## GENERAL ABBREVIATIONS

| SYMBOL | DESCRIPTION |
|---|---|
| AC | AIR CONDITIONER |
| ACFM | ACTUAL CUBIC FEET MINUTE |
| AFF | ABOVE FINISHED FLOOR |
| ALT | ALTERNATE |
| AP | ACCESS PANEL |
| APD | AIR PRESSURE DROP |
| BDD | BACKDRAFT DAMPER |
| BFF | BELOW FINISHED FLOOR |
| BFP | BACK FLOW PREVENTOR |
| BHP | BRAKE HORSEPOWER |
| BO | BY OWNER |
| BOD | BOTTOM OF DUCT |
| BWV | BACKWATER VALVE |
| CD | CONDENSATE DRAIN |
| CFH | CUBIC FEET HOUR |
| CFM | CUBIC FEET MINUTE |
| CI | CAST IRON |
| CLG | CEILING |
| CL | CENTER LINE |
| CO2 | CARBON DIOXIDE |
| CO | CARBON MONOXIDE |
| COMB | COMBINATION |
| CONC | CONCRETE |
| COND | CONDENSATE |
| CONN | CONNECTION |
| CONT | CONTINUOUS OR CONTINUED |
| CONTR | CONTRACTOR |
| DB | DECIBEL (DRY BULB) |
| DFS | DRY FIRE SPRINKLER |
| DIFF | DIFFUSER |
| DISH | DISCHARGE |
| DN | DOWN |
| DSP | DRY STAND PIPE |
| EA, E/A | EXHAUST AIR (EACH) |
| EAT | ENTERING AIR TEMPERATURE |
| EL | ELEVATION |
| EQ | EQUIPMENT |
| ESP | EXTERNAL STATIC PRESSURE |
| EWT | ENTERING WATER TEMPERATURE |
| EXH | EXHAUST |
| EXP | EXPANSION |
| EXT | EXTERNAL |
| F | FIRE PROTECTION |
| FCV | FLOW CONTROL VALVE |
| FD | FIRE DAMPER |
| FDC | FIRE DEPARTMENT CONNECTION |
| FDV | FIRE DEPARTMENT VALVE |
| FM | FIRE MAIN |
| FP | FIRE PROTECTION |
| FPM | FEET PER MINUTE |
| FPI | FINS PER INCH |
| FPS | FEET PER SECOND |
| FV | FACE VELOCITY |
| GA | GAUGE |
| GALV | GALVANIZE |
| GBD | GRAVITY BACK DRAFT DAMPER |
| GEN | GENERAL |
| GPH | GALLONS PER HOUR |
| GPM | GALLONS PER MINUTE |
| GR | GRILLE |
| HD | HEAD |
| HDCP | HANDICAPPED |
| HP | HIGH PRESSURE (HORSEPOWER) |
| HVAC | HEATING, VENTILATION & AIR CONDITIONING |
| ID | INDIRECT DRAIN (INSIDE DIAMETER) |
| INSUL | INSULATION |
| INT | INTERNAL |
| INV. EL. (I.E.) | INVERT ELEVATION |
| IPS | IRON PIPE SIZE |
| ISO | ISOLATOR/ISOLATION |
| ISP | INTERNAL STATIC PRESSURE |
| LAT | LEAVING AIR TEMPERATURE |
| LF | LINEAR FEET |
| LIQ | LIQUID |
| LV | LEAVING |
| LVR | LOUVER |
| LWT | LEAVING WATER TEMPERATURE |
| MA | MIXED AIR |
| MAT | MIXED AIR TEMPERATURE |
| MFR | MANUFACTURER |
| MH | MANHOLE |
| MOT | MOTORIZED |
| NC | NORMALLY CLOSED (NOISE CRITERIA) |
| NEG | NEGATIVE |
| NO | NORMALLY OPEN |
| NTS | NOT TO SCALE |
| O2 | OXYGEN |
| OA | OUTSIDE AIR |
| OBD | OPPOSED BLADE DAMPER |
| OC | ON CENTER |
| OD | OUTSIDE DIAMETER |
| OED | OPEN END DUCT |
| OS&Y | OUTSIDE STEM AND YOKE |
| PCR | PUMPED CONDENSATE RETURN |
| PD | PRESSURE DROP |
| PLBG | PLUMBING |
| PNL | PANEL |
| PRV | PRESSURE REDUCING VALVE |
| RA | RETURN AIR |
| REFR | REFRIGERANT/REFRIGERATE |
| REG | REGISTER |
| REQ | REQUIRED |
| RH | RELATIVE HUMIDITY |

## ABBREVIATIONS (CONT)

| SYMBOL | DESCRIPTION |
|---|---|
| RHW | RECIRCULATING HOT WATER |
| RPZ | REDUCED PRESSURE ZONE |
| RTN | RETURN |
| RW | RAIN WATER (STORM) |
| RWL | RAIN WATER LEADER |
| SA | SUPPLY AIR |
| SAN | SANITARY |
| SP | STATIC PRESSURE |
| SPKLR | SPRINKLER |
| S/S | STAINLESS STEEL |
| SSW | SUPERVISORY SWITCH |
| STM | STEAM |
| SUCT | SUCTION |
| TCC | TEMPERATURE CONTROL CONTRACTOR |
| TD | TEMPERATURE DIFFERENCE |
| TMV | THERMOSTATIC MIXING VALVE |
| TSP | TOTAL STATIC PRESSURE |
| TXV | THERMOSTATIC EXPANSION VALVE |
| TYP | TYPICAL |
| UG | UNDERGROUND |
| VAV | VARIABLE AIR VOLUME |
| VB | VACUUM BREAKER |
| VD | VOLUME DAMPER |
| VFD | VARIABLE FREQUENCY DRIVE |
| VIF | VERIFY IN FIELD |
| W/ | WITH |
| W/O | WITHOUT |
| WB | WET BULB |
| WPIV | WALL POST INDICTOR VALVE |
| WC | WATER COLUMN |
| WG | WATER GAUGE |
| WPD | WATER PRESSURE DROP |
| WSP | WET STANDPIPE |

## EQUIPMENT ABBREVIATIONS

| SYMBOL | DESCRIPTION |
|---|---|
| AC | AIR COMPRESSOR |
| ACCU | AIR COOLED CONDENSING UNIT |
| ACU | AIR CONDITIONING UNIT |
| AD | AIR DRYER |
| AF | AIR FILTER |
| AFMS | AIR FLOW MEASURING STATION |
| AHU | AIR HANDLING UNIT |
| AHX | AIR TO AIR HEAT EXCHANGER |
| AS | AIR SEPARATOR |
| BT | BUFFER TANK |
| CC | CHILLED WATER COIL |
| CO | CLEAN OUT |
| COMP | COMPRESSOR |
| COND | CONDENSER |
| CRAC | COMPUTER ROOM AIR CONDITIONING UNIT |
| CUH | CABINET UNIT HEATER |
| DDC | DIRECT DIGITAL CONTROL (PANEL) |
| DFC | DRY FLUID COOLER |
| DX | DIRECT EXPANSION (COOLING COIL) |
| EF | EXHAUST FAN |
| ET | EXPANSION TANK |
| ERV | ENERGY RECOVERY VENTILATOR |
| EVAP | EVAPORATOR |
| FC | FAN COIL |
| GF | GLYCOL FEEDER |
| GV | GRAVITY VENTILATOR |
| GWH | GAS WATER HEATER |
| H | HUMIDIFIER |
| HC | HEATING CONVECTORS |
| HW | HEAT WHEEL |
| HWC | HEATING WATER COIL |
| HX | HEAT EXCHANGER |
| IR | NFRARED HEATERS |
| LCP | LOCAL CONTROL PANEL |
| MAU | MAKE UP AIR UNIT |
| MX | THERMOSTATIC MIXING VALVE |
| P | PUMP |
| RC | REHEAT COIL |
| RF | RELIEF FAN |
| RTU | ROOF TOP UNIT |
| SAT | SOUND ATTENUATOR |
| SF | SUPPLY FAN |
| SP | SUMP PUMP |
| ST | STORAGE TANK |
| UH | UNIT HEATER |
| V | VALVE |
| VAV | VARIABLE AIR VOLUME TERMINAL BOX |
| VP | VACUUM PUMP |
| WH | GEOTHERMAL HOT WATER HEATER |
| WHX | WATER TO WATER HEAT EXCHANGER |
| WS | WATER SOFTENER |
| WW | GEOTHERMAL WATER SOURCE HEAT PUMP |

## PIPING & PLUMBING SYMBOLS

| SYMBOL | DESCRIPTION |
|---|---|
| | AIR VENT MANUAL |
| | ANCHOR |
| 4" AD-1 | TYPE (SEE SPECIFICATION) |
| | AREA DRAIN (4" CONNECTION) |
| CO | CLEAN OUT |
| FCO | CLEAN OUT (FLOOR) |
| WCO | CLEAN OUT (WALL) |
| DS | DOWN SPOUT |
| | EXPANSION JOINT |
| | FLEXIBLE CONNECTION |
| 2" FD-1 | TYPE (SEE SPECIFICATION) |
| | FLOOR DRAIN (2" CONNECTION) |
| 2" FS-1 | TYPE (SEE SPECIFICATION) |
| | FLOOR SINK (2" CONNECTION) |
| | FLOW DIRECTION |
| FS | FLOW SWITCH/SENSOR |
| HB | HOSE BIB |
| | ORIFICE |
| | PRESSURE GAUGE W/COCK |
| | CONTINUOUS PIPE NOT SHOWN |
| | PIPE CAP |
| | PIPE DOWN |
| | PIPE GUIDES |
| | PIPE TEE |
| | PIPE TEE DOWN |
| | PIPE TEE UP |
| | PIPE UP |
| 1/8" | PITCH (DOWN IN THE DIRECTION OF ARROW) |
| PS | PRESSURE SWITCH/SENSOR |
| PT | PRESSURE/TEMPERATURE PORT |
| | REDUCER (CONCENTRIC) |
| | REDUCER (ECCENTRIC) |
| 4" RD-1 | TYPE (SEE SPECIFICATION) |
| | ROOF DRAIN (4" CONNECTION) |
| 4" ORD-1 | TYPE (SEE SPECIFICATION) |
| | OVERFLOW ROOF DRAIN (4" CONNECTION) |
| 4" VTR-1 | TYPE (SEE SPECIFICATION) |
| | VENT THRU ROOF (4" CONNECTION) |
| | STRAINER |
| | STEAM TRAP |
| | THERMOMETER |
| | UNION |
| WH | WALL HYDRANT |
| | EXPANSION JOINT |

## PLUMBING ABBREVIATIONS

| SYMBOL | DESCRIPTION |
|---|---|
| AAV | AIR ADMITTANCE VALVE |
| AD | AREA DRAIN |
| CO | CLEANOUT |
| DCW | DOMESTIC COLD WATER |
| DF | DRINKING FOUNTAIN |
| DS | DOWNSPOUT |
| FCO | FLOOR CLEANOUT |
| FD | FLOOR DRAIN |
| EW | EMERGENCY EYE WASH |
| EWH | ELECTRIC WATER HEATER |
| EWC | ELECTRIC WATER COOLER |
| ES | EMERGENCY EYEWASH/SHOWER |
| ESH | EMERGENCY EYEWASH/SHOWER/HANDWASH |
| HB | HOSE BIBB |
| HR | HOSE REEL |
| LAV | LAVATORY |
| LT | LAUNDRY TUB |
| MB | MOP BASIN |
| MV | THERMOSTATIC MIXING VALVES |
| ORD | OVERFLOW ROOF DRAIN |
| RD | ROOF DRAIN |
| RH | ROOF HYDRANT |
| S | SINK |
| SD | SHOWER DRAIN |
| SH | SHOWER |
| SS | SERVICE SINK |
| TD | TRENCH DRAIN |
| UR | URINAL |
| VENT | SANITARY VENT |
| VTR | SANITARY VENT THROUGH ROOF |
| WC | WATER CLOSET |
| WH | WALL HYDRANT |

## MECHANICAL ANNOTATION

| SYMBOL | DESCRIPTION |
|---|---|
| | PLUMBING |
| | COLD WATER (CW) |
| D | CONDENSATE, CONDENSER DRAIN |
| | HOT WATER (HW) |
| G | NATURAL GAS (FIRM) |
| | RECIRCULATING HOT WATER (RHW) |
| SAN | SANITARY ABOVE GRADE |
| -SAN- | SANITARY BELOW GRADE |
| V | SANITARY VENT |
| A | COMPRESSED AIR |
| RW | RAIN WATER ABOVE GRADE |
| RW | RAIN WATER BELOW GRADE |
| | MECHANICAL |
| SV | STEAM VENT |
| MPS | MEDIUM PRESSURE STEAM |
| MPR | MEDIUM PRESSURE CONDENSATE |
| SV | STEAM VENT |
| CH | CHILLED WATER SUPPLY |
| CHR | CHILLED WATER RETURN |
| GH | GLYCOL WATER HEATING SUPPLY |
| GHR | GLYCOL WATER HEATING RETURN |
| PC | PUMPED CONDENSATE |

## VALVING SYMBOLS

| SYMBOL | DESCRIPTION |
|---|---|
| | 3-WAY VALVE |
| | 4-WAY VALVE |
| | ANGLE VALVE |
| | BALANCING VALVE |
| | BALANCING VALVE W/FLOW TAPS |
| | GATE VALVE |
| | BALL VALVE |
| | BUTTERFLY VALVE |
| | CHECK VALVE |
| | DIAPHRAGM VALVE |
| | SHUT-OFF VALVE |
| | GLOBE VALVE |
| | NEEDLE VALVE |
| | PLUG VALVE |
| | PRESSURE REDUCING VALVE |
| | PRESSURE RELIEF VALVE |
| | MOTOR OPERATOR |
| | ELECTRIC OPERATOR |
| | SOLENOID OPERATOR |
| | FLOW VENTURI |
| | BACKFLOW PREVENTER |
| | AUTOMATIC AIR VENT |

## DUCT SYMBOLS

| SYMBOL | DESCRIPTION | SYMBOL |
|---|---|---|
| DOUBLE LINE DUCTWORK: SUPPLY RETURN EXHAUST ROUND | | SINGLE LINE DUCTWORK: SUPPLY ROUND |
| SUPPLY RETURN EXHAUST ROUND | DUCT DROP | SUPPLY ROUND |
| SUPPLY RETURN EXHAUST ROUND | DUCT RISES, AND SECTIONS | SUPPLY ROUND |
| R | RISE (R) OR DROP (D) IN DUCTWORK | D |
| 24/12 18/16 | TRANSITION | 24/12 18/16 |
| 24/12 20Ø | CONCENTRIC REDUCER (SQUARE TO ROUND) | 24/12 20Ø |
| M | MOTORIZED DAMPER | M |
| | FIRE, SMOKE AND FIRE/SMOKE DAMPER | |
| B | SUPPLEMENTARY MANUAL VOLUME DAMPER AND BACKDRAFT DAMPER | B |
| | MITERED ELBOW WITH TURNING VANES | |
| | LONG SWEEP RADIUS ELBOW | |
| 36/18 24/12 14Ø 12Ø | BRANCH TAKE-OFFS OF A RECTANGULAR MAIN WITH MANUAL VOLUME DAMPERS | 36/18 24/12 14Ø 12Ø |
| 24Ø 16Ø 12Ø | BRANCH TAKE-OFFS OF A ROUND MAIN WITH MANUAL VOLUME DAMPERS | 24Ø 16Ø 12Ø |
| 3'-0" MAX | SUPPLY AIR FLOW; FLEXIBLE DUCT WITH DIFFUSER | 3'-0" MAX |
| X-XX X (TYP OF X) | TYPE (SEE SCHEDULE); NECK SIZE; AIR FLOW RATE; TYPICAL OF X | DIFFUSER TAG |
| XX-X XX (TYP OF X) | TYPE (SEE SCHEDULE); GRILLE/REGISTER SIZE; AIR FLOW RATE; TYPICAL OF X | GRILLE & REGISTER TAG |
| X-XX-X X | TYPE (SEE SCHEDULE); LENGTH; PLENUM INLET SIZE; CFM | LINEAR DIFFUSER TAG |
| AHU-1 | EQUIPMENT TYPE; UNIT NUMBER | EQUIPMENT TAG |
| AF 2 | EQUIPMENT TYPE; UNIT NUMBER | CONTROL TAG |
| T | WALL MOUNTED THERMOSTAT/TEMPERATURE SENSOR | |
| S | WALL MOUNTED SWITCH | |
| CO | WALL MOUNTED CARBON MONOXIDE SENSOR | |
| $CO_2$ | WALL MOUNTED CARBON DIOXIDE SENSOR | |
| | RECTANGULAR DUCT DOWN | |
| | ROUND DUCT DOWN | |

# CONSTRUCTION DOCUMENTS

| Revisions: | Date |
|---|---|
| | |

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I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am duly licensed Professional Engineer under the laws of the State of Minnesota

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Project Title: CONSTRUCT PARKING RAMP DESIGN

Location: 1 VETERANS DRIVE MINNEAPOLIS, MN 55417

| Date | Checked | Modeled |
|---|---|---|
| 02-24-2012 | BGB | GSP |

Project Number: 618-820

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Drawing 079 of 116

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231

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