PIPING SYMBOLS

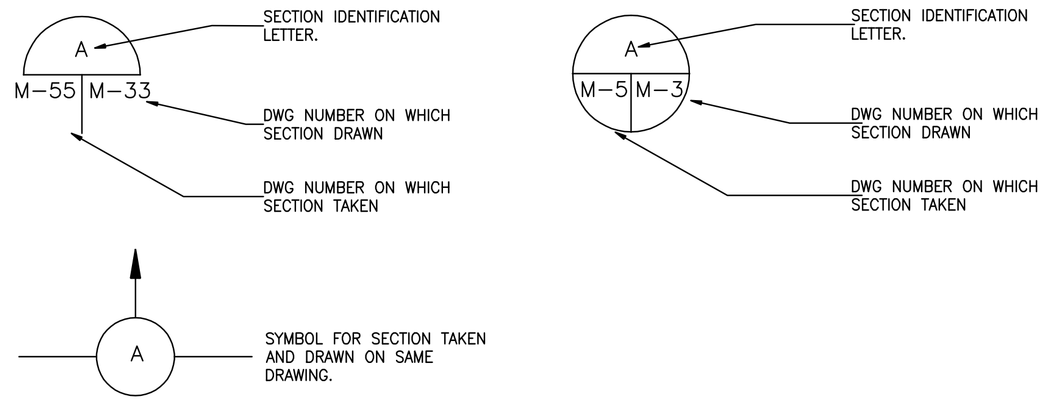
- BBO — BOILER BLOW–OFF
- FOS — FUEL OIL SUPPLY
- FOR — FUEL OIL RETURN
- FOV — FUEL OIL VENT
- G — NATURAL GAS
- F & T TRAP
- BUCKET TRAP
- THERMOSTATIC TRAP
- CCA — CONTROL COMPRESSED AIR
- RL — REFRIGERANT LIQUID
- RD — REFRIGERANT DISCHARGE
- RS — REFRIGERANT SUCTION
- RV — REFRIGERANT VENT
- CWS — CHILLED WATER SUPPLY
- CWR — CHILLED WATER RETURN
- PCHS — PRIMARY CHILLED WATER SUPPLY
- PCHR — PRIMARY CHILLED WATER RETURN
- SCHS — SECONDARY CHILLED WATER SUPPLY
- SCHR — SECONDARY CHILLED WATER RETURN
- CDWS — CONDENSER WATER SUPPLY
- CDWR — CONDENSER WATER RETURN
- BALANCE VALVE
- CHECK VALVE
- SHUT–OFF VALVE NORMALLY OPEN
- GLOBE VALVE
- GATE VALVE
- BUTTERFLY VALVE
- FLOAT OPERATED VALVE
- MOTOR OPERATED VALVE
- PRESSURE REDUCING VALVE
- 2–WAY CONTROL VALVE
- 3–WAY CONTROL VALVE
- ANGLE VALVE
- T&P — TEMP. & PRESS. RELIEF VALVE
- P — PRESS. RELIEF VALVE
- PLUG VALVE
- PRESSURE GAUGE WITH GAUGE COCK
- SIGHT GLASS
- AAV — AUTOMATIC AIR VENT
- MAV — MANUAL AIR VALVE
- STRAINER
- T1 — TEMPERATURE POINT
- ELBOW – 90 DEG.
- ELBOW – 45 DEG.
- ELBOW – TURNED UP
- ELBOW – TURNED DOWN
- R — PIPE RISER
- S — PIPE SLOPE DOWN
- CROSS
- LATERAL
- TEE
- TEE – OUTLET UP
- TEE – OUTLET DOWN
- EXPANSION JOINT
- CAP
- PLUG
- UNION
- BUTTERFLY VALVE
- GAUGE COCK
- VENTURI FLOW MEASUREMENT DEVICE
- AIR PRESSURE SWITCHED
- BALL VALVE
- SHUT–OFF VALVE NORMALLY CLOSED — NC
- PIPE GUIDE
- DIRECTION OF FLOW
- FLEXIBLE PIPE CONNECTIONS
- PT — PRESSURE / TEMPERATURE

HVAC SYMBOLS

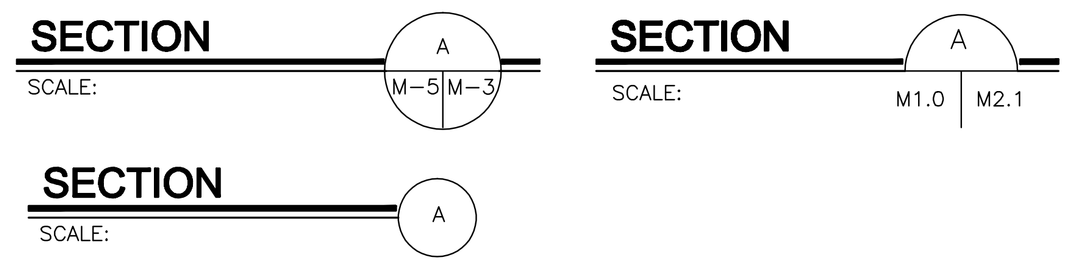
- DUCT UNDER POSITIVE PRESSURE
- DUCT UNDER NEGATIVE PRESSURE
- NEW DUCTWORK
- SUPPLY DUCT UP
- SUPPLY DUCT DOWN
- RETURN DUCT UP
- RETURN DUCT DOWN
- RECTANGULAR DUCT 90 DEG ELBOW WITH TURING VANES
- RECTANGULAR DUCT 45 DEG ELBOW LESS TURING VANES
- RECTANGULAR DUCT TRANSITION 1 SIDES SLOPED
- RECTANGULAR DUCT TRANSITION 2 SIDES SLOPED
- DUCT WITH FLEXIBLE CONNECTION
- RECTANGULAR DUCT TEE WITH SPLITTER DAMPER AND TURING VANES
- MAIN DUCT
- BRANCH DUCT
- DUCT WITH VOLUME DAMPER
- FD — DUCT WITH FIRE DAMPER
- SD — DUCT WITH SMOKE DAMPER
- DUCT WITH SMOKE DETECTOR
- AD — DUCT WITH ACCESS DOOR
- RECTANGULAR DUCT TO ROUND DUCT
- ROUND DUCTWORK
- ROUND DUCTWORK
- ROUND DUCT WITH ELBOW
- ROUND DUCT WITH ELBOW
- ROUND DUCT UP
- ROUND DUCT DOWN
- MAIN DUCT
- SPIN–IN FITTING
- BRANCH DUCT
- RETURN OR EXHAUST GRILLE OR REGISTER
- 300 — DIFFUSER SEE SCHEDULE FOR SIZE 4–WAY
- 300 — DIFFUSER SEE SCHEDULE FOR SIZE 1–WAY
- 300 — DIFFUSER SEE SCHEDULE FOR SIZE 2–WAY
- 300 — DIFFUSER SEE SCHEDULE FOR SIZE 3–WAY
- H — HUMIDISTAT
- T — THERMOSTAT
- M — MOTORIZED CONTROL DAMPER (LOW LEAKAGE)
- U/C — UNDER CUT DOOR MIN. 1/2"

THIS IS A TYPICAL SHEET, ALL ABBREVIATIONS, SYMBOLS ARE NOT NECESSARILY IN USE ON THIS PROJECT.

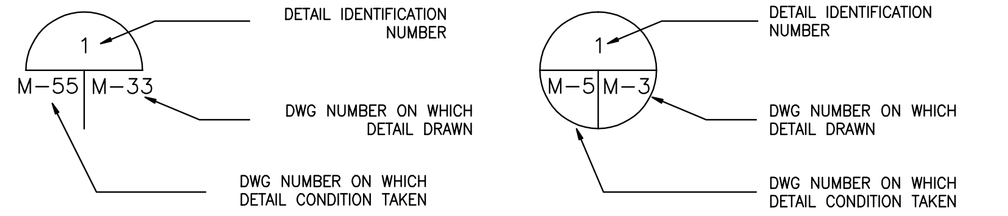
DETAIL CROSS REFERENCES



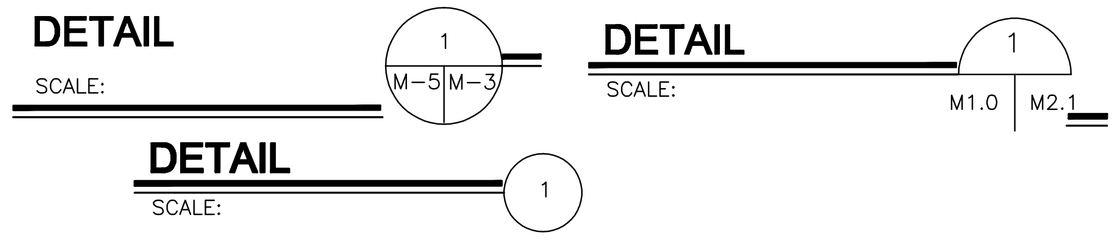
SYMBOL WHERE SECTION IS TAKEN



SUBTITLE FOR SECTION DRAWING



SYMBOL FOR LOCATION CONDITION FOR WHICH THERE IS A DETAIL.



SUBTITLE FOR DETAIL DRAWING

ABBREVIATIONS

ABV	ABOVE	dB	DECIBEL	FT	FEET
ACC	AIR COOLED CHILLER	DG	DOOR GRILLE	GPM	GALLONS PER MINUTE
AD	AIR DEVICE	DN	DOWN	HC	HEATING COIL
AFF	ABOVE FINISHED FLOOR	DWG	DRAWING	HHWR	HOT WATER RETURN
AFR	ABOVE FINISHED ROOF	EA	EACH	HHWS	HOT WATER SUPPLY
AHU	AIR HANDLING UNIT	E.A.	EXHAUST AIR	KW	KILOWATT
AAV	AUTOMATIC AIR VENT	EDB	ENTERING DRY BULB TEMPERATURE	LAT	LATENT
BDD	BACKDRAFT DAMPER	EF	EXHAUST FAN	LDB	LEAVING DRY BULB TEMPERATURE
BHP	BRAKE HORSEPOWER	ELEC	ELECTRICAL	LWB	LEAVING WET BULB TEMPERATURE
BTU	BRITISH THERMAL UNIT	ESP	EXTERNAL (OF UNIT) STATIC PRESSURE	LWT	LEAVING WATER TEMPERATURE
BTUH	BRITISH THERMAL UNIT PER HOUR	EWT	ENTERING WATER TEMPERATURE	MAV	MANUAL AIR VENT
CC	COOLING COIL	EXH	EXHAUST	MAX	MAXIMUM
CFM	CUBIC FEET PER MINUTE	F	FILTER	MBH	ONE THOUSAND BTUH
CWR	CHILLED WATER RETURN	FA	FREE AREA (IN SQUARE FEET)	MER	MECHANICAL EQUIPMENT ROOM
CWS	CHILLED WATER SUPPLY	FC	FLEXIBLE CONNECTION	MFG	MANUFACTURER
CLG	CEILING	FCU	FAN COIL UNIT	MHP	MOTOR HORSEPOWER
CONC	CONCRETE	FD	FIRE DAMPER	MIN	MINIMUM
CRWS	CONDENSER WATER SUPPLY	FPB	FAN POWER BOX	NC	NORMALLY CLOSED
CRWR	CONDENSER WATER RETURN	FSD	COMBINATION FIRE AND SMOKE DAMPER	NIC	NOT IN CONTRACT
CONT	CONTINUATION	FH	FEET HEAD	NO	NORMALLY OPEN
				OA	OUTSIDE AIR

DESIGN CONDITIONS

WINTER	SUMMER
INSIDE – 68°F	INSIDE – 75° – 50% R.H.
OUTSIDE – 33°F	OUTSIDE – 92°F DB./81°F WB.

AIR BALANCE SCHEDULE

EXHAUST (CFM)		OUTSIDE AIR (CFM)	
EF–1	555	AHU–1	2,306
O_2 LAB HOOD	800	AHU–2	2,014
VIB BENCH BLOWER	200		
TOTAL	1,555		4,612
TOTAL NET POSITIVE PRESSURE 196%			

GENERAL NOTES:

1. GENERAL MECHANICAL NOTES HERE ARE TYPICAL FOR ALL FLOOR PLANS. SEE INDIVIDUAL FLOOR PLANS FOR ADDITIONAL NOTES.
2. DUCTWORK DIMENSIONS GIVEN ARE INSIDE CLEAR.
3. IF NO SIZE IS SHOWN FOR DUCT SERVING DIFFUSER OR TERMINAL BOX, REFER TO DIFFUSER AND GRILLE SCHEDULE OR REHEAT BOX SCHEDULE FOR BRANCH DUCT SIZE.
4. SIZE DUCT RUNOUTS BY THESE SCHEDULES UNLESS NOTED OTHERWISE ON PLANS.
5. REFER TO MECHANICAL SCHEDULE SHEET FOR EQUIPMENT, DIFFUSER AND GRILLE SCHEDULES.
6. PROVIDE FLANGE TYPE CEILING OUTLETS IN SPACES WITH DRYWALL, PLASTER, HARD CEILINGS, OR NON–LAY–IN GRID TYPE CEILINGS REFER TO ARCHITECTURAL REFLECTED CEILING PLANS.
7. INSTALL TRANSITION PIECES FROM SUPPLY OUTLET OF EQUIPMENT TO DUCT SIZE INDICATED ON PLANS. CONSULT EQUIPMENT MANUFACTURER FOR OUTLET SIZE.
8. ALL DUCT ELBOWS SHALL BE PROVIDED WITH SINGLE THICKNESS TURNING VANES OR RADIUS ELBOWS.
9. FURNISH OPPOSED BLADE VOLUME DAMPERS (OBD) INTEGRAL WITH DIFFUSERS MOUNTED IN INACCESSIBLE CEILINGS (FOR AIR BALANCE) DO NOT FURNISH OBD'S WITH DIFFUSERS MOUNTED IN LAY–IN TYPE CEILINGS.
10. PROVIDE AND INSTALL MANUAL VOLUME DAMPERS IN THE BRANCH DUCTS SERVING LAY–IN DIFFUSERS GRILLES AND REGISTERS FOR AIR BALANCE.
11. PROVIDE FLEX DUCT CONNECTIONS INLET AND OUTLET OF ALL ROTATING EQUIPMENT.
12. PROVIDE SOLID NEOPRENE ISOLATORS FOR ALL EQUIPMENT. CORK PAD IS NOT ALLOWED UNLESS UNIT IS INTERNALLY ISOLATED.
13. REFER TO PLUMBING DRAWINGS FOR FLOOR DRAIN LOCATIONS.
14. REFER TO HVAC SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
15. REFER TO ELECTRICAL AND PLUMBING DRAWINGS FOR COORDINATION WITH MECHANICAL DRAWINGS.
16. EQUIPMENT SIZES AND SERVICE SPACE REQUIREMENTS VARY AMONG MANUFACTURERS. CONSULT SUBMITTED AND APPROVED MANUFACTURER FOR SPACE REQUIREMENTS & VERIFY SPACE ADEQUACY.
17. DO NOT BLOCK TUBE PULL, FILTER PULL, COIL PULL, SAFETY OR SERVICE CLEARANCE SPACE ON EQUIPMENT WITH PIPING, DUCTWORK, ETC. FLANGED OR REMOVABLE SECTIONS MAY BE USED IN SOME INSTANCES WHERE TIGHT CLEARANCES EXIST (VERIFY WITH ENGINEER IN SUCH CASES).
18. SEE ARCHITECTURAL DRAWINGS FOR COORDINATION OF MECHANICAL WITH REFLECTED CEILING PLAN.
19. SEAL ALL WALLS, ROOF, AND FLOOR PENETRATIONS SMOKE TIGHT AS REQUIRED.
20. PROVIDE ESCUTCHEONS AT ALL EXPOSED LOCATIONS WHERE PIPE PENETRATES WALL.
21. ROOM NUMBERS AND NAMES ON THE CONSTRUCTION DOCUMENTS ARE FOR CONSTRUCTION PURPOSES ONLY. OBTAIN FINAL ROOM NUMBERS AND ROOM NAMES TO BE PROVIDED BY GOVERNMENT.
22. SEE DETAILS ON SHEETS FOR BRANCH TAKE–OFF REQUIREMENTS FOR LOW PRESSURE SUPPLY AND RETURN TAPS (SHOWN ON DRAWINGS AS SINGLE LINE BRANCH TAKE–OFFS FROM MAIN) AND BRANCH RUNOUT TO TERMINAL BOX.
23. WHERE CONCEALED BY INACCESSIBLE FINISHES, PROVIDE ACCESS DOORS TO ALL VALVE BOXES, VALVES, DUCT STATIC PRESSURE SENSORS, MANUAL VOLUME DAMPERS, FIRE DAMPERS, FIRE/SMOKE CONTROLS, AIR VENTS, DRAIN CONNECTIONS & ALL OTHER ITEMS REQUIRING PERIODIC MAINTENANCE. OPERATION OR ADJUSTMENT. ACCESS DOORS ARE TO BE SIZED & LOCATED FOR EASY PERFORMANCE OF THE FUNCTION INTENDED. COORDINATE LOCATION OF ACCESS DOORS WITH ALL TRADES AFFECTED. ACCESS DOORS FOR WALLS, CEILINGS AND FLOORS, BOTH STANDARD AND FIRE RATED ARE SPECIFIED IN ARCHITECTURAL SPECIFICATIONS.
24. ALL ACCESS DOORS SHALL BE PROVIDED WITH 1"x3" TAG DESCRIBING EQUIPMENT CONCEALED.
25. ALL FIRE DAMPERS SHALL BE DYNAMIC "B" TYPE. PROVIDE FACTORY SLEEVE AND BREAKAWAY CONNECTION.
26. ALL DUCT TO BE CONSTRUCTED FOR ±2" W.G. SHEET METAL SHALL BE G–90 LQF OR EQUAL.
27. CONTRACTOR SHALL EMPLOY AN INDEPENDENT BALANCING COMPANY TO BALANCE ALL AIR AND WATER SYSTEMS. PROVIDE WRITTEN REPORT.
28. ALL DUCTWORK MUST BE SEALED PER ITG FY05–2 (NAVFAC HUMID AREA HVAC DESIGN CRITERIA)
29. SEAL ALL DUCT SEAMS, JOINTS AND CONNECTIONS INCLUDING PITTBURGHS WITH HARD CAST SURSEAL OR EQUAL.
30. EXTERNALLY INSULATE SUPPLY, RETURN, AND OUTSIDE AIR DUCTWORK WITH 2" R–6 FOIL FACED INSULATION, EXCEPT AS INDICATED. FLEXIBLE DUCTS SHALL BE MIN. R–6 INSULATION. R–VALUE REFERS TO THE INSTALLED THICKNESS, EXCEPT AS INDICATED. FLEXIBLE DUCTS FOR AHU–2 SHALL BE A MINIMUM OF R–8 INSULATION. AHU–2 SUPPLY AIR DUCTWORK TO BE INSULATED WITH 1 LAYER OF 2" THICK R–6 FOIL FACED INSULATION. INSULATE DUCTWORK IN MECHANICAL ROOMS & EXPOSED LOCATIONS WITH FIBERGLASS DUCTWRAP AS PER THE MECHANICAL BASIS OF DESIGN.
31. FLEXIBLE DUCTS SHALL BE USED ONLY FOR BRANCH "RUNOUTS" (MAX. 6') AND FOR INLETS FOR VAV'S (MAX. 3'). THERMAFLEX G–KM OR EQUAL. PROVIDE INDIVIDUAL BANDS FOR BOTH INNER LINER AND OUTER LINER.
32. CONTRACTOR SHALL FOLLOW ALL CODES INCLUDING BUT NOT LIMITED TO THE FOLLOWING: INTERNATIONAL MECHANICAL CODE 2006, NFPA, LIFE SAFETY CODE, NFPA, ASHRAE, SMACNA, UL, NEC, ETC.
33. ALL CONDENSATE DRAIN LINES SHALL BE COPPER WITH 1/2" CLOSED CELL INSULATION.
34. FOR DOMESTIC HOT AND COLD PIPING PROVIDE FACTORY–FORMED, FIBERGLASS PIPE INSULATED FACTORY–JACKETED "SYSTEM" TYPE SIMILAR TO OWENS–CORNING 25 ASJ HEAVY DENSITY, ONE–PIECE, DUAL TEMPERATURE, PREMOLDED INSULATION. INSULATE ALL VALVES, FITTINGS AND FLANGES WITH 3–POUND DENSITY FIBERGLASS INSULATION TO A THICKNESS EQUAL TO THE ADJACENT PIPING INSULATION AND COVERED WITH PREMOLDED 25/50 RATED PVC FITTING, VAPOR SEALED WITH CHILDERS CP–30 VAPOR BARRIER MASTIC. INSULATION SHALL BE 1" THICK.
35. CHILLED WATER PIPING, VALVES AND FITTINGS SHALL BE INSULATED WITH CELLULAR GLASS, ASTM C552, TYPE II, CLASS 2. NO SUBSTITUTES WILL BE CONSIDERED. INSULATION SHALL BE A MINIMUM OF 1.5 INCHES THICK FOR PIPING 2 INCHES AND SMALLER, 2 INCHES THICK FOR PIPE SIZES 2.5 INCHES TO 4 INCHES, AND 3 INCHES THICK FOR PIPING 6 INCHES AND LARGER. PROVIDE A FACTORY–APPLIED, ALL–PURPOSE JACKET. COVER ALL CHILLED WATER PIPE INSULATED PIPE, VALVES, FITTINGS AND ALL MISCELLANEOUS DEVICES WITH 0.030" THICK PVC JACKET (EXTERNALLY AND INTERNALLY) AND PREMOLDED PVC FITTINGS SECURED PER MANUFACTURER'S RECOMMENDATIONS.
36. ALL EQUIPMENT SHALL COMPLY WITH RFP CONTRACT NO. N69450–07–C–0057 REQUIREMENTS.
37. THE CHILLER & OUTDOOR CONDENSERS, INCLUDING COILS, WILL BE FACTORY COATED TO PROVIDE COMPLIANCE WITH ASTM B–117, 500 HOUR SALT SPRAY TEST.
38. "BUY AMERICA" REQUIREMENTS APPLY TO THIS PROJECT.
39. EQUIPMENT SHALL HAVE A NAMEPLATE BEARING THE MANUFACTURER'S NAME, ADDRESS, MODEL NUMBER, AND SERIAL NUMBER SECURELY AFFIXIED IN A CONSPICOUS PLACE, THE NAMEPLATE OF THE DISTRIBUTING AGENT WILL NOT BE ACCEPTABLE.
40. NATURAL GAS REGULATING VALVES ON ALL DEVICES TO BE PROPERLY VENTED TO OUTDOORS MAINTAINING NECESSARY CLEARANCE TO OUTSIDE ORCOMBUSTION AIR INTAKES.
41. ALL EQUIPMENT INSTALLATIONS SHALL BE INSTALLED TO MEET THE INSTALLATION AND OPERATION REQUIREMENT OF THE EQUIPMENT MANUFACTURER AND ALL CODES AND REGULATIONS IN EFFECT IN THE AREA WHERE WORK IS DONE.
42. PROVIDE EMERGENCY SHUTDOWN SWITCH IN ALL ROOMS WITH BOILERS OR WATER HEATERS TO DE–ENERGIZE THESE DEVICES IN EMERGENCY CONDITION.
43. ALL EQUIPMENT SHALL HAVE HOUSEKEEPING PADS.
44. THE WALLS FOR THE FORCE/TORQUE LAB, ELECTRONICS LAB, TEMPERATURE LAB, PRECISION DIMENSIONAL LAB & OXYGEN LAB SHALL BE SEALED AT THE ROOF TO ELIMINATE INFILTRATION.
45. PROVIDE MANUAL AIR VENTS AT HIGH POINTS IN THE SYSTEM TO FACILITATE THE PURGING OF AIR FROM THE SYSTEM.
46. AS PER THE MECHANICAL BASIS OF DESIGN, ALL PIPING 2–1/2" AND LARGER AND PIPING IN EQUIPMENT ROOMS 1–1/4" AND LARGER ALONG WITH RECTANGULAR DUCUTWORK 6 SQ FT OR LARGER AND ROUND DUCTWORK 28" OR LARGER WILL BE SEISMICALLY SUPPORTED.

BROADMOOR BUILDING by DESIGN
BROADMOOR, L.L.C.
2740 North Arnoult Road
Metairie, Louisiana 70002
www.broadmoorllc.com

DRAWING REVISIONS

REV.	DESCRIPTION	PREP. BY	DATE	APPROV.
0	FINAL DESIGN	RP	10/29/09	CB

Belle Chasse, Louisiana
NAS JRB New Orleans

NAVAIRSEFAC CALIBRATION BLDG.
HVAC GENERAL NOTES

DATE: AUGUST 22, 2006
APPROVED
EFD FOR COMMANDER, NAVFAC

NAVFAC
Naval Facilities Engineering Command
Southeast Division, Jacksonville, FL

STATE OF LOUISIANA
CHARLES W. BOYLE, JR.
REG. NO. 18480
REGISTERED PROFESSIONAL ENGINEER IN MECHANICAL ENGINEERING

RECORD DRAWING DATE 10/29/2009
CODE I.D. NO. –
DRAWING SIZE: D
SPEC. NO.06––
CONSTRN. CONTR. NO. –
NAVFAC DRAWING NO. 15030930
SHEET 1 OF 15
M–00

HUSEMAN & Associates
MECHANICAL ▪ ELECTRICAL ▪ PLUMBING ▪ FIRE PROTECTION
3925 N I-10 SERVICE RD (504) 456-3119
SUITE 201B, METAIRIE, LA 70002 FAX (504) 456-3122
Job No. 0900301 Designed By JL
Drawn By RP Checked By CB

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WALDEMAR S. NELSON AND COMPANY
INCORPORATED
ENGINEERS AND ARCHITECTS
1200 ST. CHARLES AVE NEW ORLEANS, LA.