

PART E
SPECIFICATIONS

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE DRAWINGS

E1.1 The following Drawings are applicable to the Work:

<u>Drawing No.</u>	<u>Information Drawings</u>
NEP 56	Contract A – Grit Removal Building Superstructure Plans and Elevations As Built
NEP 57	Contract A – Grit Removal Building Superstructure Floor Plans, Sections and Details As Built
NEP 58	Contract A – Grit Removal Building Superstructure West End Floor Plans and Details As Built
NEP 1555	North End Water Pollution Control Centre Pre-Treatment Building - Architectural Wall Sections As Built
NEP 1556	North End Water Pollution Control Centre Pre-Treatment Building - Architectural Wall Sections and Details As Built
NEP 1559	North End Water Pollution Control Centre Pre-Treatment Building - Structural Main Floor, & Roof Framing Plans, Sections and Details As Built

<u>Drawing No.</u>	<u>Drawing</u>
NEP 56A	North End Water Pollution Control Centre Grit Removal Building Re-Roofing Skylight Detail

E2. SHOP DRAWINGS

- E2.1 Submit to the Contract Administrator Shop Drawings within seven (7) Calendar Days of a request from the Contract Administrator and in orderly sequence so as to not cause delay in Work.
- E2.2 Shop Drawings shall indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- E2.3 Make changes in shop drawings as Contract Administrator requires, consistent with Contract Documents. When resubmitting, notify Contractor Administrator in writing of any revisions other than those requested.
- E2.4 Shop Drawings not stamped, signed, dated and identified as to specific project will be returned without being examined and shall be considered rejected.
- E2.5 Contractor's responsibility for errors and omissions in submission is not relieved by Contract Administrators review of shop drawings.
- E2.6 Contractor's responsibility for deviations in shop drawings from requirements are not relieved by Contract Administrator review.
- E2.7 Submit 3 prints of Shop Drawings.

- E2.8 Supplement standard information to provide details applicable to project.
- E2.9 Keep a reviewed copy of each Shop Drawing on site.
- E2.10 If upon review by the Contract Administrator, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedures indicated above, must be performed before fabrication and installation of Work may proceed.
- E2.11 The review of shop drawings by the Contract Administrator is for sole purpose of ascertaining conformance with general concept. This review shall not mean that the Contract Administrator approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of construction and Contract Documents. Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.
- E2.12 Shop Drawings will be required for roof drains, metal flashing and skylight replacement.

E3. THE FOLLOWING NATIONAL MASTER SPECIFICATIONS (NMS) ARE APPLICABLE TO THIS WORK

Section 07550 – Modified Bituminous Roofing

Section 07620 – Sheet Metal Flashing and Trim

Section 15401 – Plumbing Specialties and Accessories

Approved: 1999-01-26

Part 1 General

1.1 RELATED WORK

- .1 Section 07620 Metal Flashing and Trim.
- .2 Section 15401 Plumbing Specialties and Accessories.

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-37.5-[M89], Cutback Asphalt Plastic Cement.
 - .2 CGSB 37-GP-9Ma-[83], Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
 - .3 CGSB 37-GP-15M-[76], Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing.
 - .4 CGSB 37-GP-19M-[76], Cement, Plastic, Cutback Tar.
 - .5 CAN/CGSB-37.29-[M89], Rubber-Asphalt Sealing Compound.
 - .6 CGSB 37-GP-56M-[80], Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
 - .7 CAN/CGSB-51.20-[M87], Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .8 CAN/CGSB-51.26-[M86], Thermal Insulation, Urethane and Isocyanurate, Boards, Faced.
 - .9 CAN/CGSB-51.33-[M89], Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.
 - .10 CAN/CGSB-51.34-[M86], Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .2 Canadian Standards Association (CSA)
 - .1 CSA A123.3-[M1992], Asphalt or Tar Saturated Roofing Felt.
 - .2 CSA A123.4-[M1992], Bitumen for Use in Construction of Built-Up Roof Coverings and Dampproofing and Waterproofing Systems.
 - .3 CAN/CSA-A247-[M86], Insulating Fibreboard.
 - .4 CSA A284-[1976], Mineral Aggregate Thermal Roof Insulation.
 - .5 CSA O121-[M1978], Douglas Fir Plywood.
 - .6 CSA O151-[M1978], Canadian Softwood Plywood.

1.3 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with E2.

1.4 STORAGE AND HANDLING

- .1 Provide and maintain dry, off-ground weatherproof storage.

- .2 Store rolls of felt and membrane in upright position. Store membrane rolls with selvage edge up.
- .3 Remove only in quantities required for same day use.
- .4 Place plywood runways over work to enable movement of material and other traffic.
- .5 Store sealants at +5°C minimum.
- .6 Store insulation protected from weather and deleterious materials.

1.5 ENVIRONMENTAL REQUIREMENTS

- .1 Do not install roofing when temperature remains below -18°C for torch application, or -10°C to manufacturers' recommendations for mop application.
- .2 Minimum temperature for solvent-based adhesive is -5°C.
- .3 Install roofing on dry deck, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into roofing system.

1.6 PROTECTION

- .1 Fire Extinguishers: maintain one cartridge operated type or stored pressure rechargeable type with hose and shut-off nozzle, ULC labeled for A, B and C class protection. Size 4.5 kg on roof per torch applicator, within 10 m of torch applicator.
- .2 Maintain fire watch for 1 hour after each day's roofing operations cease.

1.7 COMPATIBILITY

- .1 Compatibility between components of roofing system is essential. Provide written declaration to Contract Administrator stating that materials and components, as assembled in system, meet this requirement.

1.8 QUALITY ASSURANCE

- .1 Submit laboratory test reports certifying compliance of bitumens and roofing felts and membrane with specification requirements.

Part 2 Products

2.1 DECK COVERING

- .1 Douglas Fir Plywood conforming to requirements of CSA 0121, thickness as indicated pressure treated to CAN/CSA 080.15M.

2.2 DECK PRIMER

- .1 Asphalt primer: to CGSB 37-GP-9Ma.
 - .1 Acceptable material: Elastocol 700.

2.3 VAPOUR RETARDER

- .1 Two-ply asphalt laminated membrane to CAN/CGSB-51.33, Type 2, and fire retardant adhesive.
 - .1 Acceptable material: Vapor-Bloc or Baral.

2.4 MEMBRANE

- .1 Base sheet and base sheet stripping: to CGSB 37-GP-56M, Styrene-Butadiene-Styrene (SBS) elastomeric polymer, prefabricated sheet, polyester reinforcement, weighing 180 g/m².
 - .1 Type 1, fully adhered
 - .2 Class C - plain surfaced.
 - .3 Grade 1 - standard service.
 - .4 Top and bottom surfaces:
 - .1 Polyethylene/sanded.
 - .5 Acceptable material: Elastophene 180 PS or Modiflex MP-180-FS-Base.
- .2 Cap sheet and cap sheet flashing: to CGSB 37-GP-56M, Styrene-Butadiene-Styrene (SBS) elastomeric polymer, prefabricated sheet, polyester reinforcement, weighing 250 g/m².
 - .1 Type 1, fully adhered.
 - .2 Class A-granule surfaced.
 - .3 Grade 1-standard service.
 - .4 Bottom surface polyethylene.
 - .5 Acceptable material: Sopralene 250 GR or Torchflex TP-250-CAP.
 - .6 Color white or gray

2.5 BITUMEN

- .1 Asphalt: to CSA A123.4, Type 2 or 3.

2.6 POLYSTYRENE INSULATION

- .1 Extruded/Expanded Polystyrene insulation to CAN/CGSB-51.20, Type 1, 2, or 3, thickness 75 mm, shiplapped edges or;

2.7 ISOCYANURATE (URETHANE) INSULATION

- .1 To CAN/CGSB-51.26, Type 1, 2, or 3, facing organic/inorganic, thickness 75mm.

2.8 INSULATING FIBREBOARD

- .1 To CAN/CSA-A247, Type 1-roof board, surface coated, 12mm thick.

2.9 CARPENTRY

- .1 Douglas Fir Plywood conforming to requirements of CSA 0121, thickness as indicated pressure treated to CAN/CSA 080.15M.

2.10 FASTENERS

- .1 Covering to steel deck: No. 10 flat head, self tapping, Type A or AB, cadmium plated screws to CSA B35.3.
- .2 Insulation to deck: fasteners and plates must meet Factory Mutual 4470 Standard for wind uplift and corrosion resistance.

Part 3 Execution

3.1 WORKMANSHIP

- .1 Do roofing work in accordance with applicable, standard in Canadian Roofing Contractors Association (CRCA) Roofing Specifications Manual
- .2 Do priming for asphalt roofing in accordance with CGSB 37-GP-15M.
- .3 Remove existing gravel and roof membrane.
- .4 Preserve existing foamglass insulation except as directed by Contract Administrator.
- .5 Remove all skylights and install roof decking and modified bituminous roofing.

3.2 PROTECTION

- .1 Cover walls and adjacent work where materials hoisted or used.
- .2 Use warning signs and barriers. Maintain in good order until completion of work.
- .3 Clean off drips and smears of bituminous material immediately.
- .4 Dispose of rain water off roof and away from face of building until roof drains or hoppers installed and connected.
- .5 Protect roof from traffic and damage. Comply with precautions deemed necessary by Contract Administrator.
- .6 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed work and materials out of storage.

3.3 EXAMINATION OF ROOF DECKS

- .1 Examine roof decks and immediately inform Contract Administrator in writing of defects.
- .2 Prior to commencement of work ensure:
 - .1 Decks are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris.
 - .2 Curbs have been built.
 - .3 Roof drains have been installed at proper elevations relative to finished roof surface.

- .4 Plywood and lumber nailer plates have been installed to deck, walls and parapets as indicated.

3.4 WET INSULATION

- .1 Remove all wet insulation. Area to be determined by Contract Administrator.
- .2 Replace wet insulation with vapour barrier and new insulation.

3.5 PRIMING CONCRETE/WOOD DECK

- .1 Apply deck primer on deck at the rate recommended by manufacturer.

3.6 DECK COVERING

- .1 Mechanically fasten to steel deck with screws spaced 400 mm oc each way.
- .2 Place with long axis of each sheet transverse to steel deck ribs, with end joints staggered and fully supported on ribs.

3.7 VAPOUR RETARDER (CONCRETE/PLYWOOD DECK)

- .1 Embed two piles of felts in hot bitumen spread at rate of 1 to 1.2 kg/m².
- .2 Modified bituminous vapour retarder sheet.

3.8 EXPOSED MEMBRANE ROOFING APPLICATION

- .1 Insulation: fully adhered, adhesive application.
 - .1 Adhere insulation to laminated vapour barrier using solvent-based adhesive.
 - .2 Place boards in parallel rows with ends staggered, and in firm contact with one another.
 - .3 Cut end pieces to suit.
- .2 Insulation: fully adhered, bitumen application.
 - .1 Embed insulation in 1 to 1.5 kg/m² mopping of bitumen.
 - .2 Place boards in parallel rows with ends staggered, and in firm contact with one another.
 - .3 Cut end pieces to suit.
- .3 Base sheet application.
 - .1 Starting at low point of roof, perpendicular to slope, unroll base sheet, align and reroll from both ends.
 - .2 Unroll and embed base sheet in uniform coating of asphalt applied at rate of 1.2 kg/m², at 230°C.
 - .3 Lap sheets 75 mm minimum for side and 150 mm minimum for end laps.
 - .4 Application to be free of blisters, wrinkles and fishmouths.
- .4 Cap sheet application.

- .1 Starting at low point on roof, perpendicular to slope, unroll cap sheet, align and reroll from both ends.
- .2 Unroll and torch cap sheet onto base sheet taking care not to burn membrane or its reinforcement.
- .3 Lap sheets 75 mm minimum for side laps and 150 mm minimum for end laps. Offset joints in cap sheet 300 mm minimum from those in base sheet.
- .4 Application to be free of blisters, fishmouths and wrinkles.
- .5 Do membrane application in accordance with manufacturer's recommendations.
- .5 Flashings.
 - .1 Complete installation of flashing base sheet stripping prior to installing membrane cap sheet.
 - .2 Mop base sheet and torch cap sheet onto substrate in 1 metre wide strips.
 - .3 Lap flashing base sheet to membrane base sheet minimum 150 mm and seal by mopping.
 - .4 Lap flashing cap sheet to membrane cap sheet 250 mm minimum and torch weld.
 - .5 Provide 75 mm minimum side lap and seal.
 - .6 Properly secure flashings to their support, without sags, blisters, fishmouths or wrinkles.
 - .7 Do work in accordance with manufacturer's recommendations.
- .6 Roof penetrations.
 - .1 Install roof drain pans, vent stack covers and other roof penetration flashings and seal to membrane in accordance with the manufacturer's recommendations and details.

3.9 CANTS

- .1 Cants can be removed or left in place
- .2 If left in place replace damaged or deteriorated cants with lumber conforming to CAN/CSA-O141.
- .3 Apply hot bitumen to receiving surface and embed cant firmly by hand. Fasten wood cants to wood insulation stops.
- .4 Angle cut cants to fit tightly on back and bottom where roof to wall angle varies from 90°.

3.10 SITE CLEANUP

- .1 Provide suitable containers for surplus roofing material
- .2 Disposal of all surplus material in a landfill site or as directed by the Contract Administrator.

END OF SECTION

Approved: 2002-12-04

Part 4 General

4.1 RELATED SECTIONS

- .1 Section 07550 - Modified Bituminous Roofing.
- .2 Section 15401 - Plumbing Specialties and Accessories

4.2 REFERENCES

- .1 The Aluminum Association Inc. (AA)
 - .1 Aluminum Sheet Metal Work in Building Construction-[2000].
 - .2 AA DAF45-[97], Designation System for Aluminum Finishes.
- .2 American Society for Testing and Materials (ASTM International)
 - .1 ASTM A167-[99], Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM A240/A240M-[02], Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
 - .3 ASTM A591/A591M-[98], Standard Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating [Mass] Applications.
 - .4 ASTM A606-[01], Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
 - .5 ASTM A653/A653M-[01a], Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .6 ASTM A792/A792M-[02], Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - .7 ASTM B32-[00], Standard Specification for Solder Metal.
 - .8 ASTM B370-[98], Standard Specification for Copper Sheet and Strip for Building Construction.
 - .9 ASTM D523-[89(1999)], Standard Test Method for Specular Gloss.
 - .10 ASTM D822-[01], Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
- .3 Canadian Roofing Contractors Association (CRCA)
 - .1 Roofing Specifications Manual [1997].
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-37.5-[M89], Cutback Asphalt Plastic Cement.
 - .2 CAN/CGSB-51.32-[M77], Sheathing, Membrane, Breather Type.
 - .3 CAN/CGSB-93.1-[M85], Sheet Aluminum Alloy, Prefinished, Residential.
- .5 Canadian Standards Association (CSA International)
 - .1 CSA A123.3-[98], Asphalt Saturated Organic Roofing Felt.

- .2 CSA-A440-[00]/A440.1-[00] - A440-[00], Windows / Special Publication A440.1-[00], User Selection Guide to CSA Standard A440-[00], Windows.
- .3 CSA B111-[1974(R1998)], Wire Nails, Spikes and Staples.

4.3 SAMPLES

- .1 Submit shop drawings in accordance with E2.
- .2 Submit 50 x 50 mm samples of each type of sheet metal material, colour and finish.

Part 5 Products

5.1 SHEET METAL MATERIALS

- .1 Zinc coated steel sheet: 22 gauge thickness, commercial quality to ASTM A653/A653M, with Z275 designation zinc coating.

5.2 ACCESSORIES

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Plastic cement: to CAN/CGSB 37.5.
- .3 Underlay for metal flashing: dry sheathing to CAN/CGSB-51.32.
- .4 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness, same as sheet metal being secured.
- .5 Fasteners: of same material as sheet metal, to CSA B111, ring thread flat head roofing nails of length and thickness suitable for metal flashing application.
- .6 Washers: of same material as sheet metal, 1 mm thick with rubber packings.

5.3 FABRICATION

- .1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series details.
- .2 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.
- .3 Hem exposed edges on underside 12 mm. Mitre and seal corners with sealant.
- .4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .5 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

5.4 METAL FLASHINGS

- .1 Form flashings, copings and fascias to profiles indicated of 22 gauge galvanized steel.

Part 6 Execution

6.1 INSTALLATION

- .1 Remove existing metal flashing and dispose.
- .2 Replace with same profile around the perimeter of the building only.
- .3 Install sheet metal work as detailed.
- .4 Use concealed fastenings except where approved before installation.
- .5 Provide underlay under sheet metal. Secure in place and lap joints 100 mm.
- .6 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs.
- .7 Lock end joints and caulk with sealant.

END OF SECTION

Approved: 2001-12-04

Part 7 General

7.1 RELATED SECTIONS

- .1 Section 07550 - Modified Bituminous Roofing.
- .2 Section 07620 Metal Flashing and Trim.

7.2 SUBMITTALS

- .1 Submit shop drawings in accordance with E2

Part 8 Products

8.1 ROOF DRAINS

- .1 Standard roof drain with cast aluminum dome.
 - .1 Acceptable material: Thalar Econo Type RD-23 Aluminum.

Part 9 Execution

9.1 INSTALLATION

- .1 Install in accordance with local authority having jurisdiction.
- .2 Install in accordance with manufacturer's instructions and as specified.
- .3 Roof drains:
 - .1 Check location at low points in roof.
 - .2 Check security, removeability of dome.
 - .3 Verify provisions for movement of roof systems.

END OF SECTION