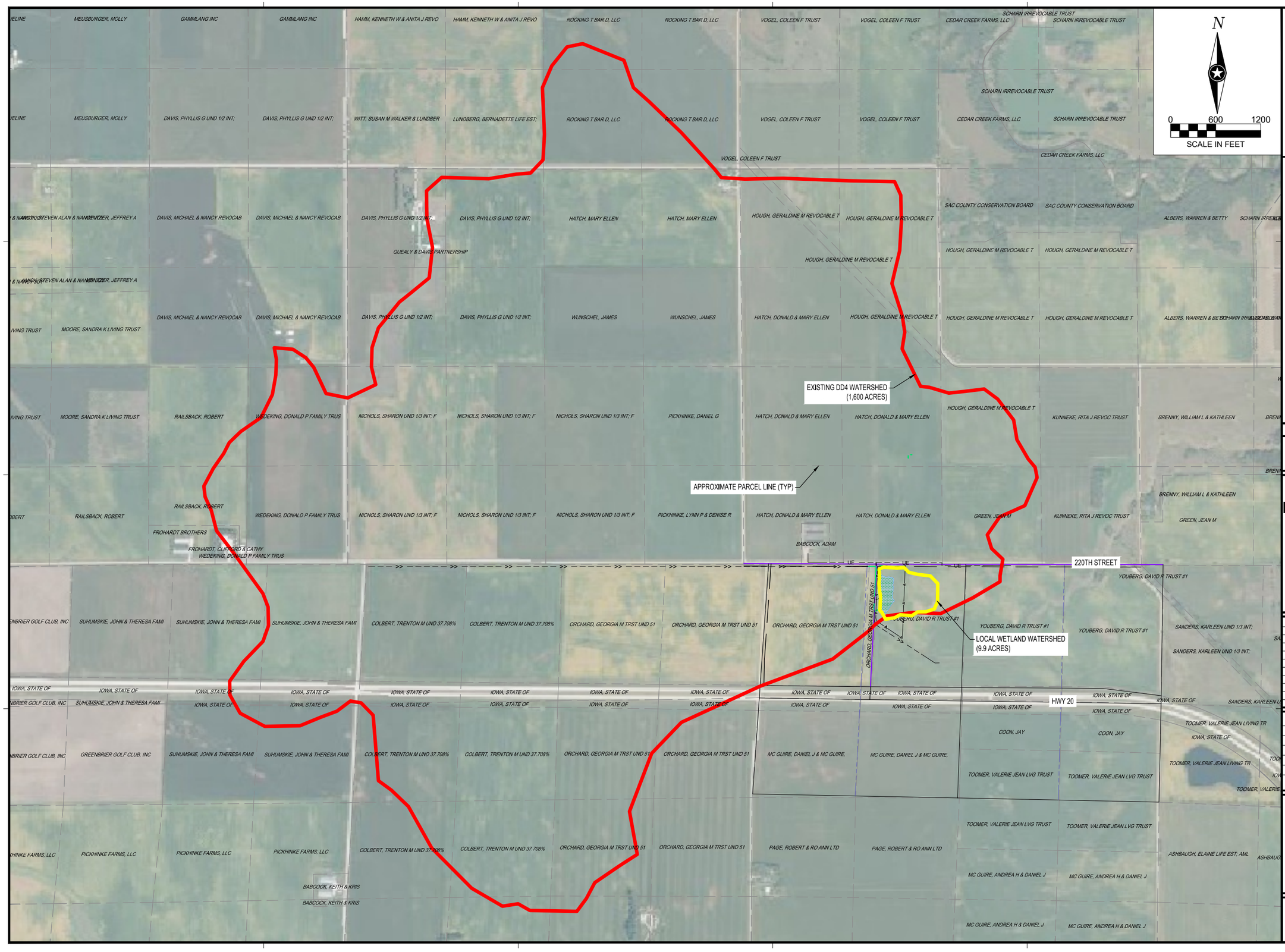


ISG

IOWA DEPARTMENT OF
AGRICULTURE &
LAND STEWARDSHIP

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PROJECT

IDALS SAC883604B

NUTRIENT REDUCTION WETLAND

SAC COUNTY IOWA

REVISION SCHEDULE

DATE	DESCRIPTION	BY

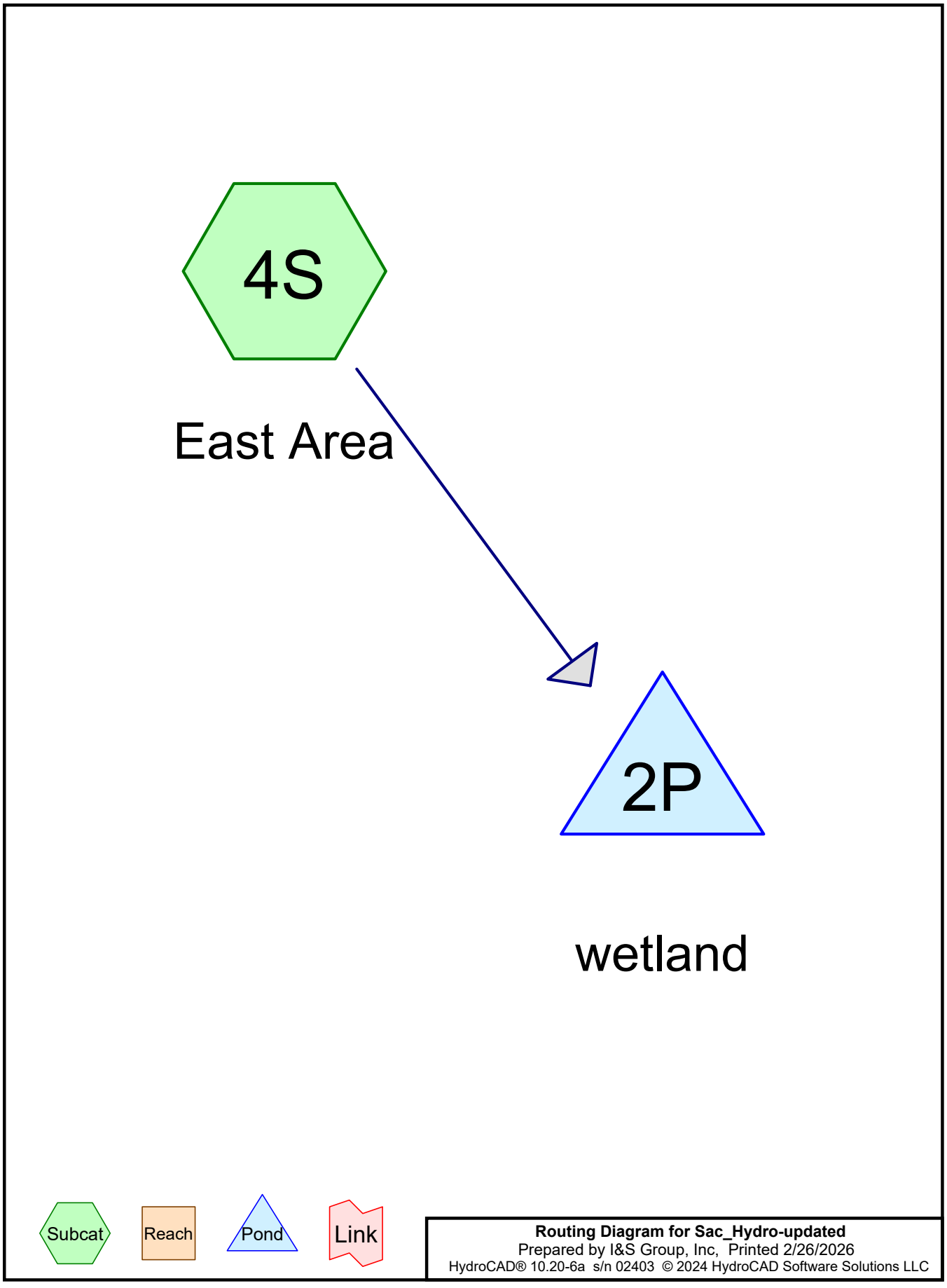
PROJECT NO.	24-31714
FILE NAME	31714-C2-WTRSHD
DRAWN BY	JAT
DESIGNED BY	HPT
REVIEWED BY	SDP
ORIGINAL ISSUE DATE	12/30/2025
CLIENT PROJECT NO.	-

TITLE

EXISTING SITE - WATERSHED

SHEET

C2-10



Routing Diagram for Sac_Hydro-updated
Prepared by I&S Group, Inc, Printed 2/26/2026
HydroCAD® 10.20-6a s/n 02403 © 2024 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1yr-24hr	MSE 24-hr	3	Default	24.00	1	3.00	2
2	5yr-24hr	MSE 24-hr	3	Default	24.00	1	3.70	2
3	10yr-24hr	MSE 24-hr	3	Default	24.00	1	4.50	2
4	25yr-24hr	MSE 24-hr	3	Default	24.00	1	5.60	2
5	50yr-24hr	MSE 24-hr	3	Default	24.00	1	6.60	2
6	100yr-24hr	MSE 24-hr	3	Default	24.00	1	7.80	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
9.890	78	Row crops, straight row, Good, HSG B (4S)
9.890	**78**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
9.890	HSG B	4S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
9.890		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	9.890	0.000	0.000	0.000	9.890	Row crops, straight row, Good	4S
0.000	**9.890**	**0.000**	**0.000**	**0.000**	**9.890**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	2P	1,275.00	1,274.74	35.0	0.0074	0.013	0.0	21.0	0.0	
2	2P	1,275.20	1,275.05	23.0	0.0065	0.013	0.0	18.0	0.0	
3	2P	1,275.30	1,275.20	23.0	0.0043	0.013	0.0	18.0	0.0	

Time span=0.00-100.00 hrs, dt=0.05 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment4S: East Area Runoff Area=9.890 ac 0.00% Impervious Runoff Depth=1.13"
Flow Length=816' Tc=67.0 min CN=78 Runoff=5.76 cfs 0.930 af

Pond 2P: wetland Peak Elev=1,277.87' Storage=1.710 af Inflow=7.09 cfs 11.928 af
Outflow=3.63 cfs 11.583 af

Total Runoff Area = 9.890 ac Runoff Volume = 0.930 af Average Runoff Depth = 1.13"
100.00% Pervious = 9.890 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 4S: East Area

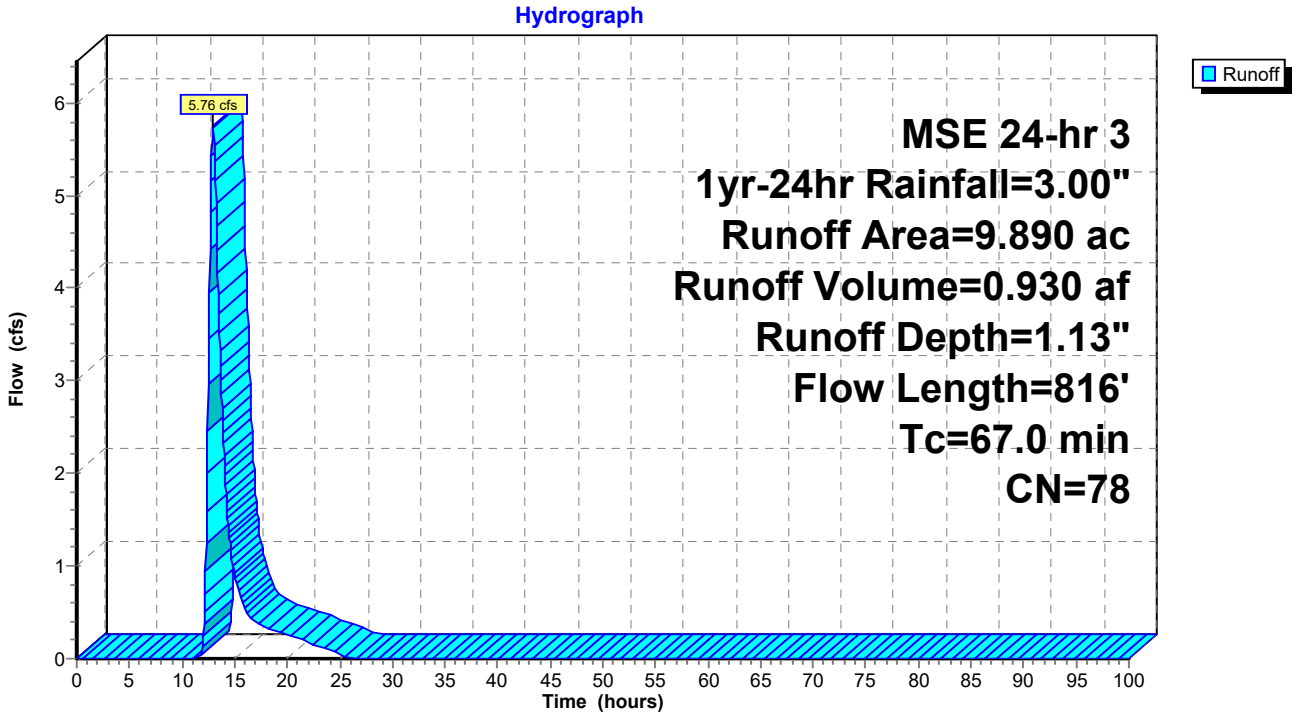
Runoff = 5.76 cfs @ 12.96 hrs, Volume= 0.930 af, Depth= 1.13"
Routed to Pond 2P : wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1yr-24hr Rainfall=3.00"

Area (ac)	CN	Description
9.890	78	Row crops, straight row, Good, HSG B
9.890		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.4	300	0.0050	0.25		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 3.00"
13.1	300	0.0150	0.38		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 3.00"
33.5	216	0.0120	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
67.0	816	Total			

Subcatchment 4S: East Area



Summary for Pond 2P: wetland

[44] Hint: Outlet device #5 is below defined storage

Inflow Area = 9.890 ac, 0.00% Impervious, Inflow Depth > 14.47" for 1yr-24hr event
Inflow = 7.09 cfs @ 12.96 hrs, Volume= 11.928 af, Incl. 1.33 cfs Base Flow
Outflow = 3.63 cfs @ 13.96 hrs, Volume= 11.583 af, Atten= 49%, Lag= 60.1 min
Primary = 3.63 cfs @ 13.96 hrs, Volume= 11.583 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Starting Elev= 1,277.50' Surf.Area= 1.683 ac Storage= 0.996 af
Peak Elev= 1,277.87' @ 13.96 hrs Surf.Area= 2.176 ac Storage= 1.710 af (0.714 af above start)

Plug-Flow detention time= 678.9 min calculated for 10.585 af (89% of inflow)
Center-of-Mass det. time= 89.4 min (2,923.9 - 2,834.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,275.50'	3.074 af	**Custom Stage Data (Prismatic)** Listed below

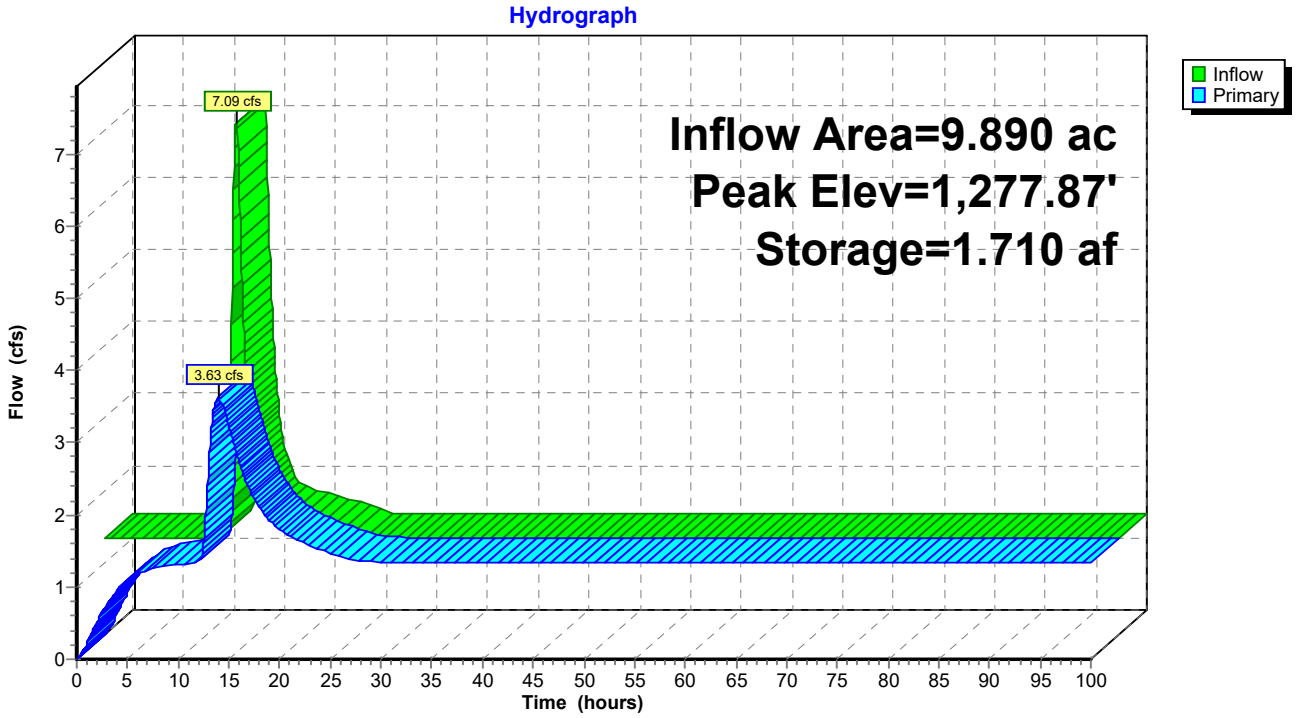
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,275.50	0.002	0.000	0.000
1,275.75	0.020	0.003	0.003
1,276.00	0.050	0.009	0.011
1,276.25	0.080	0.016	0.028
1,276.50	0.120	0.025	0.053
1,276.75	0.580	0.087	0.140
1,277.00	0.930	0.189	0.329
1,277.25	1.360	0.286	0.615
1,277.50	1.683	0.380	0.996
1,277.75	2.000	0.460	1.456
1,278.00	2.380	0.547	2.003
1,278.25	2.740	0.640	2.643
1,278.40	3.000	0.431	3.074

Device	Routing	Invert	Outlet Devices
#1	Primary	1,275.00'	**21.0" Round Culvert 1** L= 35.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,275.00' / 1,274.74' S= 0.0074 '/' Cc= 0.900 n= 0.013 Concrete sewer w/manholes & inlets, Flow Area= 2.41 sf
#2	Device 1	1,277.36'	**24.0" Horiz. Area Intake** C= 0.600 Limited to weir flow at low heads
#3	Device 2	1,275.20'	**18.0" Round Culvert 2** L= 23.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,275.20' / 1,275.05' S= 0.0065 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#4	Device 3	1,277.50'	**5.0' long x 3.00' rise WCS** Cv= 2.62 (C= 3.28)
#5	Device 4	1,275.30'	**18.0" Round Culvert 3** L= 23.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,275.30' / 1,275.20' S= 0.0043 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#6	Device 2	1,278.00'	**25.0' long + 6.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
Coef. (English)	2.49	2.56	2.70	2.69	2.68	2.69	2.67	2.64

Primary OutFlow Max=3.62 cfs @ 13.96 hrs HW=1,277.87' (Free Discharge)
- **1=Culvert 1** (Passes 3.62 cfs of 17.78 cfs potential flow)
  - **2=Area Intake** (Passes 3.62 cfs of 7.39 cfs potential flow)
    - **3=Culvert 2** (Passes 3.62 cfs of 8.18 cfs potential flow)
      - **4=WCS** (Weir Controls 3.62 cfs @ 1.98 fps)
        - **5=Culvert 3** (Passes 3.62 cfs of 6.96 cfs potential flow)
    - **6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: wetland



Time span=0.00-100.00 hrs, dt=0.05 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment4S: East Area Runoff Area=9.890 ac 0.00% Impervious Runoff Depth=1.65"
Flow Length=816' Tc=67.0 min CN=78 Runoff=8.62 cfs 1.361 af

Pond 2P: wetland Peak Elev=1,277.95' Storage=1.887 af Inflow=9.95 cfs 12.358 af
Outflow=4.89 cfs 12.014 af

Total Runoff Area = 9.890 ac Runoff Volume = 1.361 af Average Runoff Depth = 1.65"
100.00% Pervious = 9.890 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 4S: East Area

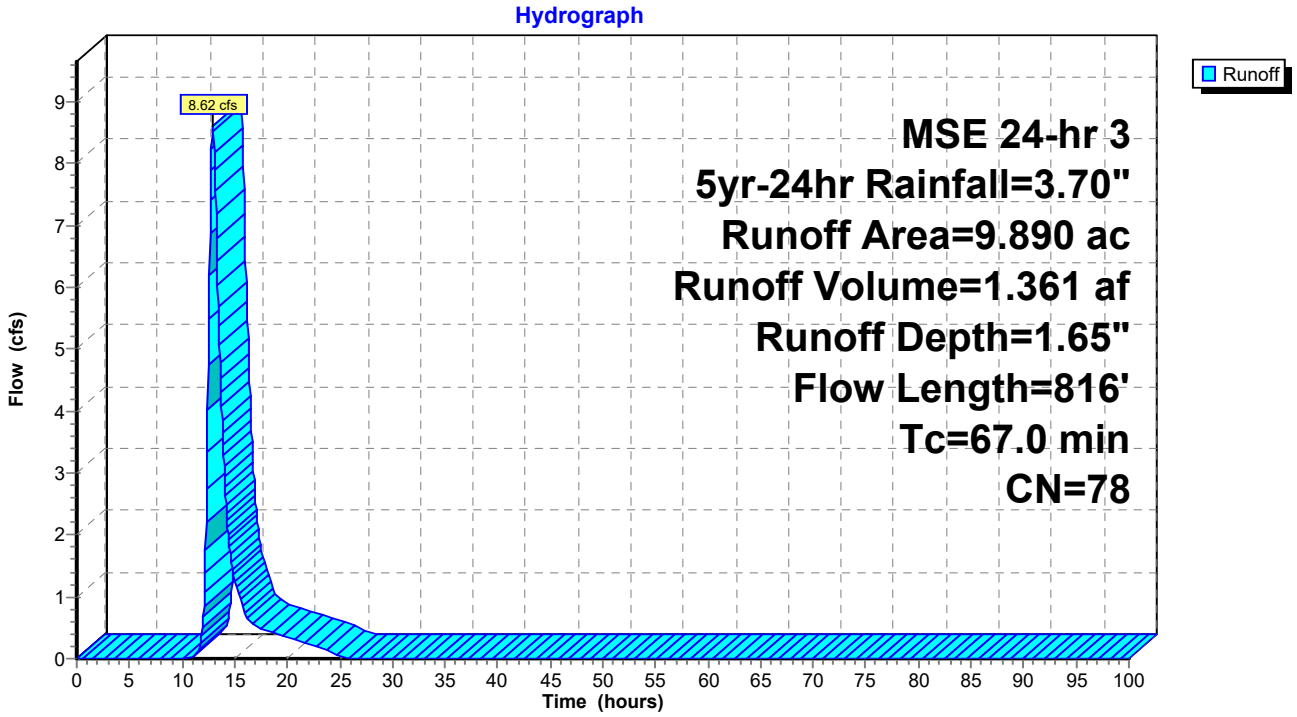
Runoff = 8.62 cfs @ 12.93 hrs, Volume= 1.361 af, Depth= 1.65"
Routed to Pond 2P : wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 5yr-24hr Rainfall=3.70"

Area (ac)	CN	Description
9.890	78	Row crops, straight row, Good, HSG B
9.890		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.4	300	0.0050	0.25		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 3.00"
13.1	300	0.0150	0.38		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 3.00"
33.5	216	0.0120	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
67.0	816	Total			

Subcatchment 4S: East Area



Summary for Pond 2P: wetland

[44] Hint: Outlet device #5 is below defined storage

Inflow Area = 9.890 ac, 0.00% Impervious, Inflow Depth > 14.99" for 5yr-24hr event
Inflow = 9.95 cfs @ 12.93 hrs, Volume= 12.358 af, Incl. 1.33 cfs Base Flow
Outflow = 4.89 cfs @ 13.87 hrs, Volume= 12.014 af, Atten= 51%, Lag= 56.8 min
Primary = 4.89 cfs @ 13.87 hrs, Volume= 12.014 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Starting Elev= 1,277.50' Surf.Area= 1.683 ac Storage= 0.996 af
Peak Elev= 1,277.95' @ 13.87 hrs Surf.Area= 2.299 ac Storage= 1.887 af (0.891 af above start)

Plug-Flow detention time= 656.7 min calculated for 11.015 af (89% of inflow)
Center-of-Mass det. time= 88.2 min (2,853.7 - 2,765.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,275.50'	3.074 af	**Custom Stage Data (Prismatic)** Listed below

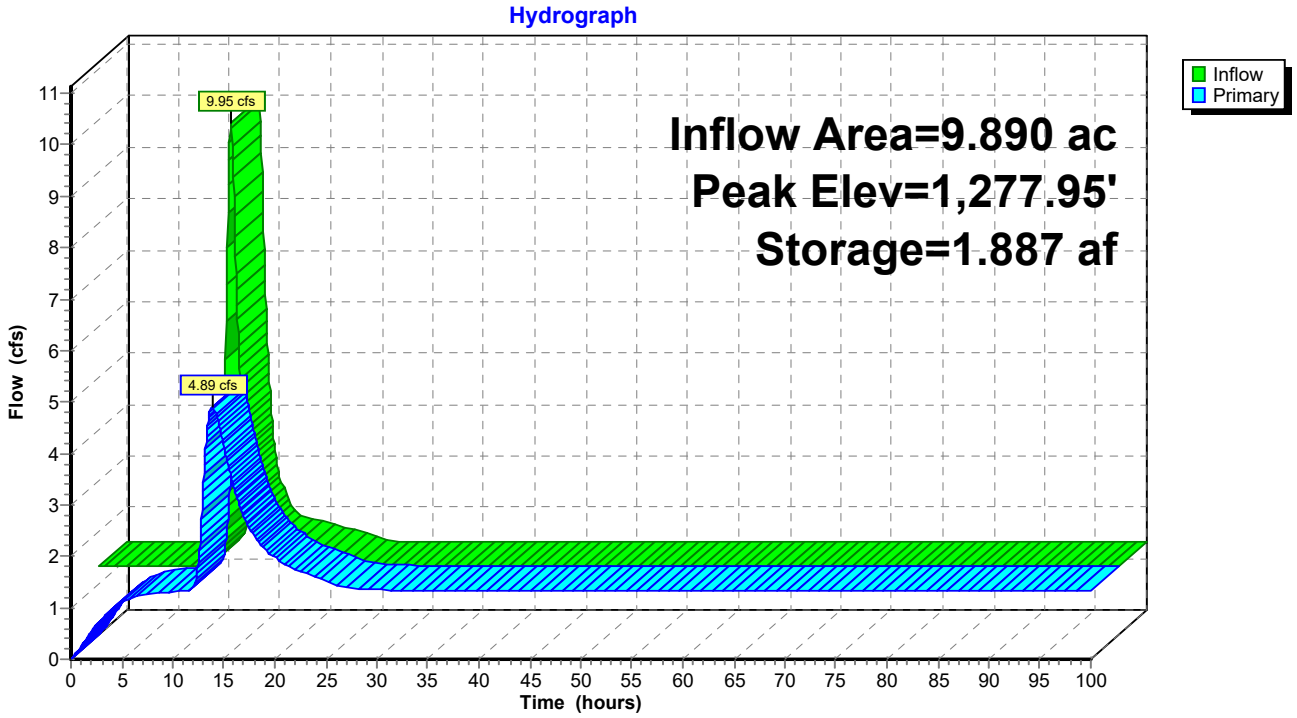
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,275.50	0.002	0.000	0.000
1,275.75	0.020	0.003	0.003
1,276.00	0.050	0.009	0.011
1,276.25	0.080	0.016	0.028
1,276.50	0.120	0.025	0.053
1,276.75	0.580	0.087	0.140
1,277.00	0.930	0.189	0.329
1,277.25	1.360	0.286	0.615
1,277.50	1.683	0.380	0.996
1,277.75	2.000	0.460	1.456
1,278.00	2.380	0.547	2.003
1,278.25	2.740	0.640	2.643
1,278.40	3.000	0.431	3.074

Device	Routing	Invert	Outlet Devices
#1	Primary	1,275.00'	**21.0" Round Culvert 1** L= 35.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,275.00' / 1,274.74' S= 0.0074 '/' Cc= 0.900 n= 0.013 Concrete sewer w/manholes & inlets, Flow Area= 2.41 sf
#2	Device 1	1,277.36'	**24.0" Horiz. Area Intake** C= 0.600 Limited to weir flow at low heads
#3	Device 2	1,275.20'	**18.0" Round Culvert 2** L= 23.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,275.20' / 1,275.05' S= 0.0065 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#4	Device 3	1,277.50'	**5.0' long x 3.00' rise WCS** Cv= 2.62 (C= 3.28)
#5	Device 4	1,275.30'	**18.0" Round Culvert 3** L= 23.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,275.30' / 1,275.20' S= 0.0043 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#6	Device 2	1,278.00'	**25.0' long + 6.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
Coef. (English)	2.49	2.56	2.70	2.69	2.68	2.69	2.67	2.64

Primary OutFlow Max=4.89 cfs @ 13.87 hrs HW=1,277.95' (Free Discharge)
- **1=Culvert 1** (Passes 4.89 cfs of 18.30 cfs potential flow)
- **2=Area Intake** (Passes 4.89 cfs of 9.23 cfs potential flow)
- **3=Culvert 2** (Passes 4.89 cfs of 8.81 cfs potential flow)
- **4=WCS** (Weir Controls 4.89 cfs @ 2.19 fps)
- **5=Culvert 3** (Passes 4.89 cfs of 7.69 cfs potential flow)
- **6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: wetland



Time span=0.00-100.00 hrs, dt=0.05 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment4S: East Area Runoff Area=9.890 ac 0.00% Impervious Runoff Depth=2.29"
Flow Length=816' Tc=67.0 min CN=78 Runoff=12.13 cfs 1.890 af

Pond 2P: wetland Peak Elev=1,278.03' Storage=2.089 af Inflow=13.46 cfs 12.887 af
Outflow=6.85 cfs 12.543 af

Total Runoff Area = 9.890 ac Runoff Volume = 1.890 af Average Runoff Depth = 2.29"
100.00% Pervious = 9.890 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 4S: East Area

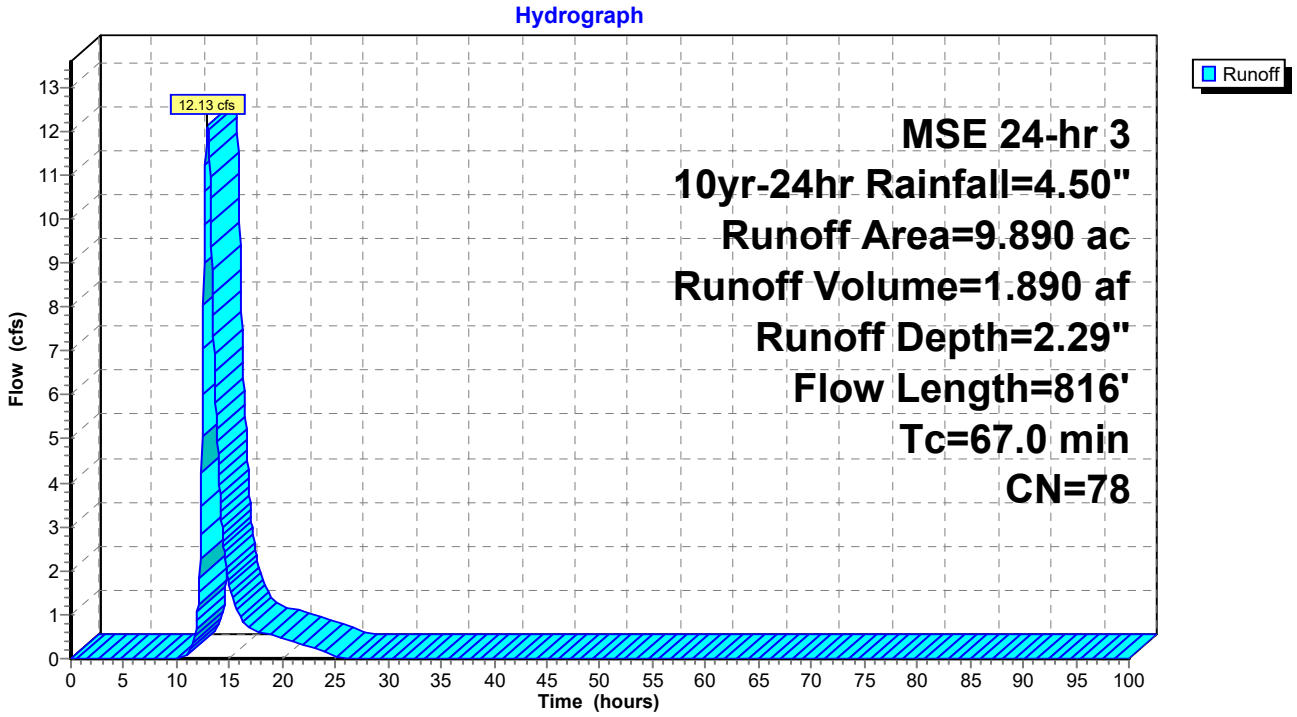
Runoff = 12.13 cfs @ 12.92 hrs, Volume= 1.890 af, Depth= 2.29"
Routed to Pond 2P : wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10yr-24hr Rainfall=4.50"

Area (ac)	CN	Description
9.890	78	Row crops, straight row, Good, HSG B
9.890		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.4	300	0.0050	0.25		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 3.00"
13.1	300	0.0150	0.38		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 3.00"
33.5	216	0.0120	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
67.0	816	Total			

Subcatchment 4S: East Area



Summary for Pond 2P: wetland

[44] Hint: Outlet device #5 is below defined storage

Inflow Area = 9.890 ac, 0.00% Impervious, Inflow Depth > 15.64" for 10yr-24hr event
Inflow = 13.46 cfs @ 12.92 hrs, Volume= 12.887 af, Incl. 1.33 cfs Base Flow
Outflow = 6.85 cfs @ 13.75 hrs, Volume= 12.543 af, Atten= 49%, Lag= 50.1 min
Primary = 6.85 cfs @ 13.75 hrs, Volume= 12.543 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Starting Elev= 1,277.50' Surf.Area= 1.683 ac Storage= 0.996 af
Peak Elev= 1,278.03' @ 13.75 hrs Surf.Area= 2.428 ac Storage= 2.089 af (1.093 af above start)

Plug-Flow detention time= 631.2 min calculated for 11.544 af (90% of inflow)
Center-of-Mass det. time= 86.5 min (2,773.2 - 2,686.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,275.50'	3.074 af	**Custom Stage Data (Prismatic)** Listed below

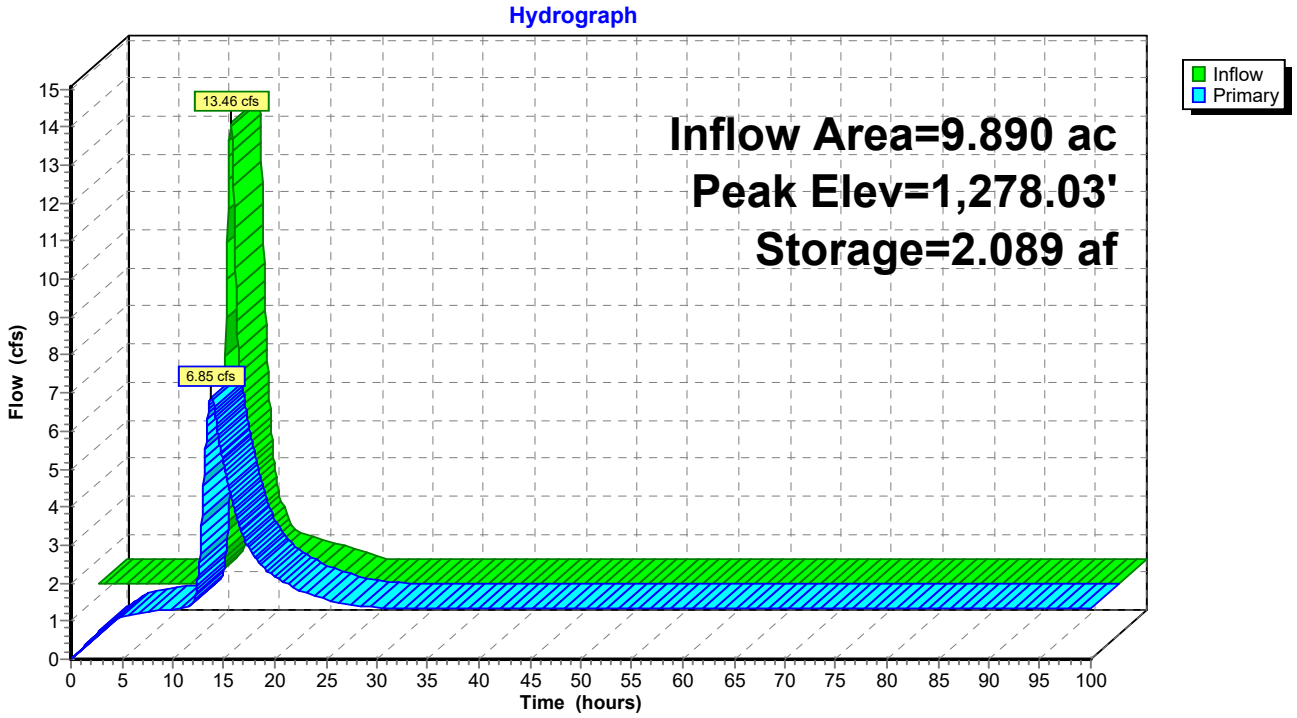
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,275.50	0.002	0.000	0.000
1,275.75	0.020	0.003	0.003
1,276.00	0.050	0.009	0.011
1,276.25	0.080	0.016	0.028
1,276.50	0.120	0.025	0.053
1,276.75	0.580	0.087	0.140
1,277.00	0.930	0.189	0.329
1,277.25	1.360	0.286	0.615
1,277.50	1.683	0.380	0.996
1,277.75	2.000	0.460	1.456
1,278.00	2.380	0.547	2.003
1,278.25	2.740	0.640	2.643
1,278.40	3.000	0.431	3.074

Device	Routing	Invert	Outlet Devices
#1	Primary	1,275.00'	**21.0" Round Culvert 1** L= 35.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,275.00' / 1,274.74' S= 0.0074 '/' Cc= 0.900 n= 0.013 Concrete sewer w/manholes & inlets, Flow Area= 2.41 sf
#2	Device 1	1,277.36'	**24.0" Horiz. Area Intake** C= 0.600 Limited to weir flow at low heads
#3	Device 2	1,275.20'	**18.0" Round Culvert 2** L= 23.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,275.20' / 1,275.05' S= 0.0065 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#4	Device 3	1,277.50'	**5.0' long x 3.00' rise WCS** Cv= 2.62 (C= 3.28)
#5	Device 4	1,275.30'	**18.0" Round Culvert 3** L= 23.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,275.30' / 1,275.20' S= 0.0043 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#6	Device 2	1,278.00'	**25.0' long + 6.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
Coef. (English)	2.49	2.56	2.70	2.69	2.68	2.69	2.67	2.64

Primary OutFlow Max=6.76 cfs @ 13.75 hrs HW=1,278.03' (Free Discharge)
- **1=Culvert 1** (Passes 6.76 cfs of 18.83 cfs potential flow)
  - **2=Area Intake** (Passes 6.76 cfs of 11.35 cfs potential flow)
    - **3=Culvert 2** (Passes 6.38 cfs of 9.44 cfs potential flow)
      - **4=WCS** (Weir Controls 6.38 cfs @ 2.39 fps)
        - **5=Culvert 3** (Passes 6.38 cfs of 8.40 cfs potential flow)
    - **6=Broad-Crested Rectangular Weir** (Weir Controls 0.38 cfs @ 0.45 fps)

Pond 2P: wetland



Time span=0.00-100.00 hrs, dt=0.05 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment4S: East Area Runoff Area=9.890 ac 0.00% Impervious Runoff Depth=3.23"
Flow Length=816' Tc=67.0 min CN=78 Runoff=17.18 cfs 2.660 af

Pond 2P: wetland Peak Elev=1,278.12' Storage=2.318 af Inflow=18.51 cfs 13.658 af
Outflow=10.85 cfs 13.313 af

Total Runoff Area = 9.890 ac Runoff Volume = 2.660 af Average Runoff Depth = 3.23"
100.00% Pervious = 9.890 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 4S: East Area

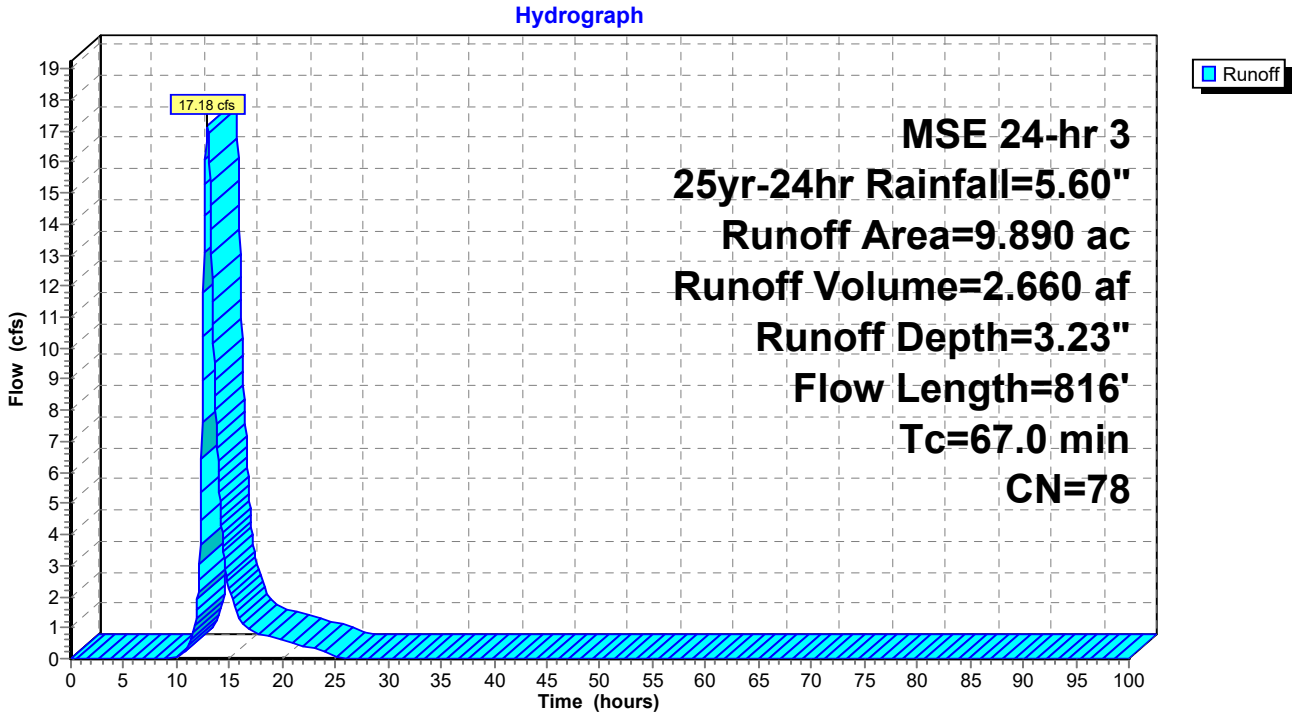
Runoff = 17.18 cfs @ 12.91 hrs, Volume= 2.660 af, Depth= 3.23"
Routed to Pond 2P : wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 25yr-24hr Rainfall=5.60"

Area (ac)	CN	Description
9.890	78	Row crops, straight row, Good, HSG B
9.890		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.4	300	0.0050	0.25		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 3.00"
13.1	300	0.0150	0.38		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 3.00"
33.5	216	0.0120	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
67.0	816	Total			

Subcatchment 4S: East Area



Summary for Pond 2P: wetland

[44] Hint: Outlet device #5 is below defined storage

Inflow Area = 9.890 ac, 0.00% Impervious, Inflow Depth > 16.57" for 25yr-24hr event
Inflow = 18.51 cfs @ 12.91 hrs, Volume= 13.658 af, Incl. 1.33 cfs Base Flow
Outflow = 10.85 cfs @ 13.55 hrs, Volume= 13.313 af, Atten= 41%, Lag= 38.9 min
Primary = 10.85 cfs @ 13.55 hrs, Volume= 13.313 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Starting Elev= 1,277.50' Surf.Area= 1.683 ac Storage= 0.996 af
Peak Elev= 1,278.12' @ 13.55 hrs Surf.Area= 2.557 ac Storage= 2.318 af (1.322 af above start)

Plug-Flow detention time= 596.5 min calculated for 12.315 af (90% of inflow)
Center-of-Mass det. time= 83.2 min (2,665.6 - 2,582.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,275.50'	3.074 af	**Custom Stage Data (Prismatic)** Listed below

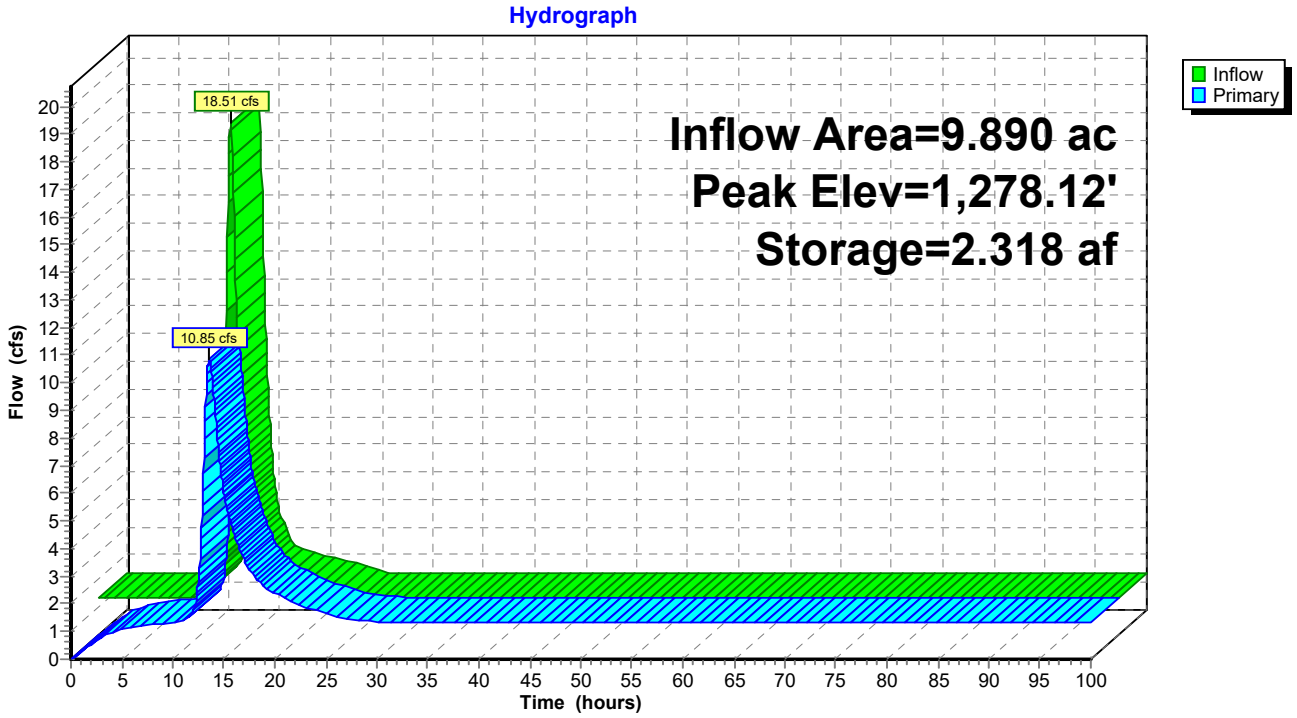
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,275.50	0.002	0.000	0.000
1,275.75	0.020	0.003	0.003
1,276.00	0.050	0.009	0.011
1,276.25	0.080	0.016	0.028
1,276.50	0.120	0.025	0.053
1,276.75	0.580	0.087	0.140
1,277.00	0.930	0.189	0.329
1,277.25	1.360	0.286	0.615
1,277.50	1.683	0.380	0.996
1,277.75	2.000	0.460	1.456
1,278.00	2.380	0.547	2.003
1,278.25	2.740	0.640	2.643
1,278.40	3.000	0.431	3.074

Device	Routing	Invert	Outlet Devices
#1	Primary	1,275.00'	**21.0" Round Culvert 1** L= 35.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,275.00' / 1,274.74' S= 0.0074 '/' Cc= 0.900 n= 0.013 Concrete sewer w/manholes & inlets, Flow Area= 2.41 sf
#2	Device 1	1,277.36'	**24.0" Horiz. Area Intake** C= 0.600 Limited to weir flow at low heads
#3	Device 2	1,275.20'	**18.0" Round Culvert 2** L= 23.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,275.20' / 1,275.05' S= 0.0065 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#4	Device 3	1,277.50'	**5.0' long x 3.00' rise WCS** Cv= 2.62 (C= 3.28)
#5	Device 4	1,275.30'	**18.0" Round Culvert 3** L= 23.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,275.30' / 1,275.20' S= 0.0043 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#6	Device 2	1,278.00'	**25.0' long + 6.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
Coef. (English)	2.49	2.56	2.70	2.69	2.68	2.69	2.67	2.64

Primary OutFlow Max=10.79 cfs @ 13.55 hrs HW=1,278.12' (Free Discharge)
- **1=Culvert 1** (Passes 10.79 cfs of 19.37 cfs potential flow)
  - **2=Area Intake** (Passes 10.79 cfs of 13.21 cfs potential flow)
    - **3=Culvert 2** (Passes 8.05 cfs of 10.04 cfs potential flow)
      - **4=WCS** (Weir Controls 8.05 cfs @ 2.58 fps)
        - **5=Culvert 3** (Passes 8.05 cfs of 9.08 cfs potential flow)
    - **6=Broad-Crested Rectangular Weir** (Weir Controls 2.74 cfs @ 0.87 fps)

Pond 2P: wetland



Time span=0.00-100.00 hrs, dt=0.05 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment4S: East Area Runoff Area=9.890 ac 0.00% Impervious Runoff Depth=4.11"
Flow Length=816' Tc=67.0 min CN=78 Runoff=21.91 cfs 3.390 af

Pond 2P: wetland Peak Elev=1,278.20' Storage=2.525 af Inflow=23.24 cfs 14.388 af
Outflow=13.89 cfs 14.043 af

Total Runoff Area = 9.890 ac Runoff Volume = 3.390 af Average Runoff Depth = 4.11"
100.00% Pervious = 9.890 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 4S: East Area

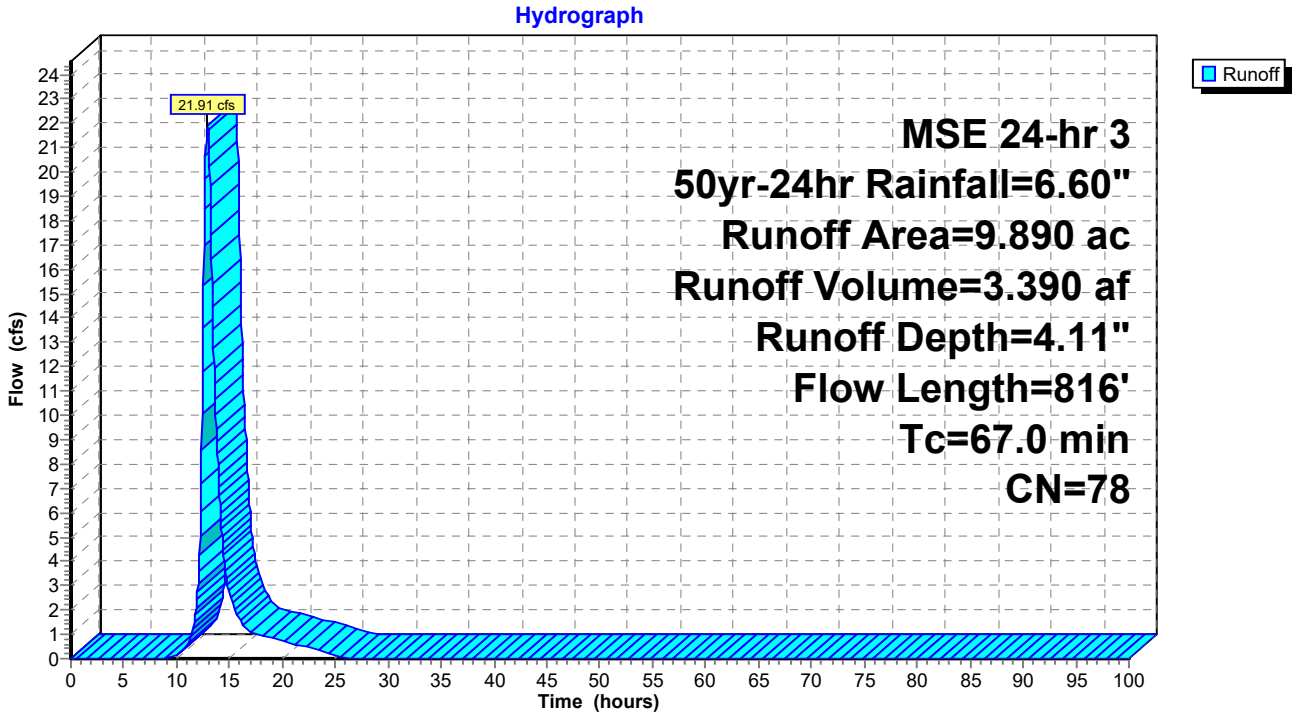
Runoff = 21.91 cfs @ 12.90 hrs, Volume= 3.390 af, Depth= 4.11"
Routed to Pond 2P : wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 50yr-24hr Rainfall=6.60"

Area (ac)	CN	Description
9.890	78	Row crops, straight row, Good, HSG B
9.890		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.4	300	0.0050	0.25		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 3.00"
13.1	300	0.0150	0.38		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 3.00"
33.5	216	0.0120	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
67.0	816	Total			

Subcatchment 4S: East Area



Summary for Pond 2P: wetland

[44] Hint: Outlet device #5 is below defined storage

Inflow Area = 9.890 ac, 0.00% Impervious, Inflow Depth > 17.46" for 50yr-24hr event
Inflow = 23.24 cfs @ 12.90 hrs, Volume= 14.388 af, Incl. 1.33 cfs Base Flow
Outflow = 13.89 cfs @ 13.51 hrs, Volume= 14.043 af, Atten= 40%, Lag= 36.7 min
Primary = 13.89 cfs @ 13.51 hrs, Volume= 14.043 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Starting Elev= 1,277.50' Surf.Area= 1.683 ac Storage= 0.996 af
Peak Elev= 1,278.20' @ 13.51 hrs Surf.Area= 2.673 ac Storage= 2.525 af (1.529 af above start)

Plug-Flow detention time= 566.8 min calculated for 13.045 af (91% of inflow)
Center-of-Mass det. time= 80.1 min (2,573.8 - 2,493.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,275.50'	3.074 af	**Custom Stage Data (Prismatic)** Listed below

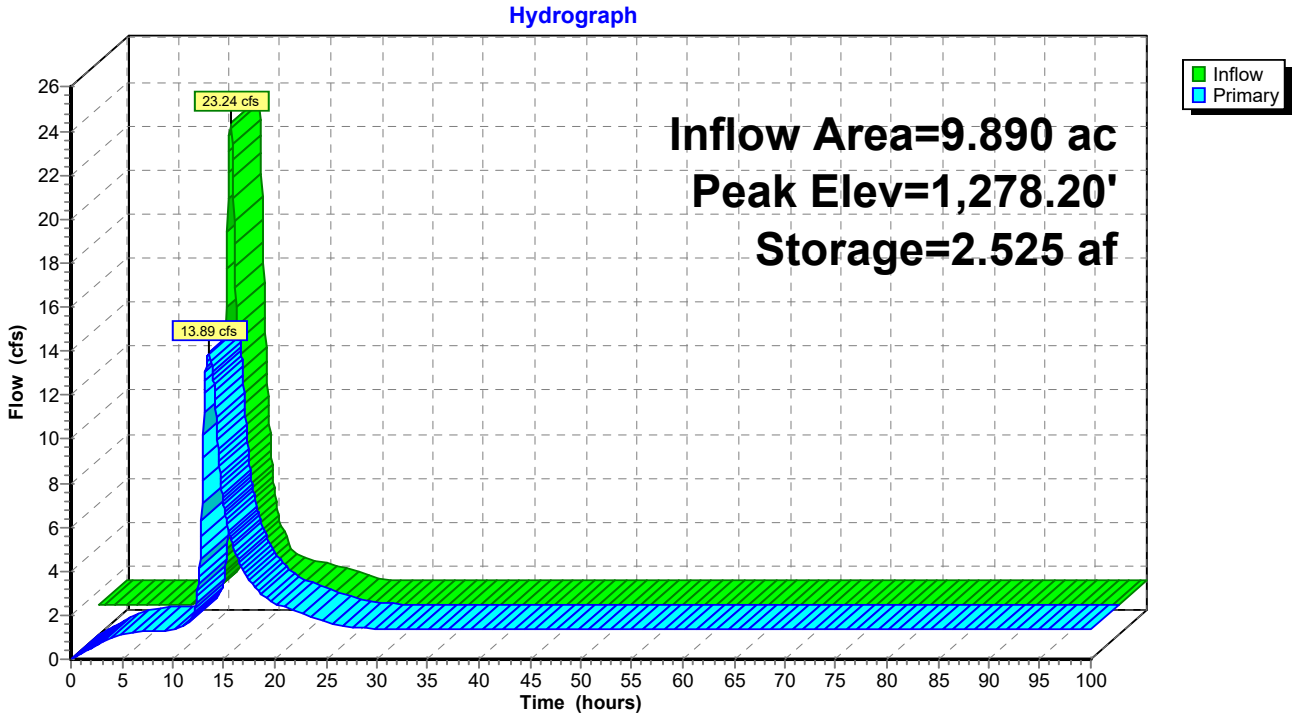
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,275.50	0.002	0.000	0.000
1,275.75	0.020	0.003	0.003
1,276.00	0.050	0.009	0.011
1,276.25	0.080	0.016	0.028
1,276.50	0.120	0.025	0.053
1,276.75	0.580	0.087	0.140
1,277.00	0.930	0.189	0.329
1,277.25	1.360	0.286	0.615
1,277.50	1.683	0.380	0.996
1,277.75	2.000	0.460	1.456
1,278.00	2.380	0.547	2.003
1,278.25	2.740	0.640	2.643
1,278.40	3.000	0.431	3.074

Device	Routing	Invert	Outlet Devices
#1	Primary	1,275.00'	**21.0" Round Culvert 1** L= 35.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,275.00' / 1,274.74' S= 0.0074 '/' Cc= 0.900 n= 0.013 Concrete sewer w/manholes & inlets, Flow Area= 2.41 sf
#2	Device 1	1,277.36'	**24.0" Horiz. Area Intake** C= 0.600 Limited to weir flow at low heads
#3	Device 2	1,275.20'	**18.0" Round Culvert 2** L= 23.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,275.20' / 1,275.05' S= 0.0065 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#4	Device 3	1,277.50'	**5.0' long x 3.00' rise WCS** Cv= 2.62 (C= 3.28)
#5	Device 4	1,275.30'	**18.0" Round Culvert 3** L= 23.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,275.30' / 1,275.20' S= 0.0043 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#6	Device 2	1,278.00'	**25.0' long + 6.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
Coef. (English)	2.49	2.56	2.70	2.69	2.68	2.69	2.67	2.64

Primary OutFlow Max=13.89 cfs @ 13.51 hrs HW=1,278.20' (Free Discharge)
- **1=Culvert 1** (Passes 13.89 cfs of 19.84 cfs potential flow)
- **2=Area Intake** (Orifice Controls 13.89 cfs @ 4.42 fps)
- **3=Culvert 2** (Passes < 10.56 cfs potential flow)
- **4=WCS** (Passes < 9.66 cfs potential flow)
- **5=Culvert 3** (Passes < 9.65 cfs potential flow)
- **6=Broad-Crested Rectangular Weir** (Passes < 5.94 cfs potential flow)

Pond 2P: wetland



Time span=0.00-100.00 hrs, dt=0.05 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment4S: East Area Runoff Area=9.890 ac 0.00% Impervious Runoff Depth=5.21"
Flow Length=816' Tc=67.0 min CN=78 Runoff=27.69 cfs 4.291 af

Pond 2P: wetland Peak Elev=1,278.34' Storage=2.888 af Inflow=29.02 cfs 15.288 af
Outflow=14.94 cfs 14.944 af

Total Runoff Area = 9.890 ac Runoff Volume = 4.291 af Average Runoff Depth = 5.21"
100.00% Pervious = 9.890 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 4S: East Area

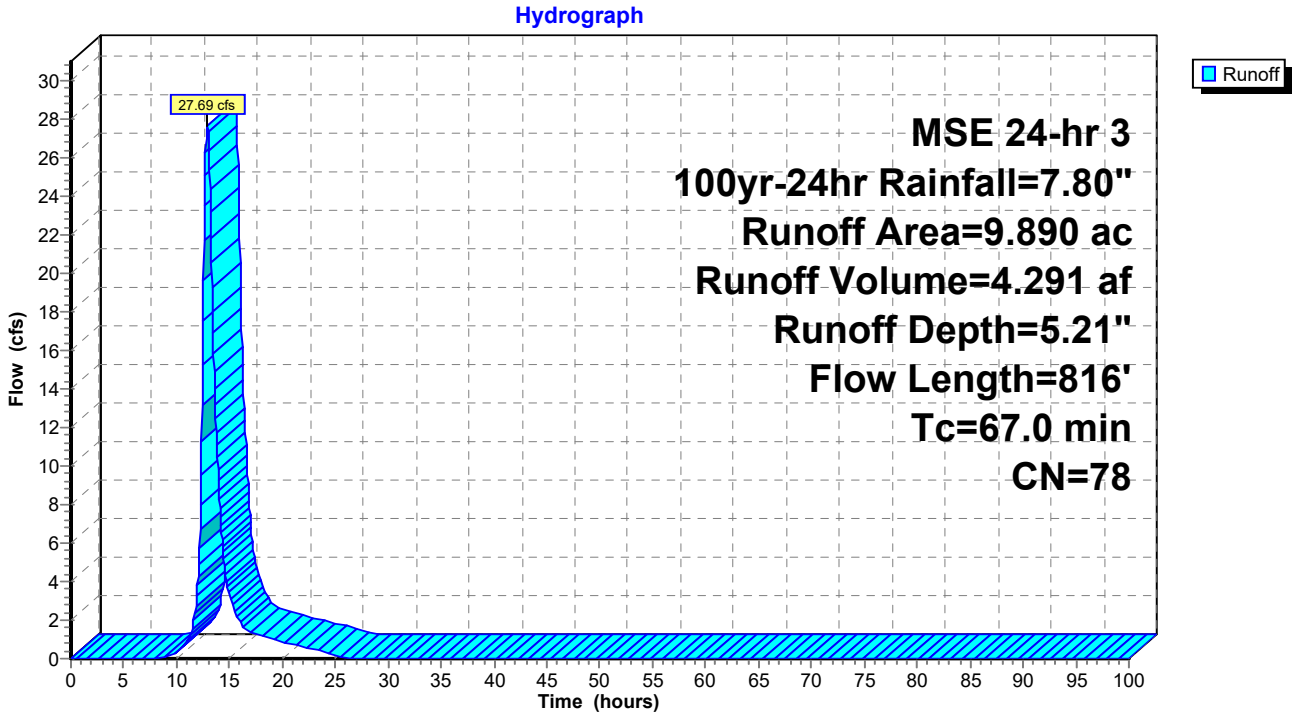
Runoff = 27.69 cfs @ 12.89 hrs, Volume= 4.291 af, Depth= 5.21"
Routed to Pond 2P : wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100yr-24hr Rainfall=7.80"

Area (ac)	CN	Description
9.890	78	Row crops, straight row, Good, HSG B
9.890		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.4	300	0.0050	0.25		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 3.00"
13.1	300	0.0150	0.38		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 3.00"
33.5	216	0.0120	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
67.0	816	Total			

Subcatchment 4S: East Area



Summary for Pond 2P: wetland

[44] Hint: Outlet device #5 is below defined storage

Inflow Area = 9.890 ac, 0.00% Impervious, Inflow Depth > 18.55" for 100yr-24hr event
Inflow = 29.02 cfs @ 12.89 hrs, Volume= 15.288 af, Incl. 1.33 cfs Base Flow
Outflow = 14.94 cfs @ 13.62 hrs, Volume= 14.944 af, Atten= 49%, Lag= 43.9 min
Primary = 14.94 cfs @ 13.62 hrs, Volume= 14.944 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Starting Elev= 1,277.50' Surf.Area= 1.683 ac Storage= 0.996 af
Peak Elev= 1,278.34' @ 13.62 hrs Surf.Area= 2.888 ac Storage= 2.888 af (1.893 af above start)

Plug-Flow detention time= 535.8 min calculated for 13.939 af (91% of inflow)
Center-of-Mass det. time= 78.3 min (2,473.9 - 2,395.6)

Volume	Invert	Avail.Storage	Storage Description
#1	1,275.50'	3.074 af	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,275.50	0.002	0.000	0.000
1,275.75	0.020	0.003	0.003
1,276.00	0.050	0.009	0.011
1,276.25	0.080	0.016	0.028
1,276.50	0.120	0.025	0.053
1,276.75	0.580	0.087	0.140
1,277.00	0.930	0.189	0.329
1,277.25	1.360	0.286	0.615
1,277.50	1.683	0.380	0.996
1,277.75	2.000	0.460	1.456
1,278.00	2.380	0.547	2.003
1,278.25	2.740	0.640	2.643
1,278.40	3.000	0.431	3.074

Device	Routing	Invert	Outlet Devices
#1	Primary	1,275.00'	**21.0" Round Culvert 1** L= 35.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,275.00' / 1,274.74' S= 0.0074 '/' Cc= 0.900 n= 0.013 Concrete sewer w/manholes & inlets, Flow Area= 2.41 sf
#2	Device 1	1,277.36'	**24.0" Horiz. Area Intake** C= 0.600 Limited to weir flow at low heads
#3	Device 2	1,275.20'	**18.0" Round Culvert 2** L= 23.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,275.20' / 1,275.05' S= 0.0065 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#4	Device 3	1,277.50'	**5.0' long x 3.00' rise WCS** Cv= 2.62 (C= 3.28)
#5	Device 4	1,275.30'	**18.0" Round Culvert 3** L= 23.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,275.30' / 1,275.20' S= 0.0043 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#6	Device 2	1,278.00'	**25.0' long + 6.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=14.94 cfs @ 13.62 hrs HW=1,278.34' (Free Discharge)
└─**1=Culvert 1** (Passes 14.94 cfs of 20.59 cfs potential flow)
└─**2=Area Intake** (Orifice Controls 14.94 cfs @ 4.75 fps)
└─**3=Culvert 2** (Passes < 11.36 cfs potential flow)
└─**4=WCS** (Passes < 12.50 cfs potential flow)
└─**5=Culvert 3** (Passes < 10.51 cfs potential flow)
└─**6=Broad-Crested Rectangular Weir** (Passes < 13.10 cfs potential flow)

Pond 2P: wetland

