



ARCHITECT/ENGINEER

TECHNICON DESIGN GROUP, INC. 1800 N. PERRY ST., SUITE 102 OTTAWA, OHIO 45875 PHONE: (419) 523-5323 FAX: (419) 523-9441 CONTACT: GILLIAN STECHSCHULTE, PROJECT ARCHITECT NAME, PROJECT MANAGER

CONTACT:







DWG. SYMBOLS & NOTATIONS

4 WALL ELEVATIONS

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A-#

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A-#

WALL ELEVATION SYMBOL

P.E.M.B. PRE-ENGINEERED METAL BUILDING

- DIRECTION

ARROW

- DETAIL DESIGNATION

-PAGE

NUMBER

-DIRECTION

ARROW

- ELEVATION

NUMBER

NUMBER

- PAGE

OF VIEW

- SECTION

NUMBER

- PAGE

NUMBER

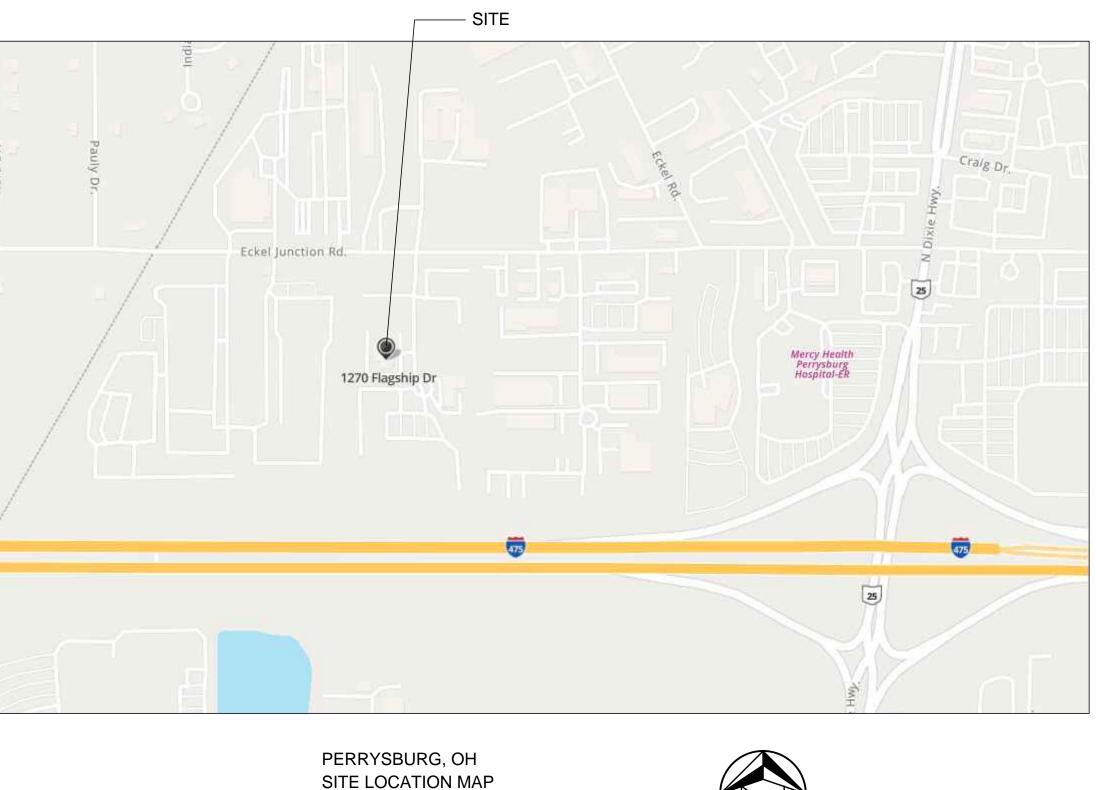
А	WINDOW DESIGNATION
(#)	KEYNOTE DESIGNATION
#	REVISION NUMBER
#	COLUMN LINE NUMBER OR LETTER
EP	ELECTRICAL PANEL
DS	DOWNSPOUT
FD	FLOOR DRAIN
FCO	FLOOR CLEANOUT
G.C.	GENERAL CONTRACTOR
P.C.	PLUMBING CONTRACTOR
M.C.	MECHANICAL CONTRACTOR
E.C.	ELECTRICAL CONTRACTOR
F.P.C.	FIRE PROTECTION CONTRACTOR
A.F.F.	ABOVE FINISHED FLOOR
F.F.E.	FINISHED FLOOR ELEVATION
U.N.O.	UNLESS NOTED OTHERWISE
N.I.C.	NOT IN CONTRACT
M.O.	MASONRY OPENING
R.O.	ROUGH OPENING
P.T.	PRESERVATIVE TREATED
F.R.T.	FIRE RETARDANT TREATED

DOOR NUMBER

(#



BUILDING RENOVATIONS PERRY PROTECH 1270 FLAGSHIP DRIVE PERRYSBURG, OH 43551



CIVIL ENGINEER DGL CONSULTING ENGINEERS, LLC 6060 ROCKSIDE WOODS BLVD N, SUITE 317 INDEPENDENCE, OHIO 44131 PHONE: (440) 387-4113 ext. 254

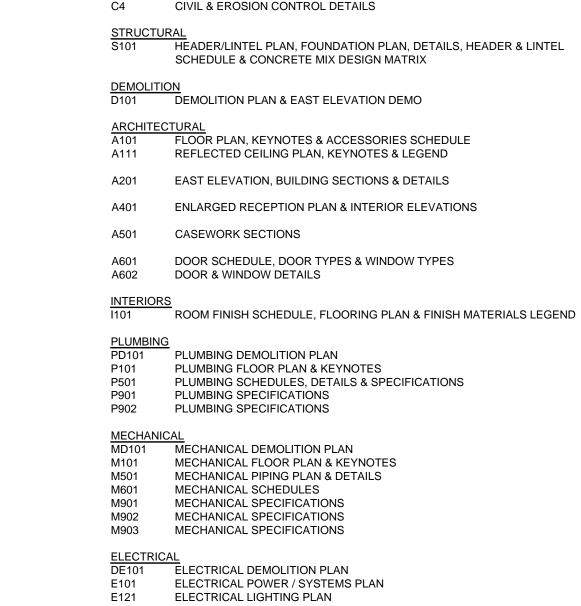
NO SCALE

DANIEL P. KONSCHAK, P.E.

IT SHALL BE THE RESPONSIBILITY OF EACH PRIME CONTRACTOR TO THOROUGHLY REVIEW THE <u>ENTIRE</u> SET OF DRAWINGS AND PROJECT MANUAL (OR SPECIFICATIONS) IN ORDER TO FAMILIARIZE THEMSELVES WITH ITEMS BEING PROVIDED BY AND WORK BEING PERFORMED BY ALL OTHER TRADES IN ADDITION TO ITEMS BEING PROVIDED BY AND WORK BEING PERFORMED BY HIS/HER RESPECTIVE TRADE.

ALL CONTRACTORS SHALL COORDINATE WORK BETWEEN TRADES.





DRAWING INDEX

<u>GENERA</u> G100

C2

COVER SITE LOCATION MAP

CODE COMPLIANCE PLAN & DATA

CIVIL GENERAL NOTES **DEMOLITION & LAYOUT PLAN**

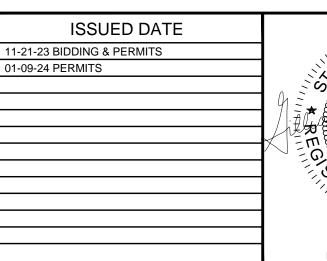
GRADING PLAN

vi903	MECHANICAL SPECIFICATIONS
ELECTRIC	<u>AL</u>
DE101	ELECTRICAL DEMOLITION PLAN
E101	ELECTRICAL POWER / SYSTEMS PLAN
E121	ELECTRICAL LIGHTING PLAN
501	ELECTRICAL LIGHT FIXTURE SCHEDULES, LIGHTING LEGEND, DETAILS,
	GENERAL NOTES
E601	ELECTRICAL LEGENDS, ONE-LINE DIAGRAM, PANEL SCHEDULES
E901	ELECTRICAL SPECIFICATIONS
FIRE PROT	ECTION

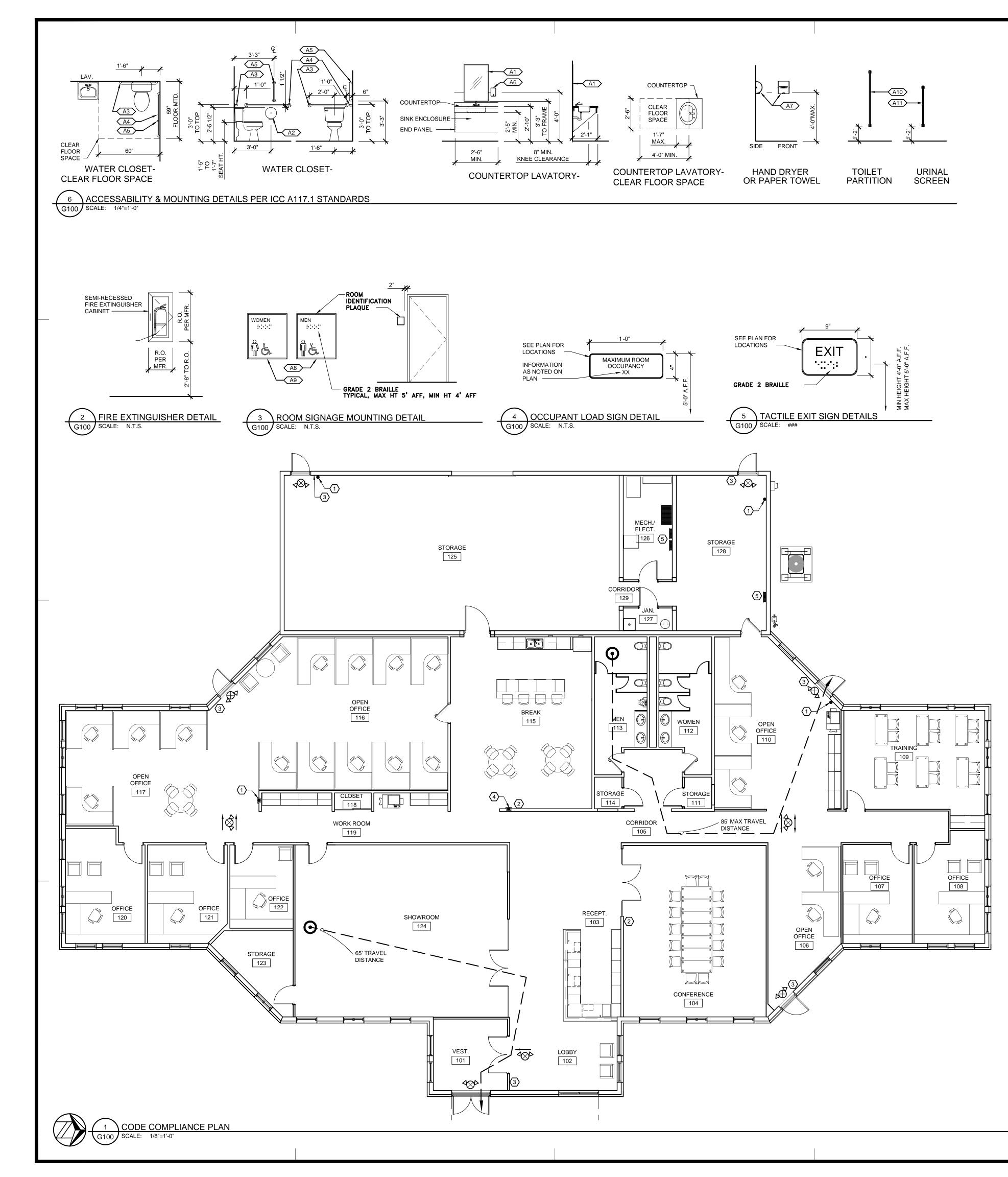
- FIRE PROTECTION FLOOR PLAN FP101
- FP901 FIRE PROTECTION SPECIFICATIONS FP902 FIRE PROTECTION SPECIFICATIONS

Technicon Design Group

ARCHITECTURE . ENGINEERING . DESIGN 1800 N PERRY STREET, SUITE 102, OTTAWA, OH 45875 P:419.523.5323







PROJECT DESCRIPTION

PROJECT DESCRIPTION: THE PROJECT CONSISTS OF ALTERATIONS TO AN EXISTING OFFICE FACILITY. THE USE AND OCCUPANCY CLASSIFICATION WILL REMAIN UNCHANGED AND GENERAL BUILDING FUNCTIONS WILL REMAIN TH SAME. ALTERATIONS INCLUDE THE DEMOLITION OF SOME INTERIOF PARTITIONS, NEW CEILING GRID AND TILE, NEW LIGHT FIXTURES, NI INTERIOR FINISHES, A NEW STOREFRONT ENTRANCE SYSTEM WITH CANOPY, AND PARKING LOT RESURFACING. THE BUILDING IS EQUIP WITH A FIRE SUPPRESSION SYSTEM WHICH WILL BE MODIFIED AS REQUIRED FOR INSTALLATION OF NEW CEILINGS AND PARTITIONS.

BASE BID:

SINGLE STORY BUILDING, SELECTIVE DEMOLITION OF EXISTING BUIL COMPONENTS, EXTERIOR & INTERIOR ALTERATIONS TO THE EXISTING STORY BUILDING.

EXISTING BUILDING COMPONENTS ARE: WOOD STUD FRAMING WITH MASONRY VENEER , PREFINISHED METAL ROOF AND WOOD TRUSSI

ALTERATIONS: NEW INTERIOR WOOD STUD AND GYPSUM BOARD PARTITIONS, NEW DOORS AND FRAMES, NEW INTERIOR FINISHES, NEW PLUMBIN MECHANICAL & ELECTRICAL SYSTEMS.

ALTERNATES: SEE PROJECT MANUAL SECTION 012300, PART 4 FOR DETAILED DESCRIPTIONS.

ALTERNATE 1: NEW ROLLER SHADES @ ALL WINDOWS

APPLICABLE BUILDING CODES

BUILDING CODE	2017 OBC
PLUMBING CODE	2017 OPC
MECHANICAL CODE	2017 OMC
ELECTRICAL CODE	2017 NEC
ENERGY CODE	2017 NEC (2010)
ACCESSIBLITY	ICC A117.1 (2009)
FUEL GAS CODE	ICC 2015

GENERAL CODE COMPLIANCE NOTES

- . THE BUILDING IS EQUIPPED THROUGHOUT WITH AN EXISTING AUTOMATIC SPRINKLER SYSTEM IN ACCORDANCE WITH NFPA THE SYSTEM WILL BE MODIFIED AS NEEDED TO ACCOMMODAT NEW CEILINGS AND PARTITIONS. SEALED DRAWINGS WILL BE SUBMITTED BY THE FIRE SUPPRESSION SUBCONTRACTOR
- MAXIMUM TRAVEL DISTANCE PERMITTED BY OBC TABLE 1017.2 FT. ACTUAL = 85 FT
- 3. SEE ELECTRICAL DRAWINGS FOR EGRESS LIGHTING AND ANY LIGHT FIXTURES ON EMERGENCY CIRCUITS.
- 4. CHILLED BOTTLED WATER WILL BE PROVIDED BY THE OWNER LIEU OF A DRINKING FOUNTAIN
- ALL CARPET USED IN THIS PROJECT IS TO BE LEGALLY PURCH IN THE UNITED STATES, AND THEREFORE, SHALL HAVE PASSEI "PILL TEST" (FFA-70) PER CFR>TITLE 16>CHAPTER II>PARTS 160 AND 1630.
- CERTIFICATE OF USE AND OCCUPANCY SHALL BE POSTED IN NEW BUILDING DESCRIBING ITS USE AND OCCUPANCY AS DESIGNATED ON PLANS OR BY BUILDING OFFICIAL IN ACCORD WITH SECTION 111.1 OBC.
- 7. POSTED OCCUPANT LOAD: EVERY ROOM CONSTITUTING A PLA OF ASSEMBLY SHALL HAVE THE APPROVED OCCUPANT LOAD O THE ROOM POSTED IN A CONSPICUOUS PLACE, NEAR THE MA EXIT FROM THE ROOM OR SPACE. THE APPROVED OCCUPANT SIGNS SHALL BE INSTALLED AND MAINTAINED IN A LEGIBLE MA BY THE OWNER PER 1004.3 OBC.

CODE COMPLIANCE KEYNOTE LEGEND

- (1) EXISTING FIRE EXTINGUISHER
- 2 POSTED OCCUPANCY LOAD SIGN DETAIL 4/G100.
- $\overline{3}$ TACTILE EXIT SIGN DETAIL 5/G100
- (4) SEMI-RECESSED FIRE EXTINGUISHER CABINET. DETAIL 2/G100.
- 5 ELECTRICAL PANEL SEE ELECTRICAL DWGS.

SYMBOLS LEGEND

**
NOMINAL EXIT CAPACITY OF EACH DOOR OR PAIR OF I

**
ROOM OCCUPANT LOAD

**
EXIT/EMERGENCY LIGHT W/ REMOTE EGRESS

**
EXIT/EMERGENCY LIGHT

**
EXIT/EMERGENCY LIGHT - DIRECTIONAL

- X RATED ASSEMBLY TYPE
- DIRECTION OF EGRESS TRAVEL
- ORIGIN OF EGRESS TRAVEL
- ORIGIN OF MAXIMUM TRAVEL DISTANCE

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GENERAL NOTES

- 1. BIDDERS SHALL VISIT AND EXAMINE THE SITE AND ALL CONTRACT DOCUMENTS.
- 2. ITEM NUMBERS REFER TO THE OHIO DEPARTMENT OF TRANSPORTATION (ODOT) CONSTRUCTION AND MATERIAL SPECIFICATIONS (CURRENT EDITION) AND ALL CONSTRUCTION WORK SHALL BE DONE ACCORDING TO SAID SPECIFICATIONS AND IN ACCORDANCE WITH APPLICABLE STANDARDS OF THE GOVERNING AGENCIES. WHEN IN CONFLICT, THE MORE STRINGENT REQUIREMENTS SHALL GOVERN.
- 3. ALL CONSTRUCTION DETAILS SHALL CONFORM TO THE CURRENT EDITION OF THE STANDARD CONSTRUCTION DRAWINGS OF THE STATE OF OHIO DEPARTMENT OF TRANSPORTATION (ODOT) UNLESS OTHERWISE NOTED.
- 4. WORK SHALL BE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES AND ORDINANCES.
- 5. ALL SIDEWALKS, RAMPS, BUILDING ENTRANCES AND ACCESSIBILITY PARKING SPACES SHALL BE ADA COMPLIANT.
- 6. CONTRACTOR IS RESPONSIBLE FOR OBTAINING A PERMIT FOR ALL CONSTRUCTION ACTIVITIES ACCORDING TO THE GOVERNING AGENCY REQUIREMENTS, SCHEDULING INSPECTIONS, AND PAYING ALL INSPECTION FEES.
- 7. THE CITY WATER POLLUTION CONTROL DIVISION (419–872–8040), SHALL BE NOTIFIED SEVEN CALENDAR DAYS PRIOR TO THE BEGINNING OF ACTUAL CONSTRUCTION.
- 8. CONTRACTOR SHALL CONTACT THE LOCAL GOVERNING AGENCIES A MINIMUM OF SEVEN (7) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION IN RIGHT OF WAY.
- 9. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF ALL EXISTING CONDITIONS, DIMENSIONS, LOCATIONS, AND MATERIALS.
- 10. CONTRACTOR SHALL REPAIR OR REPLACE, AT NO ADDITIONAL COST, ANY EXISTING IMPROVEMENTS DAMAGED DURING THE WORK.
- 11. CONTRACTOR SHALL PROVIDE TEMPORARY SIGNS AND BARRIERS AT LIMITS OF CONSTRUCTION TO ASSURE PUBLIC SAFETY DURING CONSTRUCTION.
- 12. CONTRACTOR SHALL MAINTAIN A CLEAN PROJECT SITE AND REMOVE ALL WASTE MATERIALS AND RUBBISH FROM THE PROJECT.
- 13. ALL PAVEMENT DIMENSIONS, STRIPING DIMENSIONS, AND NODES ARE TO THE EDGE OF PAVEMENT UNLESS OTHERWISE NOTED.
- 14. ALL EDGE OF PAVEMENT RADII ARE 5.00 FT UNLESS NOTED OTHERWISE.
- 15. EXISTING EDGE OF PAVEMENT ABUTTING PROPOSED PAVEMENT SHALL BE SAWCUT AND SEALED WITH ITEM 407 TACK COAT PRIOR TO PLACEMENT OF ITEM 301 OR 448.
- 16. ALL STANDARD PARKING SPACES ARE A MINIMUM OF 10' X 20'.
- 17. ALL PARKING LOT PAINT STRIPES ARE TO BE FOUR (4) INCHES WIDE YELLOW OR WHITE PER ODOT SPECIFICATIONS 641 AND 642 APPLIED IN ACCORDANCE WITH THE PLAN. EXCEPT ADA ACCESSIBLE SPACES WHICH SHALL BE BLUE.
- 18. CONTRACTOR SHALL VERIFY BUILDING DIMENSIONS WITH THE ARCHITECTURAL AND STRUCTURAL DRAWINGS PRIOR TO CONSTRUCTION.
- 19. THE CONTRACTOR AND OWNER MUST VERIFY, TAKE OFF, AND AGREE TO ALL QUANTITIES, INCLUDING EXCAVATION AND EMBANKMENT QUANTITIES PRIOR TO BEGINNING CONSTRUCTION.
- 20. CONTRACTOR SHALL VERIFY THAT COORDINATES, IF USED, MATCH PLAN DIMENSIONS. WHEN IN CONFLICT, THE PLAN DIMENSIONS SHALL GOVERN OVER COORDINATES, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- 21. A MINIMUM OF TWO WEEKS PRIOR TO POURING SITE PAVING CONCRETE, THERE SHALL BE A MEETING WITH THE GENERAL CONTRACTOR, THE CONTRACTOR PERFORMING THE WORK, THE ENGINEER, THE SURVEYOR, AND THE CONSTRUCTION MANAGER TO COORDINATE THE REQUIRED PLAN INFORMATION INCLUDING GRADES, STAKING REQUIREMENTS, POUR SEQUENCING AND SCHEDULING, POUR METHODS, JOINTING, ETC.

EARTHWORK

- EXISTING SITE SURVEY, TOPOGRAPHY, AND SUBSURFACE CONDITIONS AS PRESENTED IN THE DRAWINGS. REPORTS, OR SPECIFICATION FORM ARE BELIEVED ACCURATE WITHIN NORMAL INDUSTRY TOLERANCES BUT ARE NOT GUARANTEED. INVESTIGATE, SURVEY, CONFIRM, AND VERIFY ALL CONDITIONS BEARING ON THE WORK BY ANY MEANS NECESSARY BEFORE STARTING ANY WORK THAT CHANGES EXISTING CONDITIONS. REPORT ANY UNACCEPTABLE DISCREPANCIES TO THE ENGINEER IN WRITING BEFORE BEGINNING OPERATIONS.
- 1.1. WRITTEN CLAIMS OF DIFFERENCE SHALL BE ACCOMPANIED BY SUBSTANTIATING EVIDENCE. CLAIMS OF DIFFERENCE SHALL BE RESOLVED, INCLUDING DETERMINATION OF QUANTITIES AND COSTS, AND METHODS OF CONTRACT MODIFICATION, BEFORE WORK THAT ALTERS SUCH EXISTING CONDITIONS IS STARTED.
- 1.2. INITIATION OF SITE-CLEARING, SOIL MOVING OPERATIONS, DEMOLITION, OR OTHER ACTIVITY THAT ALTERS EXISTING CONDITIONS SHALL BE EVIDENCE THAT CONTRACTOR HAS MADE ALL INVESTIGATIONS AND EVALUATIONS IT DEEMS NECESSARY AND HAS ACCEPTED ALL EXISTING CONDITIONS PRESENT WHETHER OR NOT THEY CONFORM EXACTLY TO THE DOCUMENTS.
- 1.3. WITHOUT ADVANCE WRITTEN NOTIFICATION OF UNACCEPTABLE DISCREPANCY, NO CLAIM FOR EXTRA PAYMENT WILL BE CONSIDERED FOR A CLAIM OF DIFFERENCE BETWEEN DOCUMENTS AND ACTUAL CONDITIONS AFTER THE CONTRACTOR HAS ALTERED EXISTING CONDITIONS.
- 2. ALL SPOT ELEVATIONS ARE TO THE TOP OF FINISHED PAVEMENT/GRADE UNLESS NOTED OTHERWISE. ADD SIX (6) INCHES (0.50 FT) TO FINISHED PAVEMENT GRADES FOR BACK OF CURB GRADES UNLESS OTHERWISE NOTED.
- ANY DIGITAL SURFACE MODELS PROVIDED FOR THE PROJECT BY THE ENGINEER HAVE BEEN GENERATED FOR THE PREPARATION OF THE CONSTRUCTION DRAWINGS. THE CONTRACTOR SHALL VERIFY THAT THE DIGITAL SURFACE MODEL IS CONSISTENT WITH THE FULL SET OF CONSTRUCTION DOCUMENTS AND IS SUITABLE FOR THEIR PURPOSES. WHEN IN CONFLICT, THE PRINTED DRAWINGS GOVERN UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- ANY DETENTION OR RETENTION BASIN ON SITE SHOULD BE CONSTRUCTED PRIOR TO THE CLEARING OF 4. VEGETATION, STRIPPING TOPSOIL, AND GRADING OF THE SITE OR AS SOON AS PRACTICAL TO CONTROL STORMWATER RUNOFF AND SEDIMENTS FROM LEAVING THE SITE.
- 5. CONTRACTOR SHALL REMOVE ALL TREES AND CLEAN ALL AREAS AS DETERMINED BY THE ENGINEER OR ARCHITECT TO PERFORM ALL GRADING AND UTILITY WORK IN ACCORDANCE WITH THE DRAWINGS, GENERAL NOTES, AND PROJECT SPECIFICATIONS.
- 6. THE SITE SHALL BE STRIPPED OF ALL VEGETATION, TOPSOIL, AND OTHER ORGANIC MATERIAL AND STOCKPILED PRIOR TO GRADING.
- 7. EMBANKMENT MATERIAL SHOULD CONSIST OF PLASTIC CLAY MATERIALS, FREE OF ORGANIC MATTER, WHICH CLASSIFY AS CL ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM AND SHALL CONTAIN NO STONES WHOSE LARGEST DIMENSION EXCEEDS FOUR (4) INCHES.
- 8. CONTRACTOR SHALL ENGAGE A QUALIFIED INDEPENDENT GEOTECHNICAL TESTING AGENCY TO PERFORM FIELD QUALITY CONTROL TESTING.
- 9. A MINIMUM OF SIX (6) INCHES OF TOPSOIL SHALL BE PLACED ON ALL GRASS AREAS UNLESS SPECIFIED OTHERWISE IN THE LANDSCAPE DRAWINGS.
- 10. ALL SITE EXCAVATION AND EMBANKMENT SHALL BE COMPLETED IN ACCORDANCE WITH THE GEOTECHNICAL REPORT AND/OR THE PROJECT SPECIFICATIONS. WHEN IN CONFLICT, THE MORE STRINGENT REQUIREMENTS SHALL GOVERN.

- DRAIN THE AREAS TO THE NEAREST DRAINAGE FEATURE.
- 12. UNLESS OTHERWISE STATED IN A GEOTECHNICAL REPORT OR THE PROJECT SPECIFICATIONS, COMPACTION
- 13. COMPACTION TESTS SHALL BE PERFORMED PER THE GEOTECHNICAL ENGINEER'S RECOMMENDATIONS OR PADS. MAXIMUM 8" LIFTS IN LAWN AREAS.

GENERAL UTILITY NOTES

- 1 EXCAVATION WAS DONE TO DETERMINE LOCATION OR DEPTH UNLESS OTHERWISE NOTED.
- BEGINNING CONSTRUCTION OR EARTH MOVING OPERATIONS.
- UNDERGROUND PROTECTION, INC.
- 4. THE PROJECT.
- CONSTRUCTION ACTIVITY TO ARRANGE FOR INSPECTION OF THE PROJECT.
- CONTRACTOR SHALL VERIFY ALL UTILITY AND CONDUIT SIZES AND LOCATIONS WITH THE ARCHITECTURAL, CONSTRUCTION ACTIVITIES.

STORM SEWERS

- OHIO DEPARTMENT OF TRANSPORTATION, AND/OR THE WOOD COUNTY ENGINEER.
- CONTROL SILT AS THE INSTALLATION OF THE STORM SEWER PROGRESSES.
- .3. BE USED AS REQUIRED TO MAINTAIN THE INTEGRITY OF THE SYSTEM AT ALL TIMES.
- INLETS, ETC.) SHALL BE NO LESS THAN 1/4" ABOVE THE STORM STRUCTURE.

11. ANY AREAS THAT APPEAR AS FUTURE BUILDING OR PARKING LOTS SHALL BE GRADED TO DRAIN TO THE NEAREST SWALE, CATCH BASIN, OR OTHER DRAINAGE FEATURE OR PROVISIONS SHALL BE INSTALLED TO

IN STRUCTURAL FILL FOR BUILDINGS SHALL BE A MINIMUM OF 95% OF THE MODIFIED PROCTOR MAX DRY DENSITY PER ASTM D 1557. FILLS IN OTHER AREAS TO BE COMPACTED TO A MINIMUM OF 90% PROCTOR MAX DRY DENSITY. FINE, SILTY SAND SHALL BE 95% MODIFIED PROCTOR MAX DRY DENSITY. FILLS TO BE PLACED AND COMPACTED WITHIN $\pm 3\%$ OF OPTIMUM MOISTURE CONTENT FOR THE MATERIAL

PERFORM 1 TEST/LIFT PER 2.500 SQUARE YARDS. MAX 3"-4" LIFTS UNDER PAVEMENT AND BUILDING

UNDERGROUND UTILITIES AS SHOWN WERE LOCATED IN THE FIELD AND/OR TAKEN FROM VARIOUS DEPARTMENT RECORDS AND RECORD PLAN SETS FROM PREVIOUS PROJECTS. THE LOCATIONS ARE AS ACCURATE AS CAN BE CONFIRMED FROM SURFACE APPURTENANCES (MANHOLES, VALVES, ETC.). NO

THE LOCATION OF ALL UNDERGROUND UTILITIES ARE APPROXIMATE. THE CONTRACTOR SHALL FIELD VERIFY THE EXACT LOCATION AND ELEVATION OF ANY EXISTING UNDERGROUND UTILITIES PRIOR TO

A MINIMUM OF 48 HOURS BEFORE COMMENCING WORK. THE CONTRACTOR SHALL CONTACT THE OHIO UTILITIES PROTECTION SERVICE (OUPS) AT 811 OR 1-800-362-2764 AND ALL OTHER AGENCIES WHICH MAY HAVE UNDERGROUND UTILITIES INVOLVED IN THIS PROJECT OR ARE NOT MEMBERS OF OHIO

ALL PUBLIC AND PRIVATE UTILITY COMPANIES SHALL BE NOTIFIED BY THE CONTRACTOR, IN WRITING, AT LEAST SEVEN (7) DAYS IN ADVANCE OF ANY CONSTRUCTION ACTIVITY TO ARRANGE FOR INSPECTION OF

5. THE CITY OF PERRYBURG SHALL BE NOTIFIED AT LEAST THREE (3) WORKING DAYS IN ADVANCE OF ANY

MECHANICAL, AND STRUCTURAL DRAWINGS AND WITH THE UTILITY PROVIDERS PRIOR TO BEGINNING

7. ITEMS THAT PERTAIN TO UNDERGROUND UTILITIES SUCH AS WATER MAIN PIPE. WATER VALVES, SANITARY SEWER PIPE, MANHOLE FRAMES AND COVERS, STORM SEWERS, ETC. WILL REMAIN UNDER THE SPECIFICATIONS OF THE UTILITY SERVING THE AREA AND THE LOCAL CITY OR COUNTY ENGINEER.

STORM SEWER CONSTRUCTION SHALL MEET THE REQUIREMENTS OF THE CITY OF PERRYSBURG STORM SEWER STANDARD SPECIFICATIONS, THE AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM), THE

2. EROSION CONTROL MEASURES SHALL BE PLACED AT THE INLET AND OUTLET OF STORM SEWERS TO

UNCONTROLLED STORM WATER AND EXTRANEOUS FLOWS ARE PROHIBITED FROM ENTERING THE EXISTING STORM SEWER SYSTEM DURING CONSTRUCTION. STORM DRAINS, DIVERSION DITCHES, PUMPS, ETC. SHALL

ASPHALT PAVEMENT AROUND ALL STORM WATER COLLECTION APPURTENANCES (CATCH BASINS, CURB

ODOT STANDARD CONSTRUCTION DRAWINGS												
DRAWING	DATE	DRAWING	DATE									
BP-5.1	07/15/22	BP-7.1	07/21/23									

LINETYPE LEGEND

EXISTING	PROPOSED	DESCRIPTION	EXISTING	PROPOSED	DESCRIPTION
650		INDEX CONTOURS	—— FO — — ——	FO	FIBER OPTIC
649	649)	INTERMEDIATE CONTOURS	G	G	GAS
— c — — —	— c — c — c —	CABLE	— — T — —	——— T ———	TELEPHONE
— — E — — —	———— E ————	ELECTRIC	s	s	SANITARY
—— OHE — — — ——	OHE	OVERHEAD ELECTRIC	———— FM — ———	FM	FORCE MAIN
—— OHC —— ——	——— ОНС ———	OVERHEAD CABLE	— SL SL —	—— SL —— SL ——	SANITARY LATERAL
—— OHE — — — ——	OHT	OVERHEAD TELEPHONE	— W — — — —	——— w ———	WATER
— OHU — — —	OHU	overhead utilities	- ws — — — ws — — -	—— ws —— ws ——	WATER SERVICE
		-			-





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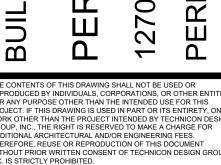
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CIVIL	GENERAL	NOTES



SHEET C1

23312

JOB NO.



Call before you dig.

UNDERGROUND UTILITIES Contact Two Working Days Before You Dig



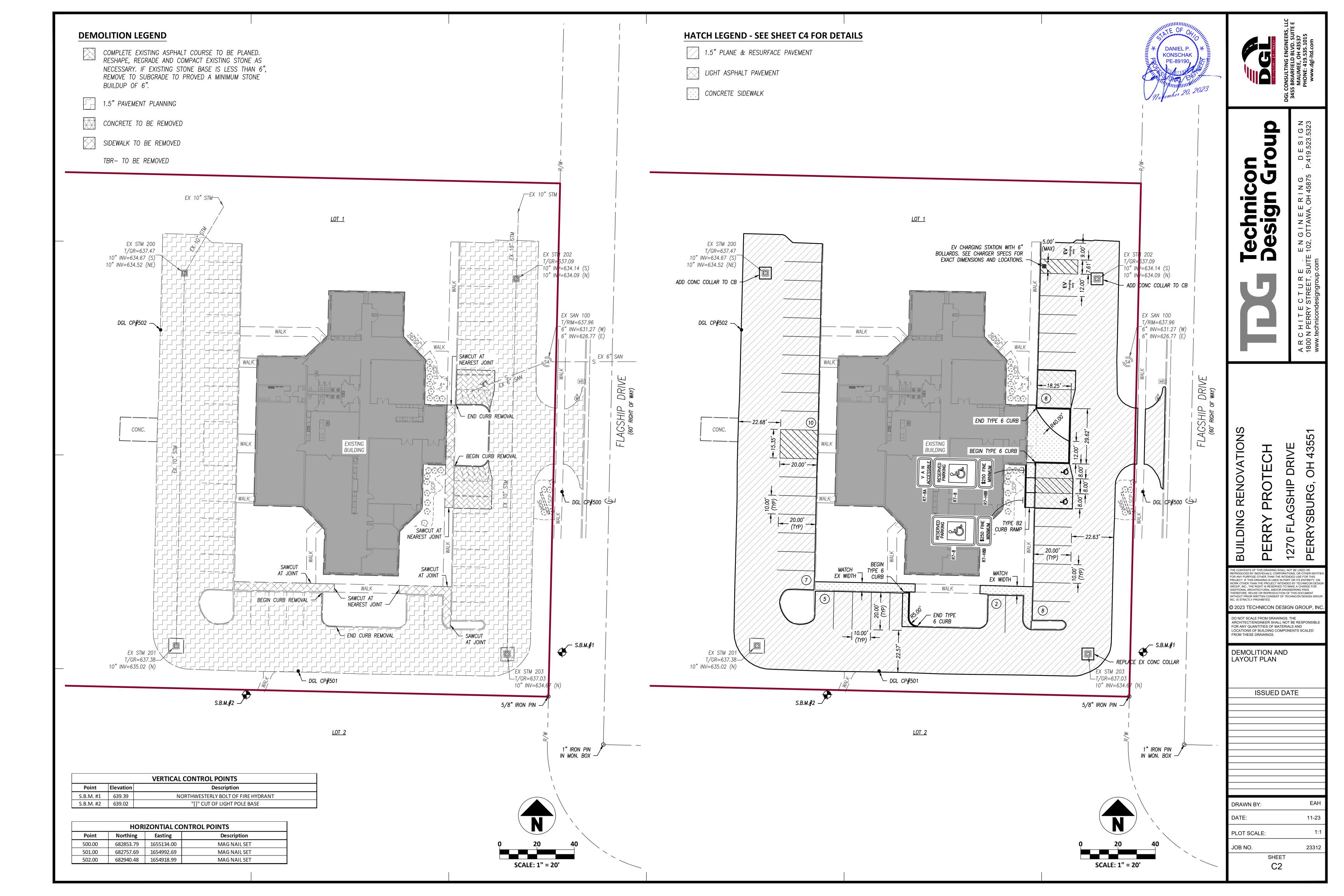
OHIO811, 8-1-1, or 1-800-362-2764 (Non-members must be called directly)

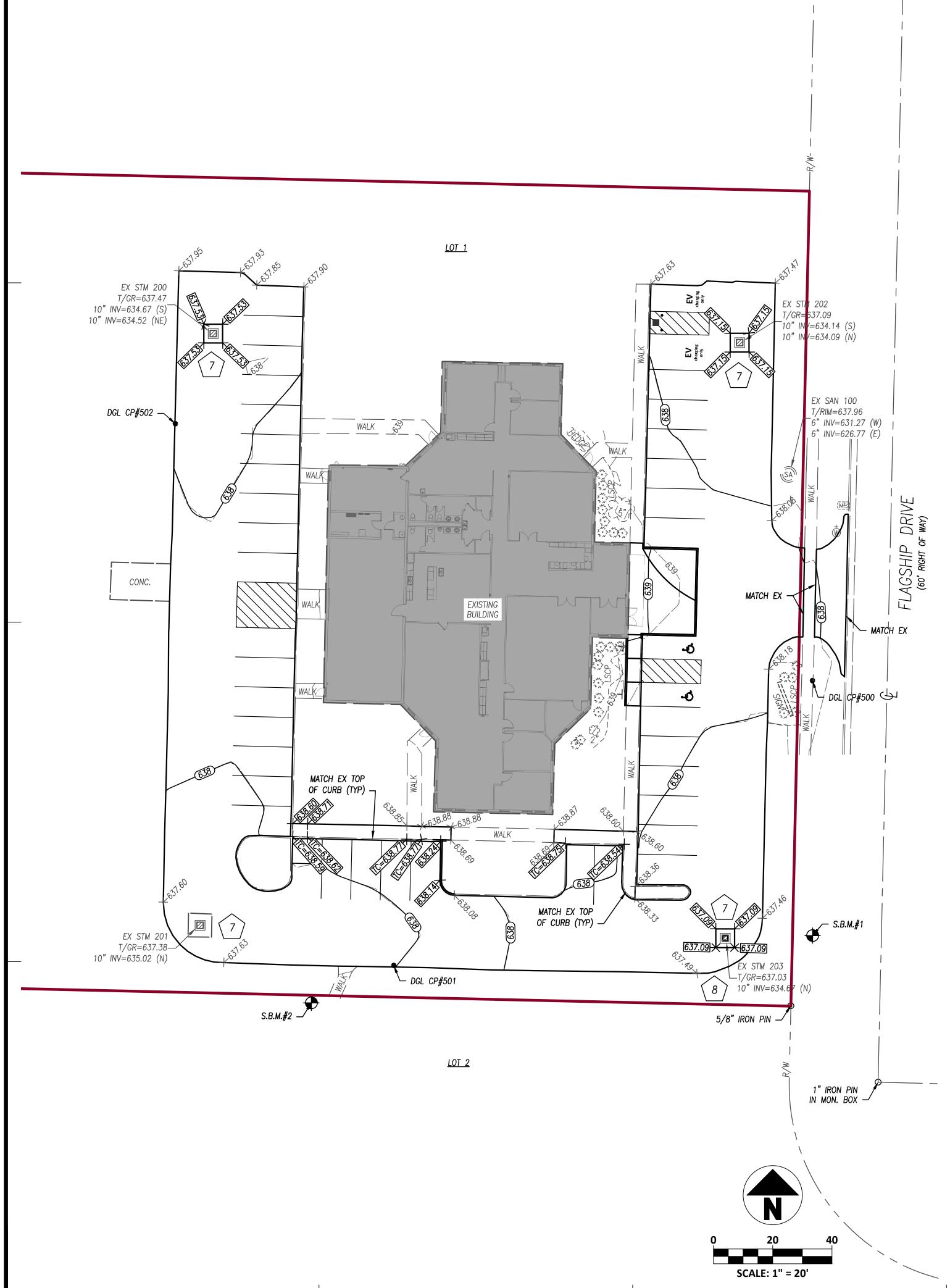
SYMBOL LEGEND EXISTING PROPOSED DESCRIPTION BENCHMARK \rightarrow

$\mathbf{\nabla}$		BENCHMARK
*		MONUMENT
ĴI.P.F.	● I.P.S.	IRON PIN
M	М	MONUMENT BOX
• P.K.F.	• P.K.S.	PK NAIL
∘M.N.F.	• M.N.S.	MAG NAIL
O D. H. F.	● D. H. S.	DRILL HOLE
Þ	×	MONUMENT SPIKE
•	•	TACKED HUB
(CB)		CATCH BASIN
1222		CURB INLET
6		STORM MANHOLE
(SA) (SA)	SA (S	SANITARY MANHOLE
୍ତ୍ର	0	CLEANOUT
E	E	ELECTRIC RISER/PULL BO
	Ø	ELECTRIC METER
(Ê)	Ē	ELECTRIC MANHOLE
<u> </u>	BE	ELECTRIC TRANSFORMER
Ø	G	GAS METER
ЧG		GAS MARKER
(G)	Ġ	GAS VALVE
φ	P	POWER POLE
φ	•	LIGHT POLE
$\overline{\phi}$	P	POWER/LIGHT POLE
$\overline{\phi}$	-	TELEPHONE POLE
C	¢—	GUY WIRE
	T	TELEPHONE PEDESTAL
tox	, t	FIRE HYDRANT
, the second sec		WATER GATE VALVE
		WATER METER
	Ŵ	WATER MANHOLE
M		STUMP
3107 3		SHRUB
		TREE-DECIDUOUS
	*	TREE-EVERGREEN
ĀCJ	· · · ·	AIR CONDITIONER
	MB	MAIL BOX
Ô		POST
L L L L L L L L L L L L L L L L L L L	•	SATELLITE DISH
<u>Δ</u> (<u>]</u>)	 	SPRINKLER HEAD
	<u>*</u> ** ⊤⊤ ⊤⊤	SIGN
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ABBREVIATION LEGEND

YMBOL	DESCRIPTION
BLDG	BUILDING
BL	BUILDING LINE
BM	BENCHMARK
СВ	CATCH BASIN
CO	CLEANOUT
CONC	CONCRETE
СР	CONTROL POINT
CPP	CORRUGATED POLYETHYLENE PIP
DE	DRAINAGE EASEMENT
Ε	EAST, EASTING
ELEV	ELEVATION
EX	EXISTING
FF	FINISHED FLOOR
FO	FIBER OPTIC
FM	FORCE MAIN
FND	FOUNDATION
FT	FOOT, FEET
HW	HEADWALL
MPERV	IMPERVIOUS
ICW	INTEGRAL CURB AND WALK
INV	INVERT
Ш	LOWER LEVEL
MH	MANHOLE
MON	MONUMENT
N	NORTH, NORTHING
NE	NORTHEAST
NW	NORTHWEST
OC	ON CENTER
OFF	OFFSET
RCP	ROCK CHANNEL PROTECTION
RCP	REINFORCED CONCRETE PIPE
R/W	RIGHT OF WAY
RYS	REAR YARD SETBACK
S	SOUTH
SAN	SANITARY
SE	SOUTHEAST
SS	SUMP SERVICE
STA	STATION
STM	STORM
SW	SOUTHWEST
TBR	TO BE REMOVED
TC	TOP OF CURB
T/GR	TOP OF GR
T/RIM	TOP OF RIM
TYP	TYPICAL
UD	UNDERDRAIN
UE	UTILITY EASEMENT
VIT	VITREOUS
W	WEST
WM	WEST WATER MAIN
WM WS	WATER MAIN WATER SERVICE
m3	WAIER JERVILE





<u>GRADING LEGEND</u>

+ EXISTING ELEVATION + PROPOSED ELEVATION

PROPOSED TOP OF CURB ELEVATION

631.

ALL SPOT ELEVATIONS ARE TO THE TOP OF FINISHED PAVEMENT/GRADE UNLESS NOTED OTHERWISE. ADD SIX (6) INCHES (0.50 FT) TO FINISHED PAVEMENT GRADES FOR BACK OF CURB GRADES UNLESS OTHERWISE NOTED.



FRONT ENTRANCE DETAIL





3455 3455

EROSION CONTROL LEGEND

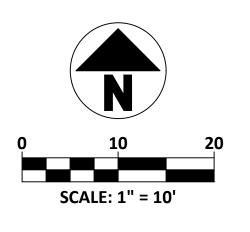


MANUFACTURED INLET FILTER

8)

CONCRETE TRUCK WASHOUT

REFER TO CIVIL AND EROSION CONTROL DETAILS SHEET FOR DETAILS

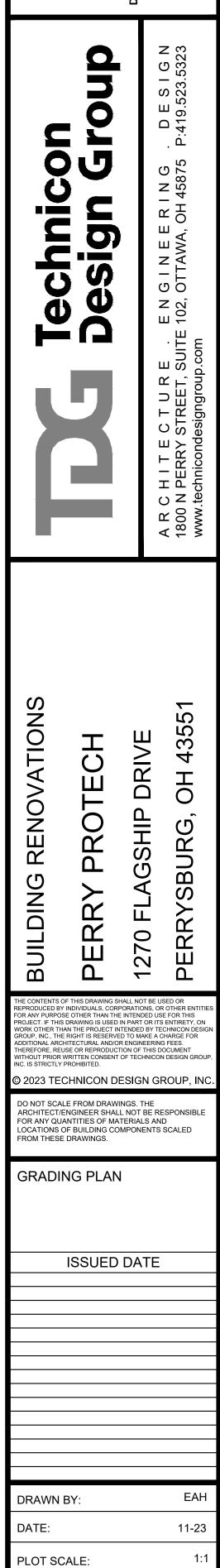


JOB NO.

SHEET

C3

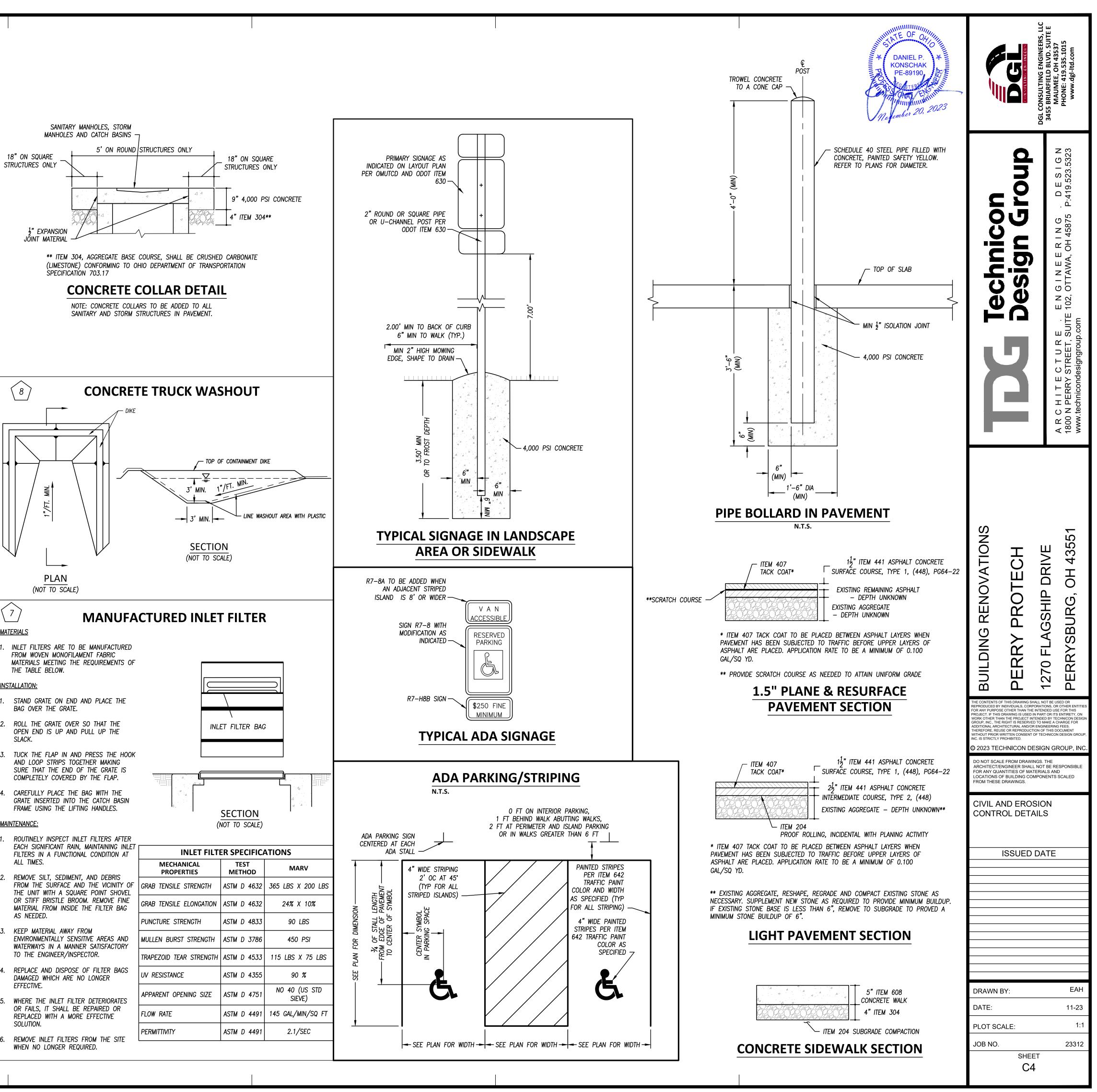
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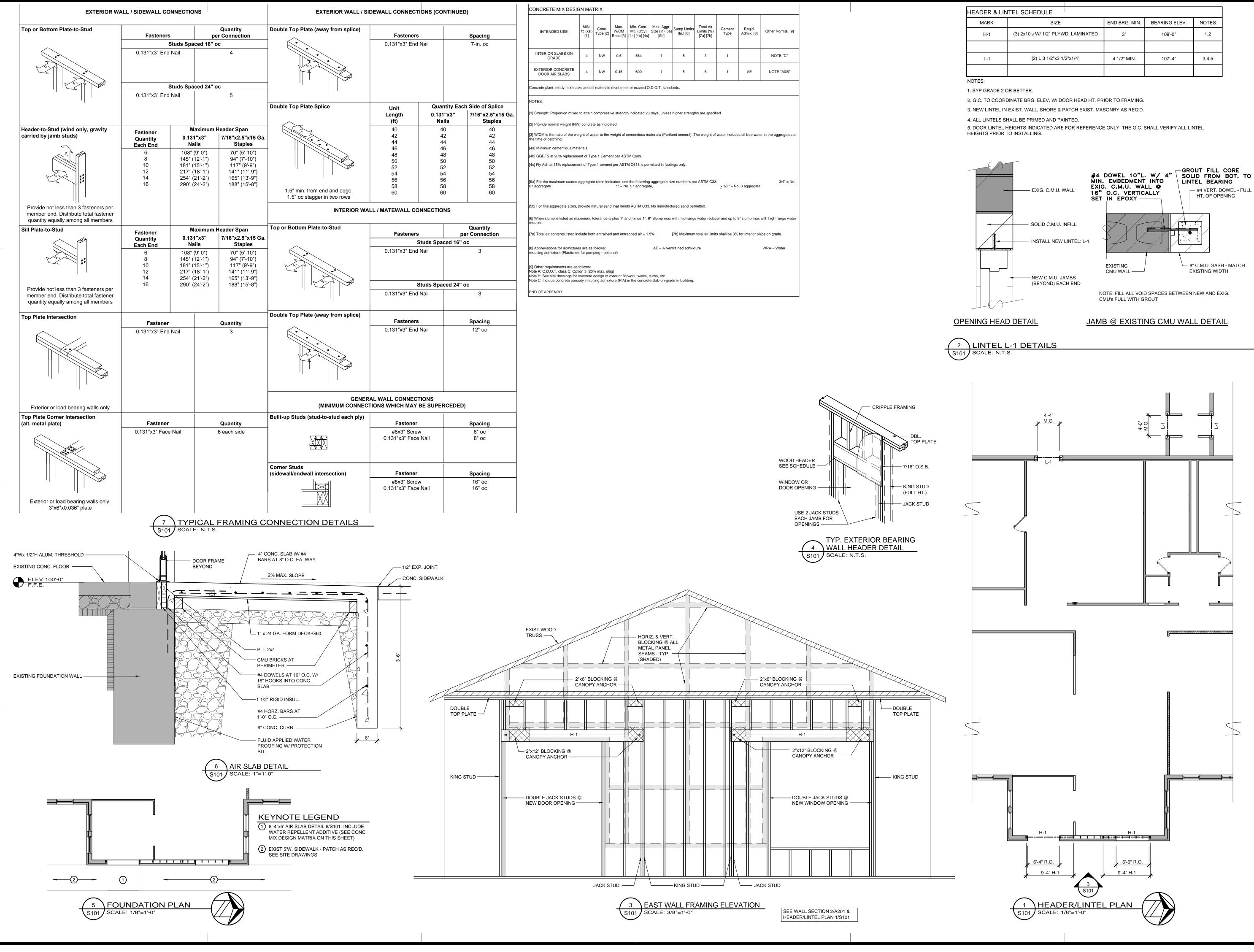


SEDIMENT AND EROSION CONTROL

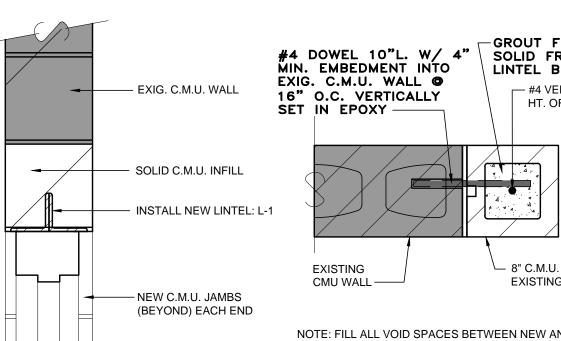
- CONTRACTOR SHALL CONFORM WITH THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT OHCOODOO5 AND ALL PLANS AND SPECIFICATIONS REGARDING SOIL EROSION/SEDIMENTATION CONTROL REQUIREMENTS.
- CONTRACTOR SHALL IMPLEMENT ALL SOIL AND EROSION CONTROL PRACTICES AS PER THE PLAN AND AS REQUIRED BY THE LOCAL GOVERNING AGENCY AND THE OHIO ENVIRONMENTAL PROTECTION AGENCY (OEPA). THE EROSION CONTROL MEASURES SHALL BE INSTALLED PER THE CURRENT EDITION OF THE OEPA'S RAINWATER AND LAND DEVELOPMENT HANDBOOK.
- 3. UNLESS OTHERWISE DIRECTED OR PROVIDED BY THE OWNER, THE CONTRACTOR SHALL PREPARE A STORM WATER POLLUTION PREVENTION PLAN (SWP3) FOR THE PROJECT UTILIZING THE EROSION AND SEDIMENT CONTROL PLANS AND DETAILS PROVIDED IN THE CONSTRUCTION DRAWINGS AS WELL AS ANY OTHER APPLICABLE DETAILS AND BEST MANAGEMENT PRACTICES (BMP). THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING AND UPDATING THE SWP3 THROUGHOUT CONSTRUCTION PER THE NPDES PERMIT.
- SWP3 AND INSPECTION LOGS MUST BE KEPT ON SITE THROUGHOUT CONSTRUCTION.
- AT THE END OF CONSTRUCTION OR AFTER THE NOTICE OF TERMINATION HAS BEEN FILED WITH THE OHIO EPA, THE SWP3 AND INSPECTION LOGS SHALL BE TURNED OVER TO THE OWNER. THE OWNER SHALL KEEP THE SWP3 AND INSPECTION LOGS IN THEIR RECORDS FOR A MINIMUM OF 3 (THREE) YEARS AFTER THE NOTICE OF TERMINATION HAS BEEN RECORDED
- BORROW AND WASTE DISPOSAL AREAS SHALL BE SELECTED WITH FULL CONSIDERATION FOR SOIL EROSION AND SEDIMENT CONTROL. ALL BORROW AND WASTE DISPOSAL AREAS ARE INCLUDED IN THE NPDES PERMIT AND ARE REQUIRED TO BECOME A PART OF THE SWP3.
- ANY PARTY (INCLUDING, BUT NOT LIMITED TO, THE GENERAL CONTRACTOR) WHO HAS DAY-TO-DAY OPERATIONAL CONTROL OF ACTIVITIES AT THIS PROJECT, WHICH ARE NECESSARY TO ENSURE COMPLIANCE WITH THE SWP3 FOR THE SITE, OR OTHER CONDITIONS AS SET FORTH IN THE PERMIT, MUST FILE A CO-PERMITTEE NOTICE OF INTENT (NOI) WITH THE OHIO EPA. THIS IS THE SOLE RESPONSIBILITY OF THE CO-PERMITTEE AND SHOULD BE DONE 21 DAYS BEFORE GROUND IS BROKEN.
- PRIOR TO THE START OF ANY CONSTRUCTION, CONTRACTOR SHALL INSTALL SOIL EROSION AND SEDIMENTATION BEST MANAGEMENT PRACTICES (BMPS) AS PER THE PLAN AND AS REQUIRED BY THE CITY OF PERRYSBURG AND THE OHIO ENVIRONMENTAL PROTECTION AGENCY. THE EROSION CONTROL MEASURES SHALL BE INSTALLED PER THE CURRENT EDITION OF THE OHIO DEPARTMENT OF NATURAL RESOURCES RAINWATER AND LAND DEVELOPMENT HANDBOOK.
- EROSION CONTROL MEASURES MAY BE IMPLEMENTED AND LOCATIONS ADJUSTED AS NEEDED TO FACILITATE CONSTRUCTION PROVIDED THE SWP3 PLAN IS UPDATED ACCORDINGLY AND THE INTENT OF THE PLAN IS MET.
- 10. SOIL EROSION AND SEDIMENTATION BMP MEASURES SHALL BE MAINTAINED AT ALL TIMES UNTIL CONSTRUCTION HAS BEEN COMPLETED, INCLUDING ALL GRASS BEING WELL ESTABLISHED AND/OR PERMANENT EROSION AND SEDIMENTATION BMP MEASURES ARE INSTALLED AND OPERATIONAL
- 11. CONTRACTOR SHALL NOTIFY THE CITY OF PERRYSBURG THREE (3) DAYS PRIOR TO STARTING CONSTRUCTION FOR PURPOSES OF MONITORING SOIL EROSION AND BMP MEASURES.
- 12. SEDIMENT AND EROSION CONTROLS SHALL BE INSPECTED ONCE EVERY SEVEN (7) DAYS AND WITHIN 24 HOURS OF EVERY 0.5" OR GREATER RAINFALL BY QUALIFIED INSPECTION PERSONNEL. A WRITTEN LOG OF THESE INSPECTIONS SHALL BECOME PART OF THE SWP3. THIS LOG SHOULD INDICATE THE DATE OF INSPECTION, NAME OF INSPECTOR, WEATHER CONDITIONS, OBSERVATIONS, ACTIONS TAKEN TO CORRECT ANY PROBLEMS AND THE DATE ACTION WAS TAKEN. FURNISH THE OWNER, OWNER'S REPRESENTATIVE, AND ENGINEER WITH WRITTEN REPORTS UNLESS OTHERWISE DIRECTED BY THE OWNER OR OWNER'S REPRESENTATIVE.
- 13. THE PROJECT HAS BEEN DESIGNED TO CONTROL EROSION AND PREVENT DAMAGE TO OTHER PROPERTY. ALL STRIPPING, EARTHWORK, AND GRADING SHALL BE PERFORMED TO MINIMIZE EROSION. NATURAL VEGETATION SHALL BE RETAINED WHEREVER POSSIBLE. THE PROPOSED PLAN WILL ALLOW MOST ERODED MATERIALS TO BE RETAINED ON SITE.
- 14. SPECIAL PRECAUTIONS WILL BE TAKEN IN THE USE OF CONSTRUCTION EQUIPMENT TO PREVENT OPERATIONS WHICH PROMOTE EROSION.
- 15. SOLID, SANITARY, AND TOXIC WASTE MUST BE DISPOSED OF IN A PROPER MANNER IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS. IT IS PROHIBITED TO BURN, BURY OR POUR INTO THE GROUND OR INTO STORM SEWERS ANY SOLVENTS, PAINTS, STAINS, GASOLINE, DIESEL FUEL, USED MOTOR OIL, HYDRAULIC FUEL, ANTIFREEZE, CEMENT CURING COMPOUNDS, AND OTHER SUCH TOXIC OR HAZARDOUS WASTES.
- 16. HAZARDOUS WASTES SHALL BE REMOVED OFF SITE AND PROPERLY DISPOSED OF CONSISTENT WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS
- 17. IN THE EVENT OF A SMALL RELEASE OF PETROLEUM WASTE (LESS THAN 25 GALLONS), PETROLEUM-BASED AND CONCRETE CURING COMPOUNDS MUST FOLLOW SPECIAL HANDLING PROCEDURES.
- 18. IN THE EVENT OF A LARGER RELEASE (25 OR MORE GALLONS): THE OHIO EPA (1-800-282-9378). THE LOCAL FIRE DEPARTMENT, AND THE LOCAL EMERGENCY PLANNING COMMITTEE (LEPC) MUST BE CONTACTED WITHIN 30 MINUTES OF A SPILL OF 25 OR MORE GALLONS.
- 19. CONTRACTOR SHALL DESIGNATE A SITE DUMP/WASH AREA PRIOR TO STARTING CONSTRUCTION FOR SUCH PURPOSES AS WASHING OUT CONCRETE TRUCKS AND DUMPING NON-HAZARDOUS WASTE MATERIALS.
- 20. DUMPING OR DISCHARGE OF ANY HAZARDOUS WASTE MATERIALS TO ANY STORM OR SANITARY SEWERS IS PROHIBITED.
- 21. WASH OUT OF CEMENT TRUCKS SHALL BE IN A DIKED, DESIGNATED AREA OR INTO PORTABLE MANUFACTURED WASHOUT BAGS SUCH AS THE LINED READY MIX BAGS MANUFACTURED BY ENVIRO SYSTEMS. INC., OR EQUIVALENT, WHERE THE WASTEWATER CAN BE COLLECTED AND DISPOSED OF PROPERLY AFTER IT HARDENS.
- 22. STORAGE TANKS SHOULD BE LOCATED IN DIKED AREAS THAT HOLD A MINIMUM VOLUME OF 110% OF THE LARGEST TANK.
- 23. LOCATION OF DUMP/WASH LOCATIONS AND CONTRACTOR PROCEDURES ARE SUBJECT TO SUPERVISION BY THE FEDERAL, STATE, AND THE CITY OF PERRYSBURG.
- 24. ALL CATCH BASINS AND INLETS NEAR DISTURBED AREAS SHALL HAVE TEMPORARY INLET PROTECTION SEDIMENT BARRIERS PLACED AND MAINTAINED THROUGHOUT CONSTRUCTION TO PREVENT SEDIMENT FROM ENTERING THE DRAINAGE SYSTEMS WHETHER SHOWN IN THE DRAWINGS OR NOT.
- 25. ANY DETENTION OR RETENTION AREAS AND ANY PERIMETER CONTROLS SHALL BE IMPLEMENTED WITHIN SEVEN (7) DAYS OF FIRST GRUBBING AND SHALL REMAIN FUNCTIONAL UNTIL THE UP-SLOPE DEVELOPMENT AREA IS STABILIZED.
- 26. STOCKPILED SOILS SHALL BE LEGALLY REMOVED FROM THE SITE OR COVERED WITH TEMPORARY SEED AND MULCH WITHIN SEVEN (7) DAYS AND SURROUNDED WITH SILT FENCE UNTIL SUCH TIME THAT IT CAN BE REUSED ON THE SITE.
- 27. ALL AREAS AT FINAL GRADE OR WHERE CONSTRUCTION ACTIVITY HAS TEMPORARILY CEASED FOR 14 DAYS OR LONGER SHALL BE STABILIZED WITHIN SEVEN (7) DAYS OF ACTIVITY.
- 28. ALL GRASS AREAS ARE TO BE SEEDED AND STRAW MULCHED WITHIN SEVEN (7) DAYS AFTER FINAL GRADE IS REACHED.
- 29. ANY DISTURBED AREA WITHIN 50 FEET OF A STREAM OR SURFACE WATER OF THE STATE AND NOT AT FINAL GRADE SHALL BE TEMPORALLY STABILIZED WITH SEEDING WITHIN TWO DAYS OF THE MOST RECENT DISTURBANCE IF THE AREA WILL REMAIN IDLE FOR MORE THAN (14) DAYS.
- 30. ANY DISTURBED AREA WITHIN 50 FEET OF A STREAM OR SURFACE WATER OF THE STATE AND AT FINAL GRADE SHALL BE PERMANENTLY STABILIZED WITH SEEDING WITHIN SEVEN DAYS OF THE MOST RECENT DISTURBANCE.
- 31. STRUCTURAL PRACTICES SHALL BE USED TO CONTROL EROSION AND TRAP SEDIMENTS FROM ALL SITES REMAINING DISTURBED FOR MORE THAN (14) FOURTEEN DAYS.
- 32. SEED AND MULCH ALL AREAS NOT SHOWN AS BUILDING OR PAVEMENT AND ALL AREAS DISTURBED BY CONSTRUCTION ACTIVITIES UNLESS OTHERWISE NOTED IN THE PLANS.
- 33. ALL STREETS MUST BE MAINTAINED DURING CONSTRUCTION. STREETS SHALL BE KEPT FREE OF MUD, DIRT, AND CONSTRUCTION DEBRIS. CONTRACTOR SHALL PROVIDE ROUTINE STREET SWEEPING TO ENSURE MINIMAL EROSION INTO THE PUBLIC STORM SEWER SYSTEM AND ROADWAY.
- 34. CLEANUP SHALL BE CONDUCTED IN A MANNER TO ENSURE THAT EROSION MEASURES ARE NOT DISTURBED.
- 35. THE CITY OF PERRYSBURG MAY REQUIRE WORK TO BE STOPPED AND THE STORM DRAINAGE OUTLET TO BE PLUGGED IF CONDITIONS BECOME UNSATISFACTORY. 36. NO OPEN BURNING WILL BE PERMITTED ON THE SITE UNLESS A PERMIT IS OBTAINED THROUGH THE OHIO ENVIRONMENTAL PROTECTION AGENCY
- 37. CONSTRUCTION SCHEDULE
- 37.1. CONTACT THE CITY OF PERRYSBURG. 37.2. INSTALL PERIMETER EROSION CONTROL MEASURES.
- 37.3. MILL PAVEMENT.
- 37.4. INSTALL PAVEMENT, CURBS AND SIDEWALKS.
- 37.5. FINISH GRADING AND FINAL STABILIZATION.
- 37.6. REMOVE TEMPORARY EROSION CONTROL MEASURES WHEN GROUND IS STABILIZED. 37.7. CONSTRUCTION COMPLETE.

AND/OR THE REQUIREMENTS OF OHIO REVISED CODE 3745-19 ARE COMPLIED WITH.

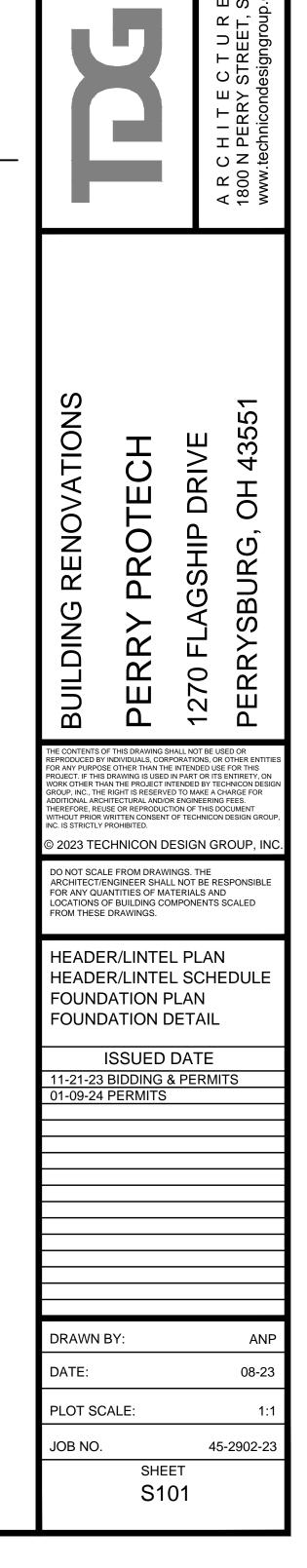




HEADER & LIN	ITEL SCHEDULE			
MARK	SIZE	END BRG. MIN.	BEARING ELEV.	NOTES
H-1	(3) 2x10's W/ 1/2" PLYWD. LAMIN	IATED 3"	109'-0"	1,2
L-1	(2) L 3 1/2"x3 1/2"x1/4"	4 1/2" MIN.	107'-4"	3,4,5







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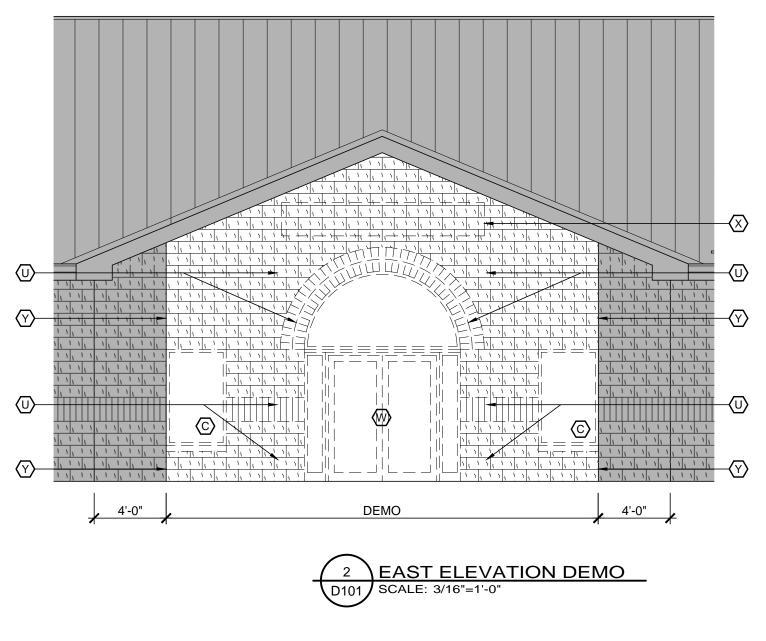
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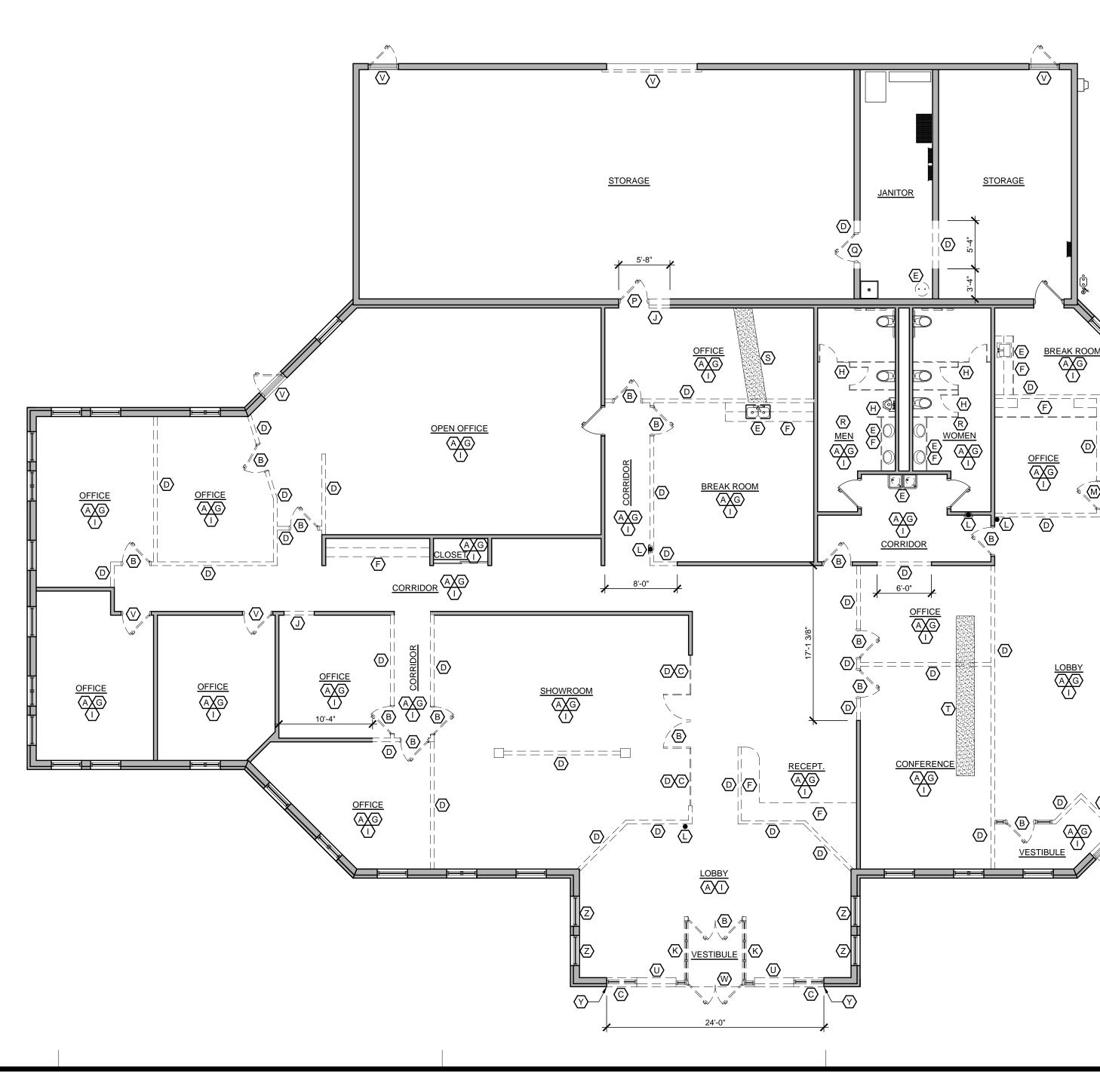
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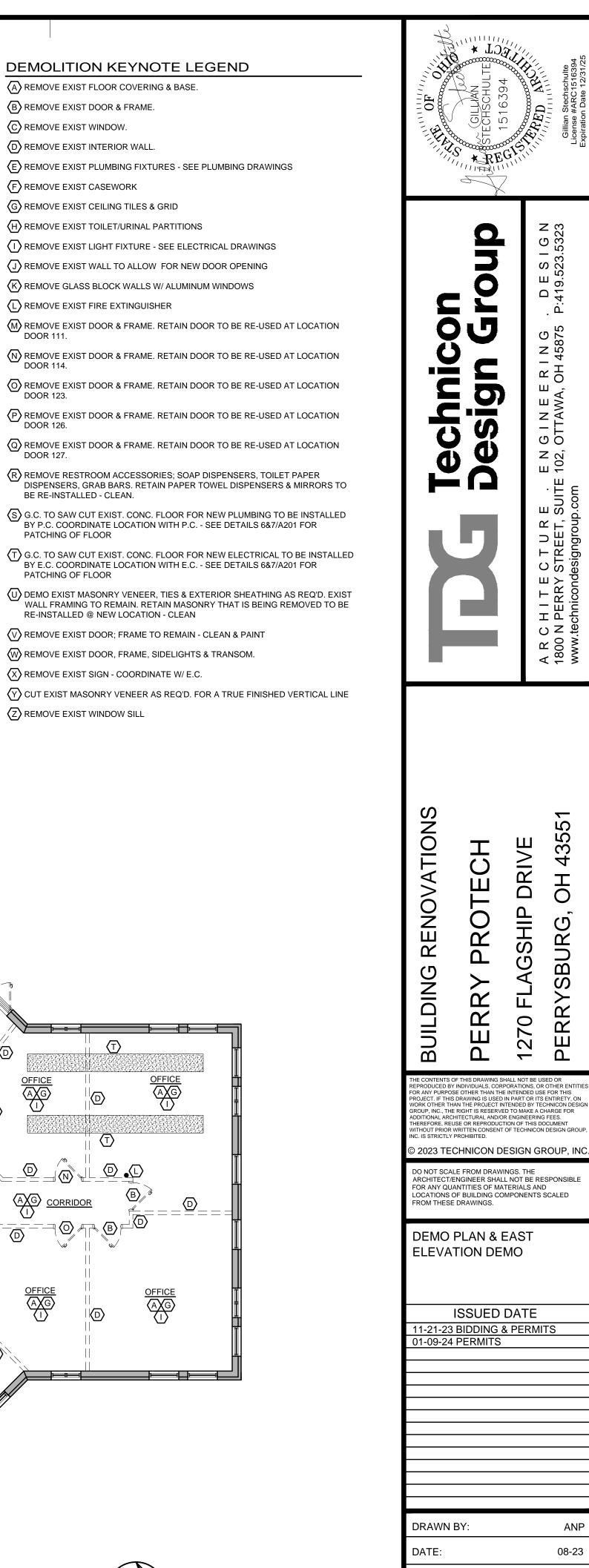
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GENERAL DEMOLITION NOTES

- 1. ALL CONTRACTORS SHALL BE RESPONSIBLE FOR THE PROTECTION OF SURROUNDING ADJACENT OR ATTACHED COMPONENTS & MATERIALS DURING DEMOLITION. 2. ALL CONTRACTORS SHALL FIELD VERIFY ALL EXISTING CONDITIONS & UTILITY LOCATIONS
- PRIOR TO BEGINNING WORK. IN THE EVENT OF CONFLICTS, CONTRACTOR SHALL SEEK RESOLUTION FROM ARCHITECT PRIOR TO BEGINNING WORK.
- 3. THE OWNER SHALL RETAIN RIGHTS OF OWNERSHIP FOR ALL SALVAGED MATERIALS & EQUIPMENT REMOVED. SALVAGED ITEMS SHALL BE RELOCATED OR PLACED IN STORAGE AS DIRECTED BY THE OWNER. NON-SALVAGEABLE MATERIALS SHALL BE REMOVED FROM THE SITE AND PROPERLY DISPOSED OF BY THE CONTRACTOR.
- 4. WHERE EXISTING WALLS, CEILINGS, FLOORS, ETC. TO REMAIN ARE DAMAGED DURING DEMOLITION & CONSTRUCTION, THE G.C. SHALL PATCH & REPAIR EXISTING DAMAGED SURFACES TO MATCH EXISTING ADJACENT SURFACE MATERIALS, INCLUDING LOCATIONS WHERE PLUMBING, MECHANICAL & ELECTRICAL ARE REMOVED. SEE PLMG., MECH. & ELEC. DWGS. FOR LOCATIONS.
- 5. FIELD VERIFY LOCATIONS OF EXISTING ELEC. PANELS.
- 6. REFER TO PLMG., MECHANICAL & ELECTRICAL DWGS. FOR FURTHER DEMOLITION WORK PERFORMED BY P.C., M.C. & E.C. THE G.C. SHALL PERFORM ANY REQ'D. PATCHING & REPAIRS AS INDICATED UNDER GENERAL NOTE #4.
- 7. THE G.C. SHALL PROVIDE ALL NECESSARY SHORING REQ'D. FOR SUPPORT OF WALLS, CEILINGS, FLOORS & OTHER STRUCTURAL MEMBERS DURING DEMOLITION. SHORING SHALL BE LEFT IN PLACE UNTIL NEW WORK IS IN PLACE.
- 8. SAW CUTTING & REMOVAL OF CONCRETE FLOORS AS REQ'D. FOR INSTALLATION OF NEW UNDER SLAB UTILITIES SHALL BE BY THE G.C., U.N.O., ALL TRENCHING & BACKFILL SHALL BE BY THE P.C., M.C. OR E.C. RESPECTIVELY. THE G.C. SHALL PATCH & REPAIR ALL CONCRETE. COORDINATE WORK BETWEEN TRADES, SEE DEMOLITION & MEP DWGS.
- 9. REMOVAL OF FLOOR COVERINGS, SUBSTRATES (IF ANY), ETC. SHALL BE TO THE EXIST. CONCRETE FLOOR, INCLUDING THE REMOVAL OF EXIST. MASTIC.
- 10. IN LOCATIONS WHERE THE EXIST WALL PARTITIONS ARE BEING REMOVED TO ALLOW FOR A NEW DOOR OR WINDOW ROUGH OPENING, THE CONTRACTOR SHALL INSTALL HEADER & JAMB FRAMING TO ALLOW FOR THE NEW OR RE-LOCATED DOORS, WINDOWS, WALL OPENINGS, ETC.



PLOT SCALE:

45-2902-23

SHEET D101

JOB NO.

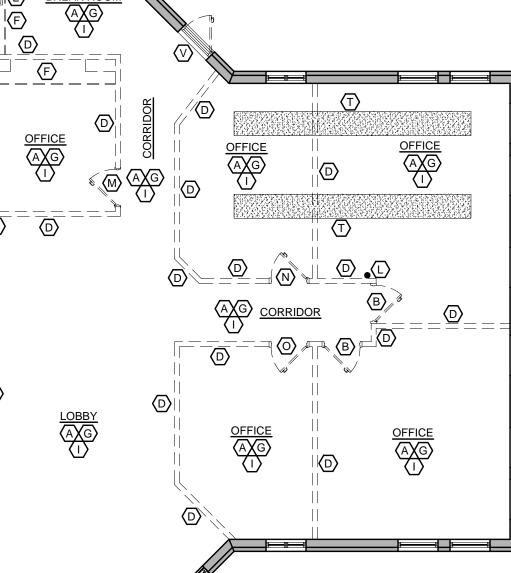
DOOR 111.

DOOR 114.

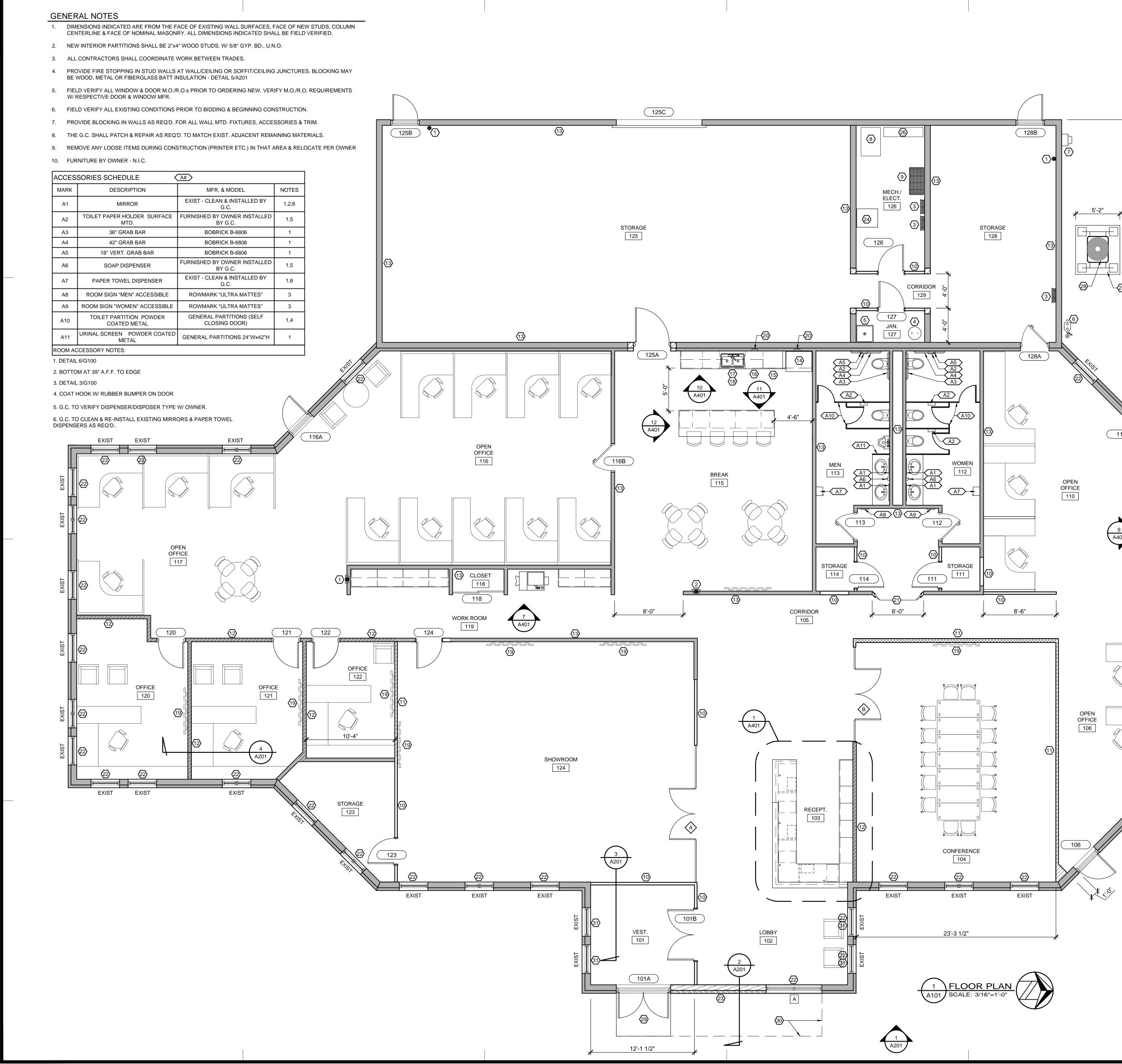
DOOR 123.

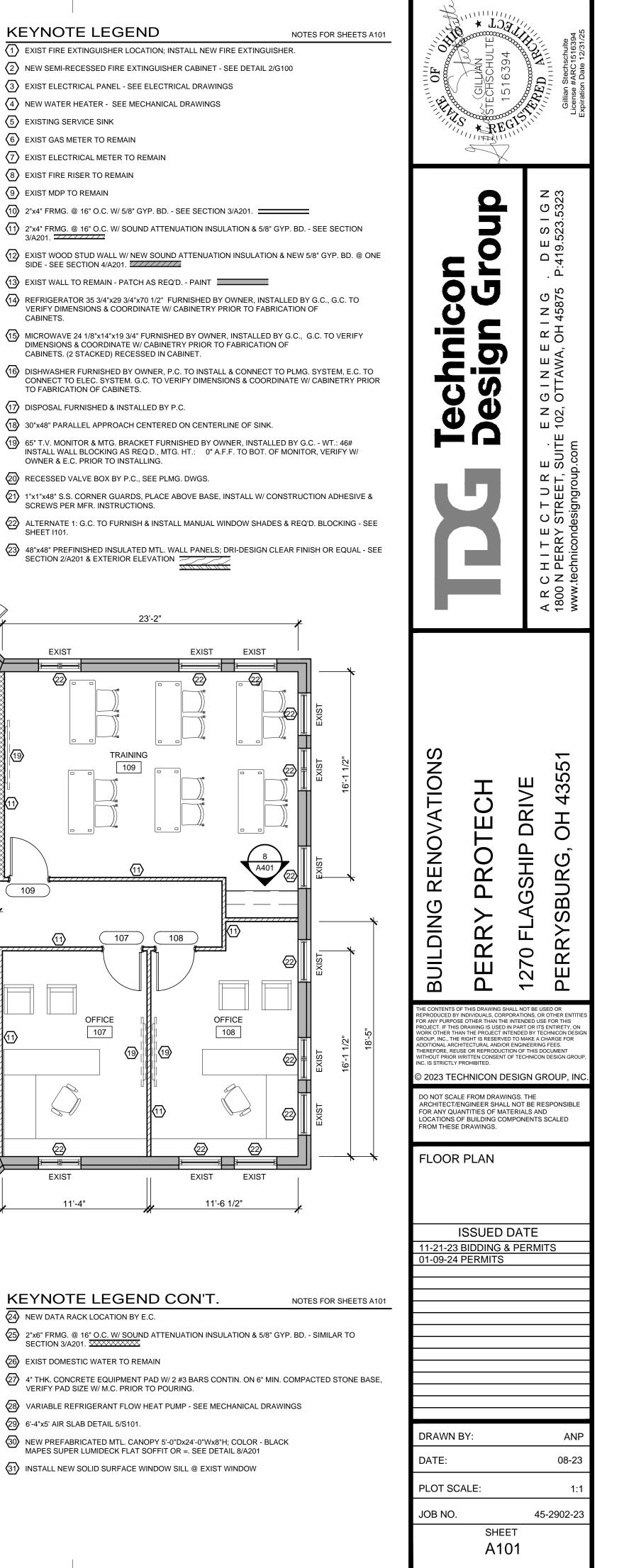
DOOR 126.

DOOR 127.









-(27)

110

9 A401

109

2'-2"

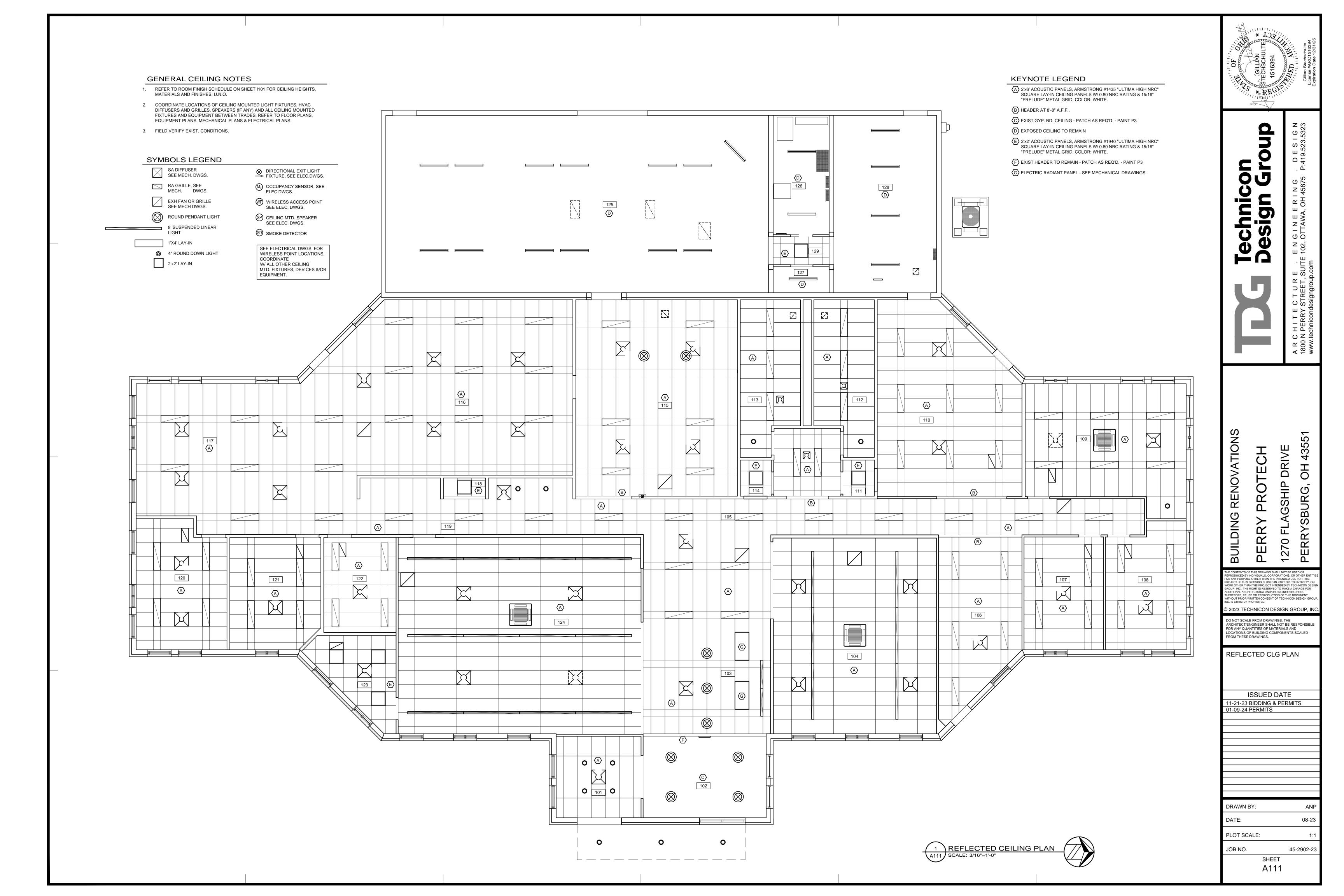
A NEW DATA RACK LOCATION BY E.C.

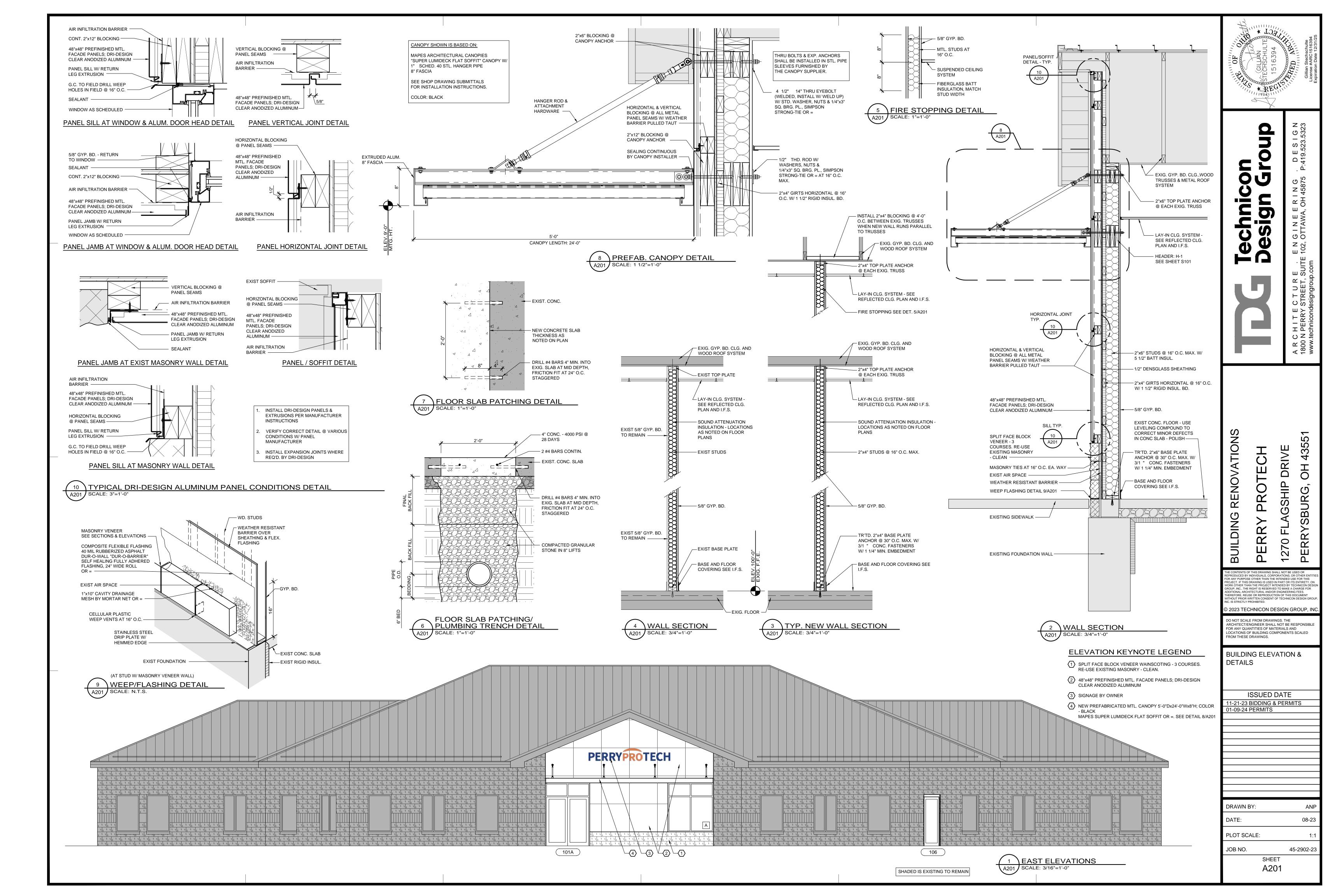
26 EXIST DOMESTIC WATER TO REMAIN

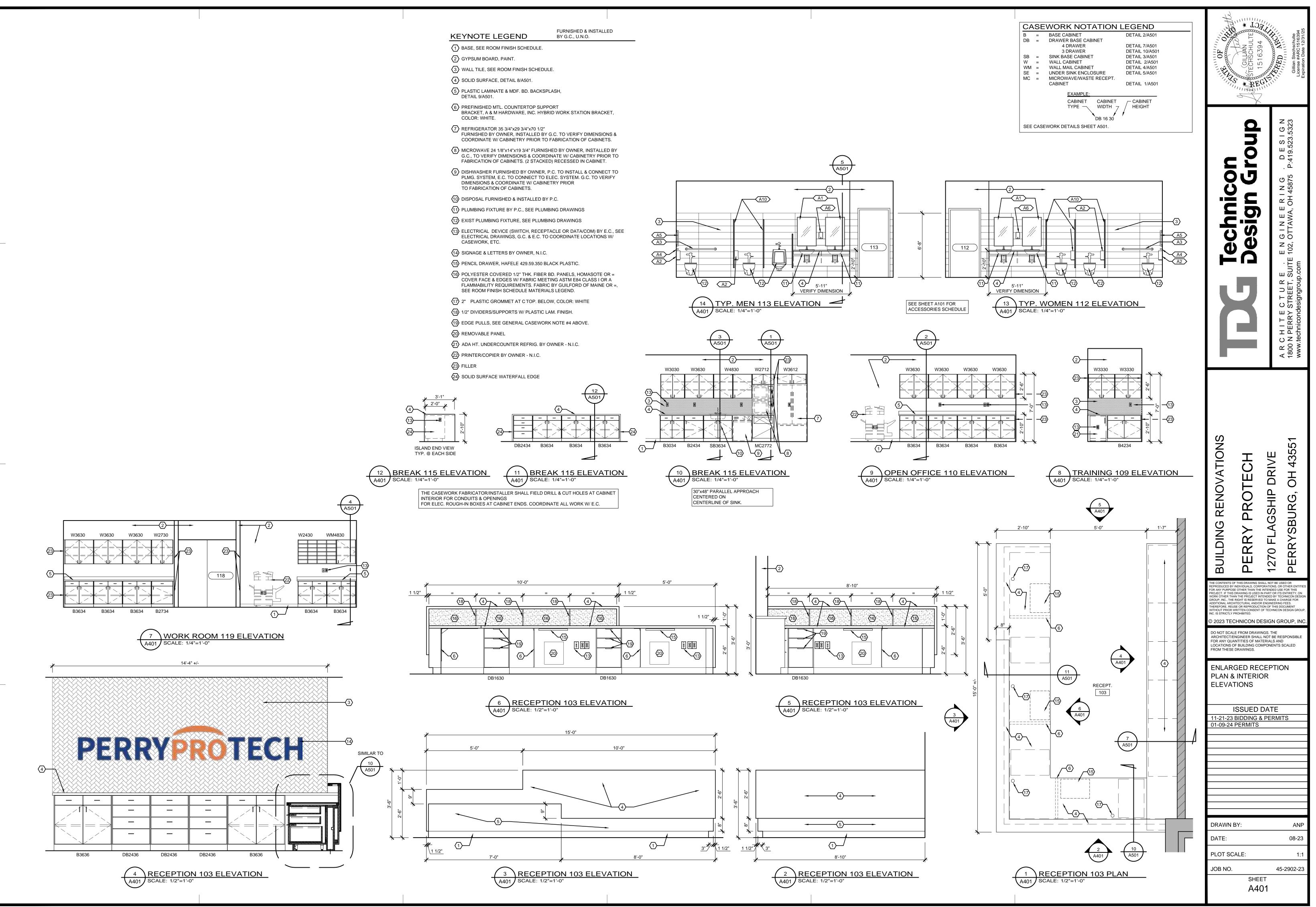
28 VARIABLE REFRIGERANT FLOW HEAT PUMP - SEE MECHANICAL DRAWINGS

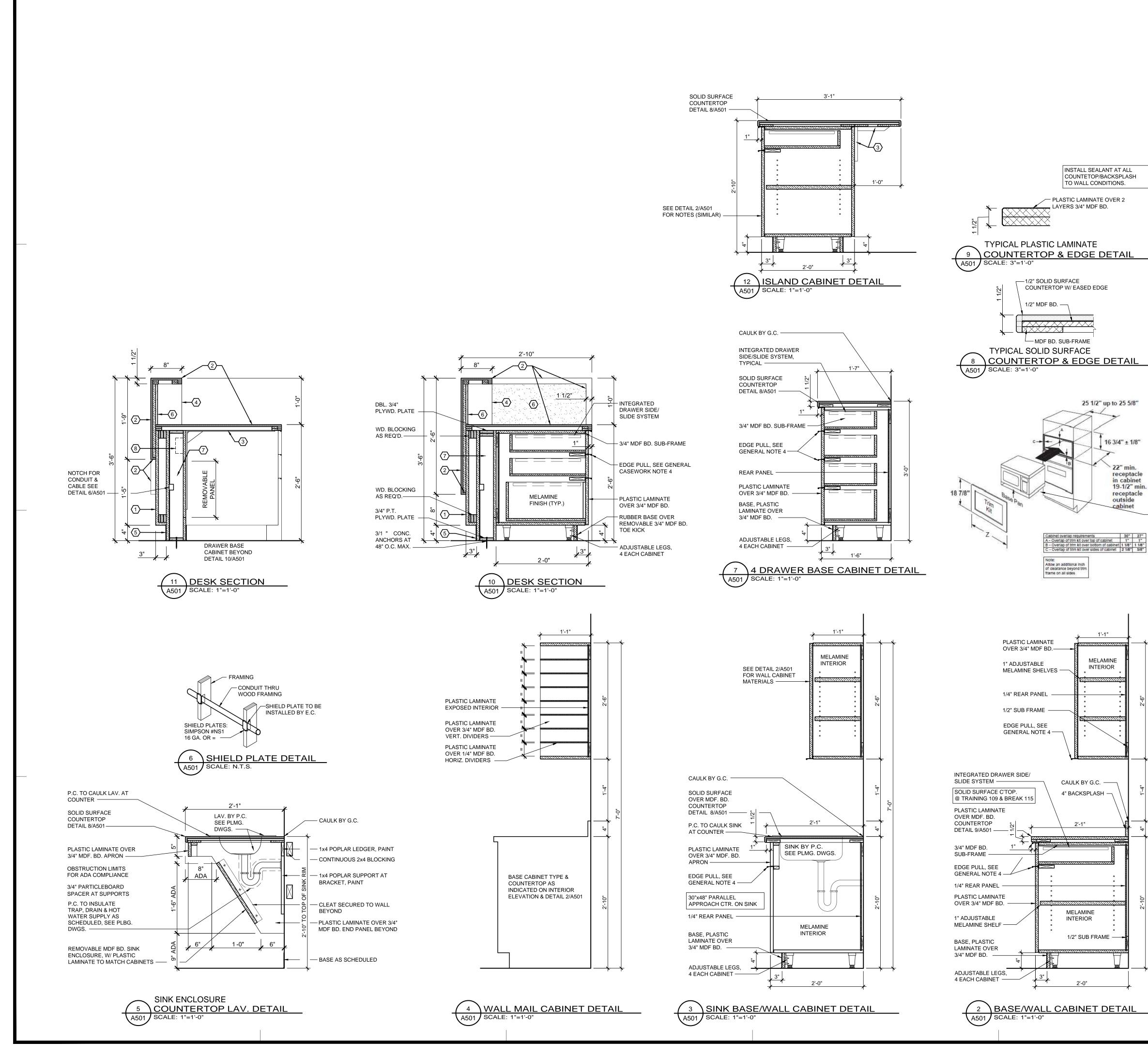
(29) 6'-4"x5' AIR SLAB DETAIL 5/S101.

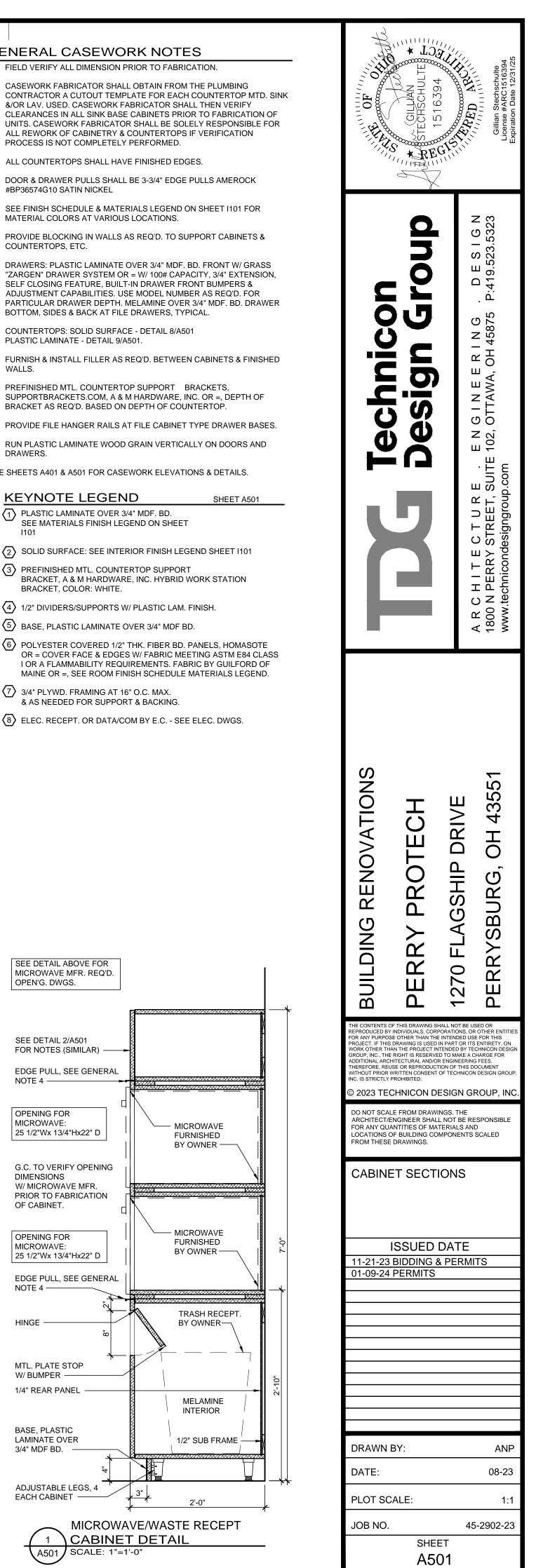
(31) INSTALL NEW SOLID SURFACE WINDOW SILL @ EXIST WINDOW





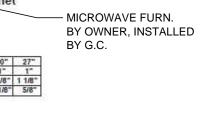


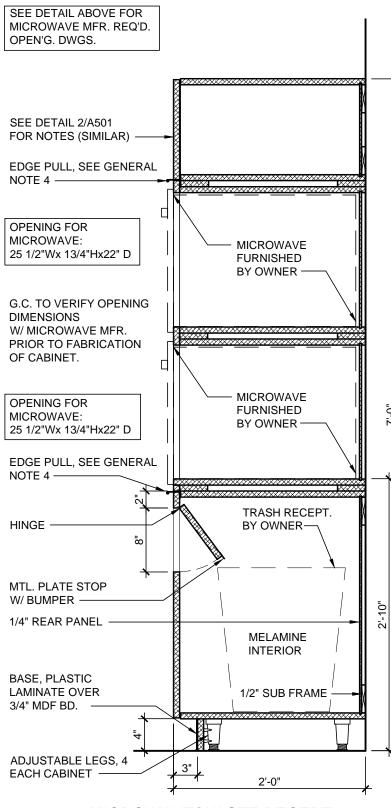




16 3/4" ± 1/8"

22" min. receptacle in cabinet 19-1/2" min. receptacle outside cabinet





MICROWAVE/WASTE RECEPT CABINET DETAIL SCALE: 1"=1'-0" A501 /

DRAWERS. SEE SHEETS A401 & A501 FOR CASEWORK ELEVATIONS & DETAILS. KEYNOTE LEGEND 1 PLASTIC LAMINATE OVER 3/4" MDF. BD. SEE MATERIALS FINISH LEGEND ON SHEET

GENERAL CASEWORK NOTES 1. FIELD VERIFY ALL DIMENSION PRIOR TO FABRICATION.

PROCESS IS NOT COMPLETELY PERFORMED.

3. ALL COUNTERTOPS SHALL HAVE FINISHED EDGES.

MATERIAL COLORS AT VARIOUS LOCATIONS.

#BP36574G10 SATIN NICKEL

COUNTERTOPS, ETC.

WALLS.

2. CASEWORK FABRICATOR SHALL OBTAIN FROM THE PLUMBING

4. DOOR & DRAWER PULLS SHALL BE 3-3/4" EDGE PULLS AMEROCK

5. SEE FINISH SCHEDULE & MATERIALS LEGEND ON SHEET I101 FOR

6. PROVIDE BLOCKING IN WALLS AS REQ'D. TO SUPPORT CABINETS &

7. DRAWERS: PLASTIC LAMINATE OVER 3/4" MDF. BD. FRONT W/ GRASS

SELF CLOSING FEATURE, BUILT-IN DRAWER FRONT BUMPERS & ADJUSTMENT CAPABILITIES. USE MODEL NUMBER AS REQ'D. FOR

9. FURNISH & INSTALL FILLER AS REQ'D. BETWEEN CABINETS & FINISHED

SUPPORTBRACKETS.COM, A & M HARDWARE, INC. OR =, DEPTH OF

11. PROVIDE FILE HANGER RAILS AT FILE CABINET TYPE DRAWER BASES.

12. RUN PLASTIC LAMINATE WOOD GRAIN VERTICALLY ON DOORS AND

SHEET A501

BOTTOM, SIDES & BACK AT FILE DRAWERS, TYPICAL.

10. PREFINISHED MTL. COUNTERTOP SUPPORT BRACKETS,

BRACKET AS REQ'D. BASED ON DEPTH OF COUNTERTOP.

8. COUNTERTOPS: SOLID SURFACE - DETAIL 8/A501

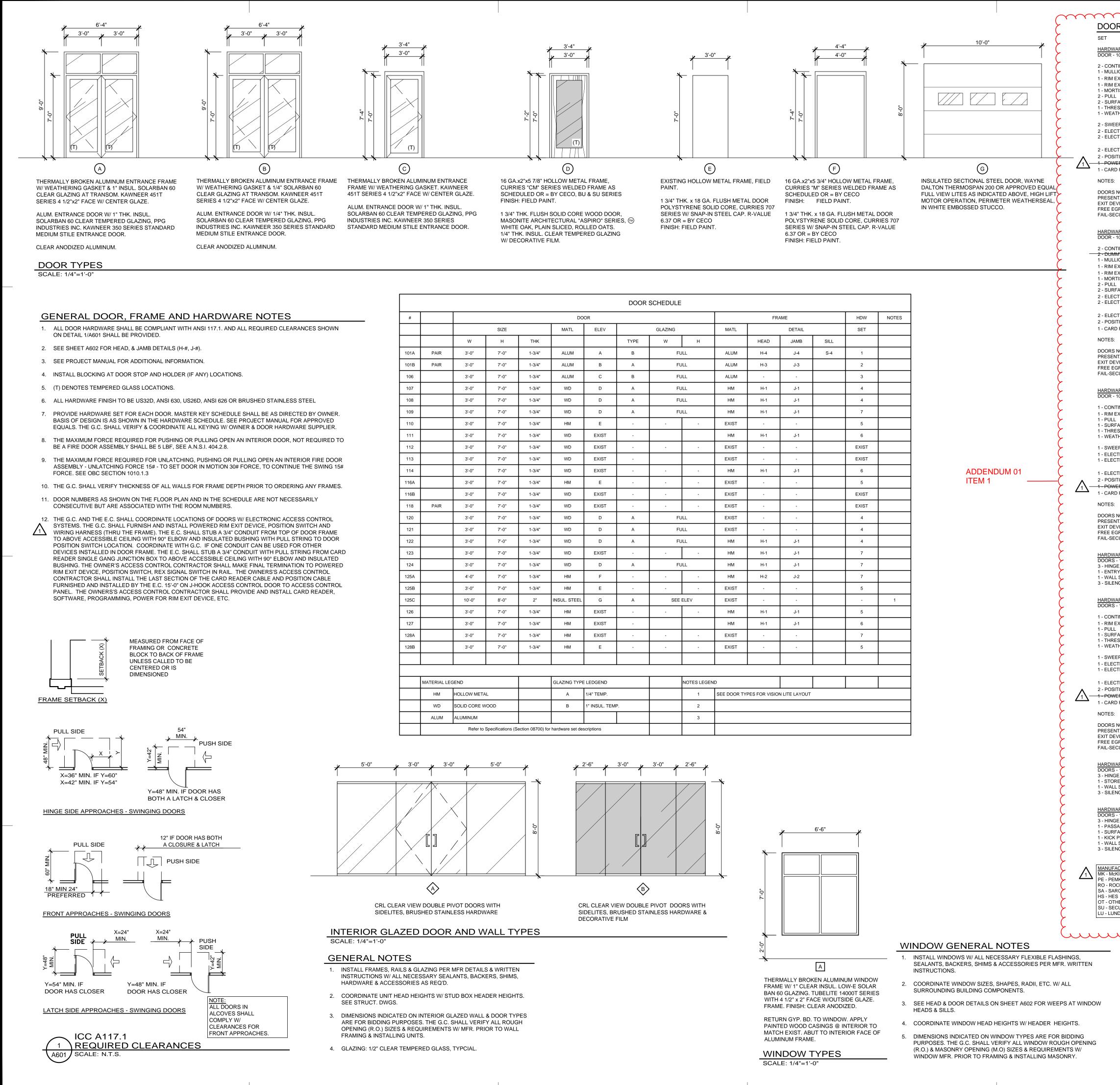
PLASTIC LAMINATE - DETAIL 9/A501.

"ZARGEN" DRAWER SYSTEM OR = W/ 100# CAPACITY, 3/4" EXTENSION,

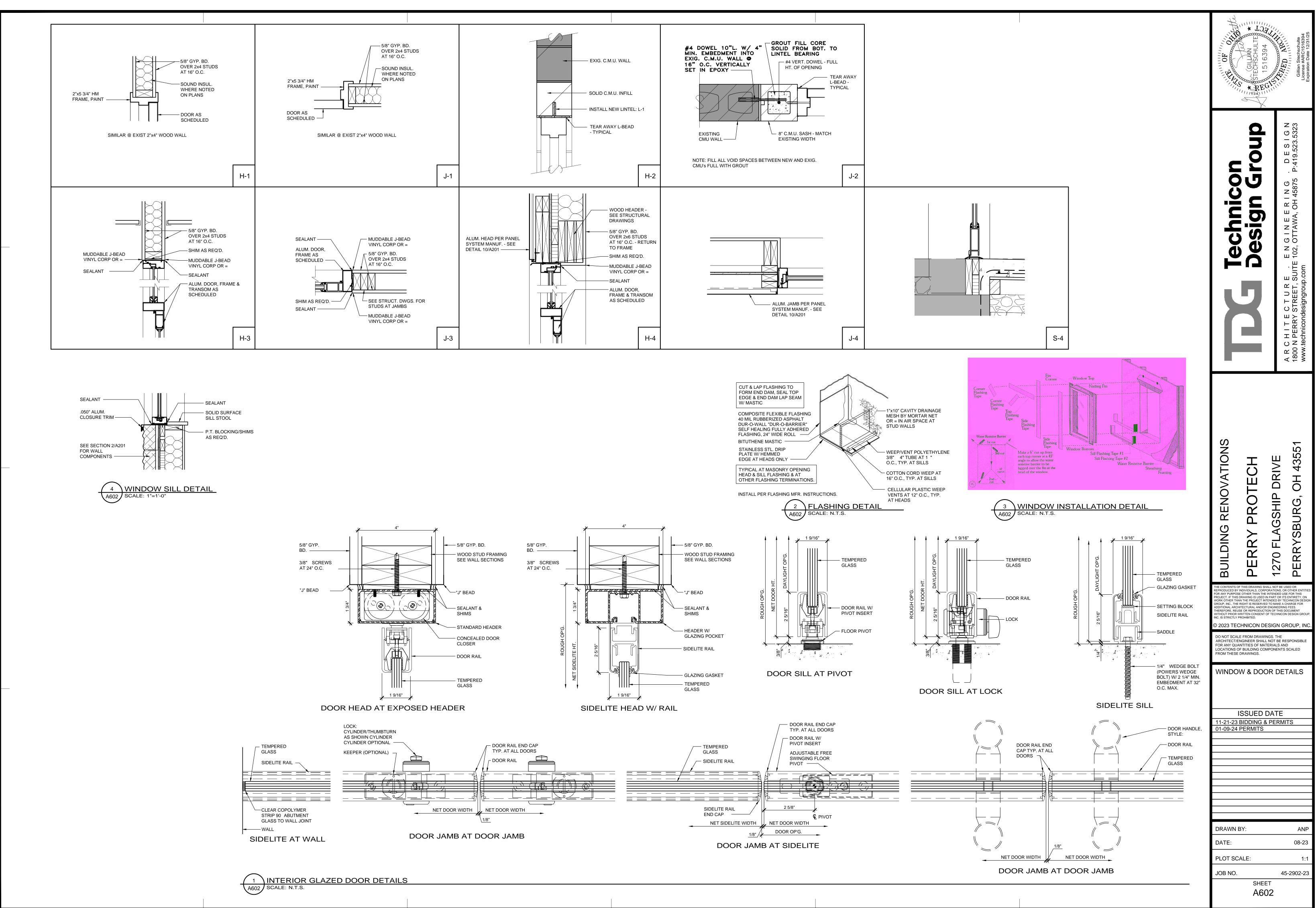
PARTICULAR DRAWER DEPTH. MELAMINE OVER 3/4" MDF. BD. DRAWER

&/OR LAV. USED. CASEWORK FABRICATOR SHALL THEN VERIFY CLEARANCES IN ALL SINK BASE CABINETS PRIOR TO FABRICATION OF UNITS. CASEWORK FABRICATOR SHALL BE SOLELY RESPONSIBLE FOR ALL REWORK OF CABINETRY & COUNTERTOPS IF VERIFICATION

- (2) SOLID SURFACE: SEE INTERIOR FINISH LEGEND SHEET 1101 $\langle 3 \rangle$ PREFINISHED MTL. COUNTERTOP SUPPORT
- BRACKET, A & M HARDWARE, INC. HYBRID WORK STATION BRACKET, COLOR: WHITE. $\overline{\langle 4 \rangle}$ 1/2" DIVIDERS/SUPPORTS W/ PLASTIC LAM. FINISH.
- 5 BASE, PLASTIC LAMINATE OVER 3/4" MDF BD.
- 6 POLYESTER COVERED 1/2" THK. FIBER BD. PANELS, HOMASOTE OR = COVER FACE & EDGES W/ FABRIC MEETING ASTM E84 CLASS I OR A FLAMMABILITY REQUIREMENTS. FABRIC BY GUILFORD OF MAINE OR =, SEE ROOM FINISH SCHEDULE MATERIALS LEGEND.
- (7) 3/4" PLYWD. FRAMING AT 16" O.C. MAX. & AS NEEDED FOR SUPPORT & BACKING.
- 8 ELEC. RECEPT. OR DATA/COM BY E.C. SEE ELEC. DWGS.
- SEE DETAIL ABOVE FOR MICROWAVE MFR. REQ'D. OPEN'G. DWGS. SEE DETAIL 2/A501 FOR NOTES (SIMILAR) -EDGE PULL, SEE GENERAL NOTE 4 -----



OR HARDWARE SETS Λ	MODEL MO.	FINISH	MFR.	-		4 ⊢ E ⊢ L	516394 2/31/23
WARE SET #1 - 101A					0F	SCHU 639	Common Comm Common Common Comm
NTINUOUS HINGE JLLION M EXIT DEVICE, STOREROOM	CFM-SLF-HD1 X PT L980A DG1 43 55 56 8804 LESS PULL GMK	US28 US32D	PE SA SA <i>4</i> 2			C CIL TECH	Gillian Gillian cense
M EXIT DEVICE, EXIT ONLY DRTISE CYLINDER (MULLION)	43 55 56 8810 EO DG1 980C1 GMK	US32D US26D	SA 🕹 SA				
ILL IRFACE CLOSER RESHOLD	RM201 MTG-TYPE 12XHD 351 CPS 1715AK MSES25SS	US32D-316 EN	RO SA PE				
EATHERSTRIP	- INTEGRAL WITHIN CONSTRUCTION OF DOOR AND FRAME ASSEMBLY 29326CNB TKSP		OT PE	ļ		X	
ECTRIC POWER TRANSFER ECTROLYNX HARNESS	EL-CEPT QC-C1500P (POWER TRANSFER OR ELECTRIC		SU <i>4</i> 2			•	23 N
ECTROLYNX HARNESS DSITION SWITCH	STRIKE TO JUNCTION BOX ABOVE) QC-C (POWER TRANSFER TO EXIT DEVICE RAIL) DPS-M-GR		МК <i>Ф</i> МК <i>Ф</i> SU <i>Ф</i>				- G .53
WER SUPPLY RD READER	AQLX E1 (AMP CAPACITY AS REQUIRED) - PROVIDED BY ACCESS CONTROL CONTRACTOR		004 −−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−	-			E S 0.523
S: RS NORMALLY CLOSED AND LOCKED. ENTATION OF VALID CREDENTIAL AT CARD R DEVICE EQUIPPED WITH REQUEST TO EXIT SV EGRESS AT ALL TIMES. SECURE.	EADER RETRACTS LATCHBOLT OF EXIT DEVICE ALLOWING WITCH TO SHUNT ALARM AT EGRESS.	INGRESS.				U	N G . D I 45875 P:419
$\frac{WARE SET #2}{R - 101B} 1$							HO HO
DNTINUOUS HINGE IMMY BAR	CFM-SLF-HD1 8893	US32D	PE SA	-		5	Е WA,
JLLION M EXIT DEVICE, STOREROOM M EXIT DEVICE, EXIT ONLY	L980A DG1 43 55 56 8804 LESS PULL GMK 43 55 56 8810 EO	US28 US32D US32D	SA SA <i>4</i> 2 SA <i>4</i> 2				ZY
ORTISE CYLINDER (MULLION)	DG1 980C1 GMK RM201 MTG-TYPE 12XHD	US26D US32D-316	SA RO		G		N G 2, OT
IRFACE CLOSER ECTRIC POWER TRANSFER ECTROLYNX HARNESS	351 CPS EL-CEPT QC-C1500P (POWER TRANSFER OR ELECTRIC	EN	SA SU <i>4</i> 2			2	щ С
	STRIKE TO JUNCTION BOX ABOVE) QC-C (POWER TRANSFER TO EXIT DEVICE RAIL)		МК <i>Ф</i> МК <i>Ф</i>				UITE Som
SITION SWITCH RD READER	DPS-M-GR - PROVIDED BY ACCESS CONTROL CONTRACTOR		SU <i>4</i> - OT <i>4</i> -				R E T, Sl
S: RS NORMALLY CLOSED AND LOCKED. ENTATION OF VALID CREDENTIAL AT CARD R DEVICE EQUIPPED WITH REQUEST TO EXIT SY EGRESS AT ALL TIMES. SECURE.	EADER RETRACTS LATCHBOLT OF EXIT DEVICE ALLOWING WITCH TO SHUNT ALARM AT EGRESS.	INGRESS.				2	T E C T U R E . RRY STREET, SUIT condesigngroup.com
WARE SET #3 R - 106							H H PEF chnid
NTINUOUS HINGE M EXIT DEVICE, STOREROOM ILL RFACE CLOSER	CFM-SLF-HD1 X PT DG1 43 55 56 8804 LESS PULL GMK RM201 MTG-TYPE 12XHD 351 CPS	US32D US32D-316 EN	PE SA 🕹 RO SA				A R C H I T E (1800 N PERRY S www.techniconde
RESHOLD EATHERSTRIP	1715AK MSES25SS - INTEGRAL WITHIN CONSTRUCTION OF DOOR AND FRAME ASSEMBLY		PE OT				
/EEP ECTRIC POWER TRANSFER ECTROLYNX HARNESS	29326CNB TKSP EL-CEPT QC-C1500P (POWER TRANSFER OR ELECTRIC		PE SU <i>&</i>				
ECTROLYNX HARNESS	STRIKE TO JUNCTION BOX ABOVE) QC-C (POWER TRANSFER TO EXIT DEVICE RAIL)		МК <i>Ф</i> МК <i>Ф</i>				
DSITION SWITCH W ER SUPPLY RD READER	DPS-M-GR AQLX-E1 (AMP CAPACITY AS REQUIRED) - PROVIDED BY ACCESS CONTROL CONTRACTOR		SU <i>&</i> SU <i>&</i> OT <i>&</i>	-			
SECURE. WARE SET #4 RS - 107, 108, 120, 121, 122 NGE, FULL MORTISE ITRY/OFFICE LOCK ALL STOP ENCER WARE SET #5 RS - 110, 116A, 125B, 126, 128B WITINUOUS HINGE M EXIT DEVICE, STOREROOM ILL IRFACE CLOSER RESHOLD EATHERSTRIP (NOT DOOR 126)	TA2714 DG1 28 7G05 LL GMK 406 / 409 608 / 609 CFM-SLF-HD1 X PT DG1 43 55 56 8804 LESS PULL GMK RM201 MTG-TYPE 12XHD 351 CPS 1715AK MSES25SS - INTEGRAL WITHIN CONSTRUCTION	US26D US26D US32D US32D US32D-316 EN	MK SA RO RO PE SA 2 RO SA PE		DING RENOVATIONS	Y PROT	'LAGSHIP DRIVE YSBURG, OH 4355
VEEP (NOT DOOR 126)	OF DOOR AND FRAME ASSEMBLY 29326CNB TKSP		OT PE	-		~/	O F RY
ECTRIC POWER TRANSFER ECTROLYNX HARNESS	EL-CEPT QC-C1500P (POWER TRANSFER OR ELECTRIC STRIKE TO JUNCTION BOX ABOVE)		SU <i>4</i> ; МК <i>4</i> ;			111	270 Fl ERRY
ECTROLYNX HARNESS DSITION SWITCH I WER SUPPLY	QC-C (POWER TRANSFER TO EXIT DEVICE RAIL) DPS-M-GR AQLX-E1 (AMP CAPACITY AS REQUIRED)		MK <i>&</i> SU <i>&</i> SU&	_	Ē	<u> </u>	<u>с</u>
RD READER S:	- PROVIDED BY ACCESS CONTROL CONTRACTOR		or&		REPRODUCED BY FOR ANY PURPOS	SE OTHER THAN THE INTI	TIONS, OR OTHER ENTITIES
RS NORMALLY CLOSED AND LOCKED.	EADER RETRACTS LATCHBOLT OF EXIT DEVICE ALLOWING WITCH TO SHUNT ALARM AT EGRESS.	INGRESS.			WORK OTHER TH GROUP, INC., THE ADDITIONAL ARC THEREFORE, REL WITHOUT PRIOR INC. IS STRICTLY	AN THE PROJECT INTENE E RIGHT IS RESERVED TO HITECTURAL AND/OR ENU JSE OR REPRODUCTION WRITTEN CONSENT OF T PROHIBITED.	DED BY TECHNICON DESIGN MAKE A CHARGE FOR GINEERING FEES. OF THIS DOCUMENT ECHNICON DESIGN GROUP, IGN GROUP, INC.
WARE SET #6 2S - 111, 114, 127 NGE, FULL MORTISE	TA2714	US26D	МК		ARCHITECT/E FOR ANY QU	ENGINEER SHALL NO ANTITIES OF MATER OF BUILDING COMPO	DT BE RESPONSIBLE IALS AND
OREROOM/CLOSET LOCK ALL STOP .ENCER	SC 28 10G04 LL 406 / 409 608 / 609	US26D US32D	SA RO RO		FROM THESE	DRAWINGS.	
WARE SET #7 RS - 109, 123, 124, 125A				-		& FRAME T SCHEDULE	
NGE, FULL MORTISE SSAGE LATCH RFACE CLOSER @ DOORS 123 & 125A	TA2714 28 10U15 LL 7500 PULL SIDE MOUNT	US26D US26D 689	MK SA NO		\	HARDWAR	
CK PLATE @ DOOR 125A ALL STOP @ DOOR 109, 124, 123	K1050 10" HIGH CSK BEV 406 / 409	US32D US32D	RO RO RO RO		WINDC	W TYPES	
LENCER	608 / 609		KU			ISSUED DA BIDDING & P	
JFACTURER'S ABBREVIATIONS: McKINNEY 2EMKO				Λ			
ROCKWOOD BARGENT IES							
DTHER SECURITRON UND EQUIPMENT CO.							
	* * * * * * * * * * * * * * *			لالم)		
					DRAWN	BY:	ANP
					DATE:		08-23
					PLOT SC	`∆ا ⊑∙	
							1:1
					JOB NO.	SHEET	45-2902-23
						A601	

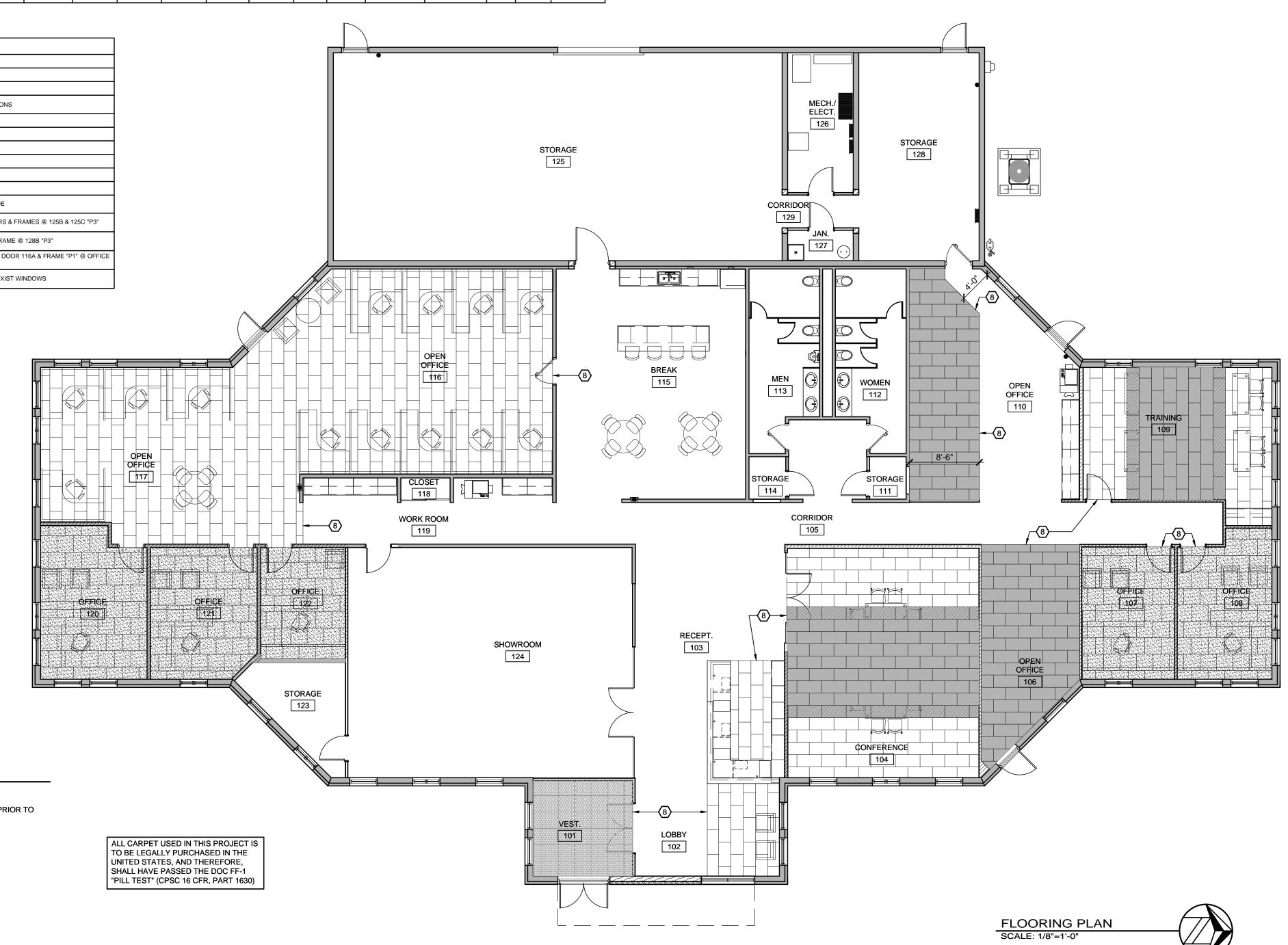


I <td< th=""><th></th><th></th><th></th><th></th><th></th><th>Ι</th><th></th><th></th><th>ROOM</th><th>FINISH SCH</th><th>HEDULE</th><th></th><th></th><th>I</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>Ι</th><th></th><th>GEND</th><th></th></td<>						Ι			ROOM	FINISH SCH	HEDULE			I									Ι		GEND		
Image: bit with with with with with with with wi	#	ROOM NAME	FLOOR	BASE				WA	ALLS					CEILING		DOORS	RS FRAMES MILLWO		WORK	NOTES		ITEN	M	TYPE/MANUFACTURER	PATTERN/TYPE	COLOR/STYLE	NOTES
1 1					NO	RTH	so	OUTH	EA	AST	WE	EST						VERT.	HORZ.			CT1	۲1	Carpet Tile/Shaw	Steppin Out	Sterling 31557/Welcome II Tile	Quarter turn install
Image Image <t< th=""><th></th><th></th><th>MATERIAL</th><th>MATERIAL</th><th>MATERIAL</th><th>FINISH</th><th>MATERIAL</th><th>FINISH</th><th>MATERIAL</th><th>FINISH</th><th>MATERIAL</th><th>FINISH</th><th>MATERIAL</th><th>FINISH</th><th>HEIGHT</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>Arrange Tile</th><th>Mirror Grey 94535</th><th>Brick install</th></t<>			MATERIAL	MATERIAL	MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH	HEIGHT										Arrange Tile	Mirror Grey 94535	Brick install
New Network New Network New Network New Network New Network New	101		CT1	DP1	<u> </u>	D2	v	 	C/X	D2		D2	641		10' 0"			+ +		2 9 15		v ⊢		•	Plains Tile	Reservoir 71485	Brick install
1 1					G	+	^				G	P3		-	-							≓ <u> </u>					
A A A B <th< th=""><th>102</th><th>LOBBY</th><th>CONC/CT3</th><th>RB1</th><th>Х</th><th>P5</th><th>G</th><th>P3</th><th>G/X</th><th>P3</th><th>-</th><th>-</th><th>G/X</th><th>P3</th><th>12'-0"</th><th></th><th></th><th></th><th></th><th>3,5,8,15</th><th></th><th></th><th></th><th></th><th>Landing Edge Tile</th><th>Remote Reservoir 71485</th><th>Brick install</th></th<>	102	LOBBY	CONC/CT3	RB1	Х	P5	G	P3	G/X	P3	-	-	G/X	P3	12'-0"					3,5,8,15					Landing Edge Tile	Remote Reservoir 71485	Brick install
10 </th <th>103</th> <th>RECEPTIONIST</th> <th>CONC/CT3</th> <th>RB1</th> <th>G/X</th> <th>WT1/P5</th> <th>G/X</th> <th>P3</th> <th>-</th> <th>-</th> <th>-</th> <th>-</th> <th>SA1</th> <th>-</th> <th>9'-0"</th> <th></th> <th></th> <th>PL2</th> <th>SS</th> <th>1,2,3,8</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>407 Lash and Directivity (00</th> <th></th>	103	RECEPTIONIST	CONC/CT3	RB1	G/X	WT1/P5	G/X	P3	-	-	-	-	SA1	-	9'-0"			PL2	SS	1,2,3,8						407 Lash and Directivity (00	
10 <th>104</th> <th>CONFERENCE</th> <th>CT3/CT4/CT5</th> <th>RB1</th> <th>G</th> <th>P2</th> <th>G/X</th> <th>P2</th> <th>Х</th> <th>P2</th> <th>G</th> <th>P1</th> <th>SA1</th> <th>-</th> <th>9'-4"</th> <th></th> <th></th> <th></th> <th></th> <th>3,5,8</th> <th>BS</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>	104	CONFERENCE	CT3/CT4/CT5	RB1	G	P2	G/X	P2	Х	P2	G	P1	SA1	-	9'-4"					3,5,8	BS						
n n <th< th=""><th>105</th><th>CORRIDOR</th><th>CONC</th><th>PB1</th><th>G</th><th>D1</th><th></th><th></th><th>G/X</th><th>P1 P5</th><th>G/X</th><th>D1</th><th>SA1</th><th></th><th>Q'_0"</th><th></th><th></th><th></th><th></th><th></th><th>Ι.</th><th></th><th></th><th></th><th></th><th></th><th></th></th<>	105	CORRIDOR	CONC	PB1	G	D1			G/X	P1 P5	G/X	D1	SA1		Q'_0"						Ι.						
1 0					Ŭ				0//		0//											z 🕂	-			· ·	
Ind Order	106	OPEN OFFICE	CT4	RB1	G	P2	G	P1	Х	P2	-	-	SA1	-	9'-8"					3,5,8,10		a'	-				
And <th>107</th> <th>OFFICE</th> <th>CT2</th> <th>RB1</th> <th>G</th> <th>P2</th> <th>G</th> <th>P3</th> <th>х</th> <th>P2</th> <th>G</th> <th>P3</th> <th>SA1</th> <th>-</th> <th>9'-8"</th> <th>DR1</th> <th>P4</th> <th></th> <th></th> <th>3,5,8</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th><u> </u> </th>	107	OFFICE	CT2	RB1	G	P2	G	P3	х	P2	G	P3	SA1	-	9'-8"	DR1	P4			3,5,8							<u> </u>
Image: state Image: sta	108	OFFICE	CT2	RB1	х	P2	G	P3	х	P2	G	P3	SA1	-	9'-8"	DR1	P4			3,5,8	.		, 	•••	Regina	Dark Blue/Herringbone Mosaic	<u> </u>
1 <th< th=""><th>109</th><th>TRAINING</th><th>CT3/CT4/CT5</th><th>RB1</th><th>×</th><th>P2</th><th>G</th><th>P3</th><th>G</th><th>W/T3/P2</th><th>×</th><th>P3</th><th>SA1</th><th></th><th>9'-8"</th><th>DR1</th><th>P4</th><th>PI 2</th><th>PI 3</th><th>12358</th><th></th><th></th><th>Г2</th><th>Wall Tile/Caesar</th><th>Whisper</th><th>Sand 8"x40"</th><th>Stacked Bond Pattern</th></th<>	109	TRAINING	CT3/CT4/CT5	RB1	×	P2	G	P3	G	W/T3/P2	×	P3	SA1		9'-8"	DR1	P4	PI 2	PI 3	12358			Г2	Wall Tile/Caesar	Whisper	Sand 8"x40"	Stacked Bond Pattern
Image Image <t< th=""><th></th><th></th><th></th><th></th><th>~</th><th></th><th></th><th></th><th></th><th></th><th>~</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>-</th><th>WT</th><th>гз</th><th>Wall Tile/Virginia Tile</th><th>Regina</th><th>Dark Blue/Hexagon Mosaic</th><th></th></t<>					~						~										-	WT	гз	Wall Tile/Virginia Tile	Regina	Dark Blue/Hexagon Mosaic	
1 0	110	OPEN OFFICE	CONC/CT4	RB1	G	P2	G/X	P1	G	P1	X	P2	SA1	-	9'-0"	P2/P3	P2/P3	PL2	PL3	1,3,5,8,10		ர SA1	\1	Susp. Acoustical/Armstrong	Ultima #1435	White	with 15/16" "Prelude" grid
10 10 0	111	STORAGE	CONC	RB1	G/X	P1	G	P1	х	P1	х	P1	SA2	-	9'-0"	P1	P1				5	ปี SA2	2	Susp. Acoustical/Armstrong	Ultima #1940	White	with 15/16" "Prelude" grid
Interplicit Matrix Ma	112	WOMEN	CONC	-	х	WT2/P3	х	WT2/P3	х	WT2/P3	х	WT2/P3	SA1	-	9'-0"	P1/P3	P1/P3	PL1	SS	1,2,4,9,11		PL1	_1	Plastic Laminate/Wilsonart		Pinnacle Walnut 7992-38	Cabinets
Image Image <t< th=""><th>113</th><th>MEN</th><th>CONC</th><th><u> </u></th><th>x</th><th>WT2/P3</th><th>x</th><th>WT2/P3</th><th>x</th><th>WT2/P3</th><th>x</th><th>WT2/P3</th><th>SA1</th><th>_</th><th>9'-0"</th><th>P1/P3</th><th>P1/P3</th><th>PI 1</th><th>SS</th><th>1.2.4.9.11</th><th></th><th>PL2</th><th>.2</th><th>Plastic Laminate/Wilsonart</th><th></th><th>Phantom Ecru 8212-38</th><th>Cabinets</th></t<>	113	MEN	CONC	<u> </u>	x	WT2/P3	x	WT2/P3	x	WT2/P3	x	WT2/P3	SA1	_	9'-0"	P1/P3	P1/P3	PI 1	SS	1.2.4.9.11		PL2	.2	Plastic Laminate/Wilsonart		Phantom Ecru 8212-38	Cabinets
I Section Sect																				, , , -,		PL3	.3	Plastic Laminate/Wilsonart		Handspun Pearl 5033-38	Countertops
Int Outpot Sector Sector <th>114</th> <th>STORAGE</th> <th>CONC</th> <th>RB1</th> <th>G</th> <th>P1</th> <th>X</th> <th>P1</th> <th>G/X</th> <th>P1</th> <th>X</th> <th>P1</th> <th>SA2</th> <th>-</th> <th>9'-0"</th> <th>P1</th> <th>P1</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>۲1</th> <th>Wood Doors/Masonite Architectural</th> <th>Aspiro Series</th> <th>White Oak (Plain Sliced); Rolled Oats</th> <th></th>	114	STORAGE	CONC	RB1	G	P1	X	P1	G/X	P1	X	P1	SA2	-	9'-0"	P1	P1						۲1	Wood Doors/Masonite Architectural	Aspiro Series	White Oak (Plain Sliced); Rolled Oats	
A OPEC OF G K </th <th>115</th> <th>BREAK ROOM</th> <th>CONC</th> <th>RB1</th> <th>Х</th> <th>P1</th> <th>х</th> <th>P1</th> <th>Х</th> <th>P1</th> <th>Х</th> <th>WT3/P1</th> <th>SA1</th> <th>-</th> <th>9'-0"</th> <th></th> <th></th> <th>PL2</th> <th>SS</th> <th>1,2</th> <th></th> <th>ss ss</th> <th>s</th> <th></th> <th></th> <th></th> <th></th>	115	BREAK ROOM	CONC	RB1	Х	P1	х	P1	Х	P1	Х	WT3/P1	SA1	-	9'-0"			PL2	SS	1,2		ss ss	s				
17 OPENOFICE C13 RB X P Y P Y P X P Y P <	116	OPEN OFFICE	СТЗ	RB1	х	P5	x	P1	х	P5	х	P1	SA1	-	9'-0"	P5/P1, P3/P1	P5/P1, P3/P1			3,5,14		╙ ┝━━━					
10 0.00 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.9 0.0 0	117	OPEN OFFICE	СТ3	RB1	х	P5	х	P1	х	P1	х	P1	SA1	-	9'-0"					3,5,8		ັ —					@ WT2
i i	110	CLOSET	CONC	DD1	×	D2	v	D2	v	D2	v		SV3		0' 0"	P1		+ +				~	-	, , , , , , , , , , , , , , , , , , ,	Ultra-Mattes Front Engravable		
And					^	F3	^	гэ	^	-	^			-		ΓI	-	+ +				· ·		Toilet & Urinal Partitions/General Partitions		Stainless Steel	
10 OFFCe RE RE X P3 X P2 X P3 P3 P3 Y P3	119	WORK ROOM	CONC	RB1	-	-	-		G/X	P1	X	P1	SA1	-	9'-0"			PL2	PL3	1				Window Treatment/Inpro	Solarity Shades - Dawn	White/Grey	
12OFFCERB1R	120	OFFICE	CT2	RB1	х	P3	Х	P2	Х	P2	Х	P3	SA1	-	9'-0"	DR1	P4			3,5	L	~~		window rreamon/mpro	Columy ondees Dawn	Wilko/Grey	
123STORAGECONCRB1GGP3VAP3VAP3VAP3VAP3VAP3<	121	OFFICE	CT2	RB1	X	P3	x	P2	х	P2	x	P3	SA1	-	9'-0"	DR1	P4			3,5							
Image: Note of the series o	122	OFFICE	CT2	RB1	G	P3	x	P2	х	P2	х	P3	SA1	-	9'-0"	DR1	P4			3							
125STORAGEXXYP3XP3XP3XP3XP3XP3XP3Y126MECH/ELECTVVV <th>123</th> <th>STORAGE</th> <th>CONC</th> <th>RB1</th> <th>G</th> <th>P3</th> <th>x</th> <th>P3</th> <th>х</th> <th>P3</th> <th>х</th> <th>P3</th> <th>SA2</th> <th>-</th> <th>9'-0"</th> <th>P1</th> <th>P1</th> <th></th> <th></th> <th>5</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>	123	STORAGE	CONC	RB1	G	P3	x	P3	х	P3	х	P3	SA2	-	9'-0"	P1	P1			5							
IncludeIncludeIncludeIncludeIncludeIncludeIncludeIncludeInclude126MECH/ELECTXRB1XP3XP3GP3XP3YP3Y126MECH/ELECTXRB1XP3XP3XP3YP3YP3Y	124	SHOWROOM	CONC	RB1	G/X	P5	G	P1	G/X	P1	G/X	P5	SA1	-	9'-0"	DR1	P4	1 1		5							
	125	STORAGE					x	P3		P3			x	-	x	P1/P3, P3	P1/P3, P3			12							
127 JANITOR X RB1 X P3 X P3 G P3 X P3 P4 P3	126	MECH/ELECT	х	RB1	х	P3	x	P3	G	P3	х	P3	х	-	х	P3	P4			7							
	127	JANITOR	x	RB1	x	P3	x	P3	х	P3	G	P3	x	-	x	P3	P4			7							
128 STORAGE X X P3 X P3 X P3 X P3 X P3 Y P3 <	128	STORAGE	x	x	х	P3	x	P3	х	P3	х	P3	х	-	x	P2/P3, P3	P2/P3, P3			13							
129 CORRIDOR X RB1 - - - G P3 G P3 SA2 - 7-8" - 7-8"	129	CORRIDOR	x	RB1	-	-	-	-	G	P3	G	P3	SA2		7'-8"					7							

NOTE	is 🔿
1	SEE 400 PAGES FOR LAMINATE & S.S. LOCATIONS
2	SEE 400 PAGES FOR CERAMIC WALL TILE
3	SEE PLAN ON SHEET THIS SHEET FOR FLOOR LAY-OUT
4	SEE "P" UNDER MISC. FINISHES ON FINISH MATERIALS LEGEND FOR METAL TOILET & URINAL PARTITIONS
5	SEE "W" UNDER MISC. FINISHES ON FINISH MATERIALS LEGEND FOR WINDOW TREATMENT
6	SEE "MB" UNDER MISC. FINISHES ON FINISH MATERIALS LEGEND FOR MARKER BOARD
7	BASE RB1 @ NEW GYP. BD. WALLS
8	SCHLUTER VINPRO-U OR EQUAL WHERE CARPET MEETS POLISHED CONCRETE
9	SEE "S1" UNDER MISC. FINISHES ON FINISH MATERIALS LEGEND FOR SIGNS @ RESTROOMS
10	PAINT H.M. DOOR 110 & FRAME "P2" @ INTERIOR SIDE & "P3" @ EXTERIOR SIDE
11	PAINT EXIST WOOD DOORS 112 & 113 & FRAMES "P3" @ INTERIOR ROOM SIDE & "P1" @ CORRIDOR SIDE
12	PAINT NEW H.M. DOOR 125A & FRAME "P3" @ STORAGE SIDE & "P1" @ BREAK ROOM SIDE; PAINT DOORS & F
13	PAINT EXIST H.M. DOOR 128A & FRAME "P3" @ STORAGE SIDE & "P2" @ OFFICE SIDE; PAINT DOOR & FRAME
14	PAINT EXIST WOOD DOOR 116B & FRAME "P5" @ OFFICE SIDE & "P1" @ BREAK ROOM SIDE; PAINT H.M. DOOI SIDE & "P3" @ EXTERIOR SIDE
15	SEE "SS" UNDER MISC. FINISHES ON FINISH MATERIALS LEGEND FOR NEW SOLID SURFACE SILLS @ EXIST
	•

GENERAL FINISH NOTES

- 1. SHADED WALLS ON PLAN ARE EXISTING. 2. USE LEVELING COMPOUND TO CORRECT MINOR DEFECTS IN CONCRETE SLAB PRIOR TO INSTALLING FLOOR COVERING.
- 3. FIELD VERIFY EXISTING CONDITIONS PRIOR TO BEGINNING WORK.
- 4. INSTALL ALL FINISH MATERIALS PER MFR. INSTRUCTIONS.
- 5. PLASTIC LAMINATE: CLASS "A" FIRE RATING.
- 6. PATCH HOLES IN EXISTING WALLS WITH LIKE MATERIAL AS REQ. AND PAINT.
- 7. THE G.C. TO PATCH ALL CRACKS IN EXIST GYP. BD. WALLS AS REQ'D. & PAINT.



Technicon Design Group E N G I N E E R I N G E 102, OTTAWA, OH 45875 ШΟ КĻ ⊃诎 нк Ω LΩ (ш≻ A R C H I T I 1800 N PERRY www.technicor 'ATIONS OH 43551 RIVE PROTECH **RENOV** \square SHIP 'SBURG, C BUILDING RR RRY Ē 0 БП 127 Ш Δ NS OR OTHER F REPRODUCED BY INDIVIDUALS, CORPORATIONS, OR OTHER ENTITIES FOR ANY PURPOSE OTHER THAN THE INTENDED USE FOR THIS PROJECT. IF THIS DRAWING IS USED IN PART OR ITS ENTIRETY, ON WORK OTHER THAN THE PROJECT INTENDED BY TECHNICON DESIG GROUP, INC., THE RIGHT IS RESERVED TO MAKE A CHARGE FOR ADDITIONAL ARCHITECTURAL AND/OR ENGINEERING FEES. THEREFORE, REUSE OR REPRODUCTION OF THIS DOCUMENT WITHOUT PRIOR WRITTEN CONSENT OF TECHNICON DESIGN GROUP INC. IS STRICTLY PROHIBITED. © 2023 TECHNICON DESIGN GROUP, IN DO NOT SCALE FROM DRAWINGS. THE ARCHITECT/ENGINEER SHALL NOT BE RESPONSIBLE FOR ANY QUANTITIES OF MATERIALS AND LOCATIONS OF BUILDING COMPONENTS SCALED FROM THESE DRAWINGS. FLOORING PLAN, ROOM FINISH SCHEDULE & FINISH MATERIALS LEGEND ISSUED DATE 11-21-23 BIDDING & PERMITS 01-09-24 PERMITS DRAWN BY: ANP DATE: 08-23 PLOT SCALE: 1:1 JOB NO. 45-2902-23

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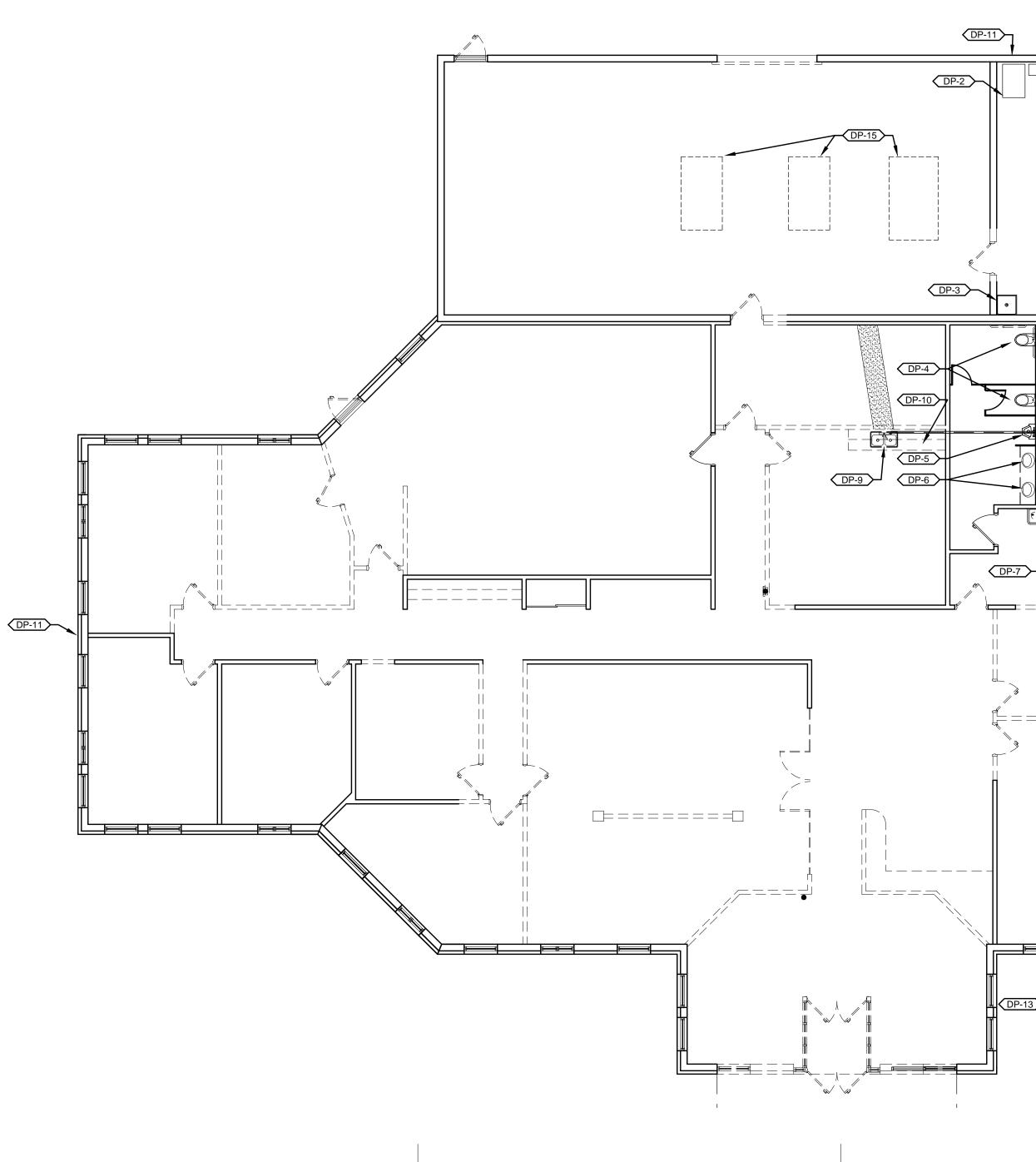
PLUMBING LEGEND PLUMBING CONTRACTOR P.C. GENERAL CONTRACTOR G.C. SITE CONTRACTOR S.C. MECHANICAL CONTRACTOR M.C. E.C. ELECTRICAL CONTRACTOR FIRE PROTECTION CONTRACTOR F.P.C. AUTHORITY HAVING JURISDICTION A.H.J. ABOVE FINISHED FLOOR A.F.F. F.V. FIELD VERIFY SOIL , WASTE OR SANITARY SEWER - ABOVE FLOOR SAN — SAN —— SOIL , WASTE OR SANITARY SEWER - BELOW FLOOR SAN VENT V _ _ _ _ _ _ _ DOMESTIC COLD WATER (UNCONDITIONED) DCW _ _ _ DOMESTIC HOT WATER DHW _ _ _ _ ___ DOMESTIC HOT WATER RETURN DHWR _____ NATURAL GAS NG _____ NG _____ \otimes WATER HAMMER ARRESTER WHA PLUMBING DRAINAGE INSTITUTE 'SIZE' PDI VENT THRU ROOF VTR CLEANOUT PLUG CO FLOOR CLEANOUT FCO COTG CLEANOUT TO GRADE $\mathbf{\Theta}$ CONNECT TO EXISTING CTOE $\rightarrow \rightarrow \rightarrow$ SHUTOFF VALVE CHECK VALVE CIRCUIT SETTER THERMOMETER \oslash PRESSURE GAUGE -∿~⊲ RELIEF VALVE SHUTOFF VALVE WITH PLUG

P.C. GENERAL NOTES:

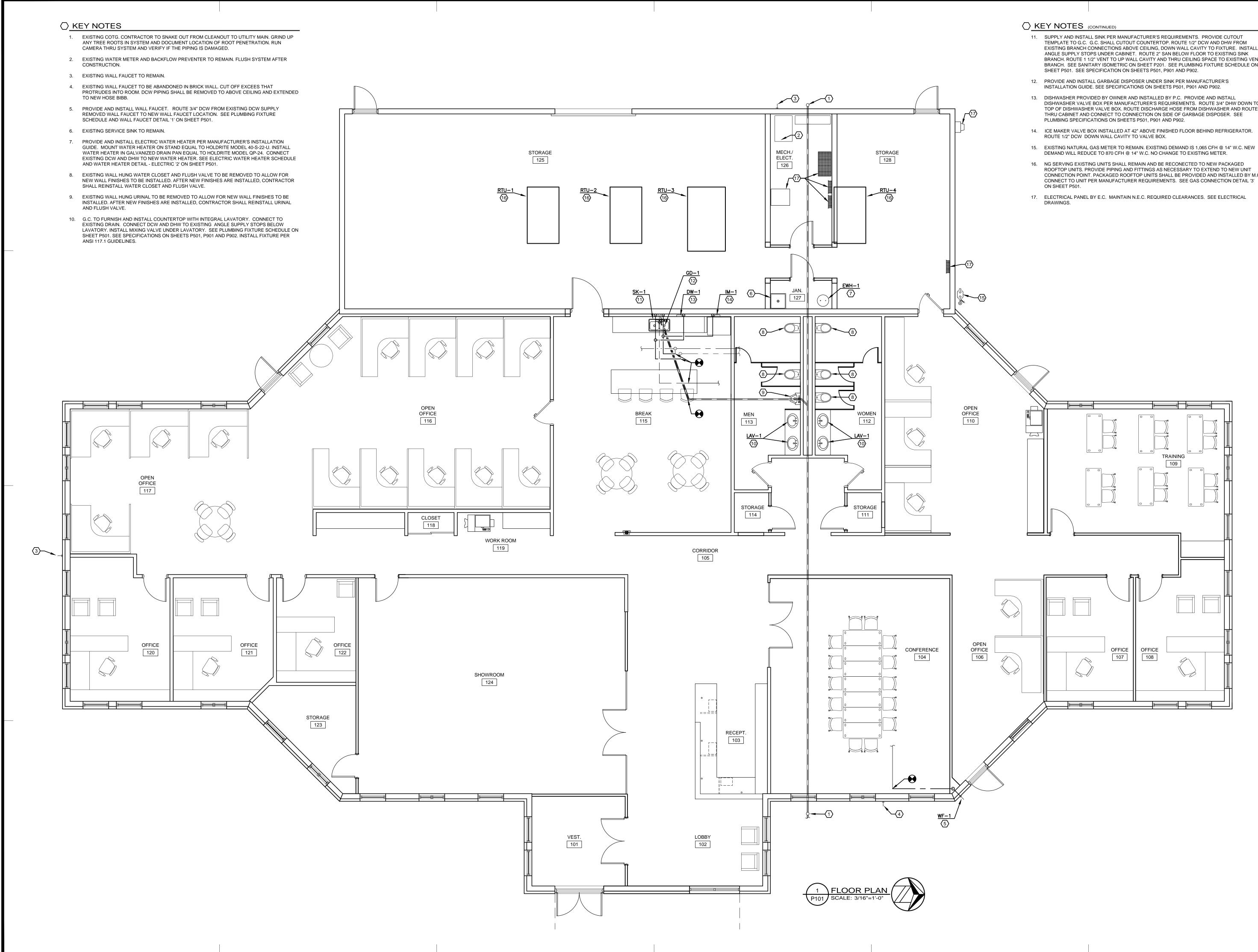
- 1. COMPLY WITH ALL FEDERAL, STATE, AND LOCAL CODES, ORDINANCES, RULES AND REGULATIONS.
- PLACEMENT OF FIXTURES AND PIPE ROUTING SHALL BE COORDINATED WITH ARCHITECTURAL, MECHANICAL, AND ELECTRICAL DRAWINGS AND TRADES.
 FIELD VERIFICAL COATION OF FOURIEMENT, FIXTURES, AND DIPING TO ENGURE NO.
- 3. FIELD VERIFY LOCATION OF EQUIPMENT, FIXTURES, AND PIPING TO ENSURE NO INTERFERENCES WITH FIELD CONDITIONS.
- ALL PLUMBING WORK SHALL BE COORDINATED WITH G.C. E.C. AND M.C. PRIOR TO INSTALLATION.
 DRAWINGS ARE SCHEMATIC IN NATURE AND MAY NOT SHOW ALL ELEVATION CHANGES AND
- HORIZONTAL OFFSETS. CONTRACTOR SHALL FIELD ADJUST AS REQUIRED AND SHALL MINIMIZE OFFSETS WHERE POSSIBLE.
- ALL PIPING SHALL BE ROUTED SO IT IS CONCEALED, AND SHALL NOT BE ROUTED EXPOSED IN ROOMS. (EXCEPT ROOMS WHERE THERE ARE NO CEILINGS OR IF A ROOM IS A UTILITY SPACE)
 PIPING TO BE INSULATED PER SPECIFICATIONS.

GENERAL DEMOLITION NOTES

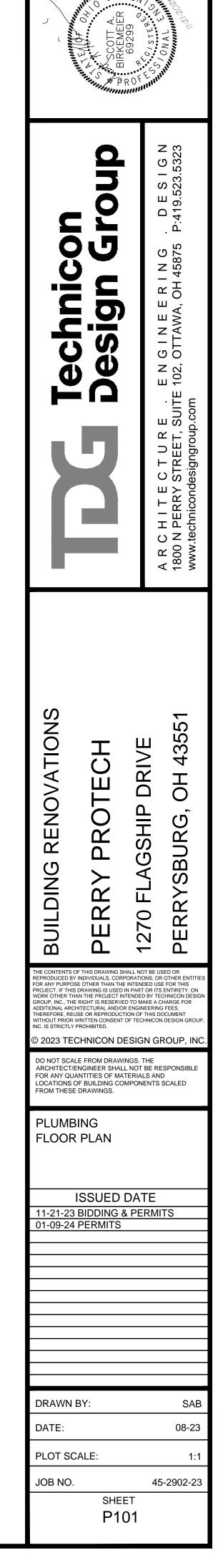
- 1. ALL CONTRACTORS SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND UTILITY LOO PRIOR TO BIDDING & BEGINNING WORK. IN THE EVENT OF CONFLICTS, CONTRACTOR SEEK RESOLUTION FROM OWNER AND/OR ARCHITECT PRIOR TO BEGINNING WORK.
- 2. THE OWNER SHALL RETAIN RIGHTS OF OWNERSHIP FOR ALL SALVAGEABLE MATERIA FIXTURES, AND EQUIPMENT REMOVED. SALVAGED ITEMS SHALL BE RELOCATED OR I IN STORAGE AS DIRECTED BY OWNER. NON-SALVAGEABLE MATERIALS OR ITEMS THE NOT WANT SHALL BE REMOVED FROM THE SITE AND PROPERLY DISPOSED OF BY TH CONTRACTOR.
- ANY PLUMBING FIXTURES BEING REMOVED AND SALVAGED FOR REUSE (SEE KEYNOTES) SHALL BE PROPERLY STORED AND PROTECTED FROM DAMAGE UN FIXTURES ARE READY FOR INSTALLATION. FIXTURES SHALL BE THOROUGHLY CLEAN AFTER INSTALLATION.
- 4. THE LOCATIONS AND SIZES OF EXISTING UNDER SLAB SANITARY LINES MUST BE FIEL VERIFIED PRIOR TO ANY SAW CUTTING OF FLOOR SLABS.
- P.C. SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND TRACE EXISTING SUPPLY PI MAINS, BRANCHES AND FEEDS TO ALL EXISTING LOCATIONS AND FIXTURES PRIOR TO SHUTTING OFF WATER AND REMOVING EXISTING PIPING.



LOCATIONS TOR SHALL RK. ERIALS, OR PLACED THEY DO Y THE	 PLUMBING DEMOLITION PLAN NOTES REMOVE EXISTING WATER HEATER AND ASSOCIATED FLUE AND NATURAL GAS PIPING. DCW AND DHW PIPING TO BE RECONNECTED TO NEW ELECTRIC WATER HEATER EXISTING WATER METER AND BACKFLOW PREVENTER TO REMAIN. EXISTING SERVICE SINK TO REMAIN. EXISTING WALL HUNG WATER CLOSET AND FLUSH VALVE TO BE REMOVED TO ALLOW FOR NEW WALL FINISHES TO BE INSTALLED. AFTER NEW FINISHES ARE INSTALLED, CONTRACTOR SHALL REINSTALL WATER CLOSET AND FLUSH VALVE. 	WEER 692999 692999 802001 A.	MAL EN CONAL EN CONTRACTOR
E UNTIL EANED FIELD LY PIPING DR TO	 EXISTING WALL HUNG URINAL TO BE REMOVED TO ALLOW FOR NEW WALL FINISHES TO BE INSTALLED, AFTER NEW FINISHES ARE INSTALLED, CONTRACTOR SHALL REINSTALLURINAL AND FLUSH VALVE. EXISTING COUNTERTOP LAVATORY AND FAUCET TO BE REMOVED AND DISPOSED OF. EXISTING ANGLE SUPPL STOPS AND DRAIN TO REMAIN. EXISTING BI-LEVEL WATER FOUNTAIN TO BE REMOVED AND DISPOSED OF. CAP SANITARY AND DCW PIPING IN WALL CAUITY. EXISTING SINK AND FAUCET TO BE REMOVED AND DISPOSED OF. REMOVE ANGLE SUPPLY STOPS. CAP SANITARY, DHW, AND DCW PIPING IN WALL CAVITY. EXISTING SINK AND FAUCET, AND GARBAGE DISPOSAL TO BE REMOVED AND DISPOSED OF. REMOVE ANGLE SUPPLY STOPS. EXTEND SANITARY, DCW, DHW AND VENT TO NEW SINK LOCATION. SEE NEW SINK LOCATION ON SHEET P101. EXISTING DISHWASHER TO BE REMOVED AND DISPOSED OF. REMOVE DHW TO ABOVE CELLING AND CAP ABOVE CELLING. EXISTING WALL FAUCET TO REMAIN. EXISTING WALL FAUCET TO REMAIN. EXISTING WALL FAUCET TO BE ABANDONED IN BRICK WALL. CUT OFF EXCEES THAT PROTRUDES INTO ROOM. DCW PIPING SHALL BE REMOVED TO ABOVE CELLING AND EXTENDED TO NEW HOSE BIBB. EXISTING WALL FAUCET TO BE ABANDONED IN BRICK WALL. CUT OFF EXCEES THAT PROTRUDES INTO ROOM. DCW PIPING SHALL BE REMOVED TO ABOVE CELING AND EXTENDED TO NEW HOSE BIBB. EXISTING WALL FAUCET TO BE ABANDONED IN BRICK WALL. CUT OFF EXCEES THAT PROTRUDES INTO ROOM. DCW PIPING SHALL BE REMOVED TO ABOVE CELING AND EXTENDED TO NEW HOSE BIBB. EXISTING WALLFAUCT TO NEW FOR TO SNAKE OUT FROM CLEANOUT TO UTILITY MAIN. GRIND UP ANY TREE ROOTS IN SYSTEM AND DOCUMENT LOCATION OF ROOT PENETRATION. RUN CAMERA THRU SYSTEM AND VERIFY IF THE PIPING IS DAMAGED. EXISTING NG METER SET. NO CHANGE TO EXISTING NG SERVICE OR INTERIOR PIPING. EXISTING PACKAGED ROOFTOP UNITS TO BE REMOVED BY M.C. P.C. TO DISCONNECT NG PIPING AND RECONNECT TO NEW PACKAGE ROOFTOP UNITS. 	Technicon Design Group	A R C H I T E C T U R E . E N G I N E E R I N G . D E S I G N 1800 N PERRY STREET, SUITE 102, OTTAWA, OH 45875 P:419.523.5323 www.technicondesigngroup.com
			DNS, OR OTHER ENTITIES DED USE FOR THIS ORI TIS ENTIRETY, ON D BY TECHNICON DESIGN AKE A CHARGE FOR IEERING FEES. THIS DOCUMENT HINICON DESIGN GROUP, IN GROUP, INC. THE BE RESPONSIBLE LS AND ENTS SCALED
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- TEMPLATE TO G.C. G.C. SHALL CUTOUT COUNTERTOP. ROUTE 1/2" DCW AND DHW FROM EXISTING BRANCH CONNECTIONS ABOVE CEILING, DOWN WALL CAVITY TO FIXTURE. INSTALL ANGLE SUPPLY STOPS UNDER CABINET. ROUTE 2" SAN BELOW FLOOR TO EXISTING SINK BRANCH. ROUTE 1 1/2" VENT TO UP WALL CAVITY AND THRU CEILING SPACE TO EXISTING VENT BRANCH. SEE SANITARY ISOMETRIC ON SHEET P201. SEE PLUMBING FIXTURE SCHEDULE ON
- DISHWASHER VALVE BOX PER MANUFACTURER'S REQUIREMENTS. ROUTE 3/4" DHW DOWN TO TOP OF DISHWASHER VALVE BOX. ROUTE DISCHARGE HOSE FROM DISHWASHER AND ROUTE THRU CABINET AND CONNECT TO CONNECTION ON SIDE OF GARBAGE DISPOSER. SEE
- 14. ICE MAKER VALVE BOX INSTALLED AT 42" ABOVE FINISHED FLOOR BEHIND REFRIGERATOR.
- 16. NG SERVING EXISTING UNITS SHALL REMAIN AND BE RECONECTED TO NEW PACKAGED ROOFTOP UNITS. PROVIDE PIPING AND FITTINGS AS NECESSARY TO EXTEND TO NEW UNIT CONNECTION POINT. PACKAGED ROOFTOP UNITS SHALL BE PROVIDED AND INSTALLED BY M.C. CONNECT TO UNIT PER MANUFACTURER REQUIREMENTS. SEE GAS CONNECTION DETAIL '3'
- 17. ELECTRICAL PANEL BY E.C. MAINTAIN N.E.C. REQUIRED CLEARANCES. SEE ELECTRICAL



DIVISION 22 - PLUMBING SPECIFICATIONS

L. THERMOMETERS

THERMOMETER SHALL BE WEISS MODEL 9VU35, VARIABLE ANGLE, MERCURY FILLED THERMOMETER WITH SEPARABLE BRASS WELL MODEL E35-75BS. TEMPERATURE RANGE SHALL BE O'F - 80'F FOR COLD WATER SYSTEMS, 30'F - 240°F FOR HOT WATER SYSTEMS.

THERMOMETER SHALL BE INSTALLED IN A MANNER THAT INSURES THAT THE BULB OF THE THERMOMETER WILL BE IN A FLOW OF FLUID AND YET NOT IMPAIR THE FLOW OF THE FLUID. INCREASE PIPE SIZE AT THIS POINT IF REQUIRED.

ACCEPTABLE MANUFACTURERS INCLUDE WEISS, TRERICE, ASHCROFT, PALMER, VERSA, WEKSLER AND MARSH

M. PRESSURE GAUGES

PRESSURE GAUGES SHALL BE WEISS MODEL 4CTS, 4-1/2" DIAL PRESSURE GAUGE, RANGE 0-60 PSI COMPLETE WITH WEISS MODEL PSN-B SNUBBER AND WEISS MODEL 25NVBR NEEDLE VALVE. ACCEPTABLE MANUFACTURERS INCLUDE WEISS, TRERICE, ASHCROFT, PALMER,

N. PRESSURE AND TEMPERATURE TEST PORTS

VERSA, WEKSLER AND MARSH.

SUPPLY AND INSTALL WHERE INDICATED 'PETE'S PLUG II' TEST PORT AS MANUFACTURED BY PETERSON ENGINEERING COMPANY CONSISTING OF A 1/4" MPT FITTING TO RECEIVE 1/8" TEMPERATURE OR PRESSURE PROBES. FITTING SHALL BE SOLID BRASS FOR COPPER PIPING AND STAINLESS STEEL FOR FERROUS PIPING. FITTINGS SHALL HAVE TWO VALVE CORES OF NEOPRENE FOR SERVICE AT 500 PSI AND A COLOR-CODED CAP WITH GASKET RATED AT 1000 PSI. PROVIDE THE EXTRA LONG MODEL FOR ANY PIPING THAT IS WRAPPED WITH INSULATION.

PROVIDE TWO PRESSURE GAUGE ADAPTERS WITH 1/8" OD PROBE ONE RANGING FROM 0 TO 30 IN W.C. VACUUM AND ONE 0 TO 100 PSI. PROVIDE TWO 5" STEM TESTING THERMOMETERS ONE WITH A RANGE OF 25°F TO 125°F, AND ONE WITH A RANGE OF 0°F TO 220°F.

ACCEPTABLE MANUFACTURERS INCLUDE PETERSON ENGINEERING COMPANY, SUZUKI PLUGS, AND FLOW DESIGN, INC.

42. WATER HEATER (ELECTRIC):

- A. HEATER CAPACITY AND ELECTRICAL CHARACTERISTIC AS INDICATED IN ELECTRIC WATER HEATER SCHEDULE ON SHEET P501.
- B. THE TANK SHALL BE RATED FOR 150 PSI WORKING PRESSURE. THE TANK SHALL BE GLASS LINED WITH MAGNESIUM ANODE PROTECTION AND FACTORY INSULATED PER ASHRAE 90A LATEST EDITION. THE OUTER STEEL JACKET SHALL HAVE A BAKED ENAMEL FINISH.
- C. HEATING SHALL INCLUDE ASME STAMPED TEMPERATURE AND PRESSURE RELIEF VALVE, HIGH TEMPERATURE LIMIT CONTROL, THERMOSTAT AND DRAIN VALVE.
- D. THE WATER HEATER SHALL BE U. L. LISTED AND CARRY A MINIMUM THREE YEAR GUARANTEE AGAINST DEFECTS IN WORKMANSHIP AND MATERIAL.
- E. UNIT SHALL BE COMPLETELY FACTORY WIRED, PIPED, TESTED AND APPROVED FOR INSTALLATION, REQUIRING ONLY CONNECTIONS OF WATER AND POWER SOURCE FOR OPERATION.
- F. ACCEPTABLE MANUFACTURERS INCLUDE LOCHINVAR, RUDD, STATE, A.O. SMITH OR BRADLEY.

43. THERMAL EXPANSION TANK

- A. TANK SHALL BE DIAPHRAGM-TYPE, PRE-PRESSURIZED WATER TANK OF SIZE, CAPACITY AND ORIENTATION AS INDICATED ON DRAWINGS.
- B. CONSTRUCTION SHALL BE HOT-DIPPED GALVANIZED STEEL WITH WELDED JOINTS FOR 150 PSI WORKING PRESSURE, HEAVY DUTY BUTYL DIAPHRAGM, SEPARATE RIGID POLYPROPYLENE LINED WATER RESERVOIR, AIR CHARGING VALVE, STURDY SUPPORT SKIRT ON LARGER MODELS AND ACCEPTANCE FITTING WITH INNER SLEEVE. NSF LISTED.
- C. EXPANSION TANK SHALL BE ASME CONSTRUCTED.

44. PLUMBING IDENTIFICATION:

A. GENERAL

ALL NEW PIPING, PLUMBING EQUIPMENT AND VALVES SHALL BE IDENTIFIED USING EITHER PREPRINTED LABELS, COILED PLASTIC MARKERS, MANUFACTURED NAMEPLATES, OR BY USING STENCILS AND ENAMEL PAINT.

THE IDENTIFICATION DEVICE'S CHARACTERS SIZE, COLOR, LENGTH OF COLOR FIELD, AND INSTALLED VIEWING ANGLE SHALL COMPLY WITH ANSI 13.1. NAMES, ABBREVIATIONS, AND OTHER DESIGNATIONS SHALL BE COORDINATED WITH OWNER IN ORDER TO BE CONSISTENT WITH ANY EXISTING IDENTIFICATION SYSTEM.

TAGS AND LABELS SHALL BE MANUFACTURED BY MARKING SERVICES, W.H. BRADY, SETON NAME PLATE, OR EQUAL.

B. PIPING

ALL NEW PIPING. EITHER EXPOSED OR IN AN ACCESSIBLE SPACE, SHALL BE IDENTIFIED AS TO SERVICE AND NORMAL DIRECTION OF FLOW. MARKERS SHALL BE LOCATED AT A MAXIMUM OF 25 FOOT INTERVALS IN LONG STRAIGHT RUNS, AT ALL MAJOR CHANGES OF DIRECTION, AT EACH BRANCH CONNECTION, EACH RISER, ALL EQUIPMENT CONNECTIONS, NEAR EACH VALVE AND CONTROL DEVICE, AND BOTH SIDES OF A WALL OR FLOOR THROUGH WHICH A PIPE PASSES.

AT THE OWNER'S OPTION, IDENTIFICATION MAY BE OMITTED IN ARCHITECTURALLY FINISHED AREAS.

C. PLUMBING EQUIPMENT

EACH NEW PIECE OF PLUMBING EQUIPMENT SHALL BE IDENTIFIED USING THE NUMBER ASSIGNED THE UNIT EITHER ON THE DRAWINGS OR BY THE OWNER.

ENGRAVED METAL NAMEPLATES SHALL BE USED WHERE PEAK SURFACE TEMPERATURE WILL EXCEED 150°F, OTHERWISE ENGRAVED PLASTIC NAMEPLATES ARE ACCEPTABLE. NAMEPLATE SHALL BE 4" X 1 1/2". THE BACKGROUND SHALL BE WHITE AND TEXT SHALL BE BLACK. EACH PLATE SHALL BE ATTACHED WITH TWO CORROSION RESISTANT FASTENERS, WHERE SCREWS ARE NOT PRACTICAL A SUITABLE ADHESIVE SHALL BE USED. BEFORE APPLYING ADHESIVE BOTH SURFACES SHALL BE THOROUGHLY DEGREASED AND CLEANED.

TAGS SHALL ALSO INCLUDE PANEL AND CIRCUIT BREAKER DESIGNATIONS.

D. VALVE TAGS

CONTRACTOR SHALL PROVIDE A NUMBERED BRASS TAG, APPROXIMATELY 2" IN DIAMETER, CHAINED TO HAND WHEEL OF EACH VALVE, EXCEPT LOCAL STOP OR SHUTOFF VALVES TO AN ITEM OF EQUIPMENT. ATTACH TAG TO VALVE WITH NON-RUSTING "S" HOOK OF ADEQUATE SIZE. EACH TAG SHALL BE STAMPED WITH AN IDENTIFICATION NUMBER, SERVICE DESIGNATION, AND WHETHER THE VALVE IS NORMALLY-CLOSED OR NORMALLY-OPEN IN SERVICE (N.C. OR N.O.). WHERE APPLICABLE, AFTER THE ABOVE SYMBOLS, ADD "S" FOR SUPPLY AND "R" FOR RETURN PIPING.

A VALVE SCHEDULE SHALL BE SUBMITTED FOR EACH PIPING SYSTEM. EACH SCHEDULE SHALL BE TYPED ON 8 1/2" X 11", AND SHALL LIST EACH VALVE IDENTIFICATION NUMBER AND SYSTEM ABBREVIATION AS THEY APPEAR ON THE TAG. THE SCHEDULE SHALL ALSO LIST THE VALVES SIZE, MANUFACTURER, TYPE, SERVICE, LOCATION AND WHETHER IT IS NO OR NC.

45. OPERATING INSTRUCTIONS:

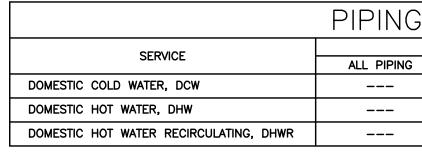
A. CONTRACTOR SHALL PROVIDE FOUR (4) COMPLETE MANUALS IN HARDBACKED BINDERS, EACH CONTAINING ALL OPERATING, SERVICING, LUBRICATION, ETC. INFORMATION AND PARTS LISTS FOR ALL EQUIPMENT INSTALLED UNDER THIS CONTRACTOR'S CONTRACT. MATERIAL SHALL BE GROUPED TOGETHER BY TRADES, EACH ITEM MARKED WITH A TAB, AND AN INDEX SHALL BE PROVIDED. WHERE DIAGRAMS ARE TOO LARGE FOR THE BINDER, ARRANGE FOLDER POCKETS WITH REINFORCED HOLES TO HOLD FOLDED DRAWINGS. MANUALS TO BE SUBMITTED FOR APPROVAL AT LEAST THIRTY (30) DAYS BEFORE COMPLETION OF THE WORK.

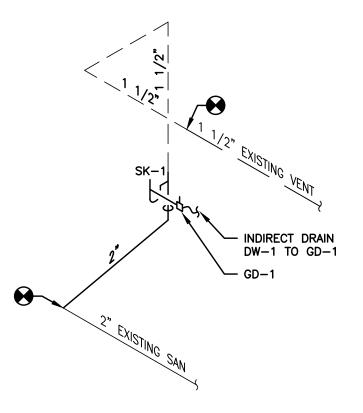
B. <u>MANUALS TO INCLUDE</u>:

- STEP-BY-STEP PROCEDURES FOR START-UP AND SHUT-DOWN OF EACH SYSTEM AND PIECE OF EQUIPMENT.
- 2. NORMAL EQUIPMENT OPERATING CHARACTERISTICS.
- 3. PERFORMANCE DATA, CURVES, RATINGS. 4. WIRING DIAGRAMS.
- 5. MANUFACTURER'S DESCRIPTIVE LITERATURE.
- 6. SPARE PARTS AND REPLACEMENT LIST FOR EACH PIECE OF EQUIPMENT.
- 7. NAME OF SERVICE AGENCY, INSTALLER AND SUPPLIERS, AND THEIR TELEPHONE NUMBERS.
- 8. FINAL REVIEWED SHOP DRAWINGS.
- 9. CERTIFICATES OF TESTS AND APPROVALS.
- 10. PLUMBING IDENTIFICATION LISTS.
- CONTRACTOR SHALL ARRANGE FOR TECHNICAL INSTRUCTION OF THE OWNER'S С. MAINTENANCE PERSONNEL BY QUALIFIED INSTRUCTORS FOR SUCH TIME AS IS REASONABLY REQUIRED TO INSTRUCT THEM IN THE OPERATION AND MAINTENANCE OF ALL PLUMBING SYSTEMS. INSTRUCTION PERIOD SHALL BE AFTER ALL SYSTEMS ARE IN OPERATION, AND HAVE BEEN ADJUSTED. CONTRACTOR SHALL VIDEO ALL TRAINING SESSIONS. COPY OF VIDEO SHALL BE INCLUDED WITH CLOSEOUT MATERIALS FOR FUTURE REFERENCE BY THE OWNER.
- SEE PROJECT MANUAL SECTION '017900 DEMONSTRATION AND TRAINING' FOR ADDITIONAL REQUIREMENTS.
- D. CONTRACTOR SHALL BUILD A HEAVY GAUGE SHEET METAL BOX WITH LOCK STAPLE, HINGES AND HASP, OF SUFFICIENT SIZE, 30" x 12" x 12" MINIMUM, TO HOLD THE FOLLOWING ITEMS: A COMPLETE SET OF CONTRACT DRAWINGS. SPECIFICATIONS AND THE ABOVE MENTIONED MAINTENANCE BOOK. INSTALL BOX AS DIRECTED BY OWNER.

PLUME DESCRIPTION TAG LAV-1 | LAVATORY - INTEGRAL TO COUNTERTOP - ADA HEIGHT SK-1 | SINK - TWO COMPARTMENT - STAINLESS STEEL GD-1 GARBAGE DISPOSAL DW-1 DISHWASHER IM-1 ICE MAKE VALVE BOX WF-1 WALL FAUCET

	ELECTRIC WATER HEATER SCHEDULE													
TAG	DIMENSIONS	HEIGHT	STORAGE GALLONS	TOTAL (KW)	NO. OF ELEMENTS	KW PER ELEMENT	EWT (°F)	LWT (°F)	RECOVERY (GPH)	POWE VOLTAGE	.r Amps	MAKE	MODEL	REMARKS
EWH-1	22 " ø	31"	30	4.5	1	4.5	55	120	25	208/1/60	21.6	STATE	PCE 30 20LSA	

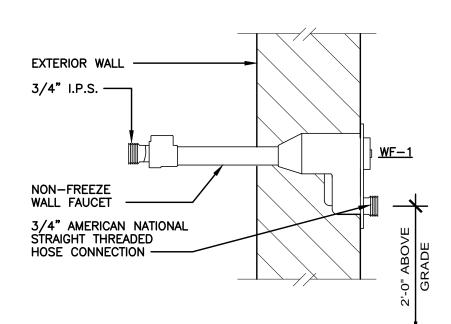




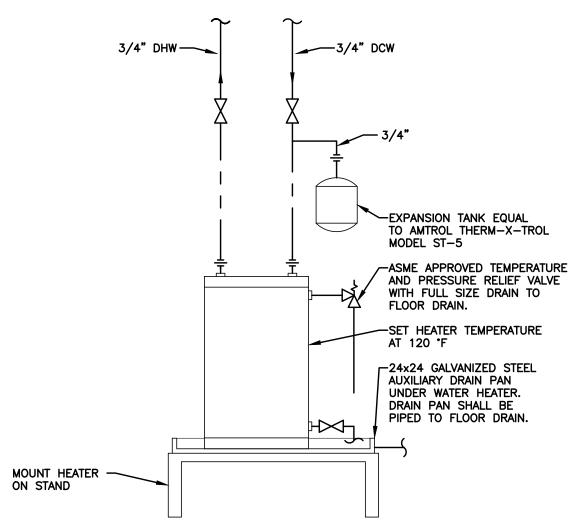
SANITARY ISOMETRIC SCALE: NONE

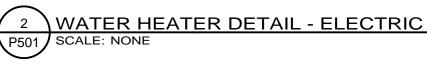
BING FIXTURE SCHI	EDULE			
	DCW	DHW	SAN	VENT
(34")	1/2"	1/2"	1 1/2"	1 1/2"
	1/2"	1/2"	1 1/2"	1 1/2"
			2"	
		1/2"		
	1/2"			
	3/4"			

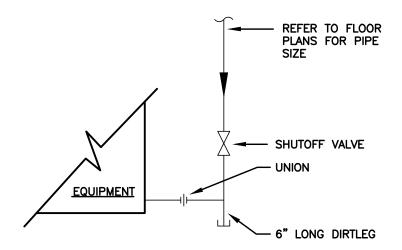
PIPING INSULATION SCHEDULE PIPE SIZE 1" & BELOW RUNOUTS 1 1/4" - 2" | 2 1/2" - 4 " ABOVE 4" 1/2" 1/2" 1" 1" ___ 1/2" 1" 1 1/2" 1" ___ 1/2" 1" 1" 1 1/2" ___



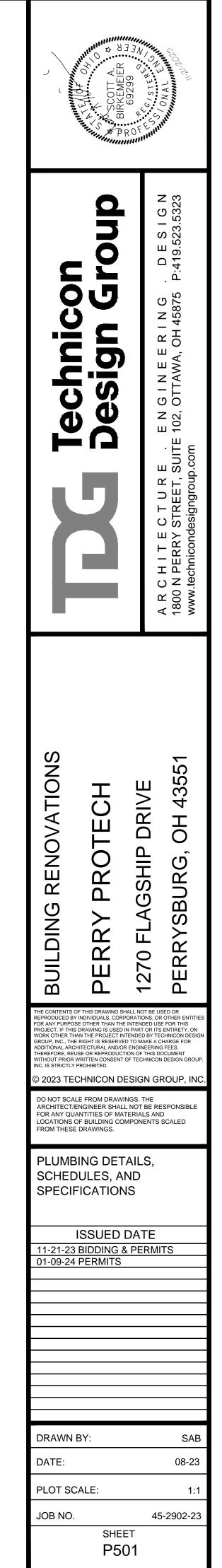








3 GAS CONNECTION DETAIL P501 / SCALE: NONE



- **DIVISION 22 PLUMBING SPECIFICATIONS** SCOPE OF WORK: WORK COVERED BY THIS SPECIFICATION AND DESIGN DRAWINGS ALL INCLUDE ALL LABOR, MATERIALS, EQUIPMENT AND SERVICES NECESSARY FOR AND REASONABLY INCIDENTAL TO COMPLETE THE INSTALLATION OF THE PLUMBING SYSTEMS AS INDICATED IN CONTRACT DOCUMENTS. REFERENCE TO CONTRACTOR OR PLUMBING CONTRACTOR (OR P.C.) ON ALL DRAWINGS AND WITHIN THIS SPECIFICATION COVERS WORK FOR PLUMBING CONTRACTORS AND THEIR SUBCONTRACTORS.
- <u>PERMITS AND INSPECTIONS</u>: THE PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR SECURING AND PAYING FOR ALL NECESSARY PERMITS. CONTRACTOR IS RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH ANY INSPECTIONS, TAXES AND INSURANCE REQUIRED BY A.H.J.
- ORDINANCES AND CODES: ALL WORK SHALL BE INSTALLED TO CONFORM WITH ALL EDERAL, STATE, LOCAL CODES AND ORDINANCES, AND INDUSTRY STANDARDS INCLUDING, BUT NOT LIMITED TO NFPA, OBC 2017, OPC 2017, OMC 2017, ASTM, ASME, ANSI, AWWA, NSF, UL, NRTL, AND NEC.
- SHOULD ANY WORK SHOWN ON THE DRAWINGS OR HEREIN SPECIFIED BE CONTRARY TO SAID MINIMUM REQUIREMENTS, ORDINANCES, STATUTES OR REGULATIONS, THE WORK SHALL BE EXECUTED IN ACCORDANCE WITH THE REQUIREMENTS, ORDINANCES, STATUTES OR REGULATIONS, BUT NOT UNTIL THE POINTS IN QUESTION HAVE BEEN REFERRED TO THE ARCHITECT/ENGINEER FOR APPROVAL
- ALL TESTS SHALL BE MADE AS REQUIRED BY ABOVE MENTIONED REQUIREMENTS. ORDINANCES. STATUTES OR REGULATIONS. OR BY THE INSPECTOR HAVING JURISDICTION. THE COST OF SUCH TESTS SHALL BE INCLUDED IN THE CONTRACT PRICE AND EVIDENCE OF SUCH TESTS AND INSPECTIONS SHALL BE PROVIDED FOR THE OWNER'S FILES.
- CONTRACT DRAWINGS: IN GENERAL, DRAWINGS ARE SCHEMATIC IN NATURE AND ARE INTENDED AS A GUIDE FOR THE CONTRACTOR, BUT DO NOT NECESSARILY SHOW ALL DETAILS, OFFSETS, ELEVATION CHANGES, ETC. THE CONTRACTOR'S WORK SHALL CONFORM TO THE INFORMATION CONTAINED IN THIS SPECIFICATION AND/OR AS INDICATED IN THE LATEST REVISION OF THE DRAWINGS REFERRED TO HEREIN. THE CONTRACTOR SHALL CONSULT WITH THE ARCHITECT/ENGINEER REGARDING ALL QUESTIONS PRIOR TO PROCEEDING WITH FABRICATION OF THE WORK IN QUESTION. THE CONTRACTOR SHALL PREPARE ALL ADDITIONAL DETAIL OR FIELD INSTALLATION DRAWINGS NECESSARY AT THEIR OWN EXPENSE. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS INDICATED ON THE ENGINEER'S LAYOUT DRAWINGS AND DETERMINE IF ANY CHANGES ARE REQUIRED IN CONDUITS, PIPING RUNS, DRAINS, ETC. TO AVOID INTERFERENCE. MAJOR CHANGES SHALL NOT BE MADE WITHOUT THE APPROVAL OF THE ARCHITECT/ENGINEER.
- THE CONTRACTOR HAS THE RIGHT TO VARY THE RUN OF CONDUITS. PIPING AS MAY BE FOUND NECESSARY OR DESIRABLE TO AVOID INTERFERENCES. MAJOR REVISIONS SHALL BE VERIFIED WITH THE ARCHITECT/ENGINEER.
- FOR CONSTRUCTION PURPOSES DRAWINGS SHOULD NOT BE SCALED. IN GENERAL, THE SPECIFICATIONS ARE WRITTEN IN SINGULAR FORM. THE DRAWINGS SHOULD BE USED TO DETERMINE NUMBER OF ITEMS REQUIRED FOR A COMPLETE INSTALLATION.
- <u>VERIFICATION:</u> BEFORE RUNNING ANY PIPING, ETC., WITHIN THE BUILDING, THE CONTRACTOR SHALL ASSURE HIMSELF THAT THEY CAN BE INSTALLED AS CONTEMPLATED WITHOUT TRAPPING OR INTERFERING WITH COLUMNS, BEAMS, PIPING, FIXTURES. ETC. ANY NECESSARY MAJOR DEVIATION SHALL BE REFERRED TO THE ARCHITECT/ENGINEER FOR ADJUSTMENT BEFORE LINES ARE RUN, AT NO INCREASE IN CONTRACT PRICE.
- OPENINGS, SUPPORTING STEEL, FIELD-BUILT CURBS, ELECTRICAL DATA, SPACE REQUIREMENTS, ETC., WERE DESIGNED AROUND SPECIFIC PARAMETERS. WHEN THE CONTRACTOR DETERMINES THE MAKE OF EQUIPMENT TO BE PROVIDED FOR THE JOB, IT SHALL BE THEIR RESPONSIBILITY TO VERIFY AND COORDINATE UNIT DIMENSIONS WITH THE GENERAL CONTRACTOR AND ALL OTHER INTERESTED CONTRACTORS ON THE JOB. IT SHALL ALSO BECOME THE CONTRACTOR'S RESPONSIBILITY TO CHANGE AS NECESSARY, THROUGH THE ARCHITECT/ENGINEER, ALL REQUIRED DIMENSIONS SO THAT OPENINGS, SUPPORTING STEEL, CURBS, ELECTRICAL DATA, ETC., WILL FIT THE EQUIPMENT SUPPLIED. ANY ADDITIONAL COST WILL BE THE SOLE RESPONSIBILITY OF THIS CONTRACTOR.
- IN ADDITION, ELECTRICAL POWER, INTERLOCK AND CONTROL DIAGRAMS AND PIPING ARRANGEMENTS WERE DESIGNED AROUND ONE SPECIFIC MANUFACTURER. IF ADDITIONAL WIRING PIPING CONTROLS, ETC. ARE REQUIRED FOR OTHER EQUIPMENT, THE CONTRACTOR SHALL INCLUDE THE COST OF THE SAME IN HIS PRICE.
- DIMENSIONS, ELEVATIONS AND RELATIVE LOCATIONS OF EXISTING EQUIPMENT, SEWERS, PIPES, DUCTS, CONDUITS, ETC., IN PLACE AS SHOWN ON THE DRAWINGS, ARE TAKEN FROM AS-BUILT AND/OR RECORD DRAWINGS AND ARE DEEMED RELIABLE ONLY IN SO FAR GENERAL LAYOUT IS CONCERNED. SUCH DIMENSIONS SHALL NOT BE USED FOR LAYOUT DRAWINGS NOR DETAILING OF COMPONENTS. THE RESPONSIBILITY FOR CHECKING IN PLACE ITEMS WILL BE THE CONTRACTORS. ALL MEASUREMENTS, THE EXACT DETERMINATION OF RELATIVE ELEVATIONS OR LOCATIONS. THE ASCERTAINING OF ACCURACY OF ALL GIVEN ELEVATIONS AND THE OBTAINING OF ALL NECESSARY ADDITIONAL INFORMATION TO INSURE THE PROPER FIT AND COORDINATION OF ALL CONDUIT, EQUIPMENT, DUCTS, AND PIPING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR
- THE CONTRACTOR SHALL CAREFULLY EXAMINE THE GENERAL BUILDING PLANS AND ALL PLUMBING PLANS AND CARRY ON HIS WORK SO AS NOT TO DELAY OR INTERFERE WITH THE WORK OF OTHER TRADES. THE CONTRACTOR SHALL OBTAIN IN WRITING FROM OTHER CONTRACTORS SUCH DATA AS NECESSARY TO COORDINATE HIS WORK WITH OTHER TRADES.
- RECORD DRAWINGS: THE CONTRACTOR SHALL NOTE CHANGES FROM CONTRACT AWINGS AND SPECIFICATIONS. THE CONTRACTOR SHALL NEATLY AND CORRECTLY ENTER IN COLORED PENCIL ANY DEVIATIONS ON DRAWINGS AFFECTED AND SHALL KEEP DRAWINGS AVAILABLE FOR INSPECTION. AN EXTRA SET OF DRAWINGS SHALL BE FURNISHED BY M.C. FOR THIS PURPOSE. THE CONTRACTOR SHALL GIVE THE DRAWINGS TO THE OWNER AT PROJECT COMPLETION AND LABEL THEM "AS BUILT DRAWINGS - PLUMBING"
- SEE PROJECT MANUAL SECTION '017839 PROJECT RECORD DOCUMENTS' FOR ADDITIONAL REQUIREMENTS.
- SITE VISITATION: THE CONTRACTOR SHALL VISIT THE SITE (OR BUILDING) AND EXAMINE THE AREA OF WORK AND COMPARE IT WITH DRAWINGS AND SPECIFICATIONS. AND BE SATISFIED AS TO CONDITION OF PREMISES, SUCH AS OBSTRUCTIONS, ACTUAL LEVELS. AND OTHER NECESSARY REQUIREMENTS FOR CARRYING OUT THE WORK. ALL BIDDERS SHALL REPORT ANY DISCREPANCIES TO THE ARCHITECT/ENGINEER PRIOR TO SUBMITTING THEIR BID OR PROPOSAL. FAILURE TO REPORT SUCH DISCREPANCIES SHALL BE DEEMED ACCEPTANCE OF EXISTING CONDITIONS. NO ADDITIONAL COMPENSATION WILL BE GIVEN AFTER THE BIDS OR PROPOSALS HAVE BEEN SELECTED.
- 8. <u>SUBMITTALS</u>: SUBMIT TO THE ARCHITECT/ENGINEER FOR REVIEW FOR THE LIMITED PURPOSE OF CHECKING FOR CONFORMANCE WITH INFORMATION GIVEN AND THE DESIGN CONCEPT EXPRESSED IN THE CONTRACT DOCUMENTS PRODUCT DATA AND SHOP DRAWINGS FOR ALL SCHEDULED EQUIPMENT. CLEARLY IDENTIFY ALL SUBMITTALS WITH NAME SHOWN IN THE SCHEDULES. APPLY CONTRACTOR'S STAMP, SIGNED OR INITIALED CERTIFYING THAT REVIEW, APPROVAL, VERIFICATION OF PRODUCTS REQUIRED, FIELD DIMENSIONS, ADJACENT CONSTRUCTION WORK, AND COORDINATION OF INFORMATION IS IN ACCORDANCE WITH THE REQUIREMENTS OF THE WORK AND CONTRACT DOCUMENTS. IDENTIFY VARIATIONS FROM CONTRACT DOCUMENTS AND PRODUCT OR SYSTEM LIMITATIONS WHICH MAY BE DETRIMENTAL TO SUCCESSFUL PERFORMANCE OF THE COMPLETED WORK. DISTRIBUTE COPIES OF REVIEWED SUBMITTALS AS APPROPRIATE. INSTRUCT PARTIES TO PROMPTLY REPORT ANY INABILITY TO COMPLY WITH REQUIREMENTS.
- SEE PROJECT MANUAL SECTION '013300 SUBMITTAL PROCEDURES' FOR ADDITIONAL REQUIREMENTS.
- PRODUCT SUBSTITUTION: MANUFACTURERS SPECIFIED IN THE EQUIPMENT SCHEDULES BY NAMING ONE OR MORE MANUFACTURERS ARE INCLUDED AS A BASIS OF DESIGN WITH A PROVISION FOR SUBSTITUTIONS.
- SUBMIT A REQUEST FOR SUBSTITUTION FOR ANY MANUFACTURER NOT NAMED. DOCUMENT EACH REQUEST WITH COMPLETE DATA SUBSTANTIATING COMPLIANCE OF PROPOSED SUBSTITUTION WITH CONTRACT DOCUMENTS. A REQUEST FOR SUBSTITUTION CONSTITUTES A REPRESENTATION THAT THE SUBMITTER HAS INVESTIGATED PROPOSED PRODUCT AND DETERMINED THAT IT MEETS OR EXCEEDS THE QUALITY LEVEL OF THE SPECIFIED PRODUCT AND THAT IT WILL PROVIDE THE SAME WARRANTY FOR THE SUBSTITUTION AS FOR THE SPECIFIED PRODUCT.
- THE CONTRACTOR SHALL COORDINATE INSTALLATION AND MAKE CHANGES TO OTHER WORK WHICH MAY BE REQUIRED FOR THE WORK TO BE COMPLETED WITH NO ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR WAIVES CLAIMS FOR ADDITIONAL COSTS OR TIME EXTENSION WHICH MAY SUBSEQUENTLY BECOME APPARENT AND WILL REIMBURSE THE OWNER. ARCHITECT AND/OR ENGINEER FOR REVIEW OR REDESIGN SERVICES ASSOCIATED WITH RE-APPROVAL BY AUTHORITIES.
- SUBSTITUTIONS WILL NOT BE CONSIDERED WHEN THEY ARE INDICATED OR IMPLIED ON SHOP DRAWING OR PRODUCT DATA SUBMITTALS, WITHOUT SEPARATE WRITTEN REQUEST, OR WHEN ACCEPTANCE WILL REQUIRE REVISION TO THE CONTRACT DOCUMENTS.
- SEE PROJECT MANUAL SECTION '016000 PRODUCT REQUIREMENTS' FOR ADDITIONAL REQUIREMENTS.

- 10. ICC_COMPLIANCE: ALL FIXTURES, EQUIPMENT, CONTROLS AND DEVICES SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF AMERICANS WITH DISABILITIES ACT (ADA), ICC A117.1, STATE BUILDING CODE, AND LOCAL CODES MAY
- 11. WARRANTY: THE PLUMBING CONTRACTOR SHALL PROVIDE WRITTEN GUARANTEE TO E OWNER THAT WORK HEREIN SHALL BE FREE FROM DEFECTS IN WORKMANSHIP AND MATERIALS. THAT APPARATUS WILL DEVELOP CAPACITIES AND CHARACTERISTICS REQUIRED ON DRAWINGS, AND THAT IF DURING A PERIOD OF <u>ONE YEAR</u> AFTER DATE OF CERTIFICATE OF COMPLETION BY G.C. AND ACCEPTANCE OF PROJECT BY OWNER FOR BENEFICIAL USE, ANY SUCH DEFECTS APPEAR, CONTRACTOR SHALL REMEDY SAME WITHOUT ANY COST TO THE OWNER. CONTRACTOR SHALL OBTAIN AND SUBMIT TO THE OWNER ALL MANUFACTURERS' WARRANTIES FOR EQUIPMENT INSTALLED AS PART OF THE CONTRACT.
- SEE PROJECT MANUAL SECTION '017400 WARRANTIES' FOR ADDITIONAL REQUIREMENTS.
- 12. CLOSE-OUT PROCEDURES: CONTRACTOR SHALL PROVIDE FIELD TESTING, CHECK-OUT AND SYSTEM DEMONSTRATIONS TO OWNER TO ASSURE PROPER PERFORMANCE AND ADJUSTMENT OF ITEMS PROVIDED UNDER THE CONTRACT. REMOVE ALL DEBRIS CREATED BY THE CONSTRUCTION WORK AND CLEAN ALL EQUIPMENT, AIR DEVICES, ETC., INSIDE AND OUTSIDE. PROVIDE COPIES OF OPERATION AND MAINTENANCE MANUALS AS DIRECTED BY PROJECT MANUAL. COPIES OF EACH SHALL INCLUDE APPROVED SHOP DRAWING, MAINTENANCE PROCEDURES, OPERATION AND INSTRUCTION MANUALS, LITERATURE SUPPLIED WITH EQUIPMENT, AND A LIST OF ALL CONTRACTOR'S PURCHASE ORDERS WITH SUPPLIERS. NAMES, ADDRESSES AND PHONE NUMBERS, FOR ALL MATERIALS, PROVIDE INSTRUCTION TO PERSONNEL SELECTED BY THE OWNER, TO FAMILIARIZE THEM WITH THE LOCATION OF SIGNIFICANT EQUIPMENT, TRAIN THEM ON EQUIPMENT FUNCTIONS, REVIEW MAINTENANCE PROCEDURES AND COORDINATE INFORMATION AVAILABLE IN THE BINDER.
- SEE PROJECT MANUAL SECTION '017700 CLOSEOUT PROCEDURES' AND '017823 - OPERATION AND MAINTENANCE DATA' FOR ADDITIONAL REQUIREMENTS.
- 13. <u>WORKMANSHIP AND LAYOUT</u>: ALL WORK SHALL BE DONE BY MECHANICS SKILLED IN THE PARTICULAR TRADE INVOLVED, UNDER RESPONSIBLE SUPERVISION, AND WITH THE BEST MODERN PRACTICES.
- CONTRACTOR SHALL CONSULT ALL DRAWINGS, CONSTRUCTION DETAILS AND JOB SITE AND CONFER AND COOPERATE WITH OTHER CONTRACTORS AND THE OWNER TO AVOID INTERFERENCES.
- THE GENERAL CONTRACTOR WILL PROVIDE PIPE SHAFT OPENINGS IN THE NEW CONSTRUCTION WHERE SHOWN ON THE ARCHITECTURAL OR STRUCTURAL DRAWINGS AND ALSO WHERE INDICATED AND SIZED BY THIS CONTRACTOR. OPENINGS REQUIRED DUE TO UNTIMELY OR INACCURATE LAYOUT BY THE PLUMBING CONTRACTOR SHALL BE AT THE PLUMBING CONTRACTOR'S OWN EXPENSE USING SKILLED WORKMEN AND THE PROPER TOOLS FOR THE WORK INVOLVED.
- 14. MATERIALS GENERAL: THE MANUFACTURERS REFERENCED THROUGHOUT THESE UTLINE SPECIFICATION ARE INCLUDED AS A BASIS OF DESIGN. SUBMISSION OF ALTERNATE MANUFACTURERS OF SIMILAR EQUIPMENT IS SUBJECT TO ENGINEERS APPROVAL. UNITS OF EQUIPMENT, OTHER THAN THOSE LISTED AS THE BASIS OF DESIGN. MUST BE PROVEN TO BE PHYSICALLY ACCEPTABLE, IN ADDITION TO MEETING ALL PERFORMANCE AND EQUIPMENT SPECIFICATIONS. LIABILITY OF NON-CONFORMANCE SHALL LIE ON CONTRACTOR/SUBMITTER.
- ALL MATERIALS SHALL BE NEW AND OF THE GRADE AND QUALITY SPECIFIED. ONLY THE BEST MATERIAL OF EACH CLASS SPECIFIED SHALL BE USED.
- 15. QUALITY REQUIREMENTS: ARTICLES, DEVICES, MATERIALS, FORMS OF CONSTRUCTION. FIXTURES, ETC. NAMED IN THE SPECIFICATIONS TO DENOTE THE TYPE AND QUALITY REQUIRED, WHETHER OR NOT THE WORDS "OR EQUAL OR EQUIVALENT" ARE USED, SHALL BE KNOWN AS "STANDARDS" AND ALL PROPOSALS SHALL BE BASED ON THE
- THE SPECIFICATIONS ARE WRITTEN AROUND THE CONSTRUCTION METHODS, USE OF MATERIALS. SPACE LIMITATIONS AND PERFORMANCE OF ONE UNIT MANUFACTURER. THE SPECIFICATIONS ALSO LIST ACCEPTABLE MANUFACTURERS FOR A PARTICULAR PIECE OF EQUIPMENT. THE ENGINEER HAS NOT NECESSARILY REVIEWED THE DESIGN AND CONSTRUCTION OPTIONS OF ALL MANUFACTURERS LISTED TO CONFIRM COMPLIANCE WITH THE DRAWINGS AND SPECIFICATIONS. BUT THIS CONTRACTOR SHALL VERIFY THAT THE EQUIPMENT PROPOSED FOR THE PROJECT WILL MEET OR EXCEED THE REQUIREMENTS.
- WHERE TWO OR MORE "STANDARDS" ARE NAMED TOGETHER, THE CONTRACTOR MAY FURNISH ANY ONE OF THE "STANDARDS" NAMED, BUT CONTRACTOR SHALL MAKE THE SELECTIONS KNOWN TO THE ARCHITECT/ENGINEER WITHIN TEN DAYS FOLLOWING AWARD OF THEIR CONTRACT.
- WHERE MATERIALS OR PROCESSES ARE SPECIFIED BY TRADE OR PROPRIETARY NAMES, CONTRACTOR MAY MAKE NO SUBSTITUTIONS, EXCEPT ON ARCHITECT/ENGINEER'S WRITTEN APPROVAL STATING THAT SUCH SUBSTITUTION HAS BEEN AUTHORIZED.
- FOR THOSE MATERIALS SPECIFIED WITHOUT THE USE OF TRADE NAMES, THE CONTRACTOR MAY FURNISH ANY MANUFACTURER'S PRODUCT THAT MEETS THE EXPRESS REQUIREMENTS OF THE SPECIFICATIONS. BIDDERS DESIRING CONSIDERATION FOR THE USE OF MATERIAL, EQUIPMENT, ETC.
- NOT NAMED IN THE SPECIFICATIONS MAY SUBMIT IN WRITING, AT LEAST TEN DAYS PRIOR TO BID OPENING, THE CHANGE INCLUDING THE SPECIFICATIONS AND DESCRIPTION TO THE OWNER/ARCHITECT/ENGINEER FOR REVIEW AND IF APPROVED, THE CHANGE WILL BE ISSUED IN AN ADDENDUM AT LEAST FIVE DAYS PRIOR TO THE OPENING OF BIDS.
- BIDDERS DESIRING CONSIDERATION FOR THE USE OF MATERIALS, EQUIPMENT, ETC. NOT NAMED IN THE SPECIFICATIONS OR AN ADDENDUM MAY SUBMIT PROPOSALS FOR THE SUBSTITUTION OF SAME FOR STANDARDS AS SPECIFIED, USING THE "SUBSTITUTION SHEET" ATTACHED TO THE PROPOSAL FORM AND LISTING FOR EACH PROPOSED CHANGE: (1) THE "STANDARD" SPECIFIED, (2) THE SUBSTITUTION, AND (3) THE CHANGE IN BID PRICE (OR "NO CHANGE"). COMPLETE SPECIFICATIONS AND DESCRIPTION OF ANY PROPOSED SUBSTITUTION BEING CONSIDERED FOR ACCEPTANCE SHALL BE FURNISHED TO THE ENGINEER/OWNER PROMPTLY, UPON REQUEST.
- SEE PROJECT MANUAL SECTION '014000 QUALITY REQUIREMENTS', '014200 -REFERENCES', AND '016000 - PRODUCT REQUIREMENTS' FOR ADDITIONAL REQUIREMENTS.
- 16. PROTECTION: CONTRACTOR SHALL PROVIDE APPROVED PROTECTION FOR ALL WORK INCLUDED IN THIS CONTRACT AND BE RESPONSIBLE FOR DAMAGE OF ANY KIND TO FIXTURES, PIPING OR OTHER WORK. AT THE COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL REMOVE ALL PROTECTION AND REPLACE ALL DAMAGED WORK WITHOUT EXPENSE TO THE OWNER.
 - IN ADDITION TO THE NORMAL PRECAUTIONS FOR PROTECTION OF WORK, CONTRACTOR SHALL PROVIDE VARIOUS TYPES OF PROTECTION AS FOLLOWS: PROTECT FINISHED FLOORS FROM CHIPS AND CUTTING OIL BY THE USE OF
 - METAL CHIP RECEIVING PAN AND AN OIL PROOF FLOOR COVER.
 - 2. PROTECT EQUIPMENT AND FINISHED SURFACES FROM WELDING AND CUTTING SPATTERS WITH BAFFLES AND SPATTER BLANKETS.
- 3. PROTECT EQUIPMENT AND FINISHED SURFACES FROM PAINT DROPPINGS, INSULATION ADHESIVE AND SIZING DROPPINGS, ETC. BY USE OF DROP CLOTHS.

ALL PUMPS, MOTORS, FANS AND OTHER ROTATING EQUIPMENT SHALL BE STORED AT THE SITE WITH OPENINGS, BEARINGS, ETC. COVERED TO EXCLUDE DUST AND MOISTURE. ALL STOCK PILED PIPE SHALL BE PLACED ON DUNNAGE AND PROTECTED FROM WEATHER AND FROM ENTRY OF FOREIGN MATERIAL. DURING CONSTRUCTION, OPEN ENDS OF PIPES, EQUIPMENT, ETC. SHALL BE CAPPED OR PLUGGED TO REDUCE DIRT ACCUMULATION INSIDE.

- 17. MANUFACTURER'S DIRECTIONS: MANUFACTURER'S DIRECTIONS SHALL BE FOLLOWED IN ALL CASES WHERE THE MANUFACTURER OF ARTICLES USED IN THIS CONTRACT FURNISH DIRECTIONS COVERING SPECIFIC POINTS FOR THE INSTALLATION, STARTUP, OPERATION OR MAINTENANCE OF THESE ARTICLES. DIRECTIONS IN CONFLICT WITH THE DRAWINGS OR THE SPECIFICATIONS SHALL BE REFERRED TO THE ARCHITECT/ENGINEER FOR CLARIFICATION.
- 18. <u>GUARDS FOR ROTATING MACHINERY</u>: FURNISH AND INSTALL GUARDS FOR ALL EXPOSED BELT DRIVES. GUARDS SHALL BE RIGID AND READILY REMOVABLE WITH OPENINGS FOR CHECKING EQUIPMENT AND MOTOR SPEEDS. GUARDS SHALL BE ATTACHED TO EQUIPMENT AND NOT TO FLOOR.

PROVIDE GUARDS OVER EXPOSED DRIVES SUCH AS PUMP COUPLINGS. GUARDS TO COMPLY WITH OSHA STANDARDS.

IF GUARDS COVER THE GREASE FITTINGS, PROVIDE EXTENDED GREASE TUBES TO PERMIT LUBRICATION OF EQUIPMENT.

- 19. <u>CUTTING AND PATCHING</u>: ALL CUTTING AND PATCHING OF, OR REPAIR OF DAMAGE TO WORK IN PLACE SHALL BE DONE IN A NEAT AND WORKMANLIKE MANNER, MEETING WITH THE APPROVAL OF THE OWNER/ARCHITECT. PLUMBING CONTRACTOR WHOSE OPERATIONS REQUIRE CUTTING OF WORK IN PLACE, OR WHO CAUSES DAMAGE WHICH ENTAILS REPAIRS OF SUCH WORK, SHALL EMPLOY MECHANICS OF THE PARTICULAR TRADE WHOSE WORK MUST BE CUT OR WHICH IS DAMAGED, AND SHALL PAY ALL COSTS OF SUCH CUTTING OR REPAIR. ALL PATCHING REQUIRED TO MATCH ADJACENT CONSTRUCTION SHALL BE BY THE GENERAL CONTRACTOR AT THE PLUMBING CONTRACTOR'S EXPENSE.
- NO STRUCTURAL MEMBERS SHALL BE CUT WITHOUT THE APPROVAL OF THE ARCHITECT/ENGINEER AND ANY SUCH CUTTING SHALL BE DONE IN A MANNER DIRECTED BY THE ARCHITECT/ENGINEER.
- 20. <u>CLEAN-UP</u>: CONTRACTOR SHALL FREQUENTLY CLEAN UP ALL REFUSE, RUBBISH, SCRAP MATERIALS AND DEBRIS CAUSED BY THE CONTRACTOR'S OPERATIONS TO THE END THAT AT ALL TIMES THE SITE SHALL PRESENT A NEAT, ORDERLY AND WORKMANLIKE APPEARANCE. CRATES AND CARTONS IN WHICH MATERIALS, EQUIPMENT OR FIXTURES ARE RECEIVED SHALL BE REMOVED DAILY.
- IF, IN THE OPINION OF THE OWNER/ARCHITECT, NEATNESS IS NOT MAINTAINED, THE OWNER MAY HAVE THE AREA CLEANED AS DEFINED IN THE GENERAL CONDITIONS.
- CONTRACTOR, AT THE COMPLETION OF THE WORK, SHALL REMOVE ALL SURPLUS MATERIAL, FALSE WORK, TEMPORARY STRUCTURES, INCLUDING FOUNDATIONS THEREOF AND DEBRIS OF EVERY NATURE RESULTING FROM THEIR OPERATIONS AND PUT THE SITE IN A NEAT AND ORDERLY CONDITION.
- IN ADDITION TO ORDINARY PRECAUTIONS IN KEEPING DUCTS, PIPES AND EQUIPMENT CLEAN AND FREE OF DEBRIS DURING CONSTRUCTION, THE CONTRACTOR SHALL MAKE PROVISIONS FOR CLEANING OUT DUCTS AND PIPES MAKING USE OF THE GREATEST VELOCITIES AVAILABLE. THE CONTRACTOR SHALL PROVIDE ATTENDANCE, TEMPORARY CONNECTIONS AND FILTERS AS REQUIRED.
- THE EXTERIOR OF PIPES AND EQUIPMENT SHALL BE CLEANED OF ALL DIRT AND GREASE, PREPARATORY TO INSULATION OR PAINTING.
- 21. TESTING AND ADJUSTMENT: ALL WORK INSTALLED UNDER THIS CONTRACT SHALL TESTED IN THE PRESENCE OF AND TO THE SATISFACTION OF THE INSPECTING AUTHORITY HAVING JURISDICTION AND THE ARCHITECT/ENGINEER. ALL PIPING OR EQUIPMENT NOT FOUND TIGHT UNDER TEST SHALL BE REWORKED OR
- REPLACED, AS DIRECTED. CONTRACTOR SHALL OPERATE ALL PARTS OF THE ENTIRE SYSTEM, MAKE ANY AND ALL ADJUSTMENTS AND REPAIRS, AND SHALL LEAVE THE ENTIRE WORK TESTED AND READY FOR OPERATION BY THE OWNER.
- IF THE INSTALLED EQUIPMENT DOES NOT MEET THE SPECIFIED CAPACITIES OR IF THE MOTOR OPERATING CURRENT EXCEEDS THE NAMEPLATE RATINGS, SUCH EQUIPMENT SHALL BE CORRECTED BY THE CONTRACTOR.
- 22. <u>LUBRICATION AND PACKING</u>: ALL ROTATING AND RECIPROCATING EQUIPMENT REQUIRING LUBRICATION SHALL BE LUBRICATED WITH THE CORRECT GRADE, TYPE AND QUALITY OF LUBRICANT BEFORE BEING PLACED IN SERVICE.
- EACH SHAFT CONTAINING A PACKING GLAND SHALL BE CHECKED FOR CONDITION BY BACKING THE PACKING GLAND OFF AND EXAMINING FOR PROPER GRADE, AMOUNT AND TYPE OF PACKING AS RECOMMENDED BY THE MANUFACTURER.
- MAINTAIN ALL LUBRICATION GASKETS AND PACKING DURING CONSTRUCTION AND ASSURE THAT AT THE TIME OF ACCEPTANCE BY THE OWNER, ALL ARE IN FIRST CLASS OPERATING CONDITION.
- ALL LUBRICATION FITTINGS SHALL BE EXTENDED AS REQUIRED FOR ACCESSIBILITY.
- ACCESS PANELS: WHERE VALVES, TRAPS, DAMPERS OR OTHER SPECIALTIES ARE CONCEALED IN THE CONSTRUCTION OR BEHIND A WALL OR CEILING SURFACE, THE CONTRACTOR SHALL FURNISH AND INSTALL AN ACCESS PANEL OF ADEQUATE SIZE TO PERMIT ADJUSTMENT OR SERVICE OF CONCEALED DEVICE. PANELS SHALL BE OF A DESIGN SUITABLE FOR INSTALLATION IN THE MATERIAL FORMING THE FINISHED SURFACE IN WHICH EACH IS MOUNTED. APPROVAL OF THE ARCHITECT/ENGINEER IS REQUIRED OF ALL EXPOSED ACCESS PANELS IN FINISHED AREAS.
- THE CONTRACTOR SHALL CONFER WITH OTHER CONTRACTORS AND SUBCONTRACTORS WITH RESPECT TO ACCESS PANEL LOCATIONS AND SHALL, WHEREVER PRACTICAL, GROUP VALVES, TRAPS, DAMPERS, ETC. IN SUCH A WAY AS TO BE ACCESSIBLE FROM A SINGLE PANEL AND ELIMINATE AS MANY ACCESS PANELS AS POSSIBLE.
- EACH ACCESS PANEL IN MASONRY, PLASTER OR DRYWALL SURFACES SHALL HAVE A FLUSH METAL FRAME AND FLUSH HINGED STEEL DOOR WITH FLUSH SCREWDRIVER-OPERATED LATCH. PANELS IN ACOUSTIC CEILING SHALL BE OF RECESSED TYPE, TO WHICH TILE CAN BE ATTACHED IN SUCH A MANNER THAT TILE ON PANEL WILL BE FLUSH WITH CEILING TILE. PANELS ARE NOT REQUIRED WHERE CEILING TILES ARE SUPPORTED IN EXPOSED T-BAR CONSTRUCTION.
- 24. <u>CORRELATION OF WORK AND INTERFERENCES</u>: BEFORE INSTALLING ANY WORK, CONTRACTOR SHALL SEE THAT SUCH INSTALLATION WILL NOT INTERFERE WITH CLEARANCES REQUIRED FOR THE PROPER FINISHING OF ARCHITECTURAL WORK INCLUDING THE FINISHING OF SURFACES. IN GENERAL, ALL DUCTWORK AND PIPES IN FINISHED AREAS SHALL BE INSTALLED AND CONCEALED IN WALLS. FURRED SPACES, PIPE CHASES OR ABOVE SUSPENDED CEILINGS. IF AN INTERFERENCE OCCURS, CONTRACTOR SHALL CONSULT WITH THE ARCHITECT/ENGINEER BEFORE INSTALLING THE DUCT OR PIPE.
- WHERE WORK OF THE VARIOUS MECHANICAL CONTRACTORS MUST BE INSTALLED IN CONFINED SPACES, THE SUPERINTENDENTS OF THE MECHANICAL CONTRACTORS SHALL COORDINATE THEIR WORK WITH THE SUPERINTENDENTS OF OTHER PERTINENT TRADES BEFORE INSTALLATION TO ASSURE AGAINST INTERFERENCES. FAILURE TO SO COORDINATE SUCH WORK SHALL PLACE THE RESPONSIBILITY FOR MAKING ANY REQUIRED CHANGES IN ANY TRADE UPON THE CONTRACTOR WHO SHALL HAVE FAILED TO JOIN IN THE REQUIRED COOPERATIVE EFFORT, ALL AT THE DIRECTION OF THE ARCHITECT/ENGINEER.
- 25. <u>HOISTS, RIGGING, SCAFFOLDING AND TRANSPORTATION</u>: CONTRACTOR SHALL PROVIDE ALL REQUIRED SCAFFOLDING, RIGGING, STAGING, TACKLE, HOISTS AND SIMILAR DEVICES AND EQUIPMENT NECESSARY FOR PROPER INSTALLATION OF HIS WORK. SHALL REMOVE ALL TEMPORARY MATERIALS OF THIS NATURE WHEN NO LONGER REQUIRED, AND SHALL BE RESPONSIBLE FOR THE SAFE AND LAWFUL USE THEREOF. CONTRACTOR SHALL BE RESPONSIBLE FOR THE TRANSPORTATION OF ALL MATERIALS AND EQUIPMENT TO THE JOB SITE, ADEQUATE PROTECTED STORAGE ON SITE, AND ALL COSTS OF SAME.
- 26. <u>PROVISIONS FOR LATER INSTALLATIONS</u>: WHERE WORK CANNOT BE INSTALLED AS THE STRUCTURE IS BEING ERECTED, CONTRACTOR FOR SUCH WORK SHALL PROVIDE AND ARRANGE FOR THE BUILDING-IN OF BOXES, SLEEVES, INSERTS, FIXTURES OR DEVICES AS NECESSARY TO PERMIT INSTALLATION OF THE OMITTED WORK DURING LATER PHASES OF CONSTRUCTION. CONTRACTOR SHALL ARRANGE FOR AND LAY OUT ANY CHASES, HOLES OR OTHER OPENINGS WHICH MUST BE PROVIDED IN MASONRY, CONCRETE OR OTHER WORK.
- CONTRACTOR SHALL BE RESPONSIBLE FOR BECOMING INFORMED OF THE NATURE AND ARRANGEMENT OF THE MATERIALS AND CONSTRUCTION TO WHICH THIS CONTRACTOR'S WORK ATTACHES, MEMBERS WITH, OR PASSES THROUGH.
- 27. EXCAVATION AND BACKFILL: THE CONTRACTOR SHALL DO ALL EXCAVATING AND BACKFILLING IN CONNECTION WITH THIS CONTRACTOR'S WORK.
 - PIPE TRENCHES SHALL BE CUT TO INSTRUMENT GRADE, HELD TO MINIMUM WIDTH TO ACCOMPLISH THE WORK, CUT OUT FOR PIPE HUBS AND FITTINGS TO OBTAIN A SOLID BED FOR ALL BURIED WORK. IN THE EVENT TRENCHES ARE CUT TOO DEEP. THEY SHALL BE FILLED WITH SAND TO CORRECT ELEVATION AND MATERIAL SHALL BE MECHANICALLY TAMPED TO SECURE THE FOUNDATION REQUIRED. IN EVENT THAT UNSUITABLE MATERIAL FOR ADEQUATE PIPE SUPPORT IS ENCOUNTERED, SAME SHALL BE REMOVED TO SUFFICIENT DEPTH AND BACKFILL INSTALLED TO SECURE PROPER FOUNDATION.
 - NO PIPING SHALL BE LAID IN WATER. CONTRACTOR SHALL PROVIDE AND OPERATE PUMPING EQUIPMENT AS MAY BE NECESSARY AND SHORE TRENCHES AS MAY BE NECESSARY TO PREVENT CAVING IN OF THE WORK. CONTRACTOR INSTALLING THE WORK SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE WORK OF OTHER CONTRACTORS AS A RESULT OF UNDERGROUND WORK.
 - BACKFILL WITHIN BUILDING AND UNDER SIDEWALKS AND PAVEMENTS SHALL BE FINE GRANULAR SAND. TO PROPER FINISHED GRADE. HANDFILL AND HANDTAMP TO NOT LESS THAN TWELVE INCHES ABOVE PIPING IN SIX INCH LAYERS AND COMPLETE BACKFILL TAMPED IN LAYERS NOT TO EXCEED SIX INCHES. BACKFILL TO MEET COMPACTION TEST AS STATED IN ARCHITECTURAL SECTION OF SPECIFICATIONS FOR BACKFILL UNDER SLAB.
 - BACKFILL OUTSIDE OF BUILDING LINES SHALL BE TAMPED SAND TO TWENTY-FOUR INCHES ABOVE PIPE AS HEREIN BEFORE DESCRIBED FOR INTERIOR WORK. CLEAN SAND OR CLEAN EARTH, APPROVED BY ARCHITECT, TO COMPLETE BACKFILL TAMPED IN LAYERS NOT TO EXCEED SIX INCHES. FINAL SIX INCHES OF FILL TO ESTABLISH GRADE SHALL BE CLEAN EARTH. FILL AS NECESSARY TO ALLOW FOR SETTLING. WHEN OR IF ROCK IS ENCOUNTERED, THE TAMPED SAND BED BELOW THE PIPE SHALL BE A MINIMUM OF SIX INCHES. BACKFILL SHALL BE AS SPECIFIED IN THE ABOVE PARAGRAPHS. EXPLOSIVES SHALL NOT BE USED FOR ROCK EXCAVATION.

EXCESS EXCAVATED MATERIALS AND DEBRIS SHALL BE REMOVED FROM THE CONTRACTOR MAKING THE EXCAVATION.

- CONTRACTOR SHALL CUT ALL PAVED DRIVES, STREETS, SIDEWALKS AND SIM AREAS TO MINIMUM WIDTHS REQUIRED. PARTICULAR CARE SHALL BE EXERC INSURE COMPACTION OF ALL FILL UNDER SUCH AREAS TO SATISFACTION OF ARCHITECT/ENGINEER.
- CONTRACTOR SHALL REPLACE ALL SUCH REMOVED AND DAMAGED PAVEMENT ALL TYPES. MATCHING EXISTING WORK, INCLUDING SEALING OF ALL BLACKTO PAVEMENTS AND PROPER FINISHING OF CONCRETE.
- FOR UNDERGROUND PIPING EXTERIOR TO THE FACILITY, PROVIDE SETON UNDERGROUND WARNING TAPES, BURIED ABOVE THE PIPE LINE AT APPROXI 18" TO 24" BELOW GRADE. TAPE TO BE 2" WIDE, BRIGHTLY COLORED, AN INDICATE SERVICE OF BURIED PIPE. FOR NON-METALLIC PIPE, USE METALL
- 28. <u>ELECTRICAL REQUIREMENTS FOR PLUMBING EQUIPMENT</u>: PLUMBING CONTRA SHALL FURNISH ALL SPECIAL CONTROL ITEMS AND MOTORS REQUIRED FOR OPERATION OF ALL EQUIPMENT PROVIDED UNDER THEIR SECTIONS OF THE
 - ELECTRICAL CONTRACTOR SHALL FURNISH ALL NECESSARY STARTERS AND DISCONNECT SWITCHES, EXCEPT ON EQUIPMENT WHICH IS TO BE PROVIDED STARTERS OR DISCONNECT SWITCHES AS PART OF THE ASSEMBLY. THE E CONTRACTOR WILL FURNISH ALL POWER WIRING THROUGH STARTERS AND DISCONNECT SWITCHES TO MOTORS.
 - P.C. SHALL PROVIDE ALL POWER WIRING FOR CONTROLS, CONTROL AND/OR INTERLOCK WIRING REQUIRED FOR HIS PARTICULAR WORK. P.C. SHALL ALS INCLUDE ANY WIRING REQUIRED AS NOTED IN THE INDIVIDUAL SECTIONS OF SPECIFICATIONS. ALL WIRING REQUIRED BY THIS CONTRACTOR SHALL BE IN ACCORDANCE WITH PROVISIONS AS SET FORTH UNDER THE NATIONAL ELECT AND DIVISION 26 ELECTRICAL WORK OF THESE SPECIFICATIONS.
 - WHERE ELECTRICAL REQUIREMENTS AND/OR MOTOR HORSEPOWERS FOR THE EQUIPMENT SUPPLIED VARIES FROM THAT SHOWN ON THE PLUMBING DRAWI AS SPECIFICALLY CALLED OUT IN THE PLUMBING SPECIFICATIONS, THE ELEC DRAWINGS AND SPECIFICATIONS SHALL GOVERN AND BE ADHERED TO AS TO ELECTRICAL POWER CHARACTERISTICS FOR THE SUPPLIED EQUIPMENT.
 - FOR ELECTRICAL POWER CHARACTERISTICS OF EQUIPMENT TO BE INSTALLED CONTRACTOR, SEE THE PLUMBING DRAWINGS AND SCHEDULES.
 - MOTORS 1/2 HP AND OVER WILL BE PROVIDED WITH ACROSS-THE-LINE S WITH OVERLOAD PROTECTION UNLESS OTHERWISE SPECIFIED. ALL MOTORS 1/2 HP SHALL HAVE INTEGRAL OVERLOAD PROTECTION. ALL MOTORS MUST CONFORM TO CURRENT NEMA STANDARDS.
 - ANY OPEN DRIVE MOTOR, ONE HORSEPOWER AND OVER, SHALL BE OF THE EFFICIENCY TYPE WITH A MINIMUM POWER FACTOR OF 82%. CERTIFIED TES SHALL BE AVAILABLE, IF REQUIRED, INDICATING THE HORSEPOWER, POWER RATING, EFFICIENCY RATING, WATTS, AND RPM. HIGH EFFICIENCY MOTOR SH AS MANUFACTURED BY BALDOR ELECTRIC COMPANY. LOUIS ALLIS COMPANY. WESTINGHOUSE ELECTRIC, GENERAL ELECTRIC, EMERSON ELECTRIC OR MAGN
- 29. <u>PIPES AND PIPE FITTINGS</u>:
- A. <u>GENERAL REQUIREMENTS FOR PIPING INSTALLATION</u>
- ALL PIPING MATERIALS FURNISHED AND ALL PROCEDURES FOLLOWED FABRICATION AND ERECTION SHALL COMPLY WITH THE APPLICABLE SEC THE LOCAL BUILDING CODE, APPLICABLE PRESSURE PIPING CODE, AND REQUIREMENTS OF APPLICABLE SECTIONS OF "BUILDING SERVICES PIPI B31.9, LATEST REVISION AND ADDENDA.
- ALL PIPING SHALL BE INSTALLED IN ACCORDANCE WITH THE RECOGNIZ PRACTICES OF THE TRADE. THE CONTRACTOR SHALL BE HELD RESPO FOR SUFFICIENT PLANNING AND FORESIGHT IN AVOIDANCE OF OBSTACL INTERFERENCES MET IN THE FIELD. PIPING SHALL BE INSTALLED PARA PLANES OF THE BUILDING STRUCTURE AND MUST BE LEVEL AND PLUM PITCHED AS REQUIRED BY GOOD ENGINEERING PRACTICE.
- PIPING SHALL BE FABRICATED OF MATERIALS AND BE OF SCHEDULE A DIMENSIONS AS INDICATED ON THE DRAWINGS AND MATERIAL SPECIFICA SEPARATELY LISTED AND SHALL BE THE LONGEST LENGTH COMMERCIAL AVAILABLE. ALL PIPE AND FITTINGS SHALL HAVE THE MANUFACTURER' IDENTIFYING MARK STENCILED, STAMPED OR ROLLED ONTO THE SURFACE ACCORDANCE WITH ASTM SPECIFICATIONS.
- FITTINGS SHALL BE USED FOR ALL PIPE LINES AND UNLESS OTHERWIS SPECIFIED SHALL CONFORM TO ANSI CODE B31.9 "BUILDING SERVICES LATEST REVISION, MATERIALS SCHEDULE. UNLESS OTHERWISE NOTED WELDED ELBOWS ARE TO BE LONG RADIUS TYPE.
- FLANGES OR UNIONS SHALL BE INSTALLED ADJACENT TO EACH TRAF OF EQUIPMENT TO PERMIT REMOVAL OF SAME FROM THE LINE. IN A UNIONS OR FLANGES SHALL BE PROVIDED AS REQUIRED TO MAKE-UP DISCONNECT PIPING. EACH UNION SHALL BE INSTALLED IN A POSITIO PERMITTING THE VALVE, TRAP OR PIECE OF EQUIPMENT TO BE REMOV DISCONNECTING THE UNION AND ONLY A MINIMAL AMOUNT OF PIPING.
- FLANGES SHALL BE FLAT-FACED WHERE BOLTING TO A FLAT-FACE FL AND RAISED-FACE WHERE BOLTING TO A RAISED-FACE FLANGE, AND SHALL BE OF THE SAME BORE AS THE ADJOINING PIPE. GASKETS AR FULL FACE TYPE FOR FLAT FACE FLANGES AND RING TYPE FOR RAISE FLANGES.
- ALL PIPE ENDS SHALL BE REAMED TO FULL SIZE AND ALL THREADS CLEANLY CUT AND TAPERED. JOINTS IN SCREWED PIPING SHALL BE WITH APPROVED PIPE THREAD COMPOUND APPLIED TO MALE THREAD AVOID LEAVING COMPOUND INSIDE THE PIPE. TEFLON TAPE IS ACCEP EXCEPT IF THE SYSTEM CONTAINS A GLYCOL FLUID, IN WHICH CASE A COMPATIBLE WITH A GLYCOL SOLUTION MAY BE USED.
- ALL PIPING SHALL BE CLEANED OUT BEFORE INSTALLATION BY BLOWIN WITH COMPRESSED AIR OR BY OTHER APPROVED METHODS. PROVIDE TEMPORARY PLUGS OR CAPS FOR ALL OPEN ENDS OF PIPE WHEN W NOT BEING CARRIED ON TO COMPLETION.
- ALL CONNECTIONS, VENTS, DRAINS, ETC. MUST BE INSTALLED AS REQU PROVIDE TAPPED ELBOWS OR OTHER NECESSARY FITTINGS TO ALLOW INSTALLATION OF THERMOWELLS, SENSORS, FLOW SWITCHES, PRESSURI
- SWITCHES, ETC. AS FURNISHED BY THE TEMPERATURE CONTROL SUBCONTRACTOR AND INSTALLED BY THIS CONTRACTOR. MOST WELLS SHOWN. VERIFY NUMBER AND LOCATION WITH THE CONTROL SUBCONT
- ALL OVERHEAD PIPING SHALL BE INSTALLED AS HIGH AS POSSIBLE TO MAXIMUM HEAD ROOM.
- PROVIDE VENTS ON HIGH POINTS OF SYSTEM WHERE NECESSARY TO THE FILLING OF THE SYSTEM AND TO INSURE THE FLOW OF FLUIDS V SYSTEM IS IN OPERATION. PROVIDE DRAIN VALVES ON LOW POINTS O PIPING (HORIZONTAL PIPING OVER 1-1/2 INCH IN SIZE AND OVER 50 LONG AND ON MAIN VENTED RISERS) FOR DRAINING PURPOSES. PROV HOSE CAPS ON HOSE END DRAIN VALVE.
- WHEN INSTALLING PIPING IN PARALLEL, SUFFICIENT SPACE SHALL BE BETWEEN PIPE LINES TO FACILITATE FUTURE WORK ON ONE OF THE
- TESTS SHALL BE AS CALLED FOR IN THE ABOVE CODES AND MATERIAL SPECIFICATIONS AND SHALL BE ADHERED TO. PIPE, VALVES, FITTINGS, SHALL BE HYDROSTATICALLY TESTED IN ACCORDANCE WITH ANSI.B31.9 SERVICES PIPING", LATEST REVISION. THE REQUIREMENTS OF HYDROS" TESTS, INDICATED HEREWITH, WILL BE CONSIDERED MET IF THE HYDRO TESTS APPLIED TO THE ERECTED PIPING SYSTEM ARE COMPLETED TO SATISFACTION OF THE ARCHITECT.
- WHEN HYDROSTATIC TESTS ARE APPLIED TO ANY PIPING SECTION, A L BE KEPT BY THE CONTRACTOR. LOG SHALL STATE SECTION OF PIPE USE OF PIPE, HYDROSTATIC TESTS PRESSURE APPLIED, LENGTH OF TE AND TIME APPLIED. LOG SHALL BE SIGNED BY THE CONTRACTOR'S SUPERINTENDENT AND RETAINED BY THE CONTRACTOR.
- TOOL MARKS WILL NOT BE PERMITTED ON WORK IN FINISHED AREAS. ALL WELDED PIPING JOINTS OF STEEL PIPE, VALVES AND FITTINGS ARE
- WELDED IN ACCORDANCE WITH ANSI CODE B31.9 "BUILDING SERVICE WELDED DETAILS FOR PIPE, VALVES AND FITTINGS SHALL CONFORM TO APPROVED WELDING STANDARDS.
- IT IS REQUIRED THAT ALL WELDING AND BRAZING OF PIPING COVERED SPECIFICATION, REGARDLESS OF CONDITION OF SERVICE, BE INSTALLED
- 1) PIPE WELDING SHALL COMPLY WITH THE PROVISIONS OF THE REVISION OF THE ASME BOILER AND PRESSURE VESSEL COE THE ANSI CODE B31.9 "BUILDING SERVICES PIPING", OR SUC OR LOCAL REQUIREMENTS AS MAY SUPPLEMENT CODES MEN

HE SITE BY 2) BEFORE ANY PIPE WELDING IS PERFORMED, THE CONTRACTOR SHALL	
HAVE IN HIS FILES, A COPY OF HIS WELDING PROCEDURES SPECIFICATIONS TOGETHER WITH PROOF OF ITS QUALIFICATION AS OUTLINED AND REQUIRED BY THE MOST RECENT ISSUE OF THE CODE	
CONTINUED AND REQUIRED BY THE MOST RECENT ISSUE OF THE CODE ERCISED TO OF 3) BEFORE ANY OPERATOR SHALL PERFORM ANY PIPE WELDING, THE	TT A. MEIER
CONTRACTOR SHALL HAVE IN HIS FILES THE WELDER'S PERFORMANCE QUALIFICATION RECORD IN CONFORMANCE WITH PROVISIONS OF THE CODE HAVING JURISDICTION, SHOWING THAT THE WELDER WAS TESTED UNDER THE PROVED PROCEDURE SPECIFICATIONS SUBMITTED BY THE CONTRACTOR.	DOSSIE PROFE
AND SHALL 4) EACH MANUFACTURER OR CONTRACTOR SHALL BE RESPONSIBLE FOR THE QUALITY OF WELDING DONE BY HIS ORGANIZATION AND SHALL ALLIC LINED REPAIR OR REPLACE ANY WORK NOT IN ACCORDANCE WITH THESE SPECIFICATIONS.	
RACTOR 5) CERTIFICATION COSTS MUST BE PAID FOR BY THIS CONTRACTOR. R THE WELDING OF GALVANIZED PIPE OR FITTINGS WILL NOT BE ACCEPTABLE. E WORK. FOR A DEVINE CONVERSION FROM A MUST AT A FLOT TWO PIPE OFFER	1 G N 3.5323
ED WITH ELECTRICAL FOR A BRANCH CONNECTION FROM A MAIN AT LEAST TWO PIPE SIZES SMALLER THAN THE MAIN, APPROVED WELDOLET OR THREDOLET OR VICTAULIC STYLE 920 BOLTED BRANCH OUTLET MAY BE USED. BRANCH CONNECTION SHALL BE WELDED OR SCREWED DEPENDING ON THE PIPING SPECIFICATION HEREINAFTER. WELDED NIPPLE INTO THE MAIN WILL NOT BE ALLOWED.	D E S D E S P:419.523
DR LSO DF THE IN HEX HEAD BOLTS AND NUTS SHALL BE USED FOR FLANGED CONNECTIONS. GASKET MATERIAL SHALL BE 150# OR 300# TYPE, 1/16" THICK. FOR 300#, FLEXITALLIC GASKETS MAY BE USED.	
CTRIC CODE COPPER TUBING SHALL CONFORM TO ASTM B88. TUBING SHALL BE CUT WITH PIPE CUTTERS AND NOT HACKSAWS. AFTER CUTTING, THE TUBING SHALL BE SIZED WITH A SIZING TOOL.	
HE COPPER FITTINGS SHALL BE WROUGHT COPPER OR CONFORM WINGS OR COPPER FITTINGS SHALL BE WROUGHT COPPER OR CAST BRASS AND CONFORM ECTRICAL TO ANSI B16.18 OR B16.22. TO	
ED BY THIS MALE ADAPTERS SHALL BE USED WHEREVER IT IS NECESSARY TO CONNECT COPPER TUBING TO A VALVE OR TEE HAVING THREADED CONNECTIONS. THE ADAPTERS SHALL BE SOLDERED TO THE COPPER TUBING. NO THREADS SHALL BE CUT IN COPPER TUBING.	E N G I
STARTERS LEAD FREE SOLDER USED FOR CONNECTIONS IN COPPER TUBING SHALL BE S UNDER 95/5 TIN ANTIMONY, 94/6 OR 96/4 TIN-SILVER OR SILVABRITE 100 (TIN, IST COPPER AND SILVER) SOLDER WITH RECOMMENDED FLUX (50/50 LEAD/TIN SOLDER IS NOT ACCEPTABLE). OTHER JOINT CONNECTIONS FOR SPECIAL SERVICE LINES ARE NOTED ELSEWHERE IN THE SPECIFICATIONS.	C H I T E C T U R E . V PERRY STREET, SUITE echnicondesigngroup.com
HE HIGH EST DATA ALL PLUGS FOR ALL SERVICES SHALL BE BRASS.	
SHALL BE B. <u>CLEANING OF PIPING SYSTEMS</u> IY, GNETEK. FLUSH SANITARY PIPING WITH DOMESTIC WATER AND WITH THE MAXIMUM AMOUNT OF WATER AVAILABLE.	T E C RY S1
THE DOMESTIC WATER SYSTEM SHALL BE FLUSHED WITH THE MAXIMUM AMOUNT OF WATER AVAILABLE. THE TOTAL WATER SYSTEM SHALL BE CHLORINATED AS REQUIRED BY LOCAL AND STATE CODES.	
IN ECTIONS OF ND ND NEW WATER PIPING CONNECTING INTO EXISTING PIPING SYSTEMS SHALL BE FILLED, DRAINED AND FLUSHED BEFORE CONNECTION INTO EXISTING SYSTEM.	A R C 1800 N www.teo
PING", ANSI PING", ANSI NEW WATER PIPING CONNECTING INTO EXISTING PIPING SYSTEMS SHALL BE FILLED, DRAINED AND FLUSHED BEFORE CONNECTION INTO EXISTING SYSTEM.	
NIZED BEST C. <u>SLEEVES</u> PONSIBLE CLES AND SLEEVES SHALL BE INSTALLED BY THE CONTRACTOR WHEREVER PIPES PASS ARALLEL TO THROUGH WALLS SLABS FLOORS OR CEILINGS NO PIPES SHALL PASS	
UMB, OR THROUGH BEAMS OR BE EMBEDDED IN CONCRETE. SLEEVES IN CONCRETE SHALL BE STANDARD WEIGHT STEEL PIPE OR PURCHASED UNITS AS SPECIFIED BELOW. TWENTY-SIX GAUGE GALVANIZED STEEL SLEEVES ARE ACCEPTABLE IN	
AND/ORWOOD, PLASTER OR DRYWALL PARTITIONS. ALL SLEEVES SHALL BE SAWED ORICATIONS ASMACHINE CUT (NO FLAME CUTTING) AND FLUSH WITH FINISHED SURFACESIALLYEXCEPT FOR MECHANICAL EQUIPMENT AREAS WHICH SHALL EXTEND 2" ABOVER'SFINISHED FLOOR AND BE OF GALVANIZED STEEL.FACE INFINISHED FLOOR AND BE OF GALVANIZED STEEL.	v <i>←</i>
CENTER PIPE IN SLEEVES WITH SPACERS. VISE IF POSSIBLE, IN NEW CONCRETE WORK, SLEEVES SHALL BE SET INTO POSITION ES PIPING", BEFORE CONCRETE IS POURED. WHERE PIPE OPENINGS ARE REQUIRED IN CONCRETE AFTER THE CONCRETE HAS BEEN POURED, THIS CONTRACTOR SHALL CORE DRILL SAME AND ELIMINATE THE PIPE SLEEVE.	NVATIONS TECH DRIVE OH 43551
OR PIECE ADDITION,WHERE PIPES PASS THROUGH EXTERIOR CONCRETE WALLS, SET SCHEDULE 40JP ORSTEEL PIPE OR SPECIAL MANUFACTURED CASTINGS OR SLEEVES 1-1/2" LARGER THAN O.D. OF PIPE. CAULK BOTH SIDES WITH OAKUM AND LEAD	\sim $ \sim$
ION WOOL, COAT WITH BITUMINOUS PAINT AND OTHERWISE ADEQUATELY WATERPROOF OVED BY OPENING AROUND PIPE. A CASING SEAL SYSTEM AS MANUFACTURED BY G. THUNDERLINE CORPORATION UNDER THE TRADE NAME "LINK-SEAL" MAY BE FLANGE, USED INSTEAD OF OAKUM AND CAULKING.	s reno GSHIP BURG, (
O THEY SLEEVES SHALL BE INSTALLED BY THE CONTRACTOR WHEREVER EXISTING PIPES ARE TO BE PASS THROUGH NEW WALLS ERECTED FOR THIS PROJECT. TWENTY-SIX GAUGE SED FACE GALVANIZED STEEL SPLIT RING TYPE SLEEVES ARE ACCEPTABLE. EXISTING DIRING SHOWN ON THE DRAWINGS IS TAKEN FROM RECORD DRAWINGS AND (OR	
S SHALL BE MADE ONLY TO PIPING SHOWN ON THE DRAWINGS IS TAKEN FROM RECORD DRAWINGS AND/OR FIELD OBSERVATION AND ARE DEEMED RELIABLE ONLY INSOFAR AS GENERAL LAYOUT IS CONCERNED. THE RESPONSIBILITY FOR CHECKING IN PLACE ITEMS WILL BE THE CONTRACTOR'S.	ERRY
OPENINGS AROUND PIPES OR IN SLEEVES FOR PIPES PASSING THROUGH FLOOR A TAPE OPENINGS AROUND PIPES OR IN SLEEVES FOR PIPES PASSING THROUGH FLOOR SLABS, FIRE-RATED WALLS, SMOKE BARRIERS, OR FIRE-RATED CEILINGS MUST BE SEALED WITH A NON-COMBUSTIBLE MATERIAL. SEAL AT BOTH SIDES OF ANY CAVITY WALL. INSULATION SHALL NOT EXTEND THROUGH SLEEVE. FILL	BUI 127 PEF
DE SLEEVE OPENING WITH DOW CORNING 3-6548 RTV SILICONE FOAM, 3M FIRE WORK IS BARRIER, G.E. RTV OR FLAME STOP, INC. PRODUCT SHALL INTUMESCE (EXPAND) WHEN SUBJECTED TO HEAT. WHEN USED FOR OPENINGS AROUND	THE CONTENTS OF THIS DRAWING SHALL NOT BE USED OR REPRODUCED BY INDIVIDUALS, CORPORATIONS, OR OTHER ENTITIES FOR ANY PURPOSE OTHER THAN THE INTENDED USE FOR THIS PROJECT. IF THIS DRAWING IS USED IN PART OR ITS ENTIRETY, ON WORK OTHER THAN THE PROJECT INTENDED BY TECHNICON DESIGN GROUP, INC., THE RIGHT IS RESERVED TO MAKE A CHARGE FOR
AROUND PIPE TO FILL VOID COMPLETELY IF THE PIPE IS CONSUMED BY THE HEAT. AN EXTERIOR METAL HOLDING COLLAR AND CLAMP MAY BE REQUIRED FOR THIS APPLICATION. DEPTH OF FILL MATERIAL SHALL PROVIDE SAME FIRE	GROUP, INC., THE RIGHT IS RESERVED TO MAKE A CHARGE FOR ADDITIONAL ARCHITECTURAL AND/OR ENGINEERING FEES. THEREFORE, REUSE OR REPRODUCTION OF THIS DOCUMENT WITHOUT PRIOR WRITTEN CONSENT OF TECHNICON DESIGN GROUP, INC. IS STRICTLY PROHIBITED.
RE RATING AS FLOOR OR WALL PENETRATED. FIBERGLASS IS NOT ACCEPTABLE, EXCEPT AS A BACKING FOR THE ABOVE MATERIALS. PREPACKED SLEEVES SUCH AS PROSET "FIRESTOP PENETRATORS" AS INSTALLED IN ACCORDANCE INTRACTOR. WITH THE MANUFACTURER'S RECOMMENDATIONS ARE ACCEPTABLE.	© 2023 TECHNICON DESIGN GROUP, INC DO NOT SCALE FROM DRAWINGS. THE ARCHITECT/ENGINEER SHALL NOT BE RESPONSIBLE
TO PROVIDE ALL METAL PIPING PASSING THROUGH OR ADJACENT TO WOOD THAT HAS BEEN TREATED WITH FIRE RETARDANT CHEMICALS SHALL BE SLEEVED WITH SCHEDULE	FOR ANY QUANTITIES OF MATERIALS AND LOCATIONS OF BUILDING COMPONENTS SCALED FROM THESE DRAWINGS.
40 PVC PIPING ONE SIZE LARGER THAN A BARE METAL PIPE OR ONE SIZE FACILITATE LARGER THAN AN INSULATED PIPE. ALTERNATE METHODS OF PROTECTING THE WHEN THE PIPING MAY BE USED AT THE CONTRACTOR'S OPTION. OF THE	PLUMBING
50 FEET D. ESCUTCHEON_PLATES ROVIDE CHROME-PLATED ESCUTCHEON PLATES SHALL BE USED WHERE PIPING ENTERS FINISHED AREAS AND SHALL FIT NEATLY TO PIPE AND SURFACE. THE PLATES MAY BE BLACK IRON IN UNFINISHED AREAS.	SPECIFICATIONS
LINES. OMIT PLATES IN CONCEALED PIPING SPACES.	ISSUED DATE 11-21-23 BIDDING & PERMITS
9 BUILDING ESCUTCHEON PLATES WILL BE REQUIRED. DSTATIC ROSTATIC E. <u>ISOLATING PIPES (FLUID FLOW SYSTEMS)</u> 0 THE	01-09-24 PERMITS
WHERE A COPPER PIPE CONNECTS TO A STEEL PIPE, THE CONNECTION SHALL BE MADE WITH A DIELECTRIC UNION OR FLANGES WITH DIELECTRIC BOLT SETS. LOG SHALL E, ULTIMATE TEST, DATE	
DIELECTRIC PIPE FITTING SHALL BE EQUIVALENT TO EPCO DIELECTRIC UNION RATED AT 250 PSI OR FLANGES RATED AT 175 PSI. INSULATING GASKET SHALL BE RATED FOR 200°F MAXIMUM TEMPERATURE ON SYSTEMS WITH FLUID TEMPERATURES UP TO 160°F AND A RATING OF 280°F ON SYSTEMS WITH 160°F TO 250°F FLUID TEMPERATURES.	
RE TO BE WHEN CONNECTIONS ARE MADE AT COILS OR SIMILAR SITUATIONS WHICH PIPING". INCLUDE SUCH ITEMS AS STEEL OR CAST IRON BALANCING COCKS, VALVES, TO PUMPS, FLOW INDICATORS, ETC., IT IS SUGGESTED THAT ALL PIPING IN THESE AREAS BE STEEL WITH DIELECTRIC UNIONS OR FLANGES WHEN CONNECTING TO ED BY THIS	DRAWN BY: SAB
ED AS WHERE COPPER PIPES CROSS IRON PIPES AND IN ALL SIMILAR CONDITIONS WHERE ISOLATION IS NECESSARY TO ELIMINATE ELECTROLYSIS, THE PIPE SHALL DE ISOLATED WITH A DVC SHEATHING	DATE: 08-23
SUCH STATE STEEL OR CAST IRON FLANGE VALVES, ETC. IN A COPPER PIPE. ON SMALLER	PLOT SCALE: 1:1
ENTIONED VALVE SIZES, DIELECTRIC UNIONS WILL BE REQUIRED.	JOB NO. 45-2902-23

(SEE CONTINUATION ON SHEET P902.)

SHEET

P901

DIVISION 22 - PLUMBING SPECIFICATIONS 30. <u>SUPPORTS AND ANCHORS</u>

CONTRACTOR SHALL PROVIDE ALL MISCELLANEOUS STEEL AND HARDWARE AS REQUIRED TO SUPPORT, HANG AND SECURE ALL EQUIPMENT, PIPES, ETC. AS FURNISHED BY THEM, UNLESS SUCH MATERIALS ARE SPECIFICALLY CALLED OUT TO BE PROVIDED BY OTHER CONTRACTORS.

31. PIPE HANGERS AND SUPPORTS

CONTRACTOR SHALL FURNISH AND INSTALL ALL ADJUSTABLE HANGERS, SPECIAL PIPE SUPPORTS, SPRING HANGERS, ANCHORS, CLAMPS, RODS, AND APPURTENANCES AS REQUIRED TO SECURELY AND PROPERLY HANG OR SUPPORT THE PIPING SYSTEMS. HANGERS AND SUPPORTS SHALL BE EQUIVALENT TO THE GRINNELL MODELS SPECIFIED.

ALL PIPING SYSTEMS SHALL HAVE ANCHORAGE, SWAY BRACES, GUIDES AND SUPPORTS SATISFACTORY TO THE ARCHITECT AND SHALL BE FABRICATED IN ACCORDANCE WITH ANSI CODE B31.9, BUILDING SERVICES PIPING", LATEST ISSUE, AND MUST BE INSTALLED WITH DUE REGARD FOR GENERAL REQUIREMENTS.

WHERE HANGERS ARE SUPPORTED FROM THE BUILDING STRUCTURAL STEEL, THEY SHALL BE ATTACHED TO STRUCTURAL MEMBERS BY BEAM CLAMPS BEARING ON BOTH SIDES. DO NOT WELD HANGER RODS TO STRUCTURAL STEEL. WHEN ATTACHING TO BAR JOISTS, ATTACH AT THE PANEL POINTS ONLY. ATTACH TO CONCRETE DECKING USING EXPANSION BOLTS OR CONCRETE ANCHORS.

HANGERS NOT OTHERWISE NOTED OR SPECIFIED SHALL BE ADJUSTABLE WROUGHT IRON CLEVIS TYPE, GRINNELL NO. 260, FOR INSULATED AND NON-INSULATED STEEL PIPE AND INSULATED COPPER TUBING. BARE COPPER TUBING SHALL BE SUPPORTED WITH COPPER-PLATED PLASTIC-COATED HANGERS, GRINNELL FIG. CT-99C. SUITABLE TRAPEZE TYPE HANGERS MAY BE USED WHERE SEVERAL LINES ARE RUNNING PARALLEL.

PIPING SHALL BE SUPPORTED WITH HANGERS SPACED IN ACCORDANCE WITH SCHEDULE ON SHEET M602. EACH SECTION OF PIPE SHALL HAVE AT LEAST ONE HANGER. VERTICAL LINES SHALL BE SUPPORTED BY PIPE CLAMP TYPE SUPPORTS DESIGNED FOR THIS PURPOSE AT EACH FLOOR LEVEL. ON PLASTIC PIPING WHICH IS INSULATED, REDUCE SPACING TO 70% OF DISTANCES LISTED.

HANGER ROD SIZE SHALL BE IN ACCORDANCE WITH SCHEDULE ON SHEET P501.

AT ALL HANGERS AND SUPPORTS OF INSULATED PIPE, PROVIDE OVERSIZED HANGERS TO FIT ON THE OUTSIDE OF THE PIPE SADDLES AND SHIELDS. SEE PIPING INSULATION SCHEDULE ON SHEET P501 FOR INSULATION THICKNESS.

FOR ALL INSULATED PIPING OVER 4", INSULATION SUBCONTRACTOR TO PROVIDE SPECIAL SUPPORTING INSULATION AND SHIELD. HANGER OR SUPPORT TO BE EXTERNAL TO INSULATION AND SHIELD.

FOR ALL INSULATED PIPING 4" AND UNDER, PROVIDE HANGERS ON OUTSIDE OF INSULATED PIPE (ALL SIZES) WITH SHIELDS.

PIPING, PLUMBING LINES, ETC. SHALL BE INDEPENDENTLY SUPPORTED FROM THE BUILDING STRUCTURE AND SHALL NOT BE SUPPORTED FROM OTHER DUCTS, PIPES, ETC. WHERE INTERFERENCES DO OCCUR, PROVIDE TRAPEZE TYPE HANGERS OR SUPPORTS.

SUPPORT CAST IRON SOIL PIPE AND FITTINGS AT SUFFICIENTLY CLOSE INTERVALS TO MAINTAIN ALIGNMENT AND PREVENT SAGGING. SUPPORT EACH LENGTH OF PIPE WITH HANGER LOCATED NOT MORE THAN 18" FROM THE JOINT.

SUPPORT ALL CAST IRON SOIL PIPE HORIZONTAL RUNS. BRANCH RUNS AND AT EACH CHANGE OF DIRECTION WITH HANGER EQUAL TO GRINNELL NO. 260. SUPPORT VERTICAL RUNS AT EACH FLOOR BY MEANS OF A PIPE CLAMP DESIGNED FOR THAT PURPOSE. BASE OF EACH VERTICAL RUN SHALL BE SUPPORTED WITH CONCRETE OR IF ABOVE GRADE, WITH HEAVY DUTY HANGERS.

32. <u>VALVES</u>:

BALL VALVES SHALL CONFORM TO THE CONSTRUCTION SET FORTH IN SYSTEM PIPING SPECIFICATION AND SHALL BE AS MANUFACTURED BY NIBCO, MILWAUKEE, SMITH, CRANE, APOLLO OR WATTS, SOLDERED JOINT BALL VALVES IN COPPER PIPING ARE NOT ACCEPTABLE. BALL VALVE IN INSULATED PIPE LINE SHALL HAVE 2" EXTENSION STEM WITH HANDLE.

CHECK VALVES SHALL CONFORM TO THE CONSTRUCTION SET FORTH IN SYSTEM PIPING SPECIFICATION AND SHALL BE AS MANUFACTURED BY METRAFLEX, GRINNELL, NIBCO, MILWAUKEE, SMITH, CRANE, APOLLO OR WATTS.

OTHER VALVES - GATE, GLOBE, BALANCE AND CHECK - SHALL CONFORM TO THE CONSTRUCTION SET FORTH IN SYSTEM PIPING SPECIFICATION AND SHALL BE AS MANUFACTURED BY CRANE, MILWAUKEE, NIBCO, RESUN, OR NORDSTROM LUBRICATED PLUG VALVES ARE ACCEPTABLE.

WHERE A WATER FLOW BALANCING VALVE IS REQUIRED IN PIPES UP TO 2 INCHES, A BALL VALVE MAY BE USED. VALVE TO MEET CONSTRUCTION SET FORTH IN SYSTEM PIPING SPECIFICATION, HAVE HANDLE REMOVED AFTER SYSTEM IS BALANCED. AND SHALL NOT BE USED FOR SHUTOFF PURPOSES. SEPARATE INDIVIDUAL VALVES ARE REQUIRED FOR BALANCING AND FOR SHUTOFF PURPOSES. HANDLES SHALL BE GIVEN TO THE OWNER.

FOR A PARTICULAR TYPE OF VALVE, ALL VALVES SHALL BE OF THE SAME MANUFACTURER.

THIS CONTRACTOR SHALL FURNISH ALL VALVES AS INDICATED ON THE DRAWINGS AND AS REQUIRED FOR THE PROPER CONTROL AT VARIOUS APPARATUS SO THAT ANY APPARATUS MAY BE REMOVED FOR REPAIR WITHOUT INTERFERENCE TO THE REMAINDER OF THE BUILDING.

33. POTABLE WATER SYSTEMS

- A. POTABLE WATER SYSTEMS SHALL BE THOROUGHLY FLUSHED AND DISINFECTED BEFORE BEING PUT INTO SERVICE AS REQUIRED BY THE WATER DEPARTMENT, HEALTH DEPARTMENT OR AUTHORITY HAVING JURISDICTION, AFTER SAMPLES HAVE BEEN APPROVED. OBTAINED CERTIFICATION OF ACCEPTANCE FROM THE HEALTH DEPARTMENT AND FORWARD CERTIFICATE TO THE OWNER. DISINFECTING METHOD SHALL BE COMPLETED IN CONFORMANCE WITH AWWA C651 'STANDARD FOR DISINFECTING WATER MAINS'.
- B. <u>DOMESTIC WATER SUPPLY</u>
 - THE DOMESTIC SERVICE SHALL BE INSTALLED AS SHOWN ON DRAWING AFTER THE DRAWINGS ARE APPROVED BY THE AUTHORITY HAVING JURISDICTION.
- 2) ALL NEW DOMESTIC WATER SERVICE PIPING AND VALVES TO BE AWWA STAMPED AND APPROVED.
- C. INSPECTION

1)

- INSPECT WATER DISTRIBUTION PIPING AS FOLLOWS: a. DO NOT ENCLOSE, COVER, OR PUT INTO OPERATION WATER DISTRIBUTION PIPING SYSTEM UNTIL IT HAS BEEN INSPECTED AND APPROVED BY THE AUTHORITY HAVING JURISDICTION.
- b. DURING PROGRESS OF THE INSTALLATION, NOTIFY THE PLUMBING OFFICIAL HAVING JURISDICTION AT LEAST 24 HOURS PRIOR TO TIME INSPECTION MUST BE MADE. PERFORM TESTS SPECIFIED BELOW IN
- PRESENCE OF THE PLUMBING OFFICIAL. c. ROUGHING-IN INSPECTION: ARRANGE FOR INSPECTION OF PIPING SYSTEM BEFORE CONCEALED OR CLOSED-IN AFTER SYSTEM
- ROUGHING-IN AND PRIOR TO SETTING FIXTURES. d. FINAL INSPECTION: ARRANGE FOR FINAL INSPECTION BY PLUMBING OFFICIAL TO OBSERVE TESTS SPECIFIED BELOW AND TO ENSURE COMPLIANCE WITH REQUIREMENTS OF PLUMBING CODE.
- e. REINSPECTIONS: WHEN A PLUMBING OFFICIAL FINDS THAT PIPING SYSTEM WILL NOT PASS TEST OR INSPECTION, MAKE REQUIRED CORRECTIONS AND ARRANGE FOR REINSPECTION BY THE PLUMBING
- f. REPORTS: PREPARE INSPECTION REPORTS SIGNED BY PLUMBING OFFICIAL
- D. <u>TESTING</u>
 - 1). TEST WATER DISTRIBUTION PIPING AS FOLLOWS: a. TEST FOR LEAKS AND DEFECTS IN NEW WATER DISTRIBUTION PIPING SYSTEMS AND PARTS OF EXISTING SYSTEMS THAT HAVE BEEN ALTERED, EXTENDED, OR REPAIRED. IF TESTING IS PERFORMED IN SEGMENTS. SUBMIT SEPARATE REPORT FOR EACH TEST, COMPLETE WITH DIAGRAM OF PORTION OF SYSTEM TESTED.
 - b. LEAVE UNCOVERED AND UNCONCEALED IN NEW, ALTERED, EXTENDED, OR REPLACED WATER DISTRIBUTION PIPING UNTIL IT HAS BEEN TESTED AND APPROVED. EXPOSE WORK THAT HAS BEEN COVERED OR CONCEALED BEFORE IT HAS BEEN TESTED AND APPROVED FOR
 - c. CAP AND SUBJECT THE PIPING SYSTEM TO A STATIC WATER PRESSURE OF 50 PSIG ABOVE THE OPERATING PRESSURE WITHOUT EXCEEDING PRESSURE RATING OF PIPING SYSTEM MATERIALS. ISOLATE TEST SOURCE AND ALLOW TO STAND FOR 4 HOURS. LEAKS AND LOSS IN TEST PRESSURE CONSTITUTE DEFECTS THAT MUST BE
 - REPAIRED. d. REPAIR LEAKS AND DEFECTS WITH NEW MATERIALS AND RETEST SYSTEM OR PORTION THEREOF UNTIL SATISFACTORY RESULTS ARE ORTAINED
 - e. PREPARE REPORTS FOR TESTS AND REQUIRED CORRECTIVE ACTION.

Ε. <u>CLEANING</u>

- CLEAN AND DISINFECT WATER DISTRIBUTION PIPING AS FOLLOWS: PURGE NEW POTABLE WATER DISTRIBUTION PIPING SYSTEMS AND PARTS OF EXISTING POTABLE WATER SYSTEMS THAT HAVE BEEN ALTERED, EXTENDED OR REPAIRED PRIOR TO USE. USE PURGING AND DISINFECTION PROCEDURE PRESCRIBED BY AUTHORITY HAVING JURISDICTION OR, IF A METHOD IS NOT
- PRESCRIBED BY THAT AUTHORITY, THE PROCEDURE DESCRIBED IN EITHER AWWA C651 OR AWWA C652 OR AS DESCRIBED BELOW: FLUSH PIPING SYSTEM WITH CLEAN, POTABLE WATER UNTIL DIRTY WATER DOES NOT APPEAR AT OUTLETS FILL SYSTEM OR PART THEREOF WITH WATER/CHLORINE
- SOLUTION CONTAINING AT LEAST 50 PARTS PER MILLION OF CHLORINE. ISOLATE (VALVE OFF) AND ALLOW TO STAND FOR 24 HOURS. iii. DRAIN SYSTEM OR PART THEREOF OF PREVIOUS SOLUTION AND REFILL WITH WATER/CHLORINE SOLUTION CONTAINING AT LEAST
- 200 PARTS PER MILLION OF CHLORINE. ISOLATE AND ALLOW TO STAND FOR 3 HOURS. iv. FLUSH SYSTEM WITH CLEAN. POTABLE WATER UNTIL CHLORINE
- DOSE NOT REMAIN IN WATER COMING FROM SYSTEM FOLLOWING ALLOWED STANDING TIME SUBMIT WATER SAMPLES IN STERILE BOTTLES TO AUTHORITY HAVING JURISDICTION. REPEAT PROCEDURE IF BIOLOGICAL EXAMINATION MADE BY THE AUTHORITY SHOWS EVIDENCE OF
- CONTAMINATION 2) PREPARE AND SUBMIT REPORTS FOR PURGING AND DISINFECTING
- ACTIVITIES AND DELIVER TO OWNER.
- <u>COMMISSIONING</u> FILL WATER SYSTEMS. CHECK COMPRESSION TANKS TO DETERMINE THAT THEY ARE NOT AIR BOUND AND THAT SYSTEM IS COMPLETELY FULL OF
- WATER 2) BEFORE OPERATING SYSTEMS, PERFORM THESE STEPS: a. CLOSE DRAIN VALVES, HYDRANTS, AND HOSE BIBBS. OPEN SHUTOFF VALVES TO FULL OPEN POSITION.
- OPEN THROTTLING VALVES TO PROPER SETTING. REMOVE PLUGS USED DURING TESTING OF PIPING SYSTEMS AND PLUGS USED FOR TEMPORARY SEALING OF PIPING DURING
- INSTALLATION. REMOVE AND CLEAN STRAINER SCREENS. CLOSE DRAIN VALVES AND REPLACE DRAIN PLUGS.
- REMOVE FILTER CARTRIDGES FROM HOUSING AND VERIFY THAT CARTRIDGES ARE AS SPECIFIED FOR APPLICATION WHERE USED, CLEAN, AND READ FOR USE.
- 3) CHECK PLUMBING EQUIPMENT AND VERIFY PROPER SETTINGS, ADJUSTMENTS, AND OPERATION. DO NOT OPERATE WATER HEATERS
- BEFORE FILLING WITH WATER. 4) CHECK PLUMBING SPECIALTIES AND VERIFY PROPER SETTINGS, ADJUSTMENTS, AND OPERATION.

34. SOIL WASTE & VENT SYSTEMS

- 1) INSTALL CAST-IRON PIPE AND CAST-IRON PIPE FITTINGS ACCORDING TO CISPA 1990 REVISED AND EDITED EDITION OF "CAST IRON SOIL PIPE AND FITTINGS HANDBOOK, VOLUME I," CHAPTER IV, "INSTALLATION OF CAST IRON SOIL PIPE AND FITTINGS."
- 2) PROTECT DRAINS DURING REMAINDER OF CONSTRUCTION PERIOD TO AVOID CLOGGING WITH DIRT AND DEBRIS AND TO PREVENT DAMAGE FROM RAFFIC AND CONSTRUCTION WORK 3) PLACE PLUGS IN ENDS OF UNCOMPLETED PIPING AT END OF DAY OR
- WHEN WORK STOPS. 4) SLOPE LINES 1/8 INCH PER FOOT FOR ALL LINES 3" AND OVER AND 1/4" FOR ALL LINES 2-1/2" AND UNDER UNLESS NOTED OTHERWISE ON DRAWINGS.
- 5) MAKE DIRECTIONAL CHANGES WITH T-Y FITTINGS OR Y FITTINGS AND 1/8 BENDS AS REQUIRED. INSTALL CLEANOUTS AT EACH DIRECTIONAL CHANGE GREATER THAN 45°, AT THE BASE OF EACH RISER, AT 50' INTERVALS ON 4" HORIZONTAL STRAIGHT RUNS AT 100' INTERVALS ON 6" HORIZONTAL STRAIGHT RUNS. AT DEAD ENDS. ON ALL EXPOSED OR ACCESSIBLE TRAPS AND ALL OTHER LOCATIONS INDICATED ON THE DRAWINGS OR AS
- REQUIRED TO REMOVE OBSTRUCTIONS. 6) SANITARY VENTS SHALL TERMINATE NO LESS THAN 12" ABOVE ROOF AND SHALL BE NOT LESS THAN 3" IN DIAMETER. PLUMBING VENTS SHALL BE OFFSET IN ROOF JOIST SPACE, IF NECESSARY, SO THAT VENT EXTENSIONS THROUGH ROOF ARE NOT LESS THAN 4' FROM EXTERIOR BUILDING WALLS AND EXCEED THE ALLOWABLE MINIMUM DISTANCE TO OUTSIDE AIR INTAKES.
- 7) INSTALL TEST TEES AT THE BASE OF EACH STACK AND ELSEWHERE AS REQUIRED FOR SECTIONALIZED TESTING OF THE SYSTEM. 8) PVC PIPING IS NOT ALLOWED IN SUPPLY OR RETURN AIR PLENUM.
- B. PREPARATION OF FOUNDATION FOR BURIED PIPING GRADE TRENCH BOTTOM TO PROVIDE SMOOTH, FIRM STABLE, AND
- ROCK-FREE FOUNDATION THROUGHOUT LENGTH OF PIPING. 2) REMOVE UNSTABLE, SOFT, AND UNSUITABLE MATERIALS AT SURFACE ON WHICH PIPING IS TO BE LAID AND BACKFILL WITH CLEAN SAND OR PEA
- GRAVEL TO INDICATED LEVEL. 3) SHAPE BOTTOM OF TRENCH TO FIT BOTTOM OF PIPING. FILL UNEVENNESS WITH TAMPED-SAND BACKFILL. DIG BELL HOLES AT EACH PIPE JOINT TO RELIEVE BELLS OF LOADS AND TO ENSURE CONTINUOUS BEARING OF PIPE

C. <u>INSPECTION</u>

- INSPECT DRAINAGE PIPING AS FOLLOWS: a. DO NOT ENCLOSE, COVER, OR PUT INTO OPERATION DRAINAGE AND VENT PIPING SYSTEM UNTIL IT HAS BEEN INSPECTED AND APPROVED BY THE AUTHORITY HAVING JURISDICTION. b. DURING PROGRESS OF INSTALLATION, NOTIFY THE PLUMBING OFFICIAL HAVING JURISDICTION PRIOR TO TIME SUCH INSPECTION MUST BE
- MADE. PERFORM TESTS SPECIFIED BELOW IN PRESENCE OF THE PLUMBING OFFICIAL.
- SYSTEM AFTER SYSTEM ROUGHING-IN, BEFORE CONCEALING, AND PRIOR TO SETTING FIXTURES.
- OFFICIAL TO OBSERVE TESTS SPECIFIED BELOW AND TO ENSURE COMPLIANCE WITH REQUIREMENTS OF PLUMBING CODE.
- REINSPECTIONS: MAKE REQUIRED CORRECTIONS AND ARRANGE FOR REINSPECTION BY PLUMBING OFFICIAL WHEN PIPING SYSTEM FAILS TO
- PASS TEST OR INSPECTION. OFFICIAL.
- <u>TESTING</u> 1) SOIL AND VENT PIPING SYSTEMS AND STORM PIPING SYSTEMS TESTS: TEST SYSTEMS ACCORDING TO PROCEDURES OF AUTHORITY HAVING JURISDICTION OR, IN ABSENCE OF PUBLISHED PROCEDURE. AS FOLLOWS:
- OF EXISTING SYSTEMS THAT HAVE BEEN ALTERED, EXTENDED, OR REPAIRED. IF TESTING IS PERFORMED IN SEGMENTS, SUBMIT A SFPARATE REPORT FOR EACH TEST, COMPLETE WITH A DIAGRAM OF THE PORTION OF THE SYSTEM TESTED. b. LEAVE UNCOVERED AND UNCONCEALED IN NEW, ALTERED, EXTENDED,
- OR REPLACED PIPING UNTIL IT HAS BEEN TESTED AND APPROVED. EXPOSE FOR TESTING WORK THAT HAS BEEN COVERED OR CONCEALED BEFORE IT HAS BEEN TESTED AND APPROVED. EXCEPT FOR OUTSIDE LEADERS AND PERFORATED OR OPEN-JOINTED DRAIN TILE, TEST PIPING OF SYSTEMS ON COMPLETION OF ROUGH-IN
- PIPING INSTALLATION. TIGHTLY CLOSE ALL OPENINGS IN PIPING SYSTEM AND FILL WITH WATER TO POINT OF OVERFLOW, BUT NOT LESS THAN 10 FEET HEAD OF WATER. WATER LEVEL SHALL NOT DROP DURING THE PERIOD FROM 15 MINUTES BEFORE INSPECTION STARTS THROUGH COMPLETION OF INSPECTION. INSPECT ALL JOINTS
- d. FINISHED PLUMBING TEST PROCEDURE: AFTER PLUMBING FIXTURES HAVE BEEN SET AND THEIR TRAPS FILLED WITH WATER, TEST OPENING ON ROOF AND BUILDING DRAIN WHERE IT LEAVES THE BUILDING AND INTRODUCE AIR INTO THE SYSTEM EQUAL TO PRESSURE OF 1-INCH WATER COLUMN. USE A U TUBE OF MANOMETER INSERTED IN THE TRAP OF A WATER CLOSET TO MEASURE THIS PRESSURE. AIR PRESSURE SHALL REMAIN CONSTANT WITHOUT INTRODUCING ADDITIONAL AIR THROUGHOUT PERIOD OF INSPECTION. INSPECT PLUMBING FIXTURE CONNECTIONS FOR GAS AND WATER LEAKS.
- PREPARE REPORTS FOR TESTS AND REQUIRED CORRECTIVE ACTION. E. <u>CLEANING</u>
- 1) CLEAN INTERIOR OF PIPING SYSTEM. REMOVE DIRT AND DEBRIS AS WORK PROGRESSES.
- <u>COMMISSIONING</u>
- CHECK PLUMBING EQUIPMENT AND VERIFY PROPER SETTINGS, ADJUSTMENTS AND OPERATION.
- 2) CHECK PLUMBING SPECIALTIES AND VERIFY PROPER SETTINGS,
- ADJUSTMENTS, AND OPERATION.

- BARREL ON FOUNDATION.
- ROUGHING-IN INSPECTION: ARRANGE FOR INSPECTION OF PIPING
- FINAL INSPECTION: ARRANGE FOR FINAL INSPECTION BY PLUMBING
- REPORTS: PREPARE INSPECTION REPORTS SIGNED BY THE PLUMBING
- TEST FOR LEAKS AND DEFECTS IN NEW PIPING SYSTEMS AND PARTS

- FOR LEAKS. CONNECTIONS AND PROVE GASTIGHT AND WATERTIGHT. PLUG STACK
- e. REPAIR LEAKS AND DEFECTS USING NEW MATERIALS AND RETEST SYSTEM OR PORTION THEREOF UNTIL SATISFACTORY RESULTS ARE
- ORTAINED

- 35. <u>SANITARY WASTE PIPING AND STORM PIPING (UNDERGROUND, UNDER BUILDING)</u>: UNDERGROUND SANITARY WASTE PIPING AND STORM PIPING SHALL BE SLOPED AS INDICATED IN 2017 OHIO PLUMBING CODE. PIPING SHALL BE AS FOLLOWS:
- A. ASPHALT-COATED SERVICE WEIGHT CAST IRON, NO-HUB PATTERN WITH HEAVY DUTY COUPLINGS UTILIZING 4 STAINLESS STEEL CLAMPS. COUPLINGS SHALL BE EQUAL TO HUSKY MODEL HD-2000.
- B. PLASTIC PVC, SCHEDULE 40 ASTM D2665-82, DWV WITH SOLVENT WELDED SOCKET JOINTS. INSTALLATION SHALL FOLLOW GUIDELINES IN ASTM D 2564-80 AND ASTM D 2665-82.
- 36. SANITARY WASTE & VENT PIPING AND STORM PIPING (ABOVE GROUND, INSIDE BUILDING): ABOVE GROUND SANITARY WASTE AND VENT PIPING AND STORM PIPING SHALL BE SLOPED AS INDICATED IN 2017 OHIO PLUMBING CODE. PIPING SHALL BE AS FOLLOWS:
 - A. ASPHALT-COATED SERVICE WEIGHT CAST IRON, SLIP JOINT NO-HUB PATTERN WITH HEAVY DUTY COUPLINGS UTILIZING 4 STAINLESS STEEL CLAMPS. COUPLINGS SHALL BE EQUAL TO HUSKY MODEL HD-2000.
 - B. PLASTIC PVC, SCHEDULE 40 ASTM D2665-82, DWV WITH SOLVENT WELDED SOCKET JOINTS. INSTALLATION SHALL FOLLOW GUIDELINES IN ASTM D 2564-80 AND ASTM D 2665-82. (NOT PERMITTED IN RETURN AIR PLENUMS OR IN EXPOSED AREAS).
- 37. DOMESTIC WATER (ABOVEGROUND, INSIDE BUILDING):
- A. COPPER 3" AND SMALLER: TYPE "L" HARD TEMPERED COPPER CONFORMING TO ASTM B-88-83A WITH SOLDERED JOINTS AND WROUGHT STANDARD WEIGHT PRESSURE RATED FITTINGS. JOINTS SHALL BE MADE IN ACCORDANCE WITH THE METHODS OF ASTM B-828. SOLDER SHALL BE A NON-LEAD BEARING TYPE CONFORMING TO ASTM B-32.
- AT CONTRACTOR'S OPTION, CONTRACTOR CAN UTILIZE COPPER TUBE PRESS FITTINGS EQUAL TO VIEGA PRO-PRESS FITTINGS. FITTINGS SHALL CONFORM WITH ASME B16.18 AND ASME B16.22, AND PERFORMANCE CRITERIA OF IAPMO PS 117. SEALING ELEMENTS OF FITTINGS SHALL BE EPDM AND SHALL BE FACTORY INSTALLED. FITTINGS SHALL BE RATED FOR A MAXIMUM PRESSURE RATING OF 125 PSI AND AMBIENT TEMPERATURES BETWEEN -40°F TO 180°F.
- B. BALL VALVES:
- 1. 1 1/2" AND SMALLER: 125 PSI, TWO PIECE, BRONZE BODY, BLOWOUT PROOF PRESSURE RETAINING STEM, FULL PORT, EXTENDED HANDLE SLEEVE FOR INSULATION. EQUAL TO NIBCO MODEL S-580
- 2" AND LARGER: 125 PSI, THREE PIECE, BRONZE BODY, BLOWOUT PROOF PRESSURE RETAINING STEM, CONVENTIONAL PORT, EXTENDED HANDLE SLEEVE FOR INSULATION. EQUAL TO NIBCO MODEL S-590. BALL VALVES 2" AND LARGER SHALL BE DISASSEMBLED PRIOR TO SOLDERING TO PREVENT DAMAGE TO VALVE SEATS. RE-ASSEMBLE VALVE AFTER SOLDER JOINTS ARE COOL.
- C. CHECK VALVES: 125 PSI, HORIZONTAL SWING, BRONZE BODY, RENEWABLE DISC, EQUAL TO NIBCO MODEL S-413.
- D. MANUFACTURERS: WATTS, CRANE, GRINNELL, NORDSTROM, NIBCO, STOCKHAM, SMITH, MILWAUKEE.
- 38. <u>RELIEF VALVE DISCHARGE PIPING</u> SHALL BE TYPE "L" COPPER WITH SOLDERED JOINTS AND WROUGHT STANDARD WEIGHT FITTING.
- 39. NATURAL GAS SYSTEM
- A. NATURAL GAS PIPING INSTALLATION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE "INTERNATIONAL FUEL GAS CODE" REQUIREMENTS AND LOCAL GAS SUPPLIER REQUIREMENTS. THE SERVICE LINE SHALL BE INSTALLED AS RECOMMENDED BY THE GAS SUPPLIER.
- B. NATURAL GAS PIPING ABOVE GRADE SHALL BE SCHEDULE 40 BLACK STEEL CONFORMING TO ASTM A-53 GRADE B & ASTM A106 WITH 150 LB. MALLEABLE IRON FITTINGS.
- NATURAL GAS PIPING BELOW GRADE SHALL BE PLASTIC PIPE. TUBE AND FITTINGS CONFORMING TO ASTM D-2513 AND LOCAL GAS SUPPLIER REQUIREMENTS. PIPE TO BE USED SHALL BE MARKED "GAS" AND "ASTM D-2513". AT CONTRACTOR'S OPTION, CONTRACTOR CAN USE SCHEDULE 40 BLACK STEEL COATED WRAPPED WITH X-TRUCOAT CONFORMING TO ASTM A-53 OR POLYETHYLENE TUBE AND FITTINGS CONFORMING TO ASTM D-2513. PIPING SHALL ALSO CONFORM TO LOCAL GAS SUPPLIER REQUIREMENTS. PIPE TO BE USED SHALL BE MARKED "GAS" AND "ASTM D-2513"
- NATURAL GAS PIPING SHALL <u>NOT</u> BE INSTALLED BELOW GRADE WITHIN BUILDING. C. UNIONS SHALL BE INSTALLED AT CONNECTIONS TO EQUIPMENT AND AS
- REQUIRED TO MAKE UP OR DISCONNECT PIPING. UNIONS SHALL BE CLASS 150. MALLEABLE IRON THREADED PIPE UNIONS CONFORMING TO ASME B16.39.
- D. INSTALL FULL SIZE DIRT LEG AT PRIOR TO EACH EQUIPMENT CONNECTION, DIRECT GAS COCK CONNECTIONS IS PROHIBITED. VALVES SHALL BE EQUAL TO ROCKWELL FIGURE 142, SEMI-STEEL BODY, 175 PSI, LUBRICATED PLUG
- E. EXTERIOR ABOVE GRADE PIPING SHALL BE PAINTED WITH ONE COAT RUST INHIBITOR PAINT. G.C. SHALL PAINT TWO COATS OF FINISH ENAMEL TO MATCH ADJACENT BUILDING COLOR.
- F. 2" PIPE AND SMALLER LESS THAN 5 PSI ABOVE GROUND SHALL BE THREADED FITTINGS 2 1/2" PIPE AND LARGER, AND ALL PIPING GREATER THAN 5 PSI SHALL BE WELDED WITH STANDARD WEIGHT WELDED FITTINGS. ALL FITTINGS IN CONCEALED LOCATIONS SHALL BE WELDED.
- G. PIPING INSIDE BUILDING
 - PIPING IN PLENUM OR CONCEALED: NO PIPING SHALL BE INSTALLED IN A SOLID PARTITION.
 - PIPING SHALL NOT BE INSTALLED IN OR THROUGH A CIRCULATING AIR DUCT, CHIMNEY, FLUE, OR VENTILATING DUCT.
 - GAS PIPING MAY BE INSTALLED IN ACCESSIBLE ABOVE CEILING SPACE, WHETHER OR NOT SUCH SPACE IS USED AS AN AIR PLENUM. VALVES SHALL NOT BE LOCATED IN SUCH SPACE.
 - CONCEALED PIPING SHALL BE JOINED BY WELDING. CONCEALED GAS PIPING IS THAT, WHICH WHEN IN PLACE IN A FINISHED BUILDING WOULD REQUIRE REMOVAL OF PERMANENT CONSTRUCTION TO GAIN ACCESS TO THE PIPING. THE NUMBER OF JOINTS SHALL BE KEPT TO A MINIMUM. VALVES, UNIONS, TUBING FITTINGS AND SWING JOINTS SHALL NOT BE INSTALLED IN CONCEALED SPACE.
- 2) DRIPS AND SEDIMENT TRAPS:
- INSTALL DRIPS AT POINTS WHERE CONDENSATE MAY COLLECT. LOCATE WHERE READILY ACCESSIBLE TO PERMIT CLEANING AND EMPTYING. DO NOT INSTALL WHERE CONDENSATE WOULD BE SUBJECT TO FREEZING.
- CONSTRUCTION DRIPS AND SEDIMENT TRAPS USING TEE FITTING WITH BOTTOM OUTLET PLUGGED OR CAPPED. USE MINIMUM-LENGTH NIPPLE OF 3 PIPE DIAMETERS, BUT NOT LESS THAN 3" LONG, AND SAME SIZE AS CONNECTED PIPE. INSTALL WITH SPACE BETWEEN BOTTOM OF DRIP AND FLOOR FOR REMOVAL OF PLUG OR CAP.
- ALL WORK INSTALLED UNDER THIS CONTRACT SHALL BE TESTED IN ACCORDANCE WITH INTERNATIONAL FUEL GAS CODE (CURREN EDITION) AND ANY OTHER APPLICABLE CODES AND STANDARDS. TESTING SHALL BE IN THE PRESENCE OF AND TO THE SATISFACTION OF THE GAS UTILITY AND THE OWNER'S REPRESENTATIVE.
- THE CONTRACTOR IS RESPONSIBLE TO PROVIDE ALL NECESSARY TEES, VALVES, GAUGES, PIPING CONNECTIONS, PUMP, ETC. AS REQUIRED TO PERFORM TESTS.
- WHEN CONTRACTOR IS READY FOR TESTING, THE GAS UTILITY SHALL BE NOTIFIED NO LESS THAN 24-HOURS IN ADVANCE. RECORDS SHALL BE MADE OF INSPECTION AND ALL TESTS PERFORMED.
- TEST PREPARATION: PIPE JOINTS, INCLUDING WELDS, SHALL BE LEFT EXPOSED FOR
- EXAMINATION DURING THE TEST. EQUIPMENT THAT IS NOT TO BE INCLUDED IN THE TEST SHALL BE EITHER DISCONNECTED FROM THE PIPING OR ISOLATED BY BLANKS,
- BLIND FLANGES, OR CAPS, PRIOR TO TESTING, THE INTERIOR OF THE PIPE SHALL BE CLEARED OF ALL FORFIGN MATERIAL.

- TEST PRESSURE: TEST PRESSURE SHALL BE MEASURED WITH A MANOMETER OR W A PRESSURE MEASURING DEVICE DESIGNED AND CAUBRATED TO READ, RECORD OR INDICATE A PRESSURE LOSS DUE TO LEAKAG DURING THE PRESSURE TEST PERIOD. THE SOURCE OF PRESSU SHALL BE ISOLATED BEFORE THE PRESSURE TESTS ARE MADE.
- THE TEST PRESSURE TO BE USED SHALL BE NO LESS THAN 1-TIMES THE PROPOSED MAXIMUM WORKING PRESSURE, BUT NOT THAN 3 PSIG, IRRESPECTIVE OF DESIGN PRESSURE.
- DETECTION OF LEAKS AND DEFECTS: THE PIPING SYSTEM SHALL WITHSTAND THE TEST PRESSURE SPECIFIED WITHOUT SHOWING EVIDENCE OF LEAKAGE OR DEFECTS ANY LOSS IN TEST PRESSURE AS INDICATED BY PRESSURE GAGE SHALL BE DEEMED TO INDICATE THE PRESENCE OF A LEAK.
- THE LEAKAGE SHALL BE LOCATED BY MEANS OF AN APPROVED COMBUSTIBLE GAS DETECTOR, SOAP AND WATER, OR AN EQUIVAL NONFLAMMABLE SOLUTION. MATCHES, CANDLES, OPEN FLAMES, O OTHER METHODS THAT COULD PROVIDE A SOURCE OF IGNITION SHALL NOT BE USED.
- WHERE LEAKAGE OR OTHER DEFECTS ARE LOCATED, THE AFFECTE PORTION OF THE PIPING SYSTEM SHALL BE REPAIRED OR REPLAC AND RETESTED AT CONTRACTOR'S EXPENSE.
- 4) <u>SYSTEM AND EQUIPMENT LEAKAGE TEST:</u> a. BEFORE GAS IS INTRODUCED INTO A SYSTEM OF NEW GAS PIPIN OR BACK INTO AN EXISTING SYSTEM AFTER BEING SHUT OFF, TH
- ENTIRE SYSTEM SHALL BE INSPECTED TO DETERMINE THAT THERE ARF NO OPEN FITTINGS OR ENDS AND THAT ALL MANUAL VALVES OUTLETS ON EQUIPMENT ARE CLOSED AND ALL UNUSED VALVES OUTLETS ARE CLOSED AND PLUGGED OR CAPPED.
- b. IMMEDIATELY AFTER TURNING ON THE GAS. THE PIPING SYSTEM SHALL BE TESTED TO ASCERTAIN THAT NO GAS IS ESCAPING. IF LEAKAGE IS INDICATED, THE GAS SUPPLY SHALL BE SHUT OFF UNTIL THE NECESSARY REPAIRS HAVE BEEN MADE.
- 40. PLUMBING INSULATION:
- <u>GENERAL</u>
- A. ALL INSULATION, UNLESS OTHERWISE NOTED, SHALL HAVE A COMPOSITE RAT INCLUDING INSULATION ADHESIVES, JACKET, ETC. AS FOLLOWS. THE COMPO ASSEMBLY SHALL HAVE A FLAME SPREAD RATING NOT OVER 25 AND A SM DEVELOPED RATING NOT HIGHER THAN 50, WHEN TESTED IN ACCORDANCE ASTM E 84, NFPA 255, OR UL 723.
- CONTRACTOR SHALL SUBMIT SHOP DRAWINGS COVERING ALL INSULATION PROPOSED FOR USE ON THIS PROJECT
- INSULATION DAMAGED OR REMOVED DUE TO WORK UNDER THIS CONTRACT SHALL BE REPLACED WITH NEW INSULATION ACCORDING TO SPECIFICATION
- WHERE FREQUENT SERVICING OR WHERE SITUATIONS NECESSITATE REMOVAL THE INSULATION AND COVER, THE CONTRACTOR MAY USE FLEXIBLE CUSTOM REUSABLE INSULATION AND COVER. INSULATION SHALL BE INSTALLED WITH ADJUSTABLE STRAPS AND BUCKLES TO FACILITATE REMOVAL. INSULATION A COVER SHALL BE SUITABLE FOR THE SERVICE BEING INSULATED.
- APPROVED MANUFACTURER'S INCLUDE OWENS-CORNING, KNAUF, JOHNS-MANVILLE, AND ARMSTRONG
- PIPE INSULATION
- A. FURNISH AND INSTALL AT ALL HANGERS AND SUPPORTS OF INSULATED PIP 12" LONG SECTIONS OF HIGH DENSITY INSULATION THAT WILL NOT DEFLECT MORE THAN 1/8" IN AN OPERATING CONDITION AND COVERING AT LEAST OF THE ARC AT THE BOTTOM OF THE PIPE. ON HORIZONTAL LINES, PROV 22 GAUGE GALVANIZED SHEET METAL SHIELDS COVERING 50 PERCENT OF CIRCUMFERENCE. ON VERTICAL LINES, THE SHEET METAL SHIELDS SHALL COMPLETELY ENCIRCLE THE INSULATION. MAINTAIN A FULL VAPOR BARRIER AROUND THE INSULATION AS IT PASSES THROUGH THE SHIELD. PIPE HAN ROLLER, OR SUPPORT SHALL BE EXTERNAL AT THE SHIELD. CONTRACTOR SHALL BUTT THE ADJACENT INSULATION TIGHTLY TO THE INSULATION AT TH PIPE SHIELDS AND LAP AND SEAL ALL SEAMS AND JOINTS. SPECIAL CARE SHALL BE TAKEN TO INSURE THAT THE VAPOR BARRIER AT THE PIPE SHIEL IS NOT BROKEN. WOOD SPACER BETWEEN PIPE AND HANGER IS NOT ALLOWED.
- B. THE PIPING INSULATION MATERIAL SHALL BE A UL-RATED, NONCOMBUSTIBL INSULATION RE INSULATION SHALL BE A HEAVY DENSITY SECTIONAL PIPE INSULATION JACKE WITH AN EMBOSSED VAPOR BARRIER LAMINATED ALL-SERVICE JACKET WITH SELF-SEALING LAP ADHESIVE. LAP AND SEAL ALL JOINTS TO INSURE VAP BARRIER. THERMAL CONDUCTIVITY(K) SHALL NOT EXCEED 0.24 BTUH SQUA FOOT F/INCH. INSULATION SHALL EQUAL JOHNS MANVILLE MICRO-LOK HP. STAPLES ARE USED ON COLD WATER LINES, APPLY WHITE VAPOR BARRIER MASTIC OVER STAPLES.
- FITTINGS SHALL BE INSULATED WITH A PREFORMED INSULATING FITTING COVE SUCH AS ZESTON 25/50 RATED PVC INSULATED FITTING COVER WITH FIBERGLASS INSERT.
- D. ANY EXPOSED INSULATED PIPING PASSING THROUGH A FLOOR WHERE IT IS SUBJECT TO DAMAGE, SHALL BE COVERED WITH A 0.032" (MINIMUM) THICK ALUMINUM JACKET 18" HIGH.
- EQUIPMENT AND ACCESSORY INSULATION:

- 1) HOT WATER ACCESSORIES (HEATING AND/OR DOMESTIC)
- a. VALVES, FLANGES, SPECIALTIES AND FITTINGS SHALL BE INSULATE
- b. INSULATE STRAINERS AS PER HOT WATER PIPING WITH REMOVABLE SECTIONS FOR STRAINER MAINTENANCE.
- c. INSULATE AIR ELIMINATORS SAME AS HOT WATER PIPING. d. EXPANSION TANKS LOCATED WITHIN EIGHT FEET OF THE FLOOR. ALONG WITH PIPING TO SAME, SHALL BE INSULATED SAME AS HO
- 2) <u>COLD WATER ACCESSORIES</u>: (COOLING AND/OR DOMESTIC)

G.

	b. <u>TEST PRES</u>		41 PU	MBING FIXTURES AND SPECIALTIES: IT IS THE RESPONSIBILITY OF THE			
	TEST PRES	SURE SHALL BE MEASURED WITH A MANOMETER OR WITH	CON	ITRACTOR TO VERIFY THE LOCATION & MOUNTING HEIGHTS OF FIXTURES, ETC. I PLUMBING & ARCHITECTURAL DRAWINGS. ALL FIXTURES AND FACTORY SUPPLIED			NINA SECOND
	DURING THI	ORD OR INDICATE A PRESSURE LOSS DUE TO LEAKAGE E PRESSURE TEST PERIOD. THE SOURCE OF PRESSURE ISOLATED BEFORE THE PRESSURE TESTS ARE MADE.	STC	ESSORIES SHALL BE PROVIDED BY CONTRACTOR INCLUDING ALL TRAPS, SUPPLY PS, RISERS, STRAINERS, ETC. UNLESS INDICATED OTHERWISE.		C A.	
	THE TEST I	PRESSURE TO BE USED SHALL BE NO LESS THAN 1–1/2 PROPOSED MAXIMUM WORKING PRESSURE, BUT NOT LESS	Α.	ACCEPTABLE MANUFACTURERS: 1. LAVATORIES – AMERICAN STANDARD, KOHLER, CRANE, ELJER		EALY SCOT SCOT	0/ 81
	THAN 3 PS	IG, IRRESPECTIVE OF DESIGN PRESSURE.		2. STAINLESS STEEL SINKS - ELKAY, JUST			RE-ESAMIN
	c. <u>Detection</u> The Piping Specified '	<u>OF LEAKS AND DEFECTS:</u> SYSTEM SHALL WITHSTAND THE TEST PRESSURE WITHOUT SHOWING EVIDENCE OF LEAKAGE OR DEFECTS.		3. FAUCETS – KOHLER, AMERICAN STANDARD, CRANE, ELJER, ELKAY, DELTA, MOEN, SPEAKMAN, CHICAGO FAUCET			///// ^{11//}
	ANY LOSS	IN TEST PRESSURE AS INDICATED BY PRESSURE GAGES DEEMED TO INDICATE THE PRESENCE OF A LEAK.		 MIXING VALVES (PRESSURE BALANCE & THERMOSTATIC) – LAWLER VALVE, POWERS, LEONARD, WATTS 			
	THE LEAKA	GE SHALL BE LOCATED BY MEANS OF AN APPROVED LE GAS DETECTOR, SOAP AND WATER, OR AN EQUIVALENT BLE SOLUTION. MATCHES, CANDLES, OPEN FLAMES, OR		5. MISCELLANEOUS TRIM (TRAPS, SUPPLIES, STRAINERS) – DEARBORN BRASS,			z ღ
	NONFLAMMA OTHER MET SHALL NOT	HODS THAT COULD PROVIDE A SOURCE OF IGNITION		T&S BRASS, MCGUIRE, CHICAGO FAUCET, KOHLER, ÁMERICAN STANDARD, BRASS CRAFT, ROYAL BRASS			I G N 5323
	WHERE LEA	KAGE OR OTHER DEFECTS ARE LOCATED. THE AFFECTED		6. ANTI-SCALD INSULATION KITS - TRUE BRO, SKAL-GARD		2	E S I 9.523.
		THE PIPING SYSTEM SHALL BE REPAIRED OR REPLACED TED AT CONTRACTOR'S EXPENSE.		7. PLUMBING SPECIALTIES (DRAINS, CLEANOUTS, ETC.) – ZURN, JOSAM, SMITH, SIOUX CHIEF, ANCON	_	. 9	D E :419
		UIPMENT LEAKAGE TEST:		8. WATER HAMMER ARRESTORS – SIOUX CHIEF, ZURN INDUSTRIES, J.R. SMITH, JOSAM OR PRECISION PLUMBING PRODUCTS, INC.			<u>.</u> ۵
	OR BACK II	S IS INTRODUCED INTO A SYSTEM OF NEW GAS PIPING, NTO AN EXISTING SYSTEM AFTER BEING SHUT OFF, THE TEM SHALL BE INSPECTED TO DETERMINE THAT THERE	в	LAV-1	l ă	J	I N G 45875
	ARE NO OF OUTLETS O	PEN FITTINGS OR ENDS AND THAT ALL MANUAL VALVES AT N EQUIPMENT ARE CLOSED AND ALL UNUSED VALVES AT	0.	LAVATORY SHALL BE INTEGRAL TO SOLID SURFACE COUNTERTOP. COUNTERTOP			R I I OH 4
		RE CLOSED AND PLUGGED OR CAPPED. Y AFTER TURNING ON THE GAS, THE PIPING SYSTEM		AND LAVATORY PROVIDED BY G.C. COORDINATE WITH G.C. FOR FAUCET HOLES. FAUCET SHALL BE EQUAL TO CHICAGO FAUCETS MODEL 2200–4, SINGLE LEVER		D	A, C
	SHALL BE	TESTED TO ASCERTAIN THAT NO GAS IS ESCAPING.		UNIT WITH CERAMIC MIXING CARTRIDGE AND TEMPERATURE LIMIT STOP.			G I N E E OTTAWA, (
	UNTIL THE	IS INDICATED, THE GAS SUPPLY SHALL BE SHUT OFF NECESSARY REPAIRS HAVE BEEN MADE.		PROVIDE A BELOW DECK MIXING VALVE. MIXING VALVE SHALL BE EQUAL TO WATTS MODEL LFUSG-B-M1 WITH INTEGRAL SCREENS AND CHECK VALVES. MIXING VALVE SHALL MEET ASSE 1016-96 AND 1070. OUTLET TEMPERATURE			0 0 1 1
ĽU	MBING INSULATION:			SHALL BE SET TO 110°F. PROVIDE THE FOLLOWING ACCESSORIES: MCGUIRE MODEL 155A GRID STRAINER,			E N 102,
	IERAL			MCGUIRE MODEL 8872 P-TRAP ASSEMBLY WITH CHROME WALL FLANGE, DEARBORN MODEL 2407 THREADED ANGLE STOPS WITH MODEL 1812 CHROME			· E e
۱.	INCLUDING INSULATION	ESS OTHERWISE NOTED, SHALL HAVE A COMPOSITE RATING A ADHESIVES, JACKET, ETC. AS FOLLOWS. THE COMPOSITE A FLAME SPREAD RATING NOT OVER 25 AND A SMOKE		SUPPLY TUBES, 1/2" CHROME PLATED NIPPLES AND WALL FLANGES. PROVIDE SCALD PROTECTION COVERING OVER PIPES EXPOSED BELOW LAVATORY		-	л с пр. с с
		OT HIGHER THAN 50, WHEN TESTED IN ACCORDANCE WITH		EQUAL TO TRUE BRO LAV GUARD 2. COVER DRAIN PIPING AND DOMESTIC COLD AND HOT WATER.			U F EET Jgrou
	CONTRACTOR SHALL S PROPOSED FOR USE	SUBMIT SHOP DRAWINGS COVERING ALL INSULATION ON THIS PROJECT.		FIXTURE AND ALL COMPONENTS SHALL COMPLY WITH ICC 117.1 GUIDELINES.			C T U R E . STREET, SUITE lesigngroup.com
	INSULATION DAMAGED	OR REMOVED DUE TO WORK UNDER THIS CONTRACT	С.	SK-1			ш≻2
).	WHERE FREQUENT SE	WITH NEW INSULATION ACCORDING TO SPECIFICATION. RVICING OR_WHERE_SITUATIONS NECESSITATE REMOVAL OF		UNDERMOUNT DOUBLE BOWL SINK SHALL BE EQUAL TO ELKAY MODEL ELUHAD311855PD. SINK SHALL BE SINGLE BOWL SINK SEAMLESSLY DRAWN OF			H I T PERR chnicor
	THE INSULATION AND REUSABLE INSULATION	COVER, THE CONTRACTOR MAY USE FLEXIBLE CUSTOM AND COVER. INSULATION SHALL BE INSTALLED WITH AND BUCKLES TO FACILITATE REMOVAL. INSULATION AND		18 GAUGE, TYPE 304 STAINLESS STEEL WITH LUSTROUS SATIN FINISH. UNDERSIDE OF SINK SHALL BE UNDERCOATED TO PREVENT CONDENSATION AND			υΖ₽
	COVER SHALL BE SUI	TABLE FOR THE SERVICE BEING INSULATED.		DEADEN SOUND. SINK SHALL HAVE A BOWL DEPTH OF 5 $1/2$ " and come with mounting clips.			A R 1800 www.
•	APPROVED MANUFACT JOHNS-MANVILLE, AN	URER'S INCLUDE OWENS-CORNING, KNAUF, D ARMSTRONG		P.C. SHALL PROVIDE A TEMPLATE FOR G.C. FOR ALL COUNTERTOP MOUNTED SINKS AND COORDINATE CUT OUT SIZE REQUIREMENTS WITH THE G.C.			
IPE	E INSULATION			FAUCET (LEAD FREE) SHALL BE EQUAL TO AMERICAN STANDARD MODEL 4932.300 WITH SINGLE HANDLE PULL DOWN FAUCET WITH 1.5 GPM AERATOR			
۱.	12" LONG SECTIONS	AT ALL HANGERS AND SUPPORTS OF INSULATED PIPE, OF HIGH DENSITY INSULATION THAT WILL NOT DEFLECT AN OPERATING CONDITION AND COVERING AT LEAST 120°		AND SWING SPOUT. FLOW CONTROL SHALL COMPLY WITH ASME A112.18, NSF 61, AND ADA GUIDELINES.			
	OF THE ARC AT THE 22 GAUGE GALVANIZE	BOTTOM OF THE PIPE. ON HORIZONTAL LINES, PROVIDE D SHEET METAL SHIELDS COVERING 50 PERCENT OF THE		PROVIDE A BELOW DECK MIXING VALVE. MIXING VALVE SHALL BE EQUAL TO WATTS MODEL LFUSG-B-M1 WITH INTEGRAL SCREENS AND CHECK VALVES.			
	COMPLETELY ENCIRCL	I VERTICAL LINES, THE SHEET METAL SHIELDS SHALL E THE INSULATION. MAINTAIN A FULL VAPOR BARRIER ION AS IT PASSES THROUGH THE SHIELD. PIPE HANGER,		MIXING VALVE SHALL MEET ASSE 1016–96 AND 1070. OUTLET TEMPERATURE SHALL BE SET TO 115°F.			
	ROLLER, OR SUPPORT SHALL BUTT THE ADJ	SHALL BE EXTERNAL AT THE SHIELD. CONTRACTOR		PROVIDE THE FOLLOWING ACCESSORIES: MCGUIRE MODEL 8912 CAST BODY P-TRAP ASSEMBLY WITH CHROME WALL FLANGE, MCGUIRE MODEL 2165LK	S		~
	SHALL BE TAKEN TO	NP AND SEAL ALL SEAMS AND JOINTS. SPECIAL CARE INSURE THAT THE VAPOR BARRIER AT THE PIPE SHIELDS NOD SPACER BETWEEN PIPE AND HANGER IS <u>NOT</u>		CHROME-PLATED BRASS STOPS WITH LOOSE KEYS AND 3/8" CHROME-PLATED COPPER RISERS.	Z		55
2	ALLOWED.	N MATERIAL SHALL BE A UL-RATED, NONCOMBUSTIBLE		PROVIDE SCALD PROTECTION COVERING OVER PIPES EXPOSED BELOW COUNTERTOP EQUAL TO TRUE BRO LAV GUARD 2. COVER DRAIN PIPING AND DOMESTIC COLD AND HOT WATER.	OVATION	СН	DRIVE OH 435
•	PIPE INSULATION REC INSULATION SHALL BE	OMMENDED FOR BOTH HOT AND COLD PIPING. A HEAVY DENSITY SECTIONAL PIPE INSULATION JACKETED		FIXTURE AND ALL COMPONENTS SHALL COMPLY WITH ICC 117.1 GUIDELINES.	Υ.Υ	Ш	DHOH
	SELF-SEALING LAP A	/APOR BARRIER LAMINATED ALL—SERVICE JACKET WITH DHESIVE. LAP AND SEAL ALL JOINTS TO INSURE VAPOR CONDUCTIVITY(K) SHALL NOT EXCEED 0.24 BTUH SQUARE	D.	GD-1	Ó		
	FOOT F/INCH. INSUL STAPLES ARE USED O	ATION SHALL ÉQUAL JOHNS MANVILLE MICRO-LOK HP. IF ON COLD WATER LINES, APPLY WHITE VAPOR BARRIER		GARBAGE DISPOSER SHALL BE EQUAL TO INSINKERATOR BADGER 5XP			-AGSHII SBURG
	MASTIC OVER STAPLES	S. ISULATED WITH A PREFORMED INSULATING FITTING COVER		CONTINUOUS FEED UNIT. DISPOSER SHALL HAVE 3/4 HP, 120 VOLT SINGLE PHASE MOTOR CONSUMING 8.1 AMPS. DISPOSER SHALL HAVE PERMANENTLY LUBRICATED BEARINGS, GALVANIZED STEEL GRINDING ELEMENTS, TWO STAINLESS	2	PR	GSH
	SUCH AS ZESTON 25 FIBERGLASS INSERT.	/50 RATED PVC INSULATED FITTING COVER WITH		STEEL 360° SWIVEL LÜGS, $1-1/2$ " CUSHIONED SLIP JOINT, DISHWASHER DRAIN CONNECTION, AND A MANUAL OVERLOAD RESET.	DING	\sim	SE LA
		TED PIPING PASSING THROUGH A FLOOR WHERE IT IS SHALL BE COVERED WITH A 0.032" (MINIMUM) THICK	E.	DW-1	D	- 4	70 FL RRYS
	ALUMINUM JACKET 18			DISHWASHER SHALL BE PROVIDED BY OWNER AND INSTALLED BY P.C. INSTALL DISHWASHER OUTLET BOX IN CABINET UNDER SK-1. OUTLET BOX SHALL BE		Ш	270 ERF
•		ESSORIES (HEATING AND/OR DOMESTIC)		EQUAL TO WATER*TITE MODEL AB9300HA WITH WATER HAMMER ARRESTOR. DISHWASHER DRAIN SHALL BE CONNECTED TO GARBAGE DISPOSAL UNDER ADJACENT SINK.	Bl	С_	PI 12
		ANGES, SPECIALTIES AND FITTINGS SHALL BE INSULATED.			REPRODUCED BY	THIS DRAWING SHAL NDIVIDUALS, CORPOR OTHER THAN THE IN	RATIONS, OR OTHER ENTITIES
		TRAINERS AS PER HOT WATER PIPING WITH REMOVABLE FOR STRAINER MAINTENANCE.	F.	IM—1 ICE MAKER BOX SHALL BE EQUAL TO GUY GRAY MODEL BIM875QTSAB. ICE	PROJECT. IF THIS I WORK OTHER THA GROUP, INC., THE	DRAWING IS USED IN P N THE PROJECT INTEN	PART OR ITS ENTIRETY, ON NDED BY TECHNICON DESIGN TO MAKE A CHARGE FOR
	c. INSULATE A	IR ELIMINATORS SAME AS HOT WATER PIPING.		MAKER BOX SHALL BE RECESSED AND CONSTRUCTED OF HOT DIPPED GALVANIZED STEEL W/ QUARTER TURN BALL VALVE HAVING 1/2" SWEAT INLET	THEREFORE, REUS	SE OR REPRODUCTION RITTEN CONSENT OF	N OF THIS DOCUMENT TECHNICON DESIGN GROUP,
		TANKS LOCATED WITHIN EIGHT FEET OF THE FLOOR, H PIPING TO SAME, SHALL BE INSULATED SAME AS HOT NG		AND 1/4" COMPRESSION OUTLET.			SIGN GROUP, INC.
		ng. <u>CESSORIES</u> : (COOLING AND/OR DOMESTIC)	G.	WF-1 WALL FAUCET SHALL BE FREEZELESS WALL HYDRANTS EQUAL TO WOODFORD	ARCHITECT/E FOR ANY QUA	NTITIES OF MATEI	NOT BE RESPONSIBLE RIALS AND
	a. VALVES, FL	ANGES, SPECIALTIES AND FITTINGS SHALL BE INSULATED. S WILL HAVE EXTENSION HANDLES, AND VALVE BODY,		MODEL 65–CH. HYDRANTS SHALL BE APPROVED UNDER ASSE STANDARD 1019–B AND LISTED BY IAPMO. HYDRANT SHALL INCLUDE NIDEL VACUUM	LOCATIONS O FROM THESE		PONENTS SCALED
	HANDLE CO	NRECTION, JAM NUT SHALL BE PROPERLY INSULATED AND PREVENT CONDENSATION.		BREAKER MODEL 34HA AND 3/4" MALE HOSE THREAD. THE VACUUM BREAKER SHALL BE APPROVED UNDER ASSE STANDARD 1011. EXTERIOR FINISH SHALL BE CHROME. FAUCET SHALL BE DESIGNED TO DRAIN AUTOMATICALLY AS	PLUMB	ING	
		TRAINERS AS PER COLD WATER PIPING WITH REMOVABLE OR STRAINER MAINTENANCE.		HANDLE IS SHUT OFF, WITH OR WITHOUT HOSE ATTACHED. LOOSE TEE KEY TO BE FURNISHED WITH EACH HYDRANT.	SPECIF	ICATIONS	3
	c. COOLING W	ATER EXPANSION TANKS, AIR ELIMINATOR, AND PIPING TO TANKS SHALL BE INSULATED SAME AS COLD WATER	Н.	WATER HAMMER ARRESTORS SHALL BE INSTALLED AS REQUIRED BY THE			
	PIPING WITH	1 - 1/2" INSULATION.		GOVERNING CODE OR SHOWN ON DRAWINGS. SHOCK ELIMINATORS SHALL HAVE P.D.I. DESIGNATIONS ON DRAWINGS OR CORRESPONDING WITH DRAINAGE FIXTURE UNITS. INSTALL ACCESS DOORS IN CHASE WALLS, FIXED CEILINGS, ETC. FOR		SSUED D	ATE
		ATING AND/OR DOMESTIC) ES SHALL BE INSULATED AS PER COOLING WATER PIPING.		ACCESS TO WATER HAMMER ARRESTORS. WATER HAMMER ARRESTOR SHALL BE EQUAL TO SIOUX CHIEF MODEL 657-F FOR ALL TRENCH FLUSHING SYSTEMS.		BIDDING & F	
•	INSULATE PIPING EXP	OSED TO THE WEATHER WITH INSULATION AS SPECIFIED	I.	TRAPS: ALL FIXTURES REQUIRING TRAPS SHALL BE FURNISHED WITH HEAVY	01 00-24		
	ALUMINUM JACKET WI	TIONAL THICKNESS. COVER WITH A 0.016" THICK SMOOTH TH 2" OVERLAP AT LONGITUDINAL AND CIRCUMFERENTIAL		DUTY STAINLESS STEEL P-TRAPS WITH CLEANOUT, TAIL PIECES AND TUBING DRAINS. AT HANDICAPPED LAVATORIES, PROVIDE OFFSET STRAINER/TAILPIECE			
	ON 18" CENTERS.	IN PLACE WITH $1/2$ " X .020" STAINLESS STEEL BANDING		AND EXTENSION AND INSTALL TRAP CLOSE AS POSSIBLE TO WALL. ROUGH-IN SANITARY OFF CENTER SO TRAP CAN BE INSTALLED PARALLEL TO WALL IF NECESSARY.			
i.	SEE PIPING INSULATIO THICKNESS.	IN SCHEDULE ON SHEET P501 FOR INSULATION					
			J.	<u>STOPS & RISERS:</u> ALL LAVATORIES, SINKS, LAUNDRY TUBS, ETC., SHALL BE FURNISHED WITH HEAVY DUTY COMMERCIAL GRADE SUPPLY STOPS, LOOSE KEY TYPE WITH CHROME PLATED FLEXIBLE RISERS.			
			ĸ	LAV. GUARD KIT: EXPOSED PIPING SUCH AS P-TRAPS, HOT AND COLD WATER			
				SUPPLIES AND STOP VALVES SHALL BE PROVIDED WITH PREFABRICATED INSULATION KITS SIMILAR TO "TRUE-BRO" HANDI-LAV GUARD KIT MODEL 102W.			
				APPROVED MANUFACTURERS: TRUE-BRO, SKAL GARD AND INSUL-TECT.	DRAWN E	BY:	SAB
				(SEE CONTINUATION ON SHEET P501.)	DATE:		08-23
				(SEL CONTINUATION ON SHEET FOUL)	PLOT SC	ALE:	1:1
					JOB NO.		45-2902-23
						QUEET	г

SHEET

P902

MECHANICAL LEGEND AND ABBREVIATIONS	
MECHANICAL CONTRACTOR	M.C.
GENERAL CONTRACTOR	G.C.
ELECTRICAL CONTRACTOR	E.C.
PLUMBING CONTRACTOR	P.C.
PACKAGED AIR CONDITIONING UNIT	RTU
VARIABLE REFRIGERANT FLOW HEAT PUMP	VRH
VARIABLE REFRIGERANT FLOW INDOOR UNIT	VRU
FAN	F
CONTROL DAMPER	CD
FIELD VERIFY	F.V.
ABOVE FINISHED FLOOR	A.F.F
BELOW FINISHED FLOOR	B.F.F
BOTTOM OF GRILLE	B.O.C
TOP OF GRILLE	T.O.C
BOTTOM OF DUCT	B.O.C
TOP OF DUCT	T.O.D
BOTTOM OF LOUVER	B.O.L
TOP OF LOUVER	T.O.L
AUTHORITY HAVING JURISDICTION	A.H.J
SUPPLY AIR	SA
RETURN AIR	RA
EXHAUST AIR	EA
OUTSIDE AIR	OA
BREAK IN PIPE	<u> </u>
DIRECTION OF FLOW IN PIPE	
PIPE DROP	
PIPE RISE	
TAKE-OFF TOP OF PIPE	<u> </u>
TAKE-OFF BOTTOM OF PIPE	<u> </u>
FIRE SUPPRESSION PULL STATION	T
CARBON DIOXIDE SENSOR/CONTROLLER	C
AIR DEVICE TAG-AIRFLOW RATE, CFM	x-xx
RECTANGULAR DUCT SIZE, CLEAR INSIDE, A = PLAN WIDTH, B = PLAN DEPTH	
OVAL DUCT SIZE, CLEAR INSIDE, $A = PLAN$ WIDTH, $B = PLAN$ DEPTH	AxB
AIR VOLUME CONTROL DAMPER	
ELBOW WITH TURNING VANES	[²)))
	بن
SUPPLY DUCTWORK UP, DOWN	
RETURN AND EXHAUST DUCTWORK UP, DOWN	

SQUARE TO ROUND TRANSITION

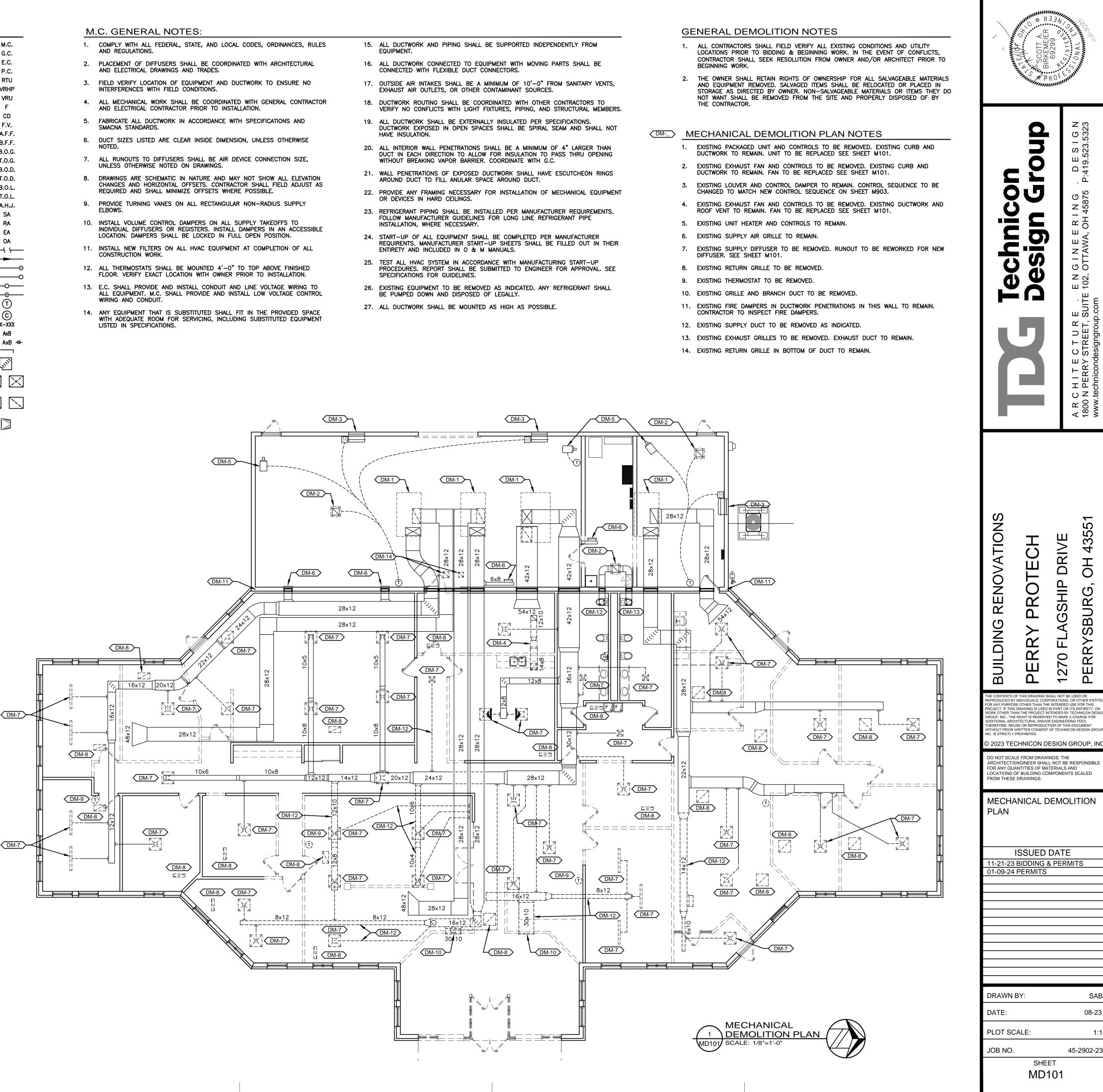
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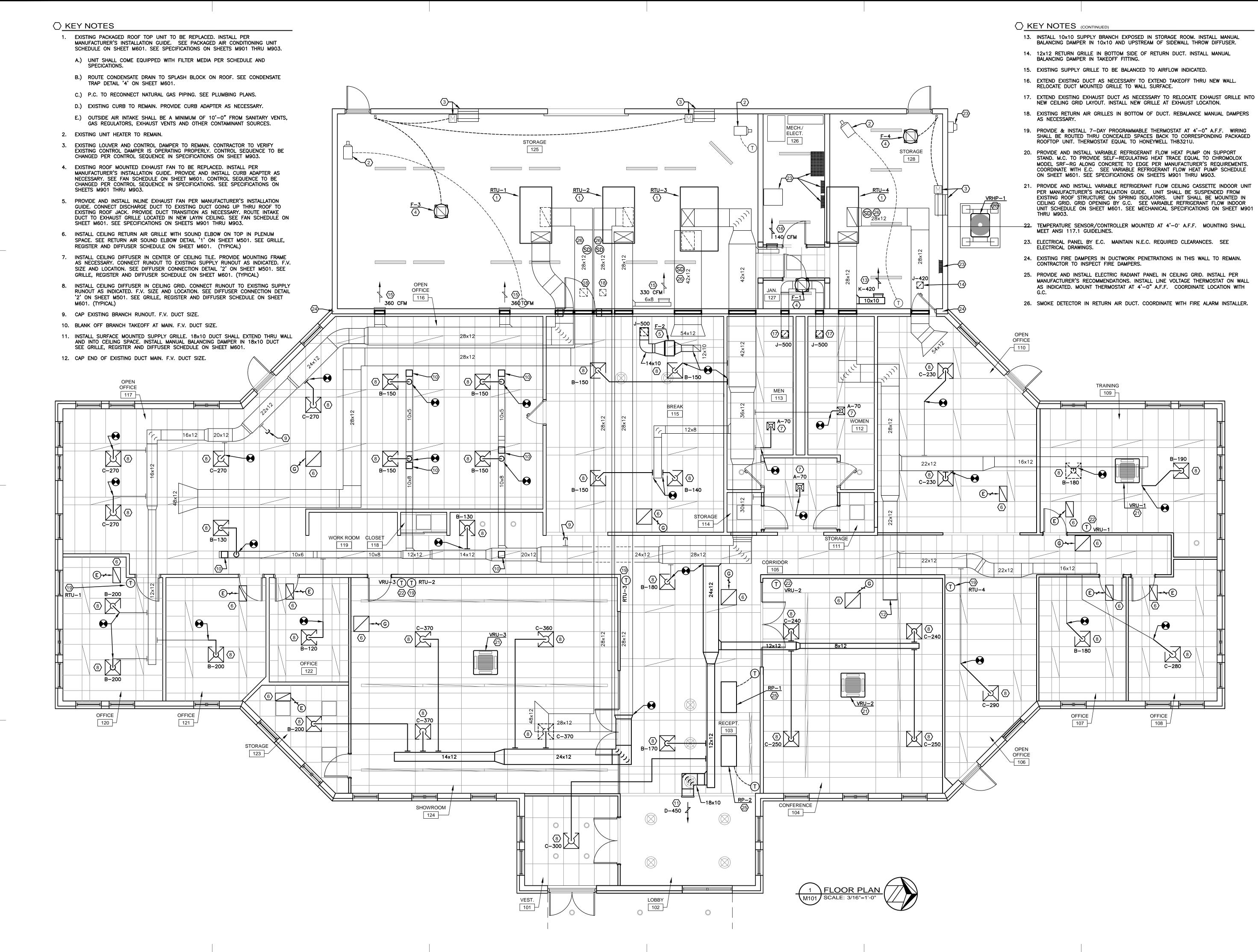
- AND REGULATIONS.

- REQUIRED AND SHALL MINIMIZE OFFSETS WHERE POSSIBLE.
- ELBOWS.
- LOCATION, DAMPERS SHALL BE LOCKED IN FULL OPEN POSITION.
- CONSTRUCTION WORK.
- WIRING AND CONDUIT.
- LISTED IN SPECIFICATIONS.

- EQUIPMENT.

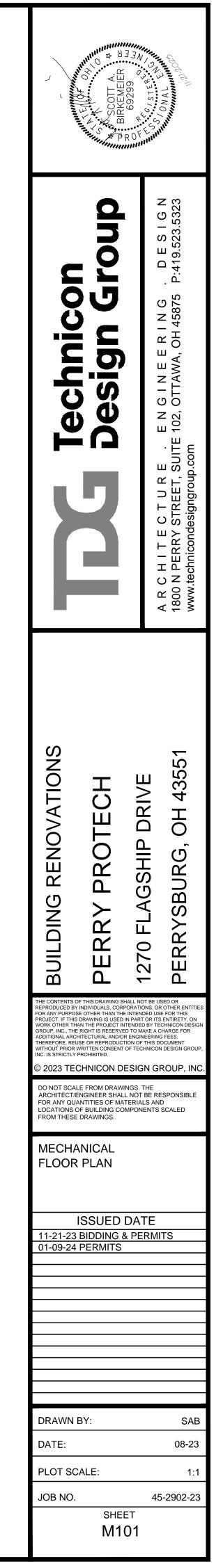
- WITHOUT BREAKING VAPOR BARRIER. COORDINATE WITH G.C.
- AROUND DUCT TO FILL ANULAR SPACE AROUND DUCT.
- OR DEVICES IN HARD CEILINGS.
- FOLLOW MANUFACTURER GUIDELINES FOR LONG LINE REFRIGERANT PIPE INSTALLATION, WHERE NECESSARY.
- ENTIRETY AND INCLUDED IN O & M MANUALS.
- SPECIFICATIONS FOR GUIDELINES.
- BE PUMPED DOWN AND DISPOSED OF LEGALLY.

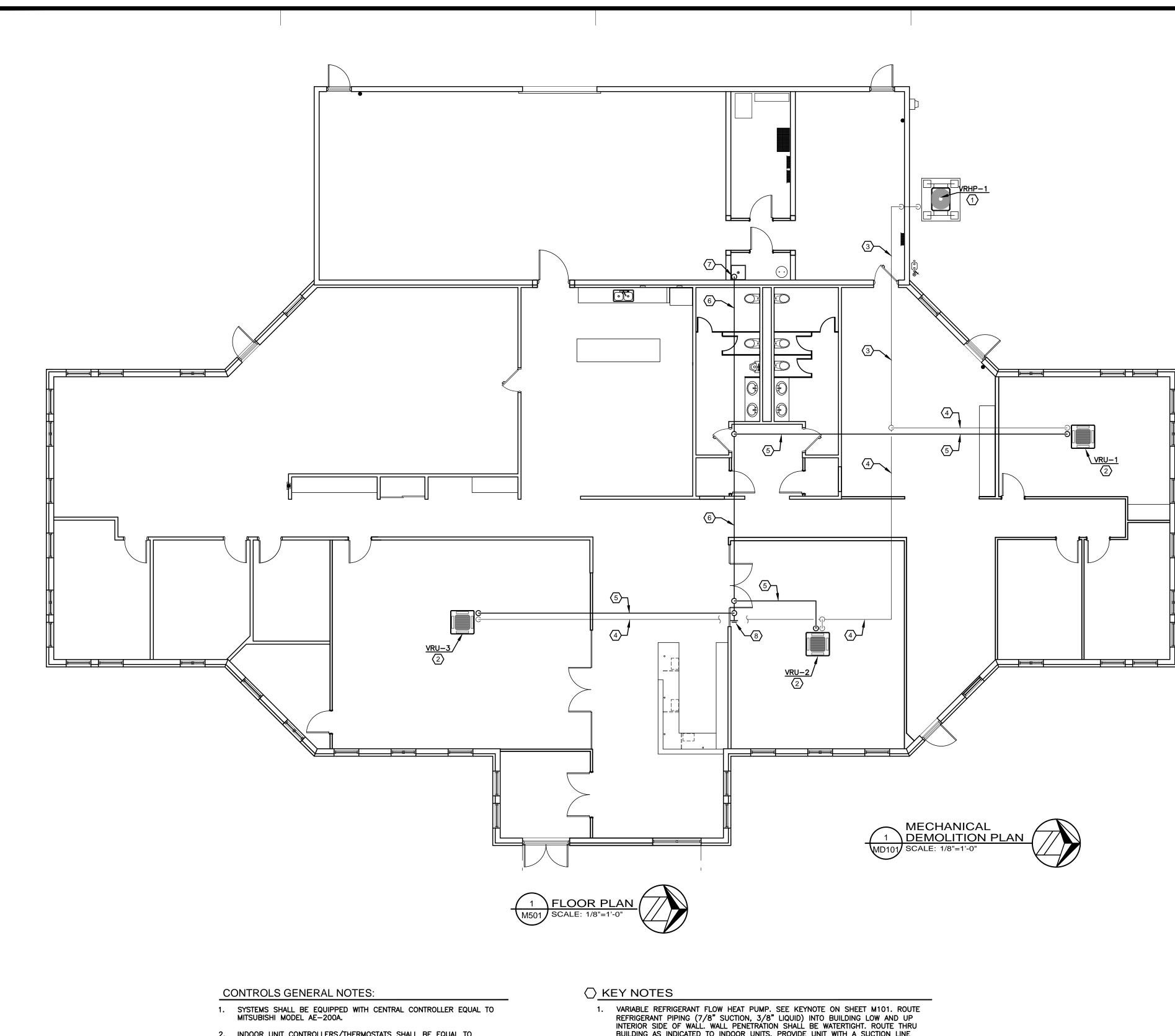




- 13. INSTALL 10x10 SUPPLY BRANCH EXPOSED IN STORAGE ROOM. INSTALL MANUAL
- 14. 12x12 RETURN GRILLE IN BOTTOM SIDE OF RETURN DUCT. INSTALL MANUAL

- 18. EXISTING RETURN AIR GRILLES IN BOTTOM OF DUCT. REBALANCE MANUAL DAMPERS
- 19. PROVIDE & INSTALL 7-DAY PROGRAMMABLE THERMOSTAT AT 4'-0" A.F.F. WIRING SHALL BE ROUTED THRU CONCEALED SPACES BACK TO CORRESPONDING PACKAGED
- STAND. M.C. TO PROVIDE SELF-REGULATING HEAT TRACE EQUAL TO CHROMOLOX MODEL SRF-RG ALONG CONCRETE TO EDGE PER MANUFACTURER'S REQUIREMENTS. COORDINATE WITH E.C. SEE VARIABLE REFRIGERANT FLOW HEAT PUMP SCHEDULE
- PER MANUFACTURER'S INSTALLATION GUIDE. UNIT SHALL BE SUSPENDED FROM EXISTING ROOF STRUCTURE ON SPRING ISOLATORS. UNIT SHALL BE MOUNTED IN CEILING GRID. GRID OPENING BY G.C. SEE VARIABLE REFRIGERANT FLOW INDOOR UNIT SCHEDULE ON SHEET M601. SEE MECHANICAL SPECIFICATIONS ON SHEET M901
- 22. TEMPERATURE SENSOR/CONTROLLER MOUNTED AT 4'-O" A.F.F. MOUNTING SHALL
- 24. EXISTING FIRE DAMPERS IN DUCTWORK PENETRATIONS IN THIS WALL TO REMAIN.
- 25. PROVIDE AND INSTALL ELECTRIC RADIANT PANEL IN CEILING GRID. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. INSTALL LINE VOLTAGE THERMOSTAT ON WALL AS INDICATED. MOUNT THERMOSTAT AT 4'-O" A.F.F. COORDINATE LOCATION WITH
- 26. SMOKE DETECTOR IN RETURN AIR DUCT. COORDINATE WITH FIRE ALARM INSTALLER.





- INDOOR UNIT CONTROLLERS/THERMOSTATS SHALL BE EQUAL TO MITSUBISHI MODEL PAC-YT53CRAU.
- 3. SYSTEMS SHALL BE EQUIPPED WITH CHANGEOVER CONTROLLER EQUAL TO MITSUBISHI MODEL AHC.

REFRIGERANT PIPING GENERAL NOTES:

- 1. TEES SHALL NOT BE INSTALLED IN A BULLHEAD CONFICTURATION. 2. TEES SHALL BE INSTALLED SO THE SIDE OF THE TEE IS IN THE
- HORIZONTAL POSITION AND SHALL NOT BE VERTICAL IN ORIENTATION. 3. MAXIMUM DISTANCE FROM FIRST BRANCH TEE TO FURTHEST UNIT SHALL
- NOT EXCEED 160'-0".
- 4. WHERE PIPING IS EXPOSED. IT SHALL BE INSTALLED IN A NEAT AND ORDERLY FASHION.

BUILDING AS INDICATED TO INDOOR UNITS. PROVIDE UNIT WITH A SUCTION LINE FILTER/CLEANING SYSTEM EQUAL TO MITSUBISHI MODEL PAC-SPRFCS. SEE SUCTION FILTER DETAIL '3' ON SHEET M501. SEE VARIABLE REFRIGERANT FLOW HEAT PUMP SCHEDULE ON SHEET M601. SEE SPECIFICATIONS ON SHEETS M901 THRU M903. 2. VARIABLE REFRIGERANT FLOW INDOOR UNIT. SEE FLOOR PLAN ON SHEET M101 FOR

ADDITIONAL NOTES. ROUTE COND PIPING AS INDICATED. REFRIGERANT PIPING (5/8" SUCTION, 3/8" LIQUID) SHALL BE CONNECTED PER MANUFACTURER REQUIREMENTS. 3. 7/8" SUCTION, 3/8" LIQUID REFRIGERANT PIPING ROUTED AS HIGH AS POSSIBLE. PIPING INDICATED AS SINGLE LINE FOR CLARITY.

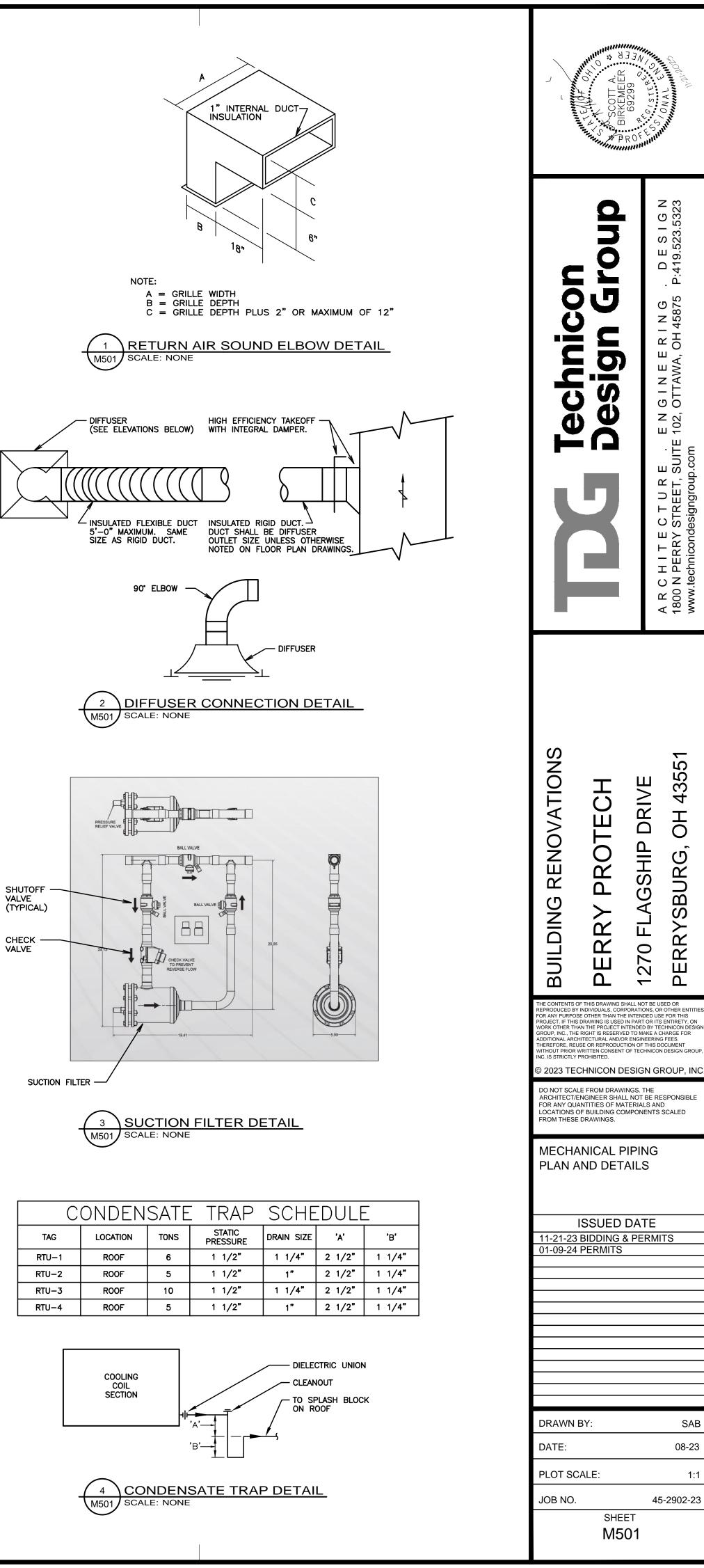
4. 5/8" SUCTION, 3/8" LIQUID REFRIGERANT PIPING ROUTED AS HIGH AS POSSIBLE. PIPING INDICATED AS SINGLE LINE FOR CLARITY.

5. 3/4" COND FROM INDOOR UNIT CONDENSATE PUMP TO MAIN. PUMPED CONDENSATE SHALL DISCHARGE INTO WYE FITTING IN TOP OF MAIN.

6. 1 1/4" COND GRAVITY MAIN SHALL BE ROUTED AS HIGH AS POSSIBLE.

7. 1 1/4" COND MAIN SHALL DISCHARGE INTO EXISTING MOP SINK. TERMINATE WITH 2" AIR GAP.

8. INSTALL CLEANOUT PLUG AT END OF COND MAIN.



TAG	LOCATION	TOTAL (MBH)
RTU-1	ROOF	73.7
	RUUF	/3./
RTU-2	ROOF	60.0
RTU-3	ROOF	118.7
RTU-4	ROOF	60.0
HING 2. TWO		

TAG	NOMINAL TONS	REFRIGERANT
VRHP-1	6	R410A
1. PROVIE	DE WITH B/	ASEPAN HEATE

TAC	LOCATION	TYPE	SUPPL	Y AIRFLO	W (CFM)		COOLII	NG COIL				HEATING COIL			FILTER	MAX SOUND		REFRIGERANT		ELECTRIC			MAKE	MODEL	CONNECTED TO HEAT PUMP	REMARKS
	TIPE	LOW	MID	HIGH	TOTAL (MBH)	SENSIBLE (MBH)	EAT (°F)	LAT (°F)	OAT (°F)	TOTAL (MBH)	EAT (°F)	LAT (°F)	OAT (°F)	BOX	dB(A)	TYPE	SUCTION	LIQUID	VOLTAGE	MCA	MOP	MARE	MODEL	HEAT PUMP	REMARNS	
VRU-1	TRAINING 109	CEILING CASSETTE	620	740	880	23.2	17.1	80.0/67.0	55.1	95	14.9	70.0	91.3	-3	FBM2-3	39	R410A	5/8"	3/8"	208-230/1/60	2.73	15	MITSUBISHI	PEFY-P24NMAU-E2	VRHP-1	NOTE 1
VRU-2	CONFERENCE 104	CEILING CASSETTE	620	740	880	23.2	17.1	80.0/67.0	55.1	95	14.9	70.0	91.3	-3	FBM2-3	39	R410A	5/8"	3/8"	208-230/1/60	2.73	15	MITSUBISHI	PEFY-P24NMAU-E2	VRHP-1	NOTE 1
VRU-3	SHOWROOM 124	CEILING CASSETTE	620	740	880	23.2	17.1	80.0/67.0	55.1	95	14.9	70.0	91.3	-3	FBM2-3	39	R410A	5/8"	3/8"	208-230/1/60	2.73	15	MITSUBISHI	PEFY-P24NMAU-E2	VRHP-1	NOTE 1

	FAN SCHEDULE																				
TAG	LOCATION	SERVICE	TYPE	CFM	SP	MOTOR		DRIVE	FAN	NOISE LEVEL		ACCESSORIES				POWER		MAKE	MODEL	REMARKS	
TAG	LUCATION	SERVICE	IIFE	CFM	(IN WC)	HP	W	RPM	DRIVE	RPM	dBA	SONES	CURB	SCREEN	DISCONNECT	DAMPER	VOLTAGE	AMPS	MARE	MODEL	REMARKS
F-1	JANITOR 127 (ROOF)	EXHAUST	CENTRIFUGAL	420	3/8	1/15		1550	DIRECT	1550	54	7.5	ADAPTER	BIRD	YES	BD-100-PB-10x10	120/1/60		GREENHECK	G-090-D	NOTE 1
F-2	BREAK 115 (CEILING)	EXHAUST	CENTRIFUGAL	500	3/8		280	1080	DIRECT	1080		2.0			YES	INTEGRAL	120/1/60	4.9	GREENHECK	CSP-A710	NOTE 2
F-3	STORAGE 125 (ROOF)	EXHAUST	CENTRIFUGAL	2,000	3/8	1/4		860	DIRECT	860	59	9.5	ADAPTER	BIRD	YES	BD-100-PB-16x16	120/1/60		GREENHECK	G-160-C	NOTE 1
F-4	STORAGE 128 (ROOF)	EXHAUST	CENTRIFUGAL	800	3/8	1/8		860	DIRECT	860	51	5.9	ADAPTER	BIRD	YES	BD-100-PB-16x16	120/1/60		GREENHECK	G-140-C	NOTE 1
1. FOAM C 2. MOTOR	I. FOAM CURB SEAL, CURB ADAPTER (M.C. TO F.V. SIZE), UL 705 LISTED, ISOLATION KIT. 2. MOTOR WITH THERMAL OVERLOAD, UL 705 LISTED, ISOLATION KIT.																				

	GRILLE, REGISTER, & DIFFUSER SCHEDULE													
TAG	DEVICE SIZE	SYSTEM	FRAME	FINISH	Mounting Height	MAKE	MODEL	REMARKS						
A	12x12-6"ø	SUPPLY	SURFACE	WHITE	CEILING	PRICE	SPD	MOUNTING FRAME						
В	24x24-8 " ø	SUPPLY	LAY-IN	WHITE	CEILING	PRICE	SPD							
С	24x24-10"ø	SUPPLY	LAY-IN	WHITE	CEILING	PRICE	SPD							
D	18x10	SUPPLY	SURFACE	WHITE	SEE DRAWINGS	PRICE	520D	FRONT BLADES SHORT DIMENSION						
E	22x10	RETURN/TRANSFER	LAY-IN	CLEAR ANODIZED	SEE DRAWINGS	PRICE	530							
G	22x22	RETURN/TRANSFER	LAY-IN	CLEAR ANODIZED	SEE DRAWINGS	PRICE	530							
J	12x12	RETURN/EXHAUST	SURFACE	CLEAR ANODIZED	SEE DRAWINGS	PRICE	530	MOUNTING FRAME						
к	14x8	SUPPLY	SURFACE	WHITE	SEE DRAWINGS	PRICE	520D	FRONT BLADES SHORT DIMENSION						

PIPING	INSULAT	ION SC	HEDULE							
SEDVICE	PIPE SIZE									
SERVICE	ALL PIPING	RUNOUTS	1" & BELOW	1 1/4" - 2"	2 1/2" - 4 "	ABOVE 4"				
CONDENSATE FROM A.C. UNITS	1/2"									
REFRIGERANT SUCTION AND LIQUID		1/2"	1"	1"	1"	1"				

ELECTRIC RADIANT PANEL HEATER SCHEDULE										
TAG	LOCATION	SIZE	WATTS	BTU/HR	STAGES	POWER	AMPS	MAKE	MODEL	REMARKS
RP-1	RECEPTION 103	48x24	750	2560	1	120/1/60		MARLEY	ATH24481A	NOTE 1
RP-2	RECEPTION 103	48x24	750	2560	1	120/1/60		MARLEY	ATH24481A	NOTE 1
1. REMOTE	REMOTE THERMOSTAT AND ELECTRICAL DISCONNECT.									

		PACKAGED AIR CONDITIONING UNIT SCHEDULE																								
	COOLING HEATING FAN MOTOR ELECTRICAL									MINIMUM	MAKE	MODEL REI	REMARKS													
)	SENSIBLE (MBH)	EAT (°F)	LAT (°F)	AMBIENT (*F)	REFRIGERANT	COMPRESSOR	EER IEE	R SEER	INPUT	OUTPUT	EAT (°F)	LAT (°F)	FUEL	EFF	CFM	ESP	DRIVE	HP	RPM	POWER	MCA	MOP	OUTSIDE AIR	MARE	MODEL	REMARKS
	58.6	80/67	59.0/57.3	95	R410A	TWO SCROLL	11.0 14.	6	150/105	121.5/85.1	70	116.4	NG	81%	2,400	3/4	DIRECT	3	1115	208–230/3/60	38	50	320	TRANE	YSJ072A3S0H	NOTE 1, 2
	49.3	80/67	59.7/58.4	95	R410A	ONE SCROLL	12.0 14.	.0	150/105	121.5/85.1	70	126.4	NG	81%	2,000	3/4	DIRECT	1.5	1125	208–230/3/60	30	45	200	TRANE	YSC060G3RH	NOTE 1, 3
	90.4	80/67	59.8/57.8	95	R410A	TWO SCROLL	11.0 14.	.6	240/168	194.4/136.0	70	114.6	NG	81%	4,000	3/4	DIRECT	3	1482	208–230/3/60	54	70	510	TRANE	YSJ120A3S0H	NOTE 1, 2
	49.3	80/67	59.7/58.4	95	R410A	ONE SCROLL	12.0 14.	0	150/105	121.5/85.1	70	126.4	NG	81%	2,000	3/4	DIRECT	1.5	1125	208–230/3/60	30	45	310	TRANE	YSC060G3RH	NOTE 1, 3

AL DISCHARGE AND RETURN, DIRECT DRIVEN MOTOR, COMPARATIVE ENTHALPY ECONOMIZER WITH BAROMETRIC EXHAUST, ENTHALPY TRANSMITTER, RETURN AIR SMOKE DETECTOR, "MERV 8 PLEATED FILTERS, FROSTAT, THROUGH THE BASE GAS AND ELECTRIC, UNIT MOUNTED NON-FUSED ELECTRICAL DISCONNECT, AND ANTI-SHORT CYCLE TIMER.

	VARIABLE REFRIGERANT FLOW HEAT PUMP SCHEDULE																	
		COOL	ING			HEATING			COMPRESSOR	COND	ENSER FANS	ELECTRIC	AL DATA					
ERANT	мвн	AMBIENT (°F)	EER	IEER	мвн	AMBIENT (*F)	СОР	QTY	TYPE	QTY	TYPE	VOLTAGE	МСА	MOP	MAX SOUND dB(A)	MAKE	MODEL	REMARKS
0A	69.5	95	13.7	23.1	44.6	-3	3.8	1	INVERTER DRIVEN SCROLL	1	PROPELLER	208-230/3/60	24	35	58	MITSUBISHI	PUHY-P72TLMU-A	NOTE 1
HEATER	TER KIT AND SUPPORT STAND. SUPPORT STAND EQUAL TO MITSUBISHI MODEL NUMBER QSSB48M-18.																	

VARIARIE REERIGERANT FLOW INDOOR LINIT SCHEDLI

LIQUID AND GAS REFRIGERANT PIPING WITH SERVICE BALL VALVES, INSULATION ON ALL REFRIGERANT PIPING FROM HEAT PUMP TO INDOOR UNIT COIL.

ROOM UMBER	ROOM	NET ROOM AREA [Az] (SQ FT)	ACTUAL OCCUPANCY [Pz]	NATURAL VENT REQUIRED OPERABLE AREA (SQ FT)	ILATION (OMC	SECTION 402) ACTUAL OPERABLE AREA (SQ FT)			VENTILATION (OMC BREATHING ZONE OUTDOOR AIRFLOW [Vbz] (CFM)	ZONE AIR	ZONE OUTDOOR AIRLOW [Voz]	ACTUAL OUTSIDE AIRFLOW (CFM)	REMARKS
101	VESTIBULE	141	0				0.06	0	8	0.8	11	11	NOTE 2
102	LOBBY	211	2				0.06	5	23	0.8	28	28	NOTE 2
103	RECEPTION	134	2				0.06	5	18	0.8	23	23	NOTE 3
104	CONFERENCE	657	14				0.06	5	109	0.8	137	137	NOTE 2
105	CORRIDOR	745	0				0.06	0	45	0.8	56	56	NOTE 3
106	OPEN OFFICE	422	2				0.06	5	35	0.8	44	44	NOTE 4
107	OFFICE	183	1				0.06	5	16	0.8	20	20	NOTE 4
108	OFFICE	199	1				0.06	5	17	0.8	21	21	NOTE 4
109	TRAINING	392	13				0.06	5	89	0.8	111	111	NOTE 4
110	OPEN OFFICE	510	3				0.06	5	46	0.8	57	57	NOTE 4
111	STORAGE	23	0				0.12	0	3	0.8	3		NOTE 6
112	WOMEN	175	3				0	70	210	1.0	210	210	NOTE 5
113	MEN	175	3				0	70	210	1.0	210	210	NOTE 5
114	STORAGE	23	0				0.12	0	3	0.8	3		NOTE 6
115	BREAK	648	2				0.06	5	49	0.8	61	61	NOTE 3
116	OPEN OFFICE	851	9				0.06	5	96	0.8	120	120	NOTE 3
117	OPEN OFFICE	603	3				0.06	5	51	0.8	64	64	NOTE 1
118	CLOSET	18	0				0.12	0	2	0.8	3	3	NOTE 3
119	WORK ROOM	225	0				0.06	5	14	0.8	17	17	NOTE 3
120	OFFICE	230	1				0.06	5	19	0.8	24	24	NOTE 1
121	OFFICE	203	1				0.06	5	17	0.8	21	21	NOTE 1
122	OFFICE	140	1				0.06	5	13	0.8	17	17	NOTE 3
123	STORAGE	118	0				0.12	0	14	0.8	18	18	NOTE 2
124	SHOWROOM	971	6				0.12	7.5	162	0.8	202	202	NOTE 3
125	STORAGE	1385	0				0.12	0	166	0.8	208	208	NOTE 1
126	MECH/ELEC	136	0				0.06	0	8	0.8	10	10	NOTE 3
127	JANITOR	30	0				0.06	0	2	0.8	2		NOTE 6
128	STORAGE	372	0				0.12	0	45	0.8	56	56	NOTE 4

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M601

DIVISION 23 - MECHANICAL SPECIFICATIONS

TEMPERATURE CONTROL SYSTEM.

- SCOPE OF WORK: WORK COVERED BY THIS SPECIFICATION AND DESIGN DRAWINGS SHALL INCLUDE ALL LABOR, MATERIALS, EQUIPMENT AND SERVICES NECESSARY FOR AND REASONABLY INCIDENTAL TO COMPLETE THE INSTALLATION OF THE HEATING. COOLING AND VENTILATION SYSTEMS AS INDICATED IN CONTRACT DOCUMENTS. REFERENCE TO CONTRACTOR OR MECHANICAL CONTRACTOR (OR M.C.) ON ALL DRAWINGS AND WITHIN THIS SPECIFICATION COVERS WORK FOR HEATING, COOLING AND VENTILATING CONTRACTORS AND THEIR SUBCONTRACTORS. HVAC CONTRACTOR SHALL BE RESPONSIBLE FOR LOW VOLTAGE CONTROLS, WIRING AND NECESSARY CONDUIT REQUIRED FOR THE COMPLETE AND OPERABLE
- 2. <u>PERMITS AND INSPECTIONS</u>: THE ARCHITECT SHALL BE RESPONSIBLE FOR OBTAINING AND PAYING FOR ALL NECESSARY PERMITS. CONTRACTOR IS RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH ANY INSPECTIONS, TAXES AND INSURANCE REQUIRED BY
- ORDINANCES AND CODES: ALL WORK SHALL BE INSTALLED TO CONFORM WITH ALL FEDERAL, STATE, LOCAL CODES AND ORDINANCES, AND INDUSTRY STANDARDS INCLUDING, BUT NOT LIMITED TO NFPA, OBC 2017, OPC 2017, OMC 2017, ASHRAE, ASTM, ASME, ANSI, UL, NEC, AMCA AND SMACNA
- SHOULD ANY WORK SHOWN ON THE DRAWINGS OR HEREIN SPECIFIED BE CONTRARY TO SAID MINIMUM REQUIREMENTS, ORDINANCES, STATUTES OR REGULATIONS, THE WORK SHALL BE EXECUTED IN ACCORDANCE WITH THE REQUIREMENTS, ORDINANCES, STATUTES OR REGULATIONS, BUT NOT UNTIL THE POINTS IN QUESTION HAVE BEEN REFERRED TO THE ARCHITECT/ENGINEER FOR APPROVAL.
- ALL TESTS SHALL BE MADE AS REQUIRED BY ABOVE MENTIONED REQUIREMENTS, ORDINANCES, STATUTES OR REGULATIONS, OR BY THE INSPECTOR HAVING JURISDICTION. THE COST OF SUCH TESTS SHALL BE INCLUDED IN THE CONTRACT PRICE AND EVIDENCE OF SUCH TESTS AND INSPECTIONS SHALL BE PROVIDED FOR THE OWNER'S FILES.
- CONTRACT DRAWINGS: IN GENERAL, DRAWINGS ARE SCHEMATIC IN NATURE AND ARE INTENDED AS A GUIDE FOR THE CONTRACTOR, BUT DO NOT NECESSARILY SHOW ALL DETAILS, OFFSETS, ELEVATION CHANGES, ETC. THE CONTRACTOR'S WORK SHALL CONFORM TO THE INFORMATION CONTAINED IN THIS SPECIFICATION AND/OR AS INDICATED IN THE LATEST REVISION OF THE DRAWINGS REFERRED TO HEREIN. THE CONTRACTOR SHALL CONSULT WITH THE ARCHITECT/ENGINEER REGARDING ALL QUESTIONS PRIOR TO PROCEEDING WITH FABRICATIÓN OF THE WORK IN QUESTION.
- THE CONTRACTOR SHALL PREPARE ALL ADDITIONAL DETAIL OR FIELD INSTALLATION DRAWINGS NECESSARY AT THEIR OWN EXPENSE. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS INDICATED ON THE ENGINEER'S LAYOUT DRAWINGS AND DETERMINE IF ANY CHANGES ARE REQUIRED IN CONDUITS, PIPING RUNS, DRAINS, ETC. TO AVOID INTERFERENCE, MAJOR CHANGES SHALL NOT BE MADE WITHOUT THE APPROVAL OF THE ARCHITECT/ENGINEER.
- THE CONTRACTOR HAS THE RIGHT TO VARY THE RUN OF CONDUITS, PIPING AND/OR DUCTS AS MAY BE FOUND NECESSARY OR DESIRABLE TO AVOID INTERFERENCES. MAJOR REVISIONS SHALL BE VERIFIED WITH THE ARCHITECT/ENGINEER.
- FOR CONSTRUCTION PURPOSES DRAWINGS SHOULD NOT BE SCALED. IN GENERAL, THE SPECIFICATIONS ARE WRITTEN IN SINGULAR FORM. THE DRAWINGS SHOULD BE USED TO DETERMINE NUMBER OF ITEMS REQUIRED FOR A COMPLETE INSTALLATION.
- <u>VERIFICATION:</u> BEFORE RUNNING ANY DUCTS, PIPING, ETC., WITHIN THE BUILDING, THE CONTRACTOR SHALL ASSURE HIMSELF THAT THEY CAN BE INSTALLED AS CONTEMPLATED WITHOUT TRAPPING OR INTERFERING WITH COLUMNS, BEAMS, PIPING, FIXTURES, ETC. ANY NECESSARY MAJOR DEVIATION SHALL BE REFERRED TO THE ARCHITECT/ENGINEER FOR ADJUSTMENT BEFORE LINES ARE RUN, AT NO INCREASE IN CONTRACT PRICE.
- OPENINGS, SUPPORTING STEEL, FIELD-BUILT CURBS, ELECTRICAL DATA, SPACE REQUIREMENTS, ETC., WERE DESIGNED AROUND SPECIFIC PARAMETERS. WHEN THE CONTRACTOR DETERMINES THE MAKE OF EQUIPMENT TO BE PROVIDED FOR THE JOB. IT SHALL BE THEIR RESPONSIBILITY TO VERIFY AND COORDINATE UNIT DIMENSIONS WITH THE GENERAL CONTRACTOR AND ALL OTHER INTERESTED CONTRACTORS ON THE JOB. IT SHALL ALSO BECOME THE CONTRACTOR'S RESPONSIBILITY TO CHANGE AS NECESSARY, THROUGH THE ARCHITECT/ENGINEER, ALL REQUIRED DIMENSIONS SO THAT OPENINGS, SUPPORTING STEEL, CURBS, ELECTRICAL DATA, ETC., WILL FIT THE EQUIPMENT SUPPLIED. ANY ADDITIONAL COST WILL BE THE SOLE RESPONSIBILITY OF THIS CONTRACTOR.
- IN ADDITION, ELECTRICAL POWER, INTERLOCK AND CONTROL DIAGRAMS AND PIPING ARRANGEMENTS WERE DESIGNED AROUND ONE SPECIFIC MANUFACTURER. IF ADDITIONAL WIRING PIPING CONTROLS, ETC. ARE REQUIRED FOR OTHER EQUIPMENT, THE CONTRACTOR SHALL INCLUDE THE COST OF THE SAME IN HIS PRICE.
- ENSIONS ELEVATIONS AND RELATIVE LOCATIONS OF EXISTING EQUIPMENT, SEWERS PIPES, DUCTS, CONDUITS, ETC., IN PLACE AS SHOWN ON THE DRAWINGS, ARE TAKEN FROM AS-BUILT AND/OR RECORD DRAWINGS AND ARE DEEMED RELIABLE ONLY IN SO FAR GENERAL LAYOUT IS CONCERNED. SUCH DIMENSIONS SHALL NOT BE USED FOR LAYOUT DRAWINGS NOR DETAILING OF COMPONENTS. THE RESPONSIBILITY FOR CHECKING IN PLACE ITEMS WILL BE THE CONTRACTORS. ALL MEASUREMENTS, THE EXACT DETERMINATION OF RELATIVE ELEVATIONS OR LOCATIONS. THE ASCERTAINING OF ACCURACY OF ALL GIVEN ELEVATIONS AND THE OBTAINING OF ALL NECESSARY ADDITIONAL INFORMATION TO INSURE THE PROPER FIT AND COORDINATION OF ALL CONDUIT, EQUIPMENT, DUCTS, AND PIPING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- THE CONTRACTOR SHALL CAREFULLY EXAMINE THE GENERAL BUILDING PLANS AND ALL MECHANICAL PLANS AND CARRY ON HIS WORK SO AS NOT TO DELAY OR INTERFERE WITH THE WORK OF OTHER TRADES. THE CONTRACTOR SHALL OBTAIN IN WRITING FROM OTHER CONTRACTORS SUCH DATA AS NECESSARY TO COORDINATE HIS WORK WITH OTHER TRADES.
- RECORD DRAWINGS: THE CONTRACTOR SHALL NOTE CHANGES FROM CONTRACT DRAWINGS AND SPECIFICATIONS. THE CONTRACTOR SHALL NEATLY AND CORRECTLY ENTER IN COLORED PENCIL ANY DEVIATIONS ON DRAWINGS AFFECTED AND SHALL KEEP DRAWINGS AVAILABLE FOR INSPECTION. AN EXTRA SET OF DRAWINGS SHALL BE FURNISHED BY M.C. FOR THIS PURPOSE. THE CONTRACTOR SHALL GIVE THE DRAWINGS TO THE ARCHITECT AT PROJECT COMPLETION AND LABEL THEM "AS BUILT DRAWINGS - HVAC."
- SEE PROJECT MANUAL SECTION '017839 PROJECT RECORD DOCUMENTS' FOR ADDITIONAL REQUIREMENTS.
- 7. SITE VISITATION: THE CONTRACTOR SHALL VISIT THE SITE (AND/OR BUILDING) AND EXAMINE THE AREA OF WORK AND COMPARE IT WITH DRAWINGS AND SPECIFICATIONS. AND BE SATISFIED AS TO CONDITION OF PREMISES, SUCH AS OBSTRUCTIONS, ACTUAL LEVELS. AND OTHER NECESSARY REQUIREMENTS FOR CARRYING OUT THE WORK. ALL BIDDERS SHALL REPORT ANY DISCREPANCIES TO THE ARCHITECT/ENGINEER PRIOR TO SUBMITTING THEIR BID OR PROPOSAL. FAILURE TO REPORT SUCH DISCREPANCIES SHALL BE DEEMED ACCEPTANCE OF EXISTING CONDITIONS. NO ADDITIONAL COMPENSATION WILL BE GIVEN AFTER THE BIDS OR PROPOSALS HAVE BEEN SELECTED.
- SUBMITTALS: SUBMIT TO THE ARCHITECT/ENGINEER FOR REVIEW FOR THE LIMITED PURPOSE OF CHECKING FOR CONFORMANCE WITH INFORMATION GIVEN AND THE DESIGN CONCEPT EXPRESSED IN THE CONTRACT DOCUMENTS PRODUCT DATA AND SHOP DRAWINGS FOR ALL SCHEDULED EQUIPMENT. CLEARLY IDENTIFY ALL SUBMITTALS WITH NAME SHOWN IN THE SCHEDULES. APPLY CONTRACTOR'S STAMP, SIGNED OR INITIALED CERTIFYING THAT REVIEW, APPROVAL, VERIFICATION OF PRODUCTS REQUIRED, FIELD DIMENSIONS, ADJACENT CONSTRUCTION WORK, AND COORDINATION OF INFORMATION IS IN ACCORDANCE WITH THE REQUIREMENTS OF THE WORK AND CONTRACT DOCUMENTS. IDENTIFY VARIATIONS FROM CONTRACT DOCUMENTS AND PRODUCT OR SYSTEM LIMITATIONS WHICH MAY BE DETRIMENTAL TO SUCCESSFUL PERFORMANCE OF THE COMPLETED WORK. DISTRIBUTE COPIES OF REVIEWED SUBMITTALS AS APPROPRIATE. INSTRUCT PARTIES TO PROMPTLY REPORT ANY INABILITY TO COMPLY WITH REQUIREMENTS.
- SEE PROJECT MANUAL SECTION '013300 SUBMITTAL PROCEDURES' FOR ADDITIONAL REQUIREMENTS.
- PRODUCT SUBSTITUTION: MANUFACTURERS SPECIFIED IN THE EQUIPMENT SCHEDULES ' NAMING ONE OR MORE MANUFACTURERS ARE INCLUDED AS A BASIS OF DESIGN WITH A PROVISION FOR SUBSTITUTIONS
- SUBMIT A REQUEST FOR SUBSTITUTION FOR ANY MANUFACTURER NOT NAMED. DOCUMENT EACH REQUEST WITH COMPLETE DATA SUBSTANTIATING COMPLIANCE OF PROPOSED SUBSTITUTION WITH CONTRACT DOCUMENTS. A REQUEST FOR SUBSTITUTION CONSTITUTES & REPRESENTATION THAT THE SUBMITTER HAS INVESTIGATED PROPOSED PRODUCT AND DETERMINED THAT IT MEETS OR EXCEEDS THE QUALITY LEVEL OF THE SPECIFIED PRODUCT AND THAT IT WILL PROVIDE THE SAME WARRANTY FOR THE SUBSTITUTION AS FOR THE SPECIFIED PRODUCT. THE CONTRACTOR SHALL COORDINATE INSTALLATION AND MAKE CHANGES TO OTHER
- WORK WHICH MAY BE REQUIRED FOR THE WORK TO BE COMPLETED WITH NO ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR WAIVES CLAIMS FOR ADDITIONAL COSTS OR TIME EXTENSION WHICH MAY SUBSEQUENTLY BECOME APPARENT AND WILL REIMBURSE THE OWNER, ARCHITECT AND/OR ENGINEER FOR REVIEW OR REDESIGN SERVICES ASSOCIATED WITH RE-APPROVAL BY AUTHORITIES.

SUBSTITUTIONS WILL NOT BE CONSIDERED WHEN THEY ARE INDICATED OR IMPLIED ON SHOP DRAWING OR PRODUCT DATA SUBMITTALS, WITHOUT SEPARATE WRITTEN REQUEST, OR WHEN ACCEPTANCE WILL REQUIRE REVISION TO THE CONTRACT DOCUMENTS.

SEE PROJECT MANUAL SECTION '012500 - SUBSTITUTION PROCEDURES' FOR ADDITIONAL REQUIREMENTS.

- 10. WARRANTY: THE MECHANICAL CONTRACTOR SHALL PROVIDE WRITTEN GUARANTEE TO THE OWNER THAT WORK HEREIN SHALL BE FREE FROM DEFECTS IN WORKMANSHIP AND MATERIALS, THAT APPARATUS WILL DEVELOP CAPACITIES AND CHARACTERISTICS REQUIRED ON DRAWINGS, AND THAT IF DURING A PERIOD OF ONE YEAR AFTER DATE OF CERTIFICATE OF COMPLETION BY ARCHITECT/ENGINEER AND ACCEPTANCE OF PROJECT BY OWNER FOR BENEFICIAL USE, ANY SUCH DEFECTS APPEAR, CONTRACTOR SHALL REMEDY SAME WITHOUT ANY COST TO THE OWNER. CONTRACTOR SHALL OBTAIN AND SUBMIT TO THE OWNER ALL MANUFACTURERS' WARRANTIES FOR EQUIPMENT INSTALLED AS PART OF THE CONTRACT.
- SEE PROJECT MANUAL SECTION '017400 WARRANTIES' FOR ADDITIONAL REQUIREMENTS.
- 11. ICC COMPLIANCE: ALL FIXTURES, EQUIPMENT, CONTROLS AND DEVICES SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF AMERICANS WITH DISABILITIES ACT (ADA), ICC A117.1, STATE BUILDING CODE, AND LOCAL CODES MAY
- 12. <u>CLOSE-OUT PROCEDURES</u>: CONTRACTOR SHALL PROVIDE FIELD TESTING, CHECK-OUT AND SYSTEM DEMONSTRATIONS TO OWNER TO ASSURE PROPER PERFORMANCE AND ADJUSTMENT OF ITEMS PROVIDED UNDER THE CONTRACT. REMOVE ALL DEBRIS CREATED BY THE CONSTRUCTION WORK AND CLEAN ALL EQUIPMENT. AIR DEVICES. ETC., INSIDE AND OUTSIDE. PROVIDE THREE BOUND COPIES OF OPERATION AND MAINTENANCE MANUALS WHICH INCLUDES: COPIES OF EACH APPROVED SHOP DRAWING, MAINTENANCE PROCEDURES, OPERATION AND INSTRUCTION MANUALS, LITERATURE SUPPLIED WITH EQUIPMENT. AND A LIST OF ALL CONTRACTOR'S PURCHASE ORDERS WITH SUPPLIERS, NAMES, ADDRESSES AND PHONE NUMBERS, FOR ALL MATERIALS. PROVIDE INSTRUCTION TO PERSONNEL SELECTED BY THE OWNER, TO FAMILIARIZE THEM WITH THE LOCATION OF SIGNIFICANT EQUIPMENT, TRAIN THEM ON EQUIPMENT FUNCTIONS, REVIEW MAINTENANCE PROCEDURES AND COORDINATE INFORMATION AVAILABLE IN THE BINDER.

SEE PROJECT MANUAL SECTION '017700 - CLOSEOUT PROCEDURES' AND '017823 - OPERATION AND MAINTENANCE DATA' FOR ADDITIONAL REQUIREMENTS.

13. <u>WORKMANSHIP AND LAYOUT</u>: ALL WORK SHALL BE DONE BY MECHANICS SKILLED IN THE PARTICULAR TRADE INVOLVED, UNDER RESPONSIBLE SUPERVISION, AND WITH THE BEST MODERN PRACTICES.

CONTRACTOR SHALL CONSULT ALL DRAWINGS. CONSTRUCTION DETAILS AND JOB SITE AND CONFER AND COOPERATE WITH OTHER CONTRACTORS AND THE OWNER TO AVOID INTERFERENCES.

THE GENERAL CONTRACTOR WILL PROVIDE DUCT OPENINGS AND PIPE SHAFT OPENINGS IN THE NEW CONSTRUCTION WHERE SHOWN ON THE ARCHITECTURAL OR STRUCTURAL DRAWINGS AND ALSO WHERE INDICATED AND SIZED BY THIS CONTRACTOR. OPENINGS REQUIRED DUE TO UNTIMELY OR INACCURATE LAYOUT BY THE MECHANICAL CONTRACTOR SHALL BE AT THE MECHANICAL CONTRACTOR'S OWN EXPENSE USING SKILLED WORKMEN AND THE PROPER TOOLS FOR THE WORK INVOLVED.

- 14. MATERIALS GENERAL: THE MANUFACTURERS REFERENCED THROUGHOUT THESE OUTLINE SPECIFICATION ARE INCLUDED AS A BASIS OF DESIGN. SUBMISSION OF ALTERNATE MANUFACTURERS OF SIMILAR EQUIPMENT IS SUBJECT TO ENGINEERS APPROVAL. UNITS OF EQUIPMENT, OTHER THAN THOSE LISTED AS THE BASIS OF DESIGN, MUST BE PROVEN TO BE PHYSICALLY ACCEPTABLE, IN ADDITION TO MEETING ALL PERFORMANCE AND EQUIPMENT SPECIFICATIONS. LIABILITY OF NON-CONFORMANCE SHALL LIE ON CONTRACTOR/SUBMITTER.
- ALL MATERIALS SHALL BE NEW AND OF THE GRADE AND QUALITY SPECIFIED. ONLY THE BEST MATERIAL OF EACH CLASS SPECIFIED SHALL BE USED.
- 15. <u>QUALITY REQUIREMENTS</u>: ARTICLES, DEVICES, MATERIALS, FORMS OF CONSTRUCTION, FIXTURES, ETC. NAMED IN THE SPECIFICATIONS TO DENOTE THE TYPE AND QUALITY REQUIRED, WHETHER OR NOT THE WORDS "OR EQUAL OR EQUIVALENT" ARE USED, SHALL BE KNOWN AS "STANDARDS" AND ALL PROPOSALS SHALL BE BASED ON THE

THE SPECIFICATIONS ARE WRITTEN AROUND THE CONSTRUCTION METHODS. USE OF MATERIALS, SPACE LIMITATIONS AND PERFORMANCE OF ONE UNIT MANUFACTURER. THE SPECIFICATIONS ALSO LIST ACCEPTABLE MANUFACTURERS FOR A PARTICULA PIECE OF EQUIPMENT. THE ENGINEER HAS NOT NECESSARILY REVIEWED THE DESIGN AND CONSTRUCTION OPTIONS OF ALL MANUFACTURERS LISTED TO CONFIRM COMPLIANCE WITH THE DRAWINGS AND SPECIFICATIONS, BUT THIS CONTRACTOR SHALL VERIFY THAT THE EQUIPMENT PROPOSED FOR THE PROJECT WILL MEET OR EXCEED THE REQUIREMENTS.

WHERE TWO OR MORE "STANDARDS" ARE NAMED TOGETHER. THE CONTRACTOR MAY FURNISH ANY ONE OF THE "STANDARDS" NAMED, BUT CONTRACTOR SHALL MAKE THE SELECTIONS KNOWN TO THE ARCHITECT/ENGINEER WITHIN TEN DAYS FOLLOWING AWARD OF THEIR CONTRACT.

WHERE MATERIALS OR PROCESSES ARE SPECIFIED BY TRADE OR PROPRIETARY NAMES, CONTRACTOR MAY MAKE NO SUBSTITUTIONS, EXCEPT ON ARCHITECT/ENGINEER'S WRITTEN APPROVAL STATING THAT SUCH SUBSTITUTION HAS BEEN AUTHORIZED.

FOR THOSE MATERIALS SPECIFIED WITHOUT THE USE OF TRADE NAMES. THE CONTRACTOR MAY FURNISH ANY MANUFACTURER'S PRODUCT THAT MEETS THE EXPRESS REQUIREMENTS OF THE SPECIFICATIONS.

BIDDERS DESIRING CONSIDERATION FOR THE USE OF MATERIAL, EQUIPMENT, ETC. NOT NAMED IN THE SPECIFICATIONS MAY SUBMIT IN WRITING, AT LEAST TEN DAYS PRIOR TO BID OPENING, THE CHANGE INCLUDING THE SPECIFICATIONS AND DESCRIPTION TO THE OWNER/ENGINEER FOR REVIEW AND IF APPROVED. THE CHANGE WILL BE ISSUED IN AN ADDENDUM AT LEAST FIVE DAYS PRIOR TO THE OPENING OF BIDS.

BIDDERS DESIRING CONSIDERATION FOR THE USE OF MATERIALS, EQUIPMENT, ETC. NOT NAMED IN THE SPECIFICATIONS OR AN ADDENDUM MAY SUBMIT PROPOSALS FOR THE SUBSTITUTION OF SAME FOR STANDARDS AS SPECIFIED, LISTING FOR EACH PROPOSED CHANGE: (1) THE "STANDARD" SPECIFIED, (2) THE SUBSTITUTION, AND (3) THE CHANGE IN BID PRICE (OR "NO CHANGE"). COMPLETE SPECIFICATIONS AND DESCRIPTION OF ANY PROPOSED SUBSTITUTION BEING CONSIDERED FOR ACCEPTANCE SHALL BE FURNISHED TO THE ARCHITECT PROMPTLY, UPON REQUEST.

SEE PROJECT MANUAL SECTION '014000 - QUALITY REQUIREMENTS', '014200 -REFERENCES', AND '016000 - PRODUCT REQUIREMENTS' FOR ADDITIONAL REQUIREMENTS.

16. <u>PROTECTION</u>: CONTRACTOR SHALL PROVIDE APPROVED PROTECTION FOR ALL WORK NCLUDED IN THIS CONTRACT AND BE RESPONSIBLE FOR DAMAGE OF ANY KIND TO FIXTURES, PIPING OR OTHER WORK. AT THE COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL REMOVE ALL PROTECTION AND REPLACE ALL DAMAGED WORK WITHOUT EXPENSE TO THE OWNER.

IN ADDITION TO THE NORMAL PRECAUTIONS FOR PROTECTION OF WORK, CONTRACTOR SHALL PROVIDE VARIOUS TYPES OF PROTECTION AS FOLLOWS:

- A. PROTECT FINISHED FLOORS FROM CHIPS AND CUTTING OIL BY THE USE OF METAL CHIP RECEIVING PAN AND AN OIL PROOF FLOOR COVER. PROTECT EQUIPMENT AND FINISHED SURFACES FROM WELDING AND CUTTING
- SPATTERS WITH BAFFLES AND SPATTER BLANKETS.
- PROTECT EQUIPMENT AND FINISHED SURFACES FROM PAINT DROPPINGS, INSULATION ADHESIVE AND SIZING DROPPINGS, ETC. BY USE OF DROP CLOTHS.

ALL PUMPS, MOTORS, FANS AND OTHER ROTATING EQUIPMENT SHALL BE STORED AT THE SITE WITH OPENINGS, BEARINGS, ETC. COVERED TO EXCLUDE DUST AND MOISTURE. ALL STOCK PILED PIPE SHALL BE PLACED ON DUNNAGE AND PROTECTED FROM WEATHER AND FROM ENTRY OF FOREIGN MATERIAL. DURING CONSTRUCTION, OPEN ENDS OF DUCTS, PIPES, EQUIPMENT, ETC. SHALL BE CAPPED OR PLUGGED TO REDUCE DIRT ACCUMULATION INSIDE.

17. MANUFACTURER'S DIRECTIONS: MANUFACTURER'S DIRECTIONS SHALL BE FOLLOWED IN ALL CASES WHERE THE MANUFACTURER OF ARTICLES USED IN THIS CONTRACT FURNISH DIRECTIONS COVERING SPECIFIC POINTS FOR THE INSTALLATION. STARTUP. OPERATION OR MAINTENANCE OF THESE ARTICLES. DIRECTIONS IN CONFLICT WITH THE DRAWINGS OR THE SPECIFICATIONS SHALL BE REFERRED TO THE ARCHITECT/ENGINEER FOR CLARIFICATION.

18. <u>GUARDS FOR ROTATING MACHINERY</u>: FURNISH AND INSTALL GUARDS FOR ALL EXPOSED BELT DRIVES. GUARDS SHALL BE RIGID AND READILY REMOVABLE WITH OPENINGS FOR CHECKING EQUIPMENT AND MOTOR SPEEDS. GUARDS SHALL BE ATTACHED TO EQUIPMENT AND NOT TO FLOOR.

PROVIDE GUARDS OVER EXPOSED DRIVES SUCH AS PUMP COUPLINGS. GUARDS TO COMPLY WITH OSHA STANDARDS.

IF GUARDS COVER THE GREASE FITTINGS, PROVIDE EXTENDED GREASE TUBES TO PERMIT LUBRICATION OF EQUIPMENT.

19. CUTTING AND PATCHING: ALL CUTTING AND PATCHING OF, OR REPAIR OF DAMAGE O WORK IN PLACE SHALL BE DONE IN A NEAT AND WORKMANLIKE MANNER, MEETING WITH THE APPROVAL OF THE ARCHITECT/ENGINEER MECHANICAL CONTRACTOR WHOSE OPERATIONS REQUIRE CUTTING OF WORK IN PLACE. OR WHO CAUSES DAMAGE WHICH ENTAILS REPAIRS OF SUCH WORK, SHALL EMPLOY MECHANICS OF THE PARTICULAR TRADE WHOSE WORK MUST BE CUT OR WHICH IS DAMAGED. AND SHALL PAY ALL COSTS OF SUCH CUTTING OR REPAIR. ALL PATCHING REQUIRED TO MATCH ADJACENT CONSTRUCTION SHALL BE BY THE GENERAL CONTRACTOR AT THE MECHANICAL CONTRACTOR'S EXPENSE.

NO STRUCTURAL MEMBERS SHALL BE CUT WITHOUT THE APPROVAL OF THE ARCHITECT/ENGINEER AND ANY SUCH CUTTING SHALL BE DONE IN A MANNER DIRECTED BY THE ARCHITECT/ENGINEER.

20. <u>CLEAN-UP</u>: CONTRACTOR SHALL FREQUENTLY CLEAN UP ALL REFUSE. RUBBISH. SCRAP MATERIALS AND DEBRIS CAUSED BY THE CONTRACTOR'S OPERATIONS TO THE END THAT AT ALL TIMES THE SITE SHALL PRESENT A NEAT, ORDERLY AND WORKMANLIKE APPEARANCE. CRATES AND CARTONS IN WHICH MATERIALS, EQUIPMENT OR FIXTURES ARE RECEIVED SHALL BE REMOVED DAILY.

IF, IN THE OPINION OF THE ARCHITECT/ENGINEER, NEATNESS IS NOT MAINTAINED, THE ARCHITECT/ENGINEER MAY HAVE THE AREA CLEANED AS DEFINED IN THE GENERAL CONDITIONS.

CONTRACTOR, AT THE COMPLETION OF THE WORK, SHALL REMOVE ALL SURPLUS MATERIAL, FALSE WORK, TEMPORARY STRUCTURES, INCLUDING FOUNDATIONS THEREOF AND DEBRIS OF EVERY NATURE RESULTING FROM THEIR OPERATIONS AND PUT THE SITE IN A NEAT AND ORDERLY CONDITION.

IN ADDITION TO ORDINARY PRECAUTIONS IN KEEPING DUCTS, PIPES AND EQUIPMENT CLEAN AND FREE OF DEBRIS DURING CONSTRUCTION, THE CONTRACTOR SHALL MAKE PROVISIONS FOR CLEANING OUT DUCTS AND PIPES MAKING USE OF THE GREATEST VELOCITIES AVAILABLE. THE CONTRACTOR SHALL PROVIDE ATTENDANCE, TEMPORARY CONNECTIONS AND FILTERS AS REQUIRED.

THE EXTERIOR OF DUCTS, PIPES AND EQUIPMENT SHALL BE CLEANED OF ALL DIRT AND GREASE, PREPARATORY TO INSULATION OR PAINTING.

21. TESTING AND ADJUSTMENT: ALL WORK INSTALLED UNDER THIS CONTRACT SHALL TESTED IN THE PRESENCE OF AND TO THE SATISFACTION OF THE INSPECTING AUTHORITY HAVING JURISDICTION AND THE ARCHITECT/ENGINEER.

ALL DUCTWORK, PIPING OR EQUIPMENT NOT FOUND TIGHT UNDER TEST SHALL BE REWORKED OR REPLACED, AS DIRECTED.

CONTRACTOR SHALL OPERATE ALL PARTS OF THE ENTIRE SYSTEM, MAKE ANY AND ALL ADJUSTMENTS AND REPAIRS, AND SHALL LEAVE THE ENTIRE WORK TESTED AND READY FOR OPERATION BY THE OWNER AND/OR OPERATION AND FINAL TESTING AND BALANCING BY THE TESTING AND BALANCING SUBCONTRACTOR.

IF THE INSTALLED EQUIPMENT DOES NOT MEET THE SPECIFIED CAPACITIES (CFM, HEAT OUTPUT, COOLING OUTPUT, ETC.) OR IF THE MOTOR OPERATING CURRENT EXCEEDS THE NAMEPLATE RATINGS, SUCH EQUIPMENT SHALL BE CORRECTED BY THE CONTRACTOR.

22. LUBRICATION AND PACKING: ALL ROTATING AND RECIPROCATING EQUIPMENT REQUIRING LUBRICATION SHALL BE LUBRICATED WITH THE CORRECT GRADE, TYPE AND QUALITY OF LUBRICANT BEFORE BEING PLACED IN SERVICE.

EACH SHAFT CONTAINING A PACKING GLAND SHALL BE CHECKED FOR CONDITION BY BACKING THE PACKING GLAND OFF AND EXAMINING FOR PROPER GRADE, AMOUNT AND TYPE OF PACKING AS RECOMMENDED BY THE MANUFACTURER.

MAINTAIN ALL LUBRICATION GASKETS AND PACKING DURING CONSTRUCTION AND ASSURE THAT AT THE TIME OF ACCEPTANCE BY THE OWNER, ALL ARE IN FIRST CLASS OPERATING CONDITION.

ALL LUBRICATION FITTINGS SHALL BE EXTENDED AS REQUIRED FOR ACCESSIBILITY.

23. ACCESS PANELS: WHERE VALVES, TRAPS, DAMPERS OR OTHER SPECIALTIES ARE CONCEALED IN THE CONSTRUCTION OR BEHIND A WALL OR CEILING SURFACE, THE CONTRACTOR SHALL FURNISH AND INSTALL AN ACCESS PANEL OF ADEQUATE SIZE TO PERMIT ADJUSTMENT OR SERVICE OF CONCEALED DEVICE. PANELS SHALL BE OF A DESIGN SUITABLE FOR INSTALLATION IN THE MATERIAL FORMING THE FINISHED SURFACE IN WHICH EACH IS MOUNTED. APPROVAL OF THE ARCHITECT/ENGINEER IS REQUIRED OF ALL EXPOSED ACCESS PANELS IN FINISHED AREAS.

THE CONTRACTOR SHALL CONFER WITH OTHER CONTRACTORS AND SUBCONTRACTORS WITH RESPECT TO ACCESS PANEL LOCATIONS AND SHALL, WHEREVER PRACTICAL, GROUP VALVES, TRAPS, DAMPERS, ETC. IN SUCH A WAY AS TO BE ACCESSIBLE FROM A SINGLE PANEL AND ELIMINATE AS MANY ACCESS PANELS AS POSSIBLE.

EACH ACCESS PANEL IN MASONRY, PLASTER OR DRYWALL SURFACES SHALL HAVE A FLUSH METAL FRAME AND FLUSH HINGED STEEL DOOR WITH FLUSH SCREWDRIVER-OPERATED LATCH. PANELS IN ACOUSTIC CEILING SHALL BE O RECESSED TYPE, TO WHICH TILE CAN BE ATTACHED IN SUCH A MANNER THAT TILE ON PANEL WILL BE FLUSH WITH CEILING TILE. PANELS ARE NOT REQUIRED WHERE CEILING TILES ARE SUPPORTED IN EXPOSED T-BAR CONSTRUCTION.

24. <u>CORRELATION OF WORK AND INTERFERENCES</u>: BEFORE INSTALLING ANY WORK, CONTRACTOR SHALL SEE THAT SUCH INSTALLATION WILL NOT INTERFERE WITH CLEARANCES REQUIRED FOR THE PROPER FINISHING OF ARCHITECTURAL WORK INCLUDING THE FINISHING OF SURFACES. IN GENERAL, ALL DUCTWORK AND PIPES IN FINISHED AREAS SHALL BE INSTALLED AND CONCEALED IN WALLS, FURRED SPACES, PIPE CHASES OR ABOVE SUSPENDED CEILINGS. IF AN INTERFERENCE OCCURS, CONTRACTOR SHALL CONSULT WITH THE ARCHITECT/ENGINEER BEFORE INSTALLING THE DUCT OR PIPE.

WHERE WORK OF THE VARIOUS MECHANICAL CONTRACTORS MUST BE INSTALLED IN CONFINED SPACES. THE SUPERINTENDENTS OF THE MECHANICAL CONTRACTORS SHALL COORDINATE THEIR WORK WITH THE SUPERINTENDENTS OF OTHER PERTINENT TRADES BEFORE INSTALLATION TO ASSURE AGAINST INTERFERENCES. FAILURE TO SO COORDINATE SUCH WORK SHALL PLACE THE RESPONSIBILITY FOR MAKING ANY REQUIRED CHANGES IN ANY TRADE UPON THE CONTRACTOR WHO SHALL HAVE FAILED TO JOIN IN THE REQUIRED COOPERATIVE EFFORT, ALL AT THE DIRECTION OF THE ARCHITECT/ENGINEER.

- 25. <u>HOISTS, RIGGING, SCAFFOLDING AND TRANSPORTATION</u>: CONTRACTOR SHALL PROVIDE ALL REQUIRED SCAFFOLDING, RIGGING, STAGING, TACKLE, HOISTS AND SIMILAR DEVICES AND EQUIPMENT NECESSARY FOR PROPER INSTALLATION OF HIS WORK SHALL REMOVE ALL TEMPORARY MATERIALS OF THIS NATURE WHEN NO LONGER REQUIRED, AND SHALL BE RESPONSIBLE FOR THE SAFE AND LAWFUL USE THEREOF. CONTRACTOR SHALL BE RESPONSIBLE FOR THE TRANSPORTATION OF ALL MATERIALS AND EQUIPMENT TO THE JOB SITE, ADEQUATE PROTECTED STORAGE ON SITE, AND ALL COSTS OF SAME.
- 26. <u>PROVISIONS FOR LATER INSTALLATIONS</u>: WHERE WORK CANNOT BE INSTALLED AS THE STRUCTURE IS BEING ERECTED, CONTRACTOR FOR SUCH WORK SHALL PROVIDE AND ARRANGE FOR THE BUILDING-IN OF BOXES, SLEEVES, INSERTS, FIXTURES OR DEVICES AS NECESSARY TO PERMIT INSTALLATION OF THE OMITTED WORK DURING LATER PHASES OF CONSTRUCTION. CONTRACTOR SHALL ARRANGE FOR AND LAY OUT ANY CHASES, HOLES OR OTHER OPENINGS WHICH MUST BE PROVIDED IN MASONRY, CONCRETE OR OTHER WORK.

CONTRACTOR SHALL BE RESPONSIBLE FOR BECOMING INFORMED OF THE NATURE AND ARRANGEMENT OF THE MATERIALS AND CONSTRUCTION TO WHICH THIS CONTRACTOR'S WORK ATTACHES, MEMBERS WITH, OR PASSES THROUGH.

27. <u>ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT</u>: MECHANICAL CONTRACTOR SHALL FURNISH ALL SPECIAL CONTROL ITEMS AND MOTORS REQUIRED FOR THE OPERATION OF ALL EQUIPMENT PROVIDED UNDER THEIR SECTIONS OF THE WORK.

ELECTRICAL CONTRACTOR SHALL FURNISH ALL NECESSARY STARTERS AND DISCONNECT SWITCHES, EXCEPT ON EQUIPMENT WHICH IS TO BE PROVIDED WITH STARTERS OR DISCONNECT SWITCHES AS PART OF THE ASSEMBLY. THE ELECTRICAL CONTRACTOR WILL FURNISH ALL POWER WIRING THROUGH STARTERS AND DISCONNECT SWITCHES TO MOTORS.

M.C. SHALL PROVIDE ALL POWER WIRING FOR CONTROLS, CONTROL AND/OR INTERLOCK WIRING REQUIRED FOR HIS PARTICULAR WORK. M.C. SHALL ALSO INCLUDE ANY WIRING REQUIRED AS NOTED IN THE INDIVIDUAL SECTIONS OF THE SPECIFICATIONS. ALL WIRING REQUIRED BY THIS CONTRACTOR SHALL BE IN ACCORDANCE WITH PROVISIONS AS SET FORTH UNDER THE NATIONAL ELECTRIC CODE AND DIVISION 26 ELECTRICAL WORK OF THESE SPECIFICATIONS.

WHERE ELECTRICAL REQUIREMENTS AND/OR MOTOR HORSEPOWERS FOR THE EQUIPMENT SUPPLIED VARIES FROM THAT SHOWN ON THE MECHANICAL DRAWINGS AS SPECIFICALLY CALLED OUT IN THE MECHANICAL SPECIFICATIONS, THE ELECTRIC DRAWINGS AND SPECIFICATIONS SHALL GOVERN AND BE ADHERED TO AS TO ELECTRICAL POWER CHARACTERISTICS FOR THE SUPPLIED EQUIPMENT.

FOR ELECTRICAL POWER CHARACTERISTICS OF EQUIPMENT TO BE INSTALLED BY 1 CONTRACTOR, SEE THE MECHANICAL DRAWINGS AND SCHEDULES.

MOTORS 1/2 HP AND OVER WILL BE PROVIDED WITH ACROSS-THE-LINE STARTER WITH OVERLOAD PROTECTION UNLESS OTHERWISE SPECIFIED. ALL MOTORS UNDER 1/2 HP SHALL HAVE INTEGRAL OVERLOAD PROTECTION. ON FACTORY SUPPLIED PREWIRED EQUIPMENT, ACCESSORY MOTORS SUCH AS CONDENSING UNIT FAN MOTORS MAY BE SINGLE-PHASE INSTEAD OF THREE PHASE IF STANDARD WITH T MANUFACTURER. ALL MOTORS MUST CONFORM TO CURRENT NEMA STANDARDS.

ANY OPEN DRIVE MOTOR, ONE HORSEPOWER AND OVER. SHALL BE OF THE HIGH FFFICIENCY TYPE WITH A MINIMUM POWER FACTOR OF 82%. CERTIFIED TEST DA SHALL BE AVAILABLE. IF REQUIRED. INDICATING THE HORSEPOWER. POWER FACTOR RATING. EFFICIENCY RATING. WATTS. AND RPM. HIGH EFFICIENCY MOTOR SHALL AS MANUFACTURED BY BALDOR ELECTRIC COMPANY. LOUIS ALLIS COMPANY. WESTINGHOUSE ELECTRIC, GENERAL ELECTRIC, EMERSON ELECTRIC OR MAGNETEK.

28. <u>PIPES AND PIPE FITTINGS</u>:

A. <u>GENERAL REQUIREMENTS FOR PIPING INSTALLATION</u>

ALL PIPING MATERIALS FURNISHED AND ALL PROCEDURES FOLLOWED IN FABRICATION AND ERECTION SHALL COMPLY WITH THE APPLICABLE SECTIONS THE LOCAL BUILDING CODE, APPLICABLE PRESSURE PIPING CODE, AND REQUIREMENTS OF APPLICABLE SECTIONS OF "BUILDING SERVICES PIPING", B31.9, LATEST REVISION AND ADDENDA.

ALL PIPING SHALL BE INSTALLED IN ACCORDANCE WITH THE RECOGNIZED B PRACTICES OF THE TRADE. THE CONTRACTOR SHALL BE HELD RESPONSIBL FOR SUFFICIENT PLANNING AND FORESIGHT IN AVOIDANCE OF OBSTACLES AN INTERFERENCES MET IN THE FIELD. PIPING SHALL BE INSTALLED PARALLEL PLANES OF THE BUILDING STRUCTURE AND MUST BE LEVEL AND PLUMB, OF PITCHED AS REQUIRED BY GOOD ENGINEERING PRACTICE.

PIPING SHALL BE FABRICATED OF MATERIALS AND BE OF SCHEDULE AND/OF DIMENSIONS AS INDICATED ON THE DRAWINGS AND MATERIAL SPECIFICATIONS SEPARATELY LISTED AND SHALL BE THE LONGEST LENGTH COMMERCIALLY AVAILABLE. ALL PIPE AND FITTINGS SHALL HAVE THE MANUFACTURER'S IDENTIFYING MARK STENCILED, STAMPED OR ROLLED ONTO THE SURFACE IN ACCORDANCE WITH ASTM SPECIFICATIONS.

FITTINGS SHALL BE USED FOR ALL PIPE LINES AND UNLESS OTHERWISE SPECIFIED SHALL CONFORM TO ANSI CODE B31.9 "BUILDING SERVICES PIPIN LATEST REVISION, MATERIALS SCHEDULE. UNLESS OTHERWISE NOTED ALL BU WELDED ELBOWS ARE TO BE LONG RADIUS TYPE.

FLANGES OR UNIONS SHALL BE INSTALLED ADJACENT TO EACH CONTROL VA TRAP OR PIECE OF EQUIPMENT TO PERMIT REMOVAL OF SAME FROM THE L IN ADDITION, UNIONS OR FLANGES SHALL BE PROVIDED AS REQUIRED TO MAKE-UP OR DISCONNECT PIPING. EACH UNION SHALL BE INSTALLED IN A POSITION PERMITTING THE VALVE, TRAP OR PIECE OF EQUIPMENT TO BE REMOVED BY DISCONNECTING THE UNION AND ONLY A MINIMAL AMOUNT OF PIPING

ALL PIPING SHALL BE CLEANED OUT BEFORE INSTALLATION BY BLOWING OUT WITH COMPRESSED AIR OR BY OTHER APPROVED METHODS. PROVIDE TEMPORARY PLUGS OR CAPS FOR ALL OPEN ENDS OF PIPE WHEN WORK IS NOT BEING CARRIED ON TO COMPLETION.

ALL CONNECTIONS, VENTS, DRAINS, ETC. MUST BE INSTALLED AS REQUIRED.

PROVIDE TAPPED ELBOWS OR OTHER NECESSARY FITTINGS TO ALLOW INSTALLATION OF THERMOWELLS, SENSORS, FLOW SWITCHES, PRESSURE SWITCHES, ETC. AS FURNISHED BY THE TEMPERATURE CONTROL SUBCONTRACTOR AND INSTALLED BY THIS CONTRACTOR. MOST WELLS ARE SHOWN. VERIFY NUMBER AND LOCATION WITH THE CONTROL SUBCONTRACT(

ALL OVERHEAD PIPING SHALL BE INSTALLED AS HIGH AS POSSIBLE TO PROV MAXIMUM HEAD ROOM.

WHEN INSTALLING PIPING IN PARALLEL, SUFFICIENT SPACE SHALL BE LEFT BETWEEN PIPE LINES TO FACILITATE FUTURE WORK ON ONE OF THE LINES.

WHEN PRESSURE TESTS ARE APPLIED TO ANY PIPING SECTION, A LOG SHAI BE KEPT BY THE CONTRACTOR. LOG SHALL STATE SECTION OF PIPE, ULTIN USE OF PIPE, TESTS PRESSURE APPLIED, LENGTH OF TEST, DATE AND TIME APPLIED. LOG SHALL BE SIGNED BY THE CONTRACTOR'S SUPERINTENDENT RETAINED BY THE CONTRACTOR.

TOOL MARKS WILL NOT BE PERMITTED ON WORK IN FINISHED AREAS. COPPER TUBING SHALL CONFORM TO ASTM B88. TUBING SHALL BE CUT W

PIPE CUTTERS AND NOT HACKSAWS. AFTER CUTTING, THE TUBING SHALL BE SIZED WITH A SIZING TOOL.

COPPER FITTINGS SHALL BE WROUGHT COPPER OR CAST BRASS AND CONFO TO ANSI B16.18 OR B16.22.

MALE ADAPTERS SHALL BE USED WHEREVER IT IS NECESSARY TO CONNECT COPPER TUBING TO A VALVE OR TEE HAVING THREADED CONNECTIONS. TH ADAPTERS SHALL BE SOLDERED TO THE COPPER TUBING. NO THREADS SH BE CUT IN COPPER TUBING.

LEAD FREE SOLDER USED FOR CONNECTIONS IN COPPER TUBING SHALL BE 95/5 TIN ANTIMONY, 94/6 OR 96/4 TIN-SILVER OR SILVABRITE 100 (TIN, COPPER AND SILVER) SOLDER WITH RECOMMENDED FLUX (50/50 LEAD/TIN SOLDER IS NOT ACCEPTABLE). OTHER JOINT CONNECTIONS FOR SPECIAL SERVICE LINES ARE NOTED ÉLSEWHERE IN THE SPECIFICATIONS.

ALL PLUGS FOR ALL SERVICES SHALL BE BRASS.

B. SLEEVES

SLEEVES SHALL BE INSTALLED BY THE CONTRACTOR WHEREVER PIPES PASS THROUGH WALLS, SLABS, FLOORS OR CEILINGS. NO PIPES SHALL PASS THROUGH BEAMS OR BE EMBEDDED IN CONCRETE. SLEEVES IN CONCRETE SHALL BE STANDARD WEIGHT STEEL PIPE OR PURCHASED UNITS AS SPECIF BELOW. TWENTY-SIX GAUGE GALVANIZED STEEL SLEEVES ARE ACCEPTABLE WOOD, PLASTER OR DRYWALL PARTITIONS. ALL SLEEVES SHALL BE SAWED MACHINE CUT (NO FLAME CUTTING) AND FLUSH WITH FINISHED SURFACES EXCEPT FOR MECHANICAL EQUIPMENT AREAS WHICH SHALL EXTEND 2" ABOV FINISHED FLOOR AND BE OF GALVANIZED STEEL.

CENTER PIPE IN SLEEVES WITH SPACERS.

IF POSSIBLE, IN NEW CONCRETE WORK, SLEEVES SHALL BE SET INTO POSIT BEFORE CONCRETE IS POURED. WHERE PIPE OPENINGS ARE REQUIRED IN CONCRETE AFTER THE CONCRETE HAS BEEN POURED, THIS CONTRACTOR SH CORE DRILL SAME AND ELIMINATE THE PIPE SLEEVE.

WHERE PIPES PASS THROUGH EXTERIOR CONCRETE WALLS, SET SCHEDULE STEEL PIPE OR SPECIAL MANUFACTURED CASTINGS OR SLEEVES 1-1/2" LARGER THAN O.D. OF PIPE. CAULK BOTH SIDES WITH OAKUM AND LEAD WOOL. COAT WITH BITUMINOUS PAINT AND OTHERWISE ADEQUATELY WATERPR OPENING AROUND PIPE. A CASING SEAL SYSTEM AS MANUFACTURED BY THUNDERLINE CORPORATION UNDER THE TRADE NAME "LINK-SEAL" MAY BE USED INSTEAD OF OAKUM AND CAULKING.

OPENINGS AROUND PIPES OR IN SLEEVES FOR PIPES PASSING THROUGH FL SLABS, FIRE-RATED WALLS, SMOKE BARRIERS, OR FIRE-RATED CEILINGS MU BE SEALED WITH A NON-COMBUSTIBLE MATERIAL. SEAL AT BOTH SIDES OF ANY CAVITY WALL. INSULATION SHALL NOT EXTEND THROUGH SLEEVE. FIL SLEEVE OPENING WITH DOW CORNING 3-6548 RTV SILICONE FOAM, 3M FIRE BARRIER, G.E. RTV OR FLAME STOP, INC. PRODUCT SHALL INTUMESCE (EXPAND) WHEN SUBJECTED TO HEAT. WHEN USED FOR OPENINGS AROUNI PVC OR SIMILAR PIPE MATERIAL. PROVIDE SUFFICIENT THICKNESS OF MATER AROUND PIPE TO FILL VOID COMPLETELY IF THE PIPE IS CONSUMED BY TH HEAT. AN EXTERIOR METAL HOLDING COLLAR AND CLAMP MAY BE REQUIRED FOR THIS APPLICATION. DEPTH OF FILL MATERIAL SHALL PROVIDE SAME FIRE RATING AS FLOOR OR WALL PENETRATED. FIBERGLASS IS NOT ACCEPTABLE. EXCEPT AS A BACKING FOR THE ABOVE MATERIALS. PREPACKED SLEEVES SUCH AS PROSET "FIRESTOP PENETRATORS" AS INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS ARE ACCEPTABLE.

ALL METAL PIPING PASSING THROUGH OR ADJACENT TO WOOD THAT HAS BEEN TREATED WITH FIRE RETARDANT CHEMICALS SHALL BE SLEEVED WITH SCHEDULE 40 PVC PIPING ONE SIZE LARGER THAN A BARE METAL PIPE OR ONE SIZE LARGER THAN AN INSULATED PIPE. ALTERNATE METHODS OF PROTECTING THE PIPING MAY BE USED AT THE CONTRACTOR'S OPTION.

		C.	ESCUTCHEON_PLATES			
OR AL			CHROME—PLATED ESCUTCHEON PLATES SHALL BE USED WHERE PIPING ENTERS FINISHED AREAS AND SHALL FIT NEATLY TO PIPE AND SURFACE. THE PLATES MAY BE BLACK IRON IN UNFINISHED AREAS.		TA. 99	E A COL
HIS			OMIT PLATES IN CONCEALED PIPING SPACES.	()))	SCOT SCOT IRKEM 6929	6, ST
lS R		D.	ISOLATING PIPES (FLUID FLOW SYSTEMS)		PRO	FE SAMME
ΙE			WHERE A COPPER PIPE CONNECTS TO A STEEL PIPE, THE CONNECTION SHALL BE MADE WITH A DIELECTRIC UNION OR FLANGES WITH DIELECTRIC BOLT SETS. DIELECTRIC COUPLINGS SHALL NOT BE USED. PIPING SHALL BE IN GOOD ALIGNMENT IN ORDER TO REDUCE WEAR ON DIELECTRIC ISOLATOR.		*********	4**
A R BE			DIELECTRIC PIPE FITTING SHALL BE EQUIVALENT TO EPCO DIELECTRIC UNION RATED AT 250 PSI OR FLANGES RATED AT 175 PSI. INSULATING GASKET SHALL BE RATED FOR 200°F MAXIMUM TEMPERATURE ON SYSTEMS WITH FLUID TEMPERATURES UP TO 160°F AND A RATING OF 280°F ON SYSTEMS WITH 160°F TO 250°F FLUID TEMPERATURES.		q	I G N 3.5323
			WHEN CONNECTIONS ARE MADE AT COILS OR SIMILAR SITUATIONS WHICH INCLUDE SUCH ITEMS AS STEEL OR CAST IRON BALANCING COCKS, VALVES, PUMPS, FLOW INDICATORS, ETC., IT IS SUGGESTED THAT ALL PIPING IN THESE AREAS BE STEEL WITH DIELECTRIC UNIONS OR FLANGES WHEN CONNECTING TO COPPER MAINS, AND/OR A COPPER COIL HEADER.		- S	. D E S P:419.523
OF			WHERE COPPER PIPES CROSS IRON PIPES AND IN ALL SIMILAR CONDITIONS WHERE ISOLATION IS NECESSARY TO ELIMINATE ELECTROLYSIS, THE PIPE SHALL BE ISOLATED WITH A PVC SHEATHING.		<u>ַ</u>	I N G 45875
NSI			DIELECTRIC BOLT SETS AND PIPE FLANGES WILL BE REQUIRED WHEN INSTALLING STEEL OR CAST IRON FLANGE VALVES, ETC. IN A COPPER PIPE. ON SMALLER		Í	R HO
ST E D	00		VALVE SIZES, DIELECTRIC UNIONS WILL BE REQUIRED.			AWA
TO ?	29.	CON	PORTS AND ANCHORS ITRACTOR SHALL PROVIDE ALL MISCELLANEOUS STEEL AND HARDWARE AS	12	5 <u>(</u>	G I N E E OTTAWA,
AS		FUR	QUIRED TO SUPPORT, HANG AND SECURE ALL EQUIPMENT, DUCTS, PIPES, ETC. AS INISHED BY THEM, UNLESS SUCH MATERIALS ARE SPECIFICALLY CALLED OUT TO PROVIDED BY OTHER CONTRACTORS.			E N 6
	30.	<u>PIPI</u>	E HANGERS AND SUPPORTS			SUITE com
G ", JTT		SUF REC HAN	NTRACTOR SHALL FURNISH AND INSTALL ALL ADJUSTABLE HANGERS, SPECIAL PIPE PORTS, SPRING HANGERS, ANCHORS, CLAMPS, RODS, AND APPURTENANCES AS WIRED TO SECURELY AND PROPERLY HANG OR SUPPORT THE PIPING SYSTEMS. IGERS AND SUPPORTS SHALL BE EQUIVALENT TO THE GRINNELL MODELS CIFIED.		5	A R C H I T E C T U R E . 1800 N PERRY STREET, SUIT www.technicondesigngroup.com
LVE, NE.		SUF ACC	PIPING SYSTEMS SHALL HAVE ANCHORAGE, SWAY BRACES, GUIDES AND PORTS SATISFACTORY TO THE ARCHITECT AND SHALL BE FABRICATED IN CORDANCE WITH ANSI CODE B31.9, BUILDING SERVICES PIPING", LATEST ISSUE, MUST BE INSTALLED WITH DUE REGARD FOR GENERAL REQUIREMENTS.			ERRY S
г		SHA SIDI BAR	ERE HANGERS ARE SUPPORTED FROM THE BUILDING STRUCTURAL STEEL, THEY ALL BE ATTACHED TO STRUCTURAL MEMBERS BY BEAM CLAMPS BEARING ON BOTH ES. DO NOT WELD HANGER RODS TO STRUCTURAL STEEL. WHEN ATTACHING TO 2 JOISTS, ATTACH AT THE PANEL POINTS ONLY. ATTACH TO CONCRETE DECKING NG EXPANSION BOLTS OR CONCRETE ANCHORS.	H		A R C H 1800 N P www.tech
		IROI PIPI SUF CT-	IGERS NOT OTHERWISE NOTED OR SPECIFIED SHALL BE ADJUSTABLE WROUGHT N CLEVIS TYPE, GRINNELL NO. 260, FOR INSULATED AND NON—INSULATED STEEL E AND INSULATED COPPER TUBING. BARE COPPER TUBING SHALL BE PPORTED WITH COPPER—PLATED PLASTIC—COATED HANGERS, GRINNELL FIG. -99C. SUITABLE TRAPEZE TYPE HANGERS MAY BE USED WHERE SEVERAL LINES E RUNNING PARALLEL.			
NOT)R. /IDE		SCH HAN DES	NG SHALL BE SUPPORTED WITH HANGERS SPACED IN ACCORDANCE WITH IEDULE ON SHEET M602. EACH SECTION OF PIPE SHALL HAVE AT LEAST ONE IGER. VERTICAL LINES SHALL BE SUPPORTED BY PIPE CLAMP TYPE SUPPORTS IGNED FOR THIS PURPOSE AT EACH FLOOR LEVEL. ON PLASTIC PIPING WHICH NSULATED, REDUCE SPACING TO 70% OF DISTANCES LISTED.			
1		AT	IGER ROD SIZE SHALL BE IN ACCORDANCE WITH SCHEDULE ON SHEET M602. ALL HANGERS AND SUPPORTS OF INSULATED PIPE, PROVIDE OVERSIZED HANGERS FIT ON THE OUTSIDE OF THE PIPE SADDLES AND SHIELDS. SEE PIPING	NS		51
AND		DUC FRO DUC	ULATION SCHEDULE ON SHEET M602 FOR INSULATION THICKNESS. CTWORK, PIPING, PLUMBING LINES, ETC. SHALL BE INDEPENDENTLY SUPPORTED M THE BUILDING STRUCTURE AND SHALL NOT BE SUPPORTED FROM OTHER CTS, PIPES, ETC. WHERE INTERFERENCES DO OCCUR, PROVIDE TRAPEZE TYPE	OVATIONS	ECH	DRIVE OH 43551
ITH		HAN "HA SHA	IGERS OR SUPPORTS. IGERS FOR DUCTWORK SHALL BE IN ACCORDANCE WITH SMACNA STANDARDS, NGERS FOR DUCTS AND UPPER ATTACHMENTS". ALL HANGER STRAP MATERIAL ALL BE GALVANIZED. DUCTWORK SHALL BE SUPPORTED FROM THE OVERHEAD	ĬŽ		
DRM		CON STU CAS	ISTRUCTION USING CONCRETE INSERTS OR ANCHORS ATTACHED TO THE ICRETE. WITH STRUCTURAL STEEL AND BAR JOIST CONSTRUCTION, USE WELDED IDS OR C-CLAMPS WITH RETAINING CLIP ATTACHED TO THE STEEL. IN ALL IES, THE MAXIMUM HANGER SPACING SHALL NOT BE EXCEEDED AND THE IGERS SHALL BE READILY REMOVABLE.	G RE	/ PR	270 FLAGSHII ERRYSBURG
<u>-</u> ALL	31.	<u>REF</u>	RIGERANT PIPE AND FITTINGS:		άi	ZYS
		Α.	PIPE SHALL BE TYPE L HARD DRAWN COPPER PIPE CONFORMING TO ASTM B-280. PIPE SHALL BE COMMERCIALLY CLEANED AND DELIVERED TO JOB SITE WITH ENDS PLUGGED TO PREVENT CONTAMINATION.	BUILDING	ER	270 ERF
		В.	FITTINGS SHALL BE WROUGHT COPPER SOLDER JOINT FITTINGS CONFORMING TO ANSI B16.22.			<u> </u>
		C.	JOINTS SHALL BE MADE WITH A SILVER BRAZING ALLOY WITH A MINIMUM MELTING TEMPERATURE OF 1200°F.	REPRODUCED B FOR ANY PURPO PROJECT. IF THI	SE OTHER THAN THE INTE S DRAWING IS USED IN PAI	TIONS, OR OTHER ENTITIES
		D.	REFRIGERANT PIPING SHALL COMPLY APPLICABLE REQUIREMENTS OF ANSI B31.5, "REFRIGERANT PIPING".	GROUP, INC., TH ADDITIONAL ARC THEREFORE, RE WITHOUT PRIOR	IE RIGHT IS RESERVED TO CHITECTURAL AND/OR ENG SUSE OR REPRODUCTION OF WRITTEN CONSENT OF TE	MAKE A CHARGE FOR GINEERING FEES.
ED		E.	REFRIGERANT PIPING SHALL BE INSTALLED PER INDUSTRY STANDARD PRACTICES.	INC. IS STRICTLY	PROHIBITED.	GN GROUP, INC.
IN DR	32.		C CONDENSATE PIPING:	ARCHITECT	ALE FROM DRAWINGS ENGINEER SHALL NO JANTITIES OF MATERI	T BE RESPONSIBLE
E		Α.	PIPE SHALL BE SCHEDULE 40 PVC TYPE 1 COMPLYING WITH ASTM D1784 AND D-1785. PIPE SHALL BE ASSEMBLED WITH SCHEDULE 40 PVC SOLVENT WELD FITTINGS CONFORMING TO ASTM D-2466. INSTALLATION SHALL FOLLOW GUIDELINES IN ASTM D 2564-80 AND D 2665-82.	LOCATIONS FROM THES	OF BUILDING COMPO E DRAWINGS.	
ION ALL		в.	WHERE LOCATED IN RETURN AIR PLENUM SPACE OR EXPOSED, PIPE SHALL BE TYPE "L" COPPER WITH SOLDERED JOINTS AND WROUGHT STANDARD WEIGHT FITTING.		ANICAL FICATIONS	
ŀO	33.	<u>VIBI</u>	RATION ISOLATORS:			
oof oor st		Α.	VIBRATION ISOLATORS FOR HANGING EQUIPMENT SHALL BE HANGERS CONSISTING OF A LATERALLY STABLE SPRING ISOLATOR IN SERIES WITH A PRE-COMPRESSED MOLDED FIBERGLASS INSERT, COMPLETE WITH A LOAD PLATE AND ASSEMBLED IN A STAMPED OR WELDED STEEL BRACKET. THE FIBERGLASS INSERT SHALL BE COATED WITH A FLEXIBLE, MOISTURE-IMPERVIOUS ELASTOMERIC MEMBRANE. THE INSERT SHALL BE CONSTRUCTED OF FIBERS WITH A MODULUS OF ELASTICITY OF 10,500,000 PSI. THE SPRING ELEMENT SHALL HAVE A MINIMUM LATERAL STIFFNESS OF 1.0 TIMES THE RATED VERTICAL STIFFNESS. THE SPRING DIAMETER AND HANGER BOX HOLE SHALL PERMIT THE HANGER ROD TO SWING A 30° ARC BEFORE CONTACTING THE BOX, AND NO METAL TO METAL CONTACT SHALL BE PERMITTED. HANGING ISOLATOR SHALL BE		ISSUED DA BIDDING & PI PERMITS	
) AL		в.	EQUAL TO KINETICS NOISE CONTROL MODEL SFH. VIBRATION ISOLATORS FOR FLOOR MOUNTED EQUIPMENT SHALL BE A FREE STANDING, UNHOUSED, LATERALLY STABLE STEEL SPRINGS. SPRING ELEMENTS			
E RE			SHALL HAVE A MINIMUM LATERAL STIFFNESS OF 1.0 TIMES THE RATED VERTICAL STIFFNESS. THE UPPER LOAD PLATE SHALL BE PROVIDED WITH STEEL LEVELING BOLTS, LOCK NUT AND WASHER FOR ATTACHMENT TO SUPPORTED EQUIPMENT.			

PAD AND SHALL HAVE PROVISIONS FOR BOLTING ISOLATOR TO SUPPORTING STRUCTURE. FREE STANDING ISOLATORS SHALL BE EQUAL TO KINETICS NOISE CONTROL MODEL FDS. C. ALL ISOLATORS SHALL BE SELECTED BY MANUFACTURER FOR SPECIFIC APPLICATION.

(SEE CONTINUATION ON SHEET M902.)

THE LOWER LOAD PLATE SHALL INCORPORATE A NON-SKID NOISE ISOLATION

DRAWN BY:

PLOT SCALE:

08-23

45-2902-23

SHEET

M901

DATE:

JOB NO.

DIVISION 23 - MECHANICAL SPECIFICATIONS 34. DUCTWORK:

<u>GENERAL</u>

- A. SHEET METAL DUCTWORK SHALL BE FABRICATED AND INSTALLED IN ACCORDANCE WITH THE LATEST ASHRAE AND SMACNA RECOMMENDATIONS AND IN THE BEST PRACTICES OF GOOD WORKMANSHIP. ALL DUCTWORK SHALL BE CONSTRUCTED OF PRIME HOT DIP GALVANIZED SHEET STEEL, EXCEPT AS
- B. SHEET METAL DUCTWORK SHALL BE HOT-DIPPED GALVANIZED STEEL SHEET WITH G60/Z180 COATING OF THE LOCKED SEAM TYPE. GAUGE AND REINFORCMENT TYPE SHALL COMPLY WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS" AND ASTM A653/A653M/A924.
- C. VERTICAL DUCTS SHALL BE SUPPORTED FROM THE FLOOR OR ADJACENT WALL BY SUBSTANTIAL ANGLE BRACKETS DESIGNED TO MEET FIELD CONDITIONS.
- D. INCREASE AND DECREASE DUCT SIZES GRADUALLY, CONVERGE OR DIVERGE AT 15" DIVERGENCE WHERE POSSIBLE; MAXIMUM 30" CONVERGING (DECREASING) IN THE DIRECTION OF AIRFLOW AND 20° DIVERGING (INCREASING) IN THE DIRECTION OF AIRFLOW.
- E. DUCT SIZES INDICATED ARE INSIDE CLEAR DIMENSIONS. FOR LINED DUCTS, MAINTAIN INTERNAL DIMENSIONS.
- F. LOCATE DUCTS WITH SUFFICIENT SPACE AROUND EQUIPMENT TO ALLOW NORMAL OPERATING AND MAINTENANCE ACTIVITIES.
- G. PROVIDE A MINIMUM OF 1/2" CLEARANCE FOR DUCTWORK PASSING THROUGH CONSTRUCTION OF COMBUSTIBLE MATERIAL. ANY DUCT PASSING THROUGH A WALL IN AN EXPOSED AREA SHALL BE PROVIDED WITH SHEET METAL COLLAR FLANGES AND SHALL FORM AN AIRTIGHT INSTALLATION.
- H. TO REDUCE SOUND TRANSMISSION BETWEEN SPACES, ANY WALL PENETRATION BY A DUCT SHALL BE CLOSED OFF. PACK AREA BETWEEN WALL AND DUCT WITH FIBERGLASS INSULATION AND PROVIDE A SHEET METAL COLLAR AROUND DUCT ON BOTH SIDES OF WALL.
- I. DUCT COVERING SHALL NOT EXTEND THROUGH A WALL OR A FLOOR REQUIRED TO BE FIRE-STOPPED OR REQUIRED TO HAVE A FIRE RESISTANCE RATING.
- J. ALL DUCT SYSTEMS TO MEET FLAME SPREAD AND SMOKE CONTRIBUTION REQUIREMENTS OF NFPA 90A.
- K. ANY ITEM THAT IS ATTACHED TO AN EXTERNALLY INSULATED DUCT SHALL BE SUPPORTED WITH STANDOFFS EQUAL TO THE INSULATION THICKNESS.
- DURING CONSTRUCTION PROVIDE TEMPORARY CLOSURES OF METAL OR TAPED POLYETHYLENE ON OPEN DUCTWORK TO PREVENT CONSTRUCTION DUST FROM ENTERING DUCTWORK SYSTEM.
- M. WHILE THE DRAWINGS ARE TO BE ADHERED TO AS CLOSELY AS POSSIBLE, THE RIGHT IS RESERVED TO VARY THE RUN AND SIZES OF DUCTS DURING THE PROGRESS OF THE WORK AS MAY BE FOUND NECESSARY OR DESIRABLE TO AVOID LOCAL INTERFERENCES. MAJOR REVISIONS SHALL BE VERIFIED WITH THE ENGINEER.
- N. THE SHEET METAL CONTRACTOR SHALL FULLY COOPERATE WITH OTHER CONTRACTORS IN THE INSTALLATION OF HIS WORK AND THEIR WORK TO AVOID INTERFERENCES. IT IS MANDATORY THAT EXTRA CARE BE GIVEN TO THE LAYOUT OF HIS WORK DUE TO THE NUMBER OF SERVICES REQUIRED IN SOME SPACES ALLOTTED FOR THEIR INSTALLATION.

LOW PRESSURE DUCTWORK

- A. DUCTWORK SHEET METAL GAUGES AND JOINT CONSTRUCTION SHALL BE AS ALLOWED BY THE LATEST SMACNA HVAC DUCT CONSTRUCTION STANDARDS FOR 2" W.G. RECTANGULAR METAL DUCTS. LONGITUDINAL SEAMS SHALL BE PITTSBURGH LOCK, ACME LOCK OR BUTTON PUNCH SNAP LOCK AS SHOWN IN THE SMACNA STANDARDS FOR THE VARIOUS DUCT SIZES. PROVIDE CROSS BREAKING OR BEADING OF DUCTS AS REQUIRED BY THESE RECOMMENDATIONS.
- B. PAINT INSIDE DUCTWORK EXPOSED BEHIND ALL REGISTERS AND GRILLES DULL BLACK.
- C. PROVIDE RADIUS ELBOW IN ALL CASES WHERE SPACE WILL PERMIT USE OF SAME. IN NO CASE SHALL THE CENTERLINE RADIUS BE LESS THAN 1.0 TIMES THE DUCT WIDTH, AND IF POSSIBLE, SHALL BE 1.5 TIMES THE WIDTH. IF RIGHT ANGLE ELBOWS ARE NECESSARY IN DUCT, INSTALL TURNING VANES, EQUIVALENT TO TUTTLE AND BAILEY. ELGIN OR AERO/DYNE SINGLE BLADE TURNING VANES WITH 4 1/2" RADIUS SPACED EVENLY NOT EXCEEDING 3" ON CENTER.
- D. ALL TRANSVERSE JOINTS AND SEAMS ON ALL LOW VELOCITY SHEET METAL SUPPLY, RETURN AND EXHAUST DUCT SYSTEMS, INCLUDING INTERNALLY INSULATED DUCTS, TO INCREASE TIGHTNESS OF THE SYSTEM, SHALL BE SEALED. INDOOR DUCTS SHALL BE SEALED WITH HARDCAST "FLEX GRIP" WATER BASED SEALANT COMPLYING ASTM C731 AND D2202 REQUIREMENTS. SEALANTS TO HAVE A FLAME SPREAD RATING OF 25 OR LOWER AND A SMOKE DEVELOPED RATING OF 50 OR LOWER.
- E. FINAL CONNECTIONS TO DIFFUSERS SHALL BE MADE WITH RIGID ELBOW CONNECTED TO SYSTEM WITH FLEXIBLE DUCT HELD IN PLACE WITH STRAP OR CLAMP. MAXIMUM LENGTH FOR FLEXIBLE DUCTWORK SHALL NOT EXCEED 3-1/2 FEET. DUCT SHALL BE PRE-INSULATED WITH EXTERIOR VAPOR BARRIER AND APPROVED FOR THE INTENDED USE BY UL-INC.
- F. INSULATED FLEXIBLE DUCTS SHALL BE DESIGNED FOR LOW TO MEDIUM OPERATING PRESSURES. FLEXIBLE DUCT SHALL BE CONSTRUCTED OF A STEEL WIRE HELIX EXCAPSULATED IN AN AIRTIGHT CPE POLYMERIC FILM. THE INNER LINING IS WRAPPED IN A THICK FIBERGLAS BLANKET THAT IS SHEATHED IN A REINFORCED METALIZED POLYESTER JACKET. FLEXIBLE DUCTWORK SHALL HAVE A MAXIMUM CONDUCTANCE OF 0.23 BTU/hr/sq ft/°F. FLEXIBLE DUCTWORK SHALL COMPLY WITH NFPA STANDARD 90A AND UL 181. FLEXIBLE DUCTWORK SHALL HAVE A FLAME SPREAD OF LESS THAN 25 AND SMOKE SPREAD LESS
- G. CONNECT FLEXIBLE DUCTS TO METAL DUCTWORK WITH LIQUID ADHESIVE AND METAL BANDS.
- H. AT CONTRACTOR'S OPTION, ROUND SPIRAL OR LONGITUDINAL SEAM SHEET METAL DUCT (UP TO 24" DIAMETER) MAY BE USED FOR RECTANGULAR EXHAUST OR UNLINED RETURN AIR DUCT. ROUND DUCT TO HAVE EQUIVALENT AREA OR PRESSURE DROP AS RECTANGULAR DUCT SHOWN. SEALING IS STILL REQUIRED.

35. <u>DUCT ACCESSORIES</u>:

- LOW PRESSURE TAKEOFFS SHALL BE EQUAL TO "E-Z TAP COLLARS WITH 2" STANDOFF" AS MANUFACTURED BY SHEET METAL CONNECTORS, INC. TAKEOFFS SHALL BE FABRICATED OF 20 GAUGE GALVANIZED STEEL AND EQUIPPED WITH VOLUME DAMPERS. TAKEOFFS SHALL HAVE A CRIMP AND STOP BEAD ON ONE END. FLANGE SHALL HAVE PREPUNCHED SCREW HOLES AND A CLOSED CELL NEOPRENE GASKET APPLIED TO THE FLANGE FOR AN AIRTIGHT SEAL AND EASY INSTALLATION.
- B. <u>DAMPERS</u> SHALL BE PROVIDED AS SHOWN ON THE DRAWINGS OR AS CALLED FOR IN THESE SPECIFICATIONS. WHERE POSSIBLE ALL DAMPERS SHALL BE BY SAME MANUFACTURER. DAMPERS SHALL BE AS MANUFACTURED BY AMERICAN WARMING AND VENTILATING COMPANY, AIR BALANCE, VENT PRODUCTS, LOUVERS AND DAMPERS, INC., GREENHECK, CESCO, AIR CONTROL OR RUSKIN.

MARK EXTENDED SHAFT TO ASSURE PERMANENT INDICATION OF DAMPER BLADE POSITION.

DAMPER SHALL HAVE A CLEARLY MARKED OPERATING BLADE WITH EXTENDABLE SHAFT (RECTANGULAR PREFERRED) AND WITH A PERMANENT POSITIONER TO PREVENT SHAFT FROM ROTATING ON OPERATING BLADE.

UNLESS OTHERWISE NOTED, INDIVIDUAL DAMPER BLADES SHALL NOT BE OVER 48" LONG AND AXLE CENTERS ARE NOT TO EXCEED 9". MAXIMUM PANEL SIZE SHALL BE 48" WIDE BY 72" HIGH.

DAMPER, INCLUDING FRAMES, LINKAGES, ETC., IN A SPECIAL MATERIAL DUCT SUCH AS STAINLESS STEEL. ALUMINUM. ETC. SHALL BE FABRICATED OF THE SAME MATERIALS AS THE DUCT UNLESS OTHERWISE NOTED.

DAMPER WITH MULTIPLE PANELS WILL REQUIRE SPECIAL FRAMES OR ADDITIONAL STRUCTURAL SUPPORT PROVIDED BY THIS CONTRACTOR.

FOR COMPLETE CONTROL AND BEST METHOD OF INSURING MINIMUM AIR LEAKAGE ON LOW LEAKAGE DAMPER. EACH PANEL 48" X 72" OR LESS SHALL BE PROVIDED WITH ITS OWN INDIVIDUAL DAMPER CONTROL MOTOR.

1) MANUAL BALANCING DAMPER:

MANUAL BALANCING DAMPER IN LOW PRESSURE SQUARE OR RECTANGULAR DUCTWORK LESS THAN ONE SQUARE FOOT IN AREA OR LESS THAN 12" HIGH SHALL BE TITUS MODEL AG-35B, BOTTOM-OPERATED, OPPOSED-BLADE VOLUME DAMPER OR EQUAL AS MANUFACTURED THE AIL DEVICE MANUFACTURERS. PERMANENTLY ATTACH DAMPER OPERATING ROD TO DAMPER. ROD TO EXTEND AT LEAST 3" BELOW DUCT. SINGLE BLADED DAMPER WITH FLAT HEAD AND SILL, SELF-LUBRICATING BEARINGS AND VENTLOK DIAL REGULATOR EQUAL TO AMERICAN WARMING AND VENTILATING COMPANY TYPE VC-1 IS ACCEPTABLE. IF DUCT IS EXTERNALLY INSULATED, PROVIDE ELEVATED DIAL REGULATORS.

DAMPER IN SQUARE OR RECTANGULAR DUCTWORK LARGER THAN THE ABOVE SHALL BE AMERICAN WARMING AND VENTILATING COMPANY TYPE VC-2. OPPOSED-BLADE. WITH HEAVY GAUGE GALVANIZED STEEL HAT CHANNEL FRAME, FLAT HEAD AND SILL ON DAMPERS UNDER 14" HIGH, SIXTEEN GAUGE STEEL STOPS AT HEAD AND SILL. 16 GAUGE GALVANIZED STEEL BLADES AND SELF-LUBRICATING BEARINGS.

DAMPER IN ROUND DUCTWORK 12 INCH DIAMETER AND LARGER SHALL BE AMERICAN WARMING AND VENTILATING COMPANY TYPE VC-23, OPPOSED-BLADE. WITH 2" X 1/8" STEEL BAND FRAME, 16 GAUGE STEEL BLADES AND SELF-LUBRICATING BEARINGS. DAMPER IN DUCTWORK LESS THAN 12 INCHES ROUND MAY BE SHOP-FABRICATED SINGLE BLADE DAMPER.

LOCKING QUADRANT FOR LARGE DAMPER IN SHEET METAL DUCT SHALL BE VENTLOK MODEL #555 OR #560. LOCKING QUADRANT FOR EXTERNALLY INSULATED DUCT SHALL BE VENTLOK MODEL #644. PROVIDE DAMPERS WHERE SHOWN AND REQUIRED FOR AIR BALANCING PURPOSES.

2) MOTORIZED AIR DAMPER:

DAMPER OPERATORS SHALL PROVIDE SMOOTH PROPORTIONAL CONTROL WITH SUFFICIENT POWER FOR AIR VELOCITIES 20 PERCENT GREATER THAN MAXIMUM DESIGN VELOCITY AND TO PROVIDE TIGHT SEAL AGAINST MAXIMUM SYSTEM PRESSURES. PROVIDE SPRING RETURN FOR TWO POSITION CONTROL AND FOR FAIL SAFE OPERATION.

- a. PROVIDE SUFFICIENT NUMBER OF OPERATORS TO ACHIEVE UNRESTRICTED MOVEMENT THROUGHOUT DAMPER RANGE.
- b. ELECTRIC OPERATORS: SPRING RETURN, ADJUSTABLE STROKE MOTOR HAVING OIL IMMERSED GEAR TRAIN.
- DUCT ACCESS DOORS SHALL BE PROVIDED AND INSTALLED FOR INSPECTION AND CLEANING BEFORE AND AFTER FILTERS, COILS, FANS, AUTOMATIC DAMPERS, AT FIRE DAMPERS, COMBINATION FIRE AND SMOKE DAMPERS, AND ELSEWHERE AS INDICATED.

ACCESS DOORS SHALL BE RIGID AND CLOSE-FITTING CONSTRUCTED OF GALVANIZED STEEL WITH SEALING GASKETS. ACCESS DOOR TO BE DOUBLE WALLED WITH 1" - 1-1/2 LB. INSULATION AND CAM LATCHES, AND SHALL BE THE LARGEST STANDARD MANUFACTURED UNIT THAT WILL FIT IN THE DUCT WHERE IN USE, EXCEPT MINIMUM SIZE SHALL BE 12"x16". PROVIDE WIDER DUCT WHERE ACCESS IS REQUIRED IF DUCT IS UNDER 12" WIDE. IF A DUCT IS WIDER THAN THIRTY SIX INCHES (36"), TWO ACCESS DOORS SHALL BE PROVIDED.

PROVIDE CAM LATCHES FOR ACCESS DOOR CONCEALED ABOVE CEILING AND CAM LATCHES WITH HINGES FOR EXPOSED ACCESS DOOR.

DOOR IN LOW PRESSURE DUCTWORK SHALL BE AIRSAN, CONTROLLED AIR, RUSKIN, ULTRASAFE, CESCO, VENTLOK OR AMERICAN WARMING.

ACCESS DOOR IN MEDIUM PRESSURE DUCTWORK SHALL BE UNITED SHEET METAL TYPE AR-W ACCESS-VACUUM RELIEF UNIT, OR APPROVED EQUAL PROPERLY SIZED AND PRESSURE CALIBRATED FOR PROTECTION OF THE DUCT SYSTEM. COMBINATION UNIT SHALL BE CONSTRUCTED OF TRANSPARENT SHATTERPROOF COVER MOUNTED INSIDE A 20 GAUGE HOUSING WELDED TO THE DUCT SECTION. COVER SHALL BE PROVIDED WITH CHAIN RETAINER FASTENED TO THE HOUSING AND HELD AGAINST THE SEALING GASKET BY SPRING TENSION OF THE PRESSURE SENSITIVE LOCKS.

ACCESS DOOR AT A FIRE DAMPER AND/OR SMOKE DAMPER SHALL BE LABELED "FIRE DAMPER", "SMOKE DAMPER", OR "COMBINATION SMOKE/FIRE DAMPER" WITH AT LEAST ONE INCH HIGH LETTERS, PERMANENTLY ATTACHED TO THE DOOR.

- D. FLEXIBLE DUCT CONNECTORS SHALL BE INSTALLED WHERE SHEET METAL DUCIWORK IS ATTACHED TO MECHANICAL EQUIPMENT WITH MOVING PARTS. FLEXIBLE DUCT CONNECTORS SHALL BE CONSTRUCTED OF WOVEN GLASS FIBER COATED IN NEOPRENE WITH EDGES CRIMPED INTO METAL EDGING STRIPS. EDGING STRIPS SHALL BE 3" WIDE, 24 GAUGE GALVANIZED METAL. FABRIC SHALL BE FIRE RETARDENT. UL LISTED, AND COMPLY WITH NFPA 90A. CONNECTORS SHALL HAVE A FLAME SPREAD OF LESS THAN 25 AND SMOKE SPREAD LESS THAN 50.
- 36. MECHANICAL INSULATION:

<u>GENERAL</u>

- A. ALL INSULATION, UNLESS OTHERWISE NOTED, SHALL HAVE A COMPOSITE RATING INCLUDING INSULATION ADHESIVES, JACKET, ETC. AS FOLLOWS. THE COMPOSITE ASSEMBLY SHALL HAVE A FLAME SPREAD RATING NOT OVER 25 AND A SMOKE DEVELOPED RATING NOT HIGHER THAN 50, WHEN TESTED IN ACCORDANCE WITH ASTM E 84. NFPA 255. OR UL 723.
- B. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS COVERING ALL INSULATION PROPOSED FOR USE ON THIS PROJECT.
- INSULATION DAMAGED OR REMOVED DUE TO WORK UNDER THIS CONTRACT SHALL BE REPLACED WITH NEW INSULATION ACCORDING TO SPECIFICATION.
- WHERE FREQUENT SERVICING OR WHERE SITUATIONS NECESSITATE REMOVAL OF THE INSULATION AND COVER, THE CONTRACTOR MAY USE FLEXIBLE CUSTOM REUSABLE INSULATION AND COVER. INSULATION SHALL BE INSTALLED WITH ADJUSTABLE STRAPS AND BUCKLES TO FACILITATE REMOVAL. INSULATION AND COVER SHALL BE SUITABLE FOR THE SERVICE BEING INSULATED. ON STEAM PIPING, JACKET SHALL BE TEFLON IMPREGNATED FIBERGLASS, AND FOR OTHER SERVICES, SILICONE FIBERGLASS JACKET MAY BE USED. INSULATION AND COVER ASSEMBLY SHALL BE AS MANUFACTURED BY FLEXPAK OR INSULATION TECHNOLOGY INCORPORATED.
- APPROVED MANUFACTURER'S INCLUDE OWENS-CORNING, KNAUF, JOHNS-MANVILLE, AND ARMSTRONG

PIPE INSULATION

- A. FURNISH AND INSTALL AT ALL HANGERS AND SUPPORTS OF INSULATED PIPE, 12" LONG SECTIONS OF HIGH DENSITY INSULATION THAT WILL NOT DEFLECT MORE THAN 1/8" IN AN OPERATING CONDITION AND COVERING AT LEAST 120" OF THE ARC AT THE BOTTOM OF THE PIPE. ON HORIZONTAL LINES, PROVIDE 22 GAUGE GALVANIZED SHEET METAL SHIELDS COVERING 50 PERCENT OF THE CIRCUMFERENCE. ON VERTICAL LINES, THE SHEET METAL SHIELDS SHALL COMPLETELY ENCIRCLE THE INSULATION. MAINTAIN A FULL VAPOR BARRIER AROUND THE INSULATION AS IT PASSES THROUGH THE SHIELD. PIPE HANGER, ROLLER, OR SUPPORT SHALL BE EXTERNAL AT THE SHIELD. CONTRACTOR SHALL BUTT THE ADJACENT INSULATION TIGHTLY TO THE INSULATION AT THE PIPE SHIELDS AND LAP AND SEAL ALL SEAMS AND JOINTS. SPECIAL CARE SHALL BE TAKEN TO INSURE THAT THE VAPOR BARRIER AT THE PIPE SHIELDS IS NOT BROKEN. WOOD SPACER BETWEEN PIPE AND HANGER IS NOT
- B. THE PIPING INSULATION MATERIAL SHALL BE A UL-RATED, NONCOMBUSTIBLE PIPE INSULATION RECOMMENDED FOR BOTH HOT AND COLD PIPING. INSULATION SHALL BE A HEAVY DENSITY SECTIONAL PIPE INSULATION JACKETED WITH AN EMBOSSED VAPOR BARRIER LAMINATED ALL-SERVICE JACKET WITH SELF-SEALING LAP ADHESIVE. LAP AND SEAL ALL JOINTS TO INSURE VAPOR BARRIER. THERMAL CONDUCTIVITY(K) SHALL NOT EXCEED 0.24 BTUH SQUARE FOOT F/INCH. INSULATION SHALL EQUAL JOHNS MANVILLE MICRO-LOK HP. IF STAPLES ARE USED ON COLD WATER LINES, APPLY WHITE VAPOR BARRIER MASTIC OVER STAPLES.
- FITTINGS SHALL BE INSULATED WITH A PREFORMED INSULATING FITTING COVER C. SUCH AS ZESTON 25/50 RATED PVC INSULATED FITTING COVER WITH FIBERGLASS INSERT.
- D. ANY EXPOSED INSULATED PIPING PASSING THROUGH A FLOOR WHERE IT IS SUBJECT TO DAMAGE, SHALL BE COVERED WITH A 0.032" (MINIMUM) THICK ALUMINUM JACKET 18" HIGH.
- INSULATE PIPING EXPOSED TO THE WEATHER WITH INSULATION AS SPECIFIED EXCEPT ADD 1" ADDITIONAL THICKNESS. COVER WITH A 0.016" THICK SMOOTH ALUMINUM JACKET WITH 2" OVERLAP AT LONGITUDINAL AND CIRCUMFERENTIAL JOINTS AND SECURED IN PLACE WITH 1/2" X .020" STAINLESS STEEL BANDING ON 18" CENTERS.
- SEE PIPING INSULATION SCHEDULE ON SHEET M602 FOR INSULATION THICKNESS.

DUCT INSULATION

- A. INSULATION SHALL BE APPLIED PER MANUFACTURER RECOMMENDATIONS, AND SHALL BE INSTALLED IN A MANNER TO PROVIDE A VAPOR SEAL AT SEAMS AND
- B. DUCTWORK IN CONCEALED CEILING SPACES: EXTERNALLY INSULATE WITH 1 1/2", 3/4 POUND PER CUBIC FOOT FLEXIBLE FIBER BLANKET. THERMAL CONDUCTIVITY (K) AT 75'F SHALL NOT EXCEED 0.27 BTUH SQUARE FOOT F/INCH. INSULATION SHALL HAVE FOIL-REINFORCED KRAFT VAPOR BARRIER FACING. APPLY WITH MASTIC. MECHANICAL FASTENERS. STAPLES AND TAPE AS PER MANUFACTURER'S RECOMMENDATIONS. LAP AND SEAL ALL JOINTS. ALL FASTENING DEVICE PENETRATIONS SHALL BE VAPOR-PROOFED. INSULATION SHALL BE EQUAL TO JOHNS MANVILLE MICROLITE EQ FSK.
- C. DUCTWORK IN UNCONDITIONED SPACES: INSULATE WITH 2", 1 1/2 POUND PER CUBIC FOOT FLEXIBLE FIBER BLANKET. THERMAL CONDUCTIVITY (K) SHALL NOT EXCEED 0.24 BTUH SQUARE FOOT F/INCH. INSULATION SHALL BE APPLIED PER MANUFACTURER'S RECOMMENDATIONS AND IN A MANNER AS TO PROVIDE VAPOR SEAL AT ALL SEAMS AND JOINTS. INSULATION SHALL BE EQUAL TO JOHNS MANVILLE MICROLITE EQ FSK.
- D. EXTERIOR DUCTWORK SHALL BE INSULATED WITH 2" THICK, 3 POUND DENSITY FIBER BOARD IMPALED OVER WELD PINS OR ADHERED PINS AT 12" CENTERS WITH A MINIMUM OF TWO ROWS PER SIDE. COVER INSULATION WITH A 0.016" THICK ALUMINUM JACKET WITH A 3" OVERLAP AT ALL TRANSVERSE AND LONGITUDINAL JOINTS. LAPS OF JACKETS SHALL BE POSITIONED TO SHED WATER. SECURE IN PLACE WITH $3/4^{"} \times 0.020^{"}$ STAINLESS STEEL BANDING ON 18" CENTERS MINIMUM. ON DUCT OVER 48" WIDE PROVIDE STIFFENER AS REQUIRED TO PREVENT SAGGING OF INSULATION. GUARANTEE WEATHER-PROOFING FOR 3 YEARS. INSULATION SHALL BE EQUAL TO JOHNS MANVILLE SPIN-GLAS 814.
- E. LOW PRESSURE SUPPLY AND RETURN DUCTS 5'-0" ON EACH SIDE OF MECHANICAL EQUIPMENT WITH MOTORS SHALL BE INTERNALLY INSULATED WITH 1" INTERNAL ACOUSTICAL DUCT LINER WITH COATED FACE TOWARD THE AIR STREAM. INSULATION SHALL MEET THE EROSION TEST METHOD DESCRIBED IN UL PUBLICATION NO. 181. IN ADDITION, ALL LININGS, INCLUDING COATINGS AND ADHESIVES, WHEN TESTED ON A COMPOSITE BASIS, SHALL HAVE A FLAME SPREAD RATING OF 25 OR LESS AND A SMOKE DEVELOPED RATING OF 50 OR LESS. INSULATION SHALL BE APPLIED WITH MASTIC AND PINS AS PER THE MANUFACTURER'S INSTRUCTIONS AND THE LATEST SMACNA STANDARD. ALL JOINTS SHALL BE PINNED AND A COATING OF ADHESIVE APPLIED OVER THE EXPOSED EDGE OF INSULATION. INTERNALLY INSULATED DUCTS SHALL ALSO BE EXTERNALLY INSULATED PER THIS SPECFICIATION. INSULATION SHALL BE EQUAL TO JOHNS MANVILLE LINACOUSTIC RC-HP.

37. <u>AIR DEVICES</u>:

- A. AIR DEVICES SHALL BE AS CALLED FOR IN SCHEDULE ON M602. QUANTITY SHALL BE DETERMINED FROM DRAWINGS.
- B. THE DRAWINGS SHOW THE APPROXIMATE LOCATION OF AIR DEVICES. THIS CONTRACTOR SHALL CAREFULLY CHECK THE ELECTRICAL AND ARCHITECTURAL DRAWINGS FOR THE PROPER PLACING OF AIR DEVICES, AND BE RESPONSIBLE FOR SUPPLYING THE GENERAL CONTRACTOR WITH NECESSARY INFORMATION AS TO EXACT LOCATION AND SIZE OF OPENINGS REQUIRED.
- C. RECTANGULAR, SQUARE, OR ROUND FACED CEILING SUPPLY AIR DIFFUSER SHALL HAVE BAKED OFF-WHITE ENAMEL FINISH. ALL INTERNAL PARTS OF THE DIFFUSER INCLUDING DAMPER, INTERIOR FACE, ETC. SHALL BE BAKED OFF-WHITE ENAMEL.
- D. CEILING AIR DEVICES SHALL BE FABRICATED OF ALUMINUM OR STEEL AS INDICATED PER SCHEDULE WITH BAKED WHITE ENAMEL FINISH.
- SIDEWALL SUPPLY AIR REGISTER SHALL HAVE PRIME COAT FINISH. UNIT SHALL INCLUDE VOLUME CONTROL DAMPER AND DEFLECTROL.
- F. TOILET ROOM AND JANITOR CLOSET SHALL HAVE AIR DEVICES FABRICATED OF
- ALL ALUMINUM CONSTRUCTION.
- G. PAINT DUCTWORK VISIBLE BEHIND AIR OUTLETS AND INLETS MATTE BLACK. APPROVED MANUFACTURER'S INCLUDE PRICE, TITUS, ANEMOSTAT, CARNES,

38. FANS:

A. FANS SHALL BE AS CALLED FOR IN SCHEDULE ON SHEET M602.

KRUEGER, AND TUTTLE & BAILEY.

- B. ALL FANS SHALL BE AMCA RATED FOR AIRFLOW AND STATIC PRESSURE GIVEN IN SCHEDULE.
- C. SOUND LEVEL GIVEN IN SCHEDULE IS MAXIMUM ACCEPTABLE VALUE FOR EACH FAN. SONE LEVEL REPRESENTS LOUDNESS LEVELS OBTAINED AT 5'-0" FROM THE FAN INLET.
- D. BELT DRIVEN FANS LARGER THAT 1/2 HP SHALL HAVE AT AT LEAST DOUBLE GROOVE SHEAVES AND DUAL BELTS. DRIVES SHALL HAVE A SERVICE FACTOR OF AT LEAST 125% OF THE MOTOR HORSEPOWER.
- E. MOTORS SHALL BE OF HEAVY DUTY, PERMANENTLY LUBRICATED, SEALED BEARING TYPE.
- F. FANS SHALL BE PROVIDED WITH DISCONNECT SWITCHES THAT ARE HORSEPOWER RATED PER THE NATIONAL ELECTRIC CODE.
- G. WHERE SCHEDULED, PROVIDE A MOTORIZED SHUTTER. FURNISH SHUTTER OPERATOR SAME VOLTAGE AS FAN MOTOR EXCEPT SINGLE PHASE. OPERATOR TO BE MOUNTED AND ATTACHED TO SHUTTER. WIRING OF OPERATOR BY E.C.
- ROOF MOUNTED FAN SHALL BE BELT DRIVEN OR DIRECT DRIVEN AS SCHEDULED AND HAVE BIRDSCREEN, AUTOMATIC BACKDRAFT SHUTTER (MOTORIZED SHUTTER) AND FACTORY MOUNTED AND WIRED SAFETY DISCONNECT ŚWITCH. PROVIDE ROOF CURB OR CURB ADAPTER AS INDICATED IN FAN SCHEDULE.
- <u>CEILING MOUNTED AND INLINE CABINET FANS</u> SHALL BE CENTRIFUGAL TYPE DIRECT DRIVE UNIT WITH RUBBER ISOLATED CENTRIFUGAL FAN, INTERNALLY LINED HOUSING, HORIZONTAL OR VERTICAL DISCHARGE, WITH BACKDRAFT DAMPER, AND DISCONNECT.
- J. PROVIDE FANS WITH ACCESSORIES AS LISTED IN THE FAN SCHEDULE.
- K. APPROVED MANUFACTURER'S INCLUDE GREENHECK, ACME, LOREN COOK, AND
- 39. PACKAGED AIR CONDITIONING HEATING AND COOLING:
 - A. SELF-CONTAINED FACTORY-ENGINEERED AND ASSEMBLED, PRE-WIRED PACKAGED ROOFTOP UNITS; UL LISTED.
 - 1. HEATING: NATURAL GAS FIRED.
 - 2. COOLING: DIRECT EXPANSION, REFRIGERANT R-410A
 - B. EFFICIENCY: ENERGY EFFICIENCY RATING (EER) NOT LESS THAN REQUIREMENTS OF ASHRAE STD 90.1; SEASONAL EFFICIENCY TO ASHRAE STD 103.
- C. CONSTRUCTION:
 - CABINET: CONSTRUCTED OF HEAVY GAUGE, ZINC COATED, GALVANIZED STEEL WITH WEATHER RESISTANT BAKED ENAMEL FINISH. EASILY REMOVED AND SECURED WATER AND AIR TIGHT ACCESS DOORS WITH SAFETY INTERLOCK SWITCHES, EXPOSED VERTICAL PANELS AND TOP SHALL BE INSULATED WITH A CLEANABLE, FOIL FACED, CLOSED CELL INSULATION. TOP SHALL BE ONE PIECE CONSTRUCTION WITH RIBS FOR ADDED STRENGTH AND TO PREVENT POOLING OF WATER.
- 2. COMPRESSOR: ARI 520; DIRECT DRIVE, HERMETICALLY SEALED, SCROLL COMPRESSORS WITH CENTRIFUGAL TYPE OIL PUMPS, WITH POSITIVE LUBRICATION, CRANKCASE HEATER, HIGH PRESSURE CONTROL (WITH MANUAL RESET SWITCH), MOTOR OVERLOAD PROTECTION, SERVICE VALVES AND DRIER. PROVIDE TIME DELAY CONTROL TO PREVENT SHORT CYCLING AND RAPID SPEED CHANGES.
- 3. SUPPLY FAN: FORWARD CURVED, BELT DRIVEN, HIGH STATIC, CENTRIFUGAL FAN WITH ADJUSTABLE MOTOR SHEAVES, AND MOUNTED ON RUBBER ISOLATORS.
- 4. AIR FILTERS: 2 INCH THICK PLEATED THROWAWAY INSTALLED AT FACTORY. FILTER SHALL HAVE A MERV RATING OF 8 OR HIGHER.

- 5. EVAPORATOR AND CONDENSER COILS: COPPER TUBE ALUMI ASSEMBLY, COILS SHALL BE LEAK AND PRESSURE TESTED / EVAPORATOR SHALL HAVE A REMOVABLE/REVERSIBLE POLYME SLOPED DRAIN PAN, DRAIN CONNECTION.
- 6. GAS HEATING SECTION: TUBULAR NATURAL GAS HEAT EXCHA STAINLESS STEEL BURNERS AND CORROSION RESISTANT STEE DRAFT COMBUSTION BLOWER, DIRECT SPARK IGNITION. PRE-I PURGE CYCLE, MANUAL RESET AFTER THREE UNSUCCESSFUL ATTEMPTS. MODULATING GAS VALVE.
- 7. CONDENSER FAN: DIRECT DRIVEN, STATICALLY AND DYNAMICA BALANCED, VERTICAL DISCHARGE, MOTOR SHALL BE PERMANE LUBRICATED WITH BUILT-IN THERMAL OVERLOAD PROTECTION.
- 8. REFRIGERANT CIRCUIT: THERMOSTATIC EXPANSION VALVE, SEI PRESSURE PORTS, REFRIGERANT LINE FILTER DRIER.
- ACCESSORIES; AS INDICATED IN KEYNOTES UNDER PACKAGED AIR UNIT SCHEDULE ON SHEET M601.
- E. APPROVED MANUFACTURER'S:

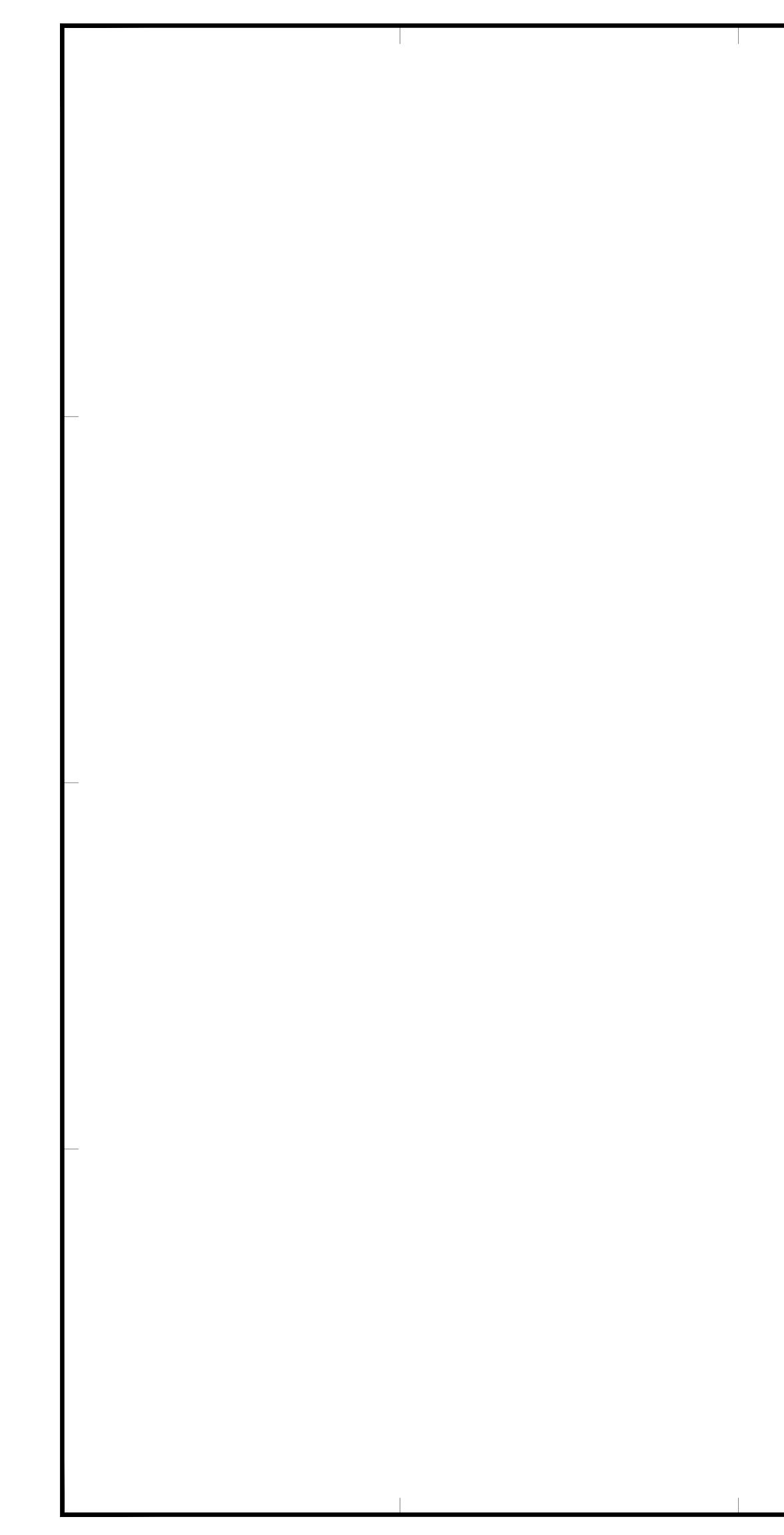
EQUIPMENT: TRANE, CARRIER, MCQUAY AND YORK CONTROLS: HONEYWELL, INVENSYS, WHITE ROGERS, TRANE AND CA

40. VARIABLE REFRIGERANT FLOW EQUIPMENT:

- A. THE VARIABLE CAPACITY, HEAT PUMP/AIR CONDITIONING SYSTEM VARIABLE REFRIGERANT FLOW SPLIT SYSTEM WITH HEAT RECOVER' SHALL CONSIST OF BC CONTROLLERS, MULTIPLE EVAPORATORS. REFRIGERANT PIPING JOINTS AND HEADERS, A TWO OR THREE P REFRIGERATION DISTRIBUTION SYSTEM USING PID CONTROL, AND REFRIGERANT FLOW OUTDOOR UNIT. THE OUTDOOR UNIT IS DIRECT (DX), MULTI-ZONE AIR-CONDITIONING SYSTEM WITH VARIABLE SPEE DRIVEN COMPRESSORS USING R-410A REFRIGERANT.
- B. ALL ZONES SHALL BE CAPABLE OF OPERATING SEPARATELY WITH TEMPERATURE CONTROL.
- C. UNITS SHALL BE ABLE TO SET TEMPERATURE INDEPENDENTLY VIA REMOTE CONTROLLER, AND A BAS (BUILDING AUTOMATION SYSTEM)
- D. ELECTRICAL CAPACITY FOR ALL UNITS SHALL BE AS SCHEDULED.
- VRF OUTDOOR AND INDOOR UNITS ARE TO BE PROVIDED BY SAMI MANUFACTURER.
- F. ALL REFRIGERANT LINES MUST BE INDIVIDUALLY INSULATED BETWEE OUTDOOR AND INDOOR UNITS, FOR BOTH (2) AND (3) PIPE SYSTE
- G. THE SYSTEM SHALL AUTOMATICALLY RESTART OPERATION AFTER A FAILURE AND WILL NOT CAUSE ANY SETTINGS TO BE LOST, THUS THE NEED FOR REPROGRAMMING.
- H. THE CONNECTION RATIO OF INDOOR UNITS TO OUTDOOR UNIT SHA PERMITTED UP TO 100% INDOOR UNITS HEATING CAPACITY @ -4F OUTDOOR SYSTEM SHALL BE ABLE TO SUPPORT THE CONNECTION UNITS SPECIFIED ON THE DRAWINGS. SYSTEM SHALL HAVE AN EX HEATING CAPACITY DOWN TO -18°F.
- EACH SYSTEM SHALL HAVE INDEPENDENT CONTROL, DEFROST CYCL REFRIGERANT AUTO-CHARGING FUNCTION, AND CHARGE CHECKING EACH SYSTEM SHALL ALSO BE EQUIPPED WITH SELF DIAGNOSTIC, FUNCTION TO DETECT A MALFUNCTION AND DISPLAY THE TYPE A FACH SYSTEM SHALL BE CAPABLE OF INTEGRATING WITH OPEN PE BACNET AND LONWORKS BUILDING MANAGEMENT SYSTEMS.
- J. OUTDOOR VRF HEAT PUMP
 - OUTDOOR UNIT SHALL BE FACTORY ASSEMBLED AND PRE-WIF NECESSARY ELECTRONIC AND REFRIGERANT CONTROLS. THE CIRCUIT OF THE CONDENSING UNIT SHALL CONSIST OF SCRO COMPRESSORS, MOTORS, FANS, CONDENSER COIL, ELECTRONI VALVES, SOLENOID VALVES, 4-WAY VALVE, DISTRIBUTION HEAD CAPILLARIES, FILTERS, SHUT OFF VALVES, OIL SEPARATORS, PORTS AND REFRIGERANT REGULATOR.
 - THE OUTDOOR UNIT TO BE LOCATED AS APPROXIMATELY SH DRAWINGS. ALLOW FOR 36-INCH ELECTRICAL ACCESS. UNIT MODULAR IN DESIGN AND ALLOW FOR SIDE-BY-SIDE INSTALL MINIMUM SPACING. INSTALL PER MANUFACTURERS REQUIREMENT
- 3. THE UNITS SHALL INCORPORATE AN AUTO-CHARGING FEATURE REFRIGERANT CHARGE CHECK FUNCTION.
- 4. THE FOLLOWING SAFETY DEVICES SHALL BE INCLUDED ON TH PUMP: HIGH PRESSURE SWITCH, CONTROL CIRCUIT FUSES, C HEATERS, FUSIBLE PLUG, HIGH PRESSURE SWITCH, OVERLOAD INVERTER OVERLOAD PROTECTOR, THERMAL PROTECTORS FOR AND FAN MOTORS, OVER CURRENT PROTECTION FOR THE INV ANTI-RECYCLING TIMERS.
- 5. TO ENSURE THE LIQUID REFRIGERANT DOES NOT FLASH WHEI TO THE VARIOUS VRF INDOOR UNITS, THE CIRCUIT SHALL BE WITH A SUB-COOLING FEATURE.
- 6. OIL RECOVERY CYCLE SHALL OCCUR AUTOMATICALLY 2 HOURS START OF OPERATION AND THEN EVERY 8 HOURS AND AND THEN EVERY 8 HOURS OPERATION AND THEN EVERY 8
- 7. THE OUTDOOR UNIT SHALL BE CAPABLE OF HEATING OPERATI DRY BULB AMBIENT TEMPERATURE WITHOUT ADDITIONAL LOW CONTROLS.
- 8. VRF OUTDOOR UNITS TO BE FACTORY TESTED AT THE FACTOR
- 9. THE OUTDOOR UNIT SHALL BE COMPLETELY WEATHERPROOF CORROSION RESISTANT. THE UNIT SHALL BE CONSTRUCTED RUST-PROOFED MILD STEEL PANELS COATED WITH A BAKED
- 10. THE HEAT PUMP UNIT SHALL BE EQUIPPED WITH ONE OR MC PROPELLER TYPE, DIRECT-DRIVE, VARIABLE SPEED FANS WITH DISCHARGE CONFIGURATION. THE FAN MOTOR SHALL HAVE IN PROTECTION AND PERMANENTLY LUBRICATED BEARINGS. THE SHALL BE PROVIDED WITH A FAN GUARD TO PREVENT CONT. MOVING PARTS.
- 11. THE CONDENSER COIL SHALL BE MANUFACTURED FROM COPF EXPANDED INTO ALUMINUM FINS TO FORM A MECHANICAL BO EXCHANGER COIL SHALL BE OF A WAFFLE LOUVER FIN AND TUBE DESIGN TO ENSURE HIGH EFFICIENCY PERFORMANCE. EXCHANGER ON THE CONDENSING UNITS SHALL BE MANUFAC HI-X SEAMLESS COPPER TUBE WITH N-SHAPE INTERNAL GR MECHANICALLY BONDED ON TO ALUMINUM FINS TO AN E-PA THE FINS ARE TO BE COVERED WITH AN ANTI- CORROSION AND HYDROPHILIC FILM TYPE E1. THE PIPE PLATES SHALL I WITH POWDERED POLYESTER RESIN FOR CORROSION PREVEN
- 12. THE COMPRESSOR SHALL BE INVERTER SCROLL COMPRESSO VARIABLE SPEED CONTROLL WHICH IS CAPABLE OF CHANGING TO FOLLOW THE VARIATIONS IN TOTAL COOLING AND HEATING DETERMINED BY THE SUCTION GAS PRESSURE AS MEASURED CONDENSING UNIT. SAMPLINGS OF EVAPORATOR AND CONDEN TEMPERATURES SHALL BE MADE SO THAT THE HIGH/LOW PRI DETECTED ARE READ EVERY 20 SECONDS AND CALCULATED. MAGNETS SHALL BE ADOPTED IN THE ROTOR CONSTRUCTION HIGHER TORQUE AND EFFICIENCY IN THE COMPRESSOR INST NORMAL FERRITE MAGNET TYPE. AT COMPLETE STOP OF THE COMPRESSOR, THE NEODYMIUM MAGNETS WILL POSITION THE A LOW TORQUE START. THE CAPACITY CONTROL RANGE SHAL 16% TO 100%. EACH COMPRESSOR SHALL BE EQUIPPED WIT CRANKCASE HEATER, HIGH PRESSURE SAFETY SWITCH, AND THERMAL OVERLOAD PROTECTOR. OIL SEPARATORS SHALL BE WITH THE EQUIPMENT TOGETHER WITH AN INTELLIGENT OIL M SYSTEM. THE COMPRESSOR SHALL BE MOUNTED TO AVOID TH TRANSMISSION OF VIBRATION. COMPRESSORS SHALL BE BAL/ MEANS OF THE DUTY CYCLING FUNCTION, ENSURING SEQUEN OF EACH MODULE AT EACH START/STOP CYCLE. COMPLETION RETURN, COMPLETION OF DEFROST OR EVERY 8 HOURS.

MINUM FIN AT FACTORY, MER DOUBLE	13. UNIT TO BE SET ON SUPPORT STAND AS INDICATED ON DRAWINGS. 14. UNIT TO BE PROVIDED WITH BASE PAN HEATER.	June 199
HANGER WITH	15. CONTRACTOR TO INSTALL ELECTRIC HEAT TAPE FROM UNIT TO EDGE OF CONCRETE PAD. COORDINATE WITH E.C. HEAT TAPE SHALL RUN WHENEVER TEMPERATURE IS BELOW 35°F.	
EEL, INDUCED IGNITION JL IGNITION	K. CONCEALED CEILING UNIT	
	1. CONCEALED VRF INDOOR UNITS SHALL BE EQUIPPED WITH ELECTRONIC EXPANSION VALVES, RETURN AIR INLET COLLAR AND SUPPLY DUCTED COLLAR. COMPUTERIZED PID CONTROL SHALL BE USED TO CONTROL	
NENTLY N.	2. UNIT SHALL BE COMPLETELY FACTORY ASSEMBLED AND TESTED INCLUDING	
SERVICE	FACTORY WIRING, PIPING, ELECTRONIC PROPORTIONAL EXPANSION VALVE, CONTROL CIRCUIT BOARD, FAN MOTOR THERMAL PROTECTOR, FLARE CONNECTIONS, CONDENSATE DRAIN PAN, SELF-DIAGNOSTICS,	
R CONDITIONING	AUTO-RESTART FUNCTION, 3-MINUTE FUSED TIME DELAY, AND TEST RUN SWITCH. 3. UNIT AND REFRIGERANT PIPES WILL BE CHARGED WITH DEHYDRATED AIR	1
	 4. UNITS SHALL BE EQUIPPED WITH AN INTEGRAL CONDENSATE PUMP AND 	-
CARRIER.	5. UNITS SHALL BE EQUIPPED WITH A RETURN AIR THERMISTOR.	
	 UNIT SHALL BE SEPARATELY POWERED WITH VOLTAGES AS SCHEDULED ON THE DRAWINGS. 	Ŭ)
SHALL BE A RY. THE SYSTEM ENGINEERED PIPE	7. CABINET SHALL INCLUDE A DUCTED DISCHARGE COLLAR AND A RETURN AIR INLET DUCTED COLLAR. THE CABINET SHALL BE CONSTRUCTED WITH SOUND ABSORBING FOAMED POLYSTYRENE AND POLYETHYLENE INSULATION.	hnicon
VARIABLE CT EXPANSION PEED INVERTER	8. THE FAN SHALL BE DIRECT-DRIVE TURBO FAN TYPE WITH STATICALLY AND DYNAMICALLY BALANCED IMPELLER WITH HIGH AND LOW FAN SPEEDS AVAILABLE, THE FAN MOTOR SHALL BE THERMALLY PROTECTED.	L C C
H INDIVIDUAL	9. RETURN AIR SHALL BE FILTERED BY MEANS OF A WASHABLE LONG-LIFE FILTER WITH MILDEW PROOF RESIN. CONTRACTOR SHALL CLEAN FILTERS AT COMPLETION OF CONSTRUCTION AND PRIOR TO OWNER OCCUPANCY.	Č
IA A LOCAL EM) INTERFACE.	10. COILS SHALL BE OF THE DIRECT EXPANSION TYPE CONSTRUCTED FROM COPPER TUBES EXPANDED INTO ALUMINUM FINS TO FORM A MECHANICAL BOND. THE COIL SHALL BE OF A WAFFLE LOUVER FIN AND HIGH HEAT EXCHANGE, RIFLED BORE TUBE DESIGN TO ENSURE HIGHLY EFFICIENT PERFORMANCE. THE REFRIGERANT CONNECTIONS SHALL BE FLARE CONNECTIONS	1.1
ME	11. CONDENSATE CONNECTION WILL BE $1-1/4$ INCH OUTSIDE DIAMETER PVC. A CONDENSATE PAN SHALL BE LOCATED UNDER THE COIL. A CONDENSATE	
NEEN THE STEMS.	PUMP WITH A 21 INCH LIFT (MINIMUM) SHALL BE LOCATED BELOW THE COIL IN THE CONDENSATE PAN WITH A BUILT IN SAFETY ALARM.	
A POWER S ELIMINATING	M. CONTROLS 1. THE UNIT SHALL HAVE CONTROLS PROVIDED TO PERFORM INPUT	12
HALL BE 4F. EACH DN OF INDOOR EXTENDED	FUNCTIONS NECESSARY TO OPERATE THE FULLY FUNCTIONING SYSTEM. 2. CONTROLLER WITH LCD DISPLAY TO BE PROVIDED BY UNIT MANUFACTURER, WITH WALL MOUNTED THERMOSTAT/CONTROLLER CAPABLE OF INDIVIDUALLY DISPLAYING TEMPERATURE SET POINT, SPACE TEMPERATURE, TIME OF DAY,	
YCLE,	AND FAN SPEED. 3. THE UNIT SHALL BE CAPABLE OF STAND-ALONE OPERATION, BUT SHALL	
IG FUNCTION. C, AUTO-CHECK AND LOCATION.	BE CAPABLE OF FUTURE INTERFACING WITH CONNECTION TO LONWORKS, TCP/IP, OR BACNET NETWORKS OR INTERFACING WITH CONNECTION TO BAS SYSTEM. CONSULT MANUFACTURER PRIOR TO APPLYING CONTROLS.	
PROTOCOL	4. UNIT MANUFACTURER SHALL PROVIDE A MICROPROCESSOR BASED CONTROL SYSTEM THAT SHALL PROVIDE THE FOLLOWING:	
	 a. DIRECT DIGITAL CONTROLLER INTERFACE. b. OCCUPIED-UNOCCUPIED CONTROL. c. NECESSARY OPERATING INTERLOCKS. 	
Wired With All Refrigeration Roll DNIC EXPANSION	d. INTERFACE REQUIREMENTS. e. COMMUNICATE WITH BACNET, LON, OR TCP/IP. f. SEND ALARMS.	SN
EADERS, , SERVICE	5. CONTROL VOLTAGE BETWEEN THE INDOOR AND OUTDOOR UNIT SHALL BE 16VDC NON-SHIELDED, STRANDED 2 CONDUCTOR CABLE. THE CONTROL	
HOWN ON SHALL BE	WIRING SHALL BE A TWO-WIRE MULTIPLEX TRANSMISSION SYSTEM, ALLOWING CONNECTION OF MULTIPLE INDOOR UNITS TO ONE OUTDOOR UNIT WITH ONE 2-CABLE WIRE.	
JRE AND A	N. THE SYSTEM MUST BE INSTALLED BY A FACTORY TRAINED CONTRACTOR. THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR EVACUATING AND PRESSURE TESTING THE REFRIGERANT LINES ACCORDING TO VRF MANUFACTURERS	ž (
THE HEAT CRANKCASE	REQUIREMENTS. O. SYSTEM IS BASED ON TWO PIPE SYSTEM. IF CONTRACTOR CHOOSES TO UTILIZE A MANUFACTURER REQUIRING A THREE PIPE SYSTEM. REQUIRED DESIGN CHANGES SHALL BE RESPONSIBILITY OF CONTRACTOR. ALL DESIGN CHANGES	
DAD RELAY, DR COMPRESSOR INVERTER AND	SHALL BE APPROVED BY ENGINEER OF RECORD. P. ACCEPTABLE MANUFACTURERS INCLUDE MITSUBISHI ELECTRIC, DAIKEN AC,	
HEN SUPPLYING BE PROVIDED	SANYO, AND LG ELECTRONICS, INC. (SEE CONTINUATION ON SHEET M903.)	
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DIVISION 23 - MECHANICAL SPECIFICATIONS 41. TEMPERATURE CONTROL SYSTEM AND SEQUENCE OF OPERATION:

- A. THE INTENT OF THIS SPECIFICATION IS TO DESCRIBE THE DESIRED ACTIONS OF THE HVAC EQUIPMENT SPECIFIED HEREIN FOR THIS FACILITY. THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH THESE WRITTEN SEQUENCES. WHETHER OR NOT EXPLICITLY SHOWN ON THE DRAWINGS, ALL DEVICES AND ITEMS REQUIRED FOR THE EXECUTION OF THESE SEQUENCES ARE THE RESPONSIBILITY OF THE CONTRACTOR. M.C. SHALL PROVIDE ANY REQUIRED TRANSFORMERS. M.C. SHALL COORDINATE WITH E.C. AND G.C. AS REQUIRED.
- ALL ELECTRICAL WIRING SHALL BE IN ACCORDANCE WITH THE NATIONAL В. ELECTRICAL CODE. THE M.C. IS RESPONSIBLE FOR ALL CONTROL AND INTERLOCK WIRING REQUIRED FOR THE COMPLETE INSTALLATION.
- C. THE M.C. IS RESPONSIBLE FOR ALL POWER WIRING FOR THE COMPLETE CONTROL SYSTEM. THIS SHALL INCLUDE POWER WIRING FOR DEDICATED 120 VOLT, 20 AMP CIRCUIT(S) FOR CONTROL PANELS, ETC. ALL 120 VOLT CIRCUITS SHALL BE FROM THE NEAREST RECEPTACLE PANEL WITH THE MAXIMUM LOAD ON ANY SINGLE CIRCUIT BEING 1400 WATTS.
- D. ALL EXPOSED TEMPERATURE CONTROL AND INTERLOCK WIRING AND ALL POWER WIRING REGARDLESS OF VOLTAGE, SHALL AT A MINIMUM BE RUN IN EMT. CONDUIT SYSTEM IN MECHANICAL AND ELECTRICAL ROOMS BELOW EIGHT FEET ABOVE FLOOR SHALL BE RIGID IN LIEU OF EMT. SEE ELECTRICAL SPECIFICATIONS FOR ADDITIONAL CONDUIT REQUIREMENTS. CONCEALED LOW VOLTAGE WIRING, SUCH AS COMMUNICATION WIRE, THERMOSTAT WIRE, ETC. SHALL BE PLENUM GRADE, FASTENED SECURELY TO BUILDING STRUCTURE. LOW VOLTAGE WIRING SHALL NOT BE LAID DIRECTLY ON THE CEILING OR BE ATTACHED TO ANY OTHER ELECTRICAL CONDUITS.
- E. ON COMPLETION OF THE JOB, THE M.C. SHALL COMPLETELY ADJUST AND READY FOR USE, ALL THERMOSTATS, VALVES, DAMPERS, DAMPER MOTORS AND RELAYS PROVIDED. THE M.C. SHALL PROVIDE A COMPLETE INSTRUCTION MANUAL COVERING THE FUNCTION AND OPERATION OF ALL CONTROL COMPONENTS ON THE JOB. THIS MANUAL SHALL BE FURNISHED TO THE OWNER'S OPERATING PERSONNEL AND A COMPETENT TECHNICIAN SHALL BE PROVIDED FOR INSTRUCTION PURPOSES AFTER THE SYSTEM IS SUBSTANTIALLY COMPLETE AND READY FOR OPERATION.
- F. THERMOSTATS AND TEMPERATURE SENSORS INSTALLED FOR USE BY BUILDING OCCUPANTS SHALL BE MOUNTED PER ANSI 117.1 REQUIREMENTS. THERMOSTATS ARE TO BE LOCATED WHERE SHOWN ON THE DRAWINGS.
- G. <u>VRF SYSTEM</u>:
 - VARIABLE REFRIGERANT FLOW SYSTEM (VRF) SHALL BE EQUIPPED WITH ITS OWN STAND ALONE CONTROL PACKAGE. THIS SYSTEM SHALL BE SET UP FOR FUTURE CONNECTION TO BAS SYSTEM TO PROVIDE START/STOP AND SUPERVISORY MONITORING OF THE UNITS WITH THE CAPABILITY TO CHANGE TEMPERATURE SET POINTS IN EACH SPACE AND OCCUPIED TIMES. INTERFACE PROTOCOL WILL BE MODBUS, LON, OR BACNET.
- 2. MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE TO INSTALL THE THERMOSTAT/CONTROLLER AND INTERCONNECTING WIRING AS REQUIRED FOR EQUIPMENT.
- OCCUPIED MODE: SUPPLY FAN SHALL RUN CONTINUOUSLY. HEATING AND COOLING SYSTEMS SHALL CYCLE AS REQUIRED TO MAINTAIN THE NEEDS OF SPACE.
- 4. UNOCCUPIED MODE: SUPPLY FAN SHALL CYCLE IN CONJUNCTION WITH THE HEATING AND COOLING SYSTEMS AS REQUIRED TO MAINTAIN THE NEEDS OF THE SPACE.
- CONTROLLER SHALL HAVE 24/7 SCHEDULING CAPABILITY, AND THE ABILITY 5. TO LOCKOUT INDIVIDUAL FUNCTIONS.
- H. <u>PACKAGED AIR CONDITIONING UNIT (RTU-1, RTU-2, RTU-3, AND RTU-4)</u>:
- HEATING AND COOLING SYSTEMS SHALL CYCLE AS REQUIRED TO MAINTAIN THE NEEDS OF SPACE BASED ON WALL MOUNTED 7 DAY PROGRAMMABLE THERMOSTAT/HUMIDISTAT. THERMOSTAT SHALL OPERATE TWO STAGES OF HEATING AND TWO STAGE OF COOLING. LOCATION OF THERMOSTATS SHALL BE AS SHOWN ON PRINT AND COORDINATED WITH OWNER.
- 2. OCCUPIED MODE: HEATING AND COOLING SYSTEMS SHALL CYCLE AS REQUIRED TO MAINTAIN THE NEEDS OF SPACE. EVAPORATOR FAN SHALL RUN CONTINUOUSLY. OUTSIDE AIR MOTORIZED DAMPER SHALL OPEN TO MINIMUM POSITION, AND SHALL MODULATE OPEN AS NECESSARY TO SATISFY CARBON DIOXIDE SENSOR. SEE MINIMUM AND MAXIMUM OUTSIDE AIR SETPOINTS IN FOOTNOTES OF PACKAGED AIR CONDITIONING UNIT SCHEDULE ON SHEET M601.
- UNOCCUPIED MODE: EVAPORATOR FAN SHALL CYCLE IN CONJUNCTION WITH THE HEATING AND COOLING SYSTEMS AS REQUIRED TO MAINTAIN THE NEEDS OF THE SPACE. OUTSIDE AIR MOTORIZED DAMPER SHALL BE CLOSED
- 4. ECONOMIZER: UNIT SHALL BE PROVIDED WITH COMPARATIVE ENTHALPY ECONOMIZER TO PROVIDE FREE COOLING. ECONOMIZERS SHALL OPERATE WHEN THE OUTDOOR AIR ENTHALPY DECREASES BELOW RETURN AIR LEVELS. THE ASSEMBLY SHALL INCLUDE FULLY MODULATING 0-100 PERCENT MOTOR AND DAMPERS WITH MINIMUM POSITION SETTING, PRESET LINKAGE, WIRING HARNESS WITH PLUG, AND SPRING RETURN ACTUATOR.
- I. <u>FAN (F–1)</u>
 - 1. FAN SHALL BE CONTROLLED BY DIGITAL 24 HOUR TIMECLOCK EQUAL TO TORK MODEL E101B. FAN SHALL ENERGIZE AS FOLLOWS (FINAL SCHEDULE SHALL BE COORDINATED WITH OWNER PERSONNEL): MONDAY THRU FRIDAY: 7:00 A.M. UNTIL 6:00 P.M. (ADJUSTABLE) SATURDAY: 8:00 A.M. UNTIL 12:00 P.M. (ADJUSTABLE)
- J. <u>FAN (F–2)</u>
- 1. FAN SHALL BE CONTROLLED BY 'ON-OFF' SWITCH LOCATED IN BREAK ROOM 115.
- K. FAN (F-3 AND EXISTING CONTROL DAMPERS)

SUNDAY: OFF (ADJUSTABLE)

- 1. FAN AND ASSOCIATED CONTROL DAMPER SHALL BE INTERLOCKED AND CONTROLLED BY 'ON-OFF' SWITCH LOCATED IN STORAGE 125. SEE ELECTRICAL PLANS FOR SWITCH LOCATION. POWER WIRING TO FAN BY E.C. CONTROL TRANSFORMER AND WIRING TO CONTROL DAMPERS BY M.C.
- 2. ON-OFF SWITCH SHALL BE LOCATED AT 4'-0" A.F.F.
- WHEN FAN IS ENERGIZED CORRESPONDING INTAKE LOUVER CONTROL DAMPER SHALL OPEN. AND THE FAN SHALL ENERGIZE AND RUN CONTINUOUSLY.
- L. FAN (F-4 AND EXISTING CONTROL DAMPER)
 - FAN AND ASSOCIATED CONTROL DAMPER SHALL BE INTERLOCKED AND CONTROLLED BY 'ON-OFF' SWITCH LOCATED IN STORAGE 128. SEE ELECTRICAL PLANS FOR SWITCH LOCATION. POWER WIRING TO FAN BY E.C. CONTROL TRANSFORMER AND WIRING TO CONTROL DAMPERS BY M.C.
- 2. ON-OFF SWITCH SHALL BE LOCATED AT 4'-0" A.F.F.
- 3 WHEN FAN IS ENERGIZED CORRESPONDING INTAKE LOUVER CONTROL DAMPER SHALL OPEN. AND THE FAN SHALL ENERGIZE AND RUN CONTINUOUSLY.
- M. <u>ELECTRIC RADIANT PANEL HEATER (RP-1 AND RP-2)</u>
- RADIANT PANEL SHALL BE CONTROLLED BY WALL MOUNTED LINE VOLTAGE THERMOSTAT. THERMOSTAT PROVIDED BY M.C. EACH PANEL SHALL HAVE A DEDICATED THERMOSTAT.
- 2. THERMOSTAT SHALL BE LOCATED AT 4'-0" A.F.F.

- 42. MECHANICAL IDENTIFICATION:
- A. GENERAL
- ALL NEW PIPING, MECHANICAL EQUIPMENT AND VALVES SHALL BE IDENTIFIED USING EITHER PREPRINTED LABELS, COILED PLASTIC MARKERS, MANUFACTURED NAMEPLATES, OR BY USING STENCILS AND ENAMEL PAINT.
- THE IDENTIFICATION DEVICE'S CHARACTERS SIZE, COLOR, LENGTH OF COLOR FIELD, AND INSTALLED VIEWING ANGLE SHALL COMPLY WITH ANSI 13.1.
- NAMES, ABBREVIATIONS, AND OTHER DESIGNATIONS SHALL BE COORDINATED WITH OWNER IN ORDER TO BE CONSISTENT WITH ANY EXISTING IDENTIFICATION SYSTEM.
- TAGS AND LABELS SHALL BE MANUFACTURED BY MARKING SERVICES, W.H. BRADY, SETON NAME PLATE, OR EQUAL. B. PIPING
 - ALL NEW PIPING, EITHER EXPOSED OR IN AN ACCESSIBLE SPACE, SHALL BE IDENTIFIED AS TO SERVICE AND NORMAL DIRECTION OF FLOW.
 - MARKERS SHALL BE LOCATED AT A MAXIMUM OF 25 FOOT INTERVALS IN LONG STRAIGHT RUNS, AT ALL MAJOR CHANGES OF DIRECTION, AT EACH BRANCH CONNECTION, EACH RISER, ALL EQUIPMENT CONNECTIONS, NEAR EACH VALVE AND CONTROL DEVICE, AND BOTH SIDES OF A WALL OR FLOOR THROUGH WHICH A PIPE PASSES.
- AT THE OWNER'S OPTION, IDENTIFICATION MAY BE OMITTED IN ARCHITECTURALLY FINISHED AREAS. C. MECHANICAL EQUIPMENT
- EACH NEW PIECE OF MECHANICAL EQUIPMENT SHALL BE IDENTIFIED USING THE NUMBER ASSIGNED THE UNIT EITHER ON THE DRAWINGS OR BY THE OWNER. ENGRAVED METAL NAMEPLATES SHALL BE USED WHERE PEAK SURFACE TEMPERATURE WILL EXCEED 150°F, OTHERWISE ENGRAVED PLASTIC NAMEPLATES ARE ACCEPTABLE. NAMEPLATE SHALL BE 4" X 1 1/2". THE BACKGROUND SHALL BE WHITE AND TEXT SHALL BE BLACK. EACH PLATE SHALL BE ATTACHED WITH TWO CORROSION RESISTANT FASTENERS, WHERE SCREWS ARE NOT
- BOTH SURFACES SHALL BE THOROUGHLY DEGREASED AND CLEANED. TAGS SHALL ALSO INCLUDE PANEL AND CIRCUIT BREAKER DESIGNATIONS. D. VALVE TAGS
- CONTRACTOR SHALL PROVIDE A NUMBERED BRASS TAG. APPROXIMATELY 2" IN DIAMETER, CHAINED TO HAND WHEEL OF EACH VALVE, EXCEPT LOCAL STOP OR SHUTOFF VALVES TO AN ITEM OF EQUIPMENT. ATTACH TAG TO VALVE WITH NON-RUSTING "S" HOOK OF ADEQUATE SIZE. EACH TAG SHALL BE STAMPED WITH AN IDENTIFICATION NUMBER, SERVICE DESIGNATION, AND WHETHER THE VALVE IS NORMALLY-CLOSED OR NORMALLY-OPEN IN SERVICE (N.C. OR N.O.). WHERE APPLICABLE, AFTER THE ABOVE SYMBOLS, ADD "S" FOR SUPPLY AND "R" FOR RETURN PIPING.
- A VALVE SCHEDULE SHALL BE SUBMITTED FOR EACH PIPING SYSTEM. EACH SCHEDULE SHALL BE TYPED ON 8 1/2" X 11", AND SHALL LIST EACH VALVE IDENTIFICATION NUMBER AND SYSTEM ABBREVIATION AS THEY APPEAR ON THE TAG. THE SCHEDULE SHALL ALSO LIST THE VALVES SIZE, MANUFACTURER, TYPE, SERVICE, LOCATION AND WHETHER IT IS NO OR NC.
- 43. TESTING, ADJUSTING, AND BALANCING:
- GENERAL REQUIREMENTS
- THE MECHANICAL CONTRACTOR SHALL ENGAGE THE SERVICES OF AN INDEPENDENT TEST AND BALANCE AGENCY THAT SPECIALIZES IN AND WHOSE BUSINESS IS LIMITED TO THE TESTING AND BALANCING OF HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS. THE AGENCY SELECTED SHALL BE A FULLY CERTIFIED MEMBER OF THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB) OR ASSOCIATED AIR BALANCE COUNCIL (AABC).
- B. THE MECHANICAL CONTRACTOR SHALL OPERATE ALL PARTS OF THE ENTIRE HEATING. VENTILATING AND AIR CONDITIONING SYSTEM. MAKING ANY AND ALL ADJUSTMENTS AND REPAIRS. BALANCE AIR DELIVERY AT ALL OUTLETS AND VAV TERMINAL UNITS, BALANCING WATER FLOWS AT ALL PUMPS AND EQUIPMENT REQUIRING WATER, AND LEAVE THE WORK TESTED AND READY FOR OPERATION BY THE OWNER.
- C. THE M.C. SHALL CHECK OUT ALL CONTROLS AND WIRING TO INSURE THE OPERATION OF THE EQUIPMENT UNDER ALL MODES OF OPERATIONS.
- D. THE ABOVE TESTS AND ADJUSTMENTS ARE MADE TO ACCOMPLISH THE CONDITIONS AS SET FORTH IN THE DRAWINGS AND SPECIFICATIONS.
- THE MECHANICAL CONTRACTOR SHALL PROVIDE FOR APPROVAL, PRIOR TO FINAL ACCEPTANCE BY THE ARCHITECT/ENGINEER, BALANCING REPORTS. THESE REPORTS SHALL INCLUDE INDIVIDUAL AIR FLOW MEASUREMENTS AT ALL OUTLETS, TOTAL AIR QUANTITY HANDLED, INDIVIDUAL WATER FLOW AT EQUIPMENT, TOTAL WATER FLOW AT PUMPS, MOTOR AMPERAGE, AND VOLTAGE NAME PLATE DATA, ACTUAL OPERATING AMPERAGE AND VOLTAGE, AND A STATEMENT THAT THE CONTROL SYSTEM HAS BEEN CHECKED AND VERIFIED FOR OPFRATION.
- F. CONTRACTOR SHALL USE AN N.E.B.B. OR A.A.B.C. CERTIFIED BALANCING CONTRACTOR TO PERFORM THESE SERVICES.
- G. VERIFY THAT SYSTEMS ARE COMPLETE AND OPERABLE BEFORE COMMENCING WORK. ENSURE THE FOLLOWING CONDITIONS:
- START AND OPERATE ALL HVAC SYSTEMS TO ENSURE SYSTEMS ARE SAFE
- AND OPERATE PROPERLY. 2. VERIFY TEMPERATURE CONTROL SYSTEMS ARE INSTALLED COMPLETE AND
- OPERABLE.
- 3. CHECK THAT PROPER THERMAL OVERLOAD PROTECTION IS IN PLACE FOR ELECTRICAL EQUIPMENT
- 4. REPLACE ALL FILTER MEDIA AFTER CONSTRUCTION IS COMPLETED AND PRIOR TO OWNER OCCUPANCY.
- 5. ENSURE DUCT SYSTEMS ARE CLEAN OF DEBRIS.
- 6. VERIFY FANS ARE ROTATING CORRECTLY.
- 7. CHECK THAT FIRE AND VOLUME DAMPERS ARE IN PLACE AND OPEN.
- 8. ENSURE ACCESS DOORS ARE CLOSED AND DUCT END CAPS ARE IN
- 9. VERIFY AIR OUTLETS ARE INSTALLED AND CONNECTED. PERMANENTLY MARK SETTINGS OF VALVES, DAMPERS, AND OTHER ADJUSTMENT
- DEVICES ALLOWING SETTINGS TO BE RESTORED. SET AND LOCK MEMORY STOPS.
- DISRUPTED OR THAT SUCH DISRUPTION HAS BEEN RECTIFIED. LEAVE SYSTEMS IN PROPER WORKING ORDER, REPLACING BELT GUARDS, CLOSING ACCESS DOORS, CLOSING DOORS TO ELECTRICAL SWITCH BOXES, AND RESTORING THERMOSTATS TO SPECIFIED SETTINGS. AIR SYSTEM PROCEDURES
- PRIOR TO THE FINAL INSPECTION OF THE BUILDING OR PROJECT, ALL AIR Α. HANDLING AND DISTRIBUTION SYSTEMS SHALL BE ADJUSTED AS NECESSARY TO PROVIDE THE REQUIRED DESIGN SUPPLY, RETURN AND EXHAUST AIR QUANTITIES FOR EACH COMPONENT. BALANCING OF ALL SYSTEMS SHALL BE CONDUCTED UNDER CONDITIONS APPROXIMATING ACTUAL OPERATION.
- VOLUME CONTROL DEVICES SHALL BE USED TO REGULATE AIR QUANTITIES ONLY В. TO THE EXTENT THAT ADJUSTMENT DOES NOT CREATE OBJECTIONABLE AIR MOTION OR SOUND LEVELS IN EXCESS OF SPECIFIED LIMITS. FINAL MEASUREMENTS OF AIR QUANTITIES SHALL BE MADE AFTER AIR TERMINALS HAVE BEEN ADJUSTED TO PROVIDE THE OPTIMUM AIR PATTERNS.
- C. TOTAL SYSTEM AIR QUANTITIES SHALL BE VARIED BY ADJUSTMENT OF FAN SPEED OR FAN BLADE PITCH. BRANCH DUCT AIR QUANTITIES SHALL BE ADJUSTED BY BRANCH DAMPER REGULATION.
- MEASURE AIR QUANTITIES AT AIR INLETS AND OUTLETS. TRAVERSE DUCTWORK WHERE NECESSARY.

<u>REPORT</u>

- PRACTICAL A SUITABLE ADHESIVE SHALL BE USED. BEFORE APPLYING ADHESIVE
- AFTER ADJUSTMENT, TAKE MEASUREMENTS TO VERIFY BALANCE HAS NOT BEEN

- A. FOUR (4) COPIES OF THE REPORT DESCRIBED HEREIN, COVERING AIR TESTING SHALL BE SUBMITTED TO THE ARCHITECT/ENGINEER PRIOR TO FINAL ACCEPTANCE OF THE PROJECT. THE REPORT SHALL BE SIGNED BY THE CONTRACTOR TO CERTIFY THAT THE SYSTEM HAS BEEN TESTED AND BALANCED. B. THESE REPORTS SHALL INCLUDE INDIVIDUAL AIR FLOW MEASUREMENTS AT ALL
- OUTLETS, TOTAL AIR QUANTITY HANDLED, INDIVIDUAL WATER FLOW AT EQUIPMENT, TOTAL WATERFLOW AT PUMPS, MOTOR AMPERAGE AND VOLTAGE NAME PLATE DATA, ACTUAL OPERATING AMPERAGE AND VOLTAGE, AND A STATEMENT THAT THE ELECTRICAL INTERLOCK AND CONTROL SYSTEM HAS BEEN CHECKED AND VERIFIED FOR OPERATION.
- 44. OPERATING INSTRUCTIONS:
- A. CONTRACTOR SHALL PROVIDE FOUR (4) COMPLETE MANUALS IN HARDBACKED BINDERS, EACH CONTAINING ALL OPERATING, SERVICING, LUBRICATION, ETC. INFORMATION AND PARTS LISTS FOR ALL EQUIPMENT INSTALLED UNDER THIS CONTRACTOR'S CONTRACT. MATERIAL SHALL BE GROUPED TOGETHER BY TRADES, EACH ITEM MARKED WITH A TAB, AND AN INDEX SHALL BE PROVIDED. WHERE DIAGRAMS ARE TOO LARGE FOR THE BINDER, ARRANGE FOLDER POCKETS WITH REINFORCED HOLES TO HOLD FOLDED DRAWINGS. MANUALS TO BE SUBMITTED FOR APPROVAL AT LEAST THIRTY (30) DAYS BEFORE COMPLETION OF THE WORK.
- B. <u>MANUALS TO INCLUDE</u>:
 - STEP-BY-STEP PROCEDURES FOR START-UP AND SHUT-DOWN OF EACH SYSTEM AND PIECE OF EQUIPMENT.
 - 2. NORMAL EQUIPMENT OPERATING CHARACTERISTICS.
 - 3. PERFORMANCE DATA, CURVES, RATINGS.
 - 4. WIRING DIAGRAMS.
 - 5. MANUFACTURER'S DESCRIPTIVE LITERATURE.
 - 6. AUTOMATIC CONTROLS WITH DIAGRAMS AND WRITTEN DESCRIPTION OF OPERATION.
 - 7. SPARE PARTS AND REPLACEMENT LIST FOR EACH PIECE OF EQUIPMENT. 8. NAME OF SERVICE AGENCY, INSTALLER AND SUPPLIERS, AND THEIR
 - TELEPHONE NUMBERS. 9. FINAL REVIEWED SHOP DRAWINGS.
 - 10. BALANCE REPORT.
 - 11. CERTIFICATES OF TESTS AND APPROVALS.
 - 12. MECHANICAL IDENTIFICATION LISTS.
- C. EACH FAN OR EQUIPMENT ROOM SHALL HAVE ALL TEMPERATURE CONTROL DIAGRAMS APPLICABLE TO THE EQUIPMENT THEREIN PERMANENTLY SEALED TO DURABLE TRANSPARENT PLASTIC AND POSTED WHERE DIRECTED.
- D. CONTRACTOR SHALL ARRANGE FOR TECHNICAL INSTRUCTION OF THE OWNER'S MAINTENANCE PERSONNEL BY QUALIFIED INSTRUCTORS FOR SUCH TIME AS IS REASONABLY REQUIRED TO INSTRUCT THEM IN THE OPERATION AND MAINTENANCE OF ALL MECHANICAL SYSTEMS. INSTRUCTION PERIOD SHALL BE AFTER ALL SYSTEMS ARE IN OPERATION, AND HAVE BEEN TESTED, BALANCED AND ADJUSTED. <u>CONTRACTOR SHALL VIDEO ALL TRAINING SESSIONS.</u> COPY OF VIDEO SHALL BE INCLUDED WITH CLOSEOUT MATERIALS FOR FUTURE REFERENCE BY THE OWNER.
- SEE PROJECT MANUAL SECTION '017900 DEMONSTRATION AND TRAINING' FOR ADDITIONAL REQUIREMENTS.
- E. CONTRACTOR SHALL BUILD A HEAVY GAUGE SHEET METAL BOX WITH LOCK STAPLE, HINGES AND HASP, OF SUFFICIENT SIZE, 30" X 12" X 12" MINIMUM, O HOLD THE FOLLOWING ITEMS: A COMPLETE SET OF CONTRACT DRAWINGS. SPECIFICATIONS AND THE ABOVE MENTIONED MAINTENANCE BOOK. INSTALL BOX AS DIRECTED BY OWNER.

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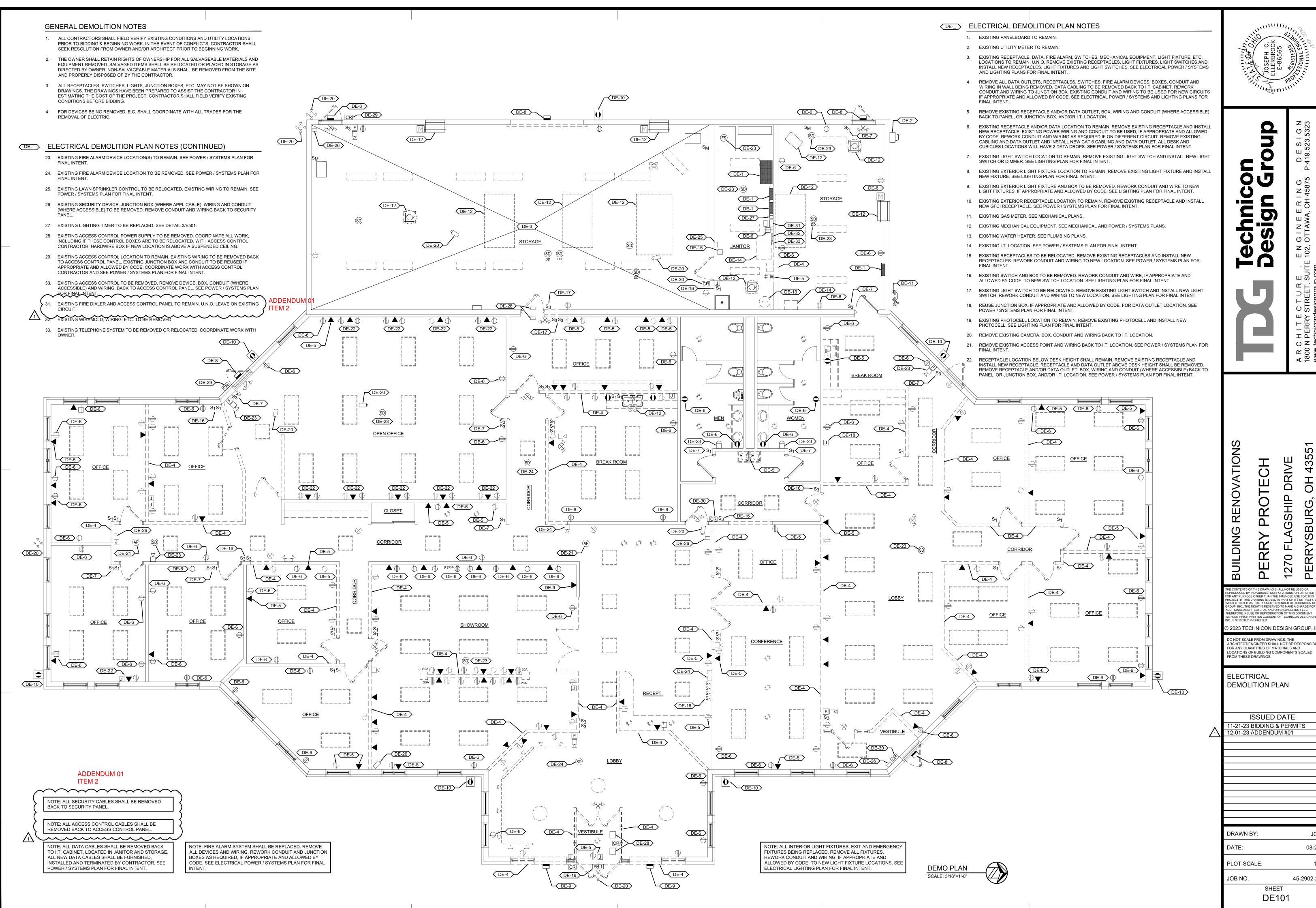
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BUILDING RENOVATIONS	PERRY PROTECH	1270 FLAGSHIP DRIVE	PERRYSBURG, OH 43551							
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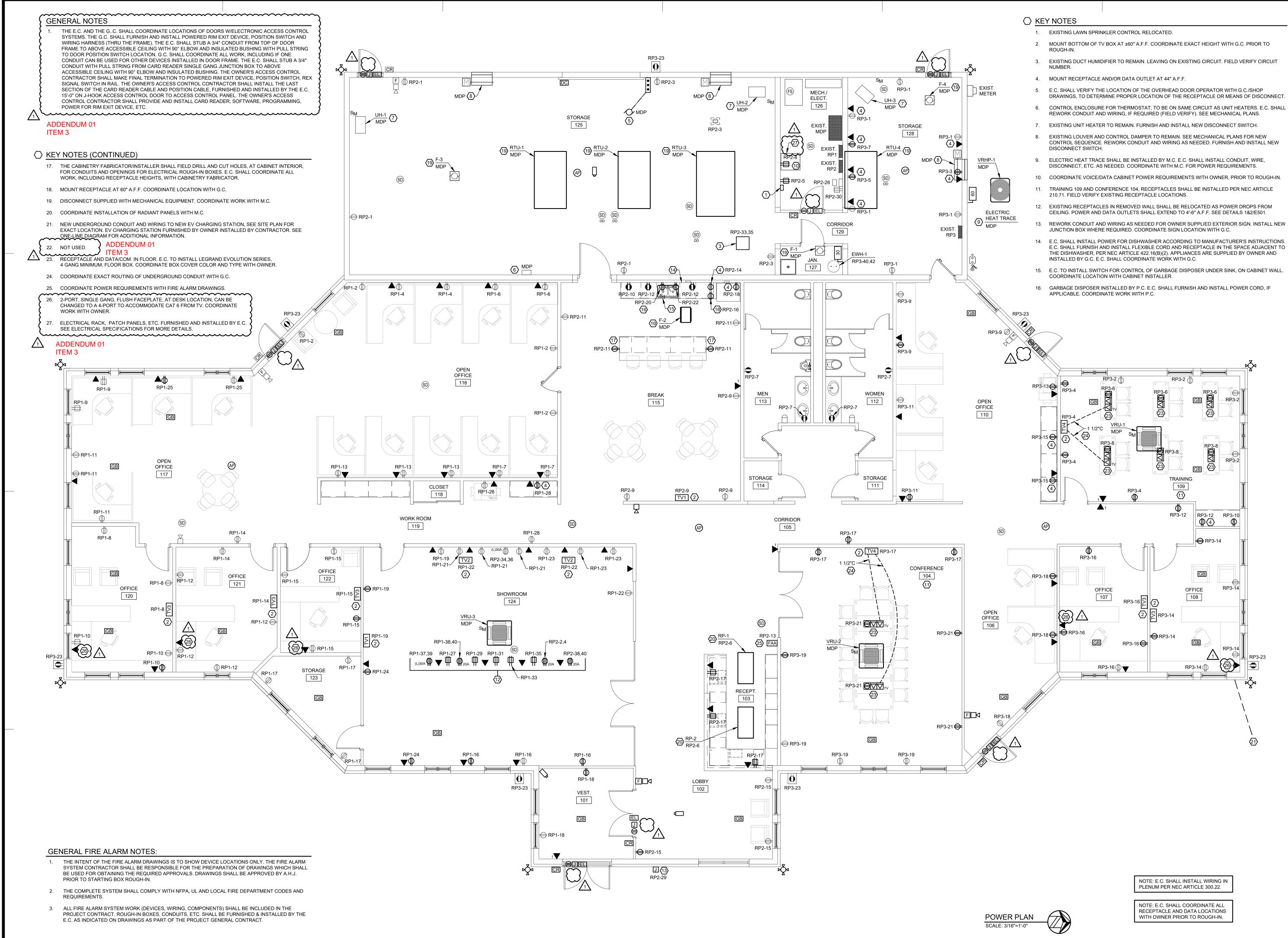
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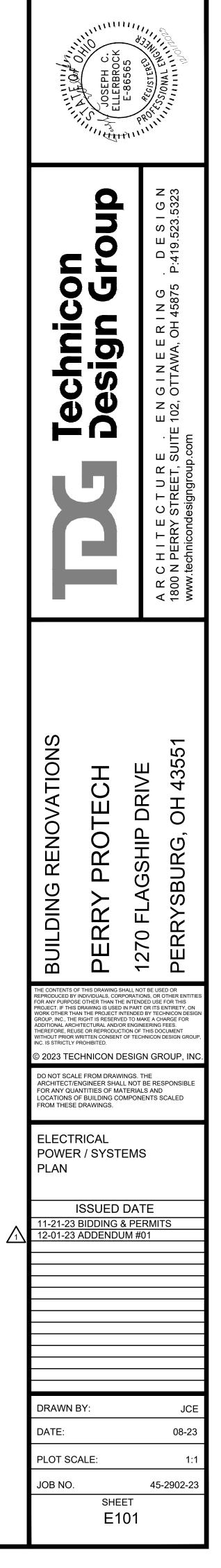
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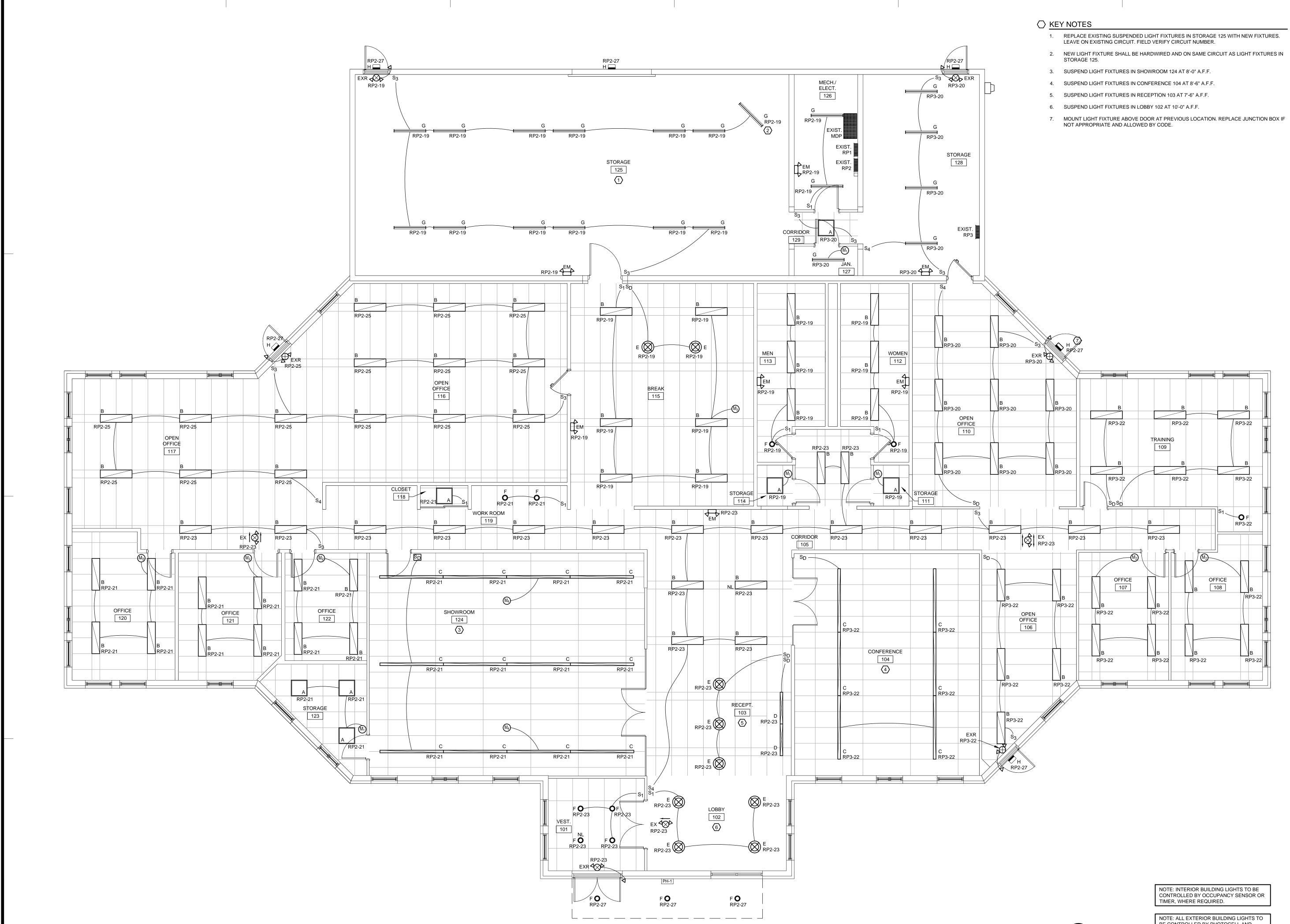
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- 2. MOUNT BOTTOM OF TV BOX AT ±60" A.F.F. COORDINATE EXACT HEIGHT WITH G.C. PRIOR TO
- EXISTING DUCT HUMIDIFIER TO REMAIN. LEAVING ON EXISTING CIRCUIT. FIELD VERIFY CIRCUIT
- 5. E.C. SHALL VERIFY THE LOCATION OF THE OVERHEAD DOOR OPERATOR WITH G.C./SHOP DRAWINGS, TO DETERMINE PROPER LOCATION OF THE RECEPTACLE OR MEANS OF DISCONNECT.
- REWORK CONDUIT AND WIRING, IF REQUIRED (FIELD VERIFY). SEE MECHANICAL PLANS. EXISTING UNIT HEATER TO REMAIN. FURNISH AND INSTALL NEW DISCONNECT SWITCH.
- EXISTING LOUVER AND CONTROL DAMPER TO REMAIN. SEE MECHANICAL PLANS FOR NEW CONTROL SEQUENCE. REWORK CONDUIT AND WIRING AS NEEDED. FURNISH AND INSTALL NEW
- ELECTRIC HEAT TRACE SHALL BE INSTALLED BY M.C. E.C. SHALL INSTALL CONDUIT, WIRE, DISCONNECT, ETC. AS NEEDED. COORDINATE WITH M.C. FOR POWER REQUIREMENTS.
- 10. COORDINATE VOICE/DATA CABINET POWER REQUIREMENTS WITH OWNER, PRIOR TO ROUGH-IN.
- CEILING. POWER AND DATA OUTLETS SHALL EXTEND TO 4'-6" A.F.F. SEE DETAILS 1&2/E501.
- REWORK CONDUIT AND WIRING AS NEEDED FOR OWNER SUPPLIED EXTERIOR SIGN. INSTALL NEW
- E.C. SHALL FURNISH AND INSTALL FLEXIBLE CORD AND RECEPTACLE IN THE SPACE ADJACENT TO THE DISHWASHER, PER NEC ARTICLE 422.16(B)(2). APPLIANCES ARE SUPPLIED BY OWNER AND
- 15. E.C. TO INSTALL SWITCH FOR CONTROL OF GARBAGE DISPOSER UNDER SINK, ON CABINET WALL.
- GARBAGE DISPOSER INSTALLED BY P.C. E.C. SHALL FURNISH AND INSTALL POWER CORD, IF







NOTE: ALL EXTERIOR BUILDING LIGHTS TO BE CONTROLLED BY PHOTOCELL AND TIMER



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GENERAL ELECTRICAL NOTES:

1. THE CONTRACTOR SHALL KEEP COPIES OF DRAWINGS MARKED IN RED TO CLEARLY INDICATE ALL CHANGES MADE AND THE EXACT LOCATIONS OF CONDUITS CONCEALED UNDER CONCRETE OR PAVING. A COPY OF THESE DRAWINGS SHALL BE SENT TO THE OWNER UPON COMPLETION OF THE JOB. THESE DRAWINGS SHALL BE MARKED AS "ELECTRICAL AS-BUILT DRAWINGS"

2. THE MINIMUM SPACING BETWEEN AND THE CLEARANCE AROUND ELECTRICAL PANELS, SAFETY SWITCHES AND CONTACTORS SHALL BE AS REQUIRED BY THE LATEST ADDITION OF THE NATIONAL ELECTRICAL CODE ARTICLE 110-26, TABLE 110-26A, CONDITIONS 2 AND 3, AS NOTED ON THE DRAWINGS OR AS REQUIRED BY LOCAL ORDINANCES.

3. CONDUCTORS SHALL BE AS FOLLOWS:

A. ALL CONDUCTORS SHALL BE COPPER STRANDED. B. ALL CONDUCTORS SHALL BE TYPE "THWN" OR "THHN" UNLESS SHOWN OR NOTED IN

SPECIFICATIONS OTHERWISE. C. CONDUCTOR COLOR CODE SHALL BE AS FOLLOWS:

120/208V BLACK PHASE A



4. ALL EQUIPMENT EXPOSED TO THE WEATHER OR WET CONDITIONS SHALL BE NEMA 4X OR NEMA 3R WHERE INDICATED.

5. INSTALL A NEATLY TYPED COPY OF THE APPLICABLE PANEL SCHEDULE INSIDE EACH PANEL DOOR AND PLACE INSIDE A PLASTIC COVER. USE PANEL SCHEDULE SHEETS AS A GUIDE.

6. ALL CONDUIT SHALL HAVE EQUIPMENT GROUND WIRE INCLUDING LIGHTING AND RECEPTACLE CIRCUITS.

7. ALL CONDUITS, APPROVED FOR DIRECT BURIAL, SHALL BE BURIED PER NEC TABLE 300.5 AND SHALL BE A MINIMUM OF 1" IN DIAMETER, UNLESS OTHERWISE NOTED.

8. SPLICES: CONDUCTORS SHALL NOT BE SPLICED EXCEPT IN OUTLETS OR JUNCTION BOXES, TROUGHS, AND GUTTERS OR WIREWAYS. JUNCTION BOXES MAY BE UTILIZED WHERE REQUIRED.

9. JUNCTION BOX TO BE SUPPORTED FROM JOISTS OR PURLINS USING BRACKETS LISTED TO MAINTAIN BOX STABILITY WITH CABLE SUSPENDED FROM IT.

10. PROVIDE BONDING FOR ALL METAL RACEWAYS THAT CONTAINS GROUNDING ELECTRODE AS PER LATEST EDITION OF THE NEC, 250-92 (3).

11. CONTRACTOR SHALL VISIT AND SURVEY THE SITE THOROUGHLY TO INSPECT CONDITIONS AFFECTING THE WORK. CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR ALL CONDITIONS INCLUDING BUT NOT LIMITED TO ACCESS AND WORK SPACE LIMITATIONS.

12. E.C. SHALL VERIFY CONDUCTOR SIZES SHOWN ARE SIZED FOR THE RUN LENGTHS FROM PANEL TO PROVIDE POWER WITHIN VOLTAGE DROP LIMITS.

13. FIELD VERIFY DIMENSIONS AND EXACT LOCATIONS OF ALL NEW MATERIALS AND COORDINATE ALL WORK WITH GENERAL CONTRACTOR AND ALL OTHER TRADES PRIOR TO FABRICATING OR INSTALLING ANY WORK.

14. ELECTRICAL CONTRACTOR SHALL COORDINATE FINAL POWER CONNECTIONS FOR ALL MECHANICAL EQUIPMENT & FABRICATING EQUIPMENT WITH THE M.C. & OWNER.

15. ALL LAMPS TO BE SUPPLIED BY FIXTURE SUPPLIER. 16. RECEPTACLE & SWITCH MOUNTING HEIGHT IS TO BOTTOM OF BOX, U.N.O., SEE PLANS & LEGENDS FOR HEIGHT.

17. ALL BREAKERS USED FOR SWITCHING SHALL BE DUTY RATED.

18. VERIFY VOLTAGE, AMPERAGE, CIRCUITS, WIRE AND CONDUIT SIZE OF ALL FIXTURES AND EQUIPMENT PRIOR TO INSTALLATION.

19. ALL UNDERGROUND GRC OR PVC CONDUIT SHALL BE INSTALLED BY E.C.. E.C. TO INSTALL PER THE LATEST ADDITION OF THE NEC REQUIREMENTS. ALL ELBOWS UP THRU SLAB SHALL BE OF GALVANIZED RIGID CONDUIT (G.R.C.)

20. VERIFY POWER LOADS AT EACH BRANCH CIRCUIT PRIOR TO INSTALLATION.

21. THE ELECTRICAL CONTRACTOR SHALL VERIFY W/ THE OWNER AND G.C. THAT THE LOCAL ZONING AUTHORITY HAS REVIEWED THE DRAWINGS FOR COMPLIANCE W/ ANY LIGHT SPILLAGE OR TRESPASSING ORDINANCES THAT MAY APPLY AT THIS LOCALITY.

22. E.C. TO REVIEW CATV RECEPTACLE (IF ANY INDICATED) & VOICE/DATA LOCATIONS W/ OWNER TO VERIFY PROPER HEIGHT & EXACT LOCATIONS BEFORE STARTING WORK.

ELECTRICAL ABBREVATIONS

UNDERGROUND CONDUIT

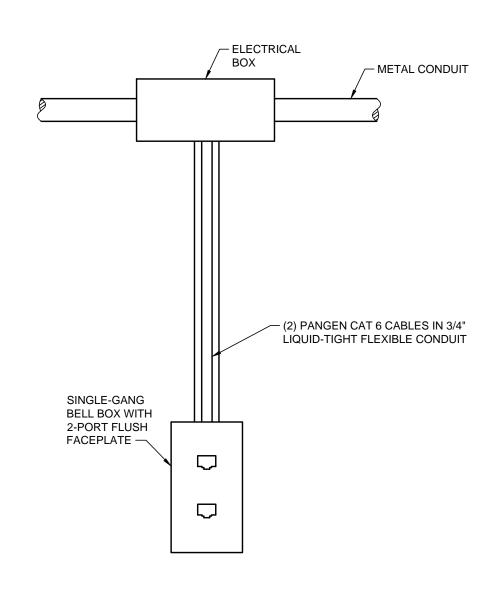
ELECTRICAL CONTRACTOR	E.C.
PLUMBING CONTRACTOR	P.C.
GENERAL CONTRACTOR	G.C.
MECHANICAL CONTRACTOR	M.C.
FIRE PROTECTION CONTRACTOR	F.P.C.
TEMPERATURE CONTROL CONTRACTOR	T.C.C.
AUTHORITY HAVING JURISDICTION	A.H.J.
ABOVE FINISHED FLOOR	A.F.F.
UNLESS NOTED OTHERWISE	U.N.O.
COVER PLATE	C.P.
SURGE PROTECTIVE DEVICE	SPD
NATIONAL ELECTRIC CODE	NEC
NIGHT LIGHT	NL
COPPER CONDUCTORS	CU
ALUMINUM CONDUCTORS	ALUM
ARC-FAULT CIRCUIT INTERRUPTER	AFCI
GROUND-FAULT CIRCUIT INTERRUPTER	GFCI
WEATHERPROOF	WP
CONCRETE MASONRY UNIT	CMU
OVERHEAD CONDUIT	

ELECTRICAL BRANCH CIRCUITS 1						
AMP/VOLT/PHASE	WIRE (CU) & CONDUIT (EMT)					
20/120/1	2 #12 THHN WIRES W/ #12 GRD. IN 1/2"C. MIN.					
20/208/1	3 #12 THHN WIRES W/ #12 GRD. IN 1/2"C. MIN.					
30/208/1	3 #10 THHN WIRES W/ #10 GRD. IN 1/2"C. MIN.					
40/208/1	3 #8 THHN WIRES W/ #10 GRD. IN 3/4"C. MIN.					
50/208/1 3 #6 THHN WIRES W/ #10 GRD. IN 3/4"C. MIN.						
208V WIRE SIZE AS NOTED OR PER AMPERAGE REQUIRED WITH GROUND, 2 POLE WIRES AS PER NEC						

	LIGHTING LEGEND								
TYPE	DESCRIPTION	MFR	MODEL	Mounting Height (A.F.F.)	COVER PLATE COLOR	V	PH	Amps	NOTES
s ₁	SINGLE POLE SWITCH	HUBBELL OR EQUAL	CS120	44" U.N.O.	WHITE	120	1	20	1
s ₃	THREE-WAY SWITCH	HUBBELL OR EQUAL	CS320	44" U.N.O.	WHITE	120	1	20	1
s ₄	FOUR-WAY SWITCH	HUBBELL OR EQUAL	CSB420	44" U.N.O.	WHITE	120	1	20	1
s _D	DIMMER SWITCH (LINE VOLTAGE)	SENSORWORX OR EQUAL	SWX-823-WH	44" U.N.O.	WHITE	120	1	6.67	1
SD	DIMMER SWITCH (LOW VOLTAGE)	SENSORWORX OR EQUAL	SWX-803-WH	44" U.N.O.	WHITE	-	-	_	1,2
(M_1)	VACANCY SENSOR (PIR)	SENSORWORX OR EQUAL	SWX-103-WH	44" U.N.O.	WHITE	120	1	6.67	1
M_2	DIMMING OCCUPANCY SENSOR (DUAL TECH)	SENSORWORX OR EQUAL	SWX-121-D-WH	44" U.N.O.	WHITE	120	1	6.67	1
M_3	OCCUPANCY SENSOR (LINE VOLTAGE, LARGE MOTION, DUAL TECH)	SENSORWORX OR EQUAL	SWX-222-2	CEILING	WHITE	120	1	6.67	
M_4	OCCUPANCY SENSOR (LOW VOLTAGE, LARGE MOTION, DUAL TECH)	SENSORWORX OR EQUAL	SWX-222-1	CEILING	WHITE	-	-	-	2
x	(X) INDICATES LIGHTING FIXTURE MARK. SEE LIGHT FIXTURE SCHEDULE			SEE PLAN					
NOTES	LEGEND								
1	VERIFY DEVICE COLOR AND/OR COVER PLATE								
2	POWER PACK SHALL BE INCLUDED WITH OCCUPANCY SENSOR(S) (SENSORWORX SWX-900-AX OR EQUAL) FOR A COMPLETE AND OPERABLE LIGHTING CONTROL SYSTEM								

INTEF	RIOR LIGHTS T-1 PH-1 EXTERIOR LIGHTS CIRCUIT RP2-31
(SEE EL	ECTRICAL LIGHTING PLAN FOR LOCATIONS)
	SYMBOL LEGEND
T-1	MULTI-PURPOSE 365 DAY DIGITAL TIME CLOCK, 120V, TORK OR EQUAL. T-1 SHALL HAVE A MINIMUM OF FOUR CHANNELS FOR SEPARATE ON-OFF TIMES OF INTERIOR AND EXTERIOR LIGHTS
PH-1	STEM MOUNTED PHOTOCELL CONTROL SWITCH W/ LIGHT LEVEL ADJUSTMENT, J-BOX MOUNTED UNDER SOFFIT, 20A., 120V., HEAV DUTY DIE CAST HOUSING, INTERMATIC OR EQUAL
NOTES:	
	MOUNT TIME CLOCK ON WALL BY ELECTRICAL PANEL (SEE PLAN) WIRE EMERGENCY LIGHTS AHEAD OF TIME CLOCK
	MER/LIGHTING CONTROL/SWITCH RISER
\sim	

			LIGHT FIXTURE SCHED	ULE						
TYPE	TYPE MARK DESCRIPTION		DESCRIPTION MFR AND MODEL MOUN			L	AMPS	COLOR	NOTES	
						V	TYPE	TEMP.	WATTAGE	NOTES
	А	2X2 LED FLAT PANEL	LITHONIA: CPX 2X2 AL07 SWW7 M4 METALUX: 22CGTS-L3C3 NICOR: TGLS2-22-U	CEILING GRID	WHITE	120	LED	4000	36W	1,4,6
	В	1X4 LED TROFFER	LITHONIA:STAKS 1X4 AL06 SWW7 METALUX: 14CZSCT3-UNV OR APPROVED EQUAL	CEILING GRID	WHITE	120	LED	4000	49W	1,4,6
	с	8' LINEAR	LITHONIA: LL8 6000LM 80CRI 40K EPD MIN10 ZT MVOLT WH CORELITE: HGL-S-UF-30L840-D-1D-UNV-STD-WAC-UM-8 OR APPROVED EQUAL	SUSPEND - SEE PLAN	WHITE	120	LED	4000	50W	1,4
X	D	LINEAR RECESSED	MARK ARCHITECTURAL: SL4L LOP 4FT FLP TG 80CRI 40K 600LMF WW MIN10 120 ZT AXIS: BBRLED-600-80-40-WW-4-W-UNV-DP-1-TB15 LEDALITE: 3908L94030QS104DE1NNNW	CEILING GRID	WHITE	120	LED	4000	24W	1,4
\bigotimes	E	METAL PENDANT	DELRAY: IL793 S W W40 L P/SR D GLIGHTING: GL-2350-SPL-NA-TS-WH-4-A-150 IMPACT ARCH. LIGHTING: P4913-40-HX-SS-WHPC-6FT	SUSPEND - SEE PLAN	SILVER	120	LED	4000	32W	1,4,7
0	F	LED RECESSED DOWNLIGHT	LITHONIA: WF6 LED 30K40K50K 90CRI HALO: HLBPH6099FS1E OR APPROVED EQUAL	RECESSED	WHITE OR BLACK	120	LED	4000	14W	1,3,5
	G	4' LED STRIPLIGHT	LITHONIA: CSS L48 AL03 MVOLT SWW3 80CRI METALUX: 4SLSTPSLC-UNV DAY-BRITE: SDS42448L8CST-UNV-DIM	SUSPEND - SEE PLAN	WHITE	120	LED	4000	42W	1,6,7
	н	LED WALL LUMINAIRE	LITHONIA: TWX2 LED AL0 40K MVOLT DDBXD LUMARK: WPMLED15S KEENE: WP60-SCT-G2-10-BZ	SURFACE - WALL	DARK BRONZE	120	LED	4000	54W	1,5,6
4⊗⊅	EX	LED EXIT/EMERGENCY FIXTURE	LITHONIA: ECBR LED M6 ISOLITE: RLP-R-U-WH-MTEB EXITRONIX: CLED-U-WH	CEILING/WALL	WHITE	120	LED	-	ЗW	1
180g	EXR	LED EXIT/EMERGENCY FIXTURE	LITHONIA: ECBR LED M6 ISOLITE: RLP-R-U-WH-MTEB EXITRONIX: CLED-U-WH	CEILING/WALL	WHITE	120	LED	-	ЗW	1,2
4_4	EM	LED EMERGENCY FIXTURE	LITHONIA: ELM2L ISOLITE: BUG-3W-WH-MB EXITRONIX: LED-52-WH	SURFACE - WALL (7'-6" A.F.F.)	WHITE	120	LED	-	1.09W	1
NOTES										
		S BY FIXTURE SUPPLIER								
			/ITH REMOTE TWIN HEADS (ERE GY T WP M12 OR COMPATIBLE SHALL BE WHITE. EXTERIOR LIGHT FIXTURES, TRIM SHALL BE	,						
		DIMMING DRIVER	STALL DE WHITE. LATERIOR LIGHT FIATURES, TRIVI SMALL DE							
-			R LUMEN OUTPUT SETTING AND/OR COLOR TEMPERATURE							
7	SEE L	IGHTING PLAN FOR MOUN	TING HEIGHT							

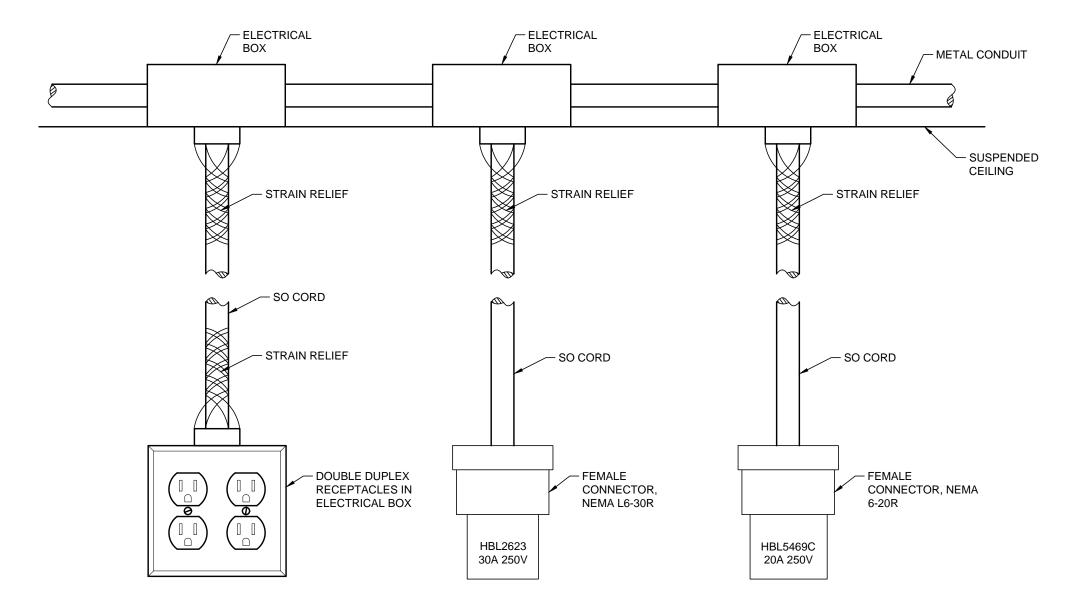


HT LEVEL SLIDE 20V., HEAVY

NOTES:

1. BOTTOM OF SINGLE-GANG BELL BOX SHALL BE 4'-6" A.F.F. U.N.O.

DATA CABLE DROP DETAIL E501 SCALE: N.T



NOTES:

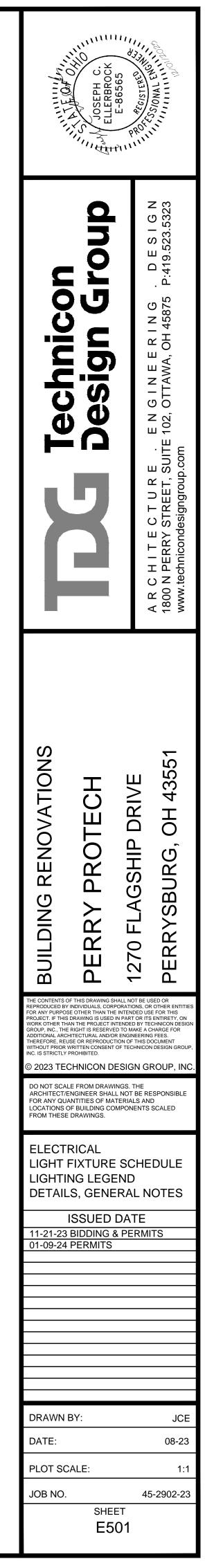
- 2. IN SHOWROOM 124: INSTALL NUMBER OF RECEPTACLES AS NOTED ON DRAWING.
- 4. BOTTOM OF ELECTRICAL BOX SHALL BE 4'-6" A.F.F U.N.O.

1. IN SHOWROOM 124: DOUBLE DUPLEX RECEPTACLES SHALL BE INSTALLED A MAXIMUM OF 3'-0", FROM CENTER LINE, APART.

3. HANGING RECEPTACLES OR FEMALE CONNECTORS SHALL BE INSTALLED IN A STRAIGHT LINE.

E501 /

POWER CABLE DROP DETAIL SCALE: N.T.S.



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	WER & DATA LEGEND	]	EXISTING ELECTRICAL PANE			LECTRICAL PANEL RP2 SCHEDULE
TYPE DESCRIPTION MFR	MODEL MOUNTING COVER PLATE V HEIGHT (A.F.F.) COLOR	PH     AMPS     NEMA     NOTES	120/208 VOLTS         AMPS         225           3 PHASE         MAIN         BREAKE	TYPE S1 R MOUNTING SURFACE	120/208 VOLTS 3 PHASE	AMPS         225         TYPE         S1           MAIN         M.L.O.         MOUNTING         SURFACE
HEAVY DUTY SAFETY SWITCH SQUARE D OR EQ	UAL	1/3R 1	4 WIRE NO BREAKER DESCRIPTION KVA A B	NEMA CABINET         1           C         KVA         DESCRIPTION         BREAKER NO	4 WIRE	NEMA CABINET     1       VA     A     B     C     KVA     DESCRIPTION     BREAKER NO
DUPLEX RECEPTACLE     HUBBELL OR EQU			1         0.00         0.72           3         30A3P *         NEW SURGE PROTECTIVE         0.00         0.36	0.72         116         RECEPTACLES         20A1P         2           0.36         116         RECEPTACLES         20A1P         4	1 20A1P 125 RECEPTACLE	0.54 2.04 1.50 0.54 2.04 1.50 124 RECEPTACLE 20A2P 2 4
FLOOR RECEPTACLE     HUBBELL OR EQU       HUBBELL OR EQU     HUBBELL OR EQU		0     1     20     2       0     1     20     2	0         0.00         0.00           5         0.00         0.00           7         20A1P         116 RECEPTACLES         0.36         0.90	0.36         0.36         116         RECEPTACLES         20A1P         6           0.54         120         RECEPTACLES         20A1P         8	5 20A1P 126 RECEPTACLE	0.36         1.86         1.50         103 RADIANT PANELS         20A1P         6           0.72         1.72         1.00         126 DATA CABINET         20A1P         8
Image: Second		$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	9         20A1P         117 RECEPTACLES         0.72         1.44           11         20A1P         117 RECEPTACLES         0.54         0.54	0.72         120 RECEPTACLES         20A1P         10           1.26         0.72         121 RECEPTACLES         20A1P         12		0.72         0.90         0.18         115         RECEPTACLES         20A1P         10           0.72         1.08         0.36         115         RECEPTACLES         20A1P         10
A Description of the second secon	UAL HBL5461 OR HBL5469C SEE PLAN - 20	3 1 20 2	13 20A1P 116 RECEPTACLES 0.54 1.08	0.54 117,121 RECEPTACLES 20A1P 14	13 20A1P FIRE ALARM PANEL C	0.60 1.60 1.00 115 RECEPT (MICROWAVE) 20A1P 14
KINSON 208V 1 PHASE 30A RECEPTACLE HUBBELL OR EQU	_	<u> </u>	15         20A1P         122 RECEPTACLES         0.90         1.44           17         20A1P         123 RECEPTACLES         0.54         19         20A1P         124 RECEPTACLES         0.54         19	0.90 0.36 101 RECEPTACLES 20A1P 18	17 20A1P 103 RECEPTACLES 1	1.08 1.68 0.60 115 RECEPT (REFRIG) 20A1P 18
GFCI RECEPTACLE HUBBELL OR EQU		$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	21         20A1P         124 RECEPTACLES         0.54         1.08	0.00         SPARE         20A1P         20           0.54         124         RECEPTACLES         20A1P         22           0.00         202         204         22         24	21 20A1P 118-124 LIGHTS 1	1.51 2.71 1.20 115 RECEPT (DISHWASHER) 20A1P 22
GFCI RECEPTACLE W/ IN-USE COVER HUBBELL OR EQU	UAL GFW20 24" CLEAR OR GRAY 12	0 1 20 2,5	23         20A1P         124 RECEPTACLES         0.54           25         20A1P         117 RECEPTACLES         0.36         1.86	0.90 0.36 124 RECEPTACLES 20A1P 24 1.50 119 COPIER/PRINTER 20A1P 26	25 20A1P 116,117 LIGHTS 0	1.42         1.42         0.00         SPARE         20A1P         24           0.82         1.00         0.18         FIRE DIALER         20A1P         26
RECESSED TV WALL BOX WITH FLUSH COVER (2 DATA, 1 RECEPT) FSR OR EQUAL	L PWB-100 SEE PLAN - 12	0 1 20 4,11	27         20A1P         124 RECEPTACLES         0.60         0.96           29         20A1P         124 RECEPTACLES         0.60         0.96	0.60 0.00 SPARE 20A1P 28 0.60 0.00 SPARE 20A1P 30	29 20A1P EXTERIOR SIGN 1	0.41         0.41         0.00         SPARE         20A1P         28           1.00         1.36         0.36         126         RECEPTACLES         20A1P         30
RECESSED TV WALL BOX WITH FLUSH COVER (2 DATA, 1 RECEPT, 1-1/4" C BELOW) FSR OR EQUAL	L PWB-100 SEE PLAN - 12	0 1 20 4,12	31         20A1P         124 RECEPTACLES         0.60         0.60           33         20A1P         124 RECEPTACLES         0.60         0.60	0.00 SPARE 20A1P 32		0.18         0.18         0.00         SPARE         20A1P         32           1.00         3.10         2.10         124 RECEPTACLE         30A2P         34
RECESSED TV WALL BOX WITH FLUSH COVER (2 DATA, 1 RECEPT, DATA TO DESK) FSR OR EQUAL	L PWB-100 SEE PLAN - 12	0 1 20 4,13	35         20A1P         124 RECEPTACLES         0.60           37         30A2P         124 RECEPTACLE         2.10         3.60	0.60 0.00 SPARE 20A1P 36 4 1.50 124 RECEPTACLE 20A2P 38	$\begin{bmatrix} 35 \\ 37 \\ 37 \\ 37 \\ 37 \\ 37 \\ 37 \\ 37 \\$	1.00         3.10         2.10         36           0.00         1.50         1.50         38
RECESSED TV WALL BOX WITH FLUSH COVER (3 DATA, 1 RECEPT, 1-1/2" C & 1" C) FSR OR EQUAL	L PWB-250-2KO-BX SEE PLAN - 12	0 1 20 4,14	39         30A2P         124 RECEPTACLE         2.10         3.60           41         20A1P         SPARE         0.00	1.50         20.11         40           0.00         0.00         SPARE         20A1P         42	39         0           41         SPACE         0	0.00         1.50         1.50         40           0.00         0.00         0.00         SPACE         42
JUNCTION BOX	- SEE PLAN & AS REQUIRED BLANK	3	SUBTOTALS         9.30         9.48           TOTAL LOAD         23.40 KVA	4.62 65 AMPS	Z ↔ SUBTOTA C ≥ TOTAL LC	ALS         10.72         12.20         10.50           DAD         33.42 KVA         93 AMPS
MOTOR -	12		NOTE *: NEW CIRCUIT BREAKER. GENERAL NOTE 1): RELOCATE CIRCUIT BREAKERS AS NEEDED	!		ERS AS NEEDED
SQUARE D OR EQ	UAL	1 - 7				
FLOOR DATA/COM. OUTLET PANDUIT	CJ688TGWH FLOOR WHITE	2,9,17	TYPE DESCRIPTION	END NOTES	EXISTING EL	LECTRICAL PANEL RP3 SCHEDULEAMPS225TYPES1
	CJ688TGWH FLOOR WHITE	2,16,17			3 PHASE 4 WIRE	MAIN M.L.O. MOUNTING SURFACE NEMA CABINET 1
A DATA/COM. OUTLET - 1 PORT PANDUIT	CJ688TGWH 44" U.N.O. WHITE	2,6,8	INTERIOR CAMERA	1,2	NO BREAKER DESCRIPTION K	VA A B C KVA DESCRIPTION BREAKER NO
Image: Constraint of the second se	CJ688TGWH 16" U.N.O. WHITE	2,6,9,17		4	3 20A1P 128 RECEPTACLES C	0.18 0.90 0.72 109 RECEPTACLES 20A1P 4
AP     WIRELESS ACCESS POINT     -	- CEILING -	10,15		5	7 20A1P 128 RECEPTACLES C	0.18         0.72         0.54         109 RECEPTACLES         20A1P         6           0.18         0.72         0.54         109 RECEPTACLES         20A1P         8
		}		5	11 20A1P 110 RECEPTACLES C	0.54         0.72         0.18         109 RECEPT (REFRIG)         20A1P         10           0.36         0.72         0.36         105,109 RECEPTACLES         20A1P         12
E.C. TO VERIFY SIZE WITH EQUIPMENT, FUSE AS NOTED OR PER MANL     E.C. TO VERIFY DEVICE COLOR AND/OR COVER PLATE WITH OWNER			GBJ     GLASS BREAK SENSOR       DC     DOOR CONTACT	6	15 20A1P 110 RECEPTACLES	1.50         2.58         1.08         108 RECEPTACLES         20A1P         14           0.36         1.26         0.90         107 RECEPTACLES         20A1P         16
3 WIRING AND/OR CONDUIT FROM J-BOX TO PANEL OR AS NOTED ON DR/ ONE NEMA 5-20R DUPLEX RECEPT. E.C. SHALL PROVIDE 3/4"C (POWER			NOTES LEGEND		19 20A1P 104 RECEPTACLES	D.72         1.26         0.54         106 RECEPTACLES         20A1P         18           D.72         1.44         0.72         110,127-129 LIGHTS         20A1P         20
WITH 90° ELBOW AND INSULATED BUSHING INSTALL WEATHER-RESISTANT GFCI RECEPTACLE IN CAST ALUMINUM E			1 CAMERA FURNISHED AND INSTALLED BY OWNER'S SECURITY CO		23 20A1P EXTERIOR RECEPTACLES 1	D.72         2.11         1.39         104,106-109 LIGHTS         20A1P         22           1.26         1.26         0.00         SPARE         20A1P         24
6 INSTALL 2 1/8" DEEP, 4 11/16" SQUARE BOX WITH 1-GANG PLASTER RING 7 HORSEPOWER RATED WITH OVERCURRENT PROTECTION (IF REQUIRED	D) AND PILOT LIGHT. SEE PLAN FOR VOLTAGE REQUIREMENT	{	INSTALL 2 1/8" DEEP, 4" SQUARE BOX WITH SINGLE GANG PLAST CABLING IF LOCATED ABOVE ACCESSIBLE CEILING. IF NOT LOCA	TED ABOVE ACCESSIBLE CEILING, INSTALL 1"C TO	27 20A1P SPARE 0	0.00         0.00         SPARE         20A1P         26           0.00         0.00         SPARE         20A1P         28
8 COMMUNICATIONS OUTLET CONSISTING OF (1) 2-PORT, SINGLE GANG, F CABLE (BLUE JACKET) ROUTED TO VOICE/DATA CABINET		[ <u>}</u>	2 ACCESSIBLE CEILING WITH 90° ELBOW AND INSULATED BUSHING COM JACK (WHITE) WITH PANGEN CAT 6 4UTP CABLE (WHITE JAC			0.00         0.00         0.00         SPARE         20A1P         30           0.00         0.00         SPARE         20A1P         32
9 COMMUNICATIONS OUTLET CONSISTING OF (1) 2-PORT, SINGLE GANG, F CABLES (BLUE JACKET) ROUTED TO VOICE/DATA CABINET	FLUSH FACEPLATE AND (2) PANDUIT CAT 6 RJ45 MINI-COM JACKS (BLU	E) WITH (2) GENSPEED CAT 6 4UTP			33 20A1P SPARE C	0.00         0.00         0.00         SPARE         20A1P         34           0.00         0.00         SPARE         20A1P         36
COMMUNICATIONS OUTLET CONSISTING OF (1) 2-PORT, SINGLE GANG, F 10 4UTP CABLES (WHITE JACKET) ROUTED TO VOICE/DATA CABINET. PROV			INSTALL OWNER PROVIDED CAMERA CORNER MOUNT. INSTALL 3 MOUNT TO TYPE-LB CONDUIT BODY. INSTALL 3/4" CONDUIT FROM	TYPE-LB CONDUIT BODY BOX TO ACCESSIBLE CEILING	<b>3</b> 7 SPACE 0	0.00 0.00 0.00 SPACE 38
CONNECTION TO WIRELESS ACCESS POINT. WIRELESS ACCESS POINT	FURNISHED BY OWNER, INSTALLED BY CONTRACTOR	} {	WITH 90° ELBOW AND INSULATED BUSHING. CONDUIT THROUGH			0.00 2.25 2.25 EWH-1 30A2P 42
COMMUNICATIONS OUTLET CONSISTING OF (1) 2-PORT, SINGLE GANG, F 4UTP CABLES (WHITE JACKET) ROUTED FROM RECESSED TV WALL BO		ITE) WITH (2) GENSPEED CAT 6	ACCESSIBLE CEILING CONSISTING OF CAT 6 RJ45 MINI-COM JACK JACKET) ROUTED TO VOICE/DATA CABINET, LOCATED IN MECH/EI		TOTAL LC	
COMMUNICATIONS OUTLET CONSISTING OF (1) 4-PORT, SINGLE GANG, F 12 4UTP CABLES (WHITE JACKET) ROUTED FROM RECESSED TV WALL BO			SECURITY CONTRACTOR			
JUNCTION BOX BELOW TV WALL BOX, MOUNT BOTTOM OF JUNCTION BO			FURNISH AND INSTALL SINGLE GANG JUNCTION BOX AND CONDU INSTALL ACCESS CONTROL CABLE (GENESIS 21965002, COLOR Y			FIRE ALARM LEGEND
COMMUNICATIONS OUTLET CONSISTING OF (1) 4-PORT, SINGLE GANG, F 13 COM JACK (BLACK) WITH (2) GENSPEED CAT 6 4UTP CABLES (WHITE JA	ACKET) ROUTED FROM RECESSED TV WALL BOX TO VOICE/DATA CAB	NET AND INSTALL (1) GENSPEED	J-HOOK ABOVE ACCESS CONTROL DOOR, TO ACCESS CONTROL 4 TERMINATIONS BY OWNER, E.C., G.C. AND OWNER SHALL COOR	PANEL, LOCATED IN MECH/ELECT 126. FINAL		Description
CAT 6 4UTP FROM TV WALL BOX TO (1) 1-PORT, SINGLE GANG, FLUSH F COMMUNICATIONS OUTLET CONSISTING OF (1) 6-PORT, SINGLE GANG, F	``````````````````````````````````````	/ <b>/</b>	AT DOORS WITH ELECTRONIC ACCESS CONTROL SYSTEMS. THE STRIKE (THROUGH DOOR FRAME) AND SHALL FURNISH AND INST	OWNER SHALL INSTALL POWER TO THE ELECTRONIC	FAA FIRE ALARM ANNUNCIATOR	
4UTP CABLES (WHITE JACKET) ROUTED FROM RECESSED TV WALL BO WITH 90° ELBOW AND INSULATED BUSHING AND 1-1/2"C FROM TV WALL	X TO VOICE/DATA CABINÈT. ALSO, FURNISH AND INSTALL 1"C TO ÀBC	VE ACCESSIBLE CEILING SPACE	SOFTWARE, PROGRAMMING, ETC.	ALL ACCESS CONTROL DEVICE WIRING, HARDWARE,	HORN AND STROBE COMBINATION - MOL	JNTED 80" A.F.F. U.N.O.
(2) GENSPEED CAT 6 4UTP CABLE (WHITE JACKET). CONTRACTOR WILL INSTALL 2 1/8" DEEP. 4 11/16" SQUARE BOX WITH 1-GANG PLASTER RING	. FURNISH, OWNER WILL INSTALL CAT 6 CABLING FROM TV WALL BOX	TO FLOOR BOX	G.C. TO FURNISH AND INSTALL. E.C. SHALL STUB 3/4" CONDUIT FI		STROBE ONLY - MOUNTED 80" A.F.F. U.N	I.O.
15         INSTALLATION, SURFACE MOUNT ON STRUCTURE ABOVE ACCESSIBLE	CEILING. PROVIDE GROMMET IN OPENING FOR CABLING	{ } }	5 CEILING WITH 90° ELBOW AND INSULATED BUSHING WITH PULL S ONE CONDUIT CAN BE USED FOR OTHER DEVICES INSTALLED IN		IEI MANUAL PULL STATION - MOUNTED 48" A SD FIRE ALARM SMOKE DETECTOR, CEILING	
COMMUNICATIONS OUTLET CONSISTING OF (1) 6-PORT, SINGLE GANG, F 4UTP CABLES (WHITE JACKET) ROUTED FROM RECESSED TV WALL BO	X TO VOICE/DATA CABINET. ALSO, FURNISH AND INSTALL 1"C TO ABC	VE ACCESSIBLE CEILING SPACE	FURNISH AND INSTALL 22/4 STRANDED UNSHIELDED CABLE FROM		SD _{DD} FIRE ALARM DUCT DETECTOR	SMOONTED
WITH 90° ELBOW AND INSULATED BUSHING AND 1-1/2"C FROM TV WALL (BLACK) WITH (2) GENSPEED CAT 6 4UTP CABLES (WHITE JACKET). COM			6 SERVICE LOOP TO ACCESS CONTROL PANEL, LOCATED IN MECH INSTALLED BY CONTRACTOR. COORDINATE WORK WITH OWNER.	ELECT 126. DEVICE TO BE FORNISHED BY OWNER,	FIRE ALARM FLOW SWITCH	
17     ADJUST WALL PLATE PART NUMBER ACCORDINGLY FOR LOCATION REC	QUIRING MORE PORTS		7 LOCATED IN MECH/ELECT 126. INSTALL CABLE IN 1"C FROM DOOI	,		
	- <u></u>		FURNISHED BY OWNER, INSTALLED BY CONTRACTOR. COORDINA	TE WORK WITH OWNER.	ADDENDUM 01 ITEM 4	
EXISTING PRIMARY ELECTRICAL SERVICE	NEW LOAD SUMMARY (N           LOAD DESCRIPTION         CONNECTED LOAD         DEMA		DENDUM 01		TTENT4	
Y	LIGHTING 9.00	125% 11.25 + 50%REST 21.35	M 4			1. E.C. SHALL PROVIDE MARKING TO WARN QUALIFIED PERSONS OF POTENTIAL ELECTRIC ARC FLASH HAZARDS PER NEC ARTICLE 110.16.
	SPACE HEATING     3.12       HVAC EQUIPMENT     65.11	100%         3.12           100%         65.11				<ol> <li>SERVICE EQUIPMENT SHALL BE FIELD MARKED WITH THE MAXIMUM AVAILABLE FAULT CURRENT. THE MARKING SHALL INCLUDE THE DATE THE FAULT CURRENT CALCULATION WAS PERFORMED PER NEC 110.24.</li> </ol>
	CONTINUOUS     66.90       NON-CONTINUOUS     4.31	125%         83.63           100%         4.31				3. EXISTING GROUNDING TO REMAIN.
		SIZING LOAD:         188.77           S LOAD (AMPS):         524				4. EXISTING CONDUIT AND WIRING TO REMAIN.
						<ol> <li>REWORK CONDUIT AND WIRING AS REQUIRED, IF APPROPRIATE AND ALLOWED BY CODE. WIRE SIZE SHOULD BE ACCEPTABLE, FIELD VERIFY.</li> </ol>
—     _{800AF}					EXISTING MDP (SIEMENS SB), 800A, 120/208V 3 PHASE, 4 WIRE	6. NEW SURGE PROTECTIVE DEVICE.
800AT/3		<b>-</b> -				7. 4#10 CU & #10 GRD - 3/4"C
					NEW NEW	8. 2#2 CU & #8 GRD - 1"C OR 2#1 AL & #6 GRD - 1-1/4"C
EXISTING SPACE	G b EXISTING b EXISTIN	- 0 30AF 0 20AF 0 30AF 0 30A	(100  A) $(100  A)$	STING AF T 250AF 250AF 225AT 225AT 225AT	) 100AF 100AT 100AT	<ol> <li>9. 2#2 CU &amp; #8 GRD - 1"C</li> <li>10. FURNISH AND INSTALL NON-FUSED DISCONNECT PER NEC ARTICLE 625.43.</li> </ol>
(1PH) (SPARE) (SPARE) (20A1 20A1 20A1 20A1 20A1	(SPARE) (SPARE)	(SPARE)				11. ONE CONDUIT MAY BE INSTALLED INSTEAD OF TWO WITH FOUR HOTS AND
3-14 -5 -5	-5 -4	(5)(1	15 -14 -5 -5 -5			ONE GROUND. IF ONE CONDUIT INSTALLED, SIZE SHALL BE A MINIMUM OF 2" AND WIRE SIZES MUST BE ADJUSTED PER NEC TABLE 310.15(B)(3)(a).
<u></u>						12. REMOVE EXISTING CIRCUIT BREAKER AND INSTALL NEW CIRCUIT BREAKER OR INSTALL IN SPARE SECTION. FIELD VERIFY EXISTING EQUIPMENT AND
					(11)	MODIFY AS NEEDED. 13. CIRCUIT BREAKER SHALL BE 30 MILLIAMP GFPE RATED.
	<u>е</u>			6 SPD		14. 2#12 CU & #12 GRD - 3/4"C
ш	1,2,3 1,2,3					15. 3#8 CU & #10 GRD - 3/4"C
	PH P	H H H H H H H H H H H H H H H H H H H	.3PH	RP3         RP1         RP2           120/208V         120/208V         120/208           3PH, 4W         3PH, 4W         3PH, 4W		
0V-1PF 20V-1F 20V-1F	HEAD 120V-1 120V-1 120V-1	20V-1F 1 208V	CA 201 CA 201 A 208V A 208V	225 AMP         225 AMP         225 AM           M.L.O.         BREAKER         M.L.O.	P (LEFT SIDE) (RIGHT SIDE)	ONE-LINE DIAGRAM GENERAL NOTES
HEAT 3A 12 1.5A 1 7.4A 1:	9.8A ' 9.8A ' 13.5A 5A 12(	F-3,4 9.3A 1 24MC/	8:19M 8:19M 330MC 330MC 330MC 330MC 330MC	FEED THRU LUGS	NEW EV CHARGER	<ul> <li>A. EXISTING PAD MOUNTED TRANSFORMER TO REMAIN.</li> <li>B. SEE LOAD SCHEDULE FOR CIRCUIT BREAKER SIZES AND QUANTITIES.</li> </ul>
						<ul> <li>B. SEE LOAD SCHEDULE FOR CIRCUIT BREAKER SIZES AND QUANTITIES.</li> <li>C. E.C. SHALL PERFORM SHORT CIRCUIT STUDY ON PROPOSED DISTRIBUTION SYSTEM. THE AIC OR SCCR OF EQUIPMENT SHALL MEET OR</li> </ul>
			1 ONE-LINE DIAGRAM			EXCEED THE CALCULATED (ISC) VALUES OF THE SHORT CIRCUIT STUDY. FIELD VERIFY EXISTING AIC OR SCCR OF EQUIPMENT.
		1	E601 SCALE: N.T.S.	1		

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NEMA	NOTES	120/208 VOLTS 3 PHASE			AMPS MAIN	225 BREA	5	TYPE Mounting Su	S1 RFACE			3	B VOLTS B PHASE		
1/3R	1	{			WIRE		•		с						4 WIRE
	2	12		REAKER		KVA 0.00	A 0.72	В			EAKER NC		1	20A1P	125 REC
	2	12	-	ΠΔ·3Ρ ^ Ι	NEW SURGE PROTECTIVE	0.00		0.36		0.36 116 RECEPTACLES 2	0A1P 4		3	20A1P	125 REC
	2	1	5		116 RECEPTACLES	0.00	0.90		0.36		0A1P 6 0A1P 8	_	5 7	20A1P 20A1P	126 REC 112,113
		1			117 RECEPTACLES	0.72	0.00	1.44			0A1P 10		9	20A1P	115 REC
	2	}			117 RECEPTACLES	0.54	1.00		1.26		0A1P 12	_	11	20A1P	115 REC
	2	}			116 RECEPTACLES 122 RECEPTACLES	0.54	1.08	1.44		,	0A1P 14 0A1P 16		13 15	20A1P 20A1P	FIRE AL
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DIVISION 26 - ELECTRICAL NOTES AND SPECIFICATIONS:

GENERAL SCOPE:

(A) THE CONTRACTOR OR E.C. REFERRED TO IN THIS SECTION SHALL BE THE ELECTRICAL CONTRACTOR. THE CONTRACTOR SHALL FURNISH ALL LABOR. MATERIALS. TOOLS AND OTHER EQUIPMENT NECESSARY TO INSTALL A COMPLETE ELECTRICAL SYSTEM IN THE BUILDING IN ACCORDANCE WITH THE DRAWINGS AND THESE SPECIFICATIONS. ALL ELECTRICAL WORK WILL COMPLY WITH THE REQUIREMENTS OF ARTICLE 27 OF OBC AND THE CURRENT ADOPTED EDITION OF THE NATIONAL ELECTRICAL CODE (NEC) NFPA 70 AND IS SUBJECT TO APPROVAL OF THE GOVERNING AGENCIES AND THE ELECTRICAL INSPECTOR ASSIGNED.

(B) ALL CONTRACTORS BIDDING THE WORK SHALL VISIT THE SITE AND ACQUAINT THEMSELVES WITH EXISTING CONDITIONS BEFORE SUBMITTING THEIR BID. AS THEY WILL BE HELD RESPONSIBLE FOR THE INSTALLATION OF THE SYSTEM COMPLETE IN EVERY DETAIL. THE CONTRACTOR SHALL VERIFY AND SECURE ALL MEASUREMENTS OF THE SITE. ALL BIDDERS SHALL REPORT ANY DISCREPANCIES TO THE ARCHITECT/ENGINEER PRIOR TO SUBMITTING THEIR BID. NO ADDITIONAL COMPENSATION WILL BE GIVEN AFTER THE BIDS HAVE BEEN SELECTED.

(C) VERIFICATION: BEFORE RUNNING ANY CONDUITS, DUCTS, PIPING, ETC., WITHIN THE BUILDING, THE CONTRACTOR SHALL ASSURE HIMSELF THAT THEY CAN BE INSTALLED AS CONTEMPLATED WITHOUT TRAPPING OR INTERFERING WITH COLUMNS. BEAMS, PIPING, FIXTURES, ETC. ANY NECESSARY MAJOR DEVIATION SHALL BE REFERRED TO THE ARCHITECT/ENGINEER FOR ADJUSTMENT BEFORE LINES ARE RUN. AT NO INCREASE IN CONTRACT PRICE, OF NECESSITY, OPENINGS, SUPPORTING STEEL, FIELD-BUILT CURBS, ELECTRICAL DATA, SPACE REQUIREMENTS, ETC., WERE DESIGNED AROUND SPECIFIC PARAMETERS. WHEN THE CONTRACTOR DETERMINES THE MAKE OF EQUIPMENT TO BE PROVIDED FOR THE JOB. IT SHALL BE HIS RESPONSIBILITY TO VERIFY AND COORDINATE UNIT DIMENSIONS WITH THE CONSTRUCTION MANAGER AND ALL OTHER INTERESTED CONTRACTORS ON THE JOB. IT SHALL ALSO BECOME THE CONTRACTOR'S RESPONSIBILITY TO CHANGE AS NECESSARY, THROUGH THE ARCHITECT/ENGINEER, ALL REQUIRED DIMENSIONS SO THAT OPENINGS, SUPPORTING STEEL CURBS. ELECTRICAL DATA. ETC., WILL FIT THE EQUIPMENT SUPPLIED, ANY ADDITIONAL COST WILL BE THE SOLE RESPONSIBILITY OF THIS CONTRACTOR. IN ADDITION, ELECTRICAL POWER, INTERLOCK AND CONTROL DIAGRAMS AND PIPING ARRANGEMENTS WERE DESIGNED AROUND ONE SPECIFIC MANUFACTURER. IF ADDITIONAL WIRING, PIPING CONTROLS, ETC., ARE REQUIRED FOR OTHER EQUIPMENT, THIS CONTRACTOR SHALL INCLUDE THE COST OF THE SAME IN HIS PRICE. DIMENSIONS, ELEVATIONS AND RELATIVE LOCATIONS OF EXISTING EQUIPMENT, SEWERS, PIPES, DUCTS, CONDUITS, ETC., IN PLACE AS SHOWN ON THE DRAWINGS, ARE TAKEN FROM AS-BUILT AND RECORD DRAWINGS AND ARE DEEMED RELIABLE ONLY IN SO FAR GENERAL LAYOUT IS CONCERNED. SUCH DIMENSIONS SHALL NOT BE USED FOR LAYOUT DRAWINGS NOR DETAILING OF COMPONENTS. THE RESPONSIBILITY FOR CHECKING IN PLACE ITEMS WILL BE THE CONTRACTORS. ALL MEASUREMENTS, THE EXACT DETERMINATION OF RELATIVE ELEVATIONS OR LOCATIONS, THE ASCERTAINING OF ACCURACY OF ALL GIVEN

ELEVATIONS AND THE OBTAINING OF ALL NECESSARY ADDITIONAL INFORMATION TO INSURE THE PROPER FIT AND COORDINATION OF ALL CONDUIT EQUIPMENT, DUCTS, AND PIPING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR, THE CONTRACTOR SHALL CAREFULLY EXAMINE THE GENERAL BUILDING PLANS AND ALL MECHANICAL PLANS AND CARRY ON HIS WORK SO AS NOT TO DELAY OR INTERFERE WITH THE WORK OF OTHER TRADES. HE SHALL OBTAIN IN WRITING FROM THE CONTRACTORS, SUCH DATA AS NECESSARY TO COORDINATE HIS WORK WITH OTHER BRANCHES.

(D) AS-BUILT DRAWINGS: THE CONTRACTOR SHALL NOTE CHANGES MADE FROM CONTRACT DRAWINGS AND SPECIFICATIONS. HE/SHE SHALL NEATLY AND CORRECTLY ENTER IN COLORED CRAYON ANY DEVIATIONS ON DRAWINGS AFFECTED AND SHALL KEEP DRAWINGS AVAILABLE FOR INSPECTION. EXTRA SET OF DRAWINGS WILL BE FURNISHED FOR THIS PURPOSE. GIVE TO OWNER AT COMPLETION AND BE MARKED "AS BUILT DRAWINGS-ELECTRICAL."

(E) CUTTING & PATCHING: PROVIDE CUTTING AND PATCHING OF ALL MATERIALS NECESSARY FOR THE INSTALLATION AS INDICATED OR SPECIFIED. NEATLY REMOVE AND LEGALLY DISPOSE OF ELECTRICAL COMPONENTS AND ITEMS NO LONGER IN USE. PROTECT THE STRUCTURE, FURNISHINGS, FINISHES AND MATERIALS ADJACENT TO THE AREA OF CUTTING AND PATCHING, PATCH EXISTING FINISHED SURFACES AND FOUIPMENT USING NEW MATERIALS AND METHODS. TO MATCH ADJACENT WORK, UTILIZING EXPERIENCED INSTALLERS. PATCHING OF FIRE RATED PARTITIONS, CEILINGS AND OTHER ASSEMBLIES SHALL MATCH THE RATING OF THE RATED BARRIER WITH MATERIALS LISTED AND IDENTIFIED FOR SUCH USE AND SHALL COMPLY WITH APPLICABLE REQUIREMENTS OF THE GENERAL TRADES SPECIFICATIONS. AS THE WORK NEARS COMPLETION, ALL CUTTING AND PATCHING SHALL BE AUTHORIZED BY THE ARCHITECT/ENGINEER PRIOR TO STARTING WORK.

(F) SUBMITTALS: PRIOR TO ORDERING ANY MATERIALS, THE CONTRACTOR SHALL SUBMIT FOR G.C. AND ARCHITECT/ENGINEER'S REVIEW, DETAILED DRAWINGS, EQUIPMENT CUT SHEETS INDICATING PHYSICAL SIZE, RATINGS, CAPACITIES, ROUGH-IN SIZES, ETC. FOR ALL MATERIALS TO BE USED UNDER THIS CONTRACT.

(G) EQUALS: WHERE THE PHRASE "OR AN APPROVED EQUAL" APPEARS, IT SHALL REFER TO THE APPROVAL OF THE ARCHITECT/ENGINEER AND/OR OWNER ON THE MATERIAL OR EQUIPMENT INVOLVED. EQUIPMENT OF SIMILAR TYPES SHALL BE ON THE SAME MANUFACTURER. EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE. WHERE THE CONTRACTOR ELECTS TO SUBSTITUTE MATERIALS OR EQUIPMENT APPROVED BY THE ARCHITECT/ENGINEER AND/OR OWNER FOR THOSE SPECIFIED. THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR ALL STRUCTURAL, MECHANICAL AND ELECTRICAL CHANGES REQUIRED FOR THE INSTALLATION OF THE SUBSTITUTED MATERIALS, AT NO ADDITIONAL COST TO THE OWNER.

(H) PERMITS: THE CONTRACTOR SHALL PROCURE ALL NECESSARY PERMITS FROM THE GOVERNING AGENCY HAVING JURISDICTION THE CONTRACTOR SHALL ARRANGE FOR ALL TESTS REQUIRED ON ANY AND ALL PARTS OF HIS WORK BY LOCAL AUTHORITIES AND PAYING ANY ADDITIONAL CHARGES INCLUDING REINSPECTION FEES. ALSO OBTAIN ALL CERTIFICATES OF INSPECTION AND APPROVAL FROM ALL REQUIRED AUTHORITIES AND THE UNDERWRITERS. UNDERWRITERS CERTIFICATES IN DUPLICATE SHALL BE FURNISHED TO THE OWNER AT THE COMPLETION OF THE PROJECT IF REQUESTED.

(I) CODES: NOTHING CONTAINED IN THESE SPECIFICATIONS OR SHOWN ON THE DRAWINGS SHALL BE SO CONSTRUED AS TO CONFLICT WITH ANY LOCAL, MUNICIPAL OR STATE LAWS OR REGULATIONS GOVERNING THE INSTALLATION OF ELECTRIC OR OTHER WORK SPECIFIED HEREIN, AND ALL SUCH ORDINANCES AND REGULATIONS, INCLUDING THE NATIONAL ELECTRIC CODE (NEC) ARE HEREBY INCORPORATED AND MADE A PART OF THESE SPECIFICATIONS. ALL SUCH REQUIREMENTS SHALL BE SATISFIED BY THE CONTRACTOR AND AT NO ADDITIONAL EXPENSE TO THE OWNER.

(J) EQUIPMENT WIRING: PROVIDE POWER WIRING CONNECTIONS AND TERMINATIONS TO EQUIPMENT PROVIDED BY OTHERS. ALL NECESSARY STARTERS AND CONTROLS WILL BE FURNISHED WITH THE EQUIPMENT UNLESS NOTED OTHERWISE. WIRING AND CONNECTIONS SHALL BE AS REQUIRED BY THE EQUIPMENT MANUFACTURER AND SHALL NOT BE PERFORMED IN A MANNER WHICH MODIFIES THE EQUIPMENT. OR DEGRADES IT'S FUNCTION OR WARRANTY. WHERE NOT FURNISHED WITH EQUIPMENT, PROVIDE A LOCAL DISCONNECT WITHIN SIGHT OF EACH MOTOR AND APPLIANCE. ALL CONTROL WIRING, DEVICES, SYSTEMS AND REQUIRED INTERLOCKS WILL BE PROVIDED BY OTHERS. FURNISH AND INSTALL POWER WIRING FOR TH AUTOMATIC POWERED DOOR OPERATORS FURNISHED COMPLETE WITH A PREWIRED CONTROL PACKAGE. POWERED DOOF REMOTE CONTROL DEVICES SHALL BE FURNISHED BY THE EQUIPMENT SUPPLIER, AND INSTALLED AND CONNECTED BY THE E C. PER THE SUPPLIER'S WIRING DIAGRAMS ALL OUTLET REQUIREMENTS AND LOCATIONS FOR THE LAUNDRY FOURIPMENT (IF ANY) SHALL BE VERIFIED WITH THE SUPPLIER PRIOR TO ROUGH-IN ELECTRICAL REQUIREMENTS OF THE ELECTRIC HEAT TRACING (FURNISHED AND INSTALLED BY OTHERS; IF ANY) SHALL BE FIELD VERIFIED AND SHALL BE PROVIDED WITH A 30 MILLIAMP GFCI TYPE BREAKER FOR THE BRANCH CIRCUIT SERVING THE HEAT TRACING.

(K) GROUNDING: GROUND AND BOND ALL METAL RACEWAYS, BOXES, FIXTURES, ENCLOSURES, ETC., PER NEC ARTICLE 250. SEPERATELY DERIVED SYSTEMS SHALL BE BONDED TO THE GROUNDING ELECTRODE SYSTEM, GROUNDING CONDUCTORS IN PVC RACEWAY SHALL BE EXTENDED TO THE BUILDING STRUCTURAL STEEL, INCOMING POINT OF THE INTERIOR METAL WATER LINE, AND SUPPLEMENTAL GROUND ROD(S). BONDING CONDUCTORS SHALL ALSO BE EXTENDED TO THE INTERIOR METAL GAS PIPING SYSTEM. INTERIOR WATER LINES, AND MAIN TELEPHONE BACKBOARD, WHERE INSTALLED, ALL FEEDERS AND BRANCH CIRCUITS SHALL INCLUDE AN INSULATED EQUIPMENT GROUNDING CONDUCTOR, ROUTED WITH THE CIRCUIT, SIZED PER NEC ARTICLE 250.122.

(L) CLOSE-OUT: CONTRACTOR SHALL PROVIDE FIELD TESTING, CHECK-OUT AND SYSTEM DEMONSTRATIONS TO G.C. AND OWNER TO ASSURE PROPER PERFORMANCE AND ADJUSTMENT OF ITEMS PROVIDED UNDER THE CONTRACT. REMOVE ALL DEBRIS CREATED BY THE ELECTRICAL WORK AND CLEAN ALL FIXTURES. PANELS, BOXES, ETC., INSIDE AND OUTSIDE, PROVIDE A BINDER WHICH INCLUDES: COPIES OF ALL SHOP DRAWINGS, MAINTENANCE PROCEDURES, OPERATION AND INSTRUCTION MANUALS, LITERATURE SUPPLIED WITH ELECTRICAL EQUIPMENT, AND A LIST OF ALL CONTRACTOR'S SUPPLIER'S NAMES, ADDRESSES AND PHONE NUMBERS, FOR ALL MATERIALS. PROVIDE INSTRUCTION TO PERSONNEL SELECTED BY THE OWNER. TO FAMILIARIZE THEM WITH THE LOCATION OF SIGNIFICANT EQUIPMENT, TRAIN THEM ON EQUIPMENT FUNCTIONS, REVIEW MAINTENANCE PROCEDURES AND COORDINATE INFORMATION AVAILABLE IN THE BINDER.

(M) CHASES & OPENINGS: THE CONSTRUCTION MANAGER WILL ARRANGE WITH OTHER SUBCONTRACTORS CHASES AND OPENINGS IN WALLS, FLOORS, CEILINGS AND PARTITIONS OF NEW CONSTRUCTION TO RECEIVE CONDUITS, DUCTS AND OTHER EQUIPMENT IN SO FAR AS IT IS POSSIBLE TO PREDETERMINE THE EXACT SIZE AND LOCATION OF SAME. THE ELECTRICAL CONTRACTOR SHALL ADVISE THE CONSTRUCTION MANAGER OF THE EXACT SIZE AND LOCATION OF ALL CHASES AND OPENINGS REQUIRED FOR THE INSTALLATION OF HIS WORK, AND SHALL CHECK THE SIZE AND LOCATION OF ALL SUCH CHASES AND OPENINGS PROVIDED BY THE CONSTRUCTION MANAGER SUBCONTRACTORS.

(N) SLEEVES: ELECTRICAL CONTRACTOR SHALL FURNISH AND PLACE ALL SLEEVES REQUIRED FOR CONDUITS AND DUCTS PASSING THROUGH FLOORS, BEAMS, WALLS AND CEILINGS BEFORE SUCH NEW GENERAL CONSTRUCTION WORK IS BUILT INTO PLACE. THE ELECTRICAL CONTRACTOR SHALL PLACE ALL INSERTS REQUIRED FOR HANGERS AND SUPPORTS. AS GENERAL CONSTRUCTION PROGRESSES, SO THAT UNNECESSARY CUTTING OF CONSTRUCTION WORK WILL BE ELIMINATED.

(O) MATERIALS: THE MATERIALS USED THROUGHOUT SHALL BE NEW, AND THE BEST OF THEIR RESPECTIVE KINDS AND SHALL BE LABELED OR LISTED BY UL WHERE SUCH STANDARDS HAVE BEEN ESTABLISHED. ALL WORK SHALL BE EXECUTED IN A NEAT AND WORKMANLIKE MANNER SKILLED IN THE PARTICULAR BRANCH OF WORK ASSIGNED TO THEM.

(P) DRAWINGS & SPECIFICATIONS: ALL ELECTRICAL WORK SHOWN ON THE DRAWINGS AND NOT SPECIFICALLY REFERRED TO IN THE SPECIFICATIONS OR VISA VERSA SHALL BE CONSIDERED A PART OF THE CONTRACT WORK. THESE SPECIFICATIONS ARE TO BE USED AS A GUIDE FOR THE QUALITY OF WORKMANSHIP AND MATERIALS, CAPACITIES, QUANTITIES, ETC., AND ARE INTENDED TO COVER ALL PARTS OF THE SYSTEM BUT THE OMISSION OF EXPRESS MENTION FITHER IN THE SPECIFICATIONS OR ON THE DRAWINGS OF ITEMS WHICH ARE OBVIOUSLY NECESSARY FOR THE PROPER FUNCTIONING OF THE SYSTEM, SHALL NOT RELIEVE THE ELECTRICAL CONTRACTOR FROM RESPONSIBILITY FOR PROVIDING SAME AND THE NECESSARY LABOR AND INSTALLATION.

(Q) DISCREPANCIES: ELECTRICAL CONTRACTOR SHALL CHECK ALL DRAWINGS INCLUDED UNDER THIS CONTRACT, AND DRAWINGS INCLUDED UNDER OTHER CONTRACTS AND SHALL REPORT TO THE CONSTRUCTION MANAGER ANY DISCREPANCIES.

(R) DISPOSAL: UPON COMPLETION OF THE WORK, ALL WASTE MATERIALS AND RUBBISH RESULTING FOR THE CONTRACT WORK SHALL BE REMOVED FROM THE BUILDING AND PREMISES AND PROPERLY DISPOSED.

(S) TESTS & INSPECTIONS: WHEN THE INSTALLATION IS REPORTED IN WRITING BY THE CONTRACTOR TO BE COMPLETE AND READY FOR ACCEPTANCE, TESTS AND INSPECTION SHALL BE MADE BY THE CONTRACTOR IN THE PRESENCE OF THE G.C. AND ARCHITECT/ENGINEER, TO ASCERTAIN WHETHER IT COMPLIES WITH THE SPECIFICATIONS AND CONTRACT, AND UPON ITS FAILURE TO DO SO, THE CONTRACTOR SHALL AT ONCE REMEDY ALL DEFECTS AND SHORTCOMINGS, AND ANY ADDITIONAL TESTS THAT MAY BE REQUIRED SHALL BE ENTIRELY AT THE CONTRACTOR'S EXPENSE. ALL OF THE TESTING WORK SHALL BE DONE WHEN AND AS DIRECTED BY THE ARCHITECT/ENGINEER BEFORE THE SYSTEM IS ACCEPTED.

(T) SCHEMATIC DRAWINGS: ELECTRICAL LAYOUTS ARE SCHEMATIC AND EXACT LOCATIONS SHALL BE DETERMINED BY STRUCTURAL AND OTHER CONDITIONS. THE CONTRACTOR SHALL MAKE MINOR CHANGES AS REQUIRED, AS LONG AS THE CHANGES ARE IN ACCORDANCE WITH NEC AND APPROVED BY THE ASSIGNED FLECTRICAL INSPECTOR, DUE TO THE SMALL SCALE OF THE DRAWINGS, IT IS NOT POSSIBLE TO INDICATE ALL CONDUITS, CONDUCTORS, FITTINGS, BOXES, SWITCHES AND SIMILAR PARTS WHICH MAY BE REQUIRED. THE DRAWINGS ARE GENERALLY INDICATIVE OF THE WORK TO BE INSTALLED. THE CONTRACTOR SHALL INVESTIGATE THE STRUCTURAL AND FINISH CONDITIONS AFFECTING THE WORK, AND ARRANGE ALL WORK ACCORDINGLY FURNISHING SUCH PARTS AND EQUIPMENT AS MAY BE REQUIRED TO MEET BUILDING CONDITIONS.

(U) LAYOUT OF WORK: THIS CONTRACTOR SHALL LAYOUT HIS WORK FROM DIMENSIONS OF ARCHITECTURAL AND STRUCTURAL DRAWINGS AND ACTUAL DIMENSIONS OF EQUIPMENT BEING INSTALLED LAYOUTS IN CONGESTED AREA SHOULD NOT BE SCALED FROM MECHANICAL AND ELECTRICAL DRAWINGS.

(V) TEMPORARY ELECTRICAL SERVICES: DURING CONSTRUCTION, ELECTRICAL CONTRACTOR SHALL ARRANGE AND PROVIDE TEMPORARY SERVICE FROM A TEMPORARY POWER SERVICE FOR LIGHTING AND POWER OUTLETS. THIS INCLUDES ALL INCIDENTALS SUCH AS LIGHT BULBS, FIXTURES, AND OTHER MISCELLANEOUS ITEMS. THE OWNER SHALL PAY ELECTRICAL DEMAND SERVICES FOR TEMPORARY SERVICE.

THEMSELVES AND NO COMPENSATION WILL BE MADE EQUIPMENT OR LABOR NOT INCLUDED.

OTHERWISE NOTED, ALL LINE VOLTAGE CIRCUITS SHALL BE STRANDED, COPPER, 600 VOLT INSULATED: (75 DEGREES C AMBIENT TEMPERATURE, ETC.).

(Y) BRANCH CIRCUITS: BRANCH CIRCUIT WIRING SHALL CORRESPOND TO THE CIRCUIT NUMBERING SHOWN ON THE PLANS, PLAN, THE QUANTITY OF THESE RUNS SHALL BE MAINTAINED AS A MINIMUM.

(Z) RENOVATIONS: REWORK THE EXISTING ELECTRICAL INSTALLATION AS REQUIRED TO ACCOMMODATE THE FINISHED AND SYSTEMS SHALL BE PERFORMED AT OFF HOURS, UNLESS SCHEDULED OTHERWISE WITH THE OWNER.

(AA) ELECTRICAL SITE WORK: COORDINATE ALL EXTERIOR WORK WITH AFFECTED UTILITIES AND THE CONSTRUCTION THE COMPLETION OF THE PROJECT.

REQUIRED, AND ADDITIONAL LABELING TO DENOTE SERVICE ENTRANCE USAGE. (CC) SUPPORTS: FURNISH AND INSTALL ALL REQUIRED MISCELLANEOUS STEEL SUPPORTS FOR MOUNTING OF PANELS,

MATERIAL AFTER INSTALLATION. PROVIDE A 4 INCH HIGH CONCRETE HOUSEKEEPING PAD FOR ALL FLOOR MOUNTED EQUIPMENT.

DESCRIPTION OF WORK

LIGHT FIXTURES. THE SYSTEM SHALL INCLUDE ALL LIGHTING FIXTURES SHOWN ON THE DRAWINGS.

POSSIBLE EQUALLY BETWEEN EACH LINE AND NEUTRAL (C) LABELS: PROVIDE AN ENGRAVED PLASTIC LAMINATE NAMEPLATES, SECURELY FASTENED TO EQUIPMENT, FOR ALL NEW PANELS, LARGE FULL BOXES, AND MAJOR COMPONENTS. NAMEPLATES SHALL BE 1" X 3", MINIMUM BLACK LETTER ON WHITE

EXCAVATION AND BACKEILL

DUCTS AND/OR WIRE FOR ELECTRICAL EQUIPMENT AS SHOWN ON THE DRAWINGS.

(C) AFTER THE UNDERGROUND DUCTS ARE INSTALLED AND TESTED, THE CONTRACTOR SHALL BACKFILL ALL EXCAVATION WITH SELECTED EARTH PLACED IN LAYERS NOT EXCEEDING 6 INCHES IN THICKNESS, WITH EACH LAYER THOROUGHLY COMPACTED. COMPACTION TO BE IN ACCORDANCE WITH COMPACTION REQUIREMENTS LISTED IN OTHER SECTIONS OF THE SPECIFICATIONS

(D) ALL SURFACES SHALL BE RESTORED TO THEIR ORIGINAL CONDITIONS, INCLUDING PAVED OR UNPAVED STREETS, ROADWAY AND TURF, TO THE SATISFACTION OF THE G.C. AND OWNER.

ELECTRICAL SYSTEM GROUNDS: POWER COMPANY THE FOLLOWING SHALL BE SOLIDLY GROUNDED: SWITCH AND PANEL BOARD ENCLOSURES, CONDUIT SYSTEM, BOXES, ETC., MOTOR FRAMEWORK, NEUTRAL LEADS OF SECONDARY SERVICE.

LIGHTING AND POWER PANELS: (A) PANELBOARDS: PANELS SHALL BE DEAD FRONT, AND EQUIPPED WITH BOLT-ON TYPE, THERMAL-MAGNETIC MOLDED CASE CIRCUIT BREAKERS AS INDICATED. UNLESS NOTED OTHERWISE, ENCLOSURES SHALL BE OF CODE GAUGE STEEL, WITH GALVANIZED TUB NOMINAL 5 75" DEEP BY 20" WIDE (NE AND NO SERIES) NEMA 1 WITH CONCEALED TRIM CLAMP DESIGN SURFACE OR FLUSH TRIM AS INDICATED, HINGED AND LOCKING DOOR, AND COPPER OR ALUMINUM BUS, AMPERE RATING AS INDICATED PANELS SHALL BEAR A UL RATING INDICATING THE MAXIMUM NUMBER OF BREAKER POLES PERMITTED PANELS EXCEEDING 42 USEABLE POLES SHALL BE PERMITTED ONLY WHERE THE MANUFACTURER'S NAMEPLATE REFLECTS THIS LISTING. PROVIDE GROUPING OF MULTI-WIRE BRANCH CIRCUITS AS REQUIRED BY NEC ARTICLE 210.4(D), WHERE LIGHTING CIRCUITS ARE CONTROLLED ONLY FROM THE PANEL BREAKERS, PROVIDE "SWITCHING DUTY" RATED BREAKERS, PROVIDE HACR, GFP AND SHUNT TRIP RATED BREAKERS WHERE NOTED OR REQUIRED. LIGHTING/RECEPTACLE PANELS SHALL BE RATED FOR 277/480 OR 120/208 VOLTS, WITH BREAKERS RATED; SQUARE D NF, NQ, OR EQUAL BY SIEMENS, ABB, OR EATON.

(B) FURNISH A NEW TYPED DIRECTORY BEHIND PLASTIC ON THE INSIDE OF EACH PANEL DOOR SHOWING "AS INSTALLED"

CIRCUIT NUMBERS, LOAD DESCRIPTIONS, A COMPLETE DESCRIPTION OF ALL OUTLETS AND FIXTURES ON EACH CIRCUIT. CIRCUIT BREAKERS

(A) ALL NEW CIRCUIT BREAKERS TO BE SAME MANUFACTURER AND TYPE AS THE PANELS. BREAKERS TO MATCH PANEL. SURGE PROTECTIVE DEVICE (SPD)

WARRANTY THE SURGE PROTECTIVE DEVICE COVERING ALL PARTS FOR A MINIMUM OF FIVE (5) YEARS.

SWITCH AND ONE SET OF DRY CONTACTS RATED AT 5A, 250VAC.

OR PANELBOARD. PROVIDE WITH FUSED SWITCH OR CIRCUIT BREAKER DISCONNECT. (D) THE PROTECTION LEVELS SHALL BE:

2. 100KA (L-N, L-G, L-L, N-G) DISTRIBUTION PANEL (DP) 3. 50KA (L-N, L-G, L-L, N-G) BRANCH PANEL

APPROVED EQUAL BY THE ENGINEER.

SAFETY SWITCHES & MOTOR STARTERS: (A) DISCONNECTS: SAFETY SWITCHES SHALL BE HEAVY DUTY, H.P. RATED, 250 OR 600 VOLTS AC RATED TO MATCH THE CIRCUIT SHOWN, WITH GROUND LUG, REJECTION STYLE FUSE CLIPS AND NEMA 1 ENCLOSURE INDOORS OR NEMA 3R ENCLOSURE OUTDOORS; AS MANUFACTURED BY SQUARE D, SIEMENS, ABB, OR EATON

(B) FUSES: FUSES SHALL BE DUAL-ELEMENT, TIME-DELAY, REJECTION STYLE, CLASS RK5 FOR FUSES UP TO 600 AMPERES; EATON BUSSMANN TYPE "FRN" (250 BOLT) OR TYPE "FRS" (600 VOLT). LARGER FUSES SHALL BE CLASS L, BOLT-IN STYLE; EATON BUSSMANN "HI-CAP". EQUAL FUSES MANUFACTURED BY MERSEN OR LITTLEFUSE, WILL BE ACCEPTABLE. PROVIDE ONE SET OF THREE SPARE FUSES FOR EACH SIZE AND TYPE INSTALLED.

WIRING DEVICES (A) DEVICES SHALL BE COMMERCIAL GRADE, COMPLETE WITH THERMOPLASTIC FACE OR HANDLE, OF THE TYPE. RATING. AND CONFIGURATION AS INDICATED ON THE DRAWINGS. DEVICES SHALL BE SUPPLIED FROM A SINGLE MANUFACTURER, WHEREVER POSSIBLE, TO STANDARDIZE ON COLOR AND REPLACEMENTS. DEVICE COLOR SHALL BE AS SELECTED BY THE ARCHITECT/ENGINEER/OWNER, TO MATCH THE BUILDING FINISHES. COVER PLATES SHALL BE SMOOTH HIGH IMPACT MATCHING PLASTIC IN OFFICE AREAS, GALVANIZED IN DAMP AREAS, AND GASKETED, FLAP-TYPE METAL "IN-USE" TYPE IN OUTDOOR AREAS. WIRING DEVICES AND COVER PLATES SHALL BE AS MANUFACTURED BY HUBBELL, LEGRAND, LEVITON, OR COOPER.

OUTLET BOXES:

(A) BOXES: FLUSH DEVICE BOXES SHALL BE DEEP, GALVANIZED, STAMPED STEEL BOXES, WITH PLASTER RINGS WHERE REQUIRED. EXPOSED DEVICE BOXES SHALL BE CAST MALLEABLE IRON TYPE FD WITH THREADED HUBS. INTERIOR PULL AND JUNCTION BOXES SHALL BE NEMA 1 GALVANIZED OR PAINTED STAMPED STEEL WITH SCREW COVERS. IN FIRE RATED WALLS AND CEILINGS, BOXES SHALL BE TWO-GANG MAXIMUM, AND CAREFULLY LOCATED TO MAINTAIN FIRE RATINGS; I.E. NO MORE THAN 100 SQUARE INCHES OF BOXES IN 100 SQUARE FEET OF WALL/CEILING WITH BOXES ON OPPOSITE SIDES OF WALL SEPARATED BY 24 HORIZONTAL INCHES MINIMUM. UNLESS WRAPPED WITH FIRE PROOFING PUTTY. SMALL EXTERIOR BOXES SHALL BE CAST TYPE WITH GASKETED COVERS, OR NEMA 4X STAINLESS STEEL FOR LARGER BOXES. FLUSH-IN-GRADE EXTERIOR BOXES SHALL BE NON-METALLIC, 12"X12"X12" MINIMUM, WITH MATCHING COVER, QUAZITE PC SERIES, SYNERTECH S SERIES, OR EQUAL

(B) BOXES FOR TELEPHONE AND CABLE TV SYSTEM (IF ANY INDICATED) SHALL BE OF TYPE APPROVED BY THE RESPECTED

(C) BOXES AT EXTERIOR OF BUILDING OR POLES SHALL BE CAST ALUMINUM, WATERTIGHT, WITH GASKETS AND BOLTED ON COVERS. BOXES FOR ALL EXTERIOR FIXTURES, EXTERIOR RECEPTACLES, ETC., MOUNTED IN EXTERIOR WALLS OF THE BUILDING OR OTHER EXTERIOR LOCATIONS SHALL BE OF WEATHER TIGHT CONSTRUCTION. INTERIOR BOXES IN FINISHED AREAS SUCH AS OFFICES, BREAK ROOMS, RESTROOMS, SALES AREAS AND SERVICE DESK SHALL BE FLUSH MOUNTED IN FINISHED AREAS UNLESS DIRECTED OTHERWISE BY THE ARCHITECT/ENGINEER, G.C. OR OWNER.

MUST BE CLOSED. ANY BOX INSTALLED WITH OPEN HOLES OTHER THAN FOR THE ENTERING CONDUIT, MUST BE REMOVED AND BE REPLACED.

(W) HIGH & LOW VOLTAGE: ALL HIGH VOLTAGE WIRING (120/208/240/480V), LOW AND HIGH VOLTAGE CONDUIT, BOXES, ETC, TO BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR. ALL SYSTEM CONTROL EQUIPMENT FOR THE HEATING AND/OR FIRE ALARM SYSTEMS SHALL BE AS NOTED OR REQUIRED IN HVAC AND/OR FIRE ALARM SPECIFICATIONS. IT IS THE RESPONSIBILITY OF THE ELECTRICAL, MECHANICAL AND FIRE ALARM CONTRACTORS TO COORDINATE THE WORK BETWEEN

(X) WIRING: FURNISH AND INSTALL ALL WIRE, TERMINATIONS AND CONNECTION DEVICES AS SHOWN OR REQUIRED. UNLESS THHN/THWN FOR CIRCUITS #14 AWG THRU #2 AWG; 90 DEGREES C THHN FOR CIRCUITS #1 AWG AND LARGER). BRANCH CIRCUIT WIRING SHALL BE #12 AWG MINIMUM. WHERE THE CIRCUIT LENGTH EXCEEDS 100 FEET, FROM THE PANEL TO THE FARTHEST DEVICE UTILIZE #10 AWG MINIMUM PHASE CONDUCTORS FOR 240 VOLT (AND LOWER) SYSTEMS SHALL BE RED, BLACK & BLUE ASSOCIATED NEUTRALS WHITE. CONNECTIONS AND TAPS FOR WIRE #4 AWG AND LARGER SHALL BE MADE WITH SOLDERLESS PRESSURE TYPE CONNECTORS AND LUGS. ALL LOW VOLTAGE CABLE SHALL BE MULTI-CONDUCTOR, COPPER, WITH WIRE SIZE, SHIELD, JACKET, COLOR-CODED INSULATION, TERMINATIONS, ETC. AS RECOMMENDED BY THE SYSTEM SUPPLIER. INSULATING AND JACKET MATERIALS SHALL BE SUITABLE FOR THE INSTALLATION ENVIRONMENT (I.E. UNDERGROUND, PLENUM, HIGH

BUT THE CONTRACTOR WILL BE PERMITTED MINOR CHANGES TO OPTIMIZE THE PIPING REQUIRED. THE QUANTITY OF CIRCUITS SHALL NOT BE REDUCED, NOR SHALL SEPARATE CIRCUITS BE COMBINED. ROUTING SHALL BE AT THE DISCRETION OF THE CONTRACTOR BUT THE INSTALLATION SHALL MEET ALL OTHER SPECIFIED CRITERIA. IN GENERAL, 1-POLE 120V, BRANCH CIRCUITS SHALL BE PROVIDED WITH A DEDICATED NEUTRAL WIRE FROM THE CIRCUIT SOURCE TO THE LOAD CONNECTION. THE AMPACITY OF BRANCH CIRCUITS ROUTED ACROSS ROOFS OR OTHERWISE EXPOSED TO SUNLIGHT, SHALL BE PROPERLY UPSIZED AS REQUIRED TO MEET THE DERATING FACTORS OF NEC ARTICLE 310.15(B)(2). WHERE "HOME RUNS" ARE SHOWN ON

OPERATING SYSTEMS AS INDICATED ON THE PLANS. NEW RACEWAYS SHALL BE CONCEALED IN FINISHED SPACES WHEREVER PRACTICALLY POSSIBLE. EXISTING BOXES AND ENCLOSURES SHALL NOT BE RENDERED INACCESSIBLE DUE TO THE NEW WORK OF ANY TRADE. PANEL DIRECTORIES IN RENOVATED AREAS SHALL BE NEATLY UPDATED INTERRUPTIONS TO EXISTING

MANAGER. PROVIDE THE EXCAVATION, BACKFILL, COMPACTION AND TESTING, NECESSARY TO INSTALL THE UNDERGROUND RACEWAYS, HANDHOLES, AND EQUIPMENT FOUNDATIONS SHOWN ON THE PLANS. ALL PAVING SHALL BE SAWCUT PRIOR TO REMOVAL. REPAIR ALL LAWNS, PLANTINGS, PAVEMENT, AND OTHER EXTERIOR FINISHES TO MATCH THE ADJACENT AREAS AT

(BB) SERVICE ENTRANCE: SELECTED PANELS OR SAFETY SWITCHES, AS INDICATED, SHALL BE UTILIZED AND BE UL RATED AS SERVICE ENTRANCE EQUIPMENT. THESE SHALL BE COMPLETE WITH AN INSULATED SOLID NEUTRAL ASSEMBLY, REMOVABLE BONDING LINK, AND GROUND LUGS FOR THE CONDUCTORS SHOWN OR REQUIRED. PROVIDE GROUNDING BUSHINGS AS

RACEWAYS, FIXTURES, CABINETS, BOXES, ETC. ALL EQUIPMENT SHALL BE RIGIDLY SUPPORTED FROM THE BUILDING STRUCTURE, WITH COMPONENTS RATED FOR TWICE THE ACTUAL LOAD OR WEIGHT. ALL INTERIOR SUPPORTS SHALL BE PAINTED STEEL STRUT WITH MATCHING FITTINGS AND HARDWARE, PLATED THREADED ROD, AND AUXILIARY STRUCTURAL STEEL. EXTERIOR SUPPORTS SHALL BE GALVANIZED STRUT WITH MATCHING FITTINGS AND STAINLESS STEEL HARDWARE. FIELD CUT GALVANIZED SUPPORTS SHALL BE COATED WITH Z.R.C. COLD GALVANIZING SPRAY OR OTHER RUST-INHIBITING

THE WORK TO BE PERFORMED UNDER THIS SECTION AND ACCOMPANYING DRAWINGS CONSISTS OF THE FOLLOWING:

(A) A COMPLETE WIRING SYSTEM FOR LIGHT AND POWER INCLUDING CABLE FROM MAIN DISTRIBUTION OR METER PANELS, SUB-PANELS, SWITCHES, PANELS FEEDERS, DUCTS, CONDUIT, BRANCH CIRCUIT WIRING TO EACH AND EVERY NEW OUTLET AS INDICATED ON THE PLANS INCLUDING THE LIGHTING UNITS ON THE EXTERIOR OF THE BUILDING AND PARKING LOT POLES WITH

(B) CIRCUITS SHALL BE SO CONNECTED TO THE PANEL BOARDS THAT THE TOTAL LOAD IS DISTRIBUTED AS NEARLY AS

(A) THE ELECTRICAL CONTRACTOR SHALL DO ALL EXCAVATING REQUIRED FOR THE INSTALLATION OF ANY UNDERGROUND

(B) UNDERGROUND DUCTS SHALL BE INSTALLED BELOW FINISH GRADE NOT LESS THAN THE REQUIREMENTS OF NEC TABLE 300.5 DUCTS SHALL BE INSTALLED AT DEPTH REQUIRED TO PROPERLY ENTER BUILDING

(A) SPD SHALL COMPLY WITH UL 1449, 4TH EDITION. INSTALLATION SHALL CONFORM TO NEC 285. THE MANUFACTURER SHALL

(B) SPD UNITS SHALL HAVE LED INDICATOR LIGHTS FOR POWER AND PROTECTION STATUS, AUDIBLE ALARM WITH SILENCING

(C) SPD UNITS SHALL BE MODULAR IN DESIGN AND REPLACEABLE WITHOUT INTERRUPTING POWER TO THE SWITCHBOARD

1. 200KA (L-N, L-G, L-L, N-G) SERVICE ENTRANCE OR MAIN DISTRIBUTION PANEL (MDP)

(E) THE SPD SHALL BE AS MANUFACTURED BY CURRENT TECHNOLOGY, LIEBERT, GENERAL ELECTRIC, SQUARE D, EATON OR

(D) ONLY SUCH HOLES IN BOXES AS ARE TO BE USED FOR THE ENTERING CONDUIT SHALL BE OPEN; ALL OTHER HOLES

(E) WHERE THE SPACE LIMITATIONS OR OTHER CONDITIONS INFLUENCE THE ARRANGEMENT AND DETAILS OF THE OUTLET, SPECIAL FORMS AND DESIGN OF OUTLET BOXES SHALL BE USED TO SECURE A PROPER, COMPLETE AND WORKMANLIKE ARRANGEMENT AT THE OUTLET.

(F) BRACKET OUTLET BOXES SHALL BE FIRMLY ANCHORED IN PLACE AND SHALL BE PROVIDED WITH FIXTURE STUDS. (G) DIAMOND EXPANSION, CINCH OR RAWL PLUG ANCHORS SHALL BE USED IN ALL CASES FOR SECURING BOXES TO BLOCK OR BRICK WALLS OR PARTITIONS.

(H) ALL OUTLET BOXES WHICH REQUIRE COVERS SHALL BE PROVIDED WITH SAME AND THEY SHALL BE OF SUCH CONSTRUCTION AND DESIGN AS TO EXACTLY FIT AND MATCH THE BOX IN WHICH THEY ARE INSTALLED.

(I) PANEL BOXES TO HAVE SEPARATE COVERS DESIGNED FOR EASY ALIGNMENT.

(J) CEILING AND WALL OUTLET BOXES GENERALLY SHALL BE 4 INCHES SQUARE OR OCTAGON WITH PLASTER RINGS AND SHALL HAVE TWO SCREW HOLES FOR MOUNTING RECEPTACLES WHEN SAME ARE SPECIFIED. GANG BOXES AND ADJUSTABLE COVERS SHALL BE USED WHERE DISSIMILAR SERVICES ARE INSTALLED.

THERMAL SWITCHES FURNISHED BY OTHER CONTRACTOR'S TO THE ELECTRICAL CONTRACTOR FOR INSTALLATION, WILL HAVE SEPARATE WALL PLATES AND MAY BE MOUNTED SEPARATELY BUT ADJACENT TO WALL SWITCHES. BOXES FOR TELEPHONE AND CABLE TV SYSTEM SHALL BE OF TYPE APPROVED BY THE RESPECTED COMPANY. LOCATION OF OUTLETS:

(A) THE APPROXIMATE LOCATION OF CEILING, SWITCH AND OTHER OUTLETS IS GIVEN ON THE DRAWINGS. THE EXACT LOCATIONS SHALL BE DETERMINED AT THE BUILDING AS THE WORK PROGRESSES.

(B) ANY OUTLET INSTALLED BY THE CONTRACTOR IN SUCH A LOCATION AS TO BE OUT OF PROPER RELATION TO BEAMS, WALLS OR OTHER DETAILS OF THE BUILDING, SHALL BE CORRECTED BY AND AT THE EXPENSE OF THE CONTRACTOR.

(C) UNLESS OTHERWISE INDICATED, OUTLET BOXES IN WALLS SHALL BE LOCATED AS INDICATED ON DRAWINGS TO BOTTOM OF BOX. IF NO ELEVATIONS ARE NOTED, THE FOLLOWING ELEVATIONS ABOVE FINISHED FLOOR: WALL SWITCHES: 44" A.F.F. MIN., EXCEPT IF HEIGHT IS NOTED ON DRAWINGS OR DIRECTED DIFFERENTLY BY OWNER, POWER RECEPTACLES: SEE SCHEDULE OR PLAN FOR HEIGHT. E.C. SHALL VERIFY ALL RECEPTACLES, SWITCHES, CONTROLS, ETC. WITH ARCHITECT/ENGINEER AND/OR OWNER FOR LOCATION AND HEIGHT PRIOR TO INSTALLATION.

(D) THESE HEIGHTS MAY BE CHANGED TO MEET BUILDING CONDITION, IN WHICH CASE THE CONTRACTOR SHALL USE NEW DIMENSIONS GIVEN HIM/HER BY THE G.C., ARCHITECT/ENGINEER AND/OR OWNER. CONDUCTORS AND FEEDERS (600V AND BELOW)

(A) CONDUCTORS FOR LIGHTING, POWER, AND RECEPTACLE CIRCUITS, AND FOR PANEL AND EQUIPMENT FEEDERS, SHALL BÉ NO. 12 AWG MINIMUM. ALL CONDUCTORS SHALL BE STRANDED COPPER, ANNEALED AND UNCOATED, IN ACCORDANCE WITH THE PHYSICAL AND ELECTRICAL PROPERTIES INDICATING IN THE ICEA STANDARDS.

(B) CONDUCTORS NO. 2 AWG AND LARGER INSTALLED IN DRY LOCATIONS SHALL HAVE 600 VOLT, 75 DEGREE C., CROSS-LINKED POLYETHYLENE XLP OR XHHW INSULATION. CONDUCTORS NO. 2 AND LARGER INSTALLED IN WET LOCATIONS OR UNDERGROUND DUCTS, SHALL HAVE 600 VOLT, 75 DEGREE C, RHW/USE TYPE INSULATION.

(C) CONDUCTORS SMALLER THAN NO. 2 AWG SHALL HAVE 600 VOLT, 75 DEGREE C, TYPE THHN/THWN OR XHHW TYPE INSULATION.

(D) ALL WIRING INSTALLED IN LIGHTING FIXTURE CHANNELS USED FOR RACEWAYS SHALL BE WIRED WITH 90 DEGREE C INSULATION ON ALL CIRCUIT WIRING WITHIN THE RACEWAYS. INSULATION MAY BE TYPE RHH OR THHN.

(E) WHERE CONDUCTORS ARE LOCATED IN AMBIENT TEMPERATURES REGULARLY EXCEEDING 60 DEGREES C, TYPE FEPB INSULATION SHALL BE USED.

(F) ALL BRANCH CIRCUIT WIRING, INCLUDING MOTOR LEADS SHALL BE NO. 12 MINIMUM. WHERE THE CIRCUIT LENGTH EXCEEDS 100 FEET (FOR 120 VOLTS). OR 200 FEET (FOR 277 VOLTS), FROM THE PANEL TO THE FARTHEST DEVICE, UTILIZE #10AWG MINIMUM OR LARGER WHERE SO INDICATED OR REQUIRED.

(G) ALL 120 VOLT CONTROL WIRING SHALL BE NO. 14 AWG MINIMUM; PROVIDE WIRING AS SPECIFIED. (H) EACH BUNDLE OF CABLE SHALL BEAR THE MAKER'S NAME AND THE UL LABEL, TOGETHER WITH THE GRADE, SIZE, LENGTH

AND MANUFACTURING DATE. SIMILAR INFORMATION SHALL BE INCLUDED ON THE INSULATION JACKET OF THE CONDUCTORS. CONDUCTORS SHALL COMPLY WITH NEC 310.

(I) ALL CONDUCTORS SHALL BE COLOR-CODED WITH A SEPARATE COLOR FOR EACH PHASE AND NEUTRAL USED CONSISTENTLY THROUGHOUT THE INSTALLATION. COLOR CODING SHALL BE IN ACCORDANCE WITH THE NEC.

(J) ALL CONDUCTOR SIZES SHOWN ON THE DRAWINGS AND HEREIN SPECIFIED ARE BASED ON COPPER. ALL CONDUCTORS SHALL BE INSTALLED TO CONFORM WITH THE NEC. ALUMINUM CONDUCTOR WILL BE PERMITTED FOR THE SERVICE CABLE FROM THE METER/C.B. TO THE ELECTRICAL PANEL ONLY.

(K) CONDUITS AND RACEWAYS: PROVIDE RACEWAYS OF MATERIAL & SIZE AS INDICATED ON DRAWINGS FOR NEW WIRING. RACEWAYS SHALL BE INSTALLED, CONCEALED WITHIN NEW AND EXISTING CONSTRUCTION, UNLESS NOTED OTHERWISE. RACEWAYS INSTALLED OUTDOORS, OR UNDERGROUND CAST IN CONCRETE, WITHIN EXTERIOR BLOCK WALLS OR EXPOSED IN UNFINISHED SPACES, SHALL BE RIGID METAL CONDUIT, SCHEDULE 40, HOT-DIPPED GALVANIZED, 3/4 INCH TRADE SIZE MINIMUM INSTALLED PER NEC 344. COMPLETE WITH THREADED FITTINGS. DOUBLE LOCK-NUTS AND BUSHINGS AT BOXES AND CABINETS. CONDUIT WITHIN INTERIOR WALLS, MOUNTED ON ROOF STRUCTURE AND NOT SUBJECT TO ABUSE, AND ABOVE SUSPENDED CEILINGS, IN TRADE SIZES 1/2 INCH THRU 2 INCH DIAMETER, SHALL BE ELECTRICAL METALLIC TUBING (EMT), INSTALLED PER NEC ARTICLE 358, COMPLETE WITH STEEL COMPRESSION OR SET-SCREW FITTINGS. IN DRY INTERIOR LOCATIONS, CONDUIT IN TRADE SIZES 2 INCH THRU 4 INCH DIAMETER, MAY BE INTERMEDIATE METAL CONDUIT, INSTALLED PER NEC ARTICLE 342, COMPLETE WITH THREADED FITTINGS. DOUBLE LOCK-NUTS AND BUSHINGS AT BOXES AND CABINETS. UNDERGROUND EXTERIOR RACEWAYS MAY BE SCHEDULE 40 PVC SIZES PER NEC ARTICLE 352, AS INDICATED ON DRAWINGS COMPLETE WITH

INSULATED GROUND WIRE, AND RGS ELBOWS WHERE RISER IS EXPOSED. PROVIDE WARNING RIBBON OR TAPE PLACED 12 INCHES ABOVE SERVICE LATERALS & BRANCH FEEDERS AND BURIED AS INDICATED IN NEC TABLE 300.5. INTERIOR UNDER-SLAB CONDUIT MAY BE SCHEDULE 40 PVC, IN TRADE SIZES 3/4 INCH THRU 3" INCH DIAMETER, COMPLETE WITH INSULATED GROUND WIRE. AND RGS ELBOWS WHERE RISER IS EXPOSED. CONNECTIONS TO RECESSED FIXTURES, AND OTHER ITEMS SUBJECT TO VIBRATION OR OCCASIONAL MOTION. SHALL BE MADE WITH FLEXIBLE METAL, ZINC-COATED STEEL CONDUIT, COMPLETE WITH STEEL FITTINGS, IN LENGTHS NOT TO EXCEED 6 FEET, INSTALLED PER NEC ARTICLE 348. FOR PUMPS, KITCHEN EQUIPMENT, OR WHERE SUBJECT TO DAMPNESS OR OILY ENVIRONMENTS, FLEXIBLE CONDUIT SHALL BE NEOPRENE JACKETED, COMPLETE WITH APPROVED FITTINGS AND MAY BE EXPOSED TO VIEW. M.C. TYPE CABLE, INSTALLED PER NEC ARTICLE 330, MAY BE USED FOR BRANCH CIRCUITS CONCEALED IN WALL CONSTRUCTION. EXPOSED CONDUIT SHALL BE FMT

(L) SURFACE METAL WIREWAY/RACEWAY SHALL BE FURNISHED AND INSTALL WHERE NOTED ON PLANS OR SPECIFICALLY PERMITTED BY THE ENGINEER FOR POWER AND/OR TELECOMMUNICATION WIRING. SURFACE METAL RACEWAYS SHALL BE INSTALLED PER NEC ARTICLE 386, RACEWAYS SHALL BE BY HUBBELL OR EQUAL PROVIDE SINGLE OR MULTI-CELL SURFACE METAL RACEWAYS FOR BRANCH CIRCUIT EXTENSIONS AND TELECOMMUNICATION WIRING MOUNT ALL RACEWAY STRAIGHT TRUE AND LEVEL AND ROUTE AS INCONSPICUOUSLY AS POSSIBLE. WHERE RUNS ARE HORIZONTAL, MOUNT TO CLEAR COUNTERTOPS, BACKSPLASH, BASE MOLDINGS, ETC.

(A) ALL SPLICING SHALL BE DONE IN OUTLET BOXES, JUNCTION BOXES, ETC. AND NOT IN CONDUIT. THE SPLICES SHALL BE MADE ACCORDING TO THE REQUIREMENTS OF THE NEC. THE CONTRACTOR SPLICES MAY BE MADE WITH SOLDERLESS CONNECTORS AND THEN INSULATED AS REQUIRED OR COVERED BY COMPOSITION INSULATION COVERS. PRESSURE CONNECTORS SHALL BE USED AT MOTOR-OPERATED EQUIPMENT AN OTHER VIBRATING EQUIPMENT.

SWITCHES AND DIMMERS: (A) AT EACH LOCAL LIGHTING WALL SWITCH INDICATED ON THE DRAWINGS, FURNISH AND INSTALL WITH PROPER GANGED FACE PLATE, FLUSH, MECHANICALLY OPERATED, QUIET OPERATING, 20 AMPERE, 120/277 VOLT SWITCH OF THE FOLLOWING OF EQUAL MAKE AS ACCEPTED BY THE ARCHITECT/ENGINEER. ACCEPTABLE EQUALS OF THE SAME GRADE OF THE SWITCHES SPECIFIED IN THE LEGEND MAY BE: HUBBELL, LEGRAND, LEVITON OR COOPER.

(B) WHERE WALL SWITCHES WITH PILOT LIGHTS ARE INDICATED OR REQUIRED, FURNISH AND INSTALL SWITCH AS SPECIFIED IN LEGEND OR EQUALED BY ABOVE WITH RED JEWEL INDICATOR.

(C) LIGHT WIRING SHALL BE POLARIZED SO THAT ONLY THE BLACK OR FUSED WIRE SHALL BE BROKEN BY A SINGLE-POLE SWITCH.

(D) ALL SWITCHES SHALL BE OF THE SAME MANUFACTURER UNLESS NOTED OTHERWISE.

(E) DIMMERS SHALL BE ROTARY OR SLIDE OPERATION AS NOTED ON LEGEND. E.C. TO VERIFY LIGHTING LOAD WITH DIMMER WATTAGE TO INSURE PROPER SIZE DIMMER IS INSTALLED. GANG DIMMERS AS RECOMMENDED BY MANUFACTURER. PROVIDE SEPARATE WALL BOXES FOR DIMMER IF LOCATED NEAR A GANG OF SWITCHES. ACCEPTABLE EQUALS OF THE SAME GRADE OF DIMMERS SPECIFIED IN THE LEGEND MAY BE: HUBBELL, SYNERGY, LEGRAND, LEVITON OR COOPER.

CONVENIENCE OUTLETS: (A) AT EACH DUPLEX RECEPTACLE NOTED 20 AMPERES, FURNISH AND INSTALL NEW RECEPTACLES W/ FACE PLATES. A 20 AMPERE FLUSH DUPLEX RECEPTACLE WITH GROUND BLADE AS PER LEGEND OR EQUAL GRADE OF THE FOLLOWING: HUBBELL, LEGRAND, LEVITON OR COOPER.

(B) ALL RECEPTACLES SHALL BE FURNISHED BY THE SAME MANUFACTURER, EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE. RECEPTACLES AND LOCAL WALL SWITCHES SHALL BE OF THE SAME MANUFACTURER.

LIGHTING FIXTURES: (A) FIXTURE NUMBERS IN THE SPECIFICATIONS HAVE BEEN TAKEN FROM THE CATALOGS OF FIXTURE MANUFACTURERS LISTED ON THE DRAWINGS. FIXTURE NUMBERS AND DESCRIPTIONS ARE INTENDED TO DENOTE A STANDARD OF QUALITY AND TYPE. FIXTURES OF OTHER MANUFACTURERS MAY BE USED. PROVIDED A COMPLETE COMPARABLE SCHEDULES IS SUBMITTED TO THE ARCHITECT/ENGINEER FOR REVIEW BEFORE PROCEEDING WITH THE ORDER.

(B) LIGHT FIXTURES: FURNISH AND INSTALL THE LIGHT FIXTURES AS INDICATED ON THE PLANS AND SCHEDULES. FIXTURES SHALL BE COMPLETE WITH LAMPS, SOCKETS, CANOPIES, SUSPENSION ACCESSORIES, REFLECTORS, BALLASTS, LENSES, LOUVERS, PLASTER FRAMES, ETC. PRISMATIC LENSES SHALL BE 100% ACRYLIC, ONE-EIGHTH INCH NOMINAL THICKNESS. ELECTRONIC LED DRIVERS AND POWER SUPPLIES SHALL BE RATED FOR LONG LIFE AND MATCHED TO THE LED ARRAY SUPPLIED. SELF-CONTAINED EMERGENCY LIGHTING UNITS SHALL INCLUDE BUILT-IN BATTERIES, CHARGER, TRANSFER RELAY; SUCH UNIT EQUIPMENT SHALL BE CONNECTED TO THE NORMAL OR NIGHT LIGHT CIRCUIT IN THE SPACE, BUT AHEAD OF ANY LOCAL SWITCHES, LIGHTING CONTACTORS OR RELAYS. FIXTURES SHALL NOT RELY ENTIRELY ON THE CEILING SUSPENSION SYSTEM FOR MOUNTING, BUT SHALL ALSO BE SUPPORTED FROM THE STRUCTURE. PROVIDE A SEPARATE POWER

CONNECTION FOR EACH FIXTURE OR CONTINUOUS AND CONTIGUOUS FIXTURE ROW (THROUGH-WIRING NOT PERMITTED) EXTERIOR FIXTURES SHALL ALSO BE PROVIDED WITH THE ANCHOR BOLTS, GROUNDING, LOW TEMPERATURE BALLASTS, ETC., AS NOTED OR REQUIRED. FIRE RATING

(A) OPENINGS AROUND CONDUITS OR IN SLEEVES FOR CONDUITS PENETRATING FIRE-RATED FLOOR SLABS, WALLS, PARTITIONS, CEILINGS, OR SMOKE PARTITIONS (IF ANY INDICATED), SHALL BE SEALED AT BOTH SIDES OF THE PENETRATION. INSULATION SHALL NOT EXTEND THROUGH SLEEVES. PACK OPENINGS WITH CALCIUM SILICATE BLOCK, DOW CORNING 3-6548 RTV SILICON FOAM. 3M CP25 CAULK, OR 303 PUTTY FIRE BARRIER SYSTEM OR MATERIAL HAVING THE SAME FIRE-RATING AS THE FLOOR OR WALL PENETRATED. FIBERGLASS IS NOT ACCEPTABLE.

SPI ICES

(A) THE CONTRACTOR GUARANTEES BY HIS ACCEPTANCE OF THE CONTRACT THAT ALL WORK WILL BE FREE FROM DEFECTS IN WORKMANSHIP AND/OR MATERIALS AND THAT ALL APPARATUS WILL DEVELOP CAPACITIES AND CHARACTERISTICS SPECIFIED FOR A PERIOD OF ONE YEAR AFTER DATE OF SUBSTANTIAL COMPLETION. SHOULD ANY DEFECTS IN WORKMANSHIP AND/OR MATERIALS REQUIRE REDESIGN OF ANY PART OF THE ELECTRICAL MECHANICAL PLUMBING OR ARCHITECTURAL LAYOUT. ALL SUCH REDESIGN AND ALL NEW DRAWINGS AND DETAILING REQUIRED THEREOF SHALL, WITH THE APPROVAL OF THE ARCHITECT/ENGINEER, BE PREPARED BY THE CONTRACTOR AT HIS OWN EXPENSE. WHERE SUCH APPROVED DEVIATION REQUIRED A DIFFERENT QUANTITY AND ARRANGEMENT OF DUCTWORK, PIPING, WIRING, CONDUIT AND/OR EQUIPMENT FROM THAT SPECIFIED OR DETAILED ON THE DRAWINGS, WITH THE APPROVAL OF THE ARCHITECT/ENGINEER, THE CONTRACTOR SHALL FURNISH AND INSTALL ALL SUCH MATERIALS AND/OR EQUIPMENT REQUIRED BY THE SYSTEM AT NO ADDITIONAL COST TO THE G.C. OR OWNER.

NEW WORK (A) UNLESS OTHERWISE NOTED, ALL WORK INDICATED THROUGHOUT THESE DRAWINGS SHALL BE CONSIDERED TO BE NEW WORK AND SHALL BE INCLUDED AS AN INTEGRAL PART OF THIS CONTRACT.

(B) CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH OTHER TRADES THE PLACEMENT OF NEW PLUMBING AND MÉCHANICAL EQUIPMENT, PIPING, DUCTWORK, METERS, AND FIXTURES TO AVOID POSSIBLE CONFLICTS. (C) E.C. IS RESPONSIBLE FOR SAW CUTTING AND PATCHING TO MATCH EXISTING.

(D) CONTRACTOR SHALL NOT INSTALL ANY WORK KNOWINGLY IN ERROR. ALL WORK SHALL BE IN ACCORDANCE WITH ALL LOCAL AND STATE CODES AND REQUIREMENTS.

TELECOMMUNICATION CABLING FOR VOICE/DATA: (A) VOICE/DATA CABLING SYSTEM: E.C. SHALL FURNISH AND INSTALL A COMPLETE SYSTEM OF RACEWAYS, RECEPTACLES, CABLING AND TERMINATIONS AS INDICATED FOR THE OWNER'S VOICE/DATA SYSTEM, INCLUDING OUTLETS, JACKS, COVER PLATES, CONDUIT AND SLEEVES. VERIFY EXISTING CONDITIONS AND IF NEEDED, PROVIDE A GROUND BAR AT THE REMOTE DATA RACK. PROVIDE A #2 GROUNDING CONDUCTOR FROM GROUND BAR TO THE NEAREST GROUNDING ELECTRODE OR THE INTERSYSTEM BONDING LUG AT THE SERVICE DISCONNECT. ALL METAL RACEWAYS STUBBED AT BACKBOARDS OR RACKS SHALL BE TERMINATED WITH BUSHINGS AND BONDED TOGETHER TO THE BUILDING GROUNDING SYSTEM. PROVIDE A PULL STRING IN EACH EMPTY RACEWAY FOR FUTURE USE. AT VOICE/DATA CABINET, EACH VOICE/DATA CABLE RUN SHALL BE PROPERLY LABELED FOR LOCATION OF WHAT ROOM THE CABLING TERMINATES. ALL LABELS SHALL BE MACHINE PRINTED. ALL VOICE/DATA CABLING, RECEPTACLES AND ASSOCIATED TERMINATION EQUIPMENT SHALL BE FURNISHED, TERMINATED, TESTED AND CERTIFIED BY E.C. PROVIDE DUST CAPS OR COVERS IN ALL RECEPTACLE JACKS. EQUIPMENT RACK (PANDUIT R4P42: 4-POST RACK, 45RU, 41.5" DEEP, #12-24 THREADED E-RAILS, BLACK) FURNISHED AND INSTALLED BY E.C. VOICE/DATA RACK CATEGORY 6 PATCH PANELS (MINIMUM QUANTITY OF 4, PANDUIT CPP48FMWBLY: MINI-COM FLUSH PATCH PANEL, 48 PORT, 2 RU, BLACK) SHALL BE FURNISHED AND INSTALLED BY E.C. VOICE/DATA JACKS (FURNISHED AND INSTALLED BY E.C.) IN EQUIPMENT RACK PATCH PANELS SHALL BE PANDUIT CJ688TGBL: MINI-COM UTP RJ45 CAT 6 TG JACK MODULE, BLACK.

CATEGORY 6 CABLES SHALL BE PRYSMIAN GROUP 6P4P24-WH-P-GCC-APCE: GENSPEED 6 CAT 6 PLENUM CABLE, WHITE, 1000FT., BOX, COLOR OF CABLE JACKET SHALL BE WHITE UNLESS SPECIFIED ELSEWHERE ON PLANS

(B) OPEN CABLING SYSTEMS: WHERE SPECIFIED HEREIN, LOW VOLTAGE CABLES SHALL BE NEATLY ROUTED "OPEN" THROUGH THE ACCESSIBLE CEILING PLENUM, OR EXPOSED ALONG STRUCTURAL ROOF STEEL MEMBERS, PARALLEL AND PERPENDICULAR TO THE BUILDING STRUCTURE. CONTRACTOR SHALL FIELD VERIFY WHERE AIR HANDLING PLENUMS ARE USED SO THAT APPROVED PLENUM RATED CABLES ARE INSTALLED. PROVIDE CABLE RUNGS. J-HOOKS. OR OTHER MEANS FOR SUPPORTING AND ORGANIZING BUNDLES OF CABLES. SEE NEC ARTICLES 725.24, 760.24, 800.24, 800.133, 820.24, AND 830.24 WHERE APPLICABLE. CABLES SHALL NOT BE SUPPORTED FROM OR BE DRAPED OVER CONDUITS, FIXTURES, PIPING, DUCT WORK, ETC. NYLON TIE WRAPS ARE NOT ACCEPTABLE FOR SUPPORTS. CABLE DROPS TO WALL MOUNTED DEVICES SHALL BE ENCLOSED IN CONDUIT SLEEVES WITH BUSHINGS AND APPROPRIATE OUTLET BOXES FOR CONCEALING CABLE CONNECTIONS.

CONTRACTOR'S QUALIFICATIONS FOR TELECOMMUNICATION CABLING: (A) CONTRACTOR MUST SUBMIT A COPY OF A BICSI (BUILDING INDUSTRY CONSULTING SERVICE INTERNATIONAL) CERTIFIED RCDD (REGISTERED COMMUNICATIONS DISTRIBUTIONS DESIGNER) CERTIFICATE OF THE INDIVIDUAL(S) WHO DESIGNS AND/OR SUPERVISES THE INSTALLATION OF THE PROPOSED WORK.

(B) THE HORIZONTAL CABLING SYSTEM IS BASED ON THE INSTALLATION OF 4-PAIR UNSHIELDED TWISTED PAIR (UTP) CATEGORY 6 DATA CABLES, CONFORMING TO APPLICABLE ANSI/EIA/TIA/BICSI STANDARDS. VENDOR MUST INSTALL CABLE TRAY TO SUPPORT NEW CABLING AND J-HOOKS AS REQUIRED IN ACCORDANCE WITH ANSI/EIA/TIA/BICSI STANDARDS.

(C) ALL CABLES SHALL BE PERMANENTLY LABELED AT BOTH THE PATCH PANEL AND THE COMMUNICATIONS OUTLET. THE LABELING SHALL CONSISTENTLY ADHERE TO THE FOLLOWING SCHEME: ALL LABELING AT THE JACK SHALL DESIGNATE CLOSET, PATCH PANEL, AND PORT #. EXAMPLE: MDF-A1 INDICATES MDF, FIRST PATCH PANEL, FIRST PORT. MDF-B24 INDICATES MDF, SECOND PATCH PANEL, 24TH PORT. ALL FACE PLATES SHALL BE PERMANENTLY LABELED REFERENCING THE CABLES LANDING IN THE FACE PLATE.

TESTING AND CERTIFICATION FOR TELECOMMUNICATION CABLING:

(A) TESTING FIBER OPTIC AND COPPER DISTRIBUTION SYSTEMS IS CRUCIAL IN ASSURING THE OVERALL INTEGRITY AND SATISFACTORY PERFORMANCE OF THE NETWORK. TEST RESULTS QUANTIFY SYSTEM QUALITY, IDENTIFY SYSTEM FAULTS, AND ESTABLISH THE BASELINE ACCOUNTABILITY PERFORMANCE OF THE SYSTEM. PROPER TESTING ALSO MAXIMIZES THE LONGEVITY OF THE SYSTEM, MINIMIZES DOWNTIME AND MAINTENANCE, AND FACILITATES SYSTEM UPGRADES OR RECONFIGURATIONS.

(B) THE CONTRACTOR SHALL TEST, FULLY DOCUMENT, AND PROVIDE PROOF OF COMMUNICATIONS WIRING SYSTEMS CERTIFICATION.

(C) EACH COMMUNICATION OUTLET TESTED SHOULD INCLUDE THE PATCH PANEL, DEVICE JACK, AND ALL CABLE CONNECTING THEM.

(D) TESTING MUST INCLUDE COMPLETE, UNMODIFIED CAT6 TESTING PARAMETERS, INCLUDING BUT NOT LIMITED TO:

COPPER TESTING LENGTH

WARRANTY

- DELAY AND DELAY SKEW
- IMPEDANCE (TDR) RESISTANCE

ELFEXT LOSS

- CAPACITANCE ATTENUATION
- NEAR END CROSS TALK (NEXT) LINE MAPPING
- RETURN LOSS

PSNEXT (POWER SUM NEAR-END CROSS TALK LOSS) PSELFEXT (POWER SUM EQUAL LEVEL FAR-END CROSS TALK LOSS)

(A) FAILURE OF VENDOR TO PROVIDE THESE FULL TEST RESULTS WILL RESULT IN DELAY OF PAYMENT UNTIL FULL TEST RESULTS ARE PROVIDED.

LOCAL AREA NETWORK (LAN) HORIZONTAL WIRING SPECIFICATIONS:

(A) THIS SECTION COVERS THE CABLE FROM THE COMMUNICATIONS OUTLET TO THE PATCH PANEL IN THE IDF OR MDF. EACH CABLE SHALL BE PLACED IN A "POINT-TO-POINT" FASHION FROM THE COMMUNICATION OUTLET TO THE WIRING CLOSET FOR EACH COMMUNICATIONS OUTLET NEEDED. THERE SHALL BE NO INTERMEDIATE SPLICES OR CROSS CONNECTS IN THESE CABLES. THE VENDOR MAY USE ANY PULL CORDS PROVIDED BY THE ELECTRICAL CONTRACTOR IN ANY CONDUITS DESIGNATED FOR NETWORK AND VOICE CABLING, IN WHICH CASE THE VENDOR IS TO BRING NEW PULL CORDS THROUGH THE CONDUITS WITH THE CABLING FOR FUTURE USE.

THE CHARACTERISTICS OF THE HORIZONTAL CABLE ARE AS FOLLOWS:

CATEGORY 6 CABLING

(A) CATEGORY 6 AS SPECIFIED, CABLE CONSISTING OF FOUR PAIR OF 24 AWG BARE SOLID COPPER CONDUCTORS INSULATED WITH A PLENUM-RATED MATERIAL SHALL BE USED FOR DATA CABLING.

(B) UNLESS SPECIFIED OTHERWISE BELOW, CABLE MUST BE WHITE IN COLOR AND DATA JACKS AT FACE PLATE MUST BE WHITE IN COLOR AND ALL DATA JACKS ON THE PATCH PANEL MUST BE BLACK IN COLOR.

(C) ALL CABLING SHALL BE PLENUM GRADE.

(D) THE CABLING SHALL MEET OR EXCEED ALL APPLICABLE EIA/TIA/BICSI STANDARDS.

(E) ALL FACE PLATES SHOULD BE WHITE.

(F) EXISTING DATA CONDUIT OR J-HOOKS FROM HALLWAY INTO ROOMS MAY BE USED BY VENDOR IF AVAILABLE. WHERE NOT AVAILABLE, VENDOR IS RESPONSIBLE FOR J-HOOKS FROM HALLWAY INTO ROOM TO DATA DROP LOCATION.

(G) VENDOR PROVIDED CABLE TRAY SHALL BE USED TO SUPPORT ALL DATA CABLING IN HALLWAYS. WIRELESS ACCESS POINT DATA LOCATIONS:

(A) TWO CATEGORY 6 CABLES SHALL BE USED FOR EACH WIRELESS ACCESS POINT LOCATION, TERMINATED IN A BISCUIT JACK OR SIMILAR ENCLOSURE ABOVE CEILING. CABLING SHALL BE WHITE IN COLOR. DATA JACKS IN PATCH PANEL SHALL BE BLACK IN COLOR.

(B) FOR CLARITY IN DETERMINING CABLE COUNTS, IN APPENDICES, WIRELESS ACCESS POINT DATA LOCATIONS ARE SPECIFIED AT TWO DATA DROPS PER INDIVIDUAL LOCATION.

(C) DATA OUTLET AT CEILING MUST BE LABELED AS PER NORMAL LABELING SCHEME. PATCH PANEL OUTLET MUST BE LABELED WITH WIRELESS ACCESS POINT NUMBER SPECIFIED FOR LOCATION, NUMBERS TO BE PROVIDED TO CONTRACTOR BY

PATCH PANELS & CABLING STANDARD:

(A) PATCH PANELS SHALL BE CATEGORY 6 MATCHING THE DATA CABLING SPECIFICATION, AND SHALL USE MODULAR JACKS, SIZED IN 48-PORT LAYOUTS OR MULTIPLES THEREOF. (B) THE TERMINATION HARDWARE WILL BE CO-LOCATED ON 19-INCH RACKS OR IN 19-INCH DATA CABINETS IN THE MDF WITH

THE OWNER-SUPPLIED LAN SWITCHES. CONSULT OWNER FOR CONFIGURATION OF THE PATCH PANELS SHOULD BE IN AN ARRANGEMENT THAT MINIMIZES PATCH CORD LENGTHS.

(C) VELCRO TIES AND NOT ZIP TIES ARE TO BE USED TO BUNDLE CABLES.

(D) HORIZONTAL CABLES FROM THE MDF/IDF TO THE DATA OUTLETS IN THE BUILDING SHALL BE WIRED TO THE EIA 568B WIRING STANDARD FOR CAT6 RESPECTIVELY.

SYSTEM DOCUMENTATION OF TELECOMMUNICATION CABLING:

(A) SYSTEM VERIFICATION AND ACCEPTANCE DOCUMENTATION SIGNED AND DATED BY THE INSTALLER (CONTRACTOR) AND THE DESIGN PROFESSIONAL SHALL BE PROVIDED. THIS DOCUMENTATION SHALL INCLUDE TEST MEASUREMENTS AND SYSTEM CALIBRATIONS PERFORMED FOR THE ENTIRE SYSTEM, SAMPLE SYSTEM OPERATIONS SHALL ALSO BE PERFORMED WITH CONTRACTOR PROVIDED TEST EQUIPMENT AND DOCUMENTED TO VERIFY THAT THE SYSTEM IS OPERATIONAL AND READY FOR ACCEPTANCE.

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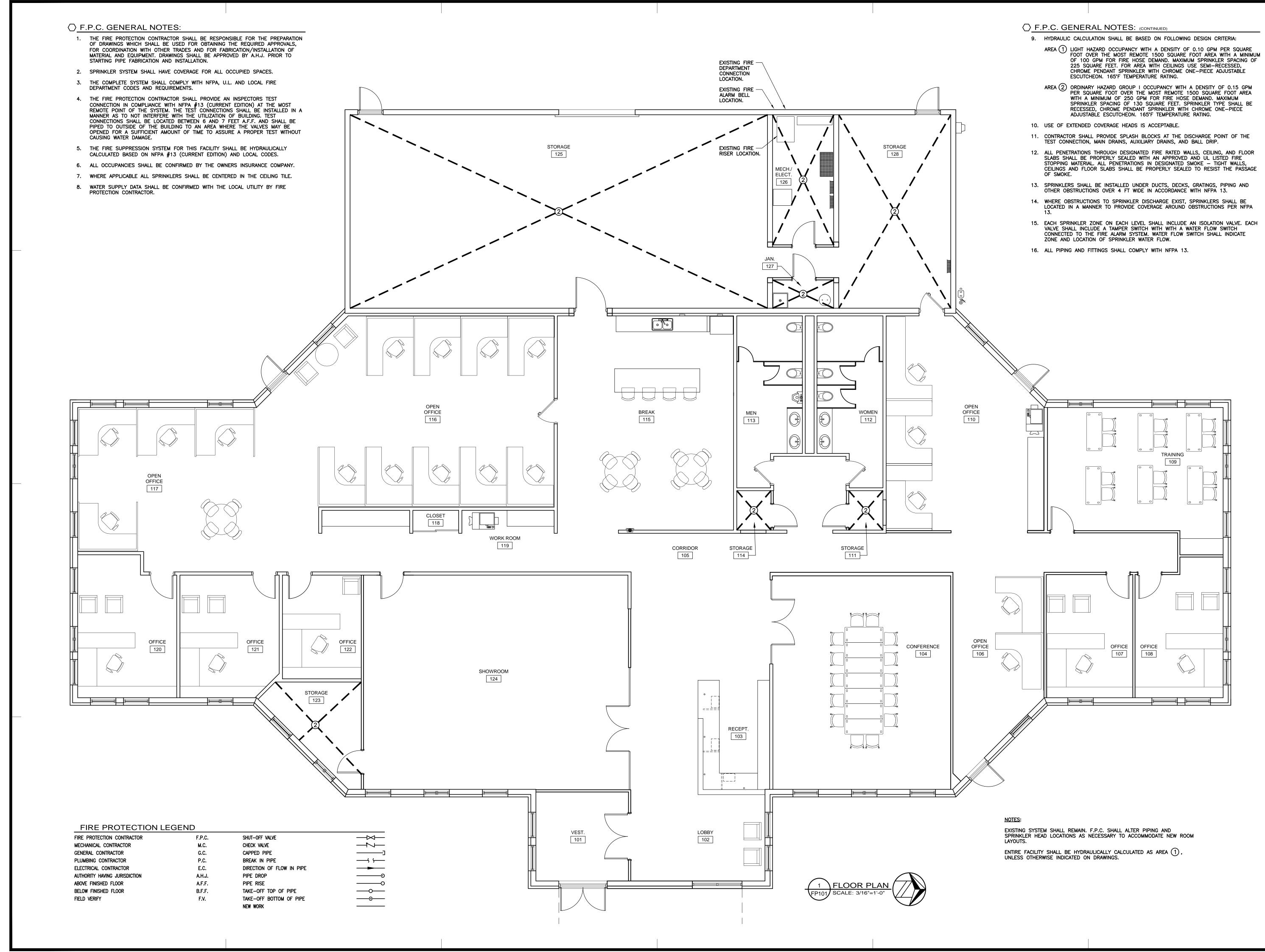
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- - OF 100 GPM FOR FIRE HOSE DEMAND. MAXIMUM SPRINKLER SPACING OF 225 SQUARE FEET. FOR AREA WITH CEILINGS USE SEMI-RECESSED, CHROME PENDANT SPRINKLER WITH CHROME ONE-PIECE ADJUSTABLE
- SPRINKLER SPACING OF 130 SQUARE FEET. SPRINKLER TYPE SHALL BE RECESSED, CHROME PENDANT SPRINKLER WITH CHROME ONE-PIECE

- STOPPING MATERIAL. ALL PENETRATIONS IN DESIGNATED SMOKE TIGHT WALLS, CEILINGS AND FLOOR SLABS SHALL BE PROPERLY SEALED TO RESIST THE PASSAGE
- 14. WHERE OBSTRUCTIONS TO SPRINKLER DISCHARGE EXIST, SPRINKLERS SHALL BE LOCATED IN A MANNER TO PROVIDE COVERAGE AROUND OBSTRUCTIONS PER NFPA
- 15. EACH SPRINKLER ZONE ON EACH LEVEL SHALL INCLUDE AN ISOLATION VALVE. EACH VALVE SHALL INCLUDE A TAMPER SWITCH WITH WITH A WATER FLOW SWITCH CONNECTED TO THE FIRE ALARM SYSTEM. WATER FLOW SWITCH SHALL INDICATE

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BUILDING RENOVATIONS	PERRY PROTECH	1270 FLAGSHIP DRIVE	PERRYSBURG, OH 43551
REPRODUCED BY FOR ANY PURPOSI PROJECT. IF THIS WORK OTHER THA GROUP, INC., THE ADDITIONAL ARCH THEREFORE, REU: WITHOUT PRIOR W INC. IS STRICTLY F © 2023 TEC DO NOT SCAL ARCHITECT/E FOR ANY QUA	EFROM DRAWI NGINEER SHAL NTITIES OF MA F BUILDING CO	PORATIONS, OF EINTENDED US IN PART OR ITS TENDED BY TE D TO MAKE A C R ENGINEERINI TON OF THIS D OF TECHNICON ESIGN GI NGS. THE L NOT BE RE TERIALS AN	ROTHER ENTITIES E FOR THIS E FORTHIS ENTIRETY, ON CHNICON DESIGN HARGE FOR 3 FEES. OCUMENT I DESIGN GROUP, ROUP, INC.
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DIVISION 21 - FIRE PROTECTION SPECIFICATIONS

SCOPE OF WORK: WORK COVERED BY THIS SPECIFICATION AND DESIGN DRAWINGS SHALL INCLUDE ALL LABOR, MATERIALS, EQUIPMENT AND SERVICES NECESSARY FOR AND REASONABLY INCIDENTAL TO COMPLETE THE INSTALLATION OF THE FIRE SUPPRESSION SYSTEMS AS INDICATED IN CONTRACT DOCUMENTS. REFERENCE TO CONTRACTOR OR FIRE PROTECTION CONTRACTOR (OR F.P.C.) ON ALL DRAWINGS AND WITHIN THIS SPECIFICATION COVERS WORK FOR FIRE PROTECTION CONTRACTORS AND THEIR SUBCONTRACTORS.

- <u>PERMITS AND INSPECTIONS</u>: THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND PAYING FOR ALL NECESSARY PERMITS. CONTRACTOR IS RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH ANY INSPECTIONS. TAXES AND INSURANCE REQUIRED BY A.H.J. FIRE PROTECTION CONTRACTOR SHALL PROVIDE ALL REQUIRED DRAWINGS, CALCULATIONS, AND PRODUCT DATA NECESSARY TO OBTAIN FINAL APPROVAL BY AUTHORITY HAVING JURISDICTION. ALL DRAWINGS AND DOCUMENTATION SHALL BE PREPARED BY STATE OF OHIO CERTIFIED FIRE PROTECTION SYSTEM DESIGNER AND SHALL BE SUBMITTED IN HARD COPY AND ELECTRONIC FORMAT TO THE ARCHITECT FOR SUBMISSION TO THE AUTHORITY HAVING JURISDICTION FOR STATE OF OHIO PLAN APPROVAL.
- ORDINANCES AND CODES: ALL WORK SHALL BE INSTALLED TO CONFORM WITH ALL EDERAL, STATE, LOCAL CODES AND ORDINANCES, AND INDUSTRY STANDARDS INCLUDING, BUT NOT LIMITED TO NFPA, OBC 2017, OPC 2017, OMC 2017, ASTM, ASME, ANSI, UL, AND NEC.

SHOULD ANY WORK SHOWN ON THE DRAWINGS OR HEREIN SPECIFIED BE CONTRARY TO SAID MINIMUM REQUIREMENTS, ORDINANCES, STATUTES OR REGULATIONS, THE WORK SHALL BE EXECUTED IN ACCORDANCE WITH THE REQUIREMENTS, ORDINANCES, STATUTES OR REGULATIONS, BUT NOT UNTIL THE POINTS IN QUESTION HAVE BEEN REFERRED TO THE ARCHITECT/ENGINEER FOR APPROVAL.

ALL TESTS SHALL BE MADE AS REQUIRED BY ABOVE MENTIONED REQUIREMENTS, ORDINANCES, STATUTES OR REGULATIONS, OR BY THE INSPECTOR HAVING JURISDICTION. THE COST OF SUCH TESTS SHALL BE INCLUDED IN THE CONTRACT PRICE AND EVIDENCE OF SUCH TESTS AND INSPECTIONS SHALL BE PROVIDED FOR THE OWNER'S FILES.

CONTRACT DRAWINGS: IN GENERAL, DRAWINGS ARE SCHEMATIC IN NATURE AND ARE INTENDED AS A GUIDE FOR THE CONTRACTOR. THE CONTRACTOR'S WORK SHALL CONFORM TO THE INFORMATION CONTAINED IN THIS SPECIFICATION AND/OR AS INDICATED IN THE LATEST REVISION OF THE DRAWINGS REFERRED TO HEREIN. THE CONTRACTOR SHALL CONSULT WITH THE ARCHITECT/ENGINEER REGARDING ALL QUESTIONS PRIOR TO PROCEEDING WITH FABRICATION OF THE WORK IN QUESTION.

THE CONTRACTOR SHALL PREPARE ALL ADDITIONAL DETAIL OR FIELD INSTALLATION DRAWINGS NECESSARY AT THEIR OWN EXPENSE. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS INDICATED ON THE ENGINEER'S LAYOUT DRAWINGS AND DETERMINE IF ANY CHANGES ARE REQUIRED IN CONDUITS. PIPING RUNS, DRAINS, ETC. TO AVOID INTERFERENCE. MAJOR CHANGES SHALL NOT BE MADE WITHOUT THE APPROVAL OF THE ARCHITECT/ENGINEER.

THE CONTRACTOR HAS THE RIGHT TO VARY THE RUN OF CONDUITS, PIPING AND/OR DUCTS AS MAY BE FOUND NECESSARY OR DESIRABLE TO AVOID INTERFERENCES. MAJOR REVISIONS SHALL BE VERIFIED WITH THE ARCHITECT/ENGINEER.

FOR CONSTRUCTION PURPOSES DRAWINGS SHOULD NOT BE SCALED. IN GENERAL, THE SPECIFICATIONS ARE WRITTEN IN SINGULAR FORM. THE DRAWINGS SHOULD BE USED TO DETERMINE NUMBER OF ITEMS REQUIRED FOR A COMPLETE INSTALLATION.

<u>VERIFICATION:</u> BEFORE RUNNING ANY PIPING, ETC., WITHIN THE BUILDING, THE CONTRACTOR SHALL ASSURE HIMSELF THAT THEY CAN BE INSTALLED AS CONTEMPLATED WITHOUT TRAPPING OR INTERFERING WITH COLUMNS, BEAMS, PIPING, FIXTURES, ETC. ANY NECESSARY MAJOR DEVIATION SHALL BE REFERRED TO THE ARCHITECT/ENGINEER FOR ADJUSTMENT BEFORE LINES ARE RUN, AT NO INCREASE IN CONTRACT PRICE.

OPENINGS, SUPPORTING STEEL, FIELD-BUILT CURBS, ELECTRICAL DATA, SPACE REQUIREMENTS, ETC., WERE DESIGNED AROUND SPECIFIC PARAMETERS. WHEN THE CONTRACTOR DETERMINES THE MAKE OF EQUIPMENT AND PIPING TO BE PROVIDED FOR THE JOB, IT SHALL BE THEIR RESPONSIBILITY TO VERIFY AND COORDINATE LAYOUT WITH THE GENERAL CONTRACTOR AND ALL OTHER INTERESTED CONTRACTORS ON THE JOB. IT SHALL ALSO BECOME THE CONTRACTOR'S RESPONSIBILITY TO CHANGE AS NECESSARY, THROUGH THE ARCHITECT/ENGINEER, ALL REQUIRED DIMENSIONS SO THAT OPENINGS, SUPPORTING STEEL, CURBS, ELECTRICAL DATA ETC., WILL FIT THE EQUIPMENT SUPPLIED. ANY ADDITIONAL COST WILL BE THE SOLE RESPONSIBILITY OF THIS CONTRACTOR.

IN ADDITION, ELECTRICAL POWER, INTERLOCK AND CONTROL DIAGRAMS AND PIPING ARRANGEMENTS WERE DESIGNED AROUND ONE SPECIFIC MANUFACTURER. IF ADDITIONAL WIRING PIPING CONTROLS. ETC. ARE REQUIRED FOR OTHER EQUIPMENT. THE CONTRACTOR SHALL INCLUDE THE COST OF THE SAME IN HIS PRICE.

IONS FLEVATIONS AND RELATIVE LOCATIONS OF EXISTING EQUIPMENT, SEWERS PIPES, DUCTS, CONDUITS, ETC., IN PLACE AS SHOWN ON THE DRAWINGS, ARE TAKEN FROM AS-BUILT AND/OR RECORD DRAWINGS AND ARE DEEMED RELIABLE ONLY IN SO FAR GENERAL LAYOUT IS CONCERNED. SUCH DIMENSIONS SHALL NOT BE USED FOR LAYOUT DRAWINGS NOR DETAILING OF COMPONENTS. THE RESPONSIBILITY FOR CHECKING IN PLACE ITEMS WILL BE THE CONTRACTORS. ALL MEASUREMENTS, THE EXACT DETERMINATION OF RELATIVE ELEVATIONS OR LOCATIONS. THE ASCERTAINING OF ACCURACY OF ALL GIVEN ELEVATIONS AND THE OBTAINING OF ALL NECESSARY ADDITIONAL INFORMATION TO INSURE THE PROPER FIT AND COORDINATION OF ALL CONDUIT, EQUIPMENT, DUCTS, AND PIPING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

THE CONTRACTOR SHALL CAREFULLY EXAMINE THE GENERAL BUILDING PLANS AND ALL PLANS AND CARRY ON HIS WORK SO AS NOT TO DELAY OR INTERFERE WITH THE WORK OF OTHER TRADES. THE CONTRACTOR SHALL OBTAIN IN WRITING FROM OTHER CONTRACTORS SUCH DATA AS NECESSARY TO COORDINATE HIS WORK WITH OTHER TRADES.

<u>RECORD DRAWINGS:</u> THE CONTRACTOR SHALL NOTE CHANGES FROM CONTRACT DRAWINGS AND SPECIFICATIONS. THE CONTRACTOR SHALL NEATLY AND CORRECTLY ENTER IN COLORED PENCIL ANY DEVIATIONS ON DRAWINGS AFFECTED AND SHALL KEEP DRAWINGS AVAILABLE FOR INSPECTION. AN EXTRA SET OF DRAWINGS SHALL BE FURNISHED BY F.P.C. FOR THIS PURPOSE. THE CONTRACTOR SHALL GIVE THE DRAWINGS TO THE ARCHITECT AT PROJECT COMPLETION AND LABEL THEM "AS BUILT DRAWINGS - FIRE PROTECTION"

SEE PROJECT MANUAL SECTION '017839 - PROJECT RECORD DOCUMENTS' FOR ADDITIONAL REQUIREMENTS.

- SITE VISITATION: THE CONTRACTOR SHALL VISIT THE SITE (AND/OR BUILDING) AND EXAMINE THE AREA OF WORK AND COMPARE IT WITH DRAWINGS AND SPECIFICATIONS, AND BE SATISFIED AS TO CONDITION OF PREMISES, SUCH AS OBSTRUCTIONS. ACTUAL LEVELS. AND OTHER NECESSARY REQUIREMENTS FOR CARRYING OUT THE WORK. ALL BIDDERS SHALL REPORT ANY DISCREPANCIES TO THE ARCHITECT/ENGINEER PRIOR TO SUBMITTING THEIR BID OR PROPOSAL. FAILURE TO REPORT SUCH DISCREPANCIES SHALL BE DEEMED ACCEPTANCE OF EXISTING CONDITIONS. NO ADDITIONAL COMPENSATION WILL BE GIVEN AFTER THE BIDS OR PROPOSALS HAVE BEEN SELECTED.
- SUBMITTALS: SUBMIT TO THE ARCHITECT/ENGINEER FOR REVIEW FOR THE LIMITED PURPOSE OF CHECKING FOR CONFORMANCE WITH INFORMATION GIVEN AND THE DESIGN CONCEPT EXPRESSED IN THE CONTRACT DOCUMENTS, PRODUCT DATA AND SHOP DRAWINGS FOR ALL SCHEDULED EQUIPMENT. CLEARLY IDENTIFY ALL SUBMITTALS WITH NAME SHOWN IN THE SCHEDULES. APPLY CONTRACTOR'S STAMP, SIGNED OR INITIALED CERTIFYING THAT REVIEW, APPROVAL, VERIFICATION OF PRODUCTS REQUIRED, FIELD DIMENSIONS, ADJACENT CONSTRUCTION WORK, AND COORDINATION OF INFORMATION IS IN ACCORDANCE WITH THE REQUIREMENTS OF THE WORK AND CONTRACT DOCUMENTS. IDENTIFY VARIATIONS FROM CONTRACT DOCUMENTS AND PRODUCT OR SYSTEM LIMITATIONS WHICH MAY BE DETRIMENTAL TO SUCCESSFUL PERFORMANCE OF THE COMPLETED WORK. DISTRIBUTE COPIES OF REVIEWED SUBMITTALS AS APPROPRIATE. INSTRUCT PARTIES TO PROMPTLY REPORT ANY INABILITY TO COMPLY WITH REQUIREMENTS.

SEE PROJECT MANUAL SECTION '013300 - SUBMITTAL PROCEDURES' FOR ADDITIONAL REQUIREMENTS.

PRODUCT SUBSTITUTION: MANUFACTURERS SPECIFIED IN THE EQUIPMENT SCHEDULES BY NAMING ONE OR MORE MANUFACTURERS ARE INCLUDED AS A BASIS OF DESIGN WITH A PROVISION FOR SUBSTITUTIONS.

SUBMIT A REQUEST FOR SUBSTITUTION FOR ANY MANUFACTURER NOT NAMED. DOCUMENT EACH REQUEST WITH COMPLETE DATA SUBSTANTIATING COMPLIANCE OF PROPOSED SUBSTITUTION WITH CONTRACT DOCUMENTS. A REQUEST FOR SUBSTITUTION CONSTITUTES A REPRESENTATION THAT THE SUBMITTER HAS INVESTIGATED PROPOSED PRODUCT AND DETERMINED THAT IT MEETS OR EXCEEDS THE QUALITY LEVEL OF THE SPECIFIED PRODUCT AND THAT IT WILL PROVIDE THE SAME WARRANTY FOR THE SUBSTITUTION AS FOR THE SPECIFIED PRODUCT. THE CONTRACTOR SHALL COORDINATE INSTALLATION AND MAKE CHANGES TO OTHER WORK WHICH MAY BE REQUIRED FOR THE WORK TO BE COMPLETED WITH NO

ADDITIONAL COST TO THE OWNER.

THE CONTRACTOR WAIVES CLAIMS FOR ADDITIONAL COSTS OR TIME EXTENSION WHICH MAY SUBSEQUENTLY BECOME APPARENT AND WILL REIMBURSE THE OWNER, ARCHITECT AND/OR ENGINEER FOR REVIEW OR REDESIGN SERVICES ASSOCIATED WITH RE-APPROVAL BY AUTHORITIES.

SUBSTITUTIONS WILL NOT BE CONSIDERED WHEN THEY ARE INDICATED OR ON SHOP DRAWING OR PRODUCT DATA SUBMITTALS. WITHOUT SEPARATE W REQUEST, OR WHEN ACCEPTANCE WILL REQUIRE REVISION TO THE CONTRA DOCUMENTS.

SEE PROJECT MANUAL SECTION '012500 - SUBSTITUTION PROCEDURES' F ADDITIONAL REQUIREMENTS.

10. WARRANTY: THE MECHANICAL CONTRACTOR SHALL PROVIDE WRITTEN GUAR THE OWNER THAT WORK HEREIN SHALL BE FREE FROM DEFECTS IN WORKI AND MATERIALS. THAT APPARATUS WILL DEVELOP CAPACITIES AND CHARACT REQUIRED ON DRAWINGS, AND THAT IF DURING A PERIOD OF ONE YEAR A OF CERTIFICATE OF COMPLETION BY ARCHITECT/ENGINEER AND ACCEPTANCE PROJECT BY OWNER FOR BENEFICIAL USE. ANY SUCH DEFECTS APPEAR. CONTRACTOR SHALL REMEDY SAME WITHOUT ANY COST TO THE OWNER. CO SHALL OBTAIN AND SUBMIT TO THE OWNER ALL MANUFACTURERS' WARRANTI EQUIPMENT INSTALLED AS PART OF THE CONTRACT.

SEE PROJECT MANUAL SECTION '017400 - WARRANTIES' FOR ADDITIONAL REQUIREMENTS.

11. <u>CLOSE-OUT PROCEDURES</u>: CONTRACTOR SHALL PROVIDE FIELD TESTING, CH AND SYSTEM DEMONSTRATIONS TO OWNER TO ASSURE PROPER PERFORMAN ADJUSTMENT OF ITEMS PROVIDED UNDER THE CONTRACT. REMOVE ALL DEB CREATED BY THE CONSTRUCTION WORK AND CLEAN ALL EQUIPMENT. ETC. AND OUTSIDE. PROVIDE THREE BOUND COPIES OF OPERATION AND MAINT MANUALS WHICH INCLUDES: COPIES OF EACH APPROVED SHOP DRAWING, MAINTENANCE PROCEDURES, OPERATION AND INSTRUCTION MANUALS, LITERA SUPPLIED WITH EQUIPMENT, AND A LIST OF ALL CONTRACTOR'S PURCHASE WITH SUPPLIERS, NAMES, ADDRESSES AND PHONE NUMBERS, FOR ALL MA PROVIDE INSTRUCTION TO PERSONNEL SELECTED BY THE OWNER, TO FAMIL THEM WITH THE LOCATION OF SIGNIFICANT EQUIPMENT, TRAIN THEM ON EQ FUNCTIONS, REVIEW MAINTENANCE PROCEDURES AND COORDINATE INFORMA AVAILABLE IN THE BINDER.

SEE PROJECT MANUAL SECTION '017700 - CLOSEOUT PROCEDURES' AND '017823 - OPERATION AND MAINTENANCE DATA' FOR ADDITIONAL REQUIREM

- 12. ICC COMPLIANCE: ALL FIXTURES, EQUIPMENT, CONTROLS AND DEVICES SHA INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF AMERICANS WITH DISABILITIES ACT (ADA), ICC A117.1, STATE BUILDING CODE, AND LOCAL CO APPI Y
- 13. <u>WORKMANSHIP AND LAYOUT</u>: ALL WORK SHALL BE DONE BY MECHANICS S THE PARTICULAR TRADE INVOLVED, UNDER RESPONSIBLE SUPERVISION, AND THE BEST MODERN PRACTICES.

CONTRACTOR SHALL CONSULT ALL DRAWINGS. CONSTRUCTION DETAILS AND AND CONFER AND COOPERATE WITH OTHER CONTRACTORS AND THE OWNER AVOID INTERFERENCES.

THE GENERAL CONTRACTOR WILL PROVIDE PIPE SHAFT OPENINGS IN THE 1 CONSTRUCTION WHERE SHOWN ON THE ARCHITECTURAL OR STRUCTURAL E AND ALSO WHERE INDICATED AND SIZED BY THIS CONTRACTOR. OPENINGS DUE TO UNTIMELY OR INACCURATE LAYOUT BY THE F.P.C. SHALL BE AT T OWN EXPENSE USING SKILLED WORKMEN AND THE PROPER TOOLS FOR TH INVOLVED.

14. MATERIALS GENERAL: THE MANUFACTURERS REFERENCED THROUGHOUT THI OUTLINE SPECIFICATION ARE INCLUDED AS A BASIS OF DESIGN. SUBMISSION ALTERNATE MANUFACTURERS OF SIMILAR EQUIPMENT IS SUBJECT TO ENGIN APPROVAL. UNITS OF EQUIPMENT, OTHER THAN THOSE LISTED AS THE BAS DESIGN. MUST BE PROVEN TO BE PHYSICALLY ACCEPTABLE. IN ADDITION ALL PERFORMANCE AND EQUIPMENT SPECIFICATIONS. LIABILITY OF NON-CONFORMANCE SHALL LIE ON CONTRACTOR/SUBMITTER.

ALL MATERIALS SHALL BE NEW AND OF THE GRADE AND QUALITY SPECIFIED THE BEST MATERIAL OF EACH CLASS SPECIFIED SHALL BE USED.

15. QUALITY REQUIREMENTS: ARTICLES, DEVICES, MATERIALS, FORMS OF CONST FIXTURES, ETC. NAMED IN THE SPECIFICATIONS TO DENOTE THE TYPE AND REQUIRED. WHETHER OR NOT THE WORDS "OR EQUAL OR EQUIVALENT" ARE SHALL BE KNOWN AS "STANDARDS" AND ALL PROPOSALS SHALL BE BASE

THE SPECIFICATIONS ARE WRITTEN AROUND THE CONSTRUCTION METHODS, MATERIALS, SPACE LIMITATIONS AND PERFORMANCE OF ONE UNIT MANUFAC THE SPECIFICATIONS ALSO LIST ACCEPTABLE MANUFACTURERS FOR A PART PIECE OF EQUIPMENT. THE ENGINEER HAS NOT NECESSARILY REVIEWED 1 AND CONSTRUCTION OPTIONS OF ALL MANUFACTURERS LISTED TO CON COMPLIANCE WITH THE DRAWINGS AND SPECIFICATIONS, BUT THIS CONTRAC SHALL VERIFY THAT THE EQUIPMENT PROPOSED FOR THE PROJECT WILL N EXCEED THE REQUIREMENTS.

WHERE TWO OR MORE "STANDARDS" ARE NAMED TOGETHER, THE CONTRACT FURNISH ANY ONE OF THE "STANDARDS" NAMED, BUT CONTRACTOR SHALL THE SELECTIONS KNOWN TO THE ARCHITECT/ENGINEER WITHIN TEN DAYS F AWARD OF THEIR CONTRACT.

WHERE MATERIALS OR PROCESSES ARE SPECIFIED BY TRADE OR PROPRIETA NAMES, CONTRACTOR MAY MAKE NO SUBSTITUTIONS, EXCEPT ON ARCHITECT/ENGINEER'S WRITTEN APPROVAL STATING THAT SUCH SUBSTITUTION BEEN AUTHORIZED.

FOR THOSE MATERIALS SPECIFIED WITHOUT THE USE OF TRADE NAMES, THE CONTRACTOR MAY FURNISH ANY MANUFACTURER'S PRODUCT THAT MEETS TH EXPRESS REQUIREMENTS OF THE SPECIFICATIONS.

BIDDERS DESIRING CONSIDERATION FOR THE USE OF MATERIAL, EQUIPMENT NOT NAMED IN THE SPECIFICATIONS MAY SUBMIT IN WRITING, AT LEAST TH PRIOR TO BID OPENING, THE CHANGE INCLUDING THE SPECIFICATIONS AND DESCRIPTION TO THE ARCHITECT/ENGINEER FOR REVIEW AND IF APPROVED. CHANGE WILL BE ISSUED IN AN ADDENDUM AT LEAST FIVE DAYS PRIOR TO OPENING OF BIDS.

BIDDERS DESIRING CONSIDERATION FOR THE USE OF MATERIALS, EQUIPMENT NOT NAMED IN THE SPECIFICATIONS OR AN ADDENDUM MAY SUBMIT PROPO THE SUBSTITUTION OF SAME FOR STANDARDS AS SPECIFIED, USING THE "SUBSTITUTION SHEET" ATTACHED TO THE PROPOSAL FORM AND LISTING FO PROPOSED CHANGE: (1) THE "STANDARD" SPECIFIED, (2) THE SUBSTITUTIC (3) THE CHANGE IN BID PRICE (OR "NO CHANGE"). COMPLETE SPECIFICAT DESCRIPTION OF ANY PROPOSED SUBSTITUTION BEING CONSIDERED FOR AC SHALL BE FURNISHED TO THE ARCHITECT PROMPTLY, UPON REQUEST.

SEE PROJECT MANUAL SECTION '014000 - QUALITY REQUIREMENTS', '0142 REFERENCES', AND '016000 - PRODUCT REQUIREMENTS' FOR ADDITIONAL REQUIREMENTS.

16. <u>PROTECTION</u>: CONTRACTOR SHALL PROVIDE APPROVED PROTECTION FOR AI INCLUDED IN THIS CONTRACT AND BE RESPONSIBLE FOR DAMAGE OF ANY FIXTURES, PIPING OR OTHER WORK. AT THE COMPLETION OF THE PROJECT, CONTRACTOR SHALL REMOVE ALL PROTECTION AND REPLACE ALL DAMAGED WITHOUT EXPENSE TO THE OWNER.

IN ADDITION TO THE NORMAL PRECAUTIONS FOR PROTECTION OF WORK, CO SHALL PROVIDE VARIOUS TYPES OF PROTECTION AS FOLLOWS:

- PROTECT FINISHED FLOORS FROM CHIPS AND CUTTING OIL BY THE US 1. METAL CHIP RECEIVING PAN AND AN OIL PROOF FLOOR COVER.
- 2. PROTECT EQUIPMENT AND FINISHED SURFACES FROM WELDING AND CUTTING SPATTERS WITH BAFFLES AND SPATTER BLANKETS.
- 3. PROTECT EQUIPMENT AND FINISHED SURFACES FROM PAINT DROPPINGS. INSULATION ADHESIVE AND SIZING DROPPINGS, ETC. BY USE OF DROP CLOTHS.

ALL PUMPS, MOTORS, AND OTHER ROTATING EQUIPMENT SHALL BE STORED AT THE SITE WITH OPENINGS, BEARINGS, ETC. COVERED TO EXCLUDE DUST AND MOISTURE. ALL STOCK PILED PIPE SHALL BE PLACED ON DUNNAGE AND PROTECTED FROM WEATHER AND FROM ENTRY OF FOREIGN MATERIAL.

DURING CONSTRUCTION, OPEN ENDS OF PIPES, EQUIPMENT, ETC. SHALL BE CAPPED OR PLUGGED TO REDUCE DIRT ACCUMULATION INSIDE.

17. <u>MANUFACTURER'S DIRECTIONS</u>: MANUFACTURER'S DIRECTIONS SHALL BE FOLLOWED IN ALL CASES WHERE THE MANUFACTURER OF ARTICLES USED IN THIS CONTRACT FURNISH DIRECTIONS COVERING SPECIFIC POINTS FOR THE INSTALLATION, STARTUP, OPERATION OR MAINTENANCE OF THESE ARTICLES. DIRECTIONS IN CONFLICT WITH THE DRAWINGS OR THE SPECIFICATIONS SHALL BE REFERRED TO THE ARCHITECT/ENGINEER FOR CLARIFICATION.

IMPLIED RITTEN CT	18.	<u>GUARDS FOR ROTATING MACHINERY</u> : FURNISH AND INSTALL GUARDS FOR ALL EXPOSED BELT DRIVES. GUARDS SHALL BE RIGID AND READILY REMOVABLE WITH OPENINGS FOR CHECKING EQUIPMENT AND MOTOR SPEEDS. GUARDS SHALL BE ATTACHED TO EQUIPMENT AND NOT TO FLOOR.	28.	REMOVALS AND RELOCATIONS: CONTRACTOR TO PERFORM ALL REMOVALS A RELOCATIONS OF FIRE PROTECTION SYSTEMS AS INDICATED ON THE DRAWING THE SPECIFICATIONS.
OR		PROVIDE GUARDS OVER EXPOSED DRIVES SUCH AS PUMP COUPLINGS. GUARDS TO COMPLY WITH OSHA STANDARDS.		THE OWNER HAS THE RIGHT TO RETAIN ALL EQUIPMENT AND/OR MATERIALS REMOVED. SUCH ITEMS WILL BE SO MARKED, REMOVED BY THE CONTRACTOR STORED ON THE SITE WHERE DIRECTED BY THE OWNER.
ANTEE TO MANSHIP ERISTICS		IF GUARDS COVER THE GREASE FITTINGS, PROVIDE EXTENDED GREASE TUBES TO PERMIT LUBRICATION OF EQUIPMENT.		ALL OTHER MATERIALS NOT CLAIMED BY THE OWNER OR REUSED IN THE NI INSTALLATION SHALL BE REMOVED FROM THE SITE BY THE F.P.C.
FTER DATE E OF ONTRACTOR TIES FOR	19.	<u>CUTTING AND PATCHING</u> : ALL CUTTING AND PATCHING OF, OR REPAIR OF DAMAGE TO WORK IN PLACE OR IN EXISTING CONSTRUCTION SHALL BE DONE IN A NEAT AND WORKMANLIKE MANNER, MEETING WITH THE APPROVAL OF THE ARCHITECT/ENGINEER. FIRE PROTECTION CONTRACTOR WHOSE OPERATIONS REQUIRE CUTTING OF WORK IN PLACE OR EXISTING CONSTRUCTION, OR WHO CAUSES DAMAGE WHICH ENTAILS REPAIRS OF SUCH WORK, SHALL EMPLOY MECHANICS OF THE PARTICULAR TRADE WHOSE WORK MUST BE CUT OR WHICH IS DAMAGED, AND SHALL PAY ALL COSTS OF SUCH CUTTING OR REPAIR. ALL PATCHING REQUIRED TO MATCH EXISTING ADJACENT	29.	EXCAVATION AND BACKFILL: IF APPLICABLE, THE CONTRACTOR SHALL DO AI EXCAVATING AND BACKFILLING IN CONNECTION WITH THIS CONTRACTOR'S WO PIPE TRENCHES SHALL BE CUT TO INSTRUMENT GRADE, HELD TO MINIMUM ACCOMPLISH THE WORK, CUT OUT FOR PIPE HUBS AND FITTINGS TO OBTAIN SOLID BED FOR ALL BURIED WORK. IN THE EVENT TRENCHES ARE CUT TO THEY SHALL BE FILLED WITH SAND TO CORRECT ELEVATION AND MATERIAL S MECHANICALLY TAMPED TO SECURE THE FOUNDATION REQUIRED. IN EVENT UNSUITABLE MATERIAL FOR ADEQUATE PIPE SUPPORT IS ENCOUNTERED, SAM
HECK-OUT NCE AND BRIS INSIDE		CONSTRUCTION SHALL BE BY THE LEAD CONTRACTOR AT THE FIRE PROTECTION CONTRACTOR'S EXPENSE. NO STRUCTURAL MEMBERS SHALL BE CUT WITHOUT THE APPROVAL OF THE ARCHITECT/ENGINEER AND ANY SUCH CUTTING SHALL BE DONE IN A MANNER DIRECTED BY THE ARCHITECT/ENGINEER.		BE REMOVED TO SUFFICIENT DEPTH AND BACKFILL INSTALLED TO SECURE P FOUNDATION. NO PIPING SHALL BE LAID IN WATER. CONTRACTOR SHALL PROVIDE AND O PUMPING EQUIPMENT AS MAY BE NECESSARY AND SHORE TRENCHES AS MA NECESSARY TO PREVENT CAVING IN OF THE WORK. CONTRACTOR INSTALLIN
ENANCE ATURE ORDERS		SEE PROJECT MANUAL SECTION '017329 - CUTTING AND PATCHING' FOR ADDITIONAL REQUIREMENTS.		WORK SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE WORK OF OTHER CONTRACTORS AS A RESULT OF UNDERGROUND WORK. BACKFILL WITHIN BUILDING AND UNDER SIDEWALKS AND PAVEMENTS SHALL
UPMENT	20.	<u>CLEAN-UP</u> : CONTRACTOR SHALL FREQUENTLY CLEAN UP ALL REFUSE, RUBBISH, SCRAP MATERIALS AND DEBRIS CAUSED BY THE CONTRACTOR'S OPERATIONS TO THE END THAT AT ALL TIMES THE SITE SHALL PRESENT A NEAT, ORDERLY AND WORKMANLIKE APPEARANCE. CRATES AND CARTONS IN WHICH MATERIALS,		GRANULAR SAND, TO PROPER FINISHED GRADE. HANDFILL AND HANDTAMP LESS THAN TWELVE INCHES ABOVE PIPING IN SIX INCH LAYERS AND COMPL BACKFILL TAMPED IN LAYERS NOT TO EXCEED SIX INCHES. BACKFILL OUTSIDE OF BUILDING LINES SHALL BE TAMPED SAND TO TWENTY- INCHES ABOVE PIPE AS HEREIN BEFORE DESCRIBED FOR INTERIOR WORK.
MENTS.		EQUIPMENT OR FIXTURES ARE RECEIVED SHALL BE REMOVED DAILY. IF, IN THE OPINION OF THE ARCHITECT/ENGINEER, NEATNESS IS NOT MAINTAINED, THE ARCHITECT/ENGINEER MAY HAVE THE AREA CLEANED AS DEFINED IN THE		SAND OR CLEAN EARTH, APPROVED BY ARCHITECT, TO COMPLETE BACKFILL IN LAYERS NOT TO EXCEED SIX INCHES. FINAL SIX INCHES OF FILL TO ES GRADE SHALL BE CLEAN EARTH. FILL AS NECESSARY TO ALLOW FOR SETTI
ALL BE DDES MAY		GENERAL CONDITIONS. CONTRACTOR, AT THE COMPLETION OF THE WORK, SHALL REMOVE ALL SURPLUS MATERIAL, FALSE WORK, TEMPORARY STRUCTURES, INCLUDING FOUNDATIONS THEREOF AND DEBRIS OF EVERY NATURE RESULTING FROM THEIR OPERATIONS AND PUT THE SITE IN A NEAT AND ORDERLY CONDITION.		WHEN OR IF ROCK IS ENCOUNTERED, THE TAMPED SAND BED BELOW THE I SHALL BE A MINIMUM OF SIX INCHES. BACKFILL SHALL BE AS SPECIFIED I ABOVE PARAGRAPHS. EXPLOSIVES SHALL NOT BE USED FOR ROCK EXCAVA EXCESS EXCAVATED MATERIALS AND DEBRIS SHALL BE REMOVED FROM THE
SKILLED IN WITH		IN ADDITION TO ORDINARY PRECAUTIONS IN KEEPING PIPES AND EQUIPMENT CLEAN AND FREE OF DEBRIS DURING CONSTRUCTION, THE CONTRACTOR SHALL MAKE PROVISIONS FOR CLEANING OUT PIPES MAKING USE OF THE GREATEST VELOCITIES AVAILABLE. THE CONTRACTOR SHALL PROVIDE ATTENDANCE, TEMPORARY		CONTRACTOR MAKING THE EXCAVATION. CONTRACTOR SHALL CUT ALL PAVED DRIVES, STREETS, SIDEWALKS AND SIMI AREAS TO MINIMUM WIDTHS REQUIRED. PARTICULAR CARE SHALL BE EXERC INSURE COMPACTION OF ALL FILL UNDER SUCH AREAS TO SATISFACTION OF ARCHITECT/ENGINEER.
JOB SITE R TO		CONNECTIONS AND FILTERS AS REQUIRED. THE EXTERIOR OF PIPES AND EQUIPMENT SHALL BE CLEANED OF ALL DIRT AND GREASE, PREPARATORY TO INSULATION OR PAINTING.		CONTRACTOR SHALL REPLACE ALL SUCH REMOVED AND DAMAGED PAVEMENT ALL TYPES, MATCHING EXISTING WORK, INCLUDING SEALING OF ALL BLACKTO PAVEMENTS AND PROPER FINISHING OF CONCRETE.
RAWINGS REQUIRED HE F.P.C.'S HE WORK	21.	TESTING AND ADJUSTMENT: ALL WORK INSTALLED UNDER THIS CONTRACT SHALL BE TESTED IN THE PRESENCE OF AND TO THE SATISFACTION OF THE INSPECTING AUTHORITY HAVING JURISDICTION AND THE ARCHITECT/ENGINEER.		FOR UNDERGROUND PIPING EXTERIOR TO THE FACILITY, PROVIDE SETON UNDERGROUND WARNING TAPES, BURIED ABOVE THE PIPE LINE AT APPROXIN 18" TO 24" BELOW GRADE. TAPE TO BE 2" WIDE, BRIGHTLY COLORED, ANI INDICATE SERVICE OF BURIED PIPE. FOR NON-METALLIC PIPE, USE METALL TAPE.
ESE N OF		ALL PIPING OR EQUIPMENT NOT FOUND TIGHT UNDER TEST SHALL BE REWORKED OR REPLACED, AS DIRECTED. CONTRACTOR SHALL OPERATE ALL PARTS OF THE ENTIRE SYSTEM, MAKE ANY AND	30.	ELECTRICAL REQUIREMENTS FOR FIRE PROTECTION EQUIPMENT: F.P.C. SHAL FURNISH ALL SPECIAL CONTROL ITEMS AND MOTORS REQUIRED FOR THE OF
EERS IS OF O MEETING		ALL ADJUSTMENTS AND REPAIRS, AND SHALL LEAVE THE ENTIRE WORK TESTED AND READY FOR OPERATION BY THE OWNER AND/OR OPERATION AND FINAL TESTING. IF THE INSTALLED EQUIPMENT DOES NOT MEET THE SPECIFIED CAPACITIES OR IF THE MOTOR OPERATING CURRENT EXCEEDS THE NAMEPLATE RATINGS, SUCH		OF ALL EQUIPMENT PROVIDED UNDER THEIR SECTIONS OF THE WORK. ELECTRICAL CONTRACTOR SHALL FURNISH ALL NECESSARY STARTERS AND DISCONNECT SWITCHES, EXCEPT ON EQUIPMENT WHICH IS TO BE PROVIDED STARTERS OR DISCONNECT SWITCHES AS PART OF THE ASSEMBLY. THE EL
D. ONLY	22.	EQUIPMENT SHALL BE CORRECTED BY THE CONTRACTOR.		CONTRACTOR WILL FURNISH ALL POWER WIRING THROUGH STARTERS AND DISCONNECT SWITCHES TO MOTORS. F.P.C. SHALL PROVIDE ALL POWER WIRING FOR CONTROLS, CONTROL AND/O
TRUCTION, QUALITY E USED,) ON THE		REQUIRING LUBRICATION SHALL BE LUBRICATED WITH THE CORRECT GRADE, TYPE AND QUALITY OF LUBRICANT BEFORE BEING PLACED IN SERVICE. EACH SHAFT CONTAINING A PACKING GLAND SHALL BE CHECKED FOR CONDITION BY BACKING THE PACKING GLAND OFF AND EXAMINING FOR PROPER GRADE, AMOUNT AND TYPE OF PACKING AS RECOMMENDED BY THE MANUFACTURER.		INTERLOCK WIRING REQUIRED FOR HIS PARTICULAR WORK. F.P.C. SHALL AL INCLUDE ANY WIRING REQUIRED AS NOTED IN THE INDIVIDUAL SECTIONS OF SPECIFICATIONS. ALL WIRING REQUIRED BY THIS CONTRACTOR SHALL BE IN ACCORDANCE WITH PROVISIONS AS SET FORTH UNDER THE NATIONAL ELECT AND DIVISION 26 ELECTRICAL WORK OF THESE SPECIFICATIONS.
USE OF TURER. ICULAR HE DESIGN		MAINTAIN ALL LUBRICATION GASKETS AND PACKING DURING CONSTRUCTION AND ASSURE THAT AT THE TIME OF ACCEPTANCE BY THE OWNER, ALL ARE IN FIRST CLASS OPERATING CONDITION.		WHERE ELECTRICAL REQUIREMENTS AND/OR MOTOR HORSEPOWERS FOR THE EQUIPMENT SUPPLIED VARIES FROM THAT SHOWN ON THE MECHANICAL DRAV AS SPECIFICALLY CALLED OUT IN THE MECHANICAL SPECIFICATIONS, THE ELE DRAWINGS AND SPECIFICATIONS SHALL GOVERN AND BE ADHERED TO AS TO ELECTRICAL POWER CHARACTERISTICS FOR THE SUPPLIED EQUIPMENT.
I TOR EET OR	23	ALL LUBRICATION FITTINGS SHALL BE EXTENDED AS REQUIRED FOR ACCESSIBILITY.		FOR ELECTRICAL POWER CHARACTERISTICS FOR THE SUPPLIED EQUIPMENT. FOR ELECTRICAL POWER CHARACTERISTICS OF EQUIPMENT TO BE INSTALLED CONTRACTOR, SEE THE MECHANICAL DRAWINGS AND SCHEDULES.
TOR MAY MAKE FOLLOWING	201	CONSTRUCTION OR BEHIND A WALL OR CEILING SURFACE, THE CONTRACTOR SHALL FURNISH AND INSTALL AN ACCESS PANEL OF ADEQUATE SIZE TO PERMIT ADJUSTMENT OR SERVICE OF CONCEALED DEVICE. PANELS SHALL BE OF A DESIGN SUITABLE FOR INSTALLATION IN THE MATERIAL FORMING THE FINISHED SURFACE IN WHICH EACH IS MOUNTED. APPROVAL OF THE ARCHITECT/ENGINEER IS REQUIRED OF ALL EXPOSED ACCESS PANELS IN FINISHED AREAS.		MOTORS 1/2 HP AND OVER WILL BE PROVIDED WITH ACROSS-THE-LINE ST WITH OVERLOAD PROTECTION UNLESS OTHERWISE SPECIFIED. ALL MOTORS 1/2 HP SHALL HAVE INTEGRAL OVERLOAD PROTECTION. ON FACTORY SUPP PREWIRED EQUIPMENT, ACCESSORY MOTORS SUCH AS CONDENSING UNIT FAI MOTORS MAY BE SINGLE-PHASE INSTEAD OF THREE PHASE IF STANDARD WI MANUFACTURER. ALL MOTORS MUST CONFORM TO CURRENT NEMA STANDAR
ary Ion has		THE CONTRACTOR SHALL CONFER WITH OTHER CONTRACTORS AND SUBCONTRACTORS WITH RESPECT TO ACCESS PANEL LOCATIONS AND SHALL, WHEREVER PRACTICAL, GROUP VALVES, TRAPS, DAMPERS, ETC. IN SUCH A WAY AS TO BE ACCESSIBLE FROM A SINGLE PANEL AND ELIMINATE AS MANY ACCESS PANELS AS POSSIBLE.		ANY OPEN DRIVE MOTOR, ONE HORSEPOWER AND OVER, SHALL BE OF THE EFFICIENCY TYPE WITH A MINIMUM POWER FACTOR OF 82%. CERTIFIED TES SHALL BE AVAILABLE, IF REQUIRED, INDICATING THE HORSEPOWER, POWER F RATING, EFFICIENCY RATING, WATTS, AND RPM. HIGH EFFICIENCY MOTOR SH
E HE , ETC.		EACH ACCESS PANEL IN MASONRY, PLASTER OR DRYWALL SURFACES SHALL HAVE A FLUSH METAL FRAME AND FLUSH HINGED STEEL DOOR WITH FLUSH SCREWDRIVER-OPERATED LATCH. PANELS IN ACOUSTIC CEILING SHALL BE OF RECESSED TYPE, TO WHICH TILE CAN BE ATTACHED IN SUCH A MANNER THAT TILE ON PANEL WILL BE FLUSH WITH CEILING TILE. PANELS ARE NOT REQUIRED WHERE	31.	AS MANUFACTURED BY BALDOR ELECTRIC COMPANY, LOUIS ALLIS COMPANY, WESTINGHOUSE ELECTRIC, GENERAL ELECTRIC, EMERSON ELECTRIC OR MAGN PIPES AND PIPE FITTINGS:
N DAYS , THE) THE	24.	CEILING TILES ARE SUPPORTED IN EXPOSED T-BAR CONSTRUCTION.		A. <u>GENERAL REQUIREMENTS FOR PIPING INSTALLATION</u> ALL PIPING MATERIALS FURNISHED AND ALL PROCEDURES FOLLOWED IN
IT, ETC. DSALS FOR	2٦,	CONTRACTOR SHALL SEE THAT SUCH INSTALLATION WILL NOT INTERFERE WITH CLEARANCES REQUIRED FOR THE PROPER FINISHING OF ARCHITECTURAL WORK INCLUDING THE FINISHING OF SURFACES. IN GENERAL, ALL PIPES IN FINISHED AREAS SHALL BE INSTALLED AND CONCEALED IN WALLS, FURRED SPACES, PIPE CHASES OR ABOVE SUSPENDED CEILINGS. IF AN INTERFERENCE OCCURS,		FABRICATION AND ERECTION SHALL COMPLY WITH THE APPLICABLE SEC THE LOCAL BUILDING CODE, APPLICABLE PRESSURE PIPING CODE, AND REQUIREMENTS OF APPLICABLE SECTIONS OF "BUILDING SERVICES PIPIN B31.9, LATEST REVISION AND ADDENDA.
OR EACH ON, AND TIONS AND CCEPTANCE		CONTRACTOR SHALL CONSULT WITH THE ARCHITECT/ENGINEER BEFORE INSTALLING THE PIPE. WHERE WORK OF THE VARIOUS MECHANICAL CONTRACTORS MUST BE INSTALLED IN CONFINED SPACES, THE SUPERINTENDENTS OF THE FIRE PROTECTION CONTRACTORS SHALL COORDINATE THEIR WORK WITH THE SUPERINTENDENTS OF OTHER PERTINENT		ALL PIPING SHALL BE INSTALLED IN ACCORDANCE WITH THE RECOGNIZI PRACTICES OF THE TRADE. THE CONTRACTOR SHALL BE HELD RESPON FOR SUFFICIENT PLANNING AND FORESIGHT IN AVOIDANCE OF OBSTACLI INTERFERENCES MET IN THE FIELD. PIPING SHALL BE INSTALLED PARA PLANES OF THE BUILDING STRUCTURE AND MUST BE LEVEL AND PLUM PITCHED AS REQUIRED BY GOOD ENGINEERING PRACTICE.
200 –		TRADES BEFORE INSTALLATION TO ASSURE AGAINST INTERFERENCES. FAILURE TO SO COORDINATE SUCH WORK SHALL PLACE THE RESPONSIBILITY FOR MAKING ANY REQUIRED CHANGES IN ANY TRADE UPON THE CONTRACTOR WHO SHALL HAVE FAILED TO JOIN IN THE REQUIRED COOPERATIVE EFFORT, ALL AT THE DIRECTION OF THE ARCHITECT/ENGINEER.		OVERHEAD PIPING SHALL BE PITCHED TO THE RISER SO THAT THE SYS BE COMPLETELY DRAINED AND SHALL CONFORM TO THE REQUIREMENTS NFPA IN THIS REGARD. ADDITIONAL VALVED AND PLUGGED TEE DRAIN S PROVIDED AT ALL LOW SECTIONS OF THE OVERHEAD PIPING THAT WILL DRAIN TO RISER BY GRAVITY.
LL WORK KIND TO , THE WORK	25.	HOISTS. RIGGING. SCAFFOLDING AND TRANSPORTATION: CONTRACTOR SHALL PROVIDE ALL REQUIRED SCAFFOLDING, RIGGING, STAGING, TACKLE, HOISTS AND SIMILAR DEVICES AND EQUIPMENT NECESSARY FOR PROPER INSTALLATION OF HIS WORK, SHALL REMOVE ALL TEMPORARY MATERIALS OF THIS NATURE WHEN NO LONGER DECUMPED AND SHALL BE DESEONSIBLE FOR THE SAFE AND LAWELIN. USE THEREOF		PIPE SHALL BE INSTALLED SO THAT THERE SHALL BE NO "POCKETS", NECESSARY, TO AVOID BEAMS AND SIMILAR CONSTRUCTION MEMBERS, I MUST BE OFFSET AND A PLUGGED TEE DRAIN INSTALLED AT THE LOWE OF SUCH OFFSETS WITH 5 GALLONS OR LESS CAPACITY.
ONTRACTOR SE OF		REQUIRED, AND SHALL BE RESPONSIBLE FOR THE SAFE AND LAWFUL USE THEREOF. CONTRACTOR SHALL BE RESPONSIBLE FOR THE TRANSPORTATION OF ALL MATERIALS AND EQUIPMENT TO THE JOB SITE, ADEQUATE PROTECTED STORAGE ON SITE, AND ALL COSTS OF SAME.		PIPING SHALL BE FABRICATED OF MATERIALS AND BE OF SCHEDULE AN DIMENSIONS AS INDICATED ON THE DRAWINGS AND MATERIAL SPECIFICA SEPARATELY LISTED AND SHALL BE THE LONGEST LENGTH COMMERCIAL AVAILABLE. ALL PIPE AND FITTINGS SHALL HAVE THE MANUFACTURER'S
UTTING				IDENTIFYING MARK STENCILED, STAMPED OR ROLLED ONTO THE SURFAC ACCORDANCE WITH ASTM SPECIFICATIONS.

26. <u>PROVISIONS FOR LATER INSTALLATIONS</u>: WHERE WORK CANNOT BE INSTALLED THE STRUCTURE IS BEING ERECTED, CONTRACTOR FOR SUCH WORK SHALL PROVIDE AND ARRANGE FOR THE BUILDING-IN OF BOXES, SLEEVES, INSERTS, FIXTURES OR DEVICES AS NECESSARY TO PERMIT INSTALLATION OF THE OMITTED WORK DURING LATER PHASES OF CONSTRUCTION. CONTRACTOR SHALL ARRANGE FOR AND LAY OUT ANY CHASES, HOLES OR OTHER OPENINGS WHICH MUST BE PROVIDED IN MASONRY, CONCRETE OR OTHER WORK.

CONTRACTOR SHALL BE RESPONSIBLE FOR BECOMING INFORMED OF THE NATURE AND ARRANGEMENT OF THE MATERIALS AND CONSTRUCTION TO WHICH THIS CONTRACTOR'S WORK ATTACHES, MEMBERS WITH, OR PASSES THROUGH.

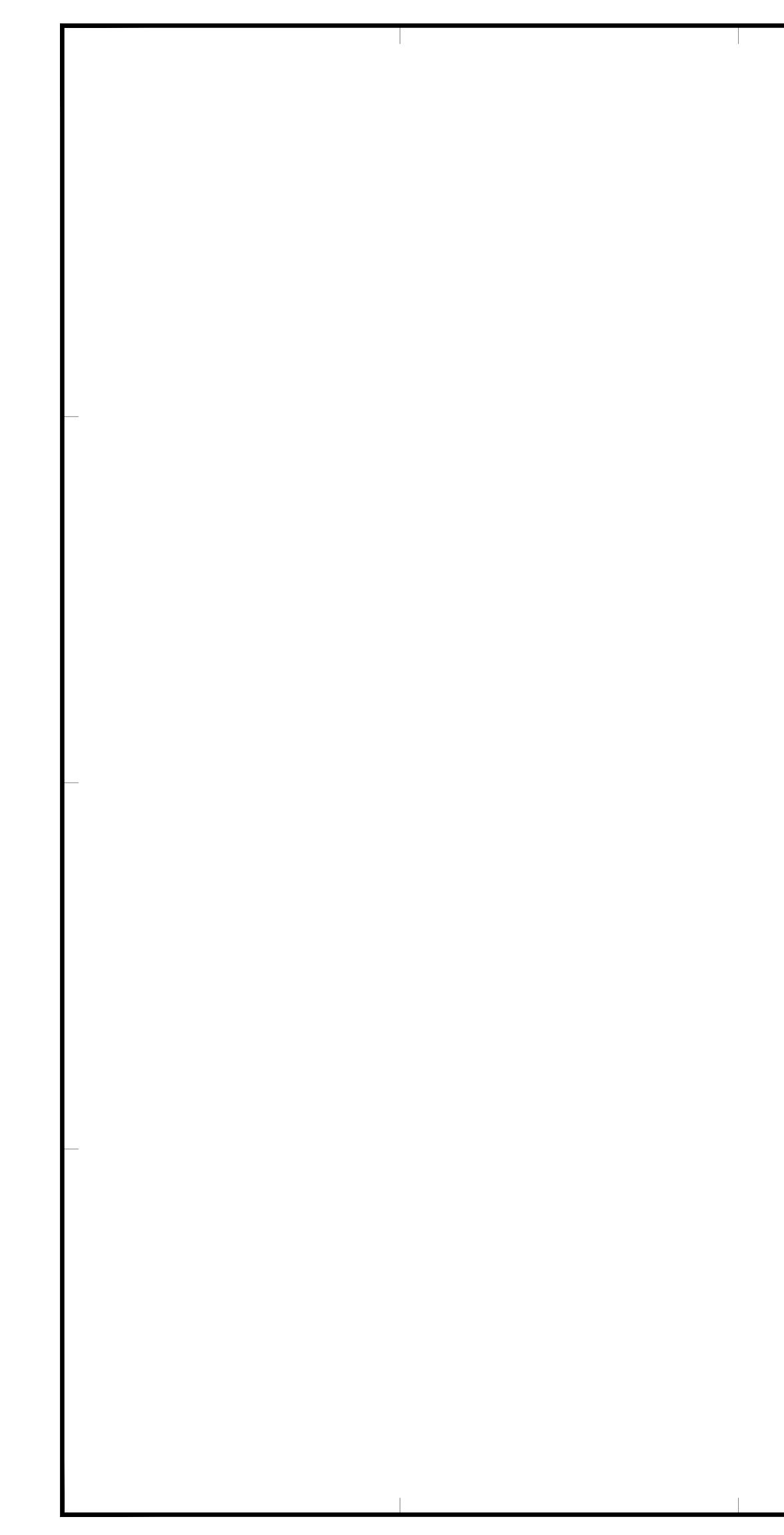
27. CONNECTIONS: CONTRACTOR SHALL COOPERATE FULLY WITH THE OWNER IN SCHEDULING AND MAKING CONNECTIONS INTO EXISTING SERVICE LINES SO AS TO CAUSE THE LEAST POSSIBLE INCONVENIENCE AND SHORTEST DELAY IN SERVICE INTERRUPTION.

CONTRACTOR SHALL INCLUDE ANY TIME AND MATERIALS NECESSARY FOR DRAINING. VENTING, PURGING AND REFILLING THE EXISTING SYSTEMS TO PERMIT CONNECTION OF THE NEW EQUIPMENT, PIPING, ETC.

IN NO CASE SHALL THE CONTRACTOR DISRUPT ANY SERVICE WITHOUT THE EXPRESS PERMISSION OF THE OWNER AND THE ARCHITECT/ENGINEER.

IT MAY BE NECESSARY THAT SOME CONNECTIONS AND PERHAPS SOME OF THE PIPING MUST BE DONE AT NIGHT OR ON WEEKENDS. CONTRACTOR SHALL BID THE WORK ON STRAIGHT TIME AND CLEAR ANY PREMIUM TIME CHARGES WITH THE GENERAL CONTRACTOR WHO IN TURN WILL CLEAR THIS WORK WITH THE OWNER.

<u>OVALS AND RELOCATIONS</u> : CONTRACTOR TO PERFORM ALL REMOVALS AND OCATIONS OF FIRE PROTECTION SYSTEMS AS INDICATED ON THE DRAWINGS OR IN SPECIFICATIONS.	PROVIDE TAPPED ELBOWS OR OTHER NECESSARY FITTINGS TO ALLOW INSTALLATION OF SENSORS, FLOW SWITCHES, PRESSURE SWITCHES, ETC. AS REQUIRED. MOST WELLS ARE NOT SHOWN.	
OWNER HAS THE RIGHT TO RETAIN ALL EQUIPMENT AND/OR MATERIALS OVED. SUCH ITEMS WILL BE SO MARKED, REMOVED BY THE CONTRACTOR AND RED ON THE SITE WHERE DIRECTED BY THE OWNER.	ALL OVERHEAD PIPING SHALL BE INSTALLED AS HIGH AS POSSIBLE TO PROVIDE MAXIMUM HEAD ROOM.	STERES STERES STERES STERES STERES
OTHER MATERIALS NOT CLAIMED BY THE OWNER OR REUSED IN THE NEW ALLATION SHALL BE REMOVED FROM THE SITE BY THE F.P.C.	PROVIDE VENTS ON HIGH POINTS OF SYSTEM WHERE NECESSARY TO FACILITATE THE FILLING OF THE SYSTEM AND TO INSURE THE FLOW OF FLUIDS WHEN THE SYSTEM IS IN OPERATION. PROVIDE DRAIN VALVES ON LOW POINTS OF THE PIPING (HORIZONTAL PIPING OVER 1-1/2 INCH IN SIZE AND OVER 50 FEET	
AVATION AND BACKFILL: IF APPLICABLE, THE CONTRACTOR SHALL DO ALL AVATING AND BACKFILLING IN CONNECTION WITH THIS CONTRACTOR'S WORK.	LONG AND ON MAIN VENTED RISERS) FOR DRAINING PURPOSES. PROVIDE HOSE CAPS ON HOSE END DRAIN VALVE. WHEN INSTALLING PIPING IN PARALLEL, SUFFICIENT SPACE SHALL BE LEFT	
TRENCHES SHALL BE CUT TO INSTRUMENT GRADE, HELD TO MINIMUM WIDTH TO OMPLISH THE WORK, CUT OUT FOR PIPE HUBS AND FITTINGS TO OBTAIN A ID BED FOR ALL BURIED WORK. IN THE EVENT TRENCHES ARE CUT TOO DEEP,	BETWEEN PIPE LINES TO FACILITATE FUTURE WORK ON ONE OF THE LINES. TESTS SHALL BE AS CALLED FOR IN THE ABOVE CODES AND MATERIAL	
Y SHALL BE FILLED WITH SAND TO CORRECT ELEVATION AND MATERIAL SHALL BE HANICALLY TAMPED TO SECURE THE FOUNDATION REQUIRED. IN EVENT THAT UITABLE MATERIAL FOR ADEQUATE PIPE SUPPORT IS ENCOUNTERED, SAME SHALL REMOVED TO SUFFICIENT DEPTH AND BACKFILL INSTALLED TO SECURE PROPER NDATION. PIPING SHALL BE LAID IN WATER. CONTRACTOR SHALL PROVIDE AND OPERATE	SPECIFICATIONS AND SHALL BE ADHERED TO. PIPE, VALVES, FITTINGS, ETC. SHALL BE HYDROSTATICALLY TESTED IN ACCORDANCE WITH ANSI.B31.9 "BUILDING SERVICES PIPING", LATEST REVISION. THE REQUIREMENTS OF HYDROSTATIC TESTS, INDICATED HEREWITH, WILL BE CONSIDERED MET IF THE HYDROSTATIC TESTS APPLIED TO THE ERECTED PIPING SYSTEM ARE COMPLETED TO THE SATISFACTION OF THE ARCHITECT.	DUD E S I G N 9.523.5323
IPING EQUIPMENT AS MAY BE NECESSARY AND SHORE TRENCHES AS MAY BE ESSARY TO PREVENT CAVING IN OF THE WORK. CONTRACTOR INSTALLING THE IK SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE WORK OF OTHER	WHEN HYDROSTATIC TESTS ARE APPLIED TO ANY PIPING SECTION, A LOG SHALL BE KEPT BY THE CONTRACTOR. LOG SHALL STATE SECTION OF PIPE, ULTIMATE USE OF PIPE, HYDROSTATIC TESTS PRESSURE APPLIED, LENGTH OF TEST, DATE	
TRACTORS AS A RESULT OF UNDERGROUND WORK. KFILL WITHIN BUILDING AND UNDER SIDEWALKS AND PAVEMENTS SHALL BE FINE NULAR SAND, TO PROPER FINISHED GRADE. HANDFILL AND HANDTAMP TO NOT	AND TIME APPLIED. LOG SHALL BE SIGNED BY THE CONTRACTOR'S SUPERINTENDENT AND RETAINED BY THE CONTRACTOR. TOOL MARKS WILL NOT BE PERMITTED ON WORK IN FINISHED AREAS.	I N G 45875
S THAN TWELVE INCHES ABOVE PIPING IN SIX INCH LAYERS AND COMPLETE KFILL TAMPED IN LAYERS NOT TO EXCEED SIX INCHES. KFILL OUTSIDE OF BUILDING LINES SHALL BE TAMPED SAND TO TWENTY-FOUR	ALL WELDED PIPING JOINTS OF STEEL PIPE, VALVES AND FITTINGS ARE TO BE WELDED IN ACCORDANCE WITH ANSI CODE B31.9 "BUILDING SERVICE PIPING". WELDED DETAILS FOR PIPE, VALVES AND FITTINGS SHALL CONFORM TO	■ ■ ⊆
IES ABOVE PIPE AS HEREIN BEFORE DESCRIBED FOR INTERIOR WORK. CLEAN D OR CLEAN EARTH, APPROVED BY ARCHITECT, TO COMPLETE BACKFILL TAMPED AYERS NOT TO EXCEED SIX INCHES. FINAL SIX INCHES OF FILL TO ESTABLISH DE SHALL BE CLEAN EARTH. FILL AS NECESSARY TO ALLOW FOR SETTLING.	APPROVED WELDING STANDARDS. IT IS REQUIRED THAT ALL WELDING AND BRAZING OF PIPING COVERED BY THIS	GINE GINE OTTAWA, C
IN OR IF ROCK IS ENCOUNTERED, THE TAMPED SAND BED BELOW THE PIPE LL BE A MINIMUM OF SIX INCHES. BACKFILL SHALL BE AS SPECIFIED IN THE VE PARAGRAPHS. EXPLOSIVES SHALL NOT BE USED FOR ROCK EXCAVATION.	SPECIFICATION, REGARDLESS OF CONDITION OF SERVICE, BE INSTALLED AS FOLLOWS: 1) PIPE WELDING SHALL COMPLY WITH THE PROVISIONS OF THE LATEST	
ESS EXCAVATED MATERIALS AND DEBRIS SHALL BE REMOVED FROM THE SITE BY TRACTOR MAKING THE EXCAVATION.	REVISION OF THE ASME BOILER AND PRESSURE VESSEL CODE, AND THE ANSI CODE B31.9 "BUILDING SERVICES PIPING", OR SUCH STATE OR LOCAL REQUIREMENTS AS MAY SUPPLEMENT CODES MENTIONED ABOVE.	
TRACTOR SHALL CUT ALL PAVED DRIVES, STREETS, SIDEWALKS AND SIMILAR AS TO MINIMUM WIDTHS REQUIRED. PARTICULAR CARE SHALL BE EXERCISED TO JRE COMPACTION OF ALL FILL UNDER SUCH AREAS TO SATISFACTION OF HITECT/ENGINEER.	2) BEFORE ANY PIPE WELDING IS PERFORMED, THE CONTRACTOR SHALL HAVE IN HIS FILES, A COPY OF HIS WELDING PROCEDURES SPECIFICATIONS TOGETHER WITH PROOF OF ITS QUALIFICATION AS OUTLINED AND REQUIRED BY THE MOST RECENT ISSUE OF THE CODE HAVING JURISDICTION.	C T U R E . STREET, SUITE
TRACTOR SHALL REPLACE ALL SUCH REMOVED AND DAMAGED PAVEMENTS OF TYPES, MATCHING EXISTING WORK, INCLUDING SEALING OF ALL BLACKTOP EMENTS AND PROPER FINISHING OF CONCRETE.	3) BEFORE ANY OPERATOR SHALL PERFORM ANY PIPE WELDING, THE CONTRACTOR SHALL HAVE IN HIS FILES THE WELDER'S PERFORMANCE	T E C RRY S1
UNDERGROUND PIPING EXTERIOR TO THE FACILITY, PROVIDE SETON ERGROUND WARNING TAPES, BURIED ABOVE THE PIPE LINE AT APPROXIMATELY TO 24" BELOW GRADE. TAPE TO BE 2" WIDE, BRIGHTLY COLORED, AND SHALL CATE SERVICE OF BURIED PIPE. FOR NON-METALLIC PIPE, USE METALLIC LINED	QUALIFICATION RECORD IN CONFORMANCE WITH PROVISIONS OF THE CODE HAVING JURISDICTION, SHOWING THAT THE WELDER WAS TESTED UNDER THE PROVED PROCEDURE SPECIFICATION SUBMITTED BY THE CONTRACTOR.	C H I T E N PERRY S
E. <u>CTRICAL REQUIREMENTS FOR FIRE PROTECTION EQUIPMENT</u> : F.P.C. SHALL NISH ALL SPECIAL CONTROL ITEMS AND MOTORS REQUIRED FOR THE OPERATION	4) EACH MANUFACTURER OR CONTRACTOR SHALL BE RESPONSIBLE FOR THE QUALITY OF WELDING DONE BY HIS ORGANIZATION AND SHALL REPAIR OR REPLACE ANY WORK NOT IN ACCORDANCE WITH THESE SPECIFICATIONS.	A R 1800 www.
ALL EQUIPMENT PROVIDED UNDER THEIR SECTIONS OF THE WORK. CTRICAL CONTRACTOR SHALL FURNISH ALL NECESSARY STARTERS AND CONNECT SWITCHES, EXCEPT ON EQUIPMENT WHICH IS TO BE PROVIDED WITH	5) CERTIFICATION COSTS MUST BE PAID FOR BY THIS CONTRACTOR. WELDING OF GALVANIZED PIPE OR FITTINGS WILL NOT BE ACCEPTABLE.	
RTERS OR DISCONNECT SWITCHES AS PART OF THE ASSEMBLY. THE ELECTRICAL TRACTOR WILL FURNISH ALL POWER WIRING THROUGH STARTERS AND CONNECT SWITCHES TO MOTORS.	AT CONTRACTOR'S OPTION, MECHANICAL GROOVED PRODUCTS MAY BE USED ON ALL WATER SERVICES WITHIN THE TEMPERATURE RANGE $-30F$ TO 230F.	
C. SHALL PROVIDE ALL POWER WIRING FOR CONTROLS, CONTROL AND/OR RLOCK WIRING REQUIRED FOR HIS PARTICULAR WORK. F.P.C. SHALL ALSO .UDE ANY WIRING REQUIRED AS NOTED IN THE INDIVIDUAL SECTIONS OF THE	1) MATERIALS SHALL BE AS FOLLOWS AND AS MANUFACTURED BY VICTAULIC, GRINNELL OR CENTRAL SPRINKLER COMPANY:	
CIFICATIONS. ALL WIRING REQUIRED BY THIS CONTRACTOR SHALL BE IN ORDANCE WITH PROVISIONS AS SET FORTH UNDER THE NATIONAL ELECTRIC CODE DIVISION 26 ELECTRICAL WORK OF THESE SPECIFICATIONS.	 COUPLINGS: MALLEABLE IRON, ASTM A47 OR DUCTILE IRON ASTM A-536 WITH ASTM A-183 BOLTS AND NUTS WITH EPDM "E" GASKET, VICTAULIC SERIES 07 ZERO-FLEX RIGID COUPLING. 	VS 51
RE ELECTRICAL REQUIREMENTS AND/OR MOTOR HORSEPOWERS FOR THE IPMENT SUPPLIED VARIES FROM THAT SHOWN ON THE MECHANICAL DRAWINGS OR SPECIFICALLY CALLED OUT IN THE MECHANICAL SPECIFICATIONS, THE ELECTRICAL WINGS AND SPECIFICATIONS SHALL GOVERN AND BE ADHERED TO AS TO	b. FLANGES: MALLEABLE IRON ASTM A47 OR DUCTILE IRON ASTM A-536 HINGED, TWO-PIECE DESIGN, SUITABLE FOR OPENING AND ENGAGING THE GROOVES.	
CTRICAL POWER CHARACTERISTICS FOR THE SUPPLIED EQUIPMENT. ELECTRICAL POWER CHARACTERISTICS OF EQUIPMENT TO BE INSTALLED BY THIS TRACTOR, SEE THE MECHANICAL DRAWINGS AND SCHEDULES.	c. FITTINGS: MALLEABLE IRON, ASTM A47 OR DUCTILE IRON ASTM A-536 FULL FLOW FITTINGS WITH GROOVED OR SHOULDERED ENDS. SERIES 77 AND 07.	NVATIO TECH DRIVE OH 435
ORS 1/2 HP AND OVER WILL BE PROVIDED WITH ACROSS-THE-LINE STARTERS 1 OVERLOAD PROTECTION UNLESS OTHERWISE SPECIFIED. ALL MOTORS UNDER	2) IT IS REQUIRED THAT ALL GROOVED END PIPE, FITTINGS AND VALVES SHALL BE PREPARED AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S LATEST PUBLISHED STANDARD SPECIFICATIONS AND	G, (OI NO
HP SHALL HAVE INTEGRAL OVERLOAD PROTECTION. ON FACTORY SUPPLIED WIRED EQUIPMENT, ACCESSORY MOTORS SUCH AS CONDENSING UNIT FAN ORS MAY BE SINGLE—PHASE INSTEAD OF THREE PHASE IF STANDARD WITH THE UFACTURER. ALL MOTORS MUST CONFORM TO CURRENT NEMA STANDARDS.	AS FOLLOWS: a. PIPE SHALL BE PREPARED IN ACCORDANCE WITH THE LATEST MANUFACTURER'S STANDARD ROLL/CUT GROOVE SPECIFICATIONS;	
OPEN DRIVE MOTOR, ONE HORSEPOWER AND OVER, SHALL BE OF THE HIGH CIENCY TYPE WITH A MINIMUM POWER FACTOR OF 82%. CERTIFIED TEST DATA LL BE AVAILABLE, IF REQUIRED, INDICATING THE HORSEPOWER, POWER FACTOR	REFER TO VICTAULIC'S "FIELD ASSEMBLY AND INSTALLATION INSTRUCTION POCKET HANDBOOK". STANDARD WEIGHT PIPE SHALL BE ROLL GROOVED WITHOUT METAL REMOVAL OR SQUARE	UILDING ERRY 270 FLA(ERRYSB
NG, EFFICIENCY RATING, WATTS, AND RPM. HIGH EFFICIENCY MOTOR SHALL BE MANUFACTURED BY BALDOR ELECTRIC COMPANY, LOUIS ALLIS COMPANY, TINGHOUSE ELECTRIC, GENERAL ELECTRIC, EMERSON ELECTRIC OR MAGNETEK.	CUT. LIGHTWALL PIPE SHALL BE ROLLED GROOVED WITHOUT METAL REMOVAL. b. THE NOMINAL OUTSIDE DIAMETER OF GROOVE PIPE SHALL NOT	UILE DER 270 ERR
S AND PIPE FITTINGS:	VARY MORE THAN THE TOLERANCE LISTED. MAXIMUM ALLOWABLE TOLERANCE FROM SQUARE CUT ENDS IS 0.030" FOR SIZES 3/4" THROUGH 3"; 0.045" FOR SIZES 4" THROUGH 6"; AND 0.060" FOR SIZES 8" AND ABOVE; MEASURED FROM TRUE	
GENERAL REQUIREMENTS FOR PIPING INSTALLATION ALL PIPING MATERIALS FURNISHED AND ALL PROCEDURES FOLLOWED IN FABRICATION AND ERECTION SHALL COMPLY WITH THE APPLICABLE SECTIONS OF	SQUARE LINE. c. PIPE SHALL BE CHECKED TO BE CERTAIN IT IS SUFFICIENTLY FREE OF INDENTATIONS, PROJECTIONS, ROLL MARKS, WELD	REPRODUCED BY INDIVIDUALS, CORPORATIONS, OR OTHER ENTITIES FOR ANY PURPOSE OTHER THAN THE INTENDED USE FOR THIS PROJECT. IF THIS DRAWING IS USED IN PART OR ITS ENTIRETY, ON WORK OTHER THAN THE PROJECT INTENDED BY TECHNICON DESIGN GROUP, INC., THE RIGHT IS RESERVED TO MAKE A CHARGE FOR ADDITIONAL ADQUITECTURAL AND/OR DATO/INCENDING FOR
THE LOCAL BUILDING CODE, APPLICABLE PRESSURE PIPING CODE, AND REQUIREMENTS OF APPLICABLE SECTIONS OF "BUILDING SERVICES PIPING", ANSI B31.9, LATEST REVISION AND ADDENDA.	SEAMS ON THE EXTERIOR OF THE PIPE AND THE ENTIRE GASKET SEATING AREA TO ASSURE PROPER SEATING OF GASKET.	ADDITIONAL ARCHITECTURAL AND/OR EINGINEERING FEES. THEREFORE, REUSE OR REPRODUCTION OF THIS DOCUMENT WITHOUT PRIOR WRITTEN CONSENT OF TECHNICON DESIGN GROUP, INC. IS STRICTLY PROHIBITED. © 2023 TECHNICON DESIGN GROUP, INC.
ALL PIPING SHALL BE INSTALLED IN ACCORDANCE WITH THE RECOGNIZED BEST PRACTICES OF THE TRADE. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR SUFFICIENT PLANNING AND FORESIGHT IN AVOIDANCE OF OBSTACLES AND INTERFERENCES MET IN THE FIELD. PIPING SHALL BE INSTALLED PARALLEL TO PLANES OF THE BUILDING STRUCTURE AND MUST BE LEVEL AND PLUMB, OR PITCHED AS REQUIRED BY GOOD ENGINEERING PRACTICE.	 d. GROOVE WIDTH, DEPTH AND OUTSIDE DIAMETER MUST CONFORM TO THE STANDARD GROOVE SPECIFICATIONS IN THE LATEST MANUFACTURER'S "FIELD ASSEMBLY AND INSTALLATION INSTRUCTION POCKET HANDBOOK". e. LUBRICATIONS SHALL ALWAYS BE USED FOR PROPER COUPLING 	DO NOT SCALE FROM DRAWINGS. THE ARCHITECT/ENGINEER SHALL NOT BE RESPONSIBLE FOR ANY QUANTITIES OF MATERIALS AND LOCATIONS OF BUILDING COMPONENTS SCALED FROM THESE DRAWINGS.
OVERHEAD PIPING SHALL BE PITCHED TO THE RISER SO THAT THE SYSTEM CAN BE COMPLETELY DRAINED AND SHALL CONFORM TO THE REQUIREMENTS OF THE NFPA IN THIS REGARD. ADDITIONAL VALVED AND PLUGGED TEE DRAIN SHALL BE	FITTING ASSEMBLY. FOR A BRANCH CONNECTION FROM A MAIN AT LEAST TWO PIPE SIZES SMALLER THAN THE MAIN, APPROVED WELDOLET OR THREDOLET OR VICTAULIC STYLE 920	FIRE PROTECTION
PROVIDED AT ALL LOW SECTIONS OF THE OVERHEAD PIPING THAT WILL NOT DRAIN TO RISER BY GRAVITY. PIPE SHALL BE INSTALLED SO THAT THERE SHALL BE NO "POCKETS", AND, IF	BOLTED BRANCH OUTLET MAY BE USED. BRANCH CONNECTION SHALL BE WELDED OR SCREWED DEPENDING ON THE PIPING SPECIFICATION HEREINAFTER. WELDED NIPPLE INTO THE MAIN WILL NOT BE ALLOWED.	SPECIFICATIONS
NECESSARY, TO AVOID BEAMS AND SIMILAR CONSTRUCTION MEMBERS, PIPE MUST BE OFFSET AND A PLUGGED TEE DRAIN INSTALLED AT THE LOWEST POINT OF SUCH OFFSETS WITH 5 GALLONS OR LESS CAPACITY.	HEX HEAD BOLTS AND NUTS SHALL BE USED FOR FLANGED CONNECTIONS. GASKET MATERIAL SHALL BE 150# OR 300# TYPE, 1/16" THICK. FOR 300#, FLEXITALLIC GASKETS MAY BE USED.	
PIPING SHALL BE FABRICATED OF MATERIALS AND BE OF SCHEDULE AND/OR DIMENSIONS AS INDICATED ON THE DRAWINGS AND MATERIAL SPECIFICATIONS AS SEPARATELY LISTED AND SHALL BE THE LONGEST LENGTH COMMERCIALLY AVAILABLE. ALL PIPE AND FITTINGS SHALL HAVE THE MANUFACTURER'S IDENTIFYING MARK STENCILED, STAMPED OR ROLLED ONTO THE SURFACE IN ACCORDANCE WITH ASTM SPECIFICATIONS.	ALL PLUGS FOR ALL SERVICES SHALL BE BRASS. ALL CHANGES IN PIPE DIAMETER SHALL BE MADE WITH REDUCING FITTINGS. NO BUSHINGS SHALL BE USED.	01-09-24 PERMITS
FITTINGS SHALL BE USED FOR ALL PIPE LINES AND UNLESS OTHERWISE SPECIFIED SHALL CONFORM TO ANSI CODE B31.9 "BUILDING SERVICES PIPING", LATEST REVISION, MATERIALS SCHEDULE. UNLESS OTHERWISE NOTED ALL BUTT WELDED ELBOWS ARE TO BE LONG RADIUS TYPE.	B. <u>CLEANING OF PIPING SYSTEMS</u> FLUSH FIRE PROTECTION PIPING WITH DOMESTIC WATER AND WITH THE MAXIMUM AMOUNT OF WATER AVAILABLE. THE SYSTEM SHALL BE CHLORINATED AS REQUIRED BY LOCAL AND STATE CODES.	
FLANGES OR UNIONS SHALL BE INSTALLED ADJACENT TO EACH CONTROL VALVE, TRAP OR PIECE OF EQUIPMENT TO PERMIT REMOVAL OF SAME FROM THE LINE. IN ADDITION, UNIONS OR FLANGES SHALL BE PROVIDED AS REQUIRED TO	REQUIRED BY LOCAL AND STATE CODES. DRAIN COMPLETELY AND REFILL SYSTEM WITH FRESH WATER. FLUSH AT EACH UNIT UNTIL CLEAR WATER APPEARS.	
MAKE-UP OR DISCONNECT PIPING. EACH UNION SHALL BE INSTALLED IN A POSITION PERMITTING THE VALVE, TRAP OR PIECE OF EQUIPMENT TO BE REMOVED BY DISCONNECTING THE UNION AND ONLY A MINIMAL AMOUNT OF PIPING.	NEW PIPING CONNECTING INTO EXISTING PIPING SYSTEMS SHALL BE FILLED, DRAINED AND FLUSHED BEFORE CONNECTION INTO EXISTING SYSTEM.	
ALL PIPE ENDS SHALL BE REAMED TO FULL SIZE AND ALL THREADS SHALL BE CLEANLY CUT AND TAPERED. JOINTS IN SCREWED PIPING SHALL BE MADE WITH APPROVED PIPE THREAD COMPOUND APPLIED TO MALE THREAD ONLY TO AVOID LEAVING COMPOUND INSIDE THE PIPE. TEFLON TAPE IS ACCEPTABLE	(SEE CONTINUATION ON SHEET FROM?)	DRAWN BY: SAB DATE: 08-23
EXCEPT IF THE SYSTEM CONTAINS A GLYCOL FLUID, IN WHICH CASE A TAPE COMPATIBLE WITH A GLYCOL SOLUTION MAY BE USED. ALL PIPING SHALL BE CLEANED OUT BEFORE INSTALLATION BY BLOWING OUT	(SEE CONTINUATION ON SHEET FP902)	PLOT SCALE: 1:1
WITH COMPRESSED AIR OR BY OTHER APPROVED METHODS. PROVIDE TEMPORARY PLUGS OR CAPS FOR ALL OPEN ENDS OF PIPE WHEN WORK IS NOT BEING CARRIED ON TO COMPLETION.		JOB NO. 45-2902-23 SHEET
ALL CONNECTIONS, VENTS, DRAINS, ETC. MUST BE INSTALLED AS REQUIRED.		FP901



C. <u>SLEEVES</u>

SLEEVES SHALL BE INSTALLED BY THE CONTRACTOR WHEREVER PIPES PASS THROUGH WALLS, SLABS, FLOORS OR CEILINGS. NO PIPES SHALL PASS THROUGH BEAMS OR BE EMBEDDED IN CONCRETE. SLEEVES IN CONCRETE SHALL BE STANDARD WEIGHT STEEL PIPE OR PURCHASED UNITS AS SPECIFI BELOW. TWENTY-SIX GAUGE GALVANIZED STEEL SLEEVES ARE ACCEPTABLE WOOD. PLASTER OR DRYWALL PARTITIONS. ALL SLEEVES SHALL BE SAWED MACHINE CUT (NO FLAME CUTTING) AND FLUSH WITH FINISHED SURFACES EXCEPT FOR MECHANICAL EQUIPMENT AREAS WHICH SHALL EXTEND 2" ABOVE FINISHED FLOOR AND BE OF GALVANIZED STEEL.

CENTER PIPE IN SLEEVES WITH SPACERS.

IF POSSIBLE, IN NEW CONCRETE WORK, SLEEVES SHALL BE SET INTO POSITI BEFORE CONCRETE IS POURED. WHERE PIPE OPENINGS ARE REQUIRED IN CONCRETE AFTER THE CONCRETE HAS BEEN POURED, THIS CONTRACTOR SH CORE DRILL SAME AND ELIMINATE THE PIPE SLEEVE.

WHERE PIPES PASS THROUGH EXTERIOR CONCRETE WALLS, SET SCHEDULE STEEL PIPE OR SPECIAL MANUFACTURED CASTINGS OR SLEEVES 1-1/2" LARGER THAN O.D. OF PIPE. CAULK BOTH SIDES WITH OAKUM AND LEAD WOOL, COAT WITH BITUMINOUS PAINT AND OTHERWISE ADEQUATELY WATERPRO OPENING AROUND PIPE. A CASING SEAL SYSTEM AS MANUFACTURED BY THUNDERLINE CORPORATION UNDER THE TRADE NAME "LINK-SEAL" MAY BE USED INSTEAD OF OAKUM AND CAULKING.

SLEEVES SHALL BE INSTALLED BY THE CONTRACTOR WHEREVER EXISTING PIP PASS THROUGH NEW WALLS ERECTED FOR THIS PROJECT. TWENTY-SIX GAU GALVANIZED STEEL SPLIT RING TYPE SLEEVES ARE ACCEPTABLE. EXISTING PIPING SHOWN ON THE DRAWINGS IS TAKEN FROM RECORD DRAWINGS AND/O FIELD OBSERVATION AND ARE DEEMED RELIABLE ONLY INSOFAR AS GENERAL LAYOUT IS CONCERNED. THE RESPONSIBILITY FOR CHECKING IN PLACE ITEM WILL BE THE CONTRACTOR'S.

OPENINGS AROUND PIPES OR IN SLEEVES FOR PIPES PASSING THROUGH FLO SLABS, FIRE-RATED WALLS, SMOKE BARRIERS, OR FIRE-RATED CEILINGS MUS BE SEALED WITH A NON-COMBUSTIBLE MATERIAL. SEAL AT BOTH SIDES OF ANY CAVITY WALL. INSULATION SHALL NOT EXTEND THROUGH SLEEVE. FILL SLEEVE OPENING WITH DOW CORNING 3-6548 RTV SILICONE FOAM, 3M FIRE BARRIER, G.E., RTV OR FLAME STOP, INC. PRODUCT SHALL INTUMESCE (EXPAND) WHEN SUBJECTED TO HEAT. WHEN USED FOR OPENINGS AROUND PVC OR SIMILAR PIPE MATERIAL, PROVIDE SUFFICIENT THICKNESS OF MATERIA AROUND PIPE TO FILL VOID COMPLETELY IF THE PIPE IS CONSUMED BY THE HEAT. AN EXTERIOR METAL HOLDING COLLAR AND CLAMP MAY BE REQUIRED FOR THIS APPLICATION. DEPTH OF FILL MATERIAL SHALL PROVIDE SAME FIRM RATING AS FLOOR OR WALL PENETRATED. FIBERGLASS IS NOT ACCEPTABLE, EXCEPT AS A BACKING FOR THE ABOVE MATERIALS. PREPACKED SLEEVES SUCH AS PROSET "FIRESTOP PENETRATORS" AS INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS ARE ACCEPTABLE.

ALL METAL PIPING PASSING THROUGH OR ADJACENT TO WOOD THAT HAS BEI TREATED WITH FIRE RETARDANT CHEMICALS SHALL BE SLEEVED WITH SCHEDU 40 PVC PIPING ONE SIZE LARGER THAN A BARE METAL PIPE OR ONE SIZE LARGER THAN AN INSULATED PIPE. ALTERNATE METHODS OF PROTECTING THE PIPING MAY BE USED AT THE CONTRACTOR'S OPTION.

D. ESCUTCHEON PLATES

CHROME-PLATED ESCUTCHEON PLATES SHALL BE USED WHERE PIPING ENTER FINISHED AREAS AND SHALL FIT NEATLY TO PIPE AND SURFACE. THE PLATE MAY BE BLACK IRON IN UNFINISHED AREAS.

OMIT PLATES IN CONCEALED PIPING SPACES.

32. <u>SUPPORTS AND ANCHORS</u>

CONTRACTOR SHALL PROVIDE ALL MISCELLANEOUS STEEL AND HARDWARE AS REQUIRED TO SUPPORT, HANG AND SECURE ALL EQUIPMENT, PIPES, ETC. AS FURNISHED BY THEM, UNLESS SUCH MATERIALS ARE SPECIFICALLY CALLED OUT T BE PROVIDED BY OTHER CONTRACTORS.

33. <u>PIPE HANGERS AND SUPPORTS</u>

CONTRACTOR SHALL FURNISH AND INSTALL ALL ADJUSTABLE HANGERS, SPECIAL P SUPPORTS, SPRING HANGERS, ANCHORS, CLAMPS, RODS, AND APPURTENANCES AS REQUIRED TO SECURELY AND PROPERLY HANG OR SUPPORT THE PIPING SYSTEMS HANGERS AND SUPPORTS SHALL BE EQUIVALENT TO THE GRINNELL MODELS SPECIFIED.

ALL PIPING SYSTEMS SHALL HAVE ANCHORAGE, SWAY BRACES, GUIDES AND SUPPORTS SATISFACTORY TO THE ARCHITECT AND SHALL BE FABRICATED IN ACCORDANCE WITH ANSI CODE B31.9, BUILDING SERVICES PIPING", LATEST ISSUE, AND MUST BE INSTALLED WITH DUE REGARD FOR GENERAL REQUIREMENTS.

WHERE HANGERS ARE SUPPORTED FROM THE BUILDING STRUCTURAL STEEL, THEY SHALL BE ATTACHED TO STRUCTURAL MEMBERS BY BEAM CLAMPS BEARING ON BOTH SIDES. DO NOT WELD HANGER RODS TO STRUCTURAL STEEL. WHEN ATTACHING TO BAR JOISTS, ATTACH AT THE PANEL POINTS ONLY. ATTACH TO CONCRETE DECKING USING EXPANSION BOLTS OR CONCRETE ANCHORS.

HANGERS NOT OTHERWISE NOTED OR SPECIFIED SHALL BE ADJUSTABLE WROUGHT IRON CLEVIS TYPE, GRINNELL NO. 260, FOR INSULATED AND NON-INSULATED STEEL PIPE AND INSULATED COPPER TUBING. BARE COPPER TUBING SHALL BE SUPPORTED WITH COPPER-PLATED PLASTIC-COATED HANGERS, GRINNELL FIG. CT-99C. SUITABLE TRAPEZE TYPE HANGERS MAY BE USED WHERE SEVERAL LINES ARE RUNNING PARALLEL.

PIPING SHALL BE SUPPORTED WITH HANGERS SPACED IN ACCORDANCE WITH SCHEDULE ON SHEET M602. EACH SECTION OF PIPE SHALL HAVE AT LEAST ONE HANGER. VERTICAL LINES SHALL BE SUPPORTED BY PIPE CLAMP TYPE SUPPORTS DESIGNED FOR THIS PURPOSE AT EACH FLOOR LEVEL. ON PLASTIC PIPING WHICH IS INSULATED, REDUCE SPACING TO 70% OF DISTANCES LISTED.

HANGER ROD SIZE SHALL BE IN ACCORDANCE WITH SCHEDULE ON SHEET FP102. PIPING, ETC. SHALL BE INDEPENDENTLY SUPPORTED FROM THE BUILDING STRUCTURE AND SHALL NOT BE SUPPORTED FROM OTHER DUCTS, PIPES, ETC. WHERE INTERFERENCES DO OCCUR, PROVIDE TRAPEZE TYPE HANGERS OR SUPPORTS.

34. <u>VALVES</u>:

GATE VALVE 2" AND SMALLER - OS&Y TYPE SCREWED, BRONZE BODY, BRONZE TRIM AND CAST IRON HAND WHEEL, KENNEDY NO. 66 OR APPROVED EQUAL BY FAIRBANKS, NIBCO, MUELLER, STOCKHAM, JENKINS AND WALWORTH.

GATE VALVE 2-1/2" AND LARGER - OS&Y TYPE FLANGED, IRON BODY, B TRIM AND CAST IRON HAND WHEEL, KENNEDY NO. 68 OR APPROVED EQUA FAIRBANKS, NIBCO, MUELLER, STOCKHAM, JENKINS AND WALWORTH.

BUTTERFLY VALVE 2 1/2" AND LARGER - UL LISTED, FM APPROVED, CAST IRON, DUCTILE IRON, OR STEEL BODY, NICKEL CHROME PLATED DISC, STAINLI SHAFT, EDPM SEAT, WAFER LUG, OR GROOVED END TYPE BODY, (ACTUATOR WITH INDICATOR, HAND WHEEL AND TAPPING FOR MONITORIN KENNEDY NO. 82 M/UL, 911 OR APPROVED EQUAL BY MUELLER, NIBCO, VICTAULIC OR GRINNELL.

CHECK VALVE 2-1/2" AND LARGER - SWING TYPE, IRON BODY, BRONZE MOUNTED, BRONZE FACED DISC, DRAIN PLUG AND TOP REMOVABLE COVER, KENNEDY NO. 126 OR APPROVED EQUAL BY NIBCO, CRANE, STOCKHAM, JENKINS, WALWORTH, MUELLER, GRINNELL, AUTOMATIC OR VIKING. OR GROOVED TYP EQUAL TO VICTAULIC STYLE 717.

WAFER CHECK VALVE 4", 6" AND 8" – GALVANIZED CAST IRON BODY WITH BRONZE CLAPPER, O-RING, PLATE AND LIFTING LUG. PLATE TO INDICATE DIRECTION OF FLOW. GRINNELL F-512 OR EQUAL BY AUTOMATIC, KENNEDY, CENTRAL OR VIKING.

DETECTOR CHECK VALVE 4", 6" AND 8" - CAST IRON BODY AND COVER AND ALL INTERNAL PARTS ARE TO BE BRONZE. GRINNELL F-1369 OR EQUAL BY HERSEY PRODUCTS OR VIKING. METER TO BE HERSEY PRODUCTS MODEL FM.

REDUCED PRESSURE ZONE ASSEMBLY 2 1/2" TO 10" - TWO INDEPENDENTLY OPERATED LINK CHECK MODULES, A DIFFERENTIAL PRESSURE RELIEF VALVE LOCATED BETWEEN AND BELOW TWO CHECK VALVES, TWO DRIP TIGHT SHUT-OFF VALVES, AND REQUIRED TEST COCKS. LINK CHECK MODULES AND RELIEF VALVE SHALL BE LOCATED WITHIN ACCESSIBLE 304 STAINLESS STEEL SLEEVE. LINK CHECKS SHALL HAVE REVERSIBLE ELASTOMER DISCS AND IN OPERATION DRIP TIGHT CLOSURE AGAINST REVERSE FLOW OF LIQUID CAUSED BY BACK PRESSURE OR BACKSIPHONAGE. ASSEMBLY SHALL BE EQUAL TO AMES MODEL C400 OR APPROVED EQUAL BY HERSEY, CLA-VAL COMPANY OR FEBCO.

FOR A PARTICULAR TYPE OF VALVE, ALL VALVES SHALL BE OF THE SAME MANUFACTURER.

THIS CONTRACTOR SHALL FURNISH ALL VALVES AS INDICATED ON THE DRAWINGS AND AS REQUIRED FOR THE PROPER CONTROL AT VARIOUS APPARATUS SO THAT ANY APPARATUS MAY BE REMOVED FOR REPAIR WITHOUT INTERFERENCE TO THE REMAINDER OF THE BUILDING.

	35.	SPRINKLER HEAD:		
ED IN OR /E		A. SPRINKLER HEAD SHALL BE UPRIGHT, SIDEWALL OR PENDANT TYPE, OF APPROVED MAKE AND OF CORRECT TEMPERATURE RATING FOR THE CONDITION AT THE INSTALLED LOCATION. SPACING OF SPRINKLER HEADS SHALL BE IN ACCORDANCE WITH REGULATIONS OF THE NFPA, IRI, FM LOCAL FIRE DEPARTMENT, AND STATE OF OHIO FOR THE TYPE OF OCCUPANCY SPECIFIED OR REQUIRED. HEAD SHALL BE AS MANUFACTURED BY GRINNELL, GEM, VIKING OR AUTOMATIC. SYSTEM HEAD IN FINISHED AREA SHALL BE OF BEST QUALITY CHROME-PLATE AND SHALL BE CENTERED IN THE CEILING TILE WHERE APPLICABLE. ESCUTCHEON IS TO BE ONE PIECE.	VEER BIRKEMEIER	MAL ENCLURE
ION		B. FURNISH EXTRA SPRINKLERS OF EACH KIND USED ON THIS PROJECT WITH WRENCHES AND CABINETS LOCATED AS DIRECTED BY THE GENERAL CONTRACTOR AND AS REQUIRED BY NFPA 13.		-
IALL		C. INSTALL SPRINKLER DEFLECTOR OR HEAD GUARD WHERE REQUIRED, AS DEMANDED BY THE LOCAL CONDITION.		7 00
40		D. USE OF EXTENDED COVERAGE HEADS IS ACCEPTABLE.	9	3.5323
OOF	36.	ALARM CHECK VALVE:		\circ
		A. EXISTING CHECK VALVE TO REMAIN.		D E
PES	37.	RISER CHECK VALVE:		-
JGE ⁄OR		A. EXISTING CHECK VALVE TO REMAIN.		I N G 45875
MS	38.	MONITOR SWITCH (ESV):		
		A. EXISTING MONITOR SWITCH TO REMAIN. VERIFY PROPER OPERATION.		E R I A, OH
LOOR IST	39.	WATER FLOW DETECTOR SWITCH (WFD):	ביב	TTAWA,
Ē		A. EXISTING WATER FLOW DETECTOR SWITCH TO REMAIN. VERIFY PROPER OPERATION.	000	00
D IAL E	40.	FIRE EXTINGUISHER	e e	E N 102,
RE ,		A. FIRE EXTINGUISHER TO BE UL LISTED, FACTORY MUTUAL APPROVED HEAVY DUTY STEEL CYLINDER, RED ENAMEL FINISH, WITH HOSE, NOZZLE AND EASY UPRIGHT SQUEEZE GRIP OPERATION. MULTIPURPOSE ABC TYPE, 10# 4A:60BC UNLESS NOTED OTHERWISE ON DRAWINGS.		A R C H I T E C T U R E . 1800 N PERRY STREET, SUITE www.technicondesigngroup.com
EEN	41.	VALVE BOX:		T U REE
ULE		A. EXISTING VALVE BOX TO REMAIN.		C ⁻ STI esiç
E	42.	ALARM HORN/STROBE		T E R≺ ond
	72.	A. EXISTING ALARM HORN/STROBE TO REMOVED. SYSTEM TO BE TIED INTO EXISTING FIRE ALARM.		N H I . N PER echnic
ERS ES	43.	FIRE DEPARTMENT INLET		R C 300 N ww.tt
		A. EXISTING TO REMAIN.	-	≤ ∓ ≥
	44.	FINAL ACCEPTANCE		
FO PIPE		A. WHEN THE FIRE PROTECTION CONTRACTOR BELIEVES THAT THE FIRE SUPPRESSION SYSTEM IS SATISFACTORILY INSTALLED AND CAPABLE OF OPERATION AS INTENDED, THE CONTRACTOR SHALL NOTIFY THE ARCHITECT, AS PER THE GENERAL MECHANICAL REQUIREMENTS, FOR CONDUCTING A FINAL OBSERVATION OF THE INSTALLATION. AFTER CORRECTION OF ANY PUNCH LIST ITEMS, THE FIRE PROTECTION CONTRACTOR SHALL NOTIFY THE AUTHORITY HAVING JURISDICTION AND MAKE ARRANGEMENTS FOR FINAL TEST AND OBSERVATION OF THE INSTALLATION. FINAL ACCEPTANCE WILL BE CONTINGENT UPON THE OPERATION AND INSTALLATION PROVING SATISFACTORY TO THE ARCHITECT, OWNER'S INSURANCE UNDERWRITER, LOCAL BUILDING AND FIRE DEPARTMENT AND THE OWNER'S REPRESENTATIVE.	S	~~
S.		B. BEFORE FINAL ACCEPTANCE THE FIRE PROTECTION CONTRACTOR MUST FURNISH	SNS -	

- TO OWNER A CURRENT COPY OF NFPA STANDARD 25, ALONG WITH OPERATION/MAINTENANCE MANUALS, COPIES OF THE "CONTRACTOR'S MATERIAL AND TEST CERTIFICATES" AND SYSTEM WARRANTY.
- 45. <u>FIRE PROTECTION CONTRACTOR</u>
 - THE FIRE PROTECTION CONTRACTOR MUST BE CERTIFIED IN THE STATE OF OHIO Α. TO DO FIRE PROTECTION WORK AND SHALL REGULARLY BE ENGAGED IN THE INSTALLATION OF FIRE SUPPRESSION SYSTEMS.
 - B. THEY SHALL EMPLOY STATE CERTIFIED "AUTOMATIC SPRINKLER SYSTEM DESIGNERS AND INSTALLERS" CERTIFIED FOR THE DESIGN AND INSTALLATION OF FIRE PROTECTION SYSTEMS.
- 46. FLUSHING AND TESTING
- A. FURNISH AND INSTALL ALL NECESSARY TESTING LINES, FITTINGS, AND VALVES. THIS SHALL INCLUDE FITTINGS FOR CHLORINATION AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION.
- B. ALL FIRE PROTECTOIN PIPING SHALL BE FLUSHED AND TESTED IN ACCORDANCE WITH NFPA, OHIO BUILDING CODE, AND LOCAL FIRE DEPARTMENT REQUIREMENTS.
- C. THE CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE AT LEAST 48 HOURS IN ADVANCE OF ANY TEST.

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GEAR	TYPE
IG S	WITCH.
KEYS	STONE,

BUILDING RENOVATIONS	PERRY PROTECH	1270 FLAGSHIP DRIVE	PERRYSBURG, OH 43551			
REPRODUCED BY FOR ANY PURPOS PROJECT. IF THIS WORK OTHER TH	F THIS DRAWING S INDIVIDUALS, COR E OTHER THAN TH DRAWING IS USED AN THE PROJECT IN RIGHT IS RESERVI	PORATIONS, OR E INTENDED US IN PART OR ITS NTENDED BY TE	COTHER ENTITIES E FOR THIS ENTIRETY, ON CHNICON DESIGN			
ADDITIONAL ARCH THEREFORE, REU	HITECTURAL AND/C ISE OR REPRODUC WRITTEN CONSENT	OR ENGINEERING	G FEES. DCUMENT			
	CHNICON D	ESIGN GI	ROUP, INC.			
ARCHITECT/E FOR ANY QUA	LE FROM DRAW ENGINEER SHAL ANTITIES OF MA DF BUILDING CO DRAWINGS.	L NOT BE RE	C			
FIRE PROTECTION SPECIFICATIONS						
	ISSUED	ΠΔΤΕ				
	PERMITS					
DRAWN	BY:		SAB			
DATE:			08-23			
PLOT SC	ALE:		1:1			
JOB NO.			-2902-23			
SHEET FP902						

COM*check* Software Version 4.1.5.5 Envelope Compliance Certificate

Project Information

Energy Code: Project Title: Location: Climate Zone: Project Type:	90.1 (2010) Standard Perry Protech Perrysburg, Ohio 5a Alteration	
Construction Site: 1270 Flagship Drive Perrysburg, OH 43551	Owner/Agent: Tony Hovest Technicon Design Group, Inc. 1800 North Perry Street Suite 102	Designer/Contractor: Gillian Stechschulte Technicon Design Group, Inc. 1800 North Perry Street Suite 102

Building Area	Floor Area
1-Office (Office) : Nonresidential	10316

419-523-5323

Ottawa, OH 45875

Envelope Assemblies

	R-Value		Proposed		Max. Allowed	
Post-Alteration Assembly	Cavity	Cont.	U-Factor	SHGC	U-Factor	SHGC
Exterior Wall 1: Wood-Framed, 16" o.c., [Bldg. Use 1 - Office]	25.0	0.0	0.057		0.064	

info@technicondesigngroup.com

Envelope PASSES

Envelope Compliance Statement

Compliance Statement: The proposed envelope alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed envelope systems have been designed to meet the 90.1 (2010) Standard requirements in COM*check* Version 4.1.5.5 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Scott A. Birkemeier, P.E. LEED AP

Name - Title

Nor A	the
Signature	

01-08-24 Date

Ottawa, OH 45875

info@technicondesigngroup.com

419-523-5323

COM*check* Software Version 4.1.5.5 Interior Lighting Compliance Certificate

Project Information

Energy Code: Project Title: Project Type:

Construction Site: 1270 Flagship Drive Perrysburg, OH 43551 90.1 (2010) Standard Perry Protech Alteration

> Owner/Agent: Tony Hovest Technicon Design Group, Inc. 1800 North Perry Street Suite 102 Ottawa, OH 45875 419-523-5323 info@technicondesigngroup.com

Designer/Contractor: Gillian Stechschulte Technicon Design Group, Inc. 1800 North Perry Street Suite 102 Ottawa, OH 45875 419-523-5323 info@technicondesigngroup.com

Allowed Interior Lighting Power

A Area Category	B Floor Area (ft2)	C Allowed Watts / ft2	D Allowed Watts (B X C)
1-101 (Common Space Types:Lobby - General)	141	0.90	127
2-102 (Common Space Types:Lobby - General)	199	0.90	179
3-103 (Common Space Types:Office - Open Plan)	516	0.98	506
4-104 (Common Space Types:Conference/Meeting/Multipurpose)	653	1.23	803
5-105 (Common Space Types:Corridor/Transition <8 ft wide)	510	0.66	337
6-106 (Common Space Types:Office - Open Plan)	266	0.98	261
7-107 (Common Space Types:Office - Enclosed)	183	1.11	203
8-108 (Common Space Types:Office - Enclosed)	199	1.11	221
9-109 (Common Space Types:Classroom/Lecture/Training)	389	1.24	482
10-110 (Common Space Types:Office - Open Plan)	510	0.98	500
11-111 (Common Space Types:Storage)	23	0.63	14
12-112 (Common Space Types:Restrooms)	175	0.98	172
13-113 (Common Space Types:Restrooms)	175	0.98	172
14-114 (Common Space Types:Storage)	23	0.63	14
15-115 (Common Space Types:Lounge/Recreation)	648	0.73	473
16-116 (Common Space Types:Office - Open Plan)	765	0.98	750
17-117 (Common Space Types:Office - Open Plan)	689	0.98	675
18-118 (Common Space Types:Storage)	15	0.63	9
19-119 (Common Space Types:Corridor/Transition <8 ft wide)	225	0.66	148
20-120 (Common Space Types:Office - Enclosed)	230	1.11	255
21-121 (Common Space Types:Office - Enclosed)	204	1.11	226
22-122 (Common Space Types:Office - Enclosed)	140	1.11	155
23-123 (Common Space Types:Storage)	118	0.63	74
24-124 (Common Space Types:Sales Area)	971	1.68	1631
25-125 (Common Space Types:Storage)	1390	0.63	876
26-126 (Common Space Types:Electrical/Mechanical)	136	0.95	129
27-127 (Common Space Types:Electrical/Mechanical)	30	0.95	28
28-128 (Common Space Types:Storage)	372	0.63	234
29-129 (Common Space Types:Corridor/Transition <8 ft wide)	37	0.66	24
		Total Allowed Watts	= 9681

Proposed Interior Lighting Power

Proposed Interior Lighting Power A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixtures	D Fixture Watt.	E (C X D)
<u>101 (Common Space Types:Lobby - General 141 sq.ft.)</u> LED 1: Other:	1	4	14	56
<u>102 (Common Space Types:Lobby - General 199 sq.ft.)</u> LED 2: Other:	1	4	32	128
<u>103 (Common Space Types:Office - Open Plan 516 sq.ft.)</u> LED 3: Other: LED 4: Other:	1	4 3	49 32	196 96
LED 5: Other: 104 (Common Space Types:Conference/Meeting/Multipurpose 653 sq.ft.)	1	2	24	48
LED 6: Other: <u>105 (Common Space Types:Corridor/Transition <8 ft wide 510 sq.ft.)</u>	1	6	50	300
LED 7: Other: 106 (Common Space Types:Office - Open Plan 266 sq.ft.)	1	10	49	490
LED 8: Other:	1	5	49	245
107 (Common Space Types:Office - Enclosed 183 sq.ft.) LED 9: Other:	1	4	49	196
108 (Common Space Types:Office - Enclosed 199 sq.ft.) LED 10: Other:	1	4	49	196
<u>109 (Common Space Types:Classroom/Lecture/Training 389 sq.ft.)</u> LED 11: Other: LED 12: Other:	1 1	6 1	49 14	294 14
<u>110 (Common Space Types:Office - Open Plan 510 sq.ft.)</u> LED 13: Other:	1	8	49	392
<u>111 (Common Space Types:Storage 23 sq.ft.)</u> LED 14: Other:	1	1	36	36
112 (Common Space Types:Restrooms 175 sq.ft.) LED 15: Other:	1	3	49	147
LED 16: Other: <u>113 (Common Space Types:Restrooms 175 sq.ft.)</u>	1	1	14	14
LED 17: Other: LED 18: Other:	1 1	3 1	49 14	147 14
<u>114 (Common Space Types:Storage 23 sq.ft.)</u> LED 19: Other:	1	1	36	36
<u>115 (Common Space Types:Lounge/Recreation 648 sq.ft.)</u> LED 20: Other:	1	6	49	294
LED 21: Other: <u>116 (Common Space Types:Office - Open Plan 765 sq.ft.)</u>	1	2	32	64
LED 22: Other: <u>117 (Common Space Types:Office - Open Plan 689 sq.ft.)</u>	1	9	49	441
LED 23: Other: <u>118 (Common Space Types:Storage 15 sq.ft.)</u>	1	8	49	392
LED 24: Other: <u>119 (Common Space Types:Corridor/Transition <8 ft wide 225 sq.ft.)</u>	1	1	36	36
LED 25: Other: LED 26: Other:	1 1	3 2	49 14	147 28
120 (Common Space Types:Office - Enclosed 230 sq.ft.) LED 27: Other:	1	4	49	196
<u>121 (Common Space Types:Office - Enclosed 204 sq.ft.)</u> LED 28: Other:	1	4	49	196
122 (Common Space Types:Office - Enclosed 140 sq.ft.)	·	·		

 Project Title:
 Perry Protech

 Data filename:
 J:\2902 - PERRY PROTECH - TOLEDO - RENOVATIONS\03_Design Data\002_Architectural-Structural\2902COMcheck.cck

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixtures	D Fixture Watt.	E (C X D)
LED 29: Other:	1	4	49	196
123 (Common Space Types:Storage 118 sq.ft.) LED 30: Other:	1	3	36	108
<u>124 (Common Space Types:Sales Area 971 sq.ft.)</u> LED 31: Other:	1	12	50	600
<u>125 (Common Space Types:Storage 1390 sq.ft.)</u> LED 32: Other:	1	13	42	546
<u>126 (Common Space Types:Electrical/Mechanical 136 sq.ft.)</u> LED 33: Other:	1	2	42	84
127 (Common Space Types:Electrical/Mechanical 30 sq.ft.) LED 34: Other:	1	1	42	42
<u>128 (Common Space Types:Storage 372 sq.ft.)</u> LED 35: Other:	1	4	42	168
<u>129 (Common Space Types:Corridor/Transition <8 ft wide 37 sq.ft.)</u> LED 36: Other:	1	1	36	36
		Total Propos	sed Watts =	6619

Interior Lighting PASSES

Interior Lighting Compliance Statement

Compliance Statement: The proposed interior lighting alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed interior lighting systems have been designed to meet the 90.1 (2010) Standard requirements in COM*check* Version 4.1.5.5 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Scott A. Birkemeier, P.E. LEED AP	
Name - Title	

Ver het t Signature

01-08-24 Date

COMcheck Software Version 4.1.5.5 Exterior Lighting Compliance Certificate

Project Information

Energy Code: Project Title: Project Type: Exterior Lighting Zone

90.1 (2010) Standard	
Perry Protech	
Alteration	
2 (Light industrial area	with limited nighttime use (LZ2))

Construction Site: 1270 Flagship Drive Perrysburg, OH 43551 Owner/Agent: Tony Hovest Technicon Design Group, Inc. 1800 North Perry Street Suite 102 Ottawa, OH 45875 419-523-5323 info@technicondesigngroup.com Designer/Contractor: Gillian Stechschulte Technicon Design Group, Inc. 1800 North Perry Street Suite 102 Ottawa, OH 45875 419-523-5323 info@technicondesigngroup.com

Allowed Exterior Lighting Power

A Area/Surface Category	B Quantity	C Allowed Watts / Unit	D Tradable Wattage	E Allowed Watts (B X C)
Front Canopy (Entry canopy)	120 ft2	0.25	Yes	30
106 (Other door (not main entry))	3 ft of door	20	Yes	60
110 (Other door (not main entry))	3 ft of door	20	Yes	60
116A (Other door (not main entry))	3 ft of door	20	Yes	60
125B (Other door (not main entry))	3 ft of door	20	Yes	60
125C (Other door (not main entry))	3 ft of door	20	Yes	60
128B (Other door (not main entry))	3 ft of door	20	Yes	60
		Total Tradab	ole Watts (a) =	390
	Total Allowed Watts = Total Allowed Supplemental Watts (b) =		390	
			600	

(a) Wattage tradeoffs are only allowed between tradable areas/surfaces.

(b) A supplemental allowance equal to 600 watts may be applied toward compliance of both non-tradable and tradable areas/surfaces.

Proposed Exterior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixtures	D Fixture Watt.	E (C X D)
Front Canopy (Entry canopy 120 ft2): Tradable Wattage LED 1: Other:	1	3	14	42
<u>106 (Other door (not main entry) 3 ft of door width): Tradable Wattage</u> LED 2: Other:	1	1	54	54
110 (Other door (not main entry) 3 ft of door width): Tradable Wattage LED 3: Other:	1	1	54	54
<u>116A (Other door (not main entry) 3 ft of door width): Tradable Wattage</u> LED 4: Other:	1	1	54	54
125B (Other door (not main entry) 3 ft of door width): Tradable Wattage LED 5: Other:	1	1	54	54
125C (Other door (not main entry) 3 ft of door width): Tradable Wattage				

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixtures	D Fixture Watt.	E (C X D)
LED 6: Other:	1	1	54	54
128B (Other door (not main entry) 3 ft of door width): Tradable Wattage				
LED 7: Other:	1	1	54	54
	Total Trac	dable Propos	sed Watts =	366

Exterior Lighting PASSES

Exterior Lighting Compliance Statement

Compliance Statement: The proposed exterior lighting alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed exterior lighting systems have been designed to meet the 90.1 (2010) Standard requirements in COM*check* Version 4.1.5.5 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Scott A. Birkemeier, P.E. LEED AP 01-08-24 Signature Name - Title Date

6 of 25

COMcheck Software Version 4.1.5.5 Mechanical Compliance Certificate

Project Information

Energy Code: Project Title: Location: Climate Zone: Project Type:

1

90.1 (2010) Standard Perry Protech Perrysburg, Ohio 5a Alteration

Construction Site: 1270 Flagship Drive Perrysburg, OH 43551 Owner/Agent: Tony Hovest Technicon Design Group, Inc. 1800 North Perry Street Suite 102 Ottawa, OH 45875 419-523-5323 info@technicondesigngroup.com Designer/Contractor: Gillian Stechschulte Technicon Design Group, Inc. 1800 North Perry Street Suite 102 Ottawa, OH 45875 419-523-5323 info@technicondesigngroup.com

Mechanical Systems List

Quantity System Type & Description

VRHP-1 VRF Condensing Unit, Air Cooled Heat Pump Heating Mode: Capacity = 45 kBtu/h, Proposed Efficiency = 3.80 COP, Required Efficiency = 3.30 COP Cooling Mode: Capacity = 70 kBtu/h, Proposed Efficiency = 13.70 EER, Required Efficiency: 11.00 EER + 12.3 IEER Fan System: None

SYSTEM VERIFICATION REQUIRED.

1 RTU-1

Heating: 1 each - Central Furnace, Gas, Capacity = 150 kBtu/h
Proposed Efficiency = 81.00% Et, Required Efficiency: 80.00 % Et (or 78% AFUE)
Cooling: 1 each - Single Package DX Unit, Capacity = 74 kBtu/h, Air-Cooled Condenser, Air Economizer
Proposed Efficiency = 11.00 EER, Required Efficiency: 11.00 EER
Fan System: FAN SYSTEM 1 -- Compliance (Motor nameplate HP method) : Passes

Fans:

FAN 1 Supply, Constant Volume, 2400 CFM, 3.0 motor nameplate hp

SYSTEM VERIFICATION REQUIRED.

1 RTU-2

Heating: 1 each - Central Furnace, Gas, Capacity = 150 kBtu/h Proposed Efficiency = 81.00% Et, Required Efficiency: 80.00 % Et (or 78% AFUE)
Cooling: 1 each - Single Package DX Unit, Capacity = 60 kBtu/h, Air-Cooled Condenser, Air Economizer Proposed Efficiency = 13.00 SEER, Required Efficiency: 13.00 SEER
Fan System: FAN SYSTEM 2 -- Compliance (Motor nameplate HP method) : Passes

Fans:

FAN 2 Supply, Constant Volume, 2000 CFM, 1.5 motor nameplate hp

SYSTEM VERIFICATION REQUIRED.

1 RTU-3

Heating: 1 each - Central Furnace, Gas, Capacity = 240 kBtu/h Proposed Efficiency = 81.00% Ec, Required Efficiency: 80.00 % Ec Cooling: 1 each - Single Package DX Unit, Capacity = 119 kBtu/h, Air-Cooled Condenser, Air Economizer

Project Title: Perry Protech Data filename: J:\2902 - PERRY PROTECH - TOLEDO - RENOVATIONS\03_Design Data\002_Architectural-Structural\2902COMcheck.cck

Quantity System Type & Description

Proposed Efficiency = 11.00 EER, Required Efficiency: 11.00 EER Fan System: FAN SYSTEM 3 -- Compliance (Motor nameplate HP method) : Passes

Fans:

FAN 3 Supply, Constant Volume, 4000 CFM, 3.0 motor nameplate hp

SYSTEM VERIFICATION REQUIRED.

1 RTU-4

Heating: 1 each - Central Furnace, Gas, Capacity = 150 kBtu/h
Proposed Efficiency = 81.00% Et, Required Efficiency: 80.00 % Et (or 78% AFUE)
Cooling: 1 each - Single Package DX Unit, Capacity = 60 kBtu/h, Air-Cooled Condenser, Air Economizer
Proposed Efficiency = 13.00 SEER, Required Efficiency: 13.00 SEER

Fan System: FAN SYSTEM 4 -- Compliance (Motor nameplate HP method) : Passes

Fans:

FAN 4 Supply, Constant Volume, 2000 CFM, 1.5 motor nameplate hp

SYSTEM VERIFICATION REQUIRED.

2 RP-1, RP-2

Heating: 1 each - Radiant Heater, Electric, Capacity = 3 kBtu/h No minimum efficiency requirement applies Fan System: None

SYSTEM VERIFICATION REQUIRED.

1 EWH-1

Electric Storage Water Heater, Capacity: 30 gallons w/ Circulation Pump Proposed Efficiency: 0.90 SL, Btu/h (if > 12 kW), Required Efficiency: 211.70 SL, Btu/h (if > 12 kW)

SWH COMPLIANCE REQUIRED.

Mechanical Compliance Statement

Compliance Statement: The proposed mechanical alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 90.1 (2010) Standard requirements in COM*check* Version 4.1.5.5 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Scott A. Birkemeier, P.E. LEED AP

Name - Title

Signature

01-08-24 Date

COMcheck Software Version 4.1.5.5 Inspection Checklist

Energy Code: 90.1 (2010) Standard

Requirements: 100.0% were addressed directly in the COMcheck software

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

Section # & Reg.ID	Plan Review	Complies?	Comments/Assumptions
4.2.2,5.4. 3.1.1,5.7 [PR1] ¹	Plans and/or specifications provide all information with which compliance can be determined for the building envelope and document where exceptions to the standard are claimed.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
4.2.2,6.4. 4.2.1,6.7. 2 [PR2] ¹	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mechanical systems and equipment and document where exceptions to the standard are claimed. Load calculations per acceptable engineering standards and handbooks.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
4.2.2,7.7. 1,10.4.2 [PR3] ¹	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the service water heating systems and equipment and document where exceptions to the standard are claimed. Hot water system sized per manufacturer's sizing guide.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
4.2.2,8.4. 1.1,8.4.1. 2,8.7 [PR6] ²		□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
4.2.2,9.4. 4,9.7 [PR4] ¹	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the interior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include interior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.

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

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
9.7 [PR8] ¹	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the exterior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include exterior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
6.7.2.4 [PR5] ¹	Detailed instructions for HVAC systems commissioning included on the plans or specifications for projects >=50,000 ft2.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.

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

Section # & Req.ID	Footing / Foundation Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
5.5.3.3 [FO1] ²	Below-grade wall insulation R- value.	R	R	□Complies □Does Not	See the Envelope Assemblies table for values.
				□Not Observable □Not Applicable	
5.5.3.5 [FO3] ²	Slab edge insulation R-value.	R Unheated	R Unheated	□Complies □Does Not	<i>See the Envelope Assemblies table for values.</i>
		Heated	Heated	□Not Observable □Not Applicable	
5.5.3.5 [FO5] ²	Slab edge insulation depth/length.	ft	ft	□Complies □Does Not	See the Envelope Assemblies table for values.
				□Not Observable □Not Applicable	
5.8.1.7.3 [FO7] ¹	Insulation in contact with the ground has <=0.3% water			□Complies □Does Not	Requirement will be met.
	absorption rate per ASTM C272.			□Not Observable □Not Applicable	
6.4.3.8 [FO9] ³	Freeze protection and snow/ice melting system sensors for future			□Complies □Does Not	Requirement will be met.
	connection to controls.			□Not Observable □Not Applicable	

1 High Impact (Tier 1)

2 Medium Impact (Tier 2) 3

Section #	Framing / Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
& Req.ID 5.4.3.2 [FR1] ³	Factory-built fenestration and doors are labeled as meeting air	Value	Value	Complies	Requirement will be met.
[FKI]	leakage requirements.			Does Not Not Observable	
5.5.4.3a [FR8] ¹	Vertical fenestration U-Factor.	U	U	□Complies □Does Not	See the Envelope Assemblies table for values.
				□Not Observable □Not Applicable	
5.5.4.3b [FR9] ¹	Skylight fenestration U-Factor.	U	U	□Complies □Does Not	See the Envelope Assemblies table for values.
				□Not Observable □Not Applicable	
5.5.4.4.1 [FR10] ¹	Vertical fenestration SHGC value.	SHGC:	SHGC:	□Complies □Does Not	See the Envelope Assemblies table for values.
				□Not Observable □Not Applicable	
5.5.4.4.2 [FR11] ¹	Skylight SHGC value.	SHGC:	SHGC:	□Complies □Does Not	See the Envelope Assemblies table for values.
				□Not Observable □Not Applicable	
5.8.2.1 [FR12] ²	Fenestration products rated in accordance with NFRC.			□Complies □Does Not	Requirement will be met.
				□Not Observable □Not Applicable	
5.8.2.2 [FR13] ¹	Fenestration products are certified as to performance labels			Complies Does Not	Requirement will be met.
	or certificates provided.			□Not Observable □Not Applicable	
5.8.2.3,5. 5.3.6	U-factor of opaque doors associated with the building	U Swinging	U U Swinging	Complies Does Not	See the Envelope Assemblies table for values.
[FR14] ²	thermal envelope meets requirements.	Nonswinging	Nonswinging	□Not Observable □Not Applicable	
5.4.3.1 [FR15] ¹	Continuous air barrier is wrapped, sealed, caulked, gasketed, and/or taped in an approved manner, except in semiheated spaces and in climate zones 1-6.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Ir
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Section # & Req.ID	Plumbing Rough-In Inspection	Complies?	Comments/Assumptions
7.4.4.1 [PL2] ³	Temperature controls installed on service water heating systems	□Complies □Does Not	Requirement will be met.
	$(=120^{\circ}F$ to maximum temperature for intended use).	□Not Observable □Not Applicable	
7.4.4.2 [PL3] ¹	Automatic time switches installed to automatically switch off the	□Complies □Does Not	Requirement will be met.
	recirculating hot-water system or heat trace.	□Not Observable □Not Applicable	

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

Section # & Req.ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.4.1.4,6. 4.1.5 [ME1] ²	HVAC equipment efficiency verified. Non-NAECA HVAC equipment labeled as meeting 90.1.	Efficiency:	Efficiency:	□Complies □Does Not □Not Observable □Not Applicable	<i>See the Mechanical Systems list for values.</i>
6.4.3.4.1 [ME3] ³	Stair and elevator shaft vents have motorized dampers that automatically close.			Complies Does Not Not Observable Not Applicable	Exception: Requirement does not apply.
6.4.3.4.2, 6.4.3.4.3 [ME4] ³	Outdoor air and exhaust systems have motorized dampers that automatically shut when not in use and meet maximum leakage rates. Check gravity dampers where allowed.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
6.4.3.4.5 [ME39] ³	Enclosed parking garage ventilation has automatic contaminant detection and capacity to stage or modulate fans to 50% or less of design capacity.			□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply.
6.4.3.4.4 [ME5] ³	Ventilation fans >0.75 hp have automatic controls to shut off fan when not required.			Complies Does Not Not Observable Not Applicable	Requirement will be met.
6.4.3.9 [ME6] ¹	Demand control ventilation provided for spaces >500 ft2 and >40 people/1000 ft2 occupant density and served by systems with air side economizer, auto modulating outside air damper control, or design airflow >3,000 cfm.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
6.4.3.10 [ME40] ²	Single zone HVAC systems with fan motors >=5 hp have variable airflow controls. Air conditioning equipment with a cooling capacity >=110,000 Btu/h has variable airflow controls.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met. See the Mechanical Systems list for values.
6.4.3.10 [ME40] ²	Single zone HVAC systems with fan motors >=5 hp have variable airflow controls. Air conditioning equipment with a cooling capacity >=110,000 Btu/h has variable airflow controls.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met. See the Mechanical Systems list for values.
6.4.3.10 [ME40] ²	Single zone HVAC systems with fan motors >=5 hp have variable airflow controls. Air conditioning equipment with a cooling capacity >=110,000 Btu/h has variable airflow controls.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met. See the Mechanical Systems list for values.
6.4.3.10 [ME40] ²	Single zone HVAC systems with fan motors >=5 hp have variable airflow controls. Air conditioning equipment with a cooling capacity >=110,000 Btu/h has variable airflow controls.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met. See the Mechanical Systems list for values.

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)
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Section # & Req.ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.4.3.10 [ME40] ²	Single zone HVAC systems with fan motors >=5 hp have variable airflow controls. Air conditioning equipment with a cooling capacity >=110,000 Btu/h has variable airflow controls.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met. See the Mechanical Systems list for values.
6.4.3.10 [ME40] ²	Single zone HVAC systems with fan motors >=5 hp have variable airflow controls. Air conditioning equipment with a cooling capacity >=110,000 Btu/h has variable airflow controls.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met. See the Mechanical Systems list for values.
6.4.4.1.1 [ME7] ³	Insulation exposed to weather protected from damage. Insulation outside of the conditioned space and associated with cooling systems is vapor retardant.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
6.4.4.1.2 [ME8] ²	HVAC ducts and plenums insulated. Where ducts or plenums are installed in or under a slab, verification may need to occur during Foundation Inspection.	R	R	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
6.4.4.1.3 [ME9] ²	HVAC piping insulation thickness. Where piping is installed in or under a slab, verification may need to occur during Foundation Inspection.	in.	in.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
6.4.4.1.4 [ME41] ³	Thermally ineffective panel surfaces of sensible heating panels have insulation >= R-3.5.			Complies Does Not Not Observable Not Applicable	Requirement will be met.
6.4.4.2.1 [ME10] ²	Ducts and plenums sealed based on static pressure and location.			Complies Does Not Not Observable Not Applicable	Requirement will be met.
6.4.4.2.2 [ME11] ³	Ductwork operating >3 in. water column requires air leakage testing.			Complies Does Not Not Observable Not Applicable	Requirement will be met.
6.4.4.2.2 [ME11] ³	Ductwork operating >3 in. water column requires air leakage testing.			Complies Does Not Not Observable Not Applicable	Requirement will be met.
6.4.4.2.2 [ME11] ³	Ductwork operating >3 in. water column requires air leakage testing.			Complies Does Not Not Observable Not Applicable	Requirement will be met.
6.4.4.2.2 [ME11] ³	Ductwork operating >3 in. water column requires air leakage testing.			Complies Does Not Not Observable Not Applicable	Requirement will be met.
6.4.4.2.2 [ME11] ³	Ductwork operating >3 in. water column requires air leakage testing.			Complies Does Not Not Observable Not Applicable	Requirement will be met.

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Section # & Req.ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.4.4.2.2 [ME11] ³	Ductwork operating >3 in. water column requires air leakage testing.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
	Air economizers provided where required, meet the requirements for design capacity, control signal, ventilation controls, high- limit shut-off, integrated economizer control, and provide a means to relieve excess outside air during operation.			Complies Does Not Not Observable Not Applicable	
	Air economizers provided where required, meet the requirements for design capacity, control signal, ventilation controls, high- limit shut-off, integrated economizer control, and provide a means to relieve excess outside air during operation.			□Complies □Does Not □Not Observable □Not Applicable	
	Air economizers provided where required, meet the requirements for design capacity, control signal, ventilation controls, high- limit shut-off, integrated economizer control, and provide a means to relieve excess outside air during operation.			□Complies □Does Not □Not Observable □Not Applicable	
6.5.1,6.5. 1.1,6.5.1. 3 [ME12] ¹	Air economizers provided where required, meet the requirements for design capacity, control signal, ventilation controls, high- limit shut-off, integrated economizer control, and provide a means to relieve excess outside air during operation.			□Complies □Does Not □Not Observable □Not Applicable	
6.5.2.3 [ME19] ³	Dehumidification controls provided to prevent reheating, recooling, mixing of hot and cold airstreams or concurrent heating and cooling of the same airstream.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
6.5.3.3 [ME42] ³	Multiple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met. See the Mechanical Systems list for values.
6.5.3.3 [ME42] ³	Multiple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met. See the Mechanical Systems list for values.
6.5.3.3 [ME42] ³	Multiple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met. See the Mechanical Systems list for values.
6.5.3.3 [ME42] ³	Multiple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.			Complies Does Not Not Observable Not Applicable	Requirement will be met. See the Mechanical Systems list for values.

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Section # & Req.ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.5.3.3 [ME42] ³	Multiple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.			Complies Does Not Not Observable	Requirement will be met. See the Mechanical Systems list for values.
6.5.3.3 [ME42] ³	Multiple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.			 Not Applicable Complies Does Not Not Observable Not Applicable 	Requirement will be met. See the Mechanical Systems list for values.
6.5.4.1 [ME25] ³	HVAC pumping systems >10 hp designed for variable fluid flow.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
6.5.6.1 [ME56] ¹	Exhaust air energy recovery on systems meeting Table 6.5.6.1.			Complies Does Not Not Observable Not Applicable	Requirement will be met.
6.5.7.1.1 [ME32] ²	Kitchen hoods >5,000 cfm have make up air >=50% of exhaust air volume.			Complies Does Not Not Observable Not Applicable	Exception: Requirement does not apply.
6.5.7.1.2 [ME46] ³	Conditioned supply air to space with a kitchen hood shall not exceed the greater of a) supply flow required to meet space heating or cooling, or b) hood exhaust flow minus the available air transfer from available spaces.			Complies Does Not Not Observable Not Applicable	Exception: Requirement does not apply.
6.5.7.1.2 [ME46] ³	Conditioned supply air to space with a kitchen hood shall not exceed the greater of a) supply flow required to meet space heating or cooling, or b) hood exhaust flow minus the available air transfer from available spaces.			□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply.
6.5.7.1.2 [ME46] ³	Conditioned supply air to space with a kitchen hood shall not exceed the greater of a) supply flow required to meet space heating or cooling, or b) hood exhaust flow minus the available air transfer from available spaces.			□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply.
6.5.7.1.2 [ME46] ³	Conditioned supply air to space with a kitchen hood shall not exceed the greater of a) supply flow required to meet space heating or cooling, or b) hood exhaust flow minus the available air transfer from available spaces.			□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply.
6.5.7.1.5 [ME49] ³	Approved field test used to evaluate design air flow rates and demonstrate proper capture and containment of kitchen exhaust systems.			□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply.

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Section # & Req.ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.5.7.2 [ME33] ¹	Fume hoods exhaust systems >=15,000 cfm have VAV hood exhaust and supply systems,			Complies	Exception: Requirement does not apply.
	direct make-up air or heat recovery.			□Not Observable □Not Applicable	
6.5.8.1 [ME34] ²	Unenclosed spaces that are heated use only radiant heat.			Complies	Exception: Requirement does not apply.
	·			□Not Observable □Not Applicable	
6.5.9 [ME35] ¹	Hot gas bypass limited to: <=240 kBtu/h - 50% >240 kBtu/h - 25%			□Complies □Does Not	Requirement will be met.
				□Not Observable □Not Applicable	
6.5.9 [ME35] ¹	Hot gas bypass limited to: <=240 kBtu/h - 50% >240 kBtu/h - 25%			□Complies □Does Not	Requirement will be met.
				□Not Observable □Not Applicable	
6.5.9 [ME35] ¹	Hot gas bypass limited to: <=240 kBtu/h - 50% >240 kBtu/h - 25%			□Complies □Does Not	Requirement will be met.
				□Not Observable □Not Applicable	
6.5.9 [ME35] ¹	Hot gas bypass limited to: <=240 kBtu/h - 50% >240 kBtu/h - 25%			□Complies □Does Not	Requirement will be met.
				□Not Observable □Not Applicable	
7.4.2 [ME36] ²	Service water heating equipment meets efficiency requirements.			□Complies □Does Not	
				□Not Observable □Not Applicable	

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Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
8.4.2 [EL10] ²		□Complies □Does Not	Requirement will be met.
	an automatic control device.	□Not Observable □Not Applicable	
	Automatic controls to shut off all building lighting.	□Complies □Does Not	Requirement will be met.
		□Not Observable □Not Applicable	
[EL2] ²	Independent lighting controls installed per approved lighting plans and all manual controls readily accessible and	Does Not	Requirement will be met.
	visible to occupants.	Not Observable	
[EL11] ²	Parking garage lighting is equipped with required lighting controls and daylight transition zone lighting.	□Complies □Does Not 	Exception: Requirement does not apply.
		□Not Observable □Not Applicable	
[EL12] ¹	Primary sidelighted areas >=250 ft2 are equipped with required lighting controls.	□Complies □Does Not 	Requirement will be met.
		□Not Observable □Not Applicable	
[EL13] ¹	Enclosed spaces with daylight area under skylights and rooftop monitors >900 ft2 are equipped with required	□Complies □Does Not	Exception: Requirement does not apply.
	lighting controls.	□Not Observable □Not Applicable	
	Automatic lighting controls for exterior lighting installed.	Does Not	Requirement will be met.
		□Not Observable □Not Applicable	
[EL4] ¹	Separate lighting control devices for specific uses installed per approved lighting plans.	□Complies □Does Not	Requirement will be met.
		□Not Observable □Not Applicable	
	Exit signs do not exceed 5 watts per face.	□Complies □Does Not	Requirement will be met.
		□Not Observable □Not Applicable	
[EL7] ¹	Exterior grounds lighting over 100 W provides >60 lm/W unless on motion sensor or fixture is exempt from scope	□Complies □Does Not	Requirement will be met.
	of code or from external LPD.	□Not Observable □Not Applicable	
[EL8] ¹	allowed for special functions per the	□Complies □Does Not	Requirement will be met.
		□Not Observable □Not Applicable	
	Electric motors meet requirements where applicable.	□Complies □Does Not	Requirement will be met.
		□Not Observable □Not Applicable	

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Section # & Req.ID	Insulation Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
5.4.3.1 [IN1] ¹	All sources of air leakage in the building thermal envelope are sealed, caulked, gasketed, weather stripped or wrapped with moisture vapor-permeable wrapping material to minimize air leakage.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
5.5.3.1 [IN2] ¹	Roof R-value. For some ceiling systems, verification may need to occur during Framing Inspection.	R Above deck Metal Attic	R Above deck Metal Attic	□Complies □Does Not □Not Observable □Not Applicable	See the Envelope Assemblies table for values.
5.5.3.2 [IN6] ¹	Above-grade wall insulation R- value.	R Mass Metal Steel Wood	R Mass Metal Steel Wood	□Complies □Does Not □Not Observable □Not Applicable	<i>See the Envelope Assemblies table for values.</i>
5.8.1.2 [IN7] ¹	Above-grade wall insulation installed per manufacturer's instructions.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
5.5.3.4 [IN8] ²	Floor insulation R-value.	R Mass Steel Wood	R Mass Steel Wood	□Complies □Does Not □Not Observable □Not Applicable	See the Envelope Assemblies table for values.
5.8.1.1 [IN10] ²	Building envelope insulation is labeled with R-value or insulation certificate providing R-value and other relevant data.			Complies Does Not Not Observable Not Applicable	Requirement will be met.
5.8.1.4 [IN11] ²	Eaves are baffled to deflect air to above the insulation.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
5.8.1.5 [IN12] ²	Insulation is installed in substantial contact with the inside surface separating conditioned space from unconditional space.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
5.8.1.6 [IN13] ²	Recessed equipment installed in building envelope assemblies does not compress the adjacent insulation.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
5.8.1.7 [IN14] ²	Exterior insulation is protected from damage with a protective material. Verification for exposed foundation insulation may need to occur during Foundation Inspection.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
5.8.1.7.1 [IN15] ²	Attics and mechanical rooms have insulation protected where adjacent to attic or equipment access.			□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
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Section # & Req.ID	Insulation Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
5.8.1.7.2 [IN16] ²	Foundation vents do not interfere with insulation.			□Complies □Does Not	Requirement will be met.
				□Not Observable □Not Applicable	

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Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
5.4.3.3 [FI1] ¹	Weatherseals installed on all loading dock cargo doors in Climate Zones 4- 8.	□Complies □Does Not	Requirement will be met.
	ο.	□Not Observable □Not Applicable	
6.4.3.1.2 [FI3] ³	Thermostatic controls have a 5 °F deadband.	□Complies □Does Not	Requirement will be met.
		□Not Observable □Not Applicable	
6.4.3.2 [FI20] ³	Temperature controls have setpoint overlap restrictions.	□Complies □Does Not	Requirement will be met.
		□Not Observable □Not Applicable	
6.4.3.3.1 [FI21] ³	HVAC systems equipped with at least one automatic shutdown control.	□Complies □Does Not	Requirement will be met.
		□Not Observable □Not Applicable	
6.4.3.3.2 [FI22] ³	Setback controls allow automatic restart and temporary operation as	□Complies □Does Not	Requirement will be met.
	required for maintenance.	□Not Observable □Not Applicable	
6.4.3.5 [FI5] ³	Heat pump controls prevent supplemental electric resistance heat	□Complies □Does Not	Requirement will be met.
	from coming on when not needed.	□Not Observable □Not Applicable	
6.4.3.7 [FI6] ³	When humidification and dehumidification are provided to a	□Complies □Does Not	Requirement will be met.
	zone, simultaneous operation is prohibited.	□Not Observable □Not Applicable	
6.7.2.1 [FI7] ³	Furnished HVAC as-built drawings submitted within 90 days of system	□Complies □Does Not	Requirement will be met.
	acceptance.	□Not Observable □Not Applicable	
6.7.2.2 [FI8] ³	Furnished O&M manuals for HVAC systems within 90 days of system	□Complies □Does Not	Requirement will be met.
	acceptance.	□Not Observable □Not Applicable	
6.7.2.3 [FI9] ¹	An air and/or hydronic system balancing report is provided for HVAC	□Complies □Does Not	Requirement will be met.
	systems serving zones >5,000 ft2 of conditioned area.	□Not Observable □Not Applicable	
6.7.2.4 [FI10] ¹	HVAC control systems have been tested to ensure proper operation,	□Complies □Does Not	Requirement will be met.
	calibration and adjustment of controls.	□Not Observable □Not Applicable	
7.4.4.3 [FI11] ³	Public lavatory faucet water temperature <=110°F.	□Complies □Does Not	Requirement will be met.
		□Not Observable □Not Applicable	
7.4.4.4 [FI12] ³	Controls are installed that limit the operation of a recirculation pump	□Complies □Does Not	Requirement will be met.
	installed to maintain temperature of a storage tank.	□Not Observable □Not Applicable	

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Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
8.7.1 [FI16] ³	Furnished as-built drawings for electric power systems within 30 days of system acceptance.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
8.7.2 [FI17] ³	Furnished O&M instructions for systems and equipment to the building owner or designated representative.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
9.2.2.3 [FI18] ¹	Interior installed lamp and fixture lighting power is consistent with what is shown on the approved lighting plans, demonstrating proposed watts are less than or equal to allowed watts.	□Complies □Does Not □Not Observable □Not Applicable	See the Interior Lighting fixture schedule for values.
9.4.3 [FI19] ¹	Exterior lighting power is consistent with what is shown on the approved lighting plans, demonstrating proposed watts are less than or equal to allowed watts.	□Complies □Does Not □Not Observable □Not Applicable	See the Exterior Lighting fixture schedule for values.
10.4.3 [FI24] ²	Elevators are designed with the proper lighting, ventilation power, and standby mode.	□Complies □Does Not □Not Observable □Not Applicable	Exception: Requirement does not apply.

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