

crossroads ventures llc

**DRAFT
Environmental Impact Statement**

Appendix 9

**Construction Phase Stormwater Quantity Management
Plan**

WITH

**Attachment 1 August 2003 Construction Retention
Basin Dewatering Plan**

The Belleayre Resort at Catskill Park

STORMWATER MODEL
PHASE TWO CONSTRUCTION

For

BIG INDIAN RESORT
AND SPA
And
BIG INDIAN
COUNTRY CLUB

**CONSTRUCTION
STORMWATER CALCULATIONS
BIG INDIAN COUNTRY CLUB-PHASE 2**

These calculations address stormwater management associated with the Phase 2 construction of the Big Indian Country Club. This phase was selected as the portion of the project that represents a large construction phase with disturbance of approximately 85 acres. As a condition of a future permit, all other phases will be analyzed in a similar fashion in order to design all the temporary stormwater facilities.

Stormwater calculations were conducted using the method prescribed in the USDA Soil Conservation Technical Release No. 20. The program used is the HydroCAD Stormwater Modeling System (Revised June 6, 1998) produced by Applied Microcomputer Systems of Chocurua, New Hampshire.

The Design Storm utilized was the ten (10) year 24 hour Type II storm event having a rainfall total of 6.0 inches.

The objective of the stormwater plan is to manage stormwater during the construction phase of the project. The plan utilizes permanent and temporary stormwater basins which are sized to collect and store the runoff associated with a ten year design storm. No recharge of stormwater is anticipated at the stormwater ponds to be built for the construction phase of the project.

Phase 2 construction of the Big Indian Country Club includes holes one through nine of golf and a temporary driving range (holes 10 and 11) along the existing plateau. The phase has been broken down into six subphases and each subphase includes three to four contiguous subcatchments. Each subphase contains on average approximately fourteen acres of cleared area. When each subphase is stabilized the contractor will then move to the next subphase.

The sequence of construction for each Phase 2 is as follows:

1. Construction stakeout and golf course centerline stakeout for entire phase.
 2. Centerline clearing for Subphase 1.
 3. Construction access and perimeter control for Subphase 1.
 4. Temporary basins rough grade in Subphase 1.
 5. Tree harvest without grubbing in Subphase 1.
 6. Stump grub, fine grade stormwater basins and stormwater swales, stabilizing swales with rock or geotextile in Subphase 1.
 7. Rough and final grade Subphase 1.
 8. Install permanent irrigation lines in Subphase 1.
 - 9A. Stabilize Subphase 1 with temporary measures as specified, and
 - 9B. Perform Steps 2, 3 and 4 in the Subphase 2.
- Whenever disturbed soils is to be left open more than 14 days, it must also be temporarily stabilized

10. Upon complete temporary stabilization of Subphase 1, repeat Steps 5-8 in Subphase 2.
11. After permanent irrigation lines are installed in Subphase 2 immediately topsoil, install irrigation heads and install permanent stabilization (sod/seed) in Subphase 2.
12. Continue topsoiling and permanently stabilize into Subphase 1 which was previously temporarily stabilized.
 - If irrigation water is not yet available at the time of permanent stabilization, then temporary stabilization measures must be applied as specified before continuing on to the next Subphase.
13. Perform Steps 2 and 3 in the Subphase 3.
14. When five acres or less of Subphase 1 require topsoiling and final stabilization, clear, but don't grub, up to 5 acres in the Subphase 3.
15. After Subphase 1 is completely permanently stabilized, construct Subphase 3 through temporary stabilization (Steps 4 through 9A).
16. Continue construction through Subphases 4 then 5 and 6 using the same sequence described above for Subphases 1, 2 and 3.
17. Upon establishment of permanent cover, remove temporary drainage swales and basins. Convert appropriate temporary basins to be utilized during operations to their permanent condition (by Subphase).
18. Stabilize all remaining disturbed areas (by Subphase).
19. Remove perimeter erosion control after vegetation stabilization is established (by Subphase).

Upon temporary or final stabilization of each Subphase, the contractor shall move into the subsequent Subphase to start the construction process for that Subphase.

The Subphases and Subcatchments are indicated on the construction plans (Drawings CP-1 through CP-18). Each Subphase Subcatchment is depicted by a three-digit number. The first digit indicates the Phase, the second the Subphase and the third indicates the Subcatchment. Therefore, Subcatchment 241 represents an area within Phase Two, Subphase Four and Subcatchment One.

HydroCAD computations can be found at the end of this report.

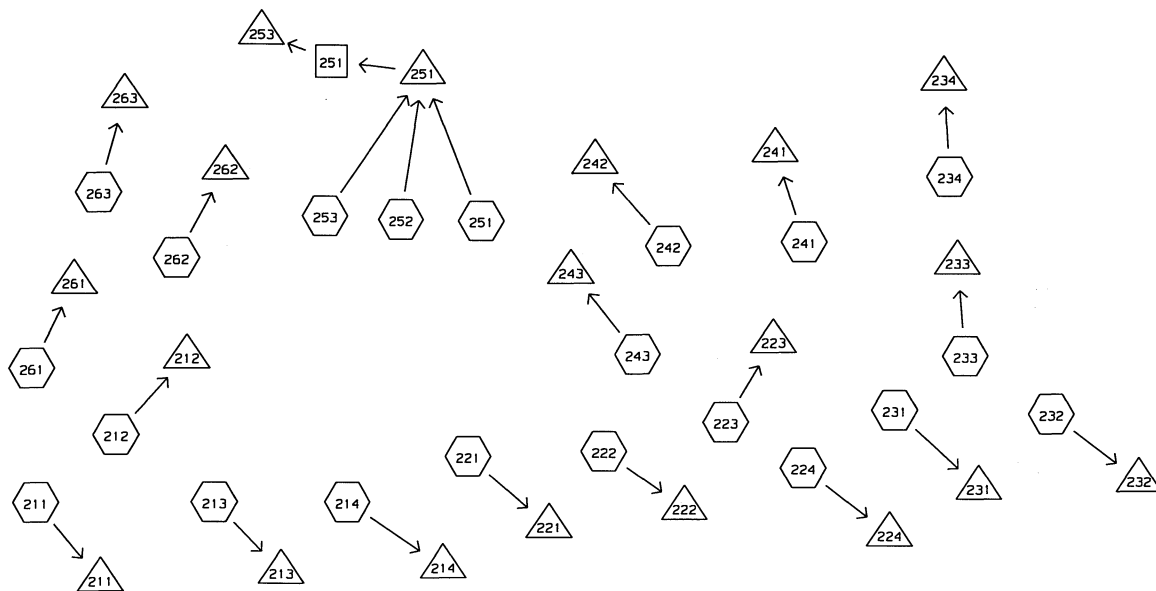
TYPE II 24-HOUR RAINFALL= 6.00 IN

Prepared by {enter your company name here}

6 Aug 03

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WATERSHED ROUTING =====



TYPE II 24-HOUR RAINFALL= 6.00 IN

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RUNOFF BY SCS TR-20 METHOD: TYPE II 24-HOUR RAINFALL= 6.00 IN, SCS U.H.

RUNOFF SPAN = 10-20 HRS, dt= .10 HRS, 101 POINTS

SUBCAT NUMBER	AREA (ACRE)	Tc (MIN)	--GROUND COVERS (%CN)--	WGT'D CN	C	PEAK (CFS)	Tpeak (HRS)	VOL (AF)
211	3.00	1.8	100%91	91	-	23.29	11.86	1.07
212	3.30	2.8	100%91	91	-	26.36	11.87	1.17
213	4.86	1.9	100%91	91	-	37.88	11.86	1.73
214	3.00	3.9	100%91	91	-	23.96	11.88	1.07
221	5.00	5.1	100%91	91	-	38.72	11.89	1.78
222	3.70	1.8	100%91	91	-	28.72	11.86	1.32
223	1.60	3.1	100%91	91	-	12.82	11.88	.57
224	3.80	4.1	100%91	91	-	30.25	11.88	1.35
231	3.30	2.0	100%91	91	-	25.82	11.86	1.17
232	3.30	3.9	100%91	91	-	26.35	11.88	1.17
233	2.50	4.8	80%91 20%70	87	-	18.39	11.89	.83
234	4.20	2.4	100%91	91	-	33.28	11.87	1.49
241	3.83	2.4	3%98 5%74 38%70 54%91	82	-	26.15	11.87	1.14
242	9.03	3.9	2%98 4%74 38%70 55%91	82	-	61.80	11.89	2.70
243	5.78	2.4	69%91 5%74 3%98 22%70	86	-	42.54	11.87	1.88
251	5.50	4.5	73%91 2%98 4%74 22%70	86	-	40.13	11.89	1.79
252	5.60	2.9	84%91 2%98 4%74 11%70	88	-	42.96	11.87	1.89
253	6.00	2.0	3%98 5%74 13%70 78%91	88	-	45.03	11.86	2.03
261	6.70	2.3	66%91 3%98 6%74 25%70	85	-	48.32	11.87	2.14
262	7.60	4.6	57%91 3%98 4%74 37%70	83	-	52.17	11.89	2.32
263	6.60	3.6	79%91 2%98 2%74 18%70	87	-	49.85	11.88	2.19

TYPE II 24-HOUR RAINFALL= 6.00 IN

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REACH ROUTING BY STOR-IND+TRANS METHOD

REACH NO.	DIAM (IN)	BOTTOM WIDTH (FT)	DEPTH (FT)	SIDE SLOPES (FT/FT)	n	LENGTH (FT)	SLOPE (FT/FT)	PEAK VEL. (FPS)	TRAVEL TIME (MIN)	PEAK Qout (CFS)
251	-	20.0	2.0	.33 .33	.040	80	.0500	5.4	.2	66.45

TYPE II 24-HOUR RAINFALL= 6.00 IN

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POND ROUTING BY STOR-IND METHOD

POND NO.	START ELEV. (FT)	FLOOD ELEV. (FT)	PEAK ELEV. (FT)	PEAK STORAGE (AF)	Qin (CFS)	Qout (CFS)	Qpri (CFS)	Qsec (CFS)	---Qout--- ATTN. (%)	LAG (MIN)
211	2304.0	2310.0	2308.9	1.07	23.29	0.00			100	0.0
212	2312.9	2316.0	2314.0	1.17	26.36	0.00			100	0.0
213	2271.0	2275.5	2275.4	1.73	37.88	0.00			100	0.0
214	2264.0	2270.0	2269.4	1.07	23.96	0.00			100	0.0
221	2294.0	2301.0	2299.0	1.78	38.72	0.00			100	0.0
222	2294.0	2300.0	2299.1	1.31	28.72	0.00			100	0.0
223	2284.0	2290.0	2288.0	.57	12.82	0.00			100	0.0
224	2199.0	2205.0	2204.8	1.35	30.25	0.00			100	0.0
231	2144.0	2150.0	2149.6	1.17	25.82	0.00			100	0.0
232	2114.0	2120.0	2119.9	1.17	26.35	0.00			100	0.0
233	2109.0	2115.0	2114.7	.83	18.39	0.00			100	0.0
234	2064.0	2071.0	2069.8	1.49	33.28	0.00			100	0.0
241	2109.0	2116.0	2114.9	1.14	26.15	0.00			100	0.0
242	2064.0	2071.0	2069.9	2.69	61.80	0.00			100	0.0
243	2169.0	2180.0	2179.8	1.88	42.54	0.00			100	0.0
251	1937.0	1950.0	1950.0	2.92	127.5	71.14			44	8.1
253	1946.5	1956.0	1954.8	3.27	66.45	0.00			100	0.0
261	2189.0	2196.0	2194.9	2.13	48.32	0.00			100	0.0
262	2139.0	2145.0	2144.8	2.32	52.17	0.00			100	0.0
263	2068.0	2075.0	2074.9	2.19	49.85	0.00			100	0.0

TYPE II 24-HOUR RAINFALL= 6.00 IN

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SUBCATCHMENT 211

PEAK= 23.29 CFS @ 11.86 HRS, VOLUME= 1.07 AF

<u>ACRES</u>	<u>CN</u>	
3.00	91	C SOIL, UNSTABILIZED

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 10-20 HRS, dt=.1 HRS

<u>Method</u>	<u>Comment</u>	<u>Tc (min)</u>
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	1.6
Nearly Bare & Untilled	Kv=10 L=300' s=.1 '/' V=3.16 fps	
CHANNEL FLOW	Segment ID:	.2
a=18 sq-ft Pw=15.8' r=1.139'	s=.07 '/' n=.04 V=10.72 fps L=150' Capacity=193 cfs	
Total Length= 450 ft		Total Tc= 1.8

SUBCATCHMENT 212

PEAK= 26.36 CFS @ 11.87 HRS, VOLUME= 1.17 AF

<u>ACRES</u>	<u>CN</u>	
3.30	91	C SOIL, UNSTABILIZED

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 10-20 HRS, dt=.1 HRS

<u>Method</u>	<u>Comment</u>	<u>Tc (min)</u>
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	2.8
Nearly Bare & Untilled	Kv=10 L=460' s=.076 '/' V=2.76 fps	

SUBCATCHMENT 213

PEAK= 37.88 CFS @ 11.86 HRS, VOLUME= 1.73 AF

<u>ACRES</u>	<u>CN</u>	
4.86	91	C SOIL, UNSTABILIZED

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 10-20 HRS, dt=.1 HRS

<u>Method</u>	<u>Comment</u>	<u>Tc (min)</u>
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	1.4
Nearly Bare & Untilled	Kv=10 L=320' s=.14 '/' V=3.74 fps	
CHANNEL FLOW	Segment ID:	.5
a=18 sq-ft Pw=15.8' r=1.139'	s=.054 '/' n=.04 V=9.42 fps L=280' Capacity=169.5 cfs	
Total Length= 600 ft		Total Tc= 1.9

TYPE II 24-HOUR RAINFALL= 6.00 IN

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SUBCATCHMENT 214

PEAK= 23.96 CFS @ 11.88 HRS, VOLUME= 1.07 AF

ACRES	CN	
3.00	91	C SOIL, UNSTABILIZED

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 10-20 HRS, dt=.1 HRS

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	3.9
Nearly Bare & Untilled	Kv=10 L=600' s=.067 '/' V=2.59 fps	

SUBCATCHMENT 221

PEAK= 38.72 CFS @ 11.89 HRS, VOLUME= 1.78 AF

ACRES	CN	
5.00	91	C SOIL, UNSTABILIZED

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 10-20 HRS, dt=.1 HRS

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	5.1
Nearly Bare & Untilled	Kv=10 L=570' s=.035 '/' V=1.87 fps	

SUBCATCHMENT 222

PEAK= 28.72 CFS @ 11.86 HRS, VOLUME= 1.32 AF

ACRES	CN	
3.70	91	C SOIL, UNSTABILIZED

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 10-20 HRS, dt=.1 HRS

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	1.8
Nearly Bare & Untilled	Kv=10 L=280' s=.07 '/' V=2.65 fps	

SUBCATCHMENT 223

PEAK= 12.82 CFS @ 11.88 HRS, VOLUME= .57 AF

ACRES	CN	
1.60	91	C SOIL, UNSTABILIZED

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 10-20 HRS, dt=.1 HRS

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	3.1
Nearly Bare & Untilled	Kv=10 L=470' s=.064 '/' V=2.53 fps	

TYPE II 24-HOUR RAINFALL= 6.00 IN

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SUBCATCHMENT 224

PEAK= 30.25 CFS @ 11.88 HRS, VOLUME= 1.35 AF

<u>ACRES</u>	<u>CN</u>	
3.80	91	C SOIL, UNSTABILIZED

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 10-20 HRS, dt=.1 HRS

<u>Method</u>	<u>Comment</u>	<u>Tc (min)</u>
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	4.1
Nearly Bare & Untilled	Kv=10 L=850' s=.12 '/' V=3.46 fps	

SUBCATCHMENT 231

PEAK= 25.82 CFS @ 11.86 HRS, VOLUME= 1.17 AF

<u>ACRES</u>	<u>CN</u>	
3.30	91	C SOIL, UNSTABILIZED

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 10-20 HRS, dt=.1 HRS

<u>Method</u>	<u>Comment</u>	<u>Tc (min)</u>
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	2.0
Nearly Bare & Untilled	Kv=10 L=400' s=.11 '/' V=3.32 fps	

SUBCATCHMENT 232

PEAK= 26.35 CFS @ 11.88 HRS, VOLUME= 1.17 AF

<u>ACRES</u>	<u>CN</u>	
3.30	91	C SOIL, UNSTABILIZED

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 10-20 HRS, dt=.1 HRS

<u>Method</u>	<u>Comment</u>	<u>Tc (min)</u>
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	3.9
Nearly Bare & Untilled	Kv=10 L=650' s=.077 '/' V=2.77 fps	

TYPE II 24-HOUR RAINFALL= 6.00 IN

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SUBCATCHMENT 233

PEAK= 18.39 CFS @ 11.89 HRS, VOLUME= .83 AF

<u>ACRES</u>	<u>CN</u>								
2.00	91	C SOIL, UNSTABILIZED							
.50	70	C SOIL, FOREST, GOOD CONDITION							
2.50	87								

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 10-20 HRS, dt=.1 HRS

<u>Method</u>	<u>Comment</u>	<u>Tc (min)</u>
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	4.4
Nearly Bare & Untilled	Kv=10 L=700' s=.07 '/' V=2.65 fps	
CHANNEL FLOW	Segment ID:	.4
a=18 sq-ft	Pw=15.8' r=1.139'	
s=.01 '/'	n=.04 V=4.05 fps L=100' Capacity=72.9 cfs	
Total Length= 800 ft		Total Tc= 4.8

SUBCATCHMENT 234

PEAK= 33.28 CFS @ 11.87 HRS, VOLUME= 1.49 AF

<u>ACRES</u>	<u>CN</u>								
4.20	91	C SOIL, UNSTABILIZED							

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 10-20 HRS, dt=.1 HRS

<u>Method</u>	<u>Comment</u>	<u>Tc (min)</u>
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	1.0
Nearly Bare & Untilled	Kv=10 L=320' s=.3 '/' V=5.48 fps	
CHANNEL FLOW	Segment ID:	1.4
a=18 sq-ft	Pw=15.8' r=1.139'	
s=.01 '/'	n=.04 V=4.05 fps L=350' Capacity=72.9 cfs	
Total Length= 670 ft		Total Tc= 2.4

TYPE II 24-HOUR RAINFALL= 6.00 IN

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SUBCATCHMENT 241

PEAK= 26.15 CFS @ 11.87 HRS, VOLUME= 1.14 AF

ACRES	CN		SCS TR-20 METHOD
.11	98	ROAD	TYPE II 24-HOUR
.20	74	C SOIL, GRASS, GOOD CONDITION	RAINFALL= 6.00 IN
1.45	70	C SOIL, FOREST, GOOD CONDITION	SPAN= 10-20 HRS, dt=.1 HRS
2.07	91	C SOIL, UNSTABILIZED	
3.83	82		

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.1
Paved Kv=20.3282 L=12' s=.02 '/' V=2.87 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.2
Short Grass Pasture Kv=7 L=20' s=.05 '/' V=1.57 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	1.5
Forest w/Heavy Litter Kv=2.5 L=120' s=.3 '/' V=1.37 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.3
Nearly Bare & Untilled Kv=10 L=100' s=.3 '/' V=5.48 fps		
CHANNEL FLOW	Segment ID:	.3
a=18 sq-ft Pw=15.8' r=1.139'		
s=.12 '/' n=.04 V=14.04 fps L=250' Capacity=252.7 cfs		
Total Length= 502 ft		Total Tc= 2.4

SUBCATCHMENT 242

PEAK= 61.80 CFS @ 11.89 HRS, VOLUME= 2.70 AF

ACRES	CN		SCS TR-20 METHOD
.22	98	ROAD	TYPE II 24-HOUR
.37	74	C SOIL, GRASS, GOOD CONDITION	RAINFALL= 6.00 IN
3.44	70	C SOIL, FOREST, GOOD CONDITION	SPAN= 10-20 HRS, dt=.1 HRS
5.00	91	C SOIL, UNSTABILIZED	
9.03	82		

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.1
Paved Kv=20.3282 L=12' s=.02 '/' V=2.87 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.2
Short Grass Pasture Kv=7 L=20' s=.05 '/' V=1.57 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	2.2
Forest w/Heavy Litter Kv=2.5 L=170' s=.26 '/' V=1.27 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.7
Nearly Bare & Untilled Kv=10 L=220' s=.27 '/' V=5.2 fps		
CHANNEL FLOW	Segment ID:	.7
a=18 sq-ft Pw=15.8' r=1.139'		
s=.08 '/' n=.04 V=11.46 fps L=450' Capacity=206.3 cfs		
Total Length= 872 ft		Total Tc= 3.9

TYPE II 24-HOUR RAINFALL= 6.00 IN

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SUBCATCHMENT 243

PEAK= 42.54 CFS @ 11.87 HRS, VOLUME= 1.88 AF

ACRES	CN		SCS TR-20 METHOD
4.00	91	C SOIL, UNSTABILIZED	TYPE II 24-HOUR
.30	74	C SOIL, GRASS, GOOD CONDITION	RAINFALL= 6.00 IN
.20	98	ROAD	SPAN= 10-20 HRS, dt=.1 HRS
1.28	70	C SOIL, FOREST, GOOD CONDITION	
5.78	86		

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.7
Forest w/Heavy Litter Kv=2.5 L=70' s=.43 '/' V=1.64 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.9
Nearly Bare & Untilled Kv=10 L=260' s=.25 '/' V=5 fps		
CHANNEL FLOW	Segment ID:	.8
a=18 sq-ft Pw=15.8' r=1.139'		
s=.03 '/' n=.04 V=7.02 fps L=350' Capacity=126.3 cfs		
Total Length= 680 ft		Total Tc= 2.4

SUBCATCHMENT 251

PEAK= 40.13 CFS @ 11.89 HRS, VOLUME= 1.79 AF

ACRES	CN		SCS TR-20 METHOD
4.00	91	C SOIL, UNSTABILIZED	TYPE II 24-HOUR
.10	98	ROAD	RAINFALL= 6.00 IN
.20	74	C SOIL, GRASS, GOOD CONDITION	SPAN= 10-20 HRS, dt=.1 HRS
1.20	70	C SOIL, FOREST, GOOD CONDITION	
5.50	86		

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.1
Paved Kv=20.3282 L=12' s=.02 '/' V=2.87 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.2
Short Grass Pasture Kv=7 L=20' s=.05 '/' V=1.57 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	2.1
Forest w/Heavy Litter Kv=2.5 L=170' s=.3 '/' V=1.37 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	1.3
Nearly Bare & Untilled Kv=10 L=370' s=.24 '/' V=4.9 fps		
CHANNEL FLOW	Segment ID:	.8
a=18 sq-ft Pw=15.8' r=1.139'		
s=.1 '/' n=.04 V=12.81 fps L=630' Capacity=230.7 cfs		
Total Length= 1202 ft		Total Tc= 4.5

TYPE II 24-HOUR RAINFALL= 6.00 IN

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SUBCATCHMENT 252

PEAK= 42.96 CFS @ 11.87 HRS, VOLUME= 1.89 AF

ACRES	CN		SCS TR-20 METHOD
4.70	91	C SOIL, UNSTABILIZED	TYPE II 24-HOUR
.10	98	ROAD	RAINFALL= 6.00 IN
.20	74	C SOIL, GRASS, GOOD CONDITION	SPAN= 10-20 HRS, dt=.1 HRS
.60	70	C SOIL, FOREST, GOOD CONDITION	
5.60	88		

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.1
Paved Kv=20.3282 L=12' s=.02 '/' V=2.87 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.2
Short Grass Pasture Kv=7 L=20' s=.05 '/' V=1.57 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	1.2
Forest w/Heavy Litter Kv=2.5 L=110' s=.36 '/' V=1.5 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	1.2
Nearly Bare & Untilled Kv=10 L=370' s=.27 '/' V=5.2 fps		
CHANNEL FLOW	Segment ID:	.2
a=18 sq-ft Pw=15.8' r=1.139'		
s=.3 '/' n=.04 V=22.2 fps L=200' Capacity=399.5 cfs		
Total Length= 712 ft		Total Tc= 2.9

SUBCATCHMENT 253

PEAK= 45.03 CFS @ 11.86 HRS, VOLUME= 2.03 AF

ACRES	CN		SCS TR-20 METHOD
.20	98	ROAD	TYPE II 24-HOUR
.30	74	C SOIL, GRASS, GOOD CONDITION	RAINFALL= 6.00 IN
.80	70	C SOIL, FOREST, GOOD CONDITION	SPAN= 10-20 HRS, dt=.1 HRS
4.70	91	C SOIL, UNSTABILIZED	
6.00	88		

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.1
Paved Kv=20.3282 L=12' s=.02 '/' V=2.87 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.2
Short Grass Pasture Kv=7 L=20' s=.05 '/' V=1.57 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.2
Forest w/Heavy Litter Kv=2.5 L=20' s=.3 '/' V=1.37 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	1.5
Nearly Bare & Untilled Kv=10 L=520' s=.33 '/' V=5.74 fps		
Total Length= 572 ft		Total Tc= 2.0

TYPE II 24-HOUR RAINFALL= 6.00 IN

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SUBCATCHMENT 261

PEAK= 48.32 CFS @ 11.87 HRS, VOLUME= 2.14 AF

<u>ACRES</u>	<u>CN</u>		SCS TR-20 METHOD
4.40	91	C SOIL, UNSTABILIZED	TYPE II 24-HOUR
.20	98	ROAD	RAINFALL= 6.00 IN
.40	74	C SOIL, GRASS, GOOD CONDITION	SPAN= 10-20 HRS, dt=.1 HRS
<u>1.70</u>	<u>70</u>	C SOIL, FOREST, GOOD CONDITION	
6.70	85		

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.1
Paved Kv=20.3282 L=12' s=.02 '/' V=2.87 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.2
Short Grass Pasture Kv=7 L=20' s=.05 '/' V=1.57 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	2.0
Nearly Bare & Untilled Kv=10 L=600' s=.25 '/' V=5 fps		
Total Length= 632 ft		Total Tc= 2.3

SUBCATCHMENT 262

PEAK= 52.17 CFS @ 11.89 HRS, VOLUME= 2.32 AF

<u>ACRES</u>	<u>CN</u>		SCS TR-20 METHOD
4.30	91	C SOIL, UNSTABILIZED	TYPE II 24-HOUR
.20	98	ROAD	RAINFALL= 6.00 IN
.30	74	C SOIL, GRASS, GOOD CONDITION	SPAN= 10-20 HRS, dt=.1 HRS
<u>2.80</u>	<u>70</u>	C SOIL, FOREST, GOOD CONDITION	
7.60	83		

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.1
Paved Kv=20.3282 L=12' s=.02 '/' V=2.87 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.2
Short Grass Pasture Kv=7 L=20' s=.05 '/' V=1.57 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	2.7
Forest w/Heavy Litter Kv=2.5 L=250' s=.38 '/' V=1.54 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	1.6
Nearly Bare & Untilled Kv=10 L=360' s=.14 '/' V=3.74 fps		
Total Length= 642 ft		Total Tc= 4.6

TYPE II 24-HOUR RAINFALL= 6.00 IN

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SUBCATCHMENT 263

PEAK= 49.85 CFS @ 11.88 HRS, VOLUME= 2.19 AF

ACRES	CN		SCS TR-20 METHOD
5.20	91	C SOIL, UNSTABILIZED	TYPE II 24-HOUR
.10	98	ROAD	RAINFALL= 6.00 IN
.10	74	C SOIL, GRASS, GOOD CONDITION	SPAN= 10-20 HRS, dt=.1 HRS
1.20	70	C SOIL, FOREST, GOOD CONDITION	
6.60	87		

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.1
Paved Kv=20.3282 L=12' s=.02 '/' V=2.87 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.2
Short Grass Pasture Kv=7 L=20' s=.05 '/' V=1.57 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	2.1
Forest w/Heavy Litter Kv=2.5 L=200' s=.4 '/' V=1.58 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.8
Nearly Bare & Untilled Kv=10 L=160' s=.12 '/' V=3.46 fps		
CHANNEL FLOW	Segment ID:	.4
a=18 sq-ft Pw=15.8' r=1.139'		
s=.15 '/' n=.04 V=15.69 fps L=400' Capacity=282.5 cfs		
Total Length= 792 ft		Total Tc= 3.6

TYPE II 24-HOUR RAINFALL= 6.00 IN

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REACH 251

STONE SWALE

Qin = 71.14 CFS @ 12.01 HRS, VOLUME= 3.22 AF

Qout= 66.45 CFS @ 12.02 HRS, VOLUME= 3.22 AF, ATTEN= 7%, LAG= .4 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.00	0.00
.20	4.12	11.46
.40	8.48	36.73
.60	13.09	72.94
.86	19.44	134.82
1.20	28.36	239.60
1.60	39.76	396.61
2.00	52.12	590.02

20' x 2' CHANNEL
 SIDE SLOPE= .33 '/'
 n= .04
 LENGTH= 80 FT
 SLOPE= .05 FT/FT

STOR-IND+TRANS METHOD
 PEAK DEPTH= .57 FT
 PEAK VELOCITY= 5.4 FPS
 TRAVEL TIME = .2 MIN
 SPAN= 10-20 HRS, dt=.1 HRS

TYPE II 24-HOUR RAINFALL= 6.00 IN

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POND 211 RETENTION BASIN

Qin = 23.29 CFS @ 11.86 HRS, VOLUME= 1.07 AF
 Qout= 0.00 CFS @ 0.00 HRS, VOLUME= 0.00 AF, ATTEN=100%, LAG= 0.0 MIN

ELEVATION (FT)	AREA (SF)	INC.STOR (CF)	CUM.STOR (CF)	STOR-IND METHOD
2304.0	0	0	0	PEAK STORAGE = 46409 CF
2305.0	7200	3600	3600	PEAK ELEVATION= 2308.9 FT
2310.0	15000	55500	59100	FLOOD ELEVATION= 2310.0 FT
				START ELEVATION= 2304.0 FT
				SPAN= 10-20 HRS, dt=.1 HRS

#	ROUTE	INVERT	OUTLET DEVICES
1	P	2309.9'	10' BROAD-CRESTED RECTANGULAR WEIR Q=C L H ^{1.5} C=1.94, 1.89, 1.97, 0, 0, 0, 0, 0

POND 212 IRRIGATION POND

Qin = 26.36 CFS @ 11.87 HRS, VOLUME= 1.17 AF
 Qout= 0.00 CFS @ 0.00 HRS, VOLUME= 0.00 AF, ATTEN=100%, LAG= 0.0 MIN

ELEVATION (FT)	AREA (SF)	INC.STOR (CF)	CUM.STOR (CF)	STOR-IND METHOD
2312.9	0	0	0	PEAK STORAGE = 51067 CF
2313.0	45275	2264	2264	PEAK ELEVATION= 2314.0 FT
2314.0	49000	47138	49401	FLOOD ELEVATION= 2316.0 FT
2315.0	64000	56500	105901	START ELEVATION= 2312.9 FT
2316.0	73500	68750	174651	SPAN= 10-20 HRS, dt=.1 HRS

#	ROUTE	INVERT	OUTLET DEVICES
1	P	2315.5'	12' BROAD-CRESTED RECTANGULAR WEIR Q=C L H ^{1.5} C=1.94, 1.89, 1.97, 0, 0, 0, 0, 0

POND 213 RETENTION BASIN

Qin = 37.88 CFS @ 11.86 HRS, VOLUME= 1.73 AF
 Qout= 0.00 CFS @ 0.00 HRS, VOLUME= 0.00 AF, ATTEN=100%, LAG= 0.0 MIN

ELEVATION (FT)	AREA (SF)	INC.STOR (CF)	CUM.STOR (CF)	STOR-IND METHOD
2271.0	0	0	0	PEAK STORAGE = 75185 CF
2272.4	18500	12950	12950	PEAK ELEVATION= 2275.4 FT
2275.0	22000	52650	65600	FLOOD ELEVATION= 2275.5 FT
2275.5	26000	12000	77600	START ELEVATION= 2271.0 FT
				SPAN= 10-20 HRS, dt=.1 HRS

#	ROUTE	INVERT	OUTLET DEVICES
1	P	2275.4'	10' BROAD-CRESTED RECTANGULAR WEIR Q=C L H ^{1.5} C=1.94, 1.89, 1.97, 0, 0, 0, 0, 0

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POND 214**RETENTION BASIN**

Qin = 23.96 CFS @ 11.88 HRS, VOLUME= 1.07 AF

Qout= 0.00 CFS @ 0.00 HRS, VOLUME= 0.00 AF, ATTEN=100%, LAG= 0.0 MIN

ELEVATION (FT)	AREA (SF)	INC.STOR (CF)	CUM.STOR (CF)	STOR-IND METHOD
2264.0	0	0	0	PEAK STORAGE = 46441 CF
2265.0	7500	3750	3750	PEAK ELEVATION= 2269.4 FT
2270.0	12000	48750	52500	FLOOD ELEVATION= 2270.0 FT
				START ELEVATION= 2264.0 FT
				SPAN= 10-20 HRS, dt=.1 HRS

ROUTE INVERT OUTLET DEVICES

1	P	2269.9'	10'	BROAD-CRESTED RECTANGULAR WEIR
Q=C L H ^{1.5} C=1.94, 1.89, 1.97, 0, 0, 0, 0, 0				

POND 221**RETENTION BASIN**

Qin = 38.72 CFS @ 11.89 HRS, VOLUME= 1.78 AF

Qout= 0.00 CFS @ 0.00 HRS, VOLUME= 0.00 AF, ATTEN=100%, LAG= 0.0 MIN

ELEVATION (FT)	AREA (SF)	INC.STOR (CF)	CUM.STOR (CF)	STOR-IND METHOD
2294.0	0	0	0	PEAK STORAGE = 77432 CF
2295.0	12000	6000	6000	PEAK ELEVATION= 2299.0 FT
2300.0	24000	90000	96000	FLOOD ELEVATION= 2301.0 FT
				START ELEVATION= 2294.0 FT
				SPAN= 10-20 HRS, dt=.1 HRS

ROUTE INVERT OUTLET DEVICES

1	P	2299.5'	10'	BROAD-CRESTED RECTANGULAR WEIR
Q=C L H ^{1.5} C=1.94, 1.89, 1.97, 0, 0, 0, 0, 0				

POND 222**RETENTION BASIN**

Qin = 28.72 CFS @ 11.86 HRS, VOLUME= 1.32 AF

Qout= 0.00 CFS @ 0.00 HRS, VOLUME= 0.00 AF, ATTEN=100%, LAG= 0.0 MIN

ELEVATION (FT)	AREA (SF)	INC.STOR (CF)	CUM.STOR (CF)	STOR-IND METHOD
2294.0	0	0	0	PEAK STORAGE = 57237 CF
2295.0	9000	4500	4500	PEAK ELEVATION= 2299.1 FT
2300.0	17000	65000	69500	FLOOD ELEVATION= 2300.0 FT
				START ELEVATION= 2294.0 FT
				SPAN= 10-20 HRS, dt=.1 HRS

ROUTE INVERT OUTLET DEVICES

1	P	2299.5'	10'	BROAD-CRESTED RECTANGULAR WEIR
Q=C L H ^{1.5} C=1.94, 1.89, 1.97, 0, 0, 0, 0, 0				

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POND 223 RETENTION BASIN

Qin = 12.82 CFS @ 11.88 HRS, VOLUME= .57 AF
 Qout= 0.00 CFS @ 0.00 HRS, VOLUME= 0.00 AF, ATTEN=100%, LAG= 0.0 MIN

ELEVATION (FT)	AREA (SF)	INC.STOR (CF)	CUM.STOR (CF)	STOR-IND METHOD
2284.0	0	0	0	PEAK STORAGE = 24762 CF
2285.0	5000	2500	2500	PEAK ELEVATION= 2288.0 FT
2290.0	10000	37500	40000	FLOOD ELEVATION= 2290.0 FT
				START ELEVATION= 2284.0 FT
				SPAN= 10-20 HRS, dt=.1 HRS

ROUTE INVERT OUTLET DEVICES

1 P 2289.9' **10' BROAD-CRESTED RECTANGULAR WEIR**
 Q=C L H^{1.5} C=1.94, 1.89, 1.97, 0, 0, 0, 0, 0

POND 224 RETENTION BASIN

Qin = 30.25 CFS @ 11.88 HRS, VOLUME= 1.35 AF
 Qout= 0.00 CFS @ 0.00 HRS, VOLUME= 0.00 AF, ATTEN=100%, LAG= 0.0 MIN

ELEVATION (FT)	AREA (SF)	INC.STOR (CF)	CUM.STOR (CF)	STOR-IND METHOD
2199.0	0	0	0	PEAK STORAGE = 58830 CF
2200.0	8000	4000	4000	PEAK ELEVATION= 2204.8 FT
2205.0	15000	57500	61500	FLOOD ELEVATION= 2205.0 FT
				START ELEVATION= 2199.0 FT
				SPAN= 10-20 HRS, dt=.1 HRS

ROUTE INVERT OUTLET DEVICES

1 P 2204.9' **10' BROAD-CRESTED RECTANGULAR WEIR**
 Q=C L H^{1.5} C=1.94, 1.89, 1.97, 0, 0, 0, 0, 0

POND 231 RETENTION BASIN

Qin = 25.82 CFS @ 11.86 HRS, VOLUME= 1.17 AF
 Qout= 0.00 CFS @ 0.00 HRS, VOLUME= 0.00 AF, ATTEN=100%, LAG= 0.0 MIN

ELEVATION (FT)	AREA (SF)	INC.STOR (CF)	CUM.STOR (CF)	STOR-IND METHOD
2144.0	0	0	0	PEAK STORAGE = 51053 CF
2145.0	6000	3000	3000	PEAK ELEVATION= 2149.6 FT
2150.0	15000	52500	55500	FLOOD ELEVATION= 2150.0 FT
				START ELEVATION= 2144.0 FT
				SPAN= 10-20 HRS, dt=.1 HRS

ROUTE INVERT OUTLET DEVICES

1 P 2149.7' **10' BROAD-CRESTED RECTANGULAR WEIR**
 Q=C L H^{1.5} C=1.94, 1.89, 1.97, 0, 0, 0, 0, 0

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POND 232 RETENTION BASIN

Qin = 26.35 CFS @ 11.88 HRS, VOLUME= 1.17 AF
 Qout= 0.00 CFS @ 0.00 HRS, VOLUME= 0.00 AF, ATTEN=100%, LAG= 0.0 MIN

ELEVATION (FT)	AREA (SF)	INC.STOR (CF)	CUM.STOR (CF)	STOR-IND METHOD
2114.0	0	0	0	PEAK STORAGE = 51085 CF
2115.0	6000	3000	3000	PEAK ELEVATION= 2119.9 FT
2120.0	13800	49500	52500	FLOOD ELEVATION= 2120.0 FT
				START ELEVATION= 2114.0 FT
				SPAN= 10-20 HRS, dt=.1 HRS

#	ROUTE	INVERT	OUTLET DEVICES
1	P	2119.9'	10' BROAD-CRESTED RECTANGULAR WEIR Q=C L H ^{1.5} C=1.94, 1.89, 1.97, 0, 0, 0, 0, 0

POND 233 RETENTION BASIN

Qin = 18.39 CFS @ 11.89 HRS, VOLUME= .83 AF
 Qout= 0.00 CFS @ 0.00 HRS, VOLUME= 0.00 AF, ATTEN=100%, LAG= 0.0 MIN

ELEVATION (FT)	AREA (SF)	INC.STOR (CF)	CUM.STOR (CF)	STOR-IND METHOD
2109.0	0	0	0	PEAK STORAGE = 36104 CF
2110.0	4500	2250	2250	PEAK ELEVATION= 2114.7 FT
2115.0	10000	36250	38500	FLOOD ELEVATION= 2115.0 FT
				START ELEVATION= 2109.0 FT
				SPAN= 10-20 HRS, dt=.1 HRS

#	ROUTE	INVERT	OUTLET DEVICES
1	P	2114.8'	10' BROAD-CRESTED RECTANGULAR WEIR Q=C L H ^{1.5} C=1.94, 1.89, 1.97, 0, 0, 0, 0, 0

POND 234 RETENTION BASIN

Qin = 33.28 CFS @ 11.87 HRS, VOLUME= 1.49 AF
 Qout= 0.00 CFS @ 0.00 HRS, VOLUME= 0.00 AF, ATTEN=100%, LAG= 0.0 MIN

ELEVATION (FT)	AREA (SF)	INC.STOR (CF)	CUM.STOR (CF)	STOR-IND METHOD
2064.0	0	0	0	PEAK STORAGE = 64985 CF
2065.0	9500	4750	4750	PEAK ELEVATION= 2069.8 FT
2070.0	15500	62500	67250	FLOOD ELEVATION= 2071.0 FT
				START ELEVATION= 2064.0 FT
				SPAN= 10-20 HRS, dt=.1 HRS

#	ROUTE	INVERT	OUTLET DEVICES
1	P	2069.9'	10' BROAD-CRESTED RECTANGULAR WEIR Q=C L H ^{1.5} C=1.94, 1.89, 1.97, 0, 0, 0, 0, 0

TYPE II 24-HOUR RAINFALL= 6.00 IN

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POND 251 RETENTION BASIN

Qin = 127.5 CFS @ 11.88 HRS, VOLUME= 5.71 AF
 Qout= 71.14 CFS @ 12.01 HRS, VOLUME= 3.22 AF, ATTEN= 44%, LAG= 8.1 MIN

ELEVATION (FT)	AREA (SF)	INC.STOR (CF)	CUM.STOR (CF)	STOR-IND METHOD
1937.0	0	0	0	PEAK STORAGE = 127406 CF
1938.0	6000	3000	3000	PEAK ELEVATION= 1950.0 FT
1945.0	10000	56000	59000	FLOOD ELEVATION= 1950.0 FT
1950.0	17500	68750	127750	START ELEVATION= 1937.0 FT
				SPAN= 10-20 HRS, dt=.1 HRS
				Tdet= 133.3 MIN (3.22 AF)

#	ROUTE	INVERT	OUTLET DEVICES
1	P	1948.5'	20' BROAD-CRESTED RECTANGULAR WEIR Q=C L H ^{1.5} C=1.94, 1.89, 1.97, 0, 0, 0, 0, 0

POND 253 RETENTION BASIN

Qin = 66.45 CFS @ 12.02 HRS, VOLUME= 3.22 AF
 Qout= 0.00 CFS @ 0.00 HRS, VOLUME= 0.00 AF, ATTEN=100%, LAG= 0.0 MIN

ELEVATION (FT)	AREA (SF)	INC.STOR (CF)	CUM.STOR (CF)	STOR-IND METHOD
1946.0	0	0	0	PEAK STORAGE = 142371 CF
1946.5	10000	2500	2500	PEAK ELEVATION= 1954.8 FT
1950.0	15500	44625	47125	FLOOD ELEVATION= 1956.0 FT
1955.0	24000	98750	145875	START ELEVATION= 1946.5 FT
				SPAN= 10-20 HRS, dt=.1 HRS

#	ROUTE	INVERT	OUTLET DEVICES
1	P	1954.9'	10' BROAD-CRESTED RECTANGULAR WEIR Q=C L H ^{1.5} C=1.94, 1.89, 1.97, 0, 0, 0, 0, 0

POND 261 RETENTION BASIN

Qin = 48.32 CFS @ 11.87 HRS, VOLUME= 2.14 AF
 Qout= 0.00 CFS @ 0.00 HRS, VOLUME= 0.00 AF, ATTEN=100%, LAG= 0.0 MIN

ELEVATION (FT)	AREA (SF)	INC.STOR (CF)	CUM.STOR (CF)	STOR-IND METHOD
2189.0	0	0	0	PEAK STORAGE = 92941 CF
2190.0	13700	6850	6850	PEAK ELEVATION= 2194.9 FT
2195.0	21500	88000	94850	FLOOD ELEVATION= 2196.0 FT
				START ELEVATION= 2189.0 FT
				SPAN= 10-20 HRS, dt=.1 HRS

#	ROUTE	INVERT	OUTLET DEVICES
1	P	2194.9'	10' BROAD-CRESTED RECTANGULAR WEIR Q=C L H ^{1.5} C=1.94, 1.89, 1.97, 0, 0, 0, 0, 0

TYPE II 24-HOUR RAINFALL= 6.00 IN

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POND 262**RETENTION BASIN**

Qin = 52.17 CFS @ 11.89 HRS, VOLUME= 2.32 AF

Qout= 0.00 CFS @ 0.00 HRS, VOLUME= 0.00 AF, ATTEN=100%, LAG= 0.0 MIN

ELEVATION (FT)	AREA (SF)	INC.STOR (CF)	CUM.STOR (CF)	STOR-IND METHOD
2139.0	0	0	0	PEAK STORAGE = 101040 CF
2140.0	13000	6500	6500	PEAK ELEVATION= 2144.8 FT
2145.0	26000	97500	104000	FLOOD ELEVATION= 2145.0 FT
				START ELEVATION= 2139.0 FT
				SPAN= 10-20 HRS, dt=.1 HRS

ROUTE INVERT OUTLET DEVICES

1 P 2144.9' **10' BROAD-CRESTED RECTANGULAR WEIR**
 Q=C L H^{1.5} C=1.94, 1.89, 1.97, 0, 0, 0, 0, 0

POND 263**RETENTION BASIN**

Qin = 49.85 CFS @ 11.88 HRS, VOLUME= 2.19 AF

Qout= 0.00 CFS @ 0.00 HRS, VOLUME= 0.00 AF, ATTEN=100%, LAG= 0.0 MIN

ELEVATION (FT)	AREA (SF)	INC.STOR (CF)	CUM.STOR (CF)	STOR-IND METHOD
2068.0	0	0	0	PEAK STORAGE = 95290 CF
2069.0	5000	2500	2500	PEAK ELEVATION= 2074.9 FT
2070.0	13000	9000	11500	FLOOD ELEVATION= 2075.0 FT
2075.0	21500	86250	97750	START ELEVATION= 2068.0 FT
				SPAN= 10-20 HRS, dt=.1 HRS

ROUTE INVERT OUTLET DEVICES

1 P 2074.9' **10' BROAD-CRESTED RECTANGULAR WEIR**
 Q=C L H^{1.5} C=1.94, 1.89, 1.97, 0, 0, 0, 0, 0

Construction Retention Basin Dewatering

The Department expressed two main concerns about the dewatering process and the use of level spreaders.

- The first concern was that dispersed flow from the proposed level spreaders (dispersion pipes) would become concentrated flow that could potentially cause downslope erosion.
- The second concern was that water that percolated into the surficial soils during dewatering could reappear downslope as surface flow, also having potential for causing downslope erosion.

The following dewatering procedures were devised to address these concerns and mitigate potential impacts associated with basin dewatering.

Proposed Level Spreader Dewatering Program

The following basins will be dewatered using level spreaders; basins 234, 242, 252, 254 and 263. All other basins in Phase 2 will be dewatered to the irrigation ponds.

In order to address concerns regarding level spreader dewatering, additional analyses of existing hydrological conditions were performed and then compared to the proposed hydrological conditions with basin dewatering. Like other hydrological analyses of stormwater management, the underlying premise behind these analyses is that if post-construction discharges are equal to or less than pre-construction discharges, then adverse impacts can be avoided. In other words, if dewatering discharge rates are less than what is currently occurring on the site naturally without adverse effects, then dewatering using level spreaders will also not result in adverse effects.

Existing (Pre-construction) Conditions

HydroCAD modeling (HydroCAD data attached) was used to calculate existing runoff rates at the proposed dewatering level spreader locations. Level spreaders constructed of perforated pipe wrapped with a filter fabric (dispersion pipes) are proposed to be installed in undisturbed wooded areas downslope of proposed construction activities. Using the locations of these level spreaders shown on LA Group Plan Sheet CP-2, the existing condition wooded subcatchment limits were determined. HydroCAD modeling was then used to create a hydrograph (runoff over time) for the 10-year design storm under existing conditions. Since the 10-year storm was used to design the proposed basins, the 10-year storm was also used for developing hydrographs for existing conditions.

The hydrographs of existing conditions do not represent runoff patterns that will occur during the construction phase. During construction, the proposed stormwater basins will capture and hold runoff from the entire subcatchments, and no runoff from these areas will reach the level spreaders. Instead, captured runoff in the basins will be discharged via the level spreaders after the storm event has passed.

Proposed (Construction) Conditions

Design volumes of the proposed ponds (HydroCAD data attached) and dewatering time periods were used to calculate proposed dewatering rates for each of the four proposed level spreaders (A, B, C & D). Worst-case dewatering rates were calculated using full pond volumes after the 10-year storm event. Dewatering runoff rates were varied by using different durations of time for basin dewatering. Generally, dewatering rates were calculated using 16 hours, 24 hours and 32 hours of total dewatering time.

The constant dewatering runoff rates for the different total dewatering times were then compared to the existing conditions hydrographs to determine how long a period of dewatering should be utilized to keep discharge rates at or below existing conditions runoff rates.

Level Spreader "A"

Basin 263 will be dewatered using level spreader "A" which will be located in the wooded area just to the west of this basin (See Sheet CP-2). Attached Figure 1 shows the existing conditions hydrograph in dark blue for level spreader "A". During the 10-year storm event under existing conditions runoff peaks at 40.49 cfs just after hour 12, then quickly decreases before leveling off and then slowly decreasing. It is this later part of the existing conditions curve, when runoff rates are fairly constant after the large peak in runoff, that the dewatering discharges should seek to match or be below.

Figure 1 also shows the discharge rates that would occur for 16 hours of dewatering (1.65 cfs), 24 hours of dewatering (1.1 cfs) and 32 hours of dewatering (0.83 cfs). Obviously, the existing conditions hydrograph and the dewatering discharge hydrographs on this figure (and on similar figures that follow) are not on the same "real time" scale. The graphics are not intended to represent dewatering discharges occurring during the actual storm event that would produce the existing conditions hydrograph. Dewatering discharge hydrographs were overlaid on the existing conditions hydrograph to facilitate direct comparison of discharge rates.

It is important to remember that the dewatering discharge rates given above are for the entire length of the level spreader, which in the case of level spreader "A" is approximately 1,000 feet long.

In Figure 1 the 16-hour discharge rate is slightly higher than the post-peak existing condition discharges. The 24 hour rate and the 32 hour rate are at or below the later part of the existing conditions curve. Therefore, basin 263 should be dewatered using level spreader "A" over the course of 24 to 32 hours. Dewatering should take place for no longer than 16 consecutive hours, with a minimum period of 8 hours with no discharge from level spreader "A". These limitations will make the dewatering discharge even more closely resemble the existing conditions hydrograph in Figure 1.

Level Spreader "B"

Using the same procedure described above, it has been determined that basin 253 can be dewatered using level spreader "B" over the course of 16 hours. See Sheet CP-2 for the location of level spreader "B" and see Figure 2 of this attachment for the existing conditions and dewatering hydrographs. If, for whatever reason, basin 253 is dewatered over the course of more than 16 hours, there should be a period of 8 hours of no dewatering following the first 16 hours of dewatering.

Level Spreader "C"

Level spreader "C" (See Sheet CP-2 for location) will be used to dewater basin 252 and basin 242. Since these two basins are in different Subphases, only one of the two basins will be serving an area of active construction at any given time. While one of the basins is serving an active construction area, the area served by the other basin will either be still undisturbed, temporarily stabilized, or finally stabilized.

Both basin 252 (attached figure 3) and basin 242 (attached figure 4) should be dewatered over a period of 24 to 32 hours, with no more than 16 consecutive hours of dewatering separated by a period of 8 hours with no dewatering discharge.

Level Spreader "D"

Using the same process, it has been determined that the total amount of dewatering time for basin 234 when using level spreader "D" should be 48 hours. The dewatering time for this basin is longer than for the other basins discussed previously because existing conditions runoff rates are lower at level spreader "D" because of its smaller drainage area (see Sheet CP-2). Dewatering should occur for no more than 16 consecutive hours separated by periods of 8 hours when no dewatering discharges occur.

If it is ever necessary to dewater basin 234 over a shorter period of time, the option exists to pump water up to basin 233 and from there to pump the water to the irrigation pond.

Figure 1
Basin 263 Level Spreader "A" Discharge

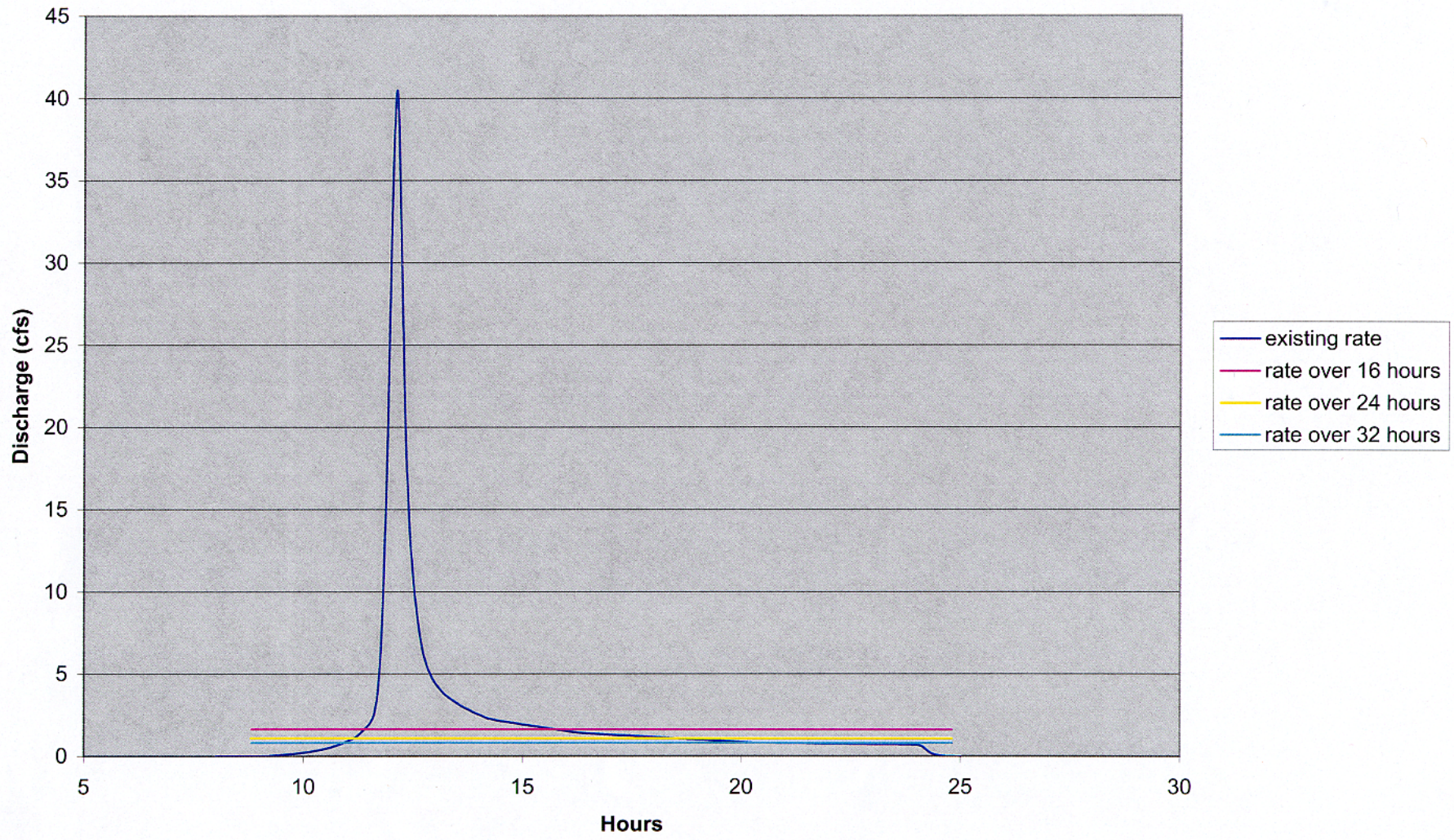


Figure 2
Basin 253 Level Spreader "B" Discharge

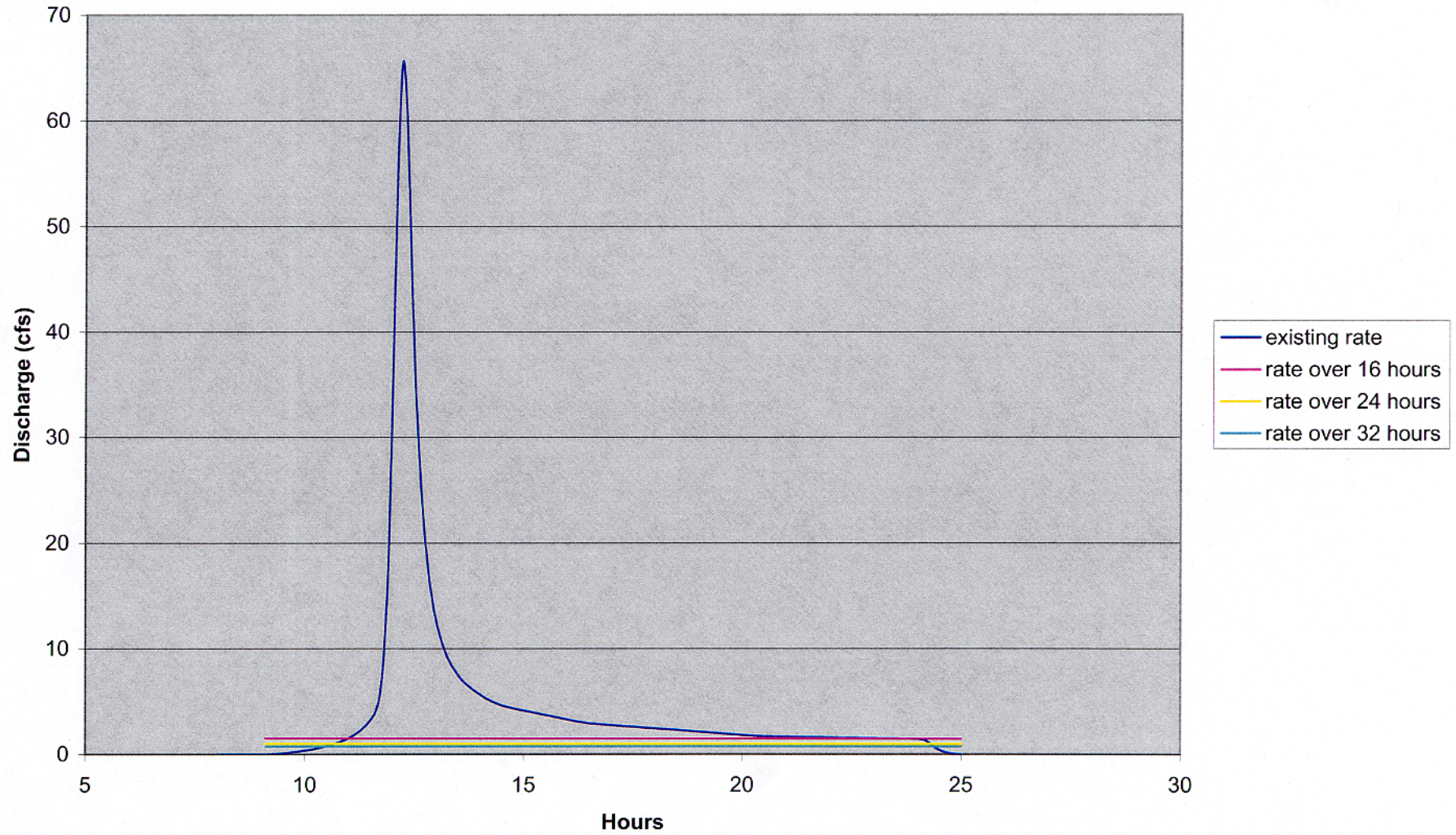


Figure 3
Basin 252 (Subcat.s 251 & 252) Level Spreader "C" Discharge

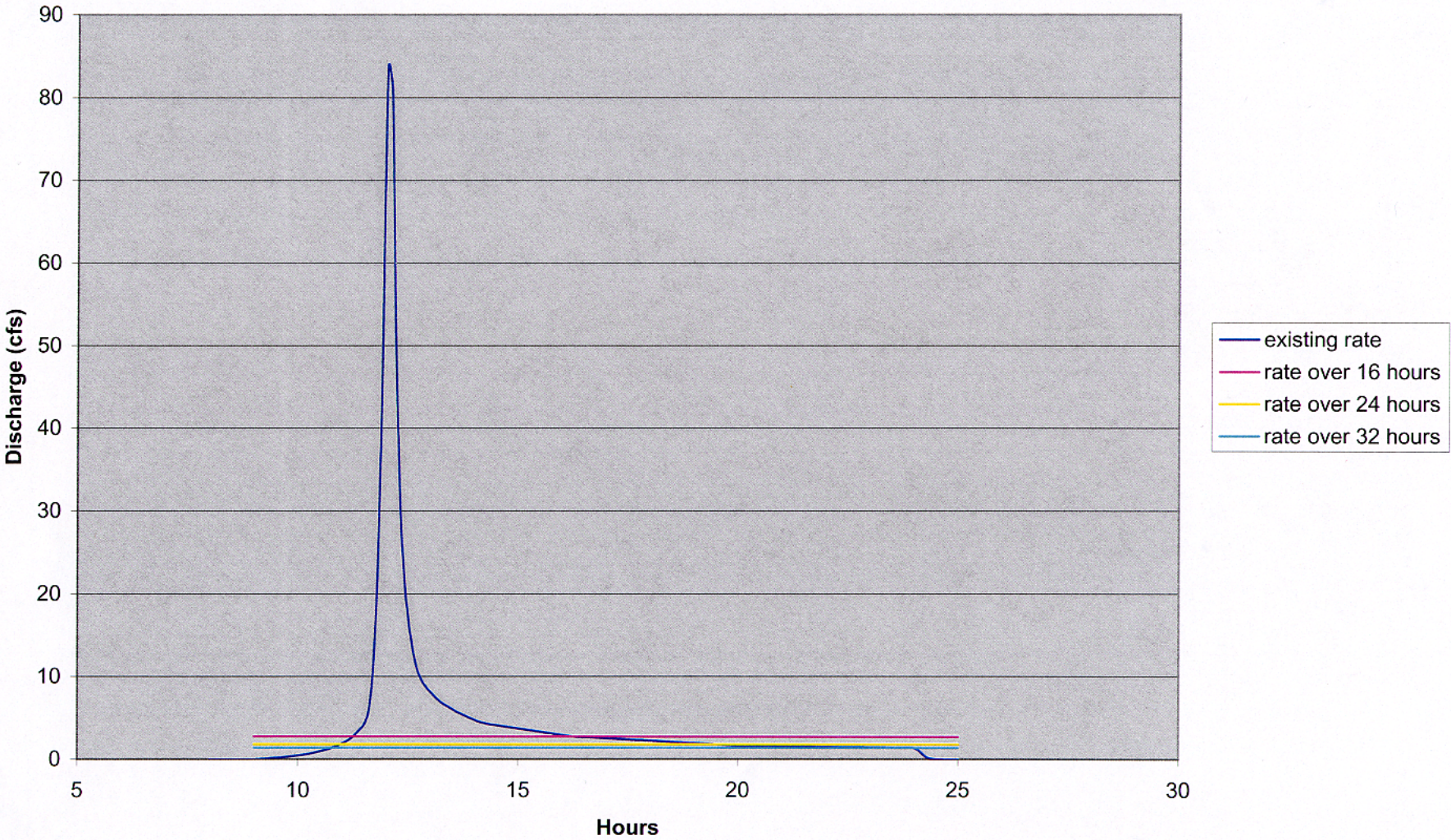


Figure 4
Basin 242 Level Spreader "C" Discharge

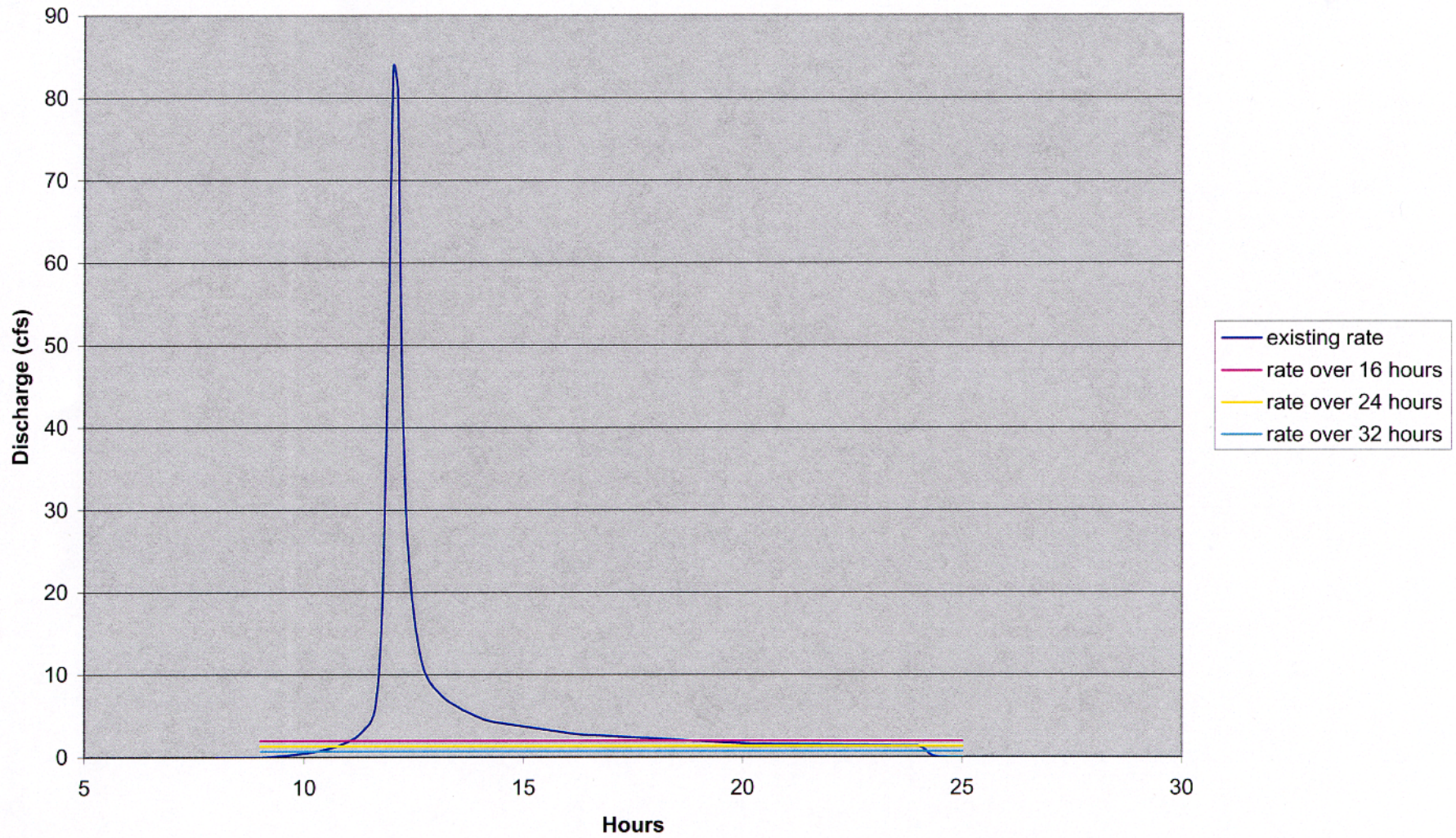
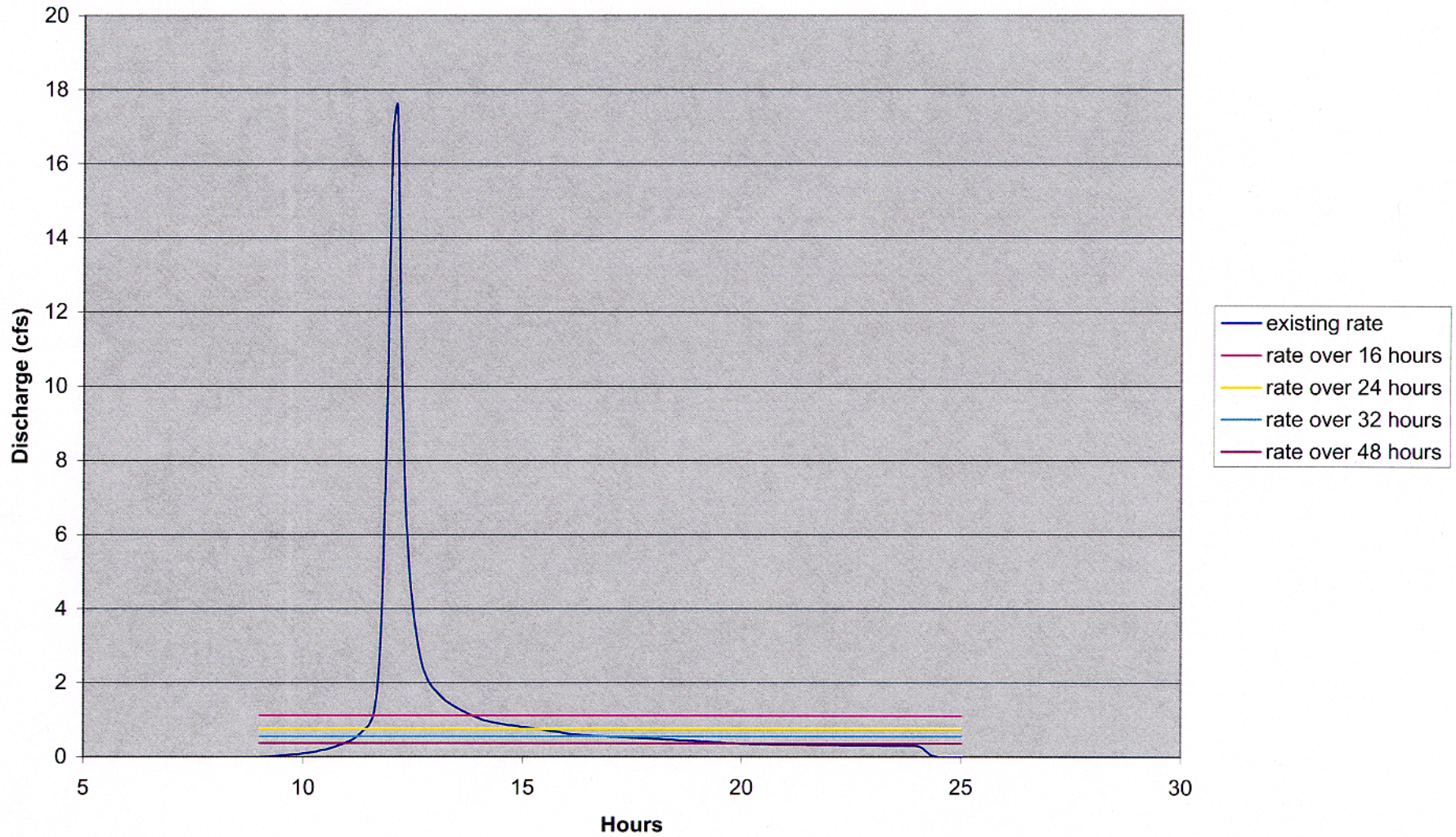


Figure 5
Basin 234 Level Spreader "D" Discharge



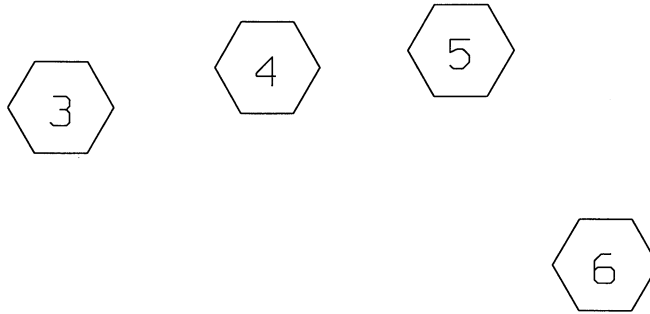
TYPE II 24-HOUR RAINFALL= 6.00 IN

Prepared by {enter your company name here}

4 Aug 03

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WATERSHED ROUTING =====



TYPE II 24-HOUR RAINFALL= 6.00 IN

Prepared by {enter your company name here}

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RUNOFF BY SCS TR-20 METHOD: TYPE II 24-HOUR RAINFALL= 6.00 IN, SCS U.H.

RUNOFF SPAN = 8-25 HRS, dt= .10 HRS, 171 POINTS

SUBCAT NUMBER	AREA (ACRE)	Tc (MIN)	--GROUND COVERS (%CN)--	WGT'D CN	C	PEAK (CFS)	Tpeak (HRS)	VOL (AF)
3	13.50	20.4	100%70	70	-	40.49	12.09	3.16
4	28.00	30.7	100%70	70	-	65.77	12.22	6.54
5	26.40	16.6	100%70	70	-	86.95	12.04	6.17
6	5.70	18.0	100%70	70	-	17.99	12.06	1.33

TYPE II 24-HOUR RAINFALL= 6.00 IN

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SUBCATCHMENT 3**AREA A**

PEAK= 40.49 CFS @ 12.09 HRS, VOLUME= 3.16 AF

ACRES	CN	
13.50	70	C SOIL, WOODS, GOOD CONDITION

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 8-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	20.4
Forest w/Heavy Litter	Kv=2.5 L=1300' s=.18 '/' V=1.06 fps	

SUBCATCHMENT 4**AREA B**

PEAK= 65.77 CFS @ 12.22 HRS, VOLUME= 6.54 AF

ACRES	CN	
28.00	70	C SOIL, WOODS, GOOD CONDITION

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 8-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	30.7
Forest w/Heavy Litter	Kv=2.5 L=2120' s=.212 '/' V=1.15 fps	

SUBCATCHMENT 5**AREA C**

PEAK= 86.95 CFS @ 12.04 HRS, VOLUME= 6.17 AF

ACRES	CN	
26.40	70	C SOIL, FOREST, GOOD CONDITION

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 8-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	16.6
Forest w/Heavy Litter	Kv=2.5 L=1320' s=.28 '/' V=1.32 fps	

SUBCATCHMENT 6**AREA D**

PEAK= 17.99 CFS @ 12.06 HRS, VOLUME= 1.33 AF

ACRES	CN	
5.70	70	C SOIL, WOODS, GOOD CONDITION

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 8-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	18.0
Forest w/Heavy Litter	Kv=2.5 L=800' s=.088 '/' V=.74 fps	

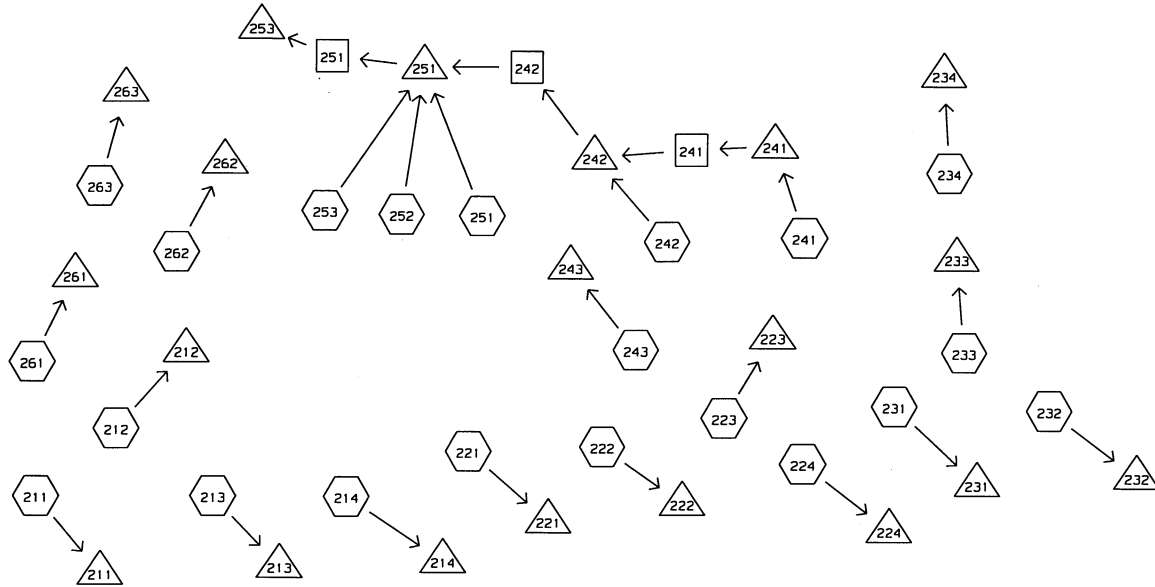
TYPE II 24-HOUR RAINFALL= 6.00 IN

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WATERSHED ROUTING =====



 SUBCATCHMENT

 REACH

 POND

 LINK

TYPE II 24-HOUR RAINFALL= 6.00 IN

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RUNOFF BY SCS TR-20 METHOD: TYPE II 24-HOUR RAINFALL= 6.00 IN, SCS U.H.

RUNOFF SPAN = 10-20 HRS, dt= .10 HRS, 101 POINTS

SUBCAT NUMBER	AREA (ACRE)	Tc (MIN)	--GROUND COVERS (%CN)--	WGT'D CN	C	PEAK (CFS)	Tpeak (HRS)	VOL (AF)
211	3.00	1.8	100%91	91	-	23.29	11.86	1.07
212	3.30	2.8	100%91	91	-	26.36	11.87	1.17
213	4.86	1.9	100%91	91	-	37.88	11.86	1.73
214	3.00	3.9	100%91	91	-	23.96	11.88	1.07
221	5.00	5.1	100%91	91	-	38.72	11.89	1.78
222	3.70	1.8	100%91	91	-	28.72	11.86	1.32
223	1.60	3.1	100%91	91	-	12.82	11.88	.57
224	3.80	4.1	100%91	91	-	30.25	11.88	1.35
231	3.30	2.0	100%91	91	-	25.82	11.86	1.17
232	3.30	3.9	100%91	91	-	26.35	11.88	1.17
233	2.50	4.8	80%91 20%70	87	-	18.39	11.89	.83
234	4.20	2.4	100%91	91	-	33.28	11.87	1.49
241	3.83	2.4	3%98 5%74 38%70 54%91	82	-	26.15	11.87	1.14
242	9.03	3.9	2%98 4%74 38%70 55%91	82	-	61.80	11.89	2.70
243	5.78	2.4	69%91 5%74 3%98 22%70	86	-	42.54	11.87	1.88
251	5.50	4.5	73%91 2%98 4%74 22%70	86	-	40.13	11.89	1.79
252	5.60	2.9	84%91 2%98 4%74 11%70	88	-	42.96	11.87	1.89
253	6.00	2.0	3%98 5%74 13%70 78%91	88	-	45.03	11.86	2.03
261	6.70	2.3	66%91 3%98 6%74 25%70	85	-	48.32	11.87	2.14
262	7.60	4.6	57%91 3%98 4%74 37%70	83	-	52.17	11.89	2.32
263	6.60	3.6	79%91 2%98 2%74 18%70	87	-	49.85	11.88	2.19

TYPE II 24-HOUR RAINFALL= 6.00 IN

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SUBCATCHMENT 211

PEAK= 23.29 CFS @ 11.86 HRS, VOLUME= 1.07 AF

<u>ACRES</u>	<u>CN</u>	
3.00	91	C SOIL, UNSTABILIZED

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 10-20 HRS, dt=.1 HRS

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	1.6
Nearly Bare & Untilled	Kv=10 L=300' s=.1 '/' V=3.16 fps	
CHANNEL FLOW	Segment ID:	.2
a=18 sq-ft	Pw=15.8' r=1.139'	
s=.07 '/'	n=.04 V=10.72 fps L=150' Capacity=193 cfs	
Total Length= 450 ft		Total Tc= 1.8

SUBCATCHMENT 212

PEAK= 26.36 CFS @ 11.87 HRS, VOLUME= 1.17 AF

<u>ACRES</u>	<u>CN</u>	
3.30	91	C SOIL, UNSTABILIZED

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 10-20 HRS, dt=.1 HRS

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	2.8
Nearly Bare & Untilled	Kv=10 L=460' s=.076 '/' V=2.76 fps	

SUBCATCHMENT 213

PEAK= 37.88 CFS @ 11.86 HRS, VOLUME= 1.73 AF

<u>ACRES</u>	<u>CN</u>	
4.86	91	C SOIL, UNSTABILIZED

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 10-20 HRS, dt=.1 HRS

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	1.4
Nearly Bare & Untilled	Kv=10 L=320' s=.14 '/' V=3.74 fps	
CHANNEL FLOW	Segment ID:	.5
a=18 sq-ft	Pw=15.8' r=1.139'	
s=.054 '/'	n=.04 V=9.42 fps L=280' Capacity=169.5 cfs	
Total Length= 600 ft		Total Tc= 1.9

TYPE II 24-HOUR RAINFALL= 6.00 IN

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SUBCATCHMENT 214

PEAK= 23.96 CFS @ 11.88 HRS, VOLUME= 1.07 AF

<u>ACRES</u>	<u>CN</u>	
3.00	91	C SOIL, UNSTABILIZED

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 10-20 HRS, dt=.1 HRS

<u>Method</u>	<u>Comment</u>	<u>Tc (min)</u>
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	3.9
Nearly Bare & Untilled	Kv=10 L=600' s=.067 '/' V=2.59 fps	

SUBCATCHMENT 221

PEAK= 38.72 CFS @ 11.89 HRS, VOLUME= 1.78 AF

<u>ACRES</u>	<u>CN</u>	
5.00	91	C SOIL, UNSTABILIZED

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 10-20 HRS, dt=.1 HRS

<u>Method</u>	<u>Comment</u>	<u>Tc (min)</u>
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	5.1
Nearly Bare & Untilled	Kv=10 L=570' s=.035 '/' V=1.87 fps	

SUBCATCHMENT 222

PEAK= 28.72 CFS @ 11.86 HRS, VOLUME= 1.32 AF

<u>ACRES</u>	<u>CN</u>	
3.70	91	C SOIL, UNSTABILIZED

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 10-20 HRS, dt=.1 HRS

<u>Method</u>	<u>Comment</u>	<u>Tc (min)</u>
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	1.8
Nearly Bare & Untilled	Kv=10 L=280' s=.07 '/' V=2.65 fps	

SUBCATCHMENT 223

PEAK= 12.82 CFS @ 11.88 HRS, VOLUME= .57 AF

<u>ACRES</u>	<u>CN</u>	
1.60	91	C SOIL, UNSTABILIZED

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 10-20 HRS, dt=.1 HRS

<u>Method</u>	<u>Comment</u>	<u>Tc (min)</u>
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	3.1
Nearly Bare & Untilled	Kv=10 L=470' s=.064 '/' V=2.53 fps	

TYPE II 24-HOUR RAINFALL= 6.00 IN

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SUBCATCHMENT 224

PEAK= 30.25 CFS @ 11.88 HRS, VOLUME= 1.35 AF

ACRES	CN	
3.80	91	C SOIL, UNSTABILIZED

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 10-20 HRS, dt=.1 HRS

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	4.1
Nearly Bare & Untilled	Kv=10 L=850' s=.12 '/' V=3.46 fps	

SUBCATCHMENT 231

PEAK= 25.82 CFS @ 11.86 HRS, VOLUME= 1.17 AF

ACRES	CN	
3.30	91	C SOIL, UNSTABILIZED

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 10-20 HRS, dt=.1 HRS

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	2.0
Nearly Bare & Untilled	Kv=10 L=400' s=.11 '/' V=3.32 fps	

SUBCATCHMENT 232

PEAK= 26.35 CFS @ 11.88 HRS, VOLUME= 1.17 AF

ACRES	CN	
3.30	91	C SOIL, UNSTABILIZED

SCS TR-20 METHOD
 TYPE II 24-HOUR
 RAINFALL= 6.00 IN
 SPAN= 10-20 HRS, dt=.1 HRS

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	3.9
Nearly Bare & Untilled	Kv=10 L=650' s=.077 '/' V=2.77 fps	

TYPE II 24-HOUR RAINFALL= 6.00 IN

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SUBCATCHMENT 233

PEAK= 18.39 CFS @ 11.89 HRS, VOLUME= .83 AF

ACRES	CN		SCS TR-20 METHOD
2.00	91	C SOIL, UNSTABILIZED	TYPE II 24-HOUR
.50	70	C SOIL, FOREST, GOOD CONDITION	RAINFALL= 6.00 IN
2.50	87		SPAN= 10-20 HRS, dt=.1 HRS

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	4.4
Nearly Bare & Untilled	Kv=10 L=700' s=.07 '/' V=2.65 fps	
CHANNEL FLOW	Segment ID:	.4
a=18 sq-ft	Pw=15.8' r=1.139'	
s=.01 '/'	n=.04 V=4.05 fps L=100' Capacity=72.9 cfs	
Total Length= 800 ft		Total Tc= 4.8

SUBCATCHMENT 234

PEAK= 33.28 CFS @ 11.87 HRS, VOLUME= 1.49 AF

ACRES	CN		SCS TR-20 METHOD
4.20	91	C SOIL, UNSTABILIZED	TYPE II 24-HOUR
			RAINFALL= 6.00 IN
			SPAN= 10-20 HRS, dt=.1 HRS

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	1.0
Nearly Bare & Untilled	Kv=10 L=320' s=.3 '/' V=5.48 fps	
CHANNEL FLOW	Segment ID:	1.4
a=18 sq-ft	Pw=15.8' r=1.139'	
s=.01 '/'	n=.04 V=4.05 fps L=350' Capacity=72.9 cfs	
Total Length= 670 ft		Total Tc= 2.4

TYPE II 24-HOUR RAINFALL= 6.00 IN

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SUBCATCHMENT 241

PEAK= 26.15 CFS @ 11.87 HRS, VOLUME= 1.14 AF

ACRES	CN		SCS TR-20 METHOD
.11	98	ROAD	TYPE II 24-HOUR
.20	74	C SOIL, GRASS, GOOD CONDITION	RAINFALL= 6.00 IN
1.45	70	C SOIL, FOREST, GOOD CONDITION	SPAN= 10-20 HRS, dt=.1 HRS
2.07	91	C SOIL, UNSTABILIZED	
3.83	82		

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.1
Paved Kv=20.3282 L=12' s=.02 '/' V=2.87 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.2
Short Grass Pasture Kv=7 L=20' s=.05 '/' V=1.57 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	1.5
Forest w/Heavy Litter Kv=2.5 L=120' s=.3 '/' V=1.37 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.3
Nearly Bare & Untilled Kv=10 L=100' s=.3 '/' V=5.48 fps		
CHANNEL FLOW	Segment ID:	.3
a=18 sq-ft Pw=15.8' r=1.139'		
s=.12 '/' n=.04 V=14.04 fps L=250' Capacity=252.7 cfs		
Total Length= 502 ft		Total Tc= 2.4

SUBCATCHMENT 242

PEAK= 61.80 CFS @ 11.89 HRS, VOLUME= 2.70 AF

ACRES	CN		SCS TR-20 METHOD
.22	98	ROAD	TYPE II 24-HOUR
.37	74	C SOIL, GRASS, GOOD CONDITION	RAINFALL= 6.00 IN
3.44	70	C SOIL, FOREST, GOOD CONDITION	SPAN= 10-20 HRS, dt=.1 HRS
5.00	91	C SOIL, UNSTABILIZED	
9.03	82		

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.1
Paved Kv=20.3282 L=12' s=.02 '/' V=2.87 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.2
Short Grass Pasture Kv=7 L=20' s=.05 '/' V=1.57 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	2.2
Forest w/Heavy Litter Kv=2.5 L=170' s=.26 '/' V=1.27 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.7
Nearly Bare & Untilled Kv=10 L=220' s=.27 '/' V=5.2 fps		
CHANNEL FLOW	Segment ID:	.7
a=18 sq-ft Pw=15.8' r=1.139'		
s=.08 '/' n=.04 V=11.46 fps L=450' Capacity=206.3 cfs		
Total Length= 872 ft		Total Tc= 3.9

TYPE II 24-HOUR RAINFALL= 6.00 IN

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SUBCATCHMENT 243

PEAK= 42.54 CFS @ 11.87 HRS, VOLUME= 1.88 AF

ACRES	CN		SCS TR-20 METHOD
4.00	91	C SOIL, UNSTABILIZED	TYPE II 24-HOUR
.30	74	C SOIL, GRASS, GOOD CONDITION	RAINFALL= 6.00 IN
.20	98	ROAD	SPAN= 10-20 HRS, dt=.1 HRS
1.28	70	C SOIL, FOREST, GOOD CONDITION	
5.78	86		

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.7
Forest w/Heavy Litter	Kv=2.5 L=70' s=.43 '/' V=1.64 fps	
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.9
Nearly Bare & Untilled	Kv=10 L=260' s=.25 '/' V=5 fps	
CHANNEL FLOW	Segment ID:	.8
a=18 sq-ft	Pw=15.8' r=1.139'	
s=.03 '/'	n=.04 V=7.02 fps L=350' Capacity=126.3 cfs	
Total Length= 680 ft		Total Tc= 2.4

SUBCATCHMENT 251

PEAK= 40.13 CFS @ 11.89 HRS, VOLUME= 1.79 AF

ACRES	CN		SCS TR-20 METHOD
4.00	91	C SOIL, UNSTABILIZED	TYPE II 24-HOUR
.10	98	ROAD	RAINFALL= 6.00 IN
.20	74	C SOIL, GRASS, GOOD CONDITION	SPAN= 10-20 HRS, dt=.1 HRS
1.20	70	C SOIL, FOREST, GOOD CONDITION	
5.50	86		

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.1
Paved	Kv=20.3282 L=12' s=.02 '/' V=2.87 fps	
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.2
Short Grass Pasture	Kv=7 L=20' s=.05 '/' V=1.57 fps	
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	2.1
Forest w/Heavy Litter	Kv=2.5 L=170' s=.3 '/' V=1.37 fps	
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	1.3
Nearly Bare & Untilled	Kv=10 L=370' s=.24 '/' V=4.9 fps	
CHANNEL FLOW	Segment ID:	.8
a=18 sq-ft	Pw=15.8' r=1.139'	
s=.1 '/'	n=.04 V=12.81 fps L=630' Capacity=230.7 cfs	
Total Length= 1202 ft		Total Tc= 4.5

TYPE II 24-HOUR RAINFALL= 6.00 IN

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SUBCATCHMENT 252

PEAK= 42.96 CFS @ 11.87 HRS, VOLUME= 1.89 AF

ACRES	CN		SCS TR-20 METHOD
4.70	91	C SOIL, UNSTABILIZED	TYPE II 24-HOUR
.10	98	ROAD	RAINFALL= 6.00 IN
.20	74	C SOIL, GRASS, GOOD CONDITION	SPAN= 10-20 HRS, dt=.1 HRS
.60	70	C SOIL, FOREST, GOOD CONDITION	
5.60	88		

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.1
Paved Kv=20.3282 L=12' s=.02 '/' V=2.87 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.2
Short Grass Pasture Kv=7 L=20' s=.05 '/' V=1.57 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	1.2
Forest w/Heavy Litter Kv=2.5 L=110' s=.36 '/' V=1.5 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	1.2
Nearly Bare & Untilled Kv=10 L=370' s=.27 '/' V=5.2 fps		
CHANNEL FLOW	Segment ID:	.2
a=18 sq-ft Pw=15.8' r=1.139'		
s=.3 '/' n=.04 V=22.2 fps L=200' Capacity=399.5 cfs		
Total Length= 712 ft		Total Tc= 2.9

SUBCATCHMENT 253

PEAK= 45.03 CFS @ 11.86 HRS, VOLUME= 2.03 AF

ACRES	CN		SCS TR-20 METHOD
.20	98	ROAD	TYPE II 24-HOUR
.30	74	C SOIL, GRASS, GOOD CONDITION	RAINFALL= 6.00 IN
.80	70	C SOIL, FOREST, GOOD CONDITION	SPAN= 10-20 HRS, dt=.1 HRS
4.70	91	C SOIL, UNSTABILIZED	
6.00	88		

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.1
Paved Kv=20.3282 L=12' s=.02 '/' V=2.87 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.2
Short Grass Pasture Kv=7 L=20' s=.05 '/' V=1.57 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.2
Forest w/Heavy Litter Kv=2.5 L=20' s=.3 '/' V=1.37 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	1.5
Nearly Bare & Untilled Kv=10 L=520' s=.33 '/' V=5.74 fps		
Total Length= 572 ft		Total Tc= 2.0

TYPE II 24-HOUR RAINFALL= 6.00 IN

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SUBCATCHMENT 261

PEAK= 48.32 CFS @ 11.87 HRS, VOLUME= 2.14 AF

<u>ACRES</u>	<u>CN</u>		SCS TR-20 METHOD
4.40	91	C SOIL, UNSTABILIZED	TYPE II 24-HOUR
.20	98	ROAD	RAINFALL= 6.00 IN
.40	74	C SOIL, GRASS, GOOD CONDITION	SPAN= 10-20 HRS, dt=.1 HRS
<u>1.70</u>	<u>70</u>	<u>C SOIL, FOREST, GOOD CONDITION</u>	
6.70	85		

<u>Method</u>	<u>Comment</u>	<u>Tc (min)</u>
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.1
Paved Kv=20.3282 L=12' s=.02 '/' V=2.87 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.2
Short Grass Pasture Kv=7 L=20' s=.05 '/' V=1.57 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	2.0
Nearly Bare & Untilled Kv=10 L=600' s=.25 '/' V=5 fps		
Total Length= 632 ft		Total Tc= 2.3

SUBCATCHMENT 262

PEAK= 52.17 CFS @ 11.89 HRS, VOLUME= 2.32 AF

<u>ACRES</u>	<u>CN</u>		SCS TR-20 METHOD
4.30	91	C SOIL, UNSTABILIZED	TYPE II 24-HOUR
.20	98	ROAD	RAINFALL= 6.00 IN
.30	74	C SOIL, GRASS, GOOD CONDITION	SPAN= 10-20 HRS, dt=.1 HRS
<u>2.80</u>	<u>70</u>	<u>C SOIL, FOREST, GOOD CONDITION</u>	
7.60	83		

<u>Method</u>	<u>Comment</u>	<u>Tc (min)</u>
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.1
Paved Kv=20.3282 L=12' s=.02 '/' V=2.87 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.2
Short Grass Pasture Kv=7 L=20' s=.05 '/' V=1.57 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	2.7
Forest w/Heavy Litter Kv=2.5 L=250' s=.38 '/' V=1.54 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	1.6
Nearly Bare & Untilled Kv=10 L=360' s=.14 '/' V=3.74 fps		
Total Length= 642 ft		Total Tc= 4.6

TYPE II 24-HOUR RAINFALL= 6.00 IN

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SUBCATCHMENT 263

PEAK= 49.85 CFS @ 11.88 HRS, VOLUME= 2.19 AF

ACRES	CN		SCS TR-20 METHOD
5.20	91	C SOIL, UNSTABILIZED	TYPE II 24-HOUR
.10	98	ROAD	RAINFALL= 6.00 IN
.10	74	C SOIL, GRASS, GOOD CONDITION	SPAN= 10-20 HRS, dt=.1 HRS
1.20	70	C SOIL, FOREST, GOOD CONDITION	
6.60	87		

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.1
Paved	Kv=20.3282 L=12' s=.02 '/' V=2.87 fps	
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.2
Short Grass Pasture	Kv=7 L=20' s=.05 '/' V=1.57 fps	
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	2.1
Forest w/Heavy Litter	Kv=2.5 L=200' s=.4 '/' V=1.58 fps	
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.8
Nearly Bare & Untilled	Kv=10 L=160' s=.12 '/' V=3.46 fps	
CHANNEL FLOW	Segment ID:	.4
a=18 sq-ft Pw=15.8' r=1.139'		
s=.15 '/' n=.04 V=15.69 fps L=400' Capacity=282.5 cfs		
Total Length= 792 ft		Total Tc= 3.6