

# SPECIFICATION

## 1.0 GENERAL PROVISIONS

### 1.1 SCOPE

- Provide complete and fully operational mechanical systems to meet requirements described herein and in accordance with applicable codes and ordinances.
- Visit the site before submitting tender and examine local and existing conditions on which the work is dependent. No consideration will be granted for misunderstanding of work to be done resulting from failure to visit the site.
- Should the contractor discover any specified equipment, material or installation which may be in violation of law, ordinance, or regulations of authorities having jurisdiction, promptly bring the matter to the attention of the consultant.
- Assume responsibility of laying out of work and for damage caused by improper execution of work.
- Protect finished and unfinished work from damage. Repair damage to parts of building resulting from improper execution of work.
- Give notices, obtain permits and pay all fees for the work specified herein.
- Protect equipment and materials in storage on site during and after installation until final acceptance. Thoroughly clean piping, ducts and equipment of dirt, cuttings and other foreign substances.
- All necessary cutting, coring and patching of existing wall, floor and roof required to complete new mechanical installation shall be included in this contract. Confirm with and obtain permission from base building owner and his structural engineer prior to cutting and/or coring of existing structure. Arrange with general contractor to make good all exposed surfaces at completion of mechanical work.
- Repair building where damaged from equipment installation, improperly located holes, etc. by this section of the work. This repair work shall be carried out by the specialist, trade at the expense of this section of work. Use matching materials as specified with respective sections.
- Contract documents of this division and drawings are diagrammatic and approximately to scale unless detailed otherwise. They establish scope, material and installation quality and are not detailed installation instructions.
- The drawings indicate the general location and route to be followed by the piping and ductwork, where details are not shown on the drawings or only shown diagrammatically. The pipes and ductwork shall be installed in such a way as to conserve head room and interfere as little as possible with the free use of space through which they pass. Service lines shall not parallel to building lines. All duct and pipes at ceiling shall be kept as tight as possible to beams or other limiting members at high end. All pipes and ducts shall be co-ordinated in elevation to ensure that they are concealed in the ceiling space provided unless detailed and dimensioned otherwise on drawings and permitted otherwise by the consultant.
- Connect to equipment specified in other sections and to equipment supplied and installed by other contractors or by the owner, uncrate equipment, move in place and install completed start-up and test.

### 1.2 MATERIALS

- All materials shall be in accordance with BCBC 1998, Part 1.
- Where pipes, ducts, cables, etc. partially penetrate or pass through fire rated walls or floors, or smoke separation walls or floors, seal all voids between pipe or duct and wall with a UL approved fire stopping to the hourly rating required by the National Building Code or local codes. Firestopping shall be installed by a contractor regularly employed in this work. Submit shop drawings for review prior to commencing work. Submit report confirming this work has been completed at the end of the project.

### 1.3 TESTING

- All systems, equipment and materials shall be tested. Testing procedures shall be as required by specification below or authority having jurisdiction. Carry out tests for an 8 hour period and maintain pressure with no appreciable pressure drop, where leakage occurs, repair and retest.

### 1.4 SHOP DRAWINGS

- Submit six (6) copies of shop drawings for review of equipment used.
- Identify materials and equipment by manufacturer, trade name and model number. Include copies of applicable brochure or catalogue material. Do not assume applicable catalogues are available in the consultant's office. Maintenance and operating manuals are not suitable submittal material.
- Clearly mark submittal material using arrows, underlining or circling to show differences from specified, e.g. ratings, capabilities and options being proposed. Cross out non-applicable material. Specifically note on the submittal specified features such as special tank fittings, pumps, seals, material or painting. Include dimensional and technical data sufficient to check if equipment meets requirements. Include wiring, piping, and service connection data and motor sizes.
- Installed materials and equipment shall meet specified requirements regardless of whether or not shop drawings are reviewed by the consultant.
- Do not order equipment or material until the consultant has reviewed and returned shop drawings.

### 1.5 OPERATING AND MAINTENANCE DATA

- Instruct the building operators in the operation and preventative maintenance of each piece of equipment and system supplied and installed. Complete and turn over documentation prior to substantial performance.
- Provide three (3) copies to consultant of hard cover type binders at completion of job.
- Index Division B of Maintenance Manuals according to the following index system:

#### 1.5.1 TAB 1.0 MECHANICAL SYSTEMS

- Provide Title Page with Clear Plastic Cover.
- The front title page shall include the cover information in addition to:
  - the owner
  - the engineer
  - the mechanical contractor
- The addresses, phone and fax numbers for the above will be given adjacent to their name.

### 2. TAB 1.1 DESCRIPTION OF SYSTEMS

- Provide complete description of each system.
  - Include detailed system description and components comprising that system, explanation of how each component interfaces with others to complete the system. Location of each thermostat, controller, or operating setpoints.
- ### 3. TAB 1.2 OPERATING DIVISION
- Provide complete and detailed operation of each major component.
  - Include starting procedure, exact switch and control location.
  - Describe operation of component controls, changes required for summer or winter operation and method of accomplishment.
  - Describe trouble shooting sequence when set points cannot be maintained.
  - Describe safe guards to check if equipment goes off line.
- ### 4. TAB 1.3 MAINTENANCE AND LUBRICATION DIVISION
- Provide detailed preventative maintenance and lubrication schedule for each of the major components including daily, weekly, monthly, semi-annual and yearly checks and tasks.
- ### 5. TAB 1.4 LIST OF EQUIPMENT SUPPLIERS AND SUB-CONTRACTORS
- Provide complete list of equipment suppliers and sub-contractors, including address and telephone number.
  - Outline procedures for purchasing parts and equipment.
  - Provide a parts list and repair manual for each piece of complete equipment specified.

### 6. TAB CERTIFICATION (2.0, 2.1 ETC.) INCLUDE COPIES OF:

- Balancing reports for air systems.
- Valve tag identification schedule including location, service and normal position.
- Start-up reports of equipment.
- Guarantee Certificate.
- Tab Shop Drawings (3.0)
- Include copy of all reviewed shop drawings.

### 1.6 AS-BUILT DRAWINGS

- The as-built drawings shall include, but not be limited to, the following changes and shall be recorded daily.
  - Size location, arrangement, route and extent of piping, conduit, and equipment, valves, rough-in, etc.
- All changes which affect the operation of the mechanical system.
  - Location, tagging and numbering of all valves.
- At end of construction, the contractor shall engage and pay for the consultant to transfer all as-built information onto CADD drawings, and submit a set of vellum to the owner at completion of work. (Allow 10/00)
- Each white print drawing sheet shall be marked: "We hereby certify that these drawings represent the building as-built" with signatures immediately below of authorized personnel of the contractor.

### 1.7 ELECTRICAL MOTORS

- Supply mechanical equipment complete with electrical motors.
- Provide motors to CEMA and CMA standards for hard, continuous service, designed to limit temperature rise to 40°C for open housing and 50°C for drip proof housing, and operate 1200 or 1800 R/min. unless otherwise specified. Do not use A/F over ratings.
- Motors shall have ball or roller type bearings with grease lubrication fittings.
- All belt-driven devices shall have the motors mounted on adjustable bases with adjusting screws so that proper belt tension can be obtained.
- Where equipment has been specified in Division B to be complete with starters, disconnects and/or control panels, this contractor shall provide any required wiring and conduit between the equipment and the above items.
- Refer to electrical specification for voltage, phase and cycle.

### 1.8 ACCESS OF EQUIPMENT

- Make all arrangements to ensure that access into the building is available for all mechanical equipment. Do all hoisting and rigging into place of all specified equipment and be responsible for any damages incurred therefrom.

### 1.9 GUARANTEE WARRANTY

- This contractor shall furnish a written warranty stating that all work executed under this Division will be free from defects of material and workmanship for a period of one (1) year from the date of substantial performance, which shall include one (1) complete summer and one (1) complete winter of uninterrupted operation. Warranty shall include any parts of equipment, units or structures furnished hereunder that show defects in the works under normal operating conditions and/or for the purpose of which they were intended.
- The contractor shall at his own expense promptly investigate any mechanical or control malfunction, and repair or replace all such defective work, and all other damages thereby which becomes defective during the time of the warranty-warranty.

### 1.10 SUBSTANTIAL PERFORMANCE INSPECTION

- Prior to the contractor requesting an inspection for substantial performance all the following items must be provided to permit beneficial use by the owner.
  - Comply with requirements in General Contract conditions.
  - Maintenance and Operating Manuals to be submitted and reviewed.
  - As-Built Drawings.
  - Balance Reports (Air).
  - All motor name plate ratings and actual operating amps and voltages.
  - All systems shall be certified in writing by the contractor as complete and fully operational.
  - Instructions to the owner's operating personnel shall be provided in accordance with the specifications. A signed statement to this effect, countersigned by the owner, shall be submitted to the consultant.
  - A complete list of items which the contractor has not finished, or are deficient shall be provided. If, in the opinion of the consultant, this list indicates the project is excessively incomplete, a substantial completion inspection will not be performed.
  - The contractor shall be fully responsible to accumulate all necessary data from his sub-trades and suppliers and present same in the specified format for the approval by the consultant.

### 1.11 DEMONSTRATION AND INSTRUCTION TO OWNER

- Demonstrate to and instruct the representative designed by the owner on the complete systems operating and maintenance procedures using the assistance of specialist sub-trades and manufacturer's representatives.
- Obtain a signed statement from the owner certifying that the demonstration and instructions have been given to his satisfaction.

### 1.12 INSPECTION

- The consultant or his representative may choose to inspect all work prior to it being concealed. All work shall be approved by any other regulatory body having jurisdiction. All openings shall be sealed appropriately in particular in fire rated walls and floors. Sealing shall be approved prior to covering.

### 1.13 EQUIPMENT LIST

#### 1.13.1 FAN SCHEDULE

TAG	MAKE	MODEL	L/S / (CFM)	F4 / (E.S.P.)	RPM	HP	VOLTAGE	COMMENTS
5F-1	LOREN COOK	48XLUH	9440 / (20,000)	615 / (0.25")	432	3	208/3	PROPELLER BELT-DRIVE SUPPLY FAN
5F-2	LOREN COOK	48XLUH	9440 / (20,000)	615 / (0.25")	432	3	208/3	PROPELLER BELT-DRIVE SUPPLY FAN
5F-3	LOREN COOK	48XLUH	9440 / (20,000)	615 / (0.25")	432	3	208/3	PROPELLER BELT-DRIVE SUPPLY FAN
5F-4	LOREN COOK	48XLUH	9440 / (20,000)	615 / (0.25")	432	3	208/3	PROPELLER BELT-DRIVE SUPPLY FAN
5F-5	LOREN COOK	---	2830 / (6,000)	615 / (0.25")	854	3/4	208/3	PROPELLER BELT-DRIVE SUPPLY FAN

#### 1. ALL FANS COMPLETE WITH TOTALLY ENCLOSED MOTORS & WIRE MOTOR GUARDS

#### 2. COORDINATE WITH ELECTRICAL TO PROVIDE POWER WIRING CONNECTION & MOTOR STARTERS.

### 2. EXISTING DUST COLLECTORS

TAG	MAKE	MODEL	L/S / (CFM)	F4 / (E.S.P.)	RPM	HP	VOLTAGE	COMMENTS
DC-1	-	-	3,061 / (6,500)	-	-	-	-	EXISTING DUST COLLECTOR TO BE MODIFIED AS NOTED.
DC-2	-	-	4,719 / (10,000)	-	-	-	-	EXISTING DUST COLLECTOR TO REMAIN
DC-3	-	-	2,34 / (4,500)	-	-	-	-	EXISTING DUST COLLECTOR TO REMAIN
DC-4	-	-	1,692 / (3,500)	-	-	-	-	EXISTING DUST COLLECTOR TO REMAIN
DC-5	-	-	4,719 / (10,000)	-	-	-	-	EXISTING DUST COLLECTOR TO REMAIN
DC-6	-	-	4,241 / (9,000)	-	-	-	-	EXISTING DUST COLLECTOR TO REMAIN

### 4. MODIFICATIONS TO EXISTING DUST COLLECTOR DC-1

- REPLACE EXISTING FILTERS (12x4) WITH 200x4 FILTERS.
- REPLACE FILTER MOUNTING PLATE. PLATE TO BE SUPPLIED BY MR. MURPHY LTD.
- REPLACE DAMAGED PORTION OF INLET DUCT AND ADD A SECOND INLET DUCT TO COLLECTOR PLENUM AS SHOWN. CONNECTION TO BE CONFIRMED WITH COLLECTOR MANUFACTURER REPRESENTATIVE.

### 2.0 HVAC

#### 2.1 GENERAL

- Ductwork shall be galvanized steel, lock formed 2" IUG 84ACNA Standard for low velocity and medium velocity ductwork quality unless specified. Fabricated in accordance with 84ACNA duct manuals and ASHRAE Handbooks. Ductwork shall meet the requirements of NFPA 30A and 91 and conform to applicable codes. All ductwork shall be properly sealed with water based duct sealant.

#### 2.2 Duct Collector Ductwork

- Material:
  - Galvanized steel with zinc coating lock forming quality unless otherwise indicated.
- Construction:
  - Round and oval, factory fabricated spiral wound with matching fittings and specials to 84ACNA. Gages as noted on drawings.
  - Transverse joints: up to 300mm (36") to be slip type with sealant and tape. Over 300mm to be V-joints.
  - 90 degree elbows smooth.
  - Branch fittings: combination lateral/elbow.

### 2.2 AIR BALANCING

- Provide balancing report to show that the design flow rates are obtained at each terminal/outlet.

### 2.3 INSULATION

- The British Columbia Insulation Contractors Association (BCICA) Standard Manuals, latest edition shall form part of this specification for the mechanical insulation.
- Provide seismic restraints on all mechanical equipment, piping and ductwork in accordance with Part 4 of BCBC 1998.

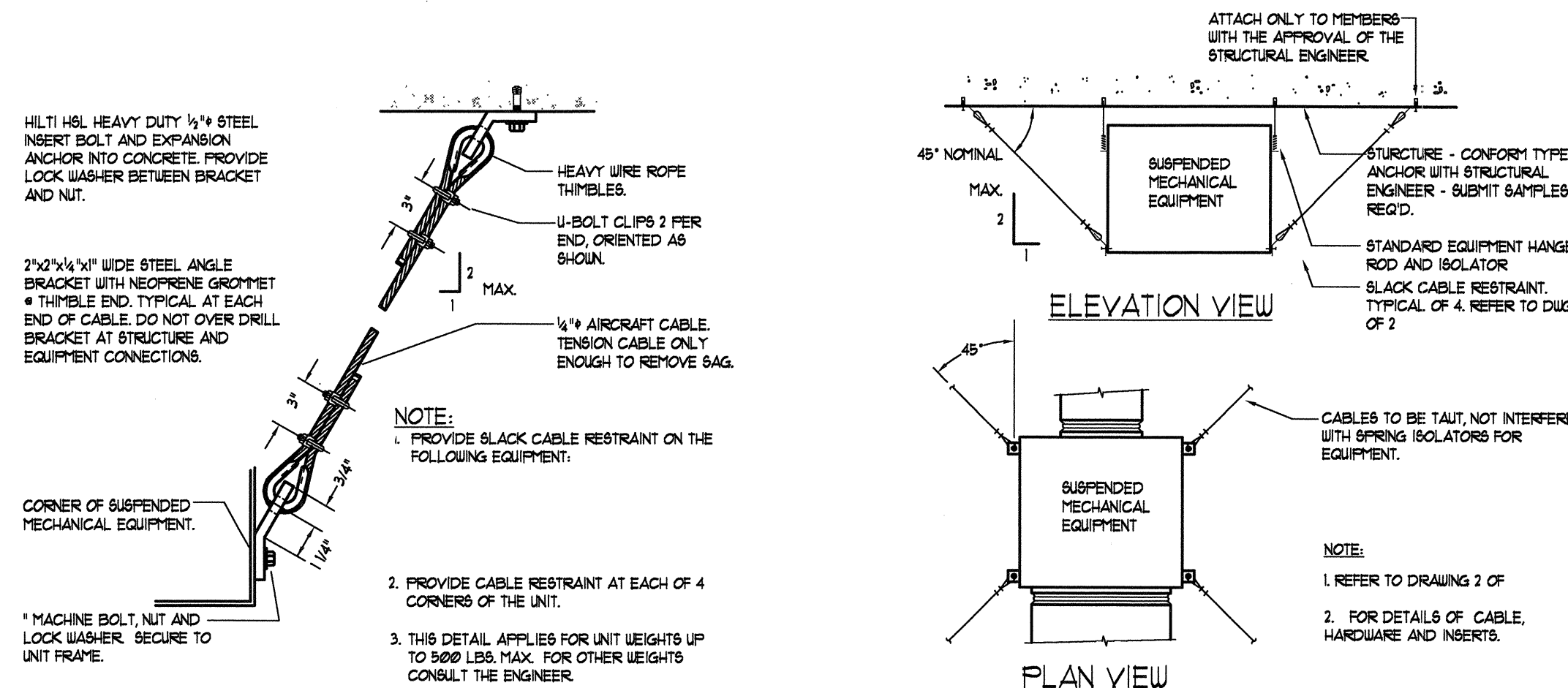
- Under this contract, Division B shall include in their bid for the service of a seismic restraint design consultant to provide detailed calculations and installation drawings of the seismic restraint design and connection methods to the structure for all Division B work. The seismic restraint design consultant shall also be responsible for aligning and sealing all related seismic restraint Letter of Assurance (Schedule B-1 & B-2) prior to and Letter of Compliance (Schedule C-B) after completion of project and to provide field review and reporting of seismic restraint installations. (Sketches shown on mechanical drawings shall be used as guidelines only).

- At completion of work, submit a letter to the consultant confirming that all new mechanical installations have been provided with seismic restraints as per Building Code Requirements.

### 3.0 CONTROLS

- All controls (interlocks) shall be electric and provided by Division 16.
- New exhaust fans shall be interlocked with matching dust collectors, as shown on drawings.

### END OF THE SPECIFICATION



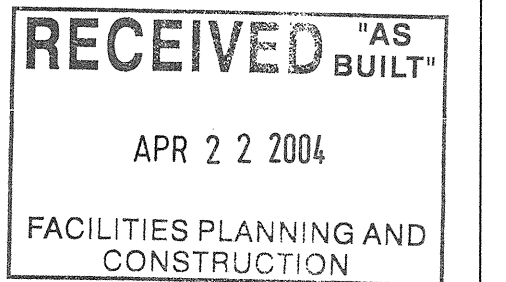
SEISMIC RESTRAINT DETAILS FOR SUSPENDED EQUIPMENT

DWG 2 OF 2

SEISMIC RESTRAINT DETAILS FOR SUSPENDED EQUIPMENT

DWG 1 OF 2

ISSUE	DATE	DESCRIPTION
A	07/24/03	ISSUED FOR OWNER'S REVIEW
B	07/25/03	ISSUED AS FINAL CHECKSET
C	07/28/03	RE-ISSUED AS FINAL CHECKSET
REV	DATE	DESCRIPTION
-	09/02/03	INCORPORATED CON NO. 1



CONSULTANTS  
**YONEDA & ASSOCIATES**  
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 PROJECT NO. 030261

PROJECT:  
**UPGRADE TO DUST COLLECTOR SYSTEM IN NE2 & NE4**

SHEET TITLE  
**MECHANICAL DETAILS & SPECIFICATIONS**

DATE: JULY 2003 SHEET NO.  
 DRAWN: DB  
 CHECKED: DL  
 SCALE: NTA  
**M-3**