

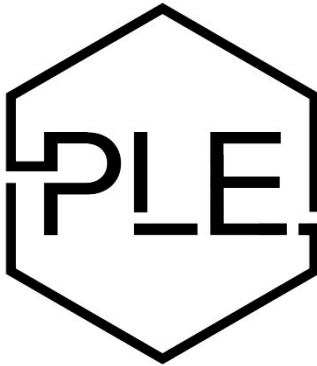
# **SPRINGHILL RETAIL** **DRAINAGE NARRATIVE**

***Date: 05-21-2024***

***Located in: Bryant, Arkansas***

***Prepared for:***  
**City of Bryant, Arkansas**

**Prepared by:**



**PHILLIP LEWIS ENGINEERING**


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Structural + Civil Consultants

23620 Interstate 30 | Bryant, AR  
PH: 501-350-9840

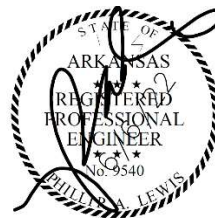
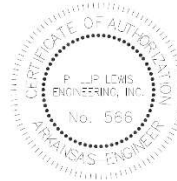
# CERTIFICATION

I hereby state that this Final Drainage has been prepared by me or under my supervision and meets the standard of care and expertise which is usual and customary in this community of professional engineers. The analysis has been prepared utilizing procedures and practices by the City of Bryant and within the standard accepted practices.



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Phillip A. Lewis, PE.



DATE: 05-21-2024

## PROJECT LOCATION MAP



Vicinity Map

SCALE 1" = 500'

## DESCRIPTION OF PROPERTY

The proposed project is for the construction of a retail center located on Springhill Road, south of the existing Merchants & Farmers Bank. The proposed development is for a 8,000 square foot building.

The intent of this drainage analysis is to evaluate the current drainage conditions coming through the site and adequately address the drainage increase created by this development.

The existing ground coverage for the entire development drainage basin consisted of poor condition grass, less than 50% covered.

According to FEMA Flood Insurance Rate Map, Panel 05125C0360E, this property lies within Zone X, areas determined to be outside the 0.2% annual chance floodplain. A copy of the map can be found in the appendix.

## DRAINAGE OBSERVATIONS

On May 16<sup>th</sup> 2024, member of Phillip Lewis Engineering and The City of Bryant Stormwater Division met onsite to discuss current stormwater condition revolving around this site and the intended solutions going forward. The existing conditions are listed below:

- A 42" RCP culvert is located north of the proposed site, discharging stormwater from the Highway 5 storm sewer system. This discharge travels along the western edge of this project site.
- The existing Merchants & Farmers Bank has a 18" culvert discharging within this ditch flow line, located at the NW corner of this site.
- Roof and yard runoff from both wester adjacent property also discharge into this drainage ditch at various locations
- Downstream there is an existing "ponding area" throttle by (1) 24" culvert with an additional ARDOT 24" culvert to the east within the ARDOT right of way
- Existing ponding area located at the south corner of this site is approximately 8,000 to 9,000 cubic feet.
- Existing site conditions for this project is little to no grass cover, mainly clay ground cover with obvious signs of existing ground runoff.

## **PROPOSED DRAINAGE SOLUTIONS**

After speaking with the Bryant Stormwater team, the below listed solutions have been designed. The main intent is to create more "ponding area" along the south of this project site to increase the "regional detention" volume that is located within this area.

- A 38" x 60" elliptical RCP culvert is proposed along the west property line to relay stormwater through the site without an open ditch.
- The capture and release of this culvert will be through standard flared end sections.
- The south pond area will be excavated and increased to 11,000 cubic feet.
- The 2,000 to 3,000 cubic feet of volume increase will account for the 1,500 cubic feet of volume increase caused by the development of this facility. This increase is shown in the attached hydrographs
- The existing 24" CMP culvert will remain as the "outlet control structure", and the existing ARDOT 24" RCP culvert will aid as an overflow outlet.
- The existing curb cut at elevation 405.69' will serve as an overflow spillway if water is to rise that high or if outlet clogging occurs.
- The 18" culvert from M&F Bank will be tied into the new elliptical culvert with a 7' junction box.
- The western property runoff will be captured and collected into the elliptical culvert through a 24" RCP culvert and tied in with a 7' junction box.

The Springhill Retail pre-development hydrographs are shown in the attached, along with an overall approximate look at post-developed conditions. General assumptions were made for off-site stormwater conditions.

## PRE DEVELOPMENT HYDROGRAPHS

## POST DEVELOPMENT HYDROGRAPHS

# Springhill Retail

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AR - Little Rock 2-yr Duration=15 min, Inten=3.54 in/hr

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## Summary for Subcatchment PRE: Springhill Retail Pre

Runoff = 1.81 cfs @ 0.20 hrs, Volume= 1,630 cf, Depth= 0.42"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

AR - Little Rock 2-yr Duration=15 min, Inten=3.54 in/hr

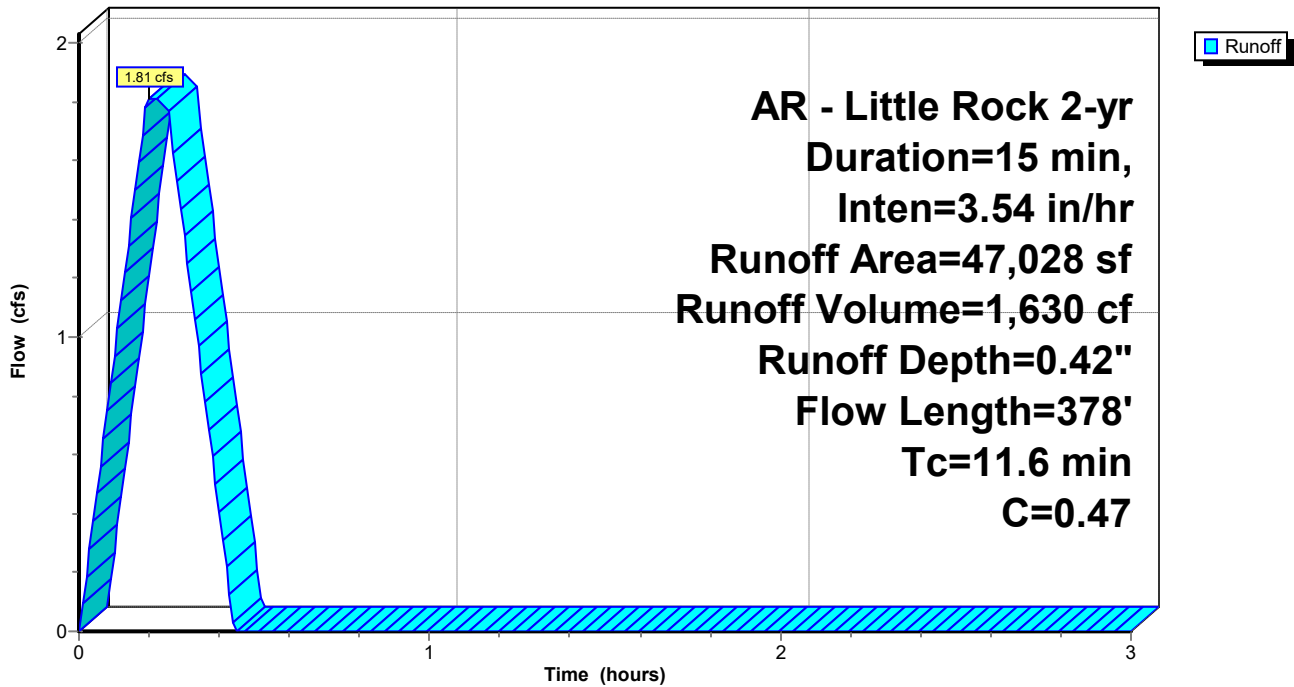
Area (sf)	C	Description
1,511	0.86	Existing Drive
45,517	0.46	Poor Condition Grass < 50%
47,028	0.47	Weighted Average
47,028		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	185	0.0510	0.32		<b>Sheet Flow, Overland Flow</b> Grass: Short n= 0.150 P2= 4.19"
2.0	193	0.0110	1.57		<b>Shallow Concentrated Flow, Open Channel</b> Grassed Waterway Kv= 15.0 fps
11.6	378	Total			

## Subcatchment PRE: Springhill Retail Pre

Hydrograph



# Springhill Retail

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AR - Little Rock 5-yr Duration=15 min, Inten=4.20 in/hr

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## Summary for Subcatchment PRE: Springhill Retail Pre

Runoff = 2.15 cfs @ 0.20 hrs, Volume= 1,934 cf, Depth= 0.49"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
AR - Little Rock 5-yr Duration=15 min, Inten=4.20 in/hr

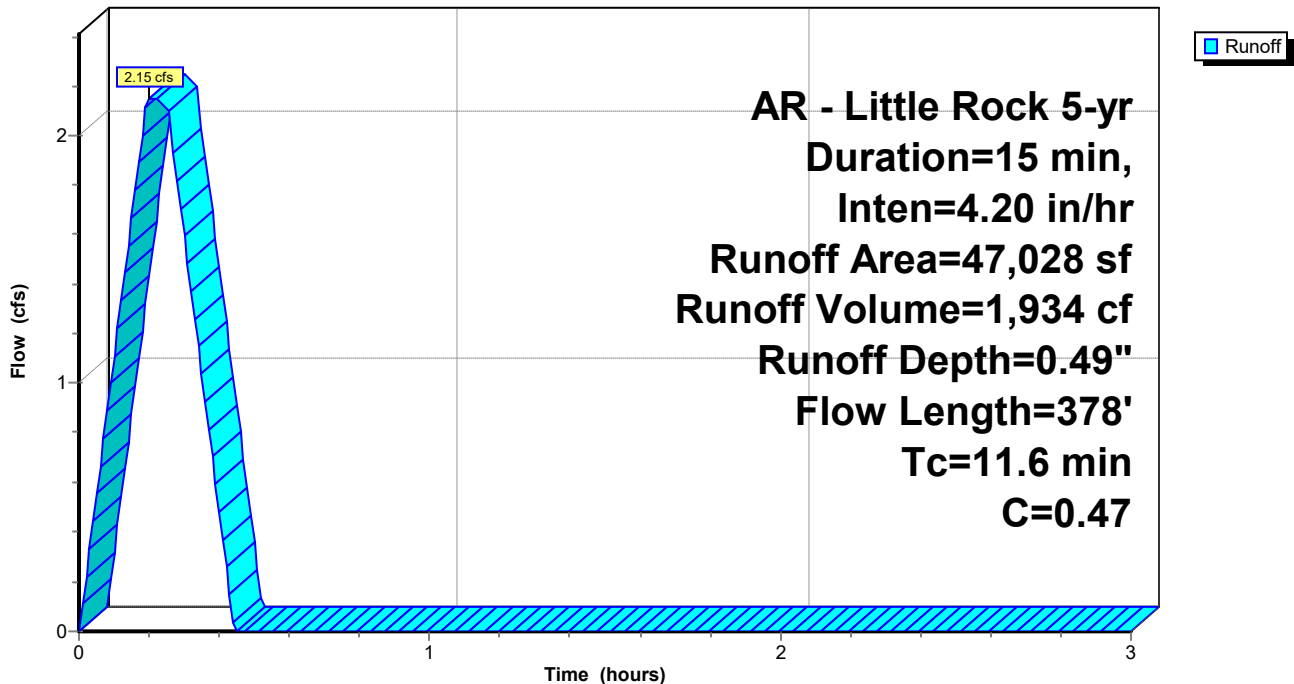
Area (sf)	C	Description
1,511	0.86	Existing Drive
45,517	0.46	Poor Condition Grass < 50%
47,028	0.47	Weighted Average
47,028		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	185	0.0510	0.32		<b>Sheet Flow, Overland Flow</b> Grass: Short n= 0.150 P2= 4.19"
2.0	193	0.0110	1.57		<b>Shallow Concentrated Flow, Open Channel</b> Grassed Waterway Kv= 15.0 fps
11.6	378	Total			

## Subcatchment PRE: Springhill Retail Pre

Hydrograph





# Springhill Retail

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AR - Little Rock 10-yr Duration=15 min, Inten=4.76 in/hr

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## Summary for Subcatchment PRE: Springhill Retail Pre

Runoff = 2.44 cfs @ 0.20 hrs, Volume= 2,192 cf, Depth= 0.56"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
 AR - Little Rock 10-yr Duration=15 min, Inten=4.76 in/hr

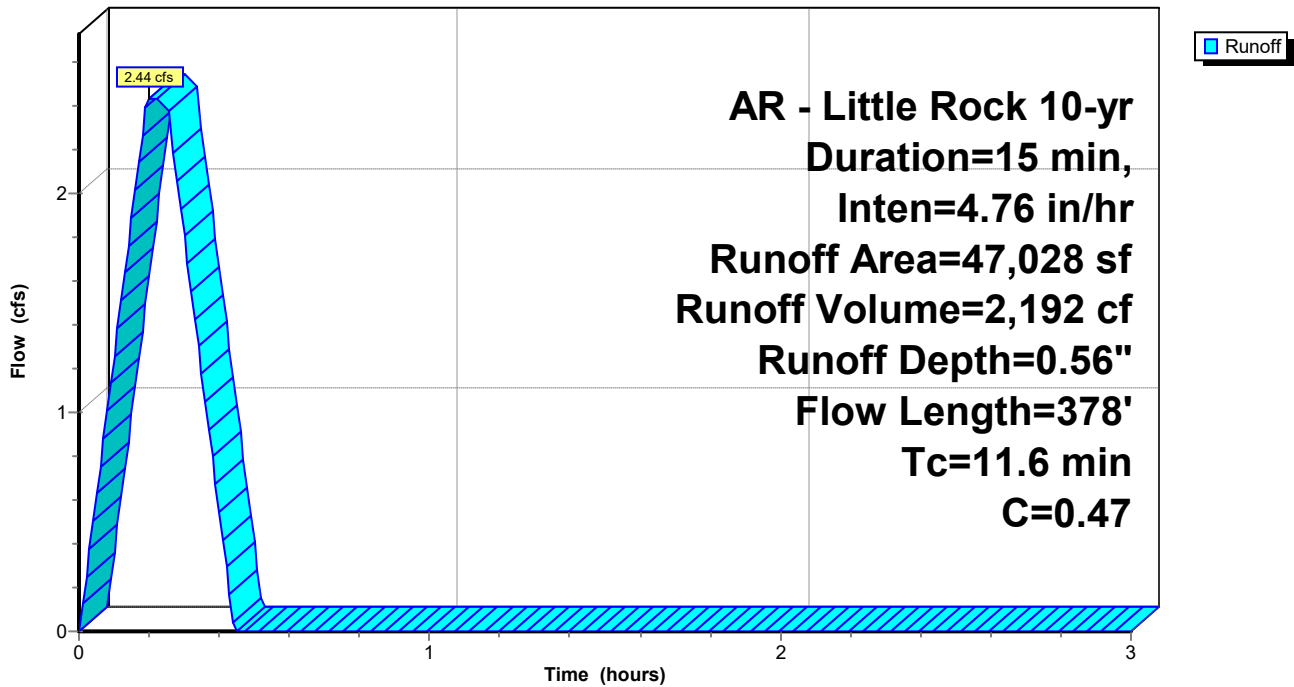
Area (sf)	C	Description
1,511	0.86	Existing Drive
45,517	0.46	Poor Condition Grass < 50%
47,028	0.47	Weighted Average
47,028		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	185	0.0510	0.32		<b>Sheet Flow, Overland Flow</b> Grass: Short n= 0.150 P2= 4.19"
2.0	193	0.0110	1.57		<b>Shallow Concentrated Flow, Open Channel</b> Grassed Waterway Kv= 15.0 fps
11.6	378	Total			

## Subcatchment PRE: Springhill Retail Pre

Hydrograph



# Springhill Retail

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AR - Little Rock 25-yr Duration=15 min, Inten=5.44 in/hr

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## Summary for Subcatchment PRE: Springhill Retail Pre

Runoff = 2.78 cfs @ 0.20 hrs, Volume= 2,505 cf, Depth= 0.64"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

AR - Little Rock 25-yr Duration=15 min, Inten=5.44 in/hr

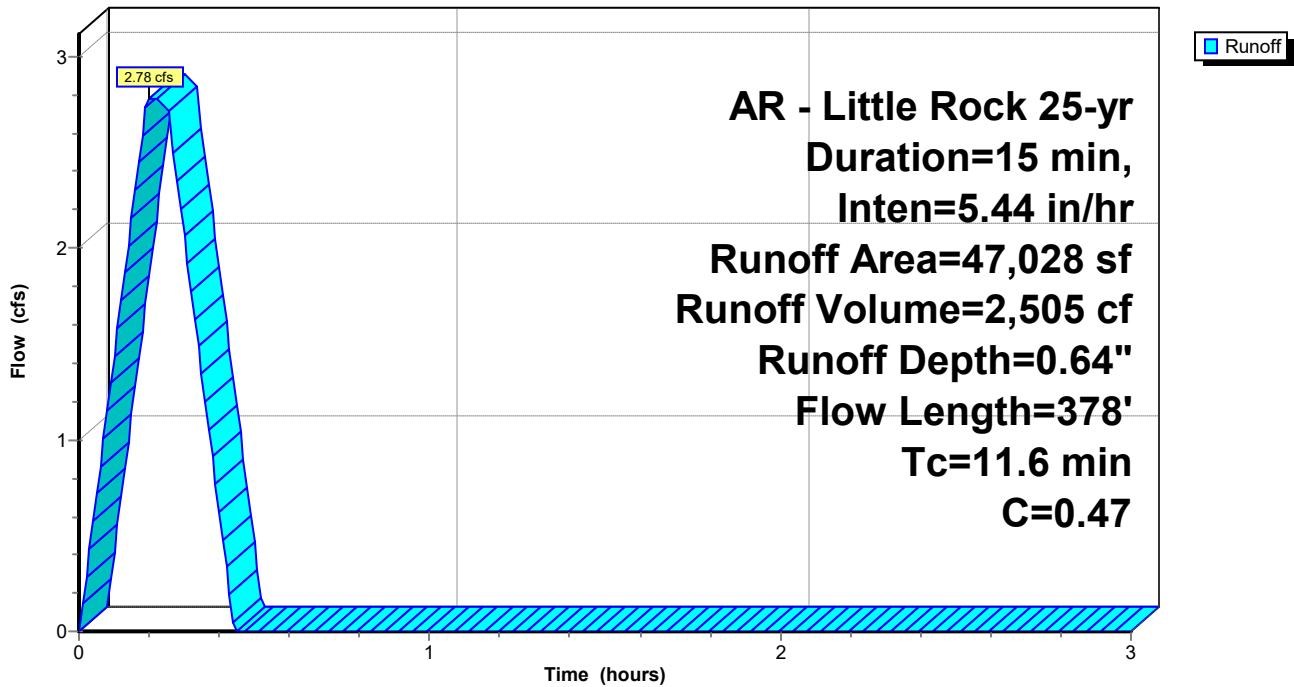
Area (sf)	C	Description
1,511	0.86	Existing Drive
45,517	0.46	Poor Condition Grass < 50%
47,028	0.47	Weighted Average
47,028		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	185	0.0510	0.32		<b>Sheet Flow, Overland Flow</b> Grass: Short n= 0.150 P2= 4.19"
2.0	193	0.0110	1.57		<b>Shallow Concentrated Flow, Open Channel</b> Grassed Waterway Kv= 15.0 fps
11.6	378	Total			

## Subcatchment PRE: Springhill Retail Pre

Hydrograph



# Springhill Retail

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AR - Little Rock 100-yr Duration=15 min, Inten=6.52 in/hr

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## Summary for Subcatchment PRE: Springhill Retail Pre

Runoff = 3.34 cfs @ 0.20 hrs, Volume= 3,002 cf, Depth= 0.77"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
 AR - Little Rock 100-yr Duration=15 min, Inten=6.52 in/hr

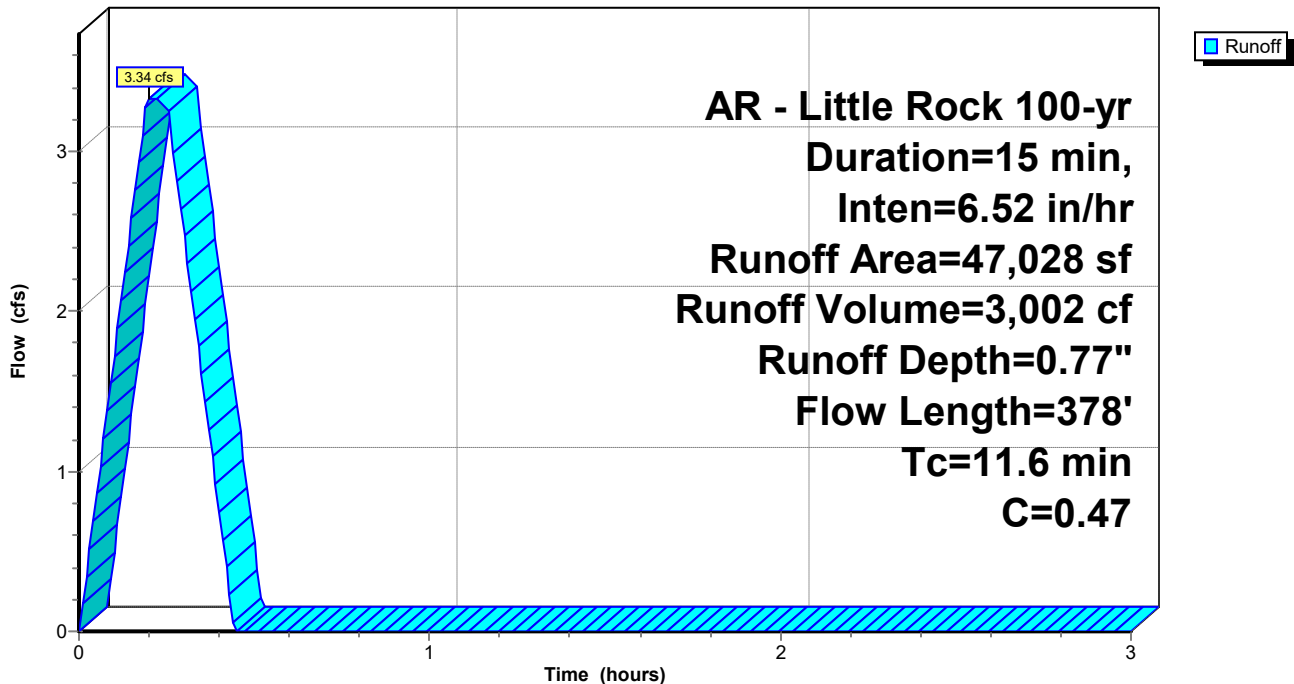
Area (sf)	C	Description
1,511	0.86	Existing Drive
45,517	0.46	Poor Condition Grass < 50%
47,028	0.47	Weighted Average
47,028		100.00% Pervious Area

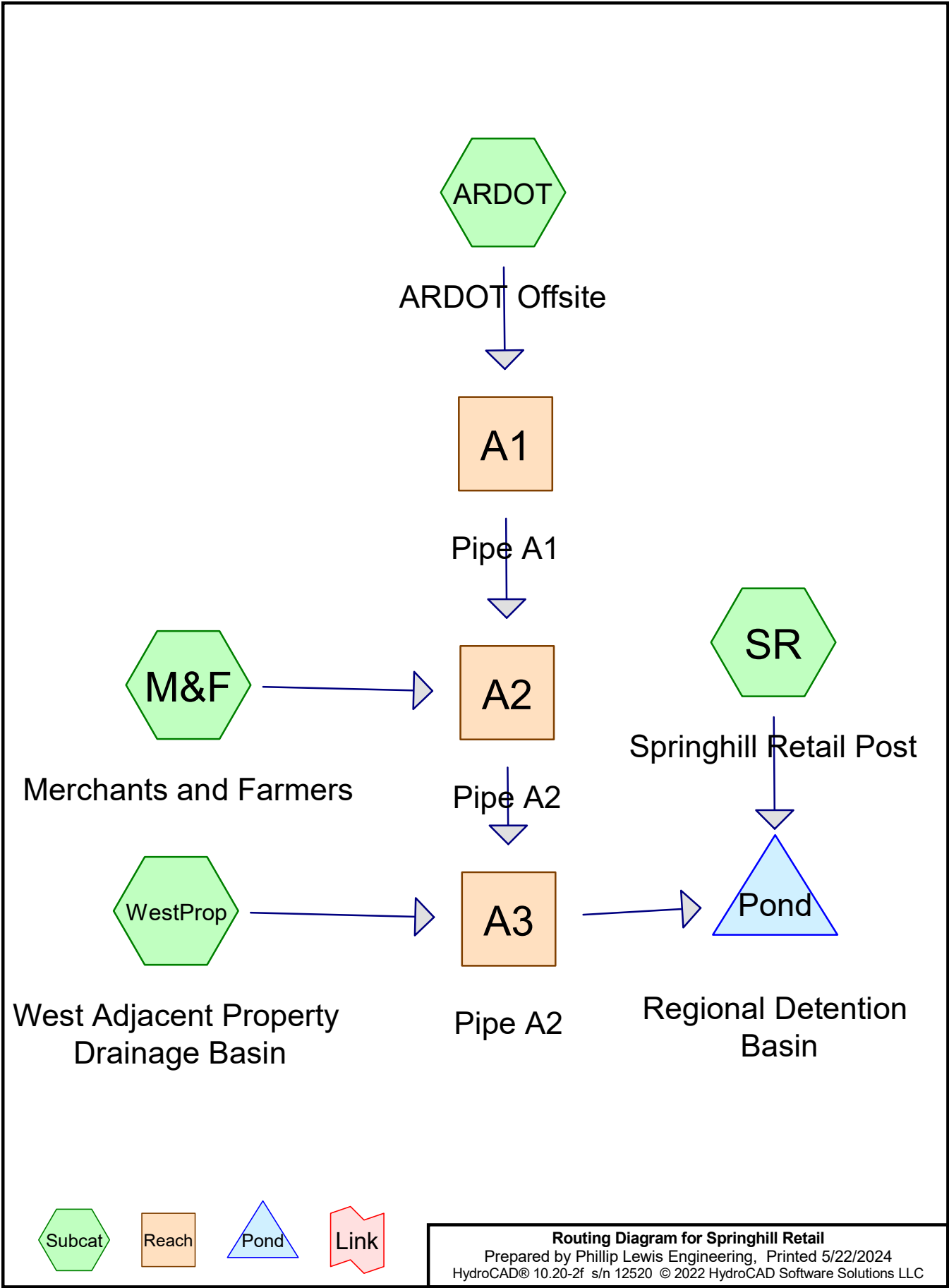
  

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	185	0.0510	0.32		<b>Sheet Flow, Overland Flow</b> Grass: Short n= 0.150 P2= 4.19"
2.0	193	0.0110	1.57		<b>Shallow Concentrated Flow, Open Channel</b> Grassed Waterway Kv= 15.0 fps
11.6	378	Total			

## Subcatchment PRE: Springhill Retail Pre

Hydrograph





# Springhill Retail

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AR - Little Rock 2-yr Duration=15 min, Inten=3.54 in/hr

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## Summary for Subcatchment ARDOT: ARDOT Offsite

Runoff = 28.73 cfs @ 0.25 hrs, Volume= 25,854 cf, Depth= 0.27"

Routed to Reach A1 : Pipe A1

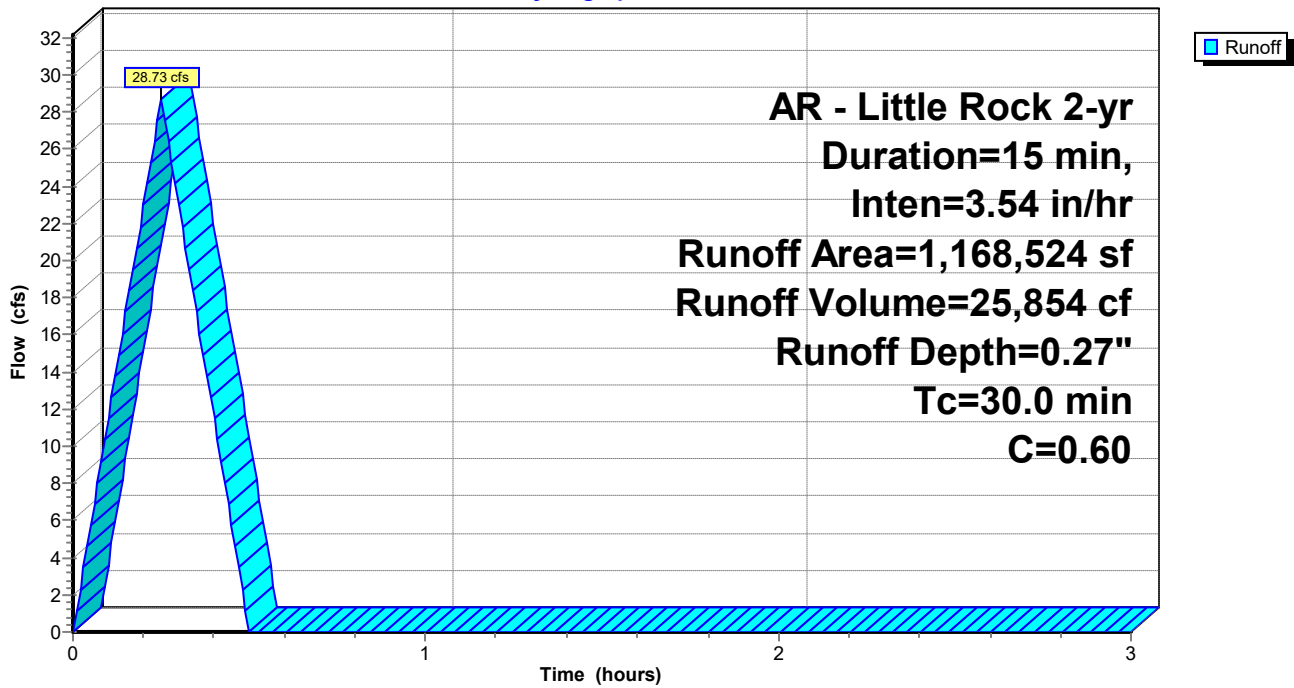
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
AR - Little Rock 2-yr Duration=15 min, Inten=3.54 in/hr

Area (sf)	C	Description
1,168,524	0.60	
1,168,524		100.00% Pervious Area

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

## Subcatchment ARDOT: ARDOT Offsite

Hydrograph



# Springhill Retail

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AR - Little Rock 2-yr Duration=15 min, Inten=3.54 in/hr

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## Summary for Subcatchment M&F: Merchants and Farmers

Runoff = 2.98 cfs @ 0.09 hrs, Volume= 2,682 cf, Depth= 0.84"

Routed to Reach A2 : Pipe A2

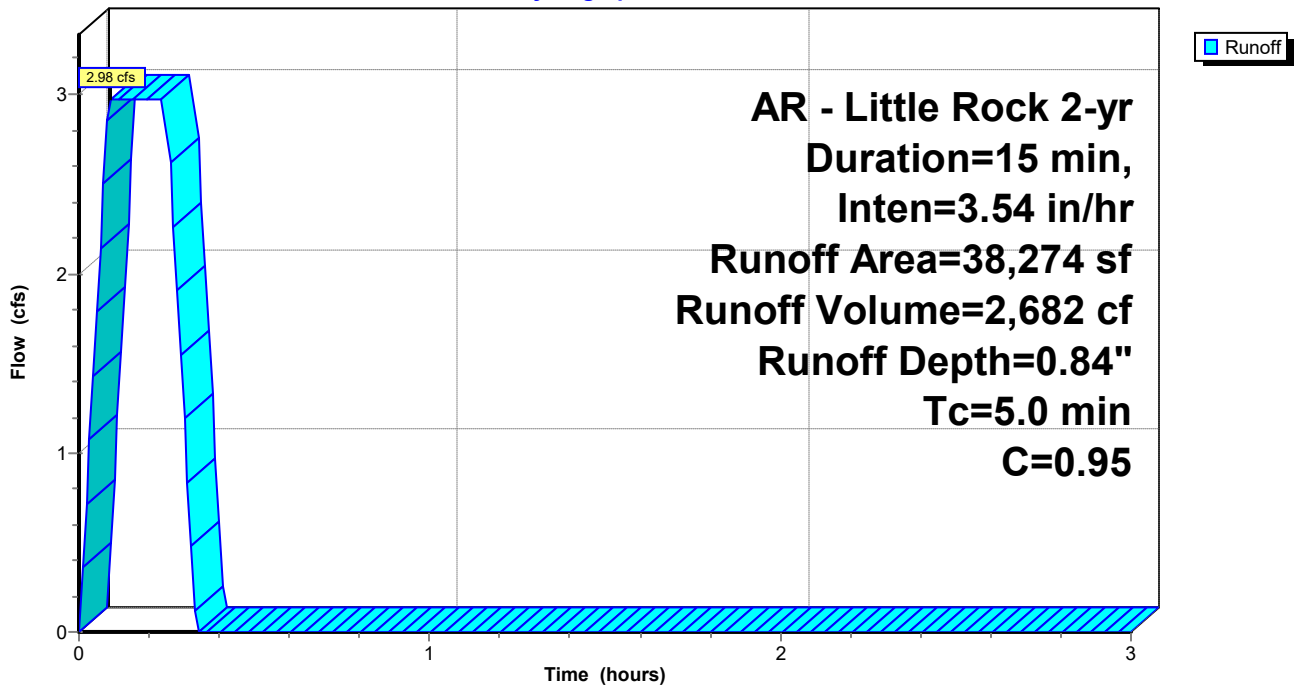
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
AR - Little Rock 2-yr Duration=15 min, Inten=3.54 in/hr

Area (sf)	C	Description
38,274	0.95	Developed Site
38,274		100.00% Impervious Area

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

## Subcatchment M&F: Merchants and Farmers

Hydrograph



**Springhill Retail**

AR - Little Rock 2-yr Duration=15 min, Inten=3.54 in/hr

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**Summary for Subcatchment SR: Springhill Retail Post**

Runoff = 2.93 cfs @ 0.09 hrs, Volume= 2,636 cf, Depth= 0.67"

Routed to Pond Pond : Regional Detention Basin

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
AR - Little Rock 2-yr Duration=15 min, Inten=3.54 in/hr

Area (sf)	C	Description
1,511	0.86	Existing Drive
33,632	0.92	Drives, Roof, Sidewalks
11,886	0.30	Landscaped Areas
47,029	0.76	Weighted Average
47,029		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	82	0.0290	1.76		<b>Sheet Flow, Asphalt Sheet Flow</b> Smooth surfaces n= 0.011 P2= 4.19"
0.8	87	0.0080	1.82		<b>Shallow Concentrated Flow, Gutter</b> Paved Kv= 20.3 fps
0.1	19	0.0210	2.94		<b>Shallow Concentrated Flow, Concentrated Pavement Flow</b> Paved Kv= 20.3 fps
1.0	197	0.0250	3.21		<b>Shallow Concentrated Flow, Gutter</b> Paved Kv= 20.3 fps
0.3	37	0.0130	2.31		<b>Shallow Concentrated Flow, Gutter</b> Paved Kv= 20.3 fps
2.0					<b>Direct Entry, Minimum adjustment</b>
5.0	422	Total			

**Springhill Retail**

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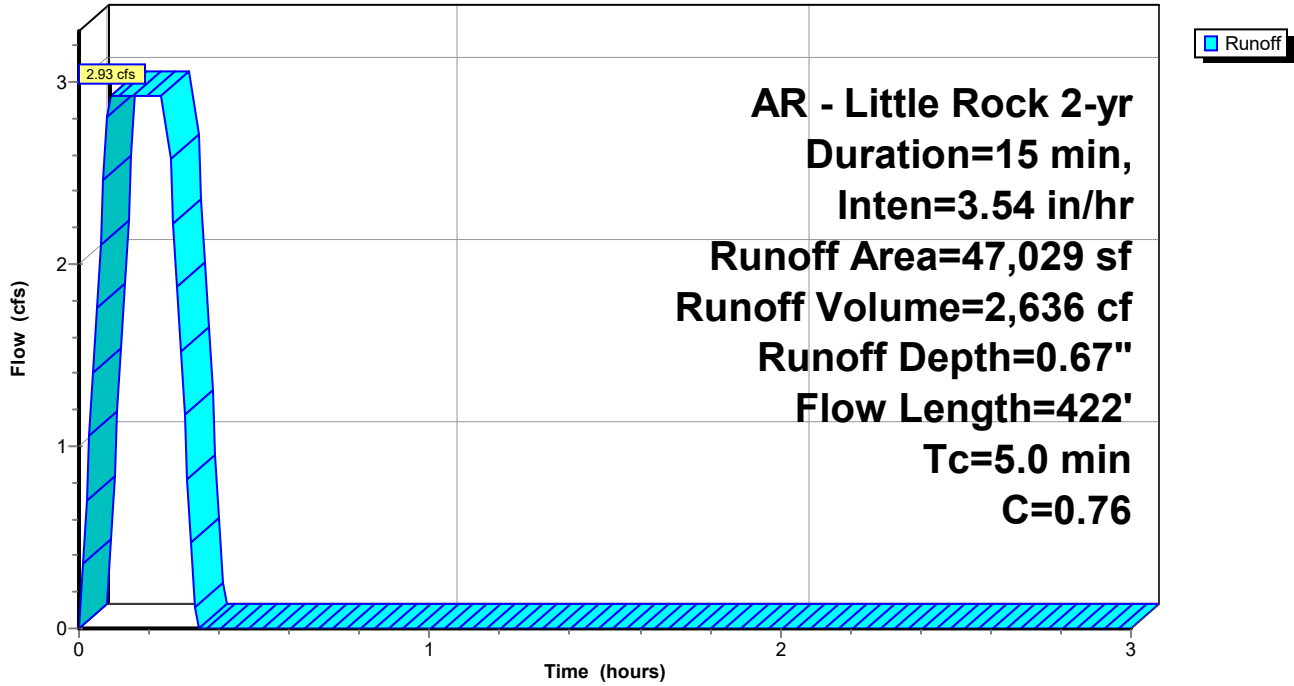
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AR - Little Rock 2-yr Duration=15 min, Inten=3.54 in/hr

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**Subcatchment SR: Springhill Retail Post**

Hydrograph





# Springhill Retail

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AR - Little Rock 2-yr Duration=15 min, Inten=3.54 in/hr

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## Summary for Subcatchment WestProp: West Adjacent Property Drainage Basin

Runoff = 6.81 cfs @ 0.25 hrs, Volume= 6,129 cf, Depth= 0.62"

Routed to Reach A3 : Pipe A2

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

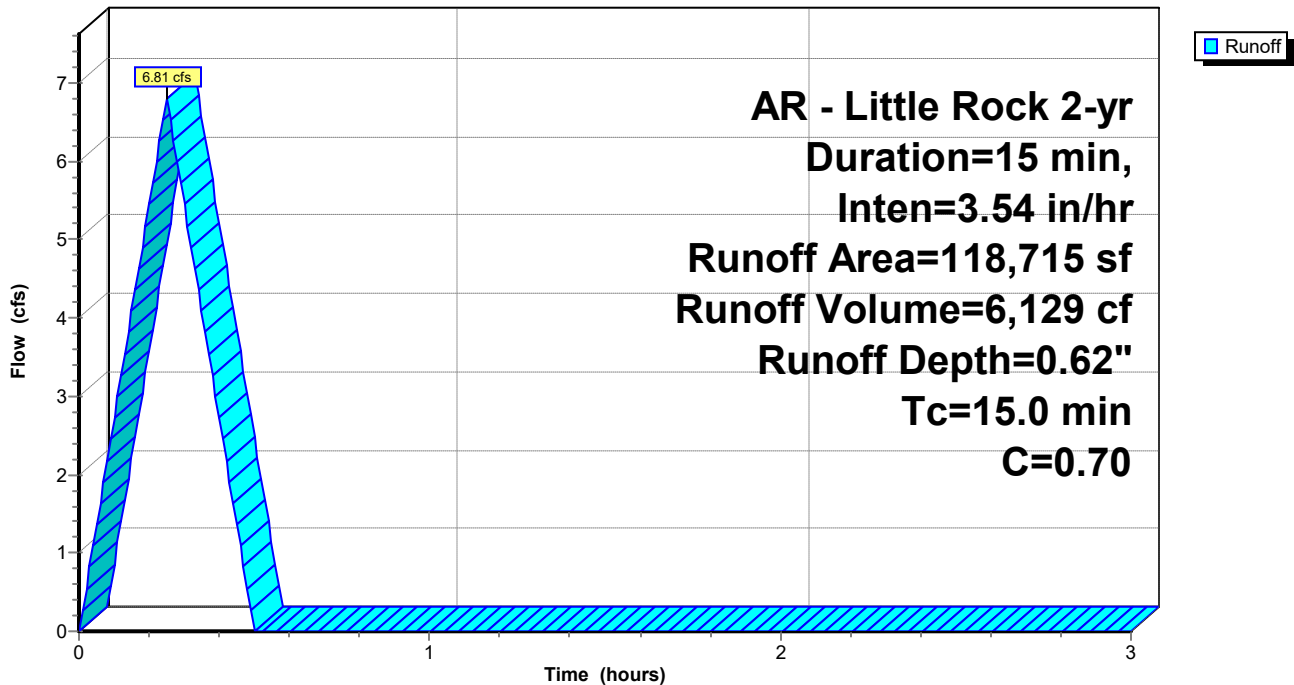
AR - Little Rock 2-yr Duration=15 min, Inten=3.54 in/hr

Area (sf)	C	Description
65,063	0.50	Pervious Areas
53,652	0.95	Rooftop/Paving
118,715	0.70	Weighted Average
65,063		54.81% Pervious Area
53,652		45.19% Impervious Area

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

## Subcatchment WestProp: West Adjacent Property Drainage Basin

Hydrograph



# Springhill Retail

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AR - Little Rock 2-yr Duration=15 min, Inten=3.54 in/hr

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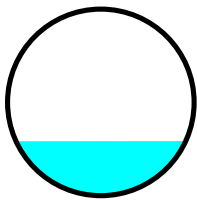
## Summary for Reach A1: Pipe A1

Inflow Area = 1,168,524 sf, 0.00% Impervious, Inflow Depth = 0.27" for 2-yr event  
Inflow = 28.73 cfs @ 0.25 hrs, Volume= 25,854 cf  
Outflow = 28.67 cfs @ 0.25 hrs, Volume= 25,855 cf, Atten= 0%, Lag= 0.0 min  
Routed to Reach A2 : Pipe A2

Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
Max. Velocity= 12.23 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 9.46 fps, Avg. Travel Time= 0.0 min

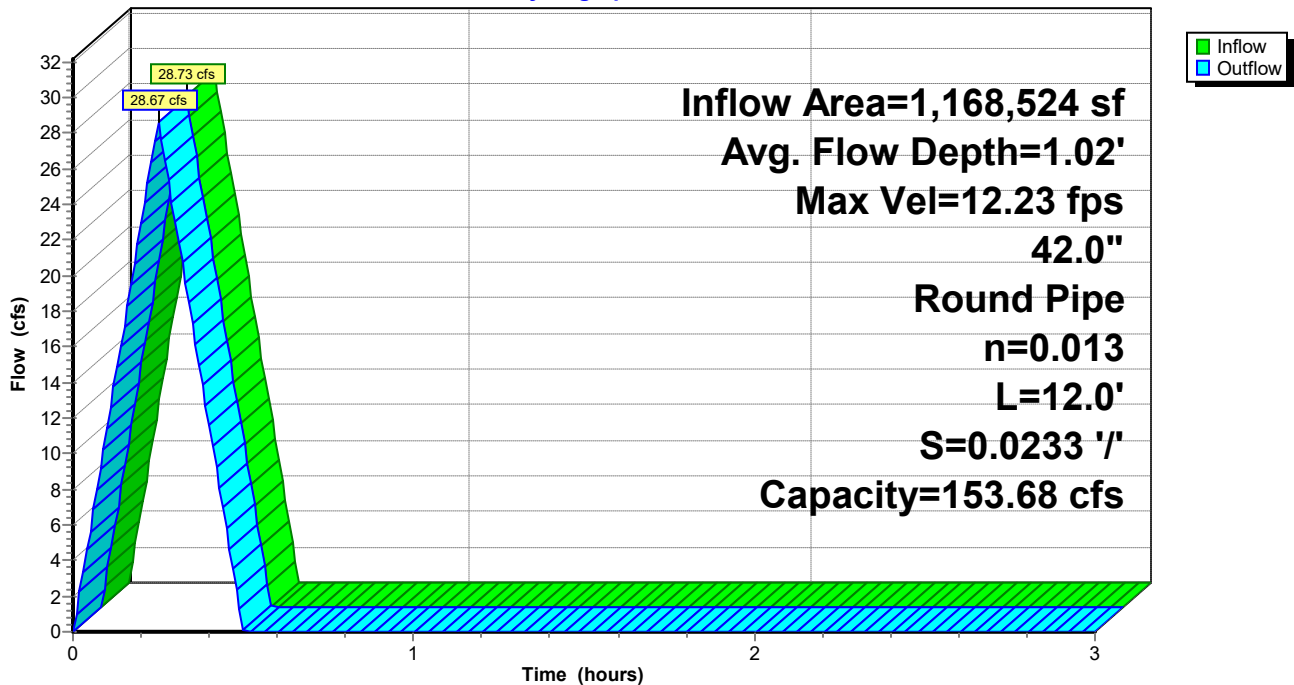
Peak Storage= 28 cf @ 0.25 hrs  
Average Depth at Peak Storage= 1.02' , Surface Width= 3.18'  
Bank-Full Depth= 3.50' Flow Area= 9.6 sf, Capacity= 153.68 cfs

42.0" Round Pipe  
n= 0.013 Concrete pipe, bends & connections  
Length= 12.0' Slope= 0.0233 '/'  
Inlet Invert= 413.00', Outlet Invert= 412.72'



## Reach A1: Pipe A1

### Hydrograph



# Springhill Retail

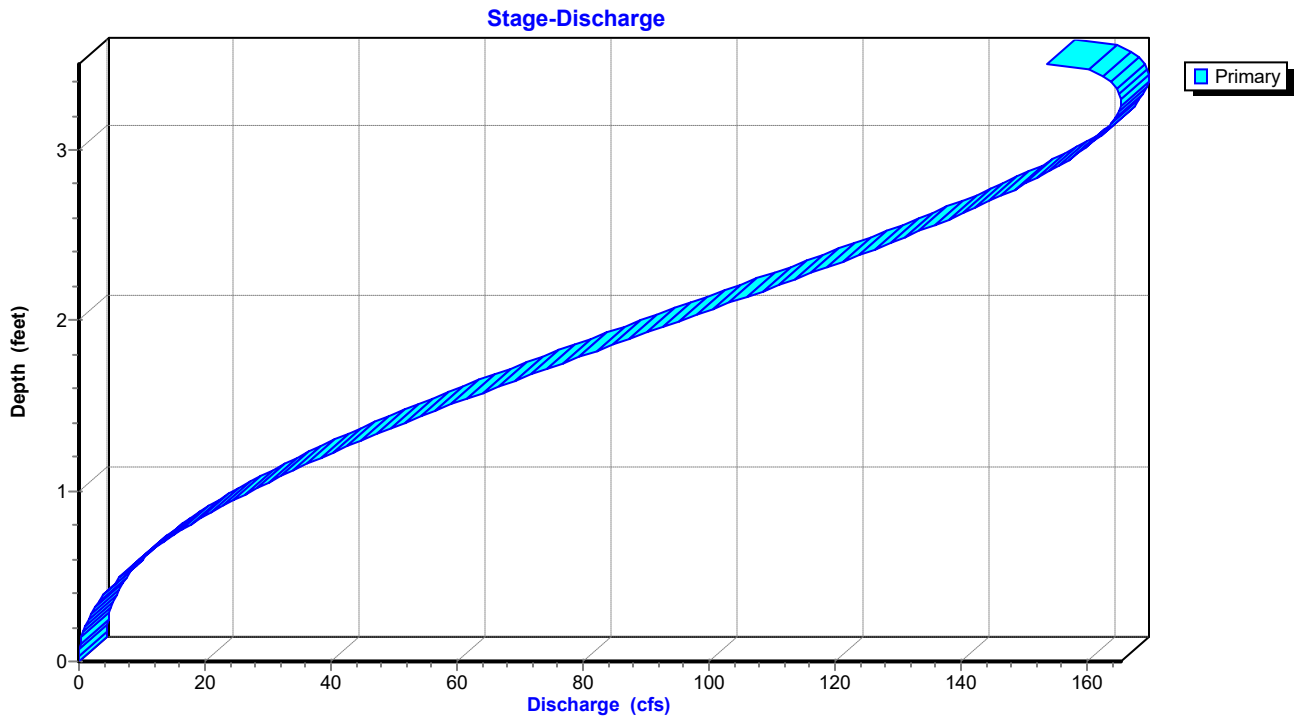
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## Reach A1: Pipe A1



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**Stage-Area-Storage for Reach A1: Pipe A1**

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
413.00	0.0	0	415.60	7.7	92
413.05	0.0	0	415.65	7.8	94
413.10	0.1	1	415.70	8.0	96
413.15	0.1	2	415.75	8.1	97
413.20	0.2	3	415.80	8.3	99
413.25	0.3	4	415.85	8.4	101
413.30	0.4	5	415.90	8.5	102
413.35	0.5	6	415.95	8.7	104
413.40	0.6	7	416.00	8.8	105
413.45	0.7	9	416.05	8.9	107
413.50	0.8	10	416.10	9.0	108
413.55	1.0	12	416.15	9.1	109
413.60	1.1	13	416.20	9.2	111
413.65	1.2	15	416.25	9.3	112
413.70	1.4	16	416.30	9.4	113
413.75	1.5	18	416.35	9.5	114
413.80	1.7	20	416.40	9.5	115
413.85	1.8	22	416.45	9.6	115
413.90	2.0	23	416.50	<b>9.6</b>	<b>115</b>
413.95	2.1	25			
414.00	2.3	27			
414.05	2.4	29			
414.10	2.6	31			
414.15	2.8	33			
414.20	2.9	35			
414.25	3.1	37			
414.30	3.3	39			
414.35	3.4	41			
414.40	3.6	43			
414.45	3.8	45			
414.50	3.9	47			
414.55	4.1	49			
414.60	4.3	51			
414.65	4.5	54			
414.70	4.6	56			
414.75	4.8	58			
414.80	5.0	60			
414.85	5.2	62			
414.90	5.3	64			
414.95	5.5	66			
415.00	5.7	68			
415.05	5.9	70			
415.10	6.0	72			
415.15	6.2	74			
415.20	6.4	76			
415.25	6.5	78			
415.30	6.7	80			
415.35	6.9	82			
415.40	7.0	84			
415.45	7.2	86			
415.50	7.4	88			
415.55	7.5	90			

# Springhill Retail

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AR - Little Rock 2-yr Duration=15 min, Inten=3.54 in/hr

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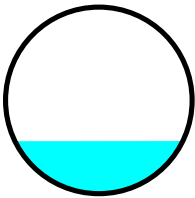
## Summary for Reach A2: Pipe A2

Inflow Area = 1,206,798 sf, 3.17% Impervious, Inflow Depth = 0.28" for 2-yr event  
Inflow = 31.65 cfs @ 0.25 hrs, Volume= 28,536 cf  
Outflow = 31.13 cfs @ 0.26 hrs, Volume= 28,536 cf, Atten= 2%, Lag= 0.5 min  
Routed to Reach A3 : Pipe A2

Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
Max. Velocity= 14.00 fps, Min. Travel Time= 0.3 min  
Avg. Velocity = 7.95 fps, Avg. Travel Time= 0.5 min

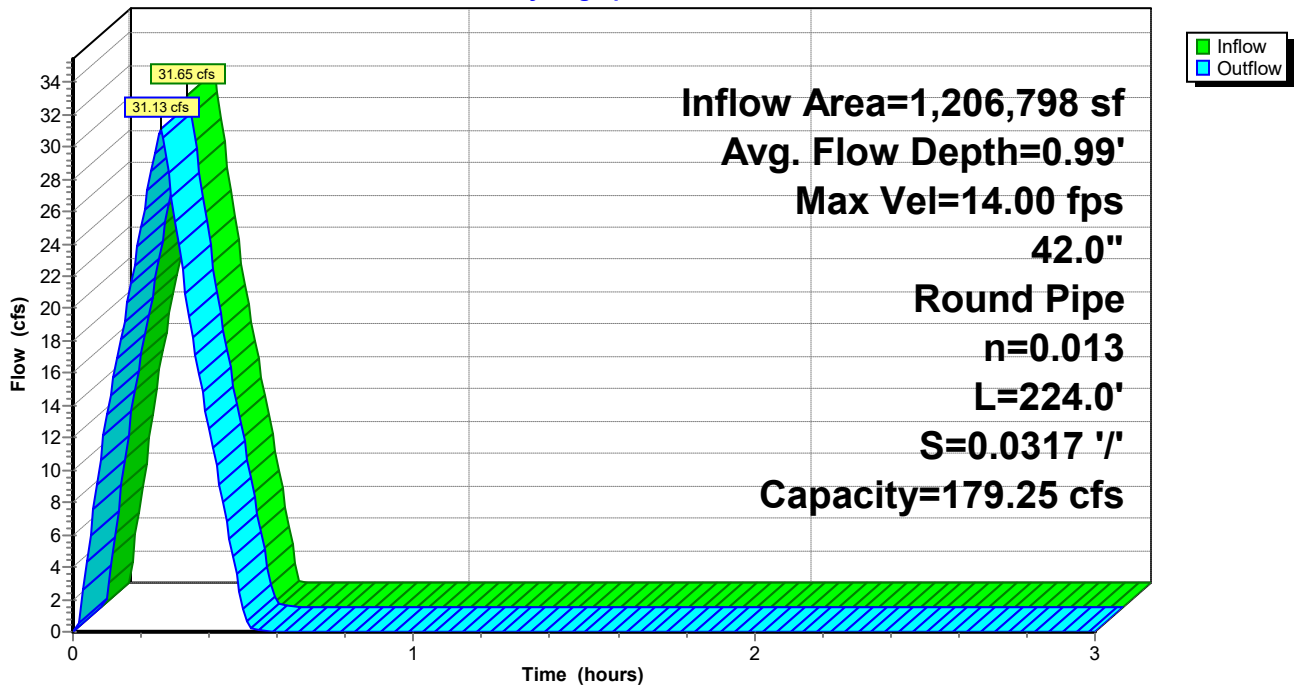
Peak Storage= 501 cf @ 0.25 hrs  
Average Depth at Peak Storage= 0.99' , Surface Width= 3.15'  
Bank-Full Depth= 3.50' Flow Area= 9.6 sf, Capacity= 179.25 cfs

42.0" Round Pipe  
n= 0.013 Concrete pipe, bends & connections  
Length= 224.0' Slope= 0.0317 '/'  
Inlet Invert= 412.52', Outlet Invert= 405.41'



## Reach A2: Pipe A2

### Hydrograph



# Springhill Retail

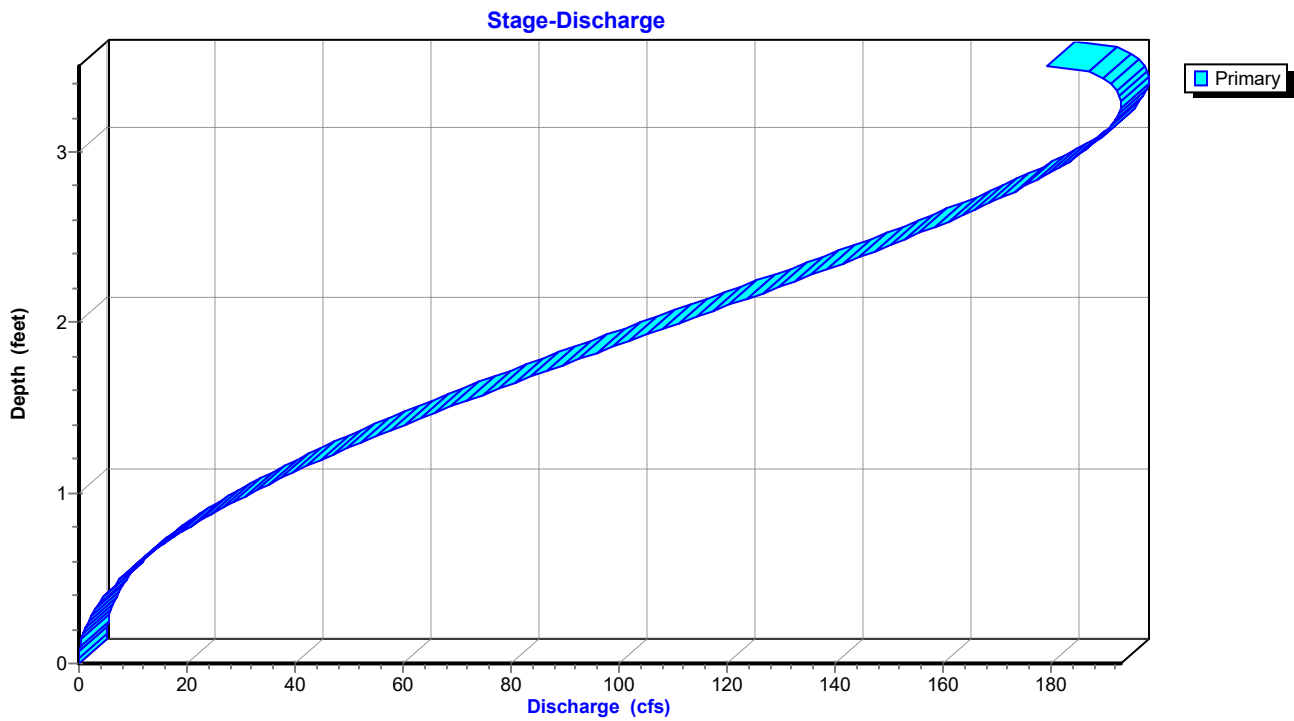
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AR - Little Rock 2-yr Duration=15 min, Inten=3.54 in/hr

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## Reach A2: Pipe A2



**Springhill Retail**

Prepared by Phillip Lewis Engineering

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**Stage-Area-Storage for Reach A2: Pipe A2**

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
412.52	0.0	0	415.12	7.7	1,717
412.57	0.0	6	415.17	7.8	1,751
412.62	0.1	18	415.22	8.0	1,784
412.67	0.1	32	415.27	8.1	1,816
412.72	0.2	49	415.32	8.3	1,848
412.77	0.3	68	415.37	8.4	1,879
412.82	0.4	90	415.42	8.5	1,909
412.87	0.5	112	415.47	8.7	1,938
412.92	0.6	136	415.52	8.8	1,966
412.97	0.7	162	415.57	8.9	1,993
413.02	0.8	189	415.62	9.0	2,019
413.07	1.0	217	415.67	9.1	2,043
413.12	1.1	246	415.72	9.2	2,066
413.17	1.2	276	415.77	9.3	2,087
413.22	1.4	307	415.82	9.4	2,106
413.27	1.5	339	415.87	9.5	2,123
413.32	1.7	371	415.92	9.5	2,138
413.37	1.8	404	415.97	9.6	2,149
413.42	2.0	438	416.02	<b>9.6</b>	<b>2,155</b>
413.47	2.1	473			
413.52	2.3	508			
413.57	2.4	544			
413.62	2.6	580			
413.67	2.8	617			
413.72	2.9	654			
413.77	3.1	691			
413.82	3.3	729			
413.87	3.4	767			
413.92	3.6	805			
413.97	3.8	844			
414.02	3.9	882			
414.07	4.1	921			
414.12	4.3	960			
414.17	4.5	999			
414.22	4.6	1,038			
414.27	4.8	1,078			
414.32	5.0	1,117			
414.37	5.2	1,156			
414.42	5.3	1,195			
414.47	5.5	1,234			
414.52	5.7	1,273			
414.57	5.9	1,312			
414.62	6.0	1,350			
414.67	6.2	1,388			
414.72	6.4	1,426			
414.77	6.5	1,464			
414.82	6.7	1,502			
414.87	6.9	1,539			
414.92	7.0	1,575			
414.97	7.2	1,611			
415.02	7.4	1,647			
415.07	7.5	1,682			

# Springhill Retail

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AR - Little Rock 2-yr Duration=15 min, Inten=3.54 in/hr

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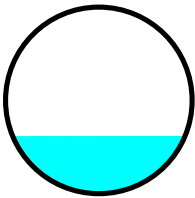
## Summary for Reach A3: Pipe A2

Inflow Area = 1,325,513 sf, 6.94% Impervious, Inflow Depth = 0.31" for 2-yr event  
Inflow = 37.77 cfs @ 0.26 hrs, Volume= 34,665 cf  
Outflow = 37.71 cfs @ 0.26 hrs, Volume= 34,665 cf, Atten= 0%, Lag= 0.1 min  
Routed to Pond Pond : Regional Detention Basin

Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
Max. Velocity= 14.91 fps, Min. Travel Time= 0.1 min  
Avg. Velocity = 8.41 fps, Avg. Travel Time= 0.1 min

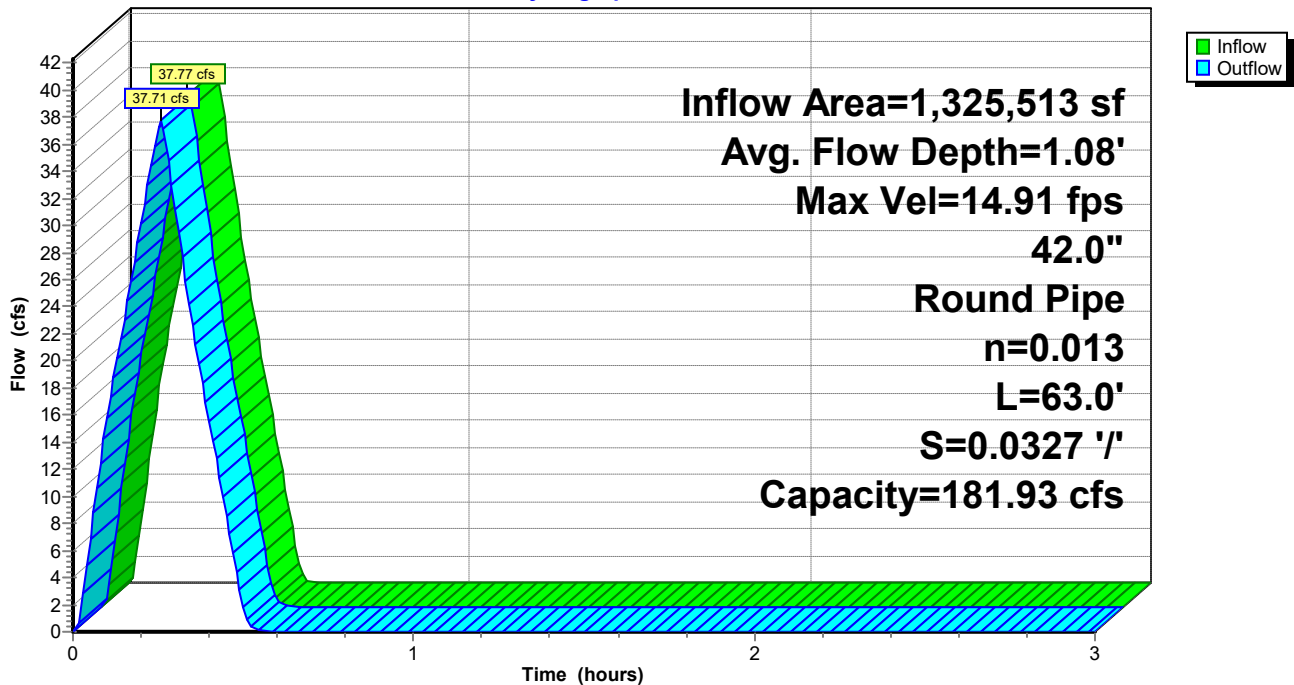
Peak Storage= 160 cf @ 0.26 hrs  
Average Depth at Peak Storage= 1.08' , Surface Width= 3.24'  
Bank-Full Depth= 3.50' Flow Area= 9.6 sf, Capacity= 181.93 cfs

42.0" Round Pipe  
n= 0.013 Concrete pipe, bends & connections  
Length= 63.0' Slope= 0.0327 '/'  
Inlet Invert= 405.31', Outlet Invert= 403.25'



## Reach A3: Pipe A2

### Hydrograph





# Springhill Retail

Prepared by Phillip Lewis Engineering

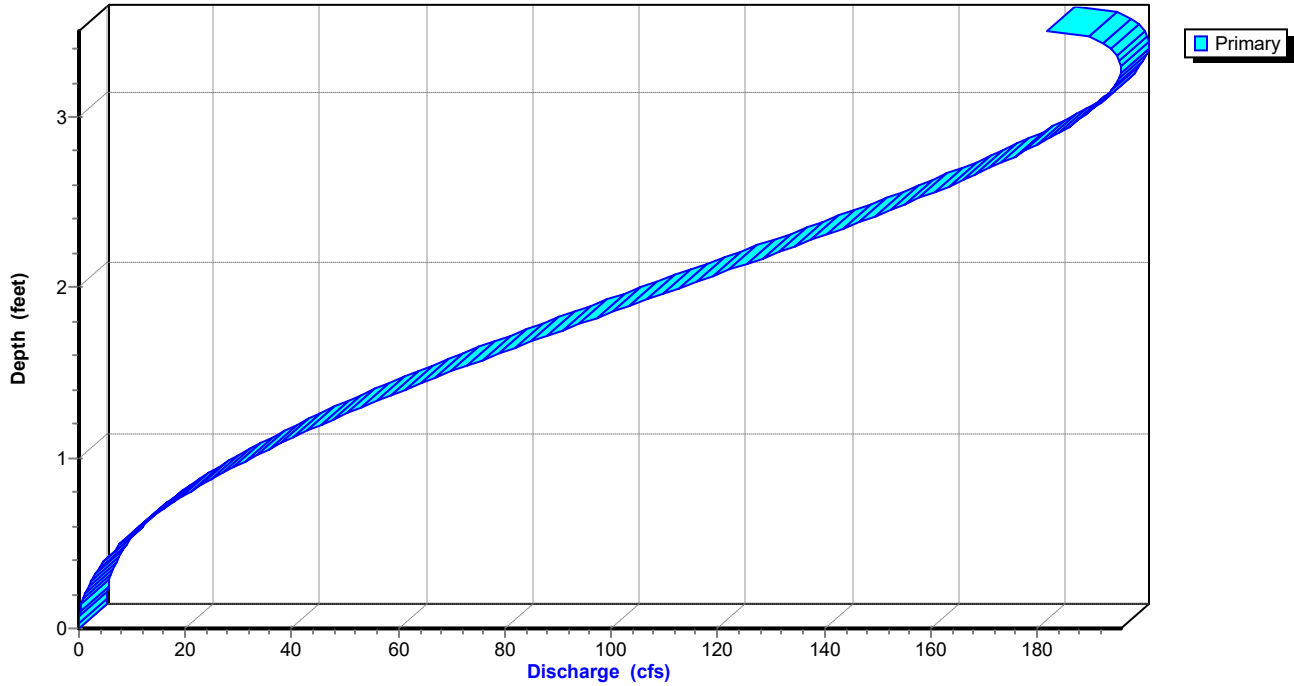
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## Reach A3: Pipe A2

Stage-Discharge



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**Stage-Area-Storage for Reach A3: Pipe A2**

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
405.31	0.0	0	407.91	7.7	483
405.36	0.0	2	407.96	7.8	492
405.41	0.1	5	408.01	8.0	502
405.46	0.1	9	408.06	8.1	511
405.51	0.2	14	408.11	8.3	520
405.56	0.3	19	408.16	8.4	529
405.61	0.4	25	408.21	8.5	537
405.66	0.5	32	408.26	8.7	545
405.71	0.6	38	408.31	8.8	553
405.76	0.7	46	408.36	8.9	561
405.81	0.8	53	408.41	9.0	568
405.86	1.0	61	408.46	9.1	575
405.91	1.1	69	408.51	9.2	581
405.96	1.2	78	408.56	9.3	587
406.01	1.4	86	408.61	9.4	592
406.06	1.5	95	408.66	9.5	597
406.11	1.7	104	408.71	9.5	601
406.16	1.8	114	408.76	9.6	604
406.21	2.0	123	408.81	<b>9.6</b>	<b>606</b>
406.26	2.1	133			
406.31	2.3	143			
406.36	2.4	153			
406.41	2.6	163			
406.46	2.8	173			
406.51	2.9	184			
406.56	3.1	194			
406.61	3.3	205			
406.66	3.4	216			
406.71	3.6	226			
406.76	3.8	237			
406.81	3.9	248			
406.86	4.1	259			
406.91	4.3	270			
406.96	4.5	281			
407.01	4.6	292			
407.06	4.8	303			
407.11	5.0	314			
407.16	5.2	325			
407.21	5.3	336			
407.26	5.5	347			
407.31	5.7	358			
407.36	5.9	369			
407.41	6.0	380			
407.46	6.2	390			
407.51	6.4	401			
407.56	6.5	412			
407.61	6.7	422			
407.66	6.9	433			
407.71	7.0	443			
407.76	7.2	453			
407.81	7.4	463			
407.86	7.5	473			

# Springhill Retail

AR - Little Rock 2-yr Duration=15 min, Inten=3.54 in/hr

Prepared by Phillip Lewis Engineering

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## Summary for Pond Pond: Regional Detention Basin

Inflow Area = 1,372,542 sf, 6.70% Impervious, Inflow Depth = 0.33" for 2-yr event  
Inflow = 40.42 cfs @ 0.26 hrs, Volume= 37,301 cf  
Outflow = 34.70 cfs @ 0.29 hrs, Volume= 37,302 cf, Atten= 14%, Lag= 2.1 min  
Primary = 34.70 cfs @ 0.29 hrs, Volume= 37,302 cf

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
Peak Elev= 404.26' @ 0.29 hrs Storage= 3,846 cf

Plug-Flow detention time= 1.2 min calculated for 37,178 cf (100% of inflow)  
Center-of-Mass det. time= 1.2 min ( 16.1 - 14.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	401.00'	12,812 cf	<b>Custom Stage Data</b> Listed below

Elevation (feet)	Cum.Store (cubic-feet)
401.00	0
402.00	103
403.00	803
404.00	2,704
405.00	7,038
406.00	12,812

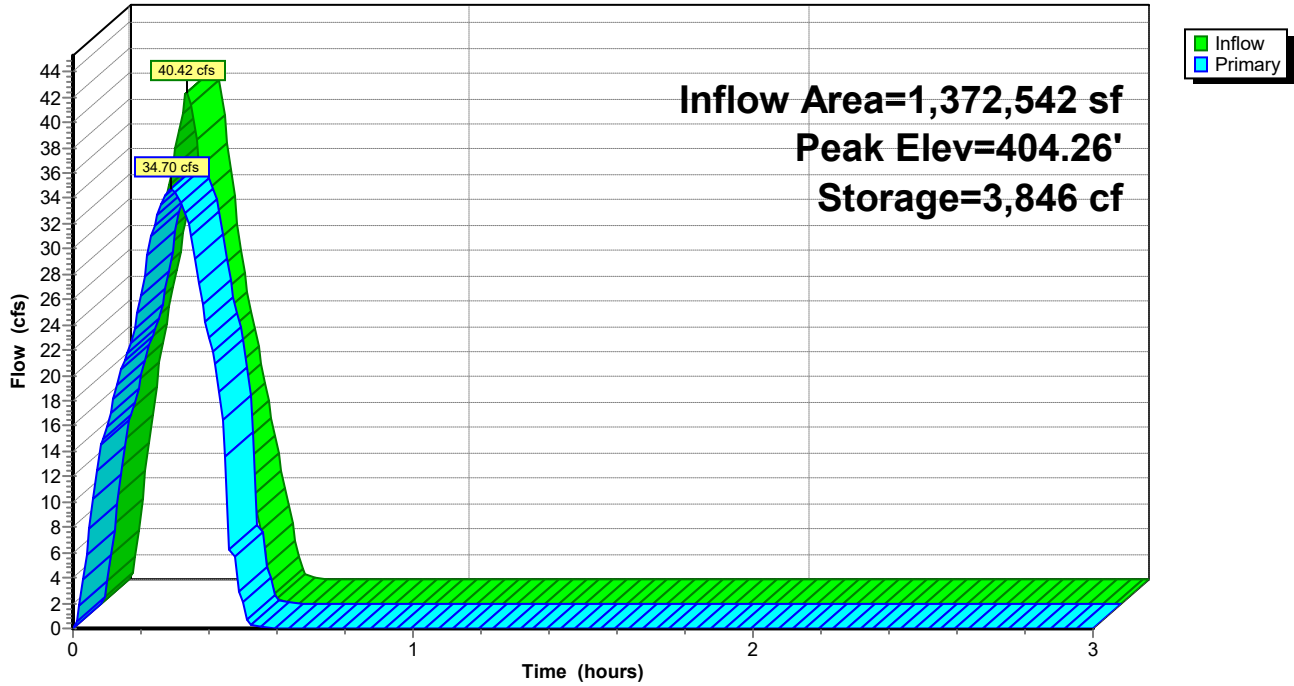
Device	Routing	Invert	Outlet Devices
#1	Primary	400.10'	<b>24.0" Round RCP_Round 24"</b> L= 100.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 400.10' / 397.97' S= 0.0213 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Primary	403.02'	<b>24.0" Round RCP_Round 24"</b> L= 35.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 403.02' / 401.73' S= 0.0369 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#3	Primary	405.69'	<b>2.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)

**Primary OutFlow** Max=34.69 cfs @ 0.29 hrs HW=404.26' (Free Discharge)

1=RCP\_Round 24" (Inlet Controls 26.90 cfs @ 8.56 fps)  
2=RCP\_Round 24" (Inlet Controls 7.79 cfs @ 3.80 fps)  
3=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)

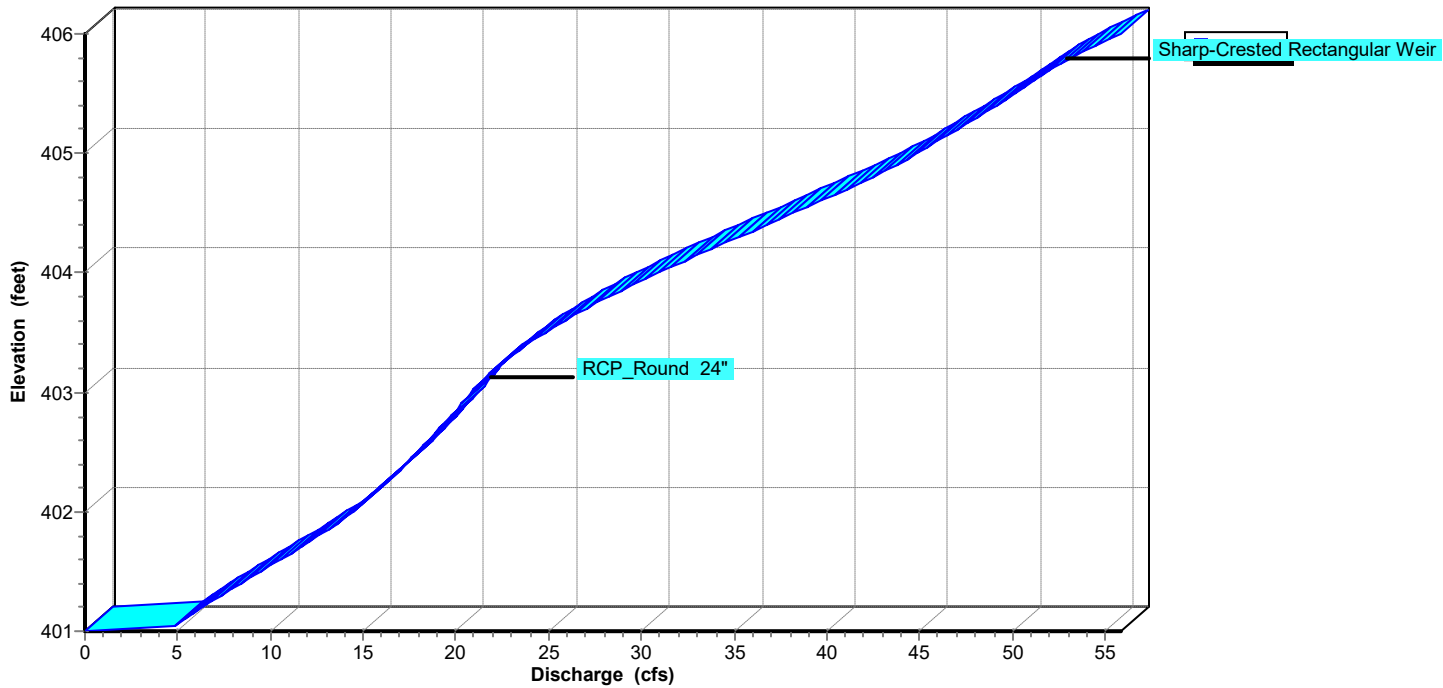
### Pond Pond: Regional Detention Basin

Hydrograph



### Pond Pond: Regional Detention Basin

Stage-Discharge



**Springhill Retail**

Prepared by Phillip Lewis Engineering

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AR - Little Rock 2-yr Duration=15 min, Inten=3.54 in/hr

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**Stage-Area-Storage for Pond Pond: Regional Detention Basin**

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
401.00	0	403.60	1,944
401.05	5	403.65	2,039
401.10	10	403.70	2,134
401.15	15	403.75	2,229
401.20	21	403.80	2,324
401.25	26	403.85	2,419
401.30	31	403.90	2,514
401.35	36	403.95	2,609
401.40	41	404.00	2,704
401.45	46	404.05	2,921
401.50	52	404.10	3,137
401.55	57	404.15	3,354
401.60	62	404.20	3,571
401.65	67	404.25	3,788
401.70	72	404.30	4,004
401.75	77	404.35	4,221
401.80	82	404.40	4,438
401.85	88	404.45	4,654
401.90	93	404.50	4,871
401.95	98	404.55	5,088
402.00	103	404.60	5,304
402.05	138	404.65	5,521
402.10	173	404.70	5,738
402.15	208	404.75	5,955
402.20	243	404.80	6,171
402.25	278	404.85	6,388
402.30	313	404.90	6,605
402.35	348	404.95	6,821
402.40	383	405.00	7,038
402.45	418	405.05	7,327
402.50	453	405.10	7,615
402.55	488	405.15	7,904
402.60	523	405.20	8,193
402.65	558	405.25	8,482
402.70	593	405.30	8,770
402.75	628	405.35	9,059
402.80	663	405.40	9,348
402.85	698	405.45	9,636
402.90	733	405.50	9,925
402.95	768	405.55	10,214
403.00	803	405.60	10,502
403.05	898	405.65	10,791
403.10	993	405.70	11,080
403.15	1,088	405.75	11,369
403.20	1,183	405.80	11,657
403.25	1,278	405.85	11,946
403.30	1,373	405.90	12,235
403.35	1,468	405.95	12,523
403.40	1,563	406.00	<b>12,812</b>
403.45	1,658		
403.50	1,754		
403.55	1,849		

# Springhill Retail

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AR - Little Rock 5-yr Duration=15 min, Inten=4.20 in/hr

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## Summary for Subcatchment ARDOT: ARDOT Offsite

Runoff = 34.08 cfs @ 0.25 hrs, Volume= 30,674 cf, Depth= 0.31"

Routed to Reach A1 : Pipe A1

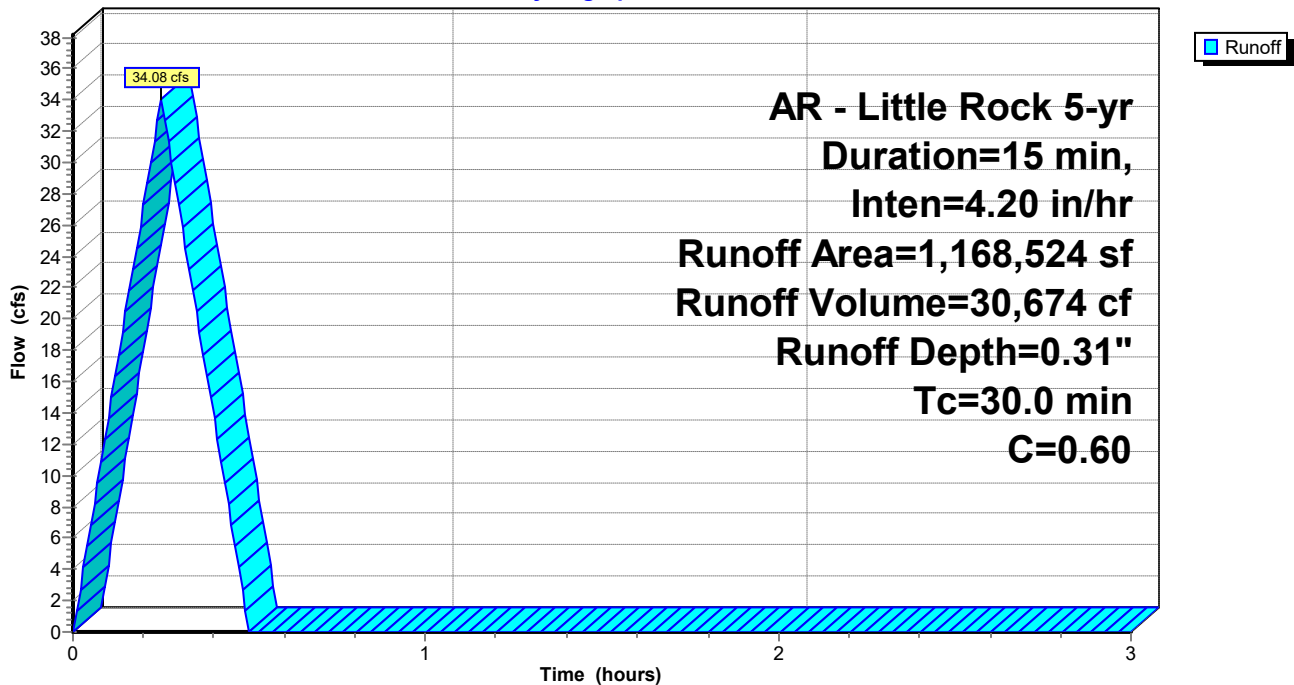
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
AR - Little Rock 5-yr Duration=15 min, Inten=4.20 in/hr

Area (sf)	C	Description
1,168,524	0.60	
1,168,524		100.00% Pervious Area

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

## Subcatchment ARDOT: ARDOT Offsite

Hydrograph



# Springhill Retail

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AR - Little Rock 5-yr Duration=15 min, Inten=4.20 in/hr

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## Summary for Subcatchment M&F: Merchants and Farmers

Runoff = 3.54 cfs @ 0.09 hrs, Volume= 3,182 cf, Depth= 1.00"

Routed to Reach A2 : Pipe A2

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

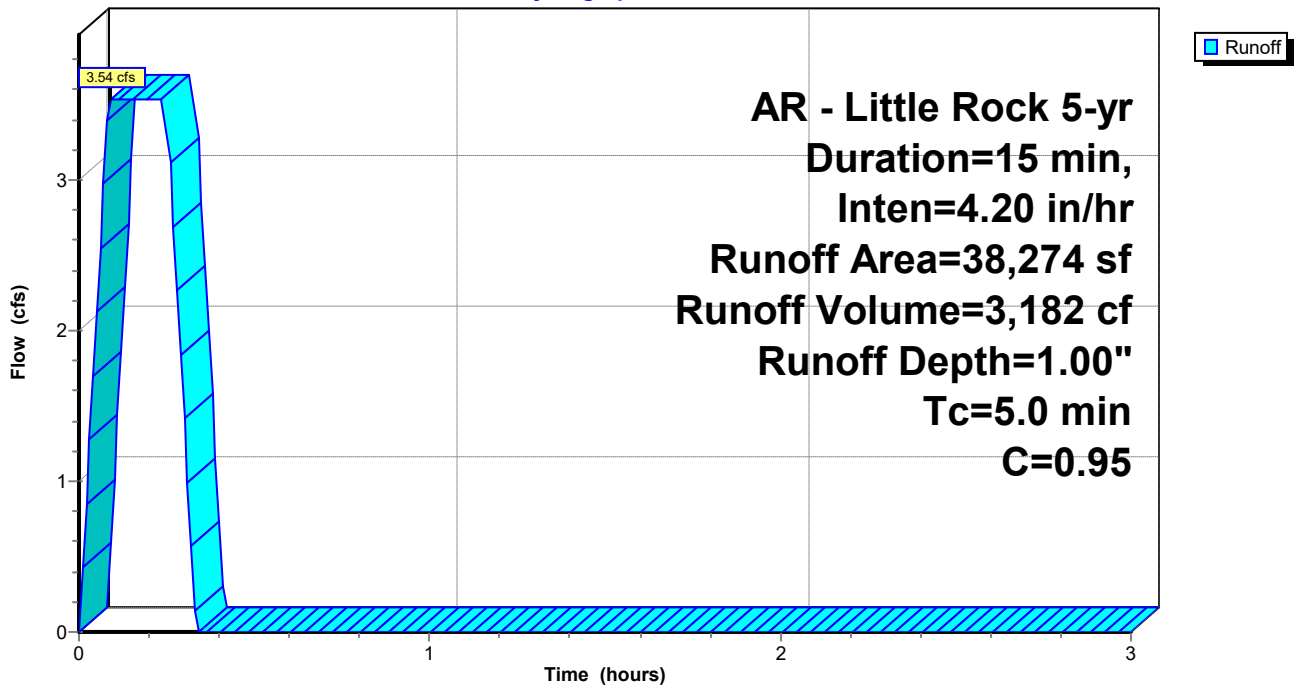
AR - Little Rock 5-yr Duration=15 min, Inten=4.20 in/hr

Area (sf)	C	Description
38,274	0.95	Developed Site
38,274		100.00% Impervious Area

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

## Subcatchment M&F: Merchants and Farmers

Hydrograph



**Springhill Retail**

AR - Little Rock 5-yr Duration=15 min, Inten=4.20 in/hr

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**Summary for Subcatchment SR: Springhill Retail Post**

Runoff = 3.47 cfs @ 0.09 hrs, Volume= 3,127 cf, Depth= 0.80"

Routed to Pond Pond : Regional Detention Basin

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

AR - Little Rock 5-yr Duration=15 min, Inten=4.20 in/hr

Area (sf)	C	Description
1,511	0.86	Existing Drive
33,632	0.92	Drives, Roof, Sidewalks
11,886	0.30	Landscaped Areas
47,029	0.76	Weighted Average
47,029		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	82	0.0290	1.76		<b>Sheet Flow, Asphalt Sheet Flow</b> Smooth surfaces n= 0.011 P2= 4.19"
0.8	87	0.0080	1.82		<b>Shallow Concentrated Flow, Gutter</b> Paved Kv= 20.3 fps
0.1	19	0.0210	2.94		<b>Shallow Concentrated Flow, Concentrated Pavement Flow</b> Paved Kv= 20.3 fps
1.0	197	0.0250	3.21		<b>Shallow Concentrated Flow, Gutter</b> Paved Kv= 20.3 fps
0.3	37	0.0130	2.31		<b>Shallow Concentrated Flow, Gutter</b> Paved Kv= 20.3 fps
2.0					<b>Direct Entry, Minimum adjustment</b>
5.0	422	Total			



**Springhill Retail**

Prepared by Phillip Lewis Engineering

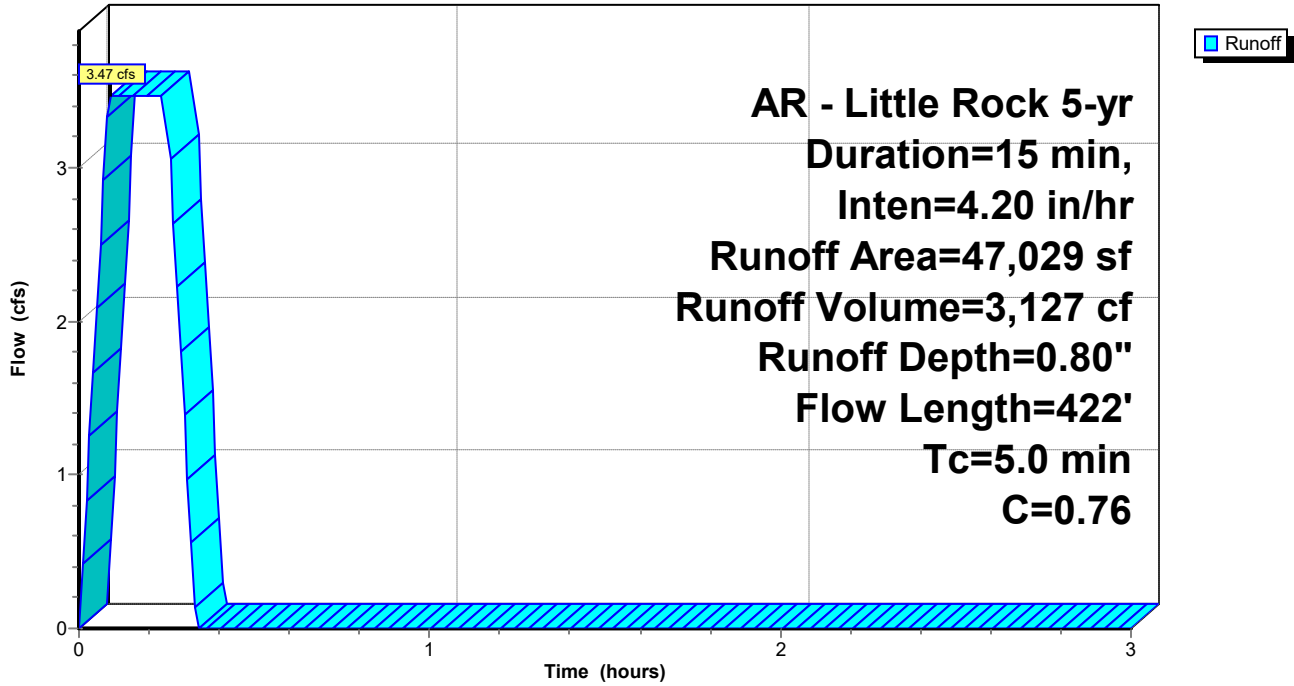
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**Subcatchment SR: Springhill Retail Post**

Hydrograph



# Springhill Retail

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## Summary for Subcatchment WestProp: West Adjacent Property Drainage Basin

Runoff = 8.08 cfs @ 0.25 hrs, Volume= 7,271 cf, Depth= 0.73"

Routed to Reach A3 : Pipe A2

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

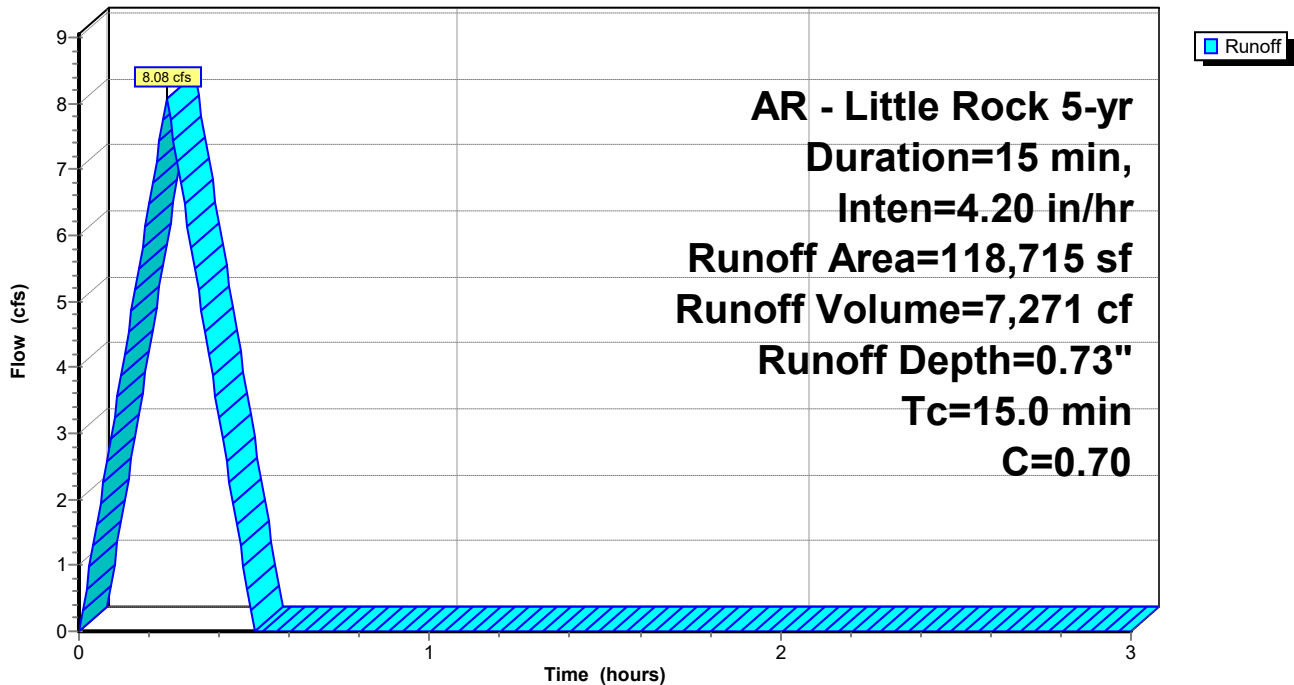
AR - Little Rock 5-yr Duration=15 min, Inten=4.20 in/hr

Area (sf)	C	Description
65,063	0.50	Pervious Areas
53,652	0.95	Rooftop/Paving
118,715	0.70	Weighted Average
65,063		54.81% Pervious Area
53,652		45.19% Impervious Area

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

## Subcatchment WestProp: West Adjacent Property Drainage Basin

Hydrograph



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AR - Little Rock 5-yr Duration=15 min, Inten=4.20 in/hr

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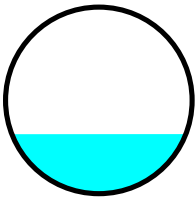
## Summary for Reach A1: Pipe A1

Inflow Area = 1,168,524 sf, 0.00% Impervious, Inflow Depth = 0.31" for 5-yr event  
Inflow = 34.08 cfs @ 0.25 hrs, Volume= 30,674 cf  
Outflow = 34.01 cfs @ 0.25 hrs, Volume= 30,675 cf, Atten= 0%, Lag= 0.0 min  
Routed to Reach A2 : Pipe A2

Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
Max. Velocity= 12.84 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 9.94 fps, Avg. Travel Time= 0.0 min

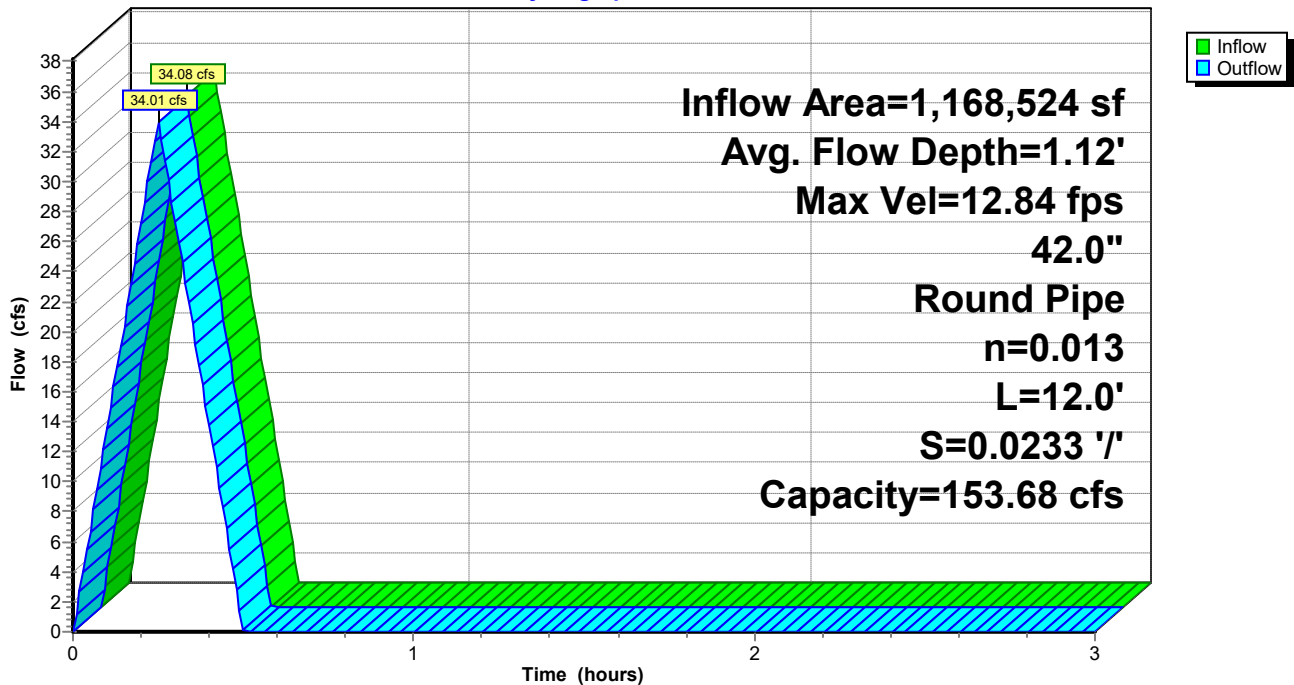
Peak Storage= 32 cf @ 0.25 hrs  
Average Depth at Peak Storage= 1.12' , Surface Width= 3.26'  
Bank-Full Depth= 3.50' Flow Area= 9.6 sf, Capacity= 153.68 cfs

42.0" Round Pipe  
n= 0.013 Concrete pipe, bends & connections  
Length= 12.0' Slope= 0.0233 '/'  
Inlet Invert= 413.00', Outlet Invert= 412.72'



## Reach A1: Pipe A1

### Hydrograph



**Springhill Retail**

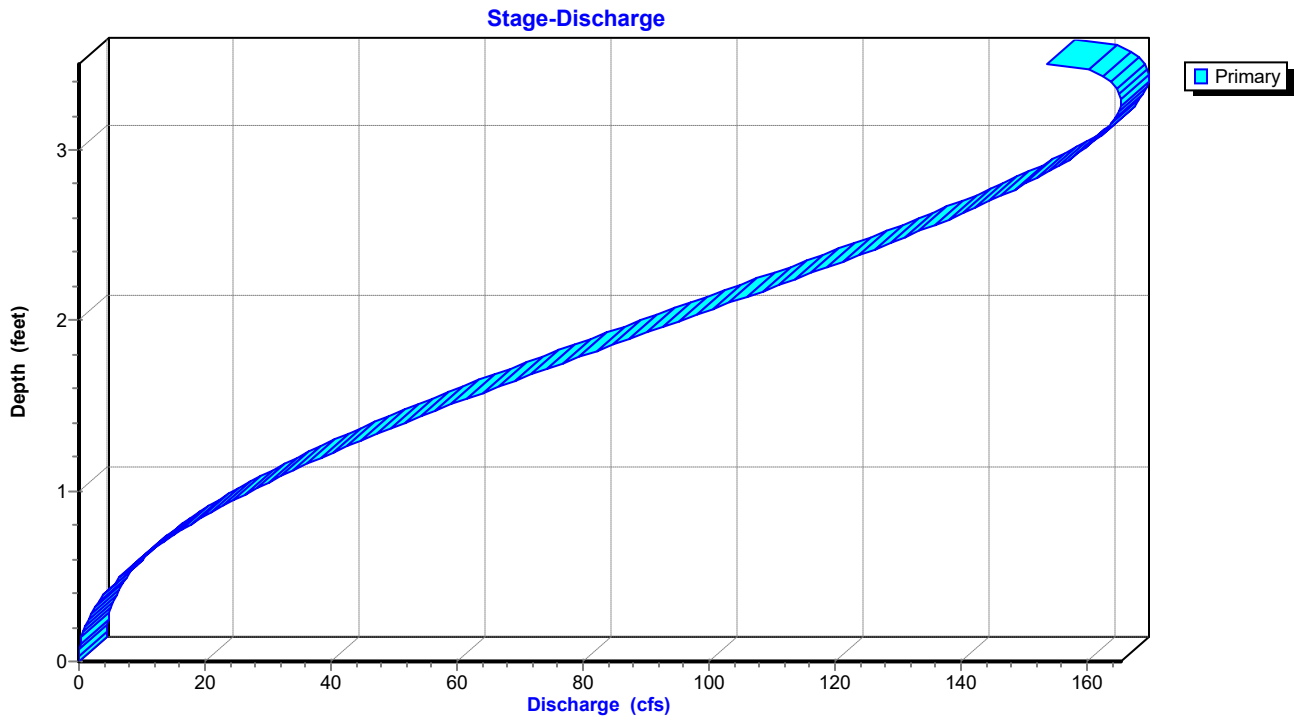
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AR - Little Rock 5-yr Duration=15 min, Inten=4.20 in/hr

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**Reach A1: Pipe A1**



**Springhill Retail**

Prepared by Phillip Lewis Engineering

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*AR - Little Rock 5-yr Duration=15 min, Inten=4.20 in/hr*

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**Stage-Area-Storage for Reach A1: Pipe A1**

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
413.00	0.0	0	415.60	7.7	92
413.05	0.0	0	415.65	7.8	94
413.10	0.1	1	415.70	8.0	96
413.15	0.1	2	415.75	8.1	97
413.20	0.2	3	415.80	8.3	99
413.25	0.3	4	415.85	8.4	101
413.30	0.4	5	415.90	8.5	102
413.35	0.5	6	415.95	8.7	104
413.40	0.6	7	416.00	8.8	105
413.45	0.7	9	416.05	8.9	107
413.50	0.8	10	416.10	9.0	108
413.55	1.0	12	416.15	9.1	109
413.60	1.1	13	416.20	9.2	111
413.65	1.2	15	416.25	9.3	112
413.70	1.4	16	416.30	9.4	113
413.75	1.5	18	416.35	9.5	114
413.80	1.7	20	416.40	9.5	115
413.85	1.8	22	416.45	9.6	115
413.90	2.0	23	416.50	<b>9.6</b>	<b>115</b>
413.95	2.1	25			
414.00	2.3	27			
414.05	2.4	29			
414.10	2.6	31			
414.15	2.8	33			
414.20	2.9	35			
414.25	3.1	37			
414.30	3.3	39			
414.35	3.4	41			
414.40	3.6	43			
414.45	3.8	45			
414.50	3.9	47			
414.55	4.1	49			
414.60	4.3	51			
414.65	4.5	54			
414.70	4.6	56			
414.75	4.8	58			
414.80	5.0	60			
414.85	5.2	62			
414.90	5.3	64			
414.95	5.5	66			
415.00	5.7	68			
415.05	5.9	70			
415.10	6.0	72			
415.15	6.2	74			
415.20	6.4	76			
415.25	6.5	78			
415.30	6.7	80			
415.35	6.9	82			
415.40	7.0	84			
415.45	7.2	86			
415.50	7.4	88			
415.55	7.5	90			

# Springhill Retail

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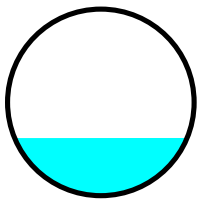
## Summary for Reach A2: Pipe A2

Inflow Area = 1,206,798 sf, 3.17% Impervious, Inflow Depth = 0.34" for 5-yr event  
Inflow = 37.55 cfs @ 0.25 hrs, Volume= 33,857 cf  
Outflow = 36.95 cfs @ 0.26 hrs, Volume= 33,857 cf, Atten= 2%, Lag= 0.4 min  
Routed to Reach A3 : Pipe A2

Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
Max. Velocity= 14.69 fps, Min. Travel Time= 0.3 min  
Avg. Velocity = 8.33 fps, Avg. Travel Time= 0.4 min

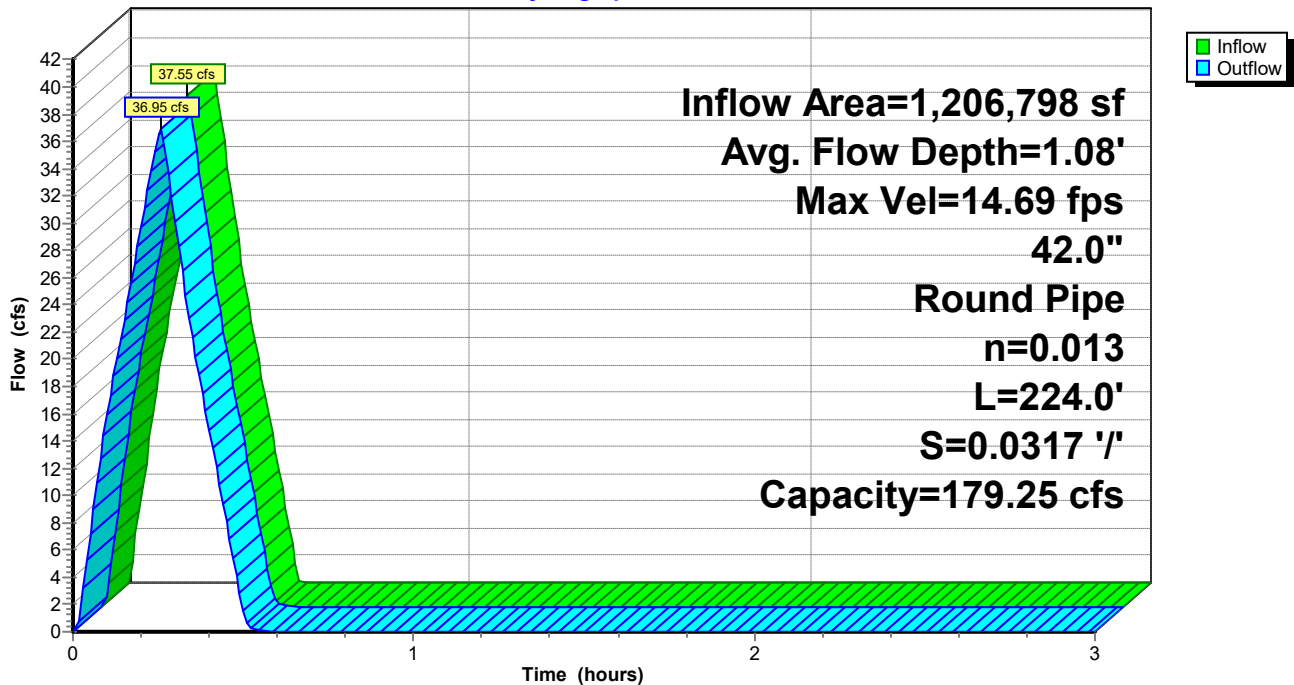
Peak Storage= 567 cf @ 0.25 hrs  
Average Depth at Peak Storage= 1.08' , Surface Width= 3.23'  
Bank-Full Depth= 3.50' Flow Area= 9.6 sf, Capacity= 179.25 cfs

42.0" Round Pipe  
n= 0.013 Concrete pipe, bends & connections  
Length= 224.0' Slope= 0.0317 '/'  
Inlet Invert= 412.52', Outlet Invert= 405.41'



## Reach A2: Pipe A2

### Hydrograph



**Springhill Retail**

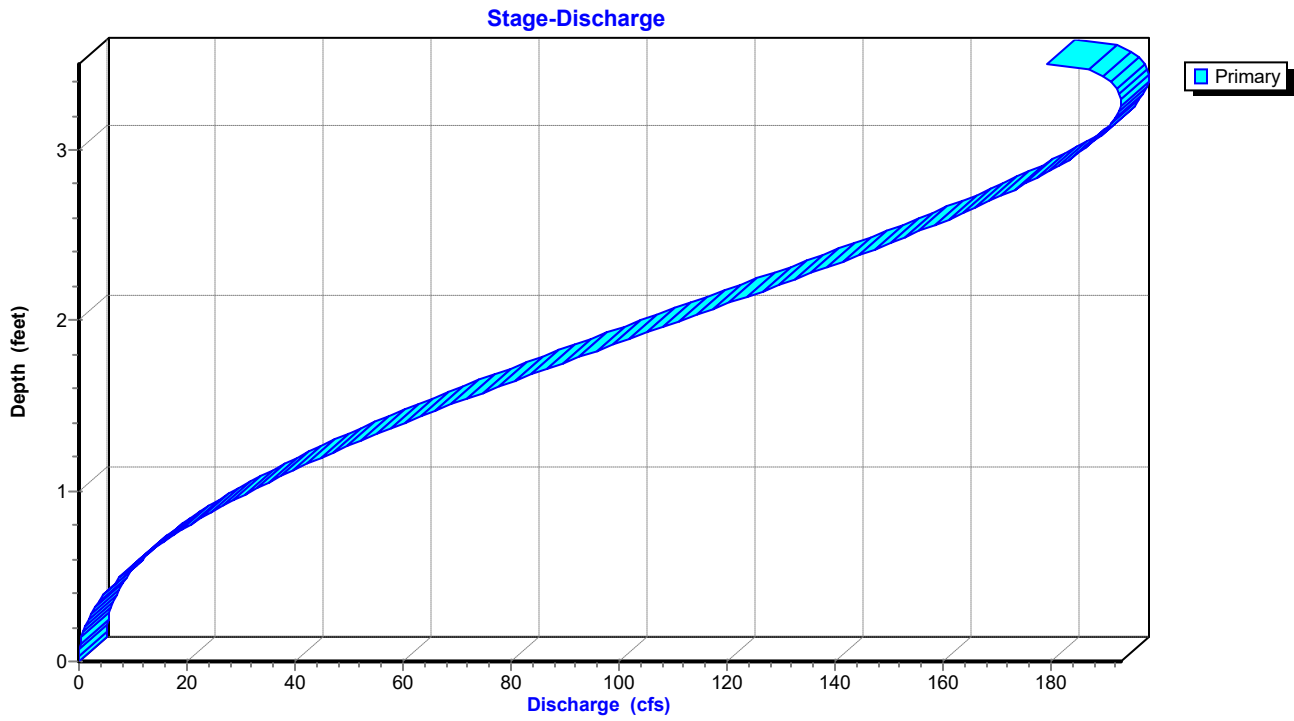
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**Reach A2: Pipe A2**



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**Stage-Area-Storage for Reach A2: Pipe A2**

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
412.52	0.0	0	415.12	7.7	1,717
412.57	0.0	6	415.17	7.8	1,751
412.62	0.1	18	415.22	8.0	1,784
412.67	0.1	32	415.27	8.1	1,816
412.72	0.2	49	415.32	8.3	1,848
412.77	0.3	68	415.37	8.4	1,879
412.82	0.4	90	415.42	8.5	1,909
412.87	0.5	112	415.47	8.7	1,938
412.92	0.6	136	415.52	8.8	1,966
412.97	0.7	162	415.57	8.9	1,993
413.02	0.8	189	415.62	9.0	2,019
413.07	1.0	217	415.67	9.1	2,043
413.12	1.1	246	415.72	9.2	2,066
413.17	1.2	276	415.77	9.3	2,087
413.22	1.4	307	415.82	9.4	2,106
413.27	1.5	339	415.87	9.5	2,123
413.32	1.7	371	415.92	9.5	2,138
413.37	1.8	404	415.97	9.6	2,149
413.42	2.0	438	416.02	<b>9.6</b>	<b>2,155</b>
413.47	2.1	473			
413.52	2.3	508			
413.57	2.4	544			
413.62	2.6	580			
413.67	2.8	617			
413.72	2.9	654			
413.77	3.1	691			
413.82	3.3	729			
413.87	3.4	767			
413.92	3.6	805			
413.97	3.8	844			
414.02	3.9	882			
414.07	4.1	921			
414.12	4.3	960			
414.17	4.5	999			
414.22	4.6	1,038			
414.27	4.8	1,078			
414.32	5.0	1,117			
414.37	5.2	1,156			
414.42	5.3	1,195			
414.47	5.5	1,234			
414.52	5.7	1,273			
414.57	5.9	1,312			
414.62	6.0	1,350			
414.67	6.2	1,388			
414.72	6.4	1,426			
414.77	6.5	1,464			
414.82	6.7	1,502			
414.87	6.9	1,539			
414.92	7.0	1,575			
414.97	7.2	1,611			
415.02	7.4	1,647			
415.07	7.5	1,682			



# Springhill Retail

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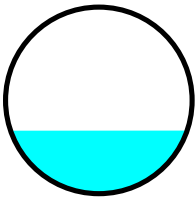
## Summary for Reach A3: Pipe A2

Inflow Area = 1,325,513 sf, 6.94% Impervious, Inflow Depth = 0.37" for 5-yr event  
Inflow = 44.84 cfs @ 0.25 hrs, Volume= 41,128 cf  
Outflow = 44.77 cfs @ 0.26 hrs, Volume= 41,128 cf, Atten= 0%, Lag= 0.1 min  
Routed to Pond Pond : Regional Detention Basin

Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
Max. Velocity= 15.64 fps, Min. Travel Time= 0.1 min  
Avg. Velocity = 8.81 fps, Avg. Travel Time= 0.1 min

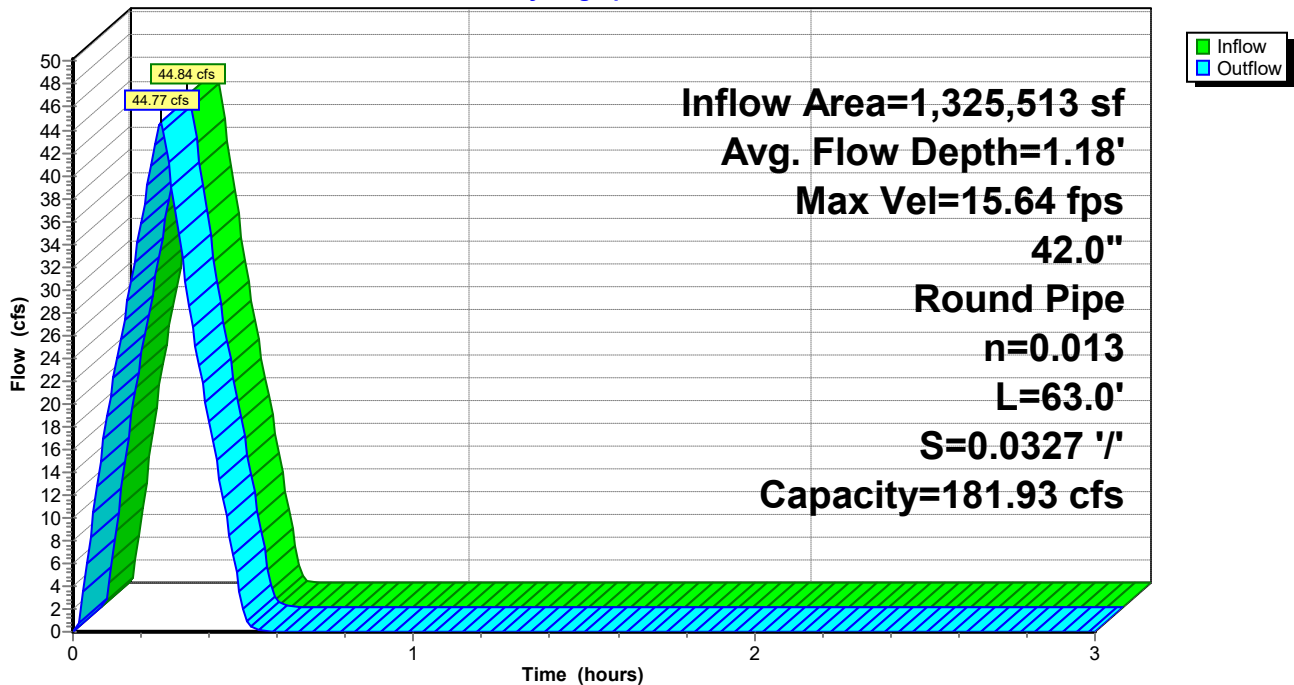
Peak Storage= 180 cf @ 0.26 hrs  
Average Depth at Peak Storage= 1.18' , Surface Width= 3.31'  
Bank-Full Depth= 3.50' Flow Area= 9.6 sf, Capacity= 181.93 cfs

42.0" Round Pipe  
n= 0.013 Concrete pipe, bends & connections  
Length= 63.0' Slope= 0.0327 '/'  
Inlet Invert= 405.31', Outlet Invert= 403.25'



## Reach A3: Pipe A2

### Hydrograph



# Springhill Retail

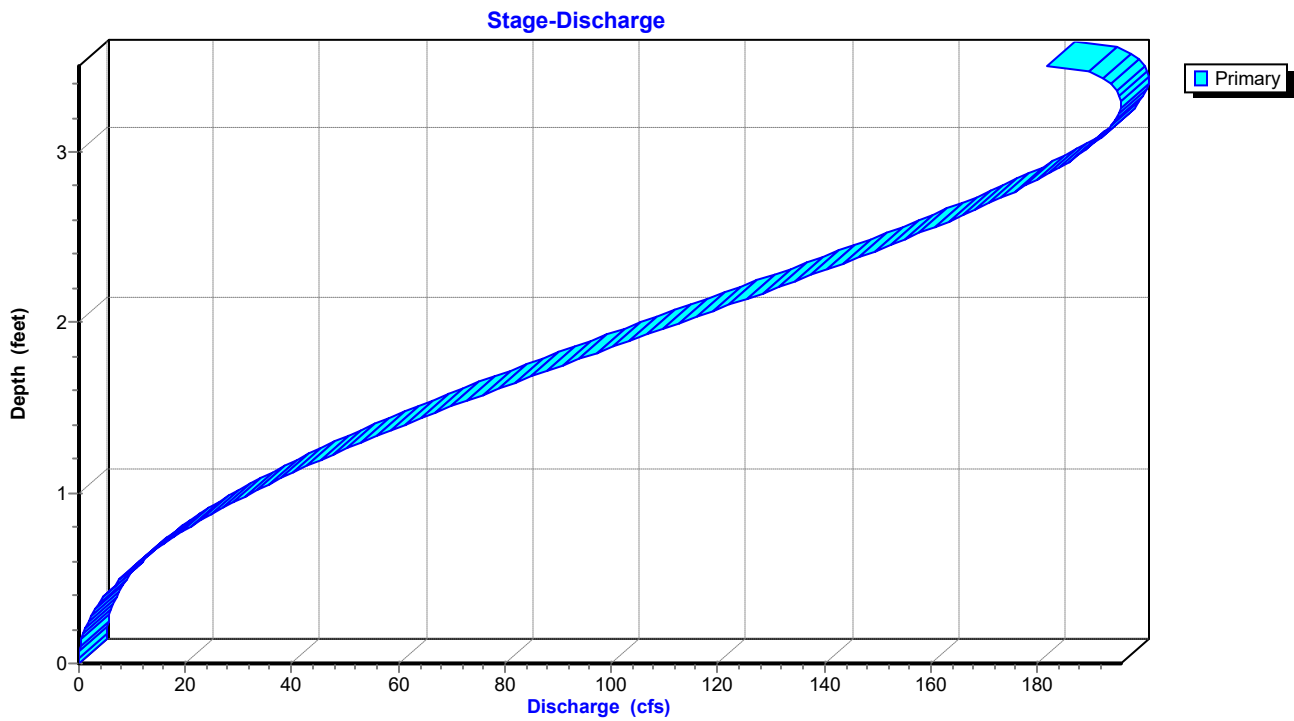
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## Reach A3: Pipe A2



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**Stage-Area-Storage for Reach A3: Pipe A2**

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
405.31	0.0	0	407.91	7.7	483
405.36	0.0	2	407.96	7.8	492
405.41	0.1	5	408.01	8.0	502
405.46	0.1	9	408.06	8.1	511
405.51	0.2	14	408.11	8.3	520
405.56	0.3	19	408.16	8.4	529
405.61	0.4	25	408.21	8.5	537
405.66	0.5	32	408.26	8.7	545
405.71	0.6	38	408.31	8.8	553
405.76	0.7	46	408.36	8.9	561
405.81	0.8	53	408.41	9.0	568
405.86	1.0	61	408.46	9.1	575
405.91	1.1	69	408.51	9.2	581
405.96	1.2	78	408.56	9.3	587
406.01	1.4	86	408.61	9.4	592
406.06	1.5	95	408.66	9.5	597
406.11	1.7	104	408.71	9.5	601
406.16	1.8	114	408.76	9.6	604
406.21	2.0	123	408.81	<b>9.6</b>	<b>606</b>
406.26	2.1	133			
406.31	2.3	143			
406.36	2.4	153			
406.41	2.6	163			
406.46	2.8	173			
406.51	2.9	184			
406.56	3.1	194			
406.61	3.3	205			
406.66	3.4	216			
406.71	3.6	226			
406.76	3.8	237			
406.81	3.9	248			
406.86	4.1	259			
406.91	4.3	270			
406.96	4.5	281			
407.01	4.6	292			
407.06	4.8	303			
407.11	5.0	314			
407.16	5.2	325			
407.21	5.3	336			
407.26	5.5	347			
407.31	5.7	358			
407.36	5.9	369			
407.41	6.0	380			
407.46	6.2	390			
407.51	6.4	401			
407.56	6.5	412			
407.61	6.7	422			
407.66	6.9	433			
407.71	7.0	443			
407.76	7.2	453			
407.81	7.4	463			
407.86	7.5	473			

# Springhill Retail

AR - Little Rock 5-yr Duration=15 min, Inten=4.20 in/hr

Prepared by Phillip Lewis Engineering

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## Summary for Pond Pond: Regional Detention Basin

Inflow Area = 1,372,542 sf, 6.70% Impervious, Inflow Depth = 0.39" for 5-yr event  
Inflow = 47.99 cfs @ 0.25 hrs, Volume= 44,255 cf  
Outflow = 40.22 cfs @ 0.29 hrs, Volume= 44,270 cf, Atten= 16%, Lag= 2.3 min  
Primary = 40.22 cfs @ 0.29 hrs, Volume= 44,270 cf

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
Peak Elev= 404.64' @ 0.29 hrs Storage= 5,463 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
Center-of-Mass det. time= 1.5 min ( 16.4 - 14.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	401.00'	12,812 cf	<b>Custom Stage Data</b> Listed below

Elevation (feet)	Cum.Store (cubic-feet)
401.00	0
402.00	103
403.00	803
404.00	2,704
405.00	7,038
406.00	12,812

Device	Routing	Invert	Outlet Devices
#1	Primary	400.10'	<b>24.0" Round RCP_Round 24"</b> L= 100.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 400.10' / 397.97' S= 0.0213 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Primary	403.02'	<b>24.0" Round RCP_Round 24"</b> L= 35.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 403.02' / 401.73' S= 0.0369 '/ Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#3	Primary	405.69'	<b>2.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)

**Primary OutFlow** Max=40.19 cfs @ 0.29 hrs HW=404.63' (Free Discharge)

1=RCP\_Round 24" (Inlet Controls 28.44 cfs @ 9.05 fps)  
2=RCP\_Round 24" (Inlet Controls 11.75 cfs @ 4.33 fps)  
3=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)

**Springhill Retail**

Prepared by Phillip Lewis Engineering

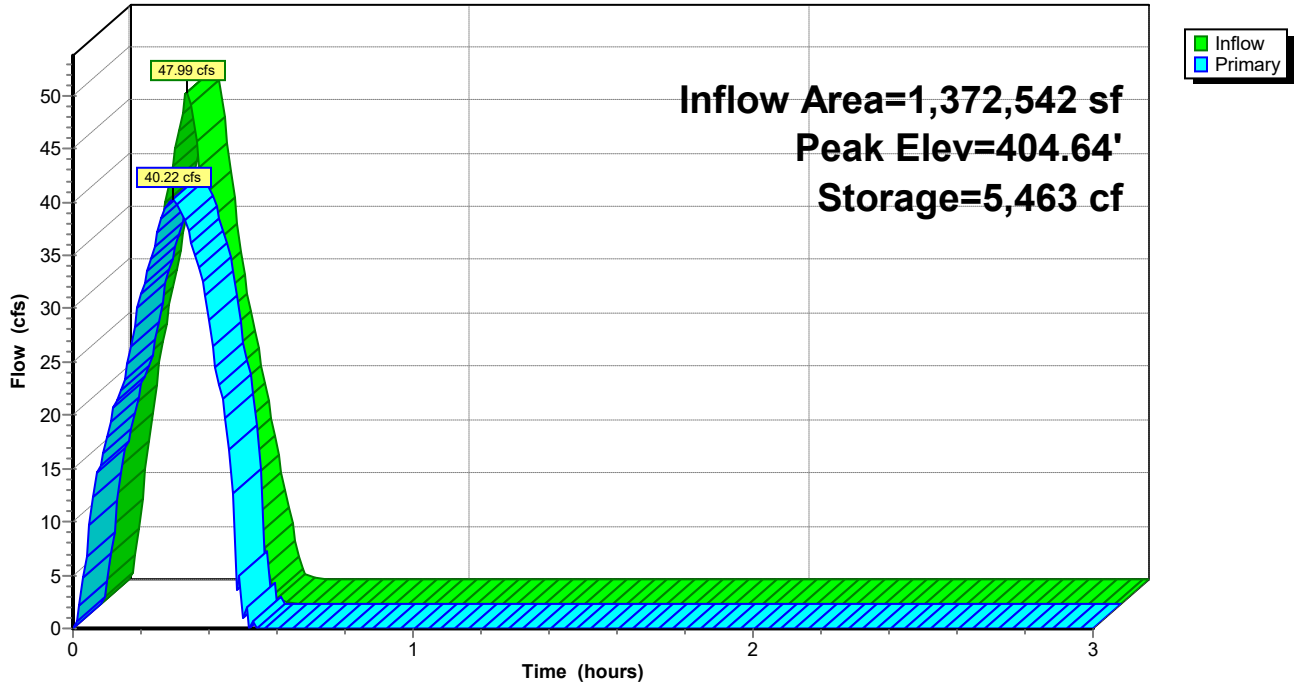
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AR - Little Rock 5-yr Duration=15 min, Inten=4.20 in/hr

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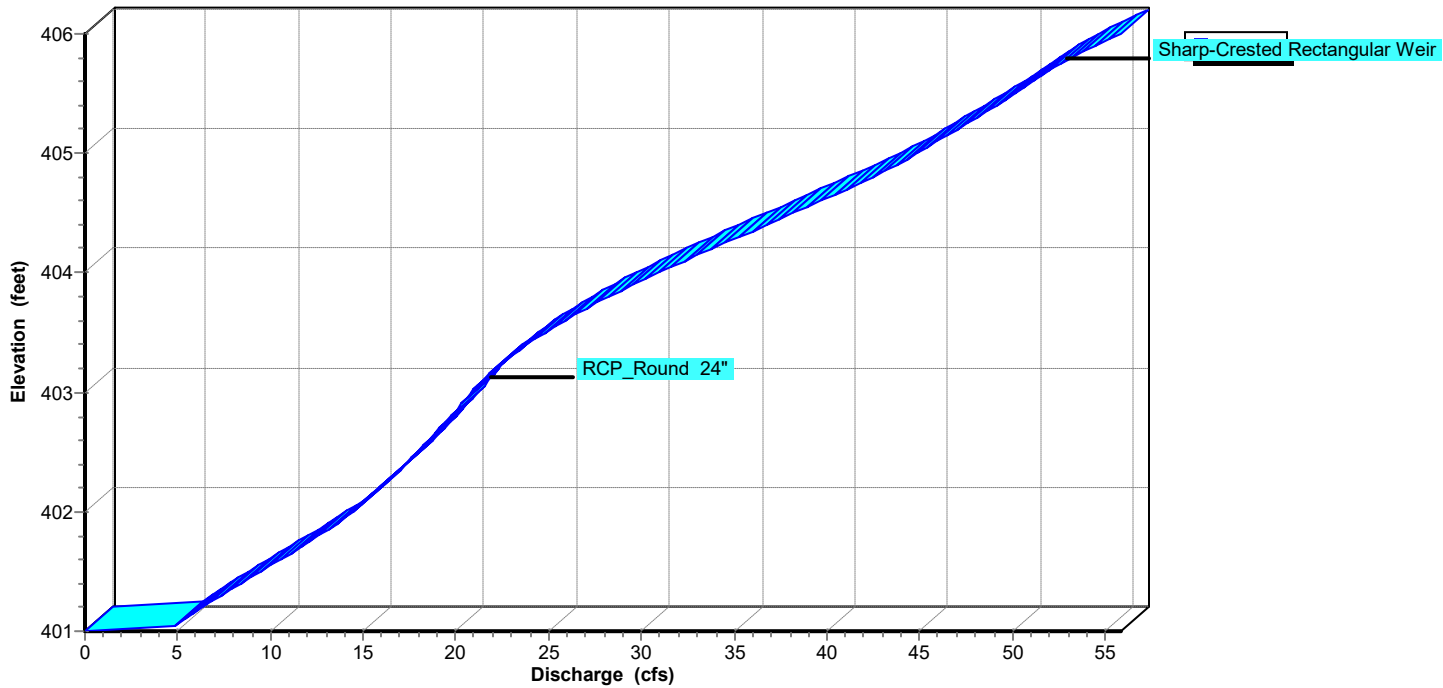
**Pond Pond: Regional Detention Basin**

Hydrograph



**Pond Pond: Regional Detention Basin**

Stage-Discharge



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AR - Little Rock 5-yr Duration=15 min, Inten=4.20 in/hr

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**Stage-Area-Storage for Pond Pond: Regional Detention Basin**

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
401.00	0	403.60	1,944
401.05	5	403.65	2,039
401.10	10	403.70	2,134
401.15	15	403.75	2,229
401.20	21	403.80	2,324
401.25	26	403.85	2,419
401.30	31	403.90	2,514
401.35	36	403.95	2,609
401.40	41	404.00	2,704
401.45	46	404.05	2,921
401.50	52	404.10	3,137
401.55	57	404.15	3,354
401.60	62	404.20	3,571
401.65	67	404.25	3,788
401.70	72	404.30	4,004
401.75	77	404.35	4,221
401.80	82	404.40	4,438
401.85	88	404.45	4,654
401.90	93	404.50	4,871
401.95	98	404.55	5,088
402.00	103	404.60	5,304
402.05	138	404.65	5,521
402.10	173	404.70	5,738
402.15	208	404.75	5,955
402.20	243	404.80	6,171
402.25	278	404.85	6,388
402.30	313	404.90	6,605
402.35	348	404.95	6,821
402.40	383	405.00	7,038
402.45	418	405.05	7,327
402.50	453	405.10	7,615
402.55	488	405.15	7,904
402.60	523	405.20	8,193
402.65	558	405.25	8,482
402.70	593	405.30	8,770
402.75	628	405.35	9,059
402.80	663	405.40	9,348
402.85	698	405.45	9,636
402.90	733	405.50	9,925
402.95	768	405.55	10,214
403.00	803	405.60	10,502
403.05	898	405.65	10,791
403.10	993	405.70	11,080
403.15	1,088	405.75	11,369
403.20	1,183	405.80	11,657
403.25	1,278	405.85	11,946
403.30	1,373	405.90	12,235
403.35	1,468	405.95	12,523
403.40	1,563	406.00	<b>12,812</b>
403.45	1,658		
403.50	1,754		
403.55	1,849		

# Springhill Retail

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AR - Little Rock 10-yr Duration=15 min, Inten=4.76 in/hr

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## Summary for Subcatchment ARDOT: ARDOT Offsite

Runoff = 38.63 cfs @ 0.25 hrs, Volume= 34,764 cf, Depth= 0.36"

Routed to Reach A1 : Pipe A1

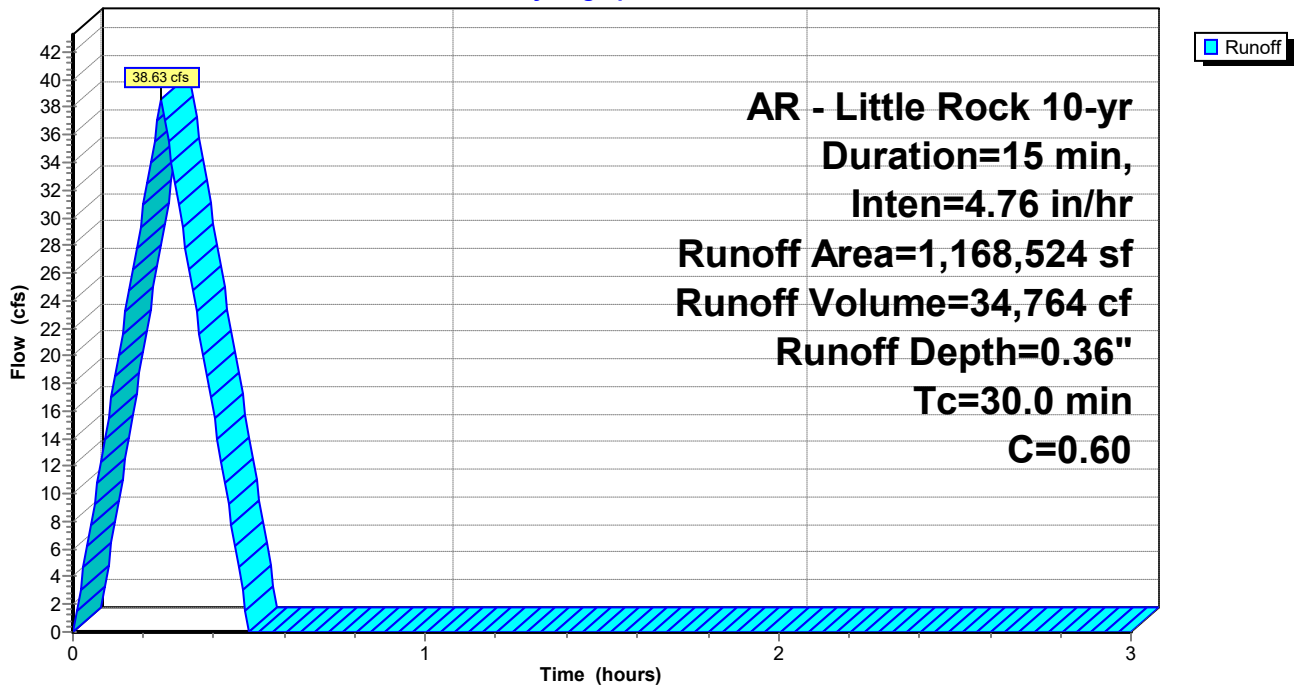
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
AR - Little Rock 10-yr Duration=15 min, Inten=4.76 in/hr

Area (sf)	C	Description
1,168,524	0.60	
1,168,524		100.00% Pervious Area

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

## Subcatchment ARDOT: ARDOT Offsite

Hydrograph



# Springhill Retail

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AR - Little Rock 10-yr Duration=15 min, Inten=4.76 in/hr

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## Summary for Subcatchment M&F: Merchants and Farmers

Runoff = 4.01 cfs @ 0.09 hrs, Volume= 3,606 cf, Depth= 1.13"

Routed to Reach A2 : Pipe A2

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

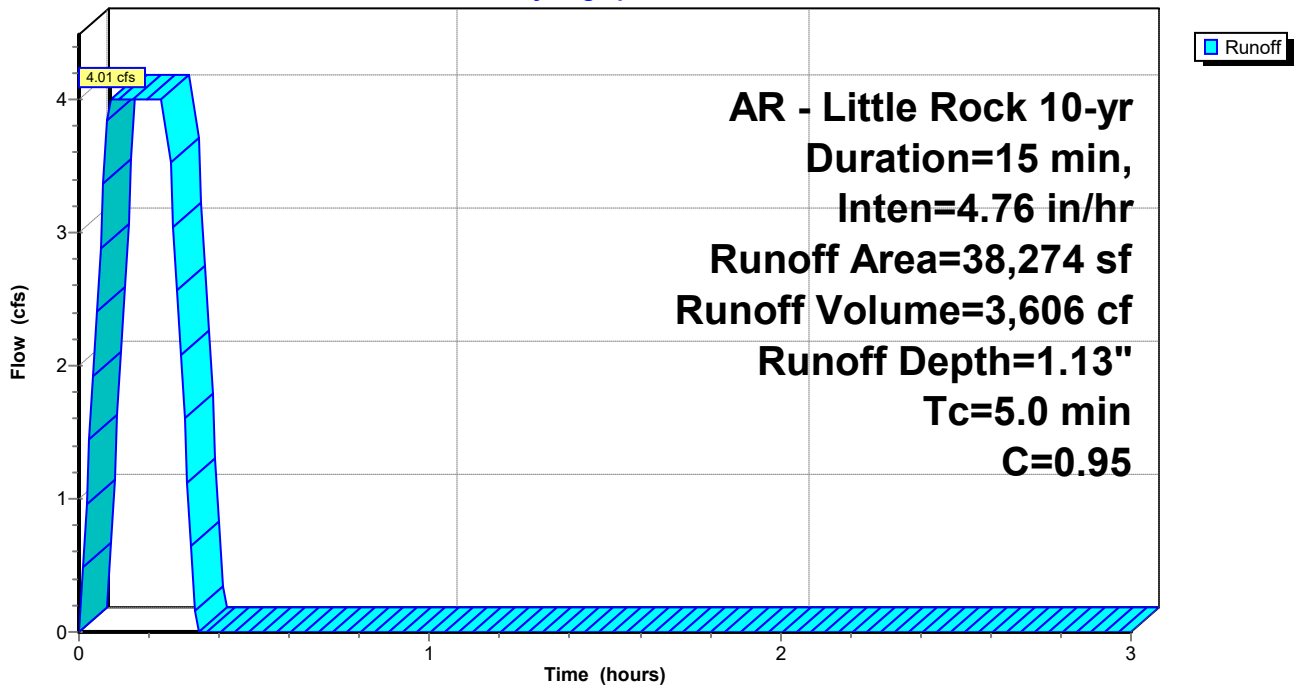
AR - Little Rock 10-yr Duration=15 min, Inten=4.76 in/hr

Area (sf)	C	Description
38,274	0.95	Developed Site
38,274		100.00% Impervious Area

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

## Subcatchment M&F: Merchants and Farmers

Hydrograph





**Springhill Retail**

AR - Little Rock 10-yr Duration=15 min, Inten=4.76 in/hr

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**Summary for Subcatchment SR: Springhill Retail Post**

Runoff = 3.94 cfs @ 0.09 hrs, Volume= 3,544 cf, Depth= 0.90"

Routed to Pond Pond : Regional Detention Basin

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

AR - Little Rock 10-yr Duration=15 min, Inten=4.76 in/hr

Area (sf)	C	Description
1,511	0.86	Existing Drive
33,632	0.92	Drives, Roof, Sidewalks
11,886	0.30	Landscaped Areas
47,029	0.76	Weighted Average
47,029		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	82	0.0290	1.76		<b>Sheet Flow, Asphalt Sheet Flow</b> Smooth surfaces n= 0.011 P2= 4.19"
0.8	87	0.0080	1.82		<b>Shallow Concentrated Flow, Gutter</b> Paved Kv= 20.3 fps
0.1	19	0.0210	2.94		<b>Shallow Concentrated Flow, Concentrated Pavement Flow</b> Paved Kv= 20.3 fps
1.0	197	0.0250	3.21		<b>Shallow Concentrated Flow, Gutter</b> Paved Kv= 20.3 fps
0.3	37	0.0130	2.31		<b>Shallow Concentrated Flow, Gutter</b> Paved Kv= 20.3 fps
2.0					<b>Direct Entry, Minimum adjustment</b>
5.0	422	Total			

**Springhill Retail**

Prepared by Phillip Lewis Engineering

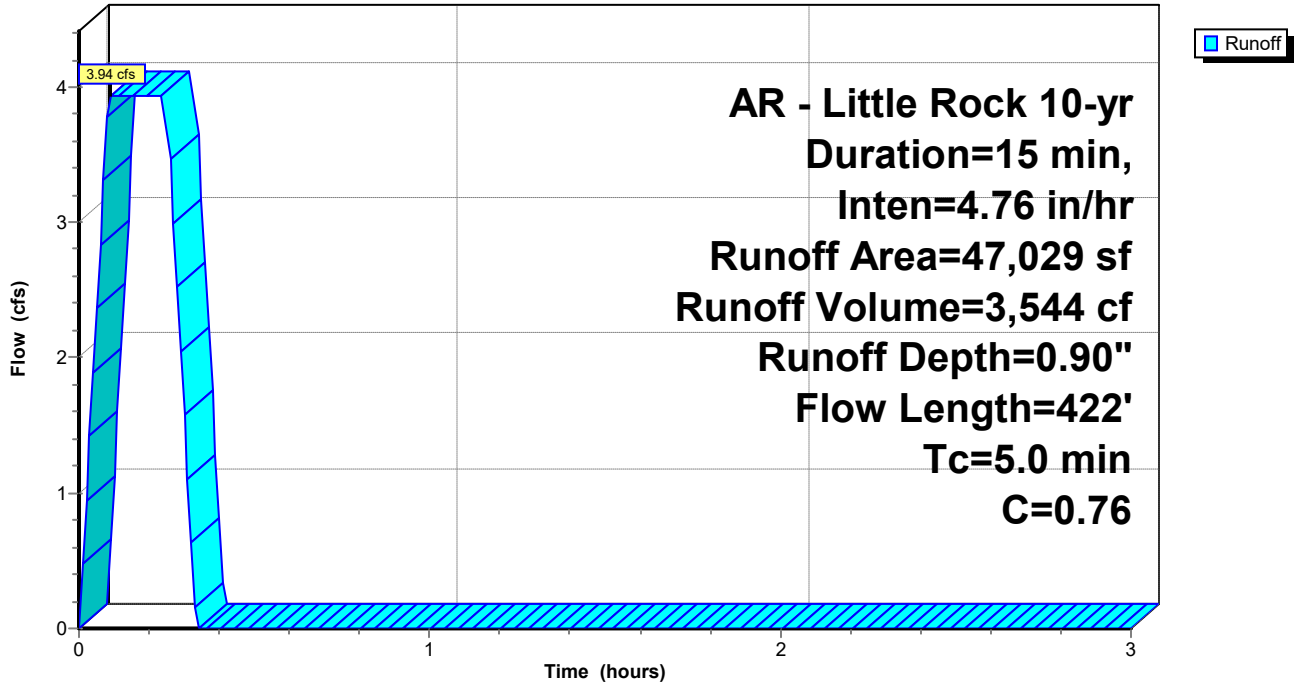
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AR - Little Rock 10-yr Duration=15 min, Inten=4.76 in/hr

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**Subcatchment SR: Springhill Retail Post**

Hydrograph



# Springhill Retail

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AR - Little Rock 10-yr Duration=15 min, Inten=4.76 in/hr

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## Summary for Subcatchment WestProp: West Adjacent Property Drainage Basin

Runoff = 9.16 cfs @ 0.25 hrs, Volume= 8,241 cf, Depth= 0.83"

Routed to Reach A3 : Pipe A2

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

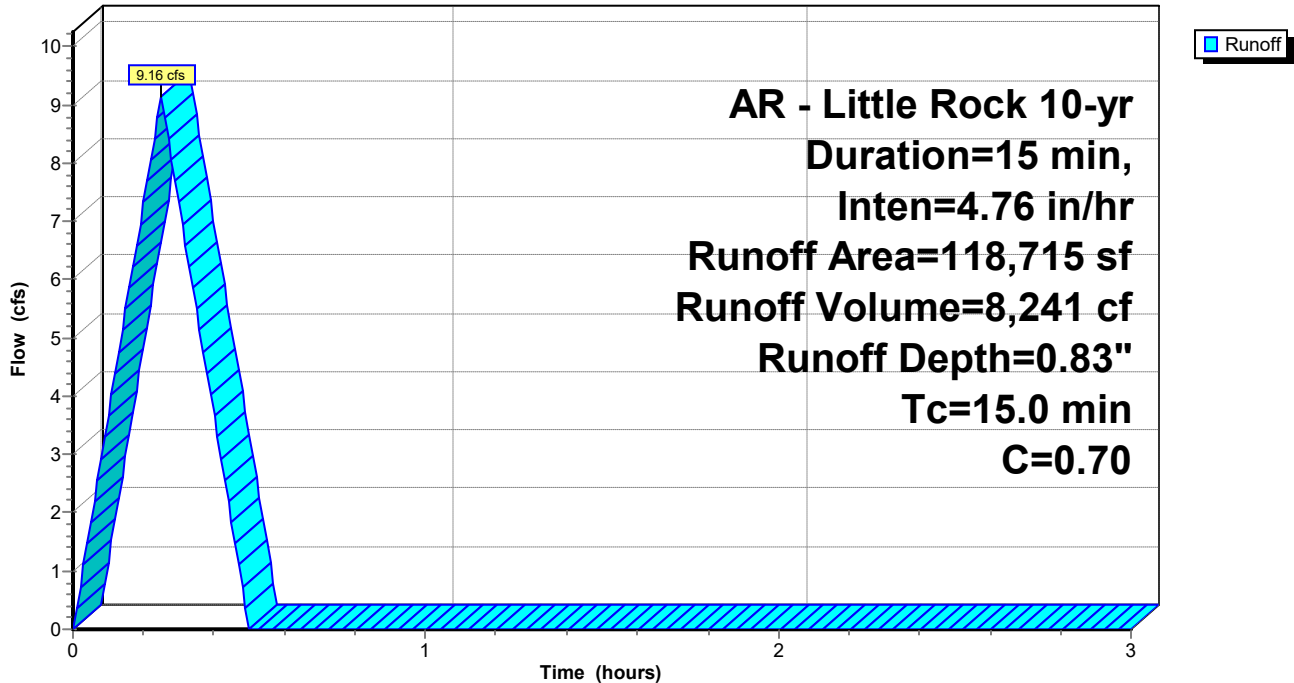
AR - Little Rock 10-yr Duration=15 min, Inten=4.76 in/hr

Area (sf)	C	Description
65,063	0.50	Pervious Areas
53,652	0.95	Rooftop/Paving
118,715	0.70	Weighted Average
65,063		54.81% Pervious Area
53,652		45.19% Impervious Area

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

## Subcatchment WestProp: West Adjacent Property Drainage Basin

Hydrograph



# Springhill Retail

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AR - Little Rock 10-yr Duration=15 min, Inten=4.76 in/hr

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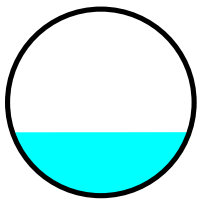
## Summary for Reach A1: Pipe A1

Inflow Area = 1,168,524 sf, 0.00% Impervious, Inflow Depth = 0.36" for 10-yr event  
Inflow = 38.63 cfs @ 0.25 hrs, Volume= 34,764 cf  
Outflow = 38.55 cfs @ 0.25 hrs, Volume= 34,765 cf, Atten= 0%, Lag= 0.0 min  
Routed to Reach A2 : Pipe A2

Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
Max. Velocity= 13.29 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 10.31 fps, Avg. Travel Time= 0.0 min

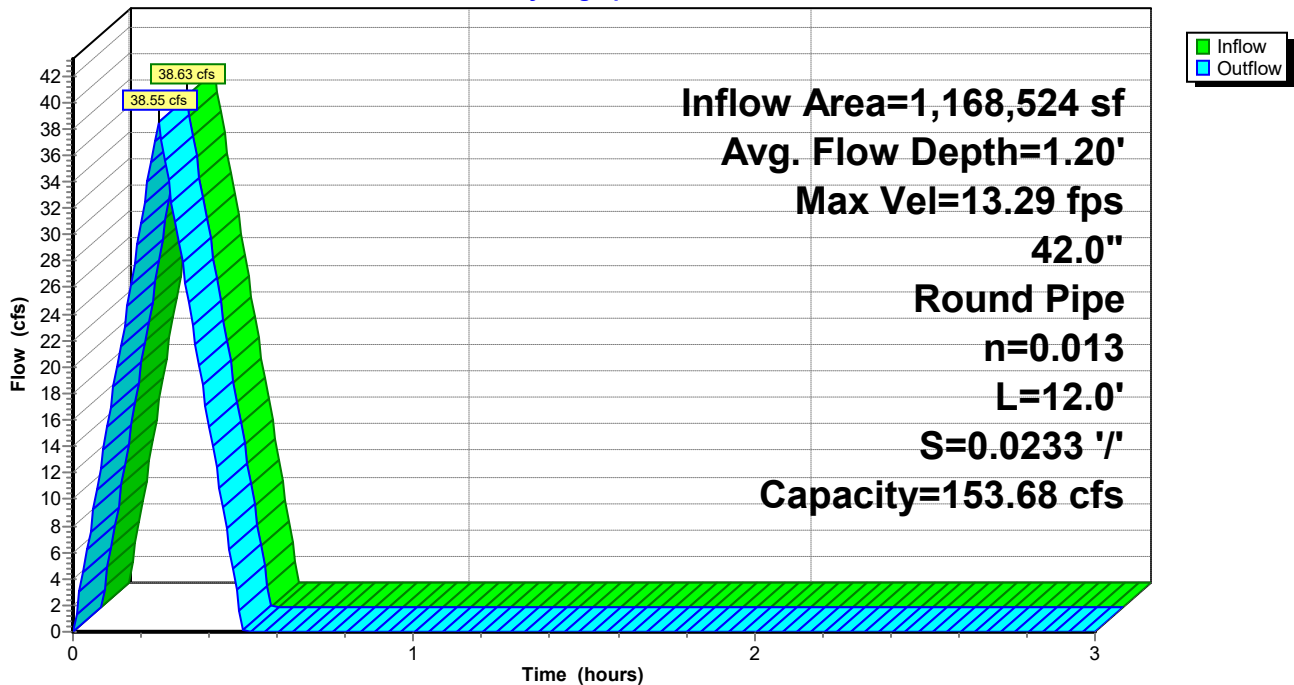
Peak Storage= 35 cf @ 0.25 hrs  
Average Depth at Peak Storage= 1.20' , Surface Width= 3.32'  
Bank-Full Depth= 3.50' Flow Area= 9.6 sf, Capacity= 153.68 cfs

42.0" Round Pipe  
n= 0.013 Concrete pipe, bends & connections  
Length= 12.0' Slope= 0.0233 '/'  
Inlet Invert= 413.00', Outlet Invert= 412.72'



## Reach A1: Pipe A1

### Hydrograph



# Springhill Retail

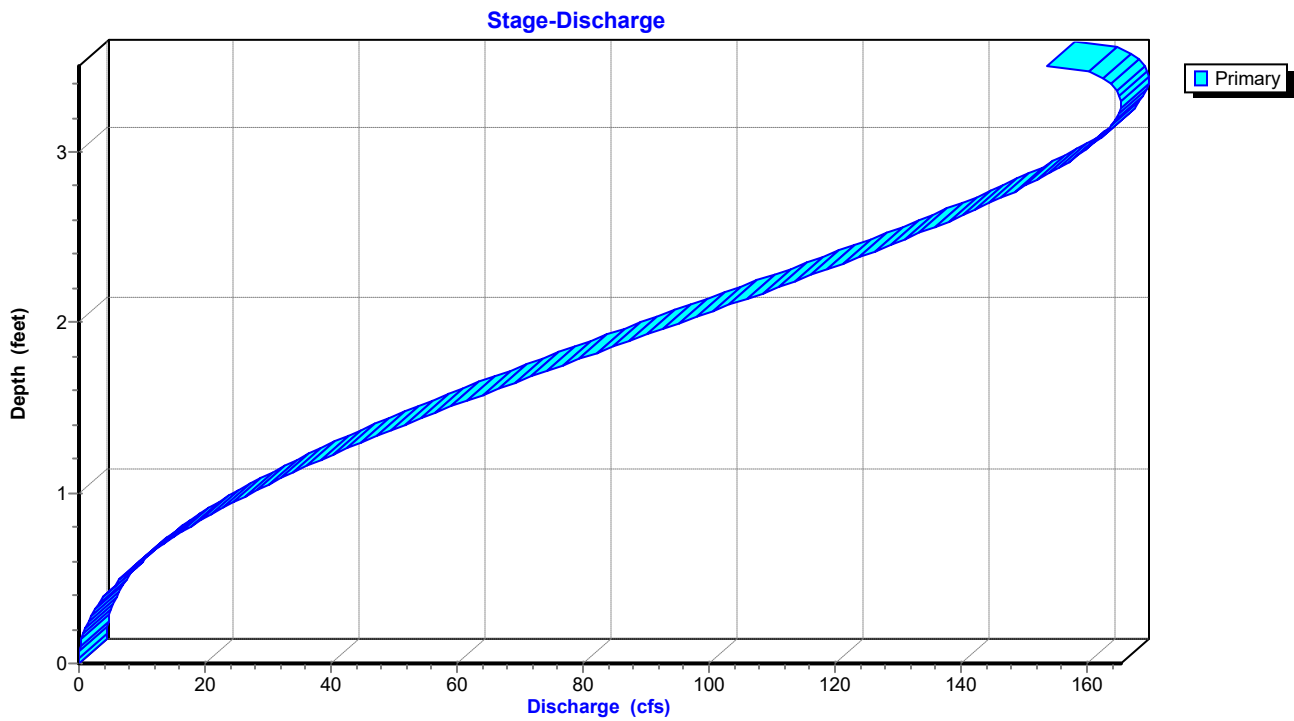
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## Reach A1: Pipe A1



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**Stage-Area-Storage for Reach A1: Pipe A1**

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
413.00	0.0	0	415.60	7.7	92
413.05	0.0	0	415.65	7.8	94
413.10	0.1	1	415.70	8.0	96
413.15	0.1	2	415.75	8.1	97
413.20	0.2	3	415.80	8.3	99
413.25	0.3	4	415.85	8.4	101
413.30	0.4	5	415.90	8.5	102
413.35	0.5	6	415.95	8.7	104
413.40	0.6	7	416.00	8.8	105
413.45	0.7	9	416.05	8.9	107
413.50	0.8	10	416.10	9.0	108
413.55	1.0	12	416.15	9.1	109
413.60	1.1	13	416.20	9.2	111
413.65	1.2	15	416.25	9.3	112
413.70	1.4	16	416.30	9.4	113
413.75	1.5	18	416.35	9.5	114
413.80	1.7	20	416.40	9.5	115
413.85	1.8	22	416.45	9.6	115
413.90	2.0	23	416.50	<b>9.6</b>	<b>115</b>
413.95	2.1	25			
414.00	2.3	27			
414.05	2.4	29			
414.10	2.6	31			
414.15	2.8	33			
414.20	2.9	35			
414.25	3.1	37			
414.30	3.3	39			
414.35	3.4	41			
414.40	3.6	43			
414.45	3.8	45			
414.50	3.9	47			
414.55	4.1	49			
414.60	4.3	51			
414.65	4.5	54			
414.70	4.6	56			
414.75	4.8	58			
414.80	5.0	60			
414.85	5.2	62			
414.90	5.3	64			
414.95	5.5	66			
415.00	5.7	68			
415.05	5.9	70			
415.10	6.0	72			
415.15	6.2	74			
415.20	6.4	76			
415.25	6.5	78			
415.30	6.7	80			
415.35	6.9	82			
415.40	7.0	84			
415.45	7.2	86			
415.50	7.4	88			
415.55	7.5	90			

# Springhill Retail

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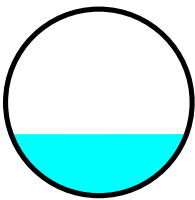
## Summary for Reach A2: Pipe A2

Inflow Area = 1,206,798 sf, 3.17% Impervious, Inflow Depth = 0.38" for 10-yr event  
Inflow = 42.56 cfs @ 0.25 hrs, Volume= 38,371 cf  
Outflow = 41.88 cfs @ 0.26 hrs, Volume= 38,371 cf, Atten= 2%, Lag= 0.4 min  
Routed to Reach A3 : Pipe A2

Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
Max. Velocity= 15.22 fps, Min. Travel Time= 0.2 min  
Avg. Velocity = 8.62 fps, Avg. Travel Time= 0.4 min

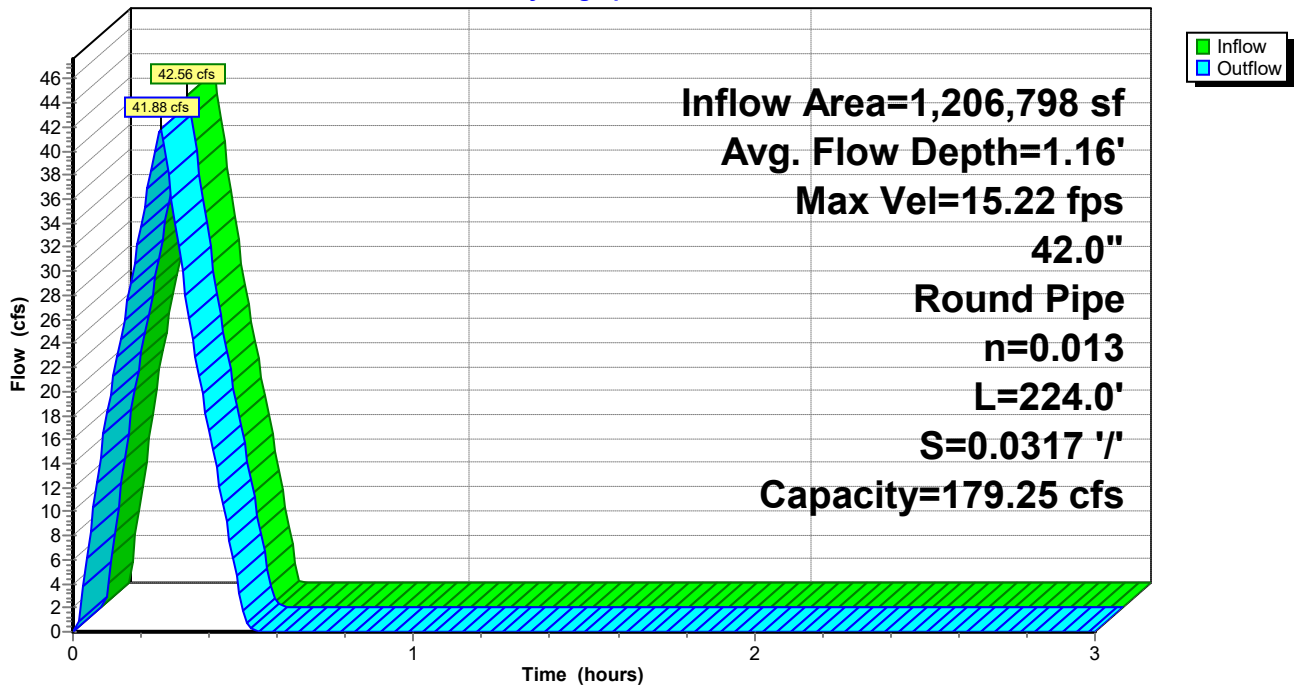
Peak Storage= 620 cf @ 0.25 hrs  
Average Depth at Peak Storage= 1.16' , Surface Width= 3.29'  
Bank-Full Depth= 3.50' Flow Area= 9.6 sf, Capacity= 179.25 cfs

42.0" Round Pipe  
n= 0.013 Concrete pipe, bends & connections  
Length= 224.0' Slope= 0.0317 '/'  
Inlet Invert= 412.52', Outlet Invert= 405.41'



## Reach A2: Pipe A2

### Hydrograph



# Springhill Retail

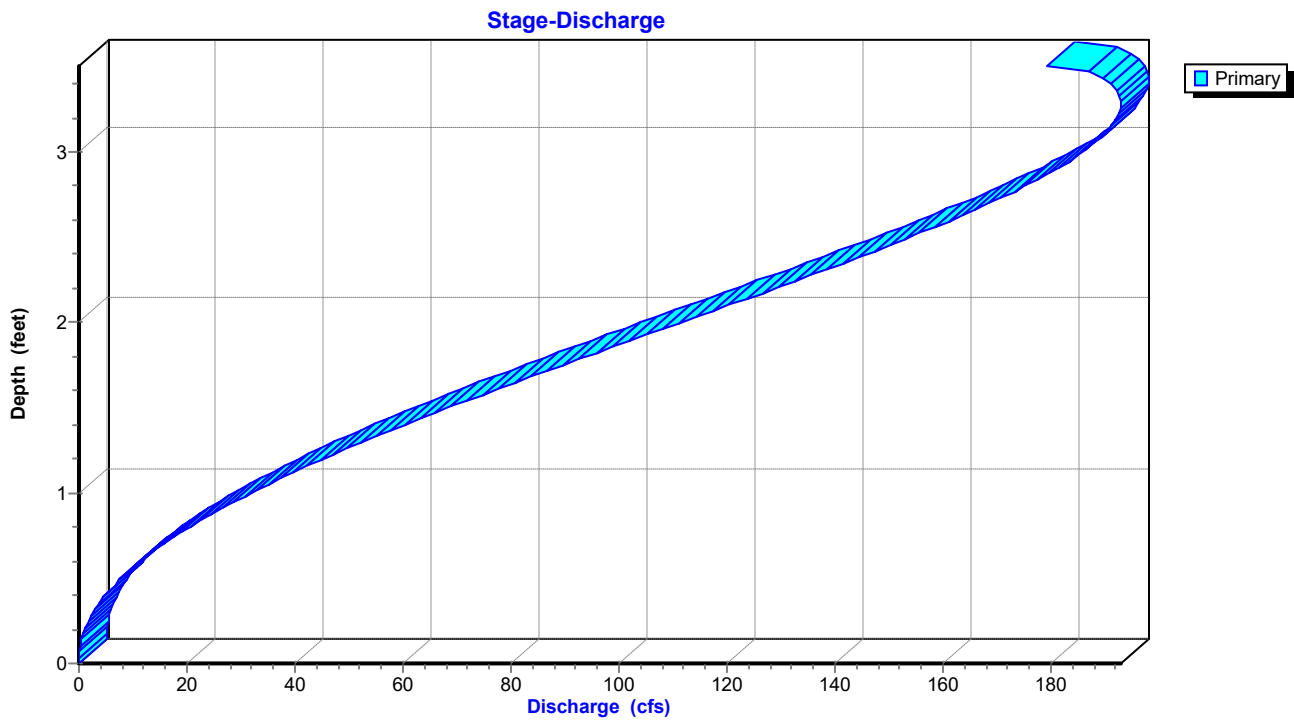
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## Reach A2: Pipe A2





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**Stage-Area-Storage for Reach A2: Pipe A2**

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
412.52	0.0	0	415.12	7.7	1,717
412.57	0.0	6	415.17	7.8	1,751
412.62	0.1	18	415.22	8.0	1,784
412.67	0.1	32	415.27	8.1	1,816
412.72	0.2	49	415.32	8.3	1,848
412.77	0.3	68	415.37	8.4	1,879
412.82	0.4	90	415.42	8.5	1,909
412.87	0.5	112	415.47	8.7	1,938
412.92	0.6	136	415.52	8.8	1,966
412.97	0.7	162	415.57	8.9	1,993
413.02	0.8	189	415.62	9.0	2,019
413.07	1.0	217	415.67	9.1	2,043
413.12	1.1	246	415.72	9.2	2,066
413.17	1.2	276	415.77	9.3	2,087
413.22	1.4	307	415.82	9.4	2,106
413.27	1.5	339	415.87	9.5	2,123
413.32	1.7	371	415.92	9.5	2,138
413.37	1.8	404	415.97	9.6	2,149
413.42	2.0	438	416.02	<b>9.6</b>	<b>2,155</b>
413.47	2.1	473			
413.52	2.3	508			
413.57	2.4	544			
413.62	2.6	580			
413.67	2.8	617			
413.72	2.9	654			
413.77	3.1	691			
413.82	3.3	729			
413.87	3.4	767			
413.92	3.6	805			
413.97	3.8	844			
414.02	3.9	882			
414.07	4.1	921			
414.12	4.3	960			
414.17	4.5	999			
414.22	4.6	1,038			
414.27	4.8	1,078			
414.32	5.0	1,117			
414.37	5.2	1,156			
414.42	5.3	1,195			
414.47	5.5	1,234			
414.52	5.7	1,273			
414.57	5.9	1,312			
414.62	6.0	1,350			
414.67	6.2	1,388			
414.72	6.4	1,426			
414.77	6.5	1,464			
414.82	6.7	1,502			
414.87	6.9	1,539			
414.92	7.0	1,575			
414.97	7.2	1,611			
415.02	7.4	1,647			
415.07	7.5	1,682			

# Springhill Retail

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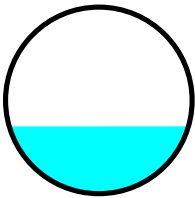
## Summary for Reach A3: Pipe A2

Inflow Area = 1,325,513 sf, 6.94% Impervious, Inflow Depth = 0.42" for 10-yr event  
Inflow = 50.84 cfs @ 0.25 hrs, Volume= 46,612 cf  
Outflow = 50.76 cfs @ 0.26 hrs, Volume= 46,612 cf, Atten= 0%, Lag= 0.1 min  
Routed to Pond Pond : Regional Detention Basin

Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
Max. Velocity= 16.20 fps, Min. Travel Time= 0.1 min  
Avg. Velocity = 9.11 fps, Avg. Travel Time= 0.1 min

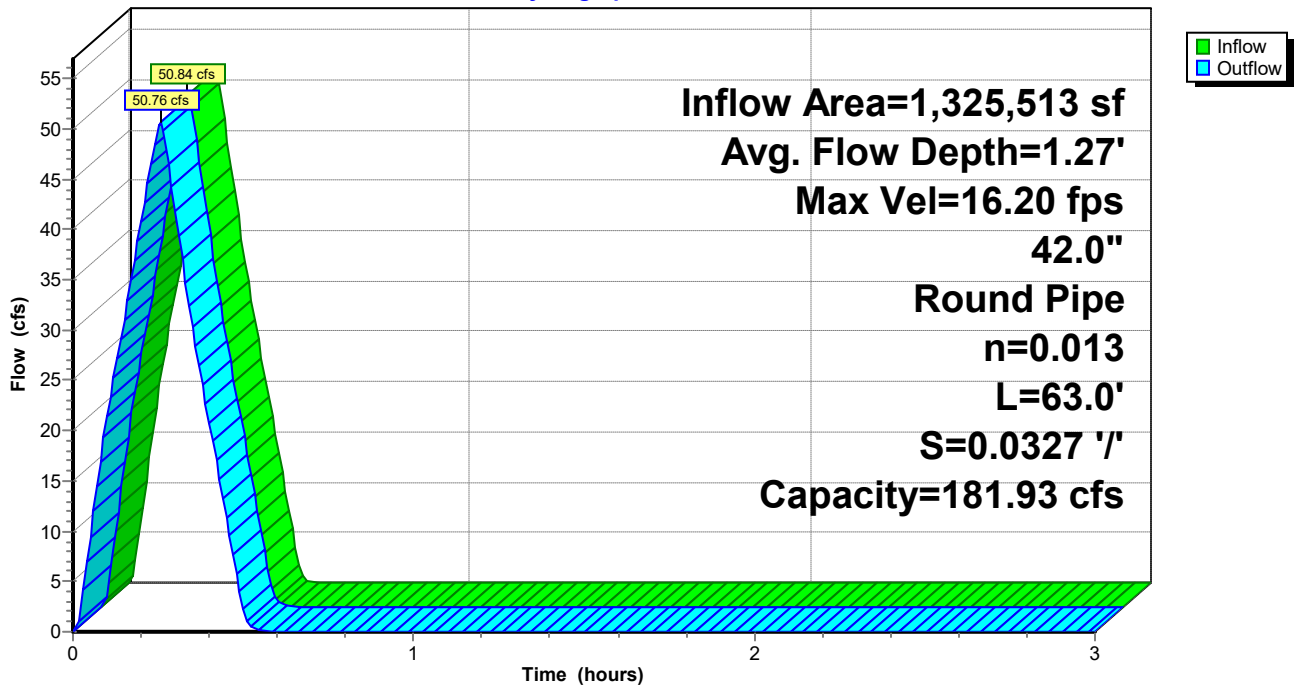
Peak Storage= 198 cf @ 0.26 hrs  
Average Depth at Peak Storage= 1.27' , Surface Width= 3.36'  
Bank-Full Depth= 3.50' Flow Area= 9.6 sf, Capacity= 181.93 cfs

42.0" Round Pipe  
n= 0.013 Concrete pipe, bends & connections  
Length= 63.0' Slope= 0.0327 '/'  
Inlet Invert= 405.31', Outlet Invert= 403.25'



## Reach A3: Pipe A2

### Hydrograph



**Springhill Retail**

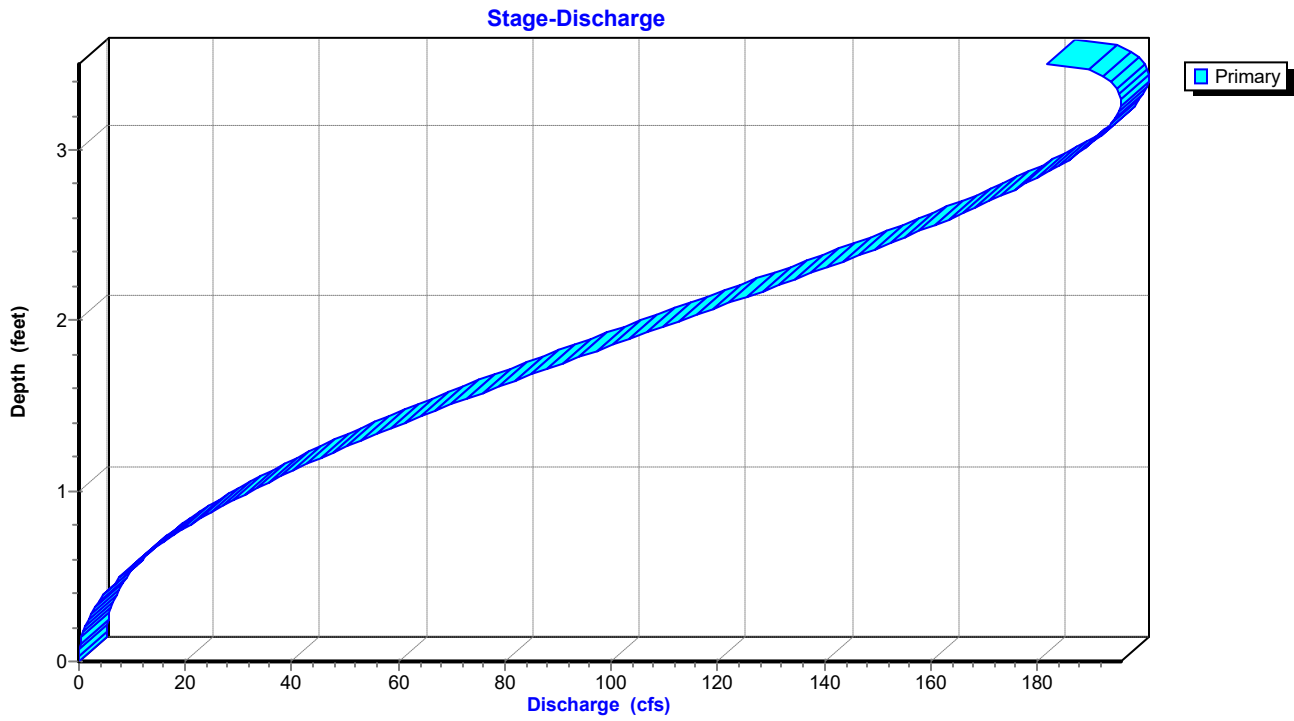
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**Reach A3: Pipe A2**



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**Stage-Area-Storage for Reach A3: Pipe A2**

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
405.31	0.0	0	407.91	7.7	483
405.36	0.0	2	407.96	7.8	492
405.41	0.1	5	408.01	8.0	502
405.46	0.1	9	408.06	8.1	511
405.51	0.2	14	408.11	8.3	520
405.56	0.3	19	408.16	8.4	529
405.61	0.4	25	408.21	8.5	537
405.66	0.5	32	408.26	8.7	545
405.71	0.6	38	408.31	8.8	553
405.76	0.7	46	408.36	8.9	561
405.81	0.8	53	408.41	9.0	568
405.86	1.0	61	408.46	9.1	575
405.91	1.1	69	408.51	9.2	581
405.96	1.2	78	408.56	9.3	587
406.01	1.4	86	408.61	9.4	592
406.06	1.5	95	408.66	9.5	597
406.11	1.7	104	408.71	9.5	601
406.16	1.8	114	408.76	9.6	604
406.21	2.0	123	408.81	<b>9.6</b>	<b>606</b>
406.26	2.1	133			
406.31	2.3	143			
406.36	2.4	153			
406.41	2.6	163			
406.46	2.8	173			
406.51	2.9	184			
406.56	3.1	194			
406.61	3.3	205			
406.66	3.4	216			
406.71	3.6	226			
406.76	3.8	237			
406.81	3.9	248			
406.86	4.1	259			
406.91	4.3	270			
406.96	4.5	281			
407.01	4.6	292			
407.06	4.8	303			
407.11	5.0	314			
407.16	5.2	325			
407.21	5.3	336			
407.26	5.5	347			
407.31	5.7	358			
407.36	5.9	369			
407.41	6.0	380			
407.46	6.2	390			
407.51	6.4	401			
407.56	6.5	412			
407.61	6.7	422			
407.66	6.9	433			
407.71	7.0	443			
407.76	7.2	453			
407.81	7.4	463			
407.86	7.5	473			

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## Summary for Pond Pond: Regional Detention Basin

Inflow Area = 1,372,542 sf, 6.70% Impervious, Inflow Depth = 0.44" for 10-yr event  
Inflow = 54.42 cfs @ 0.25 hrs, Volume= 50,156 cf  
Outflow = 44.67 cfs @ 0.30 hrs, Volume= 50,169 cf, Atten= 18%, Lag= 2.5 min  
Primary = 44.67 cfs @ 0.30 hrs, Volume= 50,169 cf

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
Peak Elev= 404.98' @ 0.30 hrs Storage= 6,943 cf

Plug-Flow detention time= 1.8 min calculated for 50,002 cf (100% of inflow)  
Center-of-Mass det. time= 1.8 min ( 16.6 - 14.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	401.00'	12,812 cf	<b>Custom Stage Data</b> Listed below

Elevation (feet)	Cum.Store (cubic-feet)
401.00	0
402.00	103
403.00	803
404.00	2,704
405.00	7,038
406.00	12,812

Device	Routing	Invert	Outlet Devices
#1	Primary	400.10'	<b>24.0" Round RCP_Round 24"</b> L= 100.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 400.10' / 397.97' S= 0.0213 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Primary	403.02'	<b>24.0" Round RCP_Round 24"</b> L= 35.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 403.02' / 401.73' S= 0.0369 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#3	Primary	405.69'	<b>2.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)

**Primary OutFlow** Max=44.65 cfs @ 0.30 hrs HW=404.98' (Free Discharge)

1=RCP\_Round 24" (Inlet Controls 29.78 cfs @ 9.48 fps)  
2=RCP\_Round 24" (Inlet Controls 14.87 cfs @ 4.76 fps)  
3=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)

# Springhill Retail

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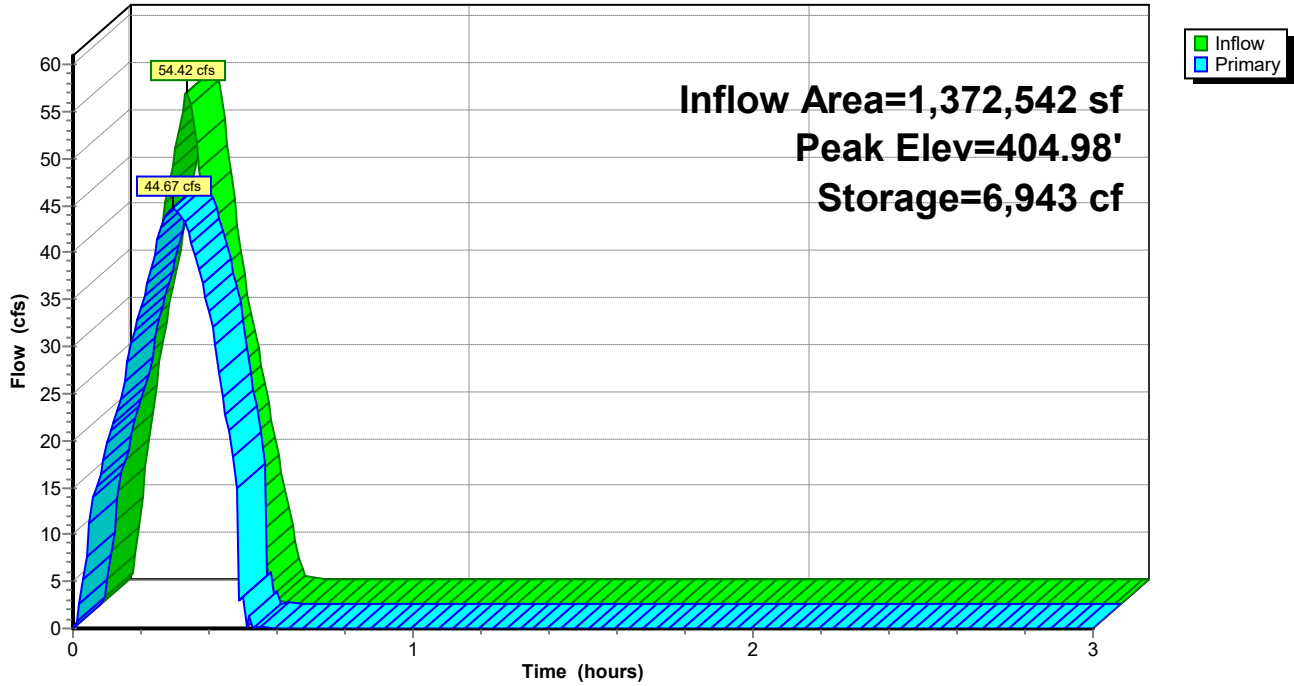
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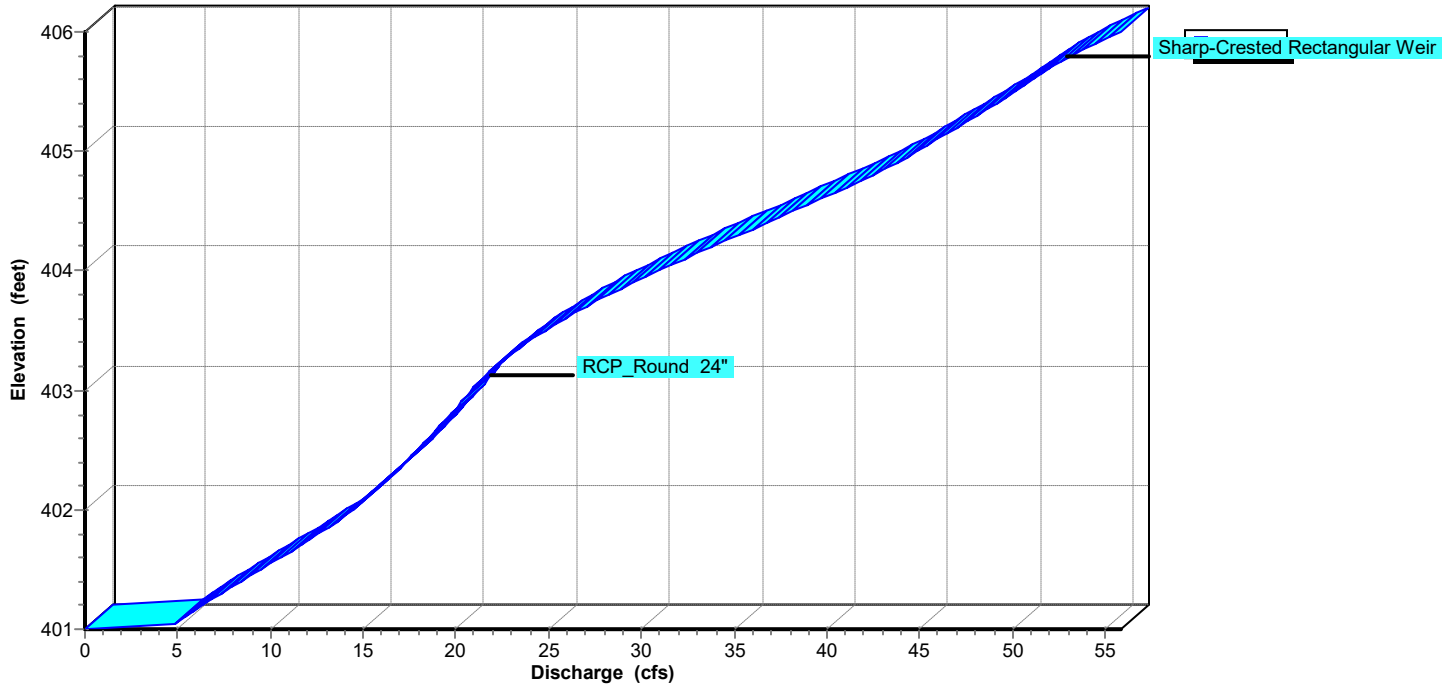
## Pond Pond: Regional Detention Basin

Hydrograph



## Pond Pond: Regional Detention Basin

Stage-Discharge



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**Stage-Area-Storage for Pond Pond: Regional Detention Basin**

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
401.00	0	403.60	1,944
401.05	5	403.65	2,039
401.10	10	403.70	2,134
401.15	15	403.75	2,229
401.20	21	403.80	2,324
401.25	26	403.85	2,419
401.30	31	403.90	2,514
401.35	36	403.95	2,609
401.40	41	404.00	2,704
401.45	46	404.05	2,921
401.50	52	404.10	3,137
401.55	57	404.15	3,354
401.60	62	404.20	3,571
401.65	67	404.25	3,788
401.70	72	404.30	4,004
401.75	77	404.35	4,221
401.80	82	404.40	4,438
401.85	88	404.45	4,654
401.90	93	404.50	4,871
401.95	98	404.55	5,088
402.00	103	404.60	5,304
402.05	138	404.65	5,521
402.10	173	404.70	5,738
402.15	208	404.75	5,955
402.20	243	404.80	6,171
402.25	278	404.85	6,388
402.30	313	404.90	6,605
402.35	348	404.95	6,821
402.40	383	405.00	7,038
402.45	418	405.05	7,327
402.50	453	405.10	7,615
402.55	488	405.15	7,904
402.60	523	405.20	8,193
402.65	558	405.25	8,482
402.70	593	405.30	8,770
402.75	628	405.35	9,059
402.80	663	405.40	9,348
402.85	698	405.45	9,636
402.90	733	405.50	9,925
402.95	768	405.55	10,214
403.00	803	405.60	10,502
403.05	898	405.65	10,791
403.10	993	405.70	11,080
403.15	1,088	405.75	11,369
403.20	1,183	405.80	11,657
403.25	1,278	405.85	11,946
403.30	1,373	405.90	12,235
403.35	1,468	405.95	12,523
403.40	1,563	406.00	<b>12,812</b>
403.45	1,658		
403.50	1,754		
403.55	1,849		

# Springhill Retail

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AR - Little Rock 25-yr Duration=15 min, Inten=5.44 in/hr

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## Summary for Subcatchment ARDOT: ARDOT Offsite

Runoff = 44.14 cfs @ 0.25 hrs, Volume= 39,730 cf, Depth= 0.41"

Routed to Reach A1 : Pipe A1

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

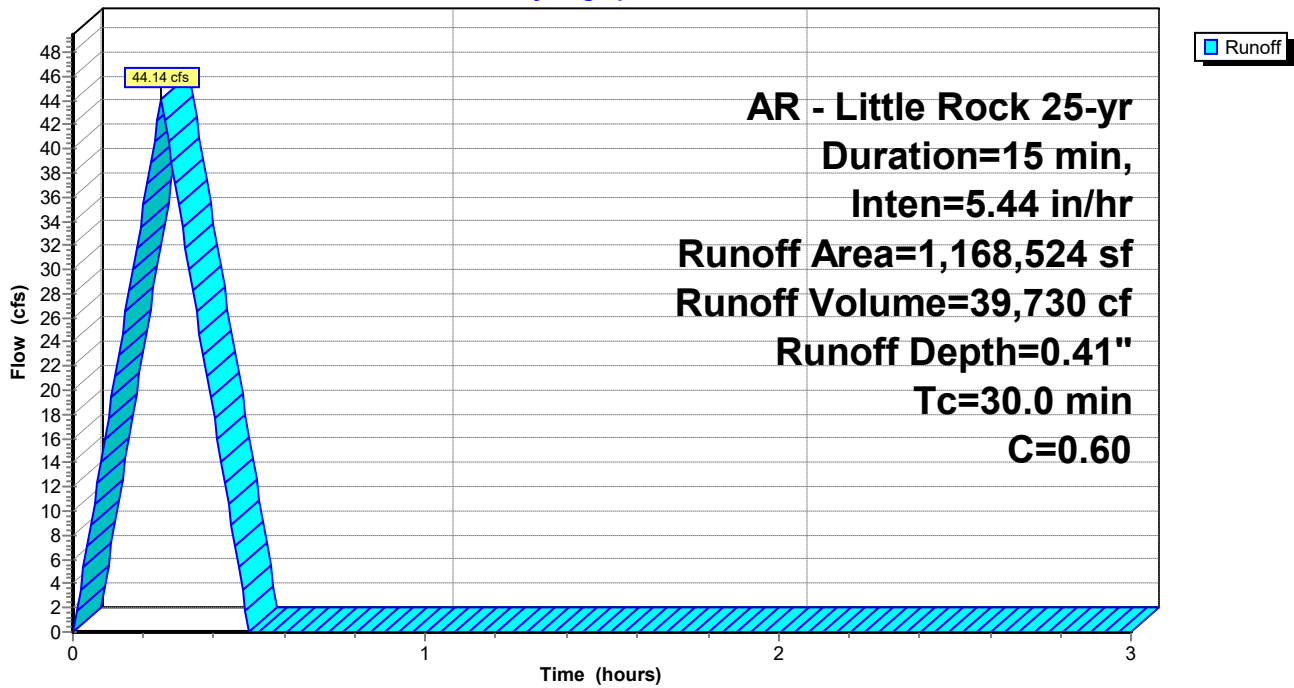
AR - Little Rock 25-yr Duration=15 min, Inten=5.44 in/hr

Area (sf)	C	Description
1,168,524	0.60	
1,168,524		100.00% Pervious Area

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

## Subcatchment ARDOT: ARDOT Offsite

Hydrograph





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## Summary for Subcatchment M&F: Merchants and Farmers

Runoff = 4.58 cfs @ 0.09 hrs, Volume= 4,121 cf, Depth= 1.29"

Routed to Reach A2 : Pipe A2

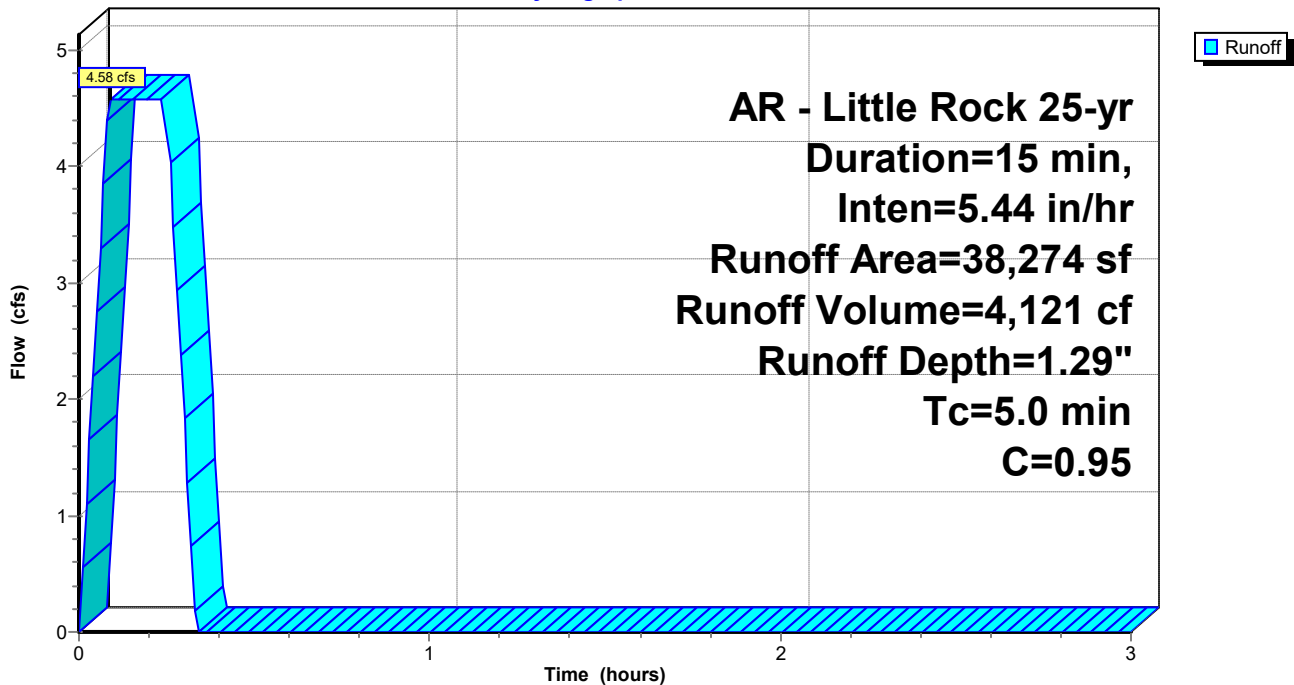
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
AR - Little Rock 25-yr Duration=15 min, Inten=5.44 in/hr

Area (sf)	C	Description
38,274	0.95	Developed Site
38,274		100.00% Impervious Area

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

## Subcatchment M&F: Merchants and Farmers

Hydrograph



# Springhill Retail

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## Summary for Subcatchment SR: Springhill Retail Post

Runoff = 4.50 cfs @ 0.09 hrs, Volume= 4,051 cf, Depth= 1.03"

Routed to Pond Pond : Regional Detention Basin

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

AR - Little Rock 25-yr Duration=15 min, Inten=5.44 in/hr

Area (sf)	C	Description
1,511	0.86	Existing Drive
33,632	0.92	Drives, Roof, Sidewalks
11,886	0.30	Landscaped Areas
47,029	0.76	Weighted Average
47,029		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	82	0.0290	1.76		<b>Sheet Flow, Asphalt Sheet Flow</b> Smooth surfaces n= 0.011 P2= 4.19"
0.8	87	0.0080	1.82		<b>Shallow Concentrated Flow, Gutter</b> Paved Kv= 20.3 fps
0.1	19	0.0210	2.94		<b>Shallow Concentrated Flow, Concentrated Pavement Flow</b> Paved Kv= 20.3 fps
1.0	197	0.0250	3.21		<b>Shallow Concentrated Flow, Gutter</b> Paved Kv= 20.3 fps
0.3	37	0.0130	2.31		<b>Shallow Concentrated Flow, Gutter</b> Paved Kv= 20.3 fps
2.0					<b>Direct Entry, Minimum adjustment</b>
5.0	422	Total			

**Springhill Retail**

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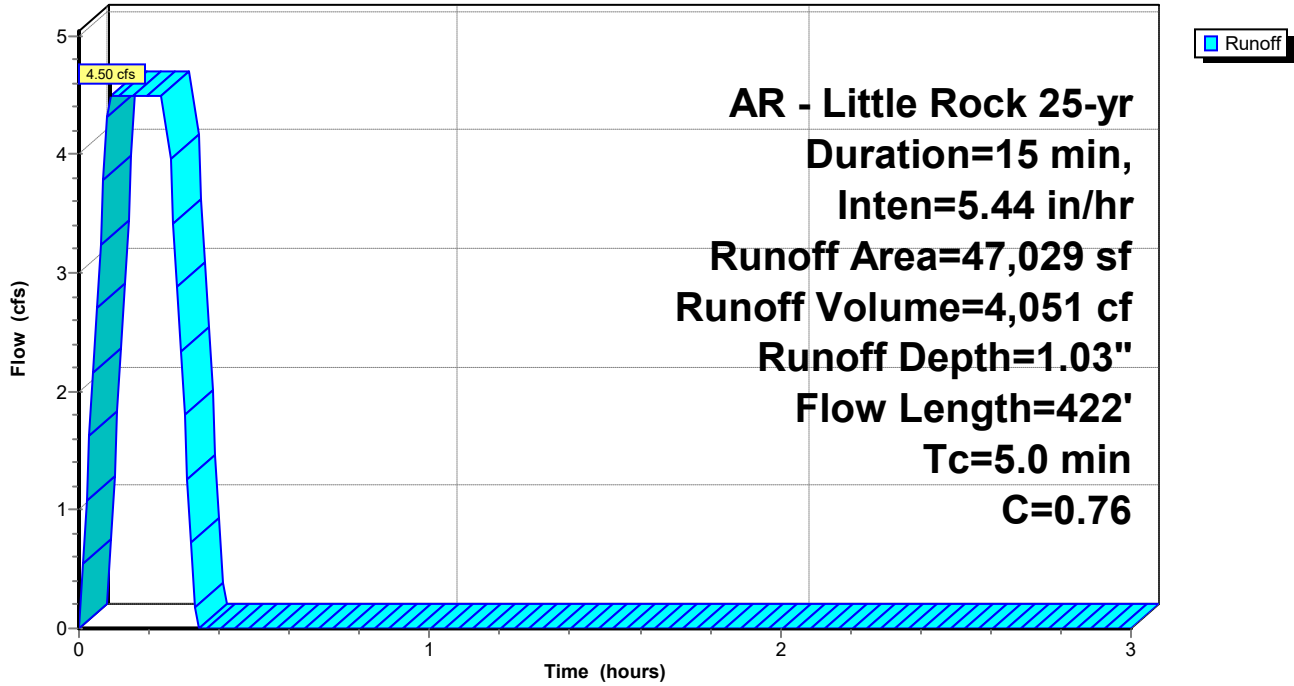
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AR - Little Rock 25-yr Duration=15 min, Inten=5.44 in/hr

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**Subcatchment SR: Springhill Retail Post**

Hydrograph



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## Summary for Subcatchment WestProp: West Adjacent Property Drainage Basin

Runoff = 10.46 cfs @ 0.25 hrs, Volume= 9,418 cf, Depth= 0.95"

Routed to Reach A3 : Pipe A2

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

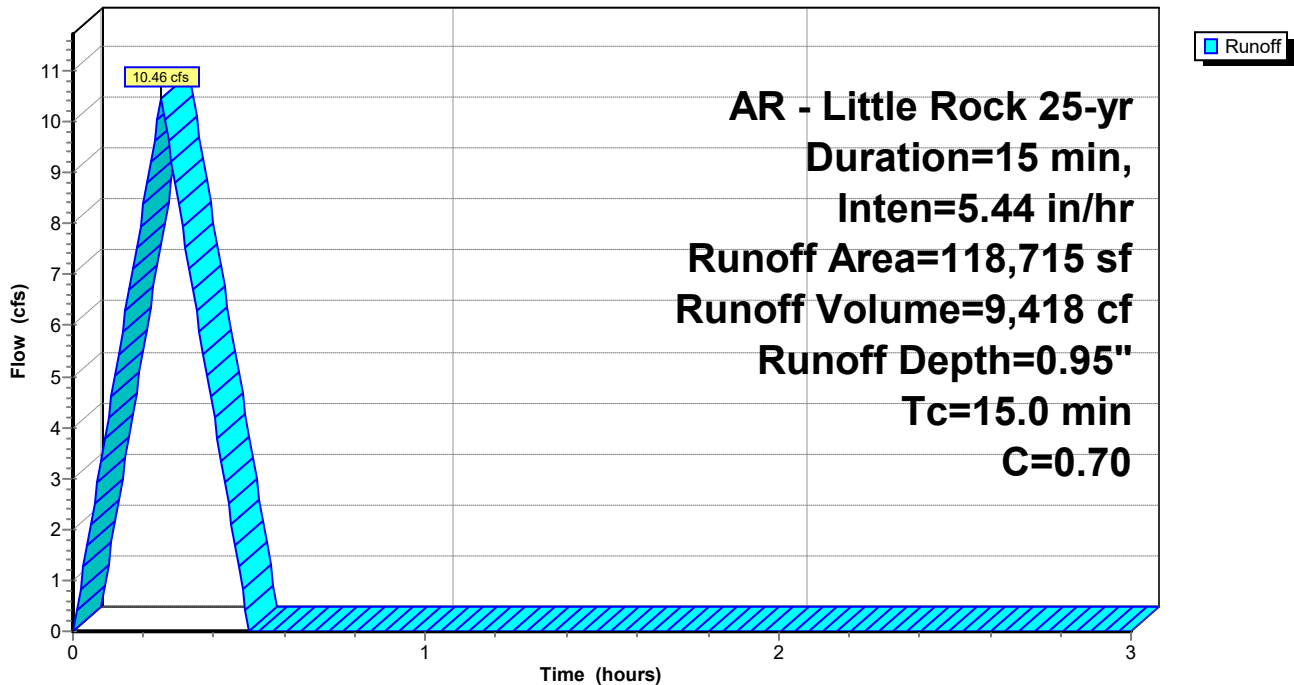
AR - Little Rock 25-yr Duration=15 min, Inten=5.44 in/hr

Area (sf)	C	Description
65,063	0.50	Pervious Areas
53,652	0.95	Rooftop/Paving
118,715	0.70	Weighted Average
65,063		54.81% Pervious Area
53,652		45.19% Impervious Area

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

## Subcatchment WestProp: West Adjacent Property Drainage Basin

Hydrograph



# Springhill Retail

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AR - Little Rock 25-yr Duration=15 min, Inten=5.44 in/hr

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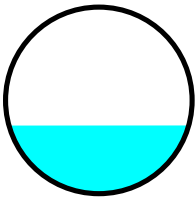
## Summary for Reach A1: Pipe A1

Inflow Area = 1,168,524 sf, 0.00% Impervious, Inflow Depth = 0.41" for 25-yr event  
Inflow = 44.14 cfs @ 0.25 hrs, Volume= 39,730 cf  
Outflow = 44.06 cfs @ 0.25 hrs, Volume= 39,731 cf, Atten= 0%, Lag= 0.0 min  
Routed to Reach A2 : Pipe A2

Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
Max. Velocity= 13.79 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 10.71 fps, Avg. Travel Time= 0.0 min

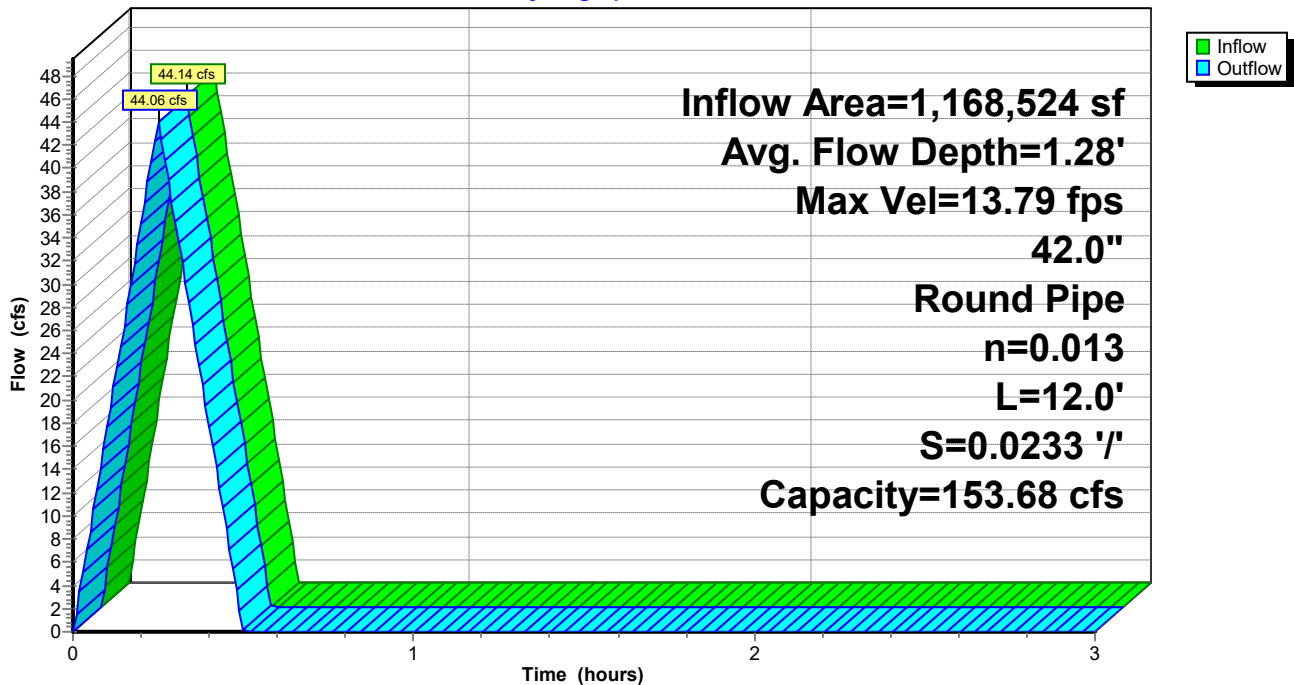
Peak Storage= 38 cf @ 0.25 hrs  
Average Depth at Peak Storage= 1.28' , Surface Width= 3.37'  
Bank-Full Depth= 3.50' Flow Area= 9.6 sf, Capacity= 153.68 cfs

42.0" Round Pipe  
n= 0.013 Concrete pipe, bends & connections  
Length= 12.0' Slope= 0.0233 '/'  
Inlet Invert= 413.00', Outlet Invert= 412.72'



## Reach A1: Pipe A1

### Hydrograph



**Springhill Retail**

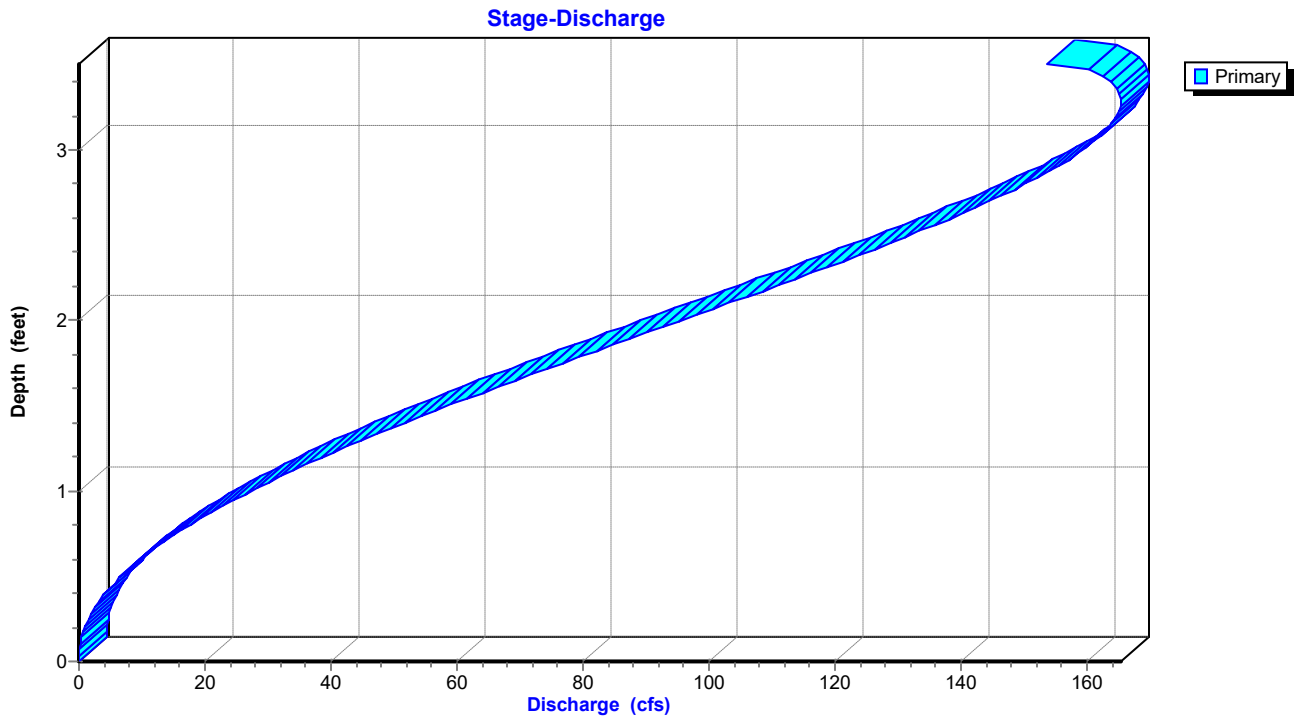
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AR - Little Rock 25-yr Duration=15 min, Inten=5.44 in/hr

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**Reach A1: Pipe A1**



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**Stage-Area-Storage for Reach A1: Pipe A1**

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
413.00	0.0	0	415.60	7.7	92
413.05	0.0	0	415.65	7.8	94
413.10	0.1	1	415.70	8.0	96
413.15	0.1	2	415.75	8.1	97
413.20	0.2	3	415.80	8.3	99
413.25	0.3	4	415.85	8.4	101
413.30	0.4	5	415.90	8.5	102
413.35	0.5	6	415.95	8.7	104
413.40	0.6	7	416.00	8.8	105
413.45	0.7	9	416.05	8.9	107
413.50	0.8	10	416.10	9.0	108
413.55	1.0	12	416.15	9.1	109
413.60	1.1	13	416.20	9.2	111
413.65	1.2	15	416.25	9.3	112
413.70	1.4	16	416.30	9.4	113
413.75	1.5	18	416.35	9.5	114
413.80	1.7	20	416.40	9.5	115
413.85	1.8	22	416.45	9.6	115
413.90	2.0	23	416.50	<b>9.6</b>	<b>115</b>
413.95	2.1	25			
414.00	2.3	27			
414.05	2.4	29			
414.10	2.6	31			
414.15	2.8	33			
414.20	2.9	35			
414.25	3.1	37			
414.30	3.3	39			
414.35	3.4	41			
414.40	3.6	43			
414.45	3.8	45			
414.50	3.9	47			
414.55	4.1	49			
414.60	4.3	51			
414.65	4.5	54			
414.70	4.6	56			
414.75	4.8	58			
414.80	5.0	60			
414.85	5.2	62			
414.90	5.3	64			
414.95	5.5	66			
415.00	5.7	68			
415.05	5.9	70			
415.10	6.0	72			
415.15	6.2	74			
415.20	6.4	76			
415.25	6.5	78			
415.30	6.7	80			
415.35	6.9	82			
415.40	7.0	84			
415.45	7.2	86			
415.50	7.4	88			
415.55	7.5	90			

# Springhill Retail

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AR - Little Rock 25-yr Duration=15 min, Inten=5.44 in/hr

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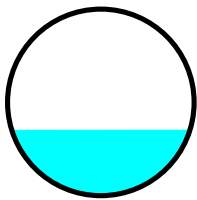
## Summary for Reach A2: Pipe A2

Inflow Area = 1,206,798 sf, 3.17% Impervious, Inflow Depth = 0.44" for 25-yr event  
Inflow = 48.64 cfs @ 0.25 hrs, Volume= 43,852 cf  
Outflow = 47.87 cfs @ 0.26 hrs, Volume= 43,852 cf, Atten= 2%, Lag= 0.4 min  
Routed to Reach A3 : Pipe A2

Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
Max. Velocity= 15.80 fps, Min. Travel Time= 0.2 min  
Avg. Velocity = 8.94 fps, Avg. Travel Time= 0.4 min

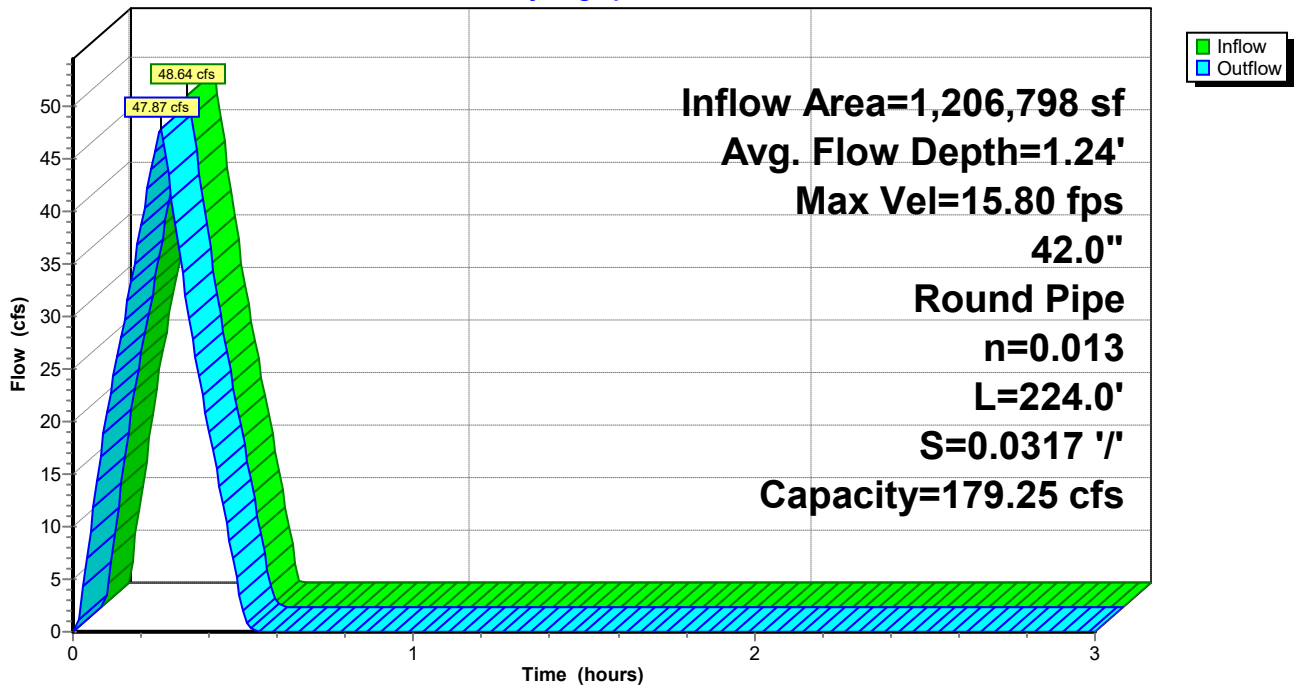
Peak Storage= 683 cf @ 0.25 hrs  
Average Depth at Peak Storage= 1.24' , Surface Width= 3.35'  
Bank-Full Depth= 3.50' Flow Area= 9.6 sf, Capacity= 179.25 cfs

42.0" Round Pipe  
n= 0.013 Concrete pipe, bends & connections  
Length= 224.0' Slope= 0.0317 '/'  
Inlet Invert= 412.52', Outlet Invert= 405.41'



## Reach A2: Pipe A2

### Hydrograph





# Springhill Retail

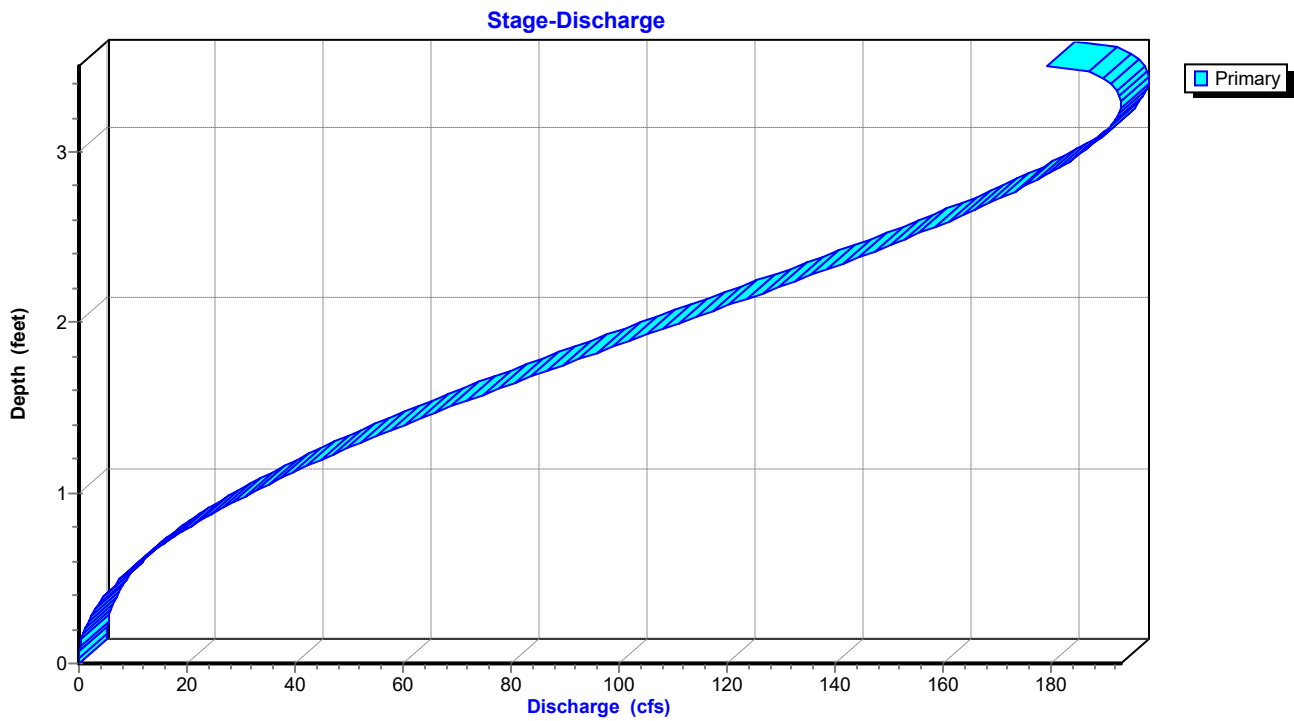
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AR - Little Rock 25-yr Duration=15 min, Inten=5.44 in/hr

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## Reach A2: Pipe A2



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**Stage-Area-Storage for Reach A2: Pipe A2**

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
412.52	0.0	0	415.12	7.7	1,717
412.57	0.0	6	415.17	7.8	1,751
412.62	0.1	18	415.22	8.0	1,784
412.67	0.1	32	415.27	8.1	1,816
412.72	0.2	49	415.32	8.3	1,848
412.77	0.3	68	415.37	8.4	1,879
412.82	0.4	90	415.42	8.5	1,909
412.87	0.5	112	415.47	8.7	1,938
412.92	0.6	136	415.52	8.8	1,966
412.97	0.7	162	415.57	8.9	1,993
413.02	0.8	189	415.62	9.0	2,019
413.07	1.0	217	415.67	9.1	2,043
413.12	1.1	246	415.72	9.2	2,066
413.17	1.2	276	415.77	9.3	2,087
413.22	1.4	307	415.82	9.4	2,106
413.27	1.5	339	415.87	9.5	2,123
413.32	1.7	371	415.92	9.5	2,138
413.37	1.8	404	415.97	9.6	2,149
413.42	2.0	438	416.02	<b>9.6</b>	<b>2,155</b>
413.47	2.1	473			
413.52	2.3	508			
413.57	2.4	544			
413.62	2.6	580			
413.67	2.8	617			
413.72	2.9	654			
413.77	3.1	691			
413.82	3.3	729			
413.87	3.4	767			
413.92	3.6	805			
413.97	3.8	844			
414.02	3.9	882			
414.07	4.1	921			
414.12	4.3	960			
414.17	4.5	999			
414.22	4.6	1,038			
414.27	4.8	1,078			
414.32	5.0	1,117			
414.37	5.2	1,156			
414.42	5.3	1,195			
414.47	5.5	1,234			
414.52	5.7	1,273			
414.57	5.9	1,312			
414.62	6.0	1,350			
414.67	6.2	1,388			
414.72	6.4	1,426			
414.77	6.5	1,464			
414.82	6.7	1,502			
414.87	6.9	1,539			
414.92	7.0	1,575			
414.97	7.2	1,611			
415.02	7.4	1,647			
415.07	7.5	1,682			

# Springhill Retail

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AR - Little Rock 25-yr Duration=15 min, Inten=5.44 in/hr

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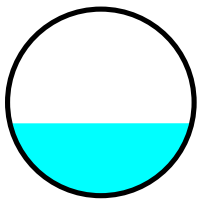
## Summary for Reach A3: Pipe A2

Inflow Area = 1,325,513 sf, 6.94% Impervious, Inflow Depth = 0.48" for 25-yr event  
Inflow = 58.14 cfs @ 0.25 hrs, Volume= 53,270 cf  
Outflow = 58.03 cfs @ 0.26 hrs, Volume= 53,270 cf, Atten= 0%, Lag= 0.1 min  
Routed to Pond Pond : Regional Detention Basin

Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
Max. Velocity= 16.80 fps, Min. Travel Time= 0.1 min  
Avg. Velocity = 9.35 fps, Avg. Travel Time= 0.1 min

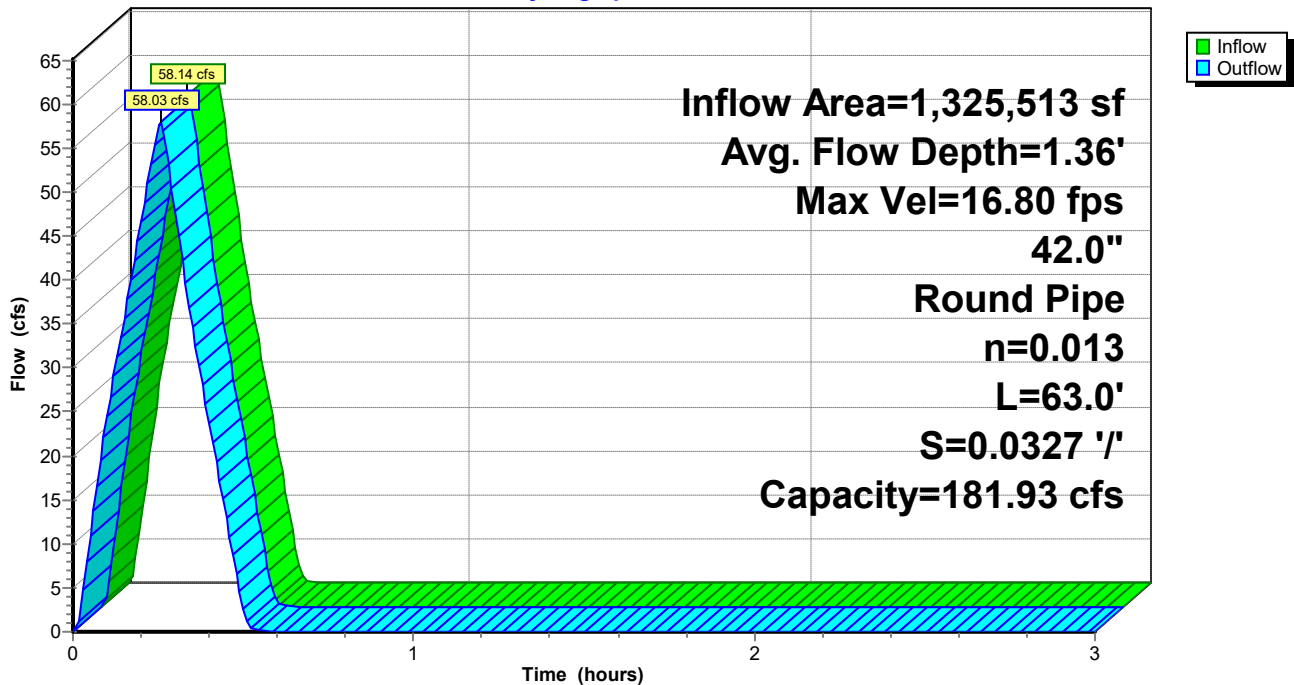
Peak Storage= 218 cf @ 0.26 hrs  
Average Depth at Peak Storage= 1.36' , Surface Width= 3.41'  
Bank-Full Depth= 3.50' Flow Area= 9.6 sf, Capacity= 181.93 cfs

42.0" Round Pipe  
n= 0.013 Concrete pipe, bends & connections  
Length= 63.0' Slope= 0.0327 '/'  
Inlet Invert= 405.31', Outlet Invert= 403.25'



## Reach A3: Pipe A2

### Hydrograph



**Springhill Retail**

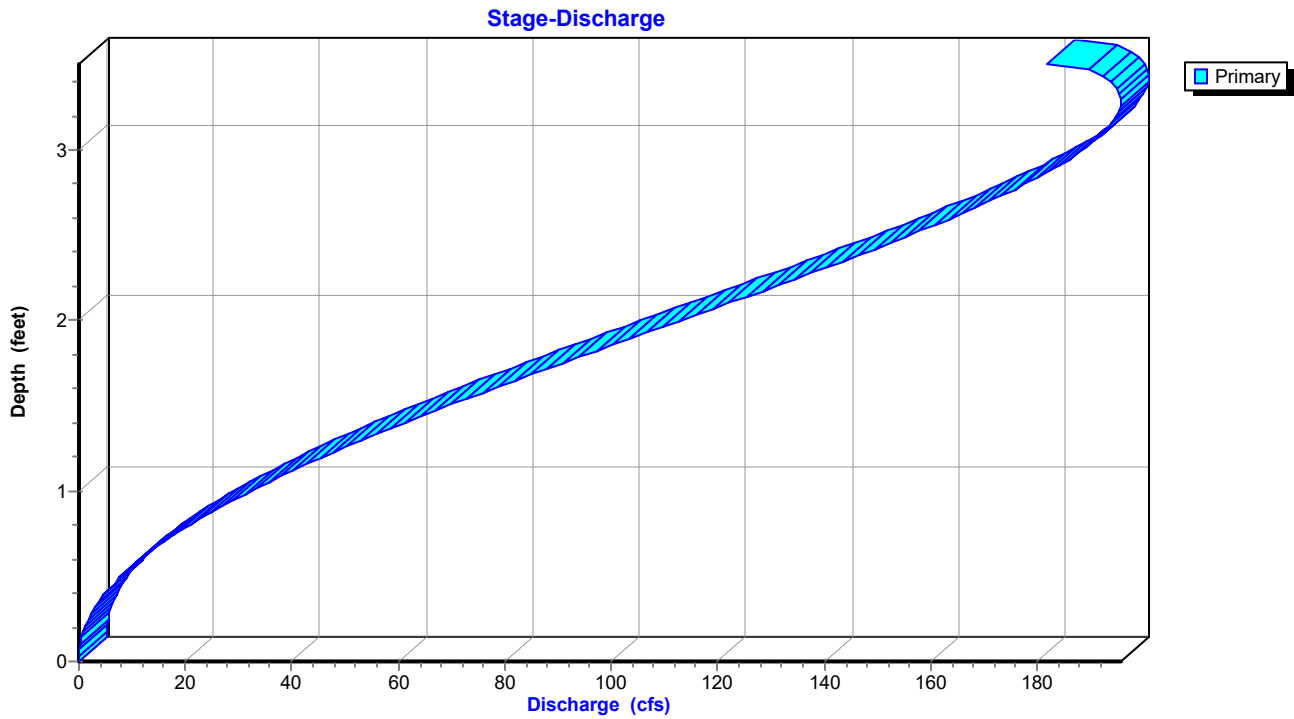
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**Reach A3: Pipe A2**



**Springhill Retail**

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**Stage-Area-Storage for Reach A3: Pipe A2**

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
405.31	0.0	0	407.91	7.7	483
405.36	0.0	2	407.96	7.8	492
405.41	0.1	5	408.01	8.0	502
405.46	0.1	9	408.06	8.1	511
405.51	0.2	14	408.11	8.3	520
405.56	0.3	19	408.16	8.4	529
405.61	0.4	25	408.21	8.5	537
405.66	0.5	32	408.26	8.7	545
405.71	0.6	38	408.31	8.8	553
405.76	0.7	46	408.36	8.9	561
405.81	0.8	53	408.41	9.0	568
405.86	1.0	61	408.46	9.1	575
405.91	1.1	69	408.51	9.2	581
405.96	1.2	78	408.56	9.3	587
406.01	1.4	86	408.61	9.4	592
406.06	1.5	95	408.66	9.5	597
406.11	1.7	104	408.71	9.5	601
406.16	1.8	114	408.76	9.6	604
406.21	2.0	123	408.81	<b>9.6</b>	<b>606</b>
406.26	2.1	133			
406.31	2.3	143			
406.36	2.4	153			
406.41	2.6	163			
406.46	2.8	173			
406.51	2.9	184			
406.56	3.1	194			
406.61	3.3	205			
406.66	3.4	216			
406.71	3.6	226			
406.76	3.8	237			
406.81	3.9	248			
406.86	4.1	259			
406.91	4.3	270			
406.96	4.5	281			
407.01	4.6	292			
407.06	4.8	303			
407.11	5.0	314			
407.16	5.2	325			
407.21	5.3	336			
407.26	5.5	347			
407.31	5.7	358			
407.36	5.9	369			
407.41	6.0	380			
407.46	6.2	390			
407.51	6.4	401			
407.56	6.5	412			
407.61	6.7	422			
407.66	6.9	433			
407.71	7.0	443			
407.76	7.2	453			
407.81	7.4	463			
407.86	7.5	473			

# Springhill Retail

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AR - Little Rock 25-yr Duration=15 min, Inten=5.44 in/hr

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## Summary for Pond Pond: Regional Detention Basin

Inflow Area = 1,372,542 sf, 6.70% Impervious, Inflow Depth = 0.50" for 25-yr event  
Inflow = 62.24 cfs @ 0.25 hrs, Volume= 57,321 cf  
Outflow = 48.70 cfs @ 0.30 hrs, Volume= 57,371 cf, Atten= 22%, Lag= 2.9 min  
Primary = 48.70 cfs @ 0.30 hrs, Volume= 57,371 cf

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
Peak Elev= 405.36' @ 0.30 hrs Storage= 9,099 cf

Plug-Flow detention time= 2.1 min calculated for 57,180 cf (100% of inflow)  
Center-of-Mass det. time= 2.1 min ( 17.0 - 14.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	401.00'	12,812 cf	<b>Custom Stage Data</b> Listed below

Elevation (feet)	Cum.Store (cubic-feet)
401.00	0
402.00	103
403.00	803
404.00	2,704
405.00	7,038
406.00	12,812

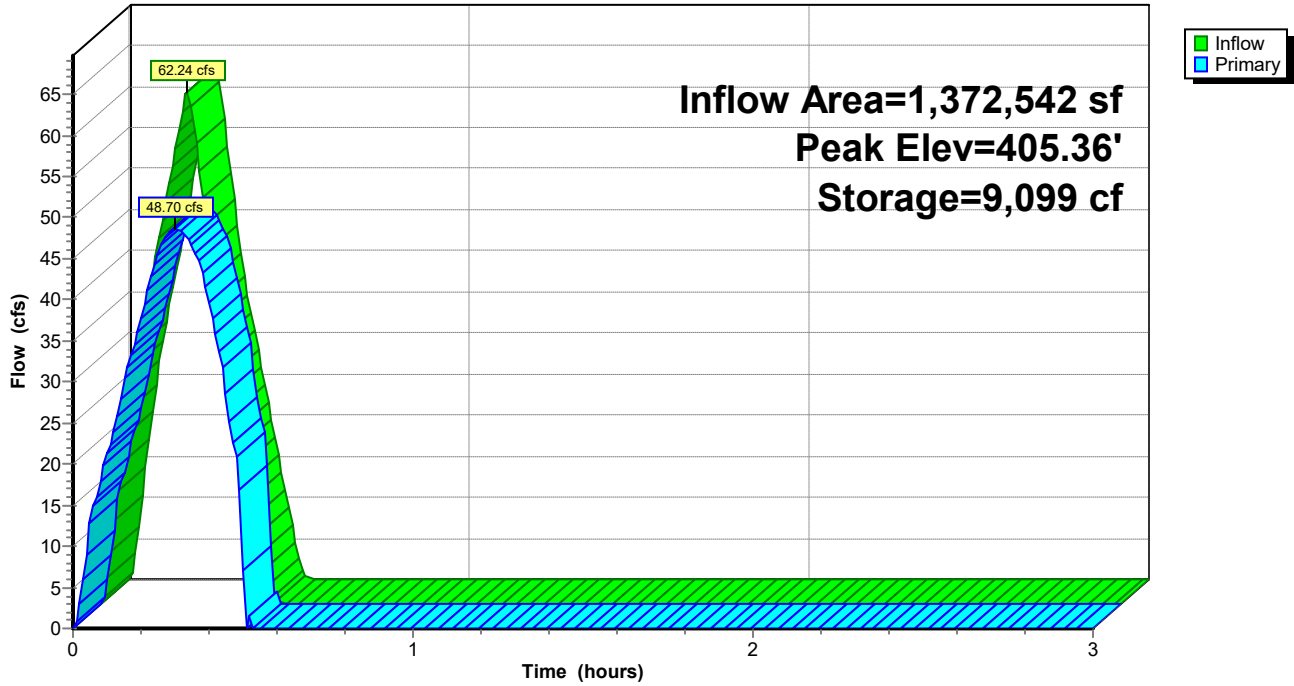
Device	Routing	Invert	Outlet Devices
#1	Primary	400.10'	<b>24.0" Round RCP_Round 24"</b> L= 100.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 400.10' / 397.97' S= 0.0213 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Primary	403.02'	<b>24.0" Round RCP_Round 24"</b> L= 35.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 403.02' / 401.73' S= 0.0369 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#3	Primary	405.69'	<b>2.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)

**Primary OutFlow** Max=48.68 cfs @ 0.30 hrs HW=405.35' (Free Discharge)

1=RCP\_Round 24" (Inlet Controls 31.20 cfs @ 9.93 fps)  
2=RCP\_Round 24" (Inlet Controls 17.48 cfs @ 5.56 fps)  
3=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)

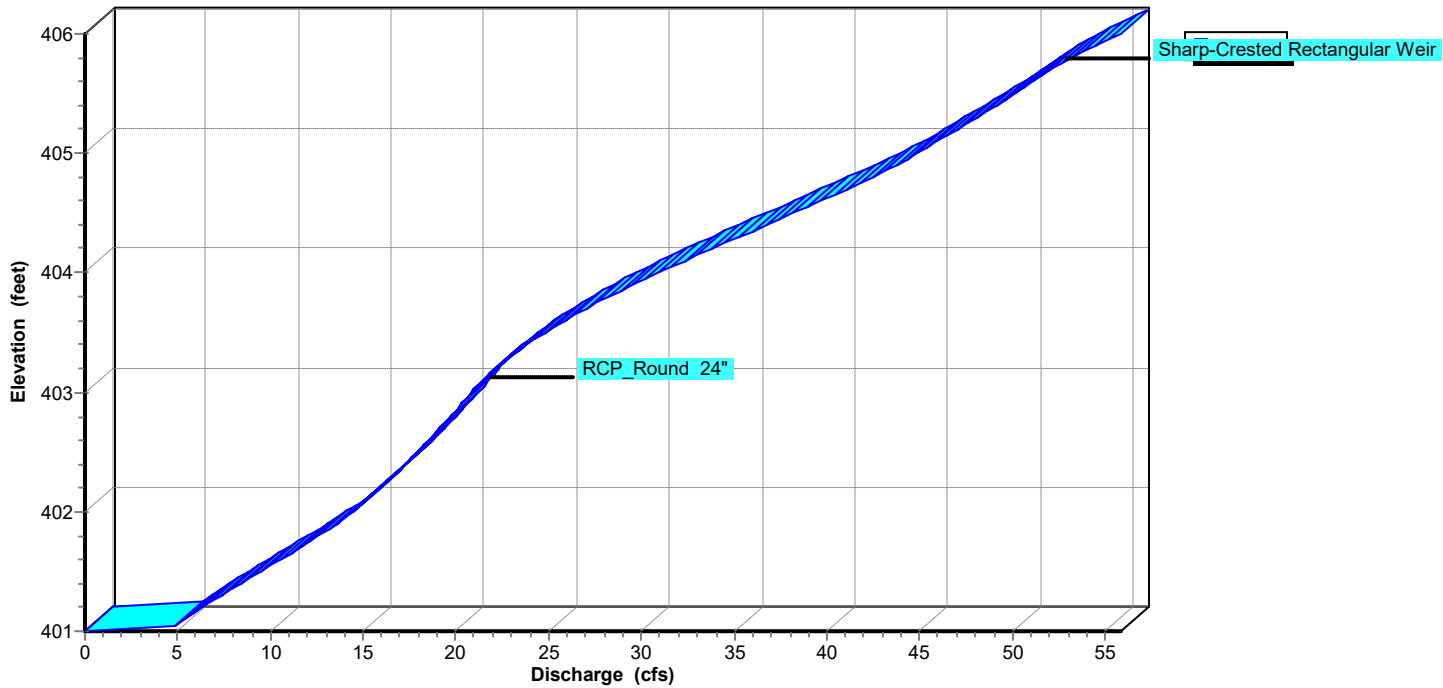
### Pond Pond: Regional Detention Basin

Hydrograph



### Pond Pond: Regional Detention Basin

Stage-Discharge



**Springhill Retail**

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*AR - Little Rock 25-yr Duration=15 min, Inten=5.44 in/hr*

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**Stage-Area-Storage for Pond Pond: Regional Detention Basin**

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
401.00	0	403.60	1,944
401.05	5	403.65	2,039
401.10	10	403.70	2,134
401.15	15	403.75	2,229
401.20	21	403.80	2,324
401.25	26	403.85	2,419
401.30	31	403.90	2,514
401.35	36	403.95	2,609
401.40	41	404.00	2,704
401.45	46	404.05	2,921
401.50	52	404.10	3,137
401.55	57	404.15	3,354
401.60	62	404.20	3,571
401.65	67	404.25	3,788
401.70	72	404.30	4,004
401.75	77	404.35	4,221
401.80	82	404.40	4,438
401.85	88	404.45	4,654
401.90	93	404.50	4,871
401.95	98	404.55	5,088
402.00	103	404.60	5,304
402.05	138	404.65	5,521
402.10	173	404.70	5,738
402.15	208	404.75	5,955
402.20	243	404.80	6,171
402.25	278	404.85	6,388
402.30	313	404.90	6,605
402.35	348	404.95	6,821
402.40	383	405.00	7,038
402.45	418	405.05	7,327
402.50	453	405.10	7,615
402.55	488	405.15	7,904
402.60	523	405.20	8,193
402.65	558	405.25	8,482
402.70	593	405.30	8,770
402.75	628	405.35	9,059
402.80	663	405.40	9,348
402.85	698	405.45	9,636
402.90	733	405.50	9,925
402.95	768	405.55	10,214
403.00	803	405.60	10,502
403.05	898	405.65	10,791
403.10	993	405.70	11,080
403.15	1,088	405.75	11,369
403.20	1,183	405.80	11,657
403.25	1,278	405.85	11,946
403.30	1,373	405.90	12,235
403.35	1,468	405.95	12,523
403.40	1,563	406.00	<b>12,812</b>
403.45	1,658		
403.50	1,754		
403.55	1,849		



# Springhill Retail

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AR - Little Rock 100-yr Duration=15 min, Inten=6.52 in/hr

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## Summary for Subcatchment ARDOT: ARDOT Offsite

Runoff = 52.91 cfs @ 0.25 hrs, Volume= 47,617 cf, Depth= 0.49"

Routed to Reach A1 : Pipe A1

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

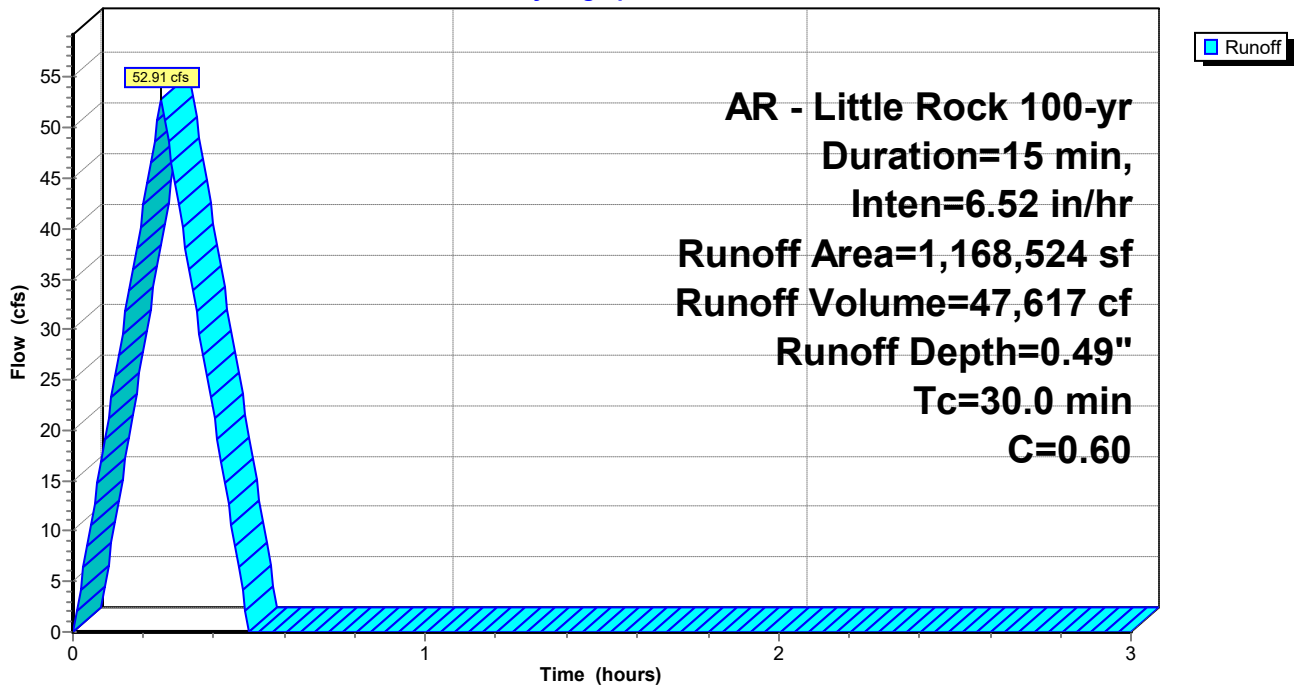
AR - Little Rock 100-yr Duration=15 min, Inten=6.52 in/hr

Area (sf)	C	Description
1,168,524	0.60	
1,168,524		100.00% Pervious Area

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

## Subcatchment ARDOT: ARDOT Offsite

Hydrograph



# Springhill Retail

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AR - Little Rock 100-yr Duration=15 min, Inten=6.52 in/hr

Printed 5/22/2024

## Summary for Subcatchment M&F: Merchants and Farmers

Runoff = 5.49 cfs @ 0.09 hrs, Volume= 4,939 cf, Depth= 1.55"

Routed to Reach A2 : Pipe A2

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

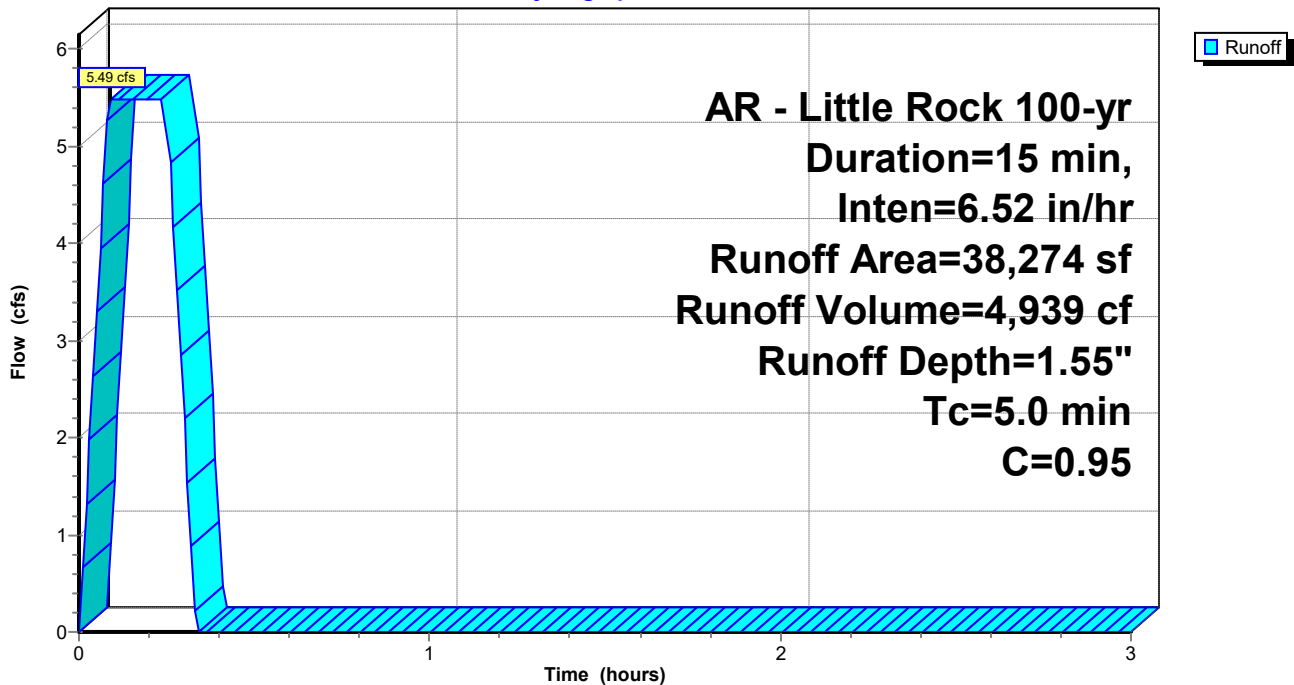
AR - Little Rock 100-yr Duration=15 min, Inten=6.52 in/hr

Area (sf)	C	Description
38,274	0.95	Developed Site
38,274		100.00% Impervious Area

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

## Subcatchment M&F: Merchants and Farmers

Hydrograph



**Springhill Retail**

AR - Little Rock 100-yr Duration=15 min, Inten=6.52 in/hr

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**Summary for Subcatchment SR: Springhill Retail Post**

Runoff = 5.39 cfs @ 0.09 hrs, Volume= 4,855 cf, Depth= 1.24"

Routed to Pond Pond : Regional Detention Basin

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

AR - Little Rock 100-yr Duration=15 min, Inten=6.52 in/hr

Area (sf)	C	Description
1,511	0.86	Existing Drive
33,632	0.92	Drives, Roof, Sidewalks
11,886	0.30	Landscaped Areas
47,029	0.76	Weighted Average
47,029		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	82	0.0290	1.76		<b>Sheet Flow, Asphalt Sheet Flow</b> Smooth surfaces n= 0.011 P2= 4.19"
0.8	87	0.0080	1.82		<b>Shallow Concentrated Flow, Gutter</b> Paved Kv= 20.3 fps
0.1	19	0.0210	2.94		<b>Shallow Concentrated Flow, Concentrated Pavement Flow</b> Paved Kv= 20.3 fps
1.0	197	0.0250	3.21		<b>Shallow Concentrated Flow, Gutter</b> Paved Kv= 20.3 fps
0.3	37	0.0130	2.31		<b>Shallow Concentrated Flow, Gutter</b> Paved Kv= 20.3 fps
2.0					<b>Direct Entry, Minimum adjustment</b>
5.0	422	Total			

**Springhill Retail**

Prepared by Phillip Lewis Engineering

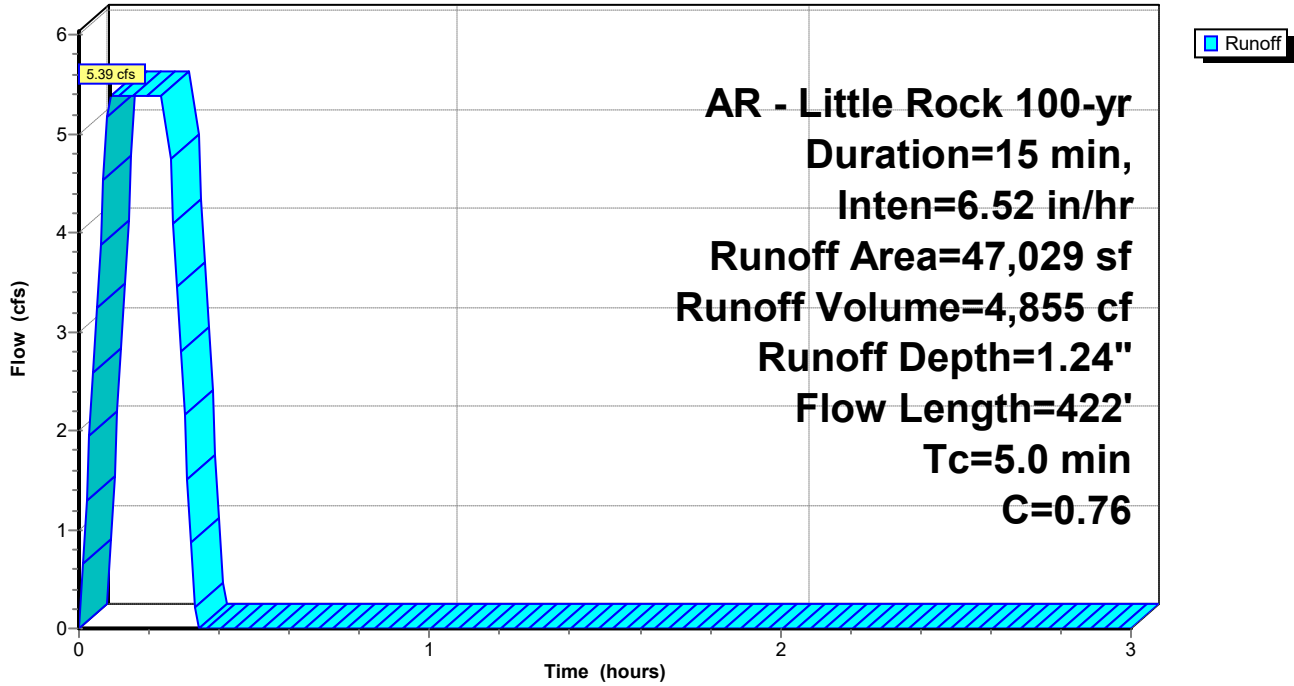
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AR - Little Rock 100-yr Duration=15 min, Inten=6.52 in/hr

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**Subcatchment SR: Springhill Retail Post**

Hydrograph



# Springhill Retail

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## Summary for Subcatchment WestProp: West Adjacent Property Drainage Basin

Runoff = 12.54 cfs @ 0.25 hrs, Volume= 11,288 cf, Depth= 1.14"

Routed to Reach A3 : Pipe A2

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

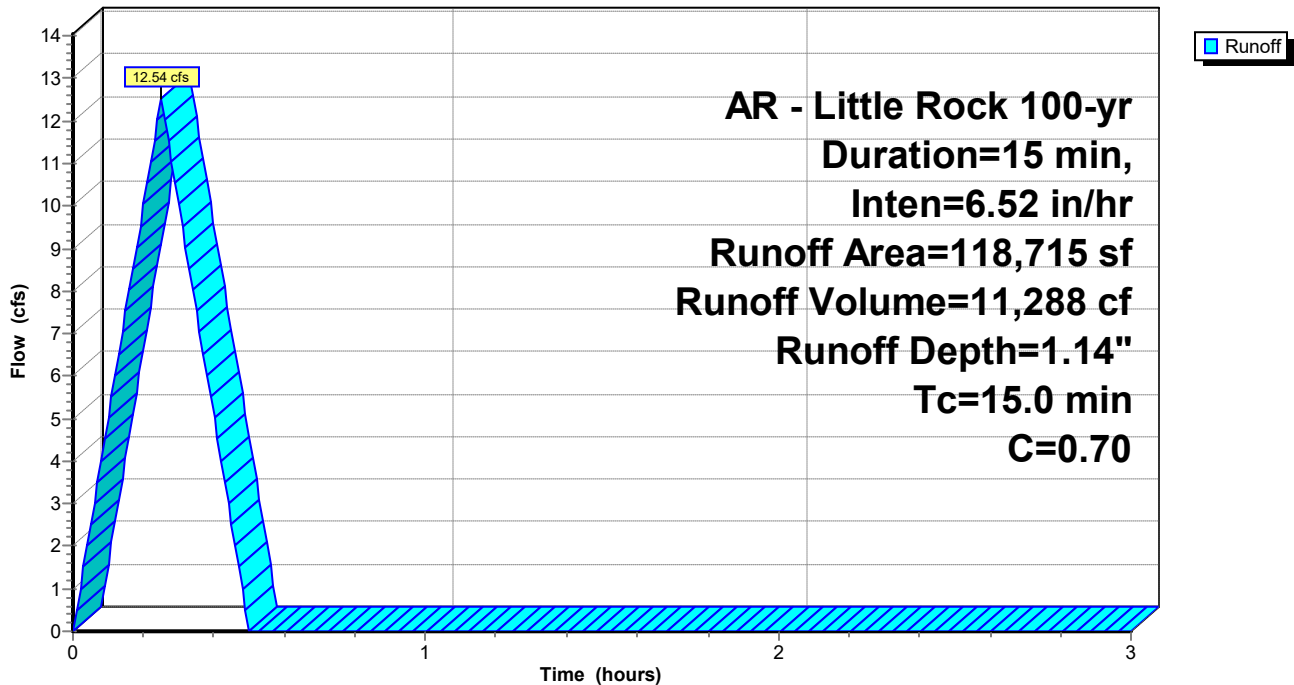
AR - Little Rock 100-yr Duration=15 min, Inten=6.52 in/hr

Area (sf)	C	Description
65,063	0.50	Pervious Areas
53,652	0.95	Rooftop/Paving
118,715	0.70	Weighted Average
65,063		54.81% Pervious Area
53,652		45.19% Impervious Area

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

## Subcatchment WestProp: West Adjacent Property Drainage Basin

Hydrograph



# Springhill Retail

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AR - Little Rock 100-yr Duration=15 min, Inten=6.52 in/hr

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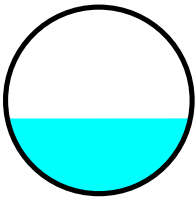
## Summary for Reach A1: Pipe A1

Inflow Area = 1,168,524 sf, 0.00% Impervious, Inflow Depth = 0.49" for 100-yr event  
Inflow = 52.91 cfs @ 0.25 hrs, Volume= 47,617 cf  
Outflow = 52.81 cfs @ 0.25 hrs, Volume= 47,619 cf, Atten= 0%, Lag= 0.0 min  
Routed to Reach A2 : Pipe A2

Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
Max. Velocity= 14.49 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 11.28 fps, Avg. Travel Time= 0.0 min

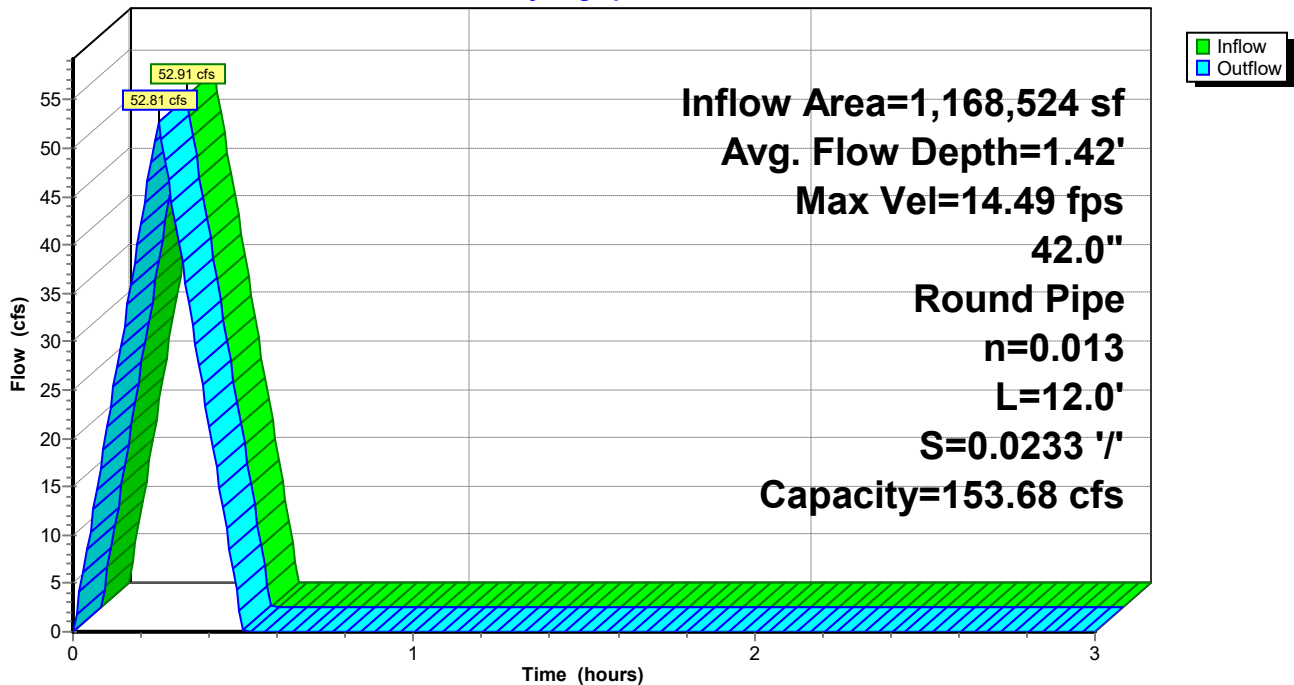
Peak Storage= 44 cf @ 0.25 hrs  
Average Depth at Peak Storage= 1.42' , Surface Width= 3.44'  
Bank-Full Depth= 3.50' Flow Area= 9.6 sf, Capacity= 153.68 cfs

42.0" Round Pipe  
n= 0.013 Concrete pipe, bends & connections  
Length= 12.0' Slope= 0.0233 '/'  
Inlet Invert= 413.00', Outlet Invert= 412.72'



## Reach A1: Pipe A1

### Hydrograph



**Springhill Retail**

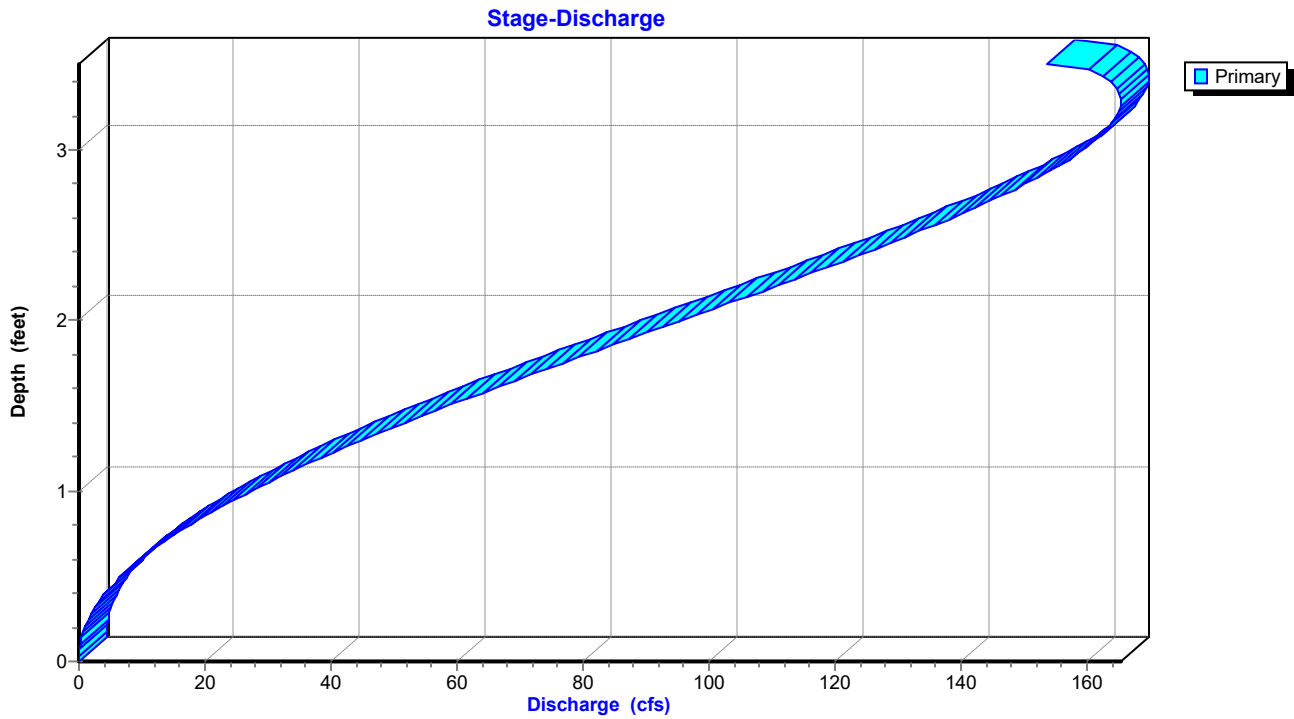
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**Reach A1: Pipe A1**



**Springhill Retail**

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**Stage-Area-Storage for Reach A1: Pipe A1**

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
413.00	0.0	0	415.60	7.7	92
413.05	0.0	0	415.65	7.8	94
413.10	0.1	1	415.70	8.0	96
413.15	0.1	2	415.75	8.1	97
413.20	0.2	3	415.80	8.3	99
413.25	0.3	4	415.85	8.4	101
413.30	0.4	5	415.90	8.5	102
413.35	0.5	6	415.95	8.7	104
413.40	0.6	7	416.00	8.8	105
413.45	0.7	9	416.05	8.9	107
413.50	0.8	10	416.10	9.0	108
413.55	1.0	12	416.15	9.1	109
413.60	1.1	13	416.20	9.2	111
413.65	1.2	15	416.25	9.3	112
413.70	1.4	16	416.30	9.4	113
413.75	1.5	18	416.35	9.5	114
413.80	1.7	20	416.40	9.5	115
413.85	1.8	22	416.45	9.6	115
413.90	2.0	23	416.50	<b>9.6</b>	<b>115</b>
413.95	2.1	25			
414.00	2.3	27			
414.05	2.4	29			
414.10	2.6	31			
414.15	2.8	33			
414.20	2.9	35			
414.25	3.1	37			
414.30	3.3	39			
414.35	3.4	41			
414.40	3.6	43			
414.45	3.8	45			
414.50	3.9	47			
414.55	4.1	49			
414.60	4.3	51			
414.65	4.5	54			
414.70	4.6	56			
414.75	4.8	58			
414.80	5.0	60			
414.85	5.2	62			
414.90	5.3	64			
414.95	5.5	66			
415.00	5.7	68			
415.05	5.9	70			
415.10	6.0	72			
415.15	6.2	74			
415.20	6.4	76			
415.25	6.5	78			
415.30	6.7	80			
415.35	6.9	82			
415.40	7.0	84			
415.45	7.2	86			
415.50	7.4	88			
415.55	7.5	90			



# Springhill Retail

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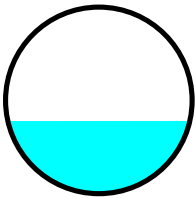
## Summary for Reach A2: Pipe A2

Inflow Area = 1,206,798 sf, 3.17% Impervious, Inflow Depth = 0.52" for 100-yr event  
Inflow = 58.30 cfs @ 0.25 hrs, Volume= 52,558 cf  
Outflow = 57.39 cfs @ 0.26 hrs, Volume= 52,558 cf, Atten= 2%, Lag= 0.4 min  
Routed to Reach A3 : Pipe A2

Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
Max. Velocity= 16.60 fps, Min. Travel Time= 0.2 min  
Avg. Velocity = 9.39 fps, Avg. Travel Time= 0.4 min

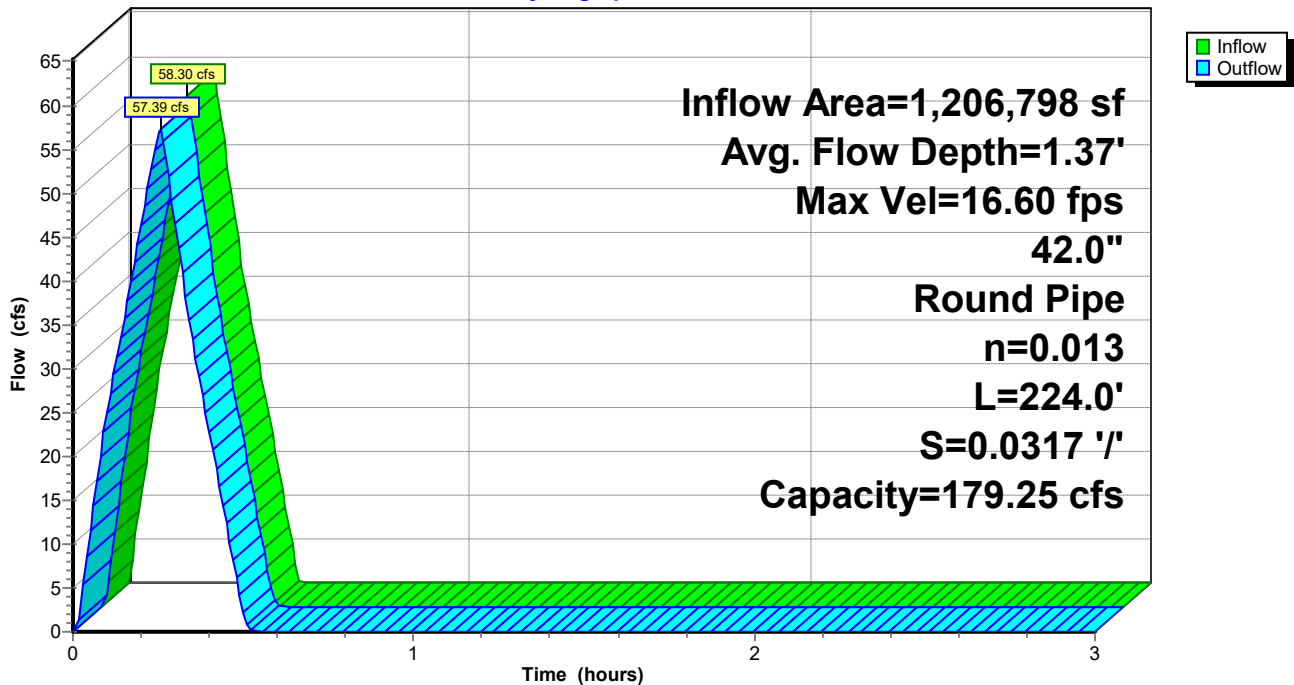
Peak Storage= 779 cf @ 0.25 hrs  
Average Depth at Peak Storage= 1.37' , Surface Width= 3.42'  
Bank-Full Depth= 3.50' Flow Area= 9.6 sf, Capacity= 179.25 cfs

42.0" Round Pipe  
n= 0.013 Concrete pipe, bends & connections  
Length= 224.0' Slope= 0.0317 '/'  
Inlet Invert= 412.52', Outlet Invert= 405.41'



## Reach A2: Pipe A2

### Hydrograph



**Springhill Retail**

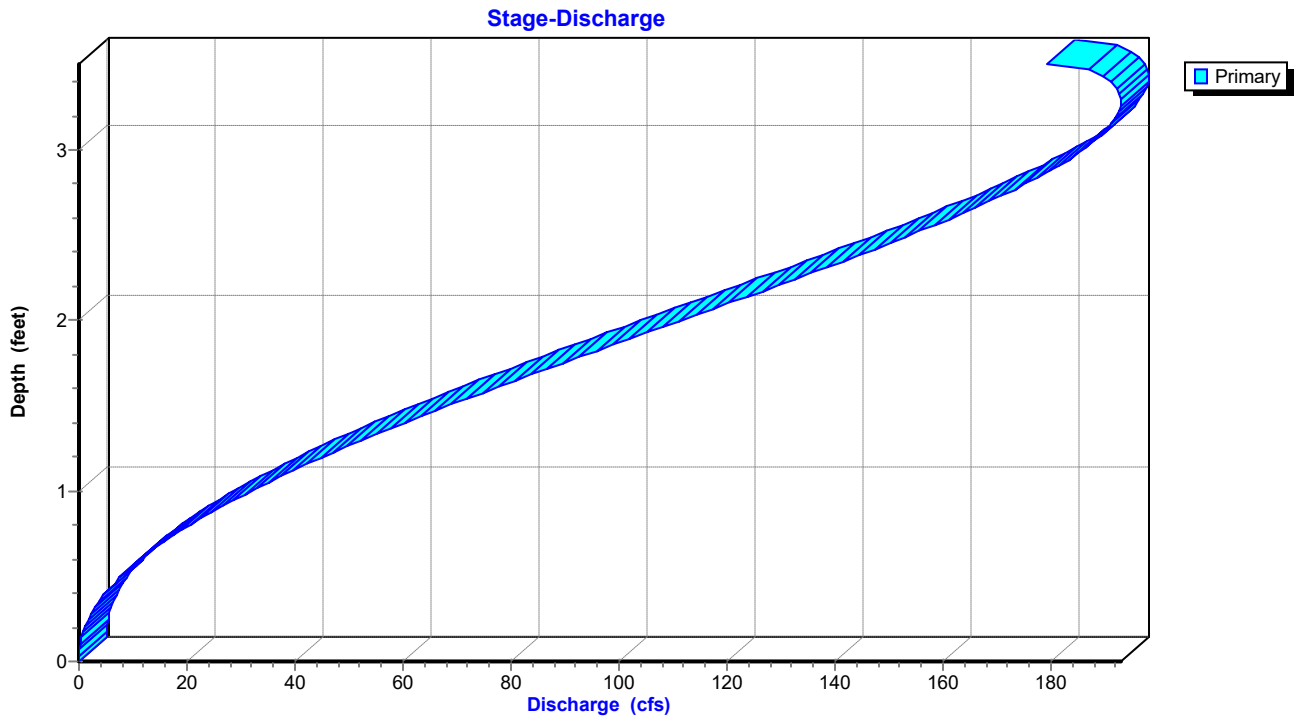
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**Reach A2: Pipe A2**



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**Stage-Area-Storage for Reach A2: Pipe A2**

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
412.52	0.0	0	415.12	7.7	1,717
412.57	0.0	6	415.17	7.8	1,751
412.62	0.1	18	415.22	8.0	1,784
412.67	0.1	32	415.27	8.1	1,816
412.72	0.2	49	415.32	8.3	1,848
412.77	0.3	68	415.37	8.4	1,879
412.82	0.4	90	415.42	8.5	1,909
412.87	0.5	112	415.47	8.7	1,938
412.92	0.6	136	415.52	8.8	1,966
412.97	0.7	162	415.57	8.9	1,993
413.02	0.8	189	415.62	9.0	2,019
413.07	1.0	217	415.67	9.1	2,043
413.12	1.1	246	415.72	9.2	2,066
413.17	1.2	276	415.77	9.3	2,087
413.22	1.4	307	415.82	9.4	2,106
413.27	1.5	339	415.87	9.5	2,123
413.32	1.7	371	415.92	9.5	2,138
413.37	1.8	404	415.97	9.6	2,149
413.42	2.0	438	416.02	<b>9.6</b>	<b>2,155</b>
413.47	2.1	473			
413.52	2.3	508			
413.57	2.4	544			
413.62	2.6	580			
413.67	2.8	617			
413.72	2.9	654			
413.77	3.1	691			
413.82	3.3	729			
413.87	3.4	767			
413.92	3.6	805			
413.97	3.8	844			
414.02	3.9	882			
414.07	4.1	921			
414.12	4.3	960			
414.17	4.5	999			
414.22	4.6	1,038			
414.27	4.8	1,078			
414.32	5.0	1,117			
414.37	5.2	1,156			
414.42	5.3	1,195			
414.47	5.5	1,234			
414.52	5.7	1,273			
414.57	5.9	1,312			
414.62	6.0	1,350			
414.67	6.2	1,388			
414.72	6.4	1,426			
414.77	6.5	1,464			
414.82	6.7	1,502			
414.87	6.9	1,539			
414.92	7.0	1,575			
414.97	7.2	1,611			
415.02	7.4	1,647			
415.07	7.5	1,682			

# Springhill Retail

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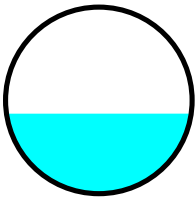
## Summary for Reach A3: Pipe A2

Inflow Area = 1,325,513 sf, 6.94% Impervious, Inflow Depth = 0.58" for 100-yr event  
Inflow = 69.72 cfs @ 0.25 hrs, Volume= 63,846 cf  
Outflow = 69.58 cfs @ 0.26 hrs, Volume= 63,846 cf, Atten= 0%, Lag= 0.1 min  
Routed to Pond Pond : Regional Detention Basin

Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
Max. Velocity= 17.63 fps, Min. Travel Time= 0.1 min  
Avg. Velocity = 9.81 fps, Avg. Travel Time= 0.1 min

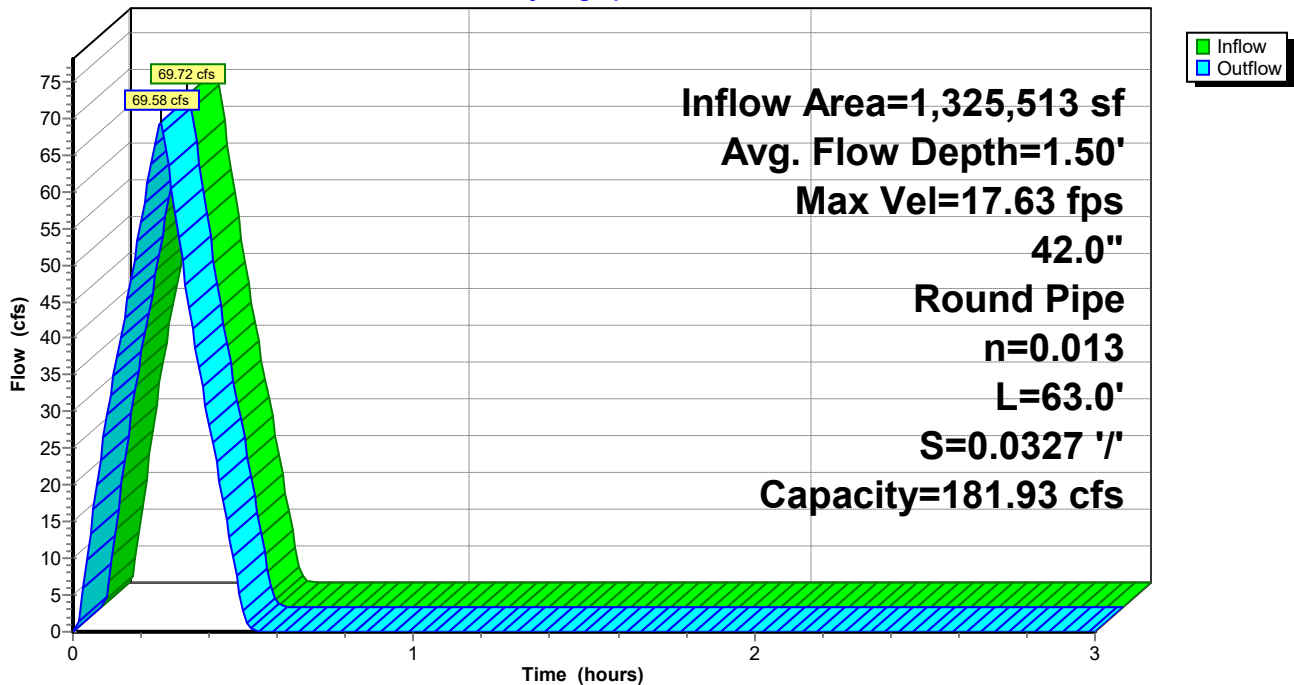
Peak Storage= 249 cf @ 0.26 hrs  
Average Depth at Peak Storage= 1.50' , Surface Width= 3.46'  
Bank-Full Depth= 3.50' Flow Area= 9.6 sf, Capacity= 181.93 cfs

42.0" Round Pipe  
n= 0.013 Concrete pipe, bends & connections  
Length= 63.0' Slope= 0.0327 '/'  
Inlet Invert= 405.31', Outlet Invert= 403.25'

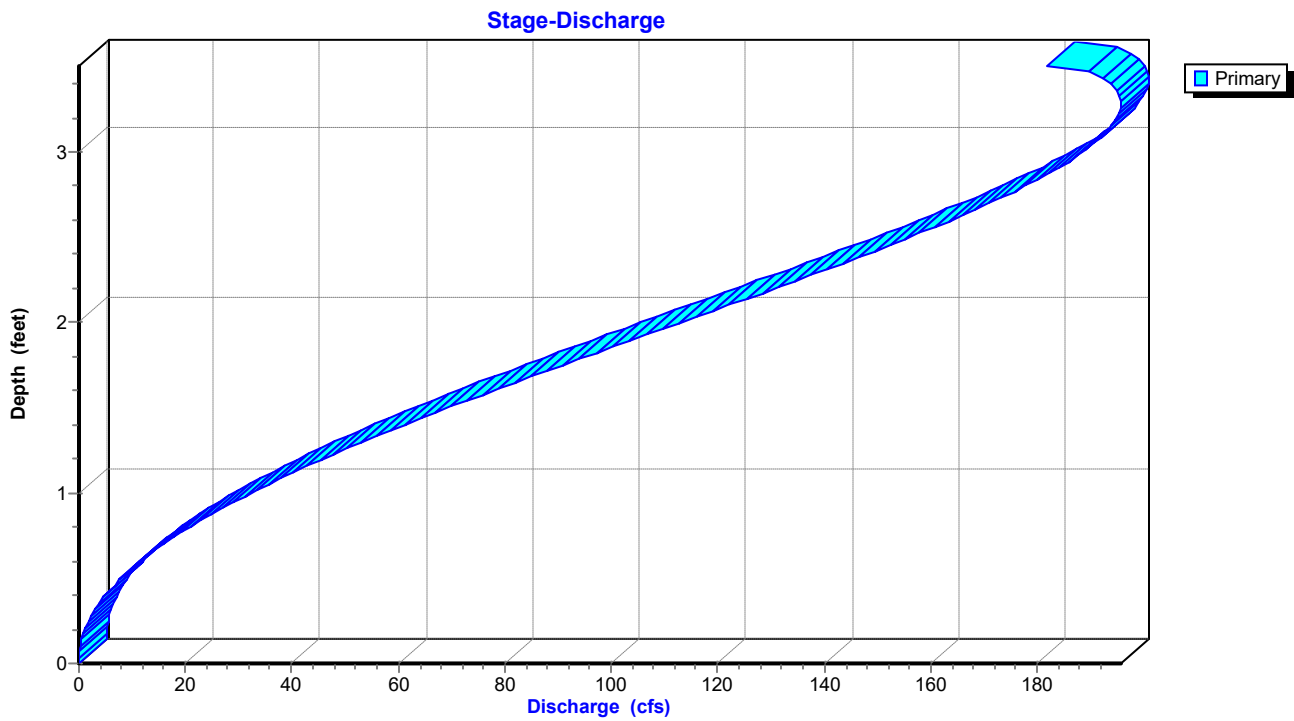


## Reach A3: Pipe A2

### Hydrograph



### Reach A3: Pipe A2



**Springhill Retail**

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**Stage-Area-Storage for Reach A3: Pipe A2**

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
405.31	0.0	0	407.91	7.7	483
405.36	0.0	2	407.96	7.8	492
405.41	0.1	5	408.01	8.0	502
405.46	0.1	9	408.06	8.1	511
405.51	0.2	14	408.11	8.3	520
405.56	0.3	19	408.16	8.4	529
405.61	0.4	25	408.21	8.5	537
405.66	0.5	32	408.26	8.7	545
405.71	0.6	38	408.31	8.8	553
405.76	0.7	46	408.36	8.9	561
405.81	0.8	53	408.41	9.0	568
405.86	1.0	61	408.46	9.1	575
405.91	1.1	69	408.51	9.2	581
405.96	1.2	78	408.56	9.3	587
406.01	1.4	86	408.61	9.4	592
406.06	1.5	95	408.66	9.5	597
406.11	1.7	104	408.71	9.5	601
406.16	1.8	114	408.76	9.6	604
406.21	2.0	123	408.81	<b>9.6</b>	<b>606</b>
406.26	2.1	133			
406.31	2.3	143			
406.36	2.4	153			
406.41	2.6	163			
406.46	2.8	173			
406.51	2.9	184			
406.56	3.1	194			
406.61	3.3	205			
406.66	3.4	216			
406.71	3.6	226			
406.76	3.8	237			
406.81	3.9	248			
406.86	4.1	259			
406.91	4.3	270			
406.96	4.5	281			
407.01	4.6	292			
407.06	4.8	303			
407.11	5.0	314			
407.16	5.2	325			
407.21	5.3	336			
407.26	5.5	347			
407.31	5.7	358			
407.36	5.9	369			
407.41	6.0	380			
407.46	6.2	390			
407.51	6.4	401			
407.56	6.5	412			
407.61	6.7	422			
407.66	6.9	433			
407.71	7.0	443			
407.76	7.2	453			
407.81	7.4	463			
407.86	7.5	473			

# Springhill Retail

AR - Little Rock 100-yr Duration=15 min, Inten=6.52 in/hr

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## Summary for Pond Pond: Regional Detention Basin

Inflow Area = 1,372,542 sf, 6.70% Impervious, Inflow Depth = 0.60" for 100-yr event  
Inflow = 74.65 cfs @ 0.25 hrs, Volume= 68,701 cf  
Outflow = 59.88 cfs @ 0.30 hrs, Volume= 68,780 cf, Atten= 20%, Lag= 2.8 min  
Primary = 59.88 cfs @ 0.30 hrs, Volume= 68,780 cf

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs  
Peak Elev= 406.27' @ 0.30 hrs Storage= 12,812 cf

Plug-Flow detention time= 2.7 min calculated for 68,552 cf (100% of inflow)  
Center-of-Mass det. time= 2.7 min ( 17.5 - 14.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	401.00'	12,812 cf	<b>Custom Stage Data</b> Listed below

Elevation (feet)	Cum.Store (cubic-feet)
401.00	0
402.00	103
403.00	803
404.00	2,704
405.00	7,038
406.00	12,812

Device	Routing	Invert	Outlet Devices
#1	Primary	400.10'	<b>24.0" Round RCP_Round 24"</b> L= 100.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 400.10' / 397.97' S= 0.0213 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Primary	403.02'	<b>24.0" Round RCP_Round 24"</b> L= 35.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 403.02' / 401.73' S= 0.0369 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#3	Primary	405.69'	<b>2.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)

**Primary OutFlow** Max=59.82 cfs @ 0.30 hrs HW=406.27' (Free Discharge)

1=RCP\_Round 24" (Inlet Controls 34.40 cfs @ 10.95 fps)  
2=RCP\_Round 24" (Inlet Controls 22.69 cfs @ 7.22 fps)  
3=Sharp-Crested Rectangular Weir (Weir Controls 2.73 cfs @ 2.49 fps)

# Springhill Retail

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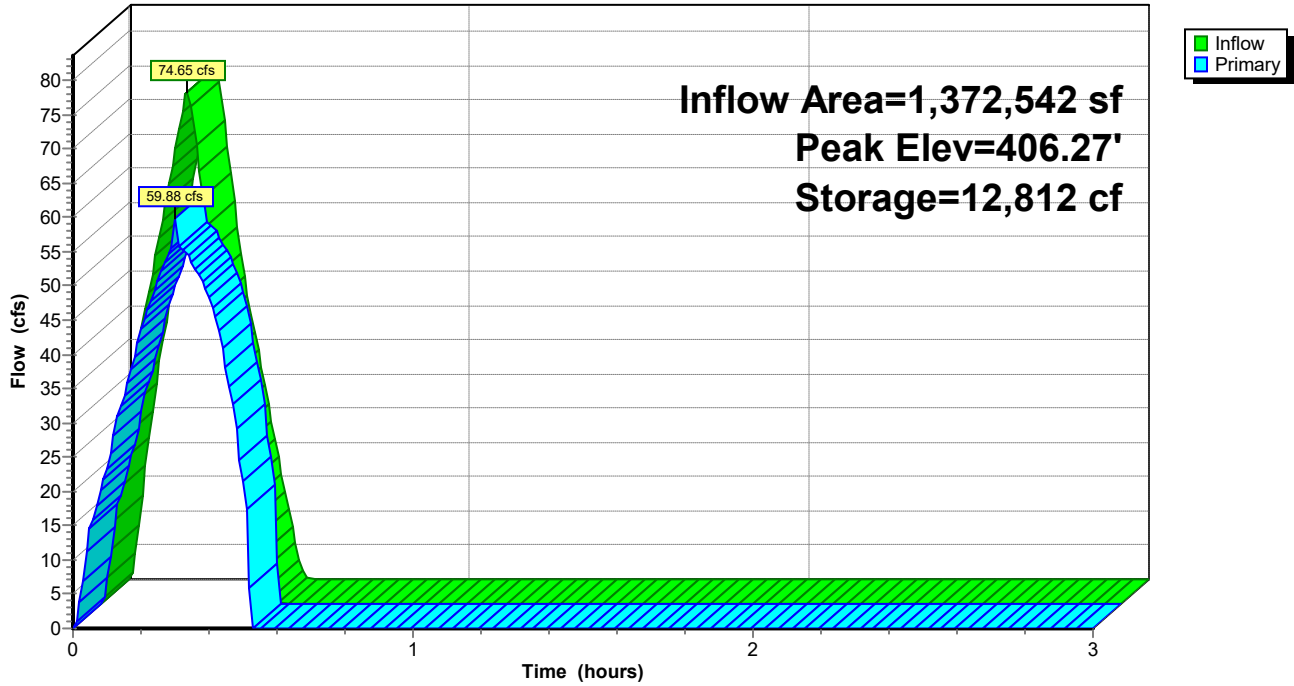
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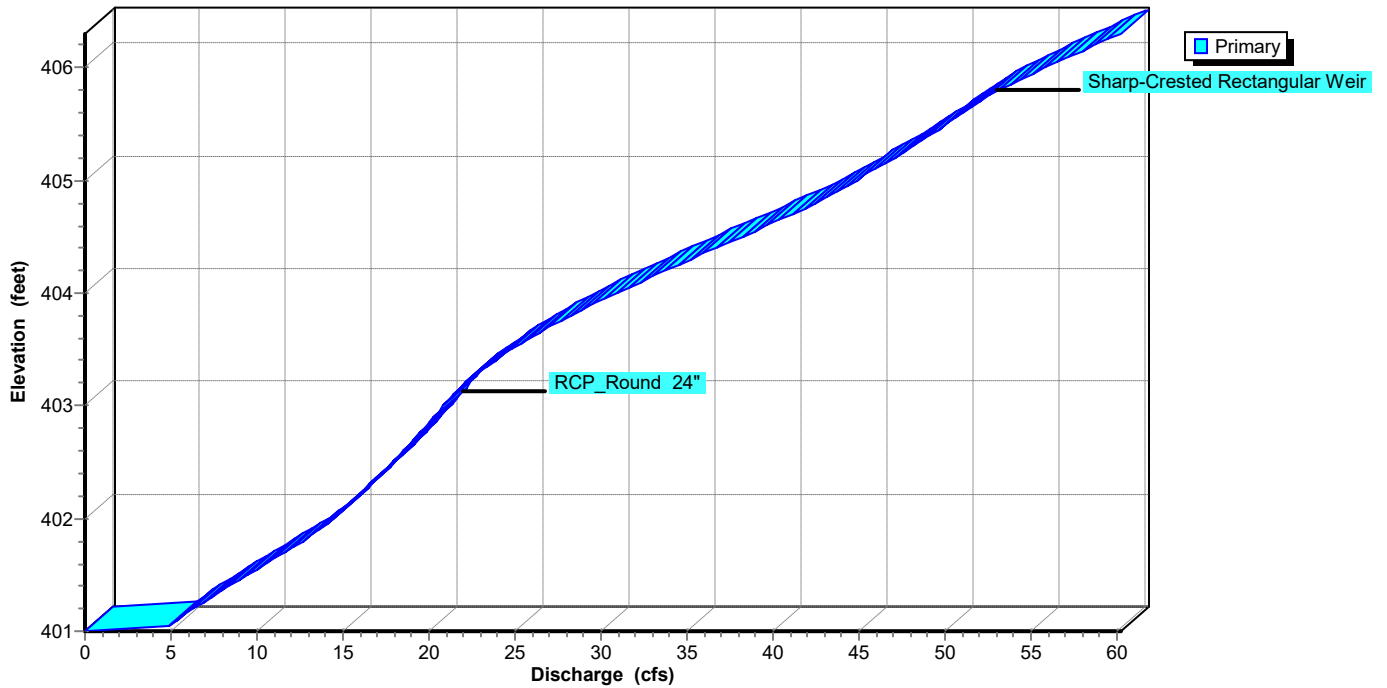
## Pond Pond: Regional Detention Basin

Hydrograph



## Pond Pond: Regional Detention Basin

Stage-Discharge





**Springhill Retail***AR - Little Rock 100-yr Duration=15 min, Inten=6.52 in/hr*

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**Stage-Area-Storage for Pond Pond: Regional Detention Basin**

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
401.00	0	403.60	1,944	406.20	12,812
401.05	5	403.65	2,039	406.25	12,812
401.10	10	403.70	2,134	406.30	12,812
401.15	15	403.75	2,229		
401.20	21	403.80	2,324		
401.25	26	403.85	2,419		
401.30	31	403.90	2,514		
401.35	36	403.95	2,609		
401.40	41	404.00	2,704		
401.45	46	404.05	2,921		
401.50	52	404.10	3,137		
401.55	57	404.15	3,354		
401.60	62	404.20	3,571		
401.65	67	404.25	3,788		
401.70	72	404.30	4,004		
401.75	77	404.35	4,221		
401.80	82	404.40	4,438		
401.85	88	404.45	4,654		
401.90	93	404.50	4,871		
401.95	98	404.55	5,088		
402.00	103	404.60	5,304		
402.05	138	404.65	5,521		
402.10	173	404.70	5,738		
402.15	208	404.75	5,955		
402.20	243	404.80	6,171		
402.25	278	404.85	6,388		
402.30	313	404.90	6,605		
402.35	348	404.95	6,821		
402.40	383	405.00	7,038		
402.45	418	405.05	7,327		
402.50	453	405.10	7,615		
402.55	488	405.15	7,904		
402.60	523	405.20	8,193		
402.65	558	405.25	8,482		
402.70	593	405.30	8,770		
402.75	628	405.35	9,059		
402.80	663	405.40	9,348		
402.85	698	405.45	9,636		
402.90	733	405.50	9,925		
402.95	768	405.55	10,214		
403.00	803	405.60	10,502		
403.05	898	405.65	10,791		
403.10	993	405.70	11,080		
403.15	1,088	405.75	11,369		
403.20	1,183	405.80	11,657		
403.25	1,278	405.85	11,946		
403.30	1,373	405.90	12,235		
403.35	1,468	405.95	12,523		
403.40	1,563	406.00	<b>12,812</b>		
403.45	1,658	406.05	12,812		
403.50	1,754	406.10	12,812		
403.55	1,849	406.15	12,812		