

STANDARD SPECIFICATIONS

FOR

ROAD CONSTRUCTION

NASHUA, NEW HAMPSHIRE

BOARD OF PUBLIC WORKS

ADOPTED AND APPROVED JUNE 11, 1986



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SECTION 100 GENERAL PROVISIONS

100.1 APPLICABILITY & AUTHORITY

1. These specifications govern all roadway construction within dedicated public ways and easements of subdivisions, and are issued under the authority given to the City Engineer and the Board of Public Works by Title 8, Chapter 5, Section 418; and by Title 6, Chapter 7, Sections 601-627 of the Nashua Revised Ordinances.

If any conflict should arise between these specifications and Title 6, Chapter 11, the more stringent shall govern.

2. These specifications also apply to road work which is constructed by Public Works Department employees, by virtue of its adoption as a standard by the Board of Public Works.
3. When so stated in the contract, these specifications shall govern the work of private contractors doing work under contract to the City of Nashua, Board of Public Works.
4. These specifications shall govern the work of all private contractors doing work for developers, contractors, etc. in streets and easements which shall later be dedicated for acceptance by the City of Nashua.
5. This specification shall not supersede the Standard Specification for Sewers and Drains, revised approved and adopted March 24, 1983.
6. Drainlayers and utilities desiring to work in accepted City Streets must first obtain a Street Opening Permit from the City of Nashua Street Department on Riverside Street.

## 100.2 DEFINITIONS

"Contract Drawings" shall be the construction drawings which have been approved by the City Engineer~, signed "approved" and on file in his office.

"Contractor" shall be the party doing the construction: either a private contractor or the Department of Public Works crews, as the case may be.

"Drain" - A pipe or conduit that carries storm water and surface water, street wash, and other wash waters, but excludes domestic waste water and industrial wastes; equivalent to a "storm drain" or "storm sewer" and including "culverts."

"Engineer" shall be understood to be the City Engineer, or his appointed representatives.

"Inspector" shall be understood to be an inspector of the Department of Public Works.

"Roadway" shall mean the entire R.O.W., and any cut or fill slopes which extend beyond the R.O.W.

"Select Materials" shall mean those base course materials, as specified in Section 300.

"Sewer" - A pipe or conduit that carries waste water from residences, commercial buildings, industrial plants, and institutions; equivalent to "Sanitary Sewer."

"Standard Specifications for Road and Bridge Construction, NHDPW & Highways" shall be the most recent available, including all revisions and addendums.

"Subgrade" shall mean the top surface of the road bed upon which select materials are placed.

### 100.3 QUALITY CONTROL

#### AUTHORITY AND DUTIES OF INSPECTORS

Inspectors shall be authorized to inspect all work done and materials furnished. Such inspection may extend to all or any part of the work, and to the preparation or manufacture of the materials to be used. In case of any dispute arising between the Contractor and the Inspector as to materials furnished or the manner of performing the work, the Inspector shall have the authority to reject material or suspend the work until the question at issue can be referred to and decided by the Engineer. The Inspector shall not be authorized to revoke, alter, enlarge, relax or release any requirements of these specifications nor to approve or accept any portion of the work, nor to issue instructions contrary to the Plans and specifications.

The Inspector shall in no case act as a foreman or perform other duties for the Contractor or interfere with the management of the work by the Contractor. Any advice which the Inspector may give the Contractor shall in no circumstances be construed as binding to the Engineer in any way.

#### INSPECTION OF THE WORK

The Contractor shall not start any road construction or lay or bury any pipes or casings or other appurtenances except in the presence of the Engineer or the Inspector. To this end, 48 hours notice shall be given the Engineer by the Contractor of the time and place he intends to do the work. Any work which is done without having given notice or is done contrary to the direction of the Engineer is considered unauthorized and will not be accepted. The Contractor shall remove and replace any unsatisfactory work.

### 100.4 SPECIAL CONTROLS

#### Erosion Control

The Contractor shall take due precautions to minimize the run-off of pollution substances such as silt, clay, fuels, oils, bitumens, calcium

chloride and any other polluting material harmful to humans, fish or other life into the waters of the State. Methods and materials conforming to section 645-Erosion Control, of the Standard Specifications for Road and Bridge Construction, NHDPW & Highways shall be used.

### Dust Control

Dust control shall be provided when deemed necessary by the Engineer so as to prevent damage and nuisance to adjacent property owners and public streets. The means of dust control may include the use of water, calcium chloride or other approved methods.

### Traffic Control

The contractor shall erect and maintain traffic control devices and employ flagmen or City of Nashua Police officers to direct traffic when directed to do so by the Engineer. The Manual on Uniform Traffic Control Devices for Streets and Highways Part IV is a part of these specifications.

Detours will only be allowed after obtaining approval from the City Engineer in consultation with the Police Department, Fire Department, Ambulance Service, and any other emergency or public agency which may be effected.

A request for a proposed detour shall be accompanied with a detailed plan showing the following;

1. Street to be closed
2. Location of construction signs
3. Location of flagmen
4. Dates and hours of the proposed detour
5. Method for notifying the public agencies affected
6. Method for notifying the general public



## 7 Method for notifying the effected abutters

When, in the opinion of the Engineer, public safety or convenience requires the services of the police r the Engineer may direct the Contractor to request the Nashua Police Department to assign officers to direct traffic within the location of work.

Nothing contained herein shall be construed as relieving the Contractor of any of his responsibilities for protection of persons and property.

Police are to be paid by the Contractor.

### Use of Explosives

The storage, handling, transportation and use of explosives shall conform with all Federal, State, and local laws and regulations, including the rules and regulation<sup>5</sup> of the Director of State Police and the provisions below.

The Contractor's attention is called to RSA 158:9-a (Supp.), which in part provides that licenses must be obtained from the Director of State Police in order (1) to use, purchase, or transport explosives, or (2) to store explosives.

When the use of explosives is necessary for the prosecution of the work, the Contractor shall exercise the utmost care not to endanger life or property, including new work. The Contractor will be responsible for all damage resulting from the use of explosives.

All explosives shall be stored in a secure manner. All storage places shall be clearly marked. Explosives shall be stored in a magazine which shall be located in respect to buildings, railways, and highways in a manner as required by the Director of State Police.

The Contractor shall notify each public utility company having structures in proximity to the site of the work of his intention to use explosives. Such notice shall be given sufficiently in advance to enable the companies to take such steps as they may deem necessary to protect their property from injury.

Explosives shall be used only during daylight hours, shall be handled only by competent workmen, and particular care shall be taken to insure that no unexploded charges remain in the work.

All persons within the danger zone of blasting operations shall be warned and no blasting shall be done until the zone has been cleared. Sufficient flagmen shall be stationed outside the danger zone to stop all approaching traffic during blasting operations.

#### 100.5 SUITABILITY OF MATERIALS

All materials to be used shall be subject to inspection and approval or rejection by the Engineer, Any material rejected shall be immediately removed from the work site.

All manufactured materials shall be accompanied with a Certificate of Compliance. The Certificate of Compliance shall be given to the Engineer prior to using the material. The certificate shall show the following:

- a. Date of certification
- b. Description of material
- c. Name of contractor or developer to whom the material is supplied
- d. Name of project or development where material is to be used
- e. Name of manufacturer
- f. Name of supplier
- g. The material meets the requirements of the Board of Public Works
- h. Quantity of material covered by the certification
- i. Date of manufacture, for precast concrete only)
- j. Date delivered to project

k. Identification markings on the material

1. Signature and title of the person having legal authority to bind the originator of the certificate

A certificate may be submitted by either the manufacturer, the supplier, or the contractor.

A sample certificate of compliance is shown in Section 100.9.

Materials listed in the certification may be subject to random sampling and testing by the engineer. Certified materials which fail to meet specification requirements will not be accepted.

The following is a partial list of materials requiring certification: any other manufactured materials not listed shall also be furnished with a certificate:

- Clay Brick
- Bituminous Materials
- Castings: Grates, frames & covers
- Concrete: Blocks, bricks & precast sections.
- Culverts
- Fence
- Guard Rail
- Pipe: Drainage, sewer
- Steel: Reinforcing, mesh, structural
- Conduits: All types
- Precast concrete manhole sections sewer & drain
- Precast concrete catchbasins

#### 100.6 PLANT INSPECTION

The Engineer may undertake the inspection of materials at the source.

In the event plant inspection is undertaken, the following conditions shall be met:

- (a) The Engineer shall have cooperation and assistance of the Contractor and the producer with whom he has contracted for materials being furnished.
- (b) If specified, the Contractor shall arrange for an approved building for the use of the inspector: such building to be located conveniently near the plant, independent of any building being used by the material producer, in which to house and use the equipment necessary to carry on the required tests.
- (c) Adequate safety measures shall be provided and maintained.

#### 100.7 SAMPLING AND TESTING OF MATERIALS

The cost of sampling and testing will be the responsibility of the contractor doing the work, In the case of a Licensed Drainlayer, the cost of sampling and testing will be billed through the Inspectors Fees Procedure. The contractor may elect to have materials sampled and tested by an independent testing laboratory of his choice, provided the laboratory meets with the approval of the Engineer; in which case, sampling shall be done in the presence of an Inspector and test results furnished to the Engineer. Sampling and testing frequency will be determined by the Engineer.

Previously approved material, later found to be unacceptable shall be considered as having never been approved, and shall be removed from the work site.

100.8 MATERIALS FOR WHICH NO SPECIFICATIONS HAS BEEN  
ADOPTED BY THE BOARD OF PUBLIC WORKS

In the event a material to be used is not specifically mentioned in these specifications, the acceptance and use of such material shall be subject to prior approval by the Engineer. The contractor or developer shall submit his request with documentation, test-results, and samples to the Engineer.

100.9 SAMPLE CERTIFICATE OF COMPLIANCE

ORGANIZATION LETTERHEAD  
(Manufacturer, Supplier, or Contractor)

CERTIFICATE OF COMPLIANCE  
--Manufactured or Fabricated Material--

Date \_\_\_\_\_ 20\_\_\_\_\_

WE HEREBY CERTIFY THAT \_\_\_\_\_  
Description, Kind of Material, or Trade Name

Furnished to \_\_\_\_\_  
Contractor (Prime or Sub)

For use on \_\_\_\_\_  
Project Name

Used for Item No. \_\_\_\_\_  
Name of Item

Identified by \_\_\_\_\_

Manufactured by \_\_\_\_\_

Date of Manufacture (Precast concrete only) \_\_\_\_\_

Supplied by \_\_\_\_\_

Date of Delivery \_\_\_\_\_

MEETS THE REQUIREMENTS OF THE PERTINENT PROJECT PLANS, SPECIAL PROVISIONS AND SPECIFICATIONS OF THE NASHUA, N.H. BOARD OF PUBLIC

WORKS IN ALL RESPECTS. PROCESSING, PRODUCT TESTING AND INSPECTION CONTROL OF RAW MATERIALS ARE IN CONFORMANCE WITH ALL APPLICABLE SPECIFICATIONS. DRAWINGS AND/OR STANDARDS OF ALL ARTICLES FURNISHED.

\_\_\_\_\_  
Manufacturer, Supplier or Contractor

Signed by \_\_\_\_\_  
(Officer of Organization)

Title \_\_\_\_\_

(For more than one item, list each Item No., Item Name, Manufacturer, and/or Supplier)

## SECTION 200 - EARTH WORK

### 200.1 CLEARING AND GRUBBING

#### SCOPE OF WORK

Clearing and grubbing shall be carried out where necessary. The Contractor will be allowed to remove only the trees and brush that are absolutely necessary for his construction operations, The Contractor shall be expected to save as many trees as is possible. The removal of all brush and trees, including their stumps necessary for construction purposes, shall be done in such a manner to present a neat appearance at the end of the work. No stumps, roots, brush or timber shall be buried within the limit5 of the roadway, or within the limits of any lot to be dedicated for public purposes, or within the limits of any public easement.

#### CLEARING

Clearing shall consist of felling, cutting and the satisfactory disposal of trees, brush and other vegetation down-timber, and rubbish.

If land owners desire the timber or small trees, the Contractor shall cut and neatly pile it in 4-ft. length for removal by the land owner; otherwise the Contractor shall dispose of it by hauling away. No burning will be permitted unless the Contractor obtains the permission of the City of Nashua Fire Chief beforehand.

## GRUBBING

Grubbing shall be carried out where trees have been felled, and shall consist of the removal and disposal of stumps, including all roots larger than 3-in in diameter to a depth of 18-in. below ground surface and within a 3 ft. radius of the trunk. Stumps within the limits of the roadway shall be completely removed.

## 200.2 EXCAVATION AND EMBANKMENT FOR ROADWAYS

Earth excavation shall be considered all excavation not included as rock excavation. The removal of bituminous pavements shall be considered as earth excavation. Rock Excavation shall consist of all solid rock which requires for its removal drilling and blasting. It shall also consist of boulders and parts of masonry structures when found to measure 2 cubic yards or more. The removal of concrete pavements shall be considered as rock excavation.

Embankment material shall be either excavated material from the work site or borrow material from other sources. In either case, the material will subject to the approval of the Engineer. Embankment material shall be free of organic material loam, humus peat, muck, stumps, roots, sod, or any other material not suitable for foundation material regardless of moisture content.



Where excavation to designed elevations results in a subgrade or slope of unsuitable material, the contractor will be required to remove the unsuitable material as directed by Engineer. The backfilling will be done with approved materials and compacted to the design subgrade or slope.

Over-excavated subgrade in rock shall be backfilled to design subgrade with porous material, such as sand, gravel, or broken rock. Non-porous materials will not be acceptable.

Rock fragments in fills shall be placed in layers of such thickness as the Engineer may direct, and in no case in excess of 4 feet. The lifts shall be worked in such a manner as to close the voids with spalls and fines. When sufficient spalls or fines are not available to close the voids, earth shall be used to make a tight surface prior to placing the next lift.

### 200.3 PLACING EARTH FOR ROADWAYS

Earth shall be place in layers the full width of the roadway, generally parallel to the finished grade. The layers shall not exceed 12 inches of loose depth unless otherwise directed. Each layer shall be spread to a uniform thickness and compacted to the required density prior to placing the next layer. Continuous grading or shaping shall be carried out concurrently with the compactive effort to insure uniform density throughout each layer of material.

Embankments shall be graded at all times to insure the run-off of water. Any saturation of non-porous material due to the Contractor's selected method of operation will occasion the suspension of additional work on the area until rectification by drying, removing and replacing, or draining has restored the fill to a stable condition, at the contractor's expense.

#### 200.4 WINTER CONSTRUCTION METHODS

No embankments shall be constructed on frozen earth materials. Each layer of material placed shall be compacted to the required density before it freezes. All frozen material shall be removed from the top of embankments prior to placing additional material. The frozen lumps of earth removed shall be placed outside of the limits of an assumed 1-1/2 to 1 slope from the break in the shoulder and inside the designed or ordered slope line. If the above: specified conditions cannot be met, earthwork operations shall be suspended.

#### 200.5 EMBANKMENT FOUNDATION

Where the existing ground is 3 feet or less below-subgrade, the top 6 inches within the limits of the roadbed shall be compacted to the same density as that required of the first-layer of material to be placed over it.

#### 200.6 DENSITY REOUIREMENTS AND TESTS

Earth materials used to construct embankments shall be compacted to at least 95 percent of maximum density. The maximum density determination will be made as specified in AASHTO T99. (Standard Proctor Test.) The in place~density determination;will be made by AASHTO T191 (Sand cone method), AASHTO T204 (Drive Cylinder Method), or by AASHTO T238 and T239. (Nuclear Method.) The contractor shall obtain whatever equipment is necessary to achieve the specified density. Manipulation of tills, silts, and clays or any combination thereof, (including aeration where necessary) will be required to produce a stable fill of the required density. Water shall be evenly applied to granular materials, as required, to produce a fill of the required density.

## 200.7 TEST STRIP PROCEDURE

Those materials which cannot be tested for maximum density in accordance with AASHTO T99 shall be tested by the test strip procedure. At the beginning of the compaction operation, the maximum density shall be determined by compacting a short control section or "test strip" at a suitable moisture content until no further increase in density can be obtained. The remainder of the material placed shall be compacted to a density not less than 95% of the maximum strip test density. Densities shall be obtained by the nuclear method. A new test strip will be required when there is a significant change in the gradation of the material being placed. Compacting of the "test strip" shall be done with an approved vibratory roller or compactor producing a dynamic force of at least 27,000 pounds,

## 200.8 FINE GRADING

### 200.81 Description of work

This work shall consist of the final grading of all base course materials, the final grading of subgrade prior to placing base course materials, the grading of all slopes whether in or out of the right-of-way, and the final grading of all easements.

The surface of each course of material, including the subgrade, shall be fine graded to conform to the typical section of the plans prior to placing the succeeding course.

The contractor shall set, or provide for the setting of, grade stakes spaced sufficiently to afford facility for checking the surface of each layer. The stakes shall be marked in such a manner that the Inspector can readily determine the corresponding location and grade, as shown on the approved plans.

This work, also, includes the grading of sidewalk base course materials, loamed areas, driveway aprons, ditches, and any other areas shown to be constructed to a specified grade.

#### 200.82 Inspection of the Work

The contractor shall notify the Engineer when he has completed the fine grading for each (layer) of base course material, including subgrade. The Engineer may take whatever measurements or tests he feels are necessary to verify the quality of the completed work.

The placing of the succeeding course shall not begin until the Engineer has had the opportunity to complete his measurements or tests. Whether or not the Engineer elects to take any measurements or tests will not relieve the contractor from constructing the project in accordance with the approved plans.

Grade stakes shall not be removed until the Engineer or Inspector has had the opportunity to complete his measurements or tests.

### SECTION 300 - BASE COURSE MATERIALS

#### BASE COURSE MATERIALS

##### 300.1 DESCRIPTION OF WORK

This section contains the requirements for materials to be used as base course material for roads and sidewalks.

Where appropriate item numbers correspond to NHDPW&H Standard Specifications for Road and Bridge Construction. All the requirements of Division 300, Base Courses, of the NHDPW&H Standard Specification for Road and Bridge Construction shall apply, unless more stringent requirements are stated herein

**300.2 REQUIRED GRADING****-PERCENT PASSING-**

SIEVE SIZE	SAND*	GRAVEL*	CRUSHED GRAVEL		GRANULAR BACKFILL		CRUSHED STONE FINE GRADATION
			over 5000cy	under 5000cy	SAND	GRAVEL	
<u>ITEM NO.</u>	304.1	304.2	304.3		209	209.1	304.4
3"			100		100	95-100	
2"			95-100				100
1-1/2"				100			85-100
1"			55-85				
3/4"							45-75
<u>NO. 4</u>	70-100	25-70	27-52	27-55	70-100	25-70	20-45
<u>NO. 200**</u>	0-12	0-12	0-12	0-12	0-15	0-15	0-15

\* Max. Size Stone = 3/4 X thickness of the layer being placed

\*\* Based on that portion passing the No. 4 Sieve

300.3 COMPACTION OF BASE COURSE MATERIALS

Compaction of sand, gravel, crushed gravel and crushed stone shall be done with an approved vibratory roller. Rolling and grading shall begin on the lower side and progress to the higher part of the course with lapped rollings parallel to the center line. Rolling and grading shall continue until the layer conforms to the required grade and cross section and the surface is smooth and uniform.

The contractor shall furnish and distribute water uniformly over the material during compaction, as required, to obtain optimum moisture.

The minimum density required shall be 95 percent of the maximum density, as determined by the test strip method (See Section 200.7).

Base courses shall not be placed on or above frozen material. If the density requirements are not fulfilled for any layer before the material freezes, no further material shall be placed upon that layer.

300.4 TYPICAL SUBDIVISION STREET

The standard subdivision street shall have base course materials conforming to one of the following alternates:

ALT. "A"	ALT. "B"	ALT. "C"
4" Crushed Gravel	4" Crushed Stone (Fine Gradation)	12" Crushed Stone (Fine Gradation)
12" Gravel	12" Gravel	

Appendix "A" 'Typical cross section, Subdivision street.' is a part of this specification.

## ALTERNATE "D" - SOILS-ENGINEER-DESIGNED ROADWAY CROSS SECTION

Prior to submitting street plans for preliminary subdivision approval, as required under Title 8, Chapter 5, Section 407 (12), the subdivider may propose another typical cross section by obtaining and submitting to the City Engineer the following:

- 1) A report from a soils engineer, registered in the state of New Hampshire, detailing his findings and recommendations, for a proposed alternate roadway cross section.
- 2) The soils engineers report shall contain his recommendations on the following points:
  - A) Adequacy of the proposed cross section for its intended use.
  - B) Thickness and gradation of base materials.
  - C) Thickness of pavement.
  - D) Location and type of underdrain.
  - E) Removal and backfill of unsuitable material.
  - F) Any other characteristics of the site that in his opinion need special construction techniques or materials, to maintain the integrity of the roadway.
- 3) The soils engineer's report should contain the results of any sampling and testing performed.

The street plans will be reviewed by the City Engineer and compared with the soils engineer's recommendations.

## ADDITIONAL REQUIREMENTS

1. Additional depths of base course materials may be ordered by the Engineer during construction, when in his opinion they are required.
2. Whether or not a cross section design report is prepared, the developer's engineer shall propose roadway underdrain, where necessary, to control any groundwater within the R.O.W. Additional underdrain may be ordered by the City Engineer during construction when in his opinion it is required.

## SECTION 400 - HOT BITUMINOUS PAVEMENTS

### 400.1 DESCRIPTION OF WORK

These specifications shall apply to new construction, overlay projects, and the patching of existing city streets.

### 400.2 MIXING AND BATCHING PLANTS

Material for hot bituminous pavement shall only be obtained from plants meeting the requirements of the NHDPW&Hwy. Written proof of meeting this requirement shall be furnished to the Engineer prior to beginning any paving operation.

At least three working days in advance of starting paving operations, the Engineer shall be notified and provided with the following information: name and location of plant, project or street where the mix is to be used, estimated tonnage, material (base, binder, or top), mix type and the time the first load is to leave the plant.

The above information is needed, should the Engineer elect to have the mix tested at the plant during batching. The cost of such inspection and testing will be the responsibility of the contractor. Generally, plant inspection will not be required for patching or paving operations involving less than 100 tons of mix.

The Engineer shall have access at any time to all parts of the plant for inspection of the conditions and operations of the plant, for confirmation of the adequacy of the equipment in use, for verification of proportions and character of materials, and for determination of temperatures being maintained in the preparation of the mixtures.



### 400.3 JOB - MIX FORMULA

A job-mix formula shall be designed for each type of pavement to be used. The job-mix formula shall be presented to the Engineer, for his approval at least one week prior to beginning paving operations, and also one week prior to requesting a change in the job-mix formula after a formula has once been approved. The job-mix formula shall be accompanied with all back-up information necessary to verify the suitability of the formula.

After the job-mix formula is approved by the Engineer, all mixtures furnished for the project shall conform thereto, within the following ranges of tolerances:

Passing No. 4 and larger sieves	$\pm 7\%$
Passing No. 4 to No. 80 sieves	$\pm 4\%$
Passing No. 200 sieves	$\pm 2\%$
Bitumen	$\pm 0.4\%$
Mix temp. at the-plant	$\pm 20$ F.

### 400.4 TYPICAL SUBDIVISION STREET

The mix designs for hot bituminous pavement for streets in subdivisions shall conform to Table 2 - Composition of Mixtures Master Ranges, as shown on page 118 of the Standard Specifications for Road and Bridge Construction NHDPW&Highways.

The base course shall be Type B: 3/4".

The wearing course shall be Type F: 3/8",

The mix design for hot bituminous concrete sidewalks in subdivisions shall conform to Table 1 - Composition of Mixtures - Master Ranges, as shown on page 331 of the Standard Specifications for Road and Bridge Construction, NHDPW& Highways. Sidewalks shall be constructed in (2) 1" courses. Handicap ramps shall be constructed at street intersections.

Appendix "A" is a part of these specifications.

#### 400.5 MIXING TEMPERATURE

The aggregate shall be dried and heated to a minimum temperature of 260°F. The bitumen shall be heated to a temperature between 250°F and 325°F.

The Engineer may adjust the job-mix formula temperature within the limits of 260°F. and 325°F, discharge temperature. Material with a temperature at discharge, outside the job-mix formula tolerance may be rejected.

#### 400.6 PLACING HOT BITUMINOUS PAVEMENT

The Engineer shall have the authority to prevent the starting of a paving operation or to suspend a paving operation that has begun, when in his opinion a satisfactory final product cannot be produced.

Mixtures shall be placed only when the underlying surface is dry, frost free and the surface temperature and air temperature is above 40°F. No load shall be sent out so late in the day-that spreading and compacting cannot be completed during daylight. Wearing course shall not be placed after October 30th, unless specifically permitted in writing by the Engineer. Base course pavement shall not be placed until the Engineer has been given the opportunity to inspect the crushed gravel for conformance to the plans and specifications. Wearing course pavement shall not be placed until the Engineer has been given the opportunity to inspect the base course pavement for conformance to the plans and specifications.

#### 400.7 MINIMUM TEMPERATURE

Any Bituminous Pavement delivered to the project having a temperature lower than 250° F shall not be used. The pavement shall be thoroughly compacted in accordance with 400.13 before the mix cools to 180°F.

#### 400.8 TACK COAT

Any base course pavement which has been exposed for a considerable length of time, such as over the winter, or has a dusty surface, shall be uniformly covered by a tack coat of emulsified asphalt immediately prior to paving the next course.

Emulsified asphalt for tack coat shall be SS-1, SS-1h, CSS-1, or CSS-1h diluted one part water to one part emulsified asphalt. The tack coat shall be applied on only as much pavement as can be covered with asphalt-aggregate mixture in the same day. The rate of application shall be 0.05 to 0.15 gals/s.y., as directed by the Engineer.

A tack coat of emulsified asphalt shall be applied to the contact edge of all utility castings, the contact edge of existing pavement, and to the contact edge of any previously placed mat that, in the opinion of the Engineer, will result in a cold joint. A longitudinal or transverse joint left open overnight shall be considered a cold joint, and will require a tack coat prior to continuing with the paving operation.

#### 400.9 PAVERS

All courses of roadway pavement, shall be spread and finished to the required thickness by self contained, self-propelled, spreading and finishing machines, (pavers). Pavers shall be provided with an adjustable, activated screed or strike-off assembly, and shall be capable of spreading the mixture with a finish that is smooth, true to the required cross section, uniform in density and texture, and free from hollows, tears, gouges, corrugations, and other irregularities. Any paver producing an unsatisfactory mat shall be removed from the project.

Automatic screed controls will not be required, although they are allowed

#### 400.10 HANDWORK

When paving small areas, or patches, not accessible with a self-propelled paver, care shall be taken to create a surface texture similar to the machine work. Surface material shall be spread by lutes.

#### 400.11 LEVELING COURSE

In the event the base course has been allowed to deteriorate a leveling course shall be placed, with a paver, to a minimum depth as specified by the Engineer. Any utility castings previously set to grade shall be raised to allow for the additional pavement.

Leveling course pavement shall conform to Table 1 on Page 144 of the Standard Specification for Road and Bridge Construction, NHDPW&Hwys.

#### 400.12 ADJUSTING UTILITY CASTINGS

The castings shall not be raised to finish grade until the base course of pavement has been placed. If the finish course is not scheduled to be placed soon, then a ring of hot bituminous pavement shall be placed around each casting which is likely to be struck by a vehicle or plow. The ring of material shall extend out from the edge of the casting a minimum of 2 feet and shall be finished to a feathered edge. The ring shall be removed prior to placing the finish course of pavement.

The void resulting from the raising of utility castings shall be filled with either Class A concrete or crushed gravel, in either case the last 2 inches shall be hot bituminous pavement. A tack coat shall be placed uniformly over the cured concrete prior to placing the hot bituminous pavement.

#### 400.13 COMPACTION

Compaction of base course pavement shall be done with a minimum of one static steel - wheeled roller weighing at least 8 tons, followed by the use of a pneumatic - tired roller. One vibratory roller may be substituted for the steel wheeled and pneumatic rollers on base courses. Compaction of finish course pavement shall be done with a minimum of one static, steel-wheeled roller weighing at least 8 tons, followed by the use of a pneumatic-tired roller. A vibratory roller is not allowed on finish pavement. Each course shall be compacted to a minimum density of 95% of laboratory specimens, made the AASHTO T245 method in the proportions of the job-mix formula.

The wearing course shall be rolled with steel-wheeled roller until all roller marks are eliminated.

Additional rollers may be required on large projects, to obtain the desired pavement density.

#### 400.14 TRANSVERSE JOINTS

Previously layed material shall be removed to provide a vertical butt joint of required thickness.

#### 400.15 DELIVERY SLIPS

All loads of hot bituminous pavement shall be accompanied with a delivery slip, one copy to be retained by the engineer for his records. The slip shall have the following information:

- a) Source of material
- b) Type of material
- c) Tons of material
- d) Date
- e) Plant inspectors initials (when appropriate)

### SECTION 500 - SLOPE GRANITE CURB

#### 500.1 DESCRIPTION OF WORK

This item consists of furnishing and installing slope granite curbing and shall conform to the following:

## 500.2 MATERIAL

Curbing shall be of hard and durable granite, light gray in color, and free from seams which impair its structural integrity. Variations characteristic of the formation are permitted.

Dimensions shall conform to the following:

Top - wire sawed to approximate true plane and shall be three (3) to nine (9) inches wide.

Front or exposed face - shall be smooth quarry split to an approximate true plane. Dimension of face shall be twelve (12) inches plus or minus one (1) inch. Face shall have no projections or depressions greater than one (1) inch, under a two foot straight edge.

Back or Concealed Face - shall be approximately parallel to the front or exposed face.

Length of Stone - minimum length shall be two (2) feet.

Ends of Stone - shall be square with the plane of the face and so finished that, when the stones are set, no space more than one inch shall show in the joint for the full width of the face.

### 500.3 CONSTRUCTION

Curb shall be set to the line and grade required by the City Engineer, on an approved foundation, on a one to one (1:1) slope and shall project seven (7) inches vertically above the finished shoulder grade or pavement, unless otherwise directed.

Slope granite curb when used on a radius of twenty (20) feet or less, shall be cut with radial joints.

Joints between curbstones shall be carefully filled with mortar for a depth of three (3) inches from the face. They shall be neatly jointed on the face, and all excess mortar shall be satisfactorily cleaned from the curbstone face.

Cement mortar shall be composed of equal parts of cement and sand with sufficient water to form a workable mixture.

Curbing shall be placed in a minimum of six (6) inches of compacted gravel. Curbing shall be set as specified and all spaces under curbstones carefully and thoroughly rammed so that the curbstone shall be completely supported throughout their entire length.

## SECTION 600 - LOAMING & SEEDING

### 600.1 MATERIALS

Loam shall be fertile, natural soil, typical of the locality, free from large stones, roots, sticks, clay, peat, weeds and sod and obtained from naturally well drained area. It shall not be excessively acid or alkaline nor contain toxic material harmful to plant growth.



Fertilizer shall be a complete commercial fertilizer, 10-10-10 grade. It shall be delivered to the site in the original unopened containers each showing the manufacturer's guaranteed analysis. Store fertilizer so that when used it shall be dry and free flowing.

Lime shall be ground limestone containing not less than 85 percent calcium and magnesium carbonates.

Seed shall be from the same or previous year's crop; each variety of seed shall have a percentage of germination not less than 90, a percentage of purity of not less than 85, and shall have not more than one percent weed content. The mixture shall consists of seed proportioned by weight as follows:

For grassplots and lawns:

Canadian Creeping Red Fescue	50%
Kentucky Bluegrass	20%
Red Top	15%
Domestic Rye Grass	15%

Seed shall be delivered in sealed containers bearing the dealer's guaranteed analysis.

#### 600.2 APPLICATION

Loam shall be placed to a minimum depth of 4 inches.

Lime shall be applied at the rate of 25 pounds per 1,000 square feet.

Fertilizer shall be applied at the rate of 30 pounds per 1,000 square feet.

Seed shall be applied at the rate of 5 pounds per 1,000 square feet.

### 600.3 INSTALLATION

The subgrade of all areas to be loamed and seeded shall be raked and all rubbish, sticks, roots and stones larger than 2-in shall be removed. Loam shall be spread and lightly compacted to finished grade. Compact loam shall not be less than the depth specified. No loam shall be spread in water or while frozen or muddy.

After the loam is placed and before it is raked to true lines and rolled, limestone shall be spread evenly over loam surface and thoroughly incorporated with loam by heavy raking to at least one half the depth of loam.

Fertilizer shall be uniformly spread and immediately mixed with the upper 2-in of topsoil.

Immediately following this preparation the seed shall be uniformly applied and lightly raked into the surface. Lightly roll the surface and water with a fine spray. Seed shall be sown in a favorable season, as approved by the Engineer.

Keep all seeded areas watered and in good condition, reseeding if and when necessary until a good, healthy, uniform growth is established over the entire area seeded, and maintain these areas in an approved condition until final acceptance.

On slopes, the Contractor shall provide against washouts by an approved method. Any washout which occurs shall be regraded and reseeded at the Contractor's expense until a good sod is established. Methods and materials conforming to Section 645 Erosion Control, of the Standard Specifications for Road and Bridge Construction. NHDPW& Highways shall be used.

SECTION 700 - GRANITE BOUNDS

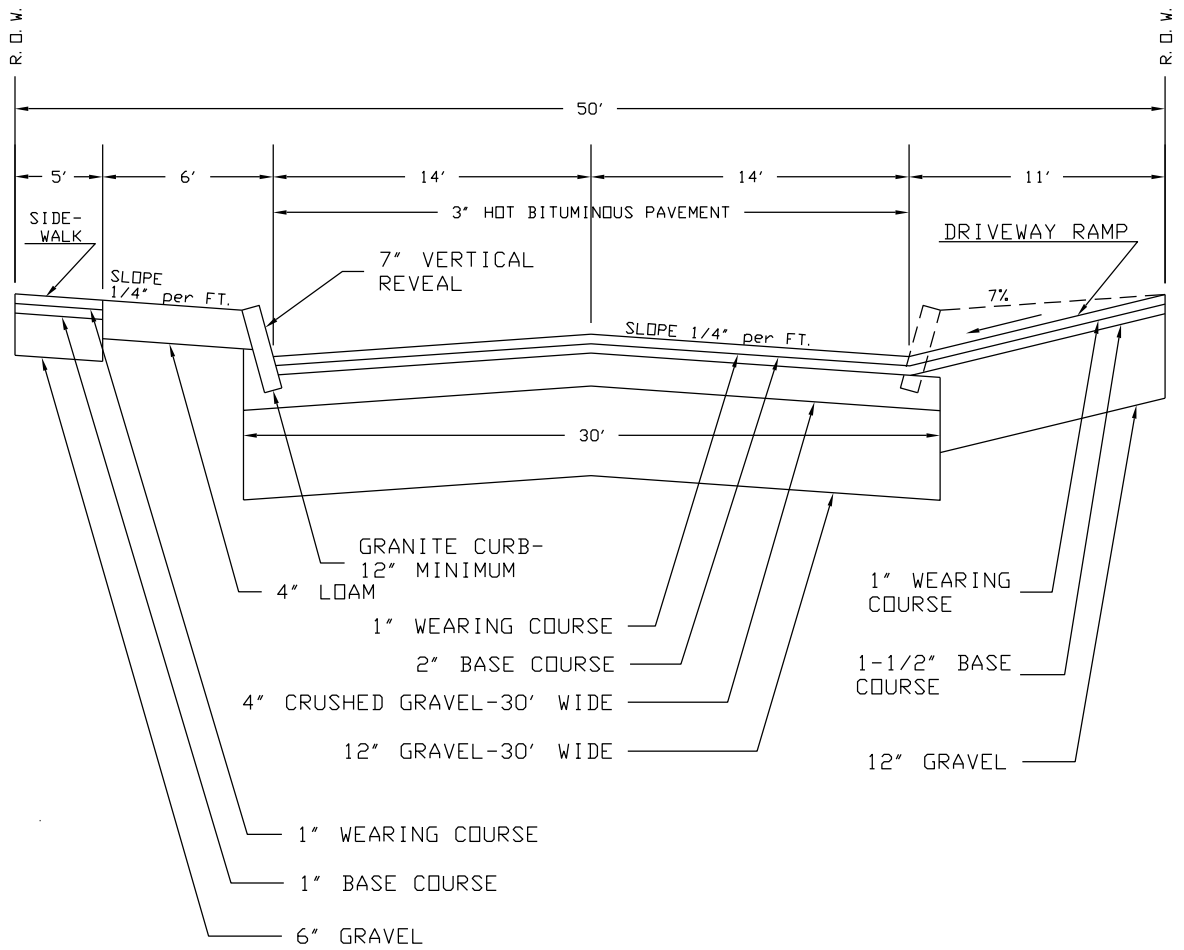
DESCRIPTION

This item consists of furnishing and setting granite stone bounds at the required locations as shown on the plan. The bounds shall be of granite and shall be free from seams which would impair their structural integrity. The minimum dimensions shall be 4" X 4" X 2'-0", and shall have a drill hole in the dressed or sawn top face.

Stone bounds shall be set at the required locations by a Land Surveyor Licensed in the State of New Hampshire.

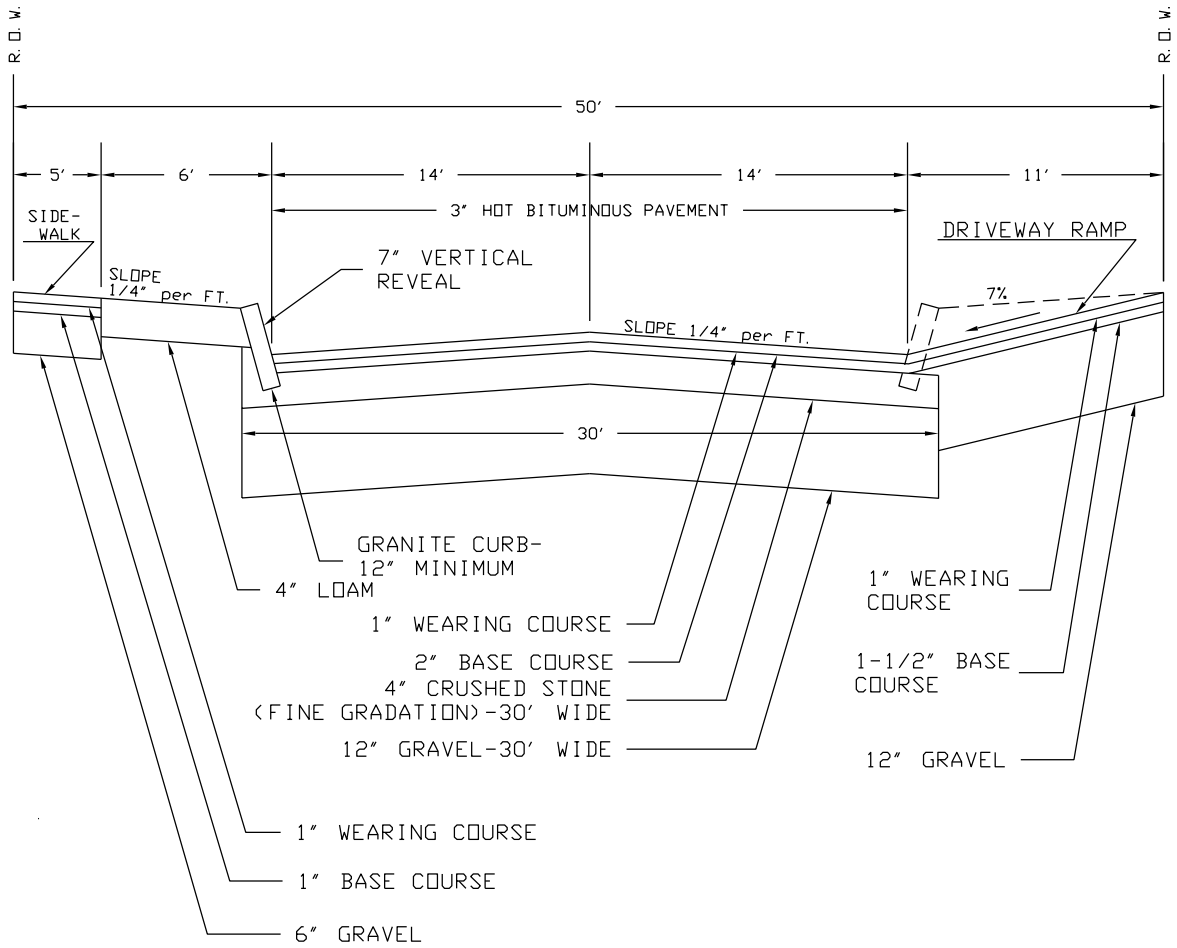
The excavation shall be made to a sufficient depth to allow the bound to protrude 4 inches above the ground. Bounds set in driveways and established lawns shall be set flush with the finished surface.

## APPENDIX "A"



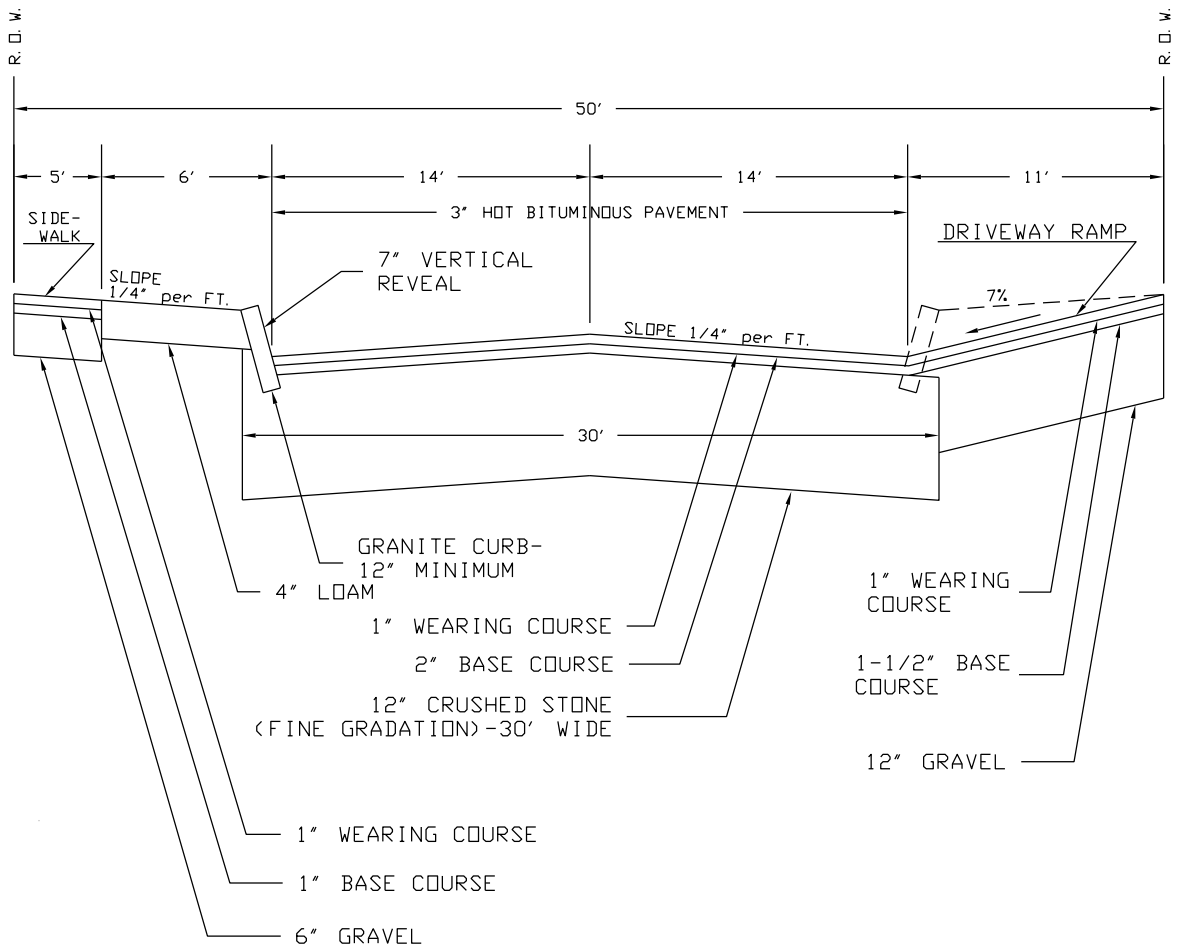
-TYPICAL X-SECTION-  
 ALT. "A"  
 SUBDIVISION STREET

< NOT TO SCALE >



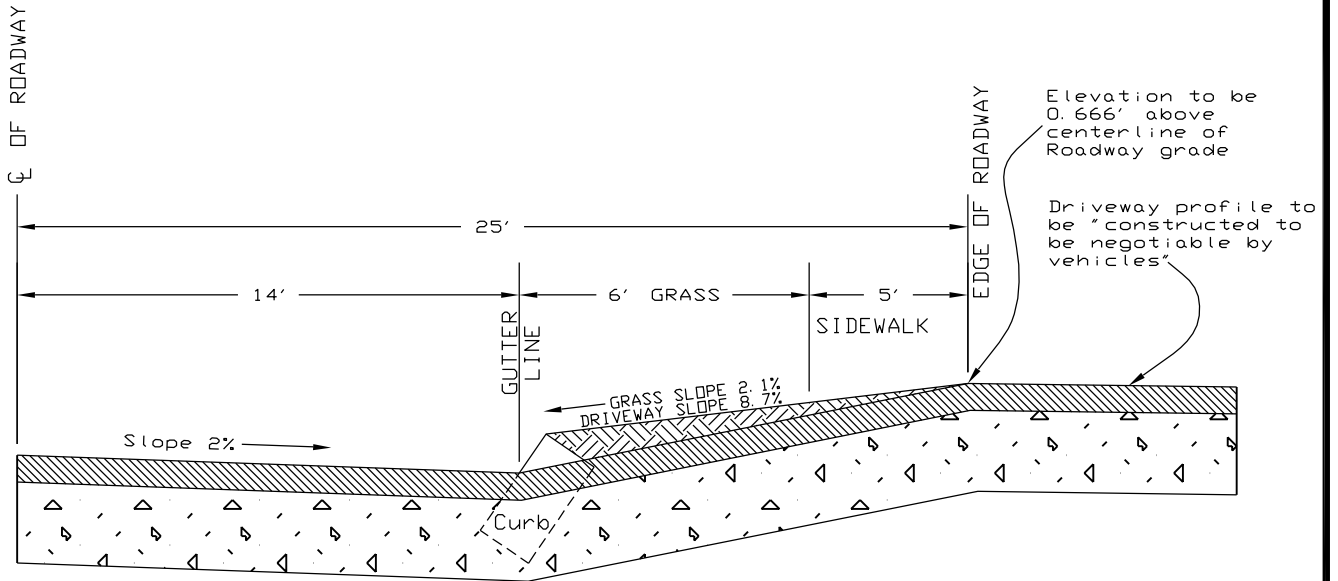
-TYPICAL X-SECTION-  
ALT. "B"  
SUBDIVISION STREET

<NOT TO SCALE>



-TYPICAL X-SECTION-  
 ALT. "C"  
 SUBDIVISION STREET

< NOT TO SCALE >

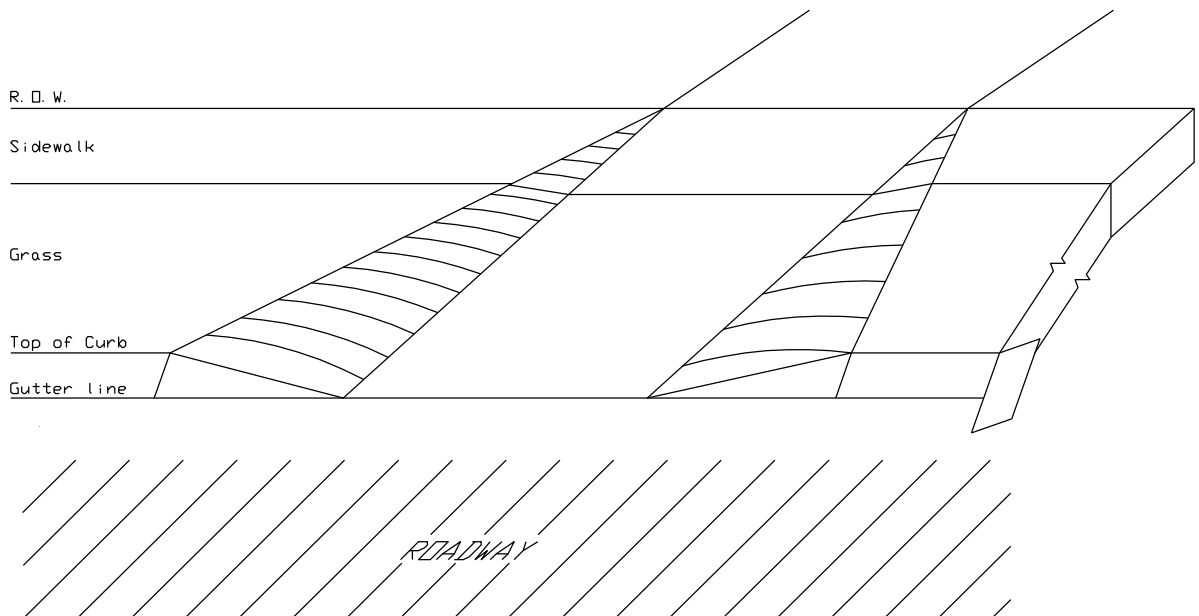


-Roadway & Driveway Cross Section-

TYPICAL DRIVEWAY DETAIL

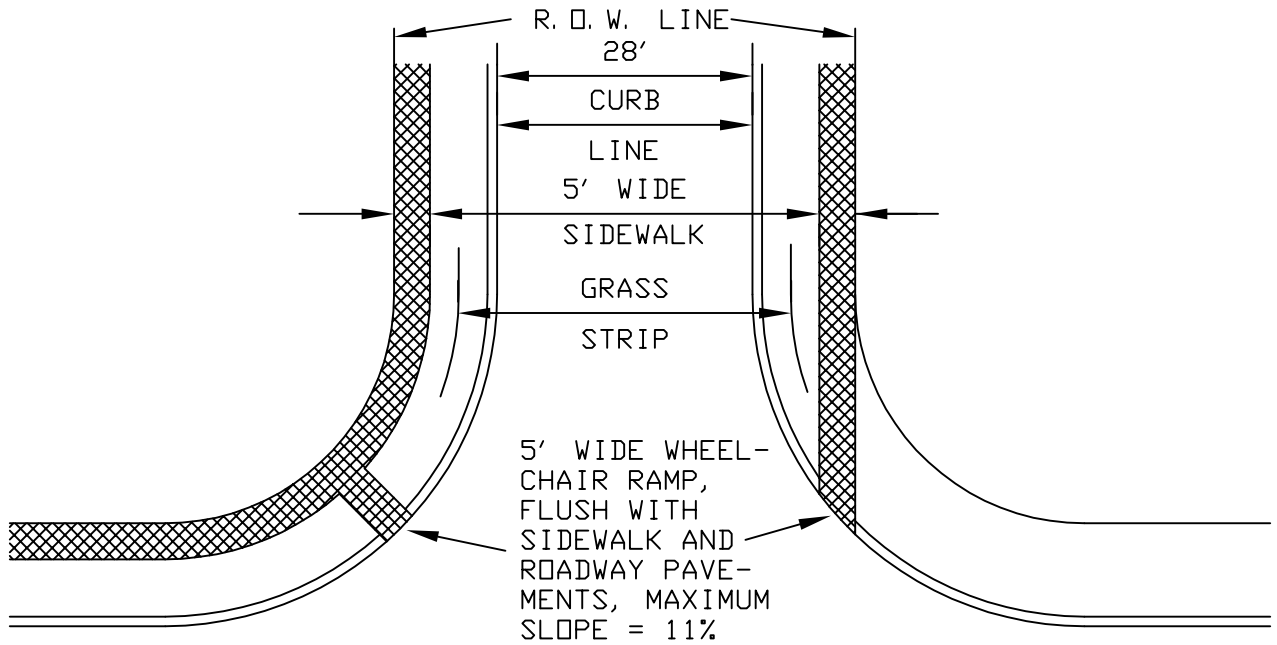
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CONSTRUCT DRIVEWAY TO MEET GRADING AS SHOWN ON PERSPECTIVE.  
 DRIVEWAY SLOPE TO RISE 8.7% FROM E. P. TO BACK OF WALK/R. D. W.

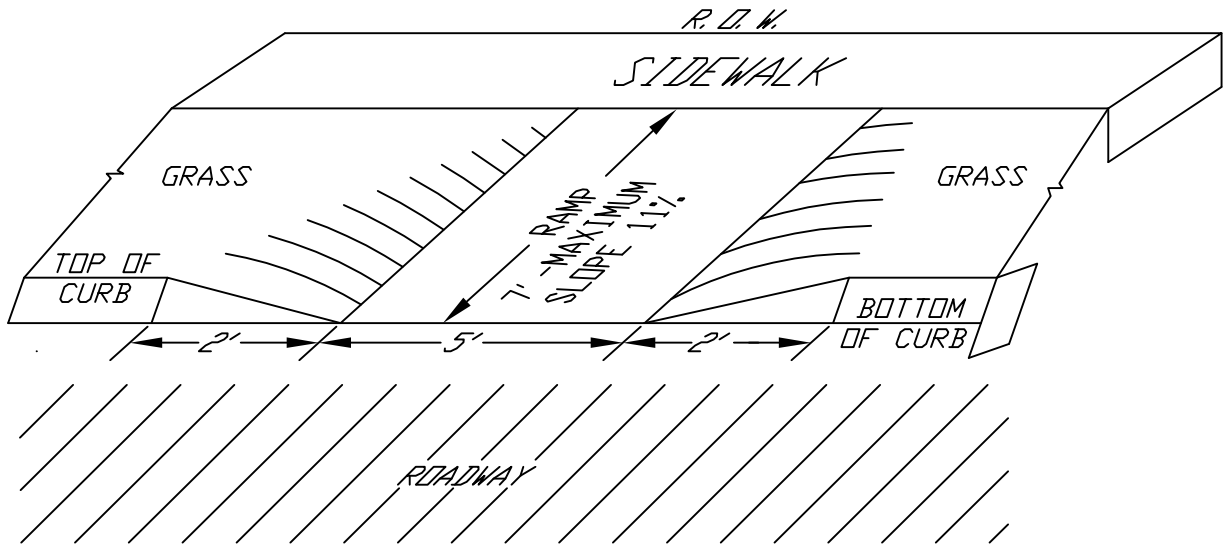


-PERSPECTIVE-





-PLAN-



-PERSPECTIVE-

WHEELCHAIR RAMP DETAIL  
WITH GRASS STRIP  
(NOT TO SCALE)