

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

DRY HYDRANT

(Each)
Code 432



DEFINITION

A non-pressurized permanent pipe assembly system installed into a water source that permits the withdrawal of water by suction.

PURPOSE

This practice may be applied to provide all weather access to an available water source for fire suppression.

CONDITIONS WHERE PRACTICE APPLIES

This standard applies where an adequate volume of water is available, where transport vehicles can access the site, and where a source of water is needed for fire suppression.

CRITERIA

General Criteria. Plan, design, and construct dry hydrants to comply with all Federal, state, and local laws and regulations.

Impact to cultural resources, wetlands and Federal and state protected species shall be evaluated and avoided or minimized to the extent practicable during planning, design and implementation of this conservation practice in

accordance with established National and Florida policy, General Manual (GM) Title 420-Part 401; Title 450-Part 401, Title 190-Parts 410.22 and 410.26, National Planning Procedures Handbook (NPPH) Florida Supplements to Parts 600.1 and 600.6, National Cultural Resources Procedures Handbook (NCRPH), National Food Security Act Manual (NFSAM), and the National Environmental Compliance Handbook (NECH).

Site Accessibility. Prior to construction obtain a letter of approval to use the site from the landowner. Prior to installation of the dry hydrant, review access, topography, elevations and dry hydrant location with department personnel. Locate or develop fire truck and pumper unit vehicle accessibility to the dry hydrant in conjunction with local fire officials.

Access shall have an all-weather surface, be well drained and be at least 12 feet wide for ease of movement by personnel and equipment during an emergency. The access road shall be an all-weather surface in conformance with Florida NRCS conservation practice standard, Access Road, Code 560. The road surface and the surface at the dry hydrant shall provide adequate support for heavy vehicles at all times of the year. A minimum turnaround diameter of 90 feet for the mobile water supply apparatus should be provided where feasible.

When local road traffic may be involved, an all-weather road surface adjacent to the dry hydrant and completely off the public road is recommended for safety of the emergency personnel and the public. Consider visibility and sight distances when locating access roads and pull off areas.

In order to limit the length of the suction lines locate the fire truck and pumper connection within 10 feet of the edge of the access.

If the dry hydrant is located in a constructed impoundment, locate the access road and fire

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truck and pumper connection at a higher elevation than the auxiliary spillway.

Upon completion of construction, provide a copy of the location map showing the exact site of the hydrant and vehicle to the local fire department and to the landowner.

Special care and maintenance will be required when debris and fine soil particles are part of the stream bed. If streams are used, those with sand, gravel, or rock bottoms provide the best operating conditions.

Water Requirement. The minimum quantity of water available to a dry hydrant is the amount obtainable at not over 15 feet of total static head during a drought. An adequate volume of water is defined as a minimum of 30,000 gallons (1.1 acre-inches) of pumpable impoundment water or a minimum pump flow rate of 250 gal per minute (gpm) without interruption for 2 hours.

Determine the adequacy of the water supply in accordance with appropriate local criteria. Determine the volume of water supply in water impounding structures using RESOP, SPAW or other similar computer programs or models. Determine the adequacy of streamflow sources using regional analysis of stream gauge data or other appropriate techniques.

Document the adequacy of pit type ponds based on water budgets, long term water table depths, soil survey data, and experience.

Pump Lift. Install the hydrant so that the top of the fire truck pumping connection or centerline of pump (whichever is higher) is no more than 15 feet in elevation above the dry hydrant intake.

Coordinate with the local fire department to determine the proper height of the fire truck connection. Typically this height is approximately 24 inches above the ground surface, but must never be higher than the intake of the fire truck drawing from the hydrant head. The total lift (pumping head) must not exceed 20 feet when all head losses are totaled. Pumping head losses include head loss from screen or strainer, elbows, line friction, elevation (static head) and hard rubber suction hose to the fire truck.

Pipe. The pipe material may be flexible conduit such as plastic pipe, ductile iron pipe, steel pipe, or aluminum pipe that meets material specifications.

Design the pipe using NRCS National Engineering Handbook (NEH) Part 636, Structural Engineering Design of Flexible Conduits, to withstand pumping pressures at design flow to meet water requirement criteria.

Use pipe with a nominal diameter of 6 inches or larger. Use no more than two 90-degree elbows in the entire pipe system. Fit the pipe with an intake strainer and hydrant head with standard fire truck hose adapters acceptable to the local fire department for quick connect/release.

Protect plastic pipe from ultraviolet rays.

Pipe Intake. Install the top of the pipe intake 2 feet below the low water surface elevation and at least 2 feet below the frost-free depth for the area, whichever is deeper.

Install the dry hydrant intake pipe on slope toward the water source in order to avoid accumulation of sediment in the joint. Support and secure the intake screen or strainer at least 2 feet above the pool bottom and at least 4 feet beyond the earth slope in pits or impoundments.

Strainer. Fabricate a strainer of material compatible with the pipe or use corrosion resistant manufactured well screens. Use non-corrosive materials for all components, including pins. Screens and strainers must have a minimum open area of 4 times the pipe cross sectional area with the pipe cross-sectional area with individual inlet holes shall not exceed 3/8-inch in diameter.

A strainer may be formed by drilling 1/4 inch to 3/8 inch diameter holes with a minimum of one hole diameter between the holes in PVC pipe. Debur drill holes and clean the pipe before putting the strainer into service.

End Cap. Cap the inlet end of the intake pipe with a perforated end cap that is easily removed without special tools. Perforations improve flow conditions into the strainer and allow jetting action for silt cleanout.

Dry Hydrant. Do not use conventional dry barrel hydrants such as those found in public water supply systems. It is necessary dry barrel hydrants be absolutely airtight and as a result, excess suction loss may occur if used for a dry hydrant installation.

A recessed hydrant (below ground-level connection) may be specified for use in areas

with special needs, such as in a high vandalism area or for low profile and aesthetic needs. Also referred to as a flush mount hydrant, this type of hydrant does not require the 24 inch riser. It may be used with the 45° or straight dry hydrant head assembly.

Dry Hydrant Head. Use a bronze, brass, aluminum alloy or other durable, non-corrosive metal hydrant sleeve permanently affixed inside the head acceptable to the local fire department, for quick connect/release.

The hydrant head must accept a 6 inch NST (National Standard Thread), also known as NH (National Hose, thread), connection to provide maximum supply. Hydrant (6 inch) head shall conform to ASTM D 2466.

All hydrants shall contain a removable head strainer and stainless steel snap ring that can be removed without special tools. The strainer shall be conical in shape to maximize straining area. All hydrants shall use a rubber "O" ring between the threaded sleeve and PVC head.

Dry Hydrant Cap. Install a snap-on/snap-off cap that is removable without special tools and joined permanently to the dry hydrant head with a steel cable or chain. The cap shall be hard plastic or of same metal as NHT connection for maximum corrosion resistance.

Materials. All materials shall meet or exceed the minimum requirements for materials described in the various sections of this standard.

Testing. Allow pipe joint to cure before testing the piping system. A 24-hour time is recommended for PVC pipe. The local fire department is responsible for performing an initial pump test at the design capacity after installation to confirm satisfactory operation. Give careful attention to silt, debris, or other interference that may limit the full operation of the hydrant. .

Markings. Use of reflective paint on signs and on the connection cap to improve visibility during emergencies.

Protection. After the dry hydrant is installed, grade the site to provide surface drainage and vegetate or otherwise protected from erosion. Vegetation shall be in accordance with Florida NRCS conservation practice standard, Critical Area Planting, Code 342.

The dry hydrant head is vulnerable to vehicle damage. Install a steel post (recommend 3" diameter or larger) adjacent to and on both sides of the head, allowing for adequate personnel access. Physical barriers may be needed to protect any above ground pipe.

CONSIDERATIONS

Dry hydrant use may result in dewatering of the water source and adversely impact aquatic organisms and other wildlife that may depend upon the water source. If the operation of the dry hydrant will dewater the water sources, include mitigation measures in the design to address the issues.

Appropriate erosion and sediment control measures are required during and immediately following construction.

A spill mitigation plan is advisable in order to mitigate the possible effects on surface and ground water of spilled fuels and lubricants by fire trucks using the dry hydrant.

The dry hydrant will have a minimal effect on the water quality at the site and downstream due to its anticipated infrequent use and low volumes of water pumped when used.

The quality of the water may be impacted due to erosion during construction but should be minimal due to the short construction time. The quality of water could be impacted due to spilled fuels and lubricants by fire trucks using the dry hydrant but should be minimal due to the anticipated infrequent use.

Consider visibility and sight distances when locating access roads and pull-off areas. When local road traffic may be involved, the access road must be completely separated from any public road for the safety of emergency service personnel and the public.

PLANS AND SPECIFICATIONS

Plans and specifications for each hydrant shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. As a minimum, plans and specifications shall include:

- Location of dry hydrant.
- Plan and profile of dry hydrant.

- Details, length, location and cross section of access road.
- Type, quantity, and quality of all materials.
- Location of utilities and notification requirements.
- Any required permits.

OPERATION AND MAINTENANCE

Develop and provide an operation and maintenance plan to the owner/operator of the dry hydrant. The minimum requirements to be addressed in the operation and maintenance plan are:

- Keep the site clear of obstructions and mow the dry hydrant access area regularly to maintain ready access to the hydrant for emergency use. When feasible, schedule mowing to take place outside of the primary nesting season for grass-nesting birds,
- Pumper test the dry hydrant annually at the maximum designed flow rate to verify site usability. Back flush the system before testing. Inspect the hydrant each spring and fall and back flush if necessary to remove silt or sediment debris that may have accumulated on the screen.

- Regularly clear the screen of excess aquatic growth that may limit the full operation of the dry hydrant.

REFERENCES

ASTM D 2466
 USDA-NRCS, National Engineering Handbook,
 Part 636, Structural Engineering, Chapter
 52, Structural Design of Flexible Conduits
 Florida NRCS Conservation Practice Standards
 Access Road, Code 560
 Critical Area Planting, Code 342
 General Manual
 Title 420-Part 401
 Title 450-Part 401
 Title 190-Parts 410.22 and 410.26
 National Cultural Resources Handbook
 National Environmental Compliance Handbook
 National Food Security Act Manual
 National Planning Procedures Handbook
 Florida Supplements to Parts 600.1 and
 600.6