REVISED
DRAINAGE PLAN AND SUPPORTING CALCULATIONS FOR
OAK CREEK 3RD ADDITION
WICHITA, SEDGWICK COUNTY, KANSAS
PEC PROJECT NO. 36-04115-5526

LETTER OF TRANSMITTAL

Professional Engineering Consultants, P.A.
303 S. TOPEKA ▪ WICHITA, KANSAS 67202 ▪ 316-262-2691 ▪ FAX 316-262-3003
www.pecl.com ▪ designers@pecl.com

TO: City of Wichita
Storm Water Management
7Th Floor - City Hall
455 N. Main
Wichita, KS 67202

ATTENTION: Scott Lindebak

FROM: Shawn Bryan

DATE: October 2, 2006

PROJECT NO.: 36-04115-003-5526

PROJECT: Oak Creek 3rd Addition

REFERENCE: Revised Storm Water Drainage Report

WE ARE SENDING YOU: ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1	10/02/2006	1	Revised Storm Water Drainage Plan & Calcs for Oak Creek 3rd Addition

THESE ARE TRANSMITTED as checked below:

☒ For approval ☐ Approved as submitted ☒ Resubmit 1 copies for approval

☒ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution

☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints

☐ For review and comment ☐ _____

☐ FOR BIDS DUE _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS: Scott here is the revised storm water drainage report for Oak Creek 3rd Addition. I made you another drainage report with the additional information you requested. If you have any questions please feel free to contact me.

Thanks.

COPIES TO: File **By:** Shawn R. Bryan

If enclosures are not as noted, kindly notify us at once.

Professional Engineering Consultants, P.A.

September 29, 2006

City of Wichita
Storm Water Management
7th Floor, City Hall
Wichita, KS 67202

Attention: Mr. Scott Lindebak

Reference: Oak Creek 3rd Addition Comments
PEC Project No. 36-04115-3-5526

Dear Mr. Lindebak

Here are the replies to your comments that are in your email letter dated 9/27/06 for Oak Creek 3rd Addition. I have included this letter with the revision package for your use.

1. The outfall for Pond #2 has a 30" pipe with 4.8' of storage above the flow line, with only 15 cfs discharging. Please review this calculation and verify the results are correct.

   This discharge rate is correct but the static elevation of the pond is 1365.00 not 1362.00 as indicated on the plan. This has been corrected on the plan and is included in this submittal.

2. The north half of basin C is routed through Detention Pond #6, however much of this site drains to the north and east and appears not to be tributary to the future pond. Please evaluate Pond #6, will less tributary area and show the north basin as a separate basin in the overall runoff calcs, if necessary.

   The drainage area to Pond C has been changed. The north part of the site will be filled eventually. The new basin matches the existing 1373 contour while anything below this elevation will drain into Pond D. This increases the discharge rate out of pond D from 15 cfs to 26cfs for the 100-yr. storm event. This increase in discharge rate now puts the overall post-development site discharge over the pre-development discharge rate. To account for this the retention area in the southeast corner of the property will be increased and installing an 18" RCP outfall structure. This structure will replace the previously proposed 24" RCP.

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3. The lot grading plan for Lots 1-4, Block 1, do not have a minimum 1% backyard grades. Please provide a plan that includes additional spot grade elevations to determine the location of the runoff, with flow arrows.

   I have enclosed a copy of the Chateau Parkway roadway plans. This shows that the grading for this area in question drains to the roadway and then through the storm water system. I have enclosed the StormCAD calculations for the roadway inlets to show the capacity is adequate for the flows. The plans are still in the process of being finalized and not finished yet.

4. The inlets located in Chateau Parkway need to be evaluated for inlet capacity. Please evaluate bypass and sump conditions, to ensure runoff will be able to reach the intended detention ponds.

   I have enclosed a copy of the Chateau Parkway roadway plans. This shows that additional inlets have been added to the roadway to account for additional flows. The plans are still in the process of being finalized and not finished yet. I have also included the StormCAD calculations for the location in question.

5. The drainage plan should delineate the floodplain and floodway, with scaled location and by elevation. The plan should include the hydrologic and hydraulic runs for the unstudied tributary that are used to establish the minimum pad elevations.

   I have included a map of the site with the FEMA floodplain mapped according to elevation. I have also included the HEC-RAS models that were used to establish the minimum pad and the station mapping.

6. The FEMA floodplain and floodway shall be located within a platted Reserve for Lots 1-5, Block 3.

   I have enclosed the HEC-RAS models with a levee located at the property line of Lots 1-5, Block 3, showing that if these lots were to be filled in the future that it wouldn't raise the water surface profile for the 100 year storm event by more than 1'. Therefore these lots aren't included in a floodplain/floodway reserve or easement and can be filled in the future with the appropriate permits.

7. The view-out elevation of Lot 1, Block 2, uses the same elevation as the 100-yr. water surface elevation of the existing pond located within Reserve E.

   There will be a 1' to 2' berm placed in the back part of Lots 1 & 2, Block 2, to account for the 100-yr. elevation in the pond. This water will then be drained to the east and into Oak Creek Parkway.

8. The pre/post discharge calculations should include the 2 & 5 year storms at the minimum, in addition to the 100-year event.

   I have included the calculations for the 2 & 5 year storm events. To meet the requirements we will be placing modified drop inlet structures with orifices on Ponds D, H & F as their outfall structures. The calculations for the sizing of the orifices has been included along with preliminary details of the outfall structures..

9. The drainage plan should be submitted in pdf format, including the grading plan and calculations.

   This will be included once the drainage plan has been approved.

If you have any questions feel free to contact me at (316) 206-1316.

Sincerely,

PROFESSIONAL ENGINEERING CONSULTANTS, P.A.

Shawn R. Bryan, P.E.
Project Engineer

SRB/tac

Encl: As noted

Oak Creek 3rd Addition
Wichita, Sedgwick County, Kansas
09/11/06

Oak Creek 3rd Addition is a 21.3 acre residential development. This development is part of the Oak Creek Development Master Plan. Oak Creek is a 154.5 acre, commercial and residential development on the southwest corner of 21st Street North and Greenwich Road within the city limits of Wichita in Sedgwick County, Kansas. The 32 lot development consists of streets, storm sewer and detention ponds. This report contains a drawing of the drainage plan, supporting calculations and data for the Oak Creek Addition including the Oak Creek 3rd Drainage Plan.

Hydrology

The proposed plat lies in the NE 1/4, Section 9, T27S, R2E. The soil on-site is comprised primarily of Goessel Silty clay, Irwin silty clay loam and Rosehill silty clay, which are all classified in hydrologic group D. Elandco silt loam is present along the West Fork of Four Mile Creek. The land is currently vacant, with the exception of streets and construction of the storm water system for Oak Creek 2nd Addition, and is wooded/ grassland throughout. The site is bordered to the north by 21st Street North, to the south by the Burlington Northern Railroad, to the east by Greenwich Road and to the west by the Remington Place Development. The West Fork of Four Mile Creek cuts through this site from the north property line to the east property line and has approximately 1.60 square miles of contributing area to the north of this site. Existing Basin A drains to the north to the storm sewer system along 21st Street North and eventually to the West Fork of Four Mile Creek. Existing Basin B drains to the south and east into the West Fork of Four Mile Creek. Existing Basin C drains to the south and west to the Remington Place 3rd Addition. Existing Basin D drains to the east Greenwich Road to a 36" RCP under Greenwich Road. Proposed Basin A, B, C, D & E drain through the pond system labeled #2, 3, 4, 5 & 6 on the drainage map and ponds A-E in the HEC-1 output files. These ponds will drain to the east into the West Fork of Four Mile Creek. Proposed Basin F

drains to an existing pond labeled pond #1 on the drainage map and Pond F in the HEC-1 output files. This pond then drains into the West Fork of Four Mile Creek. Proposed Basin G drains directly to the West Fork of Four Mile Creek. Proposed Basin H drains eventually to the southeast corner of the site to the existing 36" RCP under Greenwich. It is important to note that no water will drain west to the Remington 3rd Addition after development and that significant changes will be made to the West Fork of Four Mile Creek on this site as shown on the Drainage Map. The channelization of the West Fork of Four Mile Creek (in the future) will require permits from the Division of Water Resources and a review by the Corps of Engineers. Oak Creek 3rd Addition will have large residential lots located next to the West Fork of Four Mile Creek. As shown in the drainage plan the overall discharge from the site is less than the pre-development discharge rate. This is the case even though no detention will be placed in the area surrounding the creek. The detention pond system throughout all the Oak Creek Additions (1, 2 & 3) will decrease the discharge rate enough to enable development to occur next to the creek without detention.

Runoff coefficients were estimated based on tables presented in the Design Aids section of this report using fully developed conditions. Time of concentration was based on slope, flow velocity and length of flow through each basin (TR-55 Method) and was not allowed to be less than 15 minutes. The HEC-1 computer program was used for the pre-development runoff rate and also to route the runoff through the ponds and determine the post-development conditions leaving the site.

The analysis was made based on the available site data which includes the following: 1" = 100' topographic map with 2' contours of the site, a Sedgwick County Soil Survey Map and noted references.

Storm Sewer Design

For the storm sewer hydrologic analysis, the Rational Method was used. Runoff coefficients were estimated using the charts in the design aids section of this report. For

this development, a uniform assumption of the minimum time of concentration of 10 minutes was deemed appropriate. Travel time for flow through defined channels, pipes, etc, for these basins were estimated on the basis of Manning's Equation.

In the hydraulic analysis, the storm sewers are designed for the minor storm, with major storm overflows to be routed through easements and rights-of-way to an appropriate outlet. The minor storm has a recurrence interval of two years. The major storm evaluated has a recurrence interval of one hundred years. To simplify this analysis, the time of concentration is identical for both the major and minor storms.

For each inlet, street flooding and inlet capacity were checked for the minor storm. Conveyance in the street is based on the Modified Manning's Equation, as expressed in the Design of Urban Highway Drainage – The State of the Art, Equation (5-1), pages 5-9. It has been assumed that Tc for street flow is equal to Tc for pipe flow. This is a simplifying, but conservative, assumption since pipe flow velocities generally exceed street flow velocities. For local streets, curb-deep flow is tolerable for the minor storm. For collector streets, a single eight-foot lane should remain unflooded for the minor storm.

Inlet capacities were determined by the methods described in Drainage of Highway Pavements, Hydraulic Engineering Circular #12, using Chart #12 as found in the Design Aids section. City of Wichita Type 1A inlets and 3/8 inch per foot cross slopes have been assumed. Minimum walk grade has been assumed to be 0.3 feet above the top of curb, unless otherwise noted. Streets have been assumed to have 6-5/8 inch standard curb, unless otherwise noted.

Hydraulic computation for the storm sewer pipe system was performed using PEC's STORM computer program. This program uses Manning's Equation to calculate friction losses for pipes flowing full. Minor losses are computed by momentum principles at each structure. All pipe area is assumed to be reinforced concrete with a Manning's "n" of 0.012. It is desirable to keep the hydraulic grade line at least one foot below the top of

curb for the minor storm. The calculations and the STORM analyses for the storm sewers are included in this report.

Design Aids

This section includes material used to assist in designing the drainage system. A 1" = 100' scale Drainage Plan map (Attachment A) and a 1" = 100' scale Four-Corner Plan map (Attachment B) are enclosed in the pockets.

References

Design of Urban Highway Drainage – The State of the Art, by Reitz & Jens, Inc., April 1980.

Drainage of Highway Pavements, Hydraulic Engineering Circular #12, by Tye Engineering, Inc., March 1984.

Interim Drainage and Storm Sewer Policy for Design Criteria and Documentation, City of Wichita, Kansas, 1985.

Soil Survey of Sedgwick County, Kansas, US Department of Agriculture, Soil Conservation Service, 1979.

TABLE 1

PRE VS. POST-DEVELOPMENT DISCHARGE RATES

A	BOTH	38	68		20	109	
B	BOTH	47	153		20	26	
C	BOTH	39	7		20	57	
D	BOTH	62	52		20	15	
E	POST	N/A	N/A		20	20	
F	POST	N/A	N/A		25	60	
G	POST	N/A	N/A		25	165	
H	POST	N/A	N/A		30	38	
TOTAL DISCHARGE			280			278	

**** Note: Only ponds D, F, G & H discharge in the post-development conditions.

OAK CREEK 3RD ADDITION
PRE VS. POST RUNOFF CALCULATION

	2-YEAR STORM EVENT Discharge (CFS)				5-YEAR STORM EVENT Discharge (CFS)			
		Pre		Post		Pre		Post
A		20.0		13.0		30.0		19.0
B		46.0		22.0		68.0		30.0
C		2.0		5.0		3.0		7.0
D		16.0		5.0		23.0		5.0
E				11.0				13.0
F		N/A		10.0				25.0
G		N/A		64.0				87.0
H		N/A		5.0				5.0
Total Discharge from Site		84.0		84.0		124.0		122.0

Note: Ponds A, B, C & E drain into Pond D in post development.

OAK CREEK 3RD ADDITION
FOUR MILE CREEK WATER SURFACE ELEVATIONS

	Water Surface Elevations		
Sta	Existing Conditions	Post Development	Allowable = 1 Foot
16.37	1356.85	1356.85	0.00
405.91	1358.05	1358.05	0.00
828.54	1359.04	1359.12	0.08
1184.83	1359.47	1359.99	0.52
1363.99	1359.60	1360.55	0.95
1550.64	1359.99	1360.98	0.99
1810.00	1360.41	1361.01	0.60
2170.00	N/A	N/A	
2176.24	1361.78	1362.35	0.57

Existing Conditions

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1*****  ********  ************************
******  ********  ***********************
 *                                       *
     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)
ENGINEERS      *
 *                JUN   1998             *
CENTER     *
 *             VERSION 4.1
 *                                       *
     *
    RUN DATE   28SEP06  TIME  14:14:37   *
     *
 *                                       *
     *
 *****************************************
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U.S. ARMY CORPS OF

HYDROLOGIC ENGINEERING

609 SECOND STREET

DAVIS, CALIFORNIA 95616

(916) 756-1104

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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
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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

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*** LIST ***
*** FREE ***

     1          ID      HEC-1 ANALYSIS FOR OAK CREEK W/ 2nd & 3RD ADDITION BASIN
     2          ID      PROPOSED CONDITIONS - DETENTION BASINS ONLY
     3          ID      100-YEAR STORM - POST DEVELOPMENT

                *DIAGRAM
     4          IT      15 27SEP06    1200        0 28SEP06    2000
     5          IN      15 27SEP06    1200
     6          IO       0        5
     7          JR    PREC     3.5     4.5     5.3     6.1     7.0     7.8
                *
                *

     8          KK       A
     9          KO       5
    10          BA  0.0149
    11          PB    1.00
    12          PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
    13          PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
    14          PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
    15          PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
    16          PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
    17          PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
    18          PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
    19          PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
    20          PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
    21          PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
    22          LS       0      85      40
    23          UD   0.200
                *
                *
                *

    24          KK   PONDA
    25          KO       5
    26          RS       1    ELEV  1388.0
    27          SA    0.50    0.61    0.72    0.84
    28          SE  1388.0  1389.0  1390.0  1391.0
    29          SQ       0     1.8     5.7    11.5    19.2    29.1    41.1    55.4    72.1    91.3
    30          SQ   113.1
    31          SE  1388.0 1388.25 1388.50 1388.75 1389.00 1389.25 1389.50 1389.75 1390.00 1390.30
    32          SE  1390.5
                *
                *

    33          KK       E
    34          KO       5
    35          BA  0.0150
```

```
36          PB    1.00
37          PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
38          PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
39          PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
40          PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
41          PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
42          PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
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HEC-1 INPUT

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

43          PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
44          PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
45          PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
46          PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
47          LS       0      85      20
48          UD   0.200
            *
            *
            *
            *

49          KK   PONDE
50          KO       5
51          RS       1    ELEV  1365.0
52          SA    0.30    0.38    0.47    0.57
53          SE  1373.0  1374.0  1375.0  1376.0
54          SQ       0     3.7     8.2    10.1    11.6    13.0    14.3    15.4    16.5    17.5
55          SQ    18.4    19.3    20.2    21.0    21.8    22.6    23.3
56          SE  1373.0 1373.25 1373.50 1373.75 1374.00 1374.25 1374.50 1374.75 1375.00 1375.30
57          SE  1375.5 1375.75 1376.00 1376.25 1376.50 1376.75 1377.00
            *
            *
            *

58          KK    RTE1
59          KO       5
60          RT       0       0       1
            *
            *
            *

61          KK       B
62          KO       5
63          BA  0.0197
64          PB    1.00
65          PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
66          PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
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67          PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
68          PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
69          PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
70          PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
71          PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
72          PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
73          PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
74          PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
75          LS       0      85      50
76          UD   0.200
            *
            *
            *
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1

HEC-1 INPUT

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

77          KK   PONDB
78          KO       5
79          RS       1    ELEV  1367.0
80          SA    0.25    0.32    0.40    0.49
81          SE  1375.0  1376.0  1377.0  1378.0
82          SQ       0       6      12      18      24      30      36      42      48      54
83          SQ      60
84          SE  1375.0 1375.53 1375.85 1376.11 1376.34 1376.56 1376.76 1376.95 1377.13 1377.30
85          SE  1377.5
            *

86          KK    RTE2
87          KO       5
88          RT       0       0       1
            *

89          KK       C
90          KO       5
91          BA  0.0206
92          PB    1.00
93          PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
94          PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
95          PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
96          PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
97          PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
98          PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
99          PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
100         PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
101         PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
102         PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
```

```
103          LS       0       85       45
104          UD   0.200
             *
             *

105          KK   PONDC
106          KO       5
107          RS       1     ELEV  1372.0
108          SA    1.41     1.50     1.59     1.69
109          SE  1372.0   1373.0   1374.0   1375.0
110          SQ       0        8       16       24       32       40       48       56       64       72
111          SQ      80
112          SE  1372.0 1373.41 1374.16 1375.06 1376.25 1377.75 1379.89 1385.51 1392.09 1407.23
113          SE  1436.2
             *
             *

114          KK    RTE3
115          KO       5
116          RT       0        0        1
             *
             *
```


1

HEC-1 INPUT

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

117          KK       D
118          KO       5
119          BA  0.0152
120          PB    1.00
121          PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
122          PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
123          PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
124          PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
125          PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
126          PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
127          PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
128          PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
129          PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
130          PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
131          LS       0      85       45
132          UD   0.250
             *
             *
             *
             *
             *
```

```
133             KK    PONDD
134             KO        5
135             RS        1      ELEV  1365.0
136             SA     0.53      0.58    0.64    0.69
137             SE   1365.0    1365.0  3167.0  1368.0
138             SQ        0        10      20      30      40      50      60      70      80      90
139             SQ      100
140             SE   1365.0  1366.45 1367.19 1367.87 1368.20 1368.29 1368.37 1368.43 1368.49 1368.55
141             SE   1378.6
                *
                *
                *
                *
142             ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW

```
 8          A
            V
            V
24       PONDA

33                    E
                      V
                      V
49                PONDE
                      V
                      V
58                RTE1

61                              B
                                V
                                V
77                           PONDB
                                V
                                V
86                           RTE2

89                                    C
                                      V
```

```
                                    V
                                  PONDC
   105                              V
                                    V
                                  RTE3
   114                              .
                                    .
                                    .              D
   117                              .              V
                                    .              V
                                    .            PONDD
   133

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************
*****************************************
 *                                       *
      *
 *    FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
ENGINEERS      *
 *                 JUN   1998            *
CENTER     *
 *              VERSION 4.1              *
      *
 *                                       *
      *
 *   RUN DATE   28SEP06  TIME  14:14:37  *
      *
 *                                       *
      *
 *****************************************
*****************************************
```

```
*    U.S. ARMY CORPS OF
*    HYDROLOGIC ENGINEERING
*          609 SECOND STREET
*       DAVIS, CALIFORNIA 95616
*           (916) 756-1104
*
```

HEC-1 ANALYSIS FOR OAK CREEK W/ 2nd & 3RD ADDITION BASIN
PROPOSED CONDITIONS - DETENTION BASINS ONLY
100-YEAR STORM - POST DEVELOPMENT

```
   6 IO          OUTPUT CONTROL VARIABLES
                       IPRNT          0  PRINT CONTROL
                       IPLOT          5  PLOT CONTROL
                       QSCAL         0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                        NMIN         15  MINUTES IN COMPUTATION INTERVAL
                       IDATE     27SEP 6  STARTING DATE
```

```
                  ITIME        1200  STARTING TIME
                     NQ         129  NUMBER OF HYDROGRAPH ORDINATES
                 NDDATE     28SEP 6  ENDING DATE
                 NDTIME        2000  ENDING TIME
                 ICENT           19  CENTURY MARK

          COMPUTATION INTERVAL     .25 HOURS
               TOTAL TIME BASE   32.00 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
                  3.50      4.50      5.30      6.10      7.00      7.80


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


          **************
          *            *
  8 KK    *      A     *
          *            *
          **************

  9 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           5  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE


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

```
              **************
              *            *
   24 KK      *    PONDA   *
              *            *
              **************

   25 KO           OUTPUT CONTROL VARIABLES
                         IPRNT            5  PRINT CONTROL
                         IPLOT            5  PLOT CONTROL
                         QSCAL           0.  HYDROGRAPH PLOT SCALE


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


              **************
              *            *
   33 KK      *        E   *
              *            *
              **************

   34 KO           OUTPUT CONTROL VARIABLES
                         IPRNT            5  PRINT CONTROL
                         IPLOT            5  PLOT CONTROL
                         QSCAL           0.  HYDROGRAPH PLOT SCALE


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


              **************
              *            *
   49 KK      *    PONDE   *
              *            *
              **************

   50 KO           OUTPUT CONTROL VARIABLES
                         IPRNT            5  PRINT CONTROL
                         IPLOT            5  PLOT CONTROL
                         QSCAL           0.  HYDROGRAPH PLOT SCALE


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

```
** ***

          **************
          *            *
  58 KK   *      RTE1  *
          *            *
          **************

  59 KO        OUTPUT CONTROL VARIABLES
                     IPRNT           5   PRINT CONTROL
                     IPLOT           5   PLOT CONTROL
                     QSCAL          0.   HYDROGRAPH PLOT SCALE

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

          **************
          *            *
  61 KK   *         B  *
          *            *
          **************

  62 KO        OUTPUT CONTROL VARIABLES
                     IPRNT           5   PRINT CONTROL
                     IPLOT           5   PLOT CONTROL
                     QSCAL          0.   HYDROGRAPH PLOT SCALE

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

          **************
          *            *
  77 KK   *     PONDB  *
          *            *
          **************

  78 KO        OUTPUT CONTROL VARIABLES
                     IPRNT           5   PRINT CONTROL
                     IPLOT           5   PLOT CONTROL
                     QSCAL          0.   HYDROGRAPH PLOT SCALE
```

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

             **************
             *            *
  86 KK      *     RTE2   *
             *            *
             **************

  87 KO           OUTPUT CONTROL VARIABLES
                        IPRNT              5  PRINT CONTROL
                        IPLOT              5  PLOT CONTROL
                        QSCAL             0.  HYDROGRAPH PLOT SCALE

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

             **************
             *            *
  89 KK      *         C  *
             *            *
             **************

  90 KO           OUTPUT CONTROL VARIABLES
                        IPRNT              5  PRINT CONTROL
                        IPLOT              5  PLOT CONTROL
                        QSCAL             0.  HYDROGRAPH PLOT SCALE

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

             **************
             *            *
 105 KK      *    PONDC   *
             *            *
             **************

 106 KO           OUTPUT CONTROL VARIABLES
                        IPRNT              5  PRINT CONTROL
```

```
                  IPLOT              5  PLOT CONTROL
                  QSCAL             0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
 114 KK   *      RTE3  *
          *            *
          **************

 115 KO         OUTPUT CONTROL VARIABLES
                  IPRNT              5  PRINT CONTROL
                  IPLOT              5  PLOT CONTROL
                  QSCAL             0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
 117 KK   *         D  *
          *            *
          **************

 118 KO         OUTPUT CONTROL VARIABLES
                  IPRNT              5  PRINT CONTROL
                  IPLOT              5  PLOT CONTROL
                  QSCAL             0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
 133 KK   *     PONDD  *
          *            *
          **************
```

134 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	5	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

1

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
					3.50	4.50	5.30	6.10	7.00	7.80
HYDROGRAPH AT										
+	A	.01	1	FLOW	19.	26.	32.	38.	44.	50.
				TIME	12.00	12.00	12.00	12.00	12.00	12.00
ROUTED TO										
+	PONDA	.01	1	FLOW	13.	19.	24.	29.	35.	40.
				TIME	12.25	12.25	12.25	12.25	12.25	12.25
			** PEAK STAGES IN FEET **							
			1	STAGE	1388.80	1389.00	1389.13	1389.26	1389.38	1389.48
				TIME	12.25	12.25	12.25	12.25	12.25	12.25
HYDROGRAPH AT										
+		.01	1	FLOW	18.	25.	31.	36.	43.	49.
				TIME	12.00	12.00	12.00	12.00	12.00	12.00
ROUTED TO										
+	PONDE	.01	1	FLOW	11.	13.	15.	17.	19.	20.
				TIME	12.25	12.50	12.50	12.50	12.50	12.50
			** PEAK STAGES IN FEET **							
			1	STAGE	1373.88	1374.34	1374.75	1375.15	1375.58	1375.96
				TIME	12.25	12.50	12.50	12.50	12.50	12.50
ROUTED TO										
+	RTE1	.01	1	FLOW	11.	13.	15.	17.	19.	20.
				TIME	12.50	12.75	12.75	12.75	12.75	12.75
HYDROGRAPH AT										
+	B	.02	1	FLOW	27.	36.	43.	51.	59.	67.
				TIME	12.00	12.00	12.00	12.00	12.00	12.00

ROUTED TO										
+	PONDB	02	1	FLOW	22.	30.	36.	43.	50.	56.
				TIME	12.25	12.25	12.25	12.25	12.25	12.25
			** PEAK STAGES IN FEET **							
			1	STAGE	1376.26	1376.55	1376.77	1376.97	1377.18	1377.37
				TIME	12.25	12.25	12.25	12.25	12.25	12.25
ROUTED TO										
+	RTE2	.02	1	FLOW	22.	30.	36.	43.	50.	56.
				TIME	12.50	12.50	12.50	12.50	12.50	12.50
HYDROGRAPH AT										
		.02	1	FLOW	27.	37.	45.	53.	62.	69.
				TIME	12.00	12.00	12.00	12.00	12.00	12.00
ROUTED TO										
+	PONDC	.02	1	FLOW	5.	7.	9.	12.	14.	17.
				TIME	12.75	12.75	12.75	12.75	12.75	12.75
			** PEAK STAGES IN FEET **							
			1	STAGE	1372.93	1373.26	1373.51	1373.75	1374.01	1374.23
				TIME	12.75	12.75	12.75	12.75	12.75	12.75
ROUTED TO										
+	RTE3	.02	1	FLOW	5.	7.	9.	12.	14.	17.
				TIME	13.00	13.00	13.00	13.00	13.00	13.00
HYDROGRAPH AT										
+	D	.02	1	FLOW	17.	23.	28.	33.	38.	43.
				TIME	12.00	12.00	12.00	12.00	12.00	12.00
ROUTED TO										
+	PONDD	02	1	FLOW	8.	11.	15.	18.	22.	26.
				TIME	12.50	12.50	12.50	12.50	12.50	12.50
			** PEAK STAGES IN FEET **							
			1	STAGE	1366.13	1366.53	1366.81	1367.07	1367.36	1367.61
				TIME	12.50	12.50	12.50	12.50	12.50	12.50

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

```
1*****************************************
*****************************************
 *                                       *
     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)
ENGINEERS      *
 *                JUN   1998
CENTER     *
 *             VERSION 4.1
     *
 *  RUN DATE   28SEP06  TIME  15:32:35
     *
     *
 *****************************************
*****************************************
```


* U.S. ARMY CORPS OF
* HYDROLOGIC ENGINEERING
609 SECOND STREET
DAVIS, CALIFORNIA 95616
* (916) 756-1104
*


```
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
                2  ID      100-YEAR  24-HOUR STORM
*** LIST ***
*** FREE ***
                   *DIAGRAM
                3  IT      15 06SEP06    1200        0 06SEP06    2000
                4  IN      15 06SEP06    1200
                5  IO       0         5
                6  JR    PREC     3.5     4.5     5.3     6.1     7.0     7.8
                   *
                   *
                   *
                   *

                7  KK       A
                8  KO       5
                   *
                   *     34.55 ACRES
                   *
                9  BA  0.0540
               10  PB    1.00
               11  PC  0.0000  0.1446  0.2449  0.3146  0.3741  0.4259  0.4694  0.5060  0.5363  0.5638
               12  PC  0.5882  0.6096  0.6293  0.6485  0.6647  0.6803  0.6961  0.7107  0.7219  0.7351
               13  PC  0.7455  0.7560  0.7670  0.7758  0.7823  0.7901  0.7959  0.8036  0.8095  0.8138
               14  PC  0.8206  0.8260  0.8299  0.8372  0.8384  0.8433  0.8520  0.8582  0.8635  0.8678
               15  PC  0.8730  0.8774  0.8810  0.8857  0.8896  0.8929  0.8997  0.9059  0.9116  0.9167
               16  PC  0.9212  0.9252  0.9286  0.9314  0.9337  0.9380  0.9418  0.9452  0.9508  0.9560
               17  PC  0.9609  0.9654  0.9695  0.9732  0.9766  0.9795  0.9821  0.9875  0.9926  0.9974
               18  PC  0.9987  0.9995  1.0000
               19  LS       0       85       0
               20  UD    0.38
                   *
                   *
                   *

               21  KK       B
               22  KO       5
                   *
                   *     87.14 ACRES
                   *
               23  BA  0.1261
               24  PB    1.00
               25  PC  0.0000  0.1446  0.2449  0.3146  0.3741  0.4259  0.4694  0.5060  0.5363  0.5638
               26  PC  0.5882  0.6096  0.6293  0.6485  0.6647  0.6803  0.6961  0.7107  0.7219  0.7351
               27  PC  0.7455  0.7560  0.7670  0.7758  0.7823  0.7901  0.7959  0.8036  0.8095  0.8138
               28  PC  0.8206  0.8260  0.8299  0.8372  0.8384  0.8433  0.8520  0.8582  0.8635  0.8678
               29  PC  0.8730  0.8774  0.8810  0.8857  0.8896  0.8929  0.8997  0.9059  0.9116  0.9167
               30  PC  0.9212  0.9252  0.9286  0.9314  0.9337  0.9380  0.9418  0.9452  0.9508  0.9560
```

```
 31          PC  0.9609  0.9654  0.9695  0.9732  0.9766  0.9795  0.9821  0.9875  0.9926  0.9974
 32          PC  0.9987  0.9995  1.0000
 33          LS       0      85       0
 34          UD    0.47
             *
             *
```


HEC-1 INPUT

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

 35          KK       C
 36          KO       5
             *
             *     3.33 ACRES
             *
 37          BA  0.0052
 38          PB    1.00
 39          PC  0.0000  0.1446  0.2449  0.3146  0.3741  0.4259  0.4694  0.5060  0.5363  0.5638
 40          PC  0.5882  0.6096  0.6293  0.6485  0.6647  0.6803  0.6961  0.7107  0.7219  0.7351
 41          PC  0.7455  0.7560  0.7670  0.7758  0.7823  0.7901  0.7959  0.8036  0.8095  0.8138
 42          PC  0.8206  0.8260  0.8299  0.8372  0.8384  0.8433  0.8520  0.8582  0.8635  0.8678
 43          PC  0.8730  0.8774  0.8810  0.8857  0.8896  0.8929  0.8997  0.9059  0.9116  0.9167
 44          PC  0.9212  0.9252  0.9286  0.9314  0.9337  0.9380  0.9418  0.9452  0.9508  0.9560
 45          PC  0.9609  0.9654  0.9695  0.9732  0.9766  0.9795  0.9821  0.9875  0.9926  0.9974
 46          PC  0.9987  0.9995  1.0000
 47          LS       0      85       0
 48          UD    0.39
             *
             *

 49          KK       D
 50          KO       5
             *
             *     29.45 ACRES
             *
 51          BA  0.0460
 52          PB    1.00
 53          PC  0.0000  0.1446  0.2449  0.3146  0.3741  0.4259  0.4694  0.5060  0.5363  0.5638
 54          PC  0.5882  0.6096  0.6293  0.6485  0.6647  0.6803  0.6961  0.7107  0.7219  0.7351
 55          PC  0.7455  0.7560  0.7670  0.7758  0.7823  0.7901  0.7959  0.8036  0.8095  0.8138
 56          PC  0.8206  0.8260  0.8299  0.8372  0.8384  0.8433  0.8520  0.8582  0.8635  0.8678
 57          PC  0.8730  0.8774  0.8810  0.8857  0.8896  0.8929  0.8997  0.9059  0.9116  0.9167
 58          PC  0.9212  0.9252  0.9286  0.9314  0.9337  0.9380  0.9418  0.9452  0.9508  0.9560
 59          PC  0.9609  0.9654  0.9695  0.9732  0.9766  0.9795  0.9821  0.9875  0.9926  0.9974
 60          PC  0.9987  0.9995  1.0000
 61          LS       0      85       0
 62          UD    0.62
```

CHEMA RAM EAM

UT
N (OUTI .RS

(ONN CTOR ·) ETURN OF IV ED OR UM

COMPUTED AT TH OCATION
******** * * *** *

L OGRA CKAG
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COR

OGI ENG

609 CON

DAVI

(! 6) 1104

100-YEAR, 24-HOUR STORM

```
IO          OUTPUT CONTROL VARIABLES
                  IPRNT           0  PRINT CONTROL
                  IPLOT           5  PLOT CONTROL
                  QSCAL          0.  HYDROGRAPH PLOT SCALE

IT          HYDROGRAPH TIME DATA
                   NMIN          15  MINUTES IN COMPUTATION INTERVAL
                  IDATE      6SEP 6  STARTING DATE
                  ITIME        1200  STARTING TIME
                     NQ          33  NUMBER OF HYDROGRAPH ORDINATES
                 NDDATE      6SEP 6  ENDING DATE
                 NDTIME        2000  ENDING TIME
                 ICENT           19  CENTURY MARK

               COMPUTATION INTERVAL      .25 HOURS
                    TOTAL TIME BASE     8.00 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
              3.50      4.50      5.30      6.10      7.00      7.80


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

              ***************
              *             *
   7 KK       *          A  *
              *             *
              ***************

   8 KO       OUTPUT CONTROL VARIABLES
```

```
          IPRNT             5  PRINT CONTROL
          IPLOT             5  PLOT CONTROL
          QSCAL            0.  HYDROGRAPH PLOT SCALE

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

           **************
           *            *
  21 KK    *        B   *
           *            *
           **************

  22 KO        OUTPUT CONTROL VARIABLES
                   IPRNT             5  PRINT CONTROL
                   IPLOT             5  PLOT CONTROL
                   QSCAL            0.  HYDROGRAPH PLOT SCALE

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

           **************
           *            *
  35 KK    *        C   *
           *            *
           **************

  36 KO        OUTPUT CONTROL VARIABLES
                   IPRNT             5  PRINT CONTROL
                   IPLOT             5  PLOT CONTROL
                   QSCAL            0.  HYDROGRAPH PLOT SCALE

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

           **************
           *            *
  49 KK    *        D   *
           *            *
```

****

50 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	5	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

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 3.50	RATIO 2 4.50	RATIO 3 5.30	RATIO 4 6.10	RATIO 5 7.00	RATIO 6 7.80
HYDROGRAPH AT										
+	A	.05	1	FLOW	20.	30.	39.	48.	58.	68.
				TIME	1.50	1.25	1.25	1.25	1.00	1.00
HYDROGRAPH AT										
+	B	.13	1	FLOW	46.	68.	87.	108.	131.	153.
				TIME	1.50	1.50	1.25	1.25	1.25	1.25
HYDROGRAPH AT										
+	C	.01	1	FLOW	2.	3.	4.	5.	6.	7.
				TIME	1.50	1.25	1.25	1.25	1.00	1.00
HYDROGRAPH AT										
+	D	.05	1	FLOW	16.	23.	30.	37.	45.	52.
				TIME	1.75	1.50	1.50	1.50	1.50	1.50

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

Developed Conditions

```
1*****************************************
*****************************************
 *                                       *
     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
ENGINEERS     *
 *                JUN   1998             *
CENTER     *
 *              VERSION 4.1
     *
 *
     *
 *  RUN DATE   02OCT06  TIME  09:24:41
     *
 *
     *
 *****************************************
*****************************************
```

```
*
*   U.S. ARMY CORPS OF
*   HYDROLOGIC ENGINEERING
*        609 SECOND STREET
*      DAVIS, CALIFORNIA 95616
*          (916) 756-1104
```

```
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. 2. 3. 4.....5.....6.....7.... 8.. ..9.....10

```
*** LIST ***
*** FREE ***

*DIAGRAM
ID      HEC-1 ANALYSIS FOR OAK CREEK W/ 2nd & 3RD ADDITION BASIN
ID      PROPOSED CONDITIONS - DETENTION BASINS ONLY
ID      100-YEAR STORM - POST DEVELOPMENT
IT      15 27SEP06    1200       0 28SEP06    2000
IN      15 27SEP06    1200
IO       0       5
JR    PREC     3.5     4.5     5.3     6.1     7.0     7.8
*
*

KK       A
KO       5
BA  0.0149
PB    1.00
PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
LS       0      85      40
UD   0.200
*
*
*

KK   PONDA
KO       5
RS       1    ELEV  1388.0
SA    0.50    0.61    0.72    0.84
SE  1388.0  1389.0  1390.0  1391.0
SQ       0     1.8     5.7    11.5    19.2    29.1    41.1    55.4    72.1    91.3
SQ   113.1
SE  1388.0 1388.25 1388.50 1388.75 1389.00 1389.25 1389.50 1389.75 1390.00 1390.30
SE  1390.5
*
*

KK       E
KO       5
BA  0.0150
```

```
 36          PB    1.00
 37          PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
 38          PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
 39          PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
 40          PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
 41          PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
 42          PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
1                                        HEC-1 INPUT                                          PAGE

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

 43          PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
 44          PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
 45          PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
 46          PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
 47          LS       0      85      50
 48          UD   0.250
             *
             *
             *
             *

 49          KK   PONDE
 50          KO       5
 51          RS       1    ELEV  1365.0
 52          SA    0.30    0.38    0.47    0.57
 53          SE  1373.0  1374.0  1375.0  1376.0
 54          SQ       0     3.7     8.2    10.1    11.6    13.0    14.3    15.4    16.5    17.5
 55          SQ    18.4    19.3    20.2    21.0    21.8    22.6    23.3
 56          SE  1373.0 1373.25 1373.50 1373.75 1374.00 1374.25 1374.50 1374.75 1375.00 1375.30
 57          SE  1375.5 1375.75 1376.00 1376.25 1376.50 1376.75 1377.00
             *
             *
             *

 58          KK    RTE1
 59          KO       5
 60          RT       0       0       1
             *
             *
             *

 61          KK       B
 62          KO       5
 63          BA  0.0197
 64          PB    1.00
 65          PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
 66          PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
```

064 068 072 076 0.080 085 090 095 100 105
110 115 120 127 134 140 147 155 163 172
181 193 204 0.220 235 259 283 387 0.663 0.699
735 754 772 786 799 0.810 0.820 0.828 0.835 0.843
71 850 0.858 0.865 0.873 0.880 0.885 0.889 0.894 0.898 0.903
PC 907 0.912 0.916 0.921 925 929 0.934 0.938 0.943 0.947
0.952 0.955 0.958 0.961 0.964 0.967 0.970 0.973 0.976 0.979
982 0.985 0.988 0.991 994 997 000
75
200

PONDB

1367
0.
1375.0 1376.0 1377 1378.0

1375. 1375 1375 1376 11 1376 1376 1376 1376 1377 13 1377
1377.

RTE2

0320

0.000 003 006 008 011 014 017 019 022 025
0.029 0.032 0.035 0.038 0.042 0.045 0.048 0.052 0.056 0.060
PC 0.064 0.068 0.072 0.076 0.080 0.085 0.090 0.095 100 105
110 115 120 127 134 140 147 155 163 172
181 193 204 220 235 259 283 387 563 599
735 754 772 786 799 0.810 0.820 0.828 0.835 0.843
0.850 858 0.865 0.873 0.880 0.885 0.889 0.894 898 0.903
100 907 0.912 0.916 0.921 0.925 0.929 0.934 0.938 0.943 0.947
101 0.952 955 958 0.961 0.964 0.967 0.970 973 0.976 0.979
102 982 985 988 0.991 0.994 0.997 000

```
103
104                200

105                PONDC
106
107                                .372
108
109                1372    373     1374.0  1375.0
110
111
112           SE   1372    1373    1374    1375    1376.   1377    1379    1385    1392    1407
113                1436


115
116
```



```
INE

117
118
119                0152
120
121                0.000   003     006     008     011     014     017     019     022     025
122                0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
123                0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   100     105
124                110     115     120     127     134     140     147     155     163     172
125                181     193     204     220     235     259     283     387     0.663   0.699
126                735     754     772     786     799     0.810   0.820   0.828   0.835   0.843
127                0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   903
128                0.907   0.912   0.916   0.921   925     929     0.934   0.938   0.943   0.947
129                952     0.955   0.958   0.961   0.964   967     0.970   0.973   0.976   0.979
130                0.982   0.985   0.988   0.991   0.994   997     000
131           LS
132                250
```

```
133            KK   PONDD
134            KO       5
135            RS       1    ELEV  1365.0
136            SA    0.53    0.58    0.64    0.69
137            SE  1365.0  1365.0  3167.0  1368.0
138            SQ       0      10      20      30      40      50      60      70      80      90
139            SQ     100
140            SE  1365.0 1366.45 1367.19 1367.87 1368.20 1368.29 1368.37 1368.43 1368.49 1368.55
141            SE  1378.6
                   *
                   *
                   *
                   *
142            ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW

```
   8          A
              V
              V
  24       PONDA

  33                    E
                        V
                        V
  49                PONDE
                        V
                        V
  58                RTE1

  61                            B
                                V
                                V
  77                        PONDB
                                V
                                V
  86                        RTE2

  89                                    C
                                        V
```

```
                                                    V
   105                                            PONDC
                                                    V
                                                    V
   114                                             RTE3
                                                    .
                                                    .
   117                                              .          D
                                                    .          V
                                                    .          V
   133                                              .        PONDD
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*****************************************
 *                                       *                                       *
     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                       *    U.S. ARMY CORPS OF
ENGINEERS     *
 *                JUN   1998             *                                       *    HYDROLOGIC ENGINEERING
CENTER     *
 *             VERSION 4.1                                                              609 SECOND STREET
     *
 *                                                                                    DAVIS, CALIFORNIA 95616
     *
    RUN DATE   02OCT06  TIME  09:24:41                                           *          (916) 756-1104
      *
                                                                                 *
     *
 ****************************************
*****************************************
```

HEC-1 ANALYSIS FOR OAK CREEK W/ 2nd & 3RD ADDITION BASIN
PROPOSED CONDITIONS - DETENTION BASINS ONLY
100-YEAR STORM - POST DEVELOPMENT

```
    6 IO          OUTPUT CONTROL VARIABLES
                        IPRNT           0  PRINT CONTROL
                        IPLOT           5  PLOT CONTROL
                        QSCAL          0.  HYDROGRAPH PLOT SCALE

      IT          HYDROGRAPH TIME DATA
                         NMIN          15  MINUTES IN COMPUTATION INTERVAL
                        IDATE     27SEP 6  STARTING DATE
```

```
                    ITIME          1200  STARTING TIME
                       NQ           129  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE        28SEP 6  ENDING DATE
                   NDTIME          2000  ENDING TIME
                   ICENT             19  CENTURY MARK

             COMPUTATION INTERVAL      .25 HOURS
                  TOTAL TIME BASE    32.00 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
                   3.50      4.50      5.30      6.10      7.00      7.80

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

             **************
             *            *
   8 KK      *          A *
             *            *
             **************

   9 KO          OUTPUT CONTROL VARIABLES
                      IPRNT              5  PRINT CONTROL
                      IPLOT              5  PLOT CONTROL
                      QSCAL             0.  HYDROGRAPH PLOT SCALE

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

```
          **************
          *            *
24 KK     *     PONDA  *
          *            *
          **************

25 KO          OUTPUT CONTROL VARIABLES
                      IPRNT              5  PRINT CONTROL
                      IPLOT              5  PLOT CONTROL
                      QSCAL             0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
33 KK     *         E  *
          *            *
          **************

34 KO          OUTPUT CONTROL VARIABLES
                      IPRNT              5  PRINT CONTROL
                      IPLOT              5  PLOT CONTROL
                      QSCAL             0.  HYDROGRAPH PLOT SCALE


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


          **************
          *            *
49 KK     *     PONDE  *
          *            *
          **************

50 KO          OUTPUT CONTROL VARIABLES
                      IPRNT              5  PRINT CONTROL
                      IPLOT              5  PLOT CONTROL
                      QSCAL             0.  HYDROGRAPH PLOT SCALE


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

```
** ***

            **************
            *            *
  58 KK     *      RTE1  *
            *            *
            **************

  59 KO           OUTPUT CONTROL VARIABLES
                        IPRNT            5  PRINT CONTROL
                        IPLOT            5  PLOT CONTROL
                        QSCAL           0.  HYDROGRAPH PLOT SCALE


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

            **************
            *            *
  61 KK     *          B *
            *            *
            **************

  62 KO           OUTPUT CONTROL VARIABLES
                        IPRNT            5  PRINT CONTROL
                        IPLOT            5  PLOT CONTROL
                        QSCAL           0.  HYDROGRAPH PLOT SCALE


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

            **************
            *            *
  77 KK     *     PONDB  *
            *            *
            **************

  78 KO           OUTPUT CONTROL VARIABLES
                        IPRNT            5  PRINT CONTROL
                        IPLOT            5  PLOT CONTROL
                        QSCAL           0.  HYDROGRAPH PLOT SCALE
```

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

           ***************
           *             *
  86 KK    *       RTE2  *
           *             *
           ***************

  87 KO          OUTPUT CONTROL VARIABLES
                       IPRNT            5  PRINT CONTROL
                       IPLOT            5  PLOT CONTROL
                       QSCAL           0.  HYDROGRAPH PLOT SCALE


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

           ***************
           *             *
  89 KK    *           C *
           *             *
           ***************

  90 KO          OUTPUT CONTROL VARIABLES
                       IPRNT            5  PRINT CONTROL
                       IPLOT            5  PLOT CONTROL
                       QSCAL           0.  HYDROGRAPH PLOT SCALE


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

           ***************
           *             *
 105 KK    *      PONDC  *
           *             *
           ***************

 106 KO          OUTPUT CONTROL VARIABLES
                       IPRNT            5  PRINT CONTROL
```

```
                    IPLOT           5  PLOT CONTROL
                    QSCAL           0.  HYDROGRAPH PLOT SCALE

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

            **************
            *            *
  114 KK    *      RTE3  *
            *            *
            **************

  115 KO          OUTPUT CONTROL VARIABLES
                        IPRNT           5  PRINT CONTROL
                        IPLOT           5  PLOT CONTROL
                        QSCAL           0.  HYDROGRAPH PLOT SCALE

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

            **************
            *            *
  117 KK    *         D  *
            *            *
            **************

  118 KO          OUTPUT CONTROL VARIABLES
                        IPRNT           5  PRINT CONTROL
                        IPLOT           5  PLOT CONTROL
                        QSCAL           0.  HYDROGRAPH PLOT SCALE

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

            **************
            *            *
  133 KK    *     PONDD  *
            *            *
            **************
```

134 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	5	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

1

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
					3.50	4.50	5.30	6.10	7.00	7.80
HYDROGRAPH AT										
+	A	.01	1	FLOW	19.	26.	32.	38.	44.	50.
				TIME	12.00	12.00	12.00	12.00	12.00	12.00
ROUTED TO										
+	PONDA	.01	1	FLOW	13.	19.	24.	29.	35.	40.
				TIME	12.25	12.25	12.25	12.25	12.25	12.25
			** PEAK STAGES IN FEET **							
			1	STAGE	1388.80	1389.00	1389.13	1389.26	1389.38	1389.48
				TIME	12.25	12.25	12.25	12.25	12.25	12.25
HYDROGRAPH AT										
+		.01	1	FLOW	17.	23.	28.	33.	38.	43.
				TIME	12.00	12.00	12.00	12.00	12.00	12.00
ROUTED TO										
+	PONDE	.01	1	FLOW	12.	14.	16.	17.	19.	20.
				TIME	12.50	12.50	12.50	12.50	12.50	12.50
			** PEAK STAGES IN FEET **							
			1	STAGE	1373.99	1374.48	1374.87	1375.25	1375.66	1376.01
				TIME	12.50	12.50	12.50	12.50	12.50	12.50
ROUTED TO										
+	RTE1	.01	1	FLOW	12.	14.	16.	17.	19.	20.
				TIME	12.75	12.75	12.75	12.75	12.75	12.75
HYDROGRAPH AT										
+	B	.02	1	FLOW	27.	36.	43.	51.	59.	67.
				TIME	12.00	12.00	12.00	12.00	12.00	12.00

ROUTED TO										
+	PONDB	.02		FLOW	22.	30.	36.	43.	50.	56.
				TIME	12.25	12.25	12.25	12.25	12.25	12.25
			** PEAK STAGES IN FEET **							
			1	STAGE	1376.26	1376.55	1376.77	1376.97	1377.18	1377.37
				TIME	12.25	12.25	12.25	12.25	12.25	12.25
ROUTED TO										
+	RTE2	.02	1	FLOW	22.	30.	36.	43.	50.	56.
				TIME	12.50	12.50	12.50	12.50	12.50	12.50
HYDROGRAPH AT										
+	C	.03	1	FLOW	42.	57.	70.	82.	96.	108.
				TIME	12.00	12.00	12.00	12.00	12.00	12.00
ROUTED TO										
+	PONDC	.03	1	FLOW	8.	13.	17.	20.	23.	26.
				TIME	12.75	12.75	12.75	12.75	12.75	12.75
			** PEAK STAGES IN FEET **							
			1	STAGE	1373.43	1373.87	1374.22	1374.57	1374.96	1375.30
				TIME	12.75	12.75	12.75	12.75	12.75	12.75
ROUTED TO										
+	RTE3	.03	1	FLOW	8.	13.	17.	20.	23.	26.
				TIME	13.00	13.00	13.00	13.00	13.00	13.00
HYDROGRAPH AT										
+	D	.02	1	FLOW	17.	23.	28.	33.	38.	43.
				TIME	12.00	12.00	12.00	12.00	12.00	12.00
ROUTED TO										
+	PONDD	.02	1	FLOW	8.	11.	15.	18.	22.	26.
				TIME	12.50	12.50	12.50	12.50	12.50	12.50
			** PEAK STAGES IN FEET **							
			1	STAGE	1366.13	1366.53	1366.81	1367.07	1367.36	1367.61
				TIME	12.50	12.50	12.50	12.50	12.50	12.50

** NORMAL END OF HEC-1 ***

```
1*****************************************
*****************************************
 *                                       *
     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
ENGINEERS      *
 *                JUN   1998             *
CENTER     *
 *             VERSION 4.1               *
     *
 *
     *
    RUN DATE   28SEP06  TIME  17:27:47   *
     *
     *
 *****************************************
*****************************************
```

```
*
*    U.S. ARMY CORPS OF
*    HYDROLOGIC ENGINEERING
*         609 SECOND STREET
*       DAVIS, CALIFORNIA 95616
*           (916) 756-1104
*
```

```
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

HEC-1 INPUT PAGE 1

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

```
*** LIST ***
*** FREE ***

ID      HEC-1 ANALYSIS FOR OAK CREEK W/ 2nd & 3RD ADDITION BASIN
ID      PROPOSED CONDITIONS - DETENTION BASIN F ONLY
ID      100-YEAR 24-HOUR STORM - POST DEVELOPMENT

*DIAGRAM
IT      15 27SEP06    1200        0 28SEP06    2000
IN      15 27SEP06    1200
IO       0        4
JR    PREC     3.5     4.5     7.8
*
*
*
*

KK       F
KO       5
BA  0.0330
PB    1.00
PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022    0.02
PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056    0.06
PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100    0.10
PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163    0.17
PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663    0.69
PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835    0.84
PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898    0.90
PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943    0.94
PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976    0.97
PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
LS       0      85      20
UD   0.250
*
*

KK   PONDF
KO       5
RS       1    ELEV  1370.5
SA    0.42    0.45    0.50    0.86    1.00
SE  1370.5  1371.0  1372.0  1374.0  1375.0
SQ       0     5.0    10.0    15.0    20.0    25.0    30.0    35.0    40.0    45.0
SQ    60.0    65.0
SE  1370.5 1370.60 1370.66 1370.74 1370.92 1371.16 1371.45 1371.80 1372.20 1372.65
SE  1373.5 1374.77
*
*
*

ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW

```
     8          F
                V
                V
    24       PONDF
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*****************************************
 *                                       *
     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)
ENGINEERS     *
 *                JUN   1998
CENTER     *
 *             VERSION 4.1
     *
 *  RUN DATE   28SEP06  TIME  17:27:47   *
     *
     *
 *****************************************
*****************************************
```

U.S. ARMY CORPS OF

HYDROLOGIC ENGINEERING

* 609 SECOND STREET

* DAVIS, CALIFORNIA 95616

(916) 756-1104

HEC-1 ANALYSIS FOR OAK CREEK W/ 2nd & 3RD ADDITION BASIN
PROPOSED CONDITIONS - DETENTION BASIN F ONLY
100-YEAR 24-HOUR STORM - POST DEVELOPMENT

```
   6 IO          OUTPUT CONTROL VARIABLES
                       IPRNT          0  PRINT CONTROL
                       IPLOT          4  PLOT CONTROL
                       QSCAL         0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                        NMIN         15  MINUTES IN COMPUTATION INTERVAL
                       IDATE     27SEP 6  STARTING DATE
                       ITIME       1200  STARTING TIME
```

```
                NQ        129  NUMBER OF HYDROGRAPH ORDINATES
            NDDATE    28SEP 6  ENDING DATE
            NDTIME       2000  ENDING TIME
            ICENT          19  CENTURY MARK

         COMPUTATION INTERVAL     .25 HOURS
              TOTAL TIME BASE   32.00 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
              3.50      4.50      7.80


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


               ***************
               *             *
  8 KK         *      F      *
               *             *
               ***************

  9 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          4  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE


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


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

```
          *             *
24 KK     *    PONDF    *
          *             *
          ***************
```

25 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	4	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

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
					3.50	4.50	7.80
HYDROGRAPH AT							
+	F	.03	1	FLOW	32.	46.	90.
				TIME	12.00	12.00	12.00
ROUTED TO							
	PONDF	03	1	FLOW	28.	35.	60.
				TIME	12.25	12.25	12.50
				** PEAK STAGES IN FEET **			
			1	STAGE	1371.31	1371.82	1373.56
				TIME	12.25	12.25	12.50

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

```
1*****************************************
*****************************************
 *                                       *
     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)
ENGINEERS      *
 *                JUN   1998
CENTER     *
 *             VERSION 4.1               *
     *
 *                                       *
     *
 *  RUN DATE   28SEP06  TIME  15:23:55   *
     *
                                         *
     *
 *****************************************
*****************************************
```

U.S. ARMY CORPS OF
HYDROLOGIC ENGINEERING
609 SECOND STREET
DAVIS, CALIFORNIA 95616
(916) 756-1104

```
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.

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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      HEC-1 ANALYSIS FOR OAK CREEK W/ 2nd & 3RD ADDITION BASIN
                2          ID      PROPOSED CONDITIONS - DETENTION BASIN G ONLY
                3          ID      100-YEAR STORM - POST DEVELOPMENT
 *** LIST ***
 *** FREE ***
                           *DIAGRAM
                4          IT      15 27SEP06    1200       0 28SEP06    2000
                5          IN      15 27SEP06    1200
                6          IO       0        5
                7          JR    PREC     3.5     4.5     5.3     6.1     7.0     7.8
                           *
                           *
                           *

                8          KK       G
                9          KO       5
               10          BA  0.0580
               11          PB    1.00
               12          PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
               13          PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
               14          PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
               15          PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
               16          PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
               17          PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
               18          PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
               19          PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
               20          PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
               21          PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
               22          LS       0      85      46
               23          UD   0.250
                           *
                           *
               24          ZZ
1
                    SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE       (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.       (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

     8           G

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************
****************************************
 *                                    *                                    *
     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)                                     U.S. ARMY CORPS OF
```

```
ENGINEERS     *                                            *    HYDROLOGIC ENGINEERING
 *           JUN   1998
CENTER    *                                                        609 SECOND STREET
 *         VERSION 4.1
      *
 *                                         *               *     DAVIS, CALIFORNIA 95616
      *
 *  RUN DATE   28SEP06  TIME  15:23:55                     *        (916) 756-1104
      *
 *                                                         *
      *
 *****************************************
 **************************************
```

```
                  HEC-1 ANALYSIS FOR OAK CREEK W/ 2nd & 3RD ADDITION BASIN
                  PROPOSED CONDITIONS - DETENTION BASIN G ONLY
                  100-YEAR STORM - POST DEVELOPMENT

  6 IO         OUTPUT CONTROL VARIABLES
                     IPRNT          0  PRINT CONTROL
                     IPLOT          5  PLOT CONTROL
                     QSCAL          0. HYDROGRAPH PLOT SCALE

    IT         HYDROGRAPH TIME DATA
                      NMIN         15  MINUTES IN COMPUTATION INTERVAL
                     IDATE    27SEP 6  STARTING DATE
                     ITIME       1200  STARTING TIME
                        NQ        129  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE    28SEP 6  ENDING DATE
                    NDTIME       2000  ENDING TIME
                     ICENT         19  CENTURY MARK

                 COMPUTATION INTERVAL     .25 HOURS
                      TOTAL TIME BASE   32.00 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
                  3.50      4.50      5.30      6.10      7.00      7.80


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


          **************
          *            *
   8 KK   *          G *
          *            *
          **************

   9 KO         OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           5  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
1

           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


                                                          RATIOS APPLIED TO PRECIPITATION
 OPERATION       STATION     AREA    PLAN           RATIO 1  RATIO 2  RATIO 3  RATIO 4  RATIO 5  RATIO 6
                                                       3.50     4.50     5.30     6.10     7.00     7.80

 HYDROGRAPH AT
                       G       06         FLOW          64.      87.     106.     125.     146.     165.
                                          TIME        12.00    12.00    12.00    12.00    12.00    12.00


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

```
1****************************************
****************************************
 *                                      *                    *
      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)                       *    U.S. ARMY CORPS OF
ENGINEERS      *
 *                JUN   1998                                 *    HYDROLOGIC ENGINEERING
CENTER     *
 *             VERSION 4.1                                   *         609 SECOND STREET
      *
                                        *                    *       DAVIS, CALIFORNIA 95616
      *
    RUN DATE   02OCT06  TIME  09:29:59  *                    *         (916) 756-1104
      *
 *                                      *                    *
      *
 ****************************************
****************************************
```

```
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


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

```
*** LIST ***
*** FREE ***

 1          ID      HEC-1 ANALYSIS FOR OAK CREEK W/ 2nd & 3RD ADDITION BASIN
 2          ID      PROPOSED CONDITIONS - DETENTION BASIN H ONLY
 3          ID      100-YEAR STORM - POST DEVELOPMENT

            *DIAGRAM
 4          IT      15 27SEP06    1200       0 28SEP06    2000
 5          IN      15 27SEP06    1200
 6          IO       0        5
 7          JR    PREC     3.5     4.5     5.3     6.1     7.0     7.8
                  *
                  *
                  *
                  *
                  *

 8          KK       H
 9          KO       5
10          BA  0.0544
11          PB    1.00
12          PC   0.000   0.003   0.006   0.008   0.011   0.014   0.017   0.019   0.022   0.025
13          PC   0.029   0.032   0.035   0.038   0.042   0.045   0.048   0.052   0.056   0.060
14          PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
15          PC   0.110   0.115   0.120   0.127   0.134   0.140   0.147   0.155   0.163   0.172
16          PC   0.181   0.193   0.204   0.220   0.235   0.259   0.283   0.387   0.663   0.699
17          PC   0.735   0.754   0.772   0.786   0.799   0.810   0.820   0.828   0.835   0.843
18          PC   0.850   0.858   0.865   0.873   0.880   0.885   0.889   0.894   0.898   0.903
19          PC   0.907   0.912   0.916   0.921   0.925   0.929   0.934   0.938   0.943   0.947
20          PC   0.952   0.955   0.958   0.961   0.964   0.967   0.970   0.973   0.976   0.979
21          PC   0.982   0.985   0.988   0.991   0.994   0.997   1.000
22          LS       0      85      45
23          UD   0.300
                  *
                  *
                  *
                  *

24          KK   PONDH
25          KO       5
26          RS       1    ELEV  1365.0
27          SA    0.50    2.00    3.00
28          SE  1365.0  1366.0  1372.0
29          SQ       0       6      12      18      24      30      36      42      48      54
30          SQ      60
31          SE  1364.5 1365.88 1366.92 1368.55 1370.78 1375.05 1375.17 1375.26 1375.33 1375.40
32          SE  1375.5
                  *
                  *
```

```
            33          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

     8           H
                 V
                 V
    24         PONDH

  (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************
****************************************
 *                                      *
      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)                                  *    U.S. ARMY CORPS OF
ENGINEERS      *
 *                JUN   1998                                            *    HYDROLOGIC ENGINEERING
CENTER     *
 *             VERSION 4.1              *                                        609 SECOND STREET
      *
      *                                                                          DAVIS, CALIFORNIA 95616
 *   RUN DATE   02OCT06  TIME  09:29:59   *                                       (916) 756-1104
      *
 *
      *
 ****************************************
****************************************
```

HEC-1 ANALYSIS FOR OAK CREEK W/ 2nd & 3RD ADDITION BASIN
PROPOSED CONDITIONS - DETENTION BASIN H ONLY
100-YEAR STORM - POST DEVELOPMENT

```
    6 IO          OUTPUT CONTROL VARIABLES
                        IPRNT          0  PRINT CONTROL
                        IPLOT          5  PLOT CONTROL
                        QSCAL         0.  HYDROGRAPH PLOT SCALE

      IT          HYDROGRAPH TIME DATA
                         NMIN         15  MINUTES IN COMPUTATION INTERVAL
```

```
                 IDATE       27SEP 6  STARTING DATE
                 ITIME          1200  STARTING TIME
                    NQ           129  NUMBER OF HYDROGRAPH ORDINATES
                NDDATE       28SEP 6  ENDING DATE
                NDTIME          2000  ENDING TIME
                ICENT             19  CENTURY MARK

            COMPUTATION INTERVAL     .25 HOURS
                 TOTAL TIME BASE   32.00 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
                3.50      4.50      5.30      6.10      7.00      7.80


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


          **************
          *            *
   8 KK   *      H     *
          *            *
          **************

   9 KO       OUTPUT CONTROL VARIABLES
                   IPRNT            5  PRINT CONTROL
                   IPLOT            5  PLOT CONTROL
                   QSCAL           0.  HYDROGRAPH PLOT SCALE


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

```
          **************
          *            *
24 KK     *    PONDH   *
          *            *
          **************
```

25 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	5	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

1

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

					RATIOS APPLIED TO PRECIPITATION					
OPERATION	STATION	AREA	PLAN		RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6
					3.50	4.50	5.30	6.10	7.00	7.80
HYDROGRAPH AT										
	H	.05	1	FLOW	60.	81.	98.	115.	134.	151.
				TIME	12.25	12.25	12.25	12.25	12.25	12.25
ROUTED TO										
	PONDH	05	1	FLOW	12.	14.	16.	18.	20.	21.
				TIME	13.00	13.25	13.25	13.25	13.25	13.25
			** PEAK STAGES IN FEET **							
			1	STAGE	1366.96	1367.58	1368.10	1368.62	1369.17	1369.66
				TIME	13.00	13.25	13.25	13.25	13.25	13.25

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

OAK CREEK 2ND

AN ADDITION TO WICHITA, SEDGWICK COUNTY, KANSAS

DRAINAGE PLAN

REVISED 4-28-2006

N.W. Cor. NE1/4
Sec. 9, T27S, R2E
Found #5 Bar w/ MKEC Cap

N.E. Cor. Sec. 9
T27S, R2E
Found Chiseled "+"
In Concrete

BENCHMARKS:

BM #205 (Datum)
COW brass disc in NW corner of railroad signal base, W side of Greenwich Road, 1/2 mile S of 21st Street North.
Elev. = 1370.59 N.G.V.D.
183.19 City Datum

BM #206
"T" Post 5' W of N gate post to field entrance, W side of Greenwich Road, 700' ± N of railroad tracks and 500' ± S of RCB culvert.
Elev. = 1385.87 N.G.V.D.
178.47 City Datum

BM #207
Chiseled "d" on top of concrete headwall on NW corner of RCB under Greenwich Road, 1100' ± S of 21st Street North.
Elev. = 1360.065 N.G.V.D.
172.665 City Datum

BM #208
Railroad spike in W face of 20" Elm on E right of way line of Greenwich Road 800' ± S of 21st Street North.
Elev. = 1367.70 N.G.V.D.
180.30 City Datum

BM #209
Chiseled "d" on NW corner of traffic signal base, at SW corner of Greenwich Road & 21st Street North
Elev. = 1363.54 N.G.V.D.
176.14 City Datum

BM #215
Chiseled "+" in top center curb inlet 600' W of Greenwich Road on S side of 21st Street North.
Elev. = 1363.265 N.G.V.D.
175.865 City Datum

BM #216
Chiseled "d" on S end of curb & gutter at ℄ of Median, Target entrance on N side of 21st Street North 1400' ± W of Greenwich Road.
Elev. = 1364.55 N.G.V.D.
177.15 City Datum

RESERVE A DETAIL

SCALE: 1" = 100'

LEGEND

- BASIN IDENTIFIER
- MINOR BASIN BOUNDARY
- MAJOR BASIN BOUNDARY
- EMERGENCY STORM WATER FLOW
- STORM WATER FLOW
- 300 NODE IDENTIFIER
- STORM SEWER AND INLET
- STORM SEWER AND MANHOLE

SEE SUPPORTING CALCULATIONS FOR HYDROLOGY

MINIMUM PADS

BLOCK 1:	
LOTS 1-3	1369.5
BLOCK 2:	
LOT 1	1383.2
LOT 9	1394.6
LOTS 12 & 17	1380.5
LOT 18	1369.6
BLOCK 3:	
LOT 1	1380.1

POST DEVELOPMENT DRAINAGE BASIN

R2E
21ST STREET NORTH
PROJECT AREA
T27S
WEBB ROAD
GREENWICH ROAD
9
13TH STREET NORTH
VICINITY MAP

Existing 36" CMP Under Greenwich

Retention Area HW = 1369.7

Pond #A Static = 1368.5 HW = 1390.9
Pond #B Static = 1370.5 HW = 1373.5
Pond #C Static = 1372.0 HW = 1375.3
Pond #D Static = 1365.0 HW = 1367.6
Pond #E Static = 1373.0 HW = 1375.9

BASIN A, BASIN B, BASIN C, BASIN D, BASIN E, BASIN F, BASIN G, BASIN H

RESERVE A, RESERVE B, RESERVE C, RESERVE D, RESERVE E, RESERVE F, RESERVE G, RESERVE H, RESERVE I

℄ 21ST STREET NORTH
℄ 19TH ST. NORTH
OAK CREEK PARKWAY
℄ GREENWICH ROAD
CHATEAU PARKWAY

20' Utility Easement
20' Drainage & Utility Easement
30' Drainage & Utility Easement
50' Coffeyville Resources Pipeline Easement
Coffeyville Resources Pipeline (To Be Relocated)
100' KGE Easement Misc. BK. 594, Pg. 590
Access Control Except One Opening
Complete Access Control

S.W. Cor. NE1/4
Sec. 9, T27S, R2E
Found 1/2" Iron Pipe

ABANDONED BURLINGTON NORTHERN RAILROAD

Sec. 9, T27S, R2E
Found Railroad Spike

Saved: 10-02-2006 9:47:07 AM by JTS
Plot Scale: 1:100 10-02-2006 9:48:14 AM by SBB
P:\Oak Creek 2\oakcrek2.dwg

Time Of Concentration

OAK CREEK 3RD ADDITION
PRE-DEVELOPMENT TIME OF CONCENTRATIONS

Time of concentration (Tc) or travel time (Tt)

Project :	*Oak Creek Addition - Basin A*	***By:***	*SB*	***Date:***	*9/8/2006*
Location :	*Wichita, Kansas*	***Checked:***		***Date:***	

Circle One: [*Present*] *Developed*

Circle One: [*Tc*] *Tt through subarea*

NOTES: *Space for as many as two segments per flow type can be used for each worksheet. Include map, schematic, or description of flow segments.*

Sheet flow *(Applicable to Tc only)*

		Segment ID		
		AB		
1. Surface description (Table 3-1)		*Short Grass*		
2. Mannings roughness coeff., n (Table 3-1)		*0.15*		
3. Flow length, L (total L < 300 ft.)	*ft*	*300*		
4. Two-yr 24-hr rainfall, P2	*in*	*3.60*		
5. Calculated Land slope, s	*ft/ft*	*0.013*		
5a. Land Elevation For Upper End Of Flow Path		*1400.0*		
5b. Land Elevation For Lower End Of Flow Path		*1396.0*		
6. Compute Tt	*hr*	*0.44*	=	*0.44*

Shallow concentrated flow

		Segment ID		
		BC		
7. Surface description (Paved or Unpaved)		*Unpaved*		
8. Flow length, L	*ft*	*944*		
9. Calculated Watercourse slope, s	*ft/ft*	*0.013*		
9a. Land Elevation For Upper End Of Flow Path		*1396.0*		
9b. Land Elevation For Lower End Of Flow Path		*1383.5*		
10. Average velocity, V (Figure 3-1)	*ft/s*	*1.86*		
11. Tt = L/3600V Compute Tt	*hr*	*0.14*	=	*0.14*

Channel Flow

		Segment ID		
		CD		
12. Cross sectional flow area, a	*sf*	*30.00*		
13. Wetted perimeter, Pw	*ft*	*19*		
14. Hydraulic radius, r = a/Pw Compute r	*ft*	*1.579*		
15. Channel slope, s	*ft/ft*	*0.010*		
16. Manning's roughness coeff., n		*0.041*		
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	*ft/s*	*4.9*		
18. Flow length, L	*ft*	*1000*		
19. Tt = L/3600V Compute Tt	*hr*	*0.056*	=	*0.06*
20. Watershed or subarea Tc or Tt (add Tt in steps 6,11, and 19)			*hr*	*0.63*

Reference: *Urban Hydrology for Small Watersheds*
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Use Time Of Concentration = **38 Minutes**

Time of concentration (Tc) or travel time (Tt)

Project :	Oak Creek Addition - Basin B	**By:**	SB	**Date:**	9/8/2006
Location :	Wichita, Kansas	**Checked:**		**Date:**	

Circle One: [Present] Developed

Circle One: [Tc] Tt through subarea

NOTES: Space for as many as two segments per flow type can be used for each worksheet.
Include map, schematic, or description of flow segments.

Sheet flow (Applicable to Tc only)

		Segment ID		
		AB		
1. Surface description (Table 3-1)		Short Grass		
2. Mannings roughness coeff., n (Table 3-1)		0.15		
3. Flow length, L (total L < 300 ft.)	ft	300		
4. Two-yr 24-hr rainfall, P2	in	3.60		
5. Calculated Land slope, s	ft/ft	0.023		
5a. Land Elevation For Upper End Of Flow Path		1380.3		
5b. Land Elevation For Lower End Of Flow Path		1373.5		
6. Compute Tt	hr	0.35	=	0.35

Shallow concentrated flow

		Segment ID		
		BC		
7. Surface description (Paved or Unpaved)		Unpaved		
8. Flow length, L	ft	793		
9. Calculated Watercourse slope, s	ft/ft	0.018		
9a. Land Elevation For Upper End Of Flow Path		1373.5		
9b. Land Elevation For Lower End Of Flow Path		1359.0		
10. Average velocity, V (Figure 3-1)	ft/s	2.18		
11. Tt = L/3600V Compute Tt	hr	0.10	=	0.10

Channel Flow

		Segment ID		
		CD		
12. Cross sectional flow area, a	sf	25.00		
13. Wetted perimeter, Pw	ft	14		
14. Hydraulic radius, r = a/Pw Compute r	ft	1.786		
15. Channel slope, s	ft/ft	0.002		
16. Manning's roughness coeff., n		0.041		
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s	2.4		
18. Flow length, L	ft	2875		
19. Tt = L/3600V Compute Tt	hr	0.334	=	0.33
20. Watershed or subarea Tc or Tt (add Tt in steps 6,11, and 19)			hr	0.79

Reference: Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Use Time Of Concentration = 47 Minutes

Time of concentration (Tc) or travel time (Tt)

Project : Oak Creek Addition - Basin C **By:** SB **Date:** 9/8/2006
Location : Wichita, Kansas **Checked:** **Date:**

Circle One: [Present] Developed

Circle One: [Tc] Tt through subarea

NOTES: Space for as many as two segments per flow type can be used for each worksheet.
Include map, schematic, or description of flow segments.

Sheet flow (Applicable to Tc only)

		Segment ID		
1. Surface description (Table 3-1)		AB		
2. Mannings roughness coeff., n (Table 3-1)		Short Grass		
3. Flow length, L (total L < 300 ft.)	ft	0.15		
4. Two-yr 24-hr rainfall, P2	in	300		
5. Calculated Land slope, s	ft/ft	3.60		
5a. Land Elevation For Upper End Of Flow Path		0.008		
5b. Land Elevation For Lower End Of Flow Path		1399.6		
6. Compute Tt	hr	1397.4	=	0.55

Shallow concentrated flow

		Segment ID		
7. Surface description (Paved or Unpaved)		BC		
8. Flow length, L	ft	Unpaved		
9. Calculated Watercourse slope, s	ft/ft	697		
9a. Land Elevation For Upper End Of Flow Path		0.015		
9b. Land Elevation For Lower End Of Flow Path		1397.4		
10. Average velocity, V (Figure 3-1)	ft/s	1387.0		
11. Tt = L/3600V Compute Tt	hr	1.97		
		0.10	=	0.10

Channel Flow

		Segment ID		
12. Cross sectional flow area, a	sf			
13. Wetted perimeter, Pw	ft			
14. Hydraulic radius, r = a/Pw Compute r	ft			
15. Channel slope, s	ft/ft			
16. Manning's roughness coeff., n				
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s			
18. Flow length, L	ft			
19. Tt = L/3600V Compute Tt	hr		=	0.00
20. Watershed or subarea Tc or Tt (add Tt in steps 6,11, and 19)			hr	0.65

Reference: Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Use Time Of Concentration = 39 Minutes

Time of concentration (Tc) or travel time (Tt)

Project : Oak Creek Addition - Basin D **By:** SB **Date:** 9/8/2006
Location : Wichita, Kansas **Checked:** **Date:**

Circle One: [Present] Developed

Circle One: [Tc] Tt through subarea

NOTES: Space for as many as two segments per flow type can be used for each worksheet.
Include map, schematic, or description of flow segments.

Sheet flow (Applicable to Tc only)

		Segment ID		
1. Surface description (Table 3-1)		AB		
2. Mannings roughness coeff., n (Table 3-1)		Short Grass		
3. Flow length, L (total L < 300 ft.)		0.15		
4. Two-yr 24-hr rainfall, P2	ft	300		
5. Calculated Land slope, s	in	3.60		
5a. Land Elevation For Upper End Of Flow Path	ft/ft	0.005		
5b. Land Elevation For Lower End Of Flow Path		1400.0		
6. Compute Tt		1398.5		
	hr	0.65	=	0.65

Shallow concentrated flow

		Segment ID		
7. Surface description (Paved or Unpaved)		BC		
8. Flow length, L		Unpaved		
9. Calculated Watercourse slope, s	ft	1175		
9a. Land Elevation For Upper End Of Flow Path	ft/ft	0.007		
9b. Land Elevation For Lower End Of Flow Path		1398.5		
10. Average velocity, V (Figure 3-1)		1390.0		
11. Tt = L/3600V Compute Tt	ft/s	1.37		
	hr	0.24	=	0.24

Channel Flow

		Segment ID		
12. Cross sectional flow area, a		CD		
13. Wetted perimeter, Pw	sf	150.00		
14. Hydraulic radius, r = a/Pw Compute r	ft	70		
15. Channel slope, s	ft	2.143		
16. Manning's roughness coeff., n	ft/ft	0.004		
17 V = 1.49(r^0.667)(s^0.50)/n Compute V		0.041		
18. Flow length, L	ft/s	3.8		
19. Tt = L/3600V Compute Tt	ft	2025		
20. Watershed or subarea Tc or Tt (add Tt in steps 6,11, and 19)	hr	0.147	=	0.15
			hr	1.03

Reference: Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Use Time Of Concentration = 62 Minutes

Storm Sewer

Professional Engineering Consultants, P.A.
03 S. TOPEKA • WICHITA, KANSAS 67202
316-262-2691 • FAX 316-262-3003
www.pec1.com • designers@pec1.com

Project OAK CREEK 3rd ADDITION Date 9/28/06
Item STORM WATER Calcs. By SJB

PIPE / ORIFICE SIZING TO MEET 2,5 yr. STORM EVENTS.

POND D:

WILL CUT Q_2 FROM 8 cfs TO 5 cfs

$$Q = 0.6A[(2)(g)(4-D/2)]^{\frac{1}{2}}$$

$$5 = 0.6\left(\tfrac{1}{4}D^2\right)[64.4(4-D/2)]^{\frac{1}{2}}$$

$$D = 0.517 \text{ ft.} \quad \text{or} \quad 6.2$$

USE 6" orifice

WILL USE SAME ORIFICE FOR 5 yr. STORM ALSO $Q_5 = 5$ cfs.

POND H:

WILL CUT Q_2 & Q_5 FROM 10 & 13 TO $Q = 5$ cfs

SAME AS ABOVE $D = 6"$

POND F:

WILL CUT Q_2 from 28 cfs TO 1 cfs and Q_5 from 35 cfs TO 25 cfs

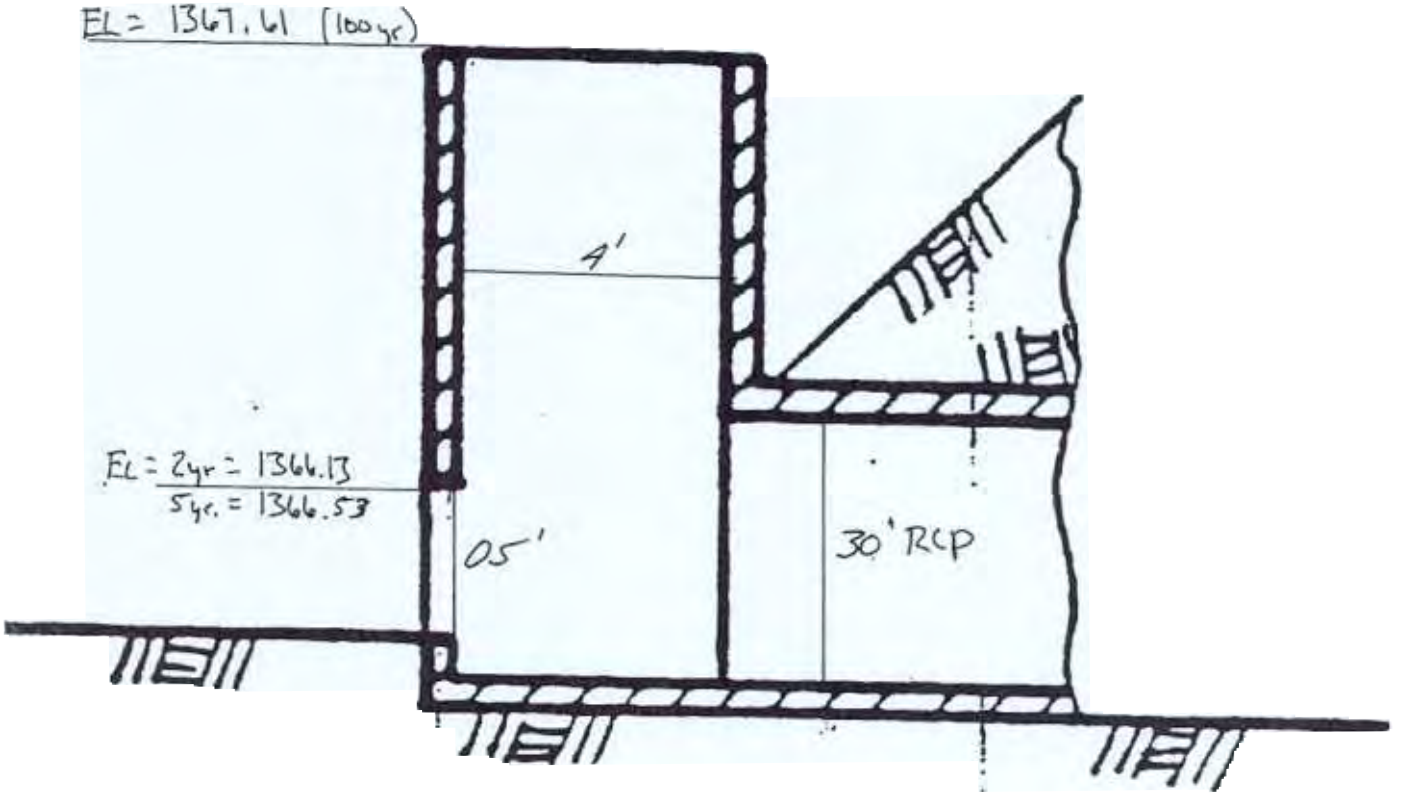
$Q_2 = 10$ cfs
$Q_5 = 25$ cfs

$$Q_2 = 0.6A[(2)(g)(4-D/2)]^{\frac{1}{2}}$$

$$D_2 = 0.568' = 7"$$

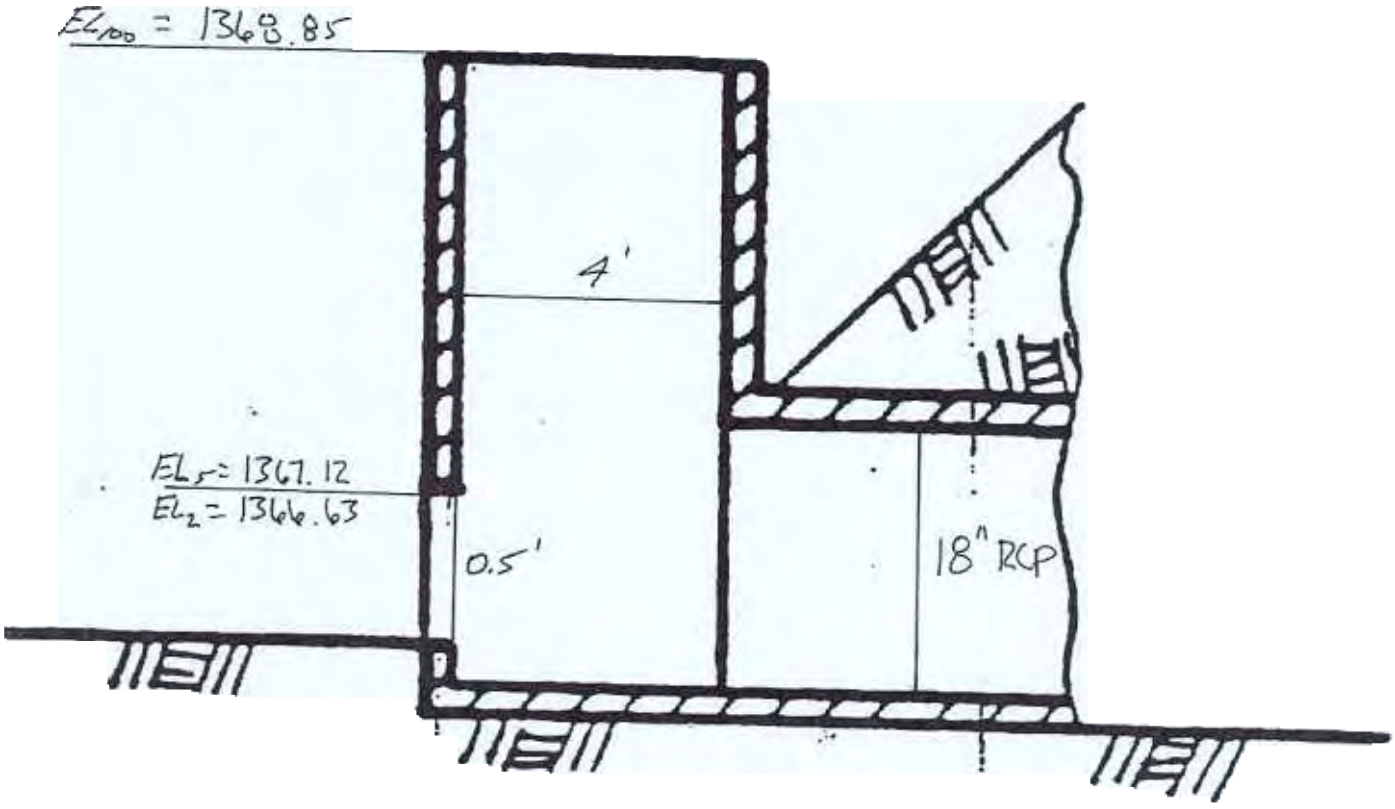
$Q_5 = 11$ ADDITIONAL cfs

$$D = 0.60 \text{ or } 7"$$



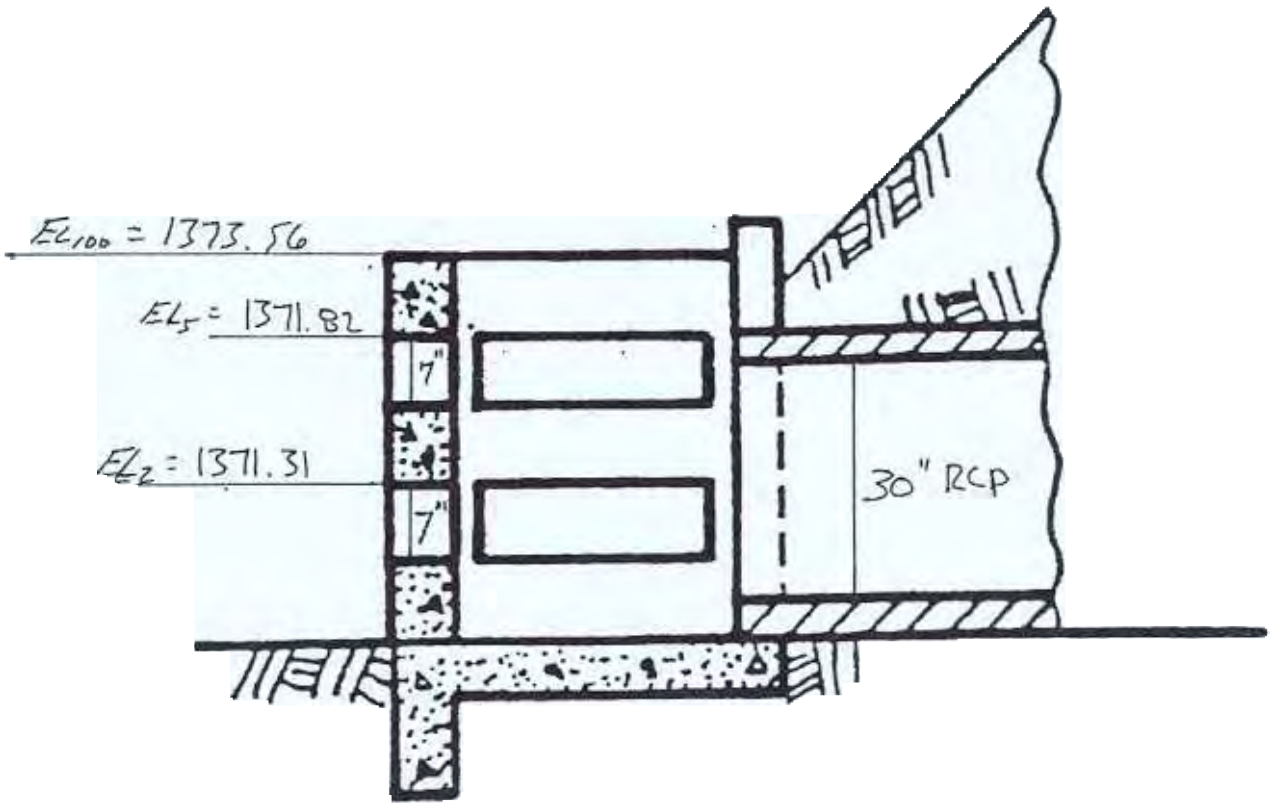
SINGLE STAGE RISER

POND "D" DRAINAGE OUTFALL STRUCTURE



SINGLE STAGE RISER

POND "H" DRAINAGE OUTFALL STRUCTURE



MULTIPLE STAGE CONCRETE INLET

POND "F" DRAINAGE OUTFALL STRUCTURE

9/11/06

STORM WATER PIPE SIZE 1/2

Basin A

A = 1.02 Ac.

Pavement = 0.98
Grass - Good / Clay Soil
Slope 2-8% = 0.25

t_c = 15 min

i_2 3.83 in

$$C = \frac{(0.62)(0.98) + (0.40)(0.25)}{1.02}$$

C 0.694

$$Q_2 = (0.694)(3.83 \text{ in})(1.02 \text{ Ac.}) = 2.71 \text{ cfs}$$

Basin B

A = 0.91 Ac

t_c 15 min

i_2 3.83

$$C = \frac{(0.60)(0.98) + (0.31)(0.25)}{0.91} \quad 0.731$$

$$Q_2 = (0.731)(3.83 \text{ in})(0.91 \text{ Ac}) = 2.55 \text{ cfs}$$

3/11/06

BASIN D

A = 0.16 Ac

T_c = 10 min

t_2 4.52 in

$$C = \frac{(0.082)(0.9) + (.078)(0.25)}{0.16} = 0.624$$

Q_2 (0.16)(0.624)(4.52) = 0.45 cfs

Size of pipe:

Manning's Eq: $Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$

$n = 0.012$
$A = \pi r^2$
$S = 1\%$
$R = A/P$
$P = 2\pi r$

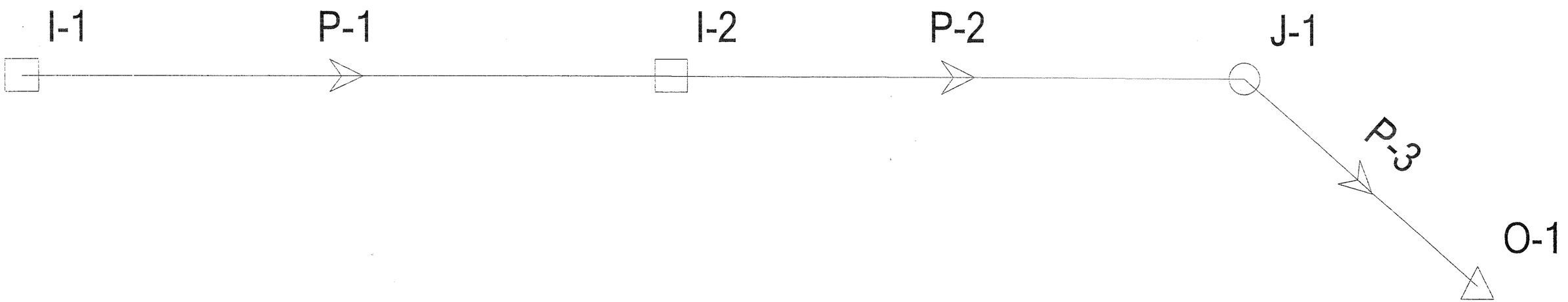
$Q = (.1)(124.166)(3.14r^2)(.5r)^{2/3}(.1)$

$Q = 2.71$

$r = 0.476'$ or $D = 0.872' = 10.5''$

Use D = 15" on all systems.

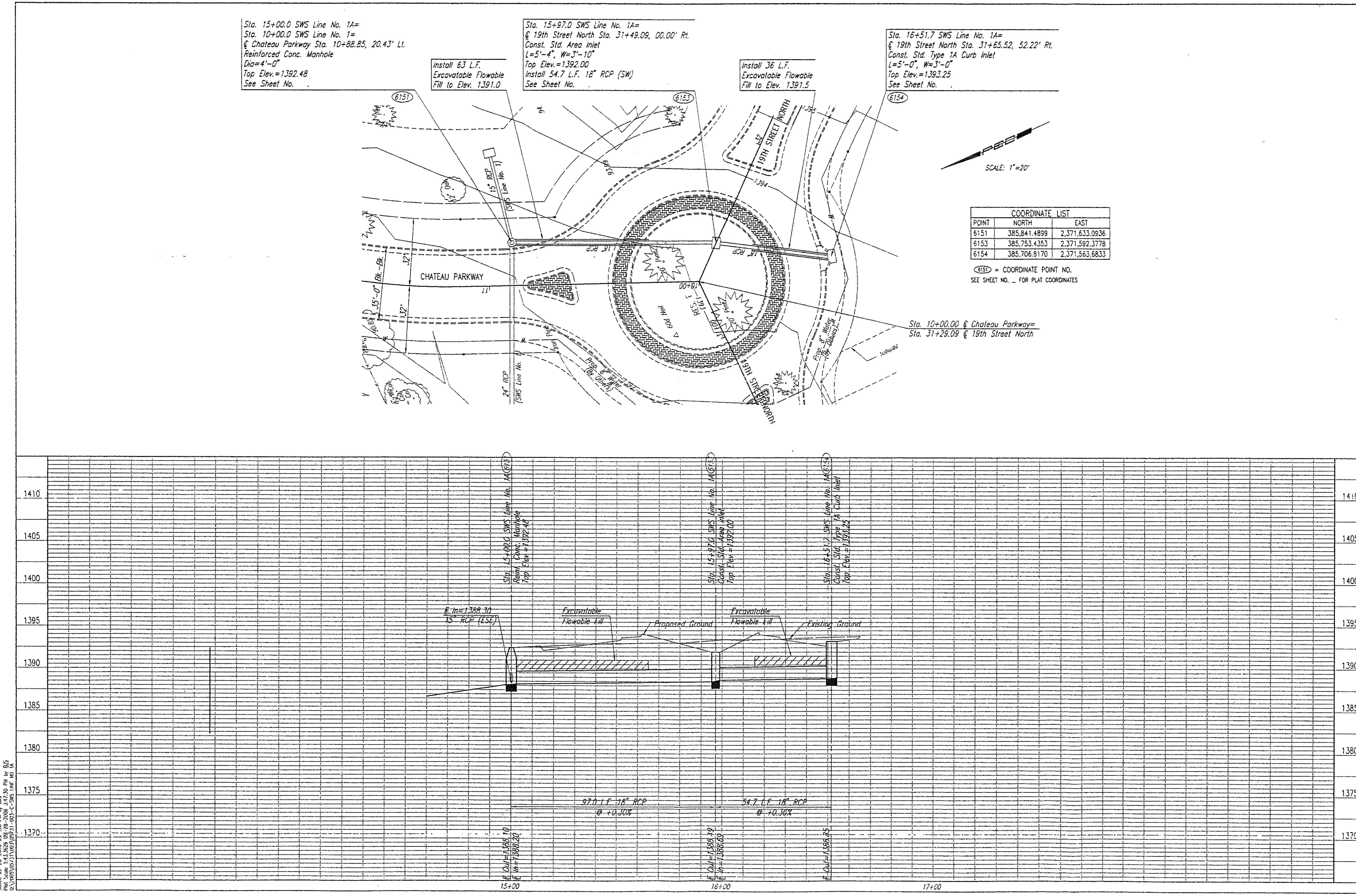
Scenario: Base



Scenario: Base

Pipe Report

Label	Upstream Node	Downstream Node	Upstream Inlet Area (acres)	Upstream Inlet Rational Coefficient	Upstream Calculated System CA (acres)	System Intensity (in/hr)	Total System Flow (cfs)	Length (ft)	Constructed Slope (ft/ft)	Section Size	Mannings n	Full Capacity (cfs)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)	Upstream Cover (ft)	Downstream Cover (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
P-1	I-1	I-2	0.79	0.85	0.67	3.83	24.59	61.00	0.000820	48 inch	0.013	41.12	1,371.96	1,371.91	1,378.00	1,378.00	2.04	2.09	1,374.26	1,374.22
P-2	I-2	J-1	0.79	0.85	1.34	3.81	27.15	388.00	0.000799	48 inch	0.013	40.60	1,371.91	1,371.60	1,378.00	1,379.00	2.09	3.40	1,374.12	1,373.59
P-3	J-1	O-1	N/A	N/A	1.34	3.66	26.96	26.00	0.023077	48 inch	0.013	218.20	1,371.60	1,371.00	1,379.00	1,371.00	3.40	-4.00	1,373.14	1,372.12



COORDINATE LIST		
POINT	NORTH	EAST
6151	385,841.4899	2,371,633.0936
6153	385,753.4353	2,371,592.3778
6154	385,706.8170	2,371,563.6833

(6151) = COORDINATE POINT NO.
SEE SHEET NO. _ FOR PLAT COORDINATES

OAK CREEK 2ND – PHASE 2

SWS LINE NO. 1A

JAMES L. ARMOUR, P.E.–CITY ENGINEER
CITY OF WICHITA PROJECT NO. 472-84209

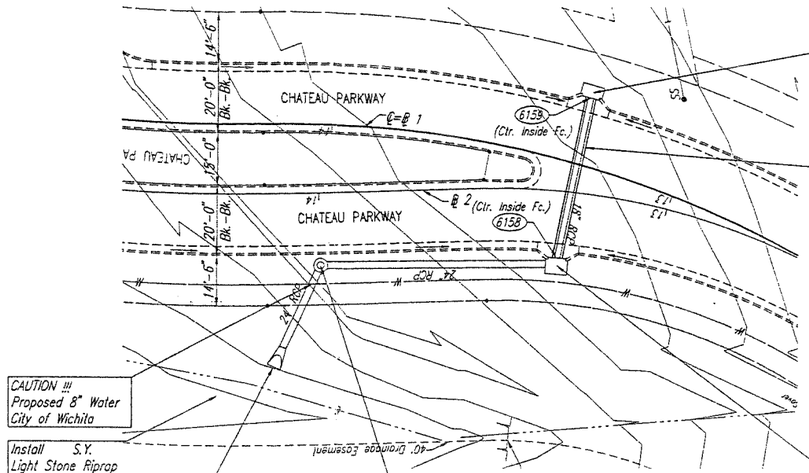
Professional Engineering Consultants, P.A.
303 S. TOPEKA • WICHITA, KANSAS 67202
316-262-2691 • FAX 316-262-3003

Designed By	BDB, BMM	Job No.	35-04688-000
Drawn By	BJS, JMU	Date	October 2004

Sheet 26 of XX

PLAN | CHECKED / CHECKED | BY | DATE

PROFILE | CHECKED / CHECKED | BY | DATE



CAUTION !!!
Proposed 8" Water
City of Wichita

Install S.Y.
Light Stone Riprap
See Sheet No.

6155

Sta. 8+94.2 SWS Line No. 1
Begin 24" RCP Construction
Install 105.8 L.F. 24" RCP (SE)
(Including End Section)

6156

Sta. 20+00.0 SWS Line No. 2=
℄ 2 Chateau Parkway Sta. 14+00.00, 20.67' Lt.
Const. Reinforced Conc. Manhole
Dia.=4'-0"
Top Elev.=1388.37
Install 67.5 L.F. 24" RCP (SW)
See Sheet No.

Sta. 21+17.7 SWS Line No. 2=
℄ 1=℄ Chateau Parkway Sta. 13+30.00, 20.67' Rt.
Const. Std. Type 1A Curb Inlet
L=5'-0", W=3'-0"
Top Elev.=1387.99
See Sheet No.

6160

Install 46 L.F.
Excavatable Flowable
Fill to Elev. 1386.5

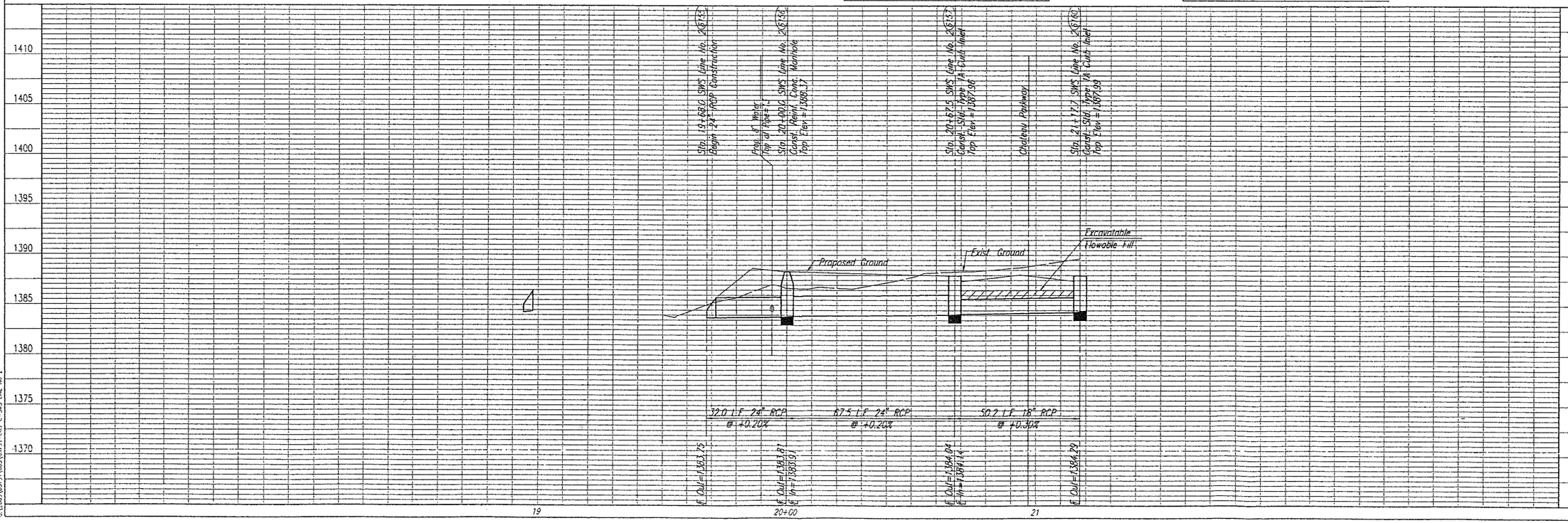
6157

Sta. 20+67.5 SWS Line No. 2=
℄ 2 Chateau Parkway Sta. 13+00.00, 20.67' Lt.
Const. Std. Type 1A Curb Inlet
L=5'-0", W=4'-0"
Top Elev.=1387.96
Install 50.2 L.F. 18" RCP (ESE)
See Sheet No.

Scale 1"=20'

COORDINATE LIST		
POINT	NORTH	EAST
6155	386,142.6743	2,371,712.5104
6156	386,123.4684	2,371,738.1059
6157	386,057.5826	2,371,723.5204
6158	386,056.9725	2,371,725.4180
6159	386,037.6557	2,371,767.9933
6160	386,036.9488	2,371,769.3162

(6155) = COORDINATE POINT NO.
SEE SHEET NO. _ FOR PLAT COORDINATES



PROFILE | CHECKED / CHECKED | BY | DATE

Saved 09-26-2006 3:41:50 PM by BJS
Plot Scale 1:43.426 09-26-2006 3:45:18 PM by BJS
G:\2005\05731\003\DRAWINGS\05731-003 C-SWS LINE NO 2

OAK CREEK 2ND - PHASE 2

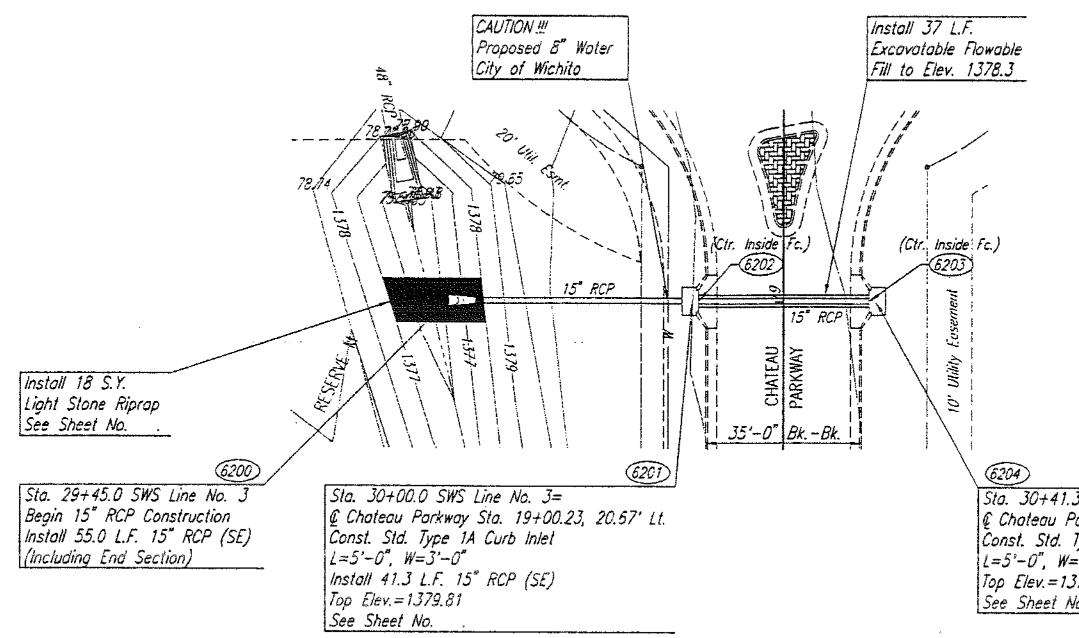
SWS LINE NO. 2

JAMES L. ARMOUR, P.E. - CITY ENGINEER
CITY OF WICHITA PROJECT NO. 472-

Professional Engineering Consultants, P.A.
303 S. TOPEKA • WICHITA, KANSAS 67202
316-262-2691 • FAX 316-262-3003

Designed By: BOB, BMM
Drawn By: BJS, TAT
Job No.: 35-05731-003
Date: February 2006

Sheet XX of XX

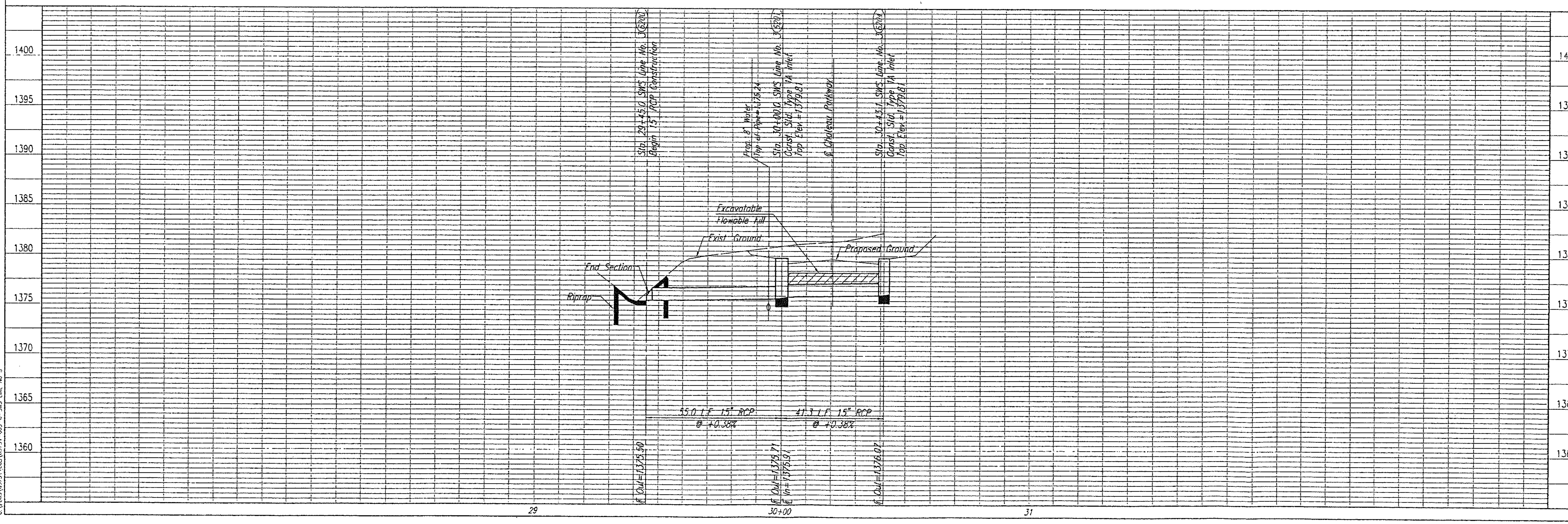


SCALE: 1"=20'

COORDINATE LIST		
POINT	NORTH	EAST
6200	386,527.9221	2,372,069.0147
6201	386,477.6566	2,372,091.3393
6202	386,476.2858	2,372,091.9481
6203	386,441.2462	2,372,107.5104
6204	386,439.8753	2,372,108.1192

(6200) = COORDINATE POINT NO.

SEE SHEET NO. _ FOR PLAT COORDINATES



PLAN | CHECKED | BY | DATE

PROFILE | CHECKED | BY | DATE

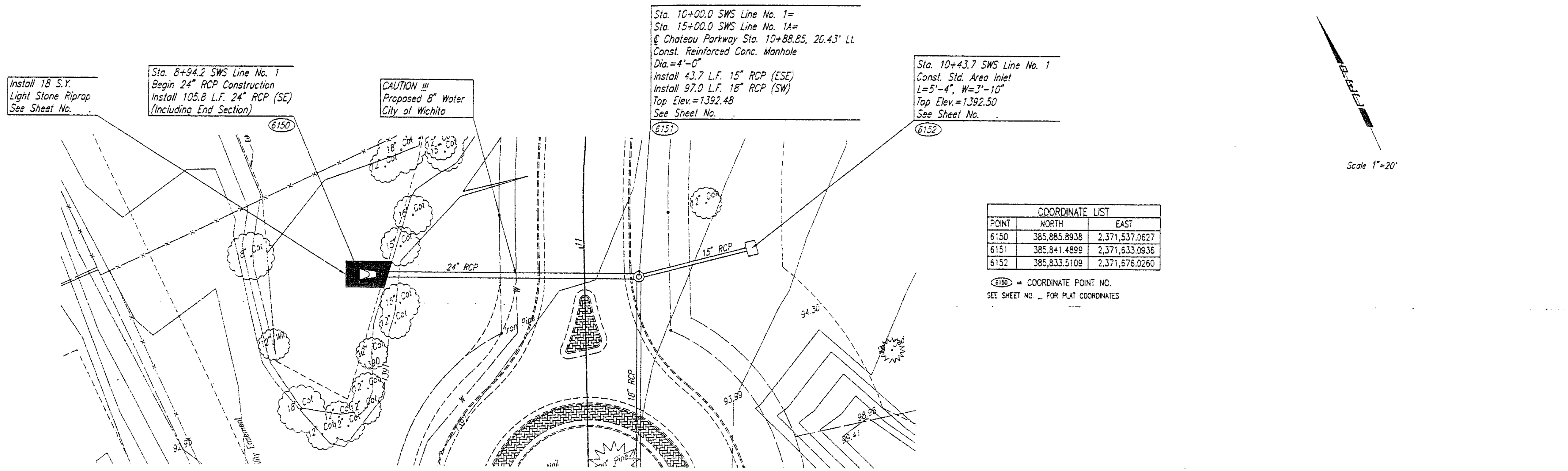
OAK CREEK 2ND - PHASE 2

SWS LINE NO. 3

JAMES L. ARMOUR, P.E.-CITY ENGINEER
CITY OF WICHITA PROJECT NO. 472-

Professional Engineering Consultants, P.A.
303 S. TOPEKA • WICHITA, KANSAS 67202
316-262-2691 • FAX 316-262-3003

Designed By BDR, BMM | Job No. 35-05731-003
Drawn By BJS, TAT | Date February 2006



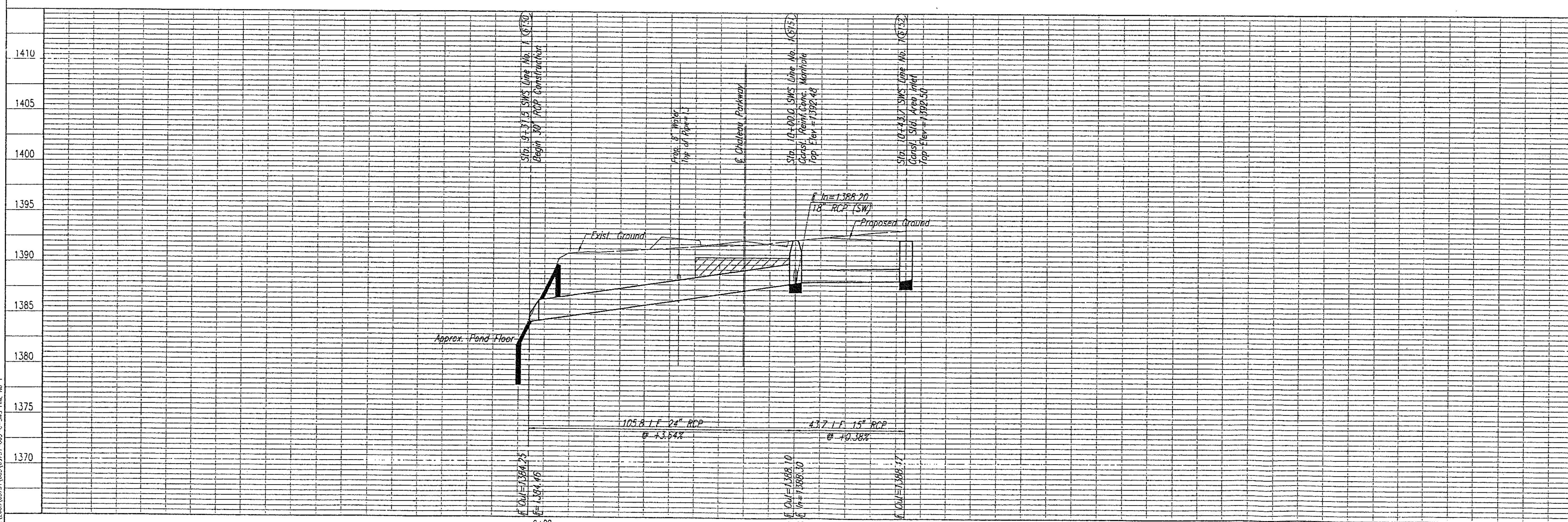
COORDINATE LIST		
POINT	NORTH	EAST
6150	385,885.8938	2,371,537.0627
6151	385,841.4899	2,371,633.0936
6152	385,833.5109	2,371,676.0260

(6150) = COORDINATE POINT NO.

SEE SHEET NO. _ FOR PLAT COORDINATES

PLAN | CHECKED | CHECKED | BY | DATE

PROFILE | CHECKED | CHECKED | BY | DATE



OAK CREEK 2ND - PHASE 2

SWS LINE NO. 1

JAMES L. ARMOUR, P.E.-CITY ENGINEER
CITY OF WICHITA PROJECT NO. 472-

Professional Engineering Consultants, P.A.
303 S. TOPEKA • WICHITA, KANSAS 67202
316-262-2691 • FAX 316-262-3003

Job No. 35-05731-003
Date February 2006
Designed By BDB, RMM
Drawn By BJS, TAT

Sheet 25 of XX

Saved 09-28-2006 3:29:32 PM by BJS
Plot Scale 1:43.3627 09-28-2006 3:47:04 PM by BJS
P:\2005\05731\003\05731-003-C-SWS LINE NO 1

Design Aids

CURRENT DATE: 09-18-2006
CURRENT TIME: 10:39:24

FILE DATE: 09-18-2006
FILE NAME: OAK3P

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.1

CU LV NO.	SITE DATA: INLET ELEV. (ft)	SITE DATA: OUTLET ELEV. (ft)	SITE DATA: CULVERT LENGTH (ft)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	1372.00	1362.00	410.12	1 RCP	2.00	2.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: OAK3P DATE: 09-18-2006

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
1372.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	1
1373.61	10.0	10.0	0.0	0.0	0.0	0.0	0.0	0.00	1
1374.59	20.0	20.0	0.0	0.0	0.0	0.0	0.0	0.00	1
1375.20	30.0	24.9	0.0	0.0	0.0	0.0	0.0	4.98	6
1375.39	40.0	26.3	0.0	0.0	0.0	0.0	0.0	13.47	4
1375.54	50.0	27.4	0.0	0.0	0.0	0.0	0.0	22.48	4
1375.68	60.0	28.3	0.0	0.0	0.0	0.0	0.0	31.26	3
1375.81	70.0	29.1	0.0	0.0	0.0	0.0	0.0	40.46	3
1375.93	80.0	29.9	0.0	0.0	0.0	0.0	0.0	49.79	3
1376.04	90.0	30.6	0.0	0.0	0.0	0.0	0.0	59.13	3
1376.14	100.0	31.2	0.0	0.0	0.0	0.0	0.0	68.51	3
1375.00	23.4	23.4	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: OAK3P DATE: 09-18-2006

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
1372.00	0.000	0.00	0.00	0.00
1373.61	0.000	10.00	0.00	0.00
1374.59	0.000	20.00	0.00	0.00
1375.20	-0.008	30.00	0.11	0.37
1375.39	-0.003	40.00	0.25	0.63
1375.54	-0.007	50.00	0.14	0.28
1375.68	-0.005	60.00	0.44	0.73
1375.81	-0.004	70.00	0.40	0.57
1375.93	-0.003	80.00	0.31	0.39
1376.04	-0.003	90.00	0.28	0.31
1376.14	-0.002	100.00	0.24	0.24

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

RRENT TIME: 10:39:24 FILE NAME: OAK3P

PERFORMANCE CURVE FOR CULVERT 1 - 1(2.00 (ft) BY 2.00 (ft)) RCP

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	1372.00	0.00	0.00	0-NF	0.00	0.00	0.00	%-1362.00	0.00	0.00
10.00	1373.61	1.61	1.61	1-S2n	0.69	1.13	0.63	%-1362.00	11.90	0.00
20.00	1374.59	2.59	2.59	5-S2n	1.02	1.60	0.90	%-1362.00	14.48	0.00
24.91	1375.19	3.19	3.19	5-S2n	1.17	1.75	1.05	%-1362.00	14.92	0.00
26.28	1375.38	3.38	3.38	5-S2n	1.22	1.79	1.09	%-1362.00	15.02	0.00
27.38	1375.54	3.54	3.54	5-S2n	1.25	1.82	1.22	%-1362.00	13.61	0.00
28.29	1375.68	3.68	3.68	5-S2n	1.28	1.85	1.25	%-1362.00	13.69	0.00
29.14	1375.80	3.80	3.80	5-S2n	1.31	1.87	1.30	%-1362.00	13.45	0.00
29.90	1375.92	3.92	3.92	5-S2n	1.33	1.90	1.33	%-1362.00	13.53	0.00
30.60	1376.03	4.03	4.03	5-S2n	1.35	1.92	1.35	%-1362.00	13.61	0.00
31.24	1376.14	4.14	4.14	5-S2n	1.37	1.94	1.37	%-1362.00	13.67	0.00

El. inlet face invert 1372.00 ft El. outlet invert 1362.00 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION	0.00 ft
INLET ELEVATION	1372.00 ft
OUTLET STATION	410.00 ft
OUTLET ELEVATION	1362.00 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0244
CULVERT LENGTH ALONG SLOPE	410.12 ft

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	2.00 ft
BARREL MATERIAL	CONCRETE
BARREL MANNING'S n	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	BEVELED EDGE (1.5:1)
INLET DEPRESSION	NONE

CURRENT DATE: 09-18-2006 FILE DATE: 09-18-2006
CURRENT TIME: 10:39:24 FILE NAME: OAK3P

TAILWATER

CONSTANT WATER SURFACE ELEVATION
0.00

ROADWAY OVERTOPPING DATA

WEIR COEFFICIENT 2.80

EMBANKMENT TOP WIDTH	60.00 ft
CREST LENGTH	20.00 ft
OVERTOPPING CRET ELEVATION	1375.00 ft

CURRENT DATE: 09-28-2006
CURRENT TIME: 14:31:01

FILE DATE: 09-28-2006
FILE NAME: OAKRET

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.1

CULVERT NO.	SITE DATA: INLET ELEV. (ft)	SITE DATA: OUTLET ELEV. (ft)	SITE DATA: CULVERT LENGTH (ft)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	1364.50	1364.25	35.00	1 RCP	1.50	1.50	.012	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: OAKRET DATE: 09-28-2006

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
1364.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	1
1365.88	6.0	6.0	0.0	0.0	0.0	0.0	0.0	0.00	1
1366.92	12.0	12.0	0.0	0.0	0.0	0.0	0.0	0.00	1
1368.55	18.0	18.0	0.0	0.0	0.0	0.0	0.0	0.00	1
1370.78	24.0	24.0	0.0	0.0	0.0	0.0	0.0	0.00	1
1375.05	30.0	28.7	0.0	0.0	0.0	0.0	0.0	1.02	22
1375.17	36.0	28.8	0.0	0.0	0.0	0.0	0.0	6.99	6
1375.26	42.0	28.9	0.0	0.0	0.0	0.0	0.0	12.96	5
1375.33	48.0	28.9	0.0	0.0	0.0	0.0	0.0	18.78	4
1375.40	54.0	29.0	0.0	0.0	0.0	0.0	0.0	24.79	4
1375.46	60.0	29.0	0.0	0.0	0.0	0.0	0.0	30.39	3
1375.00	28.7	28.7	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: OAKRET DATE: 09-28-2006

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
1364.50	0.000	0.00	0.00	0.00
1365.88	0.000	6.00	0.00	0.00
1366.92	0.000	12.00	0.00	0.00
1368.55	0.000	18.00	0.00	0.00
1370.78	0.000	24.00	0.00	0.00
1375.05	-0.004	30.00	0.25	0.83
1375.17	-0.004	36.00	0.20	0.56
1375.26	-0.004	42.00	0.17	0.40
1375.33	-0.006	48.00	0.29	0.60
1375.40	-0.005	54.00	0.23	0.43
1375.46	-0.004	60.00	0.59	0.98

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

RRENT TIME: 14:31:01 FILE NAME: OAKRET

PERFORMANCE CURVE FOR CULVERT 1 - 1(1.50 (ft) BY 1.50 (ft)) RCP

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	1364.50	0.00	0.00	0-NF	0.00	0.00	0.00	%-1364.25	0.00	0.00
6.00	1365.88	1.38	1.38	1-S2n	0.86	0.94	0.74	%-1364.25	6.87	0.00
12.00	1366.92	2.38	2.42	2-M2c	1.50	1.31	1.31	%-1364.25	7.37	0.00
18.00	1368.55	3.87	4.05	6-FFc	1.50	1.50	1.50	%-1364.25	10.19	0.00
24.00	1370.78	6.28	6.24	6-S2n	1.50	1.50	1.40	%-1364.25	14.07	0.00
28.72	1375.05	10.55	8.39	6-S2n	1.50	1.50	1.40	%-1364.25	16.84	0.00
28.81	1375.16	10.66	8.43	6-S2n	1.50	1.50	1.40	%-1364.25	16.89	0.00
28.87	1375.25	10.75	8.47	6-S2n	1.50	1.50	1.40	%-1364.25	16.93	0.00
28.93	1375.33	10.83	8.49	6-S2n	1.50	1.50	1.40	%-1364.25	16.96	0.00
28.98	1375.39	10.89	8.52	6-S2n	1.50	1.50	1.40	%-1364.25	16.99	0.00
29.02	1375.45	10.95	8.54	6-S2n	1.50	1.50	1.40	%-1364.25	17.01	0.00

El. inlet face invert 1364.50 ft El. outlet invert 1364.25 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION	0.00 ft
INLET ELEVATION	1364.50 ft
OUTLET STATION	35.00 ft
OUTLET ELEVATION	1364.25 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0071
CULVERT LENGTH ALONG SLOPE	35.00 ft

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	1.50 ft
BARREL MATERIAL	CONCRETE
BARREL MANNING'S n	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	BEVELED EDGE (1.5:1)
INLET DEPRESSION	NONE

0

CURRENT DATE: 09-28-2006 FILE DATE: 09-28-2006
CURRENT TIME: 14:31:01 FILE NAME: OAKRET

TAILWATER

CONSTANT WATER SURFACE ELEVATION
0.00

ROADWAY OVERTOPPING DATA

WEIR COEFFICIENT 2.80

EMBANKMENT TOP WIDTH	30.00 ft
CREST LENGTH	35.00 ft
OVERTOPPING CREST ELEVATION	1375.00 ft

EXHIBIT NO. 1

SOIL LEGEND

SYMBOL	HYDROLOGIC GROUP	NAME
Aa	B	Albion-Shellabarger sandy loams, 1 to 4 percent slopes
Ab	B	Albion and Shellabarger sandy loans, 7 to 15 percent slop
Ba	C	Blanket silt loam, 0 to 1 percent slopes
Bb	C	Blanket silt loan, 1 to 3 percent slopes
Ca	B	Canadian fine sandy loan
Cb	B	Canadian-Waldeck fine sandy loams
Cc	D	Carwile fine sandy loam
Cd	B	Clark-Ost clay loams, 1 to 4 percent slopes
Ce	C	Clime silty clay, 3 to 6 percent slopes
Ea	B	Elandco silt loam
Eb	B	Elandco silt loam, occasionally flooded
Ec	B	Elandco silt loam, frequently flooded
Fa	B	Farnum loam, 0 to 1 percent slopes
Fb	B	Farnum loam, 1 to 3 percent slopes
Fc	B	Farnum loam, sandy substratum, 0 to 1 percent slopes
Ga	D	Goessel silty clay, 0 to 1 percent slopes
Gb	D	Goessel silty clay, 1 to 2 percent slopes
Ia	D	Irwin silty clay loam, 1 to 3 percent slopes
Ib	D	Irwin silty clay loam, 3 to 6 percent slopes
Ic	D	Irwin silty clay loam, 2 to 6 percent slopes, eroded
La	C	Lesho loam
Lb	A	Lincoln soils
Ma	B	Milan loam, 1 to 3 percent slopes
Mb	B	Milan form, 3 to 6 percent slopes
Mc	B	Milan clay loam, 2 to 6 percent slopes, eroded
Na	B	Naron fine sandy loam
Oc	D	Owens clay loam, 1 to 3 percent slopes
Od	D	Owens-Rock outcrop complex, 3 to 10 percent slopes
Pa		Pits
Pb	D	Plevna fine sandy loam
Pc	A	Pratt loamy fine sand, undulating
Pd	A	Pratt-Tivoli complex, rolling
Ra	D	Renfrow silty clay loam, 1 to 3 percent slopes
Rb	D	Renfrow silty clay loam, 3 to 6 percent slopes
Rc	D	Renfrow-Owens clay loams, 1 to 4 percent slopes
Rd	D	Rosehill silty clay, 1 to 3 percent slopes
Sa	B	Shellabarger sandy loam, 1 to 3 percent slopes
Sb	B	Shellabarger sandy loam, 3 to 6 percent slopes
Sc	B	Shellabarger sandy loam, 3 to 6 percent slopes, eroded
Ta	D	Tabler silty clay loam
Tb	D	Tabler-Drummond complex
Ua	B	Urban land-Canadian complex
Ub	B	Urban land-Elandco complex
Uc	B	Urban land-Farnum complex, 0 to 3 percent slopes
Ud	D	Urban land-Irwin complex, 1 to 3 percent slopes
Ue	D	Urban land-Tabler complex
Va	B	Vanoss silt loam, 0 to 1 percent slopes
Vb	B	Vanoss silt loam, 1 to 3 percent slopes
Vc	B	Vanoss silt loam, 3 to 6 percent slopes
Vd	B	Vanoss silt loam, 3 to 6 percent slopes, eroded
Ve	D	Vernon sandy loam, 1 to 3 percent slopes
Vf	D	Vernon sandy loam, 3 to 6 percent lopes
Wa	C	Waldeck sandy loam
Wb	D	Waldeck silt loam


[Joins sheet 28]
R. 2 E.
OAK CREEK
NE¼, Sec. 9, T. 29S, R. 2E
Rd
16
15
10
Rawdon Landing Strip
[Joins sheet 44]

County	Expected 24-hour Storm Rainfall in Inches — Storm Frequency in Years						Normal Annual Precipitation
	100	50	25	10	5	2	Inches
Pawnee	6.6	6.0	5.2	4.5	3.7	2.8	23.3
Phillips	6.0	5.5	4.8	4.1	3.4	2.5	23.6
Pottawatomie	7.5	6.6	5.9	5.1	4.3	3.4	33.6
Pratt	7.2	6.4	5.6	4.8	4.1	3.0	24.6
Rawlins	5.5	5.0	4.3	3.6	3.1	2.3	21.0
Reno	7.4	6.6	5.8	5.0	4.2	3.2	27.7
Republic	6.8	6.0	5.4	4.6	3.9	2.9	28.6
Rice	7.3	6.4	5.6	4.8	4.1	3.0	26.6
Riley	7.4	6.5	5.8	5.1	4.3	3.3	33.5
Rooks	6.1	5.7	4.9	4.1	3.4	2.5	23.9
Rush	6.5	5.9	5.0	4.3	3.6	2.7	23.3
Russell	6.7	5.9	5.2	4.4	3.7	2.8	26.8
Saline	7.3	6.4	5.7	4.9	4.1	3.1	28.4
Scott	5.7	5.3	4.5	3.8	3.2	2.4	20.2
Sedgwick	7.8	7.0	6.1	5.3	4.5	3.5	30.6
Seward	6.0	5.7	4.8	4.2	3.5	2.6	19.8
Shawnee	7.8	6.8	6.1	5.3	4.5	3.5	34.7
Sheridan	5.7	5.3	4.5	3.8	3.2	2.4	21.3
Sherman	5.3	4.8	4.2	3.5	3.0	2.2	16.7
Smith	6.3	5.7	5.0	4.2	3.5	2.6	24.4
Stafford	7.1	6.2	5.5	4.7	4.0	2.9	25.1
Stanton	5.6	5.2	4.5	3.8	3.2	2.4	15.8
	5.9	5.5	4.7	4.1	3.4	2.5	19.7
	8.0	7.1	6.2	5.4	4.6	3.6	34.0

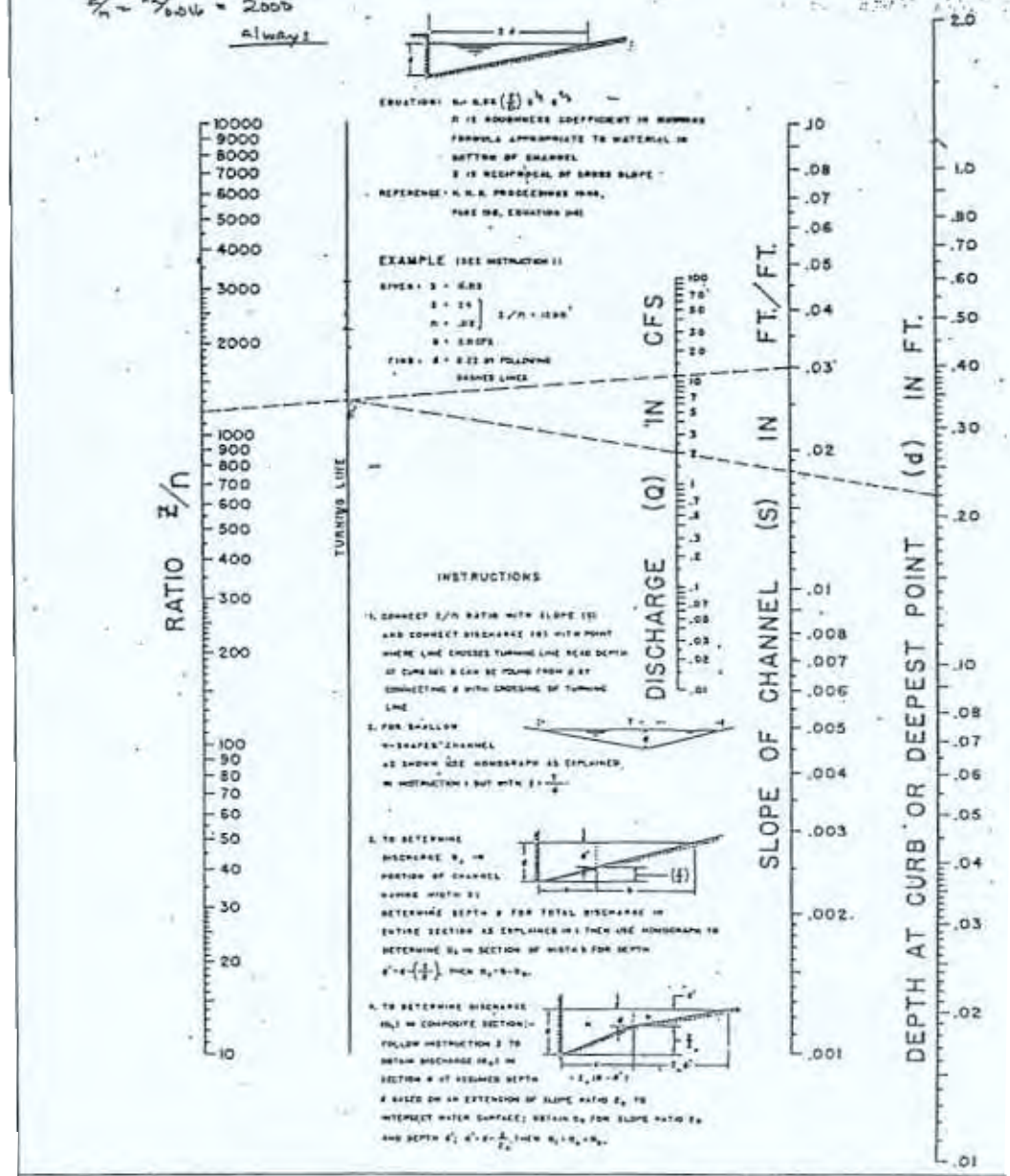
x-slope = $\frac{3}{8} \cdot \frac{1}{4} = 0.03125$

$z = \frac{1}{x}$-slope = $\frac{1}{0.0312} = 32$

$n = 0.016$

$\frac{z}{n} = \frac{32}{0.016} = 2000$

always!



BUREAU OF PUBLIC ROADS
REV. JAN. 1968

NOMOGRAPH FOR FLO
IN TRIANGULAR CHANNEL

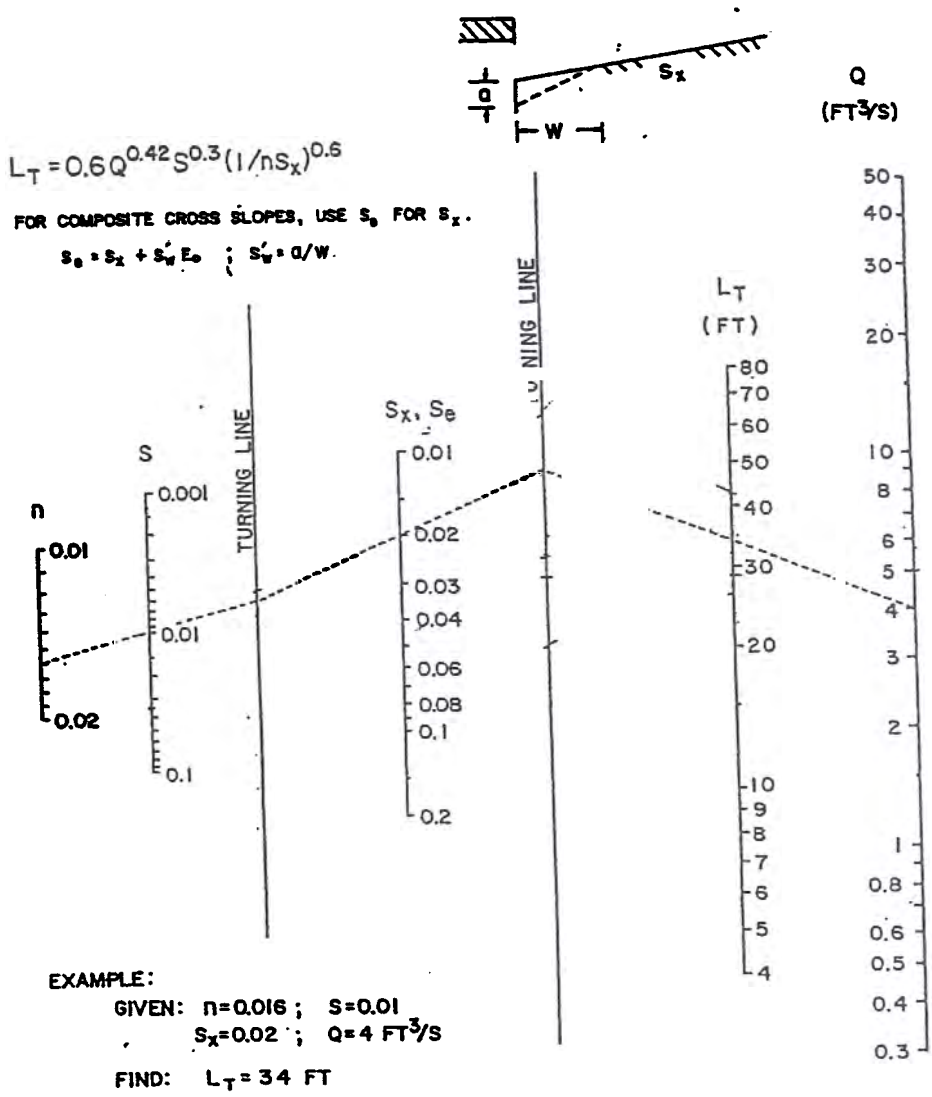


CHART 9. Curb-opening and slotted drain inlet length for total interception.

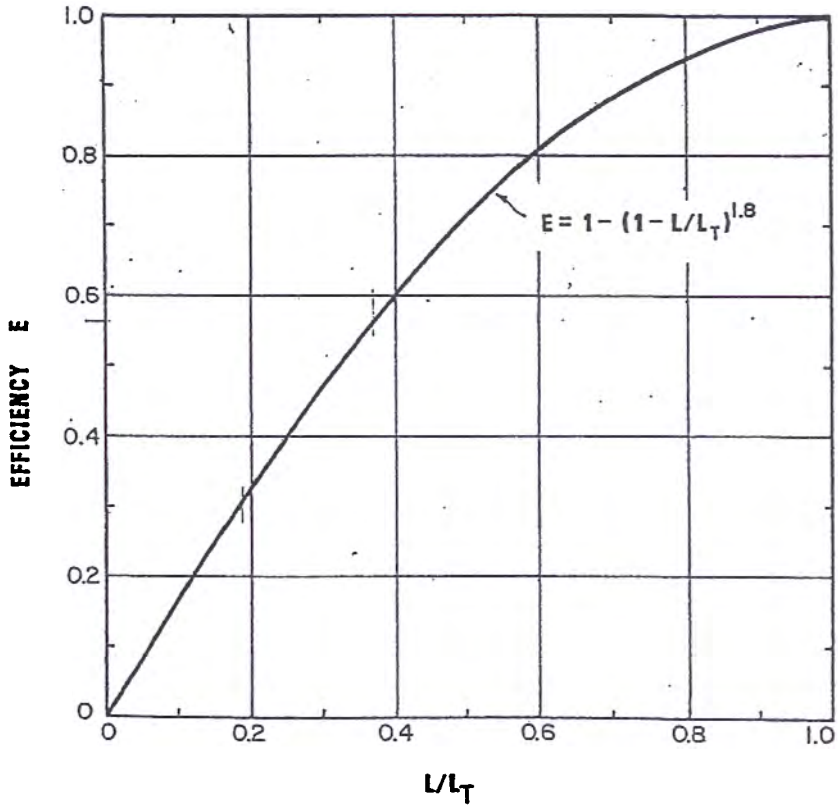


CHART 10. Curb-opening and slotted drain inlet interception efficiency.

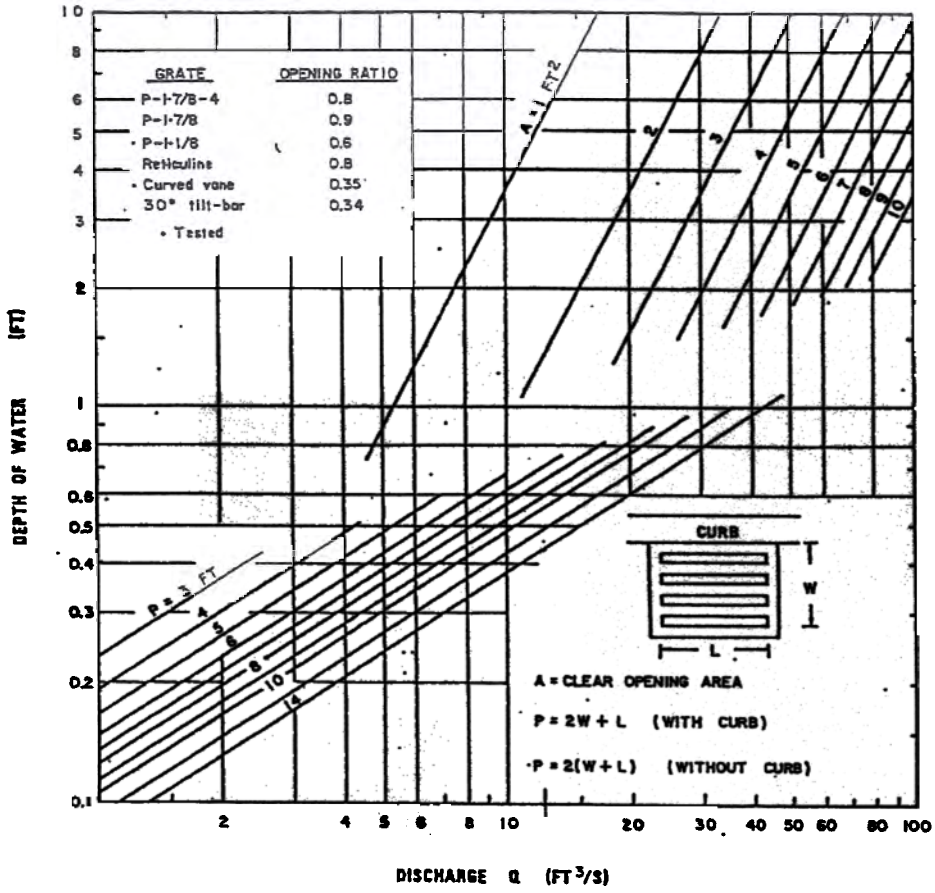


CHART 11. Grate inlet capacity in sump conditions.

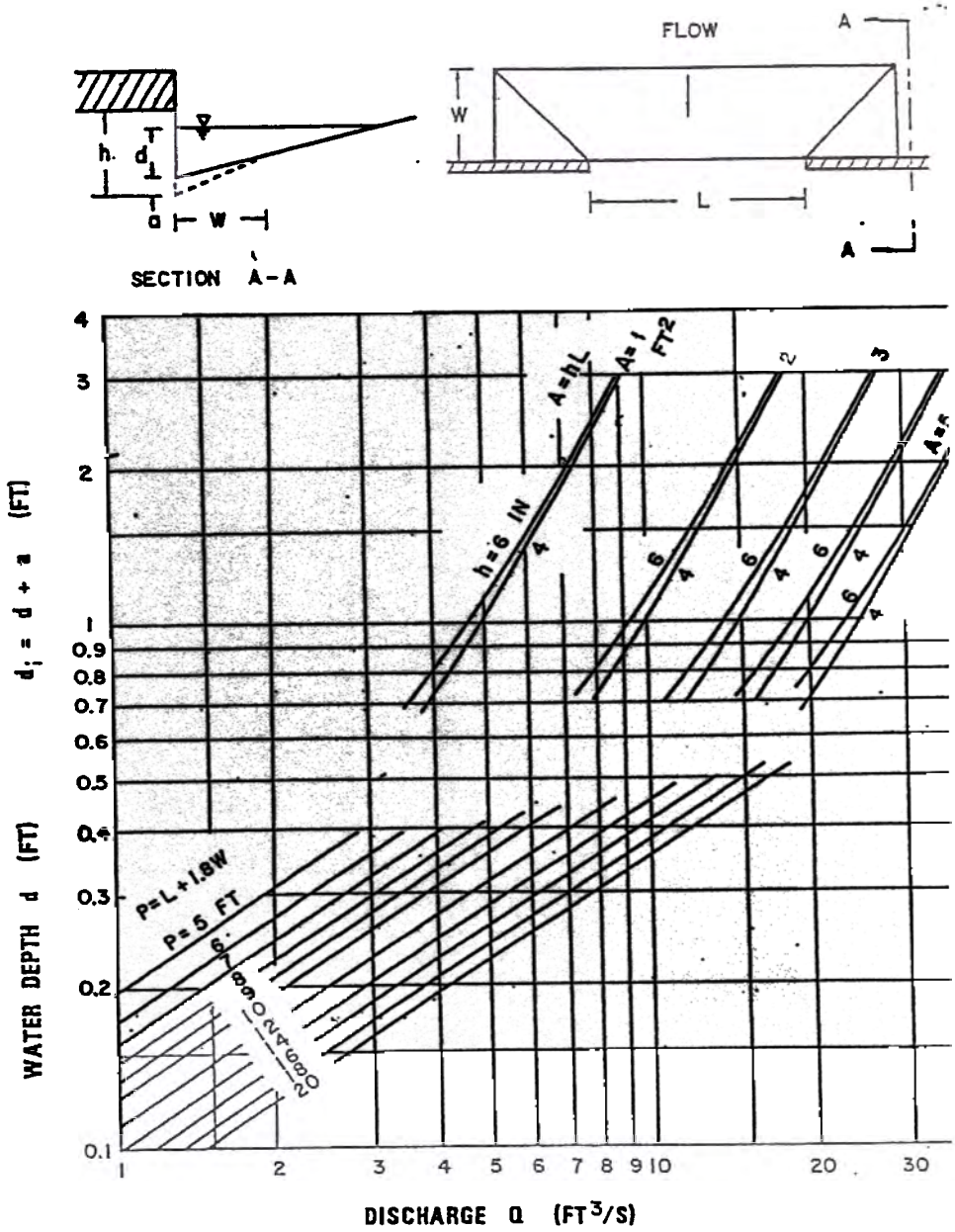


CHART 12. Depressed curb-opening inlet capacity in sump locations.

ATTACHMENT A
DRAINAGE CRITERIA MANUAL

RAINFALL INTENSITY TABLE FOR SEDGWICK COUNTY, KANSAS

The following tabulation contains rainfall intensity in inches per hour as derived from ESSA Weather Bureau Technical Paper 40 Modified to NWS Hydro-35, 1977 During First Hour

DURATION IN MINUTES (t_c)	RETURN PERIODS OF 1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-
5	i = 4.18	5.57	6.53	7.41	8.52	9.48	10.
6	3.99	5.32	6.25	7.09	8.16	9.09	9.
7	3.81	5.09	5.99	6.81	7.84	8.74	9.
8	3.66	4.89	5.75	6.55	7.55	8.42	9.
9	3.52	4.70	5.54	6.31	7.28	8.13	8.
10	3.39	4.52	5.34	6.09	7.04	7.86	8.
11	3.27	4.36	5.16	5.89	6.81	7.61	8.
12	3.18	4.21	4.99	5.71	6.60	7.38	8.
13	3.05	4.08	4.84	5.53	6.41	7.17	7
14	2.96	3.95	4.69	5.37	6.23	6.97	7
15	2.87	3.83	4.56	5.22	6.06	6.78	7
16	2.78	3.72	4.43	5.08	5.90	6.60	7
17	2.71	3.61	4.31	4.95	5.75	6.44	7
18	2.63	3.51	4.20	4.83	5.61	6.29	6
19	2.56	3.42	4.10	4.71	5.47	6.14	6
20	2.50	3.33	4.00	4.60	5.35	6.00	6
21	2.44	3.25	3.90	4.50	5.23	5.87	6
22	2.38	3.17	3.81	4.40	5.12	5.75	6
23	2.32	3.10	3.73	4.31	5.01	5.63	6
24	2.27	3.03	3.65	4.22	4.91	5.52	6
25	2.22	2.96	3.57	4.13	4.81	5.41	5
26	2.20	2.90	3.50	4.05	4.72	5.31	5
27	2.16	2.84	3.43	3.98	4.63	5.21	5
28	2.14	2.78	3.37	3.90	4.55	5.12	5
29	2.11	2.72	3.30	3.83	4.47	5.03	5
30	2.08	2.67	3.24	3.76	4.39	4.94	5
31	2.05	2.62	3.19	3.70	4.32	4.86	4
32	2.02	2.57	3.10	3.63	4.25	4.79	
33	1.99	2.52	3.05	3.57	4.18	4.71	
34	1.96	2.48	3.01	3.51	4.11	4.63	
35	1.93	2.44	2.98	3.46	4.05	4.56	
36	1.91	2.39	2.93	3.41	3.99	4.50	
37	1.89	2.35	2.88	3.36	3.93	4.43	
38	1.87	2.32	2.84	3.31	3.87	4.37	
39	1.85	2.28	2.80	3.26	3.82	4.31	
40	1.83	2.24	2.76	3.22	3.76	4.25	
41	1.81	2.21	2.72	3.17	3.71	4.19	
42	1.79	2.18	2.68	3.13	3.66	4.13	
43	1.77	2.14	2.64	3.09	3.61	4.08	
44	1.75	2.11	2.61	3.05	3.57	4.03	
45	1.73	2.08	2.57	3.01	3.52	3.98	

ATTACHMENT A CONTINUED
Page 2

DURATION IN MINUTES	RETURN PERIODS OF 1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-
46	1.70	2.05	2.54	2.97	3.48	3.93	4
47	1.67	2.02	2.50	2.93	3.44	3.88	4
48	1.66	2.00	2.47	2.90	3.39	3.84	4
49	1.64	1.97	2.44	2.86	3.35	3.79	4
50	1.61	1.95	2.41	2.83	3.32	3.75	4
51	1.59	1.92	2.38	2.79	3.28	3.71	
52	1.56	1.89	2.35	2.76	3.24	3.67	4
53	1.54	1.86	2.33	2.73	3.20	3.63	4
54	1.52	1.84	2.30	2.70	3.17	3.59	3
55	1.50	1.81	2.27	2.67	3.14	3.55	3
56	1.47	1.79	2.25	2.64	3.10	3.51	3
57	1.45	1.76	2.22	2.61	3.07	3.48	3
58	1.43	1.74	2.20	2.59	3.04	3.44	3
59	1.42	1.72	2.18	2.56	3.01	3.41	3
60	1.40	1.69	2.15	2.53	2.98	3.37	3
61	1.38	1.67	2.13	2.51	2.95	3.34	3
62	1.36	1.65	2.11	2.48	2.92	3.31	3
63	1.34	1.63	2.09	2.46	2.89	3.28	3
64	1.33	1.61	2.07	2.44	2.86	3.25	3
65	1.31	1.59	2.05	2.41	2.84	3.22	3
66	1.30	1.57	2.03	2.39	2.81	3.19	3
67	1.28	1.56	2.01	2.37	2.79	3.16	3
68	1.26	1.54	1.99	2.35	2.76	3.13	3
69	1.25	1.52	1.97	2.33	2.74	3.10	3
70	1.24	1.50	1.95	2.31	2.71	3.08	3
71	1.22	1.49	1.93	2.28	2.69	3.05	3
72	1.21	1.47	1.92	2.26	2.67	3.02	
73	1.20	1.46	1.90	2.25	2.64	3.00	
74	1.18	1.44	1.88	2.23	2.63	2.98	
75	1.17	1.43	1.86	2.21	2.61	2.95	
76	1.16	1.41	1.85	2.19	2.58	2.93	
77	1.15	1.40	1.83	2.17	2.55	2.90	
78	1.13	1.38	1.82	2.15	2.53	2.88	
79	1.12	1.37	1.80	2.14	2.50	2.86	
80	1.11	1.36	1.79	2.12	2.48	2.84	
81	1.10	1.34	1.77	2.10	2.46	2.82	
82	1.09	1.33	1.76	2.08	2.43	2.79	
83	1.08	1.32	1.74	2.06	2.41	2.76	
84	1.07	1.31	1.73	2.04	2.39	2.74	
85	1.06	1.30	1.72	2.02	2.37	2.71	
86	1.05	1.28	1.70	2.00	2.34	2.69	
87	1.04	1.27	1.69	1.99	2.32	2.66	
88	1.03	1.26	1.68	1.97	2.30	2.64	
89	1.02	1.25	1.68	1.95	2.28	2.62	
90	1.01	1.24	1.66	1.93	2.26	2.59	

DURATION IN MINUTES	RETURN PERIODS OF 1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-
91	1.00	1.23	1.65	1.92	2.24	2.57	2.
92	1.00	1.22	1.63	1.90	2.22	2.55	2.
93	0.99	1.21	1.62	1.89	2.20	2.53	2.
94	0.98	1.20	1.61	1.87	2.19	2.51	2.
95	0.97	1.19	1.59	1.85	2.17	2.49	2.
96	0.96	1.18	1.58	1.84	2.15	2.46	2.
97	0.96	1.17	1.57	1.82	2.13	2.44	2.
98	0.95	1.16	1.56	1.81	2.12	2.42	2.
99	0.94	1.15	1.54	1.80	2.10	2.41	2
100	0.93	1.14	1.53	1.78	2.08	2.39	2
101	0.93	1.13	1.52	1.77	2.07	2.39	
102	0.92	1.13	1.51	1.75	2.05	2.35	2
103	0.91	1.12	1.50	1.74	2.04	2.33	2
104	0.90	1.11	1.49	1.73	2.02	2.31	2
105	0.90	1.10	1.47	1.72	2.01	2.30	2
106	0.89	1.09	1.46	1.70	1.99	2.28	2
107	0.88	1.09	1.45	1.69	1.98	2.26	2
108	0.88	1.08	1.44	1.68	1.96	2.25	2
109	0.87	1.07	1.43	1.67	1.95	2.23	2
110	0.87	1.06	1.42	1.65	1.93	2.21	2
111	0.86	1.06	1.41	1.64	1.92	2.20	2
112	0.85	1.05	1.40	1.63	1.91	2.18	2
113	0.85	1.04	1.39	1.62	1.89	2.17	2
114	0.84	1.03	1.38	1.61	1.88	2.15	2
115	0.84	1.03	1.37	1.60	1.87	2.14	2
116	0.83	1.02	1.36	1.59	1.86	2.12	2
117	0.82	1.01	1.36	1.58	1.84	2.11	2
118	0.82	1.01	1.35	1.57	1.83	2.09	2
119	0.81	1.00	1.34	1.56	1.82	2.08	2
120	0.81	0.99	1.33	1.55	1.81	2.07	

DURATION IN HOURS	RETURN PERIODS OF 1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	10
2	0.81	0.99	1.33	1.55	1.81	2.07	
3	0.59	0.72	0.97	1.13	1.32	1.51	
4	0.47	0.58	0.78	0.91	1.06	1.21	
5	0.40	0.49	0.66	0.77	0.89	1.02	
6	0.35	0.42	0.57	0.67	0.78	0.89	
8	0.28	0.34	0.46	0.53	0.62	0.71	
10	0.23	0.29	0.39	0.45	0.52	0.60	
12	0.20	0.25	0.33	0.39	0.45	0.52	
18	0.15	0.18	0.24	0.28	0.33	0.38	
24	0.12	0.15	0.20	0.23	0.27	0.31	

ATTACHMENT B

DRAINAGE CRITERIA MANUAL

INCREMENTAL INFILTRATION VALUES IN INCHES

Time Minutes**	SCS Hydrologic Soil Group			
	A	B	C	D
5	.33	.26	.19	.12
10	.25	.17	.09	.04
15	.18	.11	.05	.02
20	.13	.07	.03	.02
25	.10	.05	.03	.02
30	.08	.05	.03	.02
35	.08	.05	.03	.02
40	.08	.05	.03	.02
45	.08	.05	.03	.02
50	.08	.05	.03	.02
55	.08	.05	.03	.02
60	.08	.05	.03	.02
65	.08	.05	.03	.02
70	.08	.05	.03	.02
75	.08	.05	.03	.02
80	.08	.05	.03	.02
85	.08	.05	.03	.02
90	.08	.05	.03	.02
95	.08	.05	.03	.02
100	.08	.05	.03	.02
105	.08	.05	.03	.02
110	.08	.05	.03	.02
115	.08	.05	.03	.02
120	.08	.05	.03	.02

**Time at end of the time increment

NOTE: Values for 125 minutes and additional 5 minute increments shall be the same as those shown for 120 minutes.

ATTACHMENT C

DRAINAGE CITERIA MANUAL

DEPRESSION STORAGE LOSSES

Surface Type	Total Loss (Inches)
Impervious:	
Paved Areas	0.1
Flat Roofs	0.1
Sloped Roofs	0.05
Pervious:	
Lawns and Grass	0.3
Wooded Areas and Open Fields	0.4

ATTACHMENT D.

DRAINAGE CRITERIA

RECOMMENDED RUNOFF COEFFICIENTS FOR RATIONAL METHOD
AND PERCENT IMPERVIOUS FOR UNIT HYDROGRAPH METHOD

Land Use or Surface Characteristics	Percent Impervious	Frequency 2	5	10	10
1. Business:					
Downtown Areas	95	0.84	0.85	0.87	0.
Neighborhood Areas	70	0.68	0.69	0.73	0.
2. Residential:					
Single Family (Soil Group D)					
1/8 Acre	50	0.57	0.61	0.68	0.
1/4 Acre	38	0.50	0.54	0.62	0.
1/3 Acre	30	0.46	0.50	0.59	0.
1/2 Acre	25	0.42	0.48	0.56	0.
3/4 Acre	22	0.42	0.46	0.55	0.
1 Acre	20	0.41	0.45	0.54	0.
Multi-Family (Soil Group D)					
Multi-Unit (detached)	60	0.62	0.66	0.72	0.
Multi-Unit (attached)	65	0.64	0.68	0.73	0.
Apartments	75	0.70	0.73	0.79	0.
Single Family (Soil Group C)					
1/8 Acre	50	0.55	0.58	0.64	0.
1/4 Acre	38	0.48	0.51	0.57	0.
1/3 Acre	30	0.43	0.46	0.53	0.
1/2 Acre	25	0.40	0.43	0.50	0.
3/4 Acre	22	0.39	0.42	0.49	0
1 Acre	20	0.37	0.40	0.48	0
Multi-Family (Soil Group C)					
Multi-Unit (detached)	60	0.60	0.63	0.69	0
Multi-Unit (attached)	65	0.63	0.66	0.71	0
Apartments	75	0.68	0.72	0.77	0
Single-Family (Soil Group B)					
1/8 Acre	50	0.52	0.54	0.59	0
1/4 Acre	38	0.44	0.46	0.52	0
1/3 Acre	30	0.39	0.41	0.47	0
1/2 Acre	25	0.36	0.38	0.44	0
3/4 Acre	22	0.34	0.36	0.42	0
1 Acre	20	0.33	0.35	0.40	0
Multi-Family (Soil Group B)					
Multi-Unit (detached)	60	0.58	0.60	0.65	0
Multi-Unit (attached)	65	0.61	0.64	0.68	0
Apartments	75	0.67	0.70	0.74	0

Land Use or rface Characteristics	Percent Impervious	Frequency 2	5	10	1
Single Family (Soil Group A)					
1/8 Acre	50	0.47	0.50	0.54	0
1/4 Acre	38	0.39	0.41	0.45	0
1/3 Acre	30	0.33	0.35	0.39	0
1/2 Acre	25	0.30	0.31	0.35	0
3/4 Acre	22	0.28	0.29	0.33	0
1 Acre	20	0.26	0.28	0.32	0
Multi-Family (Soil Group A)					
Multi-Unit (detached)	60	0.55	0.57	0.61	0
Multi-Unit (attached)	65	0.58	0.60	0.64	0
Apartments	75	0.65	0.68	0.72	0
3. Industrial:					
Light Areas	70	0.68	0.69	0.73	0
Heavy Areas	80	0.74	0.76	0.79	0
4. Playgrounds:	15	0.33	0.35	0.42	0
5. Schools:	40	0.49	0.51	0.56	0
6. Railroad Yard Areas:	30	0.43	0.45	0.50	0
7. Undeveloped Urban Areas: Offsite Flow Analysis (when land use not defined)	45	0.52	0.54	0.59	0
8. Streets:					
Paved	99	0.87	0.88	0.90	0
Gravel	00	0.24	0.26	0.33	0
9. Drive, Parking Lots and Walks:	96	0.87	0.87	0.88	
10. Roofs:	90	0.80	0.85	0.90	0
11. Urban Lawn Areas (See Note No. 1 below):					
Soil Group A					
Slope less than 1%	00	0.08	0.09	0.13	0
Slope 1% to 4%	00	0.12	0.13	0.17	0
Slope more than 4%	00	0.16	0.17	0.21	
Soil Group B					
Slope less than 1%	00	0.16	0.18	0.24	0
Slope 1% to 4%	00	0.20	0.22	0.28	0
Slope more than 4%	00	0.24	0.26	0.32	
Soil Group C					
Slope less than 1%	00	0.24	0.27	0.35	
Slope 1% to 4%	00	0.26	0.29	0.37	
Slope more than 4%	00	0.28	0.31	0.39	

Land Use or rface Characteristics	Percent Impervious	Frequency 2	5	10	10
Soil Group D					
Slope less than 1%	00	0.28	0.33	0.43	0.
Slope 1% to 4%	00	0.30	0.35	0.45	0.
Slope more than 4%	00	0.32	0.37	0.47	0.

Note No. 1: Coefficients shown in the above table are for pervious open spac areas with thick turf which includes pervious areas in parks and cemeteries Coeffjcients shown above must be increased 0.02 for use with agricultura pasture areas. Coefficients shown above must be reduced by 0.04 for use wit agricultural cultivated areas. Group A soils are well-drained, coarse texture sands with high infiltration rates. Group B soils are moderately well-drained moderately coarse textured soils with moderate infiltration rates. Group soils are moderately poor-drained, moderately fine textured soils with slc infiltration rates. Group D soils are poor-drained, fine textured soils wit very slow infiltration rates.

GENERAL NOTE: These Rational Formula Coefficients may not be valid for basir 320 acres or larger.

ATTACHMENT E

DRAINAGE CRITERIA

AVERAGE OVERLAND FLOW VELOCITY FOR USE WITH URBANIZED AREAS.

Surface Type	VELOCITY IN FEET/SECOND FOR SLOPES IN PERCENT SHOWN																			
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	20.0
Forest with Heavy Ground Litter or Meadow	0.03	0.04	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.16	0.21	0.28	0.33	0.39	0.46	0.53	0.60	0.72	1.10
Fallow or Minimum Tillage Cultivation	0.06	0.08	0.10	0.12	0.13	0.14	0.16	0.17	0.18	0.19	0.29	0.40	0.51	0.66	0.78	0.91	1.05	1.20	1.44	2.10
Short Grass Pasture or Lawns	0.09	0.13	0.15	0.18	0.20	0.21	0.23	0.25	0.26	0.28	0.45	0.60	0.77	0.96	1.17	1.33	1.50	1.68	1.98	3.20
Almost Bare Ground	0.16	0.22	0.28	0.31	0.35	0.38	0.41	0.44	0.46	0.49	0.70	0.85	1.05	1.26	1.50	1.75	2.03	2.32	2.79	4.40
Grassed Waterway	0.35	0.48	0.58	0.67	0.77	0.84	0.91	0.98	1.05	1.12	1.54	1.82	2.10	2.38	2.78	3.20	3.66	4.14	4.56	7.00
Paved Areas (Sheet Flow) or Shallow Gutter Flow	0.44	0.62	0.77	0.91	1.05	1.12	1.19	1.26	1.33	1.40	2.00	2.55	3.20	3.83	4.41	5.04	5.70	6.00	6.20	9.00

ATTACHMENT F

DETERMINATION OF DIMENSIONLESS WATERSHED CONVEYANCE FACTOR (ø)

$$ø = ø_1 + ø_2$$

$ø_1$	Classification
0.6	Extensive channel improvement and storm sewer system, closed conduit channel system
0.7	Moderate channel improvement and storm sewer system.
0.8	Some channel improvement and storm sewers, mainly cleaning and enlargement of existing channel.
0.9	Little channel improvement and storm sewers.
1.0	Natural channel conditions.

$ø_2$	Classification
0.0	No channel vegetation.
0.1	Light channel vegetation.
0.2	Moderate channel vegetation.
0.3	Heavy channel vegetation.

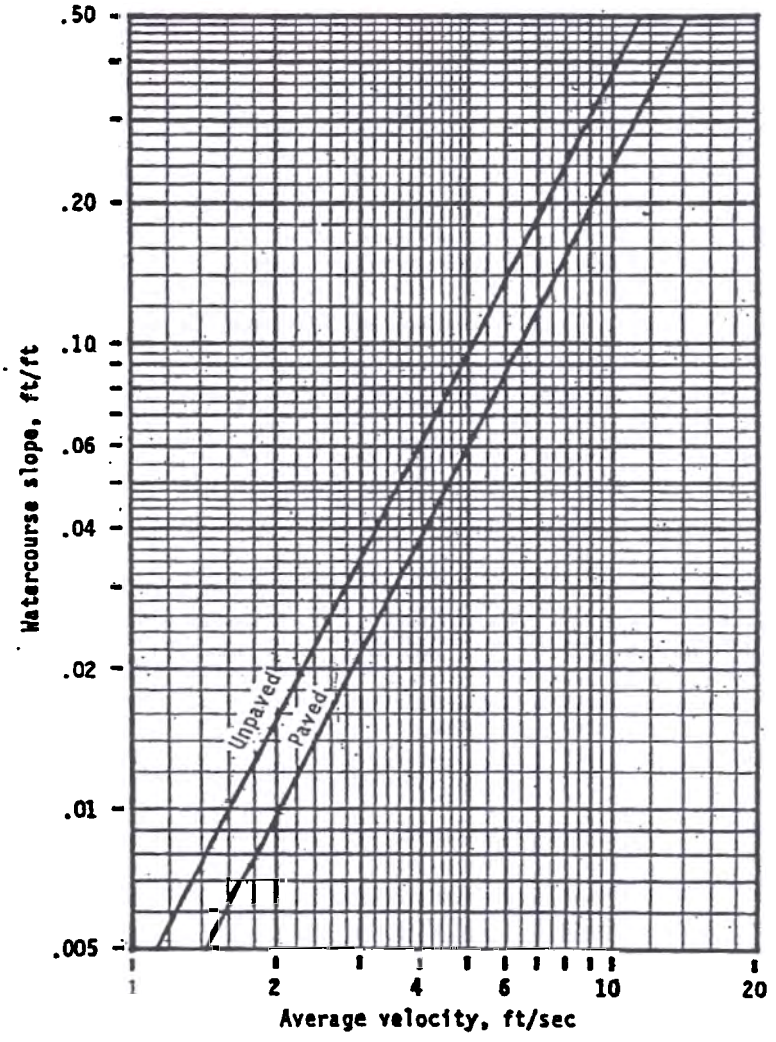
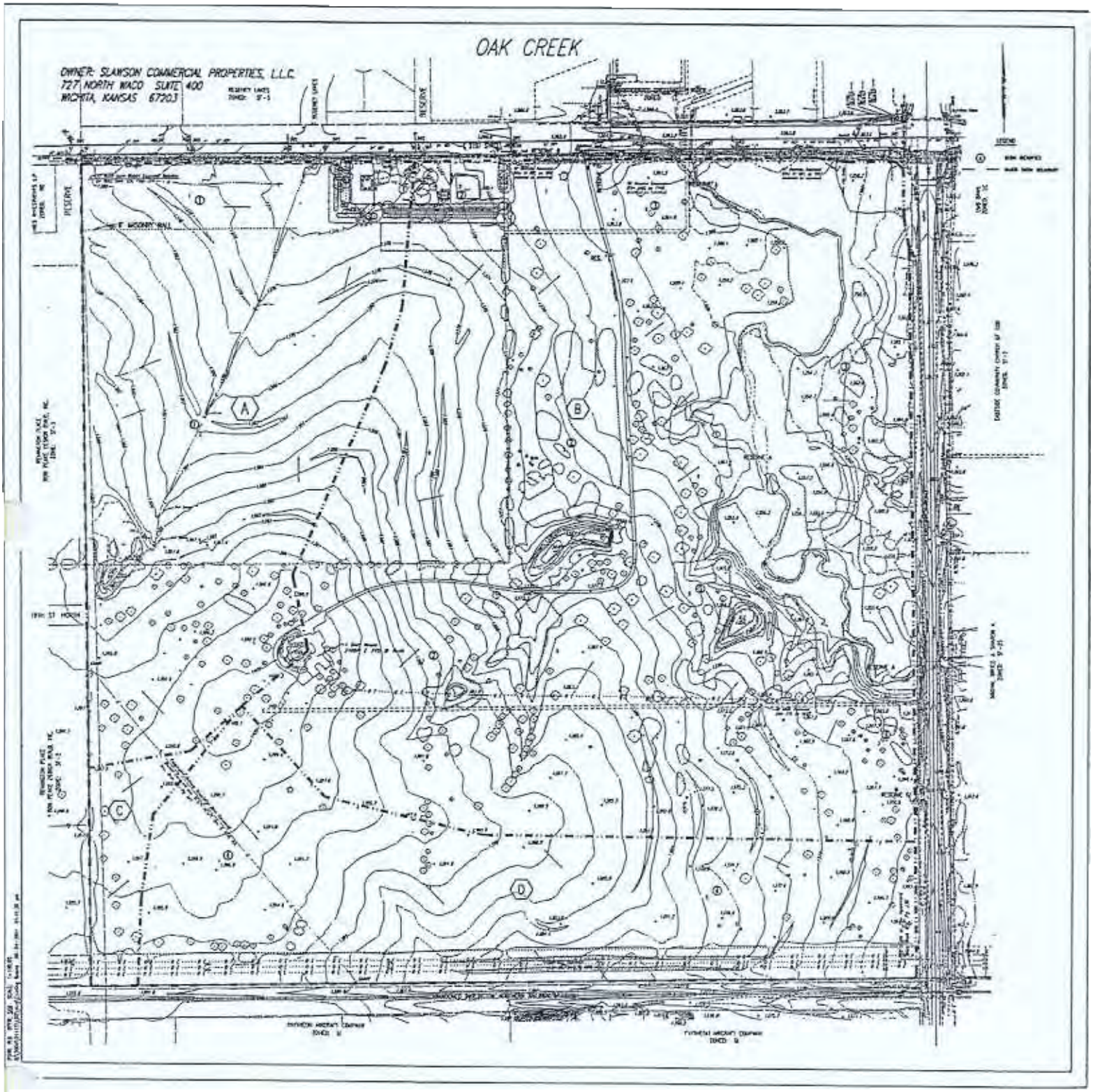


Figure 3-1.—Average velocities for estimating travel time for shallow concentrated flow.


OAK CREEK
OWNER: SLAWSON COMMERCIAL PROPERTIES, L.L.C.
727 NORTH WACO SUITE 400
WICHITA, KANSAS 67203
RESERVE
A
B
C
D

FIS Information

NATIONAL FLOOD INSURANCE PROGRAM

FLOODWAY

FLOOD BOUNDARY AND FLOODWAY MAP

SEDGWICK COUNTY, KANSAS

(UNINCORPORATED AREAS)

PANEL 150 OF 300

(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
200321 0150

EFFECTIVE DATE:
JUNE 3, 1986

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

SEDGWICK COUNTY, KANSAS

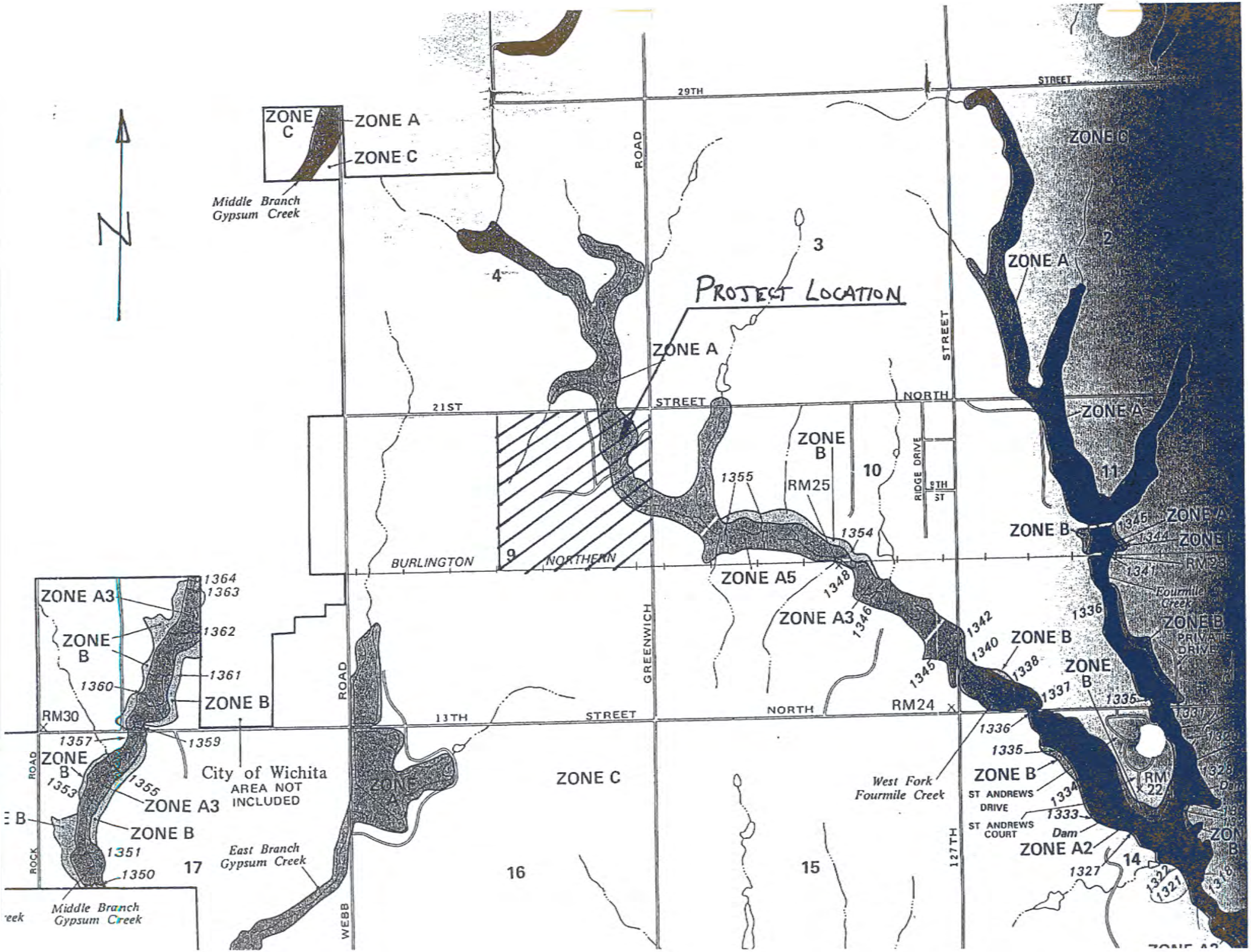
(UNINCORPORATED AREAS)

PANEL 150 OF 300

COMMUNITY-PANEL NUMBER
200321 0150 A

EFFECTIVE DATE:
JUNE 3, 1986

Federal Emergency Management Agency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ZONE A
ZONE C
ZONE B
ZONE A3
ZONE A5
ZONE A2
29TH STREET
21ST STREET NORTH
13TH STREET NORTH
ROAD
GREENWICH ROAD
WEBB ROAD
ROCK ROAD
RIDGE DRIVE
9TH ST
127TH
BURLINGTON NORTHERN
RM25
RM24
RM30
RM 22
1355
1354
1345
1344
1341
1348
1346
1342
1340
1338
1337
1336
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1321
1364
1363
1362
1361
1360
1359
1357
1353
1351
1350
Middle Branch Gypsum Creek
East Branch Gypsum Creek
West Fork Fourmile Creek
Fourmile Creek
City of Wichita
AREA NOT INCLUDED
ST ANDREWS DRIVE
ST ANDREWS COURT
PRIVATE DRIVE
Dam
2
3
4
9
10
11
14
15
16
17

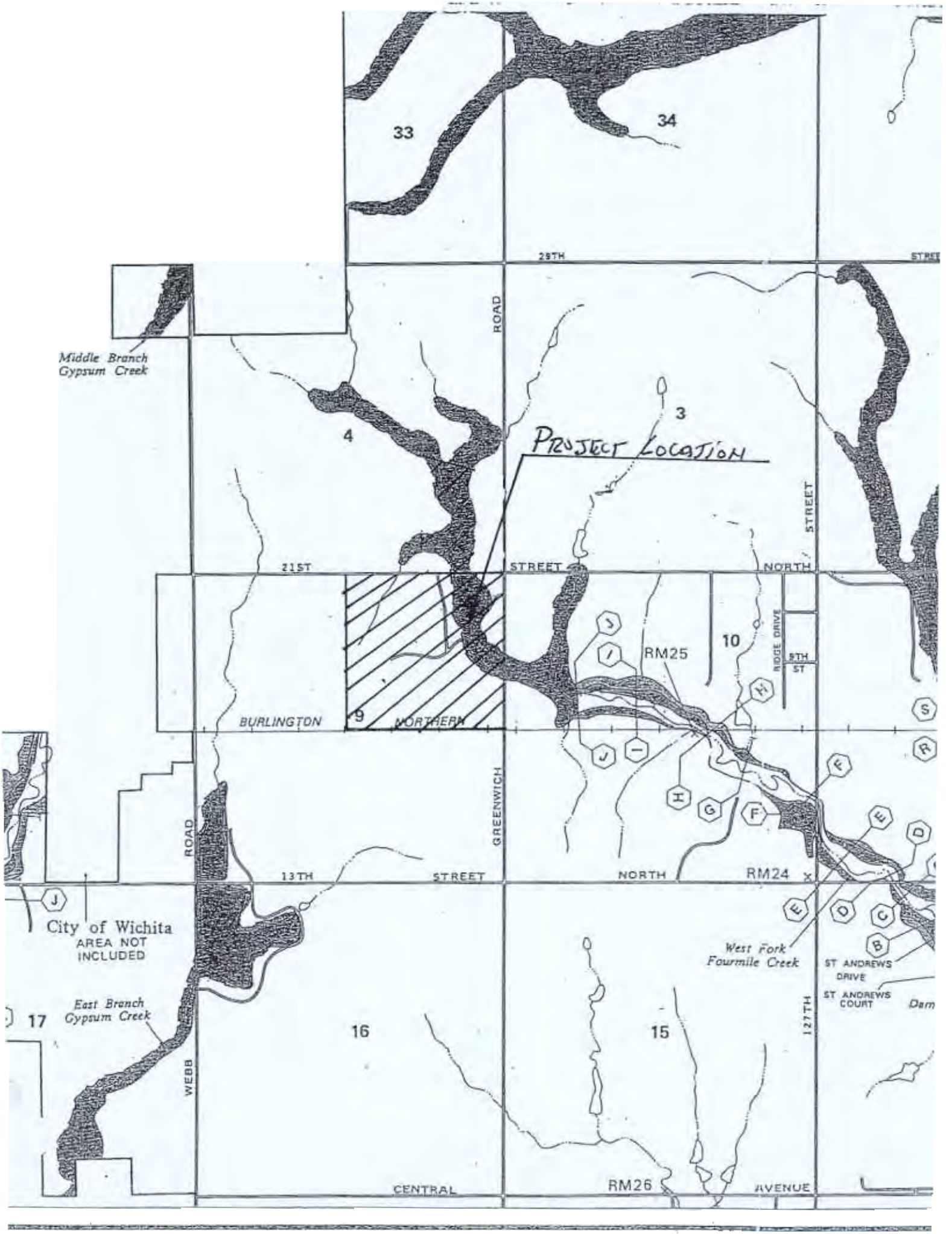

33
34
29TH
ROAD
Middle Branch
Gypsum Creek
4
3
PROJECT LOCATION
21ST
STREET
NORTH
STREET
RM25
10
RIDGE DRIVE
8TH
ST
BURLINGTON
9
NORTHERN
GREENWICH
ROAD
13TH
STREET
NORTH
RM24
City of Wichita
AREA NOT
INCLUDED
West Fork
Fourmile Creek
ST ANDREWS
DRIVE
ST ANDREWS
COURT
17
East Branch
Gypsum Creek
16
15
WEBB
127TH
CENTRAL
RM26
AVENUE

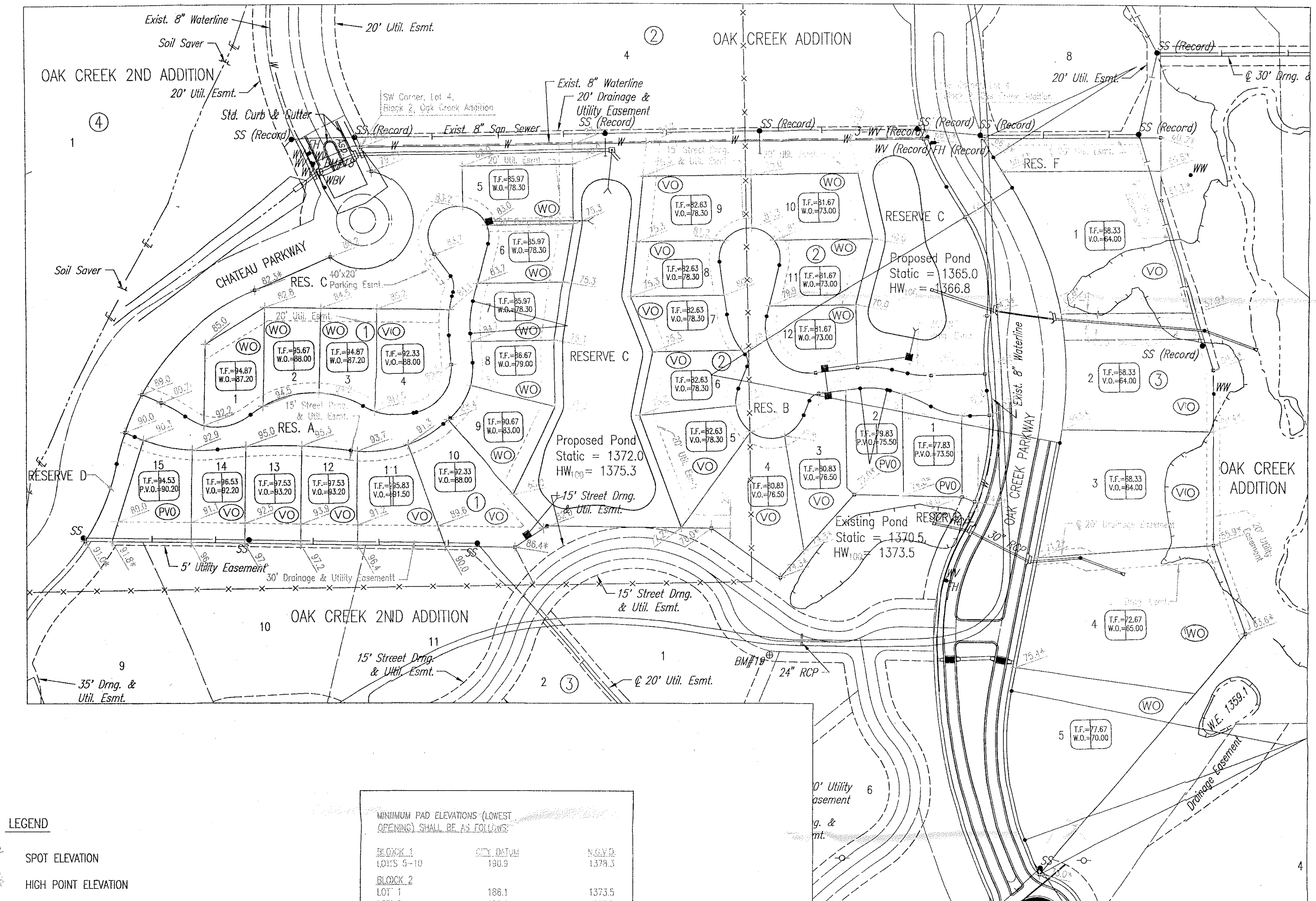
TABLE 2 - SUMMARY OF DISCHARGES (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA SQ MILES	PEAK DISCHARGES (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
MIDDLE BRANCH GYPSUM CREEK					
At 13th Street	2.3	740	1,090	1,240	1,590
FOURMILE CREEK					
At county boundary	27.2	11,680	17,390	20,100	26,800
Upstream of confluence of Brookhaven Creek	8.4	3,220	4,760	5,500	7,100
Upstream of confluence of West Fork Fourmile Creek	2.2	1,410	2,070	2,400	3,130
WEST FORK FOURMILE CREEK					
At mouth at Fourmile Creek	4.2	2,110	3,120	3,600	4,770
At 13th Street North	3.2	2,200	3,270	3,780	4,850
BROOKHAVEN CREEK					
At mouth at Fourmile Creek	4.0	2,470	3,620	4,180	5,420
At Interstate 35	1.8	2,190	3,190	3,780	5,170
MIDDLE FORK CHISHOLM CREEK					
Upstream of confluence of Tributary M1	11.7	2,990	5,280	6,190	8,920
At 53rd Street North	9.5	2,580	4,570	5,360	7,720
EAST FORK CHISHOLM CREEK					
At 45th Street North	1.6	860	1,270	1,545	2,240
CENTER DRAIN EAST TRIBUTARY					
At City of Wichita corporate limits	1.5	630	1,010	1,190	1,600

OAK CREEK 3RD

AN ADDITION TO WICHITA, SEDGWICK COUNTY, KANSAS

FOUR-CORNER PLAN



SCALE: 1" = 100'

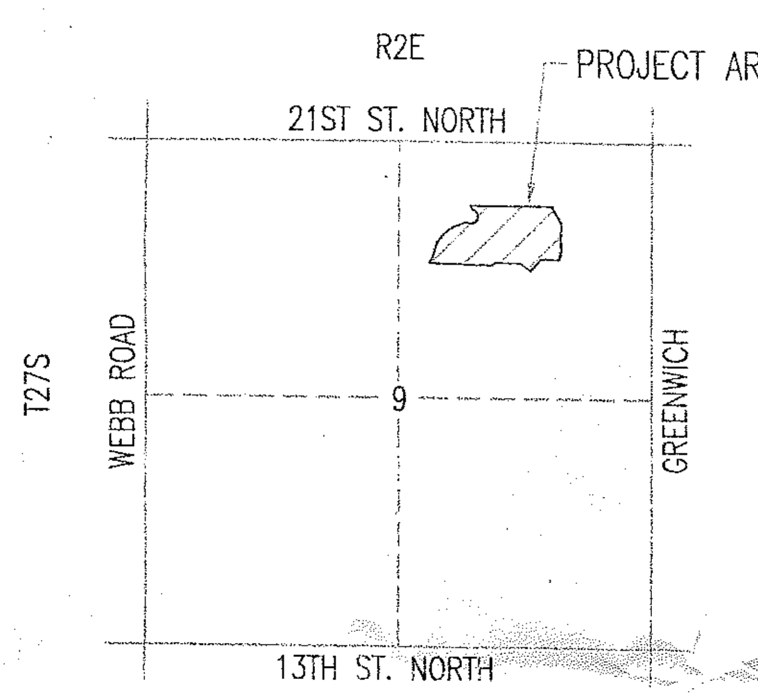
● = 1/2" REBAR W/PEC CAP UNLESS OTHERWISE NOTED

BENCHMARKS ⊕BM

BM #209
Chiseled "□" on NW corner of traffic signal base, at SW corner of Greenwich Road & 21st Street North
Elev. = 1363.54 N.G.V.D.
176.14 City Datum

BM #215
Chiseled "+" in top center curb inlet 600' W of Greenwich Road on S side of 21st Street North.
Elev. = 1363.265 N.G.V.D.
175.865 City Datum

BM #216
[illegible]
177.15 City Datum



VICINITY MAP

LEGEND

- 69.00 — SPOT ELEVATION
- 69.00 HP — HIGH POINT ELEVATION
- 69.00± — MATCH EXISTING ELEVATION
- STORM SEWER AND INLET
- STORM SEWER AND MANHOLE
- (VO) VIEW-OUT BASEMENT
- (PVO) VIEW-OUT BASEMENT
- (WO) VIEW-OUT BASEMENT

ADD 1300 TO ELEVATIONS FOR N.G.V.D. DATUM.

MINIMUM PAD ELEVATIONS (LOWEST OPENING) SHALL BE AS FOLLOWS:

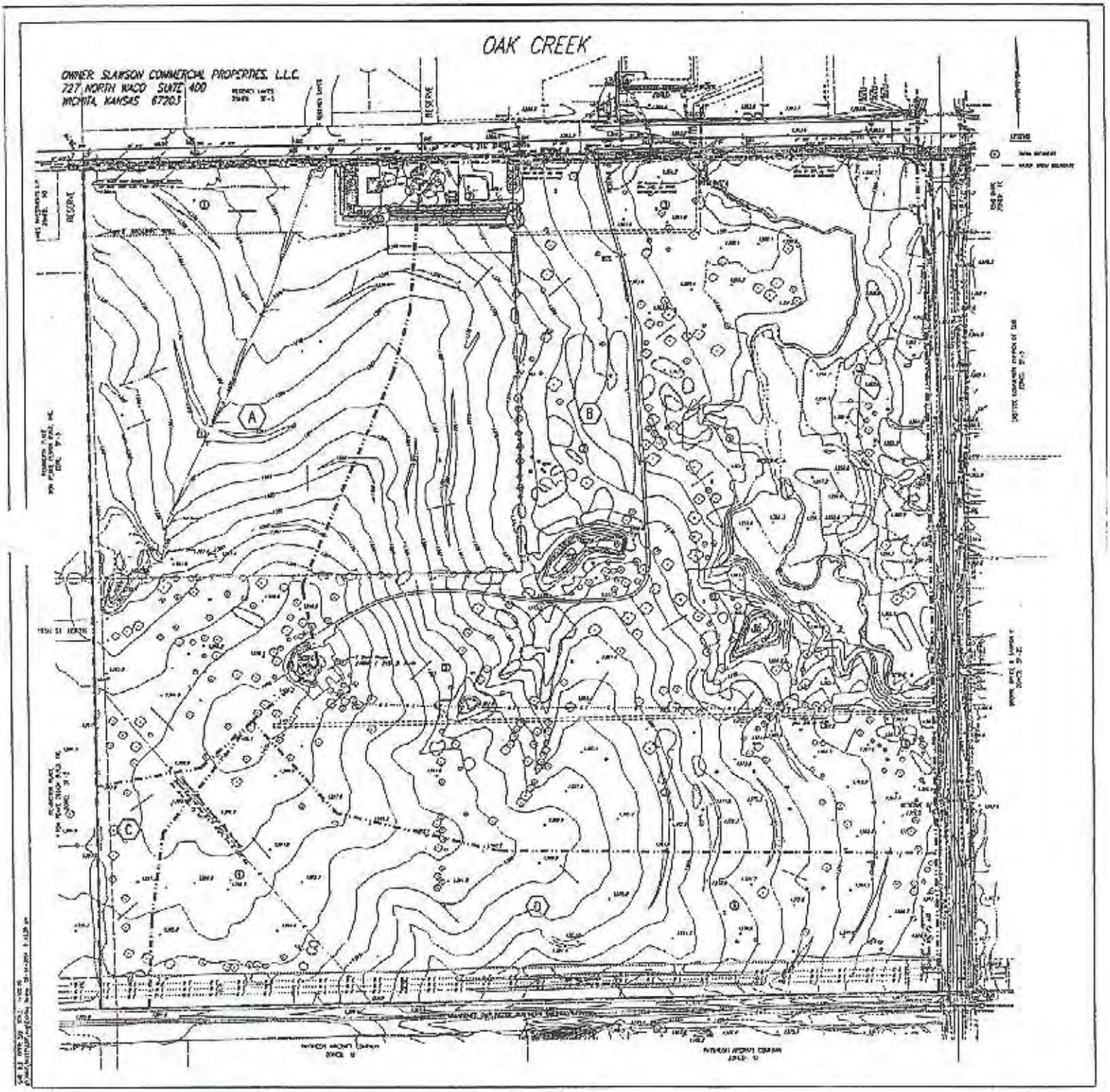
BLOCK 1	CITY DATUM	N.G.V.D.
LOTS 5-10	190.9	1378.3
BLOCK 2		
LOT 1	186.1	1373.5
LOT 2	188.1	1375.5
LOTS 3-4	189.1	1376.5
LOTS 5-9	190.9	1378.3
LOTS 10-12	182.6	1370.0
BLOCK 3		
LOTS 1-2	176.6	1364.0
LOTS 3-4	[illegible]	[illegible]

REVISED 9-21-06

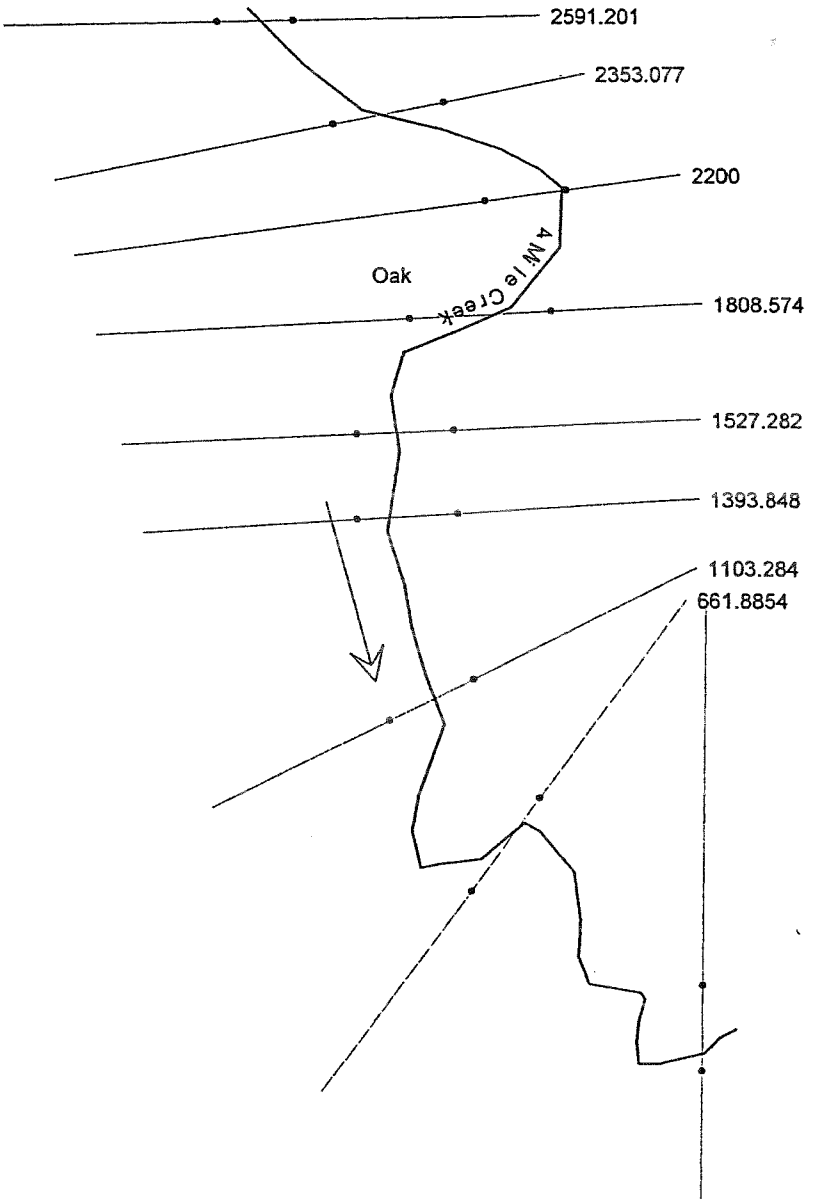
Professional Engineering Consultants, P.A.
303 S. TOPEKA • WICHITA, KANSAS 67202
316-262-2691 • FAX 316-262-3003

Saved 09-21-2006 8:39:06 AM by BMM
Plot Scale 1:100 09-29-2006 3:44:43 PM by SBB
Q:\2004\04115\004\LDD\dwg\04115-004-4-Corner

Pre-Development Basin Map


OAK CREEK
OWNER: SLAWSON COMMERCIAL PROPERTIES, L.L.C.
727 NORTH WACO SUITE 400
WICHITA, KANSAS 67203
RESERVE
A
B
C
D

HEC-RAS Analysis Existing Conditions


2591.201
2353.077
2200
Oak
A Mile Creek
1808.574
1527.282
1393.848
1103.284
661.8854

Plan: Plan 01 4 Mile Creek Oak RS: 2591.201 Profile: PF 1

E.G. Elev (ft)	1361.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.100	0.065	0.100
W.S. Elev (ft)	1361.78	Reach Len. (ft)	238.12	238.12	238.00
Crit W.S. (ft)		Flow Area (sq ft)	816.94	265.80	110.27
E.G. Slope (ft/ft)	0.003232	Area (sq ft)	816.94	265.80	110.27
Q Total (cfs)	1817.00	Flow (cfs)	1147.15	593.75	76.10
Top Width (ft)	645.92	Top Width (ft)	379.18	117.40	149.34
Vel Total (ft/s)	1.52	Avg. Vel. (ft/s)	1.40	2.23	0.69
Max Chl Dpth (ft)	4.18	Hydr. Depth (ft)	2.15	2.26	0.74
Conv. Total (cfs)	31960.2	Conv. (cfs)	20177.8	10443.9	1338.5
Length Wtd. (ft)	238.11	Wetted Per. (ft)	381.21	117.96	149.35
Min Ch El (ft)	1357.59	Shear (lb/sq ft)	0.43	0.45	0.15
Alpha	1.25	Stream Power (lb/ft s)	0.61	1.02	0.10
Frctn Loss (ft)	0.51	Cum Volume (acre-ft)	23.85	32.76	20.04
C & E Loss (ft)	0.01	Cum SA (acres)	10.39	9.55	9.35

Plan: Plan 01 4 Mile Creek Oak RS: 2353.077 Profile: PF 1

E.G. Elev (ft)	1361.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.100	0.065	0.100
W.S. Elev (ft)	1361.27	Reach Len. (ft)	300.00	309.31	320.00
Crit W.S. (ft)		Flow Area (sq ft)	698.35	421.41	366.74
E.G. Slope (ft/ft)	0.001535	Area (sq ft)	698.35	421.41	366.74
Q Total (cfs)	1817.00	Flow (cfs)	860.66	681.80	274.54
Top Width (ft)	648.78	Top Width (ft)	224.43	172.83	251.52
Vel Total (ft/s)	1.22	Avg. Vel. (ft/s)	1.23	1.62	0.75
Max Chl Dpth (ft)	3.67	Hydr. Depth (ft)	3.11	2.44	1.46
Conv. Total (cfs)	46372.8	Conv. (cfs)	21965.4	17400.8	7006.7
Length Wtd. (ft)	310.74	Wetted Per. (ft)	226.76	173.59	251.54
Min Ch El (ft)	1357.60	Shear (lb/sq ft)	0.30	0.23	0.14
Alpha	1.20	Stream Power (lb/ft s)	0.36	0.38	0.10
Frctn Loss (ft)	0.52	Cum Volume (acre-ft)	19.71	30.88	18.74
C & E Loss (ft)	0.00	Cum SA (acres)	8.74	8.76	8.26

Plan: Plan 01 4 Mile Creek Oak RS: 2200 Profile: PF 1

E.G. Elev (ft)	1360.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.100	0.065	0.100
W.S. Elev (ft)	1360.75	Reach Len. (ft)	412.00	391.43	370.00
Crit W.S. (ft)		Flow Area (sq ft)	93.74	350.56	961.56
E.G. Slope (ft/ft)	0.001800	Area (sq ft)	93.74	350.56	961.56
Q Total (cfs)	1817.00	Flow (cfs)	70.41	724.61	1021.98
Top Width (ft)	623.74	Top Width (ft)	72.03	112.58	439.13
Vel Total (ft/s)	1.29	Avg. Vel. (ft/s)	0.75	2.07	1.06
Max Chl Dpth (ft)	3.43	Hydr. Depth (ft)	1.30	3.11	2.19
Conv. Total (cfs)	42832.9	Conv. (cfs)	1659.8	17081.5	24091.6
Length Wtd. (ft)	386.09	Wetted Per. (ft)	72.06	112.65	439.17
Min Ch El (ft)	1357.32	Shear (lb/sq ft)	0.15	0.35	0.25
Alpha	1.41	Stream Power (lb/ft s)	0.11	0.72	0.26
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	16.98	28.14	13.86
C & E Loss (ft)	0.01	Cum SA (acres)	7.72	7.75	5.72

Plan: Plan 01 4 Mile Creek Oak RS: 1808.574 Profile: PF 1

E.G. Elev (ft)	1360.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.100	0.065	0.100
W.S. Elev (ft)	1360.41	Reach Len. (ft)	234.91	234.91	234.00
Crit W.S. (ft)		Flow Area (sq ft)	509.13	862.64	489.63
E.G. Slope (ft/ft)	0.000543	Area (sq ft)	509.13	862.64	489.63
Q Total (cfs)	1817.00	Flow (cfs)	369.68	1142.34	304.98
Top Width (ft)	590.15	Top Width (ft)	167.45	219.98	202.72
Vel Total (ft/s)	0.98	Avg. Vel. (ft/s)	0.73	1.32	0.62
Max Chl Dpth (ft)	4.20	Hydr. Depth (ft)	3.04	3.92	2.42
Conv. Total (cfs)	77998.7	Conv. (cfs)	15869.1	49037.6	13092.0
Length Wtd. (ft)	234.83	Wetted Per. (ft)	167.59	219.99	202.84
Min Ch El (ft)	1356.21	Shear (lb/sq ft)	0.10	0.13	0.08
Alpha	1.34	Stream Power (lb/ft s)	0.07	0.18	0.05
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	14.13	22.69	7.70
C & E Loss (ft)	0.01	Cum SA (acres)	6.58	6.25	2.99

Plan: Plan 01 4 Mile Creek Oak RS: 1527.282 Profile: PF 1

E.G. Elev (ft)	1360.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.	0.100	0.065	0.100
W.S. Elev (ft)	1359.95	Reach Len. (ft)	135.00	133.43	131.00
Crit W.S. (ft)		Flow Area (sq ft)	206.33	428.86	5.86
E.G. Slope (ft/ft)	0.005858	Area (sq ft)	206.33	428.86	5.86
Q Total (cfs)	1817.00	Flow (cfs)	302.44	1509.36	5.21
Top Width (ft)	299.11	Top Width (ft)	140.96	149.77	8.37
Vel Total (ft/s)	2.83	Avg. Vel. (ft/s)	1.47	3.52	0.89
Max Chl Dpth (ft)	4.45	Hydr. Depth (ft)	1.46	2.86	0.70
Conv. Total (cfs)	23741.0	Conv. (cfs)	3951.7	19721.3	68.0
Length Wtd. (ft)	133.50	Wetted Per. (ft)	140.99	150.32	8.49
Min Ch El (ft)	1355.50	Shear (lb/sq ft)	0.54	1.04	0.25
Alpha	1.33	Stream Power (lb/ft s)	0.78	3.67	0.22
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	12.20	19.21	6.37
C & E Loss (ft)	0.03	Cum SA (acres)	5.75	5.26	2.43

Plan: Plan 01 4 Mile Creek Oak RS: 1393.848 Profile: PF 1

E.G. Elev (ft)	1359.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.100	0.065	0.100
W.S. Elev (ft)	1359.62	Reach Len. (ft)	290.57	290.57	290.57
Crit W.S. (ft)		Flow Area (sq ft)	277.15	565.69	289.41
E.G. Slope (ft/ft)	0.001823	Area (sq ft)	277.15	565.69	289.41
Q Total (cfs)	1817.00	Flow (cfs)	254.68	1305.35	256.97
Top Width (ft)	488.83	Top Width (ft)	158.96	155.19	174.69
Vel Total (ft/s)	1.60	Avg. Vel. (ft/s)	0.92	2.31	0.89
Max Chl Dpth (ft)	4.78	Hydr. Depth (ft)	1.74	3.65	1.66
Conv. Total (cfs)	42554.0	Conv. (cfs)	5964.6	30571.3	6018.1
Length Wtd. (ft)	290.57	Wetted Per. (ft)	159.01	155.53	174.61
Min Ch El (ft)	1354.84	Shear (lb/sq ft)	0.20	0.41	0.19
Alpha	1.57	Stream Power (lb/ft s)	0.18	0.95	0.17
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	11.45	17.69	5.92
C & E Loss (ft)	0.01	Cum SA (acres)	5.29	4.79	2.15

Plan: Plan 01 4 Mile Creek Oak RS: 1103.284 Profile: PF 1

E.G. Elev (ft)	1359.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.100	0.065	0.100
W.S. Elev (ft)	1359.42	Reach Len. (ft)	434.00	441.40	446.00
Crit W.S. (ft)		Flow Area (sq ft)	782.50	628.36	527.60
E.G. Slope (ft/ft)	0.000449	Area (sq ft)	782.50	628.36	527.60
Q Total (cfs)	1817.00	Flow (cfs)	589.47	808.03	419.50
Top Width (ft)	486.54	Top Width (ft)	210.93	144.56	131.05
Vel Total (ft/s)	0.94	Avg. Vel. (ft/s)	0.75	1.29	0.80
Max Chl Dpth (ft)	5.82	Hydr. Depth (ft)	3.71	4.35	4.03
Conv. Total (cfs)	85782.0	Conv. (cfs)	27829.3	38147.8	19805.0
Length Wtd. (ft)	440.60	Wetted Per. (ft)	211.32	145.19	131.40
Min Ch El (ft)	1353.60	Shear (lb/sq ft)	0.10	0.12	0.11
Alpha	1.21	Stream Power (lb/ft s)	0.08	0.16	0.09
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)	7.92	13.70	3.20
C & E Loss (ft)	0.01	Cum SA (acres)	4.05	3.79	1.13

Plan: Plan 01 4 Mile Creek Oak RS: 661.8854 Profile: PF 1

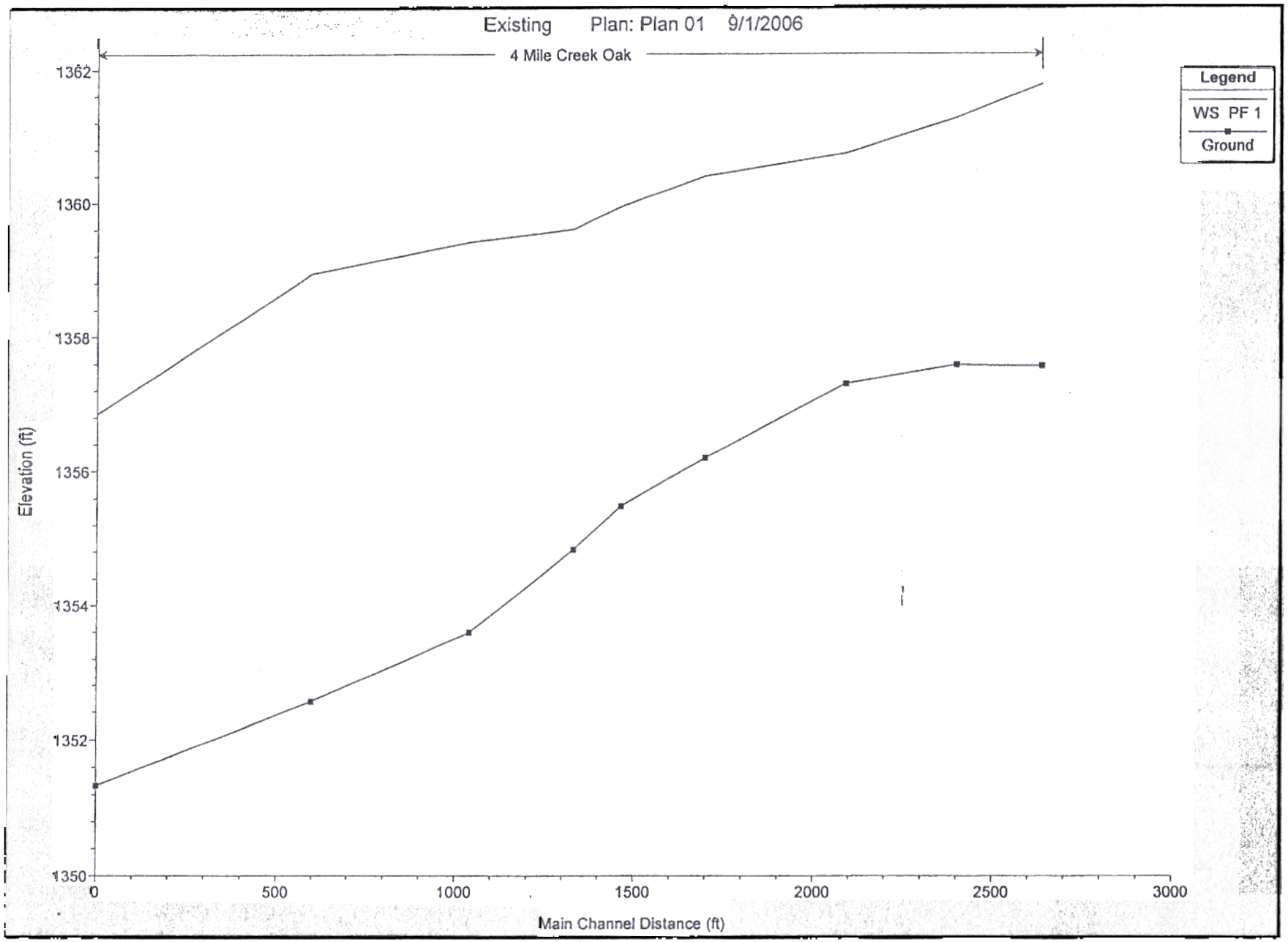
E.G. Elev (ft)	1359.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.100	0.065	0.100
W.S. Elev (ft)	1358.94	Reach Len. (ft)	592.00	597.80	605.00
Crit W.S. (ft)		Flow Area (sq ft)	109.14	655.65	19.74
E.G. Slope (ft/ft)	0.002422	Area (sq ft)	109.14	655.65	19.74
Q Total (cfs)	1817.00	Flow (cfs)	70.15	1734.23	12.62
Top Width (ft)	343.86	Top Width (ft)	139.63	180.14	24.09
Vel Total (ft/s)	2.32	Avg. Vel. (ft/s)	0.64	2.65	0.64
Max Chl Dpth (ft)	6.38	Hydr. Depth (ft)	0.78	3.64	0.82
Conv. Total (cfs)	36922.8	Conv. (cfs)	1425.5	35240.8	256.5
Length Wtd. (ft)	596.80	Wetted Per. (ft)	139.75	181.86	24.14
Min Ch El (ft)	1352.56	Shear (lb/sq ft)	0.12	0.55	0.12
Alpha	1.25	Stream Power (lb/ft s)	0.08	1.44	0.08
Frctn Loss (ft)	2.06	Cum Volume (acre-ft)	3.48	7.20	0.40
C & E Loss (ft)	0.00	Cum SA (acres)	2.31	2.14	0.34

Plan: Plan 01 4 Mile Creek Oak RS: 64.08447 Profile: PF 1

E.G. Elev (ft)	1356.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.	0.100	0.065	0.100
W.S. Elev (ft)	1356.85	Reach Len. (ft)			
Crit W.S. (ft)	1355.55	Flow Area (sq ft)	402.82	393.41	37.14
E.G. Slope (ft/ft)	0.005048	Area (sq ft)	402.82	393.41	37.14
Q Total (cfs)	2049.00	Flow (cfs)	678.51	1318.97	51.52
Top Width (ft)	356.56	Top Width (ft)	199.82	132.26	24.48
Vel Total (ft/s)	2.46	Avg. Vel. (ft/s)	1.68	3.35	1.39
Max Chl Dpth (ft)	5.52	Hydr. Depth (ft)	2.02	2.97	1.52
Conv. Total (cfs)	28839.6	Conv. (cfs)	9550.1	18564.5	725.1
Length Wtd. (ft)		Wetted Per. (ft)	199.88	132.65	24.66
Min Ch El (ft)	1351.33	Shear (lb/sq ft)	0.64	0.93	0.47
Alpha	1.36	Stream Power (lb/ft s)	1.07	3.13	0.66
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

HEC-RAS Plan: Plan 01 River: 4 Mile Creek Reach: Oak Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Oak	2591.201	PF 1	1817.00	1357.59	1361.78		1361.82	0.003232	2.23	1193.02	645.92	0.26
Oak	2353.077	PF 1	1817.00	1357.60	1361.27		1361.30	0.001535	1.62	1486.50	648.78	0.18
Oak	2200	PF 1	1817.00	1357.32	1360.75		1360.79	0.001800	2.07	1405.86	623.74	0.21
Oak	1808.574	PF 1	1817.00	1356.21	1360.41		1360.43	0.000543	1.32	1861.40	590.15	0.12
Oak	1527.282	PF 1	1817.00	1355.50	1359.95		1360.12	0.005858	3.52	641.05	299.11	0.37
Oak	1393.848	PF 1	1817.00	1354.84	1359.62		1359.69	0.001823	2.31	1132.25	488.83	0.21
Oak	1103.284	PF 1	1817.00	1353.60	1359.42		1359.44	0.000449	1.29	1936.46	486.54	0.11
Oak	661.8654	PF 1	1817.00	1352.56	1358.94		1359.04	0.002422	2.65	784.53	343.86	0.24
Oak	64.08447	PF 1	2049.00	1351.33	1356.85	1355.55	1356.98	0.005048	3.35	833.37	356.56	0.34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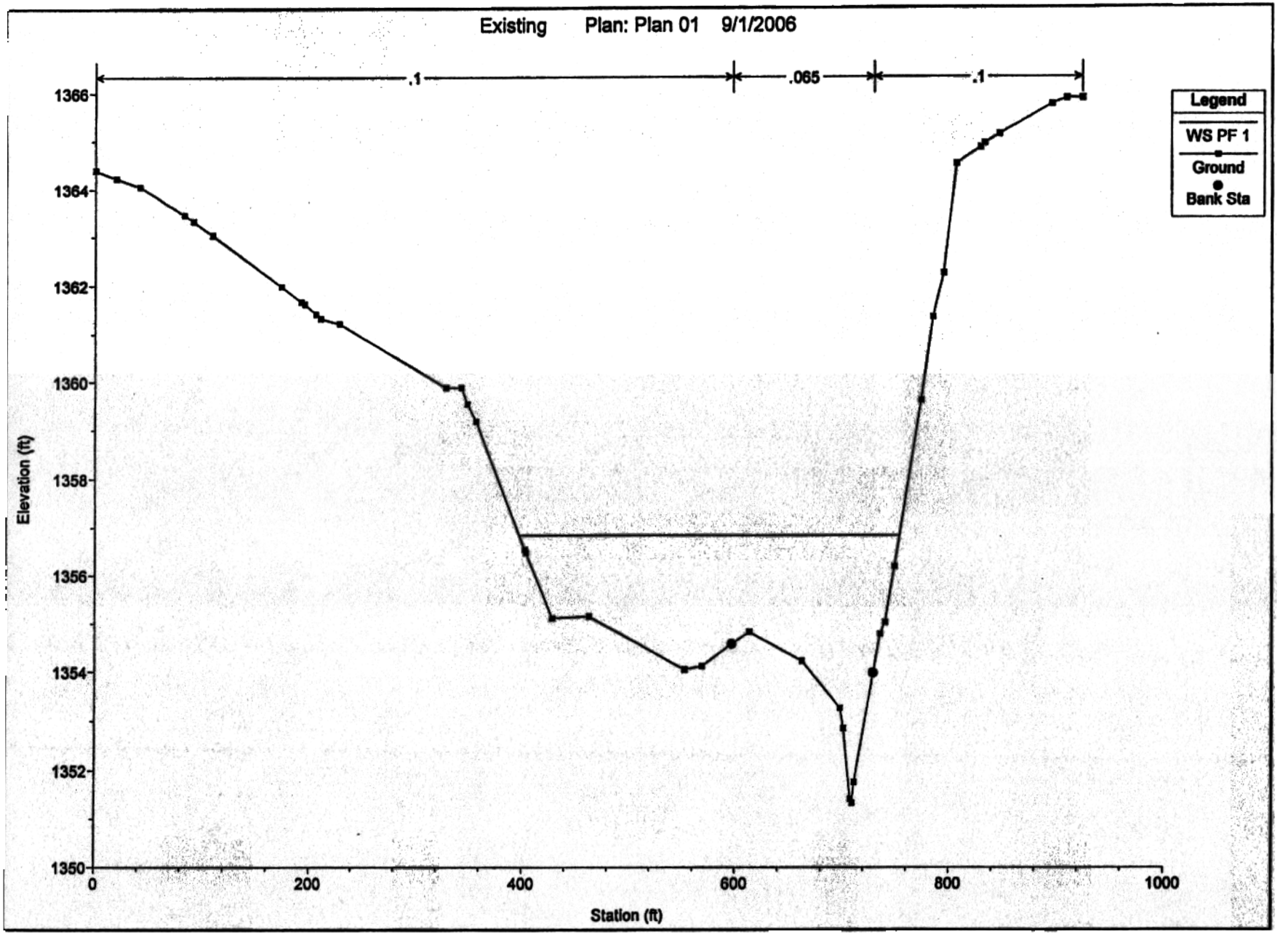
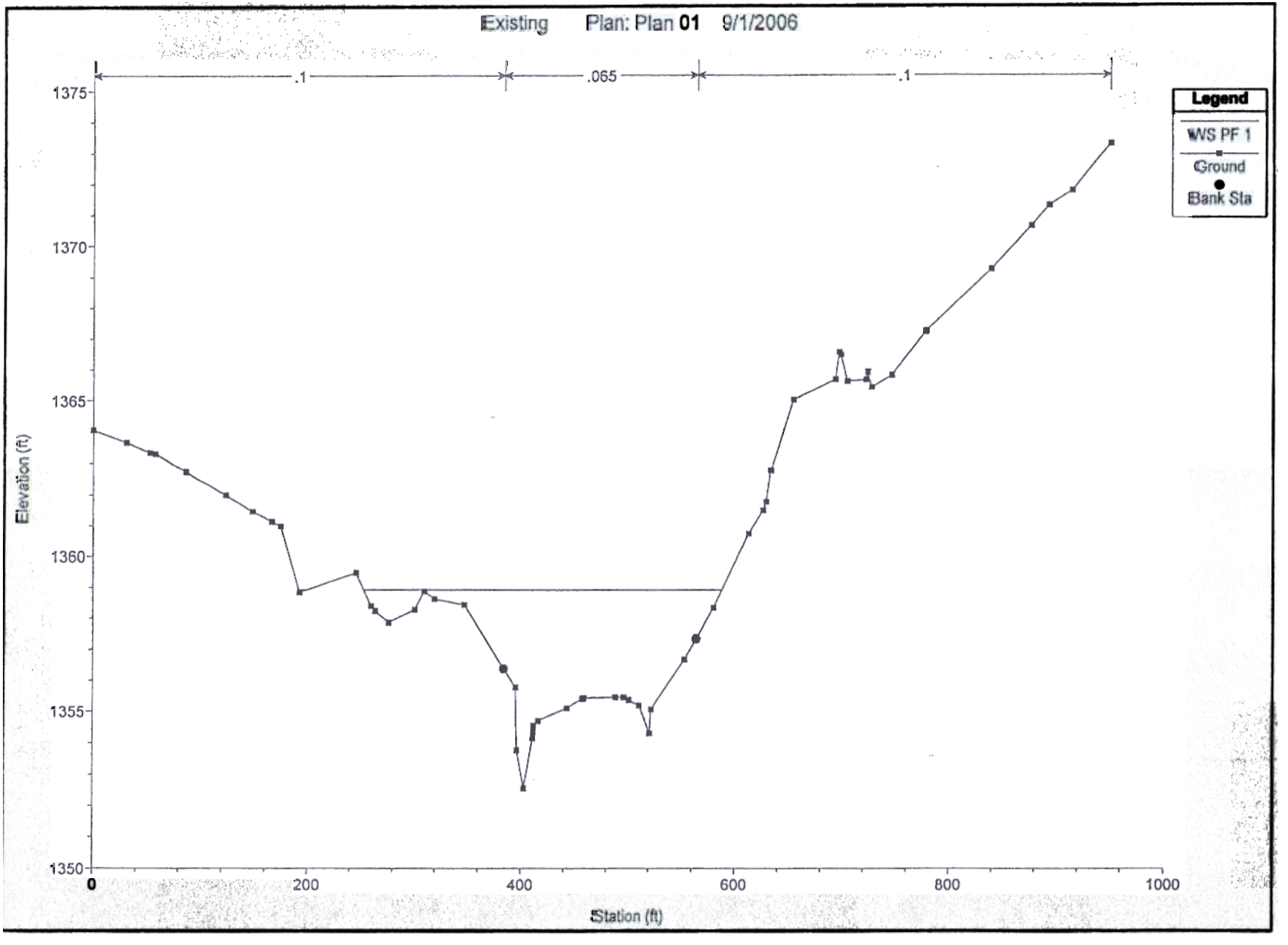
4 Mile Creek Oak
Legend
WS PF 1
Ground
Elevation (ft)
1362
1360
1358
1356
1354
1352
1350
0
500
1000
1500
2000
2500
3000
Main Channel Distance (ft)


Existing Plan: Plan 01 9/1/2006
.1
.065
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1366
1364
1362
1360
1358
1356
1354
1352
1350
0
200
400
600
800
1000
Station (ft)

Sta. 64.08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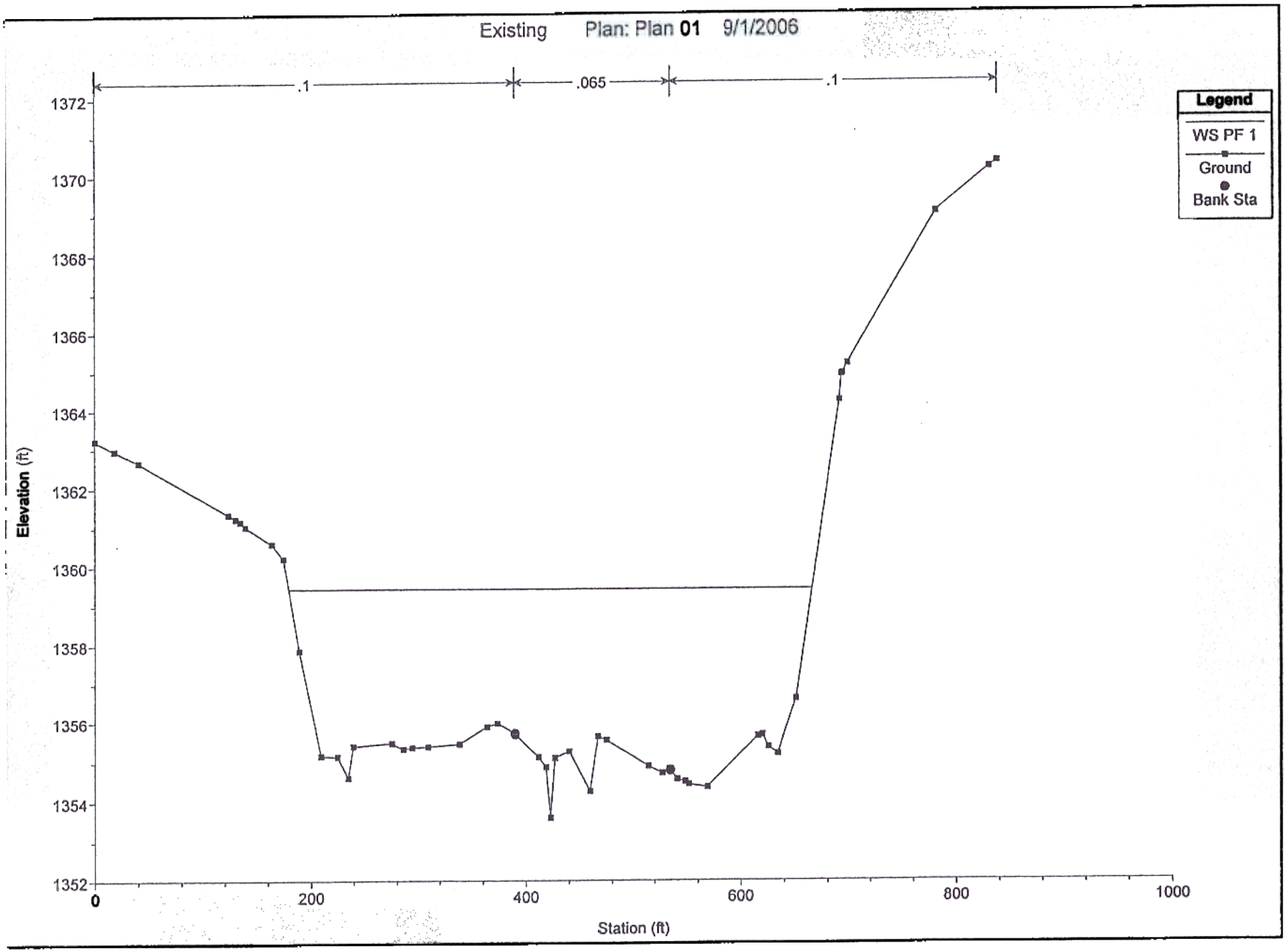
.1
.065
.1
Legend
WS PF 1
Ground
Bank Sta
1375
1370
1365
1360
1355
1350
Elevation (ft)
0
200
400
600
800
1000
Station (ft)

Sta. 561 89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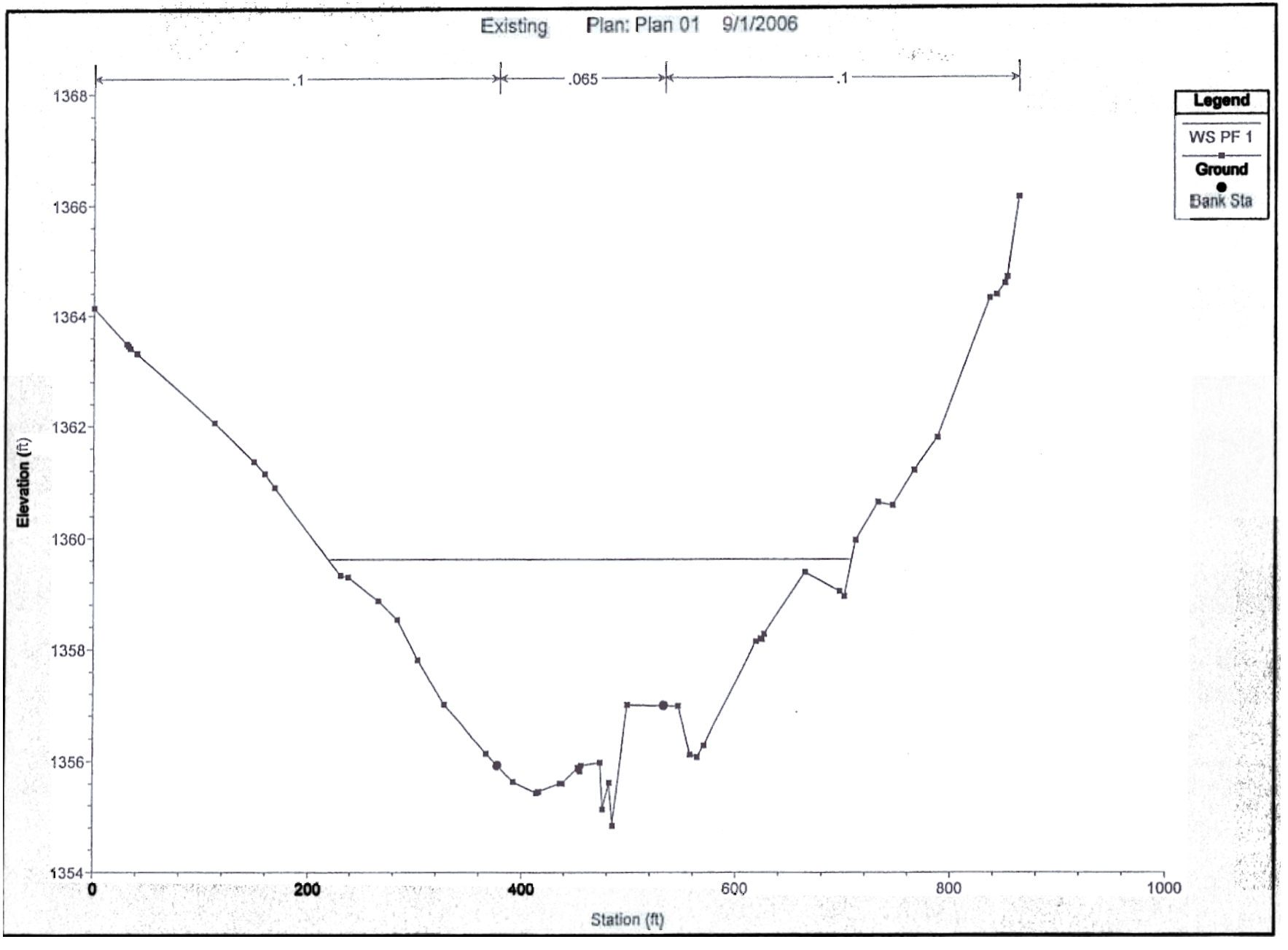
.1
.065
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1372
1370
1368
1366
1364
1362
1360
1358
1356
1354
1352
0
200
400
600
800
1000
Station (ft)

Sta. 1 03.28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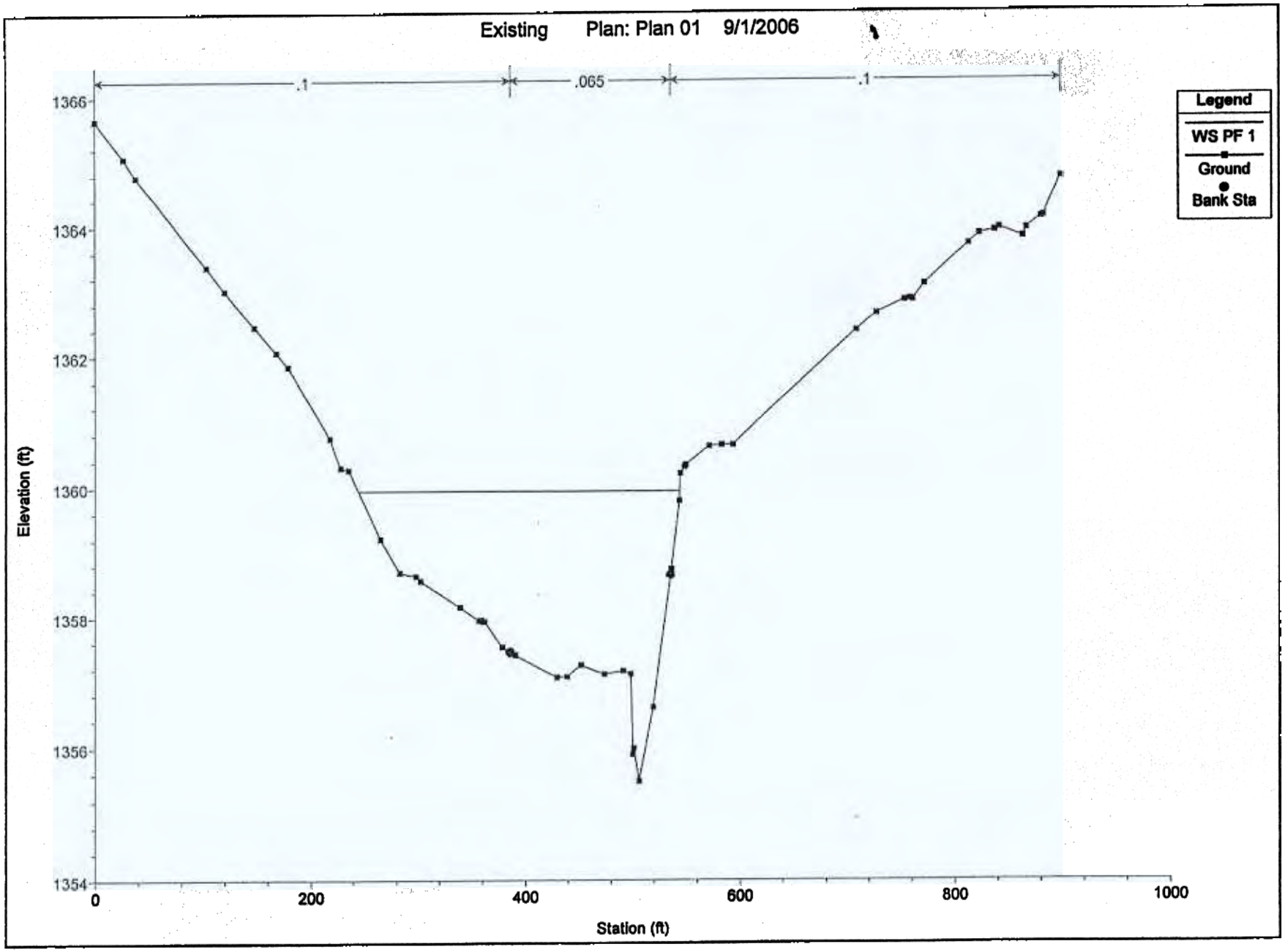
.1
.065
.1
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1368
1366
1364
1362
1360
1358
1356
1354
0
200
400
600
800
1000
Station (ft)

Sta. 1393.84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Ground
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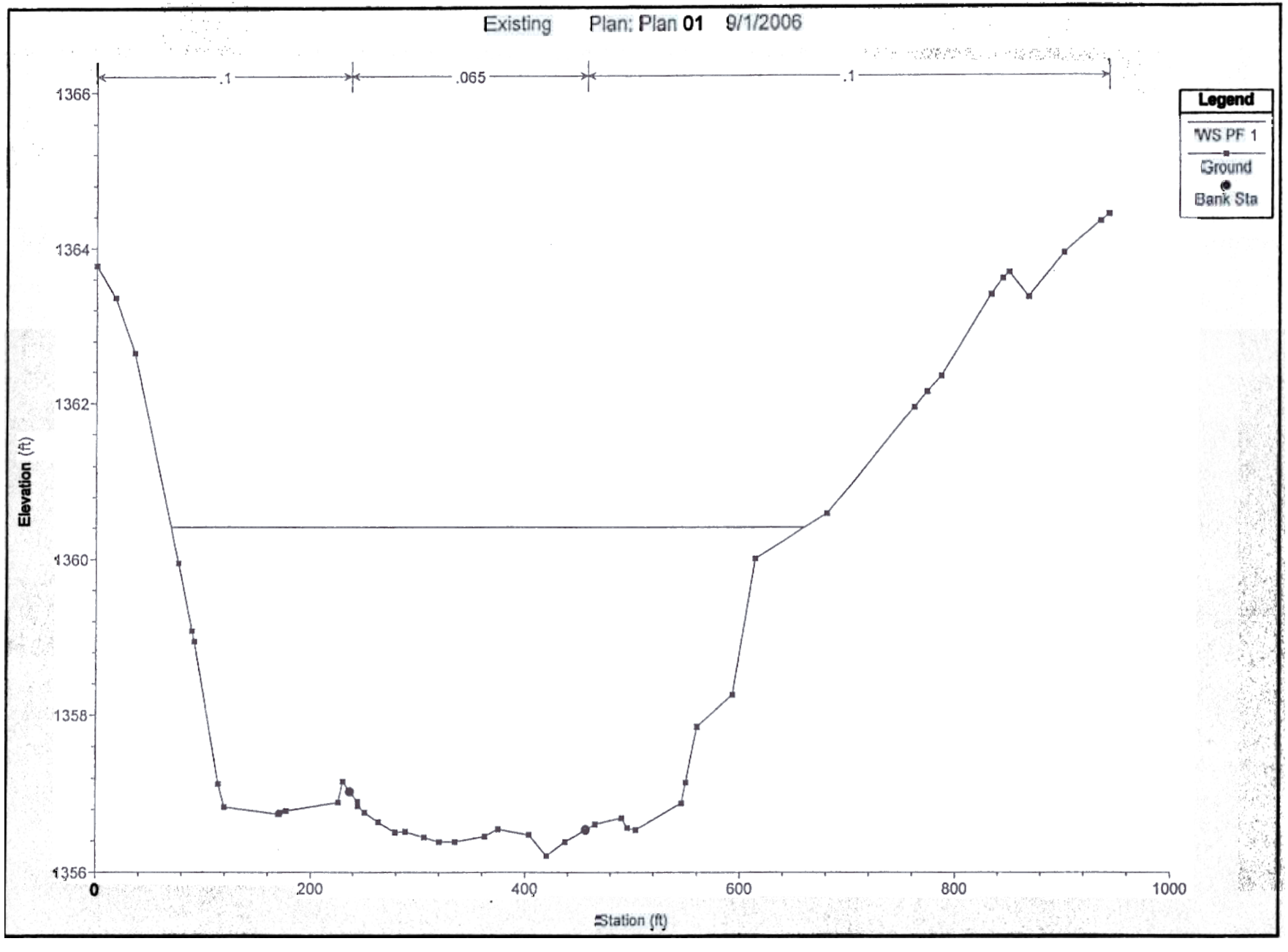
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Bank Sta

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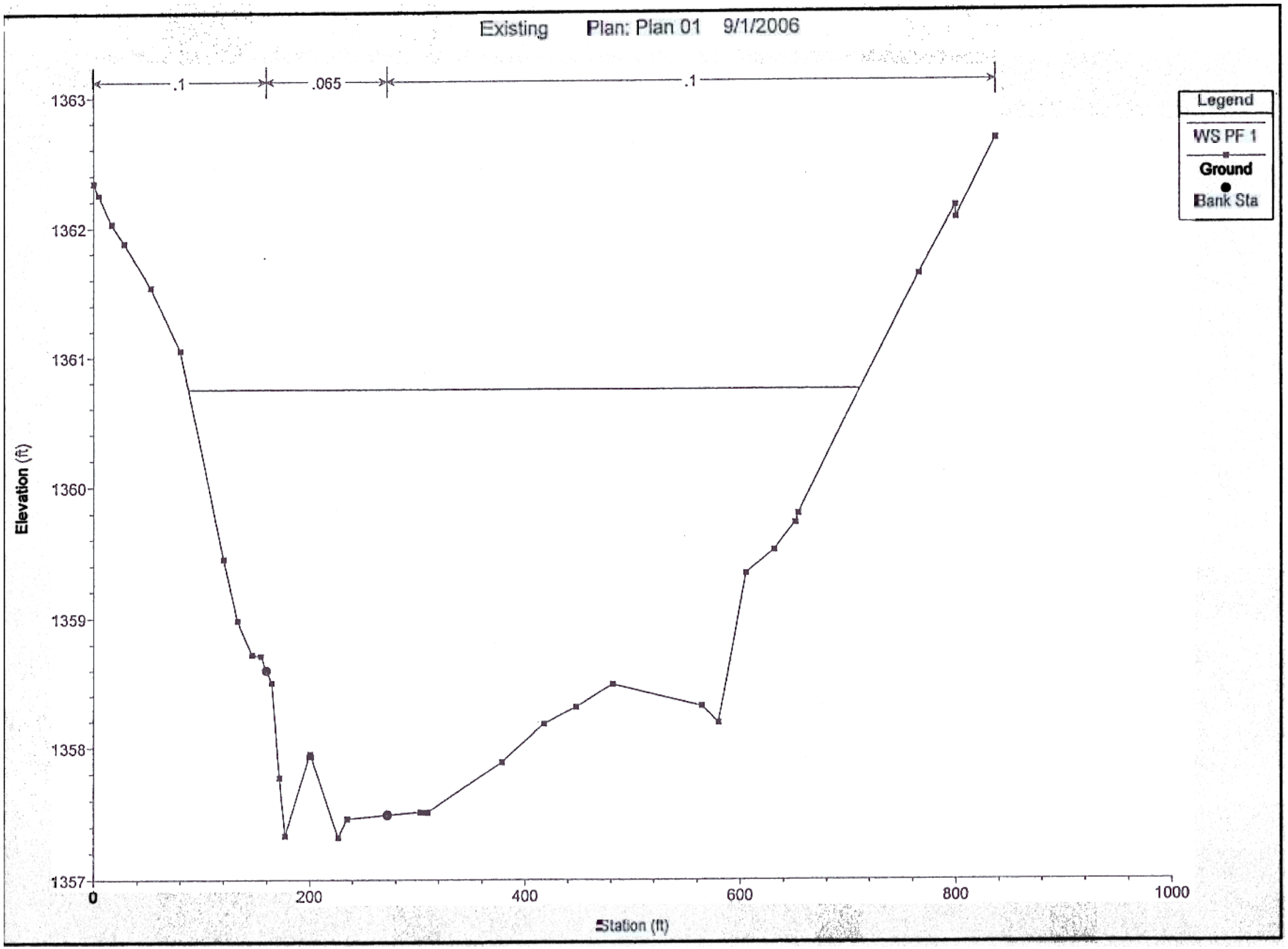
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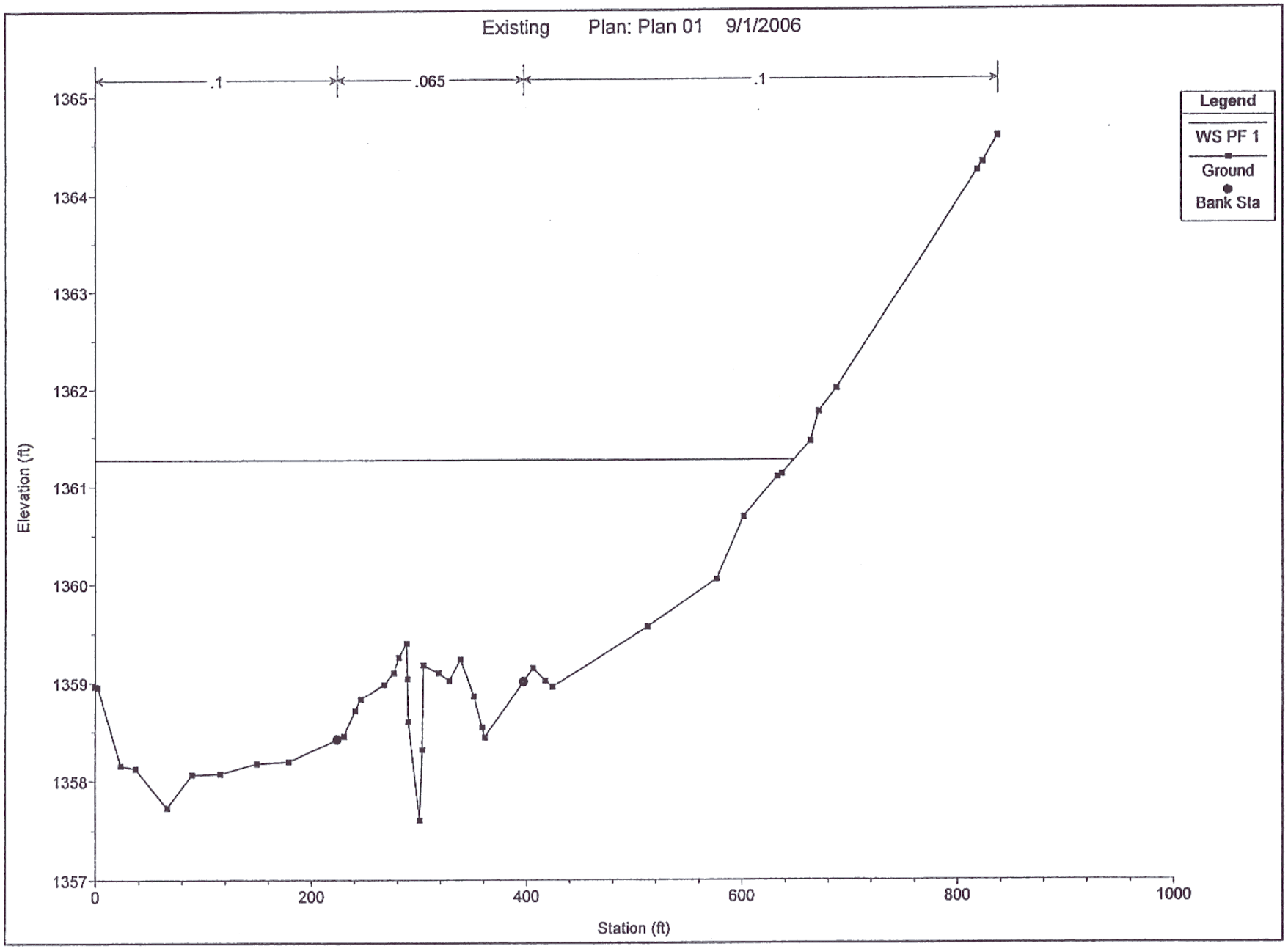
Station (ft)

Sta. 2200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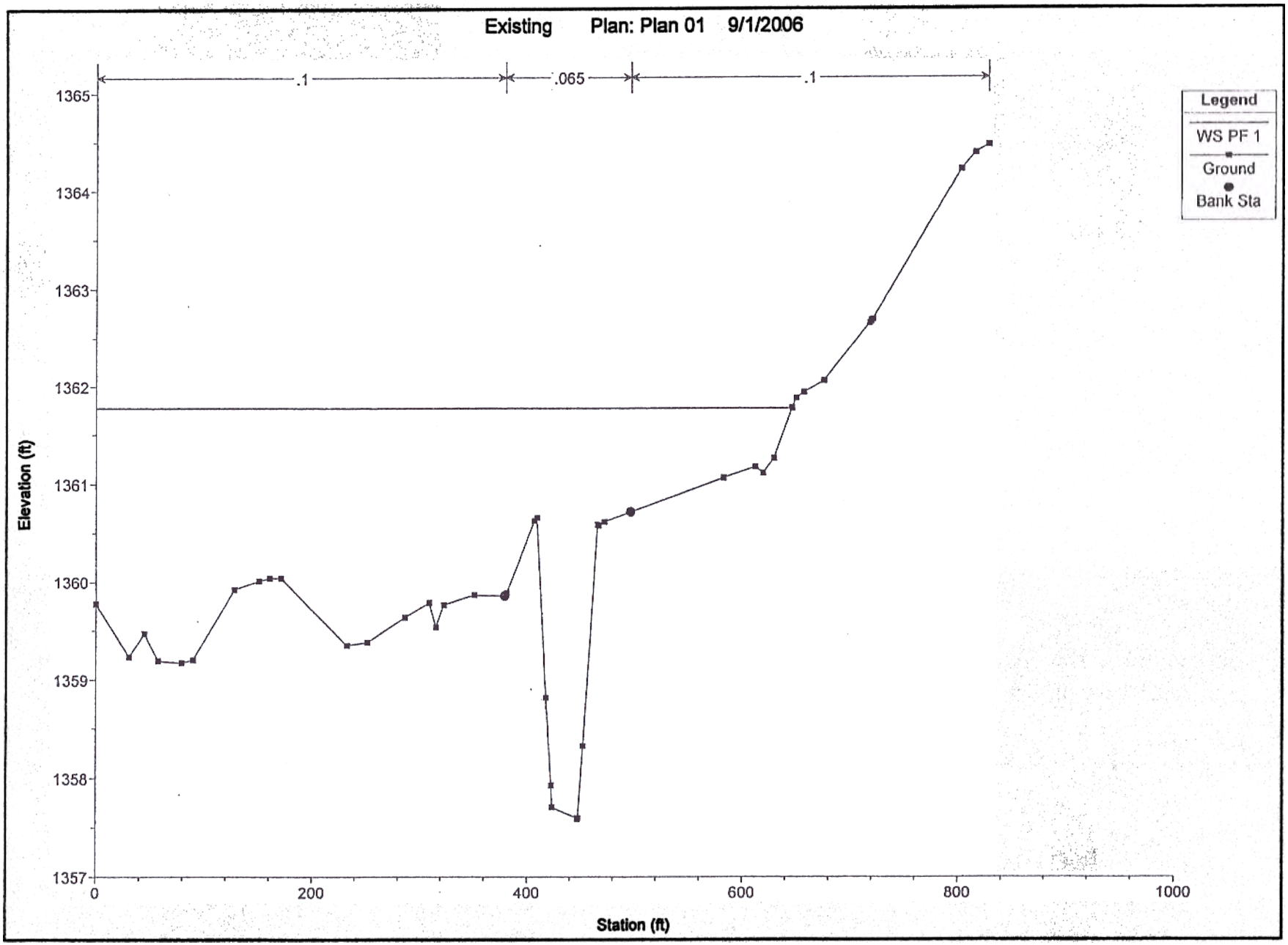
Sta. 2353.08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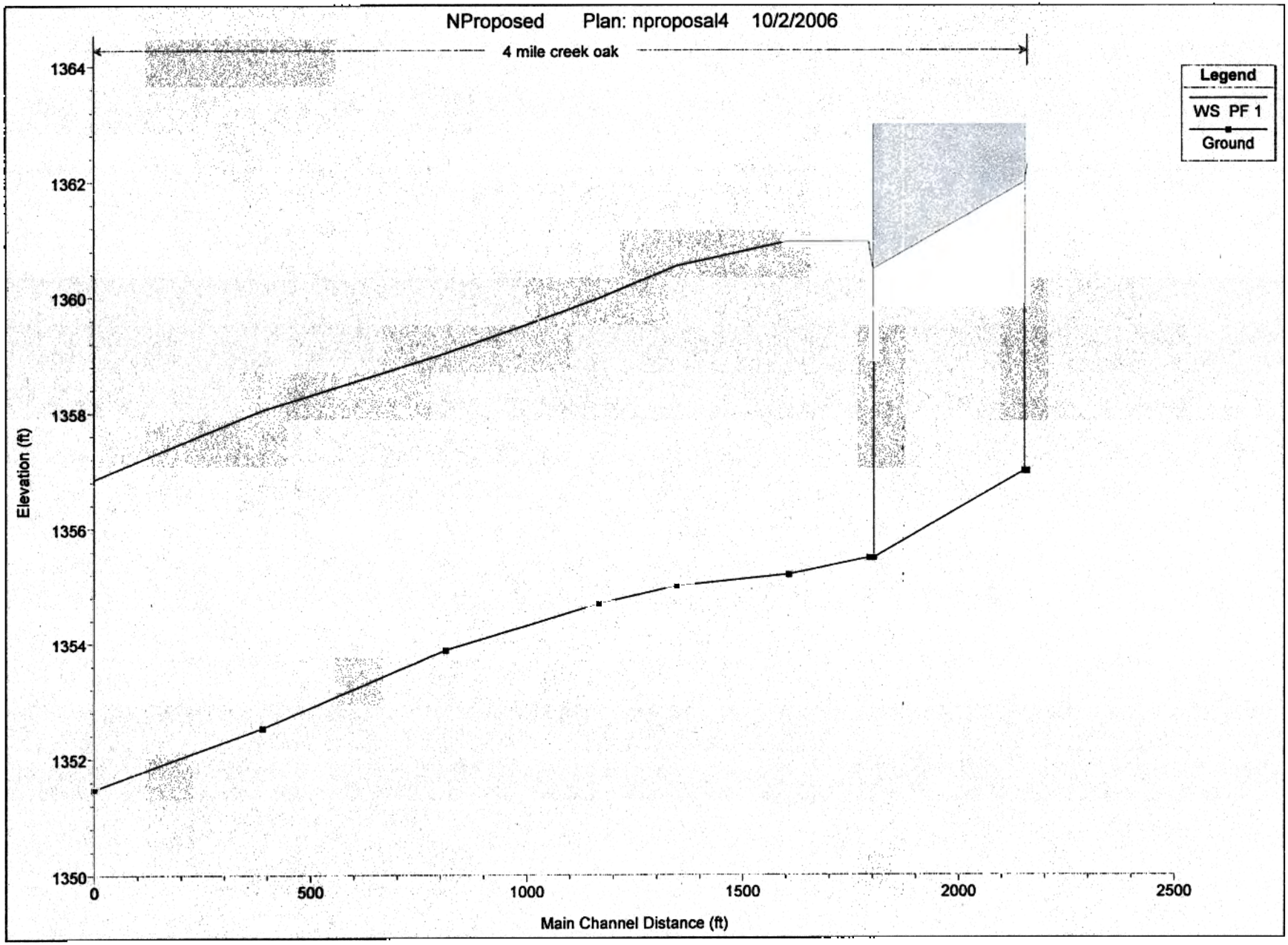
HEC-RAS Analysis Proposed Conditions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4 mile creek oak
Legend
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Ground
Elevation (ft)
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Main Channel Distance (ft)

HEC-RAS Plan: nproposal4 River: 4 mile creek Reach: oak Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
oak	2176.242	PF 1	1817.00	1357.00	1362.31	1360.38	1362.57	0.004331	4.58	585.10	200.00	0.35
oak	2170		Culvert									
oak	1810	PF 1	1817.00	1355.50	1360.98	1358.71	1361.52	0.006979	5.93	306.23	481.20	0.45
oak	1550.643	PF 1	1817.00	1355.20	1360.98	1356.83	1361.02	0.000873	1.89	1239.35	346.96	0.15
oak	1363.994	PF 1	1817.00	1355.00	1360.55	1358.54	1360.64	0.002834	2.85	855.18	260.00	0.26
oak	1184.825	PF 1	1817.00	1354.70	1359.99	1357.83	1360.08	0.003474	2.85	790.80	233.00	0.28
oak	828.5473	PF 1	1817.00	1353.88	1359.04	1357.03	1359.12	0.002150	2.33	865.55	341.07	0.23
oak	405.9100	PF 1	1817.00	1352.53	1358.05	1355.61	1358.17	0.002356	2.77	748.43	270.41	0.25
oak	16.37823	PF 1	2049.00	1351.48	1356.85	1355.37	1356.98	0.004001	3.52	887.80	345.75	0.32

Plan: nproposal4 4 mile creek oak RS: 2176.242 Profile: PF 1

E.G. Elev (ft)	1362.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.	0.100	0.065	0.100
W.S. Elev (ft)	1362.31	Reach Len. (ft)	356.00	366.24	376.00
Crit W.S. (ft)	1360.38	Flow Area (sq ft)	170.99	305.41	108.70
E.G. Slope (ft/ft)	0.004331	Area (sq ft)	170.99	305.41	108.70
Q Total (cfs)	1817.00	Flow (cfs)	280.15	1398.71	138.13
Top Width (ft)	200.00	Top Width (ft)	74.04	57.50	68.46
Vel Total (ft/s)	3.11	Avg. Vel. (ft/s)	1.64	4.58	1.27
Max Chl Dpth (ft)	5.31	Hydr. Depth (ft)	2.31	5.31	1.59
Conv. Total (cfs)	27610.5	Conv. (cfs)	4257.1	21254.4	2099.1
Length Wtd. (ft)	366.24	Wetted Per. (ft)	78.84	57.50	73.37
Min Ch El (ft)	1357.00	Shear (lb/sq ft)	0.59	1.44	0.40
Alpha	1.73	Stream Power (lb/ft s)	0.96	6.58	0.51
Frctn Loss (ft)		Cum Volume (acre-ft)	19.80	22.89	3.32
C & E Loss (ft)		Cum SA (acres)	6.76	5.97	2.65

Plan: nproposal4 4 mile creek oak RS: 1810 Profile: PF 1

E.G. Elev (ft)	1361.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.		0.065	
W.S. Elev (ft)	1360.98	Reach Len. (ft)	185.00	186.65	187.00
Crit W.S. (ft)	1358.71	Flow Area (sq ft)		306.23	
E.G. Slope (ft/ft)	0.006979	Area (sq ft)	916.12	306.23	54.71
Q Total (cfs)	1817.00	Flow (cfs)		1817.00	
Top Width (ft)	481.20	Top Width (ft)	322.34	55.92	102.94
Vel Total (ft/s)	5.93	Avg. Vel. (ft/s)		5.93	
Max Chl Dpth (ft)	5.48	Hydr. Depth (ft)		5.48	
Conv. Total (cfs)	21749.4	Conv. (cfs)		21749.4	
Length Wtd. (ft)	186.23	Wetted Per. (ft)		55.92	
Min Ch El (ft)	1355.50	Shear (lb/sq ft)		2.39	
Alpha	1.00	Stream Power (lb/ft s)		14.16	
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	15.36	20.32	2.62
C & E Loss (ft)	0.15	Cum SA (acres)	5.14	5.50	1.91

Plan: nproposal4 mile creek oak RS: 1550.643 Profile: PF 1

E.G. Elev (ft)	1361.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.100	0.065	0.100
W.S. Elev (ft)	1360.98	Reach Len. (ft)	255.00	259.36	264.00
Crit W.S. (ft)	1356.83	Flow Area (sq ft)	729.61	464.62	45.12

Plan: nproposal4 4 mile creek oak RS: 1550.643 Profile: PF 1 (Continued)

E.G. Slope (ft/ft)	0.000873	Area (sq ft)	729.61	464.62	45.12
Q Total (cfs)	1817.00	Flow (cfs)	928.01	877.57	11.42
Top Width (ft)	346.96	Top Width (ft)	145.02	99.00	102.94
Vel Total (ft/s)	1.47	Avg. Vel. (ft/s)	1.27	1.89	0.25
Max Chl Dpth (ft)	5.78	Hydr. Depth (ft)	5.03	4.69	0.44
Conv. Total (cfs)	61493.8	Conv. (cfs)	31407.3	29700.1	386.4
Length Wtd. (ft)	258.07	Wetted Per. (ft)	147.97	99.37	103.10
Min Ch El (ft)	1355.20	Shear (lb/sq ft)	0.27	0.25	0.02
Alpha	1.19	Stream Power (lb/ft s)	0.34	0.48	0.01
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)	11.86	18.67	2.40
C & E Loss (ft)	0.00	Cum SA (acres)	4.15	5.16	1.47

Plan: nproposal4 4 mile creek oak RS: 1363.994 Profile: PF 1

E.G. Elev (ft)	1360.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.	0.100	0.065	0.100
W.S. Elev (ft)	1360.55	Reach Len. (ft)	179.00	179.17	179.00
Crit W.S. (ft)	1358.54	Flow Area (sq ft)	312.97	336.58	205.63
E.G. Slope (ft/ft)	0.002834	Area (sq ft)	312.97	336.58	205.63
Q Total (cfs)	1817.00	Flow (cfs)	519.33	960.41	337.27
Top Width (ft)	260.00	Top Width (ft)	101.05	92.76	66.19
Vel Total (ft/s)	2.12	Avg. Vel. (ft/s)	1.66	2.85	1.64
Max Chl Dpth (ft)	5.55	Hydr. Depth (ft)	3.10	3.63	3.11
Conv. Total (cfs)	34134.1	Conv. (cfs)	9756.0	18042.1	6335.9
Length Wtd. (ft)	179.08	Wetted Per. (ft)	103.00	93.74	68.86
Min Ch El (ft)	1355.00	Shear (lb/sq ft)	0.54	0.64	0.53
Alpha	1.24	Stream Power (lb/ft s)	0.89	1.81	0.87
Frctn Loss (ft)	0.56	Cum Volume (acre-ft)	8.81	16.29	1.64
C & E Loss (ft)	0.00	Cum SA (acres)	3.43	4.59	0.95

Plan: nproposal4 4 mile creek oak RS: 1184.825 Profile: PF

E.G. Elev (ft)	1360.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.	0.100	0.065	
W.S. Elev (ft)	1359.99	Reach Len. (ft)	350.00	356.28	362.00
Crit W.S. (ft)	1357.83	Flow Area (sq ft)	510.91	279.89	
E.G. Slope (ft/ft)	0.003474	Area (sq ft)	510.91	279.89	
Q Total (cfs)	1817.00	Flow (cfs)	1020.31	796.69	
Top Width (ft)	233.00	Top Width (ft)	146.26	86.74	
Vel Total (ft/s)	2.30	Avg. Vel. (ft/s)	2.00	2.85	

Plan: nproposal4 4 mile creek oak RS: 1184.825 Profile: PF 1 (Continued)

Max Chl Dpth (ft)	5.29	Hydr. Depth (ft)	3.49	3.23	
Conv. Total (cfs)	30828.5	Conv. (cfs)	17311.4	13517.2	
Length Wtd. (ft)	354.42	Wetted Per. (ft)	148.37	91.15	
Min Ch El (ft)	1354.70	Shear (lb/sq ft)	0.75	0.67	
Alpha	1.10	Stream Power (lb/ft s)	1.49	1.90	
Frctn Loss (ft)	0.95	Cum Volume (acre-ft)	7.12	15.02	22
C & E Loss (ft)	0.00	Cum SA (acres)	2.92	4.22	82

Plan: nproposal4 4 mile creek oak RS: 828.5473 Profile: PF 1

E.G. Elev (ft)	1359.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.100	0.065	0.100
W.S. Elev (ft)	1359.04	Reach Len. (ft)	380.00	422.64	460.00
Crit W.S. (ft)	1357.03	Flow Area (sq ft)	103.68	739.51	22.36
E.G. Slope (ft/ft)	0.002150	Area (sq ft)	293.40	739.58	22.36
Q Total (cfs)	1817.00	Flow (cfs)	71.84	1725.50	19.66
Top Width (ft)	341.07	Top Width (ft)	99.97	225.88	15.22
Vel Total (ft/s)	2.10	Avg. Vel. (ft/s)	0.69	2.33	0.88
Max Chl Dpth (ft)	5.16	Hydr. Depth (ft)	1.04	3.27	1.47
Conv. Total (cfs)	39188.2	Conv. (cfs)	1549.5	37214.7	424.0
Length Wtd. (ft)	422.16	Wetted Per. (ft)	102.79	226.42	15.50
Min Ch El (ft)	1353.88	Shear (lb/sq ft)	0.14	0.44	0.19
Alpha	1.18	Stream Power (lb/ft s)	0.09	1.02	0.17
Frctn Loss (ft)	0.95	Cum Volume (acre-ft)	3.88	10.85	1.13
C & E Loss (ft)	0.00	Cum SA (acres)	1.93	2.94	0.75

Plan: nproposal4 nile creek oak RS: 405.9100 Profile: PF 1

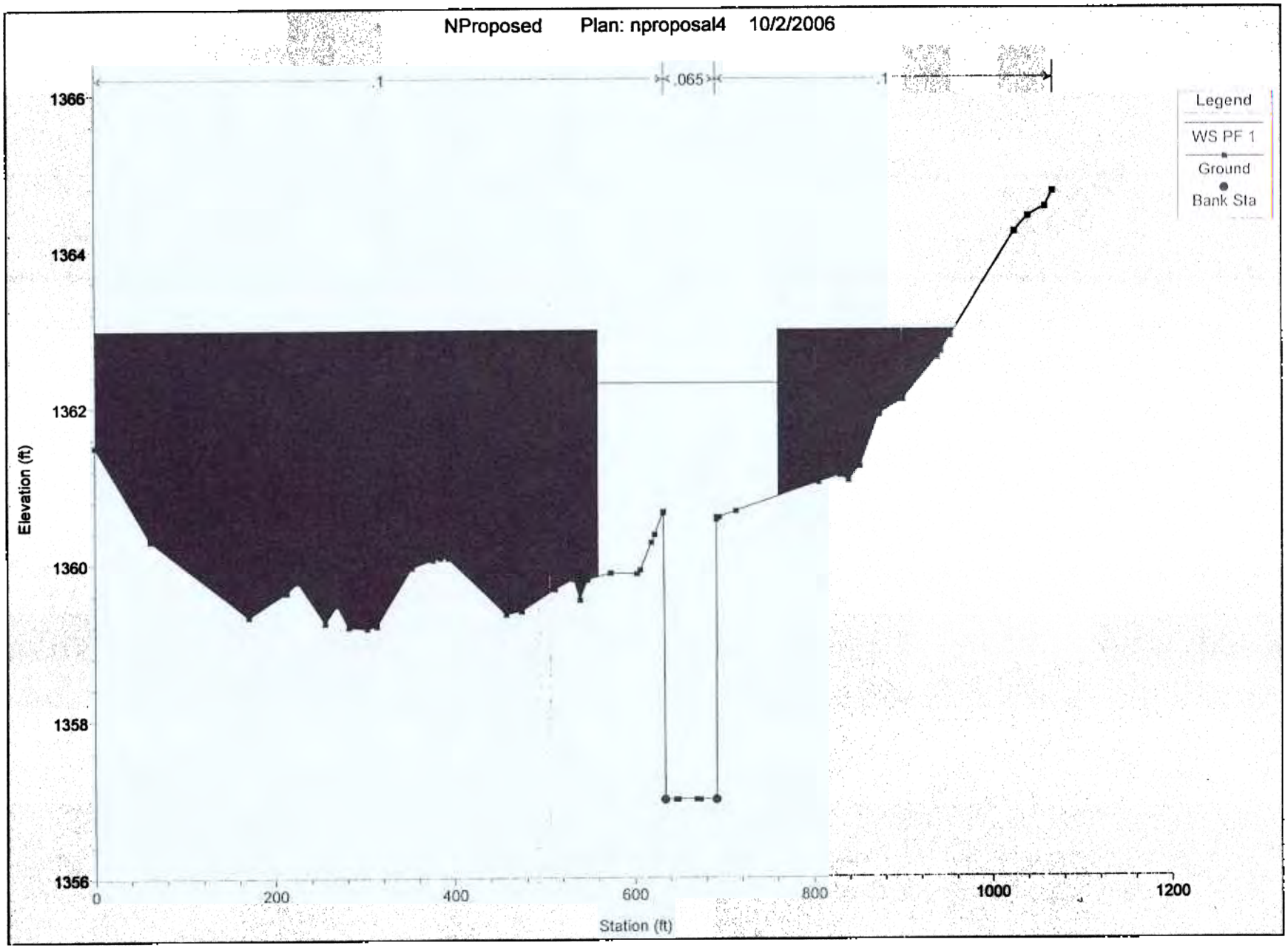
E.G. Elev (ft)	1358.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.100	0.065	0.100
W.S. Elev (ft)	1358.05	Reach Len. (ft)	375.00	389.53	403.00
Crit W.S. (ft)	1355.61	Flow Area (sq ft)	61.91	618.73	67.79
E.G. Slope (ft/ft)	0.002356	Area (sq ft)	61.91	618.73	67.79
Q Total (cfs)	1817.00	Flow (cfs)	41.81	1711.79	63.40
Top Width (ft)	270.41	Top Width (ft)	68.06	156.56	45.79
Vel Total (ft/s)	2.43	Avg. Vel. (ft/s)	0.68	2.77	0.94
Max Chl Dpth (ft)	5.52	Hydr. Depth (ft)	0.91	3.95	1.48
Conv. Total (cfs)	37436.3	Conv. (cfs)	861.4	35268.6	1306.2
Length Wtd. (ft)	386.98	Wetted Per. (ft)	68.33	157.14	45.90
Min Ch El (ft)	1352.53	Shear (lb/sq ft)	0.13	0.58	0.22

Plan: nproposal4 4 mile creek oak RS: 405.9100 Profile: PF 1 (Continued)

Alpha	1.23	Stream Power (lb/ft s)	0.09	1.60	0.20
Frctn Loss (ft)	1.19	Cum Volume (acre-ft)	2.33	4.26	0.65
C & E Loss (ft)	0.00	Cum SA (acres)	1.20	1.09	0.43

Plan: nproposal4 4 mile creek oak RS: 16.37823 Profile: PF 1

E.G. Elev (ft)	1356.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.	0.100	0.065	0.100
W.S. Elev (ft)	1356.85	Reach Len. (ft)			
Crit W.S. (ft)	1355.37	Flow Area (sq ft)	480.55	334.10	73.16
E.G. Slope (ft/ft)	0.004001	Area (sq ft)	480.55	334.10	73.16
Q Total (cfs)	2049.00	Flow (cfs)	780.88	1176.50	91.62
Top Width (ft)	345.75	Top Width (ft)	211.17	87.10	47.48
Vel Total (ft/s)	2.31	Avg. Vel. (ft/s)	1.62	3.52	1.25
Max Chl Dpth (ft)	5.37	Hydr. Depth (ft)	2.28	3.84	1.54
Conv. Total (cfs)	32393.9	Conv. (cfs)	12345.5	18600.0	1448.5
Length Wtd. (ft)		Wetted Per. (ft)	211.38	87.91	47.57
Min Ch El (ft)	1351.48	Shear (lb/sq ft)	0.57	0.95	0.38
Alpha	1.54	Stream Power (lb/ft s)	0.92	3.34	0.48
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			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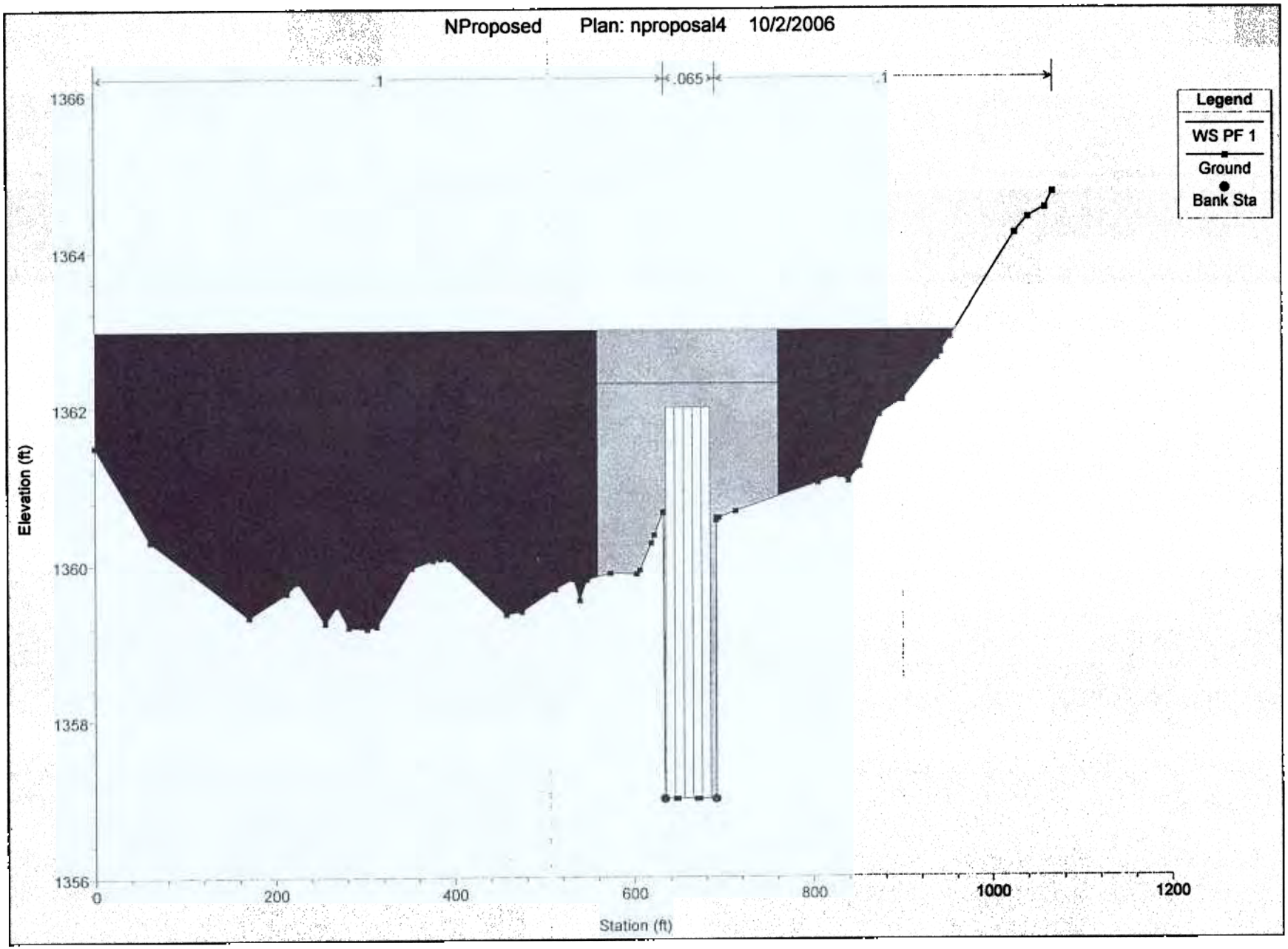
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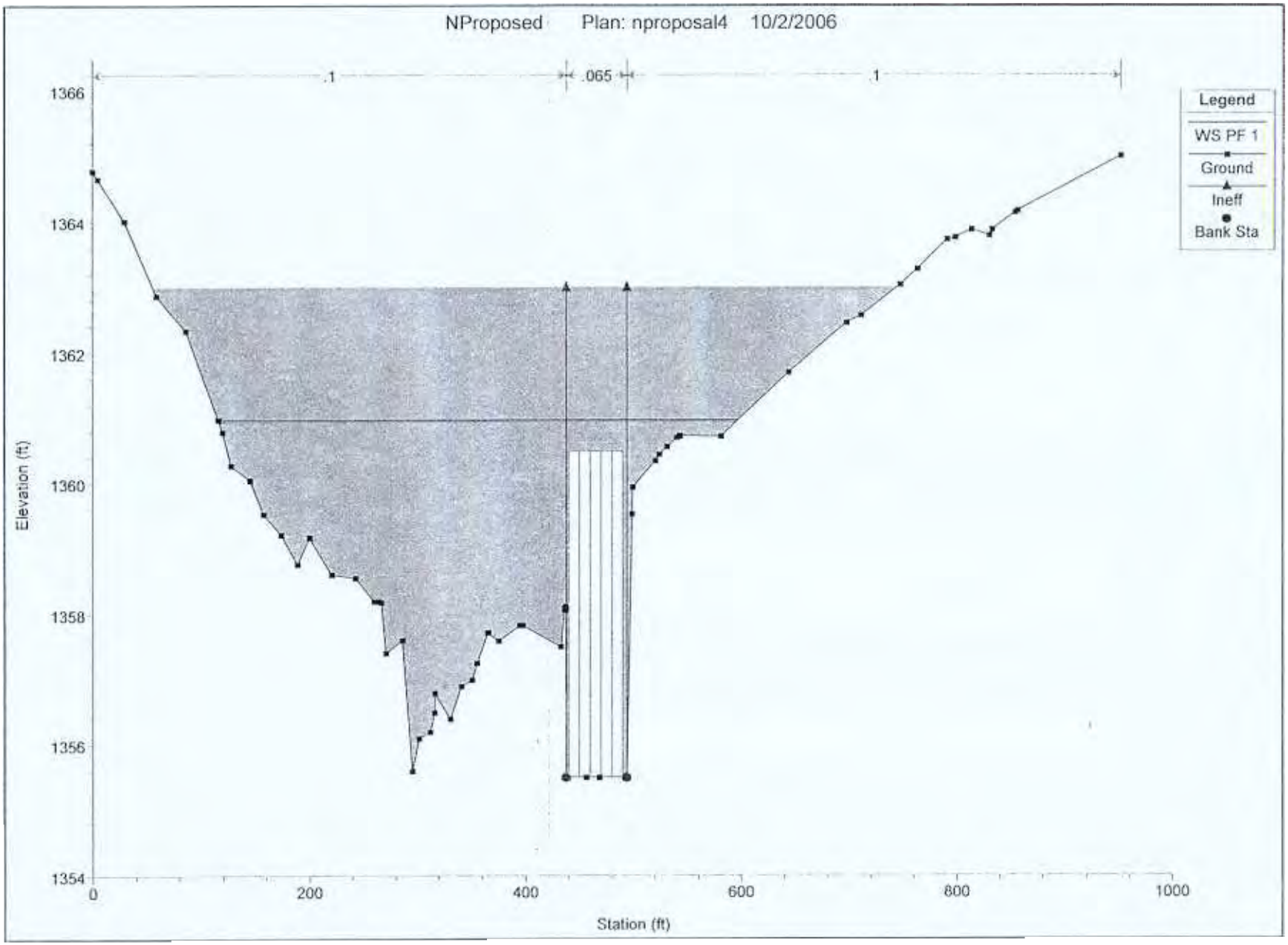
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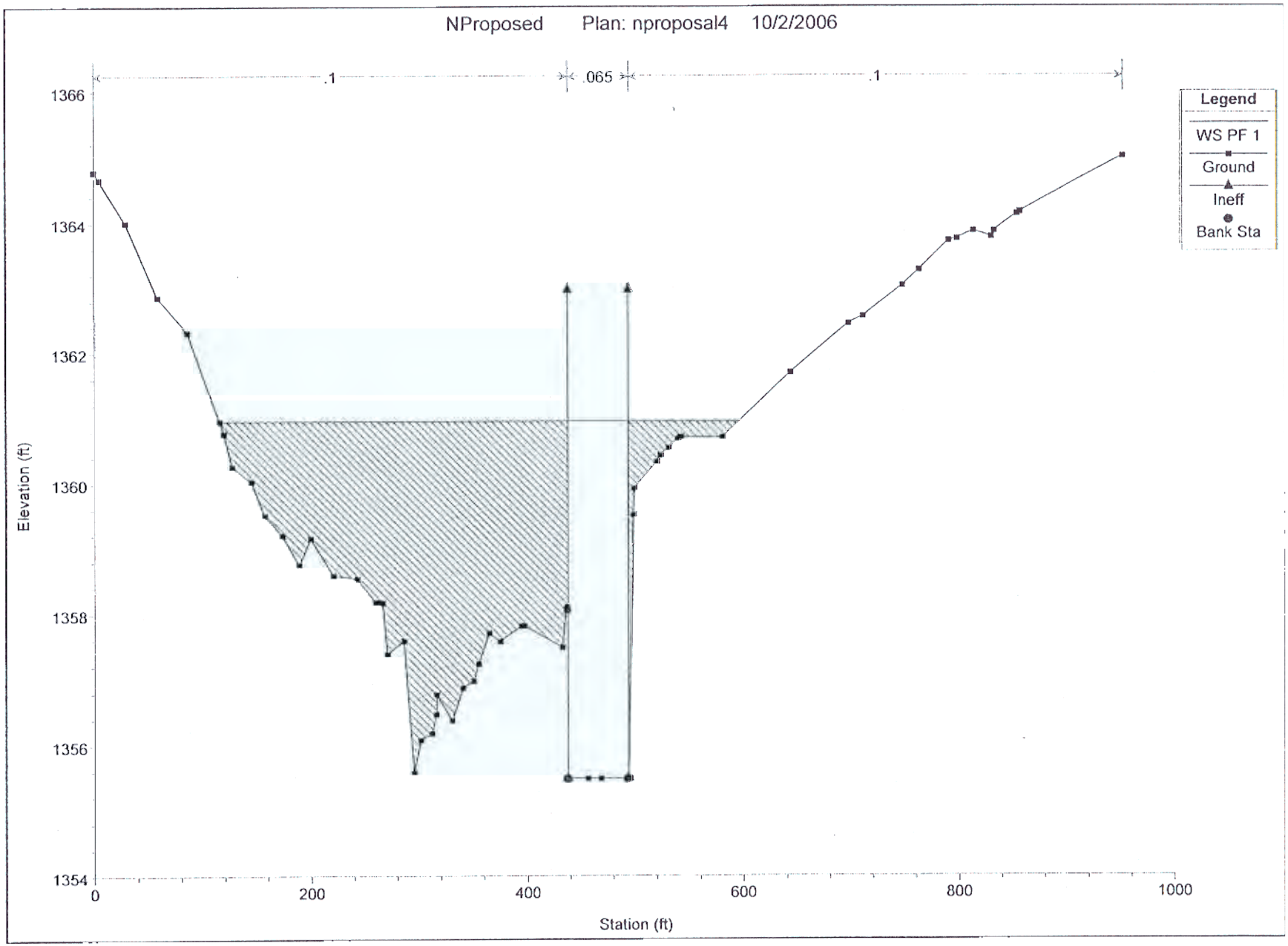
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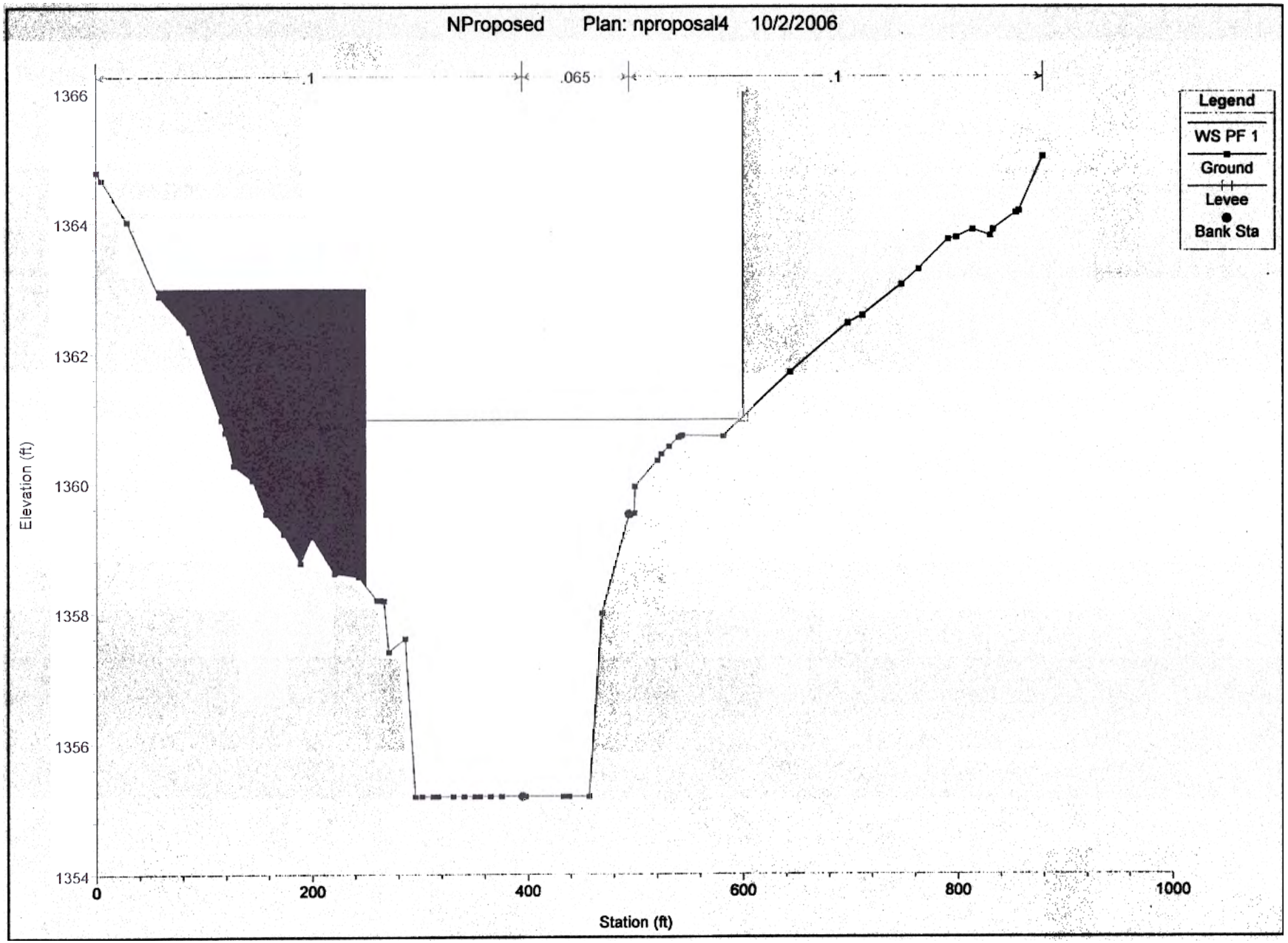
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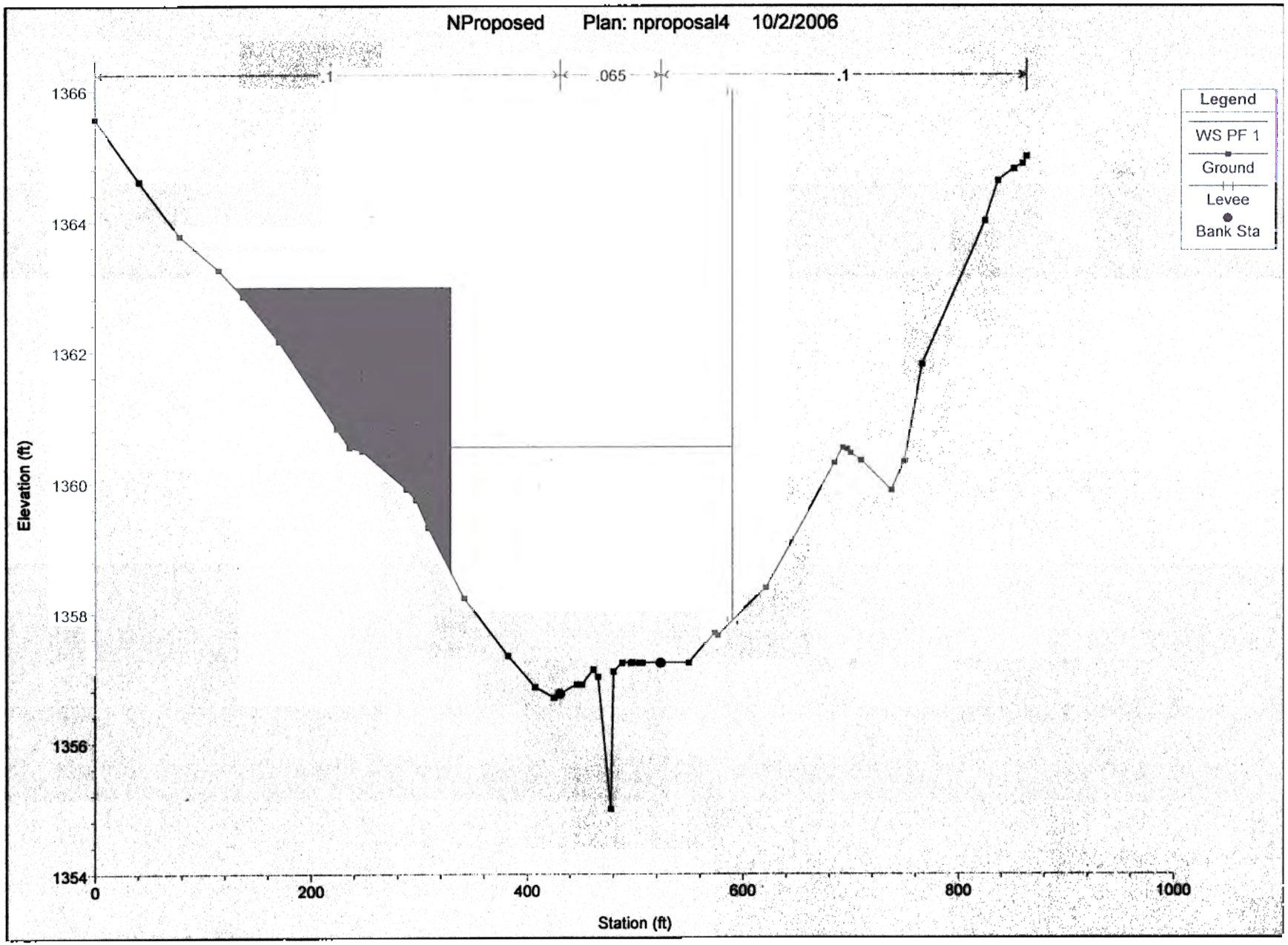
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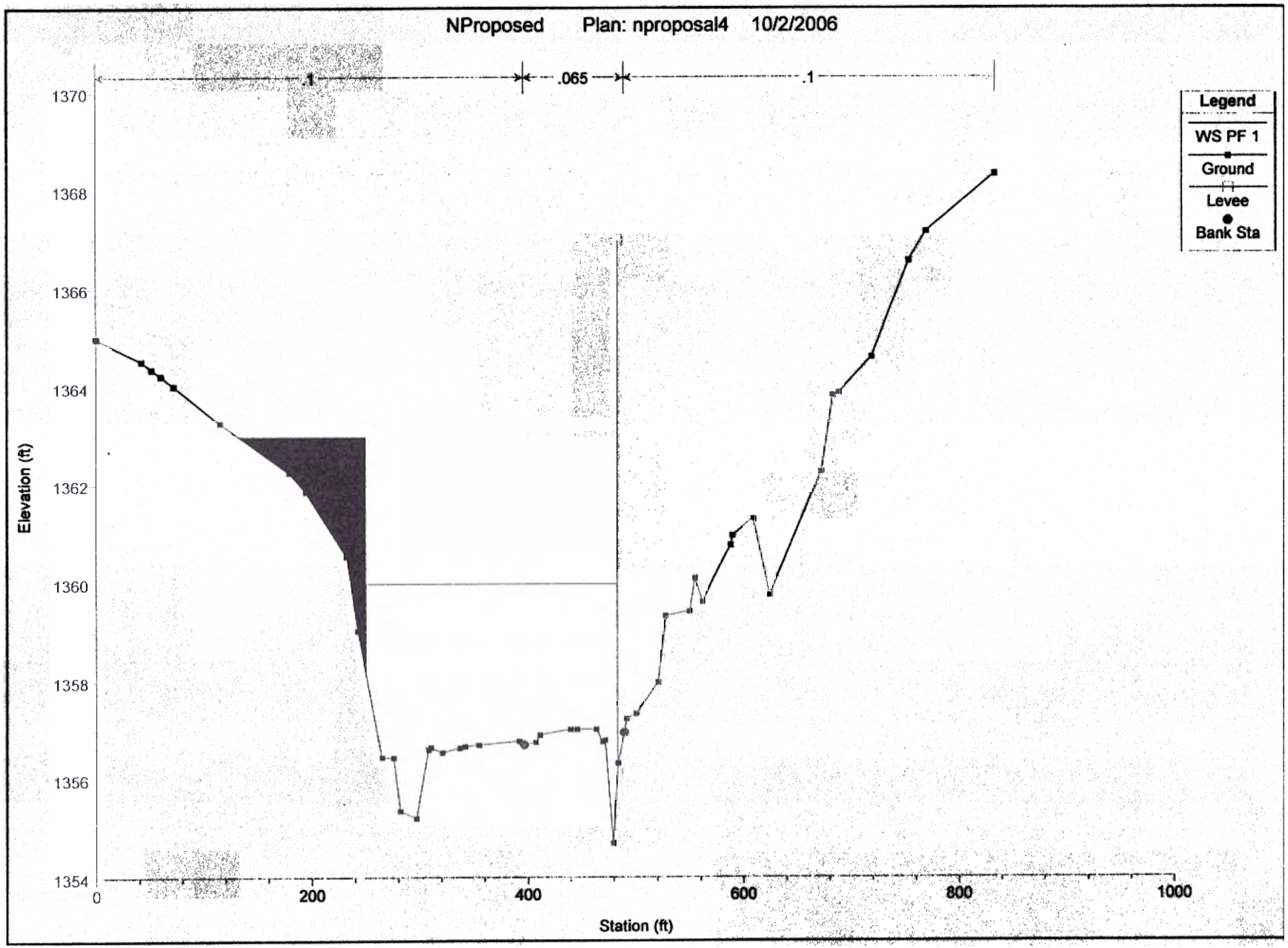
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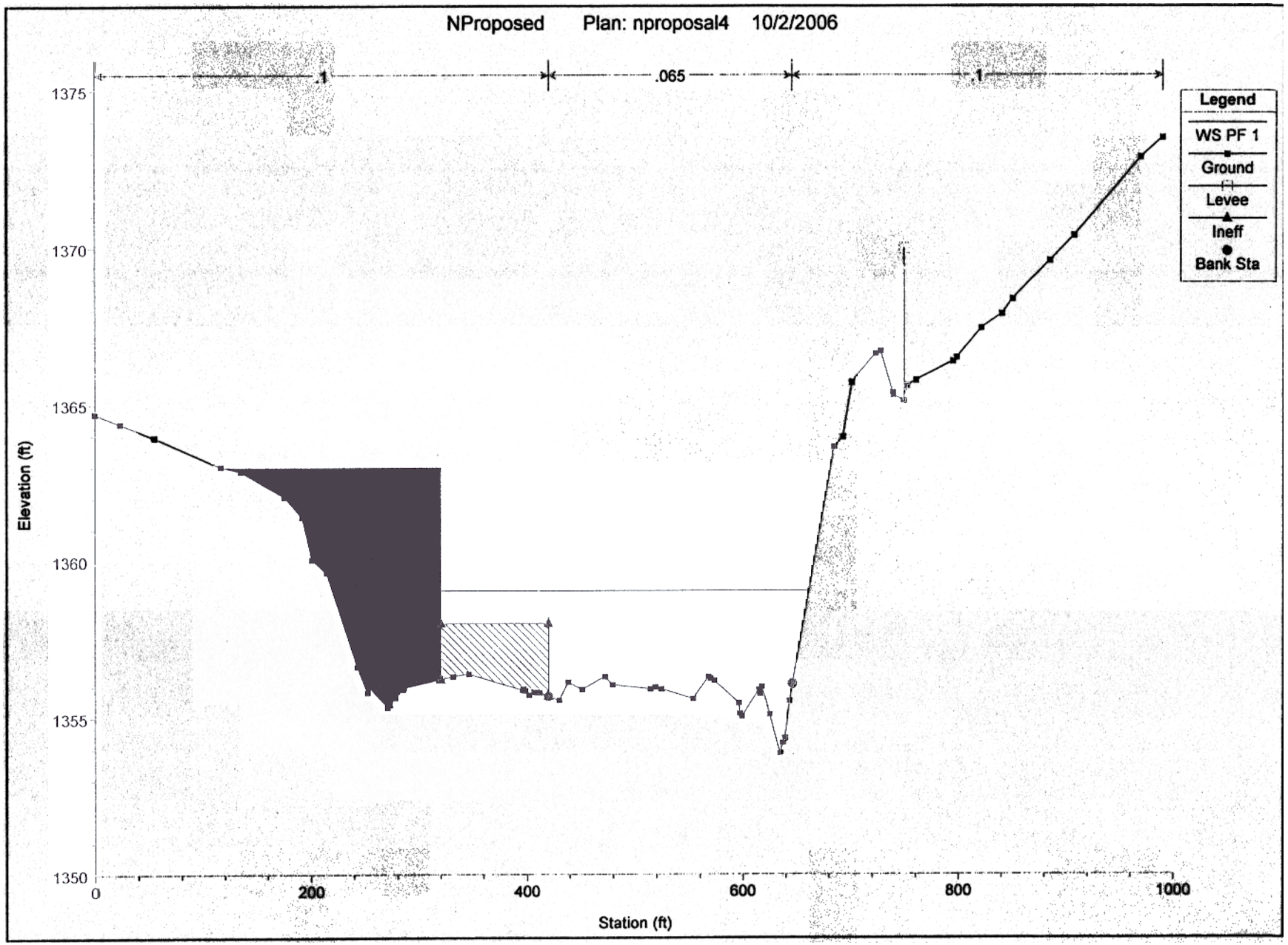
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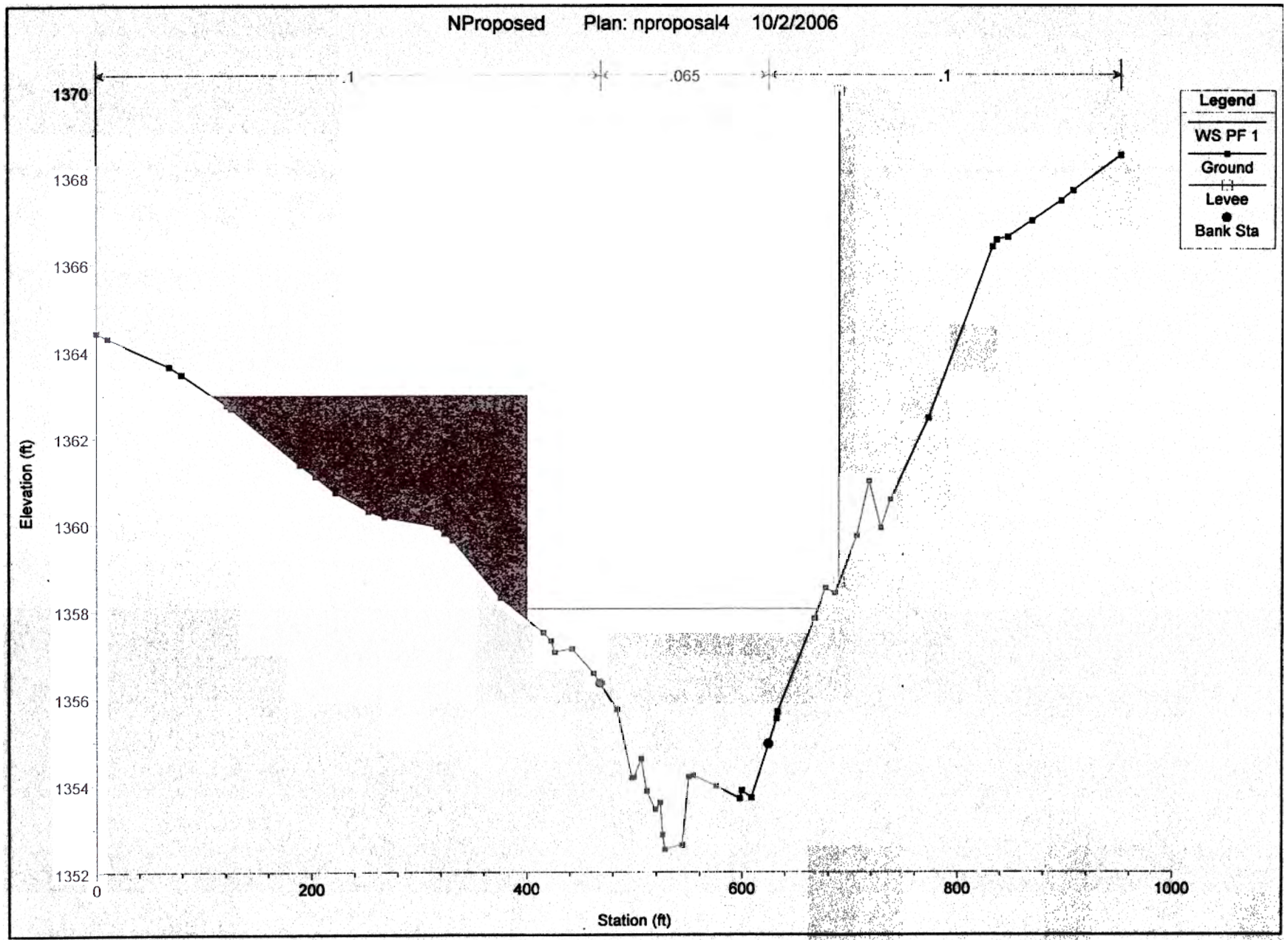
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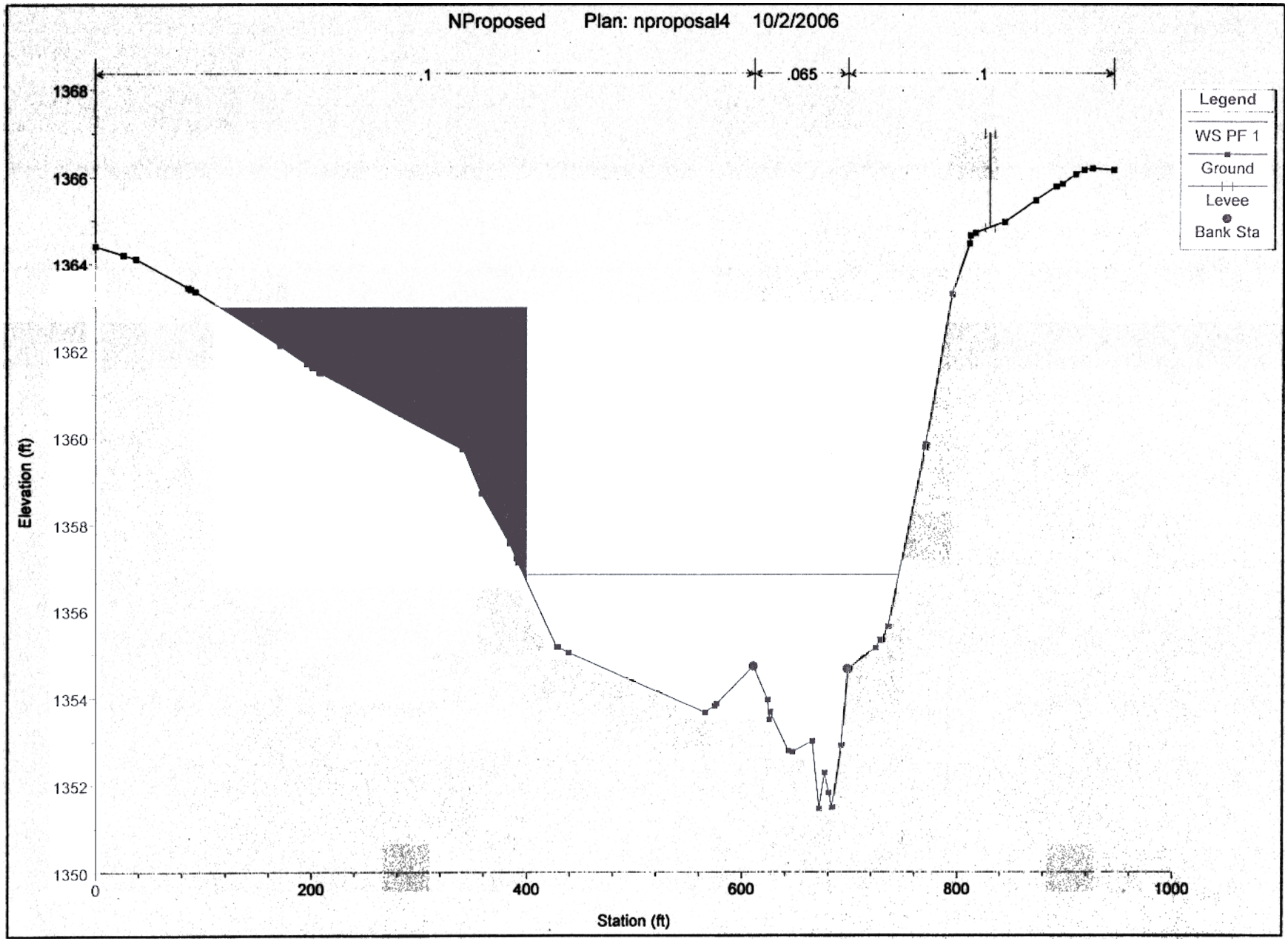
Legend
WS PF 1
Ground
Levee
Bank Sta
1370
1368
1366
1364
1362
1360
1358
1356
1354
1352
Elevation (ft)
0
200
400
600
800
1000
Station (ft)

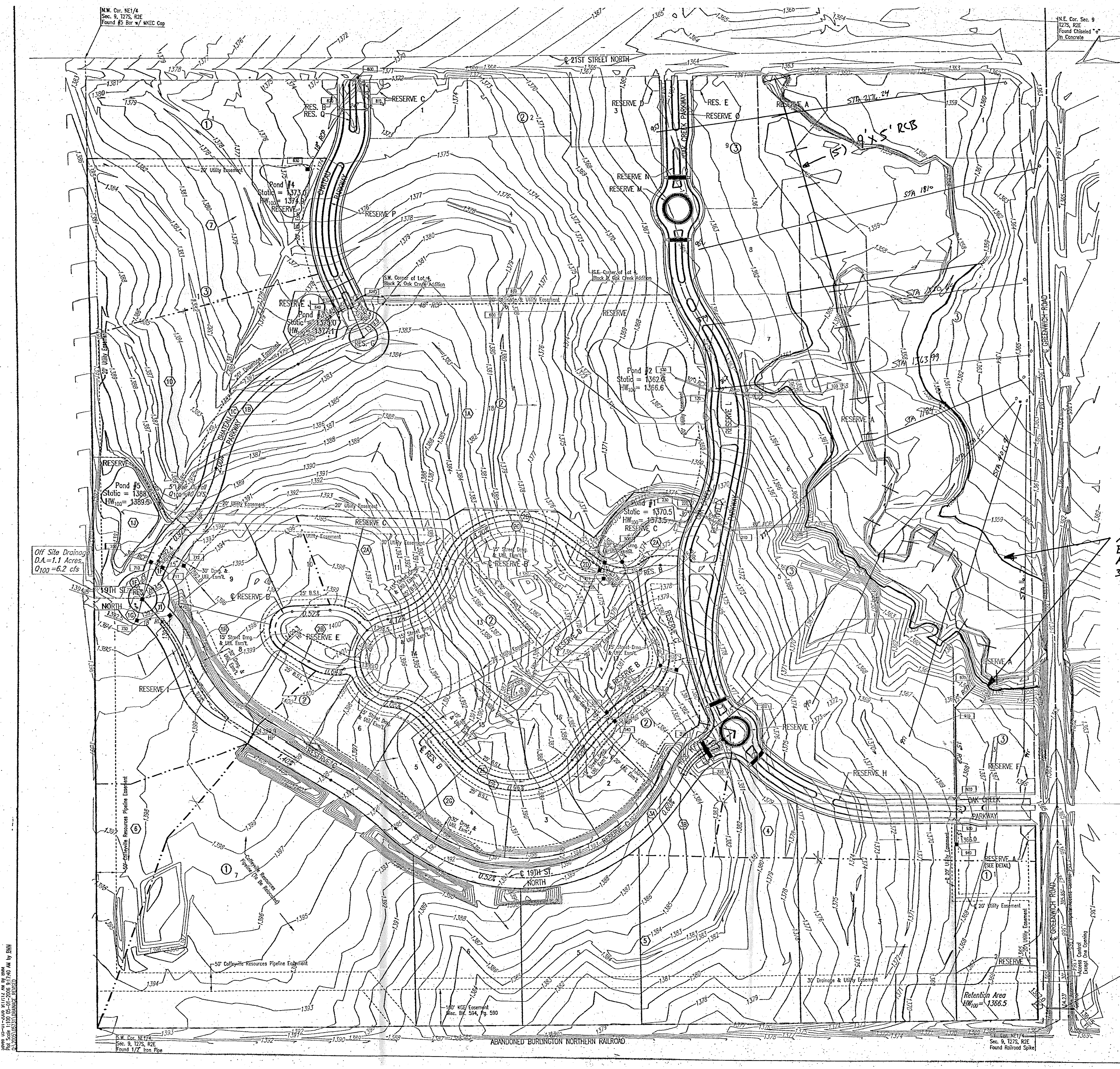

NProposed Plan: nproposal4 10/2/2006
.1
.065
.1
Legend
WS PF 1
Ground
Levee
Bank Sta
1368
1366
1364
1362
1360
1358
1356
1354
1352
1350
Elevation (ft)
0
200
400
600
800
1000
Station (ft)

OAK CREEK 2ND

AN ADDITION TO WICHITA, SEDGWICK COUNTY, KANSAS

DRAINAGE PLAN

REVISED 4-28-2006



BENCHMARKS:

BM #205 (Datum)
COW brass disc in NW corner of railroad signal base, W side of Greenwich Road, 1/2 mile S of 21st Street North.
Elev. = 1370.59 N.G.V.D.
183.19 City Datum

BM #206
"T" Post 5' W of N gate post to field entrance, W side of Greenwich Road, 700' ± N of railroad tracks and 500' ± S of RCB culvert.
Elev. = 1365.87 N.G.V.D.
178.47 City Datum

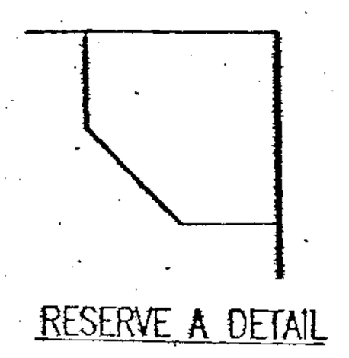
BM #207
Chiseled "a" on top of concrete headwall on NW corner of RCB under Greenwich Road, 1100' ± S of 21st Street North.
Elev. = 1360.065 N.G.V.D.
172.665 City Datum

BM #208
Railroad spike in W face of 20" Elm on E right of way line of Greenwich Road 800' ± S of 21st Street North.
Elev. = 1367.70 N.G.V.D.
180.30 City Datum

BM #209
Chiseled "a" on NW corner of traffic signal base, at SW corner of Greenwich Road & 21st Street North
Elev. = 1363.54 N.G.V.D.
176.14 City Datum

BM #215
Chiseled "+" in top center curb inlet 600' W of Greenwich Road on S side of 21st Street North.
Elev. = 1363.265 N.G.V.D.
175.865 City Datum

BM #216
Chiseled "a" on S end of curb & gutter at ℄ of Median, Target entrance on N side of 21st Street North 1400' ± W of Greenwich Road.
Elev. = 1364.55 N.G.V.D.
177.15 City Datum



RESERVE A DETAIL

SCALE: 1" = 100'

LEGEND

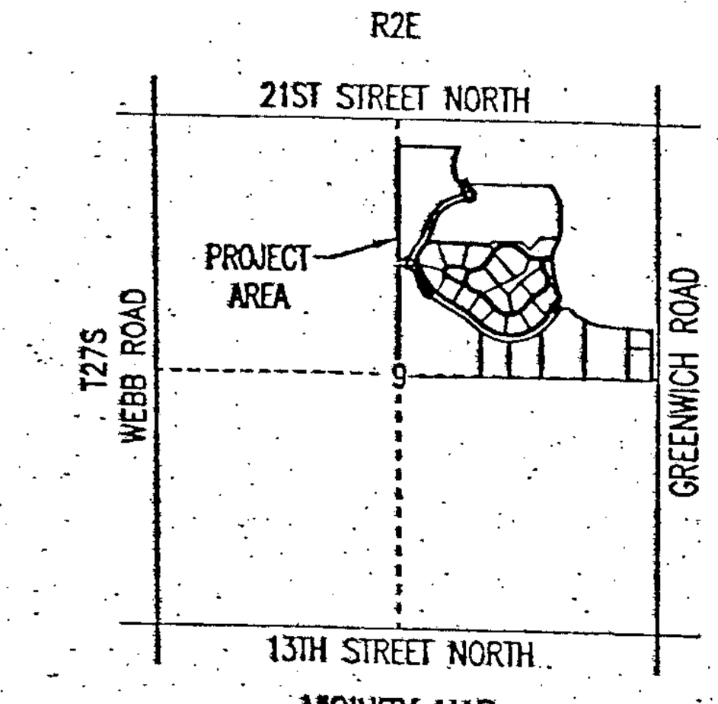
- (3A) BASIN IDENTIFIER
- MINOR BASIN BOUNDARY
- MAJOR BASIN BOUNDARY
- EMERGENCY STORM WATER FLOW
- STORM WATER FLOW
- [300] NODE IDENTIFIER
- STORM SEWER AND INLET
- STORM SEWER AND MANHOLE

SEE SUPPORTING CALCULATIONS FOR HYDROLOGY

MINIMUM PADS	
BLOCK 1:	
LOTS 1–3	1369.5
BLOCK 2:	
LOT 1	1383.2
LOT 9	1394.6
LOTS 12 & 17	1380.5
LOT 18	1369.6
BLOCK 3:	
LOT 1	1380.1

PROPOSED HEC-RAS MODEL STATIONING & FLOODPLAIN LIMITS

ATTACHMENT #8

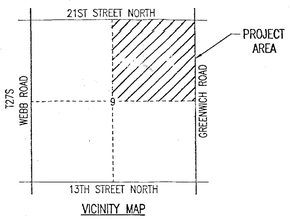


VICINITY MAP

Plan Map

OAK CREEK ADDITION

SCALE: 1" = 100'



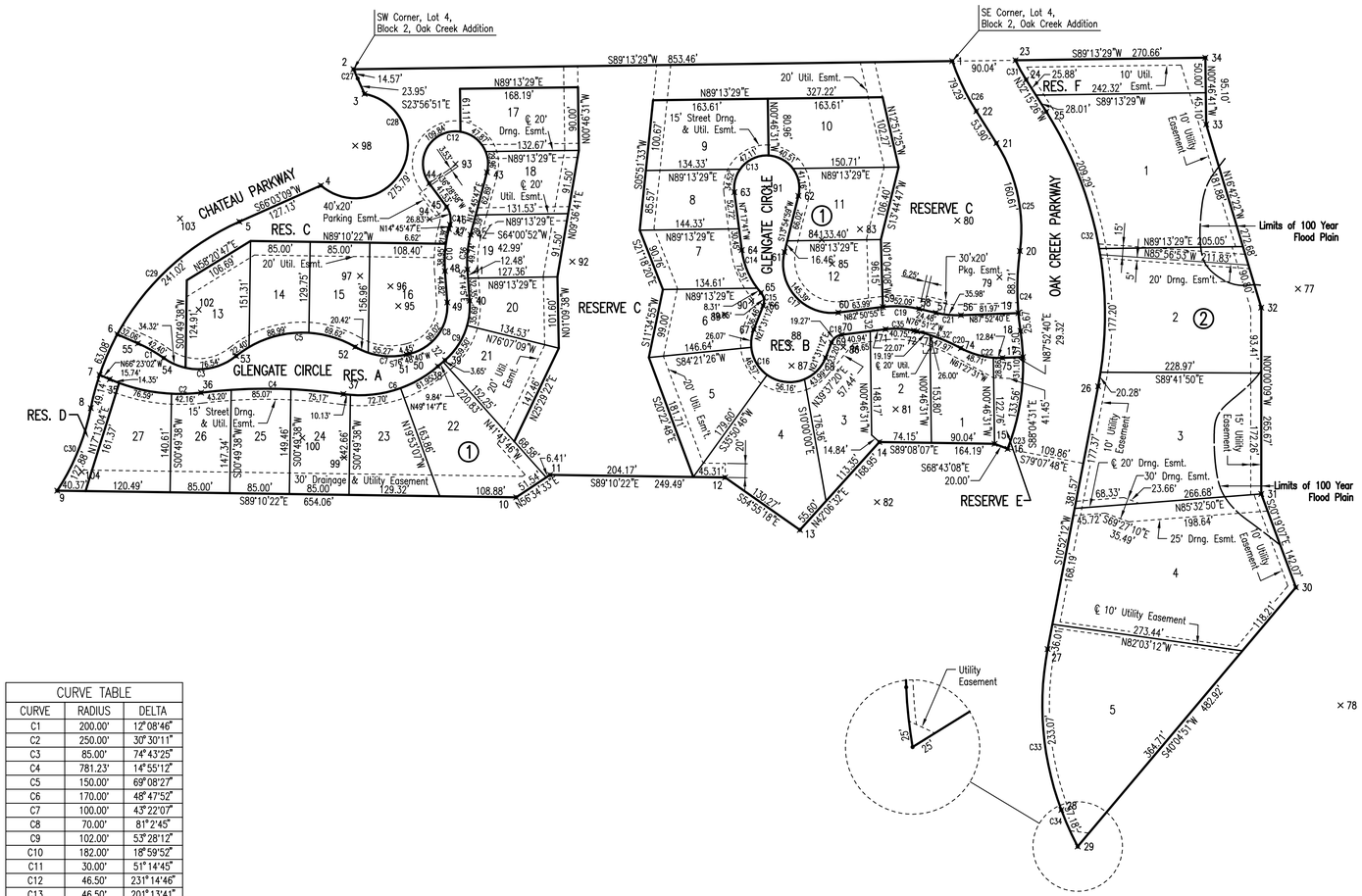
VICINITY MAP

ZONE A
AREA OF 100 YEAR FLOOD

ATTACHMENT #3

OAK CREEK 3RD

AN ADDITION TO WICHITA, SEDGWICK COUNTY, KANSAS



SCALE: 1" = 100'

• = 1/2" REBAR W/PEC CAP UNLESS OTHERWISE NOTED

COORDINATE LIST					
POINT	NORTH	EAST	POINT	NORTH	EAST
1	386619.116678	2373040.152258	53	386198.674611	2372019.449195
2	386607.569274	2372186.774853	54	386195.794914	2371916.325663
3	386572.395609	2372202.490916	55	386216.755173	2371879.562183
4	386441.781845	2372140.325125	56	386256.884237	2373052.447660
5	386390.178096	2372024.135473	57	386260.331406	2373016.736951
6	386229.600196	2371850.183471	58	386265.900350	2372992.899257
7	386171.876396	2371824.945348	59	386268.611257	2372941.157299
8	386124.417881	2371812.335308	60	386260.645356	2372877.667261
9	386006.651413	2371764.540414	61	386346.936102	2372801.007531
10	385997.209479	2372418.536104	62	386426.993360	2372820.843871
11	386029.131555	2372466.904021	63	386432.272664	2372729.585165
12	386025.529991	2372716.366366	64	386349.777547	2372740.145253
13	385950.666563	2372822.971379	65	386288.866352	2372767.480504
14	386076.007974	2372936.261592	66	386270.444052	2372770.649965
15	386073.530227	2373100.435979	67	386236.523304	2372757.274547
16	386066.271337	2373119.072352	68	386196.172236	2372859.606317
17	386197.118845	2373140.905278	69	386217.759106	2372868.118318
18	386234.430334	2373137.393217	70	386229.016211	2372882.622694
19	386259.919421	2373134.356669	71	386236.860193	2372945.141008
20	386348.421542	2373136.517208	72	386234.739415	2372985.619410
21	386502.200164	2373103.121146	73	386233.756830	2372989.825334
22	386547.779420	2373074.354833	74	386209.929952	2373052.400359
23	386620.334945	2373130.184778	75	386196.033111	2373111.605104
24	386592.611895	2373145.390382	76	386730.311638	2373363.570997
25	386547.032639	2373174.156695	77	386294.468436	2373532.861833
26	386155.546307	2373248.083662	78	385700.672639	2373593.501294
27	385780.818955	2373176.126681	79	386310.954238	2373107.346638
28	385551.475534	2373195.550011	80	386391.791647	2373047.448591
29	385499.327831	2373218.907493	81	386122.754807	2372959.457462
30	385868.829826	2373529.844605	82	385990.311938	2372932.951926
31	386002.062906	2373480.510749	83	386379.444579	2372908.619048
32	386267.731295	2373480.499616	84	386364.379393	2372854.214469
33	386528.904472	2373402.113642	85	386330.100808	2372868.952898
34	386623.997055	2373400.822390	86	386211.156238	2372884.863530
35	386165.570258	2371839.368537	87	386184.898899	2372811.131609
36	386146.436828	2371969.497835	88	386216.347666	2372808.440391
37	386144.407951	2372172.349456	89	386257.756433	2372715.808272
38	386183.982118	2372307.108200	90	386277.046920	2372753.904753
39	386192.704920	2372317.226284	91	386438.177018	2372775.708788
40	386277.491426	2372352.346593	92	386333.268399	2372498.627264
41	386322.191468	2372349.036818	93	386472.572502	2372332.128727
42	386371.492180	2372353.579194	94	386393.694773	2372295.313445
43	386460.723061	2372377.093611	95	386269.959543	2372250.625058
44	386444.924487	2372294.741066	96	386298.152616	2372239.446307
45	386411.532203	2372319.434517	97	386312.739823	2372196.106157
46	386386.050061	2372324.323070	98	386498.559747	2372189.327878
47	386379.646765	2372322.635653	99	386053.856680	2372173.507174
48	386319.829157	2372317.124132	100	386082.039003	2372113.768520
49	386275.128482	2372320.433955	101	385370.845682	2372063.176501
50	386201.805938	2372266.596471	102	386264.768122	2371966.001578
51	386200.790322	2372262.262611	103	386394.632957	2371939.519821
52	386211.707171	2372189.175192			

CURVE TABLE		
CURVE	RADIUS	DELTA
C1	200.00'	12°08'46"
C2	250.00'	30°30'11"
C3	85.00'	74°43'25"
C4	781.23'	14°55'12"
C5	150.00'	69°08'27"
C6	170.00'	48°47'52"
C7	100.00'	43°22'07"
C8	70.00'	81°2'45"
C9	102.00'	53°28'12"
C10	182.00'	18°59'52"
C11	30.00'	51°14'45"
C12	46.50'	231°14'46"
C13	46.50'	201°13'41"
C14	115.00'	33°44'57"
C15	18.00'	62°33'50"
C16	55.00'	180°00'00"
C17	75.00'	111°04'04"
C18	18.00'	64°10'51"
C19	147.00'	20°18'03"
C20	250.00'	15°23'31"
C21	135.00'	15°16'18"
C22	115.00'	30°39'49"
C23	330.00'	29°42'02"
C24	400.00'	16°23'03"
C25	230.00'	40°00'32"
C26	342.00'	13°17'01"
C27	1233.00'	00°40'38"
C28	75.00'	149°18'43"
C29	368.00'	54°59'52"
C30	332.00'	22°04'12"
C31	258.00'	7°01'35"
C32	542.00'	43°07'37"
C33	425.00'	31°25'17"
C34	458.00'	7°09'10"
C35	115.00'	20°18'04"
C36	150.00'	18°59'53"

No.	Revision	By	Date

OAK CREEK 3RD

PLAT

Professional Engineering Consultants, P.A.
303 S. TOPEKA • WICHITA, KANSAS 67202
316-262-2691 • FAX 316-262-3003

Designed by	BDB, BMM	Job No.	35-06572-000
Drawn by	BJS, TAT	Date	February 2006

Sheet 2 of 45

Saved 11-06-2006 1:26:58 PM by TAT
Plot Scale 1:100 11-29-2006 10:59:35 AM by BJS
Q:\2006\06572\000\06572-000-C-PLAT