FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

CAVE CREEK AND EAST FORK OF CAVE CREEK
FLOODPLAIN DELINEATION STUDY
ARIZONA CANAL DIVERSION CHANNEL TO CAVE BUTTE DAM

FINAL HYDRAULICS REPORT

FEMA APPROVAL 1991
STUDY DATE 1990
MAPPING DATE 1991

Prepared By

BURGESS & NIPLE, INC.

Registered Professional Engineer (Civil)
CERTIFICATE NO.
19705
JAMES B.
MESCHLER
Date Signed 3/8/91
ARIZONA, U.S.A.

MARCH 1991

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7833 3B JOB NAME Cave Creek FIS SHEET 1 OF ____ SHEETS

SUBJECT Cave Creek Wash X-Sect. PREPARED BY EM DATE 10/21/89

CHECKED BY ____ DATE ____

Flood Control District of Maricopa County
Property of
Please Return to
2801 W. Durango
Phoenix, AZ 85009
FCDMC Library

FEMA Cross Section		B&N Cross Section	XLOB	XROB	XLCH	Comment
A		15.310 ✓	N/A	N/A	560	Begin COE channel
		15.454			760	
B		15.530			400	
C		15.680			792	
D		15.878			1045	
		15.921			230	Peoria Br.
		15.939			90	
F		16.023			446	
G		16.148			660	
H		16.264 ✓			612	
I		16.373			576	
J		16.481			570	
K		16.601			634	
L		16.694			491	
M		16.823			681	
N		16.902			417	
		-			-	
		16.971			364	Cactus Br.
		16.988			90	
P		17.061			385	
		17.206 ✓			769	Wier of sed. basin
R		17.360 ✓	820	830	813	Sediment basin
S±		17.494 ✓	750	670	707	Broad crested weir entering basin
T±	357'	17.588 ✓	440	560	496	Natural channel
U	280'	17.662 ✓	380	400	391	
V	195'	17.783 ✓	540	500	639	
W	200'	17.932 ✓	790	780	787	
		18.042	620	550	581	T-Bird Br.
		18.061	100	100	100	
X	86'	18.081 ✓	80	130	106	
		18.174 ✓	500	490	491	
		18.269 ✓	500	500	502	
		18.362 ✓	490	510	491	
		18.451 ✓	500	440	470	

BURGESS & NIPLE, INC. – COMPUTATION SHEET

JOB NO. 7833 JOB NAME Cave Creek FIS SHEET 2 OF ____ SHEETS

SUBJECT Cave Creek Wash X-Sect PREPARED BY JEM DATE 10/21/89

CHECKED BY ____ DATE ____

FEMA Cross Section	B&N Cross Section	XLOB	XROB	XLCH	Comment
	18.545 ✓	470	510	496	
	18.640 ✓	500	510	502	
	18.734 ✓	490	500	496	
	18.832 ✓	480	540	517	
	18.925 ✓	480	500	491	
	19.018 ✓	460	520	491	
	19.117 ✓	490	560	523	
	19.210 ✓	500	490	491	
	19.283	390	390	386	19th Ave Br.
	19.299	85	85	85	
	19.313 ✓	75	75	74	
	19.418 ✓	520	530	554	
AL 115'	19.556 ✓	730	720	729	
	19.625	580	70	364	Greenway Br.
	19.691	330	430	350	
	19.742 ✓	80	470	269	
	19.847 ✓	520	520	554	
	19.960 ✓	640	560	597	
	19.975	110.	70.	79	Tierra Buena Br.
	19.985	50.	50.	50.	
AQ 158'	20.049 ✓	310	350	338	
	20.144 ✓	490	500	502	
	20.242 ✓	420	560	517	
	20.335 ✓	510	470	491	
	20.342	1.	150.	63	11th Ave Br.
	20.367	105.	105.	105.	
	20.423 ✓	410.	200.	296.	
	20.429	1	60.	32.	10th Ave Br.
	20.445	85	85	85	
	20.529 ✓	540.	370	444	
	20.628 ✓	530	520	523	
	20.725 ✓	510	520	512	
	20.737 36	80	80	80	Phelps Br.
	20.750	68	68	68	

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7833 JOB NAME Cave Creek FIS SHEET 3 OF ____ SHEETS

SUBJECT Cave Creek Wash X-Sect PREPARED BY ____ DATE 10/21/89

CHECKED BY ____ DATE ____

FEMA Cross Section	B&N Cross Section	XLOB	XROB	XLCH	Comment
	20.820	380	350	370	Bell Rd Br.
	20.841	110	110	110	
BA 141'	20.845 60 ✓	~~640~~ 90	~~650~~ 110	634 100	
	20.942 ✓	530	490	512	
BD 163'	21.036 ✓	490	490	496	
BE 65'	21.127 ✓	400	500	480	
	21.230 ✓	560	500	544	
BH 123'	21.363 ✓	740	700	702	
BJ 357'	21.484 ✓	650	520	639	
BK 110'	21.576 ✓	320	480	486	
BL 205'	21.669 ✓	440	470	491	
BM 83'	21.742 ✓	430	390	385	
BN 121'	21.840 ✓	430	430	517	
BO 371'	21.895 ✓	330	220	290	
	21.927	180	180	180	Union Hills
	21.939	63	63	63	Culvert
BP 361'	21.953 ✓	~~330~~ 75	~~320~~ 75	~~306~~ 74	
BQ 263'	22.065 ✓.	430	630	591	
	22.165 ✓	530	530	528	
BR 299'	22.273 ✓	470	580	570	
BS 139'	22.410 ✓	750	630	723	
BT 307'	22.483 ✓	380	390	385	
	22.578 ✓	540	490	502	
	22.675 ✓	570	480	512	
	22.794 ✓	460	500	628	
	22.880 ✓	440	480	454	
	22.990 ✓	480	530	581	
	23.097 ✓	640	490	565	
	23.168 ✓	330	300	375	Beardsley Rd Low Cro
	23.255 ✓	470	450	459	
	23.334 ✓	400	420	417	
BW 212'	23.416 ✓	400	430	433	
	23.514 ✓	560	470	517	
	23.550 ✓	220	180	190	Road in Landfill/ Quarry

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7833 JOB NAME Cave Creek FIS SHEET 4 OF ____ SHEETS

SUBJECT Cave Creek Wash X-Sect PREPARED BY JEM DATE 10/27/89

CHECKED BY ____ DATE ____

FEMA Cross Section	B&N Cross Section	XLOB	XROB	XLCH	Comment
	23.591 ✓	130	240	216	
BZ 87'	23.691 ✓	510	540	528	
	23.815 ✓	650	680	655	
CB 76'	23.912 ✓	480	510	512	
	23.989 ✓	400	410	407	
	24.086	450	560	512	7th St Br.
	24.096	53	53	53	
CE 88'	24.106 ✓	80	20	53	
	24.195 ✓	470	460	470	
	24.322 ✓	640	630	671	
	24.444 ✓	640	600	644	
	24.542 ✓	470	530	517	
	24.635 ✓	650	220	491	Deer Valley Low Cr.
	24.738 ✓	350	630	544	
	24.838 ✓	470	450	528	
	24.943 ✓	530	570	554	
	25.048 ✓	580	520	554	
	25.163 ✓	640	580	607	
	25.262 ✓	470	570	523	
	25.374 ✓	680	300	591	
	25.434 ✓	400	190	317	
	25.500 ✓	250	420	349	<SEE NEXT SHEET
	25.561 ✓	20	20	21	
	25.680 ✓	580	660	628	
	25.786 ✓	600	470	560	
	25.947 ✓	870	830	850	
	26.058 ✓	540	570	586	
	26.152 ✓	240	550	496	
	26.265 ✓	580	610	597	
	26.372 ✓	600	510	565	
	26.492 ✓	640	610	634	
	26.582 ✓	460	480	475	
	26.673 ✓	510	460	480	
	26.784 ✓	590	530	586	

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7833 JOB NAME Cave Creek FIS SHEET 5 OF ____ SHEETS

SUBJECT Cave Creek Wash PREPARED BY JEM DATE 10/27/89

X-Sect CHECKED BY ____ DATE ____

FEMA Cross Section	B&N Cross Section	XLOB	XROB	XLCH	Comment
	26.883 ✓	530	500	523	
	26.984 ✓	480	460	533	
	27.060 ✓	270	470	401	
	27.166 ✓	560	560	560	
	27.294 ✓	710	630	676	
	25.523	120	120	121	CAP model
	25.534	58	58	58	CAP model
	25.551	90	90	90	CAP model
	25.557	32	32	32	CAP model

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7833 JOB NAME Cave Creek F/S SHEET 6 OF ____ SHEETS

SUBJECT East Fork X-Sect PREPARED BY JEM DATE 10/21/89

CHECKED BY ____ DATE ____

FEMA Cross Section		B&N Cross Section	XLOB	XROB	XLCH	Comment
AM	327'	0.029 ✓	380	450	430	
B±	260'	0.112 ✓	430	450	483	
D	166'	0.198 ✓	460	420	454	
E	213'	0.288 ✓	470	460	475	
F	270	0.398 ✓	600	540	581	
G	169	0.482 ✓	440	270	444	
		0.575 ✓	460	500	491	
		0.697 ✓	640	640	644	
H	180	0.826 ✓	680	660	681	
I	230	0.945 ✓	650	600	628	
		1.035 ✓	440	460	475	
J	170	1.121 ✓	480	440	454	
K	220	1.204 ✓	430	450	438	
L±	460	1.343 ✓ ~~1.315~~	720 ~~600~~	700 ~~450~~	734 ~~566~~	
M	400	1.420	380	420	407	

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7833 (3B) JOB NAME Cave Creek Floodplain SHEET 1 OF 4 SHEETS

SUBJECT Discharge vs. River Mile PREPARED BY E.E.L. DATE 11-9-89

CHECKED BY _____ DATE _____

	100	50	10	
15.310	18,700	16,000	10,600	✓
15.454				
15.530				
15.680				
15.878				
16.023				
16.148				
16.264				
16.373	18,700	16,000	10,600	
16.481	18,300	15,700	10,300	✓
16.601				
16.694				
16.823				
16.902				
16.971				
17.061				
17.206				
17.360	18,300	15,700	10,300	
17.494	15,300	13,200	8,700	✓
17.588				
17.662				
17.783				
17.932				
18.081				
18.174				
18.269				
18.362				
18.451				
18.545				
18.640				
18.734				
18.832				
18.925				
19.018	15,300	13,200	8,700	

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7833 (3B) JOB NAME Cave Creek Floodplain SHEET 2 OF 4 SHEETS

SUBJECT Discharge vs. River Mile PREPARED BY E.E.H. DATE 11-9-89

CHECKED BY _____ DATE _____

	100	50	10	
19.117	15,300	13,200	8,700	
19.210	15,300	13,200	8,700	
19.283	14,500	12,500	8,300	✓
19.299				
19.313				
19.418				
19.556	14,500	12,500	8,300	
19.625	5,900	5,000	3,300	✓
19.691				
19.742				
19.847				
19.960				
20.049				
20.144				
20.242				
20.335				
20.423				
20.529				
20.628				
20.725				
20.845				
20.942				
21.036				
21.127				
21.230				
21.363				
21.484				
21.576	5,900	5,000	3,300	
21.669	5,700	4,900	3,200	✓
21.742				
21.840				
21.895				
21.927				
21.939				
21.953				
22.065				
22.165				
22.273	5,700	4,900	3,200	

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7833 (3B) JOB NAME Cave Creek Floodplain SHEET 3 OF 4 SHEETS

SUBJECT Discharge vs. River Mile PREPARED BY E.E.U. DATE 11-9-89

CHECKED BY _____ DATE _____

	100	50	10	
22.410	5,700	4,900	3,200	
22.483				
22.578				
22.675				
22.794				
22.880				
22.990				
23.097				
23.168				
23.255				
23.334				
23.416				
23.514				
23.550				
23.591	5,700	4,900	3,200	
23.691	5,500	4,800	3,200	✓
23.815				
23.912				
23.989				
24.086				
24.096				
24.106				
24.195				
24.322				
24.444				
24.542				
24.635	5,500	4,800	3,200	
24.738	5,400	4,700	3,100	✓
24.838				
24.943				
25.048	5,400	4,700	3,100	
25.163	5,100	4,500	3,000	✓
25.262				
25.374				
25.434				
25.500	5,100	4,500	3,000	

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7833 (3B) JOB NAME Cave Creek Floodplain SHEET 4 OF 4 SHEETS

SUBJECT Discharge vs. River Mile PREPARED BY C.E.L. DATE 11-9-89

CHECKED BY _____ DATE _____

	100	50	10	
25.523	5,100	4,500	3,000	
25.534				
25.554				
25.557				
25.561	5,100	4,500	3,000	
25.680	2,700	2,400	1,600	✓
25.786	2,500	2,300	1,500	✓
25.947	2,400	2,200	1,400	✓
26.058	2,200	2,000	1,300	✓
26.152	2,000	1,800	1,200	✓
26.265	1,900	1,700	1,100	✓
26.372	1,800	1,600	1,000	✓
26.492	1,700	1,500	900	✓
26.582	1,500	1,300	800	✓
26.673	1,500	1,300	800	
26.784	1,300	1,100	700	✓
26.883	1,100	1,000	600	✓
26.984	1,000	900	500	✓
27.060	1,000	900	500	
27.166	800	700	400	✓
27.294	600	500	300	✓
Dam	420	360	200	

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. _____ JOB NAME Cave Creek Flood Study SHEET 1 OF 2 SHEETS

SUBJECT 19th Avenue Bridge PREPARED BY D.J. Pehrson DATE 11/4/89

CHECKED BY _____ DATE _____

SPAN CALCULATIONS

Bridge is perpendicular to the flow

$\therefore L = 2(30) + 2(24.5) = 109'$

SPECIAL BRIDGE CALCULATIONS

Existing X-sectional area = 109 (1324.2 - 1311.72) = 1360.32 S.F.

ELTRD = 1325.7 (see mapping)
ELLC = 1325.7 - 1.5
ELLC = 1124.2

* RECTANGULAR CHANNEL *

SS = 0
BWC = 109'
BWP = 3(1.5) = 4.5'

BAREA = 1360.32 - 3(1.5)(12.48) = 1304.16 S.F.

XK = 0.90
XKOR = 1.56
COFQ = 3.0

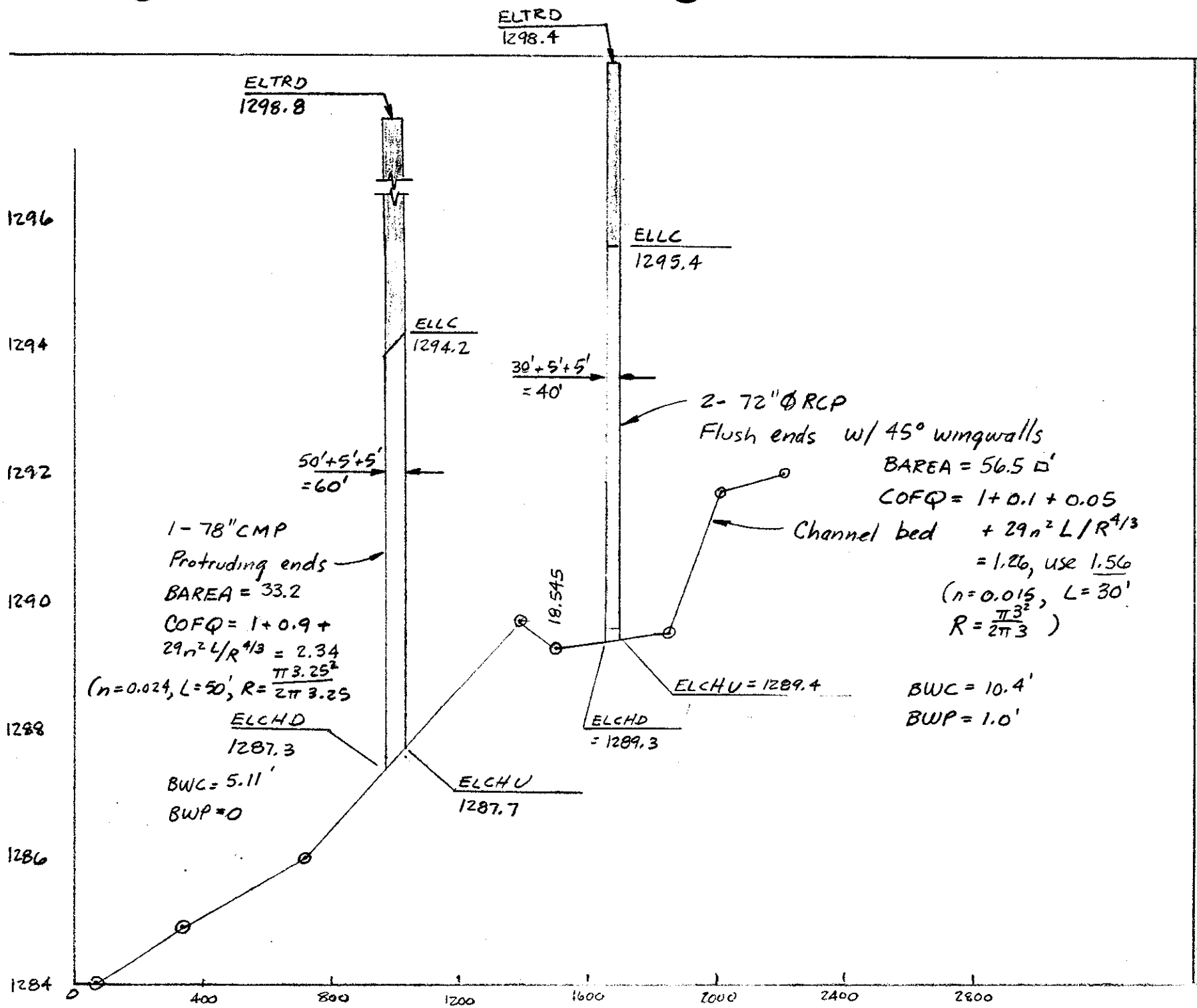
1300

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7833 JOB NAME Cave Creek FIS SHEET 1 OF 1 SHEETS

SUBJECT Golf Course Culverts PREPARED BY JEM DATE 11/19/89

CHECKED BY _____ DATE _____



BURGESS & NIPLE, INC. - COMPUTATION SHEET

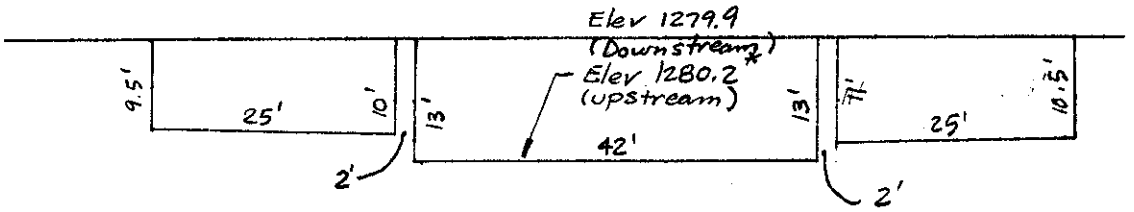
JOB NO. 7833 JOB NAME Cave Creek FIS SHEET 1 OF 1 SHEETS

SUBJECT Thunderbird Rd Bridge PREPARED BY JEM DATE 12/4/89

CHECKED BY DATE

Thunderbird Rd

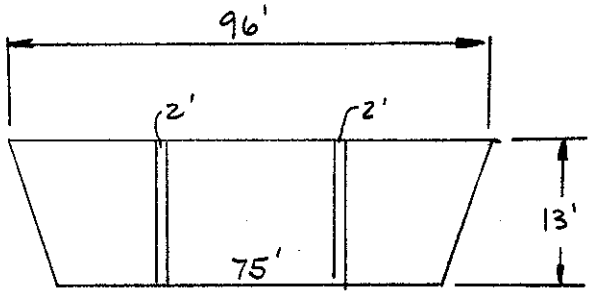
Measurements per Russ Crutt, MCFCD:



BAREA = 1059 □', compares to 996 □' per plans
- Justified by stream erosion.

* Low chord (1293.2) - 13' = 1280.2'

Trapezoid approximation:



For area = 1059 + 4×13 = 1111 □',
BWC = 75'
SS = 0.81

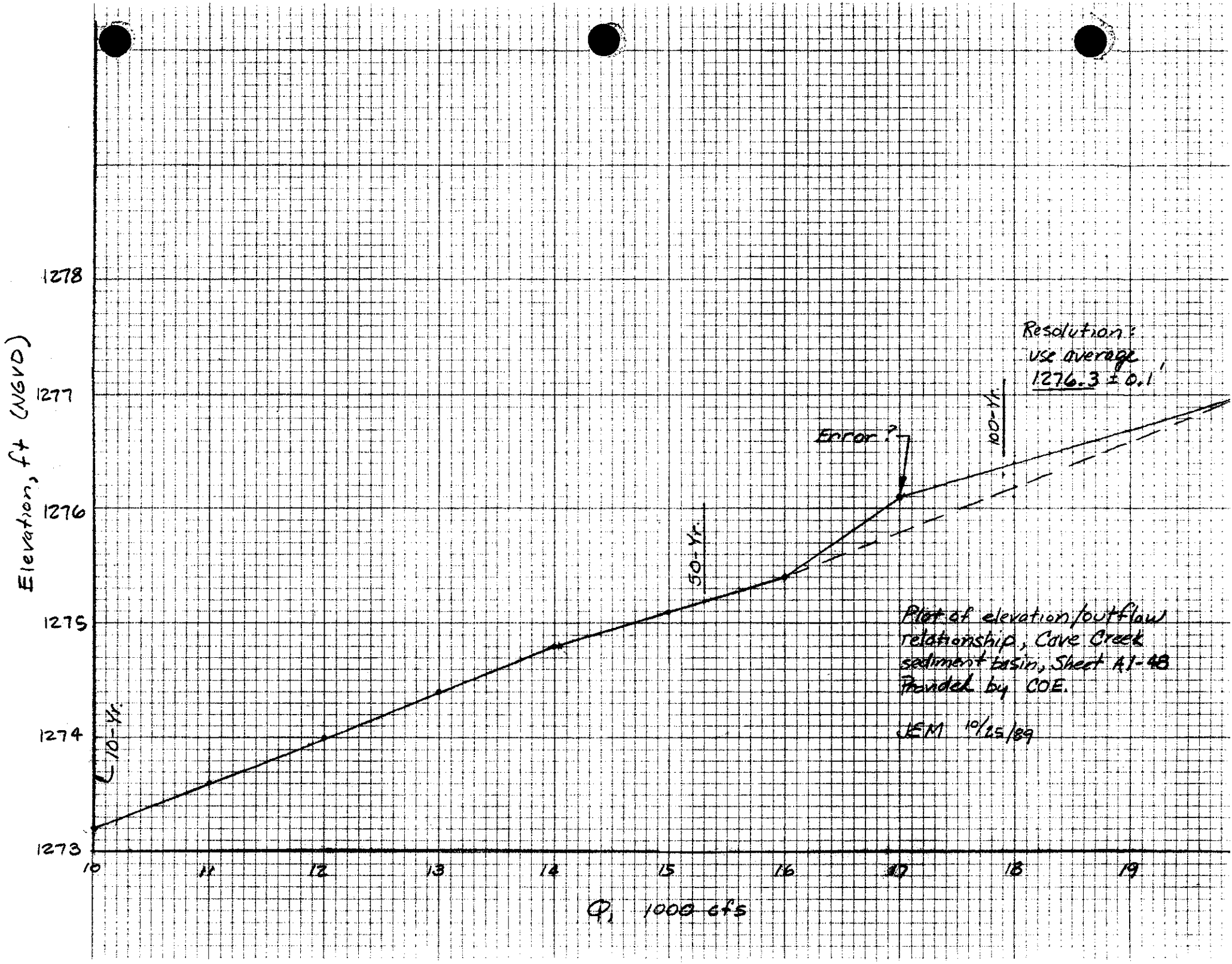
GR's at downstream section:

GR 1305. 9951. 1283.4 9952. 1282.9 9979. 1279.9 9980. 1279.9 10020.
GR 1281.9 10021. 1282.4 10048. 1305. 10049.

Table 8. Elevation-Storage-Outflow Relationships
Cave Creek Sediment Basin.

Capacity : 260 Acre-Feet
Area Covered : 34.2 Acres
Crest Elevation : 1267 Feet
Crest Length : 200 Feet
Trapezoidal Channel : z = 2

Elevation (ft)	Storage (acre-ft)	Outflow (ft^3/s)
1267.0	0	0
1267.2	2	50
1267.3	2	100
1267.5	3	200
1267.9	4	500
1268.2	7	800
1268.4	7	1,000
1269.2	16	2,000
1270.0	30	3,000
1270.4	36	4,000
1271.1	50	5,000
1272.0	68	7,000
1727.4	76	8,000
1272.9	86	9,000
1273.2	94	10,000
1273.6	102	11,000
1274.0	112	12,000
1274.4	120	13,000
1274.8	128	14,000
1275.1	136	15,000
1275.4	144	16,000
1276.1	160	17,000
1277.0	184	20,000


Elevation, ft (NGVD)
1278
1277
1276
1275
1274
1273
10
11
12
13
14
15
16
17
18
19
Q, 1000 cfs
10-Yr.
50-Yr.
100-Yr.
Error?
Resolution:
use average
1276.3 ± 0.1'
Plot of elevation/outflow relationship, Cove Creek sediment basin, Sheet A1-48 Provided by COE.
JEM 10/25/89

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. _____ JOB NAME Cave Creek Flood Study SHEET 1 OF 2 SHEETS

SUBJECT Thunderbird Rd. Bridge PREPARED BY DJ Pehrson DATE 11/4/89

CHECKED BY _____ DATE _____

SPAN CALCULATIONS

skew = 28° skew length = 2(31.32) + 50 - 2(2.5) = 107.64'

Perpendicular projection to channel:

$L_\perp = 107.64 (\cos 28°) = 95.04'$

Midspan $L_\perp = 50(\cos 28°) = 44.15'$

Endspan $L_\perp = (31.32 - 2.5) \cos 28° = 25.45'$

SPECIAL BRIDGE CALCULATIONS

Existing X-Sectional Area = 1040.25 S.F.

ELLC = (1293.5 + 1292.8)/2 = 1293.15

ELTRD = 1293.15 + 5.0 = 1298.15

* RECTANGULAR CHANNEL *

(1293.15 - ELCHU) 95.04 = 1040.25

ELCHU = 1282.20

ELCHD = 1282.20 - (91)(0.0085)

ELCHD = 1281.43

SS = 0

BWC = 95.04'

BWP = 2(2) = 4'

BAREA = 1040.25 - 4(10.95) = 996.45 S.F.

XK = 1.05

XKOR = 1.56

COFQ = 3.0

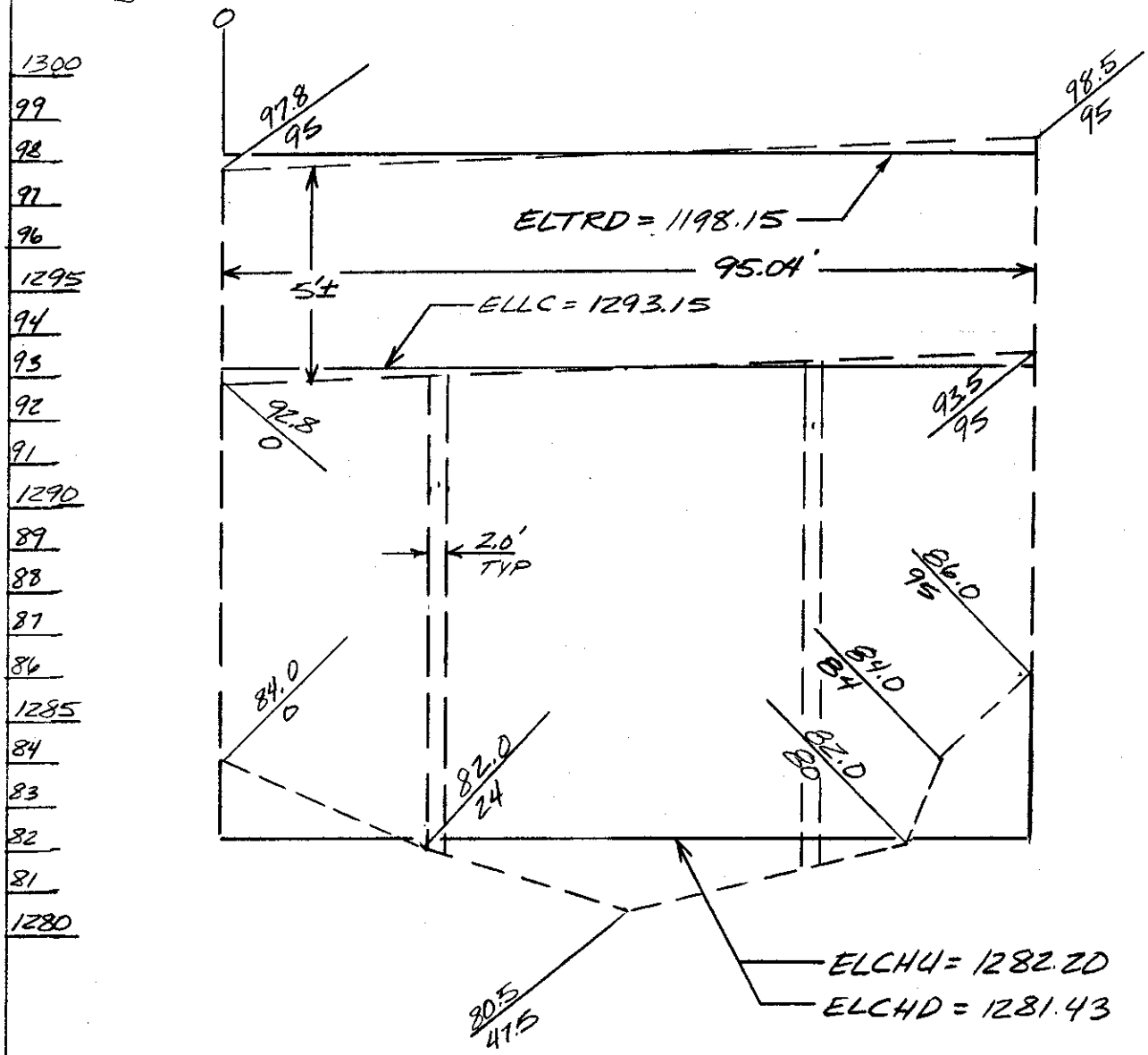
BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. _____ JOB NAME Cave Creek Flood Study SHEET 2 OF 2 SHEETS

SUBJECT Thunderbird Rd. Bridge PREPARED BY DJ Pehrson DATE 11/4/89

Cross Section CHECKED BY _____ DATE _____

Looking Upstream



BWC = 95.04'

BWP = 4'

BAREA = 996.45 S.F.

SS = 0.0.

LENGTH OF BRIDGE SECTION = 91'

XK = 1.05

XKOR = 1.56

COFQ = 3.0

PSXECE @ 18.042 = 1281.4 - 1279± = 2.4

nominal average channel bottom @ 17.932

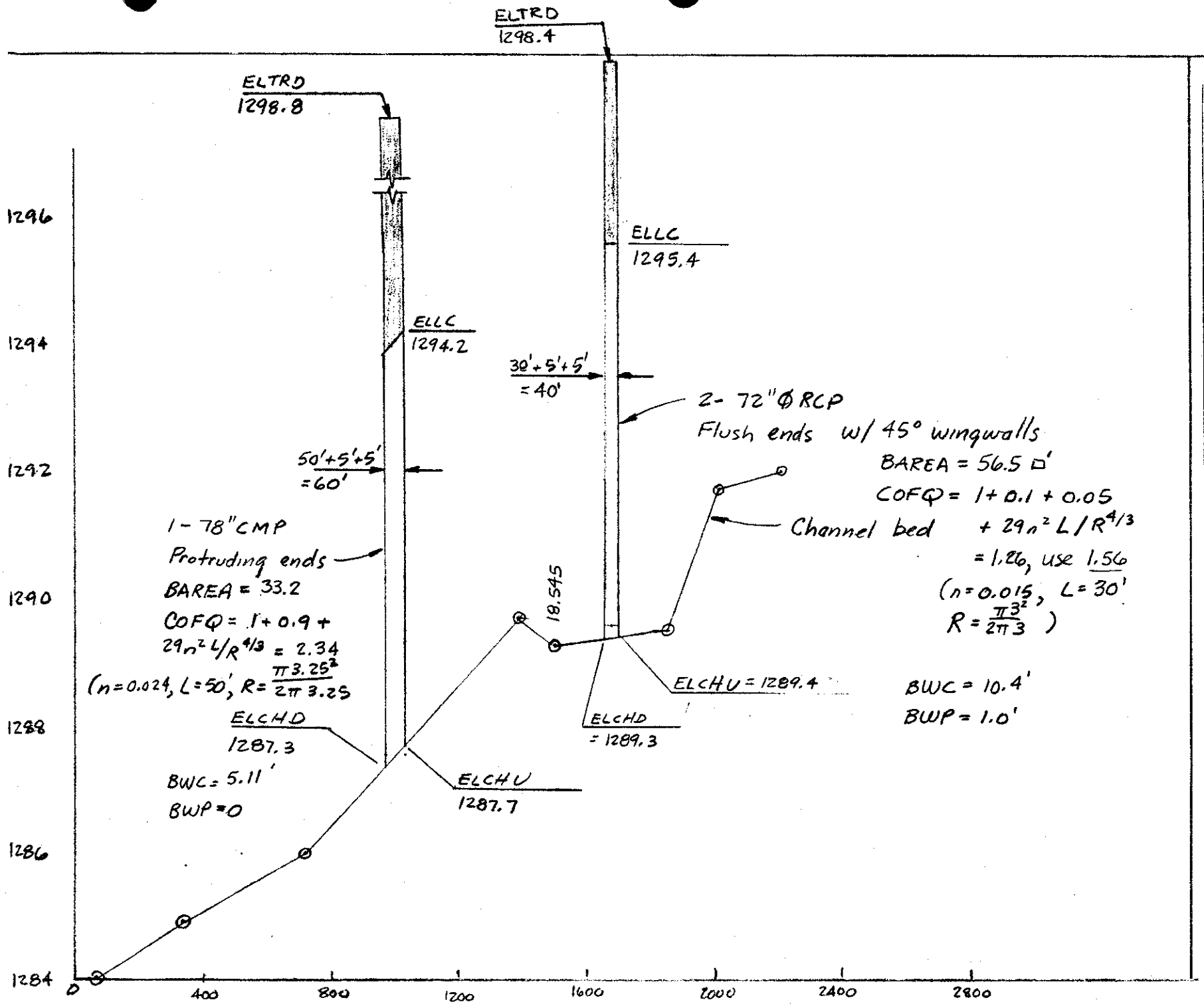
PSXECE @ 18.061 = 1282.2 - 1281.4 = 0.8

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7833 JOB NAME Cave Creek FIS SHEET 1 OF 1 SHEETS

SUBJECT Golf Course Culverts PREPARED BY JEM DATE 11/14/89

CHECKED BY _____ DATE _____



BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. _____ JOB NAME Cave Creek Flood Study SHEET 1 OF 2 SHEETS

SUBJECT 19th Avenue Bridge PREPARED BY D.J. Pehrson DATE 11/4/89

CHECKED BY _____ DATE _____

SPAN CALCULATIONS

Bridge is perpendicular to the flow

$\therefore L = 2(30) + 2(24.5) = 109'$

SPECIAL BRIDGE CALCULATIONS

Existing X-sectional area = 109 (1324.2 - 1311.72) = 1360.32 S.F.

ELTRD = 1325.7 (see mapping)
ELLC = 1325.7 - 1.5
ELLC = 1124.2

* RECTANGULAR CHANNEL *

SS = 0
BWC = 109'
BWP = 3(1.5) = 4.5'

BAREA = 1360.32 - 3(1.5)(12.48) = 1304.16 S.F.

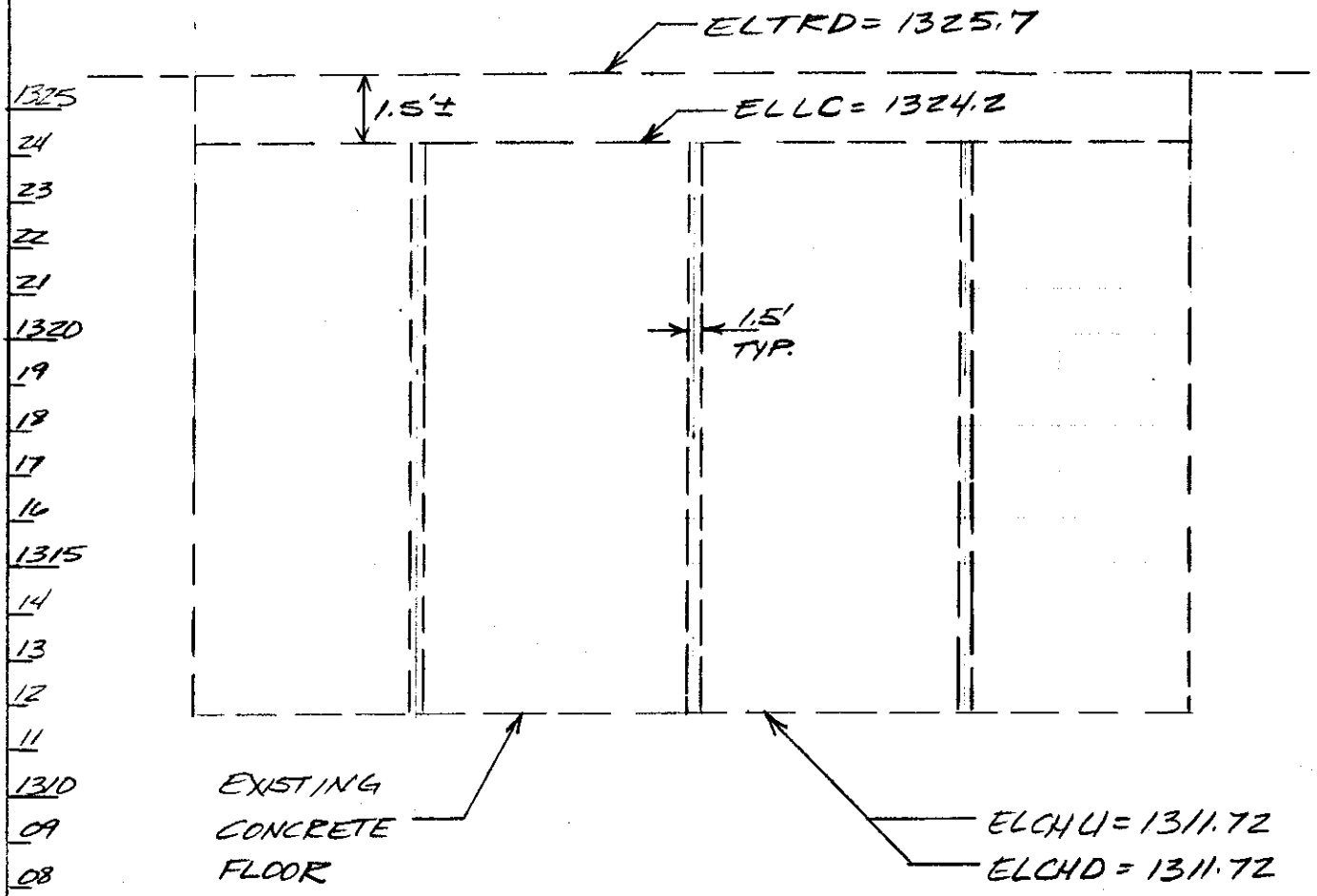
XK = 0.90
XKOR = 1.56
COFQ = 3.0

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. _____ JOB NAME Cave Creek Flood Study SHEET 2 OF 2 SHEETS

SUBJECT 19th Avenue Bridge PREPARED BY D.J. Pehrsen DATE 11/4/89

Cross Section CHECKED BY _____ DATE _____



SS = 0.0
BWC = 109'
BWP = 4.5'

LENGTH OF BRIDGE SECTION = 76.5'

BAREA = 1304.16 S.F.

XK = 0.90
XKOR = 1.56
COFQ = 3.0

PSXECE @ 19.283 = 1311.7 − 1301.4± = 10.3

(nominal average channel bottom @ 19.210

PSXECE @ 19.299 = 1311.7 − 1311.7 = 0

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. _____ JOB NAME Cave Creek Flood Study SHEET 1 OF 2 SHEETS

SUBJECT Greenway Rd. Bridge PREPARED BY D.J. Pehrson DATE 11/4/89

CHECKED BY _____ DATE _____

SPAN CALCULATIONS

Skew = 71°20'32"
Perpendicular projection shown on plans.

Span = 30' from face of abutment to center of pier.

$\therefore L = 2 \times 30 = 60'$

SPECIAL BRIDGE CALCULATIONS

ELTRD = 1332.8 (see mapping)
ELLC = 1332.8 - 4.5' = 1328.3

Channel slope = 0.31%

ELCHU = 1319.2 - 200(0.0031)

ELCHU = 1318.58

ELCHD = 1319.2 - 510(0.0031)

ELCHD = 1317.61

Cross Sectional Area:

$A_x = (1328.3 - 1318.58)\,60 = 583.20$ S.F.

RECTANGULAR CHANNEL

SS = 0.0
BWC = 60'
BWP = 2' (Ignored piers next to abutments for facia girders)

BAREA = 583.20 - 2(9.72) = 563.76 S.F.

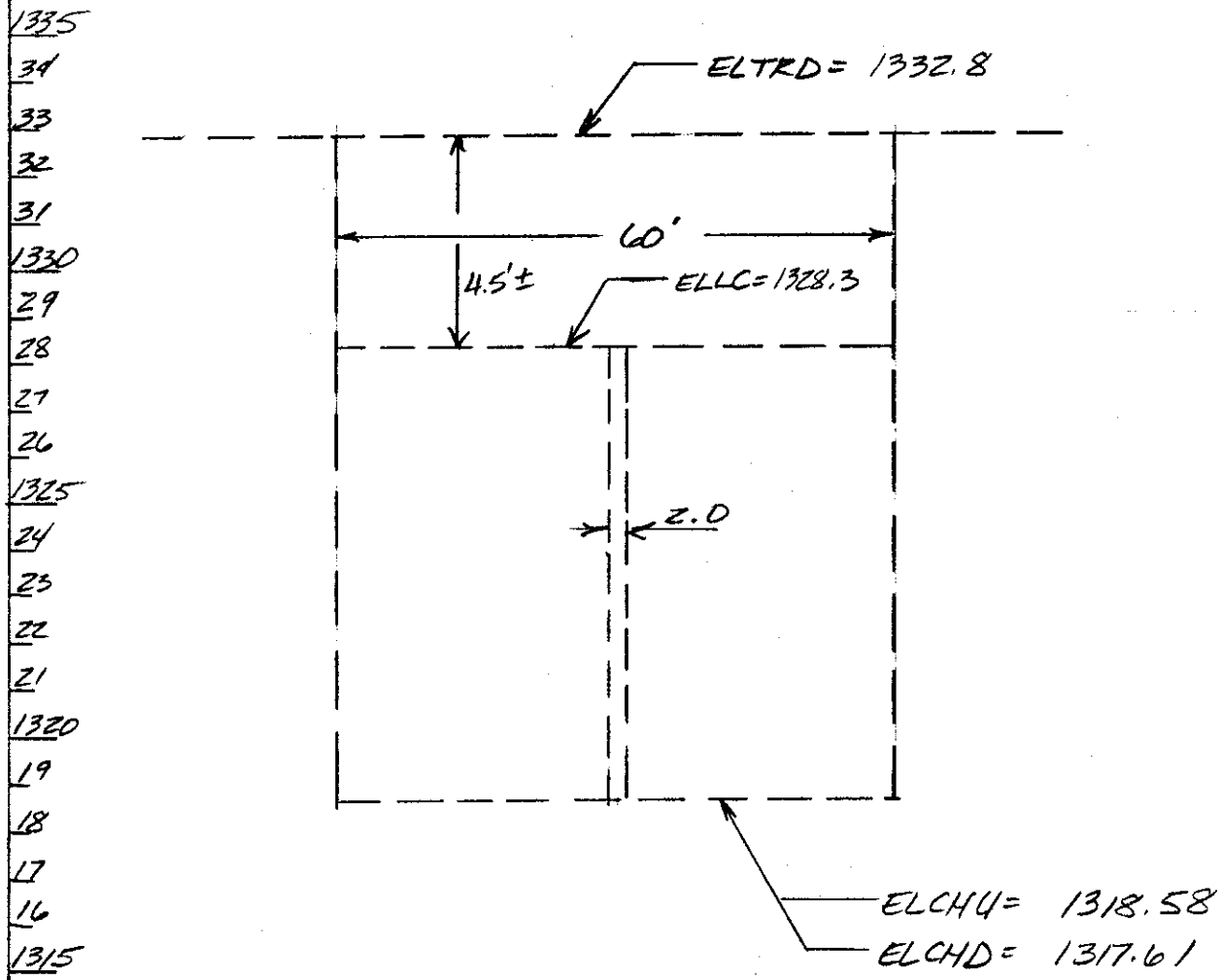
XK = 1.05
XKOR = 1.56
COFQ = 3.0

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. _____ JOB NAME Cave Creek Flood Study SHEET 2 OF 2 SHEETS

SUBJECT Greenway Rd. Bridge PREPARED BY D.J. Pehrson DATE 11/4/89

CHECKED BY _____ DATE _____



SS = 0.0
BWC = 60'
BWP = 2'
BAREA = 563.76 S.F.

LENGTH OF BRIDGE SECTION = 300'

XK = 1.05
XKOR = 1.56
COFQ = 3.0

PSXECE = 1317.6 - 1319.3± = -1.7 @ 19.625 (d/s face)
└nominal average channel bottom @ Sect 19.742

PSXECE = 1318.6 - 1317.6 = 1.0 @ 19.691 (U/S face)

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. _____ JOB NAME Cave Creek Flood Study SHEET 1 OF 2 SHEETS

SUBJECT Tierra Buena Bridge PREPARED BY D.J. Pehrson DATE 11/4/89

CHECKED BY _____ DATE _____

SPAN CALCULATIONS

4 BARREL BOX CULVERT (ADOT STD. DET.)
12'x10' OPENING
WIDTH OF BOX WALL = 12"

TOTAL SPAN = 4(12) + 3(1) = 51'

SPECIAL BRIDGE CALCULATIONS

ELTRD = 1336.9

ELCHU = 1336.9 - 12.83 (difference shown per plan)
ELCHU = 1324.07

ELCHD = 1324.07 - 51.42(0.0049)
ELCHD = 1323.82

ELLC = 1324.07 + 10.0 = 1334.07

Cross-Sectional Area:

A_x = 51(10) = 510 S.F.

* RECTANGULAR CHANNEL *

SS = 0.0
BWC = 51
BWP = 3(1) = 3

BAREA = 510 - 3(10) = 480 S.F.

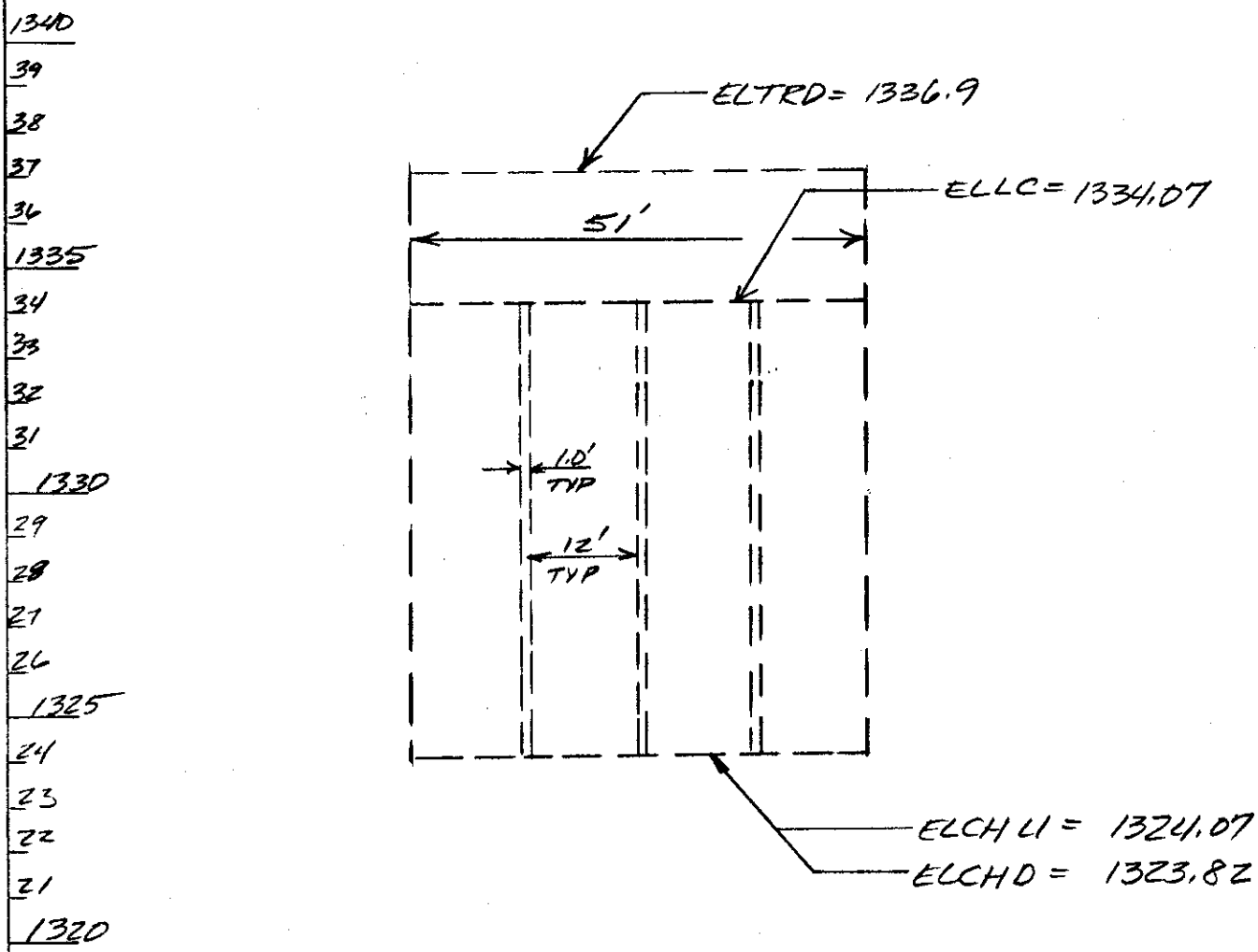
XK = 1.25
XKOR = 1.56
COFQ = 3.0

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. _____ JOB NAME Cave Creek Flood Study SHEET 2 OF 2 SHEETS

SUBJECT Tierra Buena Bridge PREPARED BY D.J. Pehrson DATE 11/4/89

Cross-Section CHECKED BY _____ DATE _____



SS=0.0
BWC=51'
BWP= 3'
BAREA= 480 S.F.

LENGTH OF BRIDGE SECTION= 51.42'

XK = 1.25
XKOR = 1.56
COFQ = 3.0

PSXECE = 0 - ELCHU$D ARE BELOW D.S. THALWEG.

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. _____ JOB NAME Cave Creek Flood Study SHEET 1 OF 2 SHEETS

SUBJECT 11th Avenue Bridge PREPARED BY D.J. Pehrson DATE 11/4/89

CHECKED BY _____ DATE _____

SPAN CALCULATIONS

4 Barrel Box Culvert (ADOT Std. Det.)
12'x12' Opening
Sidewall width = 12"

Total span = 4(12) + 3(1) = 51'

SPECIAL BRIDGE CALCULATIONS

ELTRD = 1352.5 (see mapping)

ELCHU = 1352.5 - 14.79 = 1337.71 (Δ elev. from plans)

ELCHD = 1337.71 - 0.5 = 1337.21 (Δ elev. from plans)

ELLC = 1337.71 + 12 = 1349.71

Cross-Sectional Area:

$A_x = 51(12) = 612$ S.F.

* RECTANGULAR CHANNEL *

SS = 0.0
BWC = 51
BWP = 3(1) = 3'

BAREA = 612 - (3)(12) = 576 S.F.

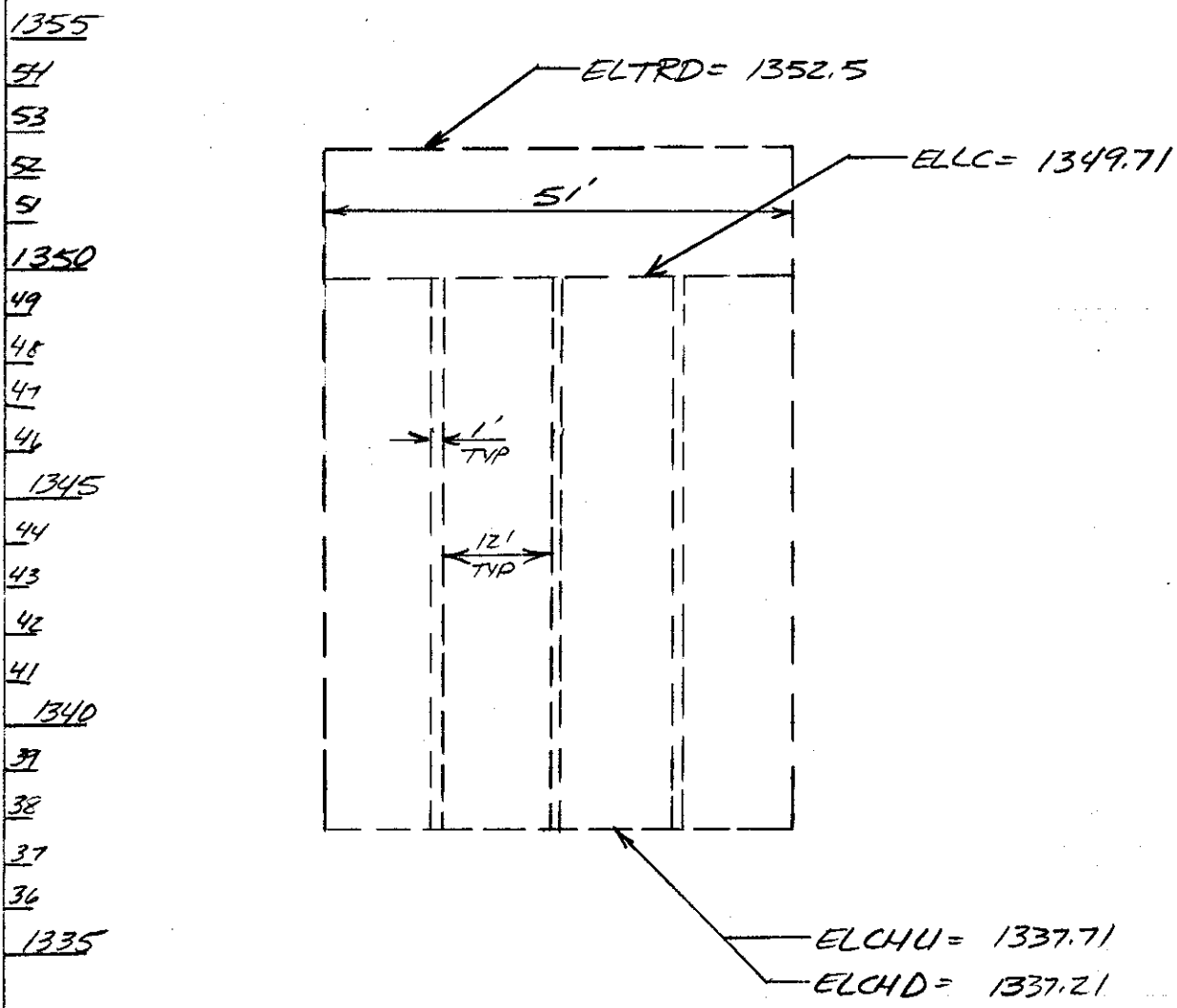
XK = 1.25
XKOR = 1.56
COFQ = 3.0

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. _____ JOB NAME Cave Creek Flood Study SHEET 2 OF 2 SHEETS

SUBJECT 11th Avenue Bridge PREPARED BY D.J. Pehrson DATE 11/4/89

Cross-Section CHECKED BY _____ DATE _____



SS = 0.0

BWC = 51'

BWP = 3'

BAREA = 576 S.F

LENGTH OF BRIDGE SECTION = 90.28'

XK = 1.25

XKOR = 1.56

COFQ = 3.0

PSXECE = 0 - DS X-SECTION IS HIGHER THAN BRIDGE.

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. _____ JOB NAME Cave Creek Flood Study SHEET 1 OF 2 SHEETS

SUBJECT 10th Avenue Bridge PREPARED BY D.J. Pehrson DATE 11/4/89

CHECKED BY _____ DATE _____

SPAN CALCULATIONS

4 Barrel Box Culvert (ADOT Std. Det.)
12'x12' Opening.
Sidewall width = 12"

SPECIAL BRIDGE CALCULATIONS

ELTRD = 1353.5 (see mapping)

ELCHU = 1353.5 − 14.18 = 1339.32 (Δelev per plans)

ELCHD = ELCHU = 1339.32 (as-built measurements)

ELLC = 1339.32 + 12 = 1351.32

Cross-Sectional Area:

A_x = 51 x 12 = 612 S.F.

* RECTANGULAR CHANNEL *

SS = 0.0
BWC = 51'
BWP = 3(1) = 3'

BAREA = 612 − (3)(12) = 576 S.F.

XK = 1.25
XKOR = 1.56
COFQ = 3.0

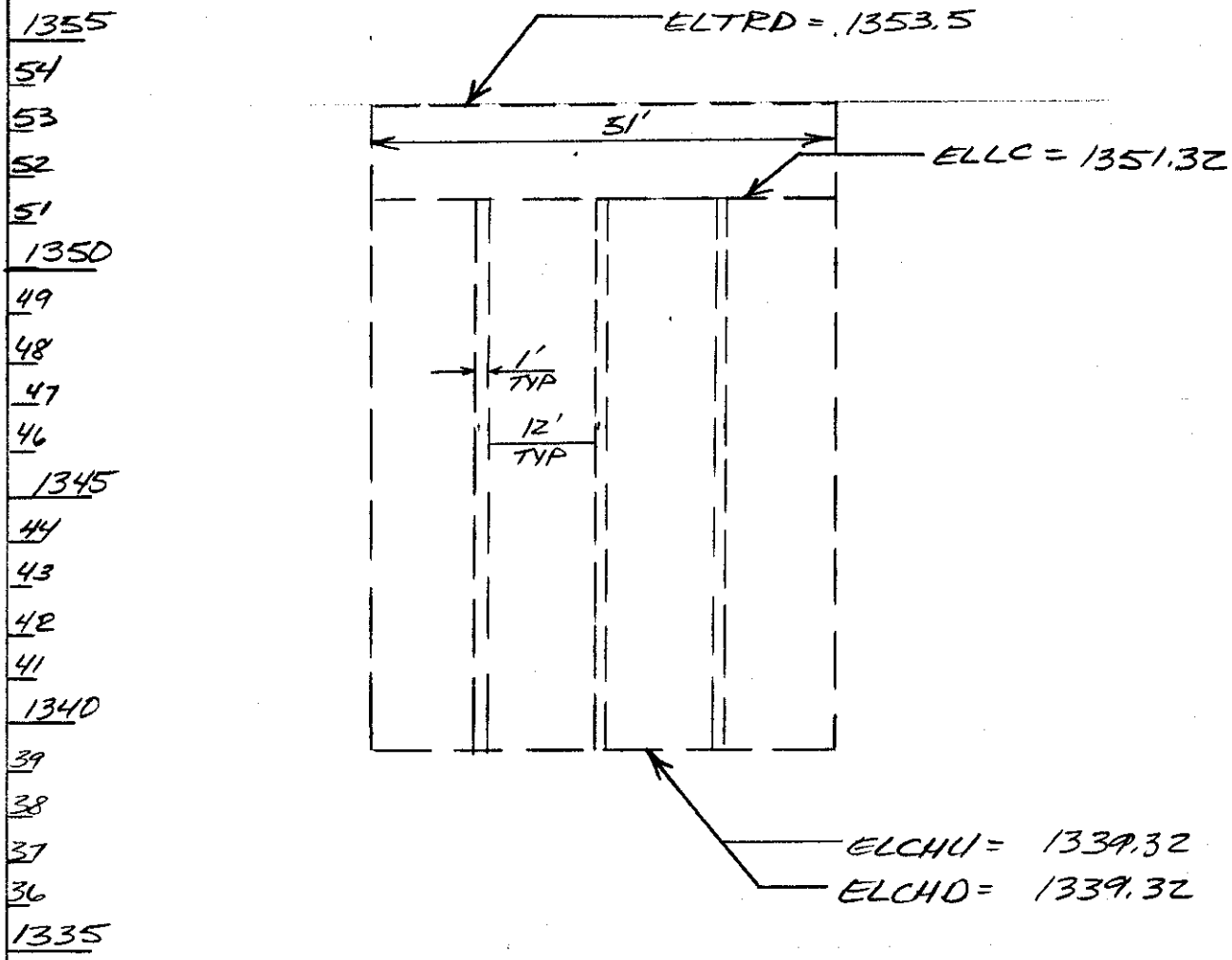
PSXECE = 0 − Sect very close to d.s. face

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. _____ JOB NAME Cave Creek Flood Study SHEET 2 OF 2 SHEETS

SUBJECT 10th Ave Bridge PREPARED BY D.J. Pehrson DATE 11/4/89

CHECKED BY _____ DATE _____



SS = 0.0
BWC = 51'
BWP = 3'
BAREA = 576 S.F.

LENGTH OF BRIDGE SECTION = 60.42'

XK = 1.25
XKOR = 1.56
COFQ = 3.0

BURGESS & NIPLE, INC. – COMPUTATION SHEET

JOB NO. _____ JOB NAME Cave Creek Flood Study SHEET 1 OF 2 SHEETS

SUBJECT Phelps Road Bridge PREPARED BY D.J. Pehrson DATE 11/6/89

CHECKED BY _____ DATE _____

SPAN CALCULATIONS

4 Barrel Box Culvert (ADOT Std. Det.)
12'x12' Opening
Sidewall width = 12"

Total Span = 4(12) + 3(1) = 51'

SPECIAL BRIDGE CALCULATIONS

ELTRD = 1366.5 (see mapping) 1364 in overbanks

ELCHU = 1366.5 - 15.46 = 1351.04 (Δ elev from plans)

ELCHD = 1351.04 - 0.10 = 1350.94 (per as-built plans)

ELLC = 1351.04 + 12 = 1363.04

Cross-Sectional Area

A_x = (51)(12) = 612 S.F.

* RECTANGULAR CHANNEL *

SS = 0.0
BWC = 51'
BWP = 3(1) = 3'

BAREA = 612 - 3(12) = 576 S.F.

XK = 1.25
XKOR = 1.56
COFQ = 3.0

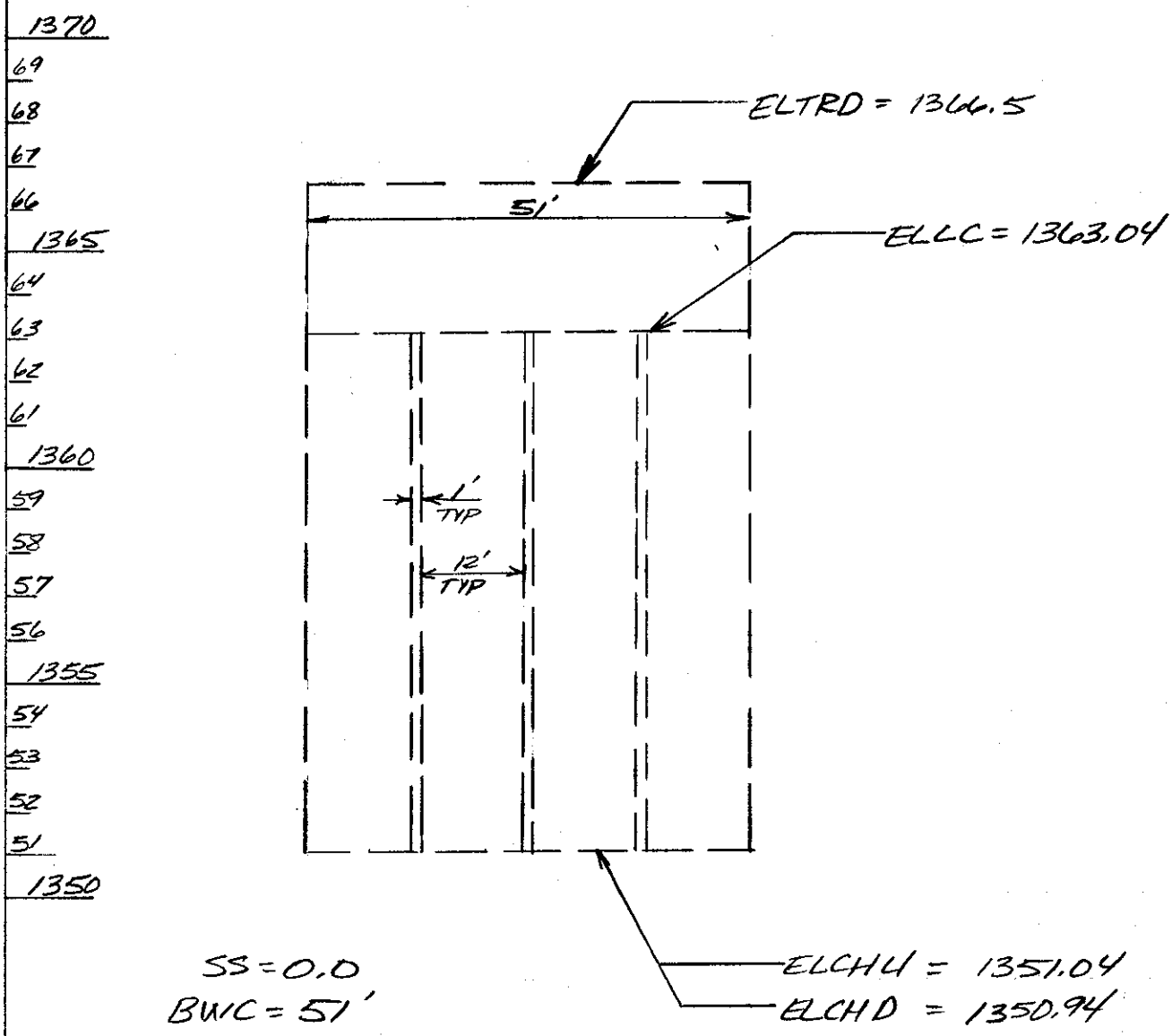
LENGTH OF BRIDGE SECTION = 61.45'

BURGESS & NIPLE, INC. – COMPUTATION SHEET

JOB NO. _____ JOB NAME Cave Creek Flood Study SHEET 2 OF 2 SHEETS

SUBJECT Phelps Road Bridge PREPARED BY D.J. Pehrson DATE 11/6/89

Cross-Section CHECKED BY _____ DATE _____



SS = 0.0
BWC = 51'
BWP = 3'

BAREA = 576 S.F.

LENGTH OF BRIDGE SECTION = 61.45'

XK = 1.25
XKOR = 1.56
COFQ = 3.0

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. _____ JOB NAME Cave Creek Flood Study SHEET 1 OF 2 SHEETS

SUBJECT Bell Rd. Bridge PREPARED BY D.J. Pehrson DATE 11/6/89

CHECKED BY _____ DATE _____

SPAN CALCULATIONS

$L = 9746 - 9666 = 80'$ @ $15°$ Skew

$L_{\perp} = 80 (\cos 15°) = 77.3'$

SPECIAL BRIDGE CALCULATIONS

Cross-Sectional Area: $A_x = 620.61$ S.F. (by coords.)

* Assume rectangular channel *

ELTRD = 1367.9 (see mapping)

ELLC = 1367.9 - 2.5 = 1365.4

(ELCHU - ELLC) x 77.3 = 620.61

∴ ELCHU ≅ 1357.4

ELCHD = ELCHU - 0.0083(105)

∴ ELCHD ≅ 1356.5

SS = 0.0

BWC = 77.3

BWP = 2(1.67) = 3.3'

BAREA = 620.6 - 3.3(10.5) = 655.3 S.F.

XK = 1.05

XKOR = 1.56

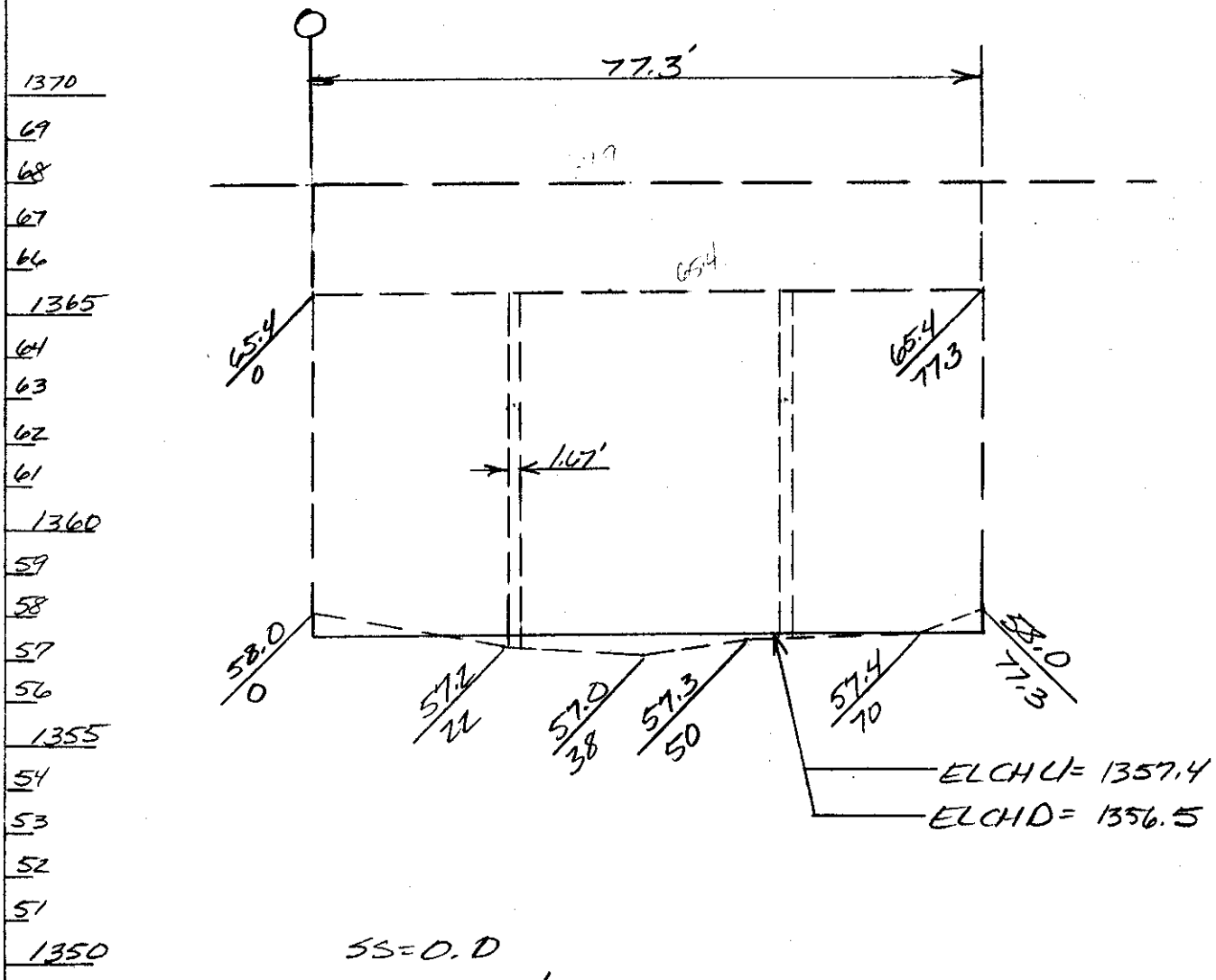
COFQ = 3.0

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. _____ JOB NAME Cave Creek Flood Study SHEET 2 OF 2 SHEETS

SUBJECT Bell Rd. Bridge PREPARED BY D.J. Pehrson DATE 11/6/89

Cross-Section. CHECKED BY _____ DATE _____



SS = 0.0

BWC = 77.3'

BWP = 2(1.67) = 3.3'

LENGTH OF BRIDGE SECTION = 105'

BAREA = 655.3 S.F.

XK = 1.05

XKOR = 1.56

COFQ = 3.0

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. _____ JOB NAME Cave Creek Flood Study SHEET 1 OF 3 SHEETS

SUBJECT Union Hills Culverts PREPARED BY D.J. Pehrson DATE 11/6/89

CHECKED BY _____ DATE _____

EXISTING CONDITIONS

4 ~ 18"x27" eliptical cmp.
1 ~ 36" dia. cmp.

Total Area = $4\left[(18)(27)(0.78540)/144\right] + \pi\left(\frac{36}{12}\right)^2/4$

Total Area ≅ 17.7 S.F

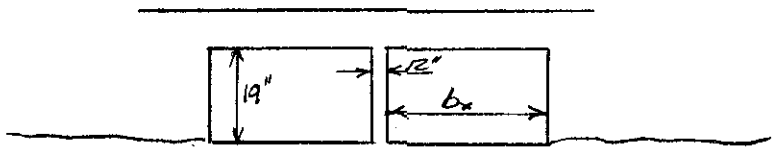
SPECIAL BRIDGE CALCULATIONS

ELTRD = 1396.6 (see mapping)

ELLC = ELTRD - 22/12 = 1394.9 (field measurements)

ELCHU = ELLC - 19/12 = 1393.3 (field measurements)
ELCHD = ELCHU - 1.3 = 1392.0 (field measurements)

Calculate equivalent cross-sectional area:



$(19/12)(b_x)(2) = 17.7$ ∴ $b_x = 5.59'$

BWC = 2(5.59) + 1 = 12.18'
BWP = 1'
BAREA = 12.18(19/12) - 1(19/12) = 17.7 S.F.

SS = 0.0 * RECTANGULAR CHANNEL

XK = 1.25

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. _____ JOB NAME Cave Creek Flood Study SHEET 2 OF 3 SHEETS

SUBJECT Union Hills Culverts PREPARED BY D.J. Pehrson DATE 11/6/89

CHECKED BY _____ DATE _____

Calculate XKOR

$K_e = 0.1$ (Kings Handbook)

$K_{pier} = 0.25$ (square edge, continuous diaphragm)

$K_f = 29(0.012)^2 50/(17.7/28.7)^{4/3}$

$K_f = 0.40$

$XKOR = K_e + K_{pier} + K_f + 1 = 1.75$

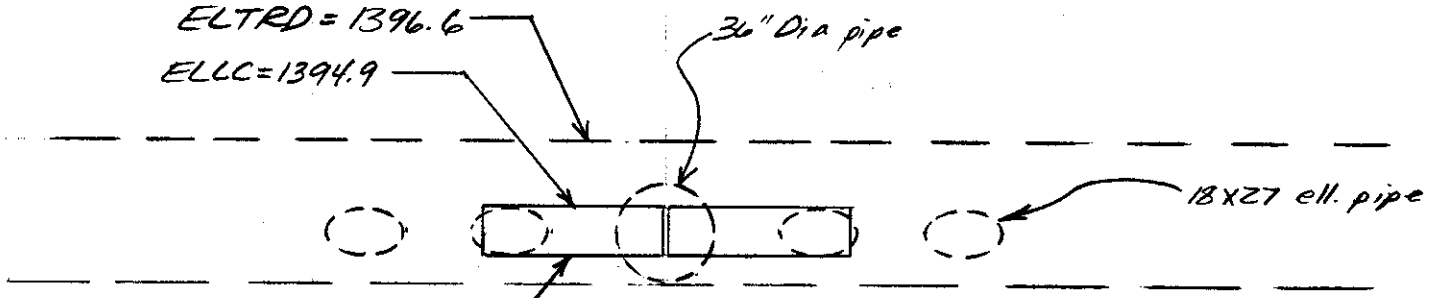
$COFQ = 2.6$ (assumed.)

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. _____ JOB NAME Cave Creek Flood Study SHEET 3 OF 3 SHEETS

SUBJECT Union Hills Culverts PREPARED BY D.T. Pehrson DATE 11/6/82

Cross-Section CHECKED BY _____ DATE _____



Equivalent section:
2 barrel 1.58' x 5.59'
with 1' wide pier.

SS = 0.0
BWC = 12.18'
BWP = 1.0'
BAREA = 17.7 S.F.

XK = 1.25
XKOR = 1.75
COFQ = 2.6

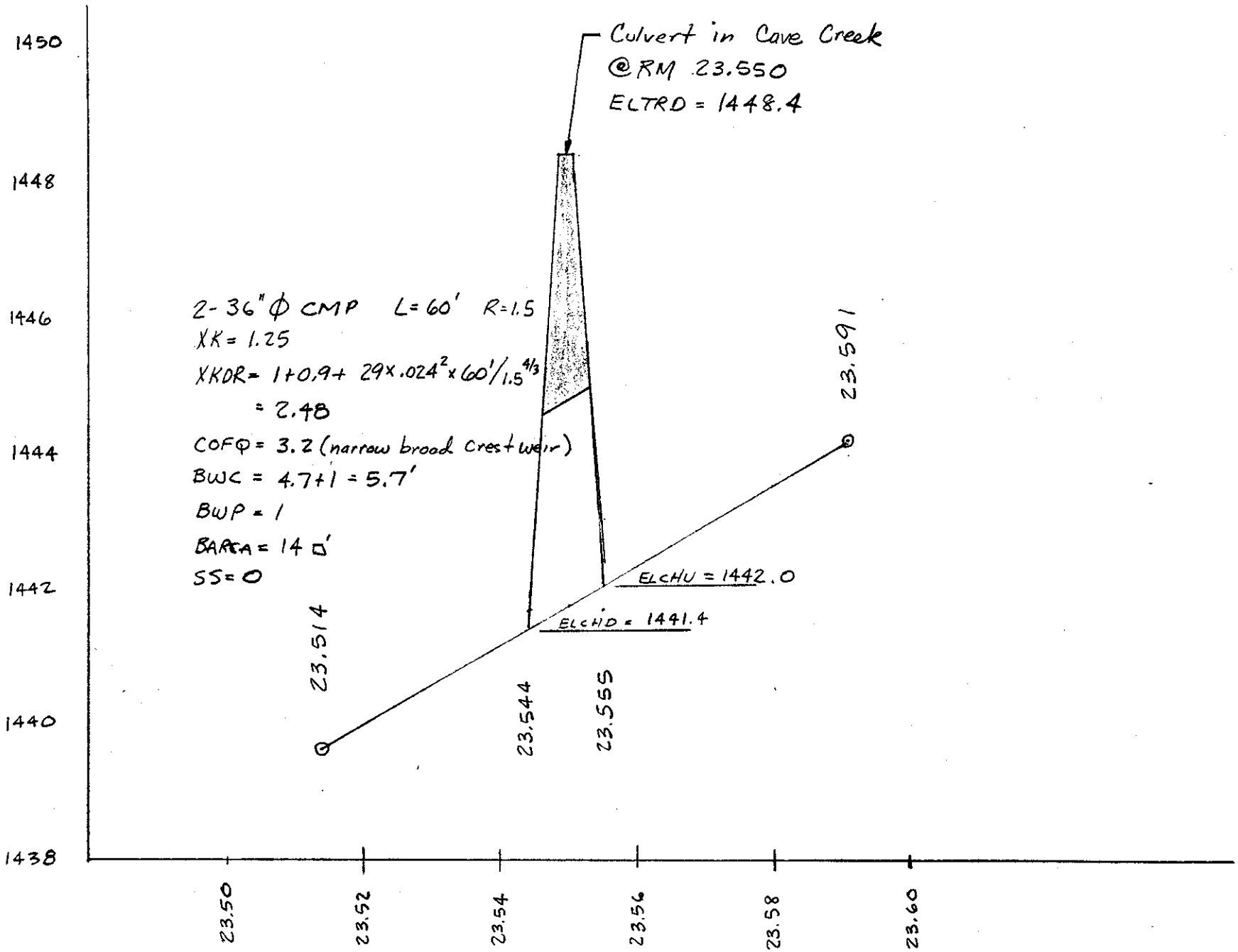
LENGTH OF BRIDGE SECTION = 50.0'

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7833 JOB NAME Cave Creek FIS SHEET 1 OF 1 SHEETS

SUBJECT Landfill Culvert PREPARED BY JEM DATE 11/21/89

CHECKED BY _____ DATE _____



BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. _____ JOB NAME Cave Creek Flood Study SHEET 1 OF 2 SHEETS

SUBJECT 7th Street Bridge PREPARED BY D.J. Pehrson DATE 11/6/89

CHECKED BY _____ DATE _____

SPAN CALCULATIONS

Triple span : $35 + 2(28.5) - 2(19/12) = 90.3'$

Skew = 37.5°

$$L_{\perp} = 90.3 (\cos 37.5°) = 71.6'$$

SPECIAL BRIDGE CALCULATIONS

ELTRD = 1464.7 (see mapping)

ELLC = ELTRD - 2.5

∴ ELLC = 1462.2

ELCHU = ELTRD - 11.1 (Δ elev per plans)

∴ ELCHU = 1453.6

∴ ELCHD = ELCHU = 1453.6 (per plans)

Cross-Sectional Area

$$A_x = 71.6 (1462.2 - 1453.6)$$

$$A_x = 615.8 \text{ S.F.}$$

* RECTANGULAR CHANNEL *

SS = 0.0

BWC = 71.6'

BWP = 2 (1.5') = 3'

BAREA = 615.8 - 3 (8.6) = 590 S.F.

XK = 0.90

XKOR = 1.56

COFQ = 3.0

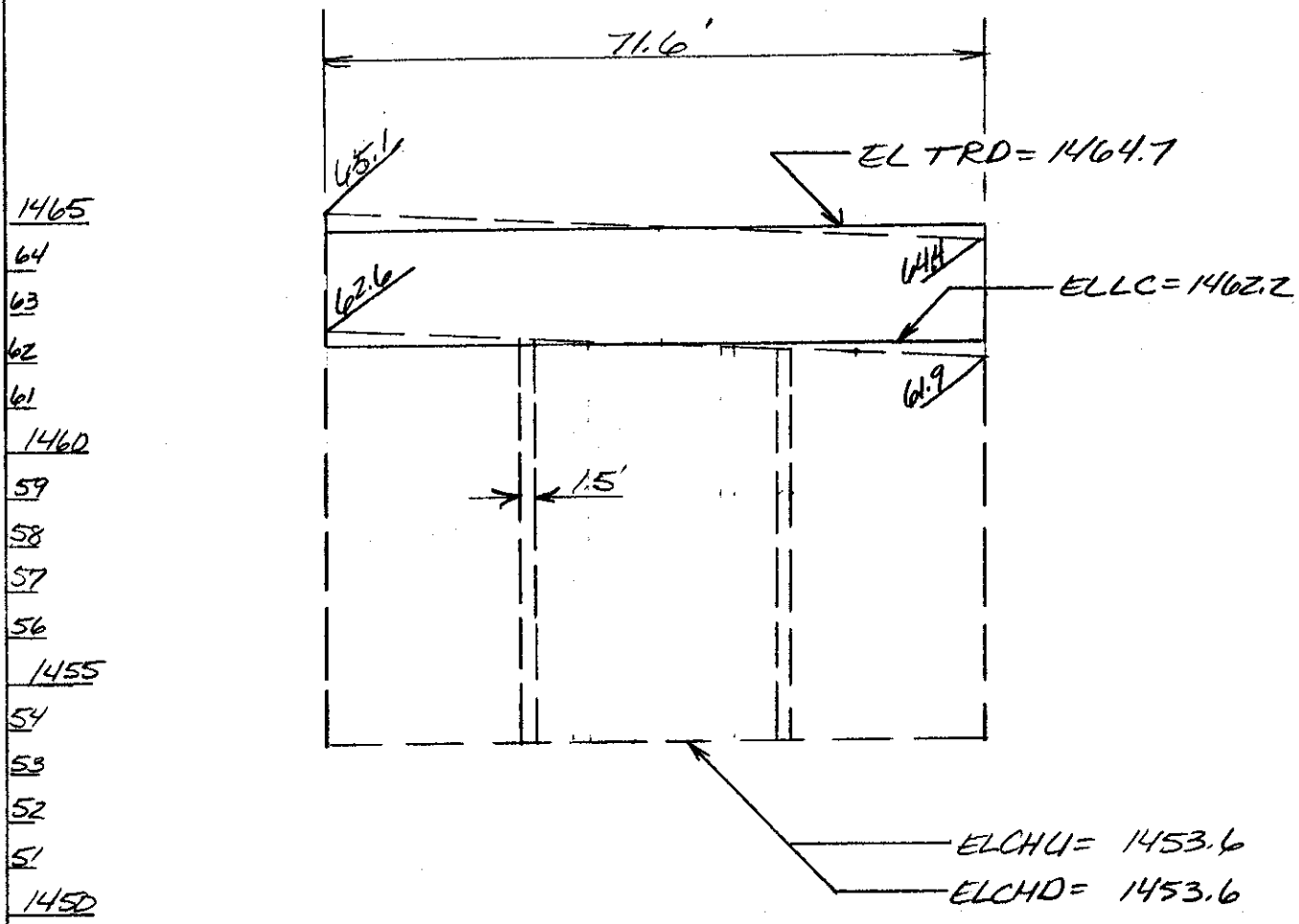
LENGTH OF BRIDGE SECTION = 46'

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. _____ JOB NAME Cave Creek Flood Study SHEET 2 OF 2 SHEETS

SUBJECT 7th Street Bridge PREPARED BY D.J. Peterson DATE 11/6/89

CHECKED BY _____ DATE _____



SS = 0.0
BWC = 71.6'
BWP = 3'

BAREA = 590 S.F.

XK = 0.95
XKOR = 1.56
COFQ = 3.0

LENGTH OF BRIDGE SECTION = 46'

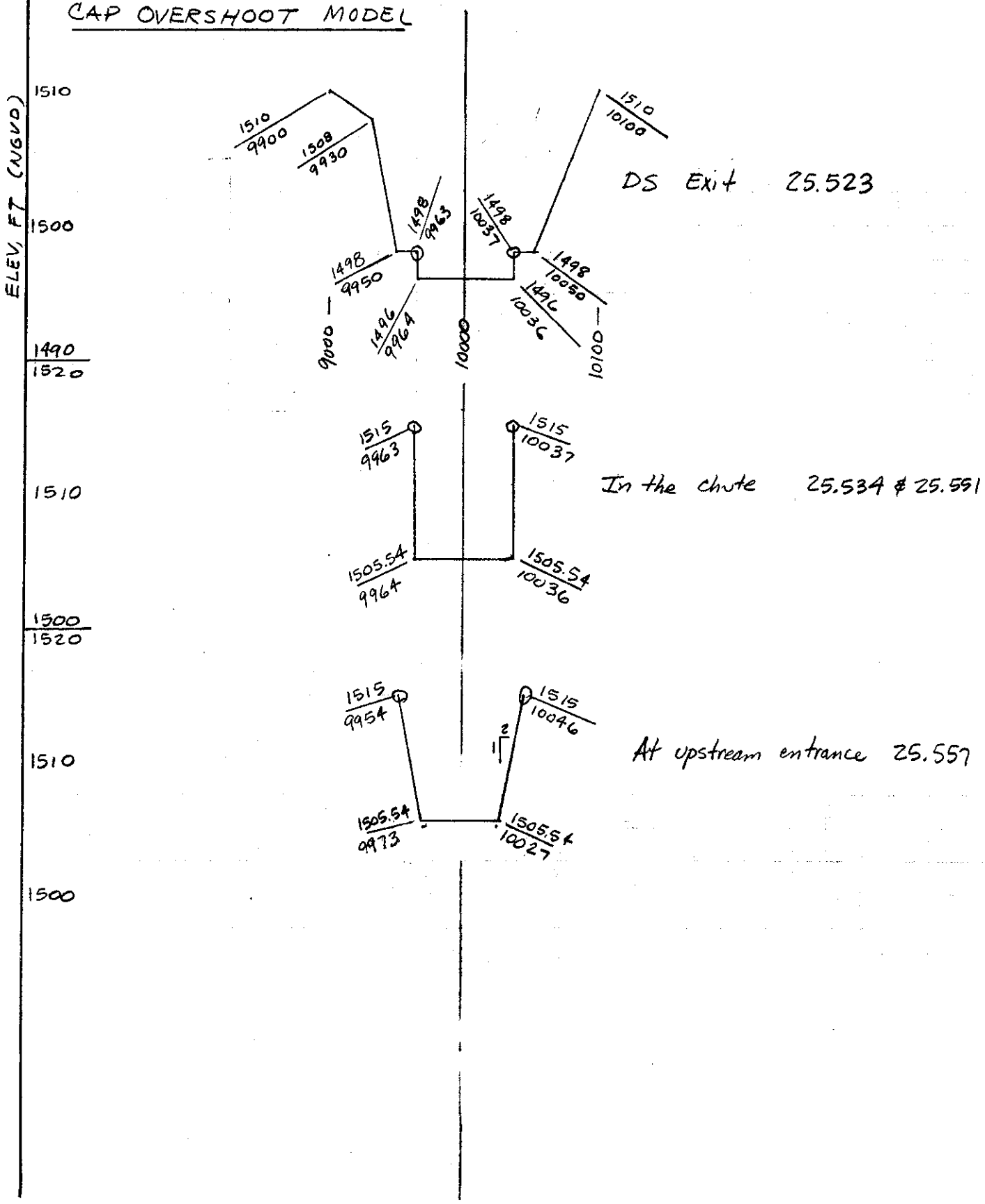
BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7833 JOB NAME Cave Creek FIS SHEET 1 OF 1 SHEETS

SUBJECT CAP Overshoot Structure PREPARED BY JEM DATE 11/5/89

CHECKED BY _____ DATE _____

CAP OVERSHOOT MODEL



BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7833 JOB NAME Cave Creek FIS SHEET 1 OF ____ SHEETS
SUBJECT Floodway Runs PREPARED BY JEM DATE 12/12/89
CHECKED BY ____ DATE ____

Floodway notes.

Run 1A - Method 4: Too high @ 17.783, problems in golf course

* Widen 17.662 to 9900 & 10150

* Remove encroachments @ 18.081 to leave off through golf course.

Run 2A: Elevations increase @ 19.283 without encroachments. Why? Bad QT card, still from profile.

* Correct QT cards.
* Reinstate ET 10.41 upstream of 19th Ave (19.313)
* Try to encroach 18.174 9857 - 10125

Hold	18.269	9882.2 - 10110.0
"	18.362	9895.6 - 10107.8
Encroach	18.445	9885 - 10110
" (.1)	18.456	" - "
Hold	18.545	9881.4 - 10169.8
"	18.575	9880.7 - 10170.8
" (.1)	18.583	9876.1 - 10177.2
"	18.640	9879.6 - 10134.7
"	18.734	9883.2 - 10111.7
"	18.832	9891.8 - 10107.7
"	18.925	9887.7 - 10087.5
"	19.018	9886.3 - 10038.5
"	19.117	9942.1 - 10061.9
"	19.210	9923.1 - 10081.0

Run 3A: Floodway good to 20.841. Ignore water surface drop at 18.445 & 18.456 (Golf course bridge - these sections will not be presented. Ignore -0.1 elev. changes that occur due to rounding. Changes to try:

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7833 JOB NAME Cave Creek FIS SHEET 2 OF ____ SHEETS

SUBJECT Floodway Runs PREPARED BY JEM DATE 12/13/89

CHECKED BY ____ DATE ____

* Try to encroach 18.081 to 9900 - 10085

* Correct 19.018 to 9866.3

* Try to match AMWEST floodway encroachment stations

	BEN SECTION	AMWEST SECTION	AMWEST WIDTH	ENCROACHMENT
19.974 9969 - 10020	19.847	4.55/4.62	86	9957 - 10043
19.986 " "	19.960	4.67	50	9975 - 10025
	20.049	4.79	50	" "
	20.144	4.86/4.90	57	9972 - 10029
	20.242	4.98	71	9964 - 10035
	20.335	5.05	73	9963 - 10036
	20.423	425	114	9958 - 10072
	20.529	5.25	139	9930 - 10069
	20.628	1563	130	9935 - 10065
	20.725	5.45	64	9962 - 10026
	20.860	5.58	156	9904 - 10060
	20.942	5.65/5.72	278/159	End match w/AMWEST

Restart Method 4.

Run 4A: Cannot match widths by AMWEST. Surch. = 3.5' @ 19.974, 1.3' @ 19.986 } Tierra Buena

* Revise:	19.742	to	9958 - 10038	(85)		-1.0' @	21.036
	19.847	to	9957 - 10043	(86)		1.4 @	21.363
	19.960	to	9958 - 10031	(73)		1.4 @	21.576
	20.942	to	9860 - 10060	(200)		1.4 @	21.933
	21.036	"	9860 - 10060	"		1.3 @	22.065
	21.127	"	9860 - 10060	"			
	21.230	"	9900 - 10100	"			
	21.363	"	9920 - 10120	"			
	21.484	"	9877 - 10077	"			
	21.576	"	9940 - 10140	"			
	21.669	"	9900 - 10100	"			
	21.742	"	9940 - 10140	"			
	21.840	"	9900 - 10100	"	21.953	9600	10050 (200)
	21.895	"	9880 - 10080	"			
	21.933	"	9860 - 10070				

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7833 JOB NAME Cave Creek FIS SHEET 3 OF ____ SHEETS

SUBJECT Floodway Notes PREPARED BY JEM DATE 12/13/89

CHECKED BY ____ DATE ____

Run 5A: Neglect minor negative surcharges of up to -0.2'
Note problems from 20.860 to 21.933

	20.860	9925	10062	(137)
Revise:	20.942	9875	10025	(150)
	21.036	9880	10030	(150)
	21.127	9900	10060	(160)
	21.230	9930	10126	(196)
	21.363	9930	10130	(184)
	21.484	9852	10077	(225)
	21.576	9940	10165	(225)
	21.669	9890	10115	(225)
	21.742	Hold		(200)
	21.840	Hold		(200)
	21.895	9830	10080	(250)
	21.933	Hold		(420)

12/16/89 : Revise Q's due to hydrology review comments:

	NEW	OLD	WSEL = 1283.80
17.588 - Q =	15,800. cfs	15300	& 1284.80
19.283 - Q =	15,000. cfs	14500	
19.625 - Q =	6,100 cfs	5900	
21.669 - Q =	5,900 cfs	5700	

Run 6A: Negative surcharge at D.S. golf course bridge faces - OK
" " " 19.210 OK (-.09)
" " " 20.049 (-.20') & 20.144 (-.11') OK
" " " 20.725 (-.11) OK
" " " 20.860 - 21.230 cannot improve, ∴ accept.

~~GOOD RUN~~.

1/22/90 Run 7A: Similar to 6A, just revised Q's to match revised hydrology.

GOOD RUN

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7833 JOB NAME Cave Creek FIS SHEET 4 OF ____ SHEETS

SUBJECT Floodway Notes PREPARED BY JEM DATE 12/16/89

CHECKED BY ____ DATE ____

Floodway Notes

Run 1B - Method 1, using data from Run 6A to start.

- QT error @24.738 - Delete extra QT

Revise:	22.065	9580	10030	
	22.165	9600	10020	
	22.273	9650	10027	
	22.410	9860	10040	
	22.483	9873	10090	
	22.578	9956	10064	
	22.675	9740	10029	
	22.794	9977	10160	
	22.880	9951	10120	
	22.990	9850	10026	
	23.097	9958	10090	
	23.168	9830	10140	
	23.253	9978.5	10023.2	(Match natural)
	23.334	9969.0	10036.0	
	drop ET's through levees			
	24.106	10.41		

1/22/90 Revise Q's per revised hydrology

Run 2B: - Method 1

Fine tune:

Revise:	22.065	9600	(narrower by 20')	
	22.165	9620	"	
	22.483	9890	10070	(180')
	22.578	9968.	10064.	(96')
	22.675	9830	10028	(198')

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7833 JOB NAME Cave Creek F/S SHEET 5 OF ____ SHEETS

SUBJECT Floodway Notes PREPARED BY JEM DATE 1/90

CHECKED BY ____ DATE ____

Run 3B - Method 1

Adjustments from run 2B were successful.

New trial:

21.953	9630		(narrower by 13')
21.065	9620		(" " 20')
21.165	9640		(" " 20')
22.483		10050	(" " ")
22.675	9850		(" " ")
22.990	9890		(" " 40')
24.106		10055	
24.195	9950	10080	
24.322	9940	10110	
24.444	9930	10110	
24.542	9950	10110	
24.635	9940	10050	
24.738	9940	10040	
24.838	9960	10020	
24.943	9880	10020	
25.048	9850	10015	
25.163	9940	10025	
25.262	9850	10023	
25.374	9850	10023	
25.434	9920	10036	
25.500	9960	10050	
25.523	9960	10040	
25.534	No enc.		
25.551	"		
25.557	"		
25.561	9949	10067	
25.68	10.41		

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JOB NO. 7833 JOB NAME Cave Creek FIS SHEET 6 OF ____ SHEETS

SUBJECT Floodway Notes PREPARED BY JEM DATE 1/90

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Run 4B - Method 1

Changes at downstream end were not successful.

22.165	9620		widen by 20'
22.675	9830		
24.195		10050	
24.322		10080	
24.444	9950	10080	
24.542	~	10040	
24.738	9936	10150	
24.838	9968	10170	
24.943		10200	
25.048		10200	
25.163		10140	

Run 5B - Floodway good up to 24.444

Make revisions marked in 5B output to try in Run 6B. At 25.374 & 25.434, replace Rt bank artificial levees by GR data, found conflict with ET's.
Found glitch @ 27.060 w/ X3 elevation - Raise ELREA.

Run 6B - Floodway good to 24.635
Make revisions in 6B output to try in Run 7B. Found discrepancy at 26.673, need to add artificial levee on left side @ Sta 9955 (Elev 1535, 0.7' above actual ground.

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JOB NO. 7833 JOB NAME Cave Creek FIS SHEET 7 OF _____ SHEETS

SUBJECT Floodway Notes PREPARED BY JEM DATE 1/90

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Run 7B Good to 24.838 (At terminal). Fine tune to yield good run.

Run 8B - Good run.

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JOB NO. 7833 JOB NAME Cave Creek FIS SHEET 8 OF ____ SHEETS

SUBJECT Floodway Notes PREPARED BY JEM DATE 1/90

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Floodway Run 1C – Method 4, using starting section in Cave Creek Wash – 19.556. Since 19.556 is within the channel & not encroached for Cave Creek run, the same holds true for this run. The beginning STRT Elevs are the same for natural & encroached runs.

Results:

Typical sawtooth floodway. Try these adjustments:

0.029	Remove	encroachments	from this conc. channel
0.112	9940	10060	(w=120')
0.198	9940	10060	
0.298	9940	10060	
0.398	9940	10060	
0.482	9940	10060	
0.575	9930	10050	
0.697	9930	10050	
0.826	9930	10050	
0.945	9910	10030	
1.035	9910	10030	
1.121	9910	10030	
1.204	9930	10050	
1.315	9940	10060	
1.420	9895	10085	Do not encroach channel.

Run 2C – Not good. Negative surcharges D.S., excessive U.S.

Try:

0.029 9940 10080 To match flood bdry.

Widen 0.482 – 1.315 to 140' as marked on 2C output

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JOB NO. 7833 JOB NAME Cave Creek FIS SHEET 9 OF ____ SHEETS

SUBJECT Floodway Notes PREPARED BY JEM DATE 1/90

CHECKED BY ____ DATE ____

Run 3C - Not good. Negative surcharge @ 0.029, 0.112, 0.198, 0.482, 0.826 Excessive @ 0.575, 0.697, 1.035, 1.121

Runs 4C, 5C - Minor adjustments

Run 6C - Good Run

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JOB NO. 7833 JOB NAME Cane Creek FIS SHEET 3 OF 3 SHEETS

SUBJECT ACDC Backwater PREPARED BY JEM DATE 1/28/90

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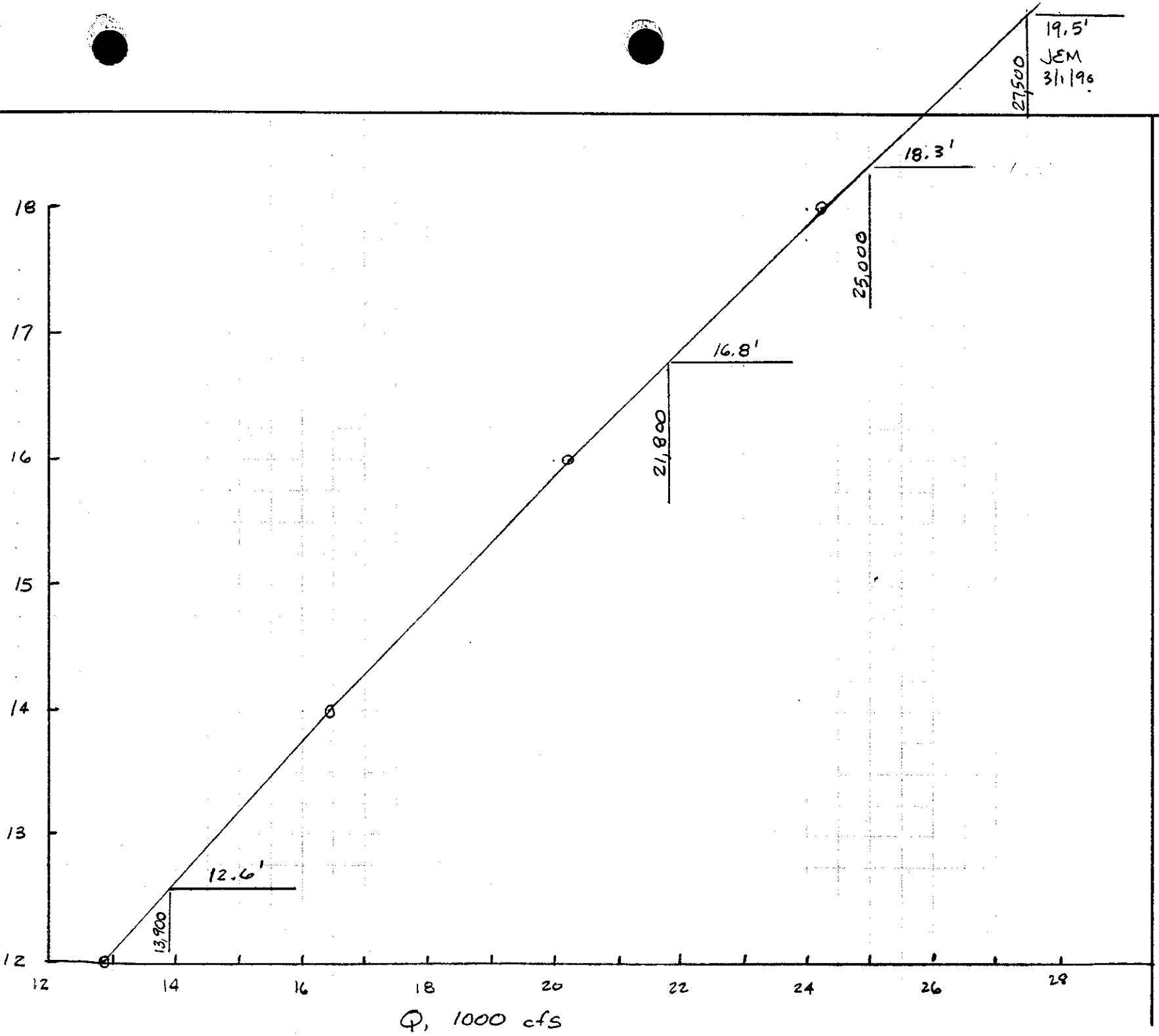

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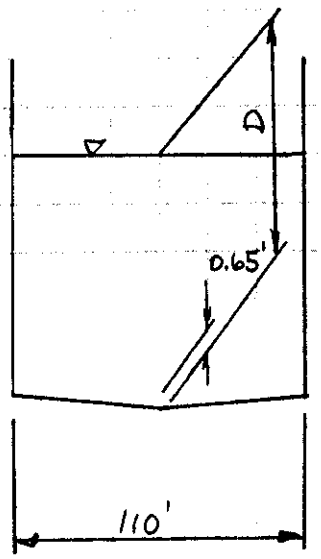
JOB NO. 7833 JOB NAME Cave Creek FIS SHEET 2 OF 3 SHEETS

SUBJECT ACDC Backwater PREPARED BY JEM DATE 1/28/90

CHECKED BY _____ DATE _____

Estimate normal depth in the ACDC channel:



$A = 110' \times D - 35.8\ \square'$

$WP = 110' + 2D$ $\qquad R = \frac{A}{WP}$

Slope = 0.0005'/'

"n" = 0.015

$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$

Depth (ft)	A (□')	WP (ft)	R (ft)	Q (cfs)
4'	404	118	3.42	2037
6'	624	122	5.11	4112
8'	844	126	6.70	6663
10'	1064	130	8.18	9595
12'	1284	134	9.58	12,864
14'	1504	138	10.90	16,423
16'	1724	142	12.14	20,227
18'	1944	146	13.32	24,257
20'	2164	150	14.43	28,485

JEM 3/1/90

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JOB NO. 7833 JOB NAME Cave Creek FIS SHEET 1 OF 3 SHEETS

SUBJECT ACDC Backwater PREPARED BY JEM DATE 1/28/90

CHECKED BY _____ DATE _____

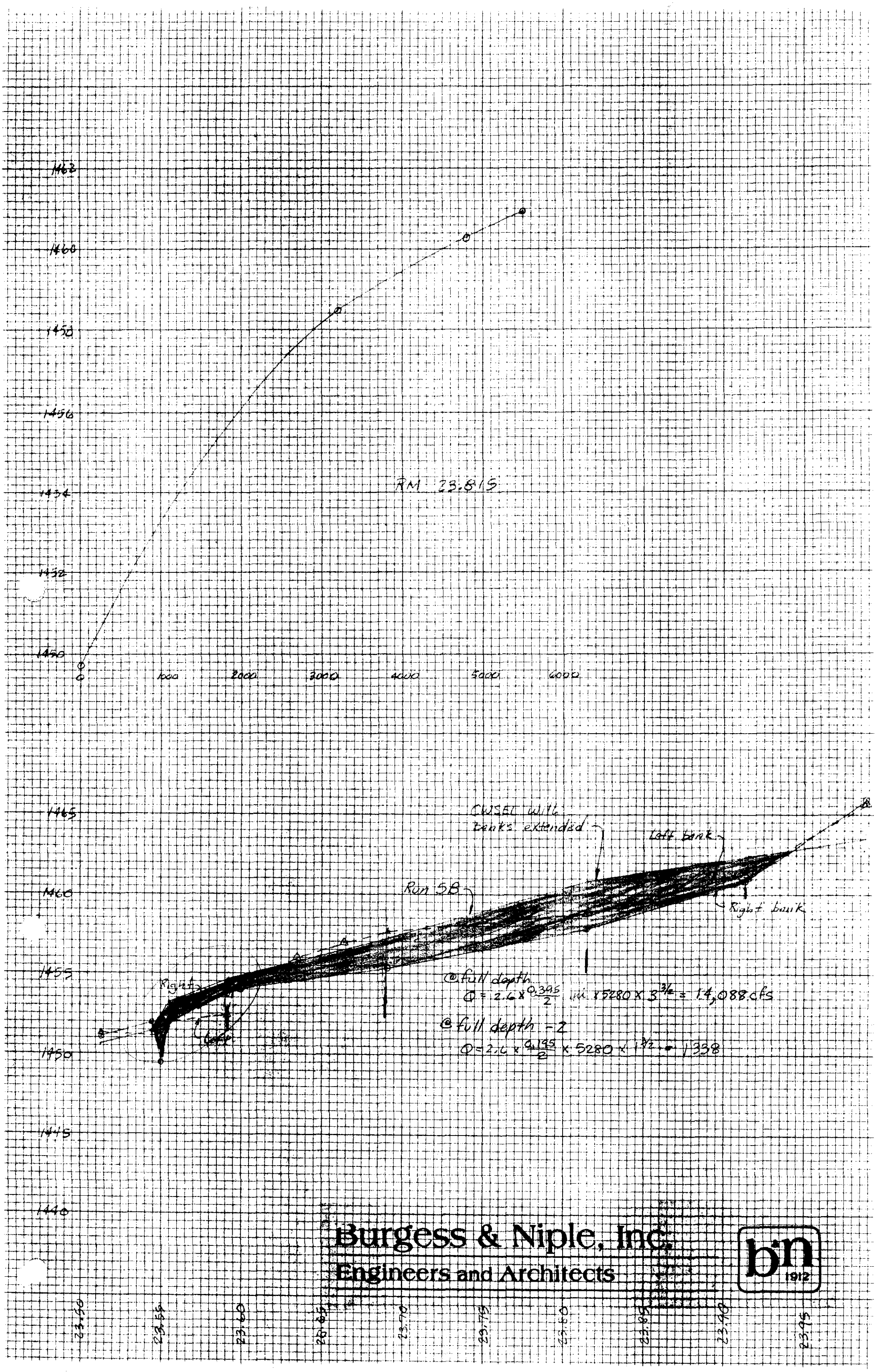
Estimate flood flows in the ACDC below the confluence with Cave Creek Wash in order to plot a profile depth. The ACDC design discharge is 25,000 cfs, corresponding to a 16,000 cfs design discharge in the Cave Creek channel, and 13,600 in the ACDC upstream

This study has a 100 yr Q = 18,500 cfs in Cave Creek Wash. Since peaks are within 20%, and the peaks in Cave Creek and the ACDC are not additive, the 25,000 cfs design discharge in the ACDC is accepted as the current 100 year Q.

No values are presented for 10 or 50 year Q's. For purposes of this study, Q_{10} & Q_{50} will be assumed proportional to Q_{100} using the same ratios as for Cave Creek Wash:

Cave Creek Wash	Ratio	ACDC
18,500 cfs	1:1	25,000 cfs
16,100 cfs	0.87:1	21,800 " *
10,300 cfs	0.56:1	13,900 " *

* Estimated



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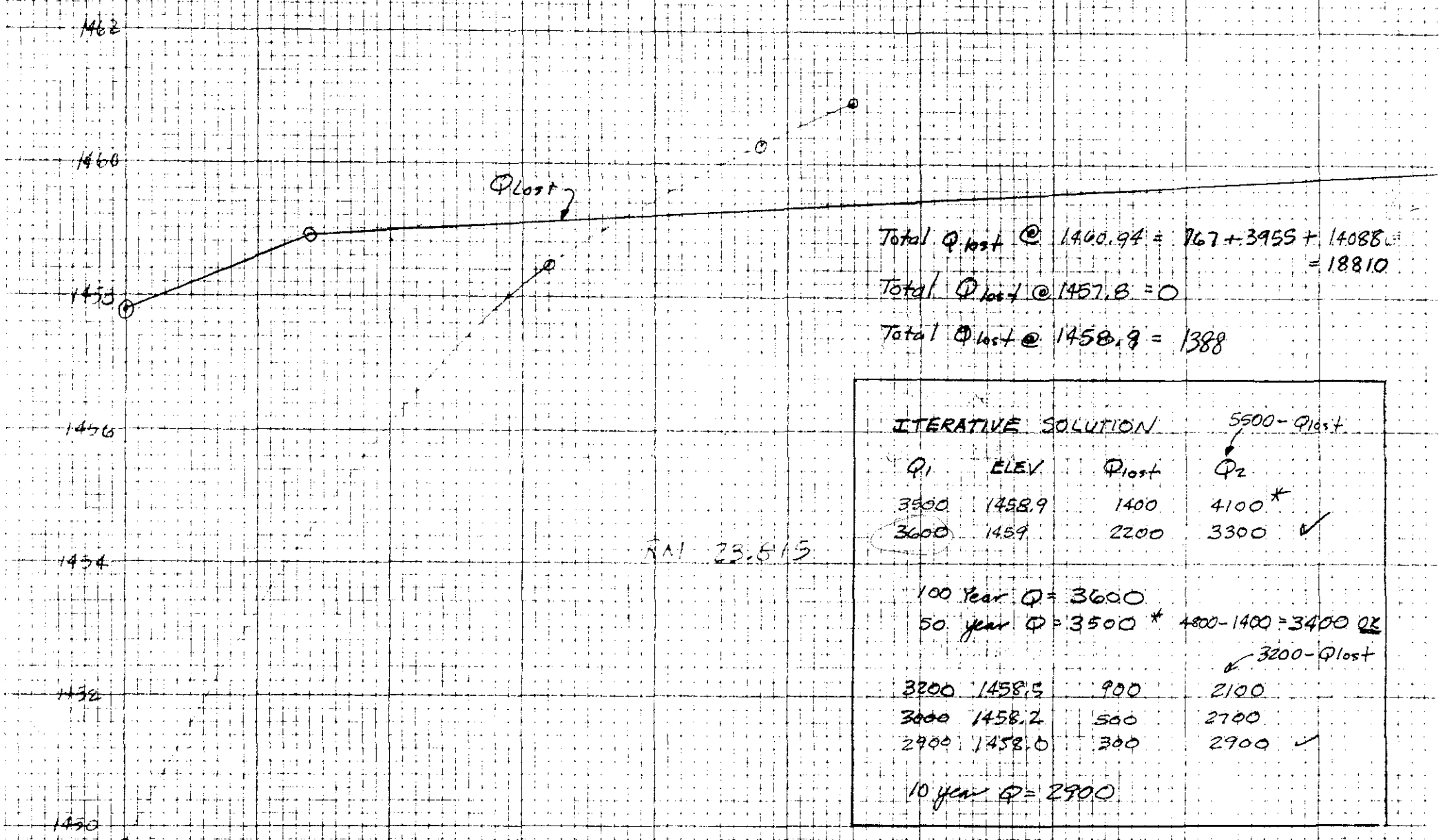


Total Q lost @ 1400.94 = 767 + 3955 + 14088 = 18810

Total Q lost @ 1457.8 = 0

Total Q lost @ 1458.9 = 1388

ITERATIVE SOLUTION

Q_1	ELEV	Q_{lost}	Q_2 (5500 − Q_{lost})
3500	1458.9	1400	4100 *
3600	1459	2200	3300 ✓

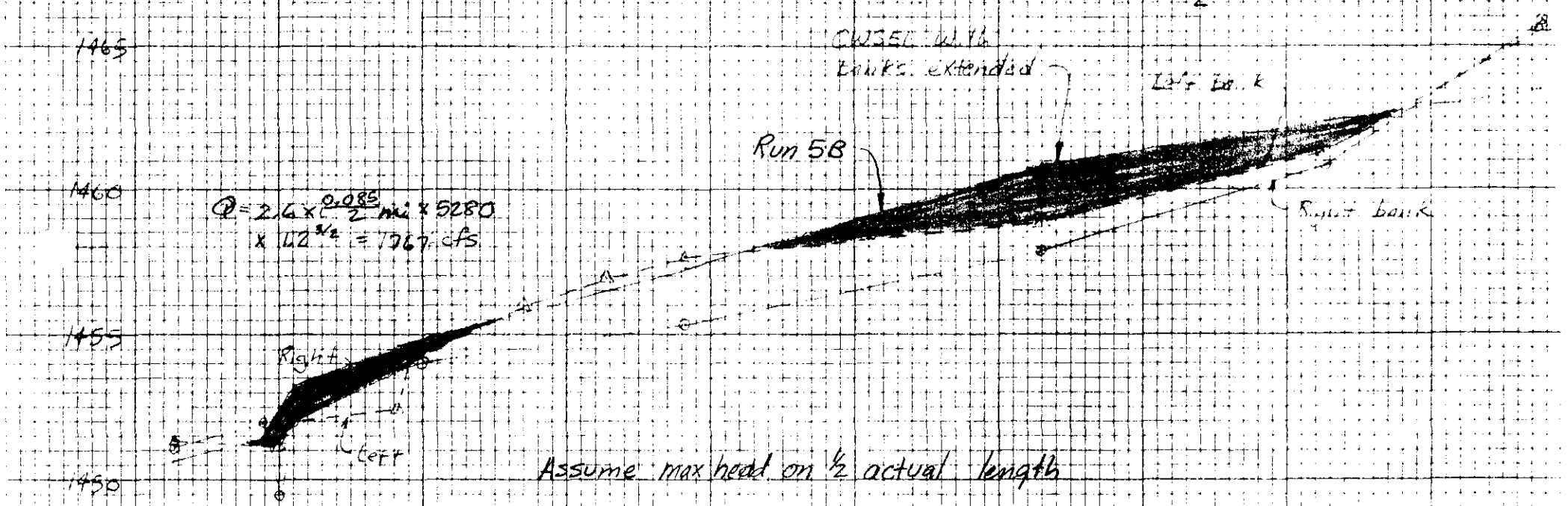
100 Year Q = 3600

50 year Q = 3500 * 4800 − 1400 = 3400 OK

			(3200 − Q_{lost})
3200	1458.5	900	2100
3000	1458.2	500	2700
2900	1458.0	300	2900 ✓

10 year Q = 2900

$Q = 2.6 \times \frac{0.22}{2}\,mi \times 5280 \times 1.9^{3/2} = 3955$



$Q = 2.6 \times \frac{0.085}{2}\,mi \times 5280 \times 1.2^{3/2} = 767\ cfs$

Assume max head on ½ actual length

23.50 23.55 23.60 23.65 23.70 23.75 23.80 23.85 23.90 23.95

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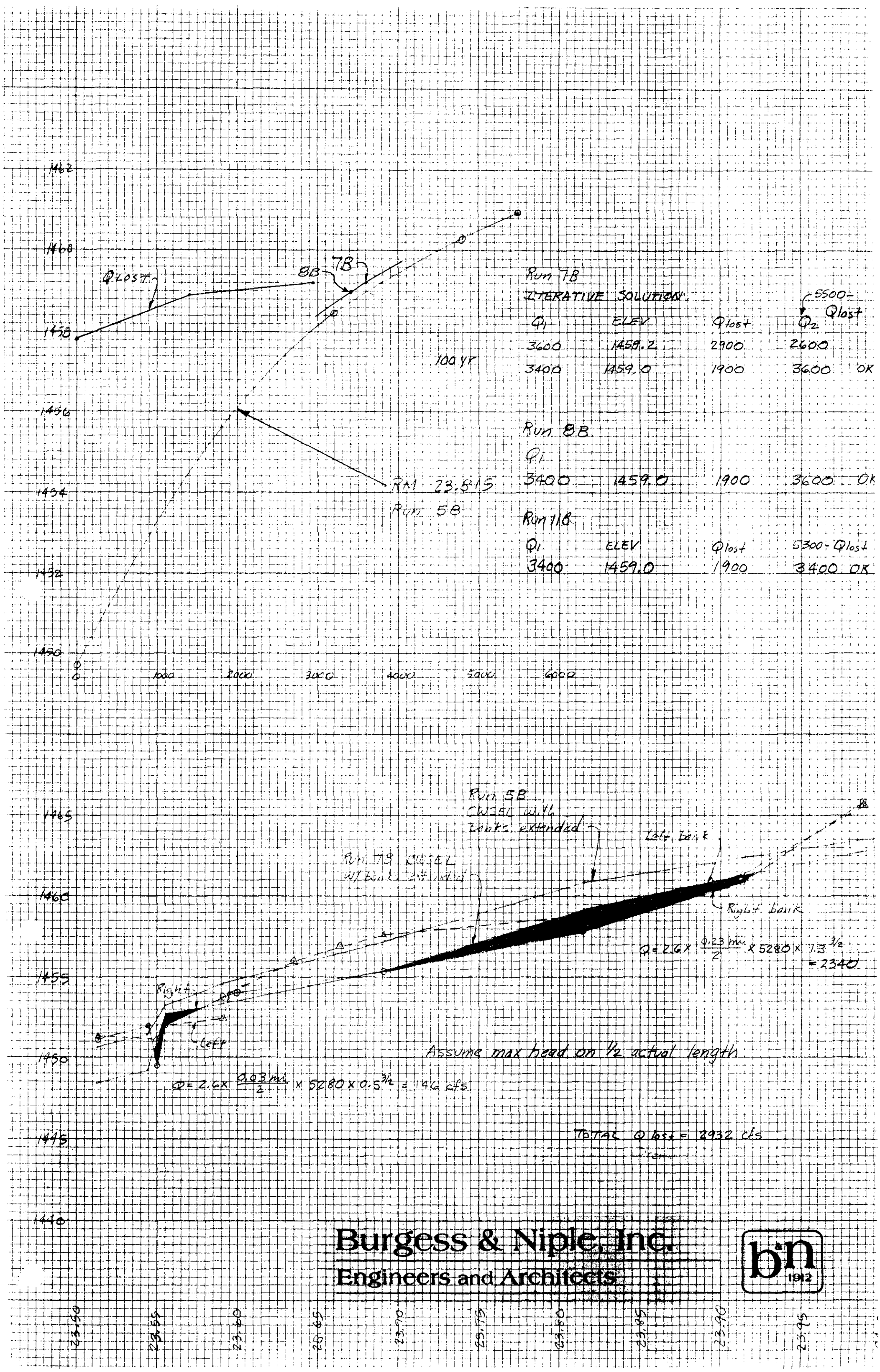

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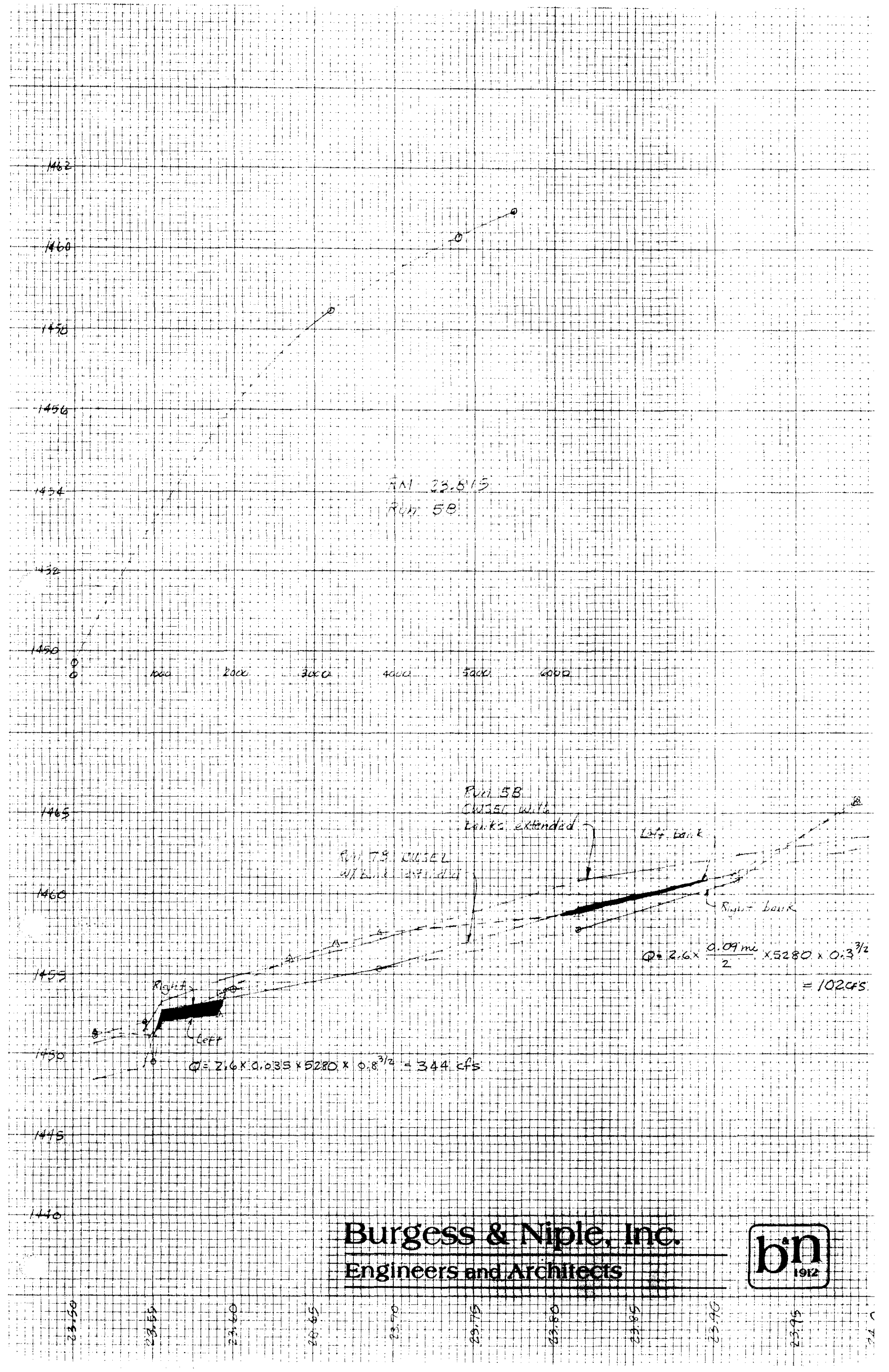

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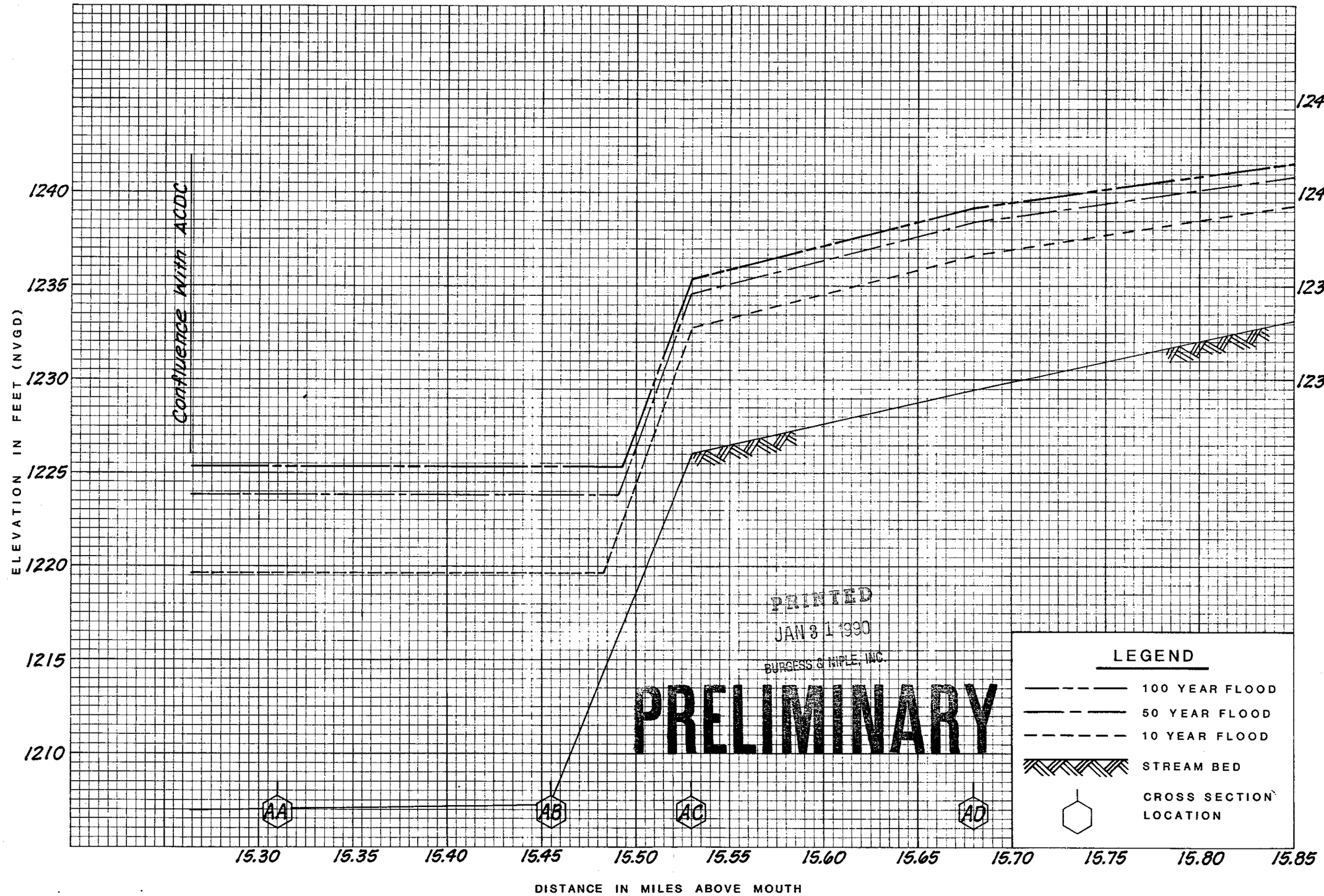

FLOOD PROFILES

CAVE CREEK

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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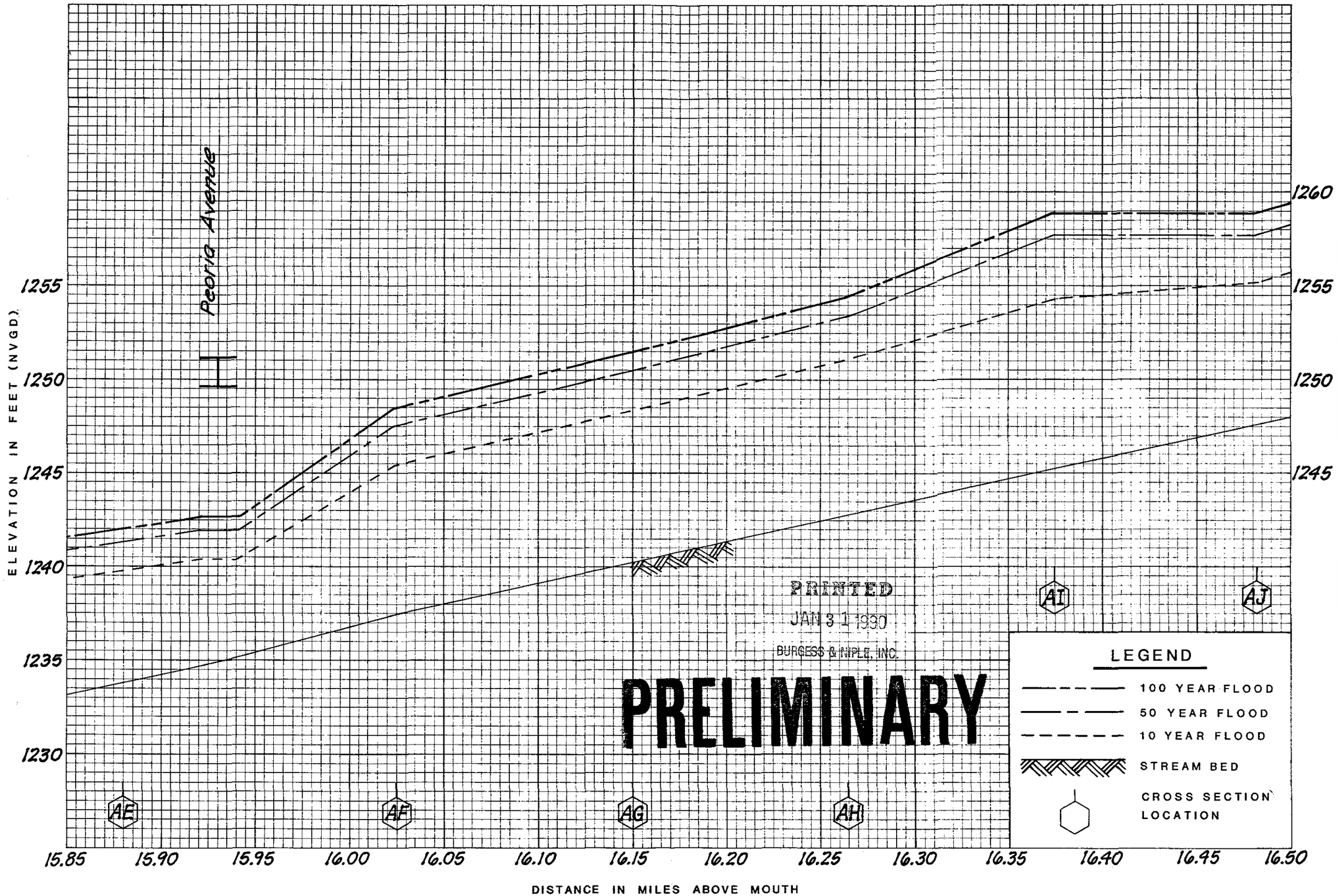

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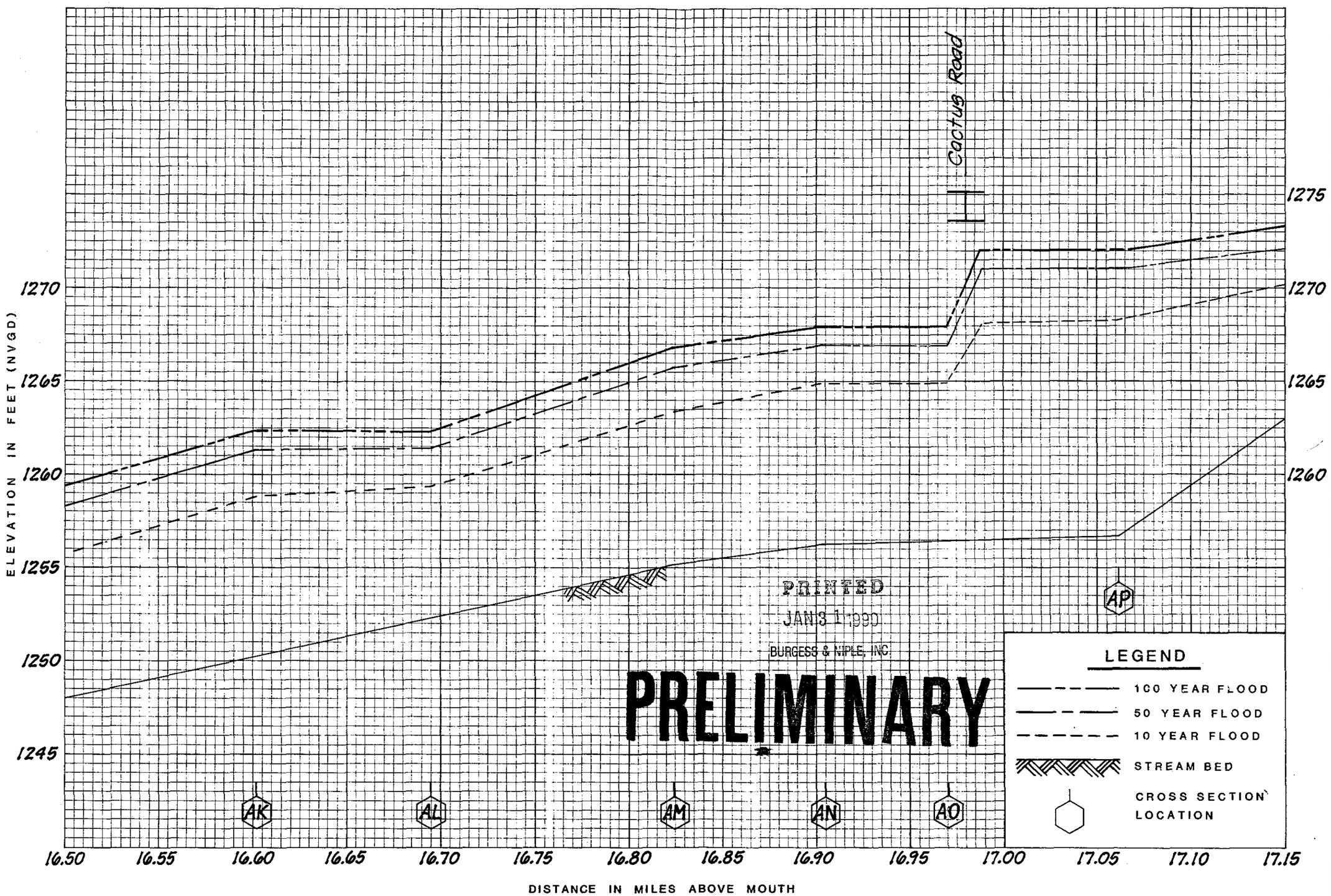

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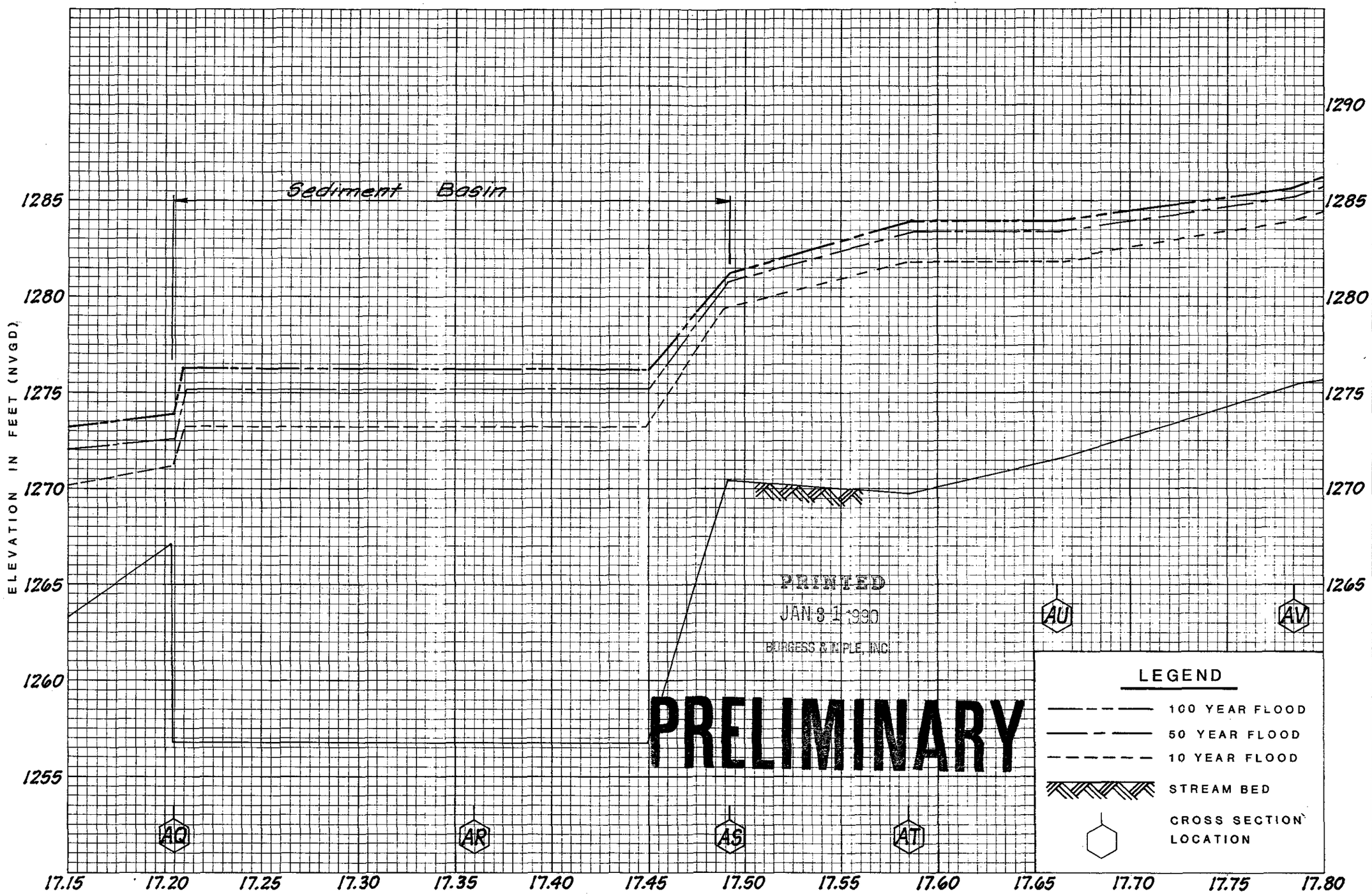

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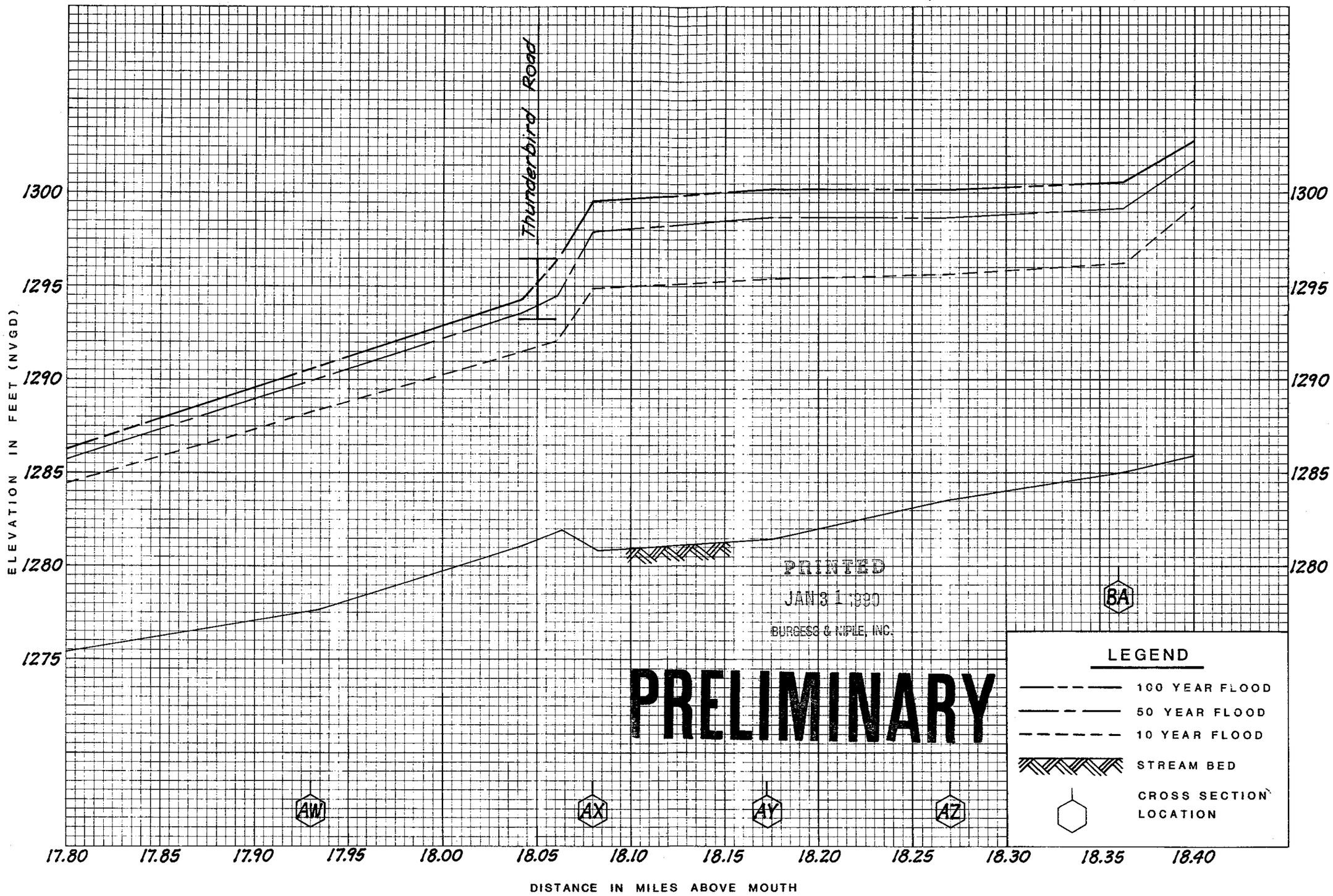

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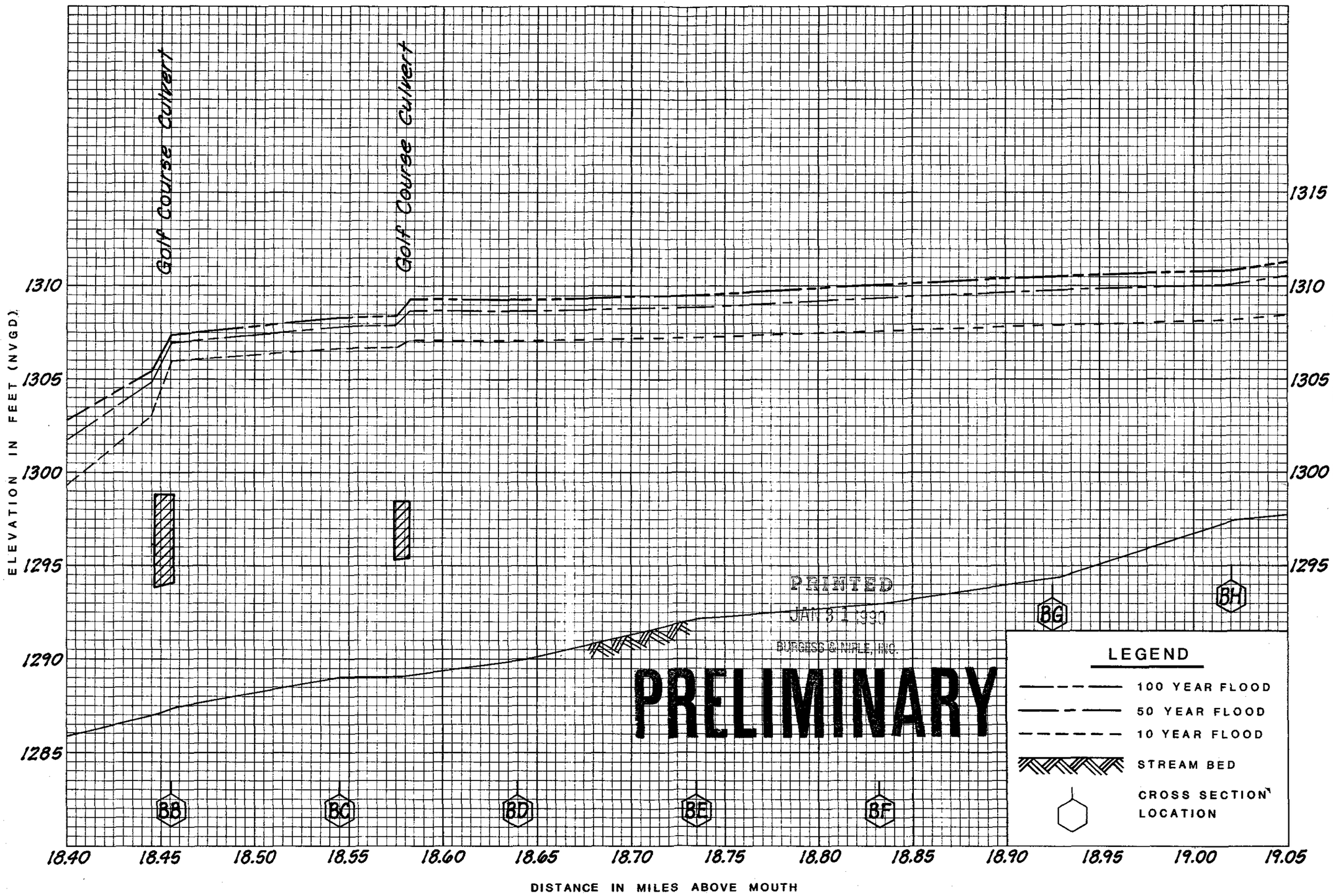

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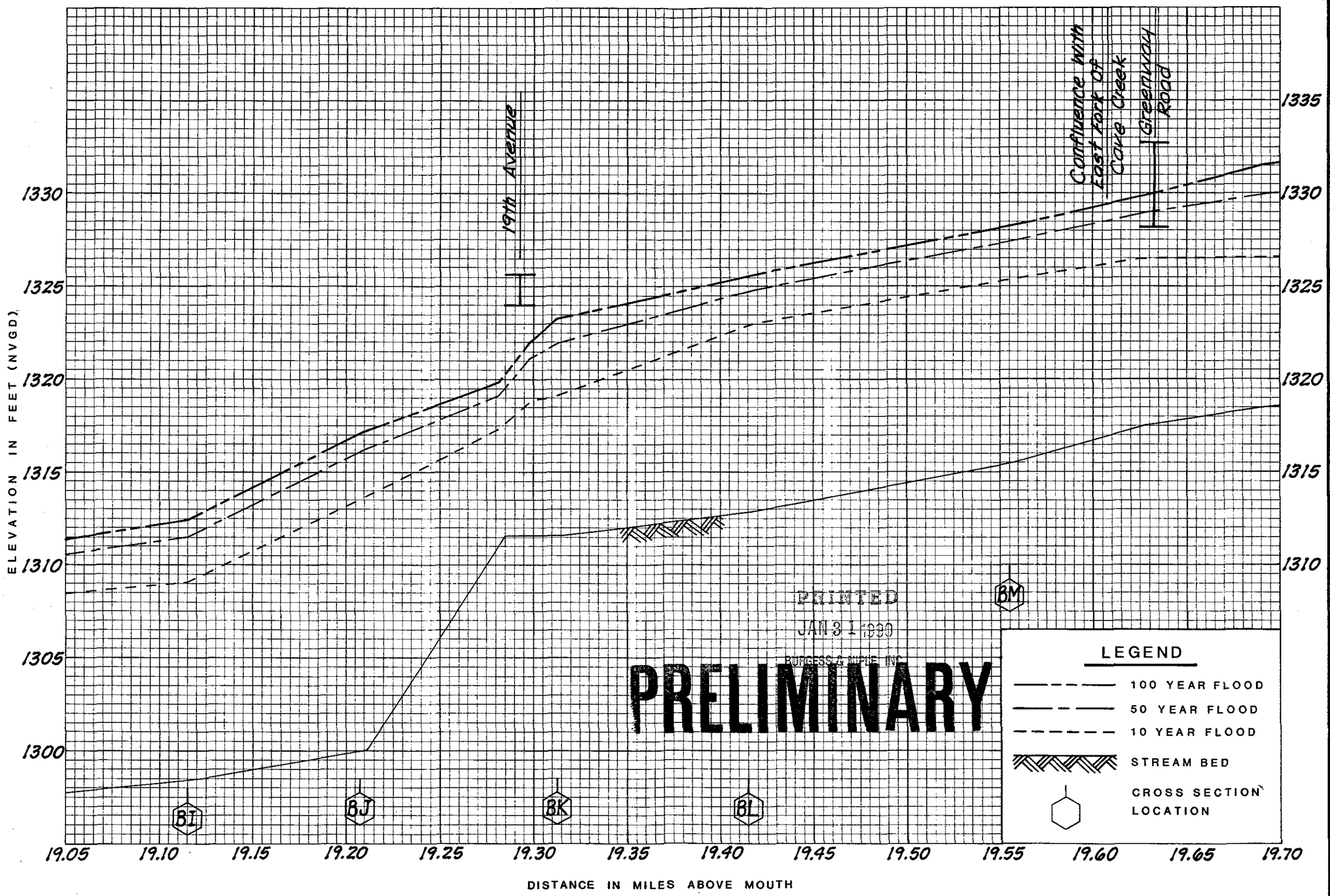

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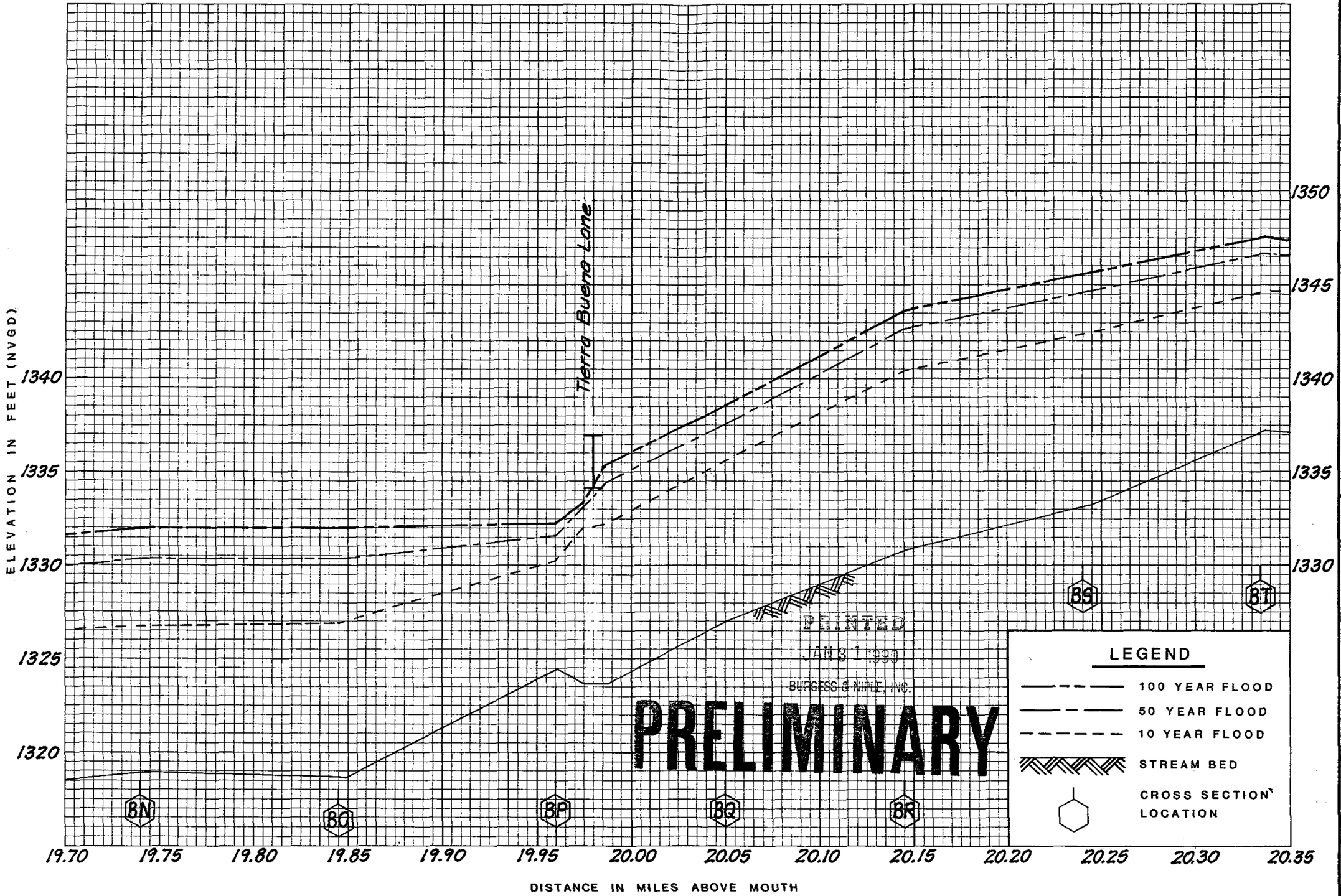

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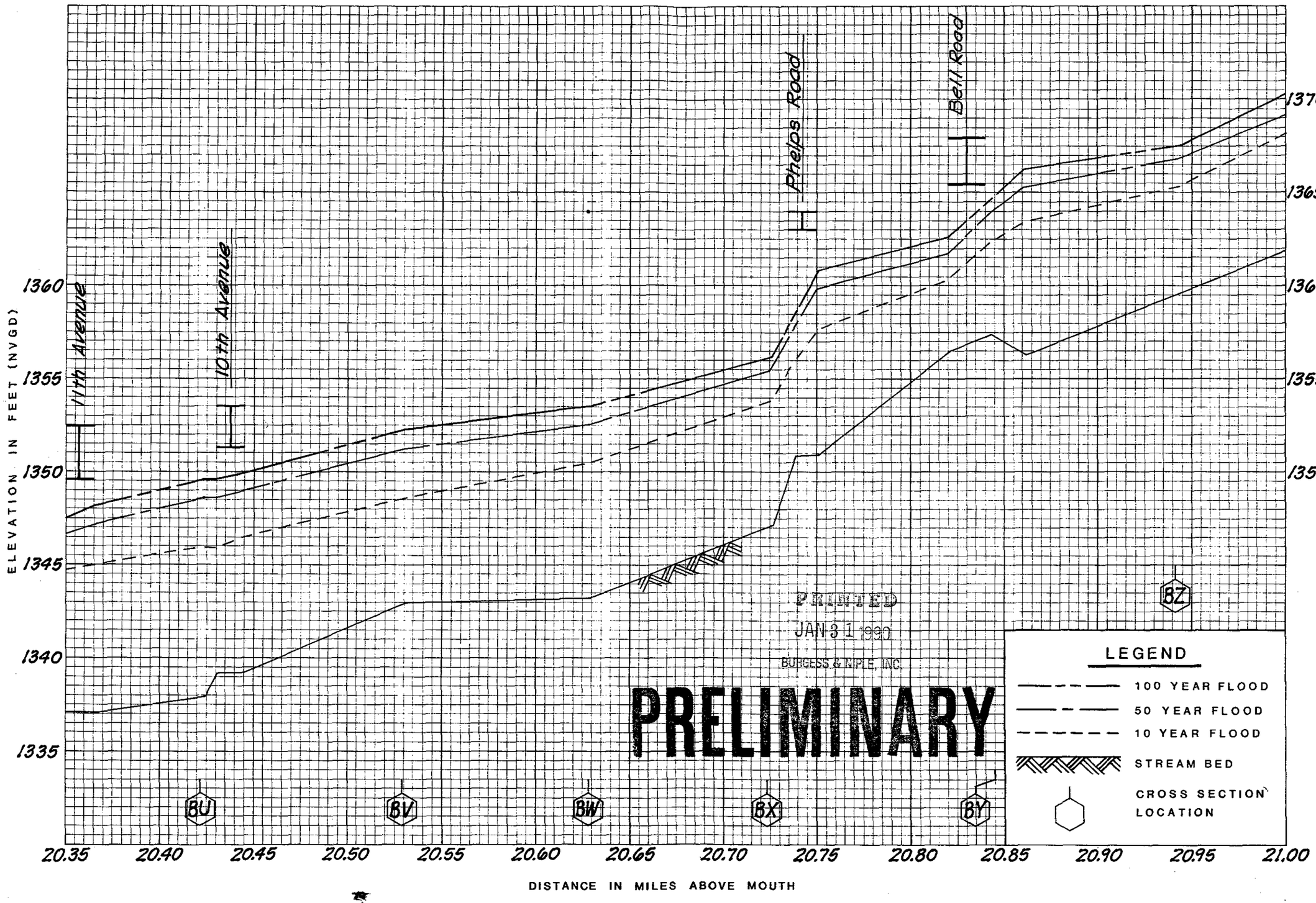

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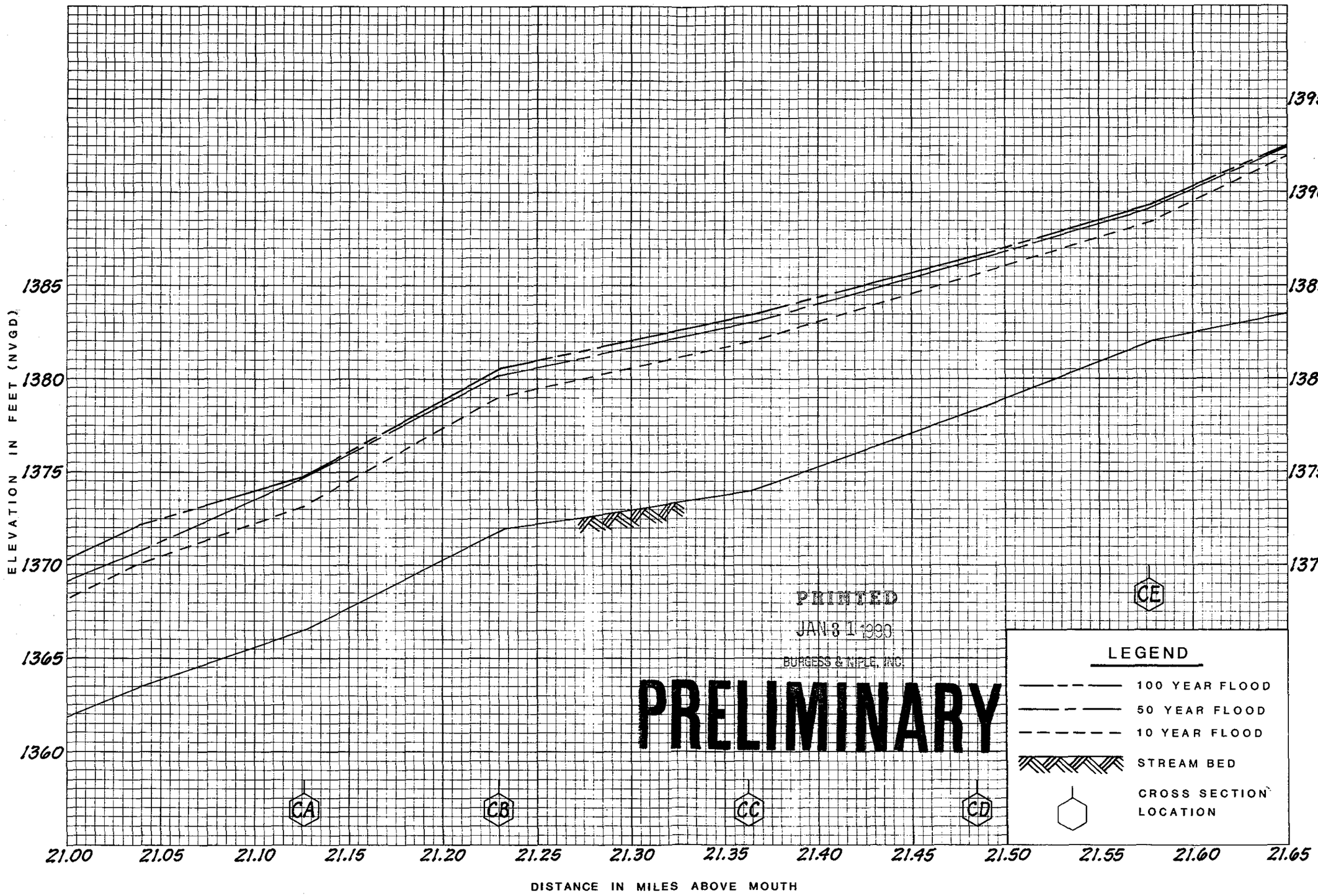

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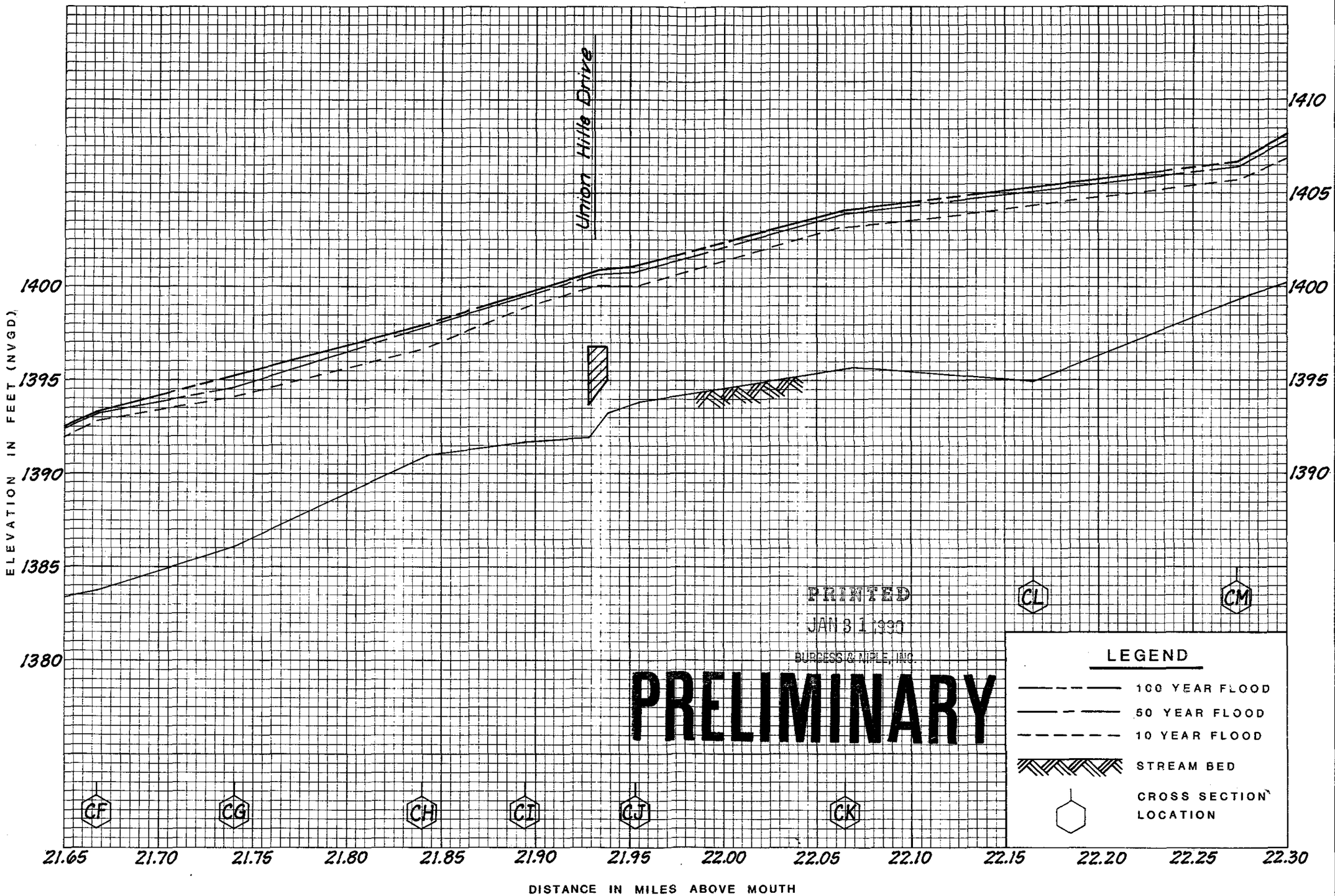

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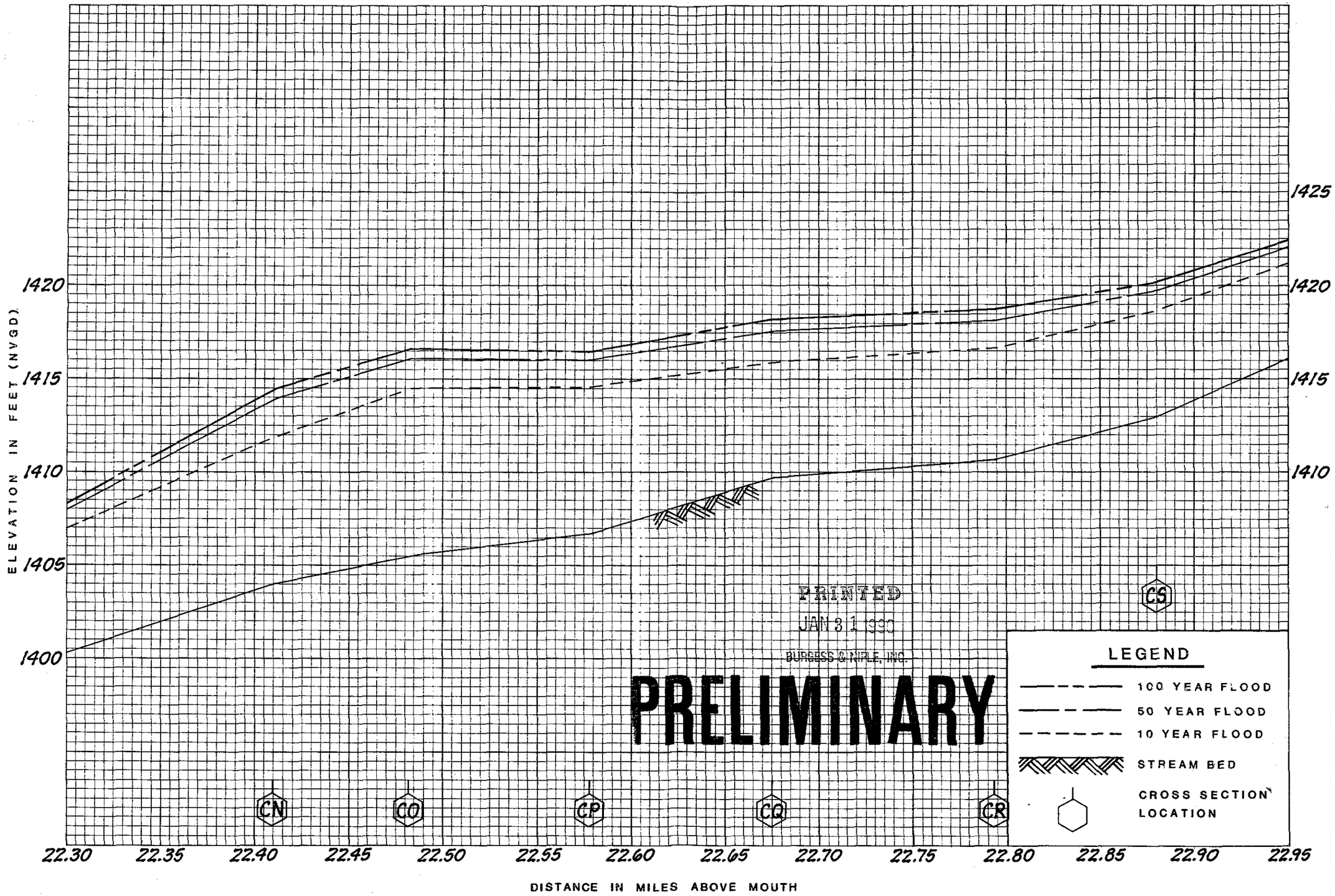

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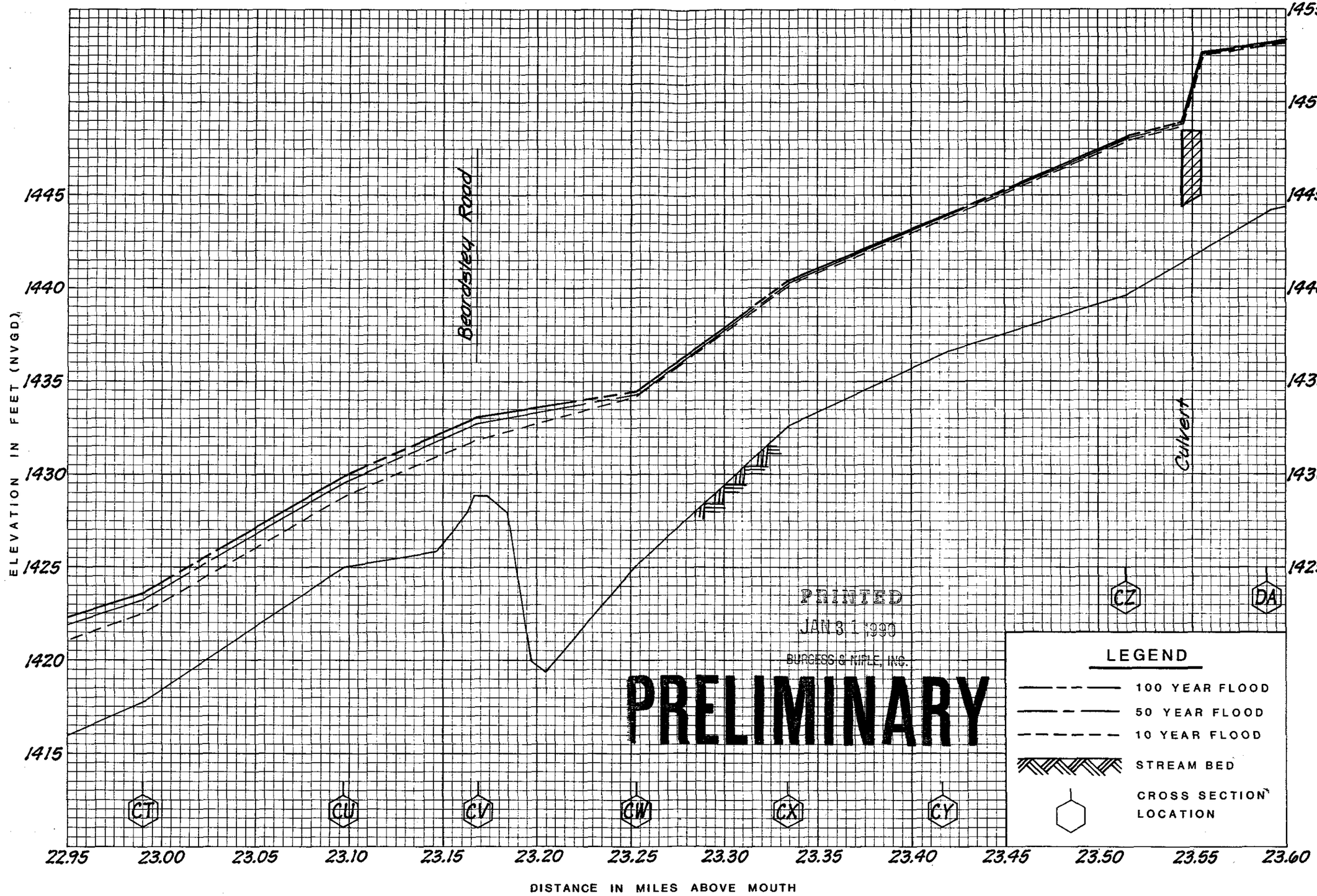

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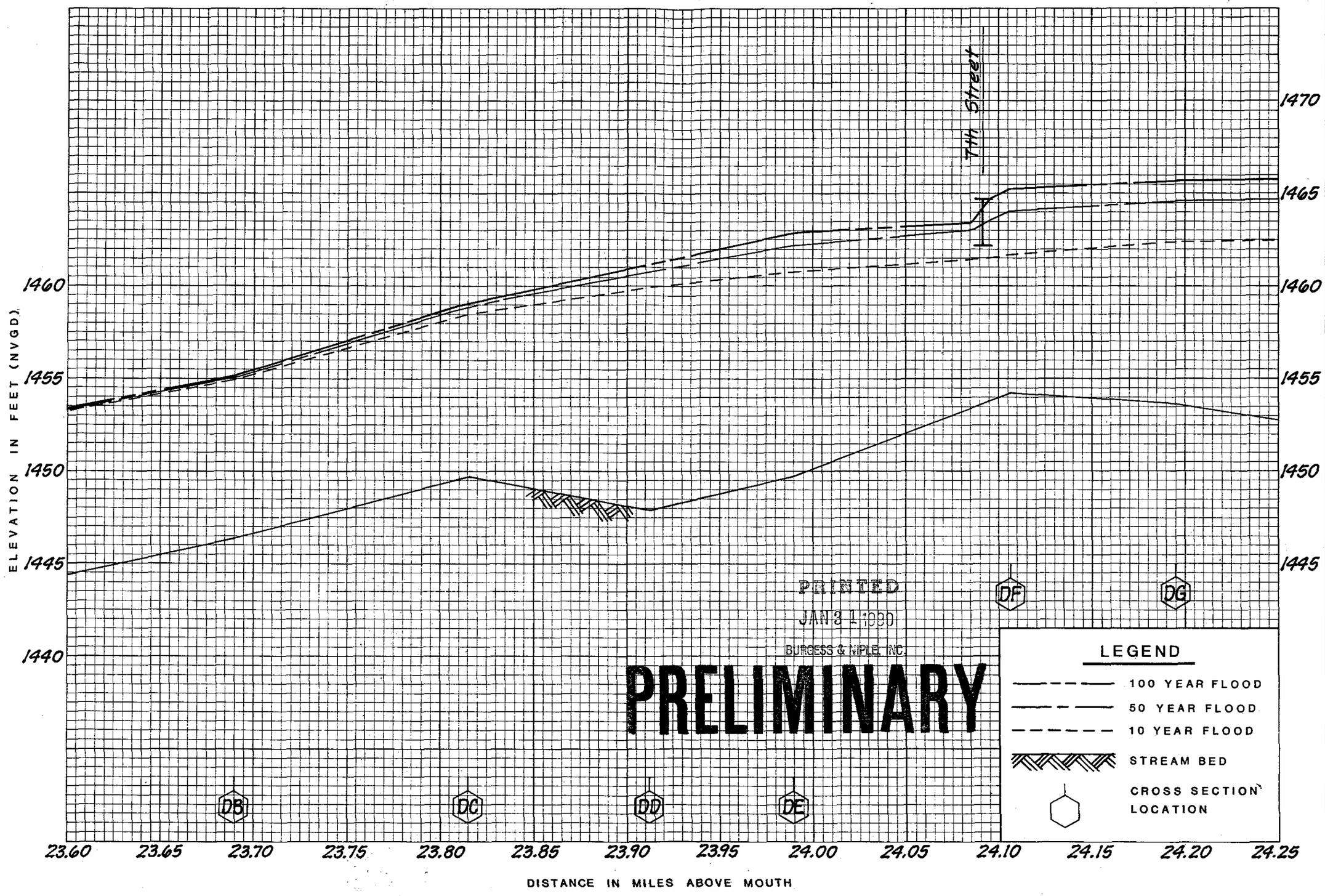

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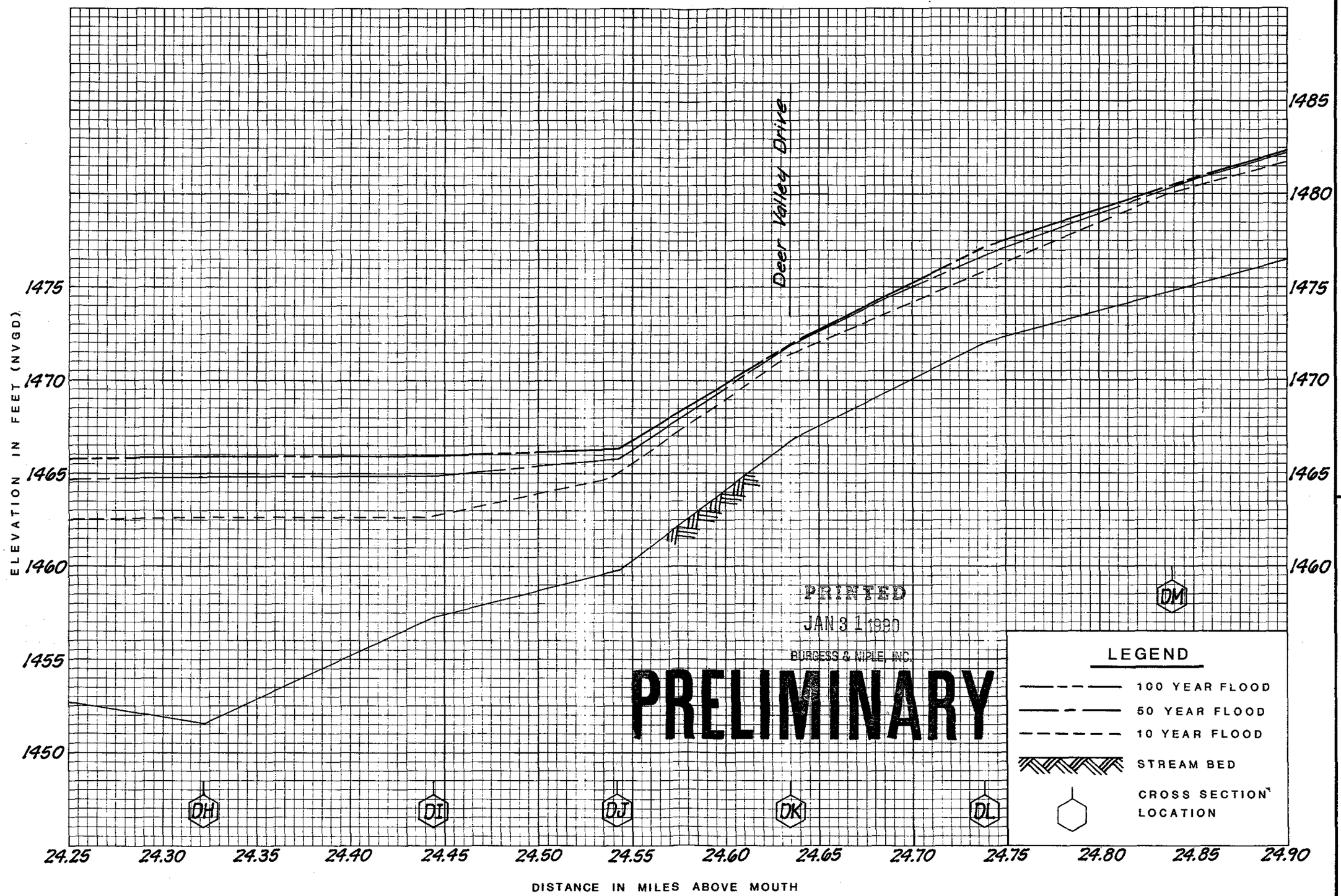

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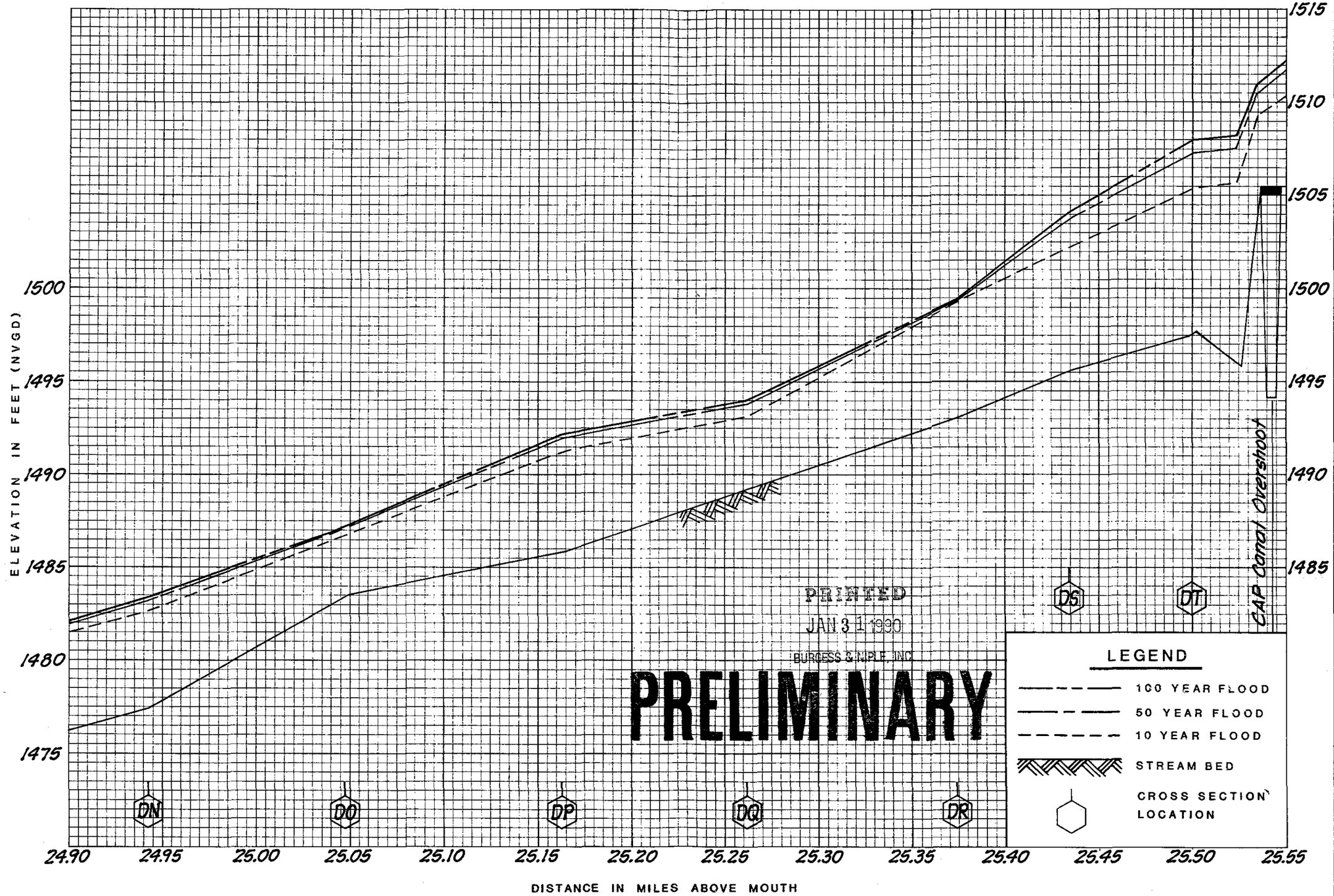

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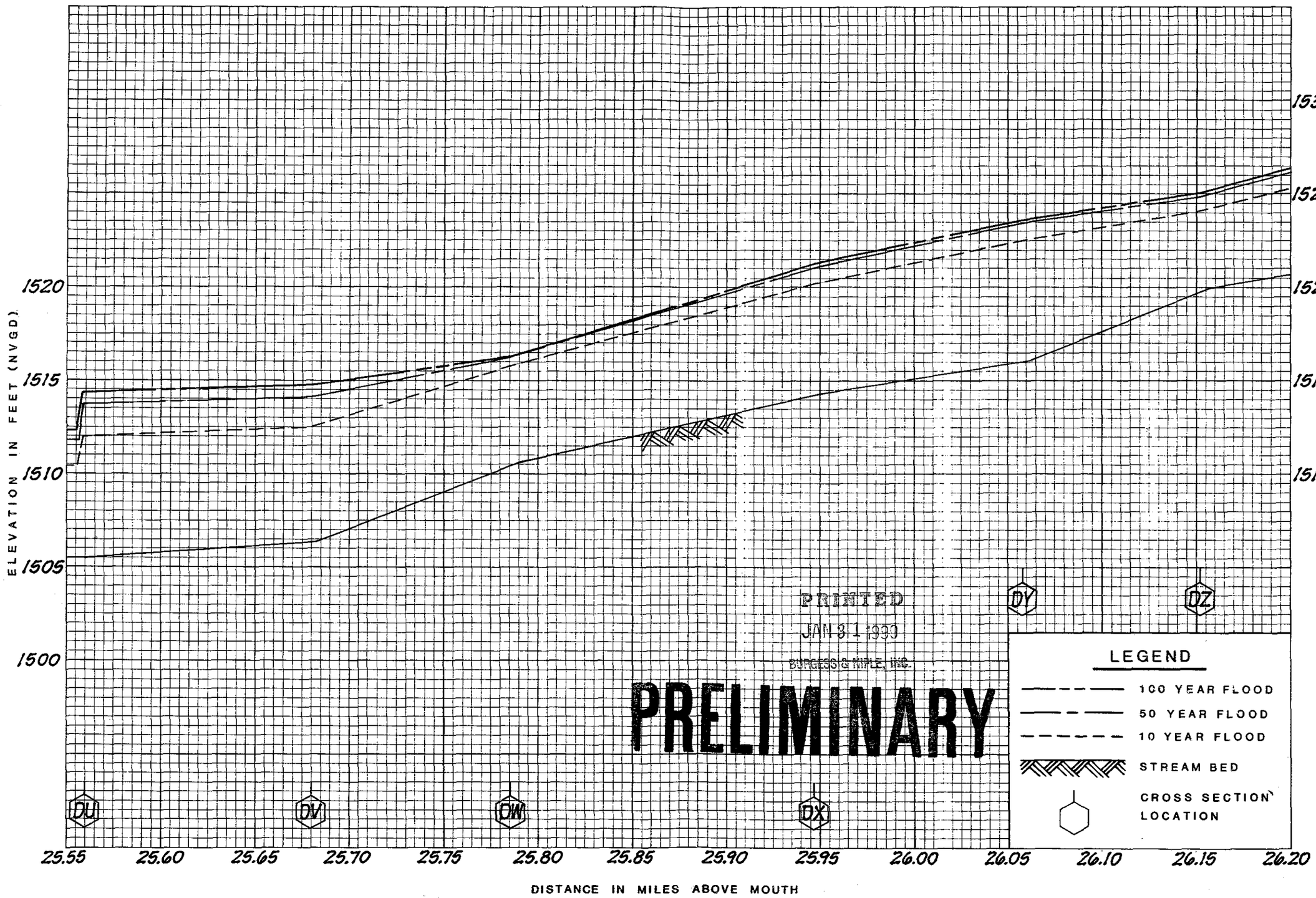

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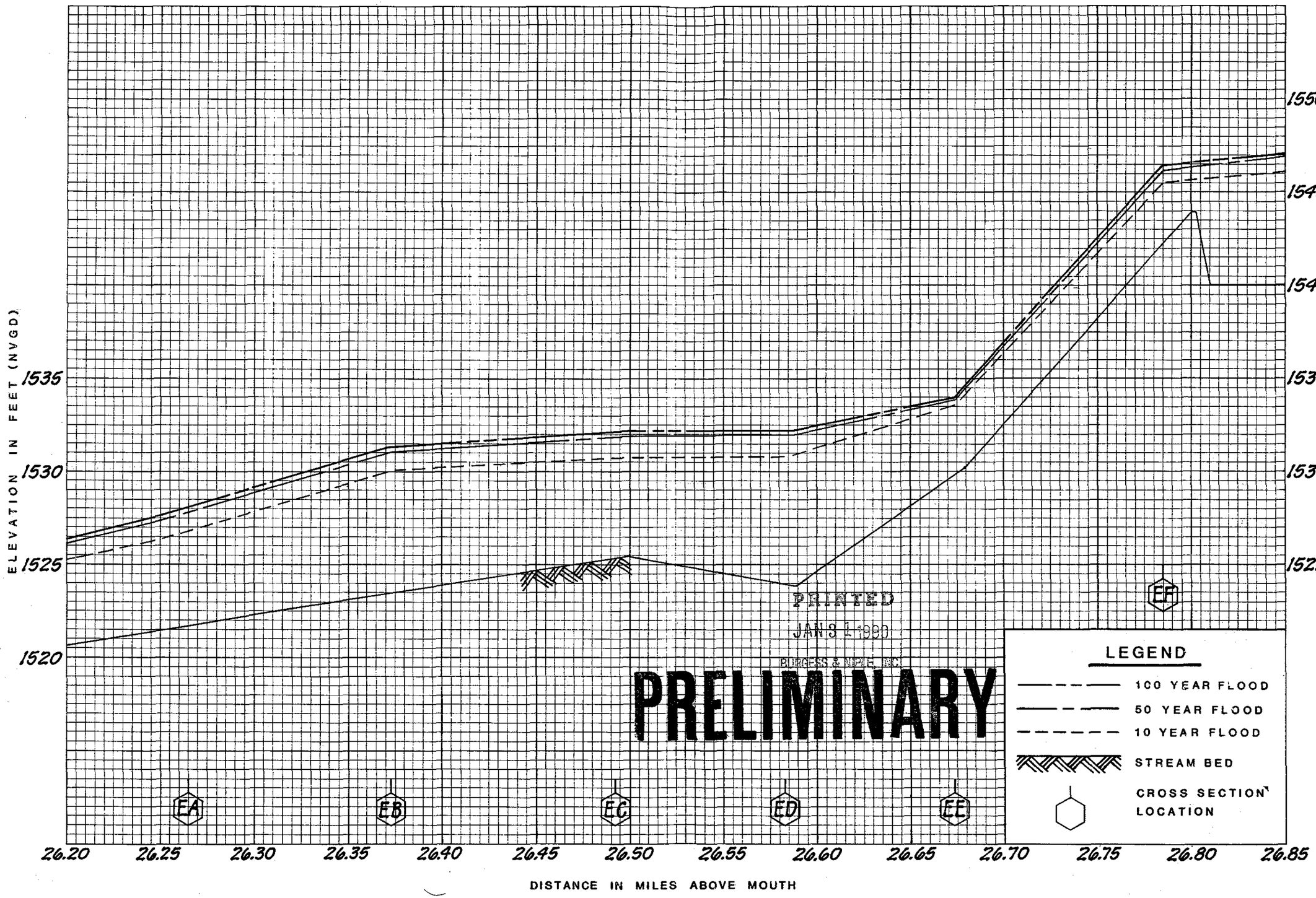

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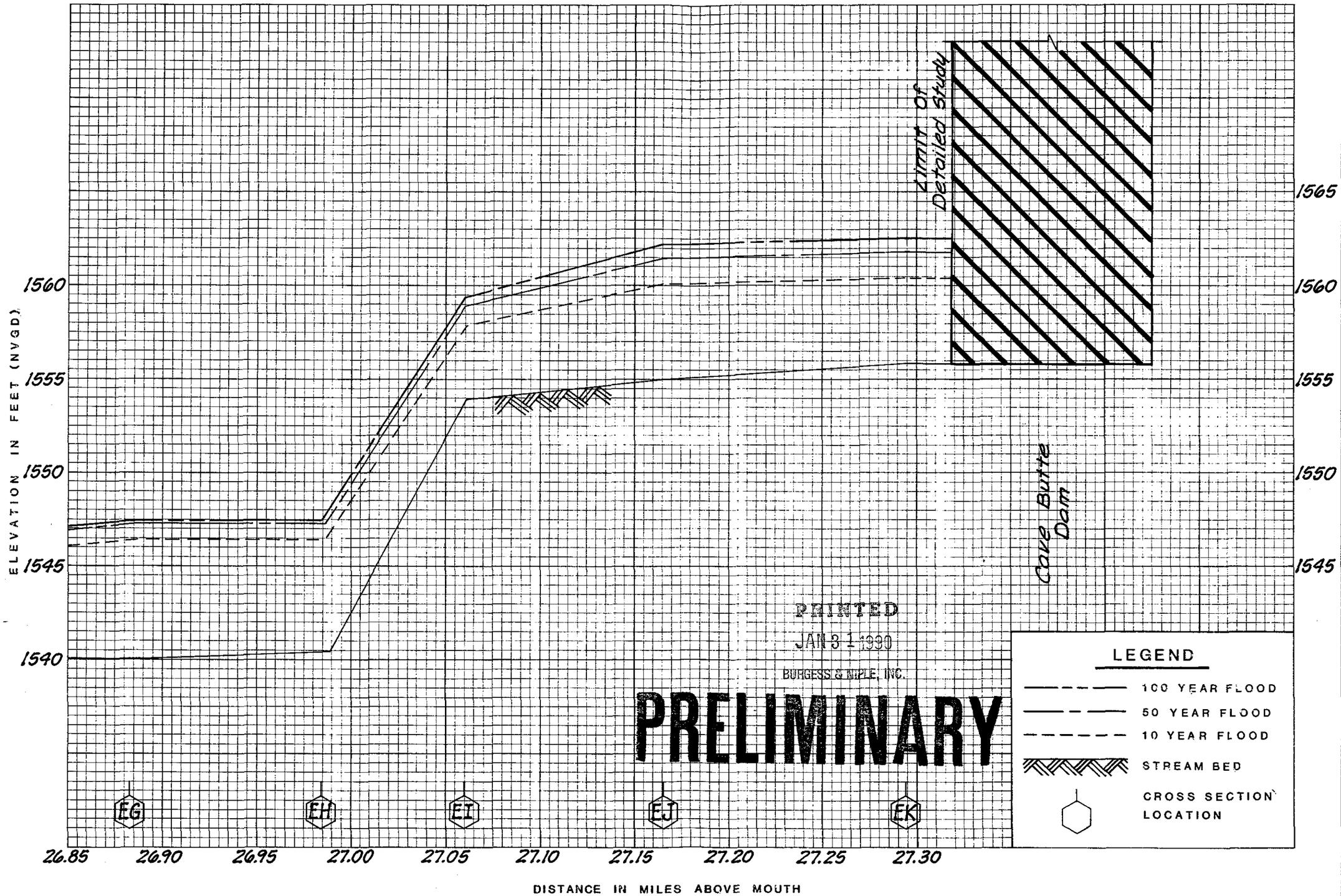

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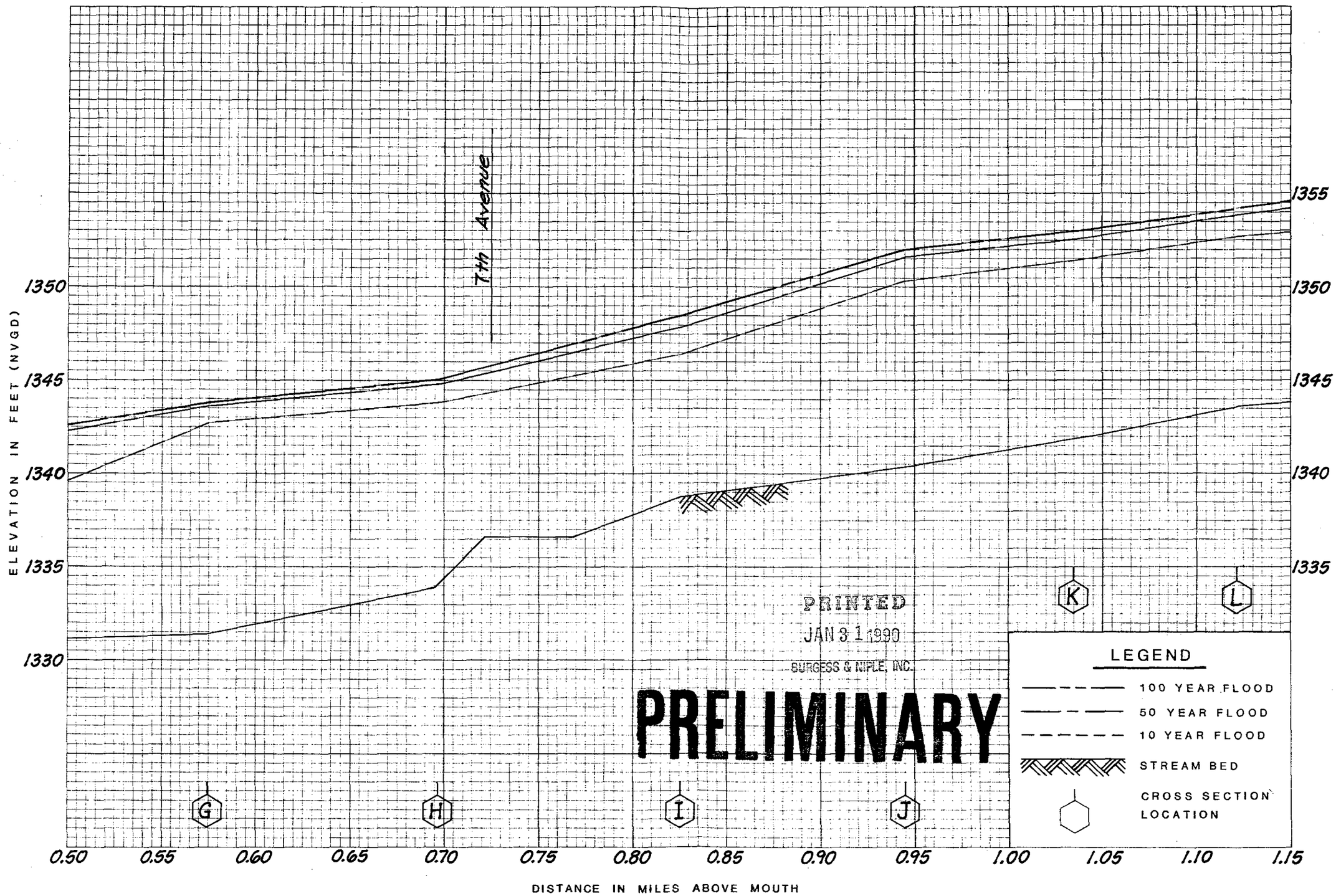

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EAST FORK, CAVE CREEK

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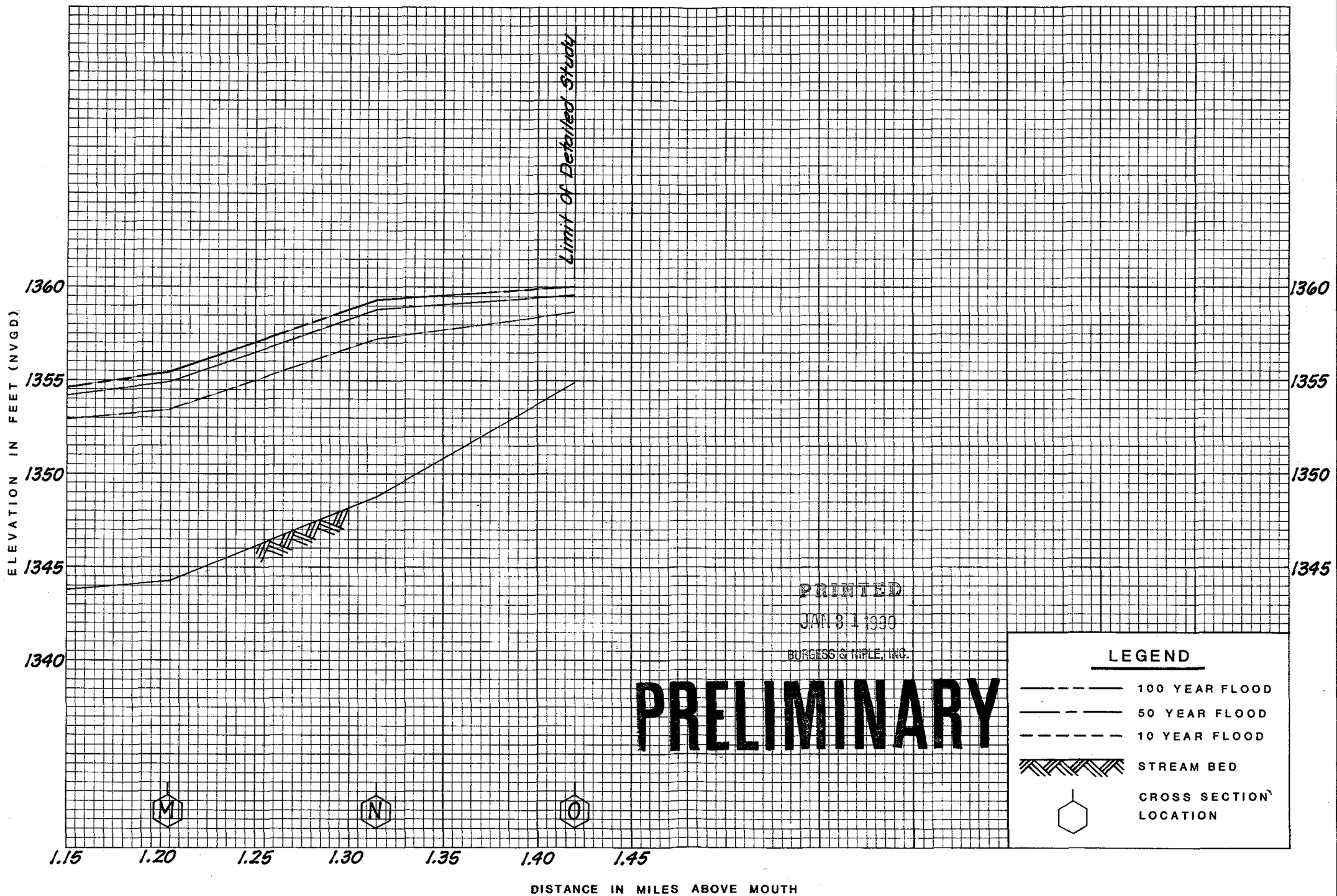

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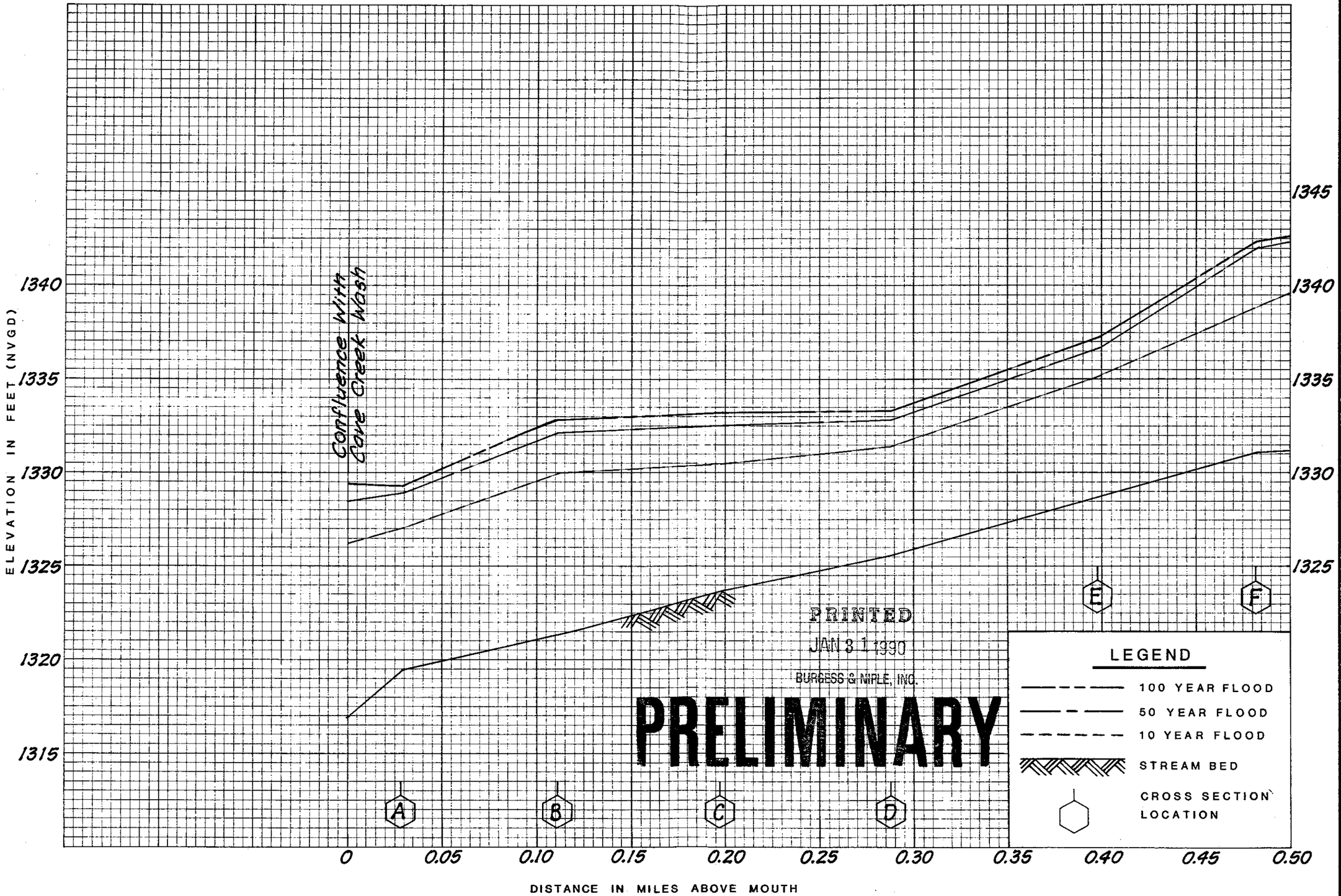

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