# REQUIRED IMPROVEMENTS FOR AN APPROVED

# SUBDIVISION

## 6.1 General Requirements

## The applicant shall provide all of the improvements required herein and installed at his/her own expense. All work done under this section shall be done under the direction of the Board, including registered engineer(s) and any other consultants appointed by the Board. The applicant shall promptly reimburse the [Town/City] for the full amount of the cost of such engineer(s) and other consultants. No performance guarantee under Section 4.3.10 shall be released until:

6.1.1 All streets and other improvements (except for the top coat of paving) shall have been in place at least 12 months and in place at least one winter (December 1 through April 15); All streets and other improvements (including the top coat of paving) must be completed prior to submission for [Town/City] Meeting approval and acceptance.

* + 1. Full approval in writing of all work done under this section is received from the Board's engineer(s) and any other consultants (See Section 4.3.12); and
		2. A cashier's check or money order, payable to "[Town/City] of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Massachusetts," has been received to provide reimbursement for the full amount of the cost of such engineer(s) and other consultants.
		3. All of the above must be completed prior to submission for [Town/City] Meeting approval and acceptance.

In addition to the Mass. Department of Transportation Construction Standards, the following minimum specifications shall govern the installation of all roadways, utilities, and other improvements in all subdivisions.

## 6.2 Clearing and Grubbing of Right of Way

6.2.1 No perishable matter such as stump, trunks, or limbs of trees or brush shall be buried within the limits of the right-of-way lines.

## 6.3 Required Improvements Prior to Road Construction

6.3.1 A temporary mud tracking bed (construction entrance) shall be put in place at each site entrance. This tracking bed shall consist of a four (4) inch minimum layer of 2 1/2”– 4” crushed stone and shall be thirty (30) feet in length and fifteen (15) feet wide. This bed shall be maintained during construction to prevent tracking or flowing of sediment onto the public right-of-way and shall be removed prior to placement of gravel base and pavement.

6.3.2 All detention ponds, drainage swales, level spreaders, and drainage outflows shall be constructed and stabilized with vegetation or erosion control matting prior to the construction of approved roads. Inspections during and after the construction of these

facilities by the Board or its Agent shall take place to ensure conformance to [Town/City] regulations.

6.3.3 It shall be the responsibility of the contractor to control blowing dust and soil. A functional water truck or any other [Town/City] accepted dust control measure must be available on site at all times.

6.3.4 No paving will be allowed between November 15 and April 1. The ground temperature for base course paving shall be forty (40) degrees F and rising. The ground temperature for wearing course pavement shall be fifty (50) degrees F and rising. Base course pavement will not be accepted until it has been in place for a minimum of one (1) winter season at which time the wearing course can be placed.

## 6.4 Foundation of Roadway

(See Diagrams in Appendix B)

6.4.1 Sub-base

6.4.1.1 Within the roadway area including driveway aprons, sidewalks, and grass strips, all material shall be removed to subgrade and any unsuitable material, in the opinion of the [Town/City] or Consulting Engineer, below subgrade shall be removed and shall be replaced with proper bank-run gravel and brought to proper compaction. The depth of the subgrade will be governed by existing conditions and shall be as specified by the Highway Superintendent (or his designee).

6.4.1.2 Ground water. Wherever ground water is encountered within four (4) feet of the proposed roadway surface or wherever the soil type indicates the possibility of a capillary rise of water in the sub-grade soil, sub-drains shall be installed under both shoulders of the roadway. The design and depth of the sub-drains shall be in accordance with the specifications of the Highway Superintendent (or his/her designee) and the Planning Board.

6.4.1.3 Rock excavations. Wherever rock is encountered, it shall be excavated to a depth of two (2) feet below the sub-base of the roadway for the full width of the street layout. The excavated rock shall be replaced with a granular material satisfactory to the Highway Superintendent (or his designee) and the Planning Board.

6.4.1.4 Where fill is required, it shall be placed in layers not deeper than eight (8) inches and shall be spread uniformly with the large stones at the bottom.

6.4.1.5 Any gravel used as fill in the subbase shall be composed of hard, durable stone and coarse sand, practically free from loam and clay containing no stone having a dimension greater than six (6) inches, and when spread and compacted shall present a stable foundation.

6.4.1.6 Each layer shall be thoroughly compacted with a roller weighing not less than ten (10) tons and rolling shall continue until a firm, even surface true to line and grade is achieved. Any depressions shall be filled and rerolled, and any soft or unsuitable areas shall be removed and replaced with suitable material and rolled. All fill shall be placed in eight (8) inch layers compacted to not less

than ninety-five percent (95%) of maximum dry density as specified in the Massachusetts Department of Transportation Standards. The developer shall be responsible for the costs of all soil testing and analysis required by the [Town/City].

6.4.1.7 The subgrade shall be shaped and finish graded at the required depth below and parallel to the proposed pavement surface, in conformance with the Typical Street Cross-Section.

6.4.1.8 Inspections shall be required after completion of the subgrade (see § 7.1).

6.4.2 Gravel Base

6.4.2.1 The gravel base courses shall consist of well compacted gravel placed upon the subgrade, the entire width of the roadway in layers not greater than six (6) inches deep.

6.4.2.2 When spreading the gravel, care should be taken to rake forward and distribute the largest stones so they will be at the bottom of the gravel base course and evenly distributed.

6.4.2.3 Each layer shall be thoroughly compacted with a roller weighing not less than ten (10) tons, and rolling shall continue until a firm, even surface true to line and grade is achieved. Any depression that appears during or after rolling shall be filled with gravel and re-rolled. All fill shall be placed in six (6) inch layers compacted to not less than ninety-five percent (95%) of maximum dry density as specified in the Massachusetts Department of Transportation Standards. The developer shall be responsible for the costs of all soil testing and analysis required by the [Town/City].

6.4.2.4 The gravel used in the base course shall conform to the specifications of the sub-base (§ 6.4.1), except that it shall contain no stones having a dimension that complies with Massachusetts Department of Transportation Standards.

6.4.2.5 The gravel base surface shall be shaped and finish graded at the required depth below and parallel to the proposed pavement surface, in conformance with the Typical Street Cross-Section.

6.4.2.6 Inspections shall be required before commencement and after completion of the gravel base (see § 7.1).

## 6.5 Surfacing of Roadway

6.5.1 The roadway shall be paved the entire width, including under the berms, and the surface treatment shall be compacted bituminous concrete placed in two (2) layers.

6.5.2 The first layer or binder course shall be Class I bituminous concrete pavement, Type I-1, binder course mix, laid at a thickness in accordance with Section 5.1.2 and in accordance with Section 460 of the Massachusetts Department of Transportation Standards Specifications for Highways, Bridges and Waterways. (Latest Edition)

6.5.3 The second layer of surface course shall be Class I bituminous concrete pavement, Type I-1, top course mix, laid at a thickness in accordance with Section 5.1.2 and in accordance with Section 460 of the Massachusetts Department of Transportation Standard Specifications for Highways, Bridges, and Waterways (Latest Edition).

6.5.4 The plant mix material shall be delivered to the site in a hot and easily workable condition, when weather conditions are satisfactory, so that it can be properly placed on the appropriate base. Job mix formula must be approved by applicant’s engineer in writing prior to installation.

6.5.5 All bituminous concrete shall be spread by an approved mechanical spreader in a uniformly loose layer to the full width required and to such thickness that each course when compacted shall have the required thickness and shall conform to grade and the Typical Street Cross-Section. Hand spreading of bituminous concrete material will be allowed only for special areas which do not permit mechanical spreading and finishing.

6.5.6 Each course of bituminous material shall be rolled with a self propelled, equally balanced, tandem roller weighing not less than five (5) nor more than ten (10) tons. Places inaccessible to the power roller, shall be compacted by means of hand or vibratory tampers. Any displacement caused by the roller shall be corrected by raking and adding fresh mixture where required. Compaction shall be in accordance with Massachusetts Department of Transportation Standards

6.5.7 Traverse joints shall be formed by laying and rolling against a form of the thickness of the compacted mixture placed across the entire width of the pavement. When the laying of the mixture is resumed, the exposed edge of the joint shall be painted with a thin coat of bituminous tack coat. The fresh mixture shall be raked against the joint and thoroughly tamped with hot tampers and rolled.

6.5.8 The final bituminous surface shall show no deviation greater than one-quarter (1/4) inch when tested with a sixteen (16) foot straight edge placed parallel to the centerline of the surface course.

6.5.9 Finished roadway and driveway apron surfaces less than the required thickness or containing any soft or imperfect places will not be approved.

6.5.10 All roadways shall be brought up to the finish grade as shown on the Definitive Plan, and all manhole covers, gate boxes, gas drips and other access to underground utilities shall be set flush with the surface of the road, grass strip or sidewalk. Inspections shall be required upon completion of the binder and surface courses (see § 7.1).

Once completed, no steel tracked vehicles are permitted on the roadway’s pavement

## 6.6 Berms

Berms shall be constructed along both sides of major, secondary and minor streets. Their construction shall meet requirements set forth by Massachusetts Department of Transportation in their latest volume of Standard Specifications for Highways and Bridges utilizing curbs, berms, catch basins, stormwater drains, oil/water separator (i.e. stormceptor, vortex, etc.) and detention/retention basins.

6.6.1 Berms shall be per Massachusetts Department of Transportation Standards Class 1 bituminous Type A (sloped Cape Cod style) placed on the bituminous binder. The installation of bituminous berm shall conform to the relevant provisions of the Massachusetts Department of Transportation Standard Specifications.

6.6.2 Where possible, berms shall not be cut out at driveway aprons.

## 6.7 Drainage

6.7.1 The design capacity of the drains shall be determined by the rational method, unless the engineer exhibits satisfactory evidence that another approach is more appropriate for the specific case. The engineer shall design the drainage collection and piping system in accordance with the zoning regulations and the natural drainage boundaries of the total contributing drainage area, using a minimum 10-year design frequency storm for Type I subdivision and a minimum 10-year storm design frequency for Type II and III subdivisions. Where, in the opinion of the Board, flooding would produce damage or a safety hazard, the design frequency storm shall be increased to 25-year. A 100-year design frequency storm shall be used for all bridge openings or major culverts. Detention/retention systems shall be designed as per the [Town/City]’s Stormwater Regulations and Appendix E.

6.7.2 Drainage pipe within the roadway shall be reinforced concrete (or other Planning Board approved equal based on supportive engineering data submitted by the development’s engineer) and have a minimum diameter of 12 inches. Joints shall be rubber gasket type. HDPE (double walled) pipes may be used for drainage outside of the roadway or for culverts under the roadway.

6.7.3 Where open stream channels exist within a subdivision, adequate provision shall be made for properly maintaining them. It is the [Town/City]’s intent to preserve and maintain the natural features of such streams and any development should be planned accordingly.

6.7.4 Drainage pipe shall be bedded in accordance with the most recent Massachusetts Department of Public Works, Standards and Specifications for Highways, Bridges and Waterways or manufacturer’s conditions.

6.7.5 Manholes and catch basins shall be precast (outlets shall contain debris hoods) and a typical detail of such noting materials, dimension and construction details shall be submitted to the Highway Superintendent for approval.

6.7.6 Drain manholes shall be located at every change in grade or direction of the drainage line, at catch basin connections and shall not exceed 300 feet apart in a continuous system.

6.7.7 Iron castings for manhole frames and covers and catch basin frames and grates shall be in accordance with the most recent Massachusetts Department of Transportation, Standards and Specifications for Highways, Bridges and Waterways.

(1) Manhole cover shall have 3-inch lettering to read “DRAIN”.

(2) Catch basin grates shall be Massachusetts Department of Transportation compliant.

(3) Stormwater treatment units shall be installed prior to discharge into basins

## 6.8 Sidewalks

6.8.1 Sidewalks must meet ADA standards and must be at least five (5) feet in width and shall be constructed on both sides of the street starting at the property line, when in the opinion of the Board such sidewalks are necessary. Their construction shall be of bituminous concrete with a 1” top coat, 2” binder course and 10” of gravel base that meet the requirements set forth by Massachusetts Department of Transportation in their latest volume of Standard Specifications for Highways and Bridges. Sidewalks shall be cross-pitched 1%-2% (see diagram in Appendix B).

The Planning Board may waive the requirement and permit sidewalks on only one side where an in-lieu of payment, in an amount approved by the Planning Board, is made. Such payments shall be deposited into a dedicated Pedestrian & Bicycle Parking Reserve Account to be used solely for expenses (land acquisition, design engineering services and construction costs, but not maintenance costs) related to adding sidewalks and bicycle parking spaces, improving the utilization of existing parking spaces. Requests to appropriate funds out of this reserve account shall be filed with the City Council/Select Board and referred to the Planning Board, who shall have 60 days to forward their comments and recommendations before a City Council/Select Board vote of the appropriation is taken.

6.8.2 Driveways shall be constructed at the level of the sidewalk wherever possible to avoid the need for ramps on either side of a driveway. Where it is not possible to construct driveways at the level of the sidewalk, such sidewalk and driveway shall be graded in accordance with ADA/MA-AAB standards as most recently amended. All crosswalks and sidewalks shall have wheelchair ramps installed at the time of construction in accordance with ADA/MA-AAB standards as most recently amended. The developer shall be responsible for all costs associated with changes that are necessary to meet the current laws before the [Town/City] has fully accepted ownership of the property or ways. Painted crosswalks are required at adjoining ADA/MA-AAB ramps. Their construction shall meet the requirements set forth by Massachusetts Department of Transportation in their latest volume of Standard Specifications for Highways and Bridges.

6.8.3 The sidewalk binder course must be installed prior to the issuance of any Building Permits

## 6.9 Grass Strips

All cleared areas of a right-of-way, not to be planted with groundcover plantings, including all disturbed area over all culverts in drainage easement, shall be loamed with not less than four (4) inches compacted depth of good quality loam, seeded with lawn grass seed. Seeding shall be done at appropriate times of the year and in a manner to ensure growth of grass. No utility poles, signs or similar items shall be placed within the grass plot within three (3) feet of the edge of the pavement.

## 6.10 Street Signs

Street name signs of a design conforming to the type specified by the Manual on Uniform Traffic Control Devices shall be furnished and installed by the subdivider, of break-away design in accordance with the Massachusetts Department of Transportation latest Standards, and erected at all street intersections prior to the occupancy of any house on the street.

A blue street sign designating the street as a “Private Way” shall also be furnished and installed by the subdivider at the entry as a private way, until the street is accepted as a public way at [Town/City] Meeting.

## 6.11 Street Lighting

Street lighting shall be installed along any street the Board deems appropriate. Light standards to be used shall be subject to the approval of the Board and when used be spaced no less than every 500 feet.

## 6.12 Monuments and Markers

6.12.1 Monuments shall be installed at all street intersections, at all points of change in direction, or curvature of streets and at other points where, in the opinion of the Board, permanent monuments are necessary. Such monuments shall conform to the standard specifications of the Department of Public Works Director and shall be set according to such specifications.

6.12.2 Markers, the type of which shall be determined by the Planning Board, shall be installed at every corner of each lot within the subdivision. Their locations shall be noted on the Definitive Plan.

6.12.3 All monuments and markers shall be installed before bond or covenant is released.

## 6.13 Trees and Planting

6.13.1 Street Trees

6.13.1.1 Shade trees of a species to be determined by the board shall be planted along the side lines of the streets with the grass strips at intervals to be determined by the Board. The applicant shall be responsible for obtaining the full growing season for these trees or shall be responsible for replacing the tree with one at least equal in size to the tree being replaced and again guarantee for at least one full growing season.

6.13.1.2 There shall be a minimum of two street trees for every lot frontage spaced 75’ apart or as otherwise approved by the Planning Board.

6.13.1.3 Large and medium height growing trees shall have a minimum 2 ½” trunk diameter, caliper measured at 4’ above the ground. Small height growing trees (for placement under utility lines) shall have a 9' crown height and a 5' spread.

6.13.2 Bank Plantings

6.13.2.1 All cut or fill bankings that tend to wash or erode shall be planted with suitable, well-rooted, and low-growing plantings. All plants shall be the equivalent of nursery grown stock in good health, free from injury, harmful insects, and diseases.

6.13.2.2 Use of invasive species is prohibited. Please refer to the “Massachusetts Prohibited Plant List” maintained by the Massachusetts Department of Agricultural Resources for the latest list of invasive species. Acceptable

planting include very low-growing (4" to 12"), low growing (12" to 30"), and herbaceous plantings. Perennial grass turf installed as sod is an acceptable alternative for the planting of banks.

6.13.2.3 If bank plantings are of a type which are properly spaced at close intervals, eight (8) to twelve (12) inches of loam shall be spread over the entire bank. If the plantings are to be widely spaced they may be planted in loam pits.

6.13.2.4 Mulch (wood chips or equal) shall be spread heavily among plantings for weed and erosion control. Softwood wood chips should not used in areas where they will be subject to flotation and washing away.

6.13.2.5 The subdivider shall be responsible for maintenance of bank plantings and replacement of those which have died or become diseased from the time of planting through one full growing season.

6.13.3 Corner Plantings

Requirements for plantings adjacent to street intersections shall be the same as those for Bank Plantings with the following exceptions:

6.13.3.1 Turf may be provided by seeding as well as by planting sod.

6.13.3.2 Bushy shrubs and herbaceous plantings that would tend to obscure visibility are not permitted within one hundred (100) feet of the intersection of the curbs adjacent to the corner lot.

6.13.4 Cul-de-Sac Plantings

 The central portion of a permanent dead-end street should be landscaped. The following options are permitted:

6.13.4.1 Planting with ground cover using an eight (8) to twelve (12) inch base of loam, and spreading mulch between plants for weed control.

6.13.4.2 Planting perennial grass by either sod or seed.

6.13.4.3 Planting ornamental shrubs of a type acceptable to the Board.

6.13.4.4 Retaining existing vegetation, with the approval of the Board.

6.13.4.5 Standards and Specifications.

The standards of the American Nurserymen Association and the specifications of the Associated Landscape Contractors of Massachusetts shall apply to landscaping subject to these regulations. The Tree Warden will have final authority for the approval of trees concerning their health, species, size and location.

## 6.14 Fire Protection

Fire protection shall be designed in accordance with the requirements of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Fire Department.

## 6.15 Guard Rails

Guard rails shall be installed as required by the Board or its engineering consultant, based on State Construction Standards or the publications of the American Association of State Highway and Transportation Officials (AASHTO).

## 6.16 Utilities

All electrical, telephone, fire alarm and other wires and cables shall be installed underground, unless in the opinion of the Board and the appropriate utility company, such installation is impractical or not in the best interest of the [Town/City]. If located within a flood prone area (determined by the Board), transformers, switching equipment, or other vital components shall be flood-proofed and approved by the Board or a Board appointed engineer at the subdivider’s expense.

**6.17 Final Clean Up**

After completion of construction and before release of the performance guarantee, the subdivider shall remove all temporary structures, debris, surplus materials, and rubbish, and shall otherwise leave the area in a neat and orderly appearance and shall clean the entire drainage system. Burning of the rubbish and waste material is prohibited.

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