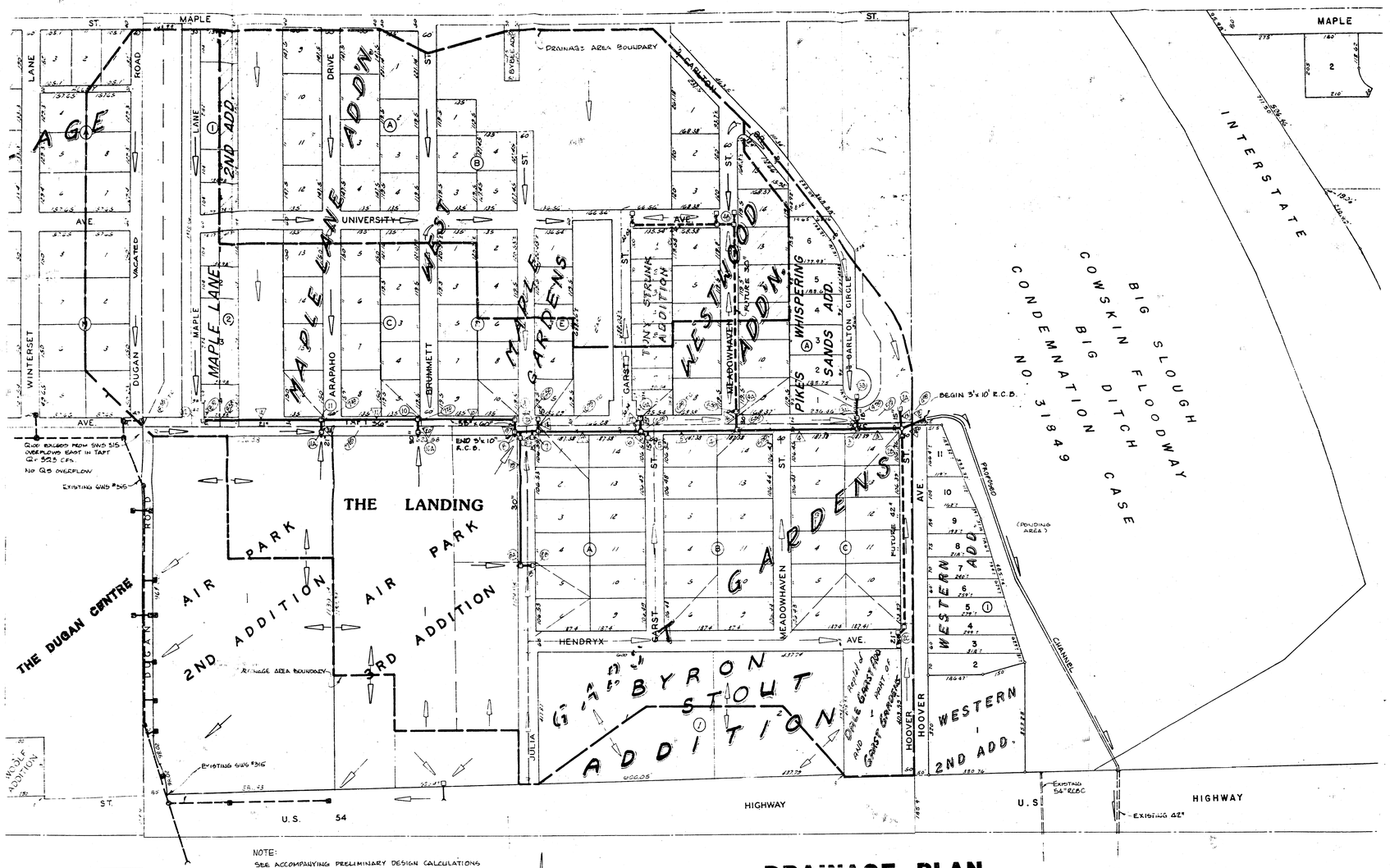


NOTE:
SEE ACCOMPANYING PRELIMINARY DESIGN CALCULATIONS FOR Q VALUES. SEE COMPUTER PRINTOUT FOR PIPE FLOW LINE AND HYDRAULIC GRADE ELEVATIONS

(A) PIPE LINE NUMBER ON PRINTOUT

(2A) INLET NUMBER ON CALCULATIONS

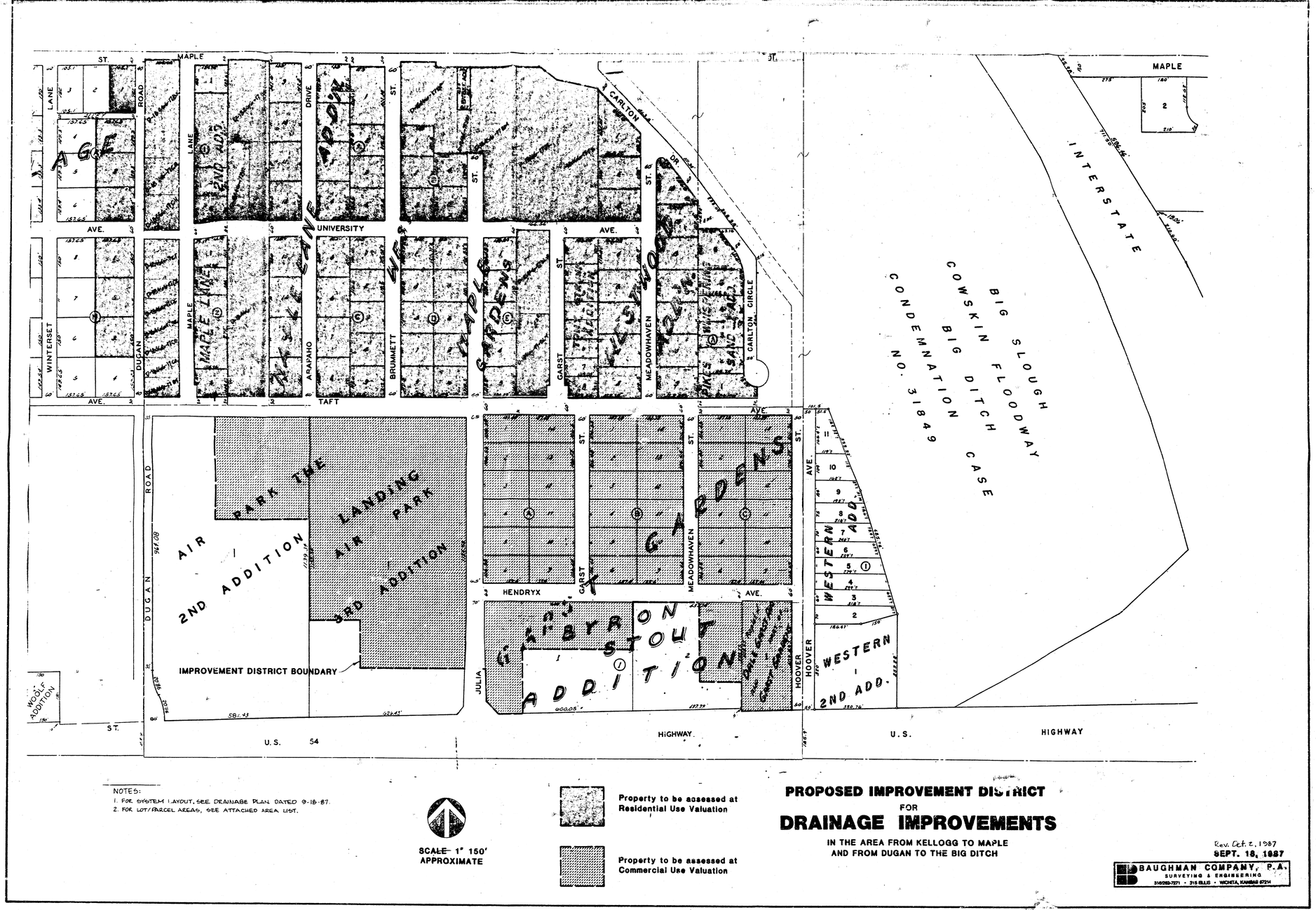
(5.9) TOP OF CURB ELEVATION (ADD 110.00)

1" = 100'

DRAINAGE PLAN FOR THE LANDING

SEPTEMBER 18, 1987

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



NOTES:
1. FOR SYSTEM LAYOUT, SEE DRAINAGE PLAN DATED 9-18-87.
2. FOR LOT/PARCEL AREAS, SEE ATTACHED AREA LIST.

SCALE 1" 150'
APPROXIMATE

Property to be assessed at Residential Use Valuation

Property to be assessed at Commercial Use Valuation

PROPOSED IMPROVEMENT DISTRICT
FOR
DRAINAGE IMPROVEMENTS

IN THE AREA FROM KELLOGG TO MAPLE
AND FROM DUGAN TO THE BIG DITCH

Rev. Oct. 2, 1987
SEPT. 18, 1987

BAUGHMAN COMPANY, P.A.
SURVEYING & ENGINEERING
316/263-7271 • 315 ELLIS • WICHITA, KANSAS 67214

Initial Storm

Project : THE LANDING - PRELIMINARY STORM SEWER DESIGN

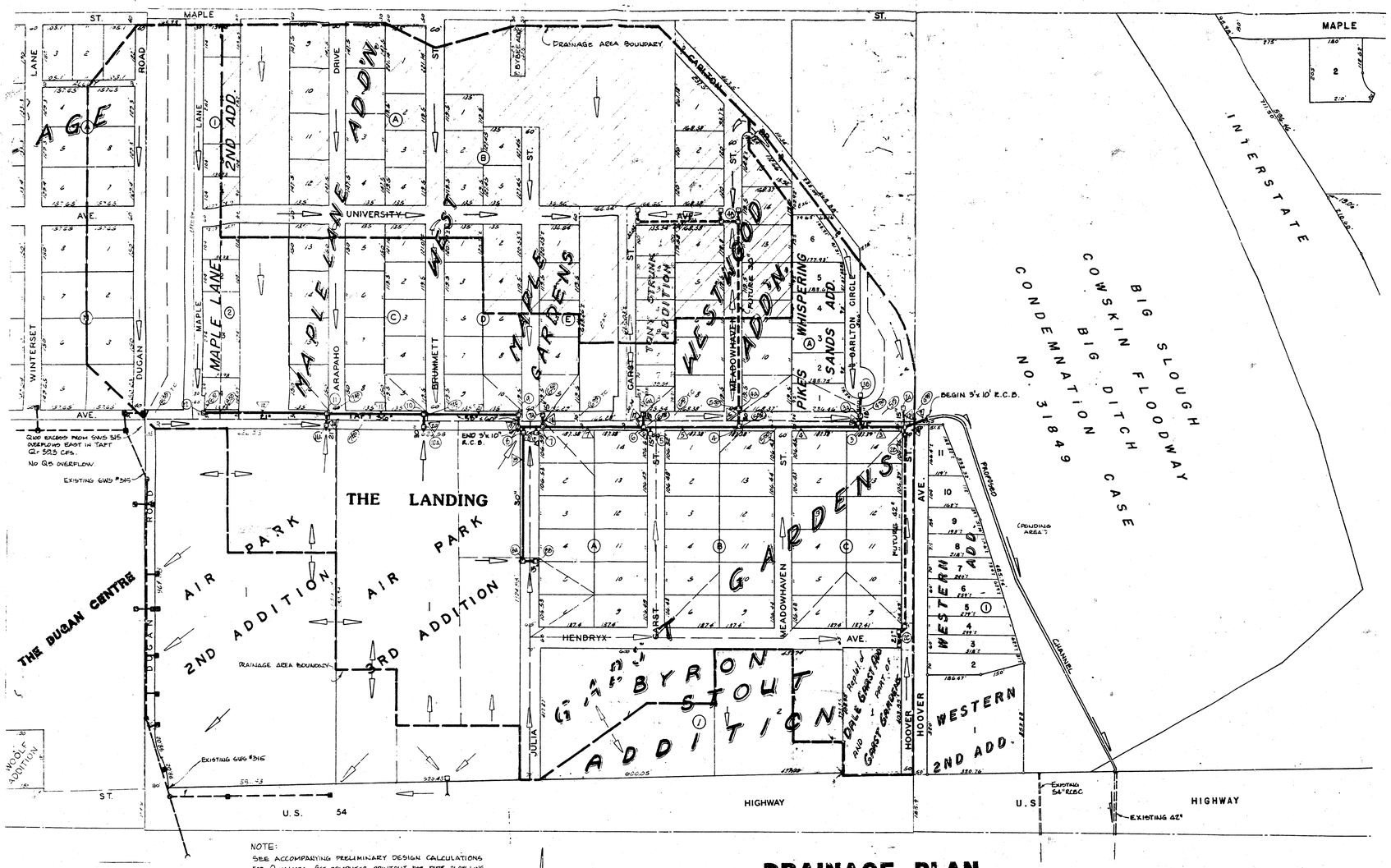
Date: 9-9-87
1/ 1/1980

Time: 1:45: 2

INPUT DATA LISTING

CD	L2	MAX Q	ADJ Q	LENGTH	FL 1	FL 2	CTL/TW	D	W	S	KJ	KE	KM	LC	L1	L3	L4	A1	A3	A4	J	N
8	1						114.15															
2	2	158.0	158.0	100.00	111.10	111.14	.00	36.	120.	3	.10	.10	.00	1	3	13	14	30.	60.	20.	5.00	.013
2	3	126.0	126.0	155.00	111.14	111.21	.00	36.	120.	3	.10	.10	.00	0	4	0	15	0.	0.	90.	5.00	.013
2	4	107.0	107.0	420.00	111.21	111.38	.00	36.	120.	3	.10	.10	.00	0	5	0	16	0.	0.	90.	5.00	.013
2	5	85.4	85.4	300.00	111.38	111.50	.00	36.	120.	3	.10	.10	.00	0	6	0	0	0.	0.	0.	5.00	.013
2	6	85.4	85.4	30.00	111.50	111.52	.00	36.	120.	3	.10	.10	.00	0	7	0	17	0.	0.	90.	5.00	.013
2	7	72.9	72.9	350.00	111.52	111.66	.00	36.	120.	3	.10	.10	.00	0	8	0	18	0.	0.	90.	5.00	.013
2	8	65.3	65.3	90.00	111.66	111.70	.00	36.	120.	3	.10	.10	.00	0	9	19	0	90.	90.	0.	5.00	.013
2	9	50.8	50.8	50.00	111.70	111.80	.00	48.	0.	3	.10	.10	.00	0	10	0	0	90.	0.	0.	5.00	.013
2	10	46.1	46.1	330.00	111.80	112.46	.00	48.	0.	3	.10	.10	.00	0	11	20	0	0.	70.	0.	5.00	.013
2	11	19.3	19.3	330.00	113.46	114.12	.00	36.	0.	3	.10	.10	.00	0	12	21	0	0.	90.	0.	5.00	.013
2	12	6.9	6.9	420.00	114.87	115.71	.00	21.	0.	1	.10	.10	.00	0	0	0	0	0.	0.	0.	5.00	.013
2	13	31.6	31.6	50.00	111.54	111.64	.00	36.	0.	1	.10	.10	.00	3	0	0	0	0.	0.	0.	5.00	.013
2	14	1.3	1.0	50.00	110.89	110.99	.00	15.	0.	1	.10	.10	.00	3	0	0	0	0.	0.	0.	5.00	.013
2	15	6.9	5.1	50.00	111.96	112.06	.00	18.	0.	1	.10	.10	.00	4	0	0	0	0.	0.	0.	5.00	.013
2	16	19.8	13.7	50.00	111.88	111.98	.00	24.	0.	1	.10	.10	.00	4	0	0	0	0.	0.	0.	5.00	.013
2	17	2.6	2.1	50.00	112.27	112.37	.00	15.	0.	1	.10	.10	.00	7	0	0	0	0.	0.	0.	5.00	.013
2	18	2.7	2.3	50.00	111.41	111.51	.00	15.	0.	1	.10	.10	.00	8	0	0	0	0.	0.	0.	5.00	.013
2	19	9.7	8.1	270.00	111.95	112.49	.00	24.	0.	1	.10	.10	.00	9	0	0	0	0.	0.	0.	5.00	.013
2	20	26.9	22.2	50.00	113.46	113.56	.00	30.	0.	1	.10	.10	.00	11	0	0	0	0.	0.	0.	5.00	.013
2	21	12.3	10.4	50.00	114.87	114.97	.00	21.	0.	1	.10	.10	.00	12	0	0	0	0.	0.	0.	5.00	.013

Line No	Q (cfs)	D (in)	W (in)	Dn (ft)	Dc (ft)	Flow Type	Sf-full (ft/ft)	V 1 (fps)	2 (fps)	FL 1 (ft)	FL 2 (ft)	HG 1 Calc	HG 2 Calc	D 1 (ft)	D 2 (ft)	TW Calc	Tc CK
1	Hydraulic grade line control = 114.15																
2	158.0	36	120	3.00	1.98	Full	.00175	5.3	5.3	111.10	111.14	114.15	114.33	3.05	3.19	.00	.00
3	126.0	36	120	3.00	1.70	Full	.00112	4.2	4.2	111.14	111.21	114.56	114.75	3.44	3.54	.00	.00
4	107.0	36	120	3.00	1.52	Full	.00080	3.6	3.6	111.21	111.38	114.88	115.22	3.67	3.84	.00	.00
5	85.4	36	120	2.61	1.31	Full	.00051	2.8	2.8	111.38	111.50	115.34	115.49	3.96	3.99	.00	.00
6	85.4	36	120	2.18	1.31	Full	.00051	2.8	2.8	111.50	111.52	115.52	115.53	4.02	4.01	.00	.00
7	72.9	36	120	2.33	1.18	Full	.00037	2.4	2.4	111.52	111.66	115.60	115.73	4.08	4.07	.00	.00
8	65.3	36	120	2.09	1.10	Full	.00030	2.2	2.2	111.66	111.70	115.76	115.79	4.10	4.09	.00	.00
9	50.8	48	0	2.69	2.13	Full	.00125	4.0	4.0	111.70	111.80	115.80	116.06	4.30	4.26	.00	.00
10	46.1	48	0	2.51	2.03	Full	.00103	3.7	3.7	111.80	112.46	116.57	116.91	4.77	4.45	.00	.00
11	19.3	36	0	1.76	1.48	Full	.00084	2.7	2.7	113.46	114.12	117.05	117.33	3.59	3.21	.00	.00
12	6.9	21	0	1.39	.97	Full	.00190	2.9	2.9	114.87	115.71	117.34	118.14	2.47	2.43	118.26	.00
3	Hydraulic grade line control = 114.45																
13	31.6	36	0	3.00	1.82	Part	.00224	4.5	4.5	111.54	111.64	114.45	114.57	2.91	2.93	114.41	.00
3	Hydraulic grade line control = 114.45																
14	1.3	15	0	.59	.45	Full	.00042	1.1	1.1	110.89	110.99	114.45	114.47	3.56	3.48	114.49	.00
4	Hydraulic grade line control = 114.82																
15	6.9	18	0	1.50	1.01	Full	.00429	3.9	3.9	111.96	112.06	114.82	115.03	2.86	2.95	115.29	.00



NOTE:
SEE ACCOMPANYING PRELIMINARY DESIGN CALCULATIONS FOR Q VALUES. SEE COMPUTER PRINTOUT FOR PIPE FLOW LINE AND HYDRAULIC GRADE ELEVATIONS.

(2) PIPE LINE NUMBER ON PRINTOUT

(2A) INLET NUMBER ON CALCULATIONS

(510) TOP OF CURB ELEVATION (ADD 110.00)

1" = 150'

DRAINAGE PLAN FOR THE LANDING

Rev. October 2, 1987
SEPTEMBER 18, 1987

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

Line No	Q (cfs)	D (in)	W (in)	Dn (ft)	Dc (ft)	Flow Type	St-full (ft/ft)	V 1 (fps)	V 2 (fps)	FL 1 (ft)	FL 2 (ft)	HG 1 Calc	HG 2 Calc	D 1 (ft)	D 2 (ft)	TW Calc	TW CK
1	Hydraulic grade line control = 114.15																
2	218.0	36	120	3.00	2.48	Full	.00334	7.9	7.9	111.10	111.14	114.15	114.48	3.05	3.34	.00	.00
3	176.0	36	120	3.00	2.12	Full	.00216	5.9	5.9	111.14	111.21	114.95	115.28	3.81	4.07	.00	.00
4	147.0	36	120	3.00	1.88	Full	.00152	4.9	4.9	111.21	111.38	115.56	116.20	4.35	4.82	.00	.00
5	116.0	36	120	3.00	1.61	Full	.00094	3.9	3.9	111.38	111.50	116.42	116.71	5.04	5.21	.00	.00
6	116.0	36	120	2.70	1.61	Full	.00094	3.9	3.9	111.50	111.52	116.76	116.78	5.26	5.26	.00	.00
7	103.0	36	120	2.97	1.49	Full	.00078	3.4	3.4	111.52	111.66	116.88	117.15	5.36	5.49	.00	.00
8	95.0	36	120	2.70	1.41	Full	.00063	3.2	3.2	111.66	111.70	117.21	117.27	5.55	5.57	.00	.00
9	50.8	48	0	2.69	1.13	Full	.00128	4.0	4.0	111.70	111.80	117.21	117.27	5.51	5.47	.00	.00
10	46.1	48	0	2.51	1.09	Full	.00103	3.7	3.7	111.80	112.46	117.37	117.71	5.57	5.25	.00	.00
11	19.3	36	0	1.96	1.40	Full	.00064	2.7	2.7	113.46	114.12	117.85	118.13	4.39	4.01	.00	.00
12	6.9	21	0	1.39	.97	Full	.00140	2.9	2.9	114.87	115.71	118.15	118.94	3.28	3.23	119.08	.00
7	Hydraulic grade line control = 114.72																
13	31.6	36	0	3.00	1.82	Full	.00224	4.5	4.5	111.54	111.64	114.72	114.83	3.18	3.19	115.17	.00
2	Hydraulic grade line control = 114.72																
14	1.3	15	0	.59	.48	Full	.00242	1.1	1.1	110.89	110.99	114.72	114.74	3.83	3.75	114.76	.00
4	Hydraulic grade line control = 115.42																
15	6.9	18	0	1.50	1.01	Full	.01479	3.9	3.9	111.96	112.06	115.42	115.64	3.46	3.58	115.90	.00
5	Hydraulic grade line control = 116.71																

16 19.8 24 0 2.00 1.60 Full .00766 6.3 6.3 111.88 111.98 116.31 116.69 4.43 4.71 117.37 .00
1Project : THE LANDING - PRELIMINARY STORM SEWER DESIGN Date: 1/ 1/1980 Time: 01:41:28
STORM DRAIN ANALYSIS RESULTS

Line No	Q (cfs)	D (in)	W (in)	Dn (ft)	Dc (ft)	Flow Type	St-full (ft/ft)	V 1 (fps)	V 2 (fps)	FL 1 (ft)	FL 2 (ft)	HG 1 Calc	HG 2 Calc	D 1 (ft)	D 2 (ft)	TW Calc	TW CK
7	Hydraulic grade line control = 116.83																
17	2.6	15	0	.93	.64	Full	.00161	2.1	2.1	112.27	112.37	116.83	116.91	4.56	4.54	116.99	.00
8	Hydraulic grade line control = 117.18																
18	2.7	15	0	.95	.65	Full	.00170	2.2	2.2	111.41	111.51	117.18	117.26	5.77	5.75	117.34	.00
8	Hydraulic grade line control = 117.24																
19	9.7	24	0	1.57	1.11	Full	.00184	3.1	3.1	111.95	112.49	117.24	117.74	5.29	5.25	117.90	.00
11	Hydraulic grade line control = 117.78																
20	26.9	30	0	2.50	1.77	Full	.00430	5.5	5.5	113.46	113.56	117.78	118.00	4.32	4.44	118.51	.00
12	Hydraulic grade line control = 118.14																
21	12.3	21	0	1.75	1.31	Full	.00603	5.1	5.1	114.87	114.97	118.14	118.44	3.27	3.47	118.88	.00

1 LIST OF ABBREVIATIONS

0 V 1, FL 1, D 1 and HG 1 refer to downstream end
0 V 2, FL 2, D 2 and HG 2 refer to upstream end
0 X - Distance in feet from downstream end to point where HG intersects soffit in seal condition
0 X(N) - Distance in feet from downstream end to point where water surface reaches normal depth by either drawdown or backw
0 X(J) - Distance in feet from downstream end to point where hydraulic jump occurs in line
0 F(J) - The computed force at the hydraulic jump

16 19.8 24 0 2.00 1.60 Full .00766 6.3 6.3 111.88 111.98 116.31 116.69 4.43 4.71 117.37 .00
1Project : THE LANDING - PRELIMINARY STORM SEWER DESIGN Date: 1/ 1/1980 Time: 01:41:28
STORM DRAIN ANALYSIS RESULTS

Line No	Q (cfs)	D (in)	W (in)	Dn (ft)	Dc (ft)	Flow Type	St-full (ft/ft)	V 1 (fps)	V 2 (fps)	FL 1 (ft)	FL 2 (ft)	HG 1 Calc	HG 2 Calc	D 1 (ft)	D 2 (ft)	TW Calc	TW CK
7	Hydraulic grade line control = 116.83																
17	2.6	15	0	.93	.64	Full	.00161	2.1	2.1	112.27	112.37	116.83	116.91	4.56	4.54	116.99	.00
8	Hydraulic grade line control = 117.18																
18	2.7	15	0	.95	.65	Full	.00170	2.2	2.2	111.41	111.51	117.18	117.26	5.77	5.75	117.34	.00
8	Hydraulic grade line control = 117.24																
19	9.7	24	0	1.57	1.11	Full	.00184	3.1	3.1	111.95	112.49	117.24	117.74	5.29	5.25	117.90	.00
11	Hydraulic grade line control = 117.78																
20	26.9	30	0	2.50	1.77	Full	.00430	5.5	5.5	113.46	113.56	117.78	118.00	4.32	4.44	118.51	.00
12	Hydraulic grade line control = 118.14																
21	12.3	21	0	1.75	1.31	Full	.00603	5.1	5.1	114.87	114.97	118.14	118.44	3.27	3.47	118.88	.00

1 LIST OF ABBREVIATIONS

0 V 1, FL 1, D 1 and HG 1 refer to downstream end
0 V 2, FL 2, D 2 and HG 2 refer to upstream end
0 X - Distance in feet from downstream end to point where HG intersects soffit in seal condition
0 X(N) - Distance in feet from downstream end to point where water surface reaches normal depth by either drawdown or backw
0 X(J) - Distance in feet from downstream end to point where hydraulic jump occurs in line
0 F(J) - The computed force at the hydraulic jump

1Project : THE LANDING - PRELIMINARY STORM SEWER DESIGN Date: 1/ 1/1980 Time: 01:41:28
STORM DRAIN ANALYSIS RESULTS

Line No	Q (cfs)	D (in)	W (in)	Dn (ft)	Dc (ft)	Flow Type	St-full (ft/ft)	V 1 (fps)	V 2 (fps)	FL 1 (ft)	FL 2 (ft)	HG 1 Calc	HG 2 Calc	D 1 (ft)	D 2 (ft)	TW Calc	TW CK
1	Hydraulic grade line control = 114.15																
2	218.0	36	120	3.00	2.48	Full	.00334	7.9	7.9	111.10	111.14	114.15	114.48	3.05	3.34	.00	.00
3	176.0	36	120	3.00	2.12	Full	.00216	5.9	5.9	111.14	111.21	114.95	115.28	3.81	4.07	.00	.00
4	147.0	36	120	3.00	1.88	Full	.00152	4.9	4.9	111.21	111.38	115.56	116.20	4.35	4.82	.00	.00
5	116.0	36	120	3.00	1.61	Full	.00094	3.9	3.9	111.38	111.50	116.42	116.71	5.04	5.21	.00	.00
6	116.0	36	120	2.70	1.61	Full	.00094	3.9	3.9	111.50	111.52	116.76	116.78	5.26	5.26	.00	.00
7	103.0	36	120	2.97	1.49	Full	.00078	3.4	3.4	111.52	111.66	116.88	117.15	5.36	5.49	.00	.00
8	95.0	36	120	2.70	1.41	Full	.00063	3.2	3.2	111.66	111.70	117.21	117.27	5.55	5.57	.00	.00
9	50.8	48	0	2.69	1.13	Full	.00128	4.0	4.0	111.70	111.80	117.21	117.27	5.51	5.47	.00	.00
10	46.1	48	0	2.51	1.09	Full	.00103	3.7	3.7	111.80	112.46	117.37	117.71	5.57	5.25	.00	.00
11	19.3	36	0	1.96	1.40	Full	.00064	2.7	2.7	113.46	114.12	117.85	118.13	4.39	4.01	.00	.00
12	6.9	21	0	1.39	.97	Full	.00140	2.9	2.9	114.87	115.71	118.15	118.94	3.28	3.23	119.08	.00
7	Hydraulic grade line control = 114.72																
13	31.6	36	0	3.00	1.82	Full	.00224	4.5	4.5	111.54	111.64	114.72	114.83	3.18	3.19	115.17	.00
2	Hydraulic grade line control = 114.72																
14	1.3	15	0	.59	.48	Full	.00242	1.1	1.1	110.89	110.99	114.72	114.74	3.83	3.75	114.76	.00
4	Hydraulic grade line control = 115.42																
15	6.9	18	0	1.50	1.01	Full	.01479	3.9	3.9	111.96	112.06	115.42	115.64	3.46	3.58	115.90	.00
5	Hydraulic grade line control = 116.71																

1Project : THE LANDING - PRELIMINARY STORM SEWER DESIGN Date: 1/ 1/1980 Time: 01:41:28
STORM DRAIN ANALYSIS RESULTS

WILLIAM L. KORBER, L.S.
JOHN E. LUNDBLADE, L.S.
N. BRENT WOOTEN, P.E.
BAUGHMAN COMPANY, P.A.
SURVEYING & ENGINEERING
316/262-7271 • 315 ELLIS • WICHITA, KANSAS 67211

Revised September 22, 1987

Preliminary Storm Sewer Estimate - Alternate A
(The Landing and adjacent areas - includes syster
in Taft, Hoover, Meadowlark and Garst)

Estimated Cost of Construction	$547,920
+ 25%	136,980
Project Cost	$684,900

Assessment Areas

The Landing	=	15.28 Ac.
Other Commercial	=	23.93 Ac.
Residential	=	56.12 Ac.
Total B.D. Area	=	95.33 Ac.

Limit assessment for The Landing to $100,000 665,603 s.f. = $0.15 s.f.	$100,000
Other commercial @ $0.15/s.f. x 1,042,198 s.f.=	156,330
Residential @ $.0375/s.f. x 2,444,663 s.f. =	91,675
	$348,005
Total assessed share of cost	-348,005
City share of Project Cost	$336,895 (=49.2%)

Typical residential lot (17,000 s.f.)
assessment @ $0.0375/s.f. = $637.50

WILLIAM L. KORBER, L.S.
JOHN E. LUNDBLADE, L.S.
N. BRENT WOOTEN, P.E.
BAUGHMAN COMPANY, P.A.
SURVEYING & ENGINEERING
316 262-7271 • 315 ELLIS • WICHITA, KANSAS 67211

September 22, 1987

Preliminary Storm Sewer Estimate - Alternate B
(The Landing and adjacent areas - excluding
that part of storm sewer north of Taft).

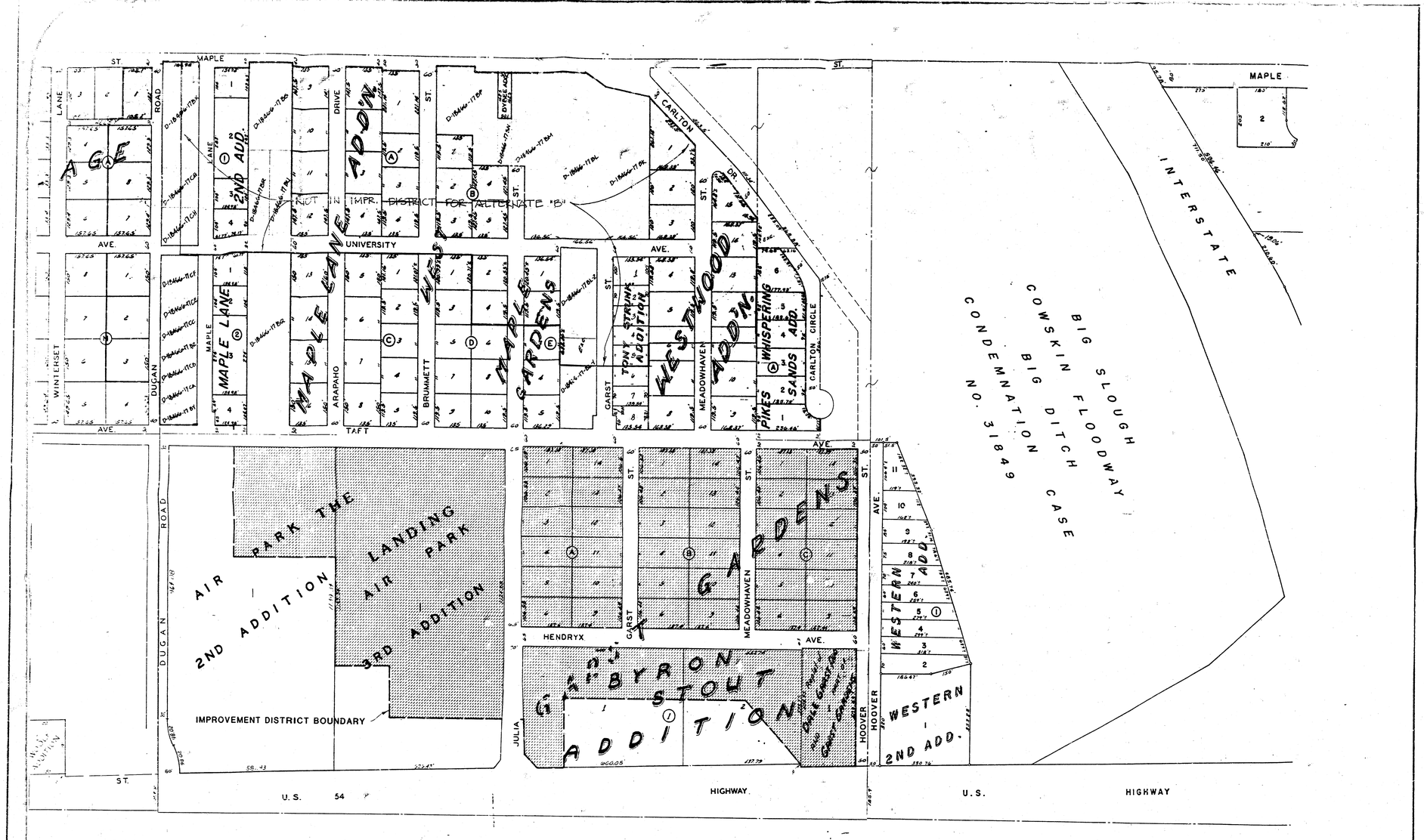
Estimated Cost of Construction	$498,358
+ 25%	124,589
Project Cost	$622,947

Assessment Areas

The Landing	=	15.28 Ac.
Other Commercial	=	23.93 Ac.
Residential (see Drainage Plan)	=	24.59 Ac.
Total B.D. area	=	63.80 Ac.

Limit assessment for The Landing to $100,000 (= 665,603 = 0.15/ s.f.)	$100,000
other commercial @ $0.15/s.f. x 1,042,198 s.f. =	156,330
Residential @ $.0375/s.f. x 1,071,297 s.f. =	40,174
	$296,504
Total assessed share of cost	-296,504
City share of Project Cost	$326,443 (=52.4%)

Typical residential lot (17,000 s.f.)
assessment @ $0.0375/s.f. = $637.50



NOTES:
1. FOR SYSTEM LAYOUT, SEE DRAINAGE PLAN DATED 9-18-87.
2. FOR LOT PARCEL AREAS, SEE ATTACHED AREA LIST.

SCALE 1" 150'
APPROXIMATE

Property to be assessed at Residential Use Valuation

Property to be assessed at Commercial Use Valuation

PROPOSED IMPROVEMENT DISTRICT FOR DRAINAGE IMPROVEMENTS

IN THE AREA FROM KELLOGG TO MAPLE AND FROM DUGAN TO THE BIG DITCH

ALTERNATE "B"

SEPT. 18, 1987

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

The Landing Storm Sewer - complete system

Tract	Area	$/s.f.	Share
Bybee Addition			
Lot 1	8,141	0.0375	$ 305.29
*Byron Stout Addition			
The west 153 feet of lot 1, except Street R/W	61,382	0.15	9,207.30
North 180 feet of Lot 1, except west 153 feet	80,460	"	12,069.00
Part of Lot 2	100,954	"	15,143.10
	242,796		
*Garst Gardens			
Lots 1-6, 9-14, Block A (12)	@19,960	0.15	2,994.00
" " " Block B "	@19,951	"	2,992.65
" " " Block C "	@19,940	"	2,991.00
	718,212		
Maple Lane 2nd Addition			
Lot 1, Block 1	14,038	0.0375	526.43
Lot 2, "	38,064	"	1,427.40
Lot 3, "	14,038	"	526.43
Lot 4, "	13,093	"	490.99
Lot 1, Block 2	14,983	"	561.86
Lot 2 "	14,038	"	526.43
Lot 3 "	36,985	"	1,386.94
Lot 4 "	13,588	"	509.55
	158,827		
Pike's Whispering Sands Addition			
Lot 1, Block A	20,500	0.0375	768.75
Lot 2, "	17,612	"	660.45
Lot 3, "	17,544	"	657.90
Lot 4, "	17,477	"	655.39
Lot 5, "	17,340	"	650.25
Lot 6, "	22,260	"	834.75
	112,733		
*Replat of Dale Garst & Part of Garst Gardens			
Lot 1, except part replatted as Byron Stout Addition	81,190	0.15	12,178.50
*The Landing			
Lot 1, except the south 182 feet	665,603	0.15	99,840.45
Tarry Strunk Addition			
Lot 1	13,554	0.0375	508.28
Lots 2-7 (6)	89,487	"	355.76
Lot 8	10,164	"	381.15
	80,640		

* Commercial Use Assumed

Tract	Area	$/s.f.	Share
West Maple Gardens			
Lot 1, Block A	29,854	0.0375	$1,119.53
Lots 2-4, " (3)	@16,133	"	604.99
Lots 1-3, Block B (3)	@16,133	"	604.99
Lots 4-5, " (2)	@17,206	"	645.23
Lot 1, Block C	16,351	"	613.16
Lots 2-5, " (4)	@16,133	"	604.99
Lot 1, Block D	16,315	"	611.81
Lots 2-10, " (8)	16,285	"	610.69
Lot 1, Block E	@16,133	"	604.99
Lot 2 "	16,446	"	616.73
Lot 3 "	16,317	"	611.89
Lot 4 "	16,307	"	611.51
Lot 5 "	16,297	"	611.14
	16,287	"	610.76
	485,205		
Westerlea Village			
Lot 1, Block A	19,128	0.0375	717.30
Lot 7, "	20,340	"	762.75
Lots 8-9, " (2)	@20,384	"	764.40
Lots 1-3, Block N (3)	@23,643	"	886.80
	151,180		
Westwood Addition			
Lot 1	29,877	0.0375	1,120.39
Lots 2-3 (2)	@20,206	"	757.73
Lot 4	20,153	"	755.74
Lots 5-14 (10)	@20,121	"	754.54
Lot 15	16,212	"	607.95
	307,864		
Unplatted Tracts (by Key Number)			
D-184-66-17 BK	86,085	0.0375	3,228.19
" BL	94,866	"	3,557.48
" BL-1	51,830	"	1,943.63
" BL-2	52,281	"	1,960.54
" BM	96,901	"	3,633.79
" BN	8,141	"	305.29
" BP	61,901	"	2,321.29
" BQ	98,988	"	3,712.05
" BR	24,747	"	928.01
" BS	49,494	"	1,856.03
" BU	24,747	"	928.01
" BX	99,943	"	1,872.86
" BY	10,124	"	379.65
" BZ	"	"	"
" CA	"	"	"
" CB	"	"	"
" CC	"	"	"
" CE	"	"	"
" CF	"	"	"
" CG	20,247	"	759.26
" CH	18,897	"	708.64
	"	"	"
	818,709		
Total B.D.	4,152,464 = 95.33 Ac		

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WILLIAM L. KOEBER L.S.
JOHN E. LANDLADE L.S.
N. BRENT WOOTEN P.E.

September 21, 1987

Preliminary Storm Sewer Estimate
(The Landing and adjacent areas)

Estimated Cost of Construction	$547,920
+ 25%	136,980
Project Cost	$684,900

Assessment Areas
The Landing = 15.28 Ac.
Other Commercial = 19.76 Ac.
Residential = 56.12 Ac.
Total B.D. Area = 91.16 Ac.

Limit assessment for The Landing to $100,000 ÷ 665,603 s.f. = $0.15/s.f.	$100,000
Other commercial @ $0.15/s.f. x 860,784 s.f. =	129,118
Residential @ $0.0375/s.f. x 2,444,463 s.f. =	91,675
Total assessed share of cost	-320,793
City share of Project Cost	$364,107 (53.2%)

Average residential lot (17,000 s.f.)
assessment @ $0.0375/s.f. = $637.50

The Landing Storm Sewer
Tract — Area — $/s.f. — Share

* Byron Stout Addition
" West 153' of lot 1, except street R/W — 61,382 — 0.15 — $9,207.30
" Part of Lot 2 — 180,954 — " — 27,143.10

Maple Lane Addition
Lots 1-4, Block 9-12 (16) — @19,913 — 0.0375 — 746.74
Lots 1-5-8, lots 12-15 (8) — @20,210 — " — 757.88
— 321,204

Maple Lane 2nd Addition
Lot 1, Blk 1 — 14,038 — 0.0375 — 526.43
Lot 2, Blk 1 — 38,064 — " — 1427.40
Lot 3, Blk 1 — 14,038 — " — 526.43
Lot 4, " — 13,093 — " — 490.99
Lot 1, Blk 2 — 14,983 — " — 561.86
Lot 2 — 14,038 — " — 526.43
Lot 3 — 36,985 — " — 1386.94
Lot 4 — 13,588 — " — 509.55
— 158,827

Garst Gardens
Lots 1-6, 9-14, Block A (12) — @19,960 — 0.15 — 2994.00
Lots 1-6, 9-14, Blk B (12) — @19,951 — " — 2992.65
Lots 1-6, 9-14, Blk C (12) — @19,940 — " — 2991.00
— 718,212

Replatted of Dale Garst & Garst Gardens
Lot 1, except part replatted as Byron Stout Add. — 81,190 — 0.15 — $12,178.50

Bybee Addition
Lot 1 — 8,141 — 0.0375 — 305.29

* The Landing
Lot 1, except the S. 182' — 665,603 — 0.15 — 99,840.45

Tarry Strunk Addition
Lot 1 — 13,554 — 0.0375 — 508.28
Lots 2-7 (6) — @9,487 — " — 355.76
Lot 8 — 10,164 — " — 381.15
— 80,640

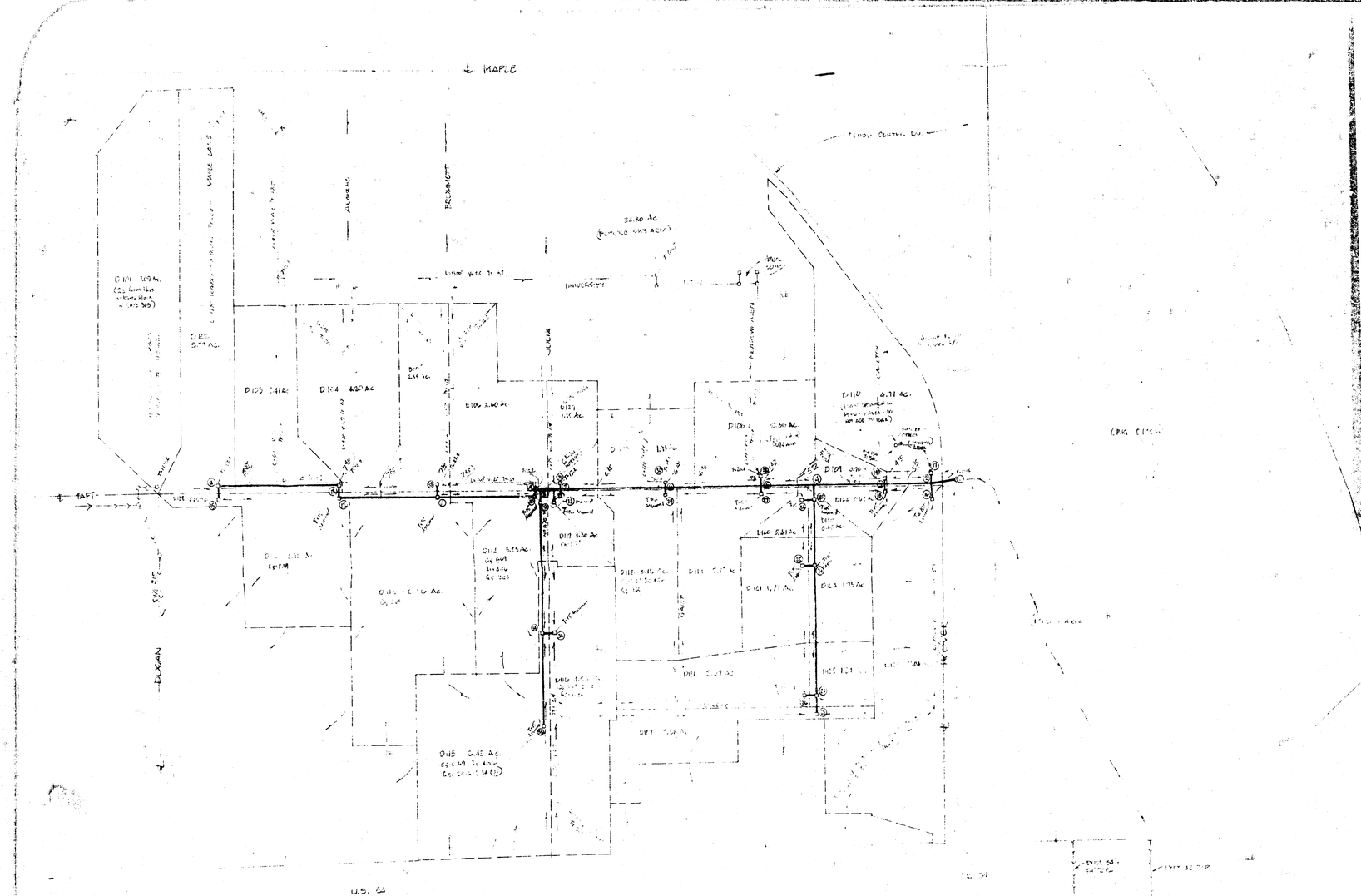
West Maple Gardens
Lot 1, Blk A — 29,854 — 0.0375 — 1119.53
Lots 2-4, " (3) — @16,133 — " — 604.99
Lots 1-3, Blk B (3) — @16,133 — " — 604.99
Lots 4-5, " (2) — @17,206 — " — 645.23
Lot 1, Blk C — 16,351 — " — 613.16
Lots 2-5, " (4) — @16,133 — " — 604.99
Lot 1, Blk D — 16,315 — " — 611.81
Lots 2-10, " (8) — 16,285 — " — 610.69
Lot 1, Blk E — @16,133 — " — 604.99
Lot 2 " — 16,446 — " — 616.73
Lot 3 " — 16,317 — " — 611.89
Lot 4 " — 16,307 — " — 611.51
Lot 5 " — 16,297 — " — 611.14
— 16,287 — " — 610.76
— 485,205

Westerlea Village
Lot 1, Blk A — 19,128 — 0.0375 — 717.30
Lot 7, " — 20,340 — " — 762.75
Lots 8-9, " (2) — @20,384 — " — 764.40
Lots 1-3, Blk N (3) — @23,643 — " — 886.80
— 151,180

Westwood Addition
Lot 1 — 29,877 — 0.0375 — 1120.39
Lots 2-3 (2) — @20,206 — " — 757.73
Lot 4 — 20,153 — " — 755.74
Lots 5-14 (10) — @20,121 — " — 754.54
Lot 15 — 16,212 — " — 607.95
— 307,864

Unplatted Tract's (by Key Number)
D-184-66-17 BK — 86,085 — 0.0375 — 3228.19
" BL — 94,866 — " — 3557.48
" BL-1 — 51,830 — " — 1943.63
" BL-2 — 52,281 — " — 1960.54
" BM — 96,901 — " — 3633.79
" BN — 8,141 — " — 305.29
" BP — 61,901 — " — 2321.29
" BQ — 98,988 — " — 3712.05
" BR — 24,747 — " — 928.01
" BS — 49,494 — " — 1856.03
" BU — 24,747 — " — 928.01
" BX — 99,943 — " — 1872.86
" BY — 10,124 — " — 379.65
" BZ — " — " — "
" CA — " — " — "
" CB — " — " — "
" CC — " — " — "
" CE — " — " — "
" CF — " — " — "
" CG — 20,247 — " — 759.26
" CH — 18,897 — " — 708.64
— " — " — "
— 818,709

Total B.D. — 3,971,050 = 91.16 Ac.



All areas north of Taft assumed commercial use (C=0.65)

Top part of The Landing from building footprint and means of drainage assumed to be 70% grass and 30% commercial (C=0.65). All other commercial areas assumed to be mixture of lawns (0.35) and multifamily (0.8) with weighted C=0.67

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September 21, 1987

Preliminary Storm Sewer Estimate
(The Landing and adjacent areas)

Estimated Cost of Construction	$547,920
+ 25%	136,980
Project Cost	$684,900

Assessment Areas

The Landing	=	15.28 Ac.
Other Commercial	=	19.76 Ac.
Residential	=	56.12 Ac.
Total B.D. Area	=	91.16 Ac.

Limit assessment for The Landing to	$100,000
$100,000 ÷ 665,603 s.f. = $0.15/s.f.	
other commercial @ $0.15/s.f. x 860,784 s.f. =	129,118
Residential @ $.0375/s.f. x 2,444,663 s.f. =	91,675
Total assessed share of cost	-320,793
City share of Project Cost	$364,107
	(=53.2%)

Average residential lot (17,000 s.f.)
assessment @ $0.0375/s.f. = $637.50

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Revised September 22, 1987

Preliminary Storm Sewer Estimate - Alternate A
(The Landing and adjacent areas - includes system in Taft, Hoover, Meadowlark and Garst)

Estimated Cost of Construction	$547,920
+ 25%	136,980
Project Cost	$684,900

Assessment Areas

The Landing	=	15.28 Ac.
Other Commercial	=	23.93 Ac.
Residential	=	56.12 Ac.
Total B.D. Area	=	95.33 Ac.

Limit assessment for The Landing to	$100,000
$100,000 665,603 s.f. = $0.15 s.f.	
other commercial @ $0.15/s.f. x 1,042,198 s.f. =	156,330
Residential @ $.0375/s.f. x 2,444,663 s.f. =	91,675
	$348,005
Total assessed share of cost	-348,005
City share of Project Cost	$336,895
	(=49.2%)

Typical residential lot (17,000 s.f.)
assessment @ $0.0375/s.f. = $637.50

Pump Station
Notes on Design
Page 8
September, 1978

FRICTION OF WATER IN PIPES AND FITTINGS

WILLIAMS & HAZEN FORMULA C = 100

Loss of Head in Feet Due to Friction per 100 Feet of 15 year old Cast Iron Pipe

# Gallons Per Min.	4 Inch Pipe Vel.	4 Inch Pipe Fric.	6 Inch Pipe Vel.	6 Inch Pipe Fric.
40	1.02	0.22		
50	1.53	0.47		
75	1.92	0.73		
100	2.55	1.22	1.14	0.14
125	3.19	1.86	1.42	0.20
150	3.84	2.55	1.71	0.32
175	4.45	3.44	2.00	0.48
200	5.11	4.40	2.28	0.62
225	5.77	5.45	2.57	0.74
250	6.40	6.72	2.80	0.92
275	7.03	7.99	3.06	1.15
300	7.66	9.30	3.40	1.29
350	8.90	12.32	3.98	1.75
400	10.21	16.00	4.54	2.21
450	11.50	19.80	5.12	2.65
500	12.77	24.00	5.68	3.30
550	.....	.....	6.16	3.93
600	.....	.....	6.72	4.70
650	.....	.....	7.28	5.40
700	.....	.....	7.97	6.20
750	.....	.....	8.50	7.00
800	.....	.....	9.08	8.00
850	.....	.....	9.58	8.95
900	.....	.....	10.18	10.11
950	.....	.....	10.72	10.80
1000	.....	.....	11.32	12.04
1050	.....	.....	11.92	13.30
1100	.....	.....	12.56	14.31
1150	.....	.....	12.95	15.50
1200	.....	.....	13.52	16.69
1250	.....	.....	14.10	18.50
1300	.....	.....	.....	.....
1400	.....	.....	.....	.....
1500	.....	.....	.....	.....
1600	.....	.....	.....	.....
1800	.....	.....	.....	.....
2000	.....	.....	.....	.....
2200	.....	.....	.....	.....
2400	.....	.....	.....	.....
2600	.....	.....	.....	.....
2800	.....	.....	.....	.....
3000	.....	.....	.....	.....

Williams & Hazen Coefficient "C"	Multiplier to Adjust Chart	Pipe Description
100	1.00	Average 15 year old cast iron pipe
110	0.840	Vitrified sewer pipe
120	0.715	New wrought iron pipe
120	0.715	Average 5 year old cast iron pipe
130	0.615	Average new cast iron pipe
140	0.540	Very straight & smooth cast iron pipe
140	0.540	New steel pipe; Cement asbestos pipe
150	0.470	New CI pipe w/cont. spun bituminous lining

8 Inch Pipe Vel.	8 Inch Pipe Fric.	10 Inch Pipe Vel.	10 Inch Pipe Fric.	12 Inch Pipe Vel.	12 Inch Pipe Fric.	14 Inch Pipe Vel.	14 Inch Pipe Fric.	16 Inch Pipe Vel.	16 Inch Pipe Fric.
1.98	0.32								
2.10	0.42								
2.21	0.54	1.64	0.18						
2.92	0.68	1.80	0.23						
3.30	0.82	2.04	0.28	1.42	11				
3.52	0.97	2.25	0.33	1.57	.14				
3.84	1.14	2.46	0.39	1.71	0.15				
4.16	1.34	2.66	0.46	1.85	0.19	1.37	0.09		
4.46	1.54	2.86	0.52	2.00	0.22	1.49	0.10		
4.80	1.74	3.06	0.59	2.13	0.24	1.58	0.1.		
5.12	1.97	3.28	0.67	2.27	0.27	1.68	0.13		
5.48	2.28	3.48	0.75	2.4.	0.31	1.79	0.14		
5.76	2.46	3.68	0.83	2.56	0.34	1.89	0.16		
6.06	2.87	3.88	0.91	2.70	0.38	2.00	0.13		
6.40	3.02	4.08	1.01	2.84	0.41	2.10	0.13	1.59	0.10
6.70	3.21	4.29	1.09	2.98	0.44	2.20	0.21	1.67	0.11
7.03	3.51	4.50	1.20	3.13	0.48	2.31	0.23	1.75	0.12
7.35	3.84	4.71	1.34	3.27	0.53	2.42	0.23	1.83	0.13
7.67	4.15	4.91	1.46	3.41	0.57	2.52	0.25	1.91	0.1.
7.99	4.45	5.11	1.51	3.55	0.62	2.63	0.27	1.99	0.15
8.32	4.85	5.31	1.87	3.69	0.67	2.74	0.33	2.07	0.16
8.95	5.60	5.71	1.87	3.98	0.78	2.94	0.36	2.22	0.18
9.60	6.27	6.10	2.09	4.20	0...	3.15	0.39	2.39	0.21
10.25	7.15	6.53	2.39	4.55	0.98	3.36	0.44	2.55	0.24
11.50	8.80	7.35	2.95	5.11	1.21	3.78	0.55	2.87	0.30
12.78	10.71	8.18	3.65	5.68	1.43	4.20	0.68	3.19	0.39
.....	.....	8.98	4.24	6.25	1.81	4.60	0.81	3.51	0.46
.....	.....	9.80	5.04	6.81	2.08	5.04	0.95	3.83	0.54
.....	.....	10.61	5.81	7.38	2.43	5.46	1.13	4.15	0.62
.....	.....	11.41	6.70	7.95	2.75	5.88	1.29	4.47	0.70
.....	.....	12.24	7.62	8.52	3.15	6.30	1.47	4.79	0.80

Length of Straight Pipe which will give same Friction Loss as listed Valves and Fittings*

Pipe Size	Std. Elbow	Long Radius Elbow	45° Elbow	Tee through Side	Gate Valve Open	Swing Check Valve Open
4"	11'	7'	5'	22'	2.3'	23'
6"	16'	11'	7.7'	33'	3.5'	40'
8"	21'	14'	10'	43'	4.5'	53'
10"	26'	17'	13'	54'	5.7'	67'
12"	32'	20'	15'	66'	6.7'	80'
14"	36'	23'	17'	76'	8.0'	93'
16"	42'	27'	19'	87'	9.0'	107'

(Add to Actual Pipe Length to get Equivalent Length for use with Friction Factor from above Table).

Gallons Per. Min.						
3200	9.10	5.51	6.68	1.67	5.12	0.88
3400	9.66	5.91	7.10	1.86	5.44	0.98
3600	10.25	6.37	7.52	2.08	5.77	1.10
3800	10.80	6.90	7.95	2.36	6.07	1.20
4000	11.35	5.32	8.40	2.67	6.38	1.34
4500	12.78	6.39	9.45	3.22	7.20	1.65
5000	14.20	8.40	10.50	3.92	7.96	2.02
5500	.....	.....	11.55	4.65	8.78	2.39
6000	.....	.....	12.60	5.50	9.56	2.80

Velocities of less than 2.5'per second are not recommended for raw sewage.

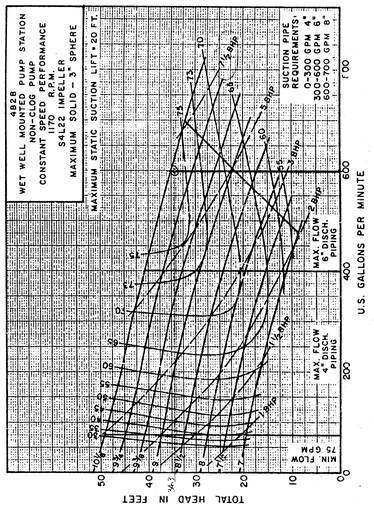
* Use twice the rated capacity for pneumatic ejector stations.

ENGINEERING DATA

Smith & Loveless, Inc.
14040 W. Santa Fe Trail Dr.
Lenexa, Kansas 66215

Vacuum Primed
Power Performance Curve
Constant Speed
4822N
1170 RPM

WET WELL MOUNTED PUMP STATION
NON-CLOG PUMP
CONSTANT SPEED PERFORMANCE
4822 N SERIES
S4L22 IMPELLER
MAXIMUM SOLID – 3" SPHERE
MAXIMUM STATIC SUCTION LIFT – 20 FT.



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September 22, 1987

Preliminary Storm Sewer Estimate - Alternate B
(The Landing and adjacent areas - excluding that part of storm sewer north of Taft).

Estimated Cost of Construction	$498,358
+ 25%	124,589
Project Cost	$622,947

Assessment Areas

The Landing	=	15.28 Ac.
Other Commercial	=	23.93 Ac.
Residential (see Drainage Plan)	=	24.59 Ac.
Total B.D. area	=	63.80 Ac.

Limit assessment for The Landing to	$100,000
$100,000 (÷ 665,603 = 0.15/s.f.)	
other commercial @ $0.15/s.f. x 1,042,198 s.f. =	156,330
Residential @ $.0375/s.f. x 1,071,297 s.f. =	40,174
	$296,504
Total assessed share of cost	-296,504
City share of Project Cost	$326,443
	(=52.4%)

Typical residential lot (17,000 s.f.)
assessment @ $0.0375/s.f. = $637.50

The Landing Storm Sewer - complete system

Tract	Area	$/s.f.	Share
Lybee Addition			
Lot 1	8,141	0.0375	$ 305.29
*Byron Stout Addition			
The west 153 feet of Lot 1, except Street R/W	61,382	0.15	9,207.30
North 180 feet of Lot 1, except west 153 feet	80,460	"	12,069.00
Part of Lot 2	100,954	"	15,143.10
	242,796		
*Garst Gardens			
Lots 1-6, 9-14, Block A (12)	@19,960	0.15	2,994.00
" " " Block B "	@19,951	"	2,992.65
" " " Block C "	@19,940	"	2,991.00
	718,212		
Maple Lane 2nd Addition			
Lot 1, Block 1	14,038	0.0375	526.43
Lot 2, "	38,064	"	1,427.40
Lot 3, "	14,038	"	526.43
Lot 4, "	13,093	"	490.99
Lot 1, Block 2	14,983	"	561.86
Lot 2 "	14,038	"	526.43
Lot 3 "	36,985	"	1,386.94
Lot 4 "	13,588	"	509.55
	158,827		
Pike's Whispering Sands Addition			
Lot 1, Block A	20,500	0.0375	768.75
Lot 2, "	17,612	"	660.45
Lot 3, "	17,544	"	657.90
Lot 4, "	17,477	"	655.39
Lot 5, "	17,340	"	650.25
Lot 6, "	22,260	"	834.75
	112,733		
*Replat of Dale Garst & Part of Garst Gardens			
Lot 1, except part replatted as Byron Stout Addition	81,190	0.15	12,178.50
*The Landing			
Lot 1, except the south 182 feet	665,603	0.15	99,840.45

Tract	Area	$/s.f.	Share
West Maple Gardens			
Lot 1, Block A	29,854	0.0375	$1,119.53
Lots 2-4, " (3)	@16,133	"	604.99
Lots 1-3, Block B (3)	@16,133	"	604.99
Lots 4-5, " (2)	@17,206	"	645.23
Lot 1, Block C	16,351	"	613.16
Lots 2-5, " (4)	@16,133	"	604.99
Lot 1, Block D	16,315	"	611.81
Lot 2, "	16,285	"	610.69
Lots 3-10, " (8)	@16,133	"	604.99
Lot 1, Block E	16,446	"	616.73
Lot 2 "	16,317	"	611.89
Lot 3 "	16,307	"	611.51
Lot 4 "	16,297	"	611.14
Lot 5 "	16,287	"	610.76
	485,265		
Westerlea Village			
Lot 1, Block A	19,128	0.0375	717.30
Lot 7, "	20,340	"	762.75
Lots 8-9, " (2)	@20,384	"	764.40
Lots 1-3, Block N (3)	@23,648	"	886.80
	151,180		
Westwood Addition			
Lot 1	29,877	0.0375	1,120.39
Lots 2-3 (2)	@20,206	"	757.73
Lot 4	20,153	"	755.74
Lots 5-14 (10)	@20,121	"	754.54
Lot 15	16,212	"	607.95
	307,864		
Unplatted Tracts (by Key Number)			
D-184-66-17 BK	86,085	0.0375	3,228.19
" BL	94,866	"	3,557.48
" BL-1	51,830	"	1,943.63
" BL-2	52,281	"	1,960.54
" BM	96,901	"	3,633.79
" BN	8,141	"	305.29
" BP	61,901	"	2,321.29
" BQ	98,988	"	3,712.05
" BR	24,747	"	928.01
" BS	49,494	"	1,856.03
" BU	24,747	"	928.01
" BX	99,943	"	1,872.86
" BY	10,124	"	379.65
" BZ	"	"	"
" CA	"	"	"
" CB	"	"	"

THE LANDING
ALTERNATE DRAINAGE PLAN

October 22, 1987

The contributing area for this plan includes all of the proposed Wal-Mart site, part of Wichita Inn, part of Block A, Garst Gardens, and part of Julia Street R/W.

Total D.A. = 18.4 Acres (all commercial)

Runoff from this area will be detained in a detention basin to be located on the north part of Lot 1, The Landing. Most of the Wal-Mart site will drain directly into the pond via flumes. Drainage from Julia Street and offsite properties will enter the pond via curb inlets and pipe systems to be constructed with the pavement projects. Relief is also provided to drain minor sumps along Taft but capacity will not be required to store runoff from Taft, since the street will overflow to the east as the pond reaches maximum depth.

Stored runoff will be pumped to an existing inlet in Storm Water 315, located on the north side of Taft at Dugan. The pumping rate will be approximately 600 gallons per minute, which will empty the pond and restore capacity in four days. This discharge rate (1.3 cfs) will have a negligible effect on the capacity of SWS 315.

Runoff volume for detention requirements was calculated using the SCS TR-55 manual. The curve number of 92 is from Table 2-2, using hydrologic soil group "B" and 85% impervious cover for the entire drainage area (assuming business and commercial uses).

The design storm for detention calculations is the 100-year frequency, 24-hour duration event, with a total rainfall of 7.8" according to Fig. C-5 in the TR-55 manual. From Table 2-1, the runoff depth from the watershed = 6.85". 100-year runoff volume = 6.85" x 18.4 Ac. / 12 = 10.5 Acre-feet = 457,258 cubic feet.

Required pumping rate to restore capacity in 4 days:

$$\frac{457{,}258 \text{ c.f.} \times 7.48 \text{ gal./c.f.}}{4 \times 24 \times 60} = 594 \text{ gpm} \quad \text{(use 600)}$$

Preliminary Pump Head Calculations

Required pumping rate = 600 gpm
Force main length = 1050 feet

Available storage volume in detention basin = 11.7 acre-feet at elevation 116.0, which is approximately the gutter flowline elevation at Taft and Julia. The calculated detention requirement of 10.5 acre-feet will be met at elevation 115.7, providing a margin of 1.2 acre-feet of storage.

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October 28, 1987

THE LANDING - Proposed Storm Water Sewer

Total Area			90.42 Ac.	I	II
Area 1	-	Landing	17%	15.29 Ac.	100,000	100,000
Area 2	-	Commercial	25%	22.74 Ac.	150,000	150,000
Area 3	-	Residential	58%	52.39 Ac.	85,000	50,000
		City			335,000	300,000
I. Total Cost					$670,000	
II. Total Reduced Cost						$600,000