DRY HYDRANT

PLANNING INFORMATION

This information highlights inventory and design recommendations for the proper design and installation of dry hydrants.

1. Involve the local fire department from planning through construction. They are the end user and must supply information concerning pumper ability and capacities, and the proper size and threads of the riser head to use.

2. Remember the access to the hydrant must be an all-weather access. If necessary, plan appropriate drainage and erosion control measures for the access. Fences or locked gates should be avoided.

3. During planning, survey the site with a level (hand level or other type of level, as appropriate), and measure the length of pipeline required. This is the first step in determining feasibility.

4. Measure the surface area and depth of the pond or water source to determine the available water. Consider any man-made or natural uses of water that may affect the available water.

5. Using data and information available for rainfall and pan evaporation from the National Oceanic and Atmospheric Administration (NOAA) and the Army Corps of Engineers, the 50 year drought condition in Maryland can be represented at 2.5 feet below the normal pool elevation of an inland impoundment of water.

6. Address the possible need of permits, easements, permissions or approvals with the landowner. Access must be available 24 hours per day, 365 days per year.

7. Plan the hydrant's location so that it is easily accessed by fire equipment but at the same time is protected from vandalism.

8. For pipelines over 50 feet long, it may be necessary to increase the diameter of the pipeline to reduce friction losses and stay under 20 feet total dynamic head at the required pumping rate. It is generally not wise to use anything larger than a 6-inch standpipe. It takes approximately 2 times the water to prime an 8-inch standpipe versus a 6-inch standpipe and the difficulty to maintain the prime increases as the standpipe diameter increases.

9. Intakes placed in streams are typically difficult to maintain due to debris and sediment accumulation and fluctuations in stream depth due to drought conditions. They are not recommended and should be used ONLY as a last resort after all other water supplies in the region have been investigated, evaluated, and eliminated as an alternative.

10. The local fire department should decide at what angle they would like the hydrant head to be placed. This will depend on the type of hard suction they will run from the pumper to the hydrant, what angle the pumper sits in reference to the hydrant, and whether the pump is located on the front or side of the truck.

11. Always install a brace 2 to 4 feet in front of the hydrant to bear the weight of the hard suction between the pumper and the hydrant head. The weight of the hard suction full of water can crack the standpipe, particularly during extremely cold weather.

DRY HYDRANT DESIGN

Landowner ______________________ **Field No.** ____________

Designed by ______________________ **Date** 09/07/2006 **Checked by** ______________________

1. Check with the local fire department for the desired design capacity. **Design for** 2000 **gpm**

2. Determine the **SHL (static head loss)** between the centerline of the intake strainer to the centerline of the intake on the pumper. Consult with the local fire department on the height of the pumper intake. **SHL =** ______ **feet**

3. Choose a pipeline diameter (6 inches) and determine the **ISL (intake strainer loss)** from Table A, below. **ISL =** ______ **feet**

Table A – Intake Strainer Loss (ISL) Based on Flow Rate and Pipeline Diameter

Pipeline Diameter (inches)	Flow Rate					
	500 gpm	750 gpm	1000 gpm	1250 gpm	1500 gpm	2000 gpm
6	0.4	0.8	1.4	2.2	3.2	5.6
8	0.1	0.3	0.4	0.7	1.0	1.8
10	0.1	0.1	0.2	0.3	0.4	0.7
12	0.1	0.1	0.2	0.3	0.3	0.4

4. Determine the total **PHL (pipe head loss)** for the pipeline and standpipe. Calculate **PHL 1** for the pipeline by multiplying $\mathbf{f_1}$ **(friction head loss for the pipeline)** by the pipeline length. Calculate **PHL 2** for the standpipe by multiplying $\mathbf{f_2}$ **(friction head loss for the standpipe)** by the standpipe equivalent length. Use Table B to determine $\mathbf{f_1}$ and $\mathbf{f_2}$.

Table B – Friction Head Loss (f) Based on Flow Rate and Pipe Diameter

Pipe Diameter (inches)	Flow Rate					
	500 gpm	750 gpm	1000 gpm	1250 gpm	1500 gpm	2000 gpm
6	0.016	0.033	0.057	0.086	0.120	0.204
8	0.004	0.008	0.014	0.021	0.030	0.050
10	0.001	0.003	0.005	0.007	0.010	0.017
12	0.001	0.001	0.002	0.003	0.004	0.007

a. Calculate PHL 1 for the Pipeline:

f_1 for the 6 -inch diameter pipeline = ______ feet/foot

Pipeline length = ______ feet

PHL 1 = $\mathbf{f_1}$ **x pipeline length**

PHL 1 = ______ **x** ______ **=** 0.0 **feet**

b. Calculate PHL 2 for the Standpipe:

Six-inch standpipe length = ______ feet

90-degree elbows ______ @ 20 feet each = 0 feet

30/45-degree elbows ______ @ 10 feet each = 0 feet

Reducers ______ @ 10 feet each = 0 feet

In-line strainers ______ @ 10 feet each = 0 feet

Pumper connection = **10** feet

Standpipe equivalent length *(total of above)* = 10 feet

f_2 for the 6-in. diam. standpipe = ______ feet/foot

PHL 2 = $\mathbf{f_2}$ **x standpipe equivalent length**

PHL 2 = ______ **x** 10 **=** 0.0 **feet**

c. Calculate the total PHL: **PHL = PHL 1 + PHL 2 =** 0.0 **feet**

5. Determine the **THL (total head loss) = SHL + ISL + PHL =** ______ + ______ + 0.0 = 0.0 **feet**

If the THL is greater than 20 feet, increase the pipeline diameter and redesign.

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