

Grade

What is the maximum grade (percent) allowed for a typical subdivision road?

Issue Overview Municipalities generally allow steeper grades for minor roads than collector and arterials roads. Within categories, a few municipalities allow steeper grades for lower-density neighborhoods. A few municipalities will also allow one grade for a short distance, and a grade that is less steep for a longer distance. Some municipalities only list one maximum grade for all roads. Grade is listed as a percent.

Research Coding Researcher selected the maximum grade requirement for the road type listed under the question on “typical subdivision roads.”

Abington *What is the maximum grade (percent) allowed for a typical subdivision road?*

10 The Rules and Regulations Governing the Subdivision of Land in the Town of Abington, Section IV(B)(4) (amended 2001) has a table which lists the type of street and the maximum grade. The maximum grade for arterial streets is 6% and the maximum grade for collector streets is 8%. The maximum grade for local residential streets is 10%.

Acton *What is the maximum grade (percent) allowed for a typical subdivision road?*

10 Town of Acton Subdivision Rules and Regulations

SECTION 8 DESIGN STANDARDS
TABLE II VERTICAL DESIGN STANDARDS

	Local Street	Collector Street
Minimum Grade	1%	1%
Maximum Grade	8% (10%*)	8%

* for low intensity LOCAL STREETS, typical residential SINGLE ACCESS STREETS as permitted in these RULES, and any other LOCAL STREETS where anticipated future traffic does not exceed an average daily traffic volume of 250 vehicles per day (vpd).

Note: on survey received 3/23/05, the answer is marked "10 on LOCAL."

Amesbury *What is the maximum grade (percent) allowed for a typical subdivision road?*

10 Common Access Driveway 12%
Minor Street 10%
Major Street 8%

- Amesbury Subdivision Rules and Regulations March 5, 2002. 7.09.D.10.

Andover*What is the maximum grade (percent) allowed for a typical subdivision road?***6**

According to Code of the Town of Andover, Part II, Article XIII, Section VI(C)(3)(a)(as amended 2003),the maximum grade for minor streets is 8%. For all other types of streets, the maximum grade is 6%.

Ashland*What is the maximum grade (percent) allowed for a typical subdivision road?***10**

Rules & Regulations Governing the Subdivision of Land in the Town of Ashland, Section 344.12(C):

"Grade.

Grades of streets shall not be less than five-tenths (0.5) percent. Grades shall not be more than six (6) percent for collector arterial streets, and a Rail Transit Access Road. Grades shall not be more than ten (10) percent for minor streets and twelve (12) percent for lanes. (Approved on April 26, 2001)."

Attleboro*What is the maximum grade (percent) allowed for a typical subdivision road?***8**

Rules and Regulations Governing the Subdivision of Land City of Attleboro SECTION V: DEFINITIVE SUBDIVISION PLANS
§5.5 REQUIREMENTS FOR CONSTRUCTION PLANS AND PROFILES:

c. Street Grade: The final profile of a street shall not exceed a maximum grade of six (6%) percent for subcollector streets or eight (8%) percent for minor streets or be less than a minimum grade of eight-tenths (0.8%) of one percent. All changes in grade shall be converted by suitable vertical curves.

Auburn*What is the maximum grade (percent) allowed for a typical subdivision road?***8**

- Rules and Regulations governing the Subdivision of Land in the Town of Auburn, Right-of-Way and Street Design Standards.

Avon*What is the maximum grade (percent) allowed for a typical subdivision road?***8**

Town of Avon RULES AND REGULATIONS GOVERNING THE SUBDIVISION OF LAND, 4.B.4

Max Gradient (%):

Arterial 6%

Collector 6%

Residential/Minor 8%

Ayer*What is the maximum grade (percent) allowed for a typical subdivision road?***12**

" 3. Grade:

a. Grades of streets shall be not less than 0.6 percent. Grades shall not be more than 12.0 percent for secondary streets. For intersection

approaches within 100' of the intersection the grade shall not exceed (4) percent."

- Rules and Regulations Governing the Subdivision of Land, February 1966. Section IV.3

Bedford

What is the maximum grade (percent) allowed for a typical subdivision road?

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Town of Bedford Rules and Regulations Governing the Subdivision of Land, Section 5.2.3 (Revised 1990)

5.2.3 Grades. Grades of ways shall not be less than 1.0%. Grades shall not be more than 6.0% for principal ways or more than 8.0% for secondary ways or minor ways.

Bellingham

What is the maximum grade (percent) allowed for a typical subdivision road?

10

425. Grades

4251. Grades of all streets shall be not less than one-half percent (0.5%).

4252. The maximum grades for streets shall be as follows:

Collector street 8%

Minor street 10%

Lane 12%

Bellingham Subdivision Rules and Regulations (effective on and after March 7, 1990)

Berkley

What is the maximum grade (percent) allowed for a typical subdivision road?

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STREET DESIGN AND CONSTRUCTION STANDARDS Table

Maximum grade is 8% for minor and secondary/local streets and 6% for major streets.

Information from:

RULES AND REGULATIONS GOVERNING THE SUBDIVISION OF LAND, Ordinance for Town of Berkley, MA (Subdivision 4/6/00 current 4/6/01) at: ordinance.com

Berlin

What is the maximum grade (percent) allowed for a typical subdivision road?

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Town of Berlin, SUBDIVISION RULES AND REGULATIONS

SECTION IV. DESIGN STANDARDS B. Streets

4. Grade

a. The centerline grade for any street shall not be less than five-tenths of one percent (.5%).

b. The maximum centerline grade for streets shall be as follows:

Minor Streets ten percent (10%)

Secondary streets eight percent (8%)

Major Streets five percent (5%)

c. Where changes in grade exceed one percent (1%), reasonable vertical curves, as required by the superintendent of Streets, will be provided; and where a grade is five percent (5%) or greater within one hundred and fifty feet (150') of the intersection of street right-of-way lines, there shall be provided a leveling area of at least seventy-five feet (75'), with a maximum grade of three percent (3%).

Beverly

What is the maximum grade (percent) allowed for a typical subdivision road?

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According to the Rules and Regulations Governing the Subdivision of Land in the City of Beverly, Section IV(A)(4)(b), the maximum grade is, "Secondary streets - six percent (6%) Principal streets - three percent (3%)"

Billerica

What is the maximum grade (percent) allowed for a typical subdivision road?

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The Town of Billerica, Subdivision Rules and Regulations, Section 6(a)(4), Adopted 1996.

"4. Grade and Curvature

(a) General:

The minimum grade is established by the requirements for effective drainage and the minimum grade is established by the safe and practical requirements for vehicular travel under all road and weather conditions.

(b) Grades:

(1) The minimum grade of tangents shall be not less than (1.0%) and of vertical curves not less than one (1.0%) percent per station at summits and depressions.

(2) The maximum grade of tangents and vertical curves shall not exceed 6% except where, in the opinion of the Board, a greater grade is required due to unusual topographic conditions in which case grades up to ten (10%) percent may be permitted

(3) The minimum sight distance at intersections and on horizontal and vertical curves shall be as tabulated below:

(4) Minimum grade at gutter line shall be 1%. Water flow shall follow gutter line. [Amended, effective 2/21/01]"

Blackstone

What is the maximum grade (percent) allowed for a typical subdivision road?

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E. Grades.

(1) Grades of all streets shall not be less than one percent (1.0%).

(2) The maximum grades for streets shall be as follows:

Maximum Grade

Type Street (percent)

Collector street 8

Minor street 10

Lane 11

(3) Grades shall not exceed four percent (4%) within fifty (50) feet of an intersecting street. ...

RULES AND REGULATIONS GOVERNING THE SUBDIVISION OF LAND, Town of Blackstone, MA (Adopted 1987, Subdivisions last amended 5/2/96) at: www.ordinance.com

Survey received from Blackstone on 5/17/05 marks the answer as "11." Since 11% is for lanes, researcher left the answer as 10% as listed for minor streets.

Bolton

What is the maximum grade (percent) allowed for a typical subdivision road?

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5224. Grade

(a) The maximum and minimum longitudinal centerline grades shall be as follows:

Major Streets: 5 percent maximum, 0.5 percent minimum

Secondary Streets: 6 percent maximum, 0.5 percent minimum

Minor Streets: 8 percent maximum, 0.5 percent minimum

Lane: 10 percent maximum*, 0.5 percent minimum

*Except that on north facing slopes the maximum shall be 8 percent.

(b) Where curves and grades combine to create potentially dangerous driving conditions, the Board will require a suitable amount of super elevation of the curves or other protection mechanisms.

Boxborough

What is the maximum grade (percent) allowed for a typical subdivision road?

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Table 1

The maximum grade for private lanes and local access roads is 10%. It is 8% for subcollector, commercial and arterial roads.

Town of Boxborough Planning Board: Rules and Regulations Regarding the Subdivision of Land
(Adopted 1954, Amended 2000)

Boxford

What is the maximum grade (percent) allowed for a typical subdivision road?

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There are differing grades allowed in low density vs. high density areas. The Planning Board determines whether an area is high or low density. The researcher chose low density minor streets as the standard (where the maximum grade is 7%), but for high density minor streets, the maximum grade is 5% and for high density major streets the maximum grade is 3%. The maximum grade for low density major streets is 5%.

Rules and Regulations Governing the Subdivision of Land in the Town of Boxford, Article IV, Section 300-12(D)

Boylston

What is the maximum grade (percent) allowed for a typical subdivision road?

TOWN OF BOYLSTON RULES & REGULATIONS GOVERNING THE SUBDIVISION OF LAND, 2004

6.2.5 Grade

a. The centerline grade for any street shall not be less than three quarters of one percent (.75%).

b. Where changes in grade exceed one percent (1%), vertical curves at least one hundred feet (100') in length shall be provided. Longer vertical curves may be required to afford adequate sight distances. On a street in any district where a grade is four percent (4%) or greater within two hundred feet (200') of the intersection of street right-of-way lines, a leveling area shall be provided of at least seventy-five feet (75') with a maximum grade of two percent (2%).

c. Roadways shall have a cross slope at two percent (2%).

d. Where curves and grades combine to create potentially dangerous driving conditions, the Board may require a suitable amount of super elevation of the curves or other protection.

e. Roadways shall be designed to fit existing topography as much as possible so as to minimize the amount of cut and fill necessary within the street R.O.W.

Braintree

What is the maximum grade (percent) allowed for a typical subdivision road?

8 Researcher found that the maximum grade allowed for Type I streets is 8%. This is in the chart of "Street Design Standards". Section IV (A)(4) Rules and Regulations Governing the Subdivision of Land and the Improvement of Land Town of Braintree, Section IV (A) (4) (from ordinance.com as of 2001)

Bridgewater *What is the maximum grade (percent) allowed for a typical subdivision road?*

5 According to (SECTION IV.C.4 - RIGHT OF WAY WIDTHS AND GRADES), the maximum grade allowed for Collector, Arterial Industrial Streets is 5% and the maximum grade for Residential Sub-Collector streets is 5%.

Bridgewater Rules and Regulations Governing the Subdivision of Land (ordinance.com)

Brockton *What is the maximum grade (percent) allowed for a typical subdivision road?*

12 The Land Use Ordinance of Brockton (City)
PLYMOUTH COUNTY, MASSACHUSETTS

RULES AND REGULATIONS GOVERNING THE SUBDIVISION OF LAND
SECTION IV DESIGN STANDARDS
B. Streets
4. Grades

Grades of all streets shall not be less than one half (1/2) of one (1%) percent. Grades shall not be more than twelve (12%) percent for any street.

Burlington *What is the maximum grade (percent) allowed for a typical subdivision road?*

8 "Grade of ways shall not exceed eight (8%) unless waived by the Planning Board".

Town of Burlington Rules and Regulations Governing the Subdivision of Land in Burlington, MA Section 10.2 (Adopted 1988, Amended 2002)

10.2 Width and Grade of Way
No major or minor arterial way shall be less than fifty (50) feet between lot lines or less than forty (40) feet on a local street or collector street. The Planning Board may also require a fortyfour (44) foot or greater layout when anticipated vehicular traffic necessitates such width.
A minimum of a one (1%) percent grade shall apply for any way, and the minimum transverse slope (crown) shall be one-fourth (1/4) inch per foot as shown in the attached illustration of a typical layout. Grade of ways shall not exceed eight (8%) unless waived by the Planning Board. Grades within cul-de-sacs shall be a minimum of one (1%) percent and a maximum of four (4%) percent, maintaining a constant grade along the centerline of the roadway (measured in a linear or tangent fashion.) No portion of the cul-de-sac as measured along the centerline shall be on a vertical curve.
The transitions in longitudinal grade of every way shall be effected by means of vertical curves of sufficient length, in the opinion of the Planning Board, in consultation with the Town Engineer, to provide for adequate sight distances.
The paved width of a way shall vary between twenty-six (26) feet and thirty-four (34) feet or greater, depending on the approved roadway layout. For residential subdivision ways which serve no more than ten (10) lots and are permanent dead end streets, the Planning Board, in consultation with professional Town staff, may approve a pavement width less than twenty-six (26) feet, but generally not less than twenty (20) feet.
Amended March 17, 1994 and October 17, 2002

Canton

What is the maximum grade (percent) allowed for a typical subdivision road?

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Rules and Regulations of the Canton Planning Board Governing the Subdivision of Land in the Town of Canton, Massachusetts, Section 3.4.7 (Adopted 1998)

3.4.7 Grade

3.4.7.1 Minimum and maximum centerline grades for streets shall be in accordance with Table 3-1.

Rules and Regulations of the Canton Planning Board Governing the Subdivision of Land in the Town of Canton, Massachusetts, Table 3-1 (Adopted 1998)

Table 3-1: Roadway Design Criteria. The table lists Maximum Centerline Grade (percent) for both Residential Lanes and Residential Streets as "8".

Carlisle

What is the maximum grade (percent) allowed for a typical subdivision road?

8

According to the Town of Carlisle Rules and Regulations Governing the Subdivision of Land, Form E, the maximum grade for a local road is 8%. Where the radius of a local street is less than 200 feet, the maximum grade is 6%. The maximum grade for collector streets is 6%.

Carver

What is the maximum grade (percent) allowed for a typical subdivision road?

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Rules and Regulations Governing the Subdivision of the Land, Town of Carver (Adopted 1981, Amended 1991)

Table 2: Recommended Geometric Design Standards

Grade

a. Maximum: Collector 3%; Local 6%

b. Minimum: Collector 0.5%; Local 0.5%

Chelmsford

What is the maximum grade (percent) allowed for a typical subdivision road?

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The Land Use Ordinance of Chelmsford
MIDDLESEX COUNTY, MASSACHUSETTS
Chapter 202 SUBDIVISION OF LAND

ARTICLE III Design Standards and Improvements

202-13. Streets

B. Vertical alignment.

(1) [Amended 9-28-1994] Grades of streets. Grades of streets along the gutter line shall be not less than 1 %. Vertical curves are required wherever the algebraic difference in grade between center-line tangents exceeds 1 %. Maximum street grade and vertical curve length shall conform to the following:

Type of Street Maximum Grade Forward Sight Distance(ft)

Business or collector street 6% 200

Minor street 10% 150

Lane 12% 125

Chelsea

What is the maximum grade (percent) allowed for a typical subdivision road?

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Researcher unable to copy and paste the chart.

City of Chelsea, Rules Governing the Subdivision of Land, SECTION V.

6. Grade

a. Streets shall conform as closely as possible to the original topography of the land, except that a combination of steep grades and tight curves shall be avoided. This standard is to promote environmentally sensitive design by incorporating flexibility into design standards and regulations.

b. The centerline grade for any street shall not be less than one percent (1%).

c. The maximum centerline grade for streets shall be as follows:

Minor Streets:

Subdivision A: 7%

Subdivision B-5%

d. Where changes in grade exceed one percent (1 %), vertical curves, as required by the Board, shall be provided.

e. Where a grade is five percent (5%) or greater within one hundred and fifty feet (150') of the intersection of streets, leveling areas shall be provided as follows: Residential subdivisions: maximum of 3% for at least 75 feet; Non residential subdivisions: maximum of 2% for at least 200 feet.

f. The grade of turn-arounds shall not exceed five percent (5%).

Clinton

What is the maximum grade (percent) allowed for a typical subdivision road?

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Town of Clinton Subdivision Control Rules and Regulations (Adopted 1973)

4.1.4. Grade

a. Grades of streets shall be not less than one-half (0.5) percent. Grades shall be not more than five (5.0) percent for Major Streets, six (6.0) percent for Collector Streets, ten (10) percent for Minor Streets, twelve (12.0) percent for Lanes.

b. On any street where the grade exceeds six (6) percent on the approach to an intersection, a leveling area with a slope of less than four (4) percent shall be provided for a distance of not less than fifty (50) feet measured from the nearest exterior line of the intersecting street.

c. Where changes in grade exceed one-half of one (0.5) percent, vertical curves shall be provided. The minimum length of vertical curves shall be designed in accordance with the following:

$L = K (\%G2 - \%G1)$ The values of K are listed below:

G.= Grade

L.= Length

GRADE

d. Roadways shall have a cross slope of at least two (2) percent or one quarter (1/4) inch per foot.

e. Where curves and grades combine to create a potentially dangerous conditions, the Board may require a suitable amount of super elevation of the curves, or other protection.

Cohasset

What is the maximum grade (percent) allowed for a typical subdivision road?

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Cohasset Subdivision Rules and Regulations, Section V(B)(4) (Last Amended 2001).

"4. Grades

Except as noted below, grades of all streets shall not be less than one percent, nor more than six percent. Where the six percent requirement would result in considerable injury to the aesthetic value of the site due to extensive cut and/or fill or tree removal the Board may waive the six percent requirement provided such waiver is consistent with safety determinants, including the distance from an intersection, the number of housing units served, the type of street, the length of the steeper graded portion of the street, the horizontal alignment and street curvature. At all intersections, grades of streets shall not exceed two percent within a distance of fifty feet from the beginning of the intersection. (The beginning of the intersection as referred to herein shall be defined as the point at which the edges of the travel lanes intersect.) At intersections of two proposed streets, grades of streets shall not exceed two percent within fifty feet from the beginning of the intersection. Street grade at cul-de-sac turnarounds shall not exceed three percent. There shall be a vertical curve for any change in street grade. Vertical curves shall be designed considering drainage and site distance impacts. Vertical curves shall not be designed with over fifty feet of the curve at a grade less than 0.5 per cent."

Concord

What is the maximum grade (percent) allowed for a typical subdivision road?

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Concord Subdivision Rules and Regulations, Section 6.8 Streets - Design Standards

Maximum Grade

Local Streets

Res AA: 8
Res A & B: 8
Res C: 7
Non Res: 7

Collector Streets

Res AA: 7
Res A & B: 7
Res C: 7
Non Res: 7

Danvers

What is the maximum grade (percent) allowed for a typical subdivision road?

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According to the Planning Board Rules and Regulations Governing the Subdivision of Land in Danvers, Massachusetts, Table 1(adopted 1979), the maximum grade for local residential streets is 10%.

Dedham

What is the maximum grade (percent) allowed for a typical subdivision road?

8

Arthur Noon of Dedham Planning confirmed that the maximum grade allowed is 8%

3.4.7 Grade

- a Minimum and maximum centerline grades for streets shall be in accordance with Table 3-1.
- b Where changes in grade exceed one-half of one percent (0.5%), vertical curves shall be provided
- c The length of vertical curves shall provide the required stopping sight distance for each class of street.
- d The Board may require superelevation for horizontal curves.
- e Reverse crown superelevation shall be provided for curves on collector streets.

f The centerline grade of roadways shall not deviate from existing undisturbed ground by more than ten (10) feet at any point and the average of the absolute value of the deviation shall not be more than three (3) feet.

Table 3.1 indicates that the maximum grade for residential streets is 8%.

Dighton

What is the maximum grade (percent) allowed for a typical subdivision road?

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Town of Dighton Rules and Regulations Governing the Subdivision of Land

"4240. Grades.

4241. Centerline grade for any street shall not be less than one percent (1.00%).

4242. Maximum centerline grades on continuous grades of 400 feet or less shall conform to the following:

Collector streets: six (6) percent

Minor streets: eight (8) percent

Lanes: eight (8) percent

On grades longer than 400 feet, reduce by 1% for each category.

4243. On any street where the grade exceeds 4% on the approach to an intersection, a leveling area with a slope of not more than 2% shall be provided for a distance of at least forty (50) feet from the nearest edge of the traveled intersecting way.

4244. Proposed centerline grade shall not be more than ten (10) percent above or below existing centerline grade unless the Board specifically waives this provision due to unusual topographic circumstances.

4245. To the extent feasible, street grades shall be designed in relation to existing grades so as to approximately balance the volume of cut and fill made within the right of ways, except to offset peat, boulders, or other unusable material required to be removed."

Douglas

What is the maximum grade (percent) allowed for a typical subdivision road?

10

Town of Douglas Rules and Regulations Governing the Subdivision of Land (Adopted 1975, Amended 1998)

3. Grade

a. Grades of streets shall be not less than 0.5%. Grades shall not be more than 6.0% for principal streets nor more than 10.0% for secondary streets.

b. All changes in grade exceeding one-half (1/2) percent- shall be connected by vertical curves of sufficient length to afford, in the opinion of the Board, adequate sight distance.

c. Streets and lots shall be aligned and graded to facilitate connection with the existing and proposed sewerage system where applicable.

d. Vertical alignments shall be in compliance with AASHTO.

e. Grades at all intersections shall not exceed 2.0% for one-hundred fifty feet (150').

Dover

What is the maximum grade (percent) allowed for a typical subdivision road?

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According to the Town of Dover Code, Part III, Chapter 248, Article V, Section 248-12(D)(2):

D.Grades.

(1)The center line grade for any street shall not be less than .75%.

(2)The maximum center line grade shall be as follows:

(a)Minor streets: 10%.

(b)Secondary streets: 8%.

(c)Major streets: 6%.

Dracut

What is the maximum grade (percent) allowed for a typical subdivision road?

8 Town of Dracut Rules and Regulations Governing the Subdivision of Land

Section V, B, 1, k. Grades of all streets shall be at a reasonable minimum, but shall not be less than 1.5% or more than 8%, except at intersecting streets. The minimum gradient at street intersections shall not be less than 1.0%. All changes in grade exceeding 1.0% shall be connected by vertical curves of sufficient length to provide three hundred feet (300') of clear sight distance to the driver. Where the grade of any street at the approach to an intersection exceeds 6.0%, a leveling area shall be provided having not greater than 4.0% grades for a distance of fifty feet (50') measured from the nearest right-of-way line of the intersecting street.

Dunstable

What is the maximum grade (percent) allowed for a typical subdivision road?

6 "IV.A.4. Grade

- a) Grade of streets shall not be less than 1.0%. Grades shall not be more than 6%, except where in the opinion of the Board a greater grade is required due to unusual topographic conditions in which case grades up to 12% may be permitted.
- b) At intersections, a leveling area no steeper than 2% shall be provided for a minimum distance of one hundred (100) feet.
- c) All changes in grade shall be connected by vertical curves of sufficient length to provide smooth transition and sight distance. The minimum vertical curve length required is one hundred and fifty (150) feet.
- d) Driveway grades shall not exceed 6%. Driveway grades shall not exceed 1% within twenty-five (25) feet of the curb. The Planning Board may approve a greater grade to no more than 12% if in its opinion the intent of these regulations is met and further due to unusual topographic conditions."

- "Rules and Regulations Governing Subdivision of Land in Dunstable, Massachusetts, Revised February 2003"

Duxbury

What is the maximum grade (percent) allowed for a typical subdivision road?

6 Town of Duxbury Rules and Regulations Governing the Subdivision of Land (as of 2004)

1.3 Grading

All roadways shall be brought to a finished grade as shown on the vertical roadway profiles of a Definitive Plan. Before sub-base material is spread, the subgrade shall be shaped to a true surface conforming to the proposed cross section of the roadway and sidewalk and compacted in accordance with Section 170 in the "State Specifications". Roadway crown shall be a minimum of 1/4 inch per foot.

7.3.6 Grades a) Grades of all streets shall not be less than one percent (1%), nor more than six percent (6%). Where the six percent (6%) requirement would result in adverse impacts to the aesthetic value of the site due to extensive cut and/or fill or tree removal, the Board may waive the six percent (6%) requirement provided such waiver is consistent with safety determinants, including the distance from an intersection, the number of dwellings served, the type of street, the length of the steeper graded portion of the street, the horizontal alignment and street curvature. At all intersections, the minimum grade on the approach street shall not exceed two percent (2%) within a distance of fifty (50) feet of the point at which the edges of the travel lanes intersect. Street grade at cul-de-sac turnarounds shall not exceed three percent (3%). Intersecting streets shall have sag vertical curve on approach street to keep water from encroaching onto pavement of through street. b) There shall be a vertical curve for any change in street grade. Where proposed pavements meet existing pavements a vertical curve is not required if the difference in tangent grades is less than one half of one percent (0.5%). Vertical crest curves shall have a minimum K value of thirty-five (35). Sag curves shall have a minimum K value of forty (40). K values of vertical curves shall be adjusted to provide the required stopping sight distance for the design speed as defined by AASHTO.

Planning Director Christine Stickney (10/27/04) said that the town has discretion with many of the by-laws and that a subdivision just went in that had a 10% grade.

East Bridgewater What is the maximum grade (percent) allowed for a typical subdivision road?

- 10** Town of East Bridgewater Subdivision Rules and Regulations, Section 4(b)(4), chart (Last Amended 2001).
- Local: 10%
Minor: 10%
Secondary: 8%
- In watershed district (for all residential roads): 6%
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Easton What is the maximum grade (percent) allowed for a typical subdivision road?

- 6** Town of Easton Subdivision Rules and Regulations, Table 2, Geometric Design Standards, for all residential streets it is 6%. Industrial streets is 3%.
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Essex What is the maximum grade (percent) allowed for a typical subdivision road?

- 8** The Land Use Ordinance of Essex
ESSEX COUNTY, MASSACHUSETTS
RULES AND REGULATIONS RELATIVE TO SUBDIVISION CONTROL
- Section 7: General Requirements and Design Standards For All Subdivision Plans
7.02 Streets and Ways
4. Table of Geometric and Other Standards for Streets.
- a. Streets:
1. Minimum width of right of way, 44 feet.
 2. Minimum width of pavement:
 - (a) Urban, 24 feet.
 - (b) Rural, 20 feet.
 3. Maximum grade, eight percent.
 4. Maximum grade at intersections, three percent within 50 feet of intersections.
 5. Minimum angle of intersections, 60 degrees.
 6. Width of shoulders:
 - (a) Urban, 10 feet
 - (b) Rural, 12 feet
 - Minimum centerline radii on curves, 200 feet.
 8. Minimum tangent length between reverse curves, 100 feet.
 9. Minimum road base, 12 inches of compacted gravel to design width of the pavement.
 10. Bituminous paving, where used, minimum 3 inches.
 11. Road crown, minimum, one-fourth per foot.
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Everett

What is the maximum grade (percent) allowed for a typical subdivision road?

6/15/04 Phone conversation with Julius Ofurie who stated that Everett calculates maximum grade using the Mass Highway definition rather than their own stated percentage.

Foxborough

What is the maximum grade (percent) allowed for a typical subdivision road?

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SECTION 5.02 STREET WIDTH & GRADES

D. Grades

1. The center line grade of residential streets shall not be less than 0.5% nor more than 6%. For non-residential subdivision streets, the grade shall not be more than 3%. The grades of ways within fifty feet of an intersection shall not exceed 1%.
 2. All summits of vertical curves shall be so graded as to provide two hundred (200) feet of clear, non-passing sight distance to drivers.
 3. The maximum super elevation for runoff on horizontal curves shall be 0.06 feet.
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Framingham

What is the maximum grade (percent) allowed for a typical subdivision road?

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Town of Framingham
Subdivision Rules and Regulations (Ordinance.com)

Section VII. Design Standards And Specifications
B. Streets
Table 1
Street Design Minimum Standards

Maximum grade

Residential subcollector streets: 6 percent
Residential access streets: 8 percent

Franklin

What is the maximum grade (percent) allowed for a typical subdivision road?

8

Franklin Subdivision Rules and Regulations, Section 300.10 (Last Amended 1999).

D. Grade.

- (1) Design. Street grades shall be designed in relation to existing grades such that the volume of cuts and fills made within the right-of-way approximately balances, except to offset peat, boulders or other unusable materials to be removed.
 - (2) Minimum and maximum. Grades of streets shall not be less than one and five-tenths percent (1.5%). Grades shall not be more than six and zero-tenths percent (6.0%) for collector streets nor more than eight and zero-tenths percent (8.0%) for all other roads.
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Freetown

What is the maximum grade (percent) allowed for a typical subdivision road?

9

Primary, Major and Secondary Streets: 6%
Minor Streets: 9%

-Rules and Regulations governing the subdivision of land in the Town of Freetown, Table IV.1 Recommended Street Design Standards.

Georgetown

What is the maximum grade (percent) allowed for a typical subdivision road?

6

Town of Georgetown, CHAPTER 365 SUBDIVISION REGULATIONS, ARTICLE V Contents of Definitive Plan
Section 365-37. Design standards.

C. Grades of all streets shall be the reasonable minimum but shall not be less than seventy- five hundredths percent (0.75%) nor more than six percent (6%). All changes in grade exceeding one-fourth of one percent (1/4 of 1%) shall be connected by vertical curves of sufficient length to afford, in the opinion of the Board, adequate sight distance. Subdivision streets shall be nearly level, with no grade less than seventy-five hundredths percent (0.75%) nor more than one and twenty-five hundredths percent (1.25%) for a distance of two hundred (200) feet back from intersection. [Amended 7-18-1973 (Amdt. B); 12-3-1986 (Amdt. E)]

Gloucester

What is the maximum grade (percent) allowed for a typical subdivision road?

8

Gloucester Rules and Regulations Governing the Subdivision of Land (Adopted 1960, Amended 1998)

Section 4.3.3 Grades

b. The maximum centerline grades shall be as follows:

- Courts: 12%
 - Lanes: 10%
 - Minor streets: 8%
 - Collector streets: 6%
-

Grafton

What is the maximum grade (percent) allowed for a typical subdivision road?

8

Town of Grafton Rules and Regulations Governing the Subdivision of Land, 1998

4.1.5 Grade

4.1.5.1 The centerline grade for any street shall be not less than eight tenths of one percent (0.8%).

Minor road=

8% in a single family area

4% in a multi family or non residential area

Groton

What is the maximum grade (percent) allowed for a typical subdivision road?

10

Town of Groton Subdivision of Land, Chapter 346 (Adopted 1983, Amended 1990)

~ 346-10. Streets.

D.Grades

(1) The center-line grade for any street shall not be less than seventy-five hundredths of one percent (0.75 of 1%).

(2)The maximum center-line grades shall be as follows:

(a) Collector streets: 7%.

- (b) Minor streets: 10%.
 - (c) Lane: 10%.
-

Groveland

What is the maximum grade (percent) allowed for a typical subdivision road?

10

Town of Groveland Rules and Regulations Governing the Subdivision of Land (1998)

4.3.10 Grades.

The minimum centerline grade for any street shall not be less than one percent.

4.3.10.1 The maximum centerline grade for streets shall be as follows:

High Density and Low Density Area* Non-Residential Area*

Minor Streets Ten percent (10%) Eight percent (8%)

Major Streets Eight percent (8%) Five percent (5%)

* As determined by the Planning Board

4.3.10.2 Where changes in grade exceed eight-tenths of one percent (0.8%), a vertical curve shall be provided. The minimum length of vertical curves shall be designed in accordance with the following:

$L = K (G(1)\% - G(2)\%)$ G = Grade L = Length

The values for K are listed below: Crests Sags Minor Streets 30 36 (30 miles per hour)

Major Streets and Streets in 80 70 A High Density and Non-Residential Area, as determined by the Planning Board (40 miles per hour)

Roadways shall have a centerline to side of road slope of three eighths feet per foot (.375 ft./ft.), minimum.

4.3.10.3 Where horizontal and vertical curves combine to create potentially dangerous driving conditions, the Board may require a suitable amount of superelevation of the curves or other projections.

4.3.10.4 At approaches to intersections, the maximum allowable centerline profile grade shall be two percent (2%) for seventy-five feet (75').

4.3.10.5 The grade of any street, except in special instances, shall be so designed that the surface runoff of water shall be from the center line of the street to the edge of the street.

Halifax

What is the maximum grade (percent) allowed for a typical subdivision road?

6

Town of Halifax, Subdivision Regulations, ARTICLE III Design Standards: Section 235-21. Streets.

D. Grade.

(1) The center-line grade for any street shall not be less than one-half percent (1/2%).

(2) The maximum center-line grade shall be in accordance with the following table:

Type of Street / Maximum Grade

Minor (residential) 6%

Collector 5%

Major 3%

(3) When the grade at any approach to an intersection exceeds six percent (6%), a platform shall be provided for a distance of not less than forty (40) feet, measured from the exterior line of the intersecting street.

(4) Grades at an intersection of more than two percent (2%) for the first forty (40) feet, and more than four percent (4%) for the next thirty (30) feet, will not be approved.

(5) All streets shall be free of abrupt and frequent changes. A vertical curve is required for any grade change over one percent (1%).

Hamilton

What is the maximum grade (percent) allowed for a typical subdivision road?

10

SUBDIVISION REGULATIONS

Hamilton Planning Board

SECTION V DESIGN STANDARDS

C. Streets
4. Grades

- a. The centerline grade for any street shall not be less than seventy-five hundredths of one percent. (.75%)
- b. The maximum centerline grades shall be as follows:

Minor streets: ten (10) per cent Secondary streets: six (6) per cent Major streets: six (6) per cent

- c. All changes in grade exceeding one (1) per cent shall be connected by vertical curves of sufficient length to afford, in the opinion of the Board, adequate sight distances.

Hanover

What is the maximum grade (percent) allowed for a typical subdivision road?

8

Rules and Regulations Governing the Subdivision of Land in the Town of Hanover

SECTION IV DESIGN STANDARDS

A. Streets

4. Grade

- a. The centerline grade for any street shall not be less than five-tenths of one percent (0.5%) nor more than eight percent (8%).
- b. Vertical curves are required when the change in profile grade exceeds one (1) percent. The length of vertical curve shall be designed to provide a minimum sight distance of two hundred (200) feet to an object six (6) inches above the roadway surface from an eye height of three feet, nine inches (3.75 feet). The sight distances shall be shown on the proposed street profiles.
- c. The grade of any roadway within seventy-five (75) feet of an intersection shall not exceed three (3) percent.

Hanson

What is the maximum grade (percent) allowed for a typical subdivision road?

10

STREET GRADES

6.5.5 The minimum grade for all streets shall be 1.0% and the maximum grade shall be 6% for arterial and collector streets and 10% for all other streets. Where street grade at the approach to an intersection exceeds 3%, a levelling area shall be provided having grades not exceeding 1% for a distance of 50 feet from the nearer exterior line of the intersecting street.

Harvard

What is the maximum grade (percent) allowed for a typical subdivision road?

15

Survey received from Harvard on 5/24/05 marks the answer: 15%

Researcher found no maximum grade listed for typical residential streets. According to Marie Nader, Planning Board Administrator, there is no maximum grade for typical residential streets defined in the bylaws. The only mention of grade refers to driveways (maximum grade of 10%).

Code of the Town of Harvard, Chapter 130, Subdivision Control (Adopted 1970, Amended 1986)

§ 125-2. Definitions.

GRADING -- A term used in engineering practice which includes installation of swales and drains, excavation and fill, and other steps in site preparation. [Added 3-27-1993 ATM by Art. 22]

§ 140-14. Construction standards.

A. Driveways.

(4) Grading. Within and next to the street, grading and side slopes shall be consistent with the requirements of the Rules and Regulations of the Harvard Planning Board Relative to Subdivision Control. Slopes shall be stabilized and not exceed 1:3 (2:3 for exposed ledge) . Firm shoulders

shall be provided and guardrails shall be used where there is a downhill side slope greater than 1:4.

Haverhill

What is the maximum grade (percent) allowed for a typical subdivision road?

7 City of Haverhill Rules and Regulations Governing the Subdivision of Land, 2000

Section V, 5.1 Streets

Grade

a. Grades of streets shall not be less than one (1) percent nor more than seven (7) percent.

b. Where the grade of any street at the approach to an intersection exceeds four (4) percent, a leveling area shall be provided having not greater than two (2) percent grade for a distance of at least fifty (50) feet measured from the nearest exterior line of the intersecting street,

c. Adequate sight distance for a speed of thirty (30) miles per hour should be provided on all vertical or horizontal curves.

Hingham

What is the maximum grade (percent) allowed for a typical subdivision road?

8 According to the Rules and Regulations Governing the Subdivision of Land in the Town of Hingham, Section 4 Design Standards, Table I, Minimum Design Standards for Streets:

Major: 5%

Secondary: 5%

Minor: 8%

Limited residential: 8%

Holbrook

What is the maximum grade (percent) allowed for a typical subdivision road?

8 Rules and Regulations Governing the Subdivision of Land Town of Holbrook, Section IV (A) 1.3, (Adopted, 1954, Amended 1998; from ordinance.com as of August 2004)

3. Grade: Grades of streets shall be not less than 0.5 percent. Grades shall not be more than 5.0 percent for principal streets nor more than 8.0 percent for secondary streets.

Holden

What is the maximum grade (percent) allowed for a typical subdivision road?

10 "3. Grades

a. Grades of an streets except dead-end streets shall not be less than 1.5% nor more than 10.0% on minor or collector streets except within 300 feet of an intersection where grades cannot exceed 5.0%. Grades on arterial streets may not exceed 5.0%. Grades of all dead-end streets shall not be less than 2.0% nor more than 10.0% and may not exceed 5.0% within 300 feet of an intersection.

b. All changes in grade exceeding three-quarters (3/4) percent shall be connected by vertical curves of sufficient length to afford, in the opinion of the Board, adequate sight distance.

c. Streets and lots shall be aligned and graded to facilitate connection with the existing and proposed sewerage system where applicable.

d. Cuts or fills in excess of eight (8) feet or roadway locations resulting in lots being more than eight (8) feet above or below the grade of the roadway shall be substantiated by the submission of cross sections showing the proposed grading within two hundred (200) feet of the roadway

on both sides.

e. Retaining walls will not be approved nor shall they be constructed within the street right of way."

- Rules and Regulations Governing Subdivision of Land in Holden, Massachusetts. V.A.3

Holliston

What is the maximum grade (percent) allowed for a typical subdivision road?

8 Holliston Planning Board Subdivision Rules and Regulations, Appendix A
Design Standards
TABLE 1 ROADWAY DIMENSIONAL REQUIREMENTS

Local Residential Street: 8%
Residential Feeder Street: 6%
Industrial Primary Street: 5%
Industrial Secondary Street: 8%

Hopedale

What is the maximum grade (percent) allowed for a typical subdivision road?

10 Town of Hopedale Rules and Regulations Governing the Subdivision of Land

SECTION IV DESIGN STANDARDS

A. Streets

3. Grade

Grades of streets shall be not less than 0.75%. Grades shall not be more than 6.0% for major streets nor more than 10.0% for minor and secondary streets.

Hopkinton

What is the maximum grade (percent) allowed for a typical subdivision road?

9 RULES AND REGULATIONS
RELATING TO THE SUBDIVISION OF LAND (Adopted May 8, 2000, Amended through June 16, 2003)

Section 8 Design Standards

8.2 Streets

8.2.4 Grades

- A. The centerline grade of streets shall not be less than .5% nor more than 7% for major and non-residential streets and not more than 9% for minor and rural streets.
 - B. All vertical curves shall be so graded as to provide 200 feet of sight distance to drivers. Minimum length of a sag or crest vertical curve shall be 100 feet.
 - C. Where the grade of any street at the approach to an intersection exceeds 5%, a leveling area shall be provided and have no greater than 3% grades for a distance of 75 feet measured from the nearest right-of-way line or edge of traveled way, whichever is greater, from the intersecting street.
 - D. Grades of turnarounds shall not exceed 5%.
-

Hudson

What is the maximum grade (percent) allowed for a typical subdivision road?

7 Town of Hudson Rules and Regulations Governing the Subdivision of Land, 1993

4.1.4. Grade.

4.1.4.1. The centerline grade for any street shall not be less than five-tenths of one percent (0.5%). However, a centerline of not less than seven-tenths of one percent (0.7%) is preferred.

4.1.4.2. The maximum centerline grade for streets shall be as follows:

Minor Streets seven percent (7%)*

Collector Streets seven percent (7%)*

Secondary Streets six percent (6%)*

Major Streets five percent (5%)

Plus up to two (2) percent for a distance not in excess of three-hundred (300) feet.

4.1.4.5. Where a grade is four (4) percent or greater within one-hundred and fifty (150) feet of the intersection of street right-of-way lines, there shall be provided in a residential subdivision containing only one (1) family dwellings, a leveling area of at least seventy-five (75) feet, with a maximum grade of three (3) percent, and in all other subdivisions, a levelling area of at least two-hundred (200) feet, with a maximum grade of two (2) percent.

Hull *What is the maximum grade (percent) allowed for a typical subdivision road?*

- 9 Major: 1 (min) 5 (max)
 Secondary: 1 (min) 5 (max)
 Minor: 1 (min) 9 (max)
 Minor Dead-End: 1 (min) 9 (max)

TOWN OF HULL RULES AND REGULATIONS GOVERNING THE SUBDIVISION OF LAND, 4.B.3 (1988, Current 3/27/01)

The grades come from Table 1 in Section 3 - Width, Alignment and Grades of Streets.

Ipswich *What is the maximum grade (percent) allowed for a typical subdivision road?*

- 8 Ipswich Subdivision Rules and Regulations (Adopted 1993, Amended 1999)
- Courts: 12%
Lanes: 10%
Local: 8%
Collector: 6%
-

Kingston *What is the maximum grade (percent) allowed for a typical subdivision road?*

- 8 Town of Kingston, RULES AND REGULATIONS GOVERNING THE SUBDIVISION OF LAND
SECTION 4.0 DESIGN STANDARDS 4.2.2. Right-of-Way Width and Street Design Standards
4.2.2.1. On all classification of streets, the following characteristics shall be the minimum acceptable.
Street Classification/Gradient % Maximum
Local 8%
Sub-collector 7%
Collector 6%
Arterial 5%

Lakeville

What is the maximum grade (percent) allowed for a typical subdivision road?

6

"4. Grade.

a) The centerline grade for any street shall not be less than five tenth of one percent (0.5%).

b) The maximum centerline grade for streets shall be as follows:

Minor Street Six Percent (6%)

Secondary Street Six Percent (6%)

Primary and Major Streets Four Percent (4%)"

- Rules and Regulations Governing Subdivision of Land in the Town of Lakeville. IV.B.

Lancaster

What is the maximum grade (percent) allowed for a typical subdivision road?

10

Town of Lancaster Rules and Regulations Governing the Subdivision of Land

425. Grades

a) Grades of all streets shall not be less than 1.0%.

b) The maximum grades for streets shall be as follows:

Collector street 8%

Minor street 10%

Lane 11%

Lawrence

What is the maximum grade (percent) allowed for a typical subdivision road?

6

City of Lawrence Subdivision Rules and Regulations, Section 6.3 (Last Amended 2001).

"b. Grades of streets shall not be less than 1.0 percent, and shall not exceed 6.0 percent, except for short runs on local streets where grades shall not exceed 12.0 percent."

Leicester

What is the maximum grade (percent) allowed for a typical subdivision road?

10

Leicester Subdivision Rules and Regulations (Adopted 1995, last Amended 2003)

SECTION IV.

DESIGN STANDARDS

A. STREETS:

2. GRADE:

a.) Grades of streets shall be not less than 0.75%. Grades shall not be more than 6.0% for major streets nor more than 10.0% for minor and secondary streets, except that the maximum grade in cul-de-sac turnarounds shall not be more than 4.0% to allow for safe maneuvering of vehicles.

b.) On any street where the grade exceeds 6.0% on the approach to an intersection, a leveling area with a slope of not more than 4.0% shall be provided for a distance of not less than fifty (50) feet measured from the nearest exterior line of the intersecting street.

Leominster

What is the maximum grade (percent) allowed for a typical subdivision road?

10 City of Leominster Rules and Regulations Governing the Subdivision of Land

4.1.2 Grade

4.1.2.0 Grades of streets shall not be less than 0.5%. Grades shall not be more than 6.0% for collector streets, 10.0% for minor streets. ...

Lexington *What is the maximum grade (percent) allowed for a typical subdivision road?*

8 Town of Lexington, Chapter 175 Planning Board Development Regulations, Part 2 Subdivision Control, Article VIII, Required Improvements; Design Standards, 175-45. Streets and rights-of-way., E(1)

Residential: 8

Local: 8

Connector: 6

Arterial: 6

Lincoln *What is the maximum grade (percent) allowed for a typical subdivision road?*

10 Town of Lincoln, Rules and Regulations Governing the Subdivision of Land, Section 6.2.4.1 Longitudinal Grades, (2001).

6.2.4 GRADES

6.2.4.1 LONGITUDINAL GRADES

The minimum grade of any street shall not be less than 0.5%. On curves the gradient shall be maintained at the gutter elevation. A descending minimum grade may not intersect with an ascending minimum grade.

The maximum grade of principal streets shall not exceed 8% on straightaways or 6% on curves, of secondary streets 10% on straightaways or 8% on curves, and of minor streets 10% on both straightaways or curves.

Littleton *What is the maximum grade (percent) allowed for a typical subdivision road?*

8 Collector streets: 5%

Minor streets: 8%

Lanes: 10%

Code of the Town of Littleton, Part II, Chapter 249, Article IV, Section 249-43(as amended 2003):

D.Grade.

(1)Grades of streets shall be not less than one percent (1%). Grades shall be not more than five percent (5%) for collector streets, eight percent (8%) for minor streets and ten percent (10%) for lanes.

Lowell *What is the maximum grade (percent) allowed for a typical subdivision road?*

6 Lowell Subdivision of Land Regulations, Section IV(A)(2):

"2. GRADES

a. The center line grade of streets shall not be less than one percent (1%). Grades shall not be more than six percent (6%) except where, in the opinion of the Board, a greater grade is required due to unusual topographic conditions in which case grades up to twelve percent (12%) may be

permitted."

Lunenburg

What is the maximum grade (percent) allowed for a typical subdivision road?

6

Town of Lunenburg Rules and Regulations Governing the Subdivision of Land

4.2.4. Grade

4.2.4.1. The centerline grade for any street shall not be less than five tenths of one percent (0.5%). However, a centerline of not less than seven tenths of one percent (0.7%) is preferred.

4.2.4.2. The maximum centerline grade for streets shall be as follows.

MAXIMUM CENTERLINE	Subdivision Type A	Type B
Minor	7%	5%
Intermediate	6%	5%
Secondary	6%	5%
Major	5%	5%

*Plus up to two (2) percent for a distance not in excess of three hundred (300) feet.

4.2.4.3. Where changes in grade exceed on half of one (0.5) percent, vertical curves will be provided. The minimum length of vertical curves shall be designed in accordance with the following:...

Lynn

What is the maximum grade (percent) allowed for a typical subdivision road?

12

City of Lynn Subdivision Rules, SECTION VI DESIGN STANDARDS, A. STREETS.(Last amended 2001).

"3. Grade

Grades of streets shall be not less than 1.0%. Grades shall not be more than 6.0% for principal streets nor more than 12.0% for secondary streets."

Lynnfield

What is the maximum grade (percent) allowed for a typical subdivision road?

9

Town of Lynnfield RULES AND REGULATIONS GOVERNING THE SUBDIVISION OF LAND, 7.1.3 (Adopted 1977)

7.1.3 Grade

1. Grades of all streets shall be the reasonable minimum, but shall not be less than one percent (1.0%). Grades shall not be more than six per cent (6.0%) for principal streets nor more than nine per cent (9.0%) for other streets.

Malden

What is the maximum grade (percent) allowed for a typical subdivision road?

10

Malden Rules and Regulations of the Malden Planning Board Governing the Subdivision of Land SECTION V DESIGN STANDARDS, A. Streets, 4. Grades

"a. Grades shall not be less than 6/10 of one percent nor more than eight per cent.

b. Where, because of limited areas, the Planning Board in its opinion feels that the usefulness of the subdividers land would be severely restricted, or the land in question is impossible to develop using the prescribed maximum, the maximum for Class B, C and D streets shall be ten per cent."

Manchester-by- What is the maximum grade (percent) allowed for a typical subdivision road?

7 Manchester-by-the-Sea RULES AND REGULATIONS GOVERNING THE SUBDIVISION OF LAND, Section 7.9(D)

Lane: 9%
Minor: 7%
Collector: 6%
Arterial: 5%

Mansfield What is the maximum grade (percent) allowed for a typical subdivision road?

9 Town of Mansfield Rules and Regulations Governing the Subdivision of Land

4.1.4. Grade
4.1.4.1. The centerline grade of any street shall not be less than five tenths of one percent (0.5%).
4.1.4.2. The maximum centerline grade of streets shall be as follows:

	Low Density*	High Density*
Minor	9	5
Secondary	6	5
Major	5	5

*As determined by the Planning Board.

Marblehead What is the maximum grade (percent) allowed for a typical subdivision road?

8 (4) Grade.

(a) The maximum and minimum longitudinal center-line grades shall be as follows:

[1] Major streets: 5% maximum, 0.5% minimum.
[2] Secondary streets: 6% maximum, 0.5% minimum.
[3] Minor streets: 8% maximum, 0.5% minimum.
[4] Lane: 10% maximum, except that on north facing slopes the maximum shall be 8%, 0.5% minimum.

Marblehead Subdivision Rules and Regulations, Section 258-17(B)(4)(a)

Marlborough What is the maximum grade (percent) allowed for a typical subdivision road?

8 City of Marlborough Subdivision Rules and Regulations (Revised 2003)

Section IV: Design Standards (B)Streets
4.Grade

(a)The centerline gradient for any street shall not be less than one percent (1%). (Amended 7/18/88)

(b)The maximum centerline grade for streets shall be as follows:

Lanes - ten percent (10%) (Amended 7/18/88)

Other secondary street - eight percent (8%)

Major street - five percent (5%)

Marshfield

What is the maximum grade (percent) allowed for a typical subdivision road?

8

Town of Marshfield Subdivision Rules and Regulations

4.1.2 Grading and Topography:

Efforts shall be taken to maintain the continuity of the natural topography. Cut and fill shall be avoided in all instances possible. Except in areas where terracing is used, when excavation is necessary, grading shall be done in such a way that the resulting contours follow smooth natural curves that conform to the curves of the surrounding landscape. Straight or angular slopes or cuts which interrupt natural topography shall not normally be allowed. Existing contours shall be preserved in-so-far as it is possible through optimal location of streets and dwellings to the satisfaction of the Planning Board. In any event, no change shall be made in existing contours which adversely affects any land abutting the proposed subdivision.

Street layouts shall generally follow (parallel) the existing contours, or existing stream valley and natural swales, and should be designed with the objective of the preservation of natural features identified on the plan, as required in Section 4.1.1 above. All work on the ground hereinafter specified shall be performed by the applicant in accordance with these rules and regulations, in conformity with approved definitive plans and specifications and other construction requirements of the Town Agencies concerned, and to the satisfaction of such Agencies. In particular, all design, material, and construction specifications of the Marshfield Public Works Department relative to road and utility construction shall be adhered to unless otherwise provided for in these regulations. Where no detail is given under Marshfield D.P.W. or the Department's specifications, reference shall be made to construction details of the Massachusetts Municipal Engineers Association. All streets in the subdivision shall be designed so that, in the opinion of the Board, they shall provide safe vehicular travel.

4.1.4 Width, Alignment and Grades of Streets:

e. No center line gradient is to exceed six (6) percent on any curve having a center line radius of less than 500 feet or 8 percent on one having a center line radius of more than 500 feet.

Maynard

What is the maximum grade (percent) allowed for a typical subdivision road?

8

According to the Town of Maynard Rules and Regulations Governing the Subdivision of Land, Section IV(A)(3)(a):

"Grades of streets shall be not less than 0.75%. Grades shall not be more than 5.0% for principal streets nor more than 8.0% for secondary streets."

Medfield

What is the maximum grade (percent) allowed for a typical subdivision road?

6

Land Subdivision Rules and Regulations of the Planning Board of the Town of Medfield, Massachusetts, Section 5.2, Table 1 Street Design Standards, maximum grade for all streets is 6%.

Medford

What is the maximum grade (percent) allowed for a typical subdivision road?

7

SECTION 7 DETAILED DESIGN STANDARDS FOR STREETS AND UTILITIES

7.2 Grades - Grades shall be as follows:

Minimum - Maximum

Class A Streets .6% - 5%

Class B and C Streets .6% - 7%

[City of Medford, RULES AND REGULATIONS GOVERNING THE SUBDIVISION OF LAND ~ Revised through September 1991]
obtained from ordinance.com

Medway

What is the maximum grade (percent) allowed for a typical subdivision road?

8

The Land Use Ordinance of Medway
NORFOLK COUNTY, MASSACHUSETTS
LAND SUBDIVISION RULES AND REGULATIONS

SECTION 4.0 DESIGN AND CONSTRUCTION STANDARDS

4.1 General

4.1.6.1 The following design and construction standards shall apply to reduced density residential subdivisions as follows.

4.1.6.1.1 Where the density of a subdivision is equal to 1/2 the density allowed under the Zoning By-Law the following standards apply.

Minimum horizontal centerline radius - 100'

Property line at street intersection radius - 20'

Granite Curb radius at intersections - 30's

Layout width - 45'

Maximum centerline grade - 10%

Dead end length - no maximum provided that no more than 12 dwellings shall have access from the way

Pavement width - 20' traveled way + 1.0 Cape Cod berm each side

Sidewalks - one 5 1/2' walk

Design Storm - 10 year for pipe size (Rational Method)

4.1.6.1.2 Where the density of a subdivision is equal to or less than 1/3 (one-third) the allowed density the following standards shall apply

Minimum horizontal centerline radius - 75'

Property line at street intersection - 20'

Granite Curb radius at intersections - 30'

Layout width - 40'

Maximum centerline grade - 12%

Deadend length - no maximum provided that no more than 15 dwellings shall have access from the way

Pavement width - 18' traveled way + 1.0 Cape Cod berm each side

Sidewalks - one 5 1/2' walk

Design Storm - 10 year for pipe size (Rational Method)

4.2 Streets and Road-ways

4.2.4 Grade

4.2.4.1 The minimum centerline grade for any street shall not be less than one percent (1%)

4.2.4.2 The maximum centerline grade for streets shall be as follows:

Minor Street Eight Percent (8%)

Secondary Street Eight Percent (8%)

Major Streets Six Percent (6%)

Streets in Industrial Districts Seven Percent (7%)

Melrose

What is the maximum grade (percent) allowed for a typical subdivision road?

10

Section V(A)(3)(a)

Grades of all streets shall be the reasonable minimum but shall not be less than one-half (0.5) percent nor more than six (6) percent for principal streets and ten (10) percent for other streets. Where the grade of a street exceeds six (6) percent at an intersection, especially with a principal street, the subdivider shall reduce the grade for a reasonable distance from such intersection or in accordance with the City Ordinances or Standards of the Public Works Department in effect at the time.

Mendon *What is the maximum grade (percent) allowed for a typical subdivision road?*

6 Town of Mendon Rules and Regulations for Subdivision of Land
4.15.6. Right-of-Way Widths and Alignments
Principle: 4%
Secondary: 6%

Merrimac *What is the maximum grade (percent) allowed for a typical subdivision road?*

8 Town of Merrimac Rules and Regulations Governing the Subdivision of Land
SECTION V. DESIGN STANDARDS
A. Streets
4. Grades
a. Grades shall not be less than 1/2 of one percent nor more than eight percent.
b. Where, because of limited areas, the Planning Board in its opinion feels that the usefulness of the subdivider's land would be severely restricted, or the land in question is impossible to develop using the prescribed maximum, the maximum for secondary streets shall be twelve (12)percent.

Methuen *What is the maximum grade (percent) allowed for a typical subdivision road?*

8 City of Methuen Subdivision Rules and Regulations
4.2.4 GRADES
4.2.4.1 CENTERLINE GRADES
Centerline grades of streets shall not be less than 0.5%. Grades of principal streets shall not exceed 6% on straight-aways or 5% on curves, and secondary and minor streets shall not exceed 8% on both straight-aways or curves. Where changes in grade exceed (1%), vertical curves, as required by the Boards shall be provided.

Middleborough *What is the maximum grade (percent) allowed for a typical subdivision road?*

6 Town of Middleborough Rules and Regulations Governing the Subdivision of Land
SECTION IV DESIGN STANDARDS
B. STREETS AND ROADWAYS
5. GRADE
a. The centerline grade for any street shall not be less than three quarters of one percent (.075%).
b. The maximum grade* for streets shall be not more than six percent (6%) and preferably not more than four percent (4%).

*May be increased by 1% for a distance of 200 feet or less.

c. Where algebraic changes in grade exceed two percent (2%) - (1/4" = 1'-0") vertical curves at least 100 feet in length shall be provided.

d. Roadways shall have a cross slope at two percent (2%) - (1/4" = 1'-0").

e. Where curves and grades combine to create potentially dangerous driving conditions, the Board may require a suitable amount of super elevation of the curves or other protection.

f. On a street in any district where a grade is four percent (4%) or greater within one hundred and fifty feet (150') of the intersection of street right-of-way lines, there shall be provided a leveling area of at least seventy-five feet (75') with a maximum grade of plus two percent (2%).

g. Roadway shall be designed to fit existing topography as much as possible so as to minimize the amount of cut and fill necessary within the street R.O.W.

Middleton

What is the maximum grade (percent) allowed for a typical subdivision road?

9

Town of Middleton Subdivision Rules and Regulations, Section VIII(b)(3)(Last Amended 2001).

"3. Grades;

a. The minimum grade for all streets shall not be less than 1%.

b. The maximum grade at all intersections shall be 2% desirable, but shall not exceed 3% for a distance of sixty-four (64) feet from the beginning of intersection.

c. The maximum grade for Major Streets shall not be more than 6%.

d. The maximum grade for Secondary Streets shall not be more than 9%.

e. The maximum grade for Minor Streets shall not be more than 9%. "

Milford

What is the maximum grade (percent) allowed for a typical subdivision road?

8

Town of Milford Rules and Regulations Relating to Subdivision of Land, Effective 2002

ARTICLE V DESIGN STANDARDS

A. STREETS

3. Grade

a. Grades of streets shall be not less than 0.5%. Grades shall not be more than 6% for arterial or collector streets, nor more than 8% for minor streets in areas having less than 120 foot average lot frontage, nor more than 12% for minor streets in residential areas having 120 foot or more average lot frontage. (Revised 7/19/65)

Millbury

What is the maximum grade (percent) allowed for a typical subdivision road?

8

Rules and Regulations Governing the Subdivision of Land in Millbury (Adopted 1980, Amended 2001)

Section 7: Design Standards

7.02 Streets and Ways

4. Street Location and Alignment

i. Grades of street shall not be more than six percent (6%) for collector streets nor more than eight percent (8%) for a minor street or subcollector and not less than one-half percent (0.5%) for all.

Millis

What is the maximum grade (percent) allowed for a typical subdivision road?

10

According to Table 1: Geometric Design Standards, the maximum grade allowed for typical subdivision residential streets is 10%.

[Town of Millis, LAND SUBDIVISION RULES AND REGULATIONS - current through 2001] obtained from ordinance.com

Type I Secondary: 10%

Type II Secondary: 6%

Types I and II Primary: 6%

Millville

What is the maximum grade (percent) allowed for a typical subdivision road?

10

Town of Millville SUBDIVISION REGULATIONS

SECTION IV DESIGN STANDARDS

A. Streets

3. Grade

a) Grades of streets shall be not less than 0.66%. Grades shall not be more than 6.0% for principal streets nor more than 10.0% for secondary streets.

b) On any street where the grade exceeds 6.0% on the approach to an intersection, levelling area with a slope of not more than 4.0% shall be provided for a distance of not less than fifty (50) feet measured from the nearest exterior line of the intersecting street.

Milton

What is the maximum grade (percent) allowed for a typical subdivision road?

8

Rules and Regulations of the Planning Board of the Town of Milton, Massachusetts Governing the Subdivision of Land and the Laying Out of Ways, Section 6.1.14 (Adopted 1966, Amended 2004)

6.1.14 Longitudinal Grades

Grades of streets shall not be less than 1.0%. Grades of streets shall not exceed 8% on straightaway or 6% on curves.

Nahant

What is the maximum grade (percent) allowed for a typical subdivision road?

12

Town of Nahant RULES AND REGULATIONS GOVERNING THE SUBDIVISION OF LAND, 4.02(D), (Received 1995, Up-to-date 2001)

D. Grade

1. The center line grade for any street shall be not less than one percent (1.0%), and shall be not more than as follows:

Street type.....Maximum Center Line Grade

Major.....six percent (6.0%)

Secondary.....nine percent (9.0%)

Minor.....twelve percent (12.0%)

Natick

What is the maximum grade (percent) allowed for a typical subdivision road?

7

Town of Natick Planning Board Subdivision Rules and Regulations, Section IV A (Adopted 1963, from ordinance.com, August 2004)

SECTION IV. DESIGN STANDARDS

A. Streets and Roadways

(g) Grades of all streets shall not be less than 0.70% more than 6.00% for principal streets, or more than 7.00% for minor streets.

Needham

What is the maximum grade (percent) allowed for a typical subdivision road?

8

Section 3.3.1 of the subdivision rules and regulations.

The grade (slope) of a street shall be not less than 0.7% nor more than 8%, except that for a distance of not more than one hundred feet there may be permitted a grade (slope) of not less than 0.5% nor more than 10%. All streets shall be built to the end of the layout or to the limit of a subdivision. The grade of a street within 50 feet of a street intersection shall not exceed 1%, to provide a level area for traffic safety.

Newbury

What is the maximum grade (percent) allowed for a typical subdivision road?

10

Town of Newbury Chapter 117, Subdivision of Land (Adopted 1961, Amended 2000)

Section 21. General layout and dimensions.

D. Grades of all streets shall be the reasonable minimum but not less than 2% nor more than 7% on collector and subcollector streets or 10% on minor streets.

Newburyport

What is the maximum grade (percent) allowed for a typical subdivision road?

8

City of Newburyport Rules and Regulations Governing the Subdivision of Land

6.8 STREETS - DESIGN STANDARDS

According to this section the requirements for maximum grade are as follows:

Court: 10%

Lane: 10%

Local: 8%

Collector: 6%

Arterial: 5%

Newton

What is the maximum grade (percent) allowed for a typical subdivision road?

12

City of Newton, Subdivision of Land, Rules and Regulations, Section 5 (Last amended 2001).

"4. Grade

a. Grades of streets shall be not less than 0.6 per cent, nor more than 12 per cent unless otherwise permitted by the Board."

Norfolk

What is the maximum grade (percent) allowed for a typical subdivision road?

10

Answer based on 7/9/04 phone conversation with Gino Carlucci, Town of Norfolk Planner (508) 528-2961 -- He said there are 2 or 3 different maximums, but was pretty sure that the requirement is 10%; they should be listed in section 4, but researcher was unable to find them there; researcher asked if the grades listed in the non-residential and mixed-used subdivision regulations could be used and he said most likely; 10% is confirmed in the table from Section 8.

North Andover

What is the maximum grade (percent) allowed for a typical subdivision road?

6

Section 6.8.1 from the Town of North Andover Massachusetts Planning Board Rules and Regulations Governing the Subdivision of Land (November 2000, revised October 2001)

6.8.1 Table IA Minimum Design Standards for LOCAL Streets (Design Speed: 30 miles per hour)

Local residential: 8%
Collector residential: 6%
Arterial: 5%

North Attleboro

What is the maximum grade (percent) allowed for a typical subdivision road?

8

Town of North Attleborough Rules and Regulations Governing the Subdivision of Land (Amended 2004)

According to Figures 1,2,3 and 4, the maximum grades are as follows:
Type I Subdivision Minor Street: 8%
Type I Subdivision Principal Street: 6%
Type II Subdivision Minor Street: 8%
Type II Subdivision Principal Street: 6%

North Reading

What is the maximum grade (percent) allowed for a typical subdivision road?

9

Subdivision Rules and Regulations Town of North Reading, Article IV, Section 350-14 (D) (Adopted 1944, Amended 1989, from ordinance.com August 2004)

ARTICLE IV Design Standards

D. Grade.

(1)The center-line grade for any street shall not be less than 1 %.

(2)The maximum center-line grade for streets shall be as follows:

(a)Secondary streets: 9%.

(b)Principal streets: 6%.

(3)Where changes in grade exceed 1%, vertical curves as required by the Commission will be provided; and where a grade is 5% or greater within 150 feet of the intersection of street right-of-way lines, there shall be provided in a residential subdivision a leveling area of at least 75 feet, with a maximum grade of 3%, and in all other subdivisions, a leveling area of at least 200 feet, with a maximum grade of 2%, and at all other intersections there shall be a leveling area of at least 50 feet.

Northborough What is the maximum grade (percent) allowed for a typical subdivision road?

10 Northborough Subdivision Rules and Regulations

C. Grades.

(1) The center-line grade of streets shall not be less than seventy-five hundredths percent (0.75%), not more than six percent (6%) for primary streets and not more than ten percent (10%) for secondary streets. [Amended 5-6-2003]

(2) Vertical curves shall be installed wherever the change in grade exceeds two (2) percent. All vertical curves shall be designed to accommodate a minimum stopping sight distance of 200 feet, at a design speed of 30 mph. All calculations shall be based on the formulas listed in the Highway Design Manual produced by the Commonwealth of Massachusetts, Department of Public Works. [Amended 5-6-2003]

(3) Where the grade of any street at the approach to an intersection exceeds four percent (4%), a leveling area shall be provided having not greater than two-percent grades for a distance of fifty (50) feet measured from the nearest right-of-way line of the intersecting street, wherever possible a low point in the proposed roadway shall be created to prevent stormwater flow onto an existing town road. [Amended 5-6-2003]

Northbridge What is the maximum grade (percent) allowed for a typical subdivision road?

7 Town of Northbridge Chapter 222 Subdivision Rules and Regulations (Adopted 1956, Amended 1998)

Table 1

Street Design Standard

Minor Streets

Maximum Grade 7% (see note 1)

Secondary Streets

Maximum Grade 6% (see note 1)

Major Streets

Maximum Grade 5%

NOTES:

1. Plus up to 2% for a distance not in excess of 300 feet.

Norton What is the maximum grade (percent) allowed for a typical subdivision road?

8 Town of Norton Rules and Regulations Governing the Subdivision of Land

ARTICLE V: DESIGN STANDARDS

5.3 Street Width and Grade

Except where otherwise required by the Planning Board due to special conditions, all street shall conform to the Typical Cross-Section (appendix B) and to the following design criteria:

Maximum gradient

Minor: 10%

Local: 8%

Major: 6%

Norwell What is the maximum grade (percent) allowed for a typical subdivision road?

9 Rules and Regulations of the Norwell Planning Board, Section 4.7.9:
"CENTERLINE GRADE:

The maximum centerline grade should not exceed nine (9) percent. Under certain conditions where safety would not be sacrificed, where the grade is not immediately adjacent to an intersection, and where adherence to a nine (9) percent grade would cause, in the opinion of the Board, excessive damage to the natural land features, the Board may waive this grade limit."

Norwood *What is the maximum grade (percent) allowed for a typical subdivision road?*

8 According to Stephen Costello, Norwood Town Planner, (7/7/04) the maximum grade for local residential streets is 8%.

Paxton *What is the maximum grade (percent) allowed for a typical subdivision road?*

10 Town of Paxton Rules and Regulations Governing the Subdivision of Land (Adopted 1987, Amended 2001)

TABLE 1 STREET DESIGN STANDARDS
Maximum grade for streets is 10%.

Footnote

(2) The Board may grant a waiver to allow steeper grades where due to severe topography, such grades are necessary to minimize cuts and fills. Waivers may not allow the grades shown above to be exceeded by more than two (2) percent.

4.2.6 Grade

4.2.6.1 The minimum centerline grade for any street shall be not less than one percent (1.0%).

4.2.6.2 The maximum centerline grade for streets shall be ten percent (10%).

Peabody *What is the maximum grade (percent) allowed for a typical subdivision road?*

9 RULES AND REGULATIONS GOVERNING THE SUBDIVISION OF LAND City of Peabody, Section IV.A.5(ordinance.com)

5. Grade

a. Streets shall conform as closely as possible to the original topography of the land, except that a combination of steep grades and tight curves shall be avoided. This standard follows from the Master Plan's policy to promote environmentally sensitive design by incorporating flexibility into design standards and regulations.

b. The centerline grade for any street shall not be less than one percent (1%).

c. The maximum centerline grade for all streets shall be six percent (6%). Secondary streets may be nine percent (9%) for a maximum of 500 feet.

d. Where changes in grade exceed one percent (1%), vertical curves, as required by the Board, shall be provided.

e. Where a grade is five percent (5%) or greater within one hundred and fifty feet (150') of the intersection of streets, leveling areas shall be provided as follows: Residential subdivisions: maximum of 3% for at least 125 feet, Non residential subdivisions: maximum of 2% for at least 200 feet.

f. The grade of turnarounds shall not exceed five percent (5%).

Pembroke

What is the maximum grade (percent) allowed for a typical subdivision road?

10 Town of Pembroke Rules and Regulations Governing the Subdivision of Land (Amended 2000)

SECTION IV. GENERAL REQUIREMENTS AND DESIGN STANDARDS

C. STREETS

3. Grade

a. Grades of streets shall, be not less than 1.0% Grades shall not be more than 6.0% for major or secondary streets nor more than 10.0% for minor streets.

Pepperell

What is the maximum grade (percent) allowed for a typical subdivision road?

8 Town of Pepperell Rules and Regulations Governing the Subdivision of Land

Section 238-13. Streets and ways

"E. Grades.

(1) The minimum grade of any street in a subdivision shall be no less than zero and five-tenths percent (0.5%) and shall be no more than six percent (6%) for collectors and shall be no more than eight percent (8%) for minor streets or subcollectors."

Plainville

What is the maximum grade (percent) allowed for a typical subdivision road?

8 Town of Plainville Rules and Regulations Governing the Subdivision of Land, Adopted 1971

According to Table 1 - Street Design Standards, the maximum grades are as follows:

- Arterial: 6%
 - Collector: 6%
 - Local: 8%
 - Minor: 8%
-

Plymouth

What is the maximum grade (percent) allowed for a typical subdivision road?

10 Town of Plymouth Rules and Regulations Governing the Subdivision of Land

STREETS

310 Grade

1. The centerline grade for any street shall not be less than one percent (1%).

2. The maximum centerline grade shall be in accordance with the following table:

Type of Street / Maximum Grade

- Minor 10%
- Collector 8%
- Major Street 8%

3. The grade at an approach to an intersection shall not be more than 2% within fifty (50) feet of the street center line of the intersecting street. If a vertical curve is used in this area, the instantaneous slope of the vertical curve measured at a point fifty (50) feet from the street center line of the intersection street shall not be more than 2%.

4. All streets shall be free of abrupt and frequent changes. A vertical curve is required for any grade change over 1%.

Plympton

What is the maximum grade (percent) allowed for a typical subdivision road?

8 Town of Plympton Rules and Regulations Governing the Subdivision of Land

Section 4, C, 3. Grade

- a. Grades of streets shall be not less than 1.0%. Grades shall not be more than 6.0% for major or secondary streets nor more than 8.0% for minor streets.
 - b. All changes in grade exceeding 1.0% shall be connected by vertical curves of sufficient length to afford, in the opinion of the Board, adequate sight distances.
 - c. At all intersections grades of streets shall not exceed 3.0% within a distance of one-hundred (100) feet within fifty (50) feet from the beginning of the intersection. Proposed streets shall also have a negative slope for a distance of at least fifty (50) feet from the beginning of the intersection.
-

Princeton

What is the maximum grade (percent) allowed for a typical subdivision road?

12 Town of Princeton Rules and Regulations Governing the Subdivision of Land (1996)

SECTION IV. DESIGN STANDARDS

A. Streets 4. Grade

- a. The centerline grade for any street shall not be less than one percent (1.0%).
 - b. The maximum centerline grade for streets shall be as follows:
Low Density Area* / High Intensity Area*
Minor Street: (12%) / (5%)
Secondary Street: (7%) / (5%)
Major Street: (5%) / (5%)
-

Quincy

What is the maximum grade (percent) allowed for a typical subdivision road?

10 Dennis Harrington, Director of Planning, (8/17/04) said that the maximum allowable grade is 10%. The board does not like to approve roads at 10%, but that is the maximum. To reach the maximum level of grade it would need to be justified by unique conditions, he said.

Randolph

What is the maximum grade (percent) allowed for a typical subdivision road?

8 Town of Randolph Subdivision Rules and Regulations, Section 3.6.2

3.6.2 Streets having a grade of less than one percent or sidewalks of less than 5-1/2 feet in width shall be approved only under exceptional circumstances. The maximum centerline grade for streets shall be as follows: Secondary Road - eight percent (8%) for a distance not in excess of 300 feet; in all other cases seven percent (7%); Primary Road - Seven percent (7%) for a distance not in excess of 200 feet; in all other cases six percent (6%).

Raynham

What is the maximum grade (percent) allowed for a typical subdivision road?

8 Town of Raynham Rules and Regulations Governing the Subdivision of Land (Adopted 1955, Amended 1999)

7.3 Streets

3. Grade

A. Grades of streets shall be not less than 1% or greater than 8% for minor street, not less than 0.6% nor greater than 9% for collector streets, and not less than 6% for arterial streets unless otherwise approved by the Planning Board.

B. On any street where the grade exceeds six (6) percent on the approach to an intersection, a leveling area with a slope of less than one (1) percent shall be provided for a distance of not less than fifty (50) feet measured from the nearest exterior line of the intersecting street.

C. Vertical curves are required whenever the algebraic difference in grade between centerline tangents is 0.5% or more. For minor and collector streets the minimum length of vertical curve shall be twenty-five (25) feet per 1% change of grade. Vertical curves for arterial streets shall be in accordance with the most current design standards outlined by AASHTO in A Policy on Design of Urban Highways and Arterial Streets.

D. All roadway pavements on minor or collector streets shall have a cross slope from the centerline of the roadway of no less than 1/2 inch per foot. Arterial roadways shall have a cross slope of no less than 3/8 inch per foot except at horizontal curves which shall be super-elevated in accordance with the most current design standards outlined by AASHTO in A Policy on Design of Urban Highways and Arterial Streets. When a roadway changes directions on a hill, the pavement shall be sloped so that water will not drain from one side of the road to the other.

E. All side slopes resulting from grading of streets and sidewalks shall not exceed one (1) foot vertical to three (3) feet horizontal in fill, one (1) foot to two (2) feet in cut, or one (1) foot to three quarters (3/4) foot in ledge.

F. On arterial streets, whenever the approved street grade and the grade of the adjacent land is such that side slopes of one (1) foot vertical to five (5) feet horizontal or steeper are created and/or if hazardous roadside feature or appurtenances are present and cannot be removed or redesigned, the developer shall be required to install a highway guard. For collector and minor one (1) foot vertical to three (3) foot horizontal or steeper are present and/or where hazardous roadways features or appurtenances are present and cannot be removed or redesigned.

Reading

What is the maximum grade (percent) allowed for a typical subdivision road?

10

Reading Subdivision Regulation Section 7.1.1(b) specifies:

b. Grades of all streets shall be the reasonable minimum, but not less than one percent (1%) nor more than six percent (6%) for principal streets, nor more than ten percent (10%) for minor streets. General slope of grades at all intersections shall be a maximum of two (2)% percent for a distance of at least sixty-four (64) feet from beginning of intersection. Proposed roads shall have a slight negative grade when intersecting with existing roads at or within 50 feet of the beginning of the intersection.

Rehoboth

What is the maximum grade (percent) allowed for a typical subdivision road?

8

Rules and Regulations Governing the Subdivision of Land in the Town of Rehoboth (Adopted 1947, Amended 2001)

502.4 Right-of-Way Widths and Alignments

Local/Residential: 8%

Collector: 6%

Arterial: 4%

Revere

What is the maximum grade (percent) allowed for a typical subdivision road?

8

City of Revere, Rules and Regulations Governing the Subdivision of Land, 5.B.6 and .7:

SECTION 5 - REQUIREMENTS FOR APPROVAL OF A SUBDIVISION

B. Suitability of Design of System of Ways

6) Grades of all streets shall be a minimum of one-half of one percent and the maximum of eight percent.

7) No new private way or ways shall have a proposed established grade at any point less than fifteen feet above Boston City Base.

Rockland

What is the maximum grade (percent) allowed for a typical subdivision road?

10

As listed in the Town of Rockland Subdivision Rules and Regulations, Appendix C (Adopted 1990, Last Amended 2001).

Rockport

What is the maximum grade (percent) allowed for a typical subdivision road?

12

Town of Rockport Rules and Regulations Governing the Subdivision of Land

"4.1.4 GRADE

(a) The centerline grade for any street shall not be less than one per cent (1%).

(b) The maximum centerline grades shall be as follows:

Residential streets: 12%

Secondary streets: 6%

Business streets: 6%

(c) All changes in grade exceeding one-half (1/2) percent shall be connected by vertical curves of sufficient length to afford, in the opinion of the Board, adequate sight distances."

Rowley

What is the maximum grade (percent) allowed for a typical subdivision road?

12

Town of Rowley Rules and Regulations Governing the Subdivision of Land

4.1.5. Grade

4.1.5.1. The centerline grade for any street shall not be less than five-tenths of one (0.5) percent. However, every effort should be made to provide a centerline grade of at least eight-tenths of one (0.8) percent.

4.1.5.2. The maximum centerline grade for streets shall be as follows:

Major: 3 - 5% (high - low density)

Secondary: 4 - 9% (high - low density)

Minor: 5 - 12% (high - low density)

Salem

What is the maximum grade (percent) allowed for a typical subdivision road?

10

According to the City of Salem, Rules and Regulations Governing the Subdivision of Land, Section IV Design Standards, (A)(3), (2001), Right of Way Improvements Policy, Grades shall not be more than 6% for principal streets nor more than 10% for secondary streets. Streets laid out at a 6% through 10% slope shall not vary more than +0.3 foot (three tenths of one foot) from the elevations shown on the Definitive Plan.

Salisbury

What is the maximum grade (percent) allowed for a typical subdivision road?

9

Town of Salisbury Rules and Regulations Governing the Subdivision of Land

SECTION V DESIGN AND CONSTRUCTION STANDARDS

Geometric Design Standards for Subdivisions

Table 69 For Minor Streets

Grade
a. Maximum 9%

Saugus *What is the maximum grade (percent) allowed for a typical subdivision road?*

7 TOWN OF SAUGUS RULES AND REGULATIONS
GOVERNING THE SUBDIVISION OF LAND, Section 4.1(D)(February 1998)
b. The maximum centerline grade for streets shall be as follows:
Minor Street and Secondary Street Nine percent (9%) for a distance not in
excess of three-hundred feet (300'); in
all other cases seven percent (7%).

Scituate *What is the maximum grade (percent) allowed for a typical subdivision road?*

9 Town of Scituate Subdivision Rules and Regulations, Section 7.2.1(4)(as amended 2003):
The maximum centerline grades shall be as follows:
Minor Streets: nine (9) percent
Secondary Streets: eight (8) percent
Major Streets: six (6) percent

Seekonk *What is the maximum grade (percent) allowed for a typical subdivision road?*

8 Town of Seekonk Rules and Regulations Governing the Subdivision of Land

7.2.3. Grades
1. Grades of streets shall be not less than 1% or greater than 8% for minor streets, not less than 0.6% nor greater than 9% for collector streets,
and not less than 0.6% nor greater than 6% for arterial streets unless otherwise approved by the Planning Board. ...

Sharon *What is the maximum grade (percent) allowed for a typical subdivision road?*

7 Maximum Grade:
Lane: 8 percent
Minor: 7 percent
Collector: 6 percent
Non-Residential: 6 percent

The minimum grade across the board is 0.8 percent.

RULES AND REGULATIONS
GOVERNING THE SUBDIVISION OF LAND
SHARON, MASSACHUSETTS
(Adopted under the Subdivision Control Law
Section 81-K to 81-GG inclusive, Chapter 41, G.L.)

4.2.2. Alignment
Roadway Alignment Tables

Sherborn

What is the maximum grade (percent) allowed for a typical subdivision road?

8

Town of Sherborn, Subdivision Rules and Regulations, Section 4.3.4 Grade, (1998).

4.3.4. Grade

- a. The minimum centerline grade for any street shall not be less than one-half percent (.5%).
 - b. The maximum centerline grade for streets shall not be more than eight percent (8%).
-

Shirley

What is the maximum grade (percent) allowed for a typical subdivision road?

10

Town of Shirley Rules and Regulations Governing the Subdivision of Land

4.5.4 Grades

4.5.4.1 The center line grade for any street shall not be less than seventy-five hundredths (0.75) of one (1) percent.

4.5.4.2 The maximum centerline grades shall be as follows:

Collector streets: seven (7) percent

Minor streets: ten (10) percent

4.5.4.3 All changes in grade exceeding one (1) percent shall be connected by vertical curves of sufficient length to afford the following safe stopping sight distances.

Collector streets: 275 feet

Minor streets: 175 feet

4.5.4.4 On any street where the grade exceeds six (6%) percent on the approach to an intersection, a leveling area with a slope of not more than three (3%) percent shall be provided for a distance of at least thirty (30) feet from the nearest edge of the intersection traveled way.

4.5.4.6 Proposed centerline grade shall not be more than seven (7) feet above or below existing centerline grade unless specifically authorized by the Board in unusual topographic circumstances.

4.5.4.6 Street grades shall be designed in relation to existing grades such that the volume of cuts and fills made within the right-of-way approximately balance, except to offset peat, boulders, or other unusable material to be removed.

Shrewsbury

What is the maximum grade (percent) allowed for a typical subdivision road?

8

Town of Shrewsbury Rules and Regulations Governing the Subdivision of Land (Adopted 1973, Amended 2002)

SECTION IV DESIGN STANDARDS

A. Streets

3. Grade

- a. Grades of streets shall be not less than 0.75%. Grades shall not be more than 6.0% for major streets not more than 8% for minor and secondary streets.
-

Somerset

What is the maximum grade (percent) allowed for a typical subdivision road?

7

Town of Somerset Rules and Regulations Governing the Subdivision of Land (Adopted 1954, Amended 1999)

7.1.5 TABLE OF STREET DESIGN

Grade: 5% for collector roads, 7% for local roads and 8.5% for minor roads.

Somerville

What is the maximum grade (percent) allowed for a typical subdivision road?

Southborough

What is the maximum grade (percent) allowed for a typical subdivision road?

8

According to Vera Koliass, AICP, Southborough Town Planner, (7/21/04), the grade shall be no more than 10% on the typical subdivision road.

Chart: Design Standards for Various Street Classifications

Minor residential: 10%

Local residential: 8%

Minor residential collector: 8%

Major residential collector: 6%

Sterling

What is the maximum grade (percent) allowed for a typical subdivision road?

10

Town of Sterling Subdivision Rules and Regulations

4000. REQUIRED IMPROVEMENTS

4240. Grades

4241. Centerline grade for any street shall not be less than seventy-five hundredths (.75) of one percent.

4242. Maximum centerline grades shall conform to the following:

Collector streets: seven (7) percent

Minor streets: ten (10) percent*

Lanes: ten (10) percent*

Cartways: ten (10) percent*

*on continuous grades of 400 feet or less. On longer grades, reduce by 2%.

4243. On any street where the grade exceeds 6% on the approach to an intersection, a staging area with a slope of not more than 4% shall be provided for a distance of at least forty (40) feet from the nearest edge of the traveled intersecting way.

4244. Proposed centerline grade shall not be more than ten (10) percent above or below existing centerline grade unless the Board specifically waives this provision due to unusual topographic circumstances.

4245. To the extent feasible, street grades shall be designed in relation to existing grades so as to approximately balance the volume of cut and fill made within the right of ways, except to offset peat, boulders, or other unusable material required to be removed.

Stoneham

What is the maximum grade (percent) allowed for a typical subdivision road?

9

Jeff Oxman, Assistant Town Engineer, (6/30/04) said the maximum grade is 9 percent.

Stoughton

What is the maximum grade (percent) allowed for a typical subdivision road?

9

TABLE 2. RECOMMENDED STREET DESIGN STANDARDS

Collector street: 6%
Minor street: 9%

Stow

What is the maximum grade (percent) allowed for a typical subdivision road?

10

Town of Stow Subdivision Rules and Regulations, Section 7.8 Street Design Standards (Last Amended 2001)

Access street: 10%
Subcollector street: 8%
Industrial and collector street: 8%
Arterial: 6%
Rural lane: 10%
Marginal access: 8%
Cul-de-sac: 10%

Sudbury

What is the maximum grade (percent) allowed for a typical subdivision road?

6

PLANNING BOARD
TOWN OF SUDBURY, MASSACHUSETTS
RULES AND REGULATIONS
Governing the Subdivision of Land
Adopted September 10, 1973
Latest Revision January 26, 1999

SECTION V. DESIGN STANDARDS

B. Street and Roadway Design

3. Grade

b. The maximum centerline grade should not exceed six percent (6%). Under certain conditions where safety would not be sacrificed, where the grade is not immediately adjacent to an intersection, and where adherence to a six percent (6%) grade would cause, in the opinion of the Board, excessive damage to natural land features, the Board may waive this grade limit.

Sutton

What is the maximum grade (percent) allowed for a typical subdivision road?

9

Town of Sutton Subdivision Rules and Regulations (Amended 2004)

SECTION 4 DESIGN STANDARDS A. STREETS

4. Grade

a. Grades of streets shall not be less than 0.5 percent nor more than 9.0 percent.
b. All changes in grade exceeding eight tenths of one percent (0. 8%) shall be connected by vertical curves with a minimum length of one hundred feet (100').
c. Where a grade is five percent or greater within 150' of the intersection of a street right-of-way line, there shall be provided a leveling area on the proposed street of at least 100', with a maximum grade of three percent.

Swampscott

What is the maximum grade (percent) allowed for a typical subdivision road?

8

According to Eugene Barden, Swampscott Planning Board Chair, (6/29/04) the maximum grade is 8%.

Swansea

What is the maximum grade (percent) allowed for a typical subdivision road?

9

Town of Swansea Subdivision Rules and Regulations

Table 1, Street Design Standards.

Minor: 9%

Principal: 7%

Taunton

What is the maximum grade (percent) allowed for a typical subdivision road?

6

City of Taunton Rules and Regulations Governing the Subdivision of Land

310 GRADE

1) The gutterline grade for any street shall not be less than eight tenths percent (0.80%).

2) The maximum centerline grade shall be in accordance with the following table:

TYPE OF STREET MAXIMUM GRADE

Minor (Residential) 6%

Collector 5%

Major 3%

Tewksbury

What is the maximum grade (percent) allowed for a typical subdivision road?

10

As listed in the Town of Tewksbury Subdivision Rules and Regulations, Table II (Adopted 1998, Last Amended 2003).

"TABLE II

VERTICAL DESIGN STANDARDS

Local & Industrial/ Street Type Cul-de-Sac Commercial Minimum Grade 1% 1% Maximum Grade 10% 8% "

Topsfield

What is the maximum grade (percent) allowed for a typical subdivision road?

8

Topsfield Rules and Regulations Governing the Subdivision of Land, Table 1, Geometric Design Standards.

Type I Subdivision Minor Street: 8%

Type II Subdivision Minor Street: 8%

Type I and II Subdivision Collector Street: 8%

Townsend What is the maximum grade (percent) allowed for a typical subdivision road?

- 9** Townsend Rules and Regulations for Subdivision Control
- §175-16. Design standards.
B. Streets.
(7) The maximum grade for any street shall not exceed 9% in any part of its length, and the minimum shall be at least 0.75%, unless, in specific cases, the Board shall otherwise determine.
- (8) On any street where the grade exceeds 6.0% on the approach to an intersection, a leveling area with a slope of not more than 4.0% shall be provided for a distance of not less than 50 feet, measured from the nearest exterior line of the intersecting street.
- (9) All changes of grade exceeding 1 % shall require vertical curves.
-

Tyngsborough What is the maximum grade (percent) allowed for a typical subdivision road?

- 10** Tyngsborough Planning Board Subdivision Rules and Regulations (Approved 1987)
- Section VII, Table 1
PRIMARY SECONDARY RESIDENTIAL
- | | | | |
|---------------|-------|----|-----|
| Maximum grade | 4% | 6% | 10% |
| Minimum grade | 0.75% | 1% | 1% |
-

Upton What is the maximum grade (percent) allowed for a typical subdivision road?

- 8** Town of Upton Rules and Regulations Governing the Subdivision of Land (Adopted 1970, Amended 2000)
- SECTION IV. DESIGN STANDARDS
A. Streets
4. Grade
a. The centerline grade for any street shall not be less than five-tenths of one percent [0.5%]
b. The maximum centerline grade for streets shall be as follows;
· Minor Streets eight percent [8%]
· Secondary Streets eight percent [8%]
· Major Streets five percent [5%]
-

Uxbridge What is the maximum grade (percent) allowed for a typical subdivision road?

- 8** Town of Uxbridge, Rules and Regulations Governing Subdivision of Land SECTION 4 Design Standards
A. Streets
3. Grades of Streets.
a. Grades of streets shall be not less than 0,75% nor more than 8.0%.
-

Wakefield What is the maximum grade (percent) allowed for a typical subdivision road?

8

According to Rules and Regulations Governing the Subdivision of Land in the Town of Wakefield, Section 4.3.3(b), "[t]he maximum centerline grades shall be as follows: Minor Streets eight (8) percent, Principal Streets six (6) percent."

Walpole

What is the maximum grade (percent) allowed for a typical subdivision road?

7

Walpole Subdivision Rules and Regulations, Section IV.5 (Last Amended 2001)

"(d) The center line grade for any street shall not be less than eight-tenths of one percent (.8%).

(e) The maximum center line grades in all subdivisions shall be as follows:

Local streets: seven percent (7%)

Primary streets: six percent (6%)

(f) All changes in grade shall be connected by vertical curves of sufficient length to afford, in the opinion of the Board, adequate sight distances."

Waltham

What is the maximum grade (percent) allowed for a typical subdivision road?

7

According to the Land Rules and Regulations of the Board of Survey and Planning of the City of Waltham, Section 4.2.4.1 (adopted 1997), the maximum centerline grade of residential streets is 7%.

Wayland

What is the maximum grade (percent) allowed for a typical subdivision road?

8

Section IV.B.2

Primary: 4%

Secondary: 6%

Residential: 8%

Limited Residential: 8%

Wellesley

What is the maximum grade (percent) allowed for a typical subdivision road?

9

SECTION V. Design Requirements B. Streets.

3. Grade.

Town of Wellesley Rules and Regulations Governing the Subdivision of Land in Wellesley, Section V. B. 3(Adopted 1993)

3. Grade

The maximum grade for any street shall not exceed 9 percent in any part of its length and shall not exceed 6 percent except for distances of no more than 200'. Approaches to intersections shall have a grade not to exceed 2 percent for a distance of 100' from the intersection. The minimum grade shall be 1.00 percent except within a cul-de-sac (turnaround) when the center line grade shall be not less than 2 percent.

Wenham

What is the maximum grade (percent) allowed for a typical subdivision road?

10

Town of Wenham Rules and Regulations Governing the Subdivision of Land, Section 4.1.5.2, (Adopted 1984, Last Amended 2001)

Low Density Area

Arterial street: Eight percent (8%) on straightaways and six percent (6%) on curves.

Collector street: Ten percent (10%) on straightaways or eight percent (8%) on curves.

Local, Modified Local and Minor and Common Driveway: Ten percent (10%)

High Density & Non-Residential Areas

Arterial street: Three percent (3%)

Collector Street: Four percent (4%)

Local, Modified Local and Minor and Common Driveway: Five percent (5%)

West Boylston

What is the maximum grade (percent) allowed for a typical subdivision road?

8

From West Boylston's Rules and Regulations Governing the Subdivision of Land, Section VI B(9), Typical Roadway Sections, Design Standards.

Local Residential-10%

Residential Feeder-8%

Industrial Primary-6%

Industrial Secondary-8%

West Bridgewater

What is the maximum grade (percent) allowed for a typical subdivision road?

8

The Land Use Ordinance of West Bridgewater
PLYMOUTH COUNTY, MASSACHUSETTS

RULE AND REGULATIONS GOVERNING THE SUBDIVISION OF LAND
SECTION 4.0 REQUIREMENTS

4.2. Streets and Roadways

4.2.5. Grade

4.2.5.1. The centerline grade for any street shall not be less than one percent (1 %).

4.2.5.2. The maximum grade for streets shall be as follows:

Special Collector Street 5%

Collector Street 6%

Minor Street 8%

Lane 9%

* May be increased by 2% for a distance of 300 feet or less.

4.2.5.3. Where changes in grade exceed one percent (1%), vertical curves at least fifty (50') feet in length shall be provided. Roadways shall have a cross slope at two per cent (2%) or one-quarter inch (1/4") per foot.

4.2.5.4. Where curves and grades combine to create potentially dangerous driving conditions, the Board may require a suitable amount of super

elevation of the curves or other protection.

4.2.5.5. On a collector street in any district and on a minor street in a Residential District, where a grade is four per cent (4%) or greater within one hundred and fifty feet (150) of the intersection of street right-of-way lines, there shall be provided in a residential subdivision containing only single family dwellings, a leveling area of at least seventy-five feet (75'), with a maximum grade of three per cent (3%), and in all other subdivisions, a leveling area of at least two hundred feet (200), with a maximum grade of two per cent (2%).

4.2.5.6. The grade of any street except in special instances shall be so designated that the surface runoff of water shall be from the building line to the street. Where one side of a street drops off so that surface water runoff cannot drain into the street, provision must be shown for drainage tiles and catch basins, with any easement needed, to prevent overflow onto neighboring lots or erosion of banks.

West Newbury *What is the maximum grade (percent) allowed for a typical subdivision road?*

9 Town of West Newbury, RULES AND REGULATIONS GOVERNING THE SUBDIVISION OF LAND
SECTION 4.0. DESIGN STANDARDS 4.1. Streets

4.1.4. Grade

4.1.4.1. The centerline grade for any street shall not be less than eight tenths (0.8) of one percent.

4.1.4.2. The maximum centerline grade for streets shall be as follows:

Low Density Area/High Intensity Area

Minor Streets: 9%/5%

Secondary Streets: 6%/5%

Major Streets: 5%/4%

Westborough *What is the maximum grade (percent) allowed for a typical subdivision road?*

6 Town of Westborough RULES AND REGULATIONS GOVERNING THE SUBDIVISION OF LAND SECTION IV DESIGN STANDARDS
B. Conventional Subdivision Design Standards
1. Streets
c. Grade

Grades of streets shall be not less than 1% or more than 6%. The maximum grade within one hundred (100) feet of an intersection shall be two (2%) percent. Measurements of the 100' leveling area shall be taken along the side street(s) from the line where the side street(s) meet(s) the thorough roadway. Where changes in grade exceed one-half of one percent (0.5%) vertical curves will be provided, the minimum length of vertical curves shall be designed in accordance with the following:

$L = K (G1 - G2)$

G= Grade in percent

L= Length in feet

The minimum value for K are 30 for crests and 35 for sags.

Westford *What is the maximum grade (percent) allowed for a typical subdivision road?*

9 As listed in the Town of Westford Subdivision Rules and Regulation, Section 218.13, subsection A(1) (Adopted 1981, Last Amended 2004):

Maximum grade

Major: 5%

Seconday: 7%

Minor: 9%

Private street: 9%

Common driveway: 10%

Weston**What is the maximum grade (percent) allowed for a typical subdivision road?****6**

Town of Weston Planning Board Rules and Regulations Article IV, 4.04 (Adopted 2002, Amended 2002)

4.04 Grades

Grades of streets shall be not less than 1.00% nor, shall grades be greater than 6%. All streets shall be graded so as to provide not less than 250 feet of clear sight distance at 4 1/2 feet above pavement. At an intersection, no grade shall exceed 3% within a distance of 225 feet of the centerline intersections of the two roads. The minimum vertical curve shall be 200 feet.

Westwood**What is the maximum grade (percent) allowed for a typical subdivision road?****8**Westwood Subdivision Rules and Regulations, Section
SECTION IV. Design Standards, Subsection A(3) Grade (Revised 1998)

b. The maximum centerline grades shall be as follows:

Minor streets: eight percent (8%)

Secondary streets: seven percent (7%)

Major streets: five percent (5%)

Weymouth**What is the maximum grade (percent) allowed for a typical subdivision road?****8**

Rules and Regulations Governing the Subdivision of Land in the Town of Weymouth, Section 5.4:

5.4. Grade

5.4.1. The center line grade for any street shall not be less than one-half of one percent (0.5%).

5.4.2. The maximum center line grade for streets shall be as follows:

Minor Street: eight percent (8%)

Secondary Street: five percent (5%)

Major Street three percent (3%)

5.4.3. Where changes in grade exceed one percent (1%), vertical curves will be provided. On streets designed with two (2) vertical tangents, the algebraic difference shall not exceed eight (8) percent. All summits of vertical curves shall be constructed in a manner which provides visibility as follows:

Minor Street: two hundred (200) feet

Secondary Street: two hundred-fifty (250) feet

Major Street three hundred (300) feet

5.4.4. Where a minor street grade is five percent (5%) or greater within one hundred and fifty feet (150') of the intersection of street right-of-way lines, there shall be provided a leveling area of at least seventy-five feet (75'), with a maximum grade of three percent (3%), and for all other streets, a leveling area of at least two hundred feet (200'), with a maximum grade of two percent (2%).

5.4.5. The grade of any street, except in special instances, shall be so designed that the surface run-off of water shall be from the building line to the street. Where one side of a street drops off so that surface water runoff cannot drain into the street, provision must be shown for drainage tiles and catch basins, with any easements needed, to prevent overflow onto neighboring lots or erosion of banks.

Whitman*What is the maximum grade (percent) allowed for a typical subdivision road?*

10 Town of Whitman RULES AND REGULATIONS GOVERNING SUBDIVISION OF LAND
SECTION IV GENERAL REQUIREMENTS AND DESIGN STANDARDS
4.1 STREETS
4.1.4 Right of Way Width and Alignments

Street Class	Max. Grad.(%)
Arterial	6
Collector	8
Residential or Minor	10

The minimum grade for all street types is 1 percent.

Wilmington*What is the maximum grade (percent) allowed for a typical subdivision road?*

6 Town of Wilmington Rules and Regulations Governing the Subdivision of Land (Adopted 1975)

b. The maximum centerline grade for streets shall be as follows:

Low Density Area*	High Density Area*
Minor Street six percent (6%)	five percent (5%)
Secondary Street five percent (5%)	four percent(4%)Major Street four percent (4%) three percent(3%)

*as determined by the Planning Board

c. Where changes in grade exceed one percent (1%) vertical curves, as required by the Board, will be provided.

d. Where a grade is four percent (4%) or greater within one hundred and fifty feet (150') of the intersection of street right-of-way lines, there shall be provided in a residential subdivision containing only one (1) family dwellings, a levelling area of at least seventy-five feet (75'), with a maximum grade of three percent (3%), and in all other subdivisions, a levelling area of at least two hundred feet (200'), with a maximum grade of two percent (2%).

e. The grade of any street except in special instances shall be so designed that the surface run-off of water shall be from the building line to the street. Where one side of a street drops off so that surface water runoff cannot drain into the street, provision must be shown for drainage tiles and catch basins, with any easement needed, to prevent overflow onto neighboring lots or erosion of banks.

Winchester*What is the maximum grade (percent) allowed for a typical subdivision road?*

10 Town of Winchester Subdivision Rules and Regulations, Section V, A.5 Streets (Adopted 1953, Amended 1988)

b. The maximum center line grades shall be as follows:

Minor streets: ten (10) percent.
Collector streets: eight (8) percent.
Major streets: six (6) percent.

Winthrop*What is the maximum grade (percent) allowed for a typical subdivision road?*

Grades shall not be more than 6% for principal streets nor more than 12% for secondary streets.

Woburn

What is the maximum grade (percent) allowed for a typical subdivision road?

8

According to the 2002 Woburn Planning Board Land and Subdivision Rules & Regulations, Table II, the maximum grade of minor streets is 8%. The minimum grade is 1%.

Worcester

What is the maximum grade (percent) allowed for a typical subdivision road?

"E GRADE

1. Longitudinal Grades The centerline for any street shall not be less than eight tenths of one percent (0.8%).

The maximum centerline grades shall be as follows:

2. Super elevation Where curves and grades combine to create potentially dangerous driving conditions, the Board may require a suitable amount of Super elevation of the curves or other protection.

3. Vertical Curbs All changes in grade exceeding one half percent (0.5%) shall be connected by vertical curves of sufficient length to afford adequate sight distances in accordance with AASHTO standards.

4. Intersections Where streets intersect within a subdivision or at the juncture of a subdivision street with an existing street, a leveling area shall be provided, the street grade at which shall not exceed three percent (3%) for a distance of one hundred (100) feet from the nearest exterior line of the intersecting street."

-- Regulations Governing the Subdivision of Land. Section IX - Design Standards.

Wrentham

What is the maximum grade (percent) allowed for a typical subdivision road?

8

Wrentham Subdivision Rules and Regulations, 4.412:

"Minor Streets: 4.412 Grades. Grades of less than one percent (1.0%) or more than eight percent (8%) shall be approved only under exceptional circumstances by the Board."
