Appendix A

CTC PREFERRED DESIGN APPROACH

Excerpt from *California Tahoe Conservancy Soil Erosion Control Grants Program – Program Announcement and Guidelines*, July 2002

D. Preferred Design Approach

This section presents an overall strategy to consider when designing projects. It is intended to apply not only to grant application preparation, but also to the more detailed design work that occurs after a grant is awarded.

The preferred design approach is a refinement of previous erosion control program guidelines, and reflects the current assessment of state-of-the-art technology and experience in implementing erosion control project at Lake Tahoe. The preferred design approach emphasizes project elements that prevent the mobilization of fine sediment and nutrients by erosion (source control), and that reduce the volume of runoff reaching natural surface waters (hydrologic design considerations). Source control measures and hydrologic design considerations, primarily infiltration, are the most cost-effective and efficient means to improve water quality. Water quality treatment measures to remove pollutants from runoff are to be considered after application of the other two groups of design considerations (source control and hydrologic design).

In cases where applicants find it difficult to apply a specific portion of the preferred design approach to a project or element of a project, the applicant should consult with Conservancy staff on specific barriers to implementation of the preferred design approach before submitting site improvement applications. If project designs are not based on this approach, grantees will be required to explain the specific barriers to the application of the preferred design approach and provide documentation to support how the proposed alternative approach meets program objectives (e.g., maximizes water quality benefit).

The Conservancy recognizes that this approach must be applied within the context of professional engineering practices to avoid impacts on public health and safety and damage to public and private property. It also recognizes that there are legal and regulatory limitations to the application of these principles, such as applicable drainage law.

Specific elements of the preferred design approach are:

Source Control

1. Place higher priority on source controls than on treatment. Source controls are measures that prevent erosion. Treatment facilities remove pollutants from runoff.
2. Emphasize reduction in bare, erodible surfaces (e.g., steep cut slopes, dirt roads) and impervious area.
3. Emphasize stabilization of gullies, unstable channels, and other sources that contribute especially high sediment loads.
4. Maximize self-sustaining source control methods, such as revegetation with native plants, pine needle mulching, and adding soil amendments such as mycorrhizal inoculum to soils when appropriate.

Hydrologic Design

5. Maintain or create distributed flow patterns (e.g., flows which discharge from the right-of-way frequently, or from shoulders by unconcentrated "sheet flow") and avoid concentration of flows where feasible.
6. Maximize infiltration of runoff from impervious surfaces. In some cases this can be accomplished by techniques described in number 5 above or also by the construction of leach fields, dry wells, or detention basins, for example.
7. Keep runoff from non-urban areas separate from urban runoff until urban runoff is treated. Treatment efficiency is much greater when flow volumes are smaller.
8. Keep treated urban runoff separate from untreated urban runoff to avoid resuspension of sediments and decreased treatment efficiency in downstream facilities.
9. Apply geomorphologic principles to natural channel design and mimic natural processes when stabilizing, restoring, or recreating natural drainage channels. For example, channels with floodplains tend to be more stable than those without. Channels with steps and pools are a frequent natural stream form and have better habitat values than those with continuous slopes. Avoid adding to or decreasing natural stream flows or changing watershed boundaries.

Treatment

10. Emphasize removal of fine sediments and phosphorous. For the purposes of the program guidelines, fine sediment is considered to be those particles that pass the number 200 sieve (less than 75 microns). Examples of improvements that are likely to achieve this objective are properly-sized, flat or gently-sloping, well-vegetated, detention areas (meadow-like areas).
11. Use natural treatment systems, such as meadows, where feasible. Because of the critical importance of wetland plants in removing pollutants from runoff, projects located in Stream Environment Zones (SEZ) should generally preserve the existing vegetation and function of the SEZs to the maximum extent practicable.

These guidelines continue to place a priority on SEZ restoration work. Such restoration work is cost-effective and beneficial for removing nutrients and fine sediment from runoff. The Environmental Improvement Program (EIP) calls for 40 acres of SEZ restoration over the 10-year EIP period in each of the primary grantee jurisdictions. In addition, the 208 Plan calls for the restoration of 1,100 acres of disturbed SEZs in the Basin. As in past years' programs, preference will be given to qualified projects that provide for infiltration of runoff and absorption of nutrients by plants and soil. This concept will continue to be promoted in the plan review process.

Appendix B

HYDROLOGY AND HYDRAULICS

RATIONAL METHOD RESULTS
(Existing Conditions)

COUNTRY CLUB HEIGHTS-JN 95191
Rational Method
EWS A

NOTES		
	2.035	= P_2 (2 yr, 24 hr rainfall depth based on 25 inches mean annual precip)
	6.0	Initial Time of Concentration for all areas
	0.90	Time of Concentration based on County of El Dorado Drainage Manual (Chapter 2)
	0.10	Time of Concentration determined using Longest Travel Path in Watershed
		c value a composite of pervious and impervious areas
		**100 Year Storm Assumes 25% increase in C
DATA RUN		= Computed Automatically
		=Determined from Appendix 4.2 of County of El Dorado Drainage Manual
		=Determined from Previous Worksheets
WS A	0%	=Bulking'

y=bx^m

	b	m
10 yrs	5.3289	-0.506
25 yrs	6.2363	-0.505
100 yrs	7.5448	-0.506

SUBWS & NODES	Area (acres)	% Imperviousness		Tc (min)	Composite C	Rainfall Intensity (in/hr)	Peak Runoff (cfs)	Conveyance	Flow Length (ft)	High Elev (ft)	Low Elev (ft)	Slope (%)	n	Pipe Diameter (ft)	Qn/ ($D^{8/3}S^{.5}$)	A/D^2	Area (ft^2)	Velocity (ft/s)	Travel Time (min)
1-2	7.47	15.35%	10 Year	10.51	0.22	1.62	2.7												
A1			25 Year	10.51	0.22	1.90	3.2												
			100 Year	10.51	0.28	2.29	4.8	CMP Inlet											
							18" CMP	Pipe 1508	48	6334.40	6333.30	2.29%	0.024	1.50	0.1701	0.3130	0.70425	4.5	0.18
			JUNCTION	10.69															

COUNTRY CLUB HEIGHTS-JN 95191
Rational Method
EWS B

NOTES		
	1.870	= P_2 (2 yr, 24 hr rainfall depth based on 23 inches mean annual precip)
	6.0	Initial Time of Concentration for all areas
	0.90	Time of Concentration based on County of El Dorado Drainage Manual (Chapter 2)
	0.10	Time of Concentration determined using Longest Travel Path in Watershed
		c value a composite of pervious and impervious areas
		**100 Year Storm Assumes 25% increase in C
DATA RUN		= Computed Automatically
		=Determined from Appendix 4.2 of County of El Dorado Drainage Manual
		=Determined from Previous Worksheets
WS B	0%	=Bulking'

y=bx^m

	b	m
10 yrs	4.9145	-0.506
25 yrs	5.7259	-0.504
100 yrs	6.9257	-0.505

SUBWS & NODES	Area (acres)	% Imperviousness		Tc (min)	Composite C	Rainfall Intensity (in/hr)	Peak Runoff (cfs)	Conveyance	Flow Length (ft)	High Elev (ft)	Low Elev (ft)	Slope (%)	n	Pipe Diameter (ft)	Qn/ ($D^{8/3}S^{.5}$)	A/D^2	Area (ft^2)	Velocity (ft/s)	Travel Time (min)
1-2	1.57	29.24%	10 Year	29.63	0.33	0.88	0.5												
B1			25 Year	29.63	0.33	1.04	0.5												
			100 Year	29.63	0.42	1.25	0.8	CMP Inlet											
							18" CMP	Pipe 1504	70	6508.64	6507.74	1.29%	0.024	1.50	0.0390	0.1079	0.2426625	2.2	0.52
			JUNCTION	30.15															
2-3	0.21	63.57%	10 Year	1.51	0.61	3.99	0.5												
B2			25 Year	1.51	0.61	4.66	0.6												
			100 Year	1.51	0.76	5.63	0.9												
																			0.00
			JUNCTION	1.51															
1-3	1.78	33.37%	10 Year	31.66	0.37	0.86	0.6												
B1-B2			25 Year	31.66	0.37	1.00	0.7												
			100 Year	31.66	0.46	1.21	1.0												
																			0.00
			JUNCTION	31.66															
4-5	0.92	26.05%	10 Year	8.73	0.31	1.64	0.5												
B3			25 Year	8.73	0.31	1.92	0.5												
			100 Year	8.73	0.39	2.32	0.8	CMP Inlet											
							18" CMP	Pipe 1505	74	6497.67	6496.68	1.34%	0.024	1.50	0.0385	0.1079	0.2426625	2.3	0.55
			JUNCTION	9.28															
1-5	2.71	30.87%	10 Year	31.66	0.35	0.86	0.80												
B1-B3			25 Year	31.66	0.35	1.00	0.94												
			100 Year	31.66	0.43	1.21	1.42												
																			0.00
			JUNCTION	31.66															
3-6	2.05	24.35%	10 Year	0.31	0.29	8.94	5.4												
B4			25 Year	0.31	0.29	10.39	6.3												
			100 Year	0.31	0.37	12.58	9.5												
								Channel											0.00
			JUNCTION	0.31															

COUNTRY CLUB HEIGHTS-JN 95191
Rational Method
EWS B

SUBWS & NODES	Area (acres)	% Imperviousness		Tc (min)	Composite C	Rainfall Intensity (in/hr)	Peak Runoff (cfs)	Conveyance	Flow Length (ft)	High Elev (ft)	Low Elev (ft)	Slope (%)	n	Pipe Diameter (ft)	Qn/ ($D^{8/3}S^{.5}$)	A/D^2	Area (ft^2)	Velocity (ft/s)	Travel Time (min)
1-6	4.75	28.06%	10 Year	31.97	0.32	0.85	1.3												
B1-B4			25 Year	31.97	0.32	1.00	1.5												
			100 Year	31.97	0.41	1.20	2.3												
																			0.00
			JUNCTION	31.97															
6-7	3.98	14.47%	10 Year	0.54	0.22	6.71	5.8												
B5			25 Year	0.54	0.22	7.80	6.7												
			100 Year	0.54	0.27	9.44	10.1												
																			0.00
			JUNCTION	0.54															
1-7	8.74	21.87%	10 Year	32.51	0.27	0.84	2.0												
B1-B5			25 Year	32.51	0.27	0.99	2.4												
			100 Year	32.51	0.34	1.19	3.6	CMP Inlet											
							18" CMP	Pipe 1496	49	6397.40	6397.30	0.20%	0.024	1.50	0.4287	0.6405	1.441125	1.7	0.49
			JUNCTION	33.00															
7-8	4.89	18.96%	10 Year	3.10	0.25	2.77	3.4												
B6			25 Year	3.10	0.25	3.24	4.0												
			100 Year	3.10	0.31	3.91	6.0												
																			0.00
			JUNCTION	3.10															
1-8	13.63	20.82%	10 Year	36.11	0.27	0.80	2.9												
B1-B6			25 Year	36.11	0.27	0.94	3.4												
			100 Year	36.11	0.33	1.13	5.1	CMP Inlet											
							21" CMP	Pipe 1499	47	6346.12	6344.71	3.00%	0.024	1.75	0.1063	0.2214	0.677884375	5.0	0.16
			JUNCTION	36.26															
9-10	4.71	17.49%	10 Year	12.72	0.24	1.36	1.5												
B7			25 Year	12.72	0.24	1.59	1.8												
			100 Year	12.72	0.30	1.92	2.7												
							18" CMP	Pipe 1494	32	6352.70	6351.60	3.44%	0.024	1.50	0.0789	0.1800	0.405	4.4	0.12
			JUNCTION	12.84															
11-12	0.09	97.16%	10 Year	6.91	0.88	1.85	0.1												
B8			25 Year	6.91	0.88	2.16	0.2												
			100 Year	6.91	1.00	2.61	0.2												
																			0.00
			JUNCTION	6.91															

COUNTRY CLUB HEIGHTS-JN 95191
Rational Method
EWS B

SUBWS & NODES	Area (acres)	% Imperviousness		Tc (min)	Composite C	Rainfall Intensity (in/hr)	Peak Runoff (cfs)	Conveyance	Flow Length (ft)	High Elev (ft)	Low Elev (ft)	Slope (%)	n	Pipe Diameter (ft)	Qn/ ($D^{8/3}S^{.5}$)	A/D^2	Area (ft^2)	Velocity (ft/s)	Travel Time (min)
9-12	4.80	18.94%	**10 Year**	**19.76**	**0.25**	**1.09**	**1.3**												
			25 Year	**19.76**	**0.25**	**1.27**	**1.5**												
B7-B8			**100 Year**	**19.76**	**0.31**	**1.54**	**2.3**	**CMP Inlet**											
							18" CMP	**Pipe 1495**	248	6351.60	6319.00	13.15%	0.024	1.50	0.0345	**0.1000**	0.225	6.8	0.61
			JUNCTION	**20.36**															

COUNTRY CLUB HEIGHTS-JN 95191
Rational Method
EWS C

NOTES	1.710	= P_2 (2 yr, 24 hr rainfall depth based on 21 inches mean annual precip)
	6.0	Initial Time of Concentration for all areas
	0.90	Time of Concentration based on County of El Dorado Drainage Manual (Chapter 2)
	0.10	Time of Concentration determined using Longest Travel Path in Watershed
		c value a composite of pervious and impervious areas
		**100 Year Storm Assumes 25% increase in C
DATA RUN		= Computed Automatically
		=Determined from Appendix 4.2 of County of El Dorado Drainage Manual
		=Determined from Previous Worksheets
WS C	0%	=Bulking'

y=bx^m

	b	m
10 yrs	4.4759	-0.507
25 yrs	5.2711	-0.507
100 yrs	6.3124	-0.504

SUBWS & NODES	Area (acres)	% Imperviousness		Tc (min)	Composite C	Rainfall Intensity (in/hr)	Peak Runoff (cfs)	Conveyance	Flow Length (ft)	High Elev (ft)	Low Elev (ft)	Slope (%)	n	Pipe Diameter (ft)	Qn/ ($D^{8/3}S^{5}$)	A/D^2	Area (ft^2)	Velocity (ft/s)	Travel Time (min)
1-2	4.19	37.26%	10 Year	18.90	0.40	1.01	1.7												
C1			25 Year	18.90	0.40	1.19	2.0												
			100 Year	18.90	0.50	1.44	3.0	CMP Inlet											
							18" CMP	Pipe 1489/1490	347	6506.10	6417.80	25.45%	0.024	1.50	0.0320	0.0961	0.216225	9.2	0.63
			JUNCTION	19.53															
3-4	4.35	15.07%	10 Year	50.28	0.22	0.61	0.6												
C2			25 Year	50.28	0.22	0.72	0.7												
			100 Year	50.28	0.28	0.88	1.1												
																			0.00
			JUNCTION	50.28															
1-4	8.55	25.96%	10 Year	50.28	0.31	0.61	1.6												
C1-C2			25 Year	50.28	0.31	0.72	1.9												
			100 Year	50.28	0.38	0.88	2.9												
							18" CMP	Pipe 1491	260	6415.30	6376.50	14.92%	0.024	1.50	0.0401	0.1118	0.25155	7.6	0.57
			JUNCTION	50.85															
5-6	3.09	16.60%	10 Year	8.22	0.23	1.54	1.1												
C3			25 Year	8.22	0.23	1.81	1.3												
			100 Year	8.22	0.29	2.18	2.0												
																			0.00
			JUNCTION	8.22															
1-6	11.64	23.48%	10 Year	50.85	0.29	0.61	2.0												
C1-C3			25 Year	50.85	0.29	0.72	2.4												
			100 Year	50.85	0.36	0.87	3.6												
							18" CMP	Pipe 1492/1493	316	6376.50	6355.60	6.61%	0.024	1.50	0.0762	0.1756	0.3949875	6.1	0.86
			JUNCTION	51.72															
7-8	5.19	14.75%	10 Year	1.04	0.22	4.39	5.0												
C4			25 Year	1.04	0.22	5.17	5.9												
			100 Year	1.04	0.27	6.19	8.8												
																			0.00
			JUNCTION	1.04															

COUNTRY CLUB HEIGHTS-JN 95191
Rational Method
EWS C

SUBWS & NODES	Area (acres)	% Imperviousness		Tc (min)	Composite C	Rainfall Intensity (in/hr)	Peak Runoff (cfs)	Conveyance	Flow Length (ft)	High Elev (ft)	Low Elev (ft)	Slope (%)	n	Pipe Diameter (ft)	Qn/ ($D^{8/3}S^{.5}$)	A/D^2	Area (ft^2)	Velocity (ft/s)	Travel Time (min)
1-8	16.83	20.79%	10 Year	52.76	0.27	0.60	2.7												
C1-C4			25 Year	52.76	0.27	0.71	3.2												
			100 Year	52.76	0.33	0.86	4.8												
																			0.00
			JUNCTION	52.76															
9-10	4.45	21.53%	10 Year	33.31	0.27	0.76	0.9												
C5			25 Year	33.31	0.27	0.89	1.1												
			100 Year	33.31	0.34	1.08	1.6	CMP Inlet											
							18" CMP	Pipe1483	250	6417.25	6373.60	17.46%	0.024	1.50	0.0210	0.0704	0.1582875	6.8	0.61
			JUNCTION	33.92															
11-12	0.17	21.84%	10 Year	27.48	0.27	0.83	0.0												
C6			25 Year	27.48	0.27	0.98	0.0												
			100 Year	27.48	0.34	1.19	0.1												
																			0.00
			JUNCTION	27.48															
9-12	4.62	21.54%	10 Year	33.92	0.27	0.75	0.9												
C5-C6			25 Year	33.92	0.27	0.88	1.1												
			100 Year	33.92	0.34	1.07	1.7	CMP Inlet											
							18" CMP	Pipe1484	30	6373.60	6373.00	2.00%	0.024	1.50	0.0639	0.1535	0.345375	3.2	0.16
			JUNCTION	34.08															
13-12	1.16	18.56%	10 Year	32.92	0.25	0.76	0.2												
C7			25 Year	32.92	0.25	0.90	0.3												
			100 Year	32.92	0.31	1.08	0.4												
																			0.00
			JUNCTION	32.92															
9-13	5.78	20.94%	10 Year	34.08	0.27	0.75	1.2												
C5-C7			25 Year	34.08	0.27	0.88	1.4												
			100 Year	34.08	0.33	1.07	2.1	CMP Inlet											
							18" CMP	Pipe 1485/1486	292	6373.00	6328.00	15.41%	0.024	1.50	0.0282	0.0885	0.199125	6.8	0.71
			JUNCTION	34.79															
1-13	22.61	20.83%	10 Year	34.79	0.27	0.74	4.5												
C1-C7			25 Year	34.79	0.27	0.87	5.3												
			100 Year	34.79	0.33	1.06	7.9	CMP Inlet											
							18" CMP	Pipe 1487	48	6328.00	6327.00	2.08%	0.024	1.50	0.2963	0.4724	1.0629	4.9	0.16
			JUNCTION	34.95															

COUNTRY CLUB HEIGHTS-JN 95191
Rational Method
EWS C

SUBWS & NODES	Area (acres)	% Imperviousness		Tc (min)	Composite C	Rainfall Intensity (in/hr)	Peak Runoff (cfs)	Conveyance	Flow Length (ft)	High Elev (ft)	Low Elev (ft)	Slope (%)	n	Pipe Diameter (ft)	Qn/ ($D^{8/3}S^{.5}$)	A/D^2	Area (ft^2)	Velocity (ft/s)	Travel Time (min)
8-14	1.88	11.32%	10 Year	1.35	0.19	3.85	1.4												
C8			25 Year	1.35	0.19	4.53	1.6												
			100 Year	1.35	0.24	5.43	2.4												
																			0.00
			JUNCTION	1.35															
1-14	24.49	20.09%	10 Year	36.30	0.26	0.72	4.6												
C1-C8			25 Year	36.30	0.26	0.85	5.4												
			100 Year	36.30	0.33	1.03	8.2												
								Channel											0.00
			JUNCTION	36.30															

COUNTRY CLUB HEIGHTS-JN 95191
Rational Method
EWS D

NOTES		
	1.630	= P_2 (2 yr, 24 hr rainfall depth based on 20 inches mean annual precip)
	6.0	Initial Time of Concentration for all areas
	0.90	Time of Concentration based on County of El Dorado Drainage Manual (Chapter 2)
	0.10	Time of Concentration determined using Longest Travel Path in Watershed
		c value a composite of pervious and impervious areas
		**100 Year Storm Assumes 25% increase in C
DATA RUN		= Computed Automatically
		=Determined from Appendix 4.2 of County of El Dorado Drainage Manual
		=Determined from Previous Worksheets
WS D	0%	=Bulking'

y=bx^m

	b	m
10 yrs	4.2681	-0.507
25 yrs	5.0264	-0.508
100 yrs	6.0429	-0.507

SUBWS & NODES	Area (acres)	% Imperviousness		Tc (min)	Composite C	Rainfall Intensity (in/hr)	Peak Runoff (cfs)	Conveyance	Flow Length (ft)	High Elev (ft)	Low Elev (ft)	Slope (%)	n	Pipe Diameter (ft)	Qn/ ($D^{8/3}S^{5}$)	A/D^2	Area (ft^2)	Velocity (ft/s)	Travel Time (min)
1-2	2.60	30.37%	10 Year	8.03	0.34	1.48	1.3												
D1			25 Year	8.03	0.34	1.74	1.6												
			100 Year	8.03	0.43	2.10	2.3												
							18" CMP	Pipe 1337	54	6290.80	6289.10	3.15%	0.024	1.50	0.0714	0.1667	0.375075	4.1	0.22
			JUNCTION	8.25															
3-4	3.85	16.30%	10 Year	43.68	0.23	0.63	0.6												
D2			25 Year	43.68	0.23	0.74	0.7												
			100 Year	43.68	0.29	0.89	1.0												
																			0.00
			JUNCTION	43.68															
1-4	6.45	21.97%	10 Year	43.68	0.28	0.63	1.1												
D1-D2			25 Year	43.68	0.28	0.74	1.3												
			100 Year	43.68	0.34	0.89	2.0												
																			0.00
			JUNCTION	43.68															
5-6	1.72	53.00%	10 Year	12.07	0.52	1.21	1.1												
D3			25 Year	12.07	0.52	1.42	1.3												
			100 Year	12.07	0.66	1.71	1.9	CMP Inlet											
							18" CMP	Pipe 1410/1411	378	6502.70	6435.90	17.67%	0.024	1.50	0.0248	0.0775	0.174375	7.3	0.86
			JUNCTION	12.93															
7-8	7.09	10.22%	10 Year	29.79	0.18	0.76	1.0												
D4			25 Year	29.79	0.18	0.90	1.2												
			100 Year	29.79	0.23	1.08	1.7												
																			0.00
			JUNCTION	29.79															
5-8	8.81	18.58%	10 Year	29.79	0.25	0.76	1.7												
D3-D4			25 Year	29.79	0.25	0.90	2.0												
			100 Year	29.79	0.31	1.08	3.0	CMP Inlet											
							18" CMP	Pipe 1389/1390	185	6403.30	6376.30	14.59%	0.024	1.50	0.0418	0.1118	0.25155	7.8	0.40
			JUNCTION	30.19															

COUNTRY CLUB HEIGHTS-JN 95191
Rational Method
EWS D

SUBWS & NODES	Area (acres)	% Imperviousness		Tc (min)	Composite C	Rainfall Intensity (in/hr)	Peak Runoff (cfs)	Conveyance	Flow Length (ft)	High Elev (ft)	Low Elev (ft)	Slope (%)	n	Pipe Diameter (ft)	Qn/ ($D^{8/3}S^{.5}$)	A/D^2	Area (ft^2)	Velocity (ft/s)	Travel Time (min)
8-9	6.99	12.23%	10 Year	3.10	0.20	2.41	3.3												
D5			25 Year	3.10	0.20	2.83	3.9												
			100 Year	3.10	0.25	3.41	5.9												
																			0.00
			JUNCTION	3.10															
5-9	15.80	15.77%	10 Year	33.29	0.23	0.72	2.6												
D3-D5			25 Year	33.29	0.23	0.85	3.0												
			100 Year	33.29	0.28	1.02	4.6	CMP Inlet											
							15" CMP	Pipe 1380	82	6353.80	6350.95	3.48%	0.024	1.25	0.2149	0.3727	0.58234375	5.2	0.26
			JUNCTION	33.55															
9-10	0.92	51.96%	10 Year	1.34	0.52	3.68	1.7												
D6			25 Year	1.34	0.52	4.33	2.0												
			100 Year	1.34	0.64	5.20	3.1												
																			0.00
			JUNCTION	1.34															
5-10	16.71	17.75%	10 Year	34.89	0.24	0.70	2.9												
D3-D6			25 Year	34.89	0.24	0.83	3.3												
			100 Year	34.89	0.30	1.00	5.0												
																			0.00
			JUNCTION	34.89															
11-12	0.52	22.12%	10 Year	7.11	0.28	1.58	0.2												
D7			25 Year	7.11	0.28	1.86	0.3												
			100 Year	7.11	0.35	2.24	0.4												
							18" CMP	Pipe 1366	34	6364.70	6364.20	1.47%	0.024	1.50	0.0181	0.0634	0.14265	1.9	0.30
			JUNCTION	7.41															
12-13	2.71	21.91%	10 Year	1.14	0.28	4.00	3.0												
D8			25 Year	1.14	0.28	4.71	3.5												
			100 Year	1.14	0.34	5.66	5.3												
																			0.00
			JUNCTION	1.14															
11-13	3.23	21.95%	10 Year	8.55	0.28	1.44	1.3												
D7-D8			25 Year	8.55	0.28	1.69	1.5												
			100 Year	8.55	0.34	2.04	2.3												
																			0.00
			JUNCTION	8.55															

COUNTRY CLUB HEIGHTS-JN 95191
Rational Method
EWS D

SUBWS & NODES	Area (acres)	% Imperviousness		Tc (min)	Composite C	Rainfall Intensity (in/hr)	Peak Runoff (cfs)	Conveyance	Flow Length (ft)	High Elev (ft)	Low Elev (ft)	Slope (%)	n	Pipe Diameter (ft)	Qn/ ($D^{8/3}S^{5}$)	A/D^2	Area (ft^2)	Velocity (ft/s)	Travel Time (min)
14-15	3.02	16.27%	10 Year	38.66	0.23	0.67	0.5												
D9			25 Year	38.66	0.23	0.79	0.5												
			100 Year	38.66	0.29	0.95	0.8												
							12" CMP	Pipe 1365	38	6413.50	6411.57	5.08%	0.024	1.00	0.0580	0.1449	0.1449	3.8	0.17
			JUNCTION	38.82															
15-16	6.65	18.60%	10 Year	3.97	0.25	2.12	3.5												
D10			25 Year	3.97	0.25	2.50	4.1												
			100 Year	3.97	0.31	3.00	6.2												
																			0.00
			JUNCTION	3.97															
14-16	9.67	17.87%	10 Year	42.79	0.24	0.64	1.5												
D9-D10			25 Year	42.79	0.24	0.75	1.8												
			100 Year	42.79	0.30	0.90	2.6												
							18" CMP	Pipe 1367	40	6357.60	6357.00	1.50%	0.024	1.50	0.1164	0.2355	0.529875	3.3	0.20
			JUNCTION	42.99															
16-13	7.82	17.68%	10 Year	10.65	0.24	1.29	2.4												
D11			25 Year	10.65	0.24	1.51	2.9												
			100 Year	10.65	0.30	1.82	4.3												
																			0.00
			JUNCTION	10.65															
13-16	17.49	17.79%	10 Year	53.64	0.24	0.57	2.4												
D9-D11			25 Year	53.64	0.24	0.66	2.8												
			100 Year	53.64	0.30	0.80	4.3												
																			0.00
			JUNCTION	53.64															
11-16	20.72	18.44%	10 Year	53.64	0.25	0.57	2.9												
D7-D11			25 Year	53.64	0.25	0.66	3.4												
			100 Year	53.64	0.31	0.80	5.1												
							18" CMP	Pipe 1379A	58	6314.00	6311.00	5.17%	0.024	1.50	0.1220	0.2450	0.55125	6.2	0.16
			JUNCTION	53.80															
5-16	37.44	18.13%	10 Year	53.80	0.25	0.57	5.2												
D3-D11			25 Year	53.80	0.25	0.66	6.1												
			100 Year	53.80	0.31	0.80	9.2												
							18" CMP	Pipe 1379B	200	6311.00	6295.00	8.00%	0.024	1.50	0.1753	0.3229	0.726525	8.4	0.40
			JUNCTION	54.20															

COUNTRY CLUB HEIGHTS-JN 95191
Rational Method
EWS D

SUBWS & NODES	Area (acres)	% Imperviousness		Tc (min)	Composite C	Rainfall Intensity (in/hr)	Peak Runoff (cfs)	Conveyance	Flow Length (ft)	High Elev (ft)	Low Elev (ft)	Slope (%)	n	Pipe Diameter (ft)	Qn/ ($D^{8/3}S^{.5}$)	A/D^2	Area (ft^2)	Velocity (ft/s)	Travel Time (min)
10-4	1.47	37.41%	10 Year	1.84	0.40	3.14	1.8												
D12			25 Year	1.84	0.40	3.69	2.2												
			100 Year	1.84	0.50	4.44	3.3												
																			0.00
			JUNCTION	1.84															
4-16	38.91	18.86%	10 Year	56.03	0.25	0.55	5.4												
D3-D12			25 Year	56.03	0.25	0.65	6.3												
			100 Year	56.03	0.31	0.78	9.6												
																			0.00
			JUNCTION	56.03															
1-16	45.36	19.30%	10 Year	56.03	0.25	0.55	6.4												
D1-D12			25 Year	56.03	0.25	0.65	7.5												
			100 Year	56.03	0.32	0.78	11.3												
							18" CMP	Pipe 1376	46	6284.73	6284.66	0.15%	0.024	1.50	1.5657	1.5000	3.375	2.2	0.34
			JUNCTION	56.38															
17-18	7.79	19.87%	10 Year	18.35	0.26	0.98	2.0												
D13			25 Year	18.35	0.26	1.15	2.3												
			100 Year	18.35	0.32	1.38	3.5												
							18" CMP	Pipe 1371	40	6293.40	6291.80	4.00%	0.024	1.50	0.0942	0.2028	0.4563	5.1	0.13
			JUNCTION	18.48															
18-19	0.63	38.98%	10 Year	1.99	0.41	3.01	0.8												
D14			25 Year	1.99	0.41	3.55	0.9												
			100 Year	1.99	0.51	4.27	1.4												
																			0.00
			JUNCTION	1.99															
17-19	8.42	21.30%	10 Year	20.47	0.27	0.92	2.1												
D13-D14			25 Year	20.47	0.27	1.08	2.5												
			100 Year	20.47	0.34	1.31	3.7												
																			0.00
			JUNCTION	20.47															
1-19	53.78	19.61%	10 Year	56.38	0.26	0.55	7.6												
D1-D14			25 Year	56.38	0.26	0.65	9.0												
			100 Year	56.38	0.32	0.78	13.5												
							15"x21" ACMP	Pipe 1375	51	6282.40	6282.17	0.45%	0.024	1.50	1.0856	1.5000	3.375	2.7	0.32
			JUNCTION	56.70															

COUNTRY CLUB HEIGHTS-JN 95191
Rational Method
EWS D

SUBWS & NODES	Area (acres)	% Imperviousness		Tc (min)	Composite C	Rainfall Intensity (in/hr)	Peak Runoff (cfs)	Conveyance	Flow Length (ft)	High Elev (ft)	Low Elev (ft)	Slope (%)	n	Pipe Diameter (ft)	Qn/ ($D^{8/3}S^{.5}$)	A/D^2	Area (ft^2)	Velocity (ft/s)	Travel Time (min)
19-20	0.34	33.07%	10 Year	2.93	0.36	2.48	0.3												
D15			25 Year	2.93	0.36	2.91	0.4												
			100 Year	2.93	0.46	3.51	0.5												
																			0.00
			JUNCTION	2.93															
1-20	54.12	19.70%	10 Year	59.62	0.26	0.54	7.5												
D1-D15			25 Year	59.62	0.26	0.63	8.8												
			100 Year	59.62	0.32	0.76	13.3												
																			0.00
			JUNCTION	59.62															
21-22	6.31	10.45%	10 Year	38.64	0.18	0.67	0.8												
D16			25 Year	38.64	0.18	0.79	0.9												
			100 Year	38.64	0.23	0.95	1.4												
							12" CMP	Pipe 1364	44	6387.80	6386.00	4.09%	0.024	1.00	0.1079	0.2260	0.226	4.0	0.18
			JUNCTION	38.82															
22-23	3.92	11.72%	10 Year	1.04	0.19	4.19	3.2												
D17			25 Year	1.04	0.19	4.93	3.7												
			100 Year	1.04	0.24	5.93	5.6												
																			0.00
			JUNCTION	1.04															
21-23	10.23	10.94%	10 Year	39.86	0.19	0.66	1.3												
D16-D17			25 Year	39.86	0.19	0.77	1.5												
			100 Year	39.86	0.23	0.93	2.2												
																			0.00
			JUNCTION	39.86															
24-25	4.87	11.90%	10 Year	35.70	0.20	0.70	0.7												
D18			25 Year	35.70	0.20	0.82	0.8												
			100 Year	35.70	0.24	0.99	1.2												
							18" CMP	Pipe 1363	61	6379.22	6375.68	5.80%	0.024	1.50	0.0263	0.0811	0.182475	4.3	0.24
			JUNCTION	35.94															
25-23	0.62	29.86%	10 Year	1.76	0.34	3.20	0.7												
D19			25 Year	1.76	0.34	3.77	0.8												
			100 Year	1.76	0.42	4.54	1.2												
																			0.00
			JUNCTION	1.76															

COUNTRY CLUB HEIGHTS-JN 95191
Rational Method
EWS D

SUBWS & NODES	Area (acres)	% Imperviousness		Tc (min)	Composite C	Rainfall Intensity (in/hr)	Peak Runoff (cfs)	Conveyance	Flow Length (ft)	High Elev (ft)	Low Elev (ft)	Slope (%)	n	Pipe Diameter (ft)	Qn/ ($D^{8/3}S^{.5}$)	A/D^2	Area (ft^2)	Velocity (ft/s)	Travel Time (min)
24-25	5.49	13.93%	10 Year	37.70	0.21	0.68	0.8												
			25 Year	37.70	0.21	0.80	0.9												
D18-D19			100 Year	37.70	0.26	0.96	1.4												
																			0.00
			JUNCTION	37.70															
21-25	15.72	11.98%	10 Year	39.86	0.20	0.66	2.0												
			25 Year	39.86	0.20	0.77	2.4												
D16-D19			100 Year	39.86	0.24	0.93	3.6												
							12" CMP	Pipe 1368	47	6353.14	6350.29	6.06%	0.024	1.00	0.2320	0.3927	0.3927	6.1	0.13
			JUNCTION	39.99															
23-26	2.41	16.64%	10 Year	0.88	0.23	4.56	2.6												
			25 Year	0.88	0.23	5.37	3.0												
D20			100 Year	0.88	0.29	6.46	4.5												
																			0.00
			JUNCTION	0.88															
21-26	18.13	12.60%	10 Year	40.87	0.20	0.65	2.4												
			25 Year	40.87	0.20	0.76	2.8												
D16-D20			100 Year	40.87	0.25	0.92	4.2												
							18" CMP	Pipe 1369	60	6322.19	6318.07	6.87%	0.024	1.50	0.0863	0.1936	0.4356	6.4	0.16
			JUNCTION	41.02															
26-27	0.34	43.71%	10 Year	0.87	0.45	4.57	0.7												
			25 Year	0.87	0.45	5.39	0.8												
D21			100 Year	0.87	0.56	6.48	1.2												
																			0.00
			JUNCTION	0.87															
21-27	18.47	13.17%	10 Year	41.90	0.21	0.64	2.4												
			25 Year	41.90	0.21	0.75	2.9												
D16-D21			100 Year	41.90	0.26	0.91	4.3												
							13"x17" ACMP	Pipe 1370	70	6303.57	6299.93	5.20%	0.024	1.25	0.1659	0.3032	0.47375	6.0	0.19
			JUNCTION	42.09															
27-28	3.98	19.79%	10 Year	1.91	0.26	3.07	3.2												
			25 Year	1.91	0.26	3.62	3.7												
D22			100 Year	1.91	0.32	4.35	5.6												
																			0.00
			JUNCTION	1.91															

COUNTRY CLUB HEIGHTS-JN 95191
Rational Method
EWS D

SUBWS & NODES	Area (acres)	% Imperviousness		Tc (min)	Composite C	Rainfall Intensity (in/hr)	Peak Runoff (cfs)	Conveyance	Flow Length (ft)	High Elev (ft)	Low Elev (ft)	Slope (%)	n	Pipe Diameter (ft)	Qn/ ($D^{8/3}S^{.5}$)	A/D^2	Area (ft^2)	Velocity (ft/s)	Travel Time (min)
21-28	22.45	14.34%	**10 Year**	**44.00**	**0.21**	**0.63**	**3.0**												
D16-D22			**25 Year**	**44.00**	**0.21**	**0.74**	**3.5**												
			100 Year	**44.00**	**0.27**	**0.89**	**5.3**												
							24" CMP	**Pipe 1372**	66	6283.30	6280.80	3.79%	0.024	2.00	0.0688	**0.1623**	0.6492	5.5	0.20
			JUNCTION	**44.20**															

COUNTRY CLUB HEIGHTS-JN 95191
Rational Method
EWS E

NOTES		
	1.630	= P_2 (2 yr, 24 hr rainfall depth based on 20 inches mean annual precip)
	6.0	Initial Time of Concentration for all areas
	0.90	Time of Concentration based on County of El Dorado Drainage Manual (Chapter 2)
	0.10	Time of Concentration determined using Longest Travel Path in Watershed
		c value a composite of pervious and impervious areas
		**100 Year Storm Assumes 25% increase in C
DATA RUN		= Computed Automatically
		=Determined from Appendix 4.2 of County of El Dorado Drainage Manual
		=Determined from Previous Worksheets
WS E	0%	=Bulking'

y=bx^m

	b	m
10 yrs	4.2681	-0.507
25 yrs	5.0264	-0.508
100 yrs	6.0429	-0.507

SUBWS & NODES	Area (acres)	% Imperviousness		Tc (min)	Composite C	Rainfall Intensity (in/hr)	Peak Runoff (cfs)	Conveyance	Flow Length (ft)	High Elev (ft)	Low Elev (ft)	Slope (%)	n	Pipe Diameter (ft)	Qn/ ($D^{8/3}S^{5}$)	A/D^2	Area (ft^2)	Velocity (ft/s)	Travel Time (min)
1-2	0.97	39.15%	10 Year	7.12	0.41	1.58	0.6												
			25 Year	7.12	0.41	1.85	0.7												
E1			100 Year	7.12	0.52	2.23	1.1	DI											
							18" CMP	Pipe 2638	43	6376.68	6375.49	2.77%	0.024	1.50	0.0363	0.1039	0.233775	3.2	0.23
			JUNCTION	7.34															
2-3	0.62	45.88%	10 Year	0.68	0.47	5.18	1.5												
			25 Year	0.68	0.47	6.10	1.8												
E2			100 Year	0.68	0.58	7.33	2.6												
																			0.00
			JUNCTION	0.68															
1-3	1.58	41.77%	10 Year	8.03	0.43	1.48	1.0												
			25 Year	8.03	0.43	1.74	1.2												
E1-E2			100 Year	8.03	0.54	2.10	1.8												
							18" HDPE	Pipe 2639	39	6350.12	6349.01	2.85%	0.012	1.50	0.0289	0.0885	0.199125	6.0	0.11
			JUNCTION	8.13															
4-5	2.20	19.07%	10 Year	39.57	0.25	0.66	0.4												
			25 Year	39.57	0.25	0.78	0.4												
E3			100 Year	39.57	0.32	0.94	0.7												
							15" CMP	Pipe 1362	42	6349.60	6348.90	1.67%	0.024	1.25	0.0443	0.1119	0.17484375	2.5	0.28
			JUNCTION	39.85															
5-6	4.60	21.78%	10 Year	5.09	0.27	1.87	2.4												
			25 Year	5.09	0.27	2.20	2.8												
E4			100 Year	5.09	0.34	2.65	4.2												
																			0.00
			JUNCTION	5.09															
4-6	6.81	20.90%	10 Year	44.94	0.27	0.62	1.1												
			25 Year	44.94	0.27	0.73	1.3												
E3-E4			100 Year	44.94	0.33	0.88	2.0												
																			0.00
			JUNCTION	44.94															

COUNTRY CLUB HEIGHTS-JN 95191
Rational Method
EWS E

SUBWS & NODES	Area (acres)	% Imperviousness		Tc (min)	Composite C	Rainfall Intensity (in/hr)	Peak Runoff (cfs)	Conveyance	Flow Length (ft)	High Elev (ft)	Low Elev (ft)	Slope (%)	n	Pipe Diameter (ft)	Qn/ ($D^{8/3}S^{.5}$)	A/D^2	Area (ft^2)	Velocity (ft/s)	Travel Time (min)
1-6	8.39	24.84%	10 Year	44.94	0.30	0.62	1.6												
E1-E4			25 Year	44.94	0.30	0.73	1.8												
			100 Year	44.94	0.37	0.88	2.7												
							21" HDPE	Pipe 1360	41	6321.07	6319.37	4.15%	0.012	1.75	0.0241	0.0775	0.23734375	7.7	0.09
			JUNCTION	45.03															
6-7	3.02	26.52%	10 Year	0.91	0.31	4.47	4.2												
E5			25 Year	0.91	0.31	5.26	5.0												
			100 Year	0.91	0.39	6.32	7.5												
																			0.00
			JUNCTION	0.91															
1-7	11.41	25.28%	10 Year	45.95	0.30	0.61	2.1												
E1-E5			25 Year	45.95	0.30	0.72	2.5												
			100 Year	45.95	0.38	0.87	3.7												
							12" CMP	Pipe 2640	45	6303.30	6301.46	4.09%	0.024	1.00	0.2944	0.4724	0.4724	5.3	0.14
			JUNCTION	46.09															
7-8	2.24	17.14%	10 Year	1.29	0.24	3.75	2.0												
E6			25 Year	1.29	0.24	4.42	2.3												
			100 Year	1.29	0.30	5.31	3.5												
																			0.00
			JUNCTION	1.29															
1-8	13.65	23.95%	10 Year	47.38	0.29	0.60	2.4												
E1-E6			25 Year	47.38	0.29	0.71	2.8												
			100 Year	47.38	0.36	0.85	4.3												
							24" CMP	Pipe 1358	61	6284.00	6282.80	1.97%	0.024	2.00	0.0760	0.1756	0.7022	4.0	0.25
			JUNCTION	47.63															
8-9	0.76	35.84%	10 Year	1.74	0.39	3.22	0.9												
E7			25 Year	1.74	0.39	3.79	1.1												
			100 Year	1.74	0.48	4.56	1.7												
																			0.00
			JUNCTION	1.74															
1-9	14.41	24.57%	10 Year	49.38	0.30	0.59	2.5												
E1-E7			25 Year	49.38	0.30	0.69	3.0												
			100 Year	49.38	0.37	0.84	4.5												
																			0.00
			JUNCTION	49.38															

COUNTRY CLUB HEIGHTS-JN 95191
Rational Method
EWS F

NOTES		
	1.630	= P_2 (2 yr, 24 hr rainfall depth based on 20 inches mean annual precip)
	6.0	Initial Time of Concentration for all areas
	0.90	Time of Concentration based on County of El Dorado Drainage Manual (Chapter 2)
	0.10	Time of Concentration determined using Longest Travel Path in Watershed
		c value a composite of pervious and impervious areas
		**100 Year Storm Assumes 25% increase in C
DATA RUN		= Computed Automatically
		=Determined from Appendix 4.2 of County of El Dorado Drainage Manual
		=Determined from Previous Worksheets
WS F	0%	=Bulking'

y=bx^m

	b	m
10 yrs	4.2681	-0.507
25 yrs	5.0264	-0.508
100 yrs	6.0429	-0.507

SUBWS & NODES	Area (acres)	% Imperviousness		Tc (min)	Composite C	Rainfall Intensity (in/hr)	Peak Runoff (cfs)	Conveyance	Flow Length (ft)	High Elev (ft)	Low Elev (ft)	Slope (%)	n	Pipe Diameter (ft)	Qn/ ($D^{8/3}S^{5}$)	A/D^2	Area (ft^2)	Velocity (ft/s)	Travel Time (min)
1-2	1.91	32.19%	10 Year	27.42	0.36	0.80	0.5												
F1			25 Year	27.42	0.36	0.93	0.6												
			100 Year	27.42	0.45	1.13	1.0	CMP Inlet											
							18" CMP	Pipe 1387	46	6480.80	6480.80	0.02%	0.024	1.50	0.3718	0.5687	1.279575	0.5	1.54
			JUNCTION	28.96															
2-3	3.87	25.71%	10 Year	3.28	0.31	2.34	2.8												
F2			25 Year	3.28	0.31	2.75	3.3												
			100 Year	3.28	0.38	3.31	4.9												
																			0.00
			JUNCTION	3.28															
1-3	5.78	27.85%	10 Year	32.23	0.32	0.73	1.4												
F1-F2			25 Year	32.23	0.32	0.86	1.6												
			100 Year	32.23	0.40	1.04	2.4	CMP Inlet											
							21" CMP	Pipe 1391	32	6447.80	6447.10	2.19%	0.024	1.75	0.0587	0.1449	0.44375625	3.6	0.15
			JUNCTION	32.38															
4-5	1.17	58.00%	10 Year	47.86	0.56	0.60	0.4												
F3			25 Year	47.86	0.56	0.70	0.5												
			100 Year	47.86	0.71	0.85	0.7												
																			0.00
			JUNCTION	47.86															
1-5	6.95	32.93%	10 Year	47.86	0.36	0.60	1.5												
F1-F3			25 Year	47.86	0.36	0.70	1.8												
			100 Year	47.86	0.45	0.85	2.7	CMP Inlet											
							21" CMP	Pipe 1392	82	6447.10	6444.70	2.93%	0.024	1.75	0.0562	0.1407	0.43089375	4.1	0.33
			JUNCTION	48.19															
6-7	0.37	44.62%	10 Year	21.02	0.46	0.91	0.2												
F4			25 Year	21.02	0.46	1.07	0.2												
			100 Year	21.02	0.57	1.29	0.3												
																			0.00
			JUNCTION	21.02															

COUNTRY CLUB HEIGHTS-JN 95191
Rational Method
EWS F

SUBWS & NODES	Area (acres)	% Imperviousness		Tc (min)	Composite C	Rainfall Intensity (in/hr)	Peak Runoff (cfs)	Conveyance	Flow Length (ft)	High Elev (ft)	Low Elev (ft)	Slope (%)	n	Pipe Diameter (ft)	Qn/ ($D^{8/3}S^{.5}$)	A/D^2	Area (ft^2)	Velocity (ft/s)	Travel Time (min)
1-7	7.32	33.52%	10 Year	48.19	0.37	0.60	1.6												
			25 Year	48.19	0.37	0.70	1.9												
F1-F4			100 Year	48.19	0.46	0.85	2.9	CMP Inlet											
							21" CMP	Pipe 1393	29	6444.70	6441.50	11.03%	0.024	1.75	0.0307	0.0885	0.27103125	7.0	0.07
			JUNCTION	48.26															
8-9	0.02	46.39%	10 Year	6.23	0.47	1.69	0.0												
			25 Year	6.23	0.47	1.98	0.0												
F5			100 Year	6.23	0.59	2.39	0.0												
																			0.00
			JUNCTION	6.23															
1-9	7.35	33.55%	10 Year	48.26	0.37	0.60	1.6												
			25 Year	48.26	0.37	0.70	1.9												
F1-F5			100 Year	48.26	0.46	0.85	2.9	CMP Inlet											
							21" CMP	Pipe 1394	173	6441.50	6426.40	8.73%	0.024	1.75	0.0347	0.1000	0.30625	6.2	0.47
			JUNCTION	48.73															
10-11	0.58	32.57%	10 Year	6.88	0.36	1.60	0.3												
			25 Year	6.88	0.36	1.89	0.4												
F6			100 Year	6.88	0.45	2.27	0.6												
																			0.00
			JUNCTION	6.88															
1-11	7.93	33.48%	10 Year	48.73	0.37	0.60	1.7												
			25 Year	48.73	0.37	0.70	2.0												
F1-F6			100 Year	48.73	0.46	0.84	3.1	CMP Inlet											
							21" CMP	Pipe 1395	131	6426.40	6414.56	9.04%	0.024	1.75	0.0365	0.1039	0.31819375	6.4	0.34
			JUNCTION	49.07															
12-13	2.65	18.29%	10 Year	6.67	0.25	1.63	1.1												
			25 Year	6.67	0.25	1.92	1.2												
F7			100 Year	6.67	0.31	2.31	1.9												
																			0.00
			JUNCTION	6.67															
1-13	10.57	29.68%	10 Year	49.07	0.34	0.59	2.1												
			25 Year	49.07	0.34	0.70	2.5												
F1-F7			100 Year	49.07	0.42	0.84	3.7	CMP Inlet											
							24" CMP	Pipe 1396	45	6414.32	6411.10	7.16%	0.024	2.00	0.0351	0.1039	0.4156	6.0	0.13
			JUNCTION	49.19															

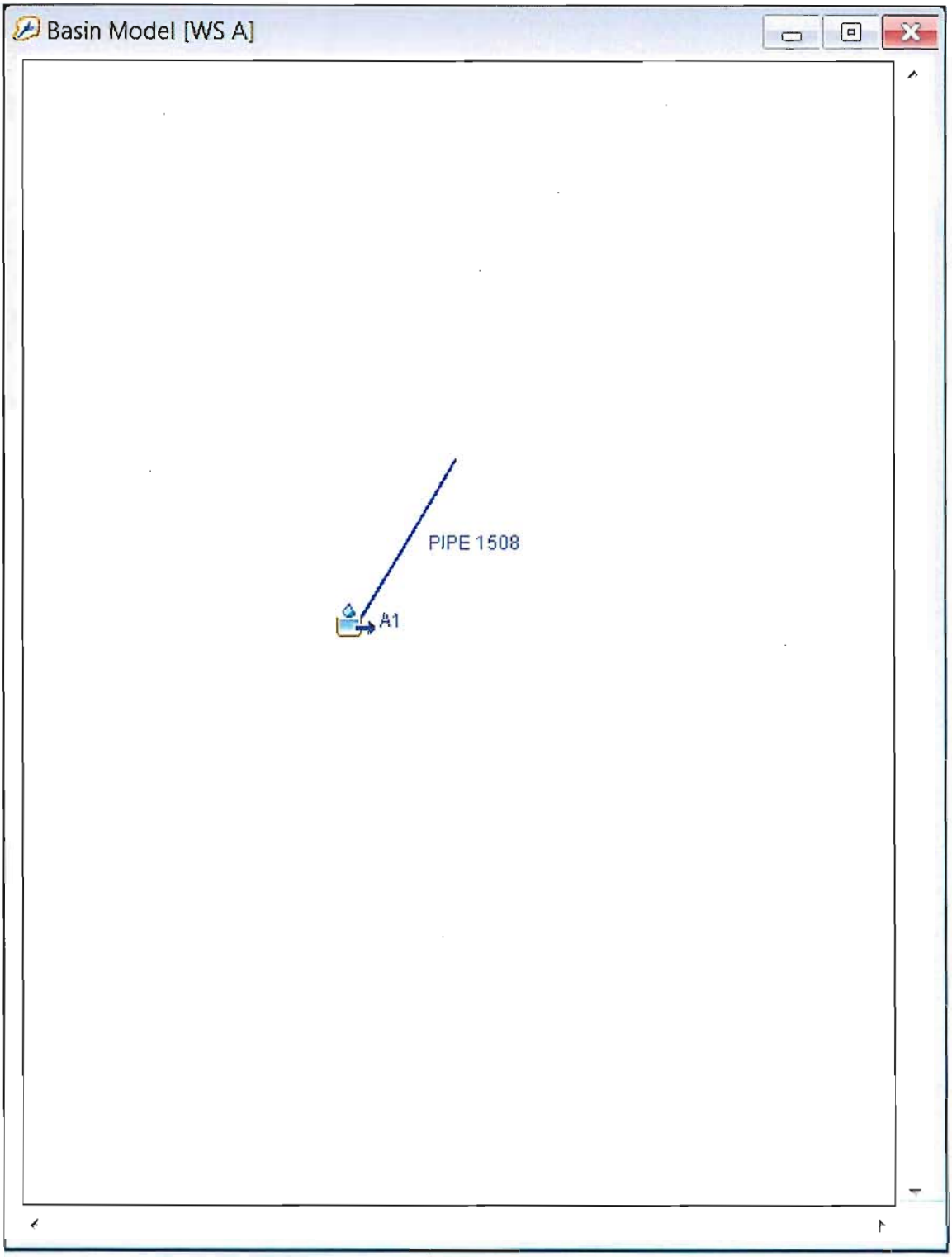
COUNTRY CLUB HEIGHTS-JN 95191
Rational Method
EWS F

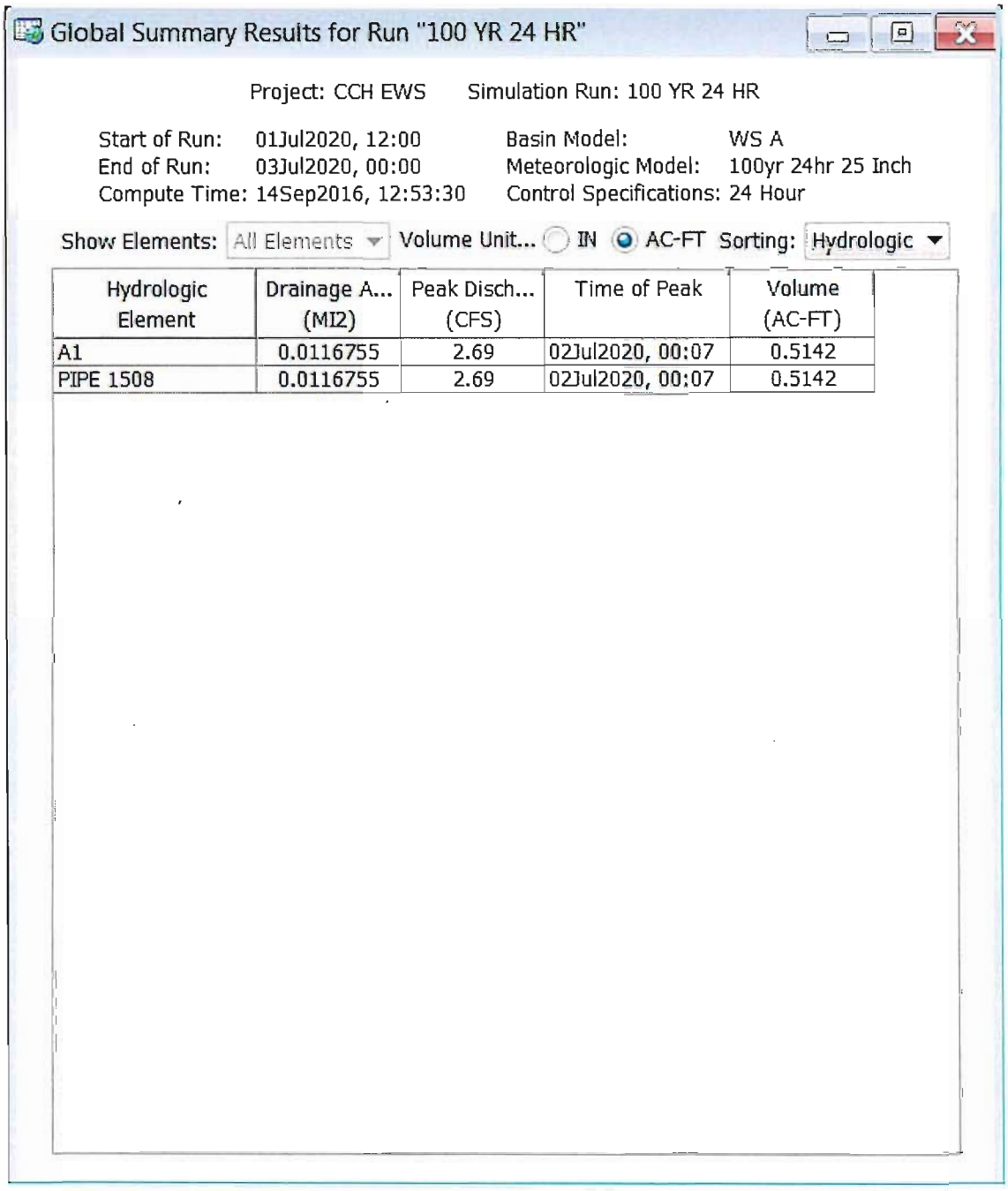
SUBWS & NODES	Area (acres)	% Imperviousness		Tc (min)	Composite C	Rainfall Intensity (in/hr)	Peak Runoff (cfs)	Conveyance	Flow Length (ft)	High Elev (ft)	Low Elev (ft)	Slope (%)	n	Pipe Diameter (ft)	Qn/ ($D^{8/3}S^{.5}$)	A/D^2	Area (ft^2)	Velocity (ft/s)	Travel Time (min)
14-15	0.06	52.07%	10 Year	10.48	0.52	1.30	0.0												
F8			25 Year	10.48	0.52	1.52	0.1												
			100 Year	10.48	0.65	1.84	0.1												
																			0.00
			JUNCTION	10.48															
1-15	10.64	29.81%	10 Year	49.19	0.34	0.59	2.1												
F1-F8			25 Year	49.19	0.34	0.69	2.5												
			100 Year	49.19	0.42	0.84	3.8	CMP Inlet											
							24" CMP	Pipe 1397	327	6411.12	6410.03	0.33%	0.024	2.00	0.1638	0.3032	1.2128	2.1	2.64
			JUNCTION	51.84															
16-17	4.13	12.59%	10 Year	34.22	0.20	0.71	0.6												
F9			25 Year	34.22	0.20	0.84	0.7												
			100 Year	34.22	0.25	1.01	1.0	CMP Inlet											
							18" CMP	Pipe 1382	402	6416.39	6412.08	1.07%	0.024	1.50	0.0544	0.1365	0.307125	2.3	2.98
			JUNCTION	37.20															
18-19	0.82	39.58%	10 Year	10.92	0.42	1.27	0.4												
F10			25 Year	10.92	0.42	1.49	0.5												
			100 Year	10.92	0.52	1.80	0.8												
																			0.00
			JUNCTION	10.92															
16-19	4.95	17.07%	10 Year	37.20	0.24	0.68	0.8												
F9-F10			25 Year	37.20	0.24	0.80	0.9												
			100 Year	37.20	0.30	0.97	1.4	CMP Inlet											
							21" CMP	Pipe 1383	150	6412.05	6410.09	1.31%	0.024	1.75	0.0442	0.1119	0.34269375	2.7	0.91
			JUNCTION	38.11															
1-19	15.58	25.77%	10 Year	51.84	0.31	0.58	2.8												
F1-F10			25 Year	51.84	0.31	0.68	3.2												
			100 Year	51.84	0.38	0.82	4.9	SDMH											
							24" CMP	Pipe 1385/1398	240	6410.03	6358.60	21.43%	0.024	2.00	0.0264	0.0811	0.3244	9.9	0.40
			JUNCTION	52.24															
20-21	6.75	19.03%	10 Year	37.55	0.25	0.68	1.2												
F11			25 Year	37.55	0.25	0.80	1.4												
			100 Year	37.55	0.32	0.96	2.0												
																			0.00
			JUNCTION	37.55															

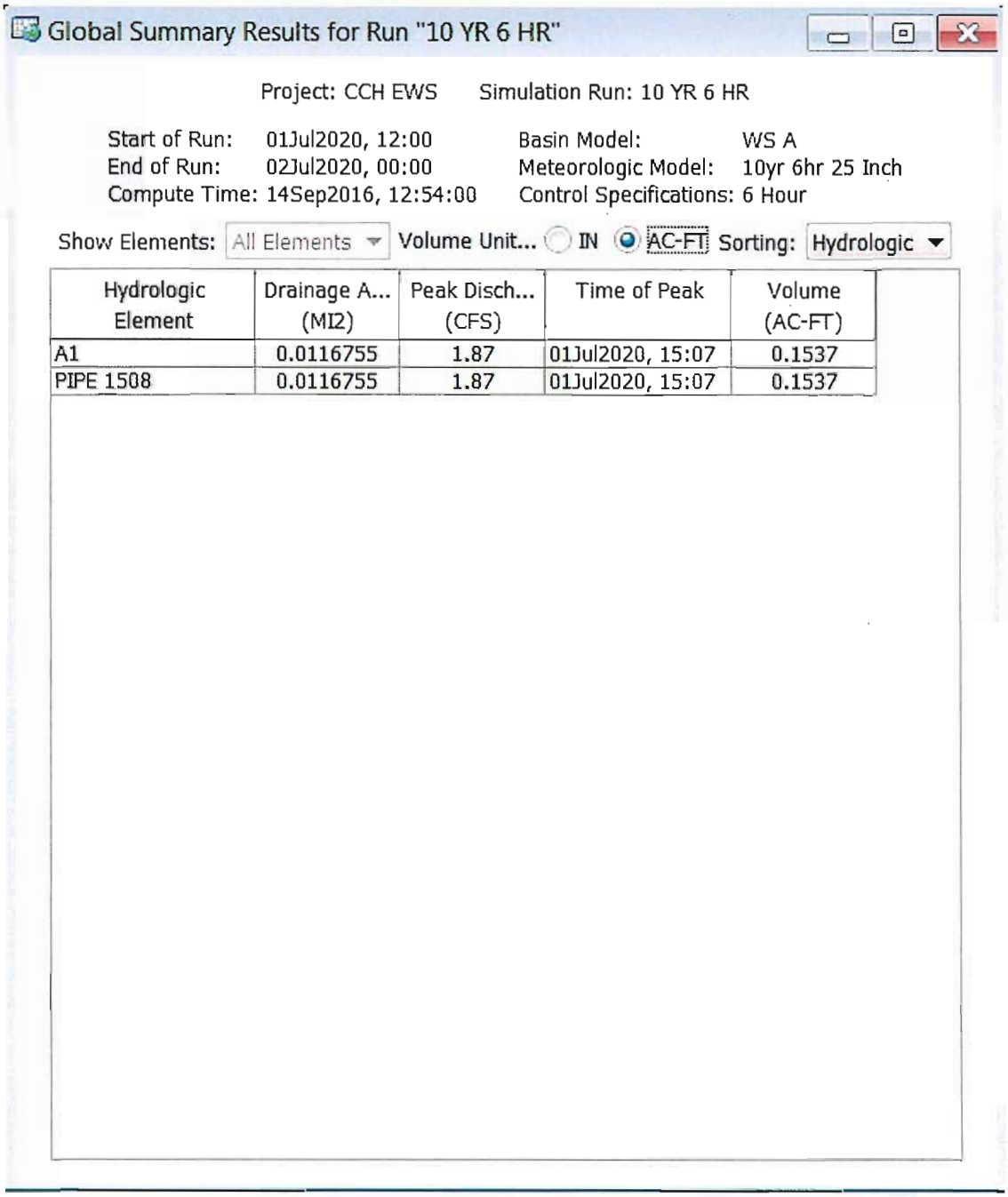
COUNTRY CLUB HEIGHTS-JN 95191
Rational Method
EWS F

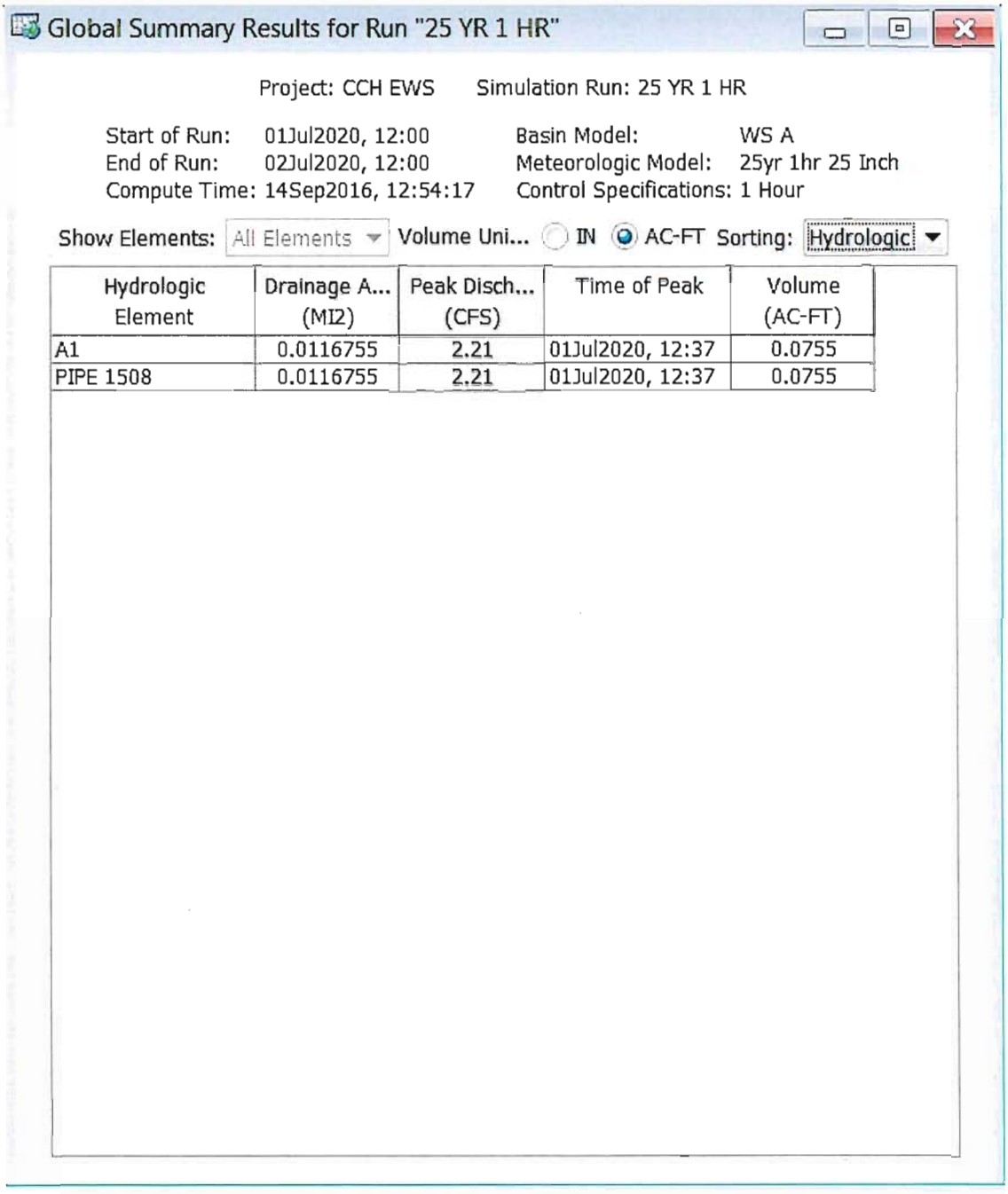
SUBWS & NODES	Area (acres)	% Imperviousness		Tc (min)	Composite C	Rainfall Intensity (in/hr)	Peak Runoff (cfs)	Conveyance	Flow Length (ft)	High Elev (ft)	Low Elev (ft)	Slope (%)	n	Pipe Diameter (ft)	Qn/ ($D^{8/3}S^{.5}$)	A/D^2	Area (ft^2)	Velocity (ft/s)	Travel Time (min)
1-21	22.33	23.73%	10 Year	52.24	0.29	0.57	3.7												
F1-F11			25 Year	52.24	0.29	0.67	4.4												
			100 Year	52.24	0.36	0.81	6.6	CMP Inlet											
							30" CMP	Pipe 1399/1400	336	6358.60	6322.90	10.63%	0.024	2.50	0.0279	0.0848	0.53	8.2	0.68
			JUNCTION	52.92															
21-22	5.25	14.54%	10 Year	0.90	0.22	4.51	5.1												
F12			25 Year	0.90	0.22	5.31	6.0												
			100 Year	0.90	0.27	6.38	9.1												
																			0.00
			JUNCTION	0.90															
1-22	27.58	21.98%	10 Year	53.82	0.28	0.57	4.3												
F1-F12			25 Year	53.82	0.28	0.66	5.0												
			100 Year	53.82	0.34	0.80	7.6												
								Channel											0.00
			JUNCTION	53.82															
23-24	2.86	20.27%	10 Year	47.47	0.26	0.60	0.5												
F13			25 Year	47.47	0.26	0.71	0.5												
			100 Year	47.47	0.33	0.85	0.8												
							12" CMP	Pipe 1361	55	6311.20	6307.80	6.18%	0.024	1.00	0.0511	0.1323	0.1323	4.0	0.23
			JUNCTION	47.69															

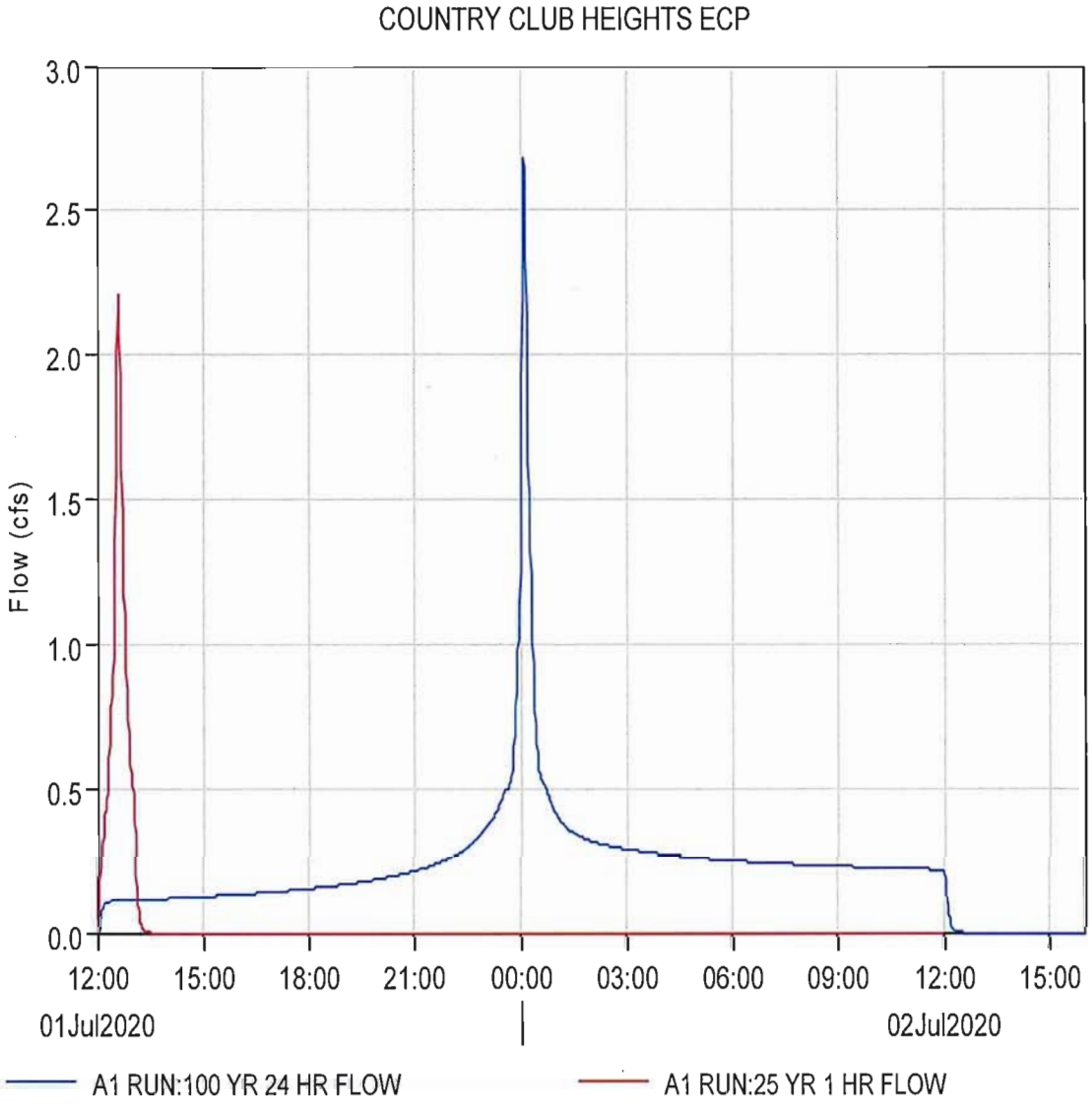
UNIT HYDROGRAPH METHOD RESULTS
(Existing Conditions)

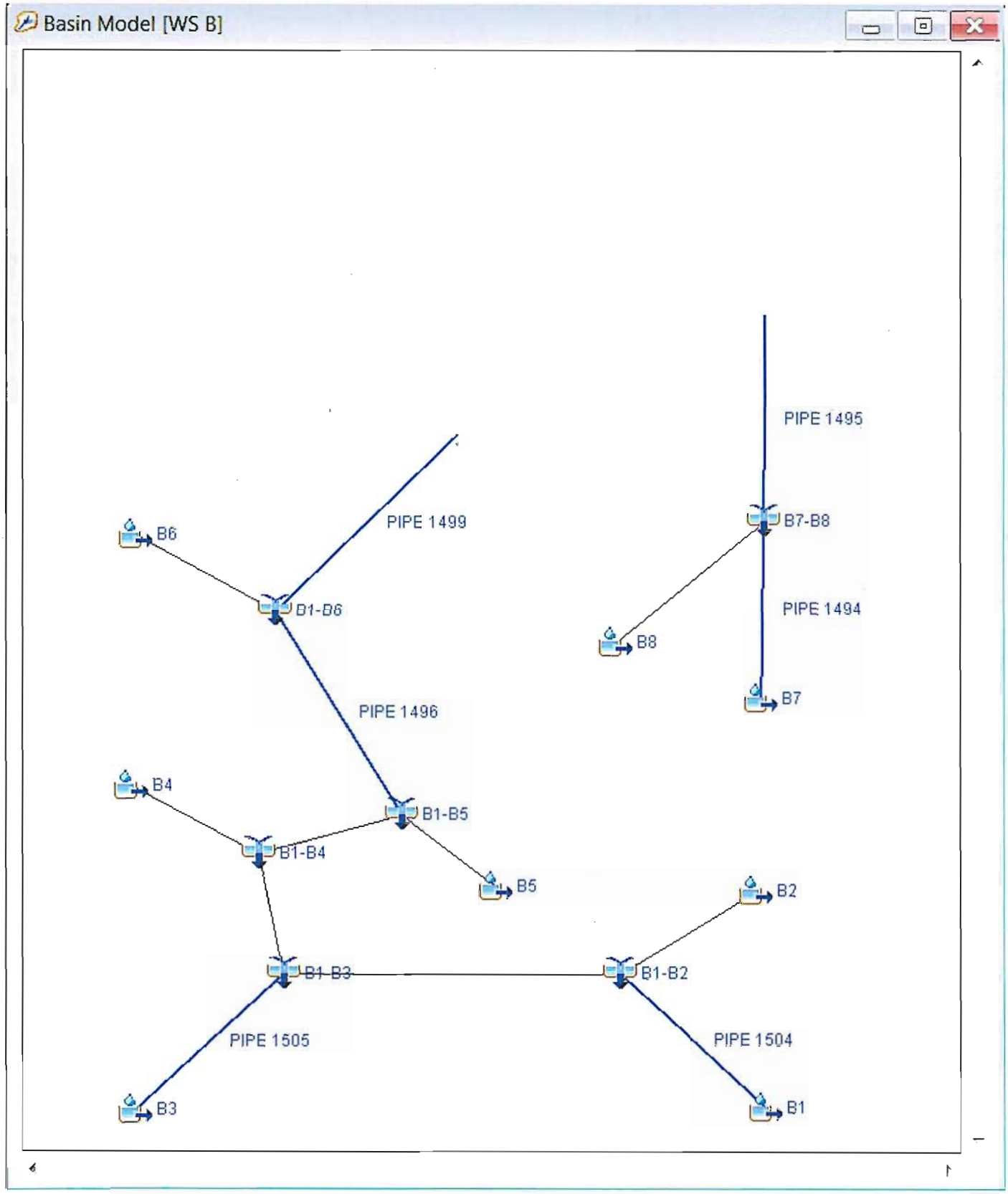

Basin Model [WS A]
PIPE 1508
A1


Global Summary Results for Run "100 YR 24 HR"
Project: CCH EWS Simulation Run: 100 YR 24 HR
Start of Run: 01Jul2020, 12:00
End of Run: 03Jul2020, 00:00
Compute Time: 14Sep2016, 12:53:30
Basin Model: WS A
Meteorologic Model: 100yr 24hr 25 Inch
Control Specifications: 24 Hour
Show Elements: All Elements
Volume Unit... IN AC-FT
Sorting: Hydrologic
Hydrologic Element
Drainage A... (MI2)
Peak Disch... (CFS)
Time of Peak
Volume (AC-FT)
A1 0.0116755 2.69 02Jul2020, 00:07 0.5142
PIPE 1508 0.0116755 2.69 02Jul2020, 00:07 0.5142


Global Summary Results for Run "10 YR 6 HR"
Project: CCH EWS Simulation Run: 10 YR 6 HR
Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 00:00
Compute Time: 14Sep2016, 12:54:00
Basin Model: WS A
Meteorologic Model: 10yr 6hr 25 Inch
Control Specifications: 6 Hour
Show Elements: All Elements
Volume Unit... IN AC-FT
Sorting: Hydrologic
Hydrologic Element
Drainage A... (MI2)
Peak Disch... (CFS)
Time of Peak
Volume (AC-FT)
A1 0.0116755 1.87 01Jul2020, 15:07 0.1537
PIPE 1508 0.0116755 1.87 01Jul2020, 15:07 0.1537


Global Summary Results for Run "25 YR 1 HR"
Project: CCH EWS Simulation Run: 25 YR 1 HR
Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 12:00
Compute Time: 14Sep2016, 12:54:17
Basin Model: WS A
Meteorologic Model: 25yr 1hr 25 Inch
Control Specifications: 1 Hour
Show Elements: All Elements
Volume Uni... IN AC-FT
Sorting: Hydrologic
Hydrologic Element
Drainage A... (MI2)
Peak Disch... (CFS)
Time of Peak
Volume (AC-FT)
A1 0.0116755 2.21 01Jul2020, 12:37 0.0755
PIPE 1508 0.0116755 2.21 01Jul2020, 12:37 0.0755


COUNTRY CLUB HEIGHTS ECP
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Flow (cfs)
12:00
15:00
18:00
21:00
00:00
03:00
06:00
09:00
12:00
15:00
01Jul2020
02Jul2020
A1 RUN:100 YR 24 HR FLOW
A1 RUN:25 YR 1 HR FLOW


Basin Model [WS B]
PIPE 1495
B7-B8
PIPE 1499
B6
B1-B6
PIPE 1494
B8
B7
PIPE 1496
B4
B1-B5
B1-B4
B5
B2
B1-B3
B1-B2
PIPE 1505
PIPE 1504
B3
B1

Global Summary Results for Run "100 YR 24 HR"

Project: CCH EWS Simulation Run: 100 YR 24 HR

Start of Run: 01Jul2020, 12:00
End of Run: 03Jul2020, 00:00
Compute Time: 14Sep2016, 12:58:28

Basin Model: WS B
Meteorologic Model: 100yr 24hr 23 Inch
Control Specifications: 24 Hour

Show Elements: All Elements Volume Unit... IN AC-FT Sorting: Hydrologic

Hydrologic Element	Drainage A... (MI2)	Peak Disch... (CFS)	Time of Peak	Volume (AC-FT)
B1	0.0024509	0.65	02Jul2020, 00:20	0.1972
PIPE 1504	0.0024509	0.65	02Jul2020, 00:20	0.1972
B2	.0003350712	0.54	02Jul2020, 00:03	0.0586
B1-B2	0.0027860	0.83	02Jul2020, 00:03	0.2558
B3	0.0014427	0.56	02Jul2020, 00:06	0.1025
PIPE 1505	0.0014427	0.56	02Jul2020, 00:06	0.1025
B1-B3	0.0042287	1.27	02Jul2020, 00:03	0.3583
B4	0.0031998	1.54	02Jul2020, 00:02	0.2114
B1-B4	0.0074285	2.81	02Jul2020, 00:03	0.5697
B5	0.0062224	1.78	02Jul2020, 00:02	0.2269
B1-B5	0.0136509	4.58	02Jul2020, 00:03	0.7967
PIPE 1496	0.0136509	4.58	02Jul2020, 00:03	0.7967
B6	0.0076457	2.74	02Jul2020, 00:03	0.3782
B1-B6	0.0212966	7.33	02Jul2020, 00:03	1.1749
PIPE 1499	0.0212966	7.33	02Jul2020, 00:03	1.1749
B7	0.0073627	1.63	02Jul2020, 00:08	0.3324
PIPE 1494	0.0073627	1.63	02Jul2020, 00:08	0.3324
B8	.0001369975	0.22	02Jul2020, 00:05	0.0306
B7-B8	0.0074997	1.80	02Jul2020, 00:08	0.3630
PIPE 1495	0.0074997	1.80	02Jul2020, 00:08	0.3630

Global Summary Results for Run "10 YR 6 HR"

Project: CCH EWS Simulation Run: 10 YR 6 HR

Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 00:00
Compute Time: 14Sep2016, 12:58:35

Basin Model: WS B
Meteorologic Model: 10yr 6hr 23 Inch
Control Specifications: 6 Hour

Show Elements: All Elements Volume Unit... IN AC-FT Sorting: Hydrologic

Hydrologic Element	Drainage A... (MI2)	Peak Disch... (CFS)	Time of Peak	Volume (AC-FT)
B1	0.0024509	0.43	01Jul2020, 15:19	0.0566
PIPE 1504	0.0024509	0.43	01Jul2020, 15:19	0.0566
B2	.0003350712	0.30	01Jul2020, 15:03	0.0176
B1-B2	0.0027860	0.51	01Jul2020, 15:03	0.0742
B3	0.0014427	0.39	01Jul2020, 15:06	0.0297
PIPE 1505	0.0014427	0.39	01Jul2020, 15:06	0.0297
B1-B3	0.0042287	0.81	01Jul2020, 15:03	0.1039
B4	0.0031998	1.08	01Jul2020, 15:02	0.0615
B1-B4	0.0074285	1.89	01Jul2020, 15:03	0.1654
B5	0.0062224	1.24	01Jul2020, 15:02	0.0711
B1-B5	0.0136509	3.13	01Jul2020, 15:03	0.2364
PIPE 1496	0.0136509	3.13	01Jul2020, 15:03	0.2364
B6	0.0076457	1.92	01Jul2020, 15:03	0.1144
B1-B6	0.0212966	5.05	01Jul2020, 15:03	0.3508
PIPE 1499	0.0212966	5.05	01Jul2020, 15:03	0.3508
B7	0.0073627	1.15	01Jul2020, 15:08	0.1016
PIPE 1494	0.0073627	1.15	01Jul2020, 15:08	0.1016
B8	.0001369975	0.15	01Jul2020, 15:05	0.0107
B7-B8	0.0074997	1.27	01Jul2020, 15:08	0.1124
PIPE 1495	0.0074997	1.27	01Jul2020, 15:08	0.1124

Global Summary Results for Run "25 YR 1 HR"

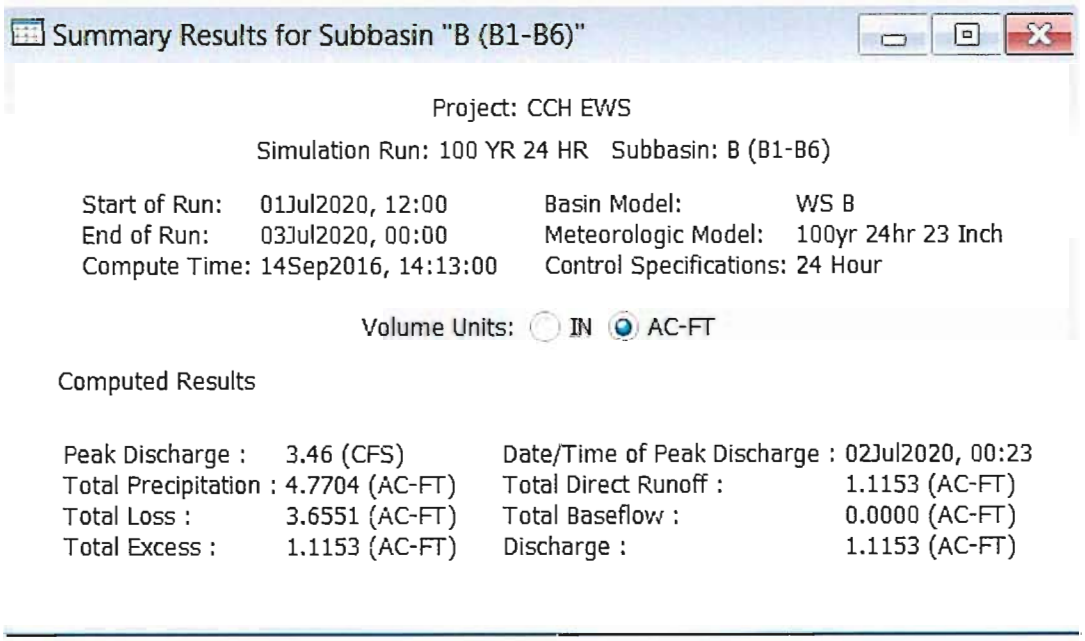
Project: CCH EWS Simulation Run: 25 YR 1 HR

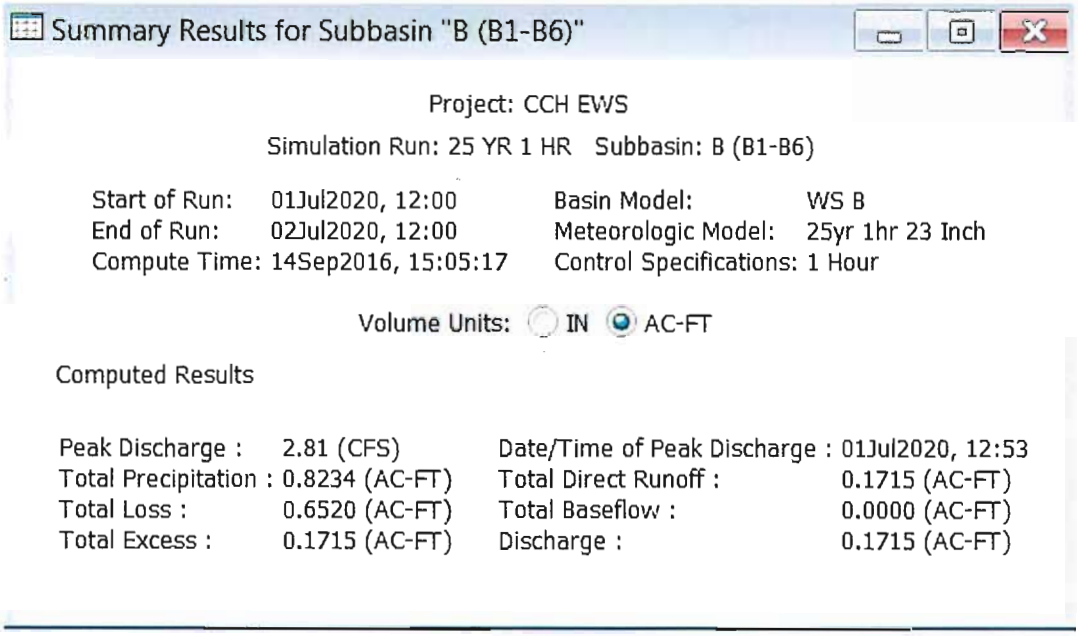
Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 12:00
Compute Time: 14Sep2016, 12:58:42

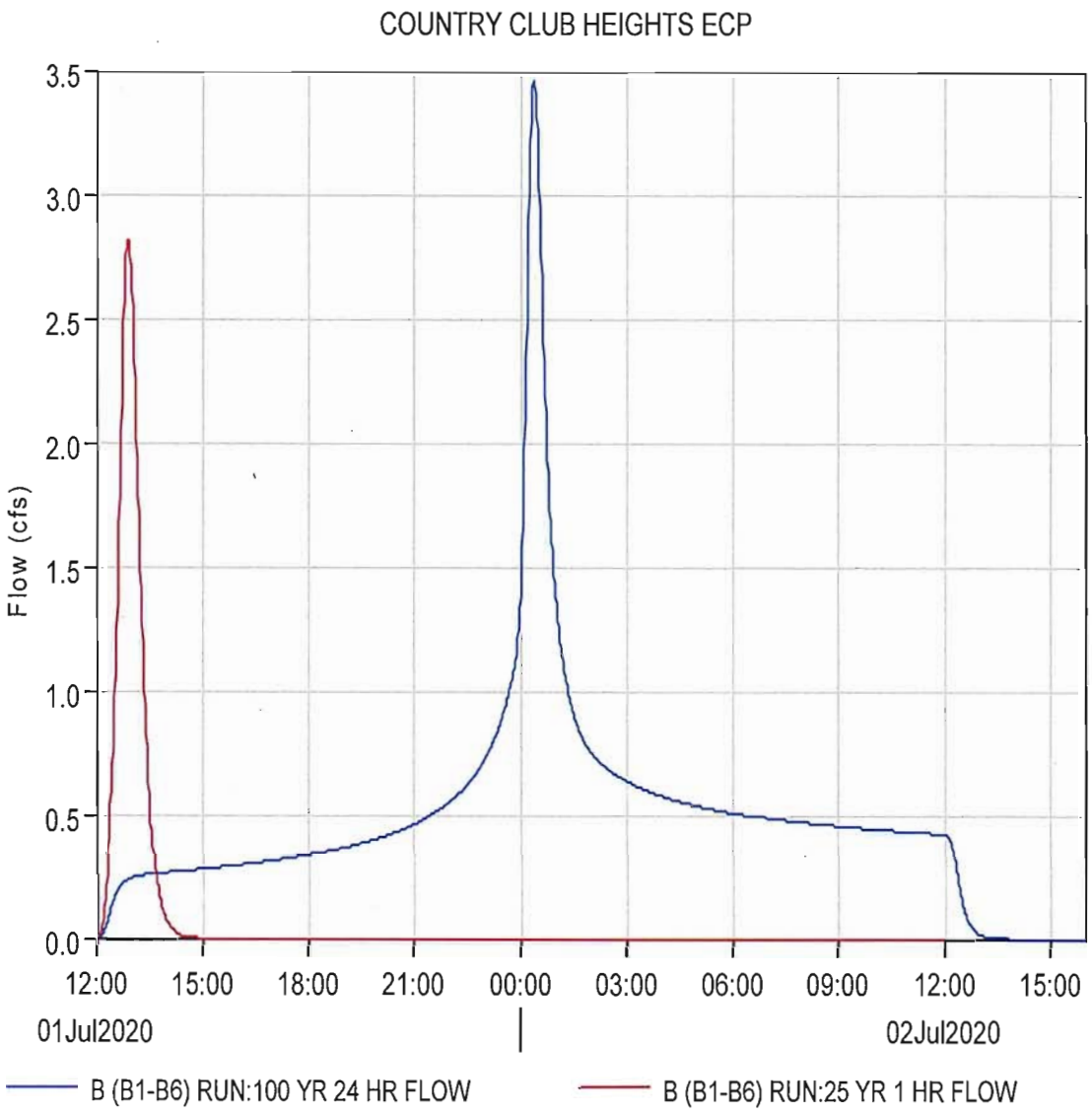
Basin Model: WS B
Meteorologic Model: 25yr 1hr 23 Inch
Control Specifications: 1 Hour

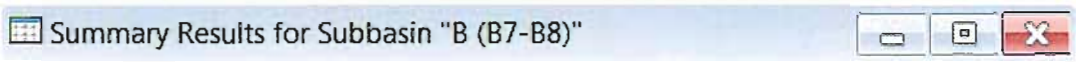
Show Elements: All Elements Volume Uni... IN AC-FT Sorting: Hydrologic

Hydrologic Element	Drainage A... (MI2)	Peak Disch... (CFS)	Time of Peak	Volume (AC-FT)
B1	0.0024509	0.51	01Jul2020, 12:49	0.0277
PIPE 1504	0.0024509	0.51	01Jul2020, 12:49	0.0277
B2	.0003350712	0.35	01Jul2020, 12:33	0.0082
B1-B2	0.0027860	0.57	01Jul2020, 12:45	0.0360
B3	0.0014427	0.46	01Jul2020, 12:36	0.0145
PIPE 1505	0.0014427	0.46	01Jul2020, 12:36	0.0145
B1-B3	0.0042287	0.93	01Jul2020, 12:33	0.0505
B4	0.0031998	1.27	01Jul2020, 12:32	0.0301
B1-B4	0.0074285	2.20	01Jul2020, 12:33	0.0806
B5	0.0062224	1.46	01Jul2020, 12:32	0.0348
B1-B5	0.0136509	3.66	01Jul2020, 12:33	0.1154
PIPE 1496	0.0136509	3.66	01Jul2020, 12:33	0.1154
B6	0.0076457	2.26	01Jul2020, 12:33	0.0560
B1-B6	0.0212966	5.92	01Jul2020, 12:33	0.1715
PIPE 1499	0.0212966	5.92	01Jul2020, 12:33	0.1715
B7	0.0073627	1.34	01Jul2020, 12:38	0.0498
PIPE 1494	0.0073627	1.34	01Jul2020, 12:38	0.0498
B8	.0001369975	0.18	01Jul2020, 12:35	0.0052
B7-B8	0.0074997	1.49	01Jul2020, 12:38	0.0550
PIPE 1495	0.0074997	1.49	01Jul2020, 12:38	0.0550


Summary Results for Subbasin "B (B1-B6)"
Project: CCH EWS
Simulation Run: 100 YR 24 HR Subbasin: B (B1-B6)
Start of Run: 01Jul2020, 12:00
End of Run: 03Jul2020, 00:00
Compute Time: 14Sep2016, 14:13:00
Basin Model: WS B
Meteorologic Model: 100yr 24hr 23 Inch
Control Specifications: 24 Hour
Volume Units: IN AC-FT
Computed Results
Peak Discharge : 3.46 (CFS)
Total Precipitation : 4.7704 (AC-FT)
Total Loss : 3.6551 (AC-FT)
Total Excess : 1.1153 (AC-FT)
Date/Time of Peak Discharge : 02Jul2020, 00:23
Total Direct Runoff : 1.1153 (AC-FT)
Total Baseflow : 0.0000 (AC-FT)
Discharge : 1.1153 (AC-FT)


Summary Results for Subbasin "B (B1-B6)"
Project: CCH EWS
Simulation Run: 25 YR 1 HR Subbasin: B (B1-B6)
Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 12:00
Compute Time: 14Sep2016, 15:05:17
Basin Model: WS B
Meteorologic Model: 25yr 1hr 23 Inch
Control Specifications: 1 Hour
Volume Units: IN AC-FT
Computed Results
Peak Discharge : 2.81 (CFS)
Total Precipitation : 0.8234 (AC-FT)
Total Loss : 0.6520 (AC-FT)
Total Excess : 0.1715 (AC-FT)
Date/Time of Peak Discharge : 01Jul2020, 12:53
Total Direct Runoff : 0.1715 (AC-FT)
Total Baseflow : 0.0000 (AC-FT)
Discharge : 0.1715 (AC-FT)


COUNTRY CLUB HEIGHTS ECP
Flow (cfs)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
12:00
15:00
18:00
21:00
00:00
03:00
06:00
09:00
12:00
15:00
01Jul2020
02Jul2020
B (B1-B6) RUN:100 YR 24 HR FLOW
B (B1-B6) RUN:25 YR 1 HR FLOW



Project: CCH EWS

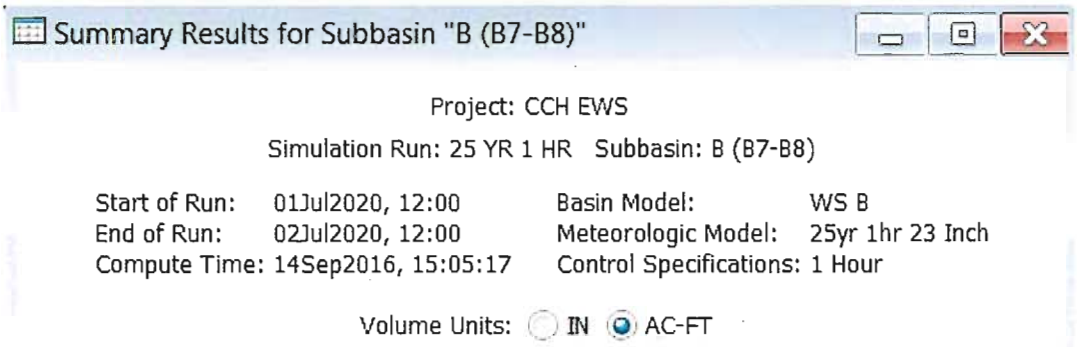
Simulation Run: 100 YR 24 HR Subbasin: B (B7-B8)

Start of Run:	01Jul2020, 12:00	Basin Model:	WS B
End of Run:	03Jul2020, 00:00	Meteorologic Model:	100yr 24hr 23 Inch
Compute Time:	14Sep2016, 14:13:00	Control Specifications:	24 Hour

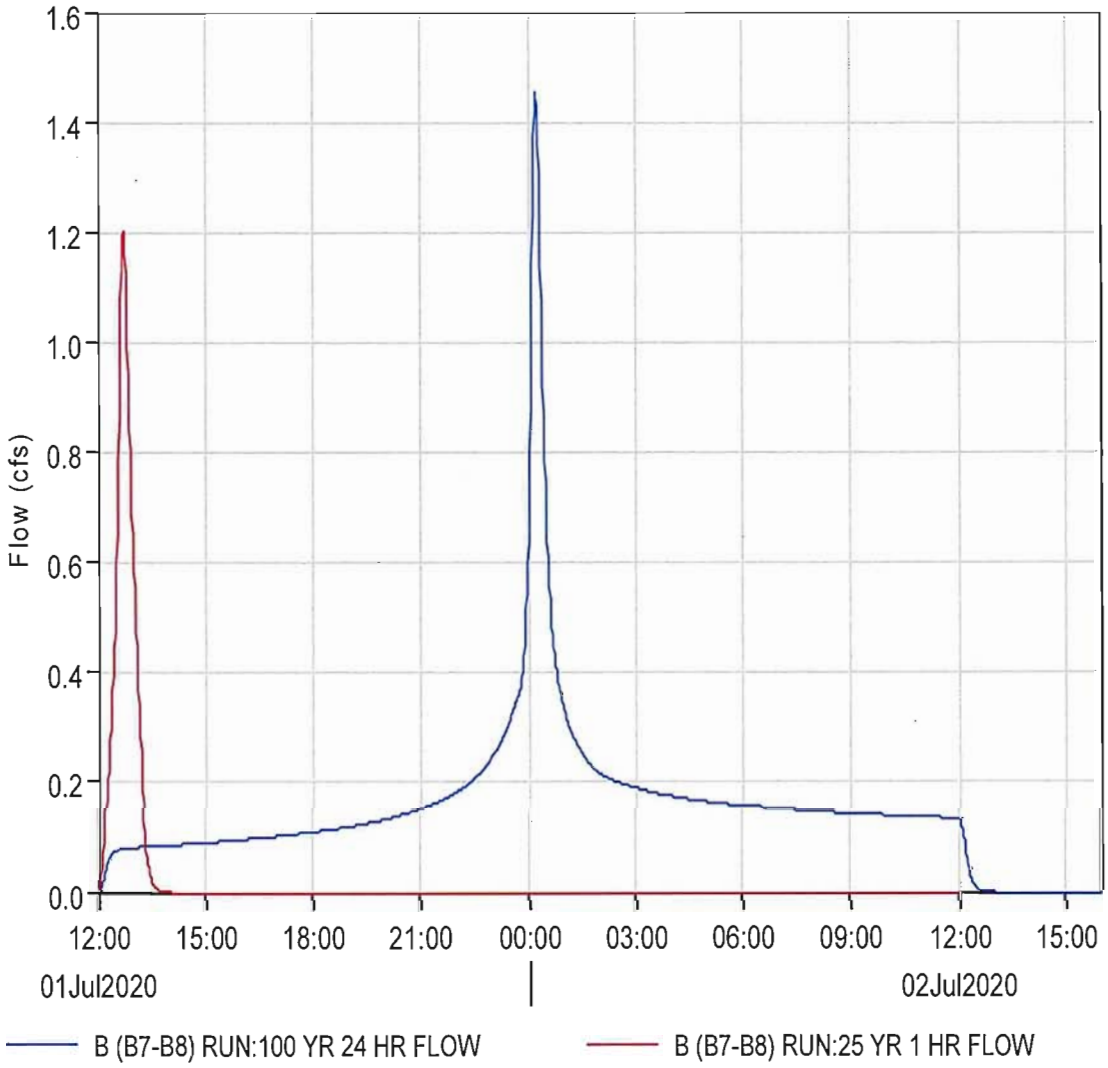
Volume Units: ○ IN ◉ AC-FT

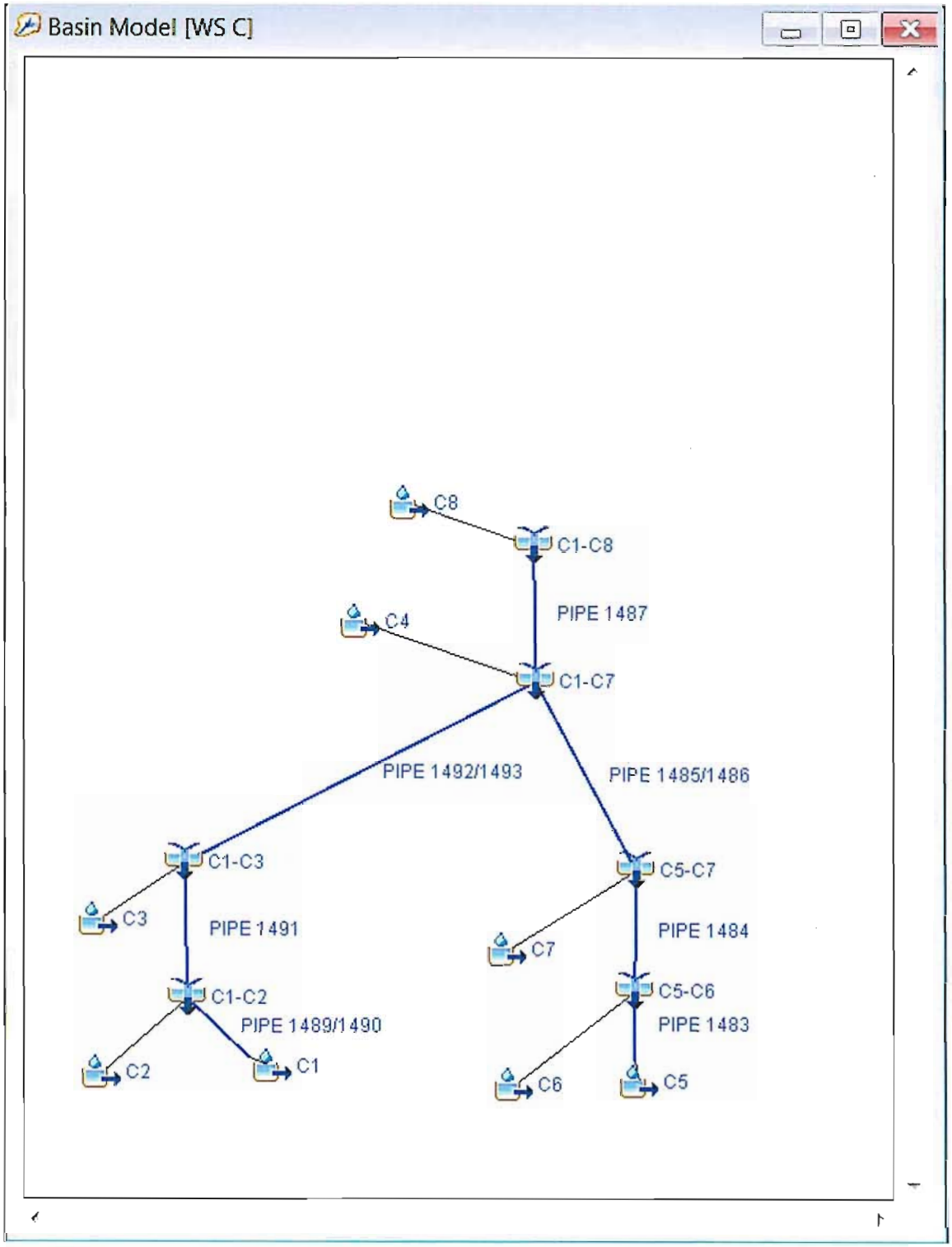
Computed Results

Peak Discharge :	1.46 (CFS)	Date/Time of Peak Discharge :	02Jul2020, 00:13
Total Precipitation :	1.6799 (AC-FT)	Total Direct Runoff :	0.3543 (AC-FT)
Total Loss :	1.3256 (AC-FT)	Total Baseflow :	0.0000 (AC-FT)
Total Excess :	0.3543 (AC-FT)	Discharge :	0.3543 (AC-FT)


Summary Results for Subbasin "B (B7-B8)"
Project: CCH EWS
Simulation Run: 25 YR 1 HR Subbasin: B (B7-B8)
Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 12:00
Compute Time: 14Sep2016, 15:05:17
Basin Model: WS B
Meteorologic Model: 25yr 1hr 23 Inch
Control Specifications: 1 Hour
Volume Units: IN AC-FT
Computed Results
Peak Discharge : 1.20 (CFS)
Total Precipitation : 0.2900 (AC-FT)
Total Loss : 0.2350 (AC-FT)
Total Excess : 0.0549 (AC-FT)
Date/Time of Peak Discharge : 01Jul2020, 12:43
Total Direct Runoff : 0.0549 (AC-FT)
Total Baseflow : 0.0000 (AC-FT)
Discharge : 0.0549 (AC-FT)

COUNTRY CLUB HEIGHTS ECP




Basin Model [WS C]
C8
C1-C8
PIPE 1487
C4
C1-C7
PIPE 1492/1493
PIPE 1485/1486
C1-C3
C5-C7
C3
PIPE 1491
C7
PIPE 1484
C1-C2
C5-C6
PIPE 1489/1490
PIPE 1483
C2
C1
C6
C5

Global Summary Results for Run "100 YR 24 HR"

Project: CCH EWS Simulation Run: 100 YR 24 HR

Start of Run: 01Jul2020, 12:00
End of Run: 03Jul2020, 00:00
Compute Time: 14Sep2016, 13:01:17

Basin Model: WS C
Meteorologic Model: 100yr 24hr 21 Inch
Control Specifications: 24 Hour

Show Elements: All Elements Volume Unit... IN AC-FT Sorting: Hydrologic

Hydrologic Element	Drainage A... (MI2)	Peak Disch... (CFS)	Time of Peak	Volume (AC-FT)
C2	0.0068010	0.62	02Jul2020, 00:32	0.2232
C1	0.0065541	2.59	02Jul2020, 00:13	0.6016
PIPE 1489/1490	0.0065541	2.59	02Jul2020, 00:13	0.6016
C1-C2	0.0133551	3.00	02Jul2020, 00:13	0.8248
PIPE 1491	0.0133551	3.00	02Jul2020, 00:13	0.8248
C3	0.0048265	1.09	02Jul2020, 00:06	0.1767
C1-C3	0.0181816	3.61	02Jul2020, 00:11	1.0015
PIPE 1492/1493	0.0181816	3.61	02Jul2020, 00:11	1.0015
C5	0.0069564	1.11	02Jul2020, 00:21	0.3477
PIPE 1483	0.0069564	1.11	02Jul2020, 00:21	0.3477
C6	.0002582218	0.05	02Jul2020, 00:18	0.0131
C5-C6	0.0072146	1.16	02Jul2020, 00:21	0.3607
PIPE 1484	0.0072146	1.16	02Jul2020, 00:21	0.3607
C7	0.0018152	0.25	02Jul2020, 00:21	0.0765
C5-C7	0.0090298	1.41	02Jul2020, 00:21	0.4373
PIPE 1485/1486	0.0090298	1.41	02Jul2020, 00:21	0.4373
C4	0.0081126	2.13	02Jul2020, 00:03	0.2611
C1-C7	0.0353240	5.34	02Jul2020, 00:13	1.6999
PIPE 1487	0.0353240	5.34	02Jul2020, 00:13	1.6999
C8	0.0029407	0.59	02Jul2020, 00:03	0.0708
C1-C8	0.0382647	5.93	02Jul2020, 00:03	1.7706

Global Summary Results for Run "10 YR 6 HR"

Project: CCH EWS Simulation Run: 10 YR 6 HR

Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 00:00
Compute Time: 14Sep2016, 13:01:24

Basin Model: WS C
Meteorologic Model: 10yr 6hr 21 Inch
Control Specifications: 6 Hour

Show Elements: All Elements Volume Unit... IN AC-FT Sorting: Hydrologic

Hydrologic Element	Drainage A... (MI2)	Peak Disch... (CFS)	Time of Peak	Volume (AC-FT)
C2	0.0068010	0.43	01Jul2020, 15:32	0.0739
C1	0.0065541	1.66	01Jul2020, 15:12	0.1760
PIPE 1489/1490	0.0065541	1.66	01Jul2020, 15:12	0.1760
C1-C2	0.0133551	1.93	01Jul2020, 15:13	0.2499
PIPE 1491	0.0133551	1.93	01Jul2020, 15:13	0.2499
C3	0.0048265	0.77	01Jul2020, 15:06	0.0578
C1-C3	0.0181816	2.40	01Jul2020, 15:10	0.3076
PIPE 1492/1493	0.0181816	2.40	01Jul2020, 15:10	0.3076
C5	0.0069564	0.78	01Jul2020, 15:21	0.1079
PIPE 1483	0.0069564	0.78	01Jul2020, 15:21	0.1079
C6	.0002582218	0.03	01Jul2020, 15:18	0.0041
C5-C6	0.0072146	0.81	01Jul2020, 15:21	0.1120
PIPE 1484	0.0072146	0.81	01Jul2020, 15:21	0.1120
C7	0.0018152	0.18	01Jul2020, 15:21	0.0243
C5-C7	0.0090298	0.99	01Jul2020, 15:21	0.1363
PIPE 1485/1486	0.0090298	0.99	01Jul2020, 15:21	0.1363
C4	0.0081126	1.51	01Jul2020, 15:03	0.0863
C1-C7	0.0353240	3.72	01Jul2020, 15:03	0.5302
PIPE 1487	0.0353240	3.72	01Jul2020, 15:03	0.5302
C8	0.0029407	0.42	01Jul2020, 15:03	0.0240
C1-C8	0.0382647	4.14	01Jul2020, 15:03	0.5542

Global Summary Results for Run "25 YR 1 HR"

Project: CCH EWS Simulation Run: 25 YR 1 HR

Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 12:00
Compute Time: 14Sep2016, 13:01:31

Basin Model: WS C
Meteorologic Model: 25yr 1hr 21 Inch
Control Specifications: 1 Hour

Show Elements: All Elements Volume Uni... IN AC-FT Sorting: Hydrologic

Hydrologic Element	Drainage A... (MI2)	Peak Disch... (CFS)	Time of Peak	Volume (AC-FT)
C2	0.0068010	0.49	01Jul2020, 13:02	0.0361
C1	0.0065541	1.96	01Jul2020, 12:42	0.0860
PIPE 1489/1490	0.0065541	1.96	01Jul2020, 12:42	0.0860
C1-C2	0.0133551	2.22	01Jul2020, 12:43	0.1220
PIPE 1491	0.0133551	2.22	01Jul2020, 12:43	0.1220
C3	0.0048265	0.91	01Jul2020, 12:36	0.0282
C1-C3	0.0181816	2.76	01Jul2020, 12:40	0.1502
PIPE 1492/1493	0.0181816	2.76	01Jul2020, 12:40	0.1502
C5	0.0069564	0.91	01Jul2020, 12:51	0.0527
PIPE 1483	0.0069564	0.91	01Jul2020, 12:51	0.0527
C6	.0002582218	0.04	01Jul2020, 12:48	0.0020
C5-C6	0.0072146	0.94	01Jul2020, 12:51	0.0547
PIPE 1484	0.0072146	0.94	01Jul2020, 12:51	0.0547
C7	0.0018152	0.21	01Jul2020, 12:51	0.0119
C5-C7	0.0090298	1.15	01Jul2020, 12:51	0.0666
PIPE 1485/1486	0.0090298	1.15	01Jul2020, 12:51	0.0666
C4	0.0081126	1.76	01Jul2020, 12:33	0.0421
C1-C7	0.0353240	4.18	01Jul2020, 12:33	0.2589
PIPE 1487	0.0353240	4.18	01Jul2020, 12:33	0.2589
C8	0.0029407	0.49	01Jul2020, 12:33	0.0117
C1-C8	0.0382647	4.67	01Jul2020, 12:33	0.2706

Summary Results for Subbasin "C"

Project: CCH EWS

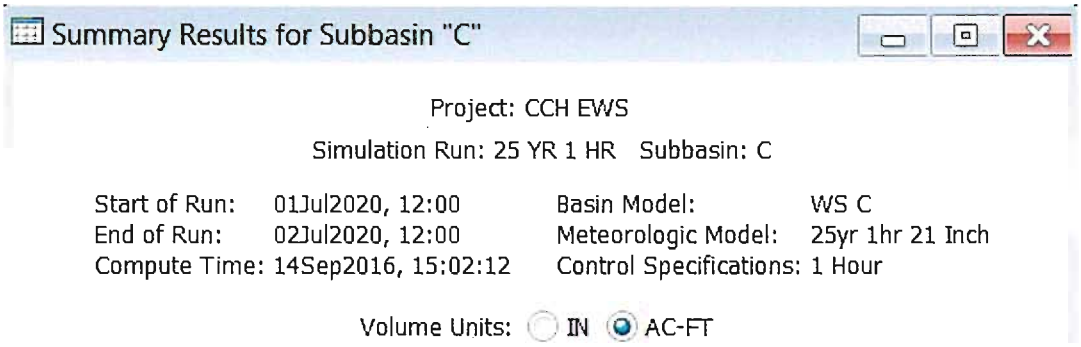
Simulation Run: 100 YR 24 HR Subbasin: C

Start of Run:	01Jul2020, 12:00	Basin Model:	WS C
End of Run:	03Jul2020, 00:00	Meteorologic Model:	100yr 24hr 21 Inch
Compute Time:	14Sep2016, 15:01:48	Control Specifications:	24 Hour

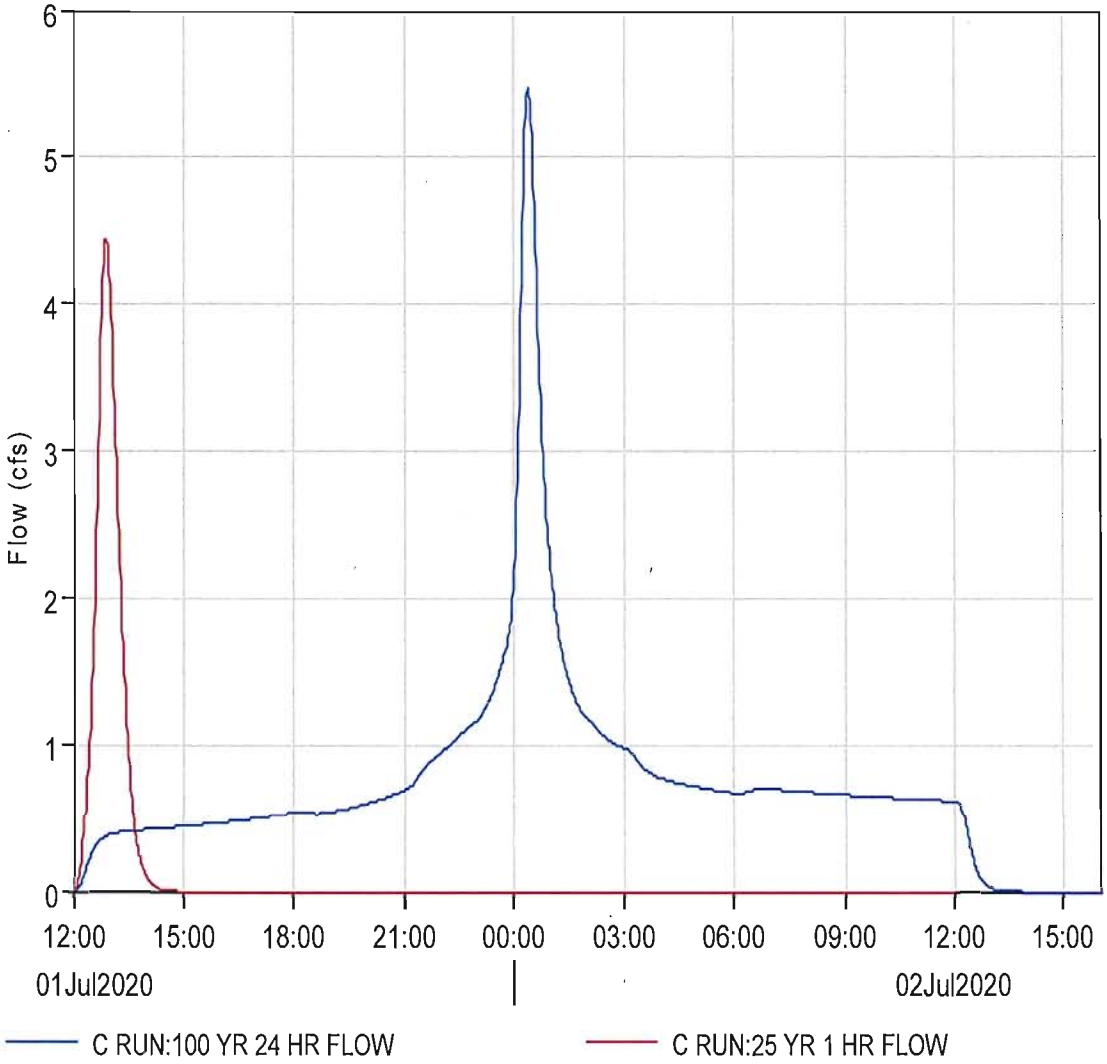
Volume Units: ○ IN ◉ AC-FT

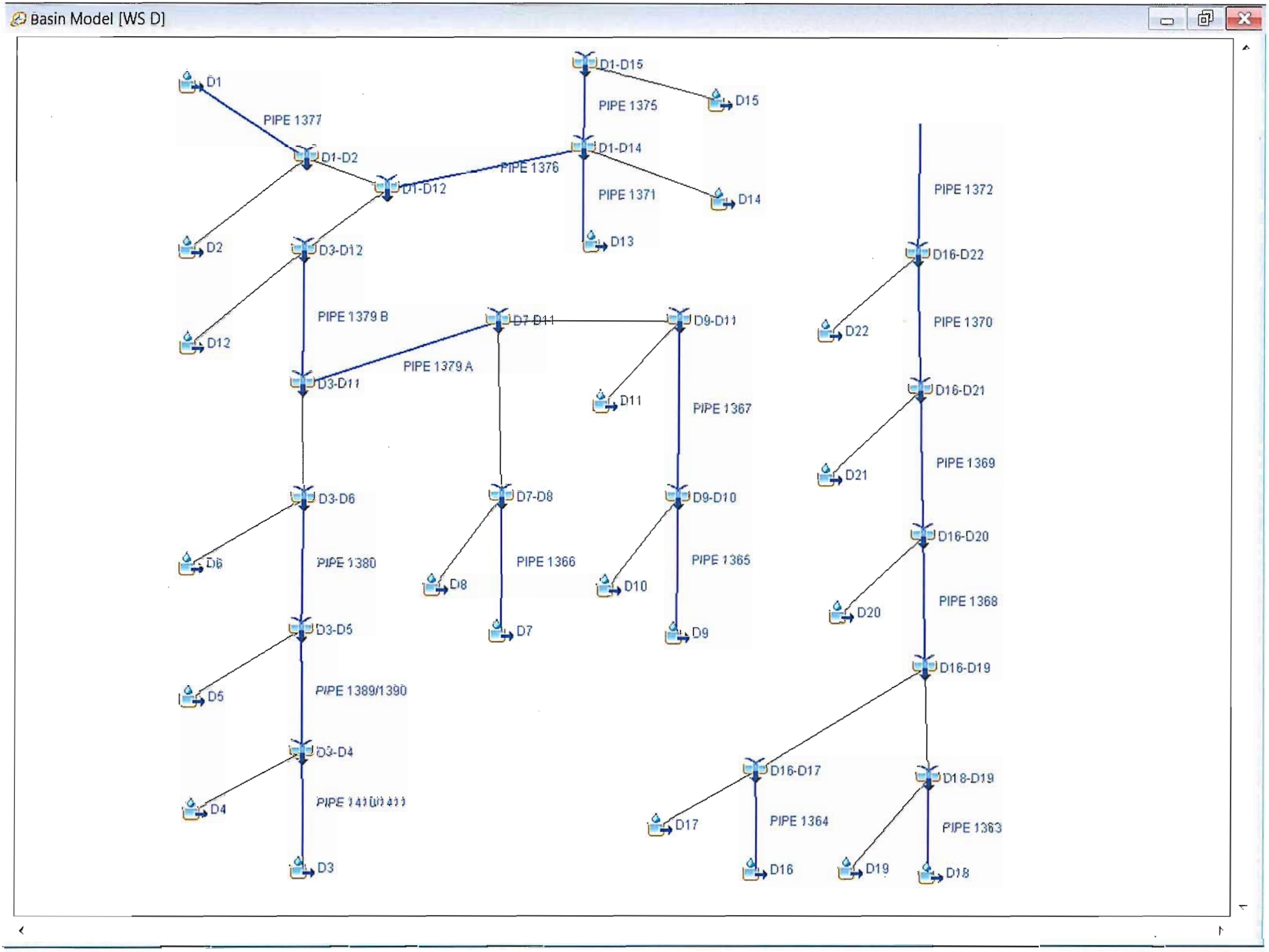
Computed Results

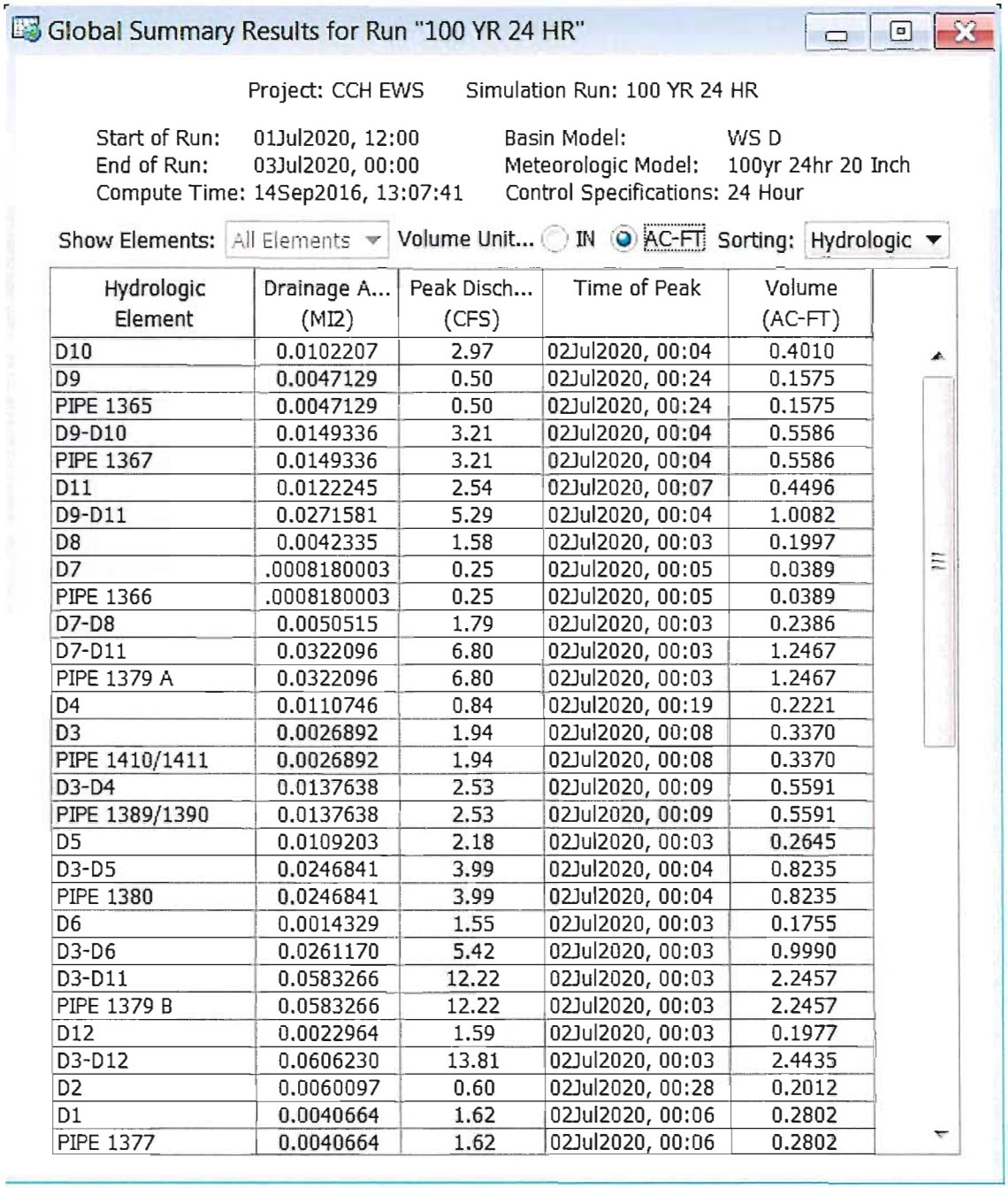
Peak Discharge :	5.47 (CFS)	Date/Time of Peak Discharge :	02Jul2020, 00:23
Total Precipitation :	7.8260 (AC-FT)	Total Direct Runoff :	1.6987 (AC-FT)
Total Loss :	6.1273 (AC-FT)	Total Baseflow :	0.0000 (AC-FT)
Total Excess :	1.6987 (AC-FT)	Discharge :	1.6987 (AC-FT)


Summary Results for Subbasin "C"
Project: CCH EWS
Simulation Run: 25 YR 1 HR Subbasin: C
Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 12:00
Compute Time: 14Sep2016, 15:02:12
Basin Model: WS C
Meteorologic Model: 25yr 1hr 21 Inch
Control Specifications: 1 Hour
Volume Units: IN AC-FT
Computed Results
Peak Discharge : 4.45 (CFS)
Total Precipitation : 1.3466 (AC-FT)
Total Loss : 1.0760 (AC-FT)
Total Excess : 0.2706 (AC-FT)
Date/Time of Peak Discharge : 01Jul2020, 12:53
Total Direct Runoff : 0.2706 (AC-FT)
Total Baseflow : 0.0000 (AC-FT)
Discharge : 0.2706 (AC-FT)

COUNTRY CLUB HEIGHTS ECP




Basin Model [WS D]
D1
PIPE 1377
D1-D2
D2
D1-D12
PIPE 1376
D1-D15
PIPE 1375
D15
D1-D14
PIPE 1371
D14
D13
D3-D12
D12
PIPE 1379 B
D7-D11
PIPE 1379 A
D3-D11
D9-D11
D11
PIPE 1367
D3-D6
D6
PIPE 1380
D7-D8
PIPE 1366
D8
D9-D10
PIPE 1365
D10
D7
D9
D3-D5
D5
PIPE 1389/1390
D3-D4
D4
PIPE 1411/1411
D3
PIPE 1372
D16-D22
D22
PIPE 1370
D16-D21
D21
PIPE 1369
D16-D20
D20
PIPE 1368
D16-D19
D16-D17
D17
PIPE 1364
D16
D18-D19
D19
PIPE 1363
D18



Hydrologic Element	Drainage A... (MI2)	Peak Disch... (CFS)	Time of Peak	Volume (AC-FT)
D10	0.0102207	2.97	02Jul2020, 00:04	0.4010
D9	0.0047129	0.50	02Jul2020, 00:24	0.1575
PIPE 1365	0.0047129	0.50	02Jul2020, 00:24	0.1575
D9-D10	0.0149336	3.21	02Jul2020, 00:04	0.5586
PIPE 1367	0.0149336	3.21	02Jul2020, 00:04	0.5586
D11	0.0122245	2.54	02Jul2020, 00:07	0.4496
D9-D11	0.0271581	5.29	02Jul2020, 00:04	1.0082
D8	0.0042335	1.58	02Jul2020, 00:03	0.1997
D7	.0008180003	0.25	02Jul2020, 00:05	0.0389
PIPE 1366	.0008180003	0.25	02Jul2020, 00:05	0.0389
D7-D8	0.0050515	1.79	02Jul2020, 00:03	0.2386
D7-D11	0.0322096	6.80	02Jul2020, 00:03	1.2467
PIPE 1379 A	0.0322096	6.80	02Jul2020, 00:03	1.2467
D4	0.0110746	0.84	02Jul2020, 00:19	0.2221
D3	0.0026892	1.94	02Jul2020, 00:08	0.3370
PIPE 1410/1411	0.0026892	1.94	02Jul2020, 00:08	0.3370
D3-D4	0.0137638	2.53	02Jul2020, 00:09	0.5591
PIPE 1389/1390	0.0137638	2.53	02Jul2020, 00:09	0.5591
D5	0.0109203	2.18	02Jul2020, 00:03	0.2645
D3-D5	0.0246841	3.99	02Jul2020, 00:04	0.8235
PIPE 1380	0.0246841	3.99	02Jul2020, 00:04	0.8235
D6	0.0014329	1.55	02Jul2020, 00:03	0.1755
D3-D6	0.0261170	5.42	02Jul2020, 00:03	0.9990
D3-D11	0.0583266	12.22	02Jul2020, 00:03	2.2457
PIPE 1379 B	0.0583266	12.22	02Jul2020, 00:03	2.2457
D12	0.0022964	1.59	02Jul2020, 00:03	0.1977
D3-D12	0.0606230	13.81	02Jul2020, 00:03	2.4435
D2	0.0060097	0.60	02Jul2020, 00:28	0.2012
D1	0.0040664	1.62	02Jul2020, 00:06	0.2802
PIPE 1377	0.0040664	1.62	02Jul2020, 00:06	0.2802

Global Summary Results for Run "100 YR 24 HR"

Project: CCH EWS Simulation Run: 100 YR 24 HR

Start of Run: 01Jul2020, 12:00
End of Run: 03Jul2020, 00:00
Compute Time: 14Sep2016, 13:07:41

Basin Model: WS D
Meteorologic Model: 100yr 24hr 20 Inch
Control Specifications: 24 Hour

Show Elements: All Elements Volume Unit... IN AC-FT Sorting: Hydrologic

Hydrologic Element	Drainage A... (MI2)	Peak Disch... (CFS)	Time of Peak	Volume (AC-FT)
PIPE 1377	0.0040664	1.62	02Jul2020, 00:06	0.2802
D1-D2	0.0100761	1.92	02Jul2020, 00:06	0.4813
D1-D12	0.0706991	15.40	02Jul2020, 00:03	2.9248
PIPE 1376	0.0706991	15.40	02Jul2020, 00:03	2.9248
D13	0.0121745	2.25	02Jul2020, 00:12	0.5168
PIPE 1371	0.0121745	2.25	02Jul2020, 00:12	0.5168
D14	.0009846419	0.74	02Jul2020, 00:03	0.0899
D1-D14	0.0838582	17.42	02Jul2020, 00:03	3.5316
PIPE 1375	0.0838582	17.42	02Jul2020, 00:03	3.5316
D15	.0005365767	0.29	02Jul2020, 00:03	0.0402
D1-D15	0.0843948	17.72	02Jul2020, 00:03	3.5718
D16	0.0098583	0.68	02Jul2020, 00:24	0.2021
PIPE 1364	0.0098583	0.68	02Jul2020, 00:24	0.2021
D17	0.0061291	1.22	02Jul2020, 00:03	0.1424
D16-D17	0.0159874	1.53	02Jul2020, 00:03	0.3445
D18	0.0076084	0.62	02Jul2020, 00:23	0.1794
PIPE 1363	0.0076084	0.62	02Jul2020, 00:23	0.1794
D19	.0009699581	0.49	02Jul2020, 00:03	0.0649
D18-D19	0.0085784	0.78	02Jul2020, 00:03	0.2442
D16-D19	0.0245658	2.31	02Jul2020, 00:03	0.5888
PIPE 1368	0.0245658	2.31	02Jul2020, 00:03	0.5888
D20	0.0037593	1.07	02Jul2020, 00:03	0.1284
D16-D20	0.0283251	3.37	02Jul2020, 00:03	0.7171
PIPE 1369	0.0283251	3.37	02Jul2020, 00:03	0.7171
D21	.0005284094	0.57	02Jul2020, 00:03	0.0653
D16-D21	0.0288535	3.94	02Jul2020, 00:03	0.7824
PIPE 1370	0.0288535	3.94	02Jul2020, 00:03	0.7824
D22	0.0062201	2.08	02Jul2020, 00:03	0.2583
D16-D22	0.0350736	6.02	02Jul2020, 00:03	1.0407
PIPE 1372	0.0350736	6.02	02Jul2020, 00:03	1.0407

Global Summary Results for Run "10 YR 6 HR"

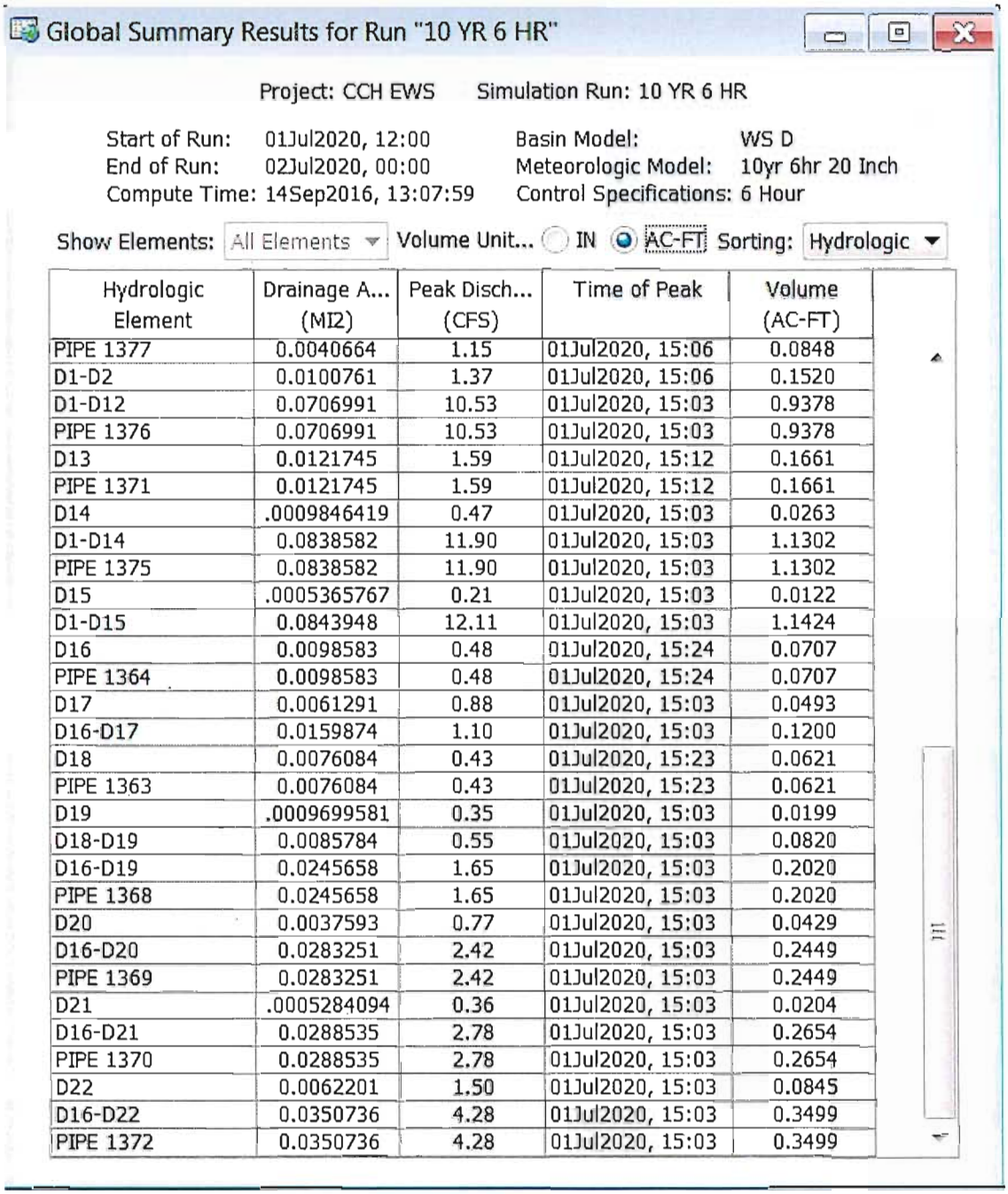
Project: CCH EWS Simulation Run: 10 YR 6 HR

Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 00:00
Compute Time: 14Sep2016, 13:07:59

Basin Model: WS D
Meteorologic Model: 10yr 6hr 20 Inch
Control Specifications: 6 Hour

Show Elements: All Elements Volume Unit... IN AC-FT Sorting: Hydrologic

Hydrologic Element	Drainage A... (MI2)	Peak Disch... (CFS)	Time of Peak	Volume (AC-FT)
D10	0.0102207	2.13	01Jul2020, 15:04	0.1305
D9	0.0047129	0.35	01Jul2020, 15:24	0.0526
PIPE 1365	0.0047129	0.35	01Jul2020, 15:24	0.0526
D9-D10	0.0149336	2.30	01Jul2020, 15:04	0.1831
PIPE 1367	0.0149336	2.30	01Jul2020, 15:04	0.1831
D11	0.0122245	1.81	01Jul2020, 15:07	0.1484
D9-D11	0.0271581	3.76	01Jul2020, 15:04	0.3315
D8	0.0042335	1.14	01Jul2020, 15:03	0.0637
D7	.0008180003	0.18	01Jul2020, 15:05	0.0124
PIPE 1366	.0008180003	0.18	01Jul2020, 15:05	0.0124
D7-D8	0.0050515	1.29	01Jul2020, 15:03	0.0761
D7-D11	0.0322096	4.85	01Jul2020, 15:03	0.4076
PIPE 1379 A	0.0322096	4.85	01Jul2020, 15:03	0.4076
D4	0.0110746	0.59	01Jul2020, 15:19	0.0777
D3	0.0026892	1.13	01Jul2020, 15:08	0.0987
PIPE 1410/1411	0.0026892	1.13	01Jul2020, 15:08	0.0987
D3-D4	0.0137638	1.54	01Jul2020, 15:09	0.1763
PIPE 1389/1390	0.0137638	1.54	01Jul2020, 15:09	0.1763
D5	0.0109203	1.57	01Jul2020, 15:03	0.0916
D3-D5	0.0246841	2.67	01Jul2020, 15:04	0.2679
PIPE 1380	0.0246841	2.67	01Jul2020, 15:04	0.2679
D6	0.0014329	0.91	01Jul2020, 15:03	0.0514
D3-D6	0.0261170	3.52	01Jul2020, 15:03	0.3193
D3-D11	0.0583266	8.37	01Jul2020, 15:03	0.7269
PIPE 1379 B	0.0583266	8.37	01Jul2020, 15:03	0.7269
D12	0.0022964	1.05	01Jul2020, 15:03	0.0590
D3-D12	0.0606230	9.41	01Jul2020, 15:03	0.7859
D2	0.0060097	0.43	01Jul2020, 15:28	0.0672
D1	0.0040664	1.15	01Jul2020, 15:06	0.0848
PIPE 1377	0.0040664	1.15	01Jul2020, 15:06	0.0848



Hydrologic Element	Drainage A... (MI2)	Peak Disch... (CFS)	Time of Peak	Volume (AC-FT)
PIPE 1377	0.0040664	1.15	01Jul2020, 15:06	0.0848
D1-D2	0.0100761	1.37	01Jul2020, 15:06	0.1520
D1-D12	0.0706991	10.53	01Jul2020, 15:03	0.9378
PIPE 1376	0.0706991	10.53	01Jul2020, 15:03	0.9378
D13	0.0121745	1.59	01Jul2020, 15:12	0.1661
PIPE 1371	0.0121745	1.59	01Jul2020, 15:12	0.1661
D14	.0009846419	0.47	01Jul2020, 15:03	0.0263
D1-D14	0.0838582	11.90	01Jul2020, 15:03	1.1302
PIPE 1375	0.0838582	11.90	01Jul2020, 15:03	1.1302
D15	.0005365767	0.21	01Jul2020, 15:03	0.0122
D1-D15	0.0843948	12.11	01Jul2020, 15:03	1.1424
D16	0.0098583	0.48	01Jul2020, 15:24	0.0707
PIPE 1364	0.0098583	0.48	01Jul2020, 15:24	0.0707
D17	0.0061291	0.88	01Jul2020, 15:03	0.0493
D16-D17	0.0159874	1.10	01Jul2020, 15:03	0.1200
D18	0.0076084	0.43	01Jul2020, 15:23	0.0621
PIPE 1363	0.0076084	0.43	01Jul2020, 15:23	0.0621
D19	.0009699581	0.35	01Jul2020, 15:03	0.0199
D18-D19	0.0085784	0.55	01Jul2020, 15:03	0.0820
D16-D19	0.0245658	1.65	01Jul2020, 15:03	0.2020
PIPE 1368	0.0245658	1.65	01Jul2020, 15:03	0.2020
D20	0.0037593	0.77	01Jul2020, 15:03	0.0429
D16-D20	0.0283251	2.42	01Jul2020, 15:03	0.2449
PIPE 1369	0.0283251	2.42	01Jul2020, 15:03	0.2449
D21	.0005284094	0.36	01Jul2020, 15:03	0.0204
D16-D21	0.0288535	2.78	01Jul2020, 15:03	0.2654
PIPE 1370	0.0288535	2.78	01Jul2020, 15:03	0.2654
D22	0.0062201	1.50	01Jul2020, 15:03	0.0845
D16-D22	0.0350736	4.28	01Jul2020, 15:03	0.3499
PIPE 1372	0.0350736	4.28	01Jul2020, 15:03	0.3499

Global Summary Results for Run "25 YR 1 HR"

Project: CCH EWS Simulation Run: 25 YR 1 HR

Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 12:00
Compute Time: 14Sep2016, 13:08:09

Basin Model: WS D
Meteorologic Model: 25yr 1hr 20 Inch
Control Specifications: 1 Hour

Show Elements: All Elements Volume Uni... IN AC-FT Sorting: Hydrologic

Hydrologic Element	Drainage A... (MI2)	Peak Disch... (CFS)	Time of Peak	Volume (AC-FT)
D10	0.0102207	2.44	01Jul2020, 12:34	0.0639
D9	0.0047129	0.41	01Jul2020, 12:55	0.0258
PIPE 1365	0.0047129	0.41	01Jul2020, 12:55	0.0258
D9-D10	0.0149336	2.60	01Jul2020, 12:34	0.0896
PIPE 1367	0.0149336	2.60	01Jul2020, 12:34	0.0896
D11	0.0122245	2.11	01Jul2020, 12:37	0.0726
D9-D11	0.0271581	4.33	01Jul2020, 12:34	0.1623
D8	0.0042335	1.29	01Jul2020, 12:33	0.0312
D7	.0008180003	0.20	01Jul2020, 12:35	0.0061
PIPE 1366	.0008180003	0.20	01Jul2020, 12:35	0.0061
D7-D8	0.0050515	1.47	01Jul2020, 12:33	0.0372
D7-D11	0.0322096	5.57	01Jul2020, 12:33	0.1995
PIPE 1379 A	0.0322096	5.57	01Jul2020, 12:33	0.1995
D4	0.0110746	0.69	01Jul2020, 12:49	0.0380
D3	0.0026892	1.33	01Jul2020, 12:38	0.0479
PIPE 1410/1411	0.0026892	1.33	01Jul2020, 12:38	0.0479
D3-D4	0.0137638	1.79	01Jul2020, 12:39	0.0859
PIPE 1389/1390	0.0137638	1.79	01Jul2020, 12:39	0.0859
D5	0.0109203	1.79	01Jul2020, 12:33	0.0449
D3-D5	0.0246841	3.07	01Jul2020, 12:34	0.1308
PIPE 1380	0.0246841	3.07	01Jul2020, 12:34	0.1308
D6	0.0014329	1.04	01Jul2020, 12:33	0.0250
D3-D6	0.0261170	4.03	01Jul2020, 12:33	0.1558
D3-D11	0.0583266	9.60	01Jul2020, 12:33	0.3553
PIPE 1379 B	0.0583266	9.60	01Jul2020, 12:33	0.3553
D12	0.0022964	1.19	01Jul2020, 12:33	0.0289
D3-D12	0.0606230	10.79	01Jul2020, 12:33	0.3841
D2	0.0060097	0.49	01Jul2020, 12:58	0.0329
D1	0.0040664	1.34	01Jul2020, 12:36	0.0415
PIPE 1377	0.0040664	1.34	01Jul2020, 12:36	0.0415

Global Summary Results for Run "25 YR 1 HR"

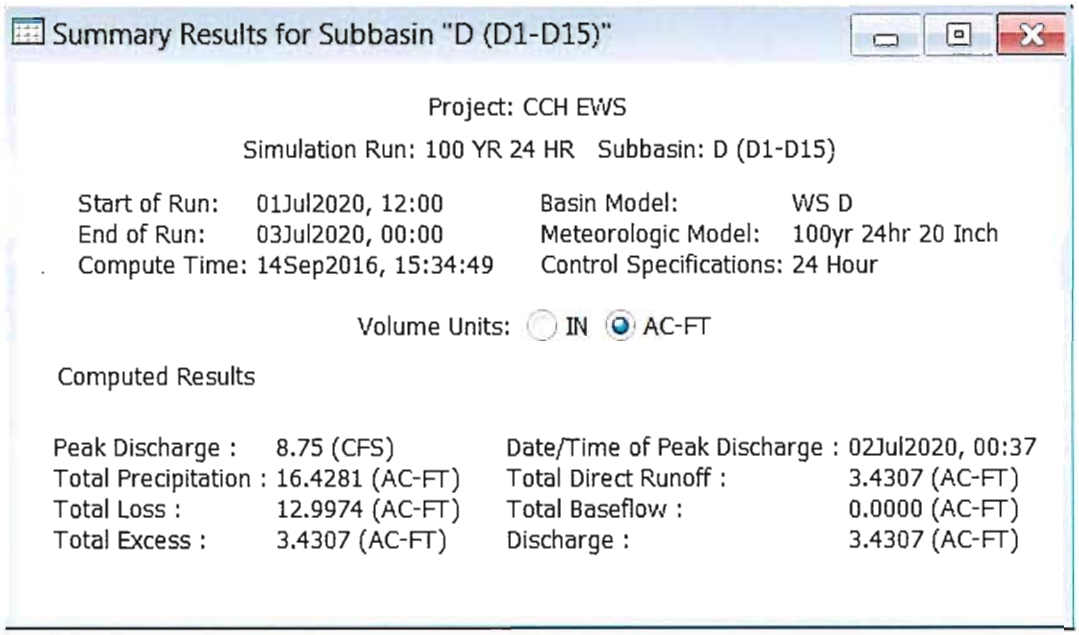
Project: CCH EWS Simulation Run: 25 YR 1 HR

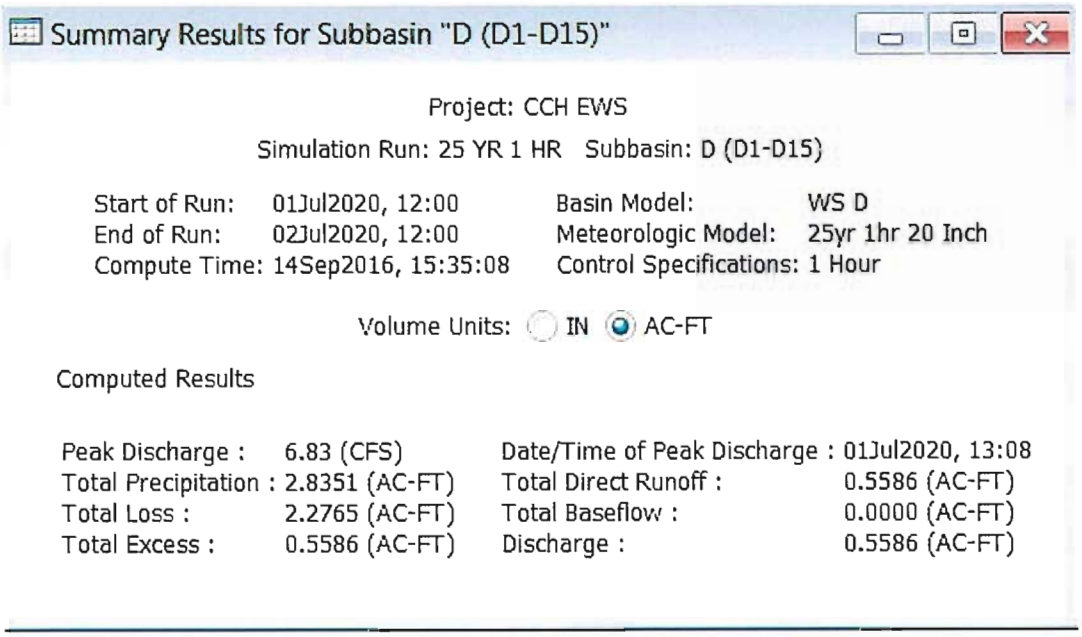
Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 12:00
Compute Time: 14Sep2016, 13:08:09

Basin Model: WS D
Meteorologic Model: 25yr 1hr 20 Inch
Control Specifications: 1 Hour

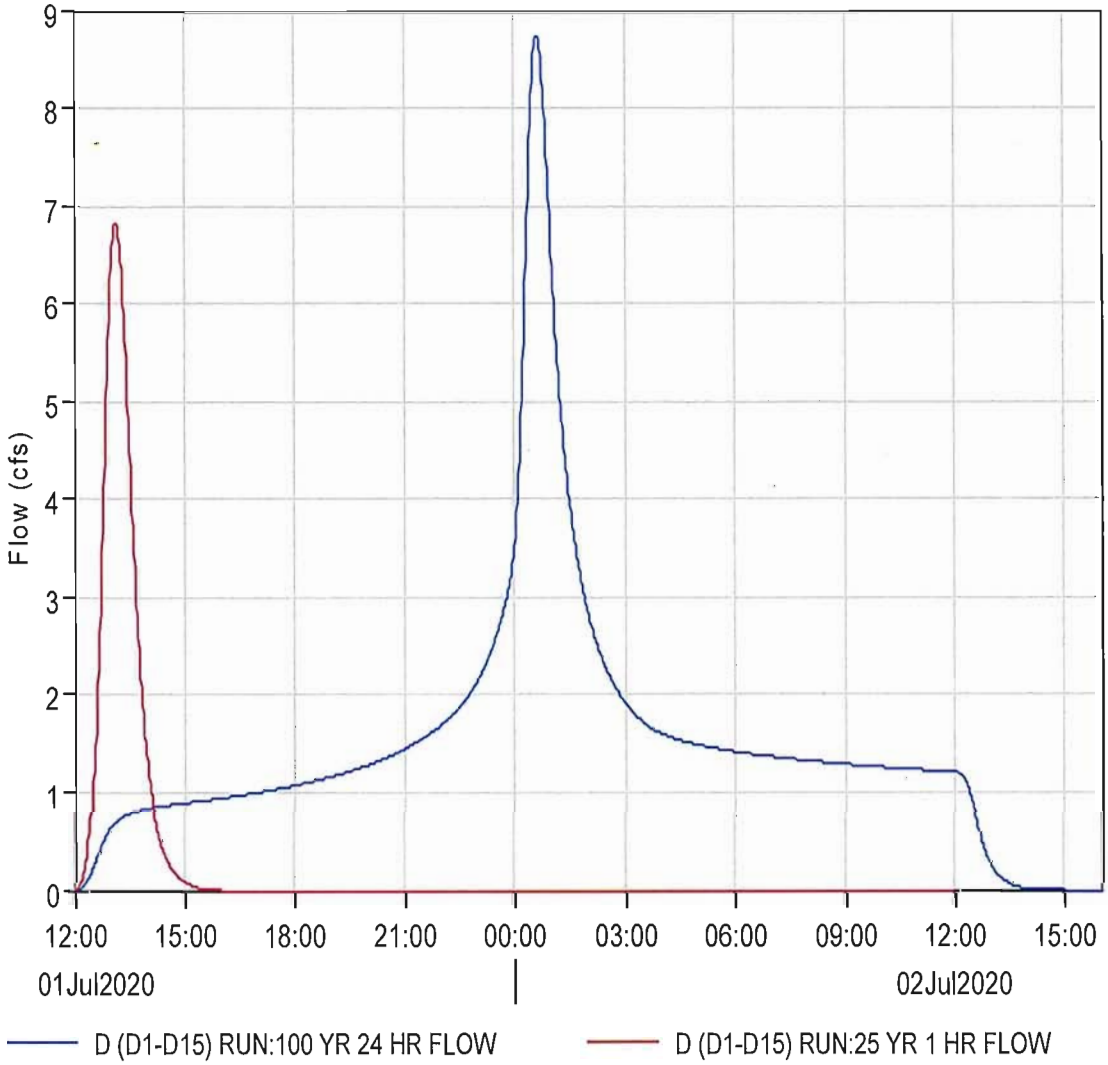
Show Elements: All Elements Volume Uni... IN AC-FT Sorting: Hydrologic

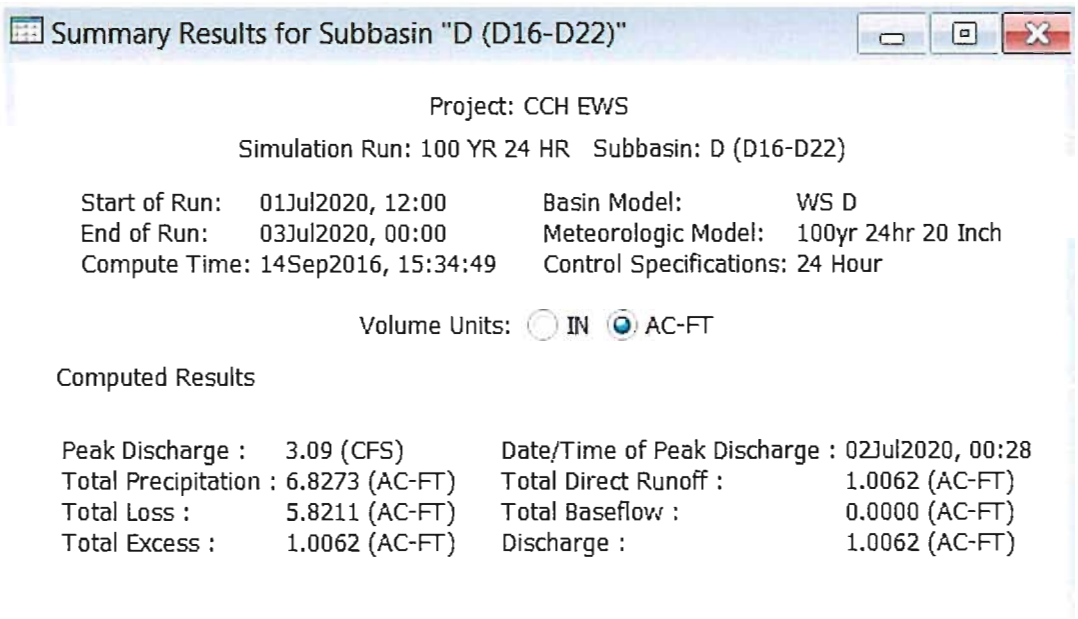
Hydrologic Element	Drainage A... (MI2)	Peak Disch... (CFS)	Time of Peak	Volume (AC-FT)
PIPE 1377	0.0040664	1.34	01Jul2020, 12:36	0.0415
D1-D2	0.0100761	1.53	01Jul2020, 12:36	0.0744
D1-D12	0.0706991	12.04	01Jul2020, 12:33	0.4585
PIPE 1376	0.0706991	12.04	01Jul2020, 12:33	0.4585
D13	0.0121745	1.87	01Jul2020, 12:42	0.0813
PIPE 1371	0.0121745	1.87	01Jul2020, 12:42	0.0813
D14	.0009846419	0.53	01Jul2020, 12:33	0.0129
D1-D14	0.0838582	13.63	01Jul2020, 12:33	0.5527
PIPE 1375	0.0838582	13.63	01Jul2020, 12:33	0.5527
D15	.0005365767	0.24	01Jul2020, 12:33	0.0060
D1-D15	0.0843948	13.87	01Jul2020, 12:33	0.5587
D16	0.0098583	0.55	01Jul2020, 12:55	0.0346
PIPE 1364	0.0098583	0.55	01Jul2020, 12:55	0.0346
D17	0.0061291	1.00	01Jul2020, 12:33	0.0241
D16-D17	0.0159874	1.19	01Jul2020, 12:33	0.0587
D18	0.0076084	0.50	01Jul2020, 12:53	0.0304
PIPE 1363	0.0076084	0.50	01Jul2020, 12:53	0.0304
D19	.0009699581	0.40	01Jul2020, 12:33	0.0097
D18-D19	0.0085784	0.59	01Jul2020, 12:33	0.0401
D16-D19	0.0245658	1.79	01Jul2020, 12:33	0.0989
PIPE 1368	0.0245658	1.79	01Jul2020, 12:33	0.0989
D20	0.0037593	0.87	01Jul2020, 12:33	0.0210
D16-D20	0.0283251	2.66	01Jul2020, 12:33	0.1199
PIPE 1369	0.0283251	2.66	01Jul2020, 12:33	0.1199
D21	.0005284094	0.41	01Jul2020, 12:33	0.0100
D16-D21	0.0288535	3.07	01Jul2020, 12:33	0.1299
PIPE 1370	0.0288535	3.07	01Jul2020, 12:33	0.1299
D22	0.0062201	1.70	01Jul2020, 12:33	0.0414
D16-D22	0.0350736	4.78	01Jul2020, 12:33	0.1713
PIPE 1372	0.0350736	4.78	01Jul2020, 12:33	0.1713

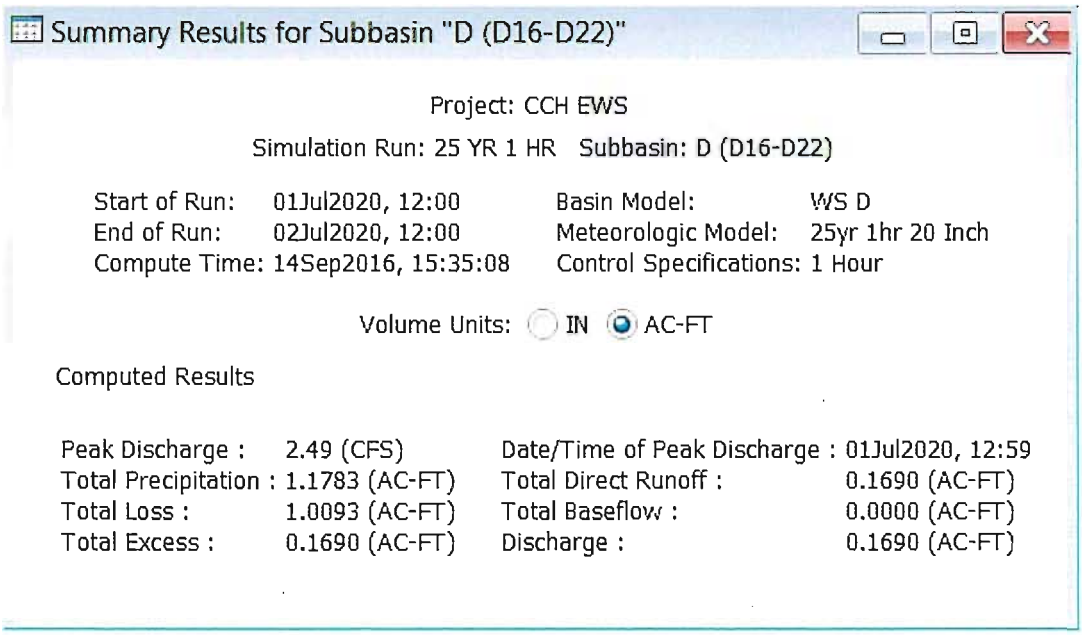

Summary Results for Subbasin "D (D1-D15)"
Project: CCH EWS
Simulation Run: 100 YR 24 HR Subbasin: D (D1-D15)
Start of Run: 01Jul2020, 12:00
End of Run: 03Jul2020, 00:00
Compute Time: 14Sep2016, 15:34:49
Basin Model: WS D
Meteorologic Model: 100yr 24hr 20 Inch
Control Specifications: 24 Hour
Volume Units: IN AC-FT
Computed Results
Peak Discharge : 8.75 (CFS)
Total Precipitation : 16.4281 (AC-FT)
Total Loss : 12.9974 (AC-FT)
Total Excess : 3.4307 (AC-FT)
Date/Time of Peak Discharge : 02Jul2020, 00:37
Total Direct Runoff : 3.4307 (AC-FT)
Total Baseflow : 0.0000 (AC-FT)
Discharge : 3.4307 (AC-FT)


Summary Results for Subbasin "D (D1-D15)"
Project: CCH EWS
Simulation Run: 25 YR 1 HR Subbasin: D (D1-D15)
Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 12:00
Compute Time: 14Sep2016, 15:35:08
Basin Model: WS D
Meteorologic Model: 25yr 1hr 20 Inch
Control Specifications: 1 Hour
Volume Units: IN AC-FT
Computed Results
Peak Discharge : 6.83 (CFS)
Total Precipitation : 2.8351 (AC-FT)
Total Loss : 2.2765 (AC-FT)
Total Excess : 0.5586 (AC-FT)
Date/Time of Peak Discharge : 01Jul2020, 13:08
Total Direct Runoff : 0.5586 (AC-FT)
Total Baseflow : 0.0000 (AC-FT)
Discharge : 0.5586 (AC-FT)

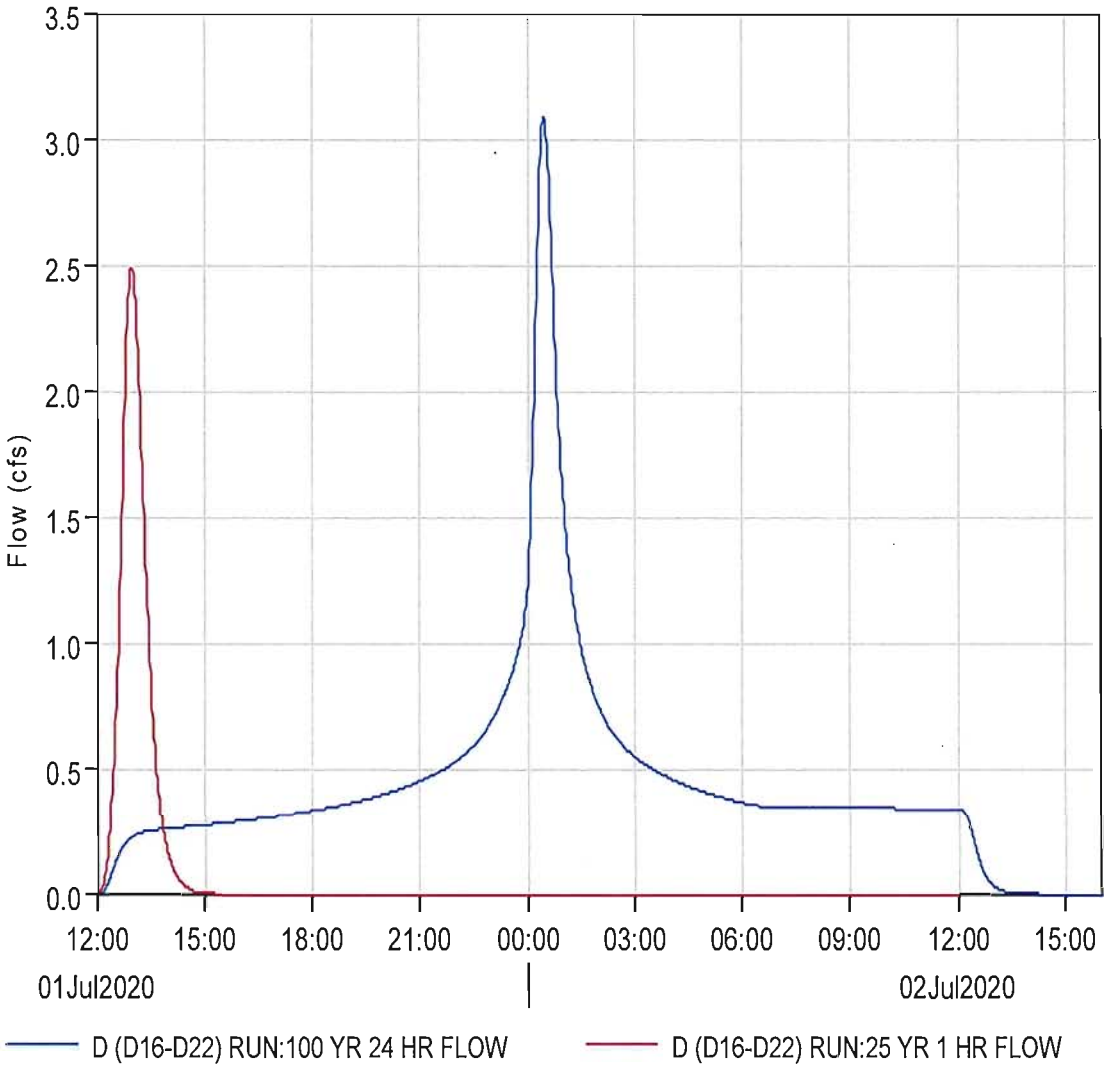
COUNTRY CLUB HEIGHTS ECP

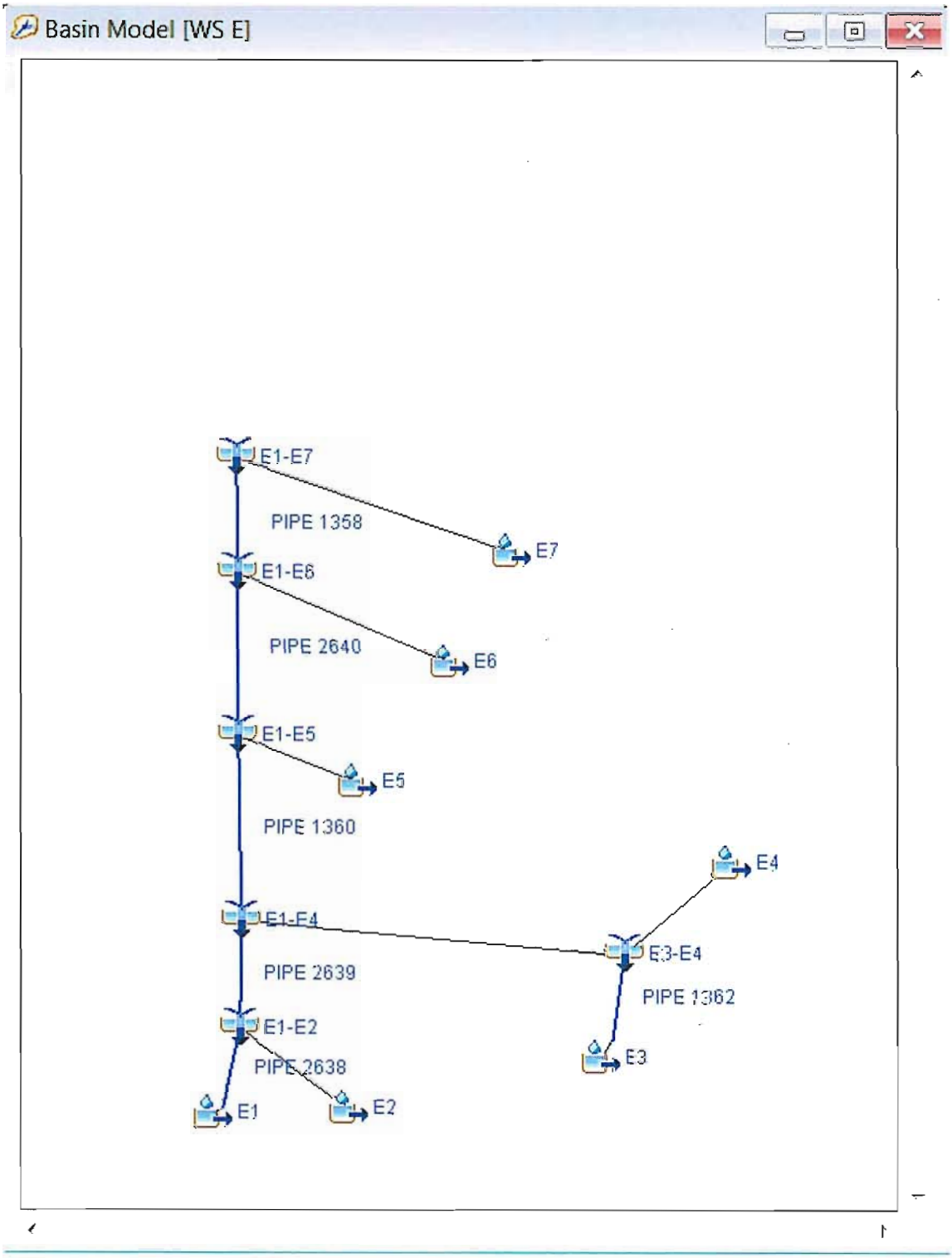



Summary Results for Subbasin "D (D16-D22)"
Project: CCH EWS
Simulation Run: 100 YR 24 HR Subbasin: D (D16-D22)
Start of Run: 01Jul2020, 12:00
End of Run: 03Jul2020, 00:00
Compute Time: 14Sep2016, 15:34:49
Basin Model: WS D
Meteorologic Model: 100yr 24hr 20 Inch
Control Specifications: 24 Hour
Volume Units: IN AC-FT
Computed Results
Peak Discharge : 3.09 (CFS)
Total Precipitation : 6.8273 (AC-FT)
Total Loss : 5.8211 (AC-FT)
Total Excess : 1.0062 (AC-FT)
Date/Time of Peak Discharge : 02Jul2020, 00:28
Total Direct Runoff : 1.0062 (AC-FT)
Total Baseflow : 0.0000 (AC-FT)
Discharge : 1.0062 (AC-FT)


Summary Results for Subbasin "D (D16-D22)"
Project: CCH EWS
Simulation Run: 25 YR 1 HR Subbasin: D (D16-D22)
Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 12:00
Compute Time: 14Sep2016, 15:35:08
Basin Model: WS D
Meteorologic Model: 25yr 1hr 20 Inch
Control Specifications: 1 Hour
Volume Units: IN AC-FT
Computed Results
Peak Discharge : 2.49 (CFS)
Total Precipitation : 1.1783 (AC-FT)
Total Loss : 1.0093 (AC-FT)
Total Excess : 0.1690 (AC-FT)
Date/Time of Peak Discharge : 01Jul2020, 12:59
Total Direct Runoff : 0.1690 (AC-FT)
Total Baseflow : 0.0000 (AC-FT)
Discharge : 0.1690 (AC-FT)

COUNTRY CLUB HEIGHTS ECP




Basin Model [WS E]
E1-E7
PIPE 1358
E7
E1-E6
PIPE 2640
E6
E1-E5
E5
PIPE 1360
E4
E1-E4
E3-E4
PIPE 2639
PIPE 1362
E1-E2
E3
PIPE 2638
E1
E2

Global Summary Results for Run "100 YR 24 HR"

Project: CCH EWS Simulation Run: 100 YR 24 HR

Start of Run: 01Jul2020, 12:00
End of Run: 03Jul2020, 00:00
Compute Time: 14Sep2016, 13:04:09

Basin Model: WS E
Meteorologic Model: 100yr 24hr 20 Inch
Control Specifications: 24 Hour

Show Elements: All Elements Volume Unit... IN AC-FT Sorting: Hydrologic

Hydrologic Element	Drainage A... (MI2)	Peak Disch... (CFS)	Time of Peak	Volume (AC-FT)
E4	0.0071910	2.35	02Jul2020, 00:04	0.3373
E3	0.0034438	0.43	02Jul2020, 00:25	0.1383
PIPE 1362	0.0034438	0.43	02Jul2020, 00:25	0.1383
E3-E4	0.0106348	2.55	02Jul2020, 00:04	0.4756
E1	0.0015110	0.90	02Jul2020, 00:05	0.1384
PIPE 2638	0.0015110	0.90	02Jul2020, 00:05	0.1384
E2	.0009624638	0.90	02Jul2020, 00:03	0.1038
E1-E2	0.0024735	1.67	02Jul2020, 00:03	0.2422
PIPE 2639	0.0024735	1.67	02Jul2020, 00:03	0.2422
E1-E4	0.0131083	4.10	02Jul2020, 00:03	0.7177
PIPE 1360	0.0131083	4.10	02Jul2020, 00:03	0.7177
E5	0.0047201	2.13	02Jul2020, 00:03	0.2767
E1-E5	0.0178284	6.24	02Jul2020, 00:03	0.9945
PIPE 2640	0.0178284	6.24	02Jul2020, 00:03	0.9945
E6	0.0035022	1.02	02Jul2020, 00:03	0.1251
E1-E6	0.0213306	7.26	02Jul2020, 00:03	1.1196
PIPE 1358	0.0213306	7.26	02Jul2020, 00:03	1.1196
E7	0.0011818	0.77	02Jul2020, 00:03	0.0971
E1-E7	0.0225124	8.03	02Jul2020, 00:03	1.2167

Global Summary Results for Run "10 YR 6 HR"

Project: CCH EWS Simulation Run: 10 YR 6 HR

Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 00:00
Compute Time: 14Sep2016, 13:04:16

Basin Model: WS E
Meteorologic Model: 10yr 6hr 20 Inch
Control Specifications: 6 Hour

Show Elements: All Elements Volume Unit... IN AC-FT Sorting: Hydrologic

Hydrologic Element	Drainage A... (MI2)	Peak Disch... (CFS)	Time of Peak	Volume (AC-FT)
E4	0.0071910	1.68	01Jul2020, 15:04	0.1075
E3	0.0034438	0.30	01Jul2020, 15:25	0.0451
PIPE 1362	0.0034438	0.30	01Jul2020, 15:25	0.0451
E3-E4	0.0106348	1.82	01Jul2020, 15:04	0.1526
E1	0.0015110	0.58	01Jul2020, 15:05	0.0406
PIPE 2638	0.0015110	0.58	01Jul2020, 15:05	0.0406
E2	.0009624638	0.54	01Jul2020, 15:02	0.0303
E1-E2	0.0024735	1.03	01Jul2020, 15:03	0.0709
PIPE 2639	0.0024735	1.03	01Jul2020, 15:03	0.0709
E1-E4	0.0131083	2.77	01Jul2020, 15:03	0.2235
PIPE 1360	0.0131083	2.77	01Jul2020, 15:03	0.2235
E5	0.0047201	1.54	01Jul2020, 15:03	0.0859
E1-E5	0.0178284	4.31	01Jul2020, 15:03	0.3094
PIPE 2640	0.0178284	4.31	01Jul2020, 15:03	0.3094
E6	0.0035022	0.74	01Jul2020, 15:03	0.0412
E1-E6	0.0213306	5.04	01Jul2020, 15:03	0.3506
PIPE 1358	0.0213306	5.04	01Jul2020, 15:03	0.3506
E7	0.0011818	0.52	01Jul2020, 15:03	0.0291
E1-E7	0.0225124	5.56	01Jul2020, 15:03	0.3797

Global Summary Results for Run "25 YR 1 HR"

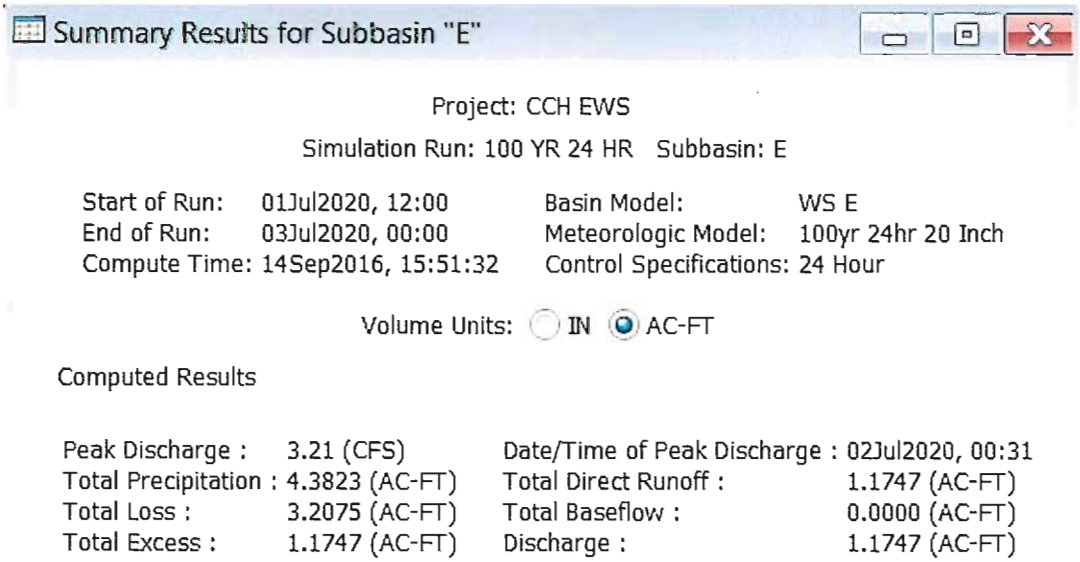
Project: CCH EWS Simulation Run: 25 YR 1 HR

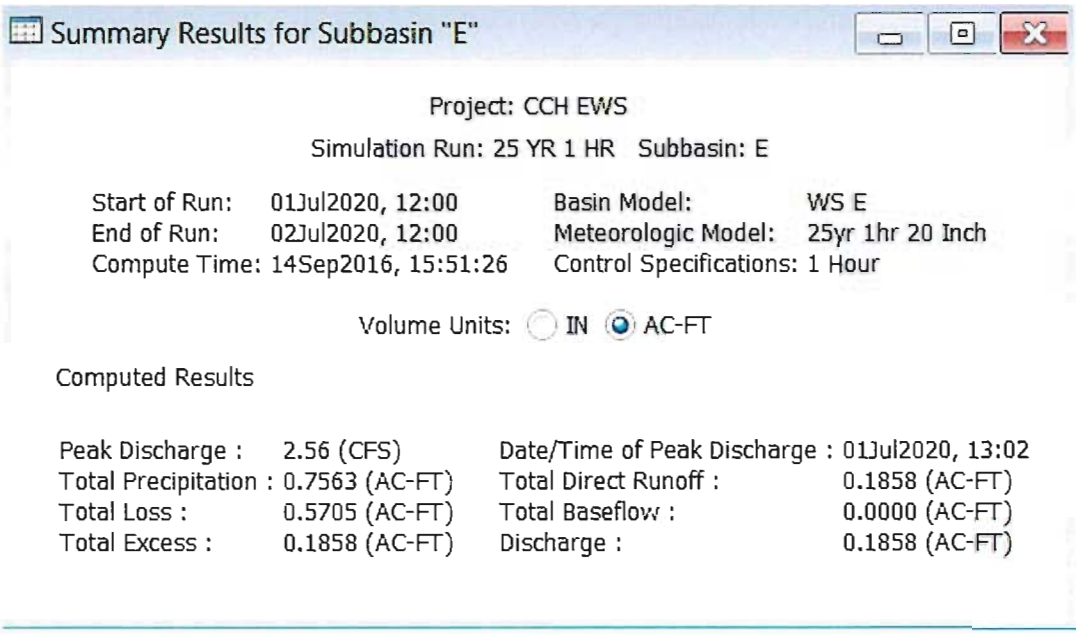
Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 12:00
Compute Time: 14Sep2016, 13:04:21

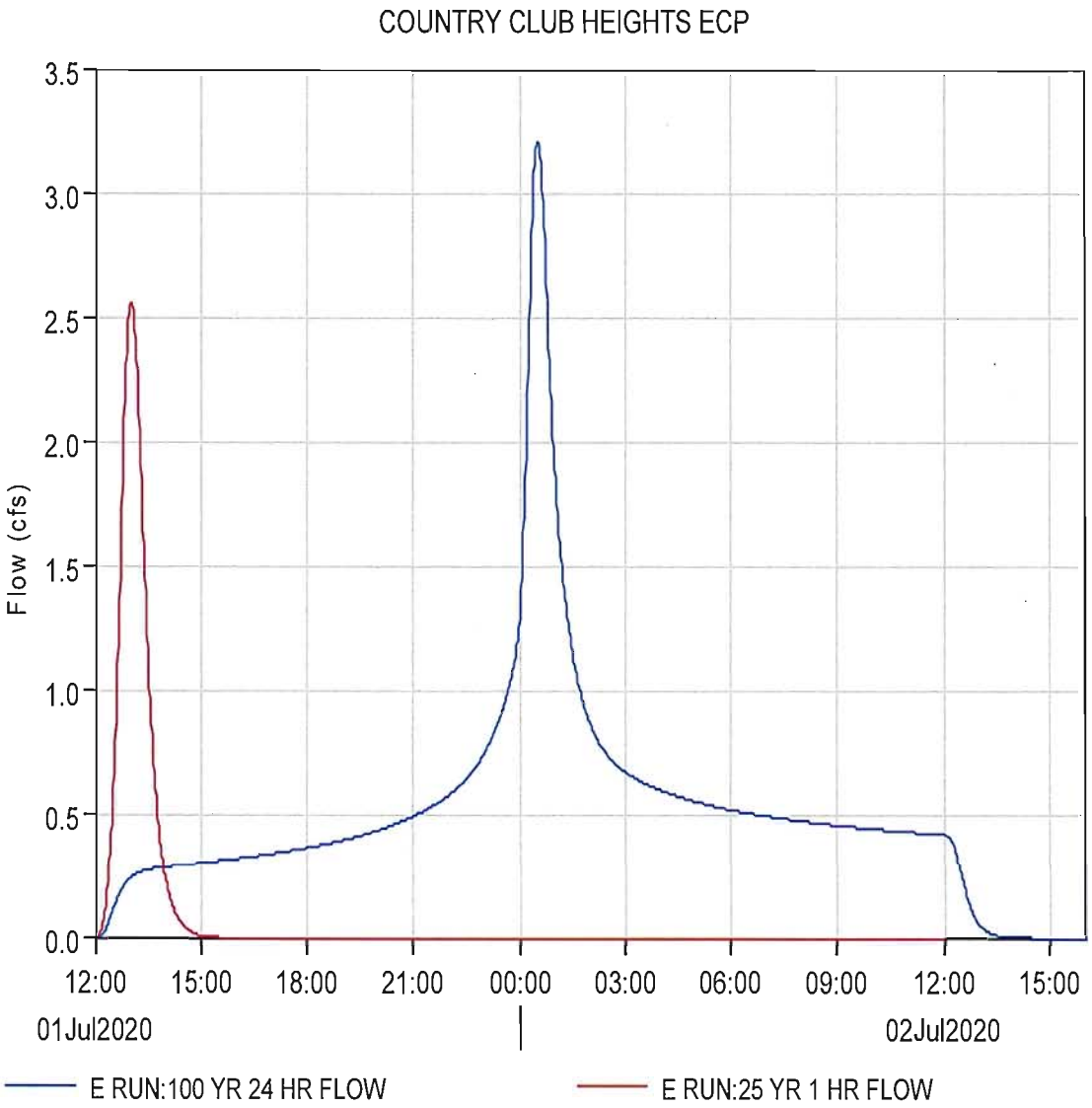
Basin Model: WS E
Meteorologic Model: 25yr 1hr 20 Inch
Control Specifications: 1 Hour

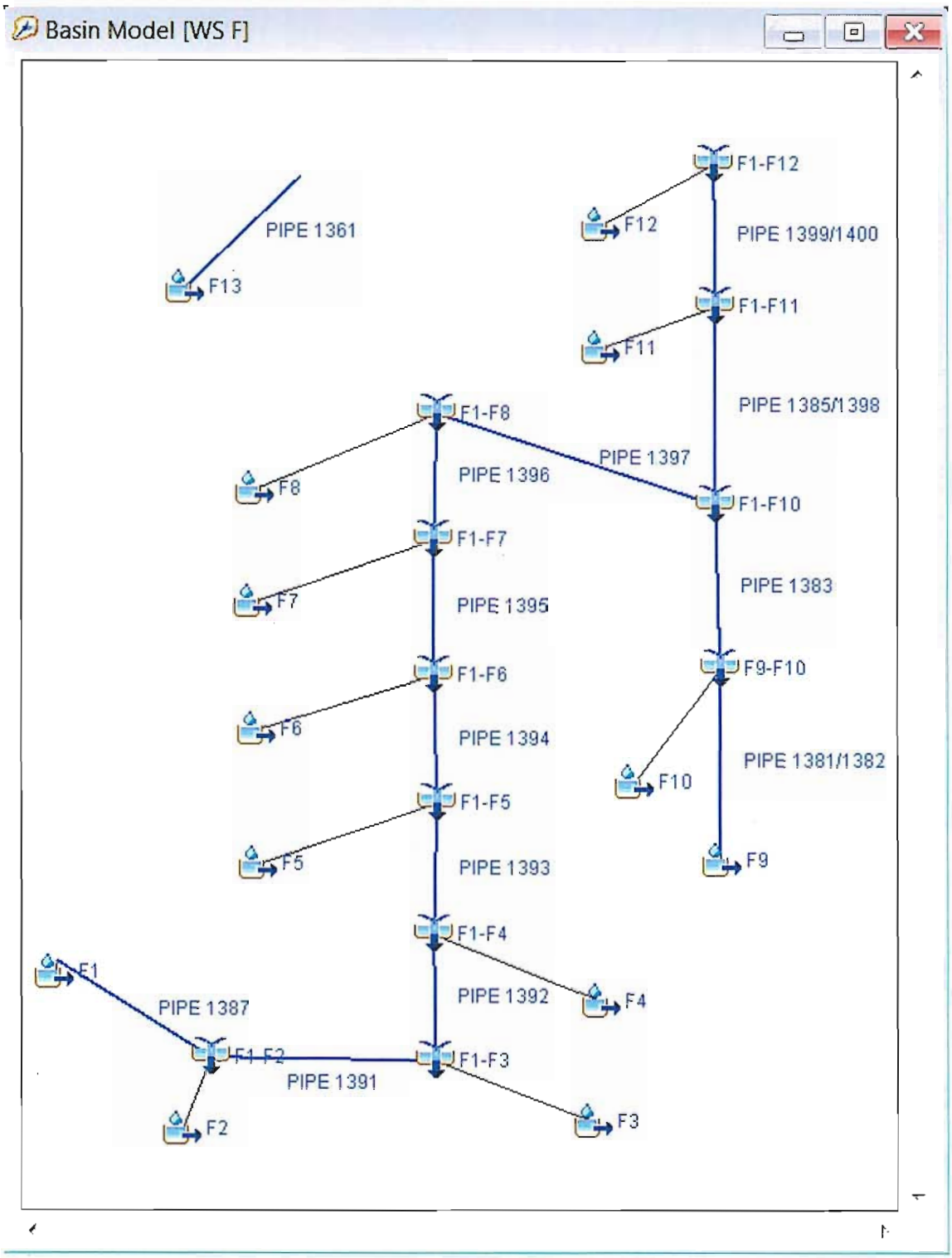
Show Elements: All Elements Volume Uni... IN AC-FT Sorting: Hydrologic

Hydrologic Element	Drainage A... (MI2)	Peak Disch... (CFS)	Time of Peak	Volume (AC-FT)
E4	0.0071910	1.93	01Jul2020, 12:34	0.0526
E3	0.0034438	0.35	01Jul2020, 12:56	0.0221
PIPE 1362	0.0034438	0.35	01Jul2020, 12:56	0.0221
E3-E4	0.0106348	2.06	01Jul2020, 12:34	0.0747
E1	0.0015110	0.67	01Jul2020, 12:35	0.0199
PIPE 2638	0.0015110	0.67	01Jul2020, 12:35	0.0199
E2	.0009624638	0.62	01Jul2020, 12:33	0.0148
E1-E2	0.0024735	1.19	01Jul2020, 12:33	0.0347
PIPE 2639	0.0024735	1.19	01Jul2020, 12:33	0.0347
E1-E4	0.0131083	3.16	01Jul2020, 12:33	0.1094
PIPE 1360	0.0131083	3.16	01Jul2020, 12:33	0.1094
E5	0.0047201	1.74	01Jul2020, 12:33	0.0421
E1-E5	0.0178284	4.91	01Jul2020, 12:33	0.1515
PIPE 2640	0.0178284	4.91	01Jul2020, 12:33	0.1515
E6	0.0035022	0.84	01Jul2020, 12:33	0.0202
E1-E6	0.0213306	5.74	01Jul2020, 12:33	0.1716
PIPE 1358	0.0213306	5.74	01Jul2020, 12:33	0.1716
E7	0.0011818	0.59	01Jul2020, 12:33	0.0142
E1-E7	0.0225124	6.33	01Jul2020, 12:33	0.1859


Summary Results for Subbasin "E"
Project: CCH EWS
Simulation Run: 100 YR 24 HR Subbasin: E
Start of Run: 01Jul2020, 12:00
End of Run: 03Jul2020, 00:00
Compute Time: 14Sep2016, 15:51:32
Basin Model: WS E
Meteorologic Model: 100yr 24hr 20 Inch
Control Specifications: 24 Hour
Volume Units: IN AC-FT
Computed Results
Peak Discharge : 3.21 (CFS)
Total Precipitation : 4.3823 (AC-FT)
Total Loss : 3.2075 (AC-FT)
Total Excess : 1.1747 (AC-FT)
Date/Time of Peak Discharge : 02Jul2020, 00:31
Total Direct Runoff : 1.1747 (AC-FT)
Total Baseflow : 0.0000 (AC-FT)
Discharge : 1.1747 (AC-FT)


Summary Results for Subbasin "E"
Project: CCH EWS
Simulation Run: 25 YR 1 HR Subbasin: E
Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 12:00
Compute Time: 14Sep2016, 15:51:26
Basin Model: WS E
Meteorologic Model: 25yr 1hr 20 Inch
Control Specifications: 1 Hour
Volume Units: IN AC-FT
Computed Results
Peak Discharge : 2.56 (CFS)
Total Precipitation : 0.7563 (AC-FT)
Total Loss : 0.5705 (AC-FT)
Total Excess : 0.1858 (AC-FT)
Date/Time of Peak Discharge : 01Jul2020, 13:02
Total Direct Runoff : 0.1858 (AC-FT)
Total Baseflow : 0.0000 (AC-FT)
Discharge : 0.1858 (AC-FT)


COUNTRY CLUB HEIGHTS ECP
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Flow (cfs)
12:00
15:00
18:00
21:00
00:00
03:00
06:00
09:00
12:00
15:00
01Jul2020
02Jul2020
E RUN:100 YR 24 HR FLOW
E RUN:25 YR 1 HR FLOW


Basin Model [WS F]
F1-F12
F12
PIPE 1399/1400
PIPE 1361
F13
F1-F11
F11
PIPE 1385/1398
F1-F8
PIPE 1397
PIPE 1396
F8
F1-F10
F1-F7
F7
PIPE 1383
PIPE 1395
F9-F10
F1-F6
F6
PIPE 1394
PIPE 1381/1382
F10
F1-F5
F5
F9
PIPE 1393
F1-F4
F1
PIPE 1392
F4
PIPE 1387
F1-F2
F1-F3
PIPE 1391
F2
F3

Global Summary Results for Run "100 YR 24 HR"

Project: CCH EWS Simulation Run: 100 YR 24 HR

Start of Run: 01Jul2020, 12:00
End of Run: 03Jul2020, 00:00
Compute Time: 19Sep2016, 13:19:26

Basin Model: WS F
Meteorologic Model: 100yr 24hr 20 Inch
Control Specifications: 24 Hour

Show Elements: All Elements Volume Units: IN AC-FT Sorting: Hydrologic

Hydrologic Element	Drainage A... (MI2)	Peak Disch... (CFS)	Time of Peak	Volume (AC-FT)
F2	0.0060511	2.52	02Jul2020, 00:03	0.3396
F1	0.0029872	0.76	02Jul2020, 00:18	0.2190
PIPE 1387	0.0029872	0.76	02Jul2020, 00:18	0.2190
F1-F2	0.0090383	2.89	02Jul2020, 00:03	0.5586
PIPE 1391	0.0090383	2.89	02Jul2020, 00:03	0.5586
F3	0.0018288	0.76	02Jul2020, 00:31	0.2493
F1-F3	0.0108671	3.21	02Jul2020, 00:03	0.8079
PIPE 1392	0.0108671	3.21	02Jul2020, 00:03	0.8079
F4	.0005781896	0.26	02Jul2020, 00:14	0.0604
F1-F4	0.0114453	3.34	02Jul2020, 00:03	0.8683
PIPE 1393	0.0114453	3.34	02Jul2020, 00:03	0.8683
F5	.0000337469	0.03	02Jul2020, 00:05	0.0037
F1-F5	0.0114790	3.36	02Jul2020, 00:03	0.8721
PIPE 1394	0.0114790	3.36	02Jul2020, 00:03	0.8721
F6	.0009077573	0.41	02Jul2020, 00:05	0.0672
F1-F6	0.0123868	3.74	02Jul2020, 00:04	0.9392
PIPE 1395	0.0123868	3.74	02Jul2020, 00:04	0.9392
F7	0.0041354	1.06	02Jul2020, 00:05	0.1569
F1-F7	0.0165222	4.76	02Jul2020, 00:04	1.0961
PIPE 1396	0.0165222	4.76	02Jul2020, 00:04	1.0961
F8	.000099661	0.07	02Jul2020, 00:07	0.0122
F1-F8	0.0166219	4.82	02Jul2020, 00:04	1.1083
PIPE 1397	0.0166219	4.82	02Jul2020, 00:05	1.1083
F9	0.0064462	0.56	02Jul2020, 00:22	0.1630
PIPE 1381/1382	0.0064462	0.56	02Jul2020, 00:23	0.1630
F10	0.0012835	0.66	02Jul2020, 00:08	0.1185
F9-F10	0.0077297	0.99	02Jul2020, 00:08	0.2814
PIPE 1383	0.0077297	0.99	02Jul2020, 00:08	0.2814
F1-F10	0.0243516	5.68	02Jul2020, 00:05	1.3898
PIPE 1385/1398	0.0243516	5.68	02Jul2020, 00:05	1.3898
F11	0.0105468	1.34	02Jul2020, 00:24	0.4225
F1-F11	0.0348984	6.36	02Jul2020, 00:05	1.8123
PIPE 1399/1400	0.0348984	6.36	02Jul2020, 00:05	1.8123
F12	0.0081956	2.03	02Jul2020, 00:03	0.2519
F1-F12	0.0430940	7.67	02Jul2020, 00:03	2.0642
F13	0.0044619	0.54	02Jul2020, 00:30	0.2150
PIPE 1361	0.0044619	0.54	02Jul2020, 00:30	0.2150
F (F1-F12)	0.0430939	5.25	02Jul2020, 00:34	1.9694

Global Summary Results for Run "10 YR 6 HR"

Project: CCH EWS Simulation Run: 10 YR 6 HR

Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 00:00
Compute Time: 19Sep2016, 13:19:31

Basin Model: WS F
Meteorologic Model: 10yr 6hr 20 Inch
Control Specifications: 6 Hour

Show Elements: All Elements Volume Units: IN AC-FT Sorting: Hydrologic

Hydrologic Element	Drainage A... (MI2)	Peak Disch... (CFS)	Time of Peak	Volume (AC-FT)
F2	0.0060511	1.81	01Jul2020, 15:03	0.1068
F1	0.0029872	0.52	01Jul2020, 15:17	0.0660
PIPE 1387	0.0029872	0.52	01Jul2020, 15:17	0.0660
F1-F2	0.0090383	2.07	01Jul2020, 15:03	0.1728
PIPE 1391	0.0090383	2.07	01Jul2020, 15:03	0.1728
F3	0.0018288	0.44	01Jul2020, 15:30	0.0741
F1-F3	0.0108671	2.26	01Jul2020, 15:03	0.2468
PIPE 1392	0.0108671	2.26	01Jul2020, 15:03	0.2468
F4	.0005781896	0.16	01Jul2020, 15:13	0.0177
F1-F4	0.0114453	2.35	01Jul2020, 15:03	0.2645
PIPE 1393	0.0114453	2.35	01Jul2020, 15:03	0.2645
F5	.0000337469	0.02	01Jul2020, 15:05	0.0011
F1-F5	0.0114790	2.36	01Jul2020, 15:03	0.2656
PIPE 1394	0.0114790	2.36	01Jul2020, 15:03	0.2656
F6	.0009077573	0.29	01Jul2020, 15:05	0.0203
F1-F6	0.0123868	2.62	01Jul2020, 15:04	0.2859
PIPE 1395	0.0123868	2.62	01Jul2020, 15:04	0.2859
F7	0.0041354	0.75	01Jul2020, 15:05	0.0519
F1-F7	0.0165222	3.35	01Jul2020, 15:04	0.3378
PIPE 1396	0.0165222	3.35	01Jul2020, 15:04	0.3378
F8	.000099661	0.04	01Jul2020, 15:07	0.0036
F1-F8	0.0166219	3.39	01Jul2020, 15:04	0.3414
PIPE 1397	0.0166219	3.39	01Jul2020, 15:05	0.3414
F9	0.0064462	0.40	01Jul2020, 15:22	0.0557
PIPE 1381/1382	0.0064462	0.40	01Jul2020, 15:23	0.0557
F10	0.0012835	0.42	01Jul2020, 15:07	0.0349
F9-F10	0.0077297	0.65	01Jul2020, 15:08	0.0905
PIPE 1383	0.0077297	0.65	01Jul2020, 15:08	0.0905
F1-F10	0.0243516	3.96	01Jul2020, 15:05	0.4319
PIPE 1385/1398	0.0243516	3.96	01Jul2020, 15:05	0.4319
F11	0.0105468	0.94	01Jul2020, 15:24	0.1377
F1-F11	0.0348984	4.43	01Jul2020, 15:05	0.5697
PIPE 1399/1400	0.0348984	4.43	01Jul2020, 15:05	0.5697
F12	0.0081956	1.46	01Jul2020, 15:03	0.0818
F1-F12	0.0430940	5.40	01Jul2020, 15:03	0.6514
F13	0.0044619	0.38	01Jul2020, 15:30	0.0621
PIPE 1361	0.0044619	0.38	01Jul2020, 15:30	0.0621
F (F1-F12)	0.0430939	3.70	01Jul2020, 15:34	0.6501

Global Summary Results for Run "25 YR 1 HR"

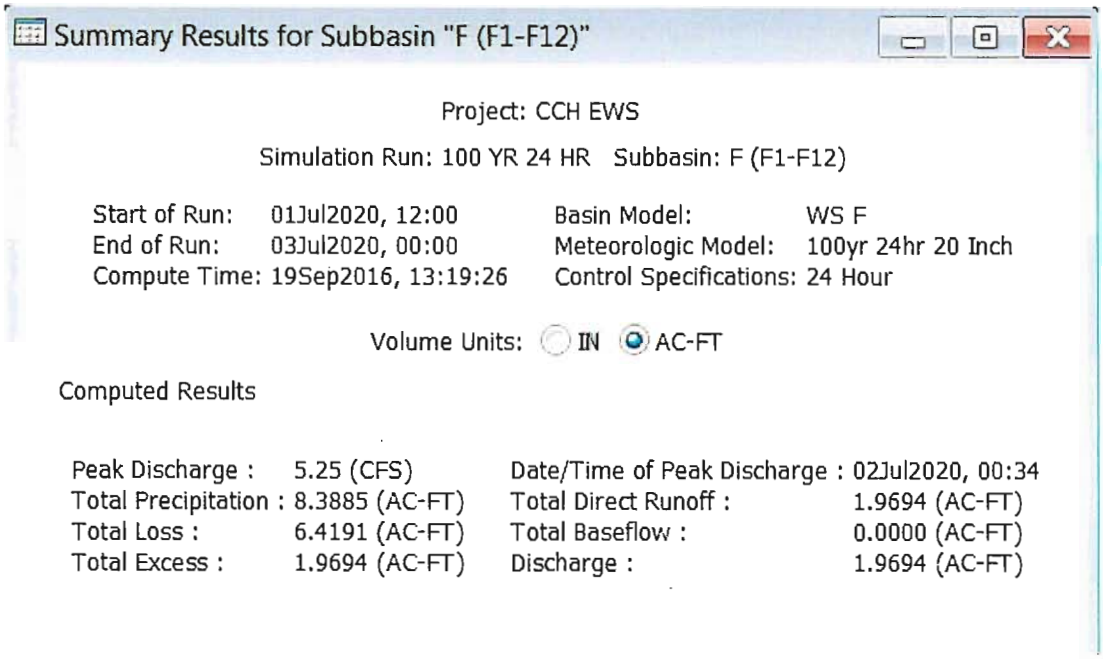
Project: CCH EWS Simulation Run: 25 YR 1 HR

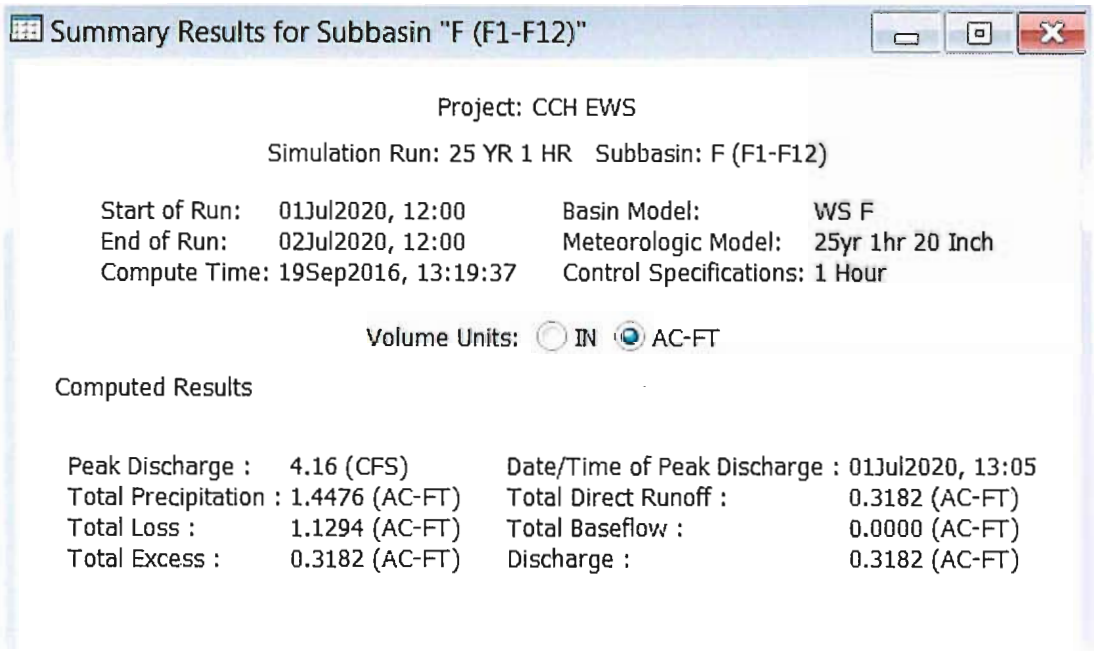
Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 12:00
Compute Time: 19Sep2016, 13:19:37

Basin Model: WS F
Meteorologic Model: 25yr 1hr 20 Inch
Control Specifications: 1 Hour

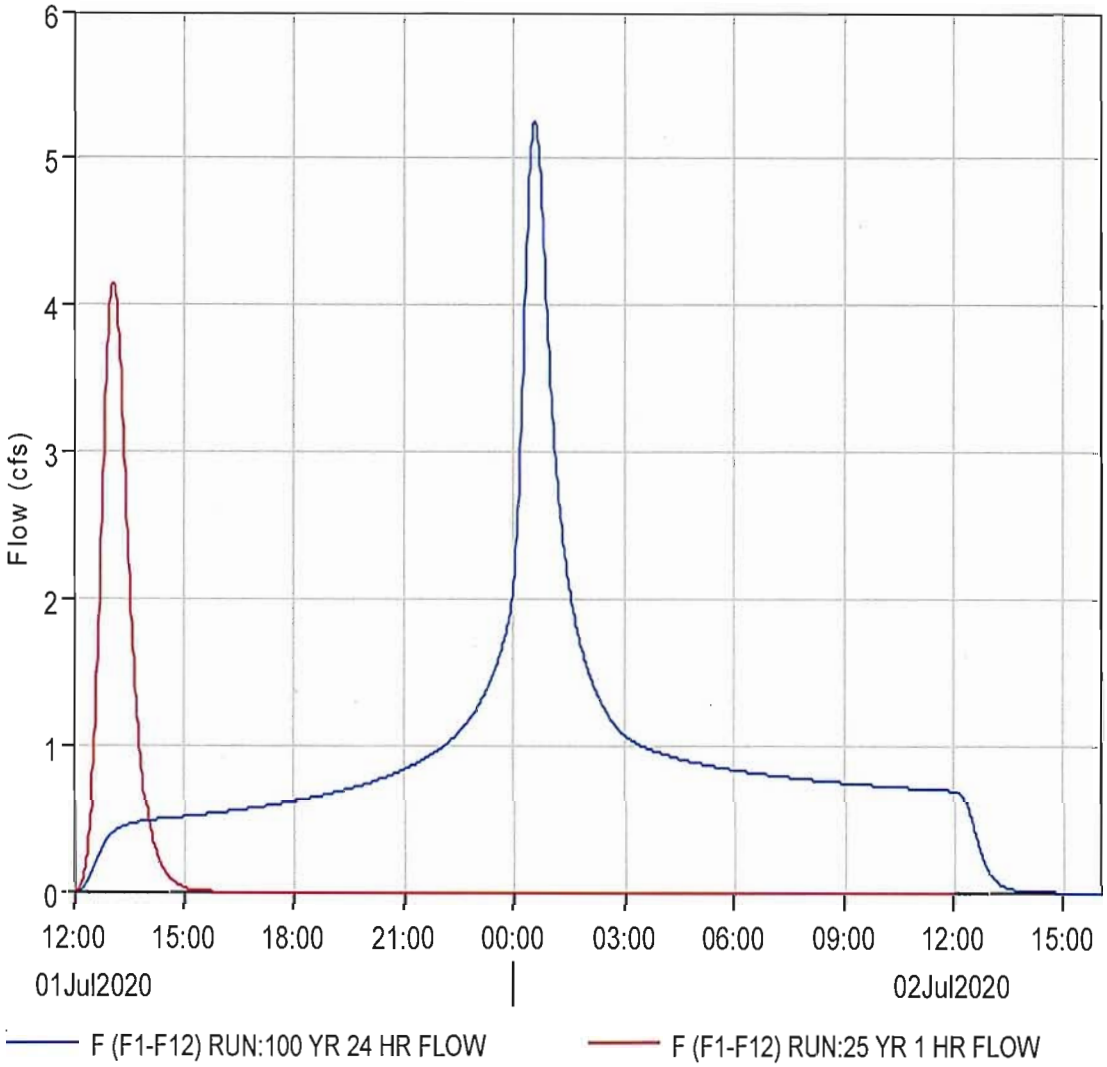
Show Elements: All Elements Volume Units: IN AC-FT Sorting: Hydrologic

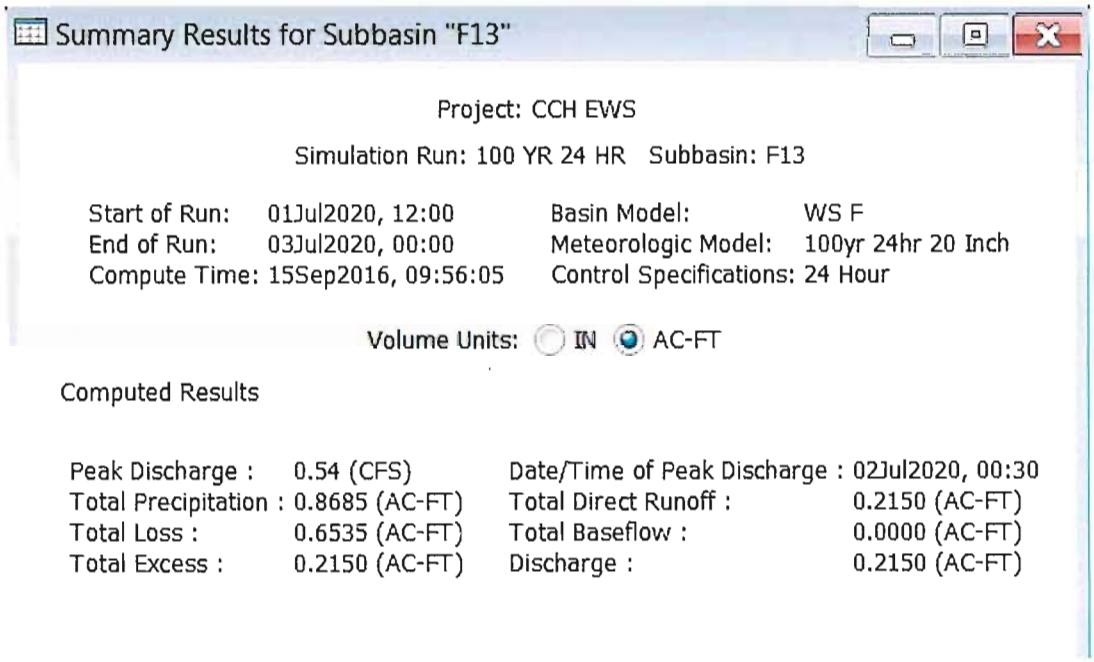
Hydrologic Element	Drainage A... (MI2)	Peak Disch... (CFS)	Time of Peak	Volume (AC-FT)
F2	0.0060511	2.07	01Jul2020, 12:33	0.0523
F1	0.0029872	0.61	01Jul2020, 12:48	0.0323
PIPE 1387	0.0029872	0.61	01Jul2020, 12:48	0.0323
F1-F2	0.0090383	2.35	01Jul2020, 12:33	0.0846
PIPE 1391	0.0090383	2.35	01Jul2020, 12:33	0.0846
F3	0.0018288	0.50	01Jul2020, 13:01	0.0356
F1-F3	0.0108671	2.48	01Jul2020, 12:33	0.1202
PIPE 1392	0.0108671	2.48	01Jul2020, 12:33	0.1202
F4	.0005781896	0.19	01Jul2020, 12:44	0.0087
F1-F4	0.0114453	2.58	01Jul2020, 12:33	0.1289
PIPE 1393	0.0114453	2.58	01Jul2020, 12:33	0.1289
F5	.0000337469	0.02	01Jul2020, 12:35	0.0005
F1-F5	0.0114790	2.60	01Jul2020, 12:33	0.1294
PIPE 1394	0.0114790	2.60	01Jul2020, 12:33	0.1294
F6	.0009077573	0.34	01Jul2020, 12:35	0.0099
F1-F6	0.0123868	2.92	01Jul2020, 12:34	0.1393
PIPE 1395	0.0123868	2.92	01Jul2020, 12:34	0.1393
F7	0.0041354	0.87	01Jul2020, 12:35	0.0254
F1-F7	0.0165222	3.76	01Jul2020, 12:34	0.1647
PIPE 1396	0.0165222	3.76	01Jul2020, 12:34	0.1647
F8	.000099661	0.05	01Jul2020, 12:37	0.0017
F1-F8	0.0166219	3.80	01Jul2020, 12:34	0.1665
PIPE 1397	0.0166219	3.80	01Jul2020, 12:35	0.1665
F9	0.0064462	0.46	01Jul2020, 12:52	0.0273
PIPE 1381/1382	0.0064462	0.46	01Jul2020, 12:53	0.0273
F10	0.0012835	0.49	01Jul2020, 12:37	0.0171
F9-F10	0.0077297	0.74	01Jul2020, 12:39	0.0443
PIPE 1383	0.0077297	0.74	01Jul2020, 12:39	0.0443
F1-F10	0.0243516	4.44	01Jul2020, 12:35	0.2108
PIPE 1385/1398	0.0243516	4.44	01Jul2020, 12:35	0.2108
F11	0.0105468	1.09	01Jul2020, 12:54	0.0674
F1-F11	0.0348984	4.91	01Jul2020, 12:35	0.2782
PIPE 1399/1400	0.0348984	4.91	01Jul2020, 12:35	0.2782
F12	0.0081956	1.66	01Jul2020, 12:33	0.0400
F1-F12	0.0430940	5.98	01Jul2020, 12:33	0.3182
F13	0.0044619	0.43	01Jul2020, 13:01	0.0304
PIPE 1361	0.0044619	0.43	01Jul2020, 13:01	0.0304
F (F1-F12)	0.0430939	4.16	01Jul2020, 13:05	0.3182

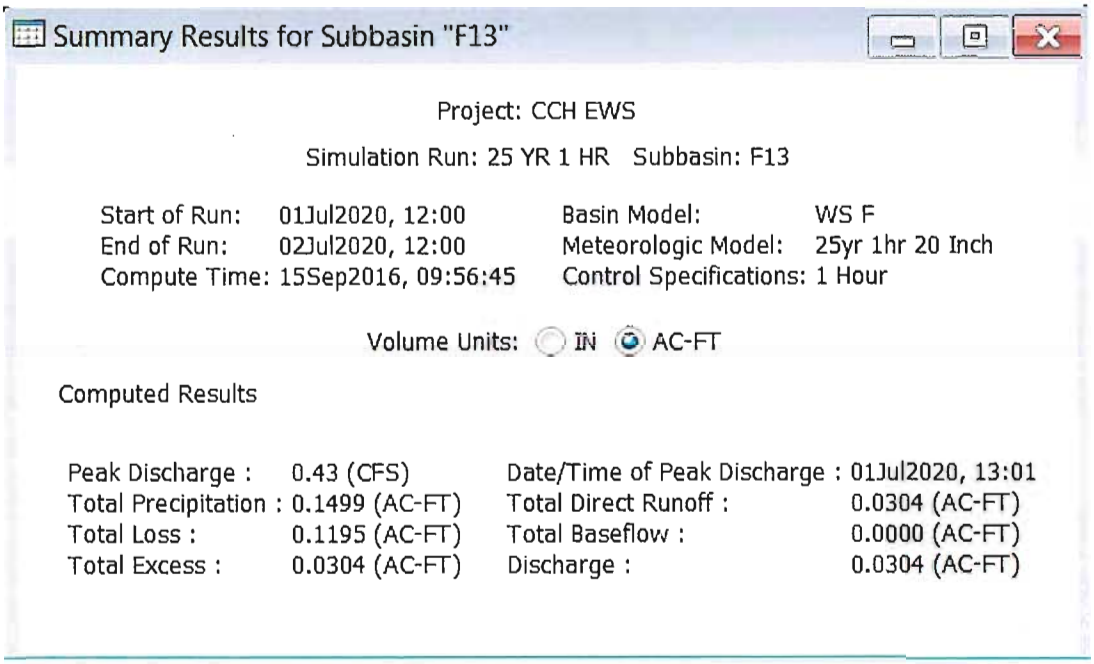

Summary Results for Subbasin "F (F1-F12)"
Project: CCH EWS
Simulation Run: 100 YR 24 HR Subbasin: F (F1-F12)
Start of Run: 01Jul2020, 12:00
End of Run: 03Jul2020, 00:00
Compute Time: 19Sep2016, 13:19:26
Basin Model: WS F
Meteorologic Model: 100yr 24hr 20 Inch
Control Specifications: 24 Hour
Volume Units: IN AC-FT
Computed Results
Peak Discharge : 5.25 (CFS)
Total Precipitation : 8.3885 (AC-FT)
Total Loss : 6.4191 (AC-FT)
Total Excess : 1.9694 (AC-FT)
Date/Time of Peak Discharge : 02Jul2020, 00:34
Total Direct Runoff : 1.9694 (AC-FT)
Total Baseflow : 0.0000 (AC-FT)
Discharge : 1.9694 (AC-FT)


Summary Results for Subbasin "F (F1-F12)"
Project: CCH EWS
Simulation Run: 25 YR 1 HR Subbasin: F (F1-F12)
Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 12:00
Compute Time: 19Sep2016, 13:19:37
Basin Model: WS F
Meteorologic Model: 25yr 1hr 20 Inch
Control Specifications: 1 Hour
Volume Units: IN AC-FT
Computed Results
Peak Discharge : 4.16 (CFS)
Total Precipitation : 1.4476 (AC-FT)
Total Loss : 1.1294 (AC-FT)
Total Excess : 0.3182 (AC-FT)
Date/Time of Peak Discharge : 01Jul2020, 13:05
Total Direct Runoff : 0.3182 (AC-FT)
Total Baseflow : 0.0000 (AC-FT)
Discharge : 0.3182 (AC-FT)

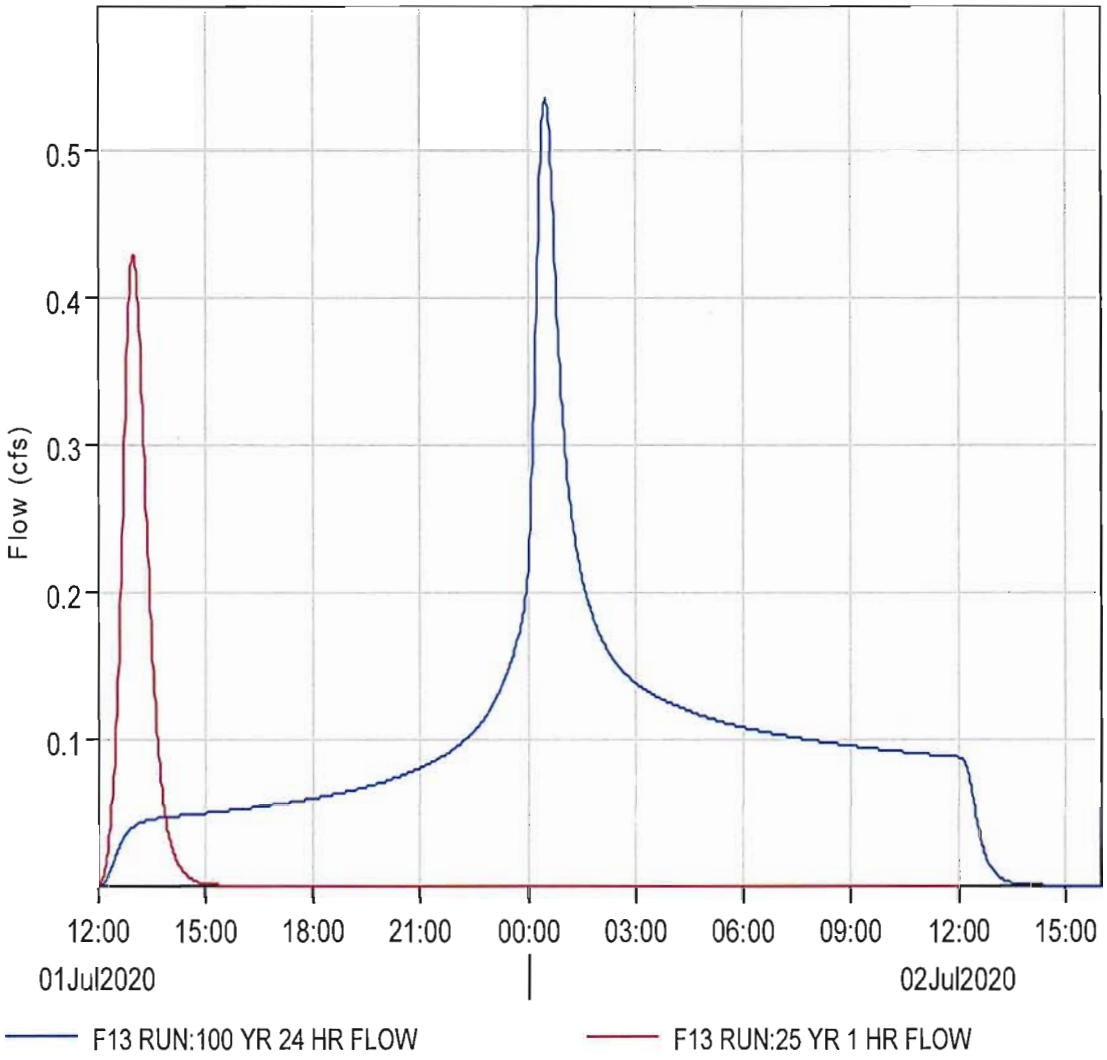
COUNTRY CLUB HEIGHTS ECP

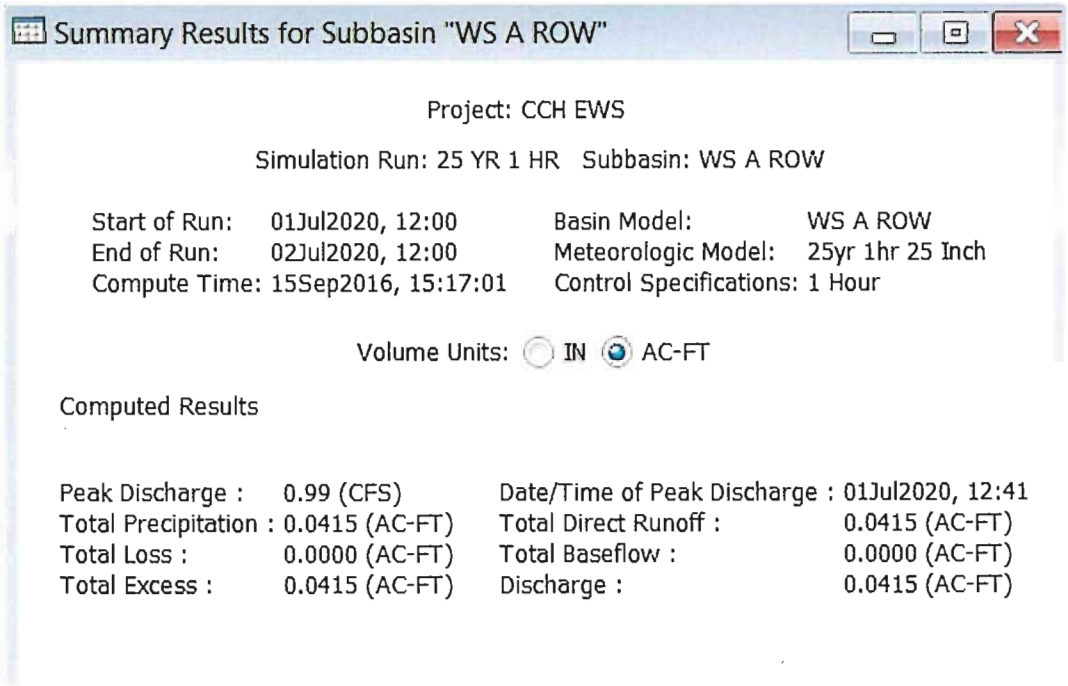


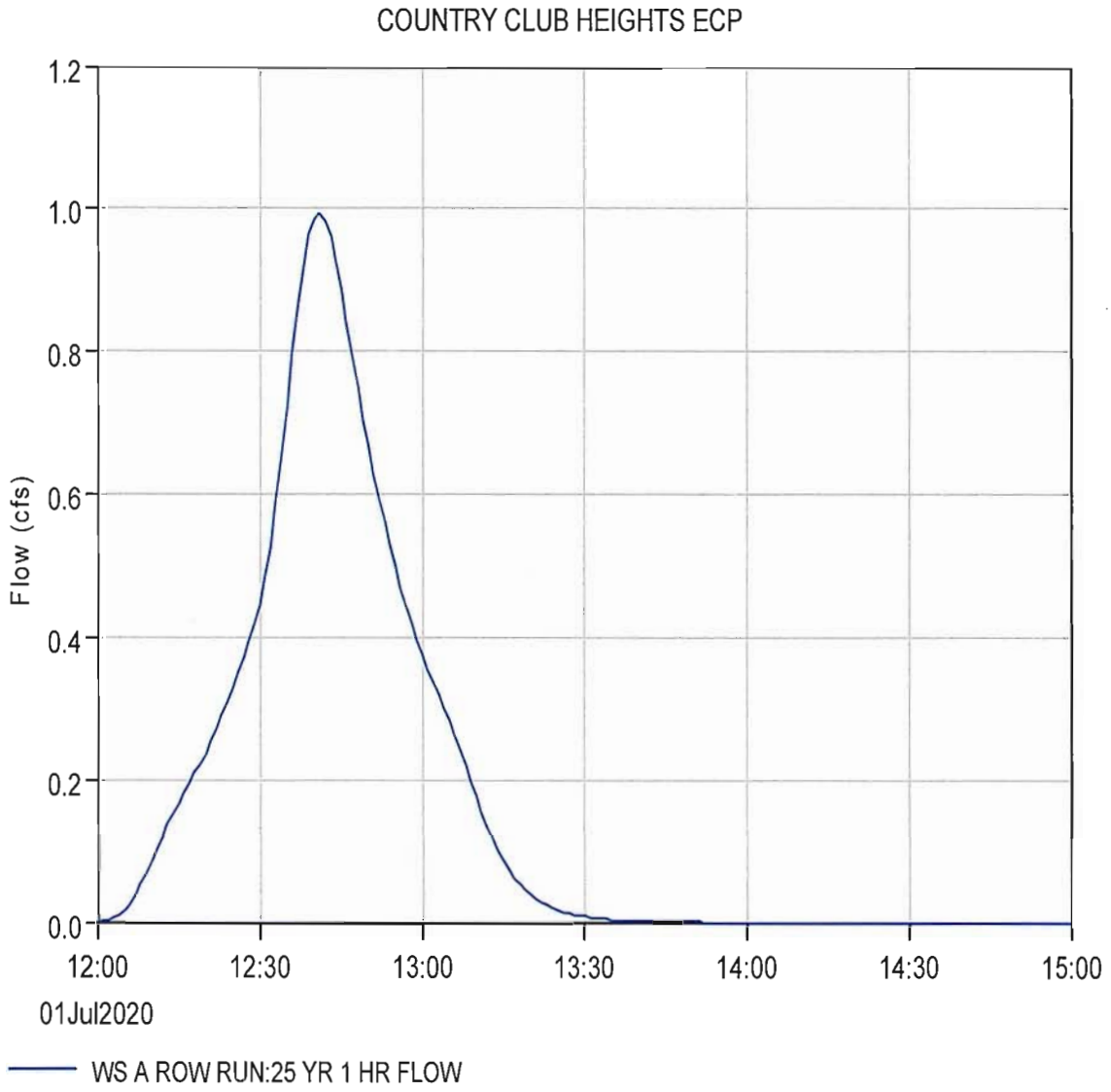

Summary Results for Subbasin "F13"
Project: CCH EWS
Simulation Run: 100 YR 24 HR Subbasin: F13
Start of Run: 01Jul2020, 12:00
End of Run: 03Jul2020, 00:00
Compute Time: 15Sep2016, 09:56:05
Basin Model: WS F
Meteorologic Model: 100yr 24hr 20 Inch
Control Specifications: 24 Hour
Volume Units: IN AC-FT
Computed Results
Peak Discharge : 0.54 (CFS)
Total Precipitation : 0.8685 (AC-FT)
Total Loss : 0.6535 (AC-FT)
Total Excess : 0.2150 (AC-FT)
Date/Time of Peak Discharge : 02Jul2020, 00:30
Total Direct Runoff : 0.2150 (AC-FT)
Total Baseflow : 0.0000 (AC-FT)
Discharge : 0.2150 (AC-FT)

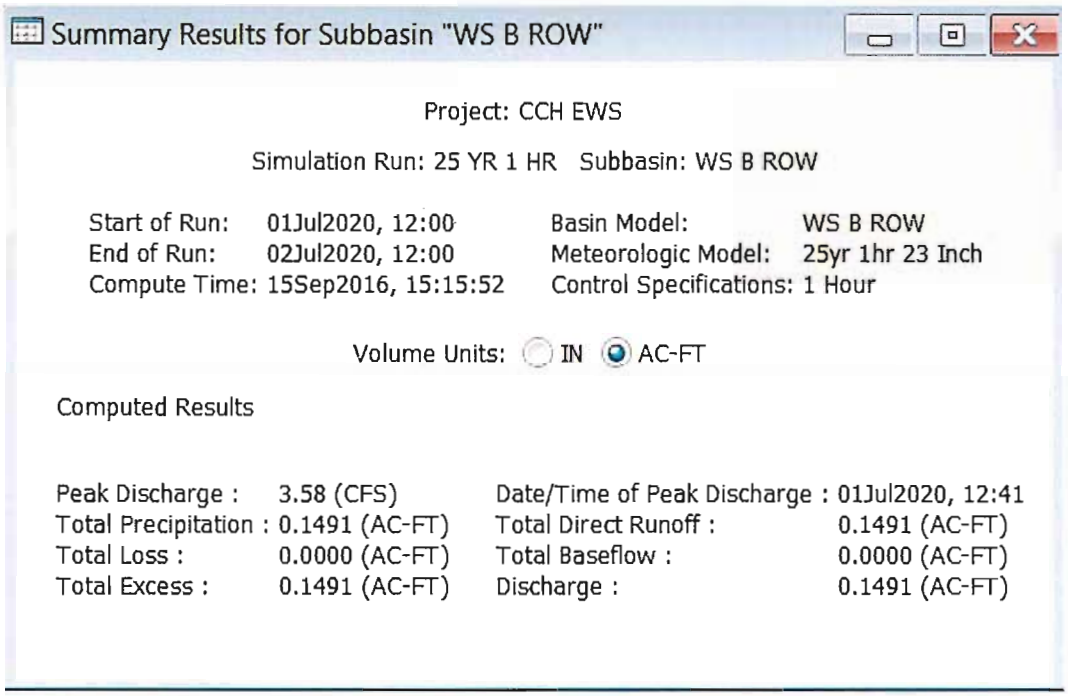

Summary Results for Subbasin "F13"
Project: CCH EWS
Simulation Run: 25 YR 1 HR Subbasin: F13
Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 12:00
Compute Time: 15Sep2016, 09:56:45
Basin Model: WS F
Meteorologic Model: 25yr 1hr 20 Inch
Control Specifications: 1 Hour
Volume Units: IN AC-FT
Computed Results
Peak Discharge : 0.43 (CFS)
Total Precipitation : 0.1499 (AC-FT)
Total Loss : 0.1195 (AC-FT)
Total Excess : 0.0304 (AC-FT)
Date/Time of Peak Discharge : 01Jul2020, 13:01
Total Direct Runoff : 0.0304 (AC-FT)
Total Baseflow : 0.0000 (AC-FT)
Discharge : 0.0304 (AC-FT)

COUNTRY CLUB HEIGHTS ECP

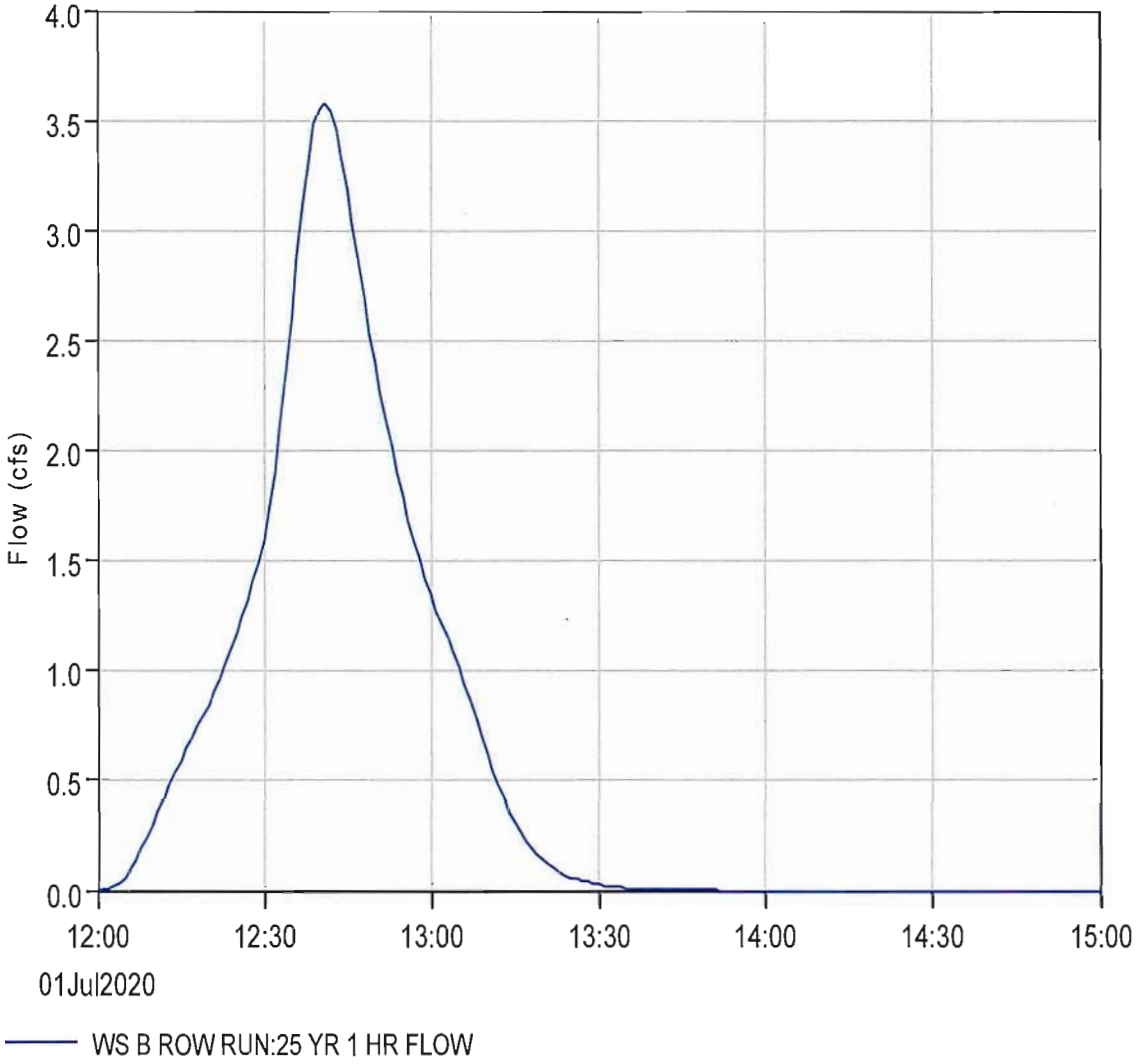



Summary Results for Subbasin "WS A ROW"
Project: CCH EWS
Simulation Run: 25 YR 1 HR Subbasin: WS A ROW
Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 12:00
Compute Time: 15Sep2016, 15:17:01
Basin Model: WS A ROW
Meteorologic Model: 25yr 1hr 25 Inch
Control Specifications: 1 Hour
Volume Units: IN AC-FT
Computed Results
Peak Discharge : 0.99 (CFS)
Total Precipitation : 0.0415 (AC-FT)
Total Loss : 0.0000 (AC-FT)
Total Excess : 0.0415 (AC-FT)
Date/Time of Peak Discharge : 01Jul2020, 12:41
Total Direct Runoff : 0.0415 (AC-FT)
Total Baseflow : 0.0000 (AC-FT)
Discharge : 0.0415 (AC-FT)


COUNTRY CLUB HEIGHTS ECP
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Flow (cfs)
12:00
12:30
13:00
13:30
14:00
14:30
15:00
01Jul2020
WS A ROW RUN:25 YR 1 HR FLOW


Summary Results for Subbasin "WS B ROW"
Project: CCH EWS
Simulation Run: 25 YR 1 HR Subbasin: WS B ROW
Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 12:00
Compute Time: 15Sep2016, 15:15:52
Basin Model: WS B ROW
Meteorologic Model: 25yr 1hr 23 Inch
Control Specifications: 1 Hour
Volume Units: IN AC-FT
Computed Results
Peak Discharge : 3.58 (CFS)
Total Precipitation : 0.1491 (AC-FT)
Total Loss : 0.0000 (AC-FT)
Total Excess : 0.1491 (AC-FT)
Date/Time of Peak Discharge : 01Jul2020, 12:41
Total Direct Runoff : 0.1491 (AC-FT)
Total Baseflow : 0.0000 (AC-FT)
Discharge : 0.1491 (AC-FT)

COUNTRY CLUB HEIGHTS ECP



Summary Results for Subbasin "WS C ROW"

Project: CCH EWS

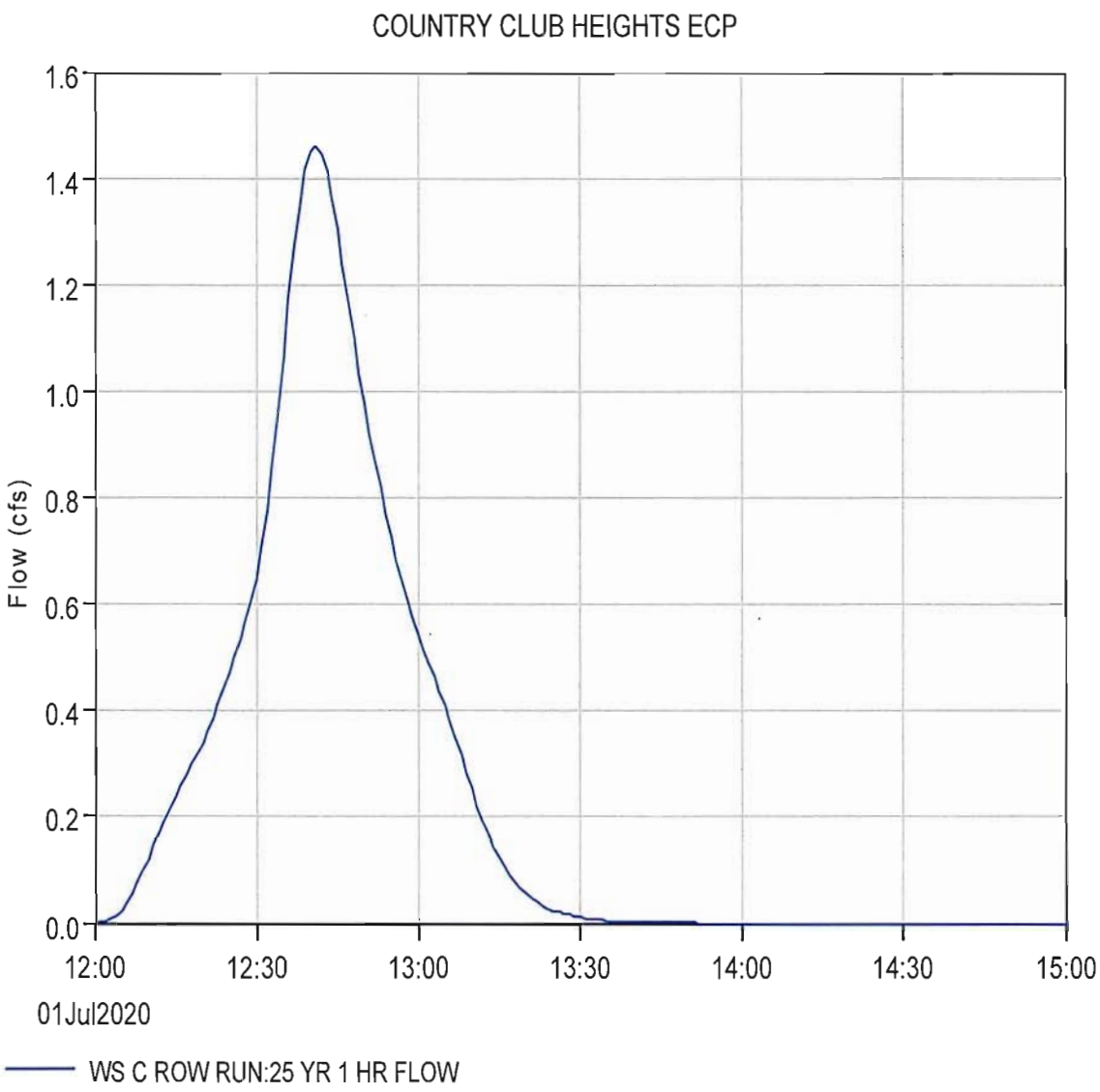
Simulation Run: 25 YR 1 HR Subbasin: WS C ROW

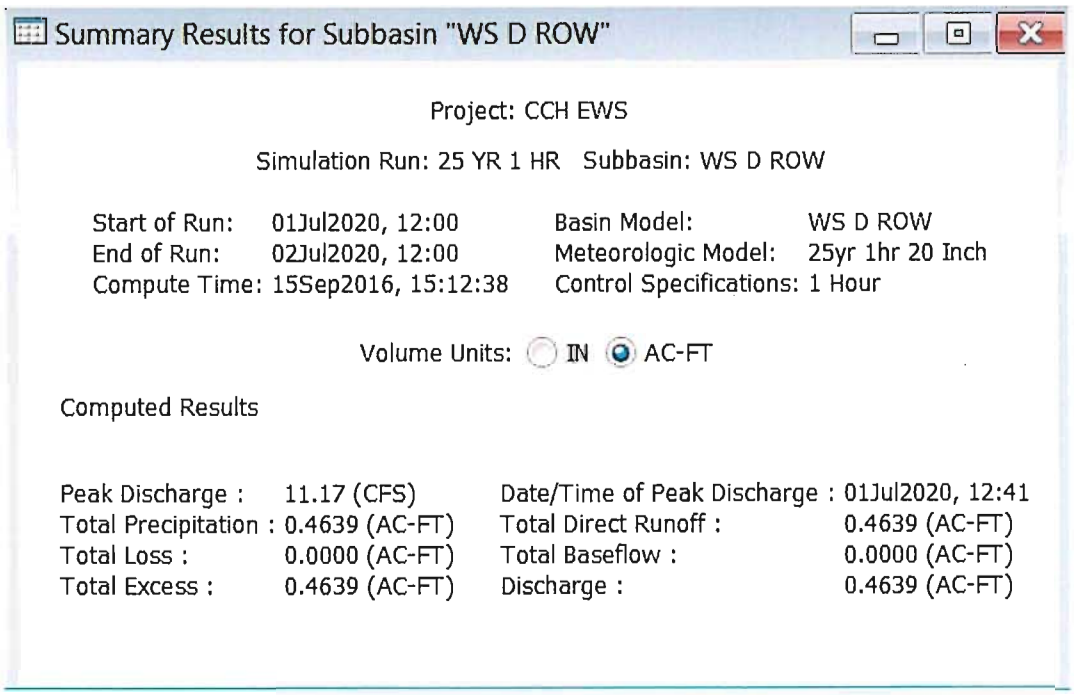
Start of Run:	01Jul2020, 12:00	Basin Model:	WS C ROW
End of Run:	02Jul2020, 12:00	Meteorologic Model:	25yr 1hr 21 Inch
Compute Time:	15Sep2016, 15:14:43	Control Specifications:	1 Hour

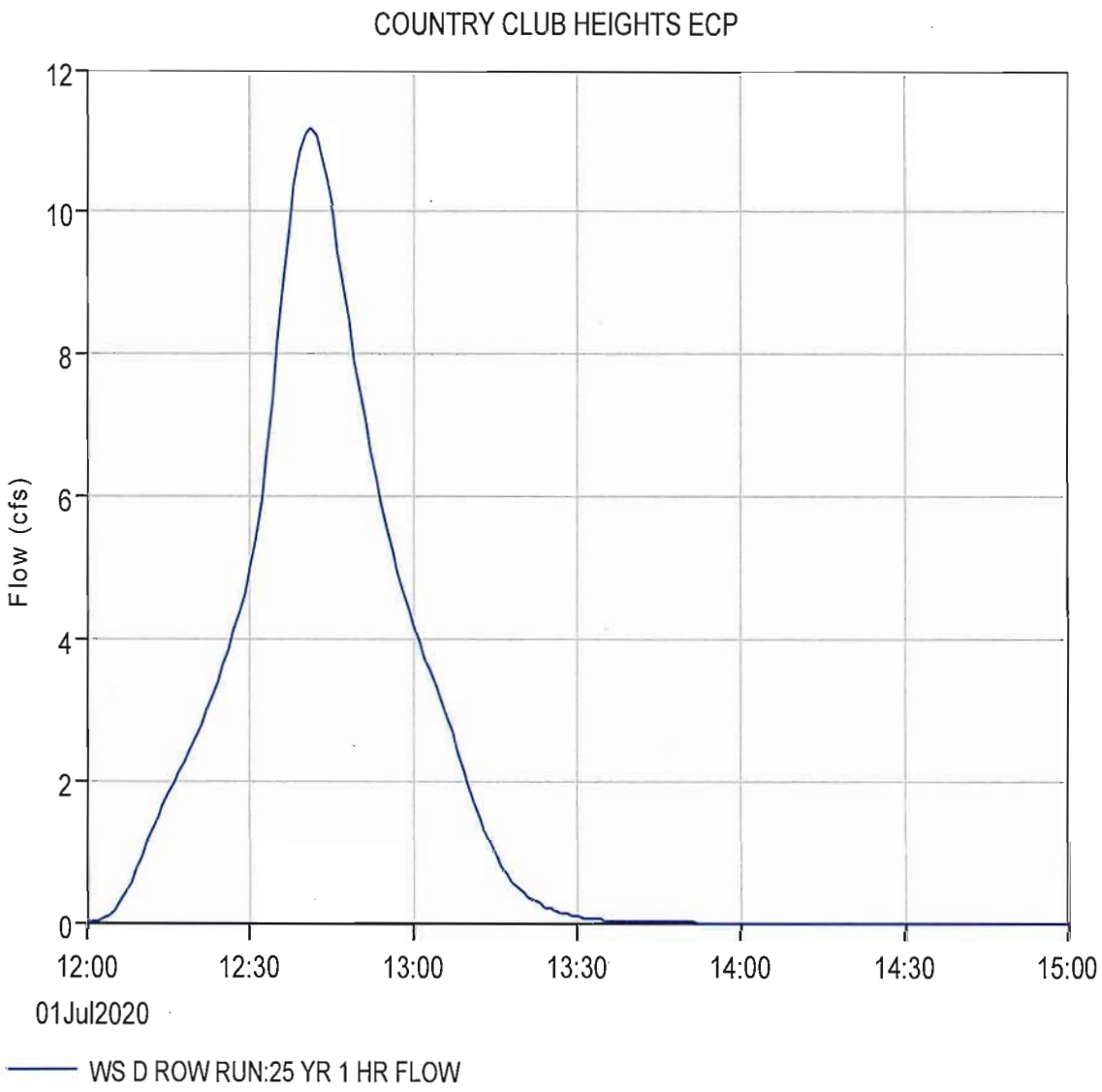
Volume Units: ○ IN ◉ AC-FT

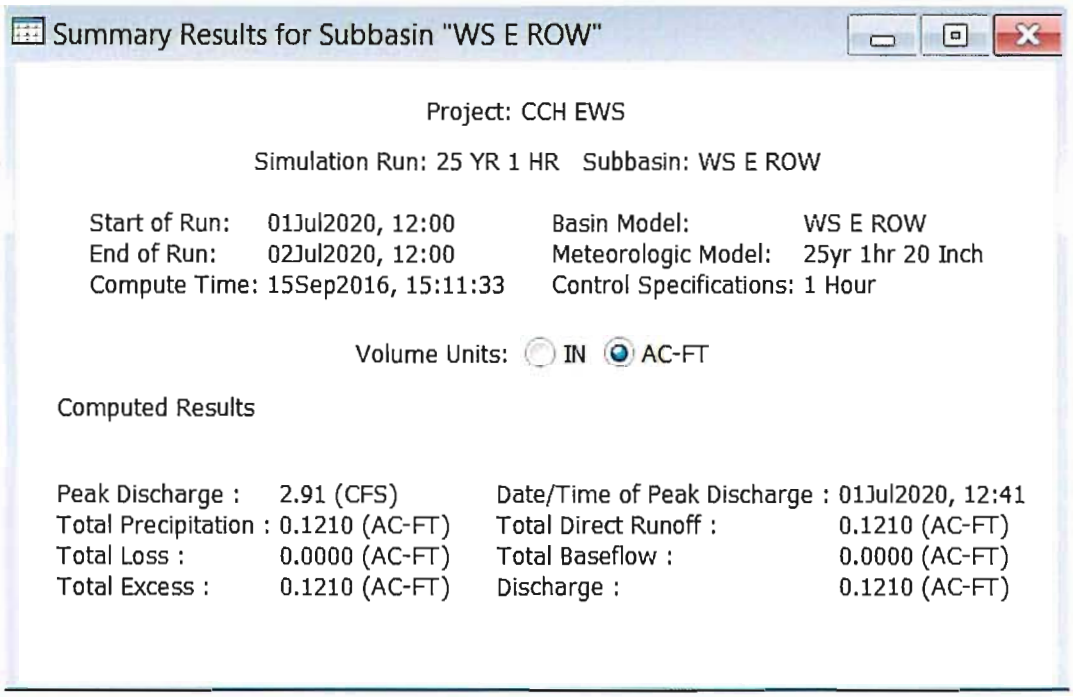
Computed Results

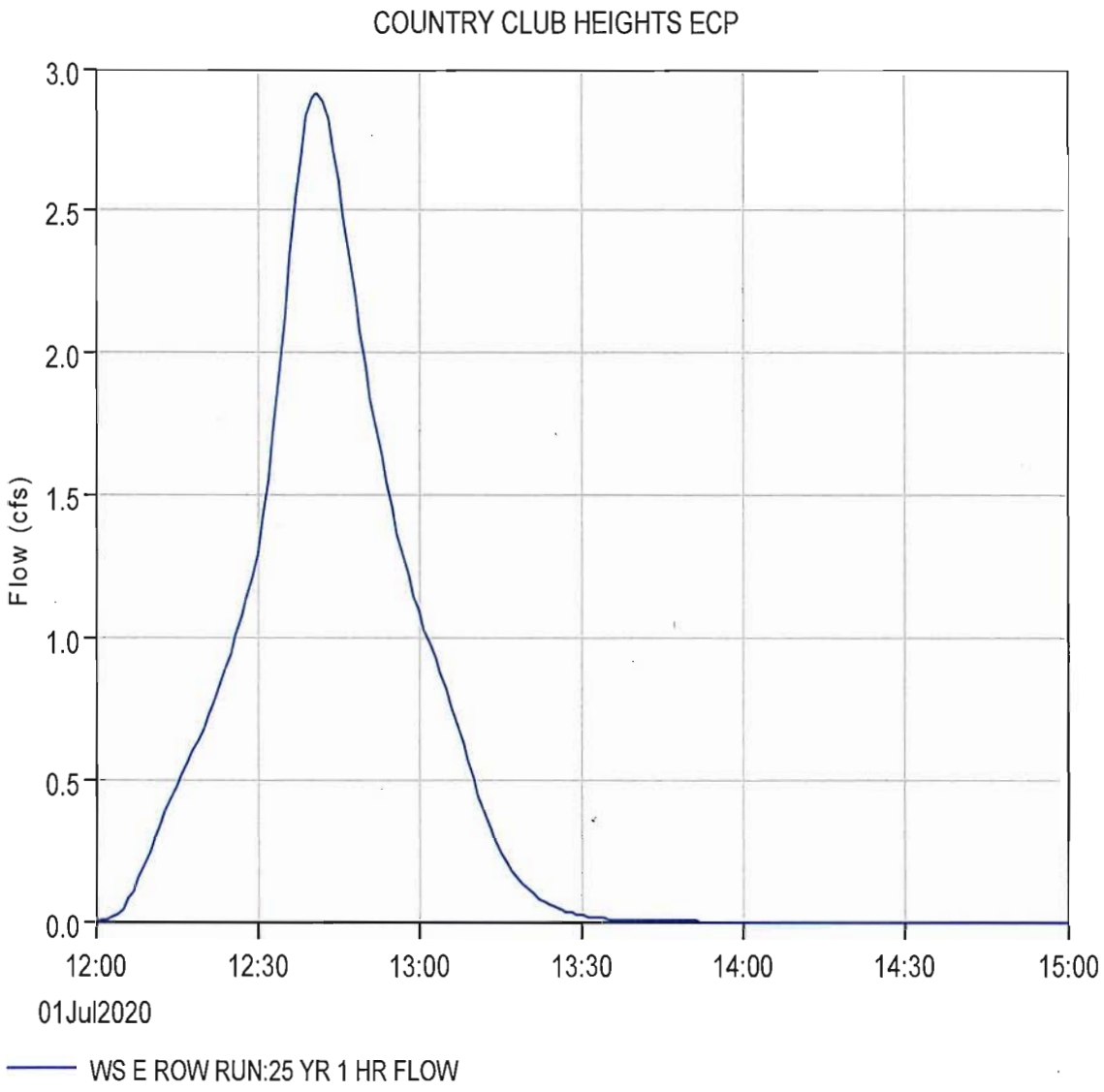
Peak Discharge :	1.46 (CFS)	Date/Time of Peak Discharge :	01Jul2020, 12:41
Total Precipitation :	0.0606 (AC-FT)	Total Direct Runoff :	0.0606 (AC-FT)
Total Loss :	0.0000 (AC-FT)	Total Baseflow :	0.0000 (AC-FT)
Total Excess :	0.0606 (AC-FT)	Discharge :	0.0606 (AC-FT)

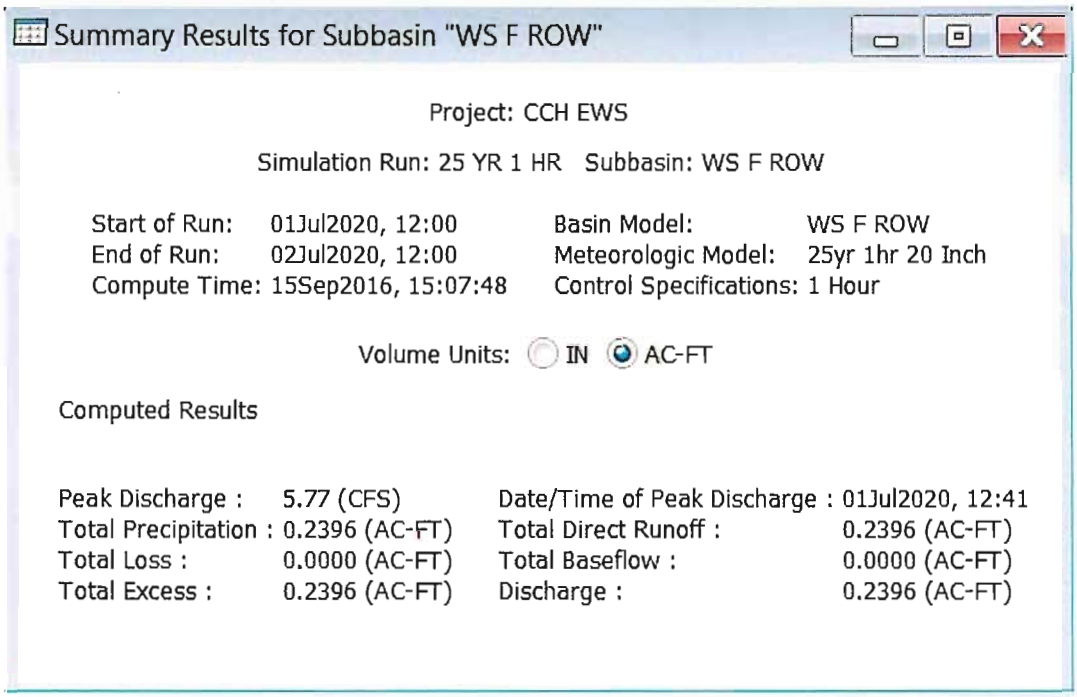

COUNTRY CLUB HEIGHTS ECP
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Flow (cfs)
12:00
12:30
13:00
13:30
14:00
14:30
15:00
01Jul2020
WS C ROW RUN:25 YR 1 HR FLOW


Summary Results for Subbasin "WS D ROW"
Project: CCH EWS
Simulation Run: 25 YR 1 HR Subbasin: WS D ROW
Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 12:00
Compute Time: 15Sep2016, 15:12:38
Basin Model: WS D ROW
Meteorologic Model: 25yr 1hr 20 Inch
Control Specifications: 1 Hour
Volume Units: IN AC-FT
Computed Results
Peak Discharge : 11.17 (CFS)
Total Precipitation : 0.4639 (AC-FT)
Total Loss : 0.0000 (AC-FT)
Total Excess : 0.4639 (AC-FT)
Date/Time of Peak Discharge : 01Jul2020, 12:41
Total Direct Runoff : 0.4639 (AC-FT)
Total Baseflow : 0.0000 (AC-FT)
Discharge : 0.4639 (AC-FT)

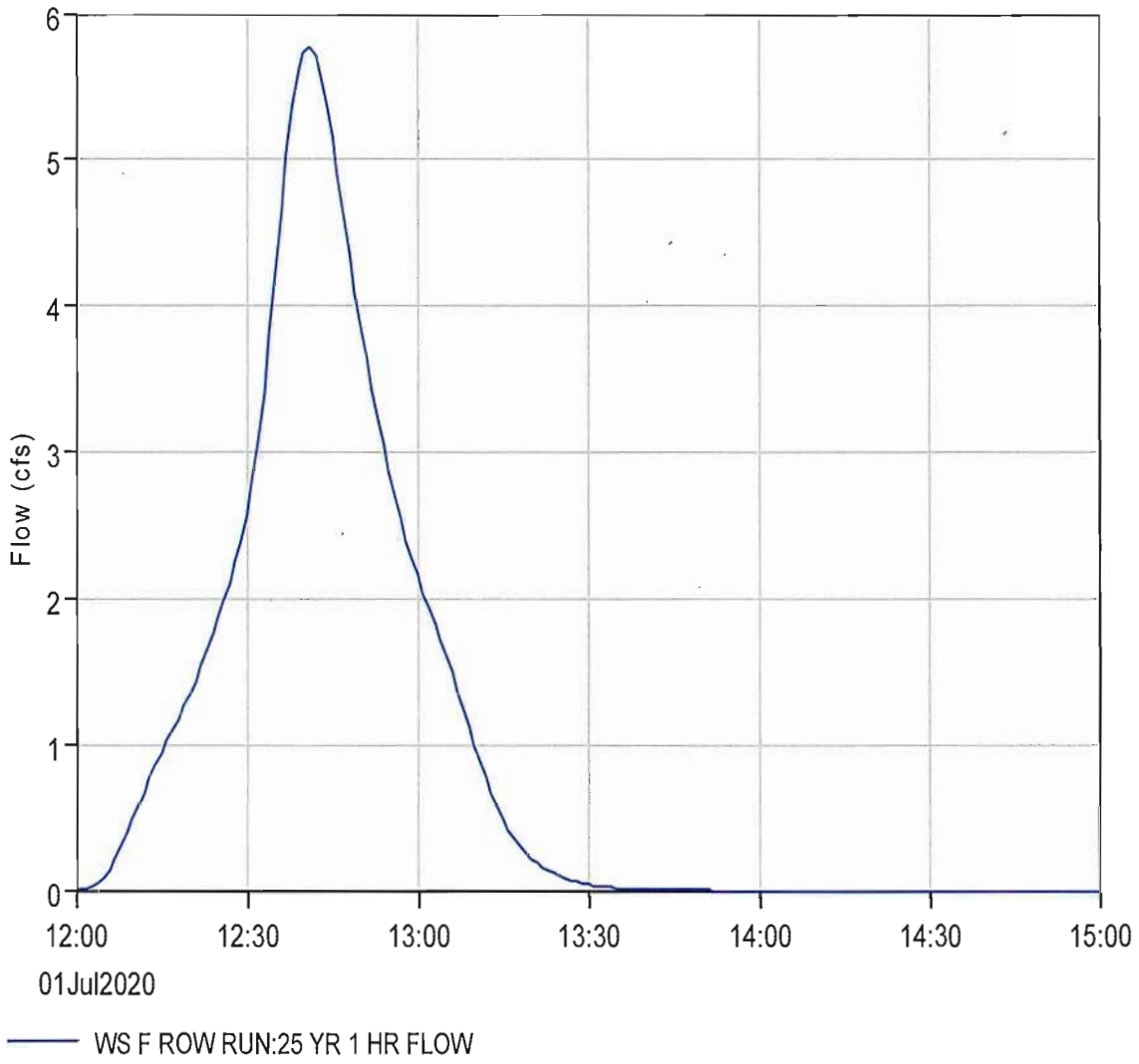

COUNTRY CLUB HEIGHTS ECP
12
10
8
6
4
2
0
Flow (cfs)
12:00
12:30
13:00
13:30
14:00
14:30
15:00
01Jul2020
WS D ROW RUN:25 YR 1 HR FLOW


Summary Results for Subbasin "WS E ROW"
Project: CCH EWS
Simulation Run: 25 YR 1 HR Subbasin: WS E ROW
Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 12:00
Compute Time: 15Sep2016, 15:11:33
Basin Model: WS E ROW
Meteorologic Model: 25yr 1hr 20 Inch
Control Specifications: 1 Hour
Volume Units: IN AC-FT
Computed Results
Peak Discharge : 2.91 (CFS)
Total Precipitation : 0.1210 (AC-FT)
Total Loss : 0.0000 (AC-FT)
Total Excess : 0.1210 (AC-FT)
Date/Time of Peak Discharge : 01Jul2020, 12:41
Total Direct Runoff : 0.1210 (AC-FT)
Total Baseflow : 0.0000 (AC-FT)
Discharge : 0.1210 (AC-FT)


COUNTRY CLUB HEIGHTS ECP
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Flow (cfs)
12:00
12:30
13:00
13:30
14:00
14:30
15:00
01Jul2020
WS E ROW RUN:25 YR 1 HR FLOW


Summary Results for Subbasin "WS F ROW"
Project: CCH EWS
Simulation Run: 25 YR 1 HR Subbasin: WS F ROW
Start of Run: 01Jul2020, 12:00
End of Run: 02Jul2020, 12:00
Compute Time: 15Sep2016, 15:07:48
Basin Model: WS F ROW
Meteorologic Model: 25yr 1hr 20 Inch
Control Specifications: 1 Hour
Volume Units: IN AC-FT
Computed Results
Peak Discharge : 5.77 (CFS)
Date/Time of Peak Discharge : 01Jul2020, 12:41
Total Precipitation : 0.2396 (AC-FT)
Total Direct Runoff : 0.2396 (AC-FT)
Total Loss : 0.0000 (AC-FT)
Total Baseflow : 0.0000 (AC-FT)
Total Excess : 0.2396 (AC-FT)
Discharge : 0.2396 (AC-FT)

COUNTRY CLUB HEIGHTS ECP



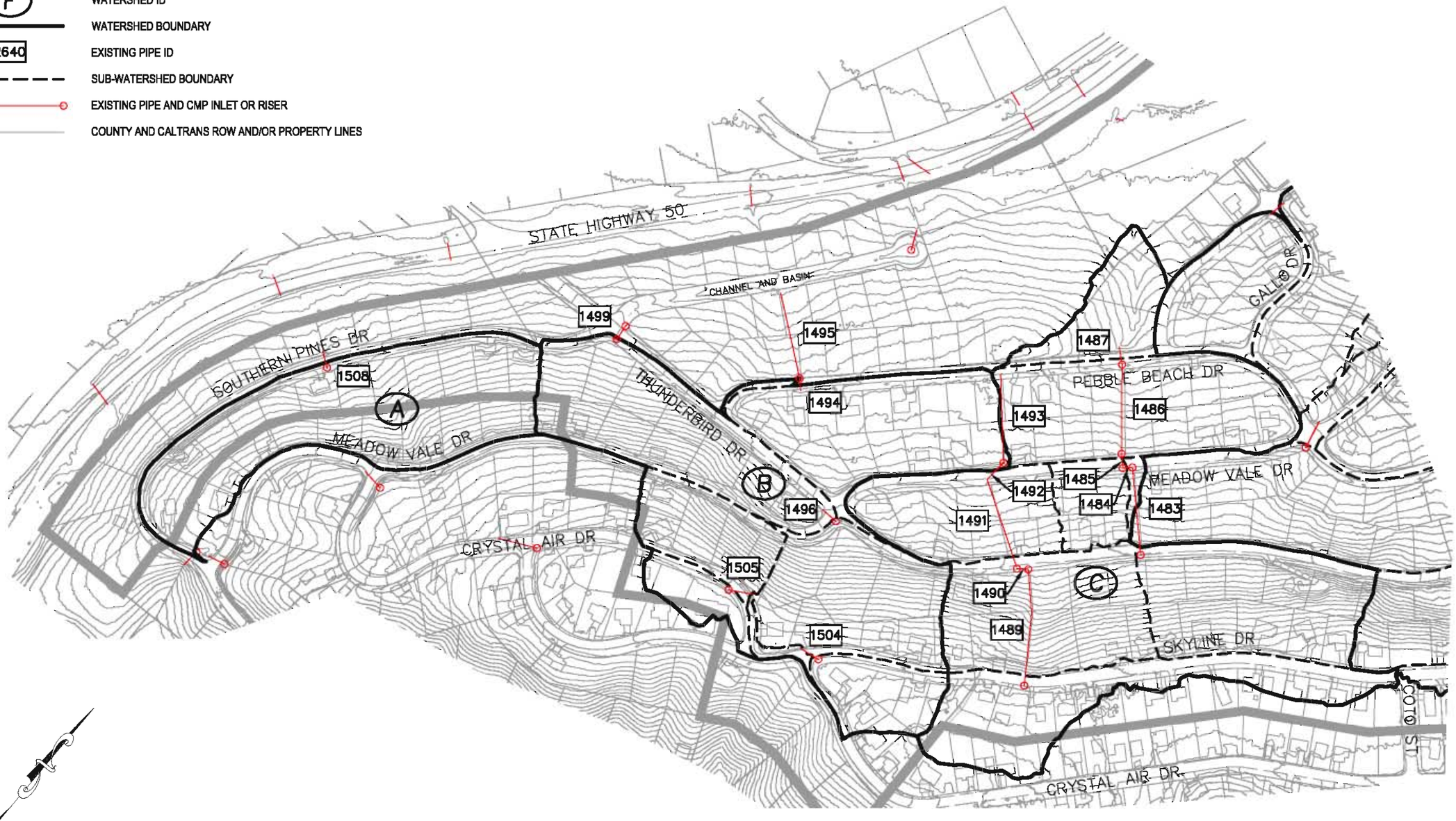
Appendix B

HYDROLOGY AND HYDRAULICS

HYDRAULIC RESULTS
(Existing Conditions)

LEGEND

- PROJECT AREA
- (F) WATERSHED ID
- WATERSHED BOUNDARY
- 2640 EXISTING PIPE ID
- SUB-WATERSHED BOUNDARY
- EXISTING PIPE AND CMP INLET OR RISER
- COUNTY AND CALTRANS ROW AND/OR PROPERTY LINES



0 150' 300'
SCALE

NOTE: ONLY THOSE PIPES THAT ARE INCLUDED IN THE CALCULATIONS ARE REFERENCED

COUNTY OF EL DORADO
COMMUNITY DEVELOPMENT AGENCY
TRANSPORTATION DIVISION

COUNTRY CLUB HEIGHTS EROSION CONTROL PROJECT

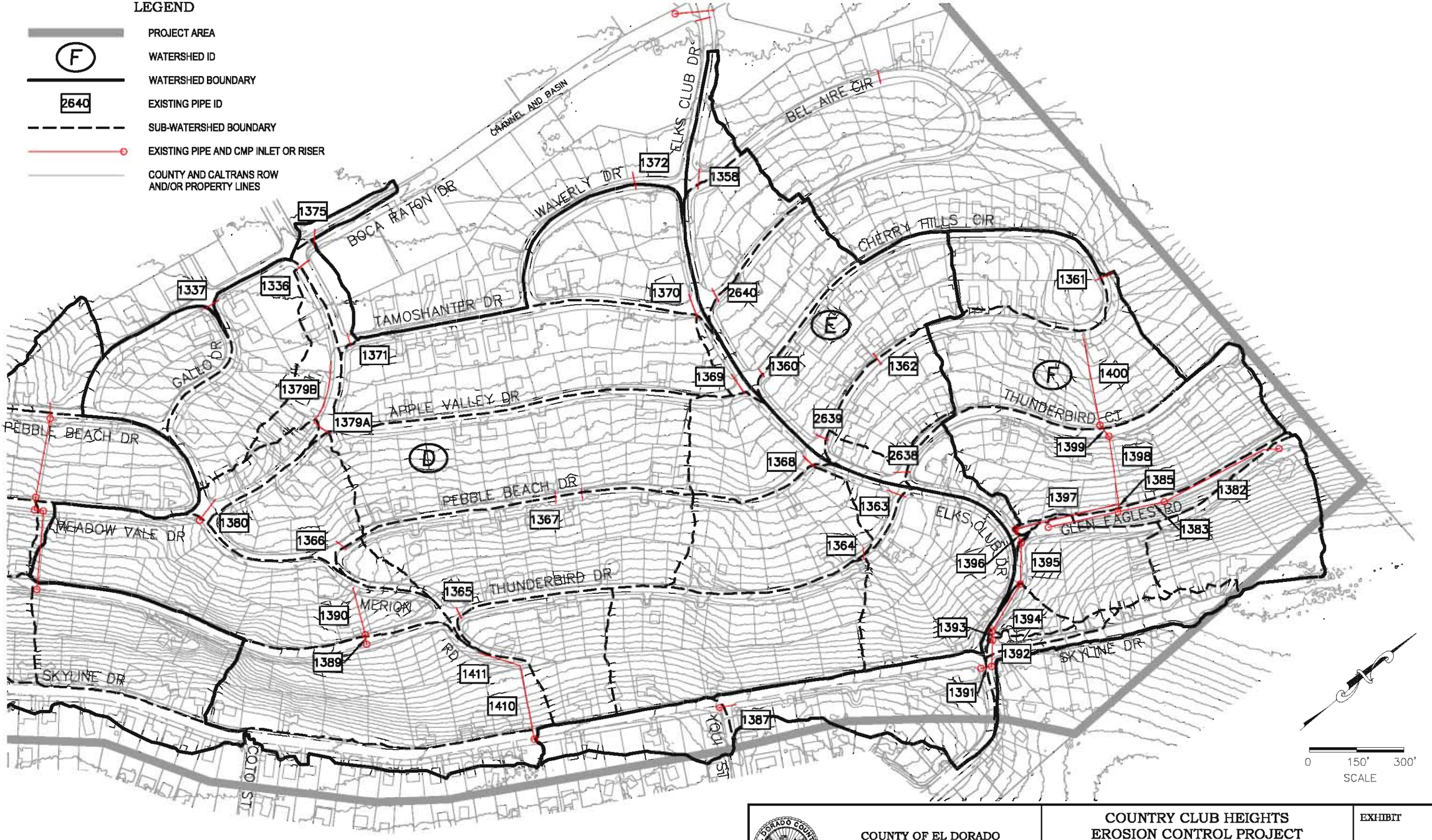
PIPE LOCATION MAP

DATE: 10/2016 | PROJECT NO.: 95191 | BY: ALD

EXHIBIT 1a

LEGEND

- PROJECT AREA
- F — WATERSHED ID
- WATERSHED BOUNDARY
- 2640 — EXISTING PIPE ID
- SUB-WATERSHED BOUNDARY
- EXISTING PIPE AND CMP INLET OR RISER
- COUNTY AND CALTRANS ROW AND/OR PROPERTY LINES



0 150' 300'
SCALE

NOTE: ONLY THOSE PIPES THAT ARE INCLUDED IN THE CALCULATIONS ARE REFERENCED

COUNTY OF EL DORADO
COMMUNITY DEVELOPMENT AGENCY
TRANSPORTATION DIVISION

COUNTRY CLUB HEIGHTS EROSION CONTROL PROJECT

PIPE LOCATION MAP

DATE:	PROJECT NO.:	BY:
10/2016	95191	ALD

EXHIBIT 1b

EWS CCH RAT WS A-C.xls
Pipe Calculations

WS A

Pipe ID	Size & Material	Dia	n	Slope*100	s	A	R	Q	Qpeak (25yr1Hr)	% of Capacity
Pipe 1508	18" CMP	1.50	0.024	2.29%	0.0229	1.767146	0.375	8.6	3.2	37%

WS B

Pipe ID	Size & Material	Dia	n	Slope*100	s	A	R	Q	Qpeak (25yr1Hr)	% of Capacity
Pipe 1504	18" CMP	1.50	0.024	1.29%	0.0129	1.767146	0.375	6.5	0.5	8%
Pipe 1505	18" CMP	1.50	0.024	1.34%	0.0134	1.767146	0.375	6.6	0.5	8%
Pipe 1496	18" CMP	1.50	0.024	0.20%	0.0020	1.767146	0.375	2.6	2.4	92%
Pipe 1499	21" CMP	1.75	0.024	3.00%	0.0300	2.405282	0.4375	14.9	3.4	23%
Pipe 1494	18" CMP	1.50	0.024	3.44%	0.0344	1.767146	0.375	10.6	1.8	17%
Pipe 1495	18" CMP	1.50	0.024	13.15%	0.1315	1.767146	0.375	20.7	1.5	7%

WS C

Pipe ID	Size & Material	Dia	n	Slope*100	s	A	R	Q	Qpeak (25yr1Hr)	% of Capacity
Pipe 1489/1490	18" CMP	1.50	0.024	25.45%	0.2545	1.767146	0.375	28.8	2.0	7%
Pipe 1491	18" CMP	1.50	0.024	14.92%	0.1492	1.767146	0.375	22.0	1.9	9%
Pipe 1492/1493	18" CMP	1.50	0.024	6.61%	0.0661	1.767146	0.375	14.7	2.4	16%
Pipe1483	18" CMP	1.50	0.024	17.46%	0.1746	1.767146	0.375	23.8	1.1	5%
Pipe1484	18" CMP	1.50	0.024	2.00%	0.0200	1.767146	0.375	8.1	1.1	14%
Pipe 1485/1486	18" CMP	1.50	0.024	15.41%	0.1541	1.767146	0.375	22.4	1.4	6%
Pipe 1487	18" CMP	1.50	0.024	2.08%	0.0208	1.767146	0.375	8.2	5.3	64%

EWS CCH RAT WS D.xls
Pipe Calculations

Pipe ID	Size & Material	Dia	n	Slope*100	s	A	R	Q	Qpeak (25yr1Hr)	% of Capacity
Pipe 1337	18" CMP	1.50	0.024	3.15%	0.0315	1.767146	0.375	10.1	1.6	15%
Pipe 1410/1411	18" CMP	1.50	0.024	17.67%	0.1767	1.767146	0.375	24.0	1.3	5%
Pipe 1389/1390	18" CMP	1.50	0.024	14.59%	0.1459	1.767146	0.375	21.8	2.0	9%
Pipe 1380	15" CMP	1.25	0.024	3.48%	0.0348	1.227185	0.3125	6.5	3.0	46%
Pipe 1366	18" CMP	1.50	0.024	1.47%	0.0147	1.767146	0.375	6.9	0.3	4%
Pipe 1365	12" CMP	1.00	0.024	5.08%	0.0508	0.785398	0.25	4.4	0.5	12%
Pipe 1367	18" CMP	1.50	0.024	1.50%	0.0150	1.767146	0.375	7.0	1.8	25%
Pipe 1379A	18" CMP	1.50	0.024	5.17%	0.0517	1.767146	0.375	13.0	3.4	26%
Pipe 1379B	18" CMP	1.50	0.024	8.00%	0.0800	1.767146	0.375	16.1	6.1	38%
Pipe 1376	18" CMP	1.50	0.024	0.15%	0.0015	1.767146	0.375	2.2	7.5	337%
Pipe 1371	18" CMP	1.50	0.024	4.00%	0.0400	1.767146	0.375	11.4	2.3	20%
Pipe 1375	15"x21" ACMP	1.50	0.024	0.45%	0.0045	1.767146	0.375	3.8	9.0	234%
Pipe 1364	12" CMP	1.00	0.024	4.09%	0.0409	0.785398	0.25	3.9	0.9	23%
Pipe 1363	18" CMP	1.50	0.024	5.80%	0.0580	1.767146	0.375	13.7	0.8	6%
Pipe 1368	12" CMP	1.00	0.024	6.06%	0.0606	0.785398	0.25	4.8	2.4	50%
Pipe 1369	18" CMP	1.50	0.024	6.87%	0.0687	1.767146	0.375	15.0	2.8	19%
Pipe 1370	13"x17" ACMP	1.25	0.024	5.20%	0.0520	1.227185	0.3125	8.0	2.9	36%
Pipe 1372	24" CMP	2.00	0.024	3.79%	0.0379	3.141593	0.5	23.9	3.5	15%

EWS CCH RAT WS E-F.xls
Pipe Calculations

WS E

Pipe ID	Size & Material	Dia	n	Slope*100	s	A	R	Q	Qpeak (25yr1Hr)	% of Capacity
Pipe 2638	18" CMP	1.50	0.024	2.77%	0.0277	1.767146	0.375	9.5	0.7	8%
Pipe 2639	18" HDPE	1.50	0.012	2.85%	0.0285	1.767146	0.375	19.2	1.2	6%
Pipe 1362	15" CMP	1.25	0.024	1.67%	0.0167	1.227185	0.3125	4.5	0.4	10%
Pipe 1360	21" HDPE	1.75	0.012	4.15%	0.0415	2.405282	0.4375	35.1	1.8	5%
Pipe 2640	12" CMP	1.00	0.024	4.09%	0.0409	0.785398	0.25	3.9	2.5	63%
Pipe 1358	24" CMP	2.00	0.024	1.97%	0.0197	3.141593	0.5	17.2	2.8	16%

WS F

Pipe ID	Size & Material	Dia	n	Slope*100	s	A	R	Q	Qpeak (25yr1Hr)	% of Capacity
Pipe 1387	18" CMP	1.50	0.024	0.02%	0.0002	1.767146	0.375	0.8	0.6	80%
Pipe 1391	21" CMP	1.75	0.024	2.19%	0.0219	2.405282	0.4375	12.7	1.6	13%
Pipe 1392	21" CMP	1.75	0.024	2.93%	0.0293	2.405282	0.4375	14.7	1.8	12%
Pipe 1393	21" CMP	1.75	0.024	11.03%	0.1103	2.405282	0.4375	28.6	1.9	7%
Pipe 1394	21" CMP	1.75	0.024	8.73%	0.0873	2.405282	0.4375	25.4	1.9	7%
Pipe 1395	21" CMP	1.75	0.024	9.04%	0.0904	2.405282	0.4375	25.9	2.0	8%
Pipe 1396	24" CMP	2.00	0.024	7.16%	0.0716	3.141593	0.5	32.9	2.5	8%
Pipe 1397	24" CMP	2.00	0.024	0.33%	0.0033	3.141593	0.5	7.1	2.5	35%
Pipe 1382	18" CMP	1.50	0.024	1.07%	0.0107	1.767146	0.375	5.9	0.7	12%
Pipe 1383	21" CMP	1.75	0.024	1.31%	0.0131	2.405282	0.4375	9.8	0.9	10%
Pipe 1385/1398	24" CMP	2.00	0.024	21.43%	0.2143	3.141593	0.5	56.9	3.2	6%
Pipe 1399/1400	30" CMP	2.50	0.024	10.63%	0.1063	4.908739	0.625	72.6	4.4	6%
Pipe 1361	12" CMP	1.00	0.024	6.18%	0.0618	0.785398	0.25	4.8	0.5	11%

Appendix C

BMP TOOLBOX

Description:

A rock-lined channel is a shallow, rock-lined depression in the earth's surface to convey runoff, stabilize the soil and slow water velocities. The rock-lined channel also allows for the infiltration of runoff as flow is conveyed by the channel.

Issues and Concerns:

Maintenance:

- Periodic inspection for side slope stability, debris and sediment accumulation.

Advantages:

- Slows velocities, minimizing erosion, stabilize soils and reduce sediment entering runoff.
- Allows for infiltration of runoff and precipitation.

Disadvantages:

- Not suitable as a primary sediment trapping device since collection of trapped debris may be difficult.

Field Photo:

Goals		Objectives
1.	Reduce the amount of coarse, fine and very fine sediment from runoff by 33% or to the Maximum Extent Practicable.	Stabilize eroding channels/ditches in order to reduce the coarse, fine and very fine sediment in runoff.
2.	Reduce the storm water runoff volume from the 25-year, 1-hour event by 33% or to the Maximum Extent Practicable.	Infiltrate a portion of the 25-year, 1-hour storm water volume.
3.	Reduce the peak flow from the 25-year, 1-hour event by 33% or to the Maximum Extent Practicable.	Reduce the peak discharge of the 25-year, 1-hour storm by infiltrating a portion of the runoff volume.

Key Design Considerations:

1. Designer should take into account runoff volume and flow velocities.
2. Rock-lined channels should not to be used over clayey soils without a filter fabric beneath rock.
3. Designer should utilize the Manning's Equation to design channel dimensions.
4. Consider site conditions when establishing freeboard for design flow rates.
5. Use angular rock rather than rounded or subrounded rock.

CADD Detail:

(over)

Cost Analysis (Based on 2010-2015 proposed bid costs and 22 inches/year mean annual rainfall):

Estimated Design Life: 30 years

ROM Construction Cost: $88/LF

Cost to Provide Source Control: $0.98/ft^2

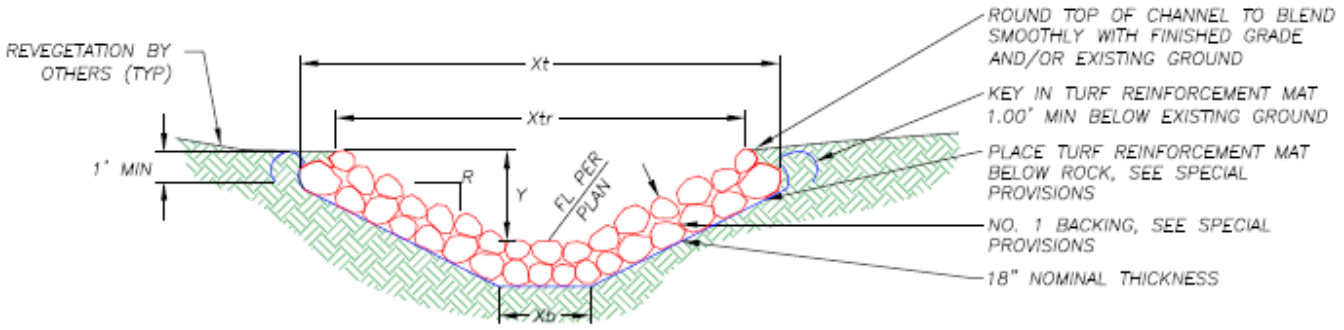
Cost to Reduce Runoff Volume: $0.04/ft^3

Cost to Reduce Runoff Peak: $128.00/cfs

Cost to Reduce Sediment: $3.80/lb

ROCK-LINED CHANNEL

CATEGORY: SC, HD, T



STREET AND STATION	WIDTH, Xt (EXCAVATION)	WIDTH, Xtr (ROCK)	WIDTH, Xb (EXCAVATION)	DEPTH, Y	SLOPE RATIO, R
EXAMPLE 20+68.30 TO 21+52.72	8.65'	6.65'	2.25'	1.5'	3:1

NOTES:

1. "Y" DEPICTS MIN REQ'D DEPTH OF CHANNEL. FINISHED TOP WIDTH AND SIDE SLOPE HEIGHT MAY VARY DEPENDING ON EXISTING TERRAIN.
2. SEE SPECIAL PROVISIONS FOR SUBGRADE COMPACTION REQUIREMENTS.

Description:

A rock dissipator is a rock-lined apron at the inlet and outlet of a pipe or at a location where dissipation of runoff velocity is necessary. The rock dissipator also allows for the infiltration of runoff.

Issues and Concerns:

Maintenance:

- Periodic inspection for stability, debris, and sediment accumulation

Advantages:

- Slows velocities, minimizing erosion, stabilize soils and reduce sediment entering runoff.
- Allows for infiltration of runoff and precipitation.

Disadvantages:

- Not suitable as a primary sediment trapping device since collection of trapped debris may be difficult.

Field Photo:

Goals		Objectives
1.	Reduce the amount of coarse, fine and very fine sediment from runoff by 33% or to the Maximum Extent Practicable.	Stabilize eroding channels/ditches in order to reduce the coarse, fine and very fine sediment in runoff.
2.	Reduce the storm water runoff volume from the 25-year, 1-hour event by 33% or to the Maximum Extent Practicable.	Infiltrate a portion of the 25-year, 1-hour storm water volume.
3.	Reduce the peak flow from the 25-year, 1-hour event by 33% or to the Maximum Extent Practicable.	Reduce the peak discharge of the 25-year, 1-hour storm by infiltrating a portion of the runoff volume.

Key Design Considerations:

1. Designer should take into account runoff volume and flow velocities.
2. Rock dissipators should not to be used over clayey soils without a filter fabric beneath rock.
3. Consider site conditions when establishing side slopes.
4. Use angular rock rather than round rock.

CADD Detail:

N/A

Cost Analysis (Based on 2010-2015 proposed bid costs and 22 inches/year mean annual rainfall):

Estimated Design Life: 30 years

ROM Construction Cost: $22/SF

Cost to Provide Source Control: $0.73/ft^2

Cost to Reduce Runoff Volume: $0.03/ft^3

Cost to Reduce Runoff Peak: $96.00/cfs

Cost to Reduce Sediment: $2.85/lb

SEED AND BLANKET CHANNEL

CATEGORY: SC, HD, T

Description:

A seed and blanket channel is identical to a grass-lined swale in that once the vegetation is established and the biodegradable blanket is gone, the channel is a shallow, vegetation-lined depression in the earth's surface to convey runoff and stabilize the soil. The seed and blanket channel also allows for the infiltration of runoff as flow is being conveyed.

Issues and Concerns:

Maintenance:

- Periodic inspection for side slope stability, debris and sediment accumulation.
- Periodic mowing.

Advantages:

- Minimize erosion, stabilize soils, and reduce sediment entering runoff.
- Allows for infiltration of runoff and precipitation.

Disadvantages:

- Not suitable for dry locations.
- Not suitable for high velocities.

Field Photo:

Goals		Objectives
1.	Reduce the amount of coarse, fine and very fine sediment from runoff by 33% or to the Maximum Extent Practicable.	Stabilize eroding channels/ditches in order to reduce the coarse, fine and very fine sediment in runoff.
2.	Reduce the storm water runoff volume from the 25-year, 1-hour event by 33% or to the Maximum Extent Practicable.	Infiltrate a portion of the 25-year 1-hour storm water volume.
3.	Reduce the peak flow from the 25-year, 1-hour event by 33% or to the Maximum Extent Practicable.	Reduce the peak discharge of the 25-year 1-hour storm by infiltrating a portion of the runoff volume.

Key Design Considerations:

1. Designer should take into account runoff volume and flow velocities.
2. Designer should utilize the Manning's Equation to design channel dimensions.
3. Consider site conditions when establishing freeboard for design flow rates.

CADD Detail:

(over)

Cost Analysis (Based on 2010-2015 proposed bid costs and 22 inches/year mean annual rainfall):

Estimated Design Life: 30 years

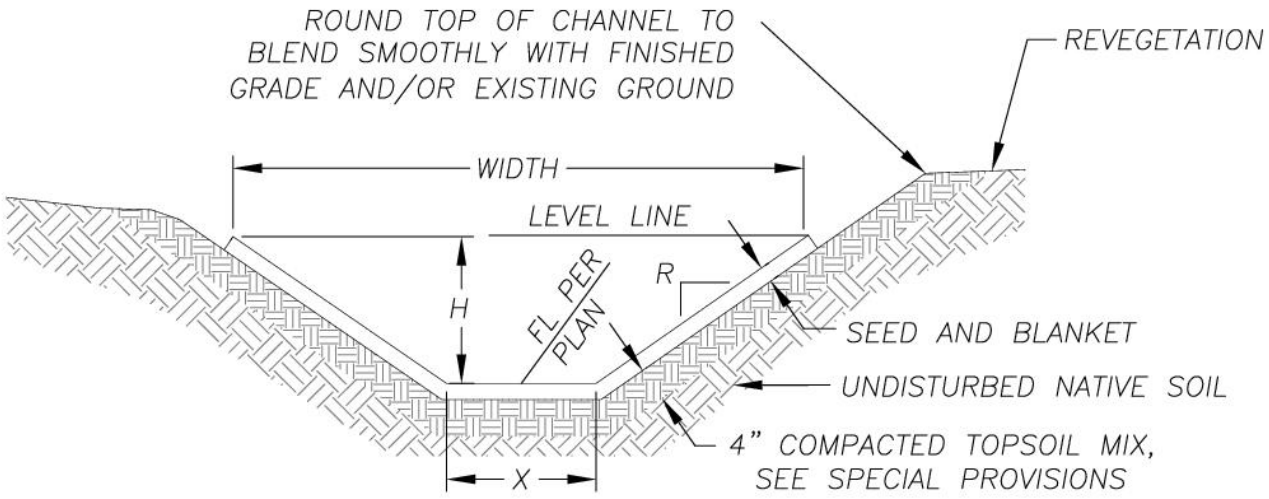
ROM Construction Cost: $51/LF

Cost to Provide Source Control: $0.57/ft^2

Cost to Reduce Runoff Volume: $0.02/ft^3

Cost to Reduce Runoff Peak: $74.18/cfs

Cost to Reduce Sediment: $2.20/lb


ROUND TOP OF CHANNEL TO BLEND SMOOTHLY WITH FINISHED GRADE AND/OR EXISTING GROUND
REVEGETATION
WIDTH
LEVEL LINE
H
FL PER PLAN
R
SEED AND BLANKET
UNDISTURBED NATIVE SOIL
4" COMPACTED TOPSOIL MIX, SEE SPECIAL PROVISIONS
X

Description:

Aggregate base is typically used along the edges of the road in order to stabilize shoulders and allow infiltration of runoff originating from the impervious road surface including snowmelt. The aggregate base provides a stable surface for the capture of sediment and road cinders. It can be used as a driving surface on non-county standard access roads that have infrequent traffic and minimal snow removal requirements.

Issues and Concerns:

Maintenance:

- Periodic inspection of condition of aggregate along the road.
- Routine sweeping to remove dislodged aggregate from the paved travel way and road cinder accumulation.
- Occasional regrading and recompaction of aggregate base may seasonally be necessary depending on snow removal activities and frost heave.

Advantages:

- Aggregate base allows infiltration directly adjacent to the road surface near the source of runoff and sediment from the impervious surface.
- Relatively low capital construction cost compared to curb and gutter.
- Stabilizes sediment along the road shoulders and reduces roadside erosion.
- Reduces the concentration of runoff from the impervious road surface.
- Does not increase the urbanization appearance of the road corridor.

Disadvantages:

- Does not provide a guide for snow removal activities (however this can be mitigated with snow stakes).
- Over the design life the voids between the aggregate could fill with sediment.
- Difficult to recover trapped sediment.

Goals		Objectives
1.	Reduce the amount of coarse, fine and very fine sediment from runoff by 33% or to the Maximum Extent Practicable.	Stabilize eroding channels/ditches in order to reduce the coarse, fine and very fine sediment in runoff.
2.	Reduce the storm water runoff volume from the 25-year, 1-hour event by 33% or to the Maximum Extent Practicable.	Infiltrate a portion of the 25-year, 1-hour storm water volume.
3.	Reduce the peak flow from the 25-year, 1-hour event by 33% or to the Maximum Extent Practicable.	Reduce the peak discharge of the 25-year, 1-hour storm by infiltrating a portion of the runoff volume.

Cost Analysis (Based on 2010-2015 proposed bid costs and 22 inches/year mean annual rainfall):

Estimated Design Life: 15 years

ROM Construction Cost: $5/SF

Cost to Provide Source Control: $0.33/ft^2

Cost to Reduce Runoff Volume: $0.01/ft^3

Cost to Reduce Runoff Peak: $43.64/cfs

Cost to Reduce Sediment: $1.29/lb

Field Photo:

None Available

Key Design Considerations:

1. Designer should take into account slope and super-elevation of the road and shoulder, runoff volume, and flow velocities.
2. The infiltration and treatment capacity of the aggregate base is dependent on the soil type, seasonal high groundwater table, slope of the road, and dimensions and slope of the road and shoulder.
3. Construction of the aggregate base should begin with the over-excavation of in situ soil adjacent to the road surface and replaced with 1" washed poorly graded angular gravel.

Detail:

None Available

Description:

Revegetation is the establishment of vegetation, both native and adapted, to control erosion with and without structural solutions. Vegetation is a natural soil stabilization technique and can be established in combination with other source controls such as mulches.

Issues and Concerns:

Maintenance:

- May require periodic re-treatment with seed, amendments, and/or mulch.

Advantages:

- Inexpensive
- Aesthetic
- Low maintenance
- Natural
- Self-sustaining

Disadvantages:

- May not be viable for all sites.
- May require some engineering solutions (toe protection, retaining walls) to reduce slope grade.
- Most effective on slopes with ratios of 3:1 and less.
- Does not resist snow removal activities.

Goals		Objectives
1.	Reduce the amount of coarse, fine and very fine sediment from runoff by 33% or to the Maximum Extent Practicable.	Stabilize eroding slopes in order to reduce the coarse, fine and very fine sediment in runoff.

Cost Analysis (Based on 2010-2015 proposed bid costs and 22 inches/year mean annual rainfall):

Estimated Design Life: 30 years

ROM Construction Cost: $3/ft^2

Cost to Provide Source Control: $0.10/ft^2

Cost to Reduce Runoff Volume: NA

Cost to Reduce Runoff Peak: NA

Cost to Reduce Sediment: NA

Field Photo:

Description:

Rock slope protection is the installation of rock over an eroding slope or bare soil in order to stabilize and protect the site from further erosion. Rock slope protection can be placed directly onto the bare soil or a soil separation filter fabric can be placed beneath the rock.

Issues and Concerns:

Maintenance:

- Periodic inspection for slope stability, debris and sediment accumulation.

Advantages:

- Stabilizes soil, minimizes erosion and sediment mobilization.
- Allows for infiltration of precipitation and runoff.

Disadvantages:

- More expensive than revegetation.
- In some situations rock slope protection is visually unappealing.

Field Photo:

Goals		Objectives
1.	Reduce the amount of coarse, fine and very fine sediment from runoff by 33% or to the Maximum Extent Practicable.	Stabilize eroding slopes in order to reduce the coarse, fine and very fine sediment in runoff.

Cost Analysis (Based on 2010-2015 proposed bid costs and 22 inches/year mean annual rainfall):

Estimated Design Life: 30 years

ROM Construction Cost: $17/ft^2

Cost to Provide Source Control: $0.57/ft^2

Cost to Reduce Runoff Volume: NA

Cost to Reduce Runoff Peak: NA

Cost to Reduce Sediment: NA

Key Design Considerations:

1. Slope stability should be a consideration in the evaluation of placement of rock slope protection.
2. Rock slope protection should not to be used over silt or clay unless suitable soil separation fabric is installed.
3. Use angular rock to improve interlocking characteristics to improve stability.

Description:

Sediment basins are impoundments that collect storm water runoff. The basin captures and detains the first flush of each storm and once the basin is at capacity the additional flow is bypassed. The basin removes floatable debris, coarse, fine, and very fine suspended solids when operating in a first flush configuration. Pollutant removal is achieved primarily through settling of sediments and particulate forms of pollutants. If sufficient separation between the bottom of the basin and the groundwater table is available, there is also some reduction in nutrients as the storm water infiltrates into the ground.

Issues and Concerns:

Maintenance:

- Regular inspections for standing water, side slope stability, debris and sediment accumulation, and vegetation height and vegetative cover.

Advantages:

- Basins have good constituent removal for suspended solids, and total metals particularly when operated for a first flush treatment.
- Compared to other treatment BMPs, basins are relatively easy to operate and maintain.
- Infiltration enhances reduction of pollutant load.
- Relatively low cost of achieving project objectives.

Disadvantages:

- Can only be constructed in areas with sufficient hydraulic head and area.
- Should not be placed in areas where groundwater contamination is a concern.

Goals		Objectives
1.	Reduce the amount of coarse, fine and very fine sediment from runoff by 33% or to the Maximum Extent Practicable.	Provide regional treatment of coarse, fine and very fine sediment in runoff.
2.	Reduce the storm water runoff volume from the 25-year, 1-hour event by 33% or to the Maximum Extent Practicable.	Capture and store a portion of the 25-year 1-hour storm water volume.
3.	Reduce the peak flow from the 25-year, 1-hour event by 33% or to the Maximum Extent Practicable.	Reduce the peak discharge of the 25-year 1-hour storm by detaining and infiltrating a portion of the runoff volume.

Cost Analysis (Based on 2010-2015 proposed bid costs and 22 inches/year mean annual rainfall):

Estimated Design Life: 30 years

ROM Construction Cost: $42/ ft^2

Cost to Provide Source Control: NA

Cost to Reduce Runoff Volume: $0.02/ft^3

Cost to Reduce Runoff Peak: $83.27/cfs

Cost to Reduce Sediment: $2.09/lb

Field Photo:

Key Design Considerations:

1. Locate, size, and shape basins relative to topography to maximize use of available space and enhance appearance.
2. Regardless of basin size or flow criteria, the basin should be designed to capture and treat the first flush of a storm event and bypass the remaining flow once the system has reached capacity.
3. Basin should percolate stormwater within 72 hours.
4. Space requirements are relatively high for basins.
5. Should not be sited where there may be insufficient hydraulic head to facilitate complete drainage, or in areas, where groundwater contamination is a concern.

CADD Detail:

Description:

CSP Inlets are depressions in the ground that temporarily detain runoff allowing sediment and other debris to settle out of suspension from runoff. Infiltration is achieved through an open area in the foundation.

Issues and Concerns:

Maintenance:

- Annual inspection of structure's integrity and condition of channel.
- Annual vactoring necessary to remove sediment accumulation.

Advantages:

- CSP inlets require less area compared to other treatment BMP's.
- Requires little or no hydraulic head to operate.
- Ease of construction.

Disadvantages:

- Minimal volume, peak or pollutant load reduction.
- Vector control issues may persist if water remains inside.
- Re-suspended sediment under heavy flows if not installed for first flush treatment.
- Primarily treats coarse sediment when not operated in a first flush configuration.
- Potential traps for small animals.
- Can be considered unattractive.

	Goals	Objectives
1.	Reduce the amount of coarse, fine and very fine sediment from runoff by 33% or to the Maximum Extent Practicable.	Provide regional treatment of coarse, fine and very fine sediment in runoff.
2.	Reduce the storm water runoff volume from the 25-year, 1-hour event by 33% or to the Maximum Extent Practicable.	Capture and store a portion of the 25-year, 1-hour storm water volume.
3.	Reduce the peak flow from the 25-year, 1-hour event by 33% or to the Maximum Extent Practicable.	Reduce the peak discharge of the 25-year, 1-hour storm by detaining and infiltrating a portion of the runoff volume.

Cost Analysis (Based on 2010-2015 proposed bid costs and 22 inches/year mean annual rainfall):

Estimated Design Life: 30 years

ROM Construction Cost: $4,500/EA

Cost to Provide Source Control: NA

Cost to Reduce Runoff Volume: $0.23/ft^3

Cost to Reduce Runoff Peak: $2,779/cfs

Cost to Reduce Sediment: $24.25/lb

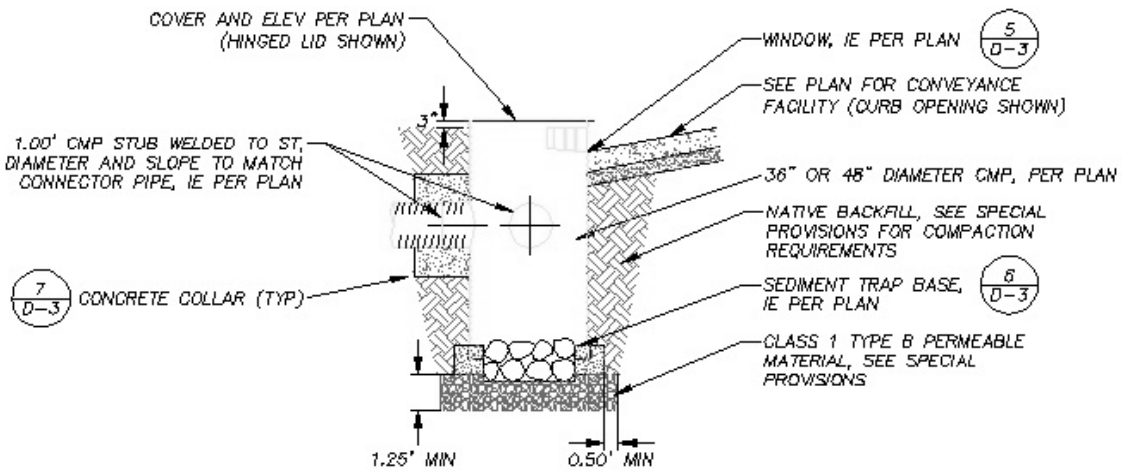
Field Photo:

Key Design Considerations:

1. Designer should take into account runoff volume and consider trapping capabilities, i.e. install in series, add baffles, or install for first flush treatment.
2. Soil type, soil conditions, groundwater depth, existing utilities, and excavation limitations need to be investigated prior to designing the CSP inlet.
3. Designer should consider the various alternatives for cover types, e.g., hinged lid, grate, trash rack, and window opening to allow for efficient and safe removal of sediment from the CSP inlet.

CADD Detail:

(over)



NOTE: SEE SPECIAL PROVISIONS FOR SUBGRADE COMPACTION REQUIREMENTS.

Appendix D

ALTERNATIVE ROM CONSTRUCTION COST ESTIMATES

COUNTRY CLUB HEIGHTS ECP
PRELIMINARY CONSTRUCTION COST ESTIMATE
ALTERNATE 1

ITEM NO.	ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT OF MEASURE	UNIT PRICE (in Figures)	ITEM TOTAL (in Figures)
1	Mobilization	1	LS	$ 45,000	$ 45,000.00
2	Traffic Control	1	LS	$ 20,000	$ 20,000.00
3	Sweeping	35	DAY	$ 500	$ 17,500.00
4	Trench and Excavation Safety	1	LS	$ 7,000	$ 7,000.00
5	Install & Maintain Temporary BMPs	1	LS	$ 20,000	$ 20,000.00
6	Remove and Dispose of CMP Inlets	9	EA	$ 1,100	$ 9,900.00
7	Remove and Dispose of CMP	400	LF	$ 45	$ 18,000.00
8	CMP Inlet	23	EA	$ 4,500	$ 103,500.00
9	18" HDPE Pipe	460	LF	$ 110	$ 50,600.00
10	Sediment Basin	1	EA	$ 17,000	$ 17,000.00
11	AC Swale R&R	1,270	LF	$ 87	$ 110,490.00
12	AC Pavement R&R	700	SF	$ 12	$ 8,400.00
13	Rock-Lined Channel	670	LF	$ 88	$ 58,960.00
14	Seed and Blanket Channel	1,650	LF	$ 51	$ 84,150.00
15	Gunite Slope Protection R&R	1	EA	$ 80,000	$ 80,000.00
16	Rock Slope Protection	18,600	SF	$ 17	$ 316,200.00
17	Rock Bowl/Dissipator	400	SF	$ 13	$ 5,200.00
18	AB Shoulder Stabilization	2,410	SF	$ 5	$ 12,050.00
19	Misc Grading	5	CY	$ 88	$ 440.00
20	Revegetation (Basin)	1	EA	$ 3,000	$ 3,000.00
21	Revegetation (General)	6,000	SF	$ 3	$ 18,000.00
22	CCCs	1	LS	$ 6,000	$ 6,000.00
23	Project Sign	1	EA	$ 2,000	$ 2,000.00
			TOTAL	**$**	**1,013,390.00**
			20% CONTINGENCY	**$**	**202,680.00**
			GRAND TOTAL	**$**	**1,216,070.00**

COUNTRY CLUB HEIGHTS ECP
PRELIMINARY CONSTRUCTION COST ESTIMATE
ALTERNATE 2

ITEM NO.	ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT OF MEASURE	UNIT PRICE (in Figures)	ITEM TOTAL (in Figures)
1	Mobilization	1	LS	$ 35,000	$ 35,000.00
2	Traffic Control	1	LS	$ 20,000	$ 20,000.00
3	Sweeping	25	DAY	$ 500	$ 12,500.00
4	Trench and Excavation Safety	1	LS	$ 7,000	$ 7,000.00
5	Install & Maintain Temporary BMPs	1	LS	$ 16,000	$ 16,000.00
6	Remove and Dispose of CMP Inlets		EA	$ 1,100	$ -
7	Remove and Dispose of CMP	245	LF	$ 45	$ 11,025.00
8	CMP Inlet	6	EA	$ 4,500	$ 27,000.00
9	18" HDPE Pipe	245	LF	$ 110	$ 26,950.00
10	Sediment Basin	1	EA	$ 17,000	$ 17,000.00
11	AC Swale R&R	145	LF	$ 87	$ 12,615.00
12	AC Pavement R&R	700	SF	$ 12	$ 8,400.00
13	Rock-Lined Channel		LF	$ 88	$ -
14	Seed and Blanket Channel	1,350	LF	$ 51	$ 68,850.00
15	Gunite Slope Protection R&R	1	EA	$ 80,000	$ 80,000.00
16	Rock Slope Protection	12,400	SF	$ 17	$ 210,800.00
17	Rock Bowl/Dissipator	350	SF	$ 13	$ 4,550.00
18	AB Shoulder Stabilization	710	SF	$ 5	$ 3,550.00
19	Misc Grading	5	CY	$ 88	$ 440.00
20	Revegetation (Basin)	1	EA	$ 3,000	$ 3,000.00
21	Revegetation (General)	4,000	SF	$ 3	$ 12,000.00
22	CCCs	1	LS	$ 4,200	$ 4,200.00
23	Project Sign	1	EA	$ 2,000	$ 2,000.00
			TOTAL	**$**	**582,880.00**
			20% CONTINGENCY	**$**	**116,580.00**
			GRAND TOTAL	**$**	**699,460.00**

Appendix E

CORRESPONDENCE

COMMUNITY DEVELOPMENT AGENCY
TRANSPORTATION DIVISION
http://www.edcgov.us/DOT/

PLACERVILLE OFFICES:
MAIN OFFICE:
2850 Fairlane Court, Placerville, CA 95667
(530) 621-5900 / (530) 626-0387 Fax

MAINTENANCE:
2441 Headington Road, Placerville, CA 95667
(530) 642-4909 / (530) 642-0508 Fax

LAKE TAHOE OFFICES:
ENGINEERING:
924 B Emerald Bay Road, South Lake Tahoe, CA 96150
(530) 573-7900 / (530) 541-7049 Fax

MAINTENANCE:
1121 Shakori Drive, South Lake Tahoe, CA 96150
(530) 573-3180 / (530) 577-8402 Fax

October 25, 2016

To Whom It May Concern:

The Tahoe Engineering Unit of the County of El Dorado Community Development Agency, Transportation Division invites you to attend a public meeting for the Evaluating Alternatives Phase of the Country Club Heights Erosion Control Project (Project). The Tahoe Engineering Unit has gathered and analyzed existing conditions information and developed and compared alternatives for the Project. The results of this study have been combined into a Draft Feasibility Report. The purpose of this meeting is to present this information for public comment. Following this meeting, the analysis will be further refined.

COUNTRY CLUB HEIGHTS EROSION CONTROL PROJECT
PUBLIC MEETING

Transportation Division's Tahoe Engineering Office
924 B Emerald Bay Road
South Lake Tahoe, California

Thursday, November 10, 2016
5:00 p.m. to 7:00 p.m.

The public meeting will begin with a brief informational presentation followed by a question and answer period. Attendees will have an opportunity to share opinions and concerns regarding the Project (orally and/or in writing).

A map of the Project Area and comment form are enclosed. A copy of the draft report is available on the County project site at:

http://www.edcgov.us/DOT/TahoeEngineering/CCH_ECP.aspx

Please use the comment sheet provided and bring it to the meeting or submit it to the following address: County of El Dorado Community Development Agency, Transportation Division – Tahoe Engineering Unit, 924 B Emerald Bay Road, South Lake Tahoe, CA 96150, Attn: Daniel Kikkert, **no later than November 12, 2016**. For more information, you may contact Daniel Kikkert at (530) 573-7914 or via email at dan.kikkert@edcgov.us.

Sincerely,

Daniel Kikkert, P.E.
Senior Civil Engineer

COMMUNITY DEVELOPMENT AGENCY

TRANSPORTATION DIVISION

http://www.edcgov.us/DOT/

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COUNTRY CLUB HEIGHTS EROSION CONTROL PROJECT

PUBLIC COMMENT SHEET

The County of El Dorado, Transportation Division - Tahoe Engineering Unit is currently in the planning process related to the development of water quality/erosion control improvements in the Country Club Heights Erosion Control Project (Project). This Project is funded in part by the United States Forest Service and the Tahoe Regional Planning Agency.

We invite you to participate in the planning process by providing feedback that will assist in the development of a preferred alternative for the Project. Please provide your comments or suggestions in the space provided below. **All public comments must be received by November 12, 2016 to be considered for this phase of the Project**. Thank you for your time in assisting our office with the planning of this important Project.

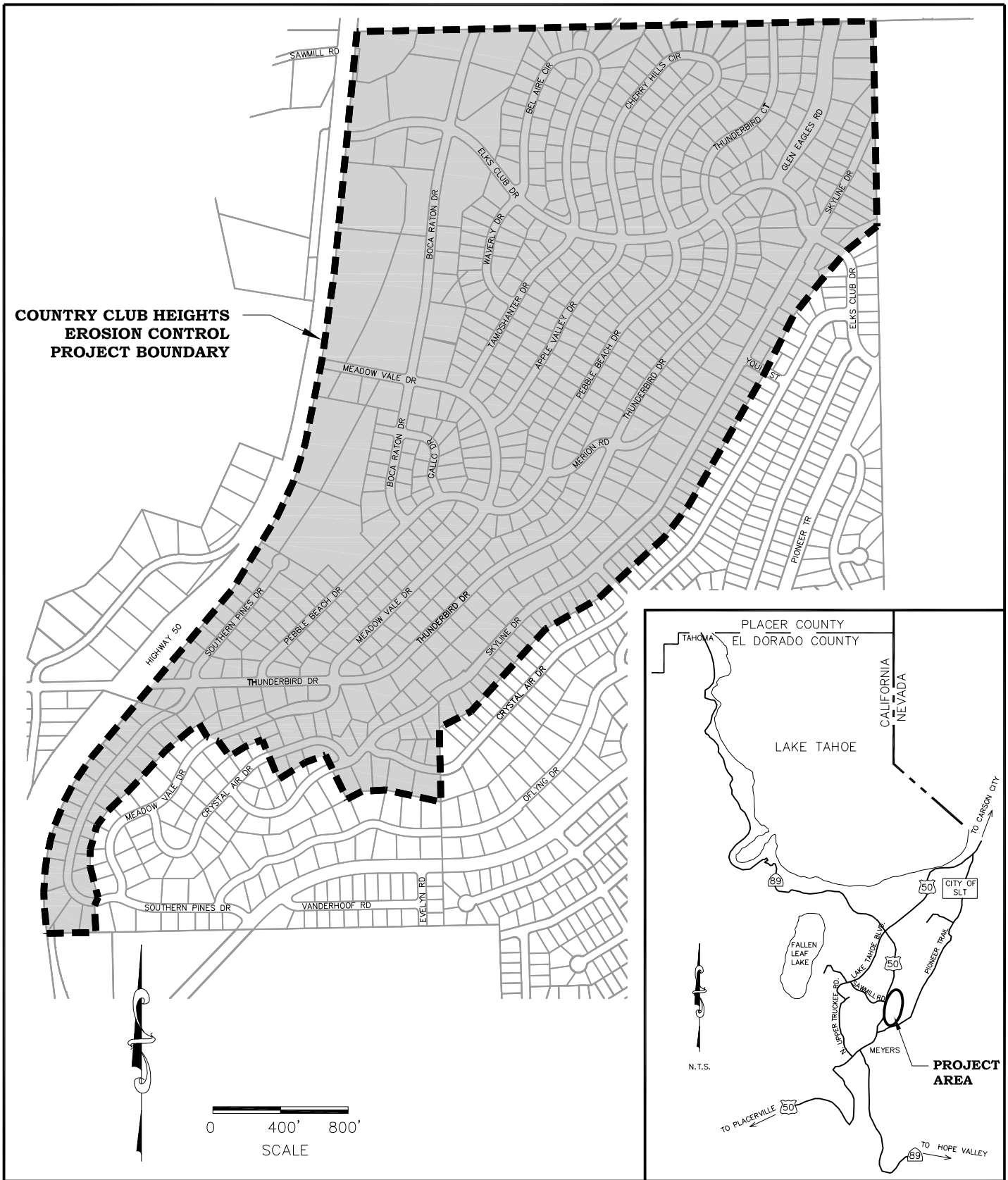
Name: _____

Tahoe Residence
Street Address: _____

Email Address: _____

Mailing Address: _____

Comments: _____



COUNTY OF EL DORADO
COMMUNITY DEVELOPMENT AGENCY
TRANSPORTATION DIVISION

COUNTRY CLUB HEIGHTS EROSION CONTROL PROJECT

LOCATION MAP

FIGURE 1

DATE:	PROJECT NO.:	BY:
10/2016	95191	ALD

Country Club Heights Erosion Control Project - Public Comments During Development of Feasibility Report			
#	**Date**	**Communication**	**Comment**
1	10/31/2016	Letter	Sent letter regarding ponding problem on Meadow Vale. Plugging of roadside ditch creates a ponding problem every winter. Also noted that the road conditions on Meadow Vale are "horrible". Person would rather see the roads repaired first.
2	11/2/2016	Letter	Sent letter regarding hillside runoff (from above house) affecting their house and garage. Also commented on the "rebar-reinforced" cement walls throughout neighborhood. Would like to see cement walls removed and replaced with something stronger and more attractive.
3	11/3/2016	Letter / Phone	Sent letter (and followed up with phone call) regarding the failing section of gunite on Meadow Vale Drive. Noted that "in paragraph 7.1 problem areas, the reference to figure 17 is noted. However in looking at the acturla figure the buckled gutine slope ... is not highlighted" (**Figure was checked and is noted to show problem area in questions ... near 1700 Meadow Vale). Noted "in pargraph 8.1 the alternatices propoes in-kind replacemt of gunite slope protection." Requests that County look into a more effectuve abd envuribnebtakkt fruedkt wat ti oritect slopes. Suggested (as a last resort) that this section of Meadow Vale be closed and the slope returned to it's orignal grade ... cul-de-sacs be created at either end of closed section.
4	11/4/2016	Letter	Sent letter concerned about the overall cost of the project. Requested information on the current unfunded amount for the project and how that cost will be covered. Unable to make the meeting and wanted to know how the results of this meeting would be communicated to impacted homeowners not able to attend the meeting.
5	10/31/2016	Phone	Called regarding problem in front of their home on Skyline Drive. Area in question is near 1668 Crystal Air Drive. Noticed that ponding occurs during storm events and the street is starting to crack. Also noticed settlement of their home … when water ponds in the roadway has seen air bubbles coming to the surface.
6	10/28/2016	Phone	Called in regards to the project. Had no issues to report, but wanted to know the background of the project. Also discussed County snow removal practices with respect to the use of salt and brine.
7	10/17/2016	Phone	Called in regards to issue at the intersection of Elks Club and Skyline. The roadside ditch on the southeast side ponds, creating an icing hazzard in the winter as ponding comes out into the roadway.
8	3/16/2016	Phone	Called our office regarding a potential problem of a plugged pipe near the intersection Apple Valley and Meadow Vale. Call was forwarded on to Maintenance.
9			
10			
11			
12			
13			
14			
15			
16			

South Tahoe Public Utility District

1275 Meadow Crest Drive • South Lake Tahoe • CA 96150-7401
Phone 530 544-6474 • Fax 530 541-0614 • www.stpud.us

October 27, 2016

County of El Dorado Community Development Agency, Transportation Division – Tahoe Engineering Unit
924 B Emerald Bay Road
South Lake Tahoe, CA 96150
Attn: Daniel Kikkert, P.E.

Re: Country Club Heights Erosion Control Project Feasibility Report comments

Dear Mr. Kikkert,

Thank you for providing the District with the Draft Feasibility Report for the Country Club Heights Erosion Control Project. The District has reviewed the information in the report and offers the following comments with respect to potential water and sewer crossings.

1. Figure 9 of the draft report contains the utility map of the project area. Based on a preliminary review, this map appears to adequately characterize the water and sewer lines of the area. There are a couple of minor discrepancies (i.e. utilities shown that do not exist), but none that appear to affect any of the proposed work.
2. The District has a 15-foot wide sewer easement containing a 6" sewer line that straddles the property line between 1555 and 1559 Cherry Hills Circle. The District's easement is 10 feet on the 1555 Cherry Hills Circle property and 5 feet on the 1559 Cherry Hills Circle. This location appears to be exactly where the County is proposing to place a rock bowl and channel. The County will need to obtain approval from the District for any improvements located within this easement.
3. Some of the project work appears to be in close proximity to the District's 30-inch ductile iron pipe export force main. This force main runs through the project area on Glen Eagles Rd., Elks Club Dr., Tamoshanter Dr., and Meadow Vale Dr. This force main is a critical component of the District's treated wastewater disposal. This force main runs from the District's Wastewater Treatment Plant on Meadow Crest Drive to the Luther Pass Pump Station at the base of Luther Pass. If the pipe was damaged in any way, it is conceivable that the entire contents of the pipes could be spilled. Any project that will cross these force mains must contain a contingency plan to handle a potential breech of the force mains. District records indicate the 24 inch force main is steel pipe, while the 30 inch force main is ductile iron pipe.
4. Please let the District know at your earliest convenience of any potholing needed of our utilities. For sewer service locations, dipping the manholes in lieu of potholing may be sufficient to determine the location and elevation of sewer piping.

If you have any questions or concerns, please don't hesitate to call me at (530) 543-6202 (office) or (530) 902-1344 (mobile).

Sincerely,

Stephen M. Caswell

Stephen Caswell, P.E.
Senior Engineer

COMMUNITY DEVELOPMENT AGENCY

TRANSPORTATION DIVISION

http://www.edcgov.us/DOT/

PLACERVILLE OFFICES:
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(530) 573-3180 / (530) 577-8402 Fax

November 8, 2016

Stephen Caswell, P.E.
South Tahoe Public Utility District
1275 Meadow Crest Drive
South Lake Tahoe, CA 96150-7401

Subject: Country Club Heights Erosion Control Project – Project Feasibility Report, Response to Comments

Dear Mr. Caswell,

Thank you for your response letter dated October 27, 2016, regarding the County of El Dorado (County), Community Development Agency - Transportation Division (CDA-TD) Country Club Heights Erosion Control Project (Project) – Project Feasibility Report (Report). We appreciate the South Tahoe Public Utility District (District) taking the time to review and provide comments on the document. Our responses to the comments submitted are as follows:

1. Figure 9 of the draft report contains the utility map of the project area. Based on a preliminary review, this map appears to adequately characterize the water and sewer lines of the area. There are a couple of minor discrepancies (i.e. utilities shown that do not exist), but none that appear to affect any of the proposed work.

Thank you for verification of the existing utility map. The County will provide a 65% plan set for review to ensure all identified sewer and water lines in areas of work are mapped correctly.

2. The District has a 15-foot wide sewer easement containing a 6" sewer line that straddles the property line between 1555 and 1559 Cherry Hills Circle. The District's easement is 10 feet on the 1555 Cherry Hills Circle property and 5 feet on the 1559 Cherry Hills Circle. This location appears to be exactly where the County is proposing to place a rock bowl and channel. The County will need to obtain approval from the District for any improvements located within this easement.

The County is re-evaluating this alternative based on the utility infrastructure and recently collected topographic data. If the County moves forward with this option, we will coordinate with the District on a preferred alignment.

3. Some of the project work appears to be in close proximity to the District's 30-inch ductile iron pipe export force main. This force main runs through the project area on Glen Eagles Rd., Elks Club Dr., Tamoshanter Dr., and Meadow Vale Dr. This force main is a critical component of the District's treated wastewater disposal. This force main runs from the District's Wastewater Treatment Plant on Meadow Crest Drive to the Luther Pass Pump Station at the base of Luther Pass. If the pipe was damaged in any way, it is conceivable that the entire contents of the pipes could be spilled. Any project that will cross these force mains must contain a contingency plan to handle a potential breech of the force mains. District records indicate the 24 inch force main is steel pipe, while the 30 inch force main is ductile iron pipe.

Based on the existing utility map, it appears the only work that will cross the 30 inch force main will be the removal and replacement of an existing culvert at Meadow Vale Drive, south of Boca Raton Drive. The County requests the District supply electronic drawings showing the vertical and horizontal location of the force main. The County will work with the District on an appropriate spill contingency plan for any potential construction impacts to the existing force line.

4. Please let the District know at your earliest convenience of any potholing needed of our utilities. For sewer service locations, dipping the manholes in lieu of potholing may be sufficient to determine the location and elevation of sewer piping.

The County appreciates the District providing this information. The County will submit the potholing request with the 65% plan set.

We thank you for your comments regarding the Country Club Heights Erosion Control Project. We will keep you informed of the progress of this Project as it moves forward through the Project Delivery Process.

Sincerely,

Daniel Kikkert, PE
Senior Civil Engineer

Cc: Amy Dillon, CDA-TD
John Kahling, CDA-TD