MECHANICAL GENERAL NOTES:

1. FURNISH AND INSTALL A COMPLETE AND WORKABLE HVAC SYSTEM AS PER THE PLANS AND SPECIFICATIONS COMPLY WITH THE LASTEST EDITION OF APPLICABLE MECHANICAL CODES. OBTAIN ALL THE PERMITS AND PAY ALL FEES. MATERIALS SHALL BE NEW AND UNDAMAGED. EQUIPMENT SHALL BE UL LISTED AND WARRANTEED FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE. COMPRESSORS IN AIR CONDITIONING EQUIPMENT SHALL BE GUARANTEED FOR A PERIOD OF TWE YEARS FROM THE DATE OF FINAL ACCEPTANCE.

2. COORDINATE WORK WITH OTHER TRADES AND WITH JOBSITE CONDITIONS BEFORE FABRICATING AND INSTALLING MECHANICAL EQUIPMENT. VISIT THE SITE PRIOR TO BID DATE AND BECOME ACQUAINTED WITH EXISTING CONDITIONS TO DETERMINE THE EXTENT OF WORK REQUIRED TO COMPLETE THE PROJECT. NO ALLOWANCE AND/OR COMPENSATION WILL BE MADE FOR FAILURE TO UNDERSTAND THE SCOPE OF WORK, INSTALL NEW DUCT WORK.

3. THE PLANS ATTEMPT TO SHOW THE DESIRED LOCATIONS OF EQUIPMENT AND MATERIALS HOWEVER, REASONABLE REVISIONS AND/OR CHANGES TO THE LOCATION OF THIS EQUIPMENT AND/OR MATERIALS MAY BE REQUIRED. PERFORM THESE CHANGES TO AVOID CONFLICTS WITH OTHER BUILDING TRADES AND EXISTING JOBSITE CONDITIONS.

4.VERIFY THE FINAL LOCATIONS OF EQUIPMENT WITH THE OWNERS REPRESENTATIVE AND THE ARCHITECT. DUCT SIZES SHOWN ARE NET FREE INSIDE CLEAR DIMENSIONS. FURNISH AND INSTALL INSULATED DUCTWORK TRANSITIONS FROM CONNECTIONS TO EQUIPMENT TO DUCT SIZES SHOWN ON THE DRAWINGS

5. EXPOSED SUPPLY AND RETURN DUCTWORK SHALL BE INTERNALLY LINED GALVANIZED SHEET METAL INSTALLED PER SMACNA STANDARDS AT TAKEOFFS. FURNISH AND INSTALL STANDARD SMACNA 45 DEGREE FITTINGS AND MANUAL VOLUME DAMPERS.

6. VERIFY THE FINAL LOCATIONS OF THERMOSTATS WITH THE ARCHITECT AND OWNERS REPRESENTATIVE PRIOR TO INSTALLATION. VERIFY THE FINAL LOCATION OF AIR DEVICES WITH THE ARCHITECTURAL REFLECTIVE CEILING PLAN.

7. FURNISH AND INSTALL THE EQUIPMENT AS SHOWN, COORDINATE THE SIZE AND LOCATION FOR OPENINGS AND/OR PENETRATIONS REQUIRED.

8. ENSURE THAT SMOKE DETECTORS ARE INSTALLED IN THE RETURN AIR PLENUM OF ALL SINGLE PACKAGE UNITS AND ARE CIRCULATED TO SHUT DOWN THE UNITS IN THE EVENT OF SMOKE IS DETECTED.

9. FURNISH AND INSTALL ALL CONTROL DEVICES INCLUDING (BUT NOT LIMITED TO THERMOSTATS, RELAYS, INTERLOCKING DEVICES AND OTHER NECESSARY ITEMS REQUIRED TO PROVIDE A COMPLETE AND WORKABLE SYSTEM. INSTALL CONTROL WIRING EXPOSED OUTSIDE THE BUILDING IN EMT CONDUIT.

10. FURNISH AND INSTALL THE FOLLOWING MATERIALS:
A. DUCTWORK: RECTANGULAR SUPPLY AND RETURN DUCTWORK SHALL BE GALVANIZED SHEET METAL OR DUCTBOARD. FABRICATED AND INSTALLED PER SMACNA STANDARDS. INSTALL 1" FIBERGLASS DUCT LINER (1-1/2 PCF DENSITY) WITH NEOPRENE FACING IN ALL SUPPLY AND RETURN DUCTWORK. LIBERALLY APPLY UNDER ADHESIVE TO ALL RAW EDGES (100% COVERAGE) TO PREVENT FIBERGLASS EROSION.
ALL SUPPLY & RETURN AIR DUCTS LOCATED IN UNCONDITIONED ATTICS, OUTSIDE THE ENVELOPE, OR OUTSIDE THE BUILDING SHALL BE INSULATED USING R-6 INSULATION. EXTERNALLY INSULATED DUCT SHALL BE R-6. ALL SUPPLY AND RETURN DUCTS LOCATED IN A CONDITIONED SPACE OR INSIDE THE ENVELOPE SHALL BE INSULATED USING A MINIMUM R-4.2 INSULATION. EXTERNALLY INSULATED DUCT SHALL BE R-6.
IN ADDITION, INSULATE ALL SUPPLY AND RETURN DUCTWORK IN UNCONDITIONED SPACES AND ALL MAKEUP AIR DUCTWORK WITH 1-1/2 DENSITY FIBERGLASS DUCTWRAP WITH NON-REINFORCE FOIL VAPOR BARRIER, INSTALLED PER MANUFACTURES RECOMMENDATIONS. DO NOT WRAP DUCTWORK EXPOSED TO THE WEATHER. TAPE AND SEAL JOINTS AIRTIGHT WITH UL LISTED DUCT TAPE AND MANDICAST DUCT SEALER BEFORE INSTALLING DUCTWORK. DUCT DIMENSIONS INDICATED ARE NET FREE CLEAR DUCTBOARD ACCEPTABLE.

11. AIR DEVICES: THE FOLLOWING AIR DEVICES AS MANUFACTURED BY TITUS SUPPLY DIFFUSERS SHALL BE TITUS MODEL PAS NECK SIZES AS INDICATED ON PLANS. EXHAUST GRILLES SHALL BE BROAN MODEL 673 L150 L200 WITH WHITE POLYMERIC NECK SIZES AS INDICATED ON PLANS. SIDEWALL SUPPLY AND RETURNS SHALL BE TITUS MODEL SIZE AS INDICATED ON PLANS. AIR DEVICES MANUFACTURED BY METAL-AIRE, PRUEGER, PRICE OR J&J REGISTER THAT EXACTLY MATCH THE REQUIREMENTS LISTED WILL BE CONSIDERED EQUAL.

12. SMOKE DETECTORS SHALL BE 24 VOLT UL LISTED, DUCT MOUNTED IONIZATION DETECTORS.

13. RETURN AIR FILTERS: RETURN AIR FILTERS SHALL BE 1" THROW AWAY SIZED TO FIT FILTER COMPARTMENT.

14. ALL SUPPLY & RETURN AIR DUCTS LOCATED IN UNCONDITIONED ATTICS OR OUTSIDE OF THE BUILDING SHALL BE INSULATED (R-6 UNCONDITIONED & R-4 OUTSIDE BUILDING) AS PER 2006 IECC ENERGY COMPLIANCE.

15. CONTRACTOR TO INSTALL AN ADDITIONAL WATERTIGHT PAN OF CORROSION-RESISTANT METAL BELOW THE COIL OR TOP
TO CATCH CONDESATION OVERFLOW DUE TO A CLOGGED PRIMARY DRAIN.

16. CONTRACTOR TO PROVIDE BACKDRAFT DAMPERS AT ALL TOILET EXHAUST FAN PER SECTION 6.4.4.4 2006 IECC.CC.

17. DAMPERS SHALL BE PROVIDED WITH AN APPROVED MEANS OF ACCESS, LARGE ENOUGH TO PERMIT INSPECTIONS& MAINTENANCE OF THE DAMPER AND ITS OPERATING PARTS. THE ACCESS SHALL NOT IMPAIR FIRE-RESISTIVE CONSTRUCTION. ACCESS SHALL NOT REQUIRE THE USE OF TOOLS, KEYS OR SPECIAL KNOWLEDGE. ACCESS POINTS SHALL BE PERMANENTLY IDENTIFIED ON THE EXTERIOR OF THE DUCT BY A LABEL WITH LETTERS NOT LESS THAN 1/2 INCH IN HEIGHT READING: SMOKE DAMPER OR FIRE DAMPER. ACCESS DOORS IN DUCTS SHALL BE 'IGHT FITTING AND SUITABLE FOR THE REQUIRED DUCT CONSTRUCTION. SECTION 608.5 – 2000 HOUSTON MECHANICAL CODE

18. ALL MOTORIZED DAMPERS AND BACKDRAFT DAMPERS WILL HAVE A MAX. LEAKAGE RATE OF 5.30 CFM/PER SQ.F.

19. CONTRACTOR TO INSTALL MOTORIZED DAMPERS THAT WILL AUTOMATICALLY SHUT WHEN THE SYSTEMS OR SPACES SERVED ARE NOT IN USE FOR BOTH OUTDOOR AIR SUPPLY AND EXHAUST SYSTEMS.

20. REFER TO SHEETS P-1 AND P-2 FOR CONDENSATE DRAIN LINES DISCHARGE POINT AND LAYOUT.

21. TEST AND BALANCE THE AIR DISTRIBUTION SYSTEMS IN ACCORDANCE WITH NEBB STANDARDS AND CRITERIA TO ENSURE THAT ALL SAPCES ARE PERFORMING PROPERLY AS INDICATED ON THE PLANS.

22. INSULATE REFRIGERANT SUCTION PIPING WITH 1/2" ARMAFLEX "AP-2000" INSULATION. SEAL ALL JOINTS AITTIGHT WITH ARMSTRONG #520 VAPOR BARRIER ADHESIVE AND TWO COATS OF ARMSTRONG FINISH PER THE MANUFACTURERS RECOMMENDATIONS.

23. SUPPLY- AND RETURN-AIR DUCTS AND PLENUMS OF A HEATING OR COOLING SYSTEM SHALL BE INSULATED TO ACHIEVE R-4 VALUE. EXCEPT FOR DUCTS AND PLENUMS USED EXCLUSIVELY FOR EVAPORATIVE COOLING SYSTEMS.
APPROVED MATERIALS SHALL BE INSTALLED WITHIN DUCTS AND PLENUMS FOR INSULATING, SOUND DEADENING OR OTHER PURPOSES. MATERIALS SHALL HAVE A MOLD-, HUMIDITY-AND EROSION-RESISTANT SURFACE. DUCT LINERS IN SYSTEMS OPERATING WITH AIR VELOCITIES EXCEEDING 10 INCHES 2030 FEET PER MINUTE (10.16 M/S) SHALL BE FASTENED WITH BOTH ADHESIVE AND MECHANICAL FASTENERS. AND EXPOSED EDGES SHALL HAVE ADEQUATE TREATMENT TO WITHSTAND THE OPERATING VELOCITY.

24. INSULATION APPLIED TO THE EXTERIOR SURFACE OF DUCTS LOCATED IN BUILDINGS SHALL HAVE A FLAME
SPREAD OF NOT MORE THAN 25 AND A SMOKE-DENSITY NOT EXCEEDING 50 WHEN TESTED AS A COMPOSITE INSTALLATION, INCLUDING INSULATION, FACING MATERIALS, TAPES AND ADHESIVES AS NORMALLY APPLIED.

25. FACTORY-MADE AIR DUCTS AND FACED INSULATIONS INTENDED FOR INSTALLATION ON THE EXTERIOR OF
DUCTS SHALL BE LEGIBLY PRINTED WITH THE NAME OF THE MANUFACTURER, THE THERMAL RESISTANCE (R)
VALUE AT INSTALLED THICKNESS AND THE FLAME-SPREAD AND SMOKE DEVELOPED RATINGS OF THE COMPOSITE MATERIAL.

26. INSULATION ON DUCTS IN UNCONDITIONED SPACES SHALL BE VAPOR SEALED.

27. VAPOR RETARDERS SHALL BE INSTALLED ON SUPPLY DUCTS IN SPACES VENTED TO THE OUTSIDE.

28. VAPOR RETARDERS: MATERIAL WITH A PERM RATING NOT EXCEEDING 0.5 PERM, ALL JOINTS TO BE SEALED.

29.SYSTEM CONTROLS:
EACH HUMIDIFICATION SYSTEM MUST HAVE ITS OWN HUMIDITY CONTROL DEVICE.
EACH HEATING OR COOLING SYSTEM SERVING A SINGLE ZONE MUST HAVE ITS OWN TEMPERATURE CONTROL DEVICE.
THERMOSTATS : CONTROLLING BOTH HEATING AND COOLING MUST BE CAPABLE OF HAVING A 5 DEG. F DEADBAND. OR RANGE OF TEMPERATURE WHERE NO HEATING OR COOLING IS AVAILABLE.
EXCEPTION:
DEADBAND CAPABILITY IS NOT REQUIRED IF THE THERMOSTAT REQUIRES MANUAL CHANGEOVER BETWEEN HEATING AND COOLING AND DOES NOT HAVE AUTOMATIC CHANGEOVER CAPABILITY.
THE SYSTEM OR ZONE CONTROL MUST BE A PROGRAMMABLE THERMOSTAT OR OTHER AUTOMATIC CONTROL MEETING THE FOLLOWING CRITERIA:
- CAPABLE OF AUTOMATICALLY SETTING BACK OR SHUTTING DOWN SYSTEMS DURING UNOCCUPIED HOURS FOR SEVEN DIFFERENT DAY SCHEDULES
- HAVE AN ACCESSIBLE 24HOUR OCCUPANT OVERRIDE
- HAVE A BATTERY BACK-UP CAPABLE OF MAINTAINING PROGRAMMED SETTINGS FOR AT LEAST 10 HOURS IF POWER IS LOST.
EXCEPTIONS:
A SETBACK OR SHUTOFF CONTROL IS NOT REQUIRED ON THERMOSTATS CONTROLLING SYSTEMS SERVING AREAS THAT OPERATE CONTINUOUSLY.
A SETBACK OR SHUTOFF CONTROL IS NOT REQUIRED ON SYSTEMS WITH A TOTAL ENERGY DEMAND OF 2000 (6,828 BTUH) OR LESS.

30.OUTDOOR-AIR VENTILATION:
THE SYSTEM MUST SUPPLY OUTSIDE VENTILATION AIR AS REQUIRED BY CHAPTER 4 OF THE INTERNATIONAL MECHANICAL CODE. IF THE VENTILATION SYSTEMS DESIGNED TO SUPPLY OUTDOOR AIR QUANTITIES EXCEEDING MINIMUM REQUIRED LEVELS. THE SYSTEM MUST BE CAPABLE OF REDUCING OUTDOOR-AIR FLOW TO THE MINIMUM REQUIRED LEVELS.
OUTDOOR-AIR SUPPLY SYSTEMS WITH DESIGN AIR FLOW RATES GREATER THAN 3,000 CUBIC FEET PER MINUTE OF OUTDOOR AIR AND ALL EXHAUST SYSTEMS MUST HAVE DAMPERS THAT AUTOMATICALLY CLOSE WHILE THE EQUIPMENT IS NOT OPERATING.

EQUIPMENT SCHEDULE

NO.	TONS	CFM'S	MANUFACTURE	OUTSIDE AIR
UNIT #1	4	1,600	CARRIER OR EQUAL	400
UNIT #1	4	1,600	CARRIER OR EQUAL	400

OUTSIDE AIR REQUIREMENTS

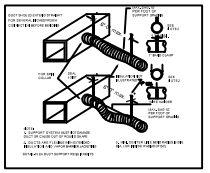
KITCHEN- 488 SF x .30 = 146.4 CFM
DINNING AREA- 523 SF x .50 = 261.5 CFM
OFFICE 77 x 0.08= 6.16 CFM
RESTROOMS (W.C.)- 2 x 50= 100 CFM

TOTAL REQUIRED = 514.06 cfm's
TOTAL PROVIDED = 800 cfm's

NOTE: ROOF TOP UNIT
SERVICE LOCATION= ROOF
DISCHARGE = TO AN APPROVE TAIL PIECE
STYLE = ROOF TOP

NOTE:
REFER TO M-2 FOR FAN SCHEDULE

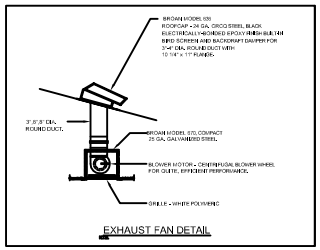
MINIMAL FLEXIBLE /SHEETMETAL ROUND DUCT SIZES	
SIZE	CFM RANGE
6" Ø	0-120
8" Ø	121-220
10" Ø	221-350
12" Ø	351-500
14" Ø	501-800



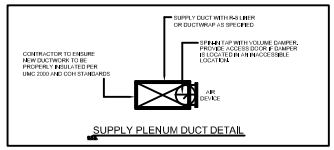
NOTES:
DUCTWORK AND PLENUMS SHALL BE SEALED IN ACCORDANCE WITH THE MECHANICAL CODE AND SMACNA METHOD A. SECTION 6.4.4.2.1 – 2006 HOUSTON COMMERCIAL ENERGY CONSERVATION CODE

NOTES:
DRAWINGS: CONTRACTOR TO PROVIDE WITHIN 90 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE RECORD DRAWINGS OF THE ACTUAL INSTALLATION BE PROVIDED TO THE BUILDING OWNER OR DESIGNATED REP. OF OWNER. RECORD DWGS. SHALL INCLUDE AS A MIN. THE LOCATION AND PERFORMANCE DATA ON EACH EQUIPMENT, GENERAL CONFIGURATION OF DUCT AND PIPE DISTRIBUTION SYSTEM INCLUDING SIZES, AND TERMINAL AIR OR WATER DESIGN FLOW RATES.
MANUALS: CONTRACTOR TO PROVIDE WITHIN 90 DAYS AFTER THE DATE OD SYSTEM ACCEPTANCE AN OPERATING MANUAL AND A MAINTENANCE MANUAL TO THE OWNER.THESE MANUALS SHALL BE IN ACCORDANCE WITH INDUSTRY-ACCEPTED STANDARDS (SEE APENDIX E) AND SHALL INCLUDE, AT A MINIMUM, THE FOLLOWING:
A) SUBMITTAL DATA STATING EQUIPMENT SIZE AND SELECTED OPTIONS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE.
B) OPERATION MANUALS AND MAINTENANCE MANUALS FOR EACH PIECE OF EQUIPMEN REQUIRED MAINTENANCE, EXCEPT EQUIPMENT NOT FURNISHED AS PART OF THE PROJECT. REQUIRED ROUTINE MAINTENACE ACTIONS SHALL BE CLEARLY IDENTIFIED.
C) NAMES AND ADDRESSES OF AT LEAST ONE SERVICE AGENCY.
D) HVAC CONTROLS SYSTEM MAINTENANCE AND CALIBRATION INFORMATION, INCLUDING WIRING DIAGRAMS, SCHEMATICS, AND CONTROLS SEQUENCE DESCRIPTIONS.DESIRED OR FIELD-DETERMINED SET-POINTS SHALL BE PERMANENTLY RECORDED ON CONTROL DWGS. AT CONTROL DEVICES OR.FOR DIGITAL CONTROL SYSTEMS, IN PROGRAMMING COMMENTS.
E) A COMPLETE NARRATIVE OF HOW EACH SYSTEM IS INTENDED TO OPERATE, INCLUDING SUGGESTED
SET-POINTS.
SECTION 6.7.2 – 2008 HOUSTON COMMERCIAL ENERGY CONSERVATION CODE

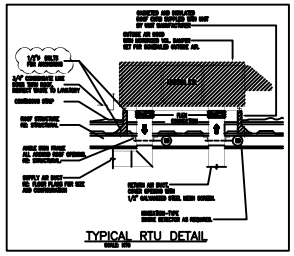
NOTE: CONTRACTOR TO DETERMINE THE EXACT PLACEMENT OF RETURN AIR.



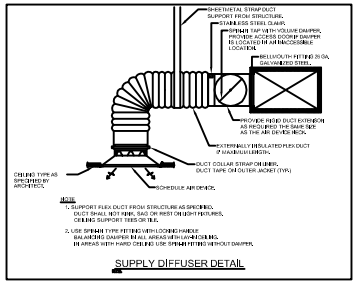
EXHAUST FAN DETAIL



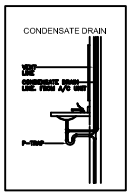
SUPPLY PLENUM DUCT DETAIL



TYPICAL RTU DETAIL



SUPPLY DIFFUSER DETAIL



MECHANICAL LEGEND:

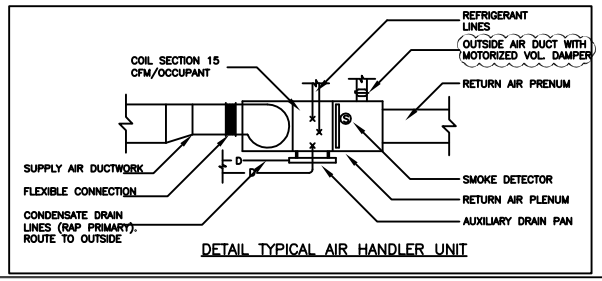
- SIDEWALL AIR DIFFUSER
- CEILING SUPPLY AIR DIFFUSER
- CEILING RETURN AIR DIFFUSER
- CEILING EXAUST FAN (SEE GENERAL MECHANICAL CONTROL NOTE # 2)
- RECTANGULAR DUCTS (SEE GENERAL MECHANICAL NOTE #10 & #11)
- RECTANGULAR DUCT TRANSITIONS
- ROUND DUCTS (SEE GENERAL MECHANICAL NOTE #10 & #11)
- FLEXIBLE DUCTS (SEE GENERAL MECHANICAL NOTE #13)
- MECHANICAL EQUIPMENT (SEE GENERAL MECHANICAL NOTE #4)
- WALL MOUNTED THERMOSTAT (SEE MECH CONTROL NOTE #1)
- SMOKE DETECTOR (SEE GENERAL MECHANICAL NOTE #8)
- VOLUME DAMPER (MANUAL)
- CD — CONDENSATE DRAIN LINE (SEE GENERAL MECHANICAL NOTE #14)
- AD — AUXILIARY DRAIN LINE (SEE GENERAL MECHANICAL NOTE # 14)
- A/U — AIR HANDLING UNIT
- ACU — AIR CONDENSING UNIT
- EF — EXHAUST FAN
- RA — RETURN AIR
- OA — OUTSIDE AIR
- RAFG — RETURN AIR FILTER GRILL

OUTSIDE AIR CALCULATION

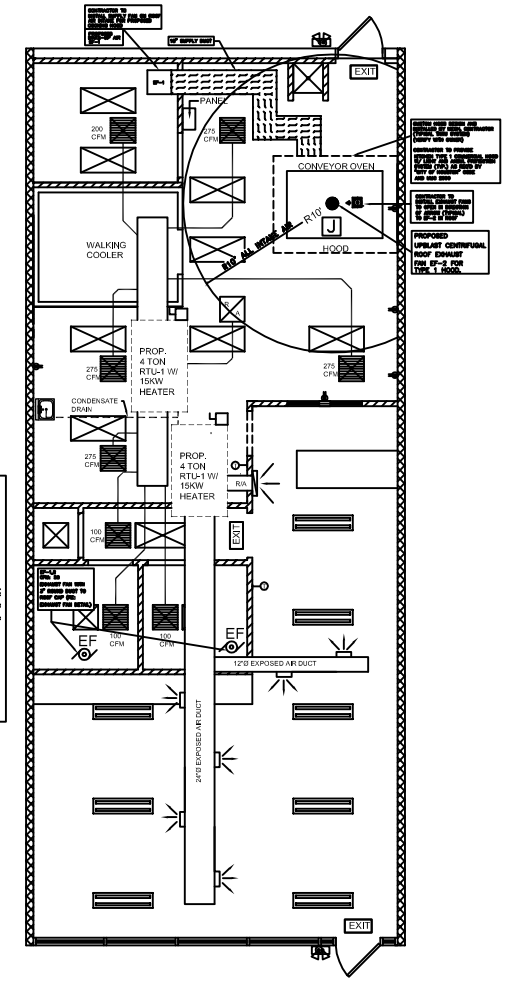
AS PER 2000 UMC C.O.H. AMMENDMENTS TABLE 4-1

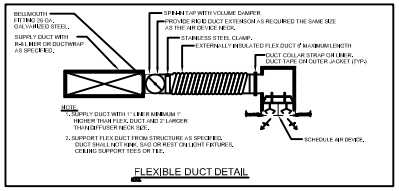
KITCHEN- 488 SF x .30 = 146.4 CFM
DINNING AREA- 523 SF x .50 = 261.5 CFM
OFFICE 77 x 0.08= 6.16 CFM
RESTROOMS (W.C.)- 2 x 50= 100 CFM

O/A REQUIRED = 514.06 CFM
O/A PROVIDED = 800 CFM



DETAIL TYPICAL AIR HANDLER UNIT





FLEXIBLE DUCT DETAIL

MECHANICAL PLAN

1/4"= 1'-0"

eclipse
DESIGN AND CONSTRUCTION
PH# 832-498-3126 FAX# 281-431-8209

MECHANICAL PLAN FOR A LEASE SPACE LOCATED AT
7219 FAIRMOND SUITE 185
PASADENA TX 77505

DATE	05/30/2011
CHECK BY	M.A.
DRAWN BY	M.A.
SCALE	------
PRO. NO.	

SHEET: M-1