

## **SUBMITTALS**

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### **1. SHOP DRAWINGS**

#### **1.1 General**

- .1 Arrange for the preparation of clearly identified Shop Drawings as specified or as the Contract Administrator may reasonably request. Shop Drawings are to clearly indicate materials, methods of construction, and attachment or anchorage, erection diagrams, connections, explanatory notes, and other information necessary for completion of the Work. Where articles or equipment attach or connect to other articles or equipment, clearly indicate that all such attachments and connections have been properly coordinated, regardless of the trade under which the adjacent articles or equipment will be supplied and installed. Shop Drawings are to indicate their relationship to design Drawings and Specifications. Notify the Contract Administrator of any deviations in Shop Drawings from the requirements of the Contract Documents to allow the Contract Administrator to assess the deviations.
- .2 Where all or part of the Shop Drawings are to be prepared under the stamp and seal of a Professional Engineer registered in the Province of Manitoba, the Contract Administrator will limit that review to an assessment of the completeness of the part of the submission so stamped and sealed.

#### **1.2 Electrical and Controls Installation Information**

- .1 Key information will be taken from Shop Drawings to prepare electrical and instrumentation Drawings and/or layout Drawings, control schematics, and interconnection wiring diagrams.

#### **1.3 Submission Requirements**

- .1 Coordinate each submission with requirements of the Work and Contract Documents. Individual submissions will not be reviewed until all related information is available.
- .2 Accompany all submissions with a transmittal letter, in duplicate, containing:
  - .1 Date
  - .2 Project title and Bid Opportunity number
  - .3 Contractor's name and address
  - .4 Specification Section number for each submittal
  - .5 Submittal number and revision number in the following format:
    - .1 498 - Spec Section # - Submittal # - Revision # (e.g. 498-05500-001-1).
    - .2 The first submittal is numbered 1 with sequential numbering after that for revisions.
  - .6 Identification and quantity of each Shop Drawing product

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- .7 Equipment tag number
- .8 Other pertinent data
- .3 Submissions shall include:
  - .1 Date and revision dates
  - .2 Project title and number
  - .3 Name, email address, and address of:
    - .1 Contractor
    - .2 Manufacturer
  - .4 Contractor's stamp, signed by Contractor's authorized representative, certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
  - .5 As required in the specifications, the seal and signature of a Professional Engineer registered in the Province of Manitoba.
- .4 Details of appropriate portions of work as applicable:
  - .1 Fabrication
  - .2 Layout showing dimensions including identified field dimensions and clearances
  - .3 Setting or erection details
  - .4 Capacities
  - .5 Performance characteristics
  - .6 Standards
  - .7 Operating weight
  - .8 Wiring diagrams
  - .9 Single line and schematic diagrams
  - .10 Method of control of equipment and its communication with the City's SCADA system

### **1.4 Drawings**

- .1 Original Drawings or modified standard Drawings provided by the Contractor to illustrate details of portions of Work which are specific to project requirements.

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- .2 Maximum sheet size: 850 x 1050 mm.
- .3 Submit twelve (12) prints and one (1) reproducible copy of Shop Drawings. The Contract Administrator will return the reproducible copy with comments transcribed.
- .4 Cross-reference Shop Drawing information to applicable portions of the Contract Documents.
- .5 Include reviewed Shop Drawings in all O&M Manuals.

### **1.5 Product Data**

- .1 Product Data; Manufacturer's catalogue sheets, brochures, literature, performance charts, and diagrams used to illustrate standard manufactured products.
- .2 Submit twelve (12) copies of product data.
- .3 Sheet size: 215 x 280 mm.

### **1.6 Procedure and Routing**

- .1 The Contractor shall provide to the Contract Administrator thirteen (13) printed copies of the Shop Drawings and corresponding submittal transmittal form(s) complete with the information specified in 1.3 Submission Requirements.
- .2 The Contractor shall simultaneously email the .pdf version of these same Shop Drawings and submittal transmittal forms to the Contract Administrator. The Contractor shall ensure the .pdf version of the Shop Drawings and corresponding submittal transmittal form(s) are identical to the printed copies being distributed for review. When the total size of the email is greater than 5 MB, the Contractor shall post the .pdf version of the Shop Drawings and submittal transmittal form(s) to an accessible place on the internet (provided by the Contract Administrator) and an e-mail notification is to be sent to all parties listed above when posting is complete.
- .3 The routing and the names of individuals responsible for receiving submittals will be identified by the Contract Administrator at the pre-construction meeting held pursuant to D4.2.
- .4 Upon review of the Shop Drawings, the Contract Administrator will e-mail the .pdf version of the annotated Shop Drawings and corresponding transmittal form(s) to the Contractor. When the total size of the email is greater than 5 MB, the Contract Administrator will post the .pdf version of the Shop Drawings and corresponding transmittal form(s) to the same accessible place on the internet and an e-mail notification will be sent to the Contractor. Two (2) printed copies of the reviewed Shop Drawings will be sent back to the Contractor.

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### **1.7 Shop Drawing Review**

- .1 Shop Drawing review by the Contract Administrator is solely to ascertain conformance with the general design concept. Responsibility for the approval of detail design inherent in Shop Drawings rests with the Contractor and review by the Contract Administrator shall not imply such approval.
- .2 Review by the Contract Administrator shall not relieve the Contractor of his responsibility for errors or omissions in Shop Drawings or for proper completion of the Work in accordance with the Contract Documents.
- .3 Shop Drawings will be returned to the Contractor with one of the following notations:
  - .1 When stamped "REVIEWED", distribute additional copies as required for execution of the Work.
  - .2 When stamped "REVIEWED AS MODIFIED", ensure that all copies for use are modified and distributed, same as specified for "REVIEWED".
  - .3 When stamped "REVISE AND RE-SUBMIT", make the necessary revisions, as indicated, consistent with the Contract Documents and submit again for review.
  - .4 When stamped "NOT REVIEWED", submit other drawings, brochures, etc., for review consistent with the Contract Documents.
  - .5 Only Shop Drawings bearing "REVIEWED" or "REVIEWED AS MODIFIED" shall be used on the Work unless otherwise authorized by the Contract Administrator.
- .4 After submittals are stamped "REVIEWED" or "REVIEWED AS MODIFIED", no further revisions are permitted unless re-submitted to the Contract Administrator for further review.
- .5 Any adjustments made on Shop Drawings by the Contract Administrator are not intended to change the Contract Price. If it is deemed that such adjustments affect the Contract Price, clearly state as such in writing prior to proceeding with fabrication and installation of Work.
- .6 Make changes in Shop Drawings which the Contract Administrator may require consistent with Contract Documents. When re-submitting, notify the Contract Administrator in writing of any revisions other than those requested by the Contract Administrator.
- .7 Shop Drawings indicating design requirements not included in the Contract Documents require the seal of a Professional Engineer registered in the Province of Manitoba. If requested, submit engineering calculations for review, sealed by a Professional Engineer.

### **1.8 Operating and Maintenance Manuals**

- .1 Refer to Section 01730 – Operations and Maintenance Manuals.

**END OF SECTION**

## QUALITY CONTROL

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### **1. GENERAL**

#### **1.1 Section Includes**

- .1 Quality assurance requirements
- .2 Inspection and testing, administrative and enforcement requirements.
- .3 Tests and mix designs.
- .4 Mock-ups.
- .5 Mill tests.
- .6 Equipment and system adjust and balance.

#### **1.2 Precedence**

- .1 Refer to GC:2.

#### **1.3 Related Sections (Not Used)**

#### **1.4 References**

- .1 Unless the edition number and/or date are specified, any reference to the Manufacturer's and published codes, standards and specifications shall mean the latest edition published by the issuing authority, and in effect three (3) Business Days before the Submission Deadline.
- .2 Referenced standards and specifications define minimum requirements. Work in quality exceeding these minimum requirements conforms to the Contract.
- .3 Any reference to a Manufacturer's direction, instruction, or specification shall be deemed to include full information on storing, handling, preparing, mixing, installing, erecting, applying, or other matters concerning the products pertinent to their use and their relationship to the products with which they are incorporated.
- .4 Any reference to regulatory authorities includes all authorities having jurisdiction.
- .5 Any reference to a Specification section includes all Drawings and Schedules related to the work of that section.

#### **1.5 Inspection**

- .1 Refer to GC:11.

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### 1.6 Independent Inspection Agencies

- .1 Except where inspecting, testing and similar quality control services are specifically indicated to be the Contractor's responsibility, the City will engage Independent Inspection/Testing Agencies for the purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by the City.
- .2 Where inspecting, testing and similar quality control services are specifically indicated in the Specification Sections as the Contractor's responsibility, the Contractor shall engage appropriate Independent Inspection/Testing Agencies. Cost of such services will be borne by the Contractor.
- .3 Where the City has engaged an Inspection/Testing Agency for testing and inspection of a part of the Work and the Contractor is also required to engage an Inspection/Testing Agency for the same or related part of the Work; the Contractor shall not employ the same agency engaged by the City without the prior written approval of the Contract Administrator.
- .4 Employment of Inspection/Testing Agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .5 If defects are revealed during inspection and/or testing, appointed agency may require additional inspection and/or testing to ascertain full degree of defect. Regardless of original responsibility, pay costs for additional inspection and testing, retesting, re-inspection.

### 1.7 Access to Work

- .1 Refer to GC:11.

### 1.8 Procedures

- .1 Refer to GC:11.
- .2 Submit for the Contract Administrator's approval a written Quality Assurance Plan prior to start of any on site activities. The plan shall include as a minimum:
  - .1 Contractor's approach and philosophy to QA/QC during construction.
  - .2 Contractor's method for identification and tracking of all control documents.
  - .3 Organization chart showing proposed personnel and key contacts for QA/QC.
  - .4 QC Representative and any subordinate experts. Submit resumes for the Contract Administrator's approval.
  - .5 QC Representative's on Site presence and participation in pre-installation, and Subcontractor meetings.

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- .6 Contractor's bi-weekly QC report, including results of contractor certifications, test results, corrective action and follow-up on any deficiencies in the Project's quality control.
- .7 A list of proposed Inspection/Testing Agencies and their qualifications.
- .3 The QC Representative shall be:
  - .1 Independent of the Contractor's Supervisor
  - .2 Qualified by experience and training to monitor construction quality.
  - .3 Responsible for the overall quality assurance of the Contractor's work and compliance with Contract.
  - .4 Responsible to observe and certify the performance of contractor tests and pre-inspections identified, and to attend meetings on site. The QC Representative may elect to use an alternate expert to observe/certify performance.
  - .5 Authorized to stop work at any time that quality problems necessitate. This authority shall be delineated in a letter of appointment from a Contractor, and shall be included in the QA Plan.
- .4 Notify appropriate agency and the Contract Administrator not less than forty eight (48) hours in advance of requirement for tests, in order that attendance arrangements can be made.
- .5 Submit samples and/or materials required for testing, as specified in Specification section. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.
- .6 Provide labour and facilities to obtain and handle samples and materials on the Site.
- .7 Provide suitable facilities for the storage of specimens or samples at correct temperature, free from vibration or damage in accordance with the instruction of the Inspection/Testing Agency and the governing standard.

### **1.9 Rejected Work**

- .1 Refer to GC:11.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.

### **1.10 Reports**

- .1 For inspecting, testing and similar quality control services which are the Contractor's responsibility, submit four (4) copies of inspection and test reports to the Contract Administrator, unless specified otherwise.

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- .2 Each report shall include:
  - .1 Date of issue
  - .2 Contract name and number
  - .3 Name, address and telephone number of Inspection/Testing Agency
  - .4 Name and signature of inspector and tester
  - .5 Date of inspection or test
  - .6 Identification of the product and Specification section covering inspected or tested Work
  - .7 Location of the inspection or the location from which the tested product was derived
  - .8 Type of inspection or test
  - .9 Complete inspection or test data.
  - .10 Test results and an interpretation of test results.
  - .11 Ambient conditions at the time of sample taking and testing.
  - .12 The remarks and observations on compliance with the Contract Documents
  - .13 Recommendations on retesting or other corrective action where necessary
  - .14 Signature of a qualified and authorized representative of the Agency
- .3 Submit reports within forty eight (48) hours, and notify the Contract Administrator forthwith if the report indicates improper conditions or procedures.
- .4 Refer to Specification section for definitive requirements.

### **1.11 Tests and Mix Designs**

- .1 Furnish test results and mix designs as specified or reasonably required by the Contract Administrator.
- .2 Refer to Specification section for definitive requirements.

### **1.12 Mock-ups**

- .1 Prepare mock-ups as identified in Specification sections. Include for Work of all Sections required to provide mock-ups.



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- .2 Construct in locations as identified in Specification sections or as otherwise approved by the Contract Administrator.
- .3 Prepare mock-ups for the Contract Administrator's review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.
- .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

### **1.13 Mill Tests**

- .1 Submit mill test certificates as specified or reasonably required by the Contract Administrator.
- .2 Refer to Specification section for definitive requirements.

### **1.14 Equipment and Systems**

- .1 Submit adjustment and balancing reports for mechanical, electrical, and other equipment systems.
- .2 Refer to Specification section for definitive requirements.

**END OF SECTION**

## **MATERIAL AND EQUIPMENT**

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### **1. PRODUCTS**

#### **1.1 Manufacturers' Directions**

- .1 Unless otherwise specified, install or erect all products in accordance with Manufacturers' recommendations. Do not rely on labels or enclosures provided with products. Obtain instructions directly from manufacturers.
- .2 Notify the Contract Administrator, in writing, of any conflicts between the Specifications and Manufacturers' instructions so that the Contract Administrator may establish the course of action.
- .3 Improper installation or erection of products due to failure in complying with these requirements authorizes the Contract Administrator to require any removal and re-installation that may be considered necessary, at no increase in Contract Price.

### **2. WORKMANSHIP**

#### **2.1 Concealment**

- .1 In finished areas conceal all pipes, ducts and wiring except where indicated otherwise on Drawings or in Specifications.
- .2 Before installation inform the Contract Administrator if there is a contradictory situation.

#### **2.2 Location of Fixtures**

- .1 Consider the location of fixtures, outlets, and other mechanical and electrical items indicated on Drawings as approximate. The actual location of these items is to be as required or directed to site conditions at the time of installation and as is reasonable.
- .2 Before installation inform the Contract Administrator if there is a contradictory situation. Install as directed.

#### **2.3 Cutting and Remedial Work**

- .1 Perform all cutting and remedial work that may be required to make the several parts of the Work come together properly. Coordinate and schedule the Work to ensure that cutting and remedial work are kept to a minimum.
- .2 Employ specialists familiar with the materials affected in performing cutting and remedial work. Perform in a manner to neither damage nor endanger any portion of the Work.
- .3 Do not cut, drill or sleeve any load-bearing members without written acceptance of the Contract Administrator.

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- .4 The Contractor is to perform work so as to minimize dust.

### **2.4 Fastenings**

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent material unless otherwise specified.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive, non-staining fasteners and anchors for securing exterior Work unless otherwise specified.
- .4 Space anchors within their load limit or shear capacity and ensure that they provide positive permanent anchorage. Wood plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and lay out neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

### **3. MEASUREMENT**

#### **3.1 Metric Project**

- .1 Unless otherwise noted, this Project has been designed and is to be constructed in the SI nominal metric system of measurements.

**END OF SECTION**

## **OPERATION AND MAINTENANCE MANUALS**

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### **1. DESCRIPTION**

- .1 This Section supplements the requirements for the provision of O&M Manuals as described in Section 01300 – Submittals.
- .2 Furnish complete operations manuals and maintenance information as specified in this Section for installation, check-out, operation, maintenance, and lubrication requirements for each unit of mechanical, electrical, and instrumentation equipment or system and each instrument.
- .3 Customize the operations manuals and maintenance information to describe the equipment actually furnished. Do not include extraneous data for models, options, or sizes not furnished (cross out or remove if required). When more than one model or size of equipment type is furnished, show the information pertaining to each model, option, or size.
- .4 Assemble, coordinate, bind, and index required data into an O&M Manual.
- .5 Three (3) draft copies of the manuals shall be submitted a minimum of sixty (60) days prior to Substantial Performance of the Work for review and comments. A maximum of eight (8) weeks after review, twelve (12) copies of the final manuals shall be supplied.
- .6 In addition to the twelve (12) hard copies, submit an electronic version of the O&M Manual.
- .7 Materials: Label each Section with tabs protected with celluloid covers, fastened to hard paper dividing sheets.
- .8 Type lists and notes.
- .9 Drawings, diagrams and Manufacturer's literature must be legible. Drawings larger than 280 x 430 mm must be folded and placed inside plastic pockets.

### **2. OPERATION AND MAINTENANCE MANUAL CONTENTS AND ORGANIZATION**

- .1 Provide the Manufacturer's standard O&M manuals for the equipment or instruments supplied. If the Manufacturer's standard manuals do not contain all the required information, provide the missing information in supplementary documents and Drawings inserted behind appropriate tabs in the manual binder.
- .2 When more than one (1) piece of identical equipment or instruments are supplied, provide only one (1) set of operations manuals.
- .3 One (1) set of operations manuals may be provided when more than one (1) piece of similar equipment or instruments are supplied, such as different sizes of the same model, and all similar pieces are covered in the same standard Manufacturer's O&M manual.
- .4 When similar equipment or instruments are provided by the same Manufacturer, but are not covered in the same standard Manufacturer's O&M manual, their specific manuals may be

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bound in the same 3-ring binder. Separate specific manuals with tab dividers labelled with the appropriate equipment numbers.

- .5 Provide a cover sheet, bound as the first page of each manual, with the following information:
  - .1 Contract name and number.
  - .2 Equipment number or, if more than one (1) piece of equipment is provided, equipment numbers for equipment or instruments covered by the manual. Include functional description of equipment after each number.
- .6 Provide a table of contents listing the contents of the manual and identifying where specific information can be located.
- .7 Insert the specific information described below in the O&M manuals in a format similar to that listed:
  - .1 Tab 1 – General Information
    - .1 Functional title of the system, equipment, material, or instrument.
    - .2 Relevant Specification Section number and Drawing reference.
    - .3 Address and telephone number of the Manufacturer and the nearest Manufacturer's Representative.
  - .2 Tab 2 - Equipment Data
    - .1 Insert Specification Section and completed Equipment and Instrumentation Data sheets for equipment supplied. Attach all Addenda, Change Orders, and change directives that refer to that specific item of equipment.
  - .3 Tab 3 – Operation Information
    - .1 Include the Manufacturer's recommended step-by-step procedures for starting and stopping under normal and emergency operation. Include all specified modes of operation including recommended operation after the assembly or equipment has been in long-term storage.
    - .2 Provide control diagrams with data and information to explain operation and control of systems and specific equipment. Identify normal operating setpoints and alarm conditions.
    - .3 Provide technical information on all alarms and monitoring devices provided with the equipment.
    - .4 Provide troubleshooting information. Clearly identify which problems to look for and how to solve them.

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- .4 Tab 4 - Technical Data
  - .1 Insert Manufacturer's Technical Specification and data sheets.
  - .2 Insert Manufacturer's certified performance and calibration curves for the equipment and instruments.
- .5 Tab 5 - Maintenance Information
  - .1 Include the description and schedule for all Manufacturers' recommended routine preventative maintenance procedures including specific lubrication recommendations. Indicate whether procedure is to be done daily, weekly, monthly, quarterly, semi-annually, annually, or fill in hours of operation.
- .6 Tab 6 - Maintenance Instructions
  - .1 Provide requirements to set-up and check out each system for use. Include all required and recommended step-by-step inspections, lubrications, adjustments, alignments, balancing, and calibrations. Include protective device settings, warnings, and cautions to prevent equipment damage and to insure personnel safety.
  - .2 Provide Manufacturer's description of routine preventive maintenance, inspections, tests, and adjustments required to ensure proper and economical operation and to minimize corrective maintenance and repair.
  - .3 Provide Manufacturer's recommendations on procedures and instructions for correcting problems and making repairs.
  - .4 Provide step-by-step procedures to isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or require replacement.
  - .5 Provide step-by-step procedures and list special required tools and supplies for removal, replacement, disassembly, and assembly of components, assemblies, subassemblies, accessories, and attachments. Provide tolerances, dimensions, settings, and adjustments required.
- .7 Tab 7 - Assembly Drawings
  - .1 Provide Drawings which completely document the equipment, assembly, subassembly, or material for which the instruction is written. Provide the following Drawings as applicable: fabrication details, wiring and connection diagrams, electrical and piping schematics, block or logic diagrams, Shop Drawings, installation Drawings, layout and dimension Drawings, and electrical component fabrication Drawings.

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.2 Provide clear and legible illustrations, Drawings, and exploded views to enable easy identification of the items. When illustrations omit the part numbers and description, both the illustrations and separate listing shall show the index, reference, or key number which will cross-reference the illustrated part to the listed part. Parts shown in the listings shall be grouped by components, assemblies, and subassemblies.

.8 Tab 8 - Bills of Materials

.1 Provide a clear, legible copy of the Bill of Materials that was shipped with the equipment. The Bill of Materials should list all equipment, instruments, components, accessories, tools, and other items that were shipped with the equipment.

.9 Tab 9 - Lubrication Data

.1 Provide a table showing recommended lubricants for specific temperature ranges and applications.

.2 Provide charts with a schematic diagram of the equipment showing lubrication points, recommended types and grades of lubricants, and capacities.

.3 If the equipment or instrument is not lubricated, add a sheet under this Tab with the words "".

### 3. FIELD CHANGES NOT APPLICABLE

.1 Following the acceptable installation and operation of an equipment item, modify and supplement the item's instructions and procedures to reflect any field changes or information requiring field data.

### 4. COMMISSIONING DATA

.1 Provide in hard cover 3-ring binders for 215 x 280 mm paper labelled "COMMISSIONING DATA" one (1) copy of:

.1 All completed equipment testing and commissioning forms.

.2 All completed equipment checklists and performance reports, including noise and vibration analysis, instrumentation calibration data, and all other relevant information.

.3 All system performance reports.

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**5. WARRANTIES**

- .1 Provide in hard cover 3-ring binders for 215 x 280 mm paper labelled "WARRANTIES" one (1) copy of:
  - .1 Manufacturers' standard Warrants and Guarantees. Include the name and telephone number of the contact person. Indicate the time frame of each Warrant or Guarantee on the list.

**END OF SECTION**