

METRIC ROAD DESIGN MANUAL
REVISIONS JULY 2009

APPENDIX “A” METRIC

- Page A-1M & A-2M – Added the following;
FLEXIBILITY IN DESIGN

The policies and procedures addressed in IIM-LD-235 (Context Sensitive Solutions) are intended to clarify and emphasize VDOT’s commitment to project and program development processes that provide flexibility, innovative design and Context Sensitive Solutions (CSS) to transportation challenges.

These processes have been structured and oriented to include stakeholders and citizens in the design of transportation systems that improve public mobility, while reflecting the community’s values, preserving the scenic, aesthetic, historic and environmental resources, and without compromising safety and mobility.

This policy emphasizes the importance of recognizing the flexibility within established standards, especially AASHTO’s Policy on Geometric Design of Highways and Streets (Green Book), AASHTO’s A Guide for Achieving Flexibility in Highway Design and AASHTO’s Guidelines for Geometric Design of Low-Volume Local Roads (ADT ≤ 400). While practicable and innovative approaches to using the flexibility inherent in existing standards is encouraged by this policy, individual project development decisions on specific applications of flexibility ultimately rest with the responsible person working with the project manager and the project team. These decisions are made after carefully processing input from all project stakeholders as well as the project team, and evaluating this input with respect to project goals as well as safety and mobility concerns.

- Page A-4M thru A-5M – Moved the following information out of the RRR section and placed it under SECTION A-1-GEOMETRIC DESIGN STANDARDS; FUNCTIONAL CLASSIFICATION

The highway system in Virginia has been functionally classified as Principal Arterial, Minor Arterial, Collector and Local Service. The American Association of State Highway and Transportation Officials (AASHTO) utilizes, as presented in the publication: A Policy on Geometric Design of Highways and Streets, referred to as The AASHTO Book, a similar functional classification system. The designations used are: Freeway, Arterial, Collector, and Local Roads and Streets. Relationships between these two classification systems have been generally developed.

Principal and Minor Arterial Highways provide direct service between cities and larger towns and are high speed, high volume facilities. Collector highways serve small towns directly, connecting them and local roads to the arterial system.

BACKGROUND

- *All roadways are classified as to how the facility functions in accordance with Federal guidelines.*
- *The Geometric Design Standards in Appendix A of VDOT's Road Design Manual are divided by Functional Classification (FC).*
- *The terms "Urban" and "Rural" used in the FC do not necessarily coincide with the terms as applied to highway systems in Virginia.*

Urban - Urbanized areas within set boundaries having a population of 5,000 or more. This may include areas outside of incorporated cities and towns.

Rural - Areas not designated as Urban. Includes incorporated cities and towns with populations less than 5,000.

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Urban - Roadways within the boundaries of incorporated towns and cities with a population of 3,500 or more plus eight other designated urbanized areas (Bridgewater, Chase City, Elkton, Grottoes, Narrows, Pearisburg, Saltville and Woodstock). The urban program is administered by the Local Assistance Division.

Primary - Primary Roadways

Secondary – All secondary roadways except those in Arlington and Henrico Counties. Projects are administered by the Local Assistance Division.

- *A project classified as Urban in FC may be part of the Interstate, Arterial, Primary, or Secondary System and will be administered as such. This applies also to projects classified as Rural.*

- *The Functional Classification block on the title sheet is to show the Geometric Design Standard used.*

If more than one standard is used in the design, it will be necessary to set up two Functional Classification blocks since in most cases there would be a change in traffic volumes and scope of work.

EXAMPLE

- *When the Functional Classification for a project would normally warrant either Geometric Design Standard GS-1, GS-2, GS-3, or GS-4 and Geometric Design Standard GS-5, GS-6, GS-7 or GS-8, respectively, is used then it will be necessary to show the standard used in the design on the title sheet under the Functional Classification.*
- *If the normal Geometric standard would be GS-3 and Geometric Standard GS-7 is used, the title sheet is to show:*

RURAL COLLECTOR-ROLLING-DIVIDED (Urban St'd. GS-7 was used)

- Page A-7M (GS-1M) – Replaced language in “FOOTNOTE” number 5 from “4.2m Shoulders may be reduced to 3.0m minimum when truck traffic is less than 250 DDHV.” to 4.2m Shoulders on bridges may be reduced to 3.0m minimum when truck traffic is less than 250 DDHV.”
- Page A-9M (GS-3M) – Revised “Width of Ditch” from 2.0m to 1.8m for “Rolling Terrain” in ADT Over 2000 column in GS-3M Table.

Added the following “FOOTNOTE”; “(10) Shoulder width may be reduced to 1.2m (2.1m with guardrail) where appropriate as long as a minimum roadway width of 9.1m is maintained. See AASHTO Green Book, Exhibit 6-5.”

- Page A-11M (GS-5M) – Revised “Shoulder Width” from 4.5m to 5.2m in fills with guardrail in GS-5M Table for “Freeways”.

Revised “Pavement Width” from 3.6m to 3.3m for a 70km/h design speed in GS-5 Table “Other Principal Arterial with Curb & Gutter”.

Revised language in “FOOTNOTE” number 1 from “On Freeways, if truck traffic exceeds 250 DDHV, the minimum width of graded shoulder should be 5.2m’ for fills and 4.2m for cuts.” to On Freeways, if truck traffic is less than 250 DDHV, the minimum width of graded shoulder shall be 4.6m for fills and 3.6m for cuts in the last sentence.

Revised language in “FOOTNOTE” number 2 from “*On Freeways, if truck traffic exceeds 250 DDHV, the right paved shoulder width should be 3.6m.*” to “*On Freeways, if truck traffic is less than 250 DDHV, the minimum right paved shoulder width shall be 3.0m.*” And deleted “*and on 6 or more lane Freeways, the left paved shoulder width should also be 3.6m if truck traffic exceeds 250 DDHV.*” in the last sentence.

Revised the last sentence in “FOOTNOTE” number 7 from “*4.2m Shoulders may be reduced to 3.0m minimum when truck traffic is less than 250 DDHV.*” to “*4.2m Shoulders on bridge may be reduced to 3.0m minimum when truck traffic is less than 250 DDHV.*”

Revised the last sentence in “FOOTNOTE” number 11 from “*If a buffer strip is used between the back of curb and sidewalk, it should be 0.6m minimum.*” to “*For buffer strip widths see IIM-LD-55.*”

- Page A-12M (GS-6M) – Revised “Pavement Width” from 3.0m to 3.3m for a 70 km/h design speed in GS-6 Table under “Streets with Curb & Gutter”.

Revised “Standard Curb and Gutter” column from requiring CG-6 to CG-7 for a 70 km/h design speed in GS-6 Table under “Streets with Curb & Gutter”.

Replaced the last sentence in “FOOTNOTE” number 10 from “*If a buffer strip is used between the back of curb and sidewalk, it should be 0.6m minimum.*” to “*For buffer strip widths see IIM-LD-55.*”

- Page A-13M (GS-7M) – Revised “Pavement Width” from 3.6m to 3.3m for a 70 km/h design speed in GS-7 Table under “Streets with Curb & Gutter”.

Replaced the last sentence in “FOOTNOTE” number 10 from “*If a buffer strip is used between the back of curb and sidewalk, it should be 0.6m minimum.*” to “*For buffer strip widths see IIM-LD-55.*”

- Page A-14M (GS-8M) – Replaced the last sentence in “FOOTNOTE” number 10 from “*If a buffer strip is used between the back of curb and sidewalk, it should be 0.6m minimum.*” to “*For buffer strip widths see IIM-LD-55.*”

- Page A-35M – Revised “TABLE A-3-2M – TYPICAL BARRIER/GUARDRAIL SELECTION AND PLACEMENT” and pertaining notes.

- Page A-36M – Inserted “design” before “speed” in the first two sentences under “GUARDRAIL INSTALLATION IN URBAN SETTINGS”.

- Page A-40M – Replaced the following language under “ENTRANCE OR CONNECTIONS ADJACENT TO A BRIDGE”; “*it is necessary*” with “*it may be necessary.*”
- Page A-50M – Deleted the following in the first paragraph; *In the planning and design of any Secondary System improvements in rural areas, Virginia's RRR Guidelines shall be utilized to the extent possible. On secondary projects that have a 15 year traffic projection of 750 vehicles per day or less, the RRR guidelines shall be the design concept of choice.*

APPENDIX “C” METRIC

- Page C-2 – Added the following language to “CROSSOVER SPACING”; “*Residency or Regional/District Traffic Section are to be coordinated through the District L&D Engineer and submitted by that office on Form LD-440 to the Assistant State Location & Design Engineer.*”
- Page C-19M – Replaced the “Passing/Left Turn Lane on Two-Lane Highway” detail.
- Page C-20M – Replaced the following language in the last sentence in the second paragraph; “*The minimum desirable width shall be 3.6m (4.8m maximum).*” with “*The minimum width for this application shall be 3.9m (3.3m lane + 0.6m = 3.9m).*”
- Page C-24M – Moved the following language from the fifth paragraph to the second paragraph; “*Roundabout designs shall be based on Federal Highway Administration Publication Number FHWA-RD-00-067, Roundabouts: An Informational Guide at <http://www.tfsrc.gov/safety/00068/htm> and <http://www.tfsrc.gov/safety/00068.pdf>. Additional information can also be found in VDOT’s Roundabout Brochure at <http://www.virginiadot.org/programs/faq-roundabouts.asp>. See Figure C-1-2.2 for Roundabout Details. When roundabout design is proposed, the Residency Administrator should consult the District Location & Design Engineer.*”
- Page C-25M – Added the following language in both the first and second paragraph under “THE APPROVAL PROCESS FOR ROUNDABOUTS; “*...appropriate Assistant State Location and Design Engineer for the review by the Central Office Roundabout Review Committee. Plans should be submitted at the PFI stage of project development. If during project development, significant horizontal and vertical alignment changes are made then the design shall be resubmitted for review by the Central Office Roundabout Review Committee.*”

- Page C-27M – Revised the language in the first paragraph as follows;

“At-grade intersections must provide adequately for anticipated turning and crossing movements. Figures C-1-4 and C-1-5 provide the designer with the basic types of intersection designs and recommendations pertinent to dimensions, radii, skews, angles, and the types of island separations, etc., to be considered. For additional information see AASHTO's A Policy on Geometric Design of Highways and Streets, Chapter 9 (Intersections). This chapter provides additional information to be considered in the design since the site conditions, alignment, grades, sight distance and the need for turning lanes and other factors enter into the type of intersection design.” to

“At-grade intersections must provide adequately for anticipated turning and crossing movements.

For shoulder applications, Figures C-1-4 and C-1-5 provides the designer with the basic types of intersection designs and recommendations pertinent to dimensions, radii, skews, angles, and the types of island separations, etc., to be considered.

For curb and gutter applications see AASHTO's A Policy on Geometric Design of Highways and Streets, Chapter 9 (Intersections). This chapter provides additional information to be considered in the design since the site conditions, alignment, grades, sight distance and the need for turning lanes and other factors enter into the type of intersection design.”

- Page C-29M – Revised name of detail FIGURE C-1-4M from “*INTERSECTION DESIGN*” to “*INTERSECTION DESIGN FOR RURAL APPICATIONS WITH STANDARD S-1 SIGN ISLAND DESIGN*”.
- Page C-30M – Revised name of detail FIGURE C-1-5M from “*INTERSECTION DESIGN*” to “*INTERSECTION DESIGN FOR RURAL APPICATIONS WITH STANDARD S-2 OR S-3 SIGN ISLAND DESIGN*”.
- Page C-40M – Added the following language; “*For instructions on measuring Intersection Sight Distances, see Chapter 9, AASHTO's A Policy on Geometric Design of Highways and Streets.*”
- Page C-49M – Added the following label; “*Perpendicular or Angled Parking Spaces*”.

- Page C-50M – Added the following language at the end of the first sentence in the second paragraph; “(overhang distance 2 feet)”.

Added the following language;
Parallel Parking Spaces

An access aisle at least 60 inches (1525 mm) wide shall be provided at street level the full length of the parking space. The access aisle shall connect to a pedestrian access route serving the space. The access aisle shall not encroach on the vehicular travel lane.

EXCEPTION: An access aisle is not required where the width of the sidewalk between the extension of the normal curb and boundary of the public right-of-way is less than 14 feet (4270 mm). When an access aisle is not provided, the parking space shall be located at the end of the block face.