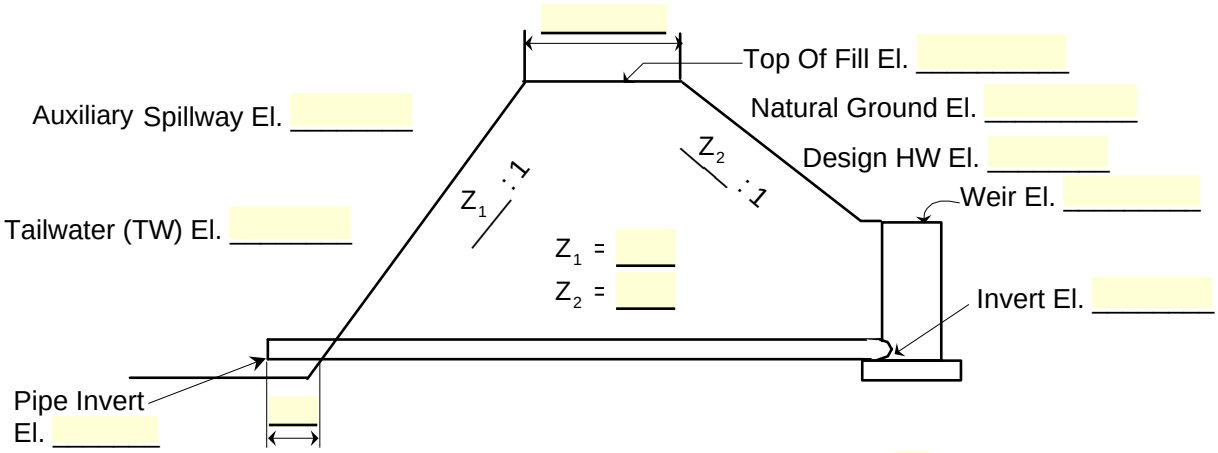
GRADE STABILIZATION STRUCTURE DESIGN AND CHECK SHEET - DROP INLET

Cooperator: _____ Location: _____

Conservation District: _____ Field Office: _____

Identification No.: _____ Field No.: _____ Gully No.: _____ Str. No.: _____



Antiseep collar required ☐ Yes ☐ No
(If yes, show location, size and number on sketch.)

Antivortex baffle required ☐ Yes ☐ No
(If yes, attach requirements.)

Drainage Area = _____ acres Required Discharge (Q_R) = _____ cfs

Pipe diam.[1/] = _____ in. Pipe length, L = _____ ft

Riser diameter [1/] = _____ inches

H = HW El. _____ – TW El. [2/] _____ = _____ ft. **Calculate H**

[1/] See back of sheet for pipe and riser hydraulic calculations.

[2/] Use the higher elevation of TW El. or 0.75 pipe diameter above pipe outlet invert

Designed By: _____ Date: _____ Checked By: _____ Date: _____

Approved By: _____ Date: _____

Construction Check

	Barrel		Riser		Top Fill Elev., ft.	Inlet Invert Elev., ft.	Outlet Invert Elev., ft.	Riser Crest Elev., ft.
	Diam, in.	Length, ft	Diam. in.	Height, ft.				
Planned								
Check								

Type of pipe: _____ Gage or Thickness: _____

Type and width of connecting bands: _____

Condition of vegetation: _____

Comments: _____

This practice meets NRCS specifications: _____ Date: _____
(Signature)

Pipe and Riser Hydraulic Calculations

1. Check Pipe Flow Q_P

Try pipe diameter _____ inches, Pipe area = _____ ft^2

Coefficient of roughness n = _____

Head loss coefficient, Kp = _____ Entrance loss coefficient, Ke = _____

$$Q_p = a\sqrt{\frac{2gH}{1+K_e+K_pL}} = _____ \text{ cfs}$$

Q_p Must be $\geq Q_R$, if not try larger pipe or adjust structure elevations.[1/]

2. Check Pipe Orifice Flow (Q_{PO})

H_{PO} = HW El. _____ - El. _____ (C/L pipe @ inlet invert) = _____ ft.

Calculate Hpo & Qpo

$Q_{PO} = c\,a\,(2gH_{PO})^{.5}$ = (_____) (_____) [(2) (32.2) (_____)]$^{.5}$ = _____ cfs

Q_{PO} must be > Q_R, if not adjust pipe elevations.[1/]
Note: Designer may want to use available Q_P.

3. Determine Riser Diameter

a. Riser diameter required for **weir** control:

$Q_W = CLH^{1.5}$ (L = weir length in feet)

H_w= HW El. - Weir El. = El. _____ - El. _____ = _____ ft.

Minimum riser diameter must be $\geq$ pipe diameter.

Try riser diameter = _____ in. = _____ ft.,

Weir length, L = πd = (3.1416) (_____) = _____ ft

$Q_W = CLH_w^{1.5}$ = (_____) (_____) (_____)$^{1.5}$ = _____ cfs

Calculate Qw

Q_W must be $\geq Q_R$ if not try larger riser; riser must be $\geq$ pipe dia. + 6 inches.

b. Check riser for **orifice** control:

Riser diameter = _____ inches, Riser area = _____ ft^2

H = HW El. - Weir El. = El. _____ - El. _____ = _____ ft.

$Q_{RO} = c\,a\,(2gH)^{0.5}$ = (_____) (_____) [(2)(32.2)(_____)] $^{0.5}$ = _____ cfs

Q_{RO} must be > Q_W if not, adjust structure elevations.[1]

[1/] If pipe elevations are adjusted in one of the above calculations, make sure all calculations include changes.

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