

HY-8 Culvert Analysis Report

Table 1 - Summary of Culvert Flows at Crossing: Pawnee

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
1312.03	0.00	0.00	0.00	1
1313.24	10.00	10.00	0.00	1
1313.83	20.00	20.00	0.00	1
1314.46	30.00	29.84	0.16	5
1314.86	40.00	37.77	2.20	5
1315.19	50.00	43.43	6.53	5
1315.46	60.00	47.42	12.56	6
1315.69	70.00	50.44	19.54	6
1315.86	80.00	52.44	27.53	5
1315.98	87.00	53.93	33.04	5
1316.18	100.00	56.33	43.65	5

Rating Curve Plot for Crossing: Pawnee

Total Rating Curve Crossing: Pawnee

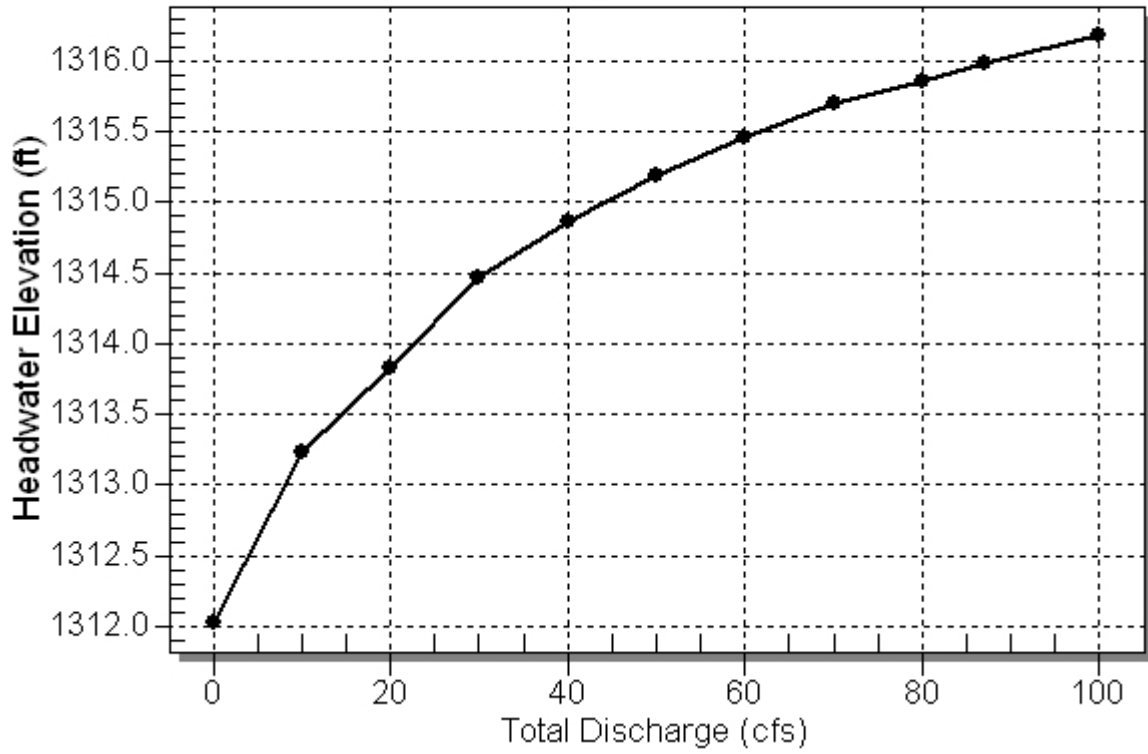


Table 2 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	1312.03	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
10.00	10.00	1313.24	1.131	1.208	2-M2c	0.984	0.798	0.798	0.370	4.245	2.641
20.00	20.00	1313.83	1.712	1.805	2-M2c	1.560	1.139	1.139	0.480	5.075	3.141
30.00	29.84	1314.46	2.228	2.431	2-M2c	2.417	1.583	1.583	0.558	6.085	3.476
40.00	37.77	1314.86	2.662	2.828	2-M2c	2.417	1.742	1.742	0.622	6.776	3.735
50.00	43.43	1315.19	3.003	3.158	2-M2c	2.417	1.844	1.844	0.676	7.290	3.949
60.00	47.42	1315.46	3.266	3.435	7-M2c	2.417	1.915	1.915	0.724	7.614	4.133
70.00	50.44	1315.69	3.477	3.665	7-M2c	2.417	1.959	1.959	0.767	7.887	4.296
80.00	52.44	1315.86	3.625	3.831	7-M2c	2.417	1.985	1.985	0.807	8.128	4.442
87.00	53.93	1315.98	3.738	3.951	7-M2c	2.417	2.004	2.004	0.833	8.285	4.536
100.00	56.33	1316.18	3.928	4.151	7-M2c	2.417	2.036	2.036	0.877	8.532	4.696

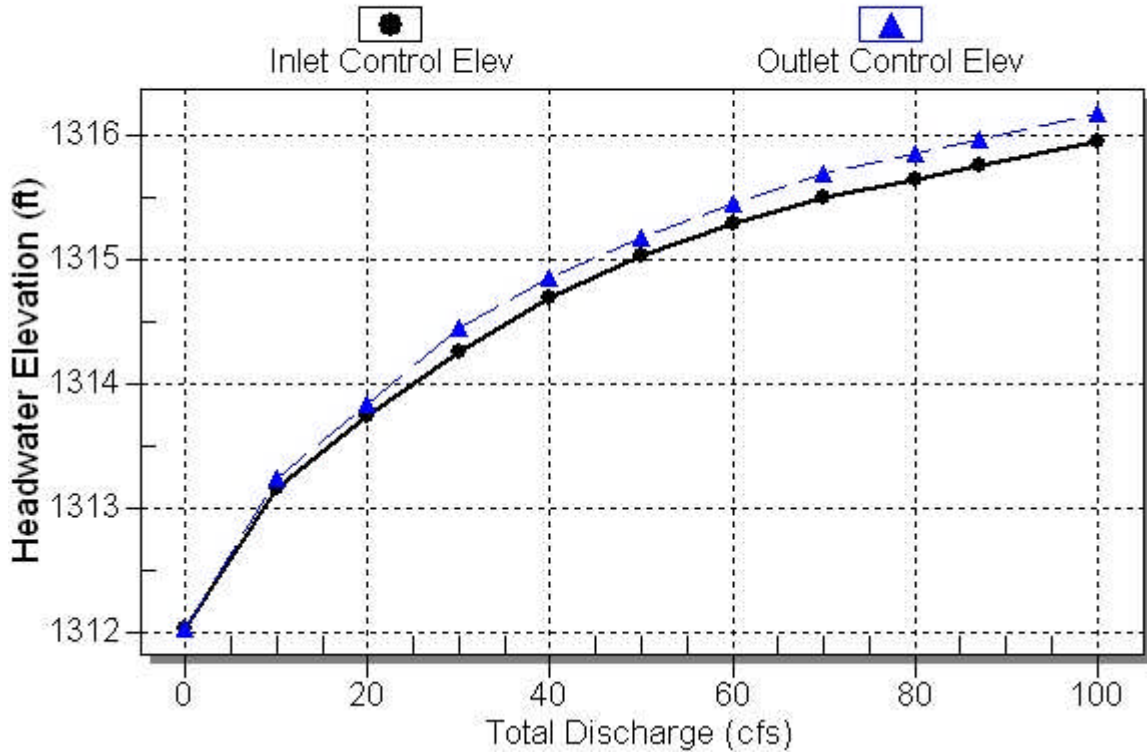
Inlet Elevation (invert): 1312.03 ft, Outlet Elevation (invert): 1311.87 ft

Culvert Length: 32.40 ft, Culvert Slope: 0.0049

Culvert Performance Curve Plot: Culvert 1

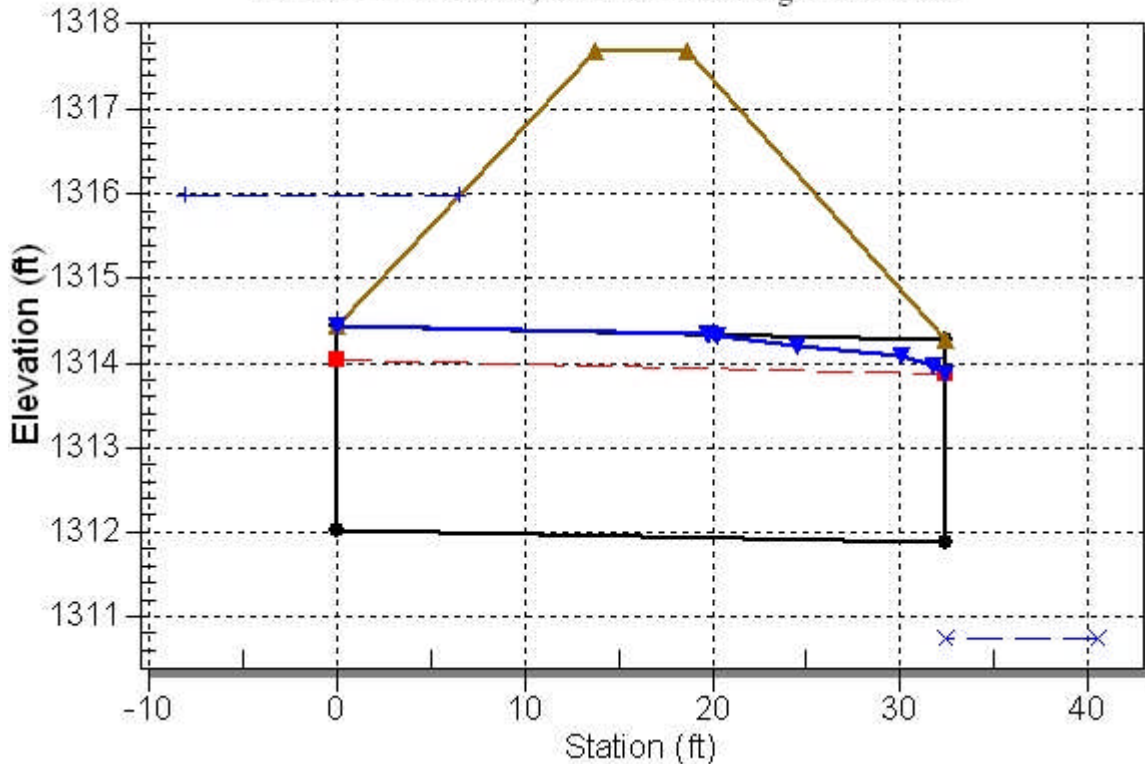
Performance Curve

Culvert: Culvert 1



Water Surface Profile Plot for Culvert: Culvert 1

Crossing - Pawnee, Design Discharge - 87.0 cfs
Culvert - Culvert 1, Culvert Discharge - 53.9 cfs



Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1312.03 ft

Outlet Station: 32.40 ft

Outlet Elevation: 1311.87 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Elliptical

Barrel Span: 45.00 in

Barrel Rise: 29.00 in

Barrel Material: Concrete

Barrel Manning's n: 0.0240

Inlet Type: Conventional

Table 3 - Downstream Channel Rating Curve (Crossing: Pawnee)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	1309.91	0.00	0.00	0.00	0.00
10.00	1310.28	0.37	2.64	0.62	1.08
20.00	1310.39	0.48	3.14	0.81	1.13
30.00	1310.47	0.56	3.48	0.94	1.16
40.00	1310.53	0.62	3.73	1.05	1.18
50.00	1310.59	0.68	3.95	1.14	1.20
60.00	1310.63	0.72	4.13	1.22	1.21
70.00	1310.68	0.77	4.30	1.29	1.22
80.00	1310.72	0.81	4.44	1.36	1.23
87.00	1310.74	0.83	4.54	1.40	1.24
100.00	1310.79	0.88	4.70	1.48	1.25

Tailwater Channel Data - Pawnee

Tailwater Channel Option: Irregular Channel

Channel Slope: 0.0270

User Defined Channel Cross-Section:

Coord No.	Station (ft)	Elevation (ft)	Manning's n
1	0.00	1311.50	0.0300
2	35.00	1309.91	0.0300
3	80.00	1311.26	0.0000

Roadway Data for Crossing: Pawnee

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
1	0.00	1317.69
2	12.00	1314.24
3	25.13	1317.43

Roadway Surface: Gravel

Roadway Top Width: 5.00 ft