



**SUBDIVISION CONSTRUCTION
&
SITE PLAN
SPECIFICATIONS**

**ENGINEERING REQUIREMENTS OF THE
STONEHAM PUBLIC WORKS DEPARTMENT**

June 2, 2010

CONSTRUCTION SPECIFICATIONS OF THE
STONEHAM PUBLIC WORKS DEPARTMENT

1. PREPARATION OF THE ROADWAY

- A. The minimum roadway grade shall be 0.8%, the maximum allowable grade being 9.0%. A minimum roadway radius of 100 feet is recommended. In order to provide for unimpeded driveway access, it is suggested that the maximum driveway grade be 13%, beginning at the layout line. The grade at the layout line must be no more than one foot above the gutter grade.
- B. In the event a subdivision or a portion thereof is being extended from a previously constructed turnaround, additional work will be required. The work will include but not be limited to the removal, replacement, and/or relocation of previously installed granite curbing and sidewalks, the loaming, fertilizing, and seeding of abandoned roadway areas, the removal of pavement outside the limits of the revised roadway, and the resurfacing, as necessary, of the remaining pavement within the limits of the previous turnaround.
- C. All materials shall be removed for the full length and width of the roadway to a depth of at least 12 inches below the finished surface as shown on the street profile plan. However if the soil is soft or spongy or contains undesirable materials, such as clay, loam, vegetable matter, debris, tree stumps, peat, or any other material detrimental to the subgrade, a deeper excavation below the subgrade must be made wherever required by the Stoneham Public Works Department. The width of the roadway referred to for excavation purposes shall be at least 50 feet, thus establishing the necessary graded area for sidewalks. This 50-foot width of roadway referred to above is the minimum width allowed for subdivision purposes. The radius of a turnaround shall be 45 feet or larger.
- D. The excavated area below the subgrade shall be filled to the subgrade with well compacted material having such properties that it may be readily spread and rolled. For purposes of definition, subgrade is defined as 12 inches below finished grade as shown on the approved street profile plan. All work must conform to a typical cross section of a 50 foot street (attached herein).
- E. Any trees located within the limits of the roadway that appear to be injured by construction, diseased, or are of a hazardous nature must be removed by the developer when so directed. All trees located in the sidewalk area must also be removed. The developer of a subdivision will be required to plant two trees per lot, four per corner lot. The type, height and location of the trees to be planted will be determined by the Stoneham Public Works Department. The trees to be planted shall be at least two and one half (2½") inch in caliper. Trees will be inspected by the deputy tree warden and if found defective or diseased, the developer will be required to replace said tree(s).

2. COMPLETION OF THE ROADWAY

A. Gravel Base Course

A good quality leaching gravel, clean and free from detrimental matter, shall be spread over the subgrade to a depth of 12 inches. The surface shall then be rolled with a power roller whose weight must not be less than 12 tons. The rolling of the gravel shall be done with respect to the proposed finished grade so as to conform to a typical street cross section plan. The gravel referred to shall be of hard durable stone and coarse sand particularly free from loam, grass, and vegetation uniformly graded and containing no stone having any dimension greater than 3 inches. It is mandatory that this gravel be subject to inspection at the time of installation.

B. Class 1. Bituminous Concrete Pavement, Type 1-1.

This type of pavement shall be composed of mineral aggregate, mineral filler and bituminous, plant mixed and laid hot. The pavement shall be constructed in two courses on the prepared base in accordance with these specifications and in conformity with the lines, grades, and typical cross section shown on the plan. The mineral aggregates, filler, and bitumen shall be proportioned and mixed to meet the composition by weight tabulated by the Massachusetts Department of Public Works (ASTM designation AC-20 asphalt shall be used).

The equipment for spreading and finishing shall be approved, mechanical, self-powered pavers capable of spreading the Bituminous Concrete mixture true to the line and grade as required. The Bituminous Concrete shall be laid in two courses, binder and top, with a finished pavement depth after rolling of 4 inches. The thickness of the binder course after rolling shall be 2 ½ to 2 ¾ inches in depth and parallel to the proposed grade of the finished surface as shown on the street profile plan with respect to a typical street cross section. The thickness of the top course after rolling shall be 1 ½ to 1 ¼ inches (dependant on binder thickness). Should the existing binder contain any irregularities, such irregularities shall be eliminated by the use of supplemental materials to bring the existing binder to uniform section and grade. Any accumulation of dirt, leaves, or other foreign matter shall be completely removed previous to application of the top course. When, in the opinion of the Public Works Department, excessive time passes between the installation of the binder and top pavement courses, the binder shall be repaired where necessary and a tack coat of Bituminous material shall be uniformly applied to the surface of the existing immediately prior to the laying of the top course. In the process of extending roads, it will be necessary that the pavement be cut evenly perpendicular to the existing street lines, at the point of uniform cross section (ensuring a proper joint). If it is found due to improper grading or street settlement that an accumulation of water takes place on a street, this condition must be remedied to the satisfactions of the Public Works Department.

C. Sidewalks

The minimum road width in a subdivision shall be 50 feet. This width is to be so utilized that the actual paved surface will be 32 feet wide. The remainder of this 50 foot width will consist of a nine (9) foot span on each side of the paved surface.

These 9 foot spans referred to are such that they include the area from the paved gutter line back to the line of abutting property. Of this 9 foot distance, 5 feet measured out from the abutting property is for a sidewalk surface, 3.5 feet for a grassplot and 6 inches for curb. Excavation will take place as mentioned previously in Section 1-A, that is the final grading for the 50 foot street including sidewalks will be determined by the typical street cross section plan. Thus, all sidewalk area will be properly graded. If it is found during construction that abutting property is left too high or too low with respect to the street profile plan, retaining walls and/or guard rail fences may be required. As this is a condition that frequently becomes apparent during construction, it is understood the initial bond shall cover the construction of any walls and/or fences, even if they were not specified in the initial bond.

The sidewalk is to consist of a single course of cement concrete having a finished, thoroughly compacted depth of four (4) inches. The thickness of the walk at driveways and the attached ramps shall be at least six (6) inches.

The 3.5 foot grass plot area shall consist of six (6) inches of good quality loam seeded with lawn grass seed and rolled. The areas shall be limed as necessary and shall be fertilized in accordance with the seed suppliers recommendation.

D. Curbing

Granite curbing is required along both sides of all streets except at driveway openings. It must be installed so as to provide a seven (7) inch reveal after all paving has been completed. Standard granite catch basin headers shall be installed behind all proposed catch basins. Two foot radius corner blocks will be installed at each lot for the driveway opening. Radius curbing shall be installed at each corner rounding and along each curved street line having a radius of 100 feet or less. The remaining curbing will be straight VB curbing, at least 5 inches by 16 inches.

E. Drainage

Roadway storm drainage will be provided to remove surface water and accept sub-surface water. Drainage shall consist of necessary pipe lines, manholes, and catch basins and shall be shown on the submitted plans. If the topography is such that it will be impractical to locate drains within the street location, easements shall be reserved for this purpose. Sufficient drainage rights must be secured for the Town and recorded in the deeds by the developer. Any existing easement or right of way on the property shall be referred to and described on the plot plan. Existing brooks, drains, and water courses on the property shall be shown on the plot plan. All necessary legal instruments giving the right to discharge water must be secured by the developer and recorded at the Registry of Deeds. A certified copy of what is recorded at the Registry of Deeds on this matter of drainage discharge must be presented to the Department

of Public Works and the Stoneham Planning Board before a building permit is granted. In dealing with the Commonwealth of Massachusetts or its political subdivision, written permission must be obtained for any drainage discharge before approval can be granted to the subdivision.

Drainage structures shall be constructed of precast reinforced concrete having a minimum inside diameter of five (5) feet. Structure size will be dependent upon the number and sizes of pipes involved and in accordance with the Commonwealth of Massachusetts Department of Transportation Standard Specifications for Highways and Bridges. All catch basins shall have sumps at least four (4) feet in depth, which shall be accessible for cleaning by means of a clam shell device. Storm drain hoods shall be installed on all catch basins.

The proposed drainage system must be designed and stamped by a Registered Professional Civil Engineer retained by the Developer who shall accept responsibility for the design. The Engineer referred to above shall submit to the office of the Director of Public Works all computations necessary to the design of the drainage system. Design shall be based on the Natural Resource Conservation Service (NRCS) hydrologic method, TR-20 and/or TR-55 for a 10-year design storm (minimum). All design shall conform to the Massachusetts Department of Environmental Protection's storm water management standards of 1997 (or more recent revisions). Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates for the 10-year design storm (minimum). Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. The Town of Stoneham will not own through easements or, if located within right of ways, any retention or infiltration system used to conform to the Massachusetts Department of Environmental Protection storm water management standards. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook. Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS).

All drainage lines and structures must be set on line and grade by means of a laser or other methods acceptable to the Public Works Department and inspected at the time of construction prior to any backfilling. The materials used must be satisfactory to the Director of Public Works. All drainage structures, whether located in the street area or in easements, must have heavy duty frames and covers and manholes shall NOT have steps for entry. Frames and covers shall conform to H-20 loading requirements or more stringent requirements based on the design engineer's discretion. No drainage line shall be connected from the property into the street drainage system without prior approval. Piping shall be of reinforced concrete, ductile iron or high-density polyethylene pipe of at least 12 inches in diameter. In the case of stub roads or any roads so designed as to be a means of providing entry to abutting land, storm drainage piping must be extended to a point off the existing paved surface, thus preventing future trenching within a newly paved road.

All work shall also conform to the "Rules and Regulations Regarding the Use of Storm Drains in the Town of Stoneham, Massachusetts, adopted by the Stoneham Stormwater Board".

F. Water

All materials are to be domestic (American made). Water mains will be ductile iron, cement-mortar lined pipe (meeting ANSI/AWWA standard C104/A21.4) and shall be of pressure Class 52 with a minimum pipe diameter of eight (8) inches. Ductile iron water mains shall conform to AWWA/ANSI Standard C150/A21.50 and C151/A21.51, Class 52 and shall have push on joints, such as tyton. All fittings shall be manufactured of Cement Motor Lined, Ductile Iron, mechanical joint - restrained gland type (Mega-lug or approved equivalent). Water service lines shall be at least one inch type K copper tubing with no couplings unless the distance exceeds 100 feet in length. Water main gates shall conform to either ANSI/AWWA C509-09 or C-515-09 standard, shall open right and be resilient seated.

The water distribution system of the development must be designed with looping as directed by the Director of Public Works so that dead ends are eliminated whenever possible; in the case of stub roads or any roads so designed as to be a means of providing entry to abutting land, water mains must be extended to a point off the existing paved surface, thus preventing future trenching within a newly paved road.

Hydrants are to open left. Hydrants shall be either Mueller (Super Centurion), Kennedy (Guardian K-81D) and American Darling Model-B-84-B-5.

All pipes, fittings and hydrants shall be installed in accordance with the latest revision of ANSI/AWWA C-600. Newly installed water main shall be disinfected in accordance with the latest revisions of ANSI/AWWA C651 or further testing required by the Director of Public Works, prior to placing in service. Water mains shall also be pressure tested in conformance with regulations set forth by the Director of Public Works. All results of pressure testing and disinfecting shall be submitted to the Director of Public Works for approval. All fittings, valves and hydrants will be installed using restrained gland, mechanical joint kits. Manufacturer and model of fittings shall be subject to the approval of the Director of Public Works. The location of all water mains, valves, and hydrants are to be shown on the subdivision plans subject to the approval of the Director of Public Works.

G. Sewer

Sanitary sewers must be provided within all new developments. Mains shall be at be at least 8 inch diameter and shall be of PVC, or sewer grade ductile iron(cement lined), and shall have a minimum grade of 0.8%. Sewer service lines shall be of 6-inch P.V.C. and 4 inch cast iron having a minimum grade of 2.0%, with use of long (4 foot minimum) sweeps only and **NO use of 90 degree bends**. Size, quality of pipes, depth and location shall be approved by the Director of Public Works. Sewer mains and services (to the sideline) should be installed throughout the entire development including stub roads, in such a manner that no trenching within a paved surface will be necessary for future extensions. Sanitary sewer mains are to be set to the proposed line and grade by means of a laser device, or by other methods acceptable to the Public Works Department.

Sewer Manholes shall be precast concrete and damp-proofed on their exterior surface with a semi-mastic fibrated asphalt coating conforming to ASTM Standard D2823, type 1. Applied rate shall be no less than one gallon per 50 square feet of surface area. Between sections of the precast manholes, gaskets shall be

installed. The gaskets shall be of flexible plastic, watertight material conforming to AASHTO standard M 198, type B. The diameter of the gasket shall be no less than 1 ½ inches. Joints between the manholes and pipes shall be made using flexible rubber sleeves with stainless steel screw clamps. To construct the invert, a straight section of PVC pipe shall be laid through the manhole, top half cut off and concrete (4000 p.s.i.) laid into the manhole to the elevation of one (1) inch below the middle of the pipeline. Once to concrete has cured and is completely level, one layer of brick shall be laid atop the concrete shelf. Sewer manhole inverts (the top layer) shall be constructed of brick (grade SS) and other brick used in sewer manholes shall be type MS or better.

Thirty (30) days following completion of sewer mains and sideline services the contractor, at his own expense, shall have a warrantee color video inspection of the sewer main completed and a copy furnished to the Director of Public Works along with a written report from the inspection company. It is the developer's responsibility to fix any defects in a timely fashion or occupancy and/or building permits may be withheld.

All work shall also conform to the "Town of Stoneham Sewer Use Ordinance, adopted October 24, 1983" or more recent revision.

H. Other Utilities

Gas and other underground utilities including street lighting wires, together with all connections to the proposed subdivision lots on both sides of the street, shall be laid after the road is up to sub-grade. All trenches shall be thoroughly tamped or water-jetted.

1. Before the paving of a road takes place, all the aforementioned utilities must be installed. All house services must be run into the sidelines, and all trenches shall be compacted to 95% compaction.

COMPLETING WAYS

Stone Bounds

Granite stone bounds shall be set to the finished grade. These bounds are to be at least six (6) inches square in cross section and four (4) feet in length. The reference point shall be a drill hole in the top surface of the bound set by the Professional Land Surveyor paid for by the developer. Granite stone bounds shall be installed at all angle points, points of curvature and tangency.

Easements

Where easements are secured for utility purposes, the minimum width is to be 15 feet for one utility and 20 feet for two pipes. Paving for driveways or walkways will be allowed over easements.

General

All the preceding work must be subject to inspection at the time of construction. All pipelines are to be inspected by the Director of Public Works through his Engineering Department prior to backfilling.

Before approval pursuant Section 7.5.2.3 or the release of the bond, the existing roadways forming the subdivision and all drainage lines and structures must be thoroughly cleaned and will be inspected. Any irregularities that appear due to construction defects in the development coming under these specifications must be remedied by the developer.

In addition, the developer will be required to provide complete "as-built" plans of the way. The plans shall include all utilities to scale (1"= 40') as well as a centerline profile of each roadway.

The current edition of the Massachusetts Department of Transportation (Mass-DOT) Standard Specifications for Highways & Bridges, will apply to construction details unless otherwise indicated herein.

Approved by the Stoneham Planning Board

Addendum #1

CAD Specifications for Plan Submittal **Stoneham Department of Public Works**

- One (1) digital copy in .DWG, .DXF, & .PDF formats is to be submitted by means of a Compact Disc (CD) submitted along with the required hard copies.
- The CD shall bear the title of the project, name of company submitting the plan, date, and revision dates if applicable. The CD shall be labeled with permanent marker and placed in a paper case.
- The DWG & DXF files are to be saved as AutoCAD 2008 version or older. All unused objects in the drawing are to be deleted.
- The zoom extents command is to be executed in the model tab and all layout tabs. All layout tabs shall be scaled, and the viewport is to be locked. Special font styles not provided by AutoCAD are NOT to be used.
- Imported images or x-referenced files are required to be provided on the submitted disc and should be already saved with the appropriate project paths. Land Development Desktop files are accepted as long as the project path and folders created by the program are present on the CD and are functional without changing project paths, etc.
- Civil 3D files are NOT to be submitted to the town, due to incompatibility with our current system.

Addendum #2

**TOWN OF STONEHAM
DEPARTMENT OF PUBLIC WORKS
REGULATIONS
REGARDING
FLOODPLAIN DISTRICTS**

In the Floodplain District designated by the Town of Stoneham, including as designated by the Conservation Commission of the Town of Stoneham:

(i) any new or replacement water or sewer facility constructed by or for the Town of Stoneham or subject to review, permitting and/or approval by the Department of Public Works, shall be required to be designed to minimize or eliminate infiltration of flood waters into the respective system(s).

(ii) any new or replacement sanitary sewage system shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters and onsite waste disposal systems to be located to avoid impairment to them or contamination from them during flooding.

*Approved by Director of Public Works
Promulgated by the Town Administrator*

Dated: June 2, 2010

ENCROACHMENTS AND OTHER STRUCTURES ALLOWED WITH CERTIFICATION FROM REGISTERED PROFESSIONAL ENGINEER PROVING NO INCREASE IN WATER SURFACE ELEVATION OF THE 100-YEAR FLOOD

All encroachments, including fill, new construction, substantial improvements, and other developments are prohibited unless certification by a registered professional engineer is provided by the applicant proving that such encroachment, construction, improvement or development will not result in any increase in water surface elevation of the 100-year flood.

