

ARTICLE V – DESIGN AND CONSTRUCTION STANDARDS

Section 170-26 Streets

A. General

1. All new subdivisions shall meet the standards recommended by the State of New Hampshire Department of Safety, Division of Emergency Services, Bureau of Emergency Communications addressing standards guidelines. No street name shall be used which will duplicate or be confused with any street name already in use. Further, the use of persons "first" names as street names shall normally be avoided.
2. Street names shall be subject to approval of the Chief of the Derry Fire Department and the Planning Board.
3. The arrangement, character, extent, width, grade and location of all streets shall be considered in their relationship to existing or planned streets, to topographic conditions, to public convenience and safety, and their appropriate relation to the proposed use of the land to be served.
4. Proposed streets shall conform, as far as practicable, to the Master Plan.
5. The arrangement of streets in a proposed subdivision shall in the discretion of the Planning Board provide for the continuation of existing streets in adjoining areas and for their proper projection when adjoining land is developed in the future.
6. All streets in a proposed subdivision shall be so designed that, in the opinion of the Planning Board, they will provide safe vehicular travel while discouraging movement of through traffic, unless this condition is deemed desirable at a given location by the Board.
7. Where a subdivision abuts or contains an existing collector or arterial street, the Board may require internal access streets, reverse frontage with screen planting contained in a non-access reservation along a property line, deep lots with rear service streets or other such treatment as may be deemed necessary for adequate protection for residential properties and to afford separation of through and local traffic.
8. Where a subdivision borders on or contains a railroad right-of-way, the Board may require a street approximately parallel to, and on each side of such right-of-way, at a distance suitable for the appropriate use of the intervening land, as for park purposes in residential districts, or for commercial or industrial purposes in appropriate districts. Such distances shall also be determined with due regard for approach grades and future grade separations.
9. Sidewalks shall be required in a subdivision when the average lot size is less than 43,560 square feet. The sidewalk shall be 5 feet wide minimum with a 6 inch crushed

gravel base and a 2 inch binder course overlaid with a 1 inch finish course of hot bituminous concrete pavement. All sidewalk construction shall conform to the requirements of the Americans with Disabilities Act. If a horizontal separation between curb and sidewalk is proposed, the area between the two shall be grassed.

10. Where necessary, in the judgment of the Planning Board, sidewalks and/or rights-of-way (R.O.W.) for pedestrian travel and access may be required in subdivisions when the average lot size is one acre or larger, between subdivisions, or between a subdivision and public property.
11. In all proposed subdivisions the applicant shall provide for all necessary street lighting, including poles and light fixtures. Lights will be located where directed by the Planning Board and be of a type, style and intensity acceptable to the Planning Board.
12. All new streets shall have signs and pavement markings installed in accordance with the Manual of Uniform Traffic Control Devices. It will be the responsibility of the applicant to provide for and install all signs as necessary, including street identification signs.
13. All proposed streets in which the sub-base is within four (4') feet of the estimated seasonal high water table shall have underdrains installed in the subgrade (see Typical Roadway Cross Section for New Construction – Figure 1). Test pits will be required along the proposed roadway at 200 feet intervals to verify water table elevation. Where refusal (bedrock) is encountered a 2-foot coarse sand sub-base shall be placed between bedrock and the road base materials [See Figure 1].
14. Vertical granite curbing shall be required on all new roadways, together with a closed drainage system except where it is impractical or impossible to comply with State of New Hampshire requirements concerning stormwater treatment and discharge, or in areas where the Derry Planning Board prefers an uncurbed typical section Vertical granite curb shall have minimum dimensions of 6 inches in width by 18 inches in height. Granite curbing shall not be required along the internal edge of cul-de-sacs but the green area within the circle shall be graded two percent (+2%) from the edge of pavement to the center of the cul-de-sac. (Effective 5/18/05)
15. All roadway construction shall conform with the Typical Roadway Cross-Section for new construction [Figure 1] as well as Table B – Table of Geometric Standards attached to these regulations.
 1. Driveway curb cuts will be installed prior to the placement of wearing course of hot bituminous asphalt pavement. No driveway locations shall be amended or relocated once the curbing is installed and wearing course is in place. All proposed driveway aprons shall be constructed to a point 40 feet inward from the edge of pavement on all streets at the time of street construction. (Effective 5/18/05)
 - a. All new driveways are to meet the following (Effective 5/18/16) :
 - i. Shall be constructed with a minimum of 12 inch depth of NHDOT Crushed Gravel 304.3 Specification for the entire length.

- ii. All loam and organic material shall be removed down to an acceptable subsurface.
- iii. Shall have a minimum clear unobstructed width of 12 feet (12') if the driveway is under 150 feet in length, or if the driveway is over 150 feet in length, a minimum clear unobstructed width of 14 feet (14') for the entire length of the driveway.
- iv. Shall have an additional clear unobstructed width of two feet (2') on each side.
- v. The vertical clearance shall be a minimum of 13 feet, 6 inches (13'6")
- vi. Driveways in excess of 150 feet in length shall provide means for Fire Department apparatus to turn around by either hammerhead or other approved means.
- vii. No driveway shall be in excess of a 15% grade.

b. All Driveway Aprons Shall (Amended 5/18/16):

- i. Slope away from the edge of the road at no less than 3% for open drainage and slope toward the road at no more than 3% in closed drainage subdivisions for a minimum of 10 feet.
- ii. Maximum grades allowed for next 30 feet are 5% and -5% respectively.
- iii. Be no wider than 24 feet except that the Driveway may be flared at the entrance.
- iv. Have a minimum site distance of 200 feet in both directions 10 feet from edge of traveled way.
- v. Be constructed with a minimum of 12 inch depth of NHDOT Crushed Gravel 304.3 Specification for entire length and width of the 40 foot driveway apron.
- vi. Include minimum 2" thickness of bituminous asphalt base course pavement between edge of pavement and edge of right of way (typically 13 feet from edge of roadway pavement).
- vii. Be completed along new roadways as part of the road drainage feature as a factor for Substantial Completion and Eligibility of Occupancy Permits.
- viii. Be completed along existing roadways as part of the road drainage feature as a factor for completion of all off-site improvements and Eligibility of Occupancy Permits. (Effective 7.16.08)

c. All Driveway Culverts shall be minimum 15 inches (15") inside diameter HDPE dual wall pipe a minimum length of thirty (30') feet. Each end shall either have an HDPE flared apron or precast concrete headwall. Minimum cover shall be two (2') feet over the very top of the pipe throughout (effective xx.xx.2021)

17. All roadway embankment slopes, including ledge cuts, shall not be steeper than 4-foot horizontal to 1-foot vertical and shall be graded, loamed (4-inches compacted), and seeded. The Planning Board in special circumstances such as may permit steeper embankment slopes when the typical 4:1 slope requirement would cause excessive earthwork or impact to wetlands. (Effective 5/18/05)

- 18 Guardrails shall be provided at all locations where roadway fill embankment slopes are steeper than 4:1. No retaining walls shall be permitted within Public R.O.W.s. (Effective 5/18/05)

Section 170-29 Storm Drains

~~A.~~ A. Storm drainage systems shall be designed to control the post-development peak runoff so that it does not exceed predevelopment runoff for the 2-year, 10-year, and 25-year, 24-hour storm events. Flood protection works shall be designed for the 50-year, 24-hour storm event. (Source of Extreme Precipitation Estimates shall be from the Northeast Regional Climate Center) (effective xx.xx.2021). ~~Storm drainage systems shall be designed using the storm return frequency as follows:~~

- ~~1.~~ 1. Single family residential 10-year frequency
- ~~2.~~ 2. Multi-family residential, commercial and industrial 25 year frequency
- ~~3.~~ 3. Flood protection works 50 year frequency

~~B-B.~~ The peak rate of discharge of storm water runoff from the development under post-development conditions shall not exceed that of the predevelopment conditions unless it can be demonstrated that no off site adverse impact will result or appropriate flowage easements have been secured.

C. A development plan shall include provisions to retain stormwater on the site by using the natural flow patterns of the site. Runoff from impervious surfaces shall be treated to achieve 80% removal of Total Suspended Solids and at least 50% removal of both total nitrogen and total phosphorus using appropriate treatment measures, as specified in the NH Stormwater Manual, Volumes 1 and 2, December 2008 as amended, or any subsequent amendment thereto, (refer to Volume 2, page 6, Table 2.1 Summary of Design Criteria, Water Quality Volume for treatment criteria) or other equivalent means. (effective xx.xx.2021)

~~C.D.~~ The maximum distance of overland flow along roadways shall not exceed 400 feet.

~~D.E.~~ Drainage calculations submitted shall where appropriate include flow analysis showing the effect of a subdivision on the existing drainage facilities outside of the area of the subdivision. Where the Board anticipates that additional runoff incident to the development of the subdivision will overload an existing downstream drainage facility so that there will be a reasonable likelihood of damage to private property or an increase in the expenditure of public funds, the Board shall not approve the subdivision until adequate provision is made, at the subdivider's expense, for the accommodation of downstream drainage improvements.

~~EF~~. All calculations used for the design of the storm drainage system shall be by currently recognized best engineering methods and practices; and shall be stamped by a licensed professional engineer.

~~FG~~. Calculations shall be for both pre-development and post-development conditions and shall include the nature and times of concentration, runoff coefficients or curve number, maximum rate of runoff, total amount of runoff, storm sewer and drainage ditch sizing, culvert sizing for all roadway and driveway crossings, retention/detention facilities, and other information as may be required by the Board or Town Engineer.

~~GH~~. All storm sewers shall be designed to have a minimum flow velocity of 2-feet per second and a maximum flow velocity of 12 feet per second based on calculated design flow and corresponding to the applicable return frequency design storm.

~~HJ~~. All open ditches and swales shall be designed to have a maximum flow velocity of 10 feet per second. All open ditches and swales shall be designed in accordance with Design of Stable Channels With Flexible Linings, Hydraulic Engineering Circular No. 15, published by the U.S. Department of Transportation, October 1975.

~~IJ~~. Suitable methods and calculations shall be used to design erosion control methods for use with all storm drainage systems. Such methods shall include but not be limited to: head walls or end sections for all inlets and outlets, bedded rip rap for drainage ditches that exceed a flow velocity of 2.5 feet per second, slope mattresses and revegetation.

~~JK~~. Minimum pipe size shall be 12 inches in diameter for privately maintained storm drainage systems and 15 inches in diameter for publicly maintained storm drainage systems. The minimum depth of cover from the road or ground surface to the crown of the pipe shall be not less than 3 feet.

~~KL~~. Storm sewer and appurtenances shall be constructed of materials in accordance with the standards set by the Public Works Department for the Construction of Storm Drains, latest edition. All catch basin grates and frames shall be heavy duty gray cast iron meeting ASTM A48 Class 30 (American Foundry) with a 24" x 24" opening a two inch (2") square opening pattern on grate, unless otherwise approved by the Planning Board. Polyethylene liners shall be installed in all proposed catch basins. (Effective 5/18/05) All grates or hatches at outlet control devices shall be fabricated from stainless steel or hot dipped galvanized steel (ASTM A123/A123M). (Effective 6/18/08)

~~LM~~. No underground storm water collection basins or infiltration systems shall be permitted. (Effective 6/18/08)

N. Salt storage areas shall be covered, and loading/offloading areas shall be designed and maintained in accordance with NHDES published guidance such that no untreated discharge to receiving waters results. Snow storage areas shall be located in accordance with NHDES published guidance such that no direct untreated discharges to receiving waters are possible from the storage site. Runoff from snow and salt storage areas shall enter treatment areas as specified above before being discharged to receiving waters or allowed to infiltrate into the groundwater. (effective xx.xx.2021)

O. All plans shall note that “Snow and ice removal shall be performed by a **Green Sno-Pro** Certified contractor following Best Management Practices for the application of de-icing materials. (effective xx.xx.2021)

ARTICLE XI - DESIGN AND CONSTRUCTION STANDARDS

Section 170-65 Stormwater Management Requirements

A. Storm drainage systems shall be designed to control the post-development peak runoff so that it does not exceed predevelopment runoff for the 2-year, 10-year, and 25-year, 24-hour storm event. Flood protection works shall be designed for the 50-year, 24-hour storm event. (Source of Extreme Precipitation Estimates shall be from the Northeast Regional Climate Center.) (effective xx.xx.2021)

a. Storm drainage systems shall be designed using the storm return frequency as follows:

1. Multi-family residential, commercial and industrial: 25-year frequency
2. Flood protection facilities: 50-year frequency

B. The peak rate of discharge of storm water runoff from the development under post development conditions shall not exceed that of the pre-development conditions unless it can be demonstrated that no off site adverse impact will result or appropriate flowage easements have been secured.

b.C. A development plan shall include provisions to retain stormwater on the site by using the natural flow patterns of the site. Runoff from impervious surfaces shall be treated to achieve 80% removal of Total Suspended Solids and at least 50% removal of both total nitrogen and total phosphorous using appropriate treatment measures, as specified in the NH Stormwater Manual, Volumes 1 and 2, December 2008 as amended, or any subsequent amendment thereto, (refer to Volume 2, page 6, Table 2.1 Summary of Design Criteria, Water Quality Volume for treatment criteria) or other equivalent means. (effective xx.xx.2021)

e.D. Drainage calculations submitted shall where appropriate include flow analysis showing the effect of site development on the existing drainage facilities outside of the site boundaries. Where the Board anticipates that additional runoff incident to the development will overload an existing downstream drainage facility so that there will be damage to private property or an increase in the expenditure of public funds, the Board shall not approve the site plan until adequate provision is made, at the developer's expense, for the accommodation of downstream drainage improvements.

- d.E. All calculations used for the design of the storm drainage system shall be by currently recognized best engineering methods and practices; and shall be stamped by a Licensed Professional Engineer.
- e.F. Calculations shall be for both pre-development and post-development conditions and shall include times of concentration, runoff coefficients or curve number, maximum rate of runoff, total amount of runoff, storm sewer and drainage ditch sizing, culvert sizing, retention/detention facility sizing, and other information as may be required by the Board or Town Engineer.
- f.G. All storm sewers shall be designed to have a minimum flow velocity of 2 feet per second and a maximum flow velocity of 12 feet per second based on calculated design flow and corresponding to the applicable return frequency design storm.
- g.H. All open ditches and swales shall be designed to have a maximum flow velocity of 10 feet per second. All open ditches and swales shall be designed in accordance with Design of Stable Channels with Flexible Linings, Hydraulic Engineering Circular No. 15, published by the U.S. Department of Transportation, October 1975.
- h.I. Suitable methods and calculations shall be used to design erosion control methods for use with all storm drainage systems. Such methods shall include but not be limited to: head walls or end sections for all inlets and outlets, bedded rip rap for drainage ditches that exceed a flow velocity of 2.5 feet per second, slope mattresses and revegetation.
- i.J. Minimum pipe size shall be 12 inches in diameter for privately maintained storm drainage systems and 15 inches in diameter for publicly maintained storm drainage systems. The minimum depth of cover from the road or ground surface to the crown of the pipe shall be not less than three feet.
- j.K. Storm sewer and appurtenances shall be constructed of materials in accordance with the standards set by the Public Works Department for the Construction of Storm Drains, latest edition. All catch basin grates and frames shall be heavy duty gray cast iron meeting ASTM A48 Class 30 (American Foundry) with a 24" x 24" opening a two inch (2") square opening pattern on grate, unless otherwise approved by the Planning Board. Polyethylene liners shall be installed in all proposed catch basins. All grates or hatches at outlet control devices shall be fabricated from stainless steel or hot dipped galvanized steel (ASTM A123/A123M). (Effective 6/18/08)
- k.L. Underground Detention Basins: No arches shall be permitted. Pipe materials shall be dual wall HDPE or RCP with H2O loading capacity. Bedding for pipe systems shall be a minimum of twelve (12) inches of ¾" washed stone below invert to spring line of pipe. The trench width extents shall be two (2) feet greater than the nominal pipe size or a minimum of three (3) feet, whichever is greater. Filter fabric shall be placed securely over all stone and sand placed to one (1) foot over top of pipe compacted in six (6) inch lifts. All underground detention basins shall start from a minimum four (4) foot diameter precast concrete drain manhole or catch basin and terminate at a minimum four (4) foot diameter precast concrete drain manhole or catch basin that is designed to control discharge according to the stormwater management plan. All materials and fasteners related to construction of flow control devices shall be constructed of stainless steel. The minimum depth of cover from the pavement or

ground surface to the crown of the pipe shall be not less than three (3) feet. (Effective 6/18/08)

L.M. Infiltration Systems: Test pits must be completed and logged on the plans showing the estimated seasonal high ground water level and soil classifications as determined by Certified Soil Scientist in New Hampshire. The bottom of proposed infiltration Systems must be a minimum of two (2) feet above the seasonal high ground water level and or two (2) feet above ledge. Infiltration Systems shall only be permitted in areas of permeable soils with percolation rates of two (2) minutes per inch or better. No arches shall be permitted. Pipe materials shall be dual wall HDPE with H20 loading capacity. Bedding for pipe systems shall be a minimum of twelve (12) inches of ¾" washed stone below invert to spring line of pipe. The trench width extents shall be two (2) feet greater than the nominal pipe size or a minimum of three (3) feet, whichever is greater. All infiltration systems shall start from a minimum four (4) foot diameter precast concrete drain manhole or catch basin. In the event of failure, all infiltration systems shall be designed with an outfall. The minimum depth of cover from the pavement or ground surface to the crown of the pipe shall be not less than three (3) feet. (Effective 6/18/08)

N. Underground Detention Basins and Infiltration Systems shall be designed to optimize access for maintenance purposes. A maintenance plan shall be included with the plan that details inspection and cleaning activities and be incorporated into the deed of the property. (Effective 6/18/08)

O. Salt storage areas shall be covered, and loading/offloading areas shall be designed and maintained in accordance with NHDES published guidance such that no untreated discharge to receiving waters results. Snow storage areas shall be located in accordance with NHDES published guidance such that no direct untreated discharges to receiving waters are possible from the storage site. Runoff from snow and salt storage areas shall enter treatment areas as specified above before being discharged to receiving waters or allowed to infiltrate into the groundwater. (effective xx.xx.2021)

M.P. All plans shall note that "Snow and ice removal shall be performed by a Green Sno-Pro Certified contractor following Best Management Practices for the application of de-icing materials. (effective xx.xx.2021)