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Appendix to
Evergreen Addition Drainage Plan
Wichita, Sedgwick County, Kansas
9/30/02

This appendix is intended to be added as an appendix to the original Evergreen Addition Drainage Plan (PEC project # 36-97B37-3104) in reference to Evergreen 3rd Addition. Contained in this appendix are the designs and calculations for two storm water sewers and an evaluation of street capacities. A 1"=50' scale map is included.

A STORM analysis was performed on each storm water sewer, and the results are enclosed. SWS #1, which is designed to carry the 2-year storm runoff from Basin 1, discharges into the Evergreen Pond. The existing Evergreen Pond was designed to handle developed conditions runoff from this area. SWS #2 has been designed to connect to existing storm water sewer in Aberdeen 2nd Addition in accordance with Evergreen Streets-Phase 3 grading revisions (PEC Project No. 32-00251-042) and subsequent drainage revisions made to the original drainage plan in September of 2000. The STORM analysis of SWS #2 shows the combined system.

Street capacity evaluations were done at points receiving the greatest amounts of flow, in order, to determine if the 2-year storm flow could be carried by the street without overtopping the curb. A standard roll curb was assumed for calculations. A roll curb proved adequate at all points save node 310. Therefore, on the eastside of Rutgers Street, approximately 35' south of the intersection of the northernmost Rutgers Court and Rutgers Street, a standard 6 5/8" curb is needed in order to keep the 2-year storm flow contained in the street.

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Project EVERGREEN Date 8/27/02

Item HYDROLOGY / SWS # 1 By SPL

A. SOIL TYPE
HYDROLOGIC GROUP "B"

B. FIND AREAS OF SUBBASINS

NODE	BASIN	AREA (Ac)
110	1A	2.39
120	1B	1.85
130	1C	0.65
135	1D	0.45
140	1E	0.44
150	1F	1.01
160	1G	0.59

C. FIND RUN-OFF COEFFICIENTS

BASIN	DESCRIPT	C_2	C_{100}
1A	1/8 Ac RES	0.52	0.67
1B	1/8 Ac RES	0.52	0.67
1C	1/4 Ac RES	0.44	0.61
1D	1/4 Ac RES	0.44	0.61
1E	1/4 Ac RES	0.44	0.61
1F	1/4 Ac RES	0.44	0.61
1G	1/4 Ac RES	0.44	0.61

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Project _____ Date _____

Item _____ By _____

D. FIND INTENSITY OF RAINFALL

* ASSUME MINIMUM TIME OF CONCENTRATION
$T_C = 15 MIN$

$i_2 = 3.8$ IN/HR
$i_{100} = 7.4$ IN/HR

E. FIND FLOW RATES USING RATIONAL METHOD, $Q = CiA$

2-YR STORM

NODE	BASIN	C_2	i_2 (IN/HR)	A (AC)	Q_2 (CFS)	ELEV (FT)
110	1A	0.52	3.8	2.39	4.7	165.4
120	1B	0.52	3.8	1.85	3.7	165.4
130	1C	0.44	3.8	0.65	1.1	165.0
135	1D	0.44	3.8	0.45	0.8	166.0
140	1E	0.44	3.8	0.44	0.7	165.0
150	1F	0.44	3.8	1.01	1.7	165.2
160	1G	0.44	3.8	0.59	1.0	165.2

Ever1.inp

```
100 j,  161.0000  100  1      8     7
110 t,  Evergreen 1
120 m,  100   161.0000
130 i,  110     0.52     2.39     0.00     0.00     4.70    15.00   165.10
131 i,  120     0.52     1.85     0.00     0.00     3.70    15.00   165.10
150 i,  130     0.44     0.65     0.00     0.00     1.10    15.00   165.00
160 i,  135     0.44     0.45     0.00     0.00     0.80    15.00   166.00
170 i,  140     0.44     0.44     0.00     0.00     0.70    15.00   165.00
180 i,  150     0.44     1.01     0.00     0.00     1.70    15.00   165.20
190 i,  160     0.44     0.59     0.00     0.00     1.00    15.00   165.50
450 p,  160  150   160.00   15  0.013   85.0   0.00
460 p,  150  140   160.00   15  0.013   0.00   0.00
470 p,  140  130   155.00   18  0.013   85.0   0.00
480 p,  135  130   195.00   15  0.013   0.00   0.00
481 p,  130  120   140.00   18  0.013   0.00   0.00
482 p,  120  110    35.00   18  0.013   0.00   0.00
490 p,  110  100   180.00   24  0.013   0.00   0.00
790 e
```

STORM11.OUT

Date: 09-26-2002
Time: 14:34:37

Input File: ever1.inp

Evergreen 1

Storm Frequency = 2-Year

* * * H Y D R O L O G Y * * *

Tributary Area									Hydrology Summation				Conduit Data				
Node	to Node	C	Area (Ac)	Slope (%)	Length (Ft)	TC(0) (Min)	I(0) (In/Hr)	Q(0) (CFS)	TC (Min)	I (In/Hr)	Q (CFS)	Sum Q (CFS)	Size	Velocity (Ft/Sec)	Length (Ft)	TT (Min)	TT+TC (Min)
160	150	.44	.59	.00	.0	15.00	3.83	1.00	15.00	3.83	1.00	1.00	15"	.81	160.00	3.27	18.27
150	140	.44	1.01	.00	.0	15.00	3.83	1.70	18.27	3.49	1.55	2.55	15"	2.08	160.00	1.28	19.56
140	130	.44	.44	.00	.0	15.00	3.83	.70	19.56	3.37	.62	3.17	18"	1.79	155.00	1.44	21.00
135	130	.44	.45	.00	.0	15.00	3.83	.80	15.00	3.83	.80	.80	15"	.65	195.00	4.99	19.99
130	120	.44	.65	.00	.0	15.00	3.83	1.10	21.00	3.25	.93	4.88	18"	2.76	140.00	.85	21.84
120	110	.52	1.85	.00	.0	15.00	3.83	3.70	21.84	3.18	3.08	7.96	18"	4.50	35.00	.13	21.97
110	100	.52	2.39	.00	.0	15.00	3.83	4.70	21.97	3.17	3.90	11.86	24"	3.77	180.00	.79	22.77

STORM12.OUT

Date: 09-26-2002
Time: 14:34:37

Evergreen 1

Input File: ever1.inp

Storm Frequency = 2-Year

* * * H Y D R A U L I C S * * *

Node	Hyd-Slope (Ft/Ft)	Friction (Ft)	Bend (Ft)	Transition (Ft)	Manhole (Ft)	Deflection (Ft)	Junction (Ft)	Total (Ft)	Hyd-Gl Elevation	Desired Elevation	Diff. (Ft)
100	.00000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	161.0000	161.0000	.00
110	.00163	.2925	.0000	.0187	.0000	.0421	.1255	.4788	161.4788	165.1000	3.62
120	.00340	.1188	.0000	.0196	.0000	.0158	.4054	.5597	162.0385	165.1000	3.06
130	.00128	.1787	.0000	.0069	.0000	.1425	.1340	.4621	162.5006	165.0000	2.50
135	.00009	.0177	.0000	.0000	.0000	.0000	.0000	.0177	162.5183	166.0000	3.48
140	.00054	.0833	.0000	.0034	.0000	.0090	.0115	.1071	162.6077	165.0000	2.39
150	.00092	.1474	.0000	.0057	.0000	.0295	.1162	.2988	162.9065	165.2000	2.29
160	.00014	.0227	.0000	.0000	.0000	.0000	.0000	.0227	162.9292	165.5000	2.57

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Project EVERGREEN Date 9/3/07

Item HYDROLOGY / SWS #2 By SPL

A. SOIL TYPE
HYDROLOGIC GROUP "B"

B. FIND AREAS OF SUBBASINS

NODE	BASIN	AREA (Ac)
210	2A	0.14
220	2B	0.27
230	2C	0.24
240	2D	0.23
250	2E	0.27

C. FIND RUN-OFF COEFFICIENTS

BASIN	DESCRIPTION	C_2	C_{100}
2A	1/8 Ac RES.; "B"	0.52	0.67
2B	"	"	"
2C	"	"	"
2D	"	"	"
2E	"	"	"

D. FIND INTENSITY OF RAINFALL

* ASSUME MINIMUM TIME OF CONCENTRATION
$T_C = 15$ MIN

$i_2 = 3.8$ IN/HR

$i_{100} = 7.4$ IN/HR

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Project EVERGREEN Date ____

Item ____ By ____

E. FIND FLOW RATES USING RATIONAL METHOD, $Q = CiA$

2-YR STORM

NODE	BASIN	C_2	i_2 (IN/HR)	A (Ac)	Q_2 (CFS)	ELEV (F)
210	2A	0.52	3.8	0.14	0.3	163.5
220	2B	0.52	3.8	0.27	0.5	163.5
230	2C	0.52	3.8	0.24	0.5	164.0
240	2D	0.52	3.8	0.23	0.5	164.3
250	2E	0.52	3.8	0.27	0.5	164.6

```
100 j,  161.0000  100  1     10     9
110 t,  Evergreen 4
120 m,  100   161.0000
130 i,  101      0.00     0.00     0.00     0.00     2.00    15.00   165.90
140 i,  102      0.00     0.00     0.00     0.00     1.50    15.00   165.90
150 i,  103      0.00     0.00     0.00     0.00     0.50    15.00   166.50
160 i,  104      0.00     0.00     0.00     0.00     10.1    15.00   163.00
170 i,  210      0.52     0.14     0.00     0.00     0.30    15.00   163.50
180 i,  220      0.52     0.27     0.00     0.00     0.50    15.00   163.50
190 i,  230      0.52     0.24     0.00     0.00     0.50    15.00   164.00
200 i,  240      0.52     0.23     0.00     0.00     0.50    15.00   164.30
210 i,  250      0.52     0.27     0.00     0.00     0.50    15.00   164.60
220 p,  250  240   151.00   15  0.013   0.00    0.00
230 p,  240  230   147.00   15  0.013   0.00    0.00
240 p,  230  220   148.00   15  0.013   0.00    0.00
250 p,  220  210   127.00   18  0.013   45.0    0.00
260 p,  210  104    50.00   24  0.013   0.00    0.00
270 p,  104  103    50.00   30  0.013   0.00    0.00
280 p,  103  102    50.00   30  0.013   90.0    0.00
290 p,  102  101    50.00   30  0.013   0.00    0.00
300 p,  101  100    50.00   30  0.013   0.00    0.00
310 e
*
*
*
*** Note nodes 100-104 represent SWS from Aberdeen 2nd Addition found in the
*** 9/1/00 revision to the original Evergreen Addition Drainage Plan
```

STORM12.OUT

Date: 09-26-2002
Time: 15:01:45

Input File: ever4.inp

Evergreen 4

Storm Frequency = 2-Year

* * * H Y D R A U L I C S * * *

Node	Hyd-Slope (Ft/Ft)	Friction (Ft)	Bend (Ft)	Transition (Ft)	Manhole (Ft)	Deflection (Ft)	Junction (Ft)	Total (Ft)	Hyd-Gl Elevation	Desired Elevation	Diff. (Ft)
100	.00000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	161.0000	161.0000	.00
101	.00079	.0393	.0000	.0035	.0000	.0146	.0734	.1308	161.1308	165.9000	4.77
102	.00059	.0297	.0000	.0023	.0000	.2491	.0492	.3303	161.4610	165.9000	4.44
103	.00047	.0234	.0000	.0007	.0000	.0105	.0167	.0513	161.5123	166.5000	4.99
104	.00043	.0214	.0000	.0073	.0000	.0008	.1842	.2137	161.7260	163.0000	1.27
210	.00004	.0021	.0000	.0017	.0000	.0355	-.0054	.0339	161.7599	163.5000	1.74
220	.00015	.0194	.0000	.0007	.0000	.0024	.0052	.0277	161.7876	163.5000	1.71
230	.00024	.0363	.0000	.0009	.0000	.0012	.0190	.0574	161.8450	164.0000	2.15
240	.00012	.0177	.0000	.0006	.0000	.0003	.0128	.0315	161.8765	164.3000	2.42
250	.00004	.0054	.0000	.0000	.0000	.0000	.0000	.0054	161.8819	164.6000	2.72

STORM11.OUT

Date: 09-26-2002
Time: 15:01:45

Input File: ever4.inp

Evergreen 4

Storm Frequency = 2-Year

* * * H Y D R O L O G Y * * *

Tributary Area									Hydrology Summation				Conduit Data				
Node	to Node	C	Area (Ac)	Slope (%)	Length (Ft)	TC(0) (Min)	I(0) (In/Hr)	Q(0) (CFS)	TC (Min)	I (In/Hr)	Q (CFS)	Sum Q (CFS)	Size	Velocity (Ft/Sec)	Length (Ft)	TT (Min)	TT+TC (Min)
250	240	.52	.27	.00	.0	15.00	3.83	.50	15.00	3.83	.50	.50	15"	.41	151.00	6.18	21.18
240	230	.52	.23	.00	.0	15.00	3.83	.50	21.18	3.24	.42	.92	15"	.75	147.00	3.26	24.44
230	220	.52	.24	.00	.0	15.00	3.83	.50	24.44	3.00	.39	1.31	15"	1.07	148.00	2.30	26.74
220	210	.52	.27	.00	.0	15.00	3.83	.50	26.74	2.85	.37	1.69	18"	.95	127.00	2.22	28.96
210	104	.52	.14	.00	.0	15.00	3.83	.30	28.96	2.73	.21	1.90	24"	.60	50.00	1.38	30.33
104	103	.00	.00	.00	.0	15.00	3.83	10.10	15.00	3.83	10.10	11.04	30"	2.25	50.00	.37	15.37
103	102	.00	.00	.00	.0	15.00	3.83	.50	15.37	3.79	.49	11.53	30"	2.35	50.00	.35	15.73
102	101	.00	.00	.00	.0	15.00	3.83	1.50	15.73	3.75	1.47	13.00	30"	2.65	50.00	.31	16.04
101	100	.00	.00	.00	.0	15.00	3.83	2.00	16.04	3.71	1.94	14.94	30"	3.04	50.00	.27	16.31

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Project EVERGREEN 4TH Date ____

Item STREET CAPACITIES By ____

STREET FLOW

2-YEAR STORM

NODE	CONTRIBUTING AREA (AC)	Q_2 (CFS)	S(%)	ROLL CURB Q_{MAX}	COMMENT
110(S)	1.8	3.0	0.5	3.25	OK
110(N)	0.6	1.0	1.0	4.5	OK
120(S)	1.3	2.2	0.5	3.25	OK
120(N)	0.6	1.0	1.0	4.5	OK
310(S)	3.5	5.9	0.6	3.5	USE 6 5/8" CURB
320(S)	1.3	2.2	0.6	3.5	OK
410(S)	0.7	1.2	0.5	3.25	OK
420(S)	0.8	1.3	0.5	3.25	OK

** ASSUME MINIMUM TIME OF CONCENTRATION, T_c = 15 MIN
@ T_c = 15 MIN: i_2 = 3.8 IN/HR

*** RUNOFF COEFFICIENTS:
SINGLE FAMILY RESIDENTIAL, 1/4 AC LOTS, SOIL GROUP "B"
C_2 = 0.44

**** RATIONAL METHOD: $Q_2 = C_2 i_2 A$

RESULTS
ON THE EASTSIDE OF RUTGERS STREET, APPROXIMATELY 35' SOUTH OF THE INTERSECTION OF THE NORTHERNMOST RUTGERS COURT AND RUTGERS STREET, A STANDARD 6 5/8" CURB IS NEEDED IN ORDER TO KEEP THE 2-YR STORM FLOW CONTAINED IN THE STREET.

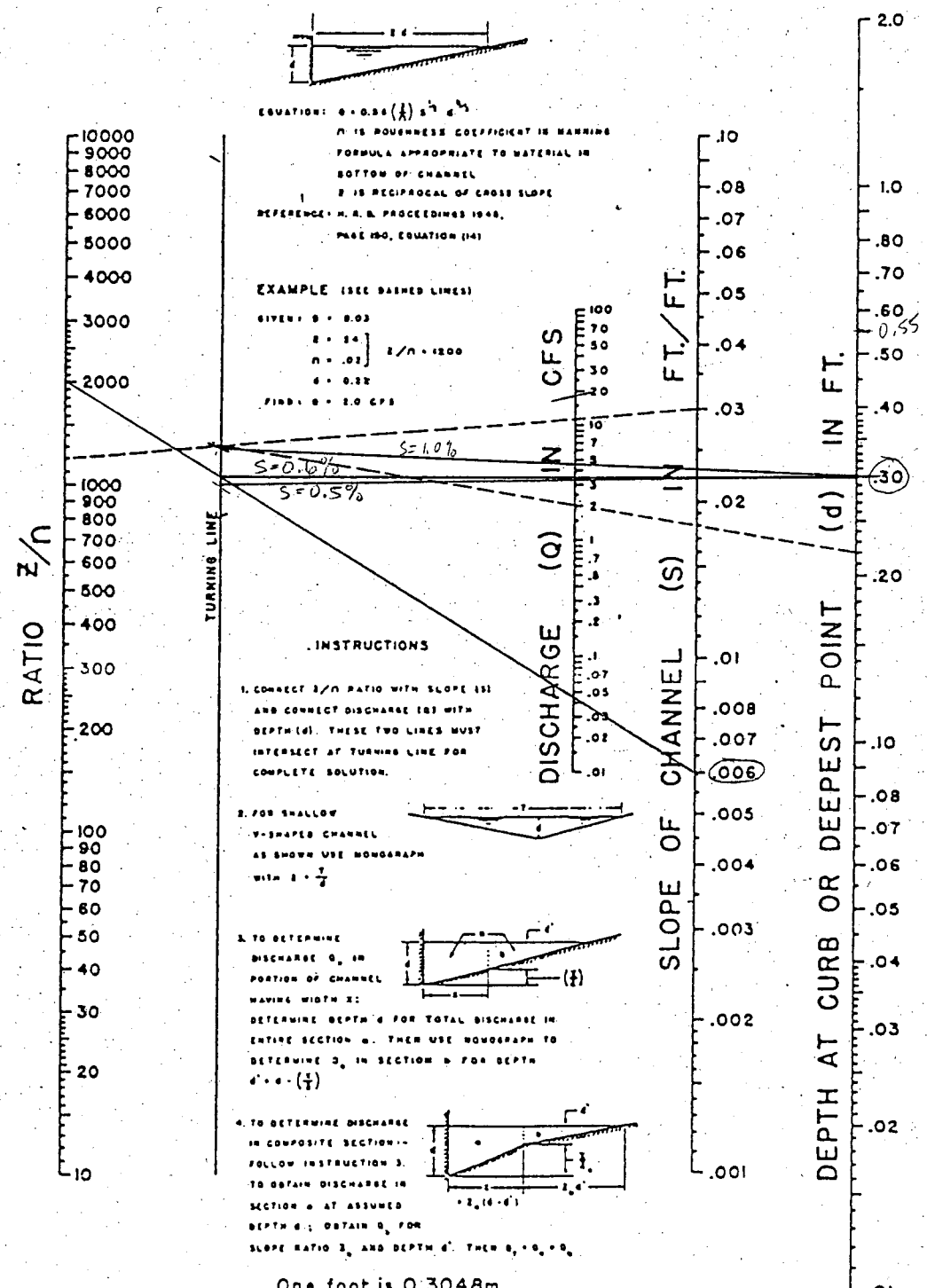
(Q_{MAX} = 17 CFS FOR A 6 5/8" CURB WITH A 0.6% SLOPE.)

$z = 32$
$n = 0.016$
$\frac{z}{n} = 2000$
$S = 0.6\%$

$d_{MAX} = 0.3'$ FOR ROLL CURB
$Q_{MAX} = 3.5$ CFS for $S = 0.6\%$
$Q_{MAX} = 3.25$ CFS for $S = 0.5\%$
$Q_{MAX} = 4.5$ CFS for $S = 1.0\%$

EVERGREEN 4TH
9/27/02

NOMOGRAPH FOR FLOW IN TRIANGULAR CHANNELS

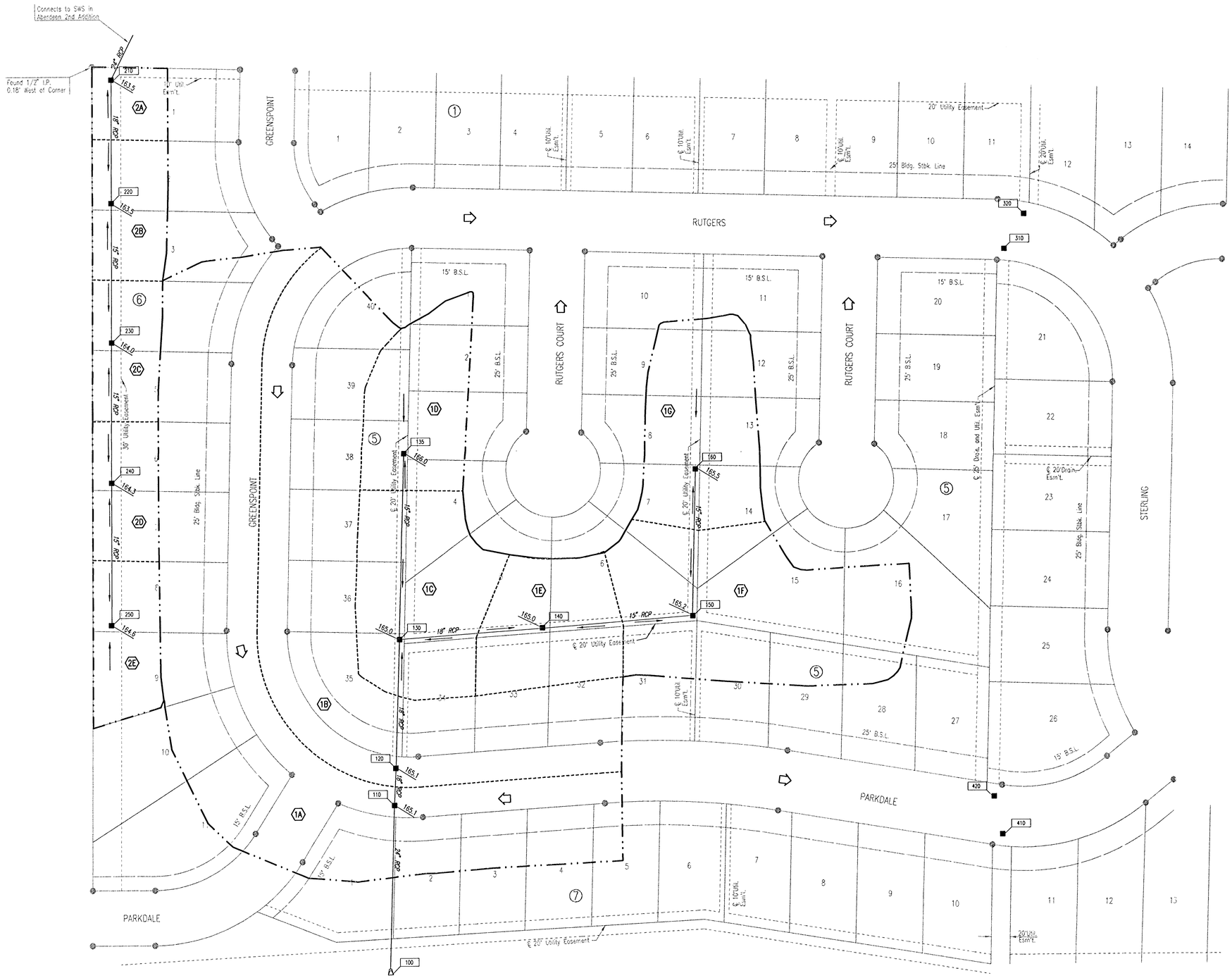


One foot is 0.3048m
One cubic foot is $0.0283 m^3$

DRAINAGE PLAN FOR

EVERGREEN 3rd ADDITION

AN ADDITION TO WICHITA, SEDGWICK COUNTY, KANSAS



SCALE: 1"=50'

LEGEND

- BASIN IDENTIFIER
- MINOR BASIN BOUNDARY
- MAJOR BASIN BOUNDARY
- MAJOR STORM WATER OVERFLOW
- MINOR STORM WATER FLOW (Q2)
- NODE IDENTIFIER
- STORM SEWER AND INLET
- SPOT ELEVATION

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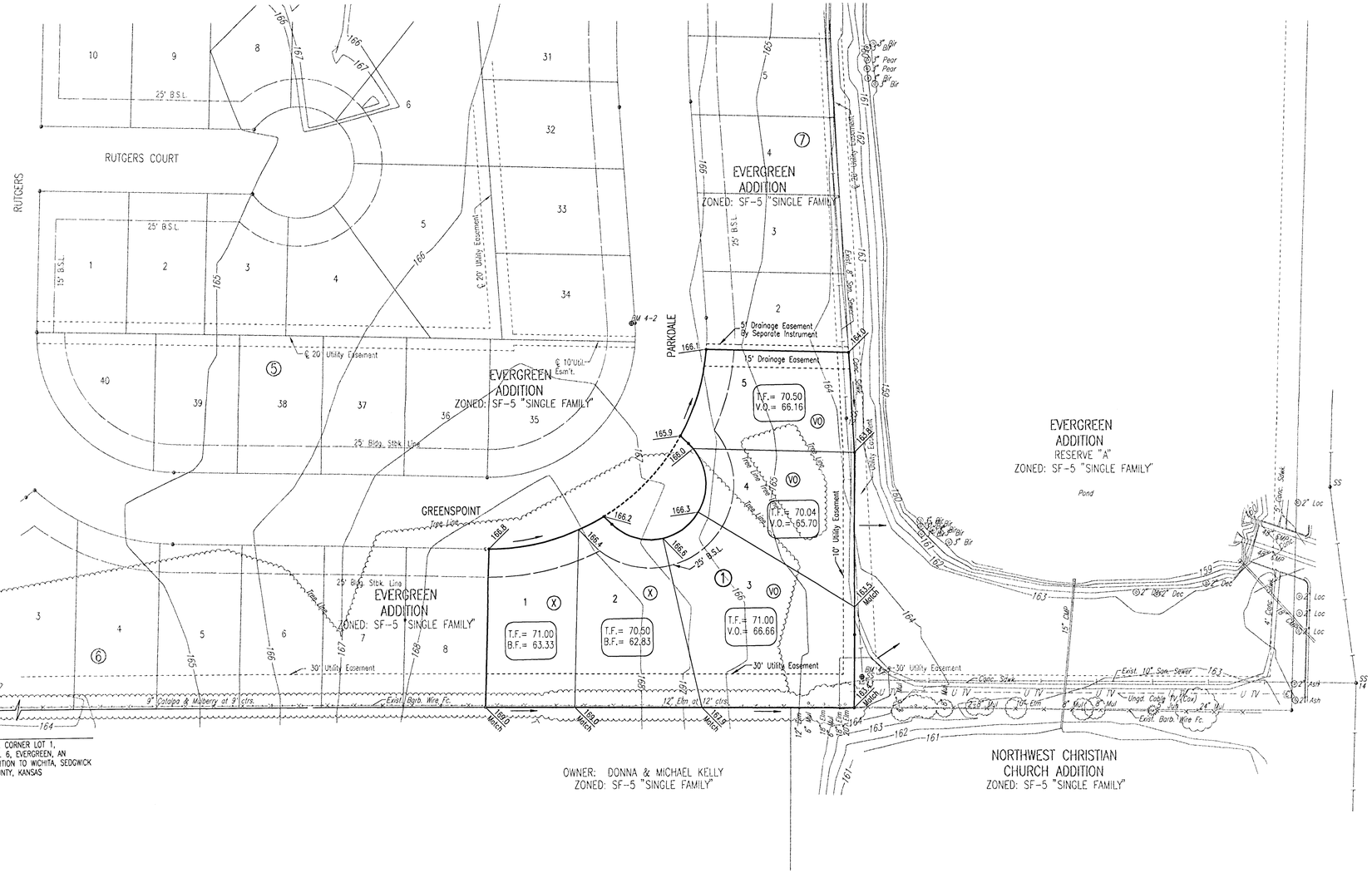
DSNR: SPL OPER: SPL SCALE: 1=50.00
O:\2002\02397\002\DRAINAGE_3 11-26-2002 10:23:56 am

FOUR CORNER PLAN

EVERGREEN 3RD

AN ADDITION TO WICHITA, SEDGWICK COUNTY, KANSAS



SCALE: 1" = 50'

• = 3/4" IRON PIPE W/PEC CAP UNLESS OTHERWISE NOTED

BENCH MARKS

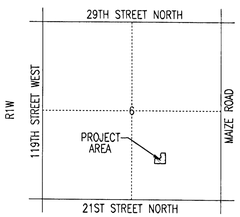
CITY OF WICHITA STD. BENCH MARK DISC 64' EAST AND 99' SOUTH OF THE INTERSECTION OF THE CENTERLINES MAIZE ROAD AND 21ST STREET NORTH.

ELEV.=1364.3 CITY DATUM
ELEV.=1351.7 N.G.V.D.

BM#4-2 – SET "T" POST 3' WEST OF PC NEAR THE SE CORNER LOT 34, BLOCK 5, EVERGREEN

ELEV. = 166.16 CITY DATUM

ESTABLISHED MINIMUM PAD (LOWEST OPENING) AS FOLLOWS:
LOT 5, BLOCK 1 = 165.6 CITY DATUM = 1353.0 M.S.L.



VICINITY MAP

LEGEND

- FLOW DIRECTION
- 156.0 — SPOT ELEVATION
- 156.0 HP — HIGH POINT ELEVATION
- 156.0 Match — MATCH EXISTING ELEVATION
- (VO) — VIEW-OUT BASEMENT
- (X) — STANDARD BASEMENT

DGNR SAD GPEN SAD SCALE: 1=50.00
D:\2002\02494\A10\dwg\4CORNER 11-26-2002 10:47:46 am