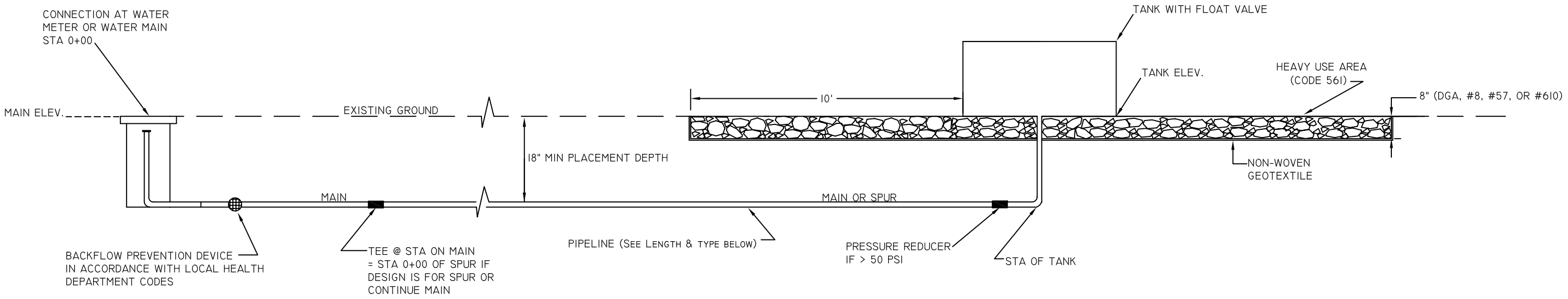


TYPICAL SECTIONAL VIEW
PIPELINE AND TANK

NOT TO SCALE

NOT TO SCALE

PLAN VIEW OF SYSTEM LAYOUT
(INCLUDE TANK AND LINE NUMBERS)

	MAIN #1	SPUR #2	SPUR #3	SPUR #4
PIPE DIAMETER				
PIPE LENGTH				
PRESSURE REDUCER Y OR N				
TANK ELEVATION				
TANK CAPACITY				
TANK STA				
TEE @ STA ON MAIN	XX			

NOTES:

1. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UTILITIES.
2. THE TRENCH SHALL BE FREE OF ROCKS AND OTHER SHARP EDGED MATERIALS.
3. THE PIPE SHALL BE PLACED IN A "SNAKE LIKE" POSITION IN THE TRENCH.
4. TURN ON THE WATER AND CHECK FOR LEAKS PRIOR TO BACKFILLING THE TRENCH.

ENGINEERING JOB CLASS _____

BILL OF MATERIALS

QUANTITIES	UNIT	ITEM
	EACH	____ GAL TANK
	EACH	____ GAL TANK
	LIN. FEET	____" _____ PIPE
	LIN. FEET	____" _____ PIPE
	LIN. FEET	____" _____ PIPE
	EACH	____" _____ ELBOWS
	EACH	____" _____ ELBOWS
	EACH	____" _____ ELBOWS
1	EACH	BACKFLOW PREVENTION DEVICE
	EACH	PRESSURE REDUCER
70 (PER TANK)	SQ. YDS.	NON WOVEN GEOTEXTILE
	EACH	FLOAT VALVE
20 (PER TANK)	TONS	ROCK (DGA,#8,#57,#610)
1	EACH	PIPE CLEANER
1	EACH	GLUE

REVISIONS

DATE	APPROVED	TITLE
09/05	DLC	CE

DATE
DESIGNED
DRAWN
CHECKED
APPROVED

PIPELINE AND TANK
(PRACTICE CODE 516 AND 614)

COUNTY:

LANDOWNER: _____

NRCS
NATURAL RESOURCES CONSERVATION SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

FILE NO.

DRAWING NO.
KY ENG 516B

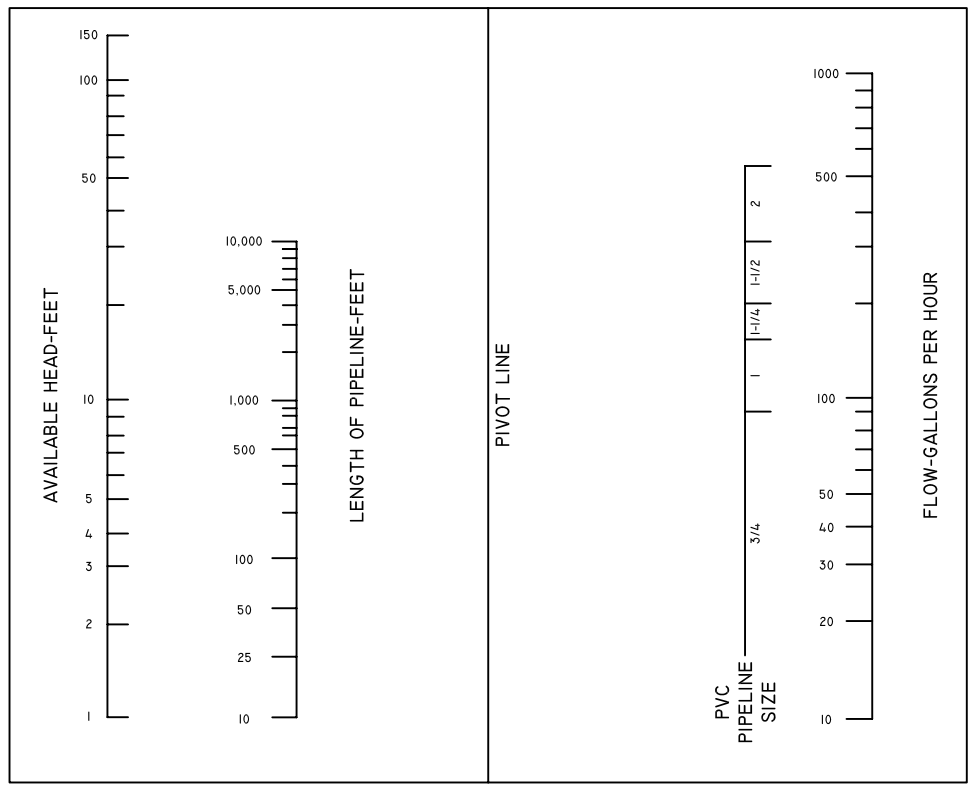
SHEET OF

PRESSURIZED PIPELINE AND TANK DESIGN

		Main #1	Spur #2	Spur #3	Spur #4
1) Pipe and Tank					
2) Number of Cows or Horses (hd)					
3) Daily Consumption 1/ (g/hd/h)	x	15	15	15	15
4) Water Needs (g/h)	=				
5) Tank Capacity (g)					
6) Flow Rate in Pipeline 2/ (g/h)					
Check the Replenishment Rate (Line 4 x 0.5) – Line 5 then divide by 3					
7) Replenishment Rate (g/h)					
For the Design Flow Rate in the Pipeline (Line 14) use the greater of Line 6 or Line 7					
8) Elev. of the Meter					
9) Elevation of the Tank	-				
10) Change in Head from Elevation					
11) Pressure @ Meter _____ x 2.31	+				
12) Total Available Head (ft.)	=				
(if > 115 add pressure reducer)					
13) Length of Pipe Along Ground Line (ft.)					
(for design purposes this distance is from the meter, down the main, and out the spur)					
14) Design Flow Rate in Pipeline (g/h)					
15) Length of Pipe to Install (ft.)					
16) PVC Pipe Diameter (in.)					

PIPELINE DESIGN CHART FOR LIVESTOCK WATER FACILITIES

(plot lines on this chart, see KYFOTG IV for instructions)



1/ From Table 1 for beef, dairy, and horses use 15 gal/hd/hr.
2/ From Table 2 FOTG
Design note: The main shall be designed from the meter to the farthest tank in the system. The spurs may be a smaller size than the main.

DESIGN PROCEDURE

1) The design survey shall have the elevation of the water meter or well pump and the elevation of each watering facility to be installed. A GPS is not accurate enough for this and it cannot be taken from a topographic map. You will also need to tape along the ground line of the proposed pipeline to determine how much pipe to design for. This can be done with a GPS with a backpack antenna. If you use a GPS, be sure to get shots close enough together to depict the ground line not the horizontal distance. Note in the taped survey or GPS survey where the spurs will be coming off the main line. The main line will usually be the one to the watering facility that is the farthest distance from the meter. However, due to more head loss in one of the spur lines, the spur with a shorter distance may actually require a larger pipe. In this case, the larger pipe would be used for the spur and from the spur out the main to the meter. Be sure to draw a plan view of the layout to accompany your survey.

2) Determine from the landowner the number of cattle or horses that will be using each tank and the volume of each tank.

3) Determine the water pressure at the meter or well. This can be done by using a pressure gage that can be purchased at most hardware stores. You may not be able to get the pressure at the meter but you can check it at a nearby hydrant at a house or barn. The water pressure fluctuates enough during the course of a day that the water company usually will not give you a number.

4) Begin by designing the main. Fill in the blanks on the Pipeline and Tank Design chart. For the main, the length of pipe along the ground line and the length of pipe to install will be the same. Using the total available head (line 12), length of pipe along the ground (line 13), and flow rate in pipe (line 14), determine the pipe size of the main.

5) To design the size of a spur line, use the same process except the length along the ground line (line 13) will be the length of the spur plus the length from the meter to the spur. The length of pipe to install (line 15) will be the length of the spur. The diameter of the spur line should be smaller or equal to the size of the main. If not, adjust the size of the main out to the meter as described in 1) above. Continue this process until all of the spurs have been designed.

6) It is best to tee off a short distance to install a tank that is on the main line so that if necessary a pressure reducer can be installed on the spur rather than on the main line. The pipes can withstand most pressures we encounter and you may need the pressure on down the line. The tanks are what is sensitive to pressure.

7) Schedule 40 PVC pipe is most commonly used for these facilities. But in the event that another type of pipe (that meets the standards) is to be used, list the length and type pipe material used in the Bill of Materials on the drawing.

8) Any time the combination of water pressure at the meter and gained head produces a total available head (line 12) greater than 115 feet (50 psi), a pressure reducer should be installed at the watering facility.

9) The engineering job class will be based on the pressure, which is the total available head divided by 2.31, and the length of pipe to the farthest watering facility (usually the main). Do not use the total length of the spurs too. Give a copy of the front sheet only to the land owner or contractor.

CONSTRUCTION CHECK

	Main #1	Spur #2	Spur #3	Spur #4
Length of Pipe (ft.)(measured)				
Diameter of Pipe (in.)				
Description of Pipe				
Min. Cover				

	#1	#2	#3	#4
Description of Tank (Gals.)				
Elev. of Tank				
Min. Projection of HUA				

To the best of my professional knowledge, judgment, and belief the installed practice meets NRCS standards.

Name _____ Title _____ Date _____