

Appendix 'A'

General Design and Construction Requirements

GENERAL DESIGN AND CONSTRUCTION REQUIREMENTS

1. RESPONSIBLE PROFESSIONAL

- .1 The professional engineer responsible for the direction and coordination of the design, as identified in the proposal, shall review and approve the issue of all Drawings and Specifications.
- .2 No Drawing or Specification section shall be used for procurement or construction without the responsible professional's approval noted, by personal signature, in an appropriate box on the Drawing or Specification cover sheet.

2. CODES AND REGULATIONS

- .1 Comply with all applicable current codes, standards, and regulations.
- .2 When a referenced standard permits alternatives, use highest quality, cost-effective alternative meeting design and performance criteria, except where otherwise specified in performance specification.

3. PREPARATION OF CONSTRUCTION DOCUMENTS

- .1 Prepare construction documents, in form of Drawings and Specifications to:
 - .1 Provide sufficient information to construct facility, and
 - .2 Satisfy PWGSC and authorities having jurisdiction that requirements of codes, regulations, and standards are complied with.
- .2 Construction documents to be prepared, sealed and signed by a registered architect and professional engineers, licensed to practice in the Nunavut Territory, for respective disciplines of work.
- .3 Prepare Drawings using the current supported AutoCAD release, to PWGSC standards and utilizing the PWGSC layering system, and specifications using latest edition of NMS specifications; to be submitted in NMS Edit Professional or DIGICON (for Word) PDF formats. Submit both electronic and paper copies as outlined in this Document.
- .4 Remain entirely responsible for complete design and construction of facility and associated Work.

4. REVIEW OF CONSTRUCTION DOCUMENTS

- .1 Submit construction documents to PWGCS and other authorities having jurisdiction for verification of code, regulation, and standards compliance.
- .2 Prior to construction, submit construction documents to PWGCS for review, at various stages of completeness.

- .3 Act upon reviews and subsequent comments made by PWGSC and other authorities having jurisdiction.
- .4 Review of any construction documentation by PWGSC is for interest and record purposes only, and is not be construed to be a check of work nor verification of code, regulation and standards compliance.

5. COLOURS OF FINISHES

- .1 Colours for building finishes, piping, and all other components shall be submitted to PWGSC for approval.

6. SITE CONDITIONS

- .1 Contractor shall make sub-surface investigations of the Site at his own cost for use in the design.

END OF SECTION

Appendix 'B'

Substructure Requirements

SUBSTRUCTURE REQUIREMENTS

1. GENERAL

1.1 Demolition

- .1 Demolish and dispose off-site of all materials in conflict with new Works.
- .2 Contractor is to receive approval from PWGSC prior to demolition and/or disposal of any item. Environment Canada retains ownership of any existing Works, unless otherwise instructed by PWGSC.
- .3 Any existing Works, such as the existing tankage, building, to be abandoned shall be demolished and disposed of off-site. Equipment such as blowers, pumps, valves, meters, shall be disposed of as per PWGSC's instructions.

1.2 Utilities

- .1 Relocate, remove or abandon all underground utilities that would be disturbed by construction or are within 3.0 m of a new building or structure, unless in a direct route to connect to that building or structure.

1.3 Foundation

- .1 Design and performance criteria:
 - .1 Design and provide foundation system and subsurface drainage in accordance with a geotechnical engineer's recommendations, or as required, for loads imposed by all structure dead and live loads.
 - .2 Provide foundations for mechanical and electrical equipment as required to limit movement and vibration within reasonable tolerances.
 - .3 Design all water retaining structures for water tightness and durability in accordance with the provisions of ACI 350R-89.
- .2 Materials
 - .1 Use concrete material of type and strength that which will support superimposed loads.
 - .2 Thermo siphons are an acceptable option for use in this location.

1.4 Concrete Work at Grade

- .1 Design and performance criteria:
 - .1 Design slabs and grade beams in accordance with existing conditions, or as required, for loads imposed by all structure dead and live loads.
 - .2 Provide sub-base for slabs-on-grade in accordance with existing conditions.

- .3 Provide floor slopes for drainage. Slope floors in all process areas at a minimum of 2 percent.
- .2 Materials:
 - .1 All concrete to provide strength and durability for intended use.

END OF SECTION

Appendix 'C'

Building Envelope Requirements

BUILDING ENVELOPE REQUIREMENTS

1. GENERAL

- .1 Contractor to design and construct to highest quality standards to the minimum requirements of the National Building Code of Canada, 2005 and its associated supplement and standards referenced therein.
- .2 Roof to be clear span if possible with a minimum slope required for the type of metal roof system. Provide protection from snow and ice above all doors.
- .3 Insulation (minimum): As per applicable codes for commercial structures constructed in Nunavut.
- .4 Building Occupancy as defined by National Building Code of Canada is Group F, Division 2.
- .5 Non-combustible construction.
- .6 Design and assemble and secure building elements to building frame to ensure stresses in sealants, and seals are within sealant manufacturer's recommended maximum.
- .7 Design building assembly to permit easy replacement of components.
- .8 Allow for ceiling, piping, conduit, and other interior dead loads imposed on this structure.

2. SUPERSTRUCTURE

- .1 Submissions:
 - .1 All final Drawings to bear signature and seal of Professional Engineer registered in the Nunavut Territory for all fabricator designed assemblies, components and connections and as noted in the Specifications.
 - .2 Submit erection Drawings for review before construction.

3. CONSTRUCTION

- .1 Roof/Exterior Wall Framing:
 - .1 Structural steel, (conventional or pre-engineered) systems.
 - .2 Over head doors: commercial grade, insulated metal panel, min R-value=12.
 - .3 Walls: Pre-engineered steel materials of low maintenance for the design life of the facility.
 - .4 Ensure continuity of air and/or vapour barriers and minimize thermal bridging wherever possible.

- .5 Use insulated metal systems for wall and roofing system: Wall R-value=; Roof R-value=

END OF SECTION

Appendix 'D'

Building Interior Requirements

BUILDING INTERIOR REQUIREMENTS

1. FIXED PARTITIONS

.1 Design and performance criteria:

- .1** HD metal stud, 12mm plywood both sides, Drywall both sides; type; as per application.
- .2** At top of walls, which extend to underside of roof deck, make provision for deflection of structures.
- .3** Walls to be a minimum of 150 (mm) thick. Primed and painted. Colour by client

2. FIRE SEPARATION AND REQUIREMENTS

- #### **.1 Design and Performance Criteria: To meet Code as required due to proposed construction methods.**

3. WINDOWS

.1 Materials and Systems:

- ##### **.1 PVC Windows: (Arctic grade windows, design temperature for insulation: -47°C)**

- .1** Commercial quality
- .2** Thermal break
- .3** Opening casement windows
- .4** Internally secured glazing stops to match.

.2 Double Glazed Glass:

- .1** Thickness and type to meet Code requirements.
- .2** Glazed with gaskets or tape of size required to suit glass thickness, for full perimeter of glass, to form resilient and tight finish.

- .3** All windows on the building exterior shall be non-fired.

4. SWINGING DOORS AND FRAMES

- #### **.1 Design and Performance Criteria: (Exterior doors must be adapted to Arctic, to match existing doors on the Main Complex, make “Clark Door” related for freezer environments.)**

- .1** Support hollow metal doors with pressed steel frames.

.2 Materials and Systems:

.1 Insulated Metal Doors and Steel Frames:

- .1 Commercial Freezer application rating; requirements of Canadian Steel Door and Frame Manufacturer's Association.

.2 Glazed doors:

- .1 Glazed with gaskets or tape of size required to suit glass thickness, for full perimeter of glass, to form a resilient and tight system.

.3 Hardware:

- .1 Heavy duty, corrosion resistant hardware.
- .2 Exit devices where required by Code.
- .3 Closers where required by Code.
- .4 Door stops.
- .5 Threshold strips where required by Code and changes in floor finishes.
- .6 Steel kick plates on both sides of doors.

.4 Painting:

- .1 Factory finished metal doors and pressed steel frames, including top and bottom edges.

5. EQUIPMENT

.1 Materials and Systems:

- .1 Eyewash/Emergency Shower/Fire Extinguisher Station.

END OF SECTION

Appendix 'E'

Mechanical Requirements

MECHANICAL REQUIREMENTS

1. GENERAL

1.1 Codes and Standards

- .1 Design all mechanical systems in conformance with the federal, provincial, and municipal laws and regulations. Conform to the latest edition or revision of the codes and authorities having jurisdiction and to current design standards and regulatory requirements including, but not limited to the following:
 - .1 Nunavut Building Code
 - .2 Nunavut Plumbing Code
 - .3 National Fire Prevention Act, NFPA 820
 - .4 Nunavut Fire Code
 - .5 Requirements of the Department of Labour
 - .6 ASHRAE Standard 62, Ventilation for Acceptable Indoor Air Quality
 - .7 The Natural Gas Installation Code
 - .8 The Propane Gas Installation Code

1.2 Product Quality

- .1 General
 - .1 The design build contractor will provide fully designed and operational systems that meet all the requirements of these Specifications. Where more than one type of system is specified in the Appendices, the design build contractor shall be responsible for selecting the most appropriate system and ensuring all the requirements are met.
 - .2 All motors shall be high efficiency type.
 - .3 All equipment and systems shall be protected against corrosion.
- .2 Heating Systems
 - .1 Design build contractor to provide overhead fuel fired unit heaters complete with chimneys, oil piping, valves and filters as required. Provide overhead propeller fans c/w independent speed controllers to assist with heat distribution. Provide thermostatically controlled overhead fuel fired unit heaters with chimneys, oil piping, valves, filters, and other components capable of maintaining 22°C space temperature and raising internal space temperature from 10 °C to 22°C in 1 hour based on outside temperature of minus 40 °C. Provide overhead propeller fans to assist with heat distribution.

- .2 Carpentry shop: Provide independent from storage area, thermostatically controlled HVAC system with chimneys, oil piping, valves, filters, and other components capable of maintaining 22°C space temperature and raising internal space temperature from 10 °C to 22°C in 15 minutes based on outside temperature of minus 40 °C. System to include exhaust and make-up air c/w filtration, designed for year round operation in Eureka.
 - .3 Design build contractor to provide an exterior double-walled storage tank with monitor, oil piping and controls for 3 month operation between fills. System to be designed for use with the on-site diesel fuel.
- .3 Gas Detection system and exhaust fan/damper system
- .1 The gas detection system shall be an advanced microprocessor – based system featuring a high quality networked controller, exhaust fan and motorized inlet/relief dampers of suitable quality and design for use in the arctic.
 - .2 All controls shall be factory tested.
 - .3 All units not accessible from the floor will have remote panels indicating alarm conditions, unit status, and providing on/off control.

END OF SECTION

Appendix 'F'

Electrical Services

ELECTRICAL SERVICES

1. GENERAL

1.1 Service Distribution

- .1 Provide new electrical service for new storage building.
- .2 Provide a complete grounding system for the new building. Ground system to be installed in compliance with the latest edition of the Canadian Electrical Code.
- .3 Provide building ground grid consisting of rod electrodes interconnected with bare copper ground conductor. Ensure building structure is adequately grounded.
- .4 Provide power to all equipment and devices supplied by other Divisions.

1.2 Lighting and Branch Wiring

- .1 High pressure sodium light source to be utilized for exterior applications and fluorescent light source for interior applications.
- .2 Maintained light levels in all areas to be in accordance with the Illuminating Engineering Society of North America (IESNA) and relevant section of these Specifications.
- .3 Provide building mounted luminaires for exterior lighting around the perimeter of the building with a minimum maintained lighting level of 20 lux for areas 6 m away from the building.
- .4 All exterior lighting to be photocell controlled with manual override.
- .5 Control of interior luminaires to be localized and suit the function of the individual space.
- .6 All fluorescent luminaries shall be electronic ballasts and T8 lamps.
- .7 When selecting luminaires, light sources, lamps and associated control, give special consideration to energy utilization.
- .8 Provide emergency lighting and exit signage in accordance with current National Building Code requirements.
- .9 Devices for maintenance areas to be industrial grade. Provide rated devices in all classified areas.
- .10 Utilize Teck 90 cable for all other areas. Provide outdoor plug-ins on outside wall. Utilize Teck 90 cable for surface and U/G wiring.
- .11 Provide a fire/smoke alarm system for the building in accordance with current National Building Code.

END OF SECTION

Appendix 'G'

Sitework Requirements

SITework REQUIREMENTS

1. GENERAL

- .1 Sitework shall be done in accordance with the requirements of the geotechnical engineer.

1.2 Earthwork

.1 Clearing and Stripping:

- .1 The Contractor shall provide Site clearing and stripping as required. All areas under the building footprint or under concrete or asphalt pavements shall be stripped of topsoil and unsuitable material.

.2 Excavating, Trenching and Backfill:

- .1 Excess excavated material may be disposed of at an appropriate location acceptable to Environment Canada.

.3 Site Grading:

- .1 The Contractor shall provide all additional rough grading as required.
- .2 Fine grade Site to prevent ponding of water, and to suit final site design layout.
- .3 Direct runoff water away from buildings in a controlled manner.

1.3 Access Roads and Driveways

.1 Location and Layout:

- .1 General location, size, and layout of access roads and driveways shall be designed in accordance with industry standards for a facility of this size. The proposal shall clearly define the proposed areas and locations. All roads may be graveled.

.2 Drainage:

.1 Grade roadway to prevent ponding of water:

- .1 Minimum roadway crossfall - 2.0 percent.
- .2 Maximum roadway grade - 0.5 percent.

.2 Grade to prevent ponding of water:

- .1 Minimum grade - 0.7 percent
- .2 Maximum grade - 3.0 percent.

END OF SECTION