

Preliminary Drainage Report

For

D & F EQUIPMENT SALES

TONTITOWN, ARKANSAS

MAY 2015

PREPARED BY

ENGINEERING SERVICES, INC.

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Engineering Services, Inc.
Consulting Engineers and Surveyors
Springdale, AR

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Engineering Services, Inc.
Consulting Engineers and Surveyors
Springdale, AR

Narrative & Summary



Engineering Services, Inc.
Consulting Engineers and Surveyors
Springdale, AR

PROJECT OWNER AND DEVELOPER

D & F Equipment Sales
P.O. Box 275
Crossville, AL 35962

PROJECT TITLE

D & F Equipment LSD

PROJECT LOCATION

Lot 19 of the Maestri Subdivision in Tontitown, Arkansas.

PROJECT DESCRIPTION

This large scale development of 1.05 acres includes the construction of a building and associated parking lot.

DRAINAGE ANALYSIS

The majority of the runoff for this project enters an existing storm drainage system along Agnes Drive. The drainage area map and drainage calculations from the initial design of Maestri Subdivision have been included with this report. Four drainage areas (Areas M, N, O & P) are shown to be different than what was originally shown on the Maestri Subdivision drainage area map. A C value of 0.80 was used for the initial design of the system for each drainage area. A new C values were established using the actual conditions. A "C" value of 0.40 was used for the grassed/permeable area. A "C" value of 0.90 was used for the paved/impermeable areas. The following chart shows the flows for the initial and proposed designs:

Drainage Area	Initial Design			Proposed Design			Difference in Flow
	Acreage	C Value	Flow	Acreage	C Value	Flow	
M	1.76	0.80	9.86	1.61	0.90	10.14	0.29
N	1.52	0.80	8.51	1.91	0.84	11.23	2.72
O	1.45	0.80	8.12	1.51	0.72	7.61	-0.51
P	1.42	0.80	7.95	1.14	0.90	7.18	-0.77

CONCLUSION

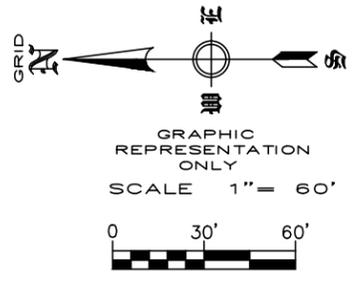
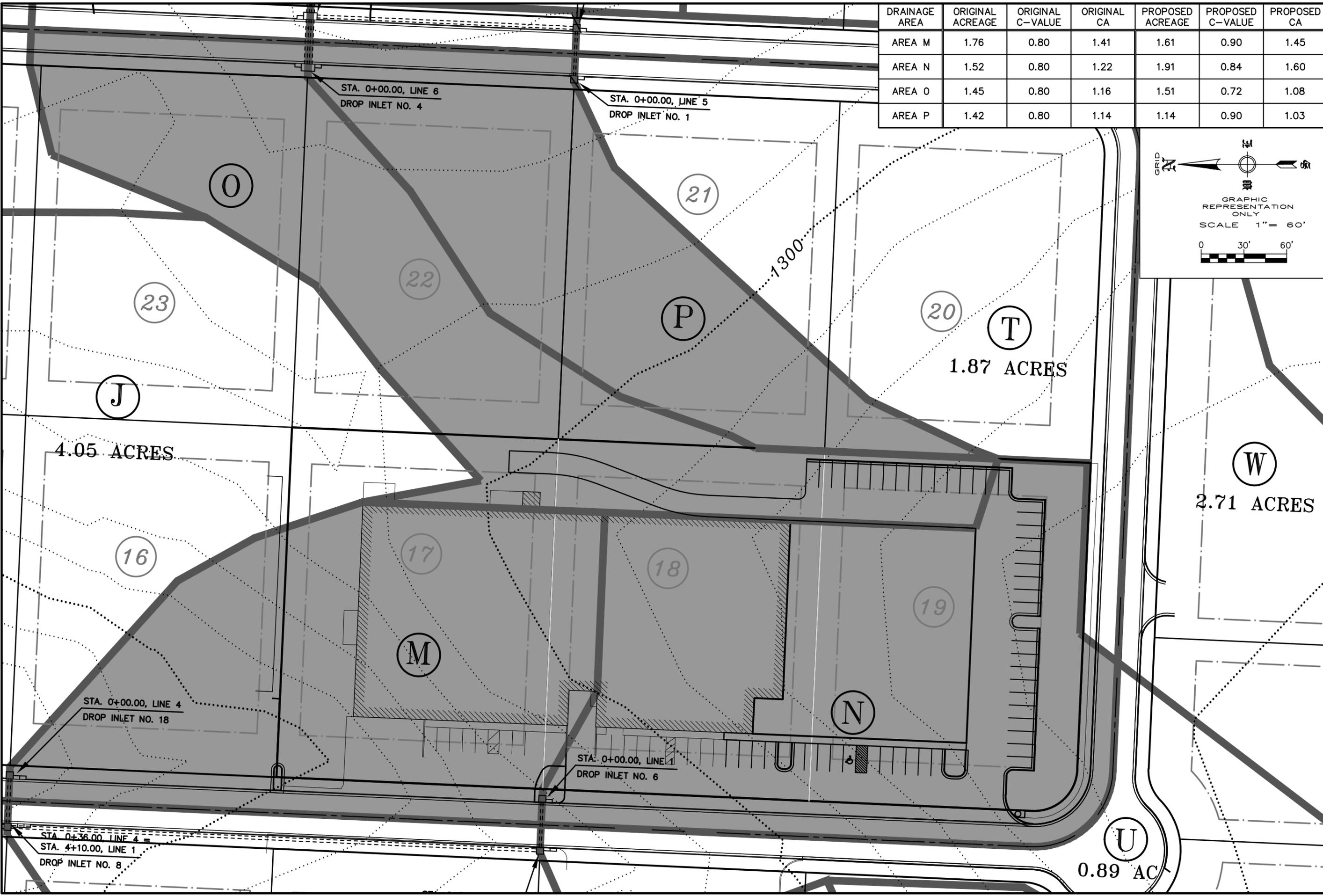
As can be seen from the chart, there is not a significant increase in flows due to this development.

PROPOSED DRAINAGE AREA MAP



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DRAINAGE AREA	ORIGINAL ACREAGE	ORIGINAL C-VALUE	ORIGINAL CA	PROPOSED ACREAGE	PROPOSED C-VALUE	PROPOSED CA
AREA M	1.76	0.80	1.41	1.61	0.90	1.45
AREA N	1.52	0.80	1.22	1.91	0.84	1.60
AREA O	1.45	0.80	1.16	1.51	0.72	1.08
AREA P	1.42	0.80	1.14	1.14	0.90	1.03



DRAINAGE AREA MAP
D & F EQUIPMENT COMPANY
TONTITOWN, ARKANSAS

REVISION	DATE	DESCRIPTION

SCALE: 1"=60'
DATE: May, 2015
W.O. # 12904

MAESTRI SUBDIVISION DRAINAGE AREA MAP



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MAESTRI SUBDIVISION DRAINAGE CALCULATIONS



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Springdale, AR

100 YR GRASS DRAINAGE SWALE COMPUTATIONS

LINE ONE	DRAINAGE AREAS	LOCATION	TOTAL CA	DISCHARGE					DITCH DESIGN										DITCH INVERTS					
				OVERLAND FLOW	TIME IN SECONDS	INCHES	IN/HR	CFS	TYPE	FT.	FT.	FT./FT.	FT.	FT./FT.	CFS	FT./SEC.	MIN.	FEET	INLET ELEVATION	TOTAL FALL L x S	OUTLET ELEVATION			
																						MINUTES	IN/HR	CFS
				4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
-		7+90.00-11+67.60	10.12	10	-	10	7.8	78.84	TRAP	2	6	3:1	2	0.0056	105.25	4.06	377.80	1.55	1285.10	2.11	1282.99			
-		11+67.60-14+13.43	12.35	10	-	10	7.8	98.33	TRAP	2	6	3:1	2	0.0056	105.25	4.28	245.83	0.96	1282.99	1.38	1281.61			
-		14+13.43-16+02.52	12.35	10	-	10	7.8	96.33	TRAP	2	6	3:1	-	0.0056	105.25	4.28	189.09	0.74	1281.61	1.08	1280.55			

LINE FIVE

-		2+37.50-4+85.00	6.21	10	-	10	7.8	48.43	TRAP	2	4	3:1	2	0.0050	79.16	3.48	227.50	1.09	1293.07	1.14	1291.93			
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LINE EIGHT

V, K1, K2		0+00-3+00	6.34	10	-	10	7.8	48.45	TRAP	2	2	3:1	2	0.0060	65.10	3.80	300	1.32	1299.40	1.81	1297.59			
V, K1, K2, K3		3+00-6+00	7.83	10	-	10	7.8	61.07	TRAP	2	4	3:1	2	0.0040	70.80	3.41	300	1.47	1297.59	1.20	1296.39			
V, K1, K2, K3, K4		6+00-9+00	9.98	10	-	10	7.8	77.89	TRAP	2	6	3:1	2	0.0040	88.95	3.57	300	1.40	1296.39	1.20	1295.19			
V, K1, K2, K3, K4, K5		9+00-12+00	10.36	10	-	10	7.8	80.80	TRAP	2	6	3:1	2	0.0063	111.63	4.28	300	1.17	1295.19	1.89	1293.30			
V, K1, K2, K3, K4, K5, K6		12+00-15+00	10.48	10	-	10	7.8	81.75	TRAP	2	6	3:1	2	0.0179	188.17	6.24	300	0.80	1293.30	5.36	1287.94			
-		15+00-16+80.04	10.48	10	-	10	7.8	81.75	TRAP	1.25	10	3:1	-	0.0163	105.76	5.69	180.04	0.53	1287.94	2.94	1285.00			

LINE NINE

X, S1		0+00-3+00	10.48	10	-	10	7.8	81.75	TRAP	2	4	3:1	2	0.0172	146.81	6.30	300	0.79	1299.12	5.15	1293.97			
X, S1, S2		3+00-6+00	11.75	10	-	10	7.8	91.62	TRAP	2	5	3:1	2	0.0078	103.36	4.62	300	1.08	1293.97	2.34	1291.63			
X, S1, S2, S3		6+00-9+00	13.01	10	-	10	7.8	101.48	TRAP	2	8	3:1	2	0.0040	107.48	3.78	300	1.32	1291.63	1.20	1290.43			
X, S1, S2, S3, S4		9+00-12+00	14.27	10	-	10	7.8	111.34	TRAP	2	8	3:1	2	0.0054	124.89	4.32	300	1.16	1290.43	1.62	1288.81			
X, S1, S2, S3, S4, S5		12+00-14+99.51	15.54	10	-	10	7.8	121.20	TRAP	2	8	3:1	-	0.0060	131.61	4.59	299.51	1.09	1288.81	1.81	1287.00			

TIME OF CONCENTRATION

DRAINAGE AREA NO.	ACRES	CMPSTE	CA
A	0.58	0.80	0.46
B	1.10	0.80	0.88
C	0.15	0.95	0.14
D	2.29	0.80	1.83
E	0.80	0.95	0.76
F	3.33	0.85	2.83
G	3.37	0.80	2.70
H	0.22	0.95	0.21
I	2.17	0.80	1.74
J	4.05	0.80	3.24
K	14.09	0.50	7.05
L	3.01	0.80	2.41
M	1.76	0.80	1.41
N	1.52	0.80	1.22
O	1.45	0.80	1.16
P	1.42	0.80	1.14
Q	0.13	0.95	0.12
R	0.13	0.95	0.12
S	4.94	0.80	3.95
T	1.87	0.80	1.50
U	0.89	0.85	0.76
V	2.70	0.80	2.16
W	2.71	0.80	2.17
X	11.51	0.80	9.21
Y	0.76	0.80	0.61
Z	0.09	0.95	0.09

FLOW COMPUTATIONS (100 YR)

LINE ONE

PIPE SEGMENT	NO.	LOCATION	CAPACITY CFS	Qm	So	y*	a	v	rc
1-18" RCP	F	0+00-0+36	8.66	5.06	0.005	0.86	1.1	4.81	0.012
1-24" RCP	G	0+36-4+10.00	25.83	16.87	0.0096	1.24	2.0	8.28	0.012
1-36" RCP	H	4+10-7+83.52	87.31	43.13	0.0076	1.83	4.90	9.56	0.012
2-30" RCP	I	7+83.52-7+90	90.68	70.87	0.009	1.76	7.40	9.82	0.012

LINE TWO

1-24" RCP	N	0+00-0+36	18.64	14.77	0.005	1.42	2.4	6.19	0.012
1-24" RCP	O	0+36-0+54.65	18.64	16.24	0.005	1.54	2.6	6.27	0.012

LINE THREE

1-24" RCP	K	0+00-0+36	18.64	16.73	0.005	1.58	2.7	6.28	0.012
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LINE FOUR

1-24" RCP	J	0+00-0+36	18.64	11.41	0.005	1.18	1.9	5.89	0.012
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LINE FIVE

1-18" RCP	A	0+00-0+36	8.66	6.72	0.005	1.05	1.3	5.10	0.012
1-24" RCP	B	0+36-2+23	18.64	14.99	0.005	1.44	2.4	6.21	0.012
2-24" RCP	C	2+23-2+37.50	44.12	43.47	0.007	1.78	3.0	7.36	0.012

LINE SIX

2-24" RCP	E	0+00-0+36	37.26	19.88	0.005	1.09	1.7	5.70	0.012
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LINE SEVEN

1-24" RCP	P	0+00-0+36	20.42	19.81	0.006	1.73	2.9	6.86	0.012
1-24" RCP	Q	0+36-0+46.45	26.36	25.13	0.01	1.69	2.8	8.88	0.012

LINE TEN

1-24" RCP	L	0+00-0+36	20.42	19.63	0.006	1.71	2.9	6.87	0.012
1-24" RCP	M	0+36-0+56.52	27.65	26.60	0.011	1.71	2.9	9.30	0.012

LINE ELEVEN

1-18" RCP	R	0+00-0+36	9.48	9.45	0.006	1.37	1.7	5.57	0.012
1-18" RCP	S	0+36-0+46.45	10.24	10.08	0.007	1.33	1.7	6.08	0.012

* DEPTH OF FLOW

STORM DRAINAGE COMPUTATIONS (50 YR)

SEGMENT NO.	LOCATION	INLET CA	ADDITIONAL CA	FROM SEGMENT	TOTAL CA	OVERLAND FLOW					PIPE DESIGN					PIPE/DITCH INVERTS					INLET ELEV. & HEIGHT		
						MINUTES	IN/HR	CFS	IN.	FT./FT.	CFS	FT./SEC.	UN. FT.	MIN.	FEET	FEET	FEET	FEET	FEET	FEET	FEET	FEET	HEIGHT
F	STA. 0+00-0+36	0.72	-	-	0.72	10	-	10	7.0	5.06	18" RCP	0.005	8.66	4.81	36.00	0.12	1293.70	0.18	1293.52	1293.70	1296.95	3.25	
G	STA. 0+36-4+10.00	1.69	0.72	F	2.41	10	-	10	7.0	16.87	24" RCP	0.0098	25.83	8.28	374.00	0.75	1291.58	3.59	1297.99	1291.58	1296.55	5.37	
H	STA. 4+10.00-7+83.52	2.12	4.04	G	6.16	10	-	10	7.0	43.13	36" RCP	0.0075	67.31	9.55	353.52	0.62	1287.99	2.85	1285.34	1287.99	1292.39	4.40	
I	STA. 7+83.52-7+90.00	1.57	8.55	H,K	10.12	10	-	10	7.0	70.87	2-30" RCP	0.009	90.68	9.62	26.48	0.05	1285.34	0.24	1285.10	1285.34	1289.15	3.81	

LINE TWO

N	STA. 0+00-0+36	2.11	-	-	2.11	10	-	10	7.0	14.77	24" RCP	0.005	18.64	6.19	36.0	0.10	1281.82	0.18	1281.74	1281.82	1285.92	4.00
D	STA. 0+36-0+54.65	0.21	2.11	N	2.32	10	-	10	7.0	16.24	24" RCP	0.005	18.64	6.27	18.85	0.05	1281.74	0.09	1281.65	1281.74	1285.92	4.18

LINE THREE

K	STA. 0+00-0+36	2.39	-	-	2.39	10	-	10	7.0	16.73	24" RCP	0.005	18.64	6.28	36.0	0.10	1285.52	0.18	1285.34	1285.52	1289.15	3.63
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LINE FOUR

J	STA. 0+00-0+36	1.63	-	-	1.63	10	-	10	7.0	11.41	1-24" RCP	0.005	18.64	5.89	36.0	0.10	1288.17	0.18	1287.99	1288.17	1292.39	4.22
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LINE FIVE

A	STA. 0+00-0+36	0.96	-	-	0.96	10	-	10	7.0	6.72	18" RCP	0.005	8.66	5.10	36.0	0.12	1294.29	0.18	1294.11	1294.29	1297.45	3.16
B	STA. 0+36-2+23	1.18	0.98	A	2.14	10	-	10	7.0	14.99	24" RCP	0.005	18.64	6.21	187.00	0.50	1294.11	0.94	1293.17	1294.11	1297.45	3.34
C	STA. 2+23-2+37.50	1.23	4.98	B,E	6.21	10	-	10	7.0	43.47	2-24" RCP	0.007	44.12	7.36	14.50	0.03	1293.17	0.10	1293.07	1293.17	1296.58	3.41

LINE SIX

E	STA. 0+00-0+36	2.84	-	-	2.84	10	-	10	7.0	19.88	2-24" RCP	0.005	37.28	5.70	36.0	0.10	1293.35	0.18	1293.17	1293.35	1296.58	3.23
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LINE SEVEN

P	STA. 0+00-0+36	2.83	-	-
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