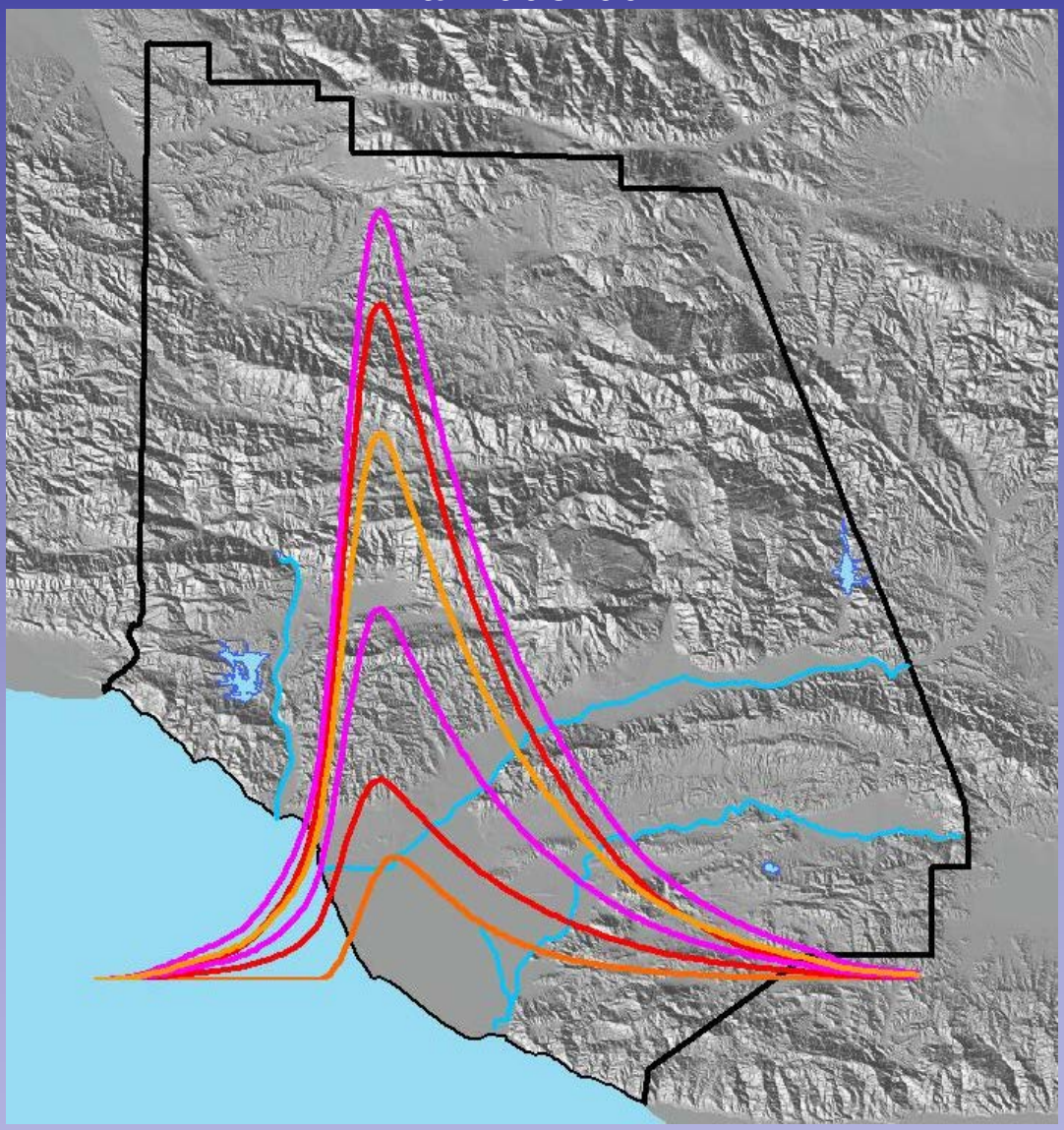
SANTA CLARA RIVER FRANKLIN-WASON-BROWN-CLARK-SUDDEN WATERSHEDS HSPF DESIGN STORM MODELING

Final Addendum I



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Hydrology Section
Watershed Resources and Technology Division
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Ventura County

Watershed Protection District

Hydrology Section

Project 12512

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EXECUTIVE SUMMARY

This report documents the work done by Kasraie Consulting (KC) for the Ventura County Watershed Protection District (VCWPD) in adapting the design hydrology for the Saticoy area watersheds of Franklin, Brown, Wason, Clark, and Sudden Barrancas. The design storm peaks and hydrographs were used for two-dimensional floodplain model of the watershed using FLO-2D. The design hydrology was based on the calibrated Santa Clara HSPF Model (Aqua Terra 2009). The main report (VCWPD, 2013) presented results for the regional-scale subareas included in the HSPF model.

KC prepared numerous additional hydrographs based on the regional model results for use in the FLO-2D model. The additional hydrographs were required to minimize the effects of using a hydrograph-based hydrology approach on the FLO-2D model results. The use of numerous hydrographs was necessary to approximate the spatial distribution of runoff that occurs in a design storm.

KC first subdivided the HSPF watersheds shown in Figure 1 into 177 smaller subareas as shown in Figure 2. This includes additional subareas outside of the original HSPF watersheds. They then took the HSPF 100-yr output hydrographs and pro-rated them by area based on the FLO-2D subareas. Next, they applied the design storm ratios supplied in the main report to convert the 100-yr hydrographs to other design storm frequencies for their modeling efforts. For storm events different from the 100-yr storm, hydrographs were converted based on land use designation as described in the report.

The District then reviewed the results and concluded that the FLO-2D hydrographs were consistent with the HSPF results and were suitable for use in the Saticoy area FLO-2D modeling effort.

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1. INTRODUCTION

This report documents the work done by Kasraie Consulting (KC) for the Ventura County Watershed Protection District (VCWPD) in adapting the design hydrology for the Saticoy area watersheds of Franklin, Brown, Wason, Clark, and Sudden Barrancas. The design hydrology was provided by the calibrated Santa Clara HSPF Model (Aqua Terra 2009). The model was used to provide the design storm peaks and hydrographs for two-dimensional floodplain modeling using FLO-2D. The main report (VCWPD, 2013) presented results for the regional-scale subareas included in the HSPF model.

KC prepared numerous additional hydrographs based on the regional model results for use in the FLO-2D model. The additional hydrographs were required to minimize the effects of using a hydrograph-based hydrology approach on the FLO-2D model results. The use of numerous hydrographs was necessary to better approximate the spatial distribution of runoff that occurs in a design storm and account for the timing of flow throughout the model domain more accurately.

2. FLO-2D HYDROGRAPHS

KC first subdivided the HSPF watersheds shown in Figure 1 into 177 smaller subareas as shown in Figure 2 and created 177 concentration points throughout the study area. The hydrologic concentration points were then spatially correlated to the FLO-2D grid elements. FLO-2D inflow nodes were then defined as either floodplain or channel elements in the Saticoy model.

They then took the HSPF output hydrographs and pro-rated them by area based on the FLO-2D subareas included in the 20 HSPF watersheds. This process was repeated for each of the six required storm frequencies.

The FLO-2D subarea boundaries follow the HSPF area boundaries with some minor exceptions. The FLO-2D subareas were checked by summing the areas and comparing them to the HSPF data.

2.1. Areas Outside of the HSPF Model

KC identified areas that were not included in the HSPF model that could contribute runoff to the developed areas in the FLO-2D model or that would drain directly to the SCR adjacently to the Saticoy redline channels. These areas are shown in Figure 3. The subarea upstream of Clark Barranca pro-rated the hydrograph from HSPF area 884 to get the runoff hydrograph. The subareas to the southwest of Clark Barranca used the hydrograph from HSPF area 885 to get the pro-rated hydrographs. The subareas to south and east of Franklin-Wason Barrancas used the hydrograph for HSPF area 874 to get the pro-rated hydrographs.

HSPF area 885 is mostly developed and so likely results in an overestimate of the peaks for the agricultural subareas to the southeast of Clark Barranca. However, these subareas drain directly to the SCR and do not affect the flooding in the redline channels that are being evaluated in the project.

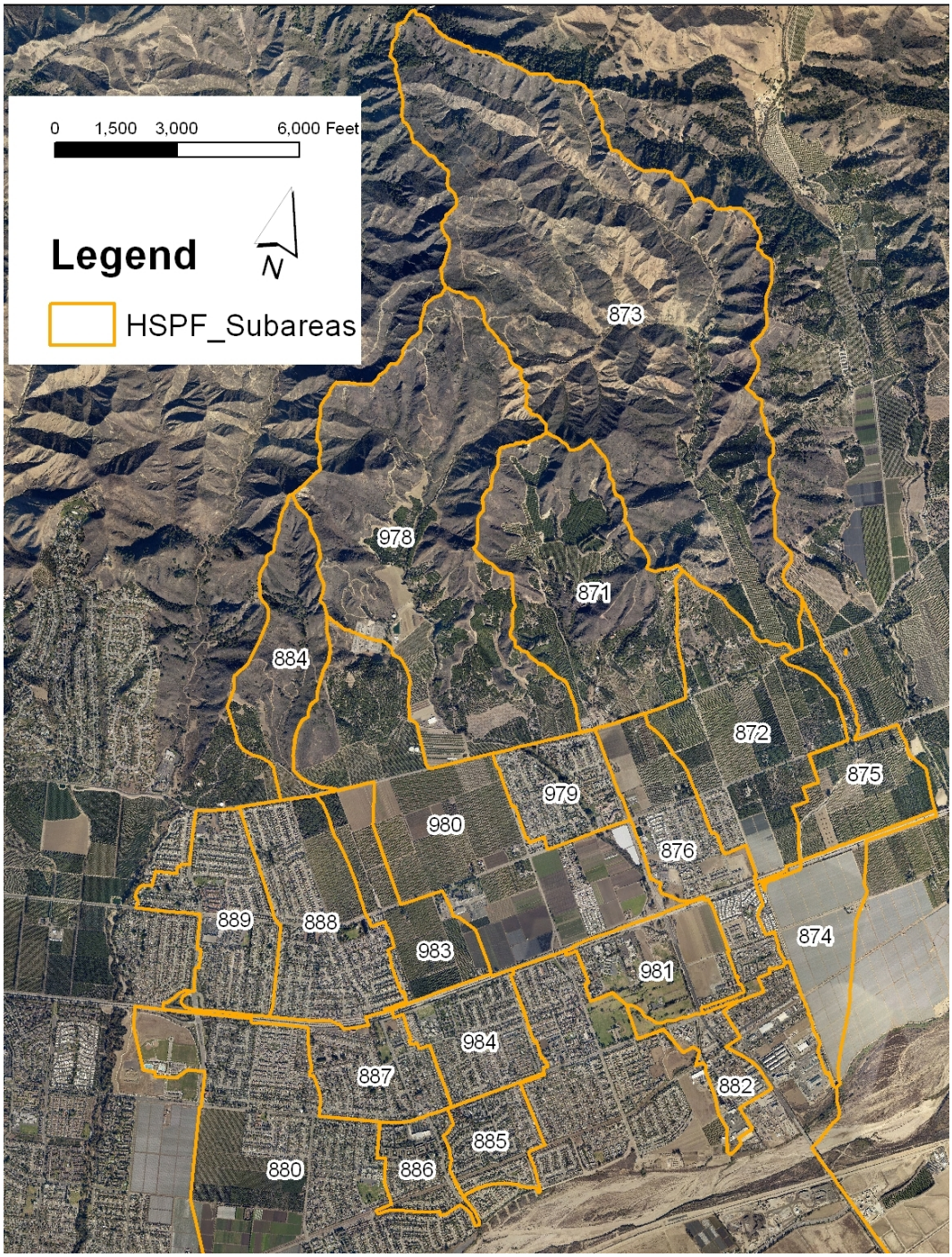

Figure 1 - 2013 HSPF Subareas and Reach Numbers

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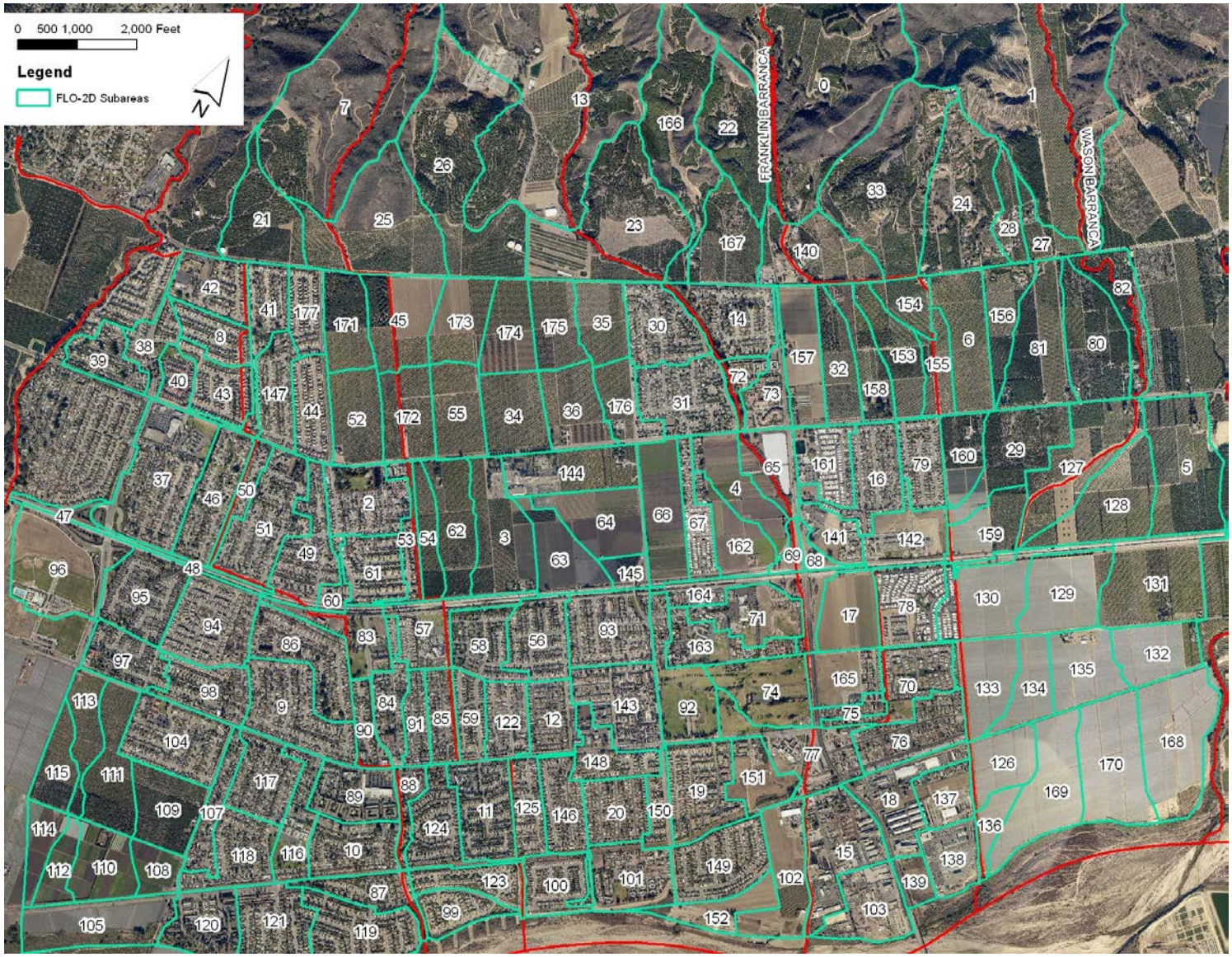

Figure 2 - FLO-2D Subareas

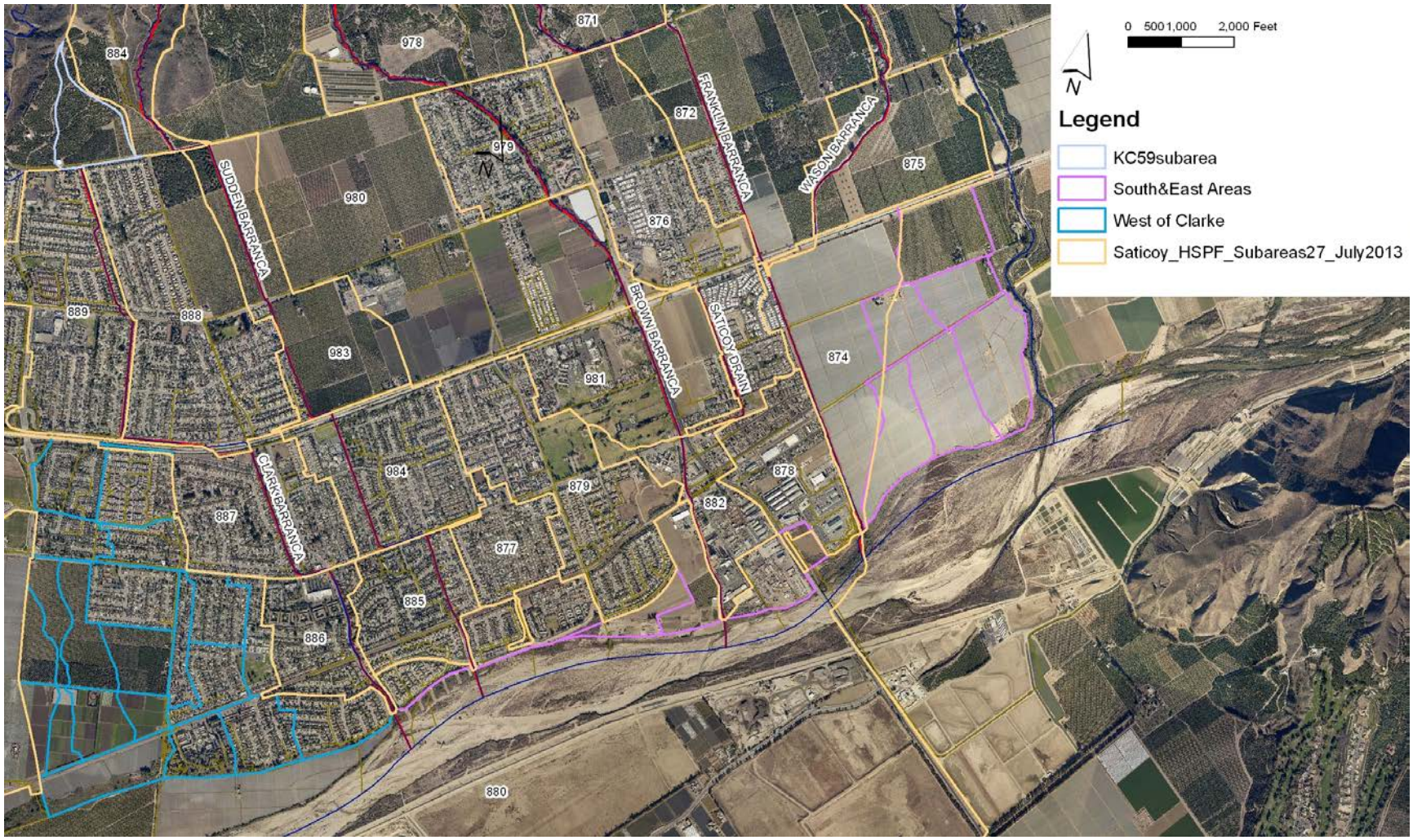

Figure 3 - HSPF Areas and Additional FLO-2D Subareas

Figure 4 - FLO-2D Subarea Land Use (U=Urban, A=Ag or Undev.)

2.2. Design Storm Ratio Application

Figure 4 shows a map of the general land uses assigned to the FLO-2D subareas. These land uses determined if the design storm ratios from undeveloped or mixed use/developed watersheds were applied to the pro-rated HSPF hydrographs to obtain the hydrology for storm frequencies other than the 100-yr. In general, the decision to use the appropriate set of multiplier is straightforward, except for irrigated parks and one subarea in the Saticoy Drain that had two-thirds agricultural land use and about one-third high density residential land use. KC decided to use the mixed/developed ratios for these partially developed subareas and the District agrees with this engineering judgment.

KC used the average storm ratios presented in the main report (VCWPD, 2013) to convert the 100-yr hydrographs to the other required storm frequencies. Table 1 includes the design storm ratios for developed watersheds from the main report

2.3. FLO-2D Peak Flows

Table 1 shows sample pro-rating calculations for HSPF subarea 886 representing an upper portion of the developed Clark Barranca watershed. The sum of the FLO-2D peaks and volumes are slightly different than the HSPF results due to rounding used in the pro-rating calculation. Appendix A presents a summary of the peak flow and hydrograph volume data used in the FLO-2D model.

Table 2 shows a comparison of the HSPF and aggregated FLO-2D data for the entire model. The sums of the areas and peaks used in the FLO-2D model are within 2.5% or less of the HSPF regional data. The differences are due to the slight differences in area between the regional HSPF subareas and the FLO-2D areas, and also due to the rounding used in the pro-rating calculation.

The percent differences in the peak/area ratio between the HSPF and aggregate FLO-2D hydrographs is also shown in Table 2. For the most upstream subarea, the hydrograph used in the FLO-2D calculations was the routed HSPF subarea hydrograph. For any downstream subarea, the local HSPF subarea hydrograph is used in the FLO-2D calculations.

Based on the evaluation, VCWPD concluded that the hydrographs developed by KC are appropriate for use in the Saticoy FLO-2D modeling effort.

3. SUMMARY AND CONCLUSIONS

This addendum describes the work by KC to prepare numerous additional hydrographs based on the regional model results for use in the FLO-2D model. The additional hydrographs were required to minimize the effects of using a hydrograph-based hydrology approach on the FLO-2D model results. The use of numerous

hydrographs was necessary to approximate the spatial distribution of runoff that occurs in a design storm.

KC first subdivided the HSPF watersheds shown in Figure 1 into 177 smaller subareas as shown in Figure 2. This includes additional subareas outside of the original HSPF watersheds. They then took the HSPF 100-yr output hydrographs and pro-rated them by area based on the FLO-2D subareas. Next, they applied the design storm ratios supplied in the main report to convert the hydrographs to other design storm frequencies for their modeling efforts.

The District then reviewed the results and concluded that the FLO-2D hydrographs were consistent with the HSPF results and were suitable for use in the Saticoy area FLO-2D modeling effort.

Table 1 - HSPF Subarea 886 Pro-Rated FLO-2D Results

Channel	CLARK					
HSPF ID	886					
HSPF AREA ac.	93.66					
HSPF 100-Yr Pk cfs	274					
HSPF 100-Yr Vol. af	53					
FLO-2D ID	10	87	88	89	FLO-2D Sum	HSPF Result
Primary Land Use	URBAN	URBAN	URBAN	URBAN		
FLO-2D Area Ac.	31.08	21.82	11.57	29.19	93.66	93.66
Subarea Ratios	0.33	0.23	0.12	0.31	0.99	1.00
Ratio 5/100-yr	0.330	0.330	0.330	0.330	-	-
5-yr Peak cfs	29.8	20.8	10.9	28.0	89.52	90.42
5-yr Vol af	5.8	4.0	2.1	5.4	17.32	17.49
Ratio 10/100-yr	0.464	0.464	0.464	0.464	-	-
10-yr Peak cfs	42.0	29.2	15.3	39.4	125.86	127.14
10-yr Vol af	8.1	5.7	3.0	7.6	24.35	24.59
Ratio 25/100-yr	0.660	0.660	0.660	0.660	-	-
25-yr Peak cfs	59.7	41.6	21.7	56.1	179.03	180.84
25-yr Vol af	11.5	8.0	4.2	10.8	34.63	34.98
Ratio 50/100-yr	0.822	0.822	0.822	0.822	-	-
50-yr Peak cfs	74.3	51.8	27.0	69.8	222.98	225.23
50-yr Vol af	14.4	10.0	5.2	13.5	43.13	43.57
Ratio 100/100-yr	1.00	1.00	1.00	1.00	-	-
100-yr Peak cfs	90.4	63.0	32.9	84.9	271.26	274.00
100-yr Vol af	17.5	12.2	6.4	16.4	52.47	53.00
Ratio 500/100-yr	1.502	1.502	1.502	1.502	-	-
500-yr Peak cfs	135.8	94.7	49.4	127.6	407.44	411.55
500-yr Vol af	26.3	18.3	9.6	24.7	78.81	79.61

Table 2 - HSPF and FLO-2D Comparison Table

Subarea Name	HSPF Reach	Area ac.	Local Subarea Peak cfs	Local Subarea Ratio cfs/ac	Routed Flow Peak cfs	Routed Flow Ratio cfs/ac	FLO-2D Area Sum ac.	FLO-2D Area Peak Sum cfs	FLO-2D cfs/ac	Cfs/ac % Change	FLO-2D Area Vol. af	FLO-2D Yield in.
Upper Franklin	871	539.8	1,460.0	2.70	1,020.0	1.89	538.9	1009.8	1.87	0.8%	277.2	6.17
Middle Franklin	872	437.0	888.0	2.03	1,650.0	1.69	435.5	896.9	2.06	-1.4%	255.5	7.04
Upper Wason	873	1,665.5	4,560.0	2.74	2,220.0	1.33	1,662.3	2,220.0	1.34	-0.2%	810.0	5.85
Middle Wason	875	198.9	397.0	2.00	2,270.0	1.22	189.8	381.1	2.01	-0.6%	110.4	6.98
Lower Franklin-Wason	874	199.8	389.0	1.95	3,930.0	1.29	179.2	354.0	1.98	-1.5%	106.5	7.13
Saticoy Op. Yard	878	117.6	391.5	3.33	NC	NC	113.9	379.8	3.33	-0.2%	63.1	6.65
Upper Brown	978	1,006.0	2,700.0	2.68	1,590.0	1.58	1,041.7	1,653.6	1.59	-0.4%	532.5	6.13
Brown Blw Foothill	979	145.5	365.0	2.51	1,750.0	1.52	145.5	365.0	2.51	0.0%	80.0	6.60
Brown Abv 126	980	698.8	1,420.0	2.03	2,720.0	1.47	682.1	1,377.4	2.02	0.6%	389.9	6.86
Brown Abv Teleph.	981	183.6	433.0	2.36	2,950.0	1.45	183.6	428.7	2.33	1.0%	100.0	6.54
Saticoy Drn at Brwn	876	259.1	579.0	2.27	295.0	1.16	259.1	573.2	2.21	2.5%	144.5	6.69
Lower Brown	882	90.5	265.0	2.93	3,330.0	1.40	90.5	265.0	2.93	0.0%	51.0	6.76
Saticoy Ave Drn	879	232.2	565.8	2.44	NC	NC	232.2	560.1	2.41	1.0%	125.7	6.50
54” RCP Nr Sudden	877	76.6	201.9	2.63	NC	NC	76.6	201.9	2.64	-0.1%	43.0	6.74
Upper Sudden	884	231.7	623.0	2.69	372.0	1.61	219.8	353.4	1.61	-0.1%	107.4	5.86
Sudden Below Foothill	983	180.7	347.0	1.92	650.0	1.58	180.5	347.0	1.92	-0.1%	106.0	7.05
Sudden Blw 126	984	165.9	489.0	2.95	801.0	1.39	165.9	489.0	2.95	0.0%	94.0	6.80
Lower Sudden	885	109.0	299.0	2.74	892.0	1.30	109.0	299.0	2.74	0.0%	62.0	6.83
Upper Clark West	889	232.7	703.0	3.02	424.0	1.82	225.2	681.9	3.03	-0.2%	128.0	6.82
Upper Clark East	888	309.2	815.0	2.64	894.0	1.65	317.1	815.0	2.57	2.5%	177.0	6.70
Clark Blw 126	887	175.4	535.0	3.05	1,090.0	1.52	175.8	540.4	3.07	-0.8%	100.0	6.83
Lower Clark	886	93.7	274.0	2.93	1,180.0	1.46	93.7	271.3	2.90	1.0%	52.5	6.72

NC= Routed Hydrograph Not Calculated

4. REFERENCES

Aqua Terra Consultants, 2009. Hydrologic Modeling of the Santa Clara River with the U.S. EPA Hydrologic Simulation Program – FORTRAN (HSPF). November, 2009.

VCWPD, 2013. Santa Clara River Franklin-Wason-Brown-Clark-Sudden Watershed HSPF Design Storm Modeling.

5. FILES

The files associated with this project are stored in:

K:\WRT\hydrology\Watersheds\Santa Clara\SaticoyModeling

6. APPENDIX A – FLO-2D HYDROGRAPH DATA

ID	Channel	Area Ac.	Primary Land Use	HSPF ID	HSPF AREA ac.	Subarea Ratio	HSPF PEAK cfs	HSPF VOL af	Ratio 5/100-yr	5-yr Peak cfs	5-yr Vol af	Ratio 10/100-yr	10-yr Peak cfs	10-yr Vol af	Ratio 25/100-yr	25-yr Peak cfs	25-yr Vol af	Ratio 50/100-yr	50-yr Peak cfs	50-yr Vol af	Ratio 100/100-yr	100-yr Peak cfs	100-yr Vol af	Ratio 500/100-yr	500-yr Peak cfs	500-yr Vol af
0	FRANKLIN	347.31	UNDEV_AG	871	539.83	0.64	1020	280	0.144	94.0	25.8	0.262	171.0	47.0	0.484	316.0	86.7	0.711	464.1	127.4	1.00	652.8	179.2	1.952	1274.3	349.8
1	WASON	1662.35	UNDEV_AG	873	1665.48	1.00	2220	810	0.144	319.7	116.6	0.262	581.6	212.2	0.484	1074.5	392.0	0.711	1578.4	575.9	1.00	2220.0	810.0	1.952	4333.4	1581.1
2	CLARK	35.05	URBAN	888	309.20	0.11	815	177	0.330	29.6	6.4	0.464	41.6	9.0	0.660	59.2	12.9	0.822	73.7	16.0	1.00	89.7	19.5	1.502	134.7	29.2
3	SUDDEN	45.07	UNDEV_AG	983	180.68	0.25	347	106	0.144	12.5	3.8	0.262	22.7	6.9	0.484	42.0	12.8	0.711	61.7	18.8	1.00	86.8	26.5	1.952	169.3	51.7
4	BROWN	30.58	UNDEV_AG	980	698.76	0.04	1420	402	0.144	8.2	2.3	0.262	14.9	4.2	0.484	27.5	7.8	0.711	40.4	11.4	1.00	56.8	16.1	1.952	110.9	31.4
5	WASON	58.96	UNDEV_AG	875	199.79	0.30	397	115	0.144	17.2	5.0	0.262	31.2	9.0	0.484	57.6	16.7	0.711	84.7	24.5	1.00	119.1	34.5	1.952	232.5	67.3
6	FRANKLIN	39.54	UNDEV_AG	872	436.99	0.09	888	253	0.144	11.5	3.3	0.262	20.9	6.0	0.484	38.7	11.0	0.711	56.8	16.2	1.00	79.9	22.8	1.952	156.0	44.4
7	SUDDEN	219.82	UNDEV_AG	884	231.71	0.95	372	113	0.144	50.9	15.5	0.262	92.6	28.1	0.484	171.1	52.0	0.711	251.3	76.3	1.00	353.4	107.4	1.952	689.8	209.5
8	CLARK	19.55	URBAN	889	232.70	0.08	703	132	0.330	18.6	3.5	0.464	26.1	4.9	0.660	37.1	7.0	0.822	46.2	8.7	1.00	56.2	10.6	1.502	84.5	15.9
9	CLARK	46.54	URBAN	887	175.38	0.27	535	99	0.330	47.7	8.8	0.464	67.0	12.4	0.660	95.3	17.6	0.822	118.7	22.0	1.00	144.5	26.7	1.502	217.0	40.1
10	CLARK	31.08	URBAN	886	93.66	0.33	274	53	0.330	29.8	5.8	0.464	42.0	8.1	0.660	59.7	11.5	0.822	74.3	14.4	1.00	90.4	17.5	1.502	135.8	26.3
11	SUDDEN	36.29	URBAN	885	109.04	0.33	299	62	0.330	32.6	6.8	0.464	45.8	9.5	0.660	65.1	13.5	0.822	81.1	16.8	1.00	98.7	20.5	1.502	148.2	30.7
12	SUDDEN	22.67	URBAN	984	165.94	0.14	489	94	0.330	22.6	4.3	0.464	31.8	6.1	0.660	45.2	8.7	0.822	56.3	10.8	1.00	68.5	13.2	1.502	102.8	19.8
13	BROWN	824.08	UNDEV_AG	978	1005.98	0.82	1590	512	0.144	187.8	60.5	0.262	341.6	110.0	0.484	631.0	203.2	0.711	927.0	298.5	1.00	1303.8	419.8	1.952	2545.0	819.5
14	BROWN	39.27	URBAN	979	145.53	0.27	365	80	0.330	32.5	7.1	0.464	45.7	10.0	0.660	65.0	14.3	0.822	81.0	17.8	1.00	98.6	21.6	1.502	148.0	32.4
15	BROWN	47.98	URBAN	882	90.48	0.53	265	51	0.330	46.4	8.9	0.464	65.2	12.5	0.660	92.7	17.8	0.822	115.5	22.2	1.00	140.5	27.0	1.502	211.0	40.6
16	SATICOY DRN	34.98	URBAN	876	259.13	0.13	579	146	0.330	24.8	6.3	0.464	34.9	8.8	0.660	49.7	12.5	0.822	61.9	15.6	1.00	75.3	19.0	1.502	113.1	28.5
17	BROWN	28.45	UNDEV_AG	981	183.62	0.15	433	101	0.144	9.4	2.2	0.262	17.0	4.0	0.484	31.4	7.3	0.711	46.2	10.8	1.00	65.0	15.2	1.952	126.8	29.6
18	SATICOY YD	36.12	URBAN	878	117.61	0.31	392	65	0.330	40.1	6.6	0.464	56.3	9.3	0.660	80.1	13.3	0.822	99.8	16.6	1.00	121.4	20.2	1.502	182.3	30.3
19	SCR-	40.01	URBAN	879	232.20	0.17	566	127	0.330	31.7	7.1	0.464	44.6	10.0	0.660	63.5	14.2	0.822	79.1	17.7	1.00	96.2	21.6	1.502	144.5	32.4
20	SCR-	26.04	URBAN	877	76.64	0.34	202	43	0.330	22.7	4.8	0.464	31.9	6.8	0.660	45.3	9.6	0.822	56.4	12.0	1.00	68.6	14.6	1.502	103.1	22.0
21	CLARK	41.20	UNDEV_AG	884	231.71	0.18	372	113	0.144	9.6	2.9	0.262	17.5	5.3	0.484	32.4	9.8	0.711	47.6	14.5	1.00	67.0	20.3	1.952	130.7	39.7
22	BROWN	48.07	UNDEV_AG	871	539.83	0.09	1020	280	0.144	13.2	3.6	0.262	24.1	6.6	0.484	44.4	12.2	0.711	65.3	17.9	1.00	91.8	25.2	1.952	179.2	49.2
23	BROWN	99.14	UNDEV_AG	978	1005.98	0.10	1590	512	0.144	22.9	7.4	0.262	41.7	13.4	0.484	77.0	24.8	0.711	113.1	36.4	1.00	159.0	51.2	1.952	310.4	99.9
24	FRANKLIN	67.67	UNDEV_AG	872	436.99	0.15	888	253	0.144	19.2	5.5	0.262	34.9	9.9	0.484	64.5	18.4	0.711	94.7	27.0	1.00	133.2	38.0	1.952	260.0	74.1
25	SUDDEN	78.87	UNDEV_AG	980	698.76	0.11	1420	402	0.144	22.5	6.4	0.262	40.9	11.6	0.484	75.6	21.4	0.711	111.1	31.4	1.00	156.2	44.2	1.952	304.9	86.3
26	SUDDEN	111.69	UNDEV_AG	980	698.76	0.16	1420	402	0.144	32.7	9.3	0.262	59.5	16.9	0.484	110.0	31.1	0.711	161.5	45.7	1.00	227.2	64.3	1.952	443.5	125.6
27	FRANKLIN	14.84	UNDEV_AG	872	436.99	0.03	888	253	0.144	3.8	1.1	0.262	7.0	2.0	0.484	12.9	3.7	0.711	18.9	5.4	1.00	26.6	7.6	1.952	52.0	14.8
28	FRANKLIN	15.71	UNDEV_AG	872	436.99	0.04	888	253	0.144	5.1	1.5	0.262	9.3	2.7	0.484	17.2	4.9	0.711	25.3	7.2	1.00	35.5	10.1	1.952	69.3	19.8
29	FRANKLIN	42.64	UNDEV_AG	872	436.99	0.10	888	253	0.144	12.8	3.6	0.262	23.3	6.6	0.484	43.0	12.2	0.711	63.1	18.0	1.00	88.8	25.3	1.952	173.3	49.4
30	BROWN	34.37	URBAN	979	145.53	0.24	365	80	0.330	28.9	6.3	0.464	40.7	8.9	0.660	57.8	12.7	0.822	72.0	15.8	1.00	87.6	19.2	1.502	131.6	28.8
31	BROWN	41.39	URBAN	979	145.53	0.28	365	80	0.330	33.7	7.4	0.464	47.4	10.4	0.660	67.5	14.8	0.822	84.0	18.4	1.00	102.2	22.4	1.502	153.5	33.6
32	FRANKLIN	26.56	UNDEV_AG	876	259.13	0.10	579	146	0.144	8.3	2.1	0.262	15.2	3.8	0.484	28.0	7.1	0.711	41.2	10.4	1.00	57.9	14.6	1.952	113.0	28.5
33	FRANKLIN	98.19	UNDEV_AG	871	539.83	0.18	1020	280	0.144	26.4	7.3	0.262	48.1	13.2	0.484	88.9	24.4	0.711	130.5	35.8	1.00	183.6	50.4	1.952	358.4	98.4
34	BROWN	33.08	UNDEV_AG	980	698.76	0.05	1420	402	0.144	10.2	2.9	0.262	18.6	5.3	0.484	34.4	9.7	0.711	50.5	14.3	1.00	71.0	20.1	1.952	138.6	39.2
35	BROWN	25.47	UNDEV_AG	980	698.76	0.04	1420	402	0.144	8.2	2.3	0.262	14.9	4.2	0.484	27.5	7.8	0.711	40.4	11.4	1.00	56.8	16.1	1.952	110.9	31.4
36	BROWN	31.50	UNDEV_AG	980	698.76	0.05	1420	402	0.144	10.2	2.9	0.262	18.6	5.3	0.484	34.4	9.7	0.711	50.5	14.3	1.00	71.0	20.1	1.952	138.6	39.2

ID	Channel	Area Ac.	Primary Land Use	HSPF ID	HSPF AREA ac.	Subarea Ratio	HSPF PEAK cfs	HSPF VOL af	Ratio 5/100-yr	5-yr Peak cfs	5-yr Vol af	Ratio 10/100-yr	10-yr Peak cfs	10-yr Vol af	Ratio 25/100-yr	25-yr Peak cfs	25-yr Vol af	Ratio 50/100-yr	50-yr Peak cfs	50-yr Vol af	Ratio 100/100-yr	100-yr Peak cfs	100-yr Vol af	Ratio 500/100-yr	500-yr Peak cfs	500-yr Vol af
37	CLARK	67.29	URBAN	889	232.70	0.29	703	132	0.330	67.3	12.6	0.464	94.6	17.8	0.660	134.6	25.3	0.822	167.6	31.5	1.00	203.9	38.3	1.502	306.2	57.5
38	CLARK	17.85	URBAN	889	232.70	0.08	703	132	0.330	18.6	3.5	0.464	26.1	4.9	0.660	37.1	7.0	0.822	46.2	8.7	1.00	56.2	10.6	1.502	84.5	15.9
39	CLARK	21.47	URBAN	889	232.70	0.09	703	132	0.330	20.9	3.9	0.464	29.4	5.5	0.660	41.8	7.8	0.822	52.0	9.8	1.00	63.3	11.9	1.502	95.0	17.8
40	CLARK	11.93	URBAN	889	232.70	0.05	703	132	0.330	11.6	2.2	0.464	16.3	3.1	0.660	23.2	4.4	0.822	28.9	5.4	1.00	35.2	6.6	1.502	52.8	9.9
41	CLARK	26.05	URBAN	888	309.20	0.08	815	177	0.330	21.5	4.7	0.464	30.3	6.6	0.660	43.0	9.3	0.822	53.6	11.6	1.00	65.2	14.2	1.502	97.9	21.3
42	CLARK	27.49	URBAN	889	232.70	0.12	703	132	0.330	27.8	5.2	0.464	39.1	7.3	0.660	55.7	10.5	0.822	69.3	13.0	1.00	84.4	15.8	1.502	126.7	23.8
43	CLARK	24.60	URBAN	889	232.70	0.11	703	132	0.330	25.5	4.8	0.464	35.9	6.7	0.660	51.0	9.6	0.822	63.6	11.9	1.00	77.3	14.5	1.502	116.2	21.8
44	CLARK	24.97	URBAN	888	309.20	0.08	815	177	0.330	21.5	4.7	0.464	30.3	6.6	0.660	43.0	9.3	0.822	53.6	11.6	1.00	65.2	14.2	1.502	97.9	21.3
45	SUDDEN	39.74	UNDEV_AG	983	180.68	0.22	347	106	0.144	11.0	3.4	0.262	20.0	6.1	0.484	37.0	11.3	0.711	54.3	16.6	1.00	76.3	23.3	1.952	149.0	45.5
46	CLARK	35.01	URBAN	889	232.70	0.15	703	132	0.330	34.8	6.5	0.464	48.9	9.2	0.660	69.6	13.1	0.822	86.7	16.3	1.00	105.5	19.8	1.502	158.4	29.7
47	CLARK	6.63	URBAN	887	175.38	0.04	535	99	0.330	7.1	1.3	0.464	9.9	1.8	0.660	14.1	2.6	0.822	17.6	3.3	1.00	21.4	4.0	1.502	32.1	5.9
48	CLARK	6.85	URBAN	887	175.38	0.04	535	99	0.330	7.1	1.3	0.464	9.9	1.8	0.660	14.1	2.6	0.822	17.6	3.3	1.00	21.4	4.0	1.502	32.1	5.9
49	CLARK	35.28	URBAN	888	309.20	0.11	815	177	0.330	29.6	6.4	0.464	41.6	9.0	0.660	59.2	12.9	0.822	73.7	16.0	1.00	89.7	19.5	1.502	134.7	29.2
50	CLARK	11.06	URBAN	888	309.20	0.04	815	177	0.330	10.8	2.3	0.464	15.1	3.3	0.660	21.5	4.7	0.822	26.8	5.8	1.00	32.6	7.1	1.502	49.0	10.6
51	CLARK	47.91	URBAN	888	309.20	0.15	815	177	0.330	40.3	8.8	0.464	56.7	12.3	0.660	80.7	17.5	0.822	100.5	21.8	1.00	122.3	26.6	1.502	183.6	39.9
52	CLARK	31.16	UNDEV_AG	888	309.20	0.10	815	177	0.144	11.7	2.5	0.262	21.4	4.6	0.484	39.5	8.6	0.711	58.0	12.6	1.00	81.5	17.7	1.952	159.1	34.6
53	SUDDEN	14.31	URBAN	983	180.68	0.08	347	106	0.330	9.2	2.8	0.464	12.9	3.9	0.660	18.3	5.6	0.822	22.8	7.0	1.00	27.8	8.5	1.502	41.7	12.7
54	SUDDEN	17.53	UNDEV_AG	983	180.68	0.10	347	106	0.144	5.0	1.5	0.262	9.1	2.8	0.484	16.8	5.1	0.711	24.7	7.5	1.00	34.7	10.6	1.952	67.7	20.7
55	BROWN	30.86	UNDEV_AG	980	698.76	0.04	1420	402	0.144	8.2	2.3	0.262	14.9	4.2	0.484	27.5	7.8	0.711	40.4	11.4	1.00	56.8	16.1	1.952	110.9	31.4
56	SUDDEN	30.87	URBAN	984	165.94	0.19	489	94	0.330	30.7	5.9	0.464	43.1	8.3	0.660	61.3	11.8	0.822	76.4	14.7	1.00	92.9	17.9	1.502	139.6	26.8
57	SUDDEN	30.25	URBAN	984	165.94	0.18	489	94	0.330	29.1	5.6	0.464	40.8	7.9	0.660	58.1	11.2	0.822	72.4	13.9	1.00	88.0	16.9	1.502	132.2	25.4
58	SUDDEN	26.79	URBAN	984	165.94	0.16	489	94	0.330	25.8	5.0	0.464	36.3	7.0	0.660	51.6	9.9	0.822	64.3	12.4	1.00	78.2	15.0	1.502	117.5	22.6
59	SUDDEN	16.59	URBAN	984	165.94	0.10	489	94	0.330	16.1	3.1	0.464	22.7	4.4	0.660	32.3	6.2	0.822	40.2	7.7	1.00	48.9	9.4	1.502	73.5	14.1
60	CLARK	7.42	URBAN	888	309.20	0.02	815	177	0.330	5.4	1.2	0.464	7.6	1.6	0.660	10.8	2.3	0.822	13.4	2.9	1.00	16.3	3.5	1.502	24.5	5.3
61	CLARK	25.57	URBAN	888	309.20	0.08	815	177	0.330	21.5	4.7	0.464	30.3	6.6	0.660	43.0	9.3	0.822	53.6	11.6	1.00	65.2	14.2	1.502	97.9	21.3
62	SUDDEN	33.10	UNDEV_AG	983	180.68	0.18	347	106	0.144	9.0	2.7	0.262	16.4	5.0	0.484	30.2	9.2	0.711	44.4	13.6	1.00	62.5	19.1	1.952	121.9	37.2
63	BROWN	30.14	UNDEV_AG	980	698.76	0.04	1420	402	0.144	8.2	2.3	0.262	14.9	4.2	0.484	27.5	7.8	0.711	40.4	11.4	1.00	56.8	16.1	1.952	110.9	31.4
64	BROWN	35.36	UNDEV_AG	980	698.76	0.05	1420	402	0.144	10.2	2.9	0.262	18.6	5.3	0.484	34.4	9.7	0.711	50.5	14.3	1.00	71.0	20.1	1.952	138.6	39.2
65	BROWN	25.40	UNDEV_AG	980	698.76	0.04	1420	402	0.144	8.2	2.3	0.262	14.9	4.2	0.484	27.5	7.8	0.711	40.4	11.4	1.00	56.8	16.1	1.952	110.9	31.4
66	BROWN	37.52	UNDEV_AG	980	698.76	0.05	1420	402	0.144	10.2	2.9	0.262	18.6	5.3	0.484	34.4	9.7	0.711	50.5	14.3	1.00	71.0	20.1	1.952	138.6	39.2
67	BROWN	19.90	URBAN	980	698.76	0.03	1420	402	0.330	14.1	4.0	0.464	19.8	5.6	0.660	28.1	8.0	0.822	35.0	9.9	1.00	42.6	12.1	1.502	64.0	18.1
68	BROWN	5.96	URBAN	980	698.76	0.01	1420	402	0.330	4.7	1.3	0.464	6.6	1.9	0.660	9.4	2.7	0.822	11.7	3.3	1.00	14.2	4.0	1.502	21.3	6.0
69	BROWN	6.25	URBAN	980	698.76	0.01	1420	402	0.330	4.7	1.3	0.464	6.6	1.9	0.660	9.4	2.7	0.822	11.7	3.3	1.00	14.2	4.0	1.502	21.3	6.0
70	SATICOY DRN	32.17	URBAN	876	259.13	0.12	579	146	0.330	22.9	5.8	0.464	32.2	8.1	0.660	45.9	11.6	0.822	57.1	14.4	1.00	69.5	17.5	1.502	104.4	26.3
71	BROWN	30.24	URBAN	981	183.62	0.16	433	101	0.330	22.9	5.3	0.464	32.2	7.5	0.660	45.7	10.7	0.822	57.0	13.3	1.00	69.3	16.2	1.502	104.1	24.3
72	BROWN	10.37	URBAN	979	145.53	0.07	365	80	0.330	8.4	1.8	0.464	11.9	2.6	0.660	16.9	3.7	0.822	21.0	4.6	1.00	25.6	5.6	1.502	38.4	8.4
73	BROWN	20.14	URBAN	979	145.53	0.14	365	80	0.330	16.9	3.7	0.464	23.7	5.2	0.660	33.7	7.4	0.822	42.0	9.2	1.00	51.1	11.2	1.502	76.8	16.8
74	BROWN	36.21	URBAN	981	183.62	0.20	433	101	0.330	28.6	6.7	0.464	40.2	9.4	0.660	57.2	13.3	0.822	71.2	16.6	1.00	86.6	20.2	1.502	130.1	30.3

ID	Channel	Area Ac.	Primary Land Use	HSPF ID	HSPF AREA ac.	Subarea Ratio	HSPF PEAK cfs	HSPF VOL af	Ratio 5/100-yr	5-yr Peak cfs	5-yr Vol af	Ratio 10/100-yr	10-yr Peak cfs	10-yr Vol af	Ratio 25/100-yr	25-yr Peak cfs	25-yr Vol af	Ratio 50/100-yr	50-yr Peak cfs	50-yr Vol af	Ratio 100/100-yr	100-yr Peak cfs	100-yr Vol af	Ratio 500/100-yr	500-yr Peak cfs	500-yr Vol af
75	BROWN	7.75	URBAN	981	183.62	0.04	433	101	0.330	5.7	1.3	0.464	8.0	1.9	0.660	11.4	2.7	0.822	14.2	3.3	1.00	17.3	4.0	1.502	26.0	6.1
76	BROWN	34.27	URBAN	878	117.61	0.29	392	65	0.330	37.5	6.2	0.464	52.7	8.7	0.660	74.9	12.4	0.822	93.3	15.5	1.00	113.5	18.9	1.502	170.5	28.3
77	BROWN	42.50	URBAN	882	90.48	0.47	265	51	0.330	41.1	7.9	0.464	57.8	11.1	0.660	82.2	15.8	0.822	102.4	19.7	1.00	124.6	24.0	1.502	187.1	36.0
78	SATICOY DRN	33.64	URBAN	876	259.13	0.13	579	146	0.330	24.8	6.3	0.464	34.9	8.8	0.660	49.7	12.5	0.822	61.9	15.6	1.00	75.3	19.0	1.502	113.1	28.5
79	FRANKLIN	24.22	URBAN	872	436.99	0.06	888	253	0.330	17.6	5.0	0.464	24.7	7.0	0.660	35.2	10.0	0.822	43.8	12.5	1.00	53.3	15.2	1.502	80.0	22.8
80	FRANKLIN	46.29	UNDEV_AG	872	436.99	0.11	888	253	0.144	14.1	4.0	0.262	25.6	7.3	0.484	47.3	13.5	0.711	69.5	19.8	1.00	97.7	27.8	1.952	190.7	54.3
81	FRANKLIN	48.64	UNDEV_AG	872	436.99	0.11	888	253	0.144	14.1	4.0	0.262	25.6	7.3	0.484	47.3	13.5	0.711	69.5	19.8	1.00	97.7	27.8	1.952	190.7	54.3
82	WASON	28.14	UNDEV_AG	875	199.79	0.14	397	115	0.144	8.0	2.3	0.262	14.6	4.2	0.484	26.9	7.8	0.711	39.5	11.4	1.00	55.6	16.1	1.952	108.5	31.4
83	CLARK	26.34	URBAN	887	175.38	0.15	535	99	0.330	26.5	4.9	0.464	37.2	6.9	0.660	53.0	9.8	0.822	66.0	12.2	1.00	80.3	14.9	1.502	120.5	22.3
84	CLARK	21.22	URBAN	887	175.38	0.12	535	99	0.330	21.2	3.9	0.464	29.8	5.5	0.660	42.4	7.8	0.822	52.8	9.8	1.00	64.2	11.9	1.502	96.4	17.8
85	SUDDEN	17.41	URBAN	984	165.94	0.10	489	94	0.330	16.1	3.1	0.464	22.7	4.4	0.660	32.3	6.2	0.822	40.2	7.7	1.00	48.9	9.4	1.502	73.5	14.1
86	CLARK	40.40	URBAN	887	175.38	0.23	535	99	0.330	40.6	7.5	0.464	57.1	10.6	0.660	81.2	15.0	0.822	101.2	18.7	1.00	123.1	22.8	1.502	184.8	34.2
87	CLARK	21.82	URBAN	886	93.66	0.23	274	53	0.330	20.8	4.0	0.464	29.2	5.7	0.660	41.6	8.0	0.822	51.8	10.0	1.00	63.0	12.2	1.502	94.7	18.3
88	CLARK	11.57	URBAN	886	93.66	0.12	274	53	0.330	10.9	2.1	0.464	15.3	3.0	0.660	21.7	4.2	0.822	27.0	5.2	1.00	32.9	6.4	1.502	49.4	9.6
89	CLARK	29.19	URBAN	886	93.66	0.31	274	53	0.330	28.0	5.4	0.464	39.4	7.6	0.660	56.1	10.8	0.822	69.8	13.5	1.00	84.9	16.4	1.502	127.6	24.7
90	CLARK	13.58	URBAN	887	175.38	0.08	535	99	0.330	14.1	2.6	0.464	19.9	3.7	0.660	28.3	5.2	0.822	35.2	6.5	1.00	42.8	7.9	1.502	64.3	11.9
91	CLARK	14.25	URBAN	887	175.38	0.08	535	99	0.330	14.1	2.6	0.464	19.9	3.7	0.660	28.3	5.2	0.822	35.2	6.5	1.00	42.8	7.9	1.502	64.3	11.9
92	SCR-	35.97	URBAN	879	232.20	0.15	566	127	0.330	28.0	6.3	0.464	39.4	8.8	0.660	56.0	12.6	0.822	69.8	15.7	1.00	84.9	19.1	1.502	127.5	28.6
93	SCR-	40.36	URBAN	879	232.20	0.17	566	127	0.330	31.7	7.1	0.464	44.6	10.0	0.660	63.5	14.2	0.822	79.1	17.7	1.00	96.2	21.6	1.502	144.5	32.4
94	SCR-	43.77	URBAN	885	109.04	0.40	299	62	0.330	39.5	8.2	0.464	55.5	11.5	0.660	78.9	16.4	0.822	98.3	20.4	1.00	119.6	24.8	1.502	179.6	37.2
95	SCR-	39.25	URBAN	885	109.04	0.36	299	62	0.330	35.5	7.4	0.464	49.9	10.4	0.660	71.0	14.7	0.822	88.5	18.3	1.00	107.6	22.3	1.502	161.7	33.5
96	SCR-	60.39	URBAN	885	109.04	0.55	299	62	0.330	54.3	11.3	0.464	76.3	15.8	0.660	108.5	22.5	0.822	135.2	28.0	1.00	164.5	34.1	1.502	247.0	51.2
97	SCR-	25.35	URBAN	885	109.04	0.23	299	62	0.330	22.7	4.7	0.464	31.9	6.6	0.660	45.4	9.4	0.822	56.5	11.7	1.00	68.8	14.3	1.502	103.3	21.4
98	SCR-	28.25	URBAN	885	109.04	0.26	299	62	0.330	25.7	5.3	0.464	36.1	7.5	0.660	51.3	10.6	0.822	63.9	13.3	1.00	77.7	16.1	1.502	116.8	24.2
99	SCR-	19.42	URBAN	885	109.04	0.18	299	62	0.330	17.8	3.7	0.464	25.0	5.2	0.660	35.5	7.4	0.822	44.2	9.2	1.00	53.8	11.2	1.502	80.8	16.8
100	SUDDEN	23.98	URBAN	885	109.04	0.22	299	62	0.330	21.7	4.5	0.464	30.5	6.3	0.660	43.4	9.0	0.822	54.1	11.2	1.00	65.8	13.6	1.502	98.8	20.5
101	SCR-	33.84	URBAN	885	109.04	0.31	299	62	0.330	30.6	6.3	0.464	43.0	8.9	0.660	61.2	12.7	0.822	76.2	15.8	1.00	92.7	19.2	1.502	139.2	28.9
102	SCR-	37.83	UNDEV_AG	885	109.04	0.35	299	62	0.144	15.1	3.1	0.262	27.4	5.7	0.484	50.7	10.5	0.711	74.4	15.4	1.00	104.7	21.7	1.952	204.3	42.4
103	SCR-	32.78	URBAN	885	109.04	0.30	299	62	0.330	29.6	6.1	0.464	41.6	8.6	0.660	59.2	12.3	0.822	73.7	15.3	1.00	89.7	18.6	1.502	134.7	27.9
104	SCR-	43.91	URBAN	885	109.04	0.40	299	62	0.330	39.5	8.2	0.464	55.5	11.5	0.660	78.9	16.4	0.822	98.3	20.4	1.00	119.6	24.8	1.502	179.6	37.2
105	SCR-	44.94	UNDEV_AG	885	109.04	0.41	299	62	0.144	17.7	3.7	0.262	32.1	6.7	0.484	59.3	12.3	0.711	87.2	18.1	1.00	122.6	25.4	1.952	239.3	49.6
107	SCR-	19.04	URBAN	885	109.04	0.17	299	62	0.330	16.8	3.5	0.464	23.6	4.9	0.660	33.6	7.0	0.822	41.8	8.7	1.00	50.8	10.5	1.502	76.4	15.8
108	SCR-	14.36	UNDEV_AG	885	109.04	0.13	299	62	0.144	5.6	1.2	0.262	10.2	2.1	0.484	18.8	3.9	0.711	27.6	5.7	1.00	38.9	8.1	1.952	75.9	15.7
109	SCR-	32.31	UNDEV_AG	885	109.04	0.30	299	62	0.144	12.9	2.7	0.262	23.5	4.9	0.484	43.4	9.0	0.711	63.8	13.2	1.00	89.7	18.6	1.952	175.1	36.3
110	SCR-	28.00	UNDEV_AG	885	109.04	0.26	299	62	0.144	11.2	2.3	0.262	20.4	4.2	0.484	37.6	7.8	0.711	55.3	11.5	1.00	77.7	16.1	1.952	151.8	31.5
111	SCR-	36.53	UNDEV_AG	885	109.04	0.33	299	62	0.144	14.2	2.9	0.262	25.9	5.4	0.484	47.8	9.9	0.711	70.2	14.5	1.00	98.7	20.5	1.952	192.6	39.9
112	SCR-	14.72	UNDEV_AG	885	109.04	0.13	299	62	0.144	5.6	1.2	0.262	10.2	2.1	0.484	18.8	3.9	0.711	27.6	5.7	1.00	38.9	8.1	1.952	75.9	15.7
113	SCR-	21.51	UNDEV_AG	885	109.04	0.20	299	62	0.144	8.6	1.8	0.262	15.7	3.2	0.484	28.9	6.0	0.711	42.5	8.8	1.00	59.8	12.4	1.952	116.7	24.2

ID	Channel	Area Ac.	Primary Land Use	HSPF ID	HSPF AREA ac.	Subarea Ratio	HSPF PEAK cfs	HSPF VOL af	Ratio 5/100-yr	5-yr Peak cfs	5-yr Vol af	Ratio 10/100-yr	10-yr Peak cfs	10-yr Vol af	Ratio 25/100-yr	25-yr Peak cfs	25-yr Vol af	Ratio 50/100-yr	50-yr Peak cfs	50-yr Vol af	Ratio 100/100-yr	100-yr Peak cfs	100-yr Vol af	Ratio 500/100-yr	500-yr Peak cfs	500-yr Vol af
114	SCR-	16.07	UNDEV_AG	885	109.04	0.15	299	62	0.144	6.5	1.3	0.262	11.8	2.4	0.484	21.7	4.5	0.711	31.9	6.6	1.00	44.9	9.3	1.952	87.6	18.2
115	SCR-	20.28	UNDEV_AG	885	109.04	0.19	299	62	0.144	8.2	1.7	0.262	14.9	3.1	0.484	27.5	5.7	0.711	40.4	8.4	1.00	56.8	11.8	1.952	110.9	23.0
116	SCR-	24.18	URBAN	885	109.04	0.22	299	62	0.330	21.7	4.5	0.464	30.5	6.3	0.660	43.4	9.0	0.822	54.1	11.2	1.00	65.8	13.6	1.502	98.8	20.5
117	SCR-	30.59	URBAN	885	109.04	0.28	299	62	0.330	27.6	5.7	0.464	38.9	8.1	0.660	55.3	11.5	0.822	68.8	14.3	1.00	83.7	17.4	1.502	125.8	26.1
118	SCR-	32.09	URBAN	885	109.04	0.29	299	62	0.330	28.6	5.9	0.464	40.2	8.3	0.660	57.2	11.9	0.822	71.3	14.8	1.00	86.7	18.0	1.502	130.2	27.0
119	SCR-	41.52	URBAN	885	109.04	0.38	299	62	0.330	37.5	7.8	0.464	52.7	10.9	0.660	75.0	15.5	0.822	93.4	19.4	1.00	113.6	23.6	1.502	170.7	35.4
120	SCR-	29.19	URBAN	885	109.04	0.27	299	62	0.330	26.6	5.5	0.464	37.5	7.8	0.660	53.3	11.0	0.822	66.4	13.8	1.00	80.7	16.7	1.502	121.3	25.1
121	SCR-	37.33	URBAN	885	109.04	0.34	299	62	0.330	33.6	7.0	0.464	47.2	9.8	0.660	67.1	13.9	0.822	83.6	17.3	1.00	101.7	21.1	1.502	152.7	31.7
122	SUDDEN	21.35	URBAN	984	165.94	0.13	489	94	0.330	21.0	4.0	0.464	29.5	5.7	0.660	42.0	8.1	0.822	52.3	10.0	1.00	63.6	12.2	1.502	95.5	18.4
123	SCR-	22.26	URBAN	885	109.04	0.20	299	62	0.330	19.7	4.1	0.464	27.8	5.8	0.660	39.5	8.2	0.822	49.2	10.2	1.00	59.8	12.4	1.502	89.8	18.6
124	SUDDEN	30.28	URBAN	885	109.04	0.28	299	62	0.330	27.6	5.7	0.464	38.9	8.1	0.660	55.3	11.5	0.822	68.8	14.3	1.00	83.7	17.4	1.502	125.8	26.1
125	SUDDEN	20.21	URBAN	885	109.04	0.19	299	62	0.330	18.8	3.9	0.464	26.4	5.5	0.660	37.5	7.8	0.822	46.7	9.7	1.00	56.8	11.8	1.502	85.3	17.7
126	FRANKLIN	26.04	UNDEV_AG	874	196.73	0.13	389	117	0.144	7.3	2.2	0.262	13.3	4.0	0.484	24.5	7.4	0.711	36.0	10.8	1.00	50.6	15.2	1.952	98.7	29.7
127	WASON	55.34	UNDEV_AG	875	199.79	0.28	397	115	0.144	16.0	4.6	0.262	29.1	8.4	0.484	53.8	15.6	0.711	79.0	22.9	1.00	111.2	32.2	1.952	217.0	62.9
128	WASON	47.38	UNDEV_AG	875	199.79	0.24	397	115	0.144	13.7	4.0	0.262	25.0	7.2	0.484	46.1	13.4	0.711	67.7	19.6	1.00	95.3	27.6	1.952	186.0	53.9
129	FRANKLIN	40.78	UNDEV_AG	874	196.73	0.21	389	117	0.144	11.8	3.5	0.262	21.4	6.4	0.484	39.5	11.9	0.711	58.1	17.5	1.00	81.7	24.6	1.952	159.5	48.0
130	FRANKLIN	45.12	UNDEV_AG	874	196.73	0.23	389	117	0.144	12.9	3.9	0.262	23.4	7.1	0.484	43.3	13.0	0.711	63.6	19.1	1.00	89.5	26.9	1.952	174.7	52.5
131	FRANKLIN	57.14	UNDEV_AG	874	196.73	0.29	389	117	0.144	16.2	4.9	0.262	29.6	8.9	0.484	54.6	16.4	0.711	80.2	24.1	1.00	112.8	33.9	1.952	220.2	66.2
132	FRANKLIN	29.92	UNDEV_AG	874	196.73	0.15	389	117	0.144	8.4	2.5	0.262	15.3	4.6	0.484	28.2	8.5	0.711	41.5	12.5	1.00	58.4	17.6	1.952	113.9	34.3
133	FRANKLIN	32.61	UNDEV_AG	874	196.73	0.17	389	117	0.144	9.5	2.9	0.262	17.3	5.2	0.484	32.0	9.6	0.711	47.0	14.1	1.00	66.1	19.9	1.952	129.1	38.8
134	FRANKLIN	22.58	UNDEV_AG	874	196.73	0.11	389	117	0.144	6.2	1.9	0.262	11.2	3.4	0.484	20.7	6.2	0.711	30.4	9.2	1.00	42.8	12.9	1.952	83.5	25.1
135	FRANKLIN	32.60	UNDEV_AG	874	196.73	0.17	389	117	0.144	9.5	2.9	0.262	17.3	5.2	0.484	32.0	9.6	0.711	47.0	14.1	1.00	66.1	19.9	1.952	129.1	38.8
136	FRANKLIN	12.03	UNDEV_AG	874	196.73	0.06	389	117	0.144	3.4	1.0	0.262	6.1	1.8	0.484	11.3	3.4	0.711	16.6	5.0	1.00	23.3	7.0	1.952	45.6	13.7
137	SATICOY YD	20.26	URBAN	878	117.61	0.17	392	65	0.330	22.0	3.6	0.464	30.9	5.1	0.660	43.9	7.3	0.822	54.7	9.1	1.00	66.6	11.1	1.502	100.0	16.6
138	SATICOY YD	23.25	URBAN	878	117.61	0.20	392	65	0.330	25.8	4.3	0.464	36.3	6.0	0.660	51.7	8.6	0.822	64.4	10.7	1.00	78.3	13.0	1.502	117.6	19.5
139	SATICOY YD	10.36	UNDEV_AG	885	109.04	0.10	299	62	0.144	4.3	0.9	0.262	7.8	1.6	0.484	14.5	3.0	0.711	21.3	4.4	1.00	29.9	6.2	1.952	58.4	12.1
140	FRANKLIN	45.28	UNDEV_AG	871	539.83	0.08	1020	280	0.144	11.8	3.2	0.262	21.4	5.9	0.484	39.5	10.8	0.711	58.0	15.9	1.00	81.6	22.4	1.952	159.3	43.7
141	SATICOY DRN	16.69	URBAN	876	259.13	0.06	579	146	0.330	11.5	2.9	0.464	16.1	4.1	0.660	22.9	5.8	0.822	28.6	7.2	1.00	34.7	8.8	1.502	52.2	13.2
142	SATICOY DRN	29.86	URBAN	876	259.13	0.12	579	146	0.330	22.9	5.8	0.464	32.2	8.1	0.660	45.9	11.6	0.822	57.1	14.4	1.00	69.5	17.5	1.502	104.4	26.3
143	SCR-	39.48	URBAN	879	232.20	0.17	566	127	0.330	31.7	7.1	0.464	44.6	10.0	0.660	63.5	14.2	0.822	79.1	17.7	1.00	96.2	21.6	1.502	144.5	32.4
144	BROWN	37.22	URBAN	980	698.76	0.05	1420	402	0.330	23.4	6.6	0.464	32.9	9.3	0.660	46.9	13.3	0.822	58.4	16.5	1.00	71.0	20.1	1.502	106.6	30.2
145	BROWN	9.00	UNDEV_AG	980	698.76	0.01	1420	402	0.144	2.0	0.6	0.262	3.7	1.1	0.484	6.9	1.9	0.711	10.1	2.9	1.00	14.2	4.0	1.952	27.7	7.8
146	SCR-	27.37	URBAN	877	76.64	0.36	202	43	0.330	24.0	5.1	0.464	33.7	7.2	0.660	48.0	10.2	0.822	59.7	12.7	1.00	72.7	15.5	1.502	109.2	23.3
147	CLARK	25.36	URBAN	888	309.20	0.08	815	177	0.330	21.5	4.7	0.464	30.3	6.6	0.660	43.0	9.3	0.822	53.6	11.6	1.00	65.2	14.2	1.502	97.9	21.3
148	SCR-	23.24	URBAN	877	76.64	0.30	202	43	0.330	20.0	4.3	0.464	28.1	6.0	0.660	40.0	8.5	0.822	49.8	10.6	1.00	60.6	12.9	1.502	91.0	19.4
149	SCR-	40.83	URBAN	879	232.20	0.18	566	127	0.330	33.6	7.5	0.464	47.3	10.6	0.660	67.2	15.1	0.822	83.7	18.8	1.00	101.8	22.9	1.502	153.0	34.3
150	SCR-	12.68	URBAN	879	232.20	0.05	566	127	0.330	9.3	2.1	0.464	13.1	2.9	0.660	18.7	4.2	0.822	23.3	5.2	1.00	28.3	6.4	1.502	42.5	9.5
151	SCR-	22.88	URBAN	879	232.20	0.10	566	127	0.330	18.7	4.2	0.464	26.3	5.9	0.660	37.3	8.4	0.822	46.5	10.4	1.00	56.6	12.7	1.502	85.0	19.1

ID	Channel	Area Ac.	Primary Land Use	HSPF ID	HSPF AREA ac.	Subarea Ratio	HSPF PEAK cfs	HSPF VOL af	Ratio 5/100-yr	5-yr Peak cfs	5-yr Vol af	Ratio 10/100-yr	10-yr Peak cfs	10-yr Vol af	Ratio 25/100-yr	25-yr Peak cfs	25-yr Vol af	Ratio 50/100-yr	50-yr Peak cfs	50-yr Vol af	Ratio 100/100-yr	100-yr Peak cfs	100-yr Vol af	Ratio 500/100-yr	500-yr Peak cfs	500-yr Vol af
152	SCR-	20.27	UNDEV_AG	885	109.04	0.19	299	62	0.144	8.2	1.7	0.262	14.9	3.1	0.484	27.5	5.7	0.711	40.4	8.4	1.00	56.8	11.8	1.952	110.9	23.0
153	FRANKLIN	28.81	UNDEV_AG	872	436.99	0.07	888	253	0.144	9.0	2.6	0.262	16.3	4.6	0.484	30.1	8.6	0.711	44.2	12.6	1.00	62.2	17.7	1.952	121.3	34.6
154	FRANKLIN	15.81	UNDEV_AG	872	436.99	0.04	888	253	0.144	5.1	1.5	0.262	9.3	2.7	0.484	17.2	4.9	0.711	25.3	7.2	1.00	35.5	10.1	1.952	69.3	19.8
155	FRANKLIN	17.93	UNDEV_AG	872	436.99	0.04	888	253	0.144	5.1	1.5	0.262	9.3	2.7	0.484	17.2	4.9	0.711	25.3	7.2	1.00	35.5	10.1	1.952	69.3	19.8
156	FRANKLIN	25.06	UNDEV_AG	872	436.99	0.06	888	253	0.144	7.7	2.2	0.262	14.0	4.0	0.484	25.8	7.3	0.711	37.9	10.8	1.00	53.3	15.2	1.952	104.0	29.6
157	FRANKLIN	34.14	UNDEV_AG	876	259.13	0.13	579	146	0.144	10.8	2.7	0.262	19.7	5.0	0.484	36.4	9.2	0.711	53.5	13.5	1.00	75.3	19.0	1.952	146.9	37.0
158	FRANKLIN	25.02	UNDEV_AG	876	259.13	0.10	579	146	0.144	8.3	2.1	0.262	15.2	3.8	0.484	28.0	7.1	0.711	41.2	10.4	1.00	57.9	14.6	1.952	113.0	28.5
159	FRANKLIN	26.29	UNDEV_AG	872	436.99	0.06	888	253	0.144	7.7	2.2	0.262	14.0	4.0	0.484	25.8	7.3	0.711	37.9	10.8	1.00	53.3	15.2	1.952	104.0	29.6
160	FRANKLIN	22.06	UNDEV_AG	872	436.99	0.05	888	253	0.144	6.4	1.8	0.262	11.6	3.3	0.484	21.5	6.1	0.711	31.6	9.0	1.00	44.4	12.7	1.952	86.7	24.7
161	SATICOY DRN	26.08	URBAN	876	259.13	0.10	579	146	0.330	19.1	4.8	0.464	26.9	6.8	0.660	38.2	9.6	0.822	47.6	12.0	1.00	57.9	14.6	1.502	87.0	21.9
162	BROWN	26.24	UNDEV_AG	980	698.76	0.04	1420	402	0.144	8.2	2.3	0.262	14.9	4.2	0.484	27.5	7.8	0.711	40.4	11.4	1.00	56.8	16.1	1.952	110.9	31.4
163	BROWN	25.97	URBAN	981	183.62	0.14	433	101	0.330	20.0	4.7	0.464	28.1	6.6	0.660	40.0	9.3	0.822	49.8	11.6	1.00	60.6	14.1	1.502	91.1	21.2
164	BROWN	29.76	URBAN	981	183.62	0.16	433	101	0.330	22.9	5.3	0.464	32.2	7.5	0.660	45.7	10.7	0.822	57.0	13.3	1.00	69.3	16.2	1.502	104.1	24.3
165	BROWN	25.24	URBAN	981	183.62	0.14	433	101	0.330	20.0	4.7	0.464	28.1	6.6	0.660	40.0	9.3	0.822	49.8	11.6	1.00	60.6	14.1	1.502	91.1	21.2
166	BROWN	81.35	UNDEV_AG	978	1005.98	0.08	1590	512	0.144	18.3	5.9	0.262	33.3	10.7	0.484	61.6	19.8	0.711	90.4	29.1	1.00	127.2	41.0	1.952	248.3	80.0
167	BROWN	37.12	UNDEV_AG	978	1005.98	0.04	1590	512	0.144	9.2	2.9	0.262	16.7	5.4	0.484	30.8	9.9	0.711	45.2	14.6	1.00	63.6	20.5	1.952	124.2	40.0
168	SCR-	59.19	UNDEV_AG	874	196.73	0.30	389	117	0.144	16.8	5.1	0.262	30.6	9.2	0.484	56.5	17.0	0.711	83.0	25.0	1.00	116.7	35.1	1.952	227.8	68.5
169	SCR-	48.26	UNDEV_AG	874	196.73	0.25	389	117	0.144	14.0	4.2	0.262	25.5	7.7	0.484	47.1	14.2	0.711	69.1	20.8	1.00	97.3	29.3	1.952	189.8	57.1
170	SCR-	52.66	UNDEV_AG	874	196.73	0.27	389	117	0.144	15.1	4.5	0.262	27.5	8.3	0.484	50.8	15.3	0.711	74.7	22.5	1.00	105.0	31.6	1.952	205.0	61.7
171	CLARK	27.94	UNDEV_AG	888	309.20	0.09	815	177	0.144	10.6	2.3	0.262	19.2	4.2	0.484	35.5	7.7	0.711	52.2	11.3	1.00	73.4	15.9	1.952	143.2	31.1
172	SUDDEN	30.78	UNDEV_AG	983	180.68	0.17	347	106	0.144	8.5	2.6	0.262	15.5	4.7	0.484	28.6	8.7	0.711	41.9	12.8	1.00	59.0	18.0	1.952	115.2	35.2
173	BROWN	29.59	UNDEV_AG	980	698.76	0.04	1420	402	0.144	8.2	2.3	0.262	14.9	4.2	0.484	27.5	7.8	0.711	40.4	11.4	1.00	56.8	16.1	1.952	110.9	31.4
174	BROWN	28.20	UNDEV_AG	980	698.76	0.04	1420	402	0.144	8.2	2.3	0.262	14.9	4.2	0.484	27.5	7.8	0.711	40.4	11.4	1.00	56.8	16.1	1.952	110.9	31.4
175	BROWN	26.53	UNDEV_AG	980	698.76	0.04	1420	402	0.144	8.2	2.3	0.262	14.9	4.2	0.484	27.5	7.8	0.711	40.4	11.4	1.00	56.8	16.1	1.952	110.9	31.4
176	BROWN	22.75	UNDEV_AG	980	698.76	0.03	1420	402	0.144	6.1	1.7	0.262	11.2	3.2	0.484	20.6	5.8	0.711	30.3	8.6	1.00	42.6	12.1	1.952	83.2	23.5
177	CLARK	19.36	URBAN	888	309.20	0.06	815	177	0.330	16.1	3.5	0.464	22.7	4.9	0.660	32.3	7.0	0.822	40.2	8.7	1.00	48.9	10.6	1.502	73.5	16.0