

August 30, 2023

Franklin Planning Board 355 East Central Street Franklin, MA 02038

Re: Special Permit Application

Lots 1R & 2R Uncas Avenue Extension

Franklin, MA

Applicant: J. Walsh Corporation

Dear Board Members,

The applicant, J. Walsh Corporation, has filed a Special Permit Application to construct three (3) family dwellings on Lots 1R and 2R, Uncas Avenue Extension. The existing subdivision is Zoned Single Family IV and was approved with the intent to construct two (2) family dwellings. The existing project site has been partially completed with water, sewer, drainage system, rough site grading and roadway constructed to binder coarse.

The Town of Franklin recently voted to allow three (3) family dwellings in Single Family IV zone with a special permit from the Planning Board.

Our firm has reviewed the originally approved Stormwater design for the subdivision and the new proposed project with three (3) family dwelling units. The stormwater system consists of catch basin, manholes and a retention basin to mitigate the increase in stormwater rate and volume of runoff. We have prepared a conceptual plan for the entire project depicting 3-unit buildings on all nine (9) lots.

The approved stormwater design was used to provide a comparison of the proposed 3-unit building layout. The drainage basin was constructed along with the roadway and utilities. The as-built conditions of the drainage basin were used to analyze the proposed 3-unit building design. The study includes the ability of the drainage basin to mitigate the stormwater flow and provide water quality pretreatment for the impervious area.

We have provided the hydro-cad results for the approved stormwater report and the proposed conditions with the as-built drainage basin conditions. The approved project design is represented by Subcatchment 30 and Pond 31P. The proposed conditions are shown as Subcatchment 31 and Pond 32P.

The following is a comparison of the peak rates, volumes, and flood elevations within the drainage basin. (See attached hydro-cad summaries)

	Approved	Conditions	Proposed 3-Family Units		
	Peak Inflow	Peak Flood	Peak Inflow	Peak Flood	
	Pond 31P	Elevation	Pond 32P	Elevation	
	(c.f.s.)	(feet)	(c.f.s.)	(feet)	
3.2"-2 year	9.27	279.9	8.77	280.2	
4.8"-10 year	19.00	281.5	18.30	281.6	
6.1"-50 year	27.42	282.5	26.68	282.5	
7.0"-100 year	33.37	283.0	32.60	283.1	

The calculations conclude that the drainage basin as constructed will provide sufficient mitigation for the proposed three (3) family dwellings units. The berm elevation was constructed as proposed to elevation 284.5 feet, thus providing a minimum of one foot freeboard.

Water quality calculations were performed to demonstrate that the basin as constructed will provide adequate pretreatment for the proposed impervious area. (See attached Water Quality Volume Calculations). In summary, the stormwater drainage basin will provide adequate water quality treatment for the impervious area.

Please let us know if you have any questions or need additional information.

Thank you for your cooperation in this matter.

Yours truly, GLM Engineering Consultants Inc.

Robert S. Truax, P.E.

## **Stormwater Water Quality Volume Calculations**

#### Project:

Uncas Avenue Extension Franklin, MA October 25, 2023

### **Impervious Areas\*:**

### **Project Site Total Impervious:**

 Roof:
 30,408 sf

 Roads/Sidewalk:
 35,017 sf

 Driveways:
 19,502 s.f

 Total:
 84,927 sf

### **Project Site Paved Impervious:**

 Roads/Sidewalk:
 35,017 sf

 Driveways:
 19,502 s.f

 Total:
 54,519 sf

Water Quality Volume (WQV): Based on 1.0 inch rainfall

WQV = Impervious Pavement x 1.0 inch WQV= 54,519 s.f. x 1.0 = 4,543 cu.ft.

### **Storage Volume Provided:**

Basin Volume below outlet elevation (Outlet El=280.0): Storage Volume = 9,619 cu.ft. > 4,543 cu.ft. **O.K.** 

Drawdown time = Volume/(K\*Bottom Area)

Volume = 1157 cf

K = 8.27 in/hr = 0.69 ft/hr

Bottom Area (Bot EL.=278.5) = 2,495 sf

Drawdown time =  $9619 \text{ cu.ft.} / (0.69 \text{ ft/hr } \times 2,495 \text{ sf})$ 

Drawdown time = 5.6 hr < 72 hr ok

# **Stormwater Calculations**

# Project:

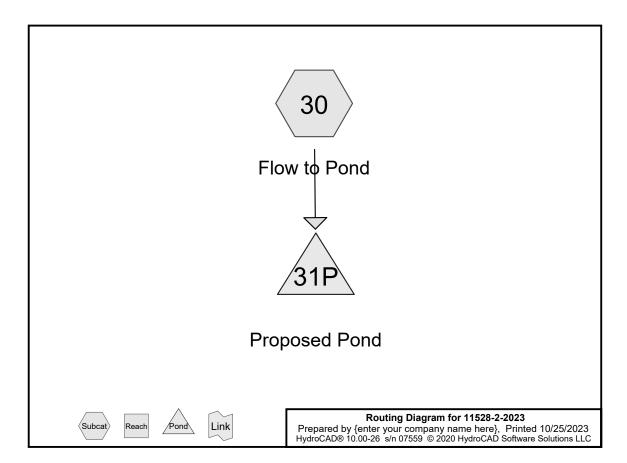
Uncas Avenue Extension Franklin, MA October 25, 2023

### **Approved Conditions:**

Subcatchment 30 Pond 31P

### **Proposed Conditions:**

Subcatchment 31 Pond 32P



### 11528-2-2023

Type III 24-hr 2 yr - 3.2" Rainfall=3.20"

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#### Summary for Subcatchment 30: Flow to Pond

Runoff = 9.27 cfs @ 12.34 hrs, Volume= 1.065 af, Depth> 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Type III 24-hr  $\,2$  yr - 3.2" Rainfall=3.20"

	Α	rea (sf)	CN I	Description									
		23,351	61 :	75% Gras	s cover, Go	ood, HSG B							
		29,088	74 I	Exist. >759	√ Grass co √	ver, Good, HSG C							
*		9,460		Exist. pave									
*		21,890			oposed drives - C								
*		25,557			oposed roads & walks								
*		45,286			oposed units & decks - C								
		31,583			5% Grass cover, Good, HSG C								
	1	44,279											
*		8,980		_edge									
		39,474		Weighted A									
		28,301			vious Area								
	1	11,173	- 2	25.30% Imp	pervious Are	ea							
	To	Length	Slope	Velocity	Capacity	Description							
						Description							
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)								
	(min) 16.3	(feet) 50	(ft/ft) 0.0100		(cfs)	Sheet Flow, 30-1							
					(cfs)	Sheet Flow, 30-1 Woods: Light underbrush n= 0.400 P2= 3.20"							
		50		0.05	(cfs)								
	16.3 5.1	50 150	0.0100	0.05 0.49	(cfs)	Woods: Light underbrush n= 0.400 P2= 3.20" <b>Shallow Concentrated Flow, 30-2</b> Short Grass Pasture Kv= 7.0 fps							
	16.3	50 150	0.0100	0.05 0.49	(cfs) 3.56	Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow, 30-2  Short Grass Pasture Kv= 7.0 fps  Pipe Channel, 12"RCP							
	16.3 5.1	50 150	0.0100	0.05 0.49		Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow, 30-2  Short Grass Pasture Kv= 7.0 fps  Pipe Channel, 12"RCP  12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'							
	16.3 5.1 1.2	50 150 325	0.0100 0.0050 0.0100	0.05 0.49 4.54	3.56	Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow, 30-2  Short Grass Pasture Kv= 7.0 fps  Pipe Channel, 12"RCP  12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013							
	16.3 5.1	50 150 325	0.0100	0.05 0.49 4.54		Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow, 30-2  Short Grass Pasture Kv= 7.0 fps  Pipe Channel, 12"RCP  12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013  Pipe Channel, 12" RCP							
	16.3 5.1 1.2	50 150 325	0.0100 0.0050 0.0100	0.05 0.49 4.54	3.56	Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow, 30-2  Short Grass Pasture Kv= 7.0 fps  Pipe Channel, 12"RCP  12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'  n= 0.013  Pipe Channel, 12" RCP  12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'							
	16.3 5.1 1.2	50 150 325	0.0100 0.0050 0.0100	0.05 0.49 4.54	3.56	Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow, 30-2  Short Grass Pasture Kv= 7.0 fps  Pipe Channel, 12"RCP  12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013  Pipe Channel, 12" RCP							

#### Summary for Pond 31P: Proposed Pond

Inflow Area =

Inflow = Outflow = 1.031 af, Atten= 62%, Lag= 29.7 min

 10.089 ac,
 25.30% Impervious, Inflow Depth > 1.27" for 2 yr - 3.2" event

 9.27 cfs @ 12.34 hrs, Volume=
 1.065 af

 3.50 cfs @ 12.83 hrs, Volume=
 1.031 af, Atten= 62%, Lag= 29.7 r

 3.50 cfs @ 12.83 hrs, Volume=
 1.031 af

 0.00 cfs @ 0.00 hrs, Volume=
 0.000 af

 Discarded = Primary =

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 279.93' @ 12.83 hrs Surf.Area= 7,515 sf Storage= 13,863 cf

Plug-Flow detention time= 58.9 min calculated for 1.031 af (97% of inflow) Center-of-Mass det. time= 41.6 min (903.5 - 861.9)

Volume	Invert	Avail.St	torage	Storage Description			
#1	273.00'	74,	097 cf	Custom Stage Data	(Irregular)Listed	l below	
Elevatio		urf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
273.0 274.0		348 348	116.0 116.0	0 348	0 348	348 464	
275.0		348	116.0	348	696	580	
276.0 277.0		348 348	116.0 116.0	348 348	1,044 1,392	696 812	
278.0		3,709	312.0	1,731	3,123	7,491	
280.0 282.0		7,651 12,840	487.0 660.0	11,125 20,268	14,248 34,516	18,647 34,479	
282.1 283.0		15,780 19.820	665.0 680.0	1,428 15.986	35,945 51,930	35,010 36,726	
284.0		24,600	690.0	22,167	74,097	38,014	
Device	Routing	Inver	t Outle	et Devices			
#1	Primary	278.00		" Round Culvert L= / Outlet Invert= 278.0			vall, Ke= 0.200 .900  n= 0.013.  Flow Area= 1.77 sf
#2 #3	Device 1 Discarded	280.00 273.00	' 4.0 <b>"</b>	W x 48.0" H Vert. Or 0 in/hr Exfiltration or	rifice/Grate C= 0		

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Type III 24-hr 2 yr - 3.2" Rainfall=3.20"

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Discarded OutFlow Max=3.49 cfs @ 12.83 hrs HW=279.93' (Free Discharge) 13-8xfiltration (Exfiltration Controls 3.49 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=273.00' (Free Discharge)
1=Culvert (Controls 0.00 cfs)
2=Orifice/Grate (Controls 0.00 cfs)

#### Summary for Subcatchment 30: Flow to Pond

Runoff 19.00 cfs @ 12.32 hrs, Volume= 2.128 af, Depth> 2.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Type III 24-hr 10 yr - 4.8" Rainfall=4.80"

_	Α	rea (sf)	CN [	escription									
		23,351	61 >	75% Gras	s cover, Go	od, HSG B							
		29,088		xist. >75%	⟨ Grass co⟩	ver, Good, HSG C							
*		9,460		xist. pave									
*		21,890			posed drives - C								
*		25,557			oposed roads & walks								
*		45,286			posed units & decks - C								
		31,583			9% Grass cover, Good, HSG C								
	1	44,279			ods, Good, HSG C								
_		8,980		.edge									
		39,474		Veighted A									
		28,301	-		vious Area								
	1	11,173	2	5.30% Imp	ervious Are	ea ea							
	То	Length	Clana	\/-li4.	Cit.	Provide the second seco							
	10												
			Slope	Velocity		Description							
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)								
_						Sheet Flow, 30-1							
_	(min) 16.3	(feet) 50	(ft/ft) 0.0100	(ft/sec) 0.05		Sheet Flow, 30-1 Woods: Light underbrush n= 0.400 P2= 3.20"							
_	(min)	(feet) 50	(ft/ft)	(ft/sec)		Sheet Flow, 30-1 Woods: Light underbrush n= 0.400 P2= 3.20" Shallow Concentrated Flow, 30-2							
_	(min) 16.3 5.1	(feet) 50 150	(ft/ft) 0.0100 0.0050	0.05 0.49	(cfs)	Sheet Flow, 30-1 Woods: Light underbrush n= 0.400 P2= 3.20" Shallow Concentrated Flow, 30-2 Short Grass Pasture Kv= 7.0 fps							
_	(min) 16.3	(feet) 50	(ft/ft) 0.0100 0.0050	(ft/sec) 0.05		Sheet Flow, 30-1 Woods: Light underbrush n= 0.400 P2= 3.20" Shallow Concentrated Flow, 30-2 Short Grass Pasture Kv= 7.0 fps Pipe Channel, 12"RCP							
_	(min) 16.3 5.1	(feet) 50 150	(ft/ft) 0.0100 0.0050	0.05 0.49	(cfs)	Sheet Flow, 30-1 Woods: Light underbrush n= 0.400 P2= 3.20" Shallow Concentrated Flow, 30-2 Short Grass Pasture Kv= 7.0 fps Pipe Channel, 12"RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'							
_	(min) 16.3 5.1 1.2	(feet) 50 150 325	(ft/ft) 0.0100 0.0050 0.0100	(ft/sec) 0.05 0.49 4.54	3.56	Sheet Flow, 30-1 Woods: Light underbrush n= 0.400 P2= 3.20" Shallow Concentrated Flow, 30-2 Short Grass Pasture Kv= 7.0 fps Pipe Channel, 12"RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013							
_	(min) 16.3 5.1	(feet) 50 150	(ft/ft) 0.0100 0.0050 0.0100	0.05 0.49	(cfs)	Sheet Flow, 30-1 Woods: Light underbrush n= 0.400 P2= 3.20" Shallow Concentrated Flow, 30-2 Short Grass Pasture Kv= 7.0 fps Pipe Channel, 12"RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'							
_	(min) 16.3 5.1 1.2	(feet) 50 150 325	(ft/ft) 0.0100 0.0050 0.0100	(ft/sec) 0.05 0.49 4.54	3.56	Sheet Flow, 30-1 Woods: Light underbrush n= 0.400 P2= 3.20" Shallow Concentrated Flow, 30-2 Short Grass Pasture Kv= 7.0 fps Pipe Channel, 12"RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Pipe Channel, 12" RCP							
_	(min) 16.3 5.1 1.2	(feet) 50 150 325	(ft/ft) 0.0100 0.0050 0.0100	(ft/sec) 0.05 0.49 4.54	3.56	Sheet Flow, 30-1 Woods: Light underbrush n= 0.400 P2= 3.20" Shallow Concentrated Flow, 30-2 Short Grass Pasture Kv= 7.0 fps Pipe Channel, 12"RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Pipe Channel, 12" RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'							

#### 11528-2-2023

Discarded

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Type III 24-hr 10 yr - 4.8" Rainfall=4.80"

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### Summary for Pond 31P: Proposed Pond

Inflow Area = 10.089 ac, 25.30% Impervious, Inflow Depth > 2.53" for 10 yr - 4.8" event 19.00 cfs 2 12.32 hrs, Volume= 7.68 cfs 2 12.77 hrs, Volume= 5.79 cfs 12.77 hrs, Volume= 1.90 cfs 12.77 hrs, Volume= 2.128 af 2.089 af, Atten= 60%, Lag= 27.0 min Inflow = Outflow Discarded = 1 934 af

273.00' 8.270 in/hr Exfiltration over Wetted area

Primary 0.155 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 281.46' @ 12.77 hrs Surf.Area= 11,449 sf Storage= 29,081 cf

Plug-Flow detention time= 59.9 min calculated for 2.085 af (98% of inflow) Center-of-Mass det. time= 49.5 min ( 891.6 - 842.1 )

Volume	Invert	Avail.S	torage	Storage Description	1		
#1	273.00'	74,	097 cf	Custom Stage Dat	a (Irregular)Listed	d below	
	•		Б.		0 01	144 4 4	
Elevation		urf.Area	Perim.	Inc.Store	Cum.Store	Wet.Area	
(fee	et)	(sq-ft)	(feet)	(cubic-feet)	(cubic-feet)	(sq-ft)	
273.0	00	348	116.0	0	0	348	
274.0	00	348	116.0	348	348	464	
275.0	00	348	116.0	348	696	580	
276.0	00	348	116.0	348	1,044	696	
277.0	00	348	116.0	348	1,392	812	
278.0	00	3,709	312.0	1,731	3,123	7,491	
280.0	00	7,651	487.0	11,125	14,248	18,647	
282.0	00	12,840	660.0	20,268	34,516	34,479	
282.1	0	15,780	665.0	1,428	35,945	35,010	
283.0	00	19,820	680.0	15,986	51,930	36,726	
284.0	00	24,600	690.0	22,167	74,097	38,014	
Device	Routing	Inver	t Outl	et Devices			
#1	Primary	278.00	18.0	" Round Culvert L	= 22.0' RCP, gro	ove end w/headv	vall, Ke= 0.200
	,						.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	280.00		W x 48.0" H Vert. C			
410	D:	070.00		–	147 44 1		

Discarded OutFlow Max=5.78 cfs @ 12.77 hrs HW=281.46' (Free Discharge)
—3=Exfiltration (Exfiltration Controls 5.78 cfs)

Primary OutFlow Max=1.89 cfs @ 12.77 hrs HW=281.46' (Free Discharge) -1=Culvert (Passes 1.89 cfs of 17.51 cfs potential flow)
-2=Orifice/Grate (Orifice Controls 1.89 cfs @ 3.88 fps)

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Type III 24-hr 50 yr - 6.1" Rainfall=6.10"

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### Summary for Subcatchment 30: Flow to Pond

Runoff 27.42 cfs @ 12.32 hrs, Volume= 3.070 af, Depth> 3.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Type III 24-hr 50 yr - 6.1" Rainfall=6.10"

	Α	rea (sf)	CN	Description									
		23,351	61	>75% Gras	s cover, Go	od, HSG B							
		29,088	74	Exist. >759	% Grass co	ver, Good, HSG C							
*		9,460	98	Exist. pave	ist. pave - C								
*		21,890	98	Proposed d	posed drives - C								
*		25,557	98	Proposed r	oposed roads & walks								
*		45,286	98	Proposed u	inits & deck	s - C							
	1	31,583	74	>75 <sup>'</sup> % Gras	s cover, Go	od, HSG C							
	1	44,279	70	Woods, Go	od, HSG C								
*		8,980	98	Ledge									
	4	39,474	78	Weighted A	verage								
	3	28,301		74.70% Pe	rvious Area								
	1	11,173		25.30% Imp	pervious Are	ea							
	Tc	Length	Slope	Velocity	Capacity	Description							
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)								
	16.3	50	0.0100	0.05		Sheet Flow, 30-1							
						Woods: Light underbrush n= 0.400 P2= 3.20"							
	5.1	150	0.0050	0.49		Shallow Concentrated Flow, 30-2							
						Short Grass Pasture Kv= 7.0 fps							
	1.2	325	0.0100	4.54	3.56	Pipe Channel, 12"RCP							
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'							
						n= 0.013							
	0.6	350	0.0400	9.07	7.13	Pipe Channel, 12" RCP							
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'							
_						n= 0.013							
	23.2	875	Total										

#### Summary for Pond 31P: Proposed Pond

 10.089 ac,
 25.30% Impervious, Inflow Depth > 3.65" for 50 yr - 6.1" event

 27.42 cfs @
 12.32 hrs, Volume=
 3.070 af

 10.92 cfs @
 12.77 hrs, Volume=
 3.027 af, Atten= 60%, Lag= 27.0 mi

 6.83 cfs @
 12.77 hrs, Volume=
 2.586 af

 4.10 cfs @
 12.77 hrs, Volume=
 0.441 af

 Inflow Area = Inflow = Outflow = 3.027 af, Atten= 60%, Lag= 27.0 min

Discarded = Primary =

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 282.45' @ 12.77 hrs Surf.Area= 17,338 sf Storage= 42,108 cf

Plug-Flow detention time= 59.2 min calculated for 3.027 af (99% of inflow) Center-of-Mass det. time= 51.0 min (882.7 - 831.7)

Volume	Invert	Avail.S	Storage	Storage Description	1		
#1	273.00	' 74	,097 cf	Custom Stage Dat	a (Irregular)Listed	below	
Elevatio		urf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
273.0		348	116.0	0	0	348	
274.0		348	116.0	348	348	464	
275.0	0	348	116.0	348	696	580	
276.0	0	348	116.0	348	1,044	696	
277.0	0	348	116.0	348	1,392	812	
278.0	10	3,709	312.0	1,731	3,123	7,491	
280.0	10	7,651	487.0	11,125	14,248	18,647	
282.0	10	12,840	660.0	20,268	34,516	34,479	
282.1	0	15,780	665.0	1,428	35,945	35,010	
283.0		19,820	680.0	15,986	51,930	36,726	
284.0	10	24,600	690.0	22,167	74,097	38,014	
Device	Routing	Inve	rt Outle	et Devices			
#1	Primary	278.00	0' <b>18.0</b>	" Round Culvert L	= 22.0' RCP, gro	ove end w/headv	wall, Ke= 0.200
#2 #3	Device 1 Discarded	280.00 273.00	0' <b>4.0"</b>	/ Outlet Invert= 278. W x 48.0" H Vert. C 0 in/hr Exfiltration o	orifice/Grate C= 0		.900 n= 0.013, Flow Area= 1.77 sf

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Type III 24-hr 50 yr - 6.1" Rainfall=6.10" Printed 10/25/2023

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Discarded OutFlow Max=6.83 cfs @ 12.77 hrs HW=282.45' (Free Discharge) -3=Exfiltration (Exfiltration Controls 6.83 cfs)

Primary OutFlow Max=4.09 cfs @ 12.77 hrs HW=282.45' (Free Discharge)
1=Culvert (Passes 4.09 cfs of 20.45 cfs potential flow)
2=Orifice/Grate (Orifice Controls 4.09 cfs @ 5.02 fps)

#### Summary for Subcatchment 30: Flow to Pond

Runoff 33.37 cfs @ 12.32 hrs, Volume= 3.747 af, Depth> 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Type III 24-hr 100 yr 7.0" Rainfall=7.00"

_	A	rea (sf)	CN E	Description									
		23,351	61 >	75% Gras	s cover, Go	ood, HSG B							
		29,088		xist. >75%	⟨ Grass co⟩	ver, Good, HSG C							
*		9,460		xist. pave									
*		21,890			pposed drives - C								
*		25,557			oposed roads & walks								
*		45,286			posed units & decks - C								
		31,583			5% Grass cover, Good, HSG C								
	1	44,279			oods, Good, HSG C								
*		8,980	98 L	.edge									
		39,474		Veighted A									
		28,301	-		vious Area								
	1	11,173	2	.5.30% Imp	pervious Are	ea							
	т.	1	Class	\/-l:h.	Composite	Description							
	(min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description							
_					(CIS)	Object Flow 99.4							
	16.3	50	0.0100	0.05		Sheet Flow, 30-1							
	5.1	150	0.0050	0.49		Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow, 30-2							
	3.1	130	0.0030	0.49		Short Grass Pasture Kv= 7.0 fps							
	1.2	325	0.0100	4.54	3.56	Pipe Channel, 12"RCP							
	1.2	323	0.0100	4.54	3.30	12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'							
						n= 0.013							
	0.6	350	0.0400	9.07	7.13	Pipe Channel, 12" RCP							
	0.0	000	0.0100	0.01	7.10	12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'							
						n= 0.013							
_	23.2	875	Total										

#### 11528-2-2023

Discarded

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Type III 24-hr 100 yr 7.0" Rainfall=7.00"

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### Summary for Pond 31P: Proposed Pond

10.089 ac, 25.30% Impervious, Inflow Depth > 4.46" for 100 yr 7.0" event 33.37 cfs @ 12.32 hrs, Volume= 3.747 af Inflow Area = 33.37 cfs @ 12.32 hrs, Volume= 12.68 cfs @ 12.78 hrs, Volume= 7.04 cfs @ 12.78 hrs, Volume= 5.64 cfs @ 12.78 hrs, Volume= Inflow = 3.701 af, Atten= 62%, Lag= 27.8 min Outflow Discarded = 2 996 af

273.00' 8.270 in/hr Exfiltration over Wetted area

0.705 af Primary

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 283.03' @ 12.78 hrs Surf.Area= 19,961 sf Storage= 52,586 cf

Plug-Flow detention time= 60.5 min calculated for 3.701 af (99% of inflow) Center-of-Mass det. time= 53.2 min ( 879.4 - 826.1 )

Volume	Invert	Avail.S	torage	Storage Description	n		
#1	273.00'	74,	097 cf	Custom Stage Da		d below	
				_			
Elevation	on S	urf.Area	Perim.	Inc.Store	Cum.Store	Wet.Area	
(fee	et)	(sq-ft)	(feet)	(cubic-feet)	(cubic-feet)	(sq-ft)	
273.0	00	348	116.0	0	0	348	
274.0	00	348	116.0	348	348	464	
275.0	00	348	116.0	348	696	580	
276.0	00	348	116.0	348	1,044	696	
277.0	00	348	116.0	348	1,392	812	
278.0	00	3,709	312.0	1,731	3,123	7,491	
280.0	00	7,651	487.0	11,125	14,248	18,647	
282.0	00	12,840	660.0	20,268	34,516	34,479	
282.1	10	15,780	665.0	1,428	35,945	35,010	
283.0	00	19,820	680.0	15,986	51,930	36,726	
284.0	00	24,600	690.0	22,167	74,097	38,014	
Device	Routing	Inver	t Outl	et Devices			
#1	Primary	278.00	' 18.0	" Round Culvert L	= 22.0' RCP, gro	ove end w/headv	wall, Ke= 0.200
	,						.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	280.00	4.0"	W x 48.0" H Vert. C	Orifice/Grate C= (	0.600	,
110	D: 1 1	070.00		–	187 44 1		

Discarded OutFlow Max=7.04 cfs @ 12.78 hrs HW=283.03' (Free Discharge) 13-3=Exfiltration (Exfiltration Controls 7.04 cfs)

Primary OutFlow Max=5.64 cfs @ 12.78 hrs HW=283.03' (Free Discharge)
1=Culvert (Passes 5.64 cfs of 22.00 cfs potential flow)
2=Orifice/Grate (Orifice Controls 5.64 cfs @ 5.59 fps)

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Type III 24-hr 100 yr 8.57" Rainfall=8.57" Printed 10/25/2023

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### Summary for Subcatchment 30: Flow to Pond

Runoff = 43.86 cfs @ 12.31 hrs, Volume= 4.958 af, Depth> 5.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Type III 24-hr 100 yr 8.57" Rainfall=8.57"

	Α	rea (sf)	CN I	Description								
		23,351	61	>75% Gras	s cover, Go	od, HSG B						
		29,088	74	Exist. >759	⟨ Grass cov	ver, Good, HSG C						
*		9,460	98	Exist. pave	- C							
*		21,890	98	Proposed d	posed drives - C							
*		25,557	98	Proposed re	posed roads & walks							
*		45,286	98	Proposed u	nits & deck	s - C						
	1	31,583	74	>75 <sup>°</sup> % Gras	s cover, Go	ood, HSG C						
	1	44,279										
*		8,980	98	_edge								
	4	39,474	78	Weighted A	verage							
	3	28,301		74.70% Pei	vious Area							
	1	11,173	:	25.30% Imp	ervious Are	ea						
				•								
	Tc	Length	Slope	Velocity	Capacity	Description						
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)							
	16.3	50	0.0100	0.05		Sheet Flow, 30-1						
						Woods: Light underbrush n= 0.400 P2= 3.20"						
	5.1	150	0.0050	0.49		Shallow Concentrated Flow, 30-2						
						Short Grass Pasture Kv= 7.0 fps						
	1.2	325	0.0100	4.54	3.56	Pipe Channel, 12"RCP						
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'						
						n= 0.013						
	0.6	350	0.0400	9.07	7.13	Pipe Channel, 12" RCP						
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'						
						n= 0.013						
	23.2	875	Total									

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#### Summary for Pond 31P: Proposed Pond

10.089 ac, 25.30% Impervious, Inflow Depth > 5.90" for 100 yr 8.57" event 43.86 cfs @ 12.31 hrs, Volume= 4.958 af 15.54 cfs @ 12.80 hrs, Volume= 4.907 af, Atten= 65%, Lag= 29.1 mir 3.646 af 8.29 cfs @ 12.80 hrs, Volume= 1.262 af Inflow Area = Inflow = Outflow =

4.907 af, Atten= 65%, Lag= 29.1 min Discarded =

Primary = Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 283.91' @ 12.80 hrs Surf.Area= 24,191 sf Storage= 72,202 cf

Plug-Flow detention time= 63.8 min calculated for 4.907 af (99% of inflow) Center-of-Mass det. time= 57.7 min (876.0 - 818.3)

Volume	Invert	t Avail.S	Storage	Storage Descriptio	n		
#1	273.00	' 74	,097 cf	Custom Stage Da	ta (Irregular)Listed	d below	
Elevatio		urf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
273.0 274.0	00	348 348	116.0 116.0	0 348	0 348	348 464	
275.0		348	116.0	348	696	580	
276.0	00	348	116.0	348	1,044	696	
277.0	00	348	116.0	348	1,392	812	
278.0	00	3,709	312.0	1,731	3,123	7,491	
280.0	00	7,651	487.0	11,125	14,248	18,647	
282.0	00	12,840	660.0	20,268	34,516	34,479	
282.1	10	15,780	665.0	1,428	35,945	35,010	
283.0	00	19,820	680.0	15,986	51,930	36,726	
284.0	00	24,600	690.0	22,167	74,097	38,014	
Device	Routing	Inve	rt Outle	et Devices			
#1	Primary	278.0	0' <b>18.0</b> '	' Round Culvert L	_= 22.0' RCP, gro	ove end w/headv	vall, Ke= 0.200
			Inlet	/ Outlet Invert= 278	.00' / 277.12' S= 0	0.0400 '/' Cc= 0.	.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	280.0	0' <b>4.0"</b>	W x 48.0" H Vert. (	Orifice/Grate C= (	0.600	
#3	Discarded	273.0	0' 8.27	in/hr Exfiltration	over Wetted area		

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Type III 24-hr 100 yr 8.57" Rainfall=8.57" Printed 10/25/2023

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Discarded OutFlow Max=7.26 cfs @ 12.80 hrs HW=283.91' (Free Discharge) -3=Exfiltration (Exfiltration Controls 7.26 cfs)

Primary OutFlow Max=8.29 cfs @ 12.80 hrs HW=283.91' (Free Discharge)
1=Culvert (Passes 8.29 cfs of 24.17 cfs potential flow)
2=Orifice/Grate (Orifice Controls 8.29 cfs @ 6.35 fps)

#### Summary for Subcatchment 30: Flow to Pond

Runoff 43.86 cfs @ 12.31 hrs, Volume= 4.958 af, Depth> 5.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Type III 24-hr Custom Rainfall=8.57"

_	Α	rea (sf)	CN [	Description									
		23,351	61 >	75% Gras	s cover, Go	ood, HSG B							
		29,088	74 E	Exist. >75%	⟨ Grass co¹	ver, Good, HSG C							
*		9,460			ist. pave - C								
*		21,890			posed drives - C								
*		25,557			oposed roads & walks								
*		45,286			oposed units & decks - C								
		31,583			5% Grass cover, Good, HSG C								
	1	44,279											
*		8,980	98 L	_edge									
		39,474		Weighted A									
		328,301	-		rvious Area								
	1	11,173	2	25.30% Imp	pervious Are	ea							
	To	Length	ength Slope Velocity Capacity		Capacity	Description							
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	Description							
_	16.3	50	0.0100	0.05		Sheet Flow, 30-1							
						Woods: Light underbrush n= 0.400 P2= 3.20"							
	5.1	150	0.0050	0.49		Shallow Concentrated Flow, 30-2							
						Short Grass Pasture Kv= 7.0 fps							
	1.2	325	0.0100	4.54	3.56	Pipe Channel, 12"RCP							
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'							
						n= 0.013							
	0.6	350	0.0400	9.07	7.13	Pipe Channel, 12" RCP							
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'							
_	00.0	075	T - 4 - 1			n= 0.013							
	23.2	875	Total										

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Type III 24-hr Custom Rainfall=8.57"

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### Summary for Pond 31P: Proposed Pond

Inflow Area = 10.089 ac, 25.30% Impervious, Inflow Depth > 5.90" for Custom event

4.958 af Inflow

4.907 af, Atten= 65%, Lag= 29.1 min Outflow 3.646 af

273.00' 8.270 in/hr Exfiltration over Wetted area

43.86 cfs @ 12.31 hrs, Volume= 15.54 cfs @ 12.80 hrs, Volume= 7.26 cfs @ 12.80 hrs, Volume= 8.29 cfs @ 12.80 hrs, Volume= Discarded = 1.262 af Primary

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 283.91' @ 12.80 hrs Surf.Area= 24,191 sf Storage= 72,202 cf

Plug-Flow detention time= 63.8 min calculated for 4.907 af (99% of inflow) Center-of-Mass det. time= 57.7 min (876.0 - 818.3)

		-	•			
Inver	t Avail.	Storage	Storage Descriptio	n		
273.00	' 74	4,097 cf	Custom Stage Da	ta (Irregular)Liste	d below	
n S	Surf.Area	Perim.	Inc.Store	Cum.Store	Wet.Area	
i)	(sq-ft)	(feet)	(cubic-feet)	(cubic-feet)	(sq-ft)	
)	348	116.0	0	0	348	
)	348	116.0	348	348	464	
)	348	116.0	348	696	580	
)	348	116.0	348	1,044	696	
)	348	116.0	348	1,392	812	
)	3,709	312.0	1,731	3,123	7,491	
)	7,651	487.0	11,125	14,248	18,647	
)	12,840	660.0	20,268	34,516	34,479	
)	15,780	665.0	1,428	35,945	35,010	
)	19,820	680.0	15,986	51,930	36,726	
)	24,600	690.0	22,167	74,097	38,014	
Routing	Inve	ert Outl	et Devices			
Primary	278.0	00' <b>18.0</b>	" Round Culvert 1	L= 22.0' RCP, gro	ove end w/headv	vall, Ke= 0.200
		Inlet	/ Outlet Invert= 278	3.00' / 277.12' S=	0.0400 '/' Cc= 0.	.900 n= 0.013, Flow Area= 1.77 sf
Device 1	280.0	00' <b>4.0"</b>	W x 48.0" H Vert. 0	Orifice/Grate C=	0.600	
	273.00  S  O  O  O  O  O  O  O  O  O  O  O  O	273.00' 7-  Surf.Area ) (sq-ft) ) 348 ) 348 ) 348 ) 348 ) 348 ) 348 ) 348 ) 348 ) 348 ) 350 ) 15,780 ) 15,780 ) 19,820 ) 24,600  Routing Inverse	273.00' 74,097 cf  Surf.Area Perim. (sq-ft) (feet) 348 116.0 348 116.0 348 116.0 348 116.0 348 116.0 3709 312.0	273.00' 74,097 cf Custom Stage Da  Surf.Area Perim. Inc.Store (sq-ft) (feet) (cubic-feet) 348 116.0 348 116.0 348 116.0 348 116.0 348 348 116.0 348 348 116.0 348 348 116.0 348 348 116.0 348 348 116.0 348 348 116.0 348 348 116.0 348 348 116.0 348 348 116.0 348 318 116.0 348 318 116.0 348 318 116.0 348 318 116.0 348 318 116.0 348 318 116.0 348 318 116.0 348 318 116.0 348 318 116.0 348 318 116.0 348 318 116.0 348 318 116.0 348 318 116.0 348 318 116.0 348 318 116.0 348 318 116.0 348 318 318 318 318 318 318 318 318 318 318	273.00' 74,097 cf Custom Stage Data (Irregular)Lister  Surf.Area Perim. Inc.Store Cum.Store (sq-ft) (feet) (cubic-feet) (cubic-feet)  348 116.0 0 0 0  348 116.0 348 696  348 116.0 348 1,044  348 116.0 348 1,392  37.09 312.0 1,731 3,123  7,651 487.0 11,125 14,248  12,840 660.0 20,268 34,516  15,780 665.0 1,428 35,945  19,820 680.0 15,986 51,930  24,600 690.0 22,167 74,097  Routing Invert Outlet Devices  Primary 278.00' 18.0" Round Culvert L= 22.0' RCP, gro	273.00' 74,097 cf Custom Stage Data (Irregular)Listed below  1

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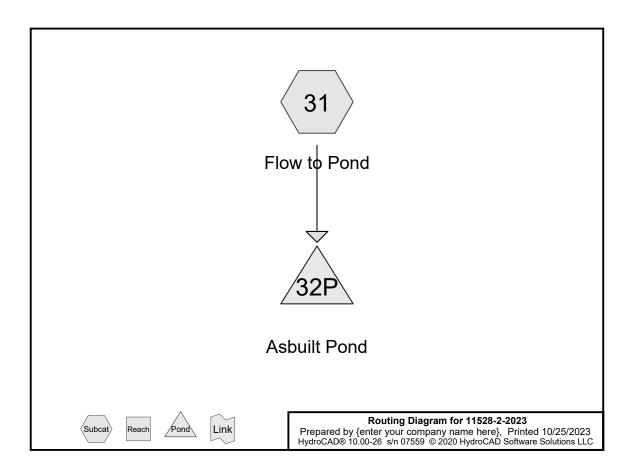
Type III 24-hr Custom Rainfall=8.57" Printed 10/25/2023

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Discarded OutFlow Max=7.26 cfs @ 12.80 hrs HW=283.91' (Free Discharge) 13-8Exfiltration (Exfiltration Controls 7.26 cfs)

Primary OutFlow Max=8.29 cfs @ 12.80 hrs HW=283.91' (Free Discharge)
1=Culvert (Passes 8.29 cfs of 24.17 cfs potential flow)
2=Orifice/Grate (Orifice Controls 8.29 cfs @ 6.35 fps)



### 11528-2-2023

Type III 24-hr 2 yr - 3.2" Rainfall=3.20"

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#### Summary for Subcatchment 31: Flow to Pond

Runoff = 8.77 cfs @ 12.34 hrs, Volume= 1.013 af, Depth> 1.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Type III 24-hr  $\,$  2 yr - 3.2" Rainfall=3.20"

	A	rea (sf)	CN	Description								
		23,351	61	>75% Gras	s cover, Go	ood, HSG B						
		29,088	74	Exist. >759	xist. >75% Grass cover, Good, HSG C							
*		9,460	98	Exist. pave	- C							
*		19,502	98	Proposed d	rives - C							
*		25,557	98	Proposed r	oads & wall	KS .						
*		30,408	98	Proposed F	Roofs - C							
	1	37,230	74	>75% Gras	s cover, Go	ood, HSG C						
	1	55,898	70	Woods, Go	od, HSG C							
*		8,980	98	Ledge								
	4	39,474	77	Weighted A	verage							
	345,567 78.63% Pervious Area											
	93,907 21.37% Impervious Area											
	Tc	Length	Slope	Velocity	Capacity	Description						
	(min)	(feet)	(ft/ft	(ft/sec)	(cfs)							
-	16.3	50	0.0100	0.05		Sheet Flow, 30-1						
						Woods: Light underbrush n= 0.400 P2= 3.20"						
	5.1	150	0.0050	0.49		Shallow Concentrated Flow, 30-2						
						Short Grass Pasture Kv= 7.0 fps						
	1.2	325	0.0100	4.54	3.56	Pipe Channel, 12"RCP						
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'						
						n= 0.013						
	0.6	350	0.0400	9.07	7.13	Pipe Channel, 12" RCP						
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'						
						n= 0.013						
	23.2	875	Total									

#### Summary for Pond 32P: Asbuilt Pond

Inflow Area =

Inflow = Outflow =

1.003 af, Atten= 57%, Lag= 26.7 min

10.089 ac, 21.37% Impervious, Inflow Depth > 1.21" for 2 yr - 3.2" event 8.77 cfs @ 12.34 hrs, Volume= 1.013 af 3.78 cfs @ 12.79 hrs, Volume= 1.003 af, Atten= 57%, Lag= 26.7 r 0.19 cfs @ 12.79 hrs, Volume= 0.994 af 0.19 cfs @ 12.79 hrs, Volume= 0.009 af Discarded = Primary =

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 280.22' @ 12.79 hrs Surf.Area= 7,917 sf Storage= 11,830 cf

Plug-Flow detention time= 46.0 min calculated for 1.003 af (99% of inflow) Center-of-Mass det. time= 40.5 min ( 905.6 - 865.1 )

Volume	Invert	t Avail.St	orage	Storage Description	1					
#1	273.00	73,	184 cf	Custom Stage Data	a (Irregular)Listed	l below				
Elevatio		urf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)				
273.0	00	348	0.0	0	0	348				
274.0	00	312	116.0	330	330	1,420				
275.0	00	312	116.0	312	642	1,536				
276.0	00	312	116.0	312	954	1,652				
277.0	00	312	116.0	312	1,266	1,768				
278.0	00	860	237.0	563	1,829	5,172				
278.5	50	2,495	265.0	803	2,632	6,297				
280.0	00	7,230	450.0	6,986	9,619	16,837				
282.0	00	13,590	650.0	20,488	30,107	34,379				
283.0	00	16,900	678.0	15,215	45,322	37,411				
284.0	00	19,100	697.0	17,989	63,311	39,601				
284.5	50	20,400	709.0	9,873	73,184	40,989				
Device	Routing	Invert	Outl	et Devices						
#1	Primary	278.00'		" Round Culvert L:						
#2	Device 1	279.90'		Inlet / Outlet Invert= 278.00' / 277.12' S= 0.0400 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf						
#3	Discarded	273.00'		8.270 in/hr Exfiltration over Wetted area						
#3	Discarded	213.00	0.27	U III/III EXIIIII alioii U	vei welleu alea					

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Type III 24-hr 2 yr - 3.2" Rainfall=3.20"

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Discarded OutFlow Max=3.58 cfs @ 12.79 hrs HW=280.22' (Free Discharge) -3=Exfiltration (Exfiltration Controls 3.58 cfs)

Primary OutFlow Max=0.19 cfs @ 12.79 hrs HW=280.22' (Free Discharge)
1=Culvert (Passes 0.19 cfs of 12.87 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.19 cfs @ 1.80 fps)

#### Summary for Subcatchment 31: Flow to Pond

Runoff 18.30 cfs @ 12.33 hrs, Volume= 2.056 af, Depth> 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Type III 24-hr 10 yr - 4.8" Rainfall=4.80"

_	Α	rea (sf)	CN [	Description		
		23,351	61 >	75% Gras	s cover, Go	ood, HSG B
		29,088	74 E	Exist. >75%	6 Grass cov	ver, Good, HSG C
*		9,460	98 E	Exist. pave	- C	
*		19,502	98 F	Proposed d	rives - C	
*		25,557	98 F	Proposed re	oads & walk	KS .
*		30,408		Proposed F		
		37,230				od, HSG C
	1	55,898			od, HSG C	
*		8,980	98 L	_edge		
		39,474		Weighted A		
	3	45,567	7	78.63% Per	vious Area	
		93,907	2	21.37% Imp	pervious Are	ea
	_					
		Length	Slope		Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	16.3	50	0.0100	0.05		Sheet Flow, 30-1
						Woods: Light underbrush n= 0.400 P2= 3.20"
	5.1	150	0.0050	0.49		Shallow Concentrated Flow, 30-2
						Short Grass Pasture Kv= 7.0 fps
	1.2	325	0.0100	4.54	3.56	Pipe Channel, 12"RCP
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
		050	0.0400	0.07	7.40	n= 0.013
	0.6	350	0.0400	9.07	7.13	Pipe Channel, 12" RCP
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
_						n= 0.013
	23.2	875	Total			

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Type III 24-hr 10 yr - 4.8" Rainfall=4.80" Printed 10/25/2023

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### Summary for Pond 32P: Asbuilt Pond

Inflow Area = 10.089 ac, 21.37% Impervious, Inflow Depth > 2.45" for 10 yr - 4.8" event 10.089 ac, 21.37% Impervious, in 18.30 cfs @ 12.33 hrs, Volume= 8.19 cfs @ 12.74 hrs, Volume= 5.87 cfs @ 12.74 hrs, Volume= 2.32 cfs @ 12.74 hrs, Volume= 2.056 af 2.026 af, Atten= 55%, Lag= 25.0 min Inflow = Outflow 1.820 af Discarded =

Primary 0.206 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 281.57' @ 12.74 hrs Surf.Area= 12,237 sf Storage= 25,747 cf

Plug-Flow detention time= 48.1 min calculated for 2.026 af (99% of inflow) Center-of-Mass det. time= 39.8 min ( 884.5 - 844.7 )

Volume	Invert	Avail	l.Storage	Storage Description	า		
#1	273.00'	0' 73,184 cf		Custom Stage Dat	ta (Irregular)Listed	d below	
Elevation (feet)		f.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
273.00		348	0.0	0	0	348	
274.00		312	116.0	330	330	1,420	
275.00		312	116.0	312	642	1,536	
276.00		312	116.0	312	954	1,652	
277.00		312	116.0	312	1,266	1,768	
278.00		860	237.0	563	1,829	5,172	
278.50		2,495	265.0	803	2,632	6,297	
280.00		7,230	450.0	6,986	9,619	16,837	
282.00	1	3,590	650.0	20,488	30,107	34,379	
283.00	1	6,900	678.0	15,215	45,322	37,411	
284.00	1	9,100	697.0	17,989	63,311	39,601	
284.50	2	0,400	709.0	9,873	73,184	40,989	
Device Ro	outing	Inv	vert Outle	et Devices			

Device	Routing	Invert	Outlet Devices
#1	Primary	278.00'	18.0" Round Culvert L= 22.0' RCP, groove end w/headwall, Ke= 0.200
	-		Inlet / Outlet Invert= 278.00' / 277.12' S= 0.0400 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	279.90'	4.0" W x 48.0" H Vert. Orifice/Grate C= 0.600
#3	Discarded	273 00'	8 270 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=5.86 cfs @ 12.74 hrs HW=281.57' (Free Discharge) 13-3=Exfiltration (Exfiltration Controls 5.86 cfs)

Primary OutFlow Max=2.32 cfs @ 12.74 hrs HW=281.57' (Free Discharge)
1=Culvert (Passes 2.32 cfs of 17.87 cfs potential flow)
2=Orifice/Grate (Orifice Controls 2.32 cfs @ 4.15 fps)

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Type III 24-hr 50 yr - 6.1" Rainfall=6.10"

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#### Summary for Subcatchment 31: Flow to Pond

Runoff 26.68 cfs @ 12.32 hrs, Volume= 2.985 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Type III 24-hr 50 yr - 6.1" Rainfall=6.10"

	Α	rea (sf)	CN	Description				
		23,351	61	>75% Gras	s cover, Go	ood, HSG B		
		29,088	74	Exist. >759	% Grass co	ver, Good, HSG C		
*		9,460		Exist. pave				
*		19,502		Proposed d				
*		25,557			oads & wall	(S		
*		30,408		Proposed F				
		37,230				od, HSG C		
	1	55,898			od, HSG C			
*		8,980	98	_edge				
		39,474		Weighted A				
	345,567 78.63% Pervious Area							
93,907 21.37% Impervious Area								
	_							
		Length	Slope		Capacity	Description		
_	(min)	(feet)	(ft/ft)		(cfs)			
	16.3	50	0.0100	0.05		Sheet Flow, 30-1		
						Woods: Light underbrush n= 0.400 P2= 3.20"		
	5.1	150	0.0050	0.49		Shallow Concentrated Flow, 30-2		
						Short Grass Pasture Kv= 7.0 fps		
	1.2	325	0.0100	4.54	3.56	Pipe Channel, 12"RCP		
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'		
						n= 0.013		
	0.6	350	0.0400	9.07	7.13	Pipe Channel, 12" RCP		
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'		
_						n= 0.013		
	23.2	875	Total					

#### Summary for Pond 32P: Asbuilt Pond

Inflow Area =

Inflow = Outflow = 2.953 af, Atten= 57%, Lag= 25.5 min

 10.089 ac,
 21.37% Impervious, Inflow Depth > 3.55" for 50 yr - 6.1" event

 26.68 cfs @
 12.32 hrs, Volume=
 2.985 af

 11.46 cfs @
 12.74 hrs, Volume=
 2.953 af, Atten= 57%, Lag= 25.5 min

 6.89 cfs @
 12.74 hrs, Volume=
 2.452 af

 4.57 cfs @
 12.74 hrs, Volume=
 0.501 af

 Discarded = Primary =

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 282.53' @ 12.74 hrs Surf.Area= 15,354 sf Storage= 38,217 cf

Plug-Flow detention time= 48.7 min calculated for 2.947 af (99% of inflow) Center-of-Mass det. time= 42.4 min (876.5 - 834.1)

Volume	Invert	t Avail.	Storage	Storage Description	า					
#1	273.00	' 7	3,184 cf	Custom Stage Dat	ta (Irregular)Listed	below				
Elevatio		urf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)				
273.0		348	0.0	0	0	348				
274.0 275.0		312 312	116.0 116.0	330 312	330 642	1,420 1,536				
276.0	00	312	116.0	312	954	1,652				
277.0		312	116.0	312	1,266	1,768				
278.0 278.5		860 2.495	237.0 265.0	563 803	1,829 2.632	5,172 6,297				
280.0		7,230	450.0	6,986	9,619	16,837				
282.0		13,590	650.0	20,488	30,107	34,379				
283.0 284.0		16,900 19,100	678.0 697.0	15,215 17.989	45,322 63,311	37,411 39,601				
284.5		20,400	709.0	9,873	73,184	40,989				
Device	Routing	Inv	ert Outle	et Devices						
#1	Primary	278.0		" Round Culvert L						
#2 #3	Device 1 Discarded	279.9 273.0	90' <b>4.0"</b>	Outlet Invert= 278.00' / 277.12' S= 0.0400 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf V x 48.0" H Vert. Orifice/Grate C= 0.600 in/hr Exfiltration over Wetted area						

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Type III 24-hr 50 yr - 6.1" Rainfall=6.10" Printed 10/25/2023

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Discarded OutFlow Max=6.89 cfs @ 12.74 hrs HW=282.53' (Free Discharge) -3=Exfiltration (Exfiltration Controls 6.89 cfs)

Primary OutFlow Max=4.57 cfs @ 12.74 hrs HW=282.53' (Free Discharge)
1=Culvert (Passes 4.57 cfs of 20.68 cfs potential flow)
2=Orifice/Grate (Orifice Controls 4.57 cfs @ 5.21 fps)

#### Summary for Subcatchment 31: Flow to Pond

Runoff 32.60 cfs @ 12.32 hrs, Volume= 3.655 af, Depth> 4.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Type III 24-hr 100 yr 7.0" Rainfall=7.00"

	Α	rea (sf)	CN I	Description							
		23,351	61	75% Gras	s cover, Go	ood, HSG B					
		29,088	74	Exist. >75%	kist. >75% Grass cover, Good, HSG C						
*		9,460	98	Exist. pave	- C						
*		19,502	98	Proposed d	rives - C						
*		25,557	98	Proposed re	oads & wall	KS .					
*		30,408	98	Proposed F	Roofs - C						
		37,230	74	75% Gras	s cover, Go	od, HSG C					
	1	55,898	70	Noods, Go	od, HSG C						
*		8,980	98	_edge							
	4	139,474	77	Weighted A	verage						
	3	345,567		78.63% Pervious Area							
		93,907	:	21.37% Imp	pervious Are	ea					
		Length	Slope		Capacity	Description					
_	(min)		(ft/ft)								
		(feet)		(ft/sec)	(cfs)						
	16.3	50	0.0100		(cfs)	Sheet Flow, 30-1					
		50	0.0100	0.05	(cfs)	Woods: Light underbrush n= 0.400 P2= 3.20"					
	16.3 5.1	50		0.05	(cfs)	Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow, 30-2					
	5.1	50 150	0.0100	0.05 0.49	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Woods: Light underbrush n= 0.400 P2= 3.20" <b>Shallow Concentrated Flow, 30-2</b> Short Grass Pasture Kv= 7.0 fps					
		50 150	0.0100	0.05 0.49	(cfs) 3.56	Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow, 30-2  Short Grass Pasture Kv= 7.0 fps  Pipe Channel, 12"RCP					
	5.1	50 150	0.0100	0.05 0.49	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Woods: Light underbrush n= 0.400 P2= 3.20" <b>Shallow Concentrated Flow, 30-2</b> Short Grass Pasture Kv= 7.0 fps <b>Pipe Channel, 12"RCP</b> 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'					
	5.1	50 150 325	0.0100 0.0050 0.0100	0.05 0.49 4.54	3.56	Woods: Light underbrush n= 0.400 P2= 3.20" <b>Shallow Concentrated Flow, 30-2</b> Short Grass Pasture Kv= 7.0 fps <b>Pipe Channel, 12"RCP</b> 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013					
	5.1	50 150	0.0100 0.0050 0.0100	0.05 0.49 4.54	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow, 30-2  Short Grass Pasture Kv= 7.0 fps  Pipe Channel, 12"RCP  12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013  Pipe Channel, 12" RCP					
	5.1	50 150 325	0.0100 0.0050 0.0100	0.05 0.49 4.54	3.56	Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow, 30-2  Short Grass Pasture Kv= 7.0 fps  Pipe Channel, 12"RCP  12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'  n= 0.013  Pipe Channel, 12" RCP  12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'					
	5.1	50 150 325	0.0100 0.0050 0.0100	0.05 0.49 4.54	3.56	Woods: Light underbrush n= 0.400 P2= 3.20"  Shallow Concentrated Flow, 30-2  Short Grass Pasture Kv= 7.0 fps  Pipe Channel, 12"RCP  12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013  Pipe Channel, 12" RCP					

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Type III 24-hr 100 yr 7.0" Rainfall=7.00"

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### Summary for Pond 32P: Asbuilt Pond

Inflow Area = 10.089 ac, 21.37% Impervious, Inflow Depth > 4.35" for 100 yr 7.0" event 32.60 cfs @ 12.32 hrs, Volume= 13.48 cfs @ 12.75 hrs, Volume= 7.22 cfs @ 12.75 hrs, Volume= 6.26 cfs @ 12.75 hrs, Volume= 3.655 af Inflow 3.621 af, Atten= 59%, Lag= 26.1 min Outflow 2 853 af Discarded =

273.00' 8.270 in/hr Exfiltration over Wetted area

0.768 af Primary Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 283.15' @ 12.75 hrs Surf.Area= 17,219 sf Storage= 47,931 cf

Plug-Flow detention time= 50.2 min calculated for 3.614 af (99% of inflow) Center-of-Mass det. time= 44.6 min (873.1 - 828.4)

Discarded

			-	•			
Volume	Invert	Avail.S	torage	Storage Description	1		
#1	273.00	73	,184 cf	Custom Stage Dat	a (Irregular)Listed	d below	
				_			
Elevation	on S	urf.Area	Perim.	Inc.Store	Cum.Store	Wet.Area	
(fee	et)	(sq-ft)	(feet)	(cubic-feet)	(cubic-feet)	(sq-ft)	
273.0	00	348	0.0	0	0	348	
274.0	00	312	116.0	330	330	1,420	
275.0	00	312	116.0	312	642	1,536	
276.0	00	312	116.0	312	954	1,652	
277.0	00	312	116.0	312	1,266	1,768	
278.0	00	860	237.0	563	1,829	5,172	
278.5	50	2,495	265.0	803	2,632	6,297	
280.0	00	7,230	450.0	6,986	9,619	16,837	
282.0	00	13,590	650.0	20,488	30,107	34,379	
283.0	00	16,900	678.0	15,215	45,322	37,411	
284.0	00	19,100	697.0	17,989	63,311	39,601	
284.5	50	20,400	709.0	9,873	73,184	40,989	
Device	Routing	Inve	t Outl	et Devices			
#1	Primary	278.00	)' 18.0	" Round Culvert L	= 22.0' RCP, gro	ove end w/headw	/all, Ke= 0.200
			Inlet	/ Outlet Invert= 278.	00' / 277.12' S=	0.0400 '/' Cc= 0.	.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	279.90	)' <b>4.0"</b>	W x 48.0" H Vert. O	rifice/Grate C=	0.600	
410	Discount of	070.00		A ! // = =	181-44		

Discarded OutFlow Max=7.22 cfs @ 12.75 hrs HW=283.14' (Free Discharge) 13-3=Exfiltration (Exfiltration Controls 7.22 cfs)

Primary OutFlow Max=6.25 cfs @ 12.75 hrs HW=283.14' (Free Discharge)
1=Culvert (Passes 6.25 cfs of 22.30 cfs potential flow)
2=Orifice/Grate (Orifice Controls 6.25 cfs @ 5.78 fps)

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Type III 24-hr 100 yr 8.57" Rainfall=8.57" Printed 10/25/2023

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#### Summary for Subcatchment 31: Flow to Pond

Runoff = 43.06 cfs @ 12.31 hrs, Volume= 4.857 af, Depth> 5.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Type III 24-hr 100 yr 8.57" Rainfall=8.57"

	Α	rea (sf)	CN	Description				
		23,351	61	>75% Gras	s cover, Go	ood, HSG B		
		29,088	74	Exist. >759	% Grass co	ver, Good, HSG C		
*		9,460		Exist. pave				
*		19,502		Proposed d				
*		25,557			oads & wall	(S		
*		30,408		Proposed F				
		37,230				od, HSG C		
	1	55,898			od, HSG C			
*		8,980	98	_edge				
		39,474		Weighted A				
	345,567 78.63% Pervious Area							
93,907 21.37% Impervious Area								
	_							
		Length	Slope		Capacity	Description		
_	(min)	(feet)	(ft/ft)		(cfs)			
	16.3	50	0.0100	0.05		Sheet Flow, 30-1		
						Woods: Light underbrush n= 0.400 P2= 3.20"		
	5.1	150	0.0050	0.49		Shallow Concentrated Flow, 30-2		
						Short Grass Pasture Kv= 7.0 fps		
	1.2	325	0.0100	4.54	3.56	Pipe Channel, 12"RCP		
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'		
						n= 0.013		
	0.6	350	0.0400	9.07	7.13	Pipe Channel, 12" RCP		
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'		
_						n= 0.013		
	23.2	875	Total					

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#### Summary for Pond 32P: Asbuilt Pond

10.089 ac, 21.37% Impervious, Inflow Depth > 5.78" for 100 yr 8.57" event 43.06 cfs @ 12.31 hrs, Volume= 4.857 af 16.84 cfs @ 12.76 hrs, Volume= 4.820 af, Atten= 61%, Lag= 27.0 min 3.500 af 9.19 cfs @ 12.76 hrs, Volume= 1.319 af Inflow Area = Inflow = Outflow = 4.820 af, Atten= 61%, Lag= 27.0 min

Discarded = Primary =

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 284.13' @ 12.76 hrs Surf.Area= 19,437 sf Storage= 65,873 cf

Plug-Flow detention time= 53.1 min calculated for 4.820 af (99% of inflow) Center-of-Mass det. time= 48.5 min (869.0 - 820.5)

Volume	Invert	Avail.St	torage	Storage Descriptio	n				
#1	273.00'	73,	184 cf	Custom Stage Da	ta (Irregular)Listed	d below			
Elevatio		urf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)			
273.0		348	0.0	0	0	348			
274.0		312	116.0	330	330	1,420			
275.0	10	312	116.0	312	642	1,536			
276.0	10	312	116.0	312	954	1,652			
277.0	0	312	116.0	312	1,266	1,768			
278.0	0	860	237.0	563	1,829	5,172			
278.5	60	2,495	265.0	803	2,632	6,297			
280.0	0	7,230	450.0	6,986	9,619	16,837			
282.0	0	13,590	650.0	20,488	30,107	34,379			
283.0	10	16,900	678.0	15,215	45,322	37,411			
284.0	10	19,100	697.0	17,989	63,311	39,601			
284.5	60	20,400	709.0	9,873	73,184	40,989			
Device	Routing	Inver	t Outl	et Devices					
#1	Primary	278.00		" Round Culvert I					
"0	5	070.00					.900 n= 0.013, Flow Area= 1.77 sf		
#2	Device 1	279.90		W x 48.0" H Vert. (		0.600			
#3	#3 Discarded 273.00' 8.270 in/hr Exfiltration over Wetted area								

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Type III 24-hr 100 yr 8.57" Rainfall=8.57"

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Discarded OutFlow Max=7.65 cfs @ 12.76 hrs HW=284.13' (Free Discharge) -3=Exfiltration (Exfiltration Controls 7.65 cfs)

Primary OutFlow Max=9.18 cfs @ 12.76 hrs HW=284.13' (Free Discharge)
1=Culvert (Passes 9.18 cfs of 24.66 cfs potential flow)
2=Orifice/Grate (Orifice Controls 9.18 cfs @ 6.89 fps)

#### Summary for Subcatchment 31: Flow to Pond

Runoff 43.06 cfs @ 12.31 hrs, Volume= 4.857 af, Depth> 5.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Type III 24-hr Custom Rainfall=8.57"

	Α	rea (sf)	CN	Description					
		23,351 61 >75% Grass cover, Go				ood, HSG B			
29,088 74 Exist. >75% Grass cov				Exist. >759	6 Grass co	ver, Good, HSG C			
*		9,460	98	Exist. pave	- C				
*		19,502	98	Proposed drives - C					
*		25,557	98	Proposed re	oads & wall	KS .			
*		30,408	98	Proposed F	Roofs - C				
		37,230	74	>75% Gras	s cover, Go	od, HSG C			
	1	55,898	70	Woods, Go	od, HSG C				
*		8,980	98	Ledge					
439,474			77	Weighted A	verage				
	345,567 78.63% Pervious Area 93,907 21.37% Impervious Are			78.63% Pei	vious Area				
				21.37% Imp	pervious Are	ea			
	Tc	Length	Slope		Capacity	Description			
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	16.3	50	0.0100	0.05		Sheet Flow, 30-1			
						Woods: Light underbrush n= 0.400 P2= 3.20"			
	5.1	150	0.0050	0.49		Shallow Concentrated Flow, 30-2			
						Short Grass Pasture Kv= 7.0 fps			
	1.2	325	0.0100	4.54	3.56	Pipe Channel, 12"RCP			
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'			
						n= 0.013			
	0.6	350	0.0400	9.07	7.13	Pipe Channel, 12" RCP			
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'			
_						n= 0.013			
	23.2	875	Total						

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Type III 24-hr Custom Rainfall=8.57"

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### Summary for Pond 32P: Asbuilt Pond

10.089 ac, 21.37% Impervious, Inflow Depth > 5.78" for Custom event 43.06 cfs @ 12.31 hrs, Volume= 4.857 af Inflow Area =

Inflow

4.820 af, Atten= 61%, Lag= 27.0 min 3.500 af Outflow

10.069 ac, 21.37% Impervious, in 43.06 cfs @ 12.31 hrs, Volume= 16.84 cfs @ 12.76 hrs, Volume= 7.65 cfs @ 12.76 hrs, Volume= 9.19 cfs @ 12.76 hrs, Volume= Discarded = Primary 1.319 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 284.13' @ 12.76 hrs Surf.Area= 19,437 sf Storage= 65,873 cf

Plug-Flow detention time= 53.1 min calculated for 4.820 af (99% of inflow) Center-of-Mass det. time= 48.5 min (869.0 - 820.5)

Volume	Invert	ert Avail.Storage		Storage Description					
#1	273.00'	00' 73,184 cf		Custom Stage Data (Irregular)Listed below					
Elevation (feet)		f.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)			
273.00		348	0.0	0	0	348			
274.00		312	116.0	330	330	1,420			
275.00		312	116.0	312	642	1,536			
276.00		312	116.0	312	954	1,652			
277.00		312	116.0	312	1,266	1,768			
278.00		860	237.0	563	1,829	5,172			
278.50		2,495	265.0	803	2,632	6,297			
280.00		7,230	450.0	6,986	9,619	16,837			
282.00	1	3,590	650.0	20,488	30,107	34,379			
283.00	1	6,900	678.0	15,215	45,322	37,411			
284.00	1	9,100	697.0	17,989	63,311	39,601			
284.50	2	0,400	709.0	9,873	73,184	40,989			
Device Ro	outing	lnv	ert Outle	et Devices					

	Device	Routing	Invert	Outlet Devices	
#1 Primary 278.00'		278.00'	18.0" Round Culvert L= 22.0' RCP, groove end w/headwall, Ke= 0.200		
		-		Inlet / Outlet Invert= 278.00' / 277.12' S= 0.0400 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf	
	#2	Device 1	279.90'	4.0" W x 48.0" H Vert. Orifice/Grate C= 0.600	
	#3	Discarded	273 00'	8 270 in/hr Exfiltration over Wetted area	

11528-2-2023

Type III 24-hr Custom Rainfall=8.57" Printed 10/25/2023

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Discarded OutFlow Max=7.65 cfs @ 12.76 hrs HW=284.13' (Free Discharge) 13-3=Exfiltration (Exfiltration Controls 7.65 cfs)

Primary OutFlow Max=9.18 cfs @ 12.76 hrs HW=284.13' (Free Discharge)
1=Culvert (Passes 9.18 cfs of 24.66 cfs potential flow)
2=Orifice/Grate (Orifice Controls 9.18 cfs @ 6.89 fps)