

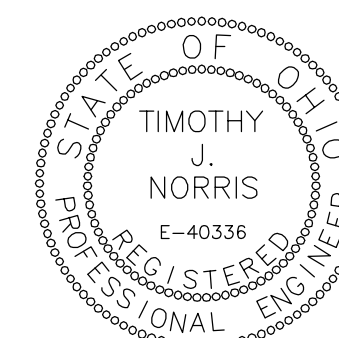
PLAN NOTES:

- ① REFER TO ELECTRICAL DRAWINGS FOR ELECTRIC HEAT IN THESE AREAS.



BASEMENT MECHANICAL PLAN

SCALE: $1/4" = 1'-0"$



<div><div><div>M1</div><div>X</div></div><div>VILLAGE OF CRESTLINE</div></div>	<div>WASTEWATER TREATMENT PLANT IMPROVEMENTS - PHASE I BASEMENT MECHANICAL PLAN</div>	<div><div></div><div><div>J&J consulting engineers</div><div>INC.</div><div>1000 W. 15th St., Suite C</div><div>P.O. Box 555, 5627</div><div>Phoenix, AZ 85006</div><div>Tel: 480.545.0000</div><div>Fax: 480.545.0000</div></div></div>	REV. NO.	DATE	CALCULATED J.D.
			BID & PERMIT 04\10\14		

PLAN NOTES:

- 1

FURNISH AND INSTALL A 26"X26" OUTSIDE AIR INTAKE LOUVER WITH MOTOR OPERATED DAMPER. INTERLOCK WITH EXHAUST FAN (EF-1) AS REQUIRED. (2000 CFM)
- 2

4"Ø SINGLE WALL VENT PIPE THRU ROOF. SEE DETAIL "A" ON DRAWING M3.
- 3

4"Ø COMBUSTION AIR INTAKE PIPE THRU ROOF. SEE DETAIL "B" ON DRAWING M3.
- 4

FURNISH AND INSTALL A GREENHECK MODEL WL-10x3 WALL DISCHARGE LOUVER, CONNECT LOUVER TO 8"X8" DUCT AS INDICATED. (250 CFM)
- 5

FURNISH AND INSTALL A 10"X6" OUTSIDE AIR INTAKE LOUVER, CONNECT LOUVER TO 8"X6" DUCT, CONNECT 8"X6" DUCT WITH MOTOR OPERATED DAMPER TO FULL LINE SIZE RETURN AIR DUCT AT FURNACE AS INDICATED. (PROVIDE 140 CFM VENTILATION AIR)
- 6

MOUNT NEW AIR COOLED CONDENSING UNIT ON GRADE. MECHANICAL CONTRACTOR SHALL FURNISH AND INSTALL A 4" REINFORCED CONCRETE PAD AS REQUIRED. EXACT LOCATION OF UNIT ON GRADE TO BE DETERMINED IN FIELD WITH OWNER AND ARCHITECT PRIOR TO INSTALLATION. ROUTING OF REFRIGERANT PIPING SHALL BE COORDINATED WITH ARCHITECT AND OWNER PRIOR TO INSTALLATION. SIZING OF PIPING AS PER UNIT MANUFACTURE'S RECOMMENDATIONS.
- 7

16"Ø SUPPLY AIR DUCT UP THRU FLOOR OF MEZZANINE ABOVE.
- 8

14"X12" RETURN AIR DUCT UP THRU FLOOR OF MEZZANINE ABOVE. CONNECT DUCT TO FULL LINE SIZE RETURN AIR DUCT AS INDICATED.
- 9

DROP 3/4" CONDENSATE DRAIN PIPE/DOWN WALL AND DUMP ONTO GRADE AS INDICATED.
- 10

FURNACE, COOLING COIL AND /RELATED SUPPLY AND RETURN AIR DUCT RUN ABOVE AT MEZZANINE LEVEL ABOVE, UNLESS OTHERWISE NOTED. FURNACE MOUNTED ON FLOOR OF MEZZANINE ABOVE.
- 11

FURNISH AND INSTALL A 8"X4" PRICE MODEL 520D (OR APPROVED EQUAL) SUPPLY AIR REGISTER TO DELIVER 100 CFM.
- 12

FURNISH AND INSTALL A 8"X4" PRICE MODEL 520D (OR APPROVED EQUAL) SUPPLY AIR REGISTER TO DELIVER 110 CFM.
- 13

FURNISH AND INSTALL A 10"X8" PRICE MODEL 520D (OR APPROVED EQUAL) SUPPLY AIR REGISTER TO DELIVER 245 CFM.
- 14

2 TON GAS-FIRED FURNACE WITH COOLING COIL, SEALED COMBUSTION TYPE, RUN INTAKE AND VENT PIPES UP THRU ROOF. SEE DETAIL ON DRAWING M3. (800 CFM)
- 15

DRYER VENT DUCT SHALL BE CONSTRUCTED OF METAL AND SHALL HAVE A SMOOTH INTERIOR FINISH. THE ENTIRE SYSTEM SHALL BE SUPPORTED AND SECURED IN PLACE. THE MALE END OF THE DUCT AT OVERLAPPED DUCT JOINTS SHALL EXTEND IN THE DIRECTION OF AIRFLOW. CLOTHES-DRYER TRANSITION DUCTS USED TO CONNECT THE APPLIANCE TO THE EXHAUST DUCT SYSTEM SHALL BE LIMITED TO 8'-0" AND SHALL BE LISTED AND LABELED FOR THE APPLICATION. TRANSITION DUCTS SHALL NOT BE CONCEALED WITHIN CONSTRUCTION. FURNISH AND INSTALL A SEIHO MODEL SX-4 WALL MOUNTED ALUMINUM VENT LOUVER AS REQUIRED, CONNECT LOUVER TO 4"Ø DRYER VENT DUCT COMPLETE.
- 16

FURNISH AND INSTALL A 10"X6" PRICE MODEL 80 (OR APPROVED EQUAL) TRANSFER AIR GRILLE TO TRANSFER 110 CFM.
- 17

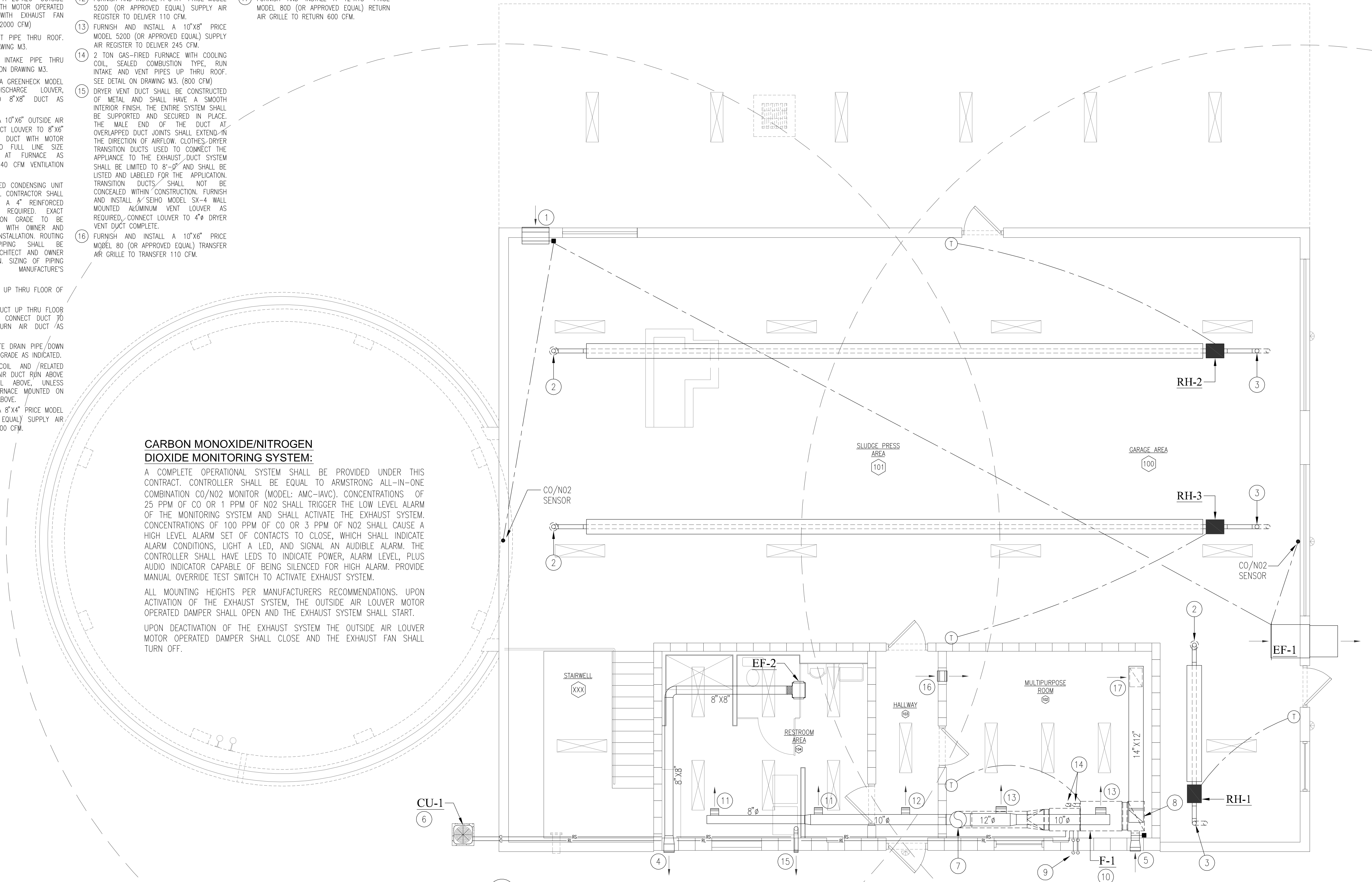
FURNISH AND INSTALL A 12"X18" PRICE MODEL 80D (OR APPROVED EQUAL) RETURN AIR GRILLE TO RETURN 600 CFM.

CARBON MONOXIDE/NITROGEN DIOXIDE MONITORING SYSTEM:

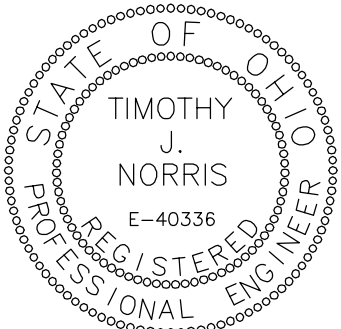
A COMPLETE OPERATIONAL SYSTEM SHALL BE PROVIDED UNDER THIS CONTRACT. CONTROLLER SHALL BE EQUAL TO ARMSTRONG ALL-IN-ONE COMBINATION CO/NO2 MONITOR (MODEL: AMC-IAVC). CONCENTRATIONS OF 25 PPM OF CO OR 1 PPM OF NO2 SHALL TRIGGER THE LOW LEVEL ALARM OF THE MONITORING SYSTEM AND SHALL ACTIVATE THE EXHAUST SYSTEM. CONCENTRATIONS OF 100 PPM OF CO OR 3 PPM OF NO2 SHALL CAUSE A HIGH LEVEL ALARM SET OF CONTACTS TO CLOSE, WHICH SHALL INDICATE ALARM CONDITIONS, LIGHT A LED, AND SIGNAL AN AUDIBLE ALARM. THE CONTROLLER SHALL HAVE LEDS TO INDICATE POWER, ALARM LEVEL, PLUS AUDIO INDICATOR CAPABLE OF BEING SILENCED FOR HIGH ALARM. PROVIDE MANUAL OVERRIDE TEST SWITCH TO ACTIVATE EXHAUST SYSTEM.

ALL MOUNTING HEIGHTS PER MANUFACTURERS RECOMMENDATIONS. UPON ACTIVATION OF THE EXHAUST SYSTEM, THE OUTSIDE AIR LOUVER MOTOR OPERATED DAMPER SHALL OPEN AND THE EXHAUST SYSTEM SHALL START.

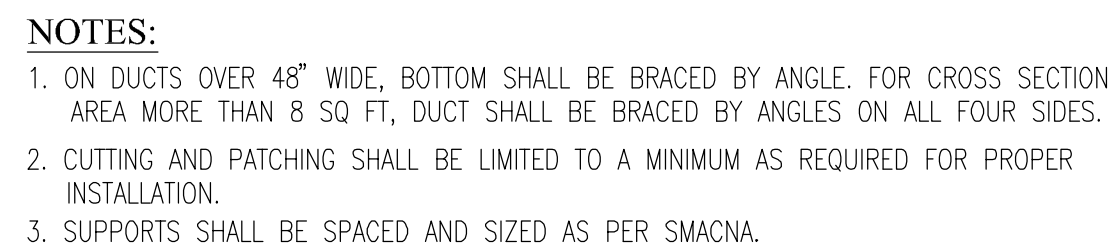
UPON DEACTIVATION OF THE EXHAUST SYSTEM THE OUTSIDE AIR LOUVER MOTOR OPERATED DAMPER SHALL CLOSE AND THE EXHAUST FAN SHALL TURN OFF.



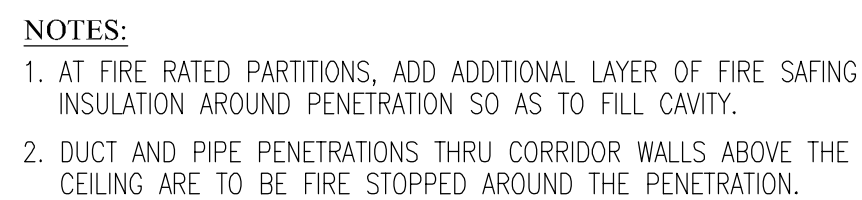
FIRST FLOOR MECHANICAL PLAN
SCALE: 1/4" = 1'-0"



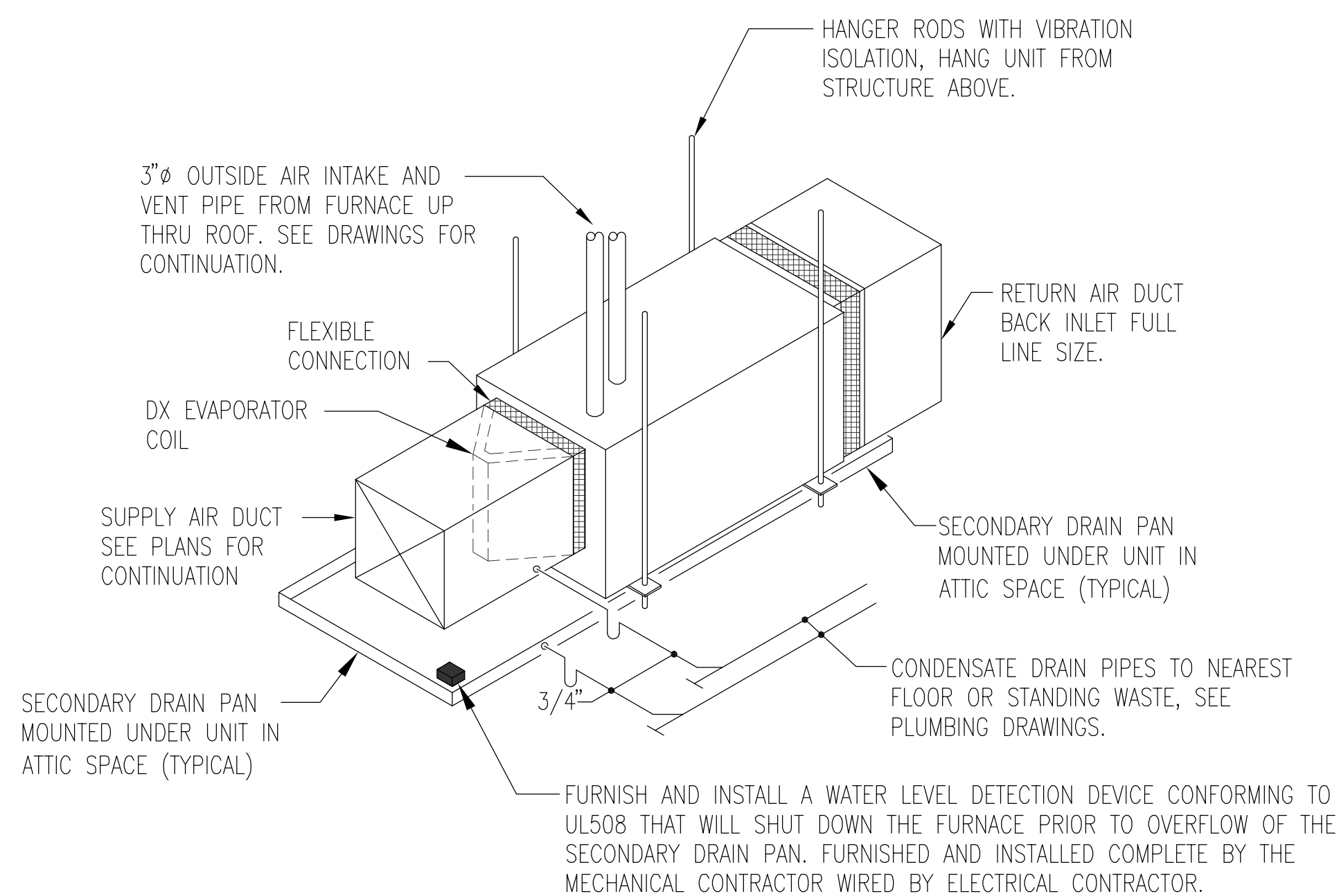
<div><div><div>M2</div><div>X</div></div></div>		VILLAGE OF CRESTLINE		WASTEWATER TREATMENT PLANT IMPROVEMENTS - PHASE I FIRST FLOOR MECHANICAL PLAN				<div><div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div>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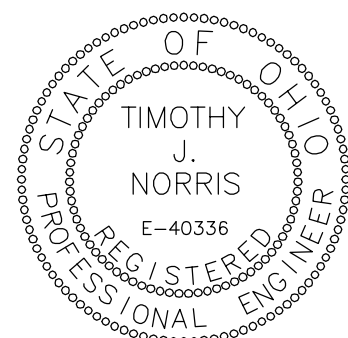
DUCT HANGER SUPPORT DETAIL
NO SCALE



DUCT AND PIPE PENETRATIONS



HORIZONTAL FURNACE DETAIL
NO SCALE



GAS-FIRED FURNACE (F) SCHEDULE												
MARK	MANUFACTURE MODEL NUMBER	CFM	E.S.P.	MOTOR		HEATING CAPACITY		OUTSIDE AIR	COOLING CAPACITY		WEIGHT LBS	REMARKS
				H.P.	VOLTAGE	INPUT	OUTPUT		MANUFACTURE MODEL NUMBER	TOTAL COOLING CAPACITY		
F-1	TRANE TUH1B040A9241A	800	0.5"	1/5	120/60/1	40,000	38,000	140	TRANE 2TXCB024AC3	24,000	220 TOTAL	INTERLOCK WITH CU-1

EQUIPMENT SHALL BE "TRANE" OR APPROVED EQUAL. EQUIPMENT SHALL BE PROVIDED WITH SEALED COMBUSTION CHAMBER SUITABLE FOR PVC PIPE VENTING AND ALL REQUIRED ACCESSORIES FOR NATURAL GAS FIRING. UNIT SHALL BE PROVIDED WITH MULTI-SPEED DIRECT DRIVE BLOWER, HIGH EFFICIENT GAS HEATING FURNACE, PROGRAMMABLE THERMOSTAT, FILTER RACK WITH 1" DISPOSABLE FILTERS, FURNACE CONDENSATE NEUTRALIZER KIT, MATCHED "TRANE" CASED COOLING COIL.

AIR COOLED CONDENSING UNIT (CU) SCHEDULE						
MARK	MANUFACTURE MODEL NUMBER	ELECTRICAL DATA			WEIGHT LBS	REMARKS
		M.C.A.	M.F.S.	VOLTAGE		
CU-1	TRANE 4TTB3024E1	12.0	20.0	208/60/1	200	INTERLOCK WITH COOLING COIL @ F-1

EQUIPMENT SHALL BE "TRANE" OR APPROVED EQUAL. EQUIPMENT SHALL BE PROVIDED WITH TIME DELAY RELAY. BALL BEARING FAN MOTOR, MATCHED THERMOSTATIC EXPANSION VALVE, SUPPORT FEET, REFRIGERANT LINE SET, FILTER DRYER, CRANKCASE HEATERS, COMPRESSOR START ASSIST CAPACITOR AND RELAY.

EXHAUST FAN (EF) SCHEDULE								
MARK	MANUFACTURE MODEL NUMBER	CFM	S.P.	FAN MOTOR		TYPE	WEIGHT LBS	REMARKS
				HP	VOLTAGE			
EF-1	GREENHECK SB-1H20-4	2000	0.25"	1/4	120/60/1	SIDEWALL PROP	25	WALL HOUSING, BACK DRAFT DAMPER GUARD & WEATHER HOOD
EF-2	GREENHECK SP-A290	250	0.25"	81 WATTS	120/60/1	SIDEWALL PROP	25	WALL HOUSING, BACK DRAFT DAMPER GUARD & WEATHER HOOD

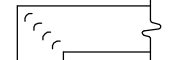

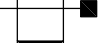









EQUIPMENT SHALL BE GREENHECK OR APPROVED EQUAL.

GAS-FIRED RADIANT HEATER SCHEDULE					
MARK	MANUFACTURER MODEL NUMBER	MBH	ELECTRICAL	LENGTH	REMARKS
RH-1	VANTAGE CTH2-40	40.0	5.0 AMPS 120/60/1-VOLTAGE	11' - 6"	
RH-2	VANTAGE CTH2-150	150.0	5.0 AMPS 120/60/1-VOLTAGE	51' - 6"	
RH-3	VANTAGE CTH2-150	150.0	5.0 AMPS 120/60/1-VOLTAGE	51' - 6"	

RADIANT HEATERS SHALL BE VANTAGE OR APPROVED EQUAL

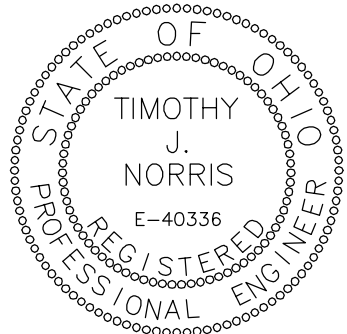
VENTILATION (GARAGE AREA)						
SPACE	FLOOR AREA (FT2)	REQUIRED OA (CFM/FT2)	OCCUPANCY	REQUIRED (CFM/PERSON)	AIR DISTRIBUTION EFFECTIVENESS	REQUIRED OA (CFM)
Corridor A C105	2510	0.75	-	-	-	1883
TOTAL	2510					1883

VENTILATION (F-1)						
SPACE	FLOOR AREA (FT2)	REQUIRED OA (CFM/FT2)	OCCUPANCY	REQUIRED (CFM/PERSON)	AIR DISTRIBUTION EFFECTIVENESS	REQUIRED OA (CFM)
Hallway 103	75	0.06	1	-	0.8	6
Multi Purpose 102	255	0.06	15	5	0.8	113
Rest Room 104	255	0.06	1	-	0.8	19
TOTAL	585					138

HVAC SYMBOLS AND ABBREVIATIONS	
SYMBOL	DESCRIPTION
	TURNING VANES
	BALANCING DAMPER
	MOTOR OPERATED DAMPER
	SUPPLY DUCT
	RETURN OR EXHAUST DUCT
	FLEXIBLE DUCT CONNECTION
	THERMOSTAT
	INDICATES PLAN NOTES
	GAS-FIRED FURNACE
	AIR COOLED CONDENSING UNIT
	EXHAUST FAN
	RADIANT HEATER

GENERAL NOTES:

- DUCT RUN OUT SIZE SHALL BE THE SAME AS THE AIR OUTLET/INLET CONNECTION SIZE UNLESS OTHERWISE NOTED.
- REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR CEILING MATERIALS AND EXACT LOCATIONS OF AIR DISTRIBUTION DEVICES.
- FLEXIBLE DUCTWORK SHALL BE INSTALLED WITHOUT KINKS AND WITHOUT BENDS GREATER THAN 30'.
- ALL DUCTWORK DIMENSIONS SHOWN ARE GROSS, NET FREE AREA OF WRAPPED INSULATION.
- ACCESS DOORS SHALL BE PROVIDED IN DUCTWORK FOR ACCESS TO ALL FIRE DAMPERS, SMOKE DAMPERS, MOTOR OPERATED DAMPERS AND COILS. (BOTH UPSTREAM AND DOWNSTREAM)
- INSTALL ALL EQUIPMENT REQUIRING AN ELECTRICAL CONNECTIONS IN SUCH A MANNER SO THAT PROPER CLEARANCE IS PROVIDED FOR SERVING PER NATIONAL ELECTRICAL CODE.
- FLEXIBLE DUCTWORK SHALL NOT PENETRATE THRU WALLS, RIGID SHEET METAL DUCTWORK IS REQUIRED AT ALL WALL PENETRATIONS.
- FLEXIBLE DUCTWORK SHALL NOT BE USED IN EXPOSED LOCATIONS.
- CONTRACTOR SHALL FURNISH AND INSTALL BALANCING DAMPERS AT ALL SUPPLY AND RETURN AIR BRANCH DUCTS AS REQUIRED FOR AIR BALANCE.
- DUCTWORK CONSTRUCTION AND INSTALLATION SHALL CONFORM TO OHIO AND INTERNATIONAL MECHANICAL CODE.
- MECHANICAL SYSTEM PIPING SHALL BE SUPPORTED IN ACCORDANCE WITH OHIO AND INTERNATIONAL MECHANICAL CODE.
- FIRE STOPPING AROUND ALL PIPE AND DUCT PENETRATIONS THRU FLOOR AND WALLS SHALL BE IN ACCORDANCE WITH INTERNATIONAL MECHANICAL CODE.
- WHEN SUBMITTING SHOP DRAWINGS ON ALL EQUIPMENT PERTAINING TO THIS PROJECT, ALL ELECTRICAL REQUIREMENTS SHALL BE COORDINATED WITH THE ELECTRICAL PRIOR TO PURCHASING THE NEW EQUIPMENT. SUBMIT SHOP DRAWINGS WITH THE CORRECT VOLTAGES SHOWN ON THE MECHANICAL SCHEDULE SHEET.
- COORDINATE PLACEMENT OF NEW EQUIPMENT, ROUTING AND ELEVATIONS OF DUCTWORK WITH THE STRUCTURAL, PLUMBING AND ELECTRICAL SO AS NOT TO INTERFERE WITH STRUCTURAL BEAMS, JOISTS, PLUMBING EQUIPMENT, PLUMBING PIPING, ELECTRICAL EQUIPMENT, ELECTRICAL LIGHTING AND/OR CONDUIT RUNS BEING INSTALLED.
- FIELD VERIFY PRIOR TO INSTALLATION THAT ALL DUCTWORK CAN BE INSTALLED AS SHOWN ON THE DRAWINGS. ANY DISCREPANCY SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND ENGINEER PRIOR TO FABRICATION.
- COORDINATE EXACT LOCATION OF CEILING DIFFUSERS, REGISTERS AND GRILLES WITH ARCHITECTURAL REFLECTED CEILING PLANS, REFER TO ARCHITECTURAL DRAWINGS AS REQUIRED.
- ROUTING OF REFRIGERANT PIPING TO BE DETERMINED IN FIELD. SIZING OF REFRIGERANT PIPING AS PER MANUFACTURER'S RECOMMENDATIONS.
- ALL MATERIALS EXPOSED WITHIN PLENUMS SHALL BE NON-COMBUSTIBLE OR SHALL HAVE A FLAME SPREAD INDEX OF NOT MORE THAN 25 AND A SMOKE-DEVELOPED INDEX OF NOT MORE THAN 50 WHEN TESTED IN ACCORDANCE WITH ASTM E 84.
- MECHANICAL CONTRACTOR SHALL VISIT SITE PRIOR TO BIDDING PROCESS AND FIELD VERIFY EXISTING CONDITIONS. CONTRACTOR SHALL TAKE ALL INTERFERENCES INTO CONSIDERATION. PROVIDE ALL NECESSARY OFFSETS OR TRANSITIONS WITH EQUIVALENT AREAS TO MATCH DUCT SIZES INDICATED ON DRAWINGS.
- CONTRACTOR SHALL BE FAMILIAR WITH FACILITY STANDARDS, RULES AND REGULATIONS. ALL OWNER'S CRITERIA SHALL BE COMPLIED WITH AND INCLUDED IN THIS BID.
- MAINTAIN ALL MANUFACTURE'S RECOMMENDED SERVICE CLEARANCES FOR ALL EQUIPMENT.



WASTEWATER TREATMENT PLANT IMPROVEMENTS - PHASE I
MECHANICAL SCHEDULES & NOTES


VILLAGE OF CRESTLINE

M4
X

REV. NO. DATE
BID & PERMIT 04\10\14

CALCULATED
J.D.

CHECKED
T.J.N.



G&J
Consulting Engineers
Civil, Mechanical, Electrical, Sanitary
10000 Ridge Road, Suite C
Crestline, Ohio 44826
Phone: 440.969.9999
Fax: 440.969.9998
www.gandjengineers.com

MECHANICAL SPECIFICATIONS:

1. HVAC SYSTEMS BALANCING

A. GENERAL

1. PROVIDE ALL LABOR, MATERIALS, AND TOOLS REQUIRED TO PERFORM THE TESTING, ADJUSTING, AND BALANCING (TAB) OF ALL AIR AND WATER DISTRIBUTION SYSTEMS THAT ARE ASSOCIATED WITH THE HEATING AND COOLING SYSTEMS AS SPECIFIED HEREIN.

B. QUALITY ASSURANCE

1. STANDARDS

- A. AABC NATIONAL STANDARDS FOR TESTING AND BALANCING HEATING, VENTILATING, AND AIR CONDITIONING SYSTEMS.
- B. SUBMIT AABC NATIONAL PERFORMANCE GUARANTY WITH TEST & BALANCE REPAIR.
- C. THE TAB AGENCY MUST BE A CERTIFIED MEMBER OF THE AABC.
- D. SPECIFIED TOLERANCE: DEVIATION LIMITS FOR BALANCING THIS PROJECT ARE OUTLETS (+10%–5%) UNLESS MODIFIED BY THE ENGINEER ON A CASE BY CASE BASIS.
2. THE BALANCING WORK SHALL BE ACCOMPLISHED BY REGULAR EMPLOYEES OF THE TAB AGENCY UNDER THE DIRECT SUPERVISION OF A AABC CERTIFIED TEST AND BALANCE ENGINEER. THE TEST AND BALANCE ENGINEER'S REGISTRATION NUMBER SHALL APPEAR ON THE TEST AND BALANCE REPORT.
3. INSTRUMENTS USED FOR TESTING AND BALANCING OF AIR AND HYDRONIC SYSTEMS WILL HAVE BEEN CALIBRATED WITHIN A PERIOD OF SIX MONTHS AND CHECKED FOR ACCURACY PRIOR TO START OF THE WORK ON THIS PROJECT.
4. ANY CAPACITY DISCREPANCIES BEYOND THE SPECIFIED DEVIATION LIMITS OR ITEMS NOT IN ACCORDANCE WITH CONTRACT DOCUMENTS, WHICH MAY AFFECT THE TOTAL SYSTEM BALANCE, SHALL BE REPORTED TO THE ENGINEER AND HVAC CONTRACTOR FOR CORRECTIVE ACTION.
5. THE TEST AND BALANCE AGENCY SHALL PROVIDE AN EXTENDED WARRANTY OF NINETY (90) DAYS AFTER THE ENGINEER HAS APPROVED THE FINAL TEST AND BALANCE REPORT. DURING THIS PERIOD THE ENGINEER MAY REQUEST A RECHECK OR RESETING OF ANY DEVICE.
- A. THE HVAC CONTRACTOR SHALL PROVIDE COPIES OF SUBMITTALS FOR ALL ROTATING EQUIPMENT, TERMINAL BOXES, DIFFUSERS, COILS AND ANY OTHER EQUIPMENT INVOLVED IN THE TAB PROCESS. SUBMITTALS SHALL INCLUDE OPERATING CURVES FOR FANS, PUMPS AND BALANCING DEVICES; AND AUTOMATIC TEMPERATURE CONTROL DIAGRAM.
- B. WHEN REQUESTED BY THE HVAC CONTRACTOR THE TBE SHALL VISIT THE JOB SITE TO INSURE THAT THE SYSTEMS TO BE BALANCED ARE OPERATIONAL AND READY FOR TAB.

C. THE HVAC CONTRACTOR SHALL INSURE THAT:

1. ALL DAMPERS ARE INSTALLED IN THE OPEN POSITION.
2. THE TEMPERATURE CONTROL SYSTEM IS OPERATIONAL AND CAPABLE OF CONTROLLING SYSTEM SETPOINTS BEFORE TAB COMMENCES.

6. BALANCING AIR SYSTEMS

- A. TEST AND ADJUST EACH FAN SYSTEM TO PROVIDE PROPER AIR VOLUMES WITHIN THE SPECIFIED TOLERANCE. TOTAL AIR FLOW READINGS WILL BE ACHIEVED BY PITOT TUBE TRAVERSE WHEREVER POSSIBLE. SHEAVES, BELTS OR ADDITIONAL DAMPERS REQUIRED TO ACHIEVE VOLUMES WITHIN THE SPECIFIED TOLERANCE WILL BE PROVIDED AND INSTALLED BY THE HVAC CONTRACTOR.
- B. STATIC PROFILES WILL BE INCLUDED FOR EACH AIR HANDLING SYSTEM THAT CONTAINS COILS AND OTHER COMPONENTS IN THE FAN HOUSING, AND FOR ANY FAN THAT FOR SOME REASON DOES NOT MEET THE SPECIFIED TOLERANCE.
- C. IDENTIFY EACH TERMINAL BOX, DIFFUSER, GRILLE, REGISTER AND OTHER DEVICE AS TO LOCATION, AREA SERVED, MANUFACTURER, TYPE, SIZE, VOLUME REQUIRED AND TEST RESULTS.
- D. TEST AND FIELD ADJUST EACH TERMINAL BOX TO DELIVER THE SPECIFIED AIR UNDER ALL SPECIFIED CONTROL SEQUENCES.
- E. TEST AND ADJUST, UTILIZING DUCT DAMPERS WHENEVER POSSIBLE, EACH DIFFUSER, GRILLE, REGISTER AND OTHER DEVICE TO DELIVER AIRFLOWS WITHIN THE SPECIFIED TOLERANCE.
- F. TEST AND ESTABLISH SETPOINTS FOR DESIGN PERCENT FRESH AIR. MARK AND/OR RECORD SETTINGS.
- G. MARK ALL QUADRANT HANDLES, SPLITTER CONTROL RODS, AND OTHER DEVICES USED FOR BALANCING (NOT OUTLET DAMPERS). PLUG ALL HOLES.

7. BALANCING REPORT

- A. THE TAB AGENCY SHALL SUBMIT A FIELD COPY OF THE TEST REPORT FOR THE ENGINEERS REVIEW WHILE THE FINAL REPORTS ARE BEING PREPARED.
- B. THE TAB AGENCY SHALL SUBMIT SIX (6) COPIES OF THE TEST AND BALANCE REPORTS FOR APPROVAL.

2. DUCTS

- A. PROVIDE AND INSTALL ALL SUPPLY RETURN AND EXHAUST DUCTS. CONNECTION TO EQUIPMENT TO BE MADE WITH DOUBLE CANVAS. AIR DUCTS SHALL BE BUILT OF THE FOLLOWING GAUGE GALVANIZED IRON AND TO CONFORM TO SMACNA STANDARDS:

RECTANGULAR:		ROUND DUCTS
MAXIMUM SIDE UP TO 12"	26 GA.	12" DIA. 24 GA.
MAXIMUM SIDE UP TO 30"	24 GA.	

- B. JOINT TO BE STRAIGHT, TYPE TO BE BEST SUITED FOR PARTICULAR SIZE, SECTIONS TO BE NO LONGER THAN 8 FEET. ALL SURFACES 15" OR WIDER SHALL BE CROSS BROKEN. WHERE DUCTS PASS THROUGH FLOOR, ROOF OR WALLS, SPACE AROUND DUCT SHALL BE PACKED WITH FIREPROOF MATERIAL. ALL SUPPLY ELBOWS ARE TO BE CURVED VANES. ALL GRILLES SHALL BE SCREWED TO FLANGED DUCTS WITH SPONGE RUBBER GASKETS AND MADE AIRTIGHT. ALL GRILLES ARE TO HAVE PRIME COAT FINISH.

3. DAMPERS AND DEFLECTORS

- A. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL BALANCING DAMPERS, SPLITTERS, AND DEFLECTORS NECESSARY TO PROPERLY DISTRIBUTE THE AIR. BALANCING DAMPERS SHALL BE INSTALLED IN EACH BRANCH DUCT AND AS REQUIRED TO PROPERLY BALANCE THE AIRFLOW. WHERE A GRILLE IS SUPPLIED SUCH THAT IT IS IMPRACTICAL TO PROVIDE A DAMPER IN THE BRANCH DUCT, A DAMPER SHALL BE PROVIDED WITH THE GRILLE.
- B. WHERE DAMPERS AND SPLITTERS ARE CONCEALED IN SUSPENDED CEILINGS, THEY SHALL BE PROVIDED WITH ACCESS DOORS, EXCEPT DOORS MAY BE OMITTED WHERE CEILINGS ARE OF THE REMOVABLE TYPE.
- C. ALL OTHER DAMPERS SHALL BE NO LONGER THAN 12" WIDE BY 48" LONG. WHERE NECESSARY, MORE THAN ONE BLADE SHALL BE PROVIDED. DAMPERS 24" AND LESS IN LENGTH SHALL BE 16 GAUGE.

4. VIBRATION ISOLATION AND FLEXIBLE CONNECTIONS

- A. AT DUCTS TO EQUIPMENT, PROVIDE VENT–FABRIC FLEXIBLE CONNECTIONS WITH A MINIMUM OF 6" FULL LENGTH, AND APPROVED BY THE GOVERNMENTAL AGENCIES HAVING JURISDICTION.
- B. ISOLATE PIPING FROM THE STRUCTURE IN A MANNER TO PREVENT TRANSMISSION OF VIBRATION.

5. DUCT INSULATION

- A. ALL SUPPLY AND RETURN AIR DUCTS AND PLENUMS SHALL BE INSULATED WITH A MINIMUM OF R–5 INSULATION WHEN LOCATED IN UNCONDITIONED SPACES AND A MINIMUM OF R–8 WHEN LOCATED OUTSIDE THE BUILDING. WHEN LOCATED WITHIN A BUILDING ENVELOPE ASSEMBLY, THE DUCT OR PLENUM SHALL BE SEPARATED FROM THE BUILDING ENVELOPE OR UNCONDITIONED OR EXEMPT SPACES BY A MINIMUM OF R–8 INSULATION.
- B. INSULATION MAY BE JOHNS MANVILLE, PITTSBURGH PLATE GLASS OR OWENS–CORNING.

6. REFRIGERANT PIPING

- A. REFRIGERANT PIPING SHALL BE TYPE L, HARD DRAWN, COPPER TUBING WITH WROUGHT COPPER RECESSED FITTINGS. INSULATE REFRIGERANT PIPING SUCTION LINE WITH ARMSTRONG CORK COMPANY, TYPE FR/ARMAFLEX. INSULATION THICKNESS SHALL BE 1/2". REFRIGERANT PIPING TO RUN FROM CONDENSING UNIT TO DIRECT EXPANSION COIL IN THE FURNACE.

7. CONDENSATE DRAIN PIPING

- A. CONDENSATE DRAIN PIPING FROM COOLING COILS TO BE SCHEDULE 40 PVC WITH SOLVENT WELDED FITTINGS.

8. VENT OUTLETS (FURNACES)

- A. VENT OUTLETS AND INTAKES FROM FURNACES TO BE SCHEDULE 40 PVC WITH SOLVENT WELDED FITTINGS. PVC PIPES SHALL CONNECT TO CONCENTRIC VENT KIT.

9. LOUVERS

- A. FURNISH EXTRUDED ALUMINUM AIR INTAKE STORMPROOF LOUVERS AS INDICATED ON DRAWINGS AND MADE BY AEROLITE MODEL CB630 OR APPROVED EQUAL. REMOVAL SCREEN WITH 1/2" MESH HAVING SAME FINISH AS LOUVERS SHALL BE NEATLY FITTED AND SECURED TO THE INSIDE FACE OF INTAKE. LOUVERS MUST HAVE MINIMUM 55% FREE OPENING. LOUVER SIZES GIVEN ARE NET CORE DIMENSIONS AND DO NOT INCLUDE ANY FRAME THICKNESS. FINISH LOUVERS DURANODIC MEDIUM BRONZE.

10. FURNACES

- A. FURNISH AND INSTALL AT LOCATIONS INDICATED ON DRAWINGS GAS FIRED WARM AIR, BLOWER TYPE FURNACES WITH ELECTRONIC SPARK IGNITION, COMPLETE WITH ELECTRONIC SAFETY CONTROLS, METAL FILTER RACK, REPLACEABLE FILTER MEDIA. FURNACES SHALL HAVE A CAPACITY INDICATED IN SCHEDULE ON DRAWING. FAN SHALL BE DIRECT DRIVEN OF CENTRIFUGAL TYPE.
- B. FURNACE TO HAVE A DIRECT EXPANSION COOLING COIL, SUITABLE FOR HORIZONTAL OPERATION WITH PLENUM ENCLOSURE CONSTRUCTED OF GALVANIZED STEEL. COILS TO HAVE A COOLING CAPACITY AS INDICATED IN SCHEDULE AND SHALL HAVE FACTORY INSTALLED REFRIGERANT METERING DEVICE AND BE EQUIPPED WITH REFRIGERANT PIPING AND FITTINGS FOR MECHANICAL CONNECTIONS.
- C. FURNACE AND COOLING COIL MAY BE BRYANT, LENNOX, OR EQUAL TO TRANE SPECIFIED.

11. CONDENSING UNIT

- A. FURNISH AND INSTALL WHERE SHOWN ON DRAWING AIR COOLED REFRIGERATION UNITS SET ON GRADE ON CONCRETE SLAB. MODEL AND CAPACITY AS SHOWN IN SCHEDULE ON DRAWING. UNIT COMPONENTS SHALL BE FACTORY WIRED AND ASSEMBLED ON COMMON BASE AND SHALL CONSIST OF COMPRESSOR, CONDENSER COIL, CONDENSER FAN AND MOTOR, RECEIVER, DRIER, CHARGING VALVES, ALL CONTROLS AND HOLDING CHARGE OF REFRIGERANT 410A.
- B. UNIT TO BE ARI RATED AND TO HAVE ZINC–COATED STEEL WEATHERPROOF HOUSING, ENAMEL FINISHED WITH SERVICE ACCESS PANELS, CONDENSER FAN TO HAVE DIRECT DRIVE MOTOR. THE COMPRESSOR TO BE HERMETIC SHELL TYPE WITH INTERNAL VIBRATION ISOLATION. CONDENSER COIL TO BE CONSTRUCTED OF COPPER TUBING WITH ALUMINUM FINS.
- C. UNIT TO BE FURNISHED WITH CRANKCASE HEATER, LIQUID RECEIVER AND REFRIGERANT DRIER. INTERNAL CONTROL SHALL CONSIST OF CONTACTORS FOR COMPRESSOR, CONDENSER FAN, HIGH PRESSURE CUT–OUT, COMPRESSOR PROTECTION CUT–OUT. FURNISH FOR LOW AMBIENT (0°F) OPERATION.
- D. CONDENSING UNIT MAY BE BRYANT, LENNOX, OR EQUAL TO TRANE SPECIFIED.

12. TEMPERATURE CONTROL

- A. ALL LOW AND LINE VOLTAGE TEMPERATURE CONTROL WIRING IS PART OF THIS CONTRACT. ALL WIRING SHALL BE IN CONDUIT AND INSTALLED IN CONFORMANCE WITH THE REQUIREMENTS OF THE ELECTRICAL SPECIFICATIONS.

B. FURNACE

1. STANDARD CONTROLS SHALL BE FACTORY SUPPLIED WITH THERMOSTAT WHICH SHALL MAINTAIN DISCHARGE TEMPERATURE BY CYCLING THE GAS HEATING OR ELECTRIC COOLING AS REQUIRED. A SUB–BASE SWITCH SHALL INCLUDE FAN "ON–AUTO" AND "HEAT–OFF–COOL" POSITIONS. CONDENSING UNIT SHALL BE ELECTRICALLY INTERLOCKED WITH THE FURNACE FAN SO THAT IT MUST BE IN OPERATION WHENEVER COOLING IS ON. ROOM THERMOSTAT SHALL MAINTAIN SPACE CONDITIONS.

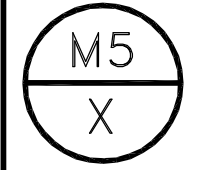
C. RADIANT HEATERS

1. STANDARD CONTROLS SHALL BE FACTORY SUPPLIED WITH THERMOSTAT WHICH SHALL MAINTAIN TEMPERATURE BY CYCLING THE GAS HEATING AS REQUIRED. ROOM THERMOSTAT SHALL MAINTAIN SPACE CONDITIONS.



WASTEWATER TREATMENT PLANT IMPROVEMENTS - PHASE I
MECHANICAL SPECIFICATIONS

VILLAGE OF CRESTLINE



REV. NO.	DATE	CALCULATED	J.D.
BID & PERMIT	04/10/14		
		CHECKED	T.J.N.