

**TOWN OF GREENFIELD
FIRE PROTECTION REGULATION
FIRE CISTERN
Adopted 02/04/2014**

I. PREAMBLE:

A. Purpose: Due to the rural nature of the Town of Greenfield and the lack of a community wide municipal water system, it has been necessary to require the provision of fire protection for newly developed areas within the community.

B. Scope: Sufficient water is of vital importance in order for the Greenfield Fire Department to provide effective fire protection services to the Town. The fire protection requirements set forth by the Fire Department shall allow developer/agents some options in providing the necessary fire protection and ensuring that there shall be an adequate fire cistern/water supply available to support fire protection operations.

II. DEFINITIONS:

A. Approved: Accepted by the authority having jurisdiction.

B. Authority Having Jurisdiction: The organization, office or individual responsible for approving" equipment, an installation or procedure. In the context of the regulation the authority having jurisdiction shall be the Planning Board, Fire Department and the Code Enforcement Office.

C. Dry Hydrant: A permanent piping system, normally a drafting source that provides access to a water source other than a municipal-type water system.

D. Municipal-Type Water System: A system having water pipes serving hydrants and designed to furnish, over and above domestic consumption, a minimum flow of 1000 gallons per minute and 20 pounds per square inch residual pressure for a 2 hour duration.

E. Protected Property/Easement: Property protected by a fire cistern/water supply that is minimally adequate in volume and duration and by a fire department capable of using this fire cistern/water supply to suppress a possible fire within a property.

F. Vehicle Pad: A level, hard surfaced area adjacent to a dry hydrant that is large enough and configured so as to allow a fire truck to be connected to the dry hydrant.

G. Water Supply: A water supply shall mean a natural body of water that is a man-made or a natural pond that has sufficient water.

III. AUTHORITY:

A. Regulation: Fire Department Regulation per NFPA 1 chapter 18, water supply.

B. Policy: The standards contained within this document and or their current version

shall be the criteria for the design, capability, construction and location of fire cistern/water supply.

C. Enforcement Authority: The enforcement of this standard shall be a shared authority between the Fire Department, Planning Board and the Code Enforcement Office.

D. The Planning Board or designee shall have authority for the enforcement of those elements that are specifically related to the design and sufficiency of the fire protection with the recommendations from the Chief of the Fire Department or its designee.

E. The Planning Board or designee shall have authority for those elements of construction and site plan/subdivision plan compliance as well as any bond issues.

IV. ADMINISTRATION:

A. Any subdivision, which creates 7 lots or more, shall be required to construct/ install a fire cistern/water supply of 30,000 gallons while meeting **IV. D.** of this document.

B. The minimum development of any fire cistern/water supply for the purpose of fire protection shall follow this procedure and all applicable NFPA requirements.

C. The developer shall provide the Planning Board the design documentation for review as part of the regular site plan/subdivision plan approval process.

D. Design Documentation and Review:

1. A site plan/subdivision plan shall be provided for review that includes all of the information required by the Planning Board and the information listed below.

a. A plan which shows the location of the water source and delineates the protected property or properties within the specified travel distance of 1200 feet. The furthest house shall not be more than 1500 feet from the fire cistern/water supply.

b. The location of the proposed hydrant(s) shall be shown.

c. A vehicle pad shall be shown if a dry hydrant/fire cistern is being proposed.

2. A design package for the type of fire cistern/water supply to be used shall be submitted for review to the Planning Board as part of the site plan/subdivision plan application. All designs and calculations shall be stamped by a New Hampshire Licensed Civil Engineer.

a. The design package shall include the following information:

1. The design and construction methods to be employed in creating the fire cistern/water supply.

2. The calculations used to determine the capacity of the water source.

3. The design calculations used to determine the size of the dry hydrant.
4. If a natural existing water supply is used, data establishing the normal water level and the low level on a 50-year drought shall be supplied.

E. Construction Timetables:

1. Water supplies that are required by this regulation shall be constructed according to the following timetable:
 - a. Subdivisions – Fire cisterns/water supplies shall be designed at the beginning phase of the project. No Certificates of Occupancy shall be issued until the fire cistern/water supply is completed, tested and approved by the authority having jurisdiction.
 - b. Subdivisions – Municipal or community type water system shall be installed at the time the roadways are constructed and tested and approved by the authority having jurisdiction prior to the issuance of building permits or Certificate of Occupancy.
 - c. Commercial – The required fire cistern/water supply of any type shall be completed and operational prior to any occupancy of the building.
2. The fire cistern/water supply shall be fully completed and tested prior to being accepted by the Fire Chief and the Planning Board or their designee.

F. Ownership/Responsibility and Bonding:

1. All required fire cistern/water supply developments shall be bonded as part of the overall bonding requirement which shall be recommended by the Planning Board and approved by the Greenfield Board of Selectmen.
2. Maintenance bonds shall be posted for cisterns and buried tanks and shall be held for a period of 2 years. The bond will be released by the Board of Selectmen upon recommendation by the Planning Board and inspection and approval of the system by the Fire Department and acceptance of the roadway.
3. The Association or developer shall own and maintain the cistern/water supply until, if and when, the roadway and infrastructure is accepted by vote of the Town legislative body.
4. The single property owner/developer shall own and maintain the cistern/water supply and provide the Town of Greenfield with a written easement that allows for fire suppression and testing use of the cistern, unless such a cistern becomes part of a future development that includes it as an adequate water supply, it shall be maintained by the Town of Greenfield.
5. If the cistern is located within a development that has an Association form of ownership i.e., Condominium or Homeowners Association etc., the responsibility

for maintenance of the cistern shall remain with the Condominium/Homeowners Association unless an agreement can be made with the Town of Greenfield.

6. The Fire Department shall be responsible for refilling the cistern after fire suppression, testing and training uses, unless the cistern is determined to be in failure and until it is repaired.

7. The single property owner/developer or Condominium and or Homeowners Association form of ownership shall maintain year round access to the cistern and vehicle pad which shall include snow removal unless the roadway and infrastructure is accepted by vote of the Town legislative body.

G. Inspection and Testing:

1. The fire cistern/water supply shall be inspected by the Code Enforcement Office, its designee or the authority having jurisdiction during its construction/installation. An inspection schedule shall be established for each specific project.

2. A successful flow test shall be conducted by the Fire Department or their designee prior to approval of the system.

3. A NH Licensed engineer shall sign-off that the cistern has been built using current specifications as referenced in this regulation and as those that become applicable.

V. CISTERN STANDARDS:

A. General Requirements:

1. Fire cistern/water supplies shall be located no more than 1200 feet roadway travel distance from any access driveway on the furthest lot within the development.

2. The design of the fire cistern/water supply shall be designed to be trouble free for a design life expectation of 20+ years.

3. The entire fire cistern/water supply shall be rated to highway loading per the American Association of State Highway and Transportation Officials (AASHTO). All appropriate easements to the Town shall be in place and accepted prior to acceptance.

4. All piping shall be American Society for Testing and Material (ASTM) (Current Edition) International steel pipe or schedule 40 PVC.

5. All connections shall be clean and the appropriate sealing material used according to the manufacturer's specifications so as to ensure all joints are airtight.

6. All connections shall be anchored to the cistern to resist movement. Steel piping shall be threaded together at all joints. Schedule 40 PVC piping shall be

glued at all joints.

7. A separate well, pump, float device and meter (as applicable) shall be connected to said cistern to maintain a full level of water at all times if a municipal water supply becomes available.

8. All metal hydrant pipe and protective bollards shall be primed with rust inhibiting primer and all pipe where exposed above ground, be painted bright red.

B. Storage Vessels:

1. Cisterns/buried tanks are a vital means of providing a water source in areas where natural or manmade ponds are not available. Cisterns are generally site built units; however manufactured tanks may be used provided the general construction concepts of this section are met.

2. Cisterns shall be designed specifically for the site and soil conditions where it is to be constructed. The plans for the design shall be stamped by a NH Licensed Civil Engineer.

3. A NH Licensed Civil Engineer shall sign off that the cistern was built to specifications.

4. Cisterns shall be designed using the information found in National Fire Protection Association (NFPA) standard #1231, Appendix B, Section B-4, 6 (current edition) as the basic design criteria.

5. The design of the dry hydrant in a cistern shall comply with Section V of this regulation.

6. The dry hydrant shall have a minimum delivery capacity of 1,000 gallons per minute (GPM) for $\frac{3}{4}$ of the capacity of the cistern.

7. The dry hydrant suction connection shall be located 3' beyond the backfill grade so as to use a single 10 foot length of suction hose to connect to the fire pump when the apparatus is parked on the vehicle pad.

8. The vehicle pad shall be so located and of sufficient size so as to allow the apparatus to connect to the dry hydrant without blocking a travel lane of the roadway. (Refer also to **Section V-Cistern Standards, C-Suction Connections 6, 7**)

9. The dry hydrant suction connection shall be a maximum height of 15 feet above the bottom of the cistern.

C. Suction Connections:

1. The suction connection shall be steel, threaded female connection 6.0 inch diameter, with National Standard Thread (NST) and provided with a suitable cap.

2. The suction piping system shall be 6 inches in diameter and capable of

delivering 1,000 GPM, for $\frac{3}{4}$ of the cisterns rated capacity. Any suction piping that is underground may be steel pipe or schedule 40 PVC.

3. The suction pipe connection shall be between 24 inches and 30 inches above level of the grade where the vehicles wheels shall be located when the cistern is in use.

4. Suction piping shall be supported on the top of the tank and to the bottom of the cistern with a space of 8 inches from the floor of the tank.

5. The bottom of the suction pipe to the suction connection shall not exceed 14 feet vertical distance.

6. The shoulder and vehicle pad shall be 12 feet wide and 60 feet in length and tapered to meet the roadway with the connection at the center of the pad length. The pull-off shall be built to the Town of Greenfield road and related regulations specifications and paved.

7. The pitch of the vehicle pad and shoulder from the edge of the pavement to the suction connection shall be 1% to 6% downgrade.

8. All horizontal suction piping must slope slightly uphill toward the suction connection to effect draining back to the water source.

D. Filler Connection:

1. The filler pipe shall be 4 inch diameter steel pipe or schedule 40 PVC.

2. The filler connection shall have one 4 inch Storz connector with an acceptable cover attached to a 45 degree downward sweep elbow that shall be supported vertically to the cistern.

3. The filler pipe connection shall be 36 inches above the final grade.

E. Vent Pipe:

1. The vent pipe shall be 6 inches in diameter.

2. The vent pipe shall terminate not less than 36 inches above the final grade, with the opening to the pipe facing downward.

3. Vent piping shall have screen covers installed to prevent access by wildlife and insects etc.

F. Backfilling:

1. The entire cistern shall be completely piped and inspected in the presence of the Fire Department or its designee prior to any backfilling being accomplished.

2. All backfill materials shall be screened gravel with no stone larger than 1.50

inches and shall be compacted to 95% ASTM 1557.

3. Bedding of the cistern shall consist of a minimum of 12 inches of .75 inch to 1.50 inch, crushed stone and compacted over a permeable geo-textile membrane which insures the crushed stone does not merge with underlying material. No fill shall be used under the stone.
4. The cistern shall be designed and installed so it will not float when empty.
5. After backfilling, the cistern shall be protected by either, guardrails, large boulders or concrete filled steel pipe bollards no less than 8 inches in diameter set in the ground below frost line, protecting all exposed piping from potential vehicular damage. The protection closest to each side of the connection shall provide an opening to the connection of 4' in width with the connection being centered.
6. Backfilling over the cistern shall be:
 - a. 4 feet of fill; or b.
 - b. The top and highest 2 feet of the cistern shall be insulated with vermin resistant foam insulation, and 2 feet of fill.
 - c. Backfill shall extend 10 feet beyond the edge of the cistern then have a maximum of a 3:1 slope, loamed and seeded with a perennial seed mixture.
7. Cisterns shall be equipped with a 32 inch watertight manhole with a bland cover that will accept a Knox Padlock as specified by the Fire Chief. Access shall be provided to all sections of the tank.
8. The developer/agent is responsible for completely filling the cistern initially. The water level shall not drop more than 1 inch in the first 24 hours initially and not more than 1 inch additionally in 30 days.
9. The developer/agent is responsible to supply and install identification signs as directed by the Fire Chief. This shall include "No Parking" signs as acceptable by the Greenfield Highway Department.
10. The Certificate of Occupancy shall be withheld until the fire cistern/water supply has been approved and acceptance testing is performed by signature of the Fire Chief or his designee and certified by a NH Licensed Civil Engineer.

VI. ALTERNATIVE SYSTEMS:

A. Ponds/Lakes:

A pond or lake, whether it is a manmade or natural, shall meet the specifications as set by the US Department of Agriculture, Soil Conservation Service unless privately owned in its entirety without public easement or a flow exiting the body does not exist and those specifications found in Section V of this Regulation. A dry hydrant shall be installed that meets the design standard of this Regulation. All work shall be inspected and approved

by the Fire Chief or his designee if the installation is a requirement of a building development.

B. Municipal/Public Water Supplies:

Extensions of municipal water service for the Town of Greenfield may be allowed if approved by the Board of Selectmen and or its proprietor and shall fully meet the design and installation requirements of the governing Water Department.

C. Community Water Systems:

If a community water system is used within a subdivision to provide the fire suppression water requirement, the system shall be designed and constructed to meet NFPA standard #24 (Standard for the Installation of Private Fire Service Mains). The design and flow capacities of the complete system shall also meet the criteria of the American Water Works Association for the size subdivision being supplied.

**Per Greenfield Fire Department
Chief Loren D. White**

**Adopted: 02/04/2014
Revised: xx/xx/xxxx**