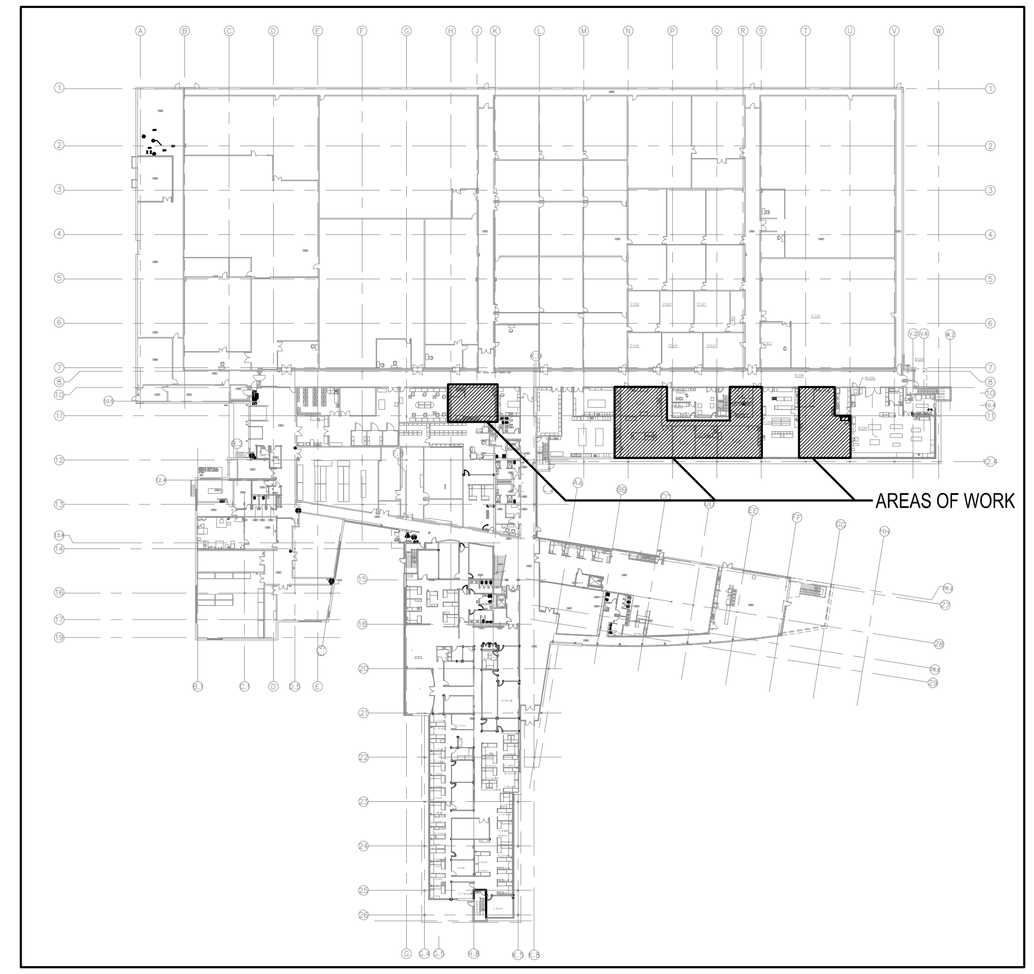
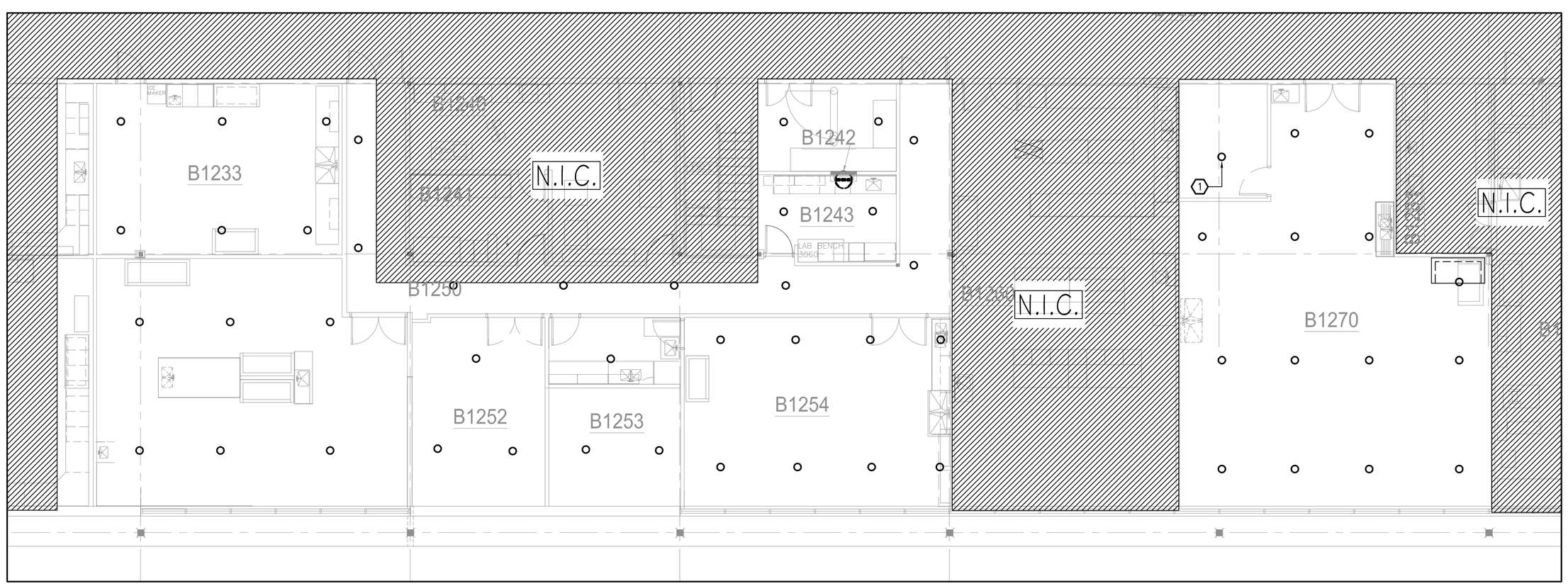
REMOVED AND/OR RELOCATED	EXISTING TO REMAIN	NEW	PLUMBING LEGEND
SAN	SAN	SAN	SANITARY PIPING ABOVE GRADE
SAN	SAN	SAN	SANITARY PIPING BELOW GRADE
			DOMESTIC COLD WATER PIPING
			DOMESTIC HOT WATER PIPING
G	G	G	NATURAL GAS PIPING
CA	CA	CA	COMPRESSED AIR PIPING
DW	DW	DW	DISTILLED WATER PIPING
			CLEAN OUT
			DRAIN/DRAIN BODY
			NATURAL GAS OUTLET
			COMPRESSED AIR OUTLET
			GATE VALVE
			ELBOW UP OR DOWN
			BRANCH CONNECTION BOTTOM & TOP
			CAP

REMOVED AND/OR RELOCATED	EXISTING TO REMAIN	NEW	FIRE PROTECTION LEGEND
			PENDANT SPRINKLER HEAD

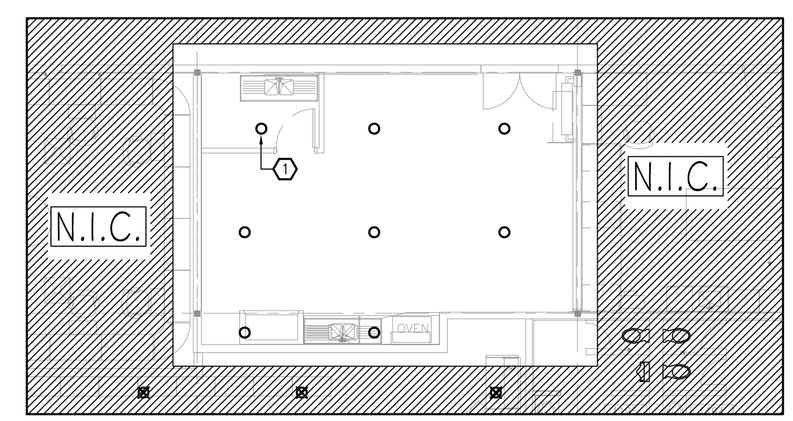
REMOVED AND/OR RELOCATED	EXISTING TO REMAIN	NEW	HVAC LEGEND
			RECTANGULAR & ROUND SUPPLY AIR DUCT
			RECTANGULAR & ROUND RETURN OR EXHAUST AIR DUCT
			AIR DUCT
M	M	M	MOTOR OPERATED DAMPER
			BALANCING DAMPER
			TURNING VANES
			FLEXIBLE DUCT (MAX. 3m LENGTH)
			TERMINAL UNIT
			DUAL DUCT TERMINAL UNIT
			LAMINAR FLOW DIFFUSER
			SQUARE DIFFUSER
			DUCTED RETURN/EXHAUST GRILLE
T	T	T	TEMPERATURE SENSOR
			CONTROL WIRING



1 / M-1 KEYPLAN



2 / M-1 FIRE PROTECTION PLAN



3 / M-1 FIRE PROTECTION PLAN

DRAWING NOTES

1. REMOVE AND REINSTALL EXISTING SPRINKLER HEAD AS REQUIRED TO SUIT NEW CEILING.

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THE PAPER COPY OF THE DRAWINGS ISSUED FOR BUILDING PERMIT AND/OR TENDER WILL TAKE PRECEDENCE OVER ELECTRONIC COPIES.

LA COPIE SUR PAPIER DES DESSINS PUBLIÉS POUR PERMIS DE CONSTRUCTION ET / OU D'APPEL D'OFFRES AURA PRÉSÉDANCE AUX COPIES ÉLECTRONIQUES.

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3.	ISSUED FOR FINAL REVIEW	NOV. 25/13
2.	ISSUED FOR 99% REVIEW	NOV. 4/13
1.	ISSUED FOR 66% REVIEW	OCT. 11/13

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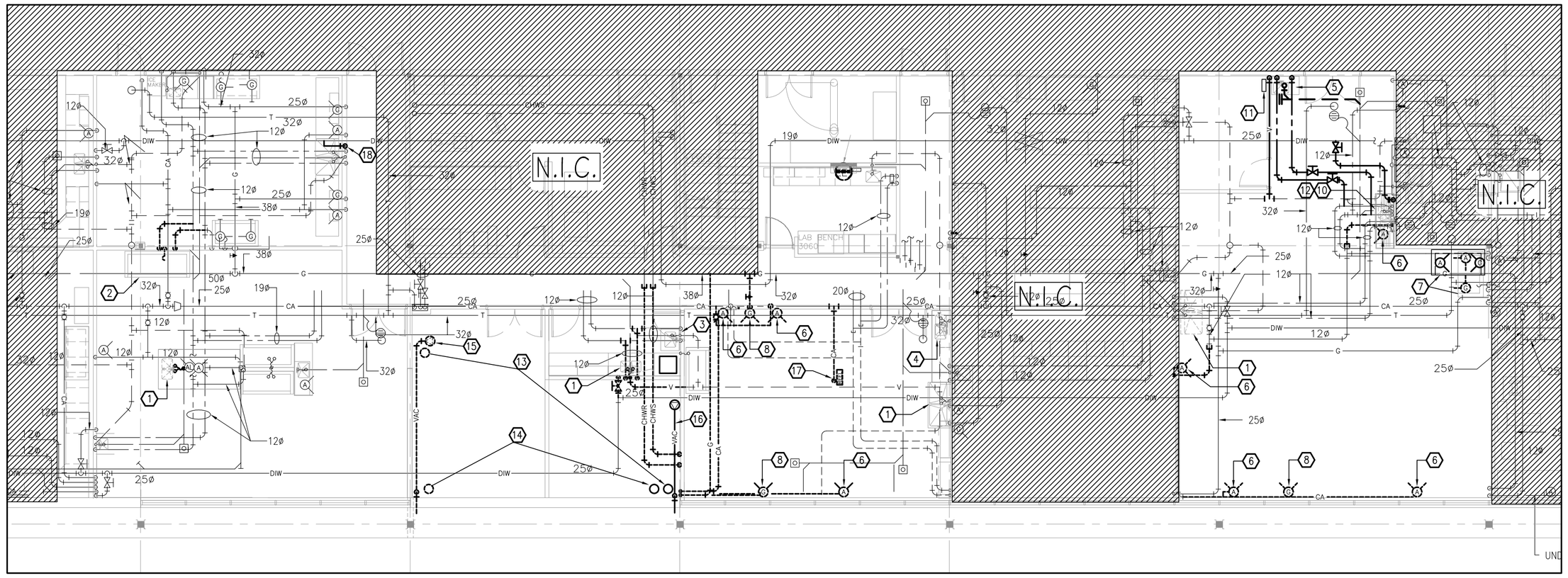
PROJECT/PROJET:
MUSEUM OF NATURE
NATURAL HERITAGE CAMPUS
MUSEE CANADIAN DE LA NATURE
EDIFICE DU PATRIMOINE NATIONAL
1740 PINK ROAD, GATINEAU

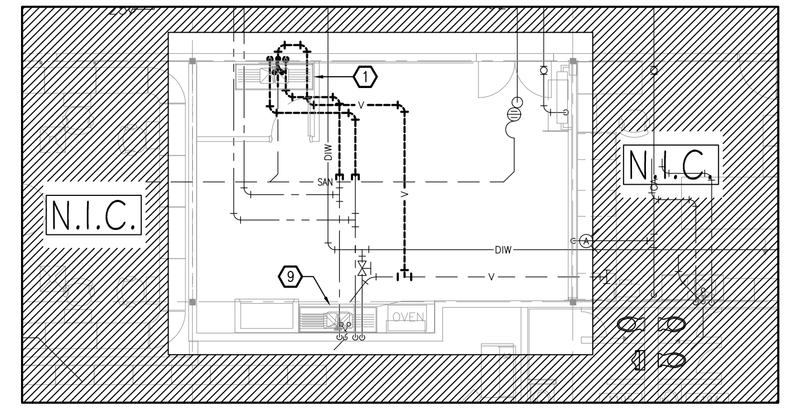
DRAWING/DESSIN:
MECHANICAL:
LEGENDS, KEYPLAN &
FIRE PROTECTION PLAN

DATE: OCT 2013
DESIGNED BY: CONCUS PAR G.S.
DRAWN BY: DESSINER PAR G.S.
CHECKED BY: VERIFIER PAR S.C.
SCALE: ECHELLE 1:100

No. DWGS. No. DESSIN 3
PROJECT No./NO. PROJET 13-303
DRAWING No./NO. DE DESSIN M-1



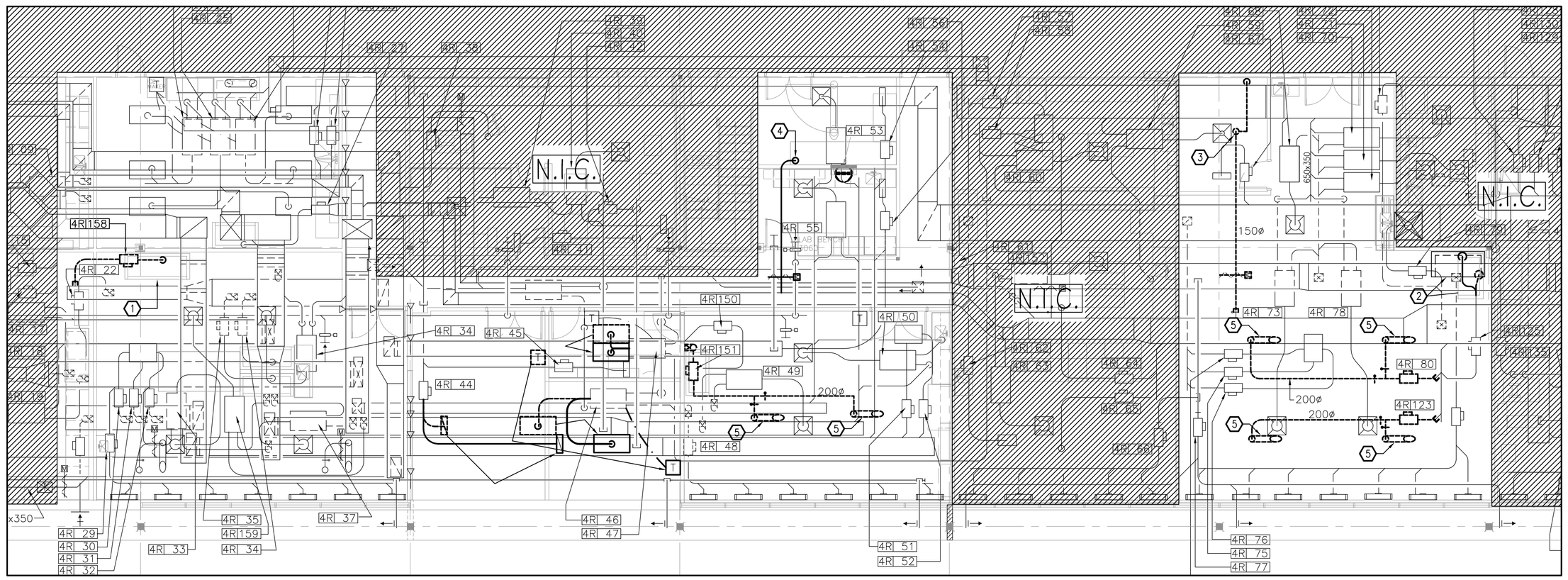
1 / M-2 PLUMBING PLAN



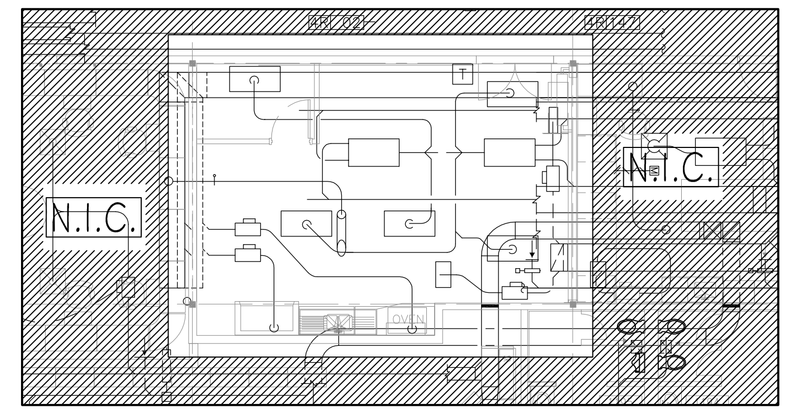
2 / M-2 PLUMBING PLAN

DRAWING NOTES

1. REMOVE EXISTING SINK. CUT BACK EXISTING PIPING AND CAP AT MAINS. CAP SANITARY PIPING BELOW GRADE.
2. EXISTING FUMEHOOD TO BE REMOVED. CUT BACK EXISTING PIPING AND CAP AT MAINS. CAP SANITARY PIPING BELOW GRADE.
3. REMOVE EXISTING SINK AND CUT BACK PIPING. REMOVE AND RELOCATE EXISTING WATER AND DRAIN PIPING SERVING EXISTING FUMEHOOD IN ADJACENT ROOM AND CHILLER AS REQUIRED TO ALLOW INSTALLATION OF NEW DOOR OPENING.
4. REMOVE EXISTING DOUBLE BOWL SINK AND SUPPLY AND INSTALL NEW SINGLE BOWL SINK. SINK SHALL BE EQUAL TO FRANKE MODEL LBS6808/316 WITH GOOSENECK FAUCET EQUAL TO AMERICAN STANDARD MODEL 7230.372
5. SUPPLY AND INSTALL NEW SINK AS SHOWN. CONNECT TO EXISTING SERVICES AS REQUIRED. NEW SINK SHALL BE EQUAL TO FRANKE MODEL ART36-1. FAUCET SHALL BE EQUAL TO AMERICAN STANDARD MODEL 6409.170.
6. REMOVE EXISTING COMPRESSED AIR OUTLET. CUT BACK AND CAP PIPING AS SHOWN.
7. EXISTING FUMEHOOD TO BE RELOCATED. RELOCATE EXISTING COMPRESSED AIR AND NATURAL GAS OUTLETS, DCW, DHW AND SANITARY CONNECTIONS. EXTEND PIPING AS REQUIRED.
8. REMOVE EXISTING NATURAL GAS OUTLET. CUT BACK AND CAP PIPING AS SHOWN.
9. EXISTING MILLWORK AND SINK TO BE RELOCATED TO ROOM B1270. SUPPLY AN INSTALL NEW SINK WITH DRAINBOARD IN THIS LOCATION. CONNECT TO EXISTING PIPING. NEW SINK SHALL BE EQUAL TO FRANKE LBSDB(R)6810/316 WITH FAUCET EQUAL TO AMERICAN STANDARD MODEL 6409.170.
10. REMOVE EXISTING SINK AND CUT BACK PIPING. MILLWORK AND SINK RELOCATED FROM ROOM N1221 TO BE INSTALLED IN THIS LOCATION. CONNECT TO EXISTING PIPING.
11. PROVIDE 13ø DCW CONNECT TO BELOW COUNTER ICE MAKER.
12. PROVIDE 13ø DEIONIZED WATER PIPING CONNECTION TO WALL MOUNTED "NANOPURE" FILTER SYSTEM AND FAUCET ADJACENT TO SINK.
13. REMOVE AND RELOCATE EXISTING NITROGEN CYLINDER COMPLETE WITH WALL MOUNTING BRACKET.
14. REMOVE AND RELOCATE EXISTING ARGON CYLINDER COMPLETE WITH WALL MOUNTING BRACKET.
15. EXISTING VACUUM PUMP TO BE RELOCATED BY OTHERS. REMOVE AND RELOCATE EXISTING DISCHARGE PIPING AS SHOWN.
16. INSTALL RELOCATED DISCHARGE PIPING FROM VACUUM PUMP. TERMINATE PIPING OUTSIDE AT HIGH LEVEL TO MATCH EXISTING INSTALLATION.
17. REMOVE EXISTING CEILING MOUNTED COMPRESSED AIR OUTLET COMPLETE WITH HOSE REEL. CUT BACK PIPING AND CAP AT MAIN.
18. SUPPLY AND INSTALL NEW DEIONIZED WATER FAUCET AT EXISTING SINK. CONNECT TO EXISTING PIPING IN CEILING SPACE. NEW FAUCET SHALL BE EQUAL TO CHICAGO FAUCET MODEL 828-ACP.



3 / M-2 HVAC PLAN



4 / M-2 HVAC PLAN

DRAWING NOTES

1. EXISTING FUMEHOOD TO BE REMOVED. REMOVE TERMINAL UNIT AND CUT BACK EXISTING EXHAUST DUCTWORK AND CAP AT MAIN.
2. EXISTING FUMEHOOD TO BE RELOCATED. MODIFY EXISTING EXHAUST DUCTWORK AS REQUIRED TO CONNECT TO FUMEHOOD IN NEW LOCATION. NEW DUCTWORK SHALL BE 316 STAINLESS STEEL.
3. REMOVE AND RELOCATE EXISTING EXHAUST ARM COMPLETE WITH CEILING MOUNTING BRACKET AND ALL CONTROLS. REFER TO DRAWING NOTE #4 FOR NEW LOCATION. CUT BACK EXISTING EXHAUST DUCTWORK AND CAP AT MAIN.
4. INSTALL RELOCATED EXHAUST ARM. REINSTATE ALL CONTROLS. CONNECT TO EXISTING EXHAUST DUCTWORK. NEW DUCTWORK SHALL BE 316 STAINLESS STEEL.
5. REMOVE EXISTING EXHAUST ARM COMPLETE WITH ALL DUCTWORK, SUPPORTS AND CONTROLS. TURN-OVER EXHAUST ARM TO BUILDING REPRESENTATIVE.

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DRAWING/DESSIN:
MECHANICAL:
PLUMBING & HVAC PLANS

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PROJECT No./NO. PROJET 13-303
DRAWING No./NO. DE DESSIN M-2

GENERAL

CONDITIONS OF CONTRACT

THE INSTRUCTIONS TO BIDDERS AND THE GENERAL CONDITIONS OF THE DESIGNER'S SPECIFICATIONS ARE AN INTEGRAL PART OF THIS DIVISION AND SHALL BE READ IN CONJUNCTION HEREWITH. THESE INSTRUCTIONS TO BIDDERS AND GENERAL CONDITIONS SHALL BE FULLY BINDING ON THE GENERAL CONTRACTOR AND HIS SUB-CONTRACTORS TO THE FULL SATISFACTION OF THE DESIGNER, ENGINEER AND OWNER.

THE RESPONSIBILITY AND SCOPE OF EACH SUB-TRADE RESTS SOLELY WITH THE GENERAL CONTRACTOR. EXTRAS WILL NOT BE CONSIDERED BASED ON THE GROUNDS OF DIFFERENCE IN INTERPRETATION OF SPECIFICATIONS AND DRAWINGS AS TO WHICH TRADE INVOLVED SHALL PROVIDE CERTAIN SPECIALTIES OR MATERIALS.

IT IS A CONDITION OF THIS CONTRACT, THAT THE CONTRACTOR WILL, IN THE PERFORMANCE OF THE SERVICES FOR THE COMPANY AS DESCRIBED IN THIS CONTRACT, COMPLY WITH ANY AND ALL MUNICIPAL, PROVINCIAL AND FEDERAL LAWS, REGULATIONS AND BY-LAWS INCLUDING, BUT NOT LIMITED TO, THOSE CONCERNING THE ENVIRONMENT AND THE DISPOSAL OF WASTE. IT IS INCUMBENT UPON THE CONTRACTOR TO INFORM ITSELF OF ANY SUCH LEGISLATION AND THE CONTRACTOR AGREES THAT IN THE EVENT OF NON-COMPLIANCE WITH THIS LEGISLATION, IT WILL INDEMNIFY AND HOLD HARMLESS THE COMPANY FROM ANY COSTS AND DAMAGES RESULTING FROM SUCH NON-COMPLIANCE.

EXAMINATON OF WORK

THIS PROJECT INVOLVES RENOVATIONS TO EXISTING BUILDING, THEREFORE EXAMINE THE SITE AND LOCAL CONDITIONS INCLUDING REVIEW OF CEILING INTERFERENCE TO DETERMINE THE DIFFICULTIES IN CARRYING OUT THE WORK INDICATED AND SPECIFIED PRIOR TO SUBMITTING FINAL PRICE. ALLOW FOR ALL DUCT AND PIPE ELBOWS AND OFFSETS AS REQUIRED TO COORDINATE WITH ALL OTHER SERVICES IN CEILING SPACE. THESE REQUIRED OFFSETS ARE NOT SHOWN ON THE DRAWINGS.

LIABILITY

THIS CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR LAYING OUT HIS WORK AND FOR ANY DAMAGE OR EXTRA COSTS CAUSED TO THE OWNER OR OTHER CONTRACTORS BY IMPROPER LOCATION OR CARRYING OUT OF HIS WORK. CARRY ALL NECESSARY INSURANCE COVERAGE.

CERTIFICATES, FEES, ETC.

GIVE ALL NOTICES, OBTAIN ALL PERMITS AND PAY ALL FEES SO THAT THE WORK SPECIFIED HEREIN MAY BE CARRIED OUT. AT THE ENGINEER'S REQUEST, FURNISH ANY CERTIFICATES AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH THE LAWS AND REGULATIONS OF ALL AUTHORITIES HAVING JURISDICTION.

TESTING

TEST ALL EQUIPMENT AND MATERIAL WHERE REQUIRED BY SPECIFICATIONS OR AUTHORITIES HAVING JURISDICTION TO DEMONSTRATE ITS PROPER OPERATION TO THE OWNER'S REPRESENTATIVE. TEST PROCEDURES SHALL BE IN ACCORDANCE WITH THE APPLICABLE PORTIONS OF THE ASME, ASHRAE, AND OTHER RECOGNIZED TEST CODES AS FAR AS FIELD CONDITIONS PERMIT.

PERFORM THE FOLLOWING TESTS AND UPON COMPLETION OF THE MECHANICAL INSTALLATION, TURN OVER TO THE OWNER A CERTIFICATION OF THE TESTS WITH THE DETAILED DATA AS REQUIRED BY EACH. EACH TEST SHALL BE ITEMIZED AS TO THE TIME PERFORMED AND PERSONNEL RESPONSIBLE FOR THE TEST. HYDRAULIC TESTS SHALL BE CARRIED OUT FOR A PERIOD OF 4 HOURS AND PRESSURE MAINTAINED WITH NO APPRECIABLE PRESSURE DROP. WHERE LEAKAGE OCCURS, REPAIRS SHALL BE MADE AND THE ENTIRE SYSTEM RE-TESTED.

DOMESTIC WATER PIPING SHALL BE TESTED AT 1034 KPA WATER PRESSURE AT THE LOW POINT OF THE SYSTEM.

TESTS ON DRAINAGE SYSTEM SHALL BE MADE BY FILLING SYSTEM WITH WATER PRODUCING A MINIMUM PRESSURE OF 15 KPA AND A MAXIMUM PRESSURE OF 75 KPA WATER COLUMN.

ALL DUCT SYSTEMS, INCLUDING SUPPLY, RETURN AND EXHAUST SHALL BE CHECKED FOR TIGHTNESS. ALL LEAKS SHALL BE REPAIRED BEFORE DUCTS ARE FURRED IN TO ENSURE TOTAL OUTLET CAPACITY IS WITHIN 5% OF THE QUANTITY.

ALL GAS PIPING SHALL BE TESTED AS REQUIRED BY AUTHORITIES HAVING JURISDICTION.

RECORD "AS-BUILT" DRAWINGS

KEEP IN THE JOB OFFICE AN EXTRA SET OF WHITE PRINTS AND SPECIFICATIONS ON WHICH ALL CHANGES AND DEVIATIONS SHALL BE RECORDED DAILY. AT COMPLETION OF THE PROJECT TURN THESE OVER TO THE ENGINEER.

SHOP DRAWINGS

THE CONSULTANT SHALL REVIEW OR TAKE OTHER APPROPRIATE ACTION ON THE CONTRACTOR'S SUBMITTALS, SUCH AS SHOP DRAWINGS, PRODUCT DATA, SAMPLES AND OTHER DATA, WHICH THE CONTRACTOR IS REQUIRED TO SUBMIT, BUT ONLY FOR THE LIMITED PURPOSES OF CHECKING FOR CONFORMANCE WITH THE DESIGN CONCEPT AND THE INFORMATION SHOWN IN THE CONSTRUCTION DOCUMENTS. THIS REVIEW SHALL NOT INCLUDE REVIEW OF THE ACCURACY OR COMPLETENESS OF DETAILS, SUCH AS QUANTITIES, DIMENSIONS, WEIGHTS OR GAUGES, FABRICATION PROCESSES, CONSTRUCTION MEANS OR METHODS, COORDINATION OF THE WORK WITH OTHER TRADES OR CONSTRUCTION SAFETY PRECAUTIONS, ALL OF WHICH ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

THE CONSULTANT'S REVIEW SHALL BE CONDUCTED WITH REASONABLE PROMPTNESS WHILE ALLOWING SUFFICIENT TIME IN THE CONSULTANT'S JUDGMENT TO PERMIT ADEQUATE REVIEW. REVIEW OF A SPECIFIC ITEM SHALL NOT INDICATE THAT THE CONSULTANT HAS REVIEWED THE ENTIRE ASSEMBLY OF WHICH THE ITEM IS A COMPONENT. THE CONSULTANT SHALL NOT BE RESPONSIBLE FOR ANY DEVIATIONS FROM THE CONSTRUCTION DOCUMENTS NOT BROUGHT TO THE ATTENTION OF THE CONSULTANT IN WRITING BY THE CONTRACTOR. THE CONSULTANT SHALL NOT BE REQUIRED TO REVIEW PARTIAL SUBMISSIONS OR THOSE FOR WHICH SUBMISSIONS OF CORRELATED ITEMS HAVE NOT BEEN RECEIVED.

SUBMIT TO CONSULTANT, FOR REVIEW, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES SPECIFIED. UNTIL SUBMISSION IS REVIEWED, WORK INVOLVING RELEVANT PRODUCT MAY NOT PROCEED.

PRODUCT DATA:
CERTAIN SPECIFICATION SECTIONS SPECIFY THAT MANUFACTURER'S STANDARD SCHEMATIC DRAWINGS, CATALOGUE SHEETS, DIAGRAMS, SCHEDULES, PERFORMANCE CHARTS, ILLUSTRATIONS AND OTHER STANDARD DESCRIPTIVE DATA WILL BE ACCEPTED IN LIEU OF SHOP DRAWINGS.

ABOVE WILL ONLY BE ACCEPTED IF THEY CONFORM TO THE FOLLOWING:
- .1 DELETE INFORMATION WHICH IS NOT APPLICABLE TO THE PROJECT.
- .2 SUPPLEMENT STANDARD INFORMATION TO PROVIDE ADDITIONAL INFORMATION APPLICABLE TO PROJECT.
- .3 SHOW DIMENSIONS AND CLEARANCES REQUIRED.
- .4 SHOW PERFORMANCE CHARACTERISTICS AND CAPACITIES.
- .5 SHOW WIRING DIAGRAMS AND CONTROLS.
- .6 FOR ITEMS WITH ELECTRICAL CONNECTIONS, SHOW VOLTAGE, PHASE AND POWER (HP, WATTS, AMPS).

COORDINATION OF SUBMISSIONS:
- .1 REVIEW SHOP DRAWINGS, PRODUCT DATA AND SAMPLES PRIOR TO SUBMISSION.
- .2 VERIFY FIELD MEASUREMENTS; FIELD CONSTRUCTION CRITERIA; CATALOGUE NUMBERS; AND SIMILAR DATA.
- .3 COORDINATE EACH SUBMISSION WITH REQUIREMENTS OF WORK AND CONTRACT. INDIVIDUAL SHOP DRAWINGS WILL NOT BE REVIEWED UNTIL ALL RELATED DRAWINGS ARE AVAILABLE. THE CONTRACTOR SHALL SUBMIT ALL SHOP DRAWINGS SPECIFIED IN A SECTION IN ONE SUBMISSION. MULTIPLE SHOP DRAWING SUBMISSIONS FOR A SPECIFICATION SECTION SHALL NOT BE ACCEPTABLE. IN THE EVENT THAT SHOP DRAWINGS ARE SUBMITTED PIECE MEAL (MULTIPLE SUBMISSIONS) WITHIN A SPECIFICATION SECTION, THE SHOP DRAWINGS SHALL BE RETAINED BY THE CONSULTANT UNTIL ALL SHOP DRAWINGS FROM THAT SECTION HAVE BEEN RECEIVED FOR REVIEW.
- .4 CONTRACTOR'S RESPONSIBILITY FOR ERRORS AND OMISSIONS IN SUBMISSION IS NOT RELIEVED BY CONSULTANT'S REVIEW OF SUBMITTALS.
- .5 CONTRACTOR'S RESPONSIBILITY FOR DEVIATIONS IN SUBMISSION FROM REQUIREMENTS OF CONTRACT DOCUMENTS IS NOT RELIEVED BY CONSULTANT'S REVIEW OF SUBMISSION, UNLESS CONSULTANT GIVES WRITTEN ACCEPTANCE OF SPECIFIED DEVIATIONS.
- .6 NOTIFY CONSULTANT, IN WRITING AT TIME OF SUBMISSION, OF DEVIATIONS FROM REQUIREMENTS OF CONTRACT DOCUMENTS.
- .7 AFTER CONSULTANT'S REVIEW, DISTRIBUTE COPIES.

SUBMISSION REQUIREMENTS:
- .1 SCHEDULE SUBMISSIONS AT LEAST 15 WORKING DAYS BEFORE DATES REVIEWED SUBMISSIONS WILL BE NEEDED.
- .2 ELECTRONIC SHOP DRAWING SUBMISSIONS ARE ACCEPTABLE WITH THE FOLLOWING CONDITIONS:
  - .1 THE SHOP DRAWINGS ARE SUBMITTED IN PDF FORMAT WITH A TRANSMITTAL AND INCLUDE THE CONTRACTOR'S REVIEW STAMP.
  - .2 THE NUMBER OF PAGES IN THE COMPLETE SUBMISSION (IE. NOT PIECE MEAL) DO NOT EXCEED 25 PAGES.
  - .3 THE PAGE SIZE CANNOT EXCEED 11"X17" AND MUST BE FULLY LEGIBLE. IN THE EVENT THAT THE ELECTRONIC SUBMISSION CANNOT CONFORM TO THE REQUIREMENTS IDENTIFIED ABOVE, THE CONTRACTOR SHALL SUBMIT SIX (6) SETS OF HARD COPIES FOR REVIEW.
- .3 ON EACH SUBMISSION SHEET, ENSURE CLEAR SPACE 3" X 3" FOR REVIEW STAMP (E.G. LETTER SIZE DATA SHEET ON LEGAL SIZE PAPER).
- .4 ACCOMPANY SUBMISSIONS WITH TRANSMITTAL LETTER CONTAINING:
  - .1 DATE; PROJECT TITLE AND NUMBER; CONTRACTOR'S NAME AND ADDRESS; NUMBER OF EACH SHOP DRAWING, PRODUCT DATA AND SAMPLE SUBMITTED.
  - .2 OTHER PERTINENT DATA.
- .5 SUBMISSIONS SHALL INCLUDE:
  - .1 DATE AND REVISION DATES; PROJECT TITLE AND NUMBER.
  - .2 NAME OF: CONTRACTOR; SUB-CONTRACTOR; SUPPLIER; MANUFACTURER.
  - .3 IDENTIFICATION OF PRODUCT OR MATERIAL.
  - .4 RELATION TO ADJACENT STRUCTURE OF MATERIALS.
  - .5 FIELD DIMENSIONS, CLEARLY IDENTIFIED AS SUCH.
  - .6 SPECIFICATION SECTION NUMBERS
  - .7 APPLICABLE STANDARDS, SUCH AS CSA OR CGSB NUMBERS.
  - .8 CONTRACTOR'S STAMP, INITIALLED OR SIGNED, CERTIFYING REVIEW OF SUBMISSION, VERIFICATION OF FIELD MEASUREMENTS AND COMPLIANCE WITH CONTRACT DOCUMENTS.

INTENT

IT IS THE INTENT OF THIS SPECIFICATION AND DRAWINGS TO PROVIDE FOR A COMPLETE AND FULLY OPERATING SYSTEM IN COMPLETE ACCORD WITH ALL APPLICABLE CODES. THESE DOCUMENTS MAY NOT SHOW OR DESCRIBE EACH AND EVERY ITEM REQUIRED FOR THE COMPLETE MECHANICAL INSTALLATION; THEREFORE, THE CONTRACTOR SHALL MAKE PROVISIONS FOR ALL LABOUR, MATERIAL AND EQUIPMENT DEEMED NECESSARY TO COMPLETE THE MECHANICAL SYSTEM TO PERFORM AS INTENDED.

ALL WORK SHOWN OR IMPLIED ON THESE DRAWINGS SHALL CONFORM TO LATEST EDITIONS OF THE NATIONAL BUILDING CODE, LOCAL CODE REGULATIONS AS APPLICABLE UNDER THE SPECIFIC JURISDICTION OF THE COMMISSION DE LA SANTÉ ET DE LA SÉCURITÉ DU TRAVAIL DU QUÉBEC, ASSOCIATION, OR LOCAL MUNICIPAL AUTHORITIES. ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH STANDARDS OF GOOD PRACTICE SUCH AS SMACNA AND ASHRAE.

TEMPORARY AND TRIAL USAGE

TEMPORARY OR TRIAL USAGE BY THE OWNER OF ANY MECHANICAL MACHINERY, APPARATUS, EQUIPMENT OR ANY OTHER WORK OR MATERIALS SUPPLIED UNDER THE CONTRACT BEFORE FINAL WRITTEN ACCEPTANCE BY THE ENGINEER IS NOT TO BE CONSTRUED AS EVIDENCE OF THE ACCEPTANCE OF SAME BY THE OWNER. THE OWNER SHALL HAVE THE PRIVILEGE OF SUCH TEMPORARY AND TRIAL USAGE AS SOON AS THIS CONTRACTOR SHALL CLAIM THAT SAID WORK IS COMPLETED. ANY DAMAGE CAUSED BY DEFECTIVE MATERIAL OR WORKMANSHIP THROUGH TEMPORARY OR TRIAL USAGE BY THE OWNER SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR.

ANY PERMANENT EQUIPMENT USED TEMPORARILY FOR TEMPORARY HEAT OR OTHERWISE WILL BE COMPLETELY REPAIRED, REPLACED, AND CLEANED TO THE FULL SATISFACTION OF THE OWNER.

EQUIPMENT AND SITE CLEANLINESS

DUCTS AND EQUIPMENT SHALL BE THOROUGHLY CLEANED OF DIRT, CUTTINGS AND OTHER FOREIGN SUBSTANCES. DISCONNECT, CLEAN AND RECONNECT WHENEVER NECESSARY FOR THE PURPOSE OF LOCATING AND REMOVING OBSTRUCTIONS. REPAIR WORK DAMAGED IN THE COURSE OF REMOVING OBSTRUCTIONS.

THE CONTRACTOR SHALL AT ALL TIMES KEEP THE PREMISES FREE FROM THE ACCUMULATION OF WASTE MATERIAL TO THE SATISFACTION OF THE PROJECT MANAGER. PLACE DUST PROTECTION IN THE FORM OF COVER SHEETS OVER EQUIPMENT AND FURNITURE TO ENSURE NO DUST INFILTRATION. CLEANING TO BE COMPLETED AT THE END OF EACH SHIFT.

GUARANTEE

THE MECHANICAL CONTRACTOR, AS A CONDITION PRECEDENT TO FINAL PAYMENT AFTER COMPLETION OF THIS WORK, SHALL GIVE THE OWNER A WRITTEN GUARANTEE WARRANTING ALL APPARATUS FURNISHED UNDER THE CONTRACT TO REMAIN IN PERFECT SERVICEABLE CONDITION FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE OF HIS WORK BY THE ARCHITECT AND ENGINEER.

CEILING TILE REMOVAL/REPLACEMENT

EACH RESPECTIVE SUBTRADE OR PRIME MECHANICAL CONTRACTOR AS THE CASE MAY BE SHALL BE RESPONSIBLE FOR THE REMOVAL AND REINSTALLATION OF ANY CEILING TILES TO SUIT WORK WITHIN THE CEILING SPACE. ANY DAMAGED TILES SHALL BE REPLACED AT THE COST TO THE RESPECTIVE SUBTRADE OR PRIME MECHANICAL CONTRACTOR AND SHALL BE HELD BACK ON THE PROGRESS DRAWS UNTIL REPLACED.

OPERATING AND MAINTENANCE DATA

FURNISH THREE SETS OF OPERATING AND MAINTENANCE DATA FOR ALL NEW EQUIPMENT AND SYSTEMS. DATA SHALL BE ASSEMBLED IN BOOKLET FORM WITH HARD COVER AND INDEX. IDENTIFY FRONT COVER WITH NAME AND LOCATION OF THE PROJECT, CONSULTING ENGINEER AND CONTRACTOR. SUBMIT ONE COPY TO THE ENGINEER FOR APPROVAL.

MATERIALS

MATERIALS AND EQUIPMENT INSTALLED SHALL BE NEW, FULL WEIGHT AND OF BEST QUALITY SPECIFIED. USE SAME BRAND OF MANUFACTURER FOR EACH SPECIFIC APPLICATION. REPLACE MATERIAL OR WORKMANSHIP BELOW SPECIFIED QUALITY AND RELOCATE WORK WRONGLY PLACED TO THE SATISFACTION OF THE ENGINEER.

APPROVALS

THE PRICE SUBMITTED FOR THIS CONTRACT SHALL BE BASED ON THE USE OF MATERIALS AND EQUIPMENT AS SPECIFIED. IF THIS CONTRACTOR WISHES TO QUOTE ON EQUIVALENT MATERIALS AND EQUIPMENT HE MUST QUOTE ON PRODUCTS APPROVED BY THE ENGINEER, IN WRITING, AS AN EQUIVALENT TO THE PRODUCT SPECIFIED. THIS CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY ADDITIONAL WORK OR MATERIALS REQUIRED BY THE MECHANICAL TRADE OR OTHER CONTRACTORS TO ACCOMMODATE APPROVED EQUIVALENT MATERIALS OR EQUIPMENT. EXTRAS WILL NOT BE APPROVED TO COVER SUCH WORK.

CUTTING AND PATCHING

THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR THIS WORK AND SHALL COORDINATE LOCATIONS FOR ALL HOLES FOR PIPES, DUCTS THROUGH FLOORS AND ROOF ETC., AND PROVIDE SLEEVES REQUIRED TO EXECUTE THE MECHANICAL INSTALLATION. X-RAY FLOORS AND STRUCTURAL WALLS BEFORE CUTTING TO LOCATE EXISTING REBAR AND CONDUITS, AND TO OBTAIN OWNER'S APPROVAL FOR PROPOSED CUTTING. PROVIDE ULC APPROVED FIRESTOPPING SYSTEM FOR ALL PENETRATIONS THROUGH RATED ASSEMBLIES.

GENERAL REVIEW DECLARATION

BEFORE THE ENGINEER CAN ISSUE A GENERAL REVIEW DECLARATION TO THE CITY TO ASSIST IN GAINING AN OCCUPANCY PERMIT, THE SPACE MUST BE READY FOR THE INTENDED USE. IT IS THE MECHANICAL CONTRACTOR'S RESPONSIBILITY TO ENSURE ALL ASPECTS OF THE MECHANICAL SYSTEMS HAVE BEEN INSTALLED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, MANUFACTURER'S INSTALLATION INSTRUCTIONS AND INDUSTRY STANDARDS AS THE CASE MAY BE. ADDITIONALLY, ALL SYSTEMS ARE TO HAVE BEEN STARTED UP, BALANCED AND COMMISSIONED (IF REQUESTED). THE FOLLOWING LIST OF ITEMS AS A MINIMUM SHALL BE REQUIRED WITH NO ISSUES PRIOR TO THE ENGINEER ISSUING A GENERAL REVIEW DECLARATION:
1. HOT AND COLD WATER SHALL BE FULLY OPERATIONAL WHERE REQUIRED BY THE CONTRACT. ADDITIONALLY THE PLUMBING CONTRACTOR SHALL CONFIRM THE MUNICIPAL PLUMBING INSPECTOR HAS INSPECTED THE INSTALLATION WITH NO ISSUES. A COPY OF THE PLUMBING INSPECTION REPORT SHALL BE SUBMITTED TO THE ENGINEER.
2. ALL FIRE PROTECTION WORK (SPRINKLERS) SHALL BE COMPLETE WITH A LETTER FROM THE INSTALLING CONTRACTOR INDICATING CONFORMANCE WITH NFPA OR APPLICABLE STANDARD REFERENCED IN THE SPECIFICATIONS.
3. ALL HVAC SYSTEMS TO BE OPERATIONAL AND CONFIRMED TO BE GENERALLY INSTALLED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. STARTUP REPORTS FOR ALL NEW EQUIPMENT SHALL BE PROVIDED.
4. LETTERS FROM ALL RESPECTIVE MECHANICAL SUB-TRADES INDICATING SYSTEMS (WHERE REQUESTED) HAVE BEEN SEISMICALLY RESTRAINED IN ACCORDANCE WITH THE NATIONAL BUILDING CODE. THE LETTERS SHALL BE AUTHORED AND SIGNED BY A LICENSED PROFESSIONAL ENGINEER IN THE PROVINCE OF QUEBEC.
5. A COMPLETE BALANCING REPORT HAS BEEN SUBMITTED WITH NO OUTSTANDING ISSUES.

EXCAVATION AND BACKFILLING

CAREFULLY READ THE SECTION OF THE ARCHITECTURAL SPECIFICATIONS COVERING EXCAVATION, TRENCHING AND BACKFILLING.

DO ALL NECESSARY CUTTING AND EXCAVATION INSIDE THE LIMITS OF THE BUILDING AND BACKFILL WITH SAND OR OTHER APPROVED MATERIAL TO A MINIMUM OF 305 mm OVER PIPES OR AS NECESSARY TO PROTECT THE MECHANICAL WORK. BACKFILL THE REMAINDER OF THE EXCAVATION TO MATCH EXISTING, OR AS DESCRIBED IN THE ARCHITECTURAL SPECIFICATIONS. ALL EXCAVATION AND BACKFILLING OUTSIDE THE BUILDING SHALL BE CARRIED OUT BY OTHERS.

EXCAVATE BOTTOM OF TRENCHES SO THAT PIPES ARE SUPPORTED ON A SOLID BED OF UNDISTURBED EARTH. DO ALL PUMPING REQUIRED TO KEEP EXCAVATION FREE OF WATER. IF THE TRENCH IS EXCAVATED BEYOND THE PROPER DEPTH, IT SHALL BE FILLED WITH GRAVEL AND COMPACTED TO 95% PROCTOR DENSITY TO BRING THE BOTTOM OF THE TRENCH TO THE PROPER ELEVATION. NO LOOSE SOIL WILL BE PERMITED UNDER THE PIPES.

IDENTIFICATION

PROVIDE 16 mm DIA. BRASS TAGS WITH STAMPED NUMBERS. SECURE TAGS WITH CHAINS TO ALL VALVES AND PREPARE A LIST DETAILING THE VALVE, LOCATION, PURPOSE, AND TAG NUMBER. MOUNT ONE COPY OF THIS LIST IN A GLAZED FRAME WHERE DIRECTED.

INSTALL SELF ADHESIVE PIPE IDENTIFICATION LABELS TO IDENTIFY FLUID MEDIUM AND DIRECTION ON PIPE EITHER SIDE OF WALLS OR FLOORS, AND SO THAT A LABEL IS CLEARLY VISIBLE FROM ANY LOCATION, INCLUDING IN CEILING SPACES.

USE PAINTED LETTERS TO IDENTIFY DUCTWORK SYSTEMS.

TESTING AND BALANCING

BALANCE ALL SYSTEMS WHERE AIRFLOW IS GIVEN FOR RATED AIR FLOW, ROOM TEMPERATURE CONTROL AND CHECK CURRENT DRAW AFTER INSTALLATION IS COMPLETE AND IN FULL WORKING ORDER. ADJUST CONTROLS DAMPERS, AND DIFFUSERS FOR PROPER AIR CIRCULATION AND MINIMUM ENERGY CONSUMPTION. BALANCE TERMINAL UNITS TO THEIR MAXIMUM AND MINIMUM POSITIONS.

MECHANICAL SYSTEMS SHALL NOT BE CONSIDERED READY FOR FINAL INSPECTION UNTIL BALANCING RESULTS ACCEPTABLE TO THE ENGINEER ARE OBTAINED. IF IT IS FOUND THAT THE SPECIFIED AIR FLOWS CANNOT BE ACHIEVED ON PORTIONS OF THE SYSTEM, THE ACTUAL CONDITIONS SHALL BE REPORTED TO THE ENGINEER FOR CONSIDERATION OF CORRECTIVE ACTION BEFORE CONTINUING THE BALANCING PROCEDURE. PROVIDE INSTRUMENTS AND MANPOWER TO VERIFY RESULTS OF UP TO 30% OF ALL REPORTED MEASUREMENTS. IF MEASURED FLOW AT FINAL INSPECTION SHOWS DEVIATION OF 10% OR MORE OF SELECTED AREAS, THE REPORT SHALL BE REJECTED. IF REPORT IS REJECTED, SYSTEMS SHALL BE REBALANCED AND A NEW CERTIFIED REPORT SUBMITTED AT NO EXTRA COST, FOLLOWING WHICH THE ENGINEER RESERVES THE RIGHT TO REQUEST ADDITIONAL VERIFICATION.

SUBMIT WRITTEN BALANCING REPORT CONFORMING TO AABC AND ASHRAE STANDARDS FOR ENGINEER'S APPROVAL. ONCE REVIEWED AND DEEMED SATISFACTORY BY THE ENGINEER, THE BALANCING CONTRACTOR SHALL SUBMIT 3 COPIES OF THE BALANCING REPORT FOR SUBMISSION TO THE OWNER.

SEISMIC CONTROL MEASURES

GENERAL:
FOLLOWING SYSTEMS AND/OR EQUIPMENT TO BE SEISMICALLY RESTRAINED IN THE EVENT OF AN EARTHQUAKE.
- FIRE PROTECTION SYSTEM
- DUCTWORK AIR DISTRIBUTION TERMINAL UNITS/SILENCERS.

EARTHQUAKE RESTRAINTS ARE TO BE PROVIDED FOR ALL MECHANICAL SYSTEMS NOTED ABOVE IN ACCORDANCE WITH THE ONTARIO BUILDING CODE, NFPA 13, SMACNA "HVAC DUCT CONSTRUCTION STANDARDS" AND GOOD ENGINEERING PRACTICE.
ALL EQUIPMENT SHALL BE SUITABLY ANCHORED, WHETHER RIGIDLY CONNECTED TO THE STRUCTURE, OR ON VIBRATION ISOLATORS, AND DESIGNED FOR EARTHQUAKE LOADING FOR THE OTTAWA AREA.
DRILLED OR POWER DRIVEN ANCHORS AND FASTENERS NOT PERMITTED.
NO EQUIPMENT, EQUIPMENT SUPPORTS OR MOUNTS TO FAIL BEFORE FAILURE OF STRUCTURE.
THE CONTRACTOR SHALL UTILIZE A SUPPLIER FAMILIAR WITH THE DESIGN OF EARTHQUAKE RESTRAINTS TO PROVIDE A COMPREHENSIVE PACKAGE OF EARTHQUAKE RESTRAINTS FOR THE PROJECT. PROVIDE DETAILED SHOP DRAWINGS SHOWING THE PROPOSED RESTRAINT SYSTEM FOR ALL EQUIPMENT, PIPING, AND DUCTWORK ON THE PROJECT. THE SHOP DRAWINGS SHALL INCLUDE CALCULATIONS FOR THE SUPPORTS CERTIFIED BY AN ENGINEER REGISTERED IN THE PROVINCE OF ONTARIO AND RECOGNIZED FOR THEIR EXPERTISE IN THIS AREA.
SEISMIC CONTROL MEASURES NOT TO INTERFERE WITH INTEGRITY OF FIRESTOPPING.
AT THE COMPLETION OF THE PROJECT, THE SUPPLIER SHALL REVIEW THE INSTALLATIONS ON SITE, AND SHALL PREPARE A WRITTEN REPORT CERTIFYING THAT THE INSTALLATIONS HAVE BEEN COMPLETED IN ACCORDANCE WITH THEIR RECOMMENDATIONS AND THE APPLICABLE BUILDING CODES.

STATIC EQUIPMENT:
ANCHOR EQUIPMENT TO EQUIPMENT SUPPORTS. ANCHOR EQUIPMENT SUPPORTS TO STRUCTURE.
SUSPENDED EQUIPMENT SHALL BE RESTRAINED USING SWAY BRACING AND HANGER RODS. EQUIPMENT SUPPORTED BY VIBRATION-ISOLATION HANGERS SHOULD BE DETAILED AND INSTALLED WITH ISOLATION HANGERS CLOSE TO THE STRUCTURE AND UPWARD LIMIT STOPS LOCATED DIRECTLY BELOW THE HANGERS. AVOID BRACING EQUIPMENT TO SEPARATE PORTIONS OF THE STRUCTURE THAT MAY ACT DIFFERENTLY IN RESPONSE TO AN EARTHQUAKE. FOR EXAMPLE, DO NOT CONNECT A TRANSVERSE BRACE TO A WALL AND A LONGITUDINAL BRACE TO A FLOOR OR ROOF AT THE SAME BRACE LOCATION.

VIBRATION ISOLATED EQUIPMENT:
SEISMIC CONTROL MEASURES NOT TO JEOPARDIZE NOISE AND VIBRATION ISOLATION SYSTEMS. PROVIDE 6 TO 9 MM CLEARANCE DURING NORMAL OPERATION OF EQUIPMENT AND SYSTEMS BETWEEN SEISMIC RESTRAINT AND EQUIPMENT. INCORPORATE SEISMIC RESTRAINTS INTO VIBRATION ISOLATION SYSTEM TO RESIST COMPLETE ISOLATOR UNLOADING.

PIPING SYSTEMS:
FIRE PROTECTION SYSTEMS: TO NFPA 13
ALL OTHER PIPING SYSTEMS IN ACCORDANCE WITH THE ONTARIO BUILDING CODE.
TO BE COMPATIBLE WITH REQUIREMENTS FOR ANCHORING AND GUIDING OF PIPING SYSTEMS.

SITE VISIT
MANUFACTURER TO VISIT SITE AND PROVIDE WRITTEN CERTIFICATION THAT INSTALLATION IS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND MAKE ADJUSTMENTS AND CORRECTIONS IN ACCORDANCE WITH WRITTEN REPORT. PROVIDE ENGINEER WITH NOTICE 24 HOURS IN ADVANCE OF VISIT.
THE ENGINEER PROVIDING THE CERTIFIED DESIGN FOR SEISMIC CONTROL OF EQUIPMENT/COMPONENTS/SYSTEMS SHALL VISIT THE SITE AS REQUIRED TO PROVIDE A LETTER AT THE END OF THE CONSTRUCTION INDICATING THE INSTALLATION IS IN ACCORDANCE WITH THE CERTIFIED SHOP DRAWING SUBMISSION. THE LETTER SHALL BE STAMPED AND SIGNED WITH THE PROFESSIONAL ENGINEER'S SEAL, LICENCED IN THE PROVINCE OF ONTARIO.

HOURS OF WORK

ANY AUDIBLE TESTING, CORE DRILLING OR ANY OTHER NOISY WORK TO BE PERFORMED "AFTER HOURS". MAKE ARRANGEMENTS WITH BUILDING PERSONNEL TO CONFIRM TIMES FOR SUCH WORK

CHANGES IN THE WORK

CHANGES IN THE WORK MAY BE REQUESTED FROM TIME TO TIME BY THE ISSUANCE OF A CONTEMPLATED CHANGE NOTICE (CCN) AND/OR PROPOSED CHANGE (PC). IN ADDITION TO THE NET COST OF THE CHANGE, THE CONTRACTOR SHALL BE ENTITLED TO A 15% FEE TO COVER OVERHEADS & PROFIT ON HIS WORK AND A 10% FEE TO COVER OVERHEADS AND PROFIT ON SUB-TRADES.

PROVIDE DETAILED BREAKDOWNS OF MATERIAL AND LABOUR WITH UNIT PRICES AND EXTENSIONS REQUIRED FOR REVIEW OF CONTEMPLATED CHANGE NOTICES (CCN'S) OR PROPOSED CHANGES (PC'S).

COST QUOTATIONS SHALL BE BASED ON INDUSTRY ACCEPTED COSTING METHODS. PLUMBING AND PIPING MATERIAL SHALL BE BASED ON "ALL-PRICER" LIST PRICING WITH A 30% DISCOUNT APPLIED. SHEET METAL MATERIAL SHALL BE BASED ON CURRENT MARKET PRICING. SUBMIT SUPPLIER INVOICES FOR ALL MATERIALS NOT INCLUDED IN "ALL PRICER".

THE FOLLOWING JOB EXPENSES SHALL BE CONSIDERED TO BE ACCEPTABLE IN CERTAIN PRICING EXERCISES:
- BONDING COSTS.
- WARRANTY COSTS WHERE CONSIDERED ACCEPTABLE SHALL BE BASED ON 2% OF THE MATERIAL & LABOUR COST FOR THE CHANGE.
- DRAFTING COSTS (WHERE INTERFERENCE /COORDINATION DRAWINGS HAVE BEEN REQUESTED AS PART OF THE CONTRACT) SHALL BE CONSIDERED BASED ON 2% OF THE LABOUR COST FOR THE CHANGE. EQUIPMENT COSTS WILL NOT BE CONSIDERED IN THE FORMULA.
- SHEET METAL DELIVERIES WHERE CONSIDERED ACCEPTABLE SHALL BE CHARGED PER THE ONTARIO SHEET METAL ASSOCIATION.
- HOISTING WHERE CONSIDERED ACCEPTABLE (IE. CRANE IS OFF SITE) SHALL BE CHARGED BASED ON CURRENT CRANING COSTS.
- EQUIPMENT RENTALS FOR LARGE EQUIPMENT (IE. NOT SMALL TOOLS COVERED IN THE LABOUR UNITS) SHALL BE CHARGED BASED ON CURRENT RENTAL RATES.
- CORE DRILLING WHERE CONSIDERED ACCEPTABLE SHALL BE CHARGED AS A JOB EXPENSE.
- TRAVEL IN ACCORDANCE WITH THE APPLICABLE UNION AGREEMENT SHALL BE CONSIDERED TO BE ACCEPTABLE AS A JOB EXPENSE.

THE FOLLOWING JOB EXPENSES SHALL NOT BE CONSIDERED ACCEPTABLE UNDER ANY CIRCUMSTANCES:
- GARBAGE BINS/CLEAN-UP.
- SUPERVISION (FOREMAN, SITE SUPER-INTENDENT, ETC) AS IT IS INCLUDED IN THE LABOUR RATES NOTED AND REFERENCED ABOVE.
- SHIPPING AND DELIVERIES FOR PLUMBING AND PIPING MATERIAL.
- PROJECT MANAGEMENT.
- ESTIMATING.
- SPECIAL CLEANING.
- SPECIAL HANDLING / STORAGE.
- EQUIPMENT RENTALS FOR SMALL TOOLS.
- EQUIPMENT START-UP.
- ANY OTHER NON PRODUCTIVE TIME ITEMS.

THE MECHANICAL CONTRACTOR SHALL SUBMIT A TEMPLATE PROPOSED TO BE USED FOR ANY CCN'S/PC'S AS A FORMAL SHOP DRAWING SUBMISSION FOR REVIEW AND RECOMMENDED ACCEPTANCE PRIOR TO ANY CCN'S/PC'S BEING ISSUED.

PLUMBING AND FIRE PROTECTION

PIPE AND PIPE FITTINGS

SANITARY DRAINAGE AND VENT PIPING ABOVE GRADE SHALL BE "DWV" COPPER WITH 50:50 TIN LEAD SOLDER JOINTS, OR DWV CAST IRON WITH MJ TYPE JOINTS.

SANITARY DRAINAGE AND VENT PIPING BELOW GRADE SHALL BE ABS OR PVC DWV PIPE WITH SOLVENT WELDED JOINTS, OR DWV CAST IRON WITH MJ TYPE JOINTS.

DOMESTIC WATER PIPE ABOVE GRADE SHALL BE TYPE M COPPER WITH WROUGHT OR CAST COPPER OR BRASS FITTINGS, AND 95:5 SOLDER JOINTS.

GAS PIPE SHALL BE SCH. 40 BLACK STEEL WITH SCREWED JOINTS IN EXPOSED LOCATIONS, AND WELDED IN CONCEALED LOCATIONS. ALL PIPING 2-½"ø AND OVER SHALL BE WELDED.

DEIONIZED WATER PIPING SHALL BE ORION SCHEDULE 80 RIGID, UNPIGMENTED POLYVINYLIDENE FLUORIDE (PVDF) ULC LISTED PIPING, 0 FLAME SPREAD AND 50 SMOKE DEVELOPED RATED IN ACCORDANCE WITH CAN/ULC-S102.2-88, STRAIGHT LENGTHS, FACTORY CLEANED AND COMPLETE WITH CAPPED ENDS. FITTINGS SHALL BE UNPIGMETED "PEGAS"POLYPROPYLENE (PP) FITTINGS COMPLETE WITH FACTORY FORMED FLANGED ENDS AND EACH FACTORY CLEANED AND BAGGED. SCREWED FITTINGS ARE ACCEPTABLE AS WELL.

WHEREVER DISSIMILAR METALS ARE JOINED OR SUPPORTED, THE PIPING SHALL HAVE NON-CONDUCTING TYPE CONNECTIONS OR HANGERS TO PREVENT GALVANIC CORROSION.

PROVIDE VACUUM BREAKERS OR BACKFLOW PREVENTERS ON LINES SERVING EQUIPMENT OR FIXTURES WHERE CONTAMINATION OF DOMESTIC WATER CAN OCCUR, IN ACCORDANCE WITH CSA B64.

PROVIDE ALL VALVES AS SHOWN ON THE DRAWINGS OR REQUIRED BY AUTHORITIES HAVING JURISDICTION.

PROVIDE ALL VENTING IN ACCORDANCE WITH LATEST ONTARIO BUILDING CODE.

PROVIDE CHROME PLATED RIGID OR FLEXIBLE SUPPLIES TO FIXTURES WITH STOPS, REDUCERS AND ESCUTCHEON PLATES.

PIPE INSULATION

DOMESTIC COLD WATER PIPING: FIBREGLASS INSULATION WITH FACTORY APPLIED VAPOUR BARRIER JACKET, MOULDED TO CONFORM TO PIPING, "K" VALUE AT 24°C SHALL BE 0.26 W/M °C MAXIMUM.

DOMESTIC HOT WATER PIPING: FINE FIBROUS GLASS INSULATION WITH FACTORY APPLIED GENERAL PURPOSE JACKET, MOULDED TO CONFORM TO PIPING, "K" VALUE AT 24°C SHALL BE 0.26 W/M °C MAXIMUM.

PIPING	PIPE SIZE (mm)	INSULATION THICKNESS(mm)
DOMESTIC COLD WATER	ALL SIZES	12
DOMESTIC HOT WATER	ALL SIZES	25

ALL EXPOSED INSULATION TO BE COVERED IN A CANVAS JACKET. CANVAS JACKET SHALL BE ULC LISTED PLAIN WEAVE COTTON FABRIC AT 0.75 OZ./SQ.FT.

INSULATION ASSEMBLIES SHALL COMPLY WITH NATIONAL BUILDING REGULATIONS WITH FLAME SPREAD AND SMOKE DEVELOPED RATINGS NOT EXCEEDING 25 AND 50 RESPECTIVELY.

ACCEPTABLE INSULATION CONTRACTORS: THERMEC, G&L, B.L. THERMAL INSULATION OR ALPINE.

CLEANOUTS

PROVIDE AND SET CLEANOUTS AT ALL POINTS REQUIRED BY THE CODE AND WHERE INDICATED ON THE DRAWINGS. ALL CLEANOUTS SHALL BE MADE ACCESSIBLE BY EXTENDING BRANCH CONNECTIONS TO FINISHED SURFACES AND FITTING THEM WITH A SUITABLE ACCESS COVER IN KEEPING WITH THE FINISH OF THE WALL OR FLOOR WHERE INSTALLED.

FLOOR AND WALL PLATES

PROVIDE CHROMIUM PLATED SOLID BRASS, PLATES WITH SET SCREWS WHERE ALL PIPES PASS THROUGH THE FINISHED FLOORS, WALLS AND CEILINGS.

HANGERS

SUPPORT ALL PIPING WITH APPROVED ADJUSTABLE CADMIUM OR GALVANIZED STEEL HANGERS, ARRANGED TO SUIT EXPANSION AND CONTRACTION. SUPPORT COPPER PIPING USING INSULATING TAPE BETWEEN COPPER PIPE AND FERROUS HANGERS. USE PROTECTION SADDLE OR SHIELD WITH OVERSIZED HANGERS FOR COLD INSULATED PIPE. SUPPORT SPACING SHALL BE IN ACCORDANCE WITH APPLICABLE STANDARDS.

VENTILATION AND AIR CONDITIONING

DUCTWORK

DUCTWORK SHALL BE OF GALVANIZED STEEL AND SHALL BE LOCK FORMING QUALITY. ALL DUCTWORK SHALL BE CONSTRUCTED, BRACED, CONNECTED AND JOINTED AS RECOMMENDED IN THE LATEST ISSUE OF THE DUCT CONSTRUCTION STANDARDS ISSUED BY THE SHEET METAL NATIONAL ASSOCIATION INC. (SMACNA). ALL DUCTWORK SHALL BE INSTALLED TO CONFORM TO THE ONTARIO BUILDING CODE, NFPA 90A AND 91 AND IN ACCORDANCE WITH OTHER APPLICABLE CODES.

DUCTWORK GAUGES, REINFORCING AND SEALING TECHNIQUES SHALL BE IN ACCORDANCE WITH LATEST EDITION OF SMACNA, FOR THE FOLLOWING CLASSIFICATION.

SYSTEM	PRESSURE CLASS	SEAL CLASS
EXHAUST	-250 PA	C
RETURN AIR	-250 PA	C
CONSTANT VOLUME SUPPLY	+500 PA	C

JOINTS SHALL BE PITTSBURGH SEAM, LONGITUDINALLY, DRIVE SLIP (450 mm AND UNDER) AND BAR SLIP (ABOVE 450 mm) TRANSVERSELY, AND SHALL BE AIR TIGHT.

SUPPORT DUCT ON 40x40x3mm ANGLE TRAPEZE SUPPORT WITH 6 mm ROD HANGERS AT 3 M MAXIMUM CENTRES.

TURNS IN DUCTWORK SHALL HAVE CENTRE LINE RADIUS NOT LESS THAN 1-1/4 TIMES DUCT WIDTH, OR SHALL HAVE MITRE BENDS WITH HOLLOW TURNING VANES.

RIGID ROUND DUCTWORK SHALL BE SPIRAL GALVANIZED STEEL CONSTRUCTION WITH SLIP JOINT, MADE AIR TIGHT USING HIGH PRESSURE SEALANT AND REINFORCING TAPE.

FLEXIBLE ROUND DUCTWORK SHALL BE CORRUGATED ALUMINUM CONSTRUCTION, .170 mm THICK, UL AND NFPA APPROVED. WHERE DUCTING IS SPECIFIED TO BE INSULATED, PROVIDE FLEXIBLE DUCT COMPLETE WITH 25 mm THICK FIBREGLASS BLANKET INSULATION AND PLASTIC VAPOUR BARRIER. MAXIMUM LENGTH NOT TO EXCEED 3 M.

TYPE 316 SHEET STAINLESS STEEL TO A.S.T.M. A480-82A, WITH METAL GAUGES IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS METAL AND FLEXIBLE, TO SUIT THE DUCT CONFIGURATION AND CLASSIFICATION. ALL STAINLESS STEEL DUCTWORK CONNECTIONS INCLUDING SEAMS AND JOINTS SHALL BE WELDED AIR TIGHT FOR ISOLATION ROOM EXHAUST, SPD RETURN/EXHAUST, AND LAB (FUME HOOD EXHAUST) AS NOTED IN ITEM 2.3 BELOW. ALL OTHER SYSTEMS INDICATED BELOW REQUIRED TO BE USING STAINLESS STEEL SHALL CONFORM TO THE SEAL CLASS NOTED IN ITEM 2.3. ALL STAINLESS STEEL DUCTWORK (ROUND OR SQUARE OR RECTANGULAR) SHALL BE WELDED AIR TIGHT..

ROUND STAINLESS STEEL DUCTWORK EQUAL TO UNITED MCGILL CORP. "INDUSTRIAL" FACTORY FABRICATED SPIRAL SEAM OR WELDED LONGITUDINAL SEAM DUCT AIR TIGHT AND FACTORY MADE FITTINGS. ALL DUCT CONNECTIONS INCLUDING SEAMS AND JOINTS SHALL BE WELDED TO PROVIDE AND AIR TIGHT SEAL.

BALANCING DAMPERS SHALL BE SINGLE BLADE, GALVANIZED STEEL CONSTRUCTION WITH INDICATING TYPE LOCKING REGULATOR ON 50mm STAND OFF BRACKET. FOR DUCTWORK DEEPER THAN 300mm CLEAR, BALANCING DAMPERS SHALL BE MULTIBLADE TYPE COMPLETE WITH CHANNEL FRAME, LINKAGES, AND SHAFT EXTENSION WITH HANDLE FOR MANUAL ADJUSTMENT.

FIRE DAMPERS AND FLAPS

FIRE DAMPERS AND FIRE STOP FLAPS SHALL BE LISTED AND BEAR LABEL OF ULC, AND SHALL BE "OUT OF AIRSTREAM" TYPE. INSTALL WHERE SHOWN ON THE DRAWINGS AND/OR REQUIRED BY BUILDING INSPECTOR AS PER BUILDING CODE. RIGIDLY SUPPORT FRAME AND SEAL INTO FIRE RATED ASSEMBLY. PROVIDE ACCESS FOR SERVICING AND INSPECTION.

DIFFUSERS

SIZES INDICATED ON THE DRAWINGS ARE NOMINAL. PROVIDE CORRECT STANDARD PRODUCT NEAREST TO NOMINAL FOR CAPACITY, CORRECT THROW, AND TO NOT EXCEED NC 35 IN THE SPACE.

UNIT SHALL BE EQUIVALENT TO THE TYPE AS SPECIFIED ON THE DRAWINGS, OF EQUAL SHAPE, SIZE, CONSTRUCTION, MATERIAL, FINISH, AND PERFORMANCE.

ACCEPTABLE MATERIALS: E. H. PRICE, NAILOR INDUSTRIES, KRUEGER, TITUS, METAL-AIRE.

DUCT INSULATION

ALL COVERING SHALL BE APPLIED IN A WORKMANLIKE MANNER TO PRESENT A NEAT AND CLEAN APPEARANCE AT COMPLETION OF THE WORK TO THE APPROVAL OF THE ENGINEER AND OWNER. INSULATION ASSEMBLIES SHALL COMPLY WITH ONTARIO BUILDING REGULATIONS WITH FLAME SPREAD AND SMOKE DEVELOPED RATINGS NOT EXCEEDING 25 AND 50 RESPECTIVELY. UTILIZE PINS ON RECTANGULAR DUCTWORK & WIRE ON ROUND DUCTWORK TO SECURE THERMAL INSULATION.

APPLY 25mm THICK FLEXIBLE FIBROUS GLASS INSULATION WITH FACTORY APPLIED REINFORCED ALUMINUM FOIL VAPOUR BARRIER ON SUPPLY AIR DUCTWORK IN ALL AREAS UP TO THE DIFFUSERS, EXCEPT WHERE INTERNAL ACOUSTIC INSULATION IS PROVIDED, THERMAL SHALL BE ADDED TO MAKE UP THE DIFFERENCE.

ACCEPTABLE INSULATION CONTRACTORS: THERMEC, G&L, B.L. THERMAL INSULATION OR ALPINE.

CONTROLS

ACCEPTABLE CONTRACTOR: LAR-MEX (KMC CONTROLS)

THESE DESIGN DOCUMENTS ARE PREPARED SOLELY FOR THE USE BY THE PARTY WITH WHOM THE DESIGN PROFESSIONAL HAS ENTERED INTO A CONTRACT AND THERE ARE NO REPRESENTATIONS OF ANY KIND MADE BY THE DESIGN PROFESSIONAL TO ANY PARTY WITH WHOM THE DESIGN PROFESSIONAL HAS NOT ENTERED INTO A CONTRACT.

CES DOCUMENTS SONT PRÉPARÉS UNIQUEMENT POUR LE PARTE AVEC LEQUEL LE PROFESSIONNEL DE CONCEPTION A CONCLU UN CONTRAT ET IL N'Y A AUCUNE DÉCLARATION D'AUCUNE SORTE FAITE PAR LE PROFESSIONNEL DE CONCEPTION ENVERS TOOT AUTRE PARTI AVEC LEQUEL LE PROFESSIONNEL DE CONCEPTION N'A PAS CONCLU DE CONTRAT.

THE PAPER COPY OF THE DRAWINGS ISSUED FOR BUILDING PERMIT AND/OR TENDER WILL TAKE PRECEDENCE OVER ELECTRONIC COPIES.

LA COPIE SUR PAPIER DES DESSINS PUBLIÉS POUR PERMIS DE CONSTRUCTION ET / OU D'APPEL D'OFFRES AURA PRÉSÉDANCE AUX COPIES ÉLECTRONIQUES.

REVISION No.	DESCRIPTION	DATE
5.	ISSUED FOR TENDER	FEB. 14/14
4.	RE-ISSUED FOR FINAL REVIEW	JAN. 8/14
3.	ISSUED FOR FINAL REVIEW	NOV. 25/13
2.	ISSUED FOR 99% REVIEW	NOV. 4/13
1.	ISSUED FOR 66% REVIEW	OCT. 11/13

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NATURAL HERITAGE CAMPUS
MUSEE CANADIAN DE LA NATURE
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DRAWING/DESSIN:
MECHANICAL:
SPECIFICATIONS

DATE: OCT 2013
DESIGNED BY: / CONCUS PAR G.S.
DRAWN BY: / DESSINER PAR G.S.
CHECKED BY: / VERIFIER PAR S.C.
SCALE: / ECHELLE N.T.S.

No. DWGS. / No. DESSIN 3
PROJECT No./NO. PROJET 13-303
DRAWING No./NO. DE DESSIN M-3