VELOCITY OBSERVATIONS OF THE CHATTAHOOCHEE RIVER AT ATLANTA, GEORGIA, SEPTEMBER 28, 1981

U.S. GEOLOGICAL SURVEY OPEN-FILE REPORT 82-76

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By T. W. Hale

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Doraville, Georgia

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U.S. DEPARTMENT OF THE INTERIOR

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Velocity data were collected at selected cross sections on the Chattahoochee River at, and downstream from, Georgia Highway 280 at Atlanta, on September 28, 1981. Stream channel cross-section and velocity data were measured during daylight hours at 11 cross sections. The locations of the cross sections are shown in figure 1. Cross section A is located at the Georgia Highway 280 gaging station, and cross section K is about 1.2 miles downstream (approximately 900 feet downstream from I-285). For all cross sections, velocity observations were obtained at 12 to 19 verticals, generally at 0.2, 0.6, and 0.8 of the river's depth at each vertical. Width, depth, and velocity data for each cross section are shown in figures 2-57.

A record of gage height and discharge from 0800 to 1900 hours, September 28, 1981, at the gaging station at Georgia Highway 280 is shown in table 1. The water level as read at the Georgia Highway 280 gage receded from 5.5 to 4.5 feet, and the discharge decreased from 1,800 to 1,260 cubic feet per second. Maximum velocities in the cross sections ranged from about 1.9 to 3.3 feet per second. The maximum depths in the cross sections ranged from 5.8 to 9.9 feet. The stream width varied from a maximum of 225 feet at cross section E to a minimum of 163 feet at cross section K.

At most cross sections, the surface flow lines appeared to be parallel to the channel except at cross sections A and E. At cross section A, at the upstream side of Georgia Highway 280 bridge, some flow lines were not parallel to the channel due to bridge piers immediately downstream. However, at the downstream side of the bridge, the flow lines appeared to be parallel to the channel except directly behind the piers, where the flow was turbulent. The flow lines along the left bank at cross section C reversed occasionally. Negative (upstream) flow was observed at cross section E, about 50 feet downstream from the railroad bridge. These anomolies were caused by piers in the channel, just upstream from the measuring section. The flow anomolies for sections A and E are shown in figures 58-61. The effect, if any, that construction work taking place during recent months on the banks of the Chattahoochee River at I-285 may have had on flow patterns in that reach, is unknown.

The cross-section and velocity data were obtained by use of standard procedures as described by Buchanan and Sommers (1969). The data were obtained by measurements from a bridge at section A and measurements from a boat at all other sections. Price type AA current meters were used to obtain the velocity observations. Horizontal distances were measured from the left bank or the left edge of water, looking downstream, using taglines of galvanized steel aircraft cable that have beads soldered at measured intervals to indicate distances. The taglines were also used to stabilize the boats when velocity measurements were obtained. Depths were obtained by use of 30-pound lead sounding weights suspended from a cable that is attached to a sounding reel composed of a drum for winding cable, a crank, and a depth indicator.

Figure 1.—Location of width, depth, and velocity observations of Chattahoochee River at Atlanta, September 28, 1981.

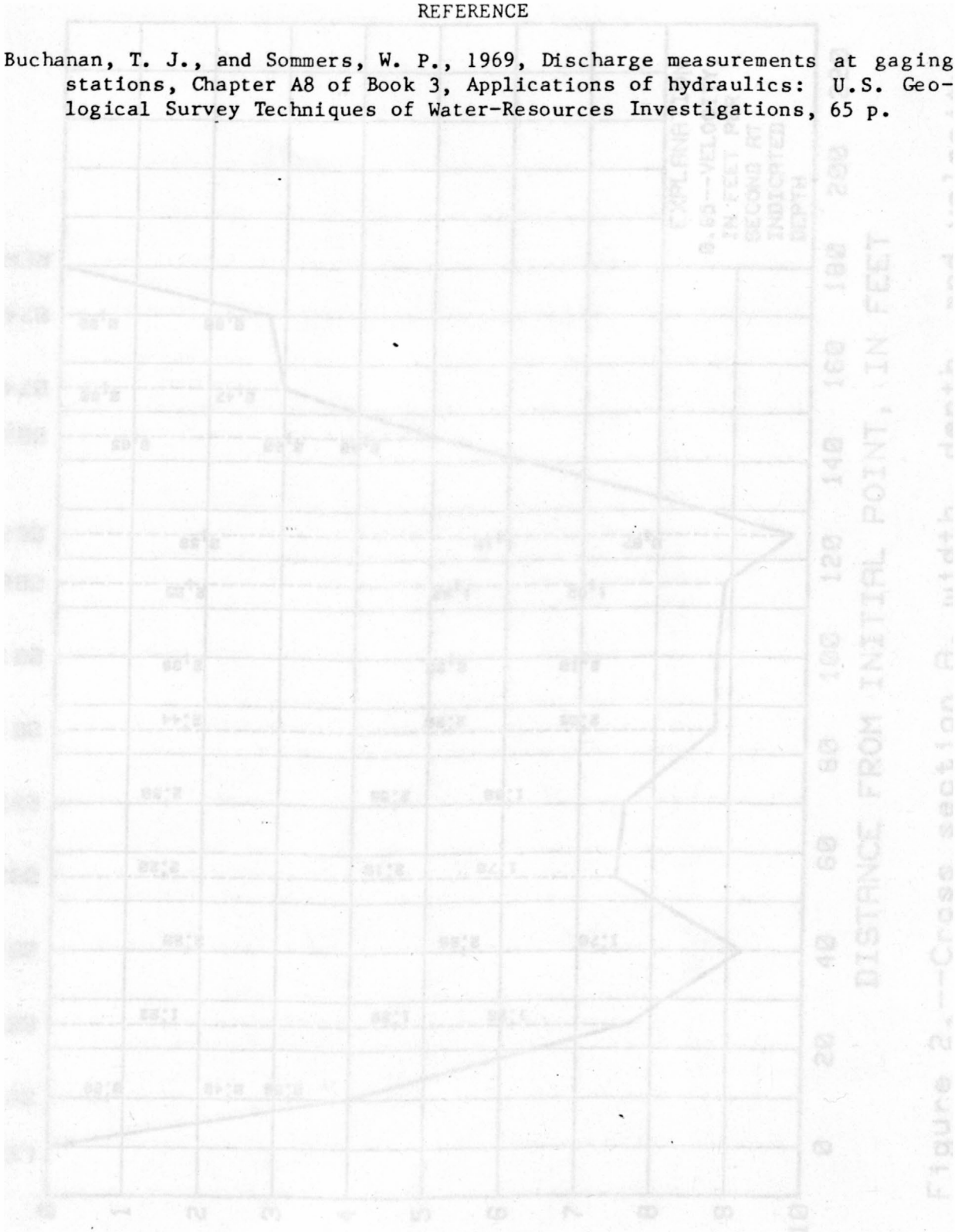
Table 1.--Gage height and discharge, at indicated time, September 28, 1981, at Georgia Highway 280, Atlanta

Eastern daylight time	Gage height, in feet above datum (Datum, 736.35 ft, NGVD)[1/]	Discharge (cubic feet per second)
0800	5.52	1,800
0900	5.50	1,790
1000	5.34	1,700
1100	5.21	1,620
1200	5.13	1,580
1300	5.03	1,520
1400	4.92	1,460
1500	4.77	1,390
1600	4.70	1,350
1700	4.65	1,320
1800	4.60	1,300
1900	4.53	1,260

1/ National Geodetic Vertical Datum of 1929.

REFERENCE

Buchanan, T. J., and Sommers, W. P., 1969, Discharge measurements at gaging stations, Chapter A8 of Book 3, Applications of hydraulics: U.S. Geological Survey Techniques of Water-Resources Investigations, 65 p.



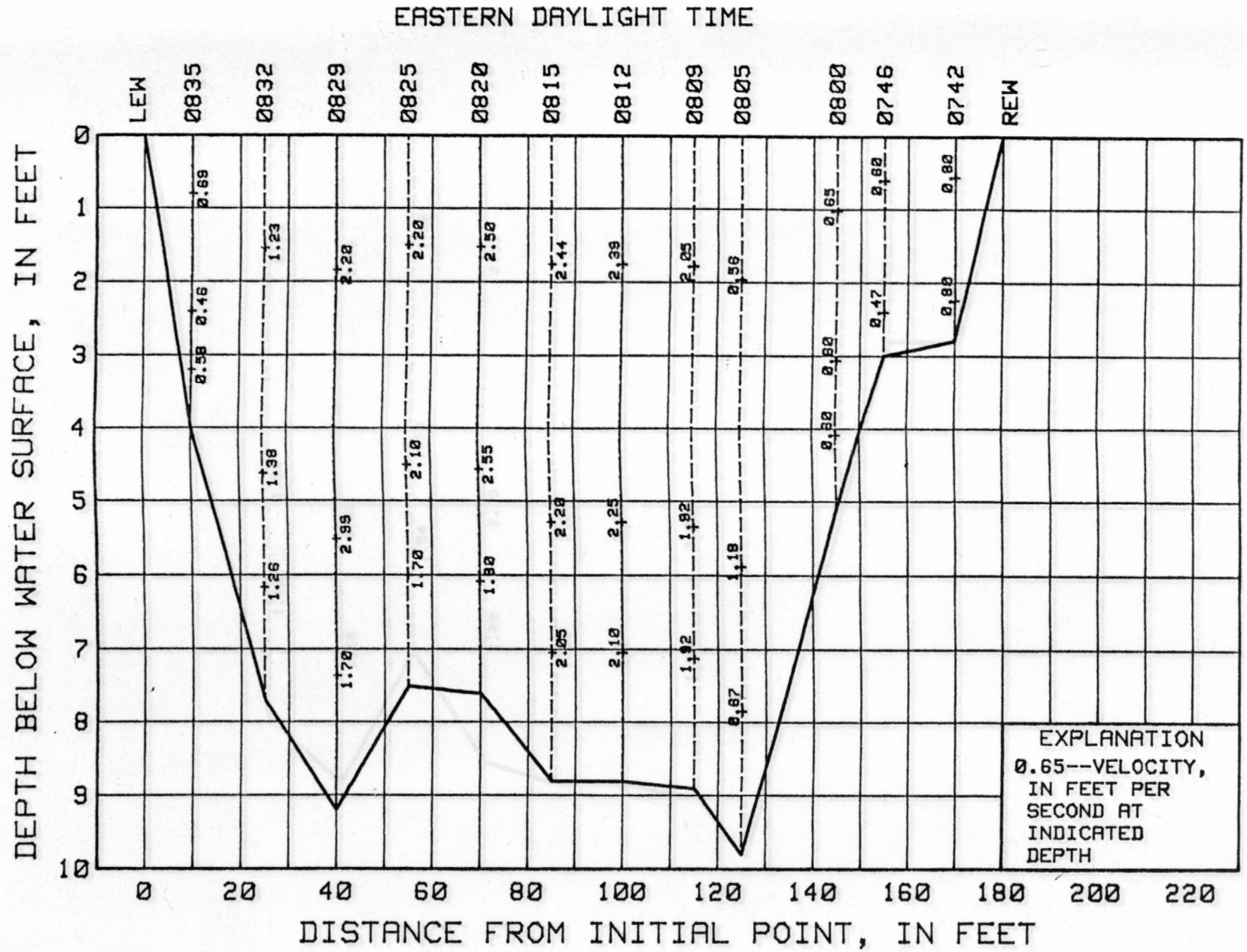


Figure 2.--Cross section A, width, depth, and velocity measurement 1, September 28, 1981.

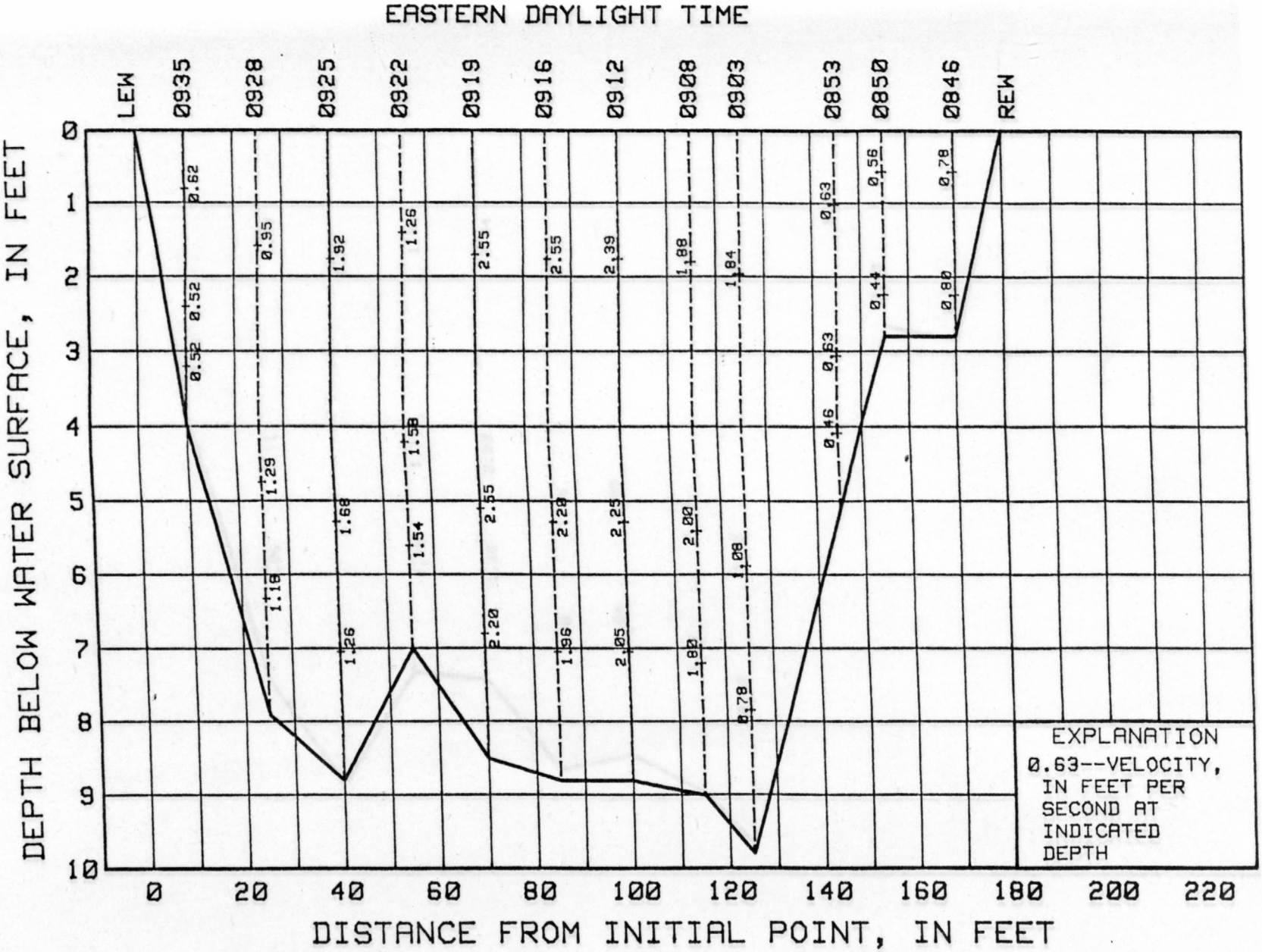
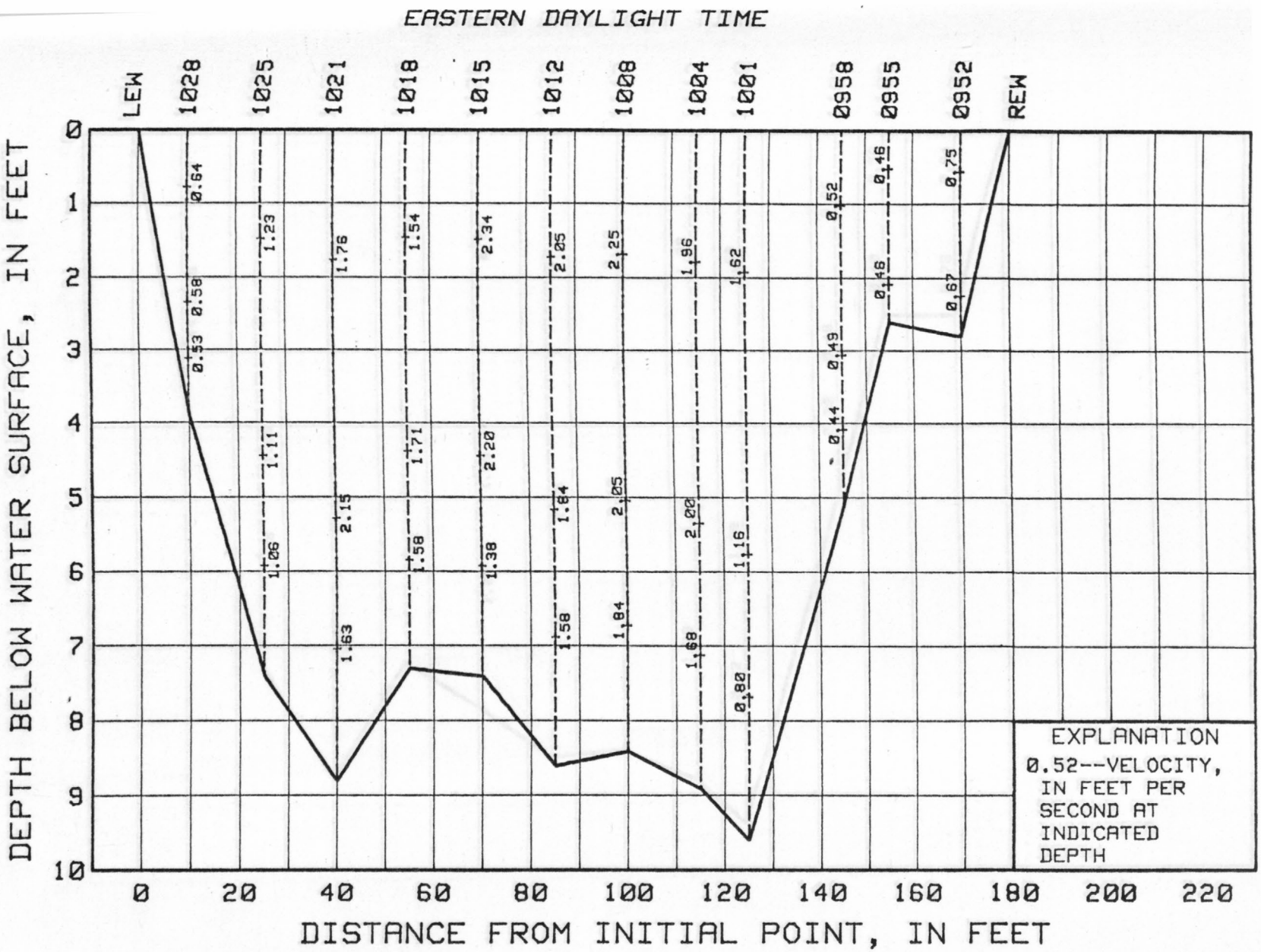


Figure 3.--Cross section A, width, depth, and velocity measurement 2, September 28, 1981.



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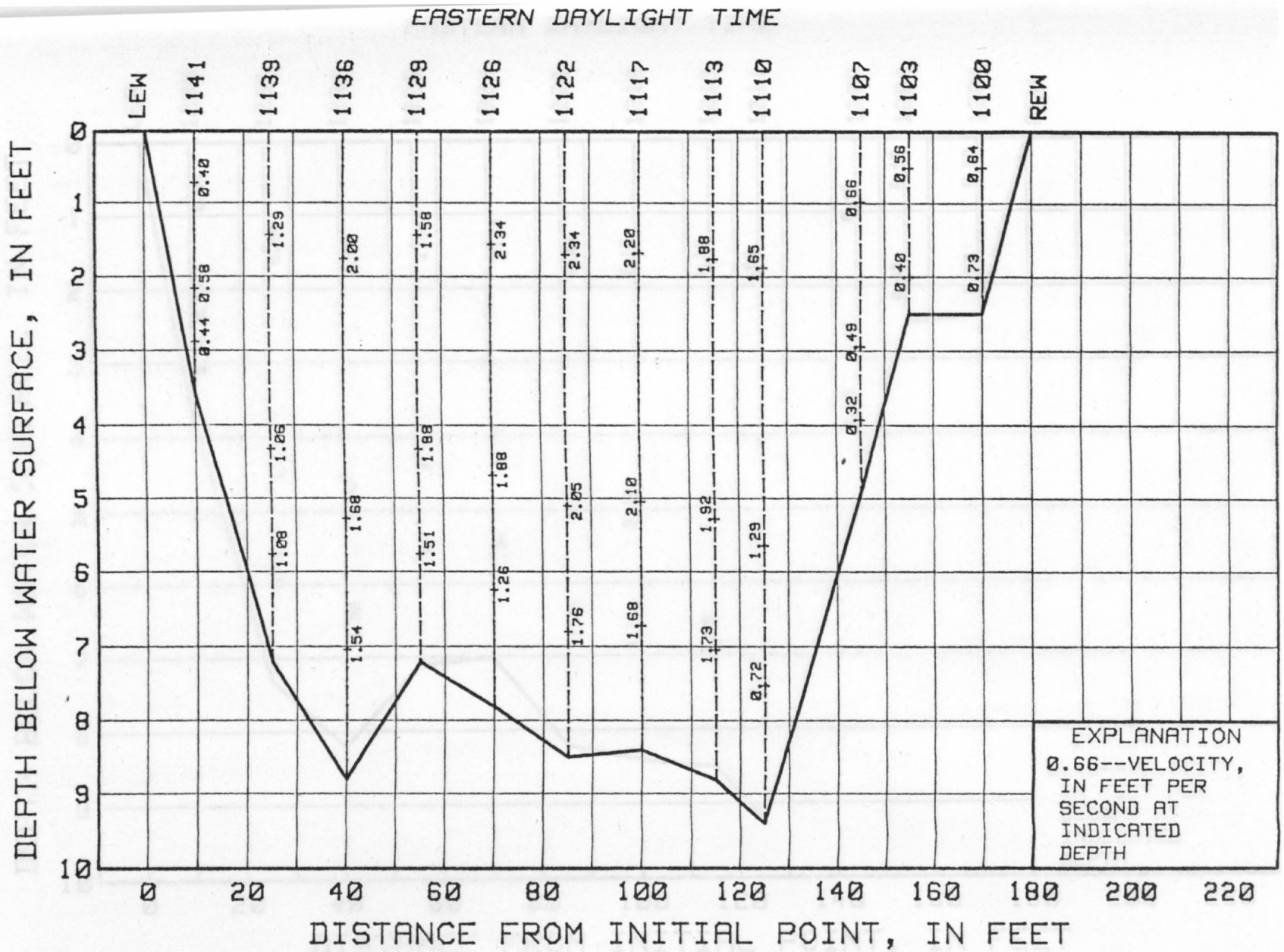

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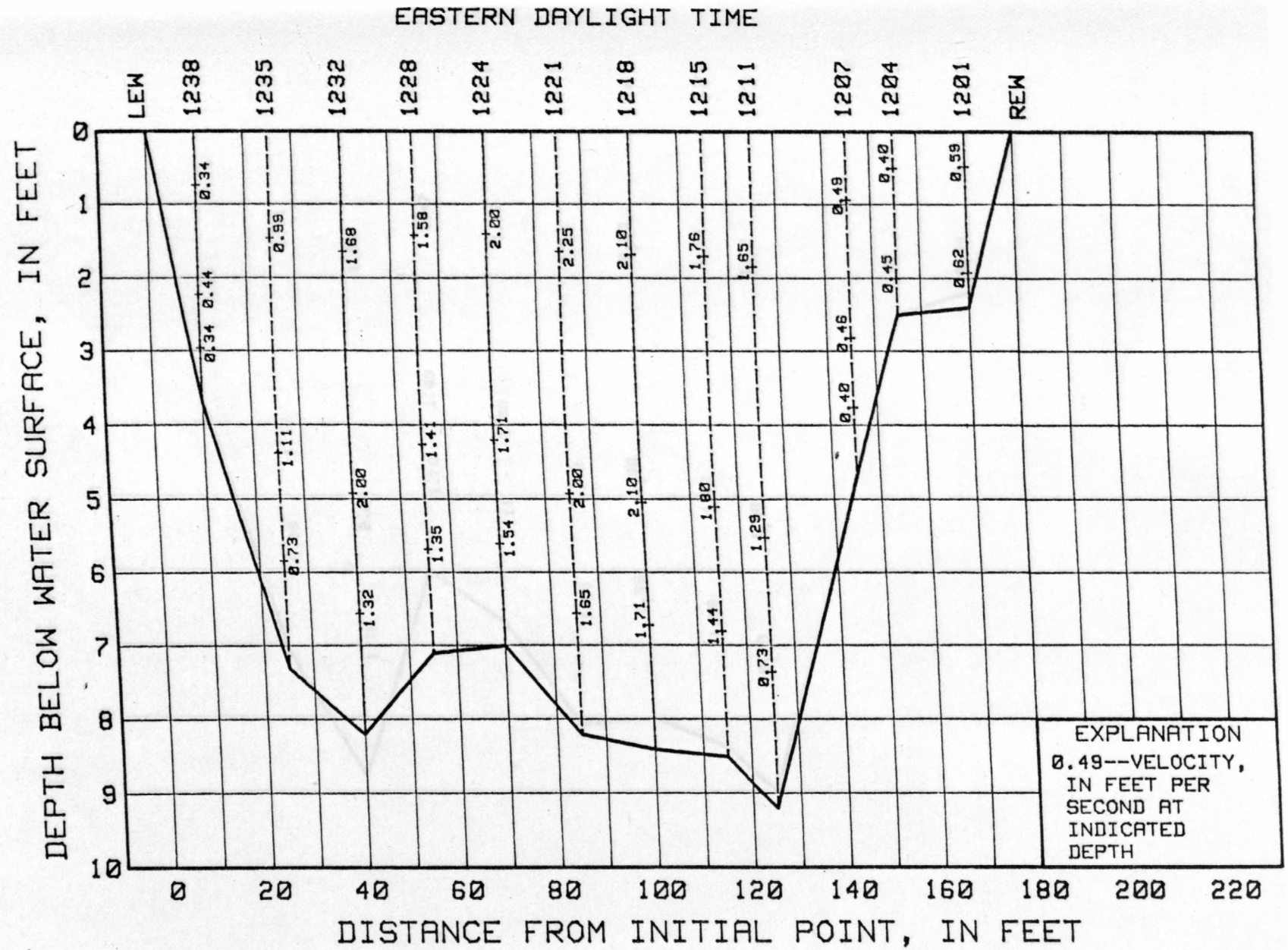

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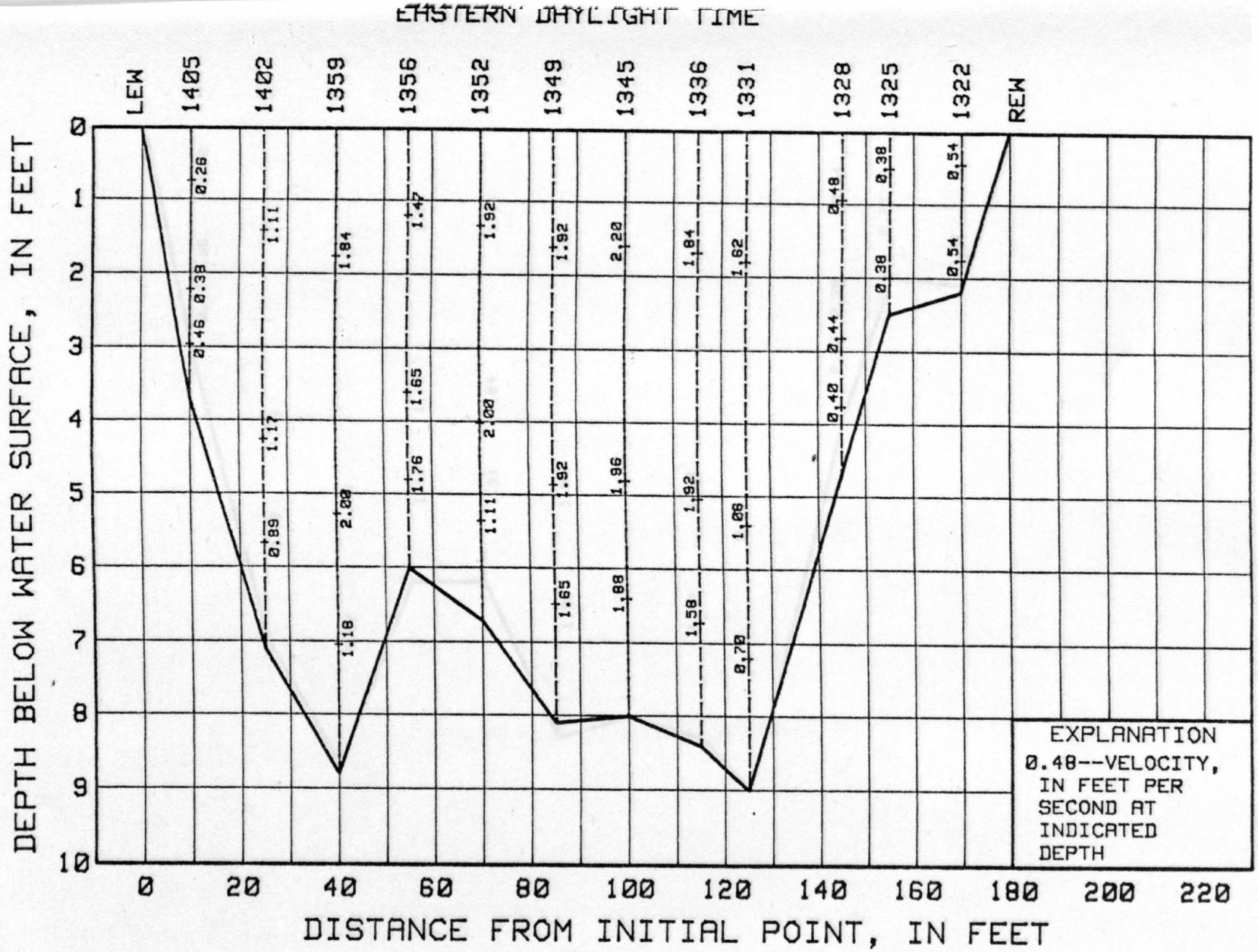

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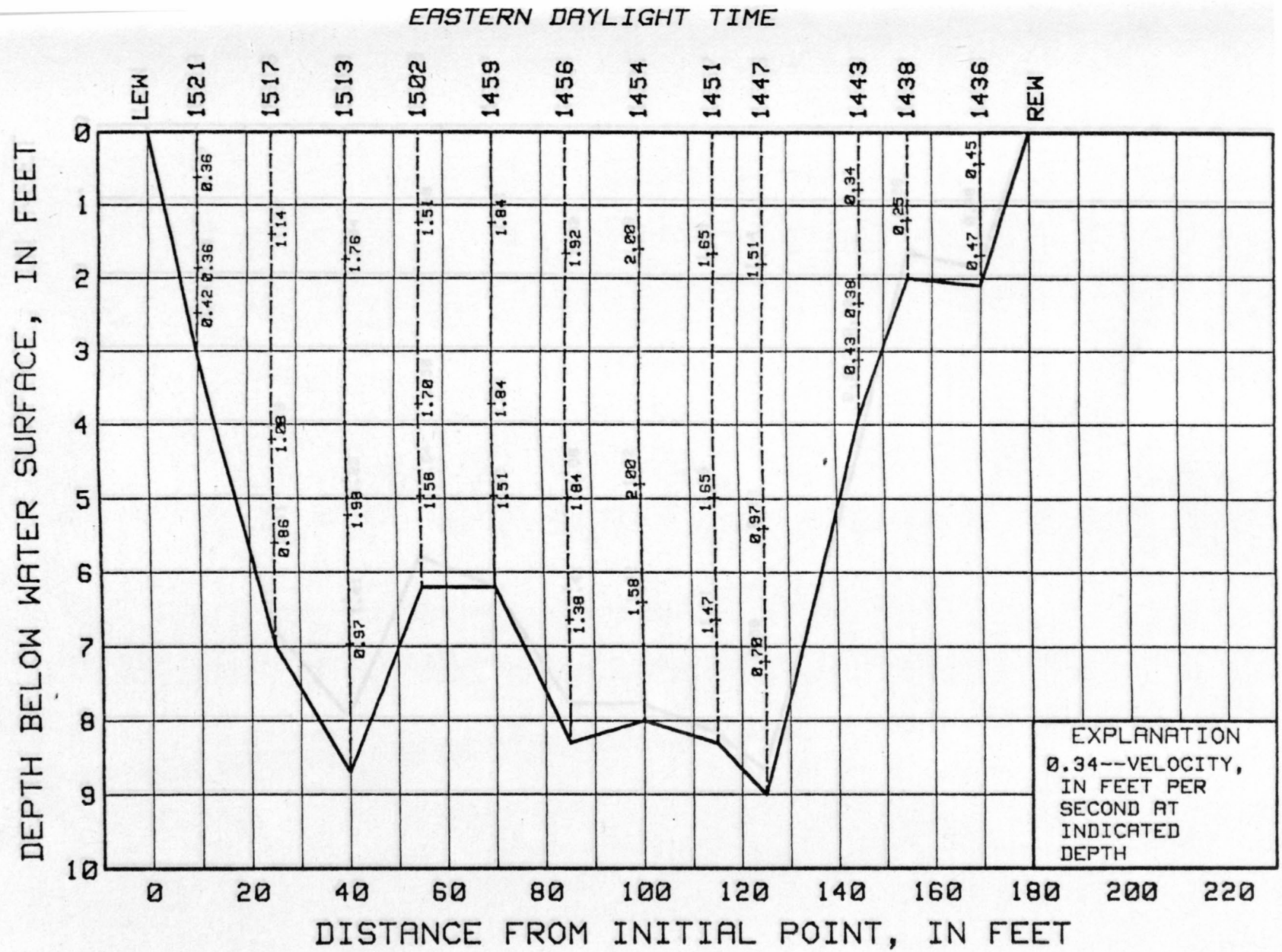

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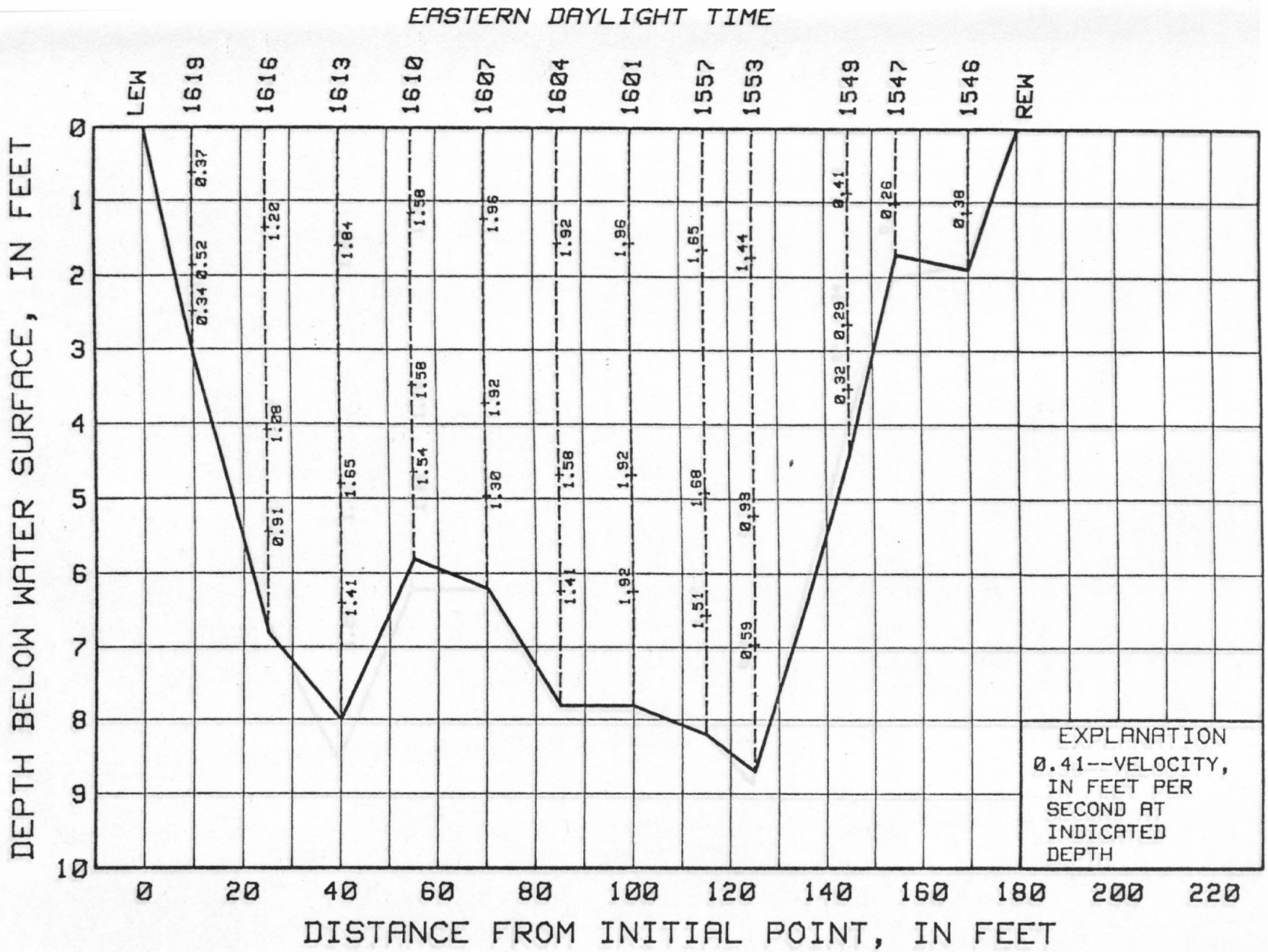

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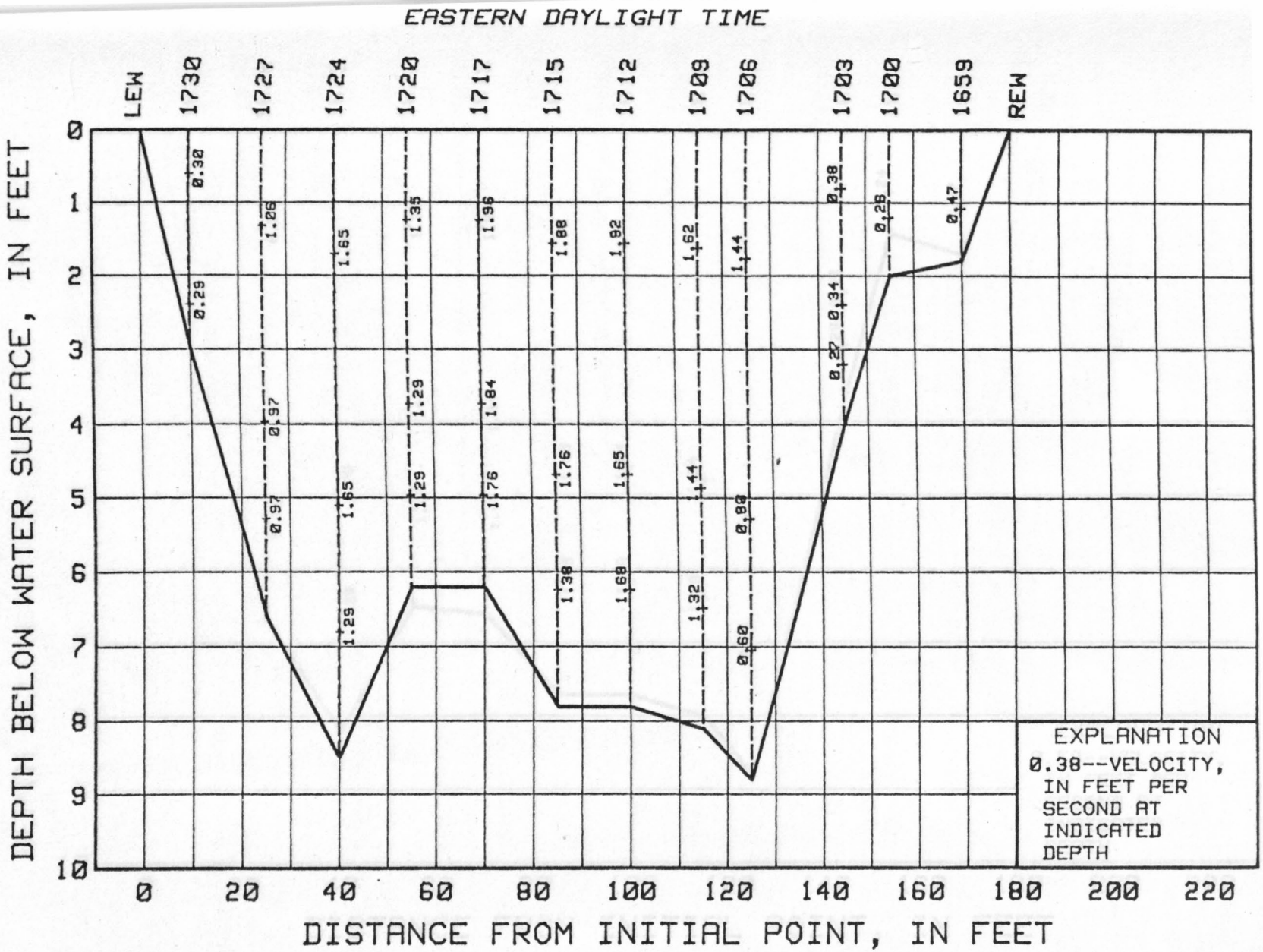

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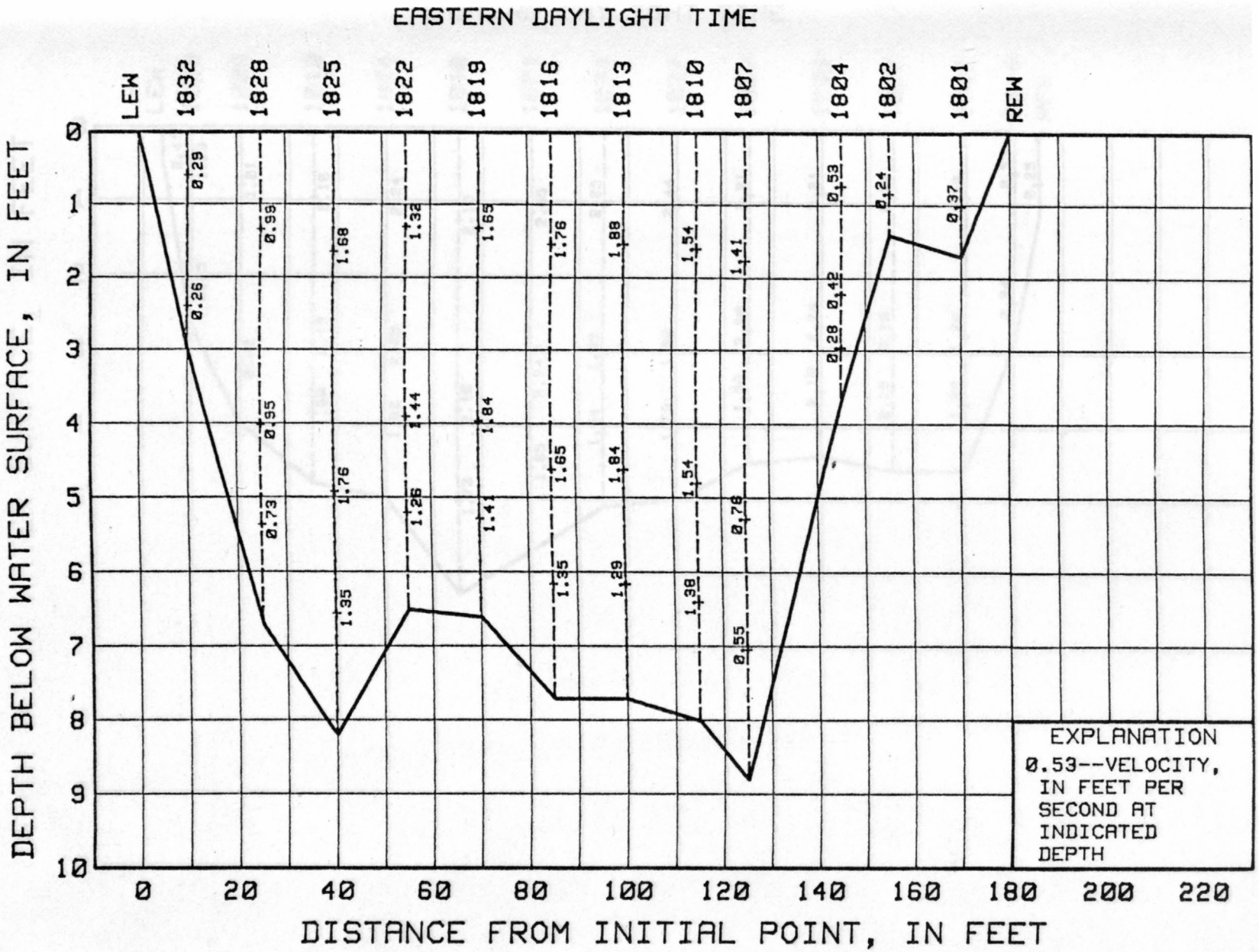

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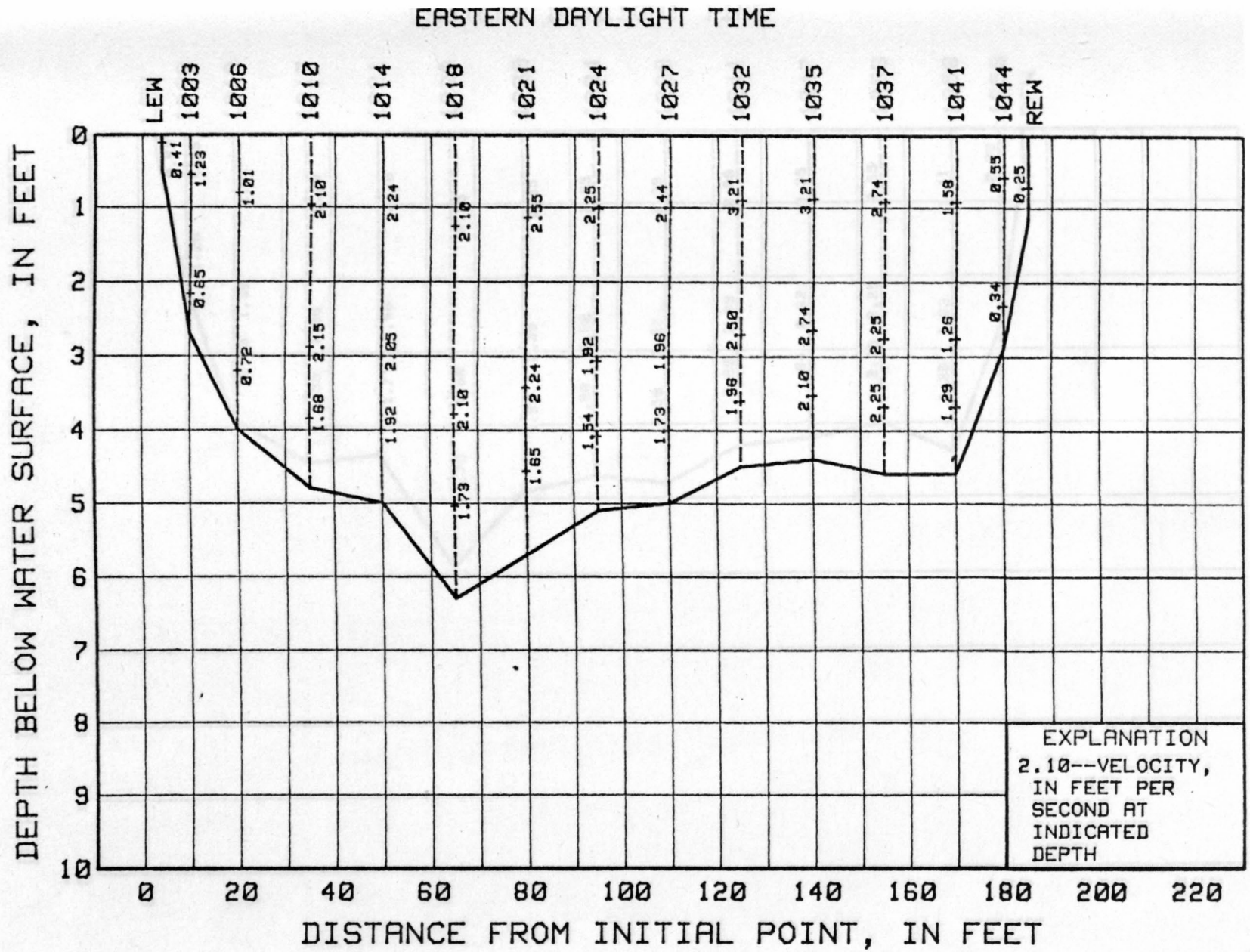

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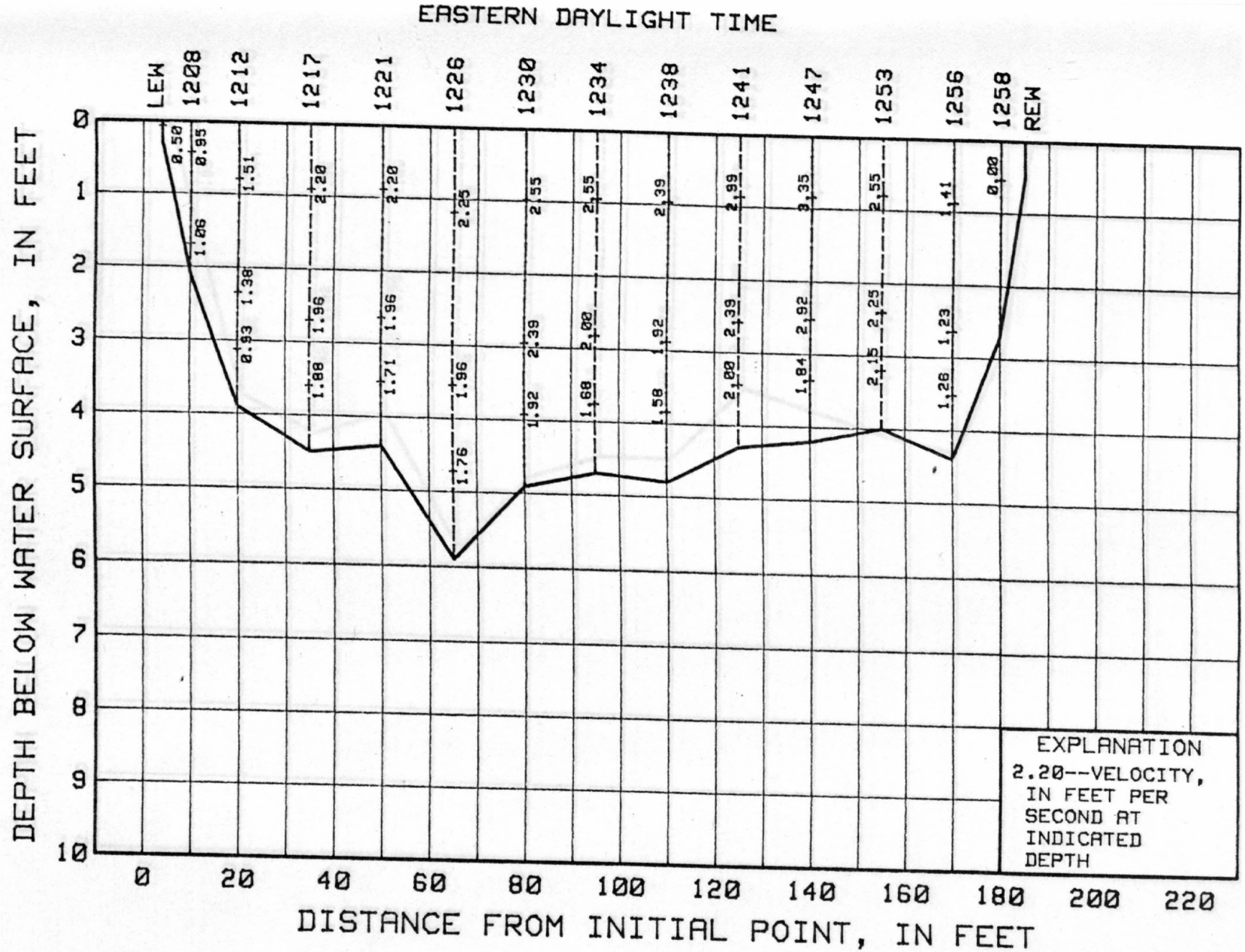

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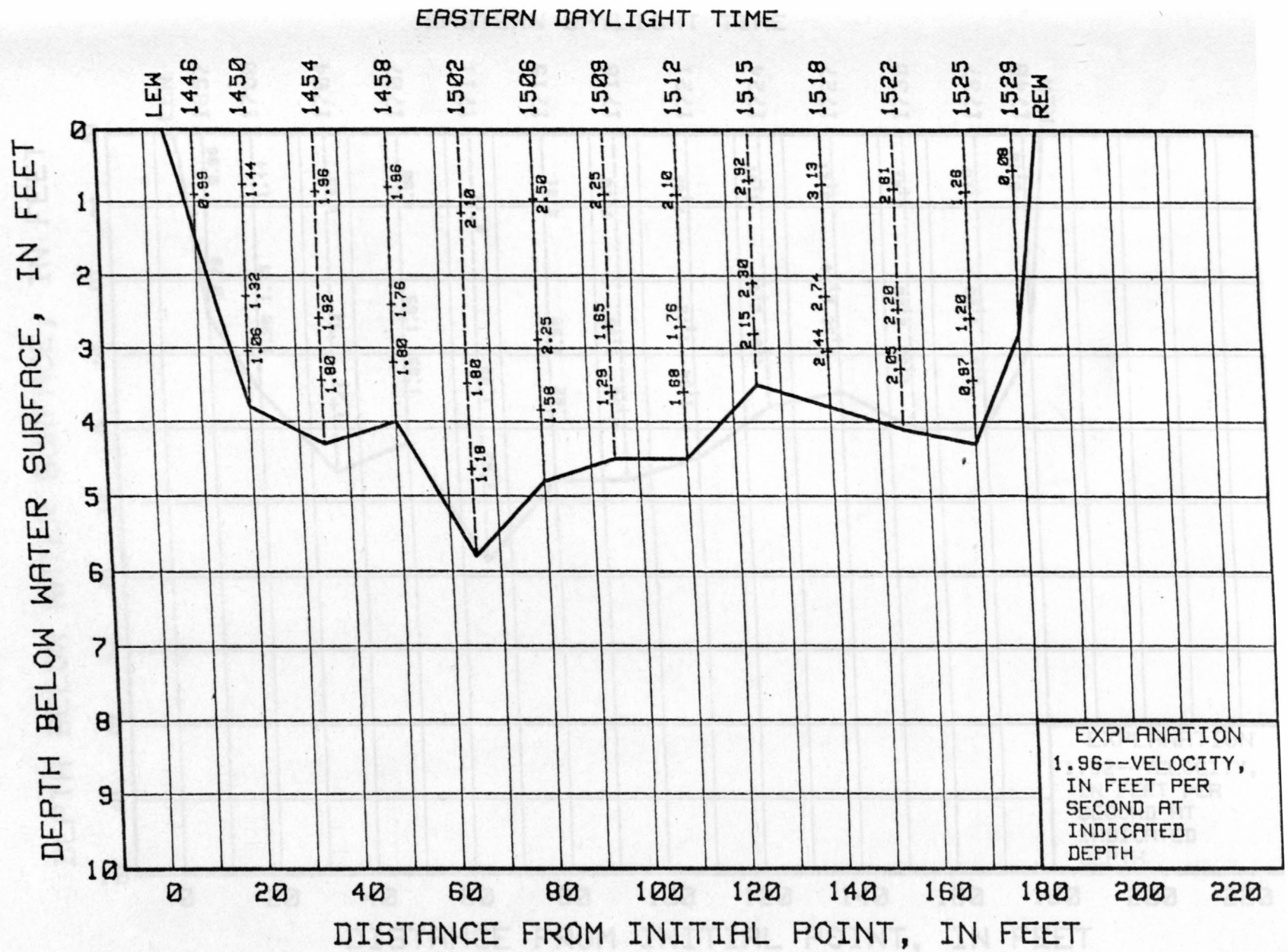

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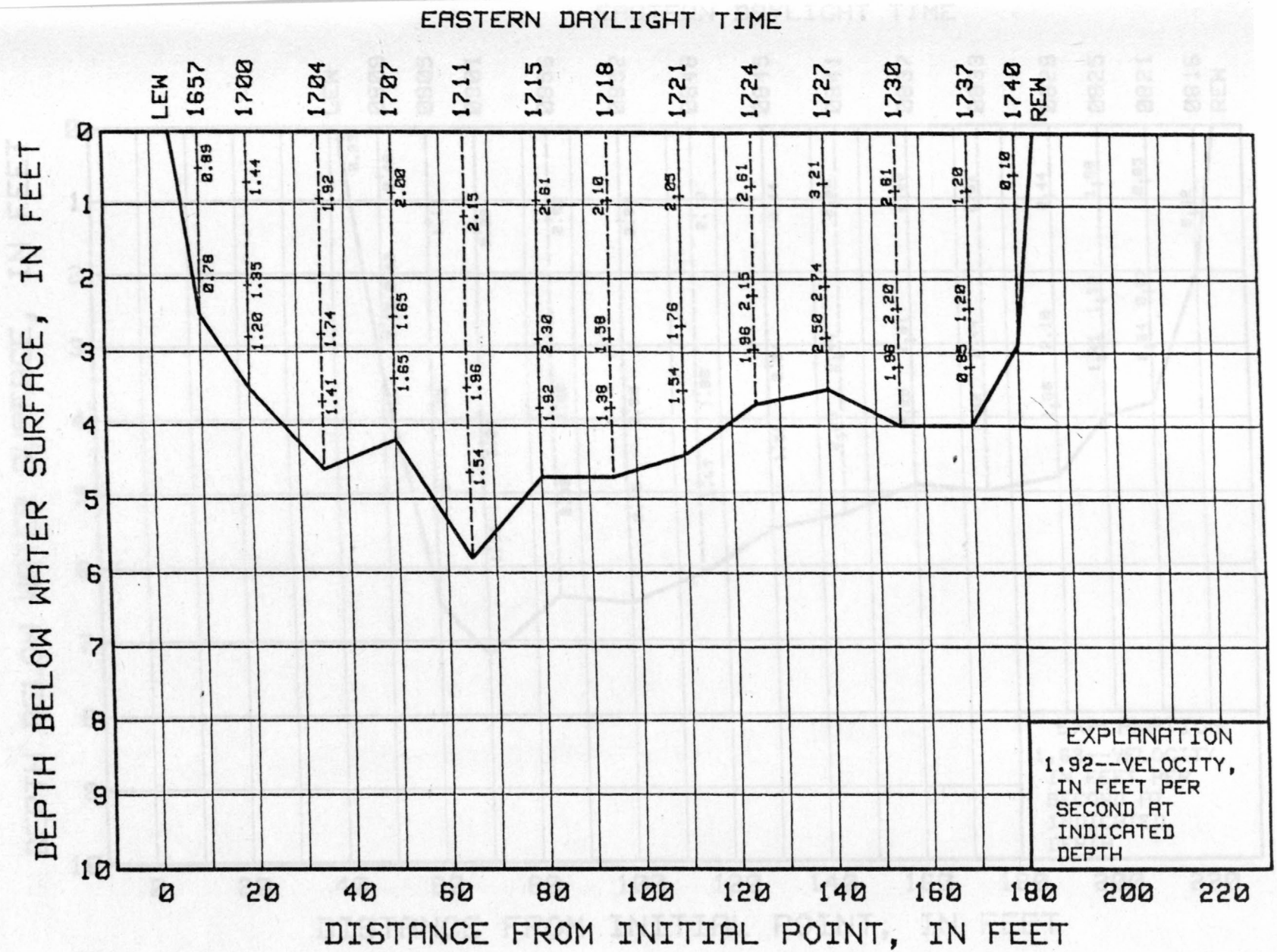

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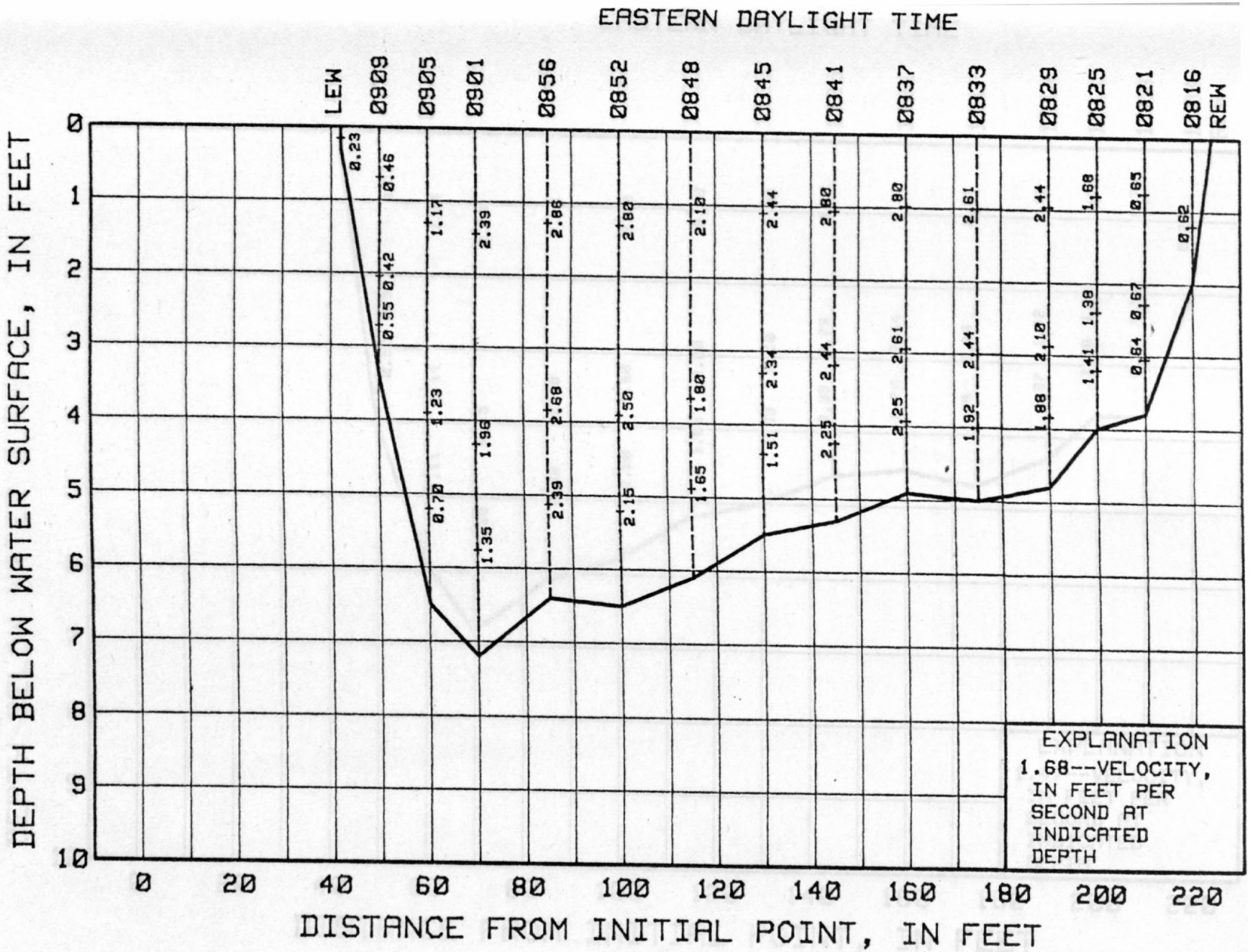
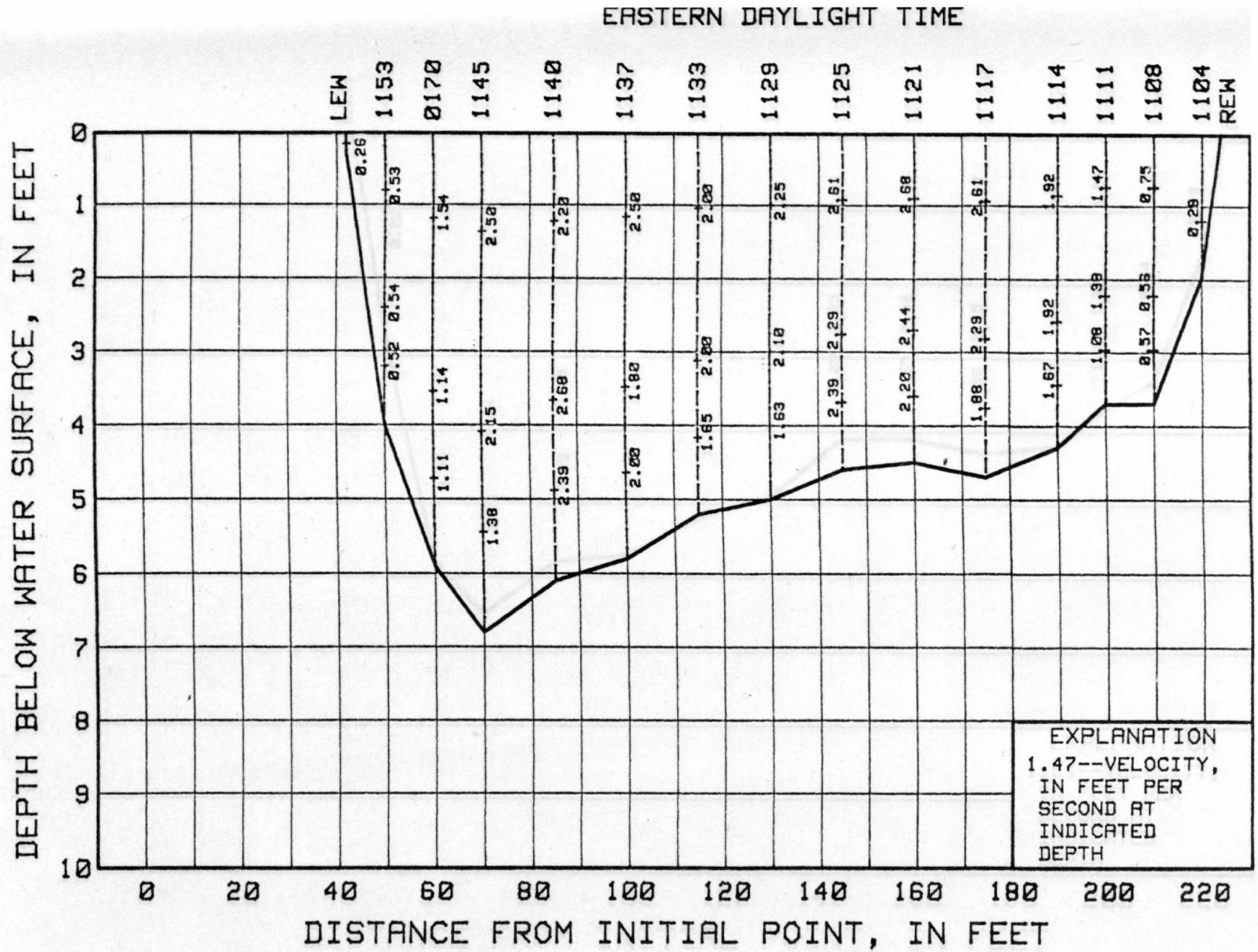


Figure 16.--Cross section C, width, depth, and velocity measurement 1, September 28, 1981.



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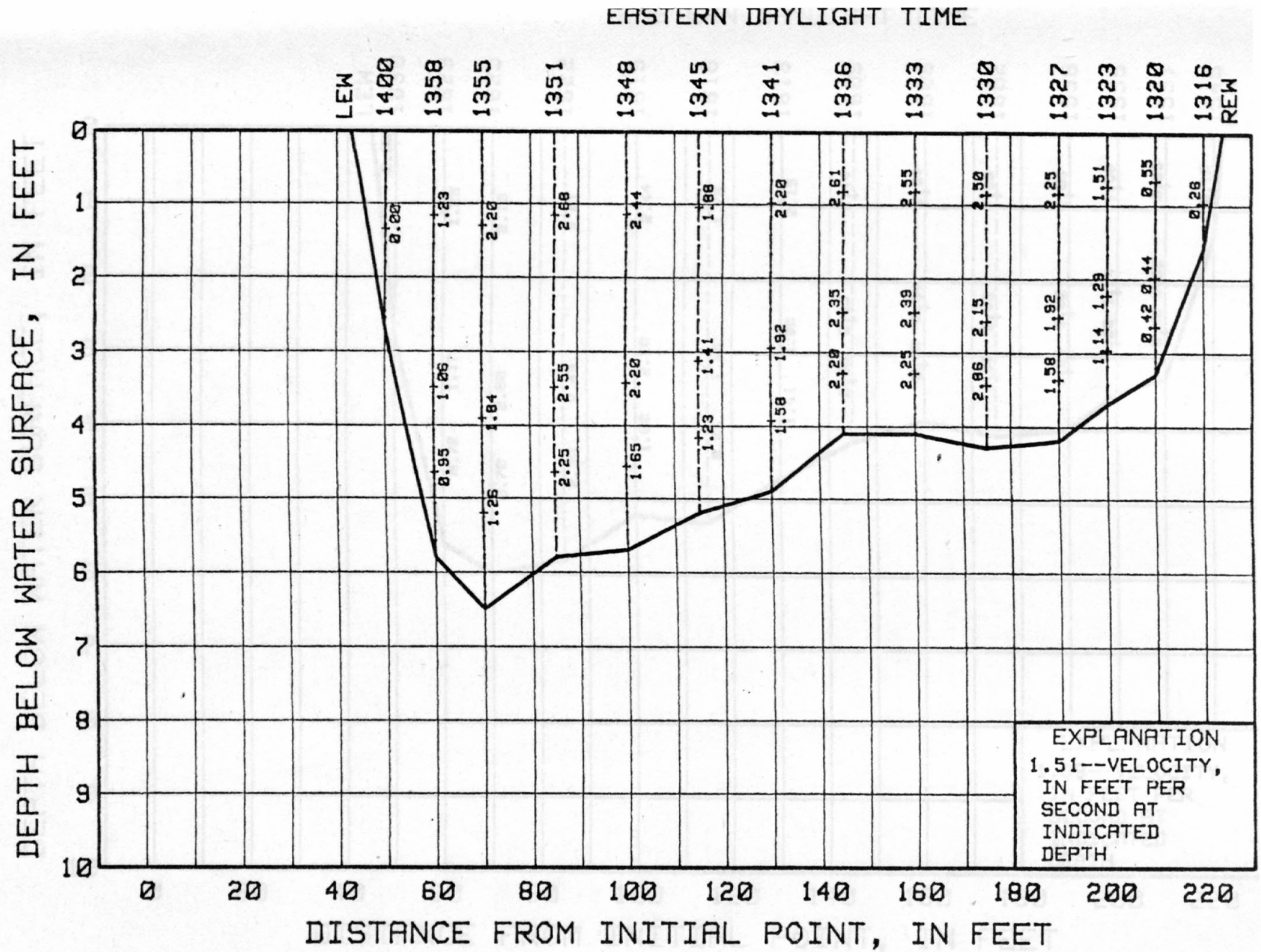

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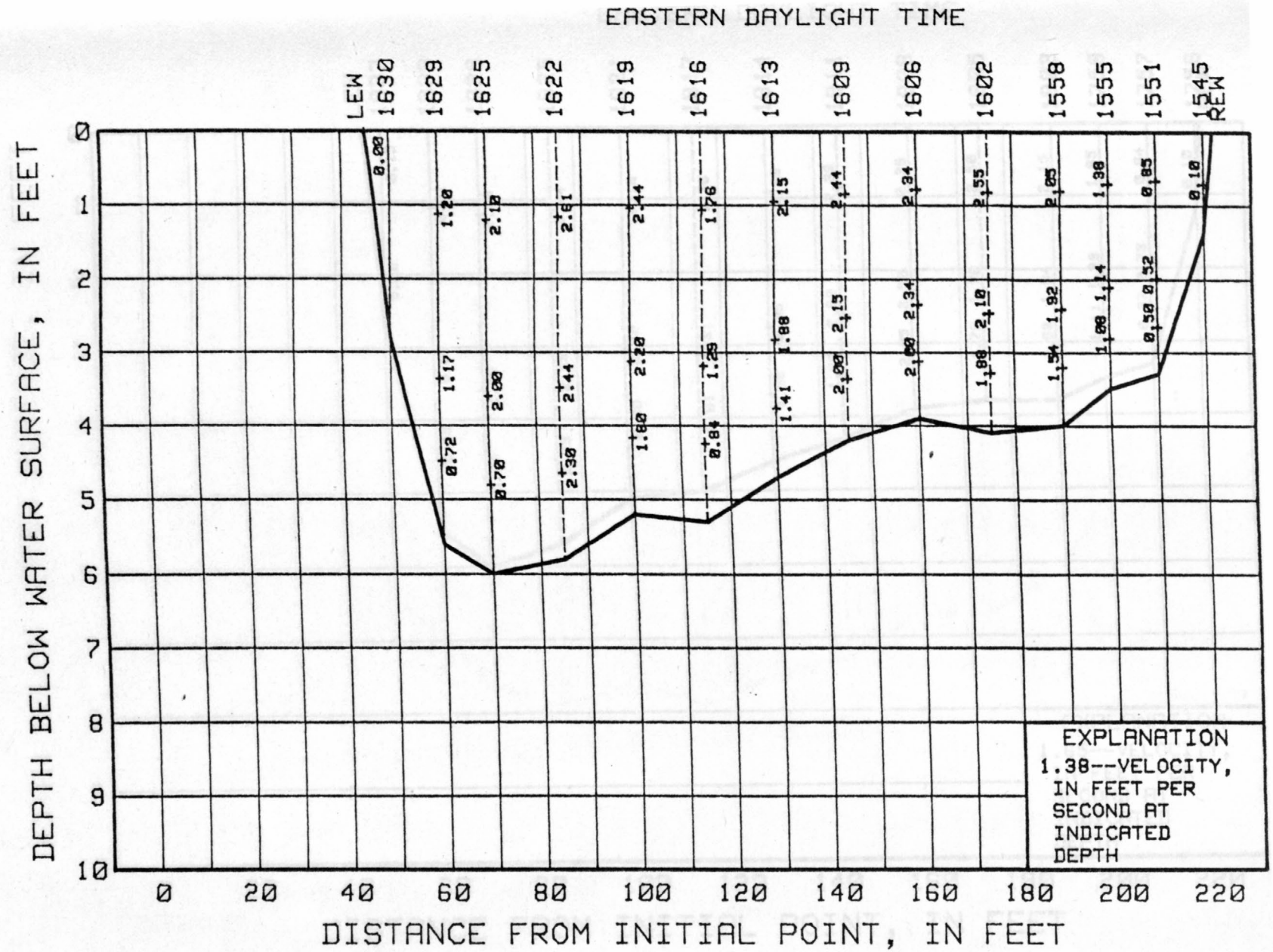

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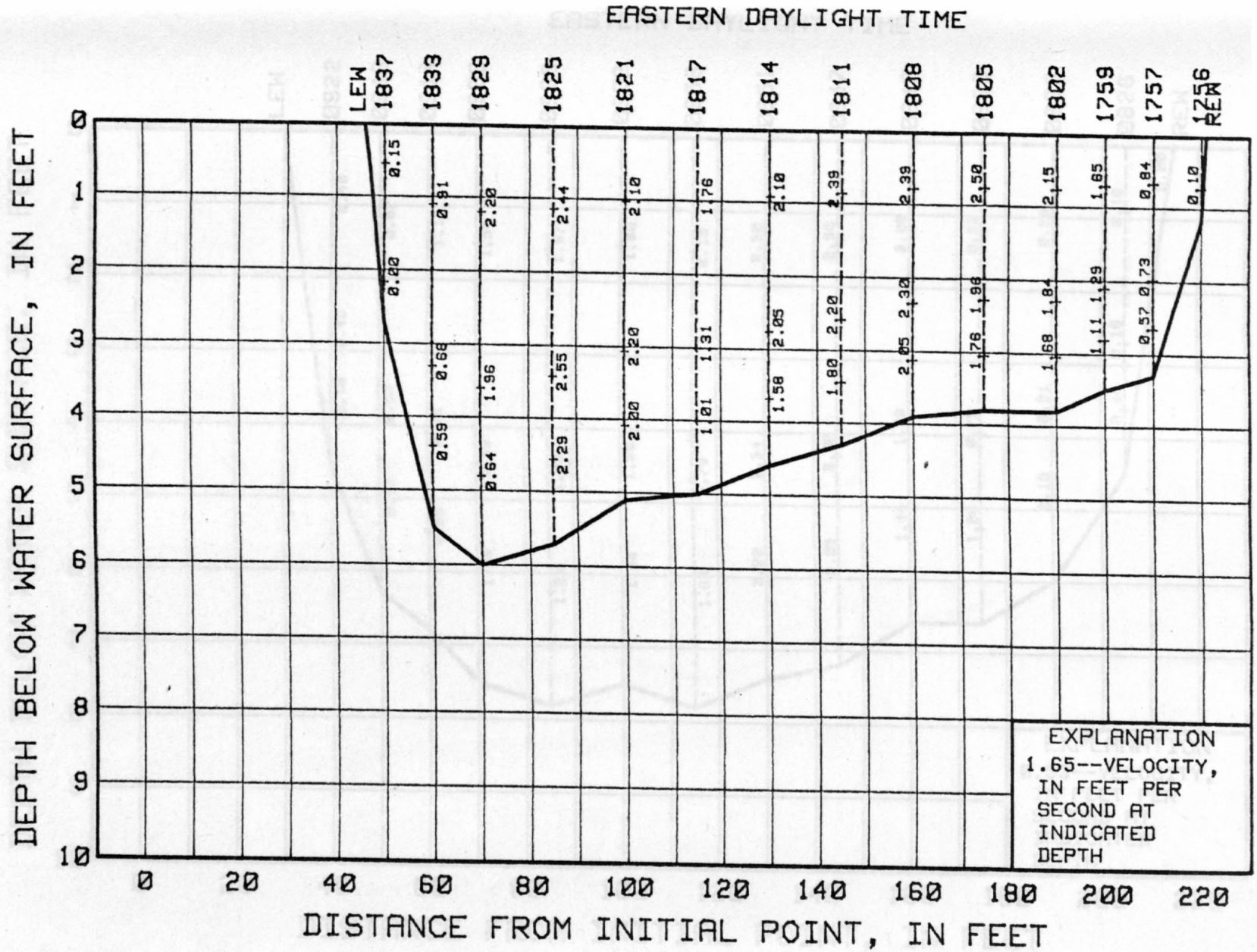

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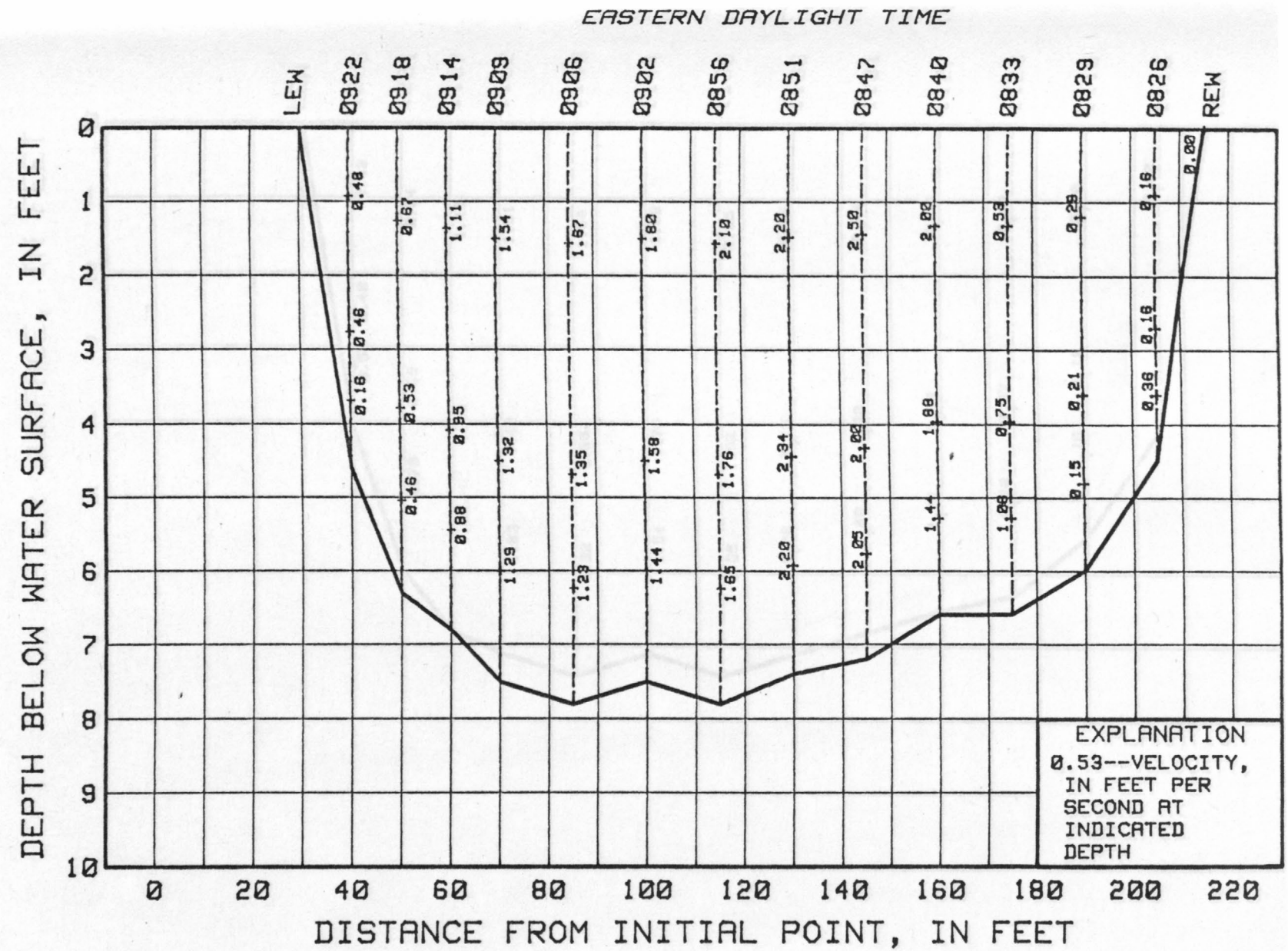

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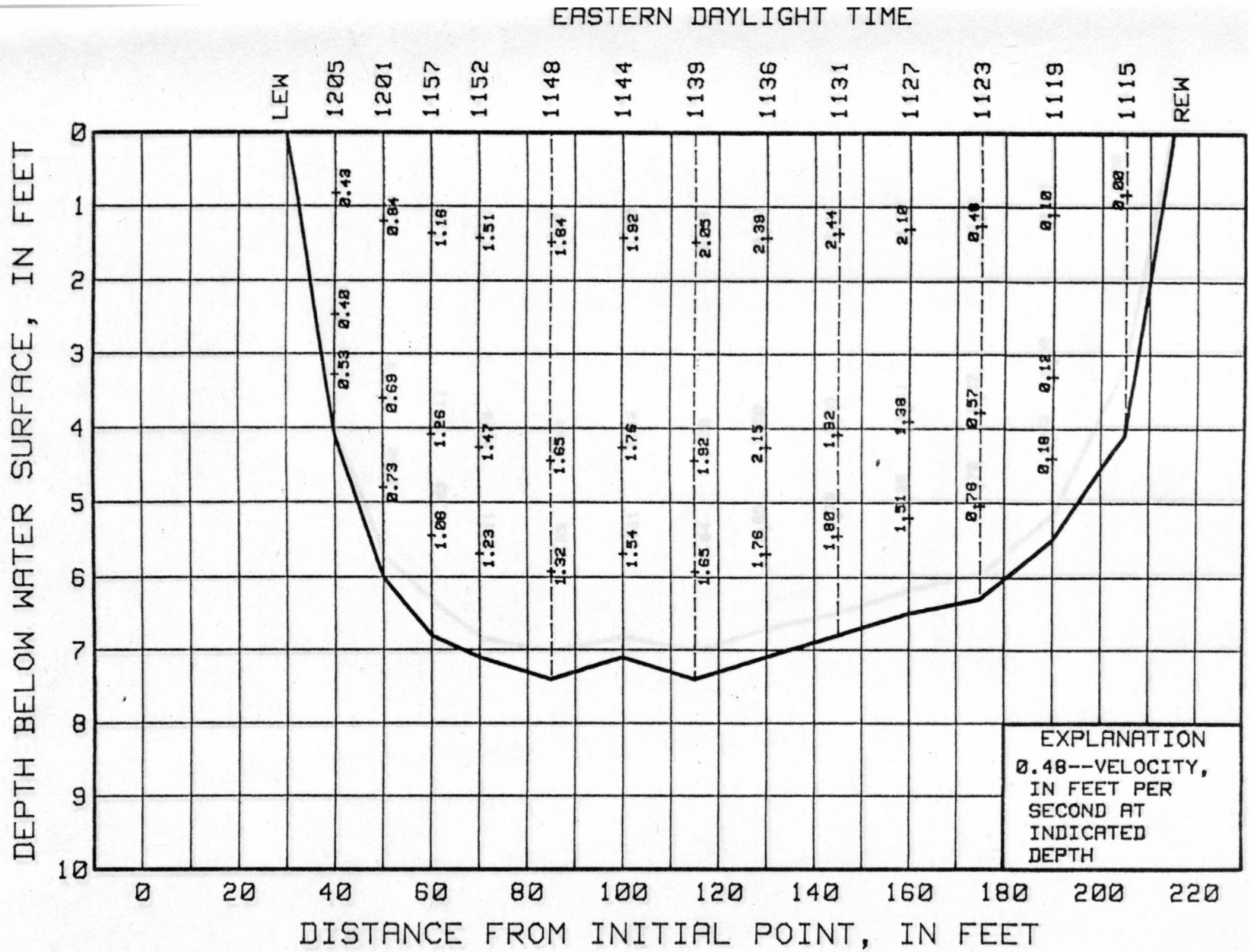

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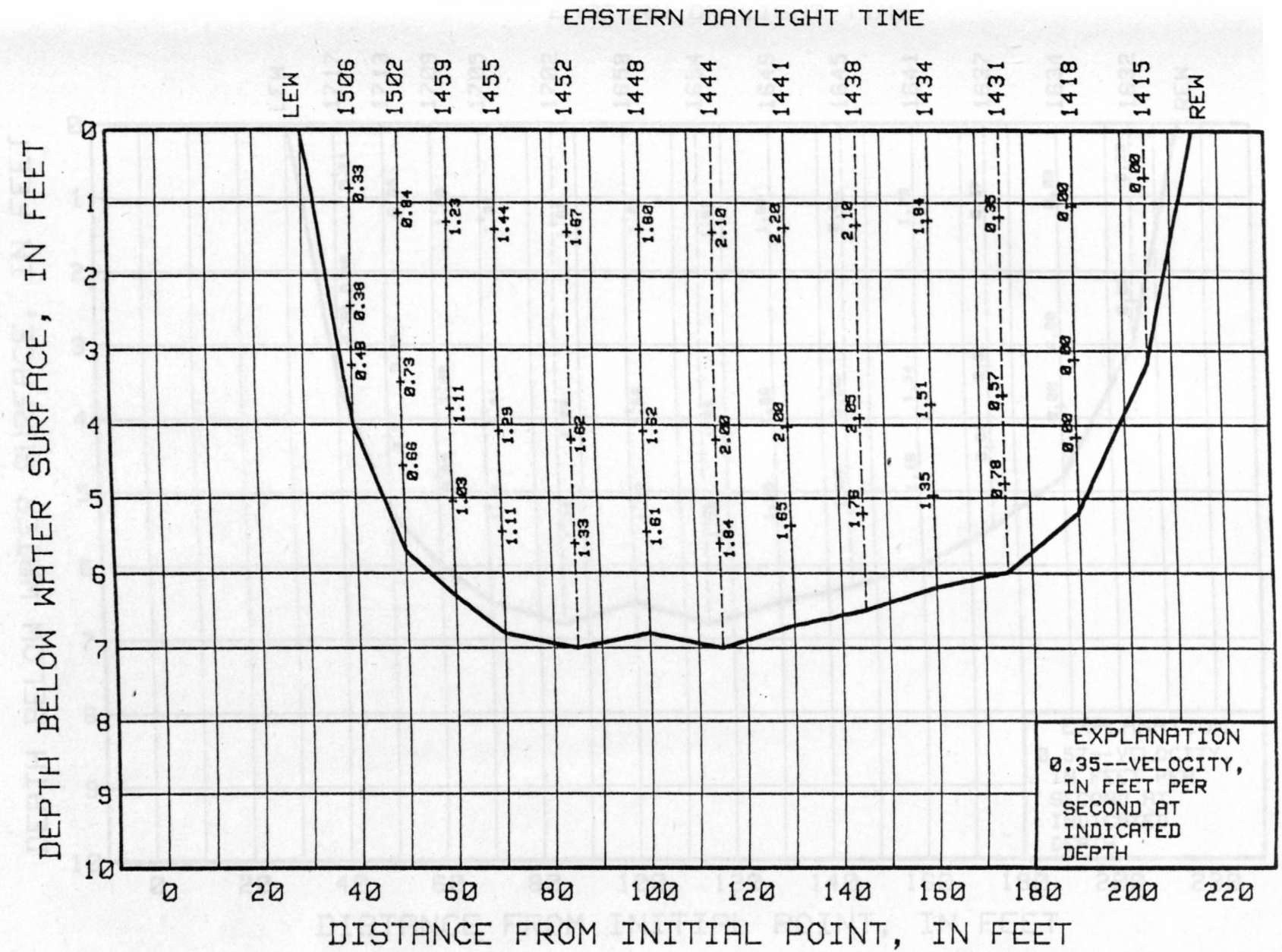

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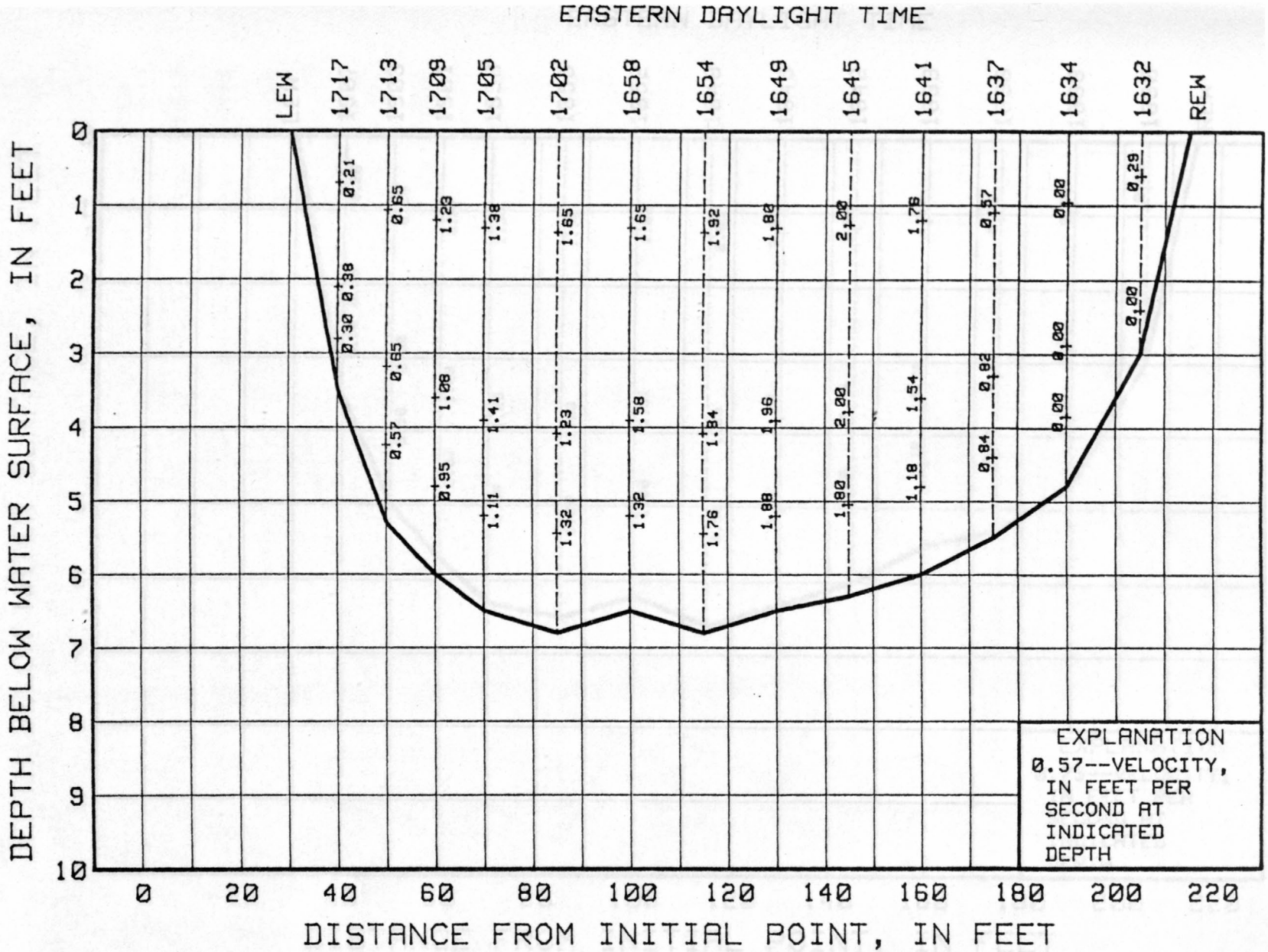

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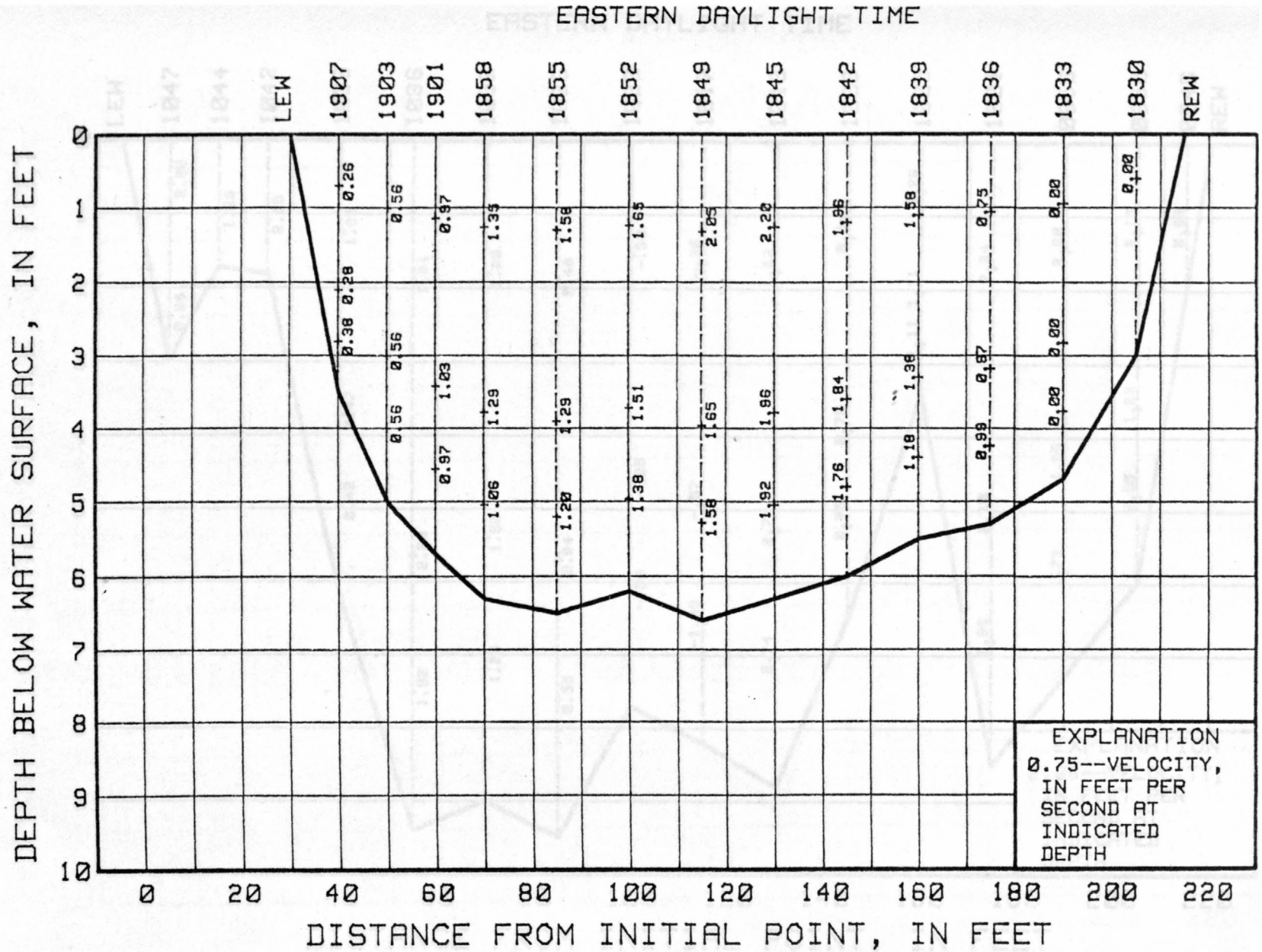

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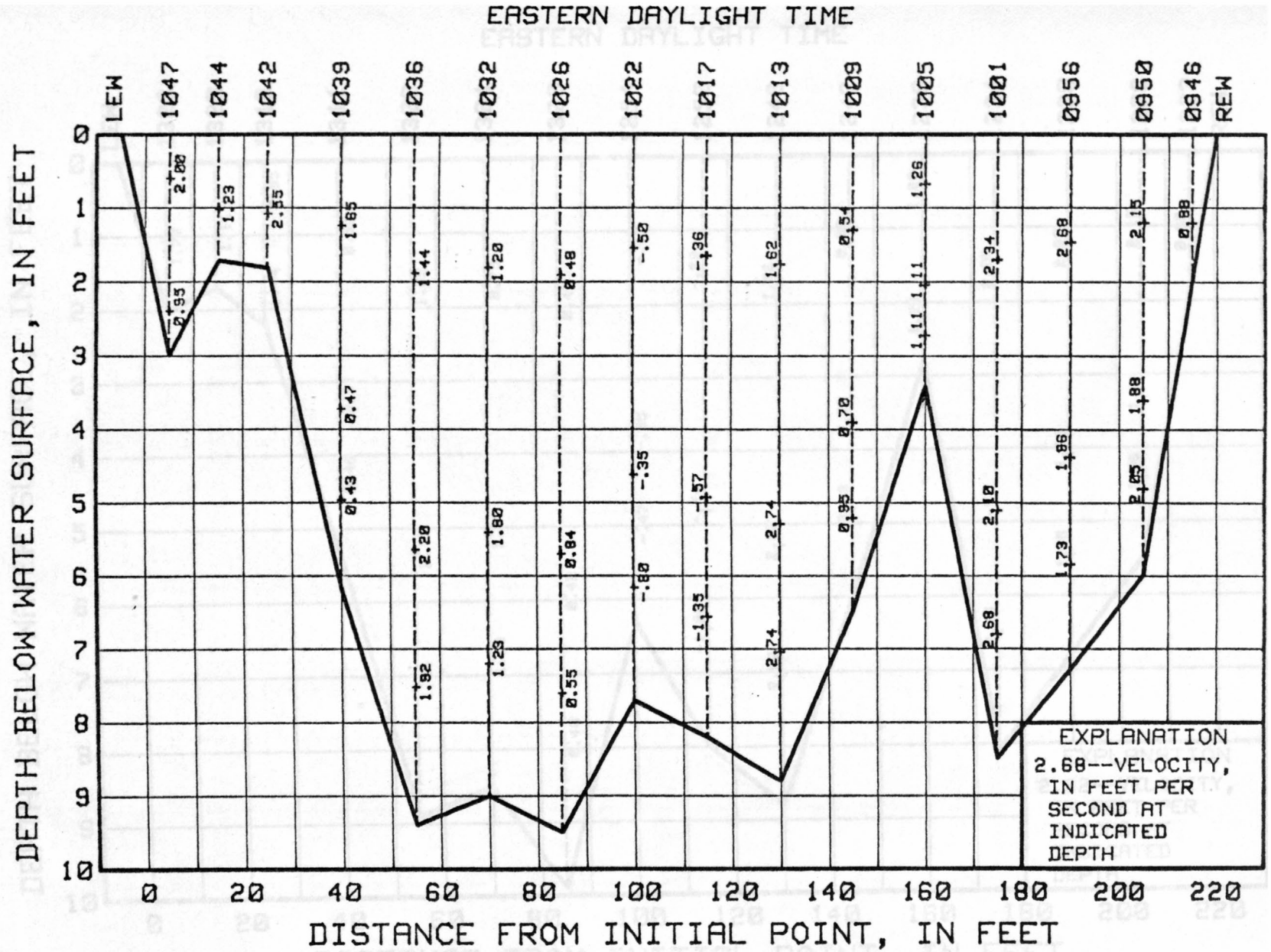
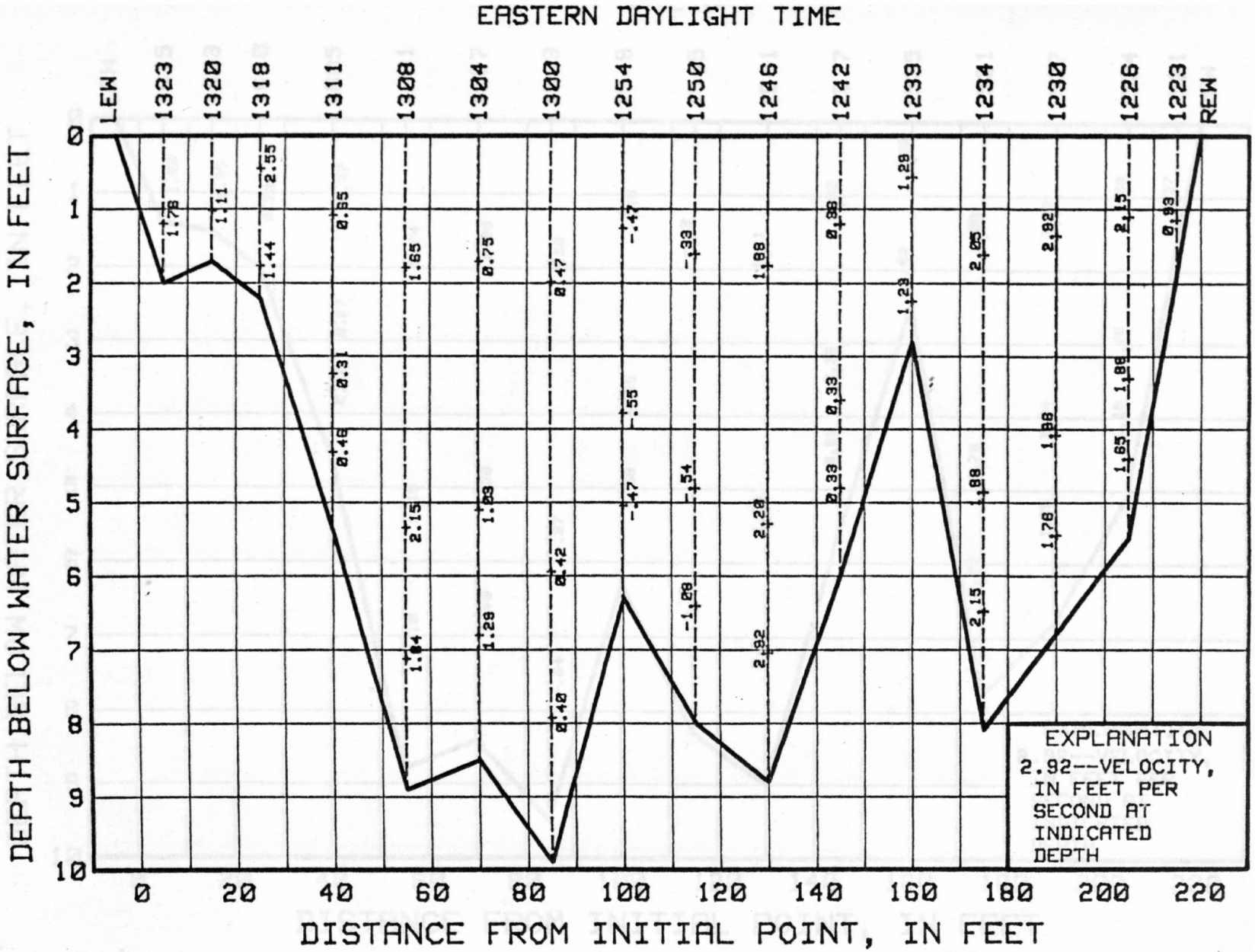


Figure 26.--Cross section E, width, depth, and velocity measurement 1, September 28, 1981.



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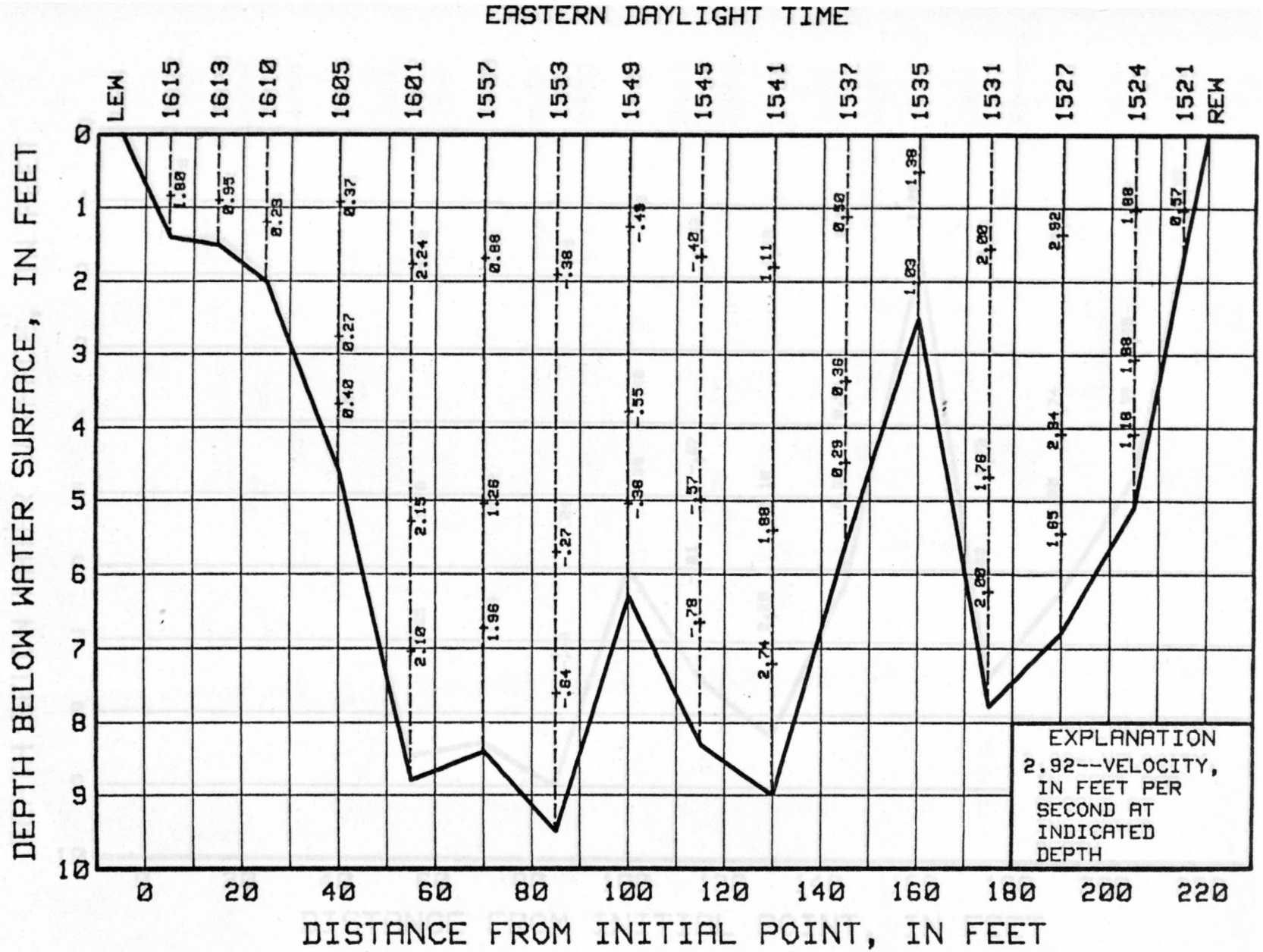

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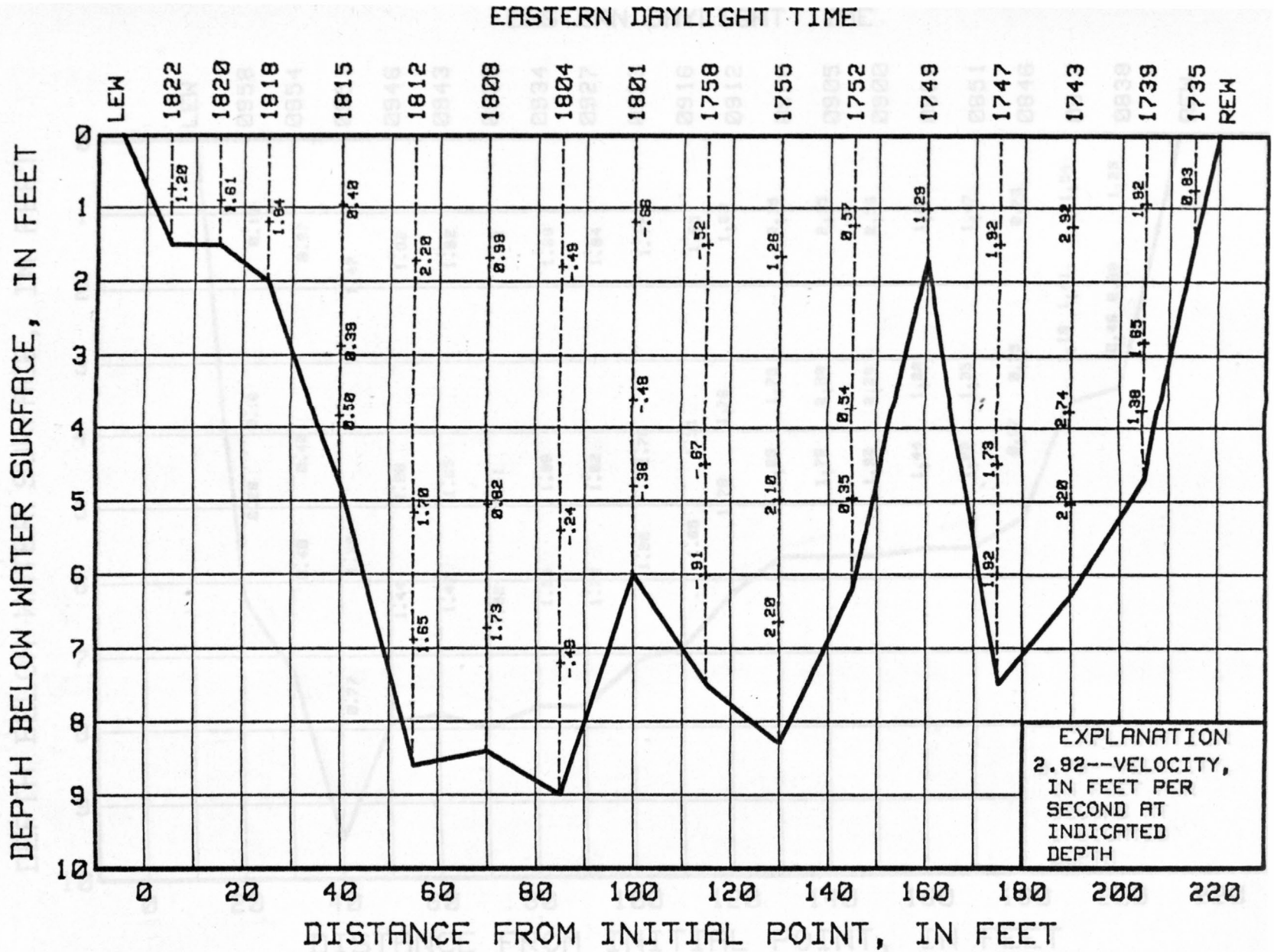

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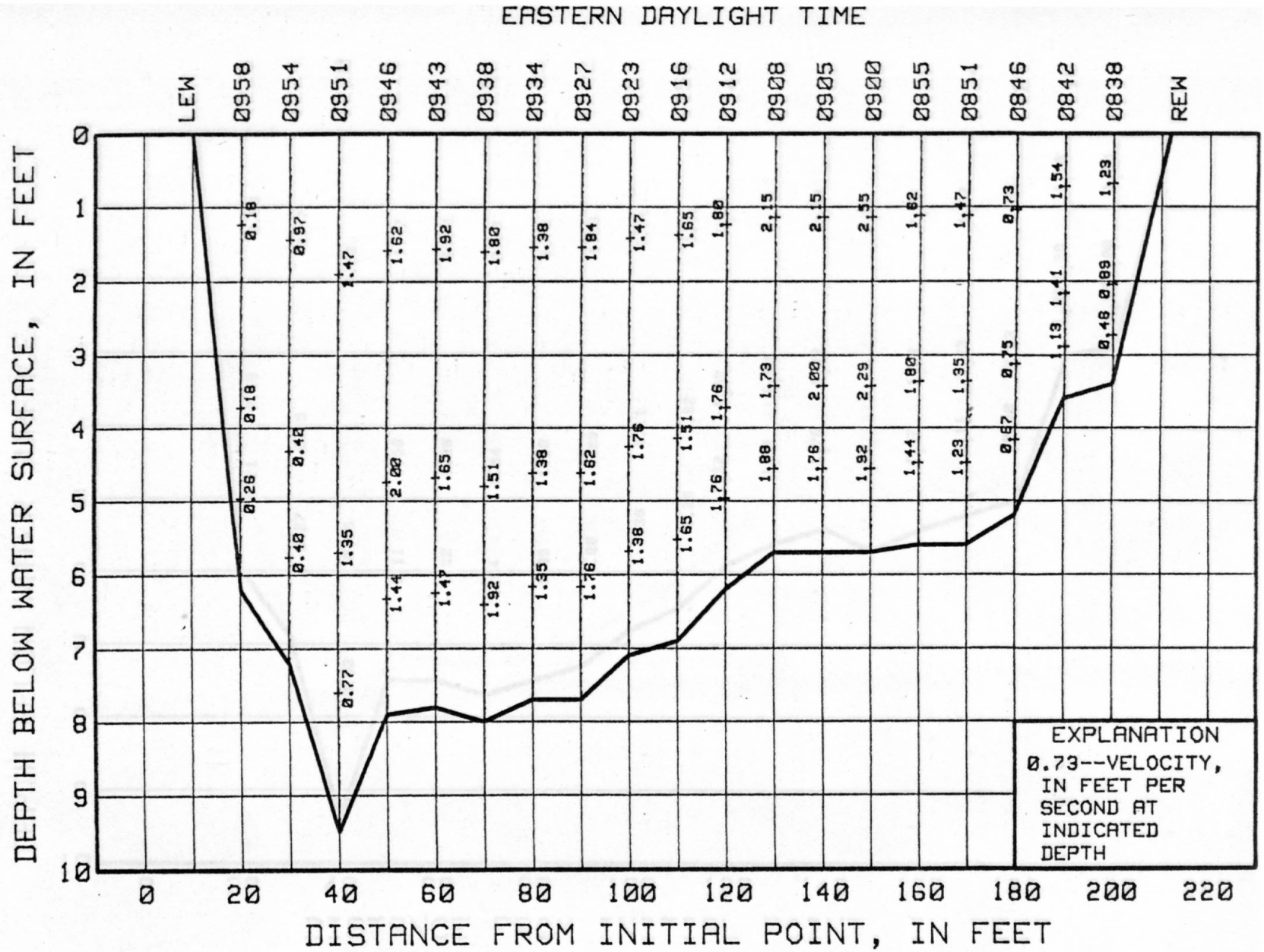

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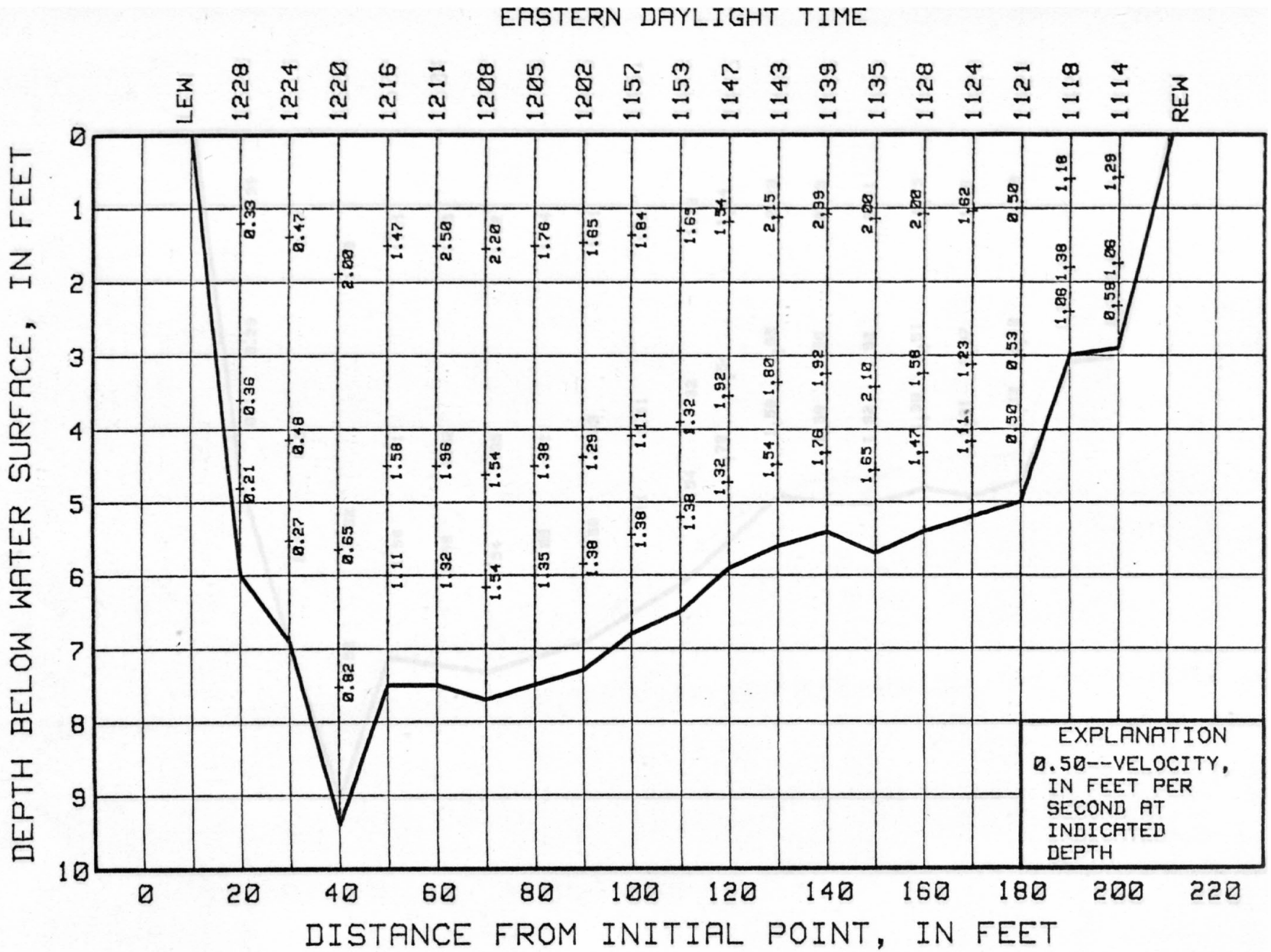

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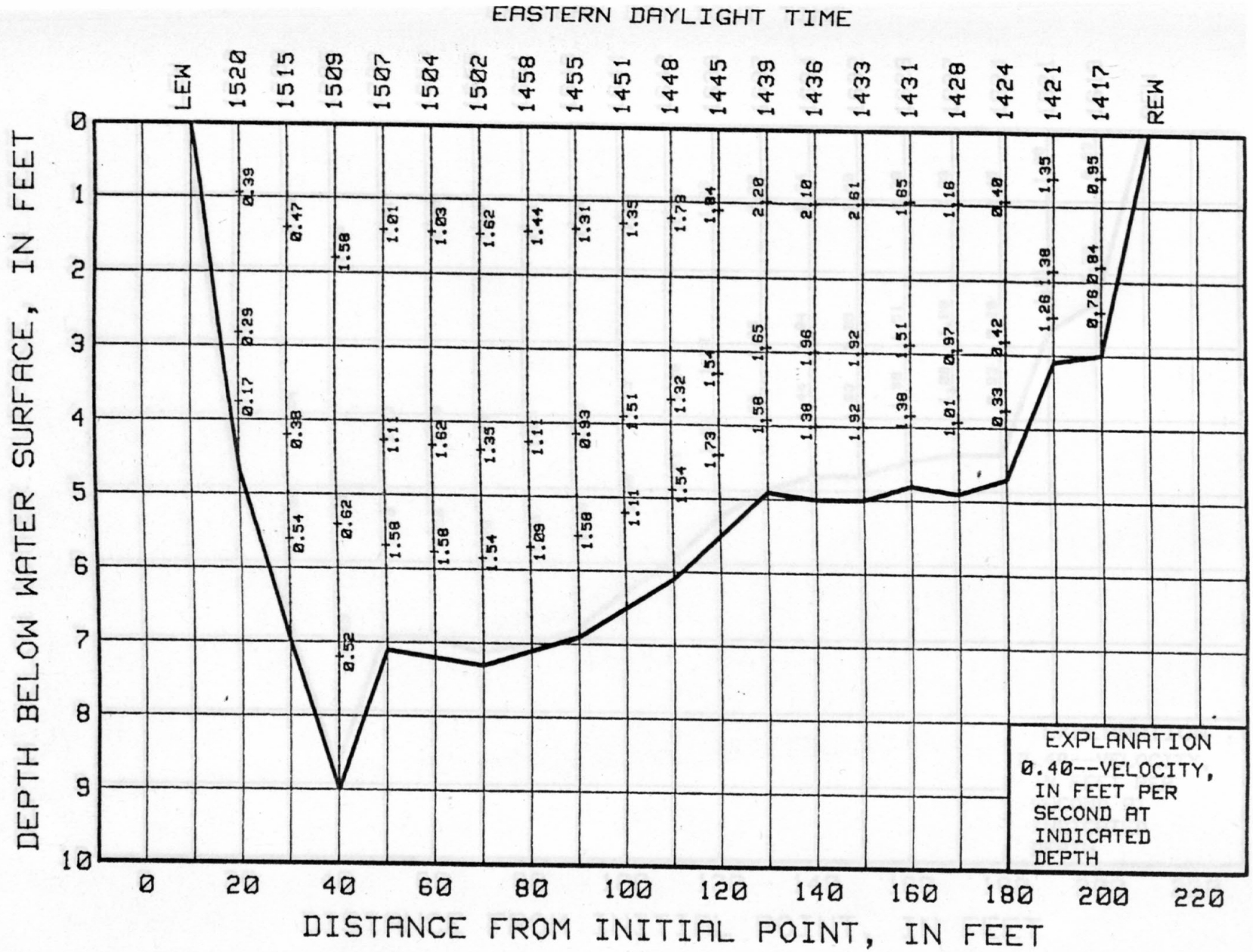

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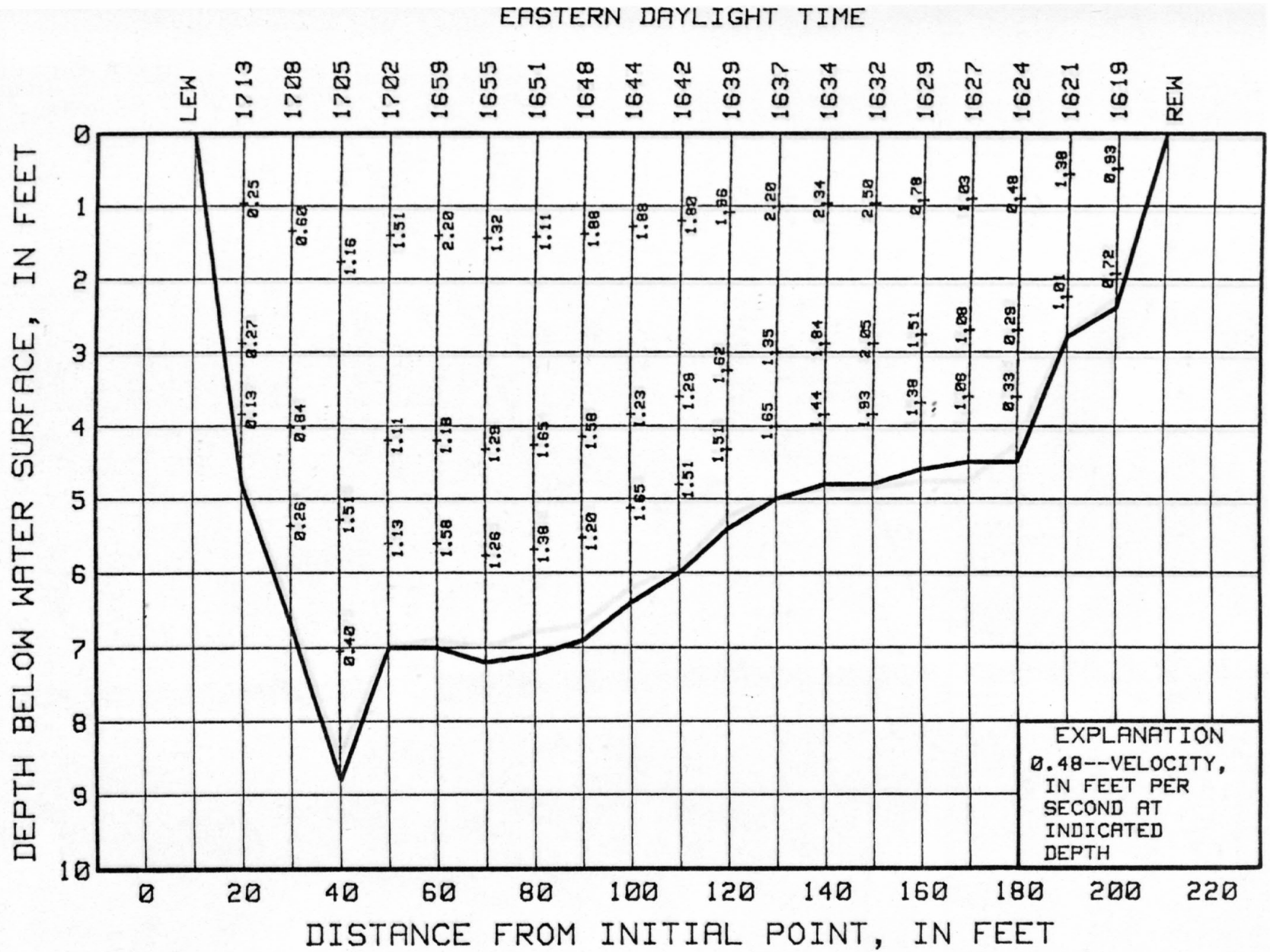

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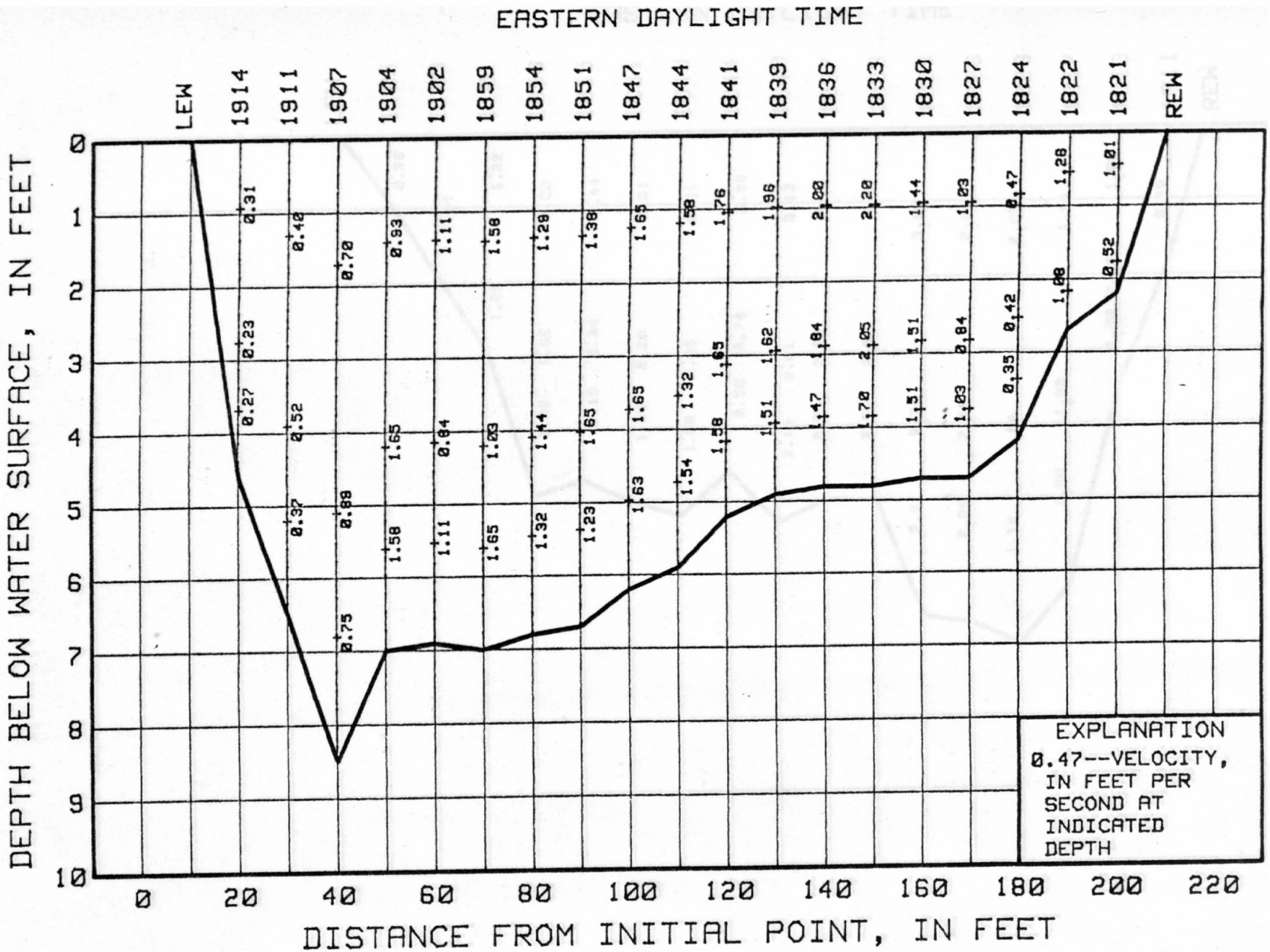

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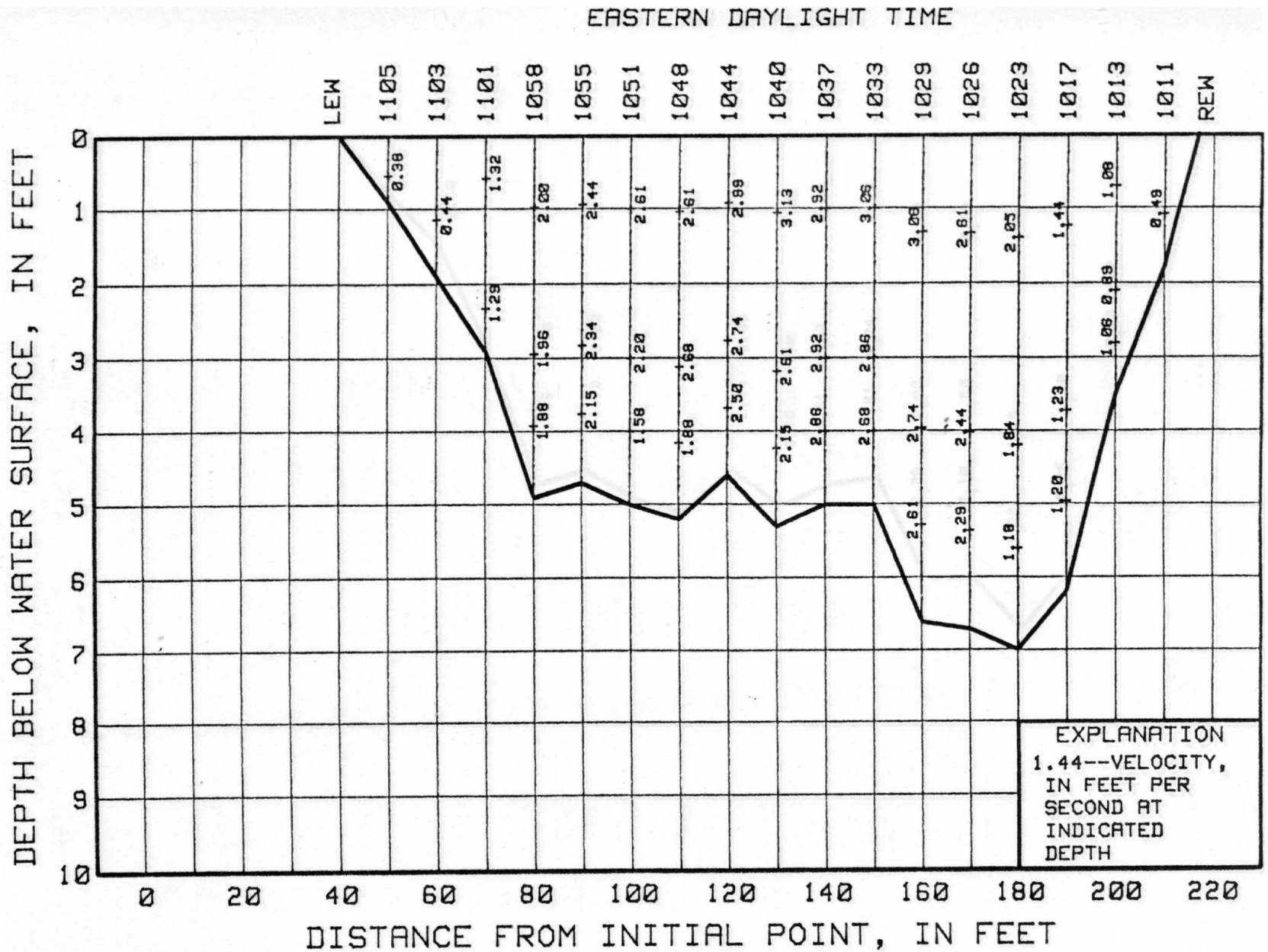
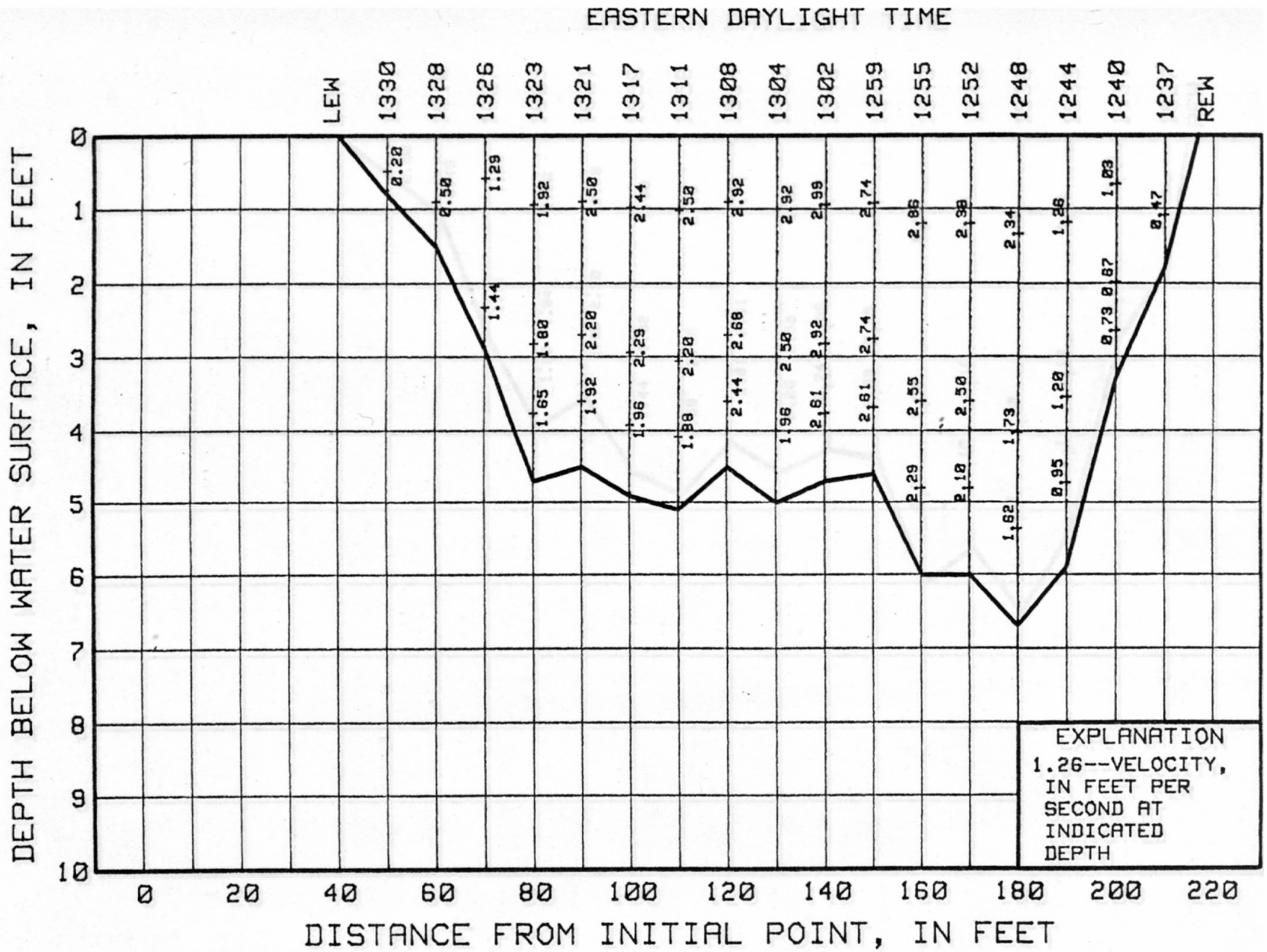


Figure 35.--Cross section G, width, depth, and velocity measurement 1, September 28, 1981.



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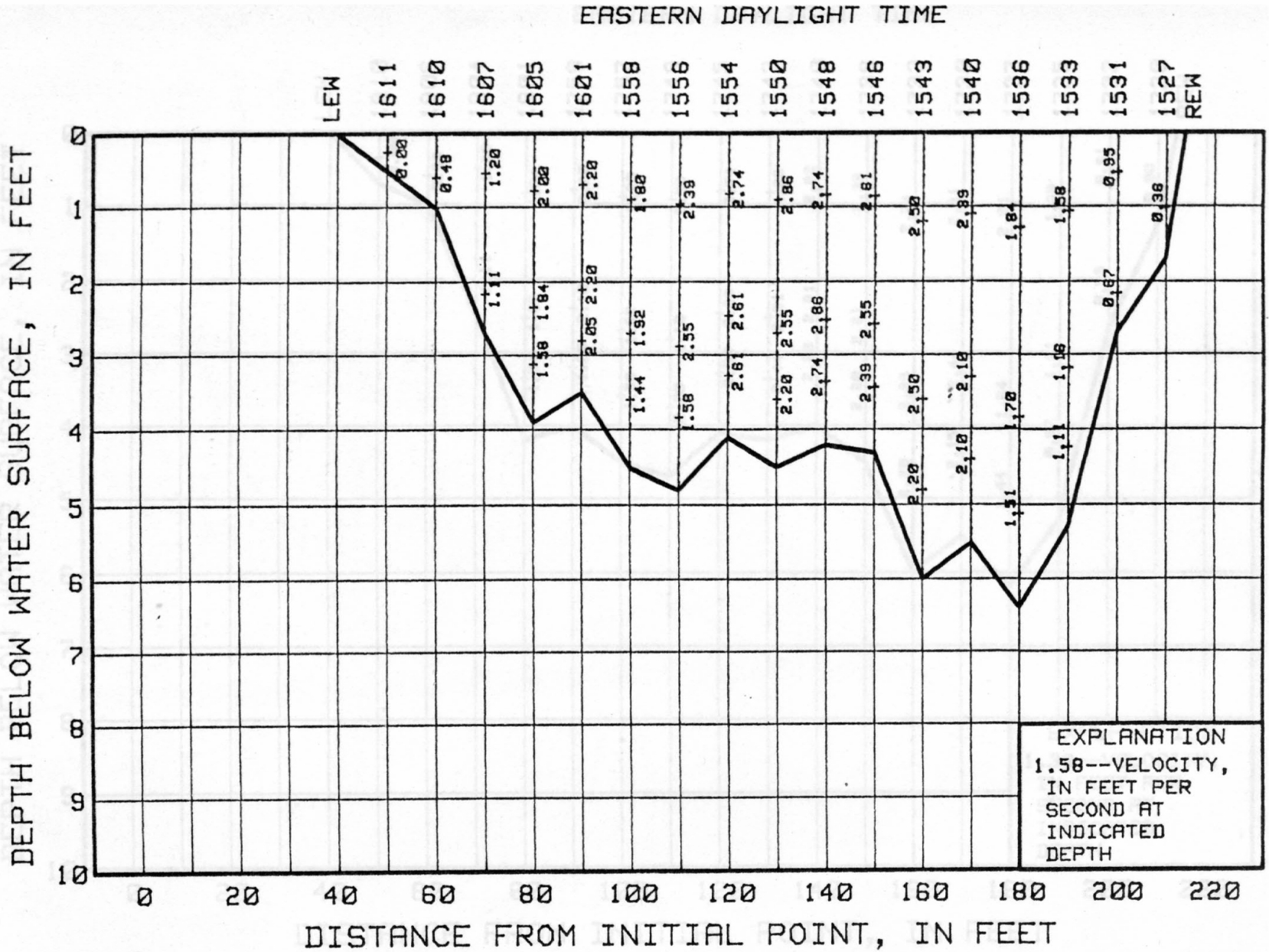

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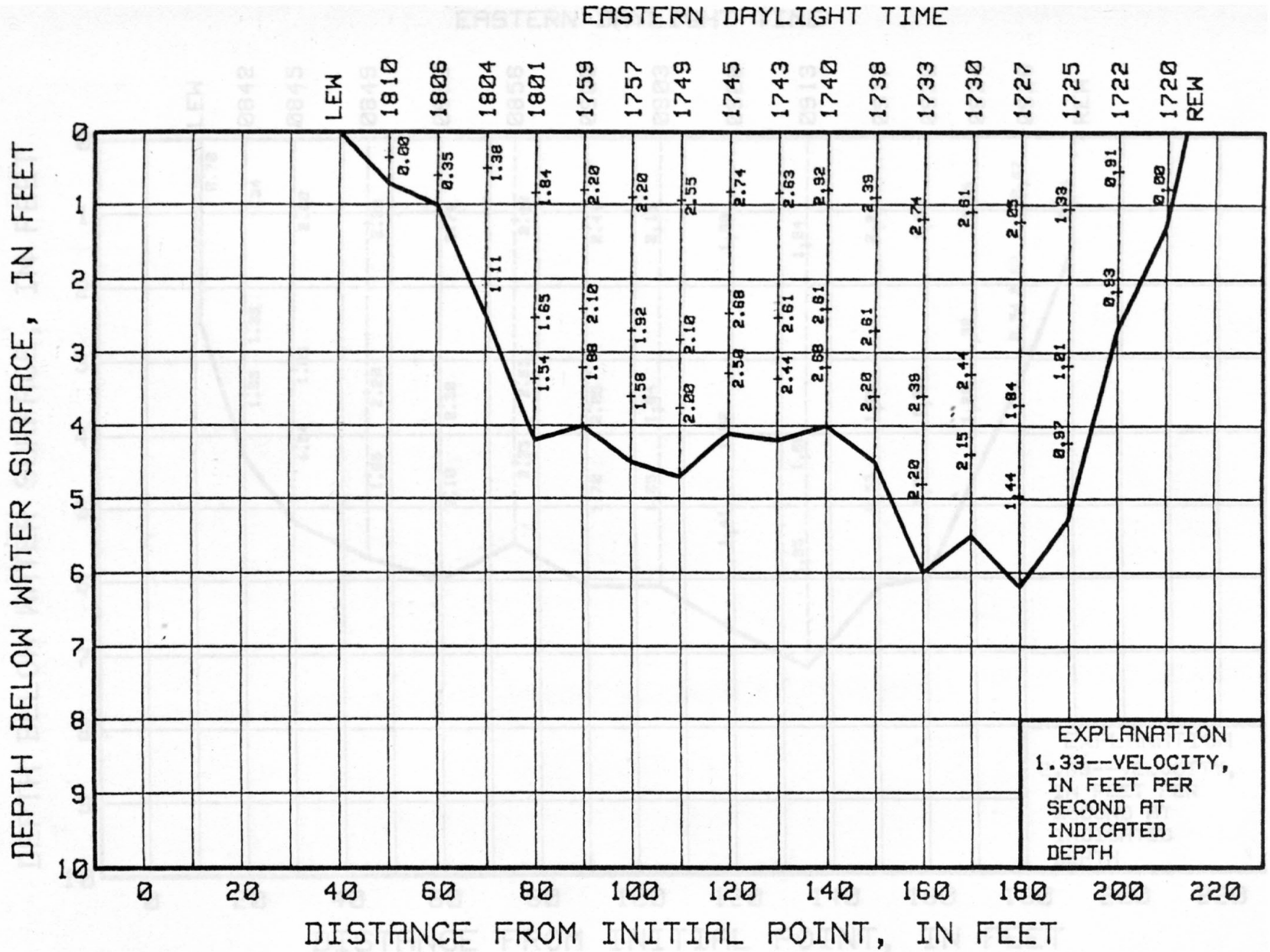

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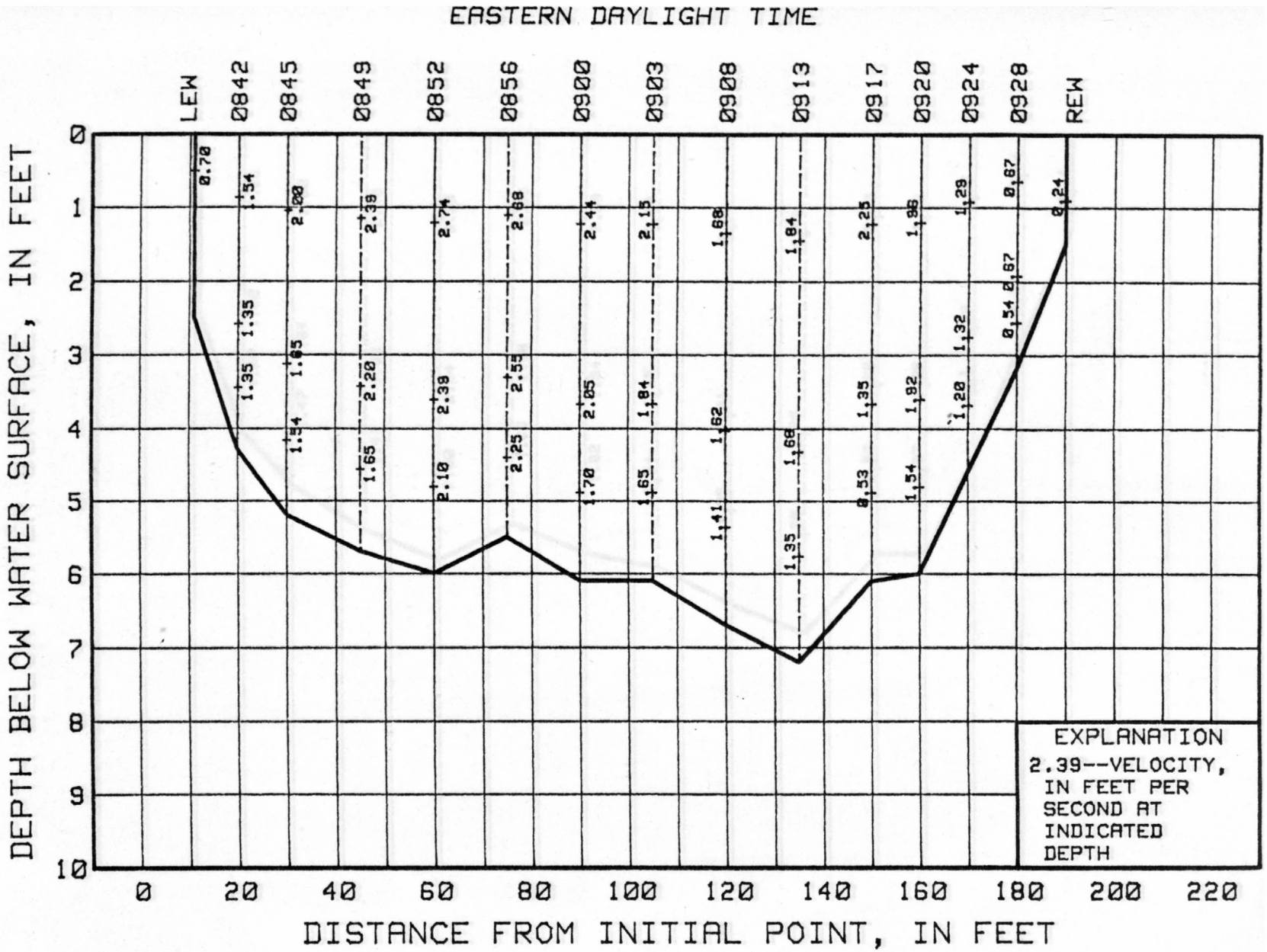
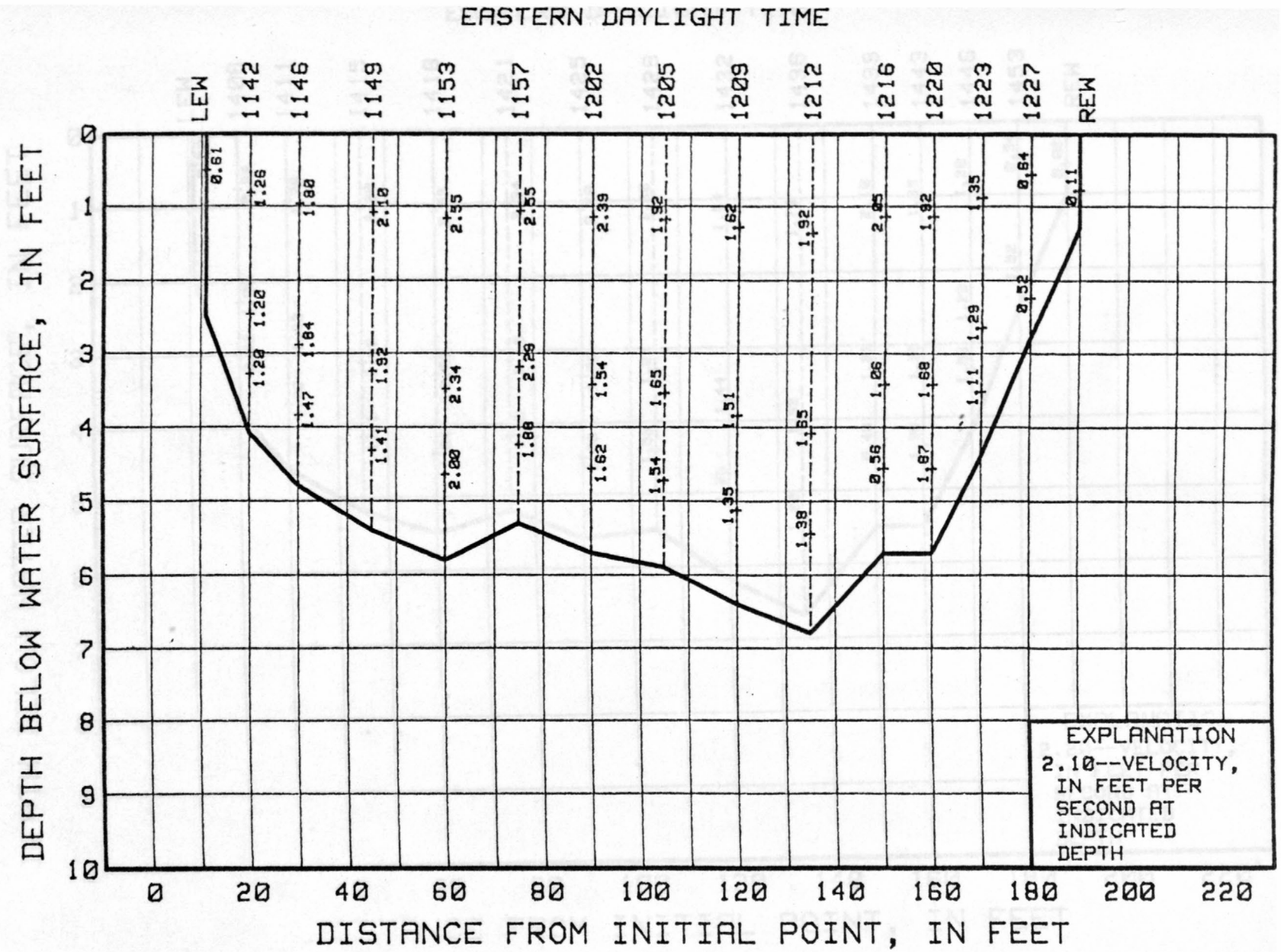


Figure 39.--Cross section H, width, depth, and velocity measurement 1, September 28, 1981.



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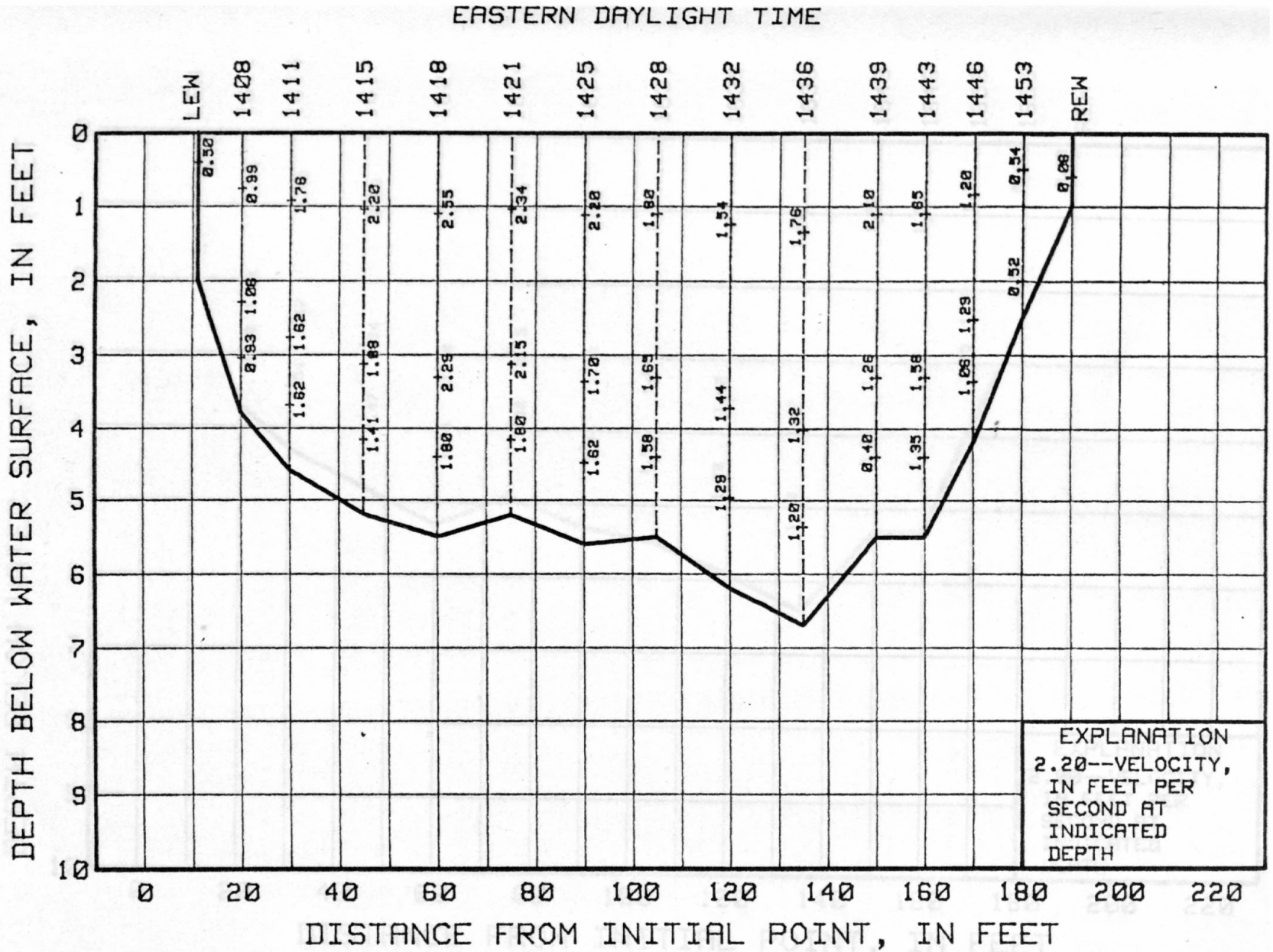

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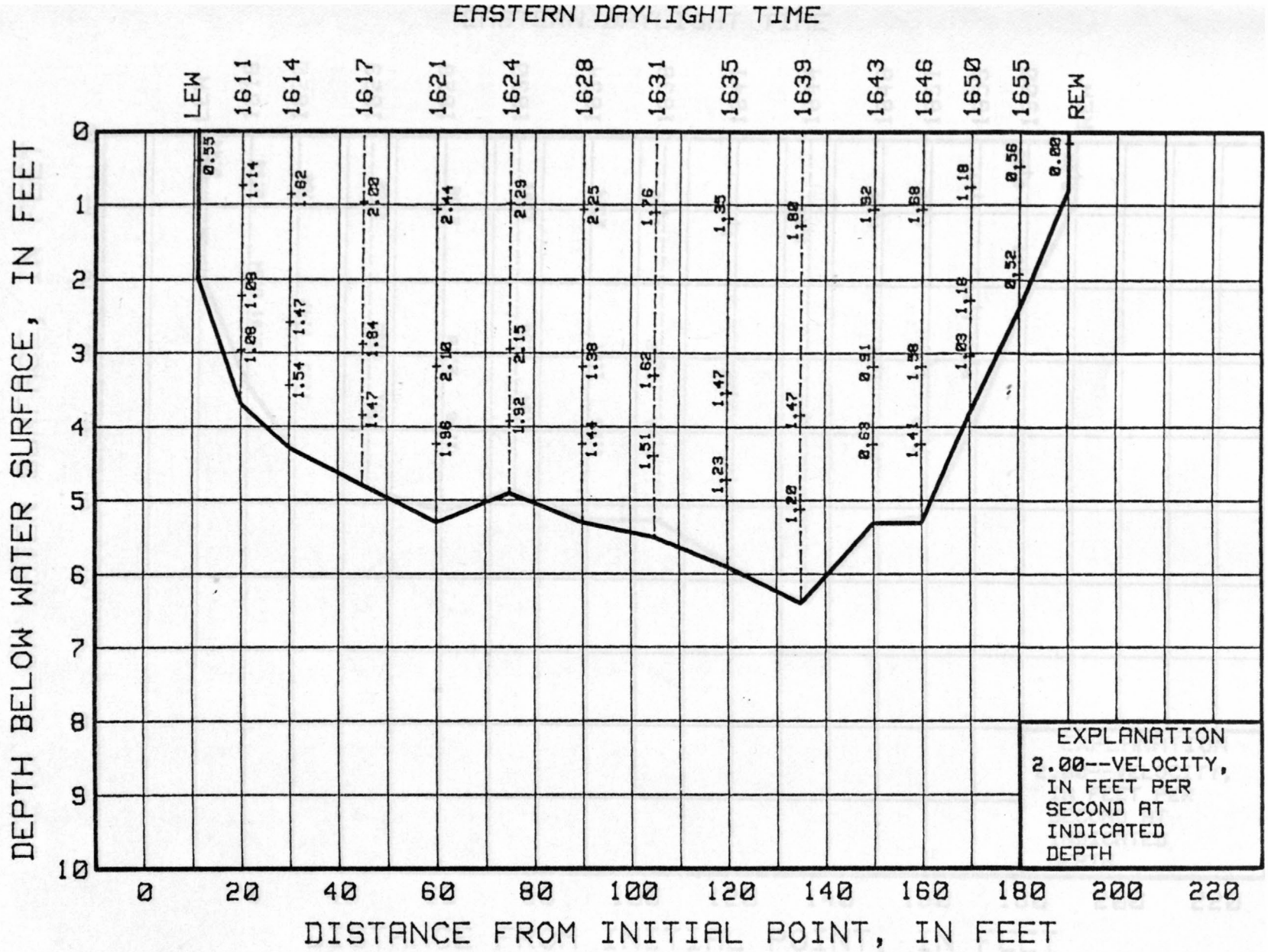

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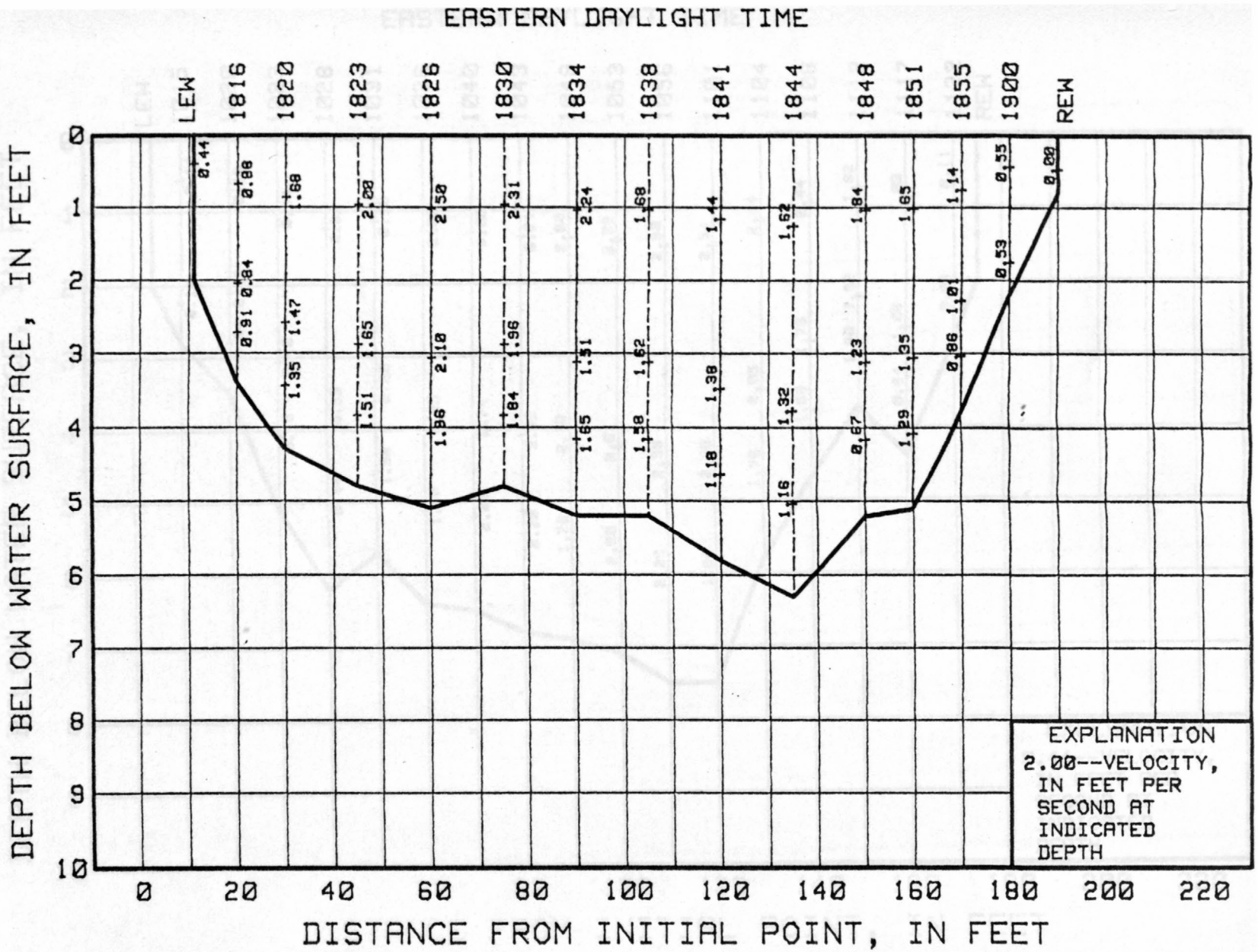

Figure 43.--Cross section H, width, depth, and velocity measurement 5, September 28, 1981.

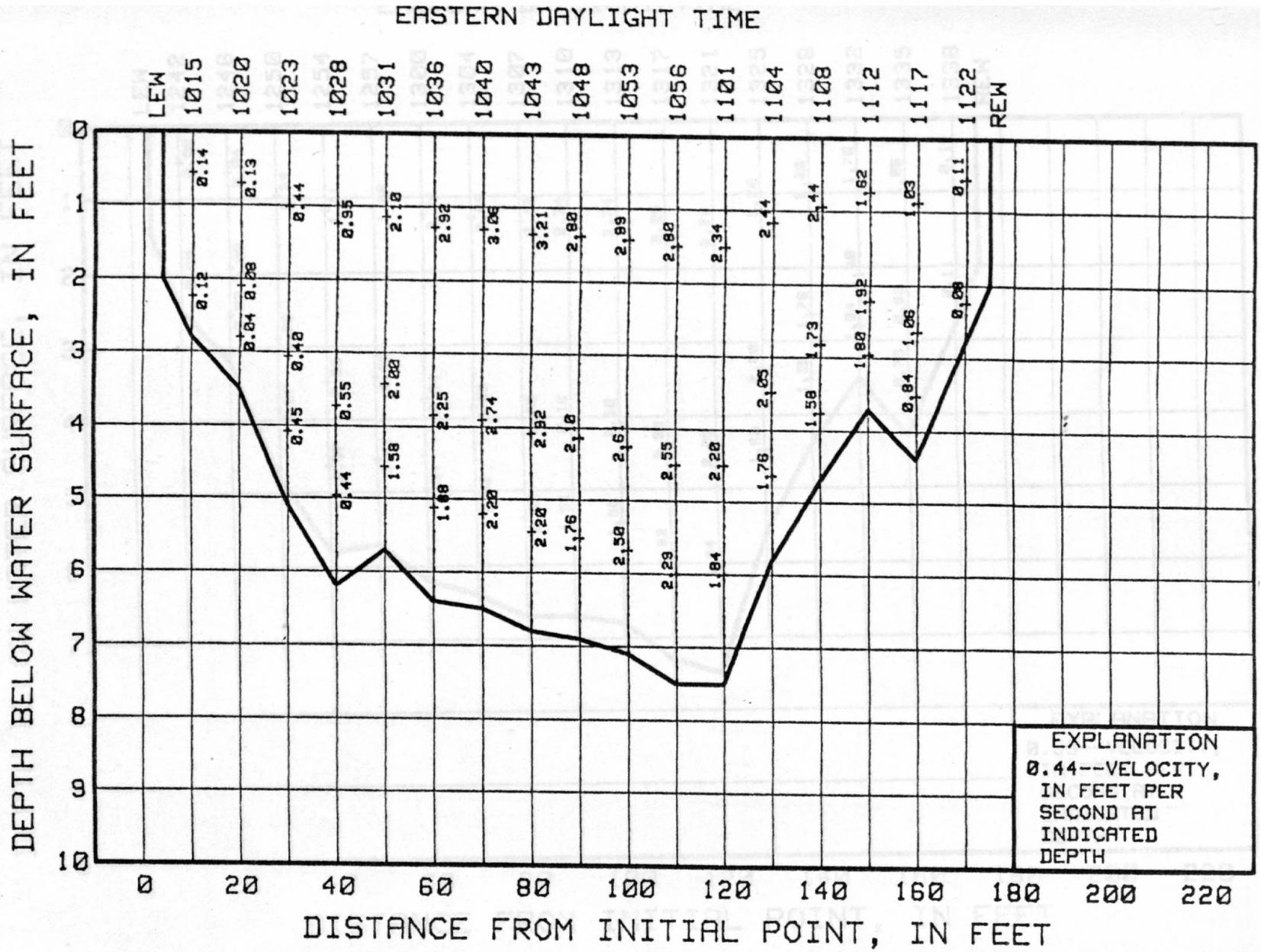

Figure 44.--Cross section I, width, depth, and velocity measurement 1, September 28, 1981.

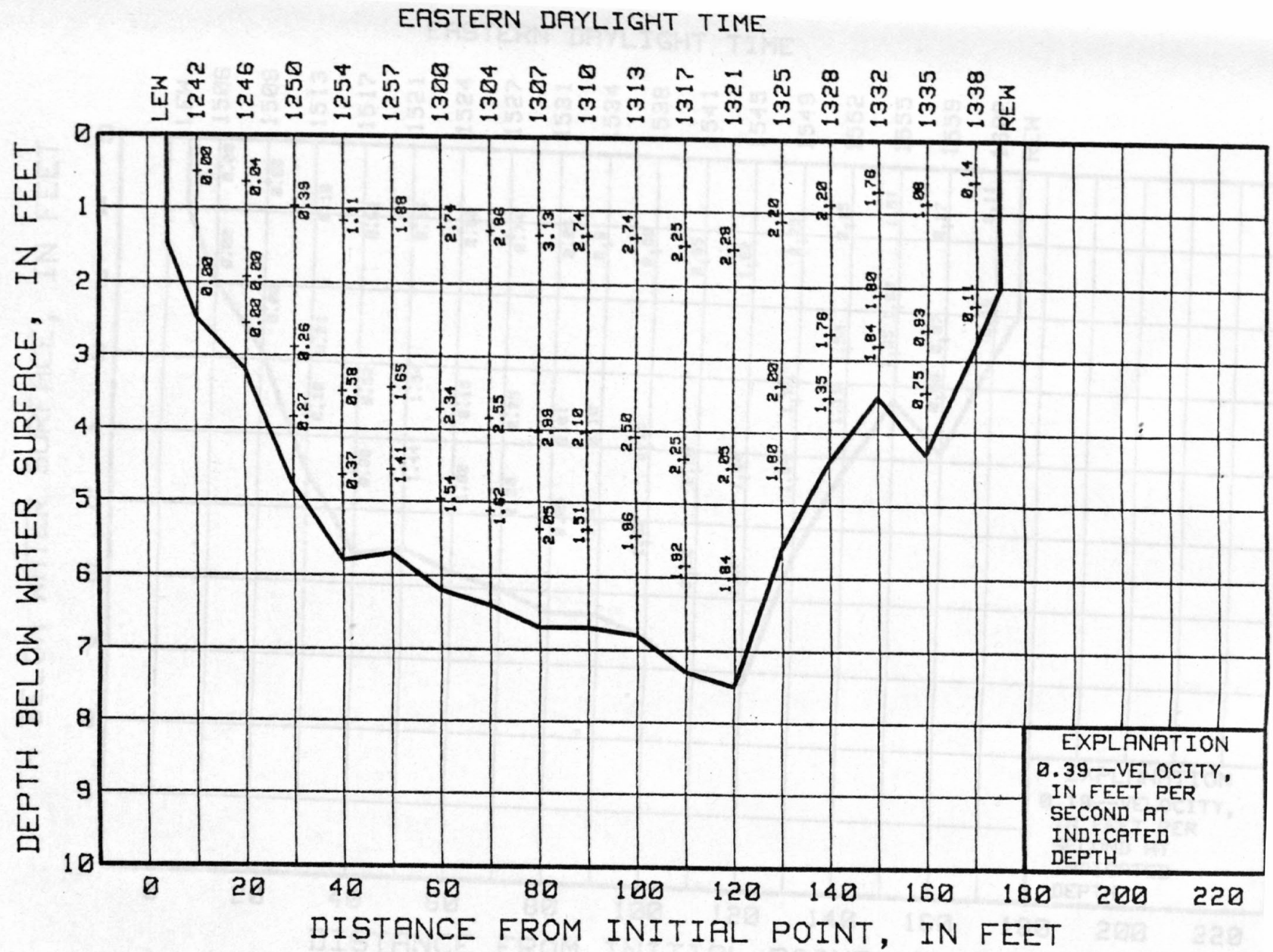

Figure 45.--Cross section I, width, depth, and velocity measurement 2, September 28, 1981.

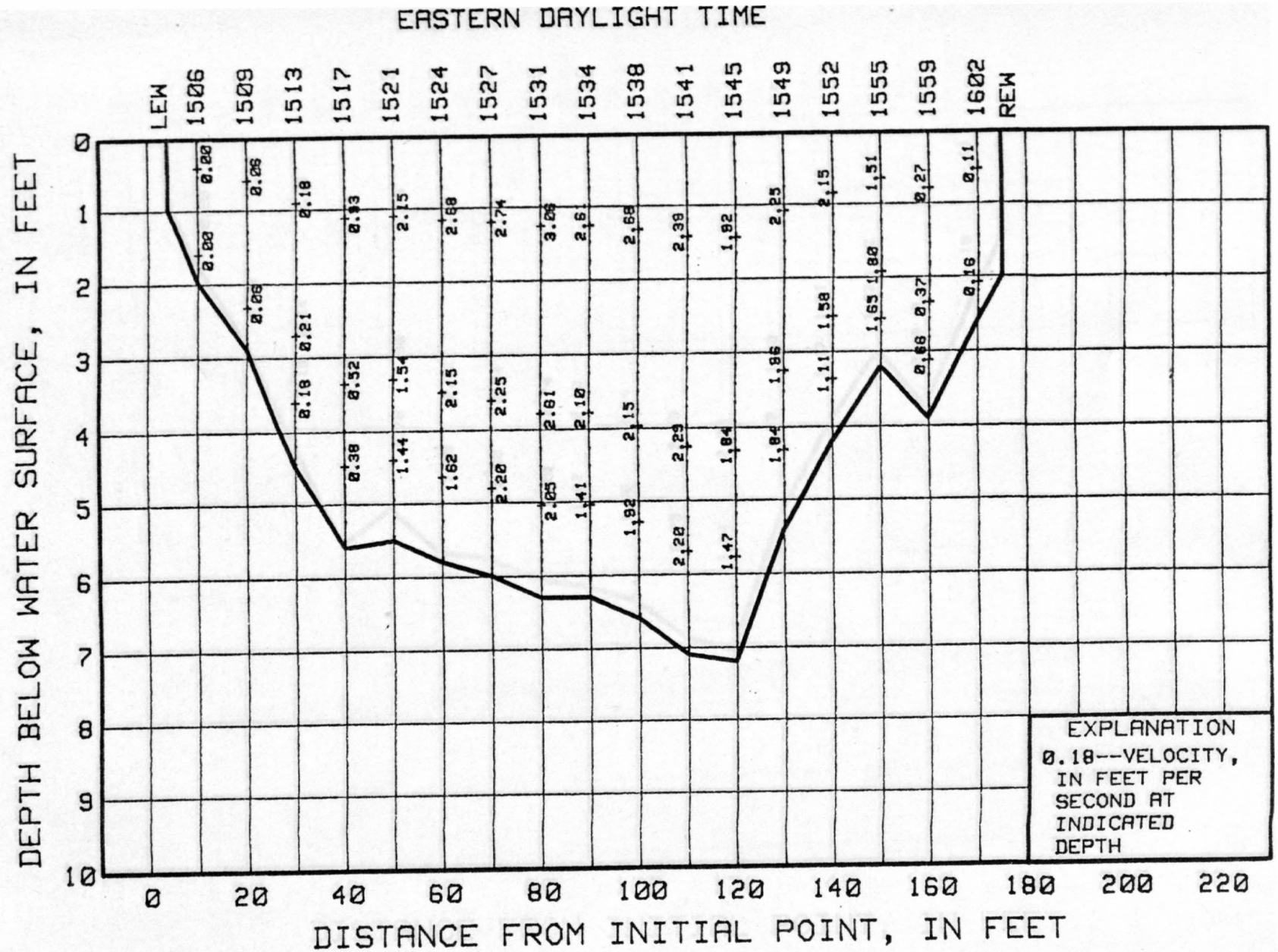

Figure 46.--Cross section I, width, depth, and velocity measurement 3, September 28, 1981.

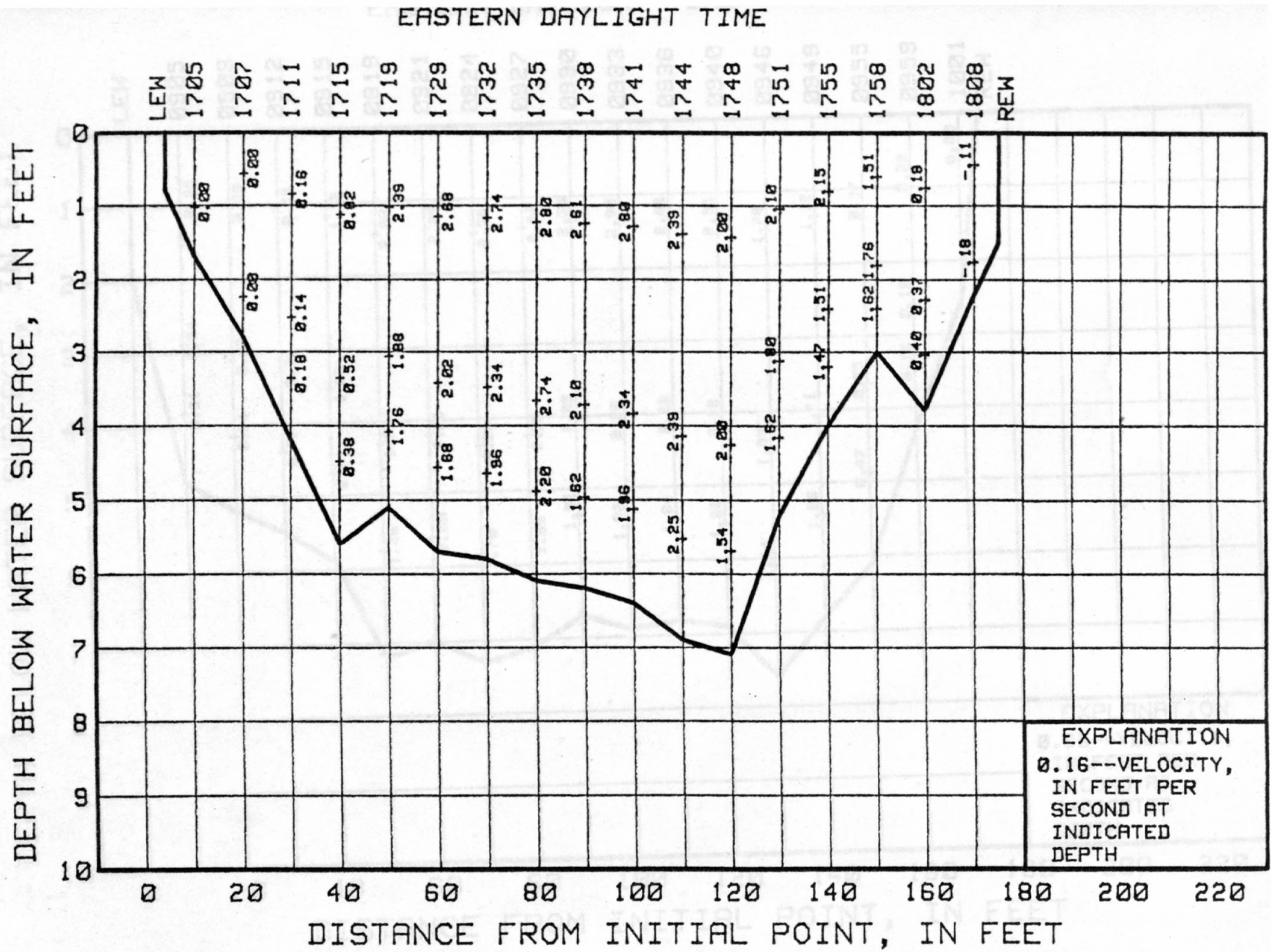

Figure 47.--Cross section I, width, depth, and velocity measurement 4, September 28, 1981.

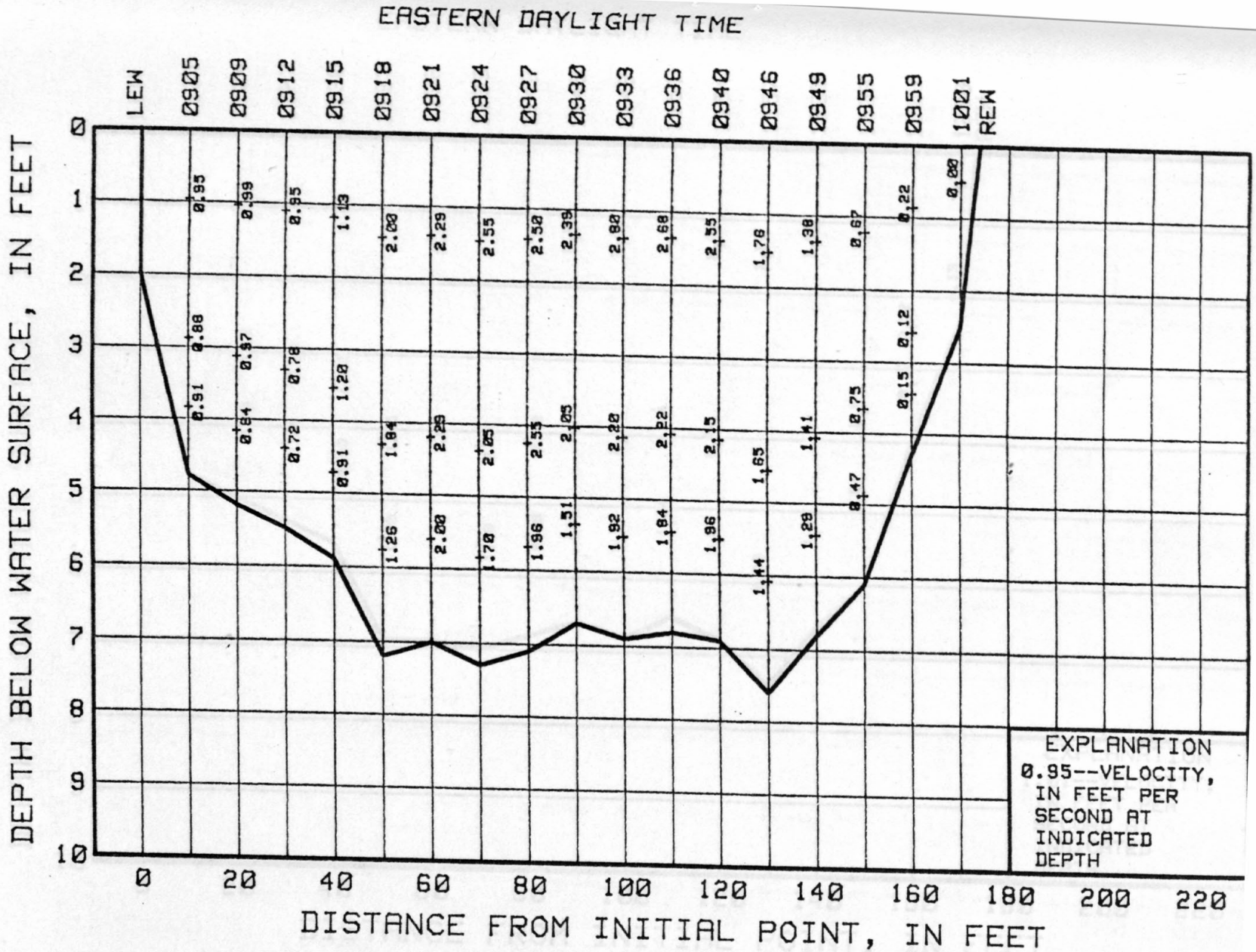

Figure 48.--Cross section J, width, depth, and velocity measurement 1, September 28, 1981.

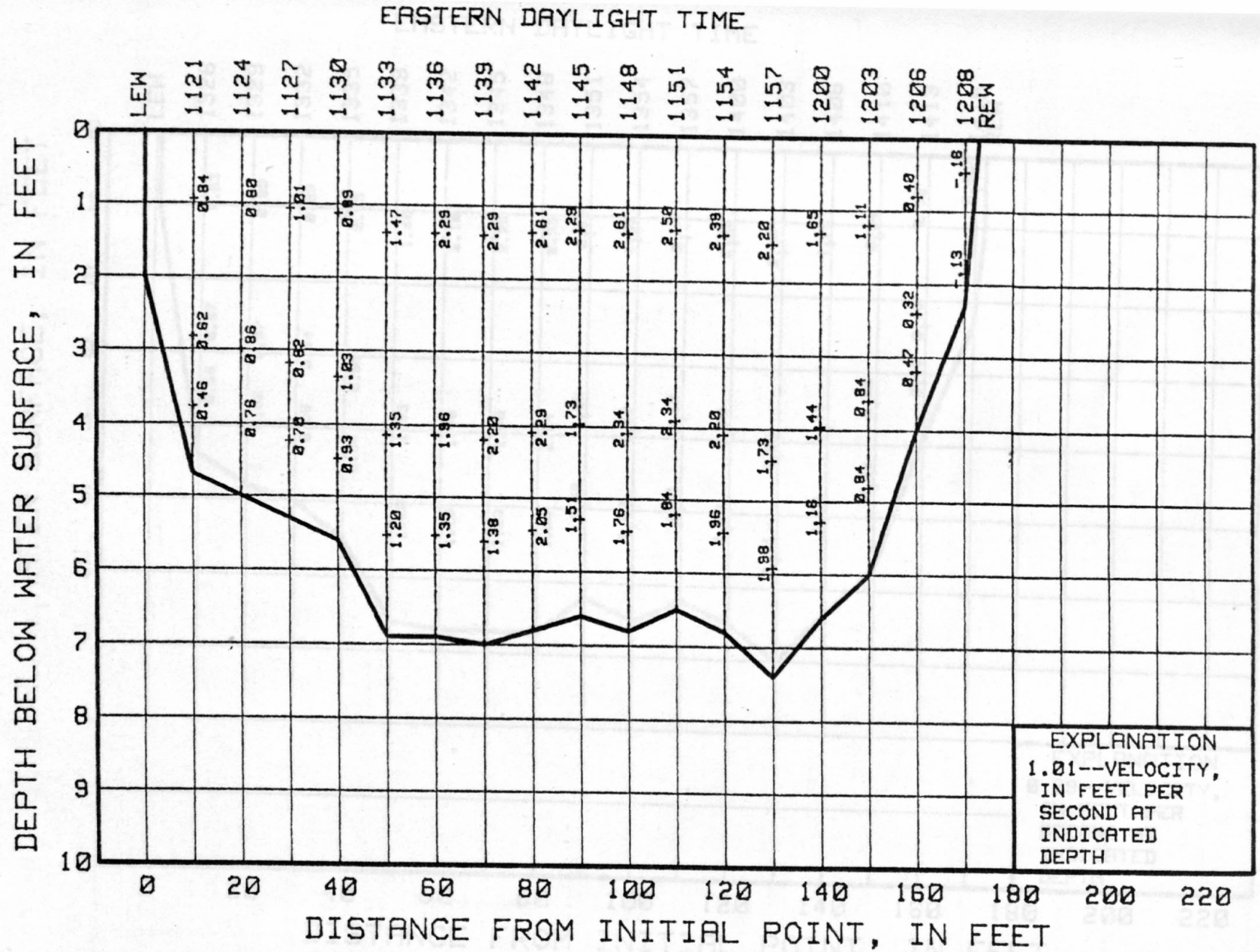

Figure 49.--Cross section J, width, depth, and velocity measurement 2, September 28, 1981.

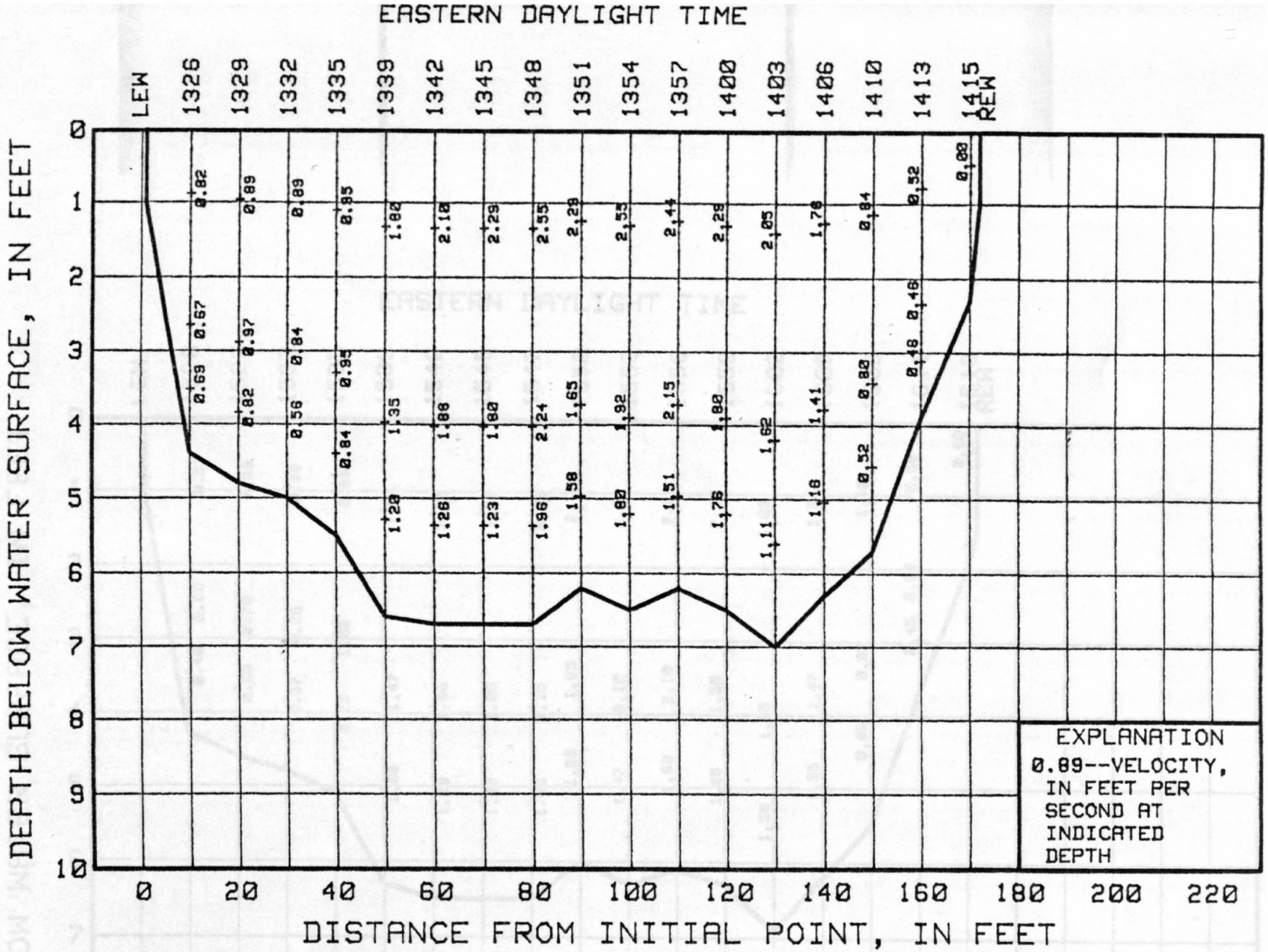

Figure 50.--Cross section J, width, depth, and velocity measurement 3, September 28, 1981.

EASTERN DAYLIGHT TIME
LEW
1526
1529
1532
1535
1539
1542
1545
1547
1550
1553
1556
1559
1602
1605
1608
1611
1613
REW
DEPTH BELOW WATER SURFACE, IN FEET
0
1
2
3
4
5
6
7
8
9
0.53
0.46
0.50
2.93
2.58
0.70
0.89
0.57
0.66
0.83
0.73
1.26
1.54
1.06
1.47
2.05
1.29
1.88
1.88
1.32
2.00
2.23
2.15
1.85
2.15
1.26
2.34
1.47
2.10
2.29
1.98
2.10
2.15
1.83
1.86
1.88
1.58
1.65
1.54
1.35
1.47
1.18
0.63
0.82
0.58
0.45
0.62
0.00
EXPLANATION
0.89--VELOCITY, IN FEET PER SECOND AT INDICATED

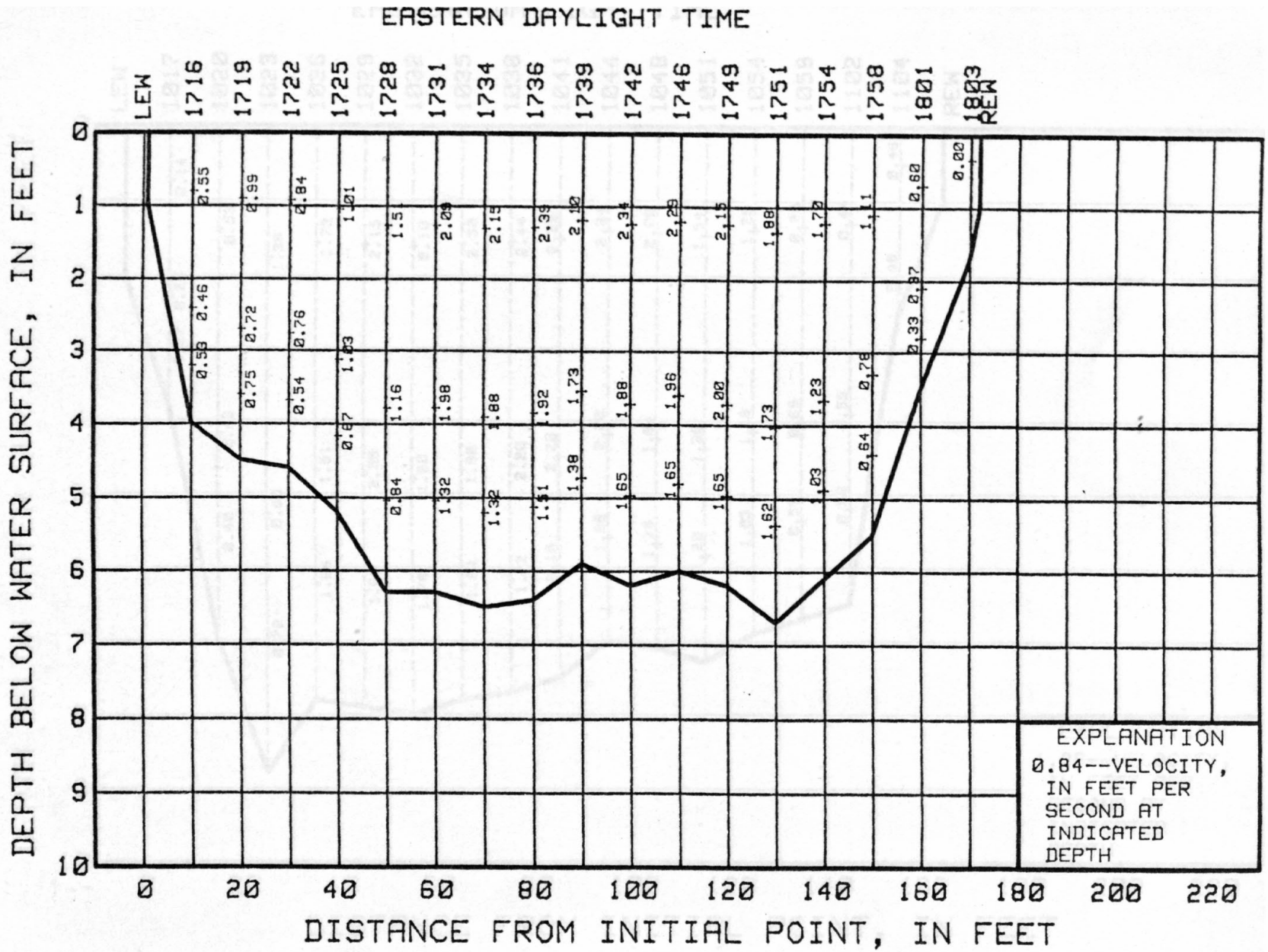

Figure 52.--Cross section J, width, depth, and velocity measurement 5, September 28, 1981.

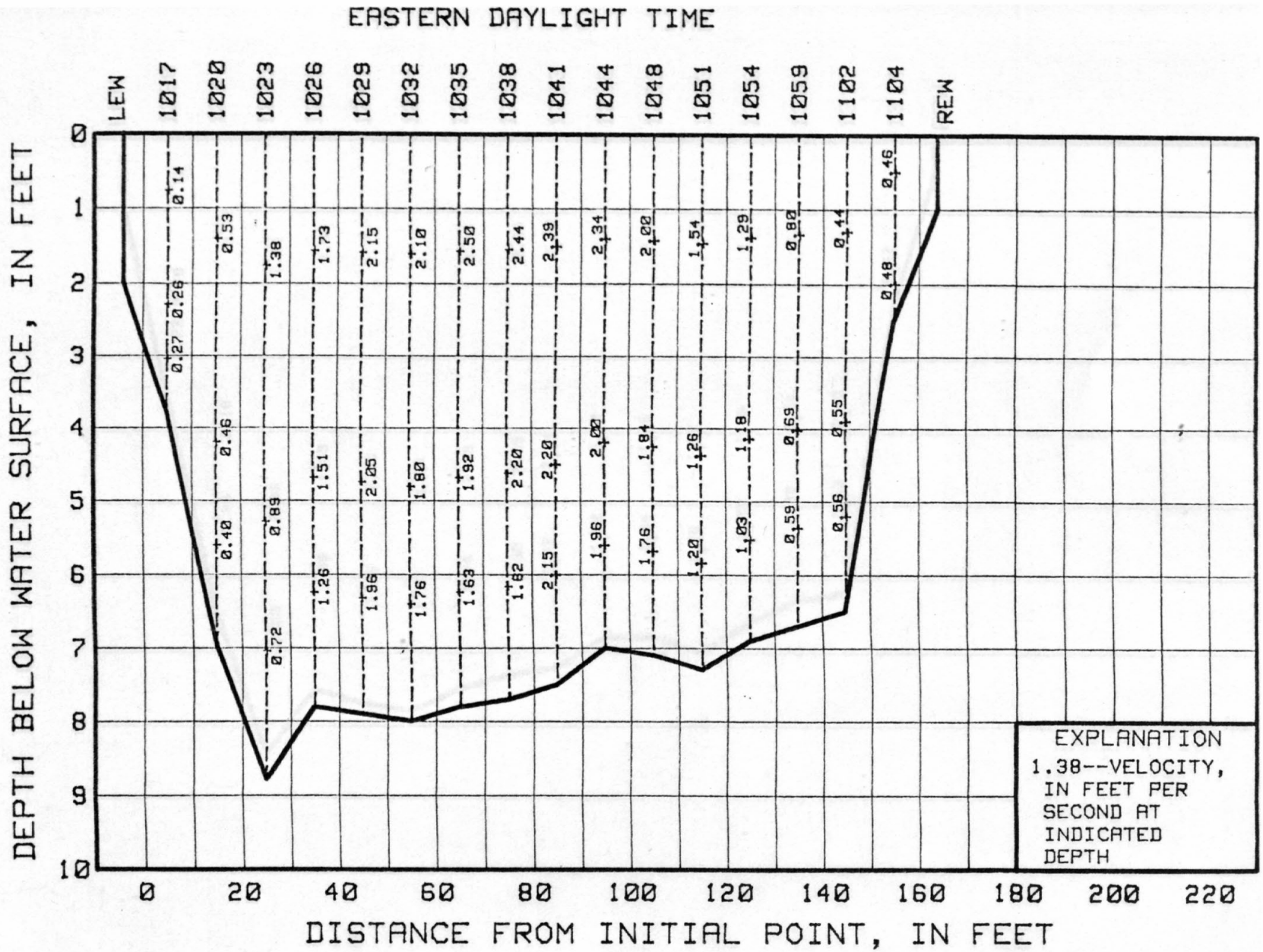

Figure 53.--Cross section K, width, depth, and velocity measurement 1, September 28, 1981.

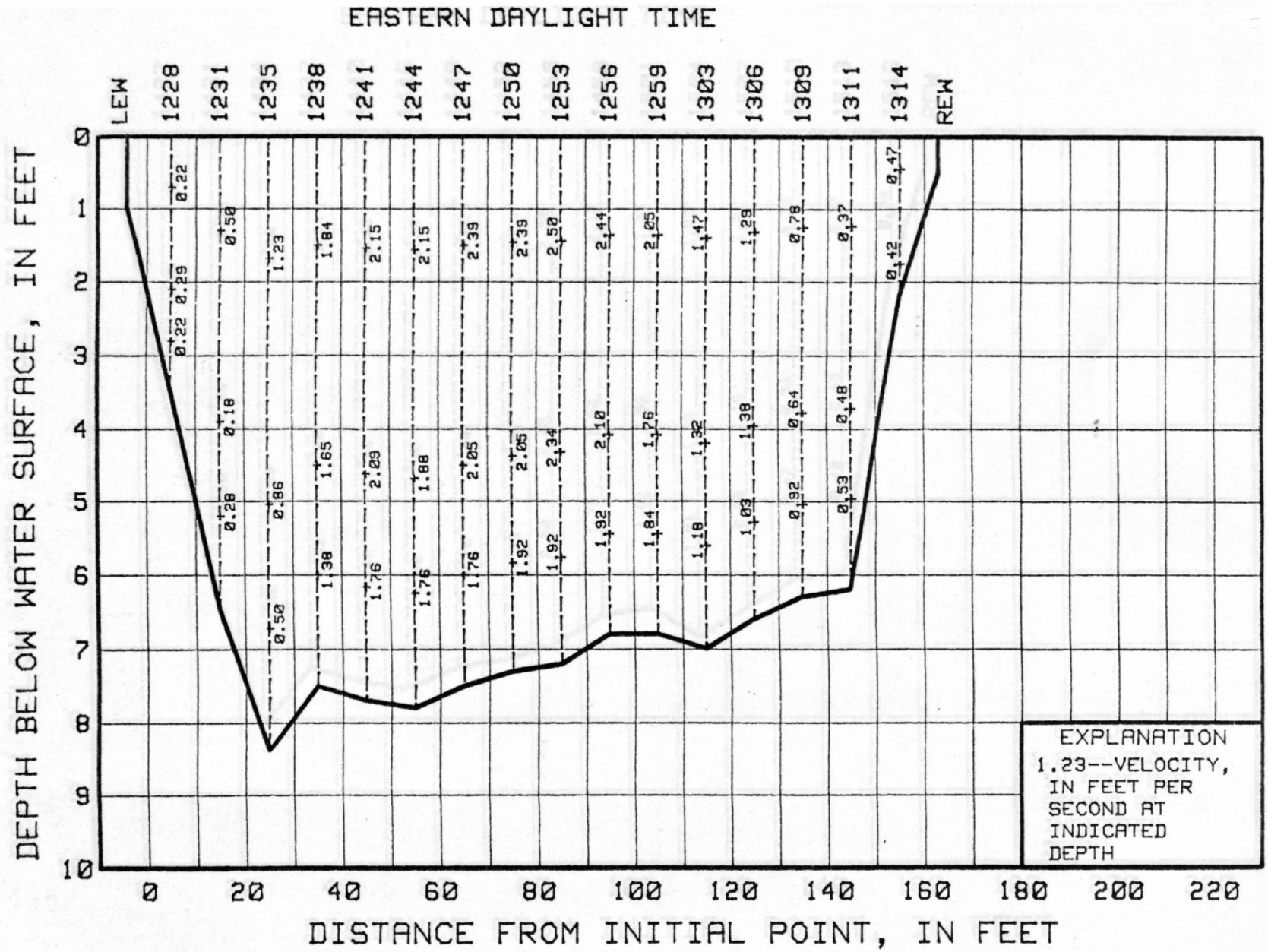

Figure 54.--Cross section K, width, depth, and velocity measurement 2, September 28, 1981.

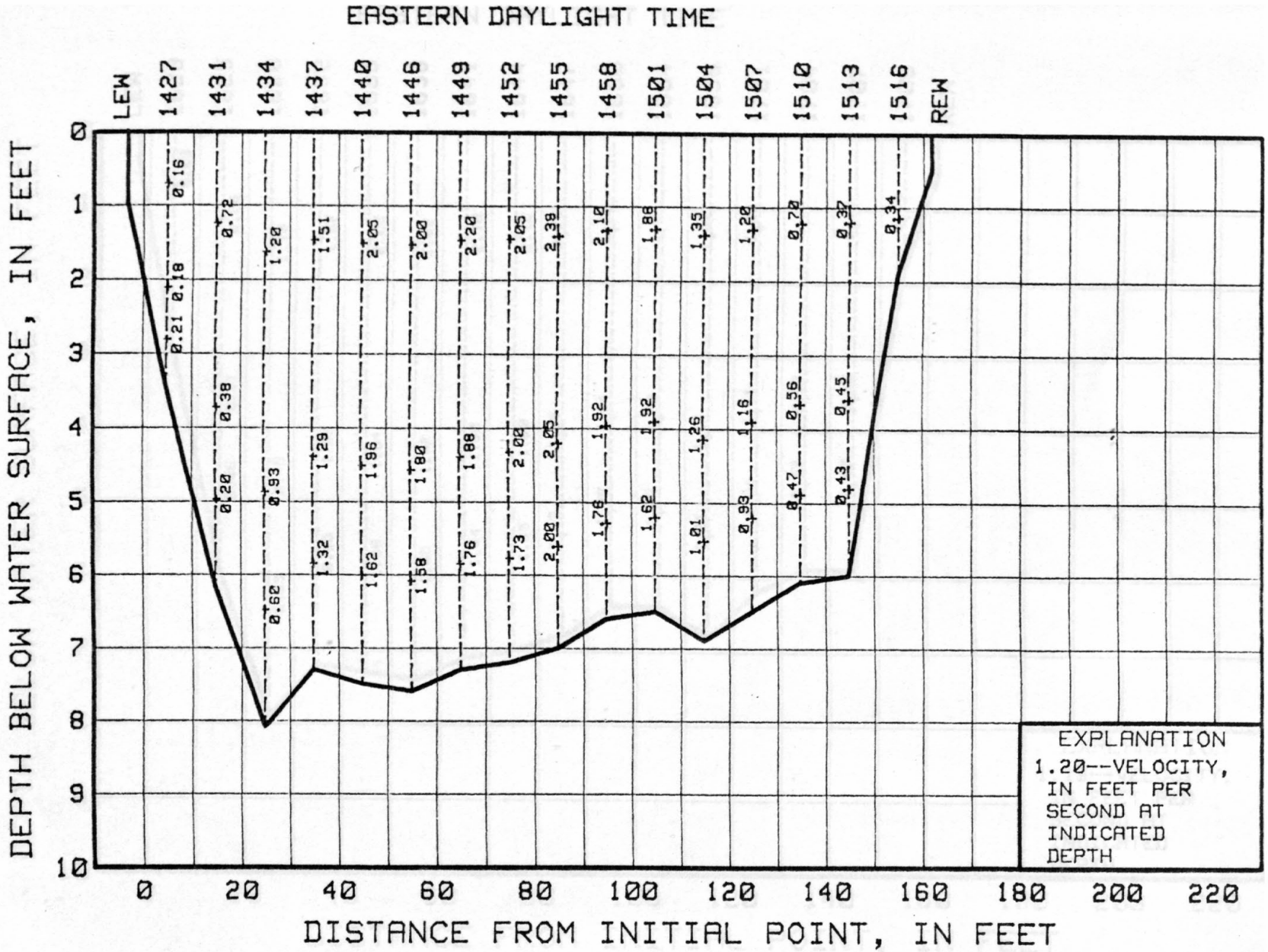

Figure 55.--Cross section K, width, depth, and velocity measurement 3, September 28, 1981.

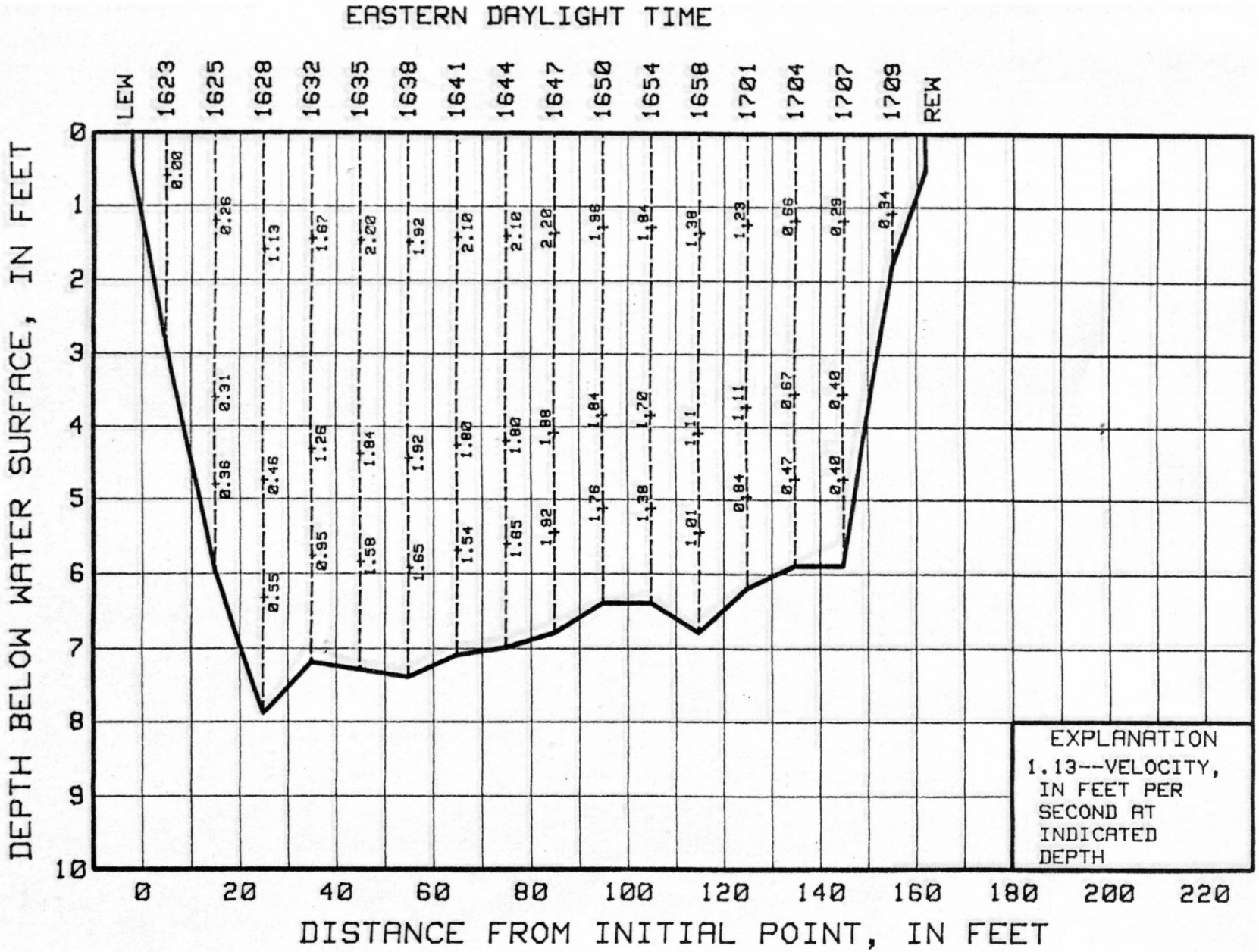

Figure 56.--Cross section K, width, depth, and velocity measurement 4, September 28, 1981.

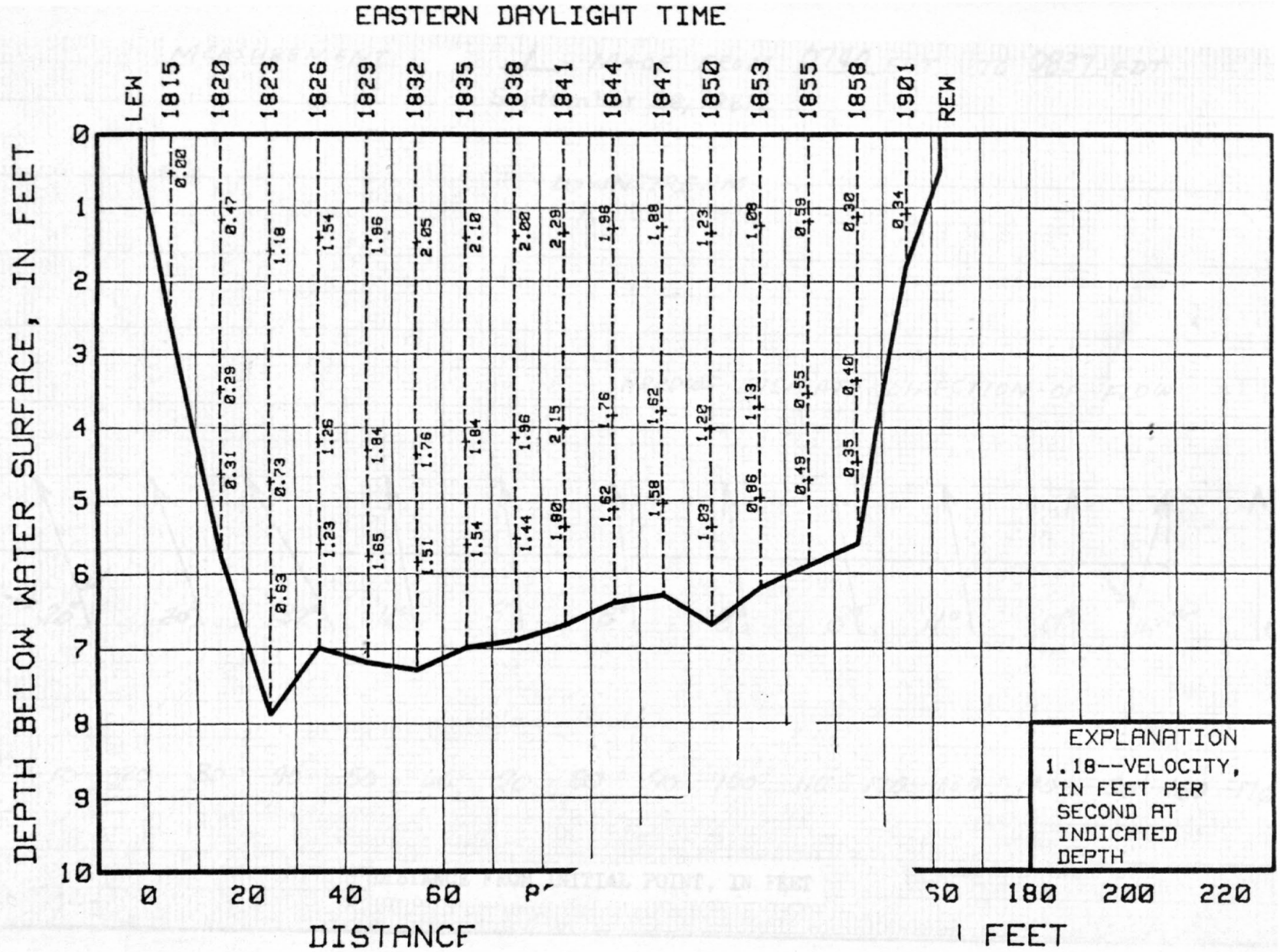

Figure 57.--C
measurem

and velocity

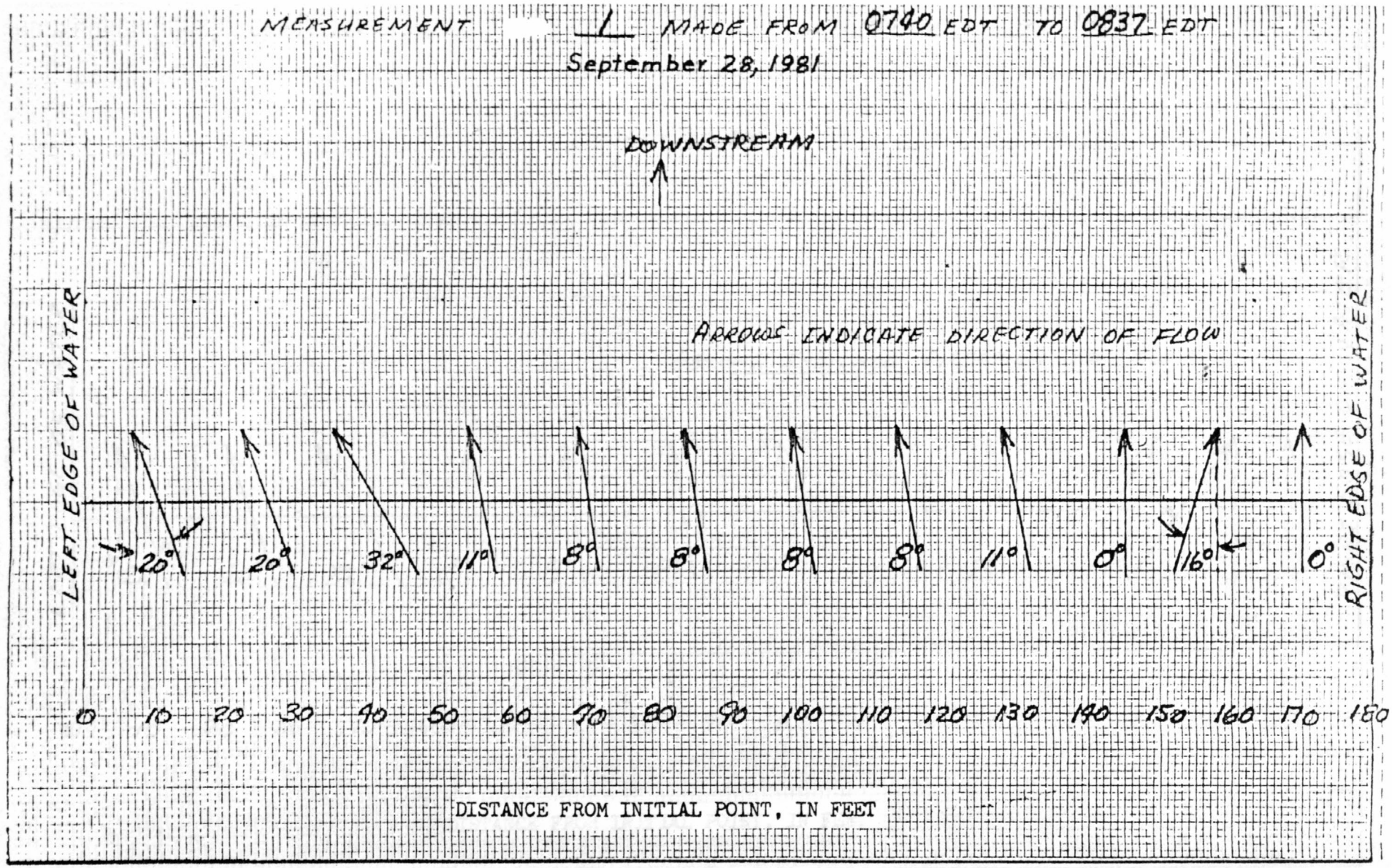

Figure 58.--Flow patterns of cross section A, measurement 1.

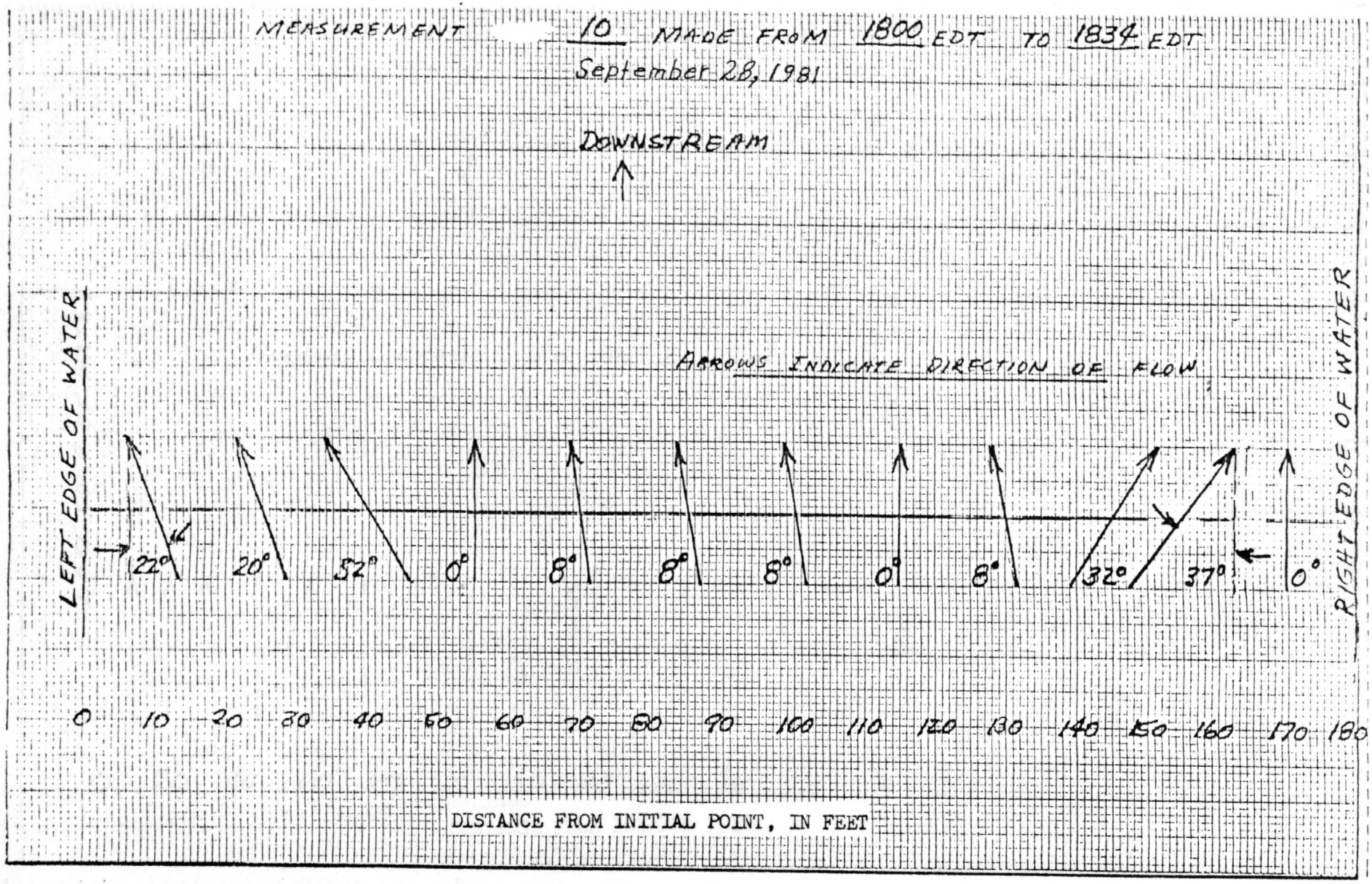

Figure 59.--Flow patterns of cross section A, measurement 10.

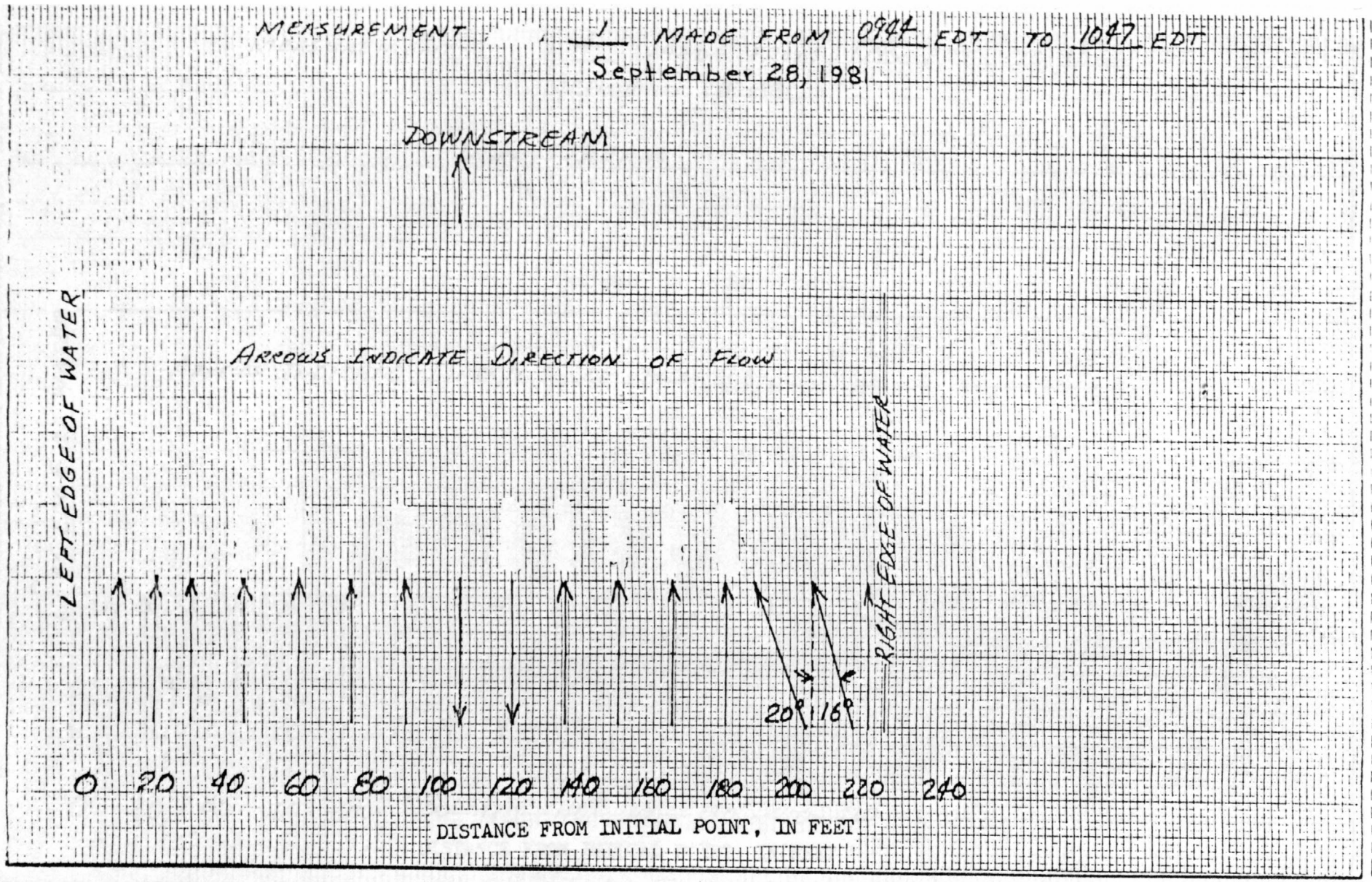

Figure 60.--Flow patterns of cross section E, measurement 1.

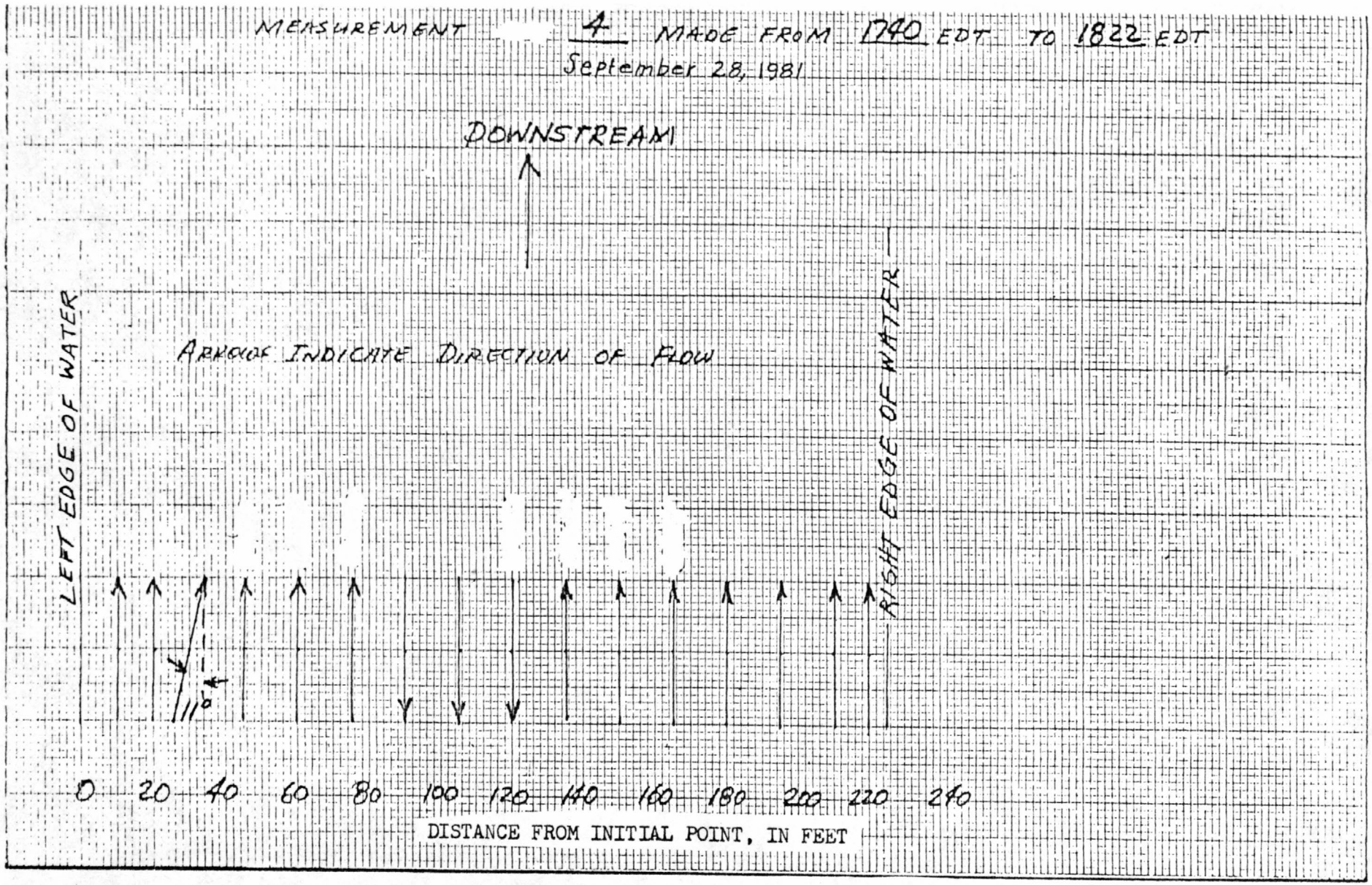

Figure 61.--Flow patterns of cross section E, measurement 4.