

019-A-001-001

1-1 India St, Portland, ME

The Longfellow at Ocean Gateway

Riverwalk, LLC

Post-Development-SC

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Post-Development w/ StormChamber
Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 63

11/22/2006

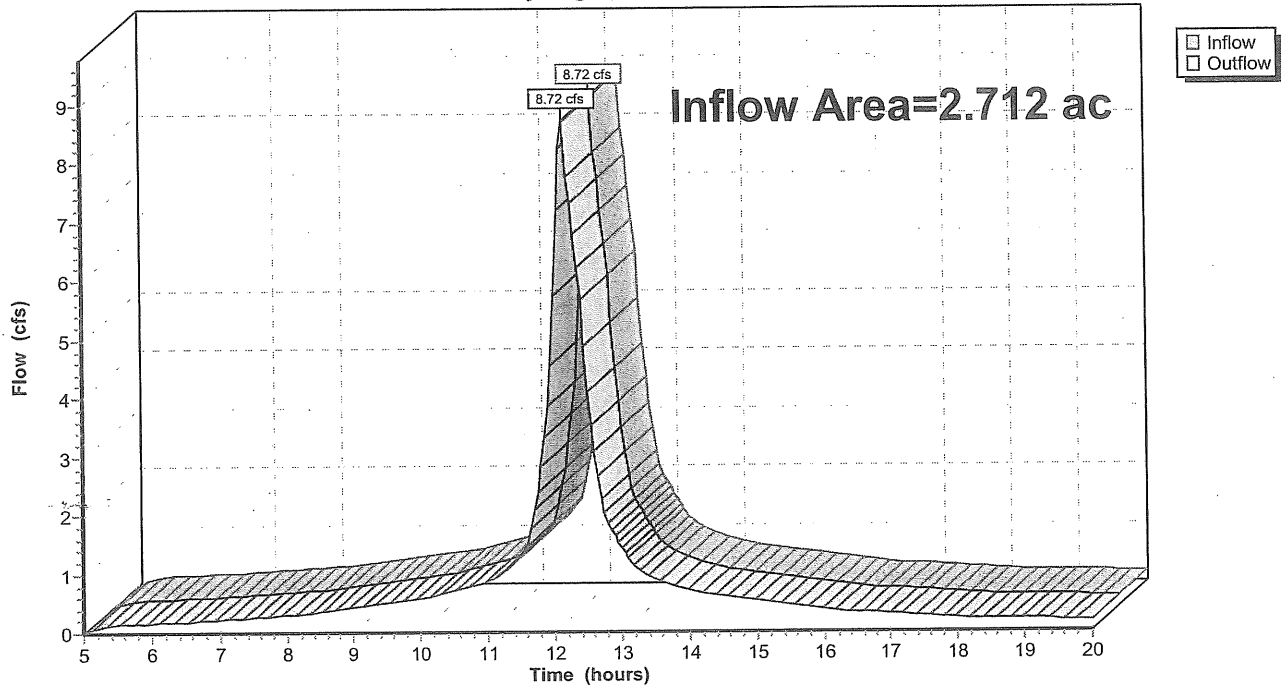
Reach FR: Fore River

Inflow Area = 2.712 ac, Inflow Depth > 4.24" for 25-Year Storm event
Inflow = 8.72 cfs @ 12.14 hrs, Volume= 0.957 af
Outflow = 8.72 cfs @ 12.14 hrs, Volume= 0.957 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach FR: Fore River

Hydrograph



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Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 62

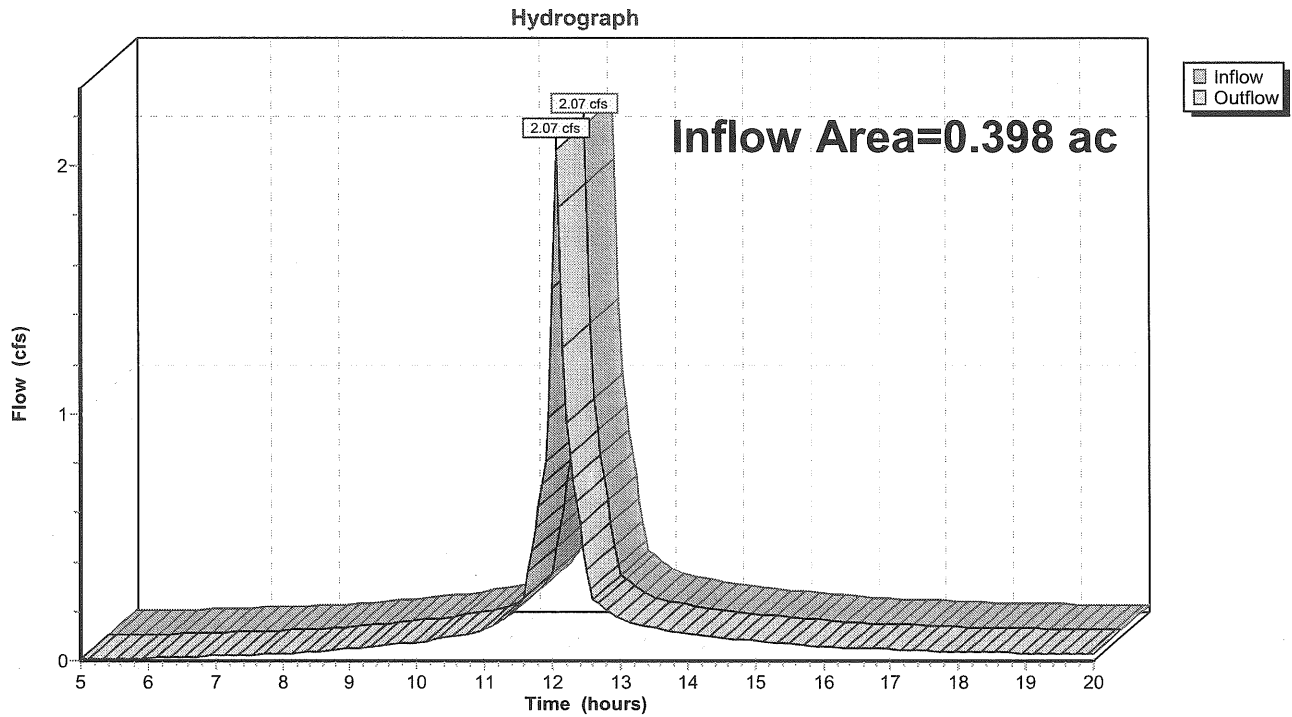
11/22/2006

Reach CS: Combined Sewer

Inflow Area = 0.398 ac, Inflow Depth > 4.22" for 25-Year Storm event
Inflow = 2.07 cfs @ 12.06 hrs, Volume= 0.140 af
Outflow = 2.07 cfs @ 12.06 hrs, Volume= 0.140 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach CS: Combined Sewer



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 Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 61

11/22/2006

Subcatchment 5CP: Plaza

Runoff = 0.68 cfs @ 12.02 hrs, Volume= 0.047 af, Depth> 4.87"

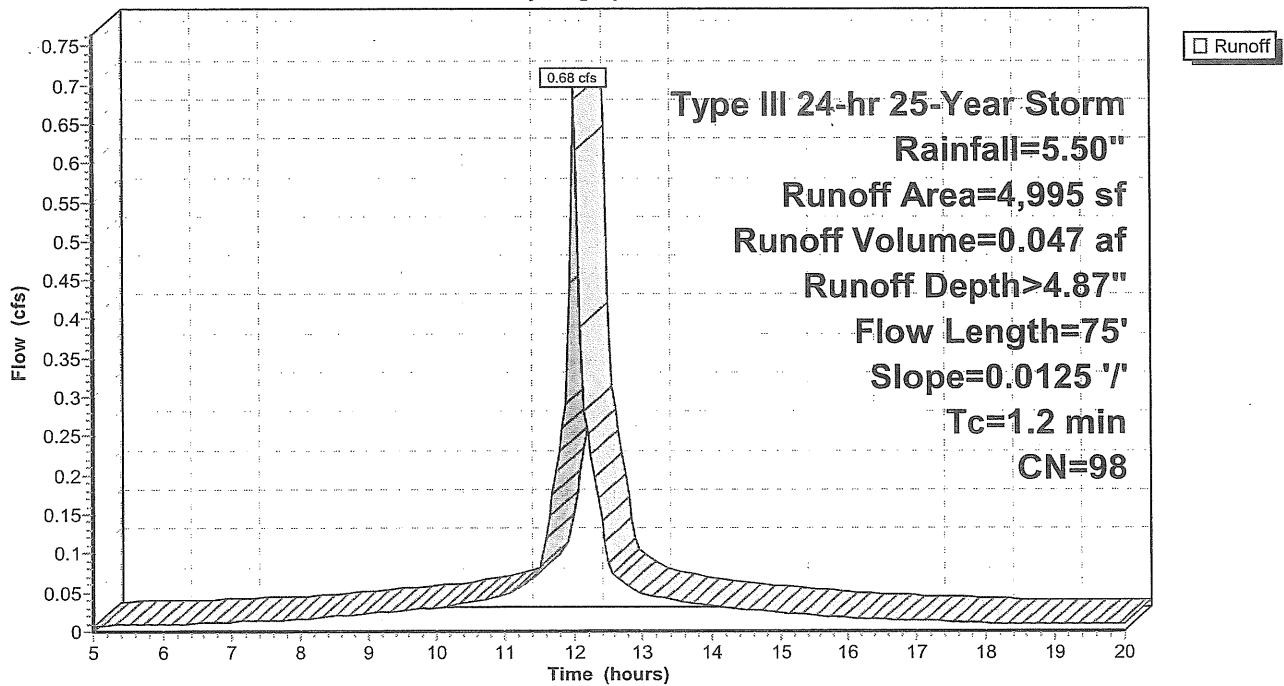
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
4,995	98	Paved parking & roofs
4,995		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	75	0.0125	1.04		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 3.00"

Subcatchment 5CP: Plaza

Hydrograph



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Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 60
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Subcatchment 5BP: East Half of Complex

Runoff = 4.65 cfs @ 12.09 hrs, Volume= 0.359 af, Depth> 4.87"

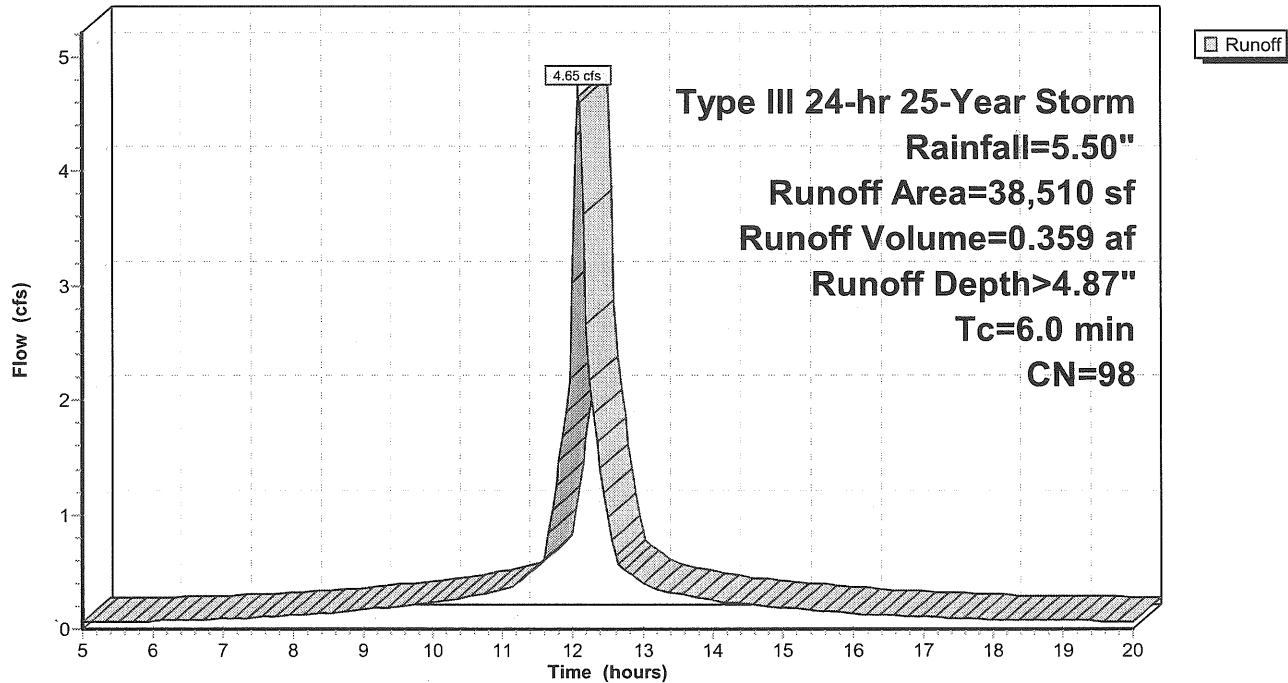
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
32,915	98	Paved parking & roofs
5,595	98	Plaza
38,510	98	Weighted Average
38,510		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Direct Entry

Subcatchment 5BP: East Half of Complex

Hydrograph



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 Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 59

11/22/2006

Subcatchment 5AP: West Half of Complex

Runoff = 1.74 cfs @ 12.09 hrs, Volume= 0.134 af, Depth> 4.87"

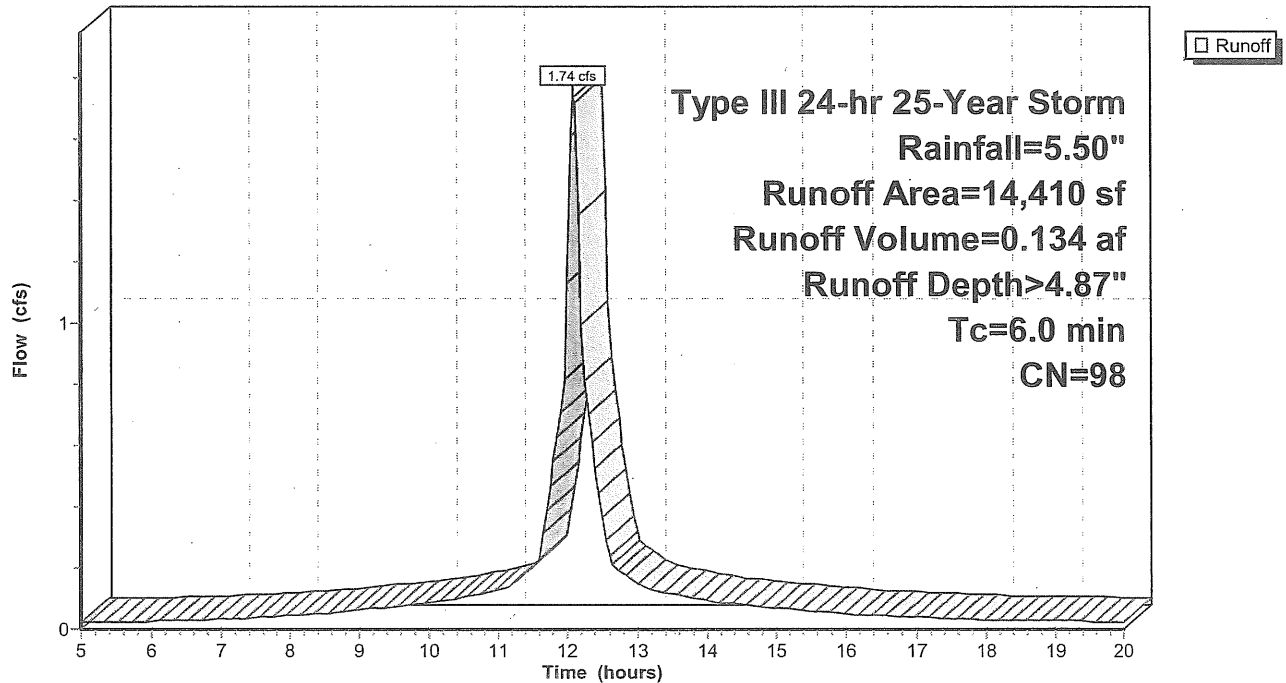
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
13,840	98	Buildings
570	98	Paved
14,410	98	Weighted Average
14,410		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Direct Entry

Subcatchment 5AP: West Half of Complex

Hydrograph



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Page 58
 11/22/2006

Subcatchment 4P: Back of PS

Runoff = 0.01 cfs @ 12.44 hrs, Volume= 0.002 af, Depth> 0.25"

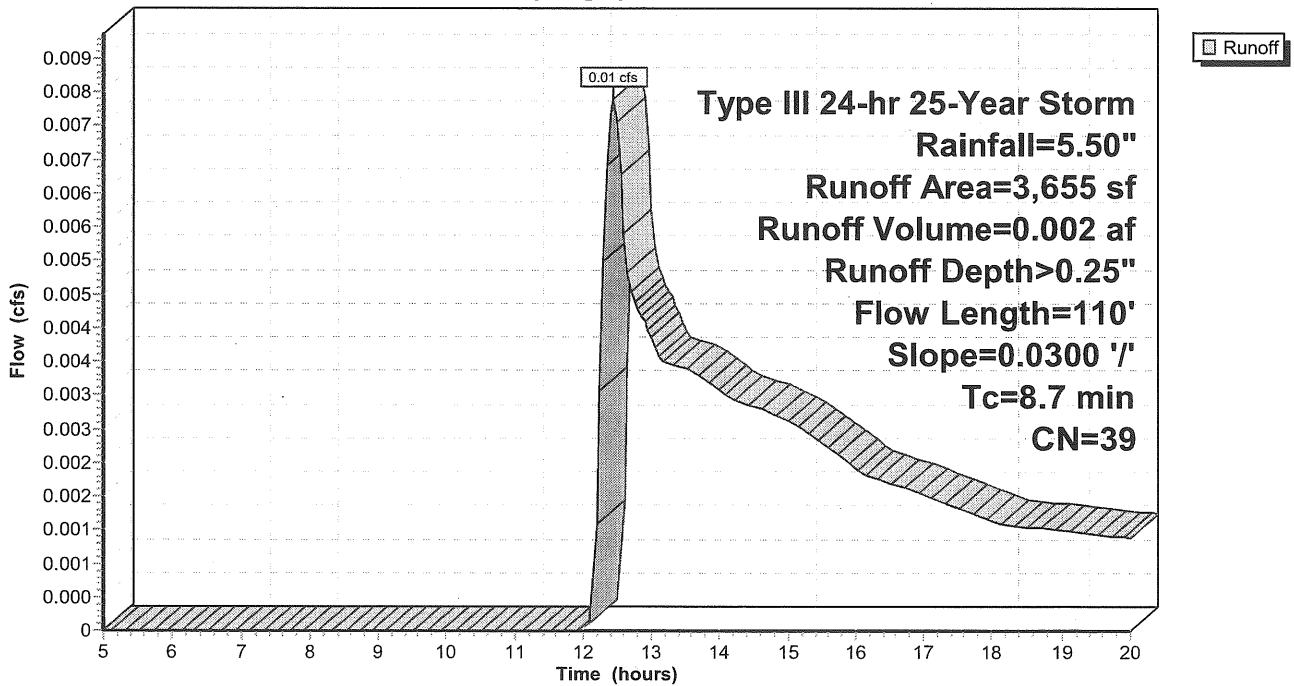
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
3,655	39	>75% Grass cover, Good, HSG A
3,655		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0300	0.19		Sheet Flow, AB Grass: Short n= 0.150 P2= 3.00"
0.1	10	0.0300	1.21		Shallow Concentrated Flow, BC Short Grass Pasture Kv= 7.0 fps
8.7	110	Total			

Subcatchment 4P: Back of PS

Hydrograph



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Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 57

11/22/2006

Subcatchment 3P: Turner Barker

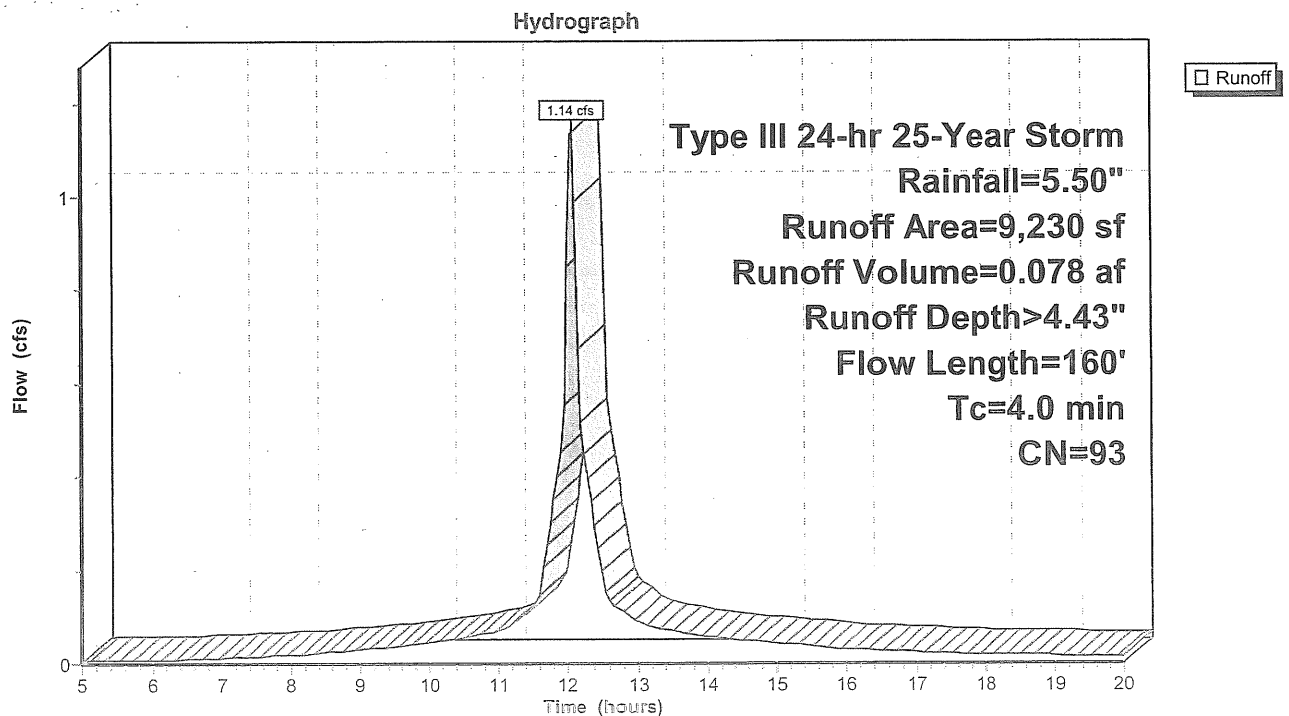
Runoff = 1.14 cfs @ 12.06 hrs, Volume= 0.078 af, Depth> 4.43"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
4,000	98	Building
4,380	98	Paved parking & roofs
850	39	>75% Grass cover, Good, HSG A
9,230	93	Weighted Average
850		Pervious Area
8,380		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	10	0.0050	0.06		Sheet Flow, AB Grass: Short n= 0.150 P2= 3.00"
0.8	30	0.0050	0.60		Sheet Flow, BC Smooth surfaces n= 0.011 P2= 3.00"
0.4	120	0.0100	5.36	4.21	Circular Channel (pipe), CDE Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011
4.0	160	Total			

Subcatchment 3P: Turner Barker



Post-Development-SC

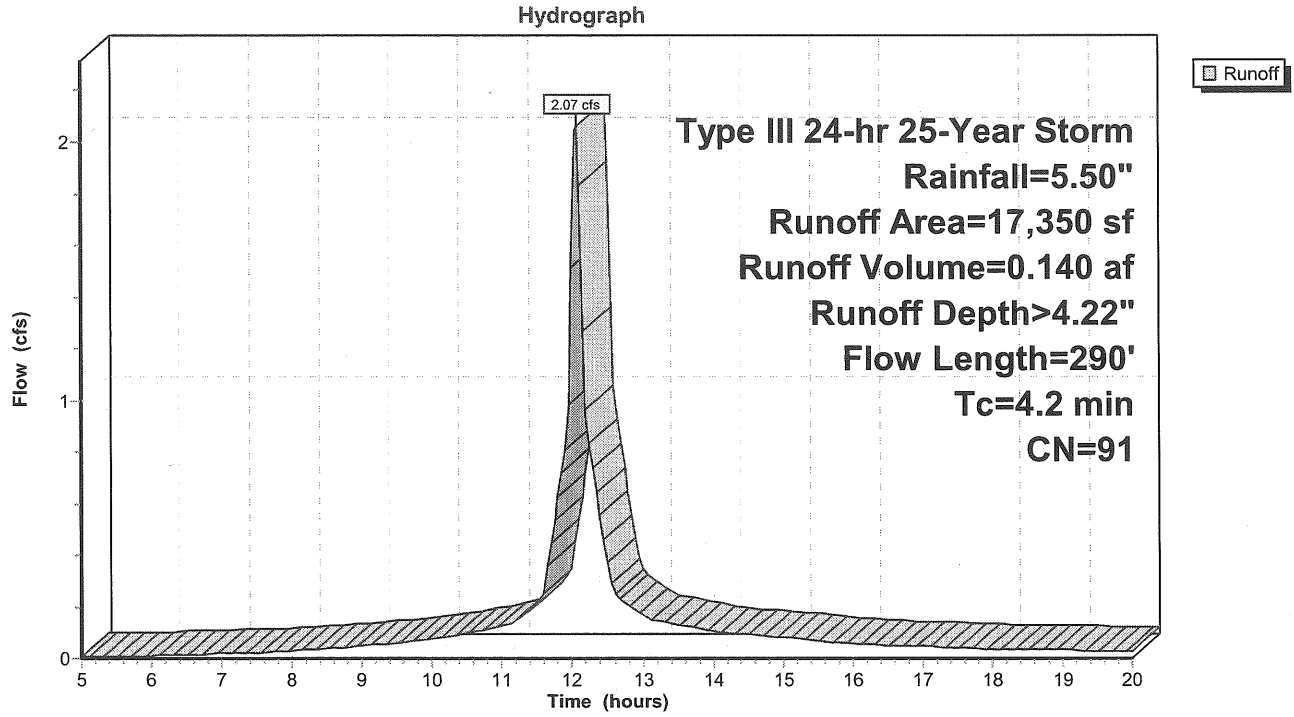
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Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 56
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Subcatchment 2P: Office Building



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 Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 55
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Subcatchment 2P: Office Building

Runoff = 2.07 cfs @ 12.06 hrs, Volume= 0.140 af, Depth> 4.22"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
5,810	98	Building
1,110	98	Paved roads w/curbs & sewers
2,130	39	>75% Grass cover, Good, HSG A
8,300	98	Gravel Parking
17,350	91	Weighted Average
2,130		Pervious Area
15,220		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	90	0.0250	1.43		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 3.00"
2.1	90	0.0100	0.70		Shallow Concentrated Flow, BC Short Grass Pasture Kv= 7.0 fps
0.1	25	0.2000	3.13		Shallow Concentrated Flow, CD Short Grass Pasture Kv= 7.0 fps
0.9	85	0.0060	1.57		Shallow Concentrated Flow, DE Paved Kv= 20.3 fps
4.2	290	Total			

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Page 54

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Subcatchment 1BP: Parking Garage

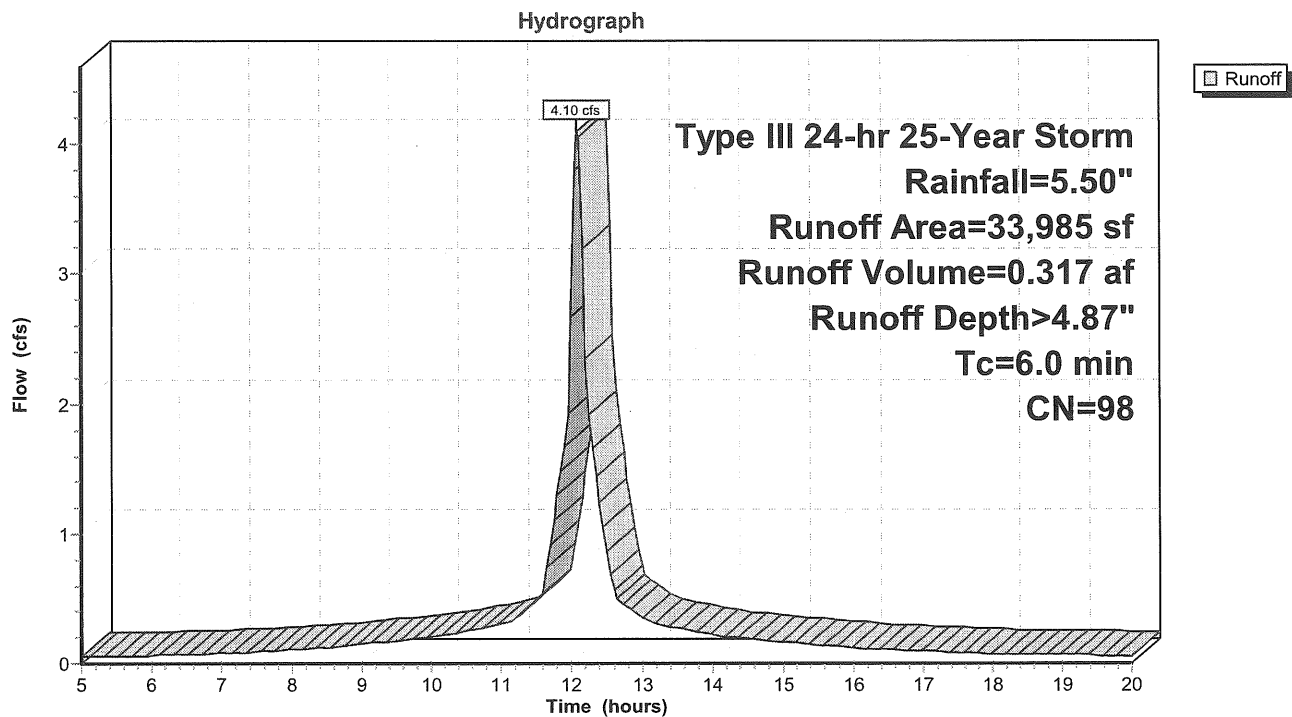
Runoff = 4.10 cfs @ 12.09 hrs, Volume= 0.317 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
30,730	98	Building
3,255	98	Paved
33,985	98	Weighted Average
33,985		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Direct Entry

Subcatchment 1BP: Parking Garage



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Page 53
 11/22/2006

Subcatchment 1AP: Open Space

Runoff = 0.29 cfs @ 12.11 hrs, Volume= 0.024 af, Depth> 0.92"

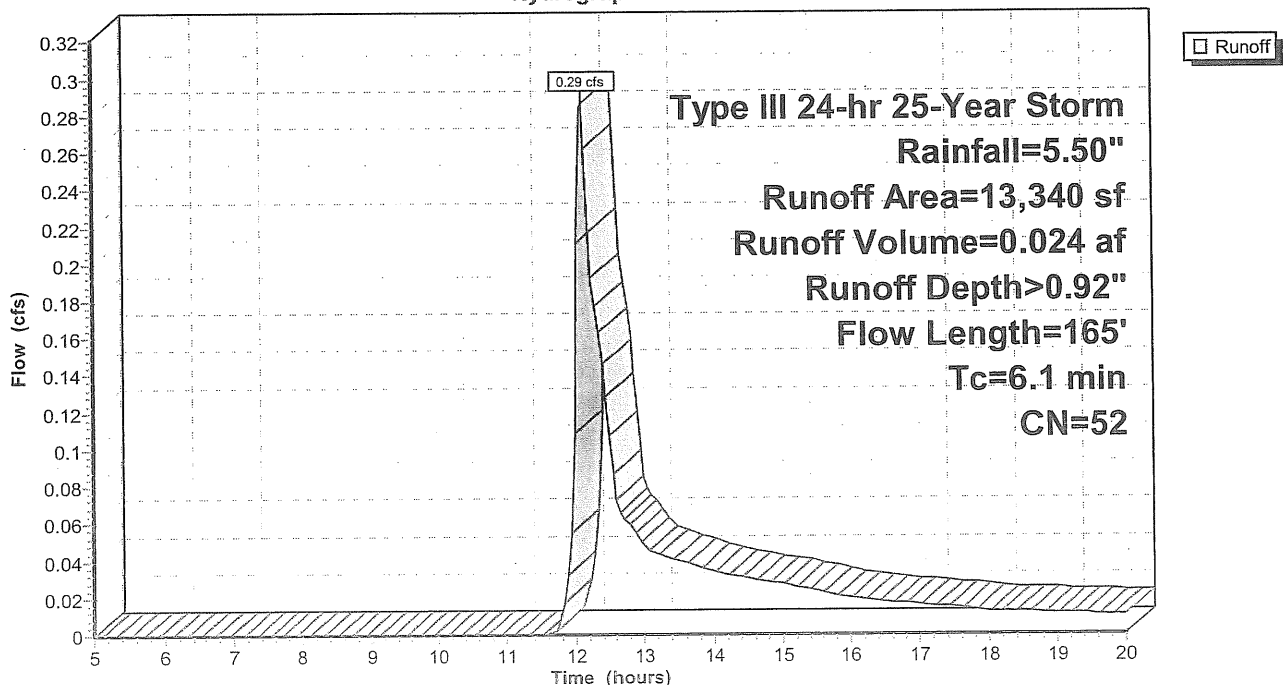
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
10,440	39	>75% Grass cover, Good, HSG A
2,900	98	Paved parking & roofs
13,340	52	Weighted Average
10,440		Pervious Area
2,900		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	45	0.0200	1.14		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 3.00"
4.8	55	0.0400	0.19		Sheet Flow, BC Grass: Short n= 0.150 P2= 3.00"
0.6	65	0.0600	1.71		Shallow Concentrated Flow, CD Short Grass Pasture Kv= 7.0 fps
6.1	165	Total			

Subcatchment 1AP: Open Space

Hydrograph



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Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 52

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Pond D7: Hancock

Peak Elev=8.91' Inflow=2.49 cfs 0.338 af
30.0" x 36.0' Culvert Outflow=2.49 cfs 0.338 af

Pond D8: Hancock Street Storm System

Peak Elev=10.44' Inflow=2.49 cfs 0.338 af
24.0" x 196.0' Culvert Outflow=2.49 cfs 0.338 af

Pond UH1: Hancock Link DMH1

Peak Elev=12.29' Inflow=2.49 cfs 0.338 af
24.0" x 125.0' Culvert Outflow=2.49 cfs 0.338 af

Pond UH2: Hancock Link DMH2

Peak Elev=17.05' Inflow=2.49 cfs 0.338 af
24.0" x 106.0' Culvert Outflow=2.49 cfs 0.338 af

Total Runoff Area = 3.110 ac Runoff Volume = 1.101 af Average Runoff Depth = 4.25"
12.60% Pervious Area = 0.392 ac 87.40% Impervious Area = 2.718 ac

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Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 51

11/22/2006

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1AP: Open Space

Runoff Area=13,340 sf Runoff Depth>0.92"
Flow Length=165' Tc=6.1 min CN=52 Runoff=0.29 cfs 0.024 af

Subcatchment 1BP: Parking Garage

Runoff Area=33,985 sf Runoff Depth>4.87"
Tc=6.0 min CN=98 Runoff=4.10 cfs 0.317 af

Subcatchment 2P: Office Building

Runoff Area=17,350 sf Runoff Depth>4.22"
Flow Length=290' Tc=4.2 min CN=91 Runoff=2.07 cfs 0.140 af

Subcatchment 3P: Turner Barker

Runoff Area=9,230 sf Runoff Depth>4.43"
Flow Length=160' Tc=4.0 min CN=93 Runoff=1.14 cfs 0.078 af

Subcatchment 4P: Back of PS

Runoff Area=3,655 sf Runoff Depth>0.25"
Flow Length=110' Slope=0.0300 '/' Tc=8.7 min CN=39 Runoff=0.01 cfs 0.002 af

Subcatchment 5AP: West Half of Complex

Runoff Area=14,410 sf Runoff Depth>4.87"
Tc=6.0 min CN=98 Runoff=1.74 cfs 0.134 af

Subcatchment 5BP: East Half of Complex

Runoff Area=38,510 sf Runoff Depth>4.87"
Tc=6.0 min CN=98 Runoff=4.65 cfs 0.359 af

Subcatchment 5CP: Plaza

Runoff Area=4,995 sf Runoff Depth>4.87"
Flow Length=75' Slope=0.0125 '/' Tc=1.2 min CN=98 Runoff=0.68 cfs 0.047 af

Reach CS: Combined Sewer

Inflow=2.07 cfs 0.140 af
Outflow=2.07 cfs 0.140 af

Reach FR: Fore River

Inflow=8.72 cfs 0.957 af
Outflow=8.72 cfs 0.957 af

Reach TOT: (new node)

Inflow=10.13 cfs 1.097 af
Outflow=10.13 cfs 1.097 af

Pond 1B: Subsurface Detention for Parking G Peak Elev=21.24' Storage=2,187 cf Inflow=4.10 cfs 0.317 af
Outflow=2.28 cfs 0.315 af

Pond 5C: Subsurface Detention for Plaza Peak Elev=12.97' Storage=1,766 cf Inflow=6.84 cfs 0.540 af
Outflow=5.56 cfs 0.539 af

Pond D2: Commercial Street Storm System

Peak Elev=11.00' Inflow=1.14 cfs 0.080 af
15.0" x 192.0' Culvert Outflow=1.14 cfs 0.080 af

Pond D3: Commercial

Peak Elev=10.99' Inflow=6.27 cfs 0.619 af
15.0" x 192.0' Culvert Outflow=6.27 cfs 0.619 af

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Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 50
11/22/2006

Pond UH2: Hancock Link DMH2

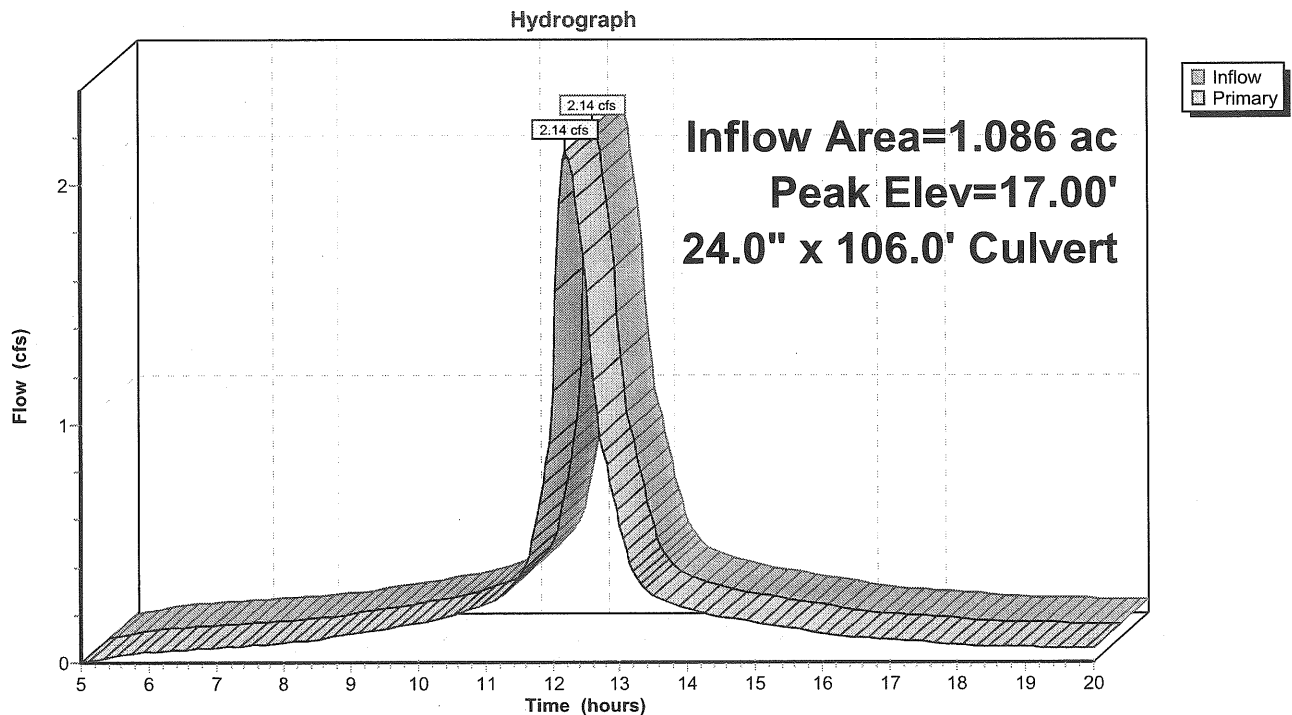
Inflow Area = 1.086 ac, Inflow Depth > 3.12" for 10-Year Storm event
Inflow = 2.14 cfs @ 12.20 hrs, Volume= 0.283 af
Outflow = 2.14 cfs @ 12.20 hrs, Volume= 0.283 af, Atten= 0%, Lag= 0.0 min
Primary = 2.14 cfs @ 12.20 hrs, Volume= 0.283 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 17.00' @ 12.20 hrs
Flood Elev= 22.41'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.39'	24.0" x 106.0' long Culvert RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 11.73' S= 0.0440 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=2.14 cfs @ 12.20 hrs HW=17.00' TW=12.24' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.14 cfs @ 2.65 fps)

Pond UH2: Hancock Link DMH2



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 Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 49

11/22/2006

Pond UH1: Hancock Link DMH1

Inflow Area = 1.086 ac, Inflow Depth > 3.12" for 10-Year Storm event
 Inflow = 2.14 cfs @ 12.20 hrs, Volume= 0.283 af
 Outflow = 2.14 cfs @ 12.20 hrs, Volume= 0.283 af, Atten= 0%, Lag= 0.0 min
 Primary = 2.14 cfs @ 12.20 hrs, Volume= 0.283 af

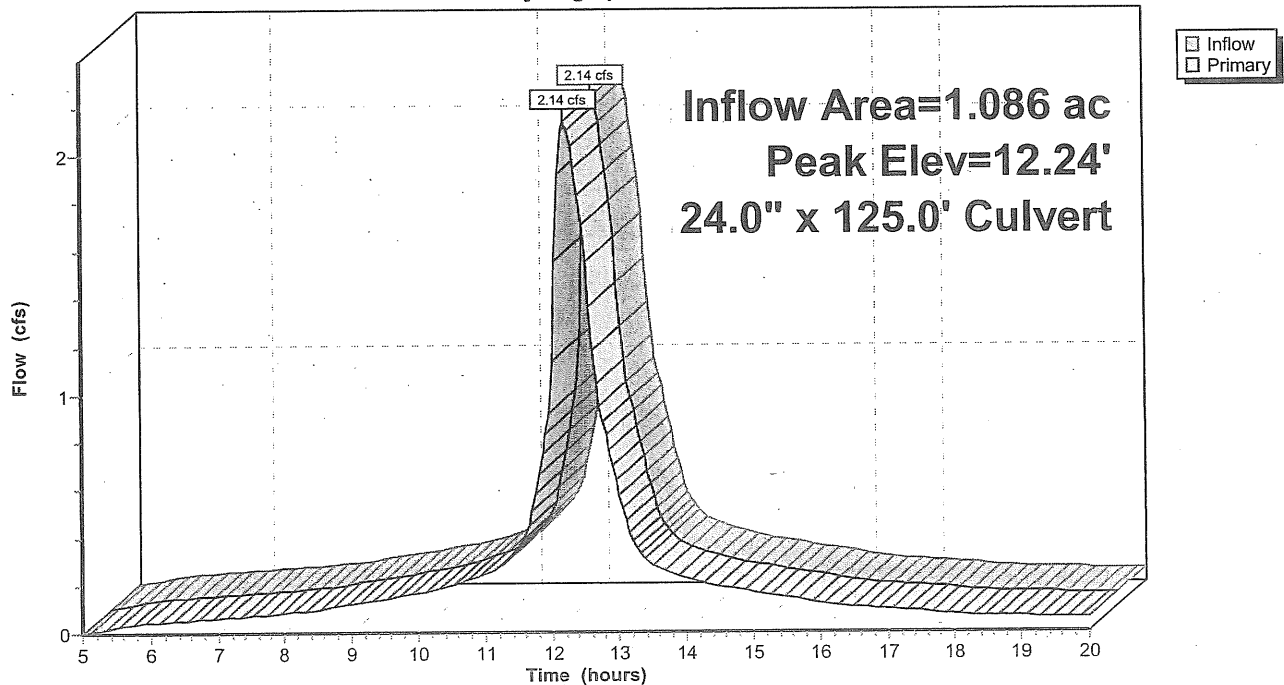
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 12.24' @ 12.20 hrs
 Flood Elev= 16.51'

Device	Routing	Invert	Outlet Devices
#1	Primary	11.63'	24.0" x 125.0' long Culvert RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 9.88' S= 0.0140 '/ Cc= 0.900 n= 0.012

Primary OutFlow Max=2.14 cfs @ 12.20 hrs HW=12.24' TW=10.39' (Dynamic Tailwater)
 1=Culvert (Inlet Controls 2.14 cfs @ 2.65 fps)

Pond UH1: Hancock Link DMH1

Hydrograph



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Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 48

11/22/2006

Pond D8: Hancock Street Storm System

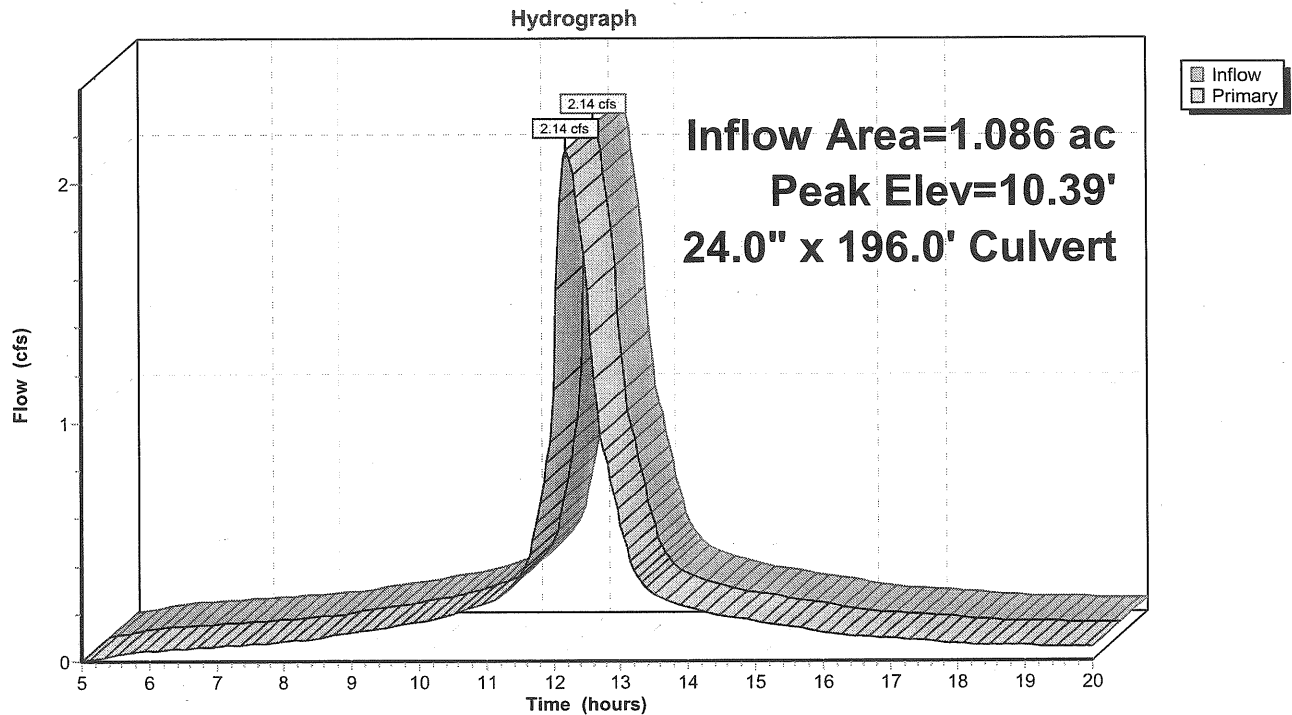
Inflow Area = 1.086 ac, Inflow Depth > 3.12" for 10-Year Storm event
Inflow = 2.14 cfs @ 12.20 hrs, Volume= 0.283 af
Outflow = 2.14 cfs @ 12.20 hrs, Volume= 0.283 af, Atten= 0%, Lag= 0.0 min
Primary = 2.14 cfs @ 12.20 hrs, Volume= 0.283 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 10.39' @ 12.20 hrs
Flood Elev= 15.38'

Device	Routing	Invert	Outlet Devices
#1	Primary	9.78'	24.0" x 196.0' long Culvert Ke= 0.500 Outlet Invert= 8.18' S= 0.0082 ' Cc= 0.900 n= 0.011

Primary OutFlow Max=2.14 cfs @ 12.20 hrs HW=10.39' TW=8.85' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.14 cfs @ 2.65 fps)

Pond D8: Hancock Street Storm System



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Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 47

11/22/2006

Pond D7: Hancock

Inflow Area = 1.086 ac, Inflow Depth > 3.12" for 10-Year Storm event
Inflow = 2.14 cfs @ 12.20 hrs, Volume= 0.283 af
Outflow = 2.14 cfs @ 12.20 hrs, Volume= 0.283 af, Atten= 0%, Lag= 0.0 min
Primary = 2.14 cfs @ 12.20 hrs, Volume= 0.283 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 8.85' @ 12.20 hrs

Flood Elev= 13.91'

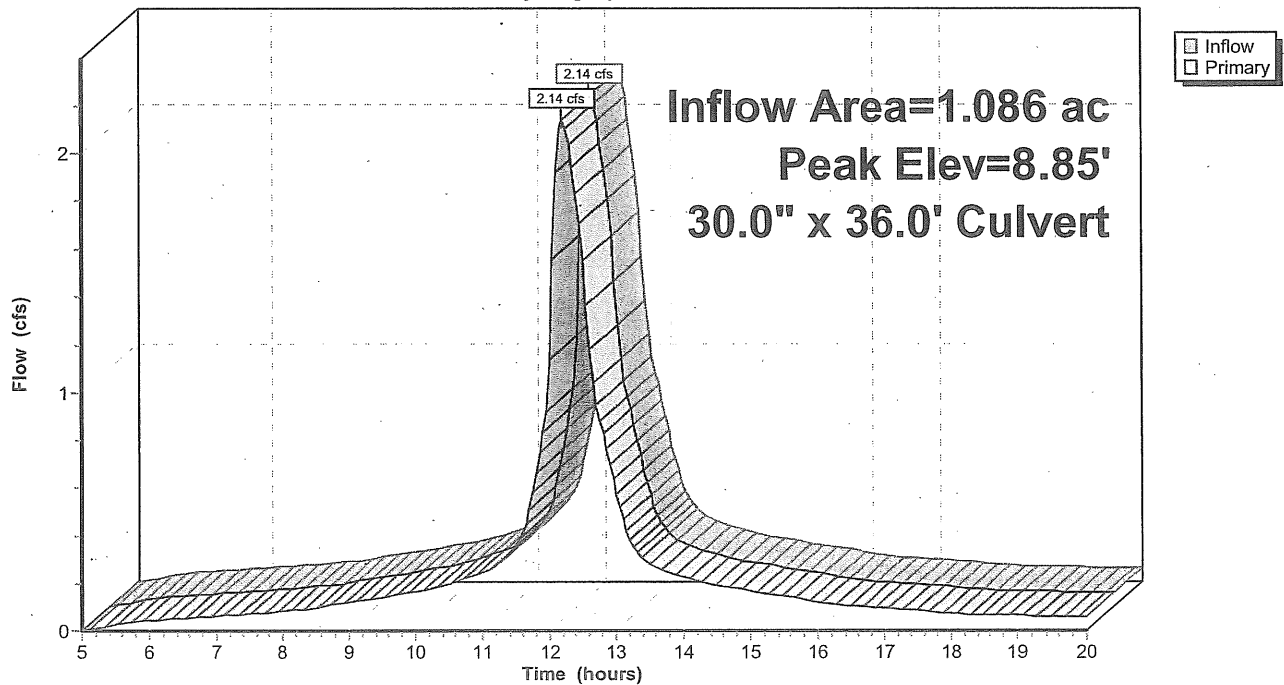
Device	Routing	Invert	Outlet Devices
#1	Primary	8.08'	30.0" x 36.0' long Culvert Ke= 0.500 Outlet Invert= 8.07' S= 0.0003 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=2.14 cfs @ 12.20 hrs HW=8.85' TW=0.00' (Dynamic Tailwater)

↑1=Culvert (Barrel Controls 2.14 cfs @ 2.48 fps)

Pond D7: Hancock

Hydrograph



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Post-Development w/ StormChamber
Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 46

11/22/2006

Pond D3: Commercial

Inflow Area = 1.625 ac, Inflow Depth > 3.87" for 10-Year Storm event
Inflow = 5.11 cfs @ 12.12 hrs, Volume= 0.524 af
Outflow = 5.11 cfs @ 12.12 hrs, Volume= 0.524 af, Atten= 0%, Lag= 0.0 min
Primary = 5.11 cfs @ 12.12 hrs, Volume= 0.524 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 10.42' @ 12.12 hrs

Flood Elev= 13.91'

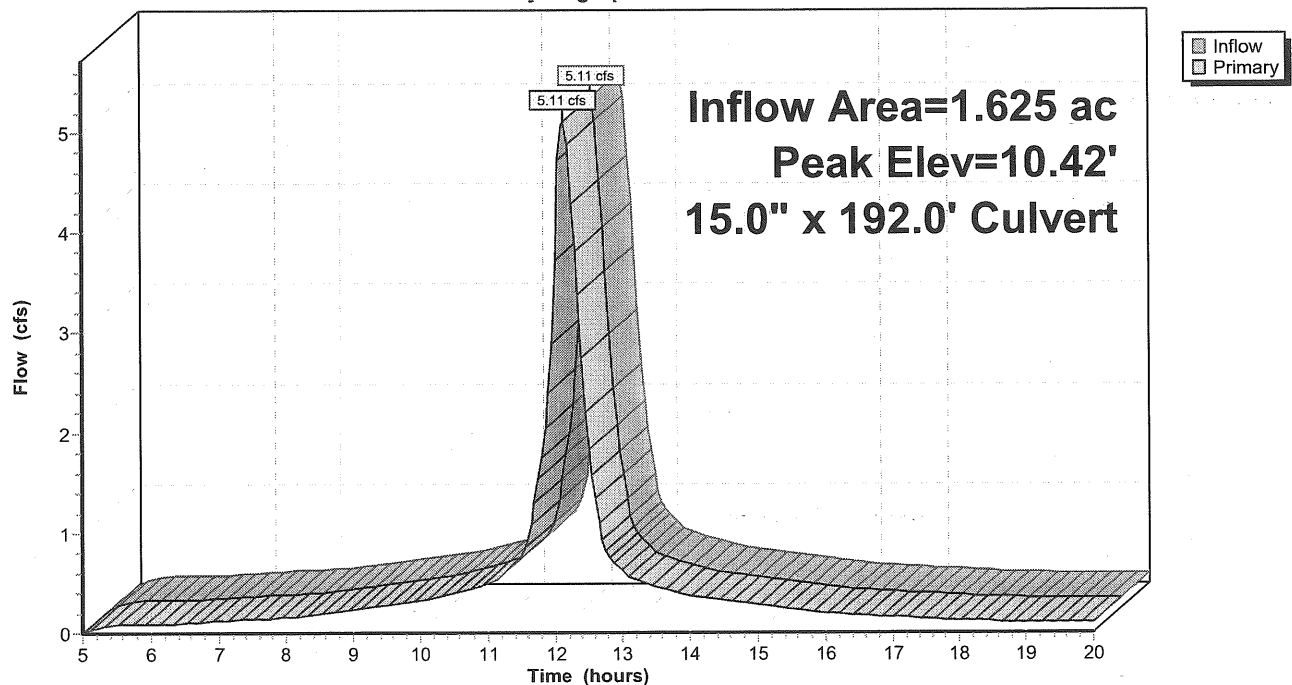
Device	Routing	Invert	Outlet Devices
#1	Primary	8.35'	15.0" x 192.0' long Culvert. Ke= 0.500 Outlet Invert= 8.06' S= 0.0015 '/' Cc= 0.900 n= 0.010

Primary OutFlow Max=5.06 cfs @ 12.12 hrs HW=10.41' TW=0.00' (Dynamic Tailwater)

1=Culvert (Barrel Controls 5.06 cfs @ 4.12 fps)

Pond D3: Commercial

Hydrograph



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Post-Development w/ StormChamber
Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 45

11/22/2006

Pond D2: Commercial Street Storm System

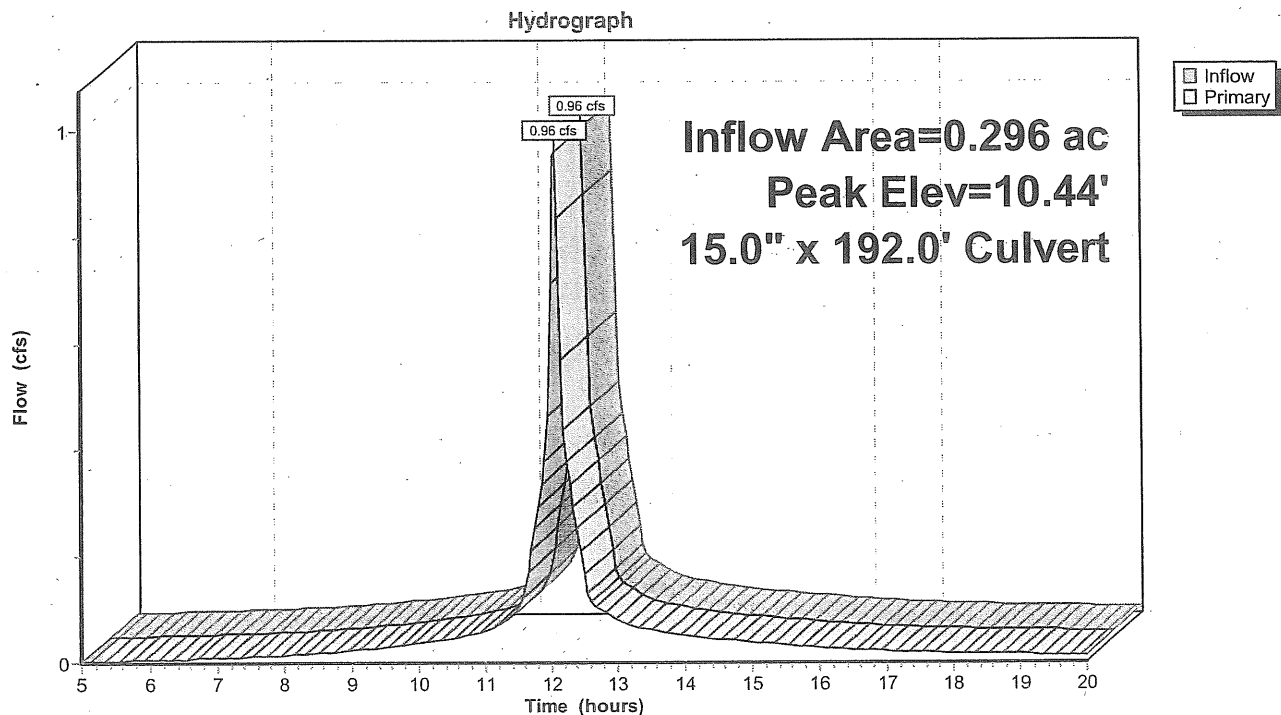
Inflow Area = 0.296 ac, Inflow Depth > 2.67" for 10-Year Storm event
Inflow = 0.96 cfs @ 12.06 hrs, Volume= 0.066 af
Outflow = 0.96 cfs @ 12.06 hrs, Volume= 0.066 af, Atten= 0%, Lag= 0.0 min
Primary = 0.96 cfs @ 12.06 hrs, Volume= 0.066 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 10.44' @ 12.17 hrs
Flood Elev= 14.95'

Device	Routing	Invert	Outlet Devices
#1	Primary	8.74'	15.0" x 192.0' long Culvert Ke= 0.500 Outlet Invert= 8.45' S= 0.0015 '/' Cc= 0.900 n= 0.010

Primary OutFlow Max=0.00 cfs @ 12.06 hrs HW=9.89' TW=10.29' (Dynamic Tailwater)
↑1=Culvert (Controls 0.00 cfs)

Pond D2: Commercial Street Storm System



Post-Development-SC

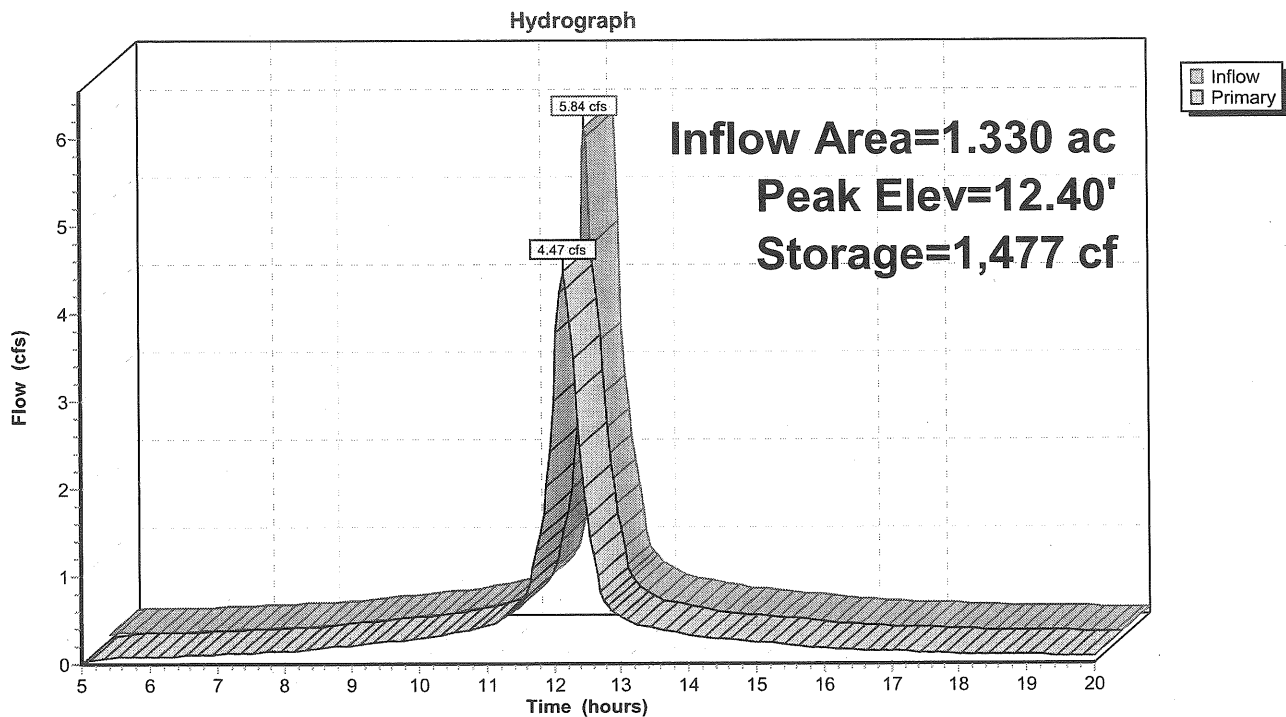
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Post-Development w/ StormChamber
Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 44
11/22/2006

Pond 5C: Subsurface Detention for Plaza



Post-Development-SC

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Post-Development w/ StormChamber
Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 43

11/22/2006

Pond 5C: Subsurface Detention for Plaza

Inflow Area = 1.330 ac, Inflow Depth > 4.15" for 10-Year Storm event
 Inflow = 5.84 cfs @ 12.08 hrs, Volume= 0.459 af
 Outflow = 4.47 cfs @ 12.15 hrs, Volume= 0.458 af, Atten= 23%, Lag= 4.3 min
 Primary = 4.47 cfs @ 12.15 hrs, Volume= 0.458 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 12.40' @ 12.16 hrs Surf.Area= 835 sf Storage= 1,477 cf

Plug-Flow detention time= 5.9 min calculated for 0.456 af (99% of inflow)
 Center-of-Mass det. time= 4.4 min (739.6 - 735.2)

Volume	Invert	Avail. Storage	Storage Description
#1	9.50'	1,086 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 3,758 cf Overall - 1,044 cf Embedded = 2,714 cf x 40.0% Voids
#2	10.50'	1,044 cf	58.4"W x 34.8"H x 7.60"L StormChamber x 14 Inside #1
		2,129 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
9.50	835	0	0
14.00	835	3,758	3,758

Device	Routing	Invert	Outlet Devices
#1	Primary	9.50'	12.0" x 50.0' long Culvert CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 9.00' S= 0.0100 '/' Cc= 0.900 n= 0.011
#2	Device 1	9.50'	8.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	10.50'	8.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	12.50'	12.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=4.47 cfs @ 12.15 hrs HW=12.39' TW=10.39' (Dynamic Tailwater)

- ↑ 1=Culvert (Passes 4.47 cfs of 5.35 cfs potential flow)
- ↑ 2=Orifice/Grate (Orifice Controls 2.38 cfs @ 6.81 fps)
- ↑ 3=Orifice/Grate (Orifice Controls 2.10 cfs @ 6.01 fps)
- ↑ 4=Orifice/Grate (Controls 0.00 cfs)

Post-Development-SC

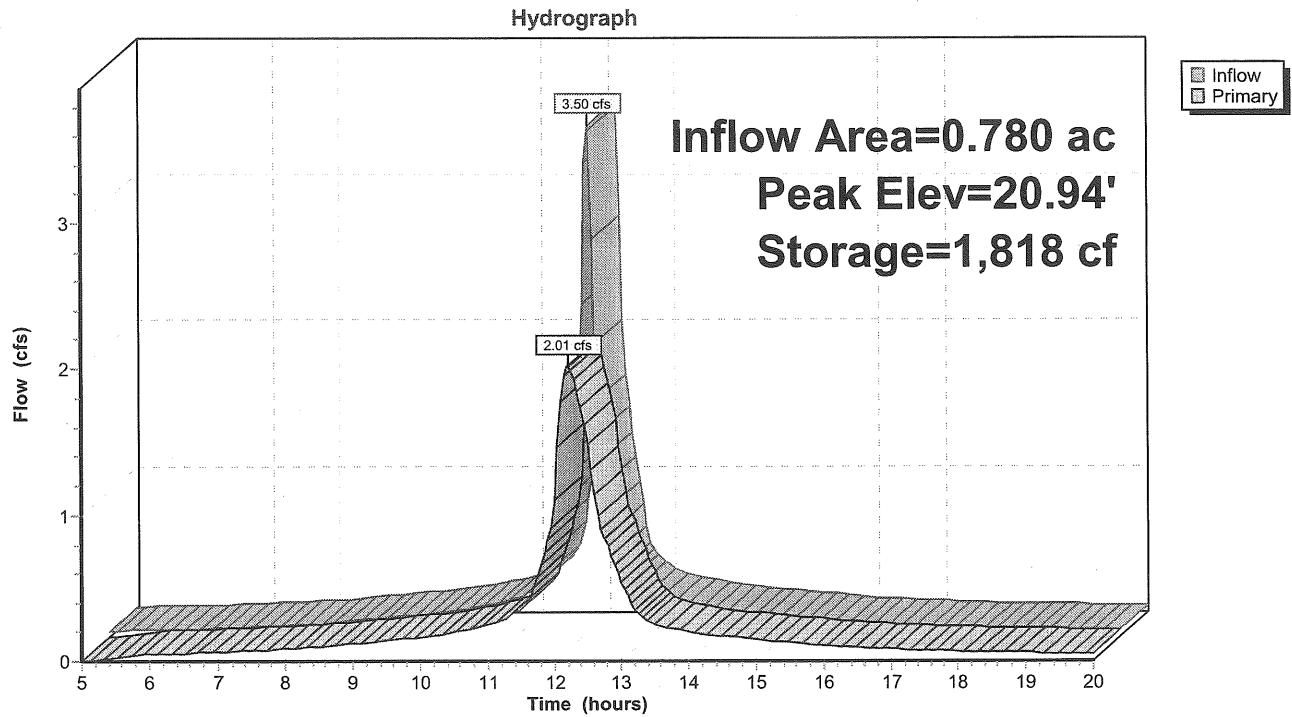
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Post-Development w/ StormChamber
Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 42
11/22/2006

Pond 1B: Subsurface Detention for Parking Garage



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 Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 41
 11/22/2006

Pond 1B: Subsurface Detention for Parking Garage

Inflow Area = 0.780 ac, Inflow Depth > 4.15" for 10-Year Storm event
 Inflow = 3.50 cfs @ 12.09 hrs, Volume= 0.270 af
 Outflow = 2.01 cfs @ 12.21 hrs, Volume= 0.268 af, Atten= 42%, Lag= 7.4 min
 Primary = 2.01 cfs @ 12.21 hrs, Volume= 0.268 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 20.94' @ 12.21 hrs Surf.Area= 1,590 sf Storage= 1,818 cf

Plug-Flow detention time= 15.9 min calculated for 0.268 af (99% of inflow)
 Center-of-Mass det. time= 12.4 min (747.9 - 735.5)

Volume	Invert	Avail.Storage	Storage Description
#1	19.00'	1,967 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 7,155 cf Overall - 2,236 cf Embedded = 4,919 cf x 40.0% Voids
#2	20.00'	2,236 cf	58.4"W x 34.8"H x 7.60"L StormChamber x 30 Inside #1
		4,204 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
19.00	1,590	0	0
23.50	1,590	7,155	7,155

Device	Routing	Invert	Outlet Devices
#1	Primary	19.00'	12.0" x 150.0' long Culvert CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 18.00' S= 0.0067 ' S= 0.0067 ' Cc= 0.900 n= 0.011
#2	Device 1	20.00'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	19.00'	6.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	22.00'	12.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=2.01 cfs @ 12.21 hrs HW=20.93' TW=17.00' (Dynamic Tailwater)

- ↑ 1=Culvert (Passes 2.01 cfs of 3.97 cfs potential flow)
- ↑ 2=Orifice/Grate (Orifice Controls 0.78 cfs @ 3.98 fps)
- ↑ 3=Orifice/Grate (Orifice Controls 1.23 cfs @ 6.24 fps)
- ↑ 4=Orifice/Grate (Controls 0.00 cfs)

Post-Development-SC

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Post-Development w/ StormChamber
Type III 24-hr 10-Year Storm Rainfall=4.70"

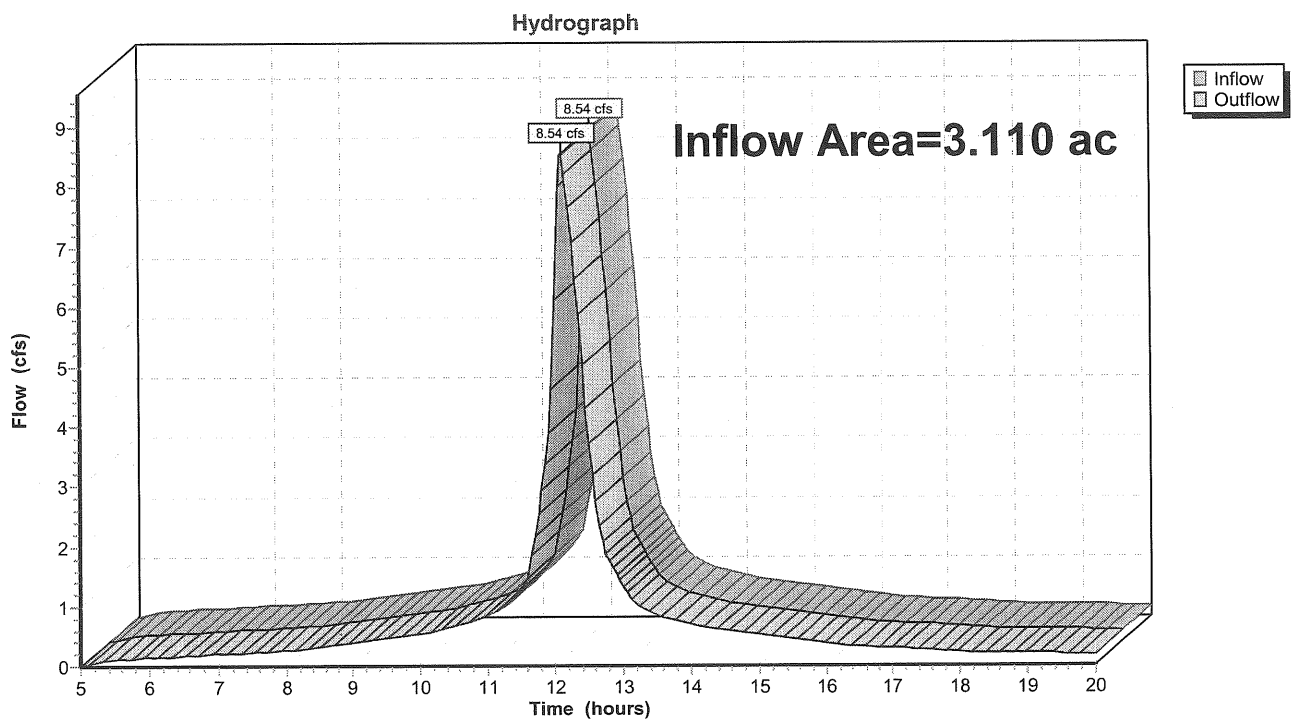
Page 40
11/22/2006

Reach TOT: (new node)

Inflow Area = 3.110 ac, Inflow Depth > 3.56" for 10-Year Storm event
Inflow = 8.54 cfs @ 12.11 hrs, Volume= 0.923 af
Outflow = 8.54 cfs @ 12.11 hrs, Volume= 0.923 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach TOT: (new node)



Post-Development-SC

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Post-Development w/ StormChamber
Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 39

11/22/2006

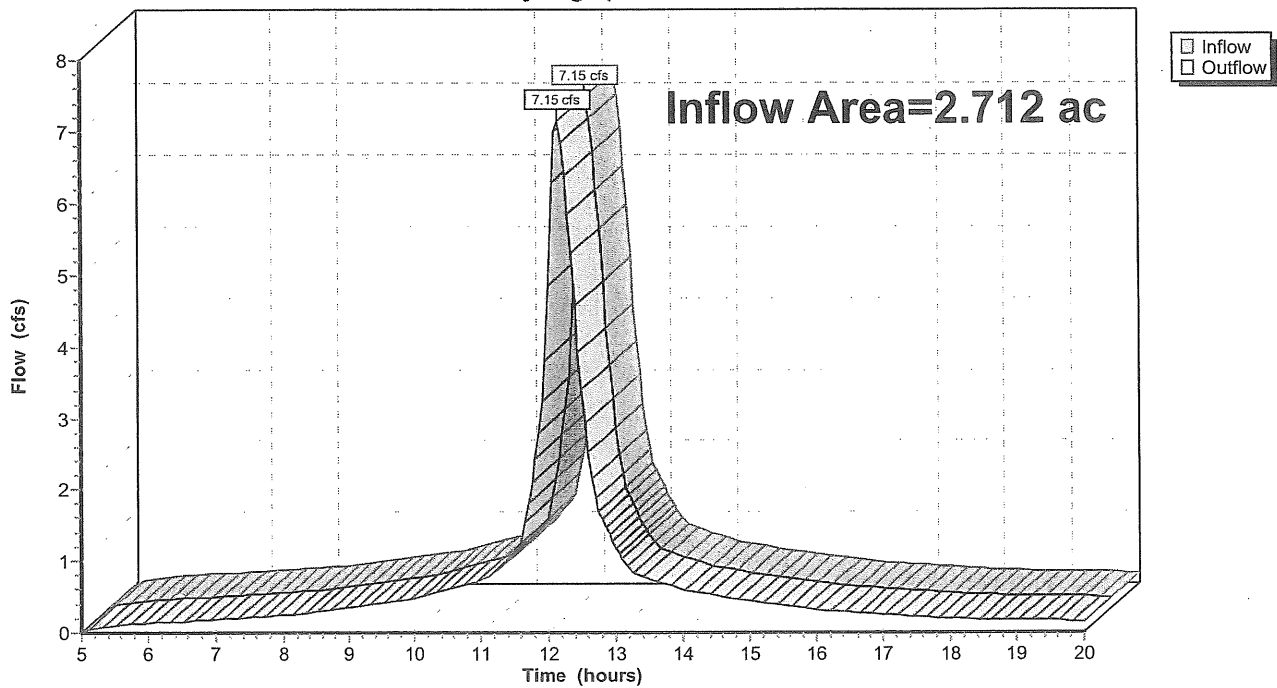
Reach FR: Fore River

Inflow Area = 2.712 ac, Inflow Depth > 3.57" for 10-Year Storm event
Inflow = 7.15 cfs @ 12.14 hrs, Volume= 0.807 af
Outflow = 7.15 cfs @ 12.14 hrs, Volume= 0.807 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach FR: Fore River

Hydrograph



Post-Development-SC

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Post-Development w/ StormChamber
Type III 24-hr 10-Year Storm Rainfall=4.70"

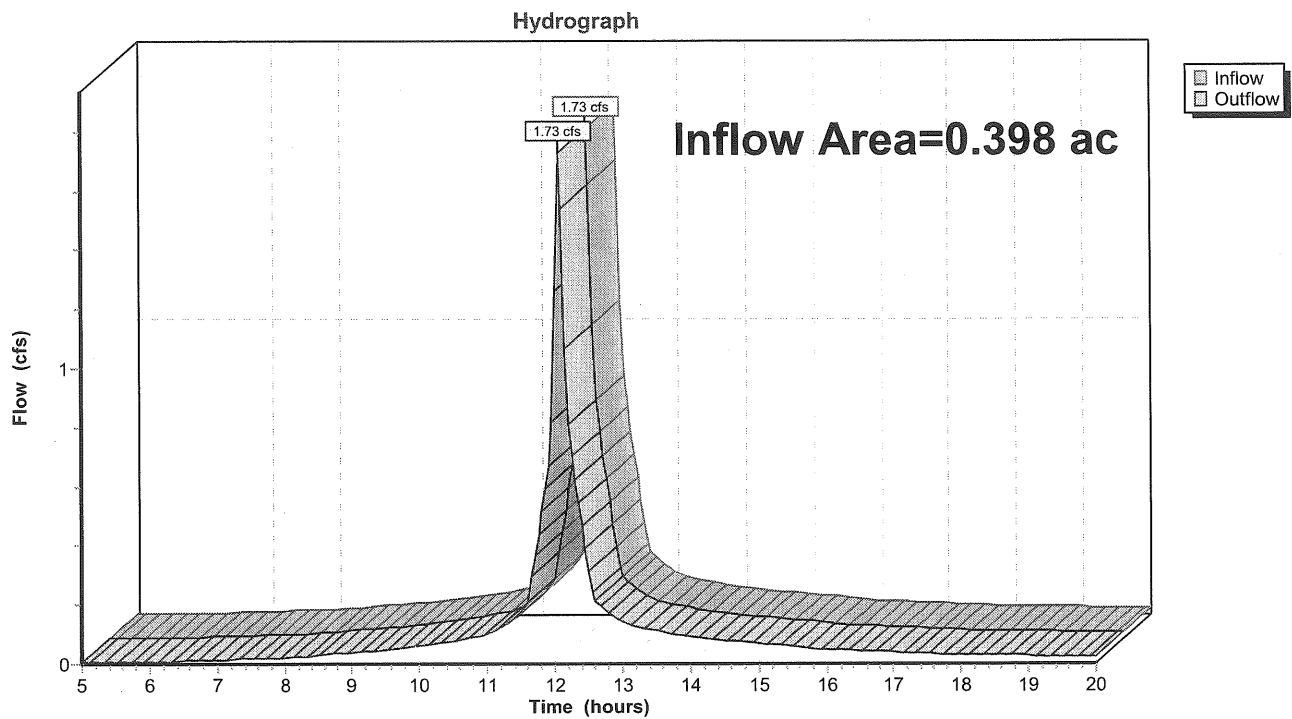
Page 38
11/22/2006

Reach CS: Combined Sewer

Inflow Area = 0.398 ac, Inflow Depth > 3.49" for 10-Year Storm event
Inflow = 1.73 cfs @ 12.06 hrs, Volume= 0.116 af
Outflow = 1.73 cfs @ 12.06 hrs, Volume= 0.116 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach CS: Combined Sewer



Post-Development-SC

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Post-Development w/ StormChamber
 Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 37
 11/22/2006

Subcatchment 5CP: Plaza

Runoff = 0.58 cfs @ 12.02 hrs, Volume= 0.040 af, Depth> 4.15"

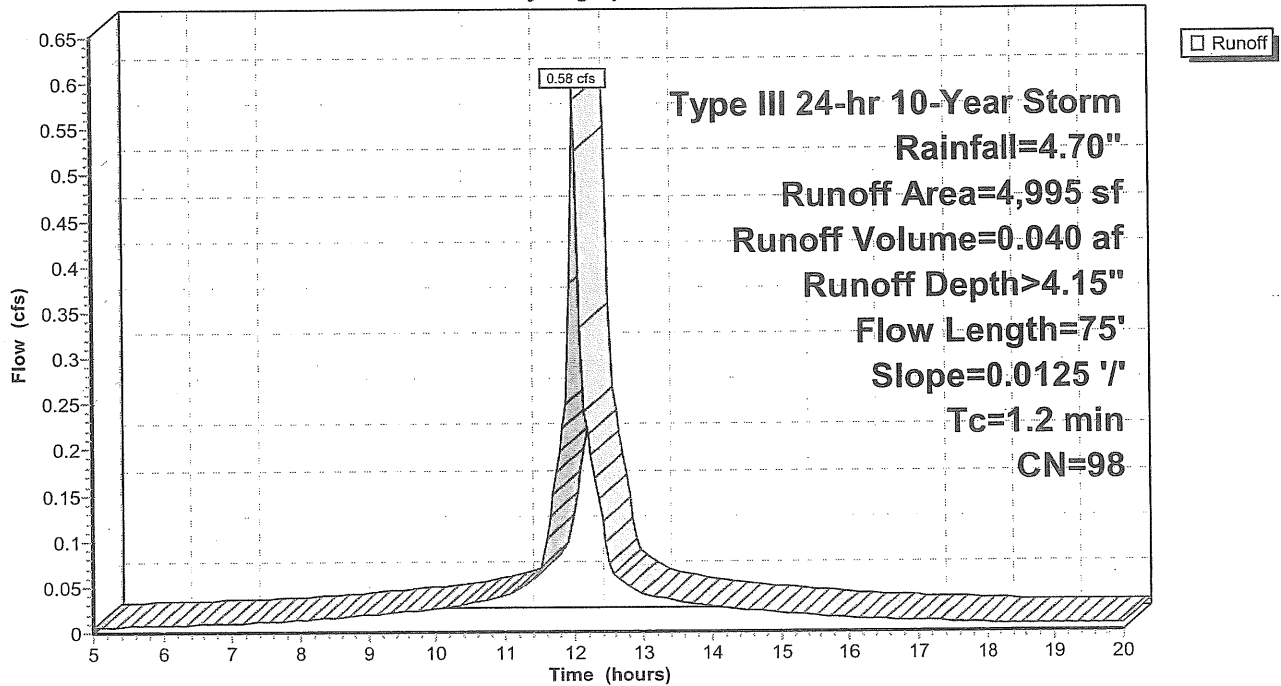
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Storm Rainfall=4.70"

Area (sf)	CN	Description
4,995	98	Paved parking & roofs
4,995		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	75	0.0125	1.04		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 3.00"

Subcatchment 5CP: Plaza

Hydrograph



Post-Development-SC

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Post-Development w/ StormChamber
Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 36

11/22/2006

Subcatchment 5BP: East Half of Complex

Runoff = 3.97 cfs @ 12.09 hrs, Volume= 0.305 af, Depth> 4.15"

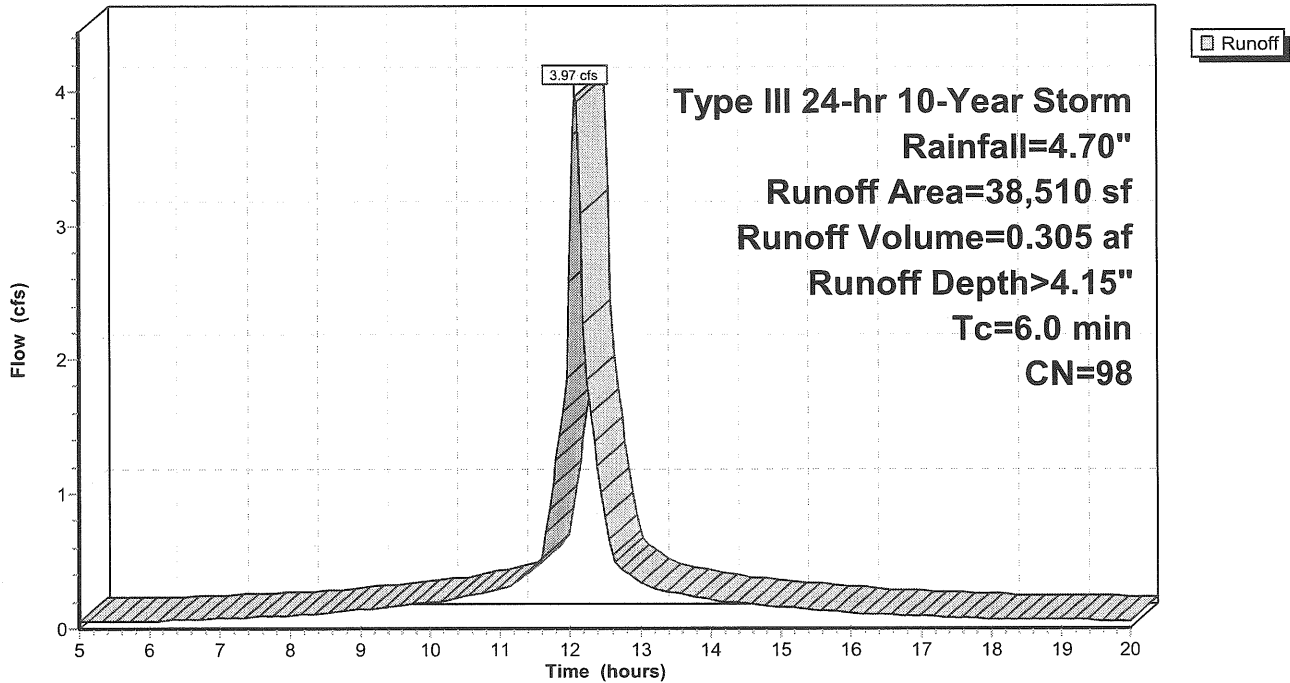
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.70"

Area (sf)	CN	Description
32,915	98	Paved parking & roofs
5,595	98	Plaza
38,510	98	Weighted Average
38,510		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Direct Entry

Subcatchment 5BP: East Half of Complex

Hydrograph



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Post-Development w/ StormChamber
 Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 35
 11/22/2006

Subcatchment 5AP: West Half of Complex

Runoff = 1.48 cfs @ 12.09 hrs, Volume= 0.114 af, Depth> 4.15"

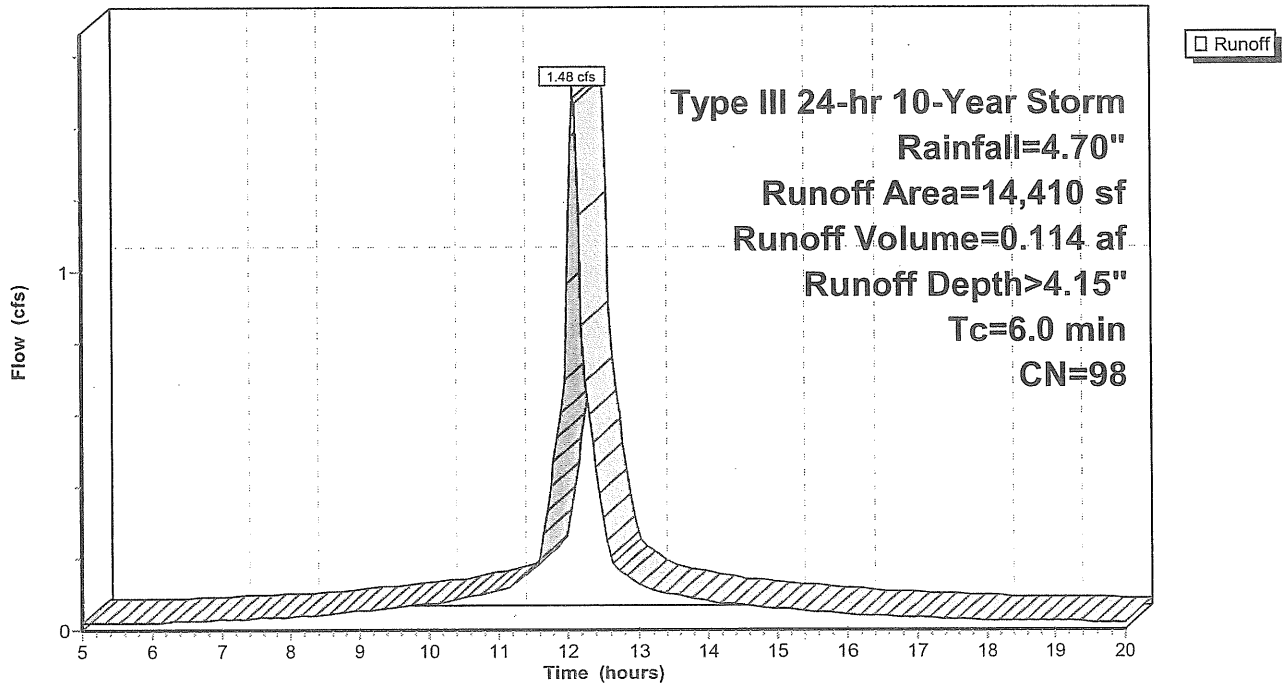
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Storm Rainfall=4.70"

Area (sf)	CN	Description
13,840	98	Buildings
570	98	Paved
14,410	98	Weighted Average
14,410		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Direct Entry

Subcatchment 5AP: West Half of Complex

Hydrograph



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Post-Development w/ StormChamber
 Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 34
 11/22/2006

Subcatchment 4P: Back of PS

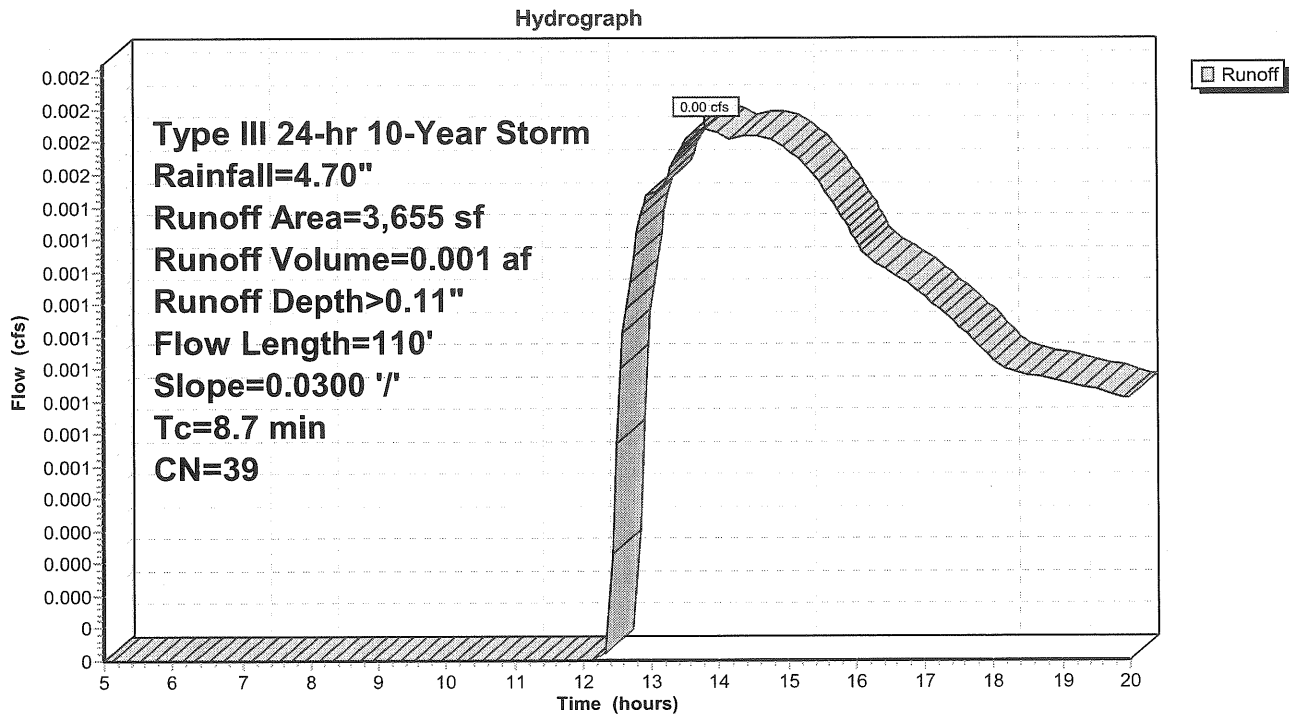
Runoff = 0.00 cfs @ 13.81 hrs, Volume= 0.001 af, Depth> 0.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Storm Rainfall=4.70"

Area (sf)	CN	Description
3,655	39	>75% Grass cover, Good, HSG A
3,655		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0300	0.19		Sheet Flow, AB Grass: Short n= 0.150 P2= 3.00"
0.1	10	0.0300	1.21		Shallow Concentrated Flow, BC Short Grass Pasture Kv= 7.0 fps
8.7	110	Total			

Subcatchment 4P: Back of PS



Post-Development-SC

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Post-Development w/ StormChamber
 Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 33
 11/22/2006

Subcatchment 3P: Turner Barker

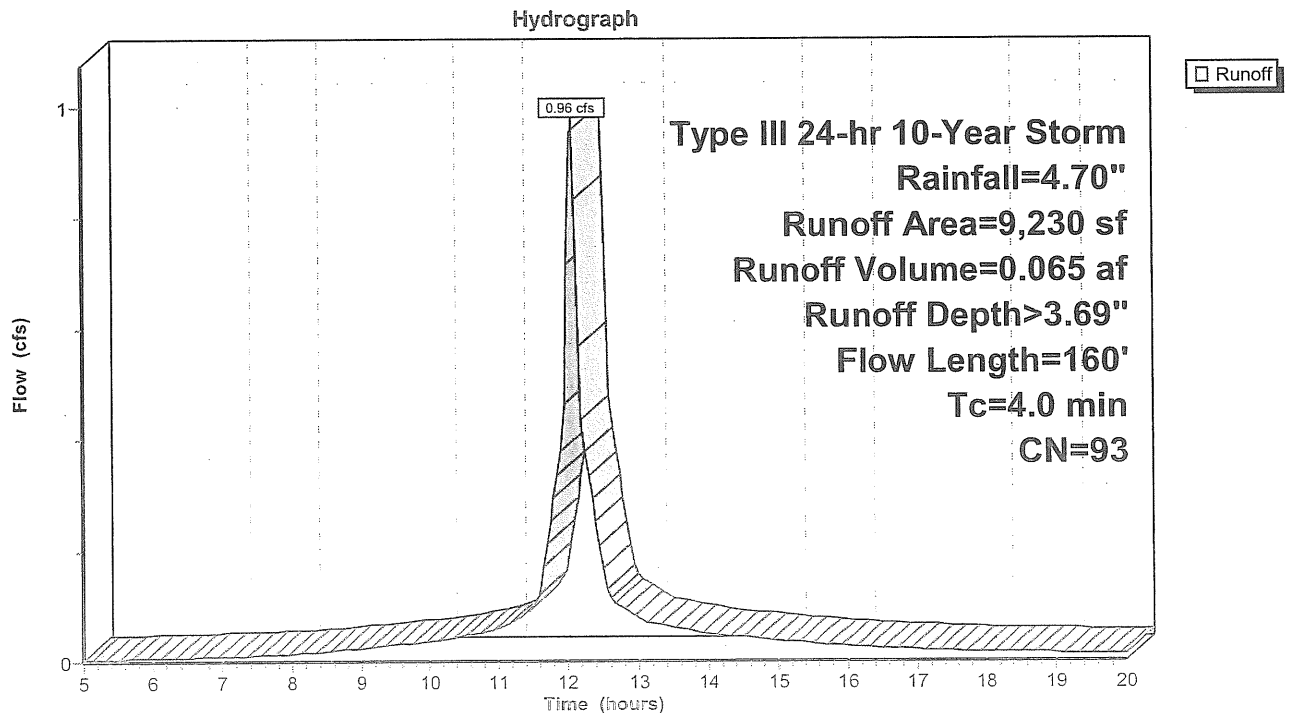
Runoff = 0.96 cfs @ 12.06 hrs, Volume= 0.065 af, Depth> 3.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Storm Rainfall=4.70"

Area (sf)	CN	Description
4,000	98	Building
4,380	98	Paved parking & roofs
850	39	>75% Grass cover, Good, HSG A
9,230	93	Weighted Average
850		Pervious Area
8,380		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	10	0.0050	0.06		Sheet Flow, AB Grass: Short n= 0.150 P2= 3.00"
0.8	30	0.0050	0.60		Sheet Flow, BC Smooth surfaces n= 0.011 P2= 3.00"
0.4	120	0.0100	5.36	4.21	Circular Channel (pipe), CDE Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011
4.0	160	Total			

Subcatchment 3P: Turner Barker



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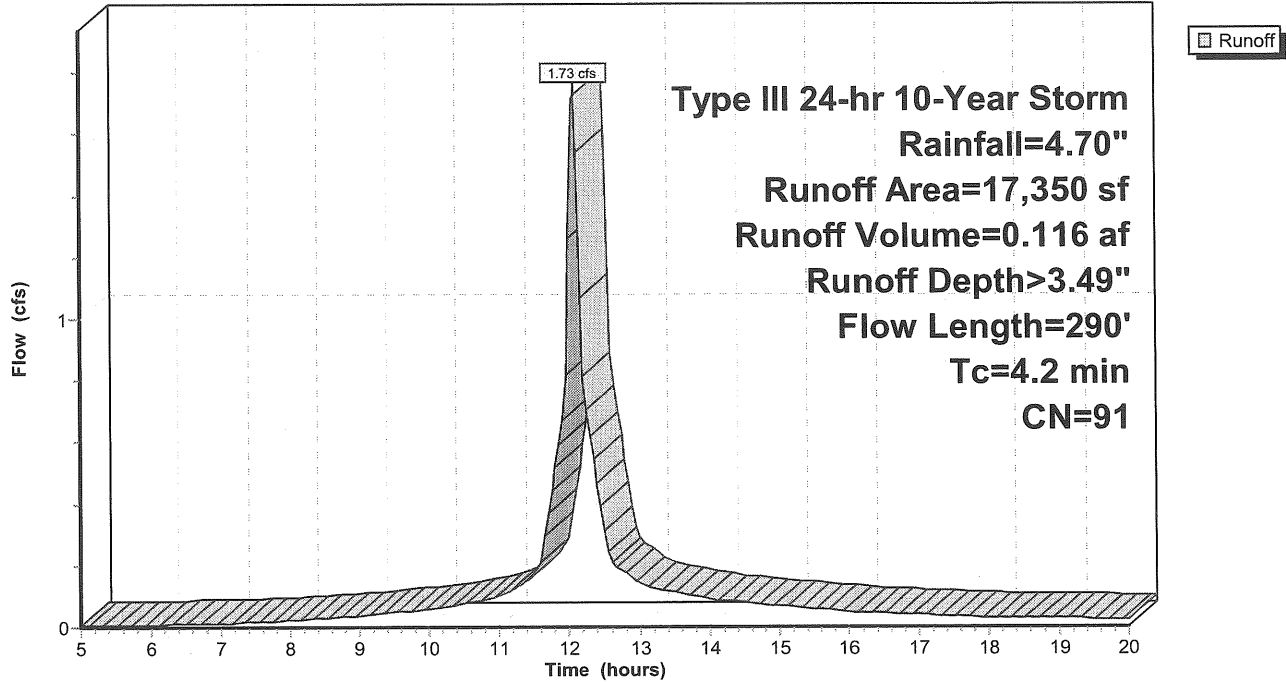
Post-Development w/ StormChamber
Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 32

11/22/2006

Subcatchment 2P: Office Building

Hydrograph



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Post-Development w/ StormChamber
 Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 31
 11/22/2006

Subcatchment 2P: Office Building

Runoff = 1.73 cfs @ 12.06 hrs, Volume= 0.116 af, Depth> 3.49"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Storm Rainfall=4.70"

Area (sf)	CN	Description
5,810	98	Building
1,110	98	Paved roads w/curbs & sewers
2,130	39	>75% Grass cover, Good, HSG A
8,300	98	Gravel Parking
17,350	91	Weighted Average
2,130		Pervious Area
15,220		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	90	0.0250	1.43		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 3.00"
2.1	90	0.0100	0.70		Shallow Concentrated Flow, BC Short Grass Pasture Kv= 7.0 fps
0.1	25	0.2000	3.13		Shallow Concentrated Flow, CD Short Grass Pasture Kv= 7.0 fps
0.9	85	0.0060	1.57		Shallow Concentrated Flow, DE Paved Kv= 20.3 fps
4.2	290	Total			

Post-Development-SC

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Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 30

11/22/2006

Subcatchment 1BP: Parking Garage

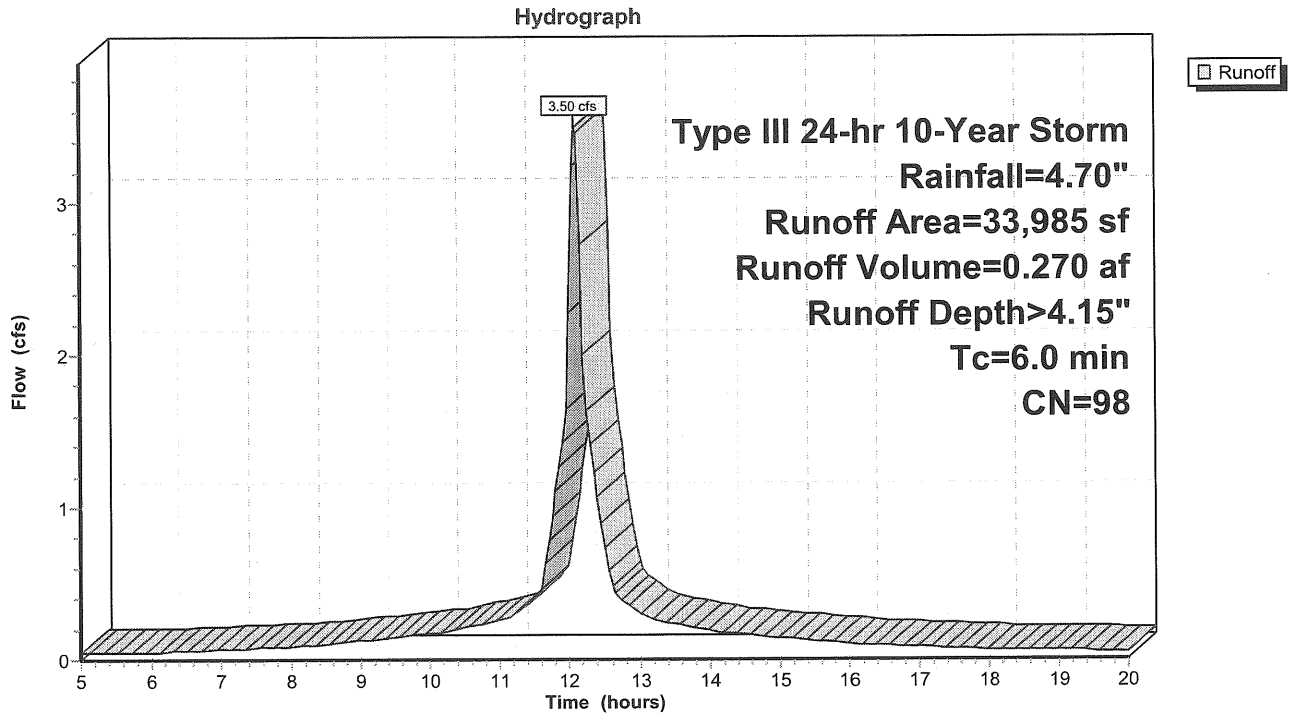
Runoff = 3.50 cfs @ 12.09 hrs, Volume= 0.270 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.70"

Area (sf)	CN	Description
30,730	98	Building
3,255	98	Paved
33,985	98	Weighted Average
33,985		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Direct Entry

Subcatchment 1BP: Parking Garage



Post-Development-SC

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 Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 29
 11/22/2006

Subcatchment 1AP: Open Space

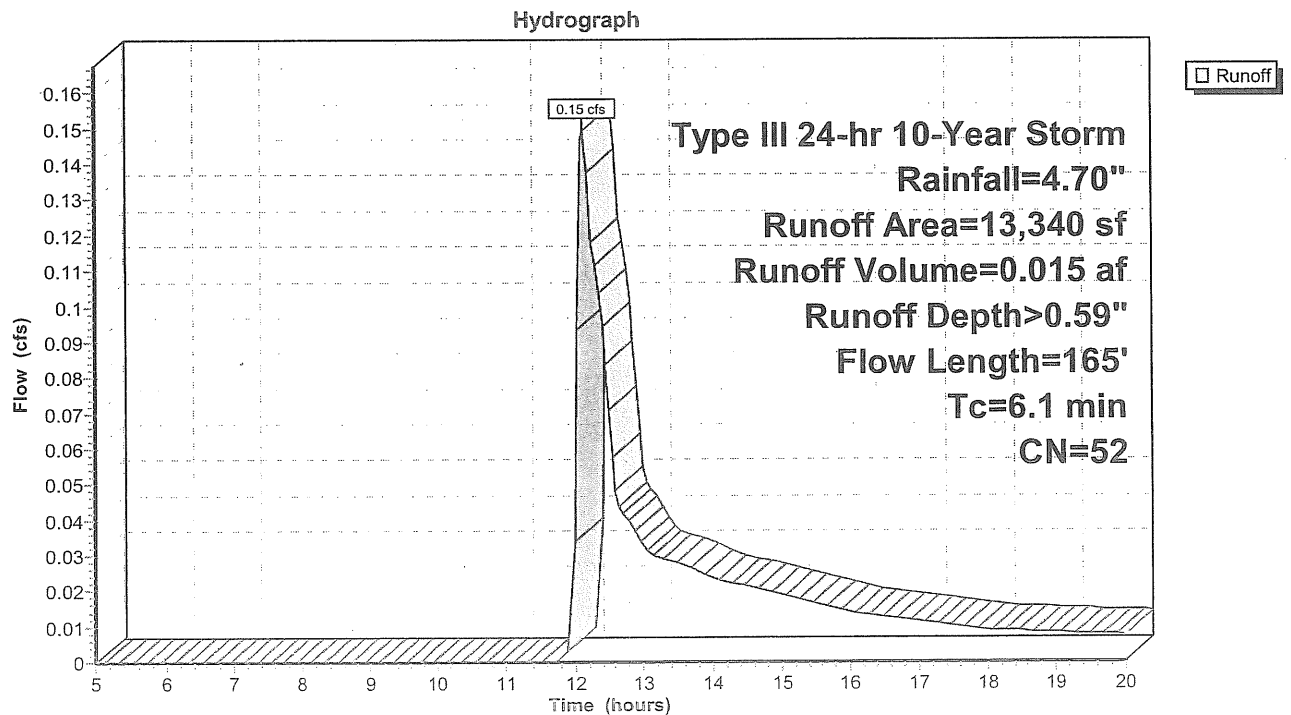
Runoff = 0.15 cfs @ 12.13 hrs, Volume= 0.015 af, Depth> 0.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Storm Rainfall=4.70"

Area (sf)	CN	Description
10,440	39	>75% Grass cover, Good, HSG A
2,900	98	Paved parking & roofs
13,340	52	Weighted Average
10,440		Pervious Area
2,900		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	45	0.0200	1.14		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 3.00"
4.8	55	0.0400	0.19		Sheet Flow, BC Grass: Short n= 0.150 P2= 3.00"
0.6	65	0.0600	1.71		Shallow Concentrated Flow, CD Short Grass Pasture Kv= 7.0 fps
6.1	165	Total			

Subcatchment 1AP: Open Space



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Post-Development w/ StormChamber
Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 28

11/22/2006

Pond D7: Hancock

Peak Elev=8.85' Inflow=2.14 cfs 0.283 af
30.0" x 36.0' Culvert Outflow=2.14 cfs 0.283 af

Pond D8: Hancock Street Storm System

Peak Elev=10.39' Inflow=2.14 cfs 0.283 af
24.0" x 196.0' Culvert Outflow=2.14 cfs 0.283 af

Pond UH1: Hancock Link DMH1

Peak Elev=12.24' Inflow=2.14 cfs 0.283 af
24.0" x 125.0' Culvert Outflow=2.14 cfs 0.283 af

Pond UH2: Hancock Link DMH2

Peak Elev=17.00' Inflow=2.14 cfs 0.283 af
24.0" x 106.0' Culvert Outflow=2.14 cfs 0.283 af

Total Runoff Area = 3.110 ac Runoff Volume = 0.926 af Average Runoff Depth = 3.57"
12.60% Pervious Area = 0.392 ac 87.40% Impervious Area = 2.718 ac

Post-Development-SC

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Post-Development w/ StormChamber
Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 27

11/22/2006

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1AP: Open Space

Runoff Area=13,340 sf Runoff Depth>0.59"
Flow Length=165' Tc=6.1 min CN=52 Runoff=0.15 cfs 0.015 af

Subcatchment 1BP: Parking Garage

Runoff Area=33,985 sf Runoff Depth>4.15"
Tc=6.0 min CN=98 Runoff=3.50 cfs 0.270 af

Subcatchment 2P: Office Building

Runoff Area=17,350 sf Runoff Depth>3.49"
Flow Length=290' Tc=4.2 min CN=91 Runoff=1.73 cfs 0.116 af

Subcatchment 3P: Turner Barker

Runoff Area=9,230 sf Runoff Depth>3.69"
Flow Length=160' Tc=4.0 min CN=93 Runoff=0.96 cfs 0.065 af

Subcatchment 4P: Back of PS

Runoff Area=3,655 sf Runoff Depth>0.11"
Flow Length=110' Slope=0.0300 '/' Tc=8.7 min CN=39 Runoff=0.00 cfs 0.001 af

Subcatchment 5AP: West Half of Complex

Runoff Area=14,410 sf Runoff Depth>4.15"
Tc=6.0 min CN=98 Runoff=1.48 cfs 0.114 af

Subcatchment 5BP: East Half of Complex

Runoff Area=38,510 sf Runoff Depth>4.15"
Tc=6.0 min CN=98 Runoff=3.97 cfs 0.305 af

Subcatchment 5CP: Plaza

Runoff Area=4,995 sf Runoff Depth>4.15"
Flow Length=75' Slope=0.0125 '/' Tc=1.2 min CN=98 Runoff=0.58 cfs 0.040 af

Reach CS: Combined Sewer

Inflow=1.73 cfs 0.116 af
Outflow=1.73 cfs 0.116 af

Reach FR: Fore River

Inflow=7.15 cfs 0.807 af
Outflow=7.15 cfs 0.807 af

Reach TOT: (new node)

Inflow=8.54 cfs 0.923 af
Outflow=8.54 cfs 0.923 af

Pond 1B: Subsurface Detention for Parking G Peak Elev=20.94' Storage=1,818 cf Inflow=3.50 cfs 0.270 af
Outflow=2.01 cfs 0.268 af

Pond 5C: Subsurface Detention for Plaza Peak Elev=12.40' Storage=1,477 cf Inflow=5.84 cfs 0.459 af
Outflow=4.47 cfs 0.458 af

Pond D2: Commercial Street Storm System Peak Elev=10.44' Inflow=0.96 cfs 0.066 af
15.0" x 192.0' Culvert Outflow=0.96 cfs 0.066 af

Pond D3: Commercial Peak Elev=10.42' Inflow=5.11 cfs 0.524 af
15.0" x 192.0' Culvert Outflow=5.11 cfs 0.524 af

Post-Development-SC

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Post-Development w/ StormChamber
Type III 24-hr 2-Year Storm Rainfall=3.00"

Page 26
11/22/2006

Pond UH2: Hancock Link DMH2

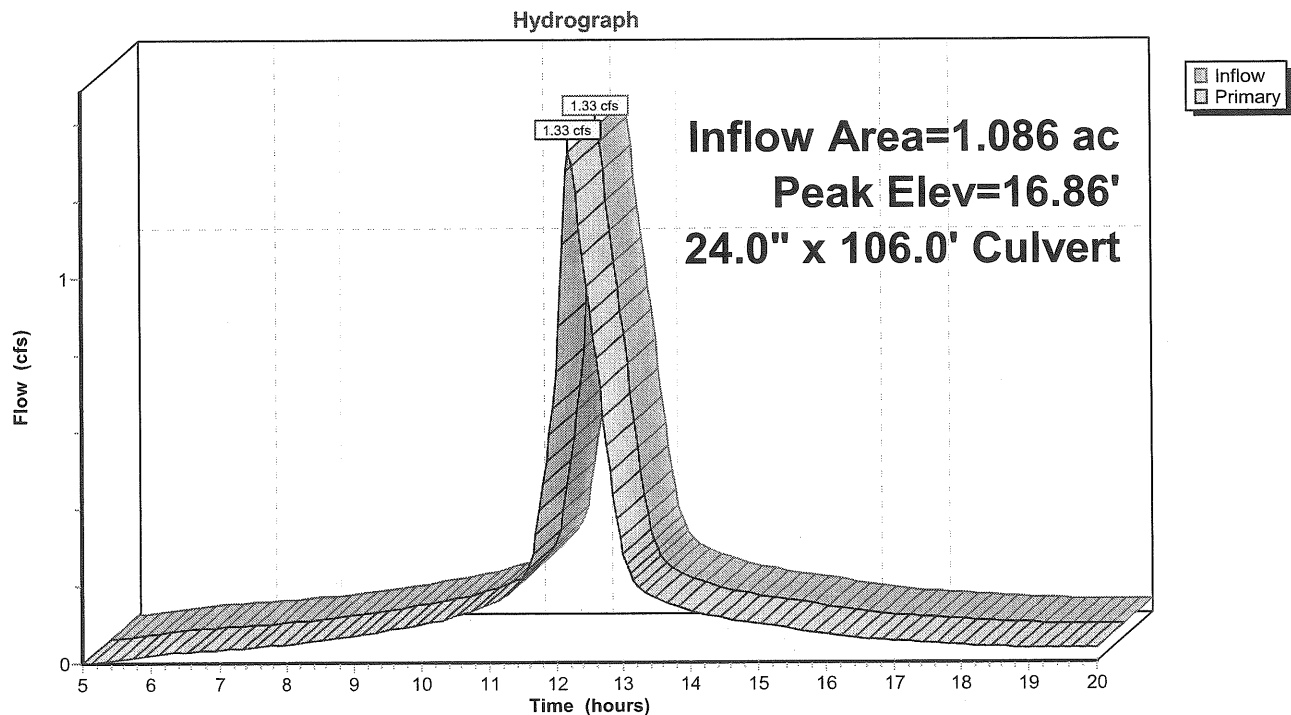
Inflow Area = 1.086 ac, Inflow Depth > 1.87" for 2-Year Storm event
Inflow = 1.33 cfs @ 12.20 hrs, Volume= 0.169 af
Outflow = 1.33 cfs @ 12.20 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.0 min
Primary = 1.33 cfs @ 12.20 hrs, Volume= 0.169 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 16.86' @ 12.20 hrs
Flood Elev= 22.41'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.39'	24.0" x 106.0' long Culvert RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 11.73' S= 0.0440 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=1.32 cfs @ 12.20 hrs HW=16.86' TW=12.10' (Dynamic Tailwater)
←**1=Culvert** (Inlet Controls 1.32 cfs @ 2.34 fps)

Pond UH2: Hancock Link DMH2



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Type III 24-hr 2-Year Storm Rainfall=3.00"

Page 25
11/22/2006

Pond UH1: Hancock Link DMH1

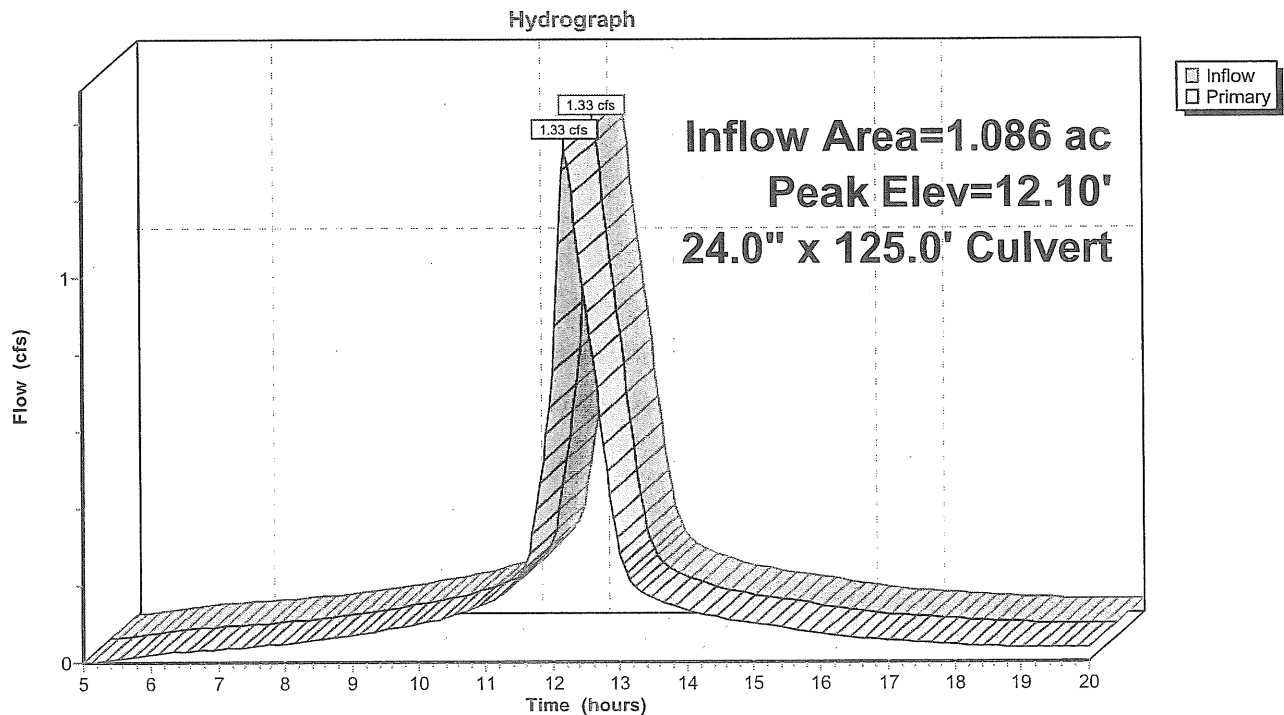
Inflow Area = 1.086 ac, Inflow Depth > 1.87" for 2-Year Storm event
Inflow = 1.33 cfs @ 12.20 hrs, Volume= 0.169 af
Outflow = 1.33 cfs @ 12.20 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.0 min
Primary = 1.33 cfs @ 12.20 hrs, Volume= 0.169 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 12.10' @ 12.20 hrs
Flood Elev= 16.51'

Device	Routing	Invert	Outlet Devices
#1	Primary	11.63'	24.0" x 125.0' long Culvert RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 9.88' S= 0.0140 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=1.32 cfs @ 12.20 hrs HW=12.10' TW=10.25' (Dynamic Tailwater)
↑1=Culvert (Inlet Controls 1.32 cfs @ 2.34 fps)

Pond UH1: Hancock Link DMH1



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Type III 24-hr 2-Year Storm Rainfall=3.00"

Page 24

11/22/2006

Pond D8: Hancock Street Storm System

Inflow Area = 1.086 ac, Inflow Depth > 1.87" for 2-Year Storm event
Inflow = 1.33 cfs @ 12.20 hrs, Volume= 0.169 af
Outflow = 1.33 cfs @ 12.20 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.0 min
Primary = 1.33 cfs @ 12.20 hrs, Volume= 0.169 af

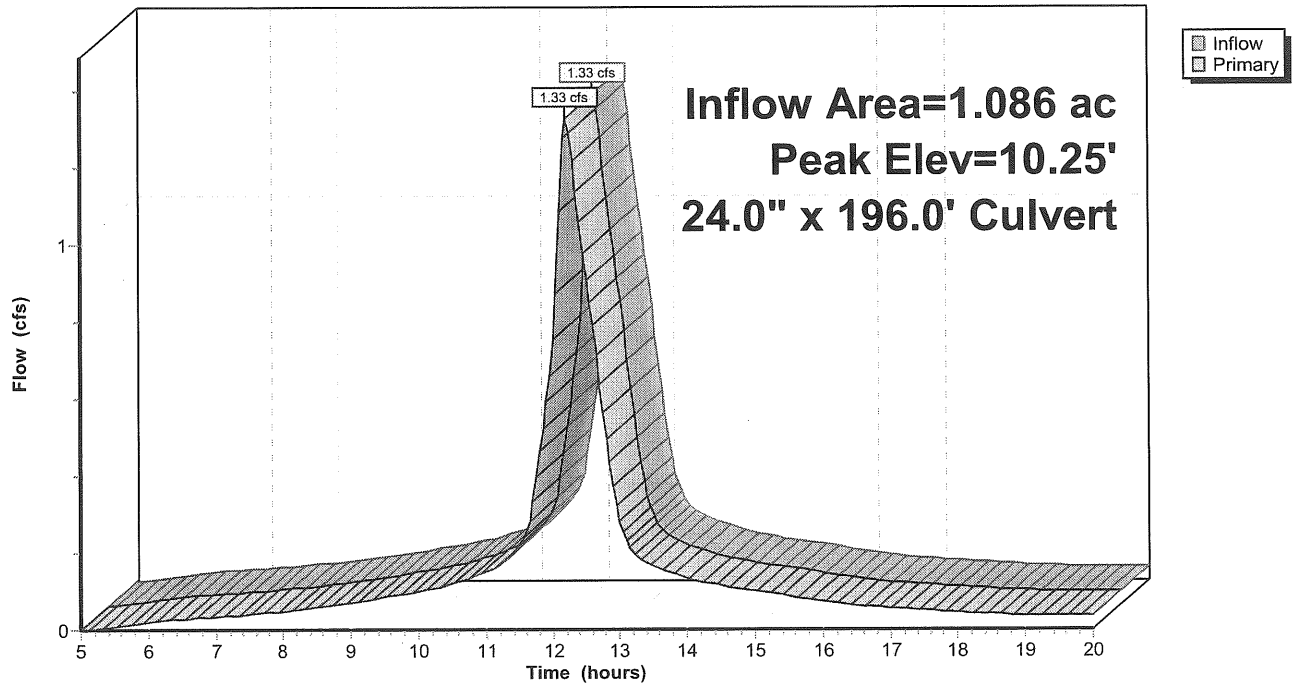
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 10.25' @ 12.20 hrs
Flood Elev= 15.38'

Device	Routing	Invert	Outlet Devices
#1	Primary	9.78'	24.0" x 196.0' long Culvert Ke= 0.500 Outlet Invert= 8.18' S= 0.0082 '/' Cc= 0.900 n= 0.011

Primary OutFlow Max=1.32 cfs @ 12.20 hrs HW=10.25' TW=8.69' (Dynamic Tailwater)
↑ **1=Culvert** (Inlet Controls 1.32 cfs @ 2.34 fps)

Pond D8: Hancock Street Storm System

Hydrograph



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 Type III 24-hr 2-Year Storm Rainfall=3.00"

Page 23

11/22/2006

Pond D7: Hancock

Inflow Area = 1.086 ac, Inflow Depth > 1.87" for 2-Year Storm event
 Inflow = 1.33 cfs @ 12.20 hrs, Volume= 0.169 af
 Outflow = 1.33 cfs @ 12.20 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.33 cfs @ 12.20 hrs, Volume= 0.169 af

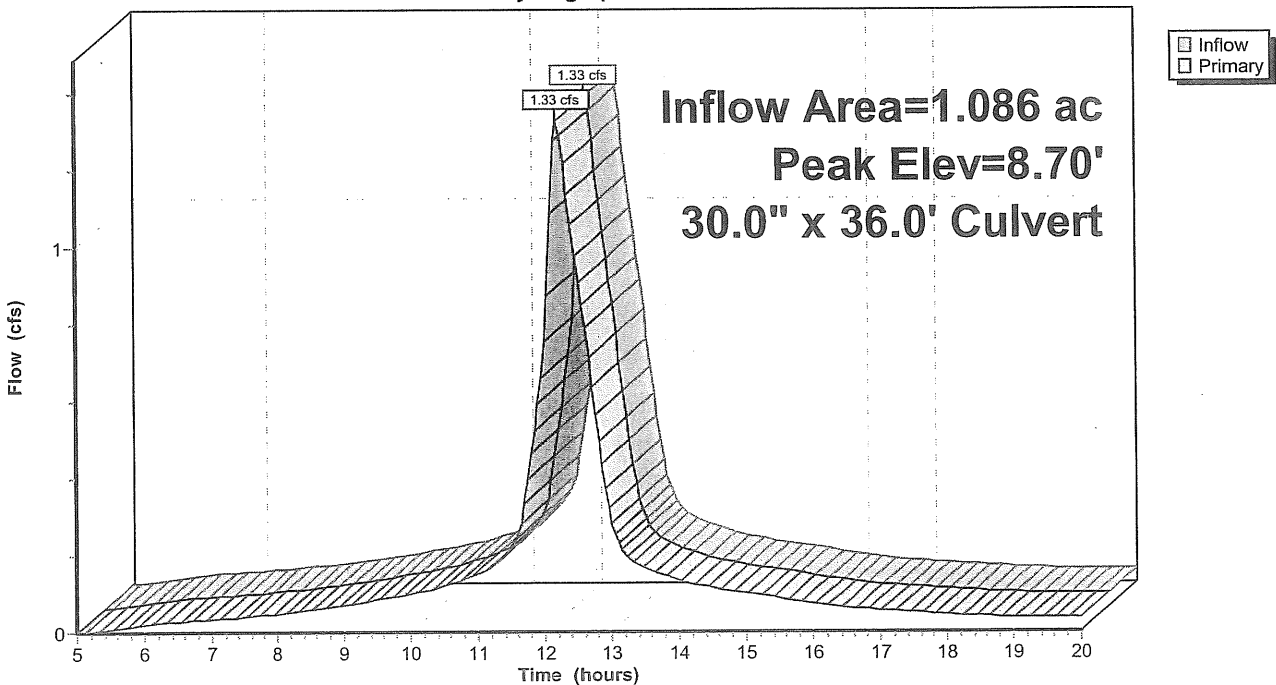
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 8.70' @ 12.20 hrs
 Flood Elev= 13.91'

Device	Routing	Invert	Outlet Devices
#1	Primary	8.08'	30.0" x 36.0' long Culvert Ke= 0.500 Outlet Invert= 8.07' S= 0.0003 1/ S Cc= 0.900 n= 0.012

Primary OutFlow Max=1.32 cfs @ 12.20 hrs HW=8.69' TW=0.00' (Dynamic Tailwater)
 ↑1=Culvert (Barrel Controls 1.32 cfs @ 2.13 fps)

Pond D7: Hancock

Hydrograph



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Type III 24-hr 2-Year Storm Rainfall=3.00"

Page 22

11/22/2006

Pond D3: Commercial

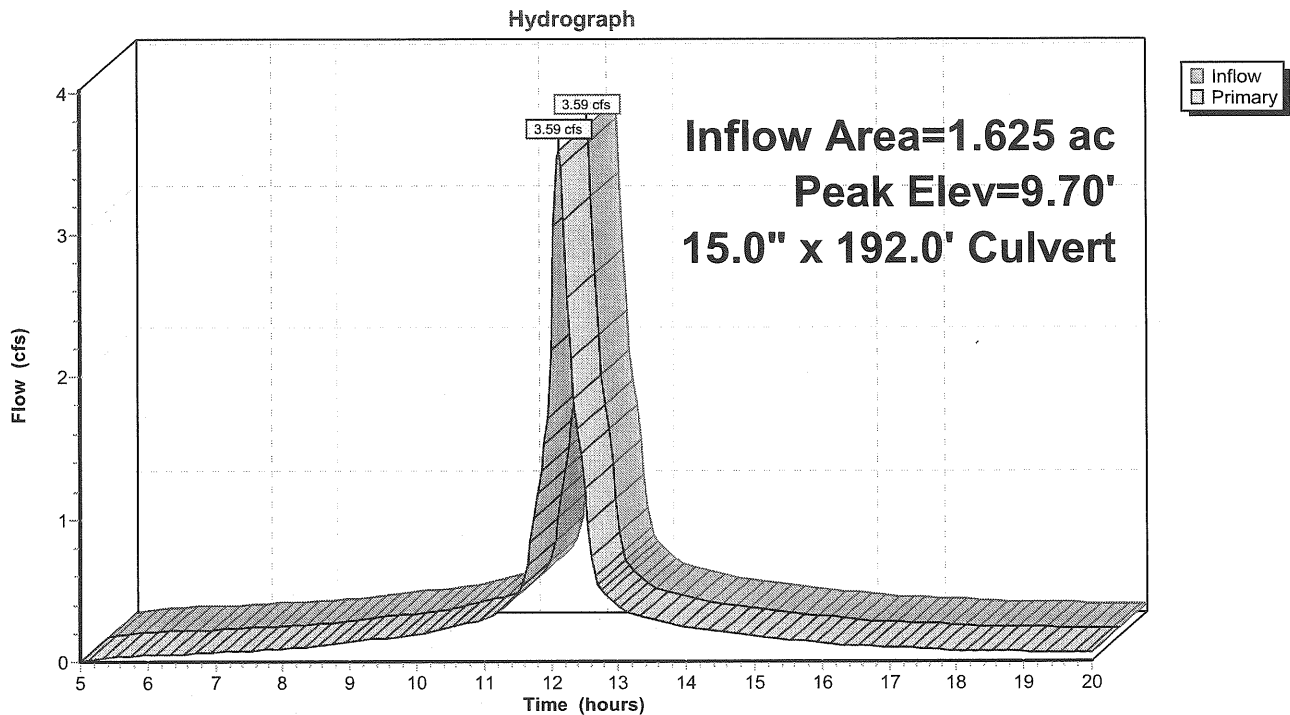
Inflow Area = 1.625 ac, Inflow Depth > 2.39" for 2-Year Storm event
Inflow = 3.59 cfs @ 12.12 hrs, Volume= 0.324 af
Outflow = 3.59 cfs @ 12.12 hrs, Volume= 0.324 af, Atten= 0%, Lag= 0.0 min
Primary = 3.59 cfs @ 12.12 hrs, Volume= 0.324 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 9.70' @ 12.12 hrs
Flood Elev= 13.91'

Device	Routing	Invert	Outlet Devices
#1	Primary	8.35'	15.0" x 192.0' long Culvert Ke= 0.500 Outlet Invert= 8.06' S= 0.0015 '/' Cc= 0.900 n= 0.010

Primary OutFlow Max=3.52 cfs @ 12.12 hrs HW=9.68' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 3.52 cfs @ 3.36 fps)

Pond D3: Commercial



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Page 21
 11/22/2006

Pond D2: Commercial Street Storm System

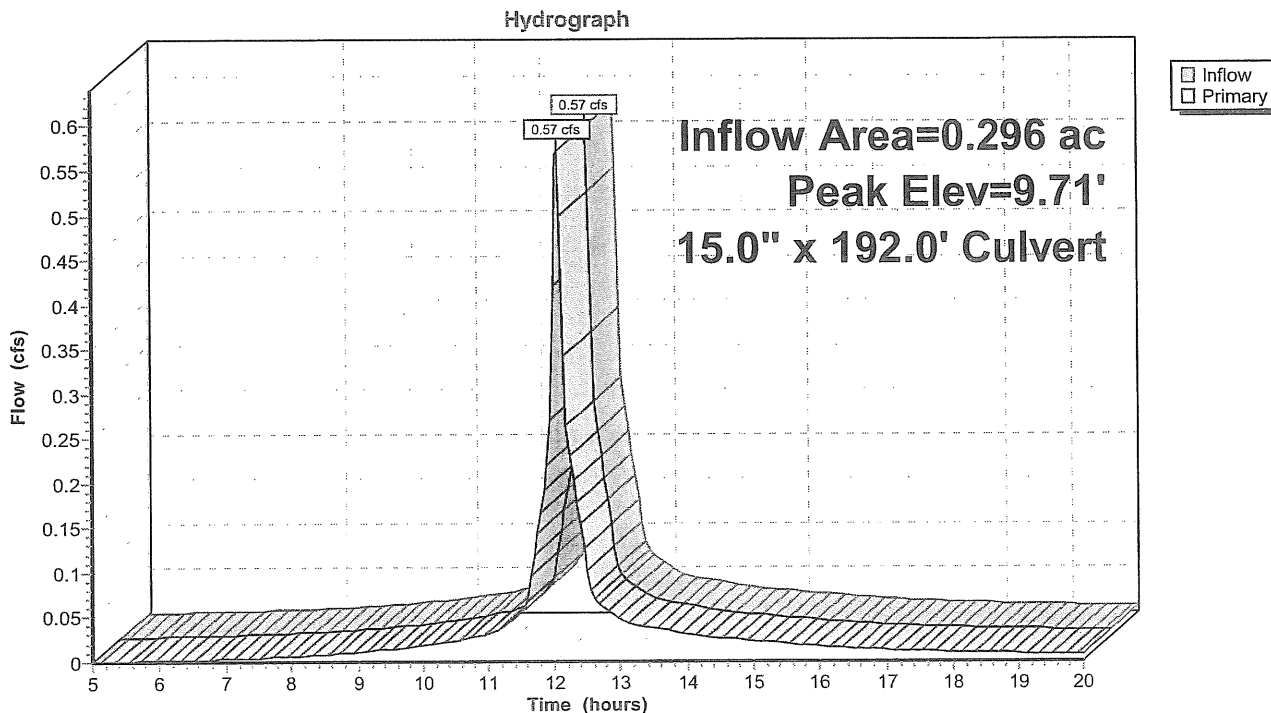
Inflow Area = 0.296 ac, Inflow Depth > 1.53" for 2-Year Storm event
 Inflow = 0.57 cfs @ 12.06 hrs, Volume= 0.038 af
 Outflow = 0.57 cfs @ 12.06 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.57 cfs @ 12.06 hrs, Volume= 0.038 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 9.71' @ 12.17 hrs
 Flood Elev= 14.95'

Device	Routing	Invert	Outlet Devices
#1	Primary	8.74'	15.0" x 192.0' long Culvert Ke= 0.500 Outlet Invert= 8.45' S= 0.0015 '/ Cc= 0.900 n= 0.010

Primary OutFlow Max=0.00 cfs @ 12.06 hrs HW=9.45' TW=9.57' (Dynamic Tailwater)
 ↑1=Culvert (Controls 0.00 cfs)

Pond D2: Commercial Street Storm System



Post-Development-SC

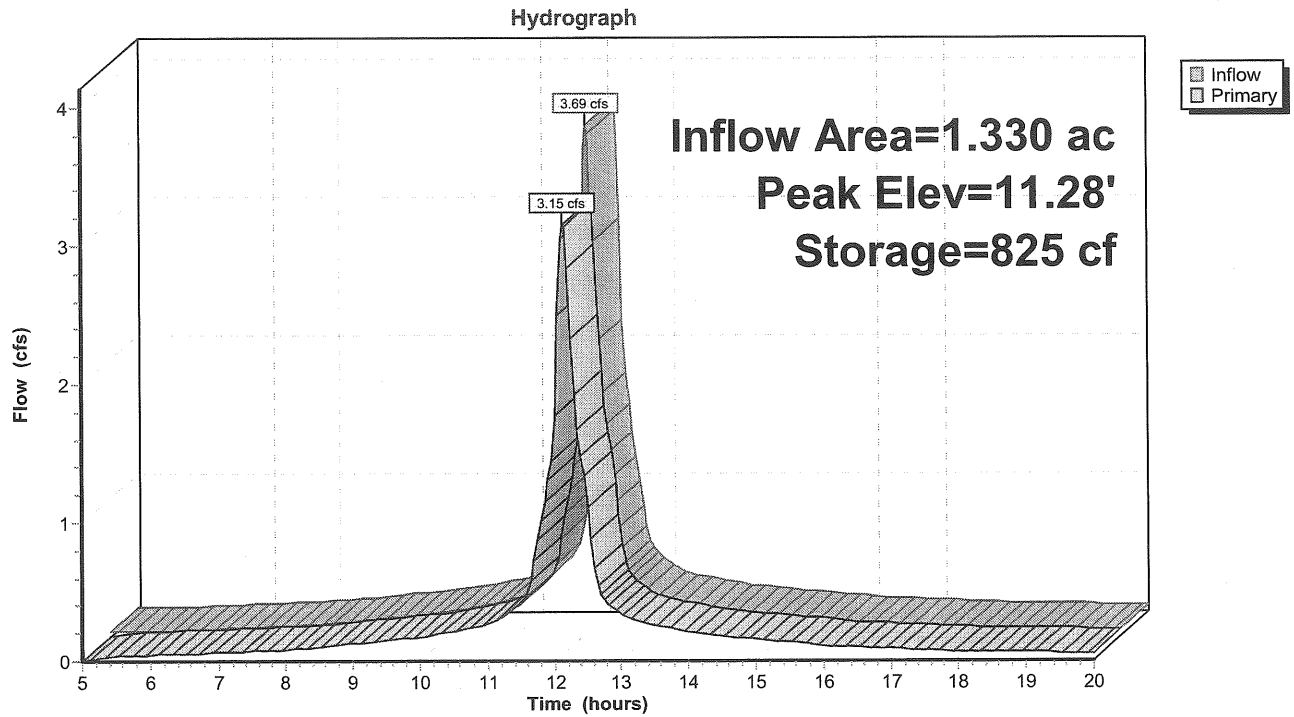
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Type III 24-hr 2-Year Storm Rainfall=3.00"

Page 20
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Pond 5C: Subsurface Detention for Plaza



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 Type III 24-hr 2-Year Storm Rainfall=3.00"

Page 19

11/22/2006

Pond 5C: Subsurface Detention for Plaza

Inflow Area = 1.330 ac, Inflow Depth > 2.59" for 2-Year Storm event
 Inflow = 3.69 cfs @ 12.08 hrs, Volume= 0.287 af
 Outflow = 3.15 cfs @ 12.14 hrs, Volume= 0.286 af, Atten= 15%, Lag= 3.3 min
 Primary = 3.15 cfs @ 12.14 hrs, Volume= 0.286 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 11.28' @ 12.14 hrs Surf.Area= 835 sf Storage= 825 cf

Plug-Flow detention time= 6.4 min calculated for 0.285 af (99% of inflow)
 Center-of-Mass det. time= 4.7 min (743.6 - 738.9)

Volume	Invert	Avail.Storage	Storage Description
#1	9.50'	1,086 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 3,758 cf Overall - 1,044 cf Embedded = 2,714 cf x 40.0% Voids
#2	10.50'	1,044 cf	58.4"W x 34.8"H x 7.60"L StormChamber x 14 Inside #1
		2,129 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
9.50	835	0	0
14.00	835	3,758	3,758

Device	Routing	Invert	Outlet Devices
#1	Primary	9.50'	12.0" x 50.0' long Culvert CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 9.00' S= 0.0100 '/' Cc= 0.900 n= 0.011
#2	Device 1	9.50'	8.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	10.50'	8.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	12.50'	12.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=3.11 cfs @ 12.14 hrs HW=11.26' TW=9.67' (Dynamic Tailwater)

- ↑ 1=Culvert (Passes 3.11 cfs of 4.25 cfs potential flow)
- ↑ 2=Orifice/Grate (Orifice Controls 2.01 cfs @ 5.76 fps)
- ↑ 3=Orifice/Grate (Orifice Controls 1.10 cfs @ 3.16 fps)
- ↑ 4=Orifice/Grate (Controls 0.00 cfs)

Post-Development-SC

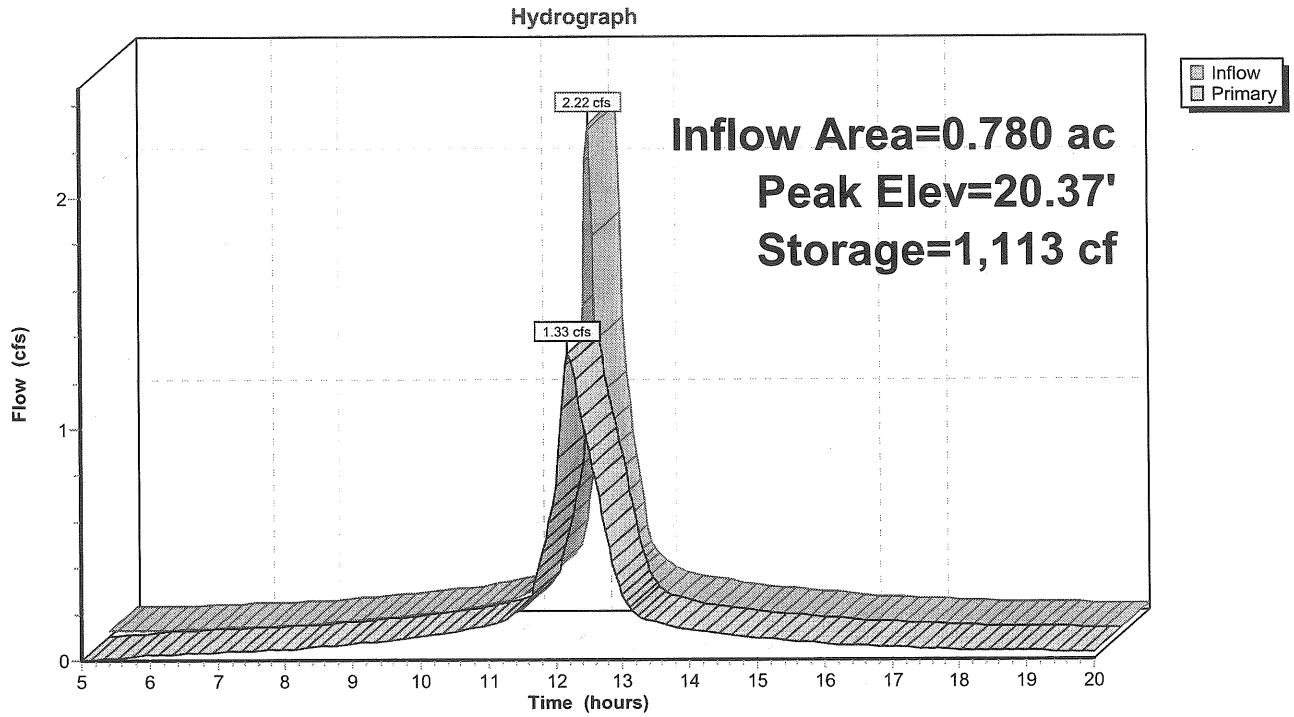
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Type III 24-hr 2-Year Storm Rainfall=3.00"

Page 18
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Pond 1B: Subsurface Detention for Parking Garage



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Type III 24-hr 2-Year Storm Rainfall=3.00"

Page 17
11/22/2006

Pond 1B: Subsurface Detention for Parking Garage

Inflow Area = 0.780 ac, Inflow Depth > 2.59" for 2-Year Storm event
 Inflow = 2.22 cfs @ 12.09 hrs, Volume= 0.168 af
 Outflow = 1.33 cfs @ 12.20 hrs, Volume= 0.167 af, Atten= 40%, Lag= 7.0 min
 Primary = 1.33 cfs @ 12.20 hrs, Volume= 0.167 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 20.37' @ 12.20 hrs Surf.Area= 1,590 sf Storage= 1,113 cf

Plug-Flow detention time= 17.5 min calculated for 0.167 af (99% of inflow)
 Center-of-Mass det. time= 13.3 min (752.5 - 739.2)

Volume	Invert	Avail.Storage	Storage Description
#1	19.00'	1,967 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 7,155 cf Overall - 2,236 cf Embedded = 4,919 cf x 40.0% Voids
#2	20.00'	2,236 cf	58.4"W x 34.8"H x 7.60'L StormChamber x 30 Inside #1
		4,204 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
19.00	1,590	0	0
23.50	1,590	7,155	7,155

Device	Routing	Invert	Outlet Devices
#1	Primary	19.00'	12.0" x 150.0' long Culvert CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 18.00' S= 0.0067 '/' Cc= 0.900 n= 0.011
#2	Device 1	20.00'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	19.00'	6.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	22.00'	12.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=1.32 cfs @ 12.20 hrs HW=20.37' TW=16.86' (Dynamic Tailwater)

- 1=Culvert (Passes 1.32 cfs of 3.34 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.32 cfs @ 2.07 fps)
- 3=Orifice/Grate (Orifice Controls 1.00 cfs @ 5.10 fps)
- 4=Orifice/Grate (Controls 0.00 cfs)

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Post-Development w/ StormChamber
Type III 24-hr 2-Year Storm Rainfall=3.00"

Page 16

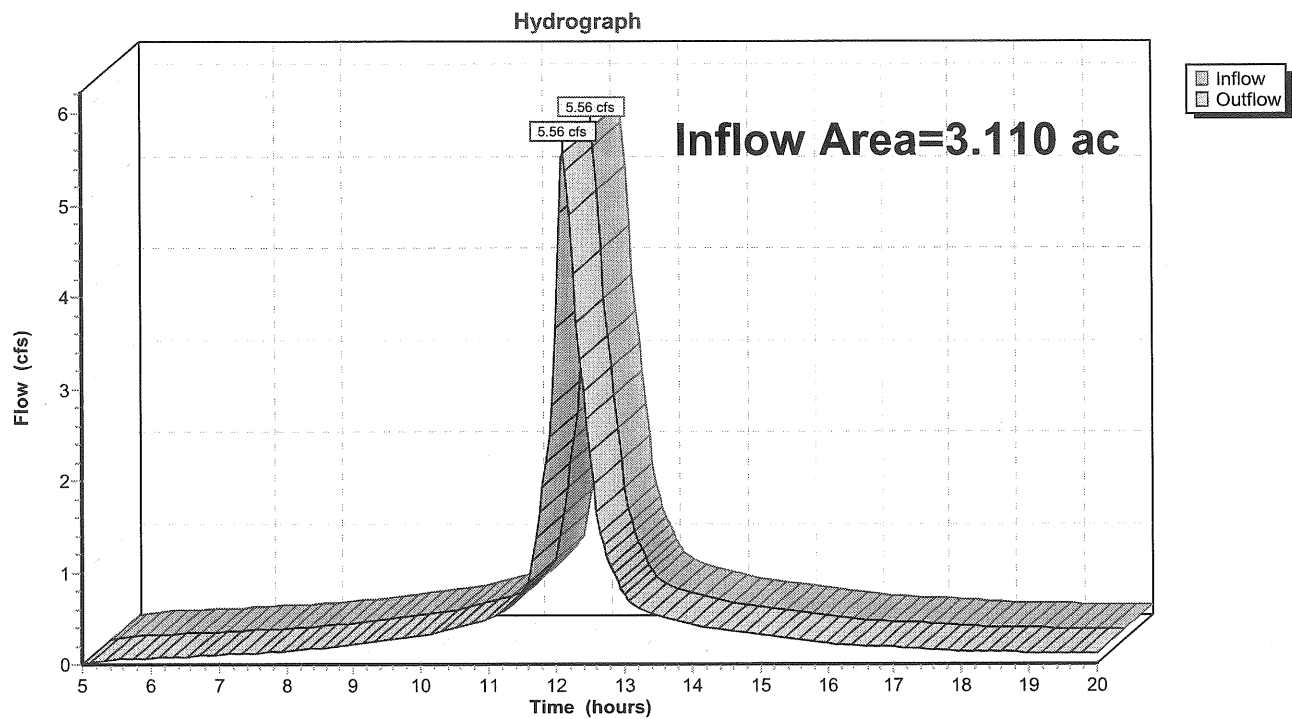
11/22/2006

Reach TOT: (new node)

Inflow Area = 3.110 ac, Inflow Depth > 2.15" for 2-Year Storm event
Inflow = 5.56 cfs @ 12.12 hrs, Volume= 0.558 af
Outflow = 5.56 cfs @ 12.12 hrs, Volume= 0.558 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach TOT: (new node)



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Post-Development w/ StormChamber
Type III 24-hr 2-Year Storm Rainfall=3.00"

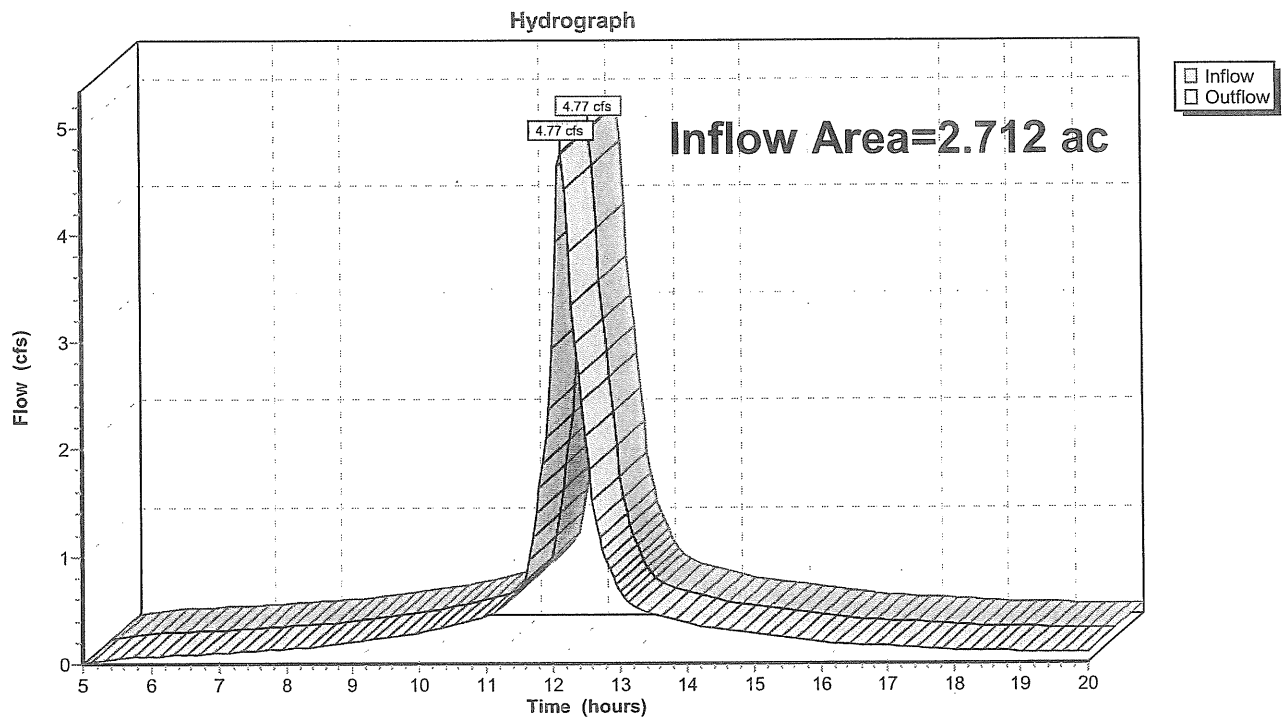
Page 15
11/22/2006

Reach FR: Fore River

Inflow Area = 2.712 ac, Inflow Depth > 2.18" for 2-Year Storm event
Inflow = 4.77 cfs @ 12.14 hrs, Volume= 0.493 af
Outflow = 4.77 cfs @ 12.14 hrs, Volume= 0.493 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach FR: Fore River



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Type III 24-hr 2-Year Storm Rainfall=3.00"

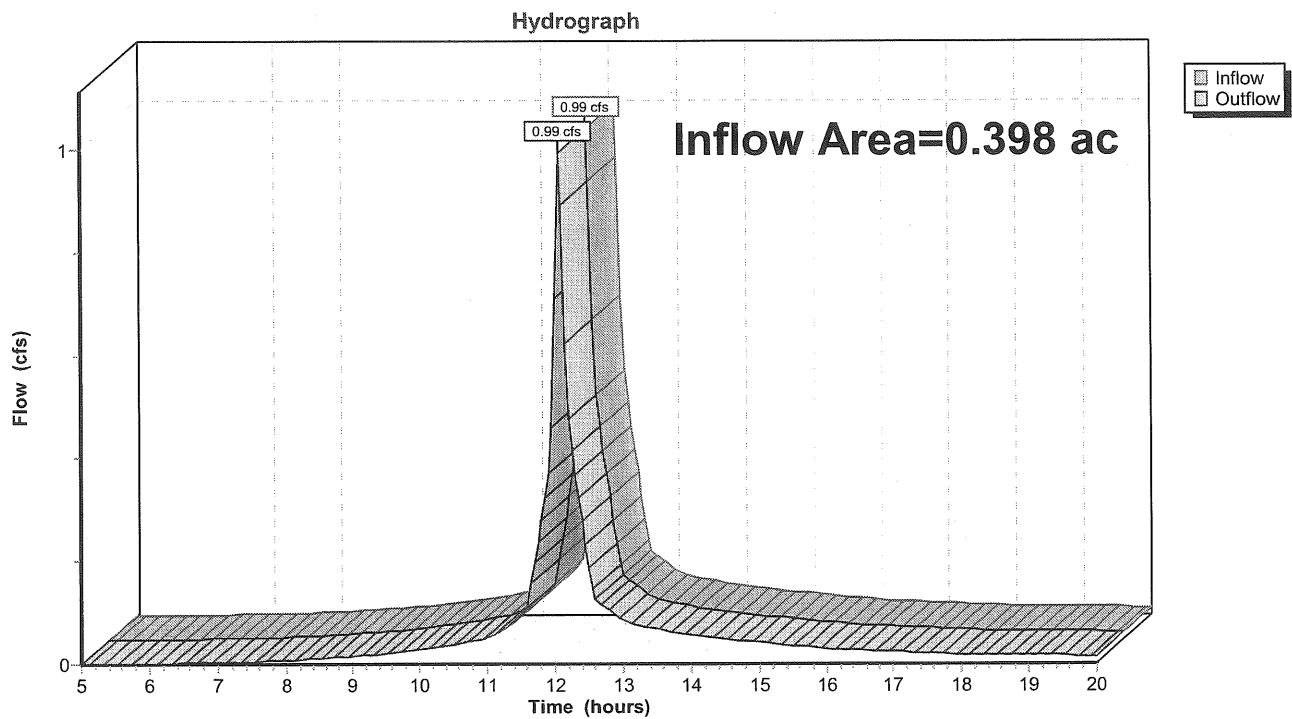
Page 14
11/22/2006

Reach CS: Combined Sewer

Inflow Area = 0.398 ac, Inflow Depth > 1.95" for 2-Year Storm event
Inflow = 0.99 cfs @ 12.06 hrs, Volume= 0.065 af
Outflow = 0.99 cfs @ 12.06 hrs, Volume= 0.065 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach CS: Combined Sewer



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 Type III 24-hr 2-Year Storm Rainfall=3.00"

Page 13
 11/22/2006

Subcatchment 5CP: Plaza

Runoff = 0.37 cfs @ 12.02 hrs, Volume= 0.025 af, Depth> 2.59"

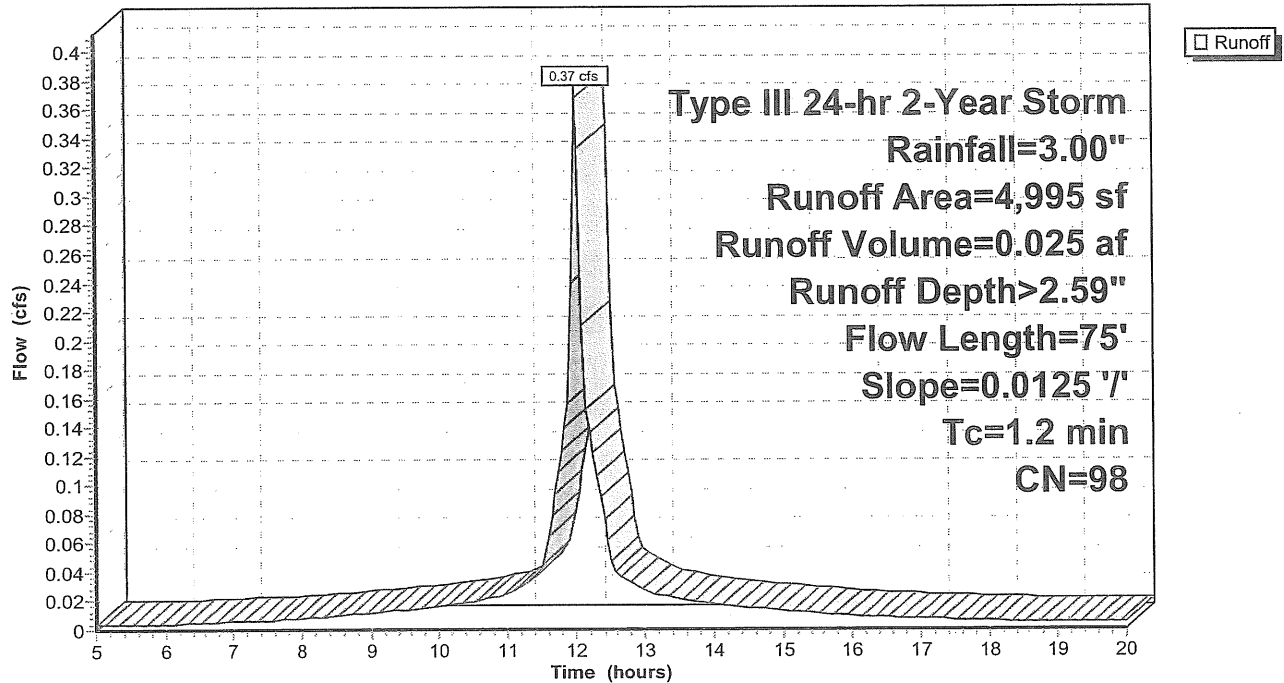
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Storm Rainfall=3.00"

Area (sf)	CN	Description
4,995	98	Paved parking & roofs
4,995		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	75	0.0125	1.04		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 3.00"

Subcatchment 5CP: Plaza

Hydrograph



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 Type III 24-hr 2-Year Storm Rainfall=3.00"

Page 12
 11/22/2006

Subcatchment 5BP: East Half of Complex

Runoff = 2.51 cfs @ 12.09 hrs, Volume= 0.191 af, Depth> 2.59"

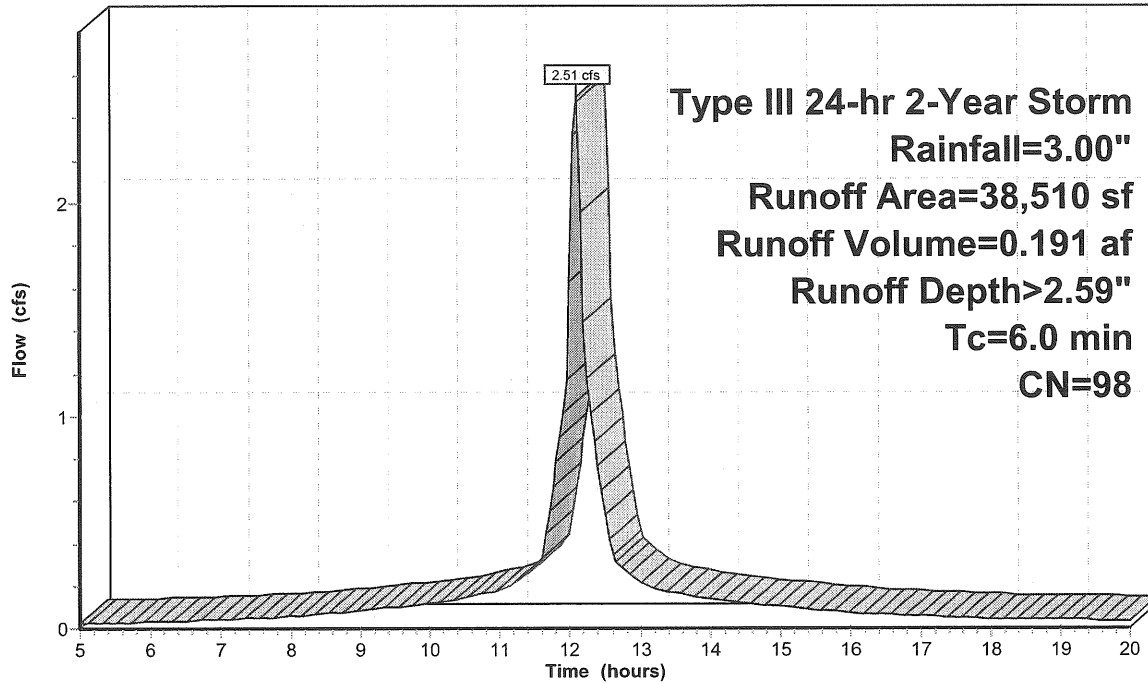
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Storm Rainfall=3.00"

Area (sf)	CN	Description
32,915	98	Paved parking & roofs
5,595	98	Plaza
38,510	98	Weighted Average
38,510		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Direct Entry

Subcatchment 5BP: East Half of Complex

Hydrograph



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 Type III 24-hr 2-Year Storm Rainfall=3.00"

Page 11

11/22/2006

Subcatchment 5AP: West Half of Complex

Runoff = 0.94 cfs @ 12.09 hrs, Volume= 0.071 af, Depth> 2.59"

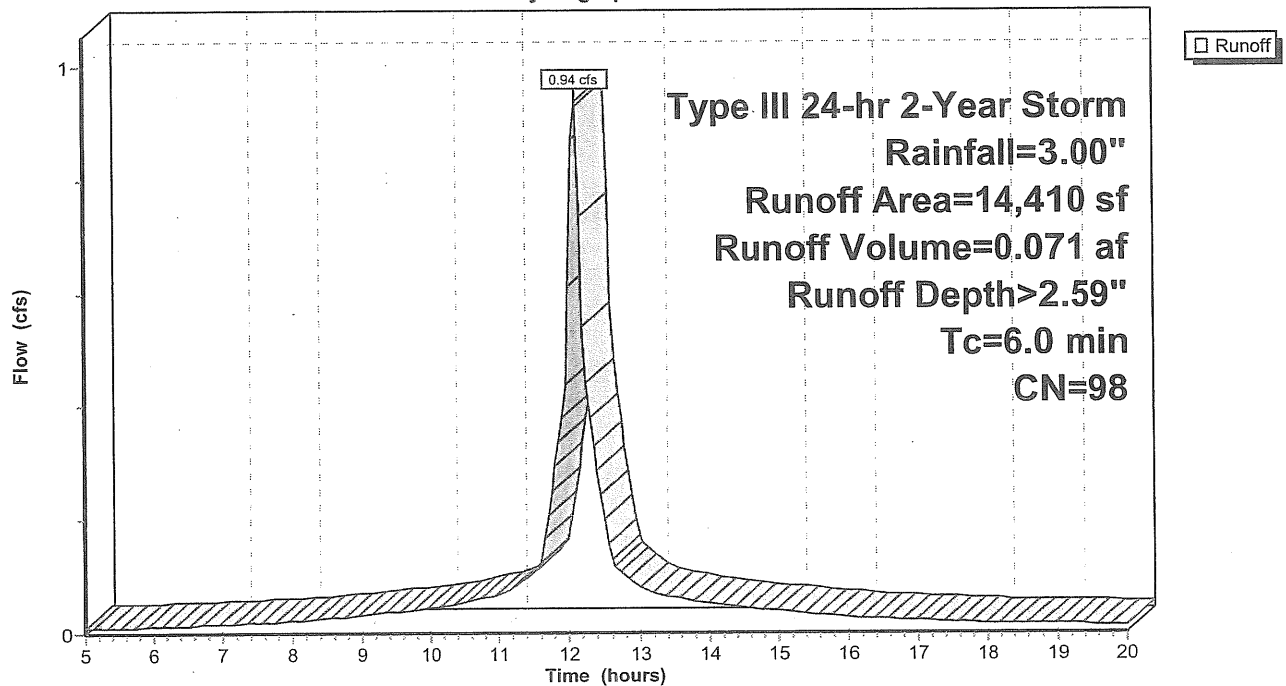
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Storm Rainfall=3.00"

Area (sf)	CN	Description
13,840	98	Buildings
570	98	Paved
14,410	98	Weighted Average
14,410		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Direct Entry

Subcatchment 5AP: West Half of Complex

Hydrograph



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 Type III 24-hr 2-Year Storm Rainfall=3.00"

Page 10
 11/22/2006

Subcatchment 4P: Back of PS

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

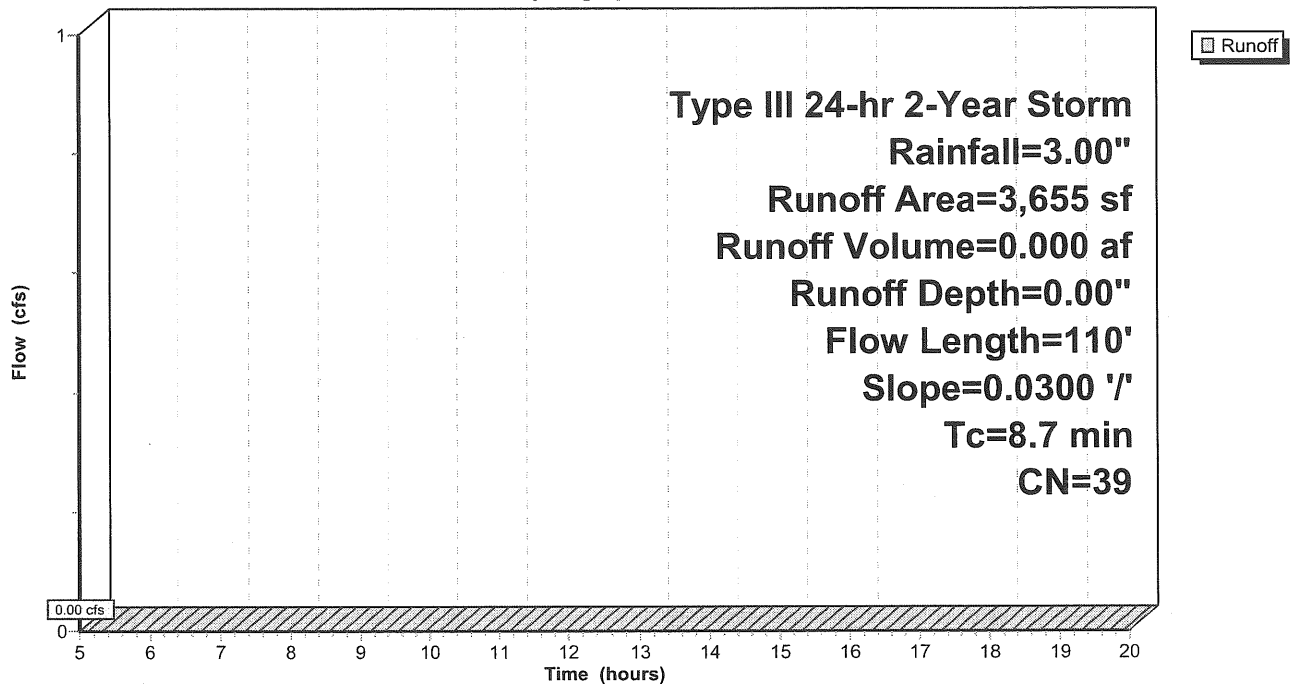
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Storm Rainfall=3.00"

Area (sf)	CN	Description
3,655	39	>75% Grass cover, Good, HSG A
3,655		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0300	0.19		Sheet Flow, AB Grass: Short n= 0.150 P2= 3.00"
0.1	10	0.0300	1.21		Shallow Concentrated Flow, BC Short Grass Pasture Kv= 7.0 fps
8.7	110	Total			

Subcatchment 4P: Back of PS

Hydrograph



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 Type III 24-hr 2-Year Storm Rainfall=3.00"

Page 9

11/22/2006

Subcatchment 3P: Turner Barker

Runoff = 0.57 cfs @ 12.06 hrs, Volume= 0.038 af, Depth> 2.13"

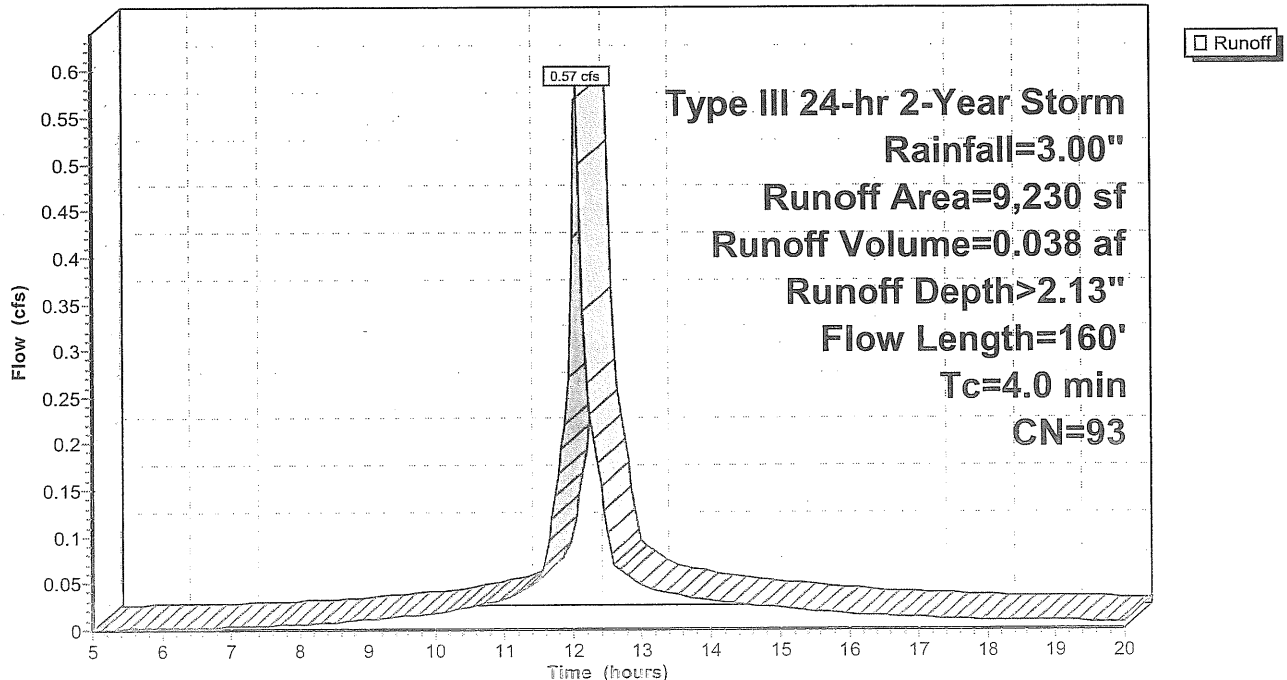
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Storm Rainfall=3.00"

Area (sf)	CN	Description
4,000	98	Building
4,380	98	Paved parking & roofs
850	39	>75% Grass cover, Good, HSG A
9,230	93	Weighted Average
850		Pervious Area
8,380		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	10	0.0050	0.06		Sheet Flow, AB Grass: Short n= 0.150 P2= 3.00"
0.8	30	0.0050	0.60		Sheet Flow, BC Smooth surfaces n= 0.011 P2= 3.00"
0.4	120	0.0100	5.36	4.21	Circular Channel (pipe), CDE Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011
4.0	160	Total			

Subcatchment 3P: Turner Barker

Hydrograph



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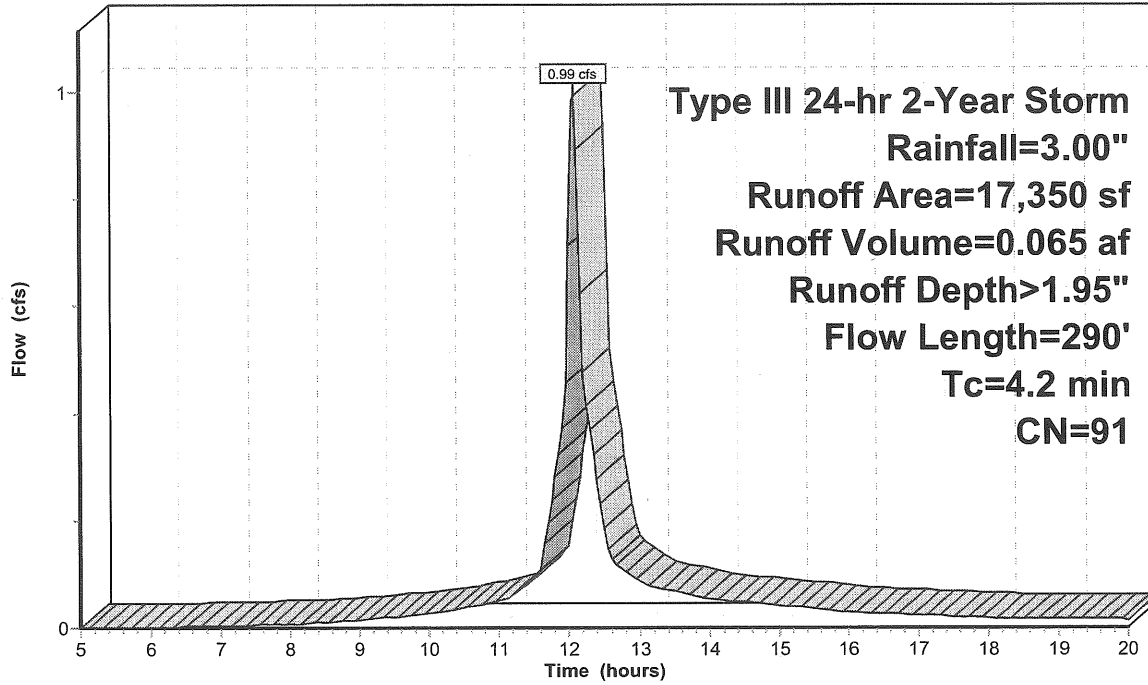
Post-Development w/ StormChamber
Type III 24-hr 2-Year Storm Rainfall=3.00"

Page 8

11/22/2006

Subcatchment 2P: Office Building

Hydrograph



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Type III 24-hr 2-Year Storm Rainfall=3.00"

Page 7

11/22/2006

Subcatchment 2P: Office Building

Runoff = 0.99 cfs @ 12.06 hrs, Volume= 0.065 af, Depth> 1.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Rainfall=3.00"

Area (sf)	CN	Description
5,810	98	Building
1,110	98	Paved roads w/curbs & sewers
2,130	39	>75% Grass cover, Good, HSG A
8,300	98	Gravel Parking
17,350	91	Weighted Average
2,130		Pervious Area
15,220		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	90	0.0250	1.43		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 3.00"
2.1	90	0.0100	0.70		Shallow Concentrated Flow, BC Short Grass Pasture Kv= 7.0 fps
0.1	25	0.2000	3.13		Shallow Concentrated Flow, CD Short Grass Pasture Kv= 7.0 fps
0.9	85	0.0060	1.57		Shallow Concentrated Flow, DE Paved Kv= 20.3 fps
4.2	290	Total			

Post-Development-SC

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Post-Development w/ StormChamber
 Type III 24-hr 2-Year Storm Rainfall=3.00"

Page 6

11/22/2006

Subcatchment 1BP: Parking Garage

Runoff = 2.22 cfs @ 12.09 hrs, Volume= 0.168 af, Depth> 2.59"

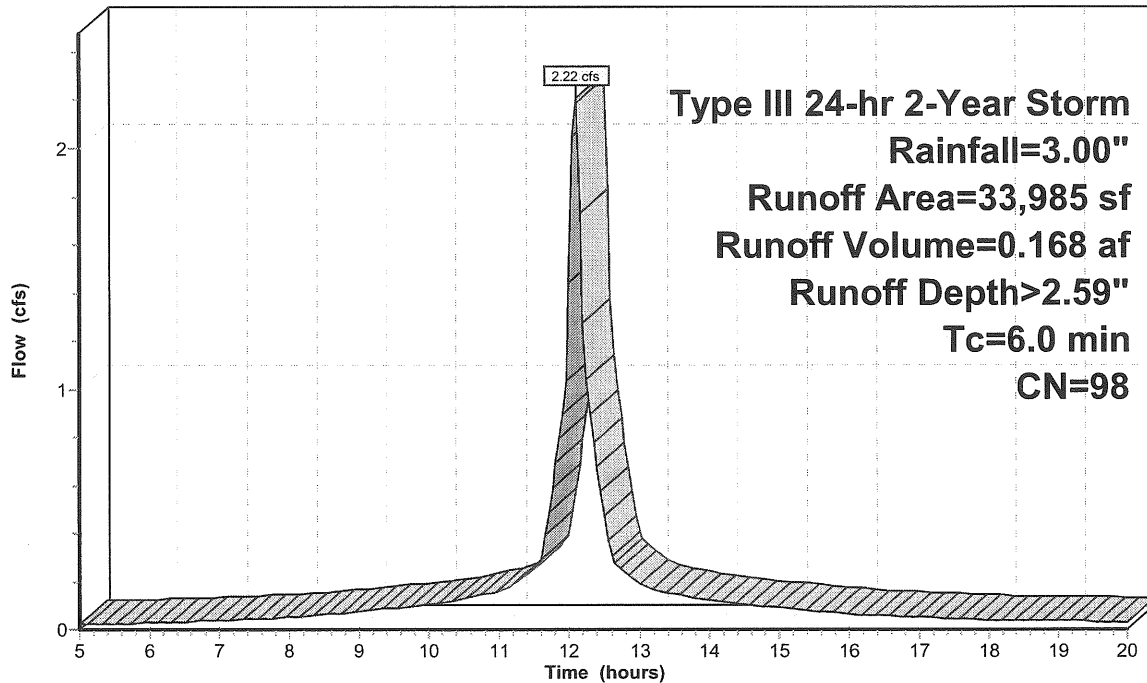
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Storm Rainfall=3.00"

Area (sf)	CN	Description
30,730	98	Building
3,255	98	Paved
33,985	98	Weighted Average
33,985		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Direct Entry

Subcatchment 1BP: Parking Garage

Hydrograph



Post-Development-SC

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Post-Development w/ StormChamber
Type III 24-hr 2-Year Storm Rainfall=3.00"

Page 5

11/22/2006

Subcatchment 1AP: Open Space

Runoff = 0.01 cfs @ 12.46 hrs, Volume= 0.003 af, Depth> 0.10"

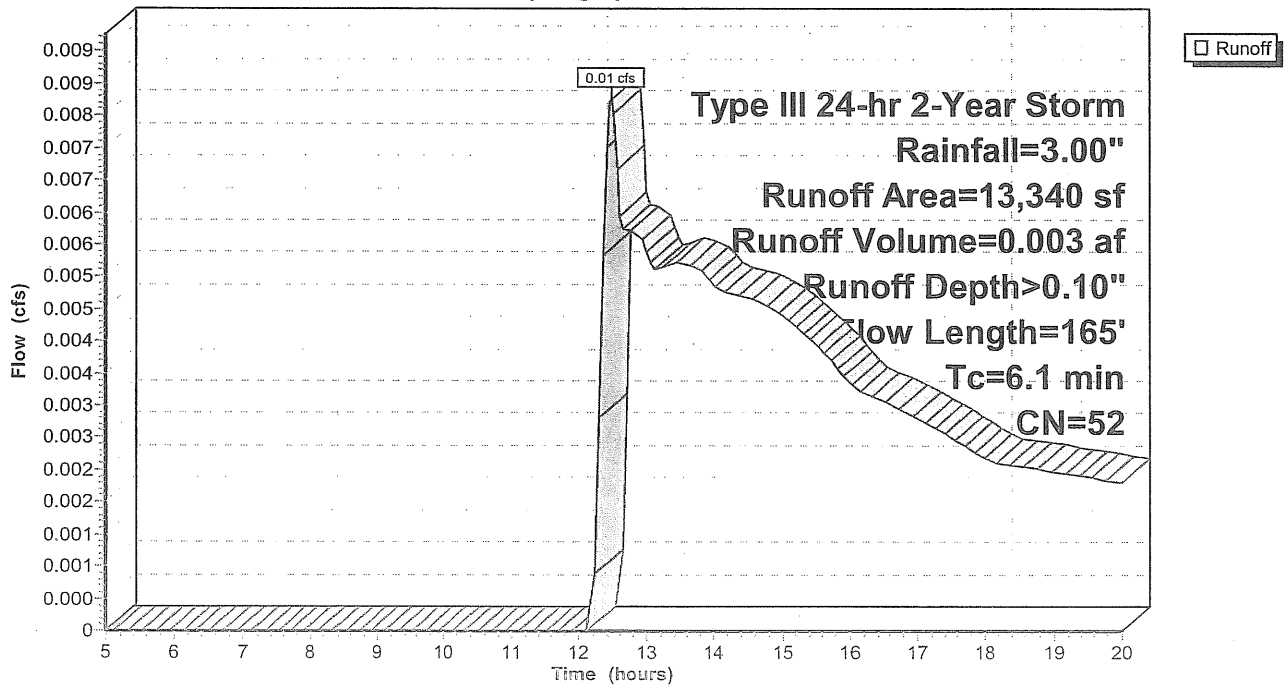
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Rainfall=3.00"

Area (sf)	CN	Description
10,440	39	>75% Grass cover, Good, HSG A
2,900	98	Paved parking & roofs
13,340	52	Weighted Average
10,440		Pervious Area
2,900		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	45	0.0200	1.14		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 3.00"
4.8	55	0.0400	0.19		Sheet Flow, BC Grass: Short n= 0.150 P2= 3.00"
0.6	65	0.0600	1.71		Shallow Concentrated Flow, CD Short Grass Pasture Kv= 7.0 fps
6.1	165	Total			

Subcatchment 1AP: Open Space

Hydrograph



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Post-Development w/ StormChamber
Type III 24-hr 2-Year Storm Rainfall=3.00"

Page 4

11/22/2006

Pond D7: Hancock

Peak Elev=8.70' Inflow=1.33 cfs 0.169 af
30.0" x 36.0' Culvert Outflow=1.33 cfs 0.169 af

Pond D8: Hancock Street Storm System

Peak Elev=10.25' Inflow=1.33 cfs 0.169 af
24.0" x 196.0' Culvert Outflow=1.33 cfs 0.169 af

Pond UH1: Hancock Link DMH1

Peak Elev=12.10' Inflow=1.33 cfs 0.169 af
24.0" x 125.0' Culvert Outflow=1.33 cfs 0.169 af

Pond UH2: Hancock Link DMH2

Peak Elev=16.86' Inflow=1.33 cfs 0.169 af
24.0" x 106.0' Culvert Outflow=1.33 cfs 0.169 af

Total Runoff Area = 3.110 ac Runoff Volume = 0.560 af Average Runoff Depth = 2.16"
12.60% Pervious Area = 0.392 ac 87.40% Impervious Area = 2.718 ac

Post-Development-SC

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Post-Development w/ StormChamber
Type III 24-hr 2-Year Storm Rainfall=3.00"

Page 3

11/22/2006

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1AP: Open SpaceRunoff Area=13,340 sf Runoff Depth>0.10"
Flow Length=165' Tc=6.1 min CN=52 Runoff=0.01 cfs 0.003 af**Subcatchment 1BP: Parking Garage**Runoff Area=33,985 sf Runoff Depth>2.59"
Tc=6.0 min CN=98 Runoff=2.22 cfs 0.168 af**Subcatchment 2P: Office Building**Runoff Area=17,350 sf Runoff Depth>1.95"
Flow Length=290' Tc=4.2 min CN=91 Runoff=0.99 cfs 0.065 af**Subcatchment 3P: Turner Barker**Runoff Area=9,230 sf Runoff Depth>2.13"
Flow Length=160' Tc=4.0 min CN=93 Runoff=0.57 cfs 0.038 af**Subcatchment 4P: Back of PS**Runoff Area=3,655 sf Runoff Depth=0.00"
Flow Length=110' Slope=0.0300 1' Tc=8.7 min CN=39 Runoff=0.00 cfs 0.000 af**Subcatchment 5AP: West Half of Complex**Runoff Area=14,410 sf Runoff Depth>2.59"
Tc=6.0 min CN=98 Runoff=0.94 cfs 0.071 af**Subcatchment 5BP: East Half of Complex**Runoff Area=38,510 sf Runoff Depth>2.59"
Tc=6.0 min CN=98 Runoff=2.51 cfs 0.191 af**Subcatchment 5CP: Plaza**Runoff Area=4,995 sf Runoff Depth>2.59"
Flow Length=75' Slope=0.0125 1' Tc=1.2 min CN=98 Runoff=0.37 cfs 0.025 af**Reach CS: Combined Sewer**Inflow=0.99 cfs 0.065 af
Outflow=0.99 cfs 0.065 af**Reach FR: Fore River**Inflow=4.77 cfs 0.493 af
Outflow=4.77 cfs 0.493 af**Reach TOT: (new node)**Inflow=5.56 cfs 0.558 af
Outflow=5.56 cfs 0.558 af**Pond 1B: Subsurface Detention for Parking G** Peak Elev=20.37' Storage=1,113 cf Inflow=2.22 cfs 0.168 af
Outflow=1.33 cfs 0.167 af**Pond 5C: Subsurface Detention for Plaza** Peak Elev=11.28' Storage=825 cf Inflow=3.69 cfs 0.287 af
Outflow=3.15 cfs 0.286 af**Pond D2: Commercial Street Storm System**Peak Elev=9.71' Inflow=0.57 cfs 0.038 af
15.0" x 192.0' Culvert Outflow=0.57 cfs 0.038 af**Pond D3: Commercial**Peak Elev=9.70' Inflow=3.59 cfs 0.324 af
15.0" x 192.0' Culvert Outflow=3.59 cfs 0.324 af

Post-Development-SC

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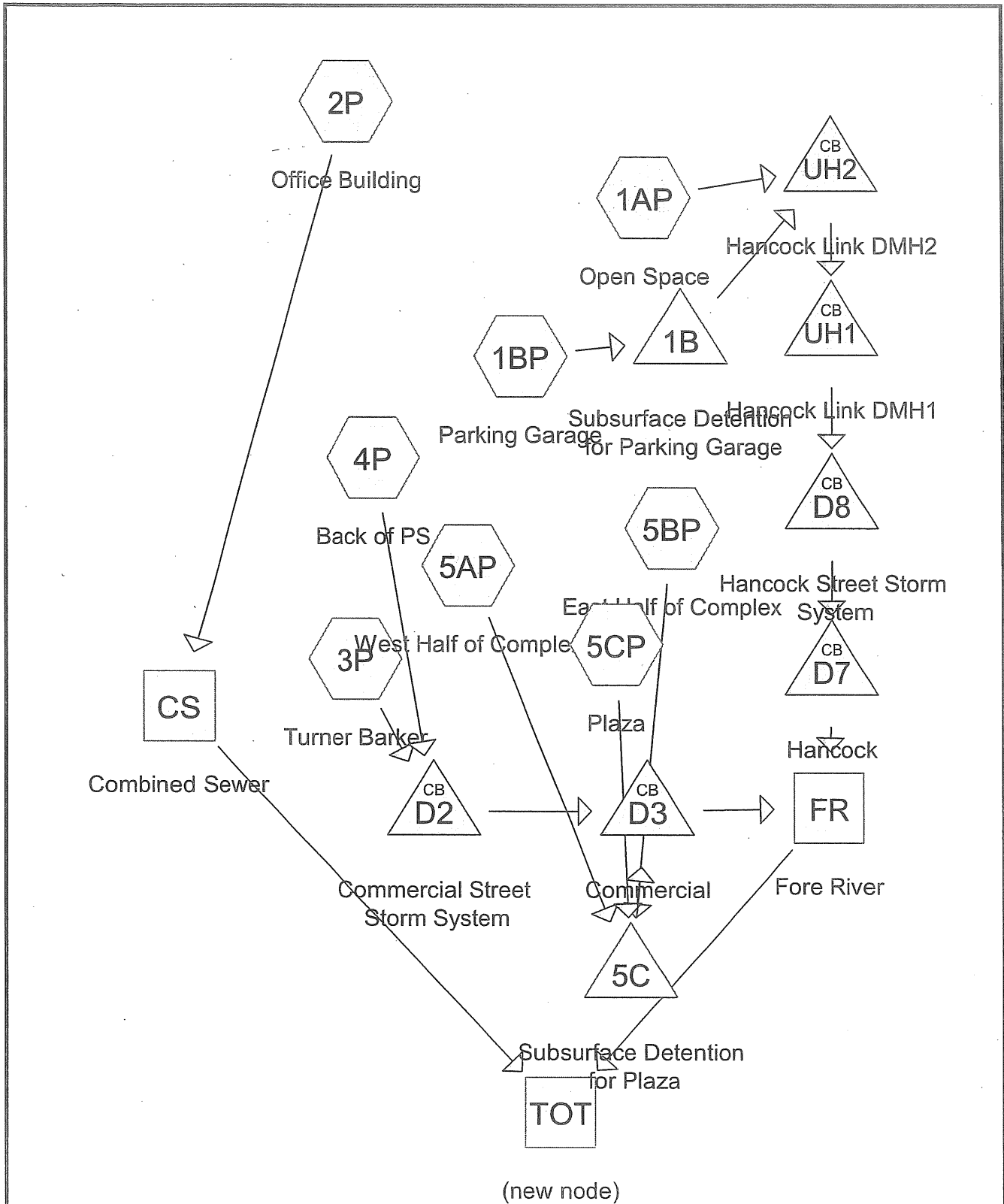
Page 2

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Area Listing (all nodes)

<u>Area (acres)</u>	<u>CN</u>	<u>Description (subcats)</u>
0.392	39	>75% Grass cover, Good, HSG A (1AP,2P,3P,4P)
0.931	98	Building (1BP,2P,3P)
0.318	98	Buildings (5AP)
0.191	98	Gravel Parking (2P)
0.088	98	Paved (1BP,5AP)
1.037	98	Paved parking & roofs (1AP,3P,5BP,5CP)
0.025	98	Paved roads w/curbs & sewers (2P)
0.128	98	Plaza (5BP)
<hr/>		
3.110		



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Pre-Development

Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 50

10/30/2006

Pond D8: Hancock Street Storm System

Inflow Area = 1.016 ac, Inflow Depth > 4.87" for 25-Year Storm event
Inflow = 5.40 cfs @ 12.08 hrs, Volume= 0.413 af
Outflow = 5.40 cfs @ 12.08 hrs, Volume= 0.413 af, Atten= 0%, Lag= 0.0 min
Primary = 5.40 cfs @ 12.08 hrs, Volume= 0.413 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 10.78' @ 12.08 hrs

Flood Elev= 15.38'

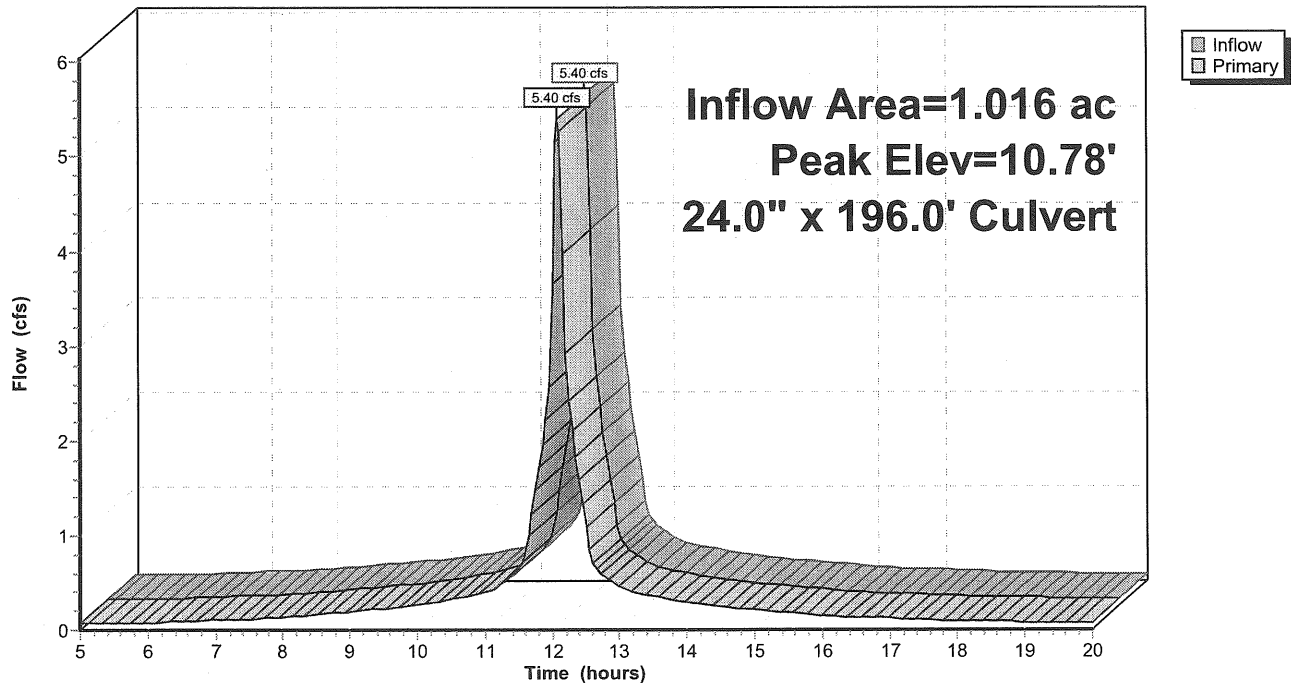
Device	Routing	Invert	Outlet Devices
#1	Primary	9.78'	24.0" x 196.0' long Culvert Ke= 0.500 Outlet Invert= 8.18' S= 0.0082 '/' Cc= 0.900 n= 0.011

Primary OutFlow Max=5.23 cfs @ 12.08 hrs HW=10.77' TW=9.29' (Dynamic Tailwater)

1=Culvert (Inlet Controls 5.23 cfs @ 3.38 fps)

Pond D8: Hancock Street Storm System

Hydrograph



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Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 49
10/30/2006

Pond D7: Hancock

Inflow Area = 1.016 ac, Inflow Depth > 4.87" for 25-Year Storm event
Inflow = 5.40 cfs @ 12.08 hrs, Volume= 0.413 af
Outflow = 5.40 cfs @ 12.08 hrs, Volume= 0.413 af, Atten= 0%, Lag= 0.0 min
Primary = 5.40 cfs @ 12.08 hrs, Volume= 0.413 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 9.31' @ 12.08 hrs

Flood Elev= 13.91'

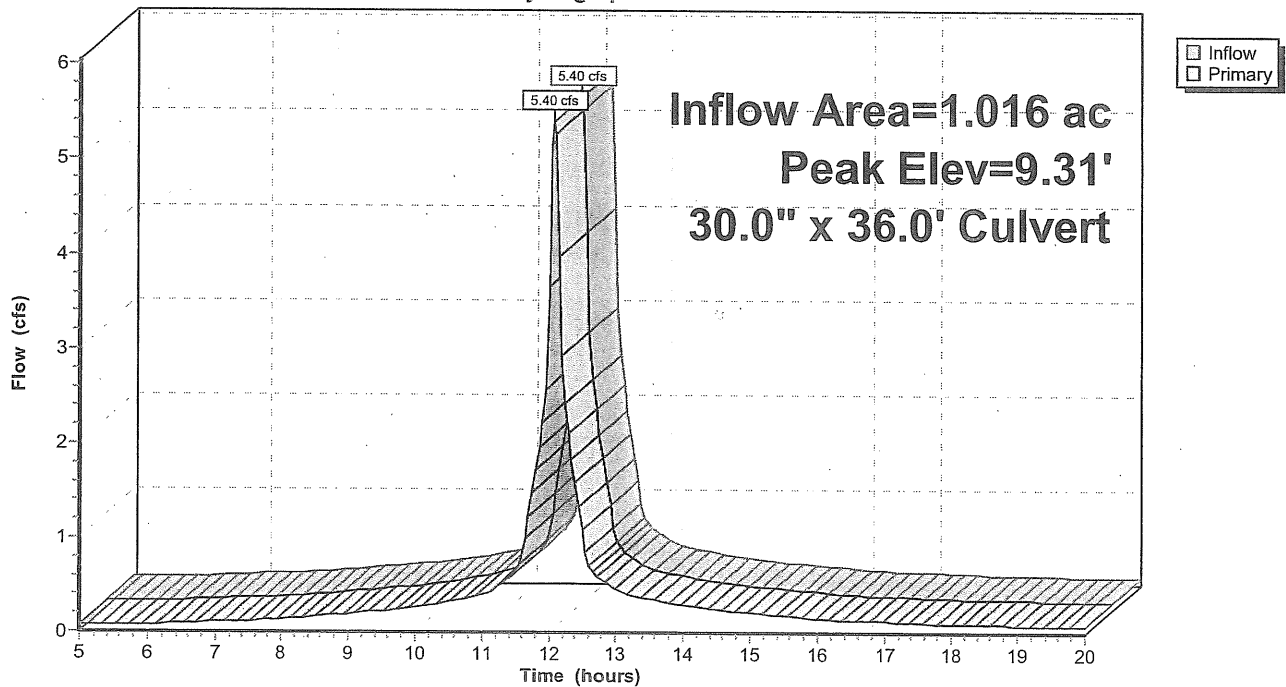
Device	Routing	Invert	Outlet Devices
#1	Primary	8.08'	30.0" x 36.0' long Culvert Ke= 0.500 Outlet Invert= 8.07' S= 0.0003 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=5.23 cfs @ 12.08 hrs HW=9.29' TW=0.00' (Dynamic Tailwater)

1=Culvert (Barrel Controls 5.23 cfs @ 3.26 fps)

Pond D7: Hancock

Hydrograph



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Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 48

10/30/2006

Pond D3: Commercial

Inflow Area = 0.430 ac, Inflow Depth > 4.71" for 25-Year Storm event
Inflow = 2.38 cfs @ 12.06 hrs, Volume= 0.169 af
Outflow = 2.38 cfs @ 12.06 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.0 min
Primary = 2.38 cfs @ 12.06 hrs, Volume= 0.169 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 9.36' @ 12.06 hrs

Flood Elev= 13.91'

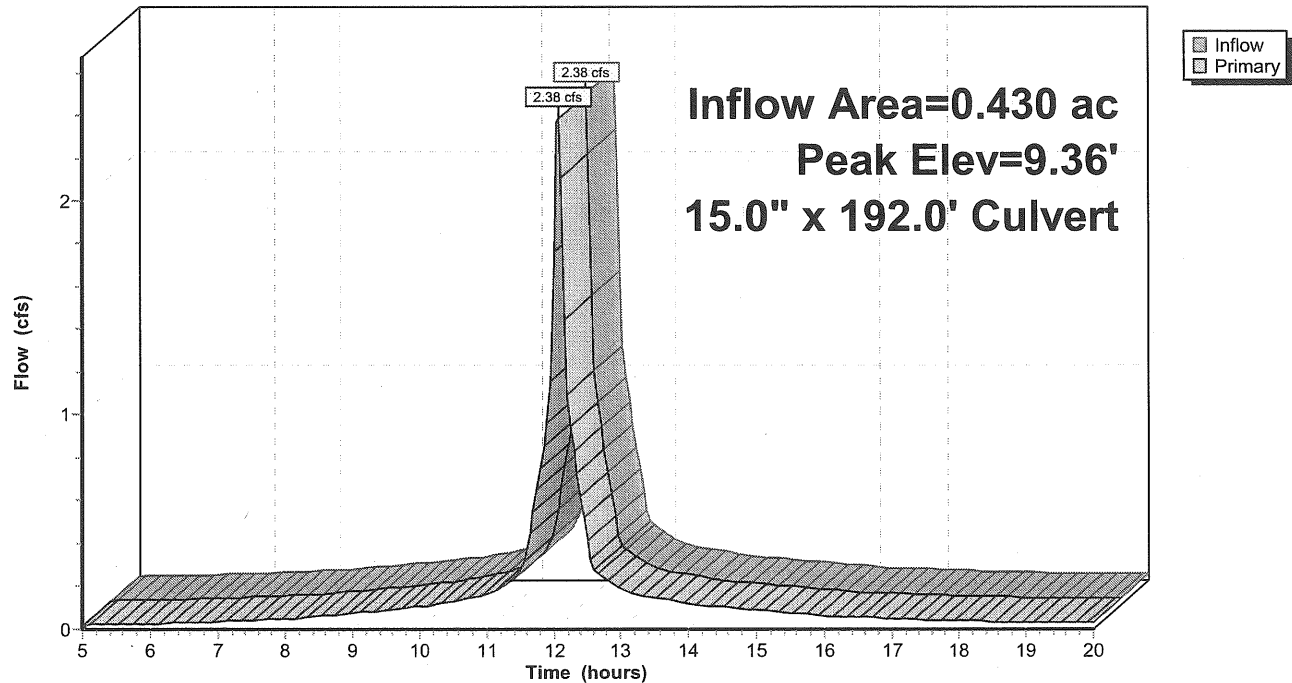
Device	Routing	Invert	Outlet Devices
#1	Primary	8.35'	15.0" x 192.0' long Culvert Ke= 0.500 Outlet Invert= 8.06' S= 0.0015 '/' Cc= 0.900 n= 0.010

Primary OutFlow Max=2.31 cfs @ 12.06 hrs HW=9.35' TW=0.00' (Dynamic Tailwater)

1=Culvert (Barrel Controls 2.31 cfs @ 3.02 fps)

Pond D3: Commercial

Hydrograph



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Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 47

10/30/2006

Pond D2: Commercial Street Storm System

Inflow Area = 0.430 ac, Inflow Depth > 4.71" for 25-Year Storm event
Inflow = 2.38 cfs @ 12.06 hrs, Volume= 0.169 af
Outflow = 2.38 cfs @ 12.06 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.0 min
Primary = 2.38 cfs @ 12.06 hrs, Volume= 0.169 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 9.78' @ 12.08 hrs

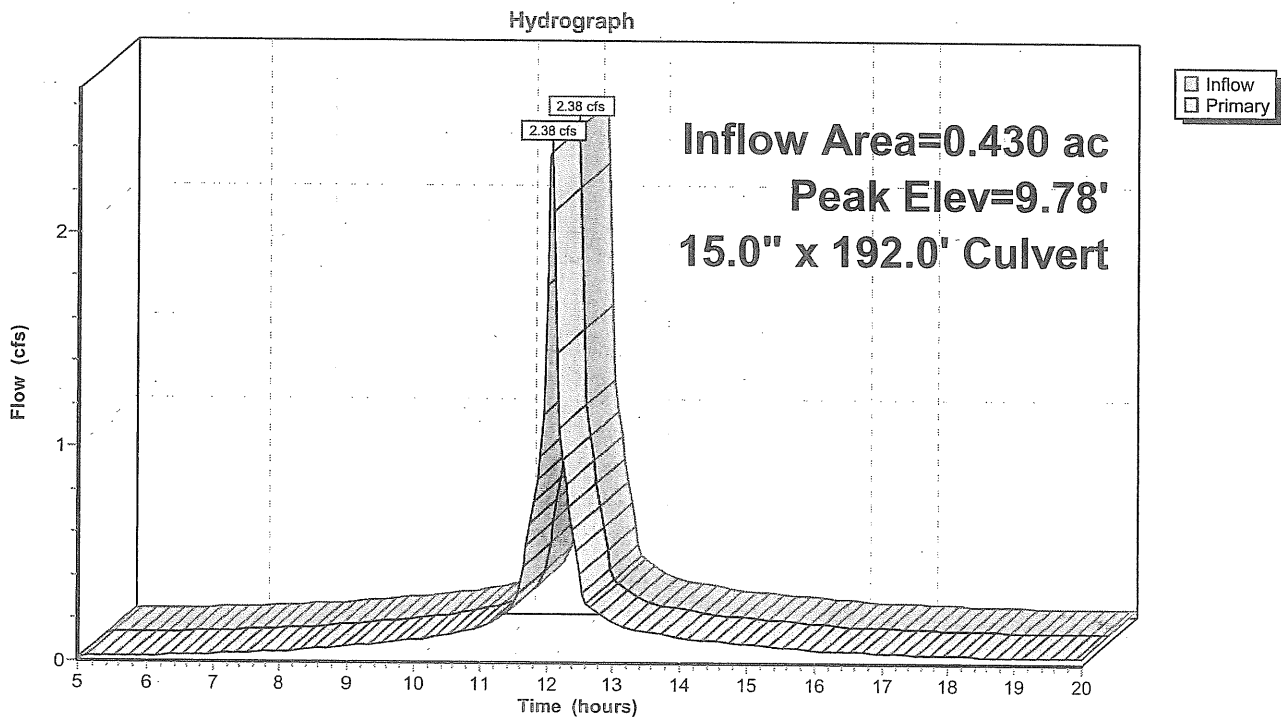
Flood Elev= 14.95'

Device	Routing	Invert	Outlet Devices
#1	Primary	8.74'	15.0" x 192.0' long Culvert Ke= 0.500 Outlet Invert= 8.45' S= 0.0015 '/ Cc= 0.900 n= 0.010

Primary OutFlow Max=2.06 cfs @ 12.06 hrs HW=9.75' TW=9.35' (Dynamic Tailwater)

1=Culvert (Outlet Controls 2.06 cfs @ 2.63 fps)

Pond D2: Commercial Street Storm System



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Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 46

10/30/2006

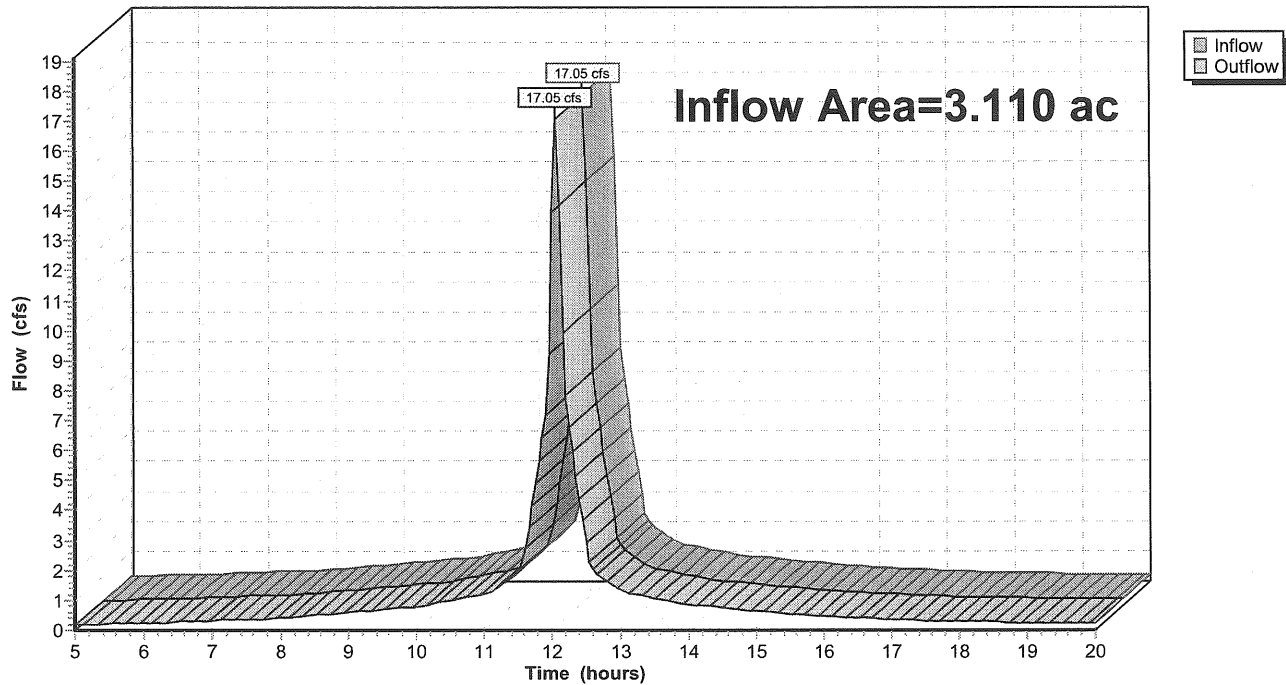
Reach TOT: (new node)

Inflow Area = 3.110 ac, Inflow Depth > 4.84" for 25-Year Storm event
Inflow = 17.05 cfs @ 12.05 hrs, Volume= 1.254 af
Outflow = 17.05 cfs @ 12.05 hrs, Volume= 1.254 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach TOT: (new node)

Hydrograph



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Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 45

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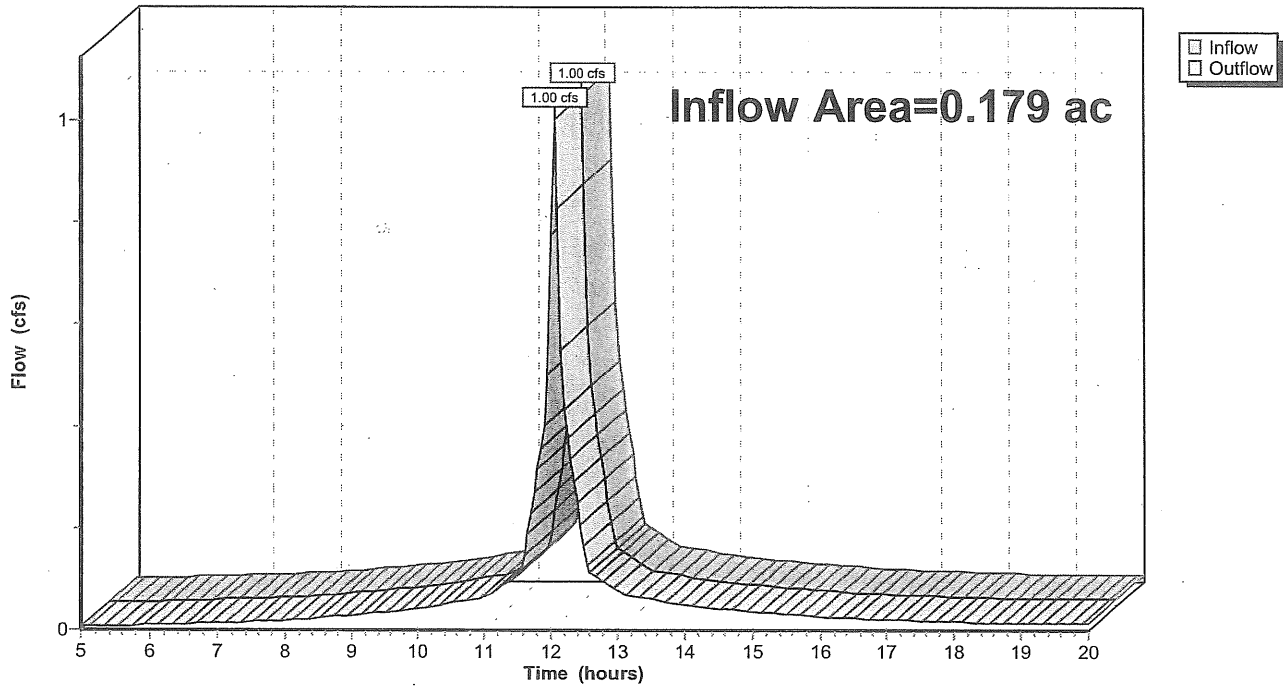
Reach S2: (new node)

Inflow Area = 0.179 ac, Inflow Depth > 4.62" for 25-Year Storm event
Inflow = 1.00 cfs @ 12.05 hrs, Volume= 0.069 af
Outflow = 1.00 cfs @ 12.05 hrs, Volume= 0.069 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach S2: (new node)

Hydrograph



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Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 44

10/30/2006

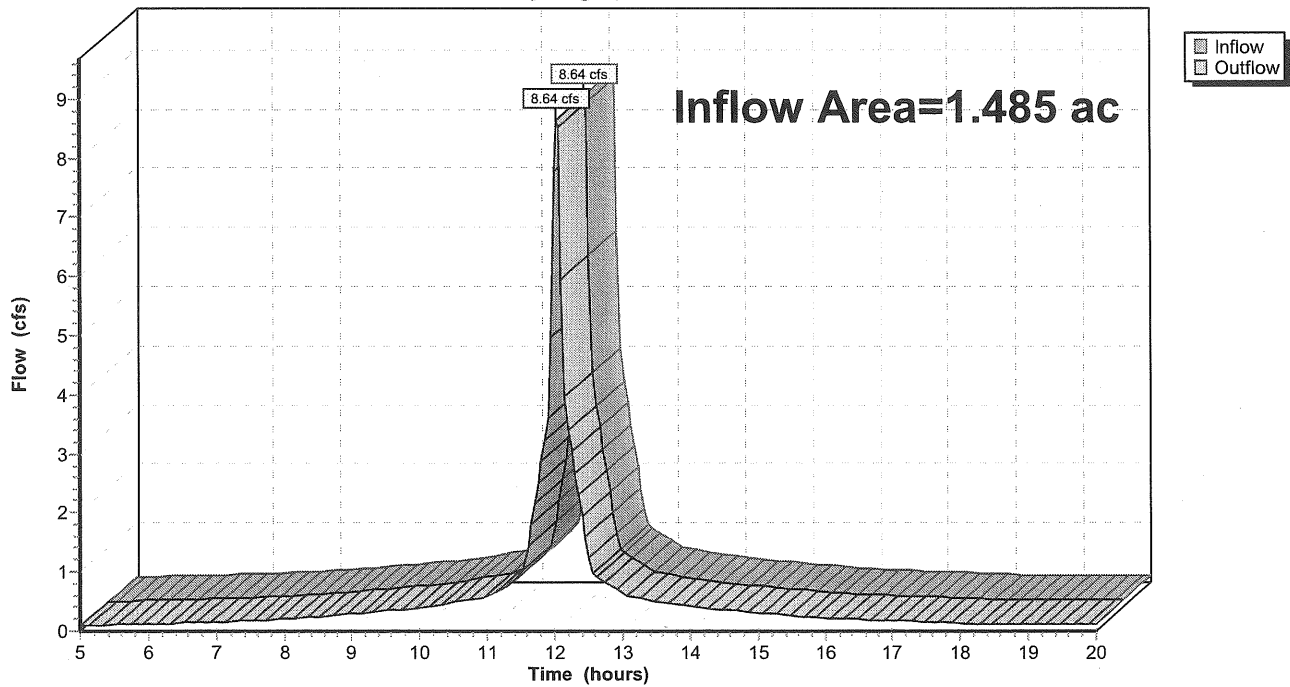
Reach S1: (new node)

Inflow Area = 1.485 ac, Inflow Depth > 4.87" for 25-Year Storm event
Inflow = 8.64 cfs @ 12.04 hrs, Volume= 0.603 af
Outflow = 8.64 cfs @ 12.04 hrs, Volume= 0.603 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach S1: (new node)

Hydrograph



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Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 43

10/30/2006

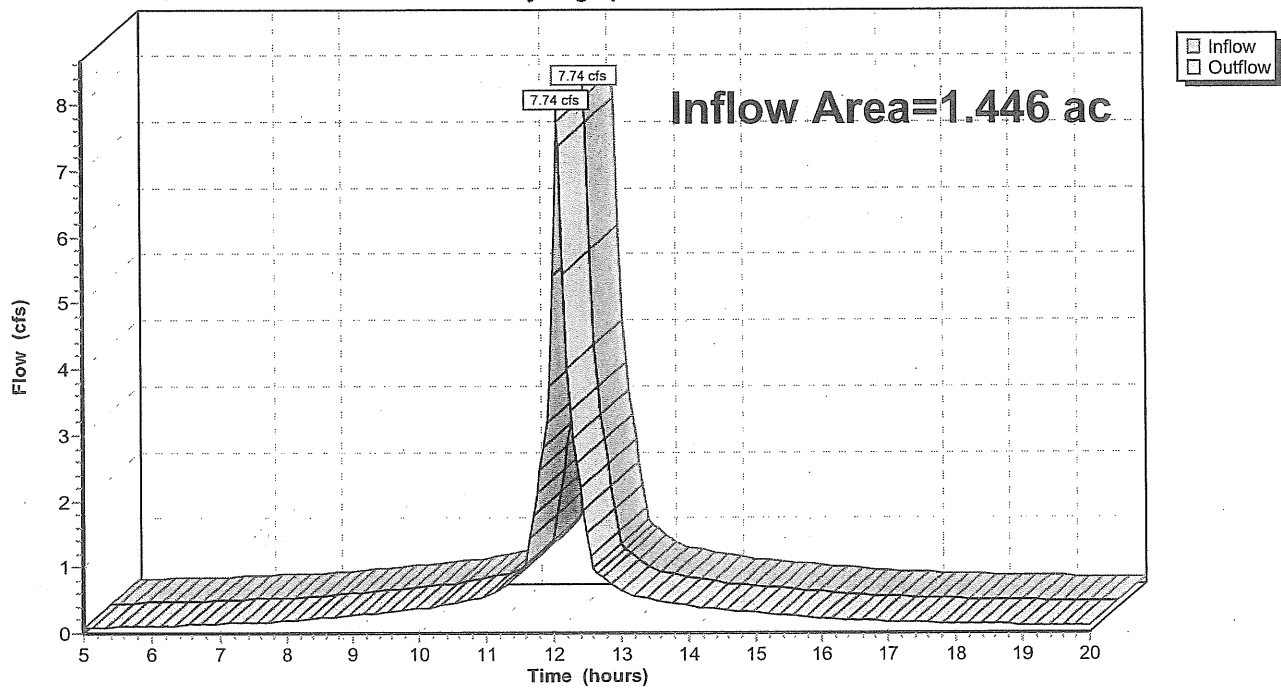
Reach FR: Fore River

Inflow Area = 1.446 ac, Inflow Depth > 4.83" for 25-Year Storm event
Inflow = 7.74 cfs @ 12.07 hrs, Volume= 0.582 af
Outflow = 7.74 cfs @ 12.07 hrs, Volume= 0.582 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ihd method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach FR: Fore River

Hydrograph



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Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 42

10/30/2006

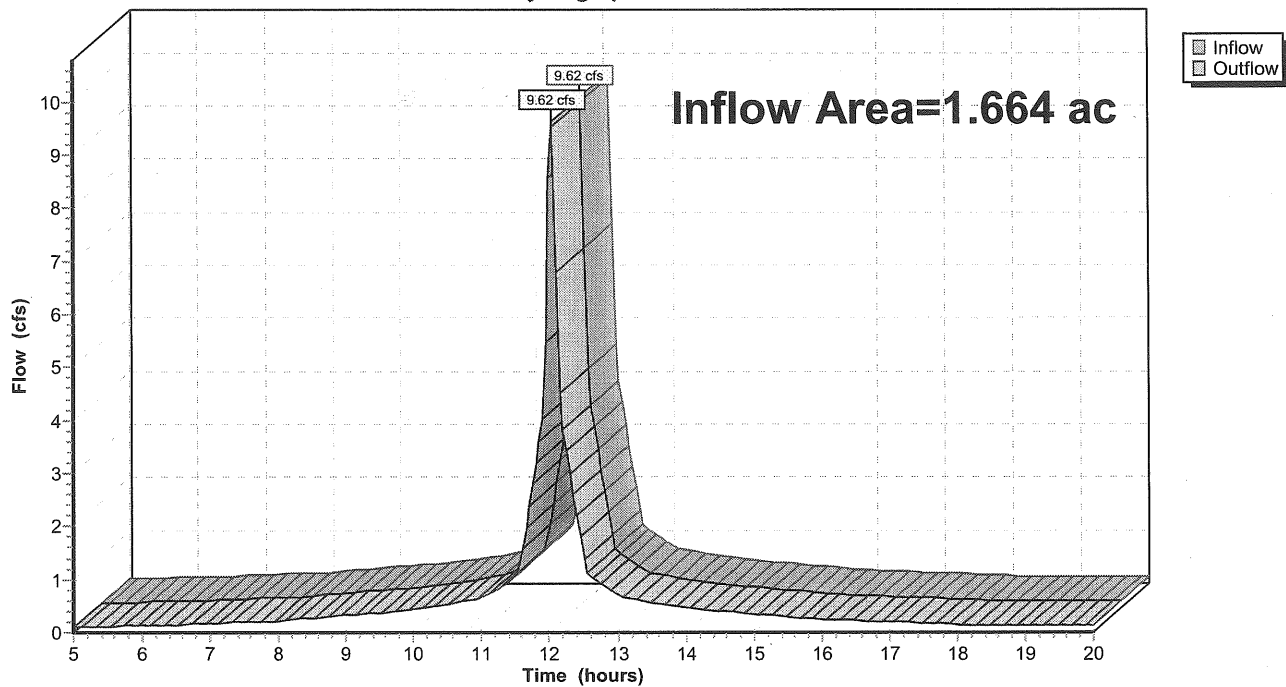
Reach CS: Combined Sewer

Inflow Area = 1.664 ac, Inflow Depth > 4.85" for 25-Year Storm event
Inflow = 9.62 cfs @ 12.04 hrs, Volume= 0.672 af
Outflow = 9.62 cfs @ 12.04 hrs, Volume= 0.672 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach CS: Combined Sewer

Hydrograph



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Pre-Development
Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 41
10/30/2006

Subcatchment 5X: Ocean Gateway Gravel Lot

Runoff = 5.40 cfs @ 12.08 hrs, Volume= 0.413 af, Depth> 4.87"

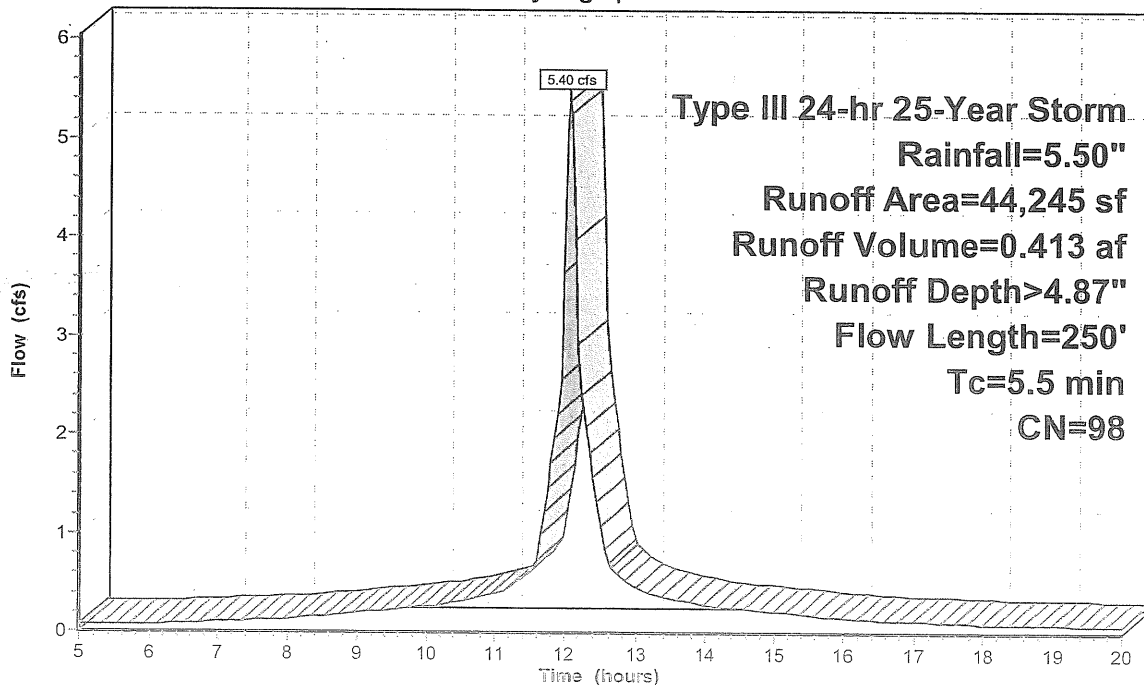
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
675	98	Buildings
1,415	98	Paved
41,460	98	Gravel Parking
695	68	<50% Grass cover, Poor, HSG A
44,245	98	Weighted Average
695		Pervious Area
43,550		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	15	0.0100	0.09		Sheet Flow, BC Grass: Short n= 0.150 P2= 3.00"
1.4	85	0.0100	0.98		Sheet Flow, CD Smooth surfaces n= 0.011 P2= 3.00"
1.2	150	0.0171	2.11		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
5.5	250	Total			

Subcatchment 5X: Ocean Gateway Gravel Lot

Hydrograph



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Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 40

10/30/2006

Subcatchment 4X: Turner Barker Gravel Lot

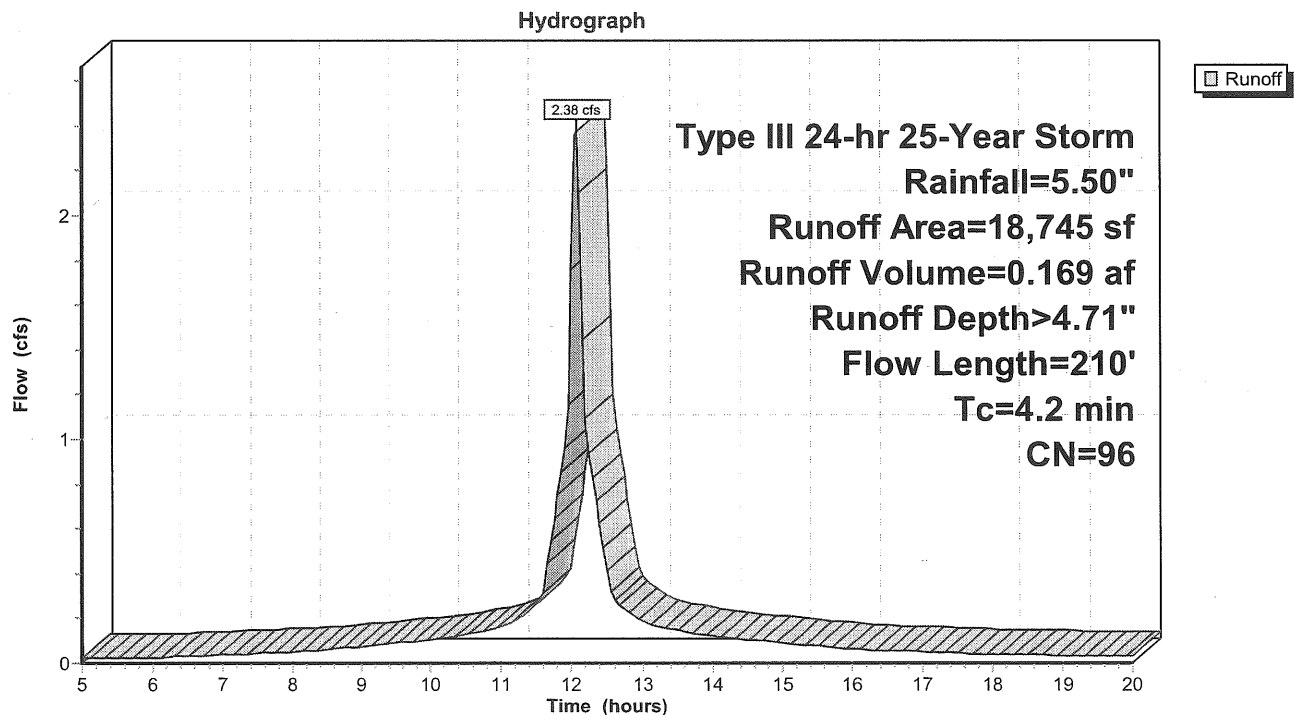
Runoff = 2.38 cfs @ 12.06 hrs, Volume= 0.169 af, Depth> 4.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
1,030	98	Buildings
285	98	Paved
16,130	98	Gravel Parking
1,300	68	<50% Grass cover, Poor, HSG A
18,745	96	Weighted Average
1,300		Pervious Area
17,445		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	15	0.0200	0.11		Sheet Flow, AB Grass: Short n= 0.150 P2= 3.00"
1.1	85	0.0200	1.29		Sheet Flow, BC Smooth surfaces n= 0.011 P2= 3.00"
0.9	110	0.0150	1.97		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
4.2	210	Total			

Subcatchment 4X: Turner Barker Gravel Lot



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Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 39

10/30/2006

Subcatchment 3X: Turner Barker

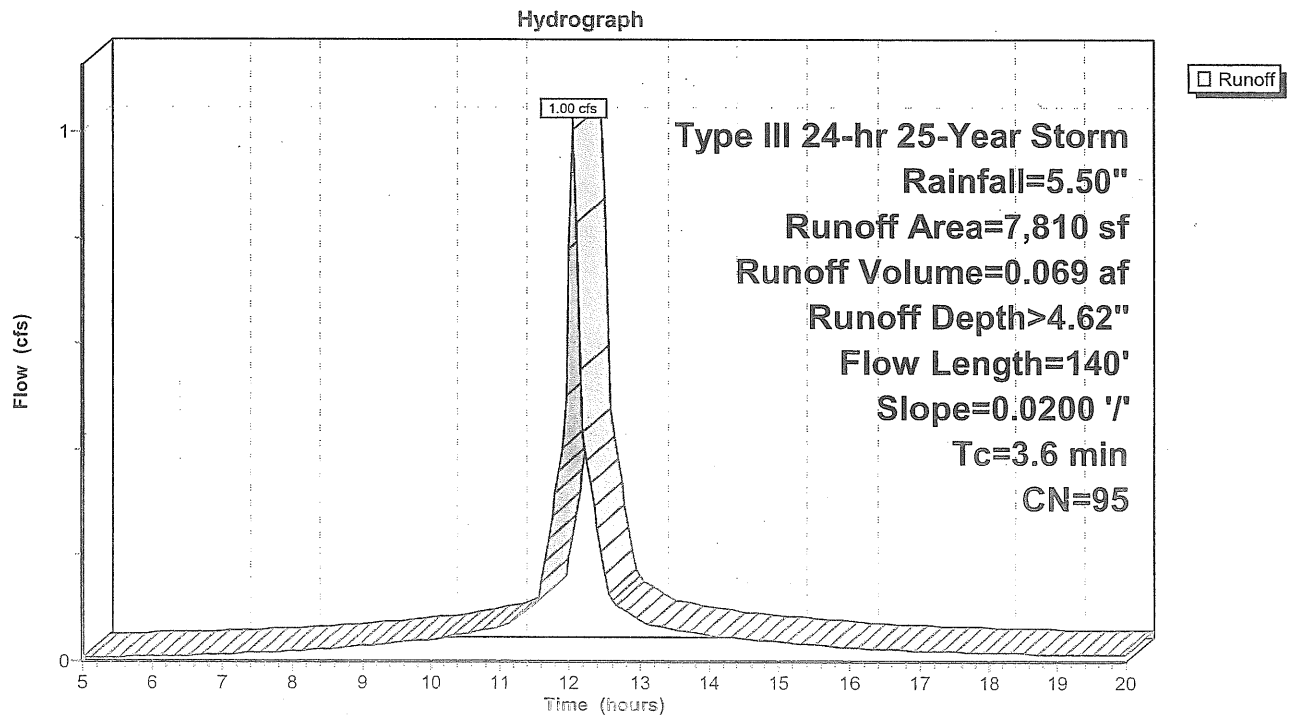
Runoff = 1.00 cfs @ 12.05 hrs, Volume= 0.069 af, Depth> 4.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
4,000	98	Building
2,980	98	Gravel Parking
830	68	<50% Grass cover, Poor, HSG A
7,810	95	Weighted Average
830		Pervious Area
6,980		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	15	0.0200	0.11		Sheet Flow, AB Grass: Short n= 0.150 P2= 3.00"
1.1	85	0.0200	1.29		Sheet Flow, BC Smooth surfaces n= 0.011 P2= 3.00"
0.3	40	0.0200	2.28		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
3.6	140	Total			

Subcatchment 3X: Turner Barker



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Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 38

10/30/2006

Subcatchment 2X: Breakaway

Runoff = 0.94 cfs @ 12.01 hrs, Volume= 0.064 af, Depth> 4.87"

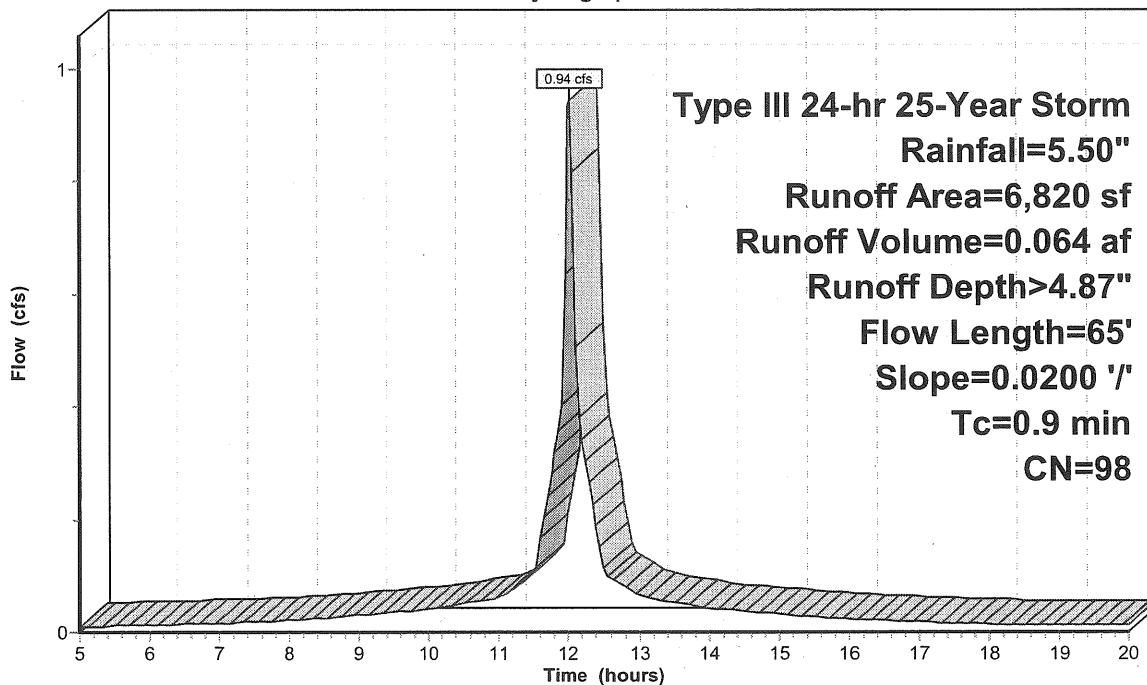
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
5,870	98	Building
950	98	Gravel Parking
6,820	98	Weighted Average
6,820		Impervious Area

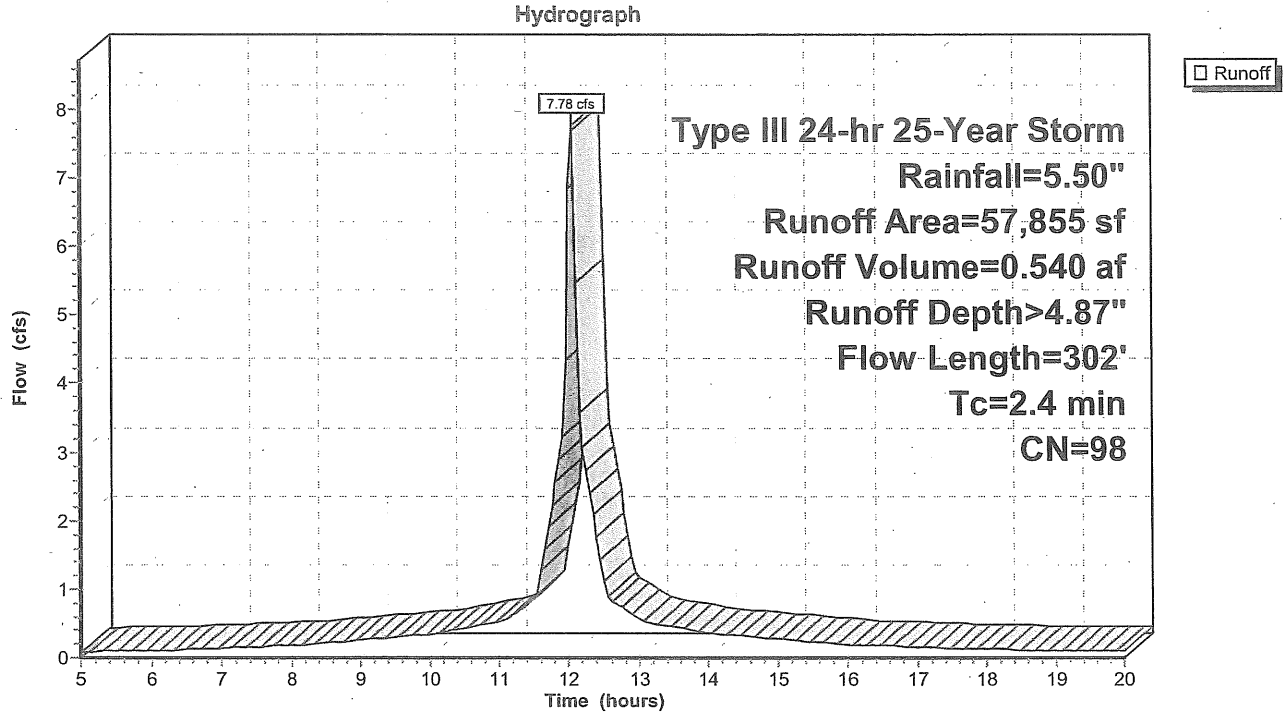
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	65	0.0200	1.22		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 3.00"

Subcatchment 2X: Breakaway

Hydrograph



Subcatchment 1X: Shipyard Gravel Lot



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Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 36

10/30/2006

Subcatchment 1X: Shipyard Gravel Lot

Runoff = 7.78 cfs @ 12.04 hrs, Volume= 0.540 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
2,635	98	Building
29,940	98	Gravel Parking
25,280	98	Paved
57,855	98	Weighted Average
57,855		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	60	0.0333	1.47		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 3.00"
0.3	40	0.1000	2.11		Sheet Flow, BC Smooth surfaces n= 0.011 P2= 3.00"
0.2	40	0.0500	3.60		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
0.9	90	0.0111	1.70		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
0.2	40	0.0625	4.03		Shallow Concentrated Flow, EF Unpaved Kv= 16.1 fps
0.1	32	0.0100	5.90	4.63	Circular Channel (pipe), FG Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010
2.4	302	Total			

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Type III 24-hr 25-Year Storm Rainfall=5.50"

Page 35

10/30/2006

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1X: Shipyard Gravel Lot	Runoff Area=57,855 sf Flow Length=302'	Runoff Depth>4.87" Tc=2.4 min CN=98 Runoff=7.78 cfs 0.540 af
Subcatchment 2X: Breakaway	Runoff Area=6,820 sf Flow Length=65' Slope=0.0200 1'	Runoff Depth>4.87" Tc=0.9 min CN=98 Runoff=0.94 cfs 0.064 af
Subcatchment 3X: Turner Barker	Runoff Area=7,810 sf Flow Length=140' Slope=0.0200 1'	Runoff Depth>4.62" Tc=3.6 min CN=95 Runoff=1.00 cfs 0.069 af
Subcatchment 4X: Turner Barker Gravel Lot	Runoff Area=18,745 sf Flow Length=210'	Runoff Depth>4.71" Tc=4.2 min CN=96 Runoff=2.38 cfs 0.169 af
Subcatchment 5X: Ocean Gateway Gravel Lot	Runoff Area=44,245 sf Flow Length=250'	Runoff Depth>4.87" Tc=5.5 min CN=98 Runoff=5.40 cfs 0.413 af
Reach CS: Combined Sewer		Inflow=9.62 cfs 0.672 af Outflow=9.62 cfs 0.672 af
Reach FR: Fore River		Inflow=7.74 cfs 0.582 af Outflow=7.74 cfs 0.582 af
Reach S1: (new node)		Inflow=8.64 cfs 0.603 af Outflow=8.64 cfs 0.603 af
Reach S2: (new node)		Inflow=1.00 cfs 0.069 af Outflow=1.00 cfs 0.069 af
Reach TOT: (new node)		Inflow=17.05 cfs 1.254 af Outflow=17.05 cfs 1.254 af
Pond D2: Commercial Street Storm System	Peak Elev=9.78' 15.0" x 192.0' Culvert	Inflow=2.38 cfs 0.169 af Outflow=2.38 cfs 0.169 af
Pond D3: Commercial	Peak Elev=9.36' 15.0" x 192.0' Culvert	Inflow=2.38 cfs 0.169 af Outflow=2.38 cfs 0.169 af
Pond D7: Hancock	Peak Elev=9.31' 30.0" x 36.0' Culvert	Inflow=5.40 cfs 0.413 af Outflow=5.40 cfs 0.413 af
Pond D8: Hancock Street Storm System	Peak Elev=10.78' 24.0" x 196.0' Culvert	Inflow=5.40 cfs 0.413 af Outflow=5.40 cfs 0.413 af

Total Runoff Area = 3.110 ac Runoff Volume = 1.254 af Average Runoff Depth = 4.84"
2.09% Pervious Area = 0.065 ac 97.91% Impervious Area = 3.045 ac

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Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 34

10/30/2006

Pond D8: Hancock Street Storm System

Inflow Area = 1.016 ac, Inflow Depth > 4.15" for 10-Year Storm event
Inflow = 4.60 cfs @ 12.08 hrs, Volume= 0.351 af
Outflow = 4.60 cfs @ 12.08 hrs, Volume= 0.351 af, Atten= 0%, Lag= 0.0 min
Primary = 4.60 cfs @ 12.08 hrs, Volume= 0.351 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 10.70' @ 12.08 hrs

Flood Elev= 15.38'

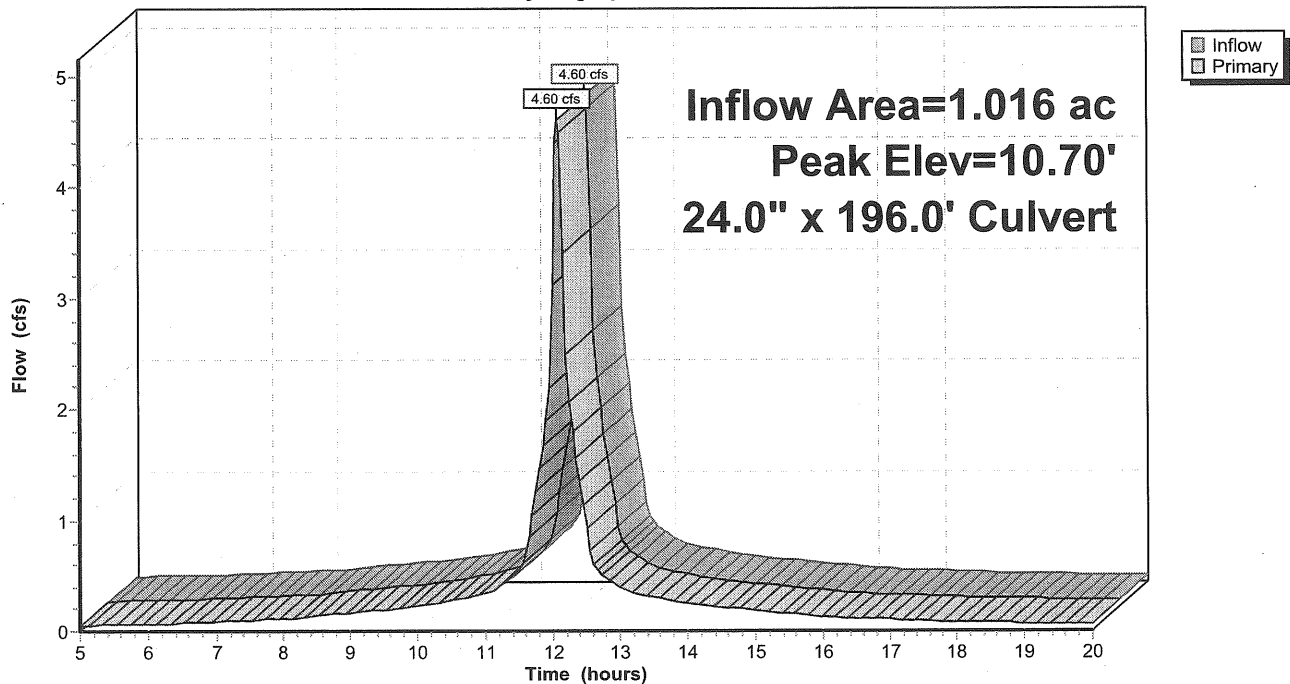
Device	Routing	Invert	Outlet Devices
#1	Primary	9.78'	24.0" x 196.0' long Culvert Ke= 0.500 Outlet Invert= 8.18' S= 0.0082 '/ Cc= 0.900 n= 0.011

Primary OutFlow Max=4.46 cfs @ 12.08 hrs HW=10.68' TW=9.19' (Dynamic Tailwater)

↳ **1=Culvert** (Inlet Controls 4.46 cfs @ 3.24 fps)

Pond D8: Hancock Street Storm System

Hydrograph



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Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 33

10/30/2006

Pond D7: Hancock

Inflow Area = 1.016 ac, Inflow Depth > 4.15" for 10-Year Storm event
Inflow = 4.60 cfs @ 12.08 hrs, Volume= 0.351 af
Outflow = 4.60 cfs @ 12.08 hrs, Volume= 0.351 af, Atten= 0%, Lag= 0.0 min
Primary = 4.60 cfs @ 12.08 hrs, Volume= 0.351 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 9.21' @ 12.08 hrs

Flood Elev= 13.91'

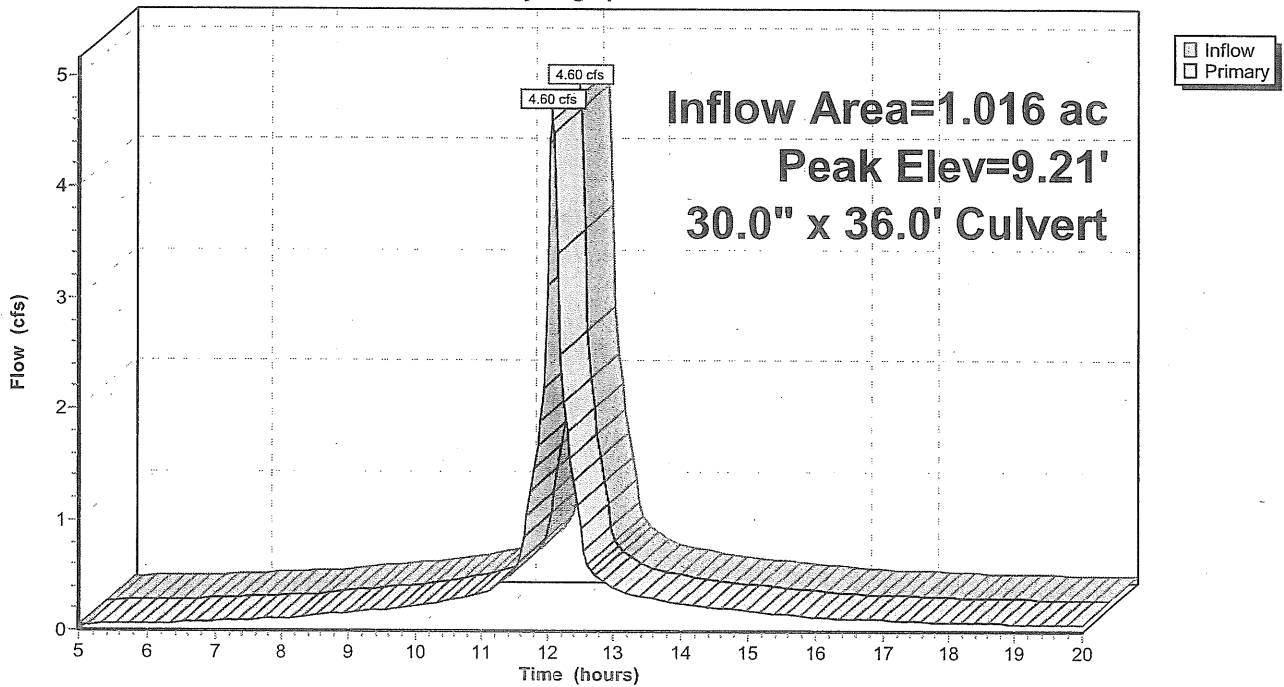
Device	Routing	Invert	Outlet Devices
#1	Primary	8.08'	30.0" x 36.0' long Culvert Ke= 0.500 Outlet Invert= 8.07' S= 0.0003 '/ Cc= 0.900 n= 0.012

Primary OutFlow Max=4.46 cfs @ 12.08 hrs HW=9.19' TW=0.00' (Dynamic Tailwater)

1=Culvert (Barrel Controls 4.46 cfs @ 3.11 fps)

Pond D7: Hancock

Hydrograph



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Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 32

10/30/2006

Pond D3: Commercial

Inflow Area = 0.430 ac, Inflow Depth > 3.98" for 10-Year Storm event
Inflow = 2.02 cfs @ 12.06 hrs, Volume= 0.143 af
Outflow = 2.02 cfs @ 12.06 hrs, Volume= 0.143 af, Atten= 0%, Lag= 0.0 min
Primary = 2.02 cfs @ 12.06 hrs, Volume= 0.143 af

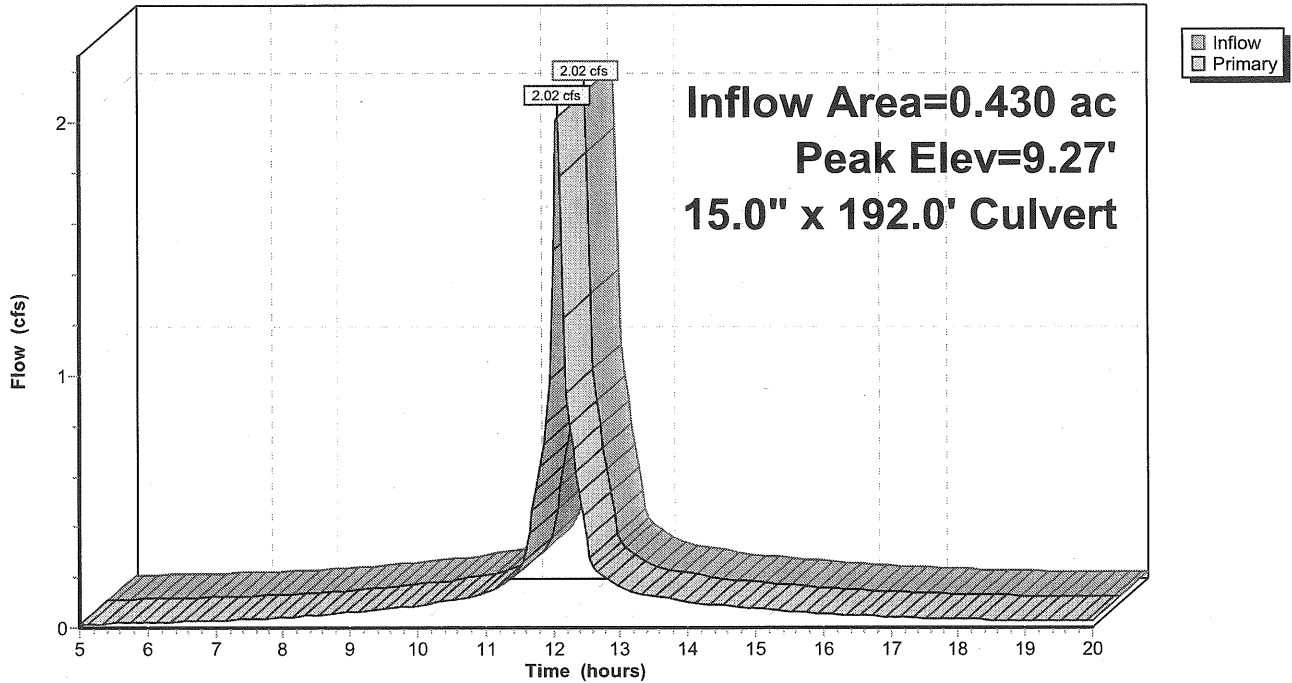
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 9.27' @ 12.06 hrs
Flood Elev= 13.91'

Device	Routing	Invert	Outlet Devices
#1	Primary	8.35'	15.0" x 192.0' long Culvert Ke= 0.500 Outlet Invert= 8.06' S= 0.0015 '/ Cc= 0.900 n= 0.010

Primary OutFlow Max=1.96 cfs @ 12.06 hrs HW=9.25' TW=0.00' (Dynamic Tailwater)
↑=Culvert (Barrel Controls 1.96 cfs @ 2.89 fps)

Pond D3: Commercial

Hydrograph



Pond D2: Commercial Street Storm System

Inflow Area = 0.430 ac, Inflow Depth > 3.98" for 10-Year Storm event
 Inflow = 2.02 cfs @ 12.06 hrs, Volume= 0.143 af
 Outflow = 2.02 cfs @ 12.06 hrs, Volume= 0.143 af, Atten= 0%, Lag= 0.0 min
 Primary = 2.02 cfs @ 12.06 hrs, Volume= 0.143 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 9.68' @ 12.08 hrs

Flood Elev= 14.95'

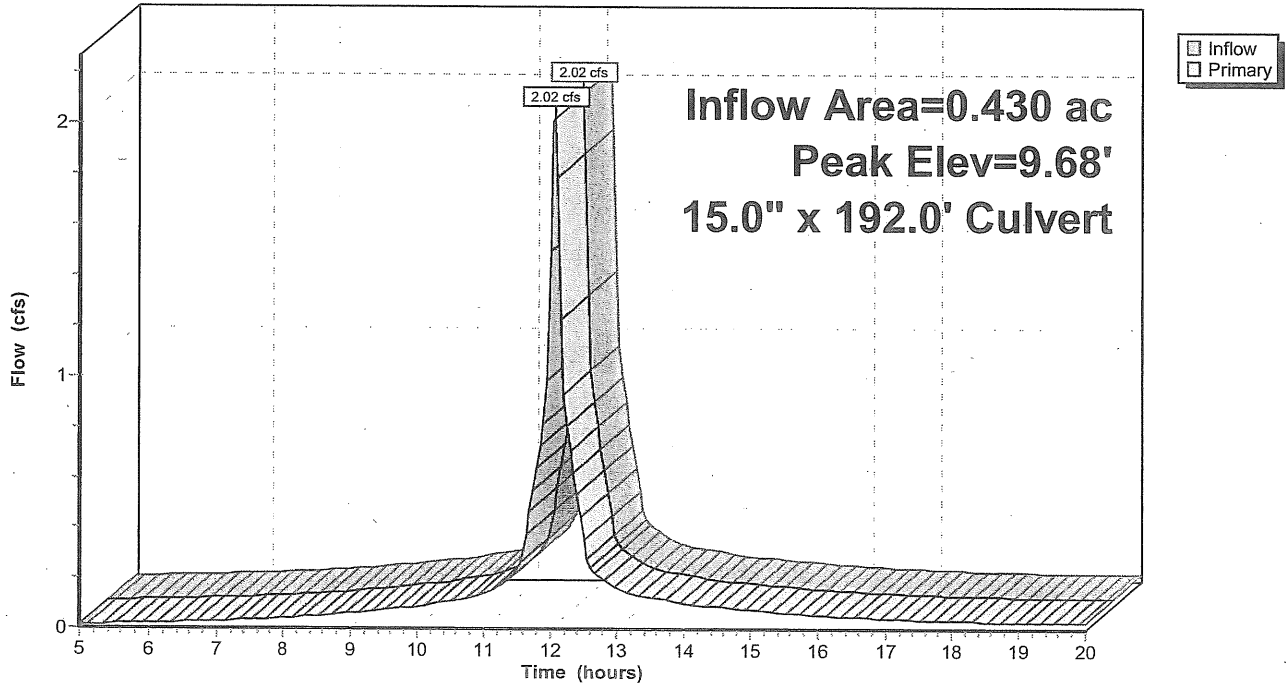
Device	Routing	Invert	Outlet Devices
#1	Primary	8.74'	15.0" x 192.0' long Culvert Ke= 0.500 Outlet Invert= 8.45' S= 0.0015 '/' Cc= 0.900 n= 0.010

Primary OutFlow Max=1.78 cfs @ 12.06 hrs HW=9.66' TW=9.25' (Dynamic Tailwater)

↑1=Culvert (Outlet Controls 1.78 cfs @ 2.57 fps)

Pond D2: Commercial Street Storm System

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Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 30
10/30/2006

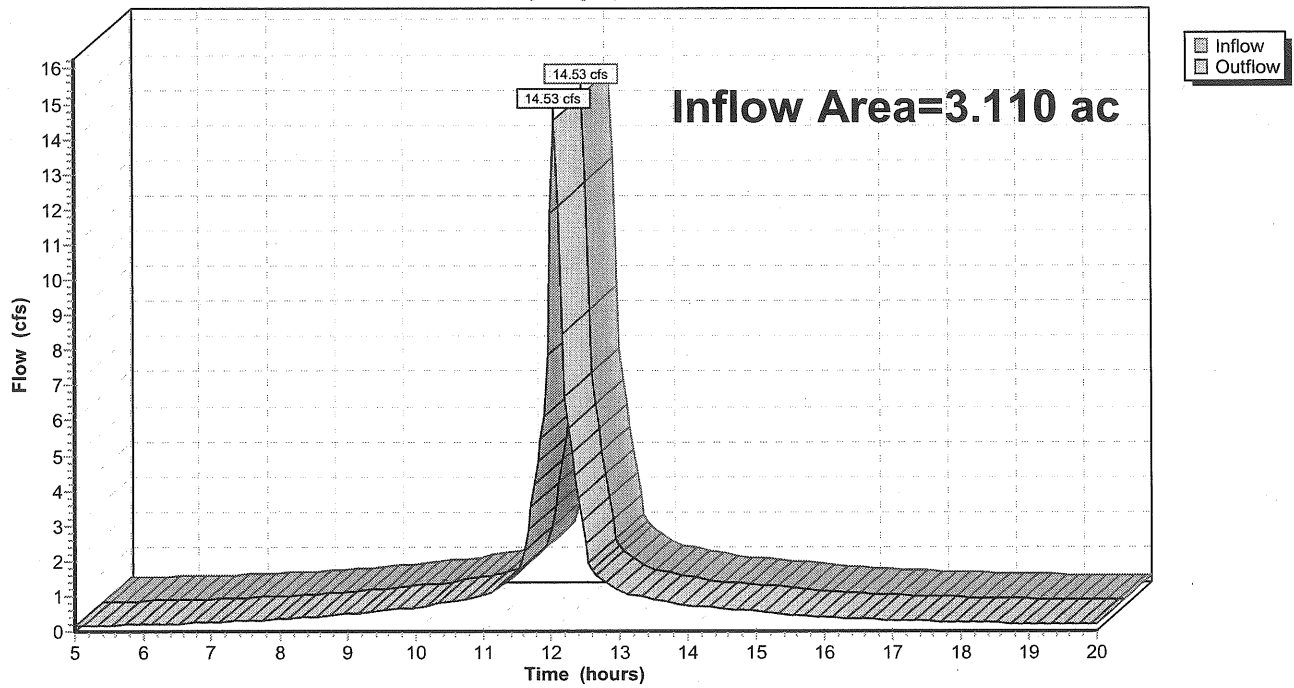
Reach TOT: (new node)

Inflow Area = 3.110 ac, Inflow Depth > 4.11" for 10-Year Storm event
Inflow = 14.53 cfs @ 12.05 hrs, Volume= 1.065 af
Outflow = 14.53 cfs @ 12.05 hrs, Volume= 1.065 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach TOT: (new node)

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Type III 24-hr 10-Year Storm Rainfall=4.70"

Page 29

10/30/2006

Reach S2: (new node)

Inflow Area = 0.179 ac, Inflow Depth > 3.89" for 10-Year Storm event
Inflow = 0.85 cfs @ 12.05 hrs, Volume= 0.058 af
Outflow = 0.85 cfs @ 12.05 hrs, Volume= 0.058 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach S2: (new node)

Hydrograph

