00BREAK00

1) COUNTY: charlevoix

2) STUDY NAME: Boyne city

3) WATERCOURSE: Boyne River

4) DOCUMENT TYPE: 10. 50 100 500 yr profiles

00BREAK00

State Copy

THIS RUN EXECUTED 07 MAY 81 16.08.44

Received 6/1/81

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*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED APRI 1980
  ERROR CORR =  01,02,03,04
  MODIFICATION =  50,51,52,53,54
*****************************************************

T1      MICHIGAN FLOOD INSURANCE STUDIES
T2      BOYNE CITY, MICHIGAN
T3      10 YR

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      =0.       2.      =0.       =0.  =0.            =0.       =0.       =0.   579.900   =0.

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      1.000   =0.       =1.000    =0.       =0.       =0.       =0.       =0.       =0.       =0.

QT     6.000   790.000  1150.000  1325.000  1860.000  1325.000  1325.000  =0.       =0.       =0.
NC      .050     .050     .035      .300      .500     =0.       =0.       =0.       =0.       =0.
ET    =0.      =0.      =0.       =0.       =0.       1.400    =0.       =0.       =0.       =0.

X1   100.000    14.000 1199.000  1251.000  =0.       =0.       =0.       =0.       =0.       =0.
GR   586.000  1000.000  584.400  1160.000  583.900  1199.000  577.700  1201.000  576.100  1207.000
GR   575.300  1216.000  575.500  1231.000  576.600  1236.000  577.800  1241.000  578.100  1250.000
GR   583.500  1251.000  584.300  1259.000  586.100  1274.000  587.000  1330.000  =0.       =0.

A X1 101.000    23.000 1139.000  1174.000    70.000    70.000    70.000  =0.       =0.       =0.
X3    10.000   =0.      =0.       =0.       =0.       =0.       =0.     587.500  587.500   =0.
X4     1.000  576.000 1152.000   =0.       =0.       =0.       =0.       =0.       =0.       =0.
GR   588.000  1000.000  586.000  1080.000  584.500  1100.000  584.000  1133.000  577.800  1135.000
GR   576.800  1139.000  576.200  1142.000  576.000  1144.000  575.800  1147.000  575.800  1150.000
GR   578.600  1156.000  578.600  1158.000  575.800  1161.000  575.700  1163.000  575.600  1166.000
GR   575.700  1169.000  575.800  1171.000  578.600  1174.000  578.200  1184.000  583.600  1185.000
GR   584.400  1193.000  586.200  1198.000  588.000  1300.000  =0.       =0.       =0.       =0.
NC    =0.      =0.       .030    =0.       =0.       =0.       =0.       =0.       =0.       =0.

X1   101.100   =0.      =0.       =0.       1.000     1.000     1.000   =0.       =0.       =0.
X3    10.000   =0.      =0.       =0.       =0.       =0.       =0.     587.500  587.500   =0.
BT    24.000  1000.000  588.000  588.000  1080.000  587.800  586.000  1100.000  587.800  584.500
BT  1133.000   587.800  584.000  1135.000  587.800  577.800  1139.000  587.800  576.800  1142.000
BT   587.800   583.200 1144.000   587.800  584.800  1147.000  587.800  585.400  1150.000  587.800
BT   584.800  1152.000  587.800  583.200  1156.000  587.800  578.600  1158.000  587.800  578.600
BT  1161.000   587.800  583.200  1163.000  587.800  584.800  1166.000  587.800  585.400  1169.000
BT   587.800   584.800 1171.000   587.800  583.200  1174.000  587.800  578.600  1184.000  587.800
BT   578.200  1185.000  587.800  583.600  1193.000  587.800  584.400  1198.000  587.800  586.200
BT  1300.000   588.000  588.000  =0.       =0.       =0.       =0.       =0.       =0.       =0.
```

INCL 1

NC	=0.	=0.	.030	.300	.500	=0.	=0.	=0.	=0.	=0.	=0.
X3	10.000	=0.	=0.	=0.	=0.	=0.	=0.	=0.	=0.	=0.	=0.
X1	201.000	=0.	=0.	=0.	=0.	50.000	50.000	=0.	.500	587.400	=0.
NC	=0.	=0.	=0.	=0.	=0.	.800	.300	=0.	=0.	=0.	=0.
GR	586.700	1085.000	587.100	1088.000	590.000	1095.000	=0.	=0.	=0.	=0.	=0.
GR	574.400	1039.000	574.800	1058.000	575.000	1063.000	1073.000	575.700	578.200	1078.000	
GR	590.000	1000.000	583.200	1015.000	581.600	1023.000	1028.000	577.900	574.600	1035.000	
X1	200.000	13.000	1023.000	1063.000	280.000	280.000	=0.	275.000	=0.	=0.	=0.
NC	=0.	=0.	=0.	.100	.300	=0.	=0.	=0.	=0.	=0.	=0.
X1	103.000	=0.	1133.000	1185.000	30.000	30.000	=0.	=0.	=0.	=0.	=0.
NC	.090	.070	.040	=0.	=0.	=0.	=0.	=0.	=0.	=0.	=0.
X3	10.000	=0.	=0.	=0.	=0.	=0.	589.000	=0.	589.000	=0.	=0.
X1	101.200	=0.	=0.	=0.	1.000	1.000	=0.	=0.	=0.	=0.	=0.
X3	10.000	=0.	=0.	=0.	=0.	=0.	589.000	=0.	=0.	=0.	=0.
X2	=0.	=0.	=0.	=0.	=0.	=0.	=0.	1.000	=0.	=0.	=0.
X1	102.000	=0.	=0.	=0.	70.000	70.000	=0.	70.000	=0.	.500	=0.
X1	102.000	=0.	=0.	=0.	=0.	=0.	=0.	=0.	=0.	=0.	=0.
X2	=0.	=0.	=0.	=0.	=0.	=0.	=0.	=0.	=0.	=0.	=0.
X3	10.000	=0.	=0.	=0.	=0.	=0.	=0.	=0.	=0.	=0.	=0.
X1	203.000	=0.	=0.	=0.	30.000	30.000	=0.	=0.	.500		=0.
X2	=0.	=0.	=0.	=0.	=0.	=0.	=0.	1.000	=0.	=0.	=0.
X3	10.000	=0.	=0.	=0.	=0.	=0.	=0.	=0.	=0.	=0.	=0.
NC	.100	.050	.040	=0.	=0.	=0.	=0.	=0.	=0.	=0.	=0.
X1	204.000	=0.	=0.	=0.	=0.	1.000	1.000	1.000	=0.	=0.	=0.
X3	10.000	=0.	=0.	=0.	=0.	=0.	=0.	=0.	588.600	588.600	=0.
NC	=0.	=0.	=0.	.100	.300	=0.	=0.	=0.	=0.	=0.	=0.
X1	300.000	14.000	1060.000	1115.000	50.000	50.000	=0.	=0.	=0.	=0.	=0.
GR	592.000	1000.000	588.100	1030.000	587.900	1045.000	1060.000	587.100	578.400	1062.000	
GR	576.000	1064.000	576.800	1084.000	576.700	1104.000	1110.000	581.600	584.200	1115.000	
GR	585.200	1122.000	586.100	1132.000	586.500	1142.000	1200.000	592.000	=0.	=0.	=0.
NC	=0.	=0.	.030	.300	.500	=0.	=0.	=0.	=0.	=0.	=0.

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D X1	400.000	15.000	1026.000	1068.000	320.000	250.000	280.000	=0.	=0.	=0.
GR	592.000	1000.000	588.000	1015.000	579.400	1020.000	577.800	1026.000	577.100	1032.000
GR	577.400	1052.000	577.300	1058.000	577.700	1064.000	578.500	1068.000	582.000	1088.000
GR	582.900	1098.000	583.600	1108.000	588.000	1120.000	590.000	1160.000	592.000	1340.000
NC	.100	.060	.050	.100	.500	=0.	=0.	=0.	=0.	=0.
X1	500.000	12.000	1003.000	1038.000	190.000	100.000	140.000	=0.	=0.	=0.
GR	590.200	1000.000	580.800	1001.000	578.200	1003.000	576.700	1010.000	575.900	1015.000
GR	575.800	1020.000	575.900	1032.000	578.100	1038.000	586.800	1050.000	588.500	1080.000
GR	590.000	1090.000	592.000	1210.000	=0.	=0.	=0.	=0.	=0.	=0.
X1	501.000	11.000	1148.000	1200.000	1.000	110.000	50.000	=0.	=0.	=0.
X3	10.000	=0.	=0.	=0.	=0.	=0.	=0.	587.200	587.200	=0.
X4	2.000	575.900	1149.000	578.100	1199.000	=0.	=0.	=0.	=0.	=0.
GR	592.000	1000.000	588.000	1050.000	578.200	1130.000	576.700	1140.000	575.900	1148.000
GR	575.800	1156.000	575.900	1191.000	578.100	1200.000	586.800	1205.000	590.000	1210.000
GR	592.000	1230.000	=0.	=0.	=0.	=0.	=0.	=0.	=0.	=0.
NC	=0.	=0.	.030	.300	.500	=0.	=0.	=0.	=0.	=0.
X1	502.000	=0.	=0.	=0.	2.000	2.000	2.000	=0.	=0.	=0.
X3	10.000	=0.	=0.	=0.	=0.	=0.	=0.	589.900	590.100	=0.
BT	11.000	1000.000	592.000	592.000	1050.000	591.500	588.000	1130.000	590.000	578.200
BT	1140.000	590.000	576.700	1148.000	589.900	575.900	1149.000	589.900	584.400	1199.000
BT	590.100	584.600	1200.000	590.100	578.100	1205.000	590.100	586.800	1210.000	590.100
BT	590.000	1230.000	592.000	592.000	=0.	=0.	=0.	=0.	=0.	=0.
X1	503.000	=0.	=0.	=0.	32.000	32.000	32.000	=0.	=0.	=0.
X2	=0.	=0.	=0.	=0.	=0.	=0.	1.000	=0.	=0.	=0.
X3	10.000	=0.	=0.	=0.	=0.	=0.	=0.	589.900	590.100	=0.
NC	.080	.080	.040	.100	.300	=0.	=0.	=0.	=0.	=0.
X1	504.000	16.000	1020.000	1075.000	2.000	2.000	2.000	=0.	=0.	=0.
X3	10.000	=0.	=0.	=0.	=0.	=0.	=0.	590.000	590.000	=0.
GR	590.000	1000.000	588.000	1010.000	582.400	1015.000	579.400	1020.000	578.100	1030.000
GR	576.600	1035.000	576.500	1040.000	577.000	1047.000	577.700	1051.000	577.900	1065.000
GR	579.900	1075.000	581.300	1077.000	582.000	1082.000	591.500	1085.000	590.000	1090.000
GR	592.000	1110.000	=0.	=0.	=0.	=0.	=0.	=0.	=0.	=0.
NC	=0.	=0.	=0.	.300	.500	=0.	=0.	=0.	=0.	=0.
E X1	600.000	=0.	=0.	=0.	30.000	30.000	30.000	=0.	=0.	=0.
NC	=0.	=0.	=0.	.100	.300	=0.	=0.	=0.	=0.	=0.

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X1	610.000	15.000	1130.000	1190.000	90.000	170.000	140.000	-0.	-0.	-0.
GR	592.800	1000.000	592.000	1100.000	590.000	1120.000	588.000	1125.000	582.600	1130.000
GR	579.600	1135.000	578.300	1145.000	576.800	1150.000	576.700	1155.000	577.200	1162.000
GR	577.900	1166.000	578.100	1180.000	580.100	1190.000	588.000	1210.000	592.000	1230.000
NC	.080	.100	.050	-0.	-0.	-0.	-0.	-0.	-0.	-0.
F X1	700.000	20.000	1080.000	1169.000	680.000	560.000	640.000	-0.	-0.	-0.
GR	592.000	1000.000	590.000	1035.000	584.000	1060.000	580.800	1080.000	580.200	1085.000
GR	578.200	1092.000	576.100	1100.000	574.400	1104.000	568.900	1128.000	575.000	1149.000
GR	577.500	1162.000	578.700	1166.000	579.500	1169.000	582.700	1180.000	583.200	1185.000
GR	584.300	1191.000	585.400	1196.000	586.300	1200.000	586.000	1400.000	588.000	1530.000
NC	.100	.080	.050	-0.	-0.	-0.	-0.	-0.	-0.	-0.
ET	-0.	-0.	-0.	-0.	-0.	-0.	9.100	-0.	1190.000	1370.000
G X1	800.000	15.000	1291.000	1347.000	1040.000	950.000	930.000	-0.	-0.	-0.
GR	590.000	1000.000	588.000	1050.000	586.000	1110.000	584.000	1170.000	580.000	1270.000
GR	580.400	1278.000	580.800	1283.000	580.200	1291.000	579.100	1292.000	576.400	1307.000
GR	579.300	1345.000	580.500	1347.000	583.500	1357.000	585.600	1387.000	590.000	1440.000
NC	.080	.080	.045	-0.	-0.	-0.	-0.	-0.	-0.	-0.
ET	-0.	-0.	-0.	-0.	-0.	-0.	9.100	-0.	1120.000	1258.000
H X1	900.000	14.000	1175.000	1235.000	1000.000	760.000	840.000	-0.	-0.	-0.
X4	4.000	578.700	1176.000	578.800	1204.000	577.600	1208.000	578.600	1234.000	-0.
GR	590.000	1000.000	586.000	1050.000	584.000	1130.000	582.500	1140.000	578.900	1170.000
GR	578.700	1175.000	578.600	1179.000	578.800	1205.000	577.600	1207.000	578.600	1235.000
GR	579.400	1240.000	583.000	1245.000	586.200	1260.000	590.000	1270.000	-0.	-0.
ET	-0.	-0.	-0.	-0.	-0.	-0.	9.100	-0.	1175.000	1235.000
X1	901.000	-0.	-0.	-0.	20.000	20.000	20.000	-0.	-0.	-0.
NC	-0.	-0.	.030	.300	.500	-0.	-0.	-0.	-0.	-0.
ET	-0.	-0.	-0.	-0.	-0.	-0.	9.100	-0.	1175.000	1235.000
X1	901.100	-0.	-0.	-0.	1.000	1.000	1.000	-0.	-0.	-0.
BT	15.000	1130.000	584.000	584.000	1140.000	584.000	582.500	1170.000	585.200	578.900
BT	1175.000	586.400	578.700	1176.000	586.400	585.200	1204.000	588.000	586.800	1205.000
BT	588.000	578.500	1207.000	588.000	577.600	1208.000	588.000	586.800	1234.000	587.500
BT	586.500	1235.000	587.500	578.600	1240.000	587.800	579.400	1245.000	588.100	583.000
BT	1260.000	589.200	586.200	1270.000	590.000	590.000	-0.	-0.	-0.	-0.
X1	901.200	-0.	-0.	-0.	25.000	25.000	25.000	-0.	-0.	-0.
X2	-0.	-0.	-0.	-0.	-0.	-0.	1.000	-0.	-0.	-0.

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X1    902.000   =0.    =0.    =0.     1.000   1.000   1.000   =0.    =0.     =0.
ET    =0.       =0.    =0.    =0.     =0.     =0.     9.100   =0.    1175.000  1235.000

X1    903.000   =0.    =0.    =0.    10.000  10.000  10.000   =0.    =0.     =0.
EJ    =0.       =0.    =0.    =0.     =0.     =0.     =0.     =0.    =0.     =0.
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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         QLOSS    BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA    LEFT/RIGHT
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN       SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID      ENDST

*PROF 1

CCHV=     .300 CEHV=     .500
*SECNO 100.000
   100.00      4.60     579.90       0.     579.90     580.22       .32       0.        0.     583.90
     790.        0.       790.       0.        0.       175.        0.        0.        0.     583.50
      0.         0.       4.52       0.       .050       .035      .050       0.     575.30    1200.29
  .002351       -0.       -0.        -0.        0          0         0         0.     50.04    1250.33

*SECNO 101.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      587.50 ELREA=      587.50

   101.00      4.37     579.97       0.       0.     580.60       .63       .23       .16     576.80
     790.        0.       790.       0.        0.       124.        0.        0.        0.     578.60
      .00        0.       6.38       0.       .050       .035      .050      .035    575.60    1139.00
  .004689       70.       70.        70.        2          0         0         0.     35.00    1174.00

*SECNO 101.100

3370 NORMAL BRIDGE,NRD= 24 MIN ELTRD=  587.80 MAX ELLC=  588.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      587.50 ELREA=      587.50

   101.10      4.33     579.93       0.       0.     580.65       .73       .01       .05     576.80
     790.        0.       790.       0.        0.       115.        0.        0.        0.     578.60
      .00        0.       6.84       0.       .050       .030      .050      .034    575.60    1139.00
  .005344        1.        1.        1.        2          0         0      -22.11     35.00    1174.00

*SECNO 102.000

3370 NORMAL BRIDGE,NRD= 24 MIN ELTRD=  587.80 MAX ELLC=  588.50

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      589.00 ELREA=      589.00

   102.00      4.19     580.29       0.       0.     581.07       .78       .39       .03     577.30
     790.        0.       790.       0.        0.       111.        0.        0.        0.     579.10
      .01        0.       7.09       0.       .050       .030      .050      .032    576.10    1139.00
  .005903       70.       70.        70.        1          0         0      -19.82     35.00    1174.00
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         DLOSS    BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA    LEFT/RIGHT
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN       SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID      ENDST

*SECNO 101.200

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      589.00 ELREA=      589.00

   101.20      4.41     580.51       0.         0.     581.13        .61        .00        .05    577.30
     790.        0.       790.       0.         0.      126.         0.         0.         0.     579.10
      .01        0.       6.29       0.        .050     .030       .050       .032     576.10   1139.00
  .003275        1.        1.        1.         2        0          0         0.       35.00   1174.00

*SECNO 103.000
   103.00      4.81     580.91       0.         0.     581.30        .39        .10        .07    577.30
     790.       26.       724.      40.        14.      139.        21.         1.         0.     579.10
      .01       1.91      5.19      1.96       .090     .040       .070       .033     576.10   1134.16
  .003464       30.       30.       30.         2        0          0         0.       50.25   1184.41

CCHV=     .100 CEHV=     .300
*SECNO 200.000
   200.00      7.13     581.53       0.         0.     581.63        .10        .31        .03    581.60
     790.        0.       657.     133.         0.      239.        89.         2.         0.     575.00
      .04        0.       2.75      1.50       .090     .040       .070       .037     574.40   1023.10
 .000538       280.      275.      280.         2        0          0         0.       57.64   1080.74

CCHV=     .300 CEHV=     .800
*SECNO 201.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      587.40 ELREA=      587.40

   201.00      6.64     581.54       0.         0.     581.74        .20        .04        .08    582.10
     790.        0.       790.       0.         0.      220.         0.         2.         1.     575.50
      .04        0.       3.60       0.        .090     .040       .070       .037     574.90   1023.75
  .001003       50.       50.       50.         2        0          0         0.       39.25   1063.00

CCHV=     .300 CEHV=     .500
*SECNO 202.000

3370 NORMAL BRIDGE,NRD= 10 MIN ELTRD=  588.50 MAX ELLC=  590.50
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SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     BANK ELEV
Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA     LEFT/RIGHT
TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      588.70 ELREA=      588.70

  202.00     6.64    581.54      0.        0.     581.75       .21       .00       .00    582.10
   790.       0.     790.       0.        0.      216.        0.        2.        1.     575.50
    .04       0.      3.65      0.       .090      .030      .070      .037    574.90   1024.60
 .000698      1.       1.       1.        0         0         0      -58.64     38.40   1063.00

*SECNO 203.000

3370 NORMAL BRIDGE,NRD= 10 MIN ELTRD=  588.50 MAX ELLC=  591.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      588.70 ELREA=      588.70

  203.00     6.14    581.54      0.        0.     581.79       .25       .02       .02    582.60
   790.       0.     790.       0.        0.      198.        0.        3.        1.     576.00
    .04       0.      4.00      0.       .090      .030      .070      .037    575.40   1025.14
 .000911     30.      30.      30.        2         0         0      -53.38     37.86   1063.00

*SECNO 204.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      588.60 ELREA=      588.60

  204.00     6.15    581.55      0.        0.     581.79       .24       .00       .00    582.60
   790.       0.     790.       0.        0.      199.        0.        3.        1.     576.00
    .04       0.      3.97      0.       .100      .040      .050      .037    575.40   1025.14
 .001326      1.       1.       1.        0         0         0        0.      37.86   1063.00

CCHV=     .100 CEHV=     .300
*SECNO 300.000
  300.00     5.68    581.68      0.        0.     581.86       .18       .06       .01    587.10
   790.       0.     790.       0.        0.      230.        0.        3.        1.     584.20
    .05       0.      3.44      0.       .100      .040      .050      .037    576.00   1061.25
 .001258     50.      50.      50.        2         0         0        0.      48.91   1110.16

CCHV=     .100 CEHV=     .300
*SECNO 400.000
  400.00     4.93    582.03      0.        0.     582.22       .19       .35       .00    577.80
   790.      25.     710.      55.       23.      194.       36.        4.        1.     578.50
    .07      1.10      3.65     1.54      .100      .040      .050      .038    577.10   1018.47
 .001259    320.     280.     250.        1         0         0        0.      69.95   1088.42
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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

CCHV=     .100 CEHV=     .500
*SECNO 500.000
   500.00      6.41    582.21      0.        0.      582.43      .22       .20       .02    578.20
     790.       5.     769.       16.        6.      202.       12.        5.        1.     578.10
      .08       .82     3.80      1.40      .100      .050      .060      .040    575.80   1000.85
  .001617     190.     140.      100.        0         0         0        0.      42.82   1043.67

*SECNO 501.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      587.20 ELREA=      587.20

   501.00      6.60    582.40      0.        0.      582.49      .09       .04       .01    575.90
     790.       0.     790.        0.        0.      329.        0.        5.        1.     578.10
      .09       0.      2.40      0.        .100      .050      .060      .040    575.80   1148.00
  .000562       <1.      50.      110.        2         0         0        0.      52.00   1200.00

CCHV=     .300 CEHV=     .500
*SECNO 502.000

3370 NORMAL BRIDGE,NRD= 11 MIN ELTRD=  589.90 MAX ELLC=  592.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      589.90 ELREA=      590.10

   502.00      6.60    582.40      0.        0.      582.49      .09       .00       .00    575.90
     790.       0.     790.        0.        0.      325.        0.        5.        1.     578.10
      .09       0.      2.43      0.        .100      .030      .060      .040    575.80   1148.00
  .000271       2.       2.        2.        0         0         0       -9.23      52.00   1200.00

*SECNO 503.000

3370 NORMAL BRIDGE,NRD= 11 MIN ELTRD=  589.90 MAX ELLC=  592.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      589.90 ELREA=      590.10

   503.00      6.61    582.41      0.        0.      582.50      .09       .01       .00    575.90
     790.       0.     790.        0.        0.      326.        0.        6.        1.     578.10
      .09       0.      2.42      0.        .100      .030      .060      .040    575.80   1148.00
  .000269      32.      32.       32.        0         0         0       -9.27      52.00   1200.00
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS   BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA   LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN      SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID     ENDST

CCHV=     .100 CEHV=     .300
*SECNO 504.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      590.00 ELREA=      590.00

   504.00     5.86    582.36      0.        0.     582.52      .16       .00       .02    579.40
     790.       0.      790.      0.        0.       248.       0.        6.        1.     579.90
      .09       0.      3.18      0.      .080      .040      .080      .040    576.50   1020.00
  .000999       2.        2.      2.         2         0         0        0.     55.00   1075.00

CCHV=     .300 CEHV=     .500
*SECNO 600.000
   600.00     5.90    582.40      0.        0.     582.55      .15       .03       .00    579.40
     790.       5.      780.      4.        8.       250.       7.        6.        1.     579.90
      .09      .68      3.12     .60      .080      .040      .080      .040    576.50   1015.00
  .000947      30.       30.     30.         2         0         0        0.     67.13   1082.13

CCHV=     .100 CEHV=     .300
*SECNO 610.000
   610.00     5.84    582.54      0.        0.     582.69      .15       .14       .00    582.60
     790.       0.      785.      5.        0.       254.       8.        7.        2.     580.10
      .11       0.      3.09     .65      .080      .040      .080      .040    576.70   1130.10
  .001041      90.      140.    170.         1         0         0        0.     66.07   1196.17

*SECNO 700.000
   700.00    13.92    582.82      0.        0.     582.84      .02       .13       .01    580.80
     790.       2.      784.      4.       13.       724.      19.       14.        3.     579.50
      .27      .17      1.08     .19      .080      .050      .100      .043    568.90   1067.40
  .000085     680.      640.    560.         2         0         0        0.    113.77   1181.17

*SECNO 800.000
   800.00     6.55    582.95      0.        0.     583.03      .08       .18       .02    580.20
     790.     101.      683.      6.      163.       281.      10.       27.        6.     580.50
      .39      .62      2.43     .58      .100      .050      .080      .045    576.40   1196.12
  .000796    1040.      930.    950.         2         0         0        0.    159.06   1355.18

*SECNO 900.000
   900.00     5.90    583.50      0.        0.     583.56      .06       .53       .00    578.70
     790.      97.      661.     32.      111.       306.      35.       37.        9.     578.60
      .51      .87      2.16     .93      .080      .045      .080      .045    577.60   1133.32
  .000492    1000.      840.    760.         2         0         0        0.    114.03   1247.35
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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS    BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA    LEFT/RIGHT
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN       SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID      ENDST

*SECNO 901.000
   901.00       5.91     583.51       0.         0.       583.57       .06        .01        .00     578.70
     790.        97.      661.        32.       111.      307.        35.        37.         9.     578.60
      .52        .87      2.15        .93       .080      .045       .080       .045     577.60    1133.23
  .000487        20.       20.        20.         0         0          0         0.      114.18    1247.41

CCHV=     .300 CEHV=     .500
*SECNO 901.100

3370 NORMAL BRIDGE,NRD= 15 MIN ELTRD=  584.00 MAX ELLC=  590.00

4677 BRIDGE DECK DEFINITION ERROR AT STATIONS    1204.00    1205.00
   901.10       5.89     583.49       0.         0.       583.60       .12        .00        .03     578.70
     790.         0.      790.         0.         0.       289.         0.        37.         9.     578.60
      .52         0.      2.73         0.       .080       .030       .080       .045     577.60    1133.42
  .000491         1.        1.         1.         2          0          0    -160.41     113.85    1247.28

*SECNO 901.200

3370 NORMAL BRIDGE,NRD= 15 MIN ELTRD=  584.00 MAX ELLC=  590.00

4677 BRIDGE DECK DEFINITION ERROR AT STATIONS    1204.00    1205.00
   901.20       5.90     583.50       0.         0.       583.61       .12        .01        .00     578.70
     790.         0.      790.         0.         0.       290.         0.        37.         9.     578.60
      .52         0.      2.72         0.       .080       .030       .080       .045     577.60    1133.34
  .000487        25.       25.        25.         0          0          0    -161.12     113.99    1247.34

*SECNO 902.000
   902.00       5.96     583.56       0.         0.       583.63       .07        .00        .01     578.70
     790.        69.      698.        23.       113.      309.        35.        37.         9.     578.60
      .52        .61      2.26        .65       .080      .030       .080       .045     577.60    1132.95
  .000235         1.        1.         1.         2          0          0         0.      114.66    1247.61

*SECNO 903.000
   903.00       5.96     583.56       0.         0.       583.63       .07        .00        .00     578.70
     790.        69.      698.        23.       113.      310.        35.        37.         9.     578.60
      .52        .61      2.26        .65       .080      .030       .080       .045     577.60    1132.93
  .000234        10.       10.        10.         0          0          0         0.      114.70    1247.63
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THIS RUN EXECUTED 07 MAY 81 16.08.44

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*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED APRI 1980
  ERROR CORR =  01,02,03,04
  MODIFICATION =  50,51,52,53,54
*****************************************************

T1       MICHIGAN FLOOD INSURANCE STUDIES
T2       BOYNE CITY, MICHIGAN
T3       50 YR

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       =0.       3.       =0.       =0.  =0.            =0.       =0.       =0.   579.900   =0.

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       2.000  =0.       =1.000    =0.       =0.       =0.       =0.       =0.       =0.       =0.
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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS   BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA   LEFT/RIGHT
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

*PROF 2

CCHV=     .300 CEHV=     .500
*SECNO 100.000
   100.00     4.60    579.90      0.     579.90    580.57      .67      0.       0.      583.90
    1150.      0.     1150.      0.        0.      175.       0.       0.       0.      583.50
      0.       0.      6.58      0.      .050      .035      .050      0.     575.30    1200.29
  .004983     *0.      *0.       *0.        0         0         0       0.     50.04    1250.33

*SECNO 101.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON*EFFECTIVE,ELLEA=      587.50 ELREA=      587.50

   101.00     4.46    580.06      0.        0.     581.33     1.27      .46       .30     576.80
    1150.      0.     1150.      0.        0.      127.       0.       0.       0.      578.60
      .00      0.      9.05      0.      .050      .035      .050     .035    575.60    1139.00
  .009094     70.      70.       70.        2         0         0       0.     35.00    1174.00

*SECNO 101.100

3370 NORMAL BRIDGE,NRD= 24 MIN ELTRD=  587.80 MAX ELLC=  588.00

3495 OVERBANK AREA ASSUMED NON*EFFECTIVE,ELLEA=      587.50 ELREA=      587.50

   101.10     4.34    579.94      0.        0.     581.47     1.53      .01       .13     576.80
    1150.      0.     1150.      0.        0.      116.       0.       0.       0.      578.60
      .00      0.      9.91      0.      .050      .030      .050     .034    575.60    1139.00
  .011170      1.       1.       1.        2         0         0    *22.44     35.00    1174.00

*SECNO 102.000

3370 NORMAL BRIDGE,NRD= 24 MIN ELTRD=  587.80 MAX ELLC=  588.50

3495 OVERBANK AREA ASSUMED NON*EFFECTIVE,ELLEA=      589.00 ELREA=      589.00
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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS    BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA    LEFT/RIGHT
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

    102.00     4.96       581.06     0.         0.         582.22     1.16       .64        .11        577.30
     1150.     0.         1150.      0.         0.         133.       0.         0.         0.         579.10
       .00     0.         8.64       0.         .050       .030       .050       .032       576.10     1139.00
   .007701     70.        70.        70.        3          0          0          33.02      35.00      1174.00

 *SECNO 101.200

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      589.00 ELREA=      589.00

    101.20     5.45       581.55     0.         0.         582.34     .79        .00        .11        577.30
     1150.     0.         1150.      0.         0.         162.       0.         0.         0.         579.10
       .00     0.         7.12       0.         .050       .030       .050       .032       576.10     1139.00
   .003003     1.         1.         1.         3          0          0          0.         35.00      1174.00

 *SECNO 103.000
    103.00     5.96       582.06     0.         0.         582.53     .46        .09        .10        577.30
     1150.     41.        1029.      80.        19.        180.       33.        1.         0.         579.10
       .01     2.13       5.72       2.44       .090       .040       .070       .033       576.10     1133.78
   .002989     30.        30.        30.        2          0          0          0.         50.84      1184.62

 CCHV=     .100 CEHV=     .300
 *SECNO 200.000
    200.00     8.33       582.73     0.         0.         582.88     .15        .32        .03        581.60
     1150.     1.         951.       198.       3.         287.       111.       3.         1.         575.00
       .03     .28        3.32       1.78       .090       .040       .070       .037       574.40     1017.36
   .000615     280.       275.       280.       2          0          0          0.         64.37      1081.73

 CCHV=     .300 CEHV=     .800
 *SECNO 201.000

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      587.40 ELREA=      587.40

    201.00     7.84       582.74     0.         0.         583.03     .29        .04        .11        582.10
     1150.     0.         1150.      0.         0.         267.       0.         3.         1.         575.50
       .03     0.         4.30       0.         .090       .040       .070       .037       574.90     1023.00
   .001136     50.        50.        50.        2          0          0          0.         40.00      1063.00
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

CCHV=     .300 CEHV=     .500
*SECNO 202.000

3370 NORMAL BRIDGE,NRD= 10 MIN ELTRD=  588.50 MAX ELLC=  590.50

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      588.70 ELREA=      588.70

   202.00     7.84    582.74      0.        0.     583.04      .30       .00       .00    582.10
    1150.      0.     1150.       0.        0.      263.       0.        3.        1.     575.50
      .03      0.      4.37       0.      .090      .030      .070      .037    574.90   1023.00
  .000856      1.       1.        1.        0         0         0    -71.43     40.00   1063.00

*SECNO 203.000

3370 NORMAL BRIDGE,NRD= 10 MIN ELTRD=  588.50 MAX ELLC=  591.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      588.70 ELREA=      588.70

   203.00     7.34    582.74      0.        0.     583.09      .35       .03       .02    582.60
    1150.      0.     1150.       0.        0.      243.       0.        3.        1.     576.00
      .04      0.      4.73       0.      .090      .030      .070      .037    575.40   1023.00
  .001080     30.      30.       30.        2         0         0    -66.05     40.00   1063.00

*SECNO 204.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      588.60 ELREA=      588.60

   204.00     7.35    582.75      0.        0.     583.09      .34       .00       .00    582.60
    1150.      0.     1150.       0.        0.      245.       0.        3.        1.     576.00
      .04      0.      4.69       0.      .100      .040      .050      .037    575.40   1023.00
  .001522      1.       1.        1.        0         0         0        0.     40.00   1063.00

CCHV=     .100 CEHV=     .300
*SECNO 300.000
   300.00     6.93    582.93      0.        0.     583.17      .24       .07       .01    587.10
    1150.      0.     1150.       0.        0.      293.       0.        3.        1.     584.20
      .04      0.      3.93       0.      .100      .040      .050      .037    576.00   1060.96
  .001307     50.      50.       50.       50         2         0         0        0.     51.61   1112.56
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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS    BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA    LEFT/RIGHT
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN       SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID      ENDST

CCHV=     .100 CEHV=     .300
*SECNO 400.000
     400.00      6.19     583.29      0.         0.       583.51       .21        .33        .00     577.80
      1150.       40.      979.      131.        33.      247.        70.         6.         1.      578.50
        .06      1.22      3.96      1.86       .100      .040       .050       .038     577.10    1017.74
    .001077      320.      280.      250.          2         0          0         0.      85.85    1103.59

CCHV=     .100 CEHV=     .500
*SECNO 500.000
     500.00      7.63     583.43      0.         0.       583.74       .31        .19        .05     578.20
      1150.       9.      1107.       34.         8.      245.        20.         7.         1.      578.10
        .07      1.08      4.52      1.74       .100      .050       .060       .040     575.80    1000.72
    .001765      190.      140.      100.          2         0          0         0.      44.64    1045.36

*SECNO 501.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      587.20 ELREA=      587.20

     501.00      7.88     583.68      0.         0.       583.81       .13        .05        .02     575.90
      1150.       0.      1150.       0.         0.      395.         0.         7.         1.      578.10
        .07      0.        2.91      0.        .100      .050       .060       .040     575.80    1148.00
    .000645        1.       50.      110.          2         0          0         0.      52.00    1200.00

CCHV=     .300 CEHV=     .500
*SECNO 502.000

3370 NORMAL BRIDGE,NRD= 11 MIN ELTRD=  589.90 MAX ELLC=  592.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      589.90 ELREA=      590.10

     502.00      7.88     583.68      0.         0.       583.81       .14        .00        .00     575.90
      1150.       0.      1150.       0.         0.      390.         0.         7.         1.      578.10
        .07      0.        2.95      0.        .100      .030       .060       .040     575.80    1148.00
    .000331        2.        2.        2.         0         0          0      -14.90      52.00    1200.00

*SECNO 503.000
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS   BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA   LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST


3370 NORMAL BRIDGE,NRD= 11 MIN ELTRD=  589.90 MAX ELLC=  592.00


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      589.90 ELREA=      590.10

   503.00      7.89    583.69      0.        0.     583.82       .13       .01       .00    575.90
    1150.       0.     1150.       0.        0.      390.        0.        7.        1.    578.10
      .08       0.      2.95       0.      .100      .030      .060      .040    575.80   1148.00
  .000330      32.       32.      32.        0         0         0    -14.96     52.00   1200.00


CCHV=     .100 CEHV=     .300
*SECNO 504.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      590.00 ELREA=      590.00

   504.00      7.14    583.64      0.        0.     583.84       .20       .00       .02    579.40
    1150.       0.     1150.       0.        0.      318.        0.        7.        1.    579.90
      .08       0.      3.61       0.      .080      .040      .080      .040    576.50   1020.00
  .000923       2.        2.       2.        2         0         0        0.     55.00   1075.00


CCHV=     .300 CEHV=     .500
*SECNO 600.000
   600.00      7.19    583.69      0.        0.     583.87       .18       .03       .01    579.40
    1150.      14.     1121.      15.       15.      321.       17.        7.        1.    579.90
      .08       .94      3.49      .90      .080      .040      .080      .040    576.50   1013.85
  .000852      30.       30.      30.        2         0         0        0.     68.69   1082.53


CCHV=     .100 CEHV=     .300
*SECNO 610.000
   610.00      7.12    583.82      0.        0.     584.00       .18       .12       .00    582.60
    1150.       0.     1136.      14.        1.      330.       17.        9.        2.    580.10
      .09       .31      3.44      .81      .080      .040      .080      .040    576.70   1128.88
  .000911      90.      140.     170.        0         0         0        0.     70.51   1199.39


*SECNO 700.000
   700.00     15.24    584.14      0.        0.     584.16       .03       .15       .02    580.80
    1150.      10.     1129.      12.       35.      842.       42.       18.        3.    579.50
      .23       .27      1.34      .28      .080      .050      .100      .043    568.90   1059.43
  .000106     680.      640.     560.        2         0         0        0.    130.68   1190.11
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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS     BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA     LEFT/RIGHT
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN       SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID      ENDST

 *SECNO 800.000
    800.00     7.90     584.30       0.         0.       584.38       .08        .20        .02     580.20
     1150.     226.       905.       19.       313.       357.       28.        36.         7.      580.50
       .35      .72      2.54        .70       .100       .050      .080       .045     576.40    1160.93
   .000633    1040.      930.       950.         2          0          0         0.      207.53    1368.46

 *SECNO 900.000
    900.00     7.17     584.77       0.         0.       584.85       .08        .46        .00     578.70
     1150.     173.       924.       54.       179.       382.       54.        49.        11.      578.60
       .46      .96      2.42        .99       .080       .045      .080       .045     577.60    1099.23
   .000458    1000.      840.       760.         2          0          0         0.      154.06    1253.29

 *SECNO 901.000
    901.00     7.18     584.78       0.         0.       584.85       .08        .01        .00     578.70
     1150.     173.       923.       54.       180.       383.       54.        49.        11.      578.60
       .46      .96      2.41        .99       .080       .045      .080       .045     577.60    1098.79
   .000455      20.        20.       20.          0          0          0         0.      154.56    1253.35

 CCHV=     .300 CEHV=     .500
 *SECNO 901.100

 3370 NORMAL BRIDGE,NRD= 15 MIN ELTRD=  584.00 MAX ELLC=  590.00

 4677 BRIDGE DECK DEFINITION ERROR AT STATIONS    1204.00    1205.00
    901.10     7.14     584.74       0.         0.       584.90       .16        .00        .04     578.70
     1150.       7.      1143.        0.        25.       359.        0.        49.        11.      578.60
       .46      .26      3.18        0.        .080       .030      .080       .045     577.60    1100.44
   .000535       1.         1.        1.         2          0          0     -226.05      152.71    1253.15

 *SECNO 901.200

 3370 NORMAL BRIDGE,NRD= 15 MIN ELTRD=  584.00 MAX ELLC=  590.00

 4677 BRIDGE DECK DEFINITION ERROR AT STATIONS    1204.00    1205.00
    901.20     7.15     584.75       0.         0.       584.91       .16        .01        .00     578.70
     1150.       7.      1143.        0.        26.       360.        0.        50.        11.      578.60
       .47      .26      3.18        0.        .080       .030      .080       .045     577.60    1099.95
   .000531      25.        25.       25.          0          0          0     -226.54      153.26    1253.21
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS    BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA    LEFT/RIGHT
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN       SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID      ENDST

*SECNO 902.000
   902.00     7.24       584.84     0.         0.         584.93     .09        .00        .02      578.70
   1150.      125.       987.       39.        185.       386.       55.        50.        11.      578.60
     .47      .68        2.55       .70        .080       .030       .080       .045     577.60    1096.33
  .000224     1.         1.         1.         2          0          0          0.       157.31    1253.63

*SECNO 903.000
   903.00     7.24       584.84     0.         0.         584.93     .09        .00        .00      578.70
   1150.      125.       987.       39.        185.       387.       55.        50.        11.      578.60
     .47      .67        2.55       .70        .080       .030       .080       .045     577.60    1096.18
  .000223     10.        10.        10.        0          0          0          0.       157.47    1253.65
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THIS RUN EXECUTED 07 MAY 81 16.08.45

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*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED APRI 1980
  ERROR CORR =  01,02,03,04
  MODIFICATION =  50,51,52,53,54
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T1      MICHIGAN FLOOD INSURANCE STUDIES
T2      BOYNE CITY, MICHIGAN
T3      100 YR

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
       -0.       4.       -0.       -0. -0.           -0.       -0.       -0.   579.900   -0.
J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
       3.000    -0.       -1.000    -0.       -0.       -0.       -0.       -0.       -0.       -0.
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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS   BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN      SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID     ENDST

*PROF 3

CCHV=     .300 CEHV=     .500
*SECNO 100.000
    100.00     4.60    579.90      0.     579.90    580.79      .89      0.        0.     583.90
     1325.      0.     1325.      0.        0.       175.      0.       0.        0.     583.50
       0.       0.      7.59      0.       .050      .035     .050      0.     575.30   1200.29
   .006614     -0.      -0.       -0.        0         0        0       0.      50.04   1250.33

*SECNO 101.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      587.50 ELREA=      587.50

    101.00     4.53    580.13      0.        0.     581.75     1.62      .60       .37    576.80
     1325.      0.     1325.      0.        0.       130.      0.       0.        0.     578.60
       .00      0.      10.23      0.       .050      .035     .050     .035    575.60   1139.00
   .011332     70.      70.       70.        2         0        0       0.      35.00   1174.00

*SECNO 101.100

3370 NORMAL BRIDGE,NRD= 24 MIN ELTRD=  587.80 MAX ELLC=  588.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      587.50 ELREA=      587.50

    101.10     4.34    579.94    579.92      0.     581.97     2.02      .01       .20    576.80
     1325.      0.     1325.      0.        0.       116.      0.       0.        0.     578.60
       .00      0.      11.41      0.       .050      .030     .050     .034    575.60   1139.00
   .014807      1.       1.        1.        4         19       0     -22.48     35.00   1174.00

*SECNO 102.000

3301 HV CHANGED MORE THAN HVINS

3370 NORMAL BRIDGE,NRD= 24 MIN ELTRD=  587.80 MAX ELLC=  588.50
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SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     BANK ELEV
Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA     LEFT/RIGHT
TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      589.00 ELREA=      589.00

  102.00      5.62    581.72      0.        0.      582.92      1.21       .71       .24    577.30
   1325.        0.    1325.        0.        0.      150.        0.        0.        0.    579.10
     .00        0.      8.82       0.      .050      .030      .050      .032    576.10   1139.00
 .007448       70.       70.      70.         4         0         0    -45.37     35.00   1174.00

*SECNO 101.200

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      589.00 ELREA=      589.00

  101.20      6.18    582.28      0.        0.      583.06       .78       .00       .13    577.30
   1325.        0.    1325.        0.        0.      187.        0.        0.        0.    579.10
     .00        0.      7.09       0.      .050      .030      .050      .032    576.10   1139.00
 .002450        1.       1.       1.         3         0         0        0.     35.00   1174.00

*SECNO 103.000
  103.00      6.66    582.76      0.        0.      583.23       .46       .07       .09    577.30
   1325.       49.    1173.      103.       23.      204.       40.        1.        0.    579.10
     .01      2.13      5.74      2.56      .090      .040      .070      .033    576.10   1133.56
 .002542       30.       30.      30.         2         0         0        0.     51.19   1184.75

CCHV=     .100 CEHV=     .300
*SECNO 200.000
  200.00      8.99    583.39      0.        0.      583.56       .16       .30       .03    581.60
   1325.        3.    1092.      230.        8.      313.      124.        3.        1.    575.00
     .03       .40      3.48      1.86      .090      .040      .070      .037    574.40   1014.58
 .000603      280.      275.      280.         2         0         0        0.     67.70   1082.28

CCHV=     .300 CEHV=     .800
*SECNO 201.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      587.40 ELREA=      587.40

  201.00      8.50    583.40      0.        0.      583.72       .32       .04       .12    582.10
   1325.        0.    1325.        0.        0.      294.        0.        3.        1.    575.50
     .03        0.      4.51       0.      .090      .040      .070      .037    574.90   1023.00
 .001102       50.       50.      50.         2         0         0        0.     40.00   1063.00
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   SECNO     DEPTH     CWSEL     CRTWS     WSELK     EG        HV        HL        OLOSS   BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA   LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

CCHV=     .300 CEHV=     .500
*SECNO 202.000

3370 NORMAL BRIDGE,NRD= 10 MIN ELTRD=  588.50 MAX ELLC=  590.50

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      588.70 ELREA=      588.70

   202.00      8.50    583.40      0.        0.      583.72      .33       .00       .01    582.10
    1325.       0.     1325.       0.        0.       289.       0.        3.        1.     575.50
      .03       0.      4.59       0.      .090       .030      .070      .037    574.90   1023.00
  .000862       1.       1.        1.        0         0         0      -78.66    40.00   1063.00

*SECNO 203.000

3370 NORMAL BRIDGE,NRD= 10 MIN ELTRD=  588.50 MAX ELLC=  591.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      588.70 ELREA=      588.70

   203.00      8.00    583.40      0.        0.      583.78      .38       .03       .02    582.60
    1325.       0.     1325.       0.        0.       269.       0.        4.        1.     576.00
      .03       0.      4.92       0.      .090       .030      .070      .037    575.40   1023.00
  .001061      30.      30.       30.        2         0         0      -73.15    40.00   1063.00

*SECNO 204.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      588.60 ELREA=      588.60

   204.00      8.01    583.41      0.        0.      583.76      .37       .00       .00    582.60
    1325.       0.     1325.       0.        0.       272.       0.        4.        1.     576.00
      .03       0.      4.88       0.      .100       .040      .050      .037    575.40   1023.00
  .001438       1.       1.        1.        0         0         0        0.      40.00   1063.00

CCHV=     .100 CEHV=     .300
*SECNO 300.000
   300.00      7.61    583.61      0.        0.      583.86      .25       .07       .01    587.10
    1325.       0.     1325.       0.        0.       328.       0.        4.        1.     584.20
      .04       0.      4.04       0.      .100       .040      .050      .037    576.00   1060.80
  .001246      50.      50.       50.        2         0         0        0.      53.06   1113.86
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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS    BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA    LEFT/RIGHT
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN       SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID      ENDST

CCHV=     .100 CEHV=     .300
*SECNO 400.000
   400.00      6.85     583.95      0.         0.       584.16       .21        .30        .00     577.80
    1325.       47.     1095.      183.        38.       275.        96.         6.         1.     578.50
      .06      1.23       3.98      1.90      .100       .040       .050       .038     577.10    1017.35
  .000944      320.       280.      250.         2          0          0         0.      91.61    1108.96

CCHV=     .100 CEHV=     .500
*SECNO 500.000
   500.00      8.26     584.06      0.         0.       584.40       .34        .17        .06     578.20
    1325.       11.     1268.       46.        10.       267.        25.         7.         1.     578.10
      .07      1.17       4.75      1.86      .100       .050       .060       .040     575.80    1000.65
  .001739      190.       140.      100.         2          0          0         0.      45.57    1046.22

*SECNO 501.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      587.20 ELREA=      587.20

   501.00      8.52     584.32      0.         0.       584.47       .15        .05        .02     575.90
    1325.       0.      1325.       0.         0.       429.        0.         8.         1.     578.10
      .07      0.        3.09      0.        .100       .050       .060       .040     575.80    1148.00
  .000653       1.        50.      110.         2          0          0         0.      52.00    1200.00

CCHV=     .300 CEHV=     .500
*SECNO 502.000

3370 NORMAL BRIDGE,NRD= 11 MIN ELTRD=  589.90 MAX ELLC=  592.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      589.90 ELREA=      590.10

   502.00      8.52     584.32      0.         0.       584.47       .15        .00        .00     575.90
    1325.       0.      1325.       0.         0.       422.        0.         8.         1.     578.10
      .07      0.        3.14      0.        .100       .030       .060       .040     575.80    1148.00
  .000346       2.         2.       2.         0          0          0     -18.28      52.00    1200.00

*SECNO 503.000
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST


3370 NORMAL BRIDGE,NRD= 11 MIN ELTRD=  589.90 MAX ELLC=  592.00


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      589.90 ELREA=      590.10

   503.00     8.53    584.33      0.        0.      584.48      .15       .01       .00    575.90
    1325.      0.     1325.       0.        0.       423.       0.        8.        1.     578.10
      .08      0.      3.14       0.      .100       .030      .060      .040    575.80   1148.00
  .000345     32.       32.      32.         0          0         0    -18.35     52.00   1200.00


CCHV=     .100 CEHV=     .300
*SECNO 504.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      590.00 ELREA=      590.00

   504.00     7.79    584.29      0.        0.      584.50      .22       .00       .02    579.40
    1325.      0.     1325.       0.        0.       354.       0.        8.        1.     579.90
      .08      0.      3.74       0.      .080       .040      .080      .040    576.50   1020.00
  .000860      2.        2.       2.         2          0         0        0.     55.00   1075.00


CCHV=     .300 CEHV=     .500
*SECNO 600.000
   600.00     7.84    584.34      0.        0.      584.54      .20       .02       .01    579.40
    1325.     19.     1284.      22.       19.       357.      22.        8.        1.     579.90
      .08     1.01      3.60     1.01      .080       .040      .080      .040    576.50   1013.27
  .000786     30.       30.      30.         2          0         0        0.     69.47   1082.74


CCHV=     .100 CEHV=     .300
*SECNO 610.000
   610.00     7.76    584.46      0.        0.      584.65      .19       .11       .00    582.60
    1325.      1.     1304.      21.        2.       369.      24.       10.        2.     580.10
      .09      .39      3.54      .86      .080       .040      .080      .040    576.70   1128.29
  .000831     90.      140.     170.         0          0         0        0.     72.73   1201.01


*SECNO 700.000
   700.00    15.89    584.79      0.        0.      584.82      .03       .15       .02    580.80
    1325.     17.     1290.      18.       49.       899.      56.       20.        3.     579.50
      .22      .34      1.43      .32      .080       .050      .100      .043    568.90   1056.72
  .000111    680.      640.     560.         2          0         0        0.    136.49   1193.21
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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS    BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA    LEFT/RIGHT
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN       SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID      ENDST

*SECNO 800.000
    800.00      8.56     584.96       0.         0.       585.03      .08        .20        .01     580.20
     1325.       305.      989.       31.       405.       394.       45.        40.        7.      580.50
       .34        .75      2.51       .69       .100       .050      .080       .045     576.40    1141.33
   .000546     1040.      930.       950.        2          0         0         0.       236.46    1377.79

*SECNO 900.000
    900.00      7.77     585.37       0.         0.       585.45      .08        .42        .00     578.70
     1325.       219.     1040.       66.       232.       418.       66.        56.        12.      578.60
       .45        .94      2.49       .99       .080       .045      .080       .045     577.60    1075.11
   .000430     1000.      840.       760.        2          0         0         0.       181.01    1256.12

*SECNO 901.000
    901.00      7.78     585.38       0.         0.       585.46      .08        .01        .00     578.70
     1325.       220.     1040.       66.       233.       419.       66.        57.        12.      578.60
       .46        .94      2.48       .99       .080       .045      .080       .045     577.60    1074.72
   .000427       20.       20.        20.         0          0         0         0.       181.45    1256.17

CCHV=     .300 CEHV=     .500
*SECNO 901.100

3370 NORMAL BRIDGE,NRD= 15 MIN ELTRD=  584.00 MAX ELLC=  590.00

4677 BRIDGE DECK DEFINITION ERROR AT STATIONS   1204.00   1205.00
    901.10      7.74     585.34       0.         0.       585.50      .17        .00        .04     578.70
     1325.        27.     1298.        0.        71.       392.        0.        57.        12.      578.60
       .46        .38      3.31       0.        .080      .030      .080       .045     577.60    1076.50
   .000551        1.        1.         1.         2          0         0      -246.28     179.46    1255.96

*SECNO 901.200

3370 NORMAL BRIDGE,NRD= 15 MIN ELTRD=  584.00 MAX ELLC=  590.00

4677 BRIDGE DECK DEFINITION ERROR AT STATIONS   1204.00   1205.00
    901.20      7.75     585.35       0.         0.       585.52      .17        .01        .00     578.70
     1325.        27.     1298.        0.        72.       393.        0.        57.        12.      578.60
       .46        .38      3.30       0.        .080      .030      .080       .045     577.60    1076.01
   .000549        25.       25.        25.         0          0         0      -246.68     180.00    1256.01
```

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
*SECNO 902.000									
902.00	7.85	585.45	0.	0.	585.54	.09	.00	.02	578.70
1325.	159.	1118.	47.	240.	423.	68.	57.	12.	578.60
.46	.67	2.65	.70	.080	.030	.080	.045	577.60	1072.09
.000213	1.	1.	1.	2	0	0	0.	184.38	1256.47
*SECNO 903.000									
903.00	7.85	585.45	0.	0.	585.54	.09	.00	.00	578.70
1325.	160.	1118.	47.	240.	423.	68.	57.	12.	578.60
.46	.67	2.64	.70	.080	.030	.080	.045	577.60	1071.94
.000212	10.	10.	10.	0	0	0	0.	184.55	1256.49

PRINTED IN U.S.A.

THIS RUN EXECUTED 07 MAY 81 16.08.45

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*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED APRI 1980
  ERROR CORR =  01,02,03,04
  MODIFICATION =  50,51,52,53,54
*****************************************************

T1      MICHIGAN FLOOD INSURANCE STUDIES
T2      BOYNE CITY, MICHIGAN
T3      500 YR

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      =0.       5.      =0.       =0.  =0.            =0.       =0.       =0.   579.900   =0.

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLOC     IBW       CHNIM     ITRACE

     15.000   =0.       =1.000    =0.       =0.       =0.       =0.       =0.       =0.       =0.
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```
   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

*PROF 4

CCHV=     .300 CEHV=     .500
*SECNO 100.000
   100.00     4.60    579.90    579.89    579.90    581.66      1.76        0.        0.    583.90
    1860.       0.     1860.       0.        0.       175.        0.        0.        0.    583.50
       0.       0.     10.65       0.      .050      .035      .050        0.    575.30   1200.29
  .013034      =0.       =0.       =0.         0         4         0        0.     50.04   1250.33

*SECNO 101.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      587.50 ELREA=      587.50

   101.00     5.27    580.87    580.87        0.    583.10      2.23       .88       .23    576.80
    1860.       0.     1860.       0.        0.       155.        0.        0.        0.    578.60
      .00       0.     11.97       0.      .050      .035      .050      .035    575.60   1139.00
  .012199      70.       70.       70.         2         8         0        0.     35.00   1174.00

*SECNO 101.100

3370 NORMAL BRIDGE,NRD= 24 MIN ELTRD=  587.80 MAX ELLC=  588.00

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      587.50 ELREA=      587.50

   101.10     5.24    580.84    580.84        0.    583.56      2.72       .01       .25    576.80
    1860.       0.     1860.       0.        0.       141.        0.        0.        0.    578.60
      .00       0.     13.23       0.      .050      .030      .050      .034    575.60   1139.00
  .017428       1.        1.        1.         3        15         0    =38.20     35.00   1174.00

*SECNO 102.000

3301 HV CHANGED MORE THAN HVINS
```

```
   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        QLOSS   BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA   LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST


3370 NORMAL BRIDGE,NRD= 24 MIN ELTRD=  587.80 MAX ELLC=  588.50


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      589.00 ELREA=      589.00

   102.00      7.05    583.15      0.        0.     584.74      1.59       .85       .34    577.30
    1860.       0.     1860.       0.        0.     184.        0.        1.         0.    579.10
      .00       0.      10.12      0.       .050     .030      .050      .032    576.10   1139.00
  .008886      70.       70.      70.        4        0         0    -76.52     35.00   1174.00


*SECNO 101.200

3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      589.00 ELREA=      589.00

   101.20      8.02    584.12      0.        0.     584.97       .85       .00       .22    577.30
    1860.       0.     1860.       0.        0.     251.        0.        1.         0.    579.10
      .00       0.      7.40      0.       .050     .030      .050      .032    576.10   1139.00
  .001799       1.       1.       1.        3        0         0        0.     35.00   1174.00


*SECNO 103.000
   103.00      8.54    584.64      0.        0.     585.13       .50       .06       .11    577.30
    1860.      74.     1613.     173.       34.     270.       62.        1.         0.    579.10
      .01      2.15     5.98     2.79      .090     .040      .070      .033    576.10   1123.78
  .001902      30.       30.      30.        2        0         0        0.     66.62   1190.40


CCHV=     .100 CEHV=     .300
*SECNO 200.000
   200.00     10.82    585.22      0.        0.     585.43       .20       .26       .03    581.60
    1860.      19.     1512.     328.       27.     386.      160.        4.         1.    575.00
      .03       .71     3.91     2.05      .090     .040      .070      .037    574.40   1010.54
  .000575     280.      275.     280.        2        0         0        0.     73.24   1083.78


CCHV=     .300 CEHV=     .800
*SECNO 201.000
```

```
    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        QLOSS    BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      587.40 ELREA=      587.40

    201.00    10.32     585.22    0.        0.        585.62    .40       .04       .16       582.10
     1860.     0.       1860.     0.        0.        366.      0.        4.        1.        575.50
       .03     0.        5.08     0.       .090       .040      .070      .037     574.90     1023.00
   .001039     50.       50.      50.        2         0         0        0.       40.00     1063.00

CCHV=     .300 CEHV=     .500
*SECNO 202.000

3370 NORMAL BRIDGE,NRD= 10 MIN ELTRD=  588.50 MAX ELLC=  590.50

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      588.70 ELREA=      588.70

    202.00    10.31     585.21    0.        0.        585.63    .42       .00       .01       582.10
     1860.     0.       1860.     0.        0.        359.      0.        4.        1.        575.50
       .03     0.        5.18     0.       .090       .030      .070      .037     574.90     1023.00
   .000902      1.        1.       1.        0         0         0      -99.30      40.00     1063.00

*SECNO 203.000

3370 NORMAL BRIDGE,NRD= 10 MIN ELTRD=  588.50 MAX ELLC=  591.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      588.70 ELREA=      588.70

    203.00     9.82     585.22    0.        0.        585.68    .47       .03       .02       582.60
     1860.     0.       1860.     0.        0.        340.      0.        5.        1.        576.00
       .03     0.        5.48     0.       .090       .030      .070      .037     575.40     1023.00
   .001058     30.       30.      30.        2         0         0      -93.47      40.00     1063.00

*SECNO 204.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      588.60 ELREA=      588.60

    204.00     9.84     585.24    0.        0.        585.69    .45       .00       .00       582.60
     1860.     0.       1860.     0.        0.        345.      0.        5.        1.        576.00
       .03     0.        5.40     0.       .100       .040      .050      .037     575.40     1023.00
   .001282      1.        1.       1.        1         0         0        0.       40.00     1063.00
```

```
   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS   BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA     LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

CCHV=     .100 CEHV=     .300
*SECNO 300.000
   300.00     9.47    585.47      0.        0.     585.76       .29       .06       .02    587.10
    1860.       0.     1855.       5.        0.      429.        6.        5.        1.    584.20
      .03       0.      4.32       .77      .100     .040      .050      .037    576.00   1060.37
  .001067      50.       50.       50.        2         0         0        0.     64.66   1125.03

CCHV=     .100 CEHV=     .300
*SECNO 400.000
   400.00     8.70    585.80      0.        0.     586.01       .21       .24       .01    577.80
    1860.      68.     1421.     371.       55.      353.      177.        8.        1.    578.50
      .06     1.23      4.03     2.10      .100     .040      .050      .038    577.10   1016.28
  .000692     320.      280.     250.         0         0         0        0.     97.74   1114.02

CCHV=     .100 CEHV=     .500
*SECNO 500.000
   500.00    10.03    585.83      0.        0.     586.25       .42       .14       .11    578.20
    1860.      19.     1752.      89.       14.      329.       41.       10.        1.    578.10
      .06     1.37      5.32     2.16      .100     .050      .060      .040    575.80   1000.46
  .001655     190.      140.     100.         2         0         0        0.     48.20   1048.67


*SECNO 501.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      587.20 ELREA=      587.20

   501.00    10.33    586.13      0.        0.     586.32       .20       .05       .02    575.90
    1860.       0.     1860.       0.        0.      523.        0.       10.        2.    578.10
      .07       0.      3.56       0.      .100     .050      .060      .040    575.80   1148.00
  .000665       1.       50.     110.         2         0         0        0.     52.00   1200.00


CCHV=     .300 CEHV=     .500
*SECNO 502.000

3370 NORMAL BRIDGE,NRD= 11 MIN ELTRD=  589.90 MAX ELLC=  592.00


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      589.90 ELREA=      590.10

   502.00    10.28    586.08      0.        0.     586.37       .29       .00       .05    575.90
    1860.       0.     1860.       0.        0.      431.        0.       10.        2.    578.10
      .07       0.      4.32       0.      .100     .030      .060      .040    575.80   1148.00
  .001343       2.        2.       2.         2         0         0   -108.16     52.00   1200.00
```

```
    SECNO     DEPTH     CWSEL     CRIWS     WSFLK     EG        HV        HL        OLOSS    BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

*SECNO 503.000

3370 NORMAL BRIDGE,NRD= 11 MIN ELTRD=  589.90 MAX ELLC=  592.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      589.90 ELREA=      590.10

   503.00     10.33    586.13      0.        0.     586.42       .29       .04       0.     575.90
    1860.       0.     1860.       0.        0.      431.        0.       11.       2.     578.10
      .07       0.      4.32       0.      .100      .030      .060      .040    575.80   1148.00
  .001343      32.       32.      32.         1         0         0   -110.28     52.00   1200.00

CCHV=     .100 CEHV=     .300
*SECNO 504.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      590.00 ELREA=      590.00

   504.00      9.66    586.16      0.        0.     586.42       .26       .00       .00    579.40
    1860.       0.     1860.       0.        0.      457.        0.       11.       2.     579.90
      .07       0.      4.07       0.      .080      .040      .080      .040    576.50   1020.00
  .000722       2.        2.       2.         2         0         0        0.     55.00   1075.00

CCHV=     .300 CEHV=     .500
*SECNO 600.000
   600.00      9.73    586.23      0.        0.     586.45       .22       .02       .01    579.40
    1860.      38.     1777.      45.       33.      461.       37.       11.       2.     579.90
      .07      1.15      3.86     1.22      .080      .040      .080      .040    576.50   1011.58
  .000642      30.       30.      30.         2         0         0        0.     71.76   1083.34

CCHV=     .100 CEHV=     .300
*SECNO 610.000
   610.00      9.63    586.33      0.        0.     586.54       .21       .09       .00    582.60
    1860.       4.     1809.      47.        6.      481.       49.       13.       2.     580.10
      .08       .56      3.76      .97      .080      .040      .080      .040    576.70   1126.55
  .000659      90.      140.     170.         0         0         0        0.     79.20   1205.75

*SECNO 700.000
   700.00     17.77    586.67      0.        0.     586.71       .04       .15       .02    580.80
    1860.      48.     1754.      57.      100.     1067.      228.       27.       5.     579.50
      .20       .48      1.64      .25      .080      .050      .100      .043    568.90   1048.88
  .000116     680.      640.     560.         2         0         0        0.    394.62   1443.50
```

```
    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA     LEFT/RIGHT
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IOC       ICONT     CORAR     TOPWID      ENDST

*SECNO 800.000
    800.00    10.43     586.83    0.        0.        586.90    .06       .18       .01       580.20
     1860.    571.      1197.     92.       739.      499.      126.      57.       13.       580.50
       .34     .77      2.40      .73       .100      .050      .080      .045    576.40     1084.96
   .000363   1040.      930.      950.        2         0         0       0.      316.92    1401.87

*SECNO 900.000
    900.00     9.53     587.13    0.        0.        587.21    .08       .31       .00       578.70
     1860.    414.      1338.     108.      452.      524.      109.      83.       19.       578.60
       .46     .92      2.55      .99       .080      .045      .080      .045    577.60     1035.88
   .000336   1000.      840.      760.        2         0         0       0.      226.57    1262.45

*SECNO 901.000
    901.00     9.54     587.14    0.        0.        587.21    .08       .01       .00       578.70
     1860.    415.      1337.     108.      453.      524.      110.      83.       19.       578.60
       .46     .92      2.55      .99       .080      .045      .080      .045    577.60     1035.79
   .000334     20.       20.       20.        0         0         0       0.      226.68    1262.47

CCHV=     .300 CEHV=     .500
*SECNO 901.100

3370 NORMAL BRIDGE,NRD= 15 MIN ELTRD=  584.00 MAX ELLC=  590.00

4677 BRIDGE DECK DEFINITION ERROR AT STATIONS   1204.00   1205.00
    901.10     9.50     587.10    0.        0.        587.25    .16       .00       .04       578.70
     1860.    303.      1557.     0.        288.      452.      0.        83.       19.       578.60
       .46     1.05     3.45      0.        .080      .030      .080      .045    577.60     1036.29
   .001103      1.        1.        1.         2         0         0    -337.76    226.07    1262.36

*SECNO 901.200

3370 NORMAL BRIDGE,NRD= 15 MIN ELTRD=  584.00 MAX ELLC=  590.00

4677 BRIDGE DECK DEFINITION ERROR AT STATIONS   1204.00   1205.00
    901.20     9.53     587.13    0.        0.        587.28    .16       .03       .00       578.70
     1860.    308.      1552.     0.        291.      452.      0.        84.       19.       578.60
       .46     1.06     3.43      0.        .080      .030      .080      .044    577.60     1035.99
   .001098     25.       25.       25.        1         0         0    -339.48    226.43    1262.42
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS     BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA     LEFT/RIGHT
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN       SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID      ENDST

*SECNO 902.000
   902.00      9.60     587.20      0.         0.       587.30       .10        .00        .02     578.70
    1860.     308.      1472.      80.       462.       528.       111.       84.        19.      578.60
      .46      .67       2.79      .72       .080       .030       .080       .044     577.60    1034.96
  .000176     1.         1.        1.         2          0          0         0.       227.68    1262.64

*SECNO 903.000
   903.00      9.61     587.21      0.         0.       587.30       .10        .00        .00     578.70
    1860.     309.      1471.      80.       463.       528.       112.       84.        19.      578.60
      .46      .67       2.78      .72       .080       .030       .080       .044     577.60    1034.88
  .000175     10.        10.       10.         0          0          0         0.       227.78    1262.66
```

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00BREAK00

1) COUNTY: Charlevoix

2) STUDY NAME: Boyne city and East Jordan

3) WATERCOURSE: Boyne River

4) DOCUMENT TYPE: report

00BREAK00

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WATER MANAGEMENT

HYDRAULIC SUMMARY REPORT

BOYNE CITY, CHARLEVOIX COUNTY, MICHIGAN

EAST JORDAN, CHARLEVOIX COUNTY, MICHIGAN

Prepared by

Bernard Johnson Incorporated

James R. Spencer, Project Manager

for the

U.S. Army Corps of Engineers,

Detroit District

October 1980

INCL

TABLE OF CONTENTS

1.0 INTRODUCTION

2.0 HYDRAULIC ANALYSES

2.1 Boyne City

2.2 East Jordan

3.0 REFERENCES

TABLES

Table 1 - Summary of Discharges

Table 2 - Summary of Elevations

EXHIBITS

Exhibit 1 - Boyne River: Description of HEC-2 Model

Exhibit 2 - Boyne River: Cross Section and Profile Plots

Exhibit 3 - Boyne River: Approximate 100-year Boundaries and Floodway

Exhibit 4 - Lake Charlevoix: Wind Set-up Calculations

Exhibit 5 - Lake Charlevoix: South Arm Outlet Computations

Exhibit 6 - Lake Charlevoix: Losses through M-32 Bridge in East Jordan

1.0 INTRODUCTION

This report summarizes the methods and computations used to develop peak flood elevations for two Michigan communities; the City of Boyne City, Charlevoix County, Michigan and the City of East Jordan, Charlevoix County, Michigan. The computed elevations will be used for the preparation of a Type 15 Flood Insurance Report for each community.

The report includes a brief description of the methods used for each flooding source and a copy of the computations. The computed flood elevations will be finalized upon review and approval from the U.S. Army Corps of Engineers, Detroit District (COE) and the Michigan Department of Natural Resources.

2.0 HYDRAULIC ANALYSES

2.1 Boyne City

Boyne River

The Boyne River, which runs through the center of the city, was studied by detailed methods from its mouth at Lake Charlevoix to an unnamed bridge (extension of Spring Street) approximately 3800 feet upstream. The lower reaches of the river pass through the center of the commercial area of the city. The upper reaches pass through residential and industrial areas and large open spaces.

The discharges used for the Boyne River were obtained from the DNR as part of their dam safety program. The values were approved for use pending review of the hydraulic analysis. The peak discharges used are summarized in Table 1, "Summary of Discharges."

Note

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
BOYNE RIVER					
At Boyne City	66.4	790	1,150	1,325	1,860

Cross sections used for this analysis were field surveyed with additional overbank elevations obtained from a topographic map prepared from aerial photography for the Flood Insurance Report. The cross sections and necessary vertical control points for the topographic map were field surveyed during the week of June 15, 1980.

The 10-, 50-, 100- and 500-year profiles were computed using the COE HEC-2 step-backwater computer program (Reference 1). Roughness coefficients (Mannings "n" values) were obtained by field inspection aided by two hydraulic references; Roughness Characteristics of Natural Channels by Barnes and Open Channel Flow by Ven T. Chow (References 2 and 3). Manning's "n" values ranged from 0.03 to 0.05 for the main channel and 0.05 to 0.10 for the overbanks. Expansion, contraction and bridge loss coefficients were developed from values recommended by the COE (Reference 1). A detailed description of the bridge loss coefficients is included in Exhibit 1.

Starting water-surface elevations were taken to be at the maximum mean lake level of Lake Charlevoix. This was assumed to be equal to the open-coast level of Lake Michigan (Reference 4).

This mean is a summer level not a stage spring which is by lower almost 9 ft.

A floodwoy was computed based upon equal conveyance from each side of the flood plain. Method 4 of the COE HEC-2 computer progrom (Reference 1) was used with a target surcharge of 0.1 foot to develope the floodway. The method 4 computer run produced good results and no additional runs were required.

A detailed description of the HEC-2 model, which includes bridge notes and sketches, is enclosed as Exhibit 1. Cross section and profile plots (Exhibit 2), and a cross section locater map showing the location of surveyed cross sections and the 100-year flood and floodway boundaries (Exhibit 3) are also enclosed for review.

For the approximote reoch of the Boyne River (from the unnamed bridge to the corporate limits) flood boundaries were developed using the computed elevations from the HEC-2 model upstream of the bridge and normal depth calculations in the upper reaches.

Lake Charlevoix

The peak flood elevations for Lake Charlevoix at the City of Charlevoix were determined to be equal to the open-coast elevations of Lake Michigan (Reference 5) (see Hydraulic Summary Report for Charlevoix and Petoskey, prepared by Bernard Johnson Incorporated). To evaluate the peak elevations of the lake at Boyne City, additional wind set-up was estimated using the methodology outlined by the COE (Reference 6). The parameters used in COE equation are fetch length (horizontal distance over which the wind creates the set-up), average depth of the fetch, angle between wind direction and the fetch, and wind velocity.

The fetch length and average depth were estimated from a sounding map (Reference 7). For wind speed, a conservatively high value of 50 mph was used. From these computations the additional wind set-up was determined to be neglible (0.1 foot). Therefore, it was concluded that the peak elevations for the lake at Charlevoix are also applicable at Boyne City. Wind set-up calculations are included as Exhibit 4 and the peak elevation-frequency relationship for Lake Charlevoix at Boyne City are summarized in Table 2, "Summary of Elevations."

2.2 City of East Jordan

Lake Charlevoix (South Arm)

For this analysis, it was again assumed that the water-surface elevation of the lake at Charlevoix is equal to the open-coast elevations of Lake Michigan.

First, the effects of local runoff into the South Arm were evaluated from drainage area measurements taken from USGS quad maps, and a 24-hour 100-year runoff depth calculated using SCS procedures (Reference 8). A conservatively high total runoff volume into the South Arm was computed. At the outlet into Lake Charlevoix, a constricted cross section was developed based upon a sounding map (Reference 7). Assuming a small head loss, the total volume of water leaving the South Arm in a 24-hour period was computed. The calculations (Exhibit 5) show that the South Arm peak flood elevations will not be a function of local runoff, but will be controlled by Lake Michigan.

In East Jordan, there is a small area at the southeast end of the lake upstream of the State Highway 32 bridge. The Jordan River flows into the lake at this point. To determine the effects of the bridge on the elevations upstream, the losses through the bridge were computed using Yarnell's Equation (Reference 1). The downstream elevation was conservatively assumed to be equal to the 10-year flood elevation. The bridge shape and cross section were obtained from survey notes of the SCS (Reference 9). The losses through the bridge were found to be minimal and therefore the elevations for this area will be equal to the South Arm lake elevations at East Jordan. Calculations are shown in Exhibit 6.

Additional wind set-up was also estimated for the South Arm using the same COE procedures used for the main stem (Exhibit 4). From the analysis, it was concluded that the set-up will be neglible. Therefore, the peak flood elevations for the South Arm Lake Charlevoix at East Jordan will be equal to the peak elevations of Lake Michigan.

Jordan River and Unnamed Stream (Approximate)

Peak flood elevations for these two streams will be developed using normal depth calculations.

The proposed peak flood elevation-frequency relationships for Lake Charlevoix at Boyne City and East Jordan are summarized in Table 2, "Summary of Elevations."

TABLE 2 - SUMMARY OF ELEVATIONS

FLOODING SOURCE AND LOCATION	ELEVATION ABOVE NGVD (feet) 10-YEAR	50-YEAR	100-YEAR	500-YEAR	
LAKE CHARLEVOIX					
At Boyne City	582.8	583.8	584.1	584.7	
At East Jordan (South Arm)	582.8	583.8	584.1	584.7	
Open-Coast Levels Published Rept	582.4	583.3	583.6	584.2	MSL
	581.2	582.1	582.4	583.0	IGLD
				1.2	diff

3.0 REFERENCES

1. U.S. Army Corps of Engineers, Generalized Computer Program, "HEC-2 Water-Surface Profiles," Users Manual, Hydrologic Engineer Center, Davis, California, August 1979.

2. U.S. Geological Survey, Water Supply Paper 1849, "Roughness Characteristic of Natural Channels," Harry H. Barnes, 1967.

3. Chow, Ven Te, Open-Channel Hydraulics, McGraw-Hill Book Company, New York, 1959.

4. U.S. Army Corps of Engineers, Detroit District, "Monthly Bulletin of Lake Levels for the Great Lakes," August 1980.

5. U.S. Army Corps of Engineers, Detroit District, "Lake Level and Wave Analysis for Grand Traverse Bay and Little Traverse Bay," 1980.

6. U.S. Army Corps of Engineers, Coastal Engineering Research Center, Shore Protection Manual, Volume 1, 1975.

7. U.S. Department of Commerce, National Ocean Survey, Chart No. 14942, "Lake Charlevoix-Soundings in Feet", January 1980.

8. U.S. Department of Agriculture, Soil Conservation Service, National Engineering Handbook, Section 4, "Hydrology", 1972.

9. U.S. Department of Agriculture, Soil Conservation Service, Traverse City office, Unpublished Survey Notes of M-32 Bridge in East Jordan, December 11, 1979.

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DESIGN NOTES AND COMPUTATIONS

SUBJECT

JOB NUMBER

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WATER MANAGEMENT

EXHIBIT 1

BOYNE RIVER

DESCRIPTION OF HEC2 MODEL

COMPUTER PRINTOUT

See revised computer printout ~~Dec. 19, 1979~~ and submitted on 6/1/81

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DESIGN NOTES AND COMPUTATIONS

SUBJECT BOYNE CITY, MI FIS
BOYNE RIVER HEC-2 MODEL

JOB NUMBER 80047

OUTLINE OF HEC2 MODEL FOR BOYNE RIVER
REFER TO CROSS SECTION PLOTS AND CROSS SECTION LOCATOR MAP

CROSS SECTION 100: 70 FEET DOWNSTREAM OF LAKE STREET CULVERT but upstream of the lake

Interpolated cross section using channel points from surveyed cross section 101 and overbank points from 1"=400' topographic map (2 foot contour intervals)

Starting water-surface elevations for the 10-, 50, 100- and 500- year flood was assumed to be equal to the average MAXIMUM water-surface elevation of Lake Michigan (579.9 feet NGVD) Elevation taken from "Monthly Bulletin of Lake Levels for the Great Lakes" published by the COE, Detroit District

These are June & July levels not spring levels when snow melt could cause a flood.

CROSS SECTIONS 101 TO 103: SPECIAL BRIDGE ROUTINE, LAKE STREET CULVERT

X-SEC 101: Surveyed cross section, overbanks assumed non-effective until weir flow begins. Directly downstream culvert.

Differences in spring & summer average levels is only approx one foot — as there are possibilities of summer floods, neglect condern.

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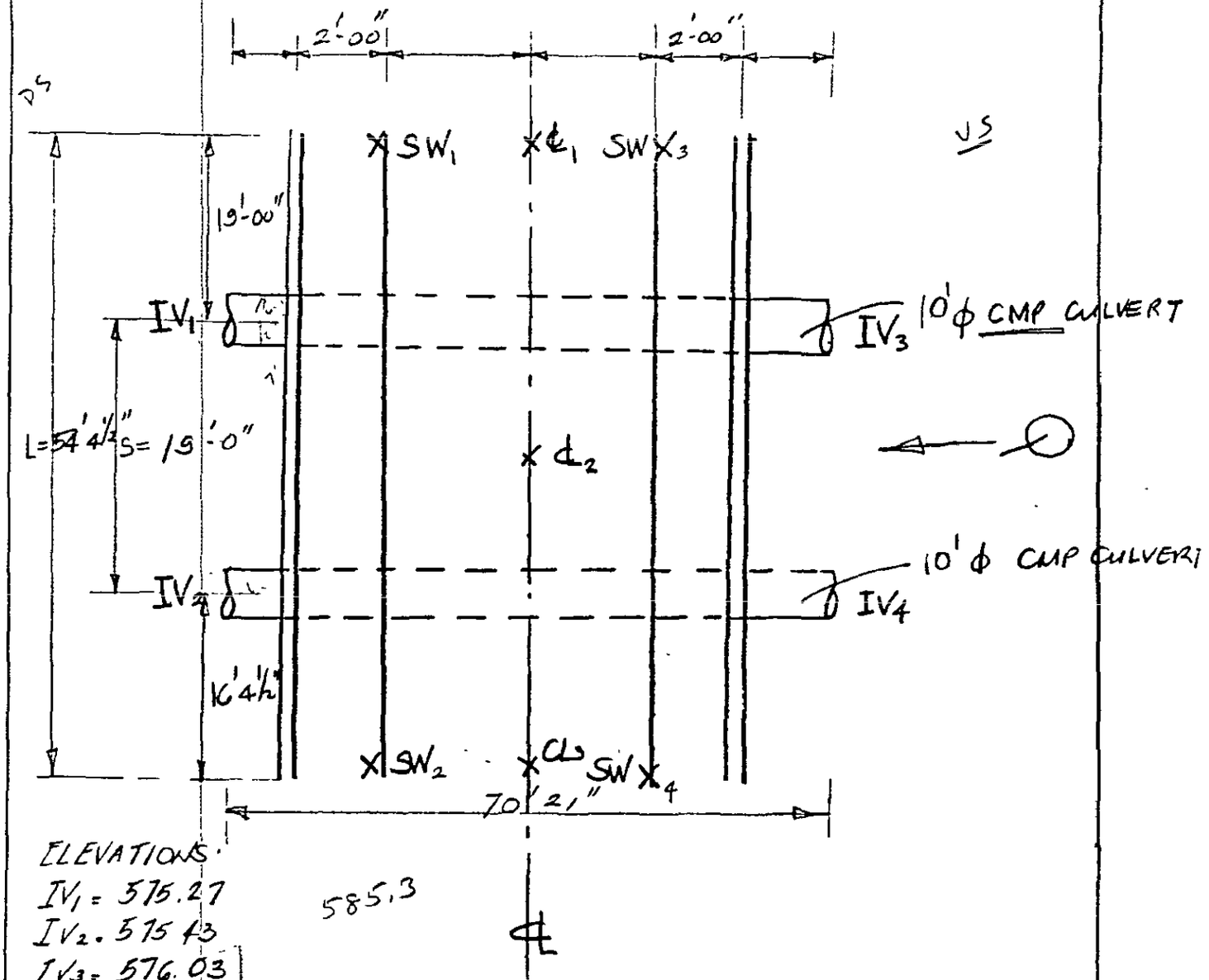
DESIGN NOTES AND COMPUTATIONS

SUBJECT: LAKE STREET BRIDGE

JOB NUMBER

PLAN



ELEVATIONS:

IV1 = 575.27
IV2 = 575.43
IV3 = 576.03
IV4 = 575.93
SW1 = 587.58
SW2 = 587.57
SW3 = 587.575
SW4 = 587.83
℄1 = 587.90
℄2 = 587.90
℄3 = 587.75

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DESIGN NOTES AND COMPUTATIONS

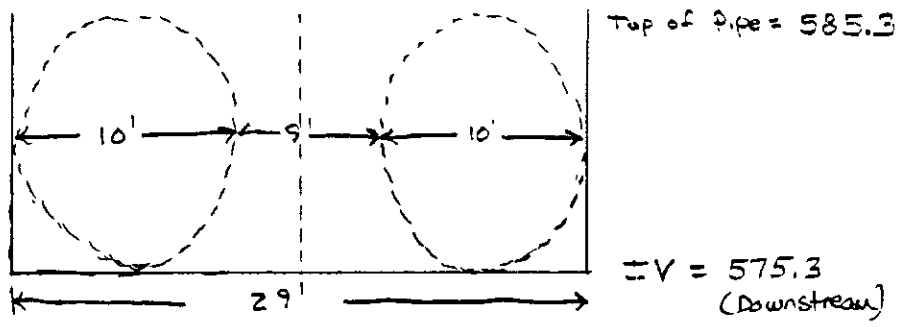
SUBJECT: BOYNE RIVER HEC-2 MODEL

JOB NUMBER

LAKE STREET CULVERT

Two 10'ϕ CMP (See attached sketch)

Computations for Area, Pier Width and Tropezoid Shape



Total Effective Flow Area = $\pi r^2 \times 2 = \pi(5)^2 \times 2 = 157$ sq-ft

Estimate Tropezoid (Rectangle) to be 10' x 25'

Total Tropezoid Area = 250 sq-ft

Not a pier

Pier Width: $10w = 250 - 157$

$10w = 93$ $\quad w = 9.3$ feet

HEC-2 procedures suggest that since the experimental pier coefficients did not include this type of test that culverts not be modeled in this manner

Special Bridge Parameters

Total Unobstructed Area = 157 sq-ft

Total Pier Width = 9.3 feet

Side Slopes = 0

Bottom Width = 25 feet

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SUBJECT

BOYNE RIVER HEC 2 MODEL

JOB NUMBER

The Top of Road(TOR) Elevation was assumed constant at 587.7 feet.

Low cord = 586.0

A preliminary HEC2 run could not balance the flow during the 500-year event. Therefore, the TOR was abritrarily ~~increased to 589.0~~ feet to assist the model with its special bridge routine derision logic. The resulting 500-year elevation is slightly over the actual TOR, therefore, a small amount of weir flow does exist.

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DESIGN NOTES AND COMPUTATIONS

SUBJECT: BOYNE RIVER HEC-2 MODEL

JOB NUMBER

LOSS COEFFICIENTS

Used recommend values from COE HEC-2 Manual (August 1979)

1. Pier Shape Coefficient - Assume Square Nose & Tail XK = 1.25 No Pier

2 Loss Coefficient for orifice Flow Equation (XKOR)

Recommended value of 1.56 for bridges and short culverts was used $R = \frac{Area}{WP} = \frac{\frac{\pi D^2}{4}}{\pi D} = \frac{D}{4} = \frac{10}{4} = 2.5$ why not calculate

3. Coefficient of Discharge for Weir Equation (COFQ)

Used recommended value of 2.6 for rectangular weir over bridge deck.

X-SEC 102

Repeat X-SEC, raise 0.5 foot, just upstream of culvert Effective - Area Option used

X-SEC 103

Repeat X-SEC, 30 feet upstream of Lake Street Culvert. Area is fully effective

XKOR est. assumed projecting

$$K_f = \frac{29.1 n^2 L}{R^{4/3}} = \frac{(29.1)(0.03)^2 70}{2.5^{4/3}} = \begin{array}{r} 1.9 \\ .54 \\ \hline 2.44 \end{array}$$

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DESIGN NOTES AND COMPUTATIONS

SUBJECT: BOYNE RIVER HEC2 MODEL

JOB NUMBER

CROSS SECTION 200 THROUGH 300 : NORMAL BRIDGE

Routine Park Street Bridge

X-SEC 200 : Approximately 50 feet downstream of Bridge - fully effective. Surveyed cross section with portions of overbanks taken from topo maps

X-SEC : 201 : Repeat of X-SEC 200, raised 0.5 foot. Just downstream of bridge, effective area option utilized Effective area is equal to bridge opening until elevation is above the TOR.

X-SEC 202 AND 203 : Repeat X-SEC's inside bridge. Upstream section raised an additional 0.5 foot. BT cards in section 203 repeated with X2 card.

X-SEC 204 : Repeat X-SEC just upstream of bridge. Effective area option used. Effective flow are equal to bridge opening until water surface elevation is above TOR

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DESIGN NOTES AND COMPUTATIONS

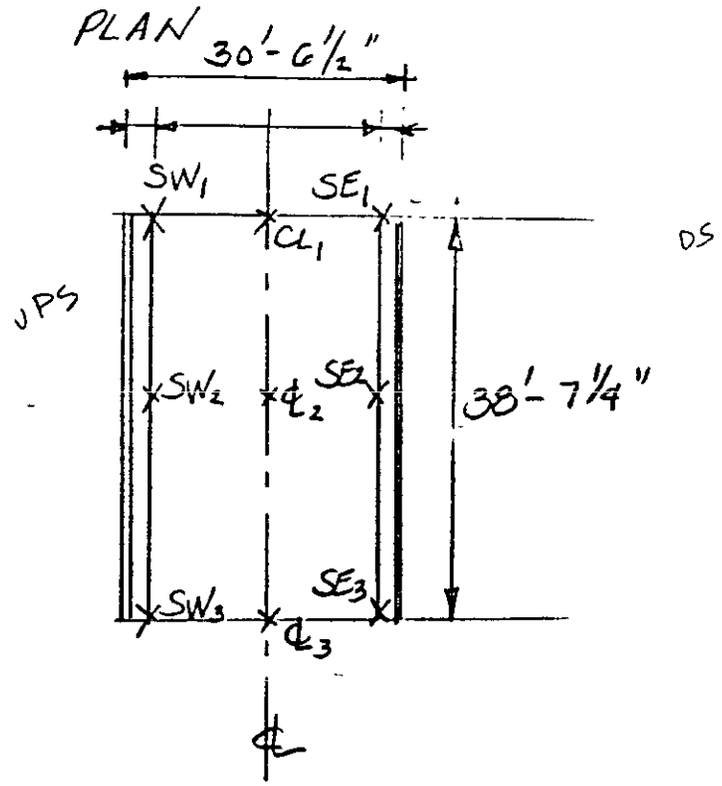
SUBJECT

BRIDGE SOUTH PARK STREET

JOB NUMBER

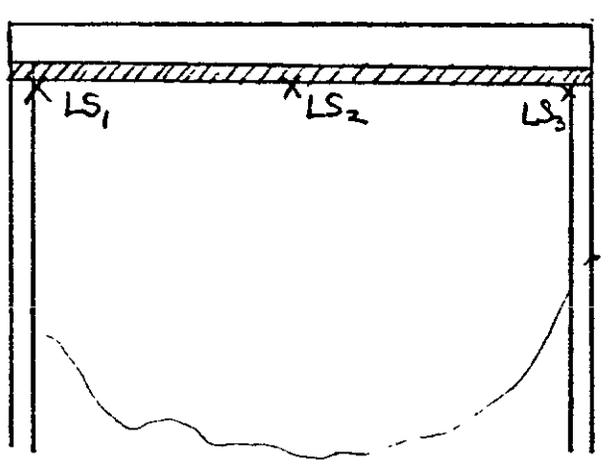
PLAN

$SW_1 = 588.67$
$SW_2 = 588.62$
$SW_3 = 588.56$
$\mathbb{C}_1 = 588.32$
$\mathbb{C}_2 = 588.26$
$\mathbb{C}_3 = 588.20$
$SE_1 = 588.72$
$SE_2 = 588.52$
$SE_3 = 588.50$



N

$LS_1 = 586.17$
$LS_2 = 586.22$
$LS_3 = 586.17$



TOP 588.6
LS 586.2

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DESIGN NOTES AND COMPUTATIONS

SUBJECT

JOB NUMBER

X-SEC 300 APPROXIMATELY 50 FEET UPSTREAM OF PARK STREET

Surveyed cross section with additional overbank points taken from topo map. Fully effective area

X-SEC 400 : APPROXIMATELY 210 feet DOWNSTREAM OF EAST STREET AND JUST DOWNSTREAM OF BEND

Surveyed cross sectional with additional points from topo map. Fully effective

Note:
"N" value were increased slightly after this cross section through the bridge routine to account for losses through the 8 bends in the stream

X-SEC 500 THROUGH 600 : NORMAL BRIDGE ROUTINE : EAST STREET

X-SEC : 500 - Fully effection section located approximately 100 feet downstream of bridge.

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DESIGN NOTES AND COMPUTATIONS

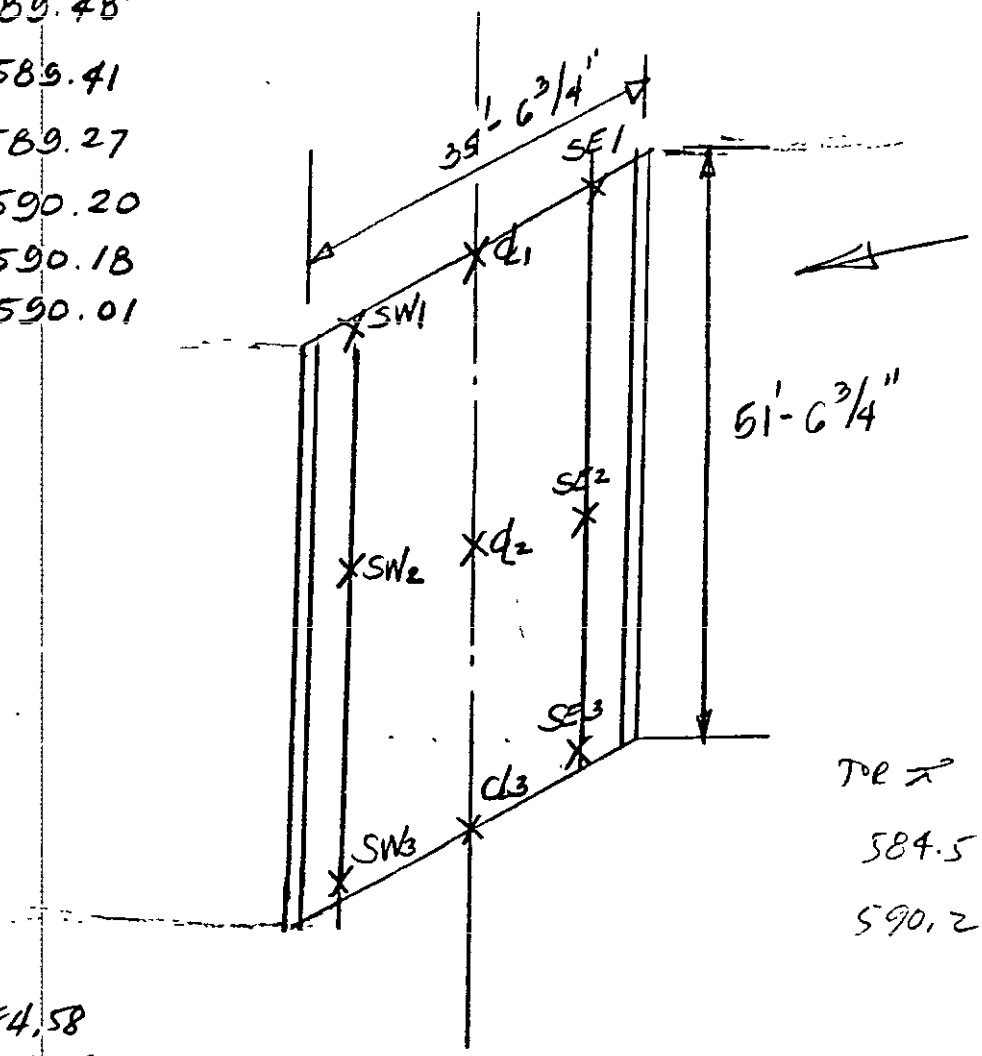
SUBJECT

BRIDGE AT EAST AVENUE

JOB NUMBER

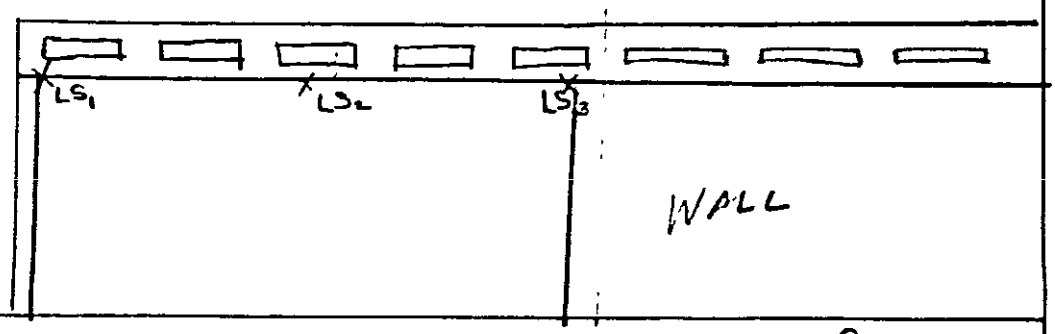
PLAN

$SW_1 = 590.08$
$SW_2 = 590.05$
$SW_3 = 589.93$
$\mathcal{C}_1 = 589.48$
$\mathcal{C}_2 = 589.41$
$\mathcal{C}_3 = 589.27$
$SE_1 = 590.20$
$SE_2 = 590.18$
$SE_3 = 590.01$



Top of
584.5 - LS
590.2

$LS_1 = 584.58$
$LS_2 = 584.55$
$LS_3 = 584.43$



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DESIGN NOTES AND COMPUTATIONS

SUBJECT

JOB NUMBER

X-SEC 501 : Interpolated X-SEC just downstream of bridge. Effective area option used.

X-SEC 502 and 503 : Just inside of bridge (downstream and upstream). BT cards used to block out bridge spar area. XZ card used to repeat BT's in section 503.

X-SEC 504 : Cross section just upstream of bridge. Effective area option used. Surveyed section 600 used here.

X-SEC 600 : Approximately 30 feet upstream of bridge. Fully effective cross section

End of Bridge Routine

X-SEC 610 : 170 upstream of East Street

Just upstream of end of bridge wingwall. Interpolated using surveyed section 600 and topo map

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SUBJECT

JOB NUMBER

X-SEC 700 : Approximately 850 feet upstream of East Street. Just Downstream of Ponded Area. Deep channel with muck and grass. "N" values increased slightly to account for this.

X-SEC 800: 900 feet downstream of Unnamed Bridge. Just upstream of ponded area

X-SEC 900 THROUGH 903 : SPECIAL BRIDGE ROUTINE: UNNAMED BRIDGE.

X-SEC 900 · Approximately 20 feet downstream of the bridge. Fully effective section

X-SEC 901: Repeat X-SEC, just downstream of bridge. Effective area option used

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DESIGN NOTES AND COMPUTATIONS

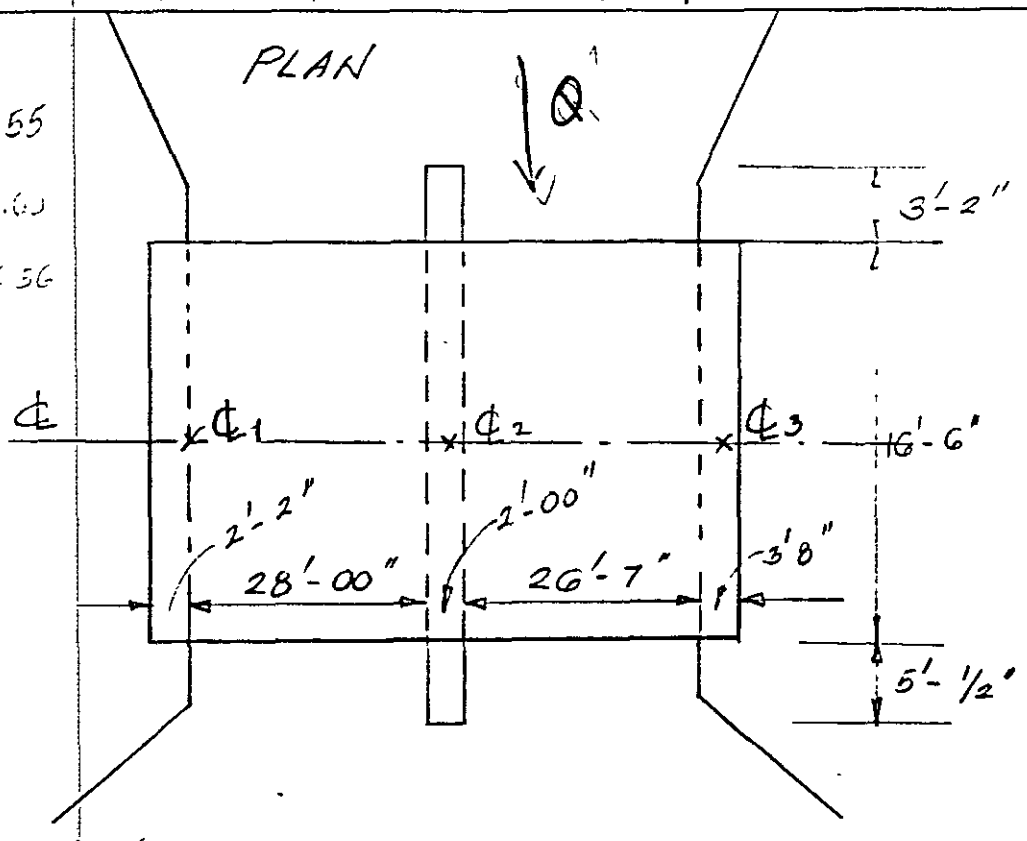
SUBJECT: BRIDGE AT SPRING STREET

JOB NUMBER

$\mathbb{C}_1 = 587.55$

$\mathbb{C}_2 = 588.63$

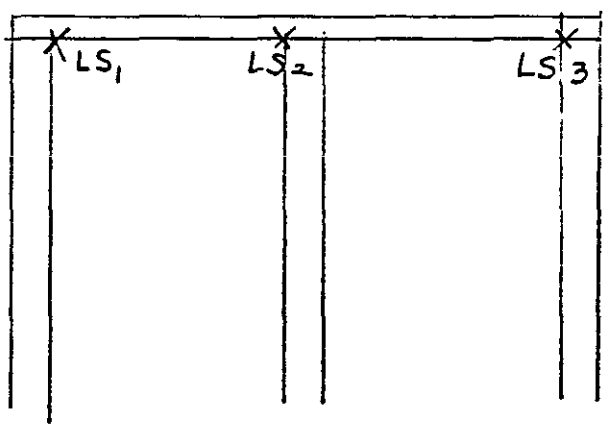
$\mathbb{C}_3 = 586.56$



$LS_1 = 586.54$

$LS_2 = 586.81$

$LS_3 = 585.18$



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DESIGN NOTES AND COMPUTATIONS

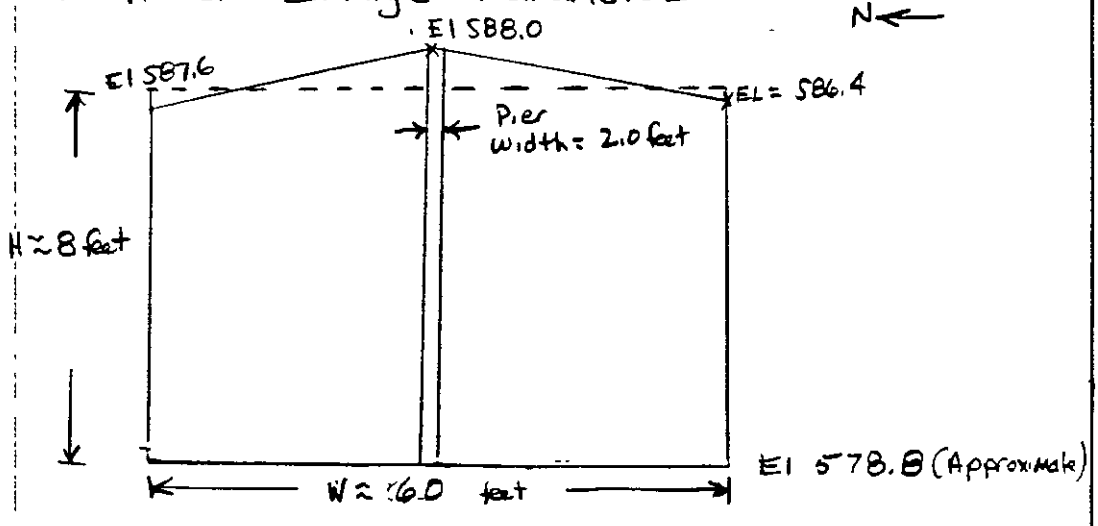
SUBJECT

JOB NUMBER

Bridge Description

Bridge is concrete and is in poor condition. The bridge would probably collapse during a large storm event. In is no longer used for vehicle traffic and is only useful for pedestrians. A sketch of the bridge is attached.

Determination of Bridge Parameters



Total Area = 8 × 60 = 480 sq. feet

Unobstructed Area = 480 − (2 × 8) = 464 sq. feet

Bottom Width = 60 feet

Side Slopes = 0

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Bridge Coefficients

1. Pier Shape Coefficient

Pier is 90° Triangular nose and take XK = 1.05 from COE Manual

2. Loss Coefficient for Orifice Equation

COE value of 1.56 was used, since no calibration data was available

XKOF = 1.56

Try use of suggested procedure used in the HEC Bridge Row

3. Coefficient of Discharge

Recommend value for flow over bridge deck is 2.6. Recommended value for flow over roadway approaches to bridges is 3.0 Since both of these types of flow occur, an average value of 2.8 was used.

COFQ = 2.8

X-SEC 902 : Just upstream of bridge. Effective area option used.

X-SEC 903: Approximately 10 feet upstream of bridge. Full effective.

End of Run.

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DESIGN NOTES AND COMPUTATIONS

SUBJECT

JOB NUMBER

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WATER MANAGEMENT

EXHIBIT 4

LAKE CHARLEVOIX

WIND SET-UP CALCULATIONS

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DESIGN NOTES AND COMPUTATIONS

SUBJECT BOYNE CITY, MICHIGAN
LAKE CHARLEVOIX WIND SETUP

JOB NUMBER

From COE Shore Protection Manual, wind Set-up can be estimated by the equation

$$\Delta S = \frac{CW^2F}{D} \cos\theta \quad \text{where} \qquad \text{(Equation 3-83)}$$

ΔS = wind Setup (feet)

C = Constant $\approx 1.165 \times 10^{-3}$ ~~&~~ $sec^2/foot$

W = wind velocity (Mph)

F = Fetch length (effective) (miles)

D = Average Depth of Fetch (feet)

θ = angle between wind and fetch

I. Determine Effective Fetch Length

Using NOAA Sounding Map, assume fetch length to be equal to the distance from Charlevoix to East Jordan.

$$\text{Fetch length} = 240 \text{ inches} \times \frac{2500 \text{ feet}}{\text{inch}} \times \frac{1 \text{ miles}}{5280 \text{ feet}}$$

$$= 11.4 \text{ Miles}$$

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Average width of fetch (estimate)

$$\frac{2.7 + 2.9 + 2.9 + 2.3}{4} \text{ inches} \times \frac{2500}{5280} = 1.3 \text{ miles}$$

Ratio of $W/D = \frac{1.3}{11.4} = 0.11$

Effective fetch length ratio from figure 3-13 of Shore Protection Manual is 0.28

$$\frac{F_E}{F} = 0.28 \qquad F_E = 0.28 \times 11.4 = 3.2 \text{ miles}$$

II. Compute Average Depth (D)

From soundings map and using "grid method", average depth was found.

Sounding depths referenced to 576.8 IGLD

~~100 YR WSE~~

$$\frac{\sum_1^n D}{n} = \text{average depth} = \frac{5497}{71} = 77.4 \text{ say } 77 \text{ feet}$$

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DESIGN NOTES AND COMPUTATIONS

SUBJECT

LAKE CHARLEVOIX WIND SETUP

JOB NUMBER

Following Depths will be used

Recurrence Interval	Elevations @ Charlevoix (IGLD)	ΔD from low water Datum	≈ D
10-	581.6	4.8	82
50-	582.6	5.8	83
100-	582.9	6.1	83
500-	583.5	6.7	84

III WIND VELOCITIES

From discussions with the COE, Detroit District and wind Data records at Muskegon County Airport, a conservative steady-wind velocity of 50 mph will be used. The highest value recorded at Muskegon (17 years record) was 46 mph.

IV Set-up

For 100-year event

$$\Delta S = \frac{(1.165 \times 10^{-3})(50)^2(3.2)}{83}(1) = 0.11 \text{ foot}$$

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DESIGN NOTES AND COMPUTATIONS

SUBJECT LAKE CHARLEVOIX- WIND SETUP

JOB NUMBER

V. Conclusions

Using a conservatively high wind velocity, the wind set-up elevation is only 0.1 foot. This is considered insignificant and it is assummed that the open-coast level of lake Michigan will be applicable for the entire main stem of Lake Charlevoix

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DESIGN NOTES AND COMPUTATIONS

SUBJECT EAST JORDAN, MI
SOUTH ARM LAKE CHARLEVOIX WIND SETUP JOB NUMBER

Equation used is

$$\Delta S = \frac{C W^2 F}{D} \cos\theta$$

I. Determine Effective Fetch Length

Using NOAA sounding Map

From inlet to East Jordan

$$13 \text{ inches} \times \frac{2500}{5280} = 6.2 \text{ Miles}$$

Average Width of Fetch

$$\frac{0.5 + 1.3 + 1.0 + 1.4}{4} \times \frac{2500}{5280} = 0.5 \text{ Mile}$$

$$W/L = \frac{0.5}{6.2} = 0.08$$

From figure 3-13 $F_E/F = 0.23$

$$6.2 \times 0.23 = 1.4 \text{ Miles}$$

PREPARED BY TJS DATE 10/18 CHECKED BY SHEET NO 5 OF 6

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DESIGN NOTES AND COMPUTATIONS

SUBJECT: WIND SETUP - SOUTH ARM

JOB NUMBER

II. Determine Average Depth

From sounding chart (Grid Method)

$$\frac{\sum D}{n} = \frac{342}{11} = 31.1 \quad \text{say } 31 \text{ feet}$$

Recurrence Interval	ΔD from Low water Datum	$\simeq D$
10-	4.8	36
50-	5.8	37
100-	6.1	37
500-	6.7	38

III. Wind Velocity

Assume Direction to be along stem of South Arm Lake Charlevoix.

Use conservative wind velocity of 50 mph

$$\Delta S = \frac{(1.169 \times 10^{-3})(50)^2(1.4)}{37}(1) = 0.11 \text{ foot}$$

IV Conclusion

Only 0.1 foot rise is insignificant. Elevations in South Arm will be controlled by Lake Michigan as well.

PREPARED BY TJS DATE CHECKED BY SHEET NO 6 OF 6

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DESIGN NOTES AND COMPUTATIONS

SUBJECT

JOB NUMBER

RECEIVED
NOV 1984
WATER MANAGEMENT

EXHIBIT 5

LAKE CHARLEVOIX

SOUTH ARM OUTLET COMPUTATIONS

PREPARED BY | DATE | CHECKED BY | SHEET NO. | OF

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2021 K Street, N W · Washington, D C 20006 202/862-8600
ENGINEERS ARCHITECTS PLANNERS

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DESIGN NOTES AND COMPUTATIONS

SUBJECT EAST JORDAN MICHIGAN
ELEVATIONS FOR SOUTH ARM LAKE CHARLEVOIX JOB NUMBER 80047

An Analysis will be done similar to the Lake Charlevoix analysis explained in the hydraulic summary for Charlevoix and Petoskey. The following assumptions will be made:

1. South Arm outflow controlled by constriction near Ironton Ferry. Approximate cross section was obtained from sounding map publisted by NOAA.

2. Runoff depth for 24-hour 100-year storm would be 1.0 inch

3. Total runoff volume would enter South Arm during 24-hour period

4. Elevation of Lake Charlevoix would equal the 10-year open-coast elevation when the 100-year storm occurs.

5. The peak storage volume would occur 24-hours after inflow into the South Arm began

PREPARED BY TJS DATE 9/23 CHECKED BY SHEET NO 1 OF 5

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SUBJECT

SOUTH ARM LAKE CHARLEVOIX

JOB NUMBER

I. DRAINAGE AREAS

Total Drainage Area for South Arm

Jordan River : 123.4 Mi^2
Remaining Area : 33.4

Total Area : 1568 Mi^2
= 100,352 Acres

Lake Area (South Arm)

4.2 sq. Miles = 2,688 Acres

II. VOLUME ENTERING SOUTH ARM

Assuming 1" of runoff

$\frac{1}{12} \times 100,352 = 8,363$ Ac-Ft

Direct Volume into lake from rainfall

100-yr rainfall = 4.4 inches

$\frac{4.4}{12} \times 2,688 = 986$ Ac-Ft

Total inflow Volume = 9,349 Ac-Ft

PREPARED BY TJS DATE CHECKED BY SHEET NO. 2 OF 5

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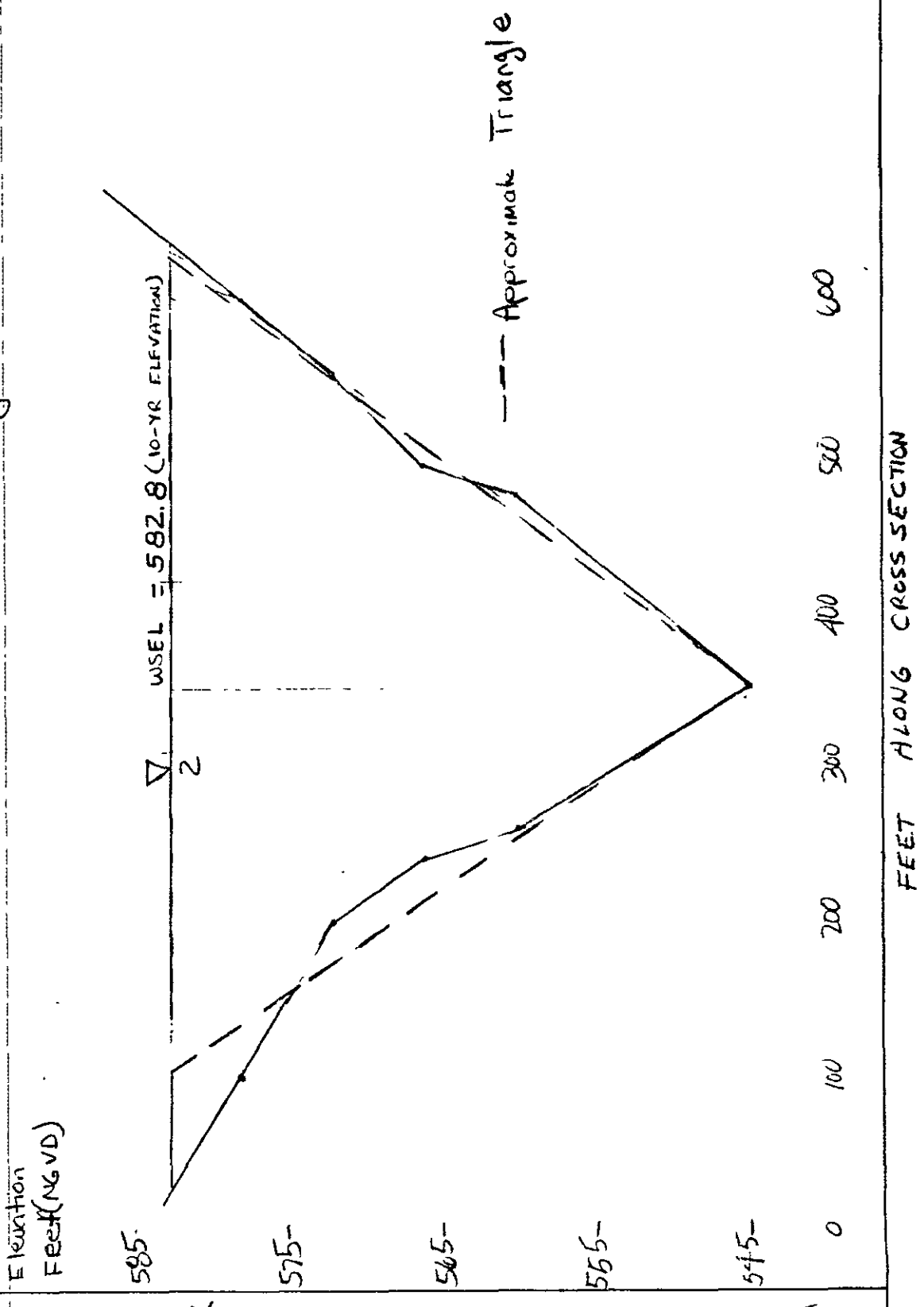
DESIGN NOTES AND COMPUTATIONS

SUBJECT OUTFLOW X-SEC
SOUTH ARM LAKE CHARLEVOIX

JOB NUMBER



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DESIGN NOTES AND COMPUTATIONS

SUBJECT

JOB NUMBER

III. OUTFLOW VOLUME ESTIMATE

Area of x-sec @ 10-year elevation level

$$\left(\frac{250}{2} + \frac{275}{2}\right) \times 37.8 = 9,920 \text{ sq. ft.}$$

Assuming small head loss (0.1 foot) between Lake Charlevoix and South Arm

$$\text{Slope} \approx \frac{0.1}{8000} = 1.25 \times 10^{-5}$$

Velocity of Outflow

$n \approx 0.03$

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

$R = A/P$ $\quad P = 253 + 278 = 531$

$$R = \frac{19,920}{531} = 18.7$$

$$V = \frac{1.49}{0.03} (18.7)^{2/3} (1.25 \times 10^{-5})^{1/2} = 1.2 \text{ ft/sec}$$

Total Volume of Outflow in 24 hours

$$1.2 \text{ ft/sec} \times 9,920 \text{ ft}^2 \times 3600 \frac{\text{sec}}{\text{hr}} \times 24 = \underline{\underline{1.03 \times 10^9 \text{ cf}}}$$

$$= 23,610 \text{ Ac Ft}$$

PREPARED BY TJS DATE 9/23 CHECKED BY DW SHEET NO 4 OF 5

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SUBJECT.

SOUTH ARM LAKE CHARLEVOIX

JOB NUMBER

IV CONCLUSION

The total outflow volume for a neglible small head loss is greater than the total inflow volume. Therefore, the elevations on the South Arm will not rise substantially from local runoff. The elevations will be controlled by Lake Charlevoix, which in turn, is controlled by Lake Michigan.

Inflow Approx. 10,000 Ac-Ft
Outflow Approx. 24,000 Ac-Ft

PREPARED BY TJS DATE 9/23 CHECKED BY [illegible] SHEET NO 5 OF 5

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DESIGN NOTES AND COMPUTATIONS

SUBJECT.

JOB NUMBER

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WATER MANAGEMENT

EXHIBIT 6

LAKE CHARLEVOIX

Losses Through M-32 Bridge
in East Jordan

PREPARED BY | DATE | CHECKED BY | SHEET NO | OF

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(1-2)

DESIGN NOTES AND COMPUTATIONS

SUBJECT: MICHIGAN FIS: EAST JORDAN
LOSSES THROUGH M-32 BRIDGE

JOB NUMBER 80047/03

EAST JORDAN, MI

ESTIMATE OF LOSSES
THROUGH M-32 BRIDGE

1] CROSS SECTION PLOT TAKEN FROM SCS NOTES OF 12/11/79 (IGLD)

2] ASSUME 10-YR ELEVATON OF LAKE CHARLEVOIX D/S OF BRIDGE

3] ESTIMATE LOSSES USING YARNELL'S EQUATION
TOTAL DISCHARGE FROM JORDAN RIVER ASSUMED TO FLOW THROUGH BRIDGE

4] EVALUATE LOSSES, COMPUTE UPSTREAM ELEVATON;

5] COMPARE WITH 100-YEAR LAKE ELEVATION

Note: The IGLD is used in all computations and the final result is converted to NGVD.

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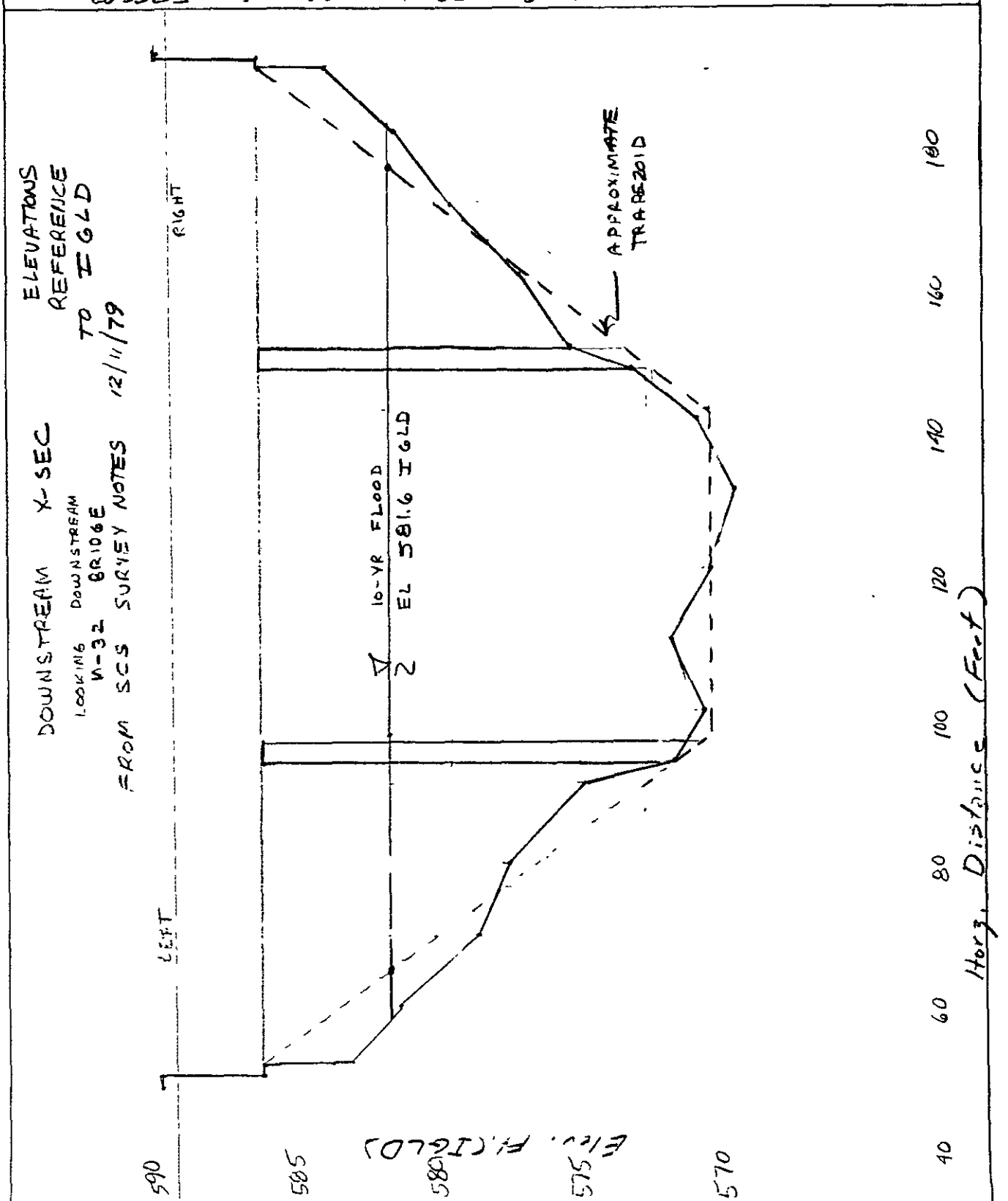
DESIGN NOTES AND COMPUTATIONS

SUBJECT EAST JORDAN, MI
LOSSES THROUGH M-32 BRIDGE

JOB NUMBER 80047/03



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DESIGN NOTES AND COMPUTATIONS

SUBJECT: MICHIGAN FIS : EAST JORDAN
LOSSES THROUGH M-32 BRIDGE JOB NUMBER 80047/04

NOTE: ALL ELEVATIONS REFERENCED TO IGLD

From Plotted Downstream X-SEC

Approximate Areas @ 10-YEAR ELEVATION FROM LAKE MICHIGAN EL 581.6 IGLD

Total Area = $\left(\frac{45+112}{2}\right) \times 11.5 = 903 \text{ ft.}^2$

Obstructed Area (from piers) (Approximate)

$(3+3) \times 9.5 = 57 \text{ ft}^2$

Total Unobstructed Area =

$903 - 57 = 846 \text{ ft}^2$

VELOCITY AT X-SEC DOWNSTREAM (100-yr)

$Q = 2{,}400$ cfs
$A = 903. \text{ ft}^2$

$V = Q/A = \frac{2{,}400}{903} = 2.7 \text{ ft/sec}$

Velocity Head $= V^2/2g = \frac{(2.7)^2}{64.4} = 0.11$

PREPARED BY TJS DATE 9/18 CHECKED BY SHEET NO 3 OF 5

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DESIGN NOTES AND COMPUTATIONS

SUBJECT EAST JORDAN, MI
LOSSES THROUGH M-32 BRIDGE

JOB NUMBER 80047

With subcritical flow, use Yarnell's Equation to determine losses

$$H_3 = 2K(K + 10\omega - 0.6)(\alpha + 15\alpha^4)\, V_3^2/2g$$

where

H_3 = drop in WSEL in feet from upstream to downstream sides of bridge (unknown)

K = Pier shape coefficient (1.05 from COE HEC-2 Manual p. IV-21)

ω = ratio of velocity head to depth downstream of bridge =

$$\frac{0.11}{11.5} = 0.00954$$

$$\alpha = \frac{\text{obstructed area}}{\text{total unobstructed area}} = \frac{57}{846} = 0.0674$$

V_3 = Velocity downstream of bridge in ft/sec (= 2.7 ft/sec)

Plugging in values

$$H_3 = 2(1.05)(1.05 + (10)(0.00954) - 0.6)(0.0674 + (15)(0.0674)^4)(0.11)$$

$$H_3 = (2.1)(0.545)(0.06771)(0.11)$$

$$H_3 = 0.01$$

negligible

PREPARED BY TJS DATE 9/18 CHECKED BY [illegible] SHEET NO 4 OF 5

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DESIGN NOTES AND COMPUTATIONS

SUBJECT East Jordan, MI
Losses Through M-32 Bridge

JOB NUMBER 80047

Due to low velocities caused by the lake elevation, there are no significant losses through the bridge even during a 100-year storm event. The elevations upstream of the bridge are the same as the lake Charlevoix elevations for the 10-, 50, 100- and 500- year flood.

Elevations

Lake Charlevoix in East Jordan (w/o wind set-up)

	REFERENCE TO NGVD
10-YR	582.8
50-YR	583.8
100-YR	584.1
500-YR	584.7

PREPARED BY TJS DATE 9/13 CHECKED BY [illegible] SHEET NO. 5 OF 5

00BREAK00

1) COUNTY: Charlevoix

2) STUDY NAME: Boyne City and East Jordan

3) WATERCOURSE: Boyne River

4) DOCUMENT TYPE: summary

00BREAK00

THIS RUN EXECUTED 07 MAY 81 16.08.45

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*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED APRI 1980
  ERROR CORR =  01,02,03,04
  MODIFICATION =  50,51,52,53,54
*****************************************************
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NOTE= ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

10 YR

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	IOK*S	VCH	AREA	.01K
	100.000	=0.	0.	0.	575.30	790.00	579.90	0.	580.22	23.51	4.52	174.68	162.92
	100.000	=0.	0.	0.	575.30	1150.00	579.90	0.	580.57	49.83	6.58	174.68	162.92
	100.000	=0.	0.	0.	575.30	1325.00	579.90	0.	580.79	66.14	7.59	174.68	162.92
	100.000	=0.	0.	0.	575.30	1860.00	579.90	579.89	581.66	130.34	10.65	174.68	162.92
	101.000	70.00	0.	0.	575.60	790.00	579.97	0.	580.60	46.89	6.38	123.80	115.37
	101.000	70.00	0.	0.	575.60	1150.00	580.06	0.	581.33	90.94	9.05	127.13	120.59
	101.000	70.00	0.	0.	575.60	1325.00	580.13	0.	581.75	113.32	10.23	129.57	124.47
*	101.000	70.00	0.	0.	575.60	1860.00	580.87	580.87	583.10	121.99	11.97	155.34	168.40
	101.100	1.00	587.80	588.00	575.60	790.00	579.93	0.	580.65	53.44	6.84	115.46	108.07
	101.100	1.00	587.80	588.00	575.60	1150.00	579.94	0.	581.47	111.70	9.91	116.03	108.81
	101.100	1.00	587.80	588.00	575.60	1325.00	579.94	579.92	581.97	148.07	11.41	116.09	108.89
*	101.100	1.00	587.80	588.00	575.60	1860.00	580.84	580.84	583.56	174.28	13.23	140.59	140.89
	102.000	70.00	587.80	588.50	576.10	790.00	580.29	0.	581.07	59.03	7.09	111.36	102.82
	102.000	70.00	587.80	588.50	576.10	1150.00	581.06	0.	582.22	77.01	8.64	133.11	131.04
	102.000	70.00	587.80	588.50	576.10	1325.00	581.72	0.	582.92	74.48	8.82	150.18	153.53
	102.000	70.00	587.80	588.50	576.10	1860.00	583.15	0.	584.74	88.86	10.12	183.77	197.31
	101.200	1.00	0.	0.	576.10	790.00	580.51	0.	581.13	32.75	6.29	125.69	138.05
	101.200	1.00	0.	0.	576.10	1150.00	581.55	0.	582.34	30.03	7.12	161.60	209.85
	101.200	1.00	0.	0.	576.10	1325.00	582.28	0.	583.06	24.50	7.09	187.01	267.68
	101.200	1.00	0.	0.	576.10	1860.00	584.12	0.	584.97	17.99	7.40	251.46	438.50
	103.000	30.00	0.	0.	576.10	790.00	580.91	0.	581.30	34.64	5.19	173.51	134.22
	103.000	30.00	0.	0.	576.10	1150.00	582.06	0.	582.53	29.89	5.72	232.02	210.33
	103.000	30.00	0.	0.	576.10	1325.00	582.76	0.	583.23	25.42	5.74	267.59	262.78
	103.000	30.00	0.	0.	576.10	1860.00	584.64	0.	585.13	19.02	5.98	366.36	426.48
	200.000	275.00	0.	0.	574.40	790.00	581.53	0.	581.63	5.38	2.75	327.86	340.53
	200.000	275.00	0.	0.	574.40	1150.00	582.73	0.	582.88	6.15	3.32	401.08	463.85
	200.000	275.00	0.	0.	574.40	1325.00	583.39	0.	583.56	6.03	3.48	445.02	539.57
	200.000	275.00	0.	0.	574.40	1860.00	585.22	0.	585.43	5.75	3.91	573.84	775.64

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SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
201.000	50.00	0.	0.	574.90	790.00	581.54	0.	581.74	10.03	3.60	219.52	249.46
201.000	50.00	0.	0.	574.90	1150.00	582.74	0.	583.03	11.36	4.30	267.30	341.19
201.000	50.00	0.	0.	574.90	1325.00	583.40	0.	583.72	11.02	4.51	293.69	399.16
201.000	50.00	0.	0.	574.90	1860.00	585.22	0.	585.62	10.39	5.08	366.37	577.05
202.000	1.00	588.50	590.50	574.90	790.00	581.54	0.	581.75	6.98	3.65	216.41	299.03
202.000	1.00	588.50	590.50	574.90	1150.00	582.74	0.	583.04	8.56	4.37	262.88	393.00
202.000	1.00	588.50	590.50	574.90	1325.00	583.40	0.	583.72	8.62	4.59	288.64	451.26
202.000	1.00	588.50	590.50	574.90	1860.00	585.21	0.	585.63	9.02	5.18	358.85	619.37
203.000	30.00	588.50	591.00	575.40	790.00	581.54	0.	581.79	9.11	4.00	197.63	261.71
203.000	30.00	588.50	591.00	575.40	1150.00	582.74	0.	583.09	10.80	4.73	243.21	349.99
203.000	30.00	588.50	591.00	575.40	1325.00	583.40	0.	583.78	10.61	4.92	269.07	406.82
203.000	30.00	588.50	591.00	575.40	1860.00	585.22	0.	585.68	10.58	5.48	339.51	571.83
204.000	1.00	0.	0.	575.40	790.00	581.55	0.	581.79	13.26	3.97	199.10	216.91
204.000	1.00	0.	0.	575.40	1150.00	582.75	0.	583.09	15.22	4.69	245.38	294.77
204.000	1.00	0.	0.	575.40	1325.00	583.41	0.	583.78	14.38	4.88	271.75	349.44
204.000	1.00	0.	0.	575.40	1860.00	585.24	0.	585.69	12.82	5.40	344.69	519.39
300.000	50.00	0.	0.	576.00	790.00	581.68	0.	581.86	12.58	3.44	229.64	222.76
300.000	50.00	0.	0.	576.00	1150.00	582.93	0.	583.17	13.07	3.93	292.57	318.14
300.000	50.00	0.	0.	576.00	1325.00	583.61	0.	583.86	12.46	4.04	327.79	375.35
300.000	50.00	0.	0.	576.00	1860.00	585.47	0.	585.76	10.67	4.32	434.85	569.35
400.000	280.00	0.	0.	577.10	790.00	582.03	0.	582.22	12.59	3.65	252.80	222.68
400.000	280.00	0.	0.	577.10	1150.00	583.29	0.	583.51	10.77	3.96	349.89	350.38
400.000	280.00	0.	0.	577.10	1325.00	583.95	0.	584.16	9.44	3.98	409.21	431.28
400.000	280.00	0.	0.	577.10	1860.00	585.80	0.	586.01	6.92	4.03	584.66	706.95
500.000	140.00	0.	0.	575.80	790.00	582.21	0.	582.43	16.17	3.80	219.40	196.48
500.000	140.00	0.	0.	575.80	1150.00	583.43	0.	583.74	17.65	4.52	272.89	273.70
500.000	140.00	0.	0.	575.80	1325.00	584.06	0.	584.40	17.39	4.75	301.29	317.77
500.000	140.00	0.	0.	575.80	1860.00	585.83	0.	586.25	16.55	5.32	384.32	457.23
501.000	50.00	0.	0.	575.80	790.00	582.40	0.	582.49	5.62	2.40	329.07	333.35
501.000	50.00	0.	0.	575.80	1150.00	583.68	0.	583.81	6.45	2.91	395.48	452.86
501.000	50.00	0.	0.	575.80	1325.00	584.32	0.	584.47	6.53	3.09	429.01	518.64
501.000	50.00	0.	0.	575.80	1860.00	586.13	0.	586.32	6.65	3.56	522.97	721.48
502.000	2.00	589.90	592.00	575.80	790.00	582.40	0.	582.49	2.71	2.43	325.27	480.33
502.000	2.00	589.90	592.00	575.80	1150.00	583.68	0.	583.81	3.31	2.95	389.65	631.93
502.000	2.00	589.90	592.00	575.80	1325.00	584.32	0.	584.47	3.46	3.14	421.97	712.34
502.000	2.00	589.90	592.00	575.80	1860.00	586.08	0.	586.37	13.43	4.32	430.80	507.59
503.000	32.00	589.90	592.00	575.80	790.00	582.41	0.	582.50	2.69	2.42	325.82	481.57
503.000	32.00	589.90	592.00	575.80	1150.00	583.69	0.	583.82	3.30	2.95	390.25	633.42
503.000	32.00	589.90	592.00	575.80	1325.00	584.33	0.	584.48	3.45	3.14	422.57	713.86
503.000	32.00	589.90	592.00	575.80	1860.00	586.13	0.	586.42	13.43	4.32	430.80	507.59

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
	504.000	2.00	0.	0.	576.50	790.00	582.36	0.	582.52	9.99	3.18	248.11	249.89
	504.000	2.00	0.	0.	576.50	1150.00	583.64	0.	583.84	9.23	3.61	318.35	378.62
	504.000	2.00	0.	0.	576.50	1325.00	584.29	0.	584.50	8.60	3.74	353.92	451.72
	504.000	2.00	0.	0.	576.50	1860.00	586.16	0.	586.42	7.22	4.07	457.18	692.09
	600.000	30.00	0.	0.	576.50	790.00	582.40	0.	582.55	9.47	3.12	265.20	256.67
	600.000	30.00	0.	0.	576.50	1150.00	583.69	0.	583.87	8.52	3.49	352.61	393.96
	600.000	30.00	0.	0.	576.50	1325.00	584.34	0.	584.54	7.86	3.60	397.56	472.65
	600.000	30.00	0.	0.	576.50	1860.00	586.23	0.	586.45	6.42	3.86	531.04	734.28
	610.000	140.00	0.	0.	576.70	790.00	582.54	0.	582.69	10.41	3.09	261.45	244.86
	610.000	140.00	0.	0.	576.70	1150.00	583.82	0.	584.00	9.11	3.44	348.21	381.09
	610.000	140.00	0.	0.	576.70	1325.00	584.46	0.	584.65	8.31	3.54	394.21	459.74
	610.000	140.00	0.	0.	576.70	1860.00	586.33	0.	586.54	6.59	3.76	536.36	724.53
	700.000	640.00	0.	0.	568.90	790.00	582.82	0.	582.84	.85	1.08	755.75	858.16
	700.000	640.00	0.	0.	568.90	1150.00	584.14	0.	584.16	1.06	1.34	918.13	1115.17
	700.000	640.00	0.	0.	568.90	1325.00	584.79	0.	584.82	1.11	1.43	1004.93	1255.58
	700.000	640.00	0.	0.	568.90	1860.00	586.67	0.	586.71	1.16	1.64	1395.33	1723.29
	800.000	930.00	0.	0.	576.40	790.00	582.95	0.	583.03	7.96	2.43	454.17	280.08
	800.000	930.00	0.	0.	576.40	1150.00	584.30	0.	584.38	6.33	2.54	697.88	457.11
	800.000	930.00	0.	0.	576.40	1325.00	584.96	0.	585.03	5.46	2.51	842.91	567.02
	800.000	930.00	0.	0.	576.40	1860.00	586.83	0.	586.90	3.63	2.40	1363.76	976.36
	900.000	840.00	0.	0.	577.60	790.00	583.50	0.	583.56	4.92	2.16	451.49	356.30
	900.000	840.00	0.	0.	577.60	1150.00	584.77	0.	584.85	4.58	2.42	614.98	537.34
	900.000	840.00	0.	0.	577.60	1325.00	585.37	0.	585.45	4.30	2.49	716.02	639.28
	900.000	840.00	0.	0.	577.60	1860.00	587.13	0.	587.21	3.36	2.55	1084.74	1015.31
	901.000	20.00	0.	0.	577.60	790.00	583.51	0.	583.57	4.87	2.15	453.00	358.00
	901.000	20.00	0.	0.	577.60	1150.00	584.78	0.	584.85	4.55	2.41	616.70	539.13
	901.000	20.00	0.	0.	577.60	1325.00	585.38	0.	585.46	4.27	2.48	717.80	641.05
	901.000	20.00	0.	0.	577.60	1860.00	587.14	0.	587.21	3.34	2.55	1086.33	1017.05
*	901.100	1.00	584.00	590.00	577.60	790.00	583.49	0.	583.60	4.91	2.73	289.30	356.57
*	901.100	1.00	584.00	590.00	577.60	1150.00	584.74	0.	584.90	5.35	3.18	384.28	497.33
*	901.100	1.00	584.00	590.00	577.60	1325.00	585.34	0.	585.50	5.51	3.31	463.46	564.71
*	901.100	1.00	584.00	590.00	577.60	1860.00	587.10	0.	587.25	11.03	3.45	739.55	560.05
*	901.200	25.00	584.00	590.00	577.60	790.00	583.50	0.	583.61	4.87	2.72	289.98	357.85
*	901.200	25.00	584.00	590.00	577.60	1150.00	584.75	0.	584.91	5.31	3.18	385.69	498.85
*	901.200	25.00	584.00	590.00	577.60	1325.00	585.35	0.	585.52	5.49	3.30	465.26	565.42
*	901.200	25.00	584.00	590.00	577.60	1860.00	587.13	0.	587.28	10.98	3.43	743.15	561.39
	902.000	1.00	0.	0.	577.60	790.00	583.56	0.	583.63	2.35	2.26	457.85	515.26
	902.000	1.00	0.	0.	577.60	1150.00	584.84	0.	584.93	2.24	2.55	626.28	768.96
	902.000	1.00	0.	0.	577.60	1325.00	585.45	0.	585.54	2.13	2.65	729.81	908.39
	902.000	1.00	0.	0.	577.60	1860.00	587.20	0.	587.30	1.76	2.79	1101.41	1403.83

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
903.000	10.00	0.	0.	577.60	790.00	583.56	0.	583.63	2.34	2.26	458.26	515.90
903.000	10.00	0.	0.	577.60	1150.00	584.84	0.	584.93	2.23	2.55	626.87	769.78
903.000	10.00	0.	0.	577.60	1325.00	585.45	0.	585.54	2.12	2.64	730.50	909.30
903.000	10.00	0.	0.	577.60	1860.00	587.21	0.	587.30	1.75	2.78	1102.85	1405.87

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10 YR

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	100.000	790.00	579.90	0.	0.	0.	50.04	-0.
	100.000	1150.00	579.90	0.	0.	0.	50.04	-0.
	100.000	1325.00	579.90	0.	0.	0.	50.04	-0.
	100.000	1860.00	579.90	0.	0.	0.	50.04	-0.
A	101.000	790.00	579.97	0.	.07	0.	35.00	70.00
	101.000	1150.00	580.06	.09	.16	0.	35.00	70.00
	101.000	1325.00	580.13	.07	.23	0.	35.00	70.00
*	101.000	1860.00	580.87	.74	.97	0.	35.00	70.00
	101.100	790.00	579.93	0.	-.04	0.	35.00	1.00
	101.100	1150.00	579.94	.02	-.12	0.	35.00	1.00
	101.100	1325.00	579.94	-.00	-.19	0.	35.00	1.00
*	101.100	1860.00	580.84	.90	-.03	0.	35.00	1.00
	102.000	790.00	580.29	0.	.37	0.	35.00	70.00
	102.000	1150.00	581.06	.77	1.12	0.	35.00	70.00
	102.000	1325.00	581.72	.65	1.77	0.	35.00	70.00
	102.000	1860.00	583.15	1.44	2.31	0.	35.00	70.00
	101.200	790.00	580.51	0.	.22	0.	35.00	1.00
	101.200	1150.00	581.55	1.04	.49	0.	35.00	1.00
	101.200	1325.00	582.28	.72	.56	0.	35.00	1.00
	101.200	1860.00	584.12	1.84	.97	0.	35.00	1.00
	103.000	790.00	580.91	0.	.39	0.	50.25	30.00
	103.000	1150.00	582.06	1.16	.51	0.	50.84	30.00
	103.000	1325.00	582.76	.70	.49	0.	51.19	30.00
	103.000	1860.00	584.64	1.87	.52	0.	66.62	30.00
B	200.000	790.00	581.53	0.	.62	0.	57.64	275.00
	200.000	1150.00	582.73	1.20	.67	0.	64.37	275.00
	200.000	1325.00	583.39	.66	.63	0.	67.70	275.00
	200.000	1860.00	585.22	1.83	.58	0.	73.24	275.00
	201.000	790.00	581.54	0.	.02	0.	39.25	50.00
	201.000	1150.00	582.74	1.20	.01	0.	40.00	50.00
	201.000	1325.00	583.40	.66	.01	0.	40.00	50.00
	201.000	1860.00	585.22	1.82	-.00	0.	40.00	50.00
	202.000	790.00	581.54	0.	-.00	0.	38.40	1.00
	202.000	1150.00	582.74	1.20	-.00	0.	40.00	1.00
	202.000	1325.00	583.40	.66	-.00	0.	40.00	1.00
	202.000	1860.00	585.21	1.81	-.01	0.	40.00	1.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	203.000	790.00	581.54	0.	.00	0.	37.86	30.00
	203.000	1150.00	582.74	1.20	.00	0.	40.00	30.00
	203.000	1325.00	583.40	.66	.00	0.	40.00	30.00
	203.000	1860.00	585.22	1.82	.00	0.	40.00	30.00
	204.000	790.00	581.55	0.	.01	0.	37.86	1.00
	204.000	1150.00	582.75	1.20	.01	0.	40.00	1.00
	204.000	1325.00	583.41	.66	.01	0.	40.00	1.00
	204.000	1860.00	585.24	1.82	.02	0.	40.00	1.00
	300.000	790.00	581.68	0.	.13	0.	48.91	50.00
C	300.000	1150.00	582.93	1.25	.18	0.	51.61	50.00
	300.000	1325.00	583.61	.67	.19	0.	53.06	50.00
	300.000	1860.00	585.47	1.87	.24	0.	64.66	50.00
	400.000	790.00	582.03	0.	.35	0.	69.95	280.00
D	400.000	1150.00	583.29	1.26	.36	0.	85.85	280.00
	400.000	1325.00	583.95	.66	.35	0.	91.61	280.00
	400.000	1860.00	585.80	1.85	.33	0.	97.74	280.00
	500.000	790.00	582.21	0.	.18	0.	42.82	140.00
E	500.000	1150.00	583.43	1.22	.14	0.	44.64	140.00
	500.000	1325.00	584.06	.63	.11	0.	45.57	140.00
	500.000	1860.00	585.83	1.77	.03	0.	48.20	140.00
	501.000	790.00	582.40	0.	.19	0.	52.00	50.00
	501.000	1150.00	583.68	1.28	.24	0.	52.00	50.00
	501.000	1325.00	584.32	.64	.26	0.	52.00	50.00
	501.000	1860.00	586.13	1.81	.30	0.	52.00	50.00
	502.000	790.00	582.40	0.	-.00	0.	52.00	2.00
	502.000	1150.00	583.68	1.28	-.00	0.	52.00	2.00
	502.000	1325.00	584.32	.64	-.00	0.	52.00	2.00
	502.000	1860.00	586.08	1.76	-.04	0.	52.00	2.00
	503.000	790.00	582.41	0.	.01	0.	52.00	32.00
	503.000	1150.00	583.69	1.28	.01	0.	52.00	32.00
	503.000	1325.00	584.33	.64	.01	0.	52.00	32.00
	503.000	1860.00	586.13	1.80	.04	0.	52.00	32.00
	504.000	790.00	582.36	0.	-.05	0.	55.00	2.00
	504.000	1150.00	583.64	1.28	-.05	0.	55.00	2.00
	504.000	1325.00	584.29	.65	-.04	0.	55.00	2.00
	504.000	1860.00	586.16	1.88	.04	0.	55.00	2.00
	600.000	790.00	582.40	0.	.04	0.	67.13	30.00
	600.000	1150.00	583.69	1.29	.05	0.	68.69	30.00
	600.000	1325.00	584.34	.65	.05	0.	69.47	30.00
	600.000	1860.00	586.23	1.89	.07	0.	71.76	30.00

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	SECNO	N	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	610.000	790.00	582.54	0.	.14	0.	66.07	140.00
	610.000	1150.00	583.82	1.27	.13	0.	70.51	140.00
	610.000	1325.00	584.46	.64	.12	0.	72.73	140.00
	610.000	1860.00	586.33	1.87	.10	0.	79.20	140.00
	700.000	790.00	582.82	0.	.27	0.	113.77	640.00
F	700.000	1150.00	584.14	1.32	.32	0.	130.68	640.00
	700.000	1325.00	584.79	.65	.33	0.	136.49	640.00
	700.000	1860.00	586.67	1.88	.34	0.	394.62	640.00
	800.000	790.00	582.95	0.	.14	0.	159.06	930.00
G	800.000	1150.00	584.30	1.35	.16	0.	207.53	930.00
	800.000	1325.00	584.96	.65	.17	0.	236.46	930.00
	800.000	1860.00	586.83	1.88	.17	0.	316.92	930.00
	900.000	790.00	583.50	0.	.55	0.	114.03	840.00
	900.000	1150.00	584.77	1.27	.47	0.	154.06	840.00
H	900.000	1325.00	585.37	.60	.42	0.	181.01	840.00
	900.000	1860.00	587.13	1.76	.30	0.	226.57	840.00
	901.000	790.00	583.51	0.	.01	0.	114.18	20.00
	901.000	1150.00	584.78	1.27	.01	0.	154.56	20.00
	901.000	1325.00	585.38	.60	.01	0.	181.45	20.00
	901.000	1860.00	587.14	1.76	.01	0.	226.68	20.00
*	901.100	790.00	583.49	0.	-.03	0.	113.85	1.00
*	901.100	1150.00	584.74	1.25	-.04	0.	152.71	1.00
*	901.100	1325.00	585.34	.60	-.04	0.	179.46	1.00
*	901.100	1860.00	587.10	1.76	-.04	0.	226.07	1.00
*	901.200	790.00	583.50	0.	.01	0.	113.99	25.00
*	901.200	1150.00	584.75	1.25	.01	0.	153.26	25.00
*	901.200	1325.00	585.35	.60	.01	0.	180.00	25.00
*	901.200	1860.00	587.13	1.77	.03	0.	226.43	25.00
	902.000	790.00	583.56	0.	.06	0.	114.66	1.00
	902.000	1150.00	584.84	1.28	.09	0.	157.31	1.00
	902.000	1325.00	585.45	.61	.10	0.	184.38	1.00
	902.000	1860.00	587.20	1.76	.08	0.	227.68	1.00
	903.000	790.00	583.56	0.	.00	0.	114.70	10.00
	903.000	1150.00	584.84	1.28	.00	0.	157.47	10.00
	903.000	1325.00	585.45	.61	.00	0.	184.55	10.00
	903.000	1860.00	587.21	1.76	.00	0.	227.78	10.00

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00BREAK00

1) COUNTY: Charlevoix

2) STUDY NAME: Boyne city

3) WATERCOURSE: Boyne River

4) DOCUMENT TYPE: input + multiple profile summary + 100 yr. Encroached

00BREAK00

THIS RUN EXECUTED 08 MAY 81 15.50.15

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*****************************************************
HEC2 RELEASE DATED NOV 76 UPDATED APRI 1980
ERROR CODE - 01,02,03,04
MODIFICATION - 50,51,52,53,54
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Received 6/1/81

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T1      MICHIGAN FLOOD INSURANCE STUDIES
T2      BOYNE CITY, MICHIGAN
T3      10 YR

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
        -0.       2.        -0.       -0.  -0.        -0.       -0.       -0.   579.900   -0.

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
        1.000     -0.       -1.000    -0.       -0.       -0.       -0.       -0.       -0.       -0.

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

        110.000   150.000   201.000   -0.       -0.       -0.       -0.       -0.       -0.       -0.

QT      6.000     790.000   1150.000  1325.000  1860.000  1325.000  1325.000  -0.       -0.       -0.
NC      .050      .050      .035      .300      .500      -0.       -0.       -0.       -0.       -0.
ET      -0.       -0.       -0.       -0.       -0.       1.400     -0.       -0.       -0.       -0.

X1      100.000   14.000    1199.000  1251.000  -0.       -0.       -0.       -0.       -0.       -0.
GR      586.000   1000.000  584.400   1160.000  583.900   1199.000  577.700   1201.000  576.100   1207.000
GR      575.300   1216.000  575.500   1231.000  576.600   1236.000  577.800   1241.000  578.100   1250.000
GR      583.500   1251.000  584.300   1259.000  586.100   1274.000  587.000   1330.000  -0.       -0.

X1      101.000   23.000    1139.000  1174.000  70.000    70.000    70.000    -0.       -0.       -0.
X3      10.000    -0.       -0.       -0.       -0.       -0.       -0.       587.500   587.500   -0.
X4      1.000     576.000   1152.000  -0.       -0.       -0.       -0.       -0.       -0.       -0.
GR      588.000   1000.000  586.000   1080.000  584.500   1100.000  584.000   1133.000  577.800   1135.000
GR      576.800   1139.000  576.200   1142.000  576.000   1144.000  575.800   1147.000  575.800   1150.000
GR      578.600   1156.000  578.600   1158.000  575.800   1161.000  575.700   1163.000  575.600   1166.000
GR      575.700   1169.000  575.800   1171.000  578.600   1174.000  578.200   1184.000  583.600   1185.000
GR      584.400   1193.000  586.200   1198.000  588.000   1300.000  -0.       -0.       -0.       -0.
NC      -0.       -0.       .030      -0.       -0.       -0.       -0.       -0.       -0.       -0.

X1      101.100   -0.       -0.       -0.       1.000     1.000     1.000     -0.       -0.       -0.
X3      10.000    -0.       -0.       -0.       -0.       -0.       -0.       587.500   587.500   -0.
BT      24.000    1000.000  588.000   588.000   1080.000  587.800   586.000   1100.000  587.800   584.500
BT      1133.000  587.800   584.000   1135.000  587.800   577.800   1139.000  587.800   576.800   1142.000
BT      587.800   583.200   1144.000  587.800   584.800   1147.000  587.800   585.400   1150.000  587.800
BT      584.600   1152.000  587.800   583.200   1156.000  587.800   578.600   1158.000  587.800   578.600
BT      1161.000  587.800   583.200   1163.000  587.800   584.800   1166.000  587.800   585.400   1169.000
BT      587.800   584.800   1171.000  587.800   583.200   1174.000  587.800   578.600   1184.000  587.800
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BT	578.200	1185.000	587.800	583.600	1193.000	587.800	584.400	1198.000	587.800	586.200
BT	1300.000	588.000	588.000	-0.	-0.	-0.	-0.	-0.	-0.	-0.
X1	102.000	-0.	-0.	-0.	70.000	70.000	70.000	-0.	.500	-0.
X2	-0.	-0.	-0.	-0.	-0.	-0.	1.000	-0.	-0.	-0.
X3	10.000	-0.	-0.	-0.	-0.	-0.	-0.	589.000	589.000	-0.
X1	101.200	-0.	-0.	-0.	1.000	1.000	1.000	-0.	-0.	-0.
X3	10.000	-0.	-0.	-0.	-0.	-0.	-0.	589.000	589.000	-0.
NC	.090	.070	.040	-0.	-0.	-0.	-0.	-0.	-0.	-0.
X1	103.000	-0.	1133.000	1185.000	30.000	30.000	30.000	-0.	-0.	-0.
NC	-0.	-0.	-0.	.100	.300	-0.	-0.	-0.	-0.	-0.
X1	200.000	13.000	1023.000	1063.000	280.000	280.000	275.000	-0.	-0.	-0.
B GR	590.000	1000.000	593.200	1015.000	581.600	1023.000	577.900	1028.000	574.600	1035.000
GR	574.400	1039.000	574.800	1058.000	575.000	1063.000	575.700	1073.000	578.200	1078.000
GR	586.700	1085.000	587.100	1088.000	590.000	1095.000	-0.	-0.	-0.	-0.
NC	-0.	-0.	-0.	.300	.800	-0.	-0.	-0.	-0.	-0.
X1	201.000	-0.	-0.	-0.	50.000	50.000	50.000	-0.	.500	-0.
X3	10.000	-0.	-0.	-0.	-0.	-0.	-0.	587.400	587.400	-0.
NC	-0.	-0.	.030	.300	.500	-0.	-0.	-0.	-0.	-0.
X1	202.000	-0.	-0.	-0.	1.000	1.000	1.000	-0.	-0.	-0.
X3	10.000	-0.	-0.	-0.	-0.	-0.	-0.	588.700	588.700	-0.
X4	2.000	582.100	1024.000	575.500	1062.000	-0.	-0.	-0.	-0.	-0.
BT	10.000	1000.000	590.500	590.500	1015.000	588.800	583.700	1023.000	588.700	582.100
BT	1024.000	588.700	586.200	1062.000	588.500	586.200	1063.000	588.500	575.500	1073.000
BT	588.500	576.200	1078.000	588.600	578.700	1085.000	588.700	587.200	1088.000	588.700
BT	587.600	1095.000	590.500	590.500	-0.	-0.	-0.	-0.	-0.	-0.
X1	203.000	-0.	-0.	-0.	30.000	30.000	30.000	-0.	.500	-0.
X2	-0.	-0.	-0.	-0.	-0.	-0.	1.000	-0.	-0.	-0.
X3	10.000	-0.	-0.	-0.	-0.	-0.	-0.	588.700	588.700	-0.
NC	.100	.050	.040	-0.	-0.	-0.	-0.	-0.	-0.	-0.
X1	204.000	-0.	-0.	-0.	1.000	1.000	1.000	-0.	-0.	-0.
X3	10.000	-0.	-0.	-0.	-0.	-0.	-0.	588.600	588.600	-0.
NC	-0.	-0.	-0.	.100	.300	-0.	-0.	-0.	-0.	-0.

C X1	300.000	14.000	1060.000	1115.000	50.000	50.000	50.000	-0.	-0.	-0.
GR	592.000	1000.000	588.100	1030.000	587.900	1045.000	587.100	1060.000	578.400	1062.000
GR	576.000	1064.000	576.800	1084.000	576.700	1104.000	581.600	1110.000	584.200	1115.000
GR	585.200	1122.000	586.100	1132.000	586.500	1142.000	592.000	1200.000	-0.	-0.
NC	-0.	-0.	-0.	.100	.300	-0.	-0.	-0.	-0.	-0.
D X1	400.000	15.000	1026.000	1068.000	320.000	250.000	280.000	-0.	-0.	-0.
GR	592.000	1000.000	588.000	1015.000	579.400	1020.000	577.800	1026.000	577.100	1032.000
GR	577.000	1052.000	577.300	1058.000	577.700	1064.000	578.500	1068.000	582.000	1088.000
GR	582.900	1098.000	583.600	1108.000	588.000	1120.000	590.000	1160.000	592.000	1340.000
NC	.100	.060	.050	.100	.500	-0.	-0.	-0.	-0.	-0.
X1	500.000	12.000	1003.000	1038.000	190.000	100.000	140.000	-0.	-0.	-0.
GR	590.200	1000.000	580.800	1001.000	578.200	1003.000	576.700	1010.000	575.900	1015.000
GR	575.800	1020.000	575.900	1032.000	578.100	1038.000	586.800	1050.000	588.500	1080.000
GR	590.000	1090.000	592.000	1210.000	-0.	-0.	-0.	-0.	-0.	-0.
X1	501.000	11.000	1148.000	1200.000	1.000	110.000	50.000	-0.	-0.	-0.
X3	10.000	-0.	-0.	-0.	-0.	-0.	-0.	587.200	587.200	-0.
X4	2.000	575.900	1149.000	578.100	1199.000	-0.	-0.	-0.	-0.	-0.
GR	592.000	1000.000	588.000	1050.000	578.200	1130.000	576.700	1140.000	575.900	1148.000
GR	575.800	1156.000	575.900	1191.000	578.100	1200.000	586.800	1205.000	590.000	1210.000
GR	592.000	1230.000	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.
NC	-0.	-0.	.030	.300	.500	-0.	-0.	-0.	-0.	-0.
1	502.000	-0.	-0.	-0.	2.000	2.000	2.000	-0.	-0.	-0.
3	10.000	-0.	-0.	-0.	-0.	-0.	-0.	589.900	590.100	-0.
T	11.000	1000.000	592.000	592.000	1050.000	591.500	588.000	1130.000	590.000	578.200
T	1140.000	590.000	576.700	1148.000	589.900	575.900	1149.000	589.900	584.400	1199.000
T	590.100	584.600	1200.000	590.100	578.100	1205.000	590.100	586.800	1210.000	590.100
T	590.000	1230.000	592.000	592.000	-0.	-0.	-0.	-0.	-0.	-0.
1	503.000	-0.	-0.	-0.	32.000	32.000	32.000	-0.	-0.	-0.
2	-0.	-0.	-0.	-0.	-0.	-0.	1.000	-0.	-0.	-0.
3	10.000	-0.	-0.	-0.	-0.	-0.	-0.	589.900	590.100	-0.
NC	.080	.080	.040	.100	.300	-0.	-0.	-0.	-0.	-0.
1	504.000	16.000	1020.000	1075.000	2.000	2.000	2.000	-0.	-0.	-0.
3	10.000	-0.	-0.	-0.	-0.	-0.	-0.	590.000	590.000	-0.
GR	590.000	1000.000	588.000	1010.000	582.400	1015.000	579.400	1020.000	578.100	1030.000
GR	576.600	1035.000	576.500	1040.000	577.000	1047.000	577.700	1051.000	577.900	1065.000
GR	579.900	1075.000	581.300	1077.000	582.000	1082.000	591.500	1085.000	590.000	1090.000
GR	592.000	1110.000	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.
NC	-0.	-0.	-0.	.300	.500	-0.	-0.	-0.	-0.	-0.

E X1	600.000	-0.	-0.	-0.	30.000	30.000	30.000	-0.	-0.	-0.
NC	-0.	-0.	-0.	.100	.300	-0.	-0.	-0.	-0.	-0.
X1	610.000	15.000	1130.000	1190.000	90.000	170.000	140.000	-0.	-0.	-0.
GR	592.800	1000.000	592.000	1100.000	590.000	1120.000	588.000	1125.000	582.600	1130.000
GR	579.600	1135.000	578.300	1145.000	576.800	1150.000	576.700	1155.000	577.200	1162.000
GR	577.900	1166.000	578.100	1180.000	580.100	1190.000	588.000	1210.000	592.000	1230.000
NC	.080	.100	.050	-0.	-0.	-0.	-0.	-0.	-0.	-0.
F X1	700.000	20.000	1080.000	1169.000	680.000	560.000	640.000	-0.	-0.	-0.
GR	592.000	1000.000	590.000	1035.000	584.000	1060.000	580.800	1080.000	580.200	1085.000
GR	578.200	1092.000	576.100	1100.000	574.400	1104.000	568.900	1128.000	575.000	1149.000
GR	577.500	1162.000	578.700	1166.000	579.500	1169.000	582.700	1180.000	583.200	1185.000
GR	584.300	1191.000	585.400	1196.000	586.300	1200.000	586.000	1400.000	588.000	1530.000
NC	.100	.080	.050	-0.	-0.	-0.	-0.	-0.	-0.	-0.
ET	-0.	-0.	-0.	-0.	-0.	-0.	9.100	-0.	1190.000	1370.000
G X1	800.000	15.000	1291.000	1347.000	1040.000	950.000	930.000	-0.	-0.	-0.
GR	590.000	1000.000	588.000	1050.000	586.000	1110.000	584.000	1170.000	580.000	1270.000
GR	580.400	1278.000	580.800	1283.000	580.200	1291.000	579.100	1292.000	576.400	1307.000
GR	579.300	1345.000	580.500	1347.000	583.500	1357.000	585.600	1387.000	590.000	1440.000
NC	.080	.080	.045	-0.	-0.	-0.	-0.	-0.	-0.	-0.
ET	-0.	-0.	-0.	-0.	-0.	-0.	9.100	-0.	1120.000	1258.000
H X1	900.000	14.000	1175.000	1235.000	1000.000	760.000	840.000	-0.	-0.	-0.
X4	4.000	578.700	1176.000	578.800	1204.000	577.600	1208.000	578.600	1234.000	-0.
GR	590.000	1000.000	586.000	1050.000	584.000	1130.000	582.500	1140.000	578.900	1170.000
GR	578.700	1175.000	578.600	1179.000	578.800	1205.000	577.600	1207.000	578.600	1235.000
GR	579.400	1240.000	583.000	1245.000	586.200	1260.000	590.000	1270.000	-0.	-0.
ET	-0.	-0.	-0.	-0.	-0.	-0.	9.100	-0.	1175.000	1235.000
X1	901.000	-0.	-0.	-0.	20.000	20.000	20.000	-0.	-0.	-0.
NC	-0.	-0.	.030	.300	.500	-0.	-0.	-0.	-0.	-0.
ET	-0.	-0.	-0.	-0.	-0.	-0.	9.100	-0.	1175.000	1235.000
X1	901.100	-0.	-0.	-0.	1.000	1.000	1.000	-0.	-0.	-0.
BT	15.000	1130.000	584.000	584.000	1140.000	584.000	582.500	1170.000	585.200	578.900
BT	1175.000	586.400	578.700	1176.000	586.400	585.200	1204.000	588.000	586.800	1205.000
BT	588.000	578.500	1207.000	588.000	577.600	1208.000	588.000	586.800	1234.000	587.500
BT	586.500	1235.000	587.500	578.600	1240.000	587.800	579.400	1245.000	588.100	583.000
BT	1260.000	589.200	586.200	1270.000	590.000	590.000	-0.	-0.	-0.	-0.

X1	901.200	-0.	-0.	-0.	25.000	25.000	25.000	-0.	-0.	-0.
X2	-0.	-0.	-0.	-0.	-0.	-0.	1.000	-0.	-0.	-0.
X1	902.000	-0.	-0.	-0.	1.000	1.000	1.000	-0.	-0.	-0.
ET	-0.	-0.	-0.	-0.	-0.	-0.	9.100	-0.	1175.000	1235.000
X1	903.000	-0.	-0.	-0.	10.000	10.000	10.000	-0.	-0.	-0.
EJ	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.

THIS RUN EXECUTED 08 MAY 81 15.50.17

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  HEC2 RELEASE DATED NOV 76 UPDATED APRI 1980
  ERROR CORR =  01,02,03,04
  MODIFICATION =  50,51,52,53,54
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NOTE= ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

10 YR

SUMMARY PRINTOUT TABLE 110

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
	100.000	579.90	0.	580.22	50.04	0.	790.00	0.	0.	0.	1199.00	1251.00	0.
	100.000	579.90	0.	580.57	50.04	0.	1150.00	0.	0.	0.	1199.00	1251.00	0.
	100.000	579.90	0.	580.79	50.04	0.	1325.00	0.	0.	0.	1199.00	1251.00	0.
	100.000	579.90	0.	581.66	50.04	0.	1860.00	0.	0.	0.	1199.00	1251.00	0.
	101.000	579.97	0.	580.60	35.00	0.	790.00	0.	0.	0.	1139.00	1174.00	0.
A	101.000	580.06	0.	581.33	35.00	0.	1150.00	0.	0.	0.	1139.00	1174.00	0.
	101.000	580.13	0.	581.75	35.00	0.	1325.00	0.	0.	0.	1139.00	1174.00	0.
*	101.000	580.87	0.	583.10	35.00	0.	1860.00	0.	0.	0.	1139.00	1174.00	0.
	101.100	579.93	0.	580.65	35.00	0.	790.00	0.	0.	0.	1139.00	1174.00	0.
	101.100	579.94	0.	581.47	35.00	0.	1150.00	0.	0.	0.	1139.00	1174.00	0.
	101.100	579.94	0.	581.97	35.00	0.	1325.00	0.	0.	0.	1139.00	1174.00	0.
*	101.100	580.84	0.	583.56	35.00	0.	1860.00	0.	0.	0.	1139.00	1174.00	0.
	102.000	580.29	0.	581.07	35.00	0.	790.00	0.	0.	0.	1139.00	1174.00	0.
	102.000	581.06	0.	582.22	35.00	0.	1150.00	0.	0.	0.	1139.00	1174.00	0.
	102.000	581.72	0.	582.92	35.00	0.	1325.00	0.	0.	0.	1139.00	1174.00	0.
	102.000	583.15	0.	584.74	35.00	0.	1860.00	0.	0.	0.	1139.00	1174.00	0.
	101.200	580.51	0.	581.13	35.00	0.	790.00	0.	0.	0.	1139.00	1174.00	0.
	101.200	581.55	0.	582.34	35.00	0.	1150.00	0.	0.	0.	1139.00	1174.00	0.
	101.200	582.28	0.	583.06	35.00	0.	1325.00	0.	0.	0.	1139.00	1174.00	0.
	101.200	584.12	0.	584.97	35.00	0.	1860.00	0.	0.	0.	1139.00	1174.00	0.
	103.000	580.91	0.	581.30	50.25	25.87	723.84	40.28	0.	0.	1139.00	1174.00	0.
	103.000	582.06	0.	582.53	50.84	41.22	1028.82	79.95	0.	0.	1139.00	1174.00	0.
	103.000	582.76	0.	583.23	51.19	49.29	1172.88	102.82	0.	0.	1139.00	1174.00	0.
	103.000	584.64	0.	585.13	66.62	74.30	1612.76	172.94	0.	0.	1139.00	1174.00	0.
	200.000	581.53	0.	581.63	57.64	0.	656.60	133.40	0.	0.	1023.00	1063.00	0.
	200.000	582.73	0.	582.88	64.37	.88	951.02	198.10	0.	0.	1023.00	1063.00	0.
B	200.000	583.39	0.	583.56	67.70	3.16	1091.74	230.10	0.	0.	1023.00	1063.00	0.
	200.000	585.22	0.	585.43	73.24	19.29	1512.29	328.42	0.	0.	1023.00	1063.00	0.

SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
201.000	581.54	0.	581.74	39.25	0.	790.00	0.	0.	0.	1023.00	1063.00	0.
201.000	582.74	0.	583.03	40.00	0.	1150.00	0.	0.	0.	1023.00	1063.00	0.
201.000	583.40	0.	583.72	40.00	0.	1325.00	0.	0.	0.	1023.00	1063.00	0.
201.000	585.22	0.	585.62	40.00	0.	1860.00	0.	0.	0.	1023.00	1063.00	0.
202.000	581.54	0.	581.75	38.40	0.	790.00	0.	0.	0.	1023.00	1063.00	0.
202.000	582.74	0.	583.04	40.00	0.	1150.00	0.	0.	0.	1023.00	1063.00	0.
202.000	583.40	0.	583.72	40.00	0.	1325.00	0.	0.	0.	1023.00	1063.00	0.
202.000	585.21	0.	585.63	40.00	0.	1860.00	0.	0.	0.	1023.00	1063.00	0.
203.000	581.54	0.	581.79	37.86	0.	790.00	0.	0.	0.	1023.00	1063.00	0.
203.000	582.74	0.	583.09	40.00	0.	1150.00	0.	0.	0.	1023.00	1063.00	0.
203.000	583.40	0.	583.78	40.00	0.	1325.00	0.	0.	0.	1023.00	1063.00	0.
203.000	585.22	0.	585.68	40.00	0.	1860.00	0.	0.	0.	1023.00	1063.00	0.
204.000	581.55	0.	581.79	37.86	0.	790.00	0.	0.	0.	1023.00	1063.00	0.
204.000	582.75	0.	583.09	40.00	0.	1150.00	0.	0.	0.	1023.00	1063.00	0.
204.000	583.41	0.	583.78	40.00	0.	1325.00	0.	0.	0.	1023.00	1063.00	0.
204.000	585.24	0.	585.69	40.00	0.	1860.00	0.	0.	0.	1023.00	1063.00	0.
300.000	581.68	0.	581.86	48.91	0.	790.00	0.	0.	0.	1060.00	1115.00	0.
300.000	582.93	0.	583.17	51.61	0.	1150.00	0.	0.	0.	1060.00	1115.00	0.
300.000	583.61	0.	583.86	53.06	0.	1325.00	0.	0.	0.	1060.00	1115.00	0.
300.000	585.47	0.	585.76	64.66	0.	1855.50	4.50	0.	0.	1060.00	1115.00	0.
400.000	582.03	0.	582.22	69.95	25.02	710.00	54.98	0.	0.	1026.00	1068.00	0.
400.000	583.29	0.	583.51	85.85	39.71	979.35	130.94	0.	0.	1026.00	1068.00	0.
400.000	583.95	0.	584.16	91.61	46.86	1094.89	183.25	0.	0.	1026.00	1068.00	0.
400.000	585.80	0.	586.01	97.74	68.04	1420.87	371.09	0.	0.	1026.00	1068.00	0.
500.000	582.21	0.	582.43	42.82	4.54	769.18	16.28	0.	0.	1003.00	1038.00	0.
500.000	583.43	0.	583.74	44.64	8.86	1107.05	34.09	0.	0.	1003.00	1038.00	0.
500.000	584.06	0.	584.40	45.57	11.29	1268.15	45.56	0.	0.	1003.00	1038.00	0.
500.000	585.83	0.	586.25	48.20	19.18	1751.89	88.92	0.	0.	1003.00	1038.00	0.
501.000	582.40	0.	582.49	52.00	0.	790.00	0.	0.	0.	1148.00	1200.00	0.
501.000	583.68	0.	583.81	52.00	0.	1150.00	0.	0.	0.	1148.00	1200.00	0.
501.000	584.32	0.	584.47	52.00	0.	1325.00	0.	0.	0.	1148.00	1200.00	0.
501.000	586.13	0.	586.32	52.00	0.	1860.00	0.	0.	0.	1148.00	1200.00	0.
502.000	582.40	0.	582.49	52.00	0.	790.00	0.	0.	0.	1148.00	1200.00	0.
502.000	583.68	0.	583.81	52.00	0.	1150.00	0.	0.	0.	1148.00	1200.00	0.
502.000	584.32	0.	584.47	52.00	0.	1325.00	0.	0.	0.	1148.00	1200.00	0.
502.000	586.08	0.	586.37	52.00	0.	1860.00	0.	0.	0.	1148.00	1200.00	0.
503.000	582.41	0.	582.50	52.00	0.	790.00	0.	0.	0.	1148.00	1200.00	0.
503.000	583.69	0.	583.82	52.00	0.	1150.00	0.	0.	0.	1148.00	1200.00	0.
503.000	584.33	0.	584.48	52.00	0.	1325.00	0.	0.	0.	1148.00	1200.00	0.
503.000	586.13	0.	586.42	52.00	0.	1860.00	0.	0.	0.	1148.00	1200.00	0.

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
	504.000	582.36	0.	582.52	55.00	0.	790.00	0.	0.	0.	1020.00	1075.00	0.
	504.000	583.64	0.	583.84	55.00	0.	1150.00	0.	0.	0.	1020.00	1075.00	0.
	504.000	584.29	0.	584.50	55.00	0.	1325.00	0.	0.	0.	1020.00	1075.00	0.
	504.000	586.16	0.	586.42	55.00	0.	1860.00	0.	0.	0.	1020.00	1075.00	0.
E	600.000	582.40	0.	582.55	67.13	5.09	780.47	4.44	0.	0.	1020.00	1075.00	0.
	600.000	583.69	0.	583.87	68.69	13.76	1121.08	15.16	0.	0.	1020.00	1075.00	0.
	600.000	584.34	0.	584.54	69.47	19.08	1284.01	21.91	0.	0.	1020.00	1075.00	0.
	600.000	586.23	0.	586.45	71.76	38.17	1776.63	45.20	0.	0.	1020.00	1075.00	0.
	610.000	582.54	0.	582.69	66.07	0.	785.10	4.90	0.	0.	1130.00	1190.00	0.
	610.000	583.82	0.	584.00	70.51	.21	1135.76	14.03	0.	0.	1130.00	1190.00	0.
	610.000	584.46	0.	584.65	72.73	.62	1303.86	20.51	0.	0.	1130.00	1190.00	0.
	610.000	586.33	0.	586.54	79.20	3.58	1808.98	47.44	0.	0.	1130.00	1190.00	0.
	700.000	582.82	0.	582.84	113.77	2.17	784.23	3.60	0.	0.	1080.00	1169.00	0.
F	700.000	584.14	0.	584.16	130.68	9.54	1128.78	11.69	0.	0.	1080.00	1169.00	0.
	700.000	584.79	0.	584.82	136.49	16.70	1290.35	17.95	0.	0.	1080.00	1169.00	0.
	700.000	586.67	0.	586.71	394.62	48.21	1754.45	57.34	0.	0.	1080.00	1169.00	0.
	800.000	582.95	0.	583.03	159.06	101.15	682.99	5.86	0.	0.	1291.00	1347.00	0.
G	800.000	584.30	0.	584.38	207.53	225.72	904.88	19.39	0.	0.	1291.00	1347.00	0.
	800.000	584.96	0.	585.03	236.46	305.07	988.95	30.98	0.	0.	1291.00	1347.00	0.
	800.000	586.83	0.	586.90	316.92	571.36	1196.75	91.89	0.	0.	1291.00	1347.00	0.
	900.000	583.50	0.	583.56	114.03	96.51	661.14	32.35	0.	0.	1175.00	1235.00	0.
H	900.000	584.77	0.	584.85	154.06	172.54	923.81	53.64	0.	0.	1175.00	1235.00	0.
	900.000	585.37	0.	585.45	181.01	219.15	1040.32	65.53	0.	0.	1175.00	1235.00	0.
	900.000	587.13	0.	587.21	226.57	414.29	1337.64	108.07	0.	0.	1175.00	1235.00	0.
	901.000	583.51	0.	583.57	114.18	96.74	660.86	32.40	0.	0.	1175.00	1235.00	0.
	901.000	584.78	0.	584.85	154.56	172.85	923.45	53.70	0.	0.	1175.00	1235.00	0.
	901.000	585.38	0.	585.46	181.45	219.50	1039.91	65.59	0.	0.	1175.00	1235.00	0.
	901.000	587.14	0.	587.21	226.68	414.73	1337.14	108.13	0.	0.	1175.00	1235.00	0.
*	901.100	583.49	0.	583.60	113.85	0.	790.00	0.	0.	0.	1175.00	1235.00	0.
*	901.100	584.74	0.	584.90	152.71	6.52	1143.48	0.	0.	0.	1175.00	1235.00	0.
*	901.100	585.34	0.	585.50	179.46	26.86	1298.14	0.	0.	0.	1175.00	1235.00	0.
*	901.100	587.10	0.	587.25	226.07	302.91	1557.09	0.	0.	0.	1175.00	1235.00	0.
*	901.200	583.50	0.	583.61	113.99	0.	790.00	0.	0.	0.	1175.00	1235.00	0.
*	901.200	584.75	0.	584.91	153.26	6.75	1143.25	0.	0.	0.	1175.00	1235.00	0.
*	901.200	585.35	0.	585.52	180.00	27.45	1297.55	0.	0.	0.	1175.00	1235.00	0.
*	901.200	587.13	0.	587.28	226.43	307.53	1552.47	0.	0.	0.	1175.00	1235.00	0.
	902.000	583.56	0.	583.63	114.66	68.77	698.27	22.95	0.	0.	1175.00	1235.00	0.
	902.000	584.84	0.	584.93	157.31	124.62	986.80	38.58	0.	0.	1175.00	1235.00	0.
	902.000	585.45	0.	585.54	184.38	159.47	1118.10	47.43	0.	0.	1175.00	1235.00	0.
	902.000	587.20	0.	587.30	227.68	308.39	1471.55	80.06	0.	0.	1175.00	1235.00	0.

SECNO	CWSEL	CIFK-S	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
903.000	583.56	0.	583.63	114.70	68.82	698.22	22.96	0.	0.	1175.00	1235.00	0.
903.000	584.84	0.	584.93	157.47	124.70	986.71	38.59	0.	0.	1175.00	1235.00	0.
903.000	585.45	0.	585.54	184.55	159.58	1117.98	47.45	0.	0.	1175.00	1235.00	0.
903.000	587.21	0.	587.30	227.78	308.71	1471.18	80.11	0.	0.	1175.00	1235.00	0.

10 YR

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	FG	10K*S	VCH	AREA	.01K
	100.000	-0.	0.	0.	575.30	790.00	579.90	0.	580.22	23.51	4.52	174.68	162.92
	100.000	-0.	0.	0.	575.30	1150.00	579.90	0.	580.57	49.83	6.58	174.68	162.92
	100.000	-0.	0.	0.	575.30	1325.00	579.90	0.	580.79	66.14	7.59	174.68	162.92
	100.000	-0.	0.	0.	575.30	1860.00	579.90	579.89	581.66	130.34	10.65	174.68	162.92
	101.000	70.00	0.	0.	575.60	790.00	579.97	0.	580.60	46.89	6.38	123.80	115.37
	101.000	70.00	0.	0.	575.60	1150.00	580.06	0.	581.33	90.94	9.05	127.13	120.59
	101.000	70.00	0.	0.	575.60	1325.00	580.13	0.	581.75	113.32	10.23	129.57	124.47
*	101.000	70.00	0.	0.	575.60	1860.00	580.87	580.87	583.10	121.99	11.97	155.34	168.40
	101.100	1.00	587.80	588.00	575.60	790.00	579.93	0.	580.65	53.44	6.84	115.46	108.07
	101.100	1.00	587.80	588.00	575.60	1150.00	579.94	0.	581.47	111.70	9.91	116.03	108.81
	101.100	1.00	587.80	588.00	575.60	1325.00	579.94	579.92	581.97	148.07	11.41	116.09	108.89
*	101.100	1.00	587.80	588.00	575.60	1860.00	580.84	580.84	583.56	174.28	13.23	140.59	140.89
	102.000	70.00	587.80	588.50	576.10	790.00	580.29	0.	581.07	59.03	7.09	111.36	102.82
	102.000	70.00	587.80	588.50	576.10	1150.00	581.06	0.	582.22	77.01	8.64	133.11	131.04
	102.000	70.00	587.80	588.50	576.10	1325.00	581.72	0.	582.92	74.48	8.82	150.18	153.53
	102.000	70.00	587.80	588.50	576.10	1860.00	583.15	0.	584.74	88.86	10.12	183.77	197.31
	101.200	1.00	0.	0.	576.10	790.00	580.51	0.	581.13	32.75	6.29	125.69	138.05
	101.200	1.00	0.	0.	576.10	1150.00	581.55	0.	582.34	30.03	7.12	161.60	209.85
	101.200	1.00	0.	0.	576.10	1325.00	582.28	0.	583.06	24.50	7.09	187.01	267.68
	101.200	1.00	0.	0.	576.10	1860.00	584.12	0.	584.97	17.99	7.40	251.46	438.50
	103.000	30.00	0.	0.	576.10	790.00	580.91	0.	581.30	34.64	5.19	173.51	134.22
	103.000	30.00	0.	0.	576.10	1150.00	582.06	0.	582.53	29.89	5.72	232.02	210.33
	103.000	30.00	0.	0.	576.10	1325.00	582.76	0.	583.23	25.42	5.74	267.59	262.78
	103.000	30.00	0.	0.	576.10	1860.00	584.64	0.	585.13	19.02	5.98	366.36	426.48
	200.000	275.00	0.	0.	574.40	790.00	581.53	0.	581.63	5.38	2.75	327.86	340.53
	200.000	275.00	0.	0.	574.40	1150.00	582.73	0.	582.88	6.15	3.32	401.08	463.85
	200.000	275.00	0.	0.	574.40	1325.00	583.39	0.	583.56	6.03	3.48	445.02	539.57
	200.000	275.00	0.	0.	574.40	1860.00	585.22	0.	585.43	5.75	3.91	573.84	775.64
	201.000	50.00	0.	0.	574.90	790.00	581.54	0.	581.74	10.03	3.60	219.52	249.46
	201.000	50.00	0.	0.	574.90	1150.00	582.74	0.	583.03	11.36	4.30	267.30	341.19
	201.000	50.00	0.	0.	574.90	1325.00	583.40	0.	583.72	11.02	4.51	293.69	399.16
	201.000	50.00	0.	0.	574.90	1860.00	585.22	0.	585.62	10.39	5.08	366.37	577.05
	202.000	1.00	588.50	590.50	574.90	790.00	581.54	0.	581.75	6.98	3.65	216.41	299.03
	202.000	1.00	588.50	590.50	574.90	1150.00	582.74	0.	583.04	8.56	4.37	262.88	393.00
	202.000	1.00	588.50	590.50	574.90	1325.00	583.40	0.	583.72	8.62	4.59	288.64	451.26
	202.000	1.00	588.50	590.50	574.90	1860.00	585.21	0.	585.63	9.02	5.18	358.85	619.37

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
203.000	30.00	588.50	591.00	575.40	790.00	581.54	0.	581.79	9.11	4.00	197.63	261.71
203.000	30.00	588.50	591.00	575.40	1150.00	582.74	0.	583.09	10.80	4.73	243.21	349.99
203.000	30.00	588.50	591.00	575.40	1325.00	583.40	0.	583.78	10.61	4.92	269.07	406.82
203.000	30.00	588.50	591.00	575.40	1860.00	585.22	0.	585.68	10.58	5.48	339.51	571.83
204.000	1.00	0.	0.	575.40	790.00	581.55	0.	581.79	13.26	3.97	199.10	216.91
204.000	1.00	0.	0.	575.40	1150.00	582.75	0.	583.09	15.22	4.69	245.38	294.77
204.000	1.00	0.	0.	575.40	1325.00	583.41	0.	583.78	14.38	4.88	271.75	349.44
204.000	1.00	0.	0.	575.40	1860.00	585.24	0.	585.69	12.82	5.40	344.69	519.39
300.000	50.00	0.	0.	576.00	790.00	581.68	0.	581.86	12.58	3.44	229.64	222.76
300.000	50.00	0.	0.	576.00	1150.00	582.93	0.	583.17	13.07	3.93	292.57	318.14
300.000	50.00	0.	0.	576.00	1325.00	583.61	0.	583.86	12.46	4.04	327.79	375.35
300.000	50.00	0.	0.	576.00	1860.00	585.47	0.	585.76	10.67	4.32	434.85	569.35
400.000	280.00	0.	0.	577.10	790.00	582.03	0.	582.22	12.59	3.65	252.80	222.68
400.000	280.00	0.	0.	577.10	1150.00	583.29	0.	583.51	10.77	3.96	349.89	350.38
400.000	280.00	0.	0.	577.10	1325.00	583.95	0.	584.16	9.44	3.98	409.21	431.28
400.000	280.00	0.	0.	577.10	1860.00	585.80	0.	586.01	6.92	4.03	584.66	706.95
500.000	140.00	0.	0.	575.80	790.00	582.21	0.	582.43	16.17	3.80	219.40	196.48
500.000	140.00	0.	0.	575.80	1150.00	583.43	0.	583.74	17.65	4.52	272.89	273.70
500.000	140.00	0.	0.	575.80	1325.00	584.06	0.	584.40	17.39	4.75	301.29	317.77
500.000	140.00	0.	0.	575.80	1860.00	585.83	0.	586.25	16.55	5.32	384.32	457.23
501.000	50.00	0.	0.	575.80	790.00	582.40	0.	582.49	5.62	2.40	329.07	333.35
501.000	50.00	0.	0.	575.80	1150.00	583.68	0.	583.81	6.45	2.91	395.48	452.86
501.000	50.00	0.	0.	575.80	1325.00	584.32	0.	584.47	6.53	3.09	429.01	518.64
501.000	50.00	0.	0.	575.80	1860.00	586.13	0.	586.32	6.65	3.56	522.97	721.48
502.000	2.00	589.90	592.00	575.80	790.00	582.40	0.	582.49	2.71	2.43	325.27	480.33
502.000	2.00	589.90	592.00	575.80	1150.00	583.68	0.	583.81	3.31	2.95	389.65	631.93
502.000	2.00	589.90	592.00	575.80	1325.00	584.32	0.	584.47	3.46	3.14	421.97	712.34
502.000	2.00	589.90	592.00	575.80	1860.00	586.08	0.	586.37	13.43	4.32	430.80	507.59
503.000	32.00	589.90	592.00	575.80	790.00	582.41	0.	582.50	2.69	2.42	325.82	481.57
503.000	32.00	589.90	592.00	575.80	1150.00	583.69	0.	583.82	3.30	2.95	390.25	633.42
503.000	32.00	589.90	592.00	575.80	1325.00	584.33	0.	584.48	3.45	3.14	422.57	713.86
503.000	32.00	589.90	592.00	575.80	1860.00	586.13	0.	586.42	13.43	4.32	430.80	507.59
504.000	2.00	0.	0.	576.50	790.00	582.36	0.	582.52	9.99	3.18	248.11	249.89
504.000	2.00	0.	0.	576.50	1150.00	583.64	0.	583.84	9.23	3.61	318.35	378.62
504.000	2.00	0.	0.	576.50	1325.00	584.29	0.	584.50	8.60	3.74	353.92	451.72
504.000	2.00	0.	0.	576.50	1860.00	586.16	0.	586.42	7.22	4.07	457.18	692.09
600.000	30.00	0.	0.	576.50	790.00	582.40	0.	582.55	9.47	3.12	265.20	256.67
600.000	30.00	0.	0.	576.50	1150.00	583.69	0.	583.87	8.52	3.49	352.61	393.96
600.000	30.00	0.	0.	576.50	1325.00	584.34	0.	584.54	7.86	3.60	397.56	472.65
600.000	30.00	0.	0.	576.50	1860.00	586.23	0.	586.45	6.42	3.86	531.04	734.28

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
	610.000	140.00	0.	0.	576.70	790.00	582.54	0.	582.69	10.41	3.09	261.45	244.86
	610.000	140.00	0.	0.	576.70	1150.00	583.82	0.	584.00	9.11	3.44	348.21	381.09
	610.000	140.00	0.	0.	576.70	1325.00	584.46	0.	584.65	8.31	3.50	394.21	459.74
	610.000	140.00	0.	0.	576.70	1860.00	586.33	0.	586.54	6.59	3.76	536.36	724.53
	700.000	640.00	0.	0.	568.90	790.00	582.82	0.	582.84	.85	1.08	755.75	858.16
	700.000	640.00	0.	0.	568.90	1150.00	584.14	0.	584.16	1.06	1.34	918.13	1115.17
	700.000	640.00	0.	0.	568.90	1325.00	584.79	0.	584.82	1.11	1.43	1004.93	1255.58
	700.000	640.00	0.	0.	568.90	1860.00	586.67	0.	586.71	1.16	1.64	1395.33	1723.29
	800.000	930.00	0.	0.	576.40	790.00	582.95	0.	583.03	7.96	2.43	454.17	280.08
	800.000	930.00	0.	0.	576.40	1150.00	584.30	0.	584.38	6.33	2.54	697.88	457.11
	800.000	930.00	0.	0.	576.40	1325.00	584.96	0.	585.03	5.46	2.51	842.91	567.02
	800.000	930.00	0.	0.	576.40	1860.00	586.83	0.	586.90	3.63	2.40	1363.76	976.36
	900.000	840.00	0.	0.	577.60	790.00	583.50	0.	583.56	4.92	2.16	451.49	356.30
	900.000	840.00	0.	0.	577.60	1150.00	584.77	0.	584.85	4.58	2.42	614.98	537.34
	900.000	840.00	0.	0.	577.60	1325.00	585.37	0.	585.45	4.30	2.49	716.02	639.28
	900.000	840.00	0.	0.	577.60	1860.00	587.13	0.	587.21	3.36	2.55	1084.74	1015.31
	901.000	20.00	0.	0.	577.60	790.00	583.51	0.	583.57	4.87	2.15	453.00	358.00
	901.000	20.00	0.	0.	577.60	1150.00	584.78	0.	584.85	4.55	2.41	616.70	539.13
	901.000	20.00	0.	0.	577.60	1325.00	585.38	0.	585.46	4.27	2.48	717.80	641.05
	901.000	20.00	0.	0.	577.60	1860.00	587.14	0.	587.21	3.34	2.55	1086.33	1017.05
*	901.100	1.00	584.00	590.00	577.60	790.00	583.49	0.	583.60	4.91	2.73	289.30	356.57
*	901.100	1.00	584.00	590.00	577.60	1150.00	584.74	0.	584.90	5.35	3.18	384.28	497.33
*	901.100	1.00	584.00	590.00	577.60	1325.00	585.34	0.	585.50	5.51	3.31	463.46	564.71
*	901.100	1.00	584.00	590.00	577.60	1860.00	587.10	0.	587.25	11.03	3.45	739.55	560.05
*	901.200	25.00	584.00	590.00	577.60	790.00	583.50	0.	583.61	4.87	2.72	289.98	357.85
*	901.200	25.00	584.00	590.00	577.60	1150.00	584.75	0.	584.91	5.31	3.18	385.69	498.85
*	901.200	25.00	584.00	590.00	577.60	1325.00	585.35	0.	585.52	5.49	3.30	465.26	565.42
*	901.200	25.00	584.00	590.00	577.60	1860.00	587.13	0.	587.28	10.98	3.43	743.15	561.39
	902.000	1.00	0.	0.	577.60	790.00	583.56	0.	583.63	2.35	2.26	457.85	515.26
	902.000	1.00	0.	0.	577.60	1150.00	584.84	0.	584.93	2.24	2.55	626.28	768.96
	902.000	1.00	0.	0.	577.60	1325.00	585.45	0.	585.54	2.13	2.65	729.81	908.39
	902.000	1.00	0.	0.	577.60	1860.00	587.20	0.	587.30	1.76	2.79	1101.41	1403.83
	903.000	10.00	0.	0.	577.60	790.00	583.56	0.	583.63	2.34	2.26	458.26	515.90
	903.000	10.00	0.	0.	577.60	1150.00	584.84	0.	584.93	2.23	2.55	626.87	769.78
	903.000	10.00	0.	0.	577.60	1325.00	585.45	0.	585.54	2.12	2.64	730.50	909.30
	903.000	10.00	0.	0.	577.60	1860.00	587.21	0.	587.30	1.75	2.78	1102.85	1405.87

10 YR

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	100.000	790.00	579.90	0.	0.	0.	50.04	-0.
	100.000	1150.00	579.90	0.	0.	0.	50.04	-0.
	100.000	1325.00	579.90	0.	0.	0.	50.04	-0.
	100.000	1860.00	579.90	0.	0.	0.	50.04	-0.
	101.000	790.00	579.97	0.	.07	0.	35.00	70.00
	101.000	1150.00	580.06	.09	.16	0.	35.00	70.00
	101.000	1325.00	580.13	.07	.23	0.	35.00	70.00
*	101.000	1860.00	580.87	.74	.97	0.	35.00	70.00
	101.100	790.00	579.93	0.	-.04	0.	35.00	1.00
	101.100	1150.00	579.94	.02	-.12	0.	35.00	1.00
	101.100	1325.00	579.94	-.00	-.19	0.	35.00	1.00
*	101.100	1860.00	580.84	.90	-.03	0.	35.00	1.00
	102.000	790.00	580.29	0.	.37	0.	35.00	70.00
	102.000	1150.00	581.06	.77	1.12	0.	35.00	70.00
	102.000	1325.00	581.72	.65	1.77	0.	35.00	70.00
	102.000	1860.00	583.15	1.44	2.31	0.	35.00	70.00
	101.200	790.00	580.51	0.	.22	0.	35.00	1.00
	101.200	1150.00	581.55	1.04	.49	0.	35.00	1.00
	101.200	1325.00	582.28	.72	.56	0.	35.00	1.00
	101.200	1860.00	584.12	1.84	.97	0.	35.00	1.00
	103.000	790.00	580.91	0.	.39	0.	50.25	30.00
	103.000	1150.00	582.06	1.16	.51	0.	50.84	30.00
	103.000	1325.00	582.76	.70	.49	0.	51.19	30.00
	103.000	1860.00	584.64	1.87	.52	0.	66.62	30.00
	200.000	790.00	581.53	0.	.62	0.	57.64	275.00
	200.000	1150.00	582.73	1.20	.67	0.	64.37	275.00
	200.000	1325.00	583.39	.66	.63	0.	67.70	275.00
	200.000	1860.00	585.22	1.83	.58	0.	73.24	275.00
	201.000	790.00	581.54	0.	.02	0.	39.25	50.00
	201.000	1150.00	582.74	1.20	.01	0.	40.00	50.00
	201.000	1325.00	583.40	.66	.01	0.	40.00	50.00
	201.000	1860.00	585.22	1.82	-.00	0.	40.00	50.00
	202.000	790.00	581.54	0.	-.00	0.	38.40	1.00
	202.000	1150.00	582.74	1.20	-.00	0.	40.00	1.00
	202.000	1325.00	583.40	.66	-.00	0.	40.00	1.00
	202.000	1860.00	585.21	1.81	-.01	0.	40.00	1.00

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
203.000	790.00	581.54	0.	.00	0.	37.86	30.00
203.000	1150.00	582.74	1.20	.00	0.	40.00	30.00
203.000	1325.00	583.40	.66	.00	0.	40.00	30.00
203.000	1860.00	585.22	1.82	.00	0.	40.00	30.00
204.000	790.00	581.55	0.	.01	0.	37.86	1.00
204.000	1150.00	582.75	1.20	.01	0.	40.00	1.00
204.000	1325.00	583.41	.66	.01	0.	40.00	1.00
204.000	1860.00	585.24	1.82	.02	0.	40.00	1.00
300.000	790.00	581.68	0.	.13	0.	48.91	50.00
300.000	1150.00	582.93	1.25	.18	0.	51.61	50.00
300.000	1325.00	583.61	.67	.19	0.	53.06	50.00
300.000	1860.00	585.47	1.87	.24	0.	64.66	50.00
400.000	790.00	582.03	0.	.35	0.	69.95	280.00
400.000	1150.00	583.29	1.26	.36	0.	85.85	280.00
400.000	1325.00	583.95	.66	.35	0.	91.61	280.00
400.000	1860.00	585.80	1.85	.33	0.	97.74	280.00
500.000	790.00	582.21	0.	.18	0.	42.82	140.00
500.000	1150.00	583.43	1.22	.14	0.	44.64	140.00
500.000	1325.00	584.06	.63	.11	0.	45.57	140.00
500.000	1860.00	585.83	1.77	.03	0.	48.20	140.00
501.000	790.00	582.40	0.	.19	0.	52.00	50.00
501.000	1150.00	583.68	1.28	.24	0.	52.00	50.00
501.000	1325.00	584.32	.64	.26	0.	52.00	50.00
501.000	1860.00	586.13	1.81	.30	0.	52.00	50.00
502.000	790.00	582.40	0.	-.00	0.	52.00	2.00
502.000	1150.00	583.68	1.28	-.00	0.	52.00	2.00
502.000	1325.00	584.32	.64	-.00	0.	52.00	2.00
502.000	1860.00	586.08	1.76	-.04	0.	52.00	2.00
503.000	790.00	582.41	0.	.01	0.	52.00	32.00
503.000	1150.00	583.69	1.28	.01	0.	52.00	32.00
503.000	1325.00	584.33	.64	.01	0.	52.00	32.00
503.000	1860.00	586.13	1.80	.04	0.	52.00	32.00
504.000	790.00	582.36	0.	-.05	0.	55.00	2.00
504.000	1150.00	583.64	1.28	-.05	0.	55.00	2.00
504.000	1325.00	584.29	.65	-.04	0.	55.00	2.00
504.000	1860.00	586.16	1.88	.04	0.	55.00	2.00
600.000	790.00	582.40	0.	.04	0.	67.13	30.00
600.000	1150.00	583.69	1.29	.05	0.	68.69	30.00
600.000	1325.00	584.34	.65	.05	0.	69.47	30.00
600.000	1860.00	586.23	1.89	.07	0.	71.76	30.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	610.000	790.00	582.54	0.	.14	0.	66.07	140.00
	610.000	1150.00	583.82	1.27	.13	0.	70.51	140.00
	610.000	1325.00	584.46	.64	.12	0.	72.73	140.00
	610.000	1860.00	586.33	1.87	.10	0.	79.20	140.00
	700.000	790.00	582.82	0.	.27	0.	113.77	640.00
	700.000	1150.00	584.14	1.32	.32	0.	130.68	640.00
	700.000	1325.00	584.79	.65	.33	0.	136.49	640.00
	700.000	1860.00	586.67	1.88	.34	0.	394.62	640.00
	800.000	790.00	582.95	0.	.14	0.	159.06	930.00
	800.000	1150.00	584.30	1.35	.16	0.	207.53	930.00
	800.000	1325.00	584.96	.65	.17	0.	236.46	930.00
	800.000	1860.00	586.83	1.88	.17	0.	316.92	930.00
	900.000	790.00	583.50	0.	.55	0.	114.03	840.00
	900.000	1150.00	584.77	1.27	.47	0.	154.06	840.00
	900.000	1325.00	585.37	.60	.42	0.	181.01	840.00
	900.000	1860.00	587.13	1.76	.30	0.	226.57	840.00
	901.000	790.00	583.51	0.	.01	0.	114.18	20.00
	901.000	1150.00	584.78	1.27	.01	0.	154.56	20.00
	901.000	1325.00	585.38	.60	.01	0.	181.45	20.00
	901.000	1860.00	587.14	1.76	.01	0.	226.68	20.00
*	901.100	790.00	583.49	0.	-.03	0.	113.85	1.00
*	901.100	1150.00	584.74	1.25	-.04	0.	152.71	1.00
*	901.100	1325.00	585.34	.60	-.04	0.	179.46	1.00
*	901.100	1860.00	587.10	1.76	-.04	0.	226.07	1.00
*	901.200	790.00	583.50	0.	.01	0.	113.99	25.00
*	901.200	1150.00	584.75	1.25	.01	0.	153.26	25.00
*	901.200	1325.00	585.35	.60	.01	0.	180.00	25.00
*	901.200	1860.00	587.13	1.77	.03	0.	226.43	25.00
	902.000	790.00	583.56	0.	.06	0.	114.66	1.00
	902.000	1150.00	584.84	1.28	.09	0.	157.31	1.00
	902.000	1325.00	585.45	.61	.10	0.	184.38	1.00
	902.000	1860.00	587.20	1.76	.08	0.	227.68	1.00
	903.000	790.00	583.56	0.	.00	0.	114.70	10.00
	903.000	1150.00	584.84	1.28	.00	0.	157.47	10.00
	903.000	1325.00	585.45	.61	.00	0.	184.55	10.00
	903.000	1860.00	587.21	1.76	.00	0.	227.78	10.00

FLOOD INSURANCE ZONE DATA FOR 10 YR

FLOOD HAZARD FACTOR FOR ENTIRE REACH USING SECTIONS

SECTION NUMBER	CUMULATIVE DISTANCE	ELEVATION DIFFERENCE BETWEEN BASE FLOOD AND 10	2	0.2
100.000	0.	0.	0.	0.
101.000	70.	-.16	-.07	.74
101.100	71.	-.02	.00	.90
102.000	141.	-1.42	-.65	1.44
101.200	142.	-1.76	-.72	1.84
103.000	172.	-1.86	-.70	1.87
200.000	447.	-1.87	-.66	1.83
201.000	497.	-1.86	-.66	1.82
202.000	498.	-1.86	-.66	1.81
203.000	528.	-1.86	-.66	1.82
204.000	529.	-1.86	-.66	1.82
300.000	579.	-1.93	-.67	1.87
400.000	859.	-1.92	-.66	1.85
500.000	999.	-1.85	-.63	1.77
501.000	1049.	-1.92	-.64	1.81
502.000	1051.	-1.92	-.64	1.76
503.000	1083.	-1.92	-.64	1.80
504.000	1085.	-1.92	-.65	1.88
600.000	1115.	-1.94	-.65	1.89
610.000	1255.	-1.91	-.64	1.87
700.000	1895.	-1.97	-.65	1.88
800.000	2825.	-2.00	-.65	1.88
900.000	3665.	-1.87	-.60	1.76
901.000	3685.	-1.87	-.60	1.76
901.100	3686.	-1.85	-.60	1.76
901.200	3711.	-1.85	-.60	1.77
902.000	3712.	-1.89	-.61	1.76
903.000	3722.	-1.89	-.61	1.76
WEIGHTED AVG FOR REACH		-1.88	-.63	1.81

FHF FOR THE REACH = 020 WITH 96.2 PERCENT OF THE REACH WITHIN .5 FEET
ZONE FOR THE REACH = A 4

THIS RUN EXECUTED 13 MAY 81 09.35.46

****
HEC2 RELEASE DATED NOV 76 UPDATED APRI 1980
ERROR CORR - 01,02,03,04
MODIFICATION - 50,51,52,53,54
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

100 YR

SUMMARY PRINTOUT TABLE 110

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
100yr Market →	100.000	579.90	0.	580.79	50.04	0.	1325.00	0.	0.	0.	1199.00	1251.00	0.
100yr Floodway →	100.000	580.00	.10	580.84	50.09	0.	1325.00	0.	0.	1199.00	1199.00	1251.00	1251.00
	101.000	580.13	0.	581.75	35.00	0.	1325.00	0.	0.	0.	1139.00	1174.00	0.
	101.000	580.21	.08	581.76	35.00	0.	1325.00	0.	0.	1139.00	1139.00	1174.00	1174.00
	101.100	579.94	0.	581.97	35.00	0.	1325.00	0.	0.	0.	1139.00	1174.00	0.
	101.100	580.02	.08	581.97	35.00	0.	1325.00	0.	0.	1139.00	1139.00	1174.00	1174.00
	102.000	581.72	0.	582.92	35.00	0.	1325.00	0.	0.	0.	1139.00	1174.00	0.
	102.000	581.66	-.06	582.89	35.00	0.	1325.00	0.	0.	1139.00	1139.00	1174.00	1174.00
	101.200	582.28	0.	583.06	35.00	0.	1325.00	0.	0.	0.	1139.00	1174.00	0.
	101.200	582.24	-.04	583.03	35.00	0.	1325.00	0.	0.	1139.00	1139.00	1174.00	1174.00
	103.000	582.76	0.	583.23	51.19	49.29	1172.88	102.82	0.	0.	1139.00	1174.00	0.
	103.000	582.73	-.03	583.21	49.56	47.50	1175.22	102.28	.03	1134.78	1139.00	1174.00	1184.34
	200.000	583.39	0.	583.56	67.70	3.16	1091.74	230.10	0.	0.	1023.00	1063.00	0.
	200.000	583.38	-.01	583.55	55.29	0.	1095.62	229.38	.02	1023.00	1023.00	1063.00	1078.29
	201.000	583.40	0.	583.72	40.00	0.	1325.00	0.	0.	0.	1023.00	1063.00	0.
	201.000	583.40	-.00	583.72	40.00	0.	1325.00	0.	0.	1023.00	1023.00	1063.00	1063.00
	202.000	583.40	0.	583.72	40.00	0.	1325.00	0.	0.	0.	1023.00	1063.00	0.
	202.000	583.40	-.00	583.72	40.00	0.	1325.00	0.	0.	1023.00	1023.00	1063.00	1063.00
	203.000	583.40	0.	583.78	40.00	0.	1325.00	0.	0.	0.	1023.00	1063.00	0.
	203.000	583.40	-.00	583.78	40.00	0.	1325.00	0.	0.	1023.00	1023.00	1063.00	1063.00
	204.000	583.41	0.	583.78	40.00	0.	1325.00	0.	0.	0.	1023.00	1063.00	0.
	204.000	583.41	-.00	583.78	40.00	0.	1325.00	0.	0.	1023.00	1023.00	1063.00	1063.00

100 yr Ele. Corr. Fig.
Sugarbush, Vermont

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
	300.000	583.61	0.	583.86	53.06	0.	1325.00	0.	0.	0.	1060.00	1115.00	0.
	300.000	583.61	.01	583.87	53.07	0.	1325.00	0.	0.	1060.00	1060.00	1115.00	1115.00
	400.000	583.95	0.	584.16	91.61	46.86	1094.89	183.25	0.	0.	1026.00	1068.00	0.
	400.000	583.95	-.01	584.18	70.50	28.79	1126.19	170.02	.03	1020.42	1026.00	1068.00	1090.92
	500.000	584.06	0.	584.40	45.57	11.29	1268.15	45.56	0.	0.	1003.00	1038.00	0.
	500.000	584.08	.02	584.44	38.32	0.	1295.11	29.89	.02	1003.00	1003.00	1038.00	1041.32
	501.000	584.32	0.	584.47	52.00	0.	1325.00	0.	0.	0.	1148.00	1200.00	0.
	501.000	584.37	.05	584.52	52.00	0.	1325.00	0.	0.	1148.00	1148.00	1200.00	1200.00
	502.000	584.32	0.	584.47	52.00	0.	1325.00	0.	0.	0.	1148.00	1200.00	0.
	502.000	584.37	.05	584.52	52.00	0.	1325.00	0.	0.	0.	1148.00	1200.00	0.
	503.000	584.33	0.	584.48	52.00	0.	1325.00	0.	0.	0.	1148.00	1200.00	0.
	503.000	584.38	.05	584.53	52.00	0.	1325.00	0.	0.	0.	1148.00	1200.00	0.
	504.000	584.29	0.	584.50	55.00	0.	1325.00	0.	0.	0.	1020.00	1075.00	0.
	504.000	584.34	.05	584.55	55.00	0.	1325.00	0.	0.	1020.00	1020.00	1075.00	1075.00
	600.000	584.34	0.	584.54	69.47	19.08	1284.01	21.91	0.	0.	1020.00	1075.00	0.
	600.000	584.37	.03	584.58	57.90	1.48	1315.01	8.51	.03	1019.23	1020.00	1075.00	1077.14
	610.000	584.46	0.	584.65	72.73	.62	1303.86	20.51	0.	0.	1130.00	1190.00	0.
	610.000	584.51	.05	584.70	60.00	0.	1325.00	0.	.02	1130.00	1130.00	1190.00	1190.00
	700.000	584.79	0.	584.82	136.49	16.70	1290.35	17.95	0.	0.	1080.00	1169.00	0.
	700.000	584.85	.06	584.88	98.47	5.07	1312.86	7.06	.02	1075.71	1080.00	1169.00	1174.18
	800.000	584.96	0.	585.03	236.46	305.07	988.95	30.98	0.	0.	1291.00	1347.00	0.
	800.000	585.02	.06	585.09	180.00	301.44	991.32	32.24	180.00	1190.00	1291.00	1347.00	1370.00
	900.000	585.37	0.	585.45	181.01	219.15	1040.32	65.53	0.	0.	1175.00	1235.00	0.
	900.000	585.43	.05	585.50	136.37	215.35	1043.45	66.20	138.00	1120.00	1175.00	1235.00	1258.00
	901.000	585.38	0.	585.46	181.45	219.50	1039.91	65.59	0.	0.	1175.00	1235.00	0.
	901.000	585.38	.00	585.54	60.00	0.	1325.00	0.	60.00	1175.00	1175.00	1235.00	1235.00
*	901.100	585.34	0.	585.50	179.46	26.86	1298.14	0.	0.	0.	1175.00	1235.00	0.
*	901.100	585.37	.04	585.55	60.00	0.	1325.00	0.	60.00	1175.00	1175.00	1235.00	1235.00
*	901.200	585.35	0.	585.52	180.00	27.45	1297.55	0.	0.	0.	1175.00	1235.00	0.
*	901.200	585.40	.05	585.57	182.19	29.85	1295.15	0.	0.	0.	1175.00	1235.00	0.
	902.000	585.45	0.	585.54	184.38	159.47	1118.10	47.43	0.	0.	1175.00	1235.00	0.
	902.000	585.50	.05	585.59	186.64	160.90	1116.42	47.68	0.	0.	1175.00	1235.00	0.
	903.000	585.45	0.	585.54	184.55	159.58	1117.98	47.45	0.	0.	1175.00	1235.00	0.
	903.000	585.47	.02	585.62	60.00	0.	1325.00	0.	60.00	1175.00	1175.00	1235.00	1235.00

100 YR

SUMMARY PRINTOUT TABLE 150

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
100.000	-0.	0.	0.	575.30	1325.00	579.90	0.	580.79	66.14	7.59	174.68	162.92
100.000	-0.	0.	0.	575.30	1325.00	580.00	0.	580.84	60.51	7.37	179.69	170.34
101.000	70.00	0.	0.	575.60	1325.00	580.13	0.	581.75	113.32	10.23	129.57	124.47
101.000	70.00	0.	0.	575.60	1325.00	580.21	0.	581.76	111.53	10.01	132.37	125.47
101.100	1.00	587.80	588.00	575.60	1325.00	579.94	579.92	581.97	148.07	11.41	116.09	108.89
101.100	1.00	587.80	588.00	575.60	1325.00	580.02	579.92	581.97	140.45	11.20	118.35	111.80
102.000	70.00	587.80	588.50	576.10	1325.00	581.72	0.	582.92	74.48	8.82	150.18	153.53
102.000	70.00	587.80	588.50	576.10	1325.00	581.66	0.	582.89	76.37	8.91	148.74	151.62
101.200	1.00	0.	0.	576.10	1325.00	582.28	0.	583.06	24.50	7.09	187.01	267.68
101.200	1.00	0.	0.	576.10	1325.00	582.24	0.	583.03	27.94	7.14	185.57	250.67
103.000	30.00	0.	0.	576.10	1325.00	582.76	0.	583.23	25.42	5.74	267.59	262.78
103.000	30.00	0.	0.	576.10	1325.00	582.73	0.	583.21	25.89	5.78	263.59	260.42
200.000	275.00	0.	0.	574.40	1325.00	583.39	0.	583.56	6.03	3.48	445.02	539.57
200.000	275.00	0.	0.	574.40	1325.00	583.38	0.	583.55	6.44	3.50	426.90	521.98
201.000	50.00	0.	0.	574.90	1325.00	583.40	0.	583.72	11.02	4.51	293.69	399.16
201.000	50.00	0.	0.	574.90	1325.00	583.40	0.	583.72	13.88	4.51	293.61	355.64
202.000	1.00	588.50	590.50	574.90	1325.00	583.40	0.	583.72	8.62	4.59	288.64	451.26
202.000	1.00	588.50	590.50	574.90	1325.00	583.40	0.	583.72	8.63	4.59	288.58	451.10
203.000	30.00	588.50	591.00	575.40	1325.00	583.40	0.	583.78	10.61	4.92	269.07	406.82
203.000	30.00	588.50	591.00	575.40	1325.00	583.40	0.	583.78	10.62	4.93	269.00	406.64
204.000	1.00	0.	0.	575.40	1325.00	583.41	0.	583.78	14.38	4.88	271.75	349.44
204.000	1.00	0.	0.	575.40	1325.00	583.41	0.	583.78	17.85	4.88	271.69	313.62
300.000	50.00	0.	0.	576.00	1325.00	583.61	0.	583.86	12.46	4.04	327.79	375.35
300.000	50.00	0.	0.	576.00	1325.00	583.61	0.	583.87	12.43	4.04	326.09	375.85
400.000	280.00	0.	0.	577.10	1325.00	583.95	0.	584.16	9.44	3.98	409.21	431.28
400.000	280.00	0.	0.	577.10	1325.00	583.95	0.	584.18	10.02	4.10	383.89	418.57
500.000	140.00	0.	0.	575.80	1325.00	584.06	0.	584.40	17.39	4.75	301.29	317.77
500.000	140.00	0.	0.	575.80	1325.00	584.08	0.	584.44	22.06	4.84	283.54	282.10
501.000	50.00	0.	0.	575.80	1325.00	584.32	0.	584.47	6.53	3.09	429.01	518.64
501.000	50.00	0.	0.	575.80	1325.00	584.37	0.	584.52	7.44	3.07	431.63	485.82
502.000	2.00	589.90	592.00	575.80	1325.00	584.32	0.	584.47	3.46	3.14	421.97	712.34
502.000	2.00	589.90	592.00	575.80	1325.00	584.37	0.	584.52	3.40	3.12	424.30	718.23

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
	503.000	32.00	589.90	592.00	575.80	1325.00	584.33	0.	584.48	3.45	3.14	422.57	713.86
	503.000	32.00	589.90	592.00	575.80	1325.00	584.38	0.	584.53	3.39	3.12	424.95	719.88
	504.000	2.00	0.	0.	576.50	1325.00	584.29	0.	584.50	8.60	3.74	353.92	451.72
	504.000	2.00	0.	0.	576.50	1325.00	584.34	0.	584.55	9.28	3.71	356.76	434.90
	600.000	30.00	0.	0.	576.50	1325.00	584.34	0.	584.54	7.86	3.60	397.56	472.65
	600.000	30.00	0.	0.	576.50	1325.00	584.37	0.	584.58	8.15	3.67	369.70	464.20
	610.000	140.00	0.	0.	576.70	1325.00	584.46	0.	584.65	8.31	3.54	394.21	459.74
	610.000	140.00	0.	0.	576.70	1325.00	584.51	0.	584.70	9.48	3.56	372.10	430.42
	700.000	640.00	0.	0.	568.90	1325.00	584.79	0.	584.82	1.11	1.43	1004.93	1255.58
	700.000	640.00	0.	0.	568.90	1325.00	584.85	0.	584.88	1.13	1.45	944.08	1245.57
	800.000	930.00	0.	0.	576.40	1325.00	584.96	0.	585.03	5.46	2.51	842.91	567.02
	800.000	930.00	0.	0.	576.40	1325.00	585.02	0.	585.09	5.33	2.50	811.35	574.16
	900.000	840.00	0.	0.	577.60	1325.00	585.37	0.	585.45	4.30	2.49	716.02	639.28
	900.000	840.00	0.	0.	577.60	1325.00	585.43	0.	585.50	4.21	2.48	698.12	645.55
	901.000	20.00	0.	0.	577.60	1325.00	585.38	0.	585.46	4.27	2.48	717.80	641.05
	901.000	20.00	0.	0.	577.60	1325.00	585.38	0.	585.54	9.07	3.16	418.88	440.07
*	901.100	1.00	584.00	590.00	577.60	1325.00	585.34	0.	585.50	5.51	3.31	463.46	564.71
*	901.100	1.00	584.00	590.00	577.60	1325.00	585.37	0.	585.55	5.70	3.36	394.62	554.93
*	901.200	25.00	584.00	590.00	577.60	1325.00	585.35	0.	585.52	5.49	3.30	465.26	565.42
*	901.200	25.00	584.00	590.00	577.60	1325.00	585.40	0.	585.57	5.44	3.28	472.50	568.21
	902.000	1.00	0.	0.	577.60	1325.00	585.45	0.	585.54	2.13	2.65	729.81	908.39
	902.000	1.00	0.	0.	577.60	1325.00	585.50	0.	585.59	2.07	2.62	739.18	920.65
	903.000	10.00	0.	0.	577.60	1325.00	585.45	0.	585.54	2.12	2.64	730.50	909.30
	903.000	10.00	0.	0.	577.60	1325.00	585.47	0.	585.62	3.88	3.12	424.09	672.79

100 YR

SUMMARY PRINTOUT TABLE 150

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
100.000	1325.00	579.90	0.	0.	0.	50.04	-0.
100.000	1325.00	580.00	.10	0.	.10	50.09	-0.
101.000	1325.00	580.13	0.	.23	0.	35.00	70.00
101.000	1325.00	580.21	.08	.21	.08	35.00	70.00
101.100	1325.00	579.94	0.	-.19	0.	35.00	1.00
101.100	1325.00	580.02	.08	-.18	.08	35.00	1.00
102.000	1325.00	581.72	0.	1.77	0.	35.00	70.00
102.000	1325.00	581.66	-.06	1.64	-.06	35.00	70.00
101.200	1325.00	582.28	0.	.56	0.	35.00	1.00
101.200	1325.00	582.24	-.04	.58	-.04	35.00	1.00
103.000	1325.00	582.76	0.	.49	0.	51.19	30.00
103.000	1325.00	582.73	-.03	.50	-.03	49.56	30.00
200.000	1325.00	583.39	0.	.63	0.	67.70	275.00
200.000	1325.00	583.38	-.01	.65	-.01	55.29	275.00
201.000	1325.00	583.40	0.	.01	0.	40.00	50.00
201.000	1325.00	583.40	-.00	.02	-.00	40.00	50.00
202.000	1325.00	583.40	0.	-.00	0.	40.00	1.00
202.000	1325.00	583.40	-.00	-.00	-.00	40.00	1.00
203.000	1325.00	583.40	0.	.00	0.	40.00	30.00
203.000	1325.00	583.40	-.00	.00	-.00	40.00	30.00
204.000	1325.00	583.41	0.	.01	0.	40.00	1.00
204.000	1325.00	583.41	-.00	.01	-.00	40.00	1.00
300.000	1325.00	583.61	0.	.19	0.	53.06	50.00
300.000	1325.00	583.61	.01	.20	.01	53.07	50.00
400.000	1325.00	583.95	0.	.35	0.	91.61	280.00
400.000	1325.00	583.95	-.01	.33	-.01	70.50	280.00
500.000	1325.00	584.06	0.	.11	0.	45.57	140.00
500.000	1325.00	584.08	.02	.13	.02	38.32	140.00
501.000	1325.00	584.32	0.	.26	0.	52.00	50.00
501.000	1325.00	584.37	.05	.29	.05	52.00	50.00
502.000	1325.00	584.32	0.	-.00	0.	52.00	2.00
502.000	1325.00	584.37	.05	-.00	.05	52.00	2.00

	SECNO	Q	CWSFL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	503.000	1325.00	584.33	0.	.01	0.	52.00	32.00
	503.000	1325.00	584.38	.05	.01	.05	52.00	32.00
	504.000	1325.00	584.29	0.	-.04	0.	55.00	2.00
	504.000	1325.00	584.34	.05	-.04	.05	55.00	2.00
	600.000	1325.00	584.34	0.	.05	0.	69.47	30.00
	600.000	1325.00	584.37	.03	.03	.03	57.90	30.00
	610.000	1325.00	584.46	0.	.12	0.	72.73	140.00
	610.000	1325.00	584.51	.05	.14	.05	60.00	140.00
	700.000	1325.00	584.79	0.	.33	0.	136.49	640.00
	700.000	1325.00	584.85	.06	.34	.06	98.47	640.00
	800.000	1325.00	584.96	0.	.17	0.	236.46	930.00
	800.000	1325.00	585.02	.06	.17	.06	180.00	930.00
	900.000	1325.00	585.37	0.	.42	0.	181.01	840.00
	900.000	1325.00	585.43	.05	.41	.05	136.37	840.00
	901.000	1325.00	585.38	0.	.01	0.	181.45	20.00
	901.000	1325.00	585.38	.00	-.04	.00	60.00	20.00
*	901.100	1325.00	585.34	0.	-.04	0.	179.46	1.00
*	901.100	1325.00	585.37	.04	-.01	.04	60.00	1.00
*	901.200	1325.00	585.35	0.	.01	0.	180.00	25.00
*	901.200	1325.00	585.40	.05	.03	.05	182.19	25.00
	902.000	1325.00	585.45	0.	.10	0.	184.38	1.00
	902.000	1325.00	585.50	.05	.09	.05	186.64	1.00
	903.000	1325.00	585.45	0.	.00	0.	184.55	10.00
	903.000	1325.00	585.47	.02	-.03	.02	60.00	10.00

FLOODWAY DATA, 100 YR
PROFILE NO. 2

	STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WATER SURFACE ELEVATION WITHOUT FLOODWAY	DIFFERENCE
	100.000	50.	180.	7.4	580.0	579.9	.1
A	101.000	35.	132.	10.0	580.2	580.1	.1
	101.100	35.	118.	11.2	580.0	579.9	.1
	102.000	35.	149.	8.9	581.7	581.7	0.
	101.200	35.	186.	7.1	582.3	582.3	0.
	103.000	50.	264.	5.0	582.8	582.8	0.
B	200.000	55.	427.	3.1	583.4	583.4	0.
	201.000	40.	294.	4.5	583.4	583.4	0.
	202.000	40.	289.	4.6	583.4	583.4	0.
	203.000	40.	269.	4.9	583.4	583.4	0.
	204.000	40.	272.	4.9	583.4	583.4	0.
C	300.000	53.	328.	4.0	583.6	583.6	0.
D	400.000	71.	384.	3.5	584.0	584.0	0.
	500.000	38.	284.	4.7	584.1	584.1	0.
	501.000	52.	432.	3.1	584.4	584.3	.1
	502.000	52.	424.	3.1	584.4	584.3	.1
	503.000	52.	425.	3.1	584.4	584.3	.1
	504.000	55.	357.	3.7	584.4	584.3	.1
E	600.000	58.	370.	3.6	584.3	584.3	0.
	610.000	60.	372.	3.6	584.5	584.5	0.
F	700.000	~~98.~~ 136	944.	1.4	584.9	584.8	.1
G	800.000	180.	811.	1.6	585.1	585.0	.1
H	900.000	136.	698.	1.9	585.5	585.4	.1
	901.000	60.	419.	3.2	585.4	585.4	0.
	901.100	60.	395.	3.4	585.3	585.3	0.
	901.200	182.	472.	2.8	585.5	585.4	.1
	902.000	187.	739.	1.8	585.5	585.4	.1
	903.000	60.	424.	3.1	585.5	585.5	0.

Ponded area

BOYNE CITY

ELEVATION REFERENCE MARK DESCRIPTIONS

REFERENCE MARK	ELEVATION (FT. NGVD)	DESCRIPTION OF LOCATION
RM-1	590.52	PAINTED 'X' AT THE INTERSECTION OF THE CENTERLINES OF WOODLAND DRIVE AND GREENWOOD DRIVE
RM-2	635.32	PAINTED "X" AT THE INTERSECTION OF THE CENTERLINES OF EAST MICHIGAN AVENUE AND LINK STREET
RM-3	587.56	PAINTED "X" AT THE INTERSECTION OF THE CENTERLINES OF FRONT STREET AND MAPLE STREET
RM-4	588.67	PARK STREET BRIDGE OVER THE BOYNE RIVER, PAINTED 'X' ON THE EAST SIDE OF THE NORTHWEST CORNER OF THE SIDEWALK
RM-5	649.48	PAINTED "X" AT THE INTERSECTION OF THE CENTERLINES OF STATE STREET AND CALL STREET
RM-6	587.55	ABANDONED SPRING STREET BRIDGE OVER THE BOYNE RIVER, PAINTED "X" 2.2 FT ALONG THE CENTERLINE OF THE BRIDGE FROM THE EAST HEADWALL

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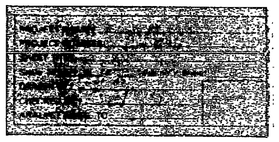
CITY OF BOYNE CITY, MI
CHARLEVOIX COUNTY
FLOOD INSURANCE RATE MAP AND
FLOOD BOUNDARY AND FLOODWAY MAP

FLOODWAY
100 YEAR
500 YEAR
APPROXIMATE 100 YEAR
SCALE 1" = 1000'
BASE FLOOD ELEVATION

RECEIVED
DEC 19 1980
WATER MANAGEMENT



MONR

Reel 6
(1110)

BOISE CITY, IDAHO
FLOOD PROFILE - BOISE RIVER
DATE OF FLOOD: 16 OCTOBER 1960

KEY
STREAM STATIONING (FEET)
10 YEAR FLOOD
50 YEAR FLOOD
100 YEAR FLOOD
500 YEAR FLOOD

BRIDGE
STAGE

BACKWATER EFFECTS
FROM LAKE CHARLESTON
ZONE AC

REACH 1
ZONE A4

INCL 2

590
585
580
575
570
565

(101) (200) (300) (400) (500) (700) (800) (900)

A B C D E F G H

STREAM DISTANCE IN FEET ABOVE MOUTH