

## **1.0 QUALITY OBJECTIVES & POLICIES**

### **1.1 QUALITY OBJECTIVES**

This document establishes the Quality Plan to be instituted by PCL for the construction of the new Abbotsford Hospital and Cancer Centre in Abbotsford, BC.

This plan is PCL project team's documentation of the organizational structure, functional responsibility, levels of authority, and lines of communications for the activities that affect quality. Quality is everyone's responsibility. All team members who perform quality functions have sufficient authority, access to work areas, and organizational freedom to:

- .1 Verify that all provisions have been made to provide required control testing.
- .2 Monitor the design, and contractor's daily work progress.
- .3 Check dimensional requirements.
- .4 Visually inspects materials received on site for proper documentation, completeness, and condition.
- .5 Observe all required tests such as mechanical and electrical to verify that they are in compliance with the specifications.
- .6 Ensure the completion of all deficiencies in materials and workmanship in a timely manner.
- .7 Maintain a document control file.
- .8 Work closely with all testing agencies to verify that all required tests are able to be performed.

## 1.2 **QUALITY POLICIES**

PCL's Quality Plan will ensure a uniform high quality level of workmanship through all phases of construction, including planning, construction, and turnover. To meet this goal, the following principles will be observed:

- .1 Ensure the highest level of quality by maintaining supervised controls and written instructions governing Quality Control procedures and practices.
- .2 Establish clearly defined responsibility and authority for compliance.
- .3 Meet contractual requirements by conformance to Contract Documents and applicable standards.
- .4 Complete and maintain accurate records of inspections and tests.
- .5 Identify and advise PCL and the Consultant of quality related non-conformance for timely corrective action. Ensure that corrective action is properly implemented and documented.
- .6 Maintain procedures to ensure that quality requirements are communicated to all levels of the field organization, including trade contractors.

It is the intent of the plan that the function of quality control be one of cooperation. It is not the responsibility of the quality control staff to "police the job", but to provide review and assistance to the operations staff (including trade contractors) to enable those involved to achieve a quality end product. To be proactive in approach, to anticipate problems and take corrective action before they occur.

## **2.0 QA/QC ORGANIZATIONAL STRUCTURE**

The Construction Quality Control process and structure is as discussed in section 7 of the Design Build Agreement.

### 3.0 NAMES AND QUALIFICATIONS

Members of the Project Quality Control Team are:

- Architect Musson Cattell Mackey Partnership/Silver Thomas Hanley
- Quality Control Coordinator TBA
- Structural RJC (Renato Camporese / Jeff Corbett)
- Mechanical Stantec Consulting (Ron Davis / Ian Niven)
- Electrical RADA Group (Doug Redmond)
- Building Envelope TBA
- Roofing Musson Cattell Mackey Partnership
- Elevators Vertech (Ray Demeyer)
- Structural Steel RJC
- Concrete Testing Trow Associates / MCM / Concrete Supplier
- Compaction Testing Trow Associates / Excavation Contractor
- Geotechnical Trow Associates
- Acoustical Brown Strachan Associates (David Brown)
- Traffic Control Bunt & Associates (Paul Bunt)
- Civil Pomeroy Engineering (Doug Sinclair)
- Life Safety GHL (David Graham)
- Medical Gas Stantec / L&H / Vital Aire
- Nurse Call Rada / Houle

#### 4.0 **DUTIES & RESPONSIBILITIES**

##### 4.1 Quality Control Team Staff Responsibilities

###### Architect

- Ensure all contractual, including design development, and design requirements are incorporated into the “Issued for Construction” drawings and specifications.
- Ensure that plans and specifications are of the highest quality to promote high quality construction.
- Communicate and coordinate with all design disciplines. Attend weekly design meetings with all Consultants to coordinate working documents.
- Receive and coordinate design for any owner initiated design changes. Once approved, he is responsible to verify their incorporation into the design documents.
- Provide general review of the construction of the work as required by BC Building Code and Project Agreement.
- Review and take action necessary, reports of Consultants inspections and independent inspections and testing agencies.
- Review shop drawings and samples for compliance with the contract documents.
- Ensure that any deficiencies, discrepancies, etc. are correctly documented and are corrected in accordance with contract documents.
- Has responsibility and authority to stop work and to instruct removal and/or replacement of work for quality issues.
- Has the responsibility and the authority to instruct PCL of the following items:
  1. Initiation of actions to prevent the occurrence of any non-conformance relating to the construction work.
  2. Identification and recording of any problems relating to the construction work.
  3. Initiation and recommendations of solutions to construction problems.
  4. Control of further construction until deficiency or unsatisfactory work has been corrected.

###### Quality Control Coordinator

- The Quality Control Coordinator reports to PCL’s General Superintendent for coordination of all quality control activities.
- Establish and maintain documented procedures to control documents and data that relate to this quality assurance for the construction work. (Also, ensure latest issue of drawings is being used by everyone).
- Administer and implement, as required, the written procedures and instruction contained in this manual. Actual practices are not limited to these procedures and where a discrepancy exists between these procedures and contract requirements, the contract requirements will prevail.

- Coordinate with Consultant Inspectors and all testing and field personnel to assure compliance with all quality control requirements of the contract documents.
- Will attend coordination meetings with the trade contractors to ensure quality requirements are followed.
- Verify that quality control efforts of trade contractors and suppliers correspond with the overall quality control procedures.
- Monitor the activities of the independent testing laboratories.
- Perform monthly audits of trade contractors' as-built drawings.

#### Consultant Inspectors

- Consultant Inspectors will include personnel from Architectural, Structural, Mechanical, Electrical and others as required.
- PCL supervisory staff will be responsible for ensuring work is in place and ready for inspection by the Consultant Inspectors.
- Responsible for conducting all inspections as required by Building Code.
- Observe the work assigned for conformance with the approved design drawings and specifications. Inspector shall be a qualified person independent of PCL who shall demonstrate his competence for inspection of the particular type of construction or operation requiring special inspection.
- Submit inspection reports to PCL and Architect.
- Non-conforming work shall be brought to the immediate attention of PCL, for correction. Copies of all reports to be provided to the PCL Quality Control Coordinator on the day of the inspection. If not corrected to the satisfaction of the proper design authority, non-conforming work shall be reported to the PCL Construction Manager.
- Participate in commissioning.
- Review and check shop drawings for conformance to the contract requirements.

#### 4.2 Project Staff Responsibilities

##### PCL Project Construction Manager

- The Construction Manager is PCL's management representative. As such, he will be involved in and be knowledgeable of all facets of the work to be able to draw the many activities into working harmony to enable the project to be completed within budget, on schedule, to PCL's quality standards, and in full compliance with contract documents and customer satisfaction.
- Responsible for the overall coordination and management of the project.

PCL Operations Construction Manager

- The Operations Construction Manager will execute the Quality Plan and will be responsible for ensuring the testing and inspection process is being achieved.
- Monitoring the quality and implementing corrective measures and complying with the agreed specifications, if necessary will occur.

PCL Project Managers

- The PCL Project Managers will administer all project correspondence, prepare monthly project billings, prepare quotations for proposed changes, resolve any conflicts within the contract documents, and conduct project meetings. They report in accordance with the Project Organization Chart.

PCL Project Coordinator

- The PCL Project Coordinators are responsible to coordinate and control certain areas of the work within budget, on schedule and to the quality standards of the contract. They report in accordance with the Project Organization Chart.
- They will review and check shop drawings for conformance to the documents.

PCL General Superintendent

- Responsible for the supervision of all field activities. The General Superintendent ensures that all construction is performed in accordance with contract requirements.
- The General Superintendent will develop schedules as required, maintain daily work records, oversee and coordinate all trade contractors' work, coordinate field testing and inspections, enforce project safety procedures.
- The General Superintendent will report in accordance with the Project Organization Chart.

PCL Area Superintendents

- The Area Superintendents have responsibilities similar to those of the General Superintendent and control certain areas of the work. They report in accordance with the Project Organization Chart.
- They are responsible to enforce quality control standards within the area of their control.

Subtrade Supervisors

- The Subtrade Supervisors are responsible for ensuring the subcontractor performs work in accordance with drawings and specifications. They will liaise with PCL Supervisors, Consultant Inspectors and Special Inspectors.
- They will review and check shop drawings for conformance to the documents.

5.0 **DESIGN DEVELOPMENT QUALITY CONTROL**

Although design review will be an ongoing activity, PCL will perform major reviews of the Contract Documents. The facilities management (FM) and User Group input are key elements that are incorporated. Design changes will be tracked as identified in the Project Agreement.

PCL will review drawings at each of the above stages of completion to ensure constructability and functionality. These reviews will also be used to ensure that schedule and budget remain in compliance with the original RFP.

PCL will provide contract document timeline requirements to the consultants to ensure that the overall project schedule is maintained.

## 6.0 **REVIEW OF CONSTRUCTION WORK**

### 6.1 **Architectural**

Unless otherwise excluded from the Scope of Work, the Architect will carry out a general review of the construction work at intervals appropriate to the stage of construction, which the Architects consider necessary to determine if the work is in general conformity with the contract documents.

The general review of construction will be carried out and will include the following:

1. Periodic site visits to review the progress of the work and to determine if it is in conformance with the issued architectural drawings and specifications.
2. Record and bring to the attention of PCL's General Superintendent any deficiencies found during these site visits, leaving a written record of inspection on site on day of inspection, together with any recommendations for remedial action which may be required.
3. Record and bring to the attention of PCL's General Superintendent and the relevant consultant (Structural, Mechanical, Electrical, or other) any items and deficiencies noted to work by Structural, Mechanical, Electrical trades which may be observed during site visits.
4. Coordinate site review by other Consultants, review their reports and where appropriate, comment to PCL's General Superintendent and the Consultant.
5. Interpret the architectural drawings and specification when requested to do so by PCL, their trades and other consultants.
6. Review shop drawings and samples submitted by PCL, their subtrades and suppliers, for conformity with the intent of the architectural drawings and specification.
7. Complete inspection reports, covering observations from the periodic site visits and distribute these to PCL.

These review services are provided for PCL's benefit and in no way relieve any supplier or subcontractor of the sole responsibility for quality control and performance of their subcontracts.

Architectural quality assurance:

1. Commences during the design and documentation phases with review of the required quality and performance of each architectural component.
2. Is continued with appropriate documentation to establish levels of quality and performance.

Following the tendering of architectural elements to subtrades and suppliers, PCL will:

1. Involve the Architect in the set-up meeting with subtrades and suppliers, to review standards and quality required of those subtrades and suppliers.

The Architect will:

1. Review mock-ups and field samples of work, when requested by PCL, for compliance with drawings and specifications, and if necessary to establish quality control standards for the work.
2. Attend meetings with PCL, their subtrades and suppliers to assist in resolution of construction, sequencing and quality control matters.
3. Review work during the course of construction, on a random sampling basis for conformance with the requirements of the documents and good acceptable trade practices.
4. Review finished areas of work for acceptance, recording deficiencies and providing a written report to PCL on the day of the inspection.
5. Follow up with PCL to review work redone and deficiencies corrected.
6. Coordinate with the quality control/assurance work of other Consultants (Structural, Mechanical, Electrical, and other) to ensure consistency of approach, level of quality assurance and reporting documentation.
7. Keep current and updated architectural drawings to assist PCL in preparing as-builts at completion of project.
8. Certify payment for construction work, monthly progress draws and holdback release.
9. Certify upon completion to the authorities having jurisdiction (through appropriate Schedule B and C “Letters of Assurance”, as per Schedule 17) where the work has been built in conformance with the approved drawings and specifications.

6.2 **Structural**

.1 **Review of Construction of the Work**

Unless otherwise excluded from the Scope of the Work, RJC (Structural) shall provide general review of the construction of the structural components of the work to meet the requirements of the BC Building Code. The Professional Engineer or delegate under his supervision shall:

1. Make periodic visits to the site to determine, on a random sampling basis, whether the work is in general conformity with the structural plans and related specifications for the structure;
2. Record structural deficiencies found during site visits and provide to PCL's General Superintendent and the Architect written reports of the deficiencies and the actions that must be taken to rectify the deficiencies – this report to be issued on day of inspection;
3. Review the reports of independent inspection and testing companies called for in the structural plans and related specifications and which pertain directly to the work being reviewed;
4. Interpret structural plans and related specifications when requested to do so by PCL, Architect or other consultants.
5. Review shop drawings and samples submitted by PCL for consistency with the intent of the structural plans and related specifications.

Their review services are rendered for PCL's benefit and in no way relieve the subcontractor of their sole responsibility for quality control and their performance of their subcontracts.

.2 Structural Sampling Program

In accordance with Clause .1 above, the following is the random sampling program to be followed in the General Review of the Construction.

a) Review of PCL's Quality Assurance Program

General

Obtain from PCL:

- list of structural subcontractors
- designated formwork design engineer
- designated shoring design engineer (if any)
- designated shoring field review engineer (if any)

Review with PCL:

- shop drawing review procedures
- inspection & testing report review procedures
- ensure all deficiencies noted by RJC (Structural) are rectified.

b) Field Review of Concrete Construction

General

Review with PCL:

- the classes of concrete exposure and strengths of concrete required for different elements of the structure.
- special requirements for some elements such as minimum cement content, special aggregate grading, super-plasticizers in columns, walls or slabs on grade.
- concrete testing procedures on high strength concrete.
- verify that proposed mixes have been submitted to RJC (Structural) and that they are acceptable.
- specified tolerances.
- requirements for review of formwork construction by engineer responsible for formwork design.
- curing procedures.
- hot & cold weather protection requirements.
- requirements for saw-cutting of slabs on grade.
- review and approve conduit and sleeving requirements

#### Excavation and Foundations

- Excavation Shoring
  - Review with PCL requirements for monitoring location and movement of shoring, for testing of tie-backs and installation of lagging.
  - Review site visit reports submitted by shoring design engineer.
  - Review site reports submitted by Trow.
  - Review surveys prepared by Trow.
  - Review Geotechnical reports submitted by the Geotechnical Engineer.
- Foundations
  - Confirm with PCL that Trow has examined the bearing conditions at footings and verified that they are acceptable for the support of the loads at the design pressures.
  - Check the dimensions and reinforcement of column and wall footings / piles

#### Formwork

- Review with PCL the requirements for camber and elevation survey of formwork for slab pours as outlined in the specification.
- Review with PCL proposed stripping and re-shoring sequencing.
- Review reports of site review of formwork and shoring.
- Before concrete is placed, confirm that forms are clean of debris and other foreign material by a random check of the form area.

#### Concrete Walls

- Simple Grade Walls With Minimum Reinforcement
  - Review length of wall pours with PCL.
  - Check wall pour for dimension, cleanliness of forms, reinforcement size, and cover of pours.
  - Review inspection reports of concrete supplied.
- Earth Retaining Walls
  - Check wall thickness, rebar size, spacing, cover, placement and length of wall pours.
  - Review inspection reports of concrete supplied.
- Other Walls (such as shear walls or core walls)
  - Check dimensions, rebar size and placement of walls poured.
  - Review inspection reports of concrete supplied.

Columns

- Check the dimensions, rebar size and placement of columns poured.
- Review inspection reports of concrete supplied.

Slabs

- Check slab thickness, rebar size, spacing, cover and chairing of the slab pour areas.
- Check beam dimensions, rebar size, quantity cover and chairing of beams.
- Review inspection reports of concrete supplied.

Beams

- Check beam dimensions, rebar size, quantity, cover and chairing of rebar.
- Review inspection reports of concrete supplied.

Tolerance for Suspended Concrete Flat Slab

- Review with PCL the specified floor finish tolerances and camber requirements.
- Review results of survey of finish of concrete surface taken before formwork is removed.
- Review results of survey of slabs taken after shoring is removed.

#### Slabs On Grade

- Review requirements for sub-base.
- Review the report of compaction testing carried out by Trow, and ensure the subgrade is acceptable to Trow and RJC.
- Review with PCL the specified floor finish tolerances.
- Check slab thickness and location of bulkheads for construction joints.
- Review the proposed curing methods and that compatibility with subsequent finishes has been considered.
- Review inspection reports of concrete supplied.

#### Precast Concrete

- Review that the appropriate level of quality assurance is provided in the interpretation of the design requirements, the preparation of shop drawings, the manufacture of components and in the assembly of the components in the field.

#### Structural Steel

- Review with the structural steel subcontractor their proposed procedures for welding inspection.
- Review painting requirements specified versus paint on steelwork delivered to site.
- Review reports submitted by structural steel subcontractor.

#### Load Bearing and Engineered Masonry

##### General

- Review with PCL which masonry (if any) is engineered.
- Review with PCL the test required for engineered masonry.
- Review reports prepared if engineered masonry is used.
- Review typical bearing details and anchorage.

##### Masonry Based On Engineered Analysis

- Review with PCL supply of masonry units to specified strength, mortar and grout requirements.
- Check reinforcement size, spacing and placement.

Construction Review Reports

- Discuss and resolve with the Architect and PCL's General Superintendent, the procedure to be followed for recording site instructions when immediate decisions are necessary.
  - Maintain a record of all review activities which have been carried out.
  - Record, in the site visit report, site decisions, and incidents involving possible deficiencies which might involve changes in the Contract or affect the progress of the work.
- c) Structural Consultant will need to certify upon completion that all structural work is performed as per drawings and specifications.
- d) Keep current and updated structural drawings to assist PCL in preparing as-builts at completion of project.

### **6.3 Mechanical**

Unless otherwise excluded from the Scope of Work, general review of the construction will be carried out by Stantec Consulting in compliance with the Building Code. The general review, which shall be carried out by a Professional Engineer or delegate under his supervision, shall:

1. Make periodic visits to the site to determine that the work is in general conformity with the mechanical plans and related specifications for the mechanical systems;
2. Record mechanical deficiencies found during site visits and provide written reports of the deficiencies to the Architect and PCL's General Superintendent – this report is to be issued on the day of the inspection;
3. Review and take action if necessary, the reports of independent inspection, testing and balance companies called for in the mechanical plans and related specifications and which pertain directly to the work being reviewed;
4. Attend Mechanical / Electrical site coordination / commissioning meetings and others when requested to do so by PCL ;
5. Interpret mechanical plans and related specifications when requested to do so by PCL , Mechanical or Electrical contractors, the Architect, or the Electrical Consultant;
6. Review shop drawings and samples submitted by Mechanical contractor for compliance with the intent of the mechanical plans and related specifications. Coordinate as necessary with the Electrical Consultant.

Stantec Consulting review services are provided to assist the Mechanical contractor and shall not be construed or interpreted as relieving or mitigating. The Mechanical contractor, their subcontractors, and/or sub-subcontractors are responsible for quality assurance, control and performance of the mechanical systems and its related/associated components.

#### **.1 Mechanical Review Process**

In accordance with Clause 1 above, the following is the random sampling program to be followed in the general review of the construction.

##### **a) Review of Mechanical contractor's Quality Assurance Program**

###### **General**

Obtain from Mechanical contractor:

- list of subcontractors

Review with Mechanical contractor:

- shop drawing review procedures
- inspection & testing report review procedures

b) Field Review of Plumbing Services

Underground Plumbing

Review with Mechanical contractor their proposed methods for:

- hot and cold weather protection requirements
- bedding materials and installation
- incoming service connections
- sleeving
- quality and standard of workmanship
- high pressure steam
- welding
- X-ray

Above Ground Plumbing

Review with Mechanical contractor their proposed methods for:

- installation of drainage products
- pipe installation, materials, hangers and venting
- sleeving
- quality and standard of workmanship

Specifically:

- .1 Unions or flanges: provide for ease of maintenance and disassembly.
- .2 Space for servicing, disassembly and removal of equipment and components.
- .3 Equipment drains: pipe to floor drains.
- .4 Install equipment, rectangular cleanouts and similar items parallel to or perpendicular to building lines.

c) Field Review of HVAC Services

General

Review with Mechanical contractor their proposed methods for:

- protection requirements for equipment
- interferences
- construction methods
- pipe installation, materials and hangers
- sleeving
- duct testing

- quality and standard of workmanship  
Specifically:

- .1 Unions or flanges: provide for ease of maintenance and disassembly.
- .2 Space for servicing, disassembly and removal of equipment and components.
- .3 Equipment drains: pipe to floor drains.
- .4 Install equipment, rectangular cleanouts and similar items parallel to or perpendicular to building lines.
- .5 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.
- .6 Ensure guards are installed for unprotected drives.
- .7 Review access door locations for concealed mechanical equipment for operating, inspecting, adjusting and servicing.
- .8 Review all weld quality requirements and defect limits by visually inspecting, entire circumference of weld externally and, wherever possible, internally during early stages of welding procedures and periodically for the remainder of the project. Review a sampling of hydrostatic tests.
- .9 Hangers - Review upper attachment, middle attachment, pipe attachment, riser clamps, shields and saddles, and sway braces.
- .10 Review installation of vibration isolation equipment in accordance with manufacturers' instructions. Ensure piping, ducting and electrical connections to isolated equipment do not reduce system flexibility and that piping, conduit and ducting passage through walls and floors do not transmit vibrations.
- .11 Review insulation installation for continuity and workmanship.
- .12 Review duct testing in critical locations and review reports on tests witnessed by Testing, Adjustments and Balancing contractor.
- .13 Review duct construction.

d) Construction Review Reports

- Discuss with Mechanical contractor and PCL, the procedure to be followed for recording site instructions when immediate decisions are necessary.
- Maintain a record of all review activities which have been carried out.
- Record, in the inspection report, site decisions, and incidents involving possible deficiencies which might involve changes in the contract or affect the progress of the work.
- Review and certify progress billing.
- Review as-built drawings to ensure changes are made for record purposes.

- e) Keep current and updated mechanical drawings to assist the Mechanical contractor in preparing as-builts at completion of project.
- f) Mechanical Consultant will need to certify upon completion that all mechanical work is performed as per drawings and specifications.

#### **6.4 Electrical**

Unless otherwise excluded from the Scope of Work, RADA shall provide general review of the construction of the electrical components of the work to meet the requirements of the BC Building Code. The general review, which shall be carried out by a Professional Engineer of delegate under his supervision shall:

1. Make periodic visits to the site to determine that the work is in general conformity with the electrical plans and related specifications for the electrical systems;
2. Record electrical deficiencies found during site visits and provide written reports of the deficiencies to the Architect and PCL's General Superintendent;
3. Review the reports of independent inspection, where these pertain directly to the work being reviewed;
4. Attend Mechanical / Electrical site coordination / commissioning meetings and others when requested to do so by PCL ;
5. Interpret electrical plans and related specifications when requested to do so by PCL , Electrical or Mechanical contractors, the Architect, or the Mechanical Consultant;
6. Review shop drawings and samples submitted by Electrical and Mechanical contractors for compliance with the intent of the electrical plans and related specifications. Coordinate as necessary with the Mechanical Consultant.

RADA's review services are provided to assist the Electrical contractor and shall not be construed or interpreted as relieving or mitigating. The Electrical contractor, their subcontractors, and/or sub-subcontractors are responsible for quality assurance, control and performance of the electrical systems and its related/associated components and interfaces.

##### **.1 Electrical Review Process**

In accordance with Clause 1 above, the following is the random sampling program to be followed in the general review of the construction.

##### **a) Review of Electrical contractor's Quality Assurance Program**

###### **General**

Obtain from Electrical contractor:

- list of subcontractors

Review with Electrical contractor:

- shop drawing review procedures
  - deficiency completion procedures
  - circuit testing and certification procedures
- b) Field Review of Underground Conduit and Services
- Review with Electrical contractor their proposed methods for:
- incoming services
  - concrete duct-banks
  - concrete encasement of slab-on-grade raceways
  - raceway materials
  - quality and standard of workmanship
- c) Field Review of Conduit in Suspended Slabs
- Review with Electrical contractor their proposed methods for:
- conduit routing
  - conduit crossings
  - materials
  - quality and standard of workmanship
- d) Field Review of Cabling
- Review with Electrical contractor their proposed methods for:
- cable installation
  - cable termination
- e) Field Review of Lighting & Equipment
- Review with Electrical contractor their proposed methods for:
- fixture support and alignment
  - equipment mounting
  - equipment designations
  - equipment locations
  - resolving coordination conflicts arising on site
  - quality and standard of workmanship
- f) Construction Review Reports
- Discuss with Electrical contractor and PCL, the procedure to be followed for recording site instructions when immediate decisions are necessary.
  - Maintain a record of all review activities which have been carried out.

- Record, in the inspection report, site decisions, and incidents involving possible deficiencies which might involve changes in the contract or affect the progress of the work.
  - Review and certify progress billing.
  - Review as-built drawings to ensure changes are made for record purposes.
- g) Keep current and updated electrical drawings to assist the Electrical contractor in preparing as-builts at completion of project.
- h) Electrical Consultant will need to certify upon completion that all electrical work is performed as per drawings and specifications.

## **6.5 Medical Equipment**

### **.1 Review of Construction of the Work**

Unless otherwise excluded from the Scope of the Work, Equipment Planning Associates Ltd. (EPA) (Medical Equipment) shall provide general review of the specification, procurement, commissioning, and final acceptance and turnover of all Cash Allowance Medical Equipment required to meet the Project Agreement. The Principal or designated associates of EPA shall:

1. Review and comply with the construction schedule prior to and during the equipment tender package preparation;
2. Group equipment in tender packages with the goal of minimizing both technical obsolescence and construction schedule risk while at the same time take advantage of any available purchasing leverage;
3. Advise PCL of any licensing or utility implications (Structural, Mechanical, or Electrical) of any the Medical Equipment items;
4. Identify, communicate and assist as required, any regulatory, permit or licensing requirements.
5. Receive and review submittals and shop drawings to ensure compliance with initial Design Specification and Construction Drawings;
6. Coordinate receipt, interim storage, placement, installation and testing of all Medical Equipment;
7. Recommend and clarify payments for medical equipment.

Their review services are rendered for PCL's benefit and in no way relieve the Medical Equipment Suppliers or subcontractors of their sole responsibility for quality control and their performance of their subcontracts.

### **.2 Medical Equipment Quality Assurance**

Medical Equipment quality assurance will occur throughout all three major phases of the scope of work of the Medical Equipment consultant (EPA).

**Phase I – Specification and Procurement Development**

- Review of the equipment list for availability and application to the Functional Program
- Ensure that Tender Package issue dates reflect the most current construction schedule.
- Review the equipment performance, accessories and features and address compatibility issues, technological obsolescence and innovations.
- Examine and communicate to PCL Design and Construction Specification for all utility information requirements.
- Ensure purchase specifications, delivery and commissioning terms meet the requirements defined in the Project Agreement.
- Identify any testing requirements in the tenders.
- Coordinate equipment design requirements with the present design team and the facilities manager.
- Ensure any embedded or rough-in requirements are communicated to the builder.

**Phase II – Tender Analysis**

- Assist as required with the analysis of tender packages and reconcile cost implications against Cash Flow Schedule and the overall Cash Flow Account.
- Assist with Tender bids.
- Analyze and provide tender recommendations to PCL.
- Review recommendation with Health Company representative prior to final purchase approval.

**Phase III – Commissioning Coordination**

- Develop Medical Equipment coordination schedule in conjunction with the most current construction schedule (Interior Rough-in and Fitout).
- Review and recommend shop drawing acceptance ensuring compliance with initial Design Specification and Construction Drawings.
- Expedite delivery and coordinate receipt, arrange for interim storage (if required), placement, installation and testing.
- Provide final acceptance recommendations to PCL Constructors Westcoast Inc.
- Review, as required, equipment installation in sufficient time to accommodate remedial work in advance of critical completion dates.

6.6 Nurse Call (Reserved)

6.6 Envelope (Reserved)

## **7.0 CONSTRUCTION INSPECTION & TESTING PLAN**

PCL's Inspection and Testing Plan for the Abbotsford Hospital and Cancer Centre has been developed by drawing on information available in the Project Agreement, as well as the experience of PCL Staff and input from the Consultants.

Inspection of materials and work in progress will be the responsibility of PCL Supervisors and Special Inspectors to ensure that the work conforms to the contract documents and is ready for testing or inspection by an independent testing agency.

### **7.1 Field Inspection**

PCL will utilize a three point inspection plan for field inspections.

#### **a) Pre-Work Coordination Meetings**

Prior to any trade contractor starting work, a pre-work coordination meeting will be held. Attendees will include Supervisory, Quality Control and Safety personnel from both PCL and trade contractors. PCL's Project Manager will chair the meeting and prepare an agenda. At a minimum, the meeting agenda will cover contract, submittal, quality control, training, safety and environmental requirements of the contract documents, as well as work and coordination procedures.

#### **b) Follow-Up Inspection**

PCL Supervisors will monitor the work on a daily basis to assure the continuing conformance of the work to the workmanship standards. Consultant Inspectors and Architect will provide site review as required by BC Building Code. Follow-up inspections will be monitored by PCL Quality Control Coordinator to ensure all deficiencies are corrected.

c) Completion Inspection

When an area of work is complete, PCL Quality Control Coordinator, in cooperation with PCL field staff and Design Consultants will conduct completion inspections. Deficiencies will be noted on a deficiency list. The appropriate Consultant or testing agency will perform testing for those sections of work as noted on Responsibility Matrix (see attachment at end of this section).

7.2 Approved Material Inspections

All materials, equipment, etc. to be incorporated into the work will be subject to periodic inspection by the Quality Control staff.

PCL will utilize a five point field inspection:

- proper identification
- damage
- evidence of prior acceptance
- completeness
- proper documentation

A visual inspection will be made for:

- Verification of conformance with the contract documents, the procurement document and approved submittals.
- Storage of materials, products and supplies for compliance with the contract documents and manufacturers instructions, as well as specific requirements of applicable technical specifications.
- Periodic inspections during installation or incorporation into the work to ensure continued compliance with the contract documents.

Items which are observed to be in non-conformance with specifications will be identified, recorded on a Notice of Non-Compliance and segregated from accepted materials, products and supplies. These materials will not be used until corrective action has been taken.

7.3 Material Test Procedures

A. Testing

The appropriate Consultant will take random samples and test them for conformance with the contract documents. These results will be distributed to all parties. The Quality Control Coordinator will review all test results and follow up as appropriate.

B. Samples

Approved samples of materials to be incorporated into the job will be maintained in the site office for use in comparing to installed material. Site mock-ups, as required, will be maintained during construction at a designated location on site.

Testing samples will be individually identified by The appropriate Consultant.

7.4 Re-Work Procedures

All deficiencies or deviations from specified requirements, with respect to quality, workmanship, materials, equipment or supplies will be dealt with in the following manner.

1. Deficiencies to be noted on Inspection Report.
2. Deficiencies will be immediately corrected and Quality Control Coordinator to ensure re-inspection is performed and all deficiencies corrected.
3. Track deficiencies using the central inspection record log.

The PCL Project Manager, Superintendent, and Quality Control Coordinator and/or Special Inspector will meet with all parties involved in any deficiency to determine a solution to the problem. The solution will then be recorded and implemented in accordance with contract documents. Once the deficiency has been rectified, the Quality Control Inspector will re-inspect the original deficiency in regard to the agreed solution.

If warranted, deficient work which cannot be satisfactorily corrected in place will be removed and replaced at the written direction of the Inspector. All such re-work shall be performed using procedures written and approved by the Inspector.



7.5 Testing & Inspection Matrix

The following matrix is prepared to show responsibility of testing and inspection for each section of the work. Blank fields will be filled in as work/design plans are finalized.

DESCRIPTION	STANDARD	TESTING	INSPECTION
Excavation & Backfill		Trow	Trow
Landscaping			PWL
Concrete Formwork			RJC
Concrete Reinforcement			RJC
Concrete Placement			RJC
Precast Concrete			MCM
Structural Steel			RJC
Metal Deck			RJC
Sprayed Fireproofing			MCM
Miscellaneous Metals			MCM
Windows/Entrances			MCM/Envelope
Dampproofing/Waterproofing			MCM/Envelope
Roofing			MCM/Envelope
Masonry			MCM
Hollow Metal			MCM
Wood Doors			MCM
Overhead Doors			MCM
Drywall			MCM
Tile			MCM
Terrazzo			MCM
Acoustic Consultant			Brown Strachan
Resilient Flooring			MCM
Carpet			MCM
Special Coatings			MCM
Painting			MCM
Toilet Partitions			MCM
Flag Poles			MCM
Signage			MCM
Lockers			MCM
Operable Walls			MCM
Toilet Accessories			MCM
Parking Control Equipment			MCM
Loading Dock Equipment			MCM
Elevators/Escalators			MCM
Mechanical		TBA	Stantec
Medical Gas		TBA	Stantec
Nurse Call		RADA	RADA
Electrical		RADA	RADA

## **8.0 ENVIRONMENTAL MONITORING**

PCL and their subcontractors will institute control measures to meet the Occupational Health and Safety requirements in relation to environmental hygiene (designated/hazardous substances). In addition, environmental inspection and testing, as well as monitoring and consulting services, are conducted by an independent consulting firm for the following objectives:

- Control and abate contaminants in soil, groundwater and air.
- Minimize waste, recover materials and handle contaminated materials in compliance with the environmentally conscious design and regulatory requirements.
- Monitor potential for methane gas generation where fill materials containing organic substances were left in place.
- Delineate contaminated soils and dispose of off-site cost-effectively based on the actual/revealed site specific geo-environmental conditions.

The above noted objectives are achieved by the following environmental monitoring tasks:

1. Environmental inspection, sampling and analysis of building materials/systems suspected of containing, designated/hazardous substances in the old existing structures to be demolished.
2. Geo-environmental investigation, sampling and analysis to delineate contaminated soils and assess the chemical quality of groundwater for off-site discharge during construction dewatering.
3. Geo-environmental full-time inspection and issuance of bills of lading for proper shipping and disposal of unsuitable materials of wastes of pre-determined receiving sites.
4. Groundwater sampling and analysis.

In addition to the above control measures, a monitoring program to prevent future environmental / health concerns arising from the construction process will be put into effect. This program will include the review of material storage and handling on site to prevent moisture or contaminant absorption.

## **9.0 DOCUMENTATION FOR NON-CONFORMITIES**

Each inspector for the Architect and Consultants shall submit a list of deficiencies to PCL following each inspection. PCL will log these items on a central deficiency log, and distribute the inspection reports to the non-compliant trade contractors. A copy of the log for each inspection will be printed off and placed in a binder in the job site plan room. Once the deficient item has been corrected and reinspected, the inspector will sign off against the item in the plan room binder copy – from this the central electronic log will be updated. The intent of this pro-active approach towards quality is to identify problems and non-conformities at the earliest stage possible in the construction process so that timely and cost-effective corrective action can be taken. A sample format for the “Inspection Report Log” is attached at the end of this section (Appendix 9.1).

This same central log will be used to log and track deficiency items raised by testing agents and other inspectors.

It is critical to note that the term “sign off” should in no way be construed as final acceptance of the construction, which remains to be the responsibility of PCL, the Architect, Consultants and Subtrades.

**APPENDIX 9.1**

**Inspection Report Log**



## **10.0 DOCUMENTATION/RECORDS**

Quality Control records will be maintained by PCL's Quality Control Coordinator.

The quality control files will be protected from deterioration or damage throughout the period of the contract. Hard copies of all quality control records will be maintained in file cabinets. An electronic database will be utilized to facilitate retrieval of documents.

The quality control records will be indexed and filed within the PCL filing system

### **10.1 As-Built Drawings**

The PCL Project Manager will be responsible for posting all Change Orders (CO's) and Requests For Information (RFI) to the contract documents. The Project Manager is responsible for distribution of all of this material to affected parties.

The Architect and Consultants are responsible for updating the drawings as changes occur, showing all modifications that were made, including Change Orders.

The Quality Control Coordinator or his designate will perform audits of trade contractor as-builts to ensure that all as-builts are current.

As-built drawings will be provided as per the Project Agreement.

### **10.2 Changes To Contract**

Change Orders, Variations and Requests For Information will be issued to the Architect and applicable Consultants.

All drawings will be kept up to date with changes or technical information being recorded and logged as revisions are received.

Trade contractors affected by Change Orders or Requests For Information will be notified as quickly as possible. All Requests For Information will be posted and distributed to all affected parties. A master log book for recording all Change Orders will be maintained by PCL.

Voided drawings or documents will be marked as such.

### 10.3 Auditing Procedures

PCL's Project Management Team and the PCL Peer Review Team will perform periodic audits of the Quality Control Program, including Quality Control and Quality Assurance Programs implemented by trade contractors.

These audits will verify to the authority that the required quality is being maintained and that the records reflect the actual quality of the work.

### 10.4 Submittals

Submittals from trade contractors and suppliers, in the form of shop drawings, installation instructions, samples, certificates of compliance, test reports, etc., will be transmitted to PCL.

These submittals will provide detailed information regarding materials, equipment, construction, fabrication and installation methods, and clarify or substantiate the level of quality of the item or product to be incorporated into the work.

All submissions from sub-subcontractors and sub-suppliers shall be reviewed by the subcontractor making these submissions to PCL, and shall be stamped and signed by that subcontractor indicating the appropriate status.

The PCL Team will review all submittals from trade contractors/suppliers to assure conformance with contract requirements, prepare the submittal tracking log and distribution of other interested parties for review.

The staff will stamp and sign the submittals indicating the appropriate status. The submittals will then be forwarded to the Design Team for review and approval by the appropriate Engineer of Record.

**11.0 COMMISSIONING & TURNOVER**

11.1 Systems Operating Manual - Reserved

11.2 Operator Training - Reserved

11.3 Commissioning

A phased commissioning plan is developed and included as Schedule 17 of the Project Agreement. The detailed Final Commissioning Plan will be developed and submitted in accordance with the Project Agreement.

**12.0 OPERATING AND MAINTENANCE MANUALS**

Paper and electronic copies of the completed “Operating and Maintenance Manuals” for the Facility Management Operators will be prepared in accordance with the Project Agreement. Separate volumes will be made for:

- .1 Architectural (including sitework)
- .2 Mechanical
- .3 Electrical