By | Date | Page | Of

BAUGHMAN COMPANY, P.A.

Existing Flow Rates

Auburn Hills 3rd Addition

Area = 9.2 acres C = 0.4 T_c = 15 min

Q_{100} = 27 cfs

Auburn Hills Commercial Addition

Area = 12.6 acres C = 0.4 T_c = 15 min

Q_{100} = 37.1

Net existing from both sites = 64 cfs

Auburn Hills 3rd SWS Allows 20 cfs to be released backyard from Auburn Hills 3rd releases 7 cfs

total from Auburn Hills 3rd = 27 cfs

Allowable Release from Auburn Hills Commercial = 64 − 27 = 37 cfs

Lot 3 Auburn Hills Commercial allows 5 cfs to drain to Maple.

Allowable discharge from detention pond = 32 cfs

24" RCP as outlet allows the release of 26 cfs

Net change in Q_{100} = 6 cfs lower

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*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              MAY   1991               *
*           VERSION 4.0.1E              *
*   Lahey F77L-EM/32 version 5.01       *
*      Dodson & Associates, Inc.        *
*  RUN DATE  05/22/97  TIME  09:39:30   *
*****************************************

*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*      DAVIS, CALIFORNIA 95616          *
*          (916) 551-1748               *
*                                       *
*****************************************

     X     X  XXXXXXX   XXXXX         X
     X     X  X        X     X       XX
     X     X  X        X              X
     XXXXXXX  XXXX     X      XXXXX   X
     X     X  X        X              X
     X     X  X        X     X        X
     X     X  XXXXXXX   XXXXX        XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
1                                HEC-1 INPUT                                          PAGE 1

LINE      ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1       ID  AUBURN HILLS COMMERCIAL DETENTION
  2       IT       5 22MAY97   00000     300
  3       IO       3       0
          *

  4       KK  AUBCOM
  5       BA    .018
  6       PH       0       0    0.86  1.8425    3.73     4.6    5.04    5.94    6.96    8.16
  7       UD     .15
  8       LS       0      91
          *

  9       KK    POND
 10       RS       1    ELEV      39
 11       SA      .8     1.0
 12       SE      39    43.0
 13       SL    39.5    3.14     .67      .5
 14       SS    42.5      10    2.86     1.5
          *
 15       ZZ
```

35

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*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              MAY   1991               *
*           VERSION 4.0.1E              *
*   Lahey F77L-EM/32 version 5.01       *
*      Dodson & Associates, Inc.        *
*  RUN DATE  05/22/97  TIME  09:39:30   *
*****************************************

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*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*      DAVIS, CALIFORNIA 95616          *
*          (916) 551-1748               *
*                                       *
*****************************************

                 AUBURN HILLS COMMERCIAL DETENTION

  3 IO         OUTPUT CONTROL VARIABLES
                     IPRNT          3  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

    IT         HYDROGRAPH TIME DATA
                      NMIN          5  MINUTES IN COMPUTATION INTERVAL
                     IDATE    22MAY97  STARTING DATE
                     ITIME       0000  STARTING TIME
                        NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE    23MAY97  ENDING DATE
                    NDTIME       0055  ENDING TIME
                     ICENT         19  CENTURY MARK

                COMPUTATION INTERVAL    0.08 HOURS
                     TOTAL TIME BASE   24.92 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
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                  ***************
                  *             *
  4 KK            *   AUBCOM    *
                  *             *
                  ***************

              SUBBASIN RUNOFF DATA

  5 BA          SUBBASIN CHARACTERISTICS
                      TAREA        0.02  SUBBASIN AREA

                PRECIPITATION DATA

  6 PH                            DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ................ TP-40 ................   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                 0.86    1.84    3.73    4.60    5.04    5.94    6.96    8.16    0.00    0.00    0.00    0.00

                                          STORM AREA =     0.02

  8 LS          SCS LOSS RATE
                      STRTL        0.20  INITIAL ABSTRACTION
                     CRVNBR       91.00  CURVE NUMBER
                      RTIMP        0.00  PERCENT IMPERVIOUS AREA

  7 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG        0.15  LAG

                                              ***

                                         UNIT HYDROGRAPH
                                     11 END-OF-PERIOD ORDINATES
               17.       44.       39.       20.       10.        5.        2.        1.        1.        0.
                0.

     ***          ***          ***          ***          ***

                    HYDROGRAPH AT STATION    AUBCOM

   TOTAL RAINFALL =    8.16, TOTAL LOSS =    1.08, TOTAL EXCESS =    7.08

  PEAK FLOW      TIME                       MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     24.92-HR
+   (CFS)        (HR)
                             (CFS)
+     75.       12.17                11.          3.          3.          3.
                          (INCHES)  5.561       7.082       7.082       7.082
                           (AC-FT)     5.          7.          7.          7.

                    CUMULATIVE AREA =     0.02 SQ MI

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
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                  ***************
                  *             *
  9 KK            *    POND     *
                  *             *
                  ***************

              HYDROGRAPH ROUTING DATA

 10 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        ELEV  TYPE OF INITIAL CONDITION
                     RSVRIC       39.00  INITIAL CONDITION
                          X        0.00  WORKING R AND D COEFFICIENT

 11 SA                 AREA         0.8         1.0

 12 SE            ELEVATION       39.00       43.00

 13 SL          LOW-LEVEL OUTLET
                      ELEVL       39.50  ELEVATION AT CENTER OF OUTLET
                      CAREA        3.14  CROSS-SECTIONAL AREA
                       COQL        0.67  COEFFICIENT
                       EXPL        0.50  EXPONENT OF HEAD

 14 SS          SPILLWAY
                       CREL       42.50  SPILLWAY CREST ELEVATION
                      SPWID       10.00  SPILLWAY WIDTH
                       COQW        2.86  WEIR COEFFICIENT
                       EXPW        1.50  EXPONENT OF HEAD

                                              ***

                                   COMPUTED STORAGE-ELEVATION DATA

           STORAGE       0.00      3.59
         ELEVATION      39.00     43.00

                                   COMPUTED OUTFLOW-ELEVATION DATA

           OUTFLOW       0.00      0.00     16.48     17.57     18.82     20.27     21.95     23.93     26.32     29.22
         ELEVATION      39.00     39.50     40.45     40.58     40.74     40.94     41.19     41.51     41.93     42.50

           OUTFLOW      29.52     29.84     30.34     31.05     32.01     33.24     34.79     36.69     38.97     41.68
         ELEVATION      42.53     42.55     42.59     42.62     42.67     42.72     42.78     42.85     42.92     43.00

                               COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

           STORAGE       0.00      0.41      1.21      1.33      1.47      1.65      1.87      2.16      2.56      3.10
           OUTFLOW       0.00      0.00     16.48     17.57     18.82     20.27     21.95     23.93     26.32     29.22
         ELEVATION      39.00     39.50     40.45     40.58     40.74     40.94     41.19     41.51     41.93     42.50

           STORAGE       3.13      3.15      3.18      3.22      3.26      3.32      3.37      3.44      3.51      3.59
           OUTFLOW      29.52     29.84     30.34     31.05     32.01     33.24     34.79     36.69     38.97     41.68
         ELEVATION      42.53     42.55     42.59     42.62     42.67     42.72     42.78     42.85     42.92     43.00

     ***          ***          ***          ***          ***

                    HYDROGRAPH AT STATION    POND

  PEAK FLOW      TIME                       MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     24.92-HR
+   (CFS)        (HR)
                             (CFS)
+     26.       12.58                11.          3.          3.          3.
                          (INCHES)  5.519       6.645       6.645       6.645
                           (AC-FT)     5.          6.          6.          6.

  PEAK STORAGE   TIME                     MAXIMUM AVERAGE STORAGE
                                    6-HR       24-HR       72-HR     24.92-HR
+   (AC-FT)      (HR)
       3.       12.58                 1.          0.          0.          0.

  PEAK STAGE     TIME                     MAXIMUM AVERAGE STAGE
                                    6-HR       24-HR       72-HR     24.92-HR
+   (FEET)       (HR)
     41.91      12.58              40.27       39.59       39.57       39.57

                    CUMULATIVE AREA =     0.02 SQ MI
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1
                                          RUNOFF SUMMARY
                                    FLOW IN CUBIC FEET PER SECOND
                                 TIME IN HOURS,  AREA IN SQUARE MILES

                                      PEAK   TIME OF    AVERAGE FLOW FOR MAXIMUM PERIOD     BASIN   MAXIMUM    TIME OF
          OPERATION       STATION     FLOW     PEAK                                          AREA     STAGE   MAX STAGE
+                                                       6-HOUR     24-HOUR     72-HOUR

          HYDROGRAPH AT
+                          AUBCOM      75.    12.17       11.         3.          3.        0.02

          ROUTED TO
+                            POND      26.    12.58       11.         3.          3.        0.02
+                                                                                                   41.91      12.58

*** NORMAL END OF HEC-1 ***
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DOT Report

Pipe	-Node- Upstream Downstream	Inlet Area (acres)	Inlet CA (acres)	Total CA (acres)	-Ground- Upstream Downstream (ft)	-HGL- Upstream Downstream (ft)	-Slope- Energy Constructed (ft/ft)	-Section- Discharge Capacity (cfs)	-Section- Shape Size	Length (ft)	Average Velocity (ft/s)	Description
P-7	I-6 I-7	0.80	0.43	0.43	143.30 143.30	143.41 143.30	0.000934 0.003306	3.21 6.04	Circular 18 inch	121.00	1.82	
P-8	I-7 I-8	0.50	0.27	0.70	143.30 143.30	143.77 143.30	0.002327 0.002927	5.07 5.68	Circular 18 inch	205.00	2.87	
P-9	I-8 I-9	0.50	0.27	0.97	143.30 144.00	143.18 142.82	0.004205 0.003448	6.81 6.17	Circular 18 inch	87.00	3.85	
P-10	I-9 I-10	2.30	1.24	2.21	144.00 144.00	142.63 142.47	0.004622 0.002941	15.38 12.27	Circular 24 inch	34.00	4.90	
P-11	I-10 I-11	0.80	0.43	2.65	144.00 144.60	142.21 141.01	0.006415 0.002247	18.33 10.72	Circular 24 inch	178.00	5.98	
P-12	I-11 Outlet	2.00	1.08	3.73	144.60 142.00	140.62 139.00	0.011649 0.022941	25.52 62.12	Circular 30 inch	170.00	6.14	

Pipe Report

Pipe	Upstream Node	Downstream Node	Weighted Roughness Coefficient	Section Size	Roughness	Constructed Slope (ft/ft)	Length (ft)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Inlet Area (acres)	Total CA (acres)
P-20	I-20	I-19	0.54	18 inch	0.013	0.028070	114.00	140.00	136.80	143.00	1.80	0.97
P-28	I-15	I-16	0.54	18 inch	0.013	0.002747	182.00	140.90	140.40	143.70	0.90	0.49
P-16	I-17	I-16	0.54	18 inch	0.013	0.002941	34.00	140.40	140.30	144.10	2.10	1.13
P-17	I-16	I-14	0.54	24 inch	0.013	0.001976	253.00	140.20	139.70	144.10	2.60	3.02
P-27	I-12	I-13	0.54	18 inch	0.013	0.003082	292.00	140.90	140.00	144.40	0.90	0.49
P-14	I-13	I-14	0.54	24 inch	0.013	0.001176	85.00	139.50	139.40	145.20	0.00	0.49
P-18	I-14	I-18	0.54	36 inch	0.013	0.002778	36.00	139.30	139.20	144.50	2.20	4.70
P-19	I-18	I-19	0.54	36 inch	0.013	0.010185	216.00	139.00	136.80	144.50	1.80	5.67
P-21	I-19	J-2	0.54	36 inch	0.013	0.001538	130.00	136.60	136.40	141.00	0.90	7.13
P-22	J-2	Outlet	N/A	36 inch	0.013	0.016667	60.00	136.00	135.00	141.00	N/A	7.13

Node Report

Node	Inlet Area (acres)	Weighted Roughness Coefficient	Ground Elevation (ft)	Inlet CA (acres)	External CA (acres)	Carryover (cfs)	Total CA (acres)	Additional Flow (cfs)	Inlet TC (min)	Known Flow (cfs)	External TC (min)	Upstream Flow Time (min)	System Flow Time (min)
I-20	1.80	0.54	143.00	0.97	0.00	0.00	0.97	0.00	15.00	0.00	0.00	0.00	15.00
I-15	0.90	0.54	143.70	0.49	0.00	0.00	0.49	0.00	15.00	0.00	0.00	0.00	15.00
I-17	2.10	0.54	144.10	1.13	0.00	0.00	1.13	0.00	15.00	0.00	0.00	0.00	15.00
I-16	2.60	0.54	144.10	1.40	0.00	0.00	3.02	0.00	15.00	0.00	0.00	17.53	17.53
I-12	0.80	0.54	144.40	0.49	0.00	0.00	0.49	0.00	15.00	0.00	0.00	0.00	15.00
I-13	0.00	0.54	145.20	0.00	0.00	0.00	0.49	0.00	15.00	2.00	0.00	17.27	17.27
I-14	2.20	0.54	144.50	1.19	0.00	0.00	4.70	0.00	15.00	2.00	0.00	18.50	18.50
I-18	1.80	0.54	144.50	0.97	0.00	0.00	5.67	0.00	15.00	2.00	0.00	18.63	18.63
I-19	0.90	0.54	141.00	0.49	0.00	0.00	7.13	0.00	15.00	2.00	0.00	19.39	19.39
J-2	N/A	N/A	141.00	N/A	N/A	N/A	7.13	N/A	N/A	N/A	0.00	19.95	19.95
Outlet	N/A	N/A	140.00	N/A	N/A	N/A	7.13	N/A	N/A	N/A	0.00	20.23	20.23

Pipe Report

Pipe	Upstream Node	Downstream Node	Weighted Roughness Coefficient	Section Size	Roughness	Constructed Slope (ft/ft)	Length (ft)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Inlet Area (acres)	Total CA (acres)
P-6	I-5	I-2	0.54	18 inch	0.013	0.002972	286.00	38.90	38.05	41.00	1.60	0.86
P-1	I-1	I-2	0.54	18 inch	0.013	0.002727	165.00	38.50	38.05	43.00	0.80	0.43
P-2	I-2	I-3	0.54	18 inch	0.013	0.003007	143.00	37.93	37.50	41.00	0.80	1.73
P-3	I-3	I-4	0.54	24 inch	0.013	0.004167	36.00	37.40	37.25	43.00	1.00	2.27
P-4	I-4	J-1	0.54	30 inch	0.013	0.002083	144.00	37.15	36.85	43.00	1.10	2.86
P-5	J-1	Outlet	N/A	30 inch	0.013	0.001923	26.00	36.75	36.70	40.00	N/A	2.86

Node Report

Node	Inlet Area (acres)	Weighted Roughness Coefficient	Ground Elevation (ft)	Inlet CA (acres)	External CA (acres)	Carryover (cfs)	Total CA (acres)	Additional Flow (cfs)	Inlet TC (min)	Known Flow (cfs)	External TC (min)	Upstream Flow Time (min)	System Flow Time (min)
I-5	1.60	0.54	41.00	0.86	0.00	0.00	0.86	0.00	15.00	0.00	0.00	0.00	15.00
I-1	0.80	0.54	43.00	0.43	0.00	0.00	0.43	0.00	15.00	0.00	0.00	0.00	15.00
I-2	0.80	0.54	41.00	0.43	0.00	0.00	1.73	0.00	15.00	0.00	0.00	16.51	16.51
I-3	1.00	0.54	43.00	0.54	0.00	0.00	2.27	0.00	15.00	0.00	0.00	16.86	16.86
I-4	1.10	0.54	43.00	0.59	0.00	0.00	2.86	0.00	15.00	0.00	0.00	16.97	16.97
J-1	N/A	N/A	40.00	N/A	N/A	N/A	2.86	N/A	N/A	N/A	0.00	17.43	17.43
Outlet	N/A	N/A	39.00	N/A	N/A	N/A	2.86	N/A	N/A	N/A	0.00	17.51	17.51

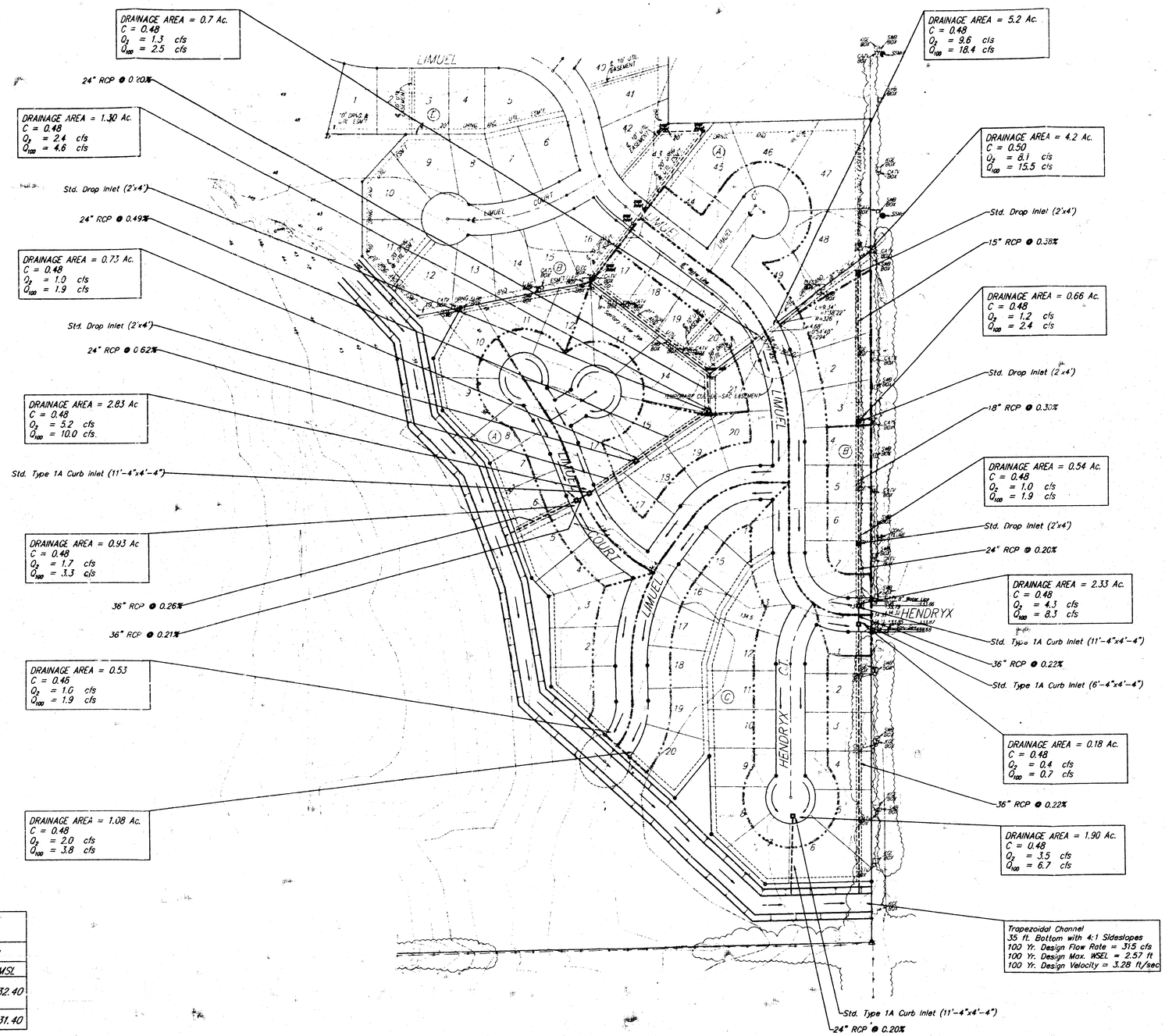
DOT Report

Pipe	-Node- Upstream Downstream	Inlet Area (acres)	Inlet CA (acres)	Total CA (acres)	-Ground- Upstream Downstream (ft)	-HGL- Upstream Downstream (ft)	-Slope- Energy Constructed (ft/ft)	-Section- Discharge Capacity (cfs)	-Section- Shape Size	Length (ft)	Average Velocity (ft/s)	Description
P-6	I-5	1.60	0.86	0.86	41.00	42.07	0.003734	6.42	Circular	286.00	3.63	
	I-2				41.00	41.00	0.002972	5.73	18 inch			
P-1	I-1	0.80	0.43	0.43	43.00	41.15	0.009834	3.21	Circular	165.00	1.82	
	I-2				41.00	41.00	0.002727	5.49	18 inch			
P-2	I-2	0.80	0.43	1.73	41.00	41.42	0.013813	12.35	Circular	143.00	6.99	
	I-3				43.00	39.44	0.003007	5.76	18 inch			
P-3	I-3	1.00	0.54	2.27	43.00	39.36	0.004495	16.06	Circular	36.00	5.14	
	I-4				43.00	39.20	0.004167	14.60	24 inch			
P-4	I-4	1.10	0.59	2.86	43.00	39.12	0.002940	20.21	Circular	144.00	5.20	
	J-1				40.00	38.59	0.002083	18.72	30 inch			
P-5	J-1	N/A	N/A	2.86	40.00	38.50	0.004034	19.99	Circular	26.00	5.93	
	Outlet				39.00	38.22	0.001923	17.99	30 inch			

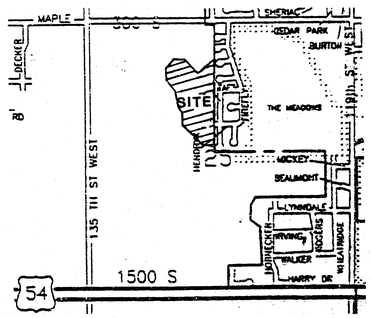
DRAINAGE PLAN

AUBURN HILLS 2nd ADDITION

SEDGWICK COUNTY, KANSAS

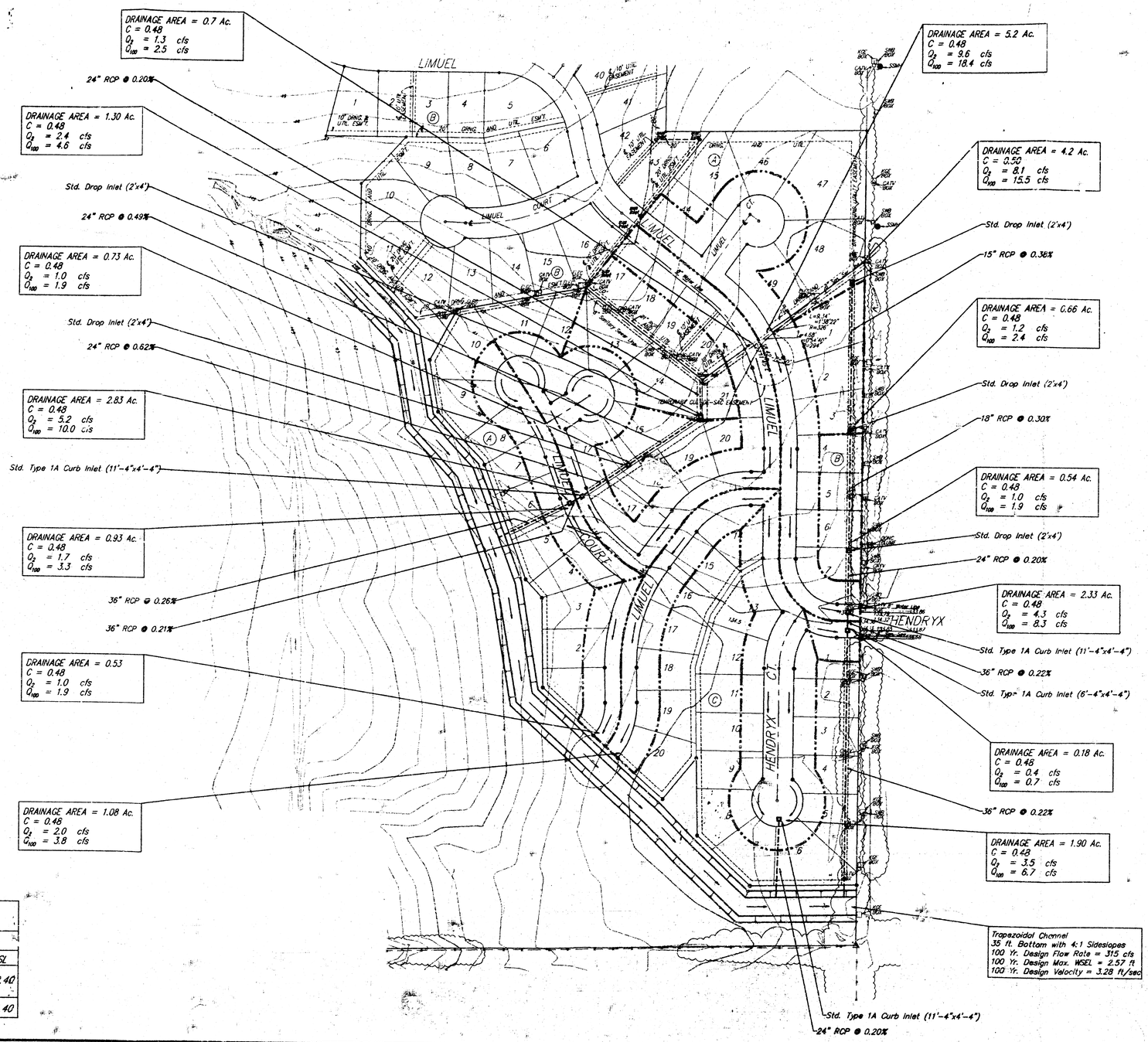


MINIMUM BUILDING PAD ELEV. LOWEST OPENING TO STRUCTURE			
LOT	BLOCK	ELEVATION	
		CITY DATUM	MSL
1, 2, 3, 4, 5, 6, 7, 8, 9, 10	A	145.00	1332.40
6, 7, 8, 9, 20	C	144.00	1331.40

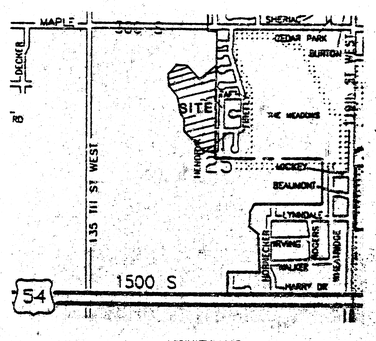


VICINITY MAP

DRAINAGE PLAN
AUBURN HILLS 2nd ADDITION
SEDGWICK COUNTY, KANSAS



MINIMUM BUILDING PAD ELEV. LOWEST OPENING TO STRUCTURE			
LOT	BLOCK	ELEVATION	
		CITY DATUM	MSL
1, 2, 3, 4, 5, 6, 7, 8, 9, 10	A	145.00	1332.40
6, 7, 8, 9, 20	C	144.00	1331.40

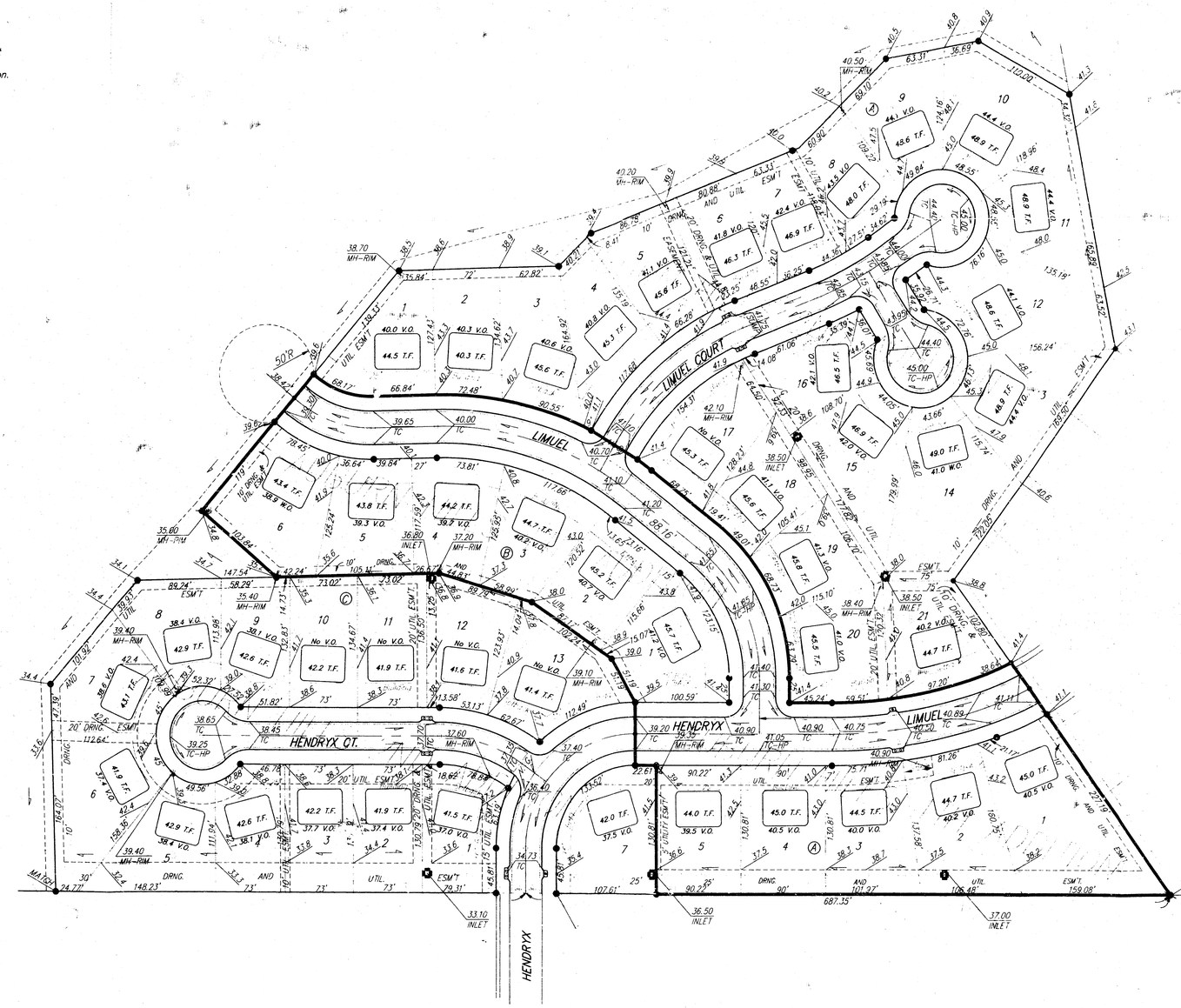


VICINITY MAP

BENCHMARKS:

BM #1 "□" On Top of Curb Located on the South Side of Hendryx 15' West of the East Line of Auburn Hills 2nd Addition. Elev. = 134.32 City Datum

BM #2 "□" On Top of Curb Located at 14.29' North and 38.05' West of the Northeast corner of Lot 13, Block B, Auburn Hills Addition. Elev. = 144.83 City Datum



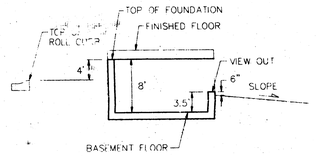
Scale: 1" = 60'
● = Iron

N.O.T.E.

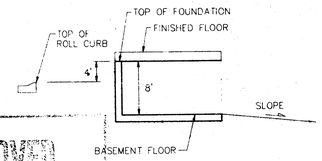
Proposed top of foundation elevations are shown on plans. Contractor to set finish floor elevation.

All street elevations shown on plans are for top of curb (full height).

View-out elevations are denoted as XX.X V.O.
Walk-out elevations are denoted as XX.X W.O.



TYPICAL VIEW OUT
NO SCALE



TYPICAL WALK OUT
NO SCALE

APPROVED
DRAINAGE PLAN

Revised 12/31/97 bjp

LOT GRADING PLAN

WOODFIELD ESTATES

BAUGHMAN COMPANY P.A.
ENGINEERING, SURVEYING & PLANNING

PROJECT NUMBER					SHEET 1 OF 1
DESIGN	DRAWN	APPROVED	DATE	SCALE	