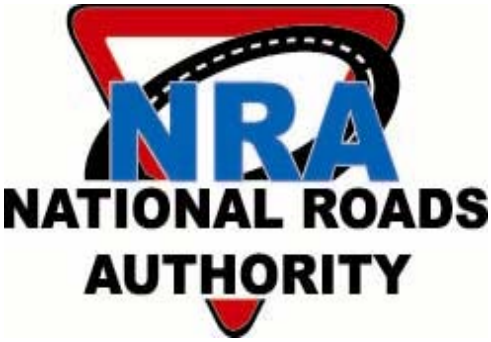

DESIGN AND CONSTRUCTION SPECIFICATIONS FOR SUBDIVISION ROADS & PROPERTY DEVELOPMENT

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DESIGN AND CONSTRUCTION SPECIFICATIONS FOR SUBDIVISION ROADS & PROPERTY DEVELOPMENT

1.0 PURPOSE 1.0

The purpose of these specifications is to promote the safety, convenience, and general welfare of the community by providing for the proper construction of all surfaced areas, adequate space for utilities, access for emergency response units, as well as sanitation and other service vehicles.

2.0 DEFINITIONS 2.0

Subdivision roads are the portions of land incorporated within a land development scheme for the purpose of moving local traffic and pedestrians.

2.1 ROAD CORRIDOR

The area of land reserved, within a subdivision, for the construction of roadways, verges, sidewalks, utility easements, sanitary and storm drainage systems and all plant required by authorities having jurisdiction.

2.2 **COLLECTOR ROADS** are roads that:-

a) provide direct access to residences and other private property;

b) permit convenient circulation of traffic within residential neighbourhoods, commercial and industrial areas; and,

c) provide access to the arterial system of roads.

2.3 **ACCESS ROADS** are roads supplementary to collector roads providing:-

a) access to residences and other property; and,

b) links to other roads and surfaced areas in the system.

2.4 CARRIAGEWAY

The surfaced portion of the corridor dedicated for the safe movement and passage of vehicles and pedestrians.

DEFINITIONS (Continued) 2.0

2.5 IMPERVIOUS AREAS

These areas are considered to be exempt from permanent plant and building improvements and include surfaced parking and recreation areas, internal driveways, carriageways, sidewalks and any other area designated as such.

3.0 PRE-CONSTRUCTION REQUIREMENTS 3.0

3.1 PLAN APPROVAL

The developer shall submit to the Planning Department, for National Roads Authority's (NRA) approval, detailed construction plans and specifications to be reviewed. These shall include the following:-

a) **LEGEND:**

The title; legal description; acreage; current and/or proposed zoning and land use designation; proposed number of lots; minimum lot size; and the name and address of the developer.

b) **VICINITY MAP:**

A map showing the relationship of the proposed subdivision and surrounding area, showing existing roads, blocks and parcel numbers and major topographic features. The subdivision layout shall be shown with the proposed drainage scheme and utility easements. This will normally be drawn to a scale of 1:2500.

3.2 CONSTRUCTION PLAN REQUIREMENTS

After Central Planning Authority (CPA) approval of the preliminary layout, road construction plans must be submitted to NRA prior to construction or within one year. These plans will show the location and width of all proposed roads and include sufficient geometric information as is necessary for the setting out of such roads; including line and grade, typical cross section, drainage details and other related construction details. An appropriate scale shall be chosen so as not to decrease the clarity of the information.

4.0 GEOMETRIC STANDARDS 4.0

4.1 GENERAL

The following standards represent the minimum geometrical design specifications for all subdivision roads.

4.2.1 **CURVES FOR COLLECTOR ROADS**

The minimum centreline radius shall be 190 feet with a maximum super elevation rate of 0.04 feet per foot for roads restricted to speeds of 25 mph. The minimum centreline radius for roads with 30 mph speed limits shall be 302 feet with a maximum super elevation rate of 0.04 feet per foot (4.0 percent).

4.2.2 **CURVES FOR ACCESS ROADS**

The minimum centreline radius shall be forty-six feet (46').

4.3 **GRADE**

The maximum longitudinal gradient as measured along the centreline of any roads shall be 8 percent. The minimum longitudinal gradient along the centreline of any road shall be 0.5 percent.

4.4 **ELEVATION**

No part of the carriageway shall be less than one foot above the vidal bench mark or less than four feet above mean sea level, except where required to tie into existing roads.

4.5 **CUL-DE-SACS**

The turning circle at the end of a residential cul-de-sac shall have a minimum right of way diameter of 100'. A cul-de-sac shall not extend more than eight-hundred feet (800') from the centreline of the major road to the centre of the turning circle. Commercial and industrial cul-de-sacs must have paved radii of fifty-six feet (56') and no centre island.

4.6 **JUNCTIONS**

4.6.1 **ANGLE OF INTERSECTION:**

Proposed roads shall intersect one another or shall intersect existing roads at an angle not less than 70 degrees and preferably 90 degrees.

4.6.2 **RADII:**

Junctions shall be designed with minimum corner radii of 30 feet (30') to the edge of carriageways when used by commercial vehicles although in lightly used access roads or cul-de-sacs, a minimum of twenty feet (20') is acceptable. Curb radii less than this will be considered for wider carriageways.

4.6.3 **SIGHT DISTANCE:**

The minimum intersection sight distances as measured from a point 15 feet back along the centreline of the minor road and three and one half feet (3 1/2') above the road surface shall be one-hundred and fifty feet (150') and, two-hundred and thirty feet (230') for major road speed limits of 25 MPH and 30 MPH respectively, as measured along the near edge of the running carriageway. Vertical stopping sight visibility shall be a minimum of 200', with an observer height of 3.5' and an object height of 6", for design speeds of 25mph and 30mph.

The minimum stopping sight distance, for horizontal alignment, along residential access roads shall be seventy-five feet (75') as measured between two (2) points on the centre of any lane and 3.5 feet above the carriageway.

4.6.4 **DESIGN:**

More comprehensive junction designs may be required where high traffic volumes and/or speeds greater than 30 MPH are involved.

4.6.5 **PROPOSED ALIGNMENT:**

Junctions with major roads shall not align with existing access roads and must be offset by a minimum of three hundred feet (300') where ever possible.

4.6.6 **ACCESS ROAD JUNCTIONS:**

a) Access road junctions within the subdivision shall be offset by a minimum of two hundred feet (200') and;

b) intersections shall not be diametrically opposed.

4.7 **CROWN**

The roadway section shall have a crown slope of minus 2 percent from the centre to the shoulder, except at super-elevated sections.

5.0 ACCESS REQUIREMENTS 5.0

All subdivisions must have access to an existing public road. "Rights of Way" and "access easements" will not be approved as public access to subdivisions.

5.1 All subdivisions are required to provide road connections to adjacent property for access or for future extensions.

6.0 ACCESS PROHIBITIONS 6.0

Road and parcel access may be denied to roads of higher classification such as secondary and primary arterials.

7.0 DRIVEWAY LOCATION 7.0

7.1 COLLECTOR ROADS:

Driveways may be no closer to the corner of intersecting rights of way than 60% of parcel frontage or one-hundred feet (100'); whichever is less. Driveways may be no closer to each other than fifty feet (50') and, shall not align with driveways on the opposite side. A separation of one-hundred and twenty feet (120') is desireable.

7.2 ACCESS ROADS:

Single family, residential driveways may be no closer to each other than twenty feet (20') and, must be a minimum of thirty feet (30') from intersections. Commercial driveways on these roads must be no closer to each other than thirty feet (30') and, located at least seventy-five feet (75') from intersections.

7.3 COMMERCIAL DRIVEWAYS:

Two (2) exit lanes and one (1) entrance lane shall be provided. Driveway separation islands shall **not** impede pedestrian traffic.

7.4 ALIGNMENT:

The alignment of all driveways shall be in accordance with (4.6.6.b) above.

8.0 DRAINAGE 8.0

Drainage systems for new developments shall be self contained within the development. No runoff or debris shall be allowed to enter upon the approved road corridor.

DRAINAGE (Continued) 8.0

8.1 The drainage system shall be designed to include storm water runoff produced from a rainfall intensity of 2 inches per hour for a duration of one hour. All drainage inlets shall be outside the paved carriageways.

Impervious areas within subdivision are included in this requirement.

9.0 CURBS, GUTTER & SIDEWALKS 9.0

Curbs, gutters and sidewalks may be required to facilitate drainage, roadway definition and/or pedestrian safety.

9.1 CURBS

Curbs for sidewalks and traffic islands shall be in accordance with drawing # 1-SDS-9.

9.2 GUTTERS

Gutters may be cast in place or pre-cast sections of standard curb may be used horizontally to grade as defined on drawing # s 4-SDS-9 and 7-SDS-9.

9.3 SIDEWALKS

Sidewalks shall be at least 6' wide with a + 2% slope from the back of the curb to the outer edge. Concrete sidewalks shall be 4" thick except at driveway let-downs, both commercial and private, where the thickness shall be 6" in accordance with drawing # 2-SDS-9. Joints shall be constructed in accordance with drawing # 5-SDS-9 at intervals as shown on drawing # 7-SDS-9.

9.4 SIDEWALK BASE

The base course for sidewalk construction shall meet the requirement of section 10.3 below. Rejected materials or fragments of porous material incorporated in the base work will not be acceptable.

9.5 MESH

Where ordered by the SO upon inspection of the sidewalk base, 6" x 6" mesh embedded 3" in the concrete shall be utilised in accordance with drawing # 6-SDS-9.

9.6 TRAFFIC ISLANDS

Where required, traffic islands shall be located in accordance with the approved plans. Pre-cast curb shall be as designated in drawing # 1-SDS-9. All back-fill material shall be placed on the granular road base. All islands shall be capped and crowned with an approved treatment. All ramps shall be constructed in accordance with drawing # 3-SDS-9.

10.0 CONSTRUCTION REQUIREMENTS 10.0

10.1 SUB-GRADE

All topsoil, clay lumps and, vegetable matter shall be excavated and, the subgrade shall be left clear. If the subgrade consists of peat or other low load-bearing material, this must be shown to be uniform, non-degradable and have a minimum California Bearing Ratio (CBR) of 2% after submersion in water for 4 days in accordance with ASTM D1883 standard method of test. The subgrade shall be compacted before placing sub-base.

10.2 SUB-BASE

The sub-base course shall be constructed from marl, crushed rock or other naturally occurring material having a minimum CBR of 25 percent. The sub-base material shall be compacted in layers not exceeding six inches (6") to a minimum of 90 percent of its maximum density as determined by ASTM D1557. Stabilized material, rock or gravel containing more than 10% retained on a 3/4" sieve will be assumed to fulfil the CBR requirements without test.

10.3 BASE

The base shall be marl, crusher-run or a cement or bitumen bound material. Where the required thickness is 6” or less the base may be spread and compacted in one layer. Where the required thickness is greater than 6” the material shall be spread and compacted in two or more layers of approximately equal thickness, the compacted thickness of any one layer shall not exceed 6”. Immediately following spreading the material shall be compacted to a minimum of 98% of the laboratory density in accordance with (ASTM D1557). Each layer shall, upon completion, be tested in accordance with (ASTM D2922) “Density of soil in place by nuclear method." The contractor shall permit NRA laboratory staff to conduct tests on site as and when required.

10.4 All subgrade, sub base, and base work must be tested in accordance with ASTM

standards. Two tests should be performed across a 30' wide road on the right and left at a frequency of every 100'. Stagger the left and right test locations so that they are approximately 50 feet apart. A copy of the test results must be submitted to the National Roads Authority (NRA) for review and approval before any further works continues. Failure to comply with said requirements shall result in the work being rejected.

10.5 PRIME COAT

The base shall be primed over its entire surface at a rate of 0.3 gallons per square yard using AE-200 asphalt emulsion. Alternatives to this procedure may be presented for approval prior to construction.

10.6 WEARING COURSE

Asphaltic concrete pavement (ACP) is required for all subdivision roads, parking areas and as specified or as directed by the CPA.

10.6.1 SHOULDERS

All roads with ACP carriageways shall be provided with shoulders constructed similarly to the carriageway details except that the surface may be bituminous surface treatment.

10.7 HOT MIX ASPHALT (ASPHALTIC CONCRETE PAVEMENT)

Shall be in accordance with National Roads Authority (NRA) medium mix specification (Section 330-8.3) unless otherwise specified. This shall have a minimum compacted thickness of 1.5 inches for sub-division roads and parking lots. A minimum compacted thickness of 2 inches is required for all major roads, commercial and industrial areas and shall achieve a minimum compacted density of 98% of the laboratory density based on ASTM D1559. This requirement is based on the average of at least five tests.

The following values, based on ASTM D 1559, are required for mix designs that are necessary for review by the National Roads Authority.

SPECIFICATIONS:-

STABILITY = Minimum 2000 LBS

FLOW	= 8 - 16, units of 0.25 mm (0.1 inch)
AIR VOIDS	= 3 - 5% in compacted mixture
V.M.A	= Minimum 12%

10.8 **BITUMINOUS SURFACE TREATMENT**

Where required by the CPA all surface treatment shall be in accordance with NRA Specification Section 310.

10.8.1 The first layer must be cured and free from loose chips before the second layer is applied. The final layer shall be free from loose chips and swept when cured.

10.9 **SAMPLING AND TESTING**

10.9.1 GRANULAR AGGREGATE

The Developer/Contractor shall submit to NRA samples of any granular aggregate proposed for use on the project, and not less than three working days before commencing work on site.

10.9.2 HOT MIX ASPHALT

The contractor will submit to NRA samples of the aggregate that is proposed for use in the manufacture of hot mix no less than three working days before commencing work. The contractor will also permit NRA laboratory staff to collect HMA samples from either the plant, haul trucks or paving machine as and when required.

10.10 **CONCRETE FOR MINOR WORKS**

This work shall be carried out in accordance with the best modern practice of cement concrete manufacture and all concrete for minor works shall be vibrated in place and shall have a minimum compressive strength of 3500 P.S.I. after 28 days.

10:11 UTILITY WORKS

All underground activities involving the disturbance of any material on the road corridor shall be deemed to be utility works and such works shall conform to NRA Specification Section 608, attached.

11.0 NOTICE 11.0

Notice of intention to commence work must be received by the National Roads Authority two (2) clear working days (weekends excepted) before commencement.

NOTICE (Continued) 11.0

11.1 INSPECTIONS

It is the responsibility of the developer to liaise with the National Roads Authority for inspection of the subgrade, sub-base, base, trench backfill and wearing courses. Failure to arrange for an inspection may lead to the rejection of the work.

12.0 TRAFFIC SIGNING & STRIPING 12.0

Traffic signs and striping shall be installed in accordance with the Official Road Code of the Cayman Islands. The developer shall be responsible for supplying and installing all traffic signs and, striping on all roads within the subdivision from their point of origin at a principal road.

12.1 PLACEMENT

Sign posts should be placed 1 1/2 feet minimum from the edge of carriageway to the edge of the sign.

12.2 HEIGHT

Signs shall be a minimum of 4 1/2 feet above the highest point of the adjacent carriageway. Where signs are erected across and, above the sidewalk, the lower edge must be a minimum of 6’ - 10” above the sidewalk.

12.3 STREET NAMES

a) All proposed roads shall be named in accordance with the Roads (Naming and Numbering) Law 1997.

b) The Developer shall erect street name signs for each road at each junction.

c) Each sign shall display a street name plus an abbreviated suffix.

d) Each sign shall have the same type and size of lettering on both sides.

e) The posts shall be iron channel section, 3 lbs per ft. painted green.

f) The bracket to fix the sign to the post shall be made from aluminium, stainless steel, or lexam plastic. All fastenings shall be stainless steel.

g) Sign Blanks shall be 6 inches high, “dog bone," extruded aluminium, length to suit individual signs, but a minimum of 18 inches long.

h) Letters shall be reflective white, on reflective green background. The reflective surface shall be 3M Scotchlite Engineering Grade or equivalent.

TRAFFIC SIGNING & STRIPING (Continued) 12.0

i) The street name lettering shall be 4 ins high U.S. Federal Highway Authority (USFHA) Standard Upper Case Letter Series B. The Suffix lettering shall be 3 ins high Upper Case USFHA Series C.

j) The bottom of the sign shall be a minimum of 6 feet 10 inches above the ground or side walk surface.

13.0 REVISIONS, SUPPLEMENTS AND ADDENDA 13.0

The foregone are the current requirements and are subject to revisions, supplement and addenda which will form an integral part of this specification.