GENERAL TENDER NOTES

GENERAL MECHANICAL NOTES:

ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF THE GOVERNING AUTHORITIES AND LOCAL BY-LAWS.

CONFORM TO BASE BUILDING STANDARDS AND SPECIFICATIONS. CONFORM TO LANDLORD/TENANT LEASE AGREEMENT, IF APPLICABLE.

FROM BUILDING INSPECTION DEPARTMENT TO ENGINEER AND LANDLORD.

BALANCING AND TESTING OF AIR SYSTEM SHALL BE PERFORMED BY A TESTING AND BALANCING

SUBMIT AS-BUILT RECORD DRAWINGS AND FINAL UNCONDITIONAL CERTIFICATE OF APPROVAL

ALL EXISTING EQUIPMENT NOTED TO BE REMOVED AND NOT RE-USED IN THIS CONTRACT SHALL BE OFFERED TO THE LANDLORD BEFORE REMOVAL FROM SITE.

CHECK AND VERIFY LOCATIONS OF EXISTING MECHANICAL AND ELECTRICAL INTERFERENCES IN CEILING SPACE BELOW IN ALL AREAS REQUIRING CORE DRILLING THROUGH EXISTING FLOOR SLAB FOR PLUMBING SERVICES, ETC. ALLOW FOR ALL NECESSARY RADIOGRAPHY TO LOCATE HIDDEN ELECTRICAL SERVICES. STRUCTURAL REINFORCING. ETC. CO-ORDINATE THIS WORK WITH LANDLORD AND/OR TENANT CO-ORDINATOR FOR LOCATIONS, TIME, AND DURATION OF WORK, AND ADHERE TO THE LANDLORDS

REQUIREMENTS. SUBMIT CORE DRILLING PLAN TO THE BASE BUILDING STRUCTURAL ENGINEER FOR

APPROVAL PRIOR TO COMMENCEMENT OF WORK. PROVIDE SLEEVES FOR ALL NEW PIPING THROUGH EXISTING SLAB, WALLS, ETC. PACK AND SEAL WITH AN APPROVED FIRE RESISTANT INSULATION TO 1" FROM END SIDE OF OPENING ON BOTH SIDES OF FLOOR OR WALL. SEAL REMAINING PORTION WITH AN APPROVED FIRE STOP SUBSTANCE.

ALL SHUTDOWNS OF ANY PORTION OF EXISTING BASE BUILDING SYSTEM SHALL BE PERFORMED BY THE LANDLORD'S BUILDING OPERATIONS STAFF AND/OR CO-ORDINATED WITH THE LANDLORD FOR THE TIME AND DURATION OF INTERRUPTIONS AND ADHERE TO THE LANDLORDS INSTRUCTIONS IN THIS

AQ STANDARDS FOR SEALANTS. MRV 8 FILTER CHANGE PER MONTH.

INCLUDE FOR CUTTING, PATCHING AND FINISHING OF ALL DRYWALL CEILING WHERE REQUIRED AND INCLUDING FOR AFTER HOURS WORK IN FLOORS BELOW.

ALL PIPING FIXTURES. FITTINGS AND COILS TO BE RATED FOR THE MEASURED SYSTEM WORKING PRESSURES, REGARDLESS OF THE SPECIFICATIONS HEREIN. PLEASE INCLUDE FOR ASME 300 CLASS SELECTIONS IN TENDER SUBMISSION. LOWER RATED FITTINGS MAY BE PERMISSIBLE FOLLOWING FIELD TESTING AND VERIFICATION OF THE APPLICABLE SYSTEM.

ALL CHILLED/ CONDENSER WATER PIPING SYSTEMS TO BE SCHEDULE 40 BLACK STEEL. ALL DOMESTIC WATER PIPING TO BE TYPE L COPPER. PLASTIC PLUMBING CONNECTIONS ARE NOT PERMITTED. THESE REQUIREMENTS SUPERCEDE ANY CONTRADICTORY SPECIFICATIONS PROVIDED WITHIN HIS PACKAGE.

ALL LOW VOLTAGE WIRING AND CONNECTION FOR ANY AND ALL EQUIPMENT TO BE CARRIED UNDER MECHANICAL

SHOP DRAWING SUBMISSION

ALL SHOP DRAWING SUBMISSIONS ARE TO BE COMPLETE WITH HH ANGUS COVER SHEET, AND EMAILED TO SHOPDRAWINGS@HHANGUS.COM SHOP DRAWING COVER SHEET WILL BE PROVIDED WITH IFC DOCUMENTS, OTHERWISE PLEASE

TEAM COORDINATION

FOR ALL QUESTIONS RELATED TO THESE DRAWINGS OR THIS PROJECT, PLEASE CONTACT THE ASSIGNED MECHANICAL DESIGNER:

STEVE.SANTINHOS@HHANGUS.COM

416-443-8200

REQUEST THROUGH HHA ANGUS MECHANICAL DESIGNER.

EQUIPMENT LIST

ZURN ZN-211-BE-P FUNNEL FLOOR DRAIN, DURA-COATED CAST IRON BODY WITH BOTTOM OUTLET, ADJUSTABLE "TYPE BE" POLISHED NICKEL BRONZE ROUND STRAINER WITH 4" ROUND FUNNEL. 1/2" TRAP PRIMER CONNECTION.

TRAP PRIMER P.P.P. INC MODEL PR-500 AUTOMATIC TRAP SEAL PRIMER VALVE, CAST BRASS BODY, SERVING INDIVIDUAL OR REMOTE AREA DRAINS WITH 1/2" CONNECTIONS WITH STRAINER AND

INTEGRAL BACK FLOW PREVENTER & VACUUM BREAKER.

(CWF-1) QUANTUM UNDERCOUNTER MOUNTED 1000 DRINKING WATER SYSTEM. COLD WATER SUPPLY ONLY (0.5 GAL/MIN WITH A CAPACITY OF 750 GALLONS WITH COUNTERMOUNTED GOOSENECK FAUCET. REMOTE CHILLING PACKAGE TO BE HIGH EFFICENCY STAINLESS STEEL OASIS 5 GALLON WATER CHILLER MODEL: R5 USING REFRIGERANT R-134A. 5.0 GALLONS OF CHILLED WATER PER HOUR. 1/5 H.P. @ 3.6 AMPS, 115V/60HZ. DISTRIBUTED BY DANAMARK WATER TREATMENT PRODUCTS(905-792-2353). PROVIDE 1/2" VALVED CW. CONNECTION UNDER COUNTER FOR THIS SYSTEM. CO-ORDINATE LOCATION OF FAUCET WITH MILLWORK INSTALLER &

AC-1 & CU-1 SPLIT SYSTEM HEAT PUMP

AC-1 TO BE MITSUBISHI WALL MOUNTED DUCTLESS AC UNIT MODEL PKA-A18HA6 1.5 TON UNIT. 18,000 BTUH RATED COOLING CAPACITY. ECM BLOWER MOTOR. 208-230/60/1, 30 W, 1 MCA, 0.33 FLA. UNIT WEIGHT IS 29Ibs. INCLUDE FOR AND INSTALL SAUERMANN DELTA PACK

> CU-1 TO BE MITSUBISHI ROOFTOP CONDENSER MODEL PUY-A18NHA6 (-BS). 18,000 BTUH RATED COOLING CAPACITY. ECM FAN MOTOR. 208-230/60/1, 40 W, 13 MCA, 0.35 FLA. BREAKER SIZE 25 AMP MOCP 20 AMP. UNIT WEIGHT IS 89Ibs. INCLUDE FOR AND INSTALL ECOFOOT MINI FRAME AN-H305. INCLUDE FOR AND INSTALL CONCRETE BLOCK WALL MOUNT KIT.

OUTDOOR C/W FACTORY INSTALLED ULTRA LOW AMBIENT COOLING FOR - 40 DEG C.LOCALLY MODIFIED ULTRA LOW AMBIENT CONTROLS ARE NOT ACCEPTABLE.

SUPPLY, INSTALL, TEST AND COMMISSION ALL INTERCONNECTING REFRIGERATION PIPEWORK BETWEEN ALL PIPEWORK TO BE CARRIED OUT IN REFRIGERANT QUALITY ACR COPPER TUBING AND COMPLETE WITH THE APPROPRIATE HEADERS AND JOINTS. ALL PIPEWORK MUST BE SUITABLE FOR R410A.

AC-2 & CU-2 AC UNIT & CONDENSER UNIT (AC-2)

AC-2 TO BE MITSUBISHI CEILING MOUNTED HEAT PUMP MODEL PEAD-A18AA6. 18,000 BTUH RATED COOLING CAPACITY. 19,000 BTU/H RATED HEATING CAPACITY, ECM BLOWER MOTOR. 1200cfm @ 0.2" S.P. 208-230/60/1, 96 W, 2.0 MCA, 0.74 FLA. UNIT WEIGHT IS 62 lbs. INCLUDE FOR AND INSTALL SAUERMANN DELTA PACK CONDENSATE PUMP

CU-2 TO BE MITSUBISHI CONDENSER MODEL PUZ-A18NHA6 (-BS). 18,000 BTUH RATED COOLING CAPACITY. 19,000 BTU/H RATED HEATING CAPACITY. ECM FAN MOTOR. 208-230/60/1. 40 W. 13 MCA, 0.35 FLA. BREAKER SIZE 15 AMP. INCLUDE FOR CONCRETE BLOCK WALL MOUNT KIT. UNIT

OUTDOOR C/W FACTORY INSTALLED ULTRA LOW AMBIENT COOLING FOR - 40 DEG C.LOCALLY MODIFIED ULTRA LOW AMBIENT CONTROLS ARE NOT ACCEPTABLE.

SUPPLY, INSTALL, TEST AND COMMISSION ALL INTERCONNECTING REFRIGERATION PIPEWORK BETWEEN THE OUTDOOR AND INDOOR UNITS.

ALL PIPEWORK TO BE CARRIED OUT IN REFRIGERANT QUALITY ACR COPPER TUBING AND COMPLETE WITH THE APPROPRIATE HEADERS AND JOINTS. ALL PIPEWORK MUST BE SUITABLE FOR R410A.

EF-1 EXHAUST FAN

GREENHECK, MODEL #CSP-A200. 120/1/60. SONES 0.8, 900 RPM, 225 CFM @ 0.125 S.P. SPEED CONTROL, HANGING VIBRATION ISOLATOR. C/W BACK DRAFT PROVIDE ELECTRONIC TIME SWITCH. WALL MOUNTED. "INTERMATIC" MODEL #ET1105C OR EQUAL. 120/1/60. COORDINATE WITH INTERIOR DESIGNER FOR INSTALLATION LOCATION. FAN DISCONNECT AND FAN SPEED CONTROL SHALL BE INSTALLED BY DIV.26. MOUNT DISCONNECT ON SIDE OF FAN AND SPEED CONTROL AT SWITCH HEIGHT AS SHOWN ON DWG. BALANCE EXHAUST FANS TO AIR QUANTITY INDICATED ON PLAN VIA. SPEED CONTROLLER MOUNTED ON SIDE OF FAN. SPEED CONTROLLER TO BE INSTALLED BY DIV-26, INCLUDE SEPARATE FAN DISCONNECT SWITCH, PROVIDE REVERSE ACTING THERMOSTAT SET TO 75F.

(EF-2) EXHAUST FAN

GREENHECK, MODEL #CSP-A390. 120/1/60. SONES 5.5, 1350 RPM, 324 CFM @ 0.625 S.P. SPEED CONTROL, HANGING VIBRATION ISOLATOR. C/W BACK DRAFT PROVIDE ELECTRONIC TIME SWITCH. WALL MOUNTED. "INTERMATIC" MODEL #ET1105C OR EQUAL. 120/1/60. COORDINATE WITH INTERIOR DESIGNER FOR INSTALLATION LOCATION. FAN DISCONNECT AND FAN SPEED CONTROL SHALL BE INSTALLED BY DIV.26. MOUNT DISCONNECT ON SIDE OF FAN AND SPEED CONTROL AT SWITCH HEIGHT AS SHOWN ON DWG. RALANCE EXHAUST FANS TO AIR QUANTITY INDICATED ON PLAN VIA. SPEED CONTROLLER MOUNTED ON SIDE OF FAN. SPEED CONTROLLER TO BE INSTALLED BY DIV-26, INCLUDE SEPARATE FAN DISCONNECT SWITCH. PROVIDE REVERSE ACTING THERMOSTAT SET TO 75F.

EF-3 - ROOF MOUNTED EXHAUST FAN

SHALL BE EQUAL TO GREENHECK G-DIRECT DRIVE CENTRIFUGAL ROOF EXHAUSTER MODEL G-085-D c/w 18" ROOF CURB, GALVANIZED BIRDSCREEN. 308 CFM, 1550 RPM, 0.5 W.G. TOTAL STATIC PRESSURE, 4413 TS, 7.6 SONES, 0.062 BHP, BELT DRIVE, 1/20 HP, 115/1/60. WEIGHT 38 lbs. BALANCE EXHAUST FANS TO AIR QUANTITY INDICATED ON PLAN VIA. SPEED CONTROLLER MOUNTED ON SIDE OF FAN. SPEED CONTROLLER TO BE INSTALLED BY DIV-26. INCLUDE SEPARATE FAN DISCONNECT SWITCH. INSTALL UNIT IN STRICT ACCORDANCE TO MANUFACTURER'S INSTRUCTIONS. INTERLOCK EXHAUST FAN WITH OCCUPANCY SENSORS, TO BE COMPLETED BY DIV-26. PROVIDE 7 DAY PROGRAMMABLE TIMER SET TO RUN ONLY DURING BUSINESS

HWT-1 HOT WATER TANK

EQUAL TO AO SMITH, DURA-POWER MODEL DEL-20, 20 GALLONS, WITH ONE 208/1/60 3000 W ELEMENT, COMPLETE WITH CONTACTOR, THERMOSTAT, PRESSURE RELIEF VALVE, DRIP PAN, AND DRAIN. PIPE PRESSURE RELIEF TO FUNNEL FLOOR DRAIN. PROVIDE ACCESSIBLE ISOLATION VALVES ON BOTH SUPPLY AND RETURN WITHIN 12" OF HOT WATER TANK. C/W LEAK DETECTION SYSTEM (WDS)..

EQUIPMENT LIST

S-1 SINGLE BOWL SINK - UNDER COUNTER FRANKE KITCHEN SYSTEMS PS2X110-21 SINK - SINGLE COMPARTMENT SINK, KITCHEN SINK, WITH OVERALL DIMENSION 597 MM (23-1/2") LONG, 495 MM (19-1/2") WIDE, 254 MM (10") HIGH, CONSTRUCTED FROM 16 GAUGE STAINLESS STEEL, BOWL DIMENSIONS ARE 533 MM (21" LONG, LEFT BOWL IS 432 MM (17") WIDE AND RIGHT BOWL IS 432 MM (17") WIDE, 254 MM (10") DEEP, DIAMOND FINISH, ROUND DRAIN COVER, 686 MM (27") MINIMUM CABINET SIZE. GROHE 3134910E FAUCET - CONCETTO, COUNTER MOUNTED, MANUAL, SINGLE HANDLE, SINK FAUCET, STARLIGHT CHROME FINISH, SINGLE HOLE CENTERSET, BRASS CONSTRUCTION, STAINLESS STEEL FLEXIBLE LINES, GROHE SILKMOVE® CERAMIC CARTRIDGE (90° TURN), 5.7 LPM (1.5 GPM) MAXIMUM FLOWRATE, GROHE ECOJOY MOUSSEUR, HIGH SPOUT, PULL DOWN,

218 MM (8-9/16") SPOUT REACH. 219 MM (8-5/8") HIGH, PROTECTED AGAINST BACKFLOW, LEVER HANDLE. INTEGRATED NON-RETURN VALVE. LAWLER 570-86820 MIXING VALVE - POINT OF USE AND MASTER CONTROLLED FIXTURES, THERMOSTATIC MASTER WATER MIXING CONTROL VALVE, LEAD FREE BRASS BODY CONSTRUCTION, NICKEL PLATED FINISH, 1.9 - 30 LPM (0.5 - 8 GPM) RANGE FOR FLOWRATE TO ADJUST THE MIXED OUTLET TEMPERATURE OF THE VALVE, REMOVE THE CAP TO GAIN ACCESS TO THE ADJUSTING SPINDLE. THE SPINDLE SHOULD BE ROTATED-CLOCKWISE TO REDUCE THE TEMPERATURE, COUNTER-CLOCKWISE TO INCREASE THE TEMPERATURE UNTIL THE DESIRED SET POINT IS REACHED, 11 LPM (3 GPM) TEMPERED FLOWRATE @ 5 PSI PRESSURE DROP, THE TEMPERATURE IS ADJUSTED WITH THE HELP OF SPINDLE, 4-7/8" (124 MM) HEIGHT, ASSE 1070 APPROVED CERTIFIED TO CSA B125.3 FOR ASSE 1070 APPLICATIONS, 3/8" MNPT (9.5 MM) INLET, 95-115 F OUTLET WATER TEMPERATURE RANGE, 3/8" MNPT (9.5 MM) OUTLET, INTERNAL CHECKS, OFFERS CHOICE OF TEMPERATURE SETTINGS FROM 95° THROUGH 115 F., 125 PSI MAX HYDROSTATIC PRESSURE, ±20% PRESSURE VARIATION, 40-80 F, 10 F, 180 F MAX, ±5 F, PROTECTS AGAINST SCALDING AND CHILLING, 7 GPM FLOWRATE @ 45 PSI MCGUIRE LFH165 SUPPLY - LEAD FREE, SHALL BE CONSTRUCTED FROM CAST BRASS VALVE, WITH CHROME-PLATED FINISH, LAVATORY SUPPLY, 10 MM (3/8") I.P.S. INLET, 10 MM (3/8") MCGUIRE 8912CB P-TRAP - HEAVY CAST BRASS, ADJUSTABLE P-TRAP, 292 MM (11-1/2")

LENGTH, WITH CLEANOUT PLUG, STEEL BOX FLANGE, NEOPRENE GASKET, SEAMLESS TUBULAR BRASS BEND, SLIPNUTS

SERVICE SINK - WALL HUNG

FRANKE COMMERCIAL WSS6713-2 SINK - SINGLE COMPARTMENT SINK, 203 MM (8") CENTERSET, SERVICE SINK, WITH OVERALL DIMENSION 508 MM (20") LONG, 483 MM (19") WIDE, 635 MM (25") HIGH, CONSTRUCTED FROM 14 GAUGE TYPE 304 STAINLESS STEEL, BOWL DIMENSIONS ARE 432 MM (17") LONG, 406 MM (16") WIDE, 330 MM (13") DEEP, POLISHED TO #4 SATIN FINISH, WITH 305 MM (12") HIGH BACKSPLASH, RADIUS COVED BOWL CORNERS, LESS OVERFLOW, CENTER WASTE LOCATION, 89 MM (3-1/2") CRUMB CUP STRAINER, CODES AND COMPLIANCES: ASME A112.19.3 COMPLIANT, CSA B45.4 COMPLIANT. CHICAGO FAUCETS 897-RCF FAUCET - WALL-HUNG, MANUAL, TWO HANDLES, MOP SINK FAUCET, ROUGH CHROME PLATED FINISH, 194 - 213 MM (7-5/8" TO 8-3/8") ADJUSTABLE CENTERSET, ROUND WALL ESCUTCHEONS, BRASS CONSTRUCTION, ADJUSTABLE SUPPLY ARMS, 1/4 TURN CERAMIC CARTRIDGE, NO FLOW RESTRICTOR, THREADED HOSE END, SPOUT WITH PAIL HOOK, 146 MM (5-3/4") SPOUT REACH, 273 MM (10-3/4") HIGH, TOP BRACE, 60 MM (2-3/8") LEVER HANDLE WITH INDEXED BUTTONS, ATMOSPHERIC VACUUM BREAKER IS NOT

(WC-1) WALL HUNG TOILET - VITREOUS CHINA - TANK TYPE

INTENDED FOR CONTINUOUS PRESSURE APPLICATIONS.

AMERICAN STANDARD VORMAX GLENWALL ELONGATED #2882107 LOW CONSUMPTION TOILET, 3447.101, VITREOUS CHINA, ELONGATED BOWL, WALL HUNG, SIPHON JET FLUSH ACTION, 4.8 L (1.28 US GAL) PER FLUSH, CLEANCURVE RIM ELIMINATES DIRT AND BUILDUP ON RIM & EVERCLEAN SURFACE INHIBITS GROWTH OF STAIN, ODOUR AND BACTERIA, TWO (2) PIECE, VORMAX FLUSHING TECHNOLOGY, SIPHON JET FLUSH ACTION, CLEANCURVE RIM ELIMINATES DIRT AND BUILDUP ON RIM & EVERCLEAN SURFACE INHIBITS GROWTH OF STAIN, ODOUR AND BACTERIA. LEFT HAND TRIPLEVER, ELONGATED BOWL, 52 MM (2-1/16") FULLY GLAZED INTERNAL TRAPWAY, TOILET SEAT NOT INCLUDED. CENTOCO #820STS.001 TOILET SEAT, EXTRA HEAVY DUTY. FOR ELONGATED BOWL. OPEN FRONT. SOLID PLASTIC WITH COVER STAINLESS STEEL CHECK HINGES METAL FLAT WASHERS. STAINLESS STEEL POSTS AND NUTS. MCGUIRE #LFH172BV TOILET SUPPLY, CHROME PLATED FINISH POLISHED BRASS, COMMERCIAL DUTY 1/4 TURN BALL VALVE ANGLE STOPS, 13 MM (1/2") I.D. INLET X 127 MM (5") LONG RIGID HORIZONTAL INTEGRAL COPPER SWEAT TUBE NIPPLÉS, COMBINATION V.P. LOOSE KEY HANDLES, ESCUTCHEON AND FLEXIBLE COPPER RISERS. WATTS #ISCA-101-M11 SINGLE HORIZONTAL ADJUSTABLE TOILET CARRIER, MOUNTED ON CONCRETE FLOOR, ALL EPOXY COATED CAST IRON FITTING, ADJUSTABLE ABS SLIDE NIPPLE WITH INTEGRAL TEST CAP AND NEOPRENE BOWL GASKET, WASTED PLATED HARDWARE, CHROME CAP NUTS, TILING FRAME, 102 MM (4") NO HUB WASTE, 51 MM (2") NO HUB VENT, 158.8 KG (350 LBS) STATIC LOAD. 305 MM (12") FINISHED METAL STUD WALL TO BACK OF PIPE SPACE. CHAMPION MI-TR SERIES #MI-HUB TR-440 DRAIN COUPLING, COUPLING, NO-HUB, TYPE 300 AISI STAINLESS STEEL BAND, TYPE 300 AISI STAINLESS STEEL EYELETS, ELASTOMERIC COMPOUND GASKET MEETING THE REQUIREMENTS OF ASTM C-564, TYPE 300 AISI STAINLESS STEEL SHIELD, TESTED TO MAINTAIN 4.3 PSI OF WATER PRESSURE AT 60 INCH LB MIN/MAX TORQUE BOLT TIGHTNESS, TESTED AND CERTIFIED TO ASTM STANDARD 1460-2012 AND CSA

WALL HUNG BASIN - HARDWIRED FAUCET AMERICAN STANDARD 0955001EC.020 0059020EC.020 BASIN - MURRO, WALL-HUNG LAVATORY, VITREOUS CHINA, EVERCLEAN® ANTIMICROBIAL SURFACE, WHITE FINISH, SINGLE HOLE CENTERSET, REAR OVERFLOW, FAUCET LEDGE WITH RECESSED SELF-DRAINING DECK, FOR CONCEALED ARM OR WALL SUPPORT, VITREOUS CHINA SHROUD/KNEE CONTACT GUARD WITH EVERCLEAN (0059020EC), SOAP DISPENSÉR, WHEN INSTALLED WITH A BELOW DECK ELECTRONICS FAUCET WHICH HAS THE CONTROL BOX, THE ACCESSORIES WILL NOT FIT UNDER THE SHROUD AND WILL NEED TO BE INSTALLED OUTSIDE THE SHROUD, OVERALL DIMENSIONS: 545 MM (21-7/16") LONG, 540 MM (21-1/4") WIDE, 152 MM (6") HIGH, BOWL DIMENSIONS: 343 MM (13-1/2") LONG, 394MM (15-1/2") WIDE, 127 MM (5") DEEP

MARK OF CONFORMITY. NON CONSTANT TEMPERATURE RATING IS 140°F

STANDAD B602-2010 AND LISTED WITH IAPMO. ALL MODELS ARE LISTED TO THE NATIONAL

PLUMBING CODE OF CANADA AND RELEVANT CANADIAN STANDARD (S) AND BEAR THE CUPC

SLOAN EFX-200-CP-0.5GPM-MLM-IR-HLP-FCT FAUCET - BASYS®. COUNTER MOUNTED. AUTOMATIC NO-TOUCH, HARDWIRED LESS PLUG ADAPTER, LAVATORY FAUCET, POLISHED CHROME FINISH, SINGLE HOLE CENTERSET, METAL, FLEXIBLE SUPPLY HOSES WITH 10 MM (3/8") COMPRESSION CONNECTIONS, 1.9 LPM (0.5 GPM) MAXIMUM FLOWRATE, MULTI-LAMINAR SPRAY OUTLET, FIXED SPOUT, 153 MM (6") SPOUT REACH, 254 MM (10") HIGH, DOUBLE INFRARED SENSORS WITH AUTOMATIC SETTING FEATURE, SOLENOID HOUSED IN REMOVABLE CARRIER THAT INCLUDES SUPPLY STRAINER ABOVE DECK INDIVIDUAL DIAGNOSTIC INDICATORS FOR BATTERY LIFE, SOLENOID CONDITION, AND POWER-UP MODE, MIXING VALVE ORDERED SEPARATELY. SLOAN TRANSFORMER RECOMMENDED. VANDAL-RESISTANT SPRAY INSERT, KEY HOUSED INSIDE FAUCET BODY, INTEGRAL ABOVE DECK WATER SUPPLY SHUT OFF, LINE PURGE MODE. SLOAN SL-EAF-70-A FAUCET AND FLUSH VALVE POWER KIT - FOR FAUCET

LAWLER 570-86820 MIXING VALVE - POINT OF USE AND MASTER CONTROLLED FIXTURES. THERMOSTATIC MASTER WATER MIXING CONTROL VALVE, LEAD FREE BRASS BODY CONSTRUCTION, NICKEL PLATED FINISH, 1.9 - 30 LPM (0.5 - 8 GPM) RANGE FOR FLOWRATE, TO ADJUST THE MIXED OUTLET TEMPERATURE OF THE VALVE, REMOVE THE CAP TO GAIN ACCESS TO THE ADJUSTING SPINDLE. THE SPINDLE SHOULD BE ROTATED-CLOCKWISE TO REDUCE THE TEMPERATURE, COUNTER-CLOCKWISE TO INCREASE THE TEMPERATURE UNTIL THE DESIRED SET POINT IS REACHED, 11 LPM (3 GPM) TEMPERED FLOWRATE @ 5 PSI PRESSURE DROP, THE TEMPERATURE IS ADJUSTED WITH THE HELP OF SPINDLE, 4-7/8" (124 MM) HEIGHT, ASSE 1070 APPROVED CERTIFIED TO CSA B125.3 FOR ASSE 1070 APPLICATIONS, 3/8" MNPT (9.5 MM) INLET, 95-115 'F OUTLET WATER TEMPERATURE RANGE, 3/8" MNPT (9.5 MM) OUTLET, INTERNAL CHECKS, OFFERS CHOICE OF TEMPERATURE SETTINGS FROM 95° THROUGH 115 F., 125 PSI MAX HYDROSTATIC PRESSURE, ±20% PRESSURE VARIATION, 40-80 F, 10 F, 180 F MAX, ±5 F, PROTECTS AGAINST SCALDING AND CHILLING, 7 GPM FLOWRATE @ 45 PSI MCGUIRE 155A FIXTURE DRAIN - STRAIGHT DRAIN, CAST BRASS, CHROME-PLATED FINISH. OPEN GRID PO PLUG. 7/32" (5.5 MM) Ø HOLES SIZE, 17 GAUGE 32 MM (1-1/4") Ø TAILPIECE DIAMETER, 17 GAUGE 152 MM (6") LONG, BRASS LOCKNUT, HEAVY RUBBER BASIN WASHER FIBER FRICTION WASHER, ASME A112.18.2 CSA B125.2, CSA COMPLIANT MCGUIRE LFBV170 SUPPLY - LEAD FREE, SHALL BE CONSTRUCTED FROM POLISHED BRASS, WITH

MCGUIRE 8872CB P-TRAP - HEAVY CAST BRASS, 292 MM (11-1/2") DISTANCE, WITH CLEANOUT PLUG, STEEL BOX FLANGE, NEOPRENE GASKET, SLIPNUTS, 17 GAUGE SEAMLESS TUBULAR WALL BEND, ASME A112.18.2 CSA B125.2, CSA COMPLIANT WATTS CA-411-CA-481 CARRIER - LAVATORY CARRIER FLOOR MOUNTED CONCELAED ARM LAVATORY CARRIER, FOR CONCEALED ARM CARRIER, EPOXY COATED CAST IRON CONCEALED ARMS, INTEGRAL WELDED FEET, FOOT SUPPORTS SHOULD BE SECURELY ANCHORED TO FLOOR WITH 1/2" BOLTS AND ANCHORS BY OTHERS, HEAVY GAUGE STEEL UPRIGHTS, LEVELING SCREWS AND BASIN LOCKING DEVICE, UPPER TIE ROD, AND PLATED HARDWARE., WALL MOUNTED STEEL SUPPORT PLATE WITH PLATED HARDWARE.

CHROME-PLATED FINISH, LAVATORY SUPPLY, 12 MM (1/2") I.P.S. INLET, 10 MM (3/8") O.D

FLOOR DRAIN/SHOWER DRAIN ZURN ZXN-415-A-P FLOOR DRAIN, DURA-COATED CASE IRON BODY WITH BOTTOM OUTLET, COMBINATION INVERTIBLE MEMBRANE CLAMP AND ADJUSTABLE COLLAR WITH SEEPAGE HOLES, AND "TYPE A" HEAVY DUTY POLISHED NICKEL BRONZE ROUND STRAINER. 1/2" TRAP PRIMER

MECHANICAL LEGEND

NEW ACOUSTICALLY LINED DUCTWORK

NEW THERMALLY INSULATED DUCTWORK

NEW ROUND RIGID DUCTWORK

NEW FLEXIBLE DUCTWORK

NEW SQUARE PLAQUE SUPPLY AIR DIFFUSER E.H.PRICE "SPD" OR EQUAL. 24"x24" NEET SIZE TO SUIT AIRFLOW

E.H.PRICE "RPD" OR EQUAL. 24"x24"

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NEW EGG CRATE RETURN AIR GRILLE E.H.PRICE 80 OR EQUAL TO MATCH EXISTING 24"x24" or 24"x12"

NEW EGG CRATE RETURN AIR GRILLE

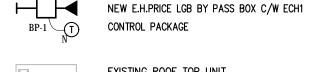
TO MATCH EXISTING 12"x6"

NEW ROUND PLAQUE SUPPLY AIR DIFFUSER

E.H.PRICE 80 WITH F BORDER OR EQUAL

E.H.PRICE 80 WITH F BORDER OR EQUAL TO MATCH EXISTING 6"x6"

NEW EGG CRATE RETURN AIR GRILLE



EXISTING ROOF TOP UNIT

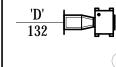


NEW TRANSFER AIR DUCT

CONTROL PACKAGE



NEW ROOF TOP MUSHROOM EXHAUST FAN



NEW EXHAUST FAN

EXISTING THERMOSTAT TO REMAIN

RELOCATED THERMOSTAT

NEW THERMOSTAT

CUT BACK AND REMOVE EXISTING SPRINKLER HEAD AND ASSOCIATED BRANCH TO SPRINKLER

NEW UPRIGHT SPRINKLER HEAD, TO MATCH BASE BUILDING STANDARD. NEW CONCEALED SPRINKLER HEAD, TO MATCH BASE BUILDING STANDARD.

CUT BACK AND REMOVE EXISTING SPRINKLER

QR SIDE WALL SPRINKLER HEAD

PLUMBING VENT DOMESTIC COLD WATER DOMESTIC HOT WATER

SAN SANITARY DRAIN WITH CLEAN OUT

FLOOR DRAIN TYPE 1 ⊙ F.F.D.#1 FUNNEL FLOOR DRAIN

TYPE 'A' SQUARE PLAQUE SUPPLY AIR DIFFUSER

EQUAL TO E.H. PRICE SQUARE PLAQUE DIFFUSER MODEL SPD/31, 24X24, FACE SIZE. 80 INLET DIAMETER UNLESS OTHERWISE NOTED. B-12 FÍNISH.

GRILLE AND DIFFUSER SCHEDULE

TYPE 'B' ROUND PLAQUE SUPPLY AIR DIFFUSER

EQUAL TO E.H. PRICE ROUND PLAQUE DIFFUSER MODEL RPD 14" ROUND, 60 INLET DIAMETER UNLESS OTHERWISE NOTED. B-12 FINISH.

TYPE 'C' RETURN AIR GRILLE

E.H. PRICE TYPE 80 OR EQUIVALENT, 24"x24" or 12"x24" EGG CRATE RETURN AIR GRILLE. B-12 FINISH. 80 CORE FOR T-BAR CEILING APPLICATIONS. 80D WITH BORDER AND DAMPER ON DRYWALL CEILING APPLICATIONS.

TYPE 'D' EXHAUST AIR GRILLE

E.H. PRICE EGG CRATE RETURN AIR GRILLE TYPE 80/LI/B12 OR EQUIVALENT, 12"x6", B-12 FINISH. 80D WITH BORDER AND DAMPER.

PE 'E' EXHAUST AIR GRILLE

E.H. PRICE EGG CRATE RETURN AIR GRILLE TYPE 80/LI/B12 OR EQUIVALENT, 6"x6", B-12 FINISH, 80D WITH BORDER AND DAMPER.

MECHANICAL WORK SHALL BE DONE AFTER HOURS, ON WEEKENDS AND/OR AT OTHER TIMES THAT IS SUITABLE TO THE TENANT AND LANDLORD. INCLUDE IN PRICE SUBMITTAL ALL ASSOCIATED COSTS AS PREMIUM TIME REQUIRED TO COMPLETE THE WORK AS SHOWN AND AS SPECIFIED. THIS MECHANICAL CONTRACTOR SHALL CO-ORDINATE WITH THE GENERAL CONTRACTOR IN THE SCHEDULING OF MECHANICAL WORK TO COMPLY WITH THE CONSTRUCTION DRAWINGS/TENDER DOCUMENTS.

DRAWING LIST M-1.0MECHANICAL LEGEND, NOTES AND EQUIPMENT LIST M-1.1MECHANICAL SPECIFICATIONS - 1 OF 5 MECHANICAL SPECIFICATIONS - 2 OF 5 M-1.2MECHANICAL SPECIFICATIONS - 3 OF 5 M-1.3MECHANICAL SPECIFICATIONS - 4 OF 5 M-1.4MECHANICAL SPECIFICATIONS - 5 OF 5 M - 1.5MECHANICAL DETAILS M-1.6HVAC NEW M - 2.0PLUMBING NEW M - 3.0FIRE PROTECTION NEW M - 4.0HVAC DEMOLITION M-5.0PLUMBING DEMOLITION M - 6.0FIRE PROTECTION DEMOLITION M - 7.0

SPECIAL NOTES

CONTRACTOR TO BALANCE ALL HVAC AIR SYSTEMS PRIOR TO INSTALLATION OF DRYWALL CEILINGS, WHERE APPLICABLE.

CONTRACTOR TO PERFORM COMFORT AIR BALANCING 30 DAYS AFTER TENANT OCCUPANCY. ALLOW FOR THREE (3) FULL DAYS OF COMFORT BALANCING.

ENSURE THAT ALL MECHANICAL WORK IS DONE IN ACCORDANCE WITH THE RELEVANT SECTIONS OF THE BASE BUILDING SPECIFICATIONS, DRAWINGS AND STANDARDS, AND TO THE SATISFACTION OF THE LANDLORD. THE BASE BUILDING DOCUMENTS CAN BE MADE AVAILABLE BY THE LANDLORD FOR REVIEW IF SO REQUESTED

THE LANDLORD SHALL BE GIVEN AT LEAST ONE (1) WEEK'S NOTICE PRIOR TO X-RAYING, IN ORDER TO INFORM THE TENANTS. X-RAY RESULTS ARE TO BE SUBMITTED TO THE BASE BUILDING STRUCTURAL ENGINEER FOR APPROVAL PRIOR TO ANY DRILLING. ALL DRILLING LOCATIONS TO HAVE THE LANDLORD'S WRITTEN APPROVAL. ALL COSTS ARE BY THIS CONTRACTOR.

WHERE SHUT DOWN OF ANY SYSTEMS IS NECESSARY, NOTICE SHALL BE SUBMITTED TO THE LANDLORD IN WRITING FIVE (5) WEEKS PRIOR TO ANY WORK BEING CARRIED OUT. IN ORDER TO INFORM OTHER TENANTS. THE LANDLORD MUST GIVE WRITTEN APPROVAL PRIOR TO ANY WORK COMMENCING.

DUCTWORK OR EQUIPMENT.

INSERTS AND HANGERS ARE TO BE ANCHORED ONTO CEILING SLAB, INDEPENDENT OF EXISTING

AIR BALANCING CONTRACTOR SHALL BE AABC OR NEBB CERTIFIED AND APPROVED BY THE

A COPY OF ALL PERMITS AND INSPECTIONS SHALL BE GIVEN TO THE LANDLORD FOR THEIR

SUPPORTS. DO NOT USE EXISTING CEILING HANGERS OR SUPPORTS TO HANG PIPING,

FILES AND RECORDS. PROVIDE THE FOLLOWING DOCUMENTS TO THE LANDLORD AFTER COMPLETION OF THE PROJECT: TWO (2) SETS OF FULL SIZE AS-BUILL DRAWINGS WITH TWO (2) DISKS CONTAINING ALL PLANS IN AUTOCAD FORMAT AND SPECIFICATIONS IN PDF FORMAT, SIGNED OFF BY THE TENANT'S CONSULTANT

 WRITTEN WARRANTIES. - TWO (2) SETS OF 'OPERATION AND MAINTENANCE MANUALS', CONTAINING APPROVED SHOP DRAWINGS OF ALL NEW EQUIPMENT.

CONTROLS NOTES

ALL WORK RELATED TO THE CONTROL SYSTEM IS TO BE CARRIED OUT BY A LANDLORD APPROVED CONTROLS CONTRACTOR, INCLUDING VERIFICATION AND COMMISSIONING.

THE CONTROLS CONTRACTOR IS TO INCLUDE ALL SCOPE REQUIRED TO COMPLY WITH THE STANDARD BASE BUILDING CONTROLS STRATEGY INCLUDING BUT NOT LIMITED TO: BAS CONNECTIONS FOR ALL TERMINAL UNITS, SUPPLEMENTARY COOLING UNITS, ALARMS AND PERIMETER UNITS. INCLUDE INTERLOCKING OF TERMINAL UNITS TO PERIMETER UNITS. INCLUDE ALL REQUIRED BAS GRAPHICS AND INTERFACES.

AIR BALANCING NOTES

BALANCE VENTILATION SYSTEM IN ACCORDANCE WITH SMACNA OR NEBB STANDARDS. TOTAL FAN CFM (WHERE APPLICABLE) AND MAIN BRANCH CFM'S TO BE ESTABLISHED BY PITOT TRAVERSES.

ADJUST PATTERN AND THROW OF AIR BOOTS OR DIFFUSERS. BALANCING WORK TO BE CARRIED OUT BY A LANDLORD APPROVED CONTRACTOR.

WHEN BALANCING AIR SYSTEMS. FILTER RESISTANCE IN AIR HANDLING UNITS TO BE SIMULATED AT 0.50 IN WG. REPLACE FILTERS AT NO ADDITIONAL COST TO OWNER. SUBMIT CONSOLIDATED BALANCING REPORT, IN TRIPLICATE, TO CONSULTANT FOLLOWING INFORMATION:

- A. CFM AT EACH LIGHT TROFFER AND DIFFUSER OUTLET WHEN THERMOSTAT IS
- CALLING FOR FULL COOLING. B. TEMPERATURE AT FARTHEST LIGHT TROFFER/ DIFFUSER.
- CFM, STATIC PRESSURE, AND TEMPERATURE AT FC-UNIT OUTLET WHEN THERMOSTAT IS CALLING FOR FULL COOLING, WHERE APPLICABLE.
- D. CFM AND STATIC PRESSURE AT EXHAUST GRILLE AND/OR AIR BOOT INLET.

SUPPLY AND RETURN AIR CFM, STATIC PRESSURE, AND TEMPERATURE AT MAIN

DUCT(S) LEAVING AND RETURNING TO MECHANICAL SHAFT, WHEN THERMOSTAT

- IS CALLING FOR FULL COOLING. RESULTS OF MAIN AND BRANCH PITOT TRAVERSES.
- NOZZLE STATIC PRESSURE OF ONE INDUCTION UNIT WITHIN EACH BAY, WHERE
- APPLICABLE. CHILLED WATER FLOW TO SUPPLEMENTAL COOLING FAN COILS OR A.C. UNITS, WHERE APPLICABLE.
- AFTER REPORT SUBMISSION PROVIDE SPOT CHECK MEASUREMENTS AS REQUESTED BY CONSULTANT.

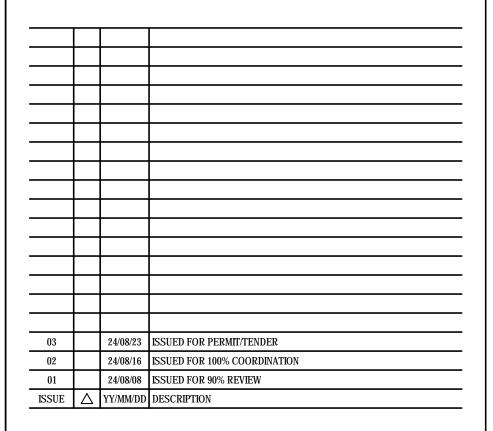
City of Pickering 2460 Brock Road, Pickering, ON, Canada L1X 0J1

Building A-200A, 2nd Floor



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Client Name		
	City of Pickering	
Project Name		
	CoP Interior Fit-Out	
Project Address		
	2460 Brock Road	
	Pickering, ON L1X 0J1	
Project number		
	2240483	

MECHANICAL LEGEND NOTES AND EQUIPMENT LIST

Drawing Scale Drawing Number



NTS

MECHANICAL GENERAL REQUIREMENTS

GENERAL REQUIREMENTS

- 1.1. EXAMINATION 1.1.1. EXAMINE ANY EXISTING BUILDINGS, LOCAL CONDITIONS, BUILDING SITE SPECIFICATIONS, AND DRAWINGS AND REPORT ANY CONDITION, DEFECT OR
- INTERFERENCE THAT WOULD PREVENT EXECUTION OF THE WORK. 1.1.2. NO ALLOWANCE WILL BE MADE FOR ANY EXPENSE INCURRED THROUGH FAILURE TO MAKE THESE EXAMINATIONS OF THE SITE AND THE DOCUMENTS PRIOR TO TENDER OR ON ACCOUNT OF ANY CONDITIONS ON SITE OR ANY GROWTH OR ITEM EXISTING THERE WHICH WAS VISIBLE OR KNOWN TO EXIST AT TIME OF
- 1.1.3. EXAMINE WORK OF OTHER DIVISIONS BEFORE COMMENCING THIS WORK, AND REPORT ANY DEFECT OR INTERFERENCE.
- 1.2. STANDARD OF MATERIAL AND EQUIPMENT 1.2.1. MATERIALS AND EQUIPMENT
 - 1.2.1.A. OF CANADIAN MANUFACTURE WHERE OBTAINABLE,
 - STANDARD PRODUCTS OF APPROVED MANUFACTURE LABELLED OR LISTED AS REQUIRED BY CODE AND/OR INSPECTION
 - AUTHORITIES. 1.2.1.D. IN COMPLIANCE WITH STANDARDS AND REGULATIONS WITH RESPECT TO;
 - 1.2.1.D.A. DESIGN, 1.2.1.D.B. PERFORMANCE CHARACTERISTICS, AND
 - 1.2.1.D.C. METHODS OF CONSTRUCTION AND INSTALLATION.
 - 1.2.1.E. IDENTICAL UNITS OF EQUIPMENT TO BE OF SAME MANUFACTURE IDENTICAL COMPONENT PARTS OF SAME MANUFACTURE IN SIMILAR UNITS OF EQUIPMENT, BUT VARIOUS COMPONENT PARTS OF EACH UNIT NEED NOT BE FROM ONE MANUFACTURER.
- 1.2.2. MATERIALS AND EQUIPMENT ARE DESCRIBED TO ESTABLISH STANDARDS OF CONSTRUCTION AND WORKMANSHIP.
- 1.2.2.A. WHERE MANUFACTURERS OR MANUFACTURERS PRODUCTS ARE IDENTIFIED IN LISTS WITH THE PHRASE "STANDARD OF ACCEPTANCE". THESE ARE MANUFACTURERS AND/OR PRODUCTS WHICH MEET REQUIRED STANDARDS WITH REGARD TO PERFORMANCE, QUALITY OF MATERIAL AND
- WORKMANSHIP. MANUFACTURERS AND OR PRODUCTS USED ARE TO BE CHOSEN FROM THESE LISTS.
- SELECT MATERIALS AND EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND INSTALL IN ACCORDANCE WITH
- MANUFACTURER'S INSTRUCTIONS. MATERIALS AND EQUIPMENT NOT SATISFYING THESE SELECTION CRITERIA
- WILL BE CONDEMNED. REMOVE CONDEMNED MATERIALS FROM JOB SITE AND PROVIDE
- PROPERLY SELECTED AND APPROVED MATERIALS. 2. SUBMITTALS
- 2.1. SHOP DRAWINGS AND PRODUCT DATA SHEETS 2.1.1. SUBMIT SHOP DRAWINGS IN THE SAME UNIT OF MEASURE AS ARE USED ON THE DRAWINGS. BOTH METRIC AND IMPERIAL MEASURES MAY BE INCLUDED.
- 2.1.2. SUBMIT SHOP DRAWINGS BY EMAIL TO: SHOPDRAWINGS@HHANGUS.COM 2.2. INCLUDE A H.H. ANGUS SHOP DRAWING COVER SHEET PREPARED FOR EACH ITEM ON THIS PROJECT AS A SEPARATE PDF. 2.3. SUBMIT SHOP DRAWINGS IN PDF FORMAT:
- 2.3.1. IF SUBMITTED IN HARDCOPY FORMAT, SUBMIT IN 8.5 X 11 OR 11 X 17 SIZE, BLACK AND WHITE ORIGINALS OF GRAPHIC QUALITY SUITABLE FOR PHOTOCOPYING. ALLOW ONE ADDITIONAL WEEK FOR PROCESSING OF SHOP
- DRAWINGS SUBMITTED IN HARDCOPY FORMAT 2.4. SUBMIT A SHOP DRAWING FOR EACH ITEM OF EQUIPMENT:
- 2.4.1. PLUMBING FIXTURES, 2.4.2. PUMPS,
- 2.4.3. AIR-MOVING UNITS,
- 2.4.4. HEATING UNITS,
- 2.4.5. COILS, 2.4.6. MOTOR CONTROL CENTRES.
- 2.4.7. MOTOR STARTERS, AND 2.4.8. SPECIAL SYSTEMS.
- REFERENCE CODES, STANDARDS, AND REGULATIONS
- 3.1. PERMITS, TESTS, AND CERTIFICATES
- 3.1.1. ARRANGE AND PAY FOR PERMITS, TESTS, AND CERTIFICATES OF INSPECTION REQUIRED BY AUTHORITIES HAVING JURISDICTION.
- 3.1.2. SUBMIT APPLICATIONS REQUIRING OWNER'S SIGNATURE BEFORE COMMENCING
- 3.1.3. OBTAIN AND SUBMIT INSPECTION CERTIFICATES 3.1.4. CERTIFICATES TO BE RENEWED AS TO REMAIN IN FORCE FOR GUARANTEE
- 3.1.5. CO-ORDINATE AND PERFORM TESTING REQUIRED BY AUTHORITIES HAVING JURISDICTION IN ACCORDANCE WITH CLAUSE TESTING IN THIS SECTION.
- 4. EQUIPMENT
- 4.1. MANUFACTURERS NAMEPLATES 4.1.1. PROVIDE METAL NAMEPLATE WITH RAISED OR RECESSED LETTERING, MOUNTED
- ON EACH PIECE OF EQUIPMENT. 4.2. FACTORY APPLIED FINISH PAINTING
- 4.2.1. APPLY PRIME AND FINAL PAINT COATS TO EQUIPMENT AND MATERIALS WHERE SPECIFICALLY DETAILED IN SECTIONS OF THESE DIVISIONS. 4.3. FACTORY APPLIED PRIME PAINTING
- 4.3.1. HAVE PRIME PAINT FACTORY—APPLIED TO OTHER EQUIPMENT FABRICATED FROM IRON OR STEEL INCLUDING ACCESS DOORS, REGISTERS, GRILLES, DIFFUSERS, DAMPERS, METAL RADIATION ENCLOSURES AND FIRE HOSE CABINETS.
- 4.4. FIELD PAINTING 4.4.1. AFTER EQUIPMENT HAS BEEN INSTALLED AND PIPING AND INSULATION IS COMPLETED, CLEAN RUST AND OIL FROM EXPOSED IRON AND STEEL WORK PROVIDED UNDER THIS DIVISION, WHETHER OR NOT IT HAS BEEN FACTORY
- 5. OFFICE, STORAGE AND TOOLS 5.1. OFFICE AND STORAGE 5.1.1. PROVIDE TEMPORARY OFFICE, WORKSHOP AND TOOLS AND MATERIAL STORAGE
- 5.1.2. ASSUME RESPONSIBILITY FOR SECURITY OF THESE FACILITIES AND PROVIDE HEAT. LIGHT AND TELEPHONE. 5.2. APPLIANCES AND TOOLS
- 5.2.1. PROVIDE TOOLS, EQUIPMENT, SCAFFOLDING, EXTENSION CORDS, LAMPS AND MISCELLANEOUS CONSUMABLE MATERIALS REQUIRED TO CARRY OUT WORK. 6. CO-ORDINATION
- 6.1. GENERAL 6.1.1. CONSULTANT DRAWINGS ARE DIAGRAMMATIC AND ILLUSTRATE THE GENERAL LOCATION OF EQUIPMENT, AND INTENDED ROUTING OF DUCTWORK, PIPING, ETC. AND DO NOT SHOW EVERY STRUCTURAL DETAIL. IN CONGESTED AREAS DRAWINGS AT GREATER SCALE MAY BE PROVIDED TO IMPROVE INTERPRETATION OF THE WORK. WHERE THEY ARE DONE SO EITHER TO IMPROVE "DOUBLE LINE" EQUIPMENT OR SYSTEMS ARE SHOWN AS UNDERSTANDING OF THE WORK, OR SIMPLY AS A RESULT OF THE USE OF A CAD DRAWING TOOL, AND IN EITHER CASE SUCH DRAWINGS ARE NOT REPRESENTED AS FABRICATION OR
- INSTALLATION DRAWINGS. 6.1.2. LOCATION OF PIPES, DUCTWORK, RACEWAYS AND EQUIPMENT MAY BE ALTERED WITHOUT EXTRA COST PROVIDED INSTRUCTION IS GIVEN OR APPROVAL IS OBTAINED. IN ADVANCE OF INSTALLATION OF ITEMS INVOLVED. CHANGES WILL BE AUTHORIZED BY SITE INSTRUCTIONS AND ARE TO BE SHOWN ON RECORD
- DRAWINGS. 6.1.3. LOCATION OF FLOOR DRAINS, HUB DRAINS, COMBINATION DRAINS, PLUMBING FIXTURES, CONVECTORS, UNIT HEATERS, DIFFUSER, REGISTERS GRILLES AND OTHER SIMILAR ITEMS MAY BE ALTERED WITHOUT EXTRA COST PROVIDED INSTRUCTION IS GIVEN PRIOR TO ROUGHING IN. NO CLAIM WILL BE PAID FOR EXTRA LABOUR AND MATERIALS FOR RELOCATING ITEMS UP TO 3 M (10 FT) FROM ORIGINAL LOCATION NOR WILL CREDITS BE ANTICIPATED WHERE RELOCATION UP TO 3 M (10 FT) REDUCES MATERIAL AND LABOUR.
- 6.2. REQUEST FOR INTERPRETATION PROCEDURES 6.2.1. CONTRACTOR MAY SUBMIT WRITTEN REQUESTS FOR INTERPRETATION OF THE CONTRACT DOCUMENTS (?RFI?) TO REQUEST CLARIFICATION OF DESIGN INTENT OR DESIGN REQUIREMENTS.
- 6.2.2. CONSULTANT SHALL REVIEW EACH RFI AND PROVIDE A WRITTEN RESPONSE TO THE CONTRACTOR.
- 6.2.3. IF CONSULTANT DETERMINES THAT THE RESPONSE WILL REQUIRE A CHANGE TO THE WORK. THE CONSULTANT SHALL INDICATE THIS AND ISSUE SEPARATELY A CHANGE INSTRUCTION IN ACCORDANCE WITH SPECIFICATION SECTION 01 26 00 CONTRACT MODIFICATION PROCEDURE
- 6.2.4. WHERE CONTRACTOR BELIEVES THE RESPONSE RESULTS IN A CHANGE TO THE WORK, CONTRACTOR SHALL NOTIFY CONSULTANT IN WRITING TO REQUEST A

- CHANGE INSTRUCTION, UPON WHICH TIME CONSULTANT SHALL REVIEW THE REQUEST AND DETERMINE IF A CHANGE TO THE WORK IS WARRANTED.
- 6.2.5. ALLOW [10] WORKING DAYS FOR CONSULTANT'S REVIEW OF EACH RFI. ALLOW ADDITIONAL [5] WORKING DAYS WHERE SUB-CONSULTANT REVIEW IS REQUIRED. 6.3. REQUEST FOR INTERPRETATION SUBMITTAL
 - 6.3.1.A. DATE AND REVISION DATES,

6.3.1. RFI SUBMITTALS SHALL INCLUDE

- 6.3.1.B. PROJECT TITLE AND NUMBER, 6.3.1.C. CONTRACTOR'S NAME AND ADDRESS.
- APPLICABLE DRAWING OR SPECIFICATION REFERENCE. APPLICABLE TRADE SUB-CONTRACTOR RAISING THE QUERY,
- DETAILED DESCRIPTION OF THE QUERY, 6.3.1.G. PROPOSED RESOLUTION OF THE QUERY
- 6.3.1.H. AS THE PROPOSED RESOLUTION PROVIDES ADDITIONAL INFORMATION FOR CONSULTANT TO UNDERSTAND THE CONTRACTOR'S QUERY, RFI'S SUBMITTED WITHOUT A PROPOSED RESOLUTION MAY BE RETURNED BY CONSULTANT WITHOUT REVIEW OR MAY REQUIRE ADDITIONAL TIME FOR CONSULTANT TO PROVIDE A RESPONSE, DEPENDING ON THE CLARITY OF CONTRACTOR'S INFORMATION PROVIDED IN THE RFI.
- 6.4. REQUEST FOR INTERPRETATION EXCESSIVE QUERIES 6.4.1. WHERE, IN CONSULTANT'S OPINION, THE QUANTUM OF RFI'S IS EXCESSIVE AND/OR THE NATURE OF THE QUERIES INDICATES THAT CONTRACTOR OR THEIR SUBCONTRACTOR MAY HAVE FAILED TO USE COMPETENT STAFF WITH SUFFICIENT KNOWLEDGE AND/OR EXPERIENCE TO FULLY UNDERSTAND THE CONTRACT DOCUMENTS AND SCOPE OF WORK, THEN CONSULTANT MAY REVIEW THE SITUATION WITH OWNER. OWNER MAY TAKE ACTIONS PERMITTED UNDER THE CONSTRUCTION CONTRACT CONCERNING CONTRACTOR'S AND SUBCONTRACTORS QUALIFICATIONS OF THEIR COMPETENT REPRESENTATION.
- 7. PROTECTION OF WORK AND PROPERTY
- 7.1. GENERAL 7.1.1. PROTECT THIS WORK AND WORK OF OTHER TRADES FROM DAMAGE. 7.1.2. COVER FLOORS WITH TARPAULINS AND PROVIDE PLYWOOD AND OTHER
- TEMPORARY PROTECTION. 7.1.3. ASSUME RESPONSIBILITY FOR REPAIRING DAMAGE TO FLOOR AND WALL
- SURFACES RESULTING FROM FAILURE TO PROVIDE ADEQUATE PROTECTION. 7.1.4. PROTECT EQUIPMENT, PIPE AND DUCT OPENINGS FROM DIRT, DUST AND OTHER FOREIGN MATERIALS 8. WORK IN EXISTING BUILDING
- 8.1. GENERAL WORK INCLUDES CHANGES TO EXISTING BUILDING.
- 8.1.2. ROUTE PIPES, DUCTS, CONDUITS AND OTHER SERVICES TO AVOID INTERFERENCE WITH EXISTING INSTALLATION.
- 8.1.3. RELOCATE EXISTING PIPES, DUCTS, CONDUITS, BUS DUCTS AND ANY OTHER EQUIPMENT OR SERVICES REQUIRED FOR PROPER INSTALLATION OF NEW WORK INCLUDING AS REQUIRED FOR TEMPORARY REMOVAL AND RE-INSTALLATION TO SUIT NEW INSTALLATION WORK.
- 8.1.4. REMOVE EXISTING PLUMBING FIXTURES, LIGHTING FIXTURES, PIPING, DUCTWORK, WIRING, AND EQUIPMENT TO SUIT NEW CONSTRUCTION. CUT BACK AND CAP DRAIN. VENT AND WATER OUTLETS, CONDUITS AND ELECTRICAL OUTLETS, NOT
- BEING USED. 8.1.5. PLUMBING FIXTURES, PIPING, DUCTWORK, CONDUIT AND WIRING SHOWN TO BE REMOVED AND NOT SHOWN RELOCATED, TO BECOME PROPERTY OF CONTRACTOR AND TO BE TAKEN FROM SITE.
- 8.1.6. LIGHTING FIXTURES SHOWN TO BE REMOVED WILL REMAIN OWNER'S PROPERTY AND WILL BE TURNED OVER TO OWNER'S REPRESENTATIVE AS DIRECTED. WHERE OWNER WISHES TO TAKE OVER RENOVATED AREAS AHEAD OF PROJECT COMPLETION DATE AND THESE AREAS ARE TO BE FED FROM NEW DISTRIBUTION

SYSTEMS, MAKE TEMPORARY CONNECTIONS TO EXISTING SERVICES IN THESE

- AREAS. RECONNECT TO PERMANENT SERVICES, AT LATER DATE, WHEN NEW DISTRIBUTION SYSTEMS ARE AVAILABLE. 8.1.8. CONTRACTOR TO PREPARE AND PROVIDE DOMESTIC WATER PRESSURE TEST ON INCOMING SERVICE TO THE TENANT SPACE.
- RECORD DRAWINGS 9.1. SITE RECORDS
- 9.1.1. A SET OF DESIGN DRAWINGS IN AUTOCAD 2008 ON CD OR DVD ROM WILL BE PROVIDED BY THE CONSULTANT. MAKE SETS P
- 9.1.2. OF WHITE PRINTS FOR EACH PHASE OF WORK, AND AS WORK PROGRESSES AND CHANGES OCCUR MARK WHITE PRINTS IN COLOURED INKS TO SHOW REVISIONS. DIMENSION LOCATIONS OF DRAINS, PIPES, DUCTWORK, CONDUIT MANHOLES, FOUNDATIONS AND SIMILAR BURIED ITEMS WITHIN THE BUILDING, WITH RESPECT TO BUILDING COLUMN CENTRES. MARK LEVEL WITH RESPECT TO
- AN ELEVATION WHICH WILL BE PROVIDED. RETAIN THESE DRAWINGS AND MAKE AVAILABLE TO CONSULTANT FOR PERIODIC REVIEW.
- 9.2. AS-BUILT DRAWINGS 9.2.1. PRIOR TO TESTING, BALANCING AND ADJUSTING, TRANSFER SITE RECORD DRAWING INFORMATION TO AUTOCAD 2008 (CAD) FILES, TO RECORD FINAL AS-BUILT CONDITION. OBTAIN A CURRENT SET OF CAD FILES FROM THE CONSULTANT
 - 9.2.1.A. DRAWINGS ARE TO REMAIN SET TO AND FOLLOW CONSULTANTS AUTOCAD STANDARDS. DO NOT ALTER DRAWING SCALES, X-REFS, COLOURS, LAYERS OR TEXT STYLES.
- 9.2.1.B. THE CONSULTANT'S CAD FILES MAY NOT REFLECT ALL OR ANY CONSTRUCTION CHANGES.
- 9.2.2. WHERE ITEMS HAVE BEEN DELETED, MOVED, RENUMBERED OR OTHERWISE CHANGED FROM CONTRACT DRAWINGS, THESE REVISIONS, AND PLACE THESE ANNOTATIONS "BUBBLE" REVISE THE CAD FILES TO RECORD THESE CHANGES. ON A SEPARATE AND EASILY IDENTIFIED DRAWING LAYER.
- 9.2.3. SHOW ON MECHANICAL AS-BUILT DRAWINGS FINAL LOCATION OF PIPING, DUCTWORK, SWITCHES, STARTERS, MOTOR CONTROL CENTRES, THERMOSTATS, AND EQUIPMENT.
- 9.2.4. SHOW ON SITE SERVICES AS-BUILT DRAWINGS SURVEY INFORMATION PROVIDED BY ONTARIO LAND SURVEYOR (OLS) MONITORING SERVICES INSTALLATION. 9.2.5. SHOW ON ELECTRICAL AS-BUILT DRAWINGS FINAL LOCATION OF CONDUIT,
- OUTLETS, PANELS, BRANCH WIRING, SYSTEM WIRING, PULL BOXES, BUS DUCTS, AND EQUIPMENT 9.2.6. IDENTIFY EACH DRAWING IN LOWER RIGHT HAND CORNER IN LETTERS AT LEAST 12 MM (1/2 IN) HIGH AS FOLLOWS: "AS-BUILT DRAWINGS. THIS DRAWING HAS BEEN REVISED TO SHOW SYSTEMS AS INSTALLED" (SIGNATURE OF CONTRACTOR) (DATE). THE SITE SERVICES DRAWINGS ARE TO INCLUDE
- (SIGNATURE AND STAMP OF OLS) ATTACHED TO NOTE. 9.2.7. SUBMIT ONE (1) SET OF WHITE PRINTS OF THE DRAFT AS-BUILT CAD FILES FOR CONSULTANTS' REVIEW.
- 9.2.8. ONCE "AS BUILT DRAWINGS" WHITE PRINTS ARE REVIEWED, TRANSFER CONSULTANTS' COMMENTS TO THE CAD FILES. RETURN AUTOCAD DRAWINGS MODIFIED TO "AS BUILT" CONDITION TO CONSULTANTS ON CD OR DVD ROM.
- 9.2.9. SUBMIT THREE (3) SETS OF WHITE PRINTS AND THREE (3) COPIES OF CAD FILES WITH OPERATING AND MAINTENANCE MANUALS. 10. OPERATING AND MAINTENANCE INSTRUCTIONS
- 10.1.1. SUPPLY SERVICES OF SKILLED MECHANIC, TO START SYSTEMS IN PROPER SEQUENCE, AND TEST AND CALIBRATE CONTROLS, PRV'S, INSTRUMENTATION AND RELIEF VALVES AND DAMPERS AND TO SET-UP SYSTEMS. 10.2. TRAINING
- 10.2.1. DURING THIS PROCEDURE THOROUGHLY EXPLAIN OPERATION AND MAINTENANCE OF EACH SYSTEM, INCORPORATING SPECIALIZED INSTRUCTION BY MANUFACTURERS AS DESCRIBED UNDER OTHER SECTIONS IN THESE DIVISIONS. 10.2.2. ARRANGE SUITABLE TIME FOR INSTRUCTIONS WITH OWNER'S OPERATING AND MAINTENANCE PERSONNEL.
- 10.3. OPERATING AND MAINTENANCE MANUALS 10.3.1. PROVIDE OPERATION AND MAINTENANCE DATA BOUND IN 210 MM X 300 MM X 50MM THICK (8½ IN X 11 IN X 2 IN THICK) SIZE, VINYL COVERED, HARD BACK, THREE-RING COVERS.
 - 10.3.1.A. ORGANIZE MATERIAL IN VOLUMES GENERALLY GROUPED BY TRADE SECTION: SITE SERVICES. PLUMBING, FIRE PROTECTION, HEATING AND COOLING PLANT AND DISTRIBUTION, AIR HANDLING, AND CONTROLS AND INSTRUMENTATION.
- 10.3.1.B. TITLE SHEET IN EACH VOLUME TO BE LABELED "OPERATING AND MAINTENANCE MANUAL" AND TO BEAR PROJECT NAME, PROJECT NUMBER, DATE, TRADE SECTION, AND LIST OF CONTENTS. 10.3.2. IN ADDITION, PROVIDE ADOBE PDF FILES FOR EACH DOCUMENT, PRODUCED
- FROM ORIGINAL DIRECT-TO-DIGITAL FILE CREATIONS. 11. CONSULTANT REVIEWS

10.1. START-UP AND TESTING

11.1. SITE REVIEWS 11.1.1. DEFICIENCY REVIEWS CONDUCTED BY THE CONSULTANT ARE PERFORMED ON A SAMPLING BASIS, AND ANY DEFICIENCY ITEM IS TO BE INTERPRETED AS BEING

- INDICATIVE OF SIMILAR LOCATIONS ELSEWHERE IN THE WORK, UNLESS OTHERWISE SHOWN.
- 12.1. GENERAL 12.1.1. SUBMIT SIMILAR GUARANTEE FOR ONE YEAR FROM DATE OF ACCEPTANCE FOR ANY PART OF WORK ACCEPTED BY OWNER, BEFORE COMPLETION OF WHOLE
- 12.2. FINAL REVIEW 12.2.1. AT PROJECT COMPLETION, SUBMIT WRITTEN REQUEST FOR FINAL REVIEW OF MECHANICAL AND ELECTRICAL SYSTEMS.

BASIC MATERIALS AND METHODS <u>20 05 01</u>

GENERAL

12. CORRECTION AFTER COMPLETION

- 1.1. SCOPE 1.1.1. ARTICLES THAT ARE OF A GENERAL NATURE, APPLICABLE TO EACH SECTION OF DIVISION 20 AND 26.
- 2.1. PROVIDE ACCESS DOORS TO BE INSTALLED AT LOCATIONS WHERE EQUIPMENT REQUIRING INSPECTION, SERVICE, MAINTENANCE OR ADJUSTMENT IS "BUILT-IN" TO
- WORK OF OTHER TRADES 2.2. SUBMIT SHOP DRAWINGS SHOWING ACCESS DOOR SIZE, TYPE AND LOCATION.
- 2.3. CONSTRUCTION: 2.3.1. CONSTRUCTED OF STEEL, PRIME COATED 2.3.2. CONSTRUCTED OF STAINLESS STEEL WITH NEOPRENE GASKETED DOOR IN DAMP
- AND HIGH HUMIDITY AREAS 2.3.3. GENERALLY FITTED WITH SCREWDRIVER OPERATED LATCHES, EXCEPT IN AREAS SUBJECT TO SECURITY RISKS (PUBLIC CORRIDORS, PSYCHIATRIC PATIENT AREAS, PUBLIC WASHROOMS). IN THESE AREAS DOORS TO BE FITTED WITH KEYED CYLINDER LOCKS WITH SIMILAR KEYS.
- SLEEVES 3.1. GENERAL
 - 3.1.1. SLEEVE PIPES, DUCTS AND CONDUITS PASSING THROUGH MASONRY WALLS. CONCRETE FLOORS, AND FIRE RATED GYPSUM BOARD CEILINGS AND PARTITIONS. 3.1.2. MAINTAIN FIRE RATING INTEGRITY WHERE PIPES AND DUCTS PASS THROUGH
- FIRE RATED WALLS, FLOORS AND PARTITIONS. 3.2. FLOOR AND WALL SLEEVES
- 3.2.1. SLEEVES IN FIRE SEPARATIONS: 3.2.1.A. SIZED TO SUIT FIRE STOPPING METHODS EMPLOYED FOR BARE PIPES, CONDUITS, INSULATED PIPES, AND BARE AND INSULATED DUCTS
- WITHOUT FIRE DAMPERS, AND 3.2.1.B. SIZED TO SUIT CONDITIONS OF APPROVAL GIVEN IN MANUFACTURERS INSTALLATION INSTRUCTIONS FOR FIRE AND SMOKE DAMPERS.
- 3.2.2. SLEEVES IN OTHER CONSTRUCTION: 3.2.2.A. SIZED TO CLEAR INSULATED PIPES AND DUCTS BY 13 MM (2 IN) ALL ROUND, AND
- SIZED TO CLEAR CONDUITS, BARE PIPES, AND BARE DUCTS BY 6 MM (3 IN) ALL ROUND. 3.2.3. SLEEVES FOR PIPES, CONDUITS AND DUCTS SMALLER THAN 0.4 M5 (4 SQ FT)
- THROUGH SOLID WALLS AND FLOORS: 3.2.3.A. SCHEDULE 40 STEEL PIPE OR 1 MM (20 GA) (MINIMUM) SHEET METAL, LAPPED AND SPOT WELDED.
- 3.2.3.B. SLEEVES FOR PIPES, CONDUITS AND DUCTS SMALLER THAN 0.4 M5 (4) SQ FT) THROUGH GYPSUM BOARD PARTITIONS: 3.1.3.B.A. 1 MM (20 GA) MINIMUM SHEET METAL, LAPPED AND SPOT WELDED
- WITH 20 MM (3/4 IN) LIP FLANGE AT ONE END. 3.1.4. SLEEVES FOR DUCTS 0.4 M5 (4 SQ FT) AND LARGER THROUGH WALLS AND
- 3.1.4.A. 1.6 MM (16 GA) MINIMUM SHEET METAL, LAPPED AND SPOT WELDED WITH 20 MM $(\frac{3}{4}$ IN) LIP FLANGE AT ONE END.
- 4. FIRE STOPPING AND SMOKE SEALS 4.1. GENERAL 4.1.1. PROVIDE FIRE STOPPING AND SMOKE SEALS WHERE DUCTS, PIPES OR CONDUITS PENETRATE FIRE SEPARATIONS. MATERIALS TO BE SUPPLIED, WORKER RAINING TO BE ARRANGED AND INSTALLATION TO BE SUPERVISED BY A
- SPECIALIST FIRM WITH AN ESTABLISHED REPUTATION IN THIS FIELD. 4.2. PRODUCTS 4.2.1. MATERIALS TO FORM ULC LISTED OR CUL LISTED/CLASSIFIED ASSEMBLIES.
- 4.2.2. OTHER MANUFACTURERS HAVING PRODUCTS WITH EXPLICITLY SIMILAR CHARACTERISTICS, LISTINGS OR CLASSIFICATIONS AND APPROVALS ARE ACCEPTABLE 4.3. INSTALLATION
- 4.3.1. SEAL SPACE BETWEEN PENETRATING SERVICE AND SLEEVE OR OPENING IN SLAB WITH FIRESTOP AND SMOKE SEALING SYSTEM IN STRICT ACCORDANCE WITH TERMS AND CONDITIONS OF ORIGINAL ULC OR CUL LISTING AND
- MANUFACTURERS RECOMMENDED PROCEDURES. 4.3.2. SELECT THICKNESS AND ARRANGEMENT OF BACK-UP MATERIALS TO SUIT SIZE OF SERVICE, LENGTH OF SLEEVE AND ANTICIPATED MOVEMENT.
- 4.3.3. SELECT FIRESTOPPING SYSTEM TO ALLOW INSULATION AND VAPOUR BARRIER TO PASS UN-BROKEN THROUGH ASSEMBLY. 4.3.4. SURFACES TO BE CLEAN, DRY AND FREE FROM DUST, OIL, GREASE, LOOSE OR FLAKING PAINT AND FOREIGN MATERIALS AT TIME OF APPLICATION OF MATERIALS
- 4.3.5. DO NOT APPLY FIRE STOPPING MATERIALS TO FIRE OR SMOKE DAMPERS. 5. CUTTING AND PATCHING 5.1. FORMING, CUTTING AND PATCHING OF GENERAL TRADES WORK TO ACCOMMODATE WORK OF THIS DIVISION, WILL BE DONE BY GENERAL CONTRACTOR TRADES, AND
- PAID FOR BY THIS DIVISION. 5.2. EACH TRADE IS RESPONSIBLE FOR PROMPT INSTALLATION OF WORK IN ADVANCE OF CONCRETE POURING, MASONRY, ROOFING, FINISHING TRADES AND SIMILAR WORK.
- 5.3. SHOULD ANY CUTTING OR REPAIRING OF EITHER UNFINISHED OR FINISHED NEW WORK OF THESE TRADES BE REQUIRED BECAUSE OF FAILURE TO CO-ORDINATE WORK, TRADE RESPONSIBLE FOR THE FAILURE TO EMPLOY AND PAY PARTICULAR TRADE CONTRACTOR WHOSE WORK IS INVOLVED, TO DO CUTTING AND PATCHING. 5.4. REPAIR CUT OR DAMAGED SURFACES WITH MATERIALS AND FINISHES TO MATCH
- EXISTING. 5.5. NEATLY CUT OR DRILL HOLES IN EXISTING CONSTRUCTION TO ACCOMMODATE PIPING. DUCTWORK OR CONDUITS.
- 5.6. LAYOUT CUTTING OF STRUCTURAL ELEMENTS, SUCH AS FLOORS SLABS, WALLS, COLUMNS OR BEAMS AND OBTAIN APPROVAL BEFORE STARTING WORK. CONDUCT A ELECTROMAGNETIC SCAN OF REINFORCING RODS, SUCH AS HILTI PS200 FERROSCAN, AND REVIEW WITH STRUCTURAL ENGINEER. BASED ON THESE RESULTS, ARRANGE AND PAY FOR SUPPLEMENTAL X-RAY EXAMINATION TO LOCATE CONCRETE REINFORCEMENT AND EMBEDMENTS. SUBMIT X-RAYS AND OBTAIN APPROVAL BEFORE STARTING WORK.

METERS AND GAUGES <u>20 05 19</u>

- GENERAL
- 1.1. SCOPE 1.1.1. PROVIDE LIQUID FLOW METERS, AND TEMPERATURE AND PRESSURE MEASURING
- 1.2. SHOP DRAWINGS / PRODUCT DATA 1.2.1. SUBMIT MANUFACTURER'S CATALOGUE LITERATURE.
- 1.3. APPLICABLE CODES AND STANDARDS; 1.3.1. ASME B40.200 THERMOMETERS, DIRECT READING AND REMOTE READING 1.3.2. ASME B40.100 PRESSURE GAUGES AND GAUGE ATTACHMENTS PRODUCTS
- 2.1. FLOW INDICATORS: 2.1.1. CONSTRUCTION:
 - 2.1.1.A. GIVE VISUAL FLOW INDICATION. 2.1.1.B. EQUIPPED WITH DUAL FLOW SCALE CALIBRATED IN L/S AND USGPM.

2.3.1. GENERAL

2.2. FLOW MEASUREMENT SYSTEMS (LIQUIDS)

2.2.2. FLOW ELEMENT IN COMBINATION WITH METER:

2.2.2.B. REPEATABILITY OF \pm 0.1%.

2.2.1. PRIMARY FLOW ELEMENTS:

2.3.1.A. NORMAL OPERATING READING TO BE BETWEEN HALF AND TWO THIRDS OF FULL SCALE RANGE

2.3. THERMOMETERS AND PRESSURE GAUGES — SELECTION CRITERIA

2.3.1.C. THERMOMETERS TO HAVE BOTH FAHRENHEIT AND CELSIUS SCALES. 2.3.1.D. PRESSURE GAUGES TO HAVE BOTH PSI AND KPA SCALES.

2.1.1.C. PROTECTED AGAINST ACCIDENTAL BREAKAGE OF THE GLASS INDICATOR.

STANDARD OF ACCEPTANCE: ITT BELL & GOSSETT, BAILEY

2.2.2.A. ACCURACY OF \pm 1% OF READING OVER MINIMUM OF 10:1 TURNDOWN.

2.2.2.C. COMPLETE WITH 4-20 MA OR DC OUTPUT DIFFERENTIAL PRESSURE

2.2.2.D. EQUIPPED WITH DUAL FLOW SCALE CALIBRATED IN L/S AND USGPM.

STANDARD OF ACCEPTANCE: ITT BELL & GOSSETT, BAILEY

(DP) TRANSMITTER WITH THREE VALVE MANIFOLD FOR ISOLATION AND

EXTENSION NECKS, FOR MEASUREMENT OF ENERGY FLOW IN KW AND

USED WITH 4-20 MA OR DC OUTPUT DIFFERENTIAL TEMPERATURE

TRANSMITTER, WITH TEMPERATURE RTD'S IN THERMOWELLS WITH

EXPECTED MAXIMUM AND MINIMUM READINGS TO BE WITHIN SCALE

2.1.1.D. IN-LINE TYPE FOR PIPE SIZES UP TO NPS 1½.

2.2.1.A. DIFFERENTIAL PRESSURE TYPE, WITH ISOLATING VALVES.

- 2.3.2. PRODUCT IDENTIFICATION 2.3.2.A. PRESSURE GAUGES AND THERMOMETERS TO BE SELECTED FROM
- MANUFACTURERS STANDARD PRODUCT LINE. 2.3.3. MODEL DESIGNATIONS FROM TRERICE CATALOGUE ARE USED TO ESTABLISH QUALITY STANDARDS AND CONSTRUCTION DETAILS TO ALLOW ASSESSMENT OF PRODUCTS FROM OTHER UNLISTED MANUFACTURERS.
- 2.4. DIRECT READING THERMOMETERS 2.4.1. INDUSTRIAL, VARIABLE ANGLE TYPE, LIQUID FILLED, ALUMINUM 230 MM (9 IN) SCALE LENGTH, TO CGSB 14.4.
- 2.5. PRESSURE GAUGES 2.5.1. FOR DIFFERENTIAL PRESSURE MEASUREMENT
- 2.5.1.A. 115 MM (4½ IN) DIAL TYPE, SILICONE-FREE DAMPENING, BLACK SOLID FRONT CASE, 1/2% ACCURACY, ADJUSTABLE POINTER AND MAXIMUM REGISTERING POINTER TO ASME B40.100 GRADE 2A., COMPLETE WITH
- IMPULSE SNUBBER AND 3-WAY SWITCHING VALVE. 2.5.2. ACCESSORIES: 2.5.2.A. PRESSURE SNUBBERS, BRASS OR T303 STAINLESS STEEL
- CONSTRUCTION: NEEDLE VALVES, RISING STEM, BRASS OR T316 STAINLESS STEEL CONSTRUCTION 2.5.2.C. COIL SYPHONS, SCHEDULE 40 CARBON STEEL
- EXECUTION 3.1. METERING DEVICES
 - 3.1.1. INSTALLATION 3.1.1.A. INSTALL FLOW MEASURING DEVICES IN HORIZONTAL STRAIGHT PIPE
- RUNS, FREE OF VALVES AND FITTINGS. 3.1.2. LENGTH OF STRAIGHT PIPE BEFORE AND AFTER METERING ELEMENTS:
- 3.1.2.A. NOT LESS THAN 1 M (3 FT) BEFORE AND 1 M (3 FT) AFTER OR, 3.1.2.B. AS RECOMMENDED BY MANUFACTURER. 3.1.3. MOUNT METER READOUT UNITS AND PROVIDE PIPING AND WIRING TO COMPLETE
- INSTALLATION. 3.2. THERMOMETER AND PRESSURE GAUGES - GENERAL INSTALLATION CRITERIA 3.2.1. INSTALL THERMOMETERS AND GAUGES NOT MORE THAN 3 M (10 FT) FROM FLOOR OR PLATFORM, OR INSTALL REMOTE READING THERMOMETERS AND GAUGES, WITH DIAL MOUNTED AT EYE LEVEL, ON STEEL OR ALUMINUM PLATE.

<u>VALVES</u>

- SCOPE
- 1.1. PROVIDE VALVES IN PIPING SYSTEMS THROUGHOUT PROJECT. 1.2. APPLICABLE CODES AND STANDARDS 1.2.1. TEMPERATURE AND PRESSURE RATINGS, MATERIAL COMPOSITION, AND MANUFACTURER'S TESTING PROCEDURES CONFORMING TO LATEST SPECIFICATIONS FROM: MANUFACTURERS STANDARDIZATION SOCIETY OF VALVE
- AND FITTINGS INDUSTRY (MSS) 1.3. QUALITY AND EQUIVALENCE 1.3.1. VALVE SELECTIONS ARE IN GENERAL IDENTIFIED BY MODEL DESIGNATIONS TAKEN FROM MANUFACTURERS CATALOGUES TO INDICATE PHYSICAL PROPERTIES AND QUALITY STANDARDS NOT OTHERWISE DESCRIBED
- 1.3.2. COMPANIES, AND/OR TRADE NAMES LISTED BELOW ARE ACCEPTABLE FOR VARIOUS VALVE TYPES, WHERE PRODUCTS OFFERED ARE ESSENTIALLY SIMILAR TO THOSE IDENTIFIED BY MANUFACTURER OR MODEL NUMBER UNDER STANDARD OF ACCEPTANCE? {list should be included?}
- 1.3.2.A. SPECIFIC DUTY VALVES ARE SPECIFIED IN EACH PIPING SERVICE
- 1.3.2.B. FOR GATE, GLOBE, ANGLE, AND CHECK VALVES 1.3.2.C. FOR DOUBLE REGULATING VALVES
- 1.3.2.D. FOR SILENT CHECK VALVES
- 1.3.2.E. FOR BUTTERFLY VALVES 1.3.2.F. FOR BALL VALVES

2.2. SPRINKLER AND STANDPIPE VALVES

- 1.3.2.G. FOR GROOVED PIPING VALVE PRODUCTS PRODUCTS
- 2.1. SELECTION CRITERIA 2.1.1. VALVES TO BE LINE SIZE, SELECTED AS FOLLOWS 2.1.1.A. FOR SHUT-OFF OR ISOLATING SERVICE, VALVES TO BE
 - 2.1.1.A.A. GATE 2.1.1.A.B. BUTTERFLY 2.1.1.A.C. BALL
- 2.1.1.B. FOR FLOW BALANCING AND SHUT-OFF SERVICE VALVES TO BE 2.1.1.B.A. DOUBLE REGULATING 2.1.1.C. AT DISCHARGE OF PUMPS CHECK VALVES TO BE SILENT OR SPRING ASSISTED OR COMBINATION CHECK AND FLOW CONTROL VALVES.
- 2.1.2. ON MAINS AND RISERS, DRAIN VALVES TO BE SELECTED AS FOLLOWS 2.1.2.A. ON MAINS NPS 4 AND UNDER 2.1.2.A.A. NPS 3/4 BRASS THREADED BALL VALVE OF APPROPRIATE PRESSURE RATING WITH HOSE THREAD, CAP AND CHAIN.
- 2.1.2.B. ON MAINS NPS 5 AND OVER 2.1.2.B.A. NPS 1 BRASS THREADED BALL VALVE OF APPROPRIATE PRESSURE RATING WITH HOSE THREAD, CAP AND CHAIN.
- 2.2.1. APPROVALS 2.2.1.A. VALVES TO BE ULC AND FM LISTED FOR FIRE PROTECTION. 2.2.2. GATE VALVES UP TO NPS 2, THREADED 2.2.2.A. 1200 KPA (175 PSI) CLASS 150 BRONZE BODY, SOLID WEDGE BRONZE

DISC, RISING STEM, OS & Y, SCREW IN YOKE BONNET,

2.2.3. BUTTERFLY VALVES UP TO NPS 2½, THREADED 2.2.3.A. 1200 KPA (175 PSI), BRONZE BODY, STAINLESS STEEL DISC, WITH LEVER HANDLE

2.2.4. BUTTERFLY VALVES NPS 2½ AND OVER, GROOVED JOINT STYLE

SEAT RING, BOLTED COVER.

EPDM SEAT, "OPEN/SHUT" INDICATOR, WITH SUPERVISORY SWITCH 2.2.5. SWING CHECK VALVES NPS 2½ AND OVER, FLANGED 2.2.5.A. 1200 KPA (175 PSI).TO ASTM A216 CLASS B. 175 CWP. CAST IRON BODY WITH FLAT FACED FLANGES, REGRIND, RENEW BRONZE DISC AND

2.2.4.A. 1200 KPA (175 PSI), CAST IRON BODY, EPDM COATED OR BRASS DISC,

- 2.3. DOMESTIC WATER VALVES
- 2.3.1. GATE VALVES NPS 2 AND UNDER, SOLDERED 2.3.1.A. 1000 KPA (150 PSI),TO MSS SP-80, CLASS 150,BRONZE BODY, SOLID
- WEDGE BRONZE DISC, RISING STEM, SCREW IN, OR UNION BONNET. 2.3.2. GLOBE VALVES NPS 2 AND UNDER, SOLDERED 2.3.2.A. 850 KPA (125 PSI),TO MSS SP-80, 300 CWP, BRONZE BODY,
- RENEWABLE COMPOSITION PTFE DISC, THREADED OVER BONNET., LOCK SHIELD HANDLES AS INDICATED. 2.3.3. GLOBE VALVES NPS 2 AND UNDER, THREADED
- 2.3.3.A. 1000 KPA (150 PSI),TO MSS SP-80, CLASS 150, BRONZE BODY, RENEWABLE COMPOSITION PTFE DISC, UNION BONNET, LOCK SHIELD HANDLES AS INDICATED.
- 2.3.4. SWING CHECK VALVES NPS 2 AND UNDER, SOLDERED 2.3.4.A. 850 KPA (125 PSI),TO MSS SP-80, BRONZE BODY, BRONZE SWING DISC, REGRINDABLE SEAT, SCREW-IN CAP,
- 2.3.5. SWING CHECK VALVES NPS 2 AND UNDER, THREADED 2.3.5.A. 850 KPA (125 PSI), TO MSS SP-80, CLASS 125, BRONZE BODY, BRONZE SWING DISC, REGRINDABLE SEAT, SCREW-IN CAP
- 2.3.6. BALL VALVES UP TO NPS 2: 2.3.6.A. 1000 KPA (150 PSI), TWO PIECE BRONZE BODY AND CHROME PLATED BRONZE BALL, PTFE SEAT RINGS, SOLDER JOINT OR NPT TO COPPER
- ADAPTERS, FULL PORT. 2.3.7. DOUBLE REGULATING VALVES (DRV), NPS 2 AND UNDER, THREADED 2.3.7.A. 1000 KPA (150 PSI) COPPER ALLOY BODY, PLUG TYPE STEM WITH FLOW MEASUREMENT PORTS AND TAMPER-PROOF SETTING.
- 2.3.8. FLOW METER FOR DRVS 2.3.8.A. DIRECT DIGITAL FLOW READOUT TYPE COMPUTERIZED METER WITH HOSES
- AND FITTINGS. 2.4. HEATING AND COOLING WATER VALVES
- 2.4.1. GATE VALVES NPS 2 AND UNDER, SOLDERED 2.4.2. GLOBE VALVES NPS 2 AND UNDER, THREADED 2.4.3. BALL VALVES NPS 2 AND UNDER, SOLDERED
- 2.4.4. BUTTERFLY VALVES NPS 2½ TO 12, FOR GROOVED END PIPE: 2.4.5. PLUG VALVES NPS 2 AND UNDER, THREADED
- 2.4.6. SWING CHECK VALVES NPS 2 AND UNDER, SOLDERED 2.4.7. SILENT CHECK VALVES NPS 2, FOR GROOVED END PIPE 2.4.8. DOUBLE REGULATING VALVES (DRV), NPS 2 AND UNDER, THREADED
- 2.4.9. FLOW METER FOR DRVS STANDARD OF ACCEPTANCE: KITZ, CRANE, JENKINS, NIBCO EXECUTION
- 3.1. VALVE INSTALLATION

1. SCOPE

- 3.1.1. INSTALL SHUT OFF VALVES AT: 3.1.1.A. BRANCH TAKE-OFFS,
- 3.1.1.B. TO ISOLATE PIPING TO EACH PIECE OF EQUIPMENT, AND 3.1.1.C. IN LOCATIONS SHOWN.
- 3.1.1.D. INSTALL VALVES IN UPRIGHT POSITION WITH STEM ABOVE HORIZONTAL
 - <u>HANGERS AND SUPPORTS</u> <u>20 05 29</u>

FIBRE-REINFORCED PLASTIC, AND PLASTIC PIPING SYSTEMS.

- 1.1. PROVIDE HANGERS AND SUPPORTS FOR PIPING AND CONDUITS. 1.2. SHOP DRAWINGS 1.2.1. SUBMIT DETAILS FOR SUPPORTS, GUIDES, AND ANCHORS FOR GLASS,
- 1.3. APPLICABLE CODES AND STANDARDS; 1.3.1. ASME B31.9 — BUILDING SERVICE PIPING 1.3.2. MANUFACTURERS STANDARDIZATION SOCIETY OF VALVE AND FITTINGS INDUSTRY
- 1.3.2.A. MSS SP-58 PIPE HANGERS AND SUPPORTS MATERIALS DESIGN AND MANUFACTURE

MSS SP-69 PIPE HANGERS AND SUPPORTS - SELECTION AND

OF SAFETY UNDER LOADS APPLIED BY GRAVITY, BY TEMPERATURE INDUCED

2.2.1. PIPE SUPPORT PRODUCTS TO BE SELECTED FROM MANUFACTURERS STANDARD

- APPLICATION
- 1.3.2.C. THE ONTARIO BUILDING CODE 2. PRODUCTS 2.1. GENERAL
- 2.1.1. HANGERS, SUPPORTS, SWAY BRACES, TO BE MADE UP FROM STOCK OR PRODUCTION PARTS, MANUFACTURED AND FABRICATED IN ACCORDANCE WITH ASME B31.1 AND MSS SP-58, SP-69, AND SP-90. 2.1.2. SELECT ELEMENTS OF PIPE SUPPORT SYSTEMS TO PROVIDE ADEQUATE FACTORS
- EXPANSION AND CONTRACTION. BY INTERNAL PRESSURE IN MECHANICALLY JOINTED PLAIN END PIPE, BY CHANGE OF MOMENTUM IN FLUID FLOW. 2.2. PRODUCT IDENTIFICATION
- PRODUCT LINE 2.3. UPPER ATTACHMENTS 2.3.1. CAST-IN-PLACE CONCRETE:

2.3.1.B. PIPE RUNS OF THREE OR MORE PIPES:

2.3.2. SURFACE MOUNT ON CONCRETE:

- 2.3.1.A. SINGLE OR DOUBLE PIPE RUNS UP TO AND INCLUDING 300 MM (12 IN) DIAMETER: 2.3.1.A.A. GALVANIZED WEDGE INSERTS TO MSS SP-58, TYPE 18. 2.3.1.A.B. ULC LISTED FOR PIPE NPS ? THROUGH NPS 8.
- 2.3.1.B.A. MULTIPLE INSERTS, SPACED TO SUIT SMALLEST PIPE IN GROUP. 2.3.1.C. PIPES RUNS 350 MM (14 IN) DIAMETER AND OVER USE SPECIAL INSERTS.
- EXPANSION CASE AND BOLT WITH MINIMUM OF TWO EXPANSION CASES AND BOLTS FOR EACH HANGER. 2.3.2.B. DO NOT USE EXPLOSIVE DRIVE PINS IN ANY SECTION OF WORK

2.3.3. PIPING OR EQUIPMENT SUPPORTED FROM EXISTING CONCRETE CONSTRUCTION:

WITHOUT OBTAINING PRIOR APPROVAL

2.3.3.A. DRILL AND INSTALL THREADED INSERTS. 2.3.4. STEEL FRAMED CONSTRUCTION: 2.3.4.A. STEEL BEAM (BOTTOM FLANGE) AND COLD PIPING NPS 2 AND UNDER:

2.3.2.A. CARBON STEEL PLATE WITH CLEVIS AND MALLEABLE IRON SOCKET AND

- 2.3.4.A.A. BEAM CLAMP TO MSS SP-58, TYPE 30, ULC LISTED. 2.3.4.B. STEEL BEAM (BOTTOM FLANGE) AND COLD PIPING NPS 2½ AND LARGER AND HOT PIPING: 2.3.4.A.A. HEAVY BEAM CLAMP ASSEMBLY TO MSS SP-58, TYPE 28 OR 29,
- 2.3.4.A.B. FABRICATED EQUIVALENT, ULC LISTED. 2.3.4.B. STEEL BEAM (TOP FLANGE) AND COLD PIPING AND HOT PIPING NPS 2 AND UNDER: 2.3.4.A.A. STEEL JAW, HOOK ROD WITH NUT, SPRING WASHER AND PLAIN

2.3.4.A.B. STEEL JOISTS AND COLD PIPING NPS 2 AND UNDER, STEEL WASHER

PLATE WITH DOUBLE LOCKING NUTS, STEEL JOISTS AND COLD PIPING

WASHER, TO MSS SP-58, TYPE 25, ULC LISTED.

NPS 21/2 AND LARGER AND HOT PIPING, STEEL WASHER PLATES WITH DOUBLE LOCKING NUT, CARBON STEEL CLEVIS AND MALLEABLE IRON SOCKET.

2.4. HANGER ROD

- 2.4.1. CARBON STEEL THREADED ROD; 2.4.1.A. ELECTRO-GALVANIZED FINISH IN MECHANICAL ROOMS AND OUTDOORS. 2.4.1.B. BLACK STEEL FINISH IN OTHER AREAS.
- 2.5. HORIZONTAL PIPE SUPPORT SUSPENDED 2.5.1. HOT OR COLD SUSPENDED PIPING, INCLUDING CONDUITS, WHERE HORIZONTAL MOVEMENT IS 25 MM (1 IN) OR LESS AND HANGER ROD IS LONGER THAN 300 MM (12 IN).
 - 2.5.1.A. STEEL OR CAST IRON PIPING: 2.5.1.A.A. ADJUSTABLE CLEVIS TO MSS SP-58, TYPE 1, ULC LISTED, SIZED FOR OUTSIDE DIMENSION OF PIPE AND INSULATION.

City of Pickering

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Project Name

Drawing Title

CoP Interior Fit-Out Project Address

2460 Brock Road

Pickering, ON L1X 0J1

Project number 2240483

> **MECHANICAL SPECIFICATIONS** PAGE 1 OF 4

Drawing Number

NTS



True North

Drawing Scale

1.1. SCOPE

2. EXECUTION

2.1. DUCTWORK

1.2. QUALIFIED TRADESMEN

1.3. APPLICABLE STANDARDS

2.2. AIR SUPPLY EQUIPMENT

2.3. AIR EXHAUST EQUIPMENT

2.4. TERMINALS DEVICES

2.5. LIFE SAFETY

2.6. AIR BALANCING

GENERAL

COMPETENCY.

THE ONTARIO BUILDING CODE

BUILD CASING AND PLENUMS.

DUST AND FUME COLLECTORS.

SMOKE SEPARATIONS

ADJUSTMENT

THE OWNER.

1.3. REFERENCE STANDARDS

1.3.1. CONFORM TO;

2.1. FLEXIBLE DUCTWORK

2.2.1. CONSTRUCTION:

2.3.1. CONSTRUCTION:

EXECUTION

GENERAL

1.1. SCOPE

3.1. DUCT INSTALLATION

2.1.1. GENERAL REQUIREMENTS:

1.2.1. PROVIDE FLEXIBLE DUCTWORK AS SHOWN.

CONDITIONING SYSTEMS.

RATING NOT TO EXCEED 50.

2.2.1.A. SPIRAL WOUND FLEXIBLE ALUMINUM,

OR ALUMINUM JACKET,

2.2.1.C. MAXIMUM PRESSURE DROP COEFFICIENT [3]

2.3.1.C. MAXIMUM PRESSURE DROP COEFFICIENT 3,

2.3.1.D. LEAKAGE RATE: IN ACCORDANCE WITH SMACNA

2.2.1.D. LEAKAGE RATE: IN ACCORDANCE WITH SMACNA

SYSTEMS.

2.1.1.A. FACTORY FABRICATED.

2.2. METALLIC UN-INSULATED FLEXIBLE DUCTWORK

2.3. METALLIC INSULATED FLEXIBLE DUCTWORK

SHEET METAL SCREWS.

ONE DUCT DIAMETER.

MASONRY WALLS

1.2. APPLICABLE CODES AND STANDARDS

1.2.3. CONSTRUCTION DETAILS:

1.2.4. MATERIALS:

1.2.1. CONFORM TO;

PUTTING INTO OPERATION VENTILATING AND AIR CONDITIONING SYSTEMS

REGULATIONS OF PROVINCE CITY, OR LOCAL AUTHORITY HAVING JURISDICTION.

2.1.1. DUCTWORK SYSTEM ROUTING IS SHOWN DIAGRAMMATICALLY. DRAWINGS ARE NOT

2.1.2. LOCATE MAINS, RISERS AND RUNOUTS TO BE CONCEALED BEHIND FURRINGS OR

2.1.3. DETERMINE AREAS WITHOUT CEILINGS FROM ARCHITECTURAL DRAWINGS AND

2.1.4. ANCHOR, GUIDE AND SUPPORT VERTICAL AND HORIZONTAL RUNS OF DUCTWORK

2.2.1. INSTALL AND CONNECT AIR HANDLING UNITS, AND AIR CONDITIONING UNITS, AND

INSTALL AND CONNECT EXHAUST FANS. ROOF AND WALL EXHAUSTERS AND

2.4.1. LOCATE AND INSTALL TERMINAL BOXES, REGISTERS, DIFFUSERS, AND GRILLE

DAMPERS TO PROTECT OPENINGS IN FIRE SEPARATIONS.

2.5.1. INSTALL FIRE DAMPERS, SMOKE DAMPERS, AND COMBINATION SMOKE AND FIRE

2.5.2. PROVIDE SMOKE STOPPING AROUND UNPROTECTED DUCTS PASSING THROUGH

2.6.1. CO-OPERATE WITH AIR BALANCING AGENCY: INSTALL SUPPLEMENTARY DAMPERS.

ACCESS OPENINGS AND ACCESS DOORS TO FACILITATE TESTING AND

2.6.3. BALANCE ALL AIR AND WATER SYSTEMS TO QUANTITIES INDICATED AND SUPPLY

TWO BALANCING REPORTS FOR ENGINEER'S REVIEW. REPORT TO INDICATE

+/-15%. ALLOW FOR AN ADDITIONAL THREE (3) FULL DAYS OF LABOR

<u>FLEXIBLE DUCTWORK</u>

<u>23 31 16</u>

1.3.1.B. ULC 181-1981 - FACTORY MADE AIR DUCTS AND CONNECTIONS.

1.3.1.C. NFPA 90A - INSTALLATION OF AIR CONDITIONING AND VENTILATING

2.1.1.B. PRESSURE DROP COEFFICIENTS AS LISTED BELOW BASED ON SHEET

2.1.1.C. FLAME SPREAD RATING NOT TO EXCEED 25 AND SMOKE DEVELOPED

2.3.1.A. SPIRAL WOUND FLEXIBLE ALUMINUM WITH FACTORY APPLIED FLEXIBLE

3.1.1. MAXIMUM LENGTH OF FLEXIBLE DUCT FEEDING CEILING OUTLET: 2 M (6 FT)

3.1.2. PROVIDE FLEXIBLE DUCT AND MAKE CONNECTIONS TO SUPPLY DIFFUSERS AND

CONNECTORS ON RETURN OR EXHAUST AIR GRILLES UNLESS SHOWN.

3.1.3. USE SEALING COMPOUND AND TAPE AT CONNECTION POINTS BETWEEN SHEET

3.1.4. CENTRE-LINE RADIUS OF BENDS IN FLEXIBLE DUCTWORK TO BE GREATER THAN

3.1.5. DO NOT INSTALL FLEXIBLE DUCTWORK THROUGH FLOORS, PARTITIONS OR

<u>23 31 13</u>

1.2.1.A. NFPA 90A — INSTALLATION OF AIR CONDITIONING AND VENTILATING

1.2.2. LETTER AND NUMBER DESIGNATIONS, SHOWN AS 'CR3-16" ETC., ARE TAKEN

1.2.3.A. SMACNA HVAC DUCT CONSTRUCTION STANDARDS, METAL AND FLEXIBLE.

1.2.4.A. ASTM A525 SPECIFICATION FOR GENERAL REQUIREMENTS FOR STEEL

NFPA 96 VENTILATION CONTROL AND FIRE PROTECTION OF COMMERCIAL

1.2.1.B. NFPA 90B - INSTALLATION OF WARM AIR HEATING AND AIR

1.1.1. PROVIDE METAL AND PVC DUCTWORK SYSTEMS AS SHOWN.

FROM ASHRAE DUCT FITTING DATA BASE. (DFDB)

CONDITIONING SYSTEMS.

COOKING OPERATIONS

(SMACNA HVAC)

GRILLES [AND INDUCTION UNITS] AS SHOWN. DO NOT USE FLEXIBLE DUCT

METAL AND FLEXIBLE DUCT. MAKE A FURTHER MECHANICAL CONNECTION USING

GLASS FIBRE THERMAL INSULATION WITH VAPOUR BARRIER AND VINYL

METAL DUCT PRESSURE DROP COEFFICIENT OF 1.00,

1.3.1.D. NFPA 90B - INSTALLATION OF WARM AIR HEATING AND AIR

1.3.1.E. SMACNA - FLEXIBLE DUCT INSTALLATION STANDARDS

2.2.1.B. MINIMUM WORKING PRESSURE: 2.5 KPA (10 IN WG),

2.3.1.B. MINIMUM WORKING PRESSURE: 2.5 KPA (10 IN WG).

1.3.1.A. ULC S110M-1986 - FIRE TESTS FOR AIR DUCTS.

SPECIFIED AND ACHIEVED QUANTITIES COMPLETE WITH SUPPORTING SCHEMATIC

DIAGRAM. AIR AND WATER QUANTITIES TO BE BALANCED TO A TOLERANCE OF

INCLUSIVE OF 3 SITE VISITS AFTER APPROVAL FROM CONSULTANTS. COMFORT

BALANCING SHALL ONLY OCCUR WITH CONSULTANTS APPROVAL. BALANCING TO

BE COMPLETED BY AABC OR NEBB CERTIFIED CONTRACTORS, OR APPROVED BY

2.6.2. MINIMUM SET POINT OF VAV BOXES SHALL BE 10% OF MAXIMUM SETTING

ABOVE CEILINGS EXCEPT IN MECHANICAL EQUIPMENT ROOMS AND ACCESS

ROOM FINISH SCHEDULES, AND IN THESE AREAS KEEP DUCTWORK AS HIGH AS

CONSIDERED TO BE FABRICATION OR INSTALLATION DRAWINGS.

SPACES WHERE DUCTWORK IS TO BE EXPOSED.

TO RESIST DEAD LOAD AND ABSORB THRUST.

1.2.1. WORK TO BE DONE BY QUALIFIED TRADESMEN HOLDING CERTIFICATES OF

2.5.2. SUSPENDED HOT STEEL OR COPPER PIPING HAVING HORIZONTAL MOVEMENT IN EXCESS OF 25 MM (1 IN) OR HOT STEEL PIPING WITH HANGER ROD 300 MM (12 IN) OR LESS:

2.5.2.A. TRAPEZE OR YOKE STYLE PIPE ROLLER TO MSS SP-58, TYPE 43.

2.5.1.B.A. ADJUSTABLE CLEVIS TO MSS SP-58, TYPE 1, COPPER PLATED.

EXECUTION 3.1. HANGER INSTALLATION

2.5.1.B. COPPER PIPING:

3.1.1. SUPPORT PIPING AND CONDUIT DIRECTLY FROM OR ON STRUCTURAL BUILDING ELEMENTS. DO NOT SUPPORT PIPE OR CONDUIT DIRECTLY FROM OTHER SERVICES EXCEPT AS DESCRIBED BELOW.

ON SUPPORTING A SINGLE PIPE DIRECTLY FROM THE STRUCTURE. INSTALL HANGERS FOR CAST IRON SOIL PIPE WITH HANGER SPACING AND

THE HANGER ROD SIZE AND SPACING IN THE FOLLOWING ARTICLES IS BASED

HANGER ROD DIAMETER IN ACCORDANCE WITH TABLE 3. 3.1.3.A. IN ADDITION, PROVIDE A HANGER AT OR ADJACENT TO EACH HUB OR JOINT.

3.1.4. HANGER SPACING AND HANGER ROD DIAMETER FOR STEEL OR COPPER FLEXIBLE JOINT ROLL GROOVE PIPE TO BE AS SHOWN IN TABLE ABOVE FOR APPROPRIATE PIPE MATERIAL WITH NOT LESS THAN ONE HANGER BETWEEN JOINTS AND WITH ANCHORS AND GUIDES LOCATED TO MAINTAIN PIPING TRUE TO LINE AND GRADE

3.1.5. IN STEEL FRAMED CONSTRUCTION, SUPPORT PIPING FROM STRUCTURAL MEMBERS. WHERE STRUCTURAL MEMBERS ARE NOT SUITABLY LOCATED FOR UPPER HANGER ATTACHMENTS AND INSERTS OF ADEQUATE CAPACITY CAN NOT BE INSTALLED IN FLOOR SLABS OVER, PROVIDE SUPPLEMENTARY STEEL FRAMING

3.1.6. OFFSET HANGERS SO THAT RODS ARE VERTICAL IN OPERATING POSITION. 3.1.7. PROVIDE HANGER WITHIN 300 MM (12 IN) OF EACH HORIZONTAL ELBOW AND

3.2. SADDLES AND SHIELDS

3.2.1. ON COLD INSULATED PIPING, PROVIDE INSULATION SHIELDS BETWEEN INSULATION

3.2.2. ON HOT INSULATED PIPING, WELD PROTECTIVE SADDLES TO PIPE AT PIPE SUPPORT LOCATIONS. 3.2.3. NO SADDLES OR SHIELDS ARE REQUIRED ON UN-INSULATED PIPING.

3.3. LOAD NUT RETENTION REQUIREMENTS 3.3.1. ADHERE FASTENING NUTS. INCLUDING TOP AND BOTTOM LOAD NUTS. AND CLEVIS BOLT NUTS, TO THREADED RODS OR FITTINGS WITH LOCTITE 266.

3.4. SET-UP AFTER INSTALLATION 3.4.1. ADJUST HANGERS TO EQUALIZE HANGER LOADS, TO SUPPORT PIPING TRUE TO LINE AND GRADE, AND TO MINIMIZE LOADS TRANSFERRED THROUGH CONNECTIONS TO EQUIPMENT AND OUTLETS.

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GENERAL 1.1. SCOPE

> 1.1.1. WELD OR BRAZE PIPE AND FITTINGS FOR WORK OF DIVISION 20. 1.1.2. IN THIS SECTION, THE TERM WELD, WELDER, WELDING?OR SIMILAR WORD OR PHRASE IS AN EXPRESSION WHICH INCLUDES BOTH WELDING OR BRAZING.

1.2. REGISTRATION AND INSPECTION 1.2.1. BEFORE COMMENCING WORK, MAKE ARRANGEMENTS AND PAY FOR REGISTRATION AND INSPECTION BY TECHNICAL STANDARDS & SAFETY AUTHORITY (TSSA), FOR THE FOLLOWING PRESSURE PIPING SYSTEMS:

1.2.1.A. SERVICE WATER PIPING FOR BUILDING HOT WATER HEATING SYSTEMS, AT DESIGN TEMPERATURES ABOVE 121 C (250 F) OR AT DESIGN PRESSURES ABOVE 1070 KPA (160 PSIG),

1.2.1.B. CHILLED WATER, COOLING WATER, AND PROCESS WATER SYSTEMS, FOR LIQUIDS NO MORE HAZARDOUS THAN WATER, AT DESIGN TEMPERATURES ABOVE 65 C (150 F) OR DESIGN PRESSURES ABOVE 1717 KPA

1.3. APPLICABLE STANDARDS:

1.3.1. O.REG. 220/01 MADE UNDER THE TSSA ACT 1.3.2. CSA B52 MECHANICAL REFRIGERATION CODE

1.3.3. PIPING STANDARDS TO:

1.3.3.A. ASME B31.9 CODE FOR BUILDING SERVICE PIPING.

EXECUTION

2.1. WELDER QUALIFICATION AND WELDING PROCEDURES 2.1.1. WELDING OF PIPING, CONDENSATE, HOT WATER OR CHILLED WATER, AT

PRESSURES GREATER THAN 100 KPA (15 PSI)] TO BE CARRIED OUT USING APPROVED PROCEDURES BY WELDERS CERTIFIED FOR PRESSURE PIPING BY 2.1.2. WELDING. BOTH SHOP AND FIELD. TO BE ELECTRIC ARC IN ACCORDANCE WITH

RECOMMENDATIONS OF CANADIAN WELDING BUREAU WELDERS CERTIFICATES AND WELDING PROCEDURES USED ON JOB TO BE AVAILABLE FOR INSPECTION DURING PIPE WELDING OPERATIONS. EACH WELD

TO BE STAMPED WITH WELDER'S IDENTIFYING NUMBER. 2.2. WELDED CONNECTIONS TO EXISTING PRESSURE PIPING SYSTEMS

2.2.1. AT THE COMMENCEMENT OF THE WORK, REVIEW WITH AUTHORITY-HAVING-JURISDICTION INSPECTOR TO DETERMINE THEIR WELD TESTING REQUIREMENTS TO VALIDATE THE PROPOSED WELDING PROCEDURES. INCLUDING BUT NOT LIMITED TO:

2.2.1.A. DIMENSIONAL MISALIGNMENT BETWEEN OLD AND NEW PIPE, 2.2.1.B. METALLURGICAL ANALYSIS OF EXISTING PIPING,

2.2.2. AFTER TESTING REQUIREMENTS ARE DETERMINED, PROVIDE A PROPOSED SCHEDULE FOR TIE-IN CONNECTIONS AND REQUIRED EXISTING SERVICE SHUT-DOWN PERIODS, FOR APPROVAL PRIOR TO COMMENCING WORK.

2.3. WELD QUALITY 2.3.1. WELDS TO BE SOLID HOMOGENEOUS PART OF METALS JOINED AND FREE FROM PITS AND INCORPORATED SLAG AND SCALE.

2.3.2. WELD SURFACES TO BE SMOOTH AND REGULAR AND WELD METAL DEPOSITION O ACHIEVE FULL PENETRATION WITH GROOVE FILLED WITH WELD METAL, FUSED TO THE BASE METAL THROUGHOUT JOINT THICKNESS.

2.3.3. CONDUCT VISUAL EXAMINATION OF WELDS IN ACCORDANCE WITH THE APPLICABLE PIPING STANDARD AND SUBMIT COPY OF EXAMINATION REPORT FOR REVIEW. FOR REGISTERED PRESSURE PIPING SYSTEMS, INCLUDE COPIES OF TSSA FIELD INSPECTION REPORTS. 2.4. RADIOGRAPHY

2.4.1. ARRANGE AND PAY FOR SERVICES OF AN INSPECTION COMPANY SPECIALIZING IN MAKING AND INTERPRETING X-RAYS OF PIPE WELDS.

2.4.2. SUBMIT COPY OF RADIOGRAPH FOR EVERY WELD EXAMINED.

2.4.3. RADIOGRAPHY TO BE IN ACCORDANCE WITH ASME BOILER AND PRESSURE VESSEL CODE, SECTION VIII, DIVISION 1 PARA. UW-51, "TECHNIQUE FOR RADIOGRAPHIC EXAMINATION OF WELDED JOINTS"

2.4.4. WELDS ARE UNACCEPTABLE WITH IMPERFECTIONS AS DETAILED IN PARA. UW-51, CLAUSE (M)1 TO (M)4 INCLUSIVE OF SAME CODE.

2.4.5. REPAIRS TO BE CARRIED OUT AS PROVIDED IN PARA. UW-38 OF SAME CODE.

23 31 01 SHEET, ZINC COATING (HOT DIPPED GALVANIZED) ASTM A480 SPECIFICATION FOR GENERAL REQUIREMENTS FOR FLAT ROLLED PLATE, SHEET, AND STRIP

ASTM A621 SPECIFICATION FOR STEEL SHEET AND STRIP CARBON HOT 1.1.1. PROVIDE LABOUR, MATERIALS AND EQUIPMENT FOR INSTALLATION, TESTING AND ROLLED DRAWING QUALITY 1.2.4.D. ASTM D1784 STANDARD SPECIFICATION FOR RIGID POLY (VINYL CHLORIDE) (PVC) COMPOUNDS AND CHLORINATED POLY (VINYL

> CHLORIDE) (CPVC) COMPOUNDS. ASTM D1927 SPECIFICATION FOR RIGID POLY (VINYL CHLORIDE) PLASTIC SHEET (WITHDRAWN 1994)

1.3. SHOP DRAWINGS AND APPLICATION DETAILS 1.3.1. SUBMIT MANUFACTURER'S CATALOGUE LITERATURE FOR;

1.3.1.A. PROPRIETARY JOINTS,

1.3.1.B. HARDWARE 1.3.2. SUBMIT FIELD/FABRICATION DRAWINGS AT 1:50 (1/4 INCH=1 FOOT) OR LARGER SCALE, WITH PIPING, DUCTWORK, AND FITTINGS IN DOUBLE LINE FORMAT, TO

ARRANGEMENTS IN CONGESTED AREAS, WHERE INSTALLATION PROPOSED DEVIATES SUBSTANTIALLY FROM LAYOUT SHOWN, AND

WHERE INSTALLATION REQUIRES JOINTS FOR FIELD ASSEMBLY IN WELDED DUCT CONSTRUCTION.

1.3.3. FOR GREATER CLARITY, DO NOT SUBMIT FIELD/FABRICATION DRAWINGS FOR OTHER AREAS OF THE WORK. 1.3.4. SUBMIT SCHEDULES AND DETAILS TO SHOW;

1.3.4.A. FABRICATION DETAILS OF 1.3.4.A.A. CONNECTIONS TO RISERS IN DUCT SHAFTS

1.3.4.A.B. BALANCING DAMPER CONSTRUCTION, FITTINGS WHERE GEOMETRY CONTEMPLATED IS DIFFERENT FROM

THAT SPECIFIED. 1.3.4.A. IN CHART FORM

1.3.4.A.A. DUCT SYSTEM PRESSURE CLASS, 1.3.4.A.B. DUCT SHEET GAUGES,

1.3.4.A.C. JOINT TYPES AND APPLICATION CRITERIA. LOCATION CRITERIA AND DIMENSIONS FOR BRACING, STIFFENERS AND BALANCING DAMPERS

1.3.4.A.E. DUCT LEAKAGE CLASS, AND 1.4. RECORD DRAWINGS

1.4.1. AS WORK PROGRESSES, MARK-UP FIELD DRAWINGS AND SUBMIT AS PART OF RECORD OF AS-BUILT? CONDITIONS. 1.5. QUALIFICATIONS

1.5.1. DUCTWORK SYSTEMS TO BE PROVIDED BY FIRM HAVING AN ESTABLISHED REPUTATION IN THIS FIELD. PRODUCTS 2.1. BASIC MATERIAL

2.1.1. GALVANIZED STEEL 2.1.1.A. LOCK FORMING QUALITY TO ASTM A525, G90 ZINC COATING.

2.1.2. ALUMINUM: 2.1.2.A. TYPE 3003-H-14 SHEET MATERIAL. 2.2. FIRE RATED DUCT WRAP INSULATION

2.2.1. FIRE RATING: 2 HRS OR AS SHOWN 2.2.2. ULC/WARNOCK HERSEY/ETI LISTED: 2.2.2.A. MAXIMUM FLAME SPREAD AND SMOKE DEVELOPMENT RATING: 25/50, TO

ULC-S102. 2.2.2.B. 2 HR VENTILATION DUCT: CAN/ISO 6944, OR CAN/ULC-S101 2.2.2.C. MATERIAL: FOIL ENCAPSULATED, FIREPROOF INSULATION BLANKET 2.3. PROPRIETARY MANUFACTURED FLANGED DUCT JOINTS

2.3.1. MATERIAL TO MATCH THAT OF DUCTWORK BEING JOINED. 2.4. SEALANT AND TAPE

2.4.1. AS SPECIFIED IN DUCT ACCESSORIES SECTION 23 33 05.

2.5. HANGERS AND SUPPORTS 2.5.1. UPPER HANGER ATTACHMENTS:

2.5.1.A. IN NEW CONCRETE: MANUFACTURED CONCRETE INSERTS. 2.5.1.B. FOR STEEL JOIST: GALVANIZED JOIST CLAMPS OR STEEL PLATE WASHER.

2.5.2. UPPER HANGERS AND SUPPORTS 2.5.2.A. IN NEW CONCRETE: MANUFACTURED CONCRETE INSERTS.

2.5.2.B. FOR STEEL JOIST: GALVANIZED JOIST CLAMPS OR STEEL PLATE WASHER. 2.5.2.C. FOR STEEL BEAMS: GALVANIZED BEAM CLAMPS. STANDARD OF ACCEPTANCE: ANVIL, MYATT

2.6. DUCT ACCESS DOORS 2.6.1. MANUFACTURED PRODUCT: 2.6.1.A. POSITIVE SEAL,

2.6.1.B. LOCKING MECHANISM 2.6.1.C. 350 MM X 450 MM (14 IN X 17 IN) WHERE DUCT SIZE PERMITS EXECUTION

3.1. CONSTRUCTION 3.1.1. CONSTRUCTION DETAILS, SHEET GAUGES, REINFORCING, AND BRACING TO BE TAKEN FROM SMACNA HVAC DUCT CONSTRUCTION STANDARDS (METAL AND

FLEXIBLE). 3.1.2. RECTANGULAR DUCTWORK:

3.1.2.A. MAKE UP LONGITUDINAL SEAMS WITH PITTSBURGH LOCK, WITH SEALANT APPLIED PRIOR TO HAMMERING OF JOINT. 3.1.3. ROUND DUCTWORK, 500 PA (2 IN WG) PRESSURE CLASS AND HIGHER:

3.1.3.A. SPIRAL FLAT TYPE LONGITUDINAL SEAM, BUTTON PUNCHED. 3.2. BALANCING DAMPERS

3.2.1. PROVIDE SPLITTER DAMPERS WHERE BRANCH CONNECTIONS ARE TAKEN FROM SUPPLY MAINS. 3.2.2. PROVIDE SINGLE BLADE DAMPERS ON EACH BRANCH OF SUPPLY AIR SYSTEMS

DOWNSTREAM OF TERMINAL BOXES. 3.2.3. PROVIDE OPPOSED BLADE DAMPERS (OBD) AT BRANCH AND MAIN CONNECTION ON EXHAUST AND RETURN AIR SYSTEMS.

3.3. WATERTIGHT DUCTS FOR DISHWASHERS, HUMIDIFIERS AND SHOWERS 3.3.1. CONSTRUCTION:

3.3.1.A. WITHOUT LONGITUDINAL SEAMS IN BOTTOM OF HORIZONTAL DUCTS, 3.3.1.B. WITH SOLDERED OR WELDED TRANSVERSE JOINTS BETWEEN BOTTOM

SHEETS AND SIDE SHEETS, AND WITH OTHER LONGITUDINAL AND TRANSVERSE JOINTS SEALED WITH TAPE AND DUCT SEALER.

3.3.2. DISHWASHER EXHAUST: 3.3.2.A. TYPE 304 STAINLESS STEEL, EXTENDED FROM STUB CONNECTIONS ON DISHWASHER TO INLET CONNECTION TO EXHAUST FAN,

3.3.2.B. BUILT AS A PAN, 3.3.2.C. SLOPPED BACK TO DRAIN INTO DISHWASHER CONNECTION STUBS

WHERE HORIZONTAL RUN IS LESS THAN 3M (10 FT), SLOPED TO BASE OF RISER WHERE HORIZONTAL RUN IS MORE THAN 3M (10 FT), WITH NPS ? DRAIN CONNECTION FROM LOW POINTS IN

BOTTOM OF DUCT, TRAPPED AND PIPED TO DRAIN. 3.3.3. SHOWER EXHAUST DUCTS: 3.3.3.A. ALUMINIUM, EXTENDED MINIMUM OF 1500 MM (5 FT) FROM SHOWER EXHAUST GRILLES AND SLOPED DOWN TO DRAIN BACK THROUGH

3.4. PROTECTION OF DUCT OPENINGS 3.4.1. CAP OFF ENDS OF UNFINISHED DUCTS WHILE PLASTERING, DRYWALL AND OTHER FINISHING OPERATIONS ARE IN PROGRESS 3.4.2. COVER OPEN ENDS OR REGISTERS OF ACTIVE EXHAUST/RETURN DUCTS WITH

EXHAUST GRILLES SERVED.

25 MM (1") THICK FILTER MEDIA SECURED WITH TAPE. MAINTAIN MEDIA UNTIL DUST PRODUCING FINISHING OPERATIONS ARE COMPLETED. 3.5. DUCT ACCESS DOORS:

3.5.1. PROVIDE FOR INSPECTION AND SERVICING OF DUCT MOUNTED COMPONENTS AND CLEANING OF DUCT SYSTEM;

3.5.1.A. LOCATED SUCH THAT ANY SECTION OF DUCT IS NOT MORE THAN 15 M (50 FT) FROM POINT OF ACCESS,

3.5.1.B. AT BASE OF EACH MAIN RISER

3.5.1.C. IN FRONT OF AND BEHIND TURNING VANES 3.5.1.D. AT FIRE, SMOKE, AND MOTORIZED DAMPERS

3.6. DUCT CLEANING 3.6.1. CLEANING TO BE PERFORMED BY AGENT SPECIALIZING IN THIS FIELD OF WORK,

BE A MEMBER IN GOOD STANDING WITH NATIONAL AIR DUCT CLEANERS ASSOCIATION (NADCA), AND TO COMPLY WITH NADCA 3.6.2. CLEAN NEW HORIZONTAL AND VERTICAL DUCTS (SUPPLY, RETURN, EXHAUST, TRANSFER), AS WELL AS, EXISTING SUPPLY AND RETURN DUCTWORK

CONNECTED TO NEW FAN SYSTEMS. 3.6.3. CLEAN DUCTWORK USING HIGH POWERED VACUUM SYSTEM, HAND TOOLS AND MECHANICAL BRUSHING SYSTEMS SUCH THAT METAL SURFACES ARE VISIBLY

3.6.4. RESET BALANCING DAMPERS TO ORIGINAL SETTINGS IF MOVED DURING WORK. HAVE TAB AGENT CONFIRM DAMPER SETTINGS. 3.6.5. MAINTAIN SET OF DRAWINGS ON SITE, COLOURED EACH DAY DURING CLEANING

TO INDICATE EXTENT OF DUCT CLEANING COMPLETED. 3.6.6. SUBMIT A WRITTEN REPORT, VERIFIED BY TAB AGENT, IDENTIFYING EXTENT OF DUCT SYSTEM CLEANING AND CERTIFYING THAT NADCA STANDARDS HAVE BEEN

<u> ACOUSTIC LINING (DUCTWORK)</u> <u>23 32 48</u>

 GENERAL 1.1. SCOPE 1.1.1. PROVIDE ACOUSTIC LINING OF DUCTWORK.

2. PRODUCTS 2.1. DUCT LINER - GLASS FIBER

2.1.1. FIBROUS GLASS DUCT LINER DENSITY 24 KG/M3 (1.5 LB/CU FT) WITH ONE SIDE COATED WITH ACRYLIC COATING AND FLEXIBLE GLASS CLOTH REINFORCEMENT

2.1.2. FLAME SPREAD RATING NOT TO EXCEED 25, SMOKE DEVELOPMENT RATING NOT TO EXCEED 50

2.1.3. FOR RECTANGULAR DUCTWORK USE 25 MM (1 IN) RIGID LINER, 2.1.4. FOR PLENUMS AND CASINGS USE 50 MM (2 IN) OF FIBROUS GLASS RIGID BOARD DUCT LINER.

2.1.5. FOR ROUND OR OVAL DUCTWORK AND CURVED SURFACES USE 25 MM (1 IN) OF FIBROUS GLASS BLANKET LINER. 2.2. ADHESIVE

2.2.1. FLAME SPREAD RATING NOT TO EXCEED 25, SMOKE DEVELOPED RATING NOT TO EXCEED 50,

2.2.2. TEMPERATURE RANGE- 40?C TO 82?C (- 40?F TO 180?F), 2.2.3. MEET REQUIREMENTS OF NFPA 90A.

2.3. FASTENERS 2.3.1. 2.0 MM (1/16 IN) DIAMETER WELD PINS, 2.3.2. LENGTH SELECTED TO SUIT THICKNESS OF INSULATION,

2.3.3. 32 MM (11/4 IN) SQUARE NYLON RETAINING CLIPS. 2.4. SEALER AND TAPE 2.4.1. ARMSTRONG WB ARMAFLEX FINISH, MANVILLE SUPERSEAL COATING, AND

2.4.2. POLYVINYL TREATED OPEN WEAVE FIBREGLASS MEMBRANE 50MM (2 IN) WIDE. EXECUTION

3.1.1. DUCT SIZE INDICATED TO BE SIZE AS MEASURED INSIDE LINER 3.1.2. FASTEN LINER TO INTERIOR SHEET METAL SURFACE OF DUCT WITH 100% COVERAGE OF ADHESIVE, AND INSTALL WELD PINS AT 1 PIN PER 0.5M2 (5 SQ FT) BUT NOT LESS THAN 1 ROW ON EACH DUCT SIDE. 3.1.3. POSITION AND ADHERE SHEETS TO OVERLAP PREVIOUSLY INSTALLED SHEETS BY

4 MM (1/8 IN). AFTER BONDING OF SHEETS SPREAD BUTT JOINTS AND BRUSH APPLY ADHESIVE TO BOTH BUTT EDGES AND APPLY PRESSURE TO

3.1.4. APPLY TAPE TO JOINTS, EXPOSED EDGES, WELD PINS AND CLIP PENETRATIONS AND DAMAGED AREAS OF LINER.

3.1.5. BED TAPE IN SEALER AND APPLY 2 COATS OF SEALER OVER TAPE. OVER ACOUSTIC INSULATION IN ROUND OR OVAL DUCTWORK WHERE AIR VELOCI EXCEEDS 10 M/SEC (2000 FPM)] APPLY PERFORATED METAL LINER AND SECURE WITH WELD PINS AND SPEED WASHERS.

DUCT ACCESSORIES <u>23 33 05</u>

 GENERAL 1.1. SCOPE 1.1.1. PROVIDE DUCT ACCESSORIES AS SHOWN.

1.2. SHOP DRAWINGS 1.2.1. SUBMIT PRODUCT DATA SHEETS FOR: 1.2.1.A. FLEXIBLE CONNECTIONS

1.2.1.B. SEALANTS 1.2.1.C. TAPES

1.2.1.D. DUCT ACCESS DOORS AND HARDWARE 1.2.1.E. INSTRUMENT TEST PORTS

2. PRODUCTS 2.1. FLEXIBLE CONNECTIONS

2.1.1. NEOPRENE: 2.1.1.A. GALVANIZED 0.66 MM (24 GA) SHEET METAL FRAME, WITH FABRIC CLENCHED WITH DOUBLE LOCKED SEAMS,

FIRE RESISTANT, SELF-EXTINGUISHING, NEOPRENE COATED GLASS 2.1.1.C. OPERATING TEMPERATURE: -40°C TO 90°C (-40°F TO 194°F),

2.1.1.D. DENSITY: 0.653 KG/M2 (0.13 LB/SQ FT) IN CONVENTIONAL SYSTEMS. 2.1.2. VINYL COATED, INSULATED: 2.1.2.A. FLAME RESISTANT, 0.56 MM (0.022 IN) THICK VINYL COATED FABRIC

ENVELOPE, ENCLOSING 32MM (1¼ IN),12KG/M3 (0.75 LB/CU FT) FIBERGLASS INSULATION, 2.1.2.B. OPERATING TEMPERATURE: 82°C (180°F) CONTINUOUS AND 93°C

(200°F) INTERMITTENT, 2.1.3. INSTALLED; 2.1.3.A. IN CONNECTIONS FOR INSULATED DUCT SYSTEMS.

2.1.3.B. IN CIRCULAR DUCT CONNECTIONS SUBJECT TO NEGATIVE PRESSURE WITH DIAMETER LESS THAN 250MM (10IN), AND

2.1.3.C. IN RECTANGULAR DUCT CONNECTIONS SUBJECT TO NEGATIVE PRESSURE WITH SMALLEST SIDE LESS THAT 300MM (12 IN) 2.2.1. WATER BASED POLYMER EMULSION TYPE FLAME RESISTANT DUCT SEALING

2.2.2. OPERATING TEMPERATURE RANGE: -29°C TO 93°C (-20°F TO 200°F). 2.3. TAPE

2.4.2. CONSTRUCTION - INSULATED DUCT OR PLENUM:

2.3.1. POLYVINYL TREATED OPEN WEAVE GLASS FIBRE TAPE, 50MM (2") WIDE. 2.4. DUCT ACCESS DOORS 2.4.1. CONSTRUCTION — UNINSULATED DUCT OR PLENUM: 2.4.1.A. SHOP OR FIELD FABRICATED FROM SAME MATERIAL AS DUCT, ONE

SHEET METAL THICKNESS HEAVIER BUT NOT LESS THAN 0.6MM (26GA.) 2.4.1.B. WITH GASKETED SHEET METAL ANGLE FRAME.

2.4.2.A. SHOP FABRICATED AS DOUBLE WALL INSULATED SANDWICH, OF SAME MATERIAL AS DUCT, ONE SHEET METAL THICKNESS HEAVIER BUT NOT LESS THAN 0.6MM (26GA) THICK,

2.4.2.B. WITH GASKETED SHEET METAL ANGLE FRAME AND 25 MM (1") THICK RIGID GLASS FIBRE INSULATION.

2.4.2.C. GASKETED WITH NEOPRENE OR FOAM RUBBER.

FITTED WITH HARDWARE AS FOLLOWS; 2.4.2.D.A. TWO SASH LOCKS FOR DOORS UP TO 300MM X 300MM (12")

FOUR SASH LOCKS FOR DOORS UP TO 301MM X 450MM (13";

2.4.1.D.C. PIANO HINGE AND MINIMUM 2 SASH LOCKS FOR DOORS UP TO 451MM X 1000MM (19" X 40") 2.4.1.D.D. PIANO HINGE AND 2 HANDLES OPERABLE FROM BOTH SIDES FOR

DOORS OVER 1000MM (40") IN HEIGHT. 2.5. INSTRUMENT TEST PORTS

2.5.1. CONSTRUCTION: 2.5.1.A. .1 1.6MM (16GA.) THICK STEEL BODY ZINC PLATED AFTER

MANUFACTURE .2 CHAIN SECURED NEOPRENE EXPANSION PLUG WITH CAM LOCK

THICKNESS, 2.5.1.D. .4 NEOPRENE MOUNTING GASKET: FLAT FOR RECTANGULAR DUCT AND MOULDED FOR ROUND DUCT. STANDARD OF ACCEPTANCE: BAKOR, RCD, 3M FASTBOND, DURO DYNE

.3 28MM (1") MINIMUM INSIDE DIAMETER, LENGTH TO SUIT INSULATION

DWN (WATER BASED) EXECUTION

3.1. FLEXIBLE CONNECTIONS 3.1.1. PROVIDE TO ISOLATE AIR HANDLING EQUIPMENT, FANS, DUCTWORK, AND AS

3.1.2. MINIMUM LENGTH: 75 MM (3") LENGTH OF FABRIC MEASURED IN DIRECTION OF AIR FLOW,

3.1.3. MINIMUM DISTANCE BETWEEN METAL PARTS WHEN SYSTEM IS IN OPERATION: 25 MM (1"). 3.1.4. ANCHORED ON STATIC SIDE OF CONNECTION.

3.2. SEALANT AND TAPE 3.2.1. APPLY TO DUCTWORK JOINTS AND SEAMS AS DETAILED IN OTHER SECTIONS. 3.3. ACCESS DOORS

3.3.1. INSTALL IN DUCTWORK; 3.3.1.A. BEFORE AND AFTER REHEAT COILS, AND AT 3.3.1.B. FIRE DAMPERS,

3.3.1.C. DUCT SMOKE DETECTORS, 3.3.1.D. VOLUME CONTROL DEVICES, AND

3.3.1.E. CONTROL ELEMENTS 3.3.2. WELD DOOR FRAMES IN PLACE FOR PLENUMS, CASINGS, AND HIGH VELOCITY DUCTWORK. 3.3.3. DOOR SIZES:

3.3.3.A. AS LARGE AS POSSIBLE, WITH 1:1.5 ASPECT RATIO, FOR DUCT SIDES UP TO AND INCLUDING 360 MM (14"), 3.3.3.B. 300 MM X 380 MM (12 IN X 15") FOR DUCT SIDES 380 MM (15")

AND LARGER, 1500 MM (60") HIGH BY 450 MM (18") WIDE IN CASINGS AND PLENUMS. 3.4. INSTRUMENT TEST PORTS

3.4.1. INSTALL FOR DUCT VELOCITY TRAVERSE READINGS AND FOR DUCT AIR TEMPERATURE READINGS. 3.4.2. LOCATE ACROSS DUCT OR PLENUM AT RIGHT ANGLES TO FLOW, AT NOT MORE THAN 250 MM (10") INTERVALS FOR TRAVERSES AND AT NOT MORE THAN 500 MM (20") FOR TEMPERATURE MEASUREMENTS.

3.4.3. INSTALL FOR VELOCITY TRAVERSES; 3.4.3.A. AT DUCTED INLETS TO ROOF AND WALL EXHAUSTERS, 3.4.3.B. AT INLET TO AND OUTLET FROM OTHER FAN SYSTEMS, AND 3.4.3.C. AT MAIN AND BRANCH WHERE BRANCH SERVES MORE THAN ONE OUTLET. PORTS IN MAIN TO BE UPSTREAM OF BRANCH IN BOTH

DIVERGING AND CONVERGING FLOW. INSTALL FOR TEMPERATURE MEASUREMENT; 3.4.3.D.A. AT OUTSIDE AIR INTAKES 3.4.3.D.B. AT INLET AND OUTLET OF COILS, AND

GRILLES. REGISTERS AND DIFFUSERS 23 37 13

1.2.1. SUBMIT MANUFACTURER'S DATA SHEETS WITH EQUIPMENT MODEL NUMBERS,

3.4.3.D.C. DOWNSTREAM OF INTERSECTION OF CONVERGING AIR STREAMS OF

1. SCOPE 1.1. PROVIDE GRILLES, REGISTERS, AND DIFFUSERS AS SHOWN. 1.2. SHOP DRAWINGS

DIFFERENT TEMPERATURES

PERFORMANCE AND DESIGN DATA, OUTLINE DIMENSIONS, SUPPORT RECOMMENDATIONS AND CONNECTION DETAILS. PRODUCTS

2.1. GENERAL 2.1.1. GRILLES, REGISTERS AND DIFFUSERS: 2.1.1.A. PRODUCT OF ONE MANUFACTURER WHERE SAME MODEL OR TYPE

IDENTIFICATION IS USED. STANDARD CATALOGUE PRODUCTS SELECTED TO MEET CAPACITY, THROW. AND NOISE LEVEL. PRIME COATED, STAMPED OR COLD ROLLED STEEL MATERIAL WITH

MITRED CORNERS AND EXPOSED JOINTS WELDED AND GROUND SMOOTH. EXTRUDED SATIN FINISH, CLEAR ANODIZED ALUMINUM MATERIAL WITH MITRED CORNERS AND MECHANICAL FASTENERS. FRAMES WITH FULL PERIMETER GASKETS, PLASTER STOPS WHERE SET

INTO PLASTER OR GYPSUM BOARD, AND CONCEALED FASTENERS. 2.2. TYPE DESIGNATIONS 2.2.1. DIFFUSER, REGISTER AND GRILLE SCHEDULE IDENTIFIES MODEL OR TYPE IDENTIFIERS USED ON FLOOR PLANS WITH MODEL NUMBERS TAKEN FROM

LISTED MANUFACTURER'S CATALOGUE. 2.2.2. WHERE SEVERAL MANUFACTURER'S MODEL NUMBERS ARE GIVEN, THESE ARE ACCEPTABLE ALTERNATIVES. 2.2.3. WHERE ONLY ONE MANUFACTURER'S MODEL NUMBER IS GIVEN, PROVIDE

DESIGNATED ITEM. 2.3. SUPPLY REGISTERS

2.3.1. DOUBLE DEFLECTION STYLE WITH FACE BARS VERTICAL AND REAR BARS HORIZONTAL, 2.3.2. PERIMETER BORDER WITH GASKET, 2.3.3. OF STEEL OR ALUMINUM MATERIAL

2.4. RETURN AND EXHAUST GRILLES

ADJUSTABLE PATTERN CONTROL,

UP.

3.1. LAYOUT

2.4.2. PERIMETER BORDER WITH GASKET, 2.4.3. OF STEEL OR ALUMINUM MATERIAL 2.5. DIFFUSERS 2.5.1. CIRCULAR OR SQUARE MULTIPLE CONE OR SQUARE PLAQUE FACE TYPE, WITH

2.4.1. SINGLE DEFLECTION TYPE, WITH HORIZONTAL FACE BARS, 20 MAXIMUM TURN

2.5.2. OF STEEL OR ALUMINUM MATERIAL. 2.6. LINEAR GRILLES 2.6.1. ALUMINUM BAR CORE TYPE WITH MARGIN AS INDICATED, PATTERN ADJUSTMENT, PLASTER FRAMES, SEALING STRIPS, END CAPS, MITRED CORNERS AND

ALIGNMENT KEY STRIPS FOR MULTIPLE SECTIONS. 2.6.2. CAPABLE OF SUPPORTING {90KG}{200LB} POINT LOADS WHERE INSTALLED AS FLOOR GRILLES. EXECUTION

3.1.1. DRAWINGS SHOWING POSITION OF AIR DISTRIBUTION OUTLETS ARE ESSENTIALLY

DIAGRAMMATIC. COORDINATE EXACT LOCATION OF DIFFUSERS WITH OTHER

ELEMENTS IN CEILING AND SHOWN ON REFLECTED CEILING DRAWINGS AND

SELECT TRIM TO SUIT CEILING MATERIALS LISTED IN FINISH SCHEDULES.

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Pickering, ON L1X 0J1

Project number 2240483

> **MECHANICAL SPECIFICATIONS** PAGE 2 OF 4

Drawing Scale Drawing Number

Drawing Title

NTS

True North

3.2. SPECIAL INSTALLATIONS 3.2.1. GRILLES, REGISTERS AND DIFFUSERS PENETRATING FIRE WALLS AND FIRE PARTITIONS, TO HAVE STEEL SLEEVES SECURED TO STRUCTURE IN ACCORDANCE WITH NFPA 90A-1985.

3.3. INSTALLATION OF GRILLES AND REGISTERS

RETURN REGISTERS WITH FACE BARS HORIZONTAL. 3.3.2. .2 INSTALL REGISTERS AND GRILLES WITH OVAL HEAD CADMIUM PLATED SCREWS IN COUNTERSUNK HOLES WHERE FASTENINGS ARE VISIBLE.

3.3.1. INSTALL SUPPLY REGISTERS WITH FACE BARS VERTICAL AND EXHAUST AND

3.4. INSTALLATION OF DIFFUSERS 3.4.1. DIFFUSERS TO BE INSTALLED WITH CONCEALED FASTENINGS.

3.4.2. ROUND, SQUARE AND RECTANGULAR DIFFUSERS TO BE PROVIDED WITH EQUALIZING DEFLECTORS, MOUNTED IN NECK, ACCESSIBLE FROM DIFFUSER FACE, WITH BLADES ORIENTED AT RIGHT ANGLES TO DIRECTION FROM WHICH

3.4.3. EXCEPT FOR LAST DIFFUSER ON BRANCH, EACH DIFFUSER INSTALLED IN UNDERSIDE OF SUPPLY DUCT TO HAVE EXTRACT VOLUME CONTROL DAMPER

DUCTWORK INSULATION <u>23 37 16</u>

GENERAL 1.1. SCOPE

> 1.1.1. INSULATE AND FINISH DUCTS, CASING, AND PLENUMS; 1.1.2. PROVIDE INSULATION, SEALER COATINGS, FINISHES, AND MECHANICAL

INSULATION IS NOT REQUIRED ON FACTORY INSULATED AND/OR AND ACOUSTICALLY LINED DUCTWORK EXCEPT AS OTHERWISE SHOWN. 1.2. QUALITY

1.2.1. MANUFACTURERS AND PRODUCTS ARE LISTED IN THIS SECTION TO ESTABLISH QUALITY AND MANUFACTURING STANDARDS. PRODUCTS FROM OTHER MANUFACTURERS WITH EXPLICITLY SIMILAR CHARACTERISTICS MAY BE ACCEPTABLE BUT MUST BE SUBMITTED AS AN ALTERNATIVE PRODUCT

SUBMISSION. 1.3. QUALIFICATIONS 1.3.1. PROVIDE INSULATION AND COVERING BY RECOGNIZED SPECIALIST APPLICATOR

WITH AN ESTABLISHED REPUTATION FOR THIS TYPE OF WORK.

STANDARD OF ACCEPTANCE: CUSTOM INSULATION SYSTEMS, GUARANTEED INSULATION LTD, WHITE & GREER CO LTD, DEWPOINT INSULATION SYSTEMS.

1.4. SAMPLE BOARDS

1.4.1. SUBMIT SAMPLE ASSEMBLY OF EACH TYPE OF INSULATION AND COVERING. 1.5. MATERIAL TEST CRITERIA

1.5.1. INSULATION, ADHESIVES, COATINGS, FINISHES, SEALERS, AND TAPES: 1.5.1.A. MAXIMUM FLAME SPREAD RATING OF 25 TO CAN/ULC-S102, 1.5.1.B. MAXIMUM SMOKE DEVELOPED RATING OF 50 TO CAN/ULC-S102.

BUILDING. 1.6. APPLICABLE CODES AND STANDARDS

> ACCORDANCE WITH FOLLOWING STANDARDS; 1.6.1.A. THERMAL INSULATION ASSOCIATION OF CANADA (TIAC) NATIONAL

1.6.1. MATERIAL AND METHOD OF APPLICATION TO COMPLY WITH OR BE TESTED IN

1.5.1.B.A. EXCEPTION: VAPOR BARRIER MASTICS INSTALLED OUTSIDE OF

INSULATION STANDARD, EXCLUDING SECTION 12 1.6.1.B. NFPA 90-A INSTALLATION OF AIR-CONDITIONING AND VENTILATING

SYSTEMS ASHRAE/IES 90.1 ENERGY STANDARD FOR BUILDINGS EXCEPT LOW-RISE

RESIDENTIAL BUILDINGS 1.6.1.D. NFPA 255 TEST OF SURFACE BURNING CHARACTERISTICS OF BUILDING

MATERIALS CAN/ULC-S102 STANDARD METHOD OF TEST FOR SURFACE BURNING CHARACTERISTICS OF FLOORING, FLOOR COVERING, AND MISCELLANEOUS MATERIALS AND ASSEMBLIES

PRODUCTS 2.1. ADHESIVES, FASTENERS, AND TAPE

2.1.1. CONTACT BOND CEMENT:

2.1.1.1. FOR QUICK SETTING FOR METAL SURFACES. 2.1.2. WATERPROOF VAPOUR RETARDER:

2.1.2.A. FOR FLEXIBLE ELASTOMERIC CLOSED CELL FOAM:

2.1.3. LAP SEAL ADHESIVE: 2.1.3.A. FOR JOINTS AND LAP SEALING OF VAPOUR BARRIERS.

2.1.4. CONTACT ADHESIVE:

2.1.4.A. FOR FIBROUS INSULATION.

2.1.5. VAPOUR BARRIER TAPE: 2.1.5.A. COLOUR MATCHED AND FOIL FACED

2.1.5.B. UL 181A LISTED. 2.1.6. WELD PINS, STUDS AND CLIPS

2.1.7. STAPLES

2.1.7.A. MONEL, FLARE TYPE, MINIMUM SIZE 12 MM (½ IN). 2.1.8. TIE WIRE

2.1.8.A. 1.6 MM (16 GA) STAINLESS STEEL WITH TWISTED ENDS.

2.1.9. CAULKING 2.1.9.A. FAST-DRYING COLOUR MATCHED FLEXIBLE BUTYL ELASTOMER BASED

VAPOUR BARRIER SEALANT.

2.2. COATINGS AND MEMBRANES

2.2.1. REINFORCING MEMBRANE 2.2.1.A. SYNTHETIC FIBRE:

> 2.2.1.A.A. LENO WEAVE, 2.2.1.A.B. INDOOR AND OUTDOOR USE.

> 2.2.1.B. GLASS-FIBRE FABRIC:

2.2.1.B.A. INDOOR USE.

2.2.1.C. GLASS-FIBRE FABRIC FOR USE WITH ELASTOMERIC CLOSED CELL FOAM: 2.2.1.C.A. INDOOR USE.

2.2.2. BREATHER COATING — INDOORS: 2.2.2.A. FOR BREATHER COATINGS AND LAGGING ADHESIVE,

2.2.2.B. WHITE IN COLOUR,

2.2.2.C. FOR INSULATION EXCEPT ELASTOMERIC CLOSED CELL FOAM. 2.2.2.D. FOR USE WITH ELASTOMERIC CLOSED CELL FOAM.

2.3. INSULATION CEMENT

2.3.1. HYDRAULIC-SETTING FINISHING TYPE. 2.4. FIELD APPLIED FINISHES

2.4.1. PVC (POLYVINYL CHLORIDE) FINISH JACKET: 2.4.1.A. MINIMUM 20 MIL THICKNESS WITH PERMEABILITY NOT MORE THAN 0.09

PERMS,

2.4.1.B. FLEXIBLE FLAT-SHEET,

2.4.1.C. PRESSURE SENSITIVE, COLOUR MATCHING VINYL TAPE.

2.4.2. FABRIC FINISH JACKET:

2.4.2.A. ULC LISTED PLAIN WEAVE COTTON FABRIC AT 220 G/M2 (6 OZ/SQ YD), TREATED WITH FIRE RETARDANT LAGGING ADHESIVE, OR

2.4.2.B. RE-WETABLE FIBERGLASS LAGGING FABRIC WITH WATER ACTIVATED SELF-ADHESIVE.

2.4.2.C. SUITABLE FOR FIELD PAINTING.

2.4.3. METAL FINISH JACKET: 2.4.3.A. EQUIPMENT:

2.4.3.B. FITTINGS:

2.4.3.A.A. STUCCO EMBOSSED ALUMINUM NOT LESS THAN 0.45 MM (0.016 IN) THICK SHEET OR,

2.4.3.A.B. CORRUGATED STAINLESS STEEL NOT LESS THAN 0.25 MM (0.010 IN) THICK SHEET.

2.4.3.B.A. CUSTOM MADE SWAGED RING OR LOBSTER BACK COVERS ON BENDS

AND DIE SHAPED FITTING COVERS OVER FITTING, VALVES, STRAINERS, FLANGES, AND GROOVED COUPLINGS.

2.4.3.D. PROTECTIVE FINISH FOR ELASTOMERIC CELLULAR FOAM INSULATION.

2.4.3.C.A. 12 MM (½ IN) WIDE STAINLESS STEEL WITH MECHANICAL FASTENERS.

2.5. DUCTWORK INSULATION 2.5.1. TYPE D-1 GLASS FIBRE BLANKET

> 2.5.1.A. TO ASTM C1290 2.5.1.B. SERVICE TEMPERATURE: UP TO 121°C (250 F)

2.5.1.C. FLEXIBLE BLANKET, 2.5.1.D. FSK JACKET OF KRAFT BONDED TO ALUMINUM FOIL REINFORCED WITH GLASS FIBRE YARN, MAXIMUM 0.02 PERMS TO ASTM E96 PROCEDURE

2.5.1.E. NONCOMBUSTIBLE

2.5.1.F. THERMAL PERFORMANCE: R = 0.74 M2 *C/W @ 24 C (4.2 BTU FT2

F/BTU @ 75 F)

2.5.1.G. DENSITY: 12 KG/M3 (0.75 PCF) 2.5.1.H. VAPOR TRANSMISSION: MAXIMUM 0.02 PERMS

2.5.2. TYPE D-2 GLASS FIBRE BOARD

2.5.2.A. TO ASTM C612, 2.5.2.B. SERVICE TEMPERATURE: UP TO JACKET SURFACE TEMPERATURE (AIR CONTACT) UP TO 66 C (150 F) AND UN-JACKETED SURFACE

TEMPERATURE (EQUIPMENT CONTACT) UP TO 232 C (450 F). 2.5.2.C. RIGID FOR FLAT SURFACES OR,

SCORED BOARD FOR CURVED SURFACES 250 MM (10 IN) DIA AND

2.5.2.E. JACKET OF KRAFT BONDED TO ALUMINUM FOIL REINFORCED WITH GLASS FIBRE YARN.

THERMAL PERFORMANCE: 0.033 W/M/C @ 24 C (0.23 BTU/HR/IN/SQ FT/F @ 75 F),

2.5.2.G. VAPOR TRANSMISSION: MAXIMUM 0.02 PERMS

2.5.2.H. DENSITY: 48 KG/M3 (3.0 LB/CU FT), SUITABLE FOR JACKET SURFACE TEMPERATURE (AIR CONTACT) UP TO 66 C (150 F) AND UN-JACKETED SURFACE TEMPERATURE (EQUIPMENT

CONTACT) UP TO 232 C (450 F). 2.5.3. TYPE D-3 FLEXIBLE ELASTOMERIC CLOSED CELL FOAM:

2.5.3.A. TO ASTM C534,

2.5.3.B. SERVICE TEMPERATURE: UP TO 82 C (180 F). 2.5.3.C. SHEET SELF-ADHERING, ROLL TYPE,

2.5.3.D. THERMAL PERFORMANCE: 0.04 W/M/C @ 24 C (0.28 BTU/HR/IN/SQ FT/F @ 75 F),

2.5.3.E. MANUFACTURER SPECIFIC SEALER/ADHESIVE.

2.5.4. TYPE D-4 LOW TEMPERATURE PHENOLIC BOARD: 2.5.4.A. TO ASTM C1126 (GR.1),

2.5.4.B. SERVICE TEMPERATURE: -73°C TO+121 °C (-100°F TO 250°F).

2.5.4.C. RIGID FOR FLAT SURFACES, 2.5.4.D. MEETING 25/50 FLAME SPREAD/SMOKE DEVELOPMENT WHEN TESTED TO

ASTM E84, 2.5.4.E. THERMAL PERFORMANCE: 0.021 W/M/C*@ 10°C (0.145 BTU/HR/IN/SQ

FT/F° @ 50°F), 2.5.4.F. DENSITY: 37 KG/M3 (2.3 IB/CUFT),

EXECUTION 3.1. INSULATION LIMITS

3.1.1. EXTERNALLY INSULATE AIR HANDLING SYSTEM COMPONENTS:

3.1.1.A. CONDITIONED AIR WITH COOLING COILS: SUPPLY UNIT CASINGS AND PLENUMS, AND FREE STANDING SUPPLY FANS FOR BOTH RECIRCULATING AND NON RECIRCULATING TYPE SYSTEMS,

3.1.1.B. CONDITIONED AIR WITH HEATING ONLY: SUPPLY UNIT CASING AND PLENUMS, FREE-STANDING SUPPLY FANS, AND SUPPLY AIR DUCTS AND PLENUMS UP TO THE SPACE SERVED BUT NOT IN THE SPACE ITSELF,

3.1.1.C. CONDITIONED AIR SUPPLY DUCTS INCLUDING DOWNSTREAM OF REHEAT

3.1.1.D. UN-CONDITIONED SUPPLY AIR DUCTS AND PLENUMS THAT PASS THROUGH UNHEATED ROOMS OR SPACES,

3.1.1.E. THE FIRST 300 MM (12 IN) LENGTH OF ACOUSTICALLY LINED

3.1.1.F. RETURN AIR DUCTS AND PLENUMS IN UNHEATED SPACES. 3.1.1.G. EXHAUST AIR DUCTS AND PLENUMS IN UNHEATED SPACES,

3.1.1.H. EXHAUST AIR DUCTS BETWEEN EXHAUST AIR DAMPER AND POINT OF DISCHARGE TO OUTSIDE OF BUILDING, 3.1.1.I. OUTSIDE AIR INTAKE DUCTS AND PLENUMS; 3.1.1.I.A. FOR NON-RECIRCULATING TYPE VENTILATION SYSTEMS WITHOUT

COOLING COILS. TERMINATE PLENUM OR CASING INSULATION 300 MM (12 IN) DOWNSTREAM OF FINAL HEATING COIL, 3.1.1.J. MIXED AIR PLENUMS AND DUCTS;

3.1.1.J.A. FOR RECIRCULATING TYPE VENTILATION SYSTEMS WITHOUT COOLING COILS, TERMINATE OUTSIDE AIR INTAKE INSULATION 300 MM (12 IN) DOWNSTREAM OF MIXING PLENUM.

3.1.1.K. SHEET METAL BLANK-OFF PLATES BEHIND UNUSED SECTIONS OF AIR INTAKE LOUVRES.

3.1.2. EXTERNALLY INSULATE DUCTWORK LOCATED OUTDOORS:

3.1.2.A. SUPPLY DUCTS. 3.1.2.B. CONDITIONED SUPPLY DUCTS. 3.1.2.C. RETURN DUCTS,

3.1.2.D. EXHAUST DUCTS, 3.1.2.D.A. EXCLUDING FAN DISCHARGE DUCT,

3.1.2.E. KITCHEN EXHAUST DUCTS WITH MORE THAN 3 M (10 FT) LENGTH OF DUCT ON ROOF.

3.1.2.E.A. EXCLUDING FAN DISCHARGE DUCT.

3.1.3. EXTERNAL INSULATION IS NOT REQUIRED ON: 3.1.3.A. CASINGS, DUCTS OR PLENUMS WHICH HAVE BEEN LINED WITH ACOUSTIC INSULATION, EXCEPT AS DESCRIBED ABOVE,

3.1.3.B. FREE STANDING UNCONDITIONED SUPPLY FANS, SUPPLY DUCTS AND PLENUMS.

3.1.3.C. PORTIONS OF INTAKE DUCTS OR PLENUMS, UNIT CASINGS AND CONDITIONED AIR PLENUMS WHICH ARE OF DOUBLE WALL INSULATED CONSTRUCTION.

3.1.3.D. PRE-INSULATED FLEXIBLE DUCTS.

3.1.3.E. FACTORY INSULATED AIR HANDLING UNITS. 3.2. GENERAL REQUIREMENTS

3.2.1. INSULATE DUCTWORK IN ACCORDANCE WITH TABLE 1 AT THE END OF THIS SECTION. 3.2.2. STORE AND USE ADHESIVES, MASTICS, AND INSULATION CEMENTS AT AMBIENT

TEMPERATURES AND CONDITIONS RECOMMENDED BY PRODUCT MANUFACTURERS. 3.2.3. SURFACES TO BE CLEAN AND DRY BEFORE APPLICATION OF INSULATION. APPLY INSULATION AFTER PRESSURE AND LEAKAGE TESTING IS COMPLETED AND

3.2.4. PLACE INSULATION WITH JOINTS STAGGERED AND TIGHTLY BUTTED, WITH NO VISIBLE GAPS.

3.2.5. NEATLY FINISH INSULATION AT SUPPORTS, PROTRUSIONS, AND INTERRUPTIONS. 3.2.6. SEAL EXPOSED INSULATION WITH REINFORCED VAPOR BARRIER OR BREATHER

COATING/MASTIC AS SHOWN. 3.2.7. FINISH DUCTWORK WITH FIELD INSTALLED FINISH JACKETS AS SHOWN.

TABLE 1	: DUCTWORK AND PLENUM INSULATION TY	PE AND THICKNESS	MM (IN)
NOMINAL SURFACE TEMPERATURE	EQUIPMENT DESCRIPTION	INSULATION TYPE	INSULATION THICKNESS
5°C TO 65°C (40?F TO 150°F)	SUPPLY UNIT CASINGS AND PLENUMS FREE STANDING SUPPLY FANS RECTANGULAR, EXPOSED RECTANGULAR, CONCEALED	D-2	25 (1)
	RECTANGULAR, CONCEALED ROUND AND OVAL, EXPOSED ROUND AND OVAL, CONCEALED	D-1	38 (1-1/2) NOTE (1)

TABLE	2: DUCTWORK AND PLENUM INSULATION	N TYPE AND	THICKNESS MM (IN)
NOMINAL SURFACE TEMPERATURE	EQUIPMENT DESCRIPTION	INSULATION TYPE	INSULATION THICKNESS
	PLENUMS AND CASINGS — AIR INTAKE	D2	TWO LAYERS EACH 50 (2
(AMBIENT TO 150°F)		D4	75 (3)
	PLENUMS AND CASINGS — EXHAUST	D2	50 (2)
	TELHOMO AND CHOINGS EXTINGST	D4	38 (1-1/2)
	RECTANGULAR - OUTDOOR - SUPPLY	D2	50 (2)
	RECTANGULAR - OUTDOOR - RETURN RECTANGULAR - OUTDOOR - EXHAUST	D2	38 (1-1/2)
	ROUND - OUTDOOR	D3	TWO LAYERS EACH 25 (1
	DRAIN PANS D3 20 (3/4)	D3	20 (3/4)

NOTE (1): THICKNESS IS "OUT OF BOX" BEFORE INSTALLATION

PLUMBING GENERAL <u>22 05 01</u>

GENERAL 1.1. SCOPE

1.1.1. PROVIDE LABOUR, MATERIALS AND EQUIPMENT FOR INSTALLATION, TESTING AND PUTTING INTO OPERATION PLUMBING AND DRAINAGE SYSTEMS.

1.2. QUALIFIED TRADESMEN

1.2.1. WORK TO BE DONE BY QUALIFIED AND RECOGNIZED FIRM WITH AN ESTABLISHED REPUTATION IN THIS FIELD USING TRADESMEN HOLDING CERTIFICATES OF

1.3. APPLICABLE CODES AND STANDARDS

1.3.1. ONTARIO BUILDING CODE

1.3.2. REGULATIONS OF PROVINCE CITY, OR LOCAL AUTHORITY HAVING JURISDICTION. 1.3.3. AWWA C651, DISINFECTING WATER MAINS.

1.3.4. CSA B149.1 NATURAL GAS AND PROPANE INSTALLATION CODE 1.4. QUALIFICATIONS 1.4.1. CONTRACTORS PERFORMING WORK ON NATURAL GAS OR PROPANE SYSTEMS TO

THE TECHNICAL STANDARDS AND SAFETY AUTHORITY. 2. PRODUCTS

2.1. WATER SERVICE METER 2.1.1. COMPOUND TYPE, TO APPROVAL OF AUTHORITIES.

2.1.2. SUITABLE FOR FUTURE INSTALLATION OF REMOTE READER. PROVIDE CONDUIT FOR FUTURE WIRING FROM METER TO REMOTE READER.

2.1.3. PAY CALIBRATION AND TRANSPORTATION CHARGES IN CONNECTION WITH METER

BE LICENSED AS A GAS AND PROPANE INSTALLER UNDER O.REG. 215/01, BY

WATER METER TO READ IN CUBIC METERS (M3) AND GALLONS PER MINUTE. INSTALLATION

3.1. PIPING 3.1.1. PIPING SYSTEM ROUTING IS SHOWN DIAGRAMMATICALLY. LOCATE MAINS, RISERS AND RUNOUTS CONCEALED BEHIND FURRINGS OR ABOVE CEILINGS EXCEPT IN MECHANICAL EQUIPMENT ROOMS AND ACCESS SPACES WHERE PIPING IS TO BE

EXPOSED. 3.1.2. DETERMINE AREAS WITHOUT CEILINGS FROM ARCHITECTURAL DRAWINGS AND ROOM FINISH SCHEDULES, AND IN THESE AREAS KEEP PIPING AS HIGH AS

3.1.3. ANCHOR, GUIDE AND SUPPORT VERTICAL AND HORIZONTAL RUNS OF PIPING TO RESIST DEAD LOAD AND ABSORB THRUST. 3.2. WATER SERVICE

3.2.1. INSTALL WATER METER IN ACCORDANCE WITH LOCAL AUTHORITY STANDARDS AND PROVIDE THREE-VALVE BY-PASS ARRANGEMENT WITH STRAINER ON STREET SIDE AND DRAIN VALVE ON BUILDING SIDE OF METER.

3.2.2. MOUNT METER:

3.2.2.A. 150 MM (6") CLEAR OF FLOOR,

3.2.2.B. MOUNT VALVES IN UPRIGHT POSITION, 3.2.2.C. LOCATE BY-PASS TO PROVIDE 500 MM (20 IN) CLEAR ABOVE TOP OF METER.

LOCATE ASSEMBLY SO THAT METER IS AT LEAST 600 MM (24 IN) FROM BACK WALL AND WITH 1050MM (42 IN) CLEAR IN FRONT. 3.2.3. METER BY-PASS LINE:

3.2.3.A. SAME SIZE AS INCOMING LINE FOR TURBINE OR PROTECTUS METER. 3.2.3.B. ONE PIPE SIZE SMALLER THAN INCOMING LINE FOR COMPOUND METER,

3.3. DOMESTIC COLD WATER SYSTEM DISTRIBUTION 3.3.1. EXTEND EXISTING DOMESTIC COLD WATER SYSTEM WITH 3.3.1.A. DISTRIBUTION PIPE AND FITTINGS,

3.3.1.B. VALVES, 3.3.1.C. PREMISES BACKFLOW ISOLATION,

3.3.1.D. ZONE OR EQUIPMENT BACKFLOW PROTECTION. 3.3.2. MINIMUM WATER PRESSURE AT STREET LEVEL: APPROXIMATELY 500 KPA (70

3.3.3. PROVIDE VALVED CONNECTIONS FROM SUPPLY SYSTEM, TO FIXTURES AND OTHER EQUIPMENT REQUIRING COLD WATER. 3.4. DOMESTIC HOT WATER SYSTEM DISTRIBUTION

3.4.1. PROVIDE DOMESTIC HOT WATER SYSTEM WITH 3.4.1.A. DISTRIBUTION PIPE AND FITTINGS

AND OTHER EQUIPMENT REQUIRING HOT WATER.

3.4.1.B. VALVES 3.4.1.C. ZONE OR EQUIPMENT BACKFLOW PROTECTION. 3.4.2. PROVIDE COLD WATER CONNECTIONS TO HOT WATER TANK, WITH SHUT-OFF AND CHECK VALVE ON SUPPLY AND VALVED DRAIN AT BOTTOM OF TANK. DRILL CHECK VALVE DISC WITH 1.6 MM (1/16 IN) HOLE IN ITS CENTRE

3.4.3. PROVIDE VALVED CONNECTIONS FROM HOT WATER SUPPLY SYSTEM TO FIXTURES

PIPING INSULATION

1.1.1. INSULATE AND FINISH PIPING, VALVES, FITTINGS, AND PIPELINE ACCESSORIES. 1.1.1.A. PROVIDE INSULATION, COATINGS, FINISHES, AND MECHANICAL

PROTECTION. 1.1.2. PROVIDE FIRE RATED INSULATION ON PIPING AS SHOWN, INCLUDING FIRE PROTECTION STANDPIPES. 1.1.2.A. COORDINATE WITH THE CONTRACTOR UNDER DIVISION 21 FOR LOCATION

3.5.1. PROVIDE WASTE AND VENT CONNECTIONS TO PLUMBING FIXTURES AND

3.5.2.C. DO NOT USE QUARTER BEND PLACED ON ITS SIDE.

3.6. FLUSHING AND CLEANING - BUILDING WATER DISTRIBUTION PIPING

WALL THICKNESS.

DO NOT USE INVERTED JOINTS BELOW FIXTURES

3.5.2.A. DO NOT USE DOUBLE HUBS, STRAIGHT CROSSES, DOUBLE T'S, OR

DOUBLE TY'S IN SOIL OR WASTE PIPE BELOW ANY FIXTURE.

DO NOT USE BRANCH FITTINGS OTHER THAN FULL "Y" OR "Y" AND AN

EIGHTH BEND, ON SOIL OR WASTE PIPE RUNNING IN HORIZONTAL

DO NOT INSTALL CLEANOUTS ABOVE FOOD PREPARATION OR PATIENT

TO FLOOR CLEANOUT FITTED WITH ADJUSTABLE GASKETTED ACCESS

DRAINAGE FITTINGS TO MATCH CONNECTED PIPING FOR QUALITY AND

3.6.1. CONDUCT FIRST FILL AND PRESSURE TESTING OF BUILDING DISTRIBUTION PIPING

3.6.2. COMPLETE PIPING PRESSURE TESTS PRIOR TO FLUSHING AND CLEANING

3.6.3. FLUSH WATER DISTRIBUTION PIPING THROUGH AVAILABLE OUTLETS WITH

3.6.3.C. OPERATE VALVES, HYDRANTS, AND APPURTENANCES WHILE MAIN

3.6.3.A. DRAIN DOWN SYSTEM TO REMOVE FLUSHING WATER,

INITIAL CONCENTRATION OF 50 MG/L

TAKEN FROM NEWLY DISINFECTED MAIN.

CONTAINS CHLORINE SOLUTION.

CONTACT TIME.

ONLY AFTER COMPLETION OF FLUSHING AND DISINFECTION OF WATER SERVICE

SUFFICIENT FLOW TO PRODUCE VELOCITY OF 1.5 M/S, WITHIN PIPE FOR 10

MINUTES, OR UNTIL FOREIGN MATERIALS HAVE BEEN REMOVED AND FLUSHED

FLUSH LINE TO REMOVE CHLORINE SOLUTION AFTER 24 HOURS

ARRANGE AND PAY FOR LABORATORY TESTING OF WATER SAMPLES

WHERE SAMPLES DO NOT MEET LABORATORY TEST STANDARD FOR

REPEATED UNTIL SATISFACTORY RESULTS ARE ACHIEVED.

<u>22 14 19</u>

POTABLE WATER. DISINFECTION PROCEDURE AND TESTING IS TO BE

INTRODUCE CHLORINE CLOSE TO POINT OF RE-FILLING OF SYSTEM,

AND EVENLY ADD TO WATER AS SYSTEM IS REFILLING, TO PROVIDE AN

TREATMENT AREAS. IN THESE AREAS CARRY RODDING CONNECTION UP

COVER AND PLUG, WITH CLEANOUT BODY CAST IN FLOOR SLAB ABOVE.

FQUIPMENT

3.5.2.D.

OPERATIONS.

WATER IS CLEAR

AND EXTENT OF STANDPIPES TO BE PROTECTED. 1.2.1. THE FOLLOWING WORK IS SPECIFIED IN OTHER SECTION OF DIVISION 20: 1.2.1.A. SUPPLY OF INSULATION SHIELDS FOR COLD AND DUAL TEMPERATURE

1.2.2. PROVISION OF WELDED SADDLES FOR HOT PIPING.

1.2.3. INSULATION OF UNDERGROUND PIPING: SECTION 20 07 21. 1.3. QUALITY 1.3.1. MANUFACTURERS AND PRODUCTS ARE LISTED IN THIS SECTION TO ESTABLISH

MANUFACTURERS WITH EXPLICITLY SIMILAR CHARACTERISTICS MAY BE ACCEPTABLE BUT MUST BE SUBMITTED AS AN ALTERNATIVE PRODUCT SUBMISSION 1.4. QUALIFICATIONS 1.4.1. PROVIDE INSULATION AND COVERING BY RECOGNIZED SPECIALIST APPLICATOR

QUALITY AND MANUFACTURING STANDARDS. PRODUCTS FROM OTHER

WITH AN ESTABLISHED REPUTATION FOR THIS TYPE OF WORK. 1.5. 1.5MATERIAL TEST CRITERIA 1.5.1. INSULATION, ADHESIVES, COATINGS, FINISHES, SEALERS, AND TAPES: 1.5.1.A. MAXIMUM FLAME SPREAD RATING OF 25 TO CAN/ULC-S102,

1.5.2. MAXIMUM SMOKE DEVELOPED RATING OF 50 TO CAN/ULC-S102.. 1.5.2.A. EXCEPTION: VAPOR BARRIER MASTICS INSTALLED OUTSIDE OF BUILDING. 1.6. APPLICABLE CODES AND STANDARDS 1.6.1. MATERIAL AND METHOD OF APPLICATION TO COMPLY WITH OR BE TESTED IN

ACCORDANCE WITH FOLLOWING STANDARDS; 1.6.1.A. THERMAL INSULATION ASSOCIATION OF CANADA (TIAC) NATIONAL INSULATION STANDARD, EXCLUDING SECTION 12

1.6.1.B. NFPA 90-A INSTALLATION OF AIR-CONDITIONING AND VENTILATING 1.6.1.C. ASHRAE/IES 90.1 ENERGY STANDARD FOR BUILDINGS EXCEPT LOW-RISE

1.6.1.D. NFPA 255 TEST OF SURFACE BURNING CHARACTERISTICS OF BUILDING CAN/ULC-S102 STANDARD METHOD OF TEST FOR SURFACE BURNING CHARACTERISTICS OF FLOORING, FLOOR COVERING, AND MISCELLANEOUS

2. PRODUCTS

2.1. GENERAL 2.1.1. NEW DOMESTIC HOT, COLD, HOT WATER RE-CIRCULATING LINES, HORIZONTAL SANITARY DRAINS AND VALVES AND FITTINGS, CONDENSER WATER PIPING AND VALVES AND FITTINGS AND CONDENSATE DRAIN PIPING AND FITTINGS FOR FIRST 15 FT. FROM COIL DRAIN PAN TO BE INSULATED WITH 1 IN STANDARD MOULDED SECTIONAL RIGID GLASS FIBRE PIPE INSULATION WITH VAPOUR

BARRIER JACKET HAVING MOISTURE TRANSMISSION OF .02 PERM.

2.1.2. NEW INDUCTION UNIT VALVES, PIPING & FITTINGS TO BE INSULATED WITH 5/8" ARMAFLEX INSULATION. 2.1.3. RECOVER EXPOSED INSULATED PIPING WITH PVC JACKETING.

2.1.4. ACCEPTABLE MANUFACTURERS OF INSULATION AND VAPOUR BARRIER:MANSON INSULATION INC. FIBERGLAS CANADA KNAUF FIBER GLASS MANVILLE CANADA INC. 2.1.5. ACCEPTABLE MANUFACTURERS OF PVC JACKETING: ACWIL INSULATIONS LTD.

RESIDENTIAL BUILDINGS

MATERIALS AND ASSEMBLIES

GENERAL

1.1. SCOPE 1.1.1. PROVIDE DOMESTIC HOT WATER HEATERS AS SHOWN

1.3. APPLICABLE CODES AND STANDARDS

HOUSEHOLD SERVICE

1.2. SHOP DRAWINGS 1.2.1. SUBMIT SHOP DRAWINGS FOR EACH HEATER WITH MODEL NUMBER, OUTLINE DIMENSIONS, FUEL OR POWER REQUIREMENTS, INLET AND OUTLET CONNECTION DETAILS AND CAPACITY.

DOMESTIC WATER HEATERS

<u>22 33 13</u>

1.3.1. CSA C22.2 NO. 110 CONSTRUCTION AND TEST OF ELECTRIC STORAGE-TANK WATER HEATERS 1.3.2. CSA C191 PERFORMANCE OF ELECTRIC STORAGE TANK WATER HEATERS FOR 2. PRODUCTS

2.1. GENERAL 2.1.1. DESIGN CONDITIONS: 2.1.1.A. DESIGN PRESSURE: [860 KPA (125 PSI)] [1035 KPA (150 PSI)]

2.1.1.B. DESIGN TEMPERATURE: 60°C (180°F).

2.1.2. PIPING CONNECTIONS

2.1.2.A. UP TO NPS 3: THREADED 2.1.2.B. NPS 3 AND OVER: FLANGED.

2.1.3. FITTINGS, ALL HEATERS:

2.1.3.A. REPLACEABLE MAGNESIUM ANODE, 2.1.3.B. 50 MM (2 IN) MINERAL WOOL INSULATION,

2.1.3.C. ENAMELLED STEEL JACKET, 2.1.3.D. HOSE THREADED DRAIN VALVE, 2.1.3.E. ASME RATED TEMPERATURE AND PRESSURE RELIEF VALVE

2.2. ELECTRIC HOT WATER HEATERS

VERTICAL TANKS.

2.2.1. CONFORM TO CSA C22.2 NO. 110 AND CSA C191 2.2.2. FACTORY ASSEMBLED AND TESTED, GLASS LINED STEEL TANK UNITS, WITH; 2.2.2.A. COPPER SHEATHED IMMERSION ELEMENTS ARRANGED FOR FLIP-FLOP

2.2.2.B. CLOSE TOLERANCE POSITIVE SNAP ACTION THERMOSTATS 2.2.2.C. MANUAL RESET HIGH TEMPERATURE LIMIT SWITCH.

2.2.2.D. BUILT—IN AND FACTORY PRE—WIRED CONTROLS INCLUDING CONTACTORS. 3. EXECUTION

3.1. INSTALLATION 3.1.1. PROVIDE SUPPORTING STRUCTURAL STEEL FOR HORIZONTAL MOUNTED TANKS AND FOR INSTANTANEOUS HEATERS. SET ANCHOR BOLTS THROUGH FEET OF

3.1.2. ISOLATE TANKS FROM GROUND. FOR HORIZONTAL TANKS PROVIDE DIELECTRIC PADS BETWEEN TANK AND SADDLES. AND FOR VERTICAL TANKS WITH LEGS. PROVIDE DIELECTRIC PADS UNDER FEET, AND ISOLATION WASHERS AND SLEEVES AT EACH ANCHOR BOLT. 3.1.3. CONNECT UP TO COLD WATER SUPPLY LINES AND DOMESTIC HOT WATER

DISTRIBUTION PIPING WITH 300MM (12 IN) LONG, LINE SIZE FLEXIBLE CONNECTIONS. 3.1.4. INSTRUMENTS WITH EXTERNAL ELECTRIC WIRING TO BE ISOLATED FROM HEATERS

3.1.6. PROVIDE VALVED DRAIN FROM EACH TANK PIPED TO NEAREST FUNNEL OR HUB

SIZED FUSED DISCONNECT SWITCH AND WIRE FROM SWITCH TO HEATER.

3.1.7. AT EACH HOT WATER HEATER REQUIRING ELECTRIC POWER PROVIDE SUITABLY

AND TANKS WITH DIELECTRIC BUSHINGS OR DIELECTRIC UNIONS 3.1.5. PROVIDE TEMPERATURE AND PRESSURE RELIEF VALVE FOR WATER SIDE OF EACH HEATER PIPED TO NEAREST FUNNEL OR HUB DRAIN.

PLUMBING SPECIALTIES & ACCESSORIES

<u>22 05 23</u>

GENERAL

1.1.1. PROVIDE PLUMBING SPECIALTIES AND ACCESSORIES 1.2. PRODUCT DATA

1.3.1. CSA-B125 PLUMBING FITTINGS.

1.2.1. SUBMIT PRODUCT DATA SHEETS FOR; 1.2.1.A. FLOOR DRAINS, CLEANOUTS, WATER HAMMER ARRESTERS, BACK FLOW PREVENTERS, BACK WATER VALVES, STRAINERS AND TRAPS. 1.3. APPLICABLE CODES AND STANDARDS

1.3.2. CSA B.64.1.1 VACUUM BREAKERS, ATMOSPHERIC TYPE 1.3.3. CSA B.64.4 BACKFLOW PREVENTERS, REDUCED PRESSURE PRINCIPLE TYPE 1.3.4. CSA B64.10 MANUAL FOR THE SELECTION AND INSTALLATION OF BACKFLOW

PREVENTION DEVICES/MANUAL FOR THE MAINTENANCE AND FIELD TESTING OF BACKFLOW PREVENTION DEVICES 1.3.5. CSA B79 FLOOR, AREA. AND SHOWER DRAINS AND CLEANOUTS FOR RESIDENTIAL CONSTRUCTION

1.3.6. PLUMBING AND DRAINAGE INSTITUTE (PDI) STANDARD PDI-WH201.WATER HAMMER 1.3.7. PDI-G101 TESTING AND RATING PROCEDURE FOR GREASE INTERCEPTORS WITH APPENDIX OF SIZING AND INSTALLATION DATA.

2.1. GENERAL 2.1.1. FLOOR, AREA, COMBINATION AND ROOF DRAINS AND CLEANOUTS TO CONFORM TO CSA B79 AND TO BE PRODUCTS OF ONE MANUFACTURER.

STANDARD OF ACCEPTANCE: JAY R. SMITH, MIFAB, ZURN 2.2. FLOOR DRAINS

2.3. COMBINATION DRAINS

DFVICE.

2.4.1.E. IN FINISHED FLOOR AREAS,

2.5. WATER HAMMER ARRESTERS

PD1-WH201.

AREAS, AND WITH

2.2.1. CONSTRUCTION: 2.2.1.A. CAST IRON BODY 2.2.1.B. INTEGRAL DOUBLE DRAINAGE OPENINGS, FLASHING RING AND CLAMPING

2.2.1.C. POLISHED NICKEL BRONZE ADJUSTABLE STRAINER. 2.2.1.D. INTEGRAL FLANGE TO RECEIVE THE FLOOR FINISH. 2.2.1.E. ADJUSTABLE GALVANIZED DUCTILE IRON TRACTOR GRATES IN MECHANICAL EQUIPMENT ROOMS AND FAN ROOMS.

2.3.1. AS SPECIFIED FOR FLOOR DRAINS WITH ADJUSTABLE NICKEL BRONZE STRAINER AND NICKEL BRONZE OVAL WASTE FUNNEL. 2.4. CLEANOUTS 2.4.1. IN FLOORS:

2.4.1.B. SEAL AND TEST PLUG 2.4.1.C. CAST IRON BODY WITH CLAMP AND COLLAR, 2.4.1.D. IN UNFINISHED FLOOR AREAS, 2.4.1.D.A. CAST IRON FRAME HEAVY DUTY SCORIATED CAST IRON ROUND OR

SQUARE TRACTOR COVER AND INTERNAL PLUG, AND

2.4.1.E.A. NICKEL BRONZE FRAME AND ROUND OR SQUARE NICKEL BRONZE

2.4.1.A. LINE SIZE FOR NPS 2, NPS 3 AND NPS 4 AND NPS 4 IN LARGER

ADJUSTABLE ACCESS COVER, 2.4.1.E.B. RECESSED FOR TILE INFILL IN TILED AREAS, 2.4.1.E.C. RECESSED FOR CARPET INFILL IN CARPETED AREAS. 2.4.1.E.D. DEEPLY RECESSED FOR TERRAZZO INFILL IN TERRAZZO FINISHED

EXTENDED FLANGE AROUND FRAME IN AREAS WITH MONOLITHIC FLOOR FINISHES. 2.4.2. IN EXPOSED AREAS, CEILING SPACES AND ACCESSIBLE PIPE CHASES, 2.4.2.A. CAST IRON CAULKING FERRULE WITH NEOPRENE JACKET AND PLUG SECURED TO BODY WITH CAP SCREWS.

2.5.1. STAINLESS STEEL CONSTRUCTION WITH PRECHARGED AIR CHAMBER OF NESTING

2.5.2. SELECTED IN ACCORDANCE WITH PLUMBING AND DRAINAGE INSTITUTE STANDARD

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Client Name City of Pickering

CoP Interior Fit-Out Project Address 2460 Brock Road

2240483

Drawing Title

Project number

Project Name

MECHANICAL SPECIFICATIONS PAGE 3 OF 4

Pickering, ON L1X 0J1

NTS Drawing Scale Drawing Number

True North

2.6. TRAP SEAL PRIMERS 2.6.1. SERVING 1 OR 2 DRAINS: 2.6.1.A. DIAPHRAGM OPERATED PRIMER WITH DISTRIBUTION UNIT, AUTOMATICALLY OPERATED BY A PRESSURE DROP OF 35 TO 70 KPA (5 TO 10 PSI) IN SUPPLY LINE TO FIXTURE. 2.6.2. SERVING 3 TO 30 DRAINS: 2.6.2.A. ELECTRIC, MANIFOLDED UNITS, 2.6.2.B. COMPONENTS FACTORY ASSEMBLED IN 1.5 MM (16 GA) RECESSED METAL CABINET WITH HINGED STAINLESS STEEL LOCKABLE ACCESS 2.6.2.C. ATMOSPHERIC VACUUM BREAKER, 2.6.2.D. PRESET 24 HR CLOCK, MANUAL OVER RIDE SWITCH, 2.6.2.F. 120 VOLT SOLENOID VALVE, 2.6.2.G. NPS ? OR NPS ½ VALVED INLET WATER CONNECTION, 2.6.2.H. CALIBRATED WATER DISTRIBUTION MANIFOLD. 2.6.2.I. NPS ½ OUTLET COMPRESSION FITTINGS. 2.7. BACK-FLOW PREVENTERS - REDUCED PRESSURE PRINCIPLE (RP) 2.7.1. CONFORMING TO CSA B.64.4 2.7.2. NPS 3/4 AND LARGER: 2.7.2.A. TWO INDEPENDENT CHECK VALVES WITH INTERMEDIATE RELIEF VALVE, 2.7.2.B. OS&Y ULC LISTED RESILIENT SEATED GATE VALVES, 2.7.2.C. BALL TEST COCKS, AND 2.7.2.D. AIR GAP DRAIN. 2.7.3. NPS ¼ AND ½: 2.8. STRAINERS 2.8.1. "Y" PATTERN WITH; 2.8.1.A. BRONZE, CAST IRON OR STEEL BODIES, SCREWED OR FLANGED TO MATCH PRESSURE CLASS AND SIZE RESTRICTIONS SPECIFIED FOR GLOBE VALVES IN SECTION OF PIPING SYSTEM WHERE STRAINER IS TO BE INSTALLED, 2.8.1.C. STAINLESS STEEL BASKETS WITH; 2.1.1.C.A. 0.8 MM (1/32 IN) DIAMETER PERFORATIONS FOR STRAINERS UP TO NPS 3 SIZE AND 2.1.1.C.B. 3.2 MM (C IN) DIAMETER PERFORATIONS FOR STRAINERS NPS 4 AND LARGER. BASKETS WITH 3.2 MM (C IN) DIAMETER PERFORATIONS TO BE MADE FROM 0.9 MM (0.037 IN) STOCK REINFORCED WITH 13 MM X 0.9 MM (1/2 IN X 0.037 IN) BANDS OF THE SAME MATERIAL SPOT WELDED TO BASKETS. EXECUTION 3.1. INSTALLATION GENERAL 3.1.1. INSTALL TO CONFORM WITH CANADIAN PLUMBING CODE, PROVINCIAL CODES, AND LOCAL AUTHORITY HAVING JURISDICTION. 3.2. CLEANOUTS 3.2.1. INSTALL AT BASE OF SOIL AND WASTE STACKS, AND RAINWATER LEADERS AND AT CHANGES IN DIRECTION

3.2.2. EXTEND CLEANOUTS FLUSH TO WALL OR FINISHED FLOOR UNLESS SERVICEABLE

3.2.3. INSTALL CLEANOUTS LOCATED IN FLOORS CLEAR OF OBSTRUCTIONS. 3.3. WATER HAMMER ARRESTERS 3.3.1. SELECT AND INSTALL IN ACCORDANCE WITH PDI-WH 201 ON BRANCH SUPPLIES

TO EACH FIXTURE OR GROUP OF FIXTURES 3.4. TRAP SEAL PRIMERS 3.4.1. SELECT AND INSTALL TO PRIME FLOOR AND FUNNEL DRAIN TRAPS. 3.4.2. 120V 1PH 60 HZ SUPPLY WILL BE BROUGHT TO ELECTRIC MANIFOLDED UNITS

UNDER DIVISION 26 AND CONNECTED UNDER DIVISION 22. 3.5. BACK-FLOW PREVENTERS AND VACUUM BREAKERS

3.5.1. INSTALL IN ACCORDANCE WITH CSA B64.10. 3.5.2. INSTALL BACKFLOW PREVENTERS HORIZONTALLY, IN ACCORDANCE WITH MANUFACTURERS RECCOMENDATIONS, BUT NOT LESS THAN 300MM (12") AND NOT GREATER THAN 1500MM (60") ABOVE THE FLOOR.

3.5.3. PIPE DISCHARGE FROM BACKFLOW PREVENTER, WITH AIR GAP, TO NEAREST DRAIN OR SERVICE SINK.

DOMESTIC WATER SUPPLY PIPING COPPER 22 11 16

GENERAL 1.1. SCOPE

2.3. JOINTS

1.1.1. PROVIDE COPPER PIPE AND FITTINGS FOR POTABLE DOMESTIC WATER PIPING, ABOVE GROUND. 1.2. APPLICABLE CODES AND STANDARDS

1.2.1. ASTM B88 STANDARD SPECIFICATION FOR SEAMLESS COPPER WATER TUBE 1.2.2. ASME B16.15 CAST BRONZE THREADED FITTINGS, CLASSES 125 AND 250 1.2.3. ASME B16.18 CAST COPPER ALLOY SOLDER JOINT PRESSURE FITTINGS 1.2.4. ASME B16.22 WROUGHT COPPER AND COPPER ALLOY SOLDER JOINT PRESSURE

1.2.5. ASTM B828 STANDARD PRACTICE FOR MAKING CAPILLARY JOINTS BY SOLDERING OF COPPER AND COPPER ALLOY TUBE AND FITTINGS.

1.2.6. CSA B242 GROOVE AND SHOULDERED TYPE MECHANICAL COUPLINGS

1.2.7. AWS A5.8 BRAZING FILLER METAL 1.2.8. AWWA C606 GROOVED AND SHOULDERED JOINTS

1.2.9. ASTM A307 STANDARD SPECIFICATION FOR CARBON STEEL BOLTS AND STUDS 60 000PSL TENSILE STRENGTH 1.2.10. ASTM A563 STANDARD SPECIFICATION FOR CARBON AND ALLOY STEEL NUTS 1.2.11. ASTM B-32 SPECIFICATION FOR SOLDER METAL

PRODUCTS 2.1. DOMESTIC HOT, COLD AND RECIRCULATING PIPING, WITHIN BUILDING 2.1.1. COPPER TUBE: TO ASTM B88. 2.1.1.A. HARD DRAWN, TYPE K ABOVE GROUND.

2.1.1.B. SOFT ANNEALED, TYPE K BELOW GROUND. 2.1.2. TUBE TO HAVE CERTIFICATION MARKINGS MADE BY TESTING AGENCY ACCREDITED BY STANDARDS COUNCIL OF CANADA. 2.2. FITTINGS

2.2.1. BRASS OR BRONZE FLANGES AND FLANGED FITTINGS: TO ASME B16.24. 2.2.2. BRASS OR BRONZE THREADED FITTINGS: TO ASME B16.15. 2.2.3. SOLDER/BRAZED FITTINGS: CAST BRONZE TO ASME B16.18, OR WROUGHT

COPPER AND BRONZE TO ASME B16.22. 2.2.4. ROLL GROOVE FULL FLOW STANDARD RADIUS CAST BRONZE FITTINGS FOR SIZES NPS 2 1/2 AND LARGER: TO AWWA C606.

2.3.1. FLANGED JOINTS: 2.3.1.A. MADE UP WITH RUBBER GASKETS 1.6 MM (1/16 IN) THICK TO AWWA 2.3.1.B. HEAVY SERIES BOLTS, HEXAGONAL HEAD PATTERN TO ASTM A307, NUTS

TO ASTM 563, AND WASHERS. 2.3.2. SOLDER: TIN ANTIMONY SOLDER, 95:5 TO ASTM B-32 2.3.3. SILVER BRAZING ALLOY AWS CLASSIFICATION BCUP-5

2.3.4. ROLL GROOVED PIPING: 2.3.4.A. MADE UP WITH ROLL GROOVE POSITIVE CLAMP GASKETTED COUPLINGS OR ROLL GROOVE FLANGE ADAPTERS FOR COPPER PIPING TO CSA B242 OR AWWA C606.

EXECUTION

3.1. INSTALLATION 3.1.1. ISOLATE EQUIPMENT, FIXTURES AND BRANCHES WITH GATE, BALL OR BUTTERFLY VALVES.

3.1.2. USE GLOBE, DRVS, BALL OR BUTTERFLY VALVES FOR THROTTLING SERVICE. 3.1.3. INSTALL PIPING CLOSE TO BUILDING STRUCTURE TO MINIMIZE FURRING AND CONSERVE HEADROOM. GROUP PIPING AND RUN PARALLEL TO WALLS AND

3.1.4. CUT TUBE SQUARE, REAM TUBE ENDS AND CLEAN TUBING AND TUBE ENDS BEFORE JOINT ASSEMBLY. 3.1.5. PREPARE ROLL GROOVE JOINTS IN SHOP OR FIELD USING GROOVE ROLLING

MACHINE 3.1.6. ASSEMBLE ROLL GROOVE JOINTS USING DRY LUBRICATED GASKETS. 3.1.7. ANCHORS, GUIDE AND SUPPORT ROLL GROOVED PIPING IN ACCORDANCE WITH COUPLING MANUFACTURERS INSTRUCTIONS.

3.1.8. BEFORE ASSEMBLING SOLDER OR BRAZED JOINTS, REMOVE WORKING PARTS OF VALVES, CLEAN INSIDE OF SOLDER FITTINGS AND OUTSIDE OF MATING PIPE WITH EMERY PAPER AND COAT WITH FLUX.

3.1.9. SOLDER OR BRAZE JOINTS WITH BLOW TORCH OR OXY-ACETYLENE FLAME. 3.1.10. JOINT CONSTRUCTION, BURIED: 3.1.10.A. ALL SIZES: BRAZED.

3.1.11. JOINT CONSTRUCTION, ABOVE GROUND: 3.1.11.A. UP TO NPS 2½: SOLDERED IN ALL LOCATIONS 3.1.11.B. NPS 3 AND LARGER: BRAZED IN ALL LOCATIONS

3.1.11.C. NPS 3 AND LARGER: GROOVED JOINT IN EXPOSED AREAS ONLY. 3.1.11.C.A. FOR GREATER CLARITY, EXPOSED AREAS?INCLUDE INSIDE SERVICE ROOMS AND ABOVE LAY-IN TILE CEILINGS. BUT EXCLUDES VERTICAL AND HORIZONTAL SERVICE SHAFTS, ABOVE ANY OTHER CEILING CONSTRUCTION, AND INSIDE WALLS AND PARTITIONS.

3.2. TESTING AND BALANCING 3.2.1. PRESSURE TEST PIPING BEFORE INSULATION IS APPLIED. CUT-OUT AND REPLACE LEAKING SOLDERED OR BRAZED FITTINGS AND RETEST.

3.2.2. BALANCE SUPPLY SYSTEMS USING LOCK SHIELD GLOBE VALVES OR DVR.

DRAINAGE & VENT PIPING CAST IRON & COPPER <u>22 13 16</u>

 GENERAL 1.1. SCOPE 1.1.1. PROVIDE CAST IRON PIPE & FITTINGS &/OR COPPER TUBE & FITTINGS FOR DRAIN, WASTE & VENT SERVICES.

1.1.1.A. FOR ABOVEGROUND SERVICES. 1.2. RELATED SECTIONS

1.2.1. 22 13 21 : DRAINAGE PIPING - PUMPED 1.3. APPLICABLE CODES & STANDARDS 1.3.1. STANDARDS:

1.3.1.A. CSA B70 CAST IRON SOIL PIPE, FITTINGS, & MEANS OF JOINING 1.3.1.B. CSA-B125 PLUMBING FITTINGS. 1.3.1.C. CSA B158.1 CAST BRASS SOLDER JOINT DRAINAGE, WASTE, & VENT

FITTINGS CSA B602 MECHANICAL COUPLINGS FOR DRAIN, WASTE, & VENT PIPE & SEWER PIPE.

ASTM A74 STANDARD SPECIFICATION FOR CAST IRON SOIL PIPE & FITTINGS ASTM A888 STANDARD SPECIFICATION FOR HUBLESS CAST IRON PIPE &

FITTINGS FOR SANITARY & STORM DRAIN, WASTE & VENT PIPING APPLICATIONS 1.3.1.G. ASME B16.29 WROUGHT COPPER & WROUGHT COPPER ALLOY SOLDER

JOINT DRAINAGE FITTINGS DWV ASTM B32 SPECIFICATION FOR SOLDER METAL STM B306 STANDARD SPECIFICATION FOR COPPER DRAINAGE TUBE

ASTM C564- SPECIFICATION FOR RUBBER GASKETS FOR CAST IRON SOIL PIPE & FITTINGS.

ASTM C1540 STANDARD SPECIFICATION FOR HEAVY DUTY SHIELDED COUPLINGS JOINING HUBLESS CAST IRON SOIL PIPE & FITTINGS.

ASTM B828 STANDARD PRACTICE FOR MAKING CAPILLARY JOINTS BY SOLDERING OF COPPER & COPPER ALLOY TUBE & FITTINGS. 1.3.1.M. CANADIAN PIPE INSTITUTE STANDARD SPECIFICATION

1.3.1.N. CAST IRON SOIL PIPE INSTITUTE (CISPI) TECHNICAL MANUAL 1.3.1.0. CISPI 301 STANDARD SPECIFICATION FOR HUBLESS CAST IRON PIPE & FITTINGS FOR SANITARY & STORM DRAIN, WASTE & VENT PIPING

APPLICATIONS CISPI 310 SPECIFICATION FOR COUPLINGS FOR USE IN CONNECTION WITH HUBLESS CAST IRON SOIL PIPE & FITTINGS FOR SANITARY &

STORM DRAIN, WASTE & VENT PIPING APPLICATIONS

2. PRODUCTS

2.2. FITTINGS:

2.1. PIPE: COPPER VENT PIPE & FITTINGS, WITHIN BUILDING 2.1.1. COPPER DWV TUBE, TO ASTM B306 2.1.2. CERTIFICATION MARKINGS BY TESTING AGENCY ACCREDITED BY STANDARDS COUNCIL OF CANADA.

2.2.1. CAST BRASS TO CSA B158.1 2.2.2. WROUGHT COPPER TO ANSI B16.29 2.3. SOLDER: TIN-ANTIMONY 95/5, TO ASTM B32 ALLOY SB5. 2.4. CAST IRON PIPE & FITTINGS FOR DRAIN WASTE & VENT SERVICES

2.4.1. PIPE & FITTINGS: CAST TO CSA B70, ASTM A74 OR ASTM A888 2.4.2. WITH HEAVY BITUMINOUS COATING FOR BURIED SERVICE.

2.4.3. JOINTS BELOW GRADE:

2.4.3.A. PLAIN END MADE UP USING MECHANICAL SLEEVE JOINTS TO CSA B602 & ASTM C1540 WITH NEOPRENE OR BUTYL RUBBER COMPRESSION GASKETS TO ASTM C564, WITH STAINLESS STEEL SLEEVE & NOT LESS THAN FOUR STAINLESS STEEL DRIVE CLAMPS WITH STAINLESS STEEL WORM GEARS.

EXECUTION 3.1. INSTALLATION GENERAL 3.1.1. INSTALL SUSPENDED PIPING TO GRADE, PARALLEL & CLOSE TO WALLS & CEILINGS TO CONSERVE HEADROOM & SPACE.

3.1.2. INSTALL PIPING CLOSE TO BUILDING STRUCTURE TO MINIMIZE FURRING. GROUP PIPING & RUN PARALLEL TO WALLS & CEILINGS. 3.2. CAST IRON PIPING 3.2.1. INSTALL CAST IRON DRAINAGE PIPING IN ACCORDANCE WITH CAST IRON SOIL

PIPE & FITTINGS (CISPF) TECHNICAL MANUAL. 3.2.2. FOR SUSPENDED PIPING, PROVIDE HANGERS WITHIN 450 MM (18 IN) OF EACH JOINT, AT EACH CHANGE OF DIRECTION, & WITHIN 450 MM (18 IN) OF THE TERMINAL END OF EACH PIPE RUN.

MANUFACTURERS RECOMMENDED TORQUE VALUE WITH TORQUE WRENCH. 3.2.4. PROVIDE BRACES OR TIE-RODS ON HORIZONTAL PIPING NPS 5 & LARGER: 3.2.4.A. AT EACH BRANCH OPENING OR CHANGE OF DIRECTION, 3.2.4.B. AT EACH PIPE RUN COUPLING.

3.2.3. ASSEMBLE & TIGHTEN MECHANICAL SLEEVE JOINTS TO COUPLING

3.2.5. PROVIDE SWAY BRACING ON ALL HORIZONTAL PIPING WHERE THE HANGER LENGTH IS GREATER THAN 450MM (18 IN) FROM THE TOP OF THE PIPE TO THE CONNECTING POINT ON THE STRUCTURE. 3.3. COPPER TUBING

3.3.1. CUT COPPER TUBE SQUARE, REAM TUBE ENDS & CLEAN TUBING & TUBE ENDS

3.3.2. BEFORE ASSEMBLING SOLDER JOINTS, CLEAN INSIDE OF SOLDER FITTINGS & OUTSIDE OF MATING PIPE WITH EMERY PAPER & COAT WITH FLUX. 3.3.3. SOLDER JOINTS IN COPPER PIPE WITH BLOW TORCH OR OXY-ACETYLENE FI AMF

3.4. TESTING 3.4.1. TEST BEFORE PIPING IS CONCEALED. 3.4.2. CUT-OUT & REPLACE LEAKING SOLDERED FITTINGS, REMAKE JOINTS IN CAST

IRON PIPING, & RETEST.

FIRE PROTECTION **GENERAL 21 05 0**

1.1. SCOPE 1.1.1. FIRE PROTECTION WORK INCLUDES;

1.1.1.A. STANDPIPE & HOSE SYSTEMS

GENERAL

1.1.1.B. FIRE EXTINGUISHERS 1.1.1.C. WET PIPE SPRINKLER SYSTEM 1.2. APPLICABLE CODES AND STANDARDS

1.2.1. FIRE PROTECTION WORK TO CONFORM TO STANDARDS OF NATIONAL FIRE PREVENTION ASSOCIATION (NFPA) AND RELEVANT SECTIONS OF THE ONTARIO BUILDING CODE.

1.3. WATER SUPPLY TEST RESULTS 1.3.1. PROVIDE WATER FLOW TEST ON MUNICIPAL WATER SERVICE IN PROXIMITY TO BUILDING CONNECTION, IN ACCORDANCE WITH NFPA 14 AND NFPA 291. FLOW TEST MUST BE CONDUCTED WITHIN ONE (1) YEAR PRIOR TO SYSTEM DESIGN. SUBMIT RECORD OF TEST INCLUDING STATIC PRESSURE, AND RESIDUAL

PRESSURE AND FLOW. 1.3.2. OBTAIN MUNICIPAL APPROVAL AND PAY FEES ASSOCIATED WITH TESTING.

2. PRODUCTS 2.1. PIPE, HANGERS AND GASKETS 2.1.1. PIPE:

2.1.1.A. ASTM A53 GRADE B, SCHEDULE 40 CONTINUOUS WELD STEEL TO UP TO NPS 2, GROOVED OR SCREWED. 2.1.1.A.A. GALVANIZED WHERE SPECIFIED.

2.1.1.B. ASTM A53-63R GRADE B, SCHEDULE 40 ELECTRIC RESISTANCE WELD STEEL FOR NPS 2 ½ TO NPS 10, WELDED. 2.1.1.C. NPS 2½ AND OVER ASTM A53-72A SCHEDULE 10 THIN WALL, ROLLED

ASTM A53-63R GRADE B ELECTRIC RESISTANCE WELD STEEL 9.53 MM (0.375 IN) WALL THICKNESS FOR NPS 12 AND OVER, WELDED. 2.1.2. PIPE HANGERS

2.1.2.A. UL/ULC LISTED FOR FIRE PROTECTION, AND 2.1.2.B. SWIVEL RING HANGER TYPE OR 2.1.2.C. AS SPECIFIED IN SECTION 20 05 29 HANGERS AND SUPPORTS. 2.1.3. GASKETS FOR FLANGED JOINTS:

2.1.3.A. RED RUBBER SHEET 1.6 MM (1/16 IN) THICK. 2.2. FITTINGS, AND VALVES UP TO 1200 KPA (175 PSI) WORKING PRESSURE 2.2.1. FITTINGS:

2.2.1.A. 1035 KPA (150 #) BLACK MALLEABLE IRON SCREWED UP TO NPS 2. 2.2.1.B. FORGED STEEL, BUTT WELDING SCHEDULE 40 FOR NPS 21/2 AND OVER. 2.2.2. UNIONS:

2.2.2.A. 1035 KPA (150 #) BLACK MALLEABLE GROUND JOINT UNION, BRONZE TO IRON SEAT UP TO NPS 2. 2.2.3. FLANGES: 2.2.3.A. 1035 KPA (150 #) FORGED STEEL, SLIP-ON OR WELD NECK, RAISED

FACE STYLE. 2.2.4. VALVES: 2.2.4.A. ULC AND FM LISTED FOR FIRE PROTECTION SERVICE.

2.3. FITTINGS FOR GROOVED PIPE TO 1200 KPA (175 PSI) 2.3.1. COUPLINGS: 2.3.1.A. MALLEABLE OR DUCTILE IRON NPS 2½ AND OVER.

2.3.2. FITTINGS: 2.3.2.A. MALLEABLE IRON OR DUCTILE IRON TO NPS 2½ TO NPS 12. 2.3.2.B. FABRICATED STEEL NPS 14 AND OVER.

2.3.3. FLANGES: 2.3.3.A. CAST IRON, RAISED FACE FLANGE WITH COUPLING GROOVE NPS 21/2 AND OVER.

2.3.4. GASKETS FOR GROOVED COUPLINGS: 2.3.4.A. EPDM GRADE "E", DRY LUBRICATED 2.4. BACKFLOW PREVENTER

2.4.1. ULC AND FM LISTED FOR FIRE SERVICE, 2.4.2. DOUBLE CHECK VALVE FOR FIRE SYSTEMS (DCVAF) ASSEMBLIES, TO CSA

STANDARD B64.5.1-01 2.4.3. REDUCED PRESSURE BACKFLOW PREVENTER ASSEMBLIES FOR FIRE SYSTEMS (RPF) TO CSA STANDARD B64.4.1-01.

EXECUTION 3.1. WATER SERVICE CONNECT TO STANDPIPE, SPRINKLER, AND DOMESTIC WATER SYSTEM AS SHOWN.

3.2. PIPING INSTALLATION 3.2.1. GENERAL LAYOUT OF MAINS, RISERS, RUN-OUTS AND CONNECTION DETAILS OF PIPING SYSTEMS ARE SHOWN

3.2.2. PROVIDE BENDS, EXPANSION LOOPS, HOSES OR JOINTS TO COMPENSATE FOR PIPE SEISMIC MOVEMENT. 3.2.3. ANCHOR. GUIDE AND LATERALLY SUPPORT VERTICAL AND HORIZONTAL PIPING TO SUPPORT FILLED WEIGHT AND ABSORB THRUST UNDER OPERATING CONDITIONS.

3.2.4. ERECT PIPING SO THAT GRAVITY FORCES AND THRUST FROM CHANGES IN DIRECTION DO NOT STRESS CONNECTIONS TO APPARATUS. 3.2.5. SEPARATE COPPER PIPE AND FITTING MATERIALS FROM CONTACT WITH FERROUS

MATERIAL WITH DI-ELECTRIC COUPLINGS. 3.2.6. INSTALL DRAIN VALVES AT LOW POINTS IN WATER PIPING SYSTEMS AND IN VALVED RUN-OUTS FROM RISERS SO THAT SYSTEM OR ISOLATED PARTS OF SYSTEM CAN BE DRAINED. 3.3. PREMISES BACKFLOW PROTECTION

3.3.1. PROVIDE A PREMISES BACKFLOW PREVENTION IN ACCORDANCE WITH THE ONTARIO BUILDING CODE.

<u>Fire extinguishers</u> <u>21 12 29</u>

 GENERAL 1.1. SCOPE

1.1.1. PROVIDE EXTINGUISHERS IN SERVICE ROOMS, KITCHENS AND FIRE HOSE CABINETS.

1.2. APPLICABLE STANDARDS 1.2.1. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 10 STANDARD FOR PORTABLE FIRE EXTINGUISHERS

2.1. PRESSURIZED WATER EXTINGUISHERS (TO MATCH EXISTING) 2.1.1. STORED PRESSURE TYPE, SQUEEZE-GRIP OPERATED OF STAINLESS STEEL CONSTRUCTION, ULC LABELED, 9.1 L (2 GAL) SIZE, 2-A RATING. STANDARD OF ACCEPTANCE: NATIONAL FIRE EQUIPMENT LTD. - MODEL

WBDL-W2.5, FLAG FIRE EQUIPMENT LTD - MODEL PWS-25-F 2.2. MULTIPURPOSE DRY CHEMICAL EXTINGUISHERS (IN ALL SERVICE ROOMS) 2.2.1. STORED PRESSURE RECHARGEABLE TYPE WITH HOSE AND SHUT-OFF NOZZLE, ULC LABELED FOR A, B AND C CLASS PROTECTION, RED ENAMEL FINISH. SIZES 2.25 KG (5 LB).

> STANDARD OF ACCEPTANCE: NATIONAL FIRE EQUIPMENT LIMITED - ABC, FLAG FIRE EQUIPMENT LIMITED — ABC

2.3. ORDINARY DRY CHEMICAL EXTINGUISHERS 2.3.1. STORED PRESSURE TYPE WITH HOSE AND SHUT-OFF NOZZLE, ULC LABELED

FOR B AND C CLASS PROTECTION, GLOSSY ENAMEL FINISH. SIZES 2.25 KG (5 2.3.2. PROVIDE 1.25 KG (2 ? LB) SIZE IF NOT OTHERWISE SHOWN. STANDARD OF ACCEPTANCE: NATIONAL FIRE EQUIPMENT LIMITED - PDC, FLAG FIRE EQUIPMENT LIMITED — PDC

2.4. IDENTIFICATION OF EXTINGUISHERS 2.4.1. INCLUDE BILINGUAL TAG OR LABEL ATTACHED TO EXTINGUISHERS, IN ACCORDANCE WITH RECOMMENDATIONS OF NFPA 10, INDICATING MONTH AND YEAR OF INSTALLATION, WITH SPACE FOR SERVICE DATES. STANDARD OF ACCEPTANCE: NATIONAL FIRE EQUIPMENT LIMITED - FB-6078,

EXECUTION 3.1. MOUNT CABINETS AND BRACKETS.

FLAG FIRE EQUIPMENT LIMITED.

WET PIPE SPRINKLER SYSTEM 21 13 13

 GENERAL 1.1. SCOPE

1.1.1. PROVIDE WET PIPE AUTOMATIC SPRINKLER SYSTEMS.

1.1.2. PROVIDE INSTALLATION DRAWINGS AND HYDRAULIC CALCULATIONS, DESIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENCED IN THE PROVINCE OF ONTARIO. 1.2. QUALIFIED SUBCONTRACTORS

1.2.1. SPRINKLER WORK TO BE UNDERTAKEN BY SPECIALIST AUTOMATIC SPRINKLER INSTALLATION FIRM WITH AN ESTABLISHED REPUTATION IN THIS FIELD. 1.3. APPLICABLE CODES AND STANDARDS

1.3.1. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 13 - STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS 1.3.2. NFPA 25 - STANDARD FOR THE INSPECTION, TESTING AND MAINTENANCE OF

WATER-BASED FIRE PROTECTION SYSTEMS 1.3.3. ONTARIO BUILDING CODE 1.3.4. ONTARIO FIRE CODE

1.3.5. ASTM A53 STANDARD SPECIFICATION FOR PIPE, STEEL, BLACK AND HOT-DIPPED, ZINC-COATED, WELDED AND SEAMLESS 1.3.6. CSA B64 - BACKFLOW PREVENTERS AND VACUUM BREAKERS

1.4. SHOP DRAWINGS AND PRODUCT DATA 1.4.1. PREPARE SHOP DRAWINGS AND FORWARD THREE COPIES WITH HYDRAULIC CALCULATIONS TO OWNERS INSURERS FOR REVIEW AND ACCEPTANCE.

1.4.2. AFTER SHOP DRAWINGS ARE ACCEPTED BY REVIEWING AUTHORITY SUBMIT COPIES OF THESE STAMPED SHOP DRAWINGS AND PRODUCT DATA SHEETS FOR REVIEW IN ACCORDANCE WITH DIVISION 1 PROCEDURES. 1.5. SAMPLES

1.5.1. SYSTEM IS DESIGNED TO NFPA 13 USING HYDRAULIC METHOD FOR HAZARD CLASSIFICATION DETERMINED UNDER NFPA DESIGN DENSITIES AND DESIGN AREAS FOR EACH ZONE AS DETAILED. 1.5.2. HYDRAULIC CALCULATIONS ARE BASED ON WATER SUPPLY TEST RESULTS, DOWN-RATED

IN ACCORDANCE WITH REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION AS SHOWN. CHANGES TO PIPE SIZES OR HEAD LAYOUTS ACCOMPANIED WITH MODIFIED HYDRAULIC CALCULATIONS, MAY BE SUBMITTED FOR APPROVAL. 1.6. MAINTENANCE MATERIALS

1.6.1. PROVIDE CABINET, CONTAINING SPECIAL SPRINKLER WRENCH, AND SPARE STOCK OF SPRINKLERS. INCLUDE AT LEAST ONE HEAD OF EACH TYPE AND TEMPERATURE RATING INSTALLED IN SYSTEM. PRODUCTS

2.1. SPRINKLER HEADS

2.1.1.A. ULC AND FM LISTED FOR FIRE SERVICE. F) WITH INTERMEDIATE OR HIGH *F TO 165 °C (135 °C TO 74°)

2.1.1.C. THERMAL SENSITIVITY 2.1.1.C.A. QUICK RESPONSE TYPE FOR LIGHT AND ORDINARY HAZARD APPLICATIONS 2.1.1.C.B. STANDARD RESPONSE TYPE FOR EXTRA HAZARD APPLICATIONS.

2.1.1.B. STANDARD 57 TEMPERATURE RATING TO SUIT LOCAL CONDITIONS.

2.1.2. SELECTION: 2.1.2.A. INDICATED BY TYPE IN ACCORDANCE WITH FOLLOWING 2.1.2.A.A. TYPE U-1 UPRIGHT BRONZE BODY WITH 12 MM (1/2 IN) DIAMETER ORIFICE

OR 13 MM (17/32 IN) DIAMETER ORIFICE AS SHOWN. TYPE P-1 PENDENT, RECESSED, CHROME PLATED ADJUSTABLE ESCUTCHEON BODY RING AND CUP, GLASS BULB TYPE. TYPE P-2 PENDENT, FLUSH, CONCEALED WITH FUSIBLE CHROME OR WHITE

COVER PLATE, GLASS BULB TYPE D-1 PENDENT, DRY TYPE HEAD WITH EXTENSION NIPPLE AND SEALED BRASS INLET, GLASS BULB

TYPE S-1 SIDE WALL, BRONZE BODY AND CHROME ESCUTCHEON PLATE, LINK AND LEVER. TYPE S-2 SIDE WALL, CHROME PLATED BODY AND ESCUTCHEON PLATE.

LINK AND LEVER. 2.2. ANCILLARY DEVICES 2.2.1. SUPERVISORY SWITCHES: 2.2.1.A. ULC AND FM LISTED FOR FIRE SERVICE,

2.2.1.B. MECHANICALLY SECURED, WITH N.O. AND N.C. CONTACTS AND SUPERVISORY CAPABILITY, 2.2.1.C. FOR OS & Y GATE VALVES.

2.2.2. PRESSURE SWITCHES ON ALARM CHECK VALVES: 2.2.2.A. FOR LOSS OF NORMAL WATER PRESSURE ON WET SPRINKLER SYSTEM, 2.2.2.B. FOR MONITORING OF LOW WATER PRESSURE ON WET SPRINKLER SYSTEM WITH EXCESS PRESSURE PUMP.

2.2.3.B. FITTED WITH; 2.2.3.B.A. SEALED RETARD, 2.2.3.B.B. VISUAL INDICATION OF SWITCH ACTIVATION.

2.2.3.A. FOR MOUNTING IN ZONE PIPING.

2.2.3. FLOW INDICATORS:

2.2.3.B.C. MECHANICAL DELAY ADJUSTMENT 2.2.4. WATER GONG: 2.2.4.A. WATER OPERATED OUTSIDE ALARM BELL, WEATHER PROTECTED.

2.3. SIGNS 2.3.1. TYPE: 2.3.1.A. FITTED ON CONTROL VALVES, SHUT-OFF VALVES, DRAIN VALVES AND TEST

150 MM X 150 MM (6 IN X 6 IN) FOR AUTOMATIC CONTROL VALVES AND ALARM VALVES. 2.3.1.C. 50 MM X 150 MM (2 IN X 6 IN) FOR OTHER VALVES, AND MADE OF ENAMELED STEEL WITH FIRE DEPARTMENT RED ENAMEL BACKGROUND,

WHITE LETTERS, INSCRIPTION IN ACCORDANCE WITH NFPA STANDARDS. 2.4. SPRINKLER CONTROL CABINETS 2.4.1. CONSTRUCTION

2.4.2. 765 MM (30 IN) HIGH, 765 MM (30 IN) WIDE AND 305 MM (12 IN) DEEP, FLUSH TYPE WITH 1.6 MM (16 GA) STEEL TUB, 2.5 MM (12 GA) METAL DOOR, AND 2.5 MM (12 GA) FLUSH ADJUSTABLE PLASTER TRIM WITH FULL REBATE FOR DOOR, OPENING DOOR HINGES AND CORBIN LATCH WITH LOCK OF FLUSH P 2.4.3. FULLY CONCEALED, 180 CONSTRUCTION,

2.4.4. INTERIOR SURFACES OF CABINET PRIME PAINTED WITH FINAL FINISH PROVIDED UNDER FINISHES, DIVISION 9, 2.4.5. FITTED WITH ALARM TEST MODULE CONSISTING OF RISING STEM BRONZE GLOBE VALVE

HAVING INTEGRAL ORIFICE AND DRAIN PORT AND SIGHT GLASSES, AND

2.4.6. IDENTIFIED BY RED LETTERED SIGN: "X FLOOR, "Y" ZONE SPRINKLER SHUT-OFF VALVE. DRAIN AND TEST". 2.5. PRESSURE REDUCING VALVES 2.5.1. CONSTRUCTION

2.5.1.A. SINGLE SEATED, 2.5.1.B. HYDRAULICALLY OPERATED, 2.5.1.C. PILOT CONTROLLED,

2.5.1.D. DIAPHRAGM STYLE GLOBE OR ANGLE MAIN VALVE WITH EPOXY, KYNAR, OR ECTFE INTERNAL COATING.

EXECUTION

3.1. GENERAL 3.1.1. PROVIDE HEADERS, ALARM CHECK VALVE ASSEMBLIES, VALVES, AND FIRE DEPARTMENT CONNECTIONS.

3.1.2. PROVIDE SUPERVISORY SWITCHES ON VALVES. 3.1.3. PROVIDE WATER FLOW ALARM SWITCHES, AND TWO LOW WATER PRESSURE MONITORING

3.1.3.A. ONE LOW WATER PRESSURE SWITCH TO OPERATE EXCESS PRESSURE PUMP ONE LOW WATER PRESSURE SWITCH TO ANNUNCIATE TROUBLE CONDITION TO FIRE ALARM SYSTEM, SET AT 70 KPA (10 PSIG) BELOW EXCESS PRESSURE

PUMP START SETPOINT - FIELD VERIFIED. 3.1.4. PROVIDE SIGNS AT EACH VALVE IDENTIFYING PORTION OF SYSTEM CONTROLLED. FASTEN SIGNS TO PIPE IN IMMEDIATE VICINITY OF VALVE.

3.1.5. INSTALL EXCESS PRESSURE PUMP ACROSS ALARM VALVE. 3.1.6. EXTEND PIPING [THROUGH ZONE SPRINKLER CONTROL CABINETS.][]AND CONNECT TO

SPRINKLERS. 3.1.7. WIRING OF TROUBLE AND FLOW ALARMS FROM ZONE SPRINKLER CONTROL VALVES WILL

BE DONE UNDER ELECTRICAL DIVISION. 3.1.8. PROVIDE DRAIN VALVES AT TRAPPED LOW POINTS IN PIPING SYSTEM.

3.1.9. PROVIDE ADDITIONAL SPRINKLER HEADS WITH ASSOCIATED PIPING FOR SPRINKLER PROTECTION UNDER DUCTS, UNDER OBSTRUCTIONS, AND IN BLIND SPACES. IDENTIFY ADDITIONAL SPRINKLER HEADS ON SHOP DRAWINGS WITH CAPITAL LETTER "A" AND RESUBMIT DRAWINGS TO PERMIT INCLUSION OF THESE SPRINKLER HEADS IN HYDRAULIC

3.1.10. COMBINATION DRAINS OR HUB DRAINS WILL BE PROVIDED AT ZONE CONTROL CABINETS UNDER PLUMBING.

3.2. SPRINKLER SELECTION 3.2.1. USE PENDANT SPRINKLERS WHERE SUSPENDED CEILINGS OCCUR. LOCATE SPRINKLERS IN SYMMETRICAL PATTERN TO SUIT REFLECTED CEILING PLANS AND TO AVOID SPEAKERS. FIRE ALARM COMPONENTS, LIGHTING FIXTURES, DUCTWORK AND DIFFUSERS. IN GENERAL, CENTRE HEADS IN CEILING TILES. 3.3. TESTING AND APPROVALS

3.3.1. TEST SPRINKLER SYSTEMS IN ACCORDANCE WITH REQUIREMENTS OF NFPA 3.3.2. IN EXISTING BUILDINGS, FOR NEW ADDITIONS TO AN EXISTING SPRINKLER SYSTEM: IN ADDITION TO THE NFPA REQUIREMENTS FOR PRESSURE TESTING, CONDUCT AN INITIAL

PRESSURE TEST: 3.3.2.A. ISOLATE THE NEW PIPING FROM THE EXISTING SYSTEM, PRESSURE TEST THE NEW PIPING AT 350 KPA (50 PSIG) USING OIL-FREE

COMPRESSED AIR OR NITROGEN, MAINTAIN PRESSURE TEST FOR ONE HOUR WITHOUT LOSS OF PRESSURE, IF ANY LEAKS ARE DISCOVERED, REPAIR LEAKS AND RETEST. 3.3.3. IN EXISTING BUILDINGS, CONDUCT THE FINAL PRESSURE TEST IN ACCORDANCE WITH

NFPA REQUIREMENTS, AND ISOLATE SERVICE VALVES ON OTHER FLOORS DURING TESTING. 3.3.4. SCHEDULE TESTING TO GIVE AT LEAST TWO WEEKS NOTICE TO FOLLOWING AUTHORITIES:

3.3.4.A. LOCAL BUILDING/PLUMBING INSPECTOR, 3.3.4.B. LOCAL FIRE DEPARTMENT REPRESENTATIVE, 3.3.4.C. INSURER'S REPRESENTATIVE,

3.3.4.D. OWNER, AND

3.3.4.E. CONSULTANT 3.3.5. PRIOR TO TESTING, ENSURE THAT VALVES, FLOW SWITCHES, PRESSURE SWITCHES, SUPERVISORY SWITCHES AND OTHER DEVICES ARE FUNCTIONING.

PROVIDE CONTRACTOR'S MATERIAL AND TEST CERTIFICATE FOR ABOVE GROUND PIPING. DISTRIBUTE COPIES OF CERTIFICATES AS PER SHOP DRAWING REQUIREMENTS. 3.3.7. ON COMPLETION OF PROJECT OBTAIN CERTIFICATE OF APPROVAL SHOWING THAT WORK IS IN ACCORDANCE WITH RULES AND REGULATIONS OF NATIONAL FIRE PROTECTION

City of Pickering

2460 Brock Road, Pickering, ON, Canada L1X 0J1 Building A-200A, 2nd Floor



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03 24/08/23 ISSUED FOR PERMIT/TENDER 02 24/08/16 ISSUED FOR 100% COORDINATION 01 24/08/08 ISSUED FOR 90% REVIEW ISSUE | A | YY/MM/DD | DESCRIPTION



354 Davenport Road, Suite 200 Toronto, Ontario, Canada M5R 1K6 T: (416) 413-0063

email: info@instudiocreative.com

Client Name	
	City of Pickering
Project Name	
	CoP Interior Fit-Out
Project Address	
	2460 Brock Road Pickering, ON L1X 0J1
Project number	
	2240483

Drawing Scale

Drawing Title

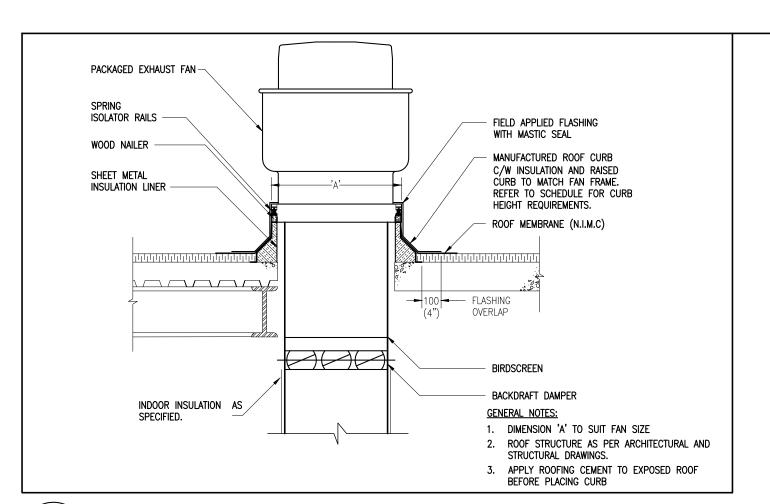
True North

Drawing Number

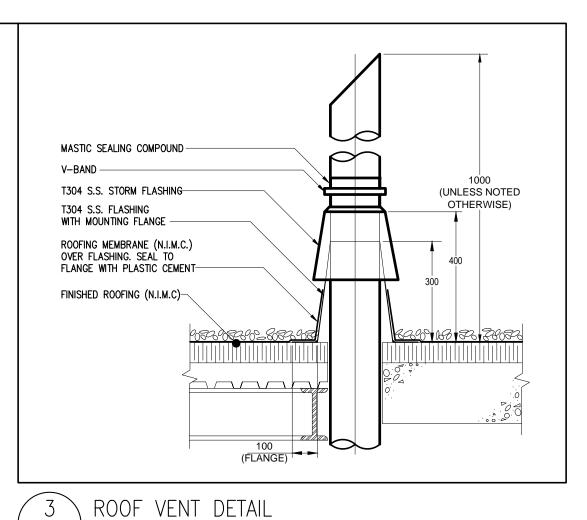
PAGE 4 OF 4 NTS

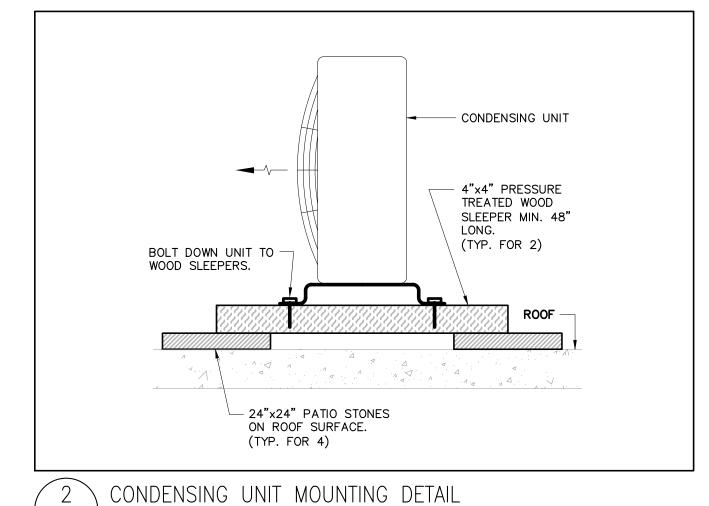
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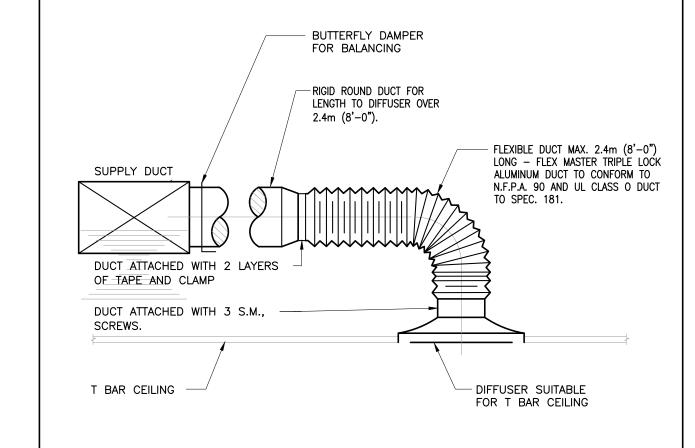
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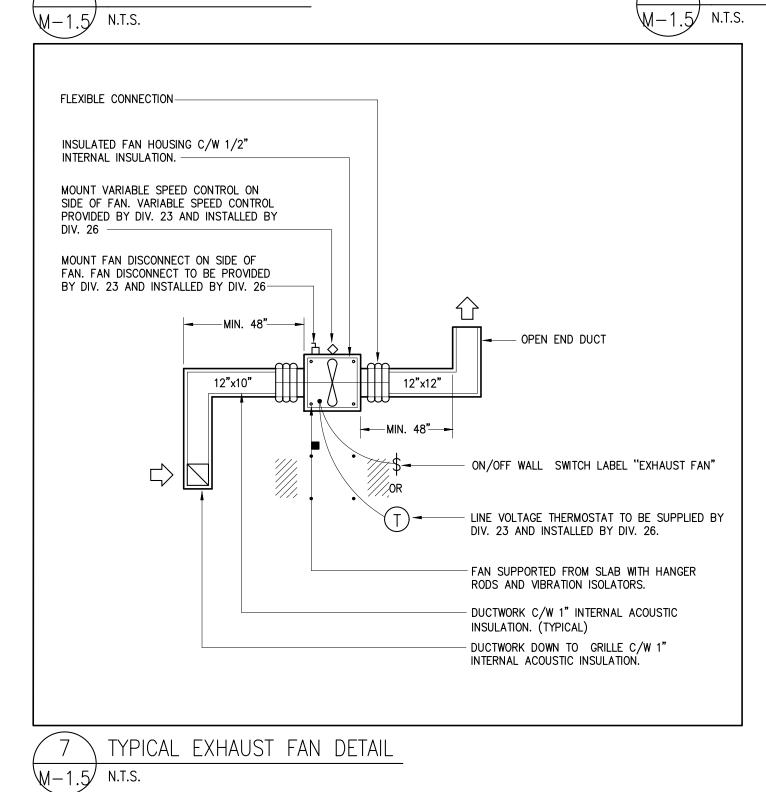
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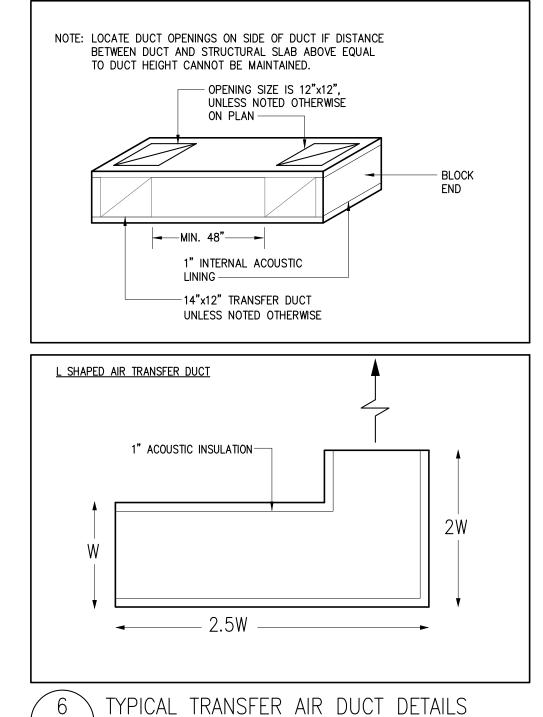


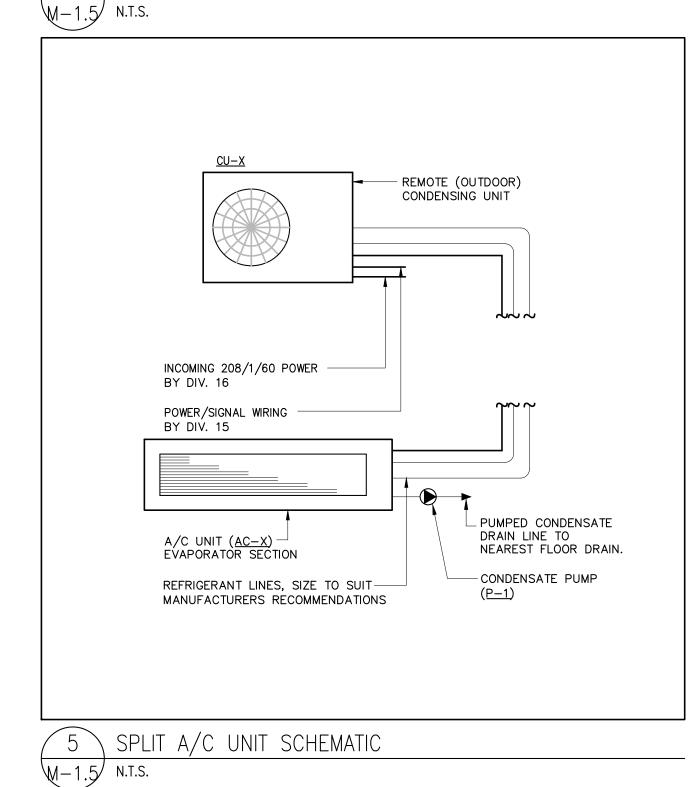


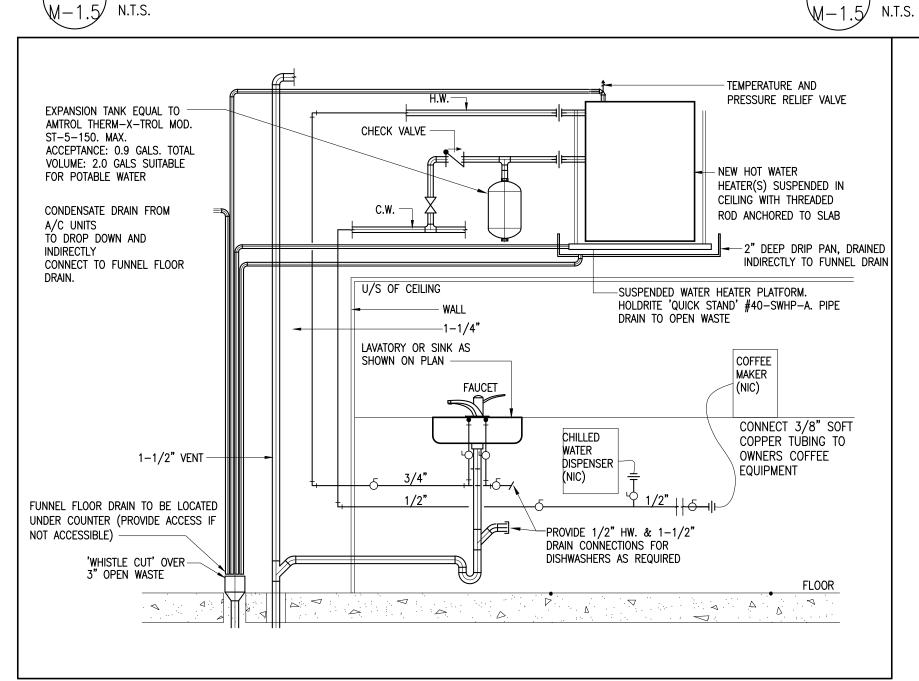


TYPICAL PLAQUE DIFFUSER

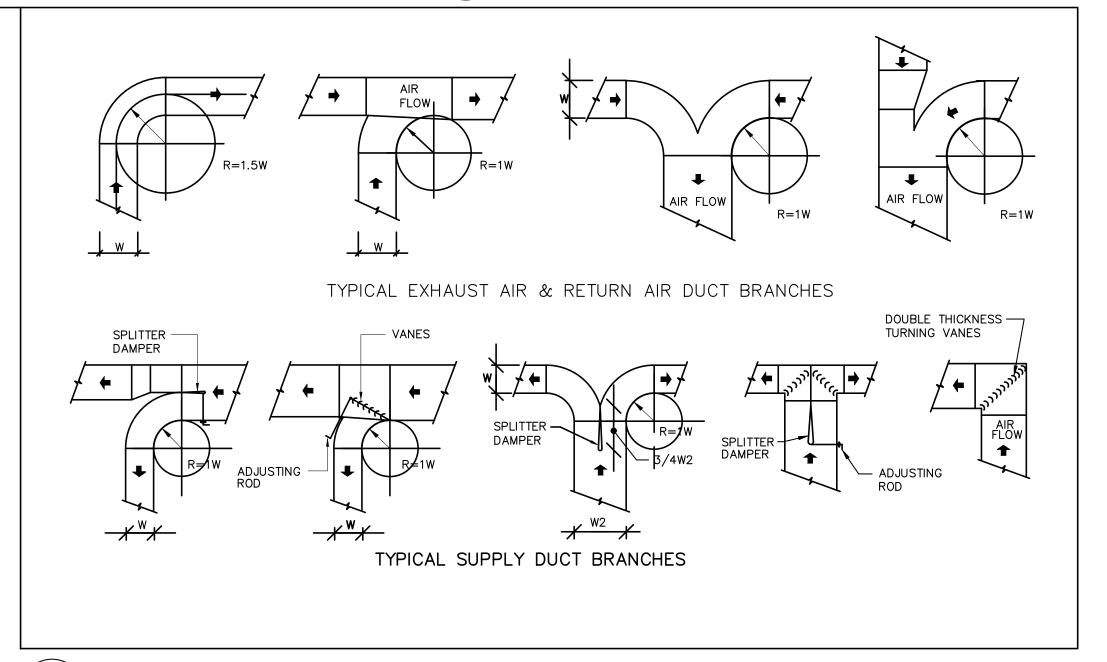












8 TYPICAL DUCT BRANCHES

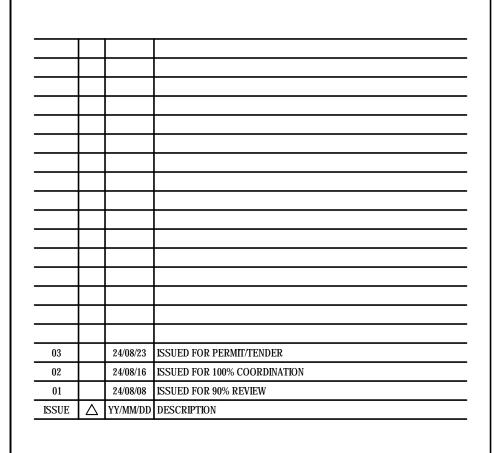
City of Pickering

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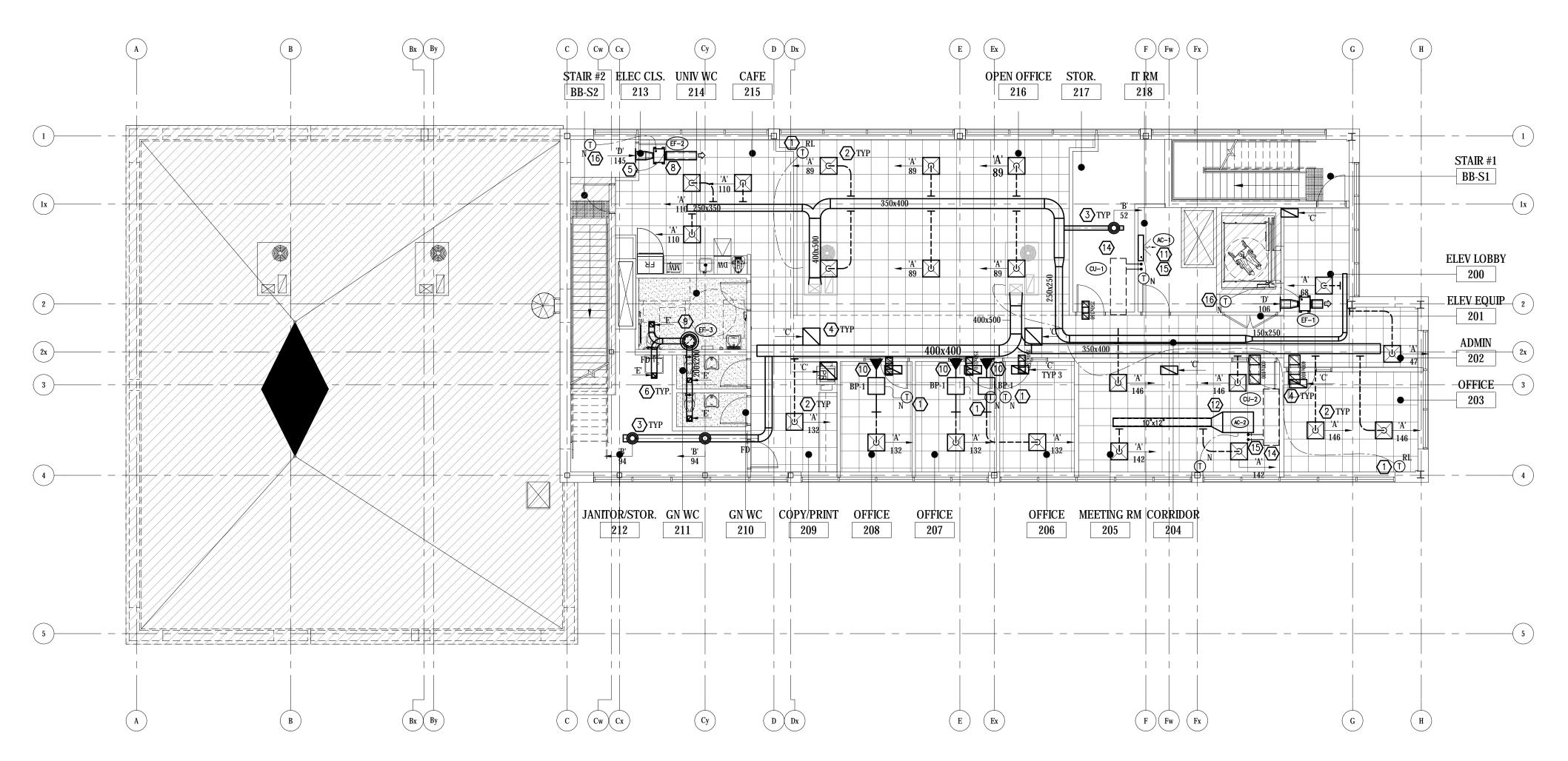
Client Name		
	City of Pickering	
Project Name		
	CoP Interior Fit-Out	
Project Address		
·	2460 Brock Road Pickering, ON L1X 0J1	
Project number		
	2240483	

MECHANICAL DETAILS

NTS Drawing Scale **Drawing Number**



M-1.5



GENERAL NOTES

ALL RTU THERMOSTATS SHALL BE MOUNTED AT 47" A.F.F. WHERE PRACTICAL. CO-ORDINATE LOCATIONS OF ALL THERMOSTATS WITHIN SPACE WITH DESIGNER PRIOR TO INSTALLATION.

CONTROLS WORK TO BE CARRIED OUT BY LANDLORD'S PREFERRED CONTROLS CONTRACTOR.

ALL NEW CONTROLS TO BE AS PER LANDLORDS EQUIPMENT SELECTION.

NEW SECTIONS OF ROUND RIGID S.A. DUCTWORK TO MATCH EXISTING FLEX. DUCT SIZE EXCEPT WHERE NOTED.

BRANCH RUNOUTS TO DIFFUSERS SHALL MATCH DIFFUSER INLET SIZE. BALANCE AIR QUANTITIES AS NOTED ON DRAWINGS.

ALL NEW H.P. DUCT JOINTS/FITTINGS UPSTREAM OF BY PASS BOXES SHALL HAVE DUCT SEALER APPLIED. DUCT CONNECTION TO NEW BY PASS BOXES SHALL MATCH BY PASS BOXES INLET SIZE. INCLUDE FOR PREMIUM TIME TO CARRY OUT MODIFICATIONS TO MEDIUM PRESSURE DUCTWORK.

BALANCE DIFFUSERS LOCATED IN DRYWALL CEILINGS PRIOR TO INSTALLATION OF CEILING FINISHES. PROVIDE ACCESS PANELS AT BALANCING DAMPERS.

ALL NEW RIGID SUPPLY AIR DUCTWORK TO BE COVERED WITH 1" EXTERNAL INSULATION.

NEW DUCTWORK FOR EXHAUST FANS TO BE LINED WITH 1" INTERNAL ACOUSTIC

MAXIMUM LENGTH OF FLEXIBLE DUCT IS 10'-0". USE RIGID ROUND DUCTWORK FOR SECTIONS ADJACENT CONNECTION TO BRANCH DUCT SO THAT MAXIMUM ALLOWED LENGTH IS NOT EXCEEDED.

NEW FLEXIBLE DUCTS TO BE COMPLETE WITH 1" FOIL FACE INSULATION AND WHERE NEW CONNECTION TO BRANCH DUCT IS REQUIRED 'SPIN—ON' DUCT COLLARS WITH BALANCING DAMPERS SHALL BE PROVIDED.

SERVICES ABOVE RETURN AIR GRILLES TO BE PAINTED FLAT BLACK.

DURING CONSTRUCTION, COVER OPEN ENDS OR REGISTERS OF ACTIVE RETURN AND EXHAUST AIR DUCTS WITH FILTER MEDIA SECURED BY METAL BAND PULLED TIGHT AROUND DUCT BY MEANS OF SCREWS. MAINTAIN THIS MEDIA UNTIL PLASTERING, DRYWALL & OTHER FINISHING OPERATIONS ARE COMPLETED.

EXHAUST FAN SWITCHING AND POWER WIRING TO BE PROVIDED BY ELECTRICAL CONTRACTOR. EXCEPT WHERE NOTED.

REFER TO MECHANICAL DRAWINGS FOR EQUIPMENT SPECIFICATIONS.

HVAC DRAWING NOTES

- RELOCATED EXISTING THERMOSTAT. THERMOSTATS SHALL BE MOUNTED AT 47" AFF WHERE
- PROVIDE NEW SQUARE DIFFUSER ('A') AND ASSOCIATED ACOUSTICAL FLEX DUCTWORK. (TYPICAL)
- PROVIDE NEW ROUND CONE DIFFUSER ('B') AND ASSOCIATED ACOUSTICAL FLEX DUCTWORK.
- 4 PROVIDE NEW RETURN GRILLE ('C'). (TYPICAL)
- (5) PROVIDE NEW EXHAUST GRILLE 'D'.
- 6 PROVIDE NEW WASHROOM EXHAUST GRILLE 'E'. (TYPICAL)
- 7 NEW TRANSFER AIR DUCT. REFER TO DETAIL 1/M-1.5. (TYPICAL)
- NEW EXHAUST FAN TO BE INSTALLED COMPLETE WITH ALL ASSOCIATED DUCTWORK, CONTROLS AND ACCESSORIES. SEE DETAIL 2/M-1.5. SWITCH LOCATION TO BE COORDINATED WITH INTERIOR DESIGNER AND INSTALLATION TO BE COMPLETED BY ELECTRICAL. SWITCH PROVIDED BY MECHANICAL.
- NEW MUSHROOM ROOFTOP EXHAUST FAN TO BE INSTALLED COMPLETE WITH ALL ASSOCIATED DUCTWORK, PENETRATION, CURB, CONTROLS AND ACCESSORIES. SEE DETAIL 2/M-1.5. EXHAUST FAN TO RUN ON A SCHEDULE. CONSULT WITH CLIENT.
- CONTRACTOR TO PROVIDE NEW EH PRICE EHC1 2503 ELECTRIC COOLING/HEATING BYPASS BOX (EHC1) C/W ATTENUATOR, THERMOSAT, TRANSFORMER AND ALL DUCTWORK SHOWN ON DRAWING. BYPASS BOX AND ATTENUATOR TO BE COMPLETE WITH 25MM FF1 DUCT LINING. 150MM INCH BOX. CONTROLS TO BE PROVIDED AND FIELD MOUNTED BY CONTROLS CONTRACTOR. 250MM INLET DUCTWORK TO BE RIGID ROUND. CONTRACTOR TO PLACE NEW THERMOSTATS AS CLOSE AS POSSIBLE TO WINDOW. FINAL LOCATION TO BE DETERMINED BY CLIENT AND ARCHITECT.
- NEW WALL MOUNTED DUCTLESS AC UNIT (AC-1) C/W PROGRAMMABLE THERMOSTAT. FINAL THERMOSTAT LOCATION TO BE DETERMINED BY CLIENT PREVIOUS TO INSTALL. CONDENSER UNIT (CU-1) LOCATION ON THE ROOF TO BE VERIFIED ON SITE AND APPROVED BY LANDLORD.
- NEW DUCTED AC UNIT (AC-2) C/W PROGRAMMABLE THERMOSTAT. FINAL THERMOSTAT LOCATION TO BE DETERMINED BY CLIENT PREVIOUS TO INSTALL. CONDENSER UNIT (CU-2) LOCATION ON THE ROOF TO BE VERIFIED ON SITE AND APPROVED BY LANDLORD.
- 13 NOT IN USE
- 14 NEW ROOF MOUNTED CONDENSER UNIT.
- (15) REFRIGERANT LINES DOWN THRU ROOF.
- PROVIDE LINE VOLTAGE THERMOSTAT TO ENERGIZE EXHAUST FAN ON TEMPERATURE RISE. 120V LINE VOLTAGE THERMOSTAT SUPPLIED BY DIVISION 23 INSTALLED BY ELECTRICAL DIVISION 26.

NOTE:

PRIOR TO TENANT MOVE IN DATE A THIRD PARTY COMMISSIONING AGENT SHALL VERIFY PROPER OPERATION OF RTU'S. COMMISSIONING AGENT TO SUBMIT REPORT TO LANDLORD & HH ANGUS

ACOUSTIC FLEXIBLE DUCTWORK SPECIFICATION

ALL NEW DUCTWORK ON DRAWING SHALL BE PEPPERTREEAIR SOLUTIONS INC. SERIES CEH – TYPE HPB, GREENGUARD CERTIFIED INSULATION, CAN/ULC-S-110 LISTED, BLACK ANTISTAT LOW DENSITY VAPOR BARRIER, CLASS 1 AIR DUCT CONNECTOR, FLAME SPREAD RATING <25/50. AS DISTRIBUTED BY PEPPERTREEAIR SOLUTIONS INC. ph: 905-771-8898.

REFER TO DRAWING M-1.0 FOR EXISTING RTU SCHEDULE

CONTRACTOR TO PROVIDE NEW BALANCING DAMPERS ON ALL SUPPLY RIDGID AND FLEX DUCTS SERVING NEW DIFFUSERS.

CONTRACTOR TO PROVIDE A COMFORT BALANCE 30 DAYS AFTER FLOOR OCCUPANCY.

City of Pickering

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Client Name	
	City of Pickering

Project Name

CoP Interior Fit-Out

Project Address
2460 Brock Road
Pickering, ON L1X 0J1

Project number 2240483

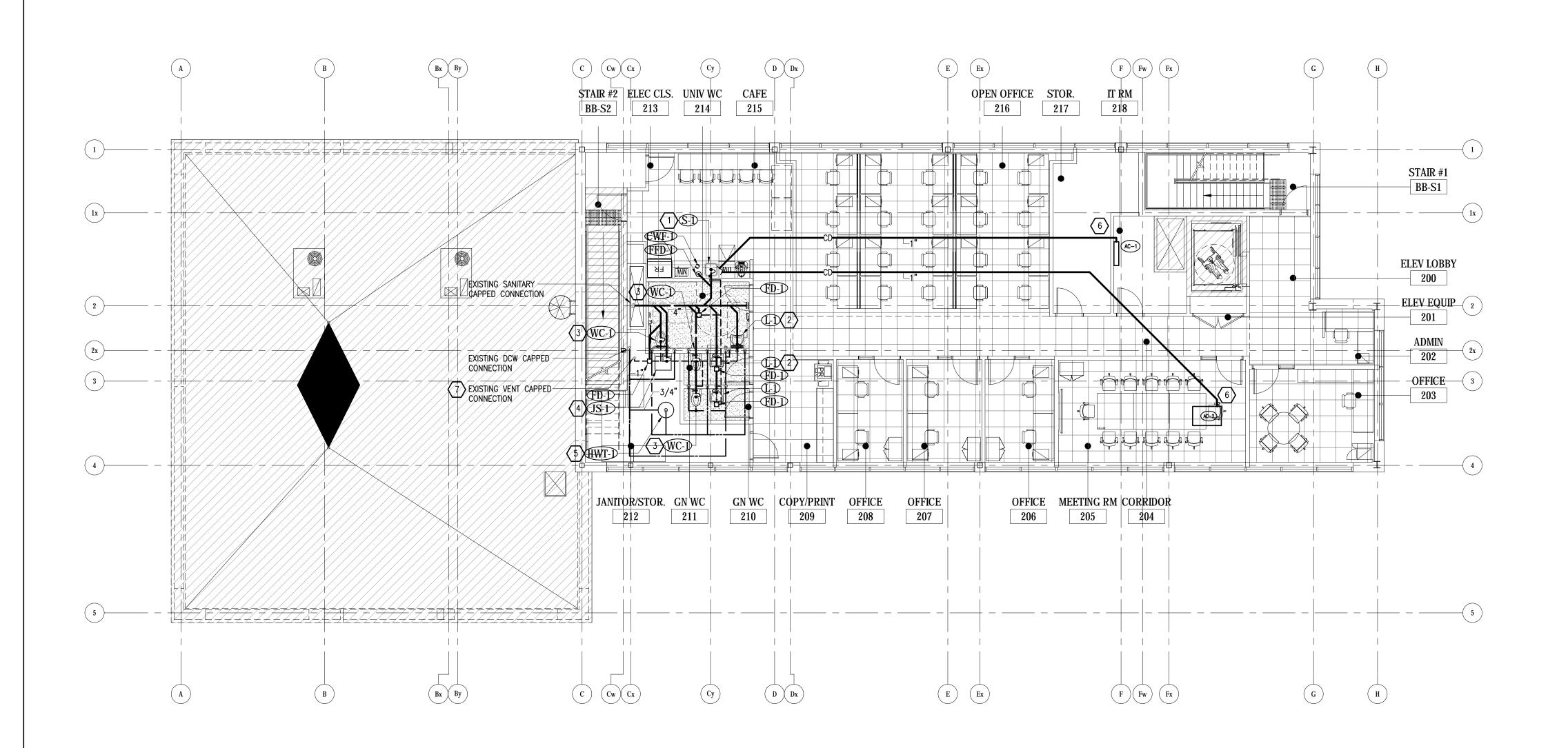
Drawing Title HVAC LAYOUT

2ND FLOOR

Drawing Scale 1:100
Drawing Number

M-2.0

) M-2



PLUMBING NOTE

THIS CONTRACTOR SHALL INCLUDE FOR INSTALLATION OF WATER DISPENSER AND COFFEE MAKERS (2). THIS CONTRACTOR SHALL MEET ON SITE WITH WATER DISPENSER AND COFFEE MAKER VENDORS AND ASSIST IN THE INSTALLATION OF BOTH WATER DISPENSER & COFFEE MAKERS THROUGH THE PROVISION OF 1/4" SOFT COPPER TUBING & PLUMBING FITTINGS FOR CONNECTION TO WATER DISPENSER AND COFFEE MAKERS AS DIRECTED BY WATER DISPENSER & COFFEE MAKER VENDORS. COORDINATE THIS INSTALLATION WITH THE GENERAL CONTRACTOR.

GENERAL NOTES

- 1. ALL WORK TO CONFORM TO BASE BUILDING STANDARDS & SPECIFICATIONS. DRAWING NOTES
- 1) 3/4" HW. & 1/2" CW, & VENT DN. IN WALL TO NEW SINK S-1, 2" WASTE DOWN THROUGH FLOOR. TIE INTO EXISTING CAPPED CONNECTION ON LEVEL BELOW. PROVIDE 1/2" VALVED HW. & 1-1/2" DRAIN CONNECTIONS UNDER COUNTER FOR DISHWASHERS. INSTALL DISHWASHERS AND REFRIGERATORS.
 ALLOW SUFFICIENT CLEARANCE FOR SINK DRAIN TRAP ACCESS.
- 2 1/2" HW. & 1/2" CW, & VENT DN. IN WALL TO NEW LAVATORY L-1, 1 1/4" WASTE DOWN THROUGH FLOOR.
- 3 1/2" HW. & 1/2" CW, & VENT DN. IN WALL TO NEW WATER CLOSET WC-1, 3" WASTE DOWN THROUGH FLOOR.
- 4 1/2" HW. & 1/2" CW, & VENT DN. IN WALL TO NEW JANITORS SINK JS-1, 3" WASTE DOWN THROUGH FLOOR.
- FOR ALL NEW HOT WATER TANK CONTRACTOR TO PROVIDE TACO LEAKBREAKER OR EQUAL HOT WATER TANK LEAK DETECTION SYSTEM. SYSTEM TO BE PURCHASED WITH LEAKBREAKER VALVE, MODULE, WATER SENSOR, POWER CORD, BATTERIES AND HARDWARE.
- PROVIDE NEW MITSUBISHI CONDENSATE PUMP AND RUN NEW 1" CONDENSATE DRAIN TO NEW FFD IN KITCHEN AREA.
- CONTRACTOR TO PROVIDE AS A SEPARATE PRICE TO RUN EXISTING VENT UP TO ROOF.

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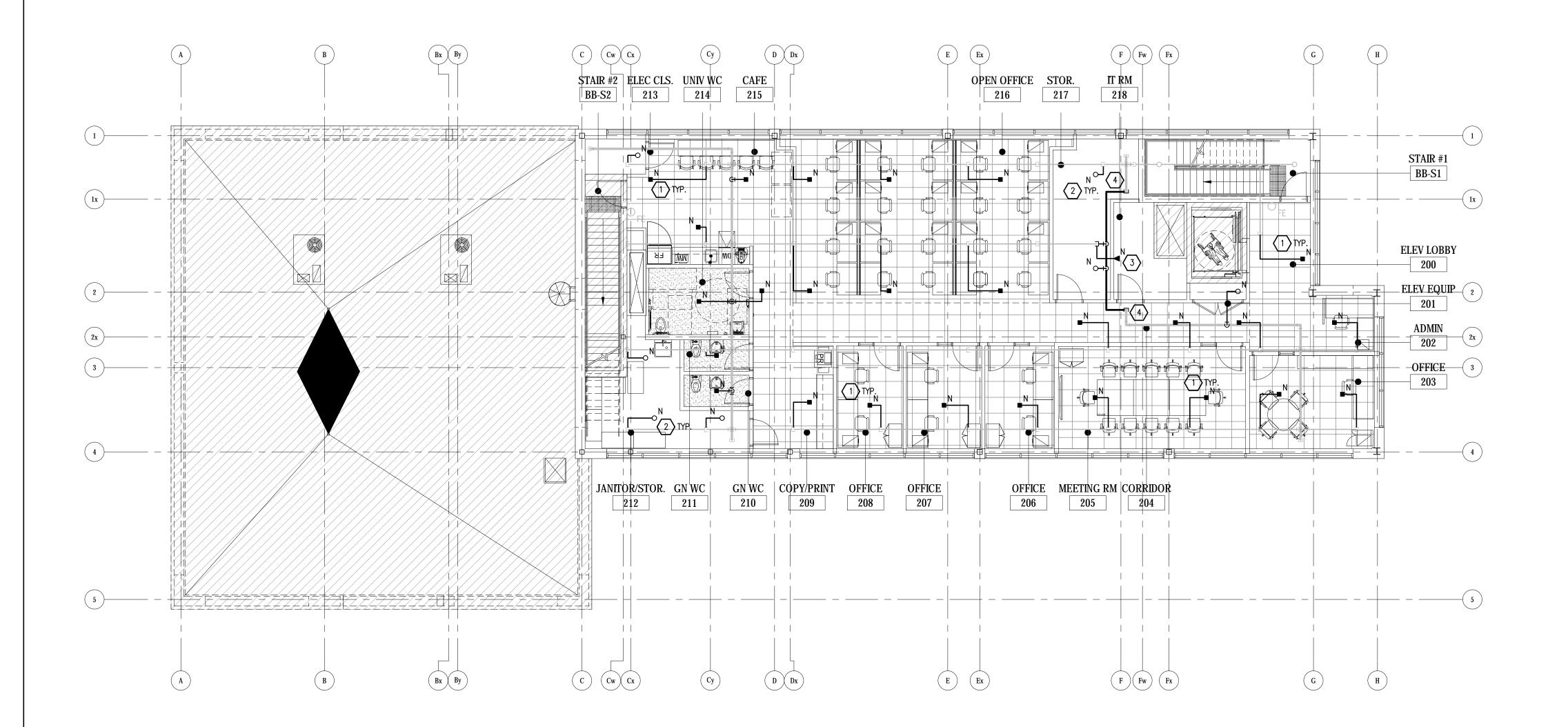
Project number

2240483

PLUMBING LAYOUT 2ND FLOOR

Drawing Scale 1:100 **Drawing Number**

True North



GENERAL NOTES

- 1. PROVIDE 1" VALVED AND CAPPED INSPECTOR'S TEST CONNECTION WITH HOSE END IN ALL SPRINKLER ZONES FOR INITIAL FLUSHING OUT OF THE SYSTEM AND REMOTE TESTING FOR ALARM DEVICES. PROVIDE ONE HOSE OF SUITABLE LENGTH. PROVIDE EACH SYSTEM WITH CHECK VALVE AND SHUT OFF VALVE IN CEILING SPACE TO FACILITATE DRAINING OF EACH SYSTEM.
- 2. PROVIDE AUXILIARY DRAINS AS PER LAST ISSUE OF NFPA 13.
- 3. ADVISE AND ARRANGE WITH FIRE DEPARTMENT THE DATES OF TESTING ALARM DEVICES. COORDINATE THIS WORK WITH TRADES UNDER ELECTRICAL DIVISION. ENSURE ALL ALARM DEVICES ARE WORKING PRIOR TO CONTACTING FIRE DEPARTMENT.
- 4. EXAMINE ARCHITECTURAL REFLECTED CEILING PLAN TO COORDINATE SPRINKLER HEAD LAYOUT & LOCATIONS.
- 5. ALL SYSTEMS SHALL BE HYDRAULICALLY SIZED. ALL PIPES SIZING SHALL BE BASED ON CONTRACTOR'S OWN HYDRAULIC CALCULATIONS AT NO ADDITIONAL COST TO THE OWNER. PROVIDE ADDITIONAL HEADS AS REQUIRED TO MEET NFPA 13.
- 6. PROVIDE FOR THE SUPPLY & INSTALLATION OF ADDITIONAL 10 SPRINKLERS HEADS INCLUDING PIPING.
- 7. CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING OR AWARD OF CONTRACT TO INSPECT EXISTING FIELD CONDITIONS. THIS CONTRACT SHALL INCLUDE ALL LABOR AND MATERIALS NECESSARY FOR FIELD MODIFICATIONS DUE TO EXISTING CONDITIONS. THE CONTRACTOR SHALL CONTACT THE ENGINEER OR OWNER PRIOR TO BIDDING FOR INTERPRETATIONS AND CLARIFICATIONS OF THE DESIGN AND INCLUDE IN HIS BID ALL COSTS TO MEET THE DESIGN INTENT.
- 8. EXISTING SPRINKLER BRANCH PIPING / DROPS SHALL BE REWORKED AS REQUIRED TO SUIT NEW SPRINKLER HEAD LAYOUT. UNUSED OR REDUNDANT BRANCH PIPING TO BE REMOVED & PLUGGED AS REQUIRED.

SPRINKLER HEAD DISCH	ARGE DENSITIES
HAZARD CLASSIFICATIONS	DESIGN DENSITY (U.S. gpm/ft/sq)
LIGHT HAZARD OFFICE	0.1
ORDINARY HAZARD (GROUP 1) MECHANICAL SERVICE AREAS COMMUNICATION ROOMS	0.15

GENERAL NOTES

ALL WORK TO CONFORM TO BASE BUILDING STANDARDS & SPECIFICATIONS.
 NEW SPRINKLER HEADS SHALL BE EQUAL TO NEW BASE BUILDING STANDARD.
 NO EXISTING HEADS SHALL BE REUSED/RELOCATED.

DRAWING NOTES

- NEW CONCEALED TYPE QUICK RESPONSE SPRINKLER HEAD, CONNECT TO EXISTING SPRINKLER BRANCH WITH MINIMUM 1" BRANCH PIPE. (TYPICAL)
- NEW UPRIGHT TYPE QUICK RESPONSE SPRINKLER HEAD, CONNECT TO EXISTING SPRINKLER MAIN WITH MINIMUM 1" BRANCH PIPE. (TYPICAL)
- NEW SIDEWALL TYPE QUICK RESPONSE SPRINKLER HEAD, CONNECT TO EXISTING SPRINKLER MAIN WITH MINIMUM 1" BRANCH PIPE.
- CONTRACTOR TO RE-ROUTE EXISTING SPRINKLER MAIN TO AVOID IT ROOM. WORK TO BE CAPTURED AS A UNIT PRICE/OPTIONAL

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Project number		
	2240483	

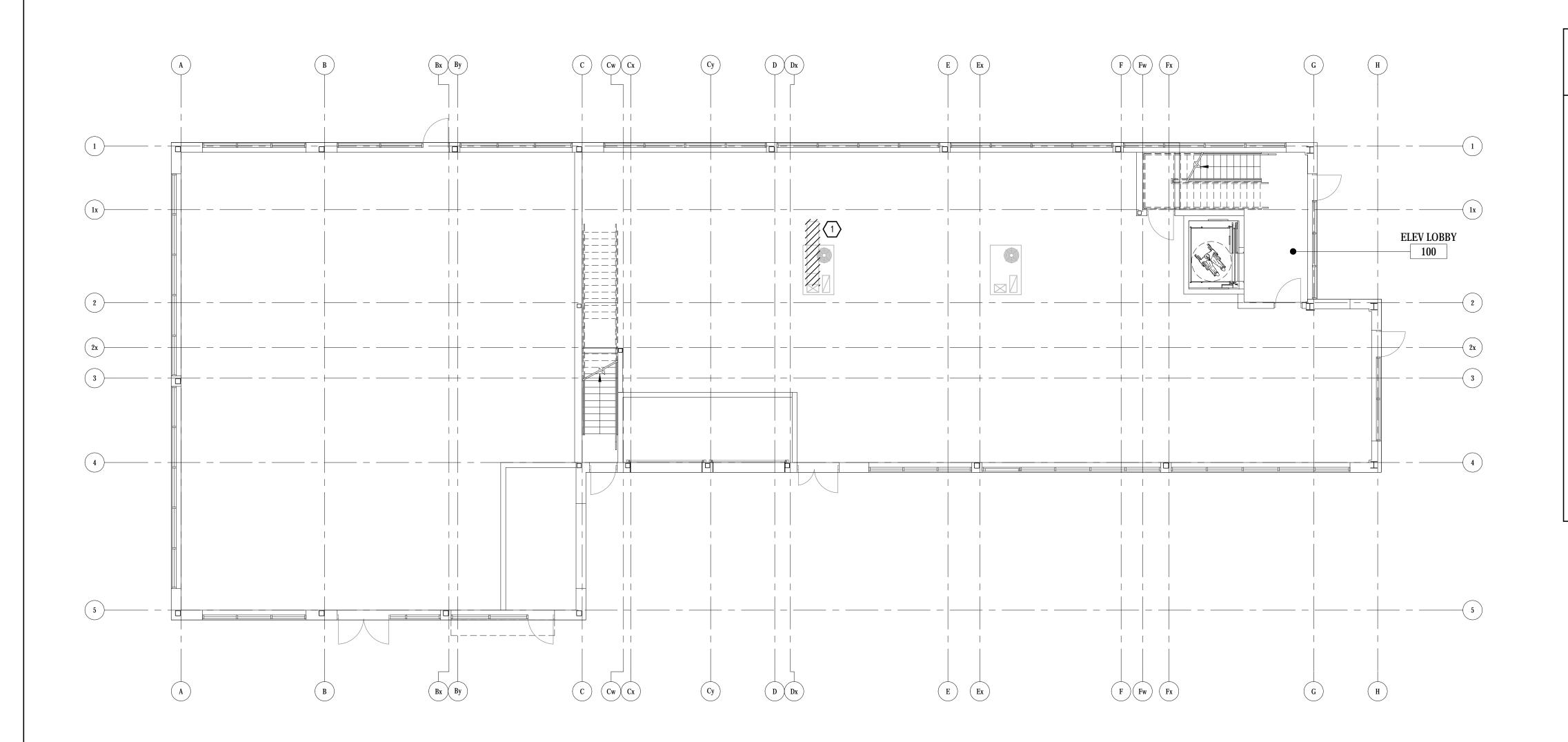
rawing Title

SPRINKLERL LAYOUT 2ND FLOOR

Drawing Scale 1:100
Drawing Number

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M-4.0



DRAWING NOTES:

(1) CUT BACK AND CAP EXISTING DUCTWORK ASSOCIATED TO RTU.

GENERAL NOTES:

ALL EQUIPMENT/MATERIALS REMOVED UNLESS NOTED OTHERWISE SHALL BE GIVEN TO LANDLORD BY THIS CONTRACTOR.

COVER RETURN AIR OPENINGS WITH FILTER MEDIA DURING EXTENT OF DEMOLITION

CONTRACTOR SHALL INCLUDE ALL LABOUR AND MATERIALS NECESSARY FOR FIELD MODIFICATIONS DUE TO BEAM AND EXISTING SERVICE INTERFERENCES. PLEASE INCLUDE FOR ALL COSTS ASSOCIATED WITH POSSIBLE REVISIONS/REROUTING OF EXISTING SERVICES AND/OR NEW SERVICES DUE TO ANY INTERFERENCES.

ALL REDUNDANT DUCTWORK TO BE REMOVED AND DUCT COLLARS SHALL BE CAPPED OFF.

SPECIAL NOTES:

CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING OR AWARD OF CONTRACT TO INSPECT EXISTING FIELD CONDITIONS. THIS CONTRACT SHALL INCLUDE ALL LABOR AND MATERIALS NECESSARY FOR FIELD MODIFICATIONS DUE TO EXISTING CONDITIONS. THE CONTRACTOR SHALL CONTACT THE ENGINEER OR OWNER PRIOR TO BIDDING FOR INTERPRETATIONS AND CLARIFICATIONS OF THE DESIGN AND INCLUDE IN HIS BID ALL COSTS TO MEET THE DESIGN INTENT.

CONTRACTOR IS RESPONSIBLE FOR INSTALLING FILTERS ON THE HVAC SYSTEM AND REPLACING THEM THROUGHOUT THE ENTIRE CONSTRUCTION PERIOD.

CERTAIN MECHANICAL WORK SHALL BE CARRIED OUT AFTER HOURS, ON WEEKENDS AND/OR AT OTHER TIMES THAT IS SUITABLE TO CLIENT. INCLUDE IN PRICE SUBMITTAL ALL ASSOCIATED COSTS AS PREMIUM TIME REQUIRED TO COMPLETE WORK THAT IS DEEMED NOISY OR DISRUPTIVE AS SHOWN AND AS SPECIFIED. THIS MECHANICAL CONTRACTOR SHALL CO-ORDINATE WITH THE GENERAL CONTRACTOR IN THE SCHEDULING OF MECHANICAL WORK TO COMPLY WITH CLIENT & CONSTRUCTION DRAWINGS/TENDER DOCUMENTS.

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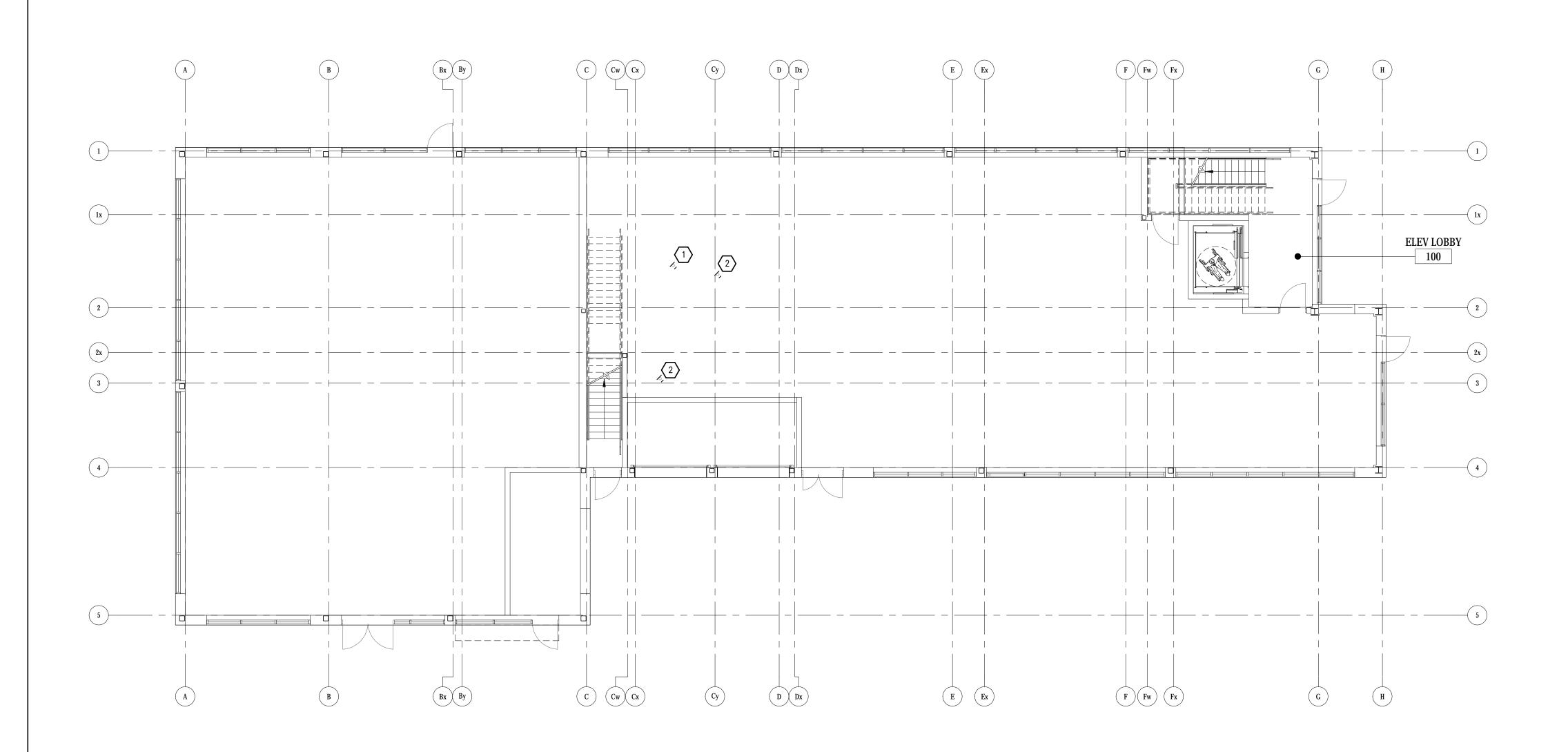
City of Pickering
CoP Interior Fit-Out
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2240483

HVAC DEMOLITION 2ND FLOOR

Drawing Scale 1:100 **Drawing Number**

Project number



DEMOLITION NOTES

- CONTRACTOR TO CUT BACK AND CAP EXISTING VENT PIPING DOWN TO LEVEL BELOW. (TYPICAL)
- 2 CONTRACTOR TO CUT BACK AND CAP EXISTING SANITARY ROUGH IN DOWN TO LEVEL BELOW. (TYPICAL)

GENERAL NOTES

ALL EQUIPMENT/MATERIALS REMOVED UNLESS NOTED OTHERWISE SHALL BE DISPOSED OF BY THIS CONTRACTOR.

WORK WITHIN CEILING SPACE OF FLOOR BELOW TO BE DONE AFTER NORMAL WORKING HOURS. ARRANGEMENT FOR ACCESS TO BE MADE WITH LANDLORD.

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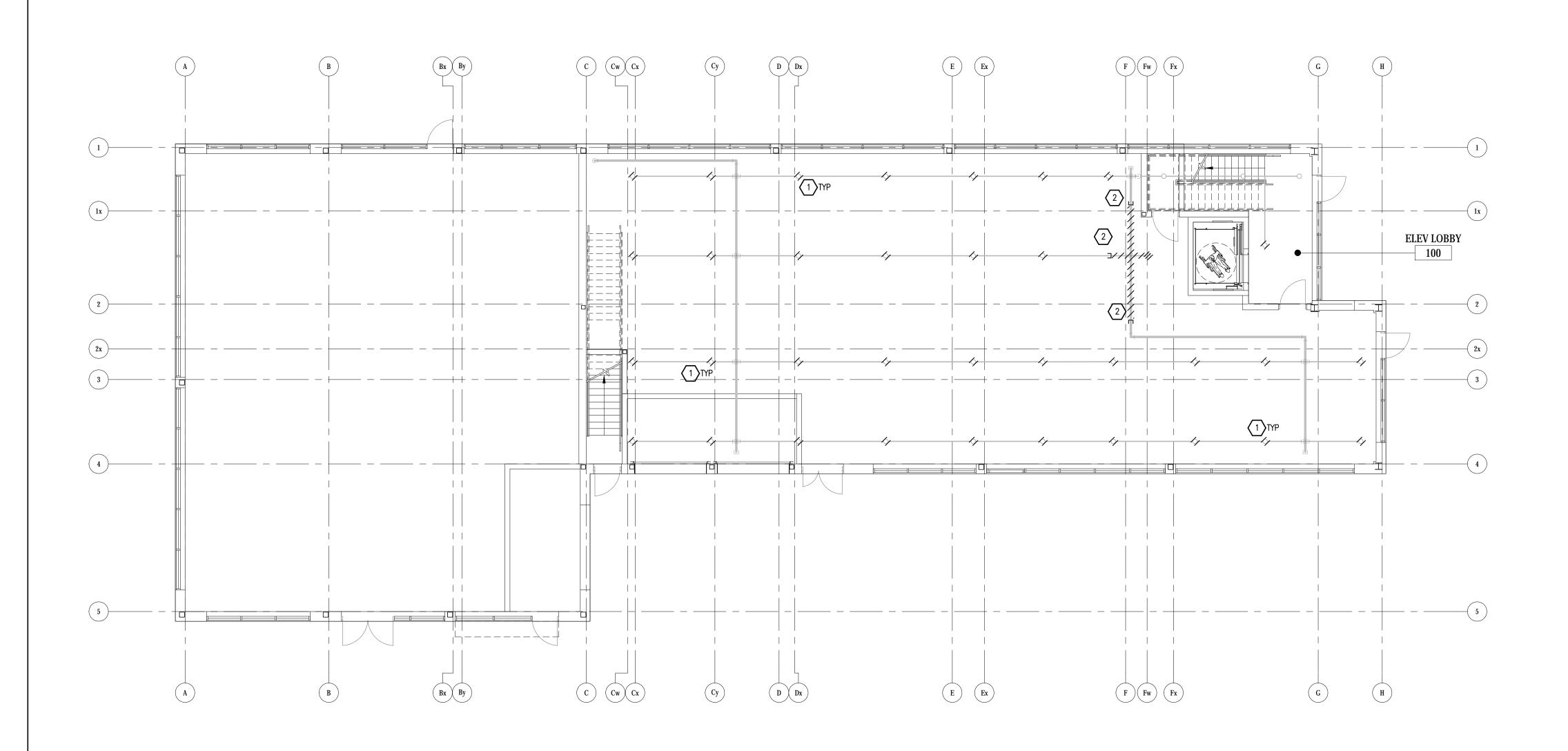
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PLUMBING DEMOLITION 2ND FLOOR

Drawing Scale 1:100
Drawing Number

Project number

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DEMOLITION NOTES

- CONTRACTOR TO REMOVE EXISTING SPRINKLER HEAD AND CUT BACK AND CAP EXISTING RETURN BEND BACK TO SPRINKLER BRANCHLINE. (TYPICAL)
- CONTRACTOR TO CUT BACK AND CAP EXISTING SPRINKLER BRANCH LINE AND SPRINKLER MAIN PIPING. CONTRACTOR TO CAPTURE COST AS A UNIT PRICE/OPTIONAL PRICE.

GENERAL NOTES

ALL EQUIPMENT/MATERIALS REMOVED UNLESS NOTED OTHERWISE SHALL BE DISPOSED OF BY THIS CONTRACTOR.

WORK WITHIN CEILING SPACE OF FLOOR BELOW TO BE DONE AFTER NORMAL WORKING HOURS. ARRANGEMENT FOR ACCESS TO BE MADE WITH LANDLORD.

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SPRINKLER DEMO 2ND FLOOR

Drawing Scale 1:100 **Drawing Number**

M-2.0