APPENDIX 7-9

Right Fork of Lila Canyon Flow and Geomorphic Evaluation

Hydrologic Design

Thomas J. Suchoski

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INTRODUCTION:

On January 31, 2004 a stream evaluation was conducted of the Right Fork of Lila Canyon downstream of the proposed mine facilities toward the Price River. The purpose of the study was to determine the impact of a continuous discharge of 500 gpm from the mine would have on the downstream channel. A series of cross-section measurements were taken to characterize the channel configuration and the channel bed and bank materials. At each cross-section a series of station and elevation shots were taken with a Trimble 4800 GPS unit. These shots were intended to provide a base condition description of the channel cross-section shape and width of the channel for input into the stream transmission loss modeling. No graphical cross-sections were prepared of the data. Additionally, photographs were taken of each cross-section location looking upstream and downstream to help visualize the conditions at the cross-section. Additional photographs of the bed and bank materials were taken to aid in classifying the material type. The photographs are presented in Attachment #1 to this Appendix. A listing of the survey points is presented in Attachment #2.

Figure 1 shows the location of the cross-section sites. The original plan was to collect cross-sections at one-half mile spacings along the channel alignment between the mine site and the Price River. However, at the third cross-section location, a recent diversion structure was found which diverted the normal flow of the Right Fork of Lila Canyon. Previously, the flow from the Right Fork joined with the flows from Grassy Wash. However, with the diversion, the entire flow of the Right Fork was diverted to a diversion channel. The location of the diversion dam and alignment of the diversion channel is presented in Figure 1. Ultimately, the diversion channel will convey the flow to a stock pond located in the SW/4, SW/4 of Section 28, T. 16 S., R. 14 E.

This stock pond was assumed to be a BLM pond. The work appeared to be part of implementation of a range improvement program in the area of the pond. As part of this program, the embankment had been improved and raised, the outlet riprapped, and the diversion structure moved upstream and improved to collect additional flows. However, the pond area was still filled with silt or sediment.

The result of this range improvement project was that the flows from the Right Fork of Lila Canyon would be diverted to the stock pond. If the pond fills, any excess water will be released back to Grassy Wash. Based on the size of the pond, if cleaned, it appears that the pond will hold about 5 to 7 acre-feet.

Subsequent to the field work, discussions were held with the BLM regarding the diversion and stock pond improvements. They indicated that they had no knowledge of them. A few months following the meeting, during other field work in

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the area, it was discovered that the diversion on the Right Fork of Lila Canyon had been breached and the flow channel reestablished to Grassy Wash.

Results:

Channel sections

The Right Fork of Lila Canyon is an ephemeral channel which is incised into the pediment surface below the Book Cliffs. At cross-section location 1, the channel is incised about 25 to 30 feet and has a top width of approximately 75 to 100 feet. The channel has a low-flow component that consists of a general trapezoidal shape with 1V:1.5 to 2H slopes, a bottom width of about 5 feet, and a low flow channel depth of almost 1.5 feet. Channel material consists of fine to coarse gravels and fine sands and few silts.

At cross section location 2, the channel is transitioning from the incised section to a broader section at the confluence of the Right Fork with Grassy Wash. In this reach, the channel is incised about 10 to 15 feet and has a top width of approximately 250 to 300 feet. The channel has a low-flow component that consists of a swale shape with gentle sideslopes, a bottom width of about 7.5 to 10 feet, and a low flow channel depth of almost 1.0 foot. Channel material consists of fine to coarse gravels and fine sands and silts.

Upstream of the confluence, at cross-section 3, Grassy Wash consists of a braided channel with several flow channels. The predominant channel has a top width of 10 to 12 feet with a bottom width of 8 or 9 feet and steep side slopes. The depth of this channel is approximately 2.5 feet deep. The overall channel is approximately 50 to 75 feet wide. Channel material consists of fine to coarse gravels and fine sands and silts.

Downstream of the confluence with the Right Fork, at cross-section 4, Grassy Wash is again an incised channel. The channel is approximately 10 to 15 feet wide with a depth of 5 to 6 feet. The channel bends to the west and flow is directed against the outer bank. This results in a steep slope on the outer bank and a gentler slope on the inner bank. Channel materials consist of fine to coarse gravels and fine sands and silts.

Downstream of the pond at cross-section 5, Grassy Wash is a moderately incised channel. The channel is approximately 10 to 15 feet wide with a depth of 4 to 5 feet. Channel materials consist of fine to coarse gravels and fine sands and silts.

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Stream Transmission Loss Modeling

Based on the DOGM estimate for mine discharge, an evaluation was conducted to determine if flow would reach the Price River. This evaluation is based on the concepts presented in the U.S. Soil Conservation Service National Engineering Handbook Chapter 19 - Transmission Losses (1985). The actual method is based on regression equations derived from Arizona and New Mexico conditions. While the current site is similar, the specific conditions were different. Therefore, the current site was modeled using similar concepts.

The estimated mine discharge was assumed to be introduced to the channel immediately below the mine site. The soil designations of the channel area were determined from preliminary soils maps developed by the NRCS Price Office for the Emery County Soil Survey (personnel communication, Leland Sasser, 2004) (a copy of the preliminary map is presented in Attachment 3). The length of channel crossing each different soil type was determined from this map. Permeability estimates of the soils were determined from the SCS Emery and Carbon County Soil Survey, engineering properties table. Estimates of channel width and depth and valley fill width and depth were derived from the photos and cross-section information. The depth of the valley fill was determined during field investigations based on the site conditions. These data along with the length of soil sections and permeability data were input into the spreadsheet presented in Table 1. No evaporation was assumed to provide a conservative estimate. Based on the discharge to the channel and the estimates of infiltration and permeability loss over the flow length, an estimate of the distance that the flow would be conveyed was determined.

Given the soils in the area, the constant 500 gpm flow from the mine would be expected to flow a distance of approximately 18,300 feet or 3.4 miles. All values used for the modeling, presented in Table 1 including the mine water discharge rate, are considered to be conservative values. The distance to the Price River from the mine is about 9.5 miles. Therefore, the flow from the mine will not reach the Price River.

Flow Characteristics

The results of the calculations channel capacity calculations (Attachment 4) show that the 500 gpm constant mine discharge (1.1 cfs) would have a flow depth at cross-section 1 of about 0.8 feet. This is significantly less than the bank full conditions flow depth expected at this cross-section below the mine site (2.55 feet).

Many reseachers consider the bankfull flow to be the major channel forming flow, due to its probability of occurrence and its channel forming energy. Given the

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fact that the mine water flow is significantly below this flow, its is not likely that the mine discharge flow will have any significant negative impact on the channel conditions.

The cross-section data has been collected as a baseline to comply with the statement under Section 728.333. UEI has a concern that subsequent surveys made to determine the impact of the mine water discharge on the channel form and shape would not necessarily show that the mine water was impacting the stream channel. This would be not be a viable approach as natural rainfall runoff events would likely have a higher peak flow, based on the flow simulations that have been conducted in Appendix 7-10 and in Appendix 7-4. These higher flows would likely result in channel form and shape changes that had nothing to do with the mine water discharge flows. Therefore, there would be no way to differentiate the changes in the channel between mine water and runoff induced changes.

It is likely that the constant low flow condition within the channel will result in the establishment of a vegetative community adjacent to the channel for the short distance that flow will exist above ground. Additionally, the development of such a community, would increase the evapotranspiration along the flow corridor which would decrease the available flow and ultimately result in a shorter flow distance below the mine.

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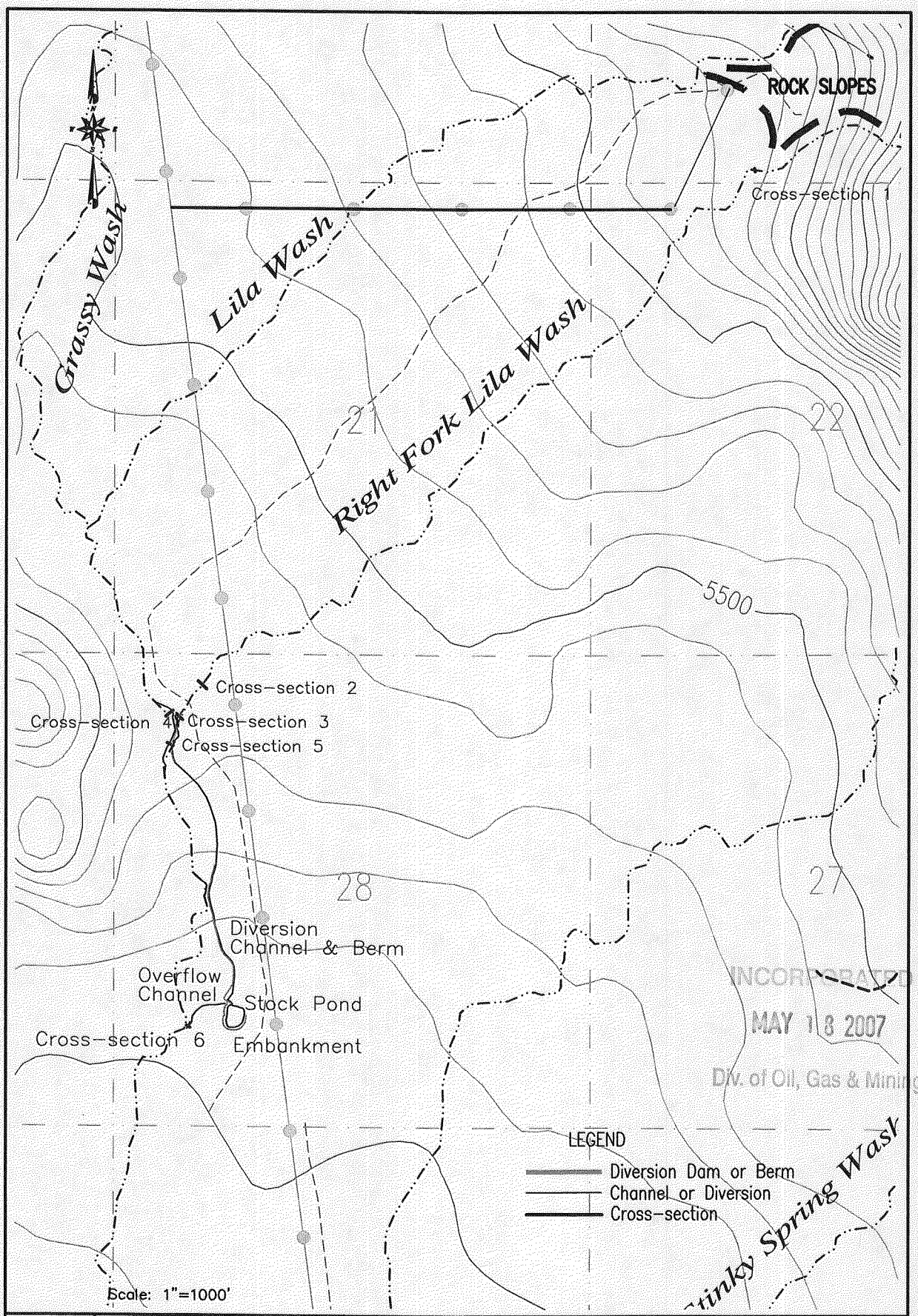

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	FIGURE 1. Cross-section Locations Diversion Dam & Channel Alignment	UtahAmerican Price, Utah	LILA CANYON MINE Price, Utah

FIGURE1.DWG UA 2/2004

Table 1

Utah American Energy, Inc. - Lila Extension
Mine Discharge Flow Modeling

Day	Discharge (gpm)	a Discharge (ac-ft/day)	Reach ID	Channel Length (ft)	Channel Width (ft)	Valley Fill Depth (ft)	Valley Fill Width (ft)	Fill Porosity	b Fill Storage Volume (ac-ft)	Infiltration Rate (in/hr)	c Potential Infiltration to Storage (ac-ft)	d Estimated Infiltration to Storage (ac-ft)	e Excess Flow (ac-ft)	f Percolation Rate from Storage (in/hr)	g Potential Percolation from Storage (ac-ft)	h Estimated Percolation from Storage (ac-ft)	i Total Outflow from Reach (ac-ft)	j
1	500	2.21	1	6251	5	5	15	0.2	2.15	2	2.87	2.15	0.06	8.33E-03	0.72	0.72	0.72	Excess flow, Continue Simulation
				6251														
2	500	2.21	1	6251	5	5	15	0.2	2.15	2	2.87	0.72	1.49	8.33E-03	0.72	0.72	0.72	Excess flow, Continue Simulation
		1.49	2	727	7.5	5	22.5	0.2	0.38	2	0.50	0.38	1.12	8.33E-03	0.11	0.11	0.83	Excess flow, Continue Simulation
		1.12	3	206	10	5	30	0.2	0.14	2	0.19	0.14	0.97	8.33E-03	0.04	0.04	0.86	Excess flow, Continue Simulation
		0.97	4	3760	10	5	30	0.2	2.59	2	3.45	0.97	0.00	8.33E-03	0.69	0.69	1.55	Excess flow, Continue Simulation
				10944														
3	500	2.21	1	6251	5	5	15	0.2	2.15	2	2.87	0.72	1.49	8.33E-03	0.72	0.72	0.72	Excess flow, Continue Simulation
		1.49	2	727	7.5	5	22.5	0.2	0.38	2	0.50	0.11	1.38	8.33E-03	0.11	0.11	0.83	Excess flow, Continue Simulation
		1.38	3	206	10	5	30	0.2	0.14	2	0.19	0.04	1.35	8.33E-03	0.04	0.04	0.86	Excess flow, Continue Simulation
		1.35	4	3760	10	5	30	0.2	2.59	2	3.45	0.69	0.66	8.33E-03	0.69	0.69	1.55	Excess flow, Continue Simulation
		0.66	5	7127	10	5	30	0.2	4.91	2	6.54	0.66	0.00	8.33E-03	1.31	0.66	2.21	Total Outflow Loss > Discharge, Stop
				18071														
4	500	2.21	1	6251	5	5	15	0.2	2.15	2	2.87	0.72	1.49	8.33E-03	0.72	0.72	0.72	Excess flow, Continue Simulation
		1.49	2	727	7.5	5	22.5	0.2	0.38	2	0.50	0.11	1.38	8.33E-03	0.11	0.11	0.83	Excess flow, Continue Simulation
		1.38	3	206	10	5	30	0.2	0.14	2	0.19	0.04	1.35	8.33E-03	0.04	0.04	0.86	Excess flow, Continue Simulation
		1.35	4	3760	10	5	30	0.2	2.59	2	3.45	0.69	0.66	8.33E-03	0.69	0.69	1.55	Excess flow, Continue Simulation
		0.66	5	7127	10	5	30	0.2	4.91	2	6.54	1.31	0.00	8.33E-03	1.31	1.31	2.86	Total Outflow Loss > Discharge, Stop
				18071														
5	500	2.21	1	6251	5	5	15	0.2	2.15	2	2.87	0.72	1.49	8.33E-03	0.72	0.72	0.72	Excess flow, Continue Simulation
		1.49	2	727	7.5	5	22.5	0.2	0.38	2	0.50	0.11	1.38	8.33E-03	0.11	0.11	0.83	Excess flow, Continue Simulation
		1.38	3	206	10	5	30	0.2	0.14	2	0.19	0.04	1.35	8.33E-03	0.04	0.04	0.86	Excess flow, Continue Simulation
		1.35	4	3760	10	5	30	0.2	2.59	2	3.45	0.69	0.66	8.33E-03	0.69	0.69	1.55	Excess flow, Continue Simulation
		0.66	5	7127	10	5	30	0.2	4.91	2	6.54	1.31	0.00	8.33E-03	1.31	1.31	2.86	Total Outflow Loss > Discharge, Stop
				18071														

Calculation Method:

Column	
a	Input discharge in ac-ft or transfer excess flow from previous reach.
b	Multiply valley fill width and depth and reach length by porosity of soil.
c	Convert infiltration rate to volume in ac-ft. Assume that infiltration will occur across channel width and along reach length.
d	Compare infiltration potential to available fill volume. If infiltration potential is less than available fill volume, then use infiltration potential. If infiltration potential is greter than available fill volume, then use available fill volume. However, if prior storage already filled, then available fill volume is limited to the flux out of storage by percolation.
e	Excess flow is the discharge (a) - infiltration (d).
f	Percolation rate includes movement of stored water into adjacent soils, bedrock, and consumption by plants and is estimated to be 5% of the infiltration rate.
g	Convert percolation rate to volume in ac-ft. Assume that 2 times depth plus width of valley fill estimate is the percolation flux surface.
h	Compare estimated infiltration to potential percolation. If estimated infiltration is greater than potential percolation, use potential percolation. If not then use infiltration.
i	Add up the outflow from each reach by summing the percolation outflows.
j	Compare the total outflow versus the discharge to the channel. When the total outflow from the channel is equal to or greater than the discharge, then the flow will not continue downstream.

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ATTACHMENT #1

PHOTOGRAPHS

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X-section 1 Looking Upstream

X-Section 1 Looking Downstream

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X-Section 1 Bed Materials

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X-Section 2 - Looking Upstream

X-section 2 Bed Materials

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X-section 3 Looking Upstream

X-section 4 Looking Upstream
Diversion Dam center and
Diversion Channel to Right

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X-section 4 looking upstream
Diversion channel in center

Diversion Channel above stock pond

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ATTACHMENT #2

LISTING OF SURVEY POINTS

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CROSS-SECTION 1

Number	Northing	Easting	Elevation	Raw Desc	Full Desc
1000	399364.4480	2325338.5220	5817.99	GND	GND
1001	399368.6210	2325337.9550	5818.23	GND	GND
1002	399372.2770	2325337.0980	5818.23	GND	GND
1003	399375.0710	2325336.4520	5818.44	GND	GND
1004	399377.0990	2325335.6640	5818.33	GND	GND
1005	399378.6020	2325335.1630	5816.04	GND	GND
1006	399379.9900	2325334.6410	5815.81	GND	GND
1007	399380.7850	2325334.2340	5815.65	GND	GND
1008	399382.3520	2325333.6680	5816.17	GND	GND
1009	399383.8040	2325333.3990	5816.06	GND	GND
1010	399385.6430	2325332.9680	5815.86	GND	GND
1011	399386.5900	2325333.1920	5816.11	GND	GND
1012	399387.5690	2325333.1110	5818.03	GND	GND
1013	399389.6760	2325332.7330	5820.52	GND	GND
1014	399392.8950	2325330.7280	5821.19	GND	GND
1015	399395.5650	2325330.1960	5821.56	GND	GND
1016	399397.8080	2325329.7560	5822.93	GND	GND

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CROSS-SECTION 2

Number	Northing	Easting	Elevation	Raw Desc	Full Desc
1017	393565.9960	2319257.2620	5344.98	GND	GND
1018	393572.1990	2319250.3510	5344.45	GND	GND
1019	393577.5300	2319244.0850	5343.97	GND	GND
1020	393583.3810	2319237.2090	5343.97	GND	GND
1021	393587.9980	2319231.5870	5344.32	GND	GND
1022	393592.9990	2319225.5060	5344.74	GND	GND
1023	393598.3430	2319219.9410	5344.48	GND	GND
1024	393601.7280	2319216.1570	5344.29	GND	GND
1025	393604.0430	2319214.3070	5343.96	GND	GND
1026	393604.4510	2319213.7920	5343.80	GND	GND
1027	393604.9680	2319213.2980	5343.38	GND	GND
1028	393605.5190	2319212.8550	5341.55	GND	GND
1029	393605.9210	2319212.5200	5341.42	GND	GND
1030	393606.9240	2319211.5160	5341.52	GND	GND
1031	393607.5840	2319211.0300	5341.66	GND	GND
1032	393608.2590	2319210.4580	5341.58	GND	GND
1033	393608.7110	2319210.0450	5341.65	GND	GND
1034	393609.0100	2319209.7950	5341.84	GND	GND
1035	393609.2460	2319209.1830	5342.91	GND	GND
1036	393609.8710	2319208.3370	5342.64	GND	GND
1037	393610.6600	2319207.6900	5343.00	GND	GND
1038	393612.4830	2319206.0910	5343.39	GND	GND
1039	393613.2580	2319205.2820	5343.70	GND	GND
1040	393617.6100	2319201.1830	5343.76	GND	GND
1041	393620.4100	2319198.3390	5344.52	GND	GND
1042	393623.6320	2319195.2180	5344.25	GND	GND
1043	393626.2330	2319191.9810	5343.82	GND	GND
1044	393628.6830	2319190.0300	5343.07	GND	GND
1045	393629.0910	2319189.1870	5343.85	GND	GND
1046	393632.6560	2319186.0720	5343.67	GND	GND
1047	393634.3610	2319184.4410	5343.39	GND	GND
1048	393635.0110	2319184.0200	5343.56	GND	GND
1049	393637.2770	2319181.6860	5342.66	GND	GND
1050	393638.2920	2319180.6290	5342.57	GND	GND
1051	393640.9190	2319178.0040	5342.53	GND	GND
1052	393641.5340	2319177.4430	5343.14	GND	GND
1053	393642.7930	2319175.7480	5343.55	GND	GND
1054	393647.3640	2319171.7630	5343.69	GND	GND
1055	393650.8390	2319167.5780	5344.07	GND	GND
1056	393652.0130	2319165.9270	5344.34	GND	GND

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CROSS-SECTION 3

Number	Northing	Easting	Elevation	Raw Desc	Full Desc
1057	393221.4530	2318985.8290	5324.44	CROSS3	CROSS3
1058	393223.4750	2318983.5430	5324.70	CROSS3	CROSS3
1059	393229.4060	2318977.1600	5325.16	CROSS3	CROSS3
1060	393235.0290	2318971.4480	5325.54	CROSS3	CROSS3
1061	393241.9480	2318964.3670	5325.67	CROSS3	CROSS3
1062	393246.6200	2318958.9300	5325.65	CROSS3	CROSS3
1063	393249.0040	2318956.1810	5325.49	CROSS3	CROSS3
1064	393250.2310	2318954.6680	5324.77	CROSS3	CROSS3
1065	393251.6470	2318952.4860	5323.72	CROSS3	CROSS3
1066	393253.4510	2318950.1270	5322.87	CROSS3	CROSS3
1067	393255.1050	2318947.7010	5322.07	CROSS3	CROSS3
1068	393255.7690	2318946.8890	5321.97	CROSS3	CROSS3
1069	393257.7440	2318944.9500	5322.12	CROSS3	CROSS3
1070	393258.6740	2318944.0230	5322.20	CROSS3	CROSS3
1071	393260.3910	2318942.3420	5322.53	CROSS3	CROSS3
1072	393262.1080	2318940.5200	5322.55	CROSS3	CROSS3
1073	393262.6960	2318939.7230	5322.69	CROSS3	CROSS3
1077	393268.2200	2318933.7690	5323.92	CROSS3	CROSS3
1078	393272.1740	2318930.2030	5324.12	CROSS3	CROSS3
1079	393275.6830	2318926.6600	5324.93	CROSS3	CROSS3
1080	393282.3840	2318920.4800	5325.24	CROSS3	CROSS3
1081	393286.6220	2318916.8720	5325.20	CROSS3	CROSS3
1082	393296.6640	2318908.1940	5325.76	CROSS3	CROSS3
1083	393306.1250	2318900.7980	5325.90	CROSS3	CROSS3
1084	393313.6170	2318893.8360	5326.29	CROSS3	CROSS3
1085	393320.7990	2318886.9310	5326.30	CROSS3	CROSS3
1086	393324.8570	2318883.0000	5326.00	CROSS3	CROSS3
1087	393322.1270	2318878.4250	5325.93	CROSS3	CROSS3
1088	393318.6140	2318873.6190	5325.48	CROSS3	CROSS3
1089	393317.5130	2318872.3420	5326.10	CROSS3	CROSS3
1090	393316.0770	2318870.3080	5325.89	CROSS3	CROSS3
1091	393314.7220	2318868.2040	5325.28	CROSS3	CROSS3
1092	393314.4360	2318867.3740	5323.35	CROSS3	CROSS3
1093	393314.2440	2318866.9060	5323.01	CROSS3	CROSS3
1094	393313.6850	2318865.9140	5322.57	CROSS3	CROSS3
1095	393313.1050	2318864.8370	5322.36	CROSS3	CROSS3
1096	393311.6920	2318863.1200	5322.10	CROSS3	CROSS3
1097	393310.7730	2318861.7790	5322.13	CROSS3	CROSS3
1098	393309.6520	2318860.9020	5321.91	CROSS3	CROSS3
1099	393309.5590	2318860.7550	5321.95	CROSS3	CROSS3
1100	393308.6880	2318859.5590	5321.82	CROSS3	CROSS3
1101	393307.5490	2318858.1410	5321.81	CROSS3	CROSS3
1102	393306.5330	2318856.7770	5322.02	CROSS3	CROSS3
1103	393305.7140	2318855.8160	5322.85	CROSS3	CROSS3
1104	393304.7890	2318854.8280	5323.56	CROSS3	CROSS3
1105	393302.5030	2318852.4810	5323.86	CROSS3	CROSS3

1106	393300.3110	2318850.4120	5323.55	CROSS3	CROSS3
1107	393298.4130	2318848.5250	5323.16	CROSS3	CROSS3
1108	393297.4950	2318847.8080	5322.95	CROSS3	CROSS3
1109	393296.0120	2318846.4280	5322.93	CROSS3	CROSS3
1110	393294.9520	2318845.2070	5322.52	CROSS3	CROSS3
1111	393294.6830	2318844.7640	5322.44	CROSS3	CROSS3
1112	393293.7580	2318843.1880	5322.48	CROSS3	CROSS3
1113	393292.6250	2318842.3080	5322.32	CROSS3	CROSS3
1114	393291.8140	2318840.9910	5322.42	CROSS3	CROSS3
1115	393289.9180	2318839.4930	5322.47	CROSS3	CROSS3
1116	393289.0810	2318838.6590	5322.62	CROSS3	CROSS3
1117	393288.5280	2318837.8390	5322.59	CROSS3	CROSS3
1118	393287.7910	2318837.1500	5322.34	CROSS3	CROSS3
1119	393287.3460	2318836.4500	5322.74	CROSS3	CROSS3
1120	393286.6420	2318835.8610	5323.11	CROSS3	CROSS3
1121	393285.9460	2318834.8390	5323.10	CROSS3	CROSS3
1122	393285.1460	2318834.0560	5323.04	CROSS3	CROSS3
1123	393284.7290	2318833.7030	5323.19	CROSS3	CROSS3
1124	393283.0180	2318832.3810	5322.43	CROSS3	CROSS3
1125	393281.9540	2318831.8480	5322.63	CROSS3	CROSS3
1126	393281.3610	2318831.5890	5322.53	CROSS3	CROSS3
1127	393280.4880	2318831.0670	5322.47	CROSS3	CROSS3
1128	393279.8840	2318830.2260	5323.14	CROSS3	CROSS3
1129	393278.6650	2318829.4370	5323.64	CROSS3	CROSS3
1130	393277.4850	2318828.3360	5323.84	CROSS3	CROSS3
1131	393273.4480	2318823.8620	5323.28	CROSS3	CROSS3
1132	393272.2590	2318822.4250	5323.18	CROSS3	CROSS3
1133	393271.4170	2318820.1500	5323.54	CROSS3	CROSS3
1134	393269.6520	2318818.1330	5323.98	CROSS3	CROSS3
1135	393268.3330	2318815.5700	5324.37	CROSS3	CROSS3
1136	393266.2560	2318811.9030	5324.41	CROSS3	CROSS3
1137	393266.0700	2318809.9310	5324.98	CROSS3	CROSS3
1138	393264.5590	2318805.5970	5324.88	CROSS3	CROSS3
1139	393263.2520	2318801.5320	5325.05	CROSS3	CROSS3

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CROSS-SECTION 4

Number	Northing	Easting	Elevation	Raw Desc	Full Desc
1140	392964.4610	2318810.3780	5317.71	CROSS4	CROSS4
1141	392962.3780	2318813.4770	5317.20	CROSS4	CROSS4
1142	392960.7770	2318815.8900	5316.97	CROSS4	CROSS4
1143	392958.2680	2318820.0470	5316.91	CROSS4	CROSS4
1144	392957.0770	2318821.8240	5316.61	CROSS4	CROSS4
1145	392956.0270	2318823.4750	5316.27	CROSS4	CROSS4
1146	392955.2370	2318824.6610	5315.75	CROSS4	CROSS4
1147	392954.6800	2318825.4210	5314.22	CROSS4	CROSS4
1148	392953.9450	2318826.1730	5314.11	CROSS4	CROSS4
1149	392953.2530	2318826.7810	5311.52	CROSS4	CROSS4
1150	392953.1080	2318827.3430	5311.19	CROSS4	CROSS4
1151	392952.2410	2318828.5390	5311.26	CROSS4	CROSS4
1152	392951.4690	2318829.4050	5311.22	CROSS4	CROSS4
1153	392950.9540	2318829.8610	5311.19	CROSS4	CROSS4
1154	392949.9560	2318831.6390	5310.25	CROSS4	CROSS4
1155	392949.7000	2318832.1390	5310.40	CROSS4	CROSS4
1156	392949.1610	2318833.2860	5310.79	CROSS4	CROSS4
1157	392948.5780	2318834.5910	5310.71	CROSS4	CROSS4
1158	392948.1660	2318835.4130	5310.95	CROSS4	CROSS4
1159	392947.7950	2318836.1700	5313.69	CROSS4	CROSS4
1160	392947.4660	2318836.7460	5314.68	CROSS4	CROSS4
1161	392946.7950	2318837.5720	5315.20	CROSS4	CROSS4
1162	392945.1380	2318839.9400	5315.94	CROSS4	CROSS4
1163	392942.9740	2318842.3500	5316.73	CROSS4	CROSS4
1164	392941.1030	2318844.9550	5317.28	CROSS4	CROSS4
1165	392938.6200	2318849.1100	5317.11	CROSS4	CROSS4
1166	392938.3180	2318850.0790	5317.62	CROSS4	CROSS4
1167	392937.4280	2318852.0420	5318.74	CROSS4	CROSS4
1168	392936.2540	2318854.6440	5318.86	CROSS4	CROSS4
1169	392935.5790	2318856.8650	5318.42	CROSS4	CROSS4
1170	392935.0280	2318858.3150	5318.00	CROSS4	CROSS4
1171	392934.9810	2318859.2290	5318.00	CROSS4	CROSS4
1172	392933.9490	2318862.2320	5316.53	CROSS4	CROSS4
1173	392933.9090	2318862.2360	5316.80	CROSS4	CROSS4
1174	392933.3500	2318865.3550	5315.58	CROSS4	CROSS4
1175	392932.7360	2318868.6070	5315.22	CROSS4	CROSS4
1176	392932.6240	2318869.1000	5315.43	CROSS4	CROSS4
1177	392932.2520	2318870.9480	5316.59	CROSS4	CROSS4
1178	392930.1600	2318876.0780	5318.69	CROSS4	CROSS4

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CROSS-SECTION 5

Number	Northing	Easting	Elevation	Raw Desc	Full Desc
1332	389801.6240	2318995.2770	5238.92	CLGRASSY	CLGRASSY
1333	389804.2980	2318969.1070	5244.39	CROSS5	CROSS5
1334	389802.0370	2318971.9160	5244.03	CROSS5	CROSS5
1335	389799.5680	2318974.7690	5243.28	CROSS5	CROSS5
1336	389798.0300	2318976.9190	5241.87	CROSS5	CROSS5
1337	389796.7530	2318978.6890	5241.15	CROSS5	CROSS5
1338	389794.9630	2318980.7640	5240.20	CROSS5	CROSS5
1339	389794.4800	2318981.8340	5240.37	CROSS5	CROSS5
1340	389793.1940	2318983.4660	5239.42	CROSS5	CROSS5
1341	389791.8520	2318986.1290	5238.98	CROSS5	CROSS5
1342	389790.1170	2318989.0880	5238.88	CROSS5	CROSS5
1343	389788.6590	2318990.9630	5238.75	CROSS5	CROSS5
1344	389786.9230	2318993.3760	5240.92	CROSS5	CROSS5
1345	389785.8540	2318994.9120	5241.39	CROSS5	CROSS5
1346	389784.7280	2318996.7810	5242.05	CROSS5	CROSS5
1347	389783.2460	2318999.4690	5242.82	CROSS5	CROSS5
1348	389780.9710	2319004.7340	5243.13	CROSS5	CROSS5

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ATTACHMENT #3

NRCS PRELIMINARY SOILS MAP

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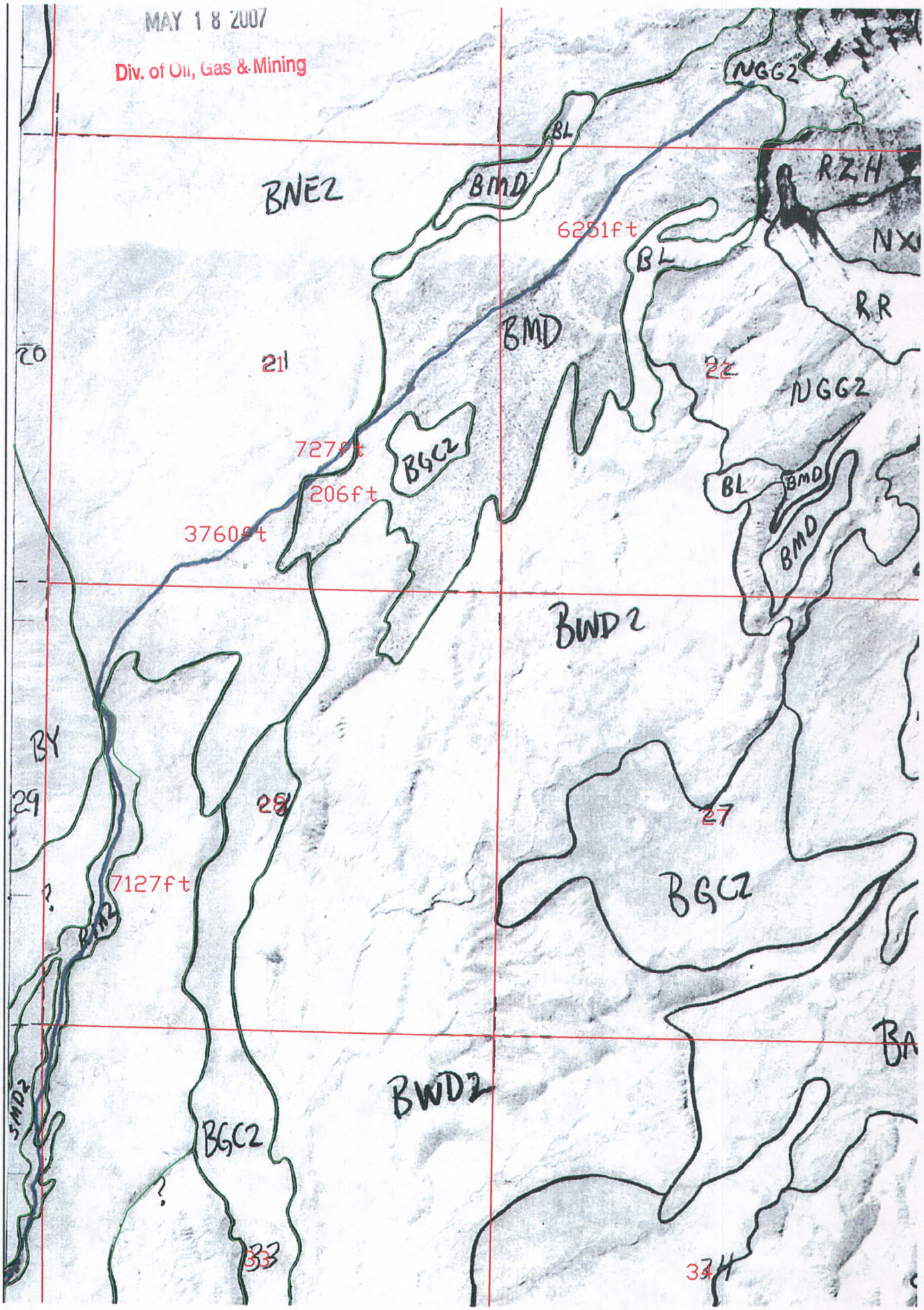

ATTACHMENT #4

CHANNEL STAGE CALCULATIONS

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Channel Report

Hydraflow Express by Intelisolve

Friday, Jan 12 2007

Lila Canyon Below Mine

User-defined

Invert Elev (ft)	= 15.65
Slope (%)	= 0.01
N-Value	= Composite

Calculations

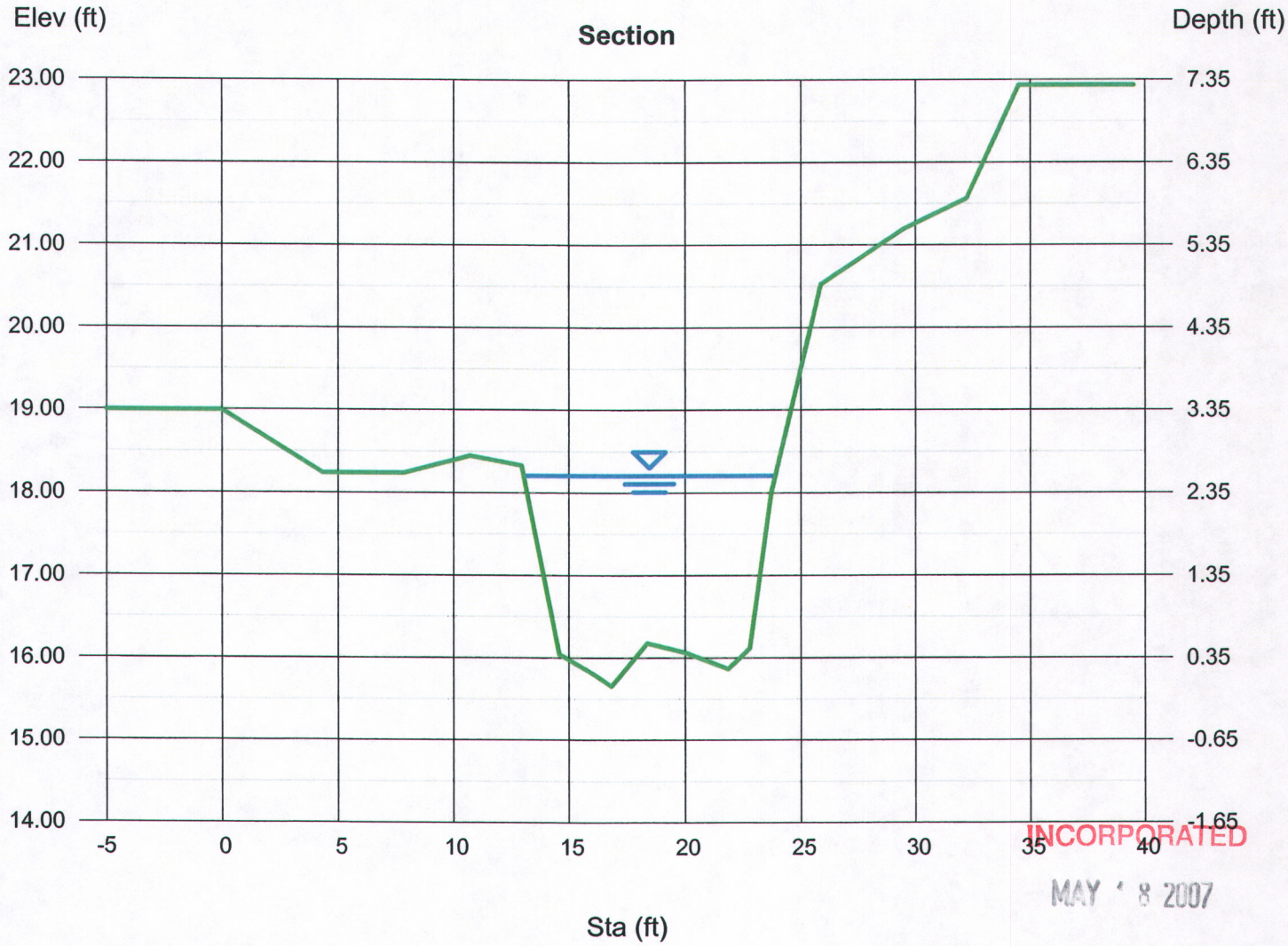
Compute by:	Q vs Depth
No. Increments	= 40

Highlighted

Depth (ft)	= 2.55
Q (cfs)	= 12.23
Area (sqft)	= 21.18
Velocity (ft/s)	= 0.58
Wetted Perim (ft)	= 13.40
Crit Depth, Yc (ft)	= 0.68
Top Width (ft)	= 10.85
EGL (ft)	= 2.55

(Sta, El, n)-(Sta, El, n)...

(0.00, 18.99)-(4.34, 18.23, 0.035)-(7.83, 18.23, 0.035)-(10.70, 18.44, 0.035)-(12.96, 18.32, 0.035)-(14.59, 16.04, 0.035)-(16.00, 15.81, 0.035)-(16.86, 15.65, 0.035)-(18.40, 16.17, 0.035)-(20.01, 16.06, 0.035)-(21.86, 15.86, 0.035)-(22.80, 16.11, 0.035)-(23.75, 18.02, 0.035)-(25.87, 20.52, 0.035)-(29.49, 21.19, 0.035)-(32.23, 21.56, 0.035)-(34.50, 22.93, 0.035)



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Depth	Q	Area	Veloc	Wp	Yc	TopWidth	Energy
(ft)	(cfs)	(sqft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
0.18	0.012	0.138	0.08	1.58	0.01	1.53	0.18
0.36	0.081	0.722	0.11	5.31	0.06	5.19	0.36
0.55	0.320	1.999	0.16	8.66	0.12	8.36	0.55
0.73	0.803	3.542	0.23	9.09	0.21	8.58	0.73
0.91	1.442	5.124	0.28	9.52	0.30	8.81	0.91
1.09	2.215	6.747	0.33	9.94	0.36	9.03	1.09
1.27	3.110	8.410	0.37	10.37	0.41	9.25	1.28
1.46	4.116	10.11	0.41	10.80	0.46	9.47	1.46
1.64	5.229	11.86	0.44	11.23	0.50	9.69	1.64
1.82	6.443	13.64	0.47	11.65	0.54	9.91	1.82
2.00	7.753	15.46	0.50	12.08	0.58	10.13	2.01
2.18	9.158	17.33	0.53	12.51	0.61	10.35	2.19
2.37	10.65	19.23	0.55	12.93	0.65	10.57	2.37
2.55	12.23	21.18	0.58	13.40	0.68	10.85	2.55
2.73	11.01	23.95	0.46	21.33	0.72	18.62	2.73
2.91	12.80	27.75	0.46	24.58	0.69	21.77	2.92
3.09	15.53	31.82	0.49	25.87	0.73	22.96	3.10
3.28	18.56	36.11	0.51	27.17	0.79	24.15	3.28
3.46	22.22	40.57	0.55	27.78	0.85	24.67	3.46
3.64	26.33	45.08	0.58	28.01	0.92	24.83	3.65
3.82	30.71	49.61	0.62	28.25	0.99	24.98	3.83
4.00	35.36	54.17	0.65	28.49	1.06	25.14	4.01
4.19	40.27	58.76	0.69	28.73	1.13	25.29	4.19
4.37	45.43	63.37	0.72	28.97	1.21	25.44	4.38
4.55	50.84	68.02	0.75	29.21	1.28	25.60	4.56
4.73	56.49	72.69	0.78	29.45	1.35	25.75	4.74
4.91	62.12	77.40	0.80	29.87	1.43	26.11	4.92
5.10	67.24	82.24	0.82	30.87	1.50	27.09	5.11
5.28	72.65	87.26	0.83	31.87	1.56	28.07	5.29
5.46	78.38	92.46	0.85	32.87	1.62	29.06	5.47
5.64	84.10	97.85	0.86	34.07	1.69	30.25	5.65
5.82	89.94	103.5	0.87	35.43	1.75	31.59	5.84

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Depth	Q	Area	Veloc	Wp	Yc	TopWidth	Energy
(ft)	(cfs)	(sqft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
6.01	97.06	109.3	0.89	36.26	1.82	32.39	6.02
6.19	105.3	115.2	0.91	36.61	1.89	32.69	6.20
6.37	113.8	121.2	0.94	36.96	1.98	32.99	6.38
6.55	122.7	127.3	0.96	37.32	2.06	33.29	6.57
6.73	131.8	133.3	0.99	37.67	2.15	33.60	6.75
6.92	141.2	139.5	1.01	38.02	2.23	33.90	6.93
7.10	150.8	145.7	1.04	38.37	2.32	34.20	7.11
7.28	160.8	151.9	1.06	38.72	2.40	34.50	7.30

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