

APPENDIX 7

DRY HYDRANT & FIRE POND SPECIFICATIONS

It is the intent of these specifications to meet or exceed the requirements set forth by NFPA 1231, "Standard on Water Supplies for Suburban and Rural Fire Fighting," 1993 (or most current edition).

GENERAL REQUIREMENTS

1. Flow- The dry hydrant system shall be capable of providing a flow rate of 1,500 gallons per minute for two (2) hours. (180,000 gallons)
2. Pond Volume & Configuration - The intake strainer shall be placed at least six (6) feet below the normal water elevation of the pond (see Figure C-1).
 - * the top four (4) feet of water below the normal water elevation should allow for drought and ice conditions and should be considered "non-usable."
 - * the two (2) feet immediately above the intake strainer should be considered the "usable" water; total volume in this zone shall be at least 180,000 gallons.

A minimum distance of two (2) feet shall separate the bottom of the intake strainer and the bottom of the pond.

3. Dry Hydrant Placement - The dry hydrant fitting at the road shall be situated 18 to 24 inches above finished grade and eight (8) feet from the edge of road pavement. The dry hydrant shall be oriented at a forty-five (45) degree angle to the road and directed to face incoming vehicles. A pull-off lane, five (5) feet wide and fifty (50) feet long with twenty (20) feet long tapers, shall be centered on the dry hydrant connection point.

ADDITIONAL SPECIFICATIONS

1. Piping, elbows, and couplings, reducer(s), and underwater strainer shall be schedule 40 or heavier PVC and shall be joined with appropriate PVC-type cement according to manufacturer's specifications so as to ensure all joints are airtight. (For a pond with a water surface elevation higher than the hydrant, a standard fire hydrant may be necessary).
2. Horizontal piping shall have a minimum inside diameter (I.D.) of six (6) inches. Riser piping shall have an inside diameter (I.D.) of six (6) inches.
3. All elbows associated with the riser assembly shall be ninety (90) degrees. Ninety-degree elbows will not be permitted elsewhere in the suction line.
4. An intake strainer, capable of supporting the above-noted flow requirements, shall be provided.

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5. The horizontal pipe shall be buried and placed nearly level at a minimum depth of four and one-half (4-1/2) feet below finished grade. It shall penetrate the static water source no less than 10 feet including the strainer and may require support and/or anchoring.
6. The riser pipe shall rise at an angle of ninety (90) degrees from the horizontal suction line. The normal water surface elevation in the riser shall be a minimum of four and one-half (4-1/2) feet below finished grade unless alternative frost protection is provided. The riser shall terminate with a six (6) inch PVC ninety (90) degree elbow and fire department connection and cap.
7. The end fitting (i.e., fire department connection) on the dry hydrant shall consist of the following:
 - One 6" PVC 90 degree elbow with 6" NH (NST) male outlet adapter.
 - One adapter, 6" NH (f) x 4.5" NH (m) with rocker lugs.
 - One cap, 4.5" NH with attaching cable.
8. All exposed PVC or metal surfaces and all underground metal surfaces should be primed and painted white to prevent deterioration of the material and enable rapid locating of hydrants.
9. Static lift should be kept as low as possible and shall not exceed fifteen (15) feet (measured from the centerline of the pumper intake, assumed to be three (3) feet above the pavement, to the top of the underwater intake strainer).
10. Design calculations shall accompany the subdivision construction drawings submitted. It is recommended that the designers of dry hydrants use the design worksheet and accompanying tables located in the rear portion of this appendix as the basis for dry hydrant design.
11. Pond design and construction should conform to the standards of the Medina County Soil & Water Conservation District and the Natural Resources Conservation Service (USDA-NRCS).
12. A plan view of the fire pond construction (with dimensions labeled), a profile view of the pond outlet, and a detail of the dry hydrant installation (similar to Figure C-1) shall be incorporated in the subdivision construction drawings. For ponds involving earthen embankment construction, the following notes shall also appear on the construction plans:
 - a. *The foundation area, pool area, and borrow area shall be cleared of all trees, stumps, roots, brush, rocks and other debris.*

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- b. *Topsoil shall be stripped from the foundation area and stockpiled for future use. The foundation surface shall be scarified before the first layer of fill is placed.*
 - c. *Suitable fill material for embankment construction shall be obtained from selected borrow areas. This material shall consist of approximately 20% clay and shall be free of all sod, roots, frozen soil, stones, and other objectionable material.*
 - d. *The principal outlet pipe shall be placed on a firm foundation to the lines and grades as shown on the plans.*
 - e. *Selected backfill material shall be placed around the pipe and any anti-seep collars in four (4) inch horizontal layers and compacted by hand tamping with power operated tampers within the dam area, to a depth of two (2) feet over the pipe. Special care shall be taken to prevent lifting of the pipe by the pressure exerted when tamping earth fill under the haunches of the pipe.*
 - f. *The placing and spreading of the embankment fill material shall begin at the lowest point in the foundation area and shall be placed in horizontal lifts with a maximum thickness of eight (8) inches prior to compaction. Unless otherwise specified on the plans, each lift shall be compacted with a piece of equipment that will exert a minimum downward force of 200 pounds per square inch and each pass shall be routed as to traverse the full width of the fill.*
 - g. *If sand layers or pockets are encountered when excavating the pool area, they shall either be completely removed or blanketed with a minimum of two (2) feet of clay material compacted to the same requirements as for the embankment fill.*
13. Design consultants should check local zoning code requirements for fire pond placement.
14. A uniform identification sign shall be installed at the dry hydrant location at the developer's expense (sign to be installed with traffic control signage by the Medina County Engineer's office).

NOTE:

Inability to meet the above-referenced criteria shall not necessarily preclude the installation of a fire pond and dry hydrant. Such cases will be individually reviewed by the County Engineer's Office and the fire department having jurisdiction.

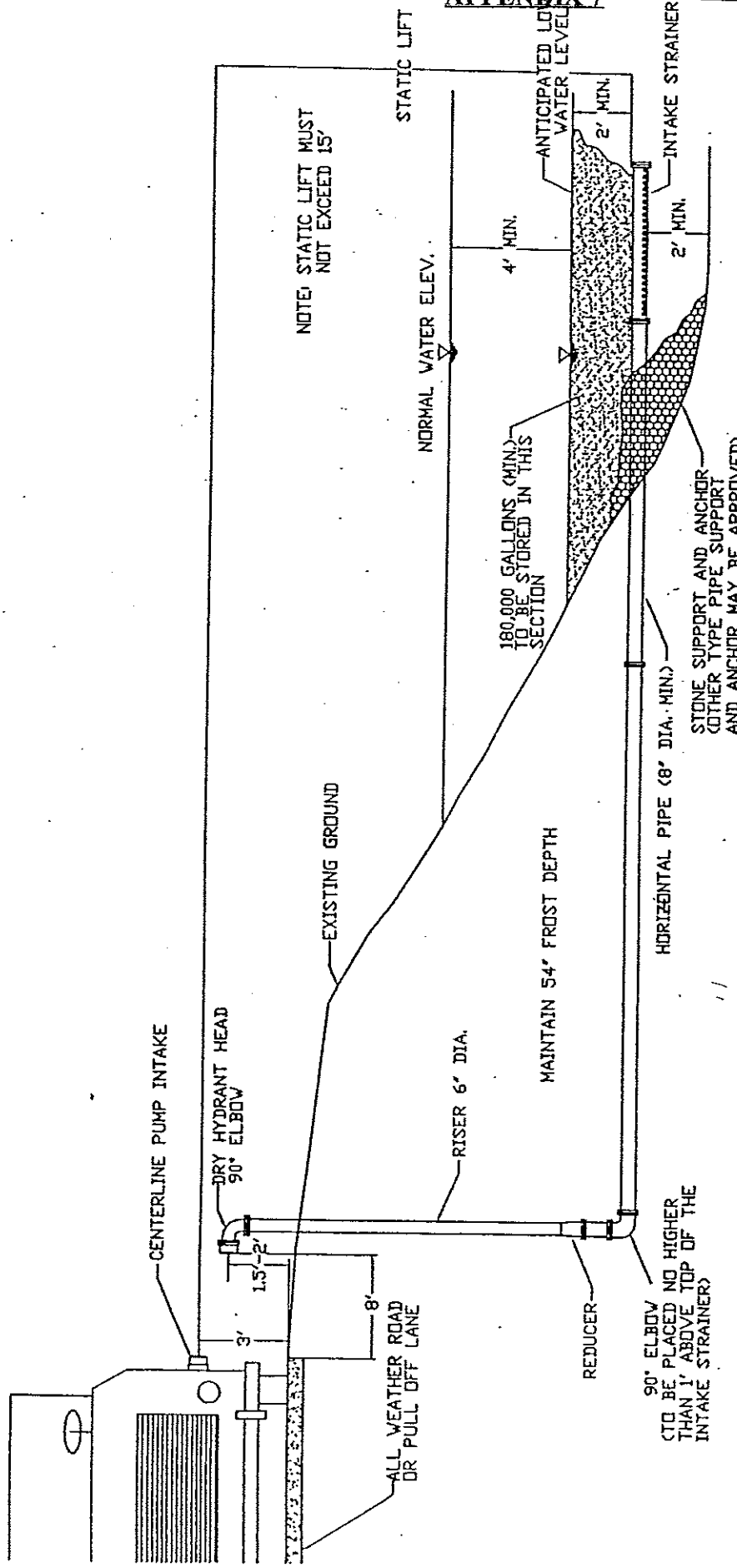


FIGURE C-1 DRY HYDRANT INSTALLATION

NOT TO SCALE

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DRY HYDRANT DESIGN WORKSHEET

DATE: _____

PROJECT/LOCATION: _____

TOWNSHIP: _____ DESIGN FLOW = 1500 GPM

A. **STATIC LIFT (SL)** (*pumper intake to top of strainer*)..... FEET (SL)

B. **PIPE HEAD LOSSES**

1. **HORIZONTAL PIPE LOSSES (HPL)**

Horiz. Pipe Diameter = _____ inches

Horiz. Pipe Length (*including strainer*)..... feet

Horiz. Pipe Fittings: (*use Chart A for straight pipe equivalents*)

90 degree elbow @ bottom of riser..... feet

_____ feet

Total Horizontal Length..... feet

HPL = Total Horizontal Length x Chart B factor

HPL = (_____) x (_____ ft/100 ft) = _____ FEET (HPL)

2. **RISER PIPE LOSSES (RPL)**

Riser Pipe Diameter = 6.0 inches

Riser Pipe Height feet

Riser Pipe Fittings (*use Chart A for straight pipe equivalents*)

_____ x 6" reducer..... feet

90 degree elbow, std. @ top..... 16.0 feet

_____ feet

Total Riser Height..... feet

RPL = Total Riser Height x Chart B Factor

RPL = (_____) x (12.3 ft/100 ft) = _____ FEET (RPL)

3. **CONNECTION LOSSES (CL)** (Worst Case)

6" x 4.5" Adapter/Reducer: 2.5' (*Chart A*) x 48.7 ft/100ft = 1.2 feet

6" Dia. Hard Suction Hose: 10.0' x 14.9 ft/100 ft (*Chart C*) = 1.5 feet :

CL = (1.2 ft) + (1.5 ft) = 2.7 FEET (CL)

C. **TOTAL HEAD LOSS (THL)**

THL = SL + HPL + RPL + CL = (_____) + (_____) + (_____) + (2.7 ft) = _____ FEET (THL)

If the Total Head Loss is greater than 20-25 feet, the pump may not be able to flow its rated GPM. Increase the horizontal pipe diameter and redesign.

STRAIGHT PIPE EQUIVALENT FOR FITTINGS < IN FEET > *

PVC PIPE DIAMETER	6.0"	8.0"	10.0"
90 ELBOW, STANDARD	16.0	26.0	27.0
90 ELBOW, MEDIUM SWEEP	14.0	18.0	22.0
90 ELBOW, LONG SWEEP	11.0	14.0	18.0
45 ELBOW	7.5	10.0	13.0
HYDRANT CONNECTION (6" X 4.5")	2.5		
REDUCER (8" X 6")	3.5		
REDUCER (10" X 6")	5.0		

CHART A

* SOURCE : HANDBOOK OF PVC PIPE

CHART B

HEAD LOSS IN FEET PER 100 FEET OF PVC PIPE

GPM	PIPE SIZE 6.0"	PIPE SIZE 8.0"	PIPE SIZE 10.0"
750	3.4	0.8	0.3
800	3.8	0.9	0.3
900	4.8	1.2	0.4
1000	5.8	1.4	0.5
1100	6.9	1.7	0.6
1200	8.1	2.0	0.7
1300	9.4	2.3	0.8
1400	10.8	2.7	0.9
1500	12.3	3.0	1.0
1600	13.8	3.4	1.2
1700	15.5	3.8	1.3
1800	17.2	4.2	1.4
1900	19.0	4.7	1.6
2000	20.9	5.2	1.7

* SOURCE : NFPA 1231, ' STANDARD ON WATER SUPPLIES FOR SUBURBAN AND RURAL FIRE FIGHTING ', 1993 EDITION

CHART C

HEAD LOSS IN FEET PER 100 FEET OF HARD SUCTION HOSE

GPM	PIPE SIZE 4.5"	PIPE SIZE 6.0"
700	14.7	3.6
800	18.9	4.7
900	23.5	5.8
1000	28.5	7.0
1100	34.0	8.4
1200	40.0	9.9
1300	46.4	11.4
1400	53.2	13.1
1500	60.5	14.9
1600	68.1	16.8
1700	76.2	18.8
1800	84.7	20.9
1900	93.7	23.1
2000	103.0	25.4