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***(REVISED NOVEMBER 2016)***

# SECTION 8 – CURBS, SIDEWALKS AND WALKWAYS DESIGN CRITERIA

8.00 SCOPE

.1 For the purpose of this specification the following definitions shall apply:

(a) Curbs refer to concrete curbs with or without integral gutters unless otherwise noted.
(b) Sidewalk refers to concrete sidewalks adjacent to a street or curb and located within a road right-of-way unless otherwise noted.
(c) Walkway refers to asphalt paved or concrete sidewalks located outside of road right-of-ways unless otherwise noted.

.2 Concrete paver surface treatment shall be in accordance with Section 13 - Concrete Pavers.

.3 Curbs, (concrete and asphalt) sidewalks and walkways shall be designed in accordance with the following design criteria.

8.01 RIGHT-OF-WAY AND PAVEMENT WIDTHS

.1 Sidewalk pavement widths shall be in accordance with the road classification of the adjacent street. All sidewalk widths shall be 1.5m except: ***(REVISED NOVEMBER 2016)***

(a) Sidewalks adjacent to Urban Arterial, Major Collector, and Minor Collector streets shall be 1.8m wide. ***(REVISED NOVEMBER 2016)***
(b) Sidewalks are not required adjacent to Lanes and Rural Local streets. ***(REVISED NOVEMBER 2016)***

.2 A minimum of 1.2m of unobstructed width is required on all sidewalks and walkways. ***(REVISED NOVEMBER 2016)***

.3 Walkway pavement widths shall be a minimum of 3.0m as specified in the Standard Drawings.

.4 Walkway rights-of-way shall be a minimum of 6.0m unless otherwise approved by the City Engineer.

8.02 CURBS - GENERAL

.1 All curbs shall be non-mountable concrete curbs except curbs within cul-de-sac bulbs shall be mountable concrete curbs, unless otherwise approved by the City Engineer.

.2 Where intersecting streets have both mountable and non-mountable curbs, non-mountable curbs shall be required for the curb returns and along the tangent to the first driveway or lane crossing located in accordance with Section 8.04 – Driveway and Lane Crossings.

.3 Curbs within driveway or lane crossings in industrial and commercial areas require an additional concrete footing or reinforcing steel as shown on Standard Drawing No. CS-1.

.4 Minimum radius of curb returns at street intersections shall be 9.0 m for urban local collectors and local streets, and 12m for industrial/commercial, urban collector and arterial streets.

.5 Radius of curbs forming nodes at intersections or mid-block shall be a minimum 5.0m concave or 3.0m convex radius. Refer to Standard Drawing No. CS-9 - Curb Extension Detail.

.6 The radius of curb returns at street intersections shall be governed by the wider of the intersecting streets.

.7 Asphalt Curb:

(a) On pavement edges where concrete curb is not required, a temporary 100mm asphalt curb shall be provided for drainage and traffic control unless otherwise specified on the construction drawings.
(b) Asphalt curbs may also be required to provide a transition from new concrete curbs to existing roadworks.

8.03 WALKWAY VEHICLE BARRICADES

.1 Barrier posts as shown on Standard Drawing No. CS-14 should be used on multi-use pathways, when necessary to prevent vehicle access. Telescoping bollards as shown on Standard Drawing No. CS-15 should be used for fire lane access.

.2 Barrier posts should be installed in odd numbers (one, three or five) so that the centre post is positioned on the centreline of the pathway.

.3 Barrier posts may be fixed or removable.

.4 Walkway barrier baffles as shown on Standard Drawing No. CS-13 should not be used on multi-use pathways.

8.04 DRIVEWAY AND LANE CROSSINGS

.1 Driveway and lane crossings shall be provided in sidewalks constructed where non-mountable curbs are used.

.2 Driveway and lane crossings shall be constructed in accordance with the Standard Drawing No. CS-5A, Type 2 or No. CS-5B, Type 3. Standard Drawing No. CS-5, Type 1 shall only be used when approved by the City Engineer. ***(REVISED NOVEMBER 2016)***

.3 Driveway and lane crossings shall be located in accordance with the City of Nanaimo's Crossing Control Bylaw.

(a) Maximum driveway width for single family residential lot with either mountable or non-mountable curb shall be 6.0m.
(b) Maximum driveway width for all other zoned lots shall be 9.0m unless otherwise approved by City Engineer.

.4 Driveway and lane crossings shall not exceed a crossfall of 8.3%.

8.05 STANDARD LONGITUDINAL GRADE

| | | |
|---|---|---|
| .1 | Concrete gutter (minimum) | 0.50% |
| | Curb return (minimum) | 1.0% |
| | Curb return (maximum) | 12.0% |
| | Sidewalks (minimum) | 0.50% |
| | Sidewalks (maximum) | 12.0% |
| | Walkways (minimum) | 0.50% |
| | Walkways (maximum) | 12.0% |

.2 The longitudinal grade for sidewalks shall follow road grades. Other measures or steps may be required to reduce longitudinal grade for walkways exceeding maximum grades.

.3 Curb return grades shall provide a smooth transition between intersecting gutter grades.

8.06 SIDEWALK AND WALKWAY CROSSFALL GRADE

| | | |
|---|---|---|
| .1 | Minimum | 1.0% |
| | Recommended | 2.0% |
| | Maximum | 4.0% |

.2 Crossfall grades in excess of 4.0% shall only be permitted for short sections at driveway or lane crossings subject to approval by the City Engineer.

.3 In no case shall the crossfall grades exceed 6.0%.

.4 The sidewalk shall slope down to the curb as shown on the Standard Drawings.

.5 Sidewalk driveway crossings shall be constructed in accordance with Section 8.04 – Driveway and Lane Crossings. ***(REVISED NOVEMBER 2016)***

8.07 SIDEWALK AND WALKWAY THICKNESS

.1 Concrete sidewalk thickness shall be minimum 150mm behind mountable curbs and at all driveway and lane crossings.

.2 Concrete sidewalk thickness behind non-mountable curbs shall be minimum 100mm, except at all driveway and lane crossings where the concrete thickness shall be minimum 150mm as shown on Standard Drawing No.'s CS-5, CS-5A and CS-5B.

.3 Walkways shall be paved with minimum 50mm thick asphaltic concrete or constructed of concrete, in accordance with the requirements for sidewalks. Concrete thickness in walkways shall be minimum 150mm where there is potential for vehicle passage, and minimum 100mm where there is no potential for vehicle passage.

8.08 CURB, SIDEWALK AND WALKWAYS - MINIMUM BASE AND SUB-BASE

.1 The minimum base and sub-base requirements for curbs and sidewalks not separated by a boulevard shall be the same as that required for the adjacent street and in accordance with Section 9.06.

.2 Walkways and sidewalks separated by a boulevard shall have a minimum compacted thickness of:

(a) 150mm Coarse Gravel Sub-base, compacted 75mm minus ***(REVISED NOVEMBER 2016)***
50mm Crushed Gravel Base, compacted 20mm minus ***(REVISED NOVEMBER 2016)***

*OR*

(b) 150mm Crushed Gravel Base, compacted 20mm minus ***(REVISED NOVEMBER 2016)***

8.09 PEDESTRIAN SIDEWALK RAMPS

.1 Pedestrian sidewalk ramps shall be provided:

(a) in sidewalks at every pedestrian road crossing,
(b) in raised traffic islands where they form a continuation of a sidewalk network across a road intersection.

.2 The design of pedestrian sidewalk ramps shall be in accordance with the Standard Drawings.

8.10 SIDEWALKS IN CUL-DE-SACS

.1 The location of sidewalks in cul-de-sacs shall be as shown on the Standard Drawings for cul-de-sacs contained in Section 9 - Streets, Traffic Signs and Markings.

8.11 TERMINATION OF SIDEWALKS

.1 Sidewalks shall be terminated in a manner that is safe for pedestrians and as follows:

(a) At the beginning of the curb return if construction of the intersection is not required.
(b) At the end of the curb return if construction of the intersection is required.
(c) At the end of the development phase or property line.
(d) At other specified locations as required by the City Engineer.

.2 Extend and terminate sidewalks as required to allow wheelchair access to pedestrian pushbuttons.

8.12 STAIRWAYS

.1 Where walkway grades exceed 12%, stairways shall be installed to suit adjacent topography.

.2 Walkways requiring stairways shall have a minimum of three stairs, and landings at all entrances to the walkway.

.3 Walkway barriers, as per Standard Drawing No. CS-13, shall be required at all entrances to walkways containing a stairway. Barriers shall be installed a minimum of 1.5m from the last stair.

.4 Landings at a 2% grade, are required at the top and bottom of all stairways. Stairways shall have a maximum of 12 risers between landings.

.5 Concrete stairways shall be designed in accordance with Standard Drawing No. CS-16. ***(REVISED NOVEMBER 2016)***

.6 Wooden stairways shall be designed in accordance with Standard Drawing No. CS-17. ***(REVISED NOVEMBER 2016)***

8.13 SIDEWALK HANDRAIL

.1 Sidewalks or walkways adjacent to retaining walls or other vertical drops exceeding a slope of 1.5H:IV or height of 0.6m shall require a handrail, or 1.2m high chain link fence. ***(REVISED NOVEMBER 2016)***

.2 Other unsafe areas, as determined by the City Engineer, may also require the installation of a handrail, or chain link fence.

8.14 BUS STOP/PULLOUT CONFIGURATIONS

.1 Bus stops and bus pullout locations will be determined by the Regional District of Nanaimo Transit and the City of Nanaimo Engineer. See Standard Drawing No.'s CS-20 and CS-21 for bus stop and pullout configurations.

# SECTION 8 – CURBS, SIDEWALKS AND WALKWAYS SPECIFICATIONS

8.20 SCOPE

.1 This specification refers to concrete curb and gutter, concrete sidewalks, concrete stairways, asphalt curbs and asphalt walkways.

.2 Specifications for reinforced and plain concrete works shall be as specified under Section 11 - Reinforced and Plain Concrete Works, except as modified by this section.

.3 Only those products approved by the City Engineer and listed in the City of Nanaimo Approved Products List will be accepted for installation.

8.21 CURB AND SIDEWALK CONCRETE

.1 Mix Design:

Mix design shall conform to the following:

(a) Hand Formed Curb and Gutter, Sidewalks and Stairways:

Slump: 80mm
Air Entrainment: 5% - 8%
Maximum aggregate size: 20mm
Minimum cement content: 335 kg/$m^3$
Minimum 28 day compressive strength: 32MPa

(b) Extruded Curb and Gutter:

Exposure Class: C-2
Slump: 0 - 2mm
Air Entrainment: 6% - 9%
Fineness modulus: 2.2 - 3.1
Maximum aggregate size: 12.5mm
Minimum cement content: 335 kg/$m^3$
Minimum 28 day compressive strength: 32MPa

.2 Admixtures:

Admixtures for the prevention of freezing shall not be used. Use of other admixtures shall require the approval of the City Engineer.

8.22 CURING COMPOUND

.1 Curing compound shall be spray-applied, liquid type conforming to ASTM C309 containing a fugitive dye.

8.23 CURB AND SIDEWALK EXPANSION JOINTS

.1 Preformed bituminous impregnated fiber board for expansion joints shall conform to ASTM D1751 with the same shape as the concrete cross sections and having a minimum thickness of 13mm.

8.24 CURB AND SIDEWALK ISOLATION JOINTS

.1 Longitudinal joints and joints around poles and structures shall be made with 6mm thick preformed bituminous impregnated fiber board material conforming to ASTM D1751, precut to the required section.

8.25 REINFORCING STEEL

.1 Reinforcing steel shall be intermediate grade steel conforming to CSA G30.18, Grade 400. Steel shall be free of excessive rust, scale or other coatings that will adversely affect the bond.

8.26 COMMON EXCAVATION

.1 Common excavation is the excavation and removal of all material encountered which is not classified as rock.

8.27 IMPORTED GRANULAR FILL

.1 Imported granular fill shall conform to Section 9.28A - Imported Granular Fill.

8.28 EARTH FILL

.1 Earth fill shall include all fills comprised of common excavation containing less than 15% by volume of rock larger than 150mm in size free of organic and deleterious matter and frozen earth lumps and shall be approved by the Engineer.

8.29 IMPORTED EARTH FILL

.1 Imported earth fill is defined as material imported from outside the project site to meet the specifications of earth fill.

8.30 GRANULAR BASE

.1 Granular base shall conform to Section 9.30 - Road Base Gravel Course.

8.31 SELECT GRANULAR SUBBASE

.1 Select granular sub-base shall conform to Section 9.29 – Road Sub-base Gravel Course.

8.32 FORMS

.1 Forms may be either steel or wood.

.2 Wood forms shall be of select dressed lumber, well seasoned, straight, free from defects, thoroughly cleaned not less than 40mm thick, and not less than 5 m long.

.3 Steel forms shall be thoroughly cleaned and free of twists and warps.

.4 Flexible forms shall be used for all curves having a radius of less than 60 m.

.5 Forms shall be to the shape, lines and full dimensions of the work being formed.

.6 Form release agents shall conform to Section 11.22 - Form Release Agent.

8.33 EXTRUDING MACHINE

.1 The extruding machine shall require approval by the Engineer. The machine shall be fitted with a template for the curb specified on the construction drawings and consistent with the cross-sections shown on the Standard Drawings.

.2 Rails for the extruding machine shall be rigid enough to ensure no deflection from established line and grade occurs.

.3 Asphalt extruding curb machine shall require approval by the Engineer. The machine shall be fitted with a template consistent with the section shown on Standard Drawing No. CS-12.

8.34 TRANSITION SIDEWALK

.1 Transition sidewalk refers to all portions of concrete or asphalt placed as "fill-in" sidewalk between existing curbs and sidewalk, sidewalks and inset building walls, sidewalks and paved parking area.

8.35 SCREEDS

.1 Power screeds, approved by the Engineer, may be used to screed formed sidewalks.

8.36 ASPHALT

.1 Asphalt pavement for walkways shall be as specified under Section 12 - Asphaltic Concrete Paving except as modified herein:

Marshall stability at 60°C - 227 kg minimum 50 blows
Percent voids total mix - 3% - 5%
Maximum aggregate size - 13mm

.2 Asphalt Curb:

(a) Asphalt mix shall conform to Section 12 - Asphaltic Concrete Paving.
(b) Bituminous tack coat shall be SS-1 or SS-1h asphalt emulsion conforming to Section 12 - Asphaltic Concrete Paving.

8.37 -NOT USED-

8.38 -NOT USED-

8.39 WALKWAY BARRIERS

.1 Materials for walkway barriers shall be as specified in the Standard Drawings.

# SECTION 8 – CURBS, SIDEWALKS AND WALKWAYS INSTALLATION

8.40 SCOPE

.1 Installation for reinforced and plain concrete works shall be as specified under Section 11 - Reinforced and Plain Concrete Works, except as modified by this section.

8.41 COMMON EXCAVATION

.1 Common excavation shall be carried out such that curb and gutter and sidewalks can be constructed to the line and grade shown on the drawings.

8.42 CUTTING AND REMOVAL OF EXISTING ASPHALTIC AND CONCRETE PAVEMENT, SIDEWALK, CURB, AND CURB AND GUTTER

.1 Existing asphaltic pavement, sidewalk, curb and gutter shall be cut in a straight line parallel to the line of the proposed work as per the requirements of Section 4.04 - Precutting Paved Surfaces and Section 4.29 - Final Cutting Paved Surfaces.

.2 Existing concrete pavement, sidewalk, curb and gutter shall be removed by cutting the concrete at the nearest joint or other location designated by the Engineer.

.3 The top surface of the remaining concrete section shall have a neat vertical face with a straight edge for a minimum of 1/4 the depth of the section.

.4 All material removed shall be disposed of as waste material.

8.43 SUBGRADE, SUB-BASE AND BASE PREPARATION

.1 Subgrade, Sub-base and Base installation shall be in accordance with Section 9 – Streets, Traffic Signs and Markings.

.2 The Subgrade, Sub-base and Base shall be approved by the Engineer prior to placement of forms and/or guides.

8.44 CROSS-SECTION

.1 The cross-sections of the curb, gutter and sidewalk shall conform to the cross-sections as detailed on the Standard Drawings.

8.45 PLACING CONCRETE

.1 The base, forms and/or rails shall be approved by the Engineer prior to the placement of concrete.

.2 Concrete shall be placed within 1.5 hours of batching time into approved preset forms or an approved extruding machine.

.3 Successive batches shall be deposited in a continuous operation. Under no circumstances shall partially set concrete be used.

.4 **Concrete shall not be placed during wet weather, on ponded water, on a frozen base, or when it appears likely that the air temperature will fall below 5$^{o}$ C within 24 hours unless special precautions approved by the Engineer are taken. Concrete shall be kept at a temperature of not less than 13$^{o}$ C for at least 72 hours after placing.**

.5 The concrete placing operation shall be timed to permit edging and finishing in daylight hours.

.6 Granular base shall be moistened prior to placement of concrete.

.7 Concrete placement shall only be discontinued at expansion, construction or isolation joints.

.8 Water shall not be added to the concrete mix unless the measured slump is less than the mix design criteria and less than 60 minutes of batching time has elapsed. The addition of water to the concrete mix shall be in accordance with CAN/CSA-A23.1.

8.46 HAND FORMED CONCRETE SECTIONS

.1 The base shall be approved by the Engineer prior to placement of the forms.

.2 Forms shall produce a true line free from waves or irregularities in line or grade. Forms shall be thoroughly cleaned and freshly oiled with form oil before concrete is placed. After forms have been set to line and grade, they shall be adequately braced, tied, and checked with a template to ensure proper setting. Concrete shall not be placed until the forms have been inspected and approved by the Engineer.

.3 A mechanical pencil vibrator not exceeding 50mm in diameter or a power screed shall be used as the concrete is being placed to produce a dense concrete. The use of a vibrator shall not exceed fifteen seconds in any one location.

.4 Face forms shall be removed as soon after pouring as is possible without resulting in damage to the curb in order to permit finishing. Under no circumstance shall the face forms remain in place overnight.

8.46A EXTRUDED CONCRETE SECTIONS

.1 The base shall be approved prior to placement of concrete.

.2 Guides for the extruding machine shall produce a true line free from waves or irregularities in line or grade and be sufficiently supported to ensure no deflection occurs.

.3 Concrete shall not be placed until guides have been approved by the Engineer.

.4 Extruded sections shall conform with cross-sections shown on the Standard Drawings.

.5 Where the Engineer is not satisfied with the extruded product, defective sections shall be removed and the replacement of defective sections and all remaining sections shall be completed by hand placement procedures.

8.47 TRANSITION SIDEWALK AND WALKWAY ***(REVISED NOVEMBER 2016)***

.1 Transition sidewalk or walkway shall be constructed at all locations designated by the Engineer and shall be edged and finished in a manner compatible with the adjacent sidewalk or walkway and shall be to the satisfaction of the Engineer. ***(REVISED NOVEMBER 2016)***

8.48 CURB AND SIDEWALK EXPANSION JOINTS

.1 Transverse expansion joints for curb and gutter shall be formed at both sides of lanes and driveway crossings, at both ends of all curb returns, and both sides of catchbasins 1.0m from the centreline of the catchbasin and at all other locations designated by the Engineer.

.2 Transverse expansion joints for sidewalks shall be formed at both sides of lanes and driveway crossings, at both ends of curb returns, at both sides of manholes, 0.75m from the centre line of the manhole and at all other locations designated by the Engineer.

.3 Extend joint through full depth of concrete. Fill joint with expansion joint material.

8.49 CURB AND SIDEWALK CONTRACTION JOINTS

.1 Contraction joints shall be constructed by cutting a groove through the surface of the concrete to a minimum of 1/2 of the depth of the concrete section at the point of cut.

.2 Contraction joints shall be constructed:

(a) For sidewalks up to 3.0m wide, lateral control joints shall be spaced at intervals equal to the width of the sidewalk.
(b) For sidewalks wider than 3.0m, lateral control joints shall be spaced at 3.0m intervals, as well as longitudinal control joints, located such that a 2.0m corridor is maintained.

.3 Contraction joints for curbs shall be constructed:

(a) For curbs separated from sidewalk, control joints shall be spaced at 3.0m intervals.
(b) For curbs abutting sidewalk, control joints shall be spaced to match the contraction joints in the adjacent sidewalk or multi use pathway, with a minimum spacing of 2.0m and maximum spacing of 4.0m.

.4 Sidewalk slabs shall be uniform in size and cut square where possible.

8.50 CURB AND SIDEWALK ISOLATION JOINTS

.1 Isolation joints shall be fabricated around telephone poles, light poles, hydrants, manholes, and all other structures located in the concrete section by wrapping 6mm thick preformed bituminous impregnated fiber board material around the structure.

.2 Longitudinal isolation joints shall be formed between sidewalk and existing curbing and where sidewalk is installed directly against a wall or other structure.

.3 Bond break compound may be used in lieu of the isolation joint between sidewalk and abutting curb where approved by the Engineer.

## 8.51 CURB AND SIDEWALK EDGING AND FINISHING

.1 Concrete curb and gutter:

(a) Concrete curb and gutter shall have a steel trowel finish. The surface shall have a smooth even dense texture free from blemishes.
(b) The finish on curb and gutter sections shall be within 5mm of the design grade and cross-section, but not uniformly high or low when measured with a 3m straightedge placed anywhere along the curb and gutter.

.2 Sidewalks and Stairways:

(a) Finish sidewalks and stairways to a smooth surface with a magnesium or wood float trowel.
(b) The surface of concrete sidewalks and stairways shall be finished prior to final set with a broom finish to provide a uniform, non-skid surface and finishing edges with a steel edging trowel in accordance with the patterns shown on the standard drawings. Alteration of the finishing pattern as shown on the standard drawings requires approval by the City Engineer.
(c) Under no circumstances shall the concrete be overworked by trowelling, dusted with dry cement, or finished with a mortar coat.
(d) Finish driveway and lane crossings and sidewalk ramps as shown on the standard drawings.
(e) The finish grade surface of concrete sidewalks and stairways shall be 0 - 6mm above the finish elevations of structures, including but not limited to, manholes, valves, service boxes and survey monuments.
(f) Finished surfaces shall be within 6mm of the design grade and cross-section, but not uniformly high or low when measured with a 3m straightedge placed anywhere on the surface.

## 8.52 CURING CONCRETE

.1 As soon as the concrete has obtained its initial set, it shall be sprayed with 2 coats of membrane curing compound as specified in Section 8.22 – Curing Compound. Other methods of curing require approval by the Engineer prior to placing concrete.

## 8.53 PROTECTING CONCRETE

.1 Tarpaulins shall be used to protect freshly finished concrete from dust, rain or frost. Protective coverings used for heating purposes shall be kept clear of the concrete to permit unimpeded circulation of air.

.2 Suitable traffic barriers shall be erected to protect concrete from equipment, vehicles and pedestrian traffic.

.3 Supervision, as required, shall be provided to prevent damage by vandalism until the concrete has set.

.4 No construction equipment shall be worked adjacent to the curb until the concrete has attained adequate strength. This shall be for at least 7 days or as directed by the Engineer.

8.54 DAMAGED CONCRETE

.1 Where concrete shows evidence of damage or freezing, as determined by the Engineer, the entire section lying between consecutive contraction joints shall be removed and replaced at the Contractor's expense.

8.55 ASPHALT WALKWAYS

.1 Asphalt walkways shall be installed in accordance with Section 12 - Asphaltic Concrete Paving.

.2 The base shall be approved prior to placement of asphalt.

.3 Any segregated coarse aggregate shall be removed from the surface. Walkway shall be finish rolled with a steel wheel roller. Completed walkway shall have a tight, fine finished surface, free from depressions.

.4 The surface of the finished walkway shall be within 10mm of the design grade and cross section when measured with a 3.0m straightedge placed anywhere on the surface.

.5 Compaction requirements shall be a minimum of 95% of the design compacted density.

8.56 CONCRETE WALKWAYS

.1 Concrete walkways shall be installed in accordance with the requirements for concrete sidewalks.

8.57 BOULEVARDS

.1 Boulevards within the statutory rights-of-way shall be graded towards the walkway and be finished with a 100mm thick layer of topsoil including grass seeding or sod as directed by the Engineer and in accordance with the standard drawings.

8.58 CATCH BASINS AND MANHOLES

.1 Catch basin and manhole frames shall be adjusted horizontally and vertically as necessary to match the finished alignment and grade prior to or at the time of concrete placement.

8.59 -NOT USED-

8.60 BACKFILL AND CLEANUP

.1 The gravel road base adjacent to the curb shall be filled tight to the curb, graded, compacted and left in a neat condition.

.2 The boulevard area adjacent to the curb or sidewalk shall be cleared of construction debris and raked clear of all rock exceeding 50mm in its largest dimension.

.3 The boulevard area shall be backfilled to within 50mm of the top of the curb for a minimum width as shown on the drawings, such that the water does not undermine the curb installation. Backfill shall be compacted to 90% of Modified Proctor Density (ASTM D1557). It is not the

intention that boulevard areas be completely filled but that they be left in a neat order and in at least as good condition as existed prior to commencement of construction.

.4 Complete boulevard grading in accordance with Section 9.60 - Boulevard Grading.

8.61 CONCRETE TESTING

.1 The Engineer will arrange for a testing firm to carry out tests to determine whether the applicable standards and specifications have been met. Where initial testing indicates inadequacies, additional testing may be required.

.2 The Contractor as directed by the Engineer shall supply specimens or samples for testing.

.3 The types of tests listed below are the minimum testing requirements. The Engineer shall determine if additional testing is required.

(a) One strength test (three - specimen cylinders as per the requirements of CSA A23.1) shall be made for each 150lm of work constructed. In no case, however, shall there be less than one test for concrete placed in one day. One cylinder shall be tested at 7 days, 2 at 28 days.
(b) One core test (for thickness) shall be made for each 80lm constructed. Cores are to be taken on a random basis as directed by the Engineer.
(c) Other testing as required by Sections 11.25 – Forms and Section 11.26 – Premoulded Joint Filler.

8.62 WALKWAY BARRIERS

.1 Walkway barriers shall be constructed in accordance with the standard drawings.

8.63 ASPHALT CURB

.1 The asphalt surface on which the curb is to be placed shall be cleaned of all dirt, loose and broken materials.

.2 The asphalt surface shall be prepared by applying an undiluted tack coat at the rate of 0.5kg/$m^2$. The tack coat shall form a continuous film over the surface and shall be allowed to dry prior to curb placement.

.3 The asphalt curb shall be placed to the line, grades and dimensions as shown on the construction drawings. Acceptable conditions for placement shall be in accordance with Section 12 - Asphaltic Concrete Paving.

.4 Areas inaccessible to the asphalt curb machine shall be compacted by hand tampers.