

Recommended Technical Standards for New Roads

UNH Technology Transfer Center

Purposes and Acknowledgements

These model standards provide New Hampshire cities and towns with a set of recommendations for inclusion in their regulations governing new roads. Nearly all are technical, quantitative requirements that will ensure long lasting roads. That is, if a city or town accepts a road constructed according to these standards, it will assume responsibility for a safe, properly designed and constructed road.

Municipal officials should regard these as minimum technical standards for new roads in their subdivision regulations. Moreover, they should exceed them whenever considerations of safety or cost effectiveness warrant. Conversely, specific situations, such as topography and other physical factors, might require a one-time exception to these standards. Municipal officials should approve an exception only after considering all factors, and based on an engineering study where appropriate.

Two attachments are included in these model standards. Table I, "Roadway Geometric Design Standards," provides minimum standards by classification as defined in section 2 below. Figure 1 and its accompanying table, entitled "Geometric Cross Section Design Elements," provides minimum standards for various ranges of average daily traffic (ADT). Both should be included in documents that make these standards official policy.

In the text below, "roads" means roads, streets, and highways. A separate "Definitions" handout suggests usage and terms definitions for subdivision regulations. Consistent with those definitions, "Board" is used below to mean the city/town Planning Board.

Numbers in parentheses refer to sources in the **References** section, which should also be included in policy documents. "*State Specification*" refers to the NHDOT's "*Standard Specifications for Road and Bridge Construction*" (5). "*State Plans*" refers to NHDOT's "*Standard Plans for Road and Bridge Construction*" (6).

Text of Recommended Technical Standards

1. **GENERAL STREET PLAN.** Approval of the general development street plan is required before construction of any phase of the plan. The street plan shall conform to References (1), (3), and (6) except as described below. Any other variation shall be justified by engineering judgment and approved by the Board.
2. **PERMITS.** Owners, builders, contractors, and subcontractors shall comply with all federal and state construction and environmental permits.
3. **STREET LAYOUT.**
 - **General.** All subdivisions shall have adequate provision for a safe and suitable access to a Class V or better road, or shall make provisions for the construction and dedication of a Class V or better road, to obtain safe and suitable access to the subdivision. Where the Board determines an existing access street to be substandard, it may require the

upgrading of said street. Where traffic from a proposed subdivision will adversely impact a nearby street or intersection, provisions shall be made for the mitigation of said impacts. Proposed streets shall be of suitable location, width, grade, and improvement to accommodate prospective traffic and afford satisfactory access to police, fire fighting, emergency equipment, snow removal, sanitation, and road maintenance equipment. The arrangement and character of all streets in a subdivision shall conform to the Master Plan, and any and all other Town regulations, and shall compose a safe and convenient system in relation to other existing and planned streets, to topographic conditions, and to the proposed uses of land to be served by the street. Existing stone walls shall be retained where possible or relocated and restored as required by the Board.

- **Access.** No subdivision shall be approved unless the property to be subdivided shall have frontage on and access from an existing Class V or better road. Each lot shall have a safe, independent and direct access from a Class V or better road. Where warranted, the Board may require that a driveway be shared by two (2) lots. All portions of such a drive which are commonly shared shall be improved to facilitate two (2)-way traffic flow beyond Town right-of-way. Rights of passage over and across such driveway shall be established by easement for each of the lots so served and recorded with the plat plan. Unless a driveway is shared, it must be located a minimum of fifteen (15) feet from any and all property lines .
 - **Arrangement.** Streets shall be laid out so as to intersect at right angles as nearly as possible. No street shall intersect another at less than 60 degrees. Streets shall be continuous and in alignment with existing streets as much as possible. All streets shall be integrated with the existing and proposed street system. The Applicant shall provide for a circular terminus at the end of all proposed roads for all phases and situations where thru streets are not provided in the design. Where extension of existing roadways is proposed, the existing turnaround shall be removed in its entirety.
 - **Classification.**
 - a. Arterial Streets are intended to carry traffic from collector streets to the system of highways; that is, to move through traffic to and from major attracters.
 - b. Collector Streets carry traffic from local streets to the major system of arterial streets and highways. They are intended to collect and distribute traffic in minor traffic generating areas.
 - c. Local Streets provide primarily for access to abutting properties, They are designed and intended to carry through traffic.
 - d. Cul-de-sacs and Loop Streets have only one point of access from an approved street that has multiple points of access.
 - e. Private Streets are on property held under private ownership and are not maintained by the Town.
4. **DEAD-END STREETS.** Streets designed to be permanent, dead-end streets shall be shorter than 1,000 feet, and shall be provided with a turn around having an inside road surface diameter of at least 100 feet.
5. **STREET NAMES.** All streets shall be named to comply with the provisions of the “Enhanced 911 System” (RSA 106-H:2 and RSA 106-H:10), and shall be subject to the approval of the Board.

6. **TRAFFIC AND STREET SIGNS.** The location and type of sign to be installed shall be in accordance with the Manual on Uniform Traffic Control Devices (MUTCD).
7. **STREET LIGHT.** Street lights shall be provided if required by the Board.
8. **GUARDRAIL.** Guardrail shall be used in locations where the New Hampshire Department of Transportation's typical warrant for guardrail is met and/or as required by the Board. Guardrail shall be metal beam on wood posts, meeting *State Specification 606* and, as applicable, *State Plans GR-1 through GR-8*. All guardrail installation must end safely using a MELT-type terminal unit. FLEAT or ELT-type units may be permitted by the Road Department.
9. **RIGHT-OF-WAY.** The minimum width of right-of-way shall be 50 feet. A greater width may be required to construct roads and ditches of the widths as described in Figure 1. The Board may require greater right-of-way width where, in its judgment, the width is warranted due to present or future demands.
10. **HIGHWAY RIGHT-OF-WAY BOUNDS.** Highway bounds, of a type approved by the Board, shall be installed at each point of curvature (PC), point of tangent (PT), and changes in property at all intersection of streets, at all points of change in direction and at any other points the Board may deem necessary to designate the street lines.
 - **Type**
 - a. Stone or Concrete Bounds shall be of concrete or stone, not less than thirty-six (36) inches in length, not less than four (4) inches square or five (5) inches in diameter, and marked on top with a cross, brass plug, iron rod, or other durable material securely imbedded.
 - b. Iron Pipes shall be at least thirty-six (36) inches long and seven-eighths (7/8) inch in diameter or square.
 - **Location**
 - a. Bound Locations. The external boundaries, rights-of-way lines, block corners, etc. of a subdivision shall be monumented on the field by bounds. These bounds shall be placed not more than 1,400 feet apart in any straight line and at all corners, at each end of all curves, at the point a curve changes its radius, at all angle points in any line, said points to be not less than twenty (20) feet from the bank of any river or stream.
 - b. Iron Pipe Locations. The lines of all lots and any other points not monumented by bounds shall be monumented by iron pipes. Those iron pipes located along rivers and streams shall be located along the meander line.
 - **Placement.** Bounds shall be set flush with finished grade. No permanent bounds shall be set until all construction which would disturb or destroy the monuments is completed. All bounds shall be set under the direction of a registered professional engineer or a registered land surveyor.
11. **ALIGNMENT AND GRADES.** Table 1 provides minimums for curves, grades, and other geometry.
 - **Exception.** Where, in the opinion of the Board, and where it has been demonstrated to the satisfaction of the Board by the Applicant, that adherence to the maximum grade specified in Table 1 will cause local streets to be constructed in what the Board considers

to be excessive cuts or fills, a waiver from the above specified maximum grade may be granted, provided:

- a. The maximum allowable grade be ten percent (10%);
- b. The maximum length of such grade, measured between vertical points of intersection (PVI) is five-hundred (500) feet;
- c. No other such slope greater than six percent (6%) occurs within five-hundred (500) feet measured along the centerline of the road from PVIs.

12. **APPLICATION TECHNICAL REVIEW.** At a regularly scheduled meeting the Planning Board will review the application for completeness and determine its acceptability for further processing. The Board will determine the need for review and special investigative studies, and advise the applicant of the time and the need for financial support from the applicant. The Applicant shall pay those fees and charges, plus the costs of any required publications, costs of posting notices, and the cost of mailing notices of hearings. Failure to pay these costs, as specified, will be valid grounds for termination of consideration of the application.

13. **CONSTRUCTION SUPERVISION.** Applicants shall ensure that roadways, drainage facilities, sidewalks, curbs and all other elements of the highway are constructed under the supervision of and with the approval of the Board of Selectmen, or its designated representatives. If the [city/town] chooses to provide independent construction testing and inspection, the following applies.

- Whenever a proposed subdivision will involve road construction, the installation of drainage structures, or other required improvements, the costs incurred by the Town in having the required improvements inspected shall be borne by the applicant. Prior to receiving final approval of a subdivision involving required improvements, the applicant shall deposit with the Treasurer of the [city/town] a sum as estimated by the Selectmen or their designated agent. The amount deposited under this section shall be held in a special escrow account by the Treasurer for the purpose of paying the Selectmen or their designated agent to perform the necessary inspections and construction observations.
- Whenever the actual amount required to make necessary inspections exceeds the amount deposited under this section, such amount in excess of the deposited amount shall be paid to the Treasurer prior to the final acceptance of the improvements and prior to the release of any bond money deposited. See Section 7.00 of these regulations for bond and construction requirements.
- Any amount deposited under this section and not used for the purposes stated herein shall be returned to the applicant upon final acceptance of the required improvements. Escrow amounts shall be returned to the Owner within 30 working days.

14. **CLEARING AND GRUBBING.** The entire area of each roadway shall be cleared and grubbed of all stumps, brush, roots, boulders, like materials and all trees not intended for preservation, and shall not be used for fill or buried on site. Clearing and grubbing shall conform to Section 201 of the *State Specifications*.

15. **SUBGRADE PREPARATION.** All loam, humus, soft clay, and other yielding material shall be removed from within the limits of the roadway area to a depth of no less than twenty-four (24) inches below subgrade grade and/or to a depth that may be required by the Town Engineer. Ledge occurring anywhere in the full cross-section of the roadway must be

cleared to a minimum depth of twenty-four (24) inches below the finished surface. Ledge occurring in pipe trenches must be cleared so as to have a gravel cushion of at least one (1) foot below and on both sides of the pipe.

16. **STORM DRAINAGE.** The proposed development shall provide for proper surface drainage so that removal of surface waters will not adversely affect any neighboring properties or the public storm water system and will help reduce flooding, erosion, and sedimentation. The drainage system shall be designed so that the post-development runoff rate does not exceed the pre-development runoff rate. Surface water runoff shall be controlled and directed in a system of catch basins, pipes, swales, drainage ways, culverts, or channels to a natural watercourse or existing drainage facilities. Where a subdivision is traversed by a watercourse, drainage way, channel, or stream, there shall be provided an easement conforming to the lines of such watercourse. When a proposed drainage system will result in water encroaching on land outside a subdivision, appropriate drainage rights must be secured and indicated on the plan. Where the Board of Selectmen determines that the existing downstream, offsite drainage system is substandard, the Planning Board may require the Applicant to improve the drainage system. Whenever required, longitudinal storm drainage systems will be provided. Construction shall be in accordance with *State Specifications* Sections 603, 604 and 605, and *State Plans* Standards DR-1, DR-2, DR-3, DR-4, and DR-5.

- Design Computations. A drainage study/stormwater management report shall be submitted for review and shall include:
 - a. A table of contents;
 - b. A narrative statement indicating how the Applicant has met the requirements of Section 7 and describing the methodology and results of the analyses;
 - c. A summary table comparing existing and post-development rates of runoff for each individual drainage basin/watershed to abutting properties. All watersheds and drainage areas shall be consistently labeled in the tables, calculations and plans;
 - d. A summary table of each pipe indicating project location, pipe size, type, length, slope, Manning's "n" value, peak discharge, depth of flow, and peak velocity for the design storm. The summary table shall also include hydraulic grade line (HGL) elevations at each location in closed conduit piping systems;
 - e. A summary table of each swale and channel indicating project location, cross-section/channel width, slope, Manning's "n" value, peak discharge, depth of flow, and peak velocity for the design storm;
 - f. The project location and watershed area shown on USGS quadrangle as a figure in the report;
 - g. A watershed area plan for the existing condition showing topography and existing ground elevations at two (2)-foot contour interval for the project site. The plan shall clearly show the boundary of each drainage area and subarea with identifying label and size indicated in acres.
 - h. A watershed area plan for post-development conditions showing existing and proposed topography at two (2) -foot contour intervals for the project site. The plan shall clearly show the boundary of each drainage area and subarea with identifying label and size indicated in acres. The post-development area shall be shown on a separate plan from the existing condition;
 - i. Runoff calculations shall be completed for the existing and post-development conditions using Soil Conservation Services (SCS) methods as described in the

- Stormwater Management and Erosion and Sediment Control Handbook for Urban and Developing Areas in New Hampshire for the appropriate design storms as required by the regulations;
- j. Flood routing calculations shall be provided for the design of each detention pond using acceptable methods such as Modified Puls, Storage Indication, or as may be approved by the Town Engineer. In addition to the design storm, a fifty (50)-year storm analysis shall be conducted to establish the fifty (50)- year elevation at the detention basin. A minimum of twelve (12) inches of free board shall be provided above the fifty (50)-year storm to the minimum elevation of embankment at the detention basin;
 - k. Water quality treatment facilities shall be designed to New Hampshire Department of Environmental Services standards and are in addition to the requirements if these regulations;
 - l. Riprap design calculations shall be provided to the requirements of the Stormwater Management and Erosion and Sediment Control Handbook for Urban and Developing Areas in New Hampshire for each pipe outfall location and where necessary for open channels and swales; and
 - m. The report shall be stamped by a licensed professional engineer in the State of New Hampshire.
- Hydraulic Grade Line (HGL).
 - a. Closed Conduit: Closed conduit systems shall be designed to convey the appropriate design storm required by the regulations under gravity flow conditions with no more than full flow pipe conditions;
 - b. Open Channels and Swales: For open channels and swales, the HGL shall be shown for the appropriate design storm required by the regulations; and
 - c. Detention Basins/Ponds: The HGL shall be shown for the fifty (50)-year flood event.
 - Flow Computations. Flow computations shall be in accordance with the following:
 - a. Manning’s formula shall be used to compute capacities for all open channels, swales, and closed piping drainage systems; and
 - b. The capacity of cross culverts shall be computed in accordance with Manual on Drainage Design for Highways – New Hampshire Department of Transportation.
 - Design Runoff. The rainfall frequency to be used for calculations shall be as follows:
 - a. Residential Areas: 10 years;
 - b. Commercial Areas: 25 years;
 - c. Industrial Areas: 25 years; and
 - d. Flood Protection Works: 50 years
 - Placement of Drain Lines All off-site drain lines shall be placed within right-of-way dedicated for public street unless use of easements is specifically approved by the Board.
 - Pipe Size, Velocity and Type.
 - a. Minimum allowable pipe diameter in any storm drain system shall be fifteen (15) inches;
 - b. The minimum design velocity in pipes shall be two (2) feet per second and the maximum velocity shall be ten (10) feet per second;

- c. The minimum depth of cover for storm drain lines shall be thirty-six (36) inches from the top of pipe to finished grade.
 - d. Bedding shall be three-quarter (3/4)-inch crushed stone. Bedding shall be a minimum six (6)-inch depth in earth and twelve (12)-inch depth in ledge; and
 - e. Acceptable pipe material as recommended and approved by the Town Engineer and Planning Board.
 - f. Maximum length between drain manholes shall be three hundred (300) feet.
- Drainage Structures. Manholes and other drainage structures shall be pre-cast concrete meeting H-20 loading and constructed and installed in accordance with New Hampshire Department of Transportation Standards and Specifications for Road and Bridge Construction. Drainage structures shall not exceed eighteen (18) feet in depth (rim to bottom of structure). Outlet structure at detention basins, when necessary, shall be submitted for approval.
 - Driveway Culverts. The location, length, size, bedding and backfill of all driveway culverts shall be approved by the Epsom Road Department prior to construction. Driveway culverts shall be located a minimum of eight (8) feet off edge of roadway pavement. Driveways and driveway culverts and related items shall be designed and approved and incorporated in the subdivision plan.
17. **CURBS**. The Board may require roadways be curbed on both sides and drained appropriately. Construction shall be in accordance with *State Specifications* Section 609, and *State Plans* Standards CR-1 and CR-2.
18. **SIDEWALKS**. The Board may require construction of sidewalks for pedestrian access to schools, parks, shopping areas and transit stops or where population density and/or traffic volume conditions are such that the Board determines the construction of sidewalks to be prudent. In commercial and industrial districts, sidewalks may be required on both sides of the street. In residential districts, sidewalks may be required on one side of the street. Sidewalks shall be a minimum of 5 feet wide (minimum), no closer than 22 feet to the street centerline, and constructed with granite curb, 6 inches thick gravel (*State Specification* 304.2, except maximum size shall be 2 inches), 3 inches crushed gravel (*State Specification* 304.3), and 3 inches of asphalt pavement (*State Specification* 608). Curb shall be set in Portland Cement Concrete. Curb ramps and sidewalks shall be constructed to comply with reference (2).
19. **DRIVEWAYS**. Driveway width for commercial and industrial subdivisions shall be in accordance with the [city/town] Zoning Ordinance. Maximum driveway width for residential single family and duplex lots shall be twelve (12) feet at the right-of-way with five (5)-foot radius at the edge of pavement of the street.
- When a proposed driveway is located on a Town road, the Applicant is responsible for certifying the proper sign distance is provided at the location indicated on the plans. For all residential driveways located on the lot serving a single family or duplex lot, the minimum proper all season sight distance shall be two-hundred fifty (250) feet in all directions and consistent with the latest version of AASHTO. For all other driveways (common, commercial, industrial, multi-family, etc.), the minimum all season sight distance shall be three-hundred sixty-five (365) feet in all directions meeting the requirements for roadway intersections and consistent with the latest version of

AASHTO. Proper visibility easements shall be provided to meet the sight distance requirements. The Applicant is responsible for obtaining a driveway permit from the [city/town] Road Department prior to the issuance of a building permit; and

- When a proposed driveway is located on a State road, the Applicant is responsible for obtaining the necessary approval and permits from the State. A copy of the permit shall also be submitted to the [city/town] and the New Hampshire Department of Transportation approval number shall be shown on the plan;
20. **BASE COURSE.** The road base course shall be of materials, and at least the widths and thicknesses, indicated in Figure 1. Crushed gravel shall conform to Pay Item 304.3 in *State Specification* Section 304. Gravel shall conform to Pay Item 304.2 in *State Specification* Section 304, except that the maximum size stones shall be 3 inches. All other provisions of *State Specification* Section 304 are part of these standards.
 21. **ASPHALT SURFACE.** Where designated in Figure 1, “Asph. Surf. Treated” surfaces shall be a two-layer Bituminous Surface Treatment in accordance with *State Specification* Section 410. “Hot Mix” surfaces shall be Hot Bituminous Pavement in accordance with *State Specification* Section 403. Widths and thicknesses shall be at least as indicated in Figure 1. At least a 44 feet wide pavement is required in areas where on-street parking is expected on both sides of the travel way. Angle parking is not allowed.
 22. **GRAVEL SURFACE.** In cases of very low traffic volumes, defined herein as up to 50 vehicles per day,) where the Board determines an asphalt surface is not required, the total usable roadway width shall be a minimum of 22 feet. Provision for a wider section should be considered to allow for future upgrading to an asphalt surface as recommended above. The gravel wearing course shall conform to *State Specification* 304.2, except that the maximum size stones shall be 1¼ inches. All other provisions of *State Specification* Section 304 are part of these standards.
 23. **GRAVEL SHOULDERS.** Gravel shoulders, and their base courses, shall be at least the depths, widths, and thicknesses indicated in Figure 1. Gravel shall conform to *State Specification* 304.33. All other provisions of *State Specification* Section 304 are part of these standards.
 24. **BRIDGES.** Bridges, as defined by State Law (RSA 234:2), are structures of 10.0 feet or greater clear span, and shall be designed to MS-18 (HS-20) loading (AASHTO Specifications). The minimum roadway width shall be 24 feet. Bridges shall be designed by a professional engineer, and constructed in accordance with that design.
 25. **ENVIRONMENTAL IMPACTS AND PERMITS.** The Applicant shall be responsible for determining the applicability of any and all environmental regulations that apply to this project, for acquiring the necessary permits, for taking whatever action is necessary to comply with applicable regulations and permits, and, if necessary, for terminating the necessary permits. The applicable work could include, but not be limited to,
 - Any fill, dredge, excavation, etc that impacts wetlands or other jurisdictional areas;
 - All temporary and permanent measures and treatment devices necessary to prevent erosion and control sediment during and after construction;

- Any construction activity proposed to disturb one (1) or more acre of land as defined by US EPA NPDES permits
 - Any disturbance of more than 100,000 square feet of terrain (50,000 sq. feet. if within the protected shoreland) as defined by NHDES rules for a “Site Specific” permit.
26. **UTILITIES.** Utility poles should be kept close to the right-of-way line, in no case closer than the ditch back slope and always well back of a curb. Water and sewer mains should be constructed outside the surface area, and preferably outside the ditch line.
27. **SAFETY.** Safety is an important factor on all roadway improvements. On development roads it may not be possible or practical to obtain obstacle-free roadsides but every effort should be made to provide clear areas within the maintenance limits. The use of flatter slopes, the use of guardrail where necessary, and the use of warnings signs are other safety factors to be considered. These areas are addressed in the publication *Roadside Design Guide* by AASHTO, 2002.

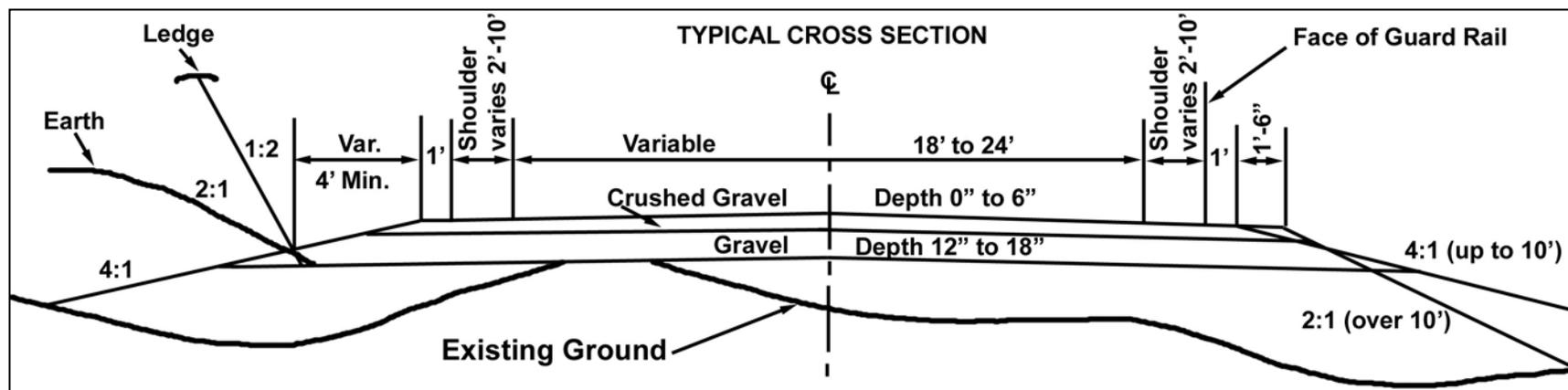
References

- (1) *A Policy on Geometric Design of Highways and Streets*. 2001 or later edition. AASHTO.
- (2) *Designing Sidewalks and Trails for Access, Part II of II: Best Practices Design Guide*.
- (3) *Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT<400)*. 2001 or later edition. AASHTO.
- (4) *Roadside Design Guide*. 2002 or later edition. AASHTO.
- (5) *Standard Specifications for Highway Bridges*. 17th Edition (2002) or later. AASHTO.
- (6) *Standard Plans for Road and Bridge Construction*. 2001 or later edition. NHDOT.
- (7) *Standard Specifications for Road and Bridge Construction*. 2002 or later edition. NHDOT.
- (8) *Stormwater Management and Erosion and Sediment Control Handbook for Urban and Developing Areas in New Hampshire*. 1992 or later edition. Rockingham County Conservation District.

TABLE 1
Roadway Geometric Design Standards

	Arterial	Collector	Local
Right-of-way width	80 feet	60 feet	50 feet
Traveled way width	24 feet	24 feet	22 feet
Shoulder width	10 feet	4 feet	3 feet
Minimum Grade	1%	1%	1%
Maximum Grade	8.0%	8.0%	8.0%
Maximum grade within 100 feet of intersections	2.0%	2.0%	2.0%
Minimum angle of intersection	75	75	75
Minimum centerline radii	600 feet	300 feet	200 feet
Intersection radii: Arterial to Collector to Local to	50 feet 50 feet 30 feet	50 feet 30 feet 30 feet	30 feet 30 feet 30 feet
Rate of super elevation (Use AASHTO Chart)	.08 feet	.08 feet	.04 feet
Rate of super elevation through intersection	.04 feet	.04 feet	.04 feet
Cross slope of pavement (minimum)	2%	2%	2%
Slope of shoulder (minimum)	5%	5%	5%

**Figure 1
Geometric Cross Section Design Elements**



Average Daily Traffic (vehicles/day)	0-50	50-200	200-750	750-1500	1500 & over
Pavement Width (feet)	18 (min.)	20	20	22	24
Shoulder Width (feet) (Note 1)	2	2	4	4	8-10
Center of Road to Ditch Line (feet)	15	16	18	19-21	Varies
Cross Slope of Roadway	4%	3%	2%	2%	2%
Wearing Surface Type (Note 2)	Gravel	Double chip seal or HMA	Hot mix asphalt	Hot mix asphalt	Hot mix asphalt
Wearing Surface Thickness (inches)	3	Varies	1 ½	2	2
Wearing Surface Specification (Note 3)	UNH T ² Handout	UNH T ² Handout or Type C	Type C	Type B	Type A
Pavement Base Thickness (inches)			3	3	4
Pavement Base Specification (Note 3)			Type F	Type E	Type D
Crushed Gravel Thickness (inches)	3	4	4	6	6
Crushed Gravel Specification (Note 4)	NHDOT 304.3	NHDOT 304.3	NHDOT 304.3	NHDOT 304.3	NHDOT 304.3
Gravel Thickness (inches) (Note 5)	12	12	12	12	18
Gravel Specification (Note 4)	NHDOT 304.3	NHDOT 304.3	NHDOT 304.3	NHDOT 304.3	NHDOT 304.3

- Notes:
1. For average daily traffic over 1000 vehicles/day, paved shoulders should be considered.
 2. Gravel surfaces should be paved where steep grades occur.
 3. "Type" is defined in Section 401 of NHDOT *Standard Specifications for Road and Bridge Construction*.
 4. "NHDOT 304.3" is defined in Section 304 of NHDOT *Standard Specifications for Road and Bridge Construction*.
 5. Gravel base course thickness should be increased in areas of poor soils.