

Town of Charlestown Subdivision and Land Development Regulations
Proposed Text Adjustments to Section 11 and Section 12 Related to Updated Figures

March 2015

SECTION 11 PHYSICAL DESIGN AND PUBLIC IMPROVEMENT STANDARDS

11.1 Generally.

The applicant, at his own expense, shall construct all streets and improvements where required by these Regulations.

11.2 Street Design Standards.

The following design standards shall be followed for safety, efficiency, minimized environmental impact, livability of residential environment, and economy of land use where applicable in the design and construction of any subdivision or land development project:

A. Frontage on Improved Roads.

No subdivision shall be approved unless **the area to be subdivided meets one of the following criteria**:

1. ~~The area to be subdivided~~ Has frontage on an existing state- or Town-maintained road that has been dedicated to the public and accepted by the Town.
2. Has the minimum frontage on a private street that existed prior to September 21, 1982, and which **has** had private arrangements established for the maintenance of the private street(s) since September 21, 1982 and which private arrangements remain in existence at the time of application for subdivision and which arrangements **continue to** provide for the permanent, long-term maintenance of the street(s).
3. Has received approval for a ~~rear lot subdivision or~~ residential compound as defined by the Charlestown Zoning Ordinance.
4. If such an existing street has not been improved to the standards of these Regulations, the Planning Commission shall require the applicant to make certain improvements along the street where necessary. See Section 4.2, Off-Site Improvements. All such improvements are required prior to final approval of a subdivision. Streets platted, but not improved or accepted for maintenance by the Town or not improved or maintained by an existing association, shall not be considered as existing improved public streets. Where these streets are incorporated or abut an application they shall be improved by the applicant to meet the standards of these Regulations.

B. Topography and Layout.

1. Street layout shall consider the existing street system and conform to the Comprehensive Plan. Limited access to arterial roads and highways shall be required for safety purposes.
2. Street alignment shall follow the natural terrain and topography and no unnecessary cuts or fills shall be allowed. Horizontal curves shall have a minimum radius of one hundred (100) feet. The combination of steep grades and curves shall be avoided. Vertical curves shall be limited to a maximum of one hundred and fifty (150) feet.

3. The use of gridiron street patterns will not be permitted. The use of curvilinear streets, reverse curves, cul-de-sacs, or U-shaped streets will be encouraged where such use will result in a more aesthetic layout.
4. All streets shall be related to population densities, and to existing and proposed land uses.
5. All streets shall be laid out to permit effective drainage and utility systems, and to provide the minimum length of roadway necessary for safe access to property.
6. The Planning Commission may require street systems to have two principal, immediate or future, means of access for developments of more than fifteen lots unless the applicant can demonstrate that two access points are not feasible due to environmental constraints. Proposed streets shall provide for their continuation or projection to intersect with existing streets or to adjacent vacant property in order that such streets may be extended at a future time.
7. The maximum continuous run of a street segment that does not reverse grade shall be five hundred (500) feet. A short up slope bench shall be provided whose crest is six (6) inches higher than its trough, with drainage inlets on each side of the bench to intercept runoff from the proceeding run.
8. Grades of minor, local residential streets shall not be less than 0.5% nor more than 8%. Arterial streets shall not exceed 6% in grade nor be less than 0.5% in grade.

C. Street Classification.

Street design shall conform to a street hierarchy system as established herein. The right-of-way width and pavement width, on-street parking, drainage and other public improvement design standards shall be tailored to the street's function. The categories of street classification are established in Table 11.1.

TABLE 11.1
STREET CONFIGURATIONS****

Street Type	Paved Lane	Graded Shoulder**	Paved Parking***	Total Paved	Right of Way	Sidewalk	Curbs
Arterial/ Collector	14'	12'	--	26'	50'	Optional 3' minimum	Optional*
Local/ Minor	12'	10'	--	24'	50'	Optional 3' minimum	Optional*
Industrial/ Commercial	12'	--	8'	24'	50'	Optional 3' minimum	Optional*
Cul-de-sac	12'	10'	--	24'	70' outside radius	Optional 3' minimum	Optional*

* As drainage, pedestrian or traffic control require.

** Optional - as drainage, pedestrian or traffic control require.

*** Optional, depends on project/community needs.

**** The Planning Commission may consider reducing pavement and right of way widths where principles of Conservation Development are proposed.

Note: See Figures 11.1 to 11.4 **11.1 and 11.2.**

TABLE 11.2
STREET CONSTRUCTION STANDARDS***

Street Type	Gravel Borrow	Crushed Gravel	Mod. Bituminous Base Course	Modified Binder*	Surface Course**
Arterial/ Collector	16"	2"		3"	2"
Local/Minor	14"	2"		3"	2"
Industrial/	18"	2"	3"	2"	2"

*R.I. Spec. M.03.01 Bituminous Concrete

**Medium texture type I-1 R.I. Spec. M.03.01 Bituminous Concrete

***All dimensions are depths after compactions by a 15 ton roller.

Note: See Typical Street Cross-Section, Figure 11.1.

D. Blocks.

Blocks shall be designed to allow traffic to move with ease and to provide safety to pedestrians and motorists.

E. Access to Arterial Streets.

Where a subdivision borders on or contains an existing or proposed arterial road, no frontage lots or access for individual lots from the arterial road shall be allowed. Screening shall be provided in a twenty (20) foot strip of landscaped land along the rear or side property line of lots which abut an arterial road.

F. Dead End Streets.

Dead end streets which cannot be extended shall have at their termination a cul-de-sac with a minimum outside radius of seventy (70) feet and shall be clearly marked at their entrances. Where a proposed street is to provide access to adjacent property, the Planning Commission shall require a temporary turnaround until such time as the adjacent tract is developed and the street extended. When the street is extended, the temporary turnaround will be reconfigured to match the paved width of the street. Dead end streets shall be limited in length as determined by the Planning Commission. **See Figures 11.1, 11.4.a, and 11.4.b 11.2, 11.3a and 11.3b.**

If presented for permitting, cul-de-sacs shall include landscaped islands in the center to reduce their impervious cover. **See Figure 11.2.** The following design criteria for cul-de-sacs and dead end streets shall be considered:

- Utilize the landscaped island for stormwater management (e.g., bioretention area).
- Reduce the radius of the turnaround bulb or consider alternative cul-de-sac design, such as “tee” and “hammerheads” turn-a-rounds for streets 200 feet or shorter in length, or looping lanes.

G. Street Names.

An extension of an existing street shall have the same name as the existing street. Names of other proposed streets shall be different from any existing street name in the Town.

H. Reserve Strip.

The creation of reserve strips of land, or any physical barrier intending to control access to a street or land dedicated for other public use will not be permitted.

I. Street Trees.

Street layout and design shall follow natural terrain to maximize preservation of existing trees and vegetation. Where existing tree growth is determined to be insufficient, the Commission shall require the applicant to plant street trees appropriate for the terrain, soil, and climatic conditions encountered on the site. Existing features such as woodlands, wetlands, cemeteries, wildflower sites, archeological sites, areas of unique botanical interest and similar irreplaceable assets shall be preserved in the design of the subdivision. Street trees shall be planted in accordance with the following conditions.

1. Location.

Street trees shall be located on the portion of building lots within ten feet of the street right-of-way line. No street trees shall be located that interfere with overhead or underground utility lines or be planted any closer than seven (7) feet from the edge of any pavement.

2. Spacing.

Trees shall be planted at intervals no closer than forty feet, and no further than eighty feet, measured between trunks. Trees shall not be located within thirty feet of intersecting rights-of-way lines. The species and size of such trees must be approved by the Planning Commission at the time of preliminary approval. The Commission or Administrative Officer may consult with the Town Tree Warden on recommendations for proposed street trees.

3. Size.

Approved species shall be no less than two inches caliper measured one foot from ground level in place and eight feet of height in place. Street trees shall be of licensed nursery stock. Street trees shall be balled and burlaped with good root development and branching characteristics. No bare root stock shall be permitted.

4. Planting.

Street trees shall be planted in holes at the same depth as the root ball and two to three times wider. If soil is extremely poor, it should be replaced with good quality top soil, amended as necessary. -Street trees shall be securely triple-staked with stakes of a minimum size of two inches by two inches by six feet.

See Figure 11.4, Tree Planting.

5. Inspection.

The Town Tree Warden shall inspect all street tree plantings and report to the Director of Public Works if the proper planting techniques and maintenance have been followed.

6. Species.

The following sustainable plant species are preferred for their tolerance of drought and dry soils, resistance to wind damage, and tolerance of ocean, roadside or aerial salt.

<u>Scientific Name</u>	<u>Common Name</u>
Abies concolor	White Fir
Acer ginnala	Amur Maple
<u>Scientific Name</u>	<u>Common Name</u>
Acer rubrum	Swamp/Red Maple
Amelanchier arborea	Serviceberry
Berberis x mentorensis	Mentor Barberry
Chamaecy paris pisifera	Sawara Falsecypress
Clethra alnifolia	Sweet Pepperbush
Cornus kousa	Kousa Dogwood
Cornus racemosa	Gray Dogwood
Cotinus coggygria	Common Smoke Tree
Cotoneaster adpressus	Creeping Cotoneaster
Cotoneaster divaricatus	Spreading Cotoneaster
Crataegus viridis 'WinterKing'	Green Hawthorn
Ginkgo biloba	Ginkgo/Madenhair Tree
Hydrangea arborescens	Smooth Hydrangea
Hydrangea macrophylla	Big Leaf Hydrangea
Ilex pedunculosa	Long-Stalk Holly
Juniperus chinensis	Chinese Juniper
Juniperus virginiana	Eastern Red Cedar
Koelreuteria paniculata	Golden Rain Tree
Ligustrum amurense	Amur Privet
Magnolia x loebneri	Loebner Magnolia
Magnolia x soulangiana	Saucer Magnolia
Magnolia x stellata	Star Magnolia
Myrica pensylvanica	Bayberry
Pieris floribunda	Mountain Pieris
Pinus cembra	Swiss Stone Pine
Pinus parviflora	Japanese White Pine
Pinus strobus	Eastern White Pine
Potentilla Fruticosa	Bush Cinquefoil

Prunus maritime	Beach Plum
Pyrus caleryana cultivars	Callery (Bradford) Pear
Quercus rubra	Red Oak
Rhododendron species and cultivars	
Rhus aromatica	Fragrant Sumac
Rosa rugosa	Saltspray Rose
Sophora japonica	Japanese Scholar Tree
<u>Scientific Name</u>	<u>Common Name</u>
Syringa reticulata	Japanese Tree Lilac
Vaccinium corymbosum	Highbush Blueberry
Viburnum prunifolium	Blackhaw Viburnum

J. Street Signs.

Street signs shall be erected at applicant's expense as contained in the "U.S. DOT – Manual on Uniform Traffic Control Devices" and as approved by the Director of Public Works.

K. Street Intersection.

1. All street center lines shall coincide precisely at intersections or shall be offset at least 125 feet between centerlines. No more than two streets can intersect at any intersection.
2. Street center lines shall intersect at ninety degree angles. Lesser angles between seventy-five degrees and ninety degrees may be approved by the Planning Commission if demonstrated a more efficient site layout is accomplished without impacting traffic safety.
3. Intersections shall be designed with a section of street at or near level grade at the approach to the intersection. A maximum grade of two (2) percent is required for two hundred (200) feet back from the intersection right-of-way.
4. Intersection right-of-way lines shall have rounded corners. The right-of-way radius shall be ten (10) feet and the curb radius for pavement shall be twenty (20) feet.
5. Lots at intersections shall be graded to provide adequate sight distance for motor vehicles approaching the intersection.

L. Private Streets.

Private streets shall not be permitted except for such existing private streets that were established and existed prior to September 21, 1982, and which had private arrangements established for the maintenance of the private street(s) since September 21, 1982, **or as a residential compound private way; see Section 12.10.** These private arrangements shall remain in existence at the time of application for subdivision and shall provide for the permanent, long-term maintenance of the street(s).

M. Street Lighting.

Full cut-off street lighting shall be installed at the applicant's expense where required by the Director of Public Works.

N. Street Surfacing.

Street rights-of-way and pavement widths shall not be less than those prescribed in Table 11.1. Pavement shall be measured between the inner faces of the curbs, berms, or shoulders as applicable, and centered between right-of-way lines. **See Figure 11.2 11.1**

O. Landscaping Standards.

1. Required Landscaping.

Landscaping shall be required for a subdivision or land development projection. The landscaping design shall be used to integrate the various elements of site development and create a pleasing aesthetic identity for the site. Landscaping shall include plant materials such as trees, shrubs, ground covers, grass, flowers, etc. and may include other materials such as rocks, ledges, wetlands, stone walls, decorative paving materials, planters, signage, and street furniture. Areas which will be required to be landscaped shall include, but are not limited to, the following:

- a. Stormwater BMPs
- b. Entrance features
- c. Open space areas that have been disturbed (i.e., not areas of preserved native vegetation)
- d. Proposed recreation facilities
- e. Buffer areas
- f. Areas subject to soil erosion and sediment control (See Section 11.9)
- g. Cemeteries

2. Stormwater BMP Landscaping.

Selection of vegetation for stormwater BMP landscaping shall be consistent with the guidance provided in Appendix B of the Rhode Island Stormwater Design and Installation Standards manual as may be amended.

P. Engineering and Land Surveying.

Where these Regulations mandate the applications be prepared by Rhode Island Registered Professional Engineers and/or Land Surveyors, all such applications shall be prepared according to existing and amended standards of the State of Rhode Island Providence Plantations Board of Registration for Professional Engineers and Board of Registration for Land Surveyors.

11.3 Lot Design Standards.

A. Lot Arrangement and Access.

1. The lot layout shall be such that there will be no environmental constraints or constraints to physical access on any lots. All lots shall be in compliance with the regulations of the RI DEM, and the RI CRMC.
2. Lots shall not derive access from an arterial or collector street unless otherwise determined by the Commission. Where driveway access from an arterial or collector may be necessary for several existing adjoining lots, the Planning Commission shall require that such lots be served by a common access drive in order to limit traffic hazards on such roads.

B. Lot Dimensions.

1. All lots shall conform to the minimum dimensional requirements of the Charlestown Zoning Ordinance established for the district within which the site is located and shall be designed so as to contain the minimum land area required exclusive of land unsuitable for development.
2. Lots shall have no interior angles of more than two hundred degrees.
3. The proportion of average lot depth to average lot width shall not exceed two and one half (2.5) feet of depth to one foot of frontage.
4. Side lot lines shall be as near right angles or radial to street lines, unless the Planning Commission determines that a variation from this standard will provide a better lot layout design.
5. The minimum lot dimensions established by the Zoning Ordinance may be increased by the Planning Commission if larger lot dimensions are needed for the safe and effective operation of individual sewage disposal systems. Lots in areas where public water is not available shall be of such area, shape, and dimensions as will allow the operation of individual sewage disposal systems in such a manner that the existing and future water supplies of said lots and all surrounding lots provide potable drinking water.
6. Lots not approved for septic system suitability by the RI DEM will not be approved for a subdivision or land development project.

C. Lot Frontage and Setback Requirements.

1. All lots shall abut an existing or a proposed public street dedicated to the public and maintained by the town or state or have the minimum frontage on a private street that existed prior to September 21, 1982 and which had private arrangements established for the maintenance of the private street(s) since September 21, 1982 and which had private arrangements remain in existence at the time of application for subdivision and which arrangements provide for the permanent, long-term maintenance of street(s). Residential lots shall front on local minor streets only.
2. Other than at corners, lots shall abut only one existing or proposed street. Through lots which front on two streets shall not be permitted.
3. Building envelopes shall be established and indicated for all lots and such lines shall run parallel to the street right-of-way line and lot lines.
4. Long, narrow lots shall not be approved. Unusual shapes, angles and dimensions shall be avoided in lot layout and design. The Commission and Administrative Officer have the authority for any application submitted under these regulations to require modifications to the proposed lot layout to achieve the purposes of these Regulations.

D. Curb Cut Standards.

1. One curb cut shall be permitted per lot and shall be approved by the Director of Public Works.
2. Curb cuts for lots shall not be located any closer than twenty-five (25) feet to an intersection.
3. Curb cuts are prohibited for any corner lot on any arterial streets.
4. Curb cuts shall be prohibited across required buffer or easement areas.

11.4 Easements.

The Planning Commission shall require the provision of easements for the placement of improvements. The Commission may require the dedication of land to the Town in lieu of easements if such dedication would provide greater control over and access to the intended use. Any such easement shall have a width in accordance with the following minimum standards:

TABLE 11.3

<u>Type of Easement</u>	<u>Easement Width</u>
Sanitary sewer	20 feet
Storm drains	20 feet
Water and gas mains	15 feet
Underground conduits and cables	15 feet
Pedestrian	10 feet
Stormwater Management	as necessary
All other purposes	as necessary

A. Drainage Easements.

Where aboveground drainage flows are directed over private property and where publicly owned and maintained stormwater management systems outfall on private land, a drainage easement shall be dedicated to the Town over the entire area. Easement into and upon aboveground drainage facilities such as stormwater BMPs shall be granted to the Town wherever stormwater from Town-owned streets or other improvements is directed to such facilities.

B. Grading Easements.

The Planning Commission shall require the dedication of an easement to the Town in order to grade or to maintain grading on private property where such grading is necessary to establish or maintain adequate drainage or sight distances.

C. Sight Distance Easements.

The Planning Commission shall require the dedication of an easement to the Town in order to establish or maintain adequate sight distances for vehicular traffic. The dedication of an easement may be required, which would prohibit the erection or maintenance of any structure, tree, shrub, wall, earthen embankment, hill or any other visual obstruction.

11.5 Utilities.

A. Water Lines.

Water lines shall be installed **as shown in Figure 44.2 11.1** where connection to a public system is feasible. Installation shall precede road construction.

B. Sanitary Sewers.

Sanitary Sewers shall be installed **as shown in Figure 44.2 11.1** where connection to a public system is feasible. The sanitary sewer system shall be separate and independent of any storm water drainage system. Installation shall precede road construction.

C. Gas Lines.

Natural gas lines may be installed in any subdivision or land development project where connection to a public system is feasible. Installation shall precede road construction.

D. Electric and Communication Lines.

All electric, telephone and cable TV lines shall be installed by the applicant. All new telephone, electric, cable or other such wired service lines shall be installed underground and shall be in conformance with the appropriate utility company's policy and construction design requirements. ~~An analysis of the cost differential between underground and overhead installation shall be submitted by the applicant prior to preliminary approval.~~ Such utilities shall be designed, installed to **meet** all applicable state and federal codes, and shown on the as-built drawings. Inspection shall be by a Rhode Island Registered Electrical Engineer, paid for by the applicant, who submitted a stamped letter of conformance for such installation. Surface pad mounted service boxes and transformers are allowed to be within the street right-of-way. Such items shall be landscaped by evergreen trees and shrubbery.

E. Subsurface Drainage Systems.

The use of underground sub-drains to artificially lower the water table of a lot to increase a lot's suitability for any purpose is not permitted.

11.6 Flood Hazard Areas.

Special Flood Hazard Area on the Charlestown Flood Insurance Rate Maps (FIRM), the Flood Hazard Boundary Maps (FHBM) and Floodway Maps dated October 19, 2010 (and any subsequent amendments thereto) are on file with Building Official. These maps and any amendments thereto and the scientific and engineering report entitled, Flood Insurance Study, Town of Charlestown, Rhode Island, dated June 17, 1986, are incorporated by reference and declared to be part of these Regulations. Approval by the Planning Commission or Administrative Officer of an application that is located wholly or partly in a Special Flood Hazard Area shall be conditioned on the following:

- A. That a general note is entered on the preliminary and final plats indicating that the subdivision or land development project is located within a Special Flood Hazard Area. The boundary lines of all flood zones and floodways shall be indicated.
- B. That the base flood elevation of the site is clearly indicated on the preliminary and final plats and the maximum and minimum elevation above mean sea level of each lot on the application is indicated.
- C. That a copy of all necessary permits and approvals of all government agencies from which approval is required by federal or state laws has been submitted as a precedent to the issuance of preliminary approval.
- D. A finding of fact with regard to the following:

1. That the proposed application will minimize damage from flooding.
2. That the applicant has submitted written certification that all public improvements, facilities and utilities are located and will be constructed to prevent or eliminate damage from flooding.
3. That no increase in runoff and adequate drainage is provided to reduce exposure to flood hazards.
4. That all proposed earth removal and/or filling will not increase base flood levels.
5. Where a proposed application provides for the alteration of a watercourse, that the applicant has notified adjacent communities and obtained approval from the Rhode Island Statewide Planning Program, RI DEM, the USACE and the Office of the Federal Insurance Administration.

11.7 Sidewalks.

Sidewalks may be required where the Planning Commission deems necessary for pedestrian safety. Sidewalks shall be installed by the applicant **as shown in Figure 11.2 11.1.**

Sidewalk lengths and widths should be minimized on a development site, where possible, to reduce overall imperviousness. The following must be considered:

- Provide common walkways linking pedestrian areas.
- Use alternative sidewalk and walkway surfaces.
- Shorten front setbacks to reduce walkway lengths.
- Permeable pavers may be used for sidewalks.

11.8 Stormwater.

The stormwater management system may be comprised of non-structural and structural elements. Appropriate structural elements include BMPs described in the RI Stormwater Design and Installation Standards manual, and elements associated conveyance system. LID site planning and design elements that mitigate pollution, reduce sedimentation, provide visual amenities and provide wildlife habitat shall be utilized over structural, constructed elements. A stormwater management plan and calculations shall be prepared by a Rhode Island Registered Professional Engineer. The methods used to design the stormwater management system meet the requirements in the RI Stormwater Manual.

A. Required Information.

The stormwater management plan and calculations shall contain the information listed in Appendix A of the RI Stormwater Manual.

B. Design Standards.

1. The proposed stormwater management system shall be designed to meet the 11 Minimum Standards, as well as the BMP design criteria, listed in the RI Stormwater Design and Installation Standards Manual as may be amended from time to time unless other standards are specifically prescribed in the regulations.
2. Each lot shall have adequate drainage and be compliant with the RI Stormwater Design and Installation Standards Manual for storms that exceed the 1-year frequency. For storms that are less than or equal to the 1-year frequency, stormwater management practices shall retain or re-use all runoff on site.
3. Existing watercourses shall be left open.

4. Where any part of the stormwater management system is proposed for location outside the public street right-of-way, provisions for future maintenance and all necessary easements shall be supplied by the applicant.
5. Consistent with the RI Stormwater Design and Installation Standards, the Commission may require a downstream analysis to ensure that controls proposed for the site will adequately protect areas that already experience flooding.

The Planning Commission may consult with outside expertise in order to properly evaluate an application at the applicant's expense.

11.9 Erosion and Sediment Control.

A. Generally.

All major applications shall submit a soil erosion and sediment control plan as part of the preliminary checklist. Minor subdivisions and land developments and administrative subdivisions shall not be required to submit such plans if the land disturbing activity involved in construction meets all the following criteria:

1. Construction activity will not take place within two hundred feet of any water body, watercourse, wetland or coastal feature.
2. Slopes of the land disturbance do not exceed ten percent.
3. The total area of the land disturbance does not exceed one thousand (1,000) square feet.
4. The proposed grading does not exceed two feet of cut or fill at any point.
5. The grading does not involve a quantity of fill greater than fifty (50) cubic yards imported into the site and fill excavated and moved elsewhere on the site does not exceed fifty (50) cubic yards.
6. That all disturbed surface areas are promptly and effectively protected to prevent soil erosion and sediment control.

B. Plan Requirements.

1. Preparation.

The plan shall be consistent and prepared with the guidelines of the "1989 Rhode Island Soil Erosion and Sediment Control Handbook" and the "Rhode Island Stormwater Design and Installation Standards Manual," as may be amended from time to time. The plan shall be prepared by a Registered Rhode Island Engineer, a Soil and Water Conservation Society Certified Erosion and Sediment Control Specialist, or a Certified Professional Soil Scientist.

2. Contents.

The plan shall contain the following:

- a. The grades, elevations and contours of the site and land within one hundred feet prior to disturbance and the proposed grades, elevations and contours to be created. Two-foot contour intervals shall be required. Where slopes are three percent or less, one-foot contour intervals shall be required. On slopes of less than one percent, spot elevations or a grid elevation shall be used.

- b. The location and description of existing natural (e.g., trees, steep slopes, all V and A flood zones, wetlands and their buffers, etc.) and manmade features, on the property where the work is to be performed, and on land within one hundred feet of the property.
- c. The location and description of proposed changes on the site.
- d. Location and technical description of all erosion and sediment control measures proposed, including sizing calculations as applicable.
- e. The sequence of installation of planned erosion and storm water control measures, both temporary and permanent, including the total area of soil surface which is to be disturbed during each stage, cut and fill calculations, topsoil management measures, and estimated starting and completion dates.
- f. A description of methods to be employed in processing and disposing of soil and other material that is removed from the grading site, including the location of disposal sites.
- g. A narrative report describing the nature, distribution, and strength of existing soils, proposed grading procedures, design criteria, and erosion prevention measures.
- h. A slope stabilization and re-vegetation plan which shall include a complete description of the existing vegetation, the vegetation to be removed, the method of disposal, the vegetation to be planted, and both the temporary and permanent slope stabilization measures to be installed, including the environmental effects of such operations on slope stability, soil erosion, and water quality.
- i. A program for inspection and maintenance of erosion and sediment control measures throughout the course of construction.

C. Design Standards.

- 1. Development shall minimize adverse effects upon the natural or existing topography and soil conditions to minimize the potential for erosion and sedimentation.
- 2. Stormwater runoff shall be minimized during construction and recharged on site to the maximum extent practicable. Sediment shall be retained on site.
- 3. Natural vegetation and features shall be retained and protected. Topsoil shall be stockpiled and reused on site with supplemental topsoil where needed to achieve a minimum four inch depth. Soil and other materials shall not be temporarily or permanently stored in locations which would cause suffocation of root systems of trees to be preserved. Individual large trees shall be retained whenever feasible; the area beyond the drip line, or crown of the tree, should be fenced or roped off to protect trees and their roots from construction equipment.
- 4. Roads and structures shall be located along natural contours to the maximum extent practicable to keep grading and other site preparation to an absolute minimum. Grade changes shall not exceed four feet at any point, except for structure foundations, required mounded septic systems, or other situations that may be identified by the Town. Excess cutting, filling or stripping of vegetation shall not be permitted. Grading shall not be done so as to divert water onto the property of another landowner without the expressed written consent of that landowner and the Planning Commission.

5. Clearing is prohibited on any slope steeper than 25%. Slopes exceeding 10% should be avoided if possible. For slopes 10-25%, aggressive erosion control practices are required. Percent slopes are measured as average change in elevation over a length (horizontal run) of 50 feet.
6. Any clearing not associated with a development plan shall limit clearing to within the required setbacks of the applicable zoning district with the exception of clearing along the frontage of the lot required for access to the site.
7. Land shall be developed in increments that can be completed during a single construction season. Erosion and sediment control measures shall be coordinated with the sequence of grading, development, and construction operations. ESC measures shall be used with each increment of the construction/development process.
8. Land disturbing activities that involve, but not limited to, grading, clearing, excavation and/or filing that affect areas greater than five (5) acres in area or where more than 50 percent of a site is disturbed either in one event or cumulatively on a site submitted for land development and/or subdivision approval may be required by the Planning Commission to include an environmental remediation plan along with all other requirements of these regulations to mitigate against any negative and/or undesirable impacts associated or resulting from such land disturbing activities.
9. Prior to the start of any land disturbance activities on a site, the developer shall physically mark limits of no land disturbance with tape, signs, or orange construction fence consistent with limits of disturbance shown on approved plans. At a minimum, the 100-year floodplain; wetlands and associated buffers; areas with erodible soils; tree stands and other natural open space to be protected; and areas designated for stormwater practices and onsite treatment systems shall be protected from disturbance and/or compaction. These limits shall be reviewed and modified as necessary during a mandatory on-site preconstruction meeting with the contractor, designer, and Town representative(s), as identified by the Commission.
10. A perimeter sediment control system shall be installed and maintained around active construction areas such as, but not limited to, borrow or stockpile areas, roadway improvements, and areas within 50 feet of a building under construction, to be inspected prior to initial disturbance.
11. Vehicle tracking pad(s) shall be installed prior to initial disturbance at all construction entrance/exit points of the site to reduce the amount of soil carried onto roadways and off the site.
12. Temporary sediment trapping practices used during construction shall be sized to store 1 inch of runoff from contributing drainage areas. Sediment basins, debris basins, or silt traps shall be installed where determined necessary, in conjunction with the initial grading operations, and maintained through the development process. Such facilities shall, wherever possible, use natural topography, natural vegetation, and be landscaped. On-site facilities shall be properly maintained by the owner in such manner that they do not become nuisances. Nuisance conditions shall include: improper storage resulting in uncontrolled runoff and overflow, stagnant water with concomitant algae growth, insect breeding and odors, discarded debris, and safety hazards.
13. Temporary stormwater conveyance systems used during construction shall be designed for the 10-year, 24-hour (Type III) storm event.

14. Offsite runoff shall be diverted from highly erodible soils and steep slopes to more stable areas.
15. Dust controls shall be employed on the site as needed to minimize soil disturbance through applying mulch and establishing vegetation, water spraying, surface roughening, and/or applying polymers, spray-on tackifiers, chlorides, and barriers.
16. Temporary seeding, mulching, or other suitable stabilization measures shall be used to protect exposed areas during construction and between construction seasons. Any disturbed areas remaining idle for more than 14 days shall be stabilized with hydroseeding or other appropriate stabilization measure(s).
17. All slopes steeper than 3:1, as well as perimeter dikes, sediment basins or traps, and embankments must, upon completion, be stabilized as soon as practicable with sod, seed, anchored straw mulch, or other approved stabilization measures; areas outside of the perimeter sediment control system must not be disturbed. The cut side of roads and ditches shall be stabilized immediately with rock rip-rap or other non-erodible erosion control liners, or where appropriate, vegetative measures such as sod.
18. Topsoil shall be stockpiled and reused on site with supplemental topsoil where needed such that there is a minimum of 4 inches of topsoil over all disturbed pervious areas. Stockpile areas should be clearly identified on the plan and stabilized within five (5) business days of completion of construction of a given area. Stockpile side slopes shall not be greater than 2:1.
19. Temporary sediment trapping devices shall not be removed until permanent stabilization is established in all contributory drainage areas, and stabilization shall be established and the facilities shall be cleaned prior to converting temporary sediment traps/basins into permanent (post-construction) stormwater management facilities.
20. Permanent seeding shall be undertaken in the spring (from March through June) or in the late summer and early fall (from August 1st to October 15th). During the peak summer months and in the fall after October 15th, when seeding is found to be impractical, an appropriate temporary mulch or sod shall be applied. Permanent seeding may be undertaken during the summer if plans provide for adequate mulching and irrigation. If planting is performed during the peak summer months and in the fall after October 15th, a cash seeding bond is required.
21. As-built topographic surveys shall be required for site compliance to prevent more cut and/or fill than shown on an approved site plan.
22. Cash performance bonds shall be required to ensure that sites are preserved, cleared, graded, stabilized, and revegetated according to the approved site plan. A site shall be considered revegetated when more than 75% of the disturbed area is stabilized. Bond shall cover the cost of removal and replacement of trees and other vegetation earmarked for preservation when damaged by construction activities (up to two years after completion of construction).

D. Review.

The Planning Commission may consult with outside expertise on any application at the applicant's expense in order to properly evaluate the application.

E. Completion Surety Required

The estimated cost to complete all measures of an Erosion and Sediment Control Plan approved by the Planning Commission shall be required to be covered by adequate and appropriate surety to ensure the completion of the plan. The form and amount of surety shall be approved by the Planning Commission and may include one or a combination of either cash or completion bond. Said surety may be released upon application to the Planning Commission and only upon a finding by the Planning Commission that the plan has been satisfactorily completed. The Planning Commission may seek recommendations from an outside consultant or appropriate Town official to properly evaluate whether the plan has been satisfactorily completed. The Planning Commission may release a portion of the surety if work remains to be completed on the plan or should a dispute over the quality of the work to complete the plan exists at the time a release of surety is sought.

11.10 Site Design Standards.

A. Generally.

Proposed development shall be based on the characteristics of the site. The development shall be so laid out to preserve the natural features of the site, to avoid areas of environmental constraints, and to minimize negative impacts and alteration of natural and manmade features. The development shall be laid out to avoid unnecessary impervious cover; to prevent flooding; to provide adequate access to lots and sites; and to mitigate adverse effects of traffic, drainage, and utilities on abutting properties.

B. Residential Development.

Every residential lot shall have sufficient access for emergency vehicles and for the lot's proposed use. The placement of dwelling units shall take into consideration topography, privacy, building height, orientation, drainage, and scenic values. Vegetated buffer areas shall be required where necessary to avoid adverse impacts from adjacent uses.

C. Nonresidential Development.

1. General.

If a proposed application involves land zoned for nonresidential purposes, the application shall accommodate such provisions as the Planning Commission may require. A nonresidential development shall conform to all requirements set forth in the Zoning Ordinance, the requirements of these Regulations, and to the Comprehensive Plan.

2. Standards.

The applicant shall demonstrate that the land itself and the proposed design and site layout is appropriate for the uses proposed and does not impact other uses in the vicinity. The following standards shall be observed:

- a. Parcels shall be suitable in area and dimensions for the types of development proposed.
- b. Street rights-of-way and pavement shall be adequate to accommodate the type and volumes of traffic proposed to be generated.
- c. Special requirements may be imposed by the Planning Commission with respect to the installation of public utilities, including, but not limited to water, sewer, storm drainage, street, curb, gutter and sidewalk design and construction.

- d. Residential areas shall be buffered from potential impacts of a nonresidential development, including, but not limited to the provision of extra depth in parcels abutting existing or potential residential uses and provisions for a permanently landscaped buffer strip.
- e. Streets carrying nonresidential traffic, shall not be extended to the boundaries of adjacent existing or potential residential areas or connect to existing local residential streets.

D. Cemeteries.

Historic and archaeological gravesites/cemeteries possess cultural and scientific values and shall be preserved within proposed projects. Applications shall utilize the least disruptive means of integrating such sites into the overall layout and design of a site. A historic or archaeological gravesite/cemetery shall be indicated on a preliminary plan and all subsequent plans submitted for approval under these Regulations. A buffer area of twenty-five (25) feet which is permanently landscaped shall be maintained around the perimeter of the boundary of the gravesite/cemetery. A written description of the gravesite/cemetery, its age and condition, historical importance, type of burial site, a listing of those known to be interred or suspected to be interred, and a plan indicating the position of graves shall be submitted as part of the preliminary plat checklist for any property which contains said gravesite/cemetery.

11.11 Temporary Improvements.

The applicant shall build and pay for all costs for temporary improvements and shall maintain the same for the period specified by the Planning Commission. Prior to construction of any temporary facility or improvements, the developer shall file with the Town Treasurer a cash bond for temporary facilities which shall insure that the temporary facilities will be properly constructed and maintained. Acceptance of formal offers of dedication shall be only by authority of the Town Council. The approval by the Planning Commission of a temporary improvement shall not be deemed to constitute or imply the acceptance by the Town of any street, easement, or park shown.

11.12 Inspection Required.

A. Generally.

All improvements shall be inspected at the applicant's expense and approved by the Director of Public Works or his designee. Failure to provide adequate notice (48 hours exclusive of Saturdays, Sundays and holidays) or receive inspection shall cause the Director to order the removal of the improvement(s) at the applicant's expense when such removal is required by the Director of Public Works. Inspections shall be billed to the developer or his or her designee at the rate of \$75 per hour. If an invoice is not paid within thirty (30) days no further inspections will occur. No final plat will be endorsed by the Administrative Officer until all outstanding inspection fees have been paid.

B. Notification.

No step in the construction of required improvements shall commence until the Director of Public Works has been notified, in writing, at least forty-eight (48) hours in advance of the beginning of the steps.

C. Inspection of Improvements.

1. Each phase or step in the construction of required improvements shall be inspected at the applicant's expense and approved, in writing, by the Director of Public Works or his representative. Inspections shall be performed during the regular work hours of the Public Works Department. No work requiring inspection shall occur outside the regular work hours of the Department without the prior written approval of the Director of Public Works and the advance payment of one and a half (1.5) times the regular inspection fee. No subsequent phase or step shall commence until such inspection is approved at the following stages.
 - a. Following installation of underground drainage and utilities, prior to backfilling.
 - b. Following preparation of the sub-base, backfilling and the installation of curbing or shoulders, prior to application of the base course.
 - c. Following spreading and compaction of the base course and crushed gravel base course surface.
 - d. Immediately prior to and at all times during the application and compaction of the binder and surface course on the roadway.
 - e. Following completion of improvements and installation of monuments.
 - f. Following the completion of required landscaping.
2. The Director of Public Works may require inspection at such other intervals as he may deem necessary to assure proper construction of improvements.
3. The Director of Public Works upon proper written notification, shall not impede the construction of improvements by delaying inspection and approval without just cause.

D. As-Built Drawings.

Upon completion of construction of required improvements, two sets of as-built drawing of such improvements shall be furnished to the Director of Public Works.

11.13 Maintenance of Improvements.

The applicant shall be required to maintain all improvements, secure from vandalism, provide for mowing and snow removal if required, until final approval and acceptance of said improvements by the Town Council. The applicant shall be required to file a maintenance bond with the Town Treasurer, prior to final recording, in an amount as recommended by the Director and in a form satisfactory to the Town, in order to assure the satisfactory function and maintenance of the required improvements, for a period of one year period subsequent to completion, inspection and acceptance of the improvement(s) unless there are extenuating circumstances.

11.14 Off-Site Improvements.

Applicants shall mitigate off-site impacts and provide off-site improvements for impacts which are directly or indirectly attributable to new development. Off-site improvements shall reflect the character of the neighborhood. Off-site improvements may include, but are not limited to improvements to the following:

- A. streets/intersections
- B. sidewalks
- C. drainage systems
- D. water supply systems
- E. sanitary sewers
- F. recreation areas

SECTION 12 CONSTRUCTION SPECIFICATIONS

12.1 General.

A. Construction Plans.

Along with the preliminary application and prior to any construction, one complete set of construction plans including profiles, cross sections, and other working drawings of required construction improvements shall be submitted to the Director of Public Works.

B. Reference Standard for Specifications.

Reference is herein made to include as a minimum standard, the construction methods and procedures described in the "Standards Specification for Road and Bridge Construction" Revision of 1971, as corrected June 1, 1974, and amendments thereto, published by the RI DOT, Division of Public Works which is incorporated into these Regulations by reference. In addition, safety provisions shall be subject to OSHA regulations and additional written comments of the Chief of the Police.

C. Clearing and Grubbing.

The applicant shall clear and grub the entire area within the paved road and drainage area limits, as shown on the approved plan, of trees, stumps, root systems, bushes and other objectionable material. Living trees outside of the pavement areas shall be cut only as directed by the Director of Public Works. The branches of any trees left standing shall be carefully trimmed to give a clear height of at least fourteen feet over the pavement area.

D. Earth Excavation.

Earth excavation includes, but is not limited to: the removal of clay, sand, gravel, mud, loam, soft or disintegrated rock which can be removed without blasting; boulders of less than one cubic yard in volume (one half cubic yard in all trenches) and other unacceptable materials within the limits of the roadway, drainage or other excavation. This item of work also includes the backfilling of all stump holes and other surface irregularities with suitable gravel borrow material. Excavations shall be to a depth and cross-section as shown on the approved plans, profiles and cross-section drawings.

E. Rock and Ledge Excavation.

Rock and ledge excavation includes removal and disposal of all boulders one cubic yard or more in volume (one half cubic yard in all trenches), and all hard ledge rock which can be removed only by drilling and splitting by hand, by mechanical means or by blasting. Such excavation shall be to a depth at least twelve inches below subgrade and, where applicable, ledge side slopes shall be four feet vertical to one foot horizontal from the edge of pavement to the right-of-way edge.

F. Subsurface Water.

Where free water is encountered within three feet of existing grade during the wet season, the subbase box elevation shall be constructed no less than four (4) feet above the height of seasonal water table.

12.2 Street Construction Standards.

A. Materials.

1. Base Course.

Gravel borrow may be bank run or filler may be added by approved methods and shall consist of sound, durable particles, free from loam, silt, clay, and vegetable matter, containing no cobbles over six inches in its largest dimension and meeting all other gradation requirements for gravel borrow of the Town's standards. See Table 12.1.

TABLE 12.1

BASE COURSE GRAVEL GRADATION STANDARD

Sample _____ Provided By _____ Date _____

Drying Time _____ Test Date _____

Signature _____

<u>Screen</u>	<u>Wgt. Passing</u>	<u>% Passing</u>	<u>Passing</u>	Acceptable %
1/2			50-65%	
3/8			45-60%	
#4			40-55%	
#40			0-10%	
#200			0-5%	

2. Base Courses Surface.

Crushed bank run gravel meeting gradation requirements for crushed gravel in the referenced standard. Note section M.01.09, Table 1, of the reference standard. Gravel produced by screening without crushing shall not be acceptable.

3. Binder Course.

Bituminous modified binder (hot mix) conforming to specifications of Section M.03.01 of the reference standard sufficient to yield a uniform depth of not less than three inches.

4. Surface Course.

Bituminous concrete (hot mix), medium texture Type 1-1, sufficient to yield a uniform depth of not less than two inches. Mix design minimum shall be seven percent of asphalt cement by weight.

5. Materials.

All materials must be made of a quality acceptable to the Director of Public Works.

B. General Conditions.

During construction maintain the subdivision roads in passable condition and take measures to eliminate the creation of erosion, sediment, drainage or dust nuisances during construction. A crushed stone construction pad entrance shall be required to prevent mud transfer to existing roads.

C. Construction Method.

1. Street Base and Pavement Standards.

Streets shall be constructed to meet or exceed the minimum standards of Tables 11.1 and 11.2 and 12.1 and **Figures 11.1 through 11.3b** of these Regulations. Road construction stakes shall be placed at linear intervals no greater than fifty (50) feet and offset at least one foot beyond, but no greater than four (4) feet from the proposed finished road surface edge.

2. Preparation of Sub-base.

Install underground sewer and water lines, utilities, laterals, service lines, electric, communication lines, and related facilities prior to any street construction. Thoroughly compact sub-base with a fifteen ton vibratory drum roller, or its equivalent, true to the lines, grades, and cross-section shown on the approved construction drawings, at least thirty days after filling and compaction of utility trenches. Sweep or otherwise clean the sub-base clear of mud, loose and foreign material. Thoroughly dry sub-base before spreading base course.

3. Curbs.

Where curbs are required, hold the edge of the wearing surface to line and grade by the installation of curbs in accordance with Section 12.3, Curbs. **See Figure 11.3 Figures 11.2 and 12.1.**

4. Base Course.

After the sub-base has been properly prepared and the curbs or shoulder set, spread the base course for the full road width and in such volume as to provide a cross section conforming to the specifications and measurements of Table 11.1, Tables 11.2, and 12.1 after compaction with a fifteen ton vibratory drum roller or greater. Note section 305.03.1 of the referenced standard.

5. Base Course Surface.

Following through compaction of the base course, spread the crusher-run gravel for the base course surface for the full road width to a depth of two inches after compaction with a fifteen ton vibratory drum roller or equivalent.

6. Application of Asphalt Surface.

Asphalt shall be applied in accordance with the following specification:

- a. The modified binder and surface courses shall consist of bituminous concrete placed to minimum depths conforming to the specifications of Table 11.2. Both layers shall meet the specifications of Section M.03 of the reference standard.
- b. Placement of mixtures shall be by an approved self-propelled paving spreader equipment with a compactor. The paving machine shall be capable of paving not less than one full lane width and pavement depth from twin operator stations at the rear of the screed. The mixture shall be laid only upon a dry base containing no frozen materials swept clean of all debris, mud, or other loose material and when outside temperatures are above 50 degrees F. Mixtures shall be between 250 and 350 degrees F.
- c. Compaction shall be effected by rolling with a fifteen ton vibratory roller or greater, equipped with a sprinkler system to wet the wheels or rolls. The finished surface will have a density of no less than ninety-six percent of voidless pavement composed of the same materials in like proportion. Upon completion of the application and compaction of the surface course, the street shall be closed to traffic for a minimum of twenty-four hours.
- d. Traffic passing over newly constructed streets shall be limited to wheeled vehicles and no tracked equipment permitted.
- e. All joints shall present the same texture, density and smoothness as other section of the course. The joints between successive day's work shall be made carefully in a manner to ensure a continuous bond between old and new sections. Where new pavement is to meet existing bituminous pavement, the existing pavement shall be sawed to a straight edge presenting a vertical face for its full depth so as to expose a fresh surface. This edge shall be painted with asphalt cement and the new pavement placed to meet this line smoothly.
- f. All paving shall be done during the regular work hours of the Public Works Department. No weekend or holiday work will be acceptable.

12.3 Curbs.

A. Minimum Requirements.

As required, streets shall be curbed with asphalt curbing **as shown on Figure 44.3 12.1** as a minimum requirement. Curbing may be interrupted or perforated in places where stormwater runoff shall be conveyed to road side swales or other BMPs acceptable to the Planning Commission. Curbing shall be placed by suitable mechanical means in accordance with the materials for the road as specified.

1. Alternate curbing which is also acceptable shall be:
 - a. R.I. Standard #35 granite. **See Figure 11.1.**
2. At all street intersections, curb returns shall have a radius of at least twenty feet.
3. Granite curbing shall have a minimum base thickness of six inches, a minimum top thickness of six inches, a minimum depth of eighteen inches, and shall extend above the finished gutter grade. The horizontal and vertical alignment of the curbing shall conform to the established line and grade as shown on the approved plan and profiles.
4. All cape cod berms shall be five inches and formed and compacted in one piece with the surface course.

12.4 Sidewalks.

Construct sidewalks in accordance to the sidewalk cross-section **as detailed in Figure 11.2 11.1** as follows:

A. Materials:

Refer to Section 12.2, Street Construction, A, Materials.

Base Course:

Compacted depth of six inches.

C. Base Course Penetration:

Apply a minimum rate of 0.75 gallons per square yard. Allow application to stand for twenty-four (24) hours without covering, after which it may receive a light covering of course sand.

D. Surface Course:

Compacted depth of two (2) inches, I-2 bituminous concrete in conformance with Section M.03.01 of the reference standard.

- E. Observe same timing of successive steps, use limitations, and surface preparations as outlined for steps of road construction.

12.5 Stormwater Management Structures and Facilities.

A. Earthwork and Drainage.

The minimum subsurface drainage pipe size shall be eighteen inches of new class three reinforced concrete pipe. Upon review by the Planning Commission, and in consultation with the Public Works Director, the minimum size may be reduced to accommodate situations where smaller pipes are integral to the effective management of stormwater and the successful operation of LID BMPs.

Construct surface and subsurface stormwater structures and facilities to conform to the RI Stormwater Design and Installation Standards manual, and the following sections of the referenced standard, exclusive of any items therein covering methods of measurement and basis of payment.

1. Earthwork:
 - Section 203, Structure Excavation and Backfill
 - Section 204, Trimming and Fine Grading
 - Section 205, Trench Excavation
2. Drainage:
 - Section 701, Culverts and Storm Drains
 - Section 702, Manholes, Inlets, Catch Basins, and Headwalls
 - Section 703, Underdrains
 - Section 704, Paved Waterways

All catch basins and grates shall conform to RI DOT Spec. 4.31 and have a five foot minimum diameter with a three foot sump. Such standard specifications may be modified at the discretion of the Director of Public Works with the approval of the Planning Commission. Examples of modifications may include, but are not limited to, those situations where catch basins are used as pre-treatment devices in accordance with Stormwater Design and Installation Standards manual.

B. Manholes.

Locate manholes on storm sewer trunk lines:

1. At maximum distances of three hundred feet;
2. At angles in the sewer lines, no curved designs will be acceptable.
3. At street intersections and other points where catch basins, inlets or laterals are to be connected;
4. At points where pipe sizes change;
5. At points where the grade of the sewer changes;
6. All catch basins shall conform to the referenced standards and shall be installed at intervals of three hundred feet or at such other intervals as may be required by the Director of Public Works.
7. Drainage frames and grates shall conform to RI Standard 6.3.4 High Capacity Frame and Grates (Bicycle Safe). See diagram on page 100A.

C. Minimum Cover.

Provide subsurface drainage structures and facilities within street rights-of-way, with a minimum cover of three feet. Where required minimum cover is physically impossible to achieve, the Planning Commission will review for approval, an alternative proposal. Do not cover any installed work until it has been inspected and approved by the Director of Public Works.

D. Minimum Dimensions.

All subsurface drainage structures shall be constructed using reinforced concrete pipe of an inside diameter no less than eighteen inches. The pipe joints shall be totally sealed with mortar cement. Upon review by the Planning Commission, and in consultation with the Public Works Director, the minimum size may be reduced to accommodate situations where smaller pipes are integral to the effective management of stormwater and the successful operation of LID BMPs.

E. Backfill Materials and Compaction.

Drainage structures shall be backfilled utilizing compactable crushed gravel borrow material with stones no larger than two inches in any dimension. The materials shall be placed and compacted in layer not more than eight inches in depth after compaction. Compaction shall be achieved by mechanical tampers, vibrators or rammers in accordance with 202.03.6 of the reference standard. A period of thirty days shall pass after full mechanical compaction of all subsurface drainage structures in the right-of-way. If after twenty-one days, less than one inch of rainfall (measured at Green State Airport) has occurred, the structures shall be thoroughly drenched with water to the degree that water puddling is observed on the compacted material over the structures.

12.6 Installation of Water Mains.

A. Install water mains when required, in conformance with the current American Water Works Association Standard Specification.

12.7 Permanent Monuments.

A. Location.

Set at every lot corner, perimeter corner and angle point on the boundary line of the subdivision and at every angle point of curvature on the proposed street rights-of-way. Except in existing historic stone walls where the angle change is less than ten degrees.

B. Materials.

Quarry split (peen hammered top) granite or pre-cast reinforced concrete conforming in size and shape to the specifications below:

1. Dimensions:

- a. At least thirty-six inches in length and four inches square in cross-section.
- b. Place and center on top surface of the monument a drill hole one-half inch in diameter and three quarters of an inch deep.
- c. Install at points indicated on preliminary plat.

C. Setting Monuments.

Set so as not to protrude more than four inches above the finished grade.

12.8 Special Grading Provisions.

Within ten feet of abutting property, limit changes to existing grade to a slope of 2:1. Provide retaining structures to contain slopes that exceed the 2:1 ratio. Rip-rap or other retaining walls

shall be sloped back at an angle of no more steep than one foot horizontal to three feet vertical and constructed of boulders with at least three sharp angular flat or cut surfaces. The installation of rip rap walls shall be in conformance with accepted structural engineering practices. The construction of such shall be inspected and certified by means of a signed and stamped letter from a Rhode Island Registered Professional Engineer.

12.9 Soil Erosion and Sediment Control.

All soil erosion and sediment control measures required by these Regulations shall be constructed in accordance with the standards and procedures set forth in the *1989 Rhode Island Soil Erosion and Sediment Control Handbook*, as may be amended from time to time.

Said handbook is adopted as an Appendix to these Regulations and is available for review from the Administrative Officer.

12.10 Residential Compound Common Private Way.

A common private way in a residential compound shall have a right-of-way width between property lines of not less than twenty-four (24) feet and a travel way width of no less than twelve (12) feet. **See Figure 12.2.** A travel way is defined as that portion of a right-of-way that is actually used for vehicular travel. The Planning Commission may require additional right-of-way or travel way widths if conditions warrant for reasons of public health or safety. Notwithstanding any other provision of these Regulations, the travel way within a residential compound shall have no sidewalks and shall have a pervious surface composed of a two (2) inch layer of crushed stone [one-half (1/2) inch to two (2) inch crushed stone] on top of a normal base course as required by Section 12.2, Street Construction Standards. Adequate drainage appurtenances are required to prevent washout and excessive erosion. In addition, a turn-around or cul-de-sac may be required by the Commission if conditions warrant.