DRAINAGE PLAN

GRACE PARK

AN ADDITION TO
WICHITA, SEDGWICK COUNTY, KANSAS

Prepared By

BAUGHMAN COMPANY, P.A.
ENGINEERING, SURVEYING & PLANNING
316/262-7271 FAX 316/262-0149 WICHITA, KANSAS 67211

December 24, 2002

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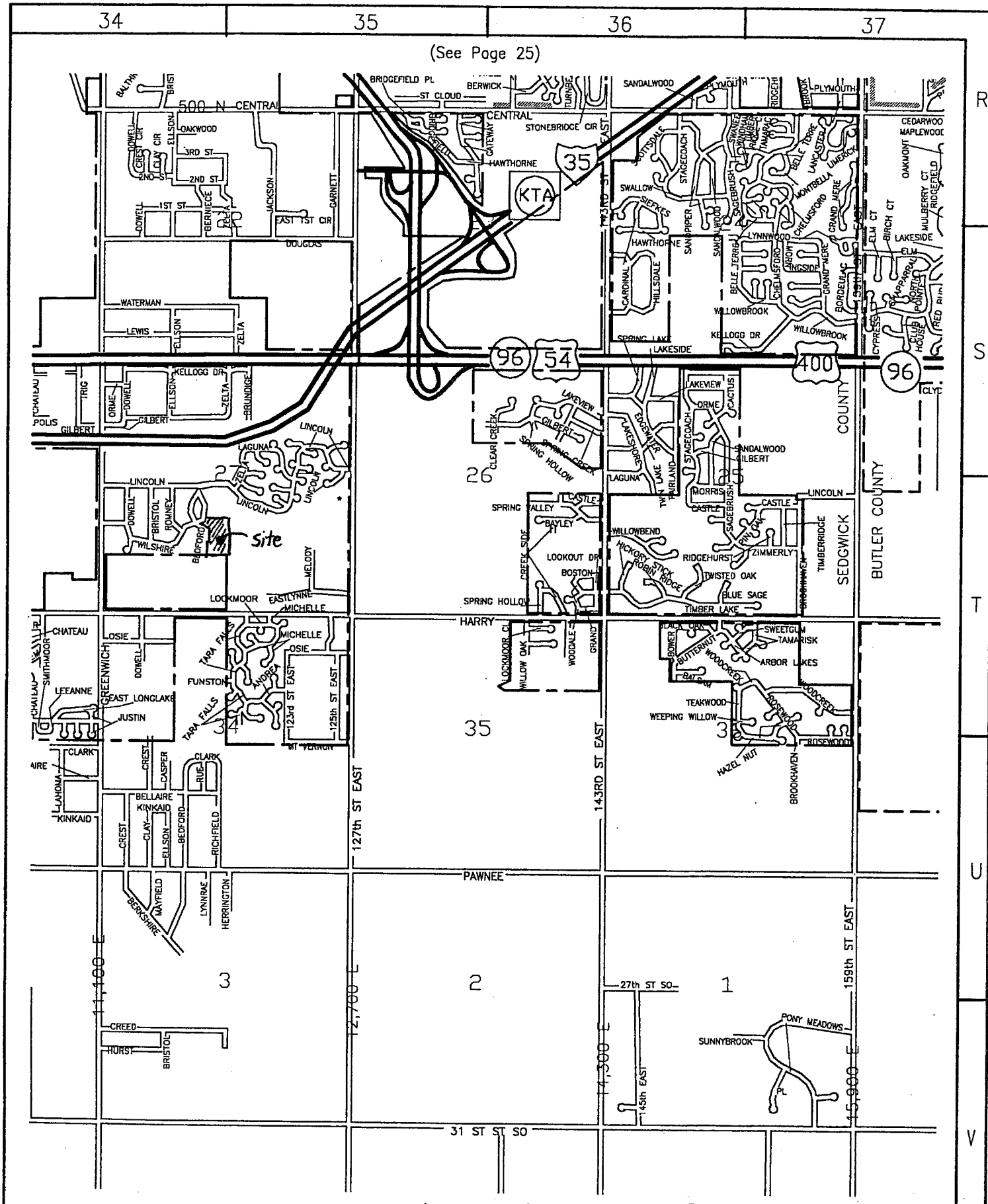
NARRATIVE

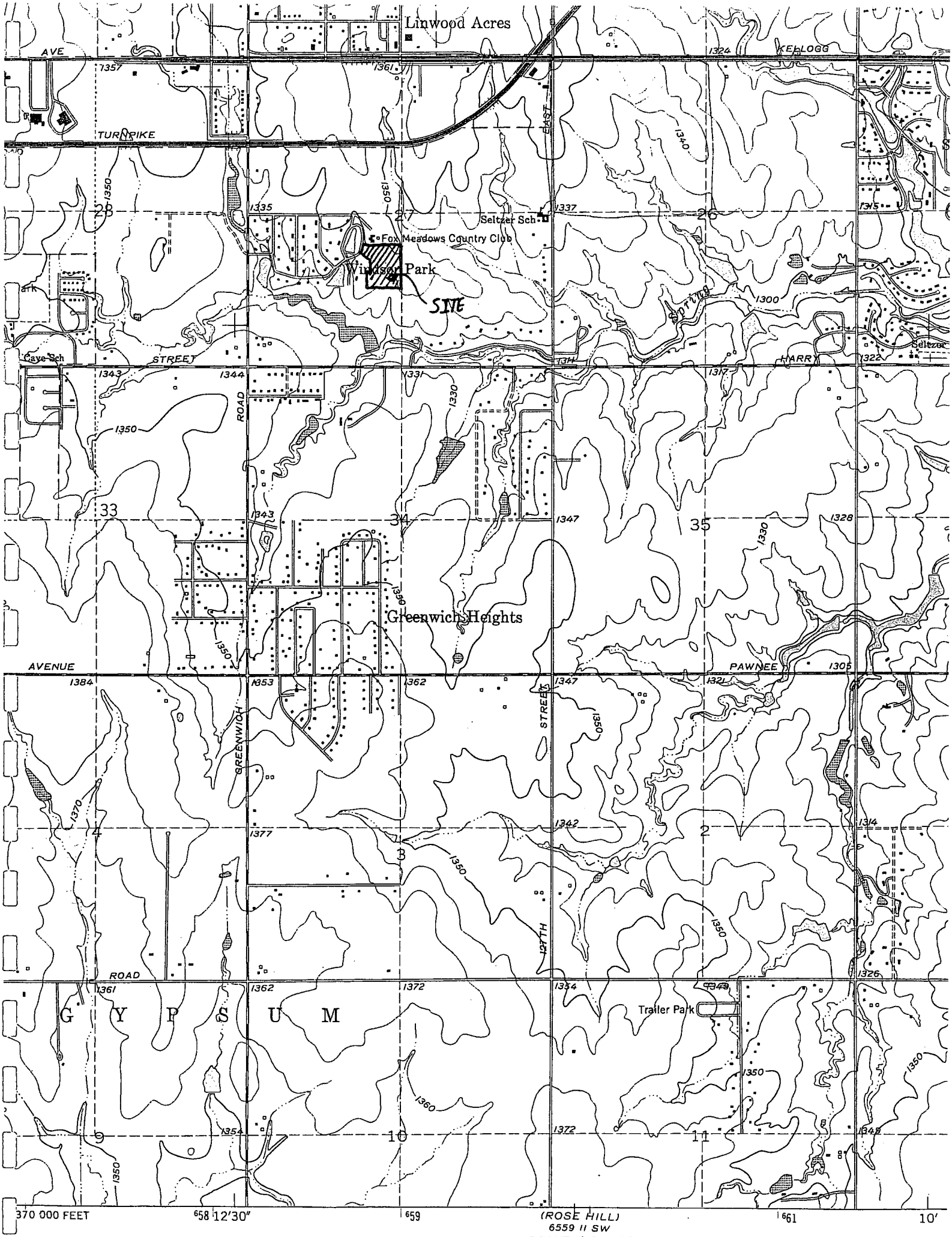
This report provides information and supporting documentation to support the "Drainage Plan" for the property located in the Southwest Quarter of Section 27, T-27-S, R-2-E in Sedgwick County, Kansas.

The "Drainage Plan" being submitted herein in intended to serve as a guide for the design of streets and storm water sewer improvements to the proposed development. Modifications to structures, pipes, etc. may be made as necessary during the final design in order to obtain the most economical design and construction possible.

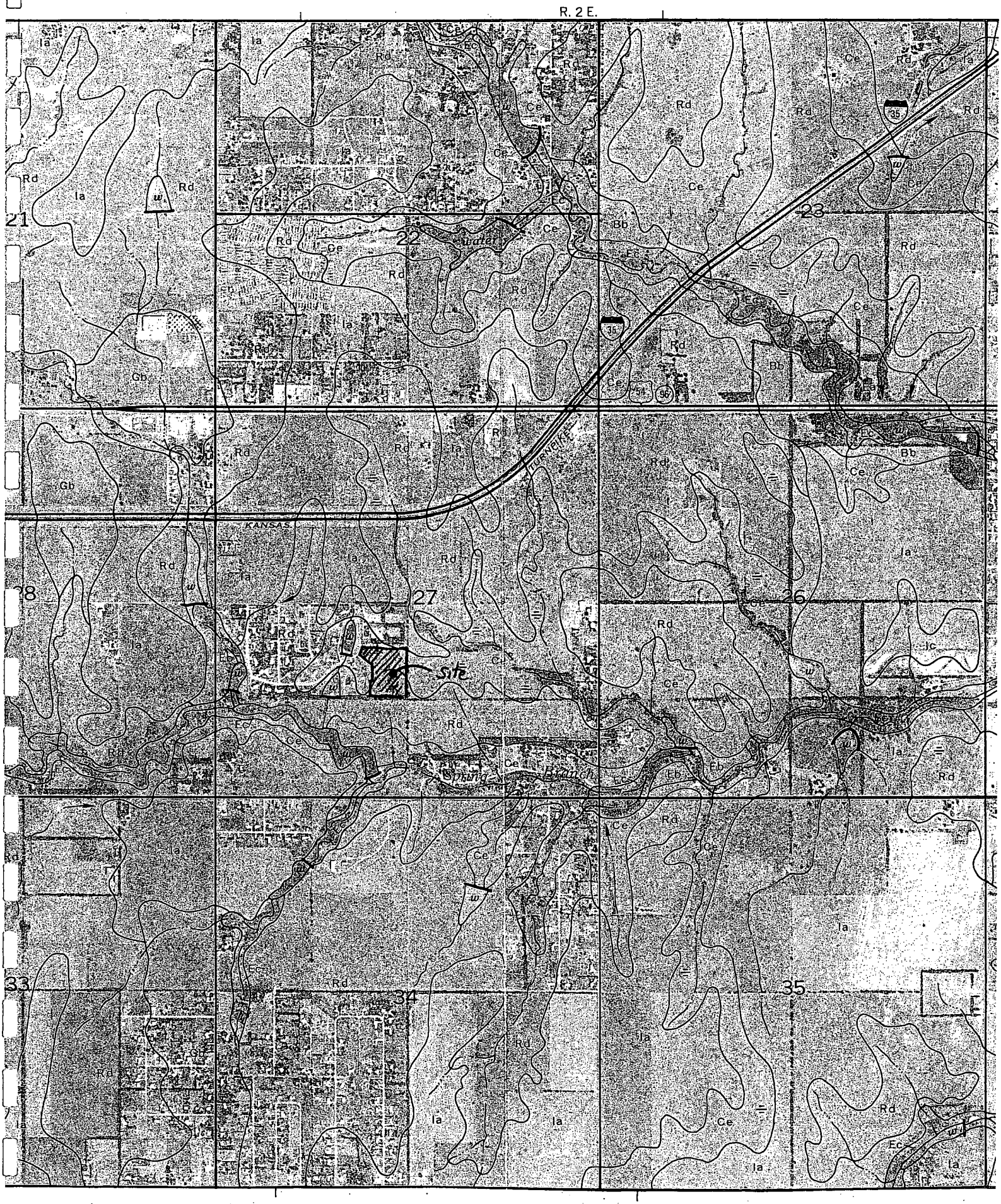
Storm water sewer systems within this proposed development have been designed to convey the 2-yr rainfall event. Calculations have also been performed to check the design during the 100-yr event. A sub-division grading plan has been prepared in conjunction with the storm water sewer design. This grading plan allows for emergency outflow points during major rainfall events.

A detention facility has been provided on-site to restrict discharge of the development. The proposed discharges are less than the existing calculated discharges.

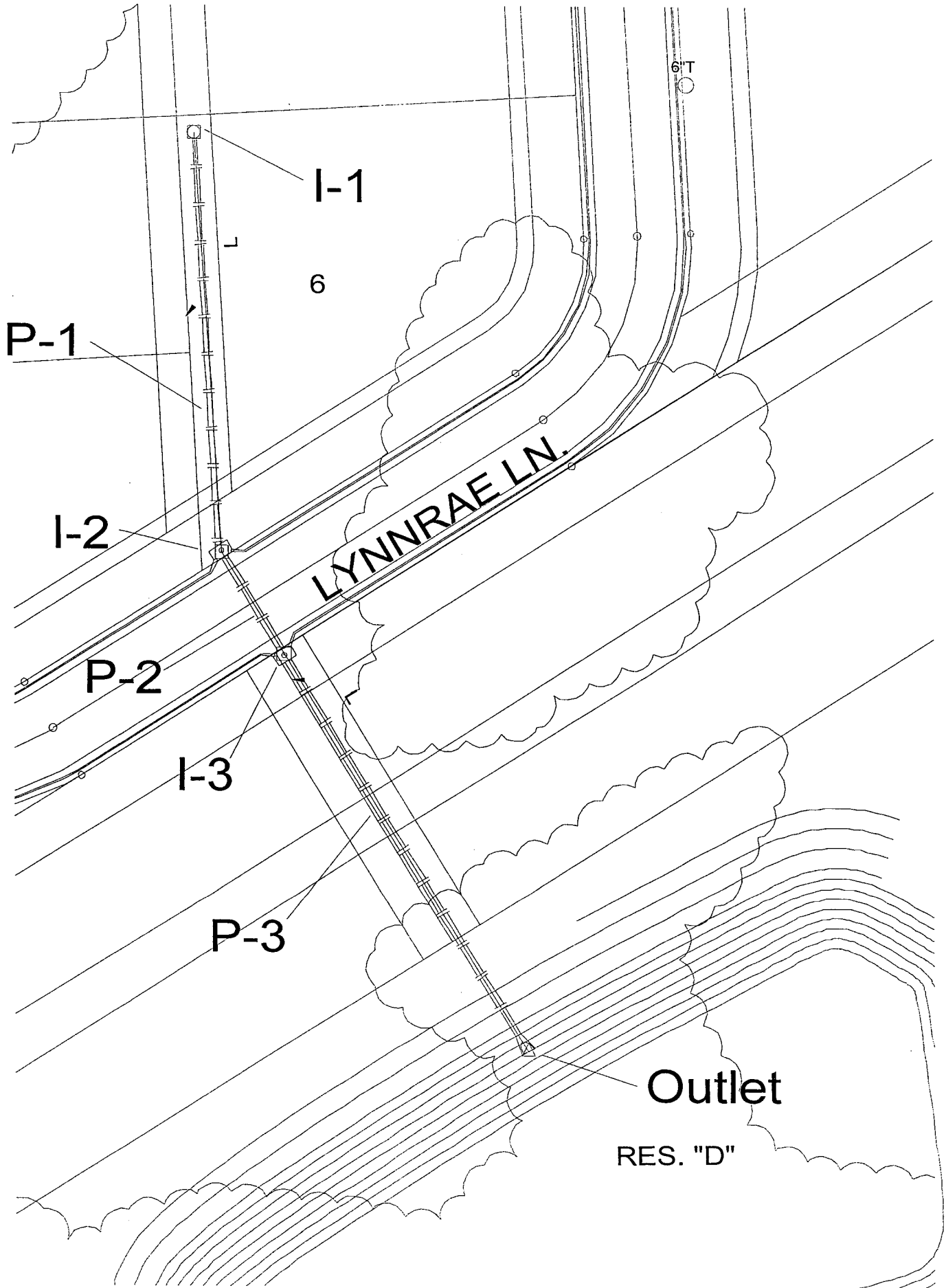

34
35
36
37
R
S
T
U
V
(See Page 25)
(See Page 40)
© Kansas Blue Print Co., Inc.
500 N CENTRAL
CENTRAL
BRIDGEFIELD PL
ST CLOUD
BERWICK
STONEBRIDGE CIR
SANDALWOOD
PLYMOUTH
CEDARWOOD
MAPLEWOOD
OAKWOOD
3RD ST
2ND ST
1ST ST
EAST 1ST CIR
DOUGLAS
WATERMAN
LEWIS
HAWTHORNE
KTA
35
96
54
400
LAKESIDE
SPRING LAKE
KELLOGG DR
WILLOWBROOK
LINCOLN
WILSHIRE
Site
LOCKMOOR
EASTLYNNE
MICHELLE
HARRY
CHATEAU
LEEANNE
EAST LONGLAKE
JUSTIN
TARA FALLS
FUNSTON
ANDREA
OSIE
123rd ST EAST
125th ST EAST
MT VERNON
CLARK
KINKAID
BELLAIRE
CREST
CLAY
ELLSON
BEDFORD
RICHFIELD
CASPER
RUE
PAWNEE
BERKSHIRE
MAYFIELD
LYNNRAE
HERRINGTON
CREED
HURST
BRISTOL
127th ST EAST
143RD ST EAST
159th ST EAST
27th ST SO
31 ST ST SO
145th ST EAST
11,100 E
12,700 E
14,300 E
15,900 E
SPRING VALLEY
BAYLEY
CASTLE
LOOKOUT DR
BOSTON
SPRING HOLLOW
CREEK SIDE
WILLOWBEND
HICKORY STICK
ROBIN RIDGE
RIDGEHURST
ZIMMERLY
TWISTED OAK
BLUE SAGE
TIMBER LAKE
TIMBERRIDGE
BROOKHAVEN
SEDGWICK
BUTLER COUNTY
LAKEVIEW
ORME
CACTUS
EDGEWATER
LAKESHORE
STAGECOACH
LAGUNA
TWIN LAKE
FAIRLAND
MORRIS
SAGEBRUSH
PINN OAK
SWEETGUM
TAMARISK
ARBOR LAKES
BLACK OAK
BOWER
BUTTERNUT
WOODCREEK
TEAKWOOD
WEEPING WILLOW
ROSEWOOD
HAZEL NUT
PONY MEADOWS
SUNNYBROOK
PL
N
33


Linwood Acres
AVE
KELLOGG
TURNPIKE
EAST
Seltzer Sch
Fox Meadows Country Club
Windsor Park
SITE
Spring
Cave Sch
STREET
HARR
Seltzer
ROAD
Greenwich Heights
AVENUE
PAWNEE
GREENWICH
STREET
12TH
ROAD
G Y P S U M
Trailer Park
370 000 FEET
658 12'30"
659
(ROSE HILL)
6559 II SW
661
10'

SEDGWICK COUNTY, KANSAS — SHEET NUMBER 44



StormCad Hydraulic Calculations



Baughman Company, P.A.
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

System Report

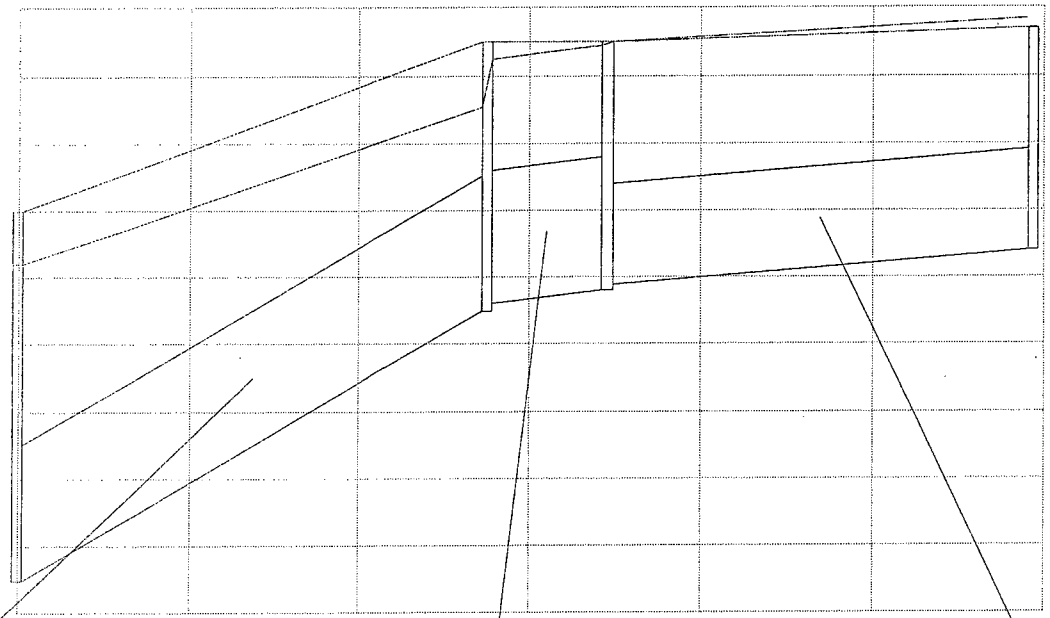
Pipe	Additional Flow (cfs)	Total Upstream Added (cfs)	Structure Discharge (cfs)	-Node- Upstream Downstream	-Section- Shape Size	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	-Ground- Upstream Downstream (ft)	-HGL- Upstream Downstream (ft)	-Slope- Energy Constructed (ft/ft)	-Section- Discharge Capacity (cfs)	Length (ft)	Average Velocity (ft/s)	Description
P-1	5.50	0.00	5.50	I-1	Circular	150.40	149.90	153.70	153.84	0.002742	5.50	124.00	3.11	
				I-2	18 inch			153.50	153.50	0.004032	6.67			
P-2	12.00	5.50	17.50	I-2	Circular	149.80	149.60	153.50	153.44	0.005985	17.50	35.00	5.57	
				I-3	24 inch			153.50	153.23	0.005714	17.10			
P-3	12.00	17.50	29.50	I-3	Circular	149.50	145.50	153.50	152.55	0.017006	29.50	138.00	9.39	
				Outlet	24 inch			151.00	150.20	0.028986	38.51			

Inlet: I-2
Rim: 153.50 ft
Sump: 149.80 ft

Inlet: I-1
Rim: 153.70 ft
Sump: 150.40 ft

Inlet: I-3
Rim: 153.50 ft
Sump: 149.50 ft

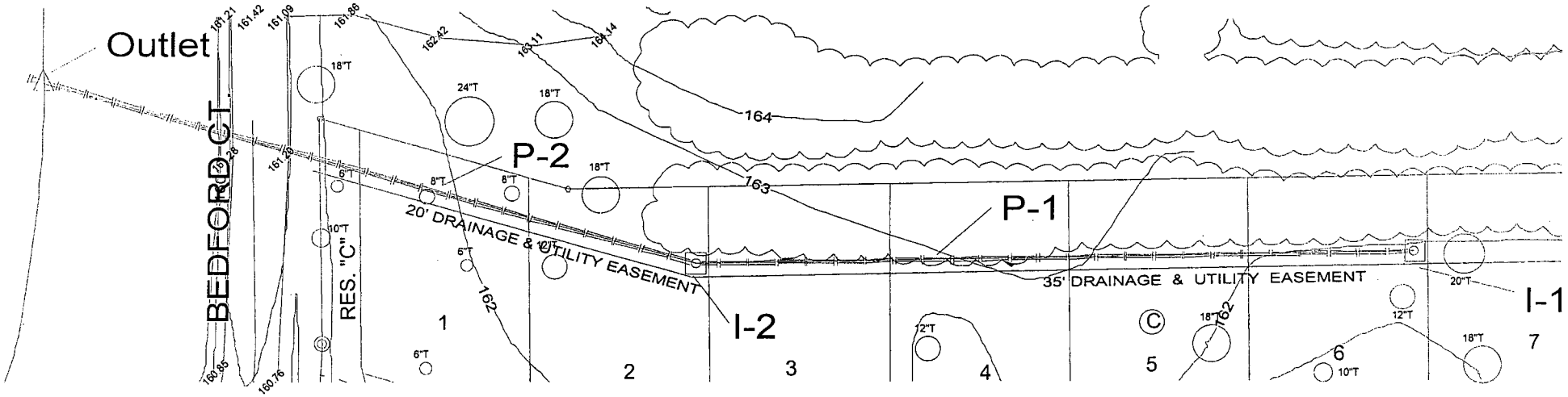
Outlet: Outlet
Rim: 151.00 ft
Sump: 145.50 ft



Pipe: P-3
Up Invert: 149.50 ft
Dn Invert: 145.50 ft
Length: 138.00 ft
Size: 24 inch

Pipe: P-2
Up Invert: 149.80 ft
Dn Invert: 149.60 ft
Length: 35.00 ft
Size: 24 inch

Pipe: P-1
Up Invert: 150.40 ft
Dn Invert: 149.90 ft
Length: 124.00 ft
Size: 18 inch



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System Report

Pipe	Additional Flow (cfs)	Total Upstream Added (cfs)	Structure Discharge (cfs)	-Node- Upstream Downstream	-Section- Shape Size	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	-Ground- Upstream Downstream (ft)	-HGL- Upstream Downstream (ft)	-Slope- Energy Constructed (ft/ft)	-Section- Discharge Capacity (cfs)	Length (ft)	Average Velocity (ft/s)	Description
P-1	6.50	0.00	6.50	I-1	Circular	157.50	156.40	160.80	160.77	0.003829	6.50	272.00	3.68	
				I-2	18 inch			161.50	159.73	0.004044	6.68			
P-2	4.30	6.50	10.80	I-2	Circular	156.10	155.20	161.50	159.73	0.010572	10.80	258.00	6.11	
				Outlet	18 inch			159.00	157.00	0.003488	6.20			

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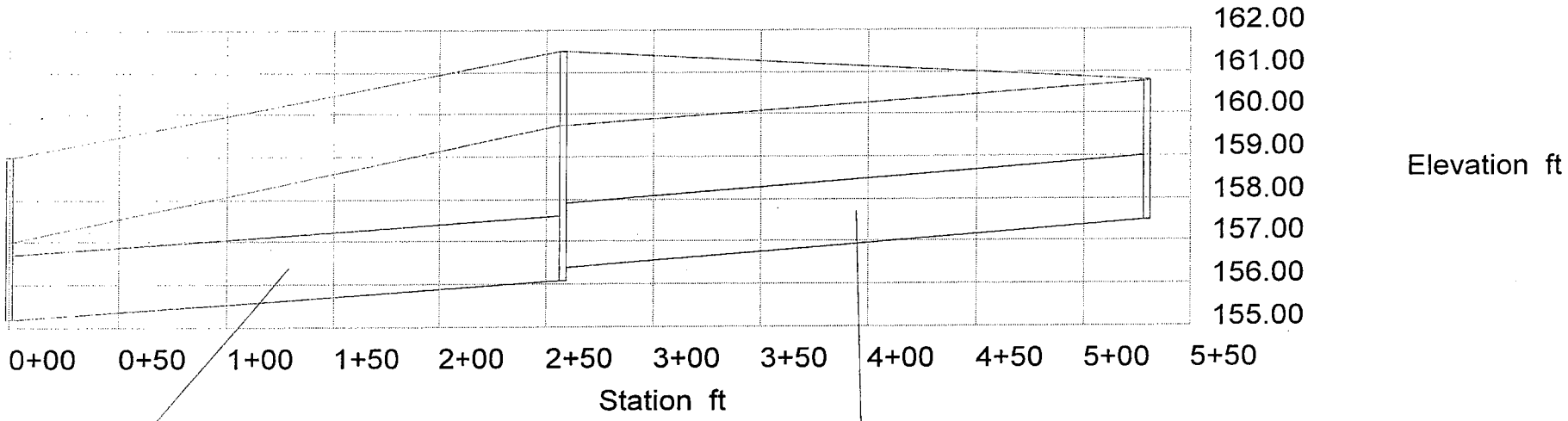
Outlet: Outlet
Rim: 159.00 ft
Sump: 155.20 ft

Inlet: I-2
Rim: 161.50 ft
Sump: 156.10 ft

Inlet: I-1
Rim: 160.80 ft
Sump: 157.50 ft



Pipe: P-2
Up Invert: 156.10 ft
Dn Invert: 155.20 ft
Length: 258.00 ft
Size: 18 inch

Pipe: P-1
Up Invert: 157.50 ft
Dn Invert: 156.40 ft
Length: 272.00 ft
Size: 18 inch

HEC-1 Storage Routing

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             MAY  1991                 *
*          VERSION 4.0.1E               *
*     Lahey F77L-EM/32 version 5.01     *
*       Dodson & Associates, Inc.       *
*  RUN DATE  12/23/02  TIME  11:39:54   *
*****************************************
```

```
*****************************************
*                                       *
*    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  GRACE PARK ADDITION
              * ADDITIONAL ROUTING
              *
   2          IT       5 23DEC02    0000     300                    2002
   3          IO       3       0
   4          JR    PREC  1.0000  1.3143  1.5143  1.7714  2.0000  2.2286
              *DIAGRAM
              *
              * EXISTING

   5          KK    LARK
   6          BA    .018                                          35min   24hr
   7          PB     3.5                                           1.42    3.5
   8          IN      60                                          4.375      60
   9          PC       0   0.011   0.022   0.035   0.048   0.063   0.080   0.098   0.120   0.147
  10          PC   0.181   0.235   0.663   0.772   0.820   0.854   0.880   0.902   0.921   0.937
  11          PC   0.952   0.965   0.978   0.989   1.000
  12          UD     .35
  13          LS       0      81       0
              *
              *

  14          KK   DEVEL
  15          BA    .018
  16          UD     .25
  17          LS       0      86       0
              *

  18          KK    POND
  19          RS       1    ELEV   148.5
  20          SA    0.61    0.71    0.81    0.91    1.02
  21          SE   148.5     149     150     151     152
  22          SS   148.5       5     2.6     1.5
              *
              *
  23          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (---->) DIVERSION OR PUMP FLOW
  NO.      (.) CONNECTOR        (<----) RETURN OF DIVERTED OR PUMPED FLOW

   5        LARK
              .
              .
  14          .       DEVEL
              .         V
              .         V
  18          .       POND
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
```

```
*****************************************
*                                       *
```

```
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            MAY  1991                 *
*          VERSION 4.0.1E              *
*  Lahey F77L-EM/32 version 5.01       *
*     Dodson & Associates, Inc.        *
*  RUN DATE  12/23/02  TIME  11:39:54  *
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*        609 SECOND STREET             *
*     DAVIS, CALIFORNIA 95616          *
*         (916) 551-1748               *
*                                      *
****************************************
```

```
                    GRACE PARK ADDITION

  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     23DEC 2  STARTING DATE
                    ITIME       0000  STARTING TIME
                       NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE     24DEC 2  ENDING DATE
                   NDTIME       0055  ENDING TIME
                    ICENT         20  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

    JP        MULTI-PLAN OPTION
                    NPLAN          1  NUMBER OF PLANS

    JR        MULTI-RATIO OPTION
                 RATIOS OF PRECIPITATION
                1.00      1.31      1.51      1.77      2.00      2.23

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

         ***************
         *             *
  5 KK   *     LARK    *
         *             *
         ***************

  8 IN        TIME DATA FOR INPUT TIME SERIES
                    JXMIN         60  TIME INTERVAL IN MINUTES
                   JXDATE     23DEC 2  STARTING DATE
                   JXTIME          0  STARTING TIME

           SUBBASIN RUNOFF DATA

  6 BA        SUBBASIN CHARACTERISTICS
                    TAREA       0.02  SUBBASIN AREA

              PRECIPITATION DATA

  7 PB              STORM       3.50  BASIN TOTAL PRECIPITATION

  9 PI          INCREMENTAL PRECIPITATION PATTERN
```

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00

  13 LS         SCS LOSS RATE
                     STRTL       0.47  INITIAL ABSTRACTION
                    CRVNBR      81.00  CURVE NUMBER
                     RTIMP       0.00  PERCENT IMPERVIOUS AREA

  12 UD         SCS DIMENSIONLESS UNITGRAPH
                      TLAG       0.35  LAG

                                                         ***

                                                     UNIT HYDROGRAPH
                                                 23 END-OF-PERIOD ORDINATES
              2.         8.        16.        21.        22.        19.        15.        10.         7.         5.
              4.         3.         2.         1.         1.         1.         0.         0.         0.         0.
              0.         0.         0.

    TOTAL RAINFALL =     3.50, TOTAL LOSS =     1.79, TOTAL EXCESS =     1.71

  PEAK FLOW     TIME                           MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR        72-HR        24.92-HR
+   (CFS)       (HR)
                           (CFS)
+      10.     12.08                    3.           1.           1.           1.
                         (INCHES)    1.381        1.708        1.708        1.708
                          (AC-FT)       1.           2.           2.           2.

                          CUMULATIVE AREA =      0.02 SQ MI

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

                           HYDROGRAPH AT STATION       LARK
                             FOR PLAN 1, RATIO = 1.00

    TOTAL RAINFALL =     3.50, TOTAL LOSS =     1.79, TOTAL EXCESS =     1.71

  PEAK FLOW     TIME                           MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR        72-HR        24.92-HR
+   (CFS)       (HR)
                           (CFS)
+      10.     12.08                    3.           1.           1.           1.
                         (INCHES)    1.381        1.708        1.708        1.708
                          (AC-FT)       1.           2.           2.           2.

                          CUMULATIVE AREA =      0.02 SQ MI

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

                           HYDROGRAPH AT STATION       LARK
                             FOR PLAN 1, RATIO = 1.31

    TOTAL RAINFALL =     4.60, TOTAL LOSS =     1.97, TOTAL EXCESS =     2.63

  PEAK FLOW     TIME                           MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR        72-HR        24.92-HR
+   (CFS)       (HR)
                           (CFS)
+      15.     12.08                    4.           1.           1.           1.
                         (INCHES)    2.120        2.634        2.634        2.634
                          (AC-FT)       2.           3.           3.           3.

                          CUMULATIVE AREA =      0.02 SQ MI

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

                           HYDROGRAPH AT STATION       LARK
                             FOR PLAN 1, RATIO = 1.51

    TOTAL RAINFALL =     5.30, TOTAL LOSS =     2.05, TOTAL EXCESS =     3.25

  PEAK FLOW     TIME                           MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR        72-HR        24.92-HR
+   (CFS)       (HR)
                           (CFS)
+      18.     12.08                    5.           2.           2.           2.
                         (INCHES)    2.605        3.251        3.251        3.251
                          (AC-FT)       3.           3.           3.           3.

                          CUMULATIVE AREA =      0.02 SQ MI
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     ***            ***            ***            ***            ***

                       HYDROGRAPH AT STATION     LARK
                         FOR PLAN 1, RATIO = 1.77

   TOTAL RAINFALL =    6.20, TOTAL LOSS =    2.13, TOTAL EXCESS =    4.07

  PEAK FLOW      TIME                           MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR       72-HR      24.92-HR
+   (CFS)       (HR)
                              (CFS)
+     23.       12.08                   6.           2.          2.           2.
                           (INCHES)  3.243       4.065       4.065        4.065
                            (AC-FT)     3.          4.          4.           4.

                           CUMULATIVE AREA =    0.02 SQ MI

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

                       HYDROGRAPH AT STATION     LARK
                         FOR PLAN 1, RATIO = 2.00

   TOTAL RAINFALL =    7.00, TOTAL LOSS =    2.19, TOTAL EXCESS =    4.81

  PEAK FLOW      TIME                           MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR       72-HR      24.92-HR
+   (CFS)       (HR)
                              (CFS)
+     27.       12.08                   7.           2.          2.           2.
                           (INCHES)  3.818       4.804       4.804        4.804
                            (AC-FT)     4.          5.          5.           5.

                           CUMULATIVE AREA =    0.02 SQ MI

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

                       HYDROGRAPH AT STATION     LARK
                         FOR PLAN 1, RATIO = 2.23

   TOTAL RAINFALL =    7.80, TOTAL LOSS =    2.25, TOTAL EXCESS =    5.55

  PEAK FLOW      TIME                           MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR       72-HR      24.92-HR
+   (CFS)       (HR)
                              (CFS)
+     31.       12.08                   9.           3.          3.           3.
                           (INCHES)  4.397       5.553       5.553        5.553
                            (AC-FT)     4.          5.          5.           5.

                           CUMULATIVE AREA =    0.02 SQ MI

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

             **************
             *            *
  14 KK      *    DEVEL   *
             *            *
             **************

               SUBBASIN RUNOFF DATA

  15 BA          SUBBASIN CHARACTERISTICS
                      TAREA        0.02  SUBBASIN AREA

                 PRECIPITATION DATA

   7 PB               STORM        3.50  BASIN TOTAL PRECIPITATION

   9 PI            INCREMENTAL PRECIPITATION PATTERN
                      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                      0.00      0.00      0.04      0.04      0.04      0.04      0.04      0.04      0.04      0.04
                      0.04      0.04      0.04      0.04      0.01      0.01      0.01      0.01      0.01      0.01
```

0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

```
17 LS          SCS LOSS RATE
                  STRTL        0.33  INITIAL ABSTRACTION
                  CRVNBR      86.00  CURVE NUMBER
                  RTIMP        0.00  PERCENT IMPERVIOUS AREA

16 UD          SCS DIMENSIONLESS UNITGRAPH
                  TLAG         0.25  LAG
```

***

UNIT HYDROGRAPH
17 END-OF-PERIOD ORDINATES

5.	18.	29.	29.	22.	13.	8.	5.	3.	2.
1.	1.	1.	0.	0.	0.	0.			

```
  TOTAL RAINFALL =   3.50, TOTAL LOSS =   1.40, TOTAL EXCESS =   2.10

PEAK FLOW    TIME                      MAXIMUM AVERAGE FLOW
                              6-HR       24-HR       72-HR     24.92-HR
+  (CFS)     (HR)
                   (CFS)
+    12.    12.00                3.          1.          1.          1.
                 (INCHES)     1.684       2.098       2.098       2.098
                  (AC-FT)        2.          2.          2.          2.

                CUMULATIVE AREA =    0.02 SQ MI
```

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

HYDROGRAPH AT STATION DEVEL
FOR PLAN 1, RATIO = 1.00

```
  TOTAL RAINFALL =   3.50, TOTAL LOSS =   1.40, TOTAL EXCESS =   2.10

PEAK FLOW    TIME                      MAXIMUM AVERAGE FLOW
                              6-HR       24-HR       72-HR     24.92-HR
+  (CFS)     (HR)
                   (CFS)
+    12.    12.00                3.          1.          1.          1.
                 (INCHES)     1.684       2.098       2.098       2.098
                  (AC-FT)        2.          2.          2.          2.

                CUMULATIVE AREA =    0.02 SQ MI
```

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

HYDROGRAPH AT STATION DEVEL
FOR PLAN 1, RATIO = 1.31

```
  TOTAL RAINFALL =   4.60, TOTAL LOSS =   1.50, TOTAL EXCESS =   3.10

PEAK FLOW    TIME                      MAXIMUM AVERAGE FLOW
                              6-HR       24-HR       72-HR     24.92-HR
+  (CFS)     (HR)
                   (CFS)
+    18.    12.00                5.          1.          1.          1.
                 (INCHES)     2.465       3.095       3.095       3.095
                  (AC-FT)        2.          3.          3.          3.

                CUMULATIVE AREA =    0.02 SQ MI
```

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

HYDROGRAPH AT STATION DEVEL
FOR PLAN 1, RATIO = 1.51

```
  TOTAL RAINFALL =   5.30, TOTAL LOSS =   1.55, TOTAL EXCESS =   3.75

PEAK FLOW    TIME                      MAXIMUM AVERAGE FLOW
                              6-HR       24-HR       72-HR     24.92-HR
+  (CFS)     (HR)
                   (CFS)
+    22.    12.00                6.          2.          2.          2.
                 (INCHES)     2.972       3.748       3.748       3.748
```

```
                    (AC-FT)       3.          4.          4.          4.

                    CUMULATIVE AREA =    0.02 SQ MI

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

                     HYDROGRAPH AT STATION    DEVEL
                       FOR PLAN 1, RATIO = 1.77

   TOTAL RAINFALL =    6.20, TOTAL LOSS =    1.60, TOTAL EXCESS =    4.60

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                  6-HR       24-HR       72-HR     24.92-HR
+  (CFS)        (HR)
                          (CFS)
+    26.       12.00                 7.          2.          2.          2.
                        (INCHES)    3.626       4.600       4.600       4.600
                         (AC-FT)     3.          4.          4.          4.

                    CUMULATIVE AREA =    0.02 SQ MI

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

                     HYDROGRAPH AT STATION    DEVEL
                       FOR PLAN 1, RATIO = 2.00

   TOTAL RAINFALL =    7.00, TOTAL LOSS =    1.63, TOTAL EXCESS =    5.37

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                  6-HR       24-HR       72-HR     24.92-HR
+  (CFS)        (HR)
                          (CFS)
+    31.       12.00                 8.          3.          3.          3.
                        (INCHES)    4.210       5.366       5.366       5.366
                         (AC-FT)     4.          5.          5.          5.

                    CUMULATIVE AREA =    0.02 SQ MI

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

                     HYDROGRAPH AT STATION    DEVEL
                       FOR PLAN 1, RATIO = 2.23

   TOTAL RAINFALL =    7.80, TOTAL LOSS =    1.66, TOTAL EXCESS =    6.14

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                  6-HR       24-HR       72-HR     24.92-HR
+  (CFS)        (HR)
                          (CFS)
+    35.       12.00                 9.          3.          3.          3.
                        (INCHES)    4.794       6.138       6.138       6.138
                         (AC-FT)     5.          6.          6.          6.

                    CUMULATIVE AREA =    0.02 SQ MI


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

              ***************
              *             *
  18 KK       *      POND   *
              *             *
              ***************

                HYDROGRAPH ROUTING DATA

  19 RS           STORAGE ROUTING
                      NSTPS            1  NUMBER OF SUBREACHES
                       ITYP         ELEV  TYPE OF INITIAL CONDITION
                     RSVRIC       148.50  INITIAL CONDITION
                          X         0.00  WORKING R AND D COEFFICIENT

  20 SA                AREA       0.6        0.7        0.8        0.9        1.0

  21 SE           ELEVATION     148.50     149.00     150.00     151.00     152.00

  22 SS           SPILLWAY
                       CREL       148.50  SPILLWAY CREST ELEVATION
                      SPWID         5.00  SPILLWAY WIDTH
                       COQW         2.60  WEIR COEFFICIENT
                       EXPW         1.50  EXPONENT OF HEAD

                                                      ***

                                             COMPUTED STORAGE-ELEVATION DATA
```

STORAGE	0.00	0.33	1.09	1.95	2.91					
ELEVATION	148.50	149.00	150.00	151.00	152.00					

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	0.00	0.00	0.01	0.12	0.39	0.93	1.82	3.15	5.01	7.47
ELEVATION	148.50	148.50	148.51	148.54	148.60	148.67	148.77	148.89	149.03	149.19
OUTFLOW	10.64	14.60	19.43	25.22	32.07	40.05	49.26	59.78	71.71	85.12
ELEVATION	149.38	149.58	149.81	150.06	150.33	150.62	150.93	151.27	151.62	152.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	0.00	0.01	0.03	0.06	0.11	0.17	0.25	0.33	0.35	0.47
OUTFLOW	0.00	0.01	0.12	0.39	0.93	1.82	3.15	4.60	5.01	7.47
ELEVATION	148.50	148.51	148.54	148.60	148.67	148.77	148.89	149.00	149.03	149.19
STORAGE	0.60	0.76	0.93	1.09	1.13	1.36	1.61	1.89	1.95	2.19
OUTFLOW	10.64	14.60	19.43	23.88	25.22	32.07	40.05	49.26	51.39	59.78
ELEVATION	149.38	149.58	149.81	150.00	150.06	150.33	150.62	150.93	151.00	151.27
STORAGE	2.54	2.91								
OUTFLOW	71.71	85.12								
ELEVATION	151.62	152.00								

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

HYDROGRAPH AT STATION POND
FOR PLAN 1, RATIO = 1.00

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)					
		(CFS)				
9.	12.25		3.	1.	1.	1.
		(INCHES)	1.643	2.051	2.051	2.051
		(AC-FT)	2.	2.	2.	2.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	24.92-HR
(AC-FT)	(HR)					
1.	12.25		0.	0.	0.	0.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	24.92-HR
(FEET)	(HR)					
149.26	12.25		148.87	148.64	148.63	148.63

CUMULATIVE AREA = 0.02 SQ MI

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

HYDROGRAPH AT STATION POND
FOR PLAN 1, RATIO = 1.31

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)					
		(CFS)				
14.	12.25		5.	1.	1.	1.
		(INCHES)	2.428	3.039	3.039	3.039
		(AC-FT)	2.	3.	3.	3.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	24.92-HR
(AC-FT)	(HR)					
1.	12.25		0.	0.	0.	0.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	24.92-HR
(FEET)	(HR)					
149.53	12.25		148.97	148.68	148.67	148.67

CUMULATIVE AREA = 0.02 SQ MI

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

HYDROGRAPH AT STATION POND
FOR PLAN 1, RATIO = 1.51

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)					
		(CFS)				
17.	12.25		6.	2.	2.	2.
		(INCHES)	2.933	3.686	3.686	3.686
		(AC-FT)	3.	4.	4.	4.

PEAK STORAGE TIME MAXIMUM AVERAGE STORAGE

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	24.92-HR
149.69	12.25	149.04	148.70	148.70	148.70

CUMULATIVE AREA = 0.02 SQ MI

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

HYDROGRAPH AT STATION POND
FOR PLAN 1, RATIO = 1.77

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
21.	12.25	7.	2.	2.	2.
		3.585	4.531	4.531	4.531
		3.	4.	4.	4.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	24.92-HR
1.	12.25	0.	0.	0.	0.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	24.92-HR
149.87	12.25	149.11	148.74	148.73	148.73

CUMULATIVE AREA = 0.02 SQ MI

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

HYDROGRAPH AT STATION POND
FOR PLAN 1, RATIO = 2.00

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
25.	12.25	8.	3.	2.	2.
		4.168	5.291	5.291	5.291
		4.	5.	5.	5.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	24.92-HR
1.	12.25	0.	0.	0.	0.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	24.92-HR
150.03	12.25	149.17	148.76	148.75	148.75

CUMULATIVE AREA = 0.02 SQ MI

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

HYDROGRAPH AT STATION POND
FOR PLAN 1, RATIO = 2.23

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
28.	12.25	9.	3.	3.	3.
		4.752	6.058	6.058	6.058
		5.	6.	6.	6.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	24.92-HR
1.	12.17	1.	0.	0.	0.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	24.92-HR
150.18	12.25	149.23	148.79	148.78	148.78

CUMULATIVE AREA = 0.02 SQ MI

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS

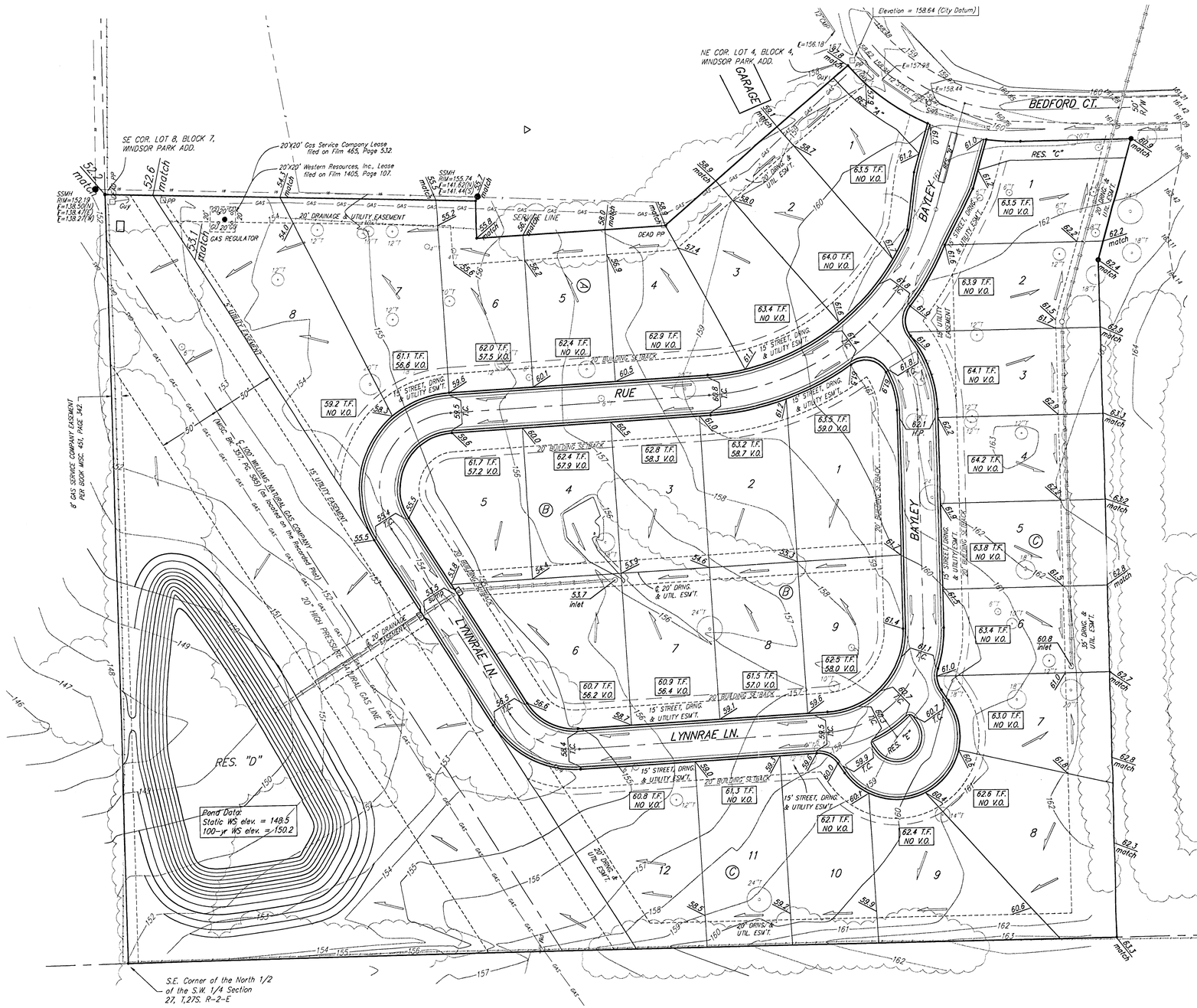
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

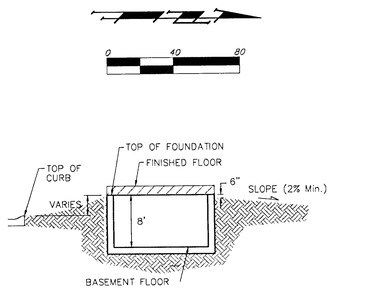
OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6
					1.00	1.31	1.51	1.77	2.00	2.23
HYDROGRAPH AT										
+	LARK	0.02	1	FLOW	10.	15.	18.	23.	27.	31.
				TIME	12.08	12.08	12.08	12.08	12.08	12.08
HYDROGRAPH AT										
+	DEVEL	0.02	1	FLOW	12.	18.	22.	26.	31.	35.
				TIME	12.00	12.00	12.00	12.00	12.00	12.00
ROUTED TO										
+	POND	0.02	1	FLOW	9.	14.	17.	21.	25.	28.
				TIME	12.25	12.25	12.25	12.25	12.25	12.25
			** PEAK STAGES IN FEET **							
			1	STAGE	149.26	149.53	149.69	149.87	150.03	150.18
				TIME	12.25	12.25	12.25	12.25	12.25	12.25

*** NORMAL END OF HEC-1 ***

Drainage Plan Sheet

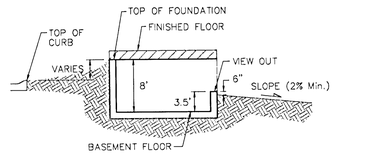
Sub-Division Grading Plan





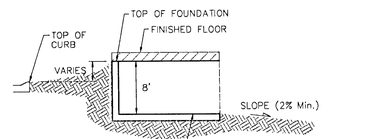
TYPICAL NON-VIEW OUT DETAIL

NO SCALE



TYPICAL VIEW OUT DETAIL

NO SCALE



TYPICAL WALK OUT DETAIL

NO SCALE

BENCHMARK:
top of curb southeast corner Reserve "C" Cedarview Addition. Elev.=161.87(City Datum) Elev.=1349.27(NGVD29)

MINIMUM BUILDING PAD ELEVATIONS FOR LOWEST OPENING TO THE STRUCTURES			
LOT	BLOCK	ELEVATION CITY DATUM	ELEVATION NGVD29
8	A	153.0	1340.40
12	C	153.0	1340.40

NOTES:
Proposed Top of Foundation Elevations Are Shown On Plans. Contractor to Set Finished Floor Elevations.

All Street Elevations Shown on Plans Are for Top of Curb (Full-Height).

This Grading Plan is Designed with View-Outs. Elevations Shown at Rear of House (XX.X V.O.)

Lot dimensions have been ommited on this plan, refer to the recorded plat for this information.

PRELIMINARY PLAN
NOT FOR CONSTRUCTION

GRACE PARK ADDITION

GRADING PLAN

WICHITA, KANSAS

BAUGHMAN COMPANY P.A.
ENGINEERING, SURVEYING, & PLANNING
316-262-7271 • 315 ELLIS • WICHITA, KANSAS 67211

PROJECT NUMBER					SHEET
					1 OF 1
DESIGN BLG	DRAWN BLG	APPROVED	DATE 01/02/2003	SCALE NOTED	