AML 4/8/97

LINDSAY'S ORCHARD DRAINAGE

SOIL TYPE: B . FROM SEDGWICK COUNTY SOIL SURVEY

FRONT YARD AREAS:
C_2 = .52
C_{100} = .67

BACK YARD AREAS:
C_2 = .25
C_{100} = .41

Tc
AREAS C, D, E, F, I, J T_c = 15

A+B
219' LAWN OVERLAND FLOW @ .28 ft/s ⇒ 13.03 min
300' SHALLOW GUTTER FLOW @ .77 ft/s ⇒ 6.49 min
320' FULL GUTTER FLOW @ 1.5 ft/s ⇒ 3.56 min
23.08 min
USE 23 min

H
220' LAWN OVERLAND FLOW @ .28 ft/s ⇒ 17.86 min
105' ASSUMED WATERWAY FLOW @ 1.0 ft/s ⇒ 5.31 min
23.16 min
USE 20 min

A
45' LAWN OVERLAND FLOW @ .28 ft/s ⇒ 2.68 min
300' SHALLOW GUTTER FLOW @ .77 ft/s ⇒ 6.49 min
495' FULL GUTTER FLOW @ 1.5 ft/s ⇒ 5.44 min
14.62 min
USE 15 min

INLET RATING

AREA (A) Q_2 = 7.66 cfs — Q_{100} = 18.98
INLET (1) 10' 15' S = .35%
Q_A = 7.66 cfs — Q_A = 18.98 cfs
Q_i = 1.92 cfs — Q_i = 3.34 cfs
Q_B = 5.74 cfs — Q_B = 15.64 cfs

AREA (B) Q_2 = 3.21 cfs — Q_{100} = 9.84 cfs
INLET (3) (4) L' 10' S = .35%
Q_A = 8.75 — Q_A = 25.48 cfs

2 L-15' Inlets, SUMP @ 26 cfs/ea. = 52 cfs cap. Inlets (3) & (4)

INLETS COLLECT ALL Q

AREA (C) Q_2 = .54 cfs — Q_{100} = 1.69 cfs
INLET (5) DROP INLET
552.25 in² = 3.84 ft²
ℓ Depth = 10'
$Q_i = .6 A \sqrt{2gh} = .6(3.84)\sqrt{2(32.2)(10)}$
Q_i = 18.49 cfs > Q_{100}

AREA (F) Q_2 = 5.77 cfs — Q_{100} = 14.30

2 L-10' INLETS, SUMP @ 26 cfs/ea. = 52 cfs cap. INLET (6) & (7)

INLETS COLLECT ALL Q

AREA (E) Q_2 = .69 cfs — Q_{100} = 2.18 cfs

INLET (8) DROP INLET Cap. = 18.49 cfs > 2.18 cfs ok

AREA (F) Q_2 = .31 cfs — Q_{100} = 2.56 cfs
$3.84 ft^2 \times .6\sqrt{2gh}$ = $3.84 \times .6\sqrt{2(32.2).67(2)}$
INLET (9) Cap. = 21.4 cfs > 2.56 cfs ok

AREA (G) Q_2 = 2.48 cfs — Q_{100} = 6.23 cfs

INLET (10) DROP INLET Cap = 18.49 > 6.23 cfs ok

AREA (I) Q_2 = .36 cfs — Q_{100} = 1.13 cfs

INLET (11) DROP INLET CAP = 18.49 > 1.13 cfs

AREA (J) Q_2 = .76 cfs — Q_{100} = 2.39 cfs
$3.84 ft^2 \times .6\sqrt{2gh}$ = $3.84 \times .6\sqrt{2(32.2).67(2)}$
INLET (12) Cap. = 21.4 cfs > 2.39 cfs

Sheet 1

LINDSAY'S ORCHARD 8/7/97
SOIL TYPE: B

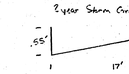
2-year Design Storm

	Area (ac.)	Tc	i	c	Q
A	3.844189	15	3.83	0.52	7.656086
B	1.992497			.52	3.51
A+B	5.836685	23	3.1	0.52	9.408737
C	0.560428	15	3.83	0.25	0.53651
D	2.897577	15	3.83	0.52	5.770815
E	0.720457	15	3.83	0.25	0.689837
F	0.846711	15	3.83	0.25	0.810726
G	1.423351	20	3.33	0.52	2.464674
H	2.818535	19	3.42	0.52	5.012482
I	0.373163	15	3.83	0.25	0.357304
J	0.790662	15	3.83	0.25	0.757059

100-year Design Storm

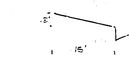
	Area (ac.)	Tc	i	c	Q
A	3.844109	15	7.37	0.67	18.98222
B	1.992497				
A+B	5.836685	23	6.13	0.67	23.97185
C	0.560428	15	7.37	0.41	1.693445
D	2.897577	15	7.37	0.67	14.30795
E	0.720457	15	7.37	0.41	2.177005
F	0.846711	15	7.37	0.41	2.558507
G	1.423351	20	6.53	0.67	6.227302
H	2.818535	19	6.68	0.67	12.01463
I	0.373163	15	7.37	0.41	1.127587
J	0.790662	15	7.37	0.41	2.389144

2 year Storm Contained in curbs



A = 5.22 ft²
R = .2353
$V = \frac{1.49}{.013}\left(\frac{.2353}{5.02}\right)^{.67}(.0035)^{.5}$ = .4982
V·A = 4.6638 × 2 = 9.33 cfs

100 year Storm

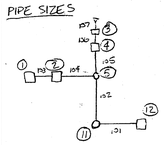


$V = \frac{1.49^2}{.038}\left(\frac{12.37}{32.55}\right)^{.67}(.0035)^{.5}$ = 2.22 ft²

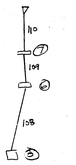
$n = \frac{15(.08) + .05(17.55)}{32.55}$ = .0208 — V·A = 27.5 × 2 = 55.01 cfs

A = 12.37 ft²

PIPE SIZES

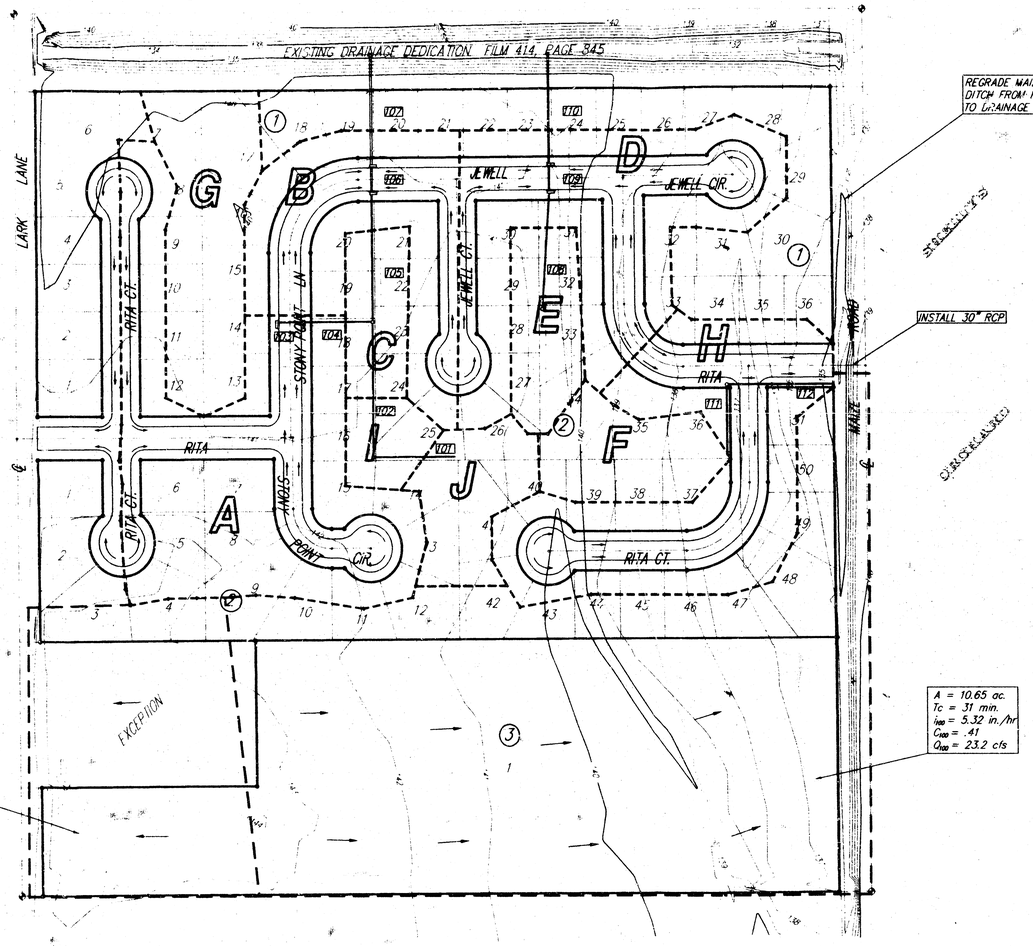


101 - 2.39 cfs ⇒ 15"
102 - 3.52 cfs ⇒ 15"
103 - 1.67 cfs ⇒ 15"
104 - 5.34 cfs ⇒ 15"
105 - 8.55 cfs ⇒ 21"
106 - 21.21 cfs ⇒ 33"
107 - 34.03 cfs ⇒ 33" or 36"



108 — 2.17 cfs ⇒ 15"
109 — 9.32 cfs ⇒ 21"
110 — 16.47 cfs ⇒ 24"

111 - 2.56 cfs ⇒ 15"
112 - 2.56 cfs ⇒ 15"



SCALE: 1" = 100'

	Area (ac)	Tc	i_2	i_{100}	C_2	C_{100}	Q_2	Q_{100}
A	3.84	15	3.83	7.37	0.52	0.67	7.66	18.99
B	1.99	15	3.83	7.37	0.52	0.67	3.97	9.84
C	0.56	15	3.83	7.37	0.25	0.41	0.54	1.69
D	2.90	15	3.83	7.37	0.52	0.67	5.77	14.31
E	0.72	15	3.83	7.37	0.25	0.41	0.69	2.18
F	0.85	15	3.83	7.37	0.25	0.41	0.81	2.56
G	1.42	20	3.33	6.53	0.52	0.67	2.46	6.23
H	2.82	19	3.42	6.68	0.52	0.67	5.01	12.61
I	0.37	15	3.83	7.37	0.25	0.41	0.36	1.13
J	0.79	15	3.83	7.37	0.25	0.41	0.76	2.39

Pipe	Size	Q (cfs)	Grade
101	15"	2.39	0.50%
102	15"	3.52	0.50%
103	15"	1.67	0.50%
104	15"	3.34	0.50%
105	21"	8.55	0.50%
106	30"	21.29	0.50%
107	30"	34.03	0.50%
108	15"	2.17	0.50%
109	21"	9.32	0.50%
110	24"	16.47	0.50%
111	15"	2.56	0.50%
112	15"	2.56	0.50%

9-16-97

DRAINAGE PLAN
LINDSAY'S ORCHARD
WICHITA, KANSAS

SRB
SAVOY, RUGGLES & BOHM, P.A.
ENGINEERING & SURVEYING
PROJECT NUMBER

DESIGN	DRAWN	CHECK	APVD	DATE	REVISED
CMB	AML			Aug. 18, 1997	

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