

STORMWATER DESIGN CALCULATIONS

FOR

Ace Mini Storage
Hwy 12
Ashland City, TN

April 14, 2021



Prepared By

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STORM WATER CALCULATIONS

NOTE: Storm water runoff is calculated using the TR-55 Method. All flow calculations are based on methods established in the Nashville / Davidson County Stormwater Management Manual.

The following pages contain calculations for the storm water drainage system.

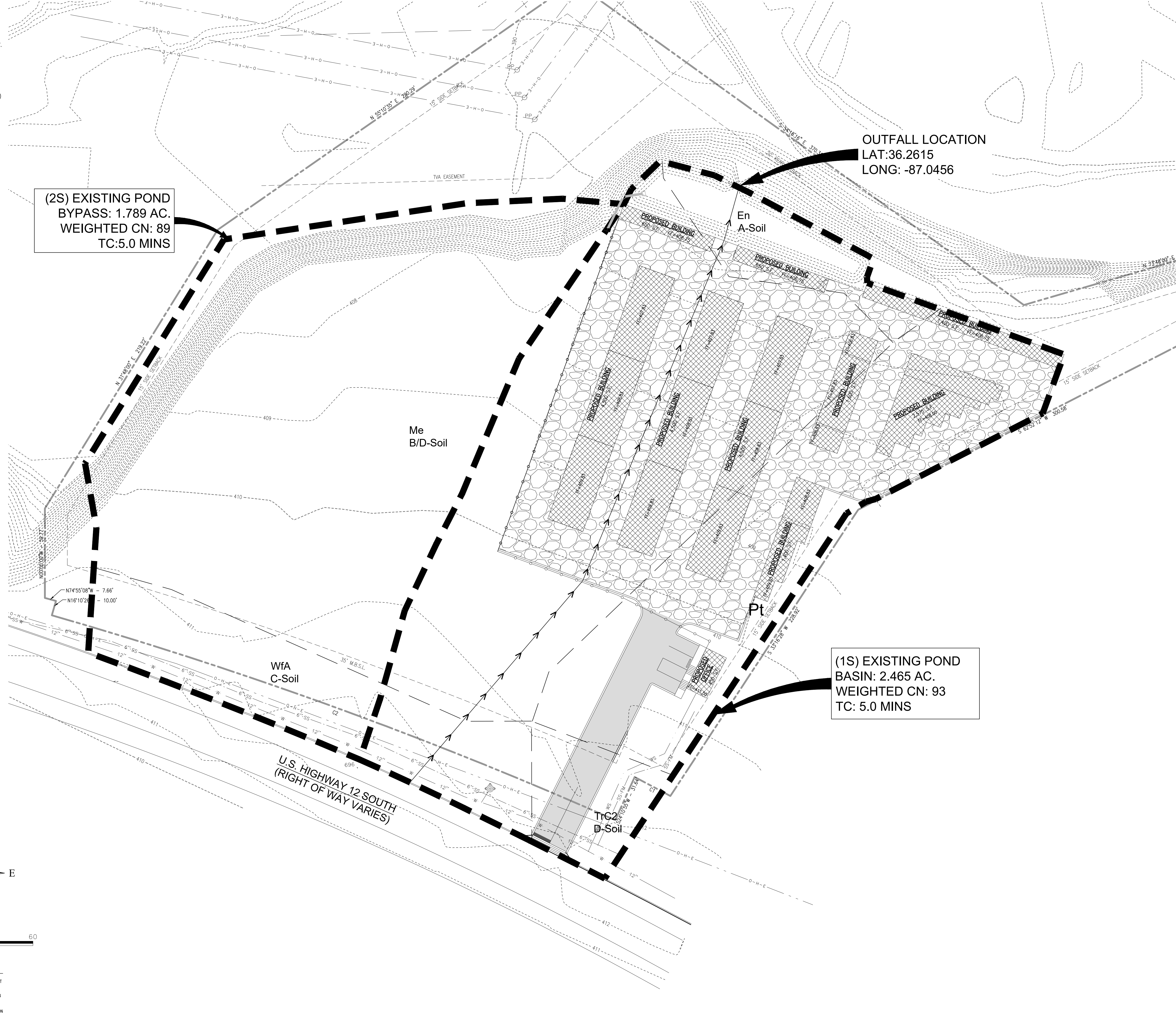
The following table illustrates storm water runoff data for pre and post developed conditions for the above referenced property.

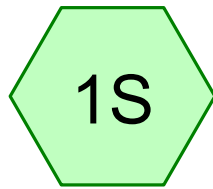
Storm Event	Total Pre-Developed Runoff (1R)	Post-Developed to Pond (3S)	Total Post Developed Discharge (2R)	Pond Elevation: TOB: 405.25
2 yr.	13.55	15.23	13.03	402.95
5 yr.	17.14	18.96	16.26	403.25
10 yr.	19.98	21.92	18.78	403.49
25 yr.	23.98	26.12	22.25	403.82
50 yr.	27.19	29.52	24.95	404.09
100yr.	30.43	33.00	27.61	404.35

Water Quantity:

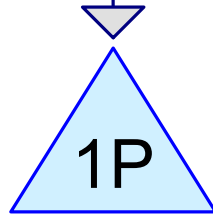
The existing detention pond on this site has been sized to handle the additional stormwater runoff generated by the site development and to reduce the peak discharge at or below predeveloped conditions. The pond and outlet structure had been designed for the complete build out of the site for all phases. Storm events are controlled by a weir structure built into the pond wall.

PRE-DEVELOPED

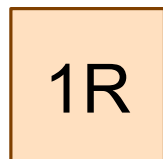




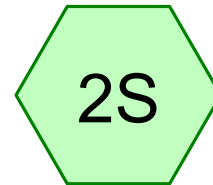
Existing Pond Basin



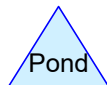
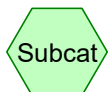
Existing Detention Pond



Total Pre



Existing Pond Bypass



Routing Diagram for Drainage - Pre

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Drainage - Pre

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NOAA 24-hr B 2-Year Rainfall=3.60"

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Summary for Subcatchment 1S: Existing Pond Basin

Runoff = 9.75 cfs @ 12.11 hrs, Volume= 0.552 af, Depth> 2.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 2-Year Rainfall=3.60"

Area (ac)	CN	Description
0.219	79	50-75% Grass cover, Fair, HSG C
0.124	49	50-75% Grass cover, Fair, HSG A
0.113	98	Paved parking, HSG C
1.491	96	Gravel surface, HSG C
* 0.510	98	Roofs, HSG C
0.008	98	Unconnected pavement, HSG C
2.465	93	Weighted Average
1.834		74.40% Pervious Area
0.631		25.60% Impervious Area
0.008		1.27% Unconnected

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

Summary for Subcatchment 2S: Existing Pond Bypass

Runoff = 6.34 cfs @ 12.11 hrs, Volume= 0.345 af, Depth> 2.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 2-Year Rainfall=3.60"

Area (ac)	CN	Description
0.215	79	50-75% Grass cover, Fair, HSG C
0.303	69	50-75% Grass cover, Fair, HSG B
1.271	96	Gravel surface, HSG C
1.789	89	Weighted Average
1.789		100.00% Pervious Area

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

Summary for Reach 1R: Total Pre

Inflow Area = 4.254 ac, 14.83% Impervious, Inflow Depth > 2.53" for 2-Year event
 Inflow = 13.55 cfs @ 12.14 hrs, Volume= 0.897 af
 Outflow = 13.55 cfs @ 12.14 hrs, Volume= 0.897 af, Atten= 0%, Lag= 0.0 min

Drainage - Pre

NOAA 24-hr B 2-Year Rainfall=3.60"

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

Summary for Pond 1P: Existing Detention Pond

Inflow Area = 2.465 ac, 25.60% Impervious, Inflow Depth > 2.69" for 2-Year event
 Inflow = 9.75 cfs @ 12.11 hrs, Volume= 0.552 af
 Outflow = 7.72 cfs @ 12.17 hrs, Volume= 0.552 af, Atten= 21%, Lag= 3.2 min
 Primary = 7.72 cfs @ 12.17 hrs, Volume= 0.552 af

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

Peak Elev= 402.47' @ 12.17 hrs Surf.Area= 2,808 sf Storage= 1,922 cf

Plug-Flow detention time= 1.9 min calculated for 0.552 af (100% of inflow)

Center-of-Mass det. time= 1.8 min (758.0 - 756.1)

Volume	Invert	Avail.Storage	Storage Description		
#1	401.25'	11,230 cf	DETENTION POND (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
401.25	16	16.0	0	0	16
402.00	2,505	355.0	680	680	10,025
403.00	3,174	346.0	2,833	3,513	10,638
404.00	3,860	357.0	3,511	7,025	11,346
405.00	4,561	368.0	4,206	11,230	12,077
Device	Routing	Invert	Outlet Devices		
#1	Primary	401.25'	2.0' long x 3.75' rise Sharp-Crested Rectangular Weir 2 End Contraction(s)		

Primary OutFlow Max=7.55 cfs @ 12.17 hrs HW=402.45' (Free Discharge)

↑1=Sharp-Crested Rectangular Weir (Weir Controls 7.55 cfs @ 3.58 fps)

Drainage - Pre

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NOAA 24-hr B 5-Year Rainfall=4.39"

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Summary for Subcatchment 1S: Existing Pond Basin

Runoff = 12.21 cfs @ 12.11 hrs, Volume= 0.702 af, Depth> 3.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 5-Year Rainfall=4.39"

Area (ac)	CN	Description
0.219	79	50-75% Grass cover, Fair, HSG C
0.124	49	50-75% Grass cover, Fair, HSG A
0.113	98	Paved parking, HSG C
1.491	96	Gravel surface, HSG C
* 0.510	98	Roofs, HSG C
0.008	98	Unconnected pavement, HSG C
2.465	93	Weighted Average
1.834		74.40% Pervious Area
0.631		25.60% Impervious Area
0.008		1.27% Unconnected

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

Summary for Subcatchment 2S: Existing Pond Bypass

Runoff = 8.15 cfs @ 12.11 hrs, Volume= 0.451 af, Depth> 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 5-Year Rainfall=4.39"

Area (ac)	CN	Description
0.215	79	50-75% Grass cover, Fair, HSG C
0.303	69	50-75% Grass cover, Fair, HSG B
1.271	96	Gravel surface, HSG C
1.789	89	Weighted Average
1.789		100.00% Pervious Area

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

Summary for Reach 1R: Total Pre

Inflow Area = 4.254 ac, 14.83% Impervious, Inflow Depth > 3.25" for 5-Year event
 Inflow = 17.14 cfs @ 12.14 hrs, Volume= 1.153 af
 Outflow = 17.14 cfs @ 12.14 hrs, Volume= 1.153 af, Atten= 0%, Lag= 0.0 min

Drainage - Pre

NOAA 24-hr B 5-Year Rainfall=4.39"

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

Summary for Pond 1P: Existing Detention Pond

Inflow Area = 2.465 ac, 25.60% Impervious, Inflow Depth > 3.42" for 5-Year event
 Inflow = 12.21 cfs @ 12.11 hrs, Volume= 0.702 af
 Outflow = 9.65 cfs @ 12.17 hrs, Volume= 0.702 af, Atten= 21%, Lag= 3.2 min
 Primary = 9.65 cfs @ 12.17 hrs, Volume= 0.702 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 402.69' @ 12.17 hrs Surf.Area= 2,957 sf Storage= 2,556 cf

Plug-Flow detention time= 2.1 min calculated for 0.700 af (100% of inflow)
 Center-of-Mass det. time= 2.1 min (753.8 - 751.7)

Volume	Invert	Avail.Storage	Storage Description		
#1	401.25'	11,230 cf	DETENTION POND (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
401.25	16	16.0	0	0	16
402.00	2,505	355.0	680	680	10,025
403.00	3,174	346.0	2,833	3,513	10,638
404.00	3,860	357.0	3,511	7,025	11,346
405.00	4,561	368.0	4,206	11,230	12,077
Device	Routing	Invert	Outlet Devices		
#1	Primary	401.25'	2.0' long x 3.75' rise Sharp-Crested Rectangular Weir 2 End Contraction(s)		

Primary OutFlow Max=9.45 cfs @ 12.17 hrs HW=402.66' (Free Discharge)
 ↑1=Sharp-Crested Rectangular Weir (Weir Controls 9.45 cfs @ 3.89 fps)

Drainage - Pre

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NOAA 24-hr B 10-Year Rainfall=5.02"

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Summary for Subcatchment 1S: Existing Pond Basin

Runoff = 14.15 cfs @ 12.11 hrs, Volume= 0.823 af, Depth> 4.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 10-Year Rainfall=5.02"

Area (ac)	CN	Description
0.219	79	50-75% Grass cover, Fair, HSG C
0.124	49	50-75% Grass cover, Fair, HSG A
0.113	98	Paved parking, HSG C
1.491	96	Gravel surface, HSG C
* 0.510	98	Roofs, HSG C
0.008	98	Unconnected pavement, HSG C
2.465	93	Weighted Average
1.834		74.40% Pervious Area
0.631		25.60% Impervious Area
0.008		1.27% Unconnected

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

Summary for Subcatchment 2S: Existing Pond Bypass

Runoff = 9.59 cfs @ 12.11 hrs, Volume= 0.536 af, Depth> 3.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 10-Year Rainfall=5.02"

Area (ac)	CN	Description
0.215	79	50-75% Grass cover, Fair, HSG C
0.303	69	50-75% Grass cover, Fair, HSG B
1.271	96	Gravel surface, HSG C
1.789	89	Weighted Average
1.789		100.00% Pervious Area

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

Summary for Reach 1R: Total Pre

Inflow Area = 4.254 ac, 14.83% Impervious, Inflow Depth > 3.83" for 10-Year event

Inflow = 19.98 cfs @ 12.13 hrs, Volume= 1.359 af

Outflow = 19.98 cfs @ 12.13 hrs, Volume= 1.359 af, Atten= 0%, Lag= 0.0 min

Drainage - Pre

NOAA 24-hr B 10-Year Rainfall=5.02"

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

Summary for Pond 1P: Existing Detention Pond

Inflow Area = 2.465 ac, 25.60% Impervious, Inflow Depth > 4.00" for 10-Year event
 Inflow = 14.15 cfs @ 12.11 hrs, Volume= 0.823 af
 Outflow = 11.17 cfs @ 12.17 hrs, Volume= 0.822 af, Atten= 21%, Lag= 3.3 min
 Primary = 11.17 cfs @ 12.17 hrs, Volume= 0.822 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 402.86' @ 12.17 hrs Surf.Area= 3,073 sf Storage= 3,064 cf

Plug-Flow detention time= 2.3 min calculated for 0.820 af (100% of inflow)
 Center-of-Mass det. time= 2.2 min (751.3 - 749.1)

Volume	Invert	Avail.Storage	Storage Description		
#1	401.25'	11,230 cf	DETENTION POND (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
401.25	16	16.0	0	0	16
402.00	2,505	355.0	680	680	10,025
403.00	3,174	346.0	2,833	3,513	10,638
404.00	3,860	357.0	3,511	7,025	11,346
405.00	4,561	368.0	4,206	11,230	12,077
Device	Routing	Invert	Outlet Devices		
#1	Primary	401.25'	2.0' long x 3.75' rise Sharp-Crested Rectangular Weir 2 End Contraction(s)		

Primary OutFlow Max=10.94 cfs @ 12.17 hrs HW=402.83' (Free Discharge)

↑ **1=Sharp-Crested Rectangular Weir** (Weir Controls 10.94 cfs @ 4.11 fps)

Drainage - Pre

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NOAA 24-hr B 25-Year Rainfall=5.92"

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Summary for Subcatchment 1S: Existing Pond Basin

Runoff = 16.92 cfs @ 12.11 hrs, Volume= 0.994 af, Depth> 4.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 25-Year Rainfall=5.92"

Area (ac)	CN	Description
0.219	79	50-75% Grass cover, Fair, HSG C
0.124	49	50-75% Grass cover, Fair, HSG A
0.113	98	Paved parking, HSG C
1.491	96	Gravel surface, HSG C
* 0.510	98	Roofs, HSG C
0.008	98	Unconnected pavement, HSG C
2.465	93	Weighted Average
1.834		74.40% Pervious Area
0.631		25.60% Impervious Area
0.008		1.27% Unconnected

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

Summary for Subcatchment 2S: Existing Pond Bypass

Runoff = 11.64 cfs @ 12.11 hrs, Volume= 0.659 af, Depth> 4.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 25-Year Rainfall=5.92"

Area (ac)	CN	Description
0.215	79	50-75% Grass cover, Fair, HSG C
0.303	69	50-75% Grass cover, Fair, HSG B
1.271	96	Gravel surface, HSG C
1.789	89	Weighted Average
1.789		100.00% Pervious Area

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

Summary for Reach 1R: Total Pre

Inflow Area = 4.254 ac, 14.83% Impervious, Inflow Depth > 4.66" for 25-Year event

Inflow = 23.98 cfs @ 12.13 hrs, Volume= 1.654 af

Outflow = 23.98 cfs @ 12.13 hrs, Volume= 1.654 af, Atten= 0%, Lag= 0.0 min

Drainage - Pre

NOAA 24-hr B 25-Year Rainfall=5.92"

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

Summary for Pond 1P: Existing Detention Pond

Inflow Area = 2.465 ac, 25.60% Impervious, Inflow Depth > 4.84" for 25-Year event
 Inflow = 16.92 cfs @ 12.11 hrs, Volume= 0.994 af
 Outflow = 13.30 cfs @ 12.17 hrs, Volume= 0.994 af, Atten= 21%, Lag= 3.3 min
 Primary = 13.30 cfs @ 12.17 hrs, Volume= 0.994 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 403.09' @ 12.17 hrs Surf.Area= 3,232 sf Storage= 3,797 cf

Plug-Flow detention time= 2.4 min calculated for 0.991 af (100% of inflow)
 Center-of-Mass det. time= 2.4 min (748.5 - 746.1)

Volume	Invert	Avail.Storage	Storage Description		
#1	401.25'	11,230 cf	DETENTION POND (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
401.25	16	16.0	0	0	16
402.00	2,505	355.0	680	680	10,025
403.00	3,174	346.0	2,833	3,513	10,638
404.00	3,860	357.0	3,511	7,025	11,346
405.00	4,561	368.0	4,206	11,230	12,077

Device	Routing	Invert	Outlet Devices
#1	Primary	401.25'	2.0' long x 3.75' rise Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=13.04 cfs @ 12.17 hrs HW=403.06' (Free Discharge)

↑ **1=Sharp-Crested Rectangular Weir** (Weir Controls 13.04 cfs @ 4.40 fps)

Drainage - Pre

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NOAA 24-hr B 50-Year Rainfall=6.65"

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Summary for Subcatchment 1S: Existing Pond Basin

Runoff = 19.16 cfs @ 12.11 hrs, Volume= 1.134 af, Depth> 5.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 50-Year Rainfall=6.65"

Area (ac)	CN	Description
0.219	79	50-75% Grass cover, Fair, HSG C
0.124	49	50-75% Grass cover, Fair, HSG A
0.113	98	Paved parking, HSG C
1.491	96	Gravel surface, HSG C
* 0.510	98	Roofs, HSG C
0.008	98	Unconnected pavement, HSG C
2.465	93	Weighted Average
1.834		74.40% Pervious Area
0.631		25.60% Impervious Area
0.008		1.27% Unconnected

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

Summary for Subcatchment 2S: Existing Pond Bypass

Runoff = 13.29 cfs @ 12.11 hrs, Volume= 0.760 af, Depth> 5.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 50-Year Rainfall=6.65"

Area (ac)	CN	Description
0.215	79	50-75% Grass cover, Fair, HSG C
0.303	69	50-75% Grass cover, Fair, HSG B
1.271	96	Gravel surface, HSG C
1.789	89	Weighted Average
1.789		100.00% Pervious Area

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

Summary for Reach 1R: Total Pre

Inflow Area = 4.254 ac, 14.83% Impervious, Inflow Depth > 5.34" for 50-Year event

Inflow = 27.19 cfs @ 12.13 hrs, Volume= 1.894 af

Outflow = 27.19 cfs @ 12.13 hrs, Volume= 1.894 af, Atten= 0%, Lag= 0.0 min

Drainage - Pre

NOAA 24-hr B 50-Year Rainfall=6.65"

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

Summary for Pond 1P: Existing Detention Pond

Inflow Area = 2.465 ac, 25.60% Impervious, Inflow Depth > 5.52" for 50-Year event
 Inflow = 19.16 cfs @ 12.11 hrs, Volume= 1.134 af
 Outflow = 15.00 cfs @ 12.17 hrs, Volume= 1.134 af, Atten= 22%, Lag= 3.3 min
 Primary = 15.00 cfs @ 12.17 hrs, Volume= 1.134 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 403.27' @ 12.17 hrs Surf.Area= 3,354 sf Storage= 4,399 cf

Plug-Flow detention time= 2.6 min calculated for 1.130 af (100% of inflow)
 Center-of-Mass det. time= 2.5 min (746.7 - 744.2)

Volume	Invert	Avail.Storage	Storage Description		
#1	401.25'	11,230 cf	DETENTION POND (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
401.25	16	16.0	0	0	16
402.00	2,505	355.0	680	680	10,025
403.00	3,174	346.0	2,833	3,513	10,638
404.00	3,860	357.0	3,511	7,025	11,346
405.00	4,561	368.0	4,206	11,230	12,077
Device	Routing	Invert	Outlet Devices		
#1	Primary	401.25'	2.0' long x 3.75' rise Sharp-Crested Rectangular Weir 2 End Contraction(s)		

Primary OutFlow Max=14.70 cfs @ 12.17 hrs HW=403.24' (Free Discharge)

↑ **1=Sharp-Crested Rectangular Weir** (Weir Controls 14.70 cfs @ 4.61 fps)

Drainage - Pre

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NOAA 24-hr B 100-Year Rainfall=7.40"

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Summary for Subcatchment 1S: Existing Pond Basin

Runoff = 21.45 cfs @ 12.11 hrs, Volume= 1.277 af, Depth> 6.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 100-Year Rainfall=7.40"

Area (ac)	CN	Description
0.219	79	50-75% Grass cover, Fair, HSG C
0.124	49	50-75% Grass cover, Fair, HSG A
0.113	98	Paved parking, HSG C
1.491	96	Gravel surface, HSG C
* 0.510	98	Roofs, HSG C
0.008	98	Unconnected pavement, HSG C
2.465	93	Weighted Average
1.834		74.40% Pervious Area
0.631		25.60% Impervious Area
0.008		1.27% Unconnected

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

Summary for Subcatchment 2S: Existing Pond Bypass

Runoff = 14.98 cfs @ 12.11 hrs, Volume= 0.864 af, Depth> 5.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 100-Year Rainfall=7.40"

Area (ac)	CN	Description
0.215	79	50-75% Grass cover, Fair, HSG C
0.303	69	50-75% Grass cover, Fair, HSG B
1.271	96	Gravel surface, HSG C
1.789	89	Weighted Average
1.789		100.00% Pervious Area

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

Summary for Reach 1R: Total Pre

Inflow Area = 4.254 ac, 14.83% Impervious, Inflow Depth > 6.04" for 100-Year event

Inflow = 30.43 cfs @ 12.13 hrs, Volume= 2.140 af

Outflow = 30.43 cfs @ 12.13 hrs, Volume= 2.140 af, Atten= 0%, Lag= 0.0 min

Drainage - Pre

NOAA 24-hr B 100-Year Rainfall=7.40"

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

Summary for Pond 1P: Existing Detention Pond

Inflow Area = 2.465 ac, 25.60% Impervious, Inflow Depth > 6.22" for 100-Year event
 Inflow = 21.45 cfs @ 12.11 hrs, Volume= 1.277 af
 Outflow = 16.70 cfs @ 12.17 hrs, Volume= 1.277 af, Atten= 22%, Lag= 3.4 min
 Primary = 16.70 cfs @ 12.17 hrs, Volume= 1.277 af

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

Peak Elev= 403.46' @ 12.17 hrs Surf.Area= 3,478 sf Storage= 5,028 cf

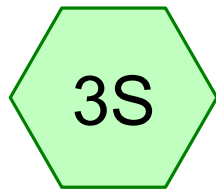
Plug-Flow detention time= 2.7 min calculated for 1.273 af (100% of inflow)

Center-of-Mass det. time= 2.6 min (745.3 - 742.7)

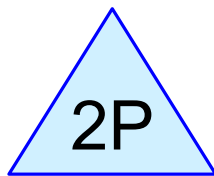
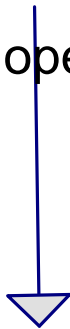
Volume	Invert	Avail.Storage	Storage Description		
#1	401.25'	11,230 cf	DETENTION POND (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
401.25	16	16.0	0	0	16
402.00	2,505	355.0	680	680	10,025
403.00	3,174	346.0	2,833	3,513	10,638
404.00	3,860	357.0	3,511	7,025	11,346
405.00	4,561	368.0	4,206	11,230	12,077
Device	Routing	Invert	Outlet Devices		
#1	Primary	401.25'	2.0' long x 3.75' rise Sharp-Crested Rectangular Weir 2 End Contraction(s)		

Primary OutFlow Max=16.37 cfs @ 12.17 hrs HW=403.42' (Free Discharge)↑ **1=Sharp-Crested Rectangular Weir** (Weir Controls 16.37 cfs @ 4.82 fps)

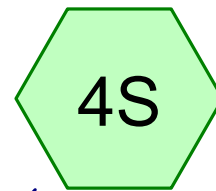
POST-DEVELOPED



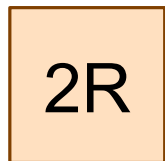
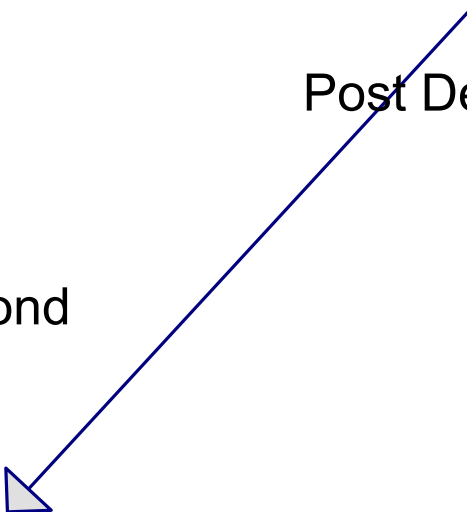
Post Developed to Pond



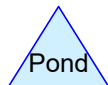
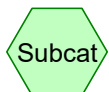
Existing Detention Pond



Post Developed Pond
Bypass



Total Post



Routing Diagram for Drainage - Pre

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Drainage - Pre

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NOAA 24-hr B 2-Year Rainfall=3.60"

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Summary for Subcatchment 3S: Post Developed to Pond

Runoff = 15.23 cfs @ 12.11 hrs, Volume= 0.874 af, Depth> 2.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 2-Year Rainfall=3.60"

Area (ac)	CN	Description
0.369	79	50-75% Grass cover, Fair, HSG C
0.124	49	50-75% Grass cover, Fair, HSG A
0.639	98	Paved parking, HSG C
1.804	96	Gravel surface, HSG C
* 0.821	98	Roofs, HSG C
0.008	98	Unconnected pavement, HSG C
3.765	94	Weighted Average
2.297		61.01% Pervious Area
1.468		38.99% Impervious Area
0.008		0.54% Unconnected

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

Summary for Subcatchment 4S: Post Developed Pond Bypass

Runoff = 1.19 cfs @ 12.12 hrs, Volume= 0.062 af, Depth> 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 2-Year Rainfall=3.60"

Area (ac)	CN	Description
0.315	69	50-75% Grass cover, Fair, HSG B
0.173	96	Gravel surface, HSG C
0.488	79	Weighted Average
0.488		100.00% Pervious Area

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

Summary for Reach 2R: Total Post

Inflow Area = 4.253 ac, 34.52% Impervious, Inflow Depth > 2.64" for 2-Year event

Inflow = 13.03 cfs @ 12.16 hrs, Volume= 0.936 af

Outflow = 13.03 cfs @ 12.16 hrs, Volume= 0.936 af, Atten= 0%, Lag= 0.0 min

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

Drainage - Pre

NOAA 24-hr B 2-Year Rainfall=3.60"

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Summary for Pond 2P: Existing Detention Pond

Inflow Area = 3.765 ac, 38.99% Impervious, Inflow Depth > 2.79" for 2-Year event
 Inflow = 15.23 cfs @ 12.11 hrs, Volume= 0.874 af
 Outflow = 11.99 cfs @ 12.17 hrs, Volume= 0.874 af, Atten= 21%, Lag= 3.3 min
 Primary = 11.99 cfs @ 12.17 hrs, Volume= 0.874 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 402.95' @ 12.17 hrs Surf.Area= 3,135 sf Storage= 3,340 cf

Plug-Flow detention time= 2.4 min calculated for 0.871 af (100% of inflow)
 Center-of-Mass det. time= 2.3 min (754.7 - 752.4)

Volume	Invert	Avail.Storage	Storage Description
#1	401.25'	11,230 cf	DETENTION POND (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
401.25	16	16.0	0	0	16
402.00	2,505	355.0	680	680	10,025
403.00	3,174	346.0	2,833	3,513	10,638
404.00	3,860	357.0	3,511	7,025	11,346
405.00	4,561	368.0	4,206	11,230	12,077

Device	Routing	Invert	Outlet Devices
#1	Primary	401.25'	2.0' long x 3.75' rise Sharp-Crested Rectangular Weir 2 End Contraction(s)
#2	Primary	405.00'	10.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=11.74 cfs @ 12.17 hrs HW=402.92' (Free Discharge)

1=Sharp-Crested Rectangular Weir (Weir Controls 11.74 cfs @ 4.22 fps)

2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Drainage - Pre

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NOAA 24-hr B 5-Year Rainfall=4.39"

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Summary for Subcatchment 3S: Post Developed to Pond

Runoff = 18.96 cfs @ 12.11 hrs, Volume= 1.104 af, Depth> 3.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 5-Year Rainfall=4.39"

Area (ac)	CN	Description
0.369	79	50-75% Grass cover, Fair, HSG C
0.124	49	50-75% Grass cover, Fair, HSG A
0.639	98	Paved parking, HSG C
1.804	96	Gravel surface, HSG C
* 0.821	98	Roofs, HSG C
0.008	98	Unconnected pavement, HSG C
3.765	94	Weighted Average
2.297		61.01% Pervious Area
1.468		38.99% Impervious Area
0.008		0.54% Unconnected

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

Summary for Subcatchment 4S: Post Developed Pond Bypass

Runoff = 1.66 cfs @ 12.12 hrs, Volume= 0.087 af, Depth> 2.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 5-Year Rainfall=4.39"

Area (ac)	CN	Description
0.315	69	50-75% Grass cover, Fair, HSG B
0.173	96	Gravel surface, HSG C
0.488	79	Weighted Average
0.488		100.00% Pervious Area

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

Summary for Reach 2R: Total Post

Inflow Area = 4.253 ac, 34.52% Impervious, Inflow Depth > 3.36" for 5-Year event

Inflow = 16.26 cfs @ 12.16 hrs, Volume= 1.191 af

Outflow = 16.26 cfs @ 12.16 hrs, Volume= 1.191 af, Atten= 0%, Lag= 0.0 min

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

Drainage - Pre

NOAA 24-hr B 5-Year Rainfall=4.39"

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Summary for Pond 2P: Existing Detention Pond

Inflow Area = 3.765 ac, 38.99% Impervious, Inflow Depth > 3.52" for 5-Year event
 Inflow = 18.96 cfs @ 12.11 hrs, Volume= 1.104 af
 Outflow = 14.83 cfs @ 12.17 hrs, Volume= 1.104 af, Atten= 22%, Lag= 3.3 min
 Primary = 14.83 cfs @ 12.17 hrs, Volume= 1.104 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 403.25' @ 12.17 hrs Surf.Area= 3,342 sf Storage= 4,339 cf

Plug-Flow detention time= 2.6 min calculated for 1.104 af (100% of inflow)
 Center-of-Mass det. time= 2.5 min (751.0 - 748.5)

Volume	Invert	Avail.Storage	Storage Description
#1	401.25'	11,230 cf	DETENTION POND (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
401.25	16	16.0	0	0	16
402.00	2,505	355.0	680	680	10,025
403.00	3,174	346.0	2,833	3,513	10,638
404.00	3,860	357.0	3,511	7,025	11,346
405.00	4,561	368.0	4,206	11,230	12,077

Device	Routing	Invert	Outlet Devices
#1	Primary	401.25'	2.0' long x 3.75' rise Sharp-Crested Rectangular Weir 2 End Contraction(s)
#2	Primary	405.00'	10.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=14.53 cfs @ 12.17 hrs HW=403.22' (Free Discharge)

1=Sharp-Crested Rectangular Weir (Weir Controls 14.53 cfs @ 4.59 fps)

2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Drainage - Pre

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NOAA 24-hr B 10-Year Rainfall=5.02"

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Summary for Subcatchment 3S: Post Developed to Pond

Runoff = 21.92 cfs @ 12.11 hrs, Volume= 1.288 af, Depth> 4.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 10-Year Rainfall=5.02"

Area (ac)	CN	Description
0.369	79	50-75% Grass cover, Fair, HSG C
0.124	49	50-75% Grass cover, Fair, HSG A
0.639	98	Paved parking, HSG C
1.804	96	Gravel surface, HSG C
* 0.821	98	Roofs, HSG C
0.008	98	Unconnected pavement, HSG C
3.765	94	Weighted Average
2.297		61.01% Pervious Area
1.468		38.99% Impervious Area
0.008		0.54% Unconnected

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

Summary for Subcatchment 4S: Post Developed Pond Bypass

Runoff = 2.04 cfs @ 12.12 hrs, Volume= 0.108 af, Depth> 2.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 10-Year Rainfall=5.02"

Area (ac)	CN	Description
0.315	69	50-75% Grass cover, Fair, HSG B
0.173	96	Gravel surface, HSG C
0.488	79	Weighted Average
0.488		100.00% Pervious Area

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

Summary for Reach 2R: Total Post

Inflow Area = 4.253 ac, 34.52% Impervious, Inflow Depth > 3.94" for 10-Year event

Inflow = 18.78 cfs @ 12.16 hrs, Volume= 1.395 af

Outflow = 18.78 cfs @ 12.16 hrs, Volume= 1.395 af, Atten= 0%, Lag= 0.0 min

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

Drainage - Pre

NOAA 24-hr B 10-Year Rainfall=5.02"

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Summary for Pond 2P: Existing Detention Pond

Inflow Area = 3.765 ac, 38.99% Impervious, Inflow Depth > 4.10" for 10-Year event
 Inflow = 21.92 cfs @ 12.11 hrs, Volume= 1.288 af
 Outflow = 17.03 cfs @ 12.17 hrs, Volume= 1.288 af, Atten= 22%, Lag= 3.4 min
 Primary = 17.03 cfs @ 12.17 hrs, Volume= 1.288 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 403.49' @ 12.17 hrs Surf.Area= 3,503 sf Storage= 5,153 cf

Plug-Flow detention time= 2.7 min calculated for 1.283 af (100% of inflow)
 Center-of-Mass det. time= 2.6 min (748.8 - 746.1)

Volume	Invert	Avail.Storage	Storage Description
#1	401.25'	11,230 cf	DETENTION POND (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
401.25	16	16.0	0	0	16
402.00	2,505	355.0	680	680	10,025
403.00	3,174	346.0	2,833	3,513	10,638
404.00	3,860	357.0	3,511	7,025	11,346
405.00	4,561	368.0	4,206	11,230	12,077

Device	Routing	Invert	Outlet Devices
#1	Primary	401.25'	2.0' long x 3.75' rise Sharp-Crested Rectangular Weir 2 End Contraction(s)
#2	Primary	405.00'	10.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=16.69 cfs @ 12.17 hrs HW=403.45' (Free Discharge)

1=Sharp-Crested Rectangular Weir (Weir Controls 16.69 cfs @ 4.86 fps)

2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Drainage - Pre

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NOAA 24-hr B 25-Year Rainfall=5.92"

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Summary for Subcatchment 3S: Post Developed to Pond

Runoff = 26.12 cfs @ 12.11 hrs, Volume= 1.550 af, Depth> 4.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 25-Year Rainfall=5.92"

Area (ac)	CN	Description
0.369	79	50-75% Grass cover, Fair, HSG C
0.124	49	50-75% Grass cover, Fair, HSG A
0.639	98	Paved parking, HSG C
1.804	96	Gravel surface, HSG C
* 0.821	98	Roofs, HSG C
0.008	98	Unconnected pavement, HSG C
3.765	94	Weighted Average
2.297		61.01% Pervious Area
1.468		38.99% Impervious Area
0.008		0.54% Unconnected

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

Summary for Subcatchment 4S: Post Developed Pond Bypass

Runoff = 2.59 cfs @ 12.12 hrs, Volume= 0.138 af, Depth> 3.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 25-Year Rainfall=5.92"

Area (ac)	CN	Description
0.315	69	50-75% Grass cover, Fair, HSG B
0.173	96	Gravel surface, HSG C
0.488	79	Weighted Average
0.488		100.00% Pervious Area

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

Summary for Reach 2R: Total Post

Inflow Area = 4.253 ac, 34.52% Impervious, Inflow Depth > 4.76" for 25-Year event

Inflow = 22.25 cfs @ 12.16 hrs, Volume= 1.688 af

Outflow = 22.25 cfs @ 12.16 hrs, Volume= 1.688 af, Atten= 0%, Lag= 0.0 min

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

Drainage - Pre

NOAA 24-hr B 25-Year Rainfall=5.92"

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Summary for Pond 2P: Existing Detention Pond

Inflow Area = 3.765 ac, 38.99% Impervious, Inflow Depth > 4.94" for 25-Year event
 Inflow = 26.12 cfs @ 12.11 hrs, Volume= 1.550 af
 Outflow = 20.05 cfs @ 12.17 hrs, Volume= 1.550 af, Atten= 23%, Lag= 3.5 min
 Primary = 20.05 cfs @ 12.17 hrs, Volume= 1.550 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 403.82' @ 12.17 hrs Surf.Area= 3,733 sf Storage= 6,351 cf

Plug-Flow detention time= 2.9 min calculated for 1.545 af (100% of inflow)
 Center-of-Mass det. time= 2.8 min (746.3 - 743.5)

Volume	Invert	Avail.Storage	Storage Description
#1	401.25'	11,230 cf	DETENTION POND (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
401.25	16	16.0	0	0	16
402.00	2,505	355.0	680	680	10,025
403.00	3,174	346.0	2,833	3,513	10,638
404.00	3,860	357.0	3,511	7,025	11,346
405.00	4,561	368.0	4,206	11,230	12,077

Device	Routing	Invert	Outlet Devices
#1	Primary	401.25'	2.0' long x 3.75' rise Sharp-Crested Rectangular Weir 2 End Contraction(s)
#2	Primary	405.00'	10.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=19.66 cfs @ 12.17 hrs HW=403.78' (Free Discharge)

1=Sharp-Crested Rectangular Weir (Weir Controls 19.66 cfs @ 5.20 fps)

2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Drainage - Pre

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NOAA 24-hr B 50-Year Rainfall=6.65"

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Summary for Subcatchment 3S: Post Developed to Pond

Runoff = 29.52 cfs @ 12.11 hrs, Volume= 1.763 af, Depth> 5.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 50-Year Rainfall=6.65"

Area (ac)	CN	Description
0.369	79	50-75% Grass cover, Fair, HSG C
0.124	49	50-75% Grass cover, Fair, HSG A
0.639	98	Paved parking, HSG C
1.804	96	Gravel surface, HSG C
* 0.821	98	Roofs, HSG C
0.008	98	Unconnected pavement, HSG C
3.765	94	Weighted Average
2.297		61.01% Pervious Area
1.468		38.99% Impervious Area
0.008		0.54% Unconnected

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

Summary for Subcatchment 4S: Post Developed Pond Bypass

Runoff = 3.04 cfs @ 12.12 hrs, Volume= 0.163 af, Depth> 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 50-Year Rainfall=6.65"

Area (ac)	CN	Description
0.315	69	50-75% Grass cover, Fair, HSG B
0.173	96	Gravel surface, HSG C
0.488	79	Weighted Average
0.488		100.00% Pervious Area

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

Summary for Reach 2R: Total Post

Inflow Area = 4.253 ac, 34.52% Impervious, Inflow Depth > 5.44" for 50-Year event

Inflow = 24.95 cfs @ 12.16 hrs, Volume= 1.927 af

Outflow = 24.95 cfs @ 12.16 hrs, Volume= 1.927 af, Atten= 0%, Lag= 0.0 min

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

Drainage - Pre

NOAA 24-hr B 50-Year Rainfall=6.65"

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Summary for Pond 2P: Existing Detention Pond

Inflow Area = 3.765 ac, 38.99% Impervious, Inflow Depth > 5.62" for 50-Year event
 Inflow = 29.52 cfs @ 12.11 hrs, Volume= 1.763 af
 Outflow = 22.39 cfs @ 12.17 hrs, Volume= 1.763 af, Atten= 24%, Lag= 3.6 min
 Primary = 22.39 cfs @ 12.17 hrs, Volume= 1.763 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 404.09' @ 12.17 hrs Surf.Area= 3,918 sf Storage= 7,360 cf

Plug-Flow detention time= 3.0 min calculated for 1.757 af (100% of inflow)
 Center-of-Mass det. time= 3.0 min (744.8 - 741.9)

Volume	Invert	Avail.Storage	Storage Description
#1	401.25'	11,230 cf	DETENTION POND (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
401.25	16	16.0	0	0	16
402.00	2,505	355.0	680	680	10,025
403.00	3,174	346.0	2,833	3,513	10,638
404.00	3,860	357.0	3,511	7,025	11,346
405.00	4,561	368.0	4,206	11,230	12,077

Device	Routing	Invert	Outlet Devices
#1	Primary	401.25'	2.0' long x 3.75' rise Sharp-Crested Rectangular Weir 2 End Contraction(s)
#2	Primary	405.00'	10.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=21.97 cfs @ 12.17 hrs HW=404.04' (Free Discharge)

1=Sharp-Crested Rectangular Weir (Weir Controls 21.97 cfs @ 5.46 fps)

2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Drainage - Pre

Prepared by Klobner Engineering Services

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NOAA 24-hr B 100-Year Rainfall=7.40"

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Summary for Subcatchment 3S: Post Developed to Pond

Runoff = 33.00 cfs @ 12.11 hrs, Volume= 1.982 af, Depth> 6.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 100-Year Rainfall=7.40"

Area (ac)	CN	Description
0.369	79	50-75% Grass cover, Fair, HSG C
0.124	49	50-75% Grass cover, Fair, HSG A
0.639	98	Paved parking, HSG C
1.804	96	Gravel surface, HSG C
* 0.821	98	Roofs, HSG C
0.008	98	Unconnected pavement, HSG C
3.765	94	Weighted Average
2.297		61.01% Pervious Area
1.468		38.99% Impervious Area
0.008		0.54% Unconnected

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

Summary for Subcatchment 4S: Post Developed Pond Bypass

Runoff = 3.51 cfs @ 12.11 hrs, Volume= 0.190 af, Depth> 4.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 100-Year Rainfall=7.40"

Area (ac)	CN	Description
0.315	69	50-75% Grass cover, Fair, HSG B
0.173	96	Gravel surface, HSG C
0.488	79	Weighted Average
0.488		100.00% Pervious Area

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

Summary for Reach 2R: Total PostInflow Area = 4.253 ac, 34.52% Impervious, Inflow Depth > 6.13" for 100-Year event
Inflow = 27.61 cfs @ 12.16 hrs, Volume= 2.172 af
Outflow = 27.61 cfs @ 12.16 hrs, Volume= 2.172 af, Atten= 0%, Lag= 0.0 min

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

Drainage - Pre

NOAA 24-hr B 100-Year Rainfall=7.40"

Prepared by Klover Engineering Services

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Summary for Pond 2P: Existing Detention Pond

Inflow Area = 3.765 ac, 38.99% Impervious, Inflow Depth > 6.32" for 100-Year event
 Inflow = 33.00 cfs @ 12.11 hrs, Volume= 1.982 af
 Outflow = 24.68 cfs @ 12.17 hrs, Volume= 1.981 af, Atten= 25%, Lag= 3.6 min
 Primary = 24.68 cfs @ 12.17 hrs, Volume= 1.981 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 404.35' @ 12.17 hrs Surf.Area= 4,102 sf Storage= 8,436 cf

Plug-Flow detention time= 3.2 min calculated for 1.981 af (100% of inflow)
 Center-of-Mass det. time= 3.1 min (743.6 - 740.5)

Volume	Invert	Avail.Storage	Storage Description
#1	401.25'	11,230 cf	DETENTION POND (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
401.25	16	16.0	0	0	16
402.00	2,505	355.0	680	680	10,025
403.00	3,174	346.0	2,833	3,513	10,638
404.00	3,860	357.0	3,511	7,025	11,346
405.00	4,561	368.0	4,206	11,230	12,077

Device	Routing	Invert	Outlet Devices
#1	Primary	401.25'	2.0' long x 3.75' rise Sharp-Crested Rectangular Weir 2 End Contraction(s)
#2	Primary	405.00'	10.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=24.24 cfs @ 12.17 hrs HW=404.30' (Free Discharge)

1=Sharp-Crested Rectangular Weir (Weir Controls 24.24 cfs @ 5.71 fps)

2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)


Hydrologic Soil Group—Cheatham County, Tennessee (Soil Map)



Hydrologic Soil Group—Cheatham County, Tennessee (Soil Map)

MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons





 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines


 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points






 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available


Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cheatham County, Tennessee
 Survey Area Data: Version 14, May 29, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 21, 2019—Apr 10, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
En	Ennis gravelly silt loam, occasionally flooded	A	0.4	5.6%
Me	Melvin silt loam, frequently flooded	B/D	3.6	48.9%
Ne	Newark silt loam, frequently flooded	B/D	0.5	7.1%
Pt	Pits, quarry		1.4	19.3%
TrC2	Tarklin gravelly silt loam, 5 to 12 percent slopes, eroded	D	0.5	6.4%
WfA	Wolftever silty clay loam, 0 to 2 percent slopes, occasionally flooded	C	1.0	12.8%
Totals for Area of Interest			7.4	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher