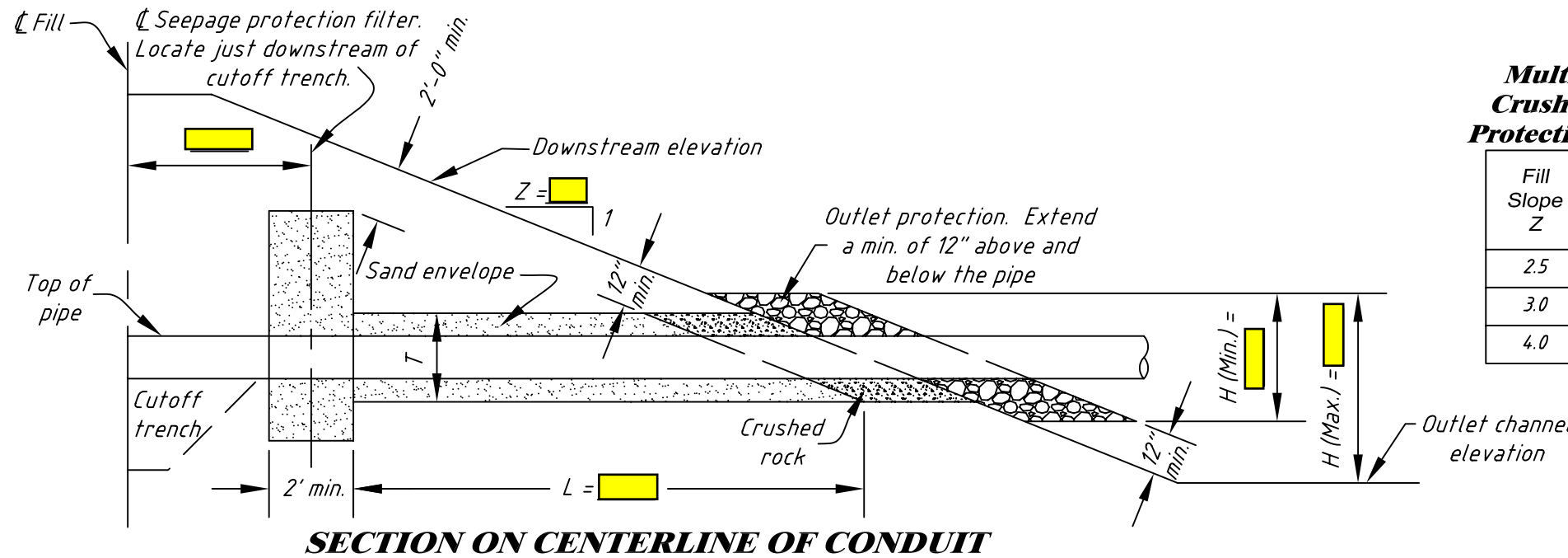


Construction Notes:

- Natural ground or earth fill shall be completed to above the top of the sand envelope and a trench excavated (per detail) for the pipe and sand envelope placement.
- The sand envelope will be protected from surface erosion by 12 inches of crushed rock aggregate (max. size = 1 inch) covered with 12 inches of outlet protection material. This material may be rock riprap, broken concrete debris, or native stone (max. size = 8 inches).
- Seepage protection filter and envelope material shall be compacted as specified in the construction specification.
 - Each layer of sand material shall be flooded prior to compaction.
 - Compaction shall be accomplished while the material is wet.
 - Each layer shall be compacted by a minimum of 2 passes of a hand-directed, vibratory compactor over the entire layer surface.
 - Layer thickness shall not exceed 12 inches after compaction.



Multiplier for Crushed Rock & Protection Material

Fill Slope Z	Multiplier "M" $(Z^2 + 1)^{0.5}$
2.5	2.69
3.0	3.16
4.0	4.12

Filter Quantities

Pipe Diameter "D" (Inches)	Min. Drain Fill - Cu. Ft.	
	Seepage Protection Filter	Envelope Per Lin. Ft. of "L" "E"
6	25	6.6
8	40	7.5
10	56	8.3
12	77	9.2
15	114	10.7
18	158	12.0
24	266	14.9
30	403	17.8
36	567	20.9
42	760	24.1
48	980	27.4

ASTM C-33 Fine Aggregate Gradation for Filter and Envelope

Sieve Size	Percent Passing
3/8	100
4	95-100
10	74-94
20	35-75
30	25-60
50	10-30
100	2-10

Quantity Requirements

$$\text{Protection Filter} = \frac{(E) \left[L - \frac{(Z)(T)}{2} \right]}{27} = \text{[] Cu. Yds.}$$

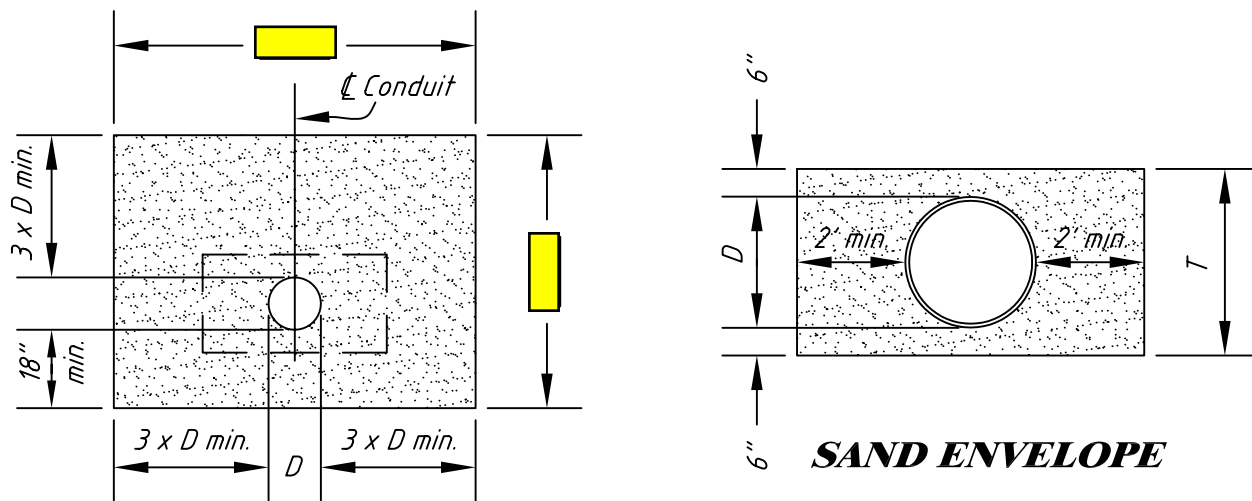
$$\text{Sand Envelope} = (E)(L) / 27 = \text{[] Cu. Yds.}$$

$$\text{Crushed Rock} = (E)(M) / 27 = \text{[] Cu. Yds.}$$

$$\text{Cu. Yds.} \times 1.35 = \text{[] Tons}$$

$$\text{Outlet Protection} = \frac{[(D+4)(H)(M)] - \left[\frac{\pi(D)^2}{4} (M) \right]}{27} = \text{[] Cu. Yds.}$$

$$\text{Cu. Yds.} \times 1.35 = \text{[] Tons}$$



Date: []

Designed: []

Drawn: []

Checked: []

Approved: []

Cooperator: []

Seepage Protection Filter

County Conservation District: []

County, Wyoming: []



File No. []

Drawing No. 378-07a

Sheet [] of []