MECHANICAL, ELECTRICAL, PLUMBING AND FIRE PROTECTION GENERAL NOTES

1. ATTENTION ALL USERS OF THESE DRAWINGS, GENERAL CONTRACTORS, SUBCONTRACTORS, MANUFACTURERS, AND MATERIAL SUPPLIERS ARE TO CAREFULLY AND THOROUGHLY REVIEW THESE GENERAL NOTES. IT IS YOUR RESPONSIBILITY TO KNOW AND ADHERE TO ALL OF THE REQUIREMENTS.

2. CONTRACTOR SHALL DETERMINE THE APPLICABILITY OF THE GENERAL NOTES BASED UPON THE PROJECT SCOPE CRITERIA AND CONSTRAINTS. QUESTIONS AS TO APPLICABILITY SHOULD BE ADDRESSED TO THE ARCHITECT / ENGINEER PRIOR TO BID SUBMISSION. THE ARCHITECT / ENGINEER SHALL MAKE THE FINAL BINDING DECISION ON APPLICABILITY. CONTRACTOR SHALL NOT REQUEST A CHANGE ORDER BASED UPON THE ENGINEER'S DECISION ON APPLICABILITY.

3. BIDDERS, PRIOR TO SUBMITTING A PROPOSAL/BID SHALL VISIT AND CAREFULLY EXAMINE THE AREAS AFFECTED BY THIS WORK AND TO BECOME FAMILIAR WITH EXISTING CONDITIONS SITE PARAMETERS AND WITH THE DIFFICULTIES THAT WILL BE ENCOUNTERED DURING THE EXECUTION OF WORK. SUBMISSION OF A PROPOSAL/BID WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE.

4. NO CONSIDERATION OR ALLOWANCE WILL BE GRANTED FOR FAILURE TO VISIT THE SITE, NOR FOR ANY ALLEGED MISUNDERSTANDING OF MATERIALS TO BE FURNISHED OR WORK TO BE PERFORMED. THE CONTRACTOR SHALL INCLUDE IN THEIR BID PRICE ALL LABOR AND MATERIAL THAT MAY AFFECT THEIR WORK.

5. IT IS THE INTENT OF THE CONSTRUCTION DOCUMENTS TO CALL FOR FINISHED WORK, TESTED AND READY FOR OPERATION. ANY APPARATUS, APPLIANCE, MATERIAL OR WORK NOT SHOWN ON DRAWINGS BUT MENTIONED IN THE SPECIFICATION, OR VICE VERSA, OR ANY INCIDENTAL ACCESSORIES NECESSARY TO MAKE THE INSTALLATION COMPLETE AND READY FOR OPERATION, EVEN IF NOT PARTICULARLY SPECIFIED, MUST BE FURNISHED, DELIVERED AND INSTALLED WITHOUT ADDITIONAL EXPENSE TO THE OWNER. DISCREPANCIES OR A QUESTION OF INTENT, MUST BE REFERRED TO THE ARCHITECT/ENGINEER IN WRITING FOR DECISION BEFORE SUBMITTING A PROPOSAL/BID. THE INTERPRETATIONS OF THE ARCHITECT/ENGINEER ARE FINAL, CONCLUSIVE AND BINDING.

6. IT IS THE INTENT OF THESE SPECIFICATIONS AND ACCOMPANYING DRAWINGS THAT THE CONTRACTOR SHALL, UNLESS OTHERWISE SPECIFIED, FURNISH ALL LABOR, MATERIALS, TOOLS AND EQUIPMENT TO COMPLETE INSTALLATION OF THE SYSTEMS AS SPECIFIED, CONTRACTOR SHALL PROPERLY INSTALL EQUIPMENT, ADJUST TEST AND PUT INTO OPERATION PER EQUIPMENT MANUFACTURER'S REQUIREMENTS THE RESPECTIVE PORTIONS OF THE INSTALLATION SPECIFIED, AND TO SO INTERCONNECT THE VARIOUS ITEMS OR SECTIONS OF THE WORK IN ORDER TO FORM A COMPLETE AND PROPERLY OPERATING SYSTEM.

7. THE CONTRACTOR UNDERSTANDS AND AGREES THAT THESE CONSTRUCTION DOCUMENTS INCLUDING DRAWINGS AND SPECIFICATIONS SHALL BE FULFILLED IN ACCORDANCE WITH MINOR MATERIALS OR DEVICES ESSENTIAL TO PROPER AND CONVENIENT OPERATION, REQUIRED OR IMPLIED AND SHALL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR WITHOUT EXTRA CHARGE, THOUGH NOT SPECIFICALLY IDENTIFIED.

8. THESE DRAWINGS ARE INTENDED TO BE USED ONLY BY AN EXPERIENCED CONTRACTOR. FAILURE TO RECOGNIZE THE COMPLEXITIES OF CONSTRUCTION AND SEQUENCING CAN RESULT IN UNSAFE WORK CONDITIONS AND UNACCEPTABLE WORK. CONTRACTOR SHALL PROCEED WITH A TOTAL UNDERSTANDING OF THE ENTIRE PROJECTS SCOPE AND A COMPLETE SET OF THE LATEST CONSTRUCTION DOCUMENTS. THE CONTRACTOR SOLELY ASSUMES TOTAL RESPONSIBILITY OF PROCEEDING WITH THE WORK.

9. READ SPECIFICATIONS AND INDIVIDUAL TRADE NOTES FOR REQUIREMENTS RELATED TO THESE DOCUMENTS.

10. DO NOT PRESUME THAT YOUR SCOPE OF WORK IS SINGULARLY DEFINED. YOUR SCOPE OF WORK IS DEFINED THROUGHOUT THE ENTIRE SET OF DRAWINGS AND SPECIFICATIONS AND IS NOT CONTAINED IN JUST ONE SERIES OF DRAWINGS OR DIVISION OF SPECIFICATIONS. YOU MUST REVIEW THE ENTIRE SET OF CONTRACT DOCUMENTS TO DETERMINE YOUR SCOPE OF WORK.

11. EVERY EFFORT HAS BEEN MADE TO MAKE THESE DOCUMENTS CONCISE AND COORDINATED, TO DEFINE WORK IN THE MOST LOGICAL PLACE AND TO ELIMINATE REDUNDANCY. KEEP IN MIND HOWEVER THAT YOUR SCOPE OF WORK CAN BE CONTAINED IN VARIOUS PLACES, WITH VARYING DESCRIPTIONS. DO NOT CONSIDER THAT THERE IS ONE CUSTOMARY PLACE TO LOCATE YOUR WORK. THERE IS A DANGER OF OMITTING WORK FROM YOUR SCOPE BECAUSE THE ENTIRE SET OF DOCUMENTS WAS NOT REVIEWED.

12. THE WORK SHALL INCLUDE ALL LABOR, MATERIALS, EQUIPMENT, PERMITS HOISTING AND RIGGING, SCAFFOLDING, LOADING AND UNLOADING, CLEAN -UP OF DEBRIS AND OTHER SERVICES, TO PROVIDE THE OWNER WITH COMPLETE FULLY OPERATIONAL SYSTEMS.

13. CONTRACTOR SHALL PROCURE AND PAY FOR ALL PERMITS, LICENSE, APPROVALS INSPECTIONS, ETC., AS ARE REQUIRED TO PERFORM THE WORK. CONTRACTOR SHALL TRANSMIT ORIGINALS TO THE OWNER FOR RECORD.

14. THESE GENERAL NOTES, CODES, STANDARDS, AND SPECIFICATIONS, INCLUDING ADDENDA AND SUPPLEMENTS, REFERENCED IN THE CONTRACT DOCUMENTS SHALL BE THE LATEST APPROVED ISSUE, UNLESS OTHERWISE SPECIFICALLY NOTED.

15. THE MEANS, METHODS, TECHNIQUES, SEQUENCES, AND OPERATIONS OF CONSTRUCTION ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE TO COORDINATE THE SEQUENCING, SCHEDULING, AND COORDINATION OF THE WORK WITH ALL TRADES INVOLVED.

16. PROJECT SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL COMPLY WITH ALL GOVERNMENTAL LAWS, RULES, AND REGULATIONS AS IT PERTAINS TO PROJECT SITE SAFETY. THE PROCEDURES TO BE USED SHALL PROVIDE FOR THE SAFE CONDUCT OF THE WORK, CAREFUL DISPOSITION AND INSTALLATION OF ALL MATERIALS, PROTECTION OF PROPERTY AND PERSONNEL, AND COORDINATION WITH OTHER WORK IN PROGRESS.

17. DURING CONSTRUCTION OPERATIONS, ALL PERSONS AND PROPERTY SHALL BE PROTECTED. THE WORK SHALL PROCEED IN SUCH A MANNER SO AS TO MINIMIZE ANY SPREAD OF DEBRIS AND FLYING PARTICLES, AND SO THAT THE EFFECTS OF THE CONSTRUCTION DO NOT INTERFERE WITH OTHER WORK IN PROGRESS. PROJECT SITE SAFETY IS SOLELY THE RESPONSIBILITY OF THE CONTRACTOR.

18. THE CONTRACTOR SHALL COMPLY WITH ALL GOVERNMENTAL LAWS, RULES AND REGULATIONS AS IT PERTAINS WITH OPERATIONS AT THE PROJECT SITE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONFORMANCE WITH ALL APPLICABLE BUILDING CODES AND SHALL NOT KNOWINGLY EXECUTE WORK SPECIFIED WHICH IS NOT IN CONFORMANCE. UNLESS THE CONTRACTOR, BEFORE SIGNING THIS CONTRACT, HAS NOTIFIED THE ARCHITECT/ENGINEER IN WRITING OF ANY ITEMS IN CONFLICT WITH CODES, THEY SHALL THEREAFTER MAKE ANY ADJUSTMENTS NECESSARY TO MEET CODES AT NO COST TO THE OWNER.

19. THE CONTRACTOR UPON SIGNING AGREEMENT, ACCEPTS THE CONSTRUCTION DOCUMENTS (INCLUDING THESE DRAWINGS WITH THE INCLUDED NOTES AND DESCRIPTIVE MATERIAL) AND AGREES TO EXECUTE THE NECESSARY WORK IN MANNER DESCRIBED THEREIN.

20. ALL CONSTRUCTION SHALL CONFORM TO THE MINIMUM STANDARDS OF THE PRESIDING APPLICABLE CODES INDICATED IN THE BUILDING SUMMARY COLUMN ON DRAWING T-1 AND ALL LOCAL CODES PRESENTLY IN EFFECT UNLESS MORE STRINGENT REQUIREMENTS ARE INDICATED.

21. ALL NEW CONSTRUCTION SHALL COMPLY WITH THE AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES (ADAAG) AND CHAPTER 11 OF THE INTERNATIONAL BUILDING CODE (INCLUDES ICC A117.1 AS AMENDED BY IBC).

22. WHERE USED IN THESE DRAWINGS, THE TERM "PROVIDE" SHALL IMPLY "FURNISH AND INSTALL".

23. THE SCOPE OF WORK UNDER THIS SECTION INCLUDES THE FURNISHING OF ALL LABOR, MATERIALS, EQUIPMENT, SERVICES AND INCIDENTALS TO COMPLETE ALL WORK IN ACCORDANCE WITH THE INTENT OF THE SPECIFICATIONS AND THE DRAWINGS.

24. DELIVER PRODUCTS TO PROJECT SITE IDENTIFIED WITH NAMES, MODEL NUMBERS, TYPES, GRADES, COMPLIANCE LABELS, AND OTHER INFORMATION NEEDED FOR DISTINCT IDENTIFICATION; ADEQUATELY PACKAGED AND PROTECTED TO PREVENT DAMAGE DURING SHIPMENT, STORAGE, AND HANDLING. PROTECT STORED EQUIPMENT AND MATERIALS FROM DAMAGE. COMPLY WITH MANUFACTURER'S RIGGING AND MOVING INSTRUCTIONS FOR UNLOADING EQUIPMENT AND MOVING INTO FINAL LOCATION. MATERIALS SHALL BE STORED IN SUCH A MANNER THAT THEIR CONDITION IS EQUIVALENT TO NEW WHEN INSTALLED.

25. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING BUILDING AND SITE UTILITIES BETWEEN CIVIL & MEP-FP DRAWINGS. THE CONTRACTOR SHALL ALSO CONTACT ALL APPLICABLE UTILITY COMPANIES. THE CONTRACTOR SHALL PROVIDE AND INSTALL CONDUIT AND OTHER FACILITIES AS DIRECTED BY THE UTILITY COMPANIES.

26. MECHANICAL, ELECTRICAL, PLUMBING AND FIRE PROTECTION DRAWINGS SHOW INFORMATION IN A DIAGRAMMATIC FASHION WITHOUT DIMENSIONING. THE CONTRACTOR IS TO COORDINATE THE LOCATIONS OF ALL EQUIPMENT WITH RESPECT TO THE ARCHITECTURAL, STRUCTURAL AND CIVIL DRAWINGS AND DETAILING OF SHAFTS, CHASES, AND OTHER DIMENSIONAL REQUIREMENTS.

27. DO NOT SCALE THE DRAWINGS, DRAWING SCALES AS INDICATED ARE FOR REFERENCE ONLY AND ARE NOT INTENDED TO ACCURATELY DEPICT ACTUAL OR DESIGNATED CONDITIONS. WRITTEN DIMENSIONS SHALL GOVERN.

28. NOTES AND DETAILS ON DRAWINGS TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. IF QUESTIONS OCCUR, IMMEDIATELY NOTIFY ARCHITECT/ENGINEER IN WRITING FOR RESOLUTION.

29. THE TERM "ALIGN" REFERS TO LOCATING DIFFERENT COMPONENTS OF CONSTRUCTION TO PROVIDE A FLUSH FINISH SURFACE.

30. USE OF THE WORD "VERIFY" POINTS OUT A SITUATION WHICH MUST BE CONFIRMED PRIOR TO PROCEEDING WITH THE WORK, FABRICATION OF EQUIPMENT, OR ORDERING MATERIAL AND EQUIPMENT. NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY QUESTIONS IN THIS REGARD.

31. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL FIELD CONDITIONS AND DIMENSIONS AS THEY RELATE TO THIS PROJECT. SHOULD QUESTIONS ARISE BETWEEN THE WORK INDICATED AND ACTUAL FIELD CONDITIONS, THE CONTRACTOR SHALL NOTIFY THE ARCHITECT/ENGINEER IN WRITING PRIOR TO PROCEEDING WITH THE WORK. DO NOT PROCEED WITH WORK UNTIL DIRECTION HAS BEEN PROVIDED, DEFECTS HAVE BEEN CORRECTED, AND CONDITIONS ARE SATISFACTORY. COMMENCEMENT OF WORK SHALL BE CONSTRUED AS ACCEPTANCE OF CONDITIONS. VERIFY EXACT SIZES, LOCATIONS, INVERTS AND ELEVATIONS PRIOR TO COMMENCING WORK. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS OF ALL FIXTURES AND EQUIPMENT.

32. DETERMINE INTERFERENCE BEFORE WORK IS FABRICATED OR INSTALLED. THE CONTRACTOR SHALL BE THOROUGHLY FAMILIAR WITH ALL DETAILS OF WORK AND WORKING CONDITIONS AND COORDINATE WORK DURING PRELIMINARY STAGES TO ENSURE ACTUAL ERECTION WILL PROCEED WITHOUT INTERFERENCE. COORDINATION IS OF PARAMOUNT IMPORTANCE AND NO REQUESTS FOR ADDITIONAL PAYMENT WILL BE CONSIDERED WHERE REQUEST IS BASED ON INTERFERENCE.

33. WHERE THE PROJECT CONDITIONS REQUIRE REASONABLE DEVIATIONS FROM CONTRACT DOCUMENTS, MAKE DEVIATIONS WITHOUT ADDITIONAL COST TO OWNER, AFTER OBTAINING APPROVAL OF ARCHITECT/ENGINEER IN WRITING.

34. PROVIDE MAXIMUM PRACTICAL SPACE FOR OPERATION, REPAIR, REMOVAL, AND TESTING OF ALL EQUIPMENT. APPROVED DEVIATIONS MAY BE MADE TO PROVIDE REQUIRED ACCESSIBILITY AFTER OBTAINING APPROVAL OF ARCHITECT/ENGINEER.

35. TEST AND ADJUST EQUIPMENT AND SYSTEMS INSTALLED AND DEMONSTRATE PROPER OPERATION TO OWNER'S REPRESENTATIVE. NO EQUIPMENT SHALL BE TESTED OR OPERATED FOR ANY PURPOSE UNTIL IT HAS BEEN FULLY PREPARED FOR OPERATION IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

36. EQUIPMENT MOUNTED ABOVE HUNG CEILING SHALL BE SUPPORTED FROM BUILDING STRUCTURE WITH VIBRATION ISOLATION RODS MEETING LOCAL SEISMIC RESTRAINT REQUIREMENTS.

37. DRAWINGS ARE PREPARED USING DIMENSIONS AND PRODUCT CONFIGURATIONS OR DETAILS OF SPECIFIC MANUFACTURERS. DIMENSIONS AND DETAILS FOR SPECIFIC PRODUCTS MAY CHANGE BEFORE THEY ARE ACTUALLY INCORPORATED INTO THE WORK, AND PRODUCTS BY OTHER MANUFACTURERS MAY BE ACCEPTABLE UPON REVIEW AND APPROVAL BY THE ARCHITECT/ENGINEER. THEREFORE, ACTUAL INSTALLATION DETAILS AND DIMENSIONS MAY DIFFER FROM THOSE SHOWN. CONTRACTOR SHALL VERIFY INSTALLATION REQUIREMENTS FOR ALL PRODUCTS TO BE INCORPORATED IN THE WORK (INCLUDING THICKNESSES FOR RECESSED OR SEMI-RECESSED PRODUCTS), AND IS RESPONSIBLE FOR ACCOMMODATING AND COORDINATING CHANGES TO OTHER MATERIALS, PRODUCTS OR TRADES THAT DUE TO THESE DIFFERENCES.

38. "TYPICAL DETAILS" ARE APPLICABLE THROUGHOUT CONSTRUCTION DOCUMENTS AND MAY NOT BE SPECIFICALLY REFERENCED THEREIN. THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING THESE TYPICAL DETAILS AND UNDERSTANDING THE EXTENT OF THEIR APPLICATION PRIOR TO PERFORMING THE WORK.

39. THE DRAWINGS AND SPECIFICATIONS ARE SEPARATED INTO DISCIPLINES FOR CONVENIENCE. THE SEPARATIONS USED ARE ONLY FOR THE PURPOSE OF CONVENIENCE AND REFERENCE AND IN NO WAY DO THEY DEFINE OR LIMIT THE SCOPE OR INTENT OF ANY PART OF THE DRAWINGS, OR OF THE DRAWINGS AND SPECIFICATIONS AS A WHOLE. THE FACT THAT THE DRAWINGS ARE SEPARATED IN NO WAY SUGGESTS THAT THE WORK IS NOT TO BE CONSTRUCTED AS A COMPLETE, INTEGRATED AND UNIFIED WHOLE.

40. THE DRAWINGS AND SPECIFICATIONS, INCLUDING DRAWINGS PREPARED BY SPECIFIC ENGINEERING DISCIPLINES (SUCH AS CIVIL, STRUCTURAL, MECHANICAL, ELECTRICAL, ETC.) ARE COMPLEMENTARY; ITEMS SHOWN IN ANY ONE LOCATION IN THE DRAWINGS SHALL BE CONSIDERED TO BE REQUIREMENTS OF THE CONTRACT FOR CONSTRUCTION. IN THE EVENT OF AN INCONSISTENCY BETWEEN THE DRAWINGS AND SPECIFICATIONS, OR WITHIN EITHER DOCUMENT, THE CONTRACTOR SHALL SEEK CLARIFICATION OR INTERPRETATION FROM THE ARCHITECT/ENGINEER IN WRITING PRIOR TO BIDDING. WHERE INCONSISTENCIES ARE NOT CLARIFIED PRIOR TO BIDDING, AND WHERE THE ACTUAL SOLUTION OR INTENT CANNOT BE REASONABLY INFERRED, THE CONTRACTOR SHALL PROVIDE THE BETTER QUALITY OR GREATER QUANTITY OF WORK.

41. ALL MATERIALS SPECIFIED OR NOTED SHALL BE NEW AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS' RECOMMENDATIONS.

42. ALL MATERIAL USED IN THIS WORK SHALL BE NEW, OF THE BEST QUALITY, AND SHALL MEET THE REQUIREMENTS OF THESE SPECIFICATIONS AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. MATERIALS SHALL BE SAMPLED AND TESTED IN ACCORDANCE WITH CURRENT ASTM SPECIFICATIONS OR SUCH OTHERS AS SPECIFIED HEREINAFTER AND APPLICABLE CODES. THE CONTRACTOR WILL BE REQUIRED TO FURNISH CERTIFICATES OF CONFORMANCE TO ASTM OR OTHER APPLICABLE SPECIFICATIONS.

43. WHENEVER IN THESE DOCUMENTS REFERENCE IS MADE TO THE REQUIREMENTS OF THE NEC (NATIONAL ELECTRIC CODE), NATIONAL UPC (NATIONALUNIFORM PLUMING CODE) ASHRAE, (AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS) ASTM (AMERICAN SOCIETY FOR TESTING MATERIALS), OR OTHER STANDARD SPECIFICATIONS, IT SHALL BE UNDERSTOOD THAT REFERENCES ARE MADE TO THE LATEST MODIFICATIONS OR REVISIONS OF SUCH SPECIFICATIONS AS ADOPTED BY AHJ.

44. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING COORDINATED SHOP DRAWINGS, PRODUCT DATA, OR SAMPLES FOR MECHANICAL, ELECTRICAL, PLUMBING FIXTURES EQUIPMENT, AND OTHER PERTINENT ITEMS REQUIRING REVIEW FOR CONFORMANCE WITH THE CONTRACT DOCUMENTS.

45. SUBMITTALS MUST BE REVIEWED AND BEAR THE GENERAL CONTRACTOR'S STAMP OF APPROVAL FOR CONFORMANCE AND COORDINATION WITH THE CONTRACT DOCUMENTS. SUBMITTALS FORWARDED WITHOUT A STAMP WILL BE RETURNED. ALL SUBMITTALS MUST BE REVIEWED AND APPROVED BY THE ARCHITECT/ENGINEER PRIOR TO PERFORMANCE OF THAT PORTION OF THE WORK AND/OR ASSOCIATED WORK.

46. CONTRACTOR SHALL INSTALL EQUIPMENT LOCATED IN MECHANICAL ROOM ONLY AFTER A THOROUGHLY COORDINATION WITH OTHER TRADES AND UTILITY COMPANY REQUIREMENTS.

47. IF MATERIAL OR EQUIPMENT IS INSTALLED BEFORE IT IS APPROVED, OR IF IN THE OPINION OF THE ARCHITECT OR ENGINEER, THE MATERIAL OR EQUIPMENT DOES NOT MEET THE INTENT OF THE DRAWINGS AND SPECIFICATIONS, THE CONTRACTOR SHALL BE LIABLE FOR ITS REMOVAL AND REPLACEMENT AT NO ADDITIONAL COST.

48. ANY DEFECTS IN THE CONSTRUCTION, INCLUDING MATERIALS AND/OR WORKMANSHIP, SHALL BE REPLACED OR CORRECTED BY REMOVAL AND REPLACEMENT OR OTHER APPROVED METHOD WITHOUT ADDITIONAL COST PRIOR TO ACCEPTANCE BY THE OWNER.

49. CONTRACTOR SHALL PROVIDE A WRITTEN WARRANTY FOR THE CONSTRUCTION INCLUDING MATERIALS AND/OR WORKMANSHIP FOR A PERIOD OF NOT LESS THAN ONE (1) YEAR AFTER ACCEPTANCE DATE. FAULTY WORK SHALL BE REPLACED OR REPAIRED AT NO COST, UNLESS OTHERWISE NOTED.

50. CONTRACTOR SHALL RE-EXECUTE ANY WORK THAT FAILS TO CONFORM TO THE DRAWINGS/DETAILS AS SHOWN, AND ANY DEFECTS DUE TO FAULTY MATERIALS OR WORKMANSHIP WHICH APPEAR WITHIN A PERIOD OF ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE, UNLESS OTHERWISE NOTED.

51. THE CONTRACTOR IS TO PROVIDE AS BUILT DRAWINGS IN HARD COPY AND AN ELECTRONIC AUTOCAD FILE TO THE OWNER WITHIN 14 DAYS OF SYSTEM ACCEPTANCE. FILES AND HARD COPIES SHALL BE LABELED "AS-BUILT DRAWINGS".

52. UNLESS SPECIFICALLY SHOWN ON THE DRAWINGS, NO SLAB OR STRUCTURAL MEMBER SHALL BE CUT, DRILLED, NOTCHED, CORED OR OTHERWISE MODIFIED WITHOUT PRIOR WRITTEN AUTHORIZATION FROM THE ARCHITECT/ENGINEER.

53. PERFORM CUTTING AND PATCHING TO INSTALL THE WORK.

54. ALL SLEEVES AND ALL CORE DRILLING OF FLOORS AND WALLS SHALL BE BY THE CONTRACTOR.

55. ALL CUTTING SHALL BE PATCHED AND FINISHED TO MATCH THE SURROUNDING AREA, SATISFACTORY TO OWNER AND ARCHITECT/ENGINEER.

56. CONTRACTOR SHALL MAINTAIN FIRE RATINGS AT ALL PENETRATIONS, THROUGH-PENETRATION FIRESTOP SYSTEMS AND SHALL BE TESTED IN ACCORDANCE WITH ASTM E814. THE SYSTEM SHALL HAVE AN "F" RATING (WALLS) OR "F AND "T" RATING (HORIZONTAL ASSEMBLIES) OF NOT LESS THAN THE REQUIRED RATING OF THE ASSEMBLY PENETRATED. PENETRATIONS ARE TO BE PROPERLY FIRE-STOPPED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. USE ONLY A SINGLE MANUFACTURER FOR EACH PROJECT.

57. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL MATERIALS, INCIDENTAL ITEMS AND DEVICES FOR A COMPLETE AND OPERATIONAL SYSTEM.

58. ALL PIPING, CONDUIT AND EQUIPMENT SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE'S HANGERS AND SUPPORTS AND SHALL BE SPECIFICALLY APPROVED FOR USE IN EACH LOCATION. WHERE OVERHEAD CONDITIONS EXIST THAT PREVENT THE FASTENING OF HANGER RODS IN THE REQUIRED LOCATIONS, PROVIDE AND INSTALL ADDITIONAL STEEL FRAMING. DO NOT USE EXPANSION SHIELDS.

59. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL SUPPORT HANGERS AND MISCELLANEOUS METALS, SUCH AS GALVANIZED IRON PIPE STANCHIONS, RACKS, FITTINGS, ETC., REQUIRED FOR PROPER INSTALLATION OF WORK. ALL MISCELLANEOUS RACKS AND FITTINGS SHALL BE GALVANIZED AND SHALL BE EITHER KINDORF CHANNEL, POWER STRUT OR UNISTRUT, UNLESS NOTED OTHERWISE.

60. STEEL SUPPORTS SHALL BE PAINTED WITH ONE COAT OF RUST INHIBITING PRIMER OR GALVANIZED.

61. ANY ELEMENT, WHATSOEVER, REQUIRED BY AN AUTHORITY HAVING JURISDICTION (A.H.J) TO BE INCORPORATED IN CONSTRUCTION, BUT NOT SPECIFIED IN THE CONTRACT DOCUMENTS, SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR REVIEW. NO MODIFICATIONS/REVISIONS/CHANGES SHALL BE UNDERTAKEN UNLESS SPECIFICALLY SO INSTRUCTED AND APPROVED IN WRITING BY ARCHITECT/ENGINEER.

62. ALL MATERIAL, EQUIPMENT, FIXTURES ETC. SHOWN ON THE CONSTRUCTION DRAWINGS SHALL BE NEW AND PROVIDED AND INSTALLED BY THE CONTRACTOR UNLESS OTHERWISE SHOWN OR SPECIFIED.

63. ALL MATERIALS SHALL CONFORM TO LOCAL, STATE AND FEDERAL CODES AND REGULATIONS AS THEY APPLY.

64. ANY WORK NEEDED TO BE ACCOMPLISHED ON AN OVERTIME BASIS SHALL BE PRICED AND PRESENTED AS SUCH IN THE BID.

65. ALL WORKERS AND SUBCONTRACTORS SHALL BE SKILLED IN THEIR TRADES AND HAVE ALL APPLICABLE LICENSES AND CERTIFICATIONS.

66. DELIVERIES, INGRESS AND EGRESS FROM BUILDING SHALL BE OVER ROUTES PRESCRIBED BY THE BUILDING REPRESENTATIVE AND AT TIMES DESIGNATED BY THAT AUTHORITY.

67. THE CONTRACTOR SHALL PERMIT AND FACILITATE OBSERVATION OF WORK BY BUILDING OWNER, ARCHITECT, ENGINEER, THEIR AGENTS AND PUBLIC AUTHORITIES, AT ALL TIMES, AND WHEN REQUESTED.

68. OWNER RETAINS THE RIGHT TO ALLOW OTHER CONTRACTORS IN CONNECTION WITH THE PROJECT WORK. OWNER SHALL PROPERLY COORDINATE AND INTERFACE THEIR SCHEDULE WITH ANY SUCH CONTRACTOR AND/OR VENDORS, ETC.

69. COORDINATE WITH OWNER'S FIELD REPRESENTATIVE AND/OR GENERAL CONTRACTOR FOR ALL PHASING AND SCHEDULING.

70. WHERE MORE THAN ONE REGULATION APPLIES, THE STRICTER ONE SHALL GOVERN.

71. A WRITTEN REQUEST MUST BE SUBMITTED TO THE ARCHITECT/ENGINEER PRIOR TO SUBMISSION OF A PROPOSED SUBSTITUTION. THE ARCHITECT/ENGINEER'S DETERMINATION OF THE USE OF A PROPOSED SUBSTITUTION WILL BE FINAL AND BINDING.

72. ALL PROPOSED SUBSTITUTIONS MUST BE SUBMITTED TO ARCHITECT/ENGINEER FOR WRITTEN APPROVAL PRIOR TO SUBSTITUTION BEING MADE.

73. WHERE REFERENCED AN APPROVED SUBSTITUTION SUBMISSION SHALL REQUIRE THE CONTRACTOR TO COORDINATE AND PROVIDE INFORMATION BY THE ARCHITECT/ENGINEER TO FULLY EVALUATE THE PROPOSED SUBSTITUTION INCLUDING BUT NOT LIMITED TO A SPREADSHEET OUTLYING THE DIFFERENCE BETWEEN THE SPECIFIED AND PROPOSED ITEM INCLUDING BUT NOT LIMITED TO WEIGHTS, DIMENSIONS, AND ELECTRICAL CHARACTERISTICS. CONTRACTOR SHALL BEAR THE FULL COST OF ENGINEERING DESIGN INCLUDING BUT NOT LIMITED TO SIGNED AND SEALED DOCUMENTS ASSOCIATED WITH PROPOSED SUBSTITUTION. THE ARCHITECT/ENGINEER APPROVAL SHALL NOT ALLEVIATE THE CONTRACTOR FROM ALL CONTRACT DOCUMENT REQUIREMENTS INCLUDING BUT NOT LIMITED TO COORDINATION OF THE APPROVED SUBSTITUTION WITHOUT ADDITIONAL COST TO OWNER OR ARCHITECT/ENGINEER.

74. THE CONDITION OF THE PROJECT SITE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE PROJECT SITE SHALL BE MAINTAINED IN A CLEAN SAFE AND ORDERLY FASHION. DEBRIS AND TRASH SHALL BE REMOVED DAILY.

75. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL LOCAL BUILDING DEPARTMENT APPROVALS, ETC.

76. CONTRACTOR SHALL CARRY AND DOCUMENT LIABILITY, ACCIDENT AND PROPERTY DAMAGE INSURANCE AS REQUIRED BY OWNER.

77. CONTRACTOR SHALL EXERCISE EXTREME CARE IN PROTECTING AREAS ADJACENT TO CONSTRUCTION AREAS, AS WELL AS ALL EXISTING AND NEW BUILDING AND SITE FEATURES. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR PROTECTING THE SITE FROM ANY DAMAGE RESULTING FROM CONTRACTOR'S WORKMEN, SUBCONTRACTOR'S MATERIALMEN OR AGENTS, AND SHALL BE RESPONSIBLE FOR REPAIRING, CLEANING OR REPLACING ANY SUCH DAMAGE TO THE SATISFACTION OF THE OWNER AND ARCHITECT/ENGINEER AT NO ADDITIONAL COST.

78. UNLESS SPECIFICALLY STATED OTHERWISE, CONTRACTOR SHALL FOLLOW MANUFACTURERS' DIRECTIONS. INSTRUCTIONS AND RECOMMENDATIONS FOR ALL MATERIALS AND PROCESSES USED IN THIS CONTRACT.

79. BUILDING DEPARTMENT APPROVED DRAWINGS SHALL BE TURNED OVER TO OWNER AT THE COMPLETION OF THE PROJECT.

80. AT THE FINAL COMPLETION OF THE PROJECT, CONTRACTOR SHALL SUBMIT TO THE OWNER AND ARCHITECT/ENGINEER A NOTARIZED AFFIDAVIT STATING COMPLIANCE WITH ALL PROVISIONS OF THIS CONTRACT, INCLUDING ALL NOTES, EXCEPT FOR THOSE CHANGES SPECIFICALLY APPROVED IN WRITING BY THE ARCHITECT/ENGINEER.

81. MAINTAIN A FIELD REPRESENTATIVE ON THE PREMISES AT ALL TIMES DURING THE COURSE OF THE CONSTRUCTION WORK.

1. CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK USING THE CONTRACTOR'S BEST SKILL AND ATTENTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE AND HAVE CONTROL OVER CONSTRUCTION MEANS, METHODS TECHNIQUES, SEQUENCE, AND JOB SITE SAFETY

2. GC MUST PROVIDE & INSTALL ALL PRODUCTS PER PLANS. ONLY SUBSTITUTED PRODUCTS NEED TO BE SUBMITTED TO THE ARCHITECT FOR APPROVAL. UNAPPROVED SUBSTITUTIONS WILL BE REPLACED AT THE EXPENSE OF THE GC.

3. VERBAL REPRESENTATION HAS NO VALUE AND ALL REQUESTS TO CHANGE ANY PRODUCTS OR SPECIFICATIONS PER PLANS, MUST BE SUBMITTED IN WRITING TO THE ARCHITECT & TLE FOR APPROVAL.

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ISSUE

NO.	DATE	DESCRIPTION	INT.
1	06-30-22	FOR TLE REVIEW	MBJ

REVISION

NO.	DATE	DESCRIPTION	INT.

PROFESSIONAL CERTIFICATION

NAME OF LICENSEE: MATTHEW B. JARMEL
LICENSE NUMBER: 12854
EXPIRATION DATE:

Project Number: TLEWA22-038	Scale: AS NOTED
Drawn By: AM	Approved By: MBJ

Drawing Name: **MECHANICAL, ELECTRICAL, PLUMBING AND FIRE PROTECTION GENERAL NOTES**

Drawing Number: **MEP-FP-001**

2021.Q4.01 RETAIL PROTOTYPE

HVAC GENERAL NOTES

A.GENERAL

1. GENERAL NOTES, SYMBOLS AND DETAILS ARE APPLICABLE TO ALL DRAWINGS WITH "H"OR "M".
2. IT IS THE RESPONSIBILITY OF THIS CONTRACTOR TO COORDINATE ALL WORK WITH ALL NEW AND EXISTING WORK OF ALL OTHER TRADES. THE SHOP DRAWINGS PREPARED BY THIS CONTRACTOR SHALL INDICATE SPACE ALLOWANCES ABOVE CEILING FOR ALL WORK OF ALL OTHER TRADES (CABLE TRAYS, CONDUITS, SPRINKLER PIPES, STORM DRAINS, GLYCOL PIPES, ALL DOMESTIC SERVICES, ETC.) AND SHALL BE COORDINATED AND SIGNED OFF BY ALL OTHER CONTRACTORS.
3. THE CONTRACTOR SHALL COORDINATE THE HEIGHTS AND LOCATIONS OF ALL DUCTWORK WITH ALL STRUCTURAL MEMBERS (COLUMNS, BEAMS, JOISTS, ANGLES, ROOF SCREENS, FRAMING, ETC.). ALL DUCTWORK IS TO BE MOUNTED TO HIGHEST POSSIBLE ELEVATION ABOVE THE FINISHED FLOOR AS SHOWN ON THE CONSTRUCTION DOCUMENTS. THE CONTRACTOR MAY BE REQUIRED TO RUN DUCTWORK THROUGH THE WEBS OF THE JOISTS TO MAINTAIN ADEQUATE CLEARANCE FOR CEILING HEIGHTS. BEFORE PROCEEDING WITH ANY WORK, THE CONTRACTOR SHALL REVIEW WITH THE ARCHITECT/ENGINEER THE MOUNTING HEIGHTS OF ALL DUCTWORK LAYOUTS.
4. CONTRACTOR SHALL VERIFY IN FIELD ALL HUNG CEILING AND PARTITION HEIGHTS AND LOCATIONS AND CEILING AIR OUTLET LOCATIONS. WHERE WORK BETWEEN THE DRAWINGS AND FIELD DIMENSIONS ARE IN CONFLICT, ADVISE PRIOR TO FABRICATION OF SHEET METAL.
5. VERIFY EXACT LOCATION, DIMENSIONS AND CONDITIONS IN THE FIELD FOR ALL EQUIPMENT, DUCTWORK AND PIPING LOCATIONS
6. VERIFY ALL EQUIPMENT CONNECTIONS WITH MANUFACTURERS CERTIFIED APPROVED DRAWINGS. VERIFY AND PROVIDE DUCT TRANSITIONS TO FURNISHED EQUIPMENT. FIELD VERIFY AND COORDINATE ALL DIMENSIONS BEFORE FABRICATION.
7. INTERNAL AIR FLOW DIMENSIONS ARE SHOWN FOR DUCTS. ALL DUCT SIZES SHALL BE NET INSIDE DIMENSIONS, INCLUDING ACOUSTIC-LINED DUCTWORK. CONTRACTOR SHALL INCREASE SIZE FOR LINER, IF APPLICABLE. DUCT SIZES ARE ACTUAL SHEET METAL SIZES AND DO NOT INCLUDE 1 INCH DUCT LINER. INCREASE DUCTWORK SIZE ACCORDINGLY.
8. CONTRACTOR SHALL NOT PROCEED TO FABRICATE AND INSTALL ANY HVAC EQUIPMENT, DUCTWORK, PIPING AND ACCESSORIES WITHOUT A THOROUGH FIELD COORDINATION WITH ALL TRADES. ALL CONFLICTS RESULTING FROM LACK OF COORDINATION WILL BE RESOLVED BY CONTRACTOR AT NO ADDITIONAL COST.
9. ALL WORK INSTALLED BY THIS CONTRACTOR SHALL BE INSTALLED IN SUCH A MANNER AS TO CLEAR ALL LIGHT FIXTURES, CEILING CONSTRUCTION, SPRINKLER PIPES AND HEADS, CONDUITS, PIPING, ETC.
10. PROVIDE INFORMATION AND HARDWARE TO COORDINATE HANGING OF EQUIPMENT REQUIRED FOR MECHANICAL WORK.
11. PROVIDE ESCUTCHEONS AND SEALING OF ALL PENETRATIONS OF FIRE SEPARATIONS IN ACCORDANCE WITH THE BUILDING CODE.
12. ALL EQUIPMENT SHALL BE INSTALLED IN ACCESSIBLE LOCATIONS TO PERMIT SERVICING AND REMOVAL.
13. SUPPORT ALL EQUIPMENT, PIPING AND DUCTWORK FROM THE BUILDING STRUCTURE TO PROVIDE A VIBRATION-FREE INSTALLATION. NOTIFY ARCHITECT AND STRUCTURAL ENGINEER OF ALL WEIGHTS AND METHODS OF SUPPORT FOR APPROVAL.
14. PROVIDE ALL NECESSARY SUPPLEMENTARY STEEL FOR SUPPORT OF EQUIPMENT, PIPING, DUCTWORK ATTACHMENT OF HANGERS AND PIPE IN SHAFTS AND BETWEEN BUILDING STRUCTURAL MEMBERS.
15. CONTRACTOR SHALL PROVIDE CHANGE OF FILTERS AFTER START-UP AND BALANCING COMPLETION.
16. CONTRACTOR TO PROVIDE CONDENSATE DRAIN PIPE SIZED PER MANUFACTURER'S REQUIREMENTS FOR EACH ROOFTOP UNIT WITH CONDENSATE TRAP. CONDENSATE TO BE DISCHARGED TO THE ROOF SLOPE TOWARD ROOF DRAIN, SCUPPER OR GUTTER.
17. CONTRACTOR TO PROVIDE INSULATED CONDENSATE DRAIN PIPE SIZED PER MANUFACTURER'S REQUIREMENTS FOR EACH INDOOR-MOUNTED AIR HANDLING UNIT WITH CONDENSATE TRAP. CONDENSATE TO DISCHARGE AS SHOWN ON DRAWINGS
18. DUCT TYPE SMOKE DETECTORS SHALL BE INSTALLED AND FURNISHED BY THE CONTRACTOR, WIRED TO FIRE ALARM. COORDINATE DETECTOR TYPE WITH FIRE ALARM SYSTEM.
19. ALL THERMOSTATS SHALL BE LOCATED ON COLUMNS OR WALL 48 INCHES A.F.F. REQUIREMENTS OR AS DIRECTED OTHERWISE BY ARCHITECT/ENGINEER. PROVIDE AND INSTALL THERMOSTAT IN NUMBER AND LOCATION SHOWN ON DRAWINGS.
20. PROVIDE AND INSTALL TEMPERATURE SENSORS 60 INCHES A.F.F., UNLESS REQUIRED LOWER BY ADA REQUIREMENTS OR AS DIRECTED OTHERWISE BY ARCHITECT/ENGINEER. ALL TEMPERATURE SENSORS SHALL BE NEW. PROVIDE TEMPERATURE SENSORS IN NUMBER AND LOCATIONS SHOWN ON DRAWINGS AND AS PER DETAIL SHOWN IN HVAC DETAIL DRAWING.
21. THERMOSTATS AND SENSORS SHALL BE LOCATED A MINIMUM OF 6 INCHES FROM INSIDE OR OUTSIDE WALL CORNER.
22. THERMOSTATS AND SENSORS SHALL BE FULLY COMPATIBLE WITH PERFORMANCE AND CHARACTERISTICS OF INSTALLED HVAC EQUIPMENT AND SHALL BE COMPATIBLE WITH EACH OTHER.
23. INSTALL ALL RETURN GRILLES SO THAT DIRECTION OF BLADES OBSTRUCT VISIBILITY.
24. IN THE CASE WHERE A CONTRACTOR IS MAKING AN APPROVED BASIS OF DESIGN HVAC EQUIPMENT SUBSTITUTION, IT IS HIS RESPONSIBILITY TO COORDINATE WITH ALL OTHER TRADES AND PROVIDE ALL NECESSARY ADJUSTMENTS WITH NO EXTRA COST TO THE OWNER OR ARCHITECT/ENGINEER. TRUSS SHOP DRAWINGS REFLECTING THE ALTERNATE EQUIPMENT WEIGHTS, ROOF PENETRATIONS, ETC., SHALL BE SUBMITTED TO ARCHITECT/ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ORDERING ALTERNATE HVAC EQUIPMENT.
25. CONTRACTOR SHALL TEST, BALANCE, ADJUST AND PUT THE SYSTEM IN FULL OPERATION INCLUDING SUPERVISION OF BUILDING OPERATING PERSONNEL, PER OWNER'S REQUIREMENTS.
26. WHERE DUCTS OR PIPE PENETRATE WALLS, SEAL OPENINGS TO PREVENT AIR TRANSFER BETWEEN SPACES.

B. DUCTWORK

1. REFER TO THE SPECIFICATIONS FOR DUCTWORK CONSTRUCTION CLASSES, SEAL, AND LEAKAGE CLASSES.
2. SEE DRAWINGS FOR DUCT HANGER DETAILS.
3. SHEET METAL DUCTWORK SHALL COMPLY WITH THE STANDARDS AS SET FORTH IN THE LATEST EDITION OF THE ASHRAE GUIDE. DUCTS SHALL BE CONSTRUCTED OF GALVANIZED STEEL, AND SHALL BE IN ACCORDANCE WITH THE BUILDING CODE. ALL SHEET METAL DUCT JOINTS SHALL BE SEALED AIR TIGHT WITH APPROVED TYPE CAULKING SEALANT.
4. HORIZONTAL DUCTS SHALL BE HUNG AT INTERVALS NOT EXCEEDING 5 FEET ON CENTER IN ACCORDANCE WITH THE DUCT MANUALS OF THE SHEET METAL AND AIR CONDITIONING CONTRACTOR'S NATIONAL ASSOCIATION (SMACNA), SECOND EDITION.
5. PROVIDE TURNING VANES ON ALL RECTANGULAR ELBOWS AND/OR WHERE SHOWN ON THE DRAWING. TURNING VANES SHALL BE DOUBLE THICKNESS TYPE CONSTRUCTED IN ACCORDANCE WITH SMACNA MANUAL. SUBMIT DETAIL ON INITIAL DUCT SHOP DRAWINGS.
6. INSULATE ALL DUCTWORK AS HEREINAFTER SPECIFIED.
7. RUN DUCTS AND PIPING CONCEALED, UNLESS SPECIFIED OTHERWISE, AND CLEAR OF CEILING INSERTS.
8. WHERE FIELD CONDITIONS DICTATE, DUCTWORK SHALL BE OFFSET AND DUCTWORK CONFIGURATIONS SHALL BE MADE, AT NO ADDITIONAL COST TO OWNER. ALL SUCH MODIFICATIONS SHALL BE MADE WITH THE APPROVAL OF THE ENGINEER.
9. WHERE FIELD CONDITIONS DICTATE MODIFICATIONS TO DUCT ASPECT RATIO, TYPE AND SIZE SHALL BE MADE, AT NO ADDITIONAL COST TO OWNER. ALL SUCH MODIFICATIONS SHALL BE MADE WITH THE APPROVAL OF THE ENGINEER.

C. FLEXIBLE DUCT

1. PROVIDE AND INSTALL FLEXIBLE CONNECTIONS ON ALL DUCTS CONNECTING TO FANS AND AIR HANDLING UNITS. ALL DUCTS TO BE GROUNDED ACROSS FLEXIBLE CONNECTION WITH FLEXIBLE COPPER GROUNDING STRAPS. (MAXIMUM LENGTH OF FLEXIBLE DUCTWORK TO FANS AND AIR HANDLING UNITS NOT TO EXCEED 6 INCHES OR AS DIRECTED BY ENGINEER).
2. PROVIDE AND INSTALL FLEXIBLE CONNECTIONS ON ALL DUCTS CONNECTING TO AIR OUTLETS. (MAXIMUM LENGTH OF FLEXIBLE DUCTWORK TO AIR OUTLETS NOT TO EXCEED 6 FEET).
3. FLEXIBLE DUCT SHALL BE UL 181 CLASS 1 FACTORY-FABRICATED ASSEMBLY WITH HELICALLY WOUND SPRING STEEL WIRE INNER SLEEVE, INSULATION AND OTHER VAPOR BARRIER. EACH CONNECTION SHALL BE SECURED WITH APPROVED TYPE HOSE CLAMPS WITH WORM GEAR DRIVE STAINLESS STEEL BANDS ON SEALER MASTIC BEFORE HOSE CONNECTION IS MADE AT THE JOINTS. SEALING TAPE SHALL BE USED AT CONNECTION BETWEEN RIDGE DUCT AND FLEXIBLE DUCT.
4. FLEXIBLE DUCT DIAMETER SHALL MATCH THE NECK SIZE OF THE DIFFUSER TO WHICH IT CONNECTS, UNLESS NOTED OTHERWISE, EXTEND SHEET METAL DUCT TO WITHIN 5 FEET FOR SMACNA COMPLIANCE.
5. FLEXIBLE DUCTWORK SHALL NOT PASS THROUGH FIRE-RATED CONSTRUCTION. FLEXIBLE DUCTWORK MUST BE INSTALLED WITH SUPERIOR WORKMANSHIP MAINTAINING FULL CROSS-SECTIONAL AREA THROUGHOUT. SUPPORT FROM STRUCTURE AT 48 INCHES INTERVALS OR CLOSER TO ENSURE THAT THE FLEXIBLE DUCT DOES NOT SAG MORE THAN 1/2 INCH PER LINEAL FOOT BETWEEN THE SUPPORTS. ENSURE FULL CROSS-SECTIONAL AREA FOR MAXIMUM AIRFLOW. PLACE SUPPORTS AT EACH CONNECTION BETWEEN FLEX DUCT AND RIGID METAL DUCT.

D. DAMPERS

1. FURNISH AND INSTALL MANUAL VOLUME DAMPERS IN ALL BRANCH AND SUB-BRANCH DUCTS AND ELSEWHERE FOR BALANCING AND CONTROL OF ALL DUCT SYSTEMS, WHETHER OR NOT SHOWN ON THE DRAWINGS.
2. ALL DAMPERS WHICH ARE NOISY IN OPERATION ARE TO BE REMOVED, REPAIRED AND REINSTALLED UNTIL QUIET OPERATION IS OBTAINED. REFER TO SMACNA MANUAL, SECTION 1 FOR DETAILS OF CONSTRUCTION.
3. EVERY DAMPER SHALL HAVE AN INDICATION DEVICE WHICH SHALL SHOW ITS POSITION AT ALL TIMES. ALL AUTOMATIC AND FIRE DAMPERS SHALL BE FURNISHED WITH DUCT ACCESS DOORS FOR SERVICING.
4. PROVIDE VOLUME DAMPERS AND WIRE MESH SCREEN FOR ALL RETURN AND DUCTWORK AND OPENINGS.
5. AIR DEVICES IN GYPSUM CEILING SHALL NOT BE UTILIZED AS ACCESS TO VOLUME DAMPERS. PROVIDE CABLE ACTUATED DAMPERS LOCATED AT THE TAKEOFF FROM MAIN DUCT.

E. ACCESS DOORS

1. WHERE NECESSARY AND INDICATED HEREIN IN DUCTWORK, SUITABLE ACCESS DOORS AND FRAMES TO PERMIT INSPECTION, OPERATION AND MAINTENANCE OF ALL DAMPERS. FANS, LOUVERS, CONTROLS, FIRE DAMPERS OR OTHER APPARATUS CONCEALED BEHIND THE SHEET METAL WORK SHALL BE PROVIDED. DOUBLE PANEL INSULATION OF NOT LESS THAN 20 GAUGE. ACCESS DOORS IN UNINSULATED DUCTS MAY BE OF SINGLE PANEL CONSTRUCTION OF NOT LESS THAN 18 GAUGE, GALVANIZED. ALL DOORS SHALL HAVE POLYURETHANE GASKETS CEMENTED IN PLACE WITH APPROVED ADHESIVE SO AS TO MAKE THEM AIRTIGHT. CONTRACTOR SHALL INSTALL ADDITIONAL ACCESS DOORS AT LOCATIONS REQUIRED BY THE CONFIGURATION OF THE WORK AT NO ADDITIONAL COST.
2. ACCESS DOORS INTO DUCTS SHALL IN GENERAL NOT BE SMALLER THAN 16 INCHES X 16 INCHES EXCEPT FOR ACCESS DOORS TO FIRE DAMPER.

F. HANGERS DUCT

1. HANGERS SHALL BE ATTACHED TO THE BUILDING STRUCTURE. HANGERS SHALL BE AS DETAILED ON THE DRAWINGS OR IN SMACNA MANUAL. ALL MATERIALS SHALL BE GALVANIZED.
2. CONTROL FREEDOM FROM VIBRATION AND NOISE IS ESSENTIAL. TAKE PARTICULAR CARE IN INSTALLING VIBRATION ISOLATION MOUNT AND HANGERS SO THAT VIBRATION FROM OPERATING EQUIPMENT IS NOT TRANSMITTED TO THE STRUCTURE OR OTHER WORK.

G. INSULATION

1. INSULATION SHALL BE COMPLETE TO INCLUDE ALL DUCTWORK, PIPING AND EQUIPMENT AS HEREINAFTER SPECIFIED.
2. ALL INSULATION IN A RETURN PLENUM SHALL HAVE A COMPOSITE (JACKETS, FACINGS, ADHESIVES, ETC.), FIRE AND SMOKE HAZARD RATINGS AS TESTED BY PROCEDURE ASTM E-84, NFPA 2TJ AND DL 723 NOT EXCEEDING FLAME SPREAD OF 25 AND SMOKE DEVELOPED OF 50.
3. INSULATE ALL SUPPLY DUCTWORK AND HVAC PLENUMS PER APPLICABLE ENERGY CODE.
4. INSULATE OUTSIDE AIR DUCTWORK AND PROVIDE AND INSTALL WEATHER PROTECTING JACKET. COORDINATE JACKET COLOR WITH ARCHITECT.
5. RETURN DUCTWORK TO BE INSULATED PER THE APPLICABLE ENERGY CODE.
6. PROVIDE AND INSTALL PIPING INSULATION PER THE APPLICABLE ENERGY CODE FOR THE FOLLOWING:
   a. COLD PIPING SYSTEMS (CHILLED WATER, BRINE, REFRIGERANT), 32°F (0°C) TO 65°F (18°C).
   b. DUAL TEMPERATURE SYSTEMS, 32°F (0°C) TO 220°F (104°C).
   c. HEATING SYSTEMS (STEAM, STEAM CONDENSATE, HOT WATER), AMBIENT UP TO 450°F (232°C).
   d. CONDENSATE PIPING.

H. AIR TESTING, ADJUSTING AND BALANCING (TAB) GENERAL

1. PROVIDE QUALIFIED PERSONNEL, EQUIPMENT, APPARATUS AND SERVICES FOR TESTING, INSPECTION, BALANCING AND ADJUSTING OF ALL MECHANICAL SYSTEMS, TO PERFORMANCE DATA SHOWN IN SCHEDULES AND AS SPECIFIED, AND AS REQUIRED BY CODES, STANDARDS, REGULATIONS AND AUTHORITIES HAVING JURISDICTION INCLUDING CITY INSPECTORS, AND ENGINEER. NOTIFY THE ENGINEER AND INVOLVED AUTHORITIES AT LEAST 24 HOURS PRIOR TO TESTING OR INSPECTION. DO NOT COVER WORK PRIOR TO TESTING OR INSPECTION.
2. ENGAGE A TAB PROFESSIONAL CERTIFIED BY THE TESTING, ADJUSTING AND BALANCING BUREAU (TABB) FOR ALL TESTING AND BALANCING WORK. ALL AIR BALANCING MUST BE PERFORMED BY AN INDEPENDENT TESTING AND BALANCING AGENCY AS A DIRECT SUB-CONTRACTOR TO THE GENERAL CONTRACTOR. PROVIDE 4 COPIES OF THE CERTIFIED BALANCING REPORT.
3. INSTRUMENTS USED FOR TESTING AND BALANCING SHALL HAVE BEEN CALIBRATED WITHIN SIX MONTHS PRIOR TO TESTING OR BALANCING. CALIBRATION SHALL BE CERTIFIED.
4. CONTRACTOR TO BALANCE HVAC SYSTEM TO ACHIEVE AIR FLOWS SPECIFIED ON THE HVAC DRAWINGS. CONTRACTOR SHALL SUBMIT A CERTIFIED BALANCING REPORT TO ENGINEER FOR APPROVAL. SYSTEM TO BE BALANCED USING APPROVED ASHRAE METHODS.
5. TESTING, INSPECTION, BALANCING AND ADJUSTING SHALL IN NO WAY RELIEVE OR REDUCE GUARANTEE REQUIREMENTS.
6. DO NOT COVER OR CONCEAL WORK PRIOR TO TESTING AND INSPECTION AND OBTAINING APPROVAL.
7. PRIOR TO DATE OF ACCEPTANCE, FURNISH ENGINEER WITH CERTIFIED CERTIFICATES OF TEST PERFORMED FOR HVAC SYSTEMS INDICATING APPROVAL OF AUTHORITIES HAVING JURISDICTION AND CONFORMANCE WITH REQUIREMENTS OF CONTRACT DOCUMENTS.
8. THE ARCHITECT/ENGINEER RESERVES THE RIGHT TO REQUEST ADDITIONAL TESTING TO DETERMINE CONFORMANCE WITH THE CONTRACT DOCUMENTS. THE COST OF ADDITIONAL TESTING SHALL BE BORNE BY THE CONTACTOR WITHOUT ADDITIONAL COMPENSATION.

I. AIR BALANCING AND ADJUSTING

1. BALANCING SHALL NOT BEGIN UNTIL SYSTEMS HAVE BEEN INSTALLED COMPLETE. PUT HVAC SYSTEMS AND EQUIPMENT INTO FULL WORKING ORDER AND CONTINUE OPERATION OF SAME DURING EACH DAY OF TESTING AND BALANCING.
2. PROCURE SERVICE OF INDEPENDENT BALANCING AND TESTING AGENCY WITH FOLLOWING QUALIFICATIONS:
   a. AGENCY IS KNOWN TO SPECIALIZE IN STARTING AND TESTING OF HVAC SYSTEMS.
   b. AGENCY-EMPLOYED, PROFESSIONAL AND QUALIFIED HVAC ENGINEER SHALL PERFORM WORK SPECIFIED HEREIN.
   c. CERTIFIED BY THE TESTING, ADJUSTING AND BALANCING BUREAU (TABB) FOR ALL TESTING AND BALANCING WORK.
3. TEST AND ADJUST EACH DIFFUSER, GRILLE AND REGISTER TO WITHIN 10% OF DESIGN REQUIREMENTS. IDENTIFY LOCATION AND AREA AND INCLUDE IN A REPORT EACH GRILLE, DIFFUSER, AND REGISTER.
4. TEST AND ADJUST EACH AIR HANDLING EQUIPMENT UNIT. BALANCE OUTSIDE AIR FLOW FOR EACH AIR HANDLING EQUIPMENT UNIT. PROVIDE STATIC PRESSURE REPORT FOR ALL AIR MOVING SYSTEMS.
5. IDENTIFY AND LIST SIZE, TYPE AND MANUFACTURER OF DIFFUSERS, GRILLES, REGISTERS AND ALL TESTED EQUIPMENT. MANUFACTURER'S RATINGS ON ALL EQUIPMENT SHALL BE USED TO MAKE REQUIRED CALCULATIONS.
6. READINGS AND TESTS OF DIFFUSERS, GRILLES, AND REGISTERS SHALL INCLUDE REQUIRED FPM VELOCITY AND TEST RESULTANT VELOCITY, REQUIRED CFM AND RESULTANT CFM AFTER ADJUSTMENTS.
7. ADJUST ALL DIFFUSERS, GRILLES, AND REGISTERS TO MINIMIZE DRAFTS.
8. A DRAWING SHALL BE SUBMITTED AS PART OF THE TESTING AND BALANCING REPORT. THE DRAWING SHALL SHOW CLEARLY THE TEST LOCATIONS IN THE DUCTWORK AND THE DUCT SIZES

1. CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK USING THE CONTRACTOR'S BEST SKILL AND ATTENTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE AND HAVE CONTROL OVER CONSTRUCTION MEANS, METHODS TECHNIQUES, SEQUENCE, AND JOB SITE SAFETY
2. GC MUST PROVIDE & INSTALL ALL PRODUCTS PER PLANS. ONLY SUBSTITUTED PRODUCTS NEED TO BE SUBMITTED TO THE ARCHITECT FOR APPROVAL. UNAPPROVED SUBSTITUTIONS WILL BE REPLACED AT THE EXPENSE OF THE GC.
3. VERBAL REPRESENTATION HAS NO VALUE AND ALL REQUESTS TO CHANGE ANY PRODUCTS OR SPECIFICATIONS PER PLANS, MUST BE SUBMITTED IN WRITING TO THE ARCHITECT & TLE FOR APPROVAL.

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Authorization # CA32449

ISSUE

NO.	DATE	DESCRIPTION	INT.
1	06-30-22	FOR TLE REVIEW	MBJ

REVISION

NO.	DATE	DESCRIPTION	INT.

PROFESSIONAL CERTIFICATION

NAME OF LICENSEE: MATTHEW B. JARMEL
LICENSE NUMBER: 12854
EXPIRATION DATE:

Project Number: TLEWA22-038	Scale: AS NOTED
Drawn By: AM IN	Approved By: MBJ

Drawing Name:

HVAC GENERAL NOTES

Drawing Number:

H-100

GENERAL ABBREVIATIONS

A		
	A	Air or Compressed Air
	AC	Air Conditioning
	ACD	Automatic Control Damper
	AD	Access Door
	AF	Air Foil
	AHU	Air Handling Unit
	AMP	Ampere
	AP	Access Panel
	APD	Air Pressure Drop
	AS	Air Stream
	ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
	ATC	Automatic Temperature Control
	ATM	Atmosphere
B		
	BDD	Back-Draft Damper
	BHP	Brake Horsepower
	BI	Backwards Inclined
	BOD	Bottom of Duct
	BTU	British Thermal Unit
	BTUH	BTU per Hour
C		
	CENT	Center or Centrifugal
	CF	Cubic Feet
	CFM	Cubic Feet per Minute
	CH	Chilled or Chiller
	CHW	Chilled Water
	CHWR	Chilled Water Return
	CHWS	Chilled Water Supply
	CO	Carbon Monoxide
	CONN	Connection
	CT	Cooling Tower
	CTBD	Cooling Tower Blow Down
	CUH	Cabinet Unit Heater
	CWR	Condenser Water Return
	CWS	Condenser Water Supply
D		
	D	Drain
	DB	Dry Bulb (Temperature)
	DEG	Degree
	DDC	Direct Digital Control
	DIA	Diameter
	DIM	Dimension
	DP	Differential Pressure
E		
	EA	Each or Exhaust Air
	EAHU	Exhaust Air Handling Unit
	EAT	Entering Air Temperature
	EF	Exhaust Fan
	EMER	Emergency
	EMS	Energy Management System
	ESP	External Static Pressure
	ET	Expansion Tank
	EUH	Electrical Unit Heater
	EWT	Entering Water Temperature
	EXH	Exhaust
	EXT	External
	EXP	Expansion
F		
	F	Fahrenheit
	FA	Free Area or Fire Alarm
	FC	Flexible Connection
	FCU	Fan Coil Unit
	FD	Fire Damper, or Fire Department
	FLA	Full Load Amps
	FLEX	Flexible
	FLRDR	Floor Drain
	FPM	Feet per Minute
	FPS	Feet per Second
	FRP	Fiberglass Reinforced Plastic
	FS	Flow Switch
	FT	Feet
	FTR	Fin Tube Radiation
G		
	G	Gas
	GA	Gauge
	GAL	Gallons
	GALV	Galvanized
	GFU	Glycol Feed Unit
	GPH	Gallons per Hour
	GPM	Gallons per Minute
	GR	Grade
H		
	HB	Hose Bib (Connection)
	HD	Head
	HP	Horsepower or High Point
	HR	Hour
	HRU	Heat Recovery Unit
	HTG	Heating
	HTHW	High Temperature Hot Water
	HWR	Hot Water Return
	HWS	Hot Water Supply
	HZ	Hertz (Cycles per Second)
I		
	ID	Inside Diameter
	IN	Inches
K		
	KW	Kilowatt
L		
	LAT	Leaving Air Temperature
	LB	Pound
	LF	Linear Feet
	LD	Linear Diffuser
	LP	Low Point
	LPS	Low Pressure Steam
	LRA	Locked Rotor Amps
	LUVR	Louver
	LVDR	Louvered Door
	LVG	Leaving
	LWT	Leaving Water Temperature
M		
	MAX	Maximum
	MBH	1000 BTUH
	MCA	Minimum Circuit Amps
	MD	Motorized Damper
	MECH	Mechanical
	MIN	Minimum
	MU	Make-Up Water
	MUA	Make-Up Air
N		
	NC	Noise Criteria or Normally Closed
	NO	Normally Open
	NOM	Nominal
O		
	OA	Outside Air
	OAI	Outside Air Intake
	OC	On Center
	OD	Outside Diameter
	ODP	Open Drip Proof
	OV	Outlet Velocity
P		
	PCF	Pounds per Cubic Foot
	PD	Pressure Drop
	PH	Phase
	PRV	Pressure Reducing Valve
	PSI	Pounds per Square Inch
	PSIA	Pounds per Square Inch - Absolute
	PSID	Pounds per Square Inch - Differential
	PSIG	Pounds per Square Inch - Gauge
	PVC	Polyvinyl Chloride
R		
	R	Radius
	RA	Return Air
	RET	Return
	RH	Relative Humidity
	RLA	Running Load Amps
	RLF	Relief
	RPM	Revolutions per Minute
	RTU	Roof-Top Unit
S		
	SA	Supply Air
	SCR	Screen
	SCT	Saturated Condensing Temperature
	SD	Smoke Detector or Smoke Damper
	SE	Smoke Exhaust
	SEN	Sensible
	SFD	Combination Smoke / Fire Damper
	SHC	Sensible Heat Capacity
	SMACNA	Sheet metal and Air Conditioning Contractor's National Association
	SP	Static Pressure
	SF	Square Feet
	SS	Stainless Steel
	SUP	Supply
T		
	T	Temperature
	TEFC	Totally Enclosed Fan Cooled
	TEMP	Temperature
	TON	12,000 BTUH (Cooling Capacity)
	TSP	Total Static Pressure
	TSTAT	Thermostat
	TYP	Typical
U		
	UC	Undercut (Door)
V		
	V	Volts
	VAV	Variable Air Volume
	VD	Volume Damper
	VEL	Velocity
	VFD	Variable Frequency Drive
W		
	WB	Wet Bulb Temperature
	WC	Water Column
	WG	Water Gauge
	WPD	Water Pressure Drop
	WTD	Water Temperature Difference

HVAC SPECIFICATIONS

THE FOLLOWING STANDARDS SHALL GOVERN THE CHARACTER OF THE WORK TO BE PERFORMED: ASTM, NFPA, SMACNA, UL, AND LOCAL AGENCIES HAVING JURISDICTION.

1. LOW PRESSURE - RECTANGULAR DUCTWORK
GALVANIZED SHEET METAL GAUGE (ALL FOUR SIDES),.

DIMENSION LONGEST SIDE, INCHES	GALV STEEL GAUGE	ALUMINUM THICKNESS INCHES	COPPER OZ. PER SQ. FT.	TRANSVERSE REINFORCING AT JOINTS AND BETWEEN JOINTS
UP THRU 12	26	0.020	16	1" POCKET LOCK 24 GAUGE. STANDING SEAM JOINT 24 GAUGE. 1" STANDING S SLIP 24 GAUGE. JOINT MAX ON 8 FT. CENTERS.
13 THRU 18	24	0.025	24	SAME AS FOR UP THRU 12.
19 THRU 54	24	0.025	24	1" POCKET LOCK 22 GAUGE. JOINTS MAX. ON 8 FT. CENTERS.

WITH 1 X 1 X 1/8 IN.
1. FLAT AREAS OF DUCT OVER 18 IN. WIDE SHALL BE STIFFENED BY CROSS BREAKING OF BEADING.
2. ALL JOINTS TO HAVE CORNER CLOSURES.
3. ALL JOINTS SHALL BE SEALED WITH 3M EC-800 MASTIC.

2. DUCT INSTALLATION:
DUCTS SHALL BE SUPPORTED WITH APPROVED HANGERS AT INTERVALS NOT EXCEEDING 5 FEET.

3.. DUCTWORK INSULATION
QUALITY ASSURANCE:
A. FLAME SPREAD/SMOKE DEVELOPED RATING 0F 25/50 IN ACCORDANCE WITH ASTM E84

PRODUCT: GLASS FIBER, FLEXIBLE
A. MANUFACTURERS:
1. SCHULLER
2. OWENS CORNING
3. KNAUF
B. INSULATION: ASTM C553 C612; FLEXIBLE, NONCOMBUSTIBLE
1. "K" (KSI) VALUE: ASTM C518, 0.29 AT 75 DEGREES F.
2. MAXIMUM SERVICE TEMPERATURE: 250 DEGREES F.
3. SECURE WITH PRESSURE SENSITIVE TAPE.
C. VAPOR BARRIER JACKET
1. KRAFT PAPER REINFORCED WITH GLASS FIBER YARN AND BONDED TO
2. MOISTURE VAPOR TRANSMISSION: ASTM E96; 0.04 PERM.
3. SECURE WITH PRESSURE SENSITIVE TAPE.
D. VAPOR BARRIER TAPE
1. KRAFT PAPER REINFORCED WITH GLASS FIBER YARN AND BONDED TO ALUMINIZED FILM, WITH PRESSURE SENSITIVE RUBBER BASED ADHESIVE.
E. TIE WIRE: ANNEALED STEEL, 16 GAGE.

DUCTWORK INSULATION NOTES:
ALL SUPPLY AND RETURN DUCTS AND PLENUM INSTALLED AS PART OF AN HVAC AIR DISTRIBUTION SYSTEM MUST BE THERMALLY INSULATED WITH MINIMUM REQUIREMENTS AS FOLLOWS:
R-6 SUPPLY AND RETURN AIR DUCT INSULATION IN UNCONDITIONED SPACES

R-8 SUPPLY AND RETURN AIR DUCT INSULATION OUTSIDE THE BUILDING

R-8 INSULATION BETWEEN DUCTS AND THE BUILDING EXTERIOR WHEN DUCTS ARE PART OF A BUILDING ASSEMBLY

ALL ABOVE MENTIONED INSULATION VALUES SHALL BE CHECKED BY CONTRACTOR AND ADAPTED TO REFLECT REQUIREMENTS OF APPLICABLE ENERGY CODE

EQUIPMENT SYMBOLS AND CALL OUTS

VD — MANUAL BALANCING VOLUME DAMPER

T — WALL ROOM THERMOSTAT

S — REMOTE WALL MOUNTED AVERAGING TEMPERATURE SENSOR WITH HUMIDITY READING CAPABILITY

H — RETURN DUCT MOUNTED HUMIDISTAT

D (S) S/R — SMOKE DETECTOR - DUCT MOUNTED
S - DENOTES SUPPLY
R - DENOTES RETURN

NEW RETURN/EXHAUST DIFFUSER

NEW SUPPLY DIFFUSER

ECH-1 — ELECTRIC CEILING HEATER

EF-1 — EXHAUST FAN ROOF MOUNTED, MUSHROOM DOWNBLAST TYPE

TYPE (REFER TO SCHEDULE) / CFM
A1/2(325) — AIR OUTLET TAG

CONDENSATE DRAIN PIPE

NEW RIGID DUCT

NEW FLEXIBLE DUCT

DUCTWORK SYMBOLS

DESCRIPTION	DOUBLE LINE DUCT
SUPPLY DUCT UP	
SUPPLY DUCT DOWN	
ROUND DUCT UP SUPPLY/ RETURN/ EXHAUST	
ROUND DUCT DOWN SUPPLY/ RETURN/ EXHAUST	
STANDARD RADIUS ELBOW (R = W) SUPPLY/ RETURN/ EXHAUST	R, W
MITERED ELBOWS W/ VANES	
BULLHEAD SPLIT SUPPLY	
TAKEOFF TO DIFF/GRILLE	VD
RETURN DUCT UP	
RETURN DUCT DN	
EXHAUST DUCT UP	
EXHAUST DUCT DN	
HORIZONTAL OFFSET SUPPLY/RETURN /EXHAUST	
RISE OR DROP SUPPLY/RETURN/ EXHAUST	R/D
45° TAP TAKE-OFF — RECTANGULAR / ROUND (Ø) - OVAL ( )	
90° TAP TAKE-OFF — RECTANGULAR / ROUND (Ø) - OVAL ( )	
BULLHEAD CONVERGE RETURN/EXHAUST — RECTANGULAR / ROUND (Ø) - OVAL ( )	

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REVISION

NO.	DATE	DESCRIPTION	INT.

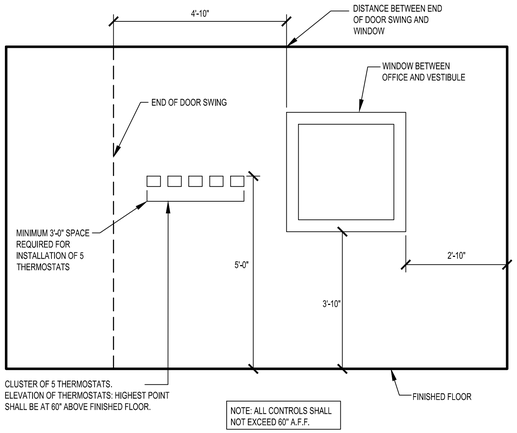
PROFESSIONAL CERTIFICATION
NAME OF LICENSEE: MATTHEW B. JARMEL
LICENSE NUMBER: 12854
EXPIRATION DATE:

Project Number: TLEWA22-038	Scale: AS NOTED
Drawn By: AM	Approved By: MBJ

Drawing Name:
HVAC ABBREVIATIONS SPECIFICATIONS AND SYMBOL LIST

Drawing Number:
H-101

2021.Q4.01 RETAIL PROTOTYPE



2 OFFICE WALL THERMOSTATS ELEVATION

SCALE: 1/2"-1'-0"

SHEET NOTES:

1. ALL SUPPLY AND RETURN DUCTWORK SHALL HAVE EXTERIOR DUCT WRAP INSULATION, MINIMUM R-6. SEE HVAC SPECIFICATIONS IN DWG H-101 FOR ACCEPTABLE MATERIAL.
2. SMOKE DETECTION SHALL BE PROVIDED IN EACH SUPPLY OR RETURN DUCT. SEE PLANS FOR LOCATION. RETURN DUCT SMOKE DETECTOR SHALL BE INSTALLED UPSTREAM OF OUTSIDE AIR DUCT CONNECTION. DUCT SMOKE DETECTION & HOUSING PROVIDED BY FIRE ALARM VENDOR. CHECK COMPATIBILITY WITH FIRE ALARM PANEL BEFORE ORDERING. HVAC CONTRACTOR SHALL PROVIDE & INSTALL SAMPLING TUBES PER FIRE ALARM VENDOR SPECIFICATIONS & DUCTWORK SHOP DRAWINGS. ALL WIRING BY FIRE ALARM VENDOR.
3. PROVIDE 1" ACOUSTICAL LINER FOR THE FIRST 15' FEET OF RUN OF SUPPLY AND RETURN DUCT FROM EACH RTU OUTLET.
4. THE THERMOSTAT SHALL BE INSTALLED ON THE WALL OF OFFICE ROOM AVERAGING SENSORS SHALL BE INSTALLED ON THE WALL OF EACH ROOM OCCUPIED BY CHILDREN (LOCATION SHALL BE AS PER PLAN)
5. INSTALL BALANCING VOLUME DAMPER ON EACH INDIVIDUAL SUPPLY/RETURN/EXHAUST TAKEOFF AS PER DETAIL IN DWG H-500
6. CONTRACTOR SHALL INSTALL A PLASMA TUBE IN EACH ROOFTOP UNIT CABINET AS PER SCHEDULE IN DWG H-400
7. SEE DETAILS IN DWG H-500 FOR MORE INFORMATION REGARDING EQUIPMENT AND DUCTWORK SHOWN ON THIS PLAN.
8. FOR DETAILED INFORMATION OF SPACE ALLOCATION IN MECHANICAL ROOM SEE ELECTRICAL DRAWING E-201.
9. UNIT AND ELECTRIC CEILING HEATERS ARE TO BE VERIFIED IF REQUIRED OR NOT BY AUTHORITY HAVING JURISDICTION.

KEY NOTES:

(1) 20x14 SUPPLY AND RETURN DUCT UP TO RTU-1 ON ROOF ABOVE. CONTRACTOR TO PROVIDE THE TRANSITION BETWEEN THE SUPPLY DUCT AND UNIT OPENING

(2) 20x14 SUPPLY AND RETURN DUCT UP TO RTU-2 ON ROOF ABOVE. CONTRACTOR TO PROVIDE THE TRANSITION BETWEEN THE SUPPLY DUCT AND UNIT OPENINGS

(3) 22x14 SUPPLY AND RETURN DUCT UP TO RTU-3 ON ROOF ABOVE. CONTRACTOR TO PROVIDE THE TRANSITION BETWEEN THE SUPPLY DUCT AND UNIT OPENING

(4) 22x14 SUPPLY AND RETURN DUCT UP TO RTU-4 ON ROOF ABOVE. CONTRACTOR TO PROVIDE THE TRANSITION BETWEEN THE SUPPLY DUCT AND UNIT OPENING

(5) 20x14 SUPPLY AND RETURN DUCT UP TO RTU-5 ON ROOF ABOVE. CONTRACTOR TO PROVIDE THE TRANSITION BETWEEN THE SUPPLY DUCT AND UNIT OPENING.

(6) RUN 4"Ø DRYER EXHAUST DUCT UP TO ROOF. TERMINATE WITH GOOSENECK MIN. 3 FEET ABOVE ROOF LINE.. PROVIDE CLEAN OUT AT EVERY ELBOW. TOTAL EXHAUST DUCT DEVELOPED LENGTH 12' WITH ONE 90° ELBOW. MAXIMUM ACCEPTABLE LENGTH WITH ONE 90° ELBOW BY MANUFACTURER IS 60'. THEREFORE NO BOOSTER FAN REQUIRED. SEE DETAIL ON DWG H-500.

(7) WALL MOUNTED THERMOSTAT WITH LOCKING COVER TO CONTROL EXHAUST FAN EF-3, SET TO ENGAGE AT 75°F.

(8) 12x10 EXHAUST DUCT UP TO EF-1 ON ROOF ABOVE.

(9) 10x10 EXHAUST DUCT UP TO EF-2 ON ROOF ABOVE.

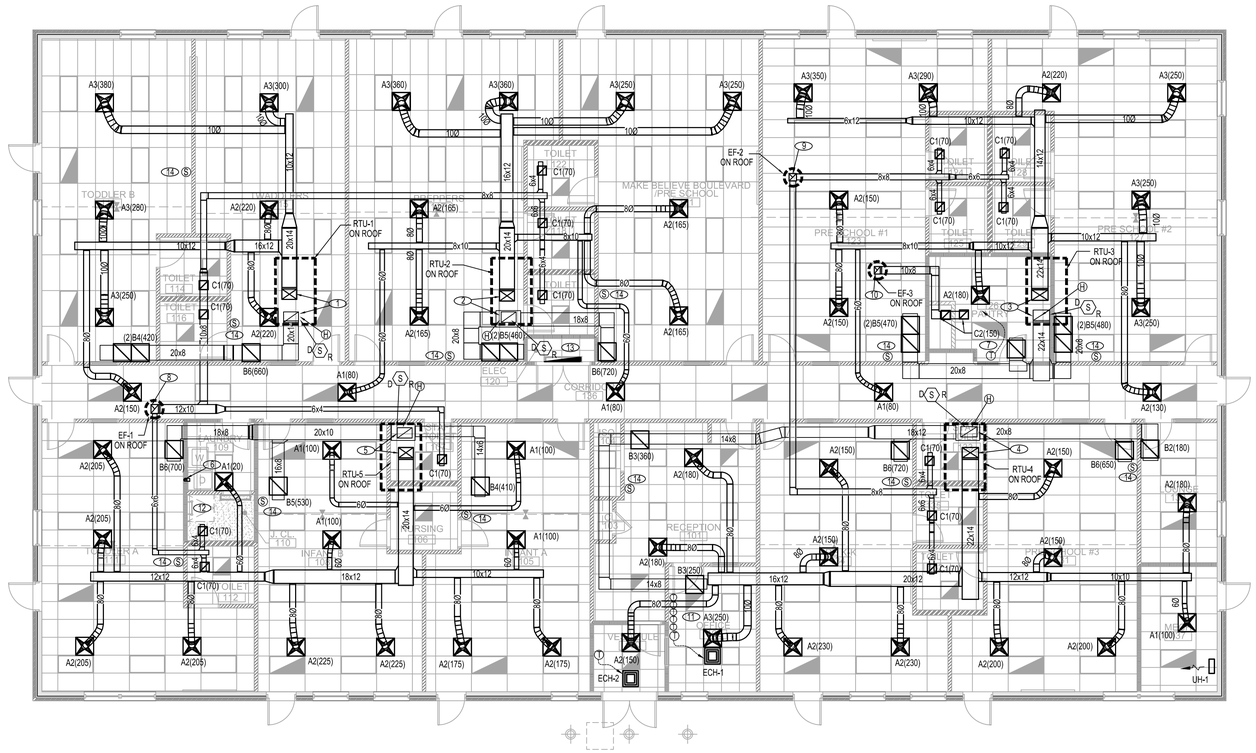
(10) 10x8 EXHAUST DUCT UP TO EF-3 ON ROOF ABOVE.

(11) EACH ROOFTOP UNIT THERMOSTAT SHALL BE TRANE MODEL TOUCH SCREEN PIVOT SMART. IT SHALL BE MOUNTED ON THE WALL OF OFFICE AS SHOWN IN DETAIL #2 IN THIS DWG

(12) ROOF ACCESS HATCH. IT SHALL NOT BE BLOCKED BY ANY DUCT, PIPES, WIRES, CONDUITS OR OTHER FIXED ITEMS

(13) CENTRAL EXHAUST FAN FOR TOILET EXHAUST TO OPERATE ON A TIMER LOCATED IN ELEC CLOSET. THE TIMER HAS EXHAUST FAN RUNNING FROM 6:00 AM TO 8:00 PM, SEVEN DAYS A WEEK. THEY SHOULD NOT BE CONNECTED TO THE LIGHT SWITCH OR BE INDIVIDUAL FAN UNITS.

(14) HONEYWELL TR40 AVERAGING TEMPERATURE SENSOR COMBINATION TEMPERATURE/HUMIDITY (RH) SENSOR KIT WITH ROOM HUMIDITY READING CAPABILITIES, WALL MOUNTED 5 FEET ABOVE FINISHED FLOOR . VERIFY THAT LOCATION OF AVERAGING SENSOR IS NOT IN CONFLICT WITH WALL MOUNTED ITEMS / MILLWORK.



1 HVAC PLAN

SCALE: 1/8" = 1'-0"

NORTH

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1	06-30-22	FOR TLE REVIEW	MBJ

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PROFESSIONAL CERTIFICATION

NAME OF LICENSEE: MATTHEW B. JARMEL
LICENSE NUMBER: 12854
EXPIRATION DATE:

Project Number: TLEWA22-038	Scale: AS NOTED
Drawn By: AM	Approved By: MBJ

Drawing Name: **HVAC PLAN**

Drawing Number: **H-200**

2021.Q4.01 RETAIL PROTOTYPE

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KEY NOTES:

1. THE HORIZONTAL DISTANCE FROM DRYER EXHAUST OUTLET TO CLOSEST ROOFTOP UNIT OUTSIDE AIR INTAKE SHALL BE MORE THAN 10 FEET
2. PROVIDE CONDENSATE DRAIN PIPE SIZED PER MANUFACTURER'S REQUIREMENTS FOR EACH ROOFTOP UNIT WITH CONDENSATE TRAP. CONDENSATE TO BE DISCHARGED TO THE ROOF TOWARD ROOF DRAIN. MINIMUM PIPE LENGTH FIVE (5) FEET AWAY FROM RTU INLET TO PROVIDE POSITIVE DRAINAGE. PROVIDE P-TRAP WITH MINIMUM 2" DIFFERENCE BETWEEN INLET AND DISCHARGE. ALLOW PVC PIPE (SIZE TO MATCH THE RTU CONDENSATE DISCHARGE) FROM P-TRAP TO ROOF DRAIN WITH VENT. THE PVC DRAIN LINE SHALL BE INSTALLED THAT NO AIR BLOCK WILL OCCUR.

SHEET NOTES:

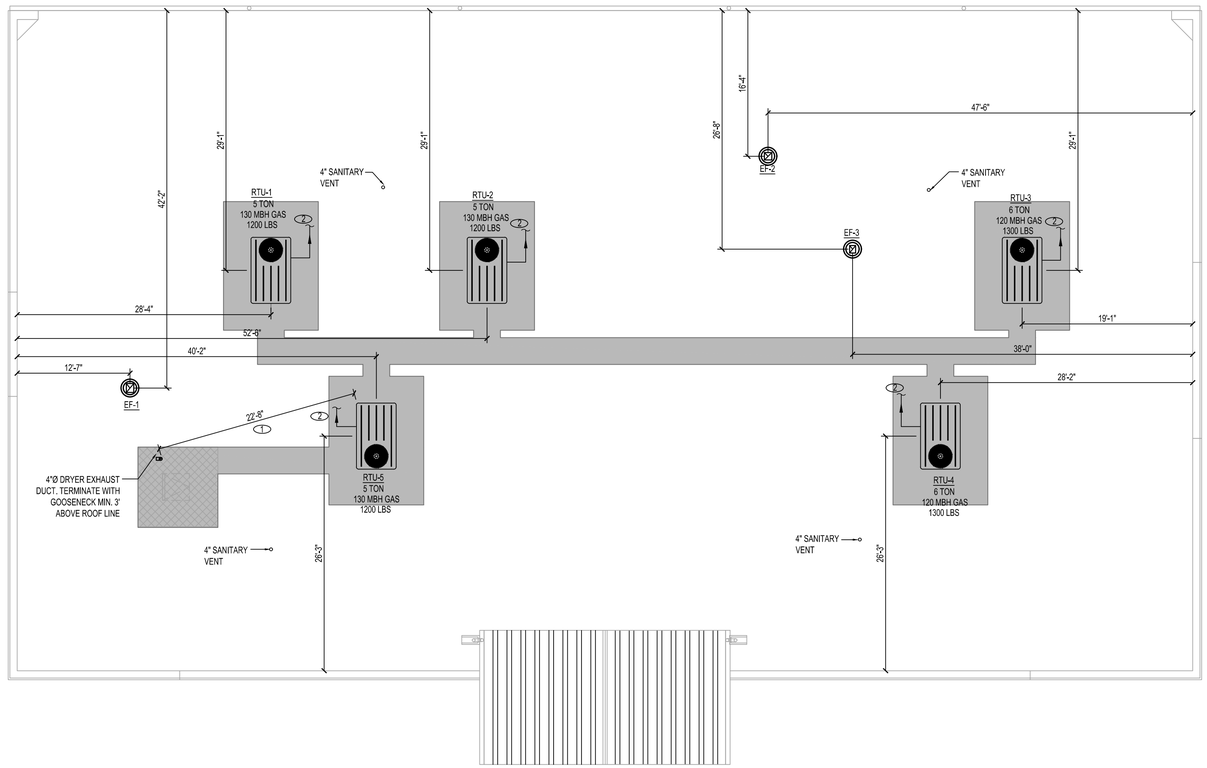
1. FOR GAS PIPE LAYOUT REFER TO PLUMBING DRAWINGS
2. CENTRAL EXHAUST FANS FOR TOILET EXHAUST TO OPERATE ON A TIMER. THE TIMER HAS TWO EXHAUST FANS RUNNING FROM 6:00 AM TO 8:00 PM, SEVEN DAYS A WEEK. THEY SHOULD NOT BE CONNECTED TO THE LIGHT SWITCH OR BE INDIVIDUAL FAN UNITS.
3. CONTRACTOR SHALL COORDINATE EXACT LOCATION OF ALL EQUIPMENT ON ROOF WITH STRUCTURAL DWGS. ALL SERVICEABLE EQUIPMENT MUST BE LOCATED A MINIMUM OF 10 FEET FROM ROOF EDGE OR OPENINGS. CONTRACTOR TO COORDINATE AND PROVIDE SAFETY RAILS IF UNITS ARE WITHIN 10 FEET OF ROOF EDGE OR OPENINGS.

ROOF EXHAUST SYSTEM NOTES

ALL EXHAUST DISCHARGE AND VENTS TO BE LOCATED AT A MINIMUM DISTANCE OF 10 FT. FROM ANY RTU'S O/A INTAKES

ALL ROOFTOP UNITS AND EXHAUST FANS TO BE LOCATED AT A MINIMUM DISTANCE OF 10 FT. FROM ROOF EDGE AND ROOF OPENINGS. CONTRACTOR TO VERIFY IN FIELD AND NOTIFY ARCHITECT/ENGINEER OF ANY DISCREPANCIES TO DETERMINE NEED FOR FALL PROTECTION

NOTE:
WHEN DISTANCE FROM EQUIPMENT REQUIRED MAINTENANCE IS LESS THAN 10 FEET FROM THE EDGE OF THE ROOF, 42 " HIGH GUARD RAIL MUST BE INSTALLED OR A PARAPET 42" HIGH TO BE PROVIDED. SEE ARCHITECTURAL PLANS.



1 HVAC ROOF PLAN

SCALE: 1/8" = 1'-0"

NORTH

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Drawn By: AMN	Approved By: MBJ

Drawing Name:

HVAC ROOF PLAN

Drawing Number:

H-300

2021.Q4.01 RETAIL PROTOTYPE

ROOFTOP AIR HANDLING UNIT SCHEDULE

TAG	LOCATION	MANUF	MANUF MODEL	TOTAL CFM	MAX. O.A. CFM	COOLING TONS	DX COOLING COIL DATA (2 STAGE COOLING)								GAS HEATING COIL DATA (2 STAGE HEATING)						MOTOR/ELECTRICAL DATA								
							NET TOTAL CAPACITY MBH	NET SENSIBLE CAPACITY MBH	LATENT CAPACITY MBH	COIL EAT DB °F	COIL EAT WB °F	UNIT LAT DB °F	UNIT LAT WB °F	COOLING DESIGN OUTDOOR AMBIENT TEMP DB/WB °F	TYPE OF HEAT	INPUT CAPACITY MBH	OUTPUT CAPACITY MBH	COIL EAT DB °F	UNIT LAT DB °F	HEATING DESIGN OUTDOOR AMBIENT TEMP DB °F	UNIT VOLTAGE	EXT. SP IN W.C.	SUPPLY FAN MOTOR HP	SUPPLY FAN MOTOR TYPE	EER	MCA	MOP	MAX. OPERATING UNIT WEIGHT LBS	REMARKS
RTU-1	ROOF	TRANE	YHC060E3	1800	300	5 TON	56.87	45.25	11.62	75.38	61.82	52.76	50.61	87/66	HIGH	130	104	64.16	117.86	21	208/3	0.7	1	STANDARD	14.2 SEER	27	40	1200	SEE NOTES
RTU-2	ROOF	TRANE	YHC060E3	2040	400	5 TON	58.16	48.67	9.49	75.80	61.98	54.28	51.99	87/66	HIGH	130	104	62.60	110.00	21	208/3	0.7	1	STANDARD	14.2 SEER	27	40	1200	SEE NOTES
RTU-3	ROOF	TRANE	YSJ072A3S0H	2300	400	6 TON	69.28	57.67	11.61	75.43	61.79	52.50	50.99	87/66	MEDIUM	120	97.2	63.96	109.81	21	208/3	0.8	3.1	MULTISPEED	11.0	38	50	1300	SEE NOTES
RTU-4	ROOF	TRANE	YSJ072A3S0H	2500	350	6 TON	69.82	58.70	11.12	74.96	61.61	53.19	51.63	87/66	MEDIUM	120	97.2	65.72	107.90	21	208/3	0.8	3.1	MULTISPEED	11.0	38	50	1300	SEE NOTES
RTU-5	ROOF	TRANE	YHC060E3	2040	400	5 TON	58.16	48.67	9.49	75.80	61.98	54.28	51.99	87/66	MEDIUM	130	104	62.60	110.00	21	208/3	0.7	1	STANDARD	14.2 SEER	27	40	1200	SEE NOTES

NOTES:
1. ALL UNITS SHALL HAVE DOWNFLOW DUCTS ARRANGEMENT
2. PROVIDE FACTORY INSTALLED DUAL ENTHALPY ECONOMIZER WITH HOOD.
3. PROVIDE FACTORY INSTALLED BAROMETRIC RELIEF DAMPERS WITH HOOD
4. PROVIDE FACTORY INSTALLED 2 IN MERV8 FILTER
5. PROVIDE FACTORY INSTALLED GFCI - FACTORY INSTALLED/NON POWERED
6. PROVIDE FACTORY INSTALLED HINGED ACCESS DOORS
7. PROVIDE MINIMUM 14" TALL MANUFACTURER'S ROOFCURBS FOR EACH UNIT.
8. PROVIDE MULTI STAGE AIR VOLUME
9. PROVIDE FACTORY INSTALLED DEHUMIDIFICATION (HOT GAS REHEAT)
10. PROVIDE FACTORY INSTALLED WEATHERPROOF DISCONNECT
11. PROVIDE FACTORY INSTALLED ENVIRON COIL SYSTEM
12. PROVIDE FIELD INSTALLED RETURN SMOKE DETECTOR KIT
13. PROVIDE CONDENSATE DRAIN OVERFLOW SWITCH
14. THE CONTRACTOR SHALL VERIFY AND COORDINATE REQUIRED ROOF ASSEMBLY OPENING LOCATIONS AND EQUIPMENT WEIGHT(S) WITH THE ARCHITECTS PRIOR TO ORDERING HVAC EQUIPMENT AND REVIEW OF FRAMING SHOP DRAWINGS.
15. FOR EACH UNIT PROVIDE THERMOSTAT HONEYWELL MODEL TC500 AND HONEYWELL AVERAGING SENSORS MODEL TR40 FOR LOCATIONS AND QUANTITIES SEE DWG H-200 IN CASE OF ROOFTOP UNIT SUBSTITUTION
CONTRACTOR SHALL PROVIDE EQUIVALENT CONTROL SYSTEM FULLY COMPATIBLE WITH APPROVED ROOFTOP UNIT SUBSTITUTED. CONTROL SYSTEM SHALL BE CAPABLE TO ACCOMMODATE NIGHT SET BACK AND MORNING WARM UP/COOLDOWN WITH OUTSIDE AIR DAMPER FULLY CLOSED DURING THIS SEQUENCE.

START UP OF UNITS
MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR STARTUP OF ALL UNITS. CONTRACTOR SHALL COORDINATE WITH MANUFACTURER REP. TO SCHEDULE SITE VISIT(S) TO VERIFY INSTALLATION IS AS PER MANUFACTURER'S SPECIFICATIONS.THE STARTUP ACTIVITIES MUST BE DOCUMENTED AND MADE PART OF THE CLOSE-OUT PACKAGE PROVIDED BY THE GENERAL CONTRACTOR TO THE OWNER AND TENANT ON THE PROJECT.

EXHAUST FAN SCHEDULE

TAG	LOCATION	MANUF	MANUF MODEL	CFM	DRIVE	RPM	ESP. IN. W.C.	SONES	ROOF OPENING	WEIGHT LBS	HP	VOLTS	MOTOR TYPE	REMARKS
EF-1	ROOF	CARNES	VEBK08	560	BELT	1438	0.4	6.6	11x11	30	1/6	120/1	K4	SEE NOTES 1& 2
EF-2	ROOF	CARNES	VEBK08	490	BELT	1352	0.4	6.1	11x11	30	1/6	120/1	K4	SEE NOTES 1& 2
EF-3	ROOF	CARNES	VEBK06	300	BELT	1219	0.3	4.0	11x11	30	1/6	120/1	K3	SEE NOTES 1& 3

NOTES:
1. PROVIDE DISCONNECT SWITCH, BACKDRAFT DAMPER ALUMINUM INSECT SCREEN AND PREFABRICATED FLAT ROOF CURB BY FAN MANUFACTURER
2. FANS TO RUN ON TIMECLOCK PARAGON MODEL 7000 SERIES AS SHOWN IN ELECTRICAL DWGS
TIMER SETTINGS: FAN ON FROM 6:00 AM TO 8:00 PM , SEVEN DAYS PER WEEK
3. PROVIDE WALL REMOTE THERMOSTAT WITH LOCKING COVER. THERMOSTAT TO BE SET AT 75°F

DIFFUSER AND REGISTER SCHEDULE

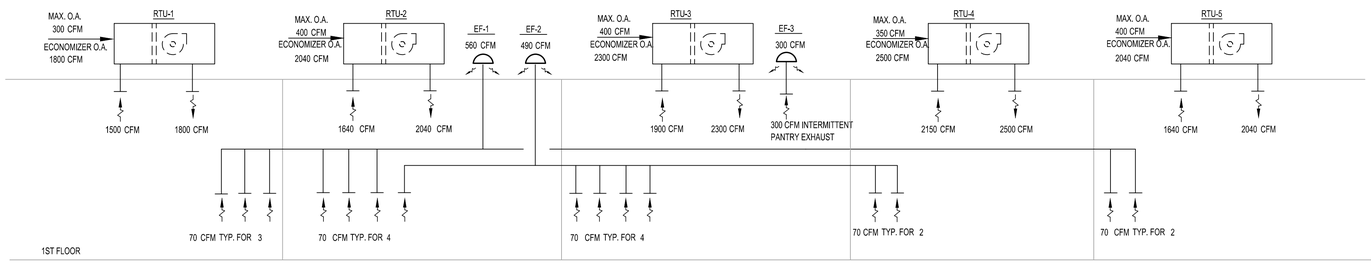
TAG	MANUF	MANUF MODEL	CFM RANGE	SERVICE	NECK SIZE Ø IN.	FACE PANEL SIZE IN.	REMARKS
A1	CARNES	SJTB	0-100	SUPPLY	6	24x24	SEE NOTES
A2	CARNES	SJTB	101-230	SUPPLY	8	24x24	SEE NOTES
A3	CARNES	SJTB	231-380	SUPPLY	10	24x24	SEE NOTES
A4	CARNES	SJTB	381-450	SUPPLY	12	24x24	SEE NOTES
A5	CARNES	SJTB	451-600	SUPPLY	14	24x24	SEE NOTES
B1	CARNES	SPRB	0-100	RETURN	6	24x24	SEE NOTES
B2	CARNES	SPRB	101-230	RETURN	8	24x24	SEE NOTES
B3	CARNES	SPRB	231-380	RETURN	10	24x24	SEE NOTES
B4	CARNES	SPRB	381-450	RETURN	12	24x24	SEE NOTES
B5	CARNES	SPRB	451-600	RETURN	14	24x24	SEE NOTES
B6	CARNES	SPRB	601-1000	RETURN	16	24x24	SEE NOTES
C1	CARNES	SPRB	0-70	TOILET EXHAUST	6	12x12	SEE NOTES
C2	CARNES	SPRB	150	PANTRY EXHAUST	8	12x12	SEE NOTES

NOTES: CFM SHALL BE AS INDICATED IN DRAWINGS.
C1 AND C2 EXHAUST GRILLES SHALL BE FACE MOUNTED ON THE 24x24 CEILING TILE

GLOBAL PLASMA AIR DUCT TUBE SCHEDULE

TAG	MANUFACTURER	MODEL	SERVING	ELEC. VOLTAGE	WEIGHT	QUANTITY PER UNIT
GP-1	GLOBAL PLASMA SOLUTIONS	FC48- AC	RTU-1	24 VOLTS	4 LBS	1
GP-2	GLOBAL PLASMA SOLUTIONS	FC48- AC	RTU-2	24 VOLTS	4 LBS	1
GP-3	GLOBAL PLASMA SOLUTIONS	FC48- AC	RTU-3	24 VOLTS	4 LBS	1
GP-4	GLOBAL PLASMA SOLUTIONS	FC48- AC	RTU-4	24 VOLTS	4 LBS	1
GP-5	GLOBAL PLASMA SOLUTIONS	FC48- AC	RTU-5	24 VOLTS	4 LBS	1

ALL TUBES SHALL BE MOUNTED INSIDE CORRESPONDING ROOFTOP UNIT CABINET



AIR FLOW DIAGRAM

N.T.S.

MECH ROOM ELECTRIC UNIT HEATER SCHEDULE

TAG	LOCATION	MANUF	MANUF MODEL	KW	BTUH	CFM	THROW FT.	MIN. MOUNTING HEIGHT FT.	MCA	CONTROL CIRCUIT & FAN MOTOR VOLTS	WEIGHT LBS	REMARKS
UH-1	MECH. RM.	QMARK	MWUH5004	1.87	6396	270	16	6	11.3	208/1/60	24	SEE NOTE 1

NOTES:
1. HEATER TO BE WALL MOUNTED. PROVIDE DISCONNECT SWITCH. BUILT IN THERMOSTAT TO BE SET AT 65° F
MOUNTING HEIGHT = 7'-0" ABOVE FLOOR FINISH.

SUBMITTALS FOR HVAC EQUIPMENT AND COMPONENTS SHALL BE PROVIDED TO THE ARCHITECT AND TO THE LEARNING EXPERIENCE PRIOR TO ORDERING EQUIPMENT.
ALL SUBSTITUTION OF EQUIPMENT SHALL BE SUBMITTED FOR REVIEW AND APPROVAL BY TLE

ELECTRIC CEILING HEATER SCHEDULE

TAG	MANUFACTURER	MODEL	KW	ELEC. VOLTAGE	WEIGHT	REMARKS
ECH - 1	QMARK	EFF SERIES 1500	1.5	120/1/60	22	SEE NOTE 1
ECH - 2	QMARK	EFF SERIES 1500	1.5	120/1/60	22	SEE NOTE 1

NOTES:
1. HEATER TO BE CEILING MOUNTED. PROVIDE T-BAR MOUNTING KIT. DISCONNECT SWITCH.
PROVIDE WALL REMOTE THERMOSTAT (120V WITH CONTACTS RATED AT 20AMPS OR GREATER). THERMOSTAT TO BE SET AT 74° F.

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FL State Board of Engineers & Land Surveyors
Authorization # CA32449

ISSUE

NO.	DATE	DESCRIPTION	INT.
1	06-30-22	FOR TLE REVIEW	MBJ

REVISION

NO.	DATE	DESCRIPTION	INT.

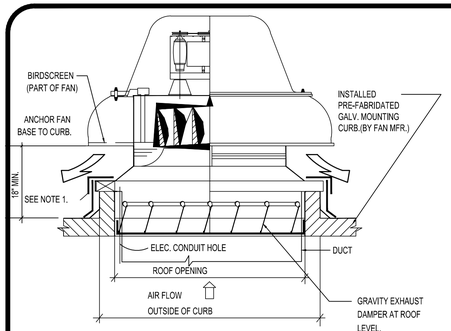
PROFESSIONAL CERTIFICATION
NAME OF LICENSEE: MATTHEW B. JARMEL
LICENSE NUMBER: 12854
EXPIRATION DATE:

Project Number: TLEWA22-038	Scale: AS NOTED
Drawn By: AM	Approved By: MBJ

Drawing Name:
HVAC SCHEDULES & AIR RISER DIAGRAM

Drawing Number:
H-400

2021.Q4.01 RETAIL PROTOTYPE

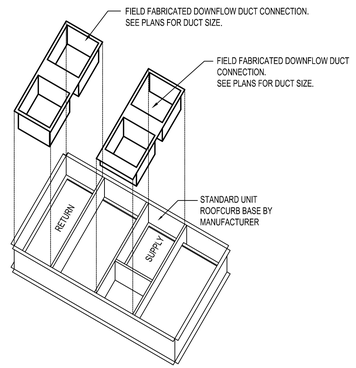


NOTES:

1. ROOF FLASHING AND SEAL TO BE PERFORMED IN A MANNER TO MAINTAIN ROOF WARRANTY. COORDINATE WITH ROOF SYSTEM MANUFACTURER.
2. EXHAUST DUCT RISER SHALL BE FLANGED OVER CURB RIM. COORDINATE SIZE WITH APPROVED DRAWING.

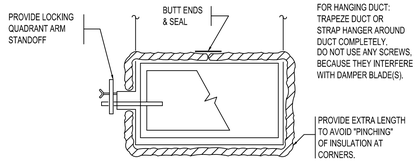
13 ROOF EXHAUST FAN DIAGRAM

SCALE: N.T.S.



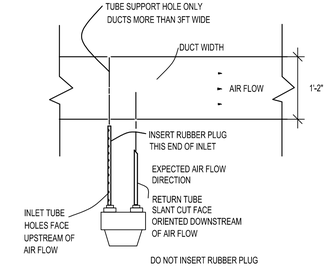
12 DUCTWORK CONNECTION TO ROOFCURB

SCALE: N.T.S.



5 DUCT INSULATION DIAGRAM

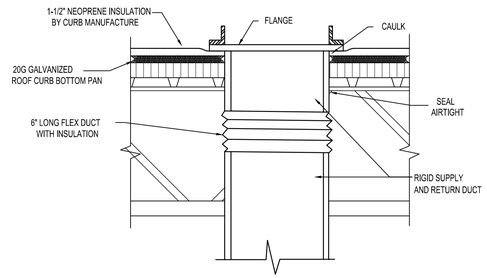
SCALE: N.T.S.



4 DUCT SMOKE DETECTOR

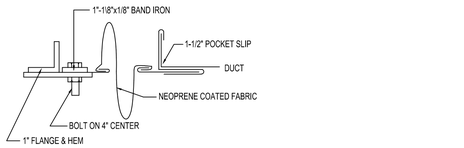
SCALE: 3/4" - 1'-0"

1. CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK USING THE CONTRACTOR'S BEST SKILL AND ATTENTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE AND HAVE CONTROL OVER CONSTRUCTION MEANS, METHODS TECHNIQUES, SEQUENCE, AND JOB SITE SAFETY
2. GC MUST PROVIDE & INSTALL ALL PRODUCTS PER PLANS. ONLY SUBSTITUTED PRODUCTS NEED TO BE SUBMITTED TO THE ARCHITECT FOR APPROVAL. UNAPPROVED SUBSTITUTIONS WILL BE REPLACED AT THE EXPENSE OF THE GC.
3. VERBAL REPRESENTATION HAS NO VALUE AND ALL REQUESTS TO CHANGE ANY PRODUCTS OR SPECIFICATIONS PER PLANS, MUST BE SUBMITTED IN WRITING TO THE ARCHITECT & TLE FOR APPROVAL.



11 DUCT PENETRATION THROUGH ROOF

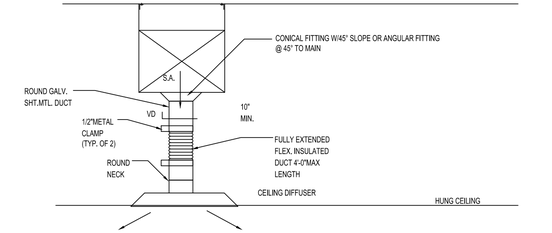
SCALE: N.T.S.



(USED AT CONNECTION BETWEEN DUCTWORK AND AIR HANDLER UNITS SUPPLY AND RETURN OUTLET)

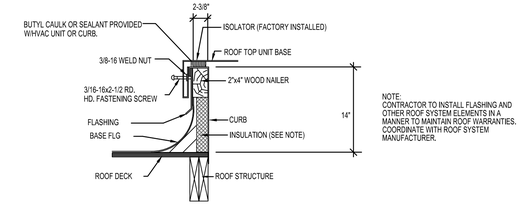
6 FLEX CONNECTOR DIAGRAM

SCALE: N.T.S.



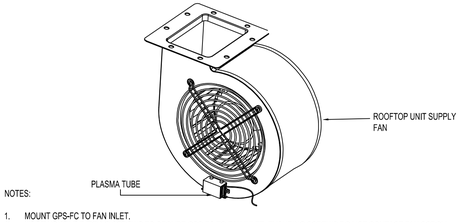
3 BOTTOM DUCT DIFFUSER CONNECTION

SCALE: 1/2" = 1'-0"



10 TYPICAL HVAC UNIT ROOFTOP CURB

SCALE: 1" - 1'-0"

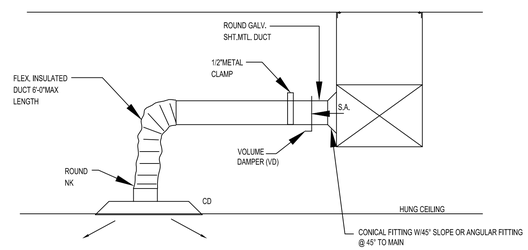


NOTES:

1. MOUNT GPS-FC TO FAN INLET.
2. USE TWO SELF-TAPPING SCREWS TO SECURE GPS-FC TO FAN INLET, ENSURING SCREWS DO NOT CONTACT FAN SCROLL.
3. WIRE GPS-FC TO 24VAC CONTROLL POWER
4. "DRY" ALARM CONTACTS ARE PROVIDED WITH EACH GPS-FC , RATED FOR 24VAC/300mA MAX.

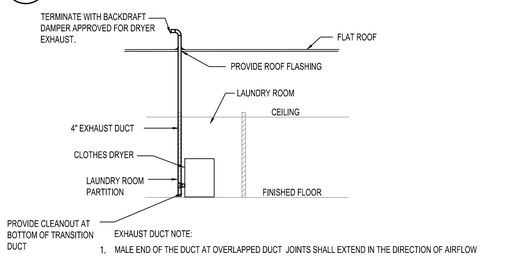
7 GPS-FC-48-AC MOUNTING DIAGRAM

SCALE: N.T.S.



2 SUPPLY DIFFUSER CONNECTION

SCALE: 1/2" = 1'-0"

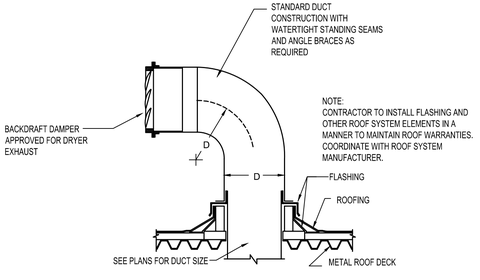


EXHAUST DUCT NOTE:

1. MALE END OF THE DUCT AT OVERLAPPED DUCT JOINTS SHALL EXTEND IN THE DIRECTION OF AIRFLOW
2. PROTECTIVE SHIELD PLATES SHALL BE PLACED WHERE NAILS OR SCREWS FROM FINISH OR OTHER WORK ARE LIKELY TO PENETRATE THE CLOTHES DRYER EXHAUST DUCT. SHIELD PLATES HALL BE PLACED ON THE FINISHED FRAMING MEMBERS WHERE THERE IS LESS THAN 1-1/4" BETWEEN DUCT AND FINISHED FRAME MEMBER. SHIELDS SHALL BE STEEL (0.062" THICK) AND EXTEND AT-LEAST 2" ABOVE SOLE PLATES AND BELOW TOP PLATES.
3. 4" RIGID METAL EXHAUST DUCT SHALL HAVE SMOOTH INTERIOR FINISH WITH METAL THICKNESS OF NOT LESS THAN 0..016" IN THICKNESS AND SHALL BE SUPPORTED AND SECURED IN PLACE.
4. SCREENS SHALL NOT BE PROVIDED AT THE DRYER EXHAUST DUCT TERMINATION

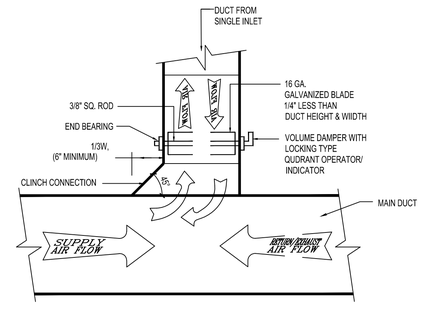
9 CLOTHES DRYER EXHAUST DIAGRAM

SCALE: N.T.S.



8 DRYER GOOSENECK DIAGRAM

SCALE: N.T.S.



1 SUPPLY/RETURN (EXHAUST) DUCT TAP

SCALE: N.T.S.

Jarmel Kizel
ARCHITECTS AND ENGINEERS INC.
42 OKNER PARKWAY
LIVINGSTON, NEW JERSEY 07039
TEL: 973-994-9669
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Architecture
Engineering
Interior Design
Implementation Services
Certificate of Authorization # AA26003594
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NAME OF LICENSEE: MATTHEW B. JARMEL
LICENSE NUMBER: 12854
EXPIRATION DATE:

Project Number: TLEWA22-038	Scale: AS NOTED
Drawn By: LNAM	Approved By: MBJ

Drawing Name:

HVAC DETAILS/DIAGRAMS

Drawing Number:

H-500

2021.Q4.01 RETAIL PROTOTYPE

1. CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK USING THE CONTRACTOR'S BEST SKILL AND ATTENTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE AND HAVE CONTROL OVER CONSTRUCTION MEANS, METHODS TECHNIQUES, SEQUENCE, AND JOB SITE SAFETY

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Phone: (912) 356-0115 Fax: (912) 356-0114
Email: info@globalplasmasolutions.com Web: www.globalplasmasolutions.com
VERSION 1.6 running ASHRAE 62.1-2013

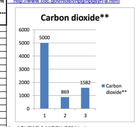
Zone Tag	Facility Type	Zone Use	Zone Floor Area (square ft) Az	Zone Max Occupancy Pz	Table 6.1 OA per Occupant Rp	Table 6.1 cfm/ft2 Ra	Pz * Rp	Az * Ra	Table 6.2 Ventilation Effectiveness Ez	Outdoor Air to Zone (CFM) with Ez correction (Vbz/Ez)
RTU-1	Educational Facilities	Daycare (through AGE 4)	1,223.0	32.0	10.0	0.18	320	220	0.8	675
										OA required per VRP

Zone Height (feet)	10.3		
Desired Outside Air (Vo) IAQP	300		
Supply Air (Vs)	1,800		
Return Air (Vr)	1500		
Recirc. Flow Factor (R)	0.83		
Ventilation Effectiveness (Ez)	0.8		
Level of Physical Activity	Standing (desk work)		
Filter Location	B		
HVAC Flow Type	Constant		
Outdoor Air Flow Type	Constant		

Air Changes Per Hour	8.6	VRP OA CFM per person	21.1
Outside Air Per VRP	675 CFM	IAQ OA CFM per person	9.4
Outside Air Per IAQ	300 CFM		
Outside Air Savings	375 CFM	Winter Heating Savings	
OA Summer Drybulb	87.0	OA Winter Design DB (F)	21
OA Summer Wetbulb	66.0	Supply Air DB Setpoint (F)	117.66
Coil Leaving Air Drybulb (F	52.8	MBH Saved Winter	10.6
Coil Leaving Air Wetbulb (	52.6	KW Saved Winter	11.6
OA MBH Saved Summer*	17.0		
OA Tons Saved Summer*	1.4		

*OA = Outside Air
**OSHA, NIOSH & WHO most conservative values u
http://www.cdc.gov/niosh/npg/npgsyn-a.html

Indoor Contaminants Generated By People & From Outdoors	Maximum Threshold Value (PPM)	Steady State Using the VRP* (Prescribed OA) Plasma Off	Steady State Using the IAQ Method (Reduced OA) Plasma On	Is Steady State Level Acceptable at Reduced OA Levels?	Contaminant Generation Rate (PPM)	Filtration Effectiveness	Cognizant Authority**
Acetaldehyde	100.0	0.01112	0.00180	Yes	0.00048	50%	OSHA
Acetone	250.0	0.00185	0.00043	Yes	0.00854	50%	NIOSH
Ammonia	25.00	0.01444	0.00842	Yes	0.21460	50%	NIOSH
Benzene	1.0000	0.00252	0.00037	Yes	0.00022	50%	OSHA
2- Butanone (MEK)	200.0	0.00018	0.00007	Yes	0.00133	50%	NIOSH
Carbon dioxide**	5000	869	1582	Yes	441	0%	NIOSH
Chloroform	2.0000	0.00011	0.00002	Yes	0.00004	50%	NIOSH
Dioxane	100.0	0.00000	0.00000	Yes	0.00000	50%	OSHA
Hydrogen Sulfide	10.0	0.00000	0.00000	Yes	0.00000	50%	NIOSH
Methane	NA	1.68094	1.68094	Yes	0.00000	0%	NA
Methanol	200.0	0.00000	0.00000	Yes	0.00000	0%	NIOSH
Methylene Chloride	25.0	0.00078	0.00013	Yes	0.00121	50%	OSHA
Propane	1000.0	0.00998	0.00998	Yes	0.00000	0%	NIOSH
Tetrachloroethane	5.0000	0.00000	0.00000	Yes	0.00000	50%	OSHA
Tetrachloroethylene	100.0000	0.00037	0.00006	Yes	0.00000	50%	OSHA
Toluene	100.0000	0.00533	0.00098	Yes	0.00032	50%	NIOSH
1,1,1 - Trichloroethane	350.0000	0.00078	0.00011	Yes	0.00058	50%	NIOSH
Xylene	100.0000	0.00230	0.00033	Yes	0.00000	50%	OSHA



Building materials and furnishings assumed to have no VOCs and off-gassing is complete
All yellow shaded boxes require user input or review

Is IAQ acceptable at reduced outside air levels? Yes

1 = ASHRAE & NIOSH CO2 Limit
2 = CO2 Level at Ventilation Rate OA Flow Rate
3 = CO2 Level at IAQ Procedure OA Flow Rate
**Carbon dioxide has been provided for reference only for gathering demand contr ventilation (DCV) setpoints. The National Research Council was commissioned b the US Navy to prove CO2 is not a contaminant of concern when using air purificati to control the other contaminants of concern, as found on submarines.

Date	6/17/2022
Job Name	TLE Graham WA
Representative	
Engineer	Jarmel Kozel Architects and Engineers
Contractor	

IMC 2006 & later allows for ASHRAE 62 IAQP through the engineered exception found in Section 403.2
Exhaust flow rates may differ from Table 6.5 based on ASHRAE 62 IAQP via Section 6.5.2

BASED ON VENTILATION RATES PRESCRIBED BY THE 2018 INTERNATIONAL MECHANICAL CODE, RTU-1 WILL NEED TO PROVIDE 675 CFM OF OUTSIDE AIR AS PER EXCEPTIONS OF PARAGRAPH 403.2 , THIS RATE OF 675 CFM HAS BEEN REDUCED TO 300 CFM DUE TO AN ENGINEERED VENTILATION SYSTEM WHICH CONSIST OF A PLASMA TUBE ADDED INTO SUPPLY AIRFLOW

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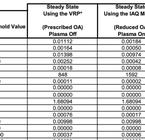
Zone Tag	Facility Type	Zone Use	Zone Floor Area (square ft) Az	Zone Max Occupancy Pz	Table 6.1 OA per Occupant Rp	Table 6.1 cfm/ft2 Ra	Pz * Rp	Az * Ra	Table 6.2 Ventilation Effectiveness Ez	Outdoor Air to Zone (CFM) with Ez correction (Vbz/Ez)
RTU-2	Educational Facilities	Daycare (through AGE 4)	1,793.0	43.0	10.0	0.18	430	323	0.8	941
										OA required per VRP

Zone Height (feet)	10.3		
Desired Outside Air (Vo) IAQP	400		
Supply Air (Vs)	2,040		
Return Air (Vr)	1640		
Recirc. Flow Factor (R)	0.80		
Ventilation Effectiveness (Ez)	0.8		
Level of Physical Activity	Standing (desk work)		
Filter Location	B		
HVAC Flow Type	Constant		
Outdoor Air Flow Type	Constant		

Air Changes Per Hour	6.6	VRP OA CFM per person	21.9
Outside Air Per VRP	941 CFM	IAQ OA CFM per person	9.3
Outside Air Per IAQ	400 CFM		
Outside Air Savings	541 CFM	Winter Heating Savings	
OA Summer Drybulb	87.0	OA Winter Design DB (F)	21
OA Summer Wetbulb	66.0	Supply Air DB Setpoint (F)	110
Coil Leaving Air Drybulb (F	54.3	MBH Saved Winter	52.2
Coil Leaving Air Wetbulb (	52.0	KW Saved Winter	15.3
OA MBH Saved Summer*	22.6		
OA Tons Saved Summer*	1.9		

*OA = Outside Air
**OSHA, NIOSH & WHO most conservative values u
http://www.cdc.gov/niosh/npg/npgsyn-a.html

Indoor Contaminants Generated By People & From Outdoors	Maximum Threshold Value (PPM)	Steady State Using the VRP* (Prescribed OA) Plasma Off	Steady State Using the IAQ Method (Reduced OA) Plasma On	Is Steady State Level Acceptable at Reduced OA Levels?	Contaminant Generation Rate (PPM)	Filtration Effectiveness	Cognizant Authority**
Acetaldehyde	100.0	0.01112	0.00184	Yes	0.00048	50%	OSHA
Acetone	250.0	0.00185	0.00044	Yes	0.00854	50%	NIOSH
Ammonia	25.00	0.01398	0.00974	Yes	0.21460	50%	NIOSH
Benzene	1.0000	0.00252	0.00042	Yes	0.00022	50%	OSHA
2- Butanone (MEK)	200.0	0.00018	0.00008	Yes	0.00133	50%	NIOSH
Carbon dioxide**	5000	848	1592	Yes	441	0%	NIOSH
Chloroform	2.0000	0.00011	0.00002	Yes	0.00004	50%	NIOSH
Dioxane	100.0	0.00000	0.00000	Yes	0.00000	50%	OSHA
Hydrogen Sulfide	10.0	0.00000	0.00000	Yes	0.00000	50%	NIOSH
Methane	NA	1.68094	1.68094	Yes	0.00000	0%	NA
Methanol	200.0	0.00000	0.00000	Yes	0.00000	0%	NIOSH
Methylene Chloride	25.0	0.00078	0.00013	Yes	0.00121	50%	OSHA
Propane	1000.0	0.00998	0.00998	Yes	0.00000	0%	NIOSH
Tetrachloroethane	5.0000	0.00000	0.00000	Yes	0.00000	50%	OSHA
Tetrachloroethylene	100.0000	0.00037	0.00006	Yes	0.00000	50%	OSHA
Toluene	100.0000	0.00533	0.00098	Yes	0.00032	50%	NIOSH
1,1,1 - Trichloroethane	350.0000	0.00078	0.00011	Yes	0.00058	50%	NIOSH
Xylene	100.0000	0.00230	0.00038	Yes	0.00000	50%	OSHA



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Is IAQ acceptable at reduced outside air levels? Yes

1 = ASHRAE & NIOSH CO2 Limit
2 = CO2 Level at Ventilation Rate OA Flow Rate
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Exhaust flow rates may differ from Table 6.5 based on ASHRAE 62 IAQP via Section 6.5.2

BASED ON VENTILATION RATES PRESCRIBED BY THE 2018 INTERNATIONAL MECHANICAL CODE, RTU-2 WILL NEED TO PROVIDE 941 CFM OF OUTSIDE AIR AS PER EXCEPTIONS OF PARAGRAPH 403.2 , THIS RATE OF 941 CFM HAS BEEN REDUCED TO 400 CFM DUE TO AN ENGINEERED VENTILATION SYSTEM WHICH CONSIST OF A PLASMA TUBE ADDED INTO SUPPLY AIRFLOW

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RTU-3	Educational Facilities	Daycare (through AGE 4)	1,888.0	45.0	10.0	0.18	450	340	0.8	987
										OA required per VRP

Zone Height (feet)	10.3		
Desired Outside Air (Vo) IAQP	400		
Supply Air (Vs)	2,300		
Return Air (Vr)	1900		
Recirc. Flow Factor (R)	0.83		
Ventilation Effectiveness (Ez)	0.8		
Level of Physical Activity	Standing (desk work)		
Filter Location	B		
HVAC Flow Type	Constant		
Outdoor Air Flow Type	Constant		

Air Changes Per Hour	7.1	VRP OA CFM per person	21.9
Outside Air Per VRP	987 CFM	IAQ OA CFM per person	8.9
Outside Air Per IAQ	400 CFM		
Outside Air Savings	587 CFM	Winter Heating Savings	
OA Summer Drybulb	87.0	OA Winter Design DB (F)	21
OA Summer Wetbulb	66.0	Supply Air DB Setpoint (F)	109.81
Coil Leaving Air Drybulb (F	52.5	MBH Saved Winter	56.6
Coil Leaving Air Wetbulb (	51.0	KW Saved Winter	16.6
OA MBH Saved Summer*	26.1		
OA Tons Saved Summer*	2.2		

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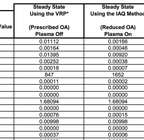
Acetaldehyde	100.0	0.01112	0.00196	Yes	0.00048	50%	OSHA
Acetone	250.0	0.00185	0.00046	Yes	0.00854	50%	NIOSH
Ammonia	25.00	0.01395	0.00920	Yes	0.21460	50%	NIOSH
Benzene	1.0000	0.00252	0.00038	Yes	0.00022	50%	OSHA
2- Butanone (MEK)	200.0	0.00018	0.00007	Yes	0.00133	50%	NIOSH
Carbon dioxide**	5000	847	1652	Yes	441	0%	NIOSH
Chloroform	2.0000	0.00011	0.00002	Yes	0.00004	50%	NIOSH
Dioxane	100.0	0.00000	0.00000	Yes	0.00000	50%	OSHA
Hydrogen Sulfide	10.0	0.00000	0.00000	Yes	0.00000	50%	NIOSH
Methane	NA	1.68094	1.68094	Yes	0.00000	0%	NA
Methanol	200.0	0.00000	0.00000	Yes	0.00000	0%	NIOSH
Methylene Chloride	25.0	0.00078	0.00013	Yes	0.00121	50%	OSHA
Propane	1000.0	0.00998	0.00998	Yes	0.00000	0%	NIOSH
Tetrachloroethane	5.0000	0.00000	0.00000	Yes	0.00000	50%	OSHA
Tetrachloroethylene	100.0000	0.00037	0.00006	Yes	0.00000	50%	OSHA
Toluene	100.0000	0.00533	0.00098	Yes	0.00032	50%	NIOSH
1,1,1 - Trichloroethane	350.0000	0.00078	0.00011	Yes	0.00058	50%	NIOSH
Xylene	100.0000	0.00230	0.00034	Yes	0.00000	50%	OSHA



Building materials and furnishings assumed to have no VOCs and off-gassing is complete
All yellow shaded boxes require user input or review

Is IAQ acceptable at reduced outside air levels? Yes

1 = ASHRAE & NIOSH CO2 Limit
2 = CO2 Level at Ventilation Rate OA Flow Rate
3 = CO2 Level at IAQ Procedure OA Flow Rate
**Carbon dioxide has been provided for reference only for gathering demand contr ventilation (DCV) setpoints. The National Research Council was commissioned b the US Navy to prove CO2 is not a contaminant of concern when using air purificati to control the other contaminants of concern, as found on submarines.

Date	6/17/2022
Job Name	TLE Graham WA
Representative	
Engineer	Jarmel Kozel Architects and Engineers
Contractor	

IMC 2006 & later allows for ASHRAE 62 IAQP through the engineered exception found in Section 403.2
Exhaust flow rates may differ from Table 6.5 based on ASHRAE 62 IAQP via Section 6.5.2

BASED ON VENTILATION RATES PRESCRIBED BY THE 2018 INTERNATIONAL MECHANICAL CODE, RTU-3 WILL NEED TO PROVIDE 987 CFM OF OUTSIDE AIR AS PER EXCEPTIONS OF PARAGRAPH 403.2 , THIS RATE OF 987 CFM HAS BEEN REDUCED TO 400 CFM DUE TO AN ENGINEERED VENTILATION SYSTEM WHICH CONSIST OF A PLASMA TUBE ADDED INTO SUPPLY AIRFLOW

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VERSION 1.6 running ASHRAE 62.1-2013

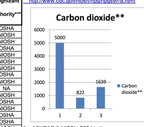
Zone Tag	Facility Type	Zone Use	Zone Floor Area (square ft) Az	Zone Max Occupancy Pz	Table 6.1 OA per Occupant Rp	Table 6.1 cfm/ft2 Ra	Pz * Rp	Az * Ra	Table 6.2 Ventilation Effectiveness Ez	Outdoor Air to Zone (CFM) with Ez correction (Vbz/Ez)
RTU-4	Educational Facilities	Daycare (through AGE 4)	1,816.0	99.0	10.0	0.18	990	327	0.8	896
										OA required per VRP

Zone Height (feet)	10.3		
Desired Outside Air (Vo) IAQP	350		
Supply Air (Vs)	2,300		
Return Air (Vr)	1950		
Recirc. Flow Factor (R)	0.85		
Ventilation Effectiveness (Ez)	0.8		
Level of Physical Activity	Standing (desk work)		
Filter Location	B		
HVAC Flow Type	Constant		
Outdoor Air Flow Type	Constant		

Air Changes Per Hour	8.0	VRP OA CFM per person	23.0
Outside Air Per VRP	896 CFM	IAQ OA CFM per person	9.0
Outside Air Per IAQ	350 CFM		
Outside Air Savings	546 CFM	Winter Heating Savings	
OA Summer Drybulb	87.0	OA Winter Design DB (F)	21
OA Summer Wetbulb	66.0	Supply Air DB Setpoint (F)	107.9
Coil Leaving Air Drybulb (F	53.2	MBH Saved Winter	31.5
Coil Leaving Air Wetbulb (	51.6	KW Saved Winter	15.1
OA MBH Saved Summer*	23.3		
OA Tons Saved Summer*	1.9		

*OA = Outside Air
**OSHA, NIOSH & WHO most conservative values u
http://www.cdc.gov/niosh/npg/npgsyn-a.html

Indoor Contaminants Generated By People & From Outdoors	Maximum Threshold Value (PPM)	Steady State Using the VRP* (Prescribed OA) Plasma Off	Steady State Using the IAQ Method (Reduced OA) Plasma On	Is Steady State Level Acceptable at Reduced OA Levels?	Contaminant Generation Rate (PPM)	Filtration Effectiveness	Cognizant Authority**
Acetaldehyde	100.0	0.01112	0.00138	Yes	0.00048	50%	OSHA
Acetone	250.0	0.00185	0.00038	Yes	0.00854	50%	NIOSH
Ammonia	25.00	0.01340	0.00755	Yes	0.21460	50%	NIOSH
Benzene	1.0000	0.00252	0.00032	Yes	0.00022	50%	OSHA
2- Butanone (MEK)	200.0	0.00017	0.00006	Yes	0.00133	50%	NIOSH
Carbon dioxide**	5000	822	1639	Yes	441	0%	NIOSH
Chloroform	2.0000	0.00011	0.00001	Yes	0.00004	50%	NIOSH
Dioxane	100.0	0.00000	0.00000	Yes	0.00000	50%	OSHA
Hydrogen Sulfide	10.0	0.00000	0.00000	Yes	0.00000	50%	NIOSH
Methane	NA	1.68094	1.68094	Yes	0.00000	0%	NA
Methanol	200.0	0.00000	0.00000	Yes	0.00000	0%	NIOSH
Methylene Chloride	25.0	0.00078	0.00013	Yes	0.00121	50%	OSHA
Propane	1000.0	0.00998	0.00998	Yes	0.00000	0%	NIOSH
Tetrachloroethane	5.0000	0.00000	0.00000	Yes	0.00000	50%	OSHA
Tetrachloroethylene	100.0000	0.00037	0.00006	Yes	0.00000	50%	OSHA
Toluene	100.0000	0.00533	0.00098	Yes	0.00032	50%	NIOSH
1,1,1 - Trichloroethane	350.0000	0.00078	0.00011	Yes	0.00058	50%	NIOSH
Xylene	100.0000	0.00230	0.00028	Yes	0.00000	50%	OSHA



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All yellow shaded boxes require user input or review

Is IAQ acceptable at reduced outside air levels? Yes

1 = ASHRAE & NIOSH CO2 Limit
2 = CO2 Level at Ventilation Rate OA Flow Rate
3 = CO2 Level at IAQ Procedure OA Flow Rate
**Carbon dioxide has been provided for reference only for gathering demand contr ventilation (DCV) setpoints. The National Research Council was commissioned b the US Navy to prove CO2 is not a contaminant of concern when using air purificati to control the other contaminants of concern, as found on submarines.

Date	6/17/2022
Job Name	TLE Graham WA
Representative	
Engineer	Jarmel Kozel Architects and Engineers
Contractor	

IMC 2006 & later allows for ASHRAE 62 IAQP through the engineered exception found in Section 403.2
Exhaust flow rates may differ from Table 6.5 based on ASHRAE 62 IAQP via Section 6.5.2

BASED ON VENTILATION RATES PRESCRIBED BY THE 2018 INTERNATIONAL MECHANICAL CODE, RTU-4 WILL NEED TO PROVIDE 896 CFM OF OUTSIDE AIR AS PER EXCEPTIONS OF PARAGRAPH 403.2 , THIS RATE OF 896 CFM HAS BEEN REDUCED TO 350 CFM DUE TO AN ENGINEERED VENTILATION SYSTEM WHICH CONSIST OF A PLASMA TUBE ADDED INTO SUPPLY AIRFLOW

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Zone Tag	Facility Type	Zone Use	Zone Floor Area (square ft) Az	Zone Max Occupancy Pz	Table 6.1 OA per Occupant Rp	Table 6.1 cfm/ft2 Ra	Pz * Rp	Az * Ra	Table 6.2 Ventilation Effectiveness Ez	Outdoor Air to Zone (CFM) with Ez correction (Vbz/Ez)
RTU-5	Educational Facilities	Daycare (through AGE 4)	1,593.0	36.0	10.0	0.18	360	287	0.8	808
										OA required per VRP

Zone Height (feet)	10.3		
Desired Outside Air (Vo) IAQP	400		
Supply Air (Vs)	2,040		
Return Air (Vr)	1640		
Recirc. Flow Factor (R)	0.80		
Ventilation Effectiveness (Ez)	0.8		
Level of Physical Activity	Standing (desk work)		
Filter Location	B		
HVAC Flow Type	Constant		
Outdoor Air Flow Type	Constant		

Air Changes Per Hour	7.5	VRP OA CFM per person	22.5
Outside Air Per VRP	808 CFM	IAQ OA CFM per person	11.1
Outside Air Per IAQ	400 CFM		
Outside Air Savings	408 CFM	Winter Heating Savings	
OA Summer Drybulb	87.0	OA Winter Design DB (F)	21
OA Summer Wetbulb	66.0	Supply Air DB Setpoint (F)	110
Coil Leaving Air Drybulb (F	54.9	MBH Saved Winter	39.4
Coil Leaving Air Wetbulb (	52.0	KW Saved Winter	11.6
OA MBH Saved Summer*	17.1		
OA Tons Saved Summer*	1.4		

*OA = Outside Air
**OSHA, NIOSH & WHO most conservative values u
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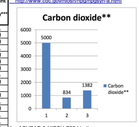
Indoor Contaminants Generated By People & From Outdoors	Maximum Threshold Value (PPM)	Steady State Using the VRP* (Prescribed OA) Plasma Off	Steady State Using the IAQ Method (Reduced OA) Plasma On	Is Steady State Level Acceptable at Reduced OA Levels?	Contaminant Generation Rate (PPM)	Filtration Effectiveness	Cognizant Authority**
Acetaldehyde	100.0	0.01112	0.00184	Yes	0.00048	50%	OSHA
Acetone	250.0	0.00185	0.00045	Yes	0.00854	50%	NIOSH
Ammonia	25.00	0.01367	0.00820	Yes	0.21460	50%	NIOSH
Benzene	1.0000	0.00252	0.00042	Yes	0.00022	50%	OSHA
2- Butanone (MEK)	200.0	0.00018	0.00007	Yes	0.00133	50%	NIOSH
Carbon dioxide**	5000	834	1582	Yes	441	0%	NIOSH
Chloroform	2.0000	0.00011	0.00002	Yes	0.00004	50%	NIOSH
Dioxane	100.0	0.00000	0.00000	Yes	0.00000	50%	OSHA
Hydrogen Sulfide	10.0	0.00000	0.00000	Yes	0.00000	50%	NIOSH
Methane	NA	1.68094	1.68094	Yes	0.00000	0%	NA
Methanol	200.0	0.00000	0.00000	Yes	0.00000	0%	NIOSH
Methylene Chloride	25.0	0.00078	0.00016	Yes	0.00121	50%	OSHA
Propane	1000.0	0.00998	0.00998	Yes	0.00000	0%	NIOSH
Tetrachloroethane	5.0000	0.00000	0.00000	Yes	0.00000	50%	OSHA
Tetrachloroethylene	100.0000	0.00037	0.00006	Yes	0.00000	50%	OSHA
Toluene	100.0000	0.00533	0.00088	Yes	0.00032	50%	NIOSH
1,1,1 - Trichloroethane	350.0000	0.00077	0.00014	Yes	0.00058	50%	NIOSH
Xylene	100.0000	0.00230	0.00038	Yes	0.00000	50%	OSHA



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Is IAQ acceptable at reduced outside air levels? Yes

1 = ASHRAE & NIOSH CO2 Limit
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**Carbon dioxide has been provided for reference only for gathering demand contr ventilation (DCV) setpoints. The National Research Council was commissioned b the US Navy to prove CO2 is not a contaminant of concern when using air purificati to control the other contaminants of concern, as found on submarines.

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BASED ON VENTILATION RATES PRESCRIBED BY THE 2018 INTERNATIONAL MECHANICAL CODE, RTU-5 WILL NEED TO PROVIDE 808 CFM OF OUTSIDE AIR AS PER EXCEPTIONS OF PARAGRAPH 403.2 , THIS RATE OF 808 CFM HAS BEEN REDUCED TO 400 CFM DUE TO AN ENGINEERED VENTILATION SYSTEM WHICH CONSIST OF A PLASMA TUBE ADDED INTO SUPPLY AIRFLOW

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Interior Design
Implementation Services
Certificate of Authorization # AA26003594
FL State Board of Engineers & Land Surveyors
Authorization # CA32449

ISSUE

NO.	DATE	DESCRIPTION	INT.
1	06-30-22	FOR TLE REVIEW	MBJ

REVISION

NO.	DATE	DESCRIPTION	INT.

PROFESSIONAL CERTIFICATION

NAME OF LICENSEE: MATTHEW B. JARMEL
LICENSE NUMBER: 12854
EXPIRATION DATE:

Project Number:	Scale:
TLEWA22-038	AS NOTED
Drawn By: AM	Approved By: MBJ

Drawing Name:

HVAC VENTILATION CALCULATIONS

Drawing Number:

H-600

2021.Q4.01 RETAIL PROTOTYPE