

Urban Drainage and Flood Control District



E-19 Surveys



Lena @ US Highway 6

ALERT ID: 1043

LID: HIWC2

HDR Engineering, Inc.

303 E 17th Ave. Suite 300

Denver CO, 80203

Introduction

HDR Engineering Inc. was contracted by the Urban Drainage and Flood Control District to survey and provide information about various flood warning stream gage sites in a manner consistent with National Weather Service E-19 procedures. On December 20, 2002, HDR personnel surveyed five sites. This report is a summary of the work done and information gathered for the Lena @ US Highway 6 gage on Lena Gulch. Included in this report are elevations of critical points in the vicinity of the site, and estimates of stages causing flood damage in vicinity of the gage.

Site

The stream gage is located immediately south of the US Highway 6 on Lena Gulch. The ALERT ID number for this Gage is 1043 while the National Weather Service LID is HIWC2 and is referred to as Lena @ US Highway 6. There are two 10'x10' concrete box culverts under US Highway 6 approximately 140 feet long at the gage site. Lena Gulch is contained in a concrete rectangular channel in the vicinity of this gage. Potential flooding at the gage site itself would consist of US Highway 6 being overtopped. During high flows the neighborhoods downstream of the box culverts could be flooded. Figure 1 shows a general location map of the site.

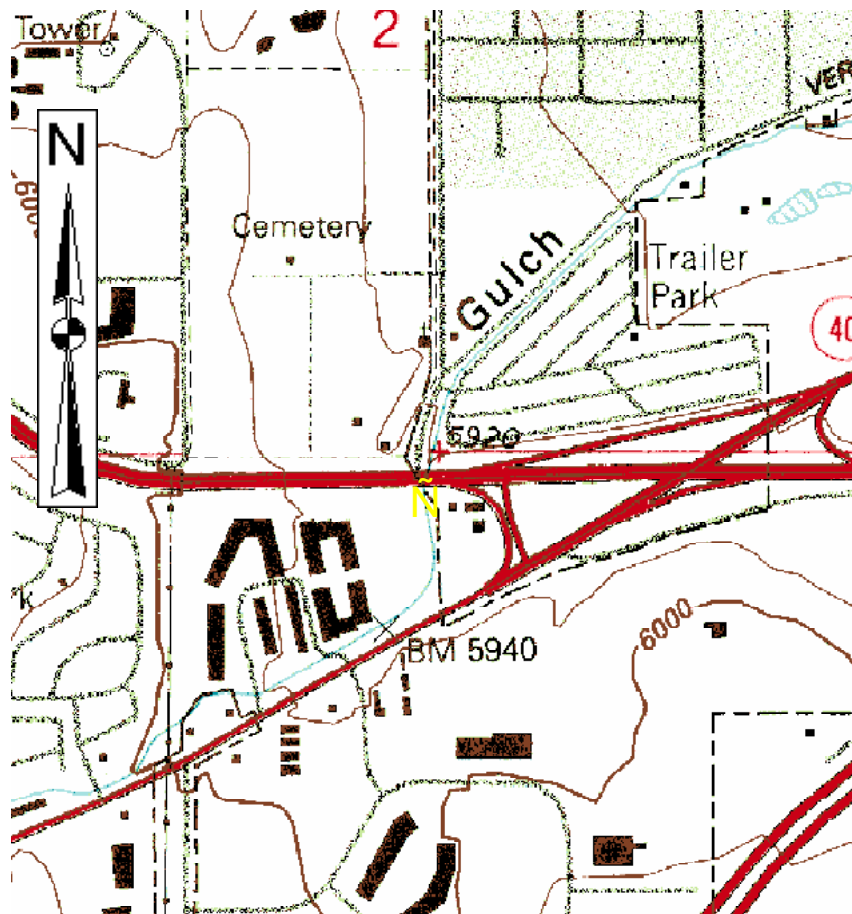


Figure – 1 Location Map

Surveyed locations

Ground elevations were surveyed along a cross section for a possible future rating curve for the site. In addition, the elevations and locations of any buildings along Lena Gulch were surveyed, along with low flow channel water surface elevations up and downstream from the gage. Figure 2 shows locations of the surveyed points in the vicinity of the gage. The base of the ALERT transmitter was surveyed at an elevation of 100.00 for a temporary benchmark. The flow line elevation is 89.1 feet. The banks of the concrete lined channel will be overtopped at 9.5 feet above the invert elevation. Water will begin to overtop the road at 13.7 feet above the invert elevation. Based on the water surface elevations in the low flow channel, the estimated channel energy slope is 5 percent. The culvert has a slope of one percent.



Figure – 2 Surveyed Points

Site photographs

Several photographs were taken of the site. Figure 3 shows Lena Gulch at the gage location looking downstream through the culverts. Figure 4 shows Lena Gulch at the gage location looking upstream. Figure 5 shows the downstream face of the culverts under US Highway 6.

Figure – 3 Looking Downstream



Figure – 4 Looking Upstream



Figure – 5 Looking at Downstream Outlet of Culverts



Historic records

There is limited information available for this gage. Since the gauge installation date in June 2, 1985, a peak stage of 1.9 feet above the invert (corresponding to 510 cfs) was recorded on July 27, 1997. Figure 6 shows the approximate 100-year flood boundary as depicted on district's annual flood hazard information brochures

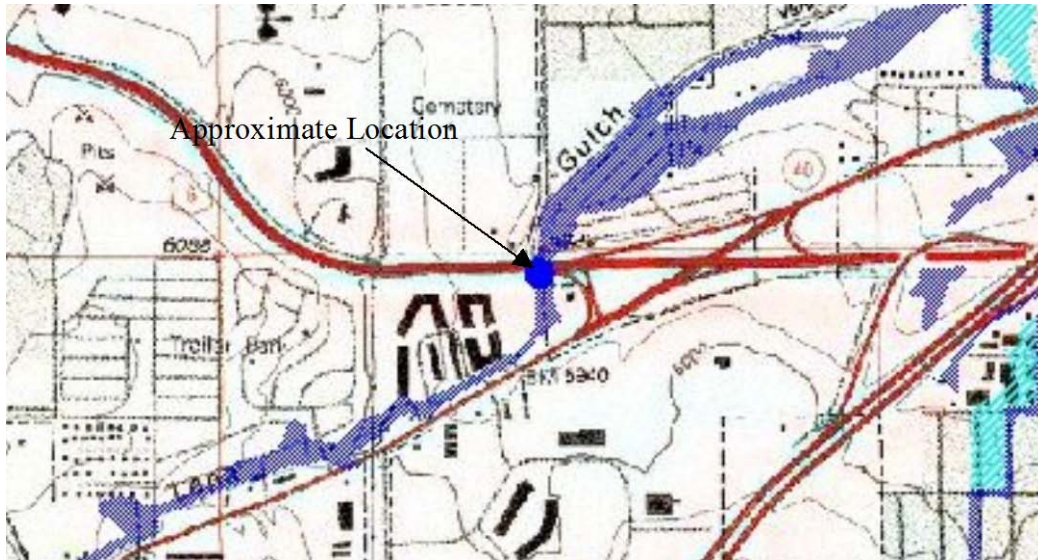


Figure – 6 Approximate 100-Year Flood Boundary As Depicted on District's Annual Flood Hazard Information Brochures

Flood warning template

The graphics template was created based on the surveyed information, historic records, another information supplied by the Urban Drainage and Flood Control District and the National Weather Service. The graphics template is compatible with the flood warning system and has been created and installed on the District's WebServer. This template is named 1043e19.tpt and is located in the appropriate directory in the District's WebServer. Figure 7 shows the graphics template online from the WebServer.

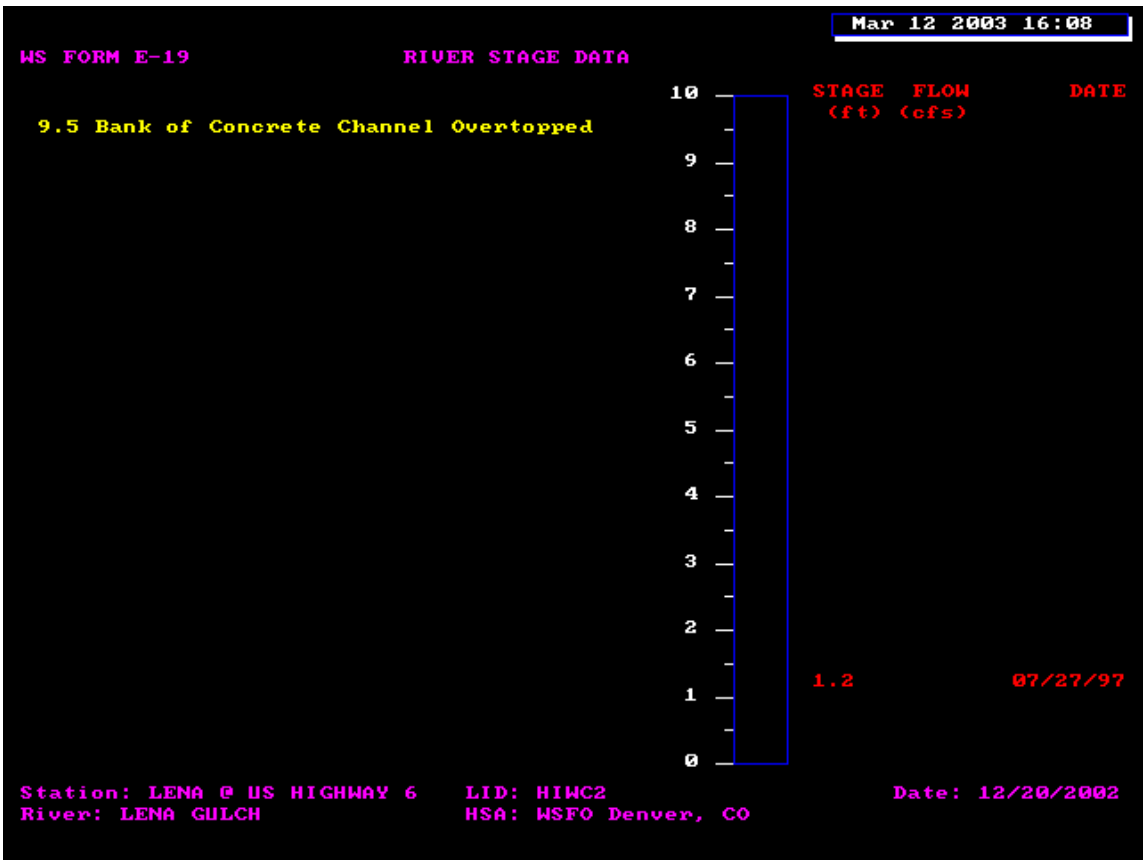


Figure – 7 Graphic Template

APPENDIX
Surveyed Data Points

Lena@6th Street

ID	X	Y	Elevation (ft)	Description
1000	10000	10000	101.778467	INST
1001	10022.1571	10000	102.03707	BS
1002	10087.2775	10074.8903	103.476503	XS
1003	9993.25237	10065.6847	90.0368416	XSEEDGEBOX
1004	9973.36261	10064.734	89.1377476	XSEEDGEBOX
1005	9972.56996	10064.2182	98.7685614	LCBOXXS
1006	9994.26066	10065.1642	98.8244783	LCBOXXS
1007	10205.4238	10087.5265	106.886438	ROAD
1008	10151.3433	10085.4371	105.448731	ROAD
1009	10096.5022	10084.0978	104.802703	ROAD
1010	10042.0404	10082.2475	104.094908	ROAD
1011	9995.1528	10080.3701	103.687738	ROAD
1012	9972.22566	10079.5955	103.555041	ROAD
1013	9969.92084	10064.3827	100	BASETRANSOUTH
1014	9925.75793	10073.9332	103.27403	ROAD
1015	9874.52548	10069.0277	102.840673	ROAD
1016	9951.64084	9888.25601	100.6152514	CHANEL
1017	9950.91555	9888.02766	106.485155	TOPCHNL
1018	9955.42243	9888.17881	100.5732455	INVTRICKLECHN
1019	9959.04321	9887.71781	100.4982726	INVTRICKLECHN
1020	9956.95754	9888.17046	100.1744744	INVTRICKLECHN
1021	9972.70996	9922.23509	96.6612331	INVT
1022	9983.18326	9991.73779	95.5903464	INVT
1023	9983.44137	10064.9424	90.3852049	CNTR2CULVTS
1024	9977.80697	10206.3399	88.0174856	INVT CULCNT
1025	9981.07872	9881.26237	110.835227	INVT CULCNT

