WWP

CITY OF ALGONA

KING COUNTY WASHINGTON

COMPREHENSIVE FLOOD HAZARD MANAGEMENT PLAN TECHNICAL APPENDIX

12/31/96

G & O No. 95743

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EXPLANATION OF MODELING TERMS AND INPUT DATA

EXPLANATION OF
INPUT COMMANDS TO HYDRA MODEL
OUTPUT INFORMATION FROM HYDRA MODEL

COMMAND FILES
Example data:
NEW JNW
#J58418
#J58518
HOL JNW
NEW JCTR
#J67D
#J59912
REC JNW
#J515224

The command file orders the pipes and ditches from the top of the basin to the discharge from the basin. In this case the data is in the northwesterly portion of sub-basin J. The model is calling pipe # J58418 and routing all storm water flow as estimated in the flow file through the pipe. After flow has been routed through this pipe it is passed on to pipe #J58518. This flow is then held in memory and flow through the next sub-basin JCTR is calculated. When the two sub-basins join the flow from the northwesterly sub-basin is recalled and joined with the flow from JCTR.

FLOW FILES - ALGONA.FLO AND ALGONAFT.FLO
The flow files store the data for land use, acreage, the time it takes for stormwater to reach the nearest stormwater pipe or ditch and dictates which pipe or ditch segment it corresponds to.

Example data
A1CHICD4 SCS 8.66/0.85, 98/90, 7

Explanation:
A1CHICD4 = The pipe or channel segment into which the storm water is discharging. In this case the storm water runoff is discharging into sub-basin A on PacTech Sheet #1 (1988). The runoff is into the Chicago Ditch and it is the fourth model segment
SCS = Storm water is generated using the Soil Conservation Service method. This is based upon land use and temporal rainfall distribution
8.66/0.85 - The acreage of this sub-basin/Percent of the sub-basin which has impervious cover. The slash (/) does not denote a division, it is a way to delineate text in the input file
98/90 - The impervious portion of the basin has a runoff coefficient of 98 and the pervious area of the Sub-basin has a runoff coefficient of 90.
7 - The maximum travel for storm water runoff to reach the discharge point. This is calculated separately outside of the model.

DESIGN FILES

The design file gives the hyetograph, rainfall distribution, throughout the storm. The distribution is given as a percentage of the total for each ten minute time interval. The total rainfall is given in the second line. The final lines are the dimensions of "typical" drainage ditches in the City. The data format is

@TRAP1

CHD 3 0 0.025 0.5 1.0 0.5 1 0 0 0 0

TRAP1 - Applies to all ditches identified in the pipe and ditch database file which are flagged as TRAP1, TRAP2 or TRAP 3

CHD tells the model that Channel Design Data follows

3 - Maximum allowable velocity in the ditch ft/sec

0 - Minimum allowable velocity

0.025 - Manning n for the ditch. This is a roughness coefficient for the bottom of the ditch.

0.5 -Left Side slope (horz/vert)

1.0 -Bottom width (ft)

0.5 -Right side slope (horz/vert)

1 - Minimum Freeboard

0 - Cost data, not input

0 - Cost data, not input

0 - Cost data, not input

PIPE AND DITCH OUTPUT DATA FILES

An example data file line is given below. Every pipe or ditch that is simulated must have the following data for it.

Pipe Name	Location	Pipe or Ditch	Length	Grd elev Up	Grd Elev Down	Invert Up	Invert Down	Slope	Diameter or 0.00 for ditch	Ditch type TRAP1, etc
F34124	Abbreviated Location	EP Existing Pipe CH - Channel	Length in feet	Elev at inlet	Elev at outlet	Elev up	Elev down	Pipe slope	Pipe diameter (inches)	TRAP1, TRAP2, etc

OUTPUT SUMMARY

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
1	275	18	0.0002	71.67	0.0	1.5	0.84	1.48	110.58	0.14	8
J58418				71.61	0.0	0.0	1.00		1.33		21

Link = Pipe Name
Long = Length
Diam = Diameter
Slope = Slope (vert/horz)
Invert Up/Dn = Elevation up
Elevation down
San Inf = Sanitary Sewer Inflow to a pipe, not used for this application.
Sto Mis = Storm water inflow to a pipe
Vel d/D = Velocity of water in pipe
d/D = depth of water in pipe/Diameter of pipe
Design CFS = Maximum flow from runoff in pipe
% CAP = Percent of maximum flow in pipe
Q max = Maximum design capacity flow in pipe
Remove = amount of flow (CFS) which needs to be removed to reduce flow to design capacity
Par = If pipe over capacity need to construct a **parallel** pipe of given diameter to handle flow
Rep = If pipe over capacity need to construct a **replacement** pipe of given diameter to handle flow

COMMAND FILES

```
JOB  ALGONA BASIN-A 10-YEAR EXISTING
DBS  ALGONA.DBF  ALGONA10.DES  ALGONA.FLO
NEW ASOUTH
#A3CHICD1
#A3CHICD2
#A1CHICD3
#A1CHICD4
HOL ASOUTH
NEW ACNTRL
#A23918
#A23334
HOL ACNTRL
NEW ANORTH
#A21018
#A10724
HOL ANORTH
NEW BNDRY
REC ASOUTH
REC ACNTRL
#A1CHICD5
#A10830
REC ANORTH
#A10536
END
```

~~ALGONAA.CMD~~

ALGA10EX.CMD

```
JOB  ALGONA BASIN-B 10-YEAR FUTURE
DBS  ALGONA.DBF  ALGONA10.DES  ALGONAFT.FLO
NEW  SUBB-1
#B184D
#B18118
#B176D
#B17418
#B174D
#B1117D
#B167A24
HOL SUBB-1
NEW SUBB-2
#B15212
#B154D
#B114118
#B16018
#B113724
REC SUBB-1
#B113824
END
```

COMMAND FILES

~~ALGONA~~
ALGB10EX.CMD

```
JOB  ALGONA BASIN-D 10-YEAR FUTURE
DBS  ALGONA.DBF  ALGONA10.DES  ALGONAFT.FLO
NEW  SUBD-1
#D1109D
HOL  FLOW
NEW SUBD-2
#D112718
REC FLOW
#D112218
END
```

ALGD10FT.CMD

```
JOB  ALGONA BASIN-E 10-YEAR FUTURE
DBS  ALGONA.DBF  ALGONA10.DES  ALGONAFT.FLO
NEW  SUBE-1
#E356D
#E15012
#E110018
HOL SUBE-1
NEW SUBE-2
#E39618
REC SUBE-1
#E1106D
END
```

ALGE 10 FT.CMD

```
JOB  ALGONA BASIN-F 10-YEAR FUTURE
DBS  ALGONA.DBF  ALGONA10.DES  ALGONAFT.FLO
NEW  SUBF-1
#F39324
HOL SUBF-1
NEW SUBF-2
#F322D
REC SUBF-1
#F39124
HOL SUBF-2
NEW SUBF-3
#F377D
HOL SUBF-3
NEW SUBF-4
#F53318
#F39418
#F39218
#F38018
REC SUBF-3
#F39524
HOL  SUBF-4
NEW SUBF-5
#F3BRDWDE
#F3BRDWDW
REC SUBF-4
#F34124
#F34230
END
```

ALGF10FT.CMD

ALGJ10 FT.CMD

```
JOB  ALGONA BASIN-J 10-YEAR FUTURE
DBS  ALGONA.DBF  ALGONA10.DES  ALGONAFT.FLO
NEW JNW
#J58418
#J58518
HOL JNW
NEW JCTR
#J67D
#J59912
#J59812
#J59112
DID (0/0, 0.045/0, 0.135/0.045, 0.72/0.18, 1.85/0.5, 3.87/1.53) DIVERSION 1ST & MILWAUKEE
DIV 74.00, 72.04, 72.01, 0.14 DIV_STANLEY
#J515518
REC JNW
#J515224
#J515324
#J71524
#J72024
#J72424
HOL JCTR
NEW J2AVE
#J510512
HOL J2AVE
NEW JCLAY
#J710912
HOL JCLAY
NEW J4AVE
#J79112
HOL J4AVE
NEW J5AVES
#J78418
HOL J5AVES
NEW JSE
REC DIV_STANLEY
#J517518
#J510424
REC J2AVE
#J713124
REC JCLAY
#J710124
#J712724
REC J4AVE
DID ( 0/0, 2.3/0, 2.64/0.05, 3.45/0.15, 5.29/0.5, 7.47/1.25, 9.55/2.25, 11.5/3.5, 13.27/4.5) DIVER AT 4TH AVE S
DIV 72.00, 67.12, 67.12, 0.66 DIV_4THAVES
#J712524
REC J5AVES
#J7MLWEX24
HOL JSE
NEW JTACOMA
#J7TAC3S18
#J76718
HOL JTACOMA
NEW J4THAVS
```

REC DIV_4THAVES
#J74SDIV18
REC JTACOMA
#J76018
HOL J4THAVS
NEW JINTERURB
#J757D
REC J4THAVS
#J715718
#J714818
#J714624
HOL JINTERURB
NEW JSEATTLESE
#J72118
#J72524
REC JINTERURB
#J714524
REC JCTR
#J714424
END

ALGJ10FT.CMD
(CONTINUED)

```
JOB  ALGONA BASIN-K 10-YEAR FUTURE
DBS  ALGONA.DBF  ALGONA10.DES  ALGONAFT.FLO
NEW SUBK-1
#K52AVED
#K55812
#K55918
HOL SUBK-1
NEW SUBK-2
#K57118
#K56618
#K5164D
#K516418
#K516518
REC SUBK-1
#K516618
END
```

ALGK10FT.CMD

```
JOB  ALGONA BASIN-L 10-YEAR FUTURE
DBS  ALGONA.DBF  ALGONA10.DES  ALGONAFT.FLO
NEW SUBL-1
#L510812
#L515618
#L515718
HOL SUBL-1
NEW SUBL-2
#L511518
REC SUBL-1
#L5171D
HOL SUBL-2
NEW SUBL-3
#L5132D
#L512912
HOL SUBL-3
NEW SUBL-4
#L5130D
REC SUBL-3
#L512512
REC SUBL-2
#L512318
END
```

ALGL10FT.CMD

INPUT PIPE AND DITCH DATA

ALGONA

SYS_NAME	SYS_LATERA	SYS_TYPE	SYS_LENGTH	SYS_GRUP	SYS_GRDN	SYS_INVUP	SYS_INVDN	Slope	SYS_SIZE	SYS_DESC1	SYS_DESC3	PacTech up	PacTech Down	Diff Up (model-PT)	Diff Down (model-PT)	PacTech Slope	Comment, if Different from PacTech
A3CHICD1	CHIC DTCH 6TH TO 7TH	CH	950.00	75.00	74.00	69.89	68.76	0.0012	0.00	TRAP2	950.00	73.00	71.30	-3.11	-2.54	0.0018	PacTech ditch invert assumed to be 2 feet below nearby ground
A3CHICD2	CHIC DTCH 7TH TO 9TH	CH	970.00	74.00	73.00	68.76	67.61	0.0012	0.00	TRAP2	970.00	71.30	69.50	-2.54	-1.89	0.0019	PacTech ditch invert assumed to be 2 feet below nearby ground
A1CHICD3	CHIC DTCH 9TH TO 10TH	CH	40.00	73.00	72.50	67.61	67.13	0.0120	0.00	TRAP3	40.00	69.50	68.30	-1.89	-1.17	0.0300	PacTech ditch invert assumed to be 3 feet below nearby ground
A1CHICD4	CHIC DTCH 10TH TO 10TH +	CH	100.00	72.50	72.00	67.13	66.89	0.0024	0.00	TRAP3	100.00	68.30	68.10	-1.17	-1.21	0.0020	PacTech ditch invert assumed to be 3 feet below nearby ground
A1CHICD5	CHIC DTCH 10+ TO BOUND	CH	700.00	72.00	71.00	66.89	66.48	0.0006	0.00	TRAP4	700.00	68.10	67.70	-1.21	-1.22	0.0006	Chicago Ditch model slopes shallower than Pac-Tech slopes
A20918	EAST PART TO MILWAUK	EP	615.00	76.00	73.00	71.68	69.09	0.0042	18.00		0.00	71.68	69.09	0.00	0.00	0.0042	
A23334	MILWAUK TO CHIC DTCH	EP	360.00	73.00	72.60	68.83	67.72	0.0029	34.00		0.00	68.83	None	0.00			twin 24" pipes = 1 , 34-inch
A10830	UNDER BOUNDARY	EP	55.00	71.00	70.50	69.48	66.39	0.0016	30.00		0.00	None	66.39		0.00		Assume slope of 0.0017
A21018	BOUNDARY EAST OF MILW	EP	450.00	73.00	72.00	70.46	69.01	0.0032	18.00			70.46	69.01	0.00	0.00	0.0032	
A10724	BOUND MILW-CHIC	EP	275.00	72.00	72.00	67.83	66.70	0.0041	24.00			67.83	66.70	0.00	0.00	0.0041	
A10536	N SD BOUND CHIC TO 400 P	EP	1140.00	67.00	66.00	66.40	64.42	0.0017	36.00		0.00	65.91	63.63	0.79	0.79	0.0017	Pipes 112, 5, 4 same slope as PacTech, upper invert = A10830
B164D	CELERY	CH	400.00	72.00	71.80	70.00	69.80	0.0005	0.00	TRAP1	400.00	71.20	70.30	-1.20	-0.50	0.0023	PacTech ditch invert assumed to be 2 feet below nearby ground
B16118	CELERY & 9TH	EP	35.00	72.70	72.60	70.01	69.48	0.0151	18.00		0.00	70.01	69.48	0.00	0.00	0.0151	
B176D	9TH AVE DITCH	CH	600.00	70.10	69.90	68.10	67.35	0.0013	0.00	TRAP1	600.00	68.00	67.30	0.10	0.05	0.0012	PacTech ditch invert assumed to be 2 feet below nearby ground
B17418	9TH & ALGONA	EP	70.00	70.00	69.00	67.35	66.90	0.0064	18.00		0.00	67.35	66.26	0.00	0.64	0.0156	
B174D	9TH AVE	CH	170.00	68.60	68.40	66.90	66.40	0.0029	0.00	TRAP1	170.00	66.60	66.50	0.30	0.10	0.0006	PacTech ditch invert assumed to be 2-3 feet below nearby ground
B1117D	W OF ALGONA BET 9-10	CH	260.00	68.40	68.20	66.40	66.10	0.0012	0.00	TRAP1	260.00	66.50	66.00	-0.10	0.10	0.0019	PacTech ditch invert assumed to be 3 feet below nearby ground
B167A24	W OF ALGONA BET 9-10	EP	220.00	68.20	68.10	66.10	65.50	0.0027	24.00		0.00	66.17	65.50	-0.07	0.00	0.0030	Outlet should equal Jct B113724 & B113824
B15212	CELERY & 10TH	EP	48.00	70.50	69.90	68.50	67.90	0.0125	12.00		0.00	71.08	69.69	-3.48	-1.79	0.0477	PacTech invert above ground
B154D	10TH AVE	CH	300.00	69.90	69.80	67.90	67.80	0.0003	0.00	TRAP1	300.00	68.00	67.80	-0.10	0.00	0.0007	
B114118	10TH AVE	EP	280.00	69.80	69.20	67.79	67.20	0.0021	18.00		0.00	67.62	67.30	0.17	-0.10	0.0011	
B16018	ALGONA & 10TH	EP	65.00	69.20	69.10	67.13	67.00	0.0020	18.00		0.00	67.13	67.12	0.00	-0.12	0.0002	
B113724	10TH AVE	EP	181.00	70.00	68.00	66.57	65.50	0.0059	24.00		0.00	66.44	65.50	0.13	0.00	0.0052	
B113824	10TH AVE TO CC	EP	386.00	67.50	66.70	65.50	64.70	0.0021	24.00		0.00	65.50	65.10	0.00	-0.40	0.0010	
C11D	W OF ALG 11TH TO BOUND	CH	380.00	67.00	67.00	63.20	62.97	0.0006	0.00	TRAP1	380.00	65.00	64.30	-1.80	-1.33	0.0018	Shallower slope than PacTech, ditch set low to match outlet
C10136	UNDER BOUNDARY	EP	55.00	67.00	67.00	62.98	62.97	0.0002	36.00		0.00	62.98	62.97	0.00	0.00	0.0002	Top of pipe near bottom of ditch
D1PROD	E OF CELERY 11TH TO BOU	CH	380.00	68.50	68.30	66.50	66.30	0.0005	36.00		0.00	66.50	66.20	0.00	0.10	0.0008	PacTech ditch invert assumed to be 3 feet below nearby ground
D1105D	BOUNDARY BLVD	CH	700.00	68.20	68.20	65.10	65.00	0.0001	0.00	TRAP1	380.00	66.50	66.20	0.00	0.10	0.0008	PacTech ditch invert assumed to be 3 feet below nearby ground
D112718	ALGONA BLVD	EP	450.00	69.50	68.20	68.35	65.46	0.0020	24.00		700.00	69.50	65.20	-1.40	-0.20	0.0019	Shallower slope than PacTech
D112218	BOUNDARY & ALGONA	EP	70.00	70.00	70.00	65.30	65.28	0.0003	18.00		0.00	68.35	65.67	0.00	-0.21	0.0015	
E356D	ALGONA N OF 7TH	CH	230.00	71.70	71.50	69.70	69.50	0.0009	0.00	TRAP1	0.00	67.30	67.28	-2.00	-2.00	0.0003	PacTech inverts appear 2 ft high based on field observation
E19812	ALGONA S OF 8TH	EP	180.00	71.00	70.80	67.78	67.20	0.0032	12.00		230.00	69.10	68.90	0.60	0.60	0.0009	PacTech ditch invert assumed to be 2 feet below nearby ground
E110018	8TH AVE W OF ALGONA	EP	600.00	70.50	69.80	67.20	66.54	0.0009	18.00		0.00	68.28	66.68	-0.50	0.52	0.0089	12-inch culvert under 18-inch, PacTech pipes 98 & 9
E39518	MAIN ST	EP	450.00	71.50	69.80	67.05	66.64	0.0009	18.00		0.00	67.20	66.64	0.00	0.00	0.0009	Pipes E110018 & E110818
E1106D	8TH AVE TO CC	CH	150.00	69.80	69.00	67.30	67.00	0.0020	0.00	TRAP1	0.00	67.05	68.13	0.00	-1.49	-0.0024	No PacTech data, outlet = E110018, inlet from E39418
F33318	MAIN BET 3RD - 4TH	EP	520.00	73.70	73.60	71.41	71.05	0.0007	18.00		150.00	67.30	67.00	0.00	0.00	0.0020	PacTech ditch invert assumed to be 2 feet below nearby ground
F39418	MAIN BET 4TH & 5TH	EP	500.00	73.90	72.60	71.14	70.47	0.0013	18.00		0.00	71.41	71.05	0.00	0.00	0.0007	PacTech Pipes 33 & 32
F35218	MAIN BET 5TH & 6TH	EP	470.00	72.20	72.20	70.47	69.73	0.0016	18.00		0.00	71.14	70.66	0.00	-0.19	0.0010	
F38018	MAIN & 6TH	EP	42.00	72.20	72.00	69.77	68.86	0.0074	18.00		0.00	70.47	69.73	0.00	0.00	0.0016	
F39324	MAIN BET 4TH & 5TH	EP	470.00	73.40	73.00	71.38	70.32	0.0023	24.00		0.00	69.17	68.86	0.00	0.00	0.0074	
F39124	MAIN BET 4TH & 5TH	EP	470.00	79.90	72.00	69.79	68.96	0.0018	24.00		0.00	71.38	70.32	0.00	0.00	0.0023	
F39524	MAIN BET 6TH & ALGONA	EP	510.00	72.10	71.00	68.86	68.37	0.0010	24.00		0.00	69.79	68.96	0.00	0.00	0.0018	
F34124	MAIN ALGONA DITCH	EP	457.00	71.00	69.90	67.47	66.89	0.0014	24.00		0.00	None	66.37		0.00		No inlet invert given PacTech pipes 95, 71, 90
F3BRDWDE	BROADWAY CEL - ALG	CH	500.00	72.30	71.24	70.30	69.24	0.0021	0.00	TRAP1	0.00	67.47	66.80	0.00	0.00	0.0014	PacTech pipes 40 & 41
F3BROWDW	BROADWAY CEL - ALG	CH	300.00	71.24	70.60	69.24	68.60	0.0021	0.00	TRAP1	500.00	70.30	69.24	0.00	0.00	0.0021	
F377D	6TH AVE CEL & MAIN	CH	610.00	72.50	72.00	70.50	70.00	0.0008	0.00	TRAP1	300.00	69.24	68.37	0.00	0.73	0.0029	Outlet Bradwy ditch adjusted to for constant slope
F322D	5TH AVE CEL & MAIN	CH	450.00	74.50	72.80	72.50	70.80	0.0038	0.00	TRAP1	610.00	70.50	70.00	0.00	0.00	0.0008	Outlet 1.04 ft higher than outlet at pipe F39124
F34220	7TH MAIN TO CC	EP	250.00	70.00	69.50	66.65	66.00	0.0026	30.00	TRAP1	490.00	72.50	70.80	0.00	0.00	0.0038	Outlet 0.48 higher than outlets at pipe F39324
G3ALGWD	ALGONA BET 5TH & 4TH	CH	405.00	71.00	72.00	70.00	69.59	0.0012	0.00		0.00	66.65	None		0.00		No outlet invert given
G51360	4TH ALGONA TO CC	CH	400.00	72.00	70.00	69.50	68.50	0.0025	0.00	TRAP1	405.00	70.00	77		0.00		Non-live ground surface slope
H5ALGWD	ALGONA BET 3RD & 4TH	CH	450.00	70.70	70.60	68.50	68.00	0.0011	0.00	TRAP1	400.00	777		68.50		0.00	Contours place elevation between 68 & 70
H54512	ACROSS 3RD @ ALGONA	EP	45.00	72.00	72.00	69.75	68.82	0.0207	12.00		450.00	69.60	68.00	-0.10	0.00	0.0013	
H54712	ACROSS ALGONA @ 3RD	EP	65.00	72.00	72.00	69.00	67.43	0.0088	12.00		0.00	69.75	68.82	0.00	0.00	0.0207	
H51018	3RD ALGONA TO CC E1/2	EP	200.00	70.50	70.00	68.40	67.09	0.0066	18.00		0.00	69.00	67.43	0.00	0.00	0.0088	12" below 18" pipe does most of conveying
H55112	3RD ALG TO CC W1/2	EP	200.00	70.00	70.00	67.09	66.79	0.0015	12.00		0.00	74.73	74.42	-6.33	-7.33	0.0016	PacTech inverts above ground
H55018	3RD ALGONA TO CC E1/2	EP	200.00	69.70	69.50	67.86	67.41	0.0023	12.00		0.00	67.53	67.09	-0.44	-0.30	0.0022	
K52AVED	N SD 2ND AVE E OF ALGONA	CH	400.00	71.00	69.50	69.20	68.25	0.0024	0.00	TRAP1	0.00		67.41		0.00		No PacTech inlet invert given
K55812	ACROSS ALGONA @ 2ND	EP	60.00	70.00	69.50	68.25	67.83	0.0070	12.00		400.00	69.70	68.25	-0.50	0.00	0.0036	Outlet set to inlet invert of pipe
K55918	ACROSS 2ND @ ALGONA	EP	50.00	69.50	69.00	67.80	67.59	0.0042	18.00		0.00	68.25	67.83	0.00	0.00	0.0070	
K57118	S SD 2ND SEAT - ALG E 1/2	EP	300.00	71.00	72.00	69.34	69.15	0.0006	18.00		0.00	67.80	67.59	0.00	0.00	0.0042	
K56618	S SD 2ND SEAT - ALG W 1/2	EP	450.00	72.00	70.00	69.15	68.10	0.0023	18.00		0.00						Pipe not listed in PacTech
K51640	ALGONA 2ND TO CROSS	CH	200.00	70.00	70.00	68.10	67.22	0.0044	0.00	TRAP1	0.00	69.10	68.10	0.05	0.00	0.0022	PacTech outlet of pipe 68 inlet of 65
K516416	CROSS ALGONA S OF 2ND	EP	95.00	70.00	70.00	67.22	66.79	0.0045	18.00		200.00	68.10	67.22	0.00	0.00	0.0044	Inverts set to adjacent inlet and outlet pipes
K516518	ALGONA CROSS TO 2ND	EP	200.00	70.00	70.00	66.78	66.63	0.0008	18.00		0.00	67.22	66.79	0.00	0.00	0.0045	
K516618	2ND N ALGONA TO CC	EP	400.00	70.00	68.00	67.14	66.26	0.0022	18.00		0.00	66.78	66.63	0.00	0.00	0.0008	
L510812	N SD 1ST SEATTLE - ALGON	EP	385.00	73.00	72.00	70.48	67.24	0.0116	18.00		0.00	67.14	66.26	0.00	0.00	0.0022	Outlet set to downstream pipe 169
L515618	INTRSCT ALGONA & 1ST	EP	230.00	72.00	71.00	70.48	67.24	0.0116	18.00		0.00		70.48		0.00		No PacTech inlet given
L515718	ACROSS 1ST @ ALGONA	EP	50.00	71.00	71.00	67.50	66.97	0.0106	18.00		0.00						No data in PacTech report
L511518	ACROSS ALGONA @ 1ST	EP	70.00	70.00	70.00	68.38	68.00	0.0054	18.00		0.00						No data in PacTech report
L51710	ALGONA 1ST S TO 2ND S	CH	480.00	71.00	69.50	66.92	65.68	0.0023	0.00	TRAP1	400.00						
L513JD	S SIDE 2ND E OF ALGONA	CH	400.00	69.50	69.50	67.66	67.36	0.0013	0.00	TRAP1	480.00	67.50	67.36	0.04	0.00	0.0014	Inlet set 0.05ft below lowest input pipe Outlet set at inlet of downstream pipe

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ALGONA

SYS_NAME	SYS_LATERA	SYS_TYPE	SYS_LENGTH	SYS_GRUP	SYS_GRDN	SYS_INVUP	SYS_INVDN	Slope	SYS_SIZE	SYS_DESC1	SYS_DESC3	PacTech up	PacTech Down	Diff Up (model-PT)	Diff Down (model-PT)	PacTech Slope	Comment, if Different from PacTech
L512912	ACROSS 2ND S @ ALGONA	EP	45.00	69.00	69.00	67.36	66.69	0.0149	12.00		0.00	67.36	65.67	0.00	1.02	0.0178	Model has shallower slope
L5130D	N SIDE 2ND E OF ALGONA	CH	500.00	69.00	68.00	66.75	66.12	0.0013	0.00	TRAP1	500.00	68.09	65.67	-1.34	0.45	0.0048	Model has shallower slope
L512512	ACROSS ALGONA @ 2ND S	EP	65.00	69.00	69.00	66.12	65.67	0.0069	12.00		0.00	67.62	65.67	-1.50	0.00	0.0300	Model has shallower slope
L512318	N SIDE 2ND ALGONA TO CC	EP	300.00	69.50	69.50	65.98	65.16	0.0027	18.00		0.00	65.98	65.16	0.00	0.00	0.0027	
J58418	E SIDE MAIN 1ST & 2ND N	EP	275.00	73.10	73.00	71.67	71.61	0.0002	18.00		0.00	71.67	71.61	0.00	0.00	0.0002	
J58518	E SIDE MAIN 1ST & 2ND N	EP	205.00	73.00	73.00	71.61	71.42	0.0009	18.00		0.00	71.63	71.42	-0.02	0.00	0.0010	
J67D	E SIDE STANLEY S OF 2ND	CH	405.00	75.00	75.00	73.12	72.53	0.0015	0.00	TRAP1	405.00	74.11	73.21	-0.99	-0.68	0.0022	In = out No 6 sheet 6, out = out No 100 sheet 7
J59912	CROSS STANLEY	EP	25.00	75.00	74.00	72.53	72.50	0.0012	12.00		0.00						No data given by PacTech
J59812	W SIDE STANLEY N OF 1ST	EP	165.00	74.00	74.00	72.50	72.29	0.0013	12.00		0.00		72.39		-0.10	-0.4387	
J59112	N OF 1ST W OF STANLEY	EP	160.00	74.00	74.00	72.29	72.09	0.0013	12.00		0.00	72.29	72.09	0.00	0.00	0.0013	
J515518	N OF 1ST E OF MAIN	EP	200.00	74.00	74.00	71.84	71.42	0.0021	18.00		0.00						No data in PacTech report
J515224	N OF 1ST W OF MAIN	EP	240.00	74.00	73.00	71.17	70.57	0.0025	24.00		0.00						No data in PacTech report
J515324	W SD SEATTLE 1ST& 2NDS	EP	540.00	73.00	71.00	70.57	68.48	0.0039	24.00		0.00						No data in PacTech report
J71524	W SD SEATTLE 2NDS 3RDS	EP	540.00	71.00	69.00	68.48	66.38	0.0039	24.00		0.00	67.22	66.38	1.26	0.00	0.0016	Assume constant slope J515324 & J71524
J72024	W SD SEATTLE 3RDS 4THS	EP	460.00	69.00	68.00	66.38	65.25	0.0025	24.00		0.00	66.48	65.25	-0.10	0.00	0.0027	Pipes J71924 and J72024 invert out = invert in downstr
J72424	W SD SEATTLE 4THS 5THS	EP	468.00	68.00	67.00	65.25	64.45	0.0017	24.00		0.00	65.38	64.45	-0.13	0.00	0.0030	Pipes J72324 & J72424
J517518	E SD MILWK 1ST-WARDE	EP	320.00	75.00	75.00	72.15	70.00	0.0067	18.00		0.00	72.10	70.00	0.05	0.00	0.0038	Pipes 172, 173, 174 & 175
J510424	E SD MILWK WARDE-2ND	EP	240.00	75.00	75.00	69.93	69.65	0.0012	24.00		0.00	69.93	69.65	0.00	0.00	0.0012	
J510512	2ND S WASH - MILWAUKEE	EP	675.00	75.00	73.00	71.11	69.65	0.0022	12.00		0.00		70.20		-0.55		No PacTech inlet, outlet set equal to J510424 outlet
J713124	E SIDE MILW 2ND S - CLAY	EP	415.00	73.00	73.00	69.65	68.90	0.0018	24.00		0.00	69.66	68.90	-0.01	0.00	0.0018	
J710912	S SIDE CLAY WASH - MILW	EP	675.00	75.00	73.00	70.36	68.90	0.0022	12.00		0.00		71.99				No PacTech inlet, outlet set equal to J510424 outlet
J710124	E SIDE MILW CLAY-3RD S	EP	395.00	73.00	73.00	68.90	68.25	0.0016	24.00		0.00	68.69	68.35	0.21	-0.10	0.0009	J710124 J712724 slopes set equal
J712724	E SIDE MILW 3RD S - 4TH S	EP	460.00	73.00	72.00	68.25	67.50	0.0016	24.00		0.00	69.45	67.22	-1.20	0.28	0.0048	Pipes J712724 and J712824
J79112	S SIDE 4TH WASH & MILW	EP	675.00	75.00	72.00	69.41	67.72	0.0025	12.00		0.00	68.94	67.81	0.47	-0.09	0.0017	Model has shallower slope
J745DIV18	S SIDE 4TH MILW - TACOMA	EP	620.00	72.00	69.00	67.72	66.73	0.0016	18.00		0.00	67.81	66.73	-0.09	0.00	0.0017	Data from Algona staff, hand written on map
J712524	E SIDE MILW 4TH- 5TH	EP	430.00	72.00	70.00	67.50	66.84	0.0015	24.00		0.00	67.31	66.54	0.19	0.00	0.0011	Slope set equal to J710124 & J712724, outlet = PacTech out
J78416	S SIDE 5TH WASH - MILW	EP	675.00	72.00	70.00	67.03	66.84	0.0016	18.00		0.00	68.33	68.14	-0.48	-1.30	0.0003	Outlet set set = J512524 outlet
J7MLWEX24	E SIDE MILW 5TH - ELL	EP	460.00	70.00	69.00	66.84	66.00	0.0021	24.00		0.00						No PacTech data given
J7TAC3S18	E SIDE TAC 3RD - 4TH	EP	450.00	70.00	69.00	67.50	67.00	0.0011	18.00		0.00		66.82		0.18		No PacTech data given
J76718	CROSS 4TH S @ TACOMA	EP	50.00	69.00	69.00	66.82	66.73	0.0018	18.00		0.00	66.82	66.73	0.00	0.00	0.0018	Data from Algona staff, hand written on map
J76018	CROSS TACOMA @ 4TH S	EP	50.00	69.00	69.00	66.73	66.50	0.0046	18.00		0.00	66.73		0.00			No outlet data
J757D	W SIDE TAC 3RD - 4TH	CH	450.00	70.00	69.00	67.50	66.50	0.0022	0.00	TRAP1	450.00		66.50		0.00		No inlet data, outlet assumed = J715718 inlet
J715718	W SIDE TAC 4TH - 5TH	EP	470.00	70.00	67.00	66.50	65.12	0.0029	18.00		0.00						No PacTech data given, outlet = inlet to J714818
J714818	5TH S TAC - INTURB	EP	250.00	67.00	67.00	65.12	64.40	0.0029	18.00		0.00	64.64	64.40	0.48	0.00	0.0010	Same slope as J715718
J714624	5TH S INTURB- SEAT	EP	290.00	67.00	67.00	64.40	64.07	0.0011	24.00		0.00	64.36	64.07	0.04	0.00	0.0010	
J72118	E SIDE SEAT 2ND - 4TH	EP	1100.00	69.50	67.50	67.82	64.79	0.0028	18.00		0.00	67.82	64.79	0.00	0.00	0.0028	Pipes 16, 17, 21, 22
J72524	E SIDE SEATTLE 4TH -5TH	EP	400.00	67.50	67.00	64.79	64.07	0.0018	24.00		0.00	65.02	64.59	-0.23	-0.52	0.0011	Inlet J7211B outlet; outlet = J714624 outlet
J714524	CROSS SEAT @ 5TH	EP	40.00	67.00	67.00	64.07	63.94	0.0032	24.00		0.00	64.07	64.04	0.00	-0.10	0.0007	
J714424	SEAT - CC @ 5TH	EP	550.00	67.00	66.50	63.94	62.18	0.0032	24.00		0.00	64.00	62.18	-0.06	0.00	0.0033	Pipes J714324 & J7 14425
		Total	38292.00						T	tal ditch length	12200.00						
		miles	7.25							miles	2.31						

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DESIGN AND FLOW FILES

!TOT 10 YEAR, 24-hour storm - TYPE 1A STORM
TOT 2.9
HYE 10 (.40 .40 .40 .40 .40 .40 .40 .40 .40 .40 .50 .50+
.50 .50 .50 .50 .60 .60 .60 .60 .60 .60 .70 .70 .70 .70+
.70 .70 .82 .82 .82 .82 .82 .82 .95 .95 .95 .95 .95 .95+
1.33 1.33 1.33 1.80 1.80 3.40 5.40 2.70 1.80 1.34 1.34+
1.34 .88 .88 .88 .88 .88 .88 .88 .88 .88 .88 .88 .88 .72+
.72 .72 .72 .72 .72 .72 .72 .72 .72 .72 .72 .57 .57 .57+
.57 .57 .57 .57 .57 .57 .57 .57 .57 .50 .50 .50 .50 .50+
.50 .50 .50 .50 .50 .50 .50 .40 .40 .40 .40 .40 .40 .40+
.40 .40 .40 .40 .40 .40 .40 .40 .40 .40 .40 .40 .40 .40+
.40 .40 .40 .40 .40 .40 .40 .40 .40 .40 .40 .40 .40 .40+
.40 .40 .40 .40 .40 .40 .40 .40 .40)
EPD 0.015 1 0.9
@TRAP1
CHD 3 0 0.025 0.5 1.0 0.5 1 0 0 0 0
@TRAP2
CHD 3 0 0.025 0.5 3.0 0.5 1 0 0 0 0
@TRAP3
CHD 3 0 0.025 0.5 4.0 0.5 1 0 0 0 0
@TRAP4
CHD 3 0 0.025 0.5 5.0 0.5 1 0 0 0 0

ALGONA 10. DRS

ALGONA_FLO

A3CHICD1 SCS 27.60/0.60, 98/90, 33
A3CHICD2 SCS 6.88/0.80, 98/90, 30
A3CHICD2 FLO 1.91
A1CHICD4 FLO 0.38
A23918 SCS 3.67/0.80, 98/90, 26
A23918 FLO 1.38
A23334 FLO 3.30
A21018 FLO 0.83
A10724 FLO 0.83
A10830 FLO 0.50
B184D SCS 8.97/0.26, 98/90, 86
B18118 SCS 5.40/0.27, 98/90, 107
B17418 SCS 9.55/0.22, 98/90, 273
B174D SCS 0.81/0, 98/90, 112
B167A24 SCS 4.03/0.40, 98/90, 32
B167A24 SCS 4.81/0.35, 98/90, 122
B15212 SCS 6.06/0.25, 98/90, 98
B16018 SCS 3.38/0.29, 98/90, 105
B113824 SCS 2.84/0, 98/90, 227
C11D SCS 2.94/0.32, 98/90, 95
C1118 SCS 4.67/0, 98/90, 133
D1PRO1 SCS 5.92/0.18, 98/85, 130
D1109D SCS 11.85/0.13, 98/87, 167
D112718 SCS 3.16/.00, 98/86, 67
D112218 SCS 6.17/0.42, 98/,64, 163
E356D SCS 7.97/0.15, 98/90, 140
E110018 SCS 3.04/0.25, 98/90, 117
E39618 SCS 5.06/.31, 98/90, 151
E1106D SCS. 6.02/0.20, 98/90, 155
F53318 SCS 1.33/0.34, 98/90, 49
F39418 SCS 2.36/0.30, 98/90, 144
F39324 SCS 2.40/0.34, 98/90, 137
F322D SCS 5.05/0.23, 98/90, 157
F39218 SCS 1.45/0.19, 98/90, 88
F38018 SCS 3.20/0.30, 98/90, 72
F39124 SCS 3.97/0.23, 98/90, 153
F377D SCS 5.96/0.40, 98/90, 113
F39524 SCS 5.23/0.30, 98/90, 107
F3BRDWDE SCS 3.47/0, 98/90, 99
F3BRDWDW SCS 6.53/0.25, 98/90, 104
F34124 SCS 3.68/0.08, 98/90, 73
F34124 SCS 1.14/0.40, 98/90, 89
F34124 SCS 6.09/0.32, 98/90, 198
F34230 SCS 2.07/0.34, 98/90, 125
F34230 SCS 1.79/0.16, 98/90, 79
G3ALGWD SCS 0.52/0.60, 98/90, 32
G3ALGWD SCS 0.75/0.0, 98/90, 84
G3ALGWD SCS 1.68/0.23, 98/90, 75
G5ALGWD SCS 4.50/0.0, 98/90, 115
G5136D SCS 1.92/0.10, 98/90, 63
G5136D SCS 1.55/0.31, 98/90, 50
H5ALGWD SCS 0.83/0.29, 98/90, 72
H54512 SCS 1.99/0.46, 98/90, 25
H54712 SCS 3.60/0.41, 98/90, 52

H55118 SCS 3.51/0.22, 98/90, 104
K52AVED SCS 2.58/0.35, 98/90, 92
K55812 SCS 2.74/0.27, 98/90, 57
K55918 SCS 2.71/0.27, 98/90, 102
K57118 SCS 1.19/0.51, 98/90, 47
K56618 SCS 1.75/0.47, 98/90, 74
K5164D SCS 2.69/0.34, 98/90, 74
K516618 SCS 2.60/0.20, 98/90, 74
L510812 SCS 2.02/0.38, 98/90, 72
L510812 SCS 2.37/0.38, 98/90, 73
L515618 SCS 1.86/0.40, 98/90, 72
L515718 SCS 1.89/0.36, 98/90, 72
L511518 SCS 2.53/0.29, 98/90, 77
L5171D SCS 3.88/0.26, 98/90, 99
L5132D SCS 2.10/0.36, 98/90, 85
L512912 SCS 2.11/0.40, 98/90, 63
L5130D SCS 2.15/0.32, 98/90, 99
L512512 SCS 2.90/0.29, 98/90, 81
J58418 SCS 13.57/0.18, 98/80, 139
J58518 SCS 4.70/0.34, 98/90, 109
J58518 SCS 1.92/0.44, 98/90, 72
J67D SCS 10.46/0.10, 98/80, 148
J59912 SCS 7.53/0.10, 98/80, 130
J59812 SCS 4.02/0.20, 98/90, 108
J72024 SCS 1.03/0.24, 98/90, 58
J72424 SCS 1.95/0.35, 98/90, 60
J517518 SCS 4.18/0.24, 98/90, 101
J510424 SCS 4.18/0.17, 98/90, 73
J510512 SCS 2.88/0.22, 98/90, 101
J713124 SCS 5.89/0.20, 98/90, 103
J710912 SCS 2.77/0.30, 98/90, 38
J710124 SCS 6.27/0.23, 98/90, 103
J712724 SCS 6.27/0.29, 98/90, 103
J79112 SCS 3.69/0.21, 98/90, 76
J7MLWEX24 SCS 6.27/0.29, 98/90, 103
J78418 SCS 1.05/0.0, 98/90, 44
J7TAC3S18 SCS 4.36/0.21, 98/90, 102
J76718 SCS 5.28/0.36, 98/90, 109
J76018 SCS 7.39/0.21, 98/90, 106
J757D SCS 7.39/0.20, 98/90, 117
J715718 SCS 6.38/0.20, 98/90, 96
J72118 SCS 7.18/0.18, 98/90, 90
J72524 SCS 6.38/0.24, 98/90, 96
J714524 SCS 3.79/0.26, 98/90, 100

ALGONA : FLO
(CONTINUED)

A3CHICD1 SCS 12.20/0.60, 98/90, 33
A3CHICD2 SCS 13.3/0.90, 98/90, 20
A3CHICD2 SCS 13.3/0.70, 98/90, 30
A3CHICD3 SCS 20.0/0.90, 98/90, 26
A3CHICD3 SCS 15.4/0.90,98/90, 5
A1CHICD4 SCS 8.7/0.90, 98/90, 5
A23918 SCS 6.7/0.70, 98/90, 25
A23918 SCS 10.7/0.90, 98/90, 20
A23334 SCS 12.8/0.90, 98/90, 20
A21018 SCS 14.0/0.90, 98/90, 20
A10724 SCS 11.0/0.90, 98/90, 20
A10830 SCS 6.8/0.90, 98/90, 20
B184D SCS 8.97/0.26, 98/90, 86
B18118 SCS 5.40/0.27, 98/90, 107
B17418 SCS 9.55/0.22, 98/90, 273
B174D SCS 0.81/0, 98/90, 112
B167A24 SCS 4.03/0.40, 98/90, 32
B167A24 SCS 4.81/0.35, 98/90, 122
B15212 SCS 6.06/0.25, 98/90, 98
B16018 SCS 3.38/0.29, 98/90, 105
B113824 SCS 2.84/0, 98/90, 227
C11D SCS 2.94/0.32, 98/90, 95
C1118 SCS 4.67/0, 98/90, 133
D1PRO1 SCS 5.92/0.18, 98/85, 130
D1109D SCS 11.85/0.13, 98/87, 167
D112718 SCS 3.16/.00, 98/86, 67
D112218 SCS 6.17/0.42, 98/,64, 163
E356D SCS 7.97/0.15, 98/90, 140
E110018 SCS 3.04/0.25, 98/90, 117
E39618 SCS 5.06/.31, 98/90, 151
E1106D SCS. 6.02/0.20, 98/90, 155
F53318 SCS 1.33/0.34, 98/90, 49
F39418 SCS 2.36/0.30, 98/90, 144
F39324 SCS 2.40/0.34, 98/90, 137
F322D SCS 5.05/0.23, 98/90, 157
F39218 SCS 1.45/0.19, 98/90, 88
F38018 SCS 3.20/0.30, 98/90, 72
F39124 SCS 3.97/0.23, 98/90, 153
F377D SCS 5.96/0.40, 98/90, 113
F39524 SCS 5.23/0.30, 98/90, 107
F3BRDWDE SCS 3.47/0, 98/90, 99
F3BRDWDW SCS 6.53/0.25, 98/90, 104
F34124 SCS 3.68/0.08, 98/90, 73
F34124 SCS 1.14/0.40, 98/90, 89
F34124 SCS 6.09/0.32, 98/90, 198
F34230 SCS 2.07/0.34, 98/90, 125
F34230 SCS 1.79/0.16, 98/90, 79
G3ALGWD SCS 0.52/0.60, 98/90, 32
G3ALGWD SCS 0.75/0.0, 98/90, 84
G3ALGWD SCS 1.68/0.23, 98/90, 75
G5ALGWD SCS 4.50/0.0, 98/90, 115
G5136D SCS 1.92/0.10, 98/90, 63
G5136D SCS 1.55/0.31, 98/90, 50
H5ALGWD SCS 0.83/0.29, 98/90, 72

ALGONAFT. FLO

H54512 SCS 1.99/0.46, 98/90, 25
H54712 SCS 3.60/0.41, 98/90, 52
H55118 SCS 3.51/0.22, 98/90, 104
K52AVED SCS 2.58/0.35, 98/90, 92
K55812 SCS 2.74/0.27, 98/90, 57
K55918 SCS 2.71/0.27, 98/90, 102
K57118 SCS 1.19/0.51, 98/90, 47
K56618 SCS 1.75/0.47, 98/90, 74
K5164D SCS 2.69/0.34, 98/90, 74
K516618 SCS 2.60/0.20, 98/90, 74
L510812 SCS 2.02/0.38, 98/90, 72
L510812 SCS 2.37/0.38, 98/90, 73
L515618 SCS 1.86/0.40, 98/90, 72
L515718 SCS 1.89/0.36, 98/90, 72
L511518 SCS 2.53/0.29, 98/90, 77
L5171D SCS 3.88/0.26, 98/90, 99
L5132D SCS 2.10/0.36, 98/90, 85
L512912 SCS 2.11/0.40, 98/90, 63
L5130D SCS 2.15/0.32, 98/90, 99
L512512 SCS 2.90/0.29, 98/90, 81
J58418 SCS 13.57/0.18, 98/80, 139
J58518 SCS 4.70/0.34, 98/90, 60
J58518 SCS 1.92/0.44, 98/90, 46
J67D SCS 10.46/0.10, 98/80, 148
J59912 SCS 7.53/0.10, 98/80, 69
J59812 SCS 4.02/0.20, 98/90, 59
J72024 SCS 1.03/0.24, 98/90, 45
J72424 SCS 1.95/0.35, 98/90, 47
J517518 SCS 4.18/0.24, 98/90, 52
J510424 SCS 4.18/0.17, 98/90, 41
J510512 SCS 2.88/0.22, 98/90, 53
J713124 SCS 5.89/0.20, 98/90, 55
J710912 SCS 2.77/0.30, 98/90, 38
J710124 SCS 6.27/0.23, 98/90, 55
J712724 SCS 6.27/0.29, 98/90, 55
J79112 SCS 3.69/0.21, 98/90, 50
J7MLWEX24 SCS 6.27/0.29, 98/90, 55
J78418 SCS 1.05/0.0, 98/90, 44
J7TAC3S18 SCS 4.36/0.21, 98/90, 54
J76718 SCS 5.28/0.36, 98/90, 55
J76018 SCS 7.39/0.21, 98/90, 58
J757D SCS 7.39/0.20, 98/90, 69
J715718 SCS 6.38/0.20, 98/90, 59
J72118 SCS 7.18/0.18, 98/90, 53
J72524 SCS 6.38/0.24, 98/90, 59
J714524 SCS 3.79/0.26, 98/90, 52
J712524 SCS 6.30/0.25, 98/90, 55

EXCERPTS FROM THE KING COUNTY SURFACE WATER DESIGN MANUAL

FIGURE 3.5.1E 10-YEAR 24-HOUR ISOPLUVIALS

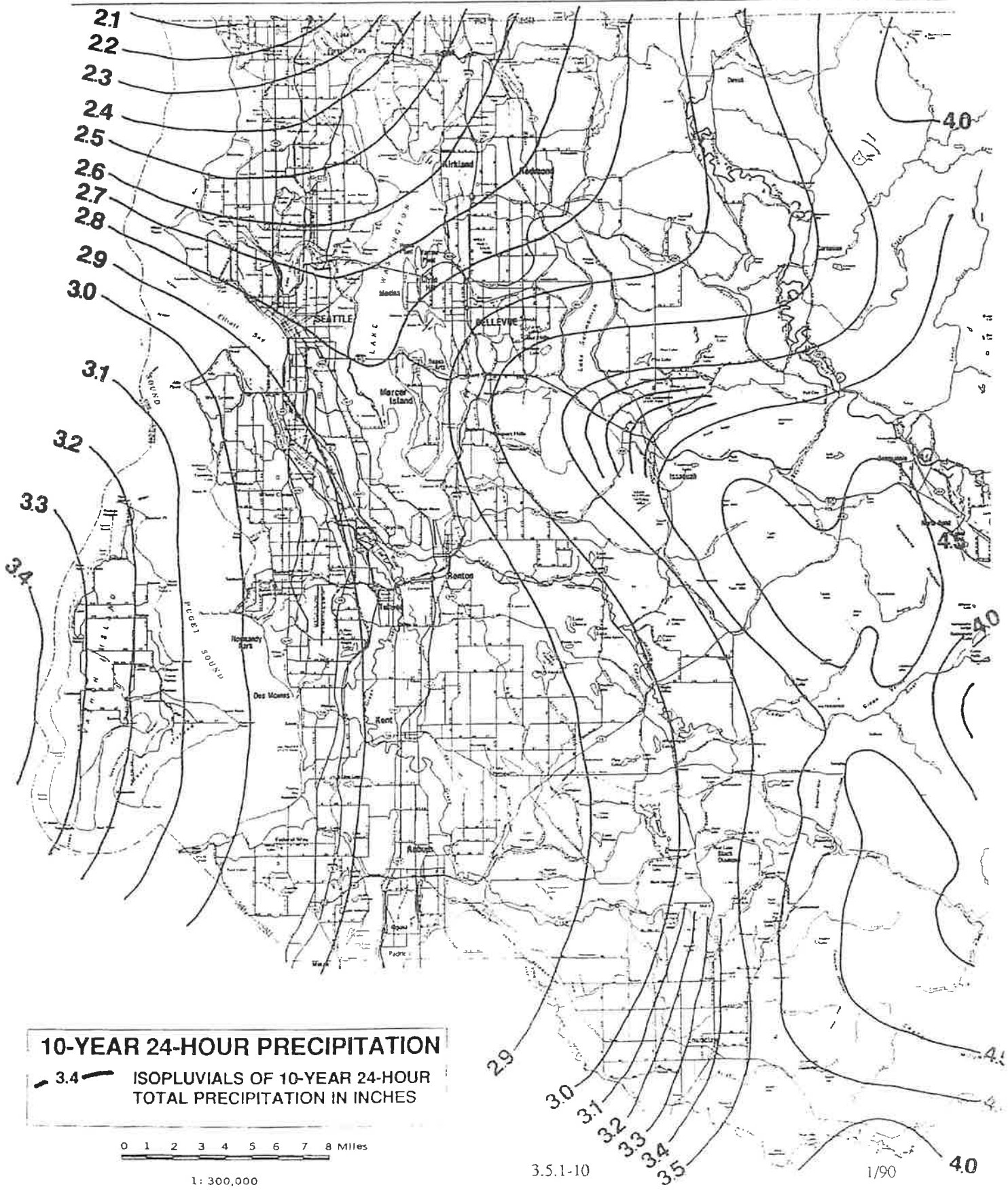


FIGURE 3.5.1F 25-YEAR 24-HOUR ISOPLUVIALS

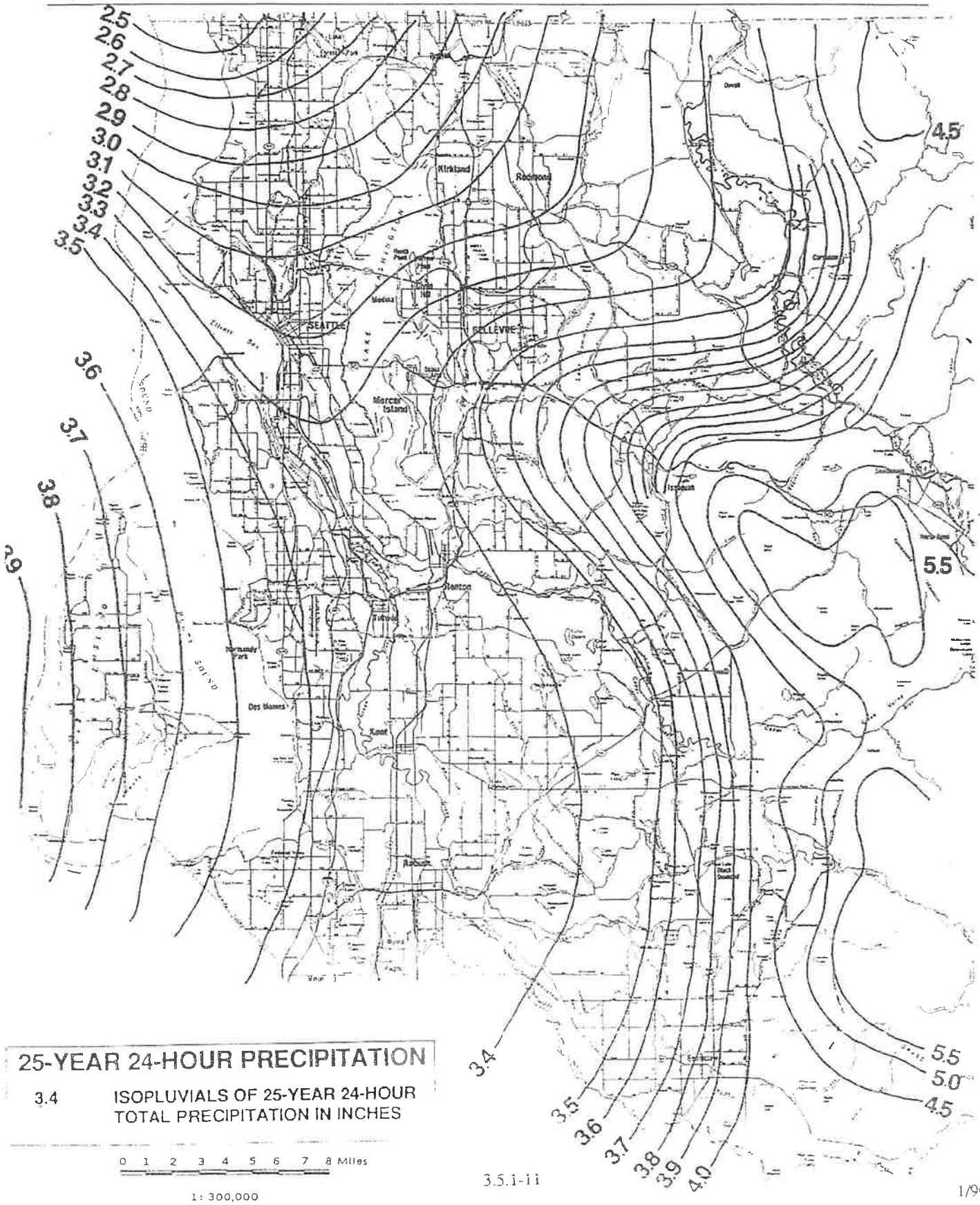


FIGURE 3.5.1G 50-YEAR 24-HOUR ISOPLUVIALS

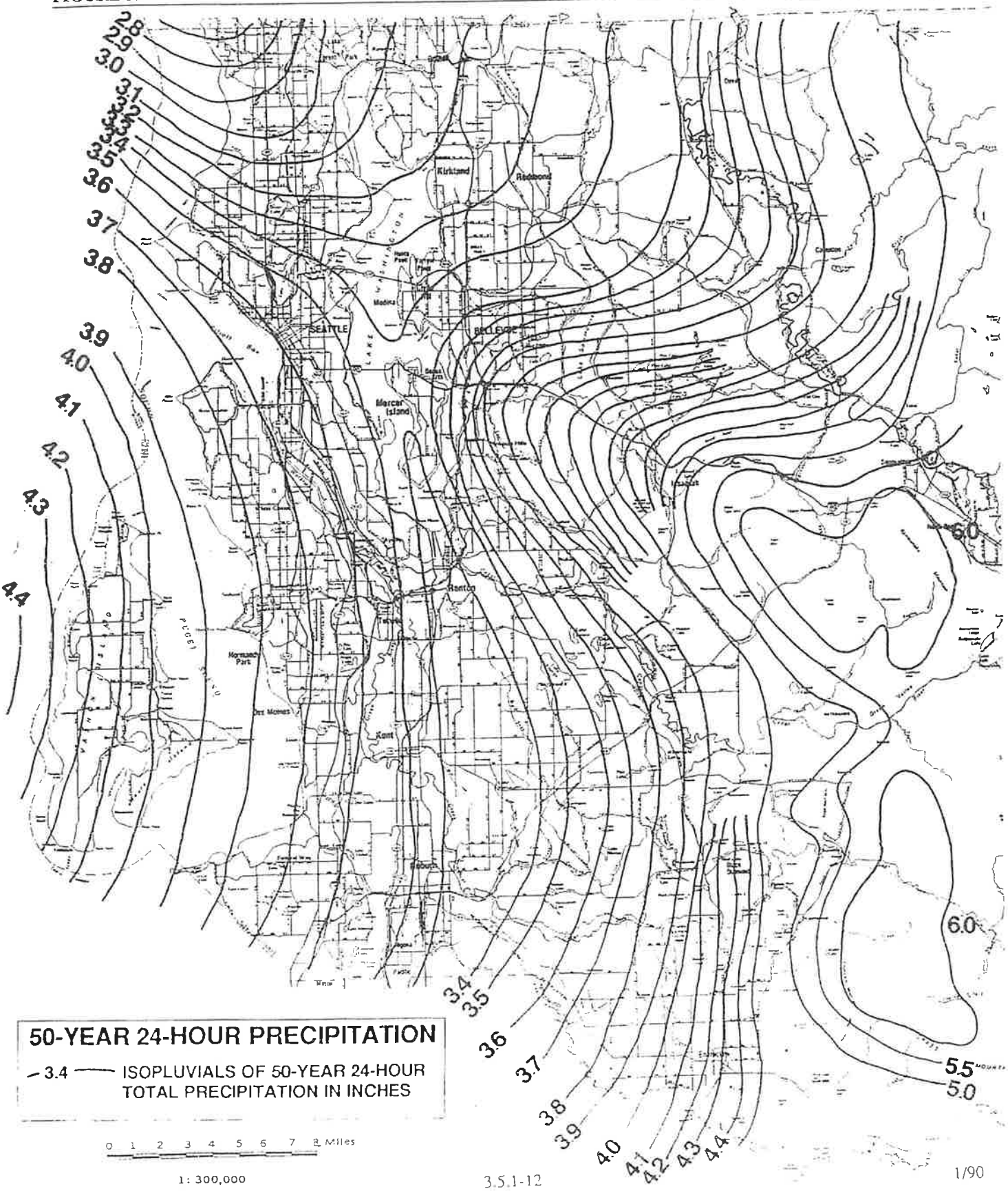


FIGURE 3.5.1H 100-YEAR 24-HOUR ISOPLUVIALS

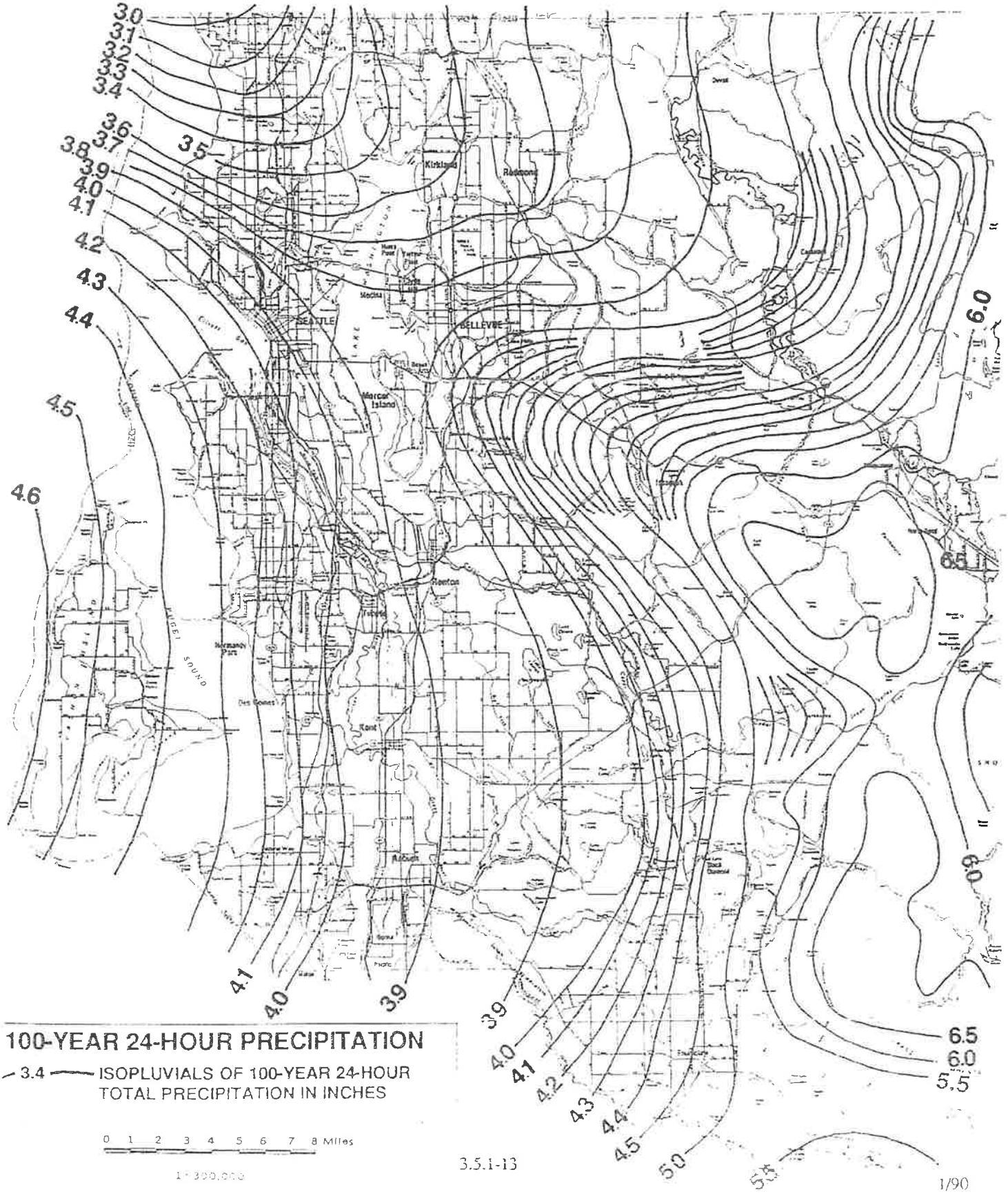
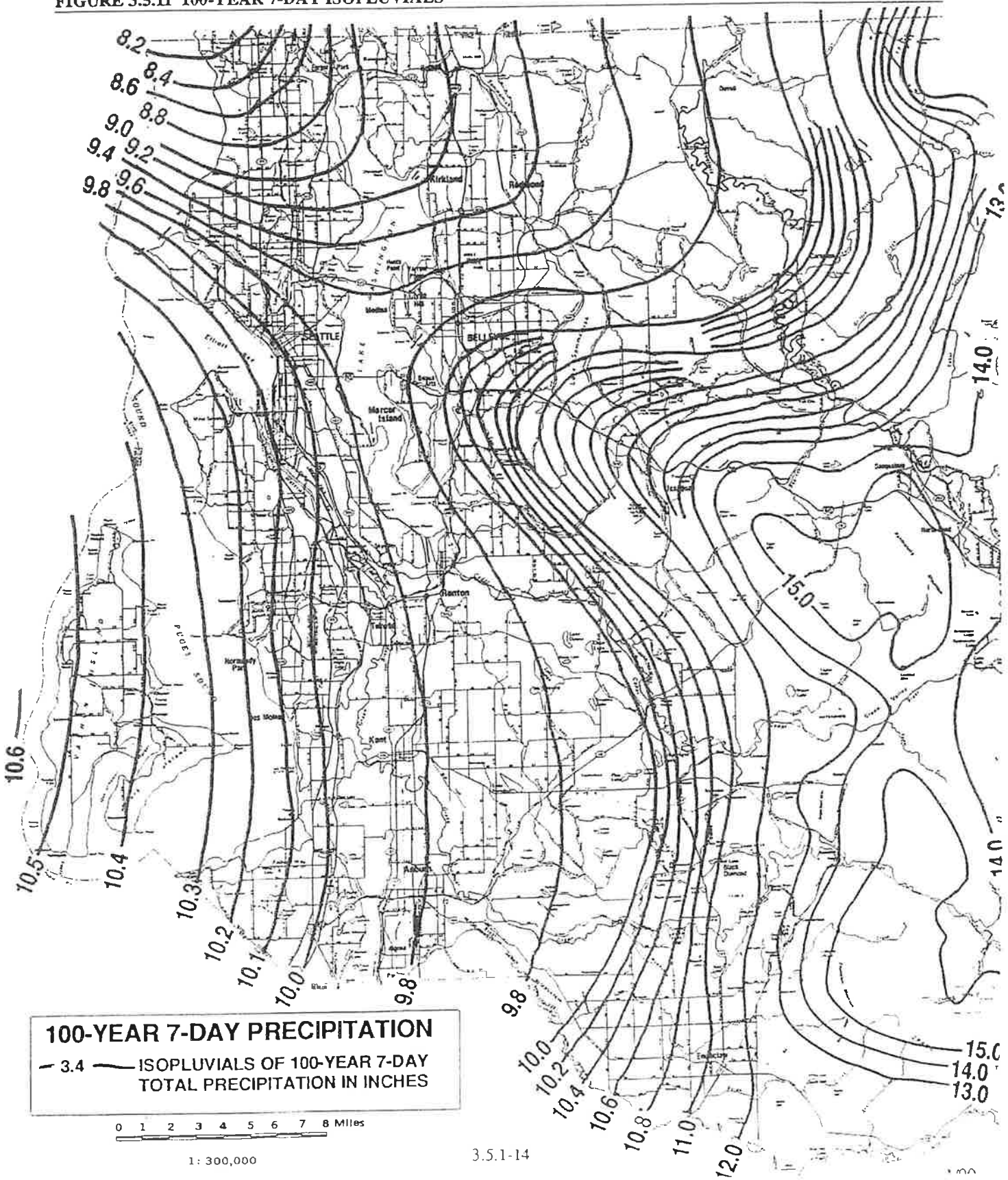


FIGURE 3.5.1I 100-YEAR 7-DAY ISOPLUVIALS



3.5.2 RUNOFF PARAMETERS

All storm event hydrograph methods require the input of parameters which describe the physical drainage basin characteristics. These parameters provide the basis from which the runoff hydrograph is developed. This section describes the three key parameters (area, curve number, and time of concentration) used to develop the runoff hydrograph using the method of hydrograph synthesis in Section 3.5.3.

Area

To obtain the highest degree of accuracy in hydrograph analysis requires the proper selection of homogeneous basin areas. Significant differences in land use within a given drainage basin must be addressed by dividing the basin area into subbasin areas of similar land use and/or runoff characteristics. For example, a drainage basin consisting of a concentrated residential area and a large forested area should be divided into two subbasin areas accordingly. Hydrographs should then be computed for each subbasin area and summed to form the total runoff hydrograph for the basin.

To further enhance the accuracy of hydrograph analysis, all pervious and impervious areas within a given basin or subbasin shall be analyzed separately. This may be done by either computing separate hydrographs for each area and combining them to form the total runoff hydrograph or, computing the precipitation excess for each area and combining the two to obtain the total precipitation excess which is then used to develop the runoff hydrograph (this procedure is performed automatically by the Santa Barbara Urban Hydrograph method explained further in Section 3.5.3, "Hydrograph Synthesis"). By analyzing pervious and impervious areas separately the errors associated with averaging these areas are avoided and the true shape of the runoff hydrograph is better approximated.

Curve Number

The Soil Conservation Service (SCS) has for many years conducted studies into the runoff characteristics of various land types. After gathering and analyzing extensive data, SCS has developed relationships between land use, soil type, vegetation cover, interception, infiltration, surface storage, and runoff. These relationships have been characterized by a single runoff coefficient called a "curve number." The National Engineering Handbook - Section 4: Hydrology (NEH-4, SCS, August 1972) contains a detailed description of the development and use of the curve number method.

SCS has developed "curve number" (CN) values based on soil type and land use. The combination of these two factors is called the "soil-cover complex." The soil-cover complexes have been assigned to one of four hydrologic soil groups, according to their runoff characteristics. SCS has classified over 4,000 soil types into these four soil groups. Table 3.5.2A shows the hydrologic soil group of the most common soils in King County and provides a brief description of the four hydrologic soil group classifications.

Table 3.5.2B shows the CN's, by land use description, for the four hydrologic soil groups found in King County. These numbers are for a 24-hour duration storm and typical antecedent soil moisture conditions preceding 24-hour storms in Western Washington. Note these CN's are not, therefore, "average," but rather calibrated by the SCS for Western Washington and should not be used with "wet" or "dry" modifications. Modeling performed to calibrate to actual rainfall and/or runoff data should start with the original SCS CN's published in TR-55.

The following are important criteria/considerations for selection of CN values:

(1) Many factors may affect the CN value for a given land use. For example, the movement of heavy equipment over bare ground may compact the soil so that it has a lesser infiltration rate and greater runoff potential than would be indicated by strict application of the CN value based on predevelopment conditions at the site.

(2) CN values can be area weighted when they apply to pervious areas of similar CN's (within 20 CN points). However, high CN areas should not be combined with low CN areas (unless the low CN areas are less than 15% of the subbasin). In this case, separate hydrographs should be generated and summed to form one hydrograph.

FIGURE 3.5.2A HYDROLOGIC SOIL GROUP OF THE SOILS IN KING COUNTY

SOIL GROUP	HYDROLOGIC GROUP*	SOIL GROUP	HYDROLOGIC GROUP*
Alderwood	C	Orcas Peat	D
Arents, Alderwood Material	C	Oridia	D
Arents, Everett Material	B	Ovall	C
Beausite	C	Pilchuck	C
Bellingham	D	Puget	D
Briscot	D	Puyallup	B
Buckley	D	Ragnar	B
Coastal Beaches	Variable	Renton	D
Earlmont Silt Loam	D	Riverwash	Variable
Edgewick	C	Salal	C
Everett	A	Sammamish	D
Indianola	A	Seattle	D
Kitsap	C	Shacar	D
Klaus	C	Si Silt	C
Mixed Alluvial Land	Variable	Snohomish	D
Neilton	A	Sultan	C
Newberg	B	Tukwila	D
Nooksack	C	Urban	Variable
Normal Sandy Loam	D	Woodinville	D

HYDROLOGIC SOIL GROUP CLASSIFICATIONS

A. (Low runoff potential). Soils having high infiltration rates, even when thoroughly wetted, and consisting chiefly of deep, well-to-excessively drained sands or gravels. These soils have a high rate of water transmission.

B. (Moderately low runoff potential). Soils having moderate infiltration rates when thoroughly wetted, and consisting chiefly of moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission.

C. (Moderately high runoff potential). Soils having slow infiltration rates when thoroughly wetted, and consisting chiefly of soils with a layer that impedes downward movement of water, or soils with moderately fine to fine textures. These soils have a slow rate of water transmission.

D. (High runoff potential). Soils having very slow infiltration rates when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a hardpan or clay layer at or near the surface, and shallow soils over nearly impervious material. These soils have a very slow rate of water transmission.

* From SCS, TR-55, Second Edition, June 1986, Exhibit A-1. Revisions made from SCS, Soil Interpretation Record, Form #5, September 1988.

TABLE 3.5.2B SCS WESTERN WASHINGTON RUNOFF CURVE NUMBERS

SCS WESTERN WASHINGTON RUNOFF CURVE NUMBERS (Published by SCS in 1982)					
Runoff curve numbers for selected agricultural, suburban and urban land use for Type 1A rainfall distribution, 24-hour storm duration.					
LAND USE DESCRIPTION		CURVE NUMBERS BY HYDROLOGIC SOIL GROUP A	B	C	D
Cultivated land(1):	winter condition	86	91	94	95
Mountain open areas:	low growing brush and grasslands	74	82	89	92
Meadow or pasture:		65	78	85	89
Wood or forest land:	undisturbed	42	64	76	81
Wood or forest land:	young second growth or brush	55	72	81	86
Orchard:	with cover crop	81	88	92	94
Open spaces, lawns, parks, golf courses, cemeteries, landscaping.					
good condition:	grass cover on 75% or more of the area	68	80	86	90
fair condition:	grass cover on 50% to 75% of the area	77	85	90	92
Gravel roads and parking lots		76	85	89	91
Dirt roads and parking lots		72	82	87	89
Impervious surfaces, pavement, roofs, etc.		98	98	98	98
Open water bodies:	lakes, wetlands, ponds, etc.	100	100	100	100
Single Family Residential (2)					
Dwelling Unit/Gross Acre	% Impervious (3)				
1.0 DU/GA	15				
1.5 DU/GA	20				
2.0 DU/GA	25				
2.5 DU/GA	30				
3.0 DU/GA	34				
3.5 DU/GA	38				
4.0 DU/GA	42				
4.5 DU/GA	46				
5.0 DU/GA	48				
5.5 DU/GA	50				
6.0 DU/GA	52				
6.5 DU/GA	54				
7.0 DU/GA	56				
Planned unit developments, condominiums, apartments, commercial business and industrial areas.	% impervious must be computed	Separate curve number shall be selected for pervious and impervious portion of the site or basin			

(1) For a more detailed description of agricultural land use curve numbers refer to National Engineering Handbook, Section 4, Hydrology, Chapter 9, August 1972.
(2) Assumes roof and driveway runoff is directed into street/storm system.
(3) The remaining pervious areas (lawn) are considered to be in good condition for these curve numbers.

(3) Separate CN values must be selected for the pervious and impervious areas of an urban basin or subbasin. For single family residential areas the percent impervious given in Table 3.5.2B shall be used to compute the respective pervious and impervious areas. For proposed commercials, P.U.D.'s etc., the percent impervious must be computed from the site plan. For all other land uses the percent impervious must be estimated from best available aerial topography and/or field reconnaissance. The pervious area CN value shall be a weighted average of all the pervious area CN's within the subbasin. The impervious area CN value shall be 98.

(4) For storm duration other than 24 hours, an adjustment must be made to the CN values given in Table 3.5.2B. Based on information obtained from SCS, the following equation shall be used for adjusting these CN's for the 7-day design storm:

$$CN_{7\text{-day}} = 0.1549\ CN + 0.8451\ ((CN^{2.365}/631.8) + 15)$$

Example: The following is an example of how CN values are selected for a sample project.

Select CN's for the following development:

Existing Land Use	--	forest (undisturbed)
Future Land Use	--	residential plat (3.6 DU/GA)
Basin Size	--	10 acres
Soil Type	--	80% Alderwood, 20% Ragnar

Table 3.5.2A shows that Alderwood soil belongs to the "C" hydrologic soil group and Ragnar soil belongs to the "B" group. Therefore, for the existing condition, CN's of 76 and 64 are read from Table 3.5.2B and area weighted to obtain a CN value of 74. For the developed condition with 3.6 DU/GA the percent impervious of 39 percent is interpolated from Table 3.5.2B and used to compute pervious and impervious areas of 6.1 acres and 3.9 acres respectively. The 6.1 acres of pervious area consists of yards and lawns covering the same proportions of Alderwood and Ragnar soil (80 percent and 20 percent respectively). Therefore, CN's of 90 and 85 are read from Table 3.5.2B and area weighted to obtain a pervious area CN value of 89. The impervious area CN-value is 98. The result of this example are summarized below:

On-Site Condition	Existing	Developed
Land use	Forest	Residential
Pervious area	10 ac.	6.1 ac.
CN of pervious area	74	89
Impervious area	0 ac	3.9 ac
CN of impervious area	---	98

SCS Curve Number Equations

The rainfall-runoff equations of the SCS curve number method relates a land area's runoff depth (precipitation excess) to the precipitation it receives and to its natural storage capacity, as follows:

$$Q_d = (P_R - 0.2S)^2 / (P_R + 0.8S) \quad \text{for } P_R \geq 0.2S$$

and $$Q_d = 0 \quad \text{for } P_R < 0.2S$$

where

Q_d = runoff depth in inches over the area,
P_R = precipitation depth in inches over the area, and
S = potential maximum natural detention, in inches over the area, due to infiltration, storage, etc.

The area's potential maximum detention, S, is related to its curve number, CN:

$$S = (1000 / CN) - 10$$

The combination of the above equations allows for estimation of the total runoff volume by computing the total runoff depth, Q_d, given the total precipitation depth, P_R. For example, if the curve number of the area is 70, then the value of S is 4.29. With a total precipitation for the design event of 2.0 inches, the total runoff depth would be:

$$Q_d = [2.0 - 0.2 (4.29)]^2 / [2.0 + 0.8 (4.29)] = \underline{0.24 \text{ inches}}$$

This computed runoff represents inches over the tributary area. Therefore, the total volume of runoff is found by multiplying Q_d by the area (with necessary conversions):

Total runoff Volume (cu-ft)	=	3,630 (cu-ft/ac-in)	X	Q_d (in)	X	A (ac)

If the area is 10 acres, the total runoff volume is:

3,630 cu. ft./acre-in. x 0.24 in. x 10 acres = <u>8,712 cu. ft.</u>

When developing the runoff hydrograph, the above equation for Q_d is used to compute the incremental runoff depth for each time interval from the incremental precipitation depth given by the design storm hyetograph. This time distribution of runoff depth is often referred to as the precipitation excess and provides the basis for synthesizing the runoff hydrograph.

Travel Time and Time of Concentration for Use in Hydrograph Analysis
(based on the methods described in Chapter 3, SCS publication 210-VI-TR-55, Second Ed., June 1986)

Travel time (T_t) is the time it takes water to travel from one location to another in a watershed. T_t is a component of time of concentration (T_c), which is the time for runoff to travel from the hydraulically most distant point of the watershed. T_c is computed by summing all the travel times for consecutive components of the drainage conveyance system. T_c influences the shape and peak of the runoff hydrograph. Urbanization usually decreases T_c, thereby increasing the peak discharge. But T_c can be increased as a result of (a) ponding behind small or inadequate drainage systems, including storm drain inlets and road culverts, or (b) reduction of land slope through grading.

Water moves through a watershed as sheet flow, shallow concentrated flow, open channel flow, or some combination of these. The type that occurs is best determined by field inspection.

Travel time (T_t) is the ratio of flow length to flow velocity:

$$T_t = \frac{L}{60\,V} \quad \text{[Travel Time Equation]}$$

where

T_t = travel time (min)
L = flow length (ft)
V = average velocity (ft/s), and
60 = conversion factor from seconds to minutes.

Time of concentration (T_c) is the sum of T_t values for the various consecutive flow segments.

$$T_c = T_{t_1} + T_{t_2} + \ldots T_{t_m}$$

where

T_c = time of concentration (min), and
m = number of flow segments

Sheet Flow: Sheet flow is flow over plane surfaces. It usually occurs in the headwater of streams. With sheet flow, the friction value (n_s) (a modified Manning's effective roughness coefficient that includes the effect of raindrop impact; drag over the plane surface; obstacles such as litter, crop ridges, and rocks; and erosion and transportation of sediment) is used. These n_s values are for very shallow flow depths of about 0.1 foot and are only used for travel lengths up to 300 feet. Table 3.5.2.C gives Manning's n_s values for sheet flow for various surface conditions.

For sheet flow up to 300 feet, use Manning's kinematic solution to directly compute T_t:

$$\text{Sheet flow: } T_t = \frac{0.42\ (n_s L)^{0.8}}{(P_2)^{0.5}\ (s_o)^{0.4}}$$

where

T_t = travel time (min),
n_s = sheet flow Manning's effective roughness coefficient (from Table 3.5.2C),
L = flow length (ft),
P_2 = 2-year, 24-hour rainfall (in), (see Figure 3.5.1C) and (2.0)
s_o = slope of hydraulic grade line (land slope, ft/ft)

Velocity Equation

A commonly used method of computing average velocity of flow, once it has measurable depth, is the following equation:

$$V = k\sqrt{s_o}$$

where:

V = velocity (ft/s)
k = time of concentration velocity factor (ft/s)
s_o = slope of flow path (ft/ft)

"k" is computed for various land covers and channel characteristics with assumptions made for hydraulic radius using the following rearrangement of Manning's equation:

$$k = (1.49\ (R)^{0.667})/n;$$

where

R = an assumed hydraulic radius
n = Manning's roughness coefficient for open channel flow (from Table 4.3.7B in Chapter 4)

TABLE 3.5.2C "n" AND "k" VALUES USED IN TIME CALCULATIONS FOR HYDROGRAPHS

"n_s" Sheet Flow Equation Manning's Values (For the initial 300 ft of travel)	n_s*
Smooth surfaces (concrete, asphalt, gravel, or bare hard packed soil)	0.011
Fallow fields or loose soil surface (no residue)	0.05
Cultivated soil with residue cover (s < = 0.20 ft/ft)	0.06
Cultivated soil with residue cover (S> 0.20 ft/ft)	0.17
Short prairie grass and lawns	0.15
Dense grasses	0.24
Bermuda grass	0.41
Range (natural)	0.13
Woods or forest with light underbrush	0.40
Woods or forest with dense underbrush	0.80

*Manning values for sheet flow only, from Overton and Meadows 1976 (See TR-55, 1986)

"k" Values Used in Travel Time/Time of Concentration Calculations

Shallow Concentrated Flow (After the initial 300 ft. of sheet flow, R = 0.1)		k_s
1.	Forest with heavy ground litter and meadows (n=0.10)	3
2.	Brushy ground with some trees (n = 0.060)	5
3.	Fallow or minimum tillage cultivation (n =0.040)	8
4.	High grass (n = 0.035)	9
5.	Short grass, pasture and lawns (n=0.030)	11
6.	Nearly bare ground (n=0.025)	13
7.	Paved and gravel areas (n=0.012)	27

Channel Flow (Intermittent) (At the beginning of visible channels: R=0.2)		k_c
1.	Forested swale with heavy ground litter (n = 0.10)	5
2.	Forested drainage course/ravine with defined channel bed (n=0.050)	10
3.	Rock-lined waterway (n=0.035)	15
4.	Grassed waterway (n=0.030)	17
5.	Earth-lined waterway (n=0.025)	20
6.	CMP pipe (n=0.024)	21
7.	Concrete pipe (0.012)	42
8.	Other waterways and pipes	0.508/n

Channel Flow (Continuous stream, R = 0.4)		k_c
9.	Meandering stream with some pools (n = 0.040)	20
10.	Rock-lined stream (n=0.035)	23
11.	Grass-lined stream (n=0.030)	27
12.	Other streams, man-made channels and pipe	0.807/n**

**See Chapter 5, Table 5.3.6C for additional Mannings "n" values for open channels

Shallow Concentrated Flow: After a maximum of 300 feet, sheet flow is assumed to become shallow concentrated flow. The average velocity for this flow can be calculated using the k_s values from Table 3.5.2C in which average velocity is a function of watercourse slope and type of channel. After computing the average velocity using the Velocity Equation above, the travel time (T_t) for the shallow concentrated flow segment can be computed using the Travel Time Equation described above.

Open Channel Flow: Open channels are assumed to begin where surveyed cross section information has been obtained, where channels are visible on aerial photographs, or where lines indicating streams appear (In blue) on United States Geological Survey (USGS) quadrangle sheets. The k_c values from Table 3.5.2C used in the Velocity Equation above or water surface profile information can be used to estimate average flow velocity. Average flow velocity is usually determined for bank-full conditions. After average velocity is computed the travel time (T_t) for the channel segment can be computed using the Travel Time Equation above.

Lakes or Wetlands: Sometimes it is necessary to estimate the velocity of flow through a lake or wetland at the outlet of a watershed. This travel time is normally very small and can be assumed as zero. Where significant attenuation may occur due to storage effects, the flows should be routed using the "level pool routing" technique described in Section 3.5.4.

Limitations: The following limitations apply in estimating travel time (T_t).

- Manning's kinematic solution should not be used for sheet flow longer than 300 feet.
- In watersheds with storm sewers, carefully identify the appropriate hydraulic flow path to estimate T_c. Storm sewers generally handle only a small portion of a large event. The rest of the peak flow travels by streets, lawns, and so on, to the outlet. Consult a standard hydraulics textbook to determine average velocity in pipes for either pressure or nonpressure flow.
- A culvert or bridge can act as a reservoir outlet if there is significant storage behind it. A hydrograph should be developed to this point and the "level pool routing" technique described in Section 3.5.4 should be used to determine the outflow rating curve through the culvert or bridge.

Example: The following is an example of travel time and time of concentration calculations.

Given: An existing drainage basin having a selected flow route composed of the following 5 segments:

(Note: Drainage basin is in Federal Way and has a P_2 = 2.1 inches, from Figure 3.5.1C.)

Segment 1: L = 200 ft, Forest with dense brush (sheet flow)
s_o = 0.03 ft/ft, n_s = 0.80

Segment 2: L = 300 ft, Pasture (shallow concentrated flow)
s_o = 0.04 ft/ft, k_s = 11

Segment 3: L = 50 ft, Small pond (year around)
s_o = 0.00 ft/ft, k_c = 0

Segment 4: L = 300 ft, Grassed waterway (intermittent channel)
s_o = 0.05, k_c = 17

Segment 5: L = 500 ft, Grass-lined stream (continuous)
s_o = 0.02, k_c = 27

Calculate travel times (T_t's) for each reach and then sum them to calculate the drainage basin time of concentration (T_c).

Segment 1: Sheet flow, $T_t = \dfrac{0.42\ (n_s L)^{0.8}}{(P_2)^{0.5}\ (s_o)^{0.4}}$

(L < 300 feet)

$$T_1 = \frac{(0.42)\ [(0.80)(200)]^{0.8}}{(2.1)^{0.5}\ (0.03)^{0.4}} = \underline{68 \text{ minutes}}$$

Segment 2: Shallow concentrated flow $V = k_s \sqrt{s_o}$

$$V_2 = (11)\ \sqrt{(0.04)} = 2.2 \text{ ft/s}$$

$$T_2 = \frac{L}{60V} = \frac{(300)}{60(2.2)} = \underline{2 \text{ minutes}}$$

Segment 3: Flat water surface

$$T_3 = \underline{0 \text{ minutes}}$$

Segment 4: Intermittent channel flow

$$V_4 = (17)\ \sqrt{(0.05)} = 3.8 \text{ ft/s}$$

$$T_4 = \frac{(300)}{60(3.8)} = \underline{1 \text{ minute}}$$

Segment 5: Continuous stream

$$V_5 = (27)\ \sqrt{(0.02)} = 3.8 \text{ ft/s}$$

$$T_5 = \frac{(500)}{60(3.8)} = \underline{2 \text{ minutes}}$$

$$T_c = T_1 + T_2 + T_3 + T_4 + T_5$$

$$T_c = 68 + 2 + 0 + 1 + 2 = \underline{73 \text{ minutes}}$$

It is important to note how the initial sheet flow segment's travel time dominates the time of concentration computation. This will nearly always be the case for relatively small drainage basins and in particular for the existing site conditions. This also illustrates the significant impact urbanization has on the surface runoff portion of the hydrologic process.

3.5.3 HYDROGRAPH SYNTHESIS

This section presents a description of the hydrograph methods used to synthesize the runoff hydrograph from precipitation excess (time distribution of runoff depth) and time of concentration.

King County the SWM Division staff have used and tested two similar hydrograph methods: the Soil Conservation Service Unit Hydrograph (SCSUH) method and the Santa Barbara Urban Hydrograph (SBUH) method. Both methods are based on the SCS Curve Number (CN) approach and utilize basic SCS equations for computing soil absorption and precipitation excess. The SCSUH method works by converting the incremental runoff depths (precipitation excess) for a given basin and design storm into unit hydrographs of equal time base according to basin time of concentration and adds them to form the total runoff hydrograph. The SBUH method, on the other hand, converts the incremental runoff depths into

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SUBJECT

PAGE OF

Storm flow.

from 100-yr 24 hr total = 3.7

TOT 2.9
HYE 10

Type 1A - 24 hour storm
from KC Storm Water Design Manual p 3.5.1.3

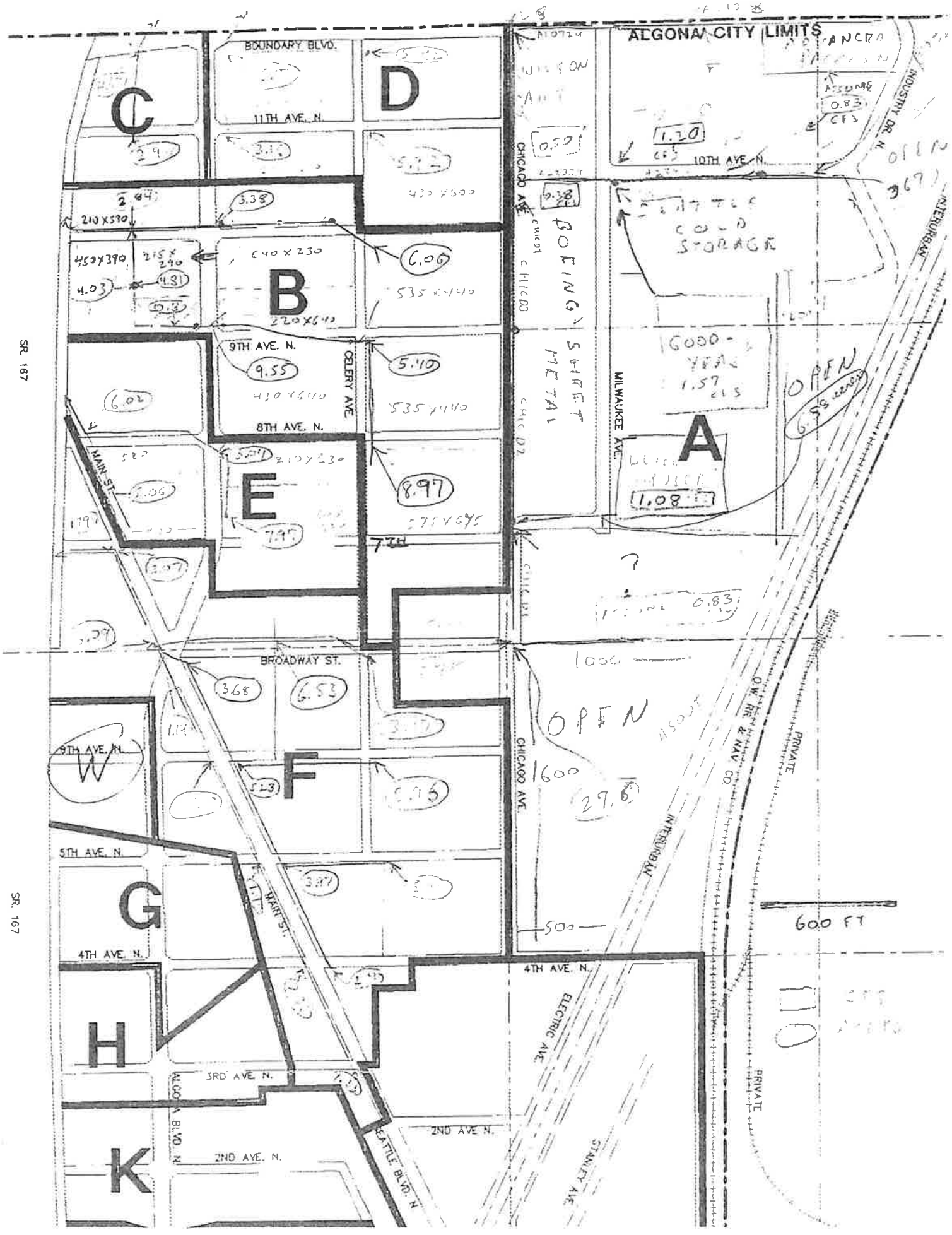
WASHINGTON, SURFACE WATER DE

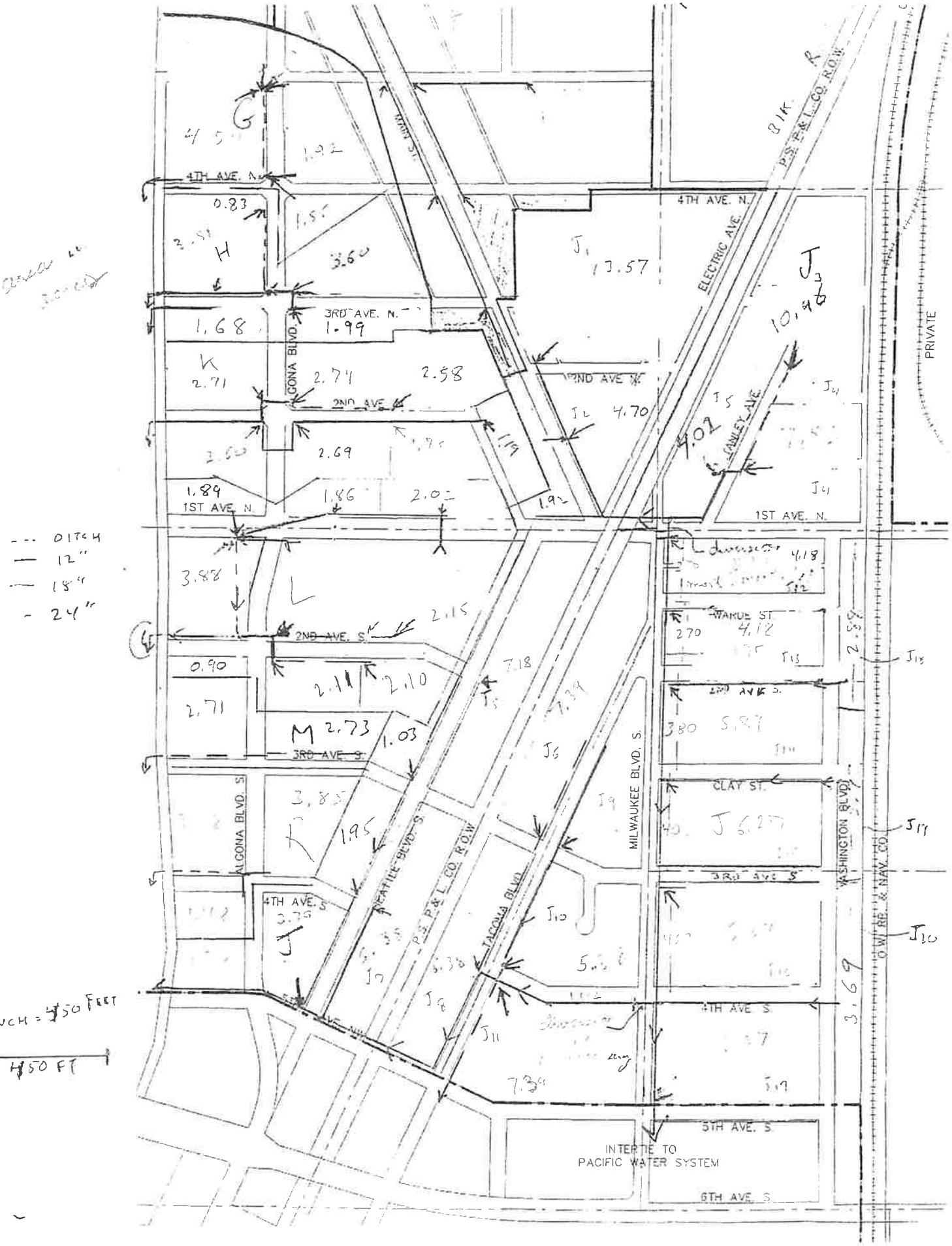
TABLE 3.5.1A 24-HOUR DESIGN STORM HYETOGRAPH VALUES

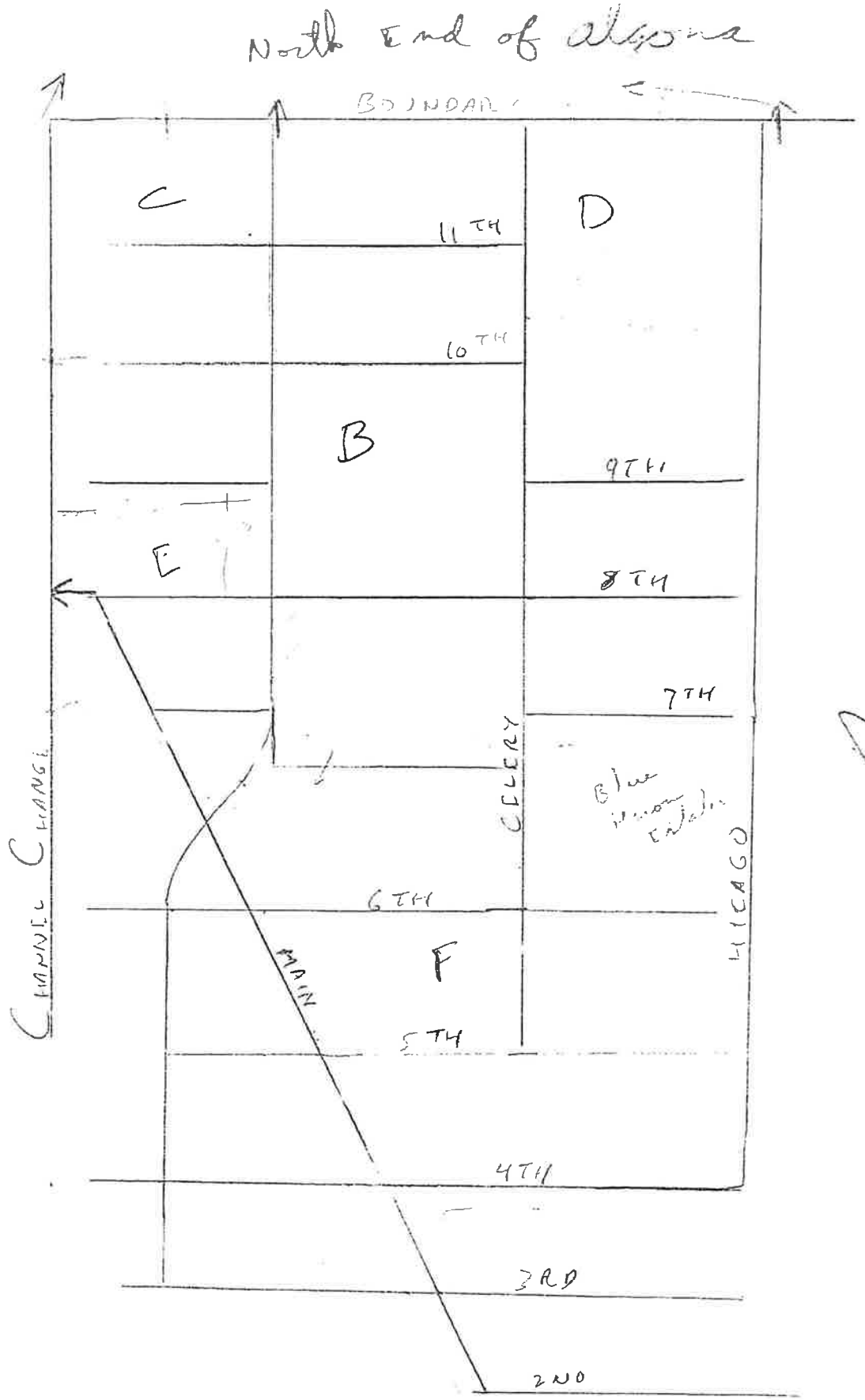
DESIGN STORM HYETOGRAPH VALUES

Time From Beginning of Storm (Min.)	Percent Rainfall	Cumulative Percent Rainfall
0 - 10	0.40	0.40
10 - 20	0.40	0.80
20 - 30	0.40	1.20
30 - 40	0.40	1.60
40 - 50	0.40	2.00
50 - 60	0.40	2.40
60 - 70	0.40	2.80
70 - 80	0.40	3.20
80 - 90	0.40	3.60
90 - 100	0.40	4.00
100 - 110	0.50	4.50
110 - 120	0.50	5.00
120 - 130	0.50	5.50
130 - 140	0.50	6.00
140 - 150	0.50	6.50
150 - 160	0.50	7.00
160 - 170	0.60	7.60
170 - 180	0.60	8.20
180 - 190	0.60	8.80
190 - 200	0.60	9.40
200 - 210	0.60	10.00
210 - 220	0.60	10.60
220 - 230	0.70	11.30
230 - 240	0.70	12.00
240 - 250	0.70	12.70
250 - 260	0.70	13.40
260 - 270	0.70	14.10
270 - 280	0.70	14.80
280 - 290	0.82	15.62
290 - 300	0.82	16.44
300 - 310	0.82	17.26
310 - 320	0.82	18.08
320 - 330	0.82	18.90
330 - 340	0.82	19.72
340 - 350	0.95	20.67
350 - 360	0.95	21.62
360 - 370	0.95	22.57
370 - 380	0.95	23.52
380 - 390	0.95	24.47
390 - 400	0.95	25.42
400 - 410	1.33	26.76
410 - 420	1.33	28.10
420 - 430	1.33	29.44
430 - 440	1.80	31.24
440 - 450	1.80	33.04
450 - 460	3.40	36.44
460 - 470	5.40	41.84
470 - 480	2.70	44.54
480 - 490	1.80	46.34
490 - 500	1.34	47.68
500 - 510	1.34	49.02
510 - 520	1.34	50.36
520 - 530	0.88	51.24
530 - 540	0.88	52.12
540 - 550	0.88	53.00
550 - 560	0.88	53.88
560 - 570	0.88	54.76
570 - 580	0.88	55.64
580 - 590	0.88	56.52
590 - 600	0.88	57.40
600 - 610	0.88	58.28
610 - 620	0.88	59.16
620 - 630	0.88	60.04
630 - 640	0.88	60.92
640 - 650	0.72	61.64
650 - 660	0.72	62.36
660 - 670	0.72	63.08
670 - 680	0.72	63.80
680 - 690	0.72	64.52
690 - 700	0.72	65.24
700 - 710	0.72	65.96
710 - 720	0.72	66.68
720 - 730	0.72	67.40
730 - 740	0.72	68.12
740 - 750	0.72	68.84
750 - 760	0.72	69.56
760 - 770	0.57	70.13
770 - 780	0.57	70.70
780 - 790	0.57	71.27
790 - 800	0.57	71.84
800 - 810	0.57	72.41
810 - 820	0.57	72.98
820 - 830	0.57	73.55
830 - 840	0.57	74.12
840 - 850	0.57	74.69
850 - 860	0.57	75.26
860 - 870	0.57	75.83
870 - 880	0.57	76.40
880 - 890	0.50	76.90
890 - 900	0.50	77.40
900 - 910	0.50	77.90
910 - 920	0.50	78.40
920 - 930	0.50	78.90
930 - 940	0.50	79.40
940 - 950	0.50	79.90
950 - 960	0.50	80.40
960 - 970	0.50	80.90
970 - 980	0.50	81.40
980 - 990	0.50	81.90
990 - 1000	0.50	82.40
1000 - 1010	0.40	82.80
1010 - 1020	0.40	83.20
1020 - 1030	0.40	83.60
1030 - 1040	0.40	84.00
1040 - 1050	0.40	84.40
1050 - 1060	0.40	84.80
1060 - 1070	0.40	85.20
1070 - 1080	0.40	85.60
1080 - 1090	0.40	86.00
1090 - 1100	0.40	86.40
1100 - 1110	0.40	86.80
1110 - 1120	0.40	87.20
1120 - 1130	0.40	87.60
1130 - 1140	0.40	88.00
1140 - 1150	0.40	88.40
1150 - 1160	0.40	88.80
1160 - 1170	0.40	89.20
1170 - 1180	0.40	89.60
1180 - 1190	0.40	90.00
1190 - 1200	0.40	90.40
1200 - 1210	0.40	90.80
1210 - 1220	0.40	91.20
1220 - 1230	0.40	91.60
1230 - 1240	0.40	92.00
1240 - 1250	0.40	92.40
1250 - 1260	0.40	92.80
1260 - 1270	0.40	93.20
1270 - 1280	0.40	93.60
1280 - 1290	0.40	94.00
1290 - 1300	0.40	94.40
1300 - 1310	0.40	94.80
1310 - 1320	0.40	95.20
1320 - 1330	0.40	95.60
1330 - 1340	0.40	96.00
1340 - 1350	0.40	96.40
1350 - 1360	0.40	96.80
1360 - 1370	0.40	97.20
1370 - 1380	0.40	97.60
1380 - 1390	0.40	98.00
1390 - 1400	0.40	98.40
1400 - 1410	0.40	98.80
1410 - 1420	0.40	99.20
1420 - 1430	0.40	99.60
1430 - 1440	0.40	100.00

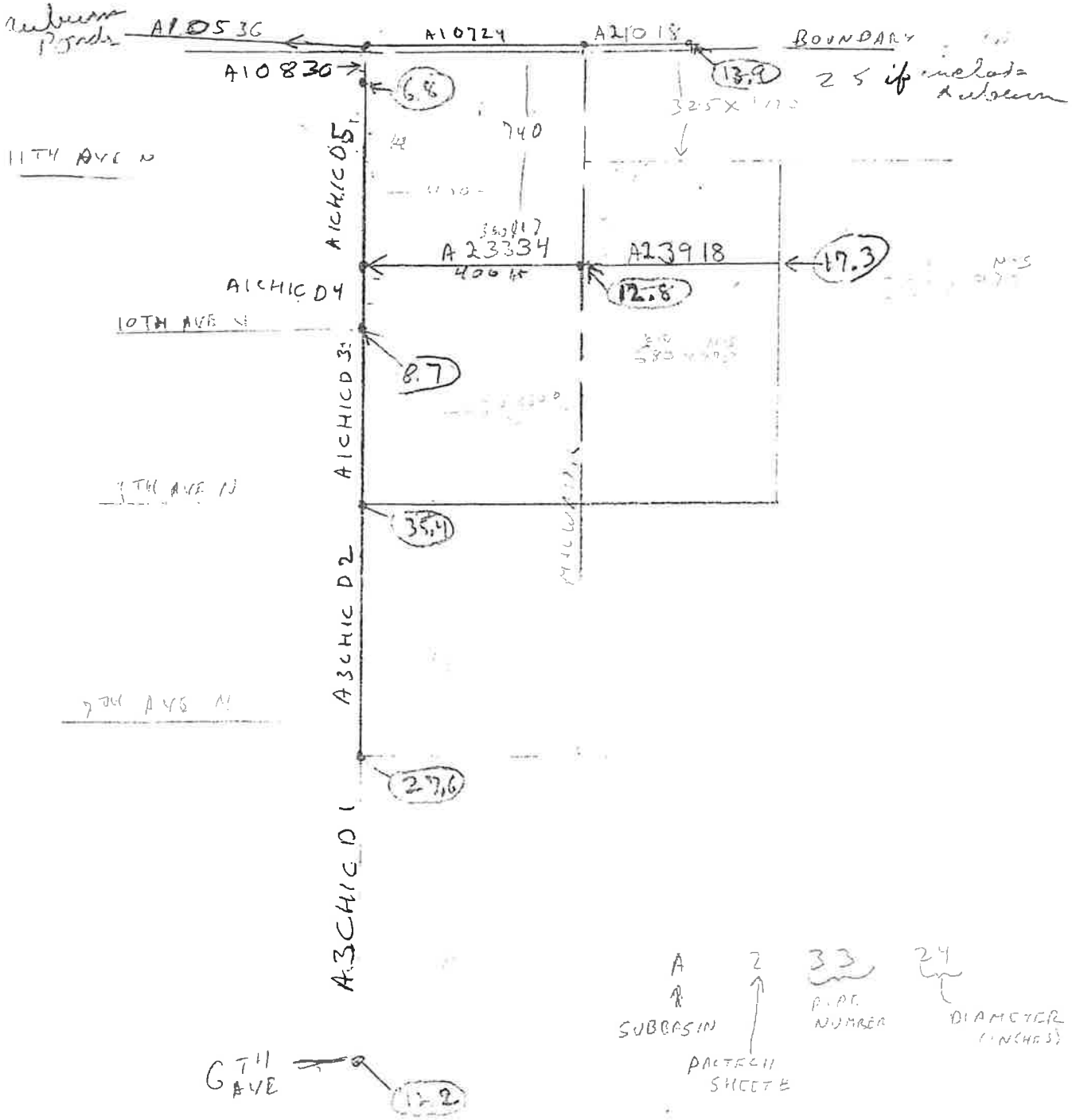
INPUT DATA
WORKING DRAWINGS


ALGONA CITY LIMITS
BOUNDARY BLVD.
11TH AVE. N.
10TH AVE. N.
9TH AVE. N.
8TH AVE. N.
7TH
BROADWAY ST.
5TH AVE. N.
4TH AVE. N.
3RD AVE. N.
2ND AVE. N.
CHICAGO AVE.
CELERY AVE.
MILWAUKEE AVE.
MAIN ST.
INTERURBAN
ELECTRIC AVE.
ALGONA BLVD. N.
SEATTLE BLVD. N.
STANLEY AVE.
PRIVATE
A
B
C
D
E
F
G
H
K
W
BOEING
COLD STORAGE
OPEN
600 FT
SR. 187
SR. 167


4TH AVE. N.
3RD AVE. N.
2ND AVE. N.
1ST AVE. N.
ALGONA BLVD.
MAIN ST.
ELECTRIC AVE.
CAMLEY AVE.
PRIVATE
P.S.P.&L.CO. R.O.W.
2ND AVE. S.
3RD AVE. S.
4TH AVE. S.
5TH AVE. S.
6TH AVE. S.
WAKUE ST.
CLAY ST.
MILWAUKEE BLVD. S.
SEATTLE BLVD. S.
TACOMA BLVD.
WASHINGTON BLVD.
O.W.R.R. & NAV. CO.
INTERTIE TO
PACIFIC WATER SYSTEM
--- DITCH
— 12"
— 18"
- 24"
1 INCH = 450 FEET
450 FT


North End of Aloma
BOUNDARY
C
D
11TH
10TH
B
9TH
E
8TH
7TH
CELERY
6TH
F
MAIN
5TH
4TH
3RD
2ND
CHANNEL CHANGE
CHICAGO

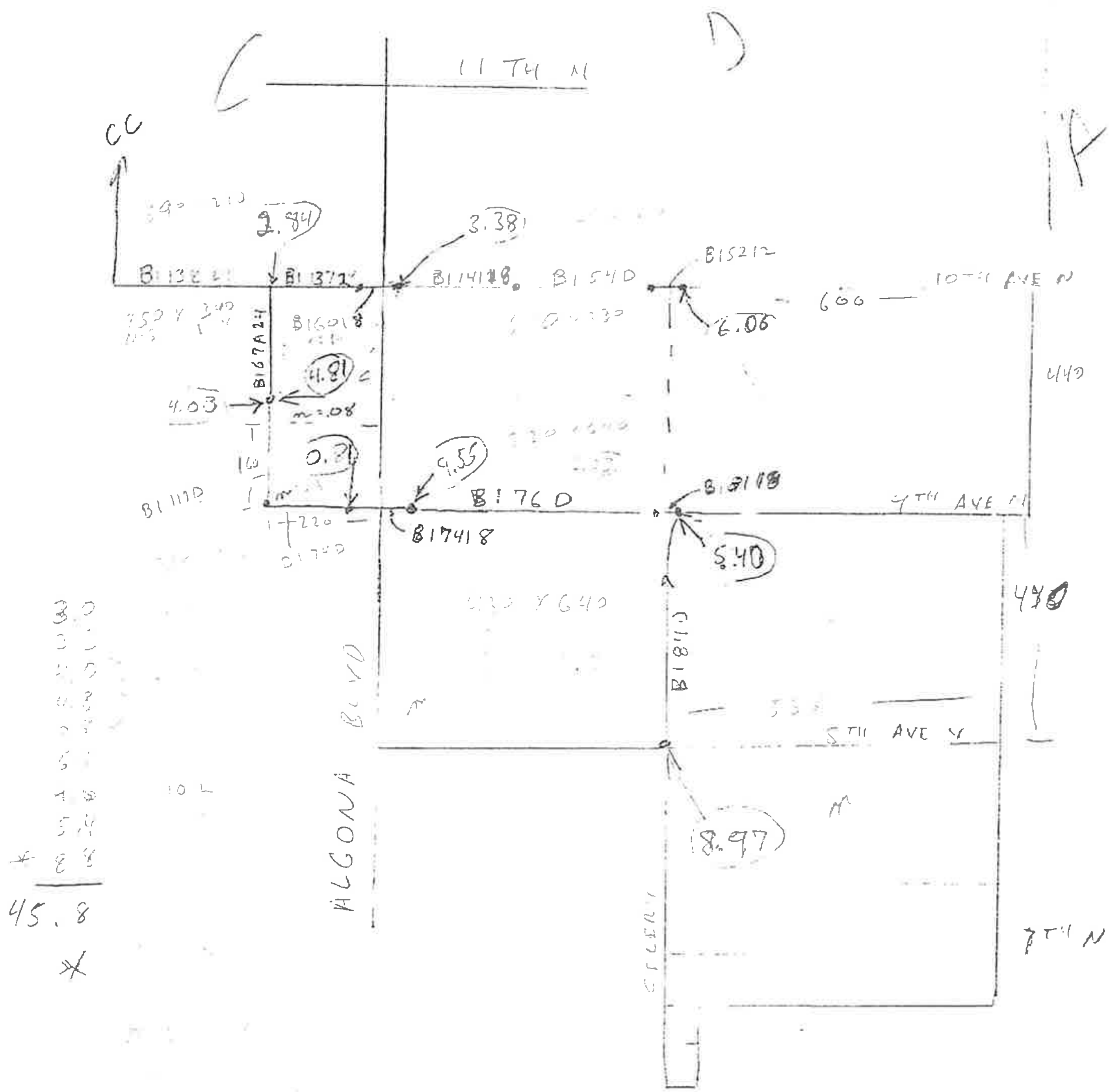
SUBBASIN A



1F

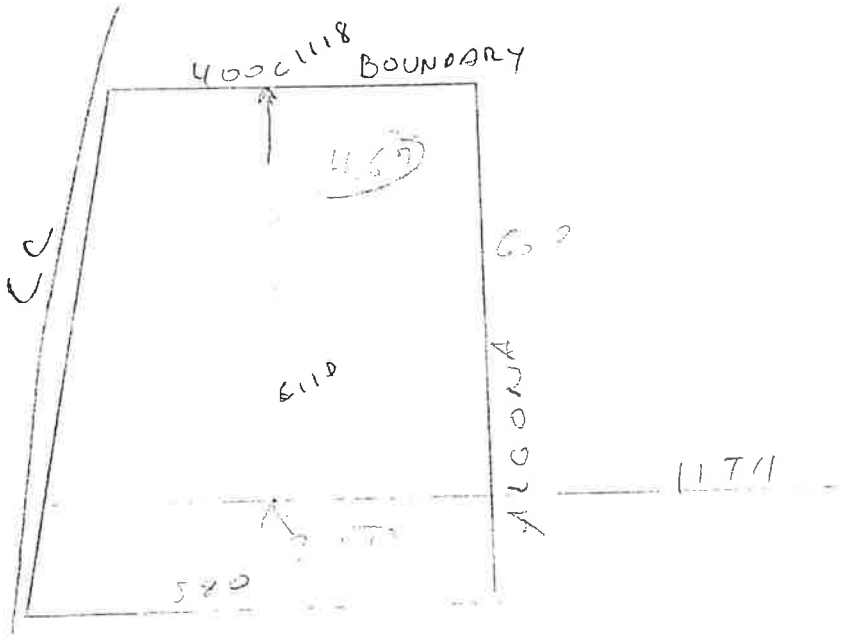
4TH AVE

SUBBASIN B



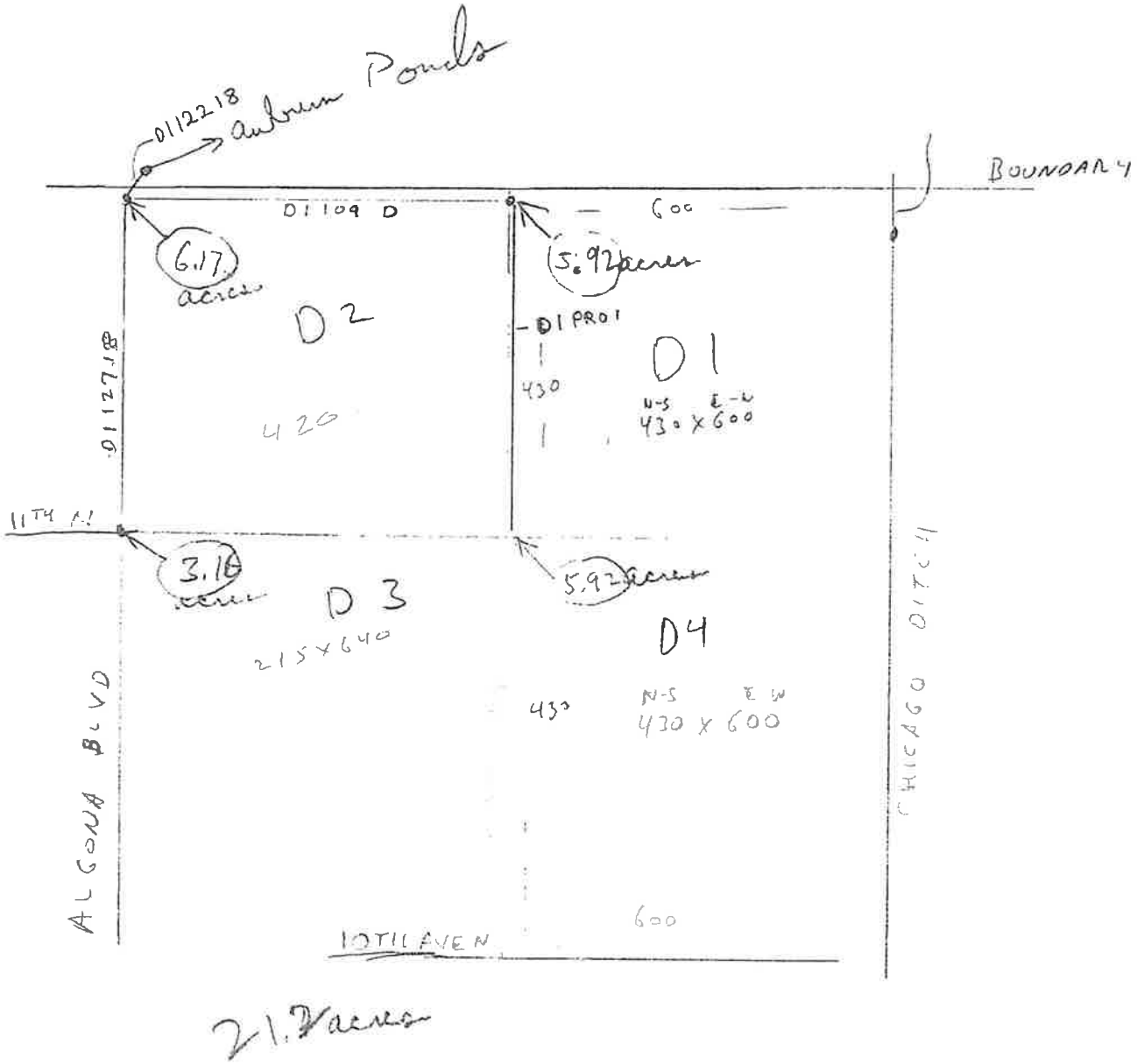
11TH N
CC
2.84
3.38
B15212
10TH AVE N
600
6.06
440
4.81
4.03
0.71
9.55
B176D
B17418
5.40
9TH AVE N
440
B181D
5TH AVE N
8.97
ALGONA BLVD
7TH N
45.8

SUB BASIN C



7.31 acres

SUB BASIN D

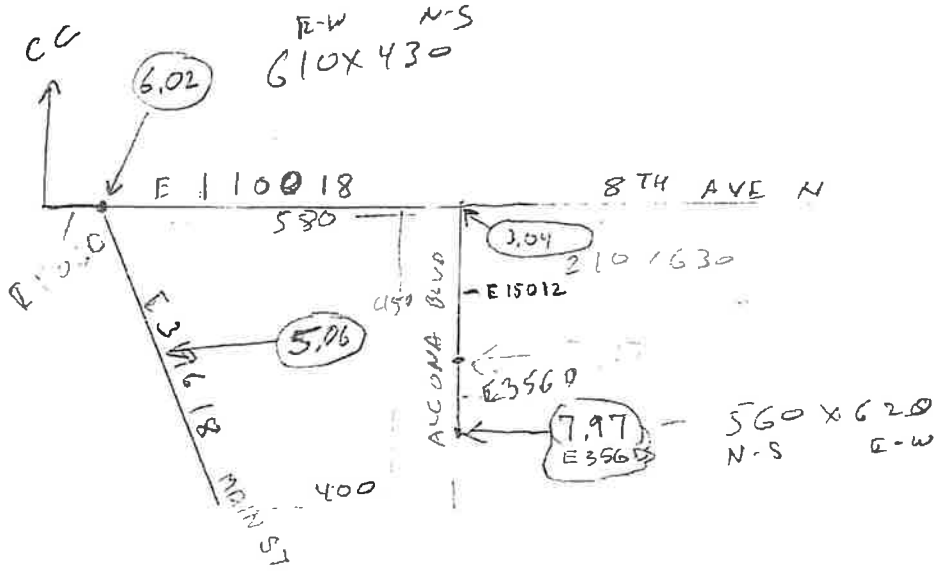


21.1 acres

D1 PRO1 PRO - Proposed improvements

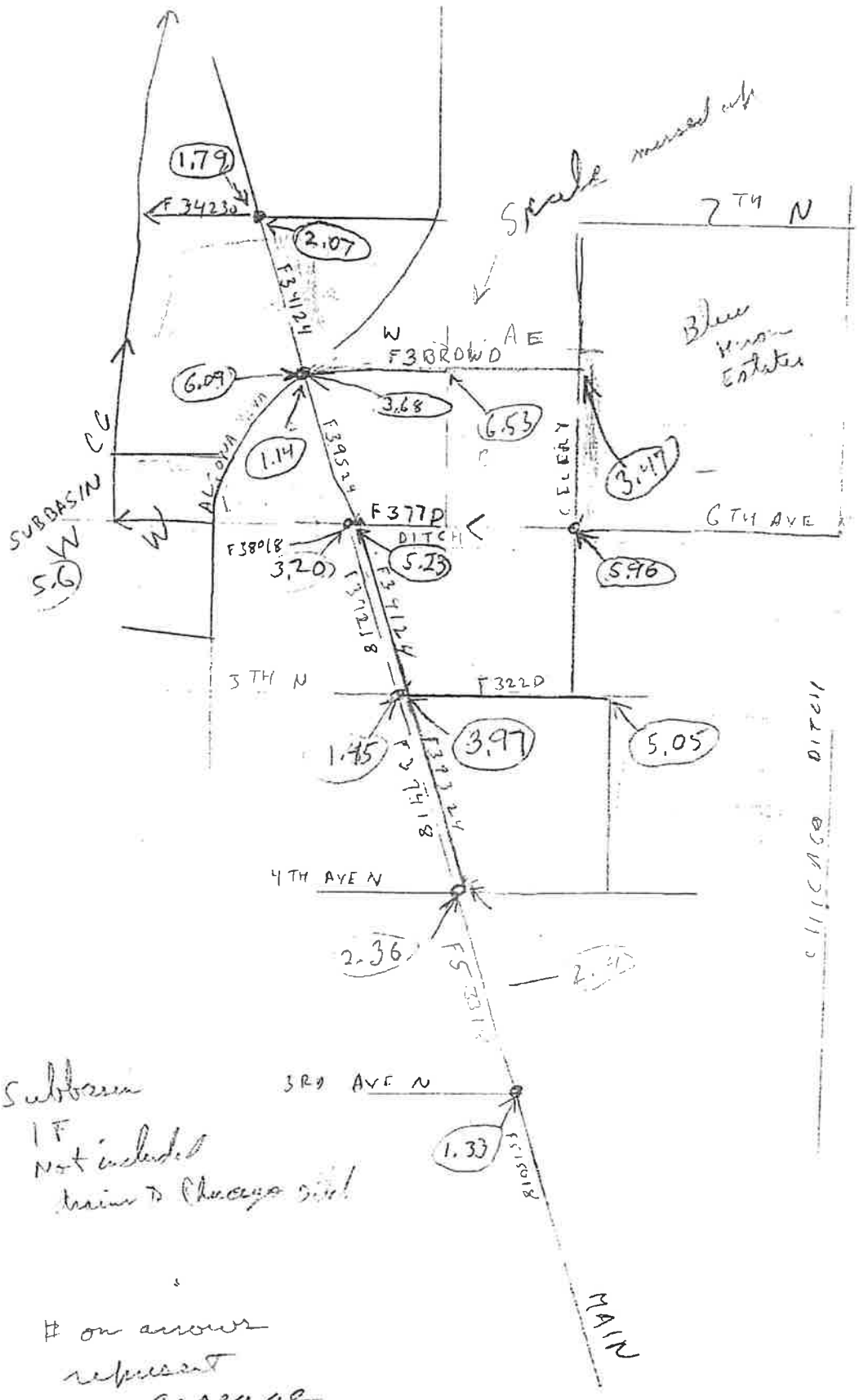
SUBBASIN E

E ↑ Subbasin | 1 ↑ PacTech Sheet # | 50 ↑ Pipe # on sheet | 12 ↑ Pipe Diam | or | D ↑ Ditch



	Pac Tech	WWP	
E	22.5	24.8	3.2
F	57.7	52.9	5.0
G	14.2	13.0	2.8
H	11.6	11.7	13.8
K	17.4	14.0	24.8
	123.4	116.4	

SUBBASIN F



Spale missed ch

A 80 X 600
B 690 X 485
C 270 X 490
D 330 X 720
E 210 X 450

= 14.84

1.1
1.9
6.4
14.8
3.3
5.3
6.0
1.5
9.5
2.4
2.4
1.3
56.2

Subbasin 1F not included in Chicago Sub!

on arrows represent acreage

EXISTING LAND USE AND RUNOFF CALCULATIONS

City of Algona

Land Use and runoff Calculations

	SubBasin	Outlet Pipe	Acres	Bldgs	Bldg/Acre	% Imperv	CN Imp	CN Perv
P1	D	D1PRO1	2.00	12	6.0	52%	98	90
P2	D	D1PRO1	3.92	0	0.0	0%	-	86
*	D	D1PR01	5.92	12	2.0	18%	98	87
*	D	D1109D	5.92	0	0.0	0%	-	86
*	D	D112718	6.17	0	0.0	0%	-	86
*	D	D112218	3.16	8	2.5	30%	98	90
*	B	B184D	8.97	19	2.1	26%	98	90
*	B	B18118	5.40	12	2.2	27%	98	90
	B	B176D	Assume no runoff into this ditch. It is a connector.					
*	B	B17418	9.55	17	1.8	22%	98	90
*	B	B174D	0.81	0	0.0	0%	98	90
	B	B1117D	Assume no runoff into this ditch. It is a connector.					
*	B	B167A24	4.03	-	-	40%	98	90
P1	B	B167A24	1.06	-	-	40%	98	90
P2	B	B167A24	3.75	11	2.9	33%	98	90
*	B	B167A24	4.81	-	-	35%	98	90
*	B	B15212	6.06	12	2.0	25%	98	90
	B	B154D	Assume no runoff into this ditch. It is a connector.					
	B	B114118	Assume no runoff into this pipe. It is a connector.					
*	B	B16018	3.38	8	2.4	29%	98	90
	B	B113724	Assume no runoff into this pipe. It is a connector.					
*	B	B113824	2.84	0	0.0	0%	98	90
*	C	C11D	2.94	8	2.7	32%	98	90
*	C	C1118	4.67	0	0.0	0%	98	90
*	E	E356D	7.97	6	0.8	15%	98	90
	E	E15012	Assume no runoff into this pipe. It is a connector.					
*	E	E110018	3.04	6	2.0	25%	98	90
*	E	E39618	5.06	13	2.6	31%	98	90
*	E	E1106D	6.02	-	-	20%	98	90
*	F	F53318	1.33	4	3.0	34%	98	90
*	F	F39418	2.36	6	2.5	30%	98	90
*	F	F39218	1.45	2	1.4	19%	98	90
	F	F38018	Assume no runoff into this pipe. It is a connector.					
*	F	F39324	3.97	7	1.8	23%	98	90
*	F	F322D	5.05	9	1.8	23%	98	90
*	F	F39124	5.23	13	2.5	30%	98	90

City of Algona

Land Use and runoff Calculations

	SubBasin	Outlet Pipe	Acres	Bldgs	Bldg/Acre	% Imperv	CN Imp	CN Perv
*	F	F377D	5.96	17	2.9	40%	98	90
*	F	F3BRDWD	3.47	9	2.6		98	90
	F	F39524	Assume no runoff into this pipe. It is a connector.					
P1	F	F34124	9.10	0	0.0	0%	98	90
P2	F	F34124	2.27	9	4.0	42%	98	90
*	F	F34124	11.37	-	-	8%	98	90
P1	F	F34124	1.22			100%	98	90
P2	F	F34124	4.87	4	0.8	15%	98	90
*	F	F34124	6.09			32%	98	90
*	F	F34230	2.07	6	2.9	34%	98	90
*	F	F34230	1.79	2	1.1	16%	98	90
	G	G3ALGWD	0.52	4	7.7	60%	98	90
	G	G3ALGWD	0.75	0	0.0	0%	98	90
	G	G3ALGWD	1.68	3	1.8	23%	98	90
	G	G5136D	4.50	0	0.0	0%	98	90
	G	G5136D	1.92	1	0.5	10%	98	90
	G	G5136D	1.55	4	2.6	31%	98	90
	H	H5ALGWD	0.83	2	2.4	29%	98	90
	H	H54512	1.99	9	4.5	46%	98	90
	H	H54712	3.60	14	3.9	41%	98	90
	H	H513818	Assume no runoff into this pipe. It is a connector.					
	H	H55118	3.51	6	1.7	22%	98	90
	K	K52AVED	2.58	8	3.1	35%	98	90
	K	K55812	2.74	6	2.2	27%	98	90
	K	K55918	2.71	6	2.2	27%	98	90
	K	K57118	1.19	7	5.9	51%	98	90
	K	K56618	1.75	8	4.6	47%	98	90
	K	K5164D	2.69	8	3.0	34%	98	90
	K	K516418	Assume no runoff into this pipe. It is a connector.					
	K	K516518	Assume no runoff into this pipe. It is a connector.					
	K	K516618	2.60	4	1.5	20%	98	90
	L	L510812	2.02	7	3.5	38%	98	90
	L	L510812	2.37	8	3.4	38%	98	90
	L	L515618	1.86	7	3.8	40%	98	90
	L	L515718	1.89	6	3.2	36%	98	90
	L	L511518	2.53	6	2.4	29%	98	90

City of Algona
Land Use and runoff Calculations

SubBasin	Outlet Pipe	Acres	Bldgs	Bldg/Acre	% Imperv	CN Imp	CN Perv
L	L5171D	3.88	8	2.1	26%	98	90
L	L5132D	2.10	7	3.3	36%	98	90
L	L512912	2.11	8	3.8	40%	98	90
L	L5130D	2.15	6	2.8	32%	98	90
L	L512512	2.90	7	2.4	29%	98	90
L	L512318	Assume no runoff into this pipe. It is a connector.					
J	J58418	13.57	18	1.3	18%	98	90
J	J58518	4.70	14	3.0	34%	98	90
J	J58518	1.92	8	4.2	44%	98	90
J	J67D	10.46	3	0.3	10%	98	90
J	J59912	7.53	4	0.5	10%	98	90
J	J59812	4.02	6	1.5	20%	98	90
J	J59112	Assume no runoff into this pipe. It is a connector.					
J	J515518	Assume no runoff into this pipe. It is a connector.					
J	J515224	Assume no runoff into this pipe. It is a connector.					
J	J515324	Assume no runoff into this pipe. It is a connector.					
J	J71524	Assume no runoff into this pipe. It is a connector.					
J	J72024	1.03	2	1.9	24%	98	90
J	J72424	1.95	6	3.1	35%	98	90
J	J517518	4.18	8	1.9	24%	98	90
J	J510424	4.18	5	1.2	17%	98	90
J	J510512	2.88	5	1.7	22%	98	90
J	J713124	5.89	9	1.5	20%	98	90
J	J710912	2.77	7	2.5	30%	98	90
J	J710124	6.27	11	1.8	23%	98	90
J	J712724	6.27	15	2.4	29%	98	90
J	J79112	3.69	6	1.6	21%	98	90
J	J74SDIV18	Assume no runoff into this pipe. It is a connector.					
J	J712524	6.27	15	2.4	29%	98	90
J	J78418	1.05	0	0.0	0%	98	90
J	J7MLWEX24	5.89	6	1.0	15%	98	90
J	J7TAC3S18	4.36	7	1.6	21%	98	90
J	J76718	5.28	17	3.2	36%	98	90
J	J76018	7.39	12	1.6	21%	98	90
J	J757D	7.39	11	1.5	20%	98	90
J	J715718	6.38	14	2.2	20%	98	90

City of Algona

Land Use and runoff Calculations

SubBasin	Outlet Pipe	Acres	Bldgs	Bldg/Acre	% Imperv	CN Imp	CN Perv
J	J714818	Assume no runoff into this pipe. It is a connector.					
J	J714624	Assume no runoff into this pipe. It is a connector.					
J	J72118	7.18	9	1.3	18%	98	90
J	J72524	6.38	12	1.9	24%	98	90
J	J714524	3.79	8	2.1	26%	98	90
J	J714424	Assume no runoff into this pipe. It is a connector.					

TRAVEL TIME CALCULATIONS

TIME FOR RUNOFF TO TRAVEL FROM FURTHEST PART OF BASIN TO OUTLET

SUBBASIN B

Outlet to B184D

Flow westerly across the basin 500 ft and then north in ditch 600 ft

		Total flow length =	1100			
Sheet Flow	V =	0.07 ft/sec	n_s =	0.15	L =	300
	T_t =	69 min	S_o =	0.0025	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.6 ft/sec	k_s =	11	L =	200
	T_t =	6 min	S_o =	0.0025		
Open Channel Flow						
	V =	0.9 ft/sec	k_c =	17	L =	600
	T_t =	12 min	S_o =	0.0025		
Total Travel time						
	T_t =	86 min			Total	1100

Outlet to B18118

Flow westerly across the basin 300 ft and then north in ditch 400 ft

		Total flow length =	700			
Sheet Flow	V =	0.05 ft/sec	n_s =	0.15	L =	300
	T_t =	99 min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.0 ft/sec	k_s =	11	L =	0
	T_t =	0 min	S_o =	0.0010		
Open Channel Flow						
	V =	0.9 ft/sec	k_c =	17	L =	400
	T_t =	8 min	S_o =	0.0025		
Total Travel time						
	T_t =	107 min			Total	700

Outlet to B17418 (south portion is biggest)

Flow northerly across the basin 400 ft and then west in ditch 550 ft

		Total flow length =	950			
Sheet Flow	V =	0.02 ft/sec	n_s =	0.24	L =	300
	T_t =	233 min	S_o =	0.0003	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.2 ft/sec	k_s =	11	L =	100
	T_t =	9 min	S_o =	0.0003		
Open Channel Flow						
	V =	0.3 ft/sec	k_c =	17	L =	550
	T_t =	31 min	S_o =	0.0003		
Total Travel time						
	T_t =	273 min			Total	950

Outlet to B174D

Flow southerly across the basin 130 ft and then north in ditch 150 ft

		Total flow length =	280			
Sheet Flow	V =	0.02 ft/sec	n_s =	0.3	L =	130
	T_t =	108 min	S_o =	0.0006	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.0 ft/sec	k_s =	11	L =	0
	T_t =	0 min	S_o =	0.0006		
Open Channel Flow						
	V =	0.6 ft/sec	k_c =	17	L =	150
	T_t =	4 min	S_o =	0.0012		
	Total Travel time					
	T_t =	112 min			Total	280

Outlet to B167A24

Flow to perimeter of basin 50 ft and then in ditch 500 ft

		Total flow length =	550			
Sheet Flow	V =	0.05 ft/sec	n_s =	0.08	L =	50
	T_t =	18 min	S_o =	0.0006	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.0 ft/sec	k_s =	11	L =	0
	T_t =	0 min	S_o =	0.0006		
Open Channel Flow						
	V =	0.6 ft/sec	k_c =	17	L =	500
	T_t =	14 min	S_o =	0.0012		
	Total Travel time					
	T_t =	32 min			Total	550

Outlet to B15212

Flow to ditches 200 ft and then west in ditch 450 ft

		Total flow length =	650			
Sheet Flow	V =	0.04 ft/sec	n_s =	0.2	L =	200
	T_t =	90 min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.0 ft/sec	k_s =	11	L =	0
	T_t =	0 min	S_o =	0.0010		
Open Channel Flow						
	V =	1.0 ft/sec	k_c =	17	L =	450
	T_t =	8 min	S_o =	0.0033		
	Total Travel time					
	T_t =	98 min			Total	650

Outlet to B167A24

Flow north to ditch by circuitous 300 ft and then west and south in ditch 900 ft

		Total flow length =	1200			
Sheet Flow	V =	0.07 ft/sec	n_s =	0.1	L =	300
	T_t =	72 min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.0 ft/sec	k_s =	11	L =	0
	T_t =	0 min	S_o =	0.0010		
Open Channel Flow						
	V =	0.3 ft/sec	k_c =	17	L =	900
	T_t =	51 min	S_o =	0.0003		
Total Travel time						
	T_t =	122 min			Total	1200

Outlet to B16018

Flow south to ditch by circuitous 300 ft and then west in ditch 600 ft

		Total flow length =	900			
Sheet Flow	V =	0.07 ft/sec	n_s =	0.1	L =	300
	T_t =	72 min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.0 ft/sec	k_s =	11	L =	0
	T_t =	0 min	S_o =	0.0010		
Open Channel Flow						
	V =	0.3 ft/sec	k_c =	17	L =	600
	T_t =	34 min	S_o =	0.0003		
Total Travel time						
	T_t =	105 min			Total	900

Outlet to B113824

Flow east and west to ditch 300 ft and then south in ditch 200 ft

		Total flow length =	500			
Sheet Flow	V =	0.02 ft/sec	n_s =	0.41	L =	300
	T_t =	221 min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.0 ft/sec	k_s =	11	L =	0
	T_t =	0 min	S_o =	0.0010		
Open Channel Flow						
	V =	0.5 ft/sec	k_c =	17	L =	200
	T_t =	6 min	S_o =	0.0010		
Total Travel time						
	T_t =	227 min			Total	500

utlet to C11D

Flow north to ditch then east and west to outlet

		Total flow length =	400			2.94	acres
Sheet Flow	V =	0.04 ft/sec	n_s =	0.2	L =	200	
	T_t =	90 min	S_o =	0.0010	P_2 =	2.0	
Shallow Concentrated flow							
	V =	0.0 ft/sec	k_s =	5	L =	0	
	T_t =	0 min	S_o =	0.0010			
Open Channel Flow							
pipe F3941	V =	0.6 ft/sec	k_c =	17	L =	200	
	T_t =	5 min	S_o =	0.0013			
	Total Travel time						
	T_t =	95 min			Total	400	

utlet to C1118

Flow north to ditch then east and west to outlet

		Total flow length =	500			4.67	acres
Sheet Flow	V =	0.03 ft/sec	n_s =	0.3	L =	200	
	T_t =	125 min	S_o =	0.0010	P_2 =	2.0	
Shallow Concentrated flow							
	V =	0.0 ft/sec	k_s =	5	L =	0	
	T_t =	0 min	S_o =	0.0010			
Open Channel Flow							
pipe F3941	V =	0.6 ft/sec	k_c =	17	L =	300	
	T_t =	8 min	S_o =	0.0013			
	Total Travel time						
	T_t =	133 min			Total	500	

Calculation of Travel Times **Algona Stormwater Comp Plan**

EQUATIONS USED TO COMPUTE TRAVEL TIME

Sheet Flow (first 300 feet of travel) Reference: King County Stormwater Design Manual

$T_t = [0.42(n_s L)^{0.8}]/[(P_2)^{0.5} (S_o)^{0.4}]$

T_t = travel time in minutes
n_s = Manning roughness coefficient
L = flow length (ft)
P_2 = 2-year, 24-hour rainfall (in)
S_o = slope of hydraulic grade line (ft/ft)

Velocity Equation (distances after Sheet flow, 300 feet)

$V = k (S_o)^{0.5}$

V = velocity (ft/sec)
k = time of concentration velocity factor (ft/sec)
S_o = slope of flow path (ft/ft)

Travel Time Equation

$T_t = L/(60\ V)$

SUBBASIN D

Outlet to D1PRO1

$n_s = 0.01*0.42 + 0.24*0.58$

Sheet Flow	T_t =	125 min	n_s =	0.24	L =	300
			P_2 =	2.0	S_o =	0.0014
Shallow Concentrated flow						
	V =	0.4 ft/sec	k_s =	10	L =	200
	T_t =	9 min	S_o =	0.0014		
Open Channel Flow						
	V =	0.6 ft/sec	k_c =	17	L =	200
	T_t =	5 min	S_o =	0.0014		
	Total Travel time					
	T_t =	130 min				

Outlet to D1109D

Total flow length = 700

Flow northwesterly across the basin

Sheet Flow	T_t =	149 min	n_s =	0.3	L =	300
			P_2 =	2.0	S_o =	0.0014
Shallow Concentrated flow						
	V =	0.4 ft/sec	k_s =	10	L =	400
	T_t =	18 min	S_o =	0.0014		
Open Channel Flow						
	V =	0.6 ft/sec	k_c =	17	L =	0
	T_t =	0 min	S_o =	0.0014		
	Total Travel time					
	T_t =	167 min				

Outlet to D112718

Flow northerly across the basin and then west in ditch

		Total flow length =	520			
Sheet Flow	T_t =	62 min	n_s =	0.15	L =	200
			S_o =	0.0014	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.0 ft/sec	k_s =	10	L =	0
	T_t =	0 min	S_o =	0		
Open Channel Flow						
	V =	0.6 ft/sec	k_c =	17	L =	320
	T_t =	8 min	S_o =	0.0014		
	Total Travel time					
	T_t =	70 min				

Outlet to D112218

Flow northerly across the basin

		Total flow length =	600			
Sheet Flow	V =	0.03 ft/sec	n_s =	0.3	L =	300
	T_t =	149 min	S_o =	0.0014	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.4 ft/sec	k_s =	10	L =	300
	T_t =	13 min	S_o =	0.0014		
Open Channel Flow						
	V =	0.0 ft/sec	k_c =	17	L =	0
	T_t =	0 min	S_o =	0.0014		
	Total Travel time					
	T_t =	163 min			Total	600

SUBBASIN E

Outlet to E356D

Flow north & south to ditch 250 ft and then west & north 600 ft

		Total flow length =	850			
Sheet Flow	V =	0.03 ft/sec	n_s =	0.24	L =	250
	T_t =	125 min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.0 ft/sec	k_s =	11	L =	0
	T_t =	0 min	S_o =	0.0010		
Open Channel Flow						
	V =	0.7 ft/sec	k_c =	17	L =	600
	T_t =	15 min	S_o =	0.0015		
	Total Travel time					
	T_t =	140 min			Total	850

Outlet to E110018

Flow north across the basin 200 ft and then north 550 ft

		Total flow length =	750			
Sheet Flow	V =	0.03 ft/sec	n_s =	0.24	L =	200
	T_t =	104 min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.0 ft/sec	k_s =	11	L =	0
	T_t =	0 min	S_o =	0.0010		
Open Channel Flow						
	V =	0.7 ft/sec	k_c =	17	L =	550
	T_t =	13 min	S_o =	0.0018		
	Total Travel time					
	T_t =	117 min			Total	750

Outlet to E39618

Flow westerly across the basin 450 ft

		Total flow length =	450			
Sheet Flow	V =	0.03 ft/sec	n_s =	0.24	L =	300
	T_t =	144 min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.3 ft/sec	k_s =	11	L =	150
	T_t =	7 min	S_o =	0.0010		
Open Channel Flow						
	V =	0.7 ft/sec	k_c =	17	L =	0
	T_t =	0 min	S_o =	0.0018		
	Total Travel time					
	T_t =	151 min			Total	450

Outlet to E1106D

Flow westerly across the basin 400 ft

		Total flow length =		450			
Sheet Flow	V =	0.03	ft/sec	n_s =	0.3	L =	300
	T_t =	146	min	S_o =	0.0015	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.2	ft/sec	k_s =	5	L =	100
	T_t =	9	min	S_o =	0.0015		
Open Channel Flow							
	V =	0.7	ft/sec	k_c =	17	L =	0
	T_t =	0	min	S_o =	0.0018		
	Total Travel time						
	T_t =	155	min			Total	400

SUBBASIN F

Outlet to F53318

Flow north to edge of basin 100 ft and then in dich 250 ft

		Total flow length =	350		1.33 acres	
Sheet Flow	V =	0.04 ft/sec	n_s =	0.15	L =	100
	T_t =	41 min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.0 ft/sec	k_s =	5	L =	0
	T_t =	0 min	S_o =	0.0010		
Open Channel Flow						
	V =	0.5 ft/sec	k_c =	17	L =	250
	T_t =	8 min	S_o =	0.0010		
	Total Travel time					
	T_t =	49 min			Total	350

Outlet to F39418

Flow east 200 ft and then NW in pipe 450 ft

		Total flow length =	650		2.36 acres	
Sheet Flow	V =	0.02 ft/sec	n_s =	0.24	L =	200
	T_t =	137 min	S_o =	0.0005	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.0 ft/sec	k_s =	5	L =	0
	T_t =	0 min	S_o =	0.0015		
Open Channel Flow						
pipe F53318	V =	1.1 ft/sec	k_c =	42	L =	450
	T_t =	7 min	S_o =	0.0007		
	Total Travel time					
	T_t =	144 min			Total	650

Outlet to F39324

Flow north to outlet 200 ft

		Total flow length =	200		2.4 acres	
Sheet Flow	V =	0.02 ft/sec	n_s =	0.24	L =	200
	T_t =	137 min	S_o =	0.0005	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.0 ft/sec	k_s =	5	L =	0
	T_t =	0 min	S_o =	0.0015		
Open Channel Flow						
	V =	0.7 ft/sec	k_c =	17	L =	0
	T_t =	0 min	S_o =	0.0018		
	Total Travel time					
	T_t =	137 min			Total	200

Outlet to F322D

Flow northwesterly across basin 600 ft

		Total flow length =	600		5.05 acres	
Sheet Flow	V =	0.03 ft/sec	n_s =	0.24	L =	300
	T_t =	144 min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.4 ft/sec	k_s =	10	L =	300
	T_t =	13 min	S_o =	0.0015		
Open Channel Flow						
pipe F39418	V =	1.5 ft/sec	k_c =	42	L =	0
	T_t =	0 min	S_o =	0.0013		
	Total Travel time					
	T_t =	157 min			Total	600

Outlet to F39218

Flow easterly across basin 150 ft and then northwest in pipe 450 ft

		Total flow length =	600		1.45 acres	
Sheet Flow	V =	0.03 ft/sec	n_s =	0.24	L =	150
	T_t =	83 min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.0 ft/sec	k_s =	5	L =	0
	T_t =	0 min	S_o =	0.0015		
Open Channel Flow						
pipe F39418	V =	1.5 ft/sec	k_c =	42	L =	450
	T_t =	5 min	S_o =	0.0013		
	Total Travel time					
	T_t =	88 min			Total	600

Outlet to F38018

Flow northwesterly across basin 300 ft

		Total flow length =	600		3.2 acres	
Sheet Flow	V =	0.03 ft/sec	n_s =	0.2	L =	150
	T_t =	72 min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.0 ft/sec	k_s =	5	L =	0
	T_t =	0 min	S_o =	0.0015		
Open Channel Flow						
pipe F39418	V =	1.5 ft/sec	k_c =	42	L =	0
	T_t =	0 min	S_o =	0.0013		
	Total Travel time					
	T_t =	72 min			Total	150

Outlet to F39124

Flow northwesterly across basin 600 ft

		Total flow length =	500		3.97 acres	
Sheet Flow	V =	0.03 ft/sec	n_s =	0.24	L =	300
	T_t =	144 min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.4 ft/sec	k_s =	10	L =	200
	T_t =	9 min	S_o =	0.0015		
Open Channel Flow						
pipe F39418	V =	1.5 ft/sec	k_c =	42	L =	0
	T_t =	0 min	S_o =	0.0013		
	Total Travel time					
	T_t =	153 min			Total	500

Outlet to F377D

Flow northwesterly to outlet

		Total flow length =	600		5.96 acres	
Sheet Flow	V =	0.05 ft/sec	n_s =	0.20	L =	300
	T_t =	101 min	S_o =	0.0017	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.4 ft/sec	k_s =	10	L =	300
	T_t =	12 min	S_o =	0.0017		
Open Channel Flow						
	V =	1.5 ft/sec	k_c =	42	L =	0
	T_t =	0 min	S_o =	0.0013		
	Total Travel time					
	T_t =	113 min			Total	600

Outlet to F39524

Flow northwesterly to driveway then north along driveway then west in ditch

		Total flow length =	600		5.23 acres	
Sheet Flow	V =	0.05 ft/sec	n_s =	0.20	L =	300
	T_t =	101 min	S_o =	0.0017	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.4 ft/sec	k_s =	10	L =	100
	T_t =	4 min	S_o =	0.0017		
Open Channel Flow						
	V =	1.7 ft/sec	k_c =	42	L =	200
	T_t =	2 min	S_o =	0.0017		
	Total Travel time					
	T_t =	107 m				600

Outlet to BRDWDE

Flow north to edge of Blue Heron estates then west around property.

		Total flow length =	700		3.47 acres	
Sheet Flow	V =	0.05 ft/sec	n_s =	0.20	L =	300
	T_t =	94 min	S_o =	0.0020	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.0 ft/sec	k_s =	10	L =	0
	T_t =	0 min	S_o =	0.0017		
Open Channel Flow						
	V =	1.9 ft/sec	k_c =	42	L =	500
	T_t =	4 min	S_o =	0.0020		
	Total Travel time					
	T_t =	99 min			Total	800

Outlet to BRDWDW

Flow northwesterly across basin to outlet

		Total flow length =	700		6.53 acres	
Sheet Flow	V =	0.05 ft/sec	n_s =	0.20	L =	300
	T_t =	94 min	S_o =	0.0020	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.5 ft/sec	k_s =	12	L =	300
	T_t =	9 min	S_o =	0.0020		
Open Channel Flow						
	V =	1.9 ft/sec	k_c =	42	L =	0
	T_t =	0 min	S_o =	0.0020		
	Total Travel time					
	T_t =	104 min			Total	600

Outlet to F34124

Flow westerly across basin 200 ft then northwest in pipe 100 ft

		Total flow length =	300		3.68 acres	
Sheet Flow	V =	0.05 ft/sec	n_s =	0.15	L =	200
	T_t =	72 min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.0 ft/sec	k_s =	12	L =	0
	T_t =	0 min	S_o =	0.0020		
Open Channel Flow						
pipe F39524	V =	1.3 ft/sec	k_c =	42	L =	100
	T_t =	1 min	S_o =	0.0010		
	Total Travel time					
	T_t =	73 min			Total	300

Outlet to F34124

Flow westerly across basin 200 ft then northwest in pipe 100 ft

	Total flow length =	300			1.14 acres	
Sheet Flow	V =	0.06 ft/sec	n_s =	0.20	L =	300
	T_t =	89 min	S_o =	0.0023	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.0 ft/sec	k_s =	12	L =	0
	T_t =	0 min	S_o =	0.0020		
Open Channel Flow						
pipe F39524	V =	1.3 ft/sec	k_c =	42	L =	0
	T_t =	0 min	S_o =	0.0010		
	Total Travel time					
	T_t =	89 min			Total	300

Outlet to F34124

Flow southeasterly across the basin

	Total flow length =	400			6.09 acres	
Sheet Flow	V =	0.03 ft/sec	n_s =	0.24	L =	300
	T_t =	190 min	S_o =	0.0005	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.2 ft/sec	k_s =	9	L =	100
	T_t =	8 min	S_o =	0.0005		
Open Channel Flow						
	V =	1.3 ft/sec	k_c =	42	L =	0
	T_t =	0 min	S_o =	0.0010		
	Total Travel time					
	T_t =	198 min			Total	400

Outlet to F34124

Flow northwesterly across the basin

	Total flow length =	300			2.07 acres	
Sheet Flow	V =	0.04 ft/sec	n_s =	0.20	L =	300
	T_t =	125 min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.0 ft/sec	k_s =	12	L =	0
	T_t =	0 min	S_o =	0.0020		
Open Channel Flow						
pipe F39524	V =	1.3 ft/sec	k_c =	42	L =	0
	T_t =	0 min	S_o =	0.0010		
	Total Travel time					
	T_t =	125 min			Total	300

Outlet to F34230						
Flow west to ditch then south						
	Total flow length =	300			1.79	acres
Sheet Flow	V =	0.02 ft/sec	n_s =	0.24	L =	100
	T_t =	79 min	S_o =	0.0005	P_2 =	2.0
Shallow Concentrated flow						
	V =	27.0 ft/sec	k_s =	9	L =	200
	T_t =	0 min	S_o =	9.0000		
				0.0005		
Open Channel Flow						
pipe F39524	V =	1.3 ft/sec	k_c =	42	L =	0
	T_t =	0 min	S_o =	0.0010		
Total Travel time						
	T_t =	79 min			Total	300

G3ALGWD - NE Portion

	Total flow length =	120		0.52	acres
V =	0.04 ft/sec	n_s =	0.15	L =	70
T_t =	31 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	5	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.6 ft/sec	k_c =	17	L =	50
T_t =	1 min	S_o =	0.0013		
Total Travel time					
T_t =	32 min		Total		120

G3ALGWD - NW Portion

	Total flow length =	550		0.75	acres
V =	0.03 ft/sec	n_s =	0.2	L =	150
T_t =	72 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	5	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.5 ft/sec	k_c =	17	L =	400
T_t =	12 min	S_o =	0.0010		
Total Travel time					
T_t =	84 min		Total		550

G3ALGWD - East portion (1.68 acres)

	Total flow length =	480		1.68	acres
V =	0.05 ft/sec	n_s =	0.15	L =	180
T_t =	66 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	5	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.5 ft/sec	k_c =	17	L =	300
T_t =	9 min	S_o =	0.0010		
Total Travel time					
T_t =	75 min		Total		480

G3ALGWD - Southwest portion	**(4.5 acres)**				
	Total flow length =	550		4.5	acres
V =	0.03 ft/sec	n_s =	0.24	L =	200
T_t =	104 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	5	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.5 ft/sec	k_c =	17	L =	350
T_t =	11 min	S_o =	0.0010		
Total Travel time					
T_t =	115 min			Total	550
G5136D - Northeast portion					
	Total flow length =	630		1.92	acres
V =	0.07 ft/sec	n_s =	0.15	L =	200
T_t =	50 min	S_o =	0.0025	P_2 =	2.0
V =	0.0 ft/sec	k_s =	5	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.5 ft/sec	k_c =	17	L =	430
T_t =	13 min	S_o =	0.0010		
Total Travel time					
T_t =	63 min			Total	630
G5136D - Southeast portion					
	Total flow length =	200		1.55	acres
V =	0.07 ft/sec	n_s =	0.15	L =	200
T_t =	50 min	S_o =	0.0025	P_2 =	2.0
V =	0.0 ft/sec	k_s =	5	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.5 ft/sec	k_c =	17	L =	0
T_t =	0 min	S_o =	0.0010		
Total Travel time					
T_t =	50 min			Total	200

H5ALGWD

	Total flow length =	200		0.83	acres
V =	0.05 ft/sec	n_s =	0.15	L =	200
T_t =	72 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	5	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.6 ft/sec	k_c =	17	L =	0
T_t =	0 min	S_o =	0.0013		
Total Travel time					
T_t =	72 min			Total	200

H54512

	Total flow length =	600		1.99	acres
V =	0.09 ft/sec	n_s =	0.15	L =	100
T_t =	19 min	S_o =	0.0070	P_2 =	2.0
V =	0.0 ft/sec	k_s =	5	L =	0
T_t =	0 min	S_o =	0.0010		
V =	1.4 ft/sec	k_c =	17	L =	500
T_t =	6 min	S_o =	0.0070		
Total Travel time					
T_t =	25 min			Total	600

H54712

	Total flow length =	800		1.99	acres
V =	0.11 ft/sec	n_s =	0.15	L =	300
T_t =	45 min	S_o =	0.0070	P_2 =	2.0
V =	0.9 ft/sec	k_s =	11	L =	100
T_t =	2 min	S_o =	0.0070		
V =	1.4 ft/sec	k_c =	17	L =	400
T_t =	5 min	S_o =	0.0070		
Total Travel time					
T_t =	52 min			Total	800

H55118					
	Total flow length =	400		1.99 acres	
V =	0.05 ft/sec	n_s =	0.15	L =	300
T_t =	99 min	S_o =	0.0010	P_2 =	2.0
V =	0.3 ft/sec	k_s =	11	L =	100
T_t =	5 min	S_o =	0.0010		
V =	0.5 ft/sec	k_c =	17	L =	0
T_t =	0 min	S_o =	0.0010		
Total Travel time					
T_t =	104 min			Total	400

J58418

Flow southwest across basin to outlet

	Total flow length =	1000		13.57	acres
V =	0.05 ft/sec	n_s =	0.2	L =	300
T_t =	106 min	S_o =	0.0015	P_2 =	2.0
V =	0.3 ft/sec	k_s =	9	L =	700
T_t =	33 min	S_o =	0.0015		
V =	0.5 ft/sec	k_c =	17	L =	0
T_t =	0 min	S_o =	0.0010		
Total Travel time					
T_t =	139 min		Total		1000

J58518

Flow westerly to outlet

	Total flow length =	500		4.7	acres
V =	0.05 ft/sec	n_s =	0.15	L =	300
T_t =	99 min	S_o =	0.0010	P_2 =	2.0
V =	0.3 ft/sec	k_s =	11	L =	200
T_t =	10 min	S_o =	0.0010		
V =	0.5 ft/sec	k_c =	17	L =	0
T_t =	0 min	S_o =	0.0010		
Total Travel time					
T_t =	109 min		Total		500

J58518

Flow easterly to pipe

	Total flow length =	200		1.92	acres
V =	0.05 ft/sec	n_s =	0.15	L =	200
T_t =	72 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.5 ft/sec	k_c =	17	L =	0
T_t =	0 min	S_o =	0.0010		
Total Travel time					
T_t =	72 min		Total		200

J67D

Flow south to outlet at north end of Stanley

	Total flow length =	700		10.46 acres	
V =	0.04 ft/sec	n_s =	0.2	L =	300
T_t =	125 min	S_o =	0.0010	P_2 =	2.0
V =	0.3 ft/sec	k_s =	9	L =	400
T_t =	23 min	S_o =	0.0010		
V =	0.5 ft/sec	k_c =	17	L =	0
T_t =	0 min	S_o =	0.0010		
Total Travel time					
T_t =	148 min			Total	700

J59912

Flow westerly to outlet

	Total flow length =	400		7.53 acres	
V =	0.04 ft/sec	n_s =	0.2	L =	300
T_t =	125 min	S_o =	0.0010	P_2 =	2.0
V =	0.3 ft/sec	k_s =	9	L =	100
T_t =	6 min	S_o =	0.0010		
V =	0.5 ft/sec	k_c =	17	L =	0
T_t =	0 min	S_o =	0.0010		
Total Travel time					
T_t =	130 min			Total	400

J59812

Flow easterly to pipe

	Total flow length =	250		4.02 acres	
V =	0.04 ft/sec	n_s =	0.2	L =	250
T_t =	108 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.5 ft/sec	k_c =	17	L =	0
T_t =	0 min	S_o =	0.0010		
Total Travel time					
T_t =	108 min			Total	250

J72024

Flow southeasterly to pipe

	Total flow length =	350		1.03	acres
V =	0.04 ft/sec	n_s =	0.15	L =	150
T_t =	57 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	2.3 ft/sec	k_c =	42	L =	200
T_t =	1 min	S_o =	0.0030		

Total Travel time

T_t =	58 min	Total	350

J72424

Flow southeasterly to pipe

	Total flow length =	600		1.95	acres
V =	0.04 ft/sec	n_s =	0.15	L =	150
T_t =	57 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	2.3 ft/sec	k_c =	42	L =	450
T_t =	3 min	S_o =	0.0030		

Total Travel time

T_t =	60 min	Total	600

J72424

Flow southeasterly to pipe

	Total flow length =	600		1.95	acres
V =	0.04 ft/sec	n_s =	0.15	L =	150
T_t =	57 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	2.3 ft/sec	k_c =	42	L =	450
T_t =	3 min	S_o =	0.0030		

Total Travel time

T_t =	60 min	Total	600

J517518

Flow to north to drop and then in pipe (assume to northwest corner)

	Total flow length =	500		1.95	acres
V =	0.05 ft/sec	n_s =	0.15	L =	300
T_t =	99 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	1.9 ft/sec	k_c =	42	L =	200
T_t =	2 min	S_o =	0.0020		
Total Travel time					
T_t =	101 min		Total		500

J517518

Flow to north to drop and then in pipe (assume to northwest corner)

	Total flow length =	500		4.18	acres
V =	0.05 ft/sec	n_s =	0.15	L =	300
T_t =	99 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	1.9 ft/sec	k_c =	42	L =	200
T_t =	2 min	S_o =	0.0020		
Total Travel time					
T_t =	101 min		Total		500

J510424

Flow to north to drop and then in pipe (assume to northwest corner)

	Total flow length =	500		4.18	acres
V =	0.07 ft/sec	n_s =	0.1	L =	300
T_t =	72 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	1.9 ft/sec	k_c =	42	L =	200
T_t =	2 min	S_o =	0.0020		
Total Travel time					
T_t =	73 min		Total		500

J510512

Flow to south and then ditch to pipe

	Total flow length =	400		2.88	acres
V =	0.05 ft/sec	n_s =	0.15	L =	300
T_t =	99 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.8 ft/sec	k_c =	17	L =	100
T_t =	2 min	S_o =	0.0020		
Total Travel time					
T_t =	101 min			Total	400

J713124

Flow to north to drop and then in pipe (assume to northwest corner)

	Total flow length =	550		5.89	acres
V =	0.05 ft/sec	n_s =	0.15	L =	300
T_t =	99 min	S_o =	0.0010	P_2 =	2.0
V =	0.3 ft/sec	k_s =	11	L =	50
T_t =	2 min	S_o =	0.0010		
V =	1.9 ft/sec	k_c =	42	L =	200
T_t =	2 min	S_o =	0.0020		
Total Travel time					
T_t =	103 min			Total	550

J710912

Flow to west and then in ditch to pipe

	Total flow length =	500		2.77	acres
V =	0.06 ft/sec	n_s =	0.1	L =	100
T_t =	30 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.8 ft/sec	k_c =	17	L =	400
T_t =	9 min	S_o =	0.0020		
Total Travel time					
T_t =	38 min			Total	500

J710124

Flow to north to drop and then in pipe (assume to northwest corner)

	Total flow length =	550		6.27	acres
V =	0.05 ft/sec	n_s =	0.15	L =	300
T_t =	99 min	S_o =	0.0010	P_2 =	2.0
V =	0.3 ft/sec	k_s =	11	L =	50
T_t =	2 min	S_o =	0.0010		
V =	1.9 ft/sec	k_c =	42	L =	200
T_t =	2 min	S_o =	0.0020		
Total Travel time					
T_t =	103 min		Total		550

J712724

Flow to north to drop and then in pipe (assume to northwest corner)

	Total flow length =	550		6.27	acres
V =	0.05 ft/sec	n_s =	0.15	L =	300
T_t =	99 min	S_o =	0.0010	P_2 =	2.0
V =	0.3 ft/sec	k_s =	11	L =	50
T_t =	2 min	S_o =	0.0010		
V =	1.9 ft/sec	k_c =	42	L =	200
T_t =	2 min	S_o =	0.0020		
Total Travel time					
T_t =	103 min		Total		550

J79112

Flow to west and then in ditch to pipe

	Total flow length =	400		3.69	acres
V =	0.05 ft/sec	n_s =	0.15	L =	200
T_t =	72 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11		0
T_t =	0 min	S_o =	0.0010		
V =	0.8 ft/sec	k_c =	17	L =	200
T_t =	4 min	S_o =	0.0020		
Total Travel time					
T_t =	76 min		Total		400

J712524

Flow to north to drop and then in pipe (assume to northwest corner)

	Total flow length =	550		6.27 acres	
V =	0.05 ft/sec	n_s =	0.15	L =	300
T_t =	99 min	S_o =	0.0010	P_2 =	2.0
V =	0.3 ft/sec	k_s =	11	L =	50
T_t =	2 min	S_o =	0.0010		
V =	1.9 ft/sec	k_c =	42	L =	200
T_t =	2 min	S_o =	0.0020		
Total Travel time					
T_t =	103 min			Total	550

J78418

Flow to west and then in ditch to pipe

	Total flow length =	200		1.05 acres	
V =	0.04 ft/sec	n_s =	0.15	L =	100
T_t =	41 min	S_o =	0.0010	P_2 =	2.0
V =	0.3 ft/sec	k_s =	11	L =	50
T_t =	2 min	S_o =	0.0010		
V =	1.9 ft/sec	k_c =	42	L =	100
T_t =	1 min	S_o =	0.0020		
Total Travel time					
T_t =	44 min			Total	250

J7MLWEX24

Flow to north to drop and then in pipe (assume to northwest corner)

	Total flow length =	550		5.89 acres	
V =	0.05 ft/sec	n_s =	0.15	L =	300
T_t =	99 min	S_o =	0.0010	P_2 =	2.0
V =	0.3 ft/sec	k_s =	11	L =	50
T_t =	2 min	S_o =	0.0010		
V =	1.9 ft/sec	k_c =	42	L =	200
T_t =	2 min	S_o =	0.0020		
Total Travel time					
T_t =	103 min			Total	550

J7TAC3S18

Flow to south to 12 inch pipe (not modeled) then in pipe to J7TAC3S18

	Total flow length =	700		4.36 acres	
V =	0.05 ft/sec	n_s =	0.15	L =	300
T_t =	99 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	1.9 ft/sec	k_c =	42	L =	400
T_t =	4 min	S_o =	0.0020		
Total Travel time					
T_t =	102 min			Total	700

J76718

Flow to north to drop and then in pipe (assume to northwest corner)

	Total flow length =	500		5.28 acres	
V =	0.05 ft/sec	n_s =	0.15	L =	300
T_t =	99 min	S_o =	0.0010	P_2 =	2.0
V =	0.3 ft/sec	k_s =	11	L =	200
T_t =	10 min	S_o =	0.0010		
V =	0.8 ft/sec	k_c =	17	L =	0
T_t =	0 min	S_o =	0.0020		
Total Travel time					
T_t =	109 min			Total	500

J76018

Flow to north to pipe and then west in pipe

	Total flow length =	700		7.39 acres	
V =	0.05 ft/sec	n_s =	0.15	L =	300
T_t =	99 min	S_o =	0.0010	P_2 =	2.0
V =	0.3 ft/sec	k_s =	11	L =	100
T_t =	5 min	S_o =	0.0010		
V =	1.9 ft/sec	k_c =	42	L =	300
T_t =	3 min	S_o =	0.0020		
Total Travel time					
T_t =	106 min			Total	700

J757D

Flow to south and east then in ditch to SE corner

	Total flow length =	1000		7.39	acres
V =	0.05	ft/sec	n_s =	0.15	L = 300
T_t =	99	min	S_o =	0.0010	P_2 = 2.0
V =	0.3	ft/sec	k_s =	11	L = 100
T_t =	5	min	S_o =	0.0010	
V =	0.8	ft/sec	k_c =	17	L = 600
T_t =	13	min	S_o =	0.0020	
Total Travel time					
T_t =	117	min		Total	1000

J715718

Flow to east then in ditch either north or south

	Total flow length =	750		6.38	acres
V =	0.05	ft/sec	n_s =	0.15	L = 250
T_t =	85	min	S_o =	0.0010	P_2 = 2.0
V =	0.0	ft/sec	k_s =	11	L = 0
T_t =	0	min	S_o =	0.0010	
V =	0.8	ft/sec	k_c =	17	L = 500
T_t =	11	min	S_o =	0.0020	
Total Travel time					
T_t =	96	min		Total	750

J72118

Flow to west then in ditch either north or south to pipe

	Total flow length =	750		7.18	acres
V =	0.05	ft/sec	n_s =	0.15	L = 250
T_t =	85	min	S_o =	0.0010	P_2 = 2.0
V =	0.0	ft/sec	k_s =	11	L = 0
T_t =	0	min	S_o =	0.0010	
V =	1.9	ft/sec	k_c =	42	L = 500
T_t =	4	min	S_o =	0.0020	
Total Travel time					
T_t =	90	min		Total	750

J72524

Flow to west then in ditch either north or south to pipe

	Total flow length =	750		6.38	acres
V =	0.05 ft/sec	n_s =	0.15	L =	250
T_t =	85 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.8 ft/sec	k_c =	17	L =	500
T_t =	11 min	S_o =	0.0020		
Total Travel time					
T_t =	96 min			Total	750

J714524

Flow to west then in pipe either north or south

	Total flow length =	750		3.79	acres
V =	0.05 ft/sec	n_s =	0.15	L =	300
T_t =	99 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	1.9 ft/sec	k_c =	42	L =	150
T_t =	1 min	S_o =	0.0020		
Total Travel time					
T_t =	100 min			Total	450

K52AVED

Flow southerly to ditch

	Total flow length =	275		2.58 acres	
V =	0.05 ft/sec	n_s =	0.15	L =	275
T_t =	92 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.5 ft/sec	k_c =	17	L =	0
T_t =	0 min	S_o =	0.0010		
Total Travel time					
T_t =	92 min			Total	275

K55812

Flow southerly and then westerly in ditch

	Total flow length =	600		2.74 acres	
V =	0.07 ft/sec	n_s =	0.15	L =	200
T_t =	50 min	S_o =	0.0025	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.9 ft/sec	k_c =	17	L =	400
T_t =	8 min	S_o =	0.0025		
Total Travel time					
T_t =	57 min			Total	600

K55918

Flow easterly and then southerly

	Total flow length =	400		2.71 acres	
V =	0.05 ft/sec	n_s =	0.15	L =	300
T_t =	99 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.5 ft/sec	k_c =	17	L =	100
T_t =	3 min	S_o =	0.0010		
Total Travel time					
T_t =	102 min			Total	400

K57118

Flow westerly and then northwesterly in ditch

	Total flow length =	400		1.19 acres	
V =	0.04 ft/sec	n_s =	0.15	L =	100
T_t =	41 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.9 ft/sec	k_c =	17	L =	300
T_t =	6 min	S_o =	0.0025		
Total Travel time					
T_t =	47 min			Total	400

K56618

	Total flow length =	500		1.75 acres	
V =	0.05 ft/sec	n_s =	0.15	L =	200
T_t =	72 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	1.7 ft/sec	k_c =	17	L =	300
T_t =	3 min	S_o =	0.0100		
Total Travel time					
T_t =	74 min			Total	500

K5164D

Flow northerly and then westerly in ditch

	Total flow length =	500		2.69 acres	
V =	0.05 ft/sec	n_s =	0.15	L =	200
T_t =	72 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	1.7 ft/sec	k_c =	17	L =	300
T_t =	3 min	S_o =	0.0100		
Total Travel time					
T_t =	74 min			Total	500

K516618					
Flow northerly and then westerly					
	Total flow length =	500		2.6	acres
V =	0.05 ft/sec	n_s =	0.15	L =	200
T_t =	72 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	1.7 ft/sec	k_c =	17	L =	300
T_t =	3 min	S_o =	0.0100		
Total Travel time					
T_t =	74 min		Total		500

L510812 (North of 1st)

Flow to outlet south center

	Total flow length =	200		2.02 acres	
V =	0.05 ft/sec	n_s =	0.15	L =	200
T_t =	72 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.5 ft/sec	k_c =	17	L =	0
T_t =	0 min	S_o =	0.0010		
Total Travel time					
T_t =	72 min			Total	200

L510812 (South of 1st)

Flow to outlet north center (pipe No. 107)

	Total flow length =	200		2.37 acres	
V =	0.05 ft/sec	n_s =	0.15	L =	200
T_t =	72 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.5 ft/sec	k_c =	17	L =	40
T_t =	1 min	S_o =	0.0010		
Total Travel time					
T_t =	73 min			Total	240

L515618

Flow to outlet south center

	Total flow length =	200		1.86 acres	
V =	0.05 ft/sec	n_s =	0.15	L =	200
T_t =	72 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.5 ft/sec	k_c =	17	L =	0
T_t =	0 min	S_o =	0.0010		
Total Travel time					
T_t =	72 min			Total	200

L515718

Flow to outlet SE portion

	Total flow length =	300		1.89	acres
V =	0.05 ft/sec	n_s =	0.15	L =	200
T_t =	72 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.5 ft/sec	k_c =	17	L =	0
T_t =	0 min	S_o =	0.0010		
Total Travel time					
T_t =	72 min		Total		200

L511518

Flow to north then west along 1st

	Total flow length =	500		2.53	acres
V =	0.05 ft/sec	n_s =	0.15	L =	200
T_t =	72 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.9 ft/sec	k_c =	17	L =	300
T_t =	6 min	S_o =	0.0025		
Total Travel time					
T_t =	77 min		Total		500

L5171D

Flow to east

	Total flow length =	300		3.88	acres
V =	0.05 ft/sec	n_s =	0.15	L =	300
T_t =	99 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.5 ft/sec	k_c =	17	L =	0
T_t =	0 min	S_o =	0.0010		
Total Travel time					
T_t =	99 min		Total		300

L5132D

Flow to West

	Total flow length =	250		2.1 acres	
V =	0.05 ft/sec	n_s =	0.15	L =	250
T_t =	85 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.5 ft/sec	k_c =	17	L =	0
T_t =	0 min	S_o =	0.0010		
Total Travel time					
T_t =	85 min		Total		250

L512912

Flow to north then west along road

	Total flow length =	350		2.11 acres	
V =	0.04 ft/sec	n_s =	0.15	L =	150
T_t =	57 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.5 ft/sec	k_c =	17	L =	200
T_t =	6 min	S_o =	0.0010		
Total Travel time					
T_t =	63 min		Total		350

L5130D

Flow to southwest along road

	Total flow length =	300		2.15 acres	
V =	0.05 ft/sec	n_s =	0.15	L =	300
T_t =	99 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.5 ft/sec	k_c =	17	L =	0
T_t =	0 min	S_o =	0.0010		
Total Travel time					
T_t =	99 min		Total		300

L512512					
Flow to southwest along road					
	Total flow length =	700		2.9 acres	
V =	0.05 ft/sec	n_s =	0.15	L =	200
T_t =	72 min	S_o =	0.0010	P_2 =	2.0
V =	0.0 ft/sec	k_s =	11	L =	0
T_t =	0 min	S_o =	0.0010		
V =	0.9 ft/sec	k_c =	17	L =	500
T_t =	10 min	S_o =	0.0025		
Total Travel time					
T_t =	81 min		Total		700

FUTURE LAND USE AND RUNOFF CALCULATIONS

			Future Land Use					
		Outlet						
	SubBasin	Pipe	Acres	Bldgs	Bldg/Acre	% Imperv	CN Imp	CN Perv
P1	D	D1PRO1	2.00	12	6.0	52%	98	90
P2	D	D1PRO1	3.92	0	0.0	0%	-	86
*	D	D1PR01	5.92	12	2.0	18%	98	87
*	D	D1109D	5.92	0	0.0	0%	-	86
*	D	D112718	6.17	0	0.0	0%	-	86
*	D	D112218	3.16	8	2.5	30%	98	90
*	B	B184D	8.97	19	2.1	26%	98	90
*	B	B18118	5.40	12	2.2	27%	98	90
	B	B176D	Assume no runoff into this ditch. It is a connector					
*	B	B17418	9.55	17	1.8	22%	98	90
*	B	B174D	0.81	0	0.0	0%	98	90
	B	B1117D	Assume no runoff into this ditch. It is a connector.					
*	B	B167A24	4.03	-	-	40%	98	90
P1	B	B167A24	1.06	-	-	40%	98	90
P2	B	B167A24	3.75	11	2.9	33%	98	90
*	B	B167A24	4.81	-	-	35%	98	90
*	B	B15212	6.06	12	2.0	25%	98	90
	B	B154D	Assume no runoff into this ditch. It is a connector.					
	B	B114118	Assume no runoff into this pipe. It is a connector.					
*	B	B16018	3.38	8	2.4	29%	98	90
	B	B113724	Assume no runoff into this pipe. It is a connector.					
*	B	B113824	2.84	0	0.0	0%	98	90
*	C	C11D	2.94	8	2.7	32%	98	90
*	C	C1118	4.67	0	0.0	0%	98	90
*	E	E356D	7.97	6	0.8	15%	98	90
	E	E15012	Assume no runoff into this pipe. It is a connector.					
*	E	E110018	3.04	6	2.0	25%	98	90
*	E	E39618	5.06	13	2.6	31%	98	90
*	E	E1106D	6.02	-	-	20%	98	90
*	F	F53318	1.33	4	3.0	34%	98	90
*	F	F39418	2.36	6	2.5	30%	98	90
*	F	F39218	1.45	2	1.4	19%	98	90
	F	F38018	Assume no runoff into this pipe. It is a connector					
*	F	F39324	3.97	7	1.8	23%	98	90
*	F	F322D	5.05	9	1.8	23%	98	90
*	F	F39124	5.23	13	2.5	30%	98	90
*	F	F377D	5.96	17	2.9	40%	98	90
*	F	F3BRDWD	3.47	9	2.6		98	90
	F	F39524	Assume no runoff into this pipe. It is a connector.					

			Future Land Use					
		Outlet						
	SubBasin	Pipe	Acres	Bldgs	Bldg/Acre	% Imperv	CN Imp	CN Perv
P1	F	F34124	9.10	0	0.0	0%	98	90
P2	F	F34124	2.27	9	4.0	42%	98	90
*	F	F34124	11.37	-	-	8%	98	90
P1	F	F34124	1.22			100%	98	90
P2	F	F34124	4.87	4	0.8	15%	98	90
*	F	F34124	6.09			32%	98	90
*	F	F34230	2.07	6	2.9	34%	98	90
*	F	F34230	1.79	2	1.1	16%	98	90
	G	G3ALGWD	0.52	4	7.7	60%	98	90
	G	G3ALGWD	0.75	0	0.0	0%	98	90
	G	G3ALGWD	1.68	3	1.8	23%	98	90
	G	G5136D	4.50	0	0.0	0%	98	90
	G	G5136D	1.92	1	0.5	10%	98	90
	G	G5136D	1.55	4	2.6	31%	98	90
	H	H5ALGWD	0.83	2	2.4	29%	98	90
	H	H54512	1.99	9	4.5	46%	98	90
	H	H54712	3.60	14	3.9	41%	98	90
	H	H513818	Assume no runoff into this pipe. It is a connector.					
	H	H55118	3.51	6	1.7	22%	98	90
	K	K52AVED	2.58	8	3.1	35%	98	90
	K	K55812	2.74	6	2.2	27%	98	90
	K	K55918	2.71	6	2.2	27%	98	90
	K	K57118	1.19	7	5.9	51%	98	90
	K	K56618	1.75	8	4.6	47%	98	90
	K	K5164D	2.69	8	3.0	34%	98	90
	K	K516418	Assume no runoff into this pipe. It is a connector					
	K	K516518	Assume no runoff into this pipe. It is a connector					
	K	K516618	2.60	4	1.5	20%	98	90
	L	L510812	2.02	7	3.5	38%	98	90
	L	L510812	2.37	8	3.4	38%	98	90
	L	L515618	1.86	7	3.8	40%	98	90
	L	L515718	1.89	6	3.2	36%	98	90
	L	L511518	2.53	6	2.4	29%	98	90
	L	L5171D	3.88	8	2.1	26%	98	90
	L	L5132D	2.10	7	3.3	36%	98	90
	L	L512912	2.11	8	3.8	40%	98	90
	L	L5130D	2.15	6	2.8	32%	98	90
	L	L512512	2.90	7	2.4	29%	98	90
	L	L512318	Assume no runoff into this pipe. It is a connector					

			Future Land Use					
		Outlet						
	SubBasin	Pipe	Acres	Bldgs	Bldg/Acre	% Imperv	CN Imp	CN Perv
	J	J58418	13.57	18	1.3	18%	98	90
	J	J58518	4.70	14	3.0	34%	98	90
	J	J58518	1.92	8	4.2	44%	98	90
	J	J67D	10.46	3	0.3	10%	98	90
	J	J59912	7.53	4	0.5	10%	98	90
	J	J59812	4.02	6	1.5	20%	98	90
	J	J59112	Assume no runoff into this pipe. It is a connector					
	J	J515518	Assume no runoff into this pipe. It is a connector					
	J	J515224	Assume no runoff into this pipe. It is a connector					
	J	J515324	Assume no runoff into this pipe. It is a connector					
	J	J71524	Assume no runoff into this pipe. It is a connector					
	J	J72024	1.03	2	1.9	24%	98	90
	J	J72424	1.95	6	3.1	35%	98	90
	J	J517518	4.18	8	1.9	24%	98	90
	J	J510424	4.18	5	1.2	17%	98	90
	J	J510512	2.88	5	1.7	22%	98	90
	J	J713124	5.89	9	1.5	20%	98	90
	J	J710912	2.77	7	2.5	30%	98	90
	J	J710124	6.27	11	1.8	23%	98	90
	J	J712724	6.27	15	2.4	29%	98	90
	J	J79112	3.69	6	1.6	21%	98	90
	J	J74SDIV18	Assume no runoff into this pipe. It is a connector.					
	J	J712524	6.27	15	2.4	29%	98	90
	J	J78418	1.05	0	0.0	0%	98	90
	J	J7MLWEX24	5.89	6	1.0	15%	98	90
	J	J7TAC3S18	4.36	7	1.6	21%	98	90
	J	J76718	5.28	17	3.2	36%	98	90
	J	J76018	7.39	12	1.6	21%	98	90
	J	J757D	7.39	11	1.5	20%	98	90
	J	J715718	6.38	14	2.2	20%	98	90
	J	J714818	Assume no runoff into this pipe. It is a connector					
	J	J714624	Assume no runoff into this pipe. It is a connector					
	J	J72118	7.18	9	1.3	18%	98	90
	J	J72524	6.38	12	1.9	24%	98	90
	J	J714524	3.79	8	2.1	26%	98	90
	J	J714424	Assume no runoff into this pipe. It is a connector					

	Calculation of Travel Times			**Algona Stormwater Comp Plan**			
	EQUATIONS USED TO COMPUTE TRAVEL TIME						
Sheet Flow (first 300 feet of travel	Reference: King County Stormwater Design Manual						
$T_t = [0.42(n_s L)^{0.8}]/[(P_2)^{0.5} (S_o)^{0.4}]$			T_t =	travel time in minutes			
			n_s =	Manning roughness coefficient			
			L =	flow length (ft)			
			P_2 =	2-year, 24-hour rainfall (in)			
			S_o =	slope of hydraulic grade line (ft/ft)			
Velocity Equation (distances after Sheet flow, 300 feet)							
$V = k (S_o)^{0.5}$		V =	velocity (ft/sec)				
		k =	time of concentration velocity factor (ft/sec)				
Travel Time Equation		S_o =	slope of flow path (ft/ft)				
$T_t = L/(60\ V)$							
SUBBASIN A							
Outlet to A3CHICD1							
Flow northwesterly across the basin		Area between 4th & 6th					
	Total flow length =	800					
Sheet Flow V =	0.11 ft/sec	n_s =	0.15	L =	300		
T_t =	44 min	S_o =	0.0075	P_2 =	2.0		
Shallow Concentrated flow							
V =	1.0 ft/sec	k_s =	11	L =	500		
T_t =	9 min	S_o =	0.0075				
Open Channel Flow							
V =	0.7 ft/sec	k_c =	17	L =	0		
T_t =	0 min	S_o =	0.0018				
Total Travel time							
T_t =	53 min			Total	800		
Outlet to A3CHICD2							
Flow northwesterly across the basin		Area between 6th and 7th					
	Total flow length =	1000					
Sheet Flow V =	0.11 ft/sec	n_s =	0.15	L =	300		
T_t =	44 min	S_o =	0.0075	P_2 =	2.0		
Shallow Concentrated flow							
V =	1.0 ft/sec	k_s =	11	L =	700		
T_t =	12 min	S_o =	0.0075				
Open Channel Flow							
V =	0.7 ft/sec	k_c =	17	L =	0		
T_t =	0 min	S_o =	0.0018				
Total Travel time							
T_t =	56 min			Total	1000		

			Plus input flow from:		Unknown	0.83	cfs
			assume constant input		Weyerhauser	1.08	
					Total	1.91	
Outlet to A1CHICD3							
Assume no input to this pipe directly from runoff.							
Outlet to A1CHICD4							
Miscellaneous input flow of 0.38 from Boeing Sheet metal.							
Outlet to A23918							
Flow northwesterly across the basin			East portion subbasin A - 3.67 acres				
		Total flow length =	600				
Sheet Flow	V =	0.11 ft/sec	n_s =	0.15	L =	300	
	T_t =	44 min	S_o =	0.0075	P_2 =	2.0	
Shallow Concentrated flow							
	V =	1.0 ft/sec	k_s =	11	L =	300	
	T_t =	5 min	S_o =	0.0075			
Open Channel Flow							
	V =	0.6 ft/sec	k_c =	13	L =	0	
	T_t =	0 min	S_o =	0.0018			
	Total Travel time						
	T_t =	49 min			Total	600	
Miscellaneous input flow:			Unknown Owner	0.83			
			Proficient Foods	0.55			
			Total	1.38			
Outlet to A23334							
Miscellaneous input flow of :			Goodyear	1.57			
			Seattle Cold Storage	0.53			
			Tharco	1.20			
			Total	3.30			
Outlet to A10830							
Miscellaneous input flow of 0.50 from Wilson Art							
Outlet to A21018							
Miscellaneous input flow of :			Advanced Packaging	0.83			
Outlet to A10724							
Miscellaneous input flow of :			Unknown Owner	0.83			

SUBBASIN B							
Outlet to B184D							
Flow westerly across the basin 500 ft and then north in ditch 600 ft							
		Total flow length =		1100			
Sheet Flow	V =	0.07	ft/sec	n_s =	0.15	L =	300
	T_t =	69	min	S_o =	0.0025	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.6	ft/sec	k_s =	11	L =	200
	T_t =	6	min	S_o =	0.0025		
Open Channel Flow							
	V =	0.9	ft/sec	k_c =	17	L =	600
	T_t =	12	min	S_o =	0.0025		
	Total Travel time						
	T_t =	86	min			Total	1100
Outlet to B18118							
Flow westerly across the basin 300 ft and then north in ditch 400 ft							
		Total flow length =		700			
Sheet Flow	V =	0.05	ft/sec	n_s =	0.15	L =	300
	T_t =	99	min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.0	ft/sec	k_s =	11	L =	0
	T_t =	0	min	S_o =	0.0010		
Open Channel Flow							
	V =	0.9	ft/sec	k_c =	17	L =	400
	T_t =	8	min	S_o =	0.0025		
	Total Travel time						
	T_t =	107	min			Total	700
Outlet to B17418 (south portion is biggest)							
Flow northerly across the basin 400 ft and then west in ditch 550 ft							
		Total flow length =		950			
Sheet Flow	V =	0.03	ft/sec	n_s =	0.15	L =	300
	T_t =	160	min	S_o =	0.0003	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.2	ft/sec	k_s =	11	L =	100
	T_t =	9	min	S_o =	0.0003		
Open Channel Flow							
	V =	0.3	ft/sec	k_c =	17	L =	550
	T_t =	31	min	S_o =	0.0003		
	Total Travel time						
	T_t =	200	min			Total	950

Outlet to B174D							
Flow southerly across the basin 130 ft and then north in ditch 150 ft							
		Total flow length =		280			
Sheet Flow	V =	0.03	ft/sec	n_s =	0.15	L =	130
	T_t =	62	min	S_o =	0.0006	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.0	ft/sec	k_s =	11	L =	0
	T_t =	0	min	S_o =	0.0006		
Open Channel Flow							
	V =	0.6	ft/sec	k_c =	17	L =	150
	T_t =	4	min	S_o =	0.0012		
	Total Travel time						
	T_t =	66	min			Total	280
Outlet to B167A24							
Flow to perimeter of basin 50 ft and then in ditch 500 ft							
		Total flow length =		550			
Sheet Flow	V =	0.03	ft/sec	n_s =	0.15	L =	50
	T_t =	29	min	S_o =	0.0006	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.0	ft/sec	k_s =	11	L =	0
	T_t =	0	min	S_o =	0.0006		
Open Channel Flow							
	V =	0.6	ft/sec	k_c =	17	L =	500
	T_t =	14	min	S_o =	0.0012		
	Total Travel time						
	T_t =	43	min			Total	550
Outlet to B15212							
Flow to ditches 200 ft and then west in ditch 450 ft							
		Total flow length =		650			
Sheet Flow	V =	0.05	ft/sec	n_s =	0.15	L =	200
	T_t =	72	min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.0	ft/sec	k_s =	11	L =	0
	T_t =	0	min	S_o =	0.0010		
Open Channel Flow							
	V =	1.0	ft/sec	k_c =	17	L =	450
	T_t =	8	min	S_o =	0.0033		
	Total Travel time						
	T_t =	79	min			Total	650

Outlet to B167A24							
Flow north to ditch by circuitous 300 ft and then west and south in ditch 900 ft							
		Total flow length =		1200			
Sheet Flow	V =	0.05	ft/sec	n_s =	0.15	L =	300
	T_t =	99	min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.0	ft/sec	k_s =	11	L =	0
	T_t =	0	min	S_o =	0.0010		
Open Channel Flow							
	V =	0.3	ft/sec	k_c =	17	L =	900
	T_t =	51	min	S_o =	0.0003		
	Total Travel time						
	T_t =	150	min			Total	1200
Outlet to B16018							
Flow south to ditch by circuitous 300 ft and then west in ditch 600 ft							
		Total flow length =		900			
Sheet Flow	V =	0.05	ft/sec	n_s =	0.15	L =	300
	T_t =	99	min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.0	ft/sec	k_s =	11	L =	0
	T_t =	0	min	S_o =	0.0010		
Open Channel Flow							
	V =	0.3	ft/sec	k_c =	17	L =	600
	T_t =	34	min	S_o =	0.0003		
	Total Travel time						
	T_t =	133	min			Total	900
Outlet to B113824							
Flow east and west to ditch 300 ft and then south in ditch 200 ft							
		Total flow length =		500			
Sheet Flow	V =	0.05	ft/sec	n_s =	0.15	L =	300
	T_t =	99	min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.0	ft/sec	k_s =	11	L =	0
	T_t =	0	min	S_o =	0.0010		
Open Channel Flow							
	V =	0.5	ft/sec	k_c =	17	L =	200
	T_t =	6	min	S_o =	0.0010		
	Total Travel time						
	T_t =	105	min			Total	500

Outlet to C11D							
Flow north to ditch then east and west to outlet							
		Total flow length =		400		2.94	acres
Sheet Flow	V =	0.05	ft/sec	n_s =	0.15	L =	200
	T_t =	72	min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.0	ft/sec	k_s =	11	L =	0
	T_t =	0	min	S_o =	0.0010		
Open Channel Flow							
pipe F39418	V =	0.6	ft/sec	k_c =	17	L =	200
	T_t =	5	min	S_o =	0.0013		
	Total Travel time						
	T_t =	77	min			Total	400
Outlet to C1118							
Flow north to ditch then east and west to outlet							
		Total flow length =		500		4.67	acres
Sheet Flow	V =	0.05	ft/sec	n_s =	0.15	L =	200
	T_t =	72	min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.0	ft/sec	k_s =	11	L =	0
	T_t =	0	min	S_o =	0.0010		
Open Channel Flow							
pipe F39418	V =	0.6	ft/sec	k_c =	17	L =	300
	T_t =	8	min	S_o =	0.0013		
	Total Travel time						
	T_t =	80	min			Total	500
	Note: Future development is likely to be commercial and require detention.						

		Calculation of Travel Times			**Algona Stormwater Comp Plan**		
		EQUATIONS USED TO COMPUTE TRAVEL TIME					
Sheet Flow (first 300 feet of travel)			Reference: King County Stormwater Design Manual				
$T_t = [0.42(n_s L)^{0.8}]/[(P_2)^{0.5}(S_o)^{0.4}]$				T_t =	travel time in minutes		
				n_s =	Manning roughness coefficient		
				L =	flow length (ft)		
				P_2 =	2-year, 24-hour rainfall (in)		
				S_o =	slope of hydraulic grade line (ft/ft)		
Velocity Equation (distances after Sheet flow, 300 feet)							
	$V = k(S_o)^{0.5}$			V =	velocity (ft/sec)		
				k =	time of concentration velocity factor (ft/sec)		
Travel Time Equation				S_o =	slope of flow path (ft/ft)		
	$T_t = L/(60\ V)$						
SUBBASIN D							
Outlet to D1PRO1					n_s =	0.01*0.42 + 0.24*0.58	
Sheet Flow	T_t =	86 min		n_s =	0.15	L =	300
				P_2 =	2.0	S_o =	0.0014
Shallow Concentrated flow							
	V =	0.4 ft/sec		k_s =	11	L =	200
	T_t =	8 min		S_o =	0.0014		
Open Channel Flow							
	V =	0.6 ft/sec		k_c =	17	L =	200
	T_t =	5 min		S_o =	0.0014		
	Total Travel time						
	T_t =	91 min					
Outlet to D1109D							
		Total flow length =	700				
Flow northwesterly across the basin							
Sheet Flow	T_t =	86 min		n_s =	0.15	L =	300
				P_2 =	2.0	S_o =	0.0014
Shallow Concentrated flow							
	V =	0.4 ft/sec		k_s =	11	L =	400
	T_t =	16 min		S_o =	0.0014		
Open Channel Flow							
	V =	0.6 ft/sec		k_c =	17	L =	0
	T_t =	0 min		S_o =	0.0014		
	Total Travel time						
	T_t =	102 min					

Outlet to D112718							
Flow northerly across the basin and then west in ditch							
		Total flow length =		520			
Sheet Flow	T_t =	62	min	n_s =	0.15	L =	200
				S_o =	0.0014	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.0	ft/sec	k_s =	11	L =	0
	T_t =	0	min	S_o =	0		
Open Channel Flow							
	V =	0.6	ft/sec	k_c =	17	L =	320
	T_t =	8	min	S_o =	0.0014		
	Total Travel time						
	T_t =	70	min				
Outlet to D112218							
Flow northerly across the basin							
		Total flow length =		600			
Sheet Flow	V =	0.06	ft/sec	n_s =	0.15	L =	300
	T_t =	86	min	S_o =	0.0014	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.4	ft/sec	k_s =	11	L =	300
	T_t =	12	min	S_o =	0.0014		
Open Channel Flow							
	V =	0.0	ft/sec	k_c =	17	L =	0
	T_t =	0	min	S_o =	0.0014		
	Total Travel time						
	T_t =	98	min			Total	600

SUBBASIN E							
Outlet to E356D							
Flow north & south to ditch 250 ft and then west & north 600 ft							
		Total flow length =		850			
Sheet Flow	V =	0.05	ft/sec	n_s =	0.15	L =	250
	T_t =	85	min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.0	ft/sec	k_s =	11	L =	0
	T_t =	0	min	S_o =	0.0010		
Open Channel Flow							
	V =	0.7	ft/sec	k_c =	17	L =	600
	T_t =	15	min	S_o =	0.0015		
	Total Travel time						
	T_t =	101	min			Total	850
Outlet to E110018							
Flow north across the basin 200 ft and then north 550 ft							
		Total flow length =		750			
Sheet Flow	V =	0.05	ft/sec	n_s =	0.15	L =	200
	T_t =	72	min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.0	ft/sec	k_s =	11	L =	0
	T_t =	0	min	S_o =	0.0010		
Open Channel Flow							
	V =	0.7	ft/sec	k_c =	17	L =	550
	T_t =	13	min	S_o =	0.0018		
	Total Travel time						
	T_t =	84	min			Total	750
Outlet to E39618							
Flow westerly across the basin 450 ft							
		Total flow length =		450			
Sheet Flow	V =	0.05	ft/sec	n_s =	0.15	L =	300
	T_t =	99	min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.3	ft/sec	k_s =	11	L =	150
	T_t =	7	min	S_o =	0.0010		
Open Channel Flow							
	V =	0.7	ft/sec	k_c =	17	L =	0
	T_t =	0	min	S_o =	0.0018		
	Total Travel time						
	T_t =	106	min			Total	450

Outlet to	**E1106D**						
Flow westerly across the basin 400 ft							
		Total flow length =		450			
Sheet Flow	V =	0.06	ft/sec	n_s =	0.15	L =	300
	T_t =	84	min	S_o =	0.0015	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.4	ft/sec	k_s =	11	L =	100
	T_t =	4	min	S_o =	0.0015		
Open Channel Flow							
	V =	0.7	ft/sec	k_c =	17	L =	0
	T_t =	0	min	S_o =	0.0018		
	Total Travel time						
	T_t =	88	min			Total	400

SUBBASIN F							
Outlet to	**F53318**						
Flow north to edge of basin 100 ft and then in dich 250 ft							
		Total flow length =		350		1.33	acres
Sheet Flow	V =	0.04	ft/sec	n_s =	0.15	L =	100
	T_t =	41	min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.0	ft/sec	k_s =	11	L =	0
	T_t =	0	min	S_o =	0.0010		
Open Channel Flow							
	V =	0.5	ft/sec	k_c =	17	L =	250
	T_t =	8	min	S_o =	0.0010		
	Total Travel time						
	T_t =	49	min			Total	350
Outlet to	**F39418**						
Flow east 200 ft and then NW in pipe 450 ft							
		Total flow length =		650		2.36	acres
Sheet Flow	V =	0.04	ft/sec	n_s =	0.15	L =	200
	T_t =	94	min	S_o =	0.0005	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.0	ft/sec	k_s =	11	L =	0
	T_t =	0	min	S_o =	0.0015		
Open Channel Flow							
pipe F53318	V =	1.1	ft/sec	k_c =	42	L =	450
	T_t =	7	min	S_o =	0.0007		
	Total Travel time						
	T_t =	101	min			Total	650
Outlet to	**F39324**						
Flow north to outlet 200 ft							
		Total flow length =		200		2.4	acres
Sheet Flow	V =	0.04	ft/sec	n_s =	0.15	L =	200
	T_t =	94	min	S_o =	0.0005	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.0	ft/sec	k_s =	11	L =	0
	T_t =	0	min	S_o =	0.0015		
Open Channel Flow							
	V =	0.7	ft/sec	k_c =	17	L =	0
	T_t =	0	min	S_o =	0.0018		
	Total Travel time						
	T_t =	94	min			Total	200

Outlet to	**F322D**						
Flow northwesterly across basin 600 ft							
		Total flow length =		600		5.05	acres
Sheet Flow	V =	0.05	ft/sec	n_s =	0.15	L =	300
	T_t =	99	min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.4	ft/sec	k_s =	11	L =	300
	T_t =	12	min	S_o =	0.0015		
Open Channel Flow							
pipe F39418	V =	1.5	ft/sec	k_c =	42	L =	0
	T_t =	0	min	S_o =	0.0013		
	Total Travel time						
	T_t =	111	min			Total	600
Outlet to	**F39218**						
Flow easterly across basin 150 ft and then northwest in pipe 450 ft							
		Total flow length =		600		1.45	acres
Sheet Flow	V =	0.04	ft/sec	n_s =	0.15	L =	150
	T_t =	57	min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.0	ft/sec	k_s =	11	L =	0
	T_t =	0	min	S_o =	0.0015		
Open Channel Flow							
pipe F39418	V =	1.5	ft/sec	k_c =	42	L =	450
	T_t =	5	min	S_o =	0.0013		
	Total Travel time						
	T_t =	62	min			Total	600
Outlet to	**F38018**						
Flow northwesterly across basin 300 ft							
		Total flow length =		600		3.2	acres
Sheet Flow	V =	0.04	ft/sec	n_s =	0.15	L =	150
	T_t =	57	min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.0	ft/sec	k_s =	11	L =	0
	T_t =	0	min	S_o =	0.0015		
Open Channel Flow							
pipe F39418	V =	1.5	ft/sec	k_c =	42	L =	0
	T_t =	0	min	S_o =	0.0013		
	Total Travel time						
	T_t =	57	min			Total	150

Outlet to	**F39124**						
Flow northwesterly across basin 600 ft							
		Total flow length =		500		3.97	acres
Sheet Flow	V =	0.05	ft/sec	n_s =	0.15	L =	300
	T_t =	99	min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.4	ft/sec	k_s =	11	L =	200
	T_t =	8	min	S_o =	0.0015		
Open Channel Flow							
pipe F39418	V =	1.5	ft/sec	k_c =	42	L =	0
	T_t =	0	min	S_o =	0.0013		
	Total Travel time						
	T_t =	107	min			Total	500
Outlet to	**F377D**						
Flow northwesterly to outlet							
		Total flow length =		600		5.96	acres
Sheet Flow	V =	0.06	ft/sec	n_s =	0.15	L =	300
	T_t =	80	min	S_o =	0.0017	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.5	ft/sec	k_s =	11	L =	300
	T_t =	11	min	S_o =	0.0017		
Open Channel Flow							
	V =	1.5	ft/sec	k_c =	42	L =	0
	T_t =	0	min	S_o =	0.0013		
	Total Travel time						
	T_t =	91	min			Total	600
Outlet to	**F39524**						
Flow northwesterly to driveway then north along driveway then west in ditch							
		Total flow length =		600		5.23	acres
Sheet Flow	V =	0.06	ft/sec	n_s =	0.15	L =	300
	T_t =	80	min	S_o =	0.0017	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.5	ft/sec	k_s =	11	L =	100
	T_t =	4	min	S_o =	0.0017		
Open Channel Flow							
	V =	1.7	ft/sec	k_c =	42	L =	200
	T_t =	2	min	S_o =	0.0017		
	Total Travel time						
	T_t =	86	min			Total	600

Outlet to	**BRDWDE**					
Flow north to edge of Blue Heron estates then west around property						
		Total flow length =	700		3.47	acres
Sheet Flow	V =	0.07 ft/sec	n_s =	0.15	L =	300
	T_t =	75 min	S_o =	0.0020	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.0 ft/sec	k_s =	11	L =	0
	T_t =	0 min	S_o =	0.0017		
Open Channel Flow						
	V =	1.9 ft/sec	k_c =	42	L =	500
	T_t =	4 min	S_o =	0.0020		
	Total Travel time					
	T_t =	79 min			Total	800
Outlet to	**BRDWDW**					
Flow northwesterly across basin to outlet						
		Total flow length =	700		6.53	acres
Sheet Flow	V =	0.07 ft/sec	n_s =	0.15	L =	300
	T_t =	75 min	S_o =	0.0020	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.5 ft/sec	k_s =	11	L =	300
	T_t =	10 min	S_o =	0.0020		
Open Channel Flow						
	V =	1.9 ft/sec	k_c =	42	L =	0
	T_t =	0 min	S_o =	0.0020		
	Total Travel time					
	T_t =	85 min			Total	600
Outlet to	**F34124**					
Flow westerly across basin 200 ft then northwest in pipe 100 ft						
		Total flow length =	300		3.68	acres
Sheet Flow	V =	0.05 ft/sec	n_s =	0.15	L =	200
	T_t =	72 min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow						
	V =	0.0 ft/sec	k_s =	11	L =	0
	T_t =	0 min	S_o =	0.0020		
Open Channel Flow						
pipe F39524	V =	1.3 ft/sec	k_c =	42	L =	100
	T_t =	1 min	S_o =	0.0010		
	Total Travel time					
	T_t =	73 min			Total	300

Outlet to	**F34124**						
Flow westerly across basin 200 ft then northwest in pipe 100 ft							
		Total flow length =		300		1.14	acres
Sheet Flow	V =	0.07	ft/sec	n_s =	0.15	L =	300
	T_t =	71	min	S_o =	0.0023	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.0	ft/sec	k_s =	11	L =	0
	T_t =	0	min	S_o =	0.0020		
Open Channel Flow							
pipe F39524	V =	1.3	ft/sec	k_c =	42	L =	0
	T_t =	0	min	S_o =	0.0010		
	Total Travel time						
	T_t =	71	min			Total	300
Outlet to	**F34124**						
Flow southeasterly across the basin							
		Total flow length =		400		6.09	acres
Sheet Flow	V =	0.04	ft/sec	n_s =	0.15	L =	300
	T_t =	131	min	S_o =	0.0005	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.2	ft/sec	k_s =	11	L =	100
	T_t =	7	min	S_o =	0.0005		
Open Channel Flow							
	V =	1.3	ft/sec	k_c =	42	L =	0
	T_t =	0	min	S_o =	0.0010		
	Total Travel time						
	T_t =	137	min			Total	400
Outlet to	**F34124**						
Flow northwesterly across the basin							
		Total flow length =		300		2.07	acres
Sheet Flow	V =	0.05	ft/sec	n_s =	0.15	L =	300
	T_t =	99	min	S_o =	0.0010	P_2 =	2.0
Shallow Concentrated flow							
	V =	0.0	ft/sec	k_s =	11	L =	0
	T_t =	0	min	S_o =	0.0020		
Open Channel Flow							
pipe F39524	V =	1.3	ft/sec	k_c =	42	L =	0
	T_t =	0	min	S_o =	0.0010		
	Total Travel time						
	T_t =	99	min			Total	300

Outlet to	**F34230**						
Flow west to ditch then south							
		Total flow length =		300		1.79	acres
Sheet Flow	V =	0.03	ft/sec	n_s =	0.15	L =	100
	T_t =	54	min	S_o =	0.0005	P_2 =	2.0
Shallow Concentrated flow							
	V =	33.0	ft/sec	k_s =	11	L =	200
	T_t =	0	min	S_o =	9.0000		
Open Channel Flow					0.0005		
pipe F39524	V =	1.3	ft/sec	k_c =	42	L =	0
	T_t =	0	min	S_o =	0.0010		
	Total Travel time						
	T_t =	54	min			Total	300

G3ALGWD - NE Portion						
	Total flow length =		120		0.52	acres
V =	0.04	ft/sec	n_s =	0.15	L =	70
T_t =	31	min	S_o =	0.0010	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	0.6	ft/sec	k_c =	17	L =	50
T_t =	1	min	S_o =	0.0013		
Total Travel time						
T_t =	32	min			Total	120
G3ALGWD - NW Portion						
	Total flow length =		550		0.75	acres
V =	0.04	ft/sec	n_s =	0.15	L =	150
T_t =	57	min	S_o =	0.0010	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	0.5	ft/sec	k_c =	17	L =	400
T_t =	12	min	S_o =	0.0010		
Total Travel time						
T_t =	69	min			Total	550
G3ALGWD - East portion (1.68 acres)						
	Total flow length =		480		1.68	acres
V =	0.05	ft/sec	n_s =	0.15	L =	180
T_t =	66	min	S_o =	0.0010	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	0.5	ft/sec	k_c =	17	L =	300
T_t =	9	min	S_o =	0.0010		
Total Travel time						
T_t =	75	min			Total	480

G3ALGWD - Southwest portion (4.5 acres)						
	Total flow length =		550		4.5	acres
V =	0.05	ft/sec	n_s =	0.15	L =	200
T_t =	72	min	S_o =	0.0010	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	0.5	ft/sec	k_c =	17	L =	350
T_t =	11	min	S_o =	0.0010		
Total Travel time						
T_t =	82	min			Total	550
G5136D - Northeast portion						
	Total flow length =		630		1.92	acres
V =	0.07	ft/sec	n_s =	0.15	L =	200
T_t =	50	min	S_o =	0.0025	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	0.5	ft/sec	k_c =	17	L =	430
T_t =	13	min	S_o =	0.0010		
Total Travel time						
T_t =	63	min			Total	630
G5136D - Southeast portion						
	Total flow length =		200		1.55	acres
V =	0.07	ft/sec	n_s =	0.15	L =	200
T_t =	50	min	S_o =	0.0025	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	0.5	ft/sec	k_c =	17	L =	0
T_t =	0	min	S_o =	0.0010		
Total Travel time						
T_t =	50	min			Total	200

H5ALGWD						
	Total flow length =		200		0.83	acres
V =	0.05	ft/sec	n_s =	0.15	L =	200
T_t =	72	min	S_o =	0.0010	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	0.6	ft/sec	k_c =	17	L =	0
T_t =	0	min	S_o =	0.0013		
Total Travel time						
T_t =	72	min			Total	200
H54512						
	Total flow length =		600		1.99	acres
V =	0.09	ft/sec	n_s =	0.15	L =	100
T_t =	19	min	S_o =	0.0070	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	1.4	ft/sec	k_c =	17	L =	500
T_t =	6	min	S_o =	0.0070		
Total Travel time						
T_t =	25	min			Total	600
H54712						
	Total flow length =		800		1.99	acres
V =	0.11	ft/sec	n_s =	0.15	L =	300
T_t =	45	min	S_o =	0.0070	P_2 =	2.0
V =	0.9	ft/sec	k_s =	11	L =	100
T_t =	2	min	S_o =	0.0070		
V =	1.4	ft/sec	k_c =	17	L =	400
T_t =	5	min	S_o =	0.0070		
Total Travel time						
T_t =	52	min			Total	800

H55118						
	Total flow length =		400		1.99	acres
V =	0.05	ft/sec	n_s =	0.15	L =	300
T_t =	99	min	S_o =	0.0010	P_2 =	2.0
V =	0.3	ft/sec	k_s =	11	L =	100
T_t =	5	min	S_o =	0.0010		
V =	0.5	ft/sec	k_c =	17	L =	0
T_t =	0	min	S_o =	0.0010		
Total Travel time						
T_t =	104	min			Total	400

J58418								
Flow southwest across basin to outlet								
	Total flow length =		1000		13.57	acres		
V =	0.05	ft/sec	n_s =	0.2	L =	300		
T_t =	106	min	S_o =	0.0015	P_2 =	2.0		
V =	0.3	ft/sec	k_s =	9	L =	700		
T_t =	33	min	S_o =	0.0015				
V =	0.5	ft/sec	k_c =	17	L =	0		
T_t =	0	min	S_o =	0.0010				
Total Travel time								
T_t =	139	min			Total	1000		
J58518								
Flow westerly to outlet								
	Total flow length =		500		4.7	acres		
V =	0.04	ft/sec	n_s =	0.15	L =	100		
T_t =	41	min	S_o =	0.0010	P_2 =	2.0		
V =	0.3	ft/sec	k_s =	11	L =	400		
T_t =	19	min	S_o =	0.0010				
V =	0.5	ft/sec	k_c =	17	L =	0		
T_t =	0	min	S_o =	0.0010				
Total Travel time								
T_t =	60	min			Total	500		
J58518								
Flow easterly to pipe								
	Total flow length =		200		1.92	acres		
V =	0.04	ft/sec	n_s =	0.15	L =	100		
T_t =	41	min	S_o =	0.0010	P_2 =	2.0		
V =	0.3	ft/sec	k_s =	11	L =	100		
T_t =	5	min	S_o =	0.0010				
V =	0.5	ft/sec	k_c =	17	L =	0		
T_t =	0	min	S_o =	0.0010				
Total Travel time								
T_t =	46	min			Total	200		

J67D								
Flow south to outlet at north end of Stanley								
	Total flow length =		700		10.46	acres		
V =	0.04	ft/sec	n_s =	0.2	L =	300		
T_t =	125	min	S_o =	0.0010	P_2 =	2.0		
V =	0.3	ft/sec	k_s =	9	L =	400		
T_t =	23	min	S_o =	0.0010				
V =	0.5	ft/sec	k_c =	17	L =	0		
T_t =	0	min	S_o =	0.0010				
Total Travel time								
T_t =	148	min			Total	700		
J59912								
Flow westerly to outlet								
	Total flow length =		400		7.53	acres		
V =	0.03	ft/sec	n_s =	0.2	L =	100		
T_t =	52	min	S_o =	0.0010	P_2 =	2.0		
V =	0.3	ft/sec	k_s =	9	L =	300		
T_t =	18	min	S_o =	0.0010				
V =	0.5	ft/sec	k_c =	17	L =	0		
T_t =	0	min	S_o =	0.0010				
Total Travel time								
T_t =	69	min			Total	400		
J59812								
Flow easterly to pipe								
	Total flow length =		250		4.02	acres		
V =	0.03	ft/sec	n_s =	0.2	L =	100		
T_t =	52	min	S_o =	0.0010	P_2 =	2.0		
V =	0.3	ft/sec	k_s =	11	L =	150		
T_t =	7	min	S_o =	0.0010				
V =	0.5	ft/sec	k_c =	17	L =	0		
T_t =	0	min	S_o =	0.0010				
Total Travel time								
T_t =	59	min			Total	250		

J72024								
Flow southeasterly to pipe								
	Total flow length =		350		1.03	acres		
V =	0.04	ft/sec	n_s =	0.15	L =	100		
T_t =	41	min	S_o =	0.0010	P_2 =	2.0		
V =	0.3	ft/sec	k_s =	11	L =	50		
T_t =	2	min	S_o =	0.0010				
V =	2.3	ft/sec	k_c =	42	L =	200		
T_t =	1	min	S_o =	0.0030				
Total Travel time								
T_t =	45	min			Total	350		
J72424								
Flow southeasterly to pipe								
	Total flow length =		600		1.95	acres		
V =	0.04	ft/sec	n_s =	0.15	L =	100		
T_t =	41	min	S_o =	0.0010	P_2 =	2.0		
V =	0.3	ft/sec	k_s =	11	L =	50		
T_t =	2	min	S_o =	0.0010				
V =	2.3	ft/sec	k_c =	42	L =	450		
T_t =	3	min	S_o =	0.0030				
Total Travel time								
T_t =	47	min			Total	600		
J72424								
Flow southeasterly to pipe								
	Total flow length =		600		1.95	acres		
V =	0.04	ft/sec	n_s =	0.15	L =	100		
T_t =	41	min	S_o =	0.0010	P_2 =	2.0		
V =	0.3	ft/sec	k_s =	11	L =	50		
T_t =	2	min	S_o =	0.0010				
V =	2.3	ft/sec	k_c =	42	L =	450		
T_t =	3	min	S_o =	0.0030				
Total Travel time								
T_t =	47	min			Total	600		

J517518								
Flow to north to drop and then in pipe (assume to northwest corner)								
	Total flow length =		500		4.18	acres		
V =	0.04	ft/sec	n_s =	0.15	L =	100		
T_t =	41	min	S_o =	0.0010	P_2 =	2.0		
V =	0.3	ft/sec	k_s =	11	L =	200		
T_t =	10	min	S_o =	0.0010				
V =	1.9	ft/sec	k_c =	42	L =	200		
T_t =	2	min	S_o =	0.0020				
Total Travel time								
T_t =	52	min			Total	500		
J510424								
Flow to north to drop and then in pipe (assume to northwest corner)								
	Total flow length =		500		4.18	acres		
V =	0.06	ft/sec	n_s =	0.1	L =	100		
T_t =	30	min	S_o =	0.0010	P_2 =	2.0		
V =	0.3	ft/sec	k_s =	11	L =	200		
T_t =	10	min	S_o =	0.0010				
V =	1.9	ft/sec	k_c =	42	L =	200		
T_t =	2	min	S_o =	0.0020				
Total Travel time								
T_t =	41	min			Total	500		

J510512								
Flow to south and then ditch to pipe								
	Total flow length =		400		2.88	acres		
V =	0.04	ft/sec	n_s =	0.15	L =	100		
T_t =	41	min	S_o =	0.0010	P_2 =	2.0		
V =	0.3	ft/sec	k_s =	11	L =	200		
T_t =	10	min	S_o =	0.0010				
V =	0.8	ft/sec	k_c =	17	L =	100		
T_t =	2	min	S_o =	0.0020				
Total Travel time								
T_t =	53	min			Total	400		
J713124								
Flow to north to drop and then in pipe (assume to northwest corner)								
	Total flow length =		550		5.89	acres		
V =	0.04	ft/sec	n_s =	0.15	L =	100		
T_t =	41	min	S_o =	0.0010	P_2 =	2.0		
V =	0.3	ft/sec	k_s =	11	L =	250		
T_t =	12	min	S_o =	0.0010				
V =	1.9	ft/sec	k_c =	42	L =	200		
T_t =	2	min	S_o =	0.0020				
Total Travel time								
T_t =	55	min			Total	550		
J710912								
Flow to west and then in ditch to pipe								
	Total flow length =		500		2.77	acres		
V =	0.06	ft/sec	n_s =	0.1	L =	100		
T_t =	30	min	S_o =	0.0010	P_2 =	2.0		
V =	0.0	ft/sec	k_s =	11	L =	0		
T_t =	0	min	S_o =	0.0010				
V =	0.8	ft/sec	k_c =	17	L =	400		
T_t =	9	min	S_o =	0.0020				
Total Travel time								
T_t =	38	min			Total	500		

J710124								
Flow to north to drop and then in pipe (assume to northwest corner)								
	Total flow length =		550		6.27	acres		
V =	0.04	ft/sec	n_s =	0.15	L =	100		
T_t =	41	min	S_o =	0.0010	P_2 =	2.0		
V =	0.3	ft/sec	k_s =	11	L =	250		
T_t =	12	min	S_o =	0.0010				
V =	1.9	ft/sec	k_c =	42	L =	200		
T_t =	2	min	S_o =	0.0020				
Total Travel time								
T_t =	55	min			Total	550		
J712724								
Flow to north to drop and then in pipe (assume to northwest corner)								
	Total flow length =		550		6.27	acres		
V =	0.04	ft/sec	n_s =	0.15	L =	100		
T_t =	41	min	S_o =	0.0010	P_2 =	2.0		
V =	0.3	ft/sec	k_s =	11	L =	250		
T_t =	12	min	S_o =	0.0010				
V =	1.9	ft/sec	k_c =	42	L =	200		
T_t =	2	min	S_o =	0.0020				
Total Travel time								
T_t =	55	min			Total	550		
J79112								
Flow to west and then in ditch to pipe								
	Total flow length =		400		3.69	acres		
V =	0.04	ft/sec	n_s =	0.15	L =	100		
T_t =	41	min	S_o =	0.0010	P_2 =	2.0		
V =	0.3	ft/sec	k_s =	11	L =	100		
T_t =	5	min	S_o =	0.0010				
V =	0.8	ft/sec	k_c =	17	L =	200		
T_t =	4	min	S_o =	0.0020				
Total Travel time								
T_t =	50	min			Total	400		

J7MLWEX24								
Flow to north to drop and then in pipe (assume to northwest corner)								
	Total flow length =		550		5.89	acres		
V =	0.04	ft/sec	n_s =	0.15	L =	100		
T_t =	41	min	S_o =	0.0010	P_2 =	2.0		
V =	0.3	ft/sec	k_s =	11	L =	250		
T_t =	12	min	S_o =	0.0010				
V =	1.9	ft/sec	k_c =	42	L =	200		
T_t =	2	min	S_o =	0.0020				
Total Travel time								
T_t =	55	min			Total	550		
J78418								
Flow to west and then in ditch to pipe								
	Total flow length =		200		1.05	acres		
V =	0.04	ft/sec	n_s =	0.15	L =	100		
T_t =	41	min	S_o =	0.0010	P_2 =	2.0		
V =	0.3	ft/sec	k_s =	11	L =	50		
T_t =	2	min	S_o =	0.0010				
V =	1.9	ft/sec	k_c =	42	L =	100		
T_t =	1	min	S_o =	0.0020				
Total Travel time								
T_t =	44	min			Total	250		

J7TAC3S18								
Flow to south to 12 inch pipe (not modeled) then in pipe to J7TAC3S18								
	Total flow length =		700		4.36	acres		
V =	0.04	ft/sec	n_s =	0.15	L =	100		
T_t =	41	min	S_o =	0.0010	P_2 =	2.0		
V =	0.3	ft/sec	k_s =	11	L =	200		
T_t =	10	min	S_o =	0.0010				
V =	1.9	ft/sec	k_c =	42	L =	400		
T_t =	4	min	S_o =	0.0020				
Total Travel time								
T_t =	54	min			Total	700		
J76718								
Flow to north to drop and then in pipe (assume to northwest corner)								
	Total flow length =		500		5.28	acres		
V =	0.04	ft/sec	n_s =	0.15	L =	100		
T_t =	41	min	S_o =	0.0010	P_2 =	2.0		
V =	0.3	ft/sec	k_s =	11	L =	200		
T_t =	10	min	S_o =	0.0010				
V =	0.8	ft/sec	k_c =	17	L =	200		
T_t =	4	min	S_o =	0.0020				
Total Travel time								
T_t =	55	min			Total	500		
J76018								
Flow to north to pipe and then west in pipe								
	Total flow length =		700		7.39	acres		
V =	0.04	ft/sec	n_s =	0.15	L =	100		
T_t =	41	min	S_o =	0.0010	P_2 =	2.0		
V =	0.3	ft/sec	k_s =	11	L =	300		
T_t =	14	min	S_o =	0.0010				
V =	1.9	ft/sec	k_c =	42	L =	300		
T_t =	3	min	S_o =	0.0020				
Total Travel time								
T_t =	58	min			Total	700		

J757D								
Flow to south and east then in ditch to SE corner								
	Total flow length =		1000		7.39	acres		
V =	0.04	ft/sec	n_s =	0.15	L =	100		
T_t =	41	min	S_o =	0.0010	P_2 =	2.0		
V =	0.3	ft/sec	k_s =	11	L =	300		
T_t =	14	min	S_o =	0.0010				
V =	0.8	ft/sec	k_c =	17	L =	600		
T_t =	13	min	S_o =	0.0020				
Total Travel time								
T_t =	69	min			Total	1000		
J715718								
Flow to east then in ditch either north or south								
	Total flow length =		750		6.38	acres		
V =	0.04	ft/sec	n_s =	0.15	L =	100		
T_t =	41	min	S_o =	0.0010	P_2 =	2.0		
V =	0.3	ft/sec	k_s =	11	L =	150		
T_t =	7	min	S_o =	0.0010				
V =	0.8	ft/sec	k_c =	17	L =	500		
T_t =	11	min	S_o =	0.0020				
Total Travel time								
T_t =	59	min			Total	750		
J72118								
Flow to west then in ditch either north or south to pipe								
	Total flow length =		750		7.18	acres		
V =	0.04	ft/sec	n_s =	0.15	L =	100		
T_t =	41	min	S_o =	0.0010	P_2 =	2.0		
V =	0.3	ft/sec	k_s =	11	L =	150		
T_t =	7	min	S_o =	0.0010				
V =	1.9	ft/sec	k_c =	42	L =	500		
T_t =	4	min	S_o =	0.0020				
Total Travel time								
T_t =	53	min			Total	750		

J72524									
Flow to west then in ditch either north or south to pipe									
	Total flow length =		750		6.38	acres			
V =	0.04	ft/sec	n_s =	0.15	L =	100			
T_t =	41	min	S_o =	0.0010	P_2 =	2.0			
V =	0.3	ft/sec	k_s =	11	L =	150			
T_t =	7	min	S_o =	0.0010					
V =	0.8	ft/sec	k_c =	17	L =	500			
T_t =	11	min	S_o =	0.0020					
Total Travel time									
T_t =	59	min			Total	750			
J714524									
Flow to west then in pipe either north or south									
	Total flow length =		750		3.79	acres			
V =	0.04	ft/sec	n_s =	0.15	L =	100			
T_t =	41	min	S_o =	0.0010	P_2 =	2.0			
V =	0.3	ft/sec	k_s =	11	L =	200			
T_t =	10	min	S_o =	0.0010					
V =	1.9	ft/sec	k_c =	42	L =	150			
T_t =	1	min	S_o =	0.0020					
Total Travel time									
T_t =	52	min			Total	450			
J712524									XXXX
Flow to north to drop and then in pipe (assume to northwest corner)									
	Total flow length =		550		6.27	acres			
V =	0.04	ft/sec	n_s =	0.15	L =	100			
T_t =	41	min	S_o =	0.0010	P_2 =	2.0			
V =	0.3	ft/sec	k_s =	11	L =	250			
T_t =	12	min	S_o =	0.0010					
V =	1.9	ft/sec	k_c =	42	L =	200			
T_t =	2	min	S_o =	0.0020					
Total Travel time									
T_t =	55	min			Total	550			

K52AVED						
	Total flow length =		275		2.58	acres
V =	0.05	ft/sec	n_s =	0.15	L =	275
T_t =	92	min	S_o =	0.0010	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	0.5	ft/sec	k_c =	17	L =	0
T_t =	0	min	S_o =	0.0010		
Total Travel time						
T_t =	92	min			Total	275
K55812						
	Total flow length =		600		2.74	acres
V =	0.07	ft/sec	n_s =	0.15	L =	200
T_t =	50	min	S_o =	0.0025	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	0.9	ft/sec	k_c =	17	L =	400
T_t =	8	min	S_o =	0.0025		
Total Travel time						
T_t =	57	min			Total	600
K55918						
	Total flow length =		400		2.71	acres
V =	0.05	ft/sec	n_s =	0.15	L =	300
T_t =	99	min	S_o =	0.0010	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	0.5	ft/sec	k_c =	17	L =	100
T_t =	3	min	S_o =	0.0010		
Total Travel time						
T_t =	102	min			Total	400

K57118						
	Total flow length =		400		1.19	acres
V =	0.04	ft/sec	n_s =	0.15	L =	100
T_t =	41	min	S_o =	0.0010	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	0.9	ft/sec	k_c =	17	L =	300
T_t =	6	min	S_o =	0.0025		
Total Travel time						
T_t =	47	min			Total	400
K56618						
	Total flow length =		500		1.75	acres
V =	0.05	ft/sec	n_s =	0.15	L =	200
T_t =	72	min	S_o =	0.0010	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	1.7	ft/sec	k_c =	17	L =	300
T_t =	3	min	S_o =	0.0100		
Total Travel time						
T_t =	74	min			Total	500
K5164D						
	Total flow length =		500		2.69	acres
V =	0.05	ft/sec	n_s =	0.15	L =	200
T_t =	72	min	S_o =	0.0010	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	1.7	ft/sec	k_c =	17	L =	300
T_t =	3	min	S_o =	0.0100		
Total Travel time						
T_t =	74	min			Total	500

K516618						
	Total flow length =		500		2.6	acres
V =	0.05	ft/sec	n_s =	0.15	L =	200
T_t =	72	min	S_o =	0.0010	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	1.7	ft/sec	k_c =	17	L =	300
T_t =	3	min	S_o =	0.0100		
Total Travel time						
T_t =	74	min			Total	500

L510812 (North of 1st)						
Flow to outlet south center						
	Total flow length =		200		2.02	acres
V =	0.05	ft/sec	n_s =	0.15	L =	200
T_t =	72	min	S_o =	0.0010	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	0.5	ft/sec	k_c =	17	L =	0
T_t =	0	min	S_o =	0.0010		
Total Travel time						
T_t =	72	min			Total	200
L510812 (South of 1st)						
Flow to outlet north center (pipe No. 107)						
	Total flow length =		200		2.37	acres
V =	0.05	ft/sec	n_s =	0.15	L =	200
T_t =	72	min	S_o =	0.0010	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	0.5	ft/sec	k_c =	17	L =	40
T_t =	1	min	S_o =	0.0010		
Total Travel time						
T_t =	73	min			Total	240
L515618						
Flow to outlet south center						
	Total flow length =		200		1.86	acres
V =	0.05	ft/sec	n_s =	0.15	L =	200
T_t =	72	min	S_o =	0.0010	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	0.5	ft/sec	k_c =	17	L =	0
T_t =	0	min	S_o =	0.0010		
Total Travel time						
T_t =	72	min			Total	200

L515718						
Flow to outlet SE portion						
	Total flow length =		300		1.89	acres
V =	0.05	ft/sec	n_s =	0.15	L =	200
T_t =	72	min	S_o =	0.0010	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	0.5	ft/sec	k_c =	17	L =	0
T_t =	0	min	S_o =	0.0010		
Total Travel time						
T_t =	72	min			Total	200
L511518						
Flow to north then west along 1st						
	Total flow length =		500		2.53	acres
V =	0.05	ft/sec	n_s =	0.15	L =	200
T_t =	72	min	S_o =	0.0010	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	0.9	ft/sec	k_c =	17	L =	300
T_t =	6	min	S_o =	0.0025		
Total Travel time						
T_t =	77	min			Total	500
L5171D						
Flow to east						
	Total flow length =		300		3.88	acres
V =	0.05	ft/sec	n_s =	0.15	L =	300
T_t =	99	min	S_o =	0.0010	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	0.5	ft/sec	k_c =	17	L =	0
T_t =	0	min	S_o =	0.0010		
Total Travel time						
T_t =	99	min			Total	300

L5132D						
Flow to West						
	Total flow length =		250		2.1	acres
V =	0.05	ft/sec	n_s =	0.15	L =	250
T_t =	85	min	S_o =	0.0010	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	0.5	ft/sec	k_c =	17	L =	0
T_t =	0	min	S_o =	0.0010		
Total Travel time						
T_t =	85	min			Total	250
L512912						
Flow to north then west along road						
	Total flow length =		350		2.11	acres
V =	0.04	ft/sec	n_s =	0.15	L =	150
T_t =	57	min	S_o =	0.0010	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	0.5	ft/sec	k_c =	17	L =	200
T_t =	6	min	S_o =	0.0010		
Total Travel time						
T_t =	63	min			Total	350
L5130D						
Flow to southwest along road						
	Total flow length =		300		2.15	acres
V =	0.05	ft/sec	n_s =	0.15	L =	300
T_t =	99	min	S_o =	0.0010	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	0.5	ft/sec	k_c =	17	L =	0
T_t =	0	min	S_o =	0.0010		
Total Travel time						
T_t =	99	min			Total	300

L512512						
Flow to southwest along road						
	Total flow length =		700		2.9	acres
V =	0.05	ft/sec	n_s =	0.15	L =	200
T_t =	72	min	S_o =	0.0010	P_2 =	2.0
V =	0.0	ft/sec	k_s =	11	L =	0
T_t =	0	min	S_o =	0.0010		
V =	0.9	ft/sec	k_c =	17	L =	500
T_t =	10	min	S_o =	0.0025		
Total Travel time						
T_t =	81	min			Total	700

MODEL RESULTS
FEBRUARY 1996 STORM

FEB STORM — 5 yr storm

ALGONA BASIN-J 10-YEAR PRESENT

*** JNW — Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
1	275	18	0.0002	71.67	0.0	1.3	0.78	1.27	95.08		
J58418				71.61	0.0	0.0	0.86		1.33		
2	205	18	0.0009	71.61	0.0	2.1	1.53	2.14	77.73		
J58518				71.42	0.0	0.0	0.74		2.75		

Lateral length= 480 Upstream length= 480

*** JCTR

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Channel Flow Vel	Estimated Cost
3	405	73.12	73.75	1.3	1.63	0.500	0.00	0.92	0.92	0
	0.0015	72.53	73.16	1.8	0.63	1.00	0.00	0.00	1.11	
J67D						0.500	Froude Number =		0.28	

*** JCTR — Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
4	25	12	0.0012	72.53	0.0	1.6	2.02	1.59	149.81	0.53	10
J59912				72.50	0.0	0.0	1.00		1.06		15
5	165	12	0.0013	72.50	0.0	2.1	2.67	2.10	192.18	1.01	12
J59812				72.29	0.0	0.0	1.00		1.09		18
6	160	12	0.0013	72.29	0.0	2.1	2.67	2.10	193.92	1.02	12
J59112				72.09	0.0	0.0	1.00		1.08		18

*** JCTR

Link	Cost		Invert Elev	Maximum Flow Values San	Inf	Sto	Mis	Diversion Design
8	0	In :	72.04	0.00	0.00	2.10	0.00	2.10
		Out :	72.01	0.00	0.00	1.47	0.00	1.47
		Over:	72.18	0.00	0.00	0.63	0.00	0.63

*** JCTR Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep CFS
				ALGONA BASIN-J 10-YEAR PRESENT							
9	200	18	0.0021	71.84	0.0	1.5	1.82	1.47	35.57		
J515518				71.42	0.0	0.0	0.46		4.14		
10	240	24	0.0025	71.17	0.0	3.6	2.44	3.61	37.11		
J515224				70.57	0.0	0.0	0.48		9.73		
11	540	24	0.0039	70.57	0.0	3.6	2.84	3.61	29.83		
J515324				68.48	0.0	0.0	0.42		12.11		
12	540	24	0.0039	68.48	0.0	3.6	2.85	3.61	29.76		
J71524				66.38	0.0	0.0	0.42		12.13		
13	460	24	0.0025	66.38	0.0	3.7	2.45	3.75	38.84		
J72024				65.25	0.0	0.0	0.49		9.64		
14	468	24	0.0017	65.25	0.0	4.0	2.20	4.00	49.78		
J72424				64.45	0.0	0.0	0.56		8.04		

Lateral length= 3203 Upstream length= 3683

*** J2AVE Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
15	675	12	0.0022	71.11	0.0	0.4	1.30	0.38	26.39		
J510512				69.65	0.0	0.0	0.40		1.42		

Lateral length= 675 Upstream length= 675

*** JCLAY Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
16	675	12	0.0022	70.36	0.0	0.5	1.37	0.47	32.68		
J710912				68.90	0.0	0.0	0.44		1.42		

Lateral length= 675 Upstream length= 675

*** J4AVE Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
17	675	12	0.0025	69.41	0.0	0.5	1.49	0.51	33.53		
J79112				67.72	0.0	0.0	0.45		1.53		

Lateral length= 675 Upstream length= 675

ALGONA BASIN-J 10-YEAR PRESENT

*** J5AVES — Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
18	675	18	0.0016	67.93	0.0	0.2	0.90	0.15	4.23		
J78418				66.84	0.0	0.0	0.17		3.63		

Lateral length= 675 Upstream length= 675

*** JSE — Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
19	320	18	0.0067	72.15	0.0	1.2	2.54	1.16	15.72		
J517518				70.00	0.0	0.0	0.30		7.41		
20	240	24	0.0012	69.93	0.0	1.7	1.49	1.70	25.63		
J510424				69.65	0.0	0.0	0.39		6.65		
21	415	24	0.0018	69.65	0.0	2.8	2.02	2.84	34.38		
J713124				68.90	0.0	0.0	0.46		8.27		
22	395	24	0.0020	68.90	0.0	4.1	2.34	4.06	46.31		
J710124				68.10	0.0	0.0	0.54		8.76		
23	460	24	0.0022	68.10	0.0	4.9	2.54	4.88	54.11		
J712724				67.11	0.0	0.0	0.59		9.03		

*** JSE — Diversion

Link	Cost		Invert Elev	Maximum Flow Values San	Inf	Sto	Mis	Design
25	0	In :	67.12	0.00	0.00	5.37	0.00	5.37
		Out :	67.12	0.00	0.00	4.85	0.00	4.85
		Over:	67.78	0.00	0.00	0.53	0.00	0.53

*** JSE — Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
26	430	24	0.0007	67.14	0.0	4.8	1.69	4.85	94.28		
J712524				66.84	0.0	0.0	0.85		5.14		
27	400	24	0.0021	66.84	0.0	5.8	2.65	5.82	65.22		
J7MLWEX24				66.00	0.0	0.0	0.66		8.92		

Lateral length= 2660 Upstream length= 5360

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ALGONA BASIN-J 10-YEAR PRESENT

*** JTACOMA Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
28	450	18	0.0011	67.50	0.0	0.6	1.09	0.57	18.85		
J7TAC3S18				67.00	0.0	0.0	0.33		3.01		
29	50	18	0.0018	66.82	0.0	1.3	1.65	1.27	33.21		
J76718				66.73	0.0	0.0	0.45		3.83		

Lateral length= 500 Upstream length= 500

*** J4THAVS Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
30	620	18	0.0016	67.72	0.0	0.5	1.22	0.53	14.66		
J74SDIV18				66.73	0.0	0.0	0.29		3.61		
31	50	18	0.0046	66.73	0.0	2.8	2.89	2.76	45.07		
J76018				66.50	0.0	0.0	0.53		6.13		

Lateral length= 670 Upstream length= 1170

*** JINTERURB

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Channel Flow Vel	Estimated Cost
32	450	67.50	68.06	1.9	1.56	0.500	0.00	0.95	0.95	0
	0.0022	66.50	67.06	1.9	0.56	1.00	0.00	0.00	1.31	
J757D						0.500	Froude Number =		0.34	

*** JINTERURB Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
33	470	18	0.0018	66.50	0.0	4.5	2.57	4.54	117.57	0.68	10
J715718				65.64	0.0	0.0	1.00		3.86		21
34	250	18	0.0050	65.64	0.0	4.5	3.46	4.54	71.41		
J714818				64.40	0.0	0.0	0.70		6.36		
35	290	24	0.0011	64.40	0.0	4.5	1.99	4.54	69.22		
J714624				64.07	0.0	0.0	0.69		6.56		

Lateral length= 1460 Upstream length= 2630

ALGONA BASIN-J 10-YEAR PRESENT

*** JSEATTLESE

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
36	1100	18	0.0028	67.82	0.0	0.9	1.74	0.95	19.93		
J72118				64.79	0.0	0.0	0.34		4.74		
37	400	24	0.0018	64.79	0.0	1.8	1.75	1.78	21.59		
J72524				64.07	0.0	0.0	0.35		8.26		
38	40	24	0.0033	64.07	0.0	6.8	3.24	6.82	61.46		
J714524				63.94	0.0	0.0	0.64		11.09		
39	550	24	0.0032	63.94	0.0	10.8	3.66	10.81	98.18		
J714424				62.18	0.0	0.0	0.88		11.01		

MODEL RESULTS
EXISTING CONDITIONS 10-YEAR STORM

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ALGONA BASIN-A 10-YEAR EXISTING

*** ASOUTH

Channel

Link	Long / Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width / Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
1	950	69.89	71.48	3.5	4.59	0.500	0.00	11.71	11.71	0
	0.0012	68.76	70.35	3.7	1.59	3.00	0.00	0.00	1.94	
A3CHICD1						0.500	Froude Number =		0.30	
2	970	68.76	70.74	3.3	4.98	0.500	0.00	14.96	16.87	0
	0.0012	67.61	69.59	3.4	1.98	3.00	0.00	1.91	2.14	
A3CHICD2						0.500	Froude Number =		0.30	
3	40	67.61	68.42	4.6	4.81	0.500	0.00	14.96	16.87	0
	0.0120	67.13	67.94	4.6	0.81	4.00	0.00	1.91	4.72	
A1CHICD3						0.500	Froude Number =		0.97	
4	100	67.13	68.48	4.0	5.35	0.500	0.00	14.96	17.25	0
	0.0024	66.89	68.24	3.8	1.35	4.00	0.00	2.29	2.72	
A1CHICD4						0.500	Froude Number =		0.44	

Lateral length= 2060 Upstream length= 2060

*** ACNTRL

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
5	615	18	0.0042	71.68	0.0	1.8	2.94	3.21	54.68		
A23918				69.09	0.0	1.4	0.59		5.86		
6	380	34	0.0029	68.83	0.0	1.8	2.93	6.51	24.43		
A23334				67.72	0.0	4.7	0.38		26.63		

Lateral length= 995 Upstream length= 995

*** ANORTH

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
7	450	18	0.0053	70.46	0.0	0.0	2.14	0.83	12.63		
A21018				68.08	0.0	0.8	0.28		6.57		
8	275	24	0.0041	67.83	0.0	0.0	2.31	1.66	13.31		
A10724				66.70	0.0	1.7	0.28		12.47		

Lateral length= 725 Upstream length= 725

ALGONA BASIN-A 10-YEAR EXISTING

*** BNDRY Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
9	700	66.89	69.09	2.9	7.21	0.500	0.00	16.78	23.75	0
	0.0006	66.48	68.69	2.3	2.21	5.00	0.00	6.97	1.77	
A1CHICD5						0.500	Froude Number =		0.23	

*** BNDRY Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
10	55	30	0.0015	66.48	0.0	16.8	4.94	24.25	180.23	10.80	30
A10830				66.40	0.0	7.5	1.00		13.46		39
11	1140	36	0.0014	66.40	0.0	16.8	3.67	25.91	119.07	4.15	21
A10536				64.76	0.0	9.1	1.00		21.76		39

Lateral length= 1895 Upstream length= 5675

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ALGONA BASIN-B 10-YEAR EXISTING

*** SUBB-1

Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
1	400	70.00	71.39	0.6	2.39	0.500	0.00	2.16	2.16	0
	0.0005	69.80	71.19	0.6	1.39	1.00	0.00	0.00	0.92	
B184D						0.500	Froude Number =		0.16	

*** SUBB-1

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
2	35	18	0.0151	70.01	0.0	3.3	4.65	3.32	29.84		
B18118				69.48	0.0	0.0	0.42		11.12		

*** SUBB-1

Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
3	600	68.10	69.47	0.6	2.37	0.500	0.00	3.32	3.32	0
	0.0013	67.35	68.72	1.2	1.37	1.00	0.00	0.00	1.44	
B176D						0.500	Froude Number =		0.26	

*** SUBB-1

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
4	70	18	0.0064	67.35	0.0	4.4	3.75	4.41	60.86		
B17418				66.90	0.0	0.0	0.63		7.24		

*** SUBB-1

Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
5	170	66.90	68.19	0.4	2.29	0.500	0.00	4.56	4.56	0
	0.0029	66.40	67.69	0.7	1.29	1.00	0.00	0.00	2.16	
B174D						0.500	Froude Number =		0.40	
6	260	66.40	68.05	0.3	2.65	0.500	0.00	4.56	4.56	0
	0.0012	66.10	67.75	0.4	1.65	1.00	0.00	0.00	1.51	
B1117D						0.500	Froude Number =		0.25	

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ALGONA BASIN-B 10-YEAR EXISTING

*** SUBB-1 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
7	220	24	0.0027	66.10	0.0	7.1	3.08	7.07	69.54		
B167A24				65.50	0.0	0.0	0.69		10.16		

Lateral length= 1755 Upstream length= 1755

*** SUBB-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
8	48	12	0.0125	68.50	0.0	1.4	3.50	1.35	39.49		
B15212				67.90	0.0	0.0	0.49		3.43		

*** SUBB-2 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
9	300	67.90	69.10	0.8	2.20	0.500	0.00	1.35	1.35	0
	0.0003	67.80	69.00	0.8	1.20	1.00	0.00	0.00	0.70	
B154D						0.500	Froude Number =		0.13	

*** SUBB-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
10	280	18	0.0021	67.79	0.0	1.4	1.78	1.35	32.62		
B114118				67.20	0.0	0.0	0.44		4.15		
11	65	18	0.0020	67.13	0.0	2.1	1.99	2.09	51.85		
B16018				67.00	0.0	0.0	0.57		4.04		
12	181	24	0.0059	66.57	0.0	2.1	2.81	2.09	14.00		
B113724				65.50	0.0	0.0	0.29		14.96		
13	386	24	0.0021	65.50	0.0	9.5	3.02	9.48	106.96	0.62	10
B113824				64.70	0.0	0.0	1.00		8.86		27

Lateral length= 1260 Upstream length= 3015

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ALGONA BASIN-C 10-YEAR EXISTING

*** SUBC-1

Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
1	380	63.20	63.89	3.1	1.69	0.500	0.00	0.69	0.69	0
	0.0006	62.97	63.66	3.3	0.69	1.00	0.00	0.00	0.75	
C11D						0.500	Froude Number =		0.18	

*** SUBC-1

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
2	55	36	0.0002	62.98	0.0	1.5	0.70	1.46	18.86		
C1118				62.97	0.0	0.0	0.33		7.74		

Lateral length= 435 Upstream length= 435

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ALGONA BASIN-D 10-YEAR EXISTING

*** SUBD-1 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
1	700	65.10	66.75	1.5	2.65	0.500	0.00	1.59	1.59	0
	0.0001	65.00	66.65	1.6	1.65	1.00	0.00	0.00	0.53	
D1109D						0.500	Froude Number =		0.09	

Lateral length= 700 Upstream length= 700

*** SUBD-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
2	450	24	0.0020	66.35	0.0	0.6	1.36	0.58	6.75		
D112718				65.46	0.0	0.0	0.21		8.65		
3	70	18	0.0003	65.30	0.0	2.7	1.54	2.72	177.82	1.19	18
D112218				65.28	0.0	0.0	1.00		1.53		24

Lateral length= 520 Upstream length= 1220

ALGONA BASIN-E 10-YEAR EXISTING

*** SUBE-1

Channel

Link	Long / Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width / Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
1	230	69.70	70.64	1.1	1.93	0.500	0.00	1.40	1.40	0
	0.0009	69.50	70.44	1.1	0.94	1.00	0.00	0.00	1.02	
E356D						0.500	Froude Number =		0.21	

*** SUBE-1

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
2	180	12	0.0032	67.78	0.0	1.4	2.20	1.40	80.67		
E19812				67.20	0.0	0.0	0.76		1.74		
3	600	18	0.0009	67.20	0.0	2.0	1.51	2.02	73.06		
E110018				66.64	0.0	0.0	0.71		2.76		

Lateral length= 1010 Upstream length= 1010

*** SUBE-2

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
4	450	18	0.0009	67.05	0.0	0.9	1.18	0.93	33.95		
E39618				66.64	0.0	0.0	0.45		2.73		

*** SUBE-2

Channel

Link	Long / Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width / Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
5	150	67.30	68.63	1.2	2.33	0.500	0.00	3.97	3.97	0
	0.0020	67.00	68.33	0.7	1.33	1.00	0.00	0.00	1.80	
E1106D						0.500	Froude Number =		0.33	

Lateral length= 600 Upstream length= 1610

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ALGONA BASIN-F 10-YEAR PRESENT

*** SUBF-1 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
1	470	24	0.0023	71.38	0.0	0.5	1.34	0.47	5.06		
F39324				70.32	0.0	0.0	0.18		9.24		

Lateral length= 470 Upstream length= 470

*** SUBF-2 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
2	450	72.50	72.95	1.5	1.45	0.500	0.00	0.87	0.87	0
	0.0038	70.80	71.26	1.5	0.45	1.00	0.00	0.00	1.56	
F322D						0.500	Froude Number =		0.44	

*** SUBF-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
3	470	24	0.0018	69.79	0.0	2.0	1.82	2.02	24.76		
F39124				68.96	0.0	0.0	0.38		8.18		

Lateral length= 920 Upstream length= 1390

*** SUBF-3 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
4	610	70.50	71.42	1.1	1.92	0.500	0.00	1.32	1.32	0
	0.0008	70.00	70.92	1.1	0.92	1.00	0.00	0.00	0.99	
F377D						0.500	Froude Number =		0.21	

Lateral length= 610 Upstream length= 610

*** SUBF-4 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
5	520	18	0.0007	71.41	0.0	0.4	0.84	0.42	17.81		
F53318				71.05	0.0	0.0	0.32		2.38		

ALGONA BASIN-F 10-YEAR PRESENT

*** SUBF-4 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
6	500	18	0.0013	71.14	0.0	0.9	1.33	0.85	25.84		
F39418				70.47	0.0	0.0	0.39		3.31		
7	470	18	0.0016	70.47	0.0	1.2	1.54	1.19	33.11		
F39218				69.73	0.0	0.0	0.45		3.58		
8	42	18	0.0074	69.17	0.0	2.0	3.13	2.04	26.26		
F38018				68.86	0.0	0.0	0.40		7.76		
9	510	24	0.0010	68.86	0.0	4.5	1.87	4.49	74.52		
F39524				68.37	0.0	0.0	0.72		6.03		

Lateral length= 2042 Upstream length= 2652

*** SUBF-5 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
10	500	70.30	70.77	1.5	1.47	0.500	0.00	0.68	0.68	0
	0.0021	69.24	69.71	1.5	0.47	1.00	0.00	0.00	1.18	
F3BRDWDE						0.500	Froude Number =		0.33	

*** SUBF-5 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
11	487	24	0.0014	67.47	0.0	7.2	2.41	7.25	100.45	0.03	4
F34124				66.80	0.0	0.0	0.90		7.22		27
12	250	30	0.0026	66.65	0.0	8.1	3.05	8.10	45.01		
F34230				66.00	0.0	0.0	0.53		17.99		

Lateral length= 1237 Upstream length= 3889

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ALGONA BASIN-G 10-YEAR EXISTING

*** SUBG-1 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	·San ·Inf	Sto Mis	Flow Vel	Estimated Cost
1	405	70.00	70.61	0.4	1.61	0.500	0.00	0.80	0.80	0
	0.0012	69.50	70.11	1.9	0.61	1.00	0.00	0.00	1.01	
G3ALGWD						0.500	Froude Number =		0.25	
2	400	69.50	70.29	1.7	1.79	0.500	0.00	1.79	1.79	0
	0.0025	68.50	69.29	0.7	0.79	1.00	0.00	0.00	1.62	
G5136D						0.500	Froude Number =		0.36	

Lateral length= 805 Upstream length= 805

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ALGONA BASIN-H 10-YEAR EXISTING

*** SUBH-1

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
1	45	12	0.0207	69.75	0.0	0.9	3.66	0.89	20.28		
H54512				68.82	0.0	0.0	0.34		4.40		
2	65	12	0.0088	68.00	0.0	2.1	3.51	2.05	71.57		
H54712				67.43	0.0	0.0	0.70		2.87		

Lateral length= 110 Upstream length= 110

*** SUBH-2

Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
3	450	68.50	68.79	1.9	1.29	0.500	0.00	0.22	0.22	0
	0.0011	68.00	68.29	2.3	0.29	1.00	0.00	0.00	0.68	
H5ALGWD						0.500	Froude Number =		0.24	

*** SUBH-2

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
4	200	18	0.0065	68.40	0.0	2.2	3.07	2.23	30.52		
H513818				67.09	0.0	0.0	0.43		7.31		

Lateral length= 650 Upstream length= 760

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ALGONA BASIN-J 10-YEAR PRESENT

*** JNW Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
1	275	18	0.0002	71.67	0.0	1.5	0.84	1.48	110.58	0.14	8
J58418				71.61	0.0	0.0	1.00		1.33		21
2	205	18	0.0009	71.61	0.0	3.0	1.70	3.00	109.05	0.25	8
J58518				71.42	0.0	0.0	1.00		2.75		21

Lateral length= 480 Upstream length= 480

*** JCTR Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
3	405	73.12	73.77	1.2	1.65	0.500	0.00	0.96	0.96	0
	0.0015	72.53	73.18	1.8	0.65	1.00	0.00	0.00	1.13	
J67D						0.500	Froude Number =		0.28	

*** JCTR Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
4	25	12	0.0012	72.53	0.0	1.7	2.17	1.70	160.48	0.64	10
J59912				72.50	0.0	0.0	1.00		1.06		15
5	165	12	0.0013	72.50	0.0	2.5	3.21	2.52	230.38	1.43	15
J59812				72.29	0.0	0.0	1.00		1.09		18
6	160	12	0.0013	72.29	0.0	2.5	3.21	2.52	232.47	1.43	15
J59112				72.09	0.0	0.0	1.00		1.08		18

*** JCTR Diversion

Link	Invert Cost	Maximum Flow Values	Elev	San	Inf	Sto	Mis	Design
8	0	In :	72.04	0.00	0.00	2.52	0.00	2.52
		Out :	72.01	0.00	0.00	1.68	0.00	1.68
		Over:	72.18	0.00	0.00	0.84	0.00	0.84

ALGONA BASIN-J 10-YEAR PRESENT

*** JCTR — Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
9	200	18	0.0021	71.84	0.0	1.7	1.89	1.68	40.52		
J515518				71.42	0.0	0.0	0.50		4.14		
10	240	24	0.0025	71.17	0.0	4.7	2.63	4.66	47.95		
J515224				70.57	0.0	0.0	0.55		9.73		
11	540	24	0.0039	70.57	0.0	4.7	3.07	4.66	38.54		
J515324				68.48	0.0	0.0	0.49		12.11		
12	540	24	0.0039	68.48	0.0	4.7	3.07	4.66	38.44		
J71524				66.38	0.0	0.0	0.49		12.13		
13	460	24	0.0025	66.38	0.0	4.9	2.66	4.94	51.19		
J72024				65.25	0.0	0.0	0.57		9.64		
14	468	24	0.0017	65.25	0.0	5.5	2.43	5.50	68.33		
J72424				64.45	0.0	0.0	0.68		8.04		

Lateral length= 3203 Upstream length= 3683

*** J2AVE — Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
15	675	12	0.0022	71.11	0.0	0.6	1.50	0.62	43.80		
J510512				69.65	0.0	0.0	0.52		1.42		

Lateral length= 675 Upstream length= 675

*** JCLAY — Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
16	675	12	0.0022	70.36	0.0	1.0	1.73	0.99	69.26		
J710912				68.90	0.0	0.0	0.69		1.42		

Lateral length= 675 Upstream length= 675

*** J4AVE — Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
17	675	12	0.0025	69.41	0.0	0.9	1.78	0.92	60.30		
J79112				67.72	0.0	0.0	0.63		1.53		

Lateral length= 675 Upstream length= 675

ALGONA BASIN-J 10-YEAR PRESENT

*** J5AVES Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
18	675	18	0.0016	67.93	0.0	0.3	1.08	0.31	8.42		
J78418				66.84	0.0	0.0	0.23		3.63		

Lateral length= 675 Upstream length= 675

*** JSE Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
19	320	18	0.0067	72.15	0.0	1.7	2.87	1.74	23.43		
J517518				70.00	0.0	0.0	0.37		7.41		
20	240	24	0.0012	69.93	0.0	2.8	1.72	2.76	41.52		
J510424				69.65	0.0	0.0	0.51		6.65		
21	415	24	0.0018	69.65	0.0	4.6	2.35	4.63	56.03		
J713124				68.90	0.0	0.0	0.60		8.27		
22	395	24	0.0020	68.90	0.0	6.9	2.76	6.91	78.91		
J710124				68.10	0.0	0.0	0.75		8.76		
23	460	24	0.0022	68.10	0.0	8.3	2.96	8.30	91.93		
J712724				67.11	0.0	0.0	0.83		9.03		

*** JSE Diversion

Link	Invert Cost	Maximum Flow Values	Elev	San	Inf	Sto	Mis	Design
25	0	In :	67.12	0.00	0.00	9.22	0.00	9.22
		Out :	67.12	0.00	0.00	7.13	0.00	7.13
		Over:	67.78	0.00	0.00	2.09	0.00	2.09

*** JSE Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
26	430	24	0.0007	67.14	0.0	7.1	2.27	7.13	138.73	1.99	18
J712524				66.84	0.0	0.0	1.00		5.14		30
27	400	24	0.0021	66.84	0.0	8.8	2.97	8.82	98.96		
J7MLWEX24				66.00	0.0	0.0	0.89		8.92		

Lateral length= 2660 Upstream length= 5360

ALGONA BASIN-J 10-YEAR PRESENT

*** JTACOMA — Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
28	450	18	0.0011	67.50	0.0	0.9	1.27	0.94	31.07		
J7TAC3S18				67.00	0.0	0.0	0.43		3.01		
29	50	18	0.0018	66.82	0.0	2.1	1.93	2.11	55.06		
J76718				66.73	0.0	0.0	0.59		3.83		

Lateral length= 500 Upstream length= 500

*** J4THAVS — Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
30	620	18	0.0016	67.72	0.0	2.1	1.84	2.09	57.96		
J74SDIV18				66.73	0.0	0.0	0.61		3.61		
31	50	18	0.0046	66.73	0.0	5.7	3.58	5.74	93.71		
J76018				66.50	0.0	0.0	0.84		6.13		

Lateral length= 670 Upstream length= 1170

*** JINTERURB — Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
32	450	67.50	68.23	1.8	1.73	0.500	0.00	1.47	1.47	0
	0.0022	66.50	67.23	1.8	0.73	1.00	0.00	0.00	1.47	
J757D						0.500	Froude Number =		0.34	

*** JINTERURB — Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
33	470	18	0.0018	66.50	0.0	8.6	4.87	8.61	222.89	4.75	21
J715718				65.64	0.0	0.0	1.00		3.86		27
34	250	18	0.0050	65.64	0.0	8.6	4.87	8.61	135.38	2.25	15
J714818				64.40	0.0	0.0	1.00		6.36		21
35	290	24	0.0011	64.40	0.0	8.6	2.74	8.61	131.23	2.05	18
J714624				64.07	0.0	0.0	1.00		6.56		27

Lateral length= 1460 Upstream length= 2630

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ALGONA BASIN-J 10-YEAR PRESENT

*** JSEATTLESE Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
36	1100	18	0.0028	67.82	0.0	1.6	2.06	1.62	34.23		
J72118				64.79	0.0	0.0	0.45		4.74		
37	400	24	0.0018	64.79	0.0	3.1	2.06	3.06	37.02		
J72524				64.07	0.0	0.0	0.48		8.26		
38	40	24	0.0033	64.07	0.0	12.5	3.98	12.51	112.78	1.42	12
J714524				63.94	0.0	0.0	1.00		11.09		27
39	550	24	0.0032	63.94	0.0	18.0	5.73	18.01	163.60	7.00	21
J714424				62.18	0.0	0.0	1.00		11.01		30

Lateral length= 2090 Upstream length= 8403

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ALGONA BASIN-K 10-YEAR PRESENT

*** SUBK-1

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Channel Flow Vel	Estimated Cost
1	400	69.20	69.63	1.4	1.43	0.500	0.00	0.62	0.62	0
	0.0024	68.25	68.68	0.8	0.43	1.00	0.00	0.00	1.20	
K52AVED						0.500	Froude Number =		0.35	

*** SUBK-1

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Par Remove	Par Rep
2	60	12	0.0070	68.25	0.0	1.4	2.91	1.43	55.83		
K55812				67.83	0.0	0.0	0.60		2.56		
3	50	18	0.0042	67.80	0.0	2.0	2.55	2.03	34.65		
K55918				67.59	0.0	0.0	0.46		5.85		

Lateral length= 510 Upstream length= 510

*** SUBK-2

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Par Remove	Par Rep
4	300	18	0.0006	69.34	0.0	0.4	0.82	0.42	18.42		
K57118				69.15	0.0	0.0	0.32		2.27		
5	450	18	0.0023	69.15	0.0	0.9	1.63	0.91	20.92		
K56618				68.10	0.0	0.0	0.35		4.36		

*** SUBK-2

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Channel Flow Vel	Estimated Cost
6	200	68.10	68.74	1.3	1.64	0.500	0.00	1.64	1.64	0
	0.0044	67.22	67.86	2.1	0.64	1.00	0.00	0.00	1.95	
K5164D						0.500	Froude Number =		0.48	

*** SUBK-2

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Par Remove	Par Rep
7	95	18	0.0045	67.22	0.0	1.6	2.47	1.64	26.93		
K516418				66.79	0.0	0.0	0.40		6.08		

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ALGONA BASIN-K 10-YEAR PRESENT

*** SUBK-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
8	200	18	0.0008	66.78	0.0	1.6	1.31	1.64	66.16		
K516518				66.63	0.0	0.0	0.67		2.47		
9	400	18	0.0022	67.14	0.0	4.3	2.45	4.32	102.01	0.08	6
K516618				66.26	0.0	0.0	1.00		4.24		21

Lateral length= 1645 Upstream length= 2155

ALGONA BASIN-L 10-YEAR PRESENT

*** SUBL-1 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
1	385	12	0.0011	70.89	0.0	1.2	1.54	1.21	121.35	0.21	8
L510812				70.48	0.0	0.0	1.00		1.00		15
2	280	18	0.0116	70.48	0.0	1.7	3.45	1.73	17.84		
L515618				67.24	0.0	0.0	0.32		9.72		
3	50	18	0.0106	67.50	0.0	2.3	3.65	2.25	24.23		
L515718				66.97	0.0	0.0	0.38		9.30		

Lateral length= 715 Upstream length= 715

*** SUBL-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
4	70	18	0.0054	68.38	0.0	0.7	2.06	0.65	9.81		
L511518				68.00	0.0	0.0	0.25		6.66		

*** SUBL-2 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
5	400	66.92	68.15	2.8	2.23	0.500	0.00	3.77	3.77	0
	0.0023	65.98	67.21	2.3	1.23	1.00	0.00	0.00	1.89	
L5171D						0.500	Froude Number =		0.35	

Lateral length= 470 Upstream length= 1185

*** SUBL-3 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
6	400	67.86	68.33	1.2	1.47	0.500	0.00	0.53	0.53	0
	0.0013	67.36	67.83	1.7	0.47	1.00	0.00	0.00	0.91	
L5132D						0.500	Froude Number =		0.25	

*** SUBL-3 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
7	45	12	0.0149	67.36	0.0	1.2	3.55	1.16	31.02		
L512912				66.69	0.0	0.0	0.43		3.74		

Lateral length= 445 Upstream length= 445

ALGONA BASIN-L 10-YEAR PRESENT

*** SUBL-4 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
8	500	66.75	67.20	1.8	1.45	0.500	0.00	0.49	0.49	0
	0.0013	66.12	66.57	1.4	0.45	1.00	0.00	0.00	0.90	
L5130D						0.500	Froude Number =		0.26	

*** SUBL-4 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
9	65	12	0.0069	66.12	0.0	2.4	3.35	2.38	93.47		
L512512				65.67	0.0	0.0	0.84		2.55		
10	300	18	0.0045	65.98	0.0	6.2	3.48	6.15	101.18	0.07	4
L512318				64.62	0.0	0.0	1.00		6.08		21

Lateral length= 865 Upstream length= 2495

MODEL RESULTS
EXISTING CONDITIONS 25-YEAR STORM

Assessment district system working

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ALGONA BASIN-A 25-YEAR EXISTING

*** ASOUTH Channel

Link	Long / Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width / Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
1	950	69.89	71.65	3.3	4.76	0.500	0.00	13.90	13.90	0
	0.0012	68.76	70.52	3.5	1.76	3.00	0.00	0.00	2.03	
A3CHICD1						0.500	Froude Number =		0.30	
2	970	68.76	70.92	3.1	5.16	0.500	0.00	17.71	19.62	0
	0.0012	67.61	69.77	3.2	2.16	3.00	0.00	1.91	2.22	
A3CHICD2						0.500	Froude Number =		0.30	
3	40	67.61	68.50	4.5	4.89	0.500	0.00	17.71	19.62	0
	0.0120	67.13	68.02	4.5	0.89	4.00	0.00	1.91	4.96	
A1CHICD3						0.500	Froude Number =		0.97	
4	100	67.13	68.61	3.9	5.48	0.500	0.00	17.71	20.00	0
	0.0024	66.89	68.37	3.6	1.48	4.00	0.00	2.29	2.84	
A1CHICD4						0.500	Froude Number =		0.44	

Lateral length= 2060 Upstream length= 2060

*** ACNTRL Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
5	615	18	0.0042	71.68	0.0	2.1	3.03	3.52	60.10		
A23918				69.09	0.0	1.4	0.63		5.86		
6	380	34	0.0029	68.83	0.0	2.1	2.98	6.82	25.63		
A23334				67.72	0.0	4.7	0.39		26.63		

Lateral length= 995 Upstream length= 995

*** ANORTH Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
7	450	18	0.0053	70.46	0.0	0.0	2.14	0.83	12.63		
A21018				68.08	0.0	0.8	0.28		6.57		
8	275	24	0.0041	67.83	0.0	0.0	2.31	1.66	13.31		
A10724				66.70	0.0	1.7	0.28		12.47		

Lateral length= 725 Upstream length= 725

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ALGONA BASIN-A 25-YEAR EXISTING

*** BNDRY

Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
9	700	66.89	69.27	2.7	7.38	0.500	0.00	19.86	26.83	0
	0.0006	66.48	68.85	2.1	2.38	5.00	0.00	6.97	1.83	
A1CHICD5						0.500	Froude Number =		0.23	

*** BNDRY

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
10	55	30	0.0015	66.48	0.0	19.9	5.57	27.33	203.08	13.87	33
A10830				66.40	0.0	7.5	1.00		13.46		42
11	1140	36	0.0014	66.40	0.0	19.9	4.10	28.99	133.20	7.23	24
A10536				64.76	0.0	9.1	1.00		21.76		42

Lateral length= 1895 Upstream length= 5675

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ALGONA BASIN-B 25-YEAR EXISTING

*** SUBB-1 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
1	400	70.00	71.54	0.5	2.54	0.500	0.00	2.63	2.63	0
	0.0005	69.80	71.34	0.5	1.54	1.00	0.00	0.00	0.96	
B184D						0.500	Froude Number =		0.16	

*** SUBB-1 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
2	35	18	0.0151	70.01	0.0	4.0	4.92	4.05	36.40		
B18118				69.48	0.0	0.0	0.47		11.12		

*** SUBB-1 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
3	600	68.10	69.62	0.5	2.52	0.500	0.00	4.05	4.05	0
	0.0013	67.35	68.87	1.0	1.52	1.00	0.00	0.00	1.51	
B176D						0.500	Froude Number =		0.26	

*** SUBB-1 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
4	70	18	0.0064	67.35	0.0	5.4	3.98	5.39	74.47		
B17418				66.90	0.0	0.0	0.72		7.24		

*** SUBB-1 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
5	170	66.90	68.34	0.3	2.44	0.500	0.00	5.58	5.58	0
	0.0029	66.40	67.84	0.6	1.44	1.00	0.00	0.00	2.26	
B174D						0.500	Froude Number =		0.40	
6	260	66.40	68.24	0.2	2.84	0.500	0.00	5.58	5.58	0
	0.0012	66.10	67.94	0.3	1.84	1.00	0.00	0.00	1.58	
B1117D						0.500	Froude Number =		0.25	

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ALGONA BASIN-B 25-YEAR EXISTING

*** SUBB-1

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
7	220	24	0.0027	66.10	0.0	8.6	3.26	8.60	84.68		
B167A24				65.50	0.0	0.0	0.78		10.16		

Lateral length= 1755 Upstream length= 1755

*** SUBB-2

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
8	48	12	0.0125	68.50	0.0	1.7	3.71	1.65	48.26		
B15212				67.90	0.0	0.0	0.55		3.43		

*** SUBB-2

Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
9	300	67.90	69.24	0.7	2.34	0.500	0.00	1.65	1.65	0
	0.0003	67.80	69.14	0.7	1.34	1.00	0.00	0.00	0.74	
B154D						0.500	Froude Number =		0.13	

*** SUBB-2

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
10	280	18	0.0021	67.79	0.0	1.7	1.89	1.65	39.86		
B114118				67.20	0.0	0.0	0.50		4.15		
11	65	18	0.0020	67.13	0.0	2.6	2.12	2.56	63.27		
B16018				67.00	0.0	0.0	0.65		4.04		
12	181	24	0.0059	66.57	0.0	2.6	2.95	2.56	17.09		
B113724				65.50	0.0	0.0	0.31		14.96		
13	386	24	0.0021	65.50	0.0	11.6	3.68	11.56	130.48	2.70	18
B113824				64.70	0.0	0.0	1.00		8.86		27

Lateral length= 1260 Upstream length= 3015

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ALGONA BASIN-C 25-YEAR EXISTING

*** SUBC-1 Channel

Link	Long / Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width / Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
1	380	63.20	63.97	3.0	1.77	0.500	0.00	0.84	0.84	0
	0.0006	62.97	63.74	3.3	0.77	1.00	0.00	0.00	0.79	
C11D						0.500	Froude Number =		0.18	

*** SUBC-1 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
2	55	36	0.0002	62.98	0.0	1.8	0.75	1.80	23.29		
C1118				62.97	0.0	0.0	0.37		7.74		

Lateral length= 435 Upstream length= 435

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ALGONA BASIN-D 25-YEAR EXISTING

*** SUBD-1

Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
1	700	65.10	66.96	1.2	2.86	0.500	0.00	2.00	2.00	0
	0.0001	65.00	66.86	1.3	1.86	1.00	0.00	0.00	0.56	
D1109D						0.500	Froude Number =		0.09	

Lateral length= 700 Upstream length= 700

*** SUBD-2

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
2	450	24	0.0020	66.35	0.0	0.8	1.46	0.76	8.74		
D112718				65.46	0.0	0.0	0.24		8.65		
3	70	18	0.0003	65.30	0.0	3.4	1.93	3.42	223.76	1.89	21
D112218				65.28	0.0	0.0	1.00		1.53		27

Lateral length= 520 Upstream length= 1220

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ALGONA BASIN-E 25-YEAR EXISTING

*** SUBE-1 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
1	230	69.70	70.75	0.9	2.05	0.500	0.00	1.73	1.73	0
	0.0009	69.50	70.55	0.9	1.05	1.00	0.00	0.00	1.08	
E356D						0.500	Froude Number =		0.21	

*** SUBE-1 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
2	180	12	0.0032	67.78	0.0	1.7	2.32	1.73	99.28		
E19812				67.20	0.0	0.0	0.89		1.74		
3	600	18	0.0009	67.20	0.0	2.5	1.60	2.47	89.63		
E110018				66.64	0.0	0.0	0.82		2.76		

Lateral length= 1010 Upstream length= 1010

*** SUBE-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
4	450	18	0.0009	67.05	0.0	1.1	1.25	1.13	41.27		
E39618				66.64	0.0	0.0	0.51		2.73		

*** SUBE-2 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
5	150	67.30	68.78	1.0	2.48	0.500	0.00	4.86	4.86	0
	0.0020	67.00	68.48	0.5	1.48	1.00	0.00	0.00	1.89	
E1106D						0.500	Froude Number =		0.33	

Lateral length= 600 Upstream length= 1610

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ALGONA BASIN-F 25-YEAR PRESENT

*** SUBF-1

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
1	470	24	0.0023	71.38	0.0	0.6	1.42	0.57	6.15		
F39324				70.32	0.0	0.0	0.20		9.24		

Lateral length= 470 Upstream length= 470

*** SUBF-2

Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
2	450	72.50	73.01	1.5	1.51	0.500	0.00	1.06	1.06	0
	0.0038	70.80	71.31	1.5	0.51	1.00	0.00	0.00	1.64	
F322D						0.500	Froude Number =		0.44	

*** SUBF-2

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
3	470	24	0.0018	69.79	0.0	2.5	1.93	2.47	30.20		
F39124				68.96	0.0	0.0	0.43		8.18		

Lateral length= 920 Upstream length= 1390

*** SUBF-3

Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
4	610	70.50	71.52	1.0	2.02	0.500	0.00	1.59	1.59	0
	0.0008	70.00	71.02	1.0	1.02	1.00	0.00	0.00	1.03	
F377D						0.500	Froude Number =		0.21	

Lateral length= 610 Upstream length= 610

*** SUBF-4

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
5	520	18	0.0007	71.41	0.0	0.5	0.89	0.51	21.49		
F53318				71.05	0.0	0.0	0.35		2.38		

ALGONA BASIN-F 25-YEAR PRESENT

*** SUBF-4 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
6	500	18	0.0013	71.14	0.0	1.0	1.40	1.04	31.37		
F39418				70.47	0.0	0.0	0.43		3.31		
7	470	18	0.0016	70.47	0.0	1.4	1.64	1.44	40.30		
F39218				69.73	0.0	0.0	0.50		3.58		
8	42	18	0.0074	69.17	0.0	2.5	3.30	2.48	31.93		
F38018				68.86	0.0	0.0	0.44		7.76		
9	510	24	0.0010	68.86	0.0	5.5	1.97	5.46	90.47		
F39524				68.37	0.0	0.0	0.82		6.03		

Lateral length= 2042 Upstream length= 2652

*** SUBF-5 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
10	500	70.30	70.83	1.5	1.53	0.500	0.00	0.84	0.84	0
	0.0021	69.24	69.77	1.5	0.53	1.00	0.00	0.00	1.25	
F3BRDWDE						0.500	Froude Number =		0.33	
11	300	69.24	70.26	1.0	2.02	0.500	0.00	2.57	2.57	0
	0.0021	68.60	69.62	1.0	1.02	1.00	0.00	0.00	1.66	
F3BRDWDW						0.500	Froude Number =		0.34	

*** SUBF-5 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
12	487	24	0.0014	67.47	0.0	10.6	3.37	10.57	146.48	3.35	21
F34124				66.80	0.0	0.0	1.00		7.22		30
13	250	30	0.0026	66.65	0.0	11.6	3.42	11.61	64.52		
F34230				66.00	0.0	0.0	0.66		17.99		

Lateral length= 1537 Upstream length= 4189

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ALGONA BASIN-J 25-YEAR PRESENT

*** JNW

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
1	275	18	0.0002	71.67	0.0	1.9	1.08	1.91	143.49	0.58	15
J58418				71.61	0.0	0.0	1.00		1.33		21
2	205	18	0.0009	71.61	0.0	3.8	2.13	3.76	136.68	1.01	15
J58518				71.42	0.0	0.0	1.00		2.75		21

Lateral length= 480 Upstream length= 480

*** JCTR

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Channel Flow Vel	Estimated Cost
3	405	73.12	73.88	1.1	1.76	0.500	0.00	1.28	1.28	0
	0.0015	72.53	73.29	1.7	0.76	1.00	0.00	0.00	1.21	
J67D						0.500	Froude Number =		0.28	

*** JCTR

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
4	25	12	0.0012	72.53	0.0	2.3	2.88	2.26	213.40	1.20	15
J59912				72.50	0.0	0.0	1.00		1.06		18
5	165	12	0.0013	72.50	0.0	3.3	4.15	3.26	298.26	2.17	18
J59812				72.29	0.0	0.0	1.00		1.09		21
6	160	12	0.0013	72.29	0.0	3.3	4.15	3.26	300.96	2.18	18
J59112				72.09	0.0	0.0	1.00		1.08		21

*** JCTR

Link	Cost		Invert Elev	Maximum Flow Values San	Inf	Sto	Diversion Mis	Design
8	0	In :	72.04	0.00	0.00	3.26	0.00	3.26
		Out :	72.01	0.00	0.00	2.04	0.00	2.04
		Over:	72.18	0.00	0.00	1.22	0.00	1.22

ALGONA BASIN-J 25-YEAR PRESENT

*** JCTR Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
9	200	18	0.0021	71.84	0.0	2.0	2.01	2.04	49.30		
J515518				71.42	0.0	0.0	0.56		4.14		
10	240	24	0.0025	71.17	0.0	5.8	2.82	5.79	59.47		
J515224				70.57	0.0	0.0	0.62		9.73		
11	540	24	0.0039	70.57	0.0	5.8	3.27	5.79	47.79		
J515324				68.48	0.0	0.0	0.55		12.11		
12	540	24	0.0039	68.48	0.0	5.8	3.28	5.79	47.68		
J71524				66.38	0.0	0.0	0.55		12.13		
13	460	24	0.0025	66.38	0.0	6.1	2.85	6.12	63.41		
J72024				65.25	0.0	0.0	0.65		9.64		
14	468	24	0.0017	65.25	0.0	6.8	2.58	6.79	84.41		
J72424				64.45	0.0	0.0	0.78		8.04		

Lateral length= 3203 Upstream length= 3683

*** J2AVE Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
15	675	12	0.0022	71.11	0.0	0.8	1.60	0.76	53.58		
J510512				69.65	0.0	0.0	0.58		1.42		

Lateral length= 675 Upstream length= 675

*** JCLAY Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
16	675	12	0.0022	70.36	0.0	1.2	1.83	1.20	83.89		
J710912				68.90	0.0	0.0	0.78		1.42		

Lateral length= 675 Upstream length= 675

*** J4AVE Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
17	675	12	0.0025	69.41	0.0	1.1	1.89	1.13	73.75		
J79112				67.72	0.0	0.0	0.72		1.53		

Lateral length= 675 Upstream length= 675

ALGONA BASIN-J 25-YEAR PRESENT

*** J5AVES

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
18	675	18	0.0016	67.93	0.0	0.4	1.14	0.38	10.47		
J78418				66.84	0.0	0.0	0.26		3.63		

Lateral length= 675 Upstream length= 675

*** JSE

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
19	320	18	0.0067	72.15	0.0	2.3	3.13	2.31	31.17		
J517518				70.00	0.0	0.0	0.43		7.41		
20	240	24	0.0012	69.93	0.0	3.6	1.86	3.56	53.58		
J510424				69.65	0.0	0.0	0.58		6.65		
21	415	24	0.0018	69.65	0.0	5.9	2.52	5.86	70.82		
J713124				68.90	0.0	0.0	0.70		8.27		
22	395	24	0.0020	68.90	0.0	8.6	2.92	8.65	98.76		
J710124				68.10	0.0	0.0	0.89		8.76		
23	460	24	0.0022	68.10	0.0	10.3	3.29	10.34	114.55	1.31	12
J712724				67.11	0.0	0.0	1.00		9.03		27

*** JSE

Diversion

Link	Cost		Invert Elev	Maximum Flow Values San	Inf	Sto	Mis	Design
25	0	In :	67.12	0.00	0.00	11.47	0.00	11.47
		Out :	67.12	0.00	0.00	7.99	0.00	7.99
		Over:	67.78	0.00	0.00	3.48	0.00	3.48

*** JSE

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
26	430	24	0.0007	67.14	0.0	8.0	2.54	7.99	155.45	2.85	21
J712524				66.84	0.0	0.0	1.00		5.14		30
27	400	24	0.0021	66.84	0.0	10.1	3.20	10.06	112.82	1.14	12
J7MLWEX24				66.00	0.0	0.0	1.00		8.92		27

Lateral length= 2660 Upstream length= 5360

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ALGONA BASIN-J 25-YEAR PRESENT

*** JTACOMA Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
28	450	18	0.0011	67.50	0.0	1.1	1.35	1.15	38.04		
J7TAC3S18				67.00	0.0	0.0	0.48		3.01		
29	50	18	0.0018	66.82	0.0	2.6	2.04	2.57	66.99		
J76718				66.73	0.0	0.0	0.67		3.83		

Lateral length= 500 Upstream length= 500

*** J4THAVS Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
30	620	18	0.0016	67.72	0.0	3.5	2.13	3.48	96.43		
J74SDIV18				66.73	0.0	0.0	0.87		3.61		
31	50	18	0.0046	66.73	0.0	7.9	4.50	7.95	129.70	1.82	12
J76018				66.50	0.0	0.0	1.00		6.13		21

Lateral length= 670 Upstream length= 1170

*** JINTERURB Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
32	450	67.50	68.32	1.7	1.82	0.500	0.00	1.80	1.80	0
	0.0022	66.50	67.32	1.7	0.82	1.00	0.00	0.00	1.55	
J757D						0.500	Froude Number =		0.34	

*** JINTERURB Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
33	470	18	0.0018	66.50	0.0	11.5	6.48	11.46	296.48	7.59	24
J715718				65.64	0.0	0.0	1.00		3.86		30
34	250	18	0.0050	65.64	0.0	11.5	6.48	11.46	180.08	5.09	18
J714818				64.40	0.0	0.0	1.00		6.36		24
35	290	24	0.0011	64.40	0.0	11.5	3.65	11.46	174.55	4.89	24
J714624				64.07	0.0	0.0	1.00		6.56		30

Lateral length= 1460 Upstream length= 2630

ALGONA BASIN-J 25-YEAR PRESENT

*** JSEATTLESE

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
36	1100	18	0.0028	67.82	0.0	2.0	2.19	1.99	42.04		
J72118				64.79	0.0	0.0	0.51		4.74		
37	400	24	0.0018	64.79	0.0	3.7	2.20	3.75	45.38		
J72524				64.07	0.0	0.0	0.53		8.26		
38	40	24	0.0033	64.07	0.0	16.2	5.17	16.23	146.31	5.14	18
J714524				63.94	0.0	0.0	1.00		11.09		30
39	550	24	0.0032	63.94	0.0	23.0	7.32	22.99	208.90	11.99	27
J714424				62.18	0.0	0.0	1.00		11.01		33

Lateral length= 2090 Upstream length= 8403

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ALGONA BASIN-K 25-YEAR PRESENT

*** SUBK-1 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
1	400	69.20	69.68	1.3	1.48	0.500	0.00	0.76	0.76	0
	0.0024	68.25	68.73	0.8	0.48	1.00	0.00	0.00	1.27	
K52AVED						0.500	Froude Number =		0.35	

*** SUBK-1 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
2	60	12	0.0070	68.25	0.0	1.7	3.08	1.74	67.74		
K55812				67.83	0.0	0.0	0.68		2.56		
3	50	18	0.0042	67.80	0.0	2.5	2.71	2.47	42.11		
K55918				67.59	0.0	0.0	0.51		5.85		

Lateral length= 510 Upstream length= 510

*** SUBK-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
4	300	18	0.0006	69.34	0.0	0.5	0.86	0.50	22.01		
K57118				69.15	0.0	0.0	0.36		2.27		
5	450	18	0.0023	69.15	0.0	1.1	1.73	1.09	25.05		
K56618				68.10	0.0	0.0	0.38		4.36		

*** SUBK-2 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
6	200	68.10	68.81	1.2	1.71	0.500	0.00	1.97	1.97	0
	0.0044	67.22	67.93	2.1	0.71	1.00	0.00	0.00	2.05	
K5164D						0.500	Froude Number =		0.48	

*** SUBK-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
7	95	18	0.0045	67.22	0.0	2.0	2.60	1.97	32.40		
K516418				66.79	0.0	0.0	0.44		6.08		

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ALGONA BASIN-K 25-YEAR PRESENT

*** SUBK-2

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
8	200	18	0.0008	66.78	0.0	2.0	1.39	1.97	79.60		
K516518				66.63	0.0	0.0	0.75		2.47		
9	400	18	0.0022	67.14	0.0	5.2	2.96	5.24	123.64	1.00	12
K516618				66.26	0.0	0.0	1.00		4.24		21

Lateral length= 1645 Upstream length= 2155

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ALGONA BASIN-L 25-YEAR PRESENT

*** SUBL-1 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
1	385	12	0.0011	70.89	0.0	1.5	1.86	1.46	146.45	0.46	10
L510812				70.48	0.0	0.0	1.00		1.00		15
2	280	18	0.0116	70.48	0.0	2.1	3.66	2.09	21.52		
L515618				67.24	0.0	0.0	0.35		9.72		
3	50	18	0.0106	67.50	0.0	2.7	3.87	2.72	29.23		
L515718				66.97	0.0	0.0	0.42		9.30		

Lateral length= 715 Upstream length= 715

*** SUBL-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
4	70	18	0.0054	68.38	0.0	0.8	2.14	0.79	11.92		
L511518				68.00	0.0	0.0	0.27		6.66		

*** SUBL-2 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
5	400	66.92	68.29	2.7	2.37	0.500	0.00	4.57	4.57	0
	0.0023	65.98	67.35	2.2	1.37	1.00	0.00	0.00	1.98	
L5171D						0.500	Froude Number =		0.35	

Lateral length= 470 Upstream length= 1185

*** SUBL-3 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
6	400	67.86	68.39	1.1	1.53	0.500	0.00	0.64	0.64	0
	0.0013	67.36	67.89	1.6	0.53	1.00	0.00	0.00	0.96	
L5132D						0.500	Froude Number =		0.26	

*** SUBL-3 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
7	45	12	0.0149	67.36	0.0	1.4	3.75	1.40	37.43		
L512912				66.69	0.0	0.0	0.48		3.74		

Lateral length= 445 Upstream length= 445

ALGONA BASIN-L 25-YEAR PRESENT

*** SUBL-4 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
8	500	66.75	67.26	1.7	1.51	0.500	0.00	0.60	0.60	0
	0.0013	66.12	66.63	1.4	0.51	1.00	0.00	0.00	0.94	
L5130D						0.500	Froude Number =		0.26	

*** SUBL-4 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
9	65	12	0.0069	66.12	0.0	2.9	3.67	2.89	113.22	0.34	6
L512512				65.67	0.0	0.0	1.00		2.55		15
10	300	18	0.0045	65.98	0.0	7.5	4.22	7.46	122.58	1.37	12
L512318				64.62	0.0	0.0	1.00		6.08		21

Lateral length= 865 Upstream length= 2495

MODEL RESULTS
FUTURE LAND USE CONDITIONS 10-YEAR STORM

assume detention system failing

ALGONA BASIN-A 10-YEAR FUTURE

*** ASOUTH Channel

Link	Long / Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width / Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
1	950	69.89	70.69	4.3	3.80	0.500	0.00	3.86	3.86	0
	0.0012	68.76	69.56	4.4	0.80	3.00	0.00	0.00	1.41	
A3CHICD1						0.500	Froude Number =		0.29	
2	970	68.76	70.56	3.4	4.80	0.500	0.00	12.44	14.35	0
	0.0012	67.61	69.41	3.6	1.80	3.00	0.00	1.91	2.05	
A3CHICD2						0.500	Froude Number =		0.30	
3	40	67.61	68.34	4.7	4.73	0.500	0.00	12.44	14.35	0
	0.0120	67.13	67.86	4.6	0.73	4.00	0.00	1.91	4.48	
A1CHICD3						0.500	Froude Number =		0.96	
4	100	67.13	68.36	4.1	5.23	0.500	0.00	12.44	14.73	0
	0.0024	66.89	68.12	3.9	1.23	4.00	0.00	2.29	2.60	
A1CHICD4						0.500	Froude Number =		0.44	

Lateral length= 2060 Upstream length= 2060

*** ACNTRL Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
5	615	18	0.0042	71.68	0.0	1.4	2.81	2.79	47.61		
A23918				69.09	0.0	1.4	0.55		5.86		
6	380	34	0.0029	68.83	0.0	1.4	2.87	6.09	22.88		
A23334				67.72	0.0	4.7	0.36		26.63		

Lateral length= 995 Upstream length= 995

*** ANORTH Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
7	450	18	0.0053	70.46	0.0	0.0	2.14	0.83	12.63		
A21018				68.08	0.0	0.8	0.28		6.57		
8	275	24	0.0041	67.83	0.0	0.0	2.31	1.66	13.31		
A10724				66.70	0.0	1.7	0.28		12.47		

Lateral length= 725 Upstream length= 725

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ALGONA BASIN-A 10-YEAR FUTURE

*** BNDRY Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
9	55	30	0.0015	66.48	0.0	13.8	4.34	21.31	158.35	7.85	27
A10830				66.40	0.0	7.5	1.00		13.46		36
10	1140	36	0.0014	66.40	0.0	13.8	3.25	22.97	105.54	1.21	15
A10536				64.76	0.0	9.1	1.00		21.76		39

Lateral length= 1195 Upstream length= 4975

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ALGONA BASIN-B 10-YEAR FUTURE

*** SUBB-1 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
1	400	70.00	71.47	0.5	2.47	0.500	0.00	2.40	2.40	0
	0.0005	69.80	71.27	0.5	1.47	1.00	0.00	0.00	0.94	
B184D						0.500	Froude Number =		0.16	

*** SUBB-1 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
2	35	18	0.0151	70.01	0.0	3.7	4.78	3.69	33.20		
B18118				69.48	0.0	0.0	0.45		11.12		

*** SUBB-1 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
3	600	68.10	69.55	0.6	2.45	0.500	0.00	3.69	3.69	0
	0.0013	67.35	68.80	1.1	1.45	1.00	0.00	0.00	1.48	
B176D						0.500	Froude Number =		0.26	

*** SUBB-1 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
4	70	18	0.0064	67.35	0.0	5.3	3.96	5.26	72.64		
B17418				66.90	0.0	0.0	0.71		7.24		

*** SUBB-1 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
5	170	66.90	68.33	0.3	2.43	0.500	0.00	5.51	5.51	0
	0.0029	66.40	67.83	0.6	1.43	1.00	0.00	0.00	2.26	
B174D						0.500	Froude Number =		0.40	
6	260	66.40	68.23	0.2	2.83	0.500	0.00	5.51	5.51	0
	0.0012	66.10	67.93	0.3	1.83	1.00	0.00	0.00	1.58	
B1117D						0.500	Froude Number =		0.25	

ALGONA BASIN-B 10-YEAR FUTURE

*** SUBB-1 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
7	220	24	0.0027	66.10	0.0	8.0	3.20	8.02	78.94		
B167A24				65.50	0.0	0.0	0.75		10.16		

Lateral length= 1755 Upstream length= 1755

*** SUBB-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
8	48	12	0.0125	68.50	0.0	1.7	3.74	1.69	49.36		
B15212				67.90	0.0	0.0	0.56		3.43		

*** SUBB-2 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
9	300	67.90	69.26	0.6	2.36	0.500	0.00	1.69	1.69	0
	0.0003	67.80	69.16	0.6	1.36	1.00	0.00	0.00	0.74	
B154D						0.500	Froude Number =		0.13	

*** SUBB-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
10	280	18	0.0021	67.79	0.0	1.7	1.90	1.69	40.77		
B114118				67.20	0.0	0.0	0.50		4.15		
11	65	18	0.0020	67.13	0.0	2.6	2.12	2.56	63.26		
B16018				67.00	0.0	0.0	0.65		4.04		
12	181	24	0.0059	66.57	0.0	2.6	2.95	2.56	17.08		
B113724				65.50	0.0	0.0	0.31		14.96		
13	386	24	0.0021	65.50	0.0	11.4	3.63	11.40	128.68	2.54	18
B113824				64.70	0.0	0.0	1.00		8.86		27

Lateral length= 1260 Upstream length= 3015

ALGONA BASIN-D 10-YEAR FUTURE

*** SUBD-1 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
1	700	65.10	67.54	0.7	3.44	0.500	0.00	3.44	3.44	0
	0.0001	65.00	67.44	0.8	2.44	1.00	0.00	0.00	0.63	
D1109D						0.500	Froude Number =		0.09	

Lateral length= 700 Upstream length= 700

*** SUBD-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
2	450	24	0.0020	66.35	0.0	1.0	1.55	0.97	11.26		
D112718				65.46	0.0	0.0	0.26		8.65		
3	70	24	0.0003	65.30	0.0	6.1	1.95	6.11	185.85	2.82	24
D112218				65.28	0.0	0.0	1.00		3.29		33

Lateral length= 520 Upstream length= 1220

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ALGONA BASIN-E 10-YEAR FUTURE

*** SUBE-1 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
1	230	69.70	70.83	0.9	2.13	0.500	0.00	1.96	1.96	0
	0.0009	69.50	70.63	0.9	1.13	1.00	0.00	0.00	1.11	
E356D						0.500	Froude Number =		0.21	

*** SUBE-1 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
2	180	12	0.0032	67.78	0.0	2.0	2.50	1.96	112.94	0.23	6
E19812				67.20	0.0	0.0	1.00		1.74		15
3	600	18	0.0009	67.20	0.0	2.7	1.64	2.74	99.35		
E110018				66.64	0.0	0.0	0.89		2.76		

Lateral length= 1010 Upstream length= 1010

*** SUBE-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
4	450	18	0.0009	67.05	0.0	1.2	1.28	1.22	44.57		
E39618				66.64	0.0	0.0	0.53		2.73		

*** SUBE-2 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
5	150	67.30	68.89	0.9	2.59	0.500	0.00	5.55	5.55	0
	0.0020	67.00	68.59	0.4	1.59	1.00	0.00	0.00	1.95	
E1106D						0.500	Froude Number =		0.33	

Lateral length= 600 Upstream length= 1610

ALGONA BASIN-F 10-YEAR FUTURE

*** SUBF-1 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
1	470	24	0.0023	71.38	0.0	0.7	1.52	0.73	7.93		
F39324				70.32	0.0	0.0	0.23		9.24		

Lateral length= 470 Upstream length= 470

*** SUBF-2 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
2	450	72.50	73.11	1.4	1.61	0.500	0.00	1.42	1.42	0
	0.0038	70.80	71.41	1.4	0.61	1.00	0.00	0.00	1.78	
F322D						0.500	Froude Number =		0.44	

*** SUBF-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
3	470	24	0.0018	69.79	0.0	3.3	2.10	3.29	40.18		
F39124				68.96	0.0	0.0	0.50		8.18		

Lateral length= 920 Upstream length= 1390

*** SUBF-3 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
4	610	70.50	71.61	0.9	2.11	0.500	0.00	1.85	1.85	0
	0.0008	70.00	71.11	0.9	1.11	1.00	0.00	0.00	1.07	
F377D						0.500	Froude Number =		0.21	

Lateral length= 610 Upstream length= 610

*** SUBF-4 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
5	520	18	0.0007	71.41	0.0	0.5	0.91	0.54	22.61		
F53318				71.05	0.0	0.0	0.36		2.38		

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ALGONA BASIN-F 10-YEAR FUTURE

*** SUBF-4 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
6	500	18	0.0013	71.14	0.0	1.2	1.47	1.23	37.28		
F39418				70.47	0.0	0.0	0.48		3.31		
7	470	18	0.0016	70.47	0.0	1.8	1.74	1.77	49.32		
F39218				69.73	0.0	0.0	0.56		3.58		
8	42	18	0.0074	69.17	0.0	3.0	3.49	2.99	38.52		
F38018				68.86	0.0	0.0	0.49		7.76		
9	510	24	0.0010	68.86	0.0	6.5	2.07	6.51	107.91	0.48	10
F39524				68.37	0.0	0.0	1.00		6.03		27

Lateral length= 2042 Upstream length= 2652

*** SUBF-5 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
10	500	70.30	70.94	1.4	1.64	0.500	0.00	1.15	1.15	0
	0.0021	69.24	69.88	1.4	0.64	1.00	0.00	0.00	1.36	
F3BRDWDE						0.500	Froude Number =		0.33	
11	300	69.24	70.41	0.8	2.17	0.500	0.00	3.25	3.25	0
	0.0021	68.60	69.77	0.8	1.17	1.00	0.00	0.00	1.76	
F3BRDWDW						0.500	Froude Number =		0.34	

*** SUBF-5 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
12	487	24	0.0014	67.47	0.0	12.9	4.12	12.94	179.29	5.72	24
F34124				66.80	0.0	0.0	1.00		7.22		30
13	250	30	0.0026	66.65	0.0	14.3	3.63	14.25	79.23		
F34230				66.00	0.0	0.0	0.75		17.99		

Lateral length= 1537 Upstream length= 4189

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ALGONA BASIN-J 10-YEAR FUTURE

*** JNW — Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
1	275	18	0.0002	71.67	0.0	1.5	0.84	1.48	110.58	0.14	8
J58418				71.61	0.0	0.0	1.00		1.33		21
2	205	18	0.0009	71.61	0.0	3.4	1.94	3.44	124.90	0.68	12
J58518				71.42	0.0	0.0	1.00		2.75		21

Lateral length= 480 Upstream length= 480

*** JCTR — Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
3	405	73.12	73.77	1.2	1.65	0.500	0.00	0.96	0.96	0
	0.0015	72.53	73.18	1.8	0.65	1.00	0.00	0.00	1.13	
J67D						0.500	Froude Number =		0.28	

*** JCTR — Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
4	25	12	0.0012	72.53	0.0	2.0	2.48	1.95	183.74	0.89	12
J59912				72.50	0.0	0.0	1.00		1.06		18
5	165	12	0.0013	72.50	0.0	3.0	3.86	3.03	277.68	1.94	15
J59812				72.29	0.0	0.0	1.00		1.09		18
6	160	12	0.0013	72.29	0.0	3.0	3.86	3.03	280.19	1.95	15
J59112				72.09	0.0	0.0	1.00		1.08		18

*** JCTR — Diversion

Link	Cost		Invert Elev	Maximum Flow Values: San	Inf	Sto	Mis	Design
8	0	In :	72.04	0.00	0.00	3.03	0.00	3.03
		Out :	72.01	0.00	0.00	1.93	0.00	1.93
		Over:	72.18	0.00	0.00	1.10	0.00	1.10

*** JCTR — Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep

ALGONA BASIN-J 10-YEAR FUTURE

9	200	18	0.0021	71.84	0.0	1.9	1.97	1.93	46.64	
J515518				71.42	0.0	0.0	0.54		4.14	
10	240	24	0.0025	71.17	0.0	5.4	2.75	5.37	55.15	
J515224				70.57	0.0	0.0	0.59		9.73	
11	540	24	0.0039	70.57	0.0	5.4	3.20	5.37	44.33	
J515324				68.48	0.0	0.0	0.53		12.11	
12	540	24	0.0039	68.48	0.0	5.4	3.20	5.37	44.22	
J71524				66.38	0.0	0.0	0.52		12.13	
13	460	24	0.0025	66.38	0.0	5.7	2.79	5.70	59.06	
J72024				65.25	0.0	0.0	0.62		9.64	
14	468	24	0.0017	65.25	0.0	6.3	2.53	6.34	78.77	
J72424				64.45	0.0	0.0	0.75		8.04	

Lateral length= 3203 Upstream length= 3683

*** J2AVE Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
15	675	12	0.0022	71.11	0.0	0.9	1.65	0.86	60.08		
J510512				69.65	0.0	0.0	0.63		1.42		

Lateral length= 675 Upstream length= 675

*** JCLAY Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
16	675	12	0.0022	70.36	0.0	1.0	1.73	0.99	69.26		
J710912				68.90	0.0	0.0	0.69		1.42		

Lateral length= 675 Upstream length= 675

*** J4AVE Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
17	675	12	0.0025	69.41	0.0	1.1	1.89	1.12	72.98		
J79112				67.72	0.0	0.0	0.71		1.53		

Lateral length= 675 Upstream length= 675

ALGONA BASIN-J 10-YEAR FUTURE

*** J5AVES — Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
18	675	18	0.0016	67.93	0.0	0.3	1.08	0.31	8.42		
J78418				66.84	0.0	0.0	0.23		3.63		

Lateral length= 675 Upstream length= 675

*** JSE — Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
19	320	18	0.0067	72.15	0.0	2.4	3.15	2.37	31.97		
J517518				70.00	0.0	0.0	0.44		7.41		
20	240	24	0.0012	69.93	0.0	3.7	1.89	3.71	55.85		
J510424				69.65	0.0	0.0	0.60		6.65		
21	415	24	0.0018	69.65	0.0	6.3	2.57	6.28	75.88		
J713124				68.90	0.0	0.0	0.73		8.27		
22	395	24	0.0016	68.90	0.0	9.1	2.89	9.08	115.07	1.19	12
J710124				68.25	0.0	0.0	1.00		7.89		27
23	460	24	0.0016	68.25	0.0	11.0	3.49	10.97	139.65	3.12	18
J712724				67.50	0.0	0.0	1.00		7.86		30

*** JSE — Diversion

Link	Cost		Invert Elev	Maximum Flow Values: San	Inf	Sto	Mis	Design
25	0	In :	67.12	0.00	0.00	12.09	0.00	12.09
		Out :	67.12	0.00	0.00	8.26	0.00	8.26
		Over:	67.78	0.00	0.00	3.83	0.00	3.83

*** JSE — Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
26	430	24	0.0015	67.50	0.0	10.1	3.22	10.12	132.81	2.50	18
J712524				66.84	0.0	0.0	1.00		7.62		27
27	400	24	0.0021	66.84	0.0	12.3	3.92	12.32	138.16	3.40	18
J7MLWEX24				66.00	0.0	0.0	1.00		8.92		30

Lateral length= 2660 Upstream length= 5360

ALGONA BASIN-J 10-YEAR FUTURE

*** JTACOMA Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
28	450	18	0.0011	67.50	0.0	1.3	1.40	1.28	42.52		
J7TAC3S18				67.00	0.0	0.0	0.51		3.01		
29	50	18	0.0018	66.82	0.0	2.9	2.12	2.92	76.13		
J76718				66.73	0.0	0.0	0.73		3.83		

Lateral length= 500 Upstream length= 500

*** J4THAVS Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
30	620	18	0.0016	67.72	0.0	3.8	2.17	3.83	106.20	0.22	8
J74SDIV18				66.73	0.0	0.0	1.00		3.61		21
31	50	18	0.0046	66.73	0.0	8.9	5.01	8.86	144.53	2.73	15
J76018				66.50	0.0	0.0	1.00		6.13		21

Lateral length= 670 Upstream length= 1170

*** JINTERURB

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Channel Flow Vel	Estimated Cost
32	450	67.50	68.36	1.6	1.86	0.500	0.00	1.93	1.93	0
	0.0022	66.50	67.36	1.6	0.86	1.00	0.00	0.00	1.58	
J757D						0.500	Froude Number =		0.34	

*** JINTERURB Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
33	470	18	0.0029	66.50	0.0	12.6	7.12	12.58	257.04	7.69	24
J715718				65.12	0.0	0.0	1.00		4.90		27
34	250	18	0.0029	65.12	0.0	12.6	7.12	12.58	259.54	7.73	24
J714818				64.40	0.0	0.0	1.00		4.85		27
35	290	24	0.0011	64.40	0.0	12.6	4.01	12.58	191.70	6.02	24
J714624				64.07	0.0	0.0	1.00		6.56		33

Lateral length= 1460 Upstream length= 2630

ALGONA BASIN-J 10-YEAR FUTURE

*** JSEATTLESE Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
36	1100	18	0.0028	67.82	0.0	2.1	2.22	2.10	44.25		
J72118				64.79	0.0	0.0	0.52		4.74		
37	400	24	0.0018	64.79	0.0	3.9	2.23	3.92	47.53		
J72524				64.07	0.0	0.0	0.55		8.26		
38	40	24	0.0033	64.07	0.0	17.7	5.62	17.66	159.22	6.57	21
J714524				63.94	0.0	0.0	1.00		11.09		30
39	550	24	0.0032	63.94	0.0	24.0	7.64	24.00	218.03	12.99	27
J714424				62.18	0.0	0.0	1.00		11.01		33

Lateral length= 2090 Upstream length= 8403

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ALGONA BASIN-K 10-YEAR FUTURE

*** SUBK-1 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
1	400	69.20	69.65	1.4	1.45	0.500	0.00	0.67	0.67	0
	0.0024	68.25	68.70	0.8	0.45	1.00	0.00	0.00	1.22	
K52AVED						0.500	Froude Number =		0.35	

*** SUBK-1 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
2	60	12	0.0070	68.25	0.0	1.6	2.98	1.55	60.56		
K55812				67.83	0.0	0.0	0.63		2.56		
3	50	18	0.0042	67.80	0.0	2.2	2.62	2.22	37.86		
K55918				67.59	0.0	0.0	0.48		5.85		

Lateral length= 510 Upstream length= 510

*** SUBK-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
4	300	18	0.0006	69.34	0.0	0.4	0.81	0.42	18.35		
K57118				69.15	0.0	0.0	0.32		2.27		
5	450	18	0.0023	69.15	0.0	0.9	1.63	0.92	21.02		
K56618				68.10	0.0	0.0	0.35		4.36		

*** SUBK-2 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
6	200	68.10	68.75	1.3	1.65	0.500	0.00	1.69	1.69	0
	0.0044	67.22	67.87	2.1	0.65	1.00	0.00	0.00	1.97	
K5164D						0.500	Froude Number =		0.48	

*** SUBK-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
7	95	18	0.0045	67.22	0.0	1.7	2.49	1.69	27.83		
K516418				66.79	0.0	0.0	0.41		6.08		

ALGONA BASIN-K 10-YEAR FUTURE

*** SUBK-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
8	200	18	0.0008	66.78	0.0	1.7	1.33	1.69	68.38		
K516518				66.63	0.0	0.0	0.68		2.47		
9	400	18	0.0022	67.14	0.0	4.7	2.64	4.66	109.89	0.42	8
K516618				66.26	0.0	0.0	1.00		4.24		21

Lateral length= 1645 Upstream length= 2155

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ALGONA BASIN-L 10-YEAR FUTURE

*** SUBL-1 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
1	385	12	0.0011	70.89	0.0	1.5	1.92	1.51	150.78	0.51	10
L510812				70.48	0.0	0.0	1.00		1.00		15
2	280	18	0.0116	70.48	0.0	2.1	3.69	2.15	22.11		
L515618				67.24	0.0	0.0	0.36		9.72		
3	50	18	0.0106	67.50	0.0	2.8	3.90	2.80	30.10		
L515718				66.97	0.0	0.0	0.42		9.30		

Lateral length= 715 Upstream length= 715

*** SUBL-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
4	70	18	0.0054	68.38	0.0	0.8	2.17	0.85	12.72		
L511518				68.00	0.0	0.0	0.28		6.66		

*** SUBL-2 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
5	400	66.92	68.31	2.7	2.39	0.500	0.00	4.72	4.72	0
	0.0023	65.98	67.37	2.1	1.39	1.00	0.00	0.00	2.00	
L5171D						0.500	Froude Number =		0.35	

Lateral length= 470 Upstream length= 1185

*** SUBL-3 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
6	400	67.86	68.35	1.1	1.49	0.500	0.00	0.57	0.57	0
	0.0013	67.36	67.85	1.6	0.49	1.00	0.00	0.00	0.93	
L5132D						0.500	Froude Number =		0.25	

ALGONA BASIN-L 10-YEAR FUTURE

*** SUBL-3 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
7	45	12	0.0149	67.36	0.0	1.2	3.60	1.22	32.59		
L512912				66.69	0.0	0.0	0.44		3.74		

Lateral length= 445 Upstream length= 445

*** SUBL-4 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
8	500	66.75	67.22	1.8	1.47	0.500	0.00	0.54	0.54	0
	0.0013	66.12	66.59	1.4	0.47	1.00	0.00	0.00	0.92	
L5130D						0.500	Froude Number =		0.26	

*** SUBL-4 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
9	65	12	0.0069	66.12	0.0	2.6	3.41	2.55	100.16	0.00	4
L512512				65.67	0.0	0.0	0.90		2.55		15
10	300	18	0.0045	65.98	0.0	7.3	4.11	7.27	119.53	1.19	10
L512318				64.62	0.0	0.0	1.00		6.08		21

Lateral length= 865 Upstream length= 2495

MODEL RESULTS
FUTURE LAND USE CONDITIONS 25-YEAR STORM

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ALGONA BASIN-A 25-YEAR FUTURE

*** ASOUTH Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
1	950	69.89	70.96	4.0	4.07	0.500	0.00	6.15	6.15	0
	0.0012	68.76	69.83	4.2	1.07	3.00	0.00	0.00	1.62	
A3CHICD1						0.500	Froude Number =		0.30	
2	970	68.76	71.07	2.9	5.32	0.500	0.00	22.01	22.01	0
	0.0012	67.61	69.93	3.1	2.31	3.00	0.00	0.00	2.29	
A3CHICD2						0.500	Froude Number =		0.30	
3	40	67.61	68.57	4.4	4.96	0.500	0.00	22.01	22.01	0
	0.0120	67.13	68.09	4.4	0.96	4.00	0.00	0.00	5.14	
A1CHICD3						0.500	Froude Number =		0.97	
4	100	67.13	68.99	3.5	5.86	0.500	0.00	28.86	28.86	0
	0.0024	66.89	68.75	3.3	1.86	4.00	0.00	0.00	3.15	
A1CHICD4						0.500	Froude Number =		0.44	

Lateral length= 2060 Upstream length= 2060

*** ACENTRAL Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
5	615	18	0.0042	71.68	0.0	10.9	6.14	10.86	185.18	4.99	18
A23918				69.09	0.0	0.0	1.00		5.86		24
6	380	34	0.0029	68.83	0.0	19.2	4.07	19.23	72.22		
A23334				67.72	0.0	0.0	0.71		26.63		

Lateral length= 995 Upstream length= 995

*** ANORTH Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
7	450	18	0.0053	70.46	0.0	9.2	5.18	9.16	139.37	2.59	15
A21018				68.08	0.0	0.0	1.00		6.57		21
8	275	24	0.0041	67.83	0.0	16.4	5.20	16.35	131.09	3.88	18
A10724				66.70	0.0	0.0	1.00		12.47		27

Lateral length= 725 Upstream length= 725

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ALGONA BASIN-A 25-YEAR FUTURE

*** BNDRY Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
9	55	30	0.0015	66.48	0.0	52.5	10.70	52.53	390.40	39.08	45
A10830				66.40	0.0	0.0	1.00		13.46		54
10	1140	36	0.0014	66.40	0.0	68.9	9.75	68.88	316.53	47.12	54
A10536				64.76	0.0	0.0	1.00		21.76		60

Lateral length= 1195 Upstream length= 4975

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ALGONA BASIN-B 25-YEAR FUTURE

*** SUBB-1

Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
1	400	70.00	71.62	0.4	2.62	0.500	0.00	2.88	2.88	0
	0.0005	69.80	71.42	0.4	1.62	1.00	0.00	0.00	0.98	
B184D						0.500	Froude Number =		0.16	

*** SUBB-1

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
2	35	18	0.0151	70.01	0.0	4.4	5.06	4.42	39.80		
B18118				69.48	0.0	0.0	0.50		11.12		

*** SUBB-1

Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
3	600	68.10	69.69	0.4	2.60	0.500	0.00	4.42	4.42	0
	0.0013	67.35	68.94	1.0	1.59	1.00	0.00	0.00	1.54	
B176D						0.500	Froude Number =		0.26	

*** SUBB-1

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
4	70	18	0.0064	67.35	0.0	6.3	4.17	6.32	87.19		
B17418				66.90	0.0	0.0	0.80		7.24		

*** SUBB-1

Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
5	170	66.90	68.47	0.1	2.57	0.500	0.00	6.61	6.61	0
	0.0029	66.40	67.97	0.4	1.57	1.00	0.00	0.00	2.35	
B174D						0.500	Froude Number =		0.40	
6	260	66.40	68.41	-0.0	3.01	0.500	0.00	6.61	6.61	0
	0.0012	66.10	68.11	0.1	2.01	1.00	0.00	0.00	1.65	
B1117D						0.500	Froude Number =		0.25	

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ALGONA BASIN-B 25-YEAR FUTURE

*** SUBB-1 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
7	220	24	0.0027	66.10	0.0	9.6	3.35	9.60	94.45		
B167A24				65.50	0.0	0.0	0.85		10.16		

Lateral length= 1755 Upstream length= 1755

*** SUBB-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
8	48	12	0.0125	68.50	0.0	2.0	3.96	2.02	59.11		
B15212				67.90	0.0	0.0	0.62		3.43		

*** SUBB-2 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
9	300	67.90	69.40	0.5	2.49	0.500	0.00	2.02	2.02	0
	0.0003	67.80	69.30	0.5	1.50	1.00	0.00	0.00	0.78	
B154D						0.500	Froude Number =		0.13	

*** SUBB-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
10	280	18	0.0021	67.79	0.0	2.0	2.00	2.02	48.83		
B114118				67.20	0.0	0.0	0.55		4.15		
11	65	18	0.0020	67.13	0.0	3.0	2.23	3.04	75.18		
B16018				67.00	0.0	0.0	0.72		4.04		
12	181	24	0.0059	66.57	0.0	3.0	3.11	3.04	20.30		
B113724				65.50	0.0	0.0	0.34		14.96		
13	386	24	0.0021	65.50	0.0	13.6	4.33	13.60	153.48	4.74	21
B113824				64.70	0.0	0.0	1.00		8.86		30

Lateral length= 1260 Upstream length= 3015

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ALGONA BASIN-D 25-YEAR FUTURE

*** SUBD-1

Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
1	700	65.10	67.74	0.5	3.65	0.500	0.00	4.04	4.04	0
	0.0001	65.00	67.65	0.6	2.65	1.00	0.00	0.00	0.66	
D1109D						0.500	Froude Number =		0.09	

Lateral length= 700 Upstream length= 700

*** SUBD-2

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
2	450	24	0.0020	66.35	0.0	1.2	1.61	1.16	13.44		
D112718				65.46	0.0	0.0	0.28		8.65		
3	70	24	0.0003	65.30	0.0	7.2	2.30	7.24	220.05	3.95	27
D112218				65.28	0.0	0.0	1.00		3.29		33

Lateral length= 520 Upstream length= 1220

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ALGONA BASIN-E 25-YEAR FUTURE

*** SUBE-1 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
1	230	69.70	70.95	0.7	2.25	0.500	0.00	2.36	2.36	0
	0.0009	69.50	70.75	0.7	1.25	1.00	0.00	0.00	1.16	
E356D						0.500	Froude Number =		0.21	

*** SUBE-1 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
2	180	12	0.0032	67.78	0.0	2.4	3.00	2.36	135.47	0.62	10
E19812				67.20	0.0	0.0	1.00		1.74		15
3	600	18	0.0009	67.20	0.0	3.3	1.86	3.29	119.15	0.53	10
E110018				66.64	0.0	0.0	1.00		2.76		21

Lateral length= 1010 Upstream length= 1010

*** SUBE-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
4	450	18	0.0009	67.05	0.0	1.5	1.36	1.46	53.47		
E39618				66.64	0.0	0.0	0.58		2.73		

*** SUBE-2 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
5	150	67.30	69.05	0.8	2.75	0.500	0.00	6.66	6.66	0
	0.0020	67.00	68.75	0.3	1.75	1.00	0.00	0.00	2.03	
E1106D						0.500	Froude Number =		0.33	

Lateral length= 600 Upstream length= 1610

ALGONA BASIN-F 25 YEAR FUTURE

*** SUBF-4 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
6	500	18	0.0013	71.14	0.0	1.2	1.48	1.24	37.57		
F39418				70.47	0.0	0.0	0.48		3.31		
7	470	18	0.0016	70.47	0.0	1.8	1.74	1.78	49.73		
F39218				69.73	0.0	0.0	0.56		3.58		
8	42	18	0.0074	69.17	0.0	3.0	3.51	3.02	38.89		
F38018				68.86	0.0	0.0	0.49		7.76		
9	510	24	0.0010	68.86	0.0	6.6	2.09	6.55	108.66	0.52	10
F39524				68.37	0.0	0.0	1.00		6.03		27

Lateral length= 2042 Upstream length= 2652

*** SUBF-5 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
10	500	70.30	70.94	1.4	1.65	0.500	0.00	1.16	1.16	0
	0.0021	69.24	69.89	1.4	0.65	1.00	0.00	0.00	1.36	
F3BRDWDE						0.500	Froude Number =		0.33	
11	300	69.24	70.41	0.8	2.17	0.500	0.00	3.27	3.27	0
	0.0021	68.60	69.77	0.8	1.17	1.00	0.00	0.00	1.76	
F3BRDWDW						0.500	Froude Number =		0.34	

*** SUBF-5 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
12	487	24	0.0014	67.47	0.0	13.0	4.14	13.02	180.35	5.80	24
F34124				66.80	0.0	0.0	1.00		7.22		30
13	250	30	0.0026	66.65	0.0	14.3	3.64	14.34	79.71		
F34230				66.00	0.0	0.0	0.75		17.99		

Lateral length= 1537 Upstream length= 4189

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ALGONA BASIN-F 25 YEAR FUTURE

*** SUBF-1 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
1	470	24	0.0023	71.38	0.0	0.7	1.52	0.74	7.97		
F39324				70.32	0.0	0.0	0.23		9.24		

Lateral length= 470 Upstream length= 470

*** SUBF-2 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
2	450	72.50	73.11	1.4	1.61	0.500	0.00	1.42	1.42	0
	0.0038	70.80	71.41	1.4	0.61	1.00	0.00	0.00	1.78	
F322D						0.500	Froude Number =		0.44	

*** SUBF-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
3	470	24	0.0018	69.79	0.0	3.3	2.10	3.29	40.30		
F39124				68.96	0.0	0.0	0.50		8.18		

Lateral length= 920 Upstream length= 1390

*** SUBF-3 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
4	610	70.50	71.61	0.9	2.12	0.500	0.00	1.86	1.86	0
	0.0008	70.00	71.11	0.9	1.11	1.00	0.00	0.00	1.07	
F377D						0.500	Froude Number =		0.21	

Lateral length= 610 Upstream length= 610

*** SUBF-4 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
5	520	18	0.0007	71.41	0.0	0.5	0.92	0.55	23.01		
F53318				71.05	0.0	0.0	0.37		2.38		

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ALGONA BASIN-G 25-YEAR FUTURE

*** SUBG-1

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Channel Flow Vel	Estimated Cost
1	405	70.00	70.68	0.3	1.68	0.500	0.00	0.97	0.97	0
	0.0012	69.50	70.18	1.8	0.68	1.00	0.00	0.00	1.06	
G3ALGWD						0.500	Froude Number =		0.25	
2	400	69.50	70.39	1.6	1.89	0.500	0.00	2.18	2.18	0
	0.0025	68.50	69.39	0.6	0.89	1.00	0.00	0.00	1.70	
G5136D						0.500	Froude Number =		0.36	

Lateral length= 805 Upstream length= 805

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ALGONA BASIN-H 25-YEAR FUTURE

*** SUBH-1 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
1	45	12	0.0207	69.75	0.0	1.1	3.89	1.07	24.26		
H54512				68.82	0.0	0.0	0.38		4.40		
2	65	12	0.0088	68.00	0.0	2.5	3.70	2.47	85.93		
H54712				67.43	0.0	0.0	0.79		2.87		

Lateral length= 110 Upstream length= 110

*** SUBH-2 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
3	450	68.50	68.82	1.9	1.32	0.500	0.00	0.27	0.27	0
	0.0011	68.00	68.32	2.3	0.32	1.00	0.00	0.00	0.72	
H5ALGWD						0.500	Froude Number =		0.24	

*** SUBH-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
4	200	18	0.0065	68.40	0.0	2.7	3.24	2.68	36.69		
H513818				67.09	0.0	0.0	0.47		7.31		

Lateral length= 650 Upstream length= 760

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ALGONA BASIN-J 25-YEAR FUTURE

*** JNW
Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
1	275	18	0.0002	71.67	0.0	1.9	1.08	1.91	143.49	0.58	15
J58418				71.61	0.0	0.0	1.00		1.33		21
2	205	18	0.0009	71.61	0.0	4.3	2.43	4.29	156.01	1.54	15
J58518				71.42	0.0	0.0	1.00		2.75		24

Lateral length= 480 Upstream length= 480

*** JCTR
Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
3	405	73.12	73.88	1.1	1.76	0.500	0.00	1.28	1.28	0
	0.0015	72.53	73.29	1.7	0.76	1.00	0.00	0.00	1.21	
J67D						0.500	Froude Number =		0.28	

*** JCTR
Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
4	25	12	0.0012	72.53	0.0	2.6	3.30	2.59	244.17	1.53	15
J59912				72.50	0.0	0.0	1.00		1.06		18
5	165	12	0.0013	72.50	0.0	3.9	5.01	3.93	359.74	2.84	18
J59812				72.29	0.0	0.0	1.00		1.09		21
6	160	12	0.0013	72.29	0.0	3.9	5.01	3.93	362.99	2.85	18
J59112				72.09	0.0	0.0	1.00		1.08		21

*** JCTR
Diversion

Link	Cost		Invert Elev	Maximum Flow Values San	Inf	Sto	Mis	Design
8	0	In :	72.04	0.00	0.00	3.93	0.00	3.93
		Out :	72.01	0.00	0.00	2.37	0.00	2.37
		Over:	72.18	0.00	0.00	1.56	0.00	1.56

*** JCTR
Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep

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9	200	18	0.0021	71.84	0.0	2.4	2.11	2.37	57.26	
J515518				71.42	0.0	0.0	0.61		4.14	
10	240	24	0.0025	71.17	0.0	6.7	2.94	6.66	68.47	
J515224				70.57	0.0	0.0	0.68		9.73	
11	540	24	0.0039	70.57	0.0	6.7	3.42	6.66	55.03	
J515324				68.48	0.0	0.0	0.59		12.11	
12	540	24	0.0039	68.48	0.0	6.7	3.43	6.66	54.90	
J71524				66.38	0.0	0.0	0.59		12.13	
13	460	24	0.0025	66.38	0.0	7.1	2.97	7.06	73.22	
J72024				65.25	0.0	0.0	0.71		9.64	
14	468	24	0.0017	65.25	0.0	7.8	2.67	7.84	97.39	
J72424				64.45	0.0	0.0	0.88		8.04	

Lateral length= 3203 Upstream length= 3683

*** J2AVE Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
15	675	12	0.0022	71.11	0.0	1.0	1.75	1.04	73.20		
J510512				69.65	0.0	0.0	0.71		1.42		

Lateral length= 675 Upstream length= 675

*** JCLAY Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
16	675	12	0.0022	70.36	0.0	1.2	1.83	1.20	83.89		
J710912				68.90	0.0	0.0	0.78		1.42		

Lateral length= 675 Upstream length= 675

*** J4AVE Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
17	675	12	0.0025	69.41	0.0	1.4	1.99	1.36	88.95		
J79112				67.72	0.0	0.0	0.81		1.53		

Lateral length= 675 Upstream length= 675

ALGONA BASIN-J 25-YEAR FUTURE

*** J5AVES — Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
18	675	18	0.0016	67.93	0.0	0.4	1.14	0.38	10.47		
J78418				66.84	0.0	0.0	0.26		3.63		

Lateral length= 675 Upstream length= 675

*** JSE — Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
19	320	18	0.0067	72.15	0.0	3.1	3.42	3.10	41.83		
J517518				70.00	0.0	0.0	0.51		7.41		
20	240	24	0.0012	69.93	0.0	4.7	2.03	4.74	71.31		
J510424				69.65	0.0	0.0	0.70		6.65		
21	415	24	0.0018	69.65	0.0	7.9	2.73	7.87	95.12		
J713124				68.90	0.0	0.0	0.86		8.27		
22	395	24	0.0016	68.90	0.0	11.3	3.59	11.27	142.84	3.38	18
J710124				68.25	0.0	0.0	1.00		7.89		30
23	460	24	0.0016	68.25	0.0	13.6	4.32	13.57	172.66	5.71	24
J712724				67.50	0.0	0.0	1.00		7.86		30

*** JSE — Diversion

Link	Cost		Invert Elev	Maximum Flow Values: San	Inf	Sto	Mis	Design
25	0	In :	67.12	0.00	0.00	14.93	0.00	14.93
		Out :	67.12	0.00	0.00	9.49	0.00	9.49
		Over:	67.78	0.00	0.00	5.44	0.00	5.44

*** JSE — Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
26	430	24	0.0015	67.50	0.0	11.8	3.74	11.76	154.30	4.14	21
J712524				66.84	0.0	0.0	1.00		7.62		30
27	400	24	0.0021	66.84	0.0	14.4	4.59	14.43	161.85	5.51	21
J7MLWEX24				66.00	0.0	0.0	1.00		8.92		30

Lateral length= 2660 Upstream length= 5360

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ALGONA BASIN-J 25-YEAR FUTURE

*** JTACOMA Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
28	450	18	0.0011	67.50	0.0	1.6	1.48	1.56	51.85		
J7TAC3S18				67.00	0.0	0.0	0.57		3.01		
29	50	18	0.0018	66.82	0.0	3.5	2.23	3.54	92.27		
J76718				66.73	0.0	0.0	0.83		3.83		

Lateral length= 500 Upstream length= 500

*** J4THAVS Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
30	620	18	0.0016	67.72	0.0	5.4	3.08	5.44	150.62	1.83	15
J74SDIV18				66.73	0.0	0.0	1.00		3.61		21
31	50	18	0.0046	66.73	0.0	11.5	6.53	11.54	188.36	5.41	18
J76018				66.50	0.0	0.0	1.00		6.13		24

Lateral length= 670 Upstream length= 1170

*** JINTERURB Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
32	450	67.50	68.46	1.5	1.96	0.500	0.00	2.36	2.36	0
	0.0022	66.50	67.46	1.5	0.96	1.00	0.00	0.00	1.66	
J757D						0.500	Froude Number =		0.34	

*** JINTERURB Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
33	470	18	0.0029	66.50	0.0	16.1	9.11	16.10	328.83	11.20	27
J715718				65.12	0.0	0.0	1.00		4.90		30
34	250	18	0.0029	65.12	0.0	16.1	9.11	16.10	332.02	11.25	27
J714818				64.40	0.0	0.0	1.00		4.85		30
35	290	24	0.0011	64.40	0.0	16.1	5.12	16.10	245.24	9.53	30
J714624				64.07	0.0	0.0	1.00		6.56		36

Lateral length= 1460 Upstream length= 2630

ALGONA BASIN-J 25-YEAR FUTURE

*** JSEATTLESE

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
36	1100	18	0.0028	67.82	0.0	2.6	2.37	2.56	54.08		
J72118				64.79	0.0	0.0	0.59		4.74		
37	400	24	0.0018	64.79	0.0	4.8	2.37	4.79	57.99		
J72524				64.07	0.0	0.0	0.61		8.26		
38	40	24	0.0033	64.07	0.0	22.3	7.09	22.29	200.92	11.19	27
J714524				63.94	0.0	0.0	1.00		11.09		33
39	550	24	0.0032	63.94	0.0	30.1	9.59	30.12	273.66	19.11	30
J714424				62.18	0.0	0.0	1.00		11.01		36

Lateral length= 2090 Upstream length= 8403

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ALGONA BASIN-K 25-YEAR FUTURE

*** SUBK-1 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
1	400	69.20	69.70	1.3	1.50	0.500	0.00	0.80	0.80	0
	0.0024	68.25	68.75	0.8	0.50	1.00	0.00	0.00	1.29	
K52AVED						0.500	Froude Number =		0.35	

*** SUBK-1 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
2	60	12	0.0070	68.25	0.0	1.9	3.15	1.86	72.47		
K55812				67.83	0.0	0.0	0.71		2.56		
3	50	18	0.0042	67.80	0.0	2.7	2.77	2.65	45.34		
K55918				67.59	0.0	0.0	0.53		5.85		

Lateral length= 510 Upstream length= 510

*** SUBK-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
4	300	18	0.0006	69.34	0.0	0.5	0.86	0.50	21.94		
K57118				69.15	0.0	0.0	0.36		2.27		
5	450	18	0.0023	69.15	0.0	1.1	1.73	1.10	25.16		
K56618				68.10	0.0	0.0	0.39		4.36		

*** SUBK-2 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
6	200	68.10	68.82	1.2	1.72	0.500	0.00	2.02	2.02	0
	0.0044	67.22	67.94	2.1	0.72	1.00	0.00	0.00	2.06	
K5164D						0.500	Froude Number =		0.48	

*** SUBK-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
7	95	18	0.0045	67.22	0.0	2.0	2.62	2.02	33.31		
K516418				66.79	0.0	0.0	0.45		6.08		

ALGONA BASIN-K 25-YEAR FUTURE

*** SUBK-2

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
8	200	18	0.0008	66.78	0.0	2.0	1.40	2.02	81.83		
K516518				66.63	0.0	0.0	0.77		2.47		
9	400	18	0.0022	67.14	0.0	5.6	3.15	5.58	131.57	1.34	12
K516618				66.26	0.0	0.0	1.00		4.24		21

Lateral length= 1645 Upstream length= 2155

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ALGONA BASIN-L 25-YEAR FUTURE

*** SUBL-1 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
1	385	12	0.0011	70.89	0.0	1.8	2.24	1.76	175.99	0.76	12
L510812				70.48	0.0	0.0	1.00		1.00		15
2	280	18	0.0116	70.48	0.0	2.5	3.90	2.51	25.80		
L515618				67.24	0.0	0.0	0.39		9.72		
3	50	18	0.0106	67.50	0.0	3.3	4.07	3.27	35.13		
L515718				66.97	0.0	0.0	0.46		9.30		

Lateral length= 715 Upstream length= 715

*** SUBL-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
4	70	18	0.0054	68.38	0.0	1.0	2.25	0.99	14.85		
L511518				68.00	0.0	0.0	0.29		6.66		

*** SUBL-2 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
5	400	66.92	68.44	2.6	2.52	0.500	0.00	5.52	5.52	0
	0.0023	65.98	67.50	2.0	1.52	1.00	0.00	0.00	2.07	
L5171D						0.500	Froude Number =		0.35	

Lateral length= 470 Upstream length= 1185

*** SUBL-3 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
6	400	67.86	68.41	1.1	1.55	0.500	0.00	0.68	0.68	0
	0.0013	67.36	67.91	1.6	0.55	1.00	0.00	0.00	0.97	
L5132D						0.500	Froude Number =		0.26	

ALGONA BASIN-L 25-YEAR FUTURE

*** SUBL-3

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
7	45	12	0.0149	67.36	0.0	1.5	3.80	1.46	39.01		
L512912				66.69	0.0	0.0	0.49		3.74		

Lateral length= 445 Upstream length= 445

*** SUBL-4

Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
8	500	66.75	67.28	1.7	1.53	0.500	0.00	0.64	0.64	0
	0.0013	66.12	66.65	1.4	0.53	1.00	0.00	0.00	0.96	
L5130D						0.500	Froude Number =		0.26	

*** SUBL-4

Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
9	65	12	0.0069	66.12	0.0	3.1	3.89	3.06	119.96	0.51	8
L512512				65.67	0.0	0.0	1.00		2.55		15
10	300	18	0.0045	65.98	0.0	8.6	4.85	8.58	141.04	2.50	15
L512318				64.62	0.0	0.0	1.00		6.08		21

Lateral length= 865 Upstream length= 2495

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ALGONA BASIN-L 25-YEAR FUTURE

*** SUBL-1 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
1	385	12	0.0011	70.89	0.0	1.8	2.24	1.76	175.99	0.76	12
L510812				70.48	0.0	0.0	1.00		1.00		15
2	280	18	0.0116	70.48	0.0	2.5	3.90	2.51	25.80		
L515618				67.24	0.0	0.0	0.39		9.72		
3	50	18	0.0106	67.50	0.0	3.3	4.07	3.27	35.13		
L515718				66.97	0.0	0.0	0.46		9.30		

Lateral length= 715 Upstream length= 715

*** SUBL-2 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
4	70	18	0.0054	68.38	0.0	1.0	2.25	0.99	14.85		
L511518				68.00	0.0	0.0	0.29		6.66		

*** SUBL-2 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
5	400	66.92	68.44	2.6	2.52	0.500	0.00	5.52	5.52	0
	0.0023	65.98	67.50	2.0	1.52	1.00	0.00	0.00	2.07	
L5171D						0.500	Froude Number =		0.35	

Lateral length= 470 Upstream length= 1185

*** SUBL-3 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
6	400	67.86	68.41	1.1	1.55	0.500	0.00	0.68	0.68	0
	0.0013	67.36	67.91	1.6	0.55	1.00	0.00	0.00	0.97	
L5132D						0.500	Froude Number =		0.26	

ALGONA BASIN-L 25-YEAR FUTURE

*** SUBL-3 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
7	45	12	0.0149	67.36	0.0	1.5	3.80	1.46	39.01		
L512912				66.69	0.0	0.0	0.49		3.74		

Lateral length= 445 Upstream length= 445

*** SUBL-4 Channel

Link	Long Slope	Invert Up/Dn	Surf Up/Dn	FreBrd Up/Dn	Width Depth	Shape L/C/R	San Inf	Sto Mis	Flow Vel	Estimated Cost
8	500	66.75	67.28	1.7	1.53	0.500	0.00	0.64	0.64	0
	0.0013	66.12	66.65	1.4	0.53	1.00	0.00	0.00	0.96	
L5130D						0.500	Froude Number =		0.26	

*** SUBL-4 Analysis of Existing Pipes

Link	Long	Diam	Slope	Invert Up/Dn	San Inf	Sto Mis	Vel d/D	Design CFS	% Cap Q Max	Remove	Par Rep
9	65	12	0.0069	66.12	0.0	3.1	3.89	3.06	119.96	0.51	8
L512512				65.67	0.0	0.0	1.00		2.55		15
10	300	18	0.0045	65.98	0.0	8.6	4.85	8.58	141.04	2.50	15
L512318				64.62	0.0	0.0	1.00		6.08		21

Lateral length= 865 Upstream length= 2495