A11/D006

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February 21, 2002

Ms. Elizabeth Smith
Bohannan-Huston, Inc.
7500 Jefferson NE
Albuquerque, NM 87113

Re: Park Hill Storm Sewer Inlets in Black Arroyo Blvd.

Dear Ms. Smith:

Please consider lowering the westerly 400' of 42" RCP on the "Black Arroyo Master Storm Drain" by 1.4 feet. Also please block out an opening in MH#1 to allow connection of the 18: RCP at Inv=25.0 for an inlet on the south side. Please verify that these changes can and will be made.

Attached please find a markup of sheets 1-4 of your plan showing a revised HGL, the Park Hill Storm P &Ps, HGL calculations and inlet capacities from the Park Hill Drainage Report. Capacities of inlets in Black Arroyo Blvd. are described as follows.

At Park Hill's property line there is about 4.43cfs in the north side of Blacks Arroyo Blvd. and 21.79cfs in the south half where the street slope is 3.41% and the flow depth is 0.29' and 0.48' respectively. Normal ½ street capacity is limited to about 18cfs without exceeding the allowable energy depth of 0.87". One Type A inlet on the south half will intercept 8.6cfs leaving 12.19 cfs flowing at about 0.40' depth in the south half. Which joins with about 2.1cfs from each half of Black Arroyo Blvd. between the west edge of Las Suenos and the first inlets at station 17+61. The slope at the inlets is 3.41% so, the flow depths are 0.34' and 0.43' for flows of 6.53cfs and 14.29cfs in the north and south half of the road respectively. The single type A inlets intercept 4.3cfs and 7.0cfs leaving 2.23cfs and 7.29cfs bypass respectively. Black Arroyo Blvd. contributes another 1.6cfs in each half of the road before the next inlets. So there is 3.83cfs and 8.89cfs approaching at 2.0% slope and 0.30' and 0.39' depths respectively. The inlets intercept 3.0 and 5.0cfs respectively, leaving very little bypass flow to downstream.

Sincerely ,

MARK GOODWIN & ASSOCIATES, PA

James D. Hughes, PE
Senior Engineer

RECEIVED
MAR 01 2002
HYDROLOGY SECTION

JDH/bm

xc: Brad Bingham — City of Albuquerque
Jeff Dowart — KB Home
John Ellis — Franklin's Earth Moving

f:\\Park Hill\Blacks Arroyo flow

CAPACITIES OF INLETS

PARK SOUTH STUB STREET

INLETS # 5 & 6

Park South Stub (24'FF) carries 22.79 cfs at 0.5% slope with a depth of 0.51'. The pair of type "A" inlets (# 5 & 6) will intercept 5.2 cfs each, per plate 22.3 D-5. This leaves 12.39 cfs by-pass flow which joins the 3.58cfs from Basin #102B and the 7.03 cfs from the upper 40% of Basin 102C for a total flow of 23.00cfs at 5.31% slope with a depth of 0.37' , a velocity of 5.6fps, and an energy depth of 0.86' at station 13+00 on Park South Place.

PARK SOUTH AVENUE EAST OF PARK NORTH STREET

INLETS # 7, 8

Park South Ave (26' FF) carries 23.00 cfs at 5.31%, slope with a depth of 0.37' at Station 13+00. The pair of type A inlets
(# 7 & 8) will intercept 6.7 cfs each. This leaves 9.6 cfs by- pass flow which joins the 10.6 cfs from the lower 60% of Basin #102C for a total flow of 20.2 cfs at 8.0% slope with a depth of 0.33' a valocity of 6.2 fps and an energy depth of 0.92' near the East edge of Basin #102C.

PARK SOUTH AVENUE WEST OF MILKY WAY STREET

NO INLETS

Park South Avenue (28' FF) carries 20.2 cfs at about 3.1% with a depth of 0.38'. The flow turns the corner and combines with the 1.27 cfs from Basin 102-L for a total of 21.47 cfs approaching Park Hill Ave in Milky Way St.

MILKY WAY STREET AT PARK HILL AVE.

NO INLETS

Milky Way Street 28'FF carries 21.47 cfs at 0.5% slope with a depth of 0.50'. Park Hill Ave contributes another 19.92 cfs from Basin "D" for a total of 41.3 cfs approaching the intersection of Milky way and Malpais Park Ave.

MILKY WAY STREET SOUTH OF MALPAIS PARK AVE

INLETS # 13, 14, 15 & 16

Milky Way Street carries 41.39 cfs at 0.5% slope with a depth of 0.64'. The first pair of type A inlets (# 13 & 14) will intercept 7.1 cfs each. This leaves 27.19 cfs bypass flow with a depth of 0.54' . The second pair of type C inlets (# 15 & 16) will intercept 5.5 cfs each. This leaves 16.19 cfs by-pass flow which joins the 28.86 cfs from Malpais Park Ave. (Basins 102 E, F & G) for a total of 45.05 cfs approaching the Red Rock Park Avenue intersection in Milky Way St.

MILKY WAY STREET SOUTH OF RED ROCK PARK AVENUE

INLETS (# 17, 18, 19 & 20)

Milky Way Street carries 45.05 cfs at 0.50% slope with a depth of 0.67'. The first pair of type A inlets (17 & 18) will intercept 7.8 cfs each. This leaves 29.45 cfs by-pass flow with a depth of 0.55'. The second pair of type C inlets (# 19 & 20) will intercept 5.8 cfs each. This leaves 17.85 cfs by-pass flow which joins the 20.53 cfs from Red Rock Park Ave for a total of 38.40 cfs. This joins with the 6.98 cfs from basin 102 J for a total of 45.36 cfs surface drainage in Milky Way Street approaching the intersection of Black Arroyo Blvd.

RED ROCK PARK AVENUE EAST OF MALPAIS PARK AVE.

INLETS # 1 & 2

Red Rock Park Park Blvd. Caries 8.5 cfs from Basin #101A and 12.42 cfs from the upper half of Basin #102H for a total of 20.92 cfs at station 16+00 at 6.3% slope with a depth of 0.35', a velocity of 5.7 fps, and an energy depth of 0.85'. A pair of type A inlets (#172) will intercept 6.4cfs each leaving 8.12cfs by pass flow which joins the 12.41cfs from the lower half of Basin #102H for a total of 20.53cfs approching the intersection of Milky Way.

MILKY WAY STREET SOUTH OF BLACK ARROYO BLVD

INLETS(# 21, 22, 23 & 24)

Milky Way Street carries 45.36 cfs at 0.5% slope with a depth of 0.67'. The first pair of type A inlets (# 21 & 22) will intercept 7.8 cfs each. This leaves 29.76 cfs by-pass flow to the second pair of inlets, with a depth of 0.57'. The second pair of type C inlets (# 23 & 24) will intercept 6.2 cfs each. This leaves 17.36 cfs by-pass flow which combines with the by-pass flow from Inlets (# 29 & 30) in Black Arroyo Blvd. West of Milky Way St.

BLACK ARROYO BLVD. WEST OF MILKY WAY ST.

INLETS(# 25,26,27,28,29 & 30)

55.25 flowing

Black Arroyo Blvd carries ~~5.85~~ cfs at 5.84% with a depth of 0.46'. The first pair of Type "A" inlets (# 25 & 26) will intercept. 9.0 cfs each leaving 37.25 cfs in the street ~~flooring~~ at a depth of 0.41'. The second pair type C inlets (# 27 & 28) will intercept 7.8 cfs. This leaves 21.65 cfs bypass flow at a depth of 0.36'. The third pair of type C inlets (#29 & 30) will intercept 6.4cfs each. This leaves 8.85 cfs by pass flow which joins the 17.36cfs bypass flow from inlets #23 and 24 in Milky Way St. for a total of 26.21cfs East of Milky Way St.

STORM DRAIN ANALYSIS PLUS

Original version by Los Angeles County Public Works
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Version
Serial Number

Feb 26, 2002 16:15:58

Input file : PARKMILK.DAT
Output file: PARKMILK.OUT

Black Arroyo 1A Lower and 42" changed to 48" for first run onsite

INPUT FILE LISTING

```
T1 PARK HILL UNIT 1
T2
T3 MAIN LINE ANALYSIS MILKY WAY ST. AND PARK SOUTH PL.
SO   000.00   81.45  3                                  86.21
R    179.00   82.52  3       .013
JX   183.00   82.53  3  1    .013    140.               82.53          90.
TS   187.00   82.62  1       .013
R    223.00   83.37  1       .013                                              1
JX   229.00   83.38  1  9 9  .013     5.0   3.0     89.31  87.5  90.   90.
R    622.00   92.56  1       .013                                              1
JX   625.00   92.57  1  9 9  .013     7.0   4.3      95.1  95.1  90.   90.
TS   628.00   93.06  2       .013
R   1000.00  104.87  2       .013                                              1
R   1396.00  118.63  2       .013                                              1
JX  1399.00  118.64  2  9    .013     8.6             22.0          90.
TS  1402.00  118.73  1       .013
R   1509.00  120.55  1       .013                                              1
JX  1515.00  122.46  1  8    .013    46.4             26.0          01.
R   1559.00  122.66  1       .013                                       90.    1
JX  1562.00  122.67  1  9 9  .013     6.2   6.2      26.0  26.0  90.   90.
TS  1565.00  123.16  2       .013
R   1599.00  123.29  2       .013                                              1
JX  1605.00  123.34  2  9 9  .013     7.8   7.8      24.0  24.0  90.   90.
R   1785.00  124.06  2       .013                                              1
JX  1791.00  124.11  2  8    .013    12.8             27.7          90.
R   1823.00  124.24  2       .013                                              1
JX  1829.00  124.29  2  9 9  .013     5.8   5.8      28.2  28.2  90.   90.
R   1859.00  124.41  2       .013                                              1
JX  1862.00  124.42  2  9 9  .013     7.8   7.8      28.0  28.0  90.   90.
TS  1865.00  124.91  6       .013
R   2085.00  125.87  6       .013                                              1
R   2169.00  126.21  6       .013                                              1
JX  2174.00  126.31  6  9 9  .013     5.5   5.5      28.2  28.2  90.   90.
R   2246.00  126.60  6       .013                                              1
JX  2249.00  126.61  6  9 9  .013     7.1   7.1      28.0  28.0  90.   90.
TS  2251.00  127.10  7       .013
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 R    2425.00  129.00  7      .013                                              1
 R    2500.00  130.76  7      .013                                              1
 R    2672.00  131.80  7      .013                                              1
 TS   2676.00  132.80  9      .013
 R    3121.00  163.90  9      .013                                        90.   1
 R    3296.00  173.50  9      .013                                              1
 JX   3300.00  176.50  9  9 9 .013     6.7    6.7     76.5        90.    90.
 R    3517.00  187.00  9      .013                                              1
 R    3645.00  192.60  9      .013                                              1
 JX   3649.00  192.80  9  9   .013     5.2            93.0        90.
 R    3669.00  193.00  9      .013                                        90.   1
 SH                    9
1                                                                 SP
                                           WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING                        PAGE    1
0 CARD   SECT   CHN   NO OF  AVE PIER  HEIGHT 1  BASE     ZL     ZR     INV   Y(1)  Y(2)  Y(3)  Y(4)  Y(5)  Y(6)  Y(7)  Y(8)  Y(9)  Y(10)
  CODE    NO    TYPE  PIERS   WIDTH    DIAMETER  WIDTH                  DROP

  CD       1     4                        4.00
  CD       2     4                        3.50
  CD       3     4                        5.50
  CD       4     4                        5.00
  CD       5     4                        4.00
  CD       6     4                        3.00
  CD       7     4                        2.50
  CD       8     4                        2.00
  CD       9     4                        1.50
  CD      10     2      0        .00     50.00    4.00                   .00
  CD      11     2      0        .00     50.00   22.00                   .00
  CD      12     3      0        .00      7.50   10.00   3.00   3.00     .00
1                                                                                                                  PAGE NO    1
0                               WATER SURFACE PROFILE - TITLE CARD LISTING
0HEADING LINE NO 1 IS -
0                                 PARK HILL UNIT 1
0HEADING LINE NO 2 IS -
0
0HEADING LINE NO 3 IS -
0                                 MAIN LINE ANALYSIS MILKY WAY ST. AND PARK SOUTH PL.
1                                                                                                                  PAGE NO    2
0                               WATER SURFACE PROFILE - ELEMENT CARD LISTING
0 ELEMENT NO    1 IS A SYSTEM OUTLET      *         *     *
                      U/S DATA    STATION    INVERT   SECT                                   W S ELEV
                                      .00     81.45     3                                       86.21
0 ELEMENT NO    2 IS A REACH              *         *     *
                      U/S DATA    STATION    INVERT   SECT               N                                         RADIUS   ANGLE   ANG PT   MAN H
                                   179.00     82.52     3              .013                                           .00     .00      .00      0
0 ELEMENT NO    3 IS A JUNCTION           *         *     *     *                *                 *            *
                      U/S DATA    STATION    INVERT   SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3    PHI 4
                                   183.00     82.53     3     1     0  .013    140.0        .0     82.53      .00   90.00      .00
0 ELEMENT NO    4 IS A TRANSITION         *         *     *
                      U/S DATA    STATION    INVERT   SECT               N
                                   187.00     82.62     1              .013
0 ELEMENT NO    5 IS A REACH              *         *     *
                      U/S DATA    STATION    INVERT   SECT               N                                         RADIUS   ANGLE   ANG PT   MAN H
                                   223.00     83.37     1              .013                                           .00     .00      .00      1
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0 ELEMENT NO   6 IS A JUNCTION        *          *     *     *            *                   *               *
                      U/S DATA    STATION     INVERT  SECT LAT-1 LAT-2   N      Q3        Q4    INVERT-3 INVERT-4  PHI 3   PHI 4
                                    229.00     83.38    1     9     9  .013     5.0       3.0     89.31    87.50  90.00   90.00
0 ELEMENT NO   7 IS A REACH           *          *     *
                      U/S DATA    STATION     INVERT  SECT               N                                RADIUS  ANGLE  ANG PT  MAN H
                                    622.00     92.56    1              .013                                  .00    .00     .00     1
0 ELEMENT NO   8 IS A JUNCTION        *          *     *     *            *                   *               *
                      U/S DATA    STATION     INVERT  SECT LAT-1 LAT-2   N      Q3        Q4    INVERT-3 INVERT-4  PHI 3   PHI 4
                                    625.00     92.57    1     9     9  .013     7.0       4.3     95.10    95.10  90.00   90.00
0 ELEMENT NO   9 IS A TRANSITION      *          *     *
                      U/S DATA    STATION     INVERT  SECT               N
                                    628.00     93.06    2              .013
0 ELEMENT NO  10 IS A REACH           *          *     *
                      U/S DATA    STATION     INVERT  SECT               N                                RADIUS  ANGLE  ANG PT  MAN H
                                   1000.00    104.87    2              .013                                  .00    .00     .00     1
1                                                                                                                  PAGE NO    3
0                          WATER SURFACE PROFILE - ELEMENT CARD LISTING
0 ELEMENT NO  11 IS A REACH           *          *     *
                      U/S DATA    STATION     INVERT  SECT               N                                RADIUS  ANGLE  ANG PT  MAN H
                                   1396.00    118.63    2              .013                                  .00    .00     .00     1
0 ELEMENT NO  12 IS A JUNCTION        *          *     *     *            *                   *               *
                      U/S DATA    STATION     INVERT  SECT LAT-1 LAT-2   N      Q3        Q4    INVERT-3 INVERT-4  PHI 3   PHI 4
                                   1399.00    118.64    2     9     0  .013     8.6        .0     22.00      .00  90.00     .00
0 ELEMENT NO  13 IS A TRANSITION      *          *     *
                      U/S DATA    STATION     INVERT  SECT               N
                                   1402.00    118.73    1              .013
0 ELEMENT NO  14 IS A REACH           *          *     *
                      U/S DATA    STATION     INVERT  SECT               N                                RADIUS  ANGLE  ANG PT  MAN H
                                   1509.00    120.55    1              .013                                  .00    .00     .00     1
0 ELEMENT NO  15 IS A JUNCTION        *          *     *     *            *                   *               *
                      U/S DATA    STATION     INVERT  SECT LAT-1 LAT-2   N      Q3        Q4    INVERT-3 INVERT-4  PHI 3   PHI 4
                                   1515.00    122.46    1     8     0  .013    46.4        .0     26.00      .00   1.00     .00
0 ELEMENT NO  16 IS A REACH           *          *     *
                      U/S DATA    STATION     INVERT  SECT               N                                RADIUS  ANGLE  ANG PT  MAN H
                                   1559.00    122.66    1              .013                                  .00    .00   90.00     1
0 ELEMENT NO  17 IS A JUNCTION        *          *     *     *            *                   *               *
                      U/S DATA    STATION     INVERT  SECT LAT-1 LAT-2   N      Q3        Q4    INVERT-3 INVERT-4  PHI 3   PHI 4
                                   1562.00    122.67    1     9     9  .013     6.2       6.2     26.00    26.00  90.00   90.00
0 ELEMENT NO  18 IS A TRANSITION      *          *     *
                      U/S DATA    STATION     INVERT  SECT               N
                                   1565.00    123.16    2              .013
0 ELEMENT NO  19 IS A REACH           *          *     *
                      U/S DATA    STATION     INVERT  SECT               N                                RADIUS  ANGLE  ANG PT  MAN H
                                   1599.00    123.29    2              .013                                  .00    .00     .00     1
0 ELEMENT NO  20 IS A JUNCTION        *          *     *     *            *                   *               *
                      U/S DATA    STATION     INVERT  SECT LAT-1 LAT-2   N      Q3        Q4    INVERT-3 INVERT-4  PHI 3   PHI 4
                                   1605.00    123.34    2     9     9  .013     7.8       7.8     24.00    24.00  90.00   90.00
1                                                                                                                  PAGE NO    4
0                          WATER SURFACE PROFILE - ELEMENT CARD LISTING
0 ELEMENT NO  21 IS A REACH           *          *     *
                      U/S DATA    STATION     INVERT  SECT               N                                RADIUS  ANGLE  ANG PT  MAN H
                                   1785.00    124.06    2              .013                                  .00    .00     .00     1
0 ELEMENT NO  22 IS A JUNCTION        *          *     *     *            *                   *               *
                      U/S DATA    STATION     INVERT  SECT LAT-1 LAT-2   N      Q3        Q4    INVERT-3 INVERT-4  PHI 3   PHI 4
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                         1791.00  124.11    2    8    0   .013     12.8       .0    27.70       .00  90.00     .00
0 ELEMENT NO  23 IS A REACH         *           *      *
                 U/S DATA   STATION     INVERT   SECT                N                                      RADIUS   ANGLE   ANG PT   MAN H
                           1823.00  124.24    2                    .013                                       .00     .00     .00      1
0 ELEMENT NO  24 IS A JUNCTION      *           *      *      *                 *                    *              *
                 U/S DATA   STATION     INVERT   SECT LAT-1 LAT-2    N      Q3          Q4     INVERT-3 INVERT-4  PHI 3    PHI 4
                           1829.00  124.29    2      9      9   .013      5.8         5.8     28.20     28.20  90.00    90.00
0 ELEMENT NO  25 IS A REACH         *           *      *
                 U/S DATA   STATION     INVERT   SECT                N                                      RADIUS   ANGLE   ANG PT   MAN H
                           1859.00  124.41    2                    .013                                       .00     .00     .00      1
0 ELEMENT NO  26 IS A JUNCTION      *           *      *      *                 *                    *              *
                 U/S DATA   STATION     INVERT   SECT LAT-1 LAT-2    N      Q3          Q4     INVERT-3 INVERT-4  PHI 3    PHI 4
                           1862.00  124.42    2      9      9   .013      7.8         7.8     28.00     28.00  90.00    90.00
0 ELEMENT NO  27 IS A TRANSITION    *           *      *
                 U/S DATA   STATION     INVERT   SECT                N
                           1865.00  124.91    6                    .013
0 ELEMENT NO  28 IS A REACH         *           *      *
                 U/S DATA   STATION     INVERT   SECT                N                                      RADIUS   ANGLE   ANG PT   MAN H
                           2085.00  125.87    6                    .013                                       .00     .00     .00      1
0 ELEMENT NO  29 IS A REACH         *           *      *
                 U/S DATA   STATION     INVERT   SECT                N                                      RADIUS   ANGLE   ANG PT   MAN H
                           2169.00  126.21    6                    .013                                       .00     .00     .00      1
0 ELEMENT NO  30 IS A JUNCTION      *           *      *      *                 *                    *              *
                 U/S DATA   STATION     INVERT   SECT LAT-1 LAT-2    N      Q3          Q4     INVERT-3 INVERT-4  PHI 3    PHI 4
                           2174.00  126.31    6      9      9   .013      5.5         5.5     28.20     28.20  90.00    90.00
1                                                                                                                   PAGE NO    5
0                      WATER SURFACE PROFILE - ELEMENT CARD LISTING
0 ELEMENT NO  31 IS A REACH         *           *      *
                 U/S DATA   STATION     INVERT   SECT                N                                      RADIUS   ANGLE   ANG PT   MAN H
                           2246.00  126.60    6                    .013                                       .00     .00     .00      1
0 ELEMENT NO  32 IS A JUNCTION      *           *      *      *                 *                    *              *
                 U/S DATA   STATION     INVERT   SECT LAT-1 LAT-2    N      Q3          Q4     INVERT-3 INVERT-4  PHI 3    PHI 4
                           2249.00  126.61    6      9      9   .013      7.1         7.1     28.00     28.00  90.00    90.00
0 ELEMENT NO  33 IS A TRANSITION    *           *      *
                 U/S DATA   STATION     INVERT   SECT                N
                           2251.00  127.10    7                    .013
0 ELEMENT NO  34 IS A REACH         *           *      *
                 U/S DATA   STATION     INVERT   SECT                N                                      RADIUS   ANGLE   ANG PT   MAN H
                           2425.00  129.00    7                    .013                                       .00     .00     .00      1
0 ELEMENT NO  35 IS A REACH         *           *      *
                 U/S DATA   STATION     INVERT   SECT                N                                      RADIUS   ANGLE   ANG PT   MAN H
                           2500.00  130.76    7                    .013                                       .00     .00     .00      1
0 ELEMENT NO  36 IS A REACH         *           *      *
                 U/S DATA   STATION     INVERT   SECT                N                                      RADIUS   ANGLE   ANG PT   MAN H
                           2672.00  131.80    7                    .013                                       .00     .00     .00      1
0 ELEMENT NO  37 IS A TRANSITION    *           *      *
                 U/S DATA   STATION     INVERT   SECT                N
                           2676.00  132.80    9                    .013
0 ELEMENT NO  38 IS A REACH         *           *      *
                 U/S DATA   STATION     INVERT   SECT                N                                      RADIUS   ANGLE   ANG PT   MAN H
                           3121.00  163.90    9                    .013                                       .00     .00   90.00      1
0 ELEMENT NO  39 IS A REACH         *           *      *
                 U/S DATA   STATION     INVERT   SECT                N                                      RADIUS   ANGLE   ANG PT   MAN H
                           3296.00  173.50    9                    .013                                       .00     .00     .00      1
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0 ELEMENT NO  40 IS A JUNCTION            *          *     *     *                *            *           *
                    U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3       Q4    INVERT-3 INVERT-4  PHI 3    PHI 4
                                3300.00  176.50    9     9     9   .013     6.7      6.7    76.50      .00  90.00    90.00
0 ELEMENT NO  41 IS A REACH               *          *     *
                    U/S DATA   STATION    INVERT  SECT               N                                RADIUS  ANGLE  ANG PT  MAN H
                                3517.00  187.00    9               .013                                  .00    .00    .00      1
1                                                                                                                    PAGE NO    6
0                           WATER SURFACE PROFILE - ELEMENT CARD LISTING
0 ELEMENT NO  42 IS A REACH               *          *     *
                    U/S DATA   STATION    INVERT  SECT               N                                RADIUS  ANGLE  ANG PT  MAN H
                                3645.00  192.60    9               .013                                  .00    .00    .00      1
0 ELEMENT NO  43 IS A JUNCTION            *          *     *     *                *            *           *
                    U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3       Q4    INVERT-3 INVERT-4  PHI 3    PHI 4
                                3649.00  192.80    9     9     0   .013     5.2       .0    93.00      .00  90.00      .00
0 ELEMENT NO  44 IS A REACH               *          *     *
                    U/S DATA   STATION    INVERT  SECT               N                                RADIUS  ANGLE  ANG PT  MAN H
                                3669.00  193.00    9               .013                                  .00    .00  90.00      1
0 ELEMENT NO  45 IS A SYSTEM HEADWORKS                     *                   *
                    U/S DATA   STATION    INVERT  SECT                                    W S ELEV
                                3669.00  193.00    9                                          .00
 NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

 ** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC
1                                                                                                                      PAGE    1
                                          WATER SURFACE PROFILE LISTING
                        PARK HILL UNIT 1

                        MAIN LINE ANALYSIS MILKY WAY ST. AND PARK SOUTH PL.
0 STATION     INVERT   DEPTH     W.S.        Q        VEL      VEL     ENERGY    SUPER  CRITICAL           HGT/    BASE/    ZL    NO
AVBPR
               ELEV   OF FLOW    ELEV                          HEAD    GRD.EL.   ELEV    DEPTH             DIA     ID NO.        PIER
0 L/ELEM       SO                                              SF AVE    HF                     NORM DEPTH                 ZR
*******************************************************************************************************************************
0       .00    81.45     4.94     86.39     331.3    14.74     3.37     89.76     .00     4.94              5.50      .00   .00   0
.00
0     40.26   .00598                                          .00859     .35                        5.50                   .00
0     40.26    81.69     5.35     87.04     331.3    14.05     3.07     90.11     .00     4.94              5.50      .00   .00   0
.00
0     33.14   .00598                                          .00911     .30                        5.50                   .00
0     73.40    81.89     5.50     87.39     331.3    13.94     3.02     90.41     .00     4.94              5.50      .00   .00   0
.00
0    105.60   .00598                                          .00968    1.02                        5.50                   .00
0    179.00    82.52     5.90     88.42     331.3    13.94     3.02     91.44     .00     4.94              5.50      .00   .00   0
.00
0JUNCT STR    .00250                                          .00649     .03                                               .00
0    183.00    82.53     9.94     92.47     191.3     8.05     1.01     93.48     .00     3.87              5.50      .00   .00   0
.00
0TRANS STR    .02250                                          .01049     .04                                               .00
0    187.00    82.62     7.82     90.44     191.3    15.22     3.60     94.04     .00     3.82              4.00      .00   .00   0
.00
0     36.00   .02083                                          .01774     .64                        3.03                   .00
0    223.00    83.37     7.89     91.26     191.3    15.22     3.60     94.86     .00     3.82              4.00      .00   .00   0
.00
0JUNCT STR    .00167                                          .01701     .10                                               .00
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WATER SURFACE PROFILE LISTING

PARK HILL UNIT 1

MAIN LINE ANALYSIS MILKY WAY ST. AND PARK SOUTH PL.

0 STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER
0 L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR	AVBPR
0 229.00	83.38	8.57	91.95	183.3	14.59	3.31	95.26	.00	3.79	4.00	.00	.00	0
.00													
0 393.00	.02336					.01628	6.40		2.79			.00	
0 622.00	92.56	5.95	98.51	183.3	14.59	3.31	101.82	.00	3.79	4.00	.00	.00	0
.00													
0JUNCT STR	.00333					.01531	.05					.00	
0 625.00	92.57	6.78	99.35	172.0	13.69	2.91	102.26	.00	3.74	4.00	.00	.00	0
.00													
0TRANS STR	.16333					.02178	.07					.00	
0 628.00	93.06	4.71	97.77	172.0	17.88	4.97	102.74	.00	3.43	3.50	.00	.00	0
.00													
0 32.85	.03175					.02923	.96		2.75			.00	
1													
0 660.85	94.10	4.65	98.75	172.0	17.88	4.97	103.72	.00	3.43	3.50	.00	.00	0
.00													
0HYDRAULIC JUMP												.00	
0 660.85	94.10	2.75	96.85	172.0	21.21	6.99	103.84	.00	3.43	3.50	.00	.00	0
.00													
0 4.48	.03175					.03172	.14		2.75			.00	
0 665.33	94.25	2.75	97.00	172.0	21.21	6.99	103.99	.00	3.43	3.50	.00	.00	0
.00													
0 334.67	.03175					.03280	10.98		2.75			.00	
0 1000.00	104.87	2.67	107.54	172.0	21.86	7.42	114.96	.00	3.43	3.50	.00	.00	0
.00													
0 .00	.03175					.03387	.00		2.75			.00	
0 1000.00	104.87	2.67	107.54	172.0	21.86	7.42	114.96	.00	3.43	3.50	.00	.00	0
.00													
0 65.95	.03475					.03365	2.22		2.64			.00	
0 1065.95	107.16	2.68	109.84	172.0	21.73	7.34	117.18	.00	3.43	3.50	.00	.00	0
.00													
0 182.01	.03475					.03182	5.79		2.64			.00	
0 1247.96	113.49	2.82	116.30	172.0	20.72	6.67	122.97	.00	3.43	3.50	.00	.00	0
.00													
0 77.25	.03475					.02889	2.23		2.64			.00	
0 1325.21	116.17	2.97	119.14	172.0	19.76	6.07	125.21	.00	3.43	3.50	.00	.00	0
.00													
0 45.29	.03475					.02664	1.21		2.64			.00	
0 1370.50	117.74	3.16	120.90	172.0	18.84	5.51	126.41	.00	3.43	3.50	.00	.00	0
.00													
0 25.50	.03475					.02596	.66		2.64			.00	
0 1396.00	118.63	3.43	122.06	172.0	17.96	5.01	127.07	.00	3.43	3.50	.00	.00	0
.00													
0JUNCT STR	.00333					.02630	.08					.00	
0 1399.00	118.64	4.52	123.16	163.4	16.98	4.48	127.64	.00	3.42	3.50	.00	.00	0
.00													

0TRANS STR .03000 .01966 .06 .00

1 PAGE 3

Final

WATER SURFACE PROFILE LISTING

PARK HILL UNIT 1

MAIN LINE ANALYSIS MILKY WAY ST. AND PARK SOUTH PL.

0 STATION / 0 L/ELEM	INVERT ELEV / SO	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD / SF AVE	ENERGY GRD.EL. / HF	SUPER ELEV	CRITICAL DEPTH / NORM DEPTH	HGT/ DIA	BASE/ ID NO.	ZL / ZR	NO PIER / AVBPR
0 1402.00	118.73	6.53	125.26	163.4	13.00	2.63	127.88	.00	3.69	4.00	.00	.00	0
.00													
0 107.00	.01701					.01294	1.38		2.89			.00	
0 1509.00	120.55	6.22	126.77	163.4	13.00	2.63	129.40	.00	3.69	4.00	.00	.00	0
.00													
0JUNCT STR	.31833					.00979	.06					.00	
0 1515.00	122.46	5.65	128.11	117.0	9.31	1.35	129.46	.00	3.26	4.00	.00	.00	0
.00													
0 44.00	.00455					.00663	.29		4.00			.00	
0 1559.00	122.66	6.21	128.87	117.0	9.31	1.35	130.22	.00	3.26	4.00	.00	.00	0
.00													
0JUNCT STR	.00333					.00597	.02					.00	
0 1562.00	122.67	6.76	129.43	104.6	8.32	1.08	130.51	.00	3.10	4.00	.00	.00	0
.00													
0TRANS STR	.16333					.00806	.02					.00	
0 1565.00	123.16	5.69	128.85	104.6	10.87	1.84	130.68	.00	3.12	3.50	.00	.00	0
.00													
0 34.00	.00382					.01081	.37		3.50			.00	
0 1599.00	123.29	6.02	129.31	104.6	10.87	1.84	131.14	.00	3.12	3.50	.00	.00	0
.00													
0JUNCT STR	.00833					.00932	.06					.00	
0 1605.00	123.34	7.04	130.38	89.0	9.25	1.33	131.71	.00	2.93	3.50	.00	.00	0
.00													
0 180.00	.00400					.00783	1.41		3.50			.00	
0 1785.00	124.06	7.79	131.85	89.0	9.25	1.33	133.18	.00	2.93	3.50	.00	.00	0
.00													
0JUNCT STR	.00833					.00678	.04					.00	
0 1791.00	124.11	8.49	132.60	76.2	7.92	.97	133.58	.00	2.73	3.50	.00	.00	0
.00													
0 32.00	.00406					.00574	.18		3.50			.00	
0 1823.00	124.24	8.59	132.83	76.2	7.92	.97	133.81	.00	2.73	3.50	.00	.00	0
.00													
0JUNCT STR	.00833					.00493	.03					.00	

1 PAGE 4

WATER SURFACE PROFILE LISTING

PARK HILL UNIT 1

MAIN LINE ANALYSIS MILKY WAY ST. AND PARK SOUTH PL.

0 STATION / 0 L/ELEM	INVERT ELEV / SO	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD / SF AVE	ENERGY GRD.EL. / HF	SUPER ELEV	CRITICAL DEPTH / NORM DEPTH	HGT/ DIA	BASE/ ID NO.	ZL / ZR	NO PIER / AVBPR

0 1829.00	124.29	9.12	133.41	64.6	6.71	.70	134.11	.00	2.52		3.50	.00	.00 0 .00
0 30.00	.00400					.00412	.12			2.92			.00
0 1859.00	124.41	9.16	133.57	64.6	6.71	.70	134.27	.00	2.52		3.50	.00	.00 0 .00
0JUNCT STR	.00333					.00325	.01						.00
0 1862.00	124.42	9.75	134.17	49.0	5.09	.40	134.58	.00	2.19		3.50	.00	.00 0 .00
0TRANS STR	.16333					.00388	.01						.00
0 1865.00	124.91	9.00	133.91	49.0	6.93	.75	134.66	.00	2.28		3.00	.00	.00 0 .00
0 220.00	.00436					.00540	1.19			3.00			.00
0 2085.00	125.87	9.27	135.14	49.0	6.93	.75	135.88	.00	2.28		3.00	.00	.00 0 .00
0 84.00	.00405					.00540	.45			3.00			.00
0 2169.00	126.21	9.42	135.63	49.0	6.93	.75	136.37	.00	2.28		3.00	.00	.00 0 .00
0JUNCT STR	.02000					.00432	.02						.00
0 2174.00	126.31	9.93	136.24	38.0	5.38	.45	136.69	.00	2.01		3.00	.00	.00 0 .00
0 72.00	.00403					.00325	.23			2.22			.00
0 2246.00	126.60	9.90	136.50	38.0	5.38	.45	136.95	.00	2.01		3.00	.00	.00 0 .00
0JUNCT STR	.00333					.00226	.01						.00
0 2249.00	126.61	10.44	137.05	23.8	3.37	.18	137.23	.00	1.57		3.00	.00	.00 0 .00
0TRANS STR	.24500					.00232	.00						.00
0 2251.00	127.10	9.81	136.91	23.8	4.85	.37	137.27	.00	1.66		2.50	.00	.00 0 .00
0 174.00	.01092					.00337	.59			1.33			.00
0 2425.00	129.00	8.51	137.51	23.8	4.85	.37	137.88	.00	1.66		2.50	.00	.00 0 .00
0 75.00	.02347					.00337	.25			1.07			.00

WATER SURFACE PROFILE LISTING

Final

PARK HILL UNIT 1

MAIN LINE ANALYSIS MILKY WAY ST. AND PARK SOUTH PL.

0 STATION / 0 L/ELEM	INVERT ELEV / SO	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD / SF AVE	ENERGY GRD.EL. / HF	SUPER ELEV	CRITICAL DEPTH / NORM DEPTH	HGT/ DIA	BASE/ ID NO.	ZL / ZR	NO PIER / AVBPR
0 2500.00	130.76	7.02	137.78	23.8	4.85	.37	138.15	.00	1.66	2.50	.00	.00	0 .00
0 172.00	.00605					.00337	.58			1.61			.00
0 2672.00	131.80	6.58	138.38	23.8	4.85	.37	138.74	.00	1.66	2.50	.00	.00	0 .00
0TRANS STR	.25000					.02735	.11						.00
0 2676.00	132.80	3.72	136.52	23.8	13.47	2.82	139.34	.00	1.48	1.50	.00	.00	0 .00
0 65.14	.06989					.05134	3.34			1.07			.00
0 2741.14	137.35	2.86	140.21	23.8	13.47	2.82	143.03	.00	1.48	1.50	.00	.00	0 .00

```
0HYDRAULIC JUMP                                                                                                   .00
0  2741.14   137.35    1.07    138.42     23.8   17.65     4.84   143.26    .00    1.48            1.50     .00   .00    0
.00
0   197.81   .06989                                       .06976   13.80                  1.07                    .00
0  2938.95   151.18    1.07    152.25     23.8   17.65     4.84   157.09    .00    1.48            1.50     .00   .00    0
.00
0    95.83   .06989                                       .06843    6.56                  1.07                    .00
0  3034.78   157.87    1.09    158.96     23.8   17.36     4.68   163.65    .00    1.48            1.50     .00   .00    0
.00
0    60.07   .06989                                       .06365    3.82                  1.07                    .00
0  3094.85   162.07    1.14    163.21     23.8   16.55     4.26   167.47    .00    1.48            1.50     .00   .00    0
.00
0    26.15   .06989                                       .05724    1.50                  1.07                    .00
0  3121.00   163.90    1.19    165.09     23.8   15.78     3.87   168.97    .00    1.48            1.50     .00   .00    0
.00
0      .00   .06989                                       .05430     .00                  1.07                    .00
0  3121.00   163.90    1.19    165.09     23.8   15.78     3.87   168.97    .00    1.48            1.50     .00   .00    0
.00
0    66.08   .05486                                       .05352    3.54                  1.19                    .00
0  3187.08   167.52    1.21    168.73     23.8   15.57     3.77   172.50    .00    1.48            1.50     .00   .00    0
.00
0    63.03   .05486                                       .05049    3.18                  1.19                    .00
1                                                                                                                    PAGE    6
                                                   WATER SURFACE PROFILE LISTING
                          PARK HILL UNIT 1

                          MAIN LINE ANALYSIS MILKY WAY ST. AND PARK SOUTH PL.
0 STATION    INVERT   DEPTH     W.S.         Q       VEL      VEL    ENERGY   SUPER  CRITICAL         HGT/    BASE/     ZL    NO
AVBPR
              ELEV   OF FLOW    ELEV                          HEAD   GRD.EL.  ELEV    DEPTH           DIA     ID NO.        PIER
0 L/ELEM      SO                                              SF AVE   HF                    NORM DEPTH                ZR
****************************************************************************************************************************
0  3250.10   170.98    1.28    172.26     23.8   14.85     3.42   175.68    .00    1.48            1.50     .00   .00    0
.00
0    28.08   .05486                                       .04662    1.31                  1.19                    .00
0  3278.19   172.52    1.36    173.88     23.8   14.15     3.11   176.99    .00    1.48            1.50     .00   .00    0
.00
0    17.81   .05486                                       .04609     .82                  1.19                    .00
0  3296.00   173.50    1.48    174.98     23.8   13.49     2.83   177.81    .00    1.48            1.50     .00   .00    0
.00
0JUNCT STR   .75000                                       .02849     .11                                          .00
0  3300.00   176.50    3.17    179.67     10.4    5.89      .54   180.21    .00    1.24            1.50     .00   .00    0
.00
0    27.32   .04839                                       .00980     .27                   .71                    .00
0  3327.32   177.82    2.12    179.94     10.4    5.89      .54   180.48    .00    1.24            1.50     .00   .00    0
.00
0HYDRAULIC JUMP                                                                                                   .00
0  3327.32   177.82     .71    178.53     10.4   12.63     2.48   181.01    .00    1.24            1.50     .00   .00    0
.00
0   142.82   .04839                                       .04733    6.76                   .71                    .00
0  3470.14   184.73     .71    185.44     10.4   12.63     2.48   187.92    .00    1.24            1.50     .00   .00    0
.00
0    46.86   .04839                                       .04516    2.12                   .71                    .00
0  3517.00   187.00     .73    187.73     10.4   12.18     2.31   190.04    .00    1.24            1.50     .00   .00    0
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WATER SURFACE PROFILE LISTING

PARK HILL UNIT 1

MAIN LINE ANALYSIS MILKY WAY ST. AND PARK SOUTH PL.

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR	
3599.87	190.63	.78	191.40	10.4	11.25	1.97	193.37	.00	1.24	1.50	.00	.00	0
.00													
13.51	.04375					.03273	.44		.73			.00	
3613.38	191.22	.81	192.02	10.4	10.73	1.79	193.81	.00	1.24	1.50	.00	.00	0
.00													
8.84	.04375					.02886	.26		.73			.00	
3622.22	191.60	.84	192.44	10.4	10.23	1.63	194.07	.00	1.24	1.50	.00	.00	0
.00													
6.23	.04375					.02548	.16		.73			.00	
3628.45	191.88	.87	192.75	10.4	9.75	1.48	194.23	.00	1.24	1.50	.00	.00	0
.00													
4.68	.04375					.02253	.11		.73			.00	
3633.14	192.08	.91	192.99	10.4	9.30	1.34	194.33	.00	1.24	1.50	.00	.00	0
.00													
3.54	.04375					.01995	.07		.73			.00	
3636.67	192.24	.95	193.18	10.4	8.87	1.22	194.40	.00	1.24	1.50	.00	.00	0
.00													
2.77	.04375					.01769	.05		.73			.00	
3639.44	192.36	.98	193.34	10.4	8.45	1.11	194.45	.00	1.24	1.50	.00	.00	0
.00													
2.07	.04375					.01572	.03		.73			.00	
3641.51	192.45	1.03	193.47	10.4	8.06	1.01	194.48	.00	1.24	1.50	.00	.00	0
.00													
1.54	.04375					.01401	.02		.73			.00	
3643.05	192.51	1.07	193.59	10.4	7.69	.92	194.51	.00	1.24	1.50	.00	.00	0
.00													
1.07	.04375					.01252	.01		.73			.00	
3644.12	192.56	1.12	193.68	10.4	7.33	.83	194.52	.00	1.24	1.50	.00	.00	0
.00													
.67	.04375					.01124	.01		.73			.00	
3644.79	192.59	1.18	193.77	10.4	6.99	.76	194.53	.00	1.24	1.50	.00	.00	0
.00													
.21	.04375					.01015	.00		.73			.00	

WATER SURFACE PROFILE LISTING

PARK HILL UNIT 1

MAIN LINE ANALYSIS MILKY WAY ST. AND PARK SOUTH PL.

0 STATION / 0 L/ELEM	INVERT ELEV / SO	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD / SF AVE	ENERGY GRD.EL. / HF	SUPER ELEV	CRITICAL DEPTH / NORM DEPTH	HGT/ DIA	BASE/ ID NO.	ZL / ZR	NO PIER / AVBPR
0 3645.00	192.60	1.24	193.84	10.4	6.66	.69	194.53	.00	1.24	1.50	.00	.00	0
.00													
0JUNCT STR	.05000					.00605	.02					.00	
0 3649.00	192.80	2.07	194.87	5.2	2.94	.13	195.01	.00	.88	1.50	.00	.00	0
.00													
0 20.00	.01000					.00245	.05		.75			.00	
0 3669.00	193.00	1.97	194.97	5.2	2.94	.13	195.10	.00	.88	1.50	.00	.00	0
.00													

1