

RECORDED 9/29/2022
PLYMOUTH COUNTY REGISTRY OF DEEDS
BOOK 57282 PAGE 183

TOWN OF HANOVER MASSACHUSETTS



RULES & REGULATIONS GOVERNING THE SUBDIVISION OF LAND IN HANOVER, MASSACHUSETTS

*APPROVED BY THE
HANOVER PLANNING BOARD
WITH AMENDMENTS THRU JANUARY 31, 2022*

TABLE OF CONTENTS

SECTION I	Introduction	5
A.	Authority	5
B.	Purpose	5
SECTION II	General	6
A.	Definitions	6
B.	Plan Believed Not to Require Approval	7
C.	Standards for the Flood Plain District	8
D.	Approved Plan Required	8
SECTION III	Submission of Plans for Approval	9
A.	Preliminary Plan	9
	(1) General	
	(2) Contents	
	(3) Tentative Approval	
B.	Definitive Plan	10
	(1) General	
	(2) Contents	
	(3) Review by Board of Health as to Suitability of Land	
	(4) Review by Other Town Officials	
	(5) Public Hearing	
	(6) Performance Guarantee	
	(7) Reduction or Increase of Financial Security	
	(8) Release of Financial Security	
	(9) Certificate of Approval	
	(10) Copies	
	(11) Release of Lots	
C.	Revisions to a Definitive Plan	18
D.	Informal Meetings	18
SECTION IV	Design Standards	19
A.	Streets	19
	(1) Location	
	(2) Alignment, Width & Grades of Streets	
	(3) Width	
	(4) Grade	
	(5) Dead-end Streets	
	(6) Curb Opening	
B.	Easements	21
C.	Open Spaces	22
D.	Protection of Natural Features	22
E.	Lot Drainage	22
F.	Building Location	22
G.	Stockpiling of Earth & Construction Materials	22
H.	Lot Design	22

SECTION V	Required Improvements for an Approved Subdivision	23
A.	Roadways	23
B.	Curbs	23
C.	Sidewalks	24
D.	Water	24
E.	Drainage	25
F.	Utility Locations	25
G.	Monuments	25
H.	Street Signs	26
I.	Street Trees	26
SECTION VI	Administration	27
A.	Variation	27
B.	Reference	27
C.	Building Permit	27
D.	Inspections	27
E.	Inspection Fee	28
F.	Inspection Procedure	28
APPENDIX A	Roadway and Drainage Construction Standards	30
1.	Clearing and Grubbing	30
2.	Excavation	30
3.	Fill	30
4.	Trenches	31
5.	Drainage	32
6.	Road Pavement	33
7.	Bituminous Concrete Sidewalk	40
8.	Grass Area Within Road Layout	40
APPENDIX B	Storm Drainage	42
1.	Watershed Area	42
2.	Runoff Computations	42
3.	Culvert Hydraulic Data	42
4.	Plans	43
5.	Profiles	43
APPENDIX C	Detention and Retention Basin Standards	44
Figure 1	Detention Basin Plan	51
Figure 2	Dike Section	52
Figure 3	Outlet Control Section	53
Figure 4	Emergency Spillway Detail	54
Figure 5	Silt-Trap Swale	55
Figure 6	Channel Section	56
APPENDIX D	Typical Roadway Section	56
	Typical Road and Sidewalk Detail	57

LEGAL NOTE

This copy of the Town of Hanover Rules and Regulations Governing the Subdivision of Land is provided solely for reference purposes and the convenience of the general public. The Town makes no warranty, express or implied, nor assumes any responsibility in the use of this document or its contents for its accuracy or completeness. The Official Rules and Regulations Governing the Subdivision of Land (as adopted and amended by the Planning Board) are on file with the Town Clerk of the Town of Hanover and shall be considered the definitive legal

reference in the event of any dispute. All site-specific questions regarding requirements and provisions must be directed to the Planning Board.

SECTION I: INTRODUCTION

SECTIONS SUMMARY

- A.** Authority
- B.** Purpose

A. AUTHORITY

Under the authority vested in the Planning Board of the Town of Hanover by Section 81-Q of Chapter 41 of the General Laws, said Board hereby adopts these Rules and Regulations Governing the Subdivision of Land in the Town of Hanover. These regulations shall be effective upon approval by the Planning Board and recording with the Registry of Deeds and the Recorder of the Land Court.

B. PURPOSE

The Rules and Regulations Governing the Subdivision of Land in Hanover, Massachusetts have been adopted by the Hanover Planning Board in accordance with the purpose outlined in Section 81-M of the General Laws. The said rules and regulations have been adopted with the purpose of protecting the safety, convenience and welfare of the inhabitants of the Town by regulating the laying out and construction of ways in subdivisions providing access to the several lots therein, but which have not become public ways, and ensuring sanitary conditions in subdivisions and in proper cases parks and open areas. The powers of the Planning Board and the Zoning Board of Appeals under the Subdivision Control Law shall be exercised with due regard for the provision of adequate access to all of the lots in a subdivision by ways that will be safe and convenient for travel; for lessening congestion in such ways and in the adjacent public ways; for reducing danger to life and limb in the operation of motor vehicles; for securing safety in the case of fire, flood, panic and other emergencies; for ensuring compliance with the applicable Zoning Bylaws; for securing adequate provisions for water, sewerage, drainage, underground utility services, fire, police, and other similar municipal equipment, and street lighting and other requirements where necessary in a subdivision; and for coordinating the ways in a subdivision with each other and with the public ways in the Town and with the ways in neighboring subdivisions.

SECTION II: GENERAL

SECTIONS SUMMARY

- A. Definitions
- B. Plan Believed Not to Require Approval
- C. Standards for the Flood Plain District
- D. Approved Plan Required

A. DEFINITIONS

Applicant: A person or entity who applies for the approval of a plan of a subdivision or a person who applies under Section III. B. of this Regulation.

Board: The Planning Board of the Town of Hanover.

Frontage - The linear distance between side lot lines where a lot meets a street/way layout.

General Laws: (G.L.) The General Laws of Massachusetts. In any amendment or rearrangement of the General Laws, any citation of particular sections of the General Laws shall be applicable to the corresponding sections in the new codification.

Intersection – An intersection is a point where two lines of street cross at the same level.

Lot: An area of land in one ownership, with definite boundaries ascertainable or to be ascertainable of record, and used, or set aside and available for use, as the site of one or more buildings and buildings accessory thereto or for any other definite purpose.

Owner: As applied to real estate, the person or entity holding the ultimate fee simple title to a parcel, tract or lot of land, as shown by the record in the appropriate Land Registration Office, Registry of Deeds or Registry of Probate.

Person: An individual, or two or more individuals or a group or association of individuals, a partnership or a corporation having common or undivided interests in a tract of land.

Preliminary Plan: A plan of a proposed subdivision or a resubdivision of land prepared in accordance with Section III. A. - to facilitate proper preparation of a definitive plan.

Public Utilities: Sewers, water drains, water pipes, gas pipes, electric lines, telephone lines, fire alarm and cable TV lines and the like and their respective appurtenances.

Plan or Definitive Plan: The plan of a subdivision as submitted (with appropriate application) to the Board for approval, to be recorded in the Registry of Deeds or the Land Court when approved by the Board, and such plan when approved and recorded, all as distinguished from a preliminary plan.

Roadway: That portion of a way which is designed and prepared for vehicular travel.

Street, Dead-end: A dead-end street is a way, or portion of a way, or a system of ways, which, if closed at any given point, vehicular access beyond said given point would not be possible by way of alternative roadway routes. The measurement of the length of a dead-end street shall be that maximum length of roadway beyond any such

given point which, if closed, would prevent vehicular access or egress. In the case of a system of ways making up a dead-end street, the measurement of the length of a dead-end street shall be the total cumulative length of roadways beyond any such given point which if which, if closed, would prevent vehicular access or egress. In any event, the maximum length of a dead-end street shall not exceed that allowed in Section IV.A.5.a.

Street, Minor: A street which, in the opinion of the Board, is being used or will be used primarily to provide access to abutting lots, carrying less than 400 vehicles per day and/or less than 1000 feet in length, and which will not be used for through traffic.

Street, Major: A street intercepting one or more minor streets, or one which, in the opinion of the Board, is used or will be used to carry a substantial volume of traffic (generally over 400 vehicles per day) from such minor street(s) to a major street or community facility, and normally including the principal entrance street of a subdivision, or group of subdivisions, and any principal circulation streets within such subdivisions.

Subdivision: ‘Subdivision’ shall mean the division of a tract of land into two or more lots and shall include resubdivision, and, when appropriate to the context, shall relate to the process of subdivision of the land or territory subdivided; provided, however, that the division of a tract of land into two or more lots shall not be deemed to constitute a subdivision within the meaning of the Subdivision Control Law, if at the time when it is made, every lot within the tract so divided has frontage on (a) a public way, or (b) a way shown on a plan previously approved in accordance with the subdivision control law, or (c) a way in existence when the Subdivision Control Law became effective in the town in which the land lies, having, in the opinion of the Board, sufficient width, suitable grades and adequate construction to provide for the needs of vehicular traffic in relation to the proposed use of the land abutting thereon or served thereby, and for the installation of municipal services to serve such land and the buildings erected or to be erected thereon. Such frontage shall be of at least such distance as is then required by the Zoning Bylaw for the Town.

Way Line: The dividing line between a way and a lot/parcel. In the case of a public way, the line established by the public authority laying out the way upon which the lot abuts (a/k/a road layout).

B. PLAN BELIEVED NOT TO REQUIRE APPROVAL

Any person, who wishes to cause to be recorded in the Registry of Deeds or to be filed with the Land Court a plan of land and who believes that the recordable plan does not require approval under the Subdivision Control Law, may submit a Mylar, six paper copies of the plan, copy of plan in electronic format (pdf) and the Form A application to the Board together with appropriate filing fees. Said application shall be accompanied by all necessary evidence to show that the plan does not require approval. Said person shall file, by delivery or registered mail, a notice with the Town Clerk stating the date of submission for such determination accompanied by a copy of said application. If the notice is given by delivery, the Town Clerk shall, if requested, give a written receipt therefore.

If the Planning Board determines that the plan does not require approval, it shall without a public hearing and without unnecessary delays endorse on the plan the words “Approval under the Subdivision Control Law not required.”

The Planning Board may add to such endorsement a statement of the reason approval is not required. The plan will be returned to the applicant. If the Planning Board determines that the plan does require approval under the Subdivision Control Law, it will so inform in writing the Town Clerk of its action. If the Planning Board fails to act upon a plan submitted under this section within twenty-one (21) days after its submission, it shall be deemed to have determined that approval under the Subdivision Control Law is not required.

Said plan shall include the following: Stamped by MA. Registered Land Surveyor, North Point, Locus Map, location and distance from property lines of existing buildings and structures, existing septic systems, stone walls, easements, swamps, marshes, and other water bodies, wetlands as delineated under Ch. 131, M.G.L., and the Town of Hanover Wetland Bylaw, total area of each lot and area in upland and wetland; together with applicable legend, title, date, and scale, the status of existing way (private or public), lot size and frontage of all lots shown, current zoning including overlays, approved density and dimensional variances, deed/plan references. Base flood elevation data, as shown on the Flood Insurance Rate Map, as most recently revised, published by the Federal Emergency Management Agency shall also be included. If portions of the lot are within the floodplain then the plan shall show the floodplain line and elevation of the floodplain. The scale of said plan shall be one (1) inch equals forty (40) feet or such other scale as shall be deemed appropriate by the Planning Board to show the property and the above required information conveniently. Plans shall be in accordance with M.G.L., Chapter 36, Section 13A, as amended. Failure to include the above information on the plan shall be grounds for disapproval.

C. STANDARDS FOR THE FLOOD PLAIN DISTRICT

All subdivision proposals and other proposed new developments shall be reviewed to determine whether such proposals will be reasonably safe from flooding. If any part of a subdivision proposal or other new development is located within the Flood Plain District established under the Zoning Bylaw, it shall be reviewed to assure that:

1. the proposal is designed consistent with the need to minimize flood damage, and
2. all public utilities and facilities, such as sewer, gas, electrical, and water systems shall be located and constructed to minimize or eliminate flood damage, and
3. adequate drainage systems shall be provided to reduce exposure to flood hazards, and
4. base flood elevation (the level of the 100-year flood) line shall be shown for that portion of lots/parcels within the Flood Plain District.

D. APPROVED SUBDIVISION PLAN REQUIRED (Residential and Non-Residential)

No person shall make a subdivision within the meaning of the Subdivision Control Law of any land within the Town, or proceed with the improvement or sale of lots in a subdivision, or the construction of ways, or preparation therefore including grading, excavating, filling or tree cutting or the installation of utilities and municipal services therein, unless and until a Definitive Plan of such subdivision has been submitted and approved by the Board as hereinafter provided.

SECTION III: PROCEDURE FOR THE SUBMISSION OF PLANS FOR APPROVAL

SECTIONS SUMMARY

- A. Preliminary Plan
- B. Definitive Plan
- C. Informal Meetings

A. PRELIMINARY PLAN

1. General

A Preliminary Plan of a subdivision may be submitted by the subdivider to the Board and to the Board of Public Works, the Conservation Commission and the Board of Health for discussion and tentative approval, modification or disapproval by each board. The submission of such a Preliminary Plan, which is not a binding commitment, will enable the subdivider, the above boards and other municipal agencies and owners of property abutting the subdivision to discuss and clarify the problems of such subdivision before a Definitive Plan is prepared. A properly executed application Form B with the appropriate filing fees shall be filed with the Preliminary Plan submitted to the Board. Non-residential subdivisions shall submit a preliminary plan pursuant to MGL. Chap.41 section 81S prior to submission of a Definitive Plan.

2. Contents

The Preliminary Plan shall be at a scale no greater than forty (40) feet to the inch, a full size copy (2'x3') and seven reduced copies (11" x 17") of said plan shall be filed with the Board in paper copy as well as in an electronic version (pdf). When, in the opinion of the Planning Board, due to design considerations and complexities, the Preliminary Plan warrants review by the Board's Consultant Review Engineer, upon notice by the Board, the Planning Department shall forward the plan to said Consultant Review Engineer and the applicant shall immediately forward to the Board a sum in the amount of six thousand (\$6,000) for plan review purposes. Said funds shall be deposited by the Treasurer in a separate escrow account. This plan shall be designated as a "Preliminary Plan" and, in order to form a clear basis for discussion of the subdivision and to aid in the preparation of the Definitive Plan, the plan shall contain all of the information designated in Section III.B.2.a, c., d., f., g., & i.

- a. Major features of the site such as existing walls, fences, buildings and structures, large trees, wooded areas, rock ridges, outcroppings, ditches, swamps, streams and other water bodies. Identification of the 100 year floodplain located within a portion of the property shown on plan.
- b. Topography at two (2) foot or less contour intervals. Topographical elevations shall be USGS datum as in effect at time of application. Random datum elevations are not acceptable.
- c. Proposed system of drainage including any existing drainage structures, culverts or drains with rim and/or invert elevations and, in a general manner, adjacent natural waterways. Uses of proposed Low Impact Development (LID) designs are encouraged where applicable.
- d. Proposed location of sidewalks, street lights, street trees, curbs, gutters, water mains, underground conduits, connection to existing water supply, drainage easements, bridges or culverts and utility poles.

- e. Approximate boundary lines of proposed lots, with approximate areas and dimensions. During discussion of the Preliminary Plan, the complete information required for the Definitive Plan and the financial arrangements for Performance Guarantee may be developed.
- f. Where the Preliminary Plan covers only a part of the subdivider's entire holding, a sketch of the prospective roadway system of the un-submitted portion shall be furnished so that the submitted roadway system can be viewed in connection with possible future development.
- g. Proposed major earth removals or change in contours with an estimate of approx. cubic yards of material either imported or to be exported.
- h. Where a new subdivision street is to be connected to an existing street, the Preliminary and Definitive Plans shall include the topography of a sufficient length of the existing street on both sides of the proposed new street intersection to show the horizontal and vertical sight distances section from the existing and proposed streets. The topography shall also indicate the existing street drainage system.
- i. The topography, streets, full or intermittent streams, wash ways, drains (sub-surface and surface) wells, easements and on-site sewerage or wastewater disposal systems for a distance of 200 feet beyond the sub-dividers entire holdings shall be included on the plan. In addition any town streets, utilities, drainage or easements for a distance of 500 feet including the 200 feet distance from the sub-dividers entire holdings shall be noted on the plan.
- j. Proposed building envelope locations shall be shown for each lot.
- k. Existing trees line and a second line showing the proposed line of tree clearing.

3. Tentative Preliminary Plan Review and Approval

The Board with the advice of the Board of Health and the Board of Public Works may give such Preliminary Plan approval, with or without modification or suggestion. Such approval does not constitute approval of the subdivision but facilitates the procedures for preparing and securing final approval of the Definitive Plan.

B. DEFINITIVE PLAN

1. General

Any person who submits a Definitive Plan of a subdivision to the Planning Board for approval shall file with the Board the following:

- a. A recordable drawing of the Definitive Plan and three (3) full size (2' x 3') paper prints and seven (7) reduced (11"x 17") Paper prints thereof, dark line on white background. The recordable drawing will be made available for recording.
- b. A properly executed application Form C including the time within which the applicant agrees to complete the ways and install the public utilities in the subdivision. Approval of all plans shall be upon the condition that all ways shown thereon and public utilities required by the Board shall be completed and installed within the time so specified. The Board may decline to approve any plan unless the applicant agrees to complete the ways shown thereon and install the public utilities aforesaid within two (2) years of the date of approval of the Definitive Plan. If the ways in any subdivision are not completed and the utilities aforesaid are not installed within the time agreed to

by the applicant or required by the Board, including any formal extension thereof, no such way shall thereafter be laid out, constructed, completed or opened for public use unless and until a new application is filed with and approved by the Board.

- c. An estimated water usage study for all residential and commercial properties within a subdivision proposed to be tied into the Town's water supply for preliminary review and comment by the Hanover Water Department.
- d. Fee Schedule. Contact Planning Department for current Planning Board Fee Schedule

Note: For that portion of the subdivision utilizing Section 6.860.B (Water Resource Protection District) the Zoning Bylaw for the Town, the above calculations need not include any land area to be dedicated for open space.

The applicant shall file by delivery or registered mail a notice with the Town Clerk stating the date of a submission for such approval and accompanied by a copy of the completed application Form C. In addition, a set of plans shall be submitted to the Board of Health at the same time as Planning with a Board of Health time stamped receipt provided to the Planning Department at time of submission.

The Planning Board may engage a peer review consultant, at the applicant's expense, where conditions of the proposed subdivision require the assistance of a planning, engineering, traffic, soils and water usage consultant to assist the Board in its review pursuant to MGL. Chapter 44 Section 53G. The applicant shall, with filing of the Definitive Subdivision Plans, deposit with the Treasurer of the Town funds equal to (\$6,000) in a separate escrow account. No definitive subdivision application shall be deemed complete and no public hearing shall be held unless said funds have been deposited with the Treasurer of the Town.

The applicant shall at no time allow the balance of the peer review account to fall below half, or below three thousand dollars (\$3,000) of the initial deposit. Release of approved plans and building permits shall not be approved until the Town has been compensated in full for all peer review costs as outlined herein.

Upon final action (filing decision with the Town Clerk) the Planning Board shall return the balance of funds in escrow to the applicant, but shall retain sufficient funds to cover the unpaid portion of any approved, outstanding invoice until such payment is made, and shall so notify the applicant in writing.

The consultant shall provide monthly invoices to the Planning Board for approval of services rendered, and shall report directly to the Planning Board as to findings, investigations, scope of work, and actions.

2. Contents

The Definitive Plan shall be prepared by a professional civil engineer and land surveyor registered in Massachusetts and shall be clearly and legibly drawn at a scale of one (1) inch equals forty (40) feet or such other scale as the Board may accept to show details clearly and adequately. Sheet sizes shall not exceed twenty-four inches (24") by thirty-six inches (36") and shall have a common border a minimum of one and one-half inches (1-1/2") in width. If multiple sheets are used, they shall be accompanied by an index sheet showing the entire subdivision. The Definitive Plan shall contain the following information:

- a. Subdivision name, boundaries, both compass and magnetic north points, date and scale.

- b. A Map indicating the approximate locus of the property involved and of the subdivision in relation to the general configuration of the Town's boundaries, major roads, and connecting roads.
- c. Name and address of record owner, applicant, professional land surveyor and engineer. In addition, Form D shall be completed and filed with owner and applicant's original signatures.
- d. Names of all direct abutters as they appear in the most recent tax list. Including abutters across the street for the length of subdivision frontage (see MGL. Chapter 41 Section 81-T)
- e. An identification of the appropriate zoning districts (including overlay districts) with an existing and proposed density & dimensional table and all wetlands and floodplain designations.
- f. Lines of existing and proposed streets, ways, sidewalks, lots, easements (existing/proposed) and public or common areas within the subdivision. Proper names shall not be allowed as street names unless such have been recommended as being of historical significance by person(s) familiar with the history of Hanover. All applicants are encouraged to seek the assistance of the Hanover Historical Society and the Hanover Fire Department for the purpose of proposing street names.
- g. Sufficient data to determine the location, direction and length of every street and way line, lot line and boundary line and to establish these lines on the ground and areas of lots with lot numbers and areas of other adjoining land of applicant not included in the subdivision.
- h. Location of all permanent monuments, including street and lot bounds, properly identified as to whether existing or proposed.
- i. Location, names and present widths of streets bounding, approaching or within reasonable proximity to the subdivision. Include traffic counts for existing streets surrounding or serving the proposed subdivision. The plan shall show the horizontal and vertical sight distances available to vehicles approaching and entering the proposed intersection of the subdivision streets with existing street. Proposed intersection designs shall provide no less than the minimum horizontal and vertical sight distances required by the current (as of the date of application) American Association of State Highway and Transportation Officials (AASHTO) standards for the design speed and projected traffic volumes of the intersecting streets. Traffic counts, widths and conditions of existing streets shall be included in a traffic report. If demonstrated that neighboring streets do not have the capacity to support additional traffic from the subdivision, then the applicant shall propose improvements to increase the capacity of neighboring streets.
- j. Indicate all existing and proposed easements, covenants or restrictions applying to the land and their purposes, whether or not within the subdivision.
- k. Suitable space to record the action of the Board and the signatures of the members of the Board on each individual sheet.

(Items l. through q. may be submitted on separate sheets of the Definitive Plan set.

- l. Existing profiles on the exterior lines and proposed profile on the center-line of proposed streets at a horizontal scale of one inch equals forty feet and vertical scale of one inch equals four feet, or such other scale acceptable to the Board. Elevations are to be referred to mean sea level as established by the Coast and Geodetic Survey. Rates of gradient shall be shown by figures.

- m. Existing and proposed topography as required in Section III, A.2. b., above, with identification of all major earth removal, cut and fill, terracing, dredging, and grading which is or will be of a slope greater than five percent.
- n. Proposed layout of storm drainage, water supply, hydrants, and sewage disposal systems, and dimensions of gutters including any utility connections to existing systems with pertinent information in adjoining existing ways or cross country. An estimated water usage report shall be provided for all anticipated structures within both a residential and commercial subdivision.
- o. Location and species of proposed street trees and existing trees to be retained with trunks over three inches in diameter, measured six inches above the finished ground level, located behind any proposed sidewalks within twenty feet of the street right-of-way line of existing or proposed streets. Location of and identification of areas where trees are to be removed during site preparation, construction, or landscaping included a tree clearing limit line of work shown on the plan.
- p. Location of proposed private utilities and sidewalks.
- q. All other features as required in Section III, A. for a Preliminary Plan.
- r. The plan shall show the following adjacent properties on all sides of the proposed subdivision and to the distance indicated:
 - i. Properties within 200 feet including all buildings/structures, on-site disposal system and private wells.
 - ii. Utilities including water, drainage, sewer, electricity, gas, telephone and cable television within existing intersecting roadways for a distance of 400 feet
 - iii. Accepted and unaccepted streets and easements within 500 feet.
- s. Proposed building envelope locations shall be shown for each lot.
- t. Landscaping and planting plan, showing treatment of all planting areas, roadway medians, and disturbed slope areas by species, location, size and quantity. Street trees shall be planted at a minimum of two trees per lot, on each side of the road, with suitable distance behind the sidewalk but within the right of way layout (See Appendix A). Applicants are encouraged to consider under Section V-I-2 alternative tree locations
- u. Cut and fill plan, showing all areas to be graded and areas where fill is to be placed. The estimated volume of earth removal and of earth fill shall be determined in cubic yards and shown on said plan that is both imported and exported from the site. Sources of excess fill required and locations of disposal of excess earth removal shall be indicated to the Board.

3. Review by Board of Health as to Suitability of the Land

At the time of filing of the Definitive Plan, the subdivider shall also file with the Board of Health a copy of the Definitive Plan. The Board of Health shall within forty-five (45) days after filing of the Plan, report to the Planning Board in writing, approval or disapproval of said plan. If the Board of Health disapproves said plan, it shall make

specific findings as to which, if any, of the lots shown on such plan cannot be used for building sites without injury to the public health, and include such specific findings and the reasons therefore in such report, and, where possible, shall make recommendations for the adjustment thereof. Every lot shall be provided with a sewage disposal system satisfactory to the Board of Health.

4. Review by Other Town Officials

The Planning Department will transmit copies of the Definitive Plan electronically to town officials other than the Board of Health as follows:

To the Building Inspector.
 To the Board of Public Works.
 To the Conservation Commission.
 To the Fire Department.
 Police Department

Applicants will be provided with a departmental sign-off sheet required to be signed by each department and returned prior to the first public hearing to the Planning Board showing all departments have received and reviewed the Definitive Plan submission. The above officials may state in writing on or before the date of the public hearing, any proposed modifications or revisions to the plan they desire.

If no modifications, revisions or objections are received prior to or at the public hearing and the Department sign off sheet is completed, approval may be assumed for purposes of any action by the Board. However, such assumption shall not negate or supersede the legal powers of any other board or officials in any way.

All plan revisions shall be provided electronically and depending on the extent of the revisions the Town Planner shall advise as to the number of paper copies to be provided beyond two paper copies.

5. Public Hearing

A public hearing shall be held by the Planning Board before approval of the Definitive Plan is given. Notice of such hearing shall be given by the Board in a newspaper of general circulation in the Town of Hanover and posted in Town Hall, in each of two successive weeks, with the first publication at least fourteen (14) days prior to the public hearing. A copy of said notice shall be mailed by the department at the expense of the applicant by certified mail, return receipt requested, to all owners (as appearing in the most recent tax list) of land abutting upon the subdivision, or lying within one hundred (100) feet of any tract of land of the applicant, any part of which is included in the proposed subdivision. The applicant shall submit to the Board, not later than two (2) weeks prior to any public hearing or continuation thereof, all plans, revisions, correspondence, and other associated documentation. Failure on the part of the applicant to do so shall cause the Board either to act on previously submitted documentation or to automatically continue the public hearing. Whenever a public hearing is continued, the applicant shall be required to request an extension of the time during which the Board is required to act and notify the Town Clerk, said extension being a minimum of sixty (60) days after the date of the continued public hearing with a designated future public hearing date and thirty (30) day extended decision deadline date. Failure of the applicant to so comply may be cause for the disapproval of said plan by the Board.

6. Performance Guarantee

Before approval of a Definitive Plan of a subdivision, the subdivider shall agree to complete the required improvements specified in Section V for any lots in a subdivision, such construction and installation to be secured by one, or in part by one and in part by the other, of the following methods which may from time to time be varied by the applicant with the written consent of the Board.

a. Final approval with covenant

The subdivider shall submit to the Planning Board the standard Town of Hanover Covenant for a vote of acceptance and then the Covenant shall be duly recorded by the owner of record, running with the land, whereby such ways and services as specified in Section V, not covered by bond or deposit under “b.” hereof, shall be provided to serve any lot before such lot may be built upon or conveyed, other than by mortgage deed of the entire subdivision.

b. Final approval with bonds or surety

The subdivider shall either file a performance bond or a deposit of money or negotiable securities in an amount determined by the Board to be sufficient to cover the cost of all or any part of the improvements specified in Section V. not covered by a covenant under “a.” hereof. Such bond or security, if filed or deposited, shall be approved as to form and manner of execution by the Town Counsel and as to sureties by the Town Treasurer and shall be contingent on the completion of such improvements at a time specified by the Board.

7. Reduction or Increase of Financial Surety

The penal sum of any such bond, or the amount of any deposit held under clause 6.b. above, may, from time to time, be reduced or increased by the Planning Board. Request of a cash or bond reductions shall be made in writing to the Planning Board, accompanied with an estimated list of incomplete work and schedule of value for each item and an estimated time schedule for completing said work. The Planning Board shall consult with the applicable Town departments as to the estimated costs and if necessary adjust before taking a vote to reduce. Reductions may be allowed as work progresses and increases required for time extensions to allow for inflationary factors and general deterioration of existing roads and other facilities previously installed.

8. Release of Financial Security

Upon the completion of improvements required under these rules and regulations to the satisfaction of the Board, security for the performance of which was given by bond, deposit or covenant, or upon the performance of any covenant with respect to any lot, the applicant may send by registered mail to the Town Clerk a written statement in duplicate that the said construction or installation in connection with which such bond, deposit or covenant has been given has been completed in accordance with the requirements contained under Section V. such statement to contain the address of the applicant, and the Town Clerk shall forthwith furnish a copy of said statement to the Planning Board. If the Board determines that said construction or installation has been completed, it shall notify the Town Treasurer in writing that it releases the interest of the Town in such bond or deposit, and that such bond or deposit should be returned to the person or persons who furnished same, or in the case of covenant it shall issue a written release of the covenant suitable for recording. However, up to ten percent of the value of the bond or other security may be held by the Town for one year after completion of construction or until the streets are accepted by the Town, whichever comes last. Prior to releasing the Town’s interest in a performance bond or deposit or covenant, the Planning Board shall receive the following written statements of approval, or fifteen (15) days shall elapse after the request for said approval without action:

From the Board of Public Works as to the construction of all ways and sidewalks; installation of monuments; street signs; curbs; gutters; drainage systems; installation of water pipes and connections; and hydrants.

From the Board of Health as to the installation of drainage and of sewage disposal facilities.

If the Board determines that said construction or installation has not been completed, it shall specify to the applicant in writing the details wherein said construction and installation fails to comply with requirements contained under these rules and regulations. Upon failure of the Board to act on such application within forty-five (45) days after receipt of the application by the Town Clerk, all obligations under the bond shall cease and terminate by operation of law, any deposit shall be returned and any such covenant shall become void.

In the event that said forty-five (45) day period expires without such specification, or without the release and return of the deposit or release of the covenant as aforesaid, the Town Clerk shall issue a certificate to such effect, duly acknowledged, which may be recorded.

9. Certificate of Approval

The action of the Board in respect to such plan shall be by vote, copies of which shall be certified and filed with the Town Clerk and sent by delivery or registered mail to the applicant. If the Board modifies or disapproves such plan, it shall state in its vote the reasons for its action and shall rescind such disapproval when the plan has been amended to conform to the rules, regulations and recommendations of the Board. Final approval, if granted, shall be endorsed on the original drawing of the Definitive Plan by the signatures of a majority of the Planning Board (or by the signature of the person officially authorized by the Board) but not until the statutory twenty (20) day appeal period has elapsed following the filing of the Certificate of the Action of the Board with the Town Clerk and said Clerk has notified the Board that no appeal has been filed. After the Definitive Plan has been approved and endorsed, the Board shall return the original to the applicant. Copies of recorded plans shall be given to the Planning Board & Building Inspector.

The Board may vote not to grant approval to a Definitive Plan if the land in question has been disturbed in violation of the Zoning and Town Bylaws regarding site preparation work. The Board shall specify corrective actions to be taken by the applicant before final approval is given.

The Board may extend the period permitted by statute between submission of a Definitive Plan and action thereon upon written request of the applicant.

Final approval of the Definitive Plan does not constitute the laying out or acceptance by the Town of streets within a subdivision.

10. Endorsed Definitive Copies

Copies of the recorded endorsed Definitive plan shall be given to the Planning Board and Building Inspector.

A duplicate original on Mylar of the approved and endorsed plan and three (3) copies shall be given to the Department of Public Works prior to the pre-construction conference. The Mylar reproducible will be held by the Department of Public Works, one of the working copies will go to the inspector, one to the contractor or developer, and the third will remain at the Department of Public Works for the addition of notes and information applicable for an as-built plan. Prior to lot release in a subdivision and prior to acceptance by the town of a subdivision street, the developer or owner will be required to update the Mylar reproducible to an as-built plan in accordance with Water Division regulations, Planning Board regulations and Town Bylaw as applicable. After each updating, the developer shall return the Mylar with three copies of the updated as-built plan to the Department of Public Works for redistribution of the updated plan and storage of the Mylar. The Mylar reproducible will remain

the property of the Town upon completion of the project. Updating information shall include all on-site sanitary sewerage disposal systems, drainage, water and all other subsurface utilities.

In addition to the Mylar and copies of the “as-built” plan, the applicant shall produce a copy of the “as-built” plan on an AutoCAD system compatible with the MASSGIS. Prior to endorsement by the Planning Board, the applicant shall submit electronically the approved version of the plan to the Planning Board for review and approval. The electronic version of the definitive plan shall be identical, full size, and shall contain all information included on the plan print. Failure to submit electronically to the Planning Board shall be cause for the Planning Board to rescind approval or not to endorse said plans.

11. Release of Lots

- a. Before lots are released from a performance guarantee, and are allowed to be built upon, all utilities shall be in place and tested in the following manner:
 - i. Water Mains - Water mains shall be installed and connectable for individual services. Water mains shall be tested, disinfected, and accepted for connection of Services by the Department of Public Works.
 - ii. Fire Hydrants - Fire hydrants shall be installed and fully usable by the Fire Department. Inspections to be done by the Department of Public Works.
 - iii. Underground Conduits - Underground conduits containing wire for the distribution of the service to be provided shall be installed and inspected by the respective utility companies.
 - iv. Gas Mains - Gas mains, if any, shall be installed, tested, and connected, and ready to accept services for the use of the product and inspected by the utility company.
- b. All lots subject to a lot release request shall have the street address posted conspicuously in front of the lot prior to approval of the lot release by the Board.
- c. No lots shall be released from covenant or performance guarantee for building or conveyance purposes unless all drainage, curbing, sidewalks, monuments, pavement construction, landscaping (including street trees, plantings in islands of turnarounds (if proposed), and any other required construction has been completed, except for the top course of asphalt and landscaping out of season, unless otherwise agreed to by the Planning Board with an estimated cost to complete.
- d. Prior to a release of lots the Planning Board shall require the submission of perc test results for all lots in the subdivision, not just for lots subject of the lot release request. Any lot failing the perc test within the subdivision shall be joined with a lot that may be built on and that has passed the perc test.

C. REVISIONS TO A DEFINITIVE PLAN

Revisions to an already approved Definitive Subdivision Plan if deemed by the Planning Board to be a major modification shall be subject to all requirements of a Definitive Subdivision Plan application including notification of abutters, advertising, public hearing, fees, contents and all other requirements. Said revision will be subject to the Subdivision Rules and Regulations in effect at the time of application for the revision.

D. INFORMAL MEETING

The Planning Board may meet at an applicant's request informally to review a development plan. The applicant will be allowed two informal sessions, not to exceed thirty minutes each.

SECTION IV: DESIGN STANDARDS

SECTIONS SUMMARY

- A. Streets
- B. Easements
- C. Open Spaces
- D. Protection of Natural Features
- E. Lot Drainage
- F. Building Location
- G. Stockpiling of Earth and Construction Materials
- H. Lot Design

A. STREETS

1. Location

- a. All streets in the subdivision shall be designed so that, in the opinion of the Planning Board, they will provide safe vehicular travel. Due consideration shall also be given by the subdivider to the attractiveness of the street layout in order to obtain the maximum livability and amenity of the subdivision.
- b. Provision satisfactory to the Planning Board shall be made for the proper projection of streets or for access to adjoining property which is not yet subdivided.
- c. When deemed necessary for the public good by the Planning Board, provision satisfactory to the Board shall be made to extend proposed subdivision ways so as to connect with existing public ways.
- d. Reserve strips prohibiting access to streets or adjoining property shall not be permitted, except where, in the opinion of the Planning Board, such strips shall be in the public interest.

2. Alignment

- a. Street jogs, or changes in direction, with centerline offsets of less than one hundred and fifty (150) feet shall be avoided.
- b. The minimum centerline radii of curved streets shall be as follows:
 - Minor Streets—one hundred and fifty (150) feet.
 - Major Streets—two hundred and fifty (250) feet.
- c. A tangent not less than one hundred and fifty (150) feet in length shall separate all reverse curves.
- d. Streets shall be laid out so as to intersect as nearly as possible at right angles. No street shall intersect any other street at less than sixty (60) degrees.
- e. Property lines at street intersections shall be rounded or cut back to provide for a curb radius of not less than forty (40) feet.

- f. Streets shall be laid out so as to intersect at intervals which will permit block size to be in a range of six hundred (600) to twelve hundred (1200) feet in length unless otherwise specified by the Planning Board. In lieu of actual construction of a cross street in special instances, the Planning Board may approve an easement for a future street.

3. Width

- a. The minimum width of rights-of-way shall be as follows:

Minor streets: fifty (50) feet.

Major streets and such minor streets, which in the judgment of the Planning Board may in the future be changed in character to become major streets: sixty (60) feet.

- b. When a street will provide the only access for lots fronting on a length in excess of five hundred (500) feet or where on a major street potential volume is such as to warrant it, the Planning Board may require a greater right-of-way than that specified above.

4. Grade

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

5. Dead-end Streets

- a. Dead-end streets shall not be longer than one thousand (1,000) feet, unless in the opinion of the Planning Board such a greater length is necessitated by topography or other local conditions.
- b. Dead-end streets shall be provided with a turn-around having an outside roadway diameter of one hundred and six (106) feet for minor streets and one hundred and ten (110) feet for major streets and with a way line diameter of one hundred and thirty (130) feet for minor streets and one hundred and forty (140) feet for major streets, unless otherwise specified by the Planning Board.
- c. Landscaped islands within the cul-de-sac shall not be required; however if an applicant chooses to install a landscape island they shall be installed as follows: Turnarounds shall be provided with a central circular island of twenty-four (24) foot radius minimum. The paved roadway width around said circular island shall be twenty-nine (29) feet for minor streets and thirty-one (31) feet for major streets. The circular island shall have granite edging and be landscaped with low lying, low maintenance shrubs and other approved plantings and/or trees.

- d. The centers of the turn-around and the central circular island shall be located on the extended centerline of the dead-end way.

6. Curb Openings and Sidewalks

- a. Driveway curb openings shall be at least eight (8) feet wide, but not more than twenty (20) feet wide.
- b. Driveway curb openings shall not be located within sixty (60) feet of the point of intersection of the center lines of intersecting streets. On corner lots, driveway curb openings shall not be located within sixty (60) feet of the point of intersection of the extended way lines of the intersecting ways.
- c. There may be a maximum of two (2) driveway curb openings per lot in residential subdivision.
- d. Curb openings shall be made at street intersections for wheelchair ramps in conformance with the requirements of the Americans with Disabilities and Massachusetts Architectural Barriers Board. In those instances where the Planning Board has waived the requirement for sidewalk construction along both sides of a subdivision roadway, the sidewalk that is constructed along one side of the way shall be five (5) feet wide and carried completely around all cul-de-sacs and a wheelchair ramp shall be placed at the termination of said sidewalk.
- e. Once a Definitive Subdivision Plan has been approved, any alteration or relocation of the driveway curb opening(s) shall require the approval of the Superintendent of the Department of Public Works. The request for said alteration or relocation shall be submitted to the Superintendent and the applicant shall be required to forward to the Planning Board a copy of said request and any subsequent approval.
- f. Sidewalks shall be required on both sides of the roadway unless waived by the Planning Board. (See Section V- C for more details.)

7. Neighboring Access Streets

Existing streets that will be used to access the proposed subdivision shall be of a width and condition to accept projected traffic. Determination of appropriateness of neighboring streets shall be made by the Planning Board with advice from the Department of Public Works in accord with commonly accepted traffic engineering standards. If the existing access streets are determined to be unable to accept additional traffic, then the Board may require the applicant to fund off-site improvements to these streets as part of the approval.

B. EASEMENTS

1. Easements for utilities across lots or centered on rear or side lot lines shall be provided where necessary and shall be at least thirty (30) feet wide.
2. Where a subdivision is traversed by a stream, water course, or drainage channel, the Planning Board may require a storm water easement or drainage right-of-way of adequate width and side slope be provided.
3. Easements for utilities and for drainage purposes shall be conveyed to the Town of Hanover as general easements, prior to As-Built Approval.
4. Easements for future roadways shall be designated on the approved Definitive Plan as: Road Easement to be used by the Town of Hanover, when necessary.

C. OPEN SPACES

1. Before approval of a plan, the Planning Board may require the plan to show an area reserved for a park or parks suitably located for playground or recreation purposes or for providing light and air. The park or parks shall not be unreasonable in area in relation to the land being subdivided and to the prospective uses of such land. The Planning Board may, by appropriate endorsement on the plan, require that no building be erected upon such park or parks without its approval for a period of three (3) years thereafter.
2. Where a subdivision abuts Town owned land or other publicly owned open space, pedestrian public access easements of a minimum of twenty (20) feet in width shall be provided leading from the subdivision way to said land or open space. The Board may require that said easement, or a portion thereof, be cleared and a gravel path be installed.

D. PROTECTION OF NATURAL FEATURES

Due regard shall be shown for all natural features, such as large trees, wooded areas, water courses, scenic points, historic spots, and similar community assets, which, if preserved, will add attractiveness and value to the subdivision. No earth, sand, loam, or gravel shall be removed from within the boundaries of the subdivision without the written approval of the Select Board

E. LOT DRAINAGE

Lots shall be prepared and graded in such a manner that development of one shall not cause detrimental drainage on another; if provision is necessary to carry drainage to or across a lot, an easement or drainage right-of-way of adequate width and proper side slope shall be provided. Storm drainage shall be designed in accordance with specifications in Appendix B.

F. BUILDING LOCATION

No houses, in the case of a residential subdivision, nor structures in the case of a non-residential subdivision, shall be located further than five hundred (500) feet by roadway and/or driveway from a fire hydrant. A residential sprinkler system (NFPA 13D) will be considered by the Fire Department between 500 and 700 feet distance from a hydrant as an alternative.

G. STOCKPILING OF EARTH AND CONSTRUCTION MATERIALS

No soil, loam, sand, gravel and other earth material, no subdivision construction materials such as, but not limited to, concrete pipes, granite curbing, asphalt, and no junk of any kind shall be stockpiled within two hundred fifty (250) ft. of a paved street or residential structure for more than six months unless screened and invisible from the street or residential structure to the satisfaction of the Planning Board.

H. LOT DESIGN

1. Lots shall be designed in such a manner as to minimize tax delinquency.
2. The applicant shall show on the plans all percolation tests so as to show to the Planning Board that all lots are buildable and will not fall into tax delinquency.
3. At the time of the first lot release, lots that do not pass state and local percolation standards for septic systems shall be joined to a buildable lot as outlined in Section III.B.11.e. Release of Lots.
4. Lots shown on an approved Definitive Plan shall comply with all applicable requirements of the Hanover Zoning Bylaws, as amended.

SECTION V: REQUIRED IMPROVEMENTS FOR AN APPROVED SUBDIVISION

SECTIONS SUMMARY

- A. Roadways
- B. Curbs
- C. Sidewalks
- D. Water
- E. Drainage
- F. Utility Locations
- G. Monuments
- H. Street Signs
- I. Street Trees
- J. Circular Driveways

A. ROADWAYS

1. Paved roadways shall be constructed for the full length of all streets within the subdivision. The centerline radius shall conform to the requirements of Section IV A. 2. The centerline of all roadways shall coincide with the centerline of the street right-of-way unless a deviation is approved by the Planning Board. The minimum width of roadway pavement shall be as follows:

Minor Streets—twenty-six (26) feet.

Major Streets—thirty (30) feet.

2. Roadways, sidewalks, curbing, and the unpaved uncurbed areas of the road layout shall be constructed in conformance with Appendix A. Bituminous concrete pavement shall not be constructed after November fifteenth or before April first without written permission of the Board of Public Works (BPW).
3. Slopes outside the right-of-way shall be evenly graded and pitched at a slope of not steeper than three (3) horizontal to one (1) vertical. Where cuts are made in ledge, steeper slopes may be approved. Where terrain necessitates greater slopes, retaining walls, terracing, fencing or rip-rap may be used either alone or in combination to provide safety and freedom from maintenance, but must be done in accordance with plans filed with the Planning Board and approved by the DPW and Planning Board. All such slopes shall be grassed in accordance with Appendix A.
4. No driveway shall be paved in such a manner as to cause excessive run-off on a road or lot shown on the plan and no driveway shall have a grade greater than five percent (5%) within seventy-five (75) feet of a street.

Driveways shall be graded up from gutter level to at least curb height before descending below roadway level.

B. CURBS

1. Straight edge vertical granite curbing shall be installed on all streets however, the Hanover Fire Department prefers the sloped granite curbing as opposed to the 90 degree curbing because it facilitates the apparatus tires better. At all curb openings six (6) foot granite transitions into driveway aprons shall be installed. in conformance with Section IVA-5 and Appendix A

2. Curbstones shall be installed on both sides of all curb openings.

C. SIDEWALKS

1. Bituminous concrete sidewalks shall be constructed along both sides of roadway for the full length of both sides and around the cul-de-sac of every subdivision way. The Planning Board, at its own volition when deemed necessary for public safety or convenience, may waive construction along one side of the way and/or may require the developer to install a sidewalk of similar length, at a maximum, along a neighboring public way.
2. The minimum sidewalk width shall be five (5) feet in accordance with ADA requirements.
3. The sidewalk shall be located at the exterior face of the curbing. No grass strip shall be located between curb and sidewalk.
4. Street signs, utility poles, or other obstructions shall be placed behind the sidewalk layout unless otherwise approved by the Planning Board.
5. Wheelchair ramps shall be provided at street intersections in conformance with the current Massachusetts Architectural Barrier Board standards. When sidewalk construction has been waived along one side of a way, a wheelchair ramp shall be located at the termination of the sidewalk after said sidewalk has been carried completely around the cul-de-sac.

D. WATER

1. Applicants shall provide with the Definitive Plan submission materials, an estimated water usage study for all residential and commercial properties within a subdivision proposed to be tied into the Town's water supply for preliminary review and approval by the Hanover Water Department. Water pipes and related equipment, such as hydrants and main shutoff valves, shall be provided within the subdivision to serve each lot with an adequate water supply for domestic use and fire protection and shall be designed and constructed in conformance with the specifications of the DPW. Connections shall be installed from the water main to the lot line of each lot within the subdivision before the pavement is constructed. Connection shall only be made to existing mains when in the judgment of the DPW the capacity is sufficient to accommodate the additional connection.
2. Where adjacent property is not subdivided or where all the property of the applicant is not being subdivided at the same time, provision shall be made for the future extension of the utility system by continuing the mains for the full length of streets and to the exterior limits of the subdivision, at such grade and size which will, in the opinion of the DPW, permit their proper future extension. Applicant shall provide all necessary easements.
3. Dead ended water mains will not be permitted by the Department of Public Works. Proposed subdivisions shall comply with the Hanover Department of Public Works regulations for water distribution.
4. In those instances that the Planning Board has waived the requirement for sidewalk construction along both sides of the subdivision way, hydrants shall be installed a distance of five (5) feet from the exterior facing of the curbing (See Appendix A). In those instances that sidewalk construction has not been waived, hydrants shall be installed behind the sidewalk but within the street layout. Hydrants shall be spaced at a distance not greater than five hundred (500) feet, unless a greater distance is approved by the Department of Public

Works and Fire Department. The style and type of hydrant shall be approved by the Department of Public Works. Each hydrant shall have a gate valve and valve box on the supply from the main.

E. DRAINAGE

1. Adequate disposal of surface water shall be provided and pipes, manholes and catch basins shall be constructed in conformance with Appendix A. Detention and Retention Basins located within local and state wetland jurisdiction shall be constructed in accordance with the latest Conservation Commission “Detention Basin Regulations and Standards – Town of Hanover” as most recently amended *See Hanover General Bylaws, Section 6-14 (Wetlands Protection Bylaw) and Conservation Commission Rules and Regulations applicable thereto*. Engineers are encouraged to consider Low Impact Development Systems (LIDS) drainage design in accordance with the MA Stormwater Handbook & Stormwater Standards to address drainage quality and quantity.
2. Catch basins shall be built on both sides of the roadway on continuous grades at intervals of not more than four hundred (400) feet, unless otherwise waived by the Planning Board and at such other places as deemed necessary by the DPW and the Planning Board to assure the unimpeded flow of all natural watercourses, to assure adequate drainage of all low points and to provide proper runoff of storm water.
3. No more than two catch basins shall be connected together in series on any run of drainage pipe upstream of the connection to a manhole.
4. Drainage pipes shall have a minimum cover of two and one-half (2 ½) feet unless otherwise approved by the DPW.
5. Drainage design plans, profiles and calculations shall be submitted in conformance with Appendix B.
6. Drainage structures outside the right of way shall be located within general easements to the Town of Hanover as specified in Section IV.B.3. Drainage structures shall include but not be limited to detention basins, retention basins, culverts, rip rap, Low Impact Development Systems and flared end pipes.

All such drainage structures shall be located on a buildable lot, such that no subdivision drainage structure shall be on a lot without a tax paying building. In the case of a residential subdivision, this shall mean on the same lot as a house and in a commercial subdivision, this shall mean a commercial building.

The Planning Board may allow drainage structures on a separate vacant lot if the applicant provides the Board with a “homeowners” or “lot owners” agreement assigning the responsibility and cost of maintenance of said drainage structures and responsibility for payment of taxes to the home or lot owners of said subdivision.

In all instances, the Town shall have a general easement to make such repairs and maintenance as it shall deem necessary recorded prior to the release of the final performance guarantee or lot release.

F. UTILITY LOCATIONS

1. All surfaces and subsurface utilities, excluding drainage shall be located outside the paved roadway on the opposite side of the street from the water mains within the street layout.

- 2 All electrical utilities shall be placed underground from station 0+00 unless waived by the Planning Board

G. MONUMENTS/BOUNDS

1. Monuments shall be installed at all street intersections; at all points of change in direction or curvature of streets; at all lot line intersections; and at all other points where, in the opinion of the Planning Board, permanent monuments are necessary.
2. Monuments shall be permanent square concrete markers approved by the DPW and installed at the time of final grading with the top flush with the final graded surface.
3. All monuments shall be installed prior to the release of a particular lot except as otherwise agreed to by the Planning Board.

H. STREET SIGNS

1. Street signs shall be installed at each intersection. Temporary street signs shall be installed prior to any construction activity and shall be maintained throughout the construction process. Permanent street signs shall be installed prior to application for street acceptance. Permanent street signs shall be of an embossed, raised letter design with white letters on a green background as approved by the Department of Public Works with notification to the Planning Board.
2. Street names shall be approved by the Planning Board and the Hanover Fire Department before requesting street numbers from the Assessors' office to prevent duplication and to provide names in keeping with the overall character of the Town.
3. Traffic control signs shall be installed as deemed necessary by the Select Board and shall be of the type, size and construction approved by the Select Board.

I. STREET TREES

1. Street trees shall not be required in the design of subdivision roadways. If a developer chooses to plant street trees, they must be deep rooted species (i.e.: white oak, hickory, walnut, linden, dogwood, hornbeam and other deep taproot species). All street trees shall be planted behind the sidewalk in the grass area adjacent to the lot line within street layout on both sides of the street. Street trees shall be planted at a minimum number of two (2) trees for lots with frontage of 150' plus and one (1) tree for lots located on the cul-de-sac with frontage of 80' along the diameter of cul-de-sac; or
2. Trees may be grouped in clusters throughout the subdivision, if in the opinion of the Planning Board grouping is desirable because of aesthetics, topography, geology, or safety, provided the number of trees equals the lot formula in I-1 above.
3. Street trees shall be of a minimum of ten (10) feet in height, deep rooted species and when planted and a minimum caliper of three inches measured at six (6) inches above the ground (Note that this specification is for typical street or shade trees; other types of trees have their own specifications depending on species). Planting of street trees, shall be witnessed and inspected by the Department of Public Works at time of planting the developer is responsible for requesting a pre-arranged appointment of said inspection prior to installation.

SECTION VI: ADMINISTRATION

SECTIONS SUMMARY

- A. Variation
- B. Reference
- C. Building Permit
- D. Inspections
- E. Inspection Fee
- F. Inspection Procedure

A. VARIATION

Strict compliance with the requirements of these rules and regulations may be waived when, in the judgment of the Planning Board, such action is in the public interest and not inconsistent with the Subdivision Control Law. Applicants shall submit in writing any request for waivers along with supporting documentation that would assist the Planning Board in their review of each requested waiver.

B. REFERENCE

For matters not covered by these rules and regulations, reference is made to Section 81-K to 81-GG, inclusive, of Chapter 41 of the Massachusetts General Laws.

C. BUILDING PERMIT

No building permit will be issued by the Building Inspector for a lot within a residential or commercial subdivision until such lot has been released by the Planning Board and if deemed by the Planning Board a performance guarantee has been submitted. All Lot releases shall be recorded at the Registry of Deeds prior to issuance of a building permit and/or conveyance of the lot.

D. INSPECTIONS

1. Inspections shall be arranged for by the Developer with the Superintendent of the Department of Public Works prior to the construction of roadways and utilities and/or the Planning Board's consultant dependent on availability and work load.
2. Inspections shall be requested at least twenty-four (24) hours in advance of the scheduled construction.
3. The following work shall be inspected:
 - a. Clearing and grubbing in fill areas.
 - b. Fill construction over three (3) feet in height.
 - c. Drainage and water system construction.
 - d. Utility trench backfill material, placement and compaction.
 - e. Roadway subgrade preparation.
 - f. Road subbase material, placement and compaction.
 - g. Curb, roadway pavement and sidewalk construction.
 - h. Monument installation.

4. Each step of the work shall be satisfactorily constructed in conformance with Appendix A before commencing subsequent steps.
5. The Department of Public Works will require testing to verify the satisfactory performance of the work in conformance with Appendix A. The developer shall obtain DPW approval of and hire and pay for a certified commercial testing laboratory to perform the tests.

Copies of test reports shall be submitted to the Superintendent of Public Works. Testing may be required for, but not limited to, the following:

- a. fill material
 - b. backfill material
 - c. roadway subbase material
 - d. compaction
 - e. bituminous concrete
6. Materials which do not meet the specifications contained in Appendix A shall be removed from the site.
 7. Workmanship which does not meet the specifications contained in Appendix A shall be redone until satisfactory.

E. INSPECTION FEE

1. The Developer shall reimburse the Town of Hanover for the cost of construction inspections by an outside consulting engineer. Requests for inspections are the responsibility of the contractor to call and arrange prior to any connections, closing of trenches and paving.
2. Construction inspection shall be performed by the Town on a part-time basis. The extent and frequency of inspections will be determined by the Town based on the Developer's ability to construct the work in conformance with these Regulations without continuous, full time inspection.
3. The Developer will be charged an hourly rate as identified in a scope of work for the actual time spent on inspection activities by the Town inspector as measured in whole hours and in accordance with the establish fee schedule.

F. INSPECTION PROCEDURE

1. At least four (4) weeks or sooner, before start of site development and/or construction (including mobilization and vegetative clearing) , the Developer shall request the Planning Department to arrange a pre-construction meeting. Said meeting shall include the developer, engineer, general site contractor and any Town Department personnel the Town Planner determines may need to attend.
2. The Planning Department will set the date, time and place and notify the Department of Public Works, Board of Health, and Conservation Commission at a minimum and any other Town department.
3. The Developer shall furnish to the Town at the pre-construction meeting a proposed development schedule and complete list of materials and their source. Catalog cuts or shop drawings shall also be supplied upon request.

4. The Developer shall present his methods and schedule for accomplishing the work and describe all arrangements to be made for Town inspection of the work.
5. Subsequent to the meeting, the Planning Board will notify the Developer of the estimated cost of inspection. The Developer shall present a check for this amount to the Town before starting work.
6. Inspection fees will be charged against this account. If the initial account is expended and the work has not been completed, the Planning Board shall make a new estimate of the remaining cost of the inspection. The DPW shall be notified of this amount and immediately request such additional amount be deposited by the Developer.
7. Failure of the Developer to make the initial payment and to maintain the account shall be grounds for the Town to revoke all approvals and permits.
8. The Developer shall accurately locate all subsurface utilities including, but not limited to, curb stops, valves, hydrants, drainage structures and similar appurtenances and record other changes made during construction and furnish the Town upon completion with a set of reproducible as-built record plans for As- Built approval by the Board.
9. No lots will be released for construction until the as-built plans of subsurface utilities have been received and approved by the Department of Public Works and a vote of the Planning Board.
10. It is the responsibility of the inspector to observe and to report to the owner/developer/contractor and the DPW/Planning Board if and when any work or activity being carried on does not comply with the approved plans, supporting data and all applicable regulations. The inspector has no authority to direct the activities being inspected.
11. In case of a conflict between the plans and the Rules and Regulations, the Rules and Regulations govern.
12. Any substantial change in street layout or elevation must be approved by the Planning Board prior to such change occurring.

VOTED APPROVAL JANUARY 10, 2022

CHAIR OF THE PLANNING BOARD OF THE TOWN OF HANOVER

ATTEST: Mary Ann Brugnoli, Chair



APPENDIX A - ROADWAY AND DRAINAGE CONSTRUCTION SPECIFICATIONS

SECTIONS SUMMARY

1. Clearing and Grubbing
2. Excavation
3. Fill
4. Trenches
5. Drainage
6. Road Pavement
7. Bituminous Concrete Sidewalk
8. Grass Area within Road Layout

1. CLEARING AND GRUBBING

1.1 Vegetation

- 1.1.1 All Definitive plans shall be approved with a limit of site clearing line for the site on the definitive plan and shall be flagged accordingly, inspected by the Town Planner on the site, prior to the start of any site work.
- 1.1.2 Remove all existing trees, brush, dead wood and other organic matter, and all rubbish, debris and other objectionable material from within the street lines.
- 1.1.3 Grub and remove stumps, roots larger than 3 inches and matted roots to a depth of 24 inches below pavement subgrade or existing ground in areas where fill less than 3 feet in height to the pavement base subgrade will be constructed.

1.2 Topsoil

- 1.2.1 Strip available topsoil and stockpile for use within the subdivision with the appropriate soil and erosion measures surrounding stockpiles for long term storage.

2. EXCAVATION

2.1 Unsuitable Material

- 2.1.1 Remove solid rock, boulders over 18 inches in diameter, clay lumps and clay lenses to a minimum depth of 12 inches below pavement base subgrade and backfill the excavation with approved fill material and compact.
- 2.1.2 Completely remove peat and other organic materials and replace with approved fill material and compact.

3. FILL

3.1 Preparation

- 3.1.1 No fill shall be constructed until clearing, grubbing, topsoil stripping and the removal of organic or other unsatisfactory material has been satisfactorily completed.

- 3.1.2 Existing ground surfaces steeper than one vertical to four horizontal shall be plowed, scarified, stepped or benched, as directed, in a manner which insures bonding of the fill material to the existing soils.

3.2 Material

- 3.2.1 Fill material shall be suitable existing material obtained from excavations or borrow from off site sources, and shall be granular soils free of roots, organic material, rubbish, stones over 6 inches in diameter and frozen soil.
- 3.2.2 Fills shall not be constructed with material from rock excavation.

3.3 Compaction

- 3.3.1 Place fill material in successive horizontal layers of 8 to 12 inches in loose depth and compact with approved equipment to at least 90% of laboratory maximum density (ASTM D 1557 Method D). Completely compact each layer before placing the next layer.
- 3.3.2 Do not place, spread or compact fill material while ground or fill material is frozen or partially thawed and during unfavorable weather conditions. Fill material which has excessive moisture content shall not be compacted until the material has been aerated by grading, harrowing or other methods to remove the excessive moisture.

4. TRENCHES

4.1 Excavation

- 4.1.1 Excavate Trenches to the minimum width required for pipe and appurtenance installation with the sides as nearly vertical as safely possible in accordance with the State and Town requirements.
- 4.1.2 Install sheeting or shoring as required and in conformance with Federal and State safety regulations.
- 4.1.3 Remove soft, unyielding or other material unsuitable for pipe bedding to a minimum depth of 6 inches, or as directed, below the bottom of pipe or structure and replace with sand, gravel, and crushed stone or approved granular material and compact.
- 4.1.4 When pipes are to be installed in new fill, place and compact the fill to a minimum height of 3 feet above the top of the pipe grade before excavating the pipe trench.
- 4.1.5 Any dewatering processes long term shall be first approved by the Planning Department prior to implementation. Keep trenches free of water until backfilling is complete.
- 4.1.6 Accurately grade and shape the trench bottom to provide uniform bearing and support for the pipes and appurtenances.
- 4.1.7 Detector tape shall be buried above all underground utilities.

4.2 Backfill

- 4.2.1 Backfill around and to a minimum depth of 12 inches over the pipe shall be selected granular material free of stones larger than 2 inches in diameter.
- 4.2.2 Place and compact backfill around and to a minimum depth of twelve (12) inches over the pipe in successive horizontal layers of 6 inches loose depth. Place the remaining backfill, and backfill around appurtenances, in successive horizontal layers of 8 to 12 inches loose depth.
- 4.2.3 Compact each layer to at least 90% of laboratory maximum density (ASTM D 1557, Method D) before placing the next layer.

5. DRAINAGE

5.1 Materials

- 5.1.1 Pipe: reinforced concrete, 12 inch minimum diameter, bell and spigot type for pipe up to 36 inches in diameter; tongue and groove type over 36 inches. Pipe shall conform to requirements and specifications of the current MDOT Standard Specifications for Highways and Bridges.
- 5.1.2 Pipe joints: tarred oakum and cement mortar or flexible water tight neoprene gaskets, ASTM-C443.
- 5.1.3 Manholes and catch basins: Precast or cast-in-place reinforced concrete or concrete block laid in mortar with a minimum inside diameter of 48 inches and conforming to the current Massachusetts Highway Department standard construction details.
- 5.1.4 Precast structure joints: mastic or rubber gasket, or cement mortar.
- 5.1.5 Pipe ends: Plain or reinforced cast-in-place concrete walls or precast reinforced concrete flared end sections.
- 5.1.6 Concrete: Portland cement concrete, 3000 pounds per square inch minimum compressive strength after 28 days curing.
- 5.1.7 Frames, grates and covers: grey cast iron, ASTM A-48. Manhole frames and covers shall be LeBaron Foundry Co. Catalog No. LK110A with the word "DRAIN" embossed on the cover, or approved equal. Catch basin frame and grate shall be East Jordan Iron Works 0MA552000022 (3 Flange) or 0MA552000023 (4 Flange) Catch Basin Assemblies with Standard Grates, or approved equal.

5.2 Pipe Installation

- 5.2.1 Pipe sections with broken bells, chipped ends, cracked barrels or other defects shall not be used.
- 5.2.2 Clean the joint and caulk a gasket of tarred oakum into the bell. Fill the remaining space with cement mortar. Thoroughly wet concrete pipe joints before placing the mortar. Install pipe with neoprene gaskets in accordance with the manufacturer's instructions.
- 5.2.3 Lay the pipe to true straight line and grade with the sections tightly butted together with the bell or groove ends upstream and with a firm bearing throughout each pipe section.

5.2.4 No pipe shall project into a catch basin or manhole more than 4 inches.

5.3 Structure Installation

5.3.1 Accurately grade and compact the soil to provide a firm, level and uniform bearing.

5.3.2 Set precast structures plumb and completely fill the space in the wall openings around the pipes with cement mortar.

5.3.3 Lay concrete blocks on cast-in-place or precast concrete base.

5.3.4 Fill all joints completely with mortar and point the inside joints.

5.4 Frames

5.4.1 Set frames true to line and grade on a full bed of mortar.

5.4.2 Masonry necessary for line and grade adjustment shall be concrete brick completely mortared in place.

5.5 Existing Structure Connections

5.5.1 Cut holes in existing structure walls for new pipe connections to the minimum size required for pipe insertion.

5.5.2 Completely fill the space around the pipe with cement mortar or grout for the full thickness of the wall.

5.5.3 No pipe shall project into an existing structure more than 4 inches.

6. ROAD PAVEMENT

6.1 Materials

6.1.1 Road Subbase: Hard, durable stone and coarse sand free gravel borrow and dense graded crushed stone free from organic material, clay, surface coatings, deleterious materials and uniformly graded within the following gradation:

ROAD SUBBASE & GRAVEL BORROW

2 inch	100
1 ½ inch	70-100
¾ inch	50-85
No. 4	30-55
50	8-24
200	3-10

DENSE GRADED CRUSHED STONE

2 inch	100
1 ½ inch	70-100

¾ inch	50-85
No. 4	30-55
50	8-24
200	3-10

One sample shall be taken for every 500 square yards of road base delivered to the site or reprocessed on the site for a sieve analysis to be done at the expense of the developer. The sample selection shall be by the Town. The developer shall be responsible for having a laboratory acceptable to and approved by the Board of Public Works and a representative of that laboratory shall come and take the sample from the location determined by the Town.

In the event that the sieve analysis does not meet the specification in the Subdivision Rules and Regulations, as many additional samples and analyses shall be made as may be necessary to determine that area of unacceptable material which shall be removed and replaced with material meeting the sieve analysis.

6.1.2 Granite Curb: Light gray in color, free from seams and other structural imperfections or flaws which would impair its structural integrity, and of a smooth splitting appearance.

Natural color variation characteristic of the deposit from which the curbing is obtained will be permitted. Sawed surfaces shall be thoroughly cleaned and any iron rust or iron particles or any saw mark in excess of 1/8 inch shall be removed. Stones shall be Type VB and have a minimum length of 36 inches, minimum width at the top of 5 inches and minimum width at the bottom of 3 ½ inches over 2/3 of each stone length and depth of 15 to 17 inches. Stones used for closure pieces may be up to 1/3 shorter than the specified minimum length. Stones set on a radius of 100 feet or less shall be cut to the required curvature and, except for making closures, shall be a minimum length of 54 inches on radius from 25 to 50 feet or less. At drainage inlets, a gutter mouth at least 3 inches in depth and at least 2 feet in length shall be cut in the front of the stone.

The front face shall be at right angles to the planes of the top and ends and shall be smooth quarry split, free from drill holes and with no projection of more than 1 inch and no depression of more than ½ inch measured from the vertical plane of the face through the arris or pitch line for a distance down from the top of 8 inches.

For the remaining distance there shall be no projection or depression greater than 1 inch measured in the same manner. The ends of all stones shall be square with the planes of the top and face so that when the stones are placed end to end as closely as possible no space shall show in the joint at the top and face of more than ½ inch for the full width of the top and for 8 inches down on the face after which the end may break back not over 8 inches from the plane of the joint. The arris formed by the intersection of the plane of the joint with the planes of the top and exposed faces shall have no variation from the plane of the top and exposed faces greater than 1/8 inch.

The finish and surface dimensions shall have a top surface free from wind, shall be peen hammered or sawed to an approximately true plane, and shall have no projections or depressions greater than 1/8 inch. The front and back arris lines shall be pitched straight and true and there shall be no projection on the back surface for 3 inches down from the top which would exceed a batter of 4 inches in 1 foot.

6.1.3 Granite Edging: Edging stones shall be cut to the following dimensions:

Minimum Length	2 feet
Maximum Length	6 feet
Thickness	3 inches to 6 inches

Width of Face

11 inches to 13 inches

Minimum length stones shall be used on curves with a radius of less than 60 ft., except 1 foot lengths shall be used on curves with a radius of 10 feet or less.

The exposed face shall be smooth quarry split to an approximately true plane having no projections or depressions which will cause over 1 inch to show between a 2 foot straight-edge and the face when the straight-edge is placed as closely as possible on any part of the face.

If projections on the face are more than that specified, they shall be dressed off. The top and bottom lines of the face shall be pitched off to a straight line and shall not show over one inch between stone and straight-edge when straight-edge is placed along the entire length of the top and bottom lines and when viewed from a direction at right angles to the plane of the face and for the top line only, not over 1 inch when viewed from a direction in the plane of the face. The ends shall be square to the length at the face and so cut that when placed end to end as closely as possible, no space shall show in the joint at the face of over 1 1/2 inches, except that where the edging is to be used on a curve having a radius of 10 feet or less the ends of the stone shall be so cut as to provide a finished joint at the face section of not more than 1/2 inch. The arris formed by the intersection of the plane of the face with the plane of the end joint shall not vary from the plane of the face more than 1/4 inch. Drill holes not more than 3 1/2 inches in length and 1/2 inch in depth will be permitted. The sides shall not be broken under the square more than 4 inches and the side adjacent to the grass shall not project over 1 inch.

Granite edging shall be set in conformance with the current detail contained in the Massachusetts Highway Department’s construction standards. The gravel foundation shall be thoroughly compacted before setting the edge stones. Additional gravel shall be placed and compacted as needed to support the edge stones. Edge stones shall be fitted together as closely as possible.

The concrete toe support shall be placed after the edge stones have been set to fill the space between the edge stones and the bituminous concrete base course. The toe support shall be placed to the full depth of the base course and finished flush with the base course surface.

6.1.4 Bituminous Concrete:

6.1.4.1 Aggregates shall consist of coarse aggregates of clean, sound, durable angular fragments of crushed stone and fine aggregates of clean, sound, durable natural sands or sands manufactured from crushed stone or gravel, or any combination of natural and manufactured sands.

6.1.4.2 Aggregate shall conform to the following gradation:

Percent by Weight Passing

<u>Sieve</u>	<u>Base Course</u>	<u>Top Course</u>
1	100	
3/4	80-100	
1/2	55-80	100
3/8		80-100

No.4	28-50	50-76
8	20-38	37-54
16		26-40
30	8-22	17-31
50	5-15	10-23
100		6-16
200	0-5	2-7

6.1.4.3 Asphalt cement shall conform to ASTM D946, penetration grade: 85-100. Percent by weight in the mix shall be 4.5 to 5.5, Base Course, and 5.5 to 7.0, Top Course.

6.1.4.4 Liquid asphalt for tack coat shall be RC -2.

6.1.4.5 The developer shall furnish to the Board of Public Works a specific job mix formula for the particular uniform combination of materials indicating and certifying that the bituminous concrete materials conform to these specifications.

6.2 Road Subbase Construction

6.2.1 Preparation

6.2.1.1 Do not begin placement of road subbase material until all earthwork and utility installation work has been completed.

6.2.1.2 Shape the subgrade to the proposed profile grade and cross-section. Remove any large stones, clay and other materials in non-conformance with Section 2, Excavation and Section 3, Fill, of these specifications.

6.2.2 Placement

6.2.2.1 Gravel Borrow, minimum total thickness - 12 inches. Dense Graded Crushed Stone, minimum total thickness - 4 inches.

6.2.2.2 Place material in two equal depth layers with approved equipment over the full width of the roadway on the prepared sub grade.

6.2.2.3 Compact each layer with approved equipment to at least 95% of laboratory maximum dry density (ASTM D1557, Method D).

6.3 Granite Curb Construction

6.3.1 Preparation

6.3.1.1 Excavate a trench at least 18 inches wide to a minimum depth of 6 inches below the bottom of the curb stones. The edge of the trench shall be 6 inches from the curb line into the roadway. Shape the excavation to a uniform surface and tamp.

- 6.3.1.2 Place cement concrete in trench so that curb sits on top of six (6) inches of cement concrete with six (6) inches of cement in front and back.
- 6.3.1.3 Set the stones on the foundation true to line and grade with the front face vertical with a 7 inch reveal.
- 6.3.1.4 Do not pour cement concrete on frozen or thawing subgrade.
- 6.3.1.5 Fill the space between curb stones with cement mortar and point the mortar joints.
- 6.3.1.6 At driveway openings, the first stone on either side of the opening shall have a 45 degree bevel in the exposed end of the stone at the driveway end.

6.4 Bituminous Concrete Roadway Construction

6.4.1 Bituminous Concrete Pavement

Base Course--4 inches
Top Course--1 ½ inches

6.4.2 Preparation

- 6.4.2.1 Complete the road subbase and curb construction. Developer shall place the bituminous concrete base in two courses of two (2) inches compacted thickness. Curb construction is to take place after the first course of base is finished, but before the second course of bases is placed. When the curb is installed, the bituminous concrete base shall be cut back a minimum of 6 inches from the face of the curb. After the curb is set, the space shall be backfilled with cement concrete and the curb backed up with cement concrete.
- 6.4.2.2 Fine grade the road subbase to the proposed profile grade and cross-section.
- 6.4.2.3 Set all utility frames, boxes, etc. to the required finished grade and cross slope.
- 6.4.2.4 When the placement of the top course will be delayed and the street open to public use, the utility frames, boxes, etc. shall be temporarily set to the base course surface grade. The said frames, boxes, etc. shall be reset to finish surface grade just prior to the placement of the top course. Bituminous concrete removed to facilitate resetting shall be replaced with cement concrete.
- 6.4.2.5 The contact surfaces of curbing and utility frames and boxes shall be given a thin uniform coating of tack coat material.
- 6.4.2.6 Thoroughly remove all sand, dust and other deleterious material from previous bituminous concrete courses before placing the next course.

6.4.3 Equipment

- 6.4.3.1 Pavers: Self-propelled, equipped with hoppers, tamping or vibrating devices, distributing screws, adjustable screeds operated either manually or automatically, equipment for heating screeds, and equalizing devices. The spreader shall be capable of spreading hot bituminous

mixtures without leaving indented areas, tearing, shoving, or gouging, and capable of producing a finished surface conforming to smoothness requirements specified below. The spreader shall be capable of confining edges of strips to true lines without use of stationary side forms and capable of placing the course to required thickness.

Spreaders shall be designed to operate forward at variable speeds and in reverse at traveling speeds of not less than 100 feet per minute.

- 6.4.3.2 Steel Wheel Rollers: Self-propelled, three-wheel and tandem types, weighing not less than 20,000 pounds each. The three-wheel rollers shall have a minimum weight of 300 pounds per inch of width of rear wheel. Wheels shall be equipped with adjustable scrapers, water tanks, and sprinkling apparatus for keeping the wheels wet to prevent bituminous mixture from sticking to wheels. Rollers shall be capable of reversing without backlash and be free from worn parts. Roller wheels with flat and pitted areas or projections that leave marks in pavement will not be permitted.

6.4.4 Placement

Bituminous concrete shall not be constructed on wet subgrade or previous courses and during rainy weather. Bituminous concrete shall be delivered to the work site at a temperature of not less than 260o F. No mixture shall be placed unless the breakdown and intermediate rolling can be completed by the time the material has cooled to 170o F. and provided the density of the completed material attains at least 95% of the laboratory compacted density.

6.4.5 Spreading

The mechanical spreader shall be adjusted and speed regulated so that surface of the course will be smooth and continuous without tears and pulling, and of such depth that, when compacted, surface will conform to cross-section, grade, and contour indicated.

Mixture shall be placed in consecutive adjacent strips having a minimum width of 13 feet, except when edge strips require a lesser width to complete an irregular area. The maximum length of a strip shall be such that the temperature of the mixture at the longitudinal and transverse joints shall not be less than 150o F. when the abutting mixture is placed.

A sufficient number of experienced shovelers and rakers shall follow the spreading machine, adding hot mixture and raking mixtures as required to produce a course that, when completed, will conform to all requirements specified herein. Broadcasting or fanning of mixture over areas being compacted will not be permitted. When segregation occurs in mixture during placing, the spreading operation shall be suspended until cause is determined and corrected. Irregularities in alignment of the course left by mechanical spreader shall be corrected by trimming directly behind the machine. Immediately after trimming, edges of the course shall be thoroughly compacted by tamping laterally with a lute. Distortion of course during tamping will not be permitted.

Hand spreading in lieu of machine spreading: In areas where use of machine spreading is impractical, mixture shall be spread by hand. Spreading shall be in a manner to prevent segregation. Mixture shall be spread uniformly with hot rakes in a loose layer of thickness that, when compacted, will conform to required grade and thickness.

6.4.6 Compaction

Rolling shall begin as soon after placing as mixture will bear roller without undue displacement. Delays in rolling freshly spread mixture will not be permitted. Speed of rollers shall be slow enough at all times to avoid displacement of hot mixture. Displacement of mixture resulting from reversing direction of roller or from any other cause shall be corrected at once by use of rakes; fresh mixture shall be applied or removed where necessary. Alternate passes of roller shall be varied slightly in length.

Mixtures that become contaminated or are defective shall be removed. Skin patching of an area that has been rolled will not be permitted. Holes the full thickness of course shall be cut so that sides are perpendicular and parallel to direction of traffic and edges are vertical. Edges shall be sprayed with tack coat material. Fresh paving mixture shall be placed in holes in sufficient quantity so that finished surface will conform to grade and smoothness requirements.

6.4.6.1 Transverse Joints: The roller shall pass over the unprotected end of freshly placed mixture only when placing of course is discontinued or when delivery of mixture is interrupted to the extent that unrolled material may become cold. In all cases, edge of the previously placed course shall be cut back to expose an even, vertical surface the full thickness of the course. In continuing placement of strip, the mechanical spreader shall be positioned on transverse joint so that sufficient hot mixture will spread to obtain a joint after rolling to conform to required density and smoothness specified herein. When required, the fresh mixture shall be raked against joints, thoroughly tamped with hot tampers, smoothed with hot irons, and rolled.

6.4.6.2 Longitudinal Joints: Edges of previously placed strip that have cooled or are irregular, honeycombed, poorly compacted, damaged or otherwise defective, and unsatisfactory sections of the joint shall be cut back to expose clean, sound surface for full thickness of the course as directed. When required, fresh mixture shall be raked against the joint, thoroughly tamped with hot tampers, smoothed with hot irons, and rolled.

6.4.7 Where a subdivision road under construction intersects a town owned street a dirt trap consisting of 2 inch trap rock 6 inch deep, the width of the planned paved road and 50 feet in length starting from the town owned road shall be constructed. The purpose of the trap is to catch the mud and dirt from the tires of vehicles leaving the site and prevent excessive amounts of dirt and mud from being carried on to the town road. Regular maintenance by removal of the dirt filled trap rock and replacement with new clean material will be required. This will not relieve the owner/developer/contractor from the responsibility of keeping the town road clean and free from mud, dirt and dust that may be hazardous to the use of the town road.

6.4.8 Whenever the circumstances of road construction resulting in a dust condition creating a hazard on the site or to adjacent public ways or a nuisance to adjacent residences, the owner/developer/contractor shall control the dust by wetting down the area, provided no municipal water is used for this purpose or treating the area with calcium chloride or similar treatment with prior approval of the Department of Public Works and Conservation Commission, if wetland would be affected.

7. BITUMINOUS CONCRETE SIDEWALK

7.1 Materials

7.1.1 Sidewalk subbase: road base material, min. compacted thickness--6".

7.1.2 Materials and construction shall conform to Section 6 of these specifications with the following revisions:

7.1.2.1 Minimum weight of steel wheel roller--2 tons.

8. GRASS AREA WITHIN ROAD LAYOUT

There is no grass strip between the sidewalk and curb only grass behind the sidewalk to the end of the street layout.

8.1 Materials

8.1.1 Topsoil shall be a natural, friable soil representative of productive soils in the vicinity, free of subsoil, foreign matter, roots, and stones larger than 1 inch in diameter.

8.1.2 Lawn seed shall not exceed 1% weed content and shall be fresh, clean new crop seed composed of the following varieties mixed in proportions and testing minimum percent ages of purity and germination indicated.

Common Name	Proportion	Purity % By Weight	Germination %
Kentucky Bluegrass	10	85	80
Red or Chewings Fescue	6	97	80
Redtop	2	92	90
White Clover	1	96	90

If seed is mixed by producer, the producer shall furnish a guaranteed statement of composition of mixture and percentage of purity and germination of each variety. If seed is to be mixed at the site it shall be delivered in original packages bearing producer's certification of germination and purity.

8.1.3 Commercial fertilizer shall consist of an N-P-K mixture, either 5-10-5 (5 parts nitrogen, 10 parts phosphorous, 5 parts potassium) or 4-12-4 (4 parts nitrogen, 12 parts phosphorous, 4 parts potassium). The above fertilizer shall be transported in containers which will insure proper protection and handling.

8.2 Construction

8.2.1 Steep Slopes: All lawn areas steeper than 1 vertical to 3 horizontal shall be sodded or planted with soil fixing shrubs or vines.

8.2.2 Finish Grading: All areas which have been regraded or stripped of topsoil shall be scarified, leveled and brought to an accurate sub grade. Topsoil shall be spread after subsoil fills are properly settled and the subsoil has been scarified to insured proper bond. The settled topsoil shall meet the approved finish grade and shall be at least 4" deep. Where existing topsoil is satisfactory the seed bed shall be prepared by plowing or tilling to a depth not greater than the topsoil thickness then harrowing and dragging thoroughly. The settled topsoil shall meet the approved finish grade and shall be at least 4" deep.

- 8.2.3 Preparation of Seed Bed: A few days before seeding, commercial fertilizer (as specified above) shall be evenly distributed at the rate of 25 lbs. of fertilizer per 1000 square feet of lawn area and raked into the soil.
- 8.2.4 Lawn Seeding: The surface of the ground shall be raked to provide a clean even surface meeting the approved finish grade. After raking, the area shall be uniformly seeded at the rate of 4 lbs. of seed per 1000 square feet of lawn area. After seeding, the entire area shall be rolled with a hand roller not exceeding 100 lbs. of weight per foot of width. All seeded areas shall be sprinkled with a fine spray avoiding runoff of water, and shall be protected by the installation of temporary fences or signs.
- 8.2.5 Maintenance: All seeded areas shall be watered and maintained until a thick stand of grass is established. After three or four weeks of favorable growing weather, all bare spots shall be re-cultivated, reseeded, raked and rolled as in the original work.
- 8.2.6 Seasonal Limits: Seeding shall be done during the proper season. No seeding shall be done in frozen soil or during unfavorable weather conditions.

APPENDIX B - STORM DRAINAGE

The following data must accompany the definitive plans of all subdivisions in Stormwater drainage calculations:

1. Watershed Area

An outline of the watershed area. The total acreage shall be shown and storage areas, and other runoff controls shall be indicated.

2. Runoff Computations

A 10 year storm frequency shall be used. The following methods may be used for determining the peak rate of runoff:

- a. Rational Method (for areas 0-200 square miles) $Q = CIA$
 - Q = the runoff in cubic feet per second
 - C = the coefficient of imperviousness
(0.90 for pavement, 0.35 minimum for other topography)
 - i = the intensity of rainfall in inches per hour
 - a = the drainage area in acres

References: For concentration time see the "Design Data Book for Civil Engineers" by Elwyn E. Seelye or "Hydraulic Design Series No. 4" published by the Bureau of Public Roads. For intensity see "Rainfall Intensity Duration Frequency Curve for Boston, Massachusetts, Department of Commerce Technical Bulletin No. 25." This rainfall intensity information is also available from the Weather Bureau State Climatologist, 1000 U.S. Custom House, Boston, Massachusetts. Another excellent reference is the "Handbook of Concrete Culvert Pipe Hydraulics" available from the Portland Cement Association.

- b. Izzard Method (for areas 0-1000 acres)

References: "Concrete Pipe Handbook" prepared by the American Concrete Pipe Association, page 285, figure 2. Note that the graph represented is for a 25 year frequency, therefore a factor of 0.8 should be used for a 10 year frequency.

- c. Peak rates of Runoff (small watersheds)

This method is outlined in "Hydraulic Design Series No. 2" and may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20225

Note: The designer should employ more than one method to serve as a check. Drainage calculations must accompany the preliminary and definitive plans.

3. Culvert Hydraulic Data

The following information shall be noted in the calculations:

- a. Location of control, i.e. inlet or outlet.
- b. Depth of water at the outlet if affected by a downstream restriction.

- c. Critical depth and outlet velocity.
- d. Allowable headwater.
- e. Design headwater.
- f. Type of headwall or pipe end structure.
- g. Channel treatment at outlet, e.g. rip rap, stone, etc.

The above data may be shown from hydraulic computations or the designer may employ the use of nomographs prepared by the Bureau of Public Roads. Recommended are the "Hydraulic Design Series No. 3, Design Charts for Open Channel Flow" and "Hydraulic Engineering Circular No. 5, Hydraulic Charts for the Selection of Highway Culverts." Both are available at the U.S. Government Printing Office, Washington, D.C. 20225 at a nominal fee.

Hydraulic Data will also be required for any stream relocation.

4. Plans

The following drainage data shall be shown on the proposed plans:

- a. Design flow (cubic feet per second).
- b. Length, location, type and size of proposed and existing culverts and pipes.
- c. Slope and inlet and outlet invert elevations.
- d. Length, location and size of stream relocations.
- e. Arrows showing direction of flow.
- f. Existing and proposed catch basins and manholes with rim and invert elevations. (Maximum distance between catch basins to be 400 feet).
- g. Drainage easements, including a typical section, base width, side slopes, minimum depth of channel and maximum depth of water.
- h. Existing and proposed topography at two (2) foot contour intervals.
- i. Locus Plan.
- j. The location and design of detention basins, retention basins, any low impact development drainage structures and all other drainage structures and facilities.
- k. Typical details of all drainage structures including manufacturing information

5. Profiles

The following shall be shown on the profiles:

- a. Catch basins and manholes with rim and invert elevations.
- b. Storm drains: type, size and slope including connections to structures outside road layout.
- c. Proposed water main
- d. Proposed gas line (if applicable)
- c. Existing ground surface.
- d. Proposed ground surface.

APPENDIX C - DETENTION AND RETENTION BASIN REGULATIONS

Design standards adopted by the Hanover Conservation Commission and Effective March 16, 1994

These regulations shall govern Planning Board review of detention and retention basins. However, all design shall conform to latest revisions, if any, adopted by the Conservation Commission.

Note: See Hanover General Bylaws, Section 6-14 (Wetlands Protection Bylaw) and Conservation Commission Rules and Regulations applicable thereto. See subsection VII.F therein.

Regulations and Standards Governing the Design/Construction of Detention Basins In the Town of Hanover

These regulations are promulgated under authority of the Hanover Wetlands Protection By-Law #6-14, Section 7, and shall take effect on March 16, 1994.

For the purpose of these regulations, a detention basin is defined as a man-made, basin-like flood control structure which is designed to collect stormwater runoff and detain it for a specified period of time during major storm events.

The purpose of these regulations is to establish guidelines and standards for the design and construction of detention basins. Given variations in soil conditions and topography, no "standard basin" is applicable in all case. However, design assumptions, calculation formulas and typical construction details can be applied to the majority of designs.

A detention basin is not the only method of controlling excess runoff from developments. Before considering the use of a detention basin, other methods of controlling runoff including, but not limited to, stormwater leaching pits and natural or man-made swales, shall be investigated. A detention basin should not be used only if alternate, low maintenance methods are not feasible. The applicant shall demonstrate, through a preponderance of credible evidence, that alternative solutions have been seriously considered.

1. PERFORMANCE STANDARDS

Any applicant proposing to construction a detention basin in the Town of Hanover shall have the burden of proving by a preponderance of credible evidence that the submitted basin-design meets the following performance standards:

Runoff rate: Post-development run-off rate shall not exceed pre-development run-off rate for the entire development.

Run-off volume: Run-off volume, after development, shall be controlled so that the receiving waters do not experience higher flood levels due to excess runoff volume.

Peak holdback: Basins shall be designed so that, during the 6-hour period following pre-development peak runoff rate, runoff volume will not exceed pre-development runoff volume. The Conservation Commission may waive this standard if the applicant demonstrates that earlier release of waters will not exacerbate downstream flooding conditions.

Non-storm water levels: The floor of any basin shall remain dry except during periods of precipitation.

Safety: The location of the basin and point of discharge of the outlet and emergency spillway shall not place a hazard on surrounding properties.

Groundwater Impact: The storage of water within the basin and the discharge of water from the basin shall not contribute to groundwater levels and flows to the detriment of surrounding properties, easements, subsurface disposal systems, etc.

2. DESIGN STANDARDS

Construction Details: As an aid to applicants, the following typical, construction details area a part of these regulations:

Figure 1	Detention Basin Plan
Figure 2	Dike Section
Figure 3	Outlet Control Structure
Figure 4	Emergency Spillway Detail
Figure 5	Silt – trap Swale Section
Figure 6	Channel Section

These details are intended to illustrate the various design standards as listed below.

Location: Generally, detention basins shall be located outside of wetlands. A basin may be constructed in wetlands providing the applicant demonstrates that 1) no other feasible alternative exists and 2) the Conservation Commission determined that construction in the wetlands will not adversely impact the wetlands. The Basin shall be located so as to minimize visual impact and to provide ease of maintenance.

Topographic Disturbance: Detention-basin design shall minimize earthwork. Existing topographic features shall be allowed to remain so far as possible. Disturbance of existing vegetation outside the basin shall be kept to a minimum.

Basin Bottom: The bottom elevation of basins shall be at least two-feet above maximum groundwater level. In general, the bottom shall slope toward the outlet structure, or towards a stone-lined channel which slopes toward the outlet. The slope of the bottom shall provide positive movement of water towards the outlet to assure that the basin remains dry except during periods of precipitation.

The material for the basin bottom shall be 12-inch layer of compact gravel overlain by 4 –inch seeded loam.

Dike Construction: The material used for dike construction shall consist of silty or clayey gravels to provide a stable and water-tight closure. Gravel shall conform to ASTM D2487 Type GM or GC. A cross section of the dike shall be included with the plans.

All unsuitable material shall be removed as directed and replaced with the specified gravel prior to dike placement.

Placement of materials shall be such as to ensure slope stability, minimize settlement and prevent both exterior and interior erosion. The dike, when completed, shall provide suitable access for any mechanized/motorized equipment necessary for maintenance of the basin.

Outlet Control Structure: A concrete outlet-control structure shall be provided to control the rate of stormwater discharge from the basin. It is suggested that the control structure consist of a box with slotted-overflow “T” weir

inlet and pipe outlet. The “T-weir” slot shall be designed so that it will not be clogged by debris. The outlet control structure shall be certified by registered professional engineer to withstand ASHTO H-20 loading. Details of the outlet-control structure shall be included with the plans.

Emergency Spillway: An emergency spillway across the full width of the crest and downstream slope of the dike shall be provided for all detention basins. The purpose of the emergency spillway is to provide release of the runoff from the basin should flow through the outlet be obstructed. In general, spillways shall be designed to release all runoff flowing into the basin assuming Antecedent Moisture Condition (AMC) II. However, if basin storage volume exceeds 2 acre-ft., AMC III shall be assumed for spillway design.

U.S. Soil Conservation Service designation

The vertical distance between the crest of the dike and maximum water level over the spillway shall be a minimum of 1 foot. Spillways shall be constructed of properly-sized stone carefully placed and hand chinked. The spillway shall be sized to prevent a flow velocity of greater than 2 fps at the termination of the stone. A cross-section of the emergency spillway detail shall be included with the plans.

Silt-traps, Channels, etc.: Where stormwater – drains discharge into a basin, silt-trap swales shall be provided to localized sedimentation. In addition, a stone-lined channel(s) shall be constructed from discharge point(s) to the outlet structure. The purpose of the channel is to provide a flow-path for runoff, especially from storms which produce small runoff volumes, to keep the basin dry during non-storm periods, and to provide scouring action to clean the outlet structure.

Side Slopes: Side slopes at detention basins shall be no steeper than 4:1 for the dike and 5:1 for excavated side slopes.

Riprap: Riprap shall be placed at the ends of all pipes (inflow, outlet etc.) and at end of the upstream and downstream ends of culverts, the size and amount to be determined by flow-rate.

Perimeter Drain: A perimeter drain will be required as determined by the Commissions consulting engineer if high groundwater exists. It shall consist of perforated PVC pipe set in full depth crushed stone with geotextile wrap. A cross-section detail of the perimeter drain shall be included with the plans.

Easements: Drainage and maintenance easements shall be provided to include all detention basins and appurtenant structures. For basins with 5:1 side slopes the minimum easement shall be twenty feet from the toe of the slope. Steeper slopes will require larger easements (4:1 – 25 feet). In addition, there shall be an access easement to all basins and appurtenant structures from the nearest public way. Said access easement shall have a minimum width of twenty feet. If necessary to prevent vandalism, a lockable gate shall be provided.

Waiver of standards: The Conservation Commission may waive any of the above design standards under the following conditions:

1. The applicant demonstrates, through a preponderance of credible evidence that waiving a specific design standard will result in a better functioning basin, or
2. The applicant demonstrates, through a preponderance of credible evidence, that waiving a specific design standard will reduce environmental damage.

However, the Commission is not obliged it waive design standards, regardless of circumstances.

3. SUPPORTING DOCUMENTATION

Detention- basin designs shall be based on the appropriate Soil Conservation Service (SCS) method for estimating runoff, Twenty-four hour storms for the 2yr, 25yr and 100 year frequencies shall be considered in the analysis of pre-and post-development runoff.

The following information must be provided with any application showing a detention basin:

1. Pre- and Post- Construction Drainage Area Plans:

These plans shall encompass the entire project site, including offsite areas which are tributary to the basin. (While an applicant is not required to control off-site run-off, the effects of routing this run-off through a detention basin shall be considered.) The emergency overflow spillway must have sufficient capacity for all runoff routed through it, including runoff originating off-site.

Hanover's storm sewers are usually designed for a 0-year storm using the rational method. Detention-basin design shall take this into consideration – i.e., storm sewer capacity may be exceeded during storm events used for a basin design, resulting in uncontrolled runoff which may or may not flow into the basin.

2. SCS Curve Numbers

Curve numbers are used to estimate the soil's capacity to absorb precipitation. Pavements and roofs have essentially no ability to absorb precipitation. Thick top soil and humus underlaid by coarse gravel will absorb a high percentage of precipitation. Determination of the SCS Curve numbers must be based on observed field conditions.

Test-pits observed by an agent of the Conservation Commission shall be provided to determine curve numbers. Test Pit information shall depths and types of soil encountered, including topsoil and humus layers.

3. Subsoil and Groundwater Conditions

In addition to providing information for determination of curve numbers, test pits shall be dug to ascertain soil suitability for proposed construction of detention basins and to determined groundwater levels. Test pit data, including soil logs, shall be provided as part of any submitted plans. Test pits shall be witnessed by an agent of the Conservation Commission.

4. Calculations for Design Storm Events

Calculations provided must show that no adverse impact to the receiving waters will result from the proposed development. Calculations shall include the following:

A. Pre- and Post-development runoff rate. Post-development runoff rate shall not exceed pre-development runoff rate for the entire development.

B. Pre- and Post-development runoff volume. Runoff volume, after development, shall be controlled so that the receiving waters do not experienced higher flood levels due to excess runoff.

C. Hydrographs. Inflow/outflow hydrographs for pre-and post-development conditions shall be provided. (Hydrograph Curves are a representation of runoff through a watershed area and/or detention basin over a period of time. These curves are useful in determining the effect of runoff over the duration of the design storms).

D. Stage-Storage-Discharge Calculations. Stage-storage-discharge calculations relate water storage volumes to water levels in a basin. Stage storage-discharge calculations shall be submitted to show detention-basin

storage requirements and discharge rates from a basin. Stage-discharge relationships shall account for head loss through outlet structure. In sizing the basin and controlling rates and volumes of runoff, no infiltration shall be assumed unless suitable subsurface leaching structures are provided.

5. Emergency Overflow Spillway.

Calculations shall be provided to demonstrate adequate capacity of this spillway, with the outlet structure obstructed, during a 100 year 24-hour storm.

6. Data to Substantiate Assumptions.

Data shall be provided to substantiate all design assumptions, including but not limited to charts, graphs, formulae and descriptive data used in the calculations. All references shall be listed

7. Computer Programs.

If a computer is used as a design aid for hydrologic analysis, including detention-basin design, the program shall be identified and a description of how it works (i.e. input required formulae used and program assumptions) shall be provided.

4. CONSTRUCTION STANDARDS

Sequence: Construction of a detention basin shall precede all other construction, excepting clearing necessary for access to the basin site.

Testing of Fill: Any fill used in connection with a detention basin shall be clean fill, containing no trash, refuse, rubbish or debris, including, without limiting the generality of the foregoing trees, stumps, bushes, lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles, or parts of any of the foregoing. Frozen material shall not be used. The permittee shall have an engineer registered with the Commonwealth certify that all fill is in full compliance with all regulation fill standards. Advanced approval of all fill, including on-site materials, must be given in writing by the Hanover Conservation Commission's consulting engineer. The foregoing shall be at the expense of the applicant through the Guaranteed Deposit fund.

Disposal and Removal Plan: If fill, spoil material and/or stumps from the site are to be removed from the site and disposed of in the Town of Hanover, the applicant shall submit, in advance, a written disposal/removal plan to the Hanover Conservation Commission for its approval. If fill and/or spoil material is to be used on-site, it must receive the criteria established in "Testing of Fill" above.

Concrete Standards: All concrete structures shall meet AASHTO H-20 or equivalent load bearing capability.

5. CHANGES FROM APPROVED DESIGN

Any changes from the Notice of Intent must be approved in advance of construction by the Conservation Commission.

6. INSPECTION OF CONSTRUCTION

To ensure quality control during construction of any detention basin, inspections shall be required but not limited to the following stages of construction:

- 1) Prior to commencement of construction.
- 2) When excavation to rough grade is completed.
- 3) Before backfill of drainage structures, including pipe and outlet structures.

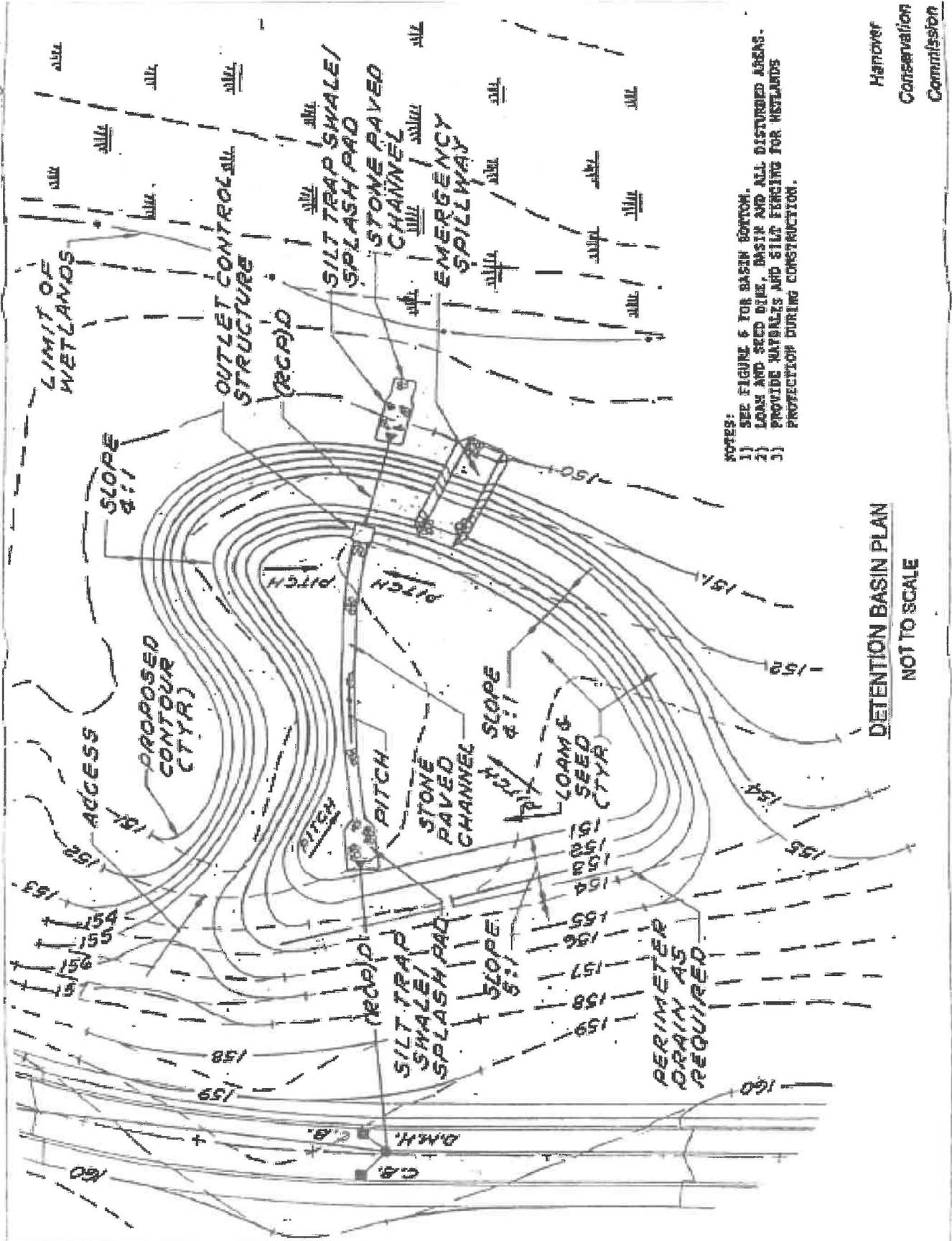
- 4) Prior to placement of dike gravel.
- 5) During and on completion of the dike.
- 6) Prior to placement of riprap channels, swales, splash pads or spillway.
- 7) After completion of riprap channels, swales, splash pads or spillways.
- 8) After final grading.
- 9) After vegetative growth has been established.

At each stage, construction shall cease, a request for inspection shall be made of the Conservation Commission and construction shall not continue until such inspection has been made and approval has been given. Failure to provide such notice, or the continuation of construction beyond an inspection point, shall be considered a violation of the Hanover Wetlands Protection By-law and will result in the issuance of an Enforcement Order.

In addition, random inspections may be conducted during construction.

The cost of these inspections shall be borne by the applicant, through the Guaranteed Deposit Fund. The inspections shall be made by a person or persons designated by the Conservation Commission and, with the timely advance requests by the applicant, every effort will be made to not delay construction.

FIGURE 1

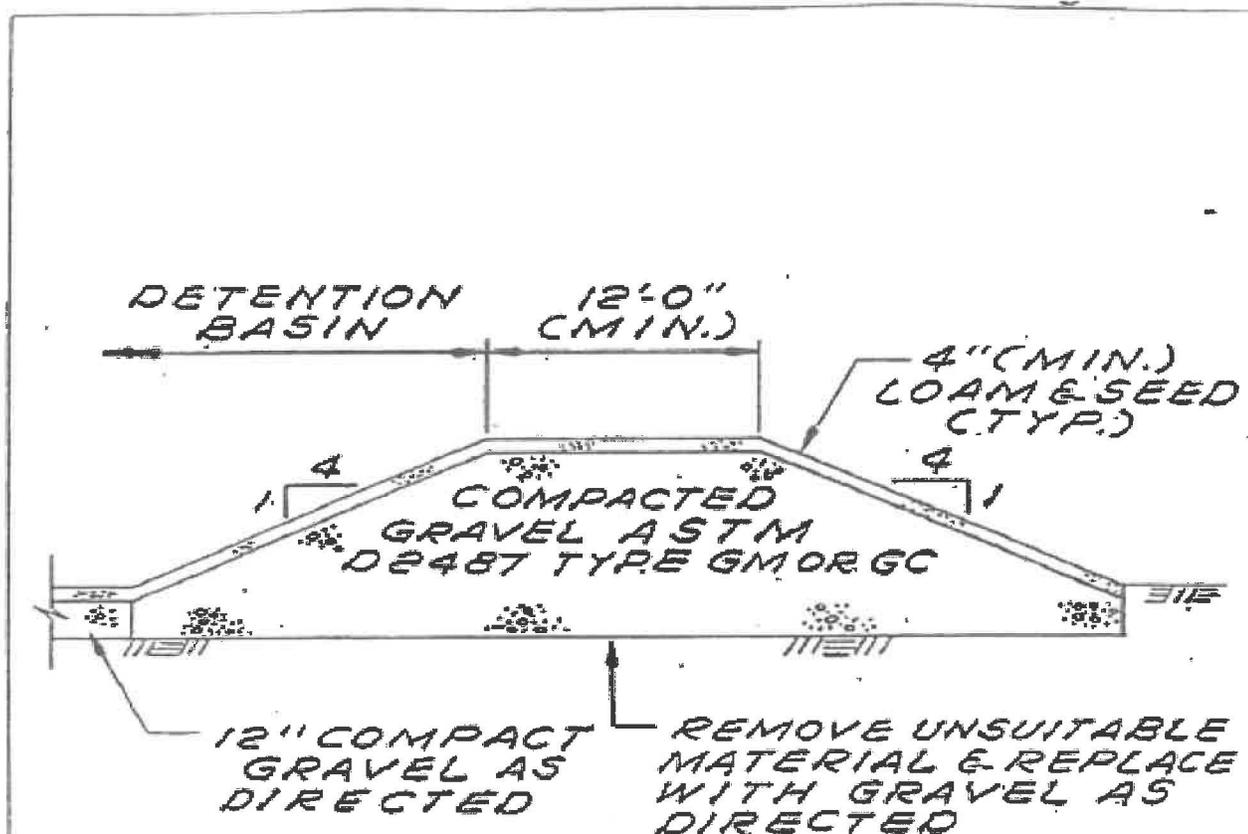


NOTES:
 1) SEE FIGURE 6 FOR BASIN BOTTOM.
 2) LOAM AND SEED DYES, BASIN AND ALL DISTURBED AREAS.
 3) PROVIDE MATING AND SILT FENCING FOR ISLANDS PROTECTION DURING CONSTRUCTION.

DETENTION BASIN PLAN
 NOT TO SCALE

Hanover
 Conservation
 Commission

FIGURE 2



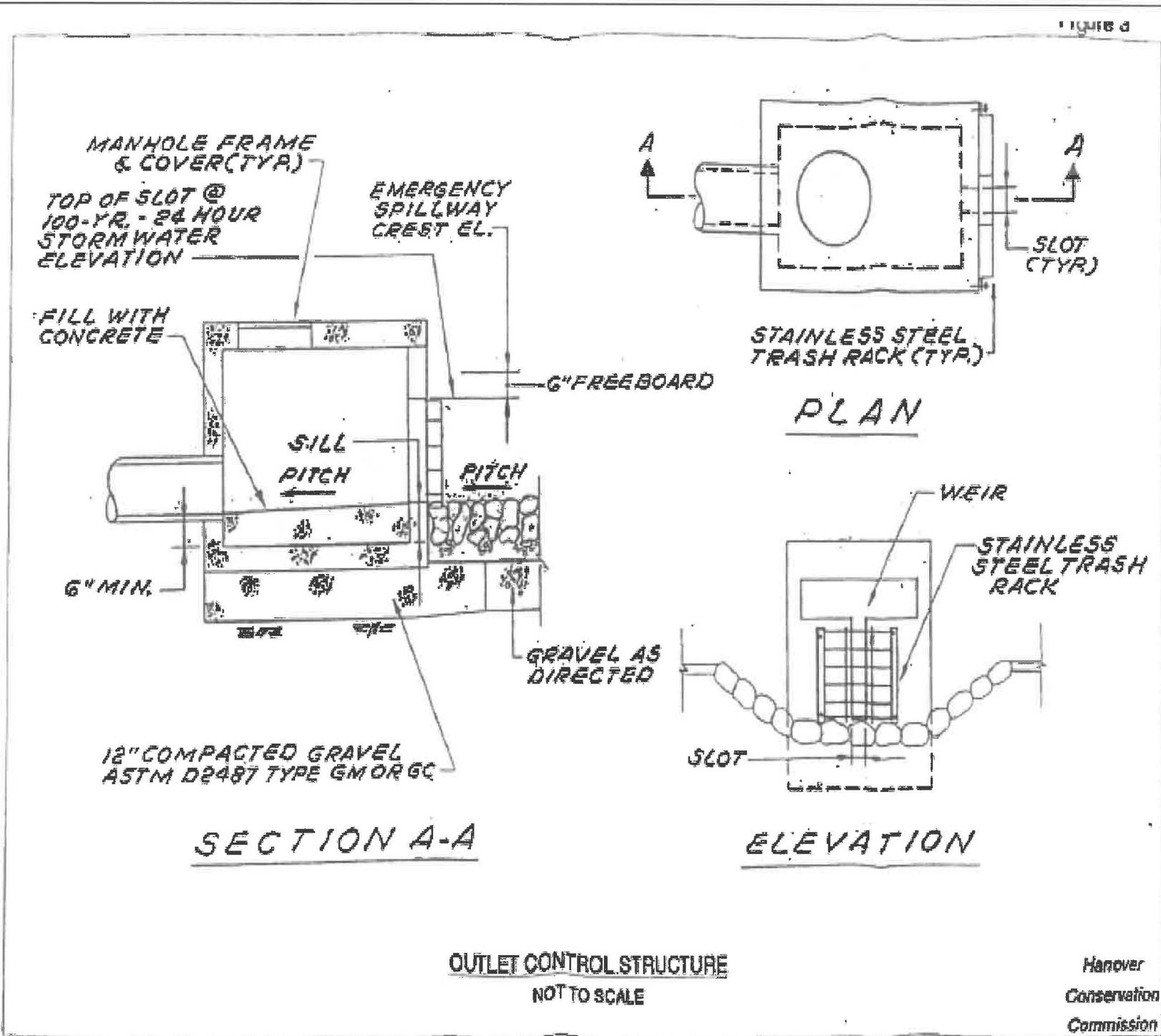
DIKE:

NOTES:

- 1) FILL AND BASE FOR DIKES SHALL INSURE WATER-TIGHTNESS AND STABILITY.
- 2) TOE DRAINS SHALL BE INCLUDED IF DETERMINED NECESSARY BY CONSERVATION COMMISSION'S CONSULTANT ENGINEER TO CONTROL SEEPAGE.

DIKE SECTION
NOT TO SCALE

*Hanover
Conservation
Commission*



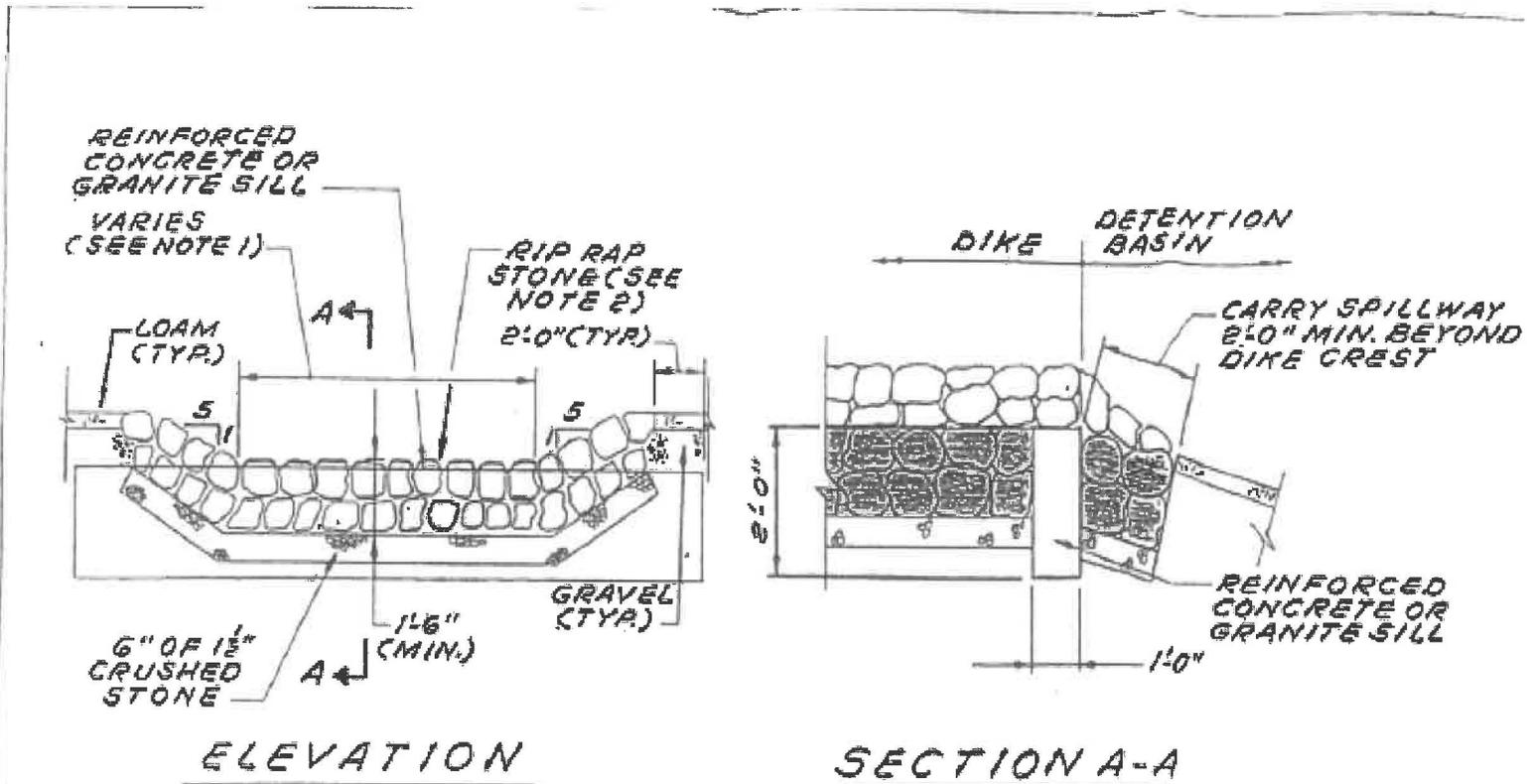


FIGURE 4

NOTES:

- 1) DIMENSIONS VARY TO SUIT CAPACITY REQUIREMENTS.
- 2) RIP RAP TO BE HAND CHISELLED WITH A SMOOTH SURFACE ALONG THE TOP OF THE DIKE AND A ROUGH SURFACE ALONG DOWNSTREAM FACE AND TOE OF THE DIKE. STONE TO MEET M2.02.3 REQUIREMENTS.

EMERGENCY SPILLWAY DETAIL

NOT TO SCALE

Hanover
Conservation
Commission

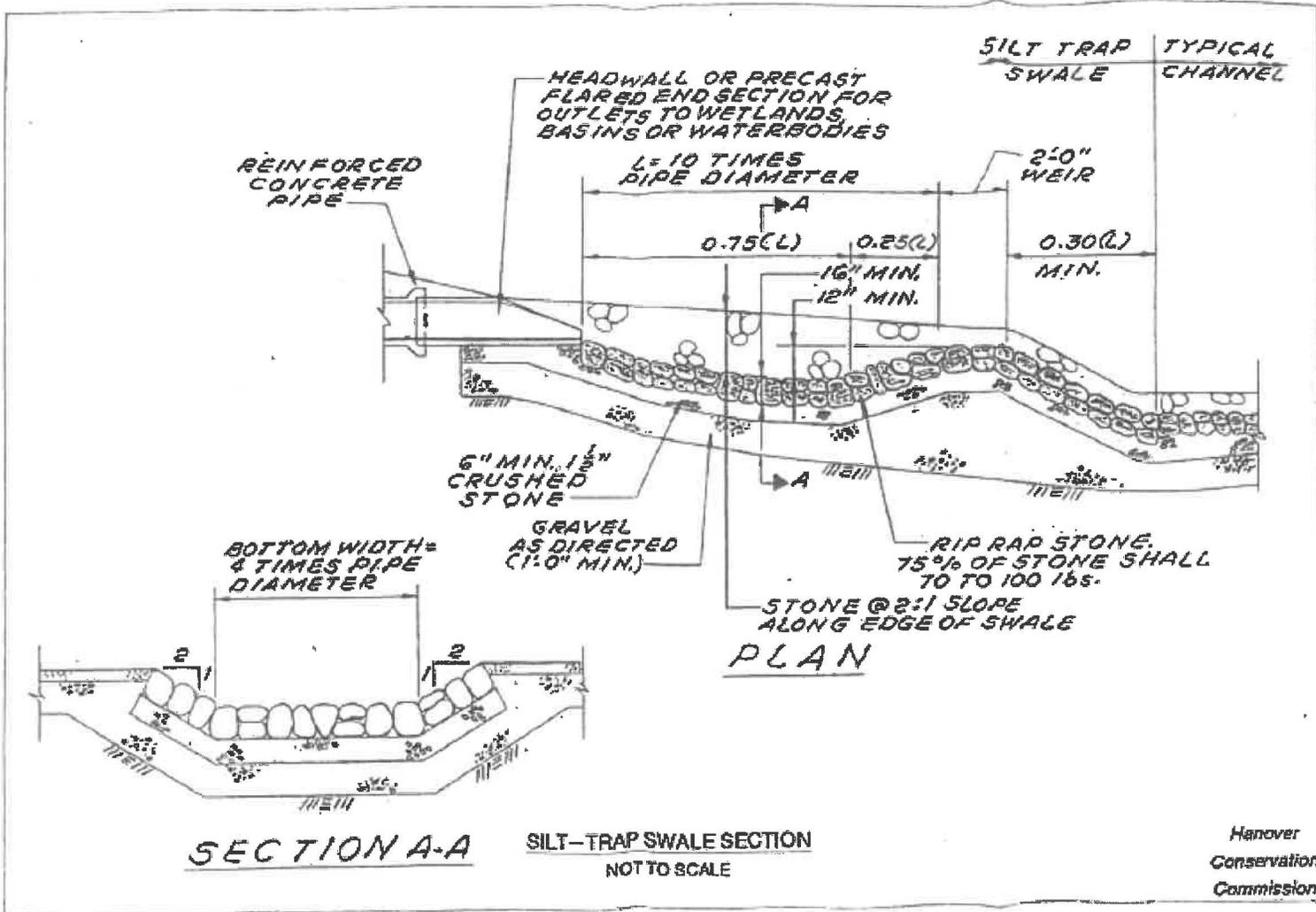
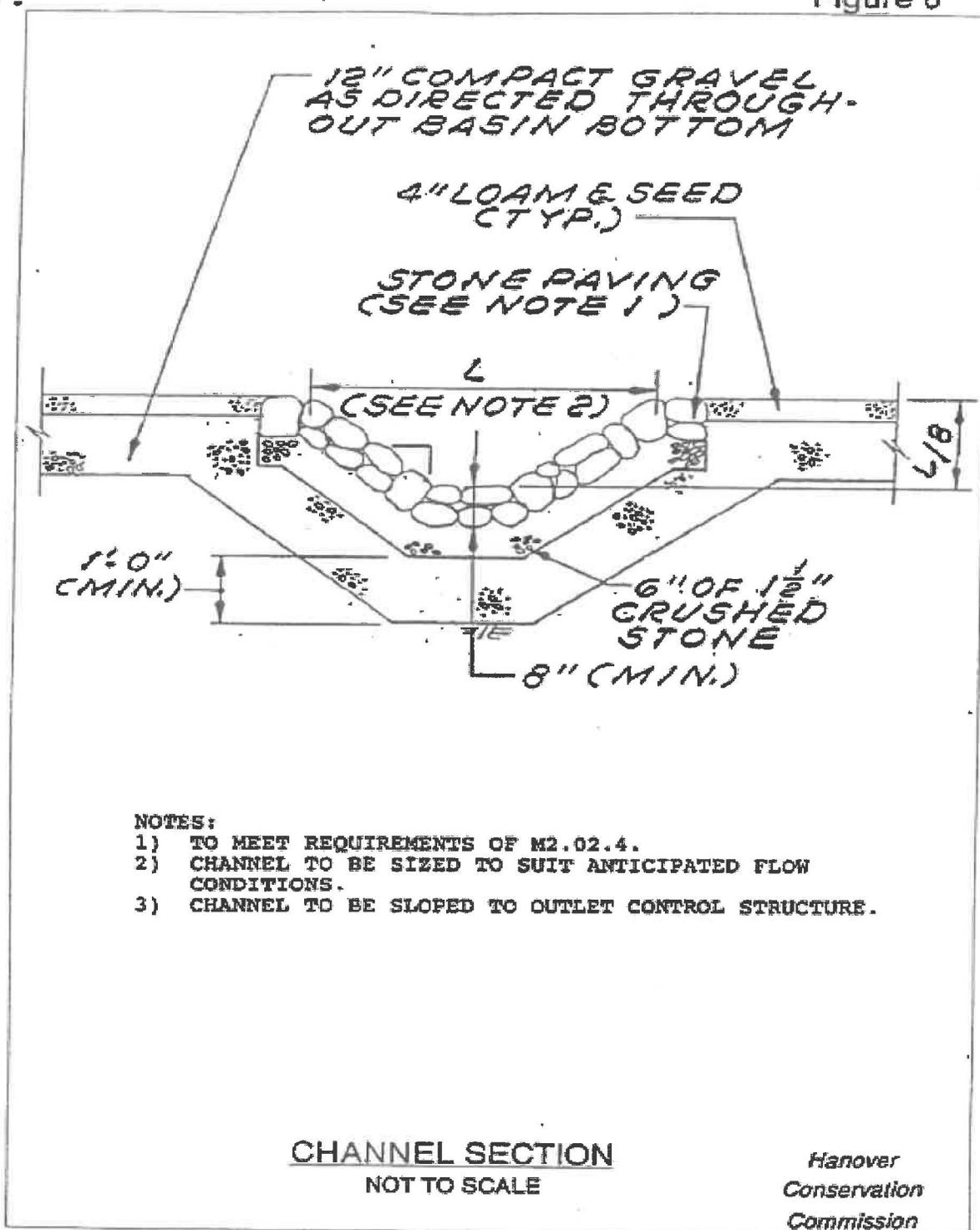


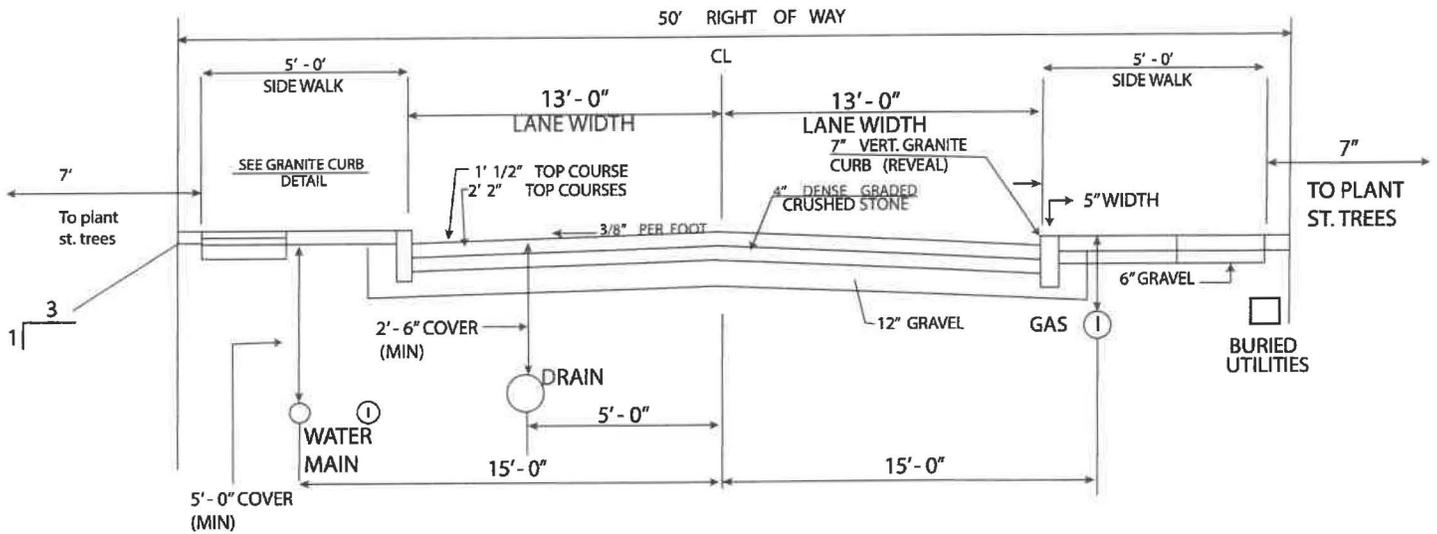
FIGURE 5

FIGURE 6

Figure 6

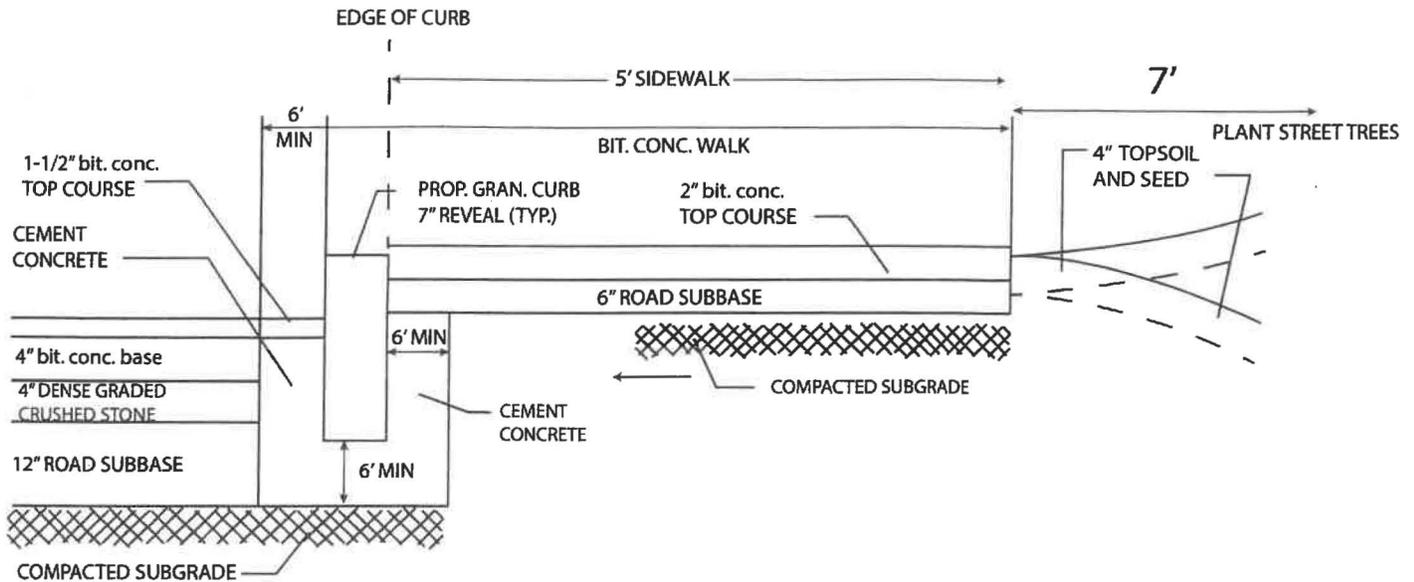


APPENDIX D – TYPICAL ROADWAY SECTION; TYPICAL ROAD AND SIDEWALK DETAIL



TYPICAL ROADWAY SECTION
(NOT TO SCALE)

This section is provided as a convenience only. It shall not supercede or negate any specifications in the Rules and Regulations pertaining to Subdivisions.



TYPICAL ROADWAY SECTION
(NOT TO SCALE)

This section is provided as a convenience only. It shall not supercede or negate any specifications in the Rules and Regulations pertaining to Subdivisions.