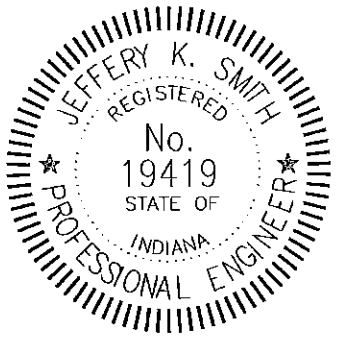
Final Drainage Report for

Graham Street Storage

City of Franklin, Johnson County, Indiana

Dated: August 12, 2015
Revised: November 3, 2015



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TECHNICAL INFORMATION DATA

Summary of Pre-Developed Drainage Conditions:

The project, "Graham Street Storage" is located at 1137 Graham Street, in the City of Franklin, Johnson County, Indiana. The site is located within the 'B' and 'C' soil classifications per the Soil Survey Maps for Johnson County. The site is currently comprised of grass areas, two existing storage buildings with asphalt drives and a concrete drive to two residential homes.

The drainage basins for this site have been divided into two (2) onsite areas and two (2) offsite areas. All the drainage basin areas are depicted on the Watershed Delineation Map located at the end of this report. A summary of the characteristics are as follows:

Onsite Pre-Basin '1' consists of two existing self-storage buildings and drains to the east to an open field. A summary of the drainage release runoff rates are as follows:

Onsite Pre-Basin '1'		
A = 1.52 acres	CN = 76	T/C=7 min.
Q_{10} = 0.25 cfs,	Q_{10} = 1.04 cfs,	Q_{100} = 2.65 cfs

Offsite Pre-Basin '1' consists of a combination of residential and commercial buildings and associated drives, which drain to the east to Onsite Pre-Basin '1'. A summary of the drainage release runoff rates are as follows:

Offsite Pre-Basin '1'		
A = 1.28 acres	CN = 75	T/C=17 min.
Q_{10} = 0.20 cfs,	Q_{10} = 0.70 cfs,	Q_{100} = 1.78 cfs

Combine Release Point '1'		
Q_{10} = 0.43 cfs,	Q_{10} = 1.56 cfs,	Q_{100} = 3.93 cfs

Onsite Pre-Basin '2' consists of grass and drains to the east to an existing swale along the south property line. The swale then drains east to an existing 24" CMP under an existing cell phone tower and releases south to an existing drainage swale. A summary of the drainage release runoff rates are as follows:

Onsite Pre-Basin '2'		
A = 1.98 acres	CN = 76	T/C=22 min.
Q_{10} 0.39 cfs,	Q_{10} = 1.09 cfs,	Q_{100} = 1.33 cfs

Offsite Pre-Basin '2' consists of an existing residential lot and drains to the east to Onsite Pre-Basin '2'. A summary of the drainage release runoff rates are as follows:

Offsite Pre-Basin '2'		
A = 0.62 acres	CN = 81	T/C=14 min.
Q_{10} = 0.19 cfs,	Q_{10} = 0 .60 cfs,	Q_{100} = 2.68 cfs

Combine Release Point '2'		
Q_{10} = 0.47 cfs,	Q_{10} = 1.58 cfs,	Q_{100} = 3.77 cfs

Allowable Release Rates:

The allowable runoff release rates per Section 6.19 of the Subdivision Control Ordinance of the City of Franklin are as follows:

- The peak discharge from the 100-yr. post-developed storm event shall not exceed the peak discharge from the 10-yr. pre-developed storm event.
- The peak discharge from the 10-yr. post-developed storm event shall not exceed the peak discharge from the 2-yr. pre-developed storm event.
- All upstream watersheds will be routed through the detention pond. Allowable release rates will include the upstream runoff discharge at its current release rates.

The allowable post-developed release rates for the site were calculated per the above requirements and a summary of the release rates are as follows:

Q_{10} = 1.82 cfs, Q_{100} = 5.24 cfs

Summary of Post-Developed Drainage Conditions:

The proposed site improvements for the "Graham Street Storage" will consist of construction of storage unit buildings, outside parking areas, also includes asphalt drives, concrete apron and concrete curbs. Additional improvements would include the installation of public and private utilities, if required. The runoff from the site will be routed through a proposed wet detention pond with the outlet controlled by a pond control box, which will outlet to the existing swale, as mentioned in the Pre-Developed Drainage Conditions portion of this report. The drainage design for the site is designed to meet the General Drainage Standards, Chapter 6.19 of the City of Franklin Subdivision Control Ordinance. A summary of the drainage runoff and the dry detention pond are as followed:

Onsite Post-Basin '1':

A = 5.14 acres CN = 87 T/C=19 min.

Q_2 = 2.92 cfs, Q_{10} = 7.19 cfs, Q_{100} = 13.86 cfs

Detention:

N.P. = 740.00, T.O.B. = 742.00, Storage = 25,583 Cu. Ft.

100-yr elev. = 741.70

Outflow:

Q_2 = 0.63 cfs, Q_{10} = 1.50 cfs, Q_{100} = 5.01 cfs

The "Graham Street Storage – Buildings 3 & 4" construction activities consist of two self-storage building, outside storage, including asphalt drives, concrete paved swale, storm pipe, concrete curbs, and the overall detention pond.

Water Quality:

The proposed wet detention pond and pond control box is designed to meet the City of Franklin Subdivision Control Ordinance, Section 6.19, for water quality design. The water quality detention pond is designed for option #1; detain 20% of the 0.5" direct runoff for 24 hours past the peak. See calculations within the Water Quality Calculations portion of this report.

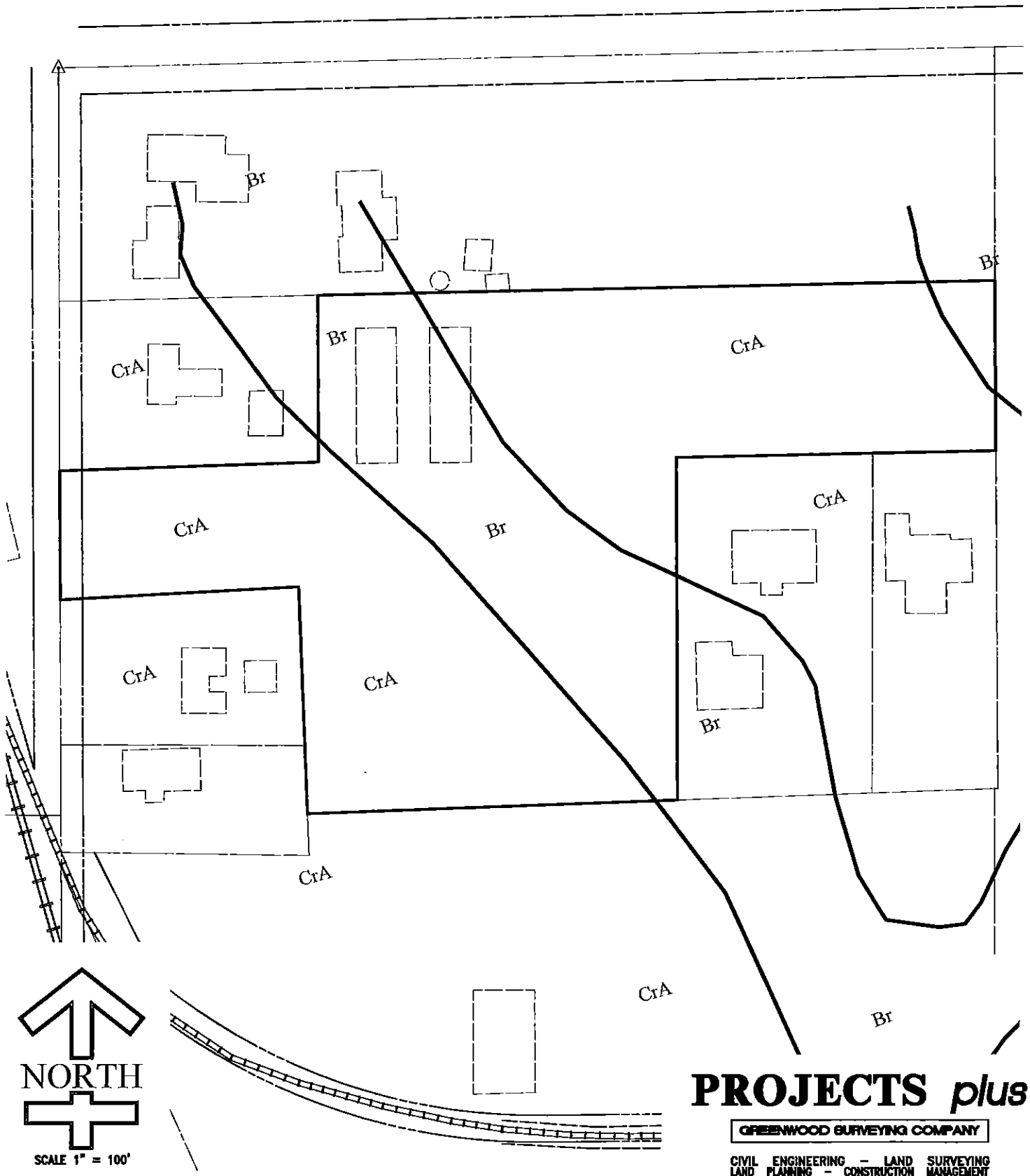
Engineering Methodology:

The calculations contained herein have been prepared in compliance with the City of Franklin Subdivision Control Ordinance. The detention facilities were designed using HYDRAFLOW Hydrograph Routing Module. A storm hydrograph is developed using the "SCS Curve Number Method" for each watershed and routed through a user defined detention basin and outlet structure configuration. Water surface elevations and outlet rates are determined by the storage indication method which uses a stage/storage/discharge relationship and inflow hydrograph to set the inflow minus the outflow equal to the change in storage. The post-developed drainage basins and basin characteristics for each pond are shown on the "Post-Development Drainage Map".

The storm sewer system was designed using the HYDRAFLOW Storm Sewer Module. Discharge rates for each inlet were calculated using the "SCS Curve Number Method" and input into the HYDRAFLOW Storm Sewer Module to calculate the capacity and hydraulic grade line for each pipe. Storm sewer systems are sized for a 10-year event with no surcharging.

Erosion Control:

The land disturbing activities will be greater than 1 acre, so a Rule 5 submittal is required. A Stormwater Pollution Prevent Plan (SWPPP) with an activities schedule will be submitted as part of the construction plans. Standard maintenance schedules and details will be included. All swales and pond banks will be mulch-seeded and have an erosion control blanket installed. All drainage easements will be mulch-seeded and the rights-of-way will be temporary seeded. A perimeter filter fence will be installed where needed as well as at all ditch inlets.



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Hours	Minutes	Return Period - Rainfall Intensity (in/hr)					
		2	5	10	25	50	100
0.08	5	4.75	6.14	6.99	8.08	8.83	9.69
0.17	10	3.63	4.75	5.48	6.40	7.07	7.77
0.25	15	2.97	3.92	4.55	5.34	5.94	6.53
0.5	30	1.98	2.64	3.09	3.65	4.10	4.50
1	60	1.25	1.67	1.96	2.31	2.62	2.88
2	120	0.76	1.02	1.20	1.40	1.59	1.75
3	180	0.56	0.75	0.88	1.03	1.17	1.29
6	360	0.33	0.44	0.52	0.60	0.68	0.75
12	720	0.20	0.26	0.30	0.35	0.39	0.43
24	1440	0.11	0.15	0.17	0.20	0.22	0.25

Hours	Minutes	Return Period - Rainfall Depth (in)					
		2	5	10	25	50	100
0.08	5	0.40	0.51	0.58	0.67	0.74	0.81
0.17	10	0.61	0.79	0.91	1.07	1.18	1.30
0.25	15	0.74	0.98	1.14	1.34	1.49	1.63
0.5	30	0.99	1.32	1.55	1.83	2.05	2.25
1	60	1.25	1.67	1.96	2.31	2.62	2.88
2	120	1.52	2.04	2.40	2.80	3.18	3.50
3	180	1.68	2.25	2.64	3.09	3.51	3.87
6	360	1.98	2.64	3.12	3.60	4.08	4.50
12	720	2.40	3.12	3.60	4.20	4.68	5.16
24	1440	2.64	3.60	4.08	4.80	5.28	6.00

TABLE 202-02: IDF and IDD Tables for Indianapolis, IN

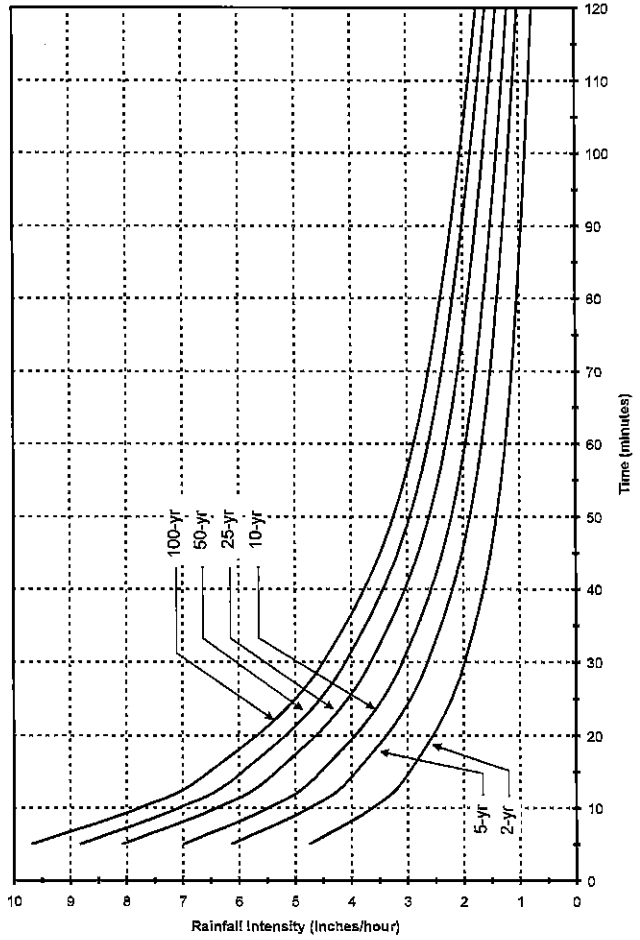

FIGURE 202-01: Indianapolis IDF Curve

Surface Description	n
Smooth surfaces (concrete, asphalt, gravel, or bare soil)	0.011
Fallow (no residue)	0.05
Cultivated Soils:	
Residue cover </= 20%	0.06
Residue cover > 20%	0.17
Grass:	
Short grass prairie	0.15
Dense grasses	0.24
Bermuda grass	0.41
Range (natural)	0.13
Woods:	
Light underbrush	0.40
Dense underbrush	0.80

TABLE 203-01: Roughness coefficients (Manning's n) for sheet flow

TYPE OF SURFACE	RUNOFF COEFFICIENT ©
Non-Urban Areas	
Bare earth	0.55
Steep grassed areas (slope 2:1)	0.60
Turf meadows	0.25
Forested areas	0.20
Cultivated fields	0.30
Urban Areas	
All watertight roof surfaces	0.90
Pavement	0.85
Gravel	0.85
Impervious soils (heavy)	0.55
Impervious soils (with turf)	0.45
Slightly pervious soil	0.25
Slightly pervious soil (with turf)	0.20
Moderately pervious soil	0.15
Moderately pervious soil (with turf)	0.10
Business, Commercial & Industrial	0.85
Apartments & Townhouses	0.70
Schools & Churches	0.55
Single Family Lots < 10,000 SF	0.45
Lots < 12,000 SF	0.45
Lots < 17,000 SF	0.40
Lots > ½ acre	0.35
Park, Cemetery or Unimproved Area	0.30

TABLE 204-01: Runoff Coefficients© for Use in the Rational Method

[Absence of an entry indicates the feature is not a concern. The symbol < means less than; > means greater than]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Potential frost action
		Frequency	Duration	Months	Depth	Kind	Months	
					Ft			
Brookston: Br	B/D	Frequent	Brief	Dec–May	0–1.0	Apparent	Dec–May	High.
Crosby: CrA	C	None			1.0–3.0	Apparent	Jan–Apr	High.
[1] CsB2: Crosby part	C	None			1.0–3.0	Apparent	Jan–Apr	High.
Miami part	B	None			>6.0			Moderate.
Eel: Ee	C	Frequent	Brief	Oct–Jun	1.0–3.0	Apparent	Jan–Apr	High.
Fox: FoA, FoB2, [1] FsC2	B	None			>6.0			Moderate.
Genesee: Ge	B	Frequent	Brief	Oct–Jun	>6.0			Moderate.
Hennepin: HeF	B	None			>6.0			Moderate.
Martinsville: MgA, MgB2	B	None			>6.0			Moderate.
Miami: MmA, MmB2, MmC2, [1] MxD2, MxE2	B	None			>6.0			Moderate.
Ockley: OcA, OcB2	B	None			>6.0			Moderate.
Rensselaer: Re	B/D	None			0–1.0	Apparent	Dec–May	High.
Shoals: Sh	C	Frequent	Brief	Oct–Jun	1.0–3.0	Apparent	Jan–Apr	High.
Sleeth: Sk	C	None			1.0–3.0	Apparent	Jan–Apr	High.
Sloan: So	B/D	Frequent	Long	Oct–Jun	0–0.5	Apparent	Nov–Jun	High.
Urban land: [1] Ub: Brookston part	B/D	Frequent	Brief	Dec–May	0–1.0	Apparent	Dec–May	High.
[1] Uc: Crosby part	C	None			1.0–3.0	Apparent	Jan–Apr	High.
[1] UfA: Fox part	B	None			>6.0			Moderate.
[1] UfC: Fox part	B	None			>6.0			Moderate.
[1] Ug: Genesee part	B	Frequent	Brief	Oct–Jun	>6.0			Moderate.
[1] UmB: Miami part	B	None			>6.0			Moderate.
[1] UmC: Miami part	B	None			>6.0			Moderate.
[1] Uw: Westland part	B/D	Frequent	Brief	Dec–May	0–1.0	Apparent	Dec–May	High.
Westland: We	B/D	Frequent	Brief	Dec–May	0–1.0	Apparent	Dec–May	High.
Whitaker: Wh	C	None			1.0–3.0	Apparent	Jan–Apr	High.

[1] This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 205-01: Soil and Water Features for Marion County, Indiana
(SOURCE: NRCS, Soil Survey of Marion county, Indiana, 1991)

Cover Description	Curve Numbers for Hydrologic Soil Groups				
Cover Type and Hydrologic Condition	Average Percent Impervious Area [2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [2]		68	79	86	89
Poor condition (grass cover < 50%)		49	69	79	84
Fair condition (grass cover 50% to 75%)		39	61	74	80
Good condition (grass cover > 75%)					
Impervious Areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and Roads:					
Paved; curbs and storm drains (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Urban Districts:					
Commercial and Business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential Districts by Average Lot Size:					
0.125 acre or less (townhouses)	65	77	85	90	92
0.25 acre	38	61	75	83	87
0.33 acre	30	57	72	81	86
0.50 acre	25	54	70	80	85
1.00 acre	20	51	68	79	84
2.00 acre	12	46	65	77	82
Developing Urban Areas					
Newly graded areas (pervious area only, no vegetation)		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in *Table 205-04*)					

[1] *Average runoff condition, and $I_a = 0.2S$*

[2] *The average percent impervious area shown was used to develop the composite CNs. Other assumptions are as follows: Impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. If the impervious area is not connected, the NRCS method has an adjustment to reduce the effect.*

[3] *CNs shown are equivalent to those of pasture. Composite CNs may be computed for other combinations of open space cover type.*

TABLE 205-02: Runoff Curve Numbers for Urban Areas
(SOURCE: 210-VI-TR-55, Second Ed., June 1986)

Cover Description	Curve Numbers for Hydrologic Soil Groups			
Cover Type and Hydrologic Condition	A	B	C	D
Cultivated Land (Row Crops) With conservation treatment Without conservation treatment	72 62	81 71	88 78	91 81
Pasture or Range Land Poor condition Good condition	68 39	79 61	86 74	89 80
Meadow Good condition	30	58	71	78
Wood or Forest Land Thin stand, poor cover, no mulch Good cover	45 25	66 55	77 70	83 77

TABLE 205-03: Runoff Curve Numbers for Undeveloped Areas
(SOURCE: 210-VI-TR-55, Second Ed., June 1986)

Cover Description	Curve Numbers for Hydrologic Soil Groups			
Cover Type and Hydrologic Condition	A	B	C	D
Pasture, grassland or range with continuous forage for grazing.				
Poor	68	79	86	89
Fair	49	69	79	84
Good	39	61	74	80
Meadow with continuous grass, protected from grazing and generally mowed for hay.	30	58	71	78
Brush/brush-weed-grass mixture with brush being the major element.				
Poor	48	67	77	83
Fair	35	56	70	77
Good	30	48	65	73
Woods and grass combination (orchard or tree farm).				
Poor	57	73	82	86
Fair	43	65	76	82
Good	32	58	72	79
Woods				
Poor	45	66	77	83
Fair	36	60	73	79
Good	30	55	70	77
Farmsteads	59	74	82	86

TABLE 205-04: Runoff Curve Numbers for Agricultural Lands
(SOURCE: 210-VI-TR-55, Second Ed., June 1986)

Pre-Developed Drainage Conditions

Runoff curve number (CN) and Time of Concentration (TC) Calculations

Project: Graham Street Storage By: JPH Date: 8/12/15

Circle one: Present | Developed Offsite Basin 1

Runoff curve number (CN)

Soil Name and Hydrologic Group	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio	CN 1/	Area (in sq ft. / acres)	Product of CN x area
'B' (Br)	Pasture/Grassland/Open Space (Good Condition)	61	0.00	0.0
'C' (CrA)	Pasture/Grassland/Open Space (Good Condition)	74	0.43	31.8
			0.00	0.0
	Impervious Area	98	8,289 0.19	18.6
		Totals=	0.62	50.47

CN (weighted) = Total Product / Total Area

CN (weighted) = 50.5 / 0.6

CN (weighted) = **81.4**

US CN = **81**

Time of Concentration

Sheet Flow	T.C.=	$\frac{0.01 \times (0.15 \times 100)^{0.80}}{2.64^{0.50} \quad 0.01^{0.40}}$					=	14 Minutes
Shallow Concentrated	Unpaved:	T.C.= 16.1 x $0.0081^{0.5}$ =			1.45	ft/sec		
			=		123	feet	=	1 Minutes
					1.45	ft/sec		
	Paved:	T.C.= 20.3 x $0.03^{0.5}$ =			3.52	ft/sec		
			=		0	feet	=	0 Minutes
					3.52	ft/sec		
	Minimum T/C =	**5 Minutes**					T/c Total=	**16 Minutes**

Circle one: Present | Developed Offsite Basin 2

Runoff curve number (CN)

Soil Name and Hydrologic Group	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio	CN 1/	Area (in sq.ft. / acres)	Product of CN x area
'B' (Br)	Pasture/Grassland/Open Space (Good Condition)	61	0.47	28.7
'C' (CrA)	Pasture/Grassland/Open Space (Good Condition)	74	0.52	38.5
			0.00	0.0
	Impervious Area	98	12,839 0.29	28.9
		Totals=	1.28	96.03

CN (weighted) = Total Product / Total Area

CN (weighted) = 96.0 / 1.3

CN (weighted) = **74.8**

US CN = **75**

Time of Concentration

Sheet Flow	T.C.=	$\frac{0.01 \times (0.15 \times 80)^{0.80}}{2.64^{0.50} \quad 0.006^{0.40}}$					=	15 Minutes
Shallow Concentrated	Unpaved:	T.C.= 16.1 x $0.006^{0.5}$ =			1.25	ft/sec		
			=		152	feet	=	2 Minutes
					1.25	ft/sec		
	Paved:	T.C.= 20.3 x $0.03^{0.5}$ =			3.52	ft/sec		
			=		0	feet	=	0 Minutes
					3.52	ft/sec		
	Minimum T/C =	**5 Minutes**					T/c Total=	**17 Minutes**

Runoff curve number (CN) and Time of Concentration (TC) Calculations

Project: Graham Street Storage By: JPH Date: 8/12/15

Circle one: Present | Developed Onsite Basin 1

Runoff curve number (CN)

Soil Name and Hydrologic Group	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio	CN 1/	Area (in sq.ft. / acres)	Product of CN x area
'B' (Br)	Pasture/Grassland/Open Space (Good Condition)	61	0.10	6.1
'C' (CrA)	Pasture/Grassland/Open Space (Good Condition)	74	1.25	92.5
			0.00	0.0
	Impervious Area	98	7,472 0.17	16.8
		Totals=	1.52	115.41

CN (weighted) = Total Product / Total Area

CN (weighted) = 115.4 / 1.5

CN (weighted) = **75.9**

US CN = **76**

Time of Concentration

Sheet Flow

$$T.C. = \frac{0.007 \times (0.011 \times 127)^{0.80}}{2.64^{0.50} \quad 0.035^{0.40}} = 1 \text{ Minutes}$$

Shallow Concentrated

Unpaved: T.C.= 16.13 x $0.0051^{0.5}$ = 1.15 ft/sec

= 387 feet = 6 Minutes

1.15 ft/sec

Paved: T.C.= 20.33 x $0.03^{0.5}$ = 3.52 ft/sec

= 0 feet = 0 Minutes

3.52 ft/sec

Minimum T/C = 5 Minutes T/c Total= **7 Minutes**

Circle one: Present | Developed Onsite Basin 2

Runoff curve number (CN)

Soil Name and Hydrologic Group	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio	CN 1/	Area (in sq.ft. / acres)	Product of CN x area
'B' (Br)	Pasture/Grassland/Open Space (Good Condition)	61	0.40	24.4
'C' (CrA)	Pasture/Grassland/Open Space (Good Condition)	74	1.21	89.5
			0.00	0.0
	Impervious Area	98	16,105 0.37	36.2
		Totals=	1.98	150.17

CN (weighted) = Total Product / Total Area

CN (weighted) = 150.2 / 2.0

CN (weighted) = **75.9**

US CN = **76**

Time of Concentration

Sheet Flow

$$T.C. = \frac{0.007 \times (0.15 \times 100)^{0.80}}{2.64^{0.50} \quad 0.0072^{0.40}} = 16 \text{ Minutes}$$

Shallow Concentrated

Unpaved: T.C.= 16.13 x $0.0072^{0.5}$ = 1.37 ft/sec

= 453 feet = 6 Minutes

1.37 ft/sec

Paved: T.C.= 20.33 x $0.03^{0.5}$ = 3.52 ft/sec

= 0 feet = 0 Minutes

3.52 ft/sec

Minimum T/C = 5 Minutes T/c Total= **22 Minutes**

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.16	1	39	399	----	------	------	Offsite Pre Dev 1- 1 hr.
2	SCS Runoff	0.18	1	55	799	----	------	------	Offsite Pre Dev 1- 2 hr.
3	SCS Runoff	0.17	1	64	1,085	----	------	------	Offsite Pre Dev 1- 3 hr.
4	SCS Runoff	0.15	1	97	1,705	----	------	------	Offsite Pre Dev 1- 6 hr.
5	SCS Runoff	0.18	1	327	2,724	----	------	------	Offsite Pre Dev 1- 12 hr.
6	SCS Runoff	0.20	1	936	4,200	----	------	------	Onsite Pre Dev 1- 24 hr.
7	SCS Runoff	0.25	1	30	544	----	------	------	Onsite Pre Dev 1- 1 hr.
8	SCS Runoff	0.25	1	43	1,049	----	------	------	Onsite Pre Dev 1- 2 hr.
9	SCS Runoff	0.23	1	49	1,406	----	------	------	Onsite Pre Dev 1- 3 hr.
10	SCS Runoff	0.20	1	91	2,171	----	------	------	Onsite Pre Dev 1- 6 hr.
11	SCS Runoff	0.24	1	324	3,415	----	------	------	Onsite Pre Dev 1- 12 hr.
12	SCS Runoff	0.20	1	936	4,200	----	------	------	Onsite Pre Dev 1- 24 hr.
13	Combine	0.37	1	31	943	1, 7,	------	------	Rel Pnt 1 - 1 hr.
14	Combine	0.42	1	55	1,848	2, 8,	------	------	Rel Pnt 1 - 2 hr.
15	Combine	0.39	1	63	2,491	3, 9,	------	------	Rel Pnt 1 - 3 hr.
16	Combine	0.35	1	92	3,876	4, 10,	------	------	Rel Pnt 1 - 6 hr.
17	Combine	0.43	1	325	6,139	5, 11,	------	------	Rel Pnt 1 - 12 hr.
18	Combine	0.40	1	936	8,401	6, 12,	------	------	Rel Pnt 1 - 1 hr.
20	SCS Runoff	0.19	1	31	439	----	------	------	Offsite Pre Dev 2- 1 hr.
21	SCS Runoff	0.18	1	41	732	----	------	------	Offsite Pre Dev 2- 2 hr.
22	SCS Runoff	0.16	1	52	928	----	------	------	Offsite Pre Dev 2- 3 hr.
23	SCS Runoff	0.13	1	92	1,332	----	------	------	Offsite Pre Dev 2- 6 hr.
24	SCS Runoff	0.14	1	325	1,962	----	------	------	Offsite Pre Dev 2- 12 hr.
25	SCS Runoff	0.11	1	936	2,348	----	------	------	Offsite Pre Dev 2- 24 hr.
26	SCS Runoff	0.27	1	45	721	----	------	------	Onsite Pre Dev 2- 1 hr.
27	SCS Runoff	0.31	1	58	1,389	----	------	------	Onsite Pre Dev 2- 2 hr.
28	SCS Runoff	0.29	1	67	1,861	----	------	------	Onsite Pre Dev 1- 3 hr.
29	SCS Runoff	0.25	1	100	2,874	----	------	------	Onsite Pre Dev 2- 6 hr.
30	SCS Runoff	0.30	1	329	4,522	----	------	------	Onsite Pre Dev 2- 12 hr.

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
31	SCS Runoff	0.26	1	938	5,562	----	------	------	Onsite Pre Dev 2- 24 hr.
32	Combine	0.41	1	38	1,159	20, 26,	------	------	Rel Pnt 2 - 1 hr.
33	Combine	0.47	1	55	2,121	21, 27,	------	------	Rel Pnt 2 - 2 hr.
34	Combine	0.44	1	64	2,789	22, 28,	------	------	Rel Pnt 2 - 3 hr.
35	Combine	0.37	1	96	4,206	23, 29,	------	------	Rel Pnt 2 - 6 hr.
36	Combine	0.44	1	327	6,484	24, 30,	------	------	Rel Pnt 2 - 12 hr.
37	Combine	0.37	1	937	7,910	25, 31,	------	------	Rel Pnt 2 - 24 hr.

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Wednesday, Aug 12 2015, 9:22 AM

Hyd. No. 6

Onsite Pre Dev 1- 24 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 0.20 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Drainage area	= 1.52 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 7.0 min
Total precip.	= 2.64 in	Distribution	= Huff-3rd
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 4,200 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)
13.33	0.10	13.90	0.13	14.47	0.16	15.03	0.18
13.35	0.11	13.92	0.13	14.48	0.16	15.05	0.18
13.37	0.11	13.93	0.13	14.50	0.16	15.07	0.19
13.38	0.11	13.95	0.13	14.52	0.16	15.08	0.19
13.40	0.11	13.97	0.13	14.53	0.16	15.10	0.19
13.42	0.11	13.98	0.14	14.55	0.17	15.12	0.19
13.43	0.11	14.00	0.14	14.57	0.17	15.13	0.19
13.45	0.12	14.02	0.14	14.58	0.17	15.15	0.19
13.47	0.12	14.03	0.14	14.60	0.17	15.17	0.19
13.48	0.12	14.05	0.14	14.62	0.17	15.18	0.19
13.50	0.12	14.07	0.14	14.63	0.17	15.20	0.19
13.52	0.12	14.08	0.14	14.65	0.17	15.22	0.19
13.53	0.12	14.10	0.14	14.67	0.17	15.23	0.19
13.55	0.12	14.12	0.14	14.68	0.17	15.25	0.19
13.57	0.12	14.13	0.14	14.70	0.17	15.27	0.19
13.58	0.12	14.15	0.14	14.72	0.17	15.28	0.19
13.60	0.12	14.17	0.14	14.73	0.17	15.30	0.19
13.62	0.12	14.18	0.14	14.75	0.17	15.32	0.19
13.63	0.12	14.20	0.14	14.77	0.18	15.33	0.19
13.65	0.12	14.22	0.14	14.78	0.18	15.35	0.19
13.67	0.12	14.23	0.14	14.80	0.18	15.37	0.19
13.68	0.12	14.25	0.14	14.82	0.18	15.38	0.20
13.70	0.13	14.27	0.15	14.83	0.18	15.40	0.20
13.72	0.13	14.28	0.15	14.85	0.18	15.42	0.20
13.73	0.13	14.30	0.15	14.87	0.18	15.43	0.20
13.75	0.13	14.32	0.15	14.88	0.18	15.45	0.20
13.77	0.13	14.33	0.15	14.90	0.18	15.47	0.20
13.78	0.13	14.35	0.15	14.92	0.18	15.48	0.20
13.80	0.13	14.37	0.15	14.93	0.18	15.50	0.20
13.82	0.13	14.38	0.15	14.95	0.18	15.52	0.20
13.83	0.13	14.40	0.15	14.97	0.18	15.53	0.20
13.85	0.13	14.42	0.15	14.98	0.18	15.55	0.20
13.87	0.13	14.43	0.15	15.00	0.18	15.57	0.20
13.88	0.13	14.45	0.15	15.02	0.18	15.58	0.20

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Onsite Pre Dev 1- 24 hr.

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)
15.60	0.20 <<	16.45	0.15	17.30	0.11
15.62	0.20	16.47	0.15	17.32	0.11
15.63	0.20	16.48	0.15	17.33	0.11
15.65	0.19	16.50	0.15	17.35	0.11
15.67	0.18	16.52	0.15	17.37	0.11
15.68	0.18	16.53	0.15	17.38	0.11
15.70	0.17	16.55	0.15	17.40	0.11
15.72	0.16	16.57	0.15	17.42	0.11
15.73	0.15	16.58	0.15	17.43	0.11
15.75	0.15	16.60	0.15	17.45	0.11
15.77	0.15	16.62	0.15	17.47	0.11
15.78	0.14	16.63	0.15	17.48	0.11
15.80	0.14	16.65	0.15	17.50	0.11
15.82	0.14	16.67	0.15	17.52	0.11
15.83	0.14	16.68	0.15	17.53	0.11
15.85	0.14	16.70	0.15	17.55	0.11
15.87	0.14	16.72	0.16	17.57	0.11
15.88	0.14	16.73	0.16	17.58	0.11
15.90	0.14	16.75	0.16	17.60	0.11
15.92	0.14	16.77	0.16	17.62	0.11
15.93	0.14	16.78	0.16	17.63	0.11
15.95	0.15	16.80	0.16	17.65	0.11
15.97	0.15	16.82	0.15	17.67	0.11
15.98	0.15	16.83	0.15	17.68	0.11
16.00	0.15	16.85	0.15	17.70	0.11
16.02	0.15	16.87	0.14	17.72	0.11
16.03	0.15	16.88	0.13	17.73	0.11
16.05	0.15	16.90	0.13	17.75	0.11
16.07	0.15	16.92	0.12	17.77	0.11
16.08	0.15	16.93	0.12	17.78	0.11
16.10	0.15	16.95	0.11	17.80	0.11
16.12	0.15	16.97	0.11	17.82	0.11
16.13	0.15	16.98	0.11	17.83	0.11
16.15	0.15	17.00	0.11	17.85	0.11
16.17	0.15	17.02	0.11	17.87	0.11
16.18	0.15	17.03	0.11	17.88	0.11
16.20	0.15	17.05	0.11	17.90	0.11
16.22	0.15	17.07	0.11	17.92	0.11
16.23	0.15	17.08	0.11	17.93	0.11
16.25	0.15	17.10	0.11	17.95	0.11
16.27	0.15	17.12	0.11	17.97	0.11
16.28	0.15	17.13	0.11	17.98	0.11
16.30	0.15	17.15	0.11	18.00	0.11
16.32	0.15	17.17	0.11	18.02	0.11
16.33	0.15	17.18	0.11	18.03	0.11
16.35	0.15	17.20	0.11	18.05	0.10
16.37	0.15	17.22	0.11		
16.38	0.15	17.23	0.11		
16.40	0.15	17.25	0.11	*...End*	
16.42	0.15	17.27	0.11		
16.43	0.15	17.28	0.11		

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Wednesday, Aug 12 2015, 9:23 AM

Hyd. No. 7

Onsite Pre Dev 1- 1 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 0.25 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Drainage area	= 1.52 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 7.0 min
Total precip.	= 1.25 in	Distribution	= Huff-1st
Storm duration	= 1 hrs	Shape factor	= 484

Hydrograph Volume = 544 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Outflow cfs)	Time (hrs)	Outflow cfs)
0.33	0.14	0.90	0.18
0.35	0.17	0.92	0.17
0.37	0.19	0.93	0.16
0.38	0.20	0.95	0.15
0.40	0.22	0.97	0.14
0.42	0.23	0.98	0.14
0.43	0.23	1.00	0.14
0.45	0.24	1.02	0.14
0.47	0.24	1.03	0.14
0.48	0.25	1.05	0.13
0.50	0.25 <<		
0.52	0.25		
0.53	0.24	*...End*	
0.55	0.23		
0.57	0.22		
0.58	0.20		
0.60	0.19		
0.62	0.19		
0.63	0.18		
0.65	0.17		
0.67	0.17		
0.68	0.17		
0.70	0.17		
0.72	0.18		
0.73	0.18		
0.75	0.18		
0.77	0.18		
0.78	0.19		
0.80	0.19		
0.82	0.19		
0.83	0.19		
0.85	0.20		
0.87	0.20		
0.88	0.19		

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Wednesday, Aug 12 2015, 9:23 AM

Hyd. No. 17

Rel Pnt 1 - 12 hr.

Hydrograph type	= Combine	Peak discharge	= 0.43 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Inflow hyds.	= 5, 11		

Hydrograph Volume = 6,139 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Hyd. 5 + (cfs)	Hyd. 11 + (cfs)	Outflow (cfs)
5.03	0.16	0.21	0.36
5.05	0.16	0.21	0.36
5.07	0.16	0.21	0.37
5.08	0.16	0.21	0.37
5.10	0.16	0.21	0.37
5.12	0.16	0.21	0.38
5.13	0.16	0.22	0.38
5.15	0.16	0.22	0.38
5.17	0.16	0.22	0.38
5.18	0.17	0.22	0.39
5.20	0.17	0.22	0.39
5.22	0.17	0.22	0.39
5.23	0.17	0.23	0.40
5.25	0.17	0.23	0.40
5.27	0.17	0.23	0.40
5.28	0.17	0.23	0.40
5.30	0.17	0.23	0.41
5.32	0.18	0.23	0.41
5.33	0.18	0.24	0.41
5.35	0.18	0.24	0.42
5.37	0.18	0.24	0.42
5.38	0.18	0.24	0.42
5.40	0.18	0.24 <<	0.43
5.42	0.18	0.24	0.43 <<
5.43	0.18	0.24	0.42
5.45	0.18 <<	0.23	0.42
5.47	0.18	0.23	0.41
5.48	0.18	0.22	0.40
5.50	0.18	0.21	0.39
5.52	0.18	0.20	0.39
5.53	0.18	0.20	0.38
5.55	0.18	0.19	0.37
5.57	0.18	0.19	0.37
5.58	0.17	0.19	0.36
5.60	0.17	0.19	0.36
5.62	0.17	0.19	0.36
5.63	0.17	0.19	0.36
5.65	0.16	0.19	0.35
5.67	0.16	0.19	0.35

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Wednesday, Aug 12 2015, 9:23 AM

Hyd. No. 20

Offsite Pre Dev 2- 1 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 0.19 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Drainage area	= 0.62 ac	Curve number	= 81
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 14.0 min
Total precip.	= 1.25 in	Distribution	= Huff-1st
Storm duration	= 1 hrs	Shape factor	= 484

Hydrograph Volume = 439 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)
0.33	0.11	0.90	0.12
0.35	0.12	0.92	0.12
0.37	0.14	0.93	0.12
0.38	0.15	0.95	0.11
0.40	0.16	0.97	0.11
0.42	0.17	0.98	0.11
0.43	0.18	1.00	0.10
0.45	0.18	1.02	0.10
0.47	0.19	1.03	0.10
0.48	0.19		
0.50	0.19		
0.52	0.19 <<	*...End*	
0.53	0.19		
0.55	0.19		
0.57	0.18		
0.58	0.18		
0.60	0.17		
0.62	0.17		
0.63	0.16		
0.65	0.15		
0.67	0.15		
0.68	0.14		
0.70	0.14		
0.72	0.13		
0.73	0.13		
0.75	0.13		
0.77	0.12		
0.78	0.12		
0.80	0.12		
0.82	0.12		
0.83	0.12		
0.85	0.12		
0.87	0.12		
0.88	0.12		

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Wednesday, Aug 12 2015, 9:24 AM

Hyd. No. 27

Onsite Pre Dev 2- 2 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 0.31 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Drainage area	= 1.98 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 22.0 min
Total precip.	= 1.52 in	Distribution	= Huff-1st
Storm duration	= 2 hrs	Shape factor	= 484

Hydrograph Volume = 1,389 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)
0.63	0.17	1.20	0.26	1.77	0.21
0.65	0.18	1.22	0.26	1.78	0.21
0.67	0.19	1.23	0.25	1.80	0.20
0.68	0.21	1.25	0.24	1.82	0.20
0.70	0.22	1.27	0.24	1.83	0.20
0.72	0.23	1.28	0.23	1.85	0.20
0.73	0.24	1.30	0.23	1.87	0.19
0.75	0.25	1.32	0.22	1.88	0.19
0.77	0.26	1.33	0.22	1.90	0.18
0.78	0.27	1.35	0.22	1.92	0.18
0.80	0.28	1.37	0.21	1.93	0.18
0.82	0.29	1.38	0.21	1.95	0.17
0.83	0.29	1.40	0.21	1.97	0.17
0.85	0.30	1.42	0.21	1.98	0.17
0.87	0.30	1.43	0.20	2.00	0.16
0.88	0.31	1.45	0.20	2.02	0.16
0.90	0.31	1.47	0.20	2.03	0.16
0.92	0.31	1.48	0.20	2.05	0.16
0.93	0.31	1.50	0.20		
0.95	0.31	1.52	0.20		
0.97	0.31 <<	1.53	0.20	...End	
0.98	0.31	1.55	0.20		
1.00	0.31	1.57	0.20		
1.02	0.31	1.58	0.20		
1.03	0.31	1.60	0.20		
1.05	0.31	1.62	0.20		
1.07	0.30	1.63	0.20		
1.08	0.30	1.65	0.20		
1.10	0.29	1.67	0.21		
1.12	0.29	1.68	0.21		
1.13	0.28	1.70	0.21		
1.15	0.28	1.72	0.21		
1.17	0.27	1.73	0.21		
1.18	0.27	1.75	0.21		

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Wednesday, Aug 12 2015, 9:24 AM

Hyd. No. 33

Rel Pnt 2 - 2 hr.

Hydrograph type	= Combine	Peak discharge	= 0.47 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Inflow hyds.	= 21, 27		

Hydrograph Volume = 2,121 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Hyd. 21 + (cfs)	Hyd. 27 + (cfs)	Outflow (cfs)
0.55	0.16	0.09	0.25
0.57	0.16	0.11	0.27
0.58	0.17	0.12	0.29
0.60	0.18	0.14	0.31
0.62	0.18	0.15	0.33
0.63	0.18	0.17	0.35
0.65	0.18	0.18	0.36
0.67	0.18	0.19	0.38
0.68	0.18 <<	0.21	0.39
0.70	0.18	0.22	0.40
0.72	0.18	0.23	0.41
0.73	0.18	0.24	0.42
0.75	0.18	0.25	0.43
0.77	0.18	0.26	0.44
0.78	0.17	0.27	0.44
0.80	0.17	0.28	0.45
0.82	0.17	0.29	0.45
0.83	0.17	0.29	0.46
0.85	0.16	0.30	0.46
0.87	0.16	0.30	0.46
0.88	0.16	0.31	0.46
0.90	0.16	0.31	0.47
0.92	0.16	0.31	0.47 <<
0.93	0.15	0.31	0.47
0.95	0.15	0.31	0.46
0.97	0.15	0.31 <<	0.46
0.98	0.15	0.31	0.46
1.00	0.15	0.31	0.46
1.02	0.14	0.31	0.45
1.03	0.14	0.31	0.45
1.05	0.14	0.31	0.44
1.07	0.13	0.30	0.44
1.08	0.13	0.30	0.43
1.10	0.13	0.29	0.42
1.12	0.12	0.29	0.41
1.13	0.12	0.28	0.40
1.15	0.11	0.28	0.39
1.17	0.11	0.27	0.38

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Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.70	1	33	1,660	----	------	------	Offsite Pre Dev 1- 1 hr.
2	SCS Runoff	0.68	1	42	2,724	----	------	------	Offsite Pre Dev 1- 2 hr.
3	SCS Runoff	0.60	1	53	3,371	----	------	------	Offsite Pre Dev 1- 3 hr.
4	SCS Runoff	0.45	1	93	4,778	----	------	------	Offsite Pre Dev 1- 6 hr.
5	SCS Runoff	0.43	1	326	6,307	----	------	------	Offsite Pre Dev 1- 12 hr.
6	SCS Runoff	0.43	1	936	9,684	----	------	------	Onsite Pre Dev 1- 24 hr.
7	SCS Runoff	1.04	1	21	2,116	----	------	------	Onsite Pre Dev 1- 1 hr.
8	SCS Runoff	0.93	1	32	3,414	----	------	------	Onsite Pre Dev 1- 2 hr.
9	SCS Runoff	0.79	1	46	4,200	----	------	------	Onsite Pre Dev 1- 3 hr.
10	SCS Runoff	0.58	1	90	5,899	----	------	------	Onsite Pre Dev 1- 6 hr.
11	SCS Runoff	0.54	1	324	7,738	----	------	------	Onsite Pre Dev 1- 12 hr.
12	SCS Runoff	0.43	1	936	9,684	----	------	------	Onsite Pre Dev 1- 24 hr.
13	Combine	1.56	1	29	3,776	1, 7,	------	------	Rel Pnt 1 - 1 hr.
14	Combine	1.52	1	37	6,138	2, 8,	------	------	Rel Pnt 1 - 2 hr.
15	Combine	1.36	1	48	7,571	3, 9,	------	------	Rel Pnt 1 - 3 hr.
16	Combine	1.03	1	91	10,677	4, 10,	------	------	Rel Pnt 1 - 6 hr.
17	Combine	0.97	1	324	14,045	5, 11,	------	------	Rel Pnt 1 - 12 hr.
18	Combine	0.86	1	936	19,367	6, 12,	------	------	Rel Pnt 1 - 1 hr.
20	SCS Runoff	0.60	1	26	1,302	----	------	------	Offsite Pre Dev 2- 1 hr.
21	SCS Runoff	0.53	1	36	1,962	----	------	------	Offsite Pre Dev 2- 2 hr.
22	SCS Runoff	0.44	1	47	2,348	----	------	------	Offsite Pre Dev 2- 3 hr.
23	SCS Runoff	0.30	1	79	3,165	----	------	------	Offsite Pre Dev 2- 6 hr.
24	SCS Runoff	0.27	1	325	4,028	----	------	------	Offsite Pre Dev 2- 12 hr.
25	SCS Runoff	0.21	1	936	4,926	----	------	------	Offsite Pre Dev 2- 24 hr.
26	SCS Runoff	1.09	1	37	2,801	----	------	------	Onsite Pre Dev 2- 1 hr.
27	SCS Runoff	1.09	1	46	4,521	----	------	------	Onsite Pre Dev 2- 2 hr.
28	SCS Runoff	0.97	1	57	5,561	----	------	------	Onsite Pre Dev 1- 3 hr.
29	SCS Runoff	0.74	1	94	7,811	----	------	------	Onsite Pre Dev 2- 6 hr.
30	SCS Runoff	0.69	1	327	10,245	----	------	------	Onsite Pre Dev 2- 12 hr.

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
31	SCS Runoff	0.56	1	937	12,822	----	------	------	Onsite Pre Dev 2- 24 hr.
32	Combine	1.58	1	33	4,103	20, 26,	------	------	Rel Pnt 2 - 1 hr.
33	Combine	1.56	1	43	6,482	21, 27,	------	------	Rel Pnt 2 - 2 hr.
34	Combine	1.38	1	54	7,910	22, 28,	------	------	Rel Pnt 2 - 3 hr.
35	Combine	1.04	1	92	10,977	23, 29,	------	------	Rel Pnt 2 - 6 hr.
36	Combine	0.96	1	326	14,274	24, 30,	------	------	Rel Pnt 2 - 12 hr.
37	Combine	0.77	1	936	17,748	25, 31,	------	------	Rel Pnt 2 - 24 hr.

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Wednesday, Aug 12 2015, 9:22 AM

Hyd. No. 1

Offsite Pre Dev 1- 1 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 0.70 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Drainage area	= 1.28 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 17.0 min
Total precip.	= 1.96 in	Distribution	= Huff-1st
Storm duration	= 1 hrs	Shape factor	= 484

Hydrograph Volume = 1,660 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)
0.35	0.40	0.92	0.42
0.37	0.45	0.93	0.42
0.38	0.49	0.95	0.41
0.40	0.53	0.97	0.40
0.42	0.57	0.98	0.40
0.43	0.60	1.00	0.39
0.45	0.63	1.02	0.38
0.47	0.65	1.03	0.37
0.48	0.67	1.05	0.36
0.50	0.69		
0.52	0.70		
0.53	0.70	*...End*	
0.55	0.70 <<		
0.57	0.70		
0.58	0.69		
0.60	0.67		
0.62	0.66		
0.63	0.64		
0.65	0.62		
0.67	0.59		
0.68	0.57		
0.70	0.55		
0.72	0.53		
0.73	0.51		
0.75	0.50		
0.77	0.49		
0.78	0.48		
0.80	0.47		
0.82	0.46		
0.83	0.45		
0.85	0.45		
0.87	0.44		
0.88	0.44		
0.90	0.43		

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Wednesday, Aug 12 2015, 9:23 AM

Hyd. No. 7

Onsite Pre Dev 1- 1 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 1.04 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Drainage area	= 1.52 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 7.0 min
Total precip.	= 1.96 in	Distribution	= Huff-1st
Storm duration	= 1 hrs	Shape factor	= 484

Hydrograph Volume = 2,116 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)
0.23	0.55
0.25	0.68
0.27	0.79
0.28	0.89
0.30	0.96
0.32	1.01
0.33	1.03
0.35	1.04 <<
0.37	1.03
0.38	1.02
0.40	0.99
0.42	0.97
0.43	0.94
0.45	0.92
0.47	0.91
0.48	0.89
0.50	0.87
0.52	0.84
0.53	0.79
0.55	0.75
0.57	0.70
0.58	0.65
0.60	0.61
0.62	0.57
0.63	0.55
0.65	0.53
0.67	0.52

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Wednesday, Aug 12 2015, 9:23 AM

Hyd. No. 13

Rel Pnt 1 - 1 hr.

Hydrograph type	= Combine	Peak discharge	= 1.56 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Inflow hyds.	= 1, 7		

Hydrograph Volume = 3,776 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Hyd. 1 + (cfs)	Hyd. 7 + (cfs)	Outflow (cfs)
0.25	0.12	0.68	0.80
0.27	0.16	0.79	0.95
0.28	0.20	0.89	1.09
0.30	0.25	0.96	1.21
0.32	0.30	1.01	1.31
0.33	0.35	1.03	1.38
0.35	0.40	1.04 <<	1.44
0.37	0.45	1.03	1.48
0.38	0.49	1.02	1.51
0.40	0.53	0.99	1.52
0.42	0.57	0.97	1.54
0.43	0.60	0.94	1.54
0.45	0.63	0.92	1.55
0.47	0.65	0.91	1.56
0.48	0.67	0.89	1.56 <<
0.50	0.69	0.87	1.55
0.52	0.70	0.84	1.53
0.53	0.70	0.79	1.49
0.55	0.70 <<	0.75	1.45
0.57	0.70	0.70	1.40
0.58	0.69	0.65	1.34
0.60	0.67	0.61	1.28
0.62	0.66	0.57	1.23
0.63	0.64	0.55	1.18
0.65	0.62	0.53	1.15
0.67	0.59	0.52	1.11
0.68	0.57	0.52	1.09
0.70	0.55	0.51	1.06
0.72	0.53	0.52	1.05
0.73	0.51	0.52	1.04
0.75	0.50	0.53	1.03
0.77	0.49	0.53	1.02
0.78	0.48	0.53	1.01
0.80	0.47	0.54	1.01
0.82	0.46	0.54	1.00
0.83	0.45	0.55	1.00
0.85	0.45	0.55	1.00
0.87	0.44	0.54	0.99

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Wednesday, Aug 12 2015, 9:23 AM

Hyd. No. 20

Offsite Pre Dev 2- 1 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 0.60 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Drainage area	= 0.62 ac	Curve number	= 81
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 14.0 min
Total precip.	= 1.96 in	Distribution	= Huff-1st
Storm duration	= 1 hrs	Shape factor	= 484

Hydrograph Volume = 1,302 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)
0.27	0.32
0.28	0.37
0.30	0.42
0.32	0.46
0.33	0.50
0.35	0.53
0.37	0.56
0.38	0.58
0.40	0.59
0.42	0.60
0.43	0.60 <<
0.45	0.60
0.47	0.60
0.48	0.59
0.50	0.57
0.52	0.56
0.53	0.54
0.55	0.52
0.57	0.50
0.58	0.48
0.60	0.46
0.62	0.43
0.63	0.41
0.65	0.39
0.67	0.37
0.68	0.36
0.70	0.34
0.72	0.33
0.73	0.32
0.75	0.31
0.77	0.30

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Wednesday, Aug 12 2015, 9:24 AM

Hyd. No. 26

Onsite Pre Dev 2- 1 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 1.09 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Drainage area	= 1.98 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 22.0 min
Total precip.	= 1.96 in	Distribution	= Huff-1st
Storm duration	= 1 hrs	Shape factor	= 484

Hydrograph Volume = 2,801 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)
0.38	0.61	0.95	0.72
0.40	0.67	0.97	0.70
0.42	0.73	0.98	0.69
0.43	0.79	1.00	0.68
0.45	0.85	1.02	0.66
0.47	0.90	1.03	0.65
0.48	0.94	1.05	0.63
0.50	0.98	1.07	0.61
0.52	1.01	1.08	0.59
0.53	1.04	1.10	0.57
0.55	1.06	1.12	0.55
0.57	1.07		
0.58	1.08		
0.60	1.09	*...End*	
0.62	1.09 <<		
0.63	1.08		
0.65	1.08		
0.67	1.06		
0.68	1.04		
0.70	1.02		
0.72	1.00		
0.73	0.97		
0.75	0.95		
0.77	0.92		
0.78	0.90		
0.80	0.87		
0.82	0.85		
0.83	0.83		
0.85	0.81		
0.87	0.80		
0.88	0.78		
0.90	0.76		
0.92	0.75		
0.93	0.73		

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Wednesday, Aug 12 2015, 9:24 AM

Hyd. No. 32

Rel Pnt 2 - 1 hr.

Hydrograph type	= Combine	Peak discharge	= 1.58 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Inflow hyds.	= 20, 26		

Hydrograph Volume = 4,103 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Hyd. 20 + (cfs)	Hyd. 26 + (cfs)	Outflow (cfs)
0.32	0.46	0.34	0.80
0.33	0.50	0.41	0.90
0.35	0.53	0.47	1.00
0.37	0.56	0.54	1.09
0.38	0.58	0.61	1.18
0.40	0.59	0.67	1.26
0.42	0.60	0.73	1.33
0.43	0.60 <<	0.79	1.39
0.45	0.60	0.85	1.45
0.47	0.60	0.90	1.49
0.48	0.59	0.94	1.52
0.50	0.57	0.98	1.55
0.52	0.56	1.01	1.57
0.53	0.54	1.04	1.57
0.55	0.52	1.06	1.58 <<
0.57	0.50	1.07	1.57
0.58	0.48	1.08	1.56
0.60	0.46	1.09	1.54
0.62	0.43	1.09 <<	1.52
0.63	0.41	1.08	1.50
0.65	0.39	1.08	1.47
0.67	0.37	1.06	1.44
0.68	0.36	1.04	1.40
0.70	0.34	1.02	1.37
0.72	0.33	1.00	1.33
0.73	0.32	0.97	1.29
0.75	0.31	0.95	1.26
0.77	0.30	0.92	1.22
0.78	0.30	0.90	1.19
0.80	0.29	0.87	1.16
0.82	0.29	0.85	1.14
0.83	0.29	0.83	1.12
0.85	0.29	0.81	1.10
0.87	0.29	0.80	1.08
0.88	0.28	0.78	1.06
0.90	0.28	0.76	1.04
0.92	0.28	0.75	1.02
0.93	0.27	0.73	1.00

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Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	1.78	1	29	4,055	----	------	------	Offsite Pre Dev 1- 1 hr.
2	SCS Runoff	1.59	1	37	5,980	----	------	------	Offsite Pre Dev 1- 2 hr.
3	SCS Runoff	1.34	1	49	7,210	----	------	------	Offsite Pre Dev 1- 3 hr.
4	SCS Runoff	0.90	1	90	9,418	----	------	------	Offsite Pre Dev 1- 6 hr.
5	SCS Runoff	0.79	1	325	11,850	----	------	------	Offsite Pre Dev 1- 12 hr.
6	SCS Runoff	0.75	1	936	18,184	----	------	------	Onsite Pre Dev 1- 24 hr.
7	SCS Runoff	2.65	1	19	5,030	----	------	------	Onsite Pre Dev 1- 1 hr.
8	SCS Runoff	2.09	1	31	7,344	----	------	------	Onsite Pre Dev 1- 2 hr.
9	SCS Runoff	1.69	1	45	8,820	----	------	------	Onsite Pre Dev 1- 3 hr.
10	SCS Runoff	1.20	1	38	11,458	----	------	------	Onsite Pre Dev 1- 6 hr.
11	SCS Runoff	0.97	1	324	14,353	----	------	------	Onsite Pre Dev 1- 12 hr.
12	SCS Runoff	0.75	1	936	18,184	----	------	------	Onsite Pre Dev 1- 24 hr.
13	Combine	3.93	1	22	9,085	1, 7,	------	------	Rel Pnt 1 - 1 hr.
14	Combine	3.56	1	33	13,324	2, 8,	------	------	Rel Pnt 1 - 2 hr.
15	Combine	3.01	1	46	16,030	3, 9,	------	------	Rel Pnt 1 - 3 hr.
16	Combine	2.01	1	74	20,876	4, 10,	------	------	Rel Pnt 1 - 6 hr.
17	Combine	1.76	1	324	26,202	5, 11,	------	------	Rel Pnt 1 - 12 hr.
18	Combine	1.51	1	936	36,368	6, 12,	------	------	Rel Pnt 1 - 1 hr.
20	SCS Runoff	1.33	1	24	2,750	----	------	------	Offsite Pre Dev 2- 1 hr.
21	SCS Runoff	1.09	1	31	3,845	----	------	------	Offsite Pre Dev 2- 2 hr.
22	SCS Runoff	0.87	1	44	4,530	----	------	------	Offsite Pre Dev 2- 3 hr.
23	SCS Runoff	0.64	1	42	5,735	----	------	------	Offsite Pre Dev 2- 6 hr.
24	SCS Runoff	0.46	1	291	7,038	----	------	------	Offsite Pre Dev 2- 12 hr.
25	SCS Runoff	0.34	1	936	8,741	----	------	------	Offsite Pre Dev 2- 24 hr.
26	SCS Runoff	2.68	1	33	6,661	----	------	------	Onsite Pre Dev 2- 1 hr.
27	SCS Runoff	2.50	1	42	9,724	----	------	------	Onsite Pre Dev 2- 2 hr.
28	SCS Runoff	2.14	1	50	11,679	----	------	------	Onsite Pre Dev 1- 3 hr.
29	SCS Runoff	1.45	1	91	15,171	----	------	------	Onsite Pre Dev 2- 6 hr.
30	SCS Runoff	1.25	1	326	19,004	----	------	------	Onsite Pre Dev 2- 12 hr.

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
31	SCS Runoff	0.99	1	936	24,077	----	------	------	Onsite Pre Dev 2- 24 hr.
32	Combine	3.77	1	30	9,411	20, 26,	------	------	Rel Pnt 2 - 1 hr.
33	Combine	3.46	1	40	13,569	21, 27,	------	------	Rel Pnt 2 - 2 hr.
34	Combine	2.99	1	48	16,208	22, 28,	------	------	Rel Pnt 2 - 3 hr.
35	Combine	1.99	1	80	20,905	23, 29,	------	------	Rel Pnt 2 - 6 hr.
36	Combine	1.70	1	325	26,042	24, 30,	------	------	Rel Pnt 2 - 12 hr.
37	Combine	1.33	1	936	32,818	25, 31,	------	------	Rel Pnt 2 - 24 hr.

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Wednesday, Aug 12 2015, 9:22 AM

Hyd. No. 1

Offsite Pre Dev 1- 1 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 1.78 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 1.28 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 17.0 min
Total precip.	= 2.88 in	Distribution	= Huff-1st
Storm duration	= 1 hrs	Shape factor	= 484

Hydrograph Volume = 4,055 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)
0.30	1.01	0.87	0.90
0.32	1.14		
0.33	1.25		
0.35	1.36	*...End*	
0.37	1.46		
0.38	1.54		
0.40	1.62		
0.42	1.67		
0.43	1.72		
0.45	1.75		
0.47	1.77		
0.48	1.78 <<		
0.50	1.78		
0.52	1.77		
0.53	1.74		
0.55	1.70		
0.57	1.66		
0.58	1.61		
0.60	1.55		
0.62	1.49		
0.63	1.43		
0.65	1.36		
0.67	1.30		
0.68	1.24		
0.70	1.19		
0.72	1.14		
0.73	1.10		
0.75	1.06		
0.77	1.03		
0.78	1.00		
0.80	0.97		
0.82	0.95		
0.83	0.93		
0.85	0.92		

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Wednesday, Aug 12 2015, 9:23 AM

Hyd. No. 7

Onsite Pre Dev 1- 1 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 2.65 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 1.52 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 7.0 min
Total precip.	= 2.88 in	Distribution	= Huff-1st
Storm duration	= 1 hrs	Shape factor	= 484

Hydrograph Volume = 5,030 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)
0.20	1.60
0.22	1.88
0.23	2.13
0.25	2.35
0.27	2.51
0.28	2.60
0.30	2.65
0.32	2.65 <<
0.33	2.61
0.35	2.55
0.37	2.47
0.38	2.37
0.40	2.28
0.42	2.18
0.43	2.09
0.45	2.02
0.47	1.97
0.48	1.91
0.50	1.85
0.52	1.77
0.53	1.67
0.55	1.56
0.57	1.46
0.58	1.35

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Wednesday, Aug 12 2015, 9:23 AM

Hyd. No. 13

Rel Pnt 1 - 1 hr.

Hydrograph type	= Combine	Peak discharge	= 3.93 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Inflow hyds.	= 1, 7		

Hydrograph Volume = 9,085 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Hyd. 1 + (cfs)	Hyd. 7 + (cfs)	Outflow (cfs)
0.22	0.39	1.88	2.27
0.23	0.50	2.13	2.63
0.25	0.62	2.35	2.97
0.27	0.75	2.51	3.26
0.28	0.88	2.60	3.48
0.30	1.01	2.65	3.66
0.32	1.14	2.65 <<	3.79
0.33	1.25	2.61	3.86
0.35	1.36	2.55	3.91
0.37	1.46	2.47	3.93 <<
0.38	1.54	2.37	3.92
0.40	1.62	2.28	3.89
0.42	1.67	2.18	3.86
0.43	1.72	2.09	3.81
0.45	1.75	2.02	3.78
0.47	1.77	1.97	3.74
0.48	1.78 <<	1.91	3.69
0.50	1.78	1.85	3.63
0.52	1.77	1.77	3.54
0.53	1.74	1.67	3.41
0.55	1.70	1.56	3.27
0.57	1.66	1.46	3.12
0.58	1.61	1.35	2.96
0.60	1.55	1.26	2.81
0.62	1.49	1.18	2.67
0.63	1.43	1.12	2.55
0.65	1.36	1.08	2.44
0.67	1.30	1.06	2.36
0.68	1.24	1.04	2.28
0.70	1.19	1.04	2.23
0.72	1.14	1.04	2.18
0.73	1.10	1.05	2.14
0.75	1.06	1.05	2.11
0.77	1.03	1.06	2.08
0.78	1.00	1.06	2.06
0.80	0.97	1.07	2.04
0.82	0.95	1.07	2.02
0.83	0.93	1.08	2.01

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Aug 12 2015, 9:23 AM

Hyd. No. 20

Offsite Pre Dev 2- 1 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 1.33 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.62 ac	Curve number	= 81
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 14.0 min
Total precip.	= 2.88 in	Distribution	= Huff-1st
Storm duration	= 1 hrs	Shape factor	= 484

Hydrograph Volume = 2,750 cuft

(Printed values >= 50% of Qp)

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)
0.23	0.72
0.25	0.83
0.27	0.93
0.28	1.02
0.30	1.10
0.32	1.17
0.33	1.23
0.35	1.28
0.37	1.31
0.38	1.33
0.40	1.33 <<
0.42	1.32
0.43	1.30
0.45	1.27
0.47	1.24
0.48	1.20
0.50	1.16
0.52	1.11
0.53	1.07
0.55	1.02
0.57	0.97
0.58	0.92
0.60	0.87
0.62	0.83
0.63	0.78
0.65	0.74
0.67	0.70
0.68	0.67

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Wednesday, Aug 12 2015, 9:24 AM

Hyd. No. 26

Onsite Pre Dev 2- 1 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 2.68 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 1.98 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 22.0 min
Total precip.	= 2.88 in	Distribution	= Huff-1st
Storm duration	= 1 hrs	Shape factor	= 484

Hydrograph Volume = 6,661 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)
0.33	1.47	0.90	1.55
0.35	1.64	0.92	1.51
0.37	1.80	0.93	1.47
0.38	1.94	0.95	1.44
0.40	2.08	0.97	1.40
0.42	2.20	0.98	1.37
0.43	2.31	1.00	1.35
0.45	2.41		
0.47	2.49		
0.48	2.56	*...End*	
0.50	2.61		
0.52	2.65		
0.53	2.67		
0.55	2.68 <<		
0.57	2.68		
0.58	2.67		
0.60	2.64		
0.62	2.61		
0.63	2.56		
0.65	2.50		
0.67	2.44		
0.68	2.36		
0.70	2.28		
0.72	2.20		
0.73	2.12		
0.75	2.04		
0.77	1.96		
0.78	1.89		
0.80	1.83		
0.82	1.77		
0.83	1.72		
0.85	1.67		
0.87	1.63		
0.88	1.59		

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Aug 12 2015, 9:40 AM

Hyd. No. 32

Rel Pnt 2 - 1 hr.

Hydrograph type	= Combine	Peak discharge	= 3.77 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Inflow hyds.	= 20, 26		

Hydrograph Volume = 9,411 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Hyd. 20 + (cfs)	Hyd. 26 + (cfs)	Outflow (cfs)
0.28	1.02	0.97	1.99
0.30	1.10	1.13	2.24
0.32	1.17	1.31	2.48
0.33	1.23	1.47	2.71
0.35	1.28	1.64	2.92
0.37	1.31	1.80	3.11
0.38	1.33	1.94	3.27
0.40	1.33 <<	2.08	3.41
0.42	1.32	2.20	3.53
0.43	1.30	2.31	3.62
0.45	1.27	2.41	3.69
0.47	1.24	2.49	3.73
0.48	1.20	2.56	3.76
0.50	1.16	2.61	3.77 <<
0.52	1.11	2.65	3.76
0.53	1.07	2.67	3.74
0.55	1.02	2.68 <<	3.70
0.57	0.97	2.68	3.65
0.58	0.92	2.67	3.59
0.60	0.87	2.64	3.51
0.62	0.83	2.61	3.43
0.63	0.78	2.56	3.34
0.65	0.74	2.50	3.25
0.67	0.70	2.44	3.14
0.68	0.67	2.36	3.03
0.70	0.64	2.28	2.92
0.72	0.62	2.20	2.82
0.73	0.59	2.12	2.71
0.75	0.58	2.04	2.62
0.77	0.56	1.96	2.53
0.78	0.55	1.89	2.44
0.80	0.54	1.83	2.37
0.82	0.53	1.77	2.30
0.83	0.53	1.72	2.24
0.85	0.52	1.67	2.20
0.87	0.52	1.63	2.15
0.88	0.51	1.59	2.10
0.90	0.51	1.55	2.06

PROJECT: GRAHAM STREET STORAGE

NAME: JPH

ALLOWABLE RELEASE RATE CALCULATIONS

DATED: 8/12/15

ALLOWABLE RELEASE

Q10p = 0.5 Q10e = **1.82** cfs

Q100p = Q10e = **5.24** cfs

OFFSITE BASIN '1' (AREA TO BYPASS)

Time	2 YR	10 YR.	100 YR.
1 hr.	0.16	0.70	1.78
2 hr.	0.18	0.68	1.59
3 hr.	0.17	0.60	1.34
6 hr.	0.15	0.45	0.90
12 hr.	0.18	0.43	0.79
24 hr.	0.20	0.43	0.75

OFFSITE BASIN '2' (AREA TO BYPASS)

Time	2 YR	10 YR.	100 YR.
1 hr.	0.19	0.60	1.33
2 hr.	0.18	0.53	1.09
3 hr.	0.16	0.44	0.87
6 hr.	0.13	0.30	0.64
12 hr.	0.14	0.27	0.46
24 hr.	0.11	0.21	0.34

ONSITE BASIN '1'

Time	2 YR	10 YR.	100 YR.
1 hr.	0.25	1.04	2.65
2 hr.	0.25	0.93	2.09
3 hr.	0.23	0.79	1.69
6 hr.	0.20	0.57	1.20
12 hr.	0.24	0.54	0.90
24 hr.	0.20	0.43	0.75

ONSITE BASIN '2'

Time	2 YR	10 YR.	100 YR.
	0.27	1.09	2.68
	0.31	1.09	2.50
	0.29	0.97	2.14
	0.25	0.74	1.45
	0.30	0.69	1.25
	0.26	0.56	0.99

ALLOWABLES

	10p		100p
	1.82		5.24
	1.77		4.70
	1.56		3.97
	1.20		2.85
	1.24		2.48
	1.10		2.08

ALLOWABLE RELEASE RATE CALCULATIONS

Post-Developed Drainage Conditions

Runoff curve number (CN) and Time of Concentration (TC) Calculations

Project: Graham Street Storage By: JPH Date: 11/3/15

Circle one: Present | Developed Onsite Basin 1

Runoff curve number (CN)

Soil Name and Hydrologic Group	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio	CN 1/	Area (in sq.ft. / acres)	Product of CN x area
'B' (Br)	Pasture/Grassland/Open Space (Good Condition)	61	0.79	48.2
'C' (CrA)	Pasture/Grassland/Open Space (Good Condition)	74	1.11	82.1
			0.00	0.0
	Impervious Area	98	3.24	317.5
		Totals=	5.14	447.85

CN (weighted) = Total Product / Total Area

CN (weighted) = 447.9 / 5.1

CN (weighted) = **87.1**

US CN = **87**

Time of Concentration

Sheet Flow

$$T.C. = \frac{0.007 \times (0.15 \times 100)^{0.80}}{2.64^{0.50} \times 0.01^{0.40}} = 14 \text{ Minutes}$$

Shallow Concentrated

Unpaved: $T.C. = 16.13 \times 0.01^{0.5} = 1.61$ ft/sec

$= 110$ feet / 1.61 ft/sec $= 1$ Minutes

Paved: $T.C. = 20.33 \times 0.006^{0.5} = 1.57$ ft/sec

$= 313$ feet / 1.57 ft/sec $= 3$ Minutes

Minimum T/C = 5 Minutes

T/c Total= **19 Minutes**

Pond Report

Hydraflow Hydrographs by Intelisolve

Tuesday, Nov 3 2015, 2:48 PM

Pond No. 1 - Pond 1

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	740.00	10,813	0	0
2.00	742.00	14,770	25,583	25,583

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise (in)	= 10.00	4.00	5.00	0.00
Span (in)	= 10.00	4.00	10.00	0.00
No. Barrels	= 2	1	1	0
Invert El. (ft)	= 740.00	740.00	740.70	0.00
Length (ft)	= 24.00	0.50	0.50	0.00
Slope (%)	= 0.35	0.50	0.50	0.00
N-Value	= .013	.013	.013	.000
Orif. Coeff.	= 0.60	0.60	0.60	0.00
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 11.70	0.00	0.00	0.00
Crest El. (ft)	= 741.40	0.00	0.00	0.00
Weir Coeff.	= 3.33	0.00	0.00	0.00
Weir Type	= Riser	---	---	---
Multi-Stage	= Yes	No	No	No

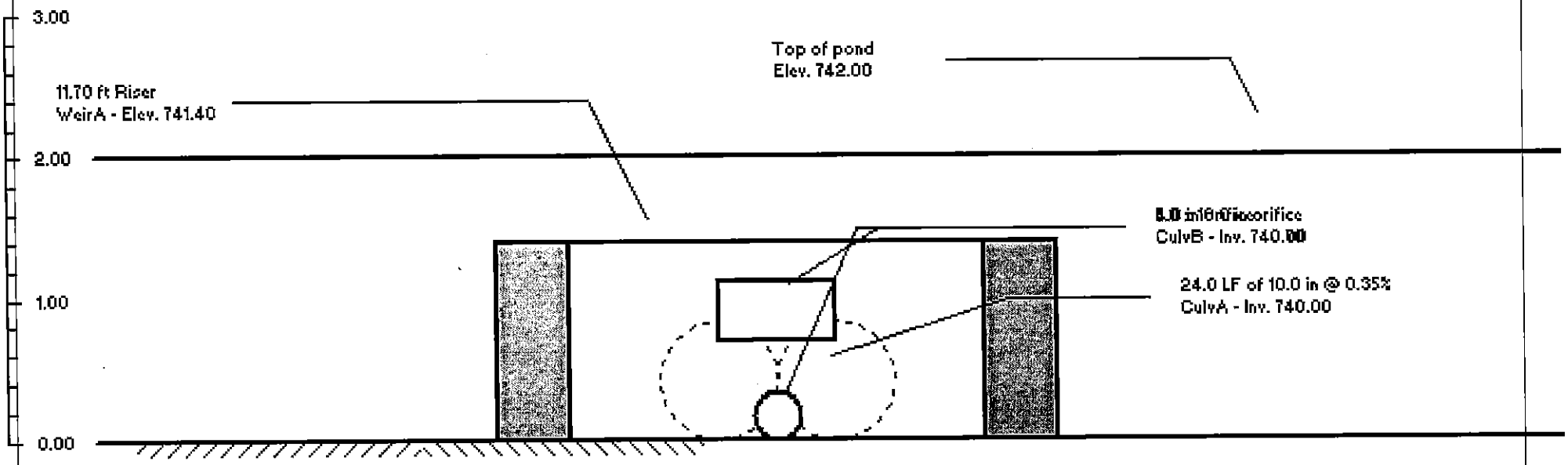
Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	740.00	0.00	0.00	0.00	---	0.00	---	---	---	---	0.00
2.00	25,583	742.00	6.20	0.06	0.25	---	5.89	---	---	---	---	6.20

Pond 1



Front View

NTS - Looking Downstream

Schematic only. Not for construction.

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	2.92	1	31	6,893	----	------	------	Onsite Post Dev 1- 1 hr.
2	SCS Runoff	2.67	1	39	10,244	----	------	------	Onsite Post Dev 1- 2 hr.
3	SCS Runoff	2.27	1	51	12,378	----	------	------	Onsite Post Dev 1- 3 hr.
4	SCS Runoff	1.59	1	91	16,607	----	------	------	Onsite Post Dev 1- 6 hr.
5	SCS Runoff	1.52	1	325	22,911	----	------	------	Onsite Post Dev 1- 12 hr.
6	SCS Runoff	1.11	1	936	26,663	----	------	------	Onsite Post Dev 1- 24 hr.
7	Reservoir	0.23	1	80	6,861	1	740.49	6,264	Pond 1 - 1 hr.
8	Reservoir	0.32	1	136	10,204	2	740.68	8,700	Pond 1 - 2 hr.
9	Reservoir	0.37	1	194	12,328	3	740.76	9,731	Pond 1 - 3 hr.
10	Reservoir	0.43	1	317	16,534	4	740.82	10,448	Pond 1 - 6 hr.
11	Reservoir	0.63	1	474	22,771	5	740.92	11,768	Pond 1 - 12 hr.
12	Reservoir	0.62	1	1026	26,159	6	740.92	11,703	Pond 1 - 24 hr.

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Tuesday, Nov 3 2015, 2:16 PM

Hyd. No. 1

Onsite Post Dev 1- 1 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 2.92 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Drainage area	= 5.14 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 19.0 min
Total precip.	= 1.98 in	Distribution	= Huff-1st
Storm duration	= 1 hrs	Shape factor	= 484

Hydrograph Volume = 6,893 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Outflow cfs)	Time (hrs)	Outflow cfs)
0.32	1.62	0.88	1.58
0.33	1.81	0.90	1.55
0.35	2.00	0.92	1.52
0.37	2.17	0.93	1.49
0.38	2.33		
0.40	2.46		
0.42	2.58	*...End*	
0.43	2.68		
0.45	2.77		
0.47	2.83		
0.48	2.88		
0.50	2.91		
0.52	2.92 <<		
0.53	2.92		
0.55	2.89		
0.57	2.85		
0.58	2.80		
0.60	2.74		
0.62	2.66		
0.63	2.57		
0.65	2.48		
0.67	2.38		
0.68	2.28		
0.70	2.18		
0.72	2.09		
0.73	2.01		
0.75	1.94		
0.77	1.87		
0.78	1.81		
0.80	1.76		
0.82	1.72		
0.83	1.68		
0.85	1.65		
0.87	1.62		

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Tuesday, Nov 3 2015, 2:16 PM

Hyd. No. 11

Pond 1 - 12 hr.

Hydrograph type	= Reservoir	Peak discharge	= 0.63 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Inflow hyd. No.	= 5	Reservoir name	= Pond 1
Max. Elevation	= 740.92 ft	Max. Storage	= 11,768 cuft

Storage Indication method used.

Outflow hydrograph volume = 22,771 cuft

(Printed values >= 75% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
6.45	0.93	740.84	0.48	0.31	0.17	-----	-----	-----	-----	-----	-----	0.48
6.47	0.93	740.84	0.48	0.31	0.17	-----	-----	-----	-----	-----	-----	0.48
6.48	0.92	740.85	0.49	0.31	0.18	-----	-----	-----	-----	-----	-----	0.49
6.50	0.92	740.85	0.49	0.31	0.18	-----	-----	-----	-----	-----	-----	0.49
6.52	0.92	740.85	0.50	0.31	0.18	-----	-----	-----	-----	-----	-----	0.50
6.53	0.92	740.85	0.50	0.31	0.19	-----	-----	-----	-----	-----	-----	0.50
6.55	0.92	740.85	0.50	0.31	0.19	-----	-----	-----	-----	-----	-----	0.50
6.57	0.93	740.86	0.51	0.31	0.19	-----	-----	-----	-----	-----	-----	0.51
6.58	0.93	740.86	0.51	0.31	0.20	-----	-----	-----	-----	-----	-----	0.51
6.60	0.93	740.86	0.52	0.31	0.20	-----	-----	-----	-----	-----	-----	0.51
6.62	0.93	740.86	0.52	0.31	0.21	-----	-----	-----	-----	-----	-----	0.52
6.63	0.93	740.86	0.52	0.31	0.21	-----	-----	-----	-----	-----	-----	0.52
6.65	0.93	740.87	0.53	0.31	0.21	-----	-----	-----	-----	-----	-----	0.53
6.67	0.92	740.87	0.53	0.31	0.22	-----	-----	-----	-----	-----	-----	0.53
6.68	0.92	740.87	0.53	0.31	0.22	-----	-----	-----	-----	-----	-----	0.53
6.70	0.92	740.87	0.54	0.31	0.22	-----	-----	-----	-----	-----	-----	0.54
6.72	0.91	740.87	0.54	0.31	0.23	-----	-----	-----	-----	-----	-----	0.54
6.73	0.90	740.87	0.54	0.31	0.23	-----	-----	-----	-----	-----	-----	0.54
6.75	0.90	740.88	0.55	0.31	0.23	-----	-----	-----	-----	-----	-----	0.55
6.77	0.89	740.88	0.55	0.31	0.24	-----	-----	-----	-----	-----	-----	0.55
6.78	0.88	740.88	0.55	0.31	0.24	-----	-----	-----	-----	-----	-----	0.55
6.80	0.87	740.88	0.56	0.31	0.24	-----	-----	-----	-----	-----	-----	0.56
6.82	0.86	740.88	0.56	0.31	0.24	-----	-----	-----	-----	-----	-----	0.56
6.83	0.86	740.88	0.56	0.32	0.25	-----	-----	-----	-----	-----	-----	0.56
6.85	0.85	740.88	0.57	0.32	0.25	-----	-----	-----	-----	-----	-----	0.56
6.87	0.84	740.89	0.57	0.32	0.25	-----	-----	-----	-----	-----	-----	0.57
6.88	0.84	740.89	0.57	0.32	0.25	-----	-----	-----	-----	-----	-----	0.57
6.90	0.83	740.89	0.57	0.32	0.26	-----	-----	-----	-----	-----	-----	0.57
6.92	0.82	740.89	0.58	0.32	0.26	-----	-----	-----	-----	-----	-----	0.57
6.93	0.82	740.89	0.58	0.32	0.26	-----	-----	-----	-----	-----	-----	0.58
6.95	0.81	740.89	0.58	0.32	0.26	-----	-----	-----	-----	-----	-----	0.58
6.97	0.81	740.89	0.58	0.32	0.27	-----	-----	-----	-----	-----	-----	0.58
6.98	0.81	740.89	0.58	0.32	0.27	-----	-----	-----	-----	-----	-----	0.58
7.00	0.80	740.90	0.59	0.32	0.27	-----	-----	-----	-----	-----	-----	0.58
7.02	0.80	740.90	0.59	0.32	0.27	-----	-----	-----	-----	-----	-----	0.59
7.03	0.80	740.90	0.59	0.32	0.27	-----	-----	-----	-----	-----	-----	0.59
7.05	0.79	740.90	0.59	0.32	0.27	-----	-----	-----	-----	-----	-----	0.59
7.07	0.79	740.90	0.59	0.32	0.28	-----	-----	-----	-----	-----	-----	0.59

Continues on next page...

Pond 1 - 12 hr.

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
7.08	0.79	740.90	0.60	0.32	0.28	-----	-----	-----	-----	-----	-----	0.59
7.10	0.79	740.90	0.60	0.32	0.28	-----	-----	-----	-----	-----	-----	0.60
7.12	0.79	740.90	0.60	0.32	0.28	-----	-----	-----	-----	-----	-----	0.60
7.13	0.79	740.90	0.60	0.32	0.28	-----	-----	-----	-----	-----	-----	0.60
7.15	0.79	740.90	0.60	0.32	0.28	-----	-----	-----	-----	-----	-----	0.60
7.17	0.79	740.90	0.60	0.32	0.29	-----	-----	-----	-----	-----	-----	0.60
7.18	0.79	740.91	0.61	0.32	0.29	-----	-----	-----	-----	-----	-----	0.61
7.20	0.79	740.91	0.61	0.32	0.29	-----	-----	-----	-----	-----	-----	0.61
7.22	0.79	740.91	0.61	0.32	0.29	-----	-----	-----	-----	-----	-----	0.61
7.23	0.79	740.91	0.61	0.32	0.29	-----	-----	-----	-----	-----	-----	0.61
7.25	0.79	740.91	0.61	0.32	0.29	-----	-----	-----	-----	-----	-----	0.61
7.27	0.79	740.91	0.61	0.32	0.30	-----	-----	-----	-----	-----	-----	0.61
7.28	0.78	740.91	0.62	0.32	0.30	-----	-----	-----	-----	-----	-----	0.62
7.30	0.78	740.91	0.62	0.32	0.30	-----	-----	-----	-----	-----	-----	0.62
7.32	0.77	740.91	0.62	0.32	0.30	-----	-----	-----	-----	-----	-----	0.62
7.33	0.77	740.91	0.62	0.32	0.30	-----	-----	-----	-----	-----	-----	0.62
7.35	0.76	740.91	0.62	0.32	0.30	-----	-----	-----	-----	-----	-----	0.62
7.37	0.75	740.91	0.62	0.32	0.30	-----	-----	-----	-----	-----	-----	0.62
7.38	0.74	740.91	0.62	0.32	0.31	-----	-----	-----	-----	-----	-----	0.62
7.40	0.74	740.92	0.63	0.32	0.31	-----	-----	-----	-----	-----	-----	0.62
7.42	0.73	740.92	0.63	0.32	0.31	-----	-----	-----	-----	-----	-----	0.63
7.43	0.72	740.92	0.63	0.32	0.31	-----	-----	-----	-----	-----	-----	0.63
7.45	0.71	740.92	0.63	0.32	0.31	-----	-----	-----	-----	-----	-----	0.63
7.47	0.70	740.92	0.63	0.32	0.31	-----	-----	-----	-----	-----	-----	0.63
7.48	0.69	740.92	0.63	0.32	0.31	-----	-----	-----	-----	-----	-----	0.63
7.50	0.69	740.92	0.63	0.32	0.31	-----	-----	-----	-----	-----	-----	0.63
7.52	0.68	740.92	0.63	0.32	0.31	-----	-----	-----	-----	-----	-----	0.63
7.53	0.68	740.92	0.63	0.32	0.31	-----	-----	-----	-----	-----	-----	0.63
7.55	0.67	740.92	0.63	0.32	0.31	-----	-----	-----	-----	-----	-----	0.63
7.57	0.67	740.92	0.63	0.32	0.31	-----	-----	-----	-----	-----	-----	0.63
7.58	0.66	740.92	0.63	0.32	0.31	-----	-----	-----	-----	-----	-----	0.63
7.60	0.66	740.92	0.63	0.32	0.31	-----	-----	-----	-----	-----	-----	0.63
7.62	0.66	740.92	0.63	0.32	0.31	-----	-----	-----	-----	-----	-----	0.63
7.63	0.65	740.92	0.63	0.32	0.31	-----	-----	-----	-----	-----	-----	0.63
7.65	0.65	740.92	0.63	0.32	0.31	-----	-----	-----	-----	-----	-----	0.63
7.67	0.65	740.92	0.63	0.32	0.31	-----	-----	-----	-----	-----	-----	0.63
7.68	0.65	740.92	0.63	0.32	0.31	-----	-----	-----	-----	-----	-----	0.63
7.70	0.65	740.92	0.63	0.32	0.31	-----	-----	-----	-----	-----	-----	0.63
7.72	0.65	740.92	0.63	0.32	0.31	-----	-----	-----	-----	-----	-----	0.63
7.73	0.65	740.92	0.63	0.32	0.31	-----	-----	-----	-----	-----	-----	0.63
7.75	0.65	740.92	0.63	0.32	0.31	-----	-----	-----	-----	-----	-----	0.63
7.77	0.65	740.92	0.63	0.32	0.31	-----	-----	-----	-----	-----	-----	0.63
7.78	0.65	740.92	0.63	0.32	0.31	-----	-----	-----	-----	-----	-----	0.63
7.80	0.65	740.92	0.63	0.32	0.32	-----	-----	-----	-----	-----	-----	0.63
7.82	0.65	740.92	0.63	0.32	0.32	-----	-----	-----	-----	-----	-----	0.63
7.83	0.65	740.92	0.63	0.32	0.32	-----	-----	-----	-----	-----	-----	0.63
7.85	0.64	740.92 <<	0.63	0.32	0.32	-----	-----	-----	-----	-----	-----	0.63
7.87	0.64	740.92 <<	0.63	0.32	0.32	-----	-----	-----	-----	-----	-----	0.63
7.88	0.64	740.92	0.63	0.32	0.32	-----	-----	-----	-----	-----	-----	0.63
7.90	0.63	740.92	0.63	0.32	0.32	-----	-----	-----	-----	-----	-----	0.63 <<
7.92	0.63	740.92 <<	0.63	0.32	0.32	-----	-----	-----	-----	-----	-----	0.63

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Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	7.19	1	29	16,314	----	------	------	Onsite Post Dev 1- 1 hr.
2	SCS Runoff	6.34	1	36	22,905	----	------	------	Onsite Post Dev 1- 2 hr.
3	SCS Runoff	5.15	1	41	26,660	----	------	------	Onsite Post Dev 1- 3 hr.
4	SCS Runoff	3.75	1	46	34,411	----	------	------	Onsite Post Dev 1- 6 hr.
5	SCS Runoff	2.74	1	294	42,401	----	------	------	Onsite Post Dev 1- 12 hr.
6	SCS Runoff	1.96	1	936	50,566	----	------	------	Onsite Post Dev 1- 24 hr.
7	Reservoir	1.02	1	75	16,264	1	741.10	14,091	Pond 1 - 1 hr.
8	Reservoir	1.37	1	123	22,846	2	741.29	16,511	Pond 1 - 2 hr.
9	Reservoir	1.38	1	161	26,594	3	741.30	16,645	Pond 1 - 3 hr.
10	Reservoir	1.41	1	183	34,325	4	741.32	16,931	Pond 1 - 6 hr.
11	Reservoir	1.50	1	407	42,244	5	741.38	17,696	Pond 1 - 12 hr.
12	Reservoir	1.43	1	960	49,976	6	741.33	17,030	Pond 1 - 24 hr.

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Tuesday, Nov 3 2015, 2:16 PM

Hyd. No. 1

Onsite Post Dev 1- 1 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 7.19 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Drainage area	= 5.14 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 19.0 min
Total precip.	= 3.12 in	Distribution	= Huff-1st
Storm duration	= 1 hrs	Shape factor	= 484

Hydrograph Volume = 16,314 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Outflow cfs)
0.27	3.70
0.28	4.22
0.30	4.69
0.32	5.13
0.33	5.55
0.35	5.92
0.37	6.25
0.38	6.52
0.40	6.75
0.42	6.93
0.43	7.06
0.45	7.14
0.47	7.19
0.48	7.19 <<
0.50	7.15
0.52	7.06
0.53	6.94
0.55	6.78
0.57	6.59
0.58	6.37
0.60	6.13
0.62	5.88
0.63	5.62
0.65	5.36
0.67	5.11
0.68	4.86
0.70	4.62
0.72	4.41
0.73	4.21
0.75	4.03
0.77	3.87
0.78	3.74
0.80	3.62

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Tuesday, Nov 3 2015, 2:16 PM

Hyd. No. 11

Pond 1 - 12 hr.

Hydrograph type	= Reservoir	Peak discharge	= 1.50 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Inflow hyd. No.	= 5	Reservoir name	= Pond 1
Max. Elevation	= 741.38 ft	Max. Storage	= 17,696 cuft

Storage Indication method used.

Outflow hydrograph volume = 42,244 cuft

(Printed values >= 75% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
5.38	2.70	741.16	1.15	0.33	0.81	-----	-----	-----	-----	-----	-----	1.14
5.40	2.71	741.16	1.16	0.33	0.82	-----	-----	-----	-----	-----	-----	1.16
5.42	2.71	741.17	1.18	0.33	0.84	-----	-----	-----	-----	-----	-----	1.17
5.43	2.70	741.18	1.19	0.33	0.86	-----	-----	-----	-----	-----	-----	1.19
5.45	2.70	741.19	1.21	0.33	0.87	-----	-----	-----	-----	-----	-----	1.20
5.47	2.69	741.19	1.23	0.33	0.89	-----	-----	-----	-----	-----	-----	1.22
5.48	2.67	741.20	1.24	0.33	0.90	-----	-----	-----	-----	-----	-----	1.23
5.50	2.65	741.21	1.25	0.33	0.91	-----	0.00	-----	-----	-----	-----	1.24
5.52	2.63	741.21	1.26	0.33	0.92	-----	0.00	-----	-----	-----	-----	1.25
5.53	2.60	741.22	1.27	0.34	0.93	-----	0.00	-----	-----	-----	-----	1.26
5.55	2.57	741.22	1.28	0.34	0.94	-----	0.00	-----	-----	-----	-----	1.27
5.57	2.53	741.23	1.29	0.34	0.94	-----	0.00	-----	-----	-----	-----	1.28
5.58	2.49	741.24	1.30	0.34	0.95	-----	0.00	-----	-----	-----	-----	1.29
5.60	2.45	741.24	1.30	0.34	0.96	-----	0.00	-----	-----	-----	-----	1.30
5.62	2.41	741.25	1.31	0.34	0.97	-----	0.00	-----	-----	-----	-----	1.30
5.63	2.37	741.25	1.32	0.34	0.97	-----	0.00	-----	-----	-----	-----	1.31
5.65	2.33	741.26	1.33	0.34	0.98	-----	0.00	-----	-----	-----	-----	1.32
5.67	2.30	741.26	1.33	0.34	0.99	-----	0.00	-----	-----	-----	-----	1.33
5.68	2.27	741.27	1.34	0.34	0.99	-----	0.00	-----	-----	-----	-----	1.33
5.70	2.24	741.27	1.34	0.34	1.00	-----	0.00	-----	-----	-----	-----	1.34
5.72	2.21	741.27	1.35	0.34	1.00	-----	0.00	-----	-----	-----	-----	1.34
5.73	2.18	741.28	1.36	0.34	1.01	-----	0.00	-----	-----	-----	-----	1.35
5.75	2.16	741.28	1.36	0.34	1.01	-----	0.00	-----	-----	-----	-----	1.36
5.77	2.14	741.29	1.37	0.34	1.02	-----	0.00	-----	-----	-----	-----	1.36
5.78	2.12	741.29	1.37	0.34	1.02	-----	0.00	-----	-----	-----	-----	1.37
5.80	2.10	741.29	1.38	0.34	1.03	-----	0.00	-----	-----	-----	-----	1.37
5.82	2.09	741.30	1.38	0.34	1.03	-----	0.00	-----	-----	-----	-----	1.38
5.83	2.07	741.30	1.39	0.34	1.04	-----	0.00	-----	-----	-----	-----	1.38
5.85	2.07	741.30	1.39	0.34	1.04	-----	0.00	-----	-----	-----	-----	1.38
5.87	2.06	741.31	1.39	0.34	1.05	-----	0.00	-----	-----	-----	-----	1.39
5.88	2.05	741.31	1.40	0.34	1.05	-----	0.00	-----	-----	-----	-----	1.39
5.90	2.05	741.31	1.40	0.34	1.05	-----	0.00	-----	-----	-----	-----	1.40
5.92	2.05	741.32	1.41	0.34	1.06	-----	0.00	-----	-----	-----	-----	1.40
5.93	2.05	741.32	1.41	0.34	1.06	-----	0.00	-----	-----	-----	-----	1.41
5.95	2.05	741.32	1.42	0.34	1.07	-----	0.00	-----	-----	-----	-----	1.41
5.97	2.06	741.32	1.42	0.35	1.07	-----	0.00	-----	-----	-----	-----	1.42
5.98	2.06	741.33	1.42	0.35	1.07	-----	0.00	-----	-----	-----	-----	1.42
6.00	2.06	741.33	1.43	0.35	1.08	-----	0.00	-----	-----	-----	-----	1.42

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Pond 1 - 12 hr.

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
6.02	2.06	741.33	1.43	0.35	1.08	-----	0.00	-----	-----	-----	-----	1.43
6.03	2.06	741.34	1.44	0.35	1.09	-----	0.00	-----	-----	-----	-----	1.43
6.05	2.05	741.34	1.44	0.35	1.09	-----	0.00	-----	-----	-----	-----	1.44
6.07	2.04	741.34	1.45	0.35	1.09	-----	0.00	-----	-----	-----	-----	1.44
6.08	2.03	741.35	1.45	0.35	1.10	-----	0.00	-----	-----	-----	-----	1.45
6.10	2.01	741.35	1.45	0.35	1.10	-----	0.00	-----	-----	-----	-----	1.45
6.12	2.00	741.35	1.46	0.35	1.11	-----	0.00	-----	-----	-----	-----	1.45
6.13	1.98	741.35	1.46	0.35	1.11	-----	0.00	-----	-----	-----	-----	1.46
6.15	1.95	741.36	1.46	0.35	1.11	-----	0.00	-----	-----	-----	-----	1.46
6.17	1.93	741.36	1.47	0.35	1.11	-----	0.00	-----	-----	-----	-----	1.46
6.18	1.90	741.36	1.47	0.35	1.12	-----	0.00	-----	-----	-----	-----	1.47
6.20	1.87	741.36	1.47	0.35	1.12	-----	0.00	-----	-----	-----	-----	1.47
6.22	1.84	741.36	1.47	0.35	1.12	-----	0.00	-----	-----	-----	-----	1.47
6.23	1.81	741.36	1.48	0.35	1.12	-----	0.00	-----	-----	-----	-----	1.47
6.25	1.78	741.37	1.48	0.35	1.13	-----	0.00	-----	-----	-----	-----	1.48
6.27	1.76	741.37	1.48	0.35	1.13	-----	0.00	-----	-----	-----	-----	1.48
6.28	1.74	741.37	1.48	0.35	1.13	-----	0.00	-----	-----	-----	-----	1.48
6.30	1.71	741.37	1.48	0.35	1.13	-----	0.00	-----	-----	-----	-----	1.48
6.32	1.69	741.37	1.49	0.35	1.13	-----	0.00	-----	-----	-----	-----	1.48
6.33	1.68	741.37	1.49	0.35	1.13	-----	0.00	-----	-----	-----	-----	1.48
6.35	1.66	741.37	1.49	0.35	1.14	-----	0.00	-----	-----	-----	-----	1.49
6.37	1.64	741.37	1.49	0.35	1.14	-----	0.00	-----	-----	-----	-----	1.49
6.38	1.63	741.37	1.49	0.35	1.14	-----	0.00	-----	-----	-----	-----	1.49
6.40	1.62	741.38	1.49	0.35	1.14	-----	0.00	-----	-----	-----	-----	1.49
6.42	1.61	741.38	1.49	0.35	1.14	-----	0.00	-----	-----	-----	-----	1.49
6.43	1.60	741.38	1.49	0.35	1.14	-----	0.00	-----	-----	-----	-----	1.49
6.45	1.59	741.38	1.49	0.35	1.14	-----	0.00	-----	-----	-----	-----	1.49
6.47	1.59	741.38	1.49	0.35	1.14	-----	0.00	-----	-----	-----	-----	1.49
6.48	1.58	741.38	1.50	0.35	1.14	-----	0.00	-----	-----	-----	-----	1.49
6.50	1.58	741.38	1.50	0.35	1.14	-----	0.00	-----	-----	-----	-----	1.49
6.52	1.58	741.38	1.50	0.35	1.14	-----	0.00	-----	-----	-----	-----	1.49
6.53	1.58	741.38	1.50	0.35	1.14	-----	0.00	-----	-----	-----	-----	1.49
6.55	1.58	741.38	1.50	0.35	1.14	-----	0.00	-----	-----	-----	-----	1.49
6.57	1.58	741.38	1.50	0.35	1.14	-----	0.00	-----	-----	-----	-----	1.50
6.58	1.58	741.38	1.50	0.35	1.15	-----	0.00	-----	-----	-----	-----	1.50
6.60	1.58	741.38	1.50	0.35	1.15	-----	0.00	-----	-----	-----	-----	1.50
6.62	1.58	741.38	1.50	0.35	1.15	-----	0.00	-----	-----	-----	-----	1.50
6.63	1.58	741.38	1.50	0.35	1.15	-----	0.00	-----	-----	-----	-----	1.50
6.65	1.58	741.38	1.50	0.35	1.15	-----	0.00	-----	-----	-----	-----	1.50
6.67	1.57	741.38	1.50	0.35	1.15	-----	0.00	-----	-----	-----	-----	1.50
6.68	1.57	741.38	1.50	0.35	1.15	-----	0.00	-----	-----	-----	-----	1.50
6.70	1.56	741.38	1.50	0.35	1.15	-----	0.00	-----	-----	-----	-----	1.50
6.72	1.55	741.38	1.50	0.35	1.15	-----	0.00	-----	-----	-----	-----	1.50
6.73	1.54	741.38	1.50	0.35	1.15	-----	0.00	-----	-----	-----	-----	1.50
6.75	1.53	741.38	1.50	0.35	1.15	-----	0.00	-----	-----	-----	-----	1.50
6.77	1.52	741.38 <<	1.50	0.35	1.15	-----	0.00	-----	-----	-----	-----	1.50
6.78	1.50	741.38	1.50	0.35	1.15	-----	0.00	-----	-----	-----	-----	1.50 <<
6.80	1.49	741.38 <<	1.50	0.35	1.15	-----	0.00	-----	-----	-----	-----	1.50
6.82	1.47	741.38	1.50	0.35	1.15	-----	0.00	-----	-----	-----	-----	1.50
6.83	1.46	741.38	1.50	0.35	1.15	-----	0.00	-----	-----	-----	-----	1.50
6.85	1.44	741.38	1.50	0.35	1.15	-----	0.00	-----	-----	-----	-----	1.50

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Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	13.86	1	27	30,501	----	------	------	Onsite Post Dev 1- 1 hr.
2	SCS Runoff	11.79	1	33	40,716	----	------	------	Onsite Post Dev 1- 2 hr.
3	SCS Runoff	9.72	1	36	46,968	----	------	------	Onsite Post Dev 1- 3 hr.
4	SCS Runoff	7.19	1	45	57,816	----	------	------	Onsite Post Dev 1- 6 hr.
5	SCS Runoff	4.43	1	292	69,375	----	------	------	Onsite Post Dev 1- 12 hr.
6	SCS Runoff	3.09	1	936	84,283	----	------	------	Onsite Post Dev 1- 24 hr.
7	Reservoir	4.65	1	59	30,445	1	741.63	20,888	Pond 1 - 1 hr.
8	Reservoir	5.01	1	69	40,653	2	741.70	21,717	Pond 1 - 2 hr.
9	Reservoir	4.90	1	82	46,899	3	741.68	21,455	Pond 1 - 3 hr.
10	Reservoir	4.42	1	107	57,723	4	741.60	20,429	Pond 1 - 6 hr.
11	Reservoir	4.14	1	331	69,206	5	741.58	20,193	Pond 1 - 12 hr.
12	Reservoir	3.07	1	939	83,640	6	741.51	19,258	Pond 1 - 24 hr.

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Tuesday, Nov 3 2015, 2:16 PM

Hyd. No. 1

Onsite Post Dev 1- 1 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 13.86 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 5.14 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 19.0 min
Total precip.	= 4.50 in	Distribution	= Huff-1st
Storm duration	= 1 hrs	Shape factor	= 484

Hydrograph Volume = 30,501 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Outflow cfs)
0.25	7.51
0.27	8.56
0.28	9.52
0.30	10.35
0.32	11.11
0.33	11.78
0.35	12.36
0.37	12.86
0.38	13.25
0.40	13.54
0.42	13.74
0.43	13.84
0.45	13.86 <<
0.47	13.80
0.48	13.66
0.50	13.45
0.52	13.17
0.53	12.82
0.55	12.39
0.57	11.92
0.58	11.40
0.60	10.88
0.62	10.36
0.63	9.86
0.65	9.35
0.67	8.87
0.68	8.41
0.70	7.96
0.72	7.56
0.73	7.19

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Tuesday, Nov 3 2015, 2:16 PM

Hyd. No. 8

Pond 1 - 2 hr.

Hydrograph type	= Reservoir	Peak discharge	= 5.01 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Inflow hyd. No.	= 2	Reservoir name	= Pond 1
Max. Elevation	= 741.70 ft	Max. Storage	= 21,717 cuft

Storage Indication method used.

Outflow hydrograph volume = 40,653 cuft

(Printed values >= 75% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
0.87	7.95	741.56	3.93	0.22	0.85	-----	2.86	-----	-----	-----	-----	3.93
0.88	7.74	741.58	4.19	0.21	0.81	-----	3.17	-----	-----	-----	-----	4.19
0.90	7.53	741.60	4.42	0.20	0.78	-----	3.44	-----	-----	-----	-----	4.42
0.92	7.34	741.61	4.52	0.19	0.75	-----	3.58	-----	-----	-----	-----	4.52
0.93	7.15	741.62	4.59	0.18	0.73	-----	3.68	-----	-----	-----	-----	4.59
0.95	6.97	741.64	4.66	0.18	0.71	-----	3.78	-----	-----	-----	-----	4.66
0.97	6.80	741.65	4.72	0.17	0.68	-----	3.86	-----	-----	-----	-----	4.72
0.98	6.64	741.66	4.77	0.17	0.67	-----	3.94	-----	-----	-----	-----	4.77
1.00	6.49	741.66	4.82	0.16	0.65	-----	4.01	-----	-----	-----	-----	4.82
1.02	6.34	741.67	4.86	0.16	0.63	-----	4.07	-----	-----	-----	-----	4.86
1.03	6.19	741.68	4.90	0.16	0.62	-----	4.12	-----	-----	-----	-----	4.90
1.05	6.03	741.68	4.93	0.15	0.61	-----	4.17	-----	-----	-----	-----	4.93
1.07	5.87	741.69	4.96	0.15	0.60	-----	4.20	-----	-----	-----	-----	4.96
1.08	5.70	741.69	4.98	0.15	0.59	-----	4.24	-----	-----	-----	-----	4.98
1.10	5.51	741.69	4.99	0.15	0.59	-----	4.26	-----	-----	-----	-----	4.99
1.12	5.34	741.70	5.01	0.15	0.58	-----	4.28	-----	-----	-----	-----	5.01
1.13	5.17	741.70	5.01	0.15	0.58	-----	4.29	-----	-----	-----	-----	5.01
1.15	5.00	741.70 <<	5.01	0.15	0.58	-----	4.29	-----	-----	-----	-----	5.01 <<
1.17	4.83	741.70	5.01	0.15	0.58	-----	4.28	-----	-----	-----	-----	5.01
1.18	4.66	741.70	5.00	0.15	0.58	-----	4.27	-----	-----	-----	-----	5.00
1.20	4.49	741.69	4.99	0.15	0.59	-----	4.26	-----	-----	-----	-----	4.99
1.22	4.33	741.69	4.98	0.15	0.59	-----	4.24	-----	-----	-----	-----	4.98
1.23	4.19	741.69	4.96	0.15	0.60	-----	4.21	-----	-----	-----	-----	4.96
1.25	4.06	741.68	4.94	0.15	0.61	-----	4.18	-----	-----	-----	-----	4.94
1.27	3.94	741.68	4.91	0.15	0.62	-----	4.14	-----	-----	-----	-----	4.91
1.28	3.83	741.68	4.89	0.16	0.63	-----	4.10	-----	-----	-----	-----	4.89
1.30	3.72	741.67	4.86	0.16	0.64	-----	4.06	-----	-----	-----	-----	4.86
1.32	3.63	741.66	4.83	0.16	0.65	-----	4.02	-----	-----	-----	-----	4.82
1.33	3.55	741.66	4.79	0.17	0.66	-----	3.97	-----	-----	-----	-----	4.79
1.35	3.47	741.65	4.76	0.17	0.67	-----	3.92	-----	-----	-----	-----	4.76
1.37	3.41	741.65	4.72	0.17	0.68	-----	3.87	-----	-----	-----	-----	4.72
1.38	3.35	741.64	4.69	0.17	0.70	-----	3.82	-----	-----	-----	-----	4.69
1.40	3.31	741.63	4.65	0.18	0.71	-----	3.77	-----	-----	-----	-----	4.65
1.42	3.27	741.63	4.62	0.18	0.72	-----	3.72	-----	-----	-----	-----	4.62
1.43	3.24	741.62	4.58	0.18	0.73	-----	3.66	-----	-----	-----	-----	4.58
1.45	3.22	741.62	4.55	0.19	0.75	-----	3.61	-----	-----	-----	-----	4.55
1.47	3.20	741.61	4.51	0.19	0.76	-----	3.56	-----	-----	-----	-----	4.51
1.48	3.19	741.60	4.48	0.19	0.77	-----	3.51	-----	-----	-----	-----	4.48

Continues on next page...

PROJECT NAME: **Graham Street Storage**
Emergency spillway calculation Pond

Peak 100 Yr. Inflow = 13.86 c.f.s.

1.25 x 13.86 c.f.s. = 17.3

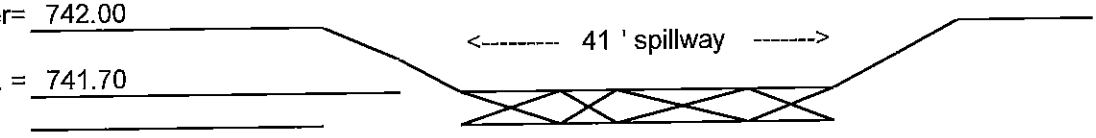
Weir Equation: Q = C L H(3/2)

Where Q = outflow
L = length of weir
C = discharge coefficient
H = hydraulic head over weir

17.325 c.f.s. = 2.6 (L) 0.16
L = 40.55 '

Top of Bank 742.00
Depth of Water= 742.00

Top of Spill Elev. = 741.70



Storm Sewer Calculations

Graham Street Storage

Storm Sewer Calculations

STR. #	Runoff curve number (CN)	Desc.	Soil	Ac.		CN		CNxAc.	
604		Imp.	(PR.)	0.94	x	98	=	92	
		Imp.	-	0.00	x	98	=	0	
		Lawn	'C'	0.30	x	79	=	24	
Area =		Lawn	'B'	0.14	x	61	=	9	
1.38			Total	1.38		/		124	= CN- 90
Acres	"T/c" =								

1. Sheet Flow $T.C.= \frac{0.007 \times (0.15 \times 100)^{0.80}}{2.64^{0.50} \quad 0.01^{0.40}} =$ 14 Minutes

2. Shallow Concentrated

Unpaved: $T.C.= 16.135 \times 0.01^{0.5} = 1.61$ ft/sec

$= \frac{93 \text{ feet}}{1.61 \text{ ft/sec}} =$ 1 Minutes

Paved: $T.C.= 20.328 \times 0.006^{0.5} = 1.57$ ft/sec

$= \frac{338 \text{ feet}}{1.57 \text{ ft/sec}} =$ 4 Minutes

T/c Total= 19 Minutes

STR. #	Runoff curve number (CN)	Desc.	Soil	Ac.		CN		CNxAc.	
606		Imp.	(PR.)	1.04	x	98	=	102	
		Imp.	-	0.00	x	98	=	0	
		Lawn	'C'	0.30	x	79	=	24	
Area =		Lawn	'B'	0.26	x	61	=	16	
1.60			Total	1.60		/		141	= CN- 88
Acres	"T/c" =								

1. Sheet Flow $T.C.= \frac{0.007 \times (0.15 \times 100)^{0.80}}{2.64^{0.50} \quad 0.01^{0.40}} =$ 14 Minutes

2. Shallow Concentrated

Unpaved: $T.C.= 16.135 \times 0.01^{0.5} = 1.61$ ft/sec

$= \frac{110 \text{ feet}}{1.61 \text{ ft/sec}} =$ 1 Minutes

Paved: $T.C.= 20.328 \times 0.006^{0.5} = 1.57$ ft/sec

$= \frac{313 \text{ feet}}{1.57 \text{ ft/sec}} =$ 3 Minutes

T/c Total= 19 Minutes

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	2.65	1	28	3,620	----	------	------	Str. 604 - 0.5 hr.
2	SCS Runoff	2.82	1	40	5,309	----	------	------	Str. 604 - 1 hr.
3	SCS Runoff	2.43	1	63	7,224	----	------	------	Str. 604 - 2 hr.
4	SCS Runoff	3.24	1	28	4,437	----	------	------	Str. 606 - 0.5 hr.
5	SCS Runoff	3.56	1	41	6,706	----	------	------	Str. 606 - 1 hr.
6	SCS Runoff	3.14	1	64	9,317	----	------	------	Str. 606 - 2 hr.
7	Combine	5.89	1	28	8,057	1, 4,	------	------	Total to 606 - 0.5 hr.
8	Combine	6.38	1	40	12,015	2, 5,	------	------	Total to 606 - 1 hr.
9	Combine	5.56	1	63	16,541	3, 6,	------	------	Total to 606 - 2 hr.

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Tuesday, Nov 3 2015, 2:17 PM

Hyd. No. 2

Str. 604 - 1 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 2.82 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Drainage area	= 1.38 ac	Curve number	= 90
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 19.0 min
Total precip.	= 1.96 in	Distribution	= Huff-2nd
Storm duration	= 1 hrs	Shape factor	= 484

Hydrograph Volume = 5,309 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Outflow cfs)
0.48	1.53
0.50	1.73
0.52	1.92
0.53	2.10
0.55	2.27
0.57	2.42
0.58	2.55
0.60	2.65
0.62	2.73
0.63	2.79
0.65	2.81
0.67	2.82 <<
0.68	2.81
0.70	2.78
0.72	2.74
0.73	2.68
0.75	2.61
0.77	2.53
0.78	2.44
0.80	2.34
0.82	2.23
0.83	2.12
0.85	2.01
0.87	1.90
0.88	1.79
0.90	1.68
0.92	1.58
0.93	1.49

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Tuesday, Nov 3 2015, 2:17 PM

Hyd. No. 5

Str. 606 - 1 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 3.56 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Drainage area	= 1.98 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 19.0 min
Total precip.	= 1.96 in	Distribution	= Huff-2nd
Storm duration	= 1 hrs	Shape factor	= 484

Hydrograph Volume = 6,706 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Outflow cfs)
0.50	2.02
0.52	2.26
0.53	2.50
0.55	2.73
0.57	2.94
0.58	3.11
0.60	3.27
0.62	3.39
0.63	3.47
0.65	3.53
0.67	3.56
0.68	3.56 <<
0.70	3.54
0.72	3.50
0.73	3.44
0.75	3.37
0.77	3.27
0.78	3.17
0.80	3.05
0.82	2.92
0.83	2.78
0.85	2.64
0.87	2.50
0.88	2.37
0.90	2.23
0.92	2.11
0.93	1.98
0.95	1.86

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Tuesday, Nov 3 2015, 2:17 PM

Hyd. No. 8

Total to 606 - 1 hr.

Hydrograph type	= Combine	Peak discharge	= 6.38 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Inflow hyds.	= 2, 5		

Hydrograph Volume = 12,015 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Hyd. 2 + (cfs)	Hyd. 5 + (cfs)	Outflow (cfs)
0.48	1.53	1.76	3.29
0.50	1.73	2.02	3.74
0.52	1.92	2.26	4.18
0.53	2.10	2.50	4.60
0.55	2.27	2.73	5.00
0.57	2.42	2.94	5.35
0.58	2.55	3.11	5.66
0.60	2.65	3.27	5.92
0.62	2.73	3.39	6.12
0.63	2.79	3.47	6.26
0.65	2.81	3.53	6.34
0.67	2.82 <<	3.56	6.38 <<
0.68	2.81	3.56 <<	6.38
0.70	2.78	3.54	6.32
0.72	2.74	3.50	6.24
0.73	2.68	3.44	6.12
0.75	2.61	3.37	5.98
0.77	2.53	3.27	5.81
0.78	2.44	3.17	5.61
0.80	2.34	3.05	5.39
0.82	2.23	2.92	5.15
0.83	2.12	2.78	4.91
0.85	2.01	2.64	4.65
0.87	1.90	2.50	4.40
0.88	1.79	2.37	4.15
0.90	1.68	2.23	3.92
0.92	1.58	2.11	3.69
0.93	1.49	1.98	3.47
0.95	1.40	1.86	3.26

...End

Hydraflow Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	Dns line No.
1	604	6.38	15 x 23 b (2)15" RCP	68.0	740.00	740.15	0.221	740.70	741.15	0.00	End

Project File: 14013 603-604.stm	IDF File: Marion1.IDF	Total No. Lines: 1	Run Date: 11-03-2015

NOTES: c = circular; e = elliptical; b = box; Return period = 10 Yrs.; * Indicates surcharge condition.

Hydraflow Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
1	End	68.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	6.38	6.73	4.04	15 23b (2) is "RCP	0.22	740.15	740.00	741.15	740.70	742.10	0.00	604

Project File: 14013 603-604.stm | IDF File: Marion1.IDF | Total number of lines: 1 | Run Date: 11-03-2015

NOTES: Intensity = 0.00 / (Inlet time + 0.00) ^ 0.00; Return period = 10 Yrs. ; Initial tailwater elevation = 740.70 (ft)

Hydraflow Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	Dns line No.
1	606	2.82	15 c	24.0	740.20	740.25	0.208	740.87	741.10	0.00	End

Project File: 14013 605-606.stm | IDF File: Marion1.IDF | Total No. Lines: 1 | Run Date: 11-03-2015

NOTES: c = circular; e = elliptical; b = box; Return period = 10 Yrs.; * Indicates surcharge condition.

Hydraflow Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
1	End	24.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	2.82	2.95	3.69	15	0.21	740.25	740.20	741.10	740.87	742.10	0.00	606

Project File: 14013 605-606.stm | IDF File: Marion1.IDF | Total number of lines: 1 | Run Date: 11-03-2015

NOTES: Intensity = 0.00 / (Inlet time + 0.00) ^ 0.00; Return period = 10 Yrs. ; Initial tailwater elevation = 740.87 (ft)

Water Quality Calculations

Project Name: Graham Street Storage **Project # 14013**

Water Quality

Option #1

20% of Runoff from a 1.25" storm event

Volume= 6,903 c.f. X 0.20 = 1,381 c.f.

Option #2

20% of a 0.50" direct runoff

Volume = 5.14 ac. $\frac{\text{X 43560 s.f.}}{\text{1 ac.}}$ $\frac{\text{X 144 s.-in.}}{\text{1 s.f.}}$ X 0.50-in

= 16,120,685 c.in = 9,329 c.f.

= 9,329 c.f. X 0.20 = 1,866 c.f. <== USE

Peak storm event happens at 1.45 inch storm event

Storm event that provides 1,866 c.f. is a 1.45 inch storm event

Peak occurs at 11.13 hrs for the 1.45 inch storm event

11.13 hrs + 12.0 hrs = 23.13 hrs

Pond Elevation at 23.13 hrs = 740.19 n.p. 740.00

Pond Storage Volume at 23.13 hrs = 2,430 c.f. > 1,866 c.f.

$\frac{2}{25,583} = \frac{0.19}{2,430}$

11.13 hrs + 18.0 hrs = 29.13 hrs

Pond Elevation at 29.13 hrs = 740.11 n.p. 740.00

Pond Storage Volume at 29.13 hrs = 1,407 c.f. < 1,866 c.f.

$\frac{2}{25,583} = \frac{0.11}{1,407}$

11.13 hrs + 24.0 hrs = 35.13 hrs

Pond Elevation at 35.13 hrs = 740.05 n.p. 740.00

Pond Storage Volume at 35.13 hrs = 640 c.f. < 1,866 c.f.

$\frac{2}{25,583} = \frac{0.05}{640}$

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.17	1	361	6,903	----	------	------	WQ 1.25IN EVENT
2	SCS Runoff	0.23	1	361	9,346	----	------	------	WQ 0.5IN EVENT
3	Reservoir	0.12	1	668	9,186	2	740.26	3,369	Pond 1 - 1 hr.

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Tuesday, Nov 3 2015, 2:12 PM

Hyd. No. 2

WQ 0.5IN EVENT

Hydrograph type	= SCS Runoff	Peak discharge	= 0.23 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Drainage area	= 5.14 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 19.0 min
Total precip.	= 1.45 in	Distribution	= Huff-1st
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 9,346 cuft

(Printed values >= 50% of Qp)

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)
2.20	0.12	2.77	0.15	3.33	0.17	3.90	0.19
2.22	0.12	2.78	0.15	3.35	0.17	3.92	0.19
2.23	0.13	2.80	0.15	3.37	0.18	3.93	0.19
2.25	0.13	2.82	0.15	3.38	0.18	3.95	0.19
2.27	0.13	2.83	0.15	3.40	0.18	3.97	0.19
2.28	0.14	2.85	0.14	3.42	0.18	3.98	0.19
2.30	0.14	2.87	0.14	3.43	0.18	4.00	0.19
2.32	0.15	2.88	0.15	3.45	0.18	4.02	0.19
2.33	0.15	2.90	0.15	3.47	0.18	4.03	0.19
2.35	0.15	2.92	0.15	3.48	0.18	4.05	0.19
2.37	0.16	2.93	0.15	3.50	0.18	4.07	0.19
2.38	0.16	2.95	0.15	3.52	0.19	4.08	0.19
2.40	0.16	2.97	0.15	3.53	0.19	4.10	0.19
2.42	0.17	2.98	0.15	3.55	0.19	4.12	0.20
2.43	0.17	3.00	0.15	3.57	0.19	4.13	0.20
2.45	0.17	3.02	0.15	3.58	0.19	4.15	0.20
2.47	0.17	3.03	0.15	3.60	0.19	4.17	0.20
2.48	0.18	3.05	0.16	3.62	0.19	4.18	0.20
2.50	0.18	3.07	0.16	3.63	0.19	4.20	0.20
2.52	0.18	3.08	0.16	3.65	0.19	4.22	0.20
2.53	0.18	3.10	0.16	3.67	0.19	4.23	0.20
2.55	0.18	3.12	0.16	3.68	0.19	4.25	0.20
2.57	0.17	3.13	0.16	3.70	0.19	4.27	0.20
2.58	0.17	3.15	0.16	3.72	0.19	4.28	0.20
2.60	0.17	3.17	0.16	3.73	0.19	4.30	0.20
2.62	0.17	3.18	0.16	3.75	0.19	4.32	0.20
2.63	0.16	3.20	0.17	3.77	0.19	4.33	0.20
2.65	0.16	3.22	0.17	3.78	0.19	4.35	0.21
2.67	0.16	3.23	0.17	3.80	0.19	4.37	0.21
2.68	0.16	3.25	0.17	3.82	0.19	4.38	0.21
2.70	0.15	3.27	0.17	3.83	0.19	4.40	0.21
2.72	0.15	3.28	0.17	3.85	0.19	4.42	0.21
2.73	0.15	3.30	0.17	3.87	0.19	4.43	0.21
2.75	0.15	3.32	0.17	3.88	0.19	4.45	0.21

Continues on next page...

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Tuesday, Nov 3 2015, 2:13 PM

Hyd. No. 3

Pond 1 - 1 hr.

Hydrograph type	= Reservoir	Peak discharge	= 0.12 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Inflow hyd. No.	= 2	Reservoir name	= Pond 1
Max. Elevation	= 740.26 ft	Max. Storage	= 3,369 cuft

Storage Indication method used.

Outflow hydrograph volume = 9,186 cuft

Hydrograph Discharge Table

(Printed values >= 5% of Qp.)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
2.38	0.16	740.01	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.40	0.16	740.02	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.42	0.17	740.02	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.43	0.17	740.02	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.45	0.17	740.02	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.47	0.17	740.02	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.48	0.18	740.02	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.50	0.18	740.02	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.52	0.18	740.02	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.53	0.18	740.02	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.55	0.18	740.02	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.57	0.17	740.02	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.58	0.17	740.02	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.60	0.17	740.02	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.62	0.17	740.03	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.63	0.16	740.03	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.65	0.16	740.03	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.67	0.16	740.03	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.68	0.16	740.03	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.70	0.15	740.03	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.72	0.15	740.03	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.73	0.15	740.03	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.75	0.15	740.03	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.77	0.15	740.03	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.78	0.15	740.03	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.80	0.15	740.03	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.82	0.15	740.03	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.83	0.15	740.03	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.85	0.14	740.03	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.87	0.14	740.04	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.88	0.15	740.04	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.90	0.15	740.04	0.01	0.01	-----	-----	-----	-----	-----	-----	-----	0.01
2.92	0.15	740.04	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
2.93	0.15	740.04	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
2.95	0.15	740.04	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
2.97	0.15	740.04	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
2.98	0.15	740.04	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
3.00	0.15	740.04	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02

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Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
22.57	0.04	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.58	0.04	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.60	0.04	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.62	0.04	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.63	0.04	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.65	0.04	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.67	0.04	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.68	0.04	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.70	0.04	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.72	0.04	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.73	0.04	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.75	0.04	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.77	0.04	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.78	0.04	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.80	0.04	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.82	0.04	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.83	0.04	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.85	0.04	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.87	0.04	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.88	0.05	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.90	0.05	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.92	0.05	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.93	0.05	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.95	0.05	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.97	0.05	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
22.98	0.06	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.00	0.06	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.02	0.06	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.03	0.06	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.05	0.07	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.07	0.07	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.08	0.07	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.10	0.07	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.12	0.07	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.13	0.08	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.15	0.08	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.17	0.08	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.18	0.08	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.20	0.08	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.22	0.08	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.23	0.08	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.25	0.08	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.27	0.08	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.28	0.08	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.30	0.08	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.32	0.08	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.33	0.08	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.35	0.08	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.37	0.08	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.38	0.08	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
23.40	0.08	740.19	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08

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Pond 1 - 1 hr.

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
28.52	0.00	740.12	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.53	0.00	740.12	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.55	0.00	740.12	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.57	0.00	740.12	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.58	0.00	740.12	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.60	0.00	740.12	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.62	0.00	740.12	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.63	0.00	740.12	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.65	0.00	740.11	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.67	0.00	740.11	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.68	0.00	740.11	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.70	0.00	740.11	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.72	0.00	740.11	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.73	0.00	740.11	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.75	0.00	740.11	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.77	0.00	740.11	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.78	0.00	740.11	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.80	0.00	740.11	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.82	0.00	740.11	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.83	0.00	740.11	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.85	0.00	740.11	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.87	0.00	740.11	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.88	0.00	740.11	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.90	0.00	740.11	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.92	0.00	740.11	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.93	0.00	740.11	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.95	0.00	740.11	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
28.97	0.00	740.11	0.05	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
28.98	0.00	740.11	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
29.00	0.00	740.11	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
29.02	0.00	740.11	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
29.03	0.00	740.11	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
29.05	0.00	740.11	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
29.07	0.00	740.11	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
29.08	0.00	740.11	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
29.10	0.00	740.11	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
29.12	0.00	740.11	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
29.13	0.00	740.11	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
29.15	0.00	740.11	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
29.17	0.00	740.11	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
29.18	0.00	740.11	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
29.20	0.00	740.11	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
29.22	0.00	740.11	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
29.23	0.00	740.11	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
29.25	0.00	740.11	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
29.27	0.00	740.11	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
29.28	0.00	740.11	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
29.30	0.00	740.11	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
29.32	0.00	740.11	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
29.33	0.00	740.11	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
29.35	0.00	740.11	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04

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Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
34.47	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.48	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.50	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.52	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.53	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.55	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.57	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.58	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.60	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.62	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.63	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.65	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.67	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.68	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.70	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.72	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.73	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.75	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.77	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.78	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.80	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.82	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.83	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.85	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.87	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.88	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.90	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.92	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.93	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.95	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.97	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
34.98	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
35.00	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
35.02	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
35.03	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
35.05	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
35.07	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
35.08	0.00	740.06	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
35.10	0.00	740.05	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
35.12	0.00	740.05	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
35.13	0.00	740.05	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
35.15	0.00	740.05	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
35.17	0.00	740.05	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
35.18	0.00	740.05	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
35.20	0.00	740.05	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
35.22	0.00	740.05	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
35.23	0.00	740.05	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
35.25	0.00	740.05	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
35.27	0.00	740.05	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
35.28	0.00	740.05	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
35.30	0.00	740.05	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02

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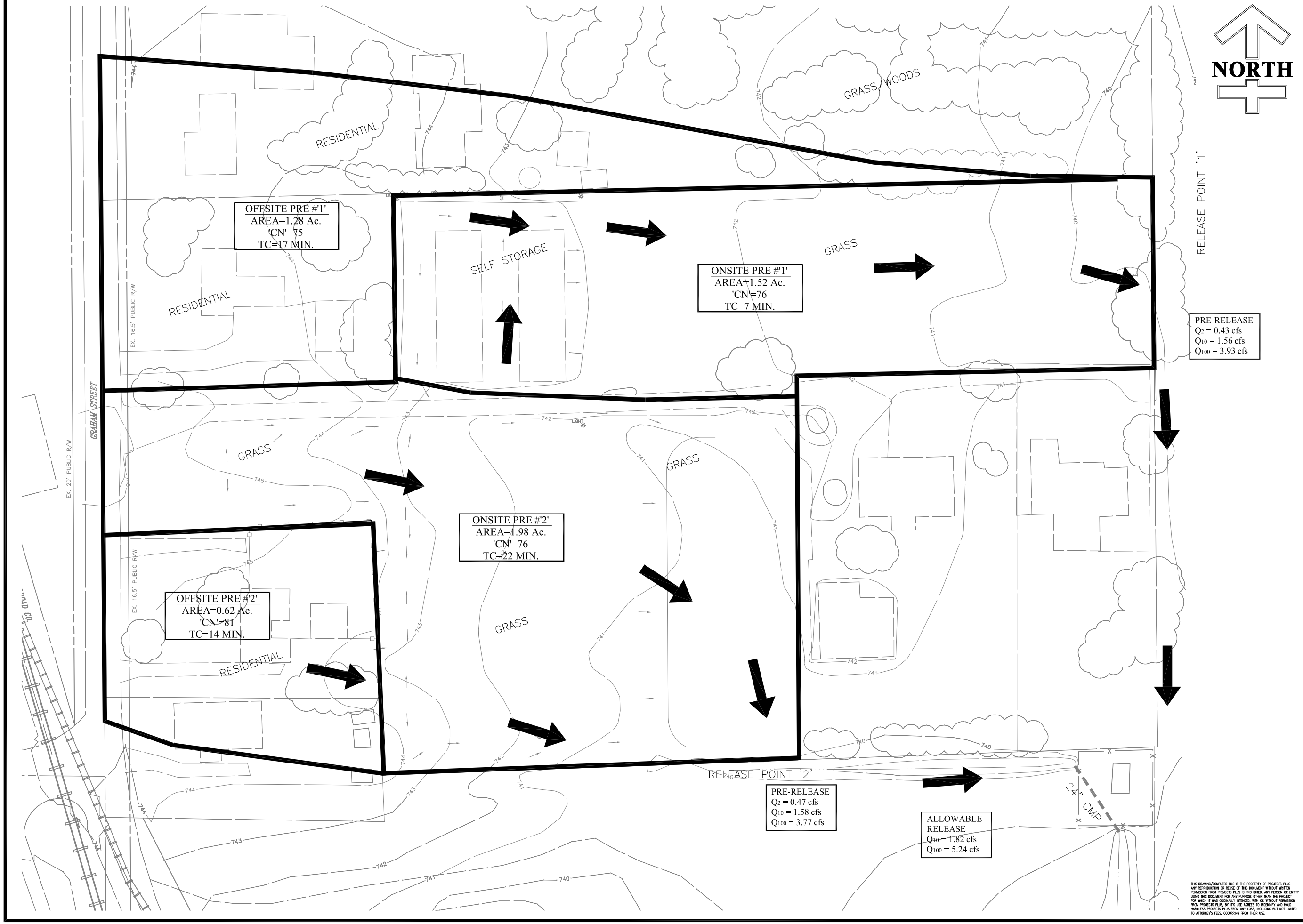
Watershed Basin Maps



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SYMBOL	REVISION	DATE

SCALE 1"=60'
DRAWN JPH
CHECKED JKS
CERTIFIED --

PROJECT
GRAHAM STREET STORAGE
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
PRE-DEVELOPMENT BASIN MAP

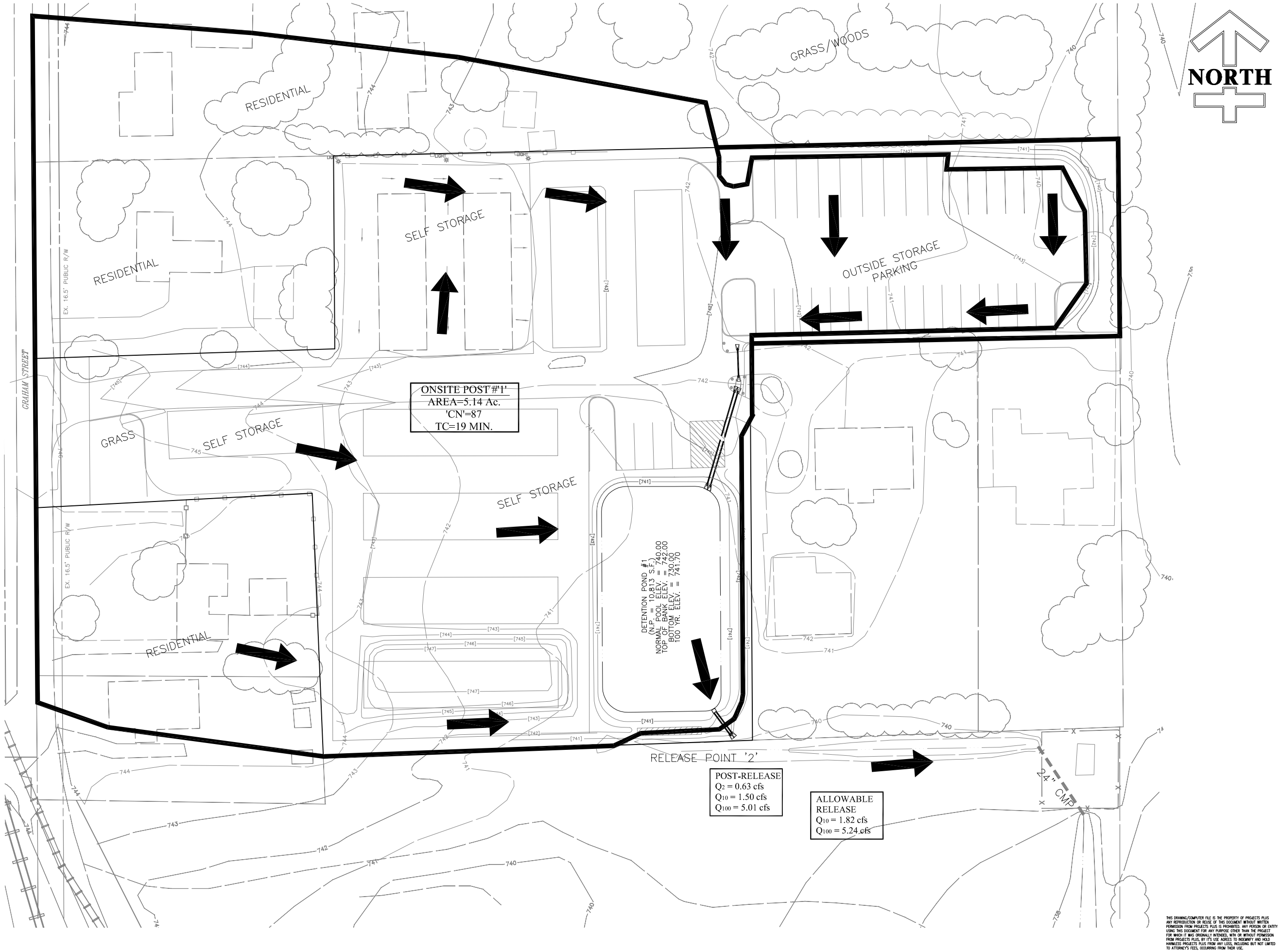
PROJECTS plus
GREENWOOD SURVEYING COMPANY
CIVIL ENGINEERING – LAND SURVEYING
LAND PLANNING – CONSTRUCTION MANAGEMENT
2555 Fairview Place Suite A Greenwood, Indiana 46142
(317)-882-5003

JOB NUMBER
14013

SHEET
1

OF **1** SHEETS

DATE
AUGUST 12, 2015



DATE	REVISION	SYMBOL

SCALE 1"=60'
DRAWN JPH
CHECKED JKS
CERTIFIED --

PROJECT
GRAHAM STREET STORAGE
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
POST-DEVELOPMENT BASIN MAP

PROJECTS *plus*

GREENWOOD SURVEYING COMPANY

CIVIL ENGINEERING – LAND SURVEYING
LAND PLANNING CONSTRUCTION MANAGEMENT
2353 Fairview Place, Suite A, Greenwood, Indiana 46142
(317)-882-5003

JOB NUMBER **14013**

SHEET **1**

OF **1** SHEETS

DATE **NOVEMBER 3, 2015**

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EX. 20' PUBLIC R/W

GRAHAM STREET

EX. 16.5' PUBLIC R/W

EX. 16.5' PUBLIC R/W

STM. BASIN #604
AREA=1.38 Ac.
CN=90
TC=21 MIN.

STM. BASIN #606
AREA=1.60 Ac.
CN=90
TC=21 MIN.

DETENTION POND #1
(N.P. = 10,813 S.F.)
NORMAL POOL ELEV. = 740.00
TOP OF BANK ELEV. = 742.00
BOTTOM ELEV. = 730.00
100 YR. ELEV. = 741.70

NORTH

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PROJECT
GRAHAM STREET STORAGE
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
STORM SEWER BASIN MAP

SCALE	SYMBOL	REVISION	DATE
1"=60'			
DRAWN JPH			
CHECKED JKS			
CERTIFIED – –			

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SHEET 1
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