

Land use	Definition	Land use	Definition
Retirement community	Residential units similar to apartments and condominiums usually restricted to adults or senior citizens, and located in self-contained villages. Special services such as medical, dining, and retail facilities may be available.	Recreational home	Dwellings usually located in a resort containing local services and complete recreational facilities. These are often second homes used by the owner or rented on a seasonal basis.

TABLE 4.2
RESIDENTIAL STREET HIERARCHY DEFINITIONS

Street type	Description	Average daily traffic (maximum)
Residential Access [†]	Lowest order, other than rural street type, of residential streets Provides frontage for access to lots and carries traffic with destination or origin on the street itself. Designed to carry the least amount of traffic at the lowest speed. All, or the maximum number of housing units, shall front on this class of street. † Residential access streets of “loop” configuration, that is, two ways out, should be designed so no section conveys an ADT greater than 1500. Each half of a loop street may be classified as a single residential access street, but the total traffic volume generated on the loop street should not exceed 1500 ADT, nor should it exceed 750 ADT at any point of traffic concentration.	1,500 [†]
Residential Neighborhood [‡]	A type of residential access street conforming to traditional subdivision street design, and providing access to building lots fronting on a street and parking on both sides of street. [‡] Applicant may choose either the RESIDENTIAL ACCESS or the RESIDENTIAL NEIGHBORHOOD street type for new streets. See section 4.8(b) for specific right-of-way and cartway width requirements for new streets that are a continuation of an existing street.	
Minor Collector	Middle order of residential street. Provides frontage for access to lots and carries traffic of adjoining residential access streets. Designed to carry somewhat higher traffic volumes than lower-order streets such as rural and residential access streets, with traffic limited to motorists having origin or destination within the immediate neighborhood. Is not intended to carry regional traffic. Each half of a loop-configured minor collector may be classified as a single minor collector street, but the total traffic volume conveyed on the loop should not exceed 3,500 ADT, nor should it exceed 1750 ADT at any point of traffic concentration.	3,500
Major Collector	Highest order of residential streets. Conducts and distributes traffic between lower-order residential streets and higher-order streets—arterials and expressways. Carries the largest volume of traffic at higher speeds. Function is to promote free traffic flow; therefore, parking should be prohibited and direct access to homes from this level of street should be avoided. Collectors should be designed so they cannot be used as shortcuts by non-neighborhood traffic.	7,500
Special Purpose Streets		
Rural street	A rural street is a street that serves dwellings on lots that are one acre or greater, AND primarily serves as access to abutting building lots, AND has no on-street parking, AND has lot-to-street access designed so vehicles do not back out of lots onto the street. Rural streets shall only connect to rural streets, rural lanes, or mixed-use collectors. However, a rural street shall not connect two mixed-use collectors.	500
Rural lane	A rural lane is a street that serves dwellings on lots that are two acres or greater, AND primarily serves as access to abutting building lots, AND has no on-street parking, AND has lot-to-street access designed so vehicles do not have to back out of lots onto the street. Rural lanes shall only connect to rural streets, rural lanes, or mixed-use collectors. However, a rural lane shall not connect two mixed-use collectors.	200

<u>Street type</u>	<u>Description</u>	<u>Average daily traffic (maximum)</u>
Alley	A service road that provides a secondary means of access to lots. On same level as residential access street, but different standards apply. No parking shall be permitted; alleys should be designed to discourage through traffic. ADT level shall not exceed that of a residential access street.	500
Cul-de-sac ¹	A street with a single means of ingress and egress and having a turnaround, the design of which may vary. A divided-type entrance roadway to at least the first cross street, with median of sufficient width to ensure freedom of continued emergency access by lanes on one side, shall not be considered part of a cul-de-sac. Parking lots with a single means of ingress and egress shall not be included within the definition of cul-de-sac.	250
Marginal access street	A service street that runs parallel to a higher-order street and provides access to abutting properties and separation from through traffic. May be designed as residential access street or minor collector, according to anticipated daily traffic.	1,500 (residential access total) 3,500 (minor collector total)
Divided street	Municipalities may require streets to be divided to provide alternate emergency access, protect the environment, or avoid grade changes. Design standards should be applied to the combined dimensions of the two street segments, as required by the street class.	
Multifamily access cul-de-sac	A street with a single means of ingress and egress, which serves multifamily development, that provides a means for vehicles to turn around.	1,000
Multifamily court	A street with a single means of ingress and egress, which serves multifamily development, that does not provide a means for vehicles to turn around. The length of multifamily courts is limited to 300 feet.	Note ²

Notes:

¹ Streets serving multifamily developments with a single means of ingress and egress shall be classified as multifamily access cul-de-sacs.

² There is no ADT limit for multifamily courts specified because the length of the court will effectively limit the ADT to acceptable levels.

Administrative correction.

See: 29 N.J.R. 1296(a).
Amended by R.1999 d.374, effective November 1, 1999 (operative May 1, 2000).

See: 31 N.J.R. 477(a), 31 N.J.R. 3259(a).

In (c), added a second sentence; and in Table 4.2, added a third sentence in the Cul-de-sac Description, and substituted a reference to non-parallel parking for a reference to perpendicular parking in the Parking Loop Description.

Administrative correction.

See: 32 N.J.R. 684(b).
Amended by R.2000 d.480, effective December 4, 2000 (operative June 3, 2001).

See: 32 N.J.R. 2670(b), 32 N.J.R. 4277(a).

Rewrote Table 4.1 and in Table 4.2, rewrote the description of "Rural residential lane".

Amended by R.2002 d.399, effective December 16, 2002.

See: 34 N.J.R. 2615(a), 34 N.J.R. 4412(a).

In Table 4.1, inserted "Trip General" preceding "manual" in the second sentence of footnote 1, and added footnote 2; rewrote Table 4.2. Public Notice: Notice regarding the Publication of two Notices of Adoption in the December 16, 2002 New Jersey Register.

See: 34 N.J.R. 4343(a), 4412(a), 35 N.J.R. 219(b).

Amended by R.2005 d.56, effective February 7, 2005.

See: 36 N.J.R. 4025(a), 37 N.J.R. 481(c).

5:21-4.2 Cartway width

(a) Cartway width for each street classification shall be determined by parking and curbing requirements that are based on the intensity of development served by that street.

(b) Intensity of development shall be based on the number of dwelling units per gross acre of land served by a particular street, excluding the acreage of dedicated common open space or other areas restricted from future development, as follows:

<u>Intensity</u>	<u>Dwelling Units per Gross Acre</u>
Low	Less than or equal to 4
Medium	More than 4 and less than or equal to 8
High	More than 8

(c) Cartway widths for each street classification are as shown in Table 4.3 below.

(d) Cartway width also shall consider possible limitations imposed by sight distances, climate, terrain, and maintenance needs.

(e) Municipalities may require additional cartway width for major or minor collectors which are part of a designated bike route as indicated in the bicycle circulation part of the municipal master plan to make them consistent with the AASHTO guidelines for bicycle-compatible streets.

Administrative correction.
 See: 29 N.J.R. 1296(a).
 Amended by R.1999 d.374, effective November 1, 1999 (operative May 1, 2000).
 See: 31 N.J.R. 477(a), 31 N.J.R. 3259(a).
 Administrative correction.
 See: 32 N.J.R. 684(b).
 Amended by R.2000 d.480, effective December 4, 2000 (operative June 3, 2001).
 See: 32 N.J.R. 2670(b), 32 N.J.R. 4277(a).
 In Figure 4.1, amended (1 of 5), (2 of 5) and (3 of 5).
 Amended by R.2002 d.399, effective December 16, 2002.
 See: 34 N.J.R. 2615(a), 34 N.J.R. 4412(a).
 Added Figure 4.1 (4 of 6); the elements of Figure 4.1 redesignated from "of 5" to "of 6"; amended Figure 4.1 (3 of 6).
 Public Notice: Notice regarding the Publication of two Notices of Adoption in the December 16, 2002 New Jersey Register.
 See: 34 N.J.R. 4343(a), 4412(a), 35 N.J.R. 219(b).
 Amended by R.2004 d.35, effective January 20, 2004.
 See: 35 N.J.R. 3981(a), 36 N.J.R. 447(a).
 In (c), amended 3, 5 and 6 of 6 in Figure 4.1.

5:21-4.18 Sidewalks and bikeways construction standards

- (a) The following apply to sidewalks and graded areas:
1. Sidewalks of concrete shall be four inches thick except at points of vehicular crossing, where they shall be at least six inches thick. At vehicular crossings, concrete sidewalks shall be reinforced with welded wire fabric mesh or an equivalent.
 2. Concrete, air-entrained sidewalks shall be Class B concrete, having a 28-day verification strength of 4,500 p.s.i. Other materials may be permitted, depending on the design of the development.
 3. Graded areas shall be planted with grass or treated with other suitable ground cover, and their width and cross slope shall correspond to that of sidewalks.
- (b) The following apply to bikeways:
1. The construction of bikeways shall conform to the New Jersey Department of Transportation Planning and Design Guidelines for Bicycle Compatible Roadways and Bikeways (November 1995) and the AASHTO Guide for the Development of Bicycle Facilities (1999), incorporated herein by reference.
 2. Bicycle-safe drainage grates shall be used in the construction of all residential streets.

Administrative correction.
 See: 29 N.J.R. 1296(a).
 Amended by R.2000 d.480, effective December 4, 2000 (operative June 3, 2001).
 See: 32 N.J.R. 2670(b), 32 N.J.R. 4277(a).
 Rewrote (b)1.
 Amended by R.2002 d.399, effective December 16, 2002.
 See: 34 N.J.R. 2615(a), 34 N.J.R. 4412(a).

In (a)2, substituted "Class B concrete" for "Class C concrete" and substituted "4,500 p.s.i." for "4,000 p.s.i."
 Public Notice: Notice regarding the Publication of two Notices of Adoption in the December 16, 2002 New Jersey Register.
 See: 34 N.J.R. 4343(a), 4412(a), 35 N.J.R. 219(b).

5:21-4.19 Street grade, intersections, pavement, and lighting construction standards

- (a) The following apply to street grade:
1. Minimum street grade permitted for all streets shall be 0.5 percent.
 2. Maximum street grade shall vary by road hierarchy with flatter grades required for roads with higher ADTs, in accordance with the requirements shown in Table 4.6. Where terrain makes it necessary, the allowable maximum grade may be increased by up to two percent, but shall not exceed a maximum grade of 16 percent.
- (b) The following shall apply to intersections:
1. Street intersections shall be as nearly at right angles as possible and in no case shall be less than 75 degrees.
 2. New intersections along one side of an existing street shall, if possible, coincide with an existing intersection on the opposite of each street. Where provided, offsets shall be at least 150 feet between right-of-way centerlines.
 3. Intersections shall be rounded at the curbline with the street having the highest radius requirement, as shown in Table 4.6 below, determining the minimum standard for all curblines.
 4. Intersections shall be designed with a flat grade wherever practical.
 5. The minimum centerline radius, minimum tangent length between reverse curves, and curb radii shall be as shown in Table 4.6 below.
 6. Sight triangles shall be in accordance with AASHTO's "A Policy on Geometric Design of Highways and Streets" standards and based on the speed limits established by the government agency having jurisdiction. Sight triangle easements shall be required and shall include the area on each street corner that is bounded by the line which connects the sight or "connecting" points located on each of the right-of-way lines of the intersecting street. The planting of trees or other plantings, or the location of structures exceeding 30 inches in height that would obstruct the clear sight across the area of the easements, shall be prohibited, and a public right-of-entry shall be reserved for the purpose of removing any object, material or otherwise, that obstructs the clear sight.

TABLE 4.6
 STREET GRADE AND INTERSECTION DESIGN CRITERIA
 Street Hierarchy

	Special purpose street: alley	Special purpose street: cul-de-sac	Rural, residential access, and neighborhood	Minor collector	Major collector
Minimum Grade	0.5%	0.5%	0.5%	0.5%	0.5%

	Special purpose street: alley	Special purpose street: cul-de-sac	Rural, residential access, and neighborhood	Minor collector	Major collector
Maximum Grade	15%	12%	12%	10%	8%
Maximum Grade of Secondary Street within 50 feet of Intersection†	5%	5%	5%	5%	5%
Minimum Center-Line Radius	100 ft	100 ft	100 ft	150 ft	300 ft
Minimum Tangent Length between Reverse Curves	0 ft	50 ft	50 ft	100 ft	150 ft
Curb Radii	20 ft	25 ft	25 ft	30 ft	35 ft

Note: †As measured from the nearest right-of-way line.

(c) Pavement shall be designed using either Figures 4.2 through 4.5, the structural number method, or the alternate pavement design methods referenced in (c)3 below.

1. Pavement design using figures: Pavement design for special-purpose streets (cul-de-sac, rural, etc.), residential access, neighborhood, minor collector, and major collector shall follow the specifications shown in Figures 4.2 through 4.5 based on the street type. Subgrade categories are shown in Table 4.7 below.

2. Structural number method: As an alternative to using Figures 4.2 through 4.5, applicants may design pavement using the structural numbers found in Table 4.9 below.

i. The designated structural number must be achieved by choosing the appropriate layers of bituminous stabilized surface course (Mix I-4, Mix I-5), bituminous stabilized base course (Mix I-2, stone mix), bituminous stabilized base course (Mix I-2, gravel mix), dense graded aggregate base course, soil aggregate base course, and subbase. The structural values and minimum layer thicknesses for the various materials are listed in Table 4.8 below.

TABLE 4.8

PER-INCH STRUCTURAL VALUE FOR VARIOUS PAVING MATERIALS

Layer material	Structural value per-inch thickness	Minimum thickness
Bituminous stabilized concrete surface (Mix I-4, Mix I-5) ¹	0.44	2 inches
Bituminous stabilized base course (Mix I-2, stone mix) ²	0.44	3 inches
Bituminous stabilized base course (Mix I-2, gravel mix) ²	0.37	3 inches
Dense graded aggregate base course ²	0.14	4 inches
Soil aggregate base course ²	0.11	4 inches
Subbase	0.08	6 inches

Notes:
¹ Materials for asphalt concrete surface shall conform to Section 404.02 of the New Jersey Department of Transportation's Standard Specification for Road and Bridge Construction (1989).
² Materials for asphalt concrete base shall conform to Sections 301.02 and 304.02 of the New Jersey Department of Transportation's Standard Specification for Road and Bridge Construction (1989).

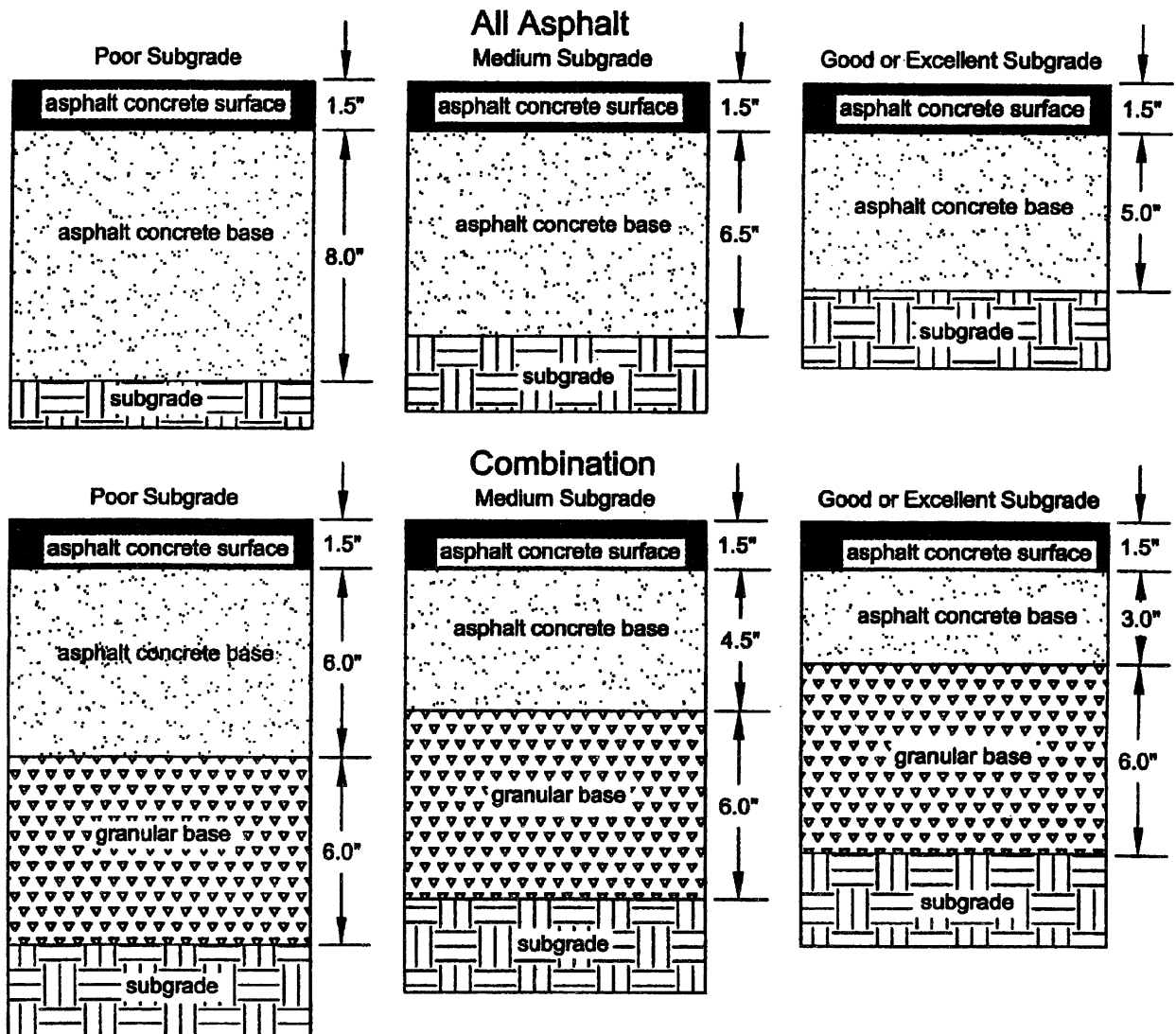
ii. Thicknesses shall be provided in 0.5 inch increments.

TABLE 4.9

STRUCTURAL NUMBER VALUES AS A FUNCTION OF ADT AND M_r¹

Maximum ADT ²	SN ₀ prior to two-inch asphalt concrete surface course		
	M _r = 3,000 psi Poor Subgrade	M _r = 5,000 psi Medium Subgrade	M _r = 7,500 psi Good/Excellent Subgrade
200	1.60	1.15	0.84
250	1.69	1.23	0.91
500	1.99	1.49	1.14
750	2.17	1.65	1.29
1,000	2.31	1.77	1.40

Figure 4.5
Pavement Sections for Major Collectors (ADT \leq 7,500) (EAL \leq 400,000)



Source: N.J.S.M.E., *Asphalt Handbook for County and Municipal Engineers*, 3rd Edition, March 2000. The figures were derived by applying the Asphalt Institute's *Thickness Design - Full Depth Asphalt Pavement Structures for Highways and Streets*.

NOTES:

1. Materials for the asphalt concrete surface shall conform to Section 404.02 of the New Jersey Department of Transportation's *Standard Specifications for Road and Bridge Construction* (1989).
2. Materials for the asphalt concrete base shall conform to Sections 301.02 and 304.02 of the N.J. Department of Transportation's *Standard Specification for Road and Bridge Construction* (1989).
3. Thicknesses may have to be constructed in multiple lifts, based on equipment capabilities.
4. The granular base shall be dense graded aggregate conforming to Section 901.08 or soil aggregate designated I-5 conforming to Section 901.09 and shown in Table 901-2 of the N.J. Department of Transportation's *Standard Specifications for Road and Bridge Construction* (1989).
5. All subgrades shall be considered "poor," unless the applicant proves otherwise through CBR testing or field evaluation of soil classification. Test results shall be reviewed by the municipal engineer.
6. Subgrade compaction shall be approved by the municipal engineer.
7. Drawings are based on the following design assumptions: A 20-year design period with staged construction is used. Base courses are designed to withstand the construction traffic anticipated during a 3-year construction period and have a residual life of 17 years at the end of the 3-year period. The entire pavement section, base course plus finish course, is designed to withstand the traffic loading for the remaining 17 years of the 20-year design period.

TABLE 4.7
SUBGRADE CATEGORIES
A. BASED ON STRENGTH TEST

<u>Subgrade category</u>	<u>California Bearing Ratio (Cbr)</u>	<u>Resilient Modules Mr Value</u>
Good to excellent	+ 10	Above 15,000
Medium	+ 5 to 9	7,500 to 13,500
Poor	2 to 4	3,000 to 6,000

B. BASED ON SOIL CLASSIFICATION

<u>Subgrade category</u>	<u>Material</u>	<u>Unified System^a</u>	<u>AASHTO System^a</u>
Good to excellent	Gravels and sands	GW, GP, GM, GC, SW, SP, SM, SC	A-1, A-2-4, A-2-5, A-2-6, A-2-7, A-3
Good or poor	Silts and clays	ML, CL, OL, MH, CH, OH	A-4, A-5, A-6, A-7-5, A-7-6

Notes: ^aRefers to categories of soil types and properties

Sources: Per the Rutgers Model Subdivision and Site Plan Ordinance by David Listokin and Carole W. Baker, January 1987—Original strength test and soil classification information derived from the Asphalt Institute, "Thickness Design—Full-Depth Asphalt Pavement Structures for Highways and Streets," MS-1, 8th Edition, August 1970 in Robert F. Baker et al. (editor), Handbook of Highway Engineering. Inclusion of SW, SP, SC soil classifications based on information from the Portland Cement Association's Thickness Design for Concrete Highway and Street Pavements.

Revised CBR strength test and M_r value information are from the Asphalt Handbook for County and Municipal Engineers, November 1991 (Second Edition), published by the New Jersey Society of Municipal Engineers.

Administrative correction.

See: 29 N.J.R. 1296(a).

Administrative correction.

See: 29 N.J.R. 2816(a).

Amended by R.1999 d.374, effective November 1, 1999 (operative May 1, 2000).

See: 31 N.J.R. 477(a), 31 N.J.R. 3259(a).

Rewrote (b)2; and in Table 4.6, deleted Intersection Standard heading, and substituted a reference to Maximum Grade of Secondary Street for a reference to Maximum Grade.

Amended by R.2000 d.480, effective December 4, 2000 (operative June 3, 2001).

See: 32 N.J.R. 2670(b), 32 N.J.R. 4277(a).

Rewrote (c); amended Figures 4.2 and 4.3; and inserted Figures 4.4 and 4.5.

Amended by R.2002 d.399, effective December 16, 2002.

See: 34 N.J.R. 2615(a), 34 N.J.R. 4412(a).

Added new (c), including Tables 4.8 and 4.9; deleted former (c); recodified former (d) as new (c)3; added new Figures 4.2 through 4.5 and deleted former Figures 4.2 through 4.5.

Public Notice: Notice regarding the Publication of two Notices of Adoption in the December 16, 2002 New Jersey Register.

See: 34 N.J.R. 4343(a), 4412(a), 35 N.J.R. 219(b).

Administrative correction.

See: 35 N.J.R. 2494(a).

Amended by R.2005 d.56, effective February 7, 2005.

See: 36 N.J.R. 4025(a), 37 N.J.R. 481(c).

(b) Sight easements on vertical and horizontal curves shall be required and determined based on the sight distance requirements contained in AASHTO's "A Policy on Geometric Design of Highways and Streets" standards, taking into consideration the speed limits established by the government agency having jurisdiction. Residential access, residential neighborhood, and rural street design shall be based on a speed limit of 25 miles an hour. Minor collector street design shall be based on a speed limit of 30 miles per hour. Major collector design shall be based on a speed limit of 30 miles per hour or five miles over the anticipated posted speed limit, whichever is higher.

Amended by R.2000 d.480, effective December 4, 2000 (operative June 3, 2001).

See: 32 N.J.R. 2670(b), 32 N.J.R. 4277(a).

In (b), substituted "shall" for "should" in the second and third sentences, deleted "and major" following "Minor" in the third sentence, and the last sentence was added.

Administrative correction.

See: 35 N.J.R. 2494(a).

5:21-4.20 Curves

(a) Vertical and horizontal curves shall be designed in accordance with AASHTO's "A Policy on Geometric Design of Highways and Streets" standards, incorporated herein by reference.

SUBCHAPTER 5. WATER SUPPLY

5:21-5.1 Water supply system

Water supply systems, where installed, shall conform to the standards contained in this subchapter.