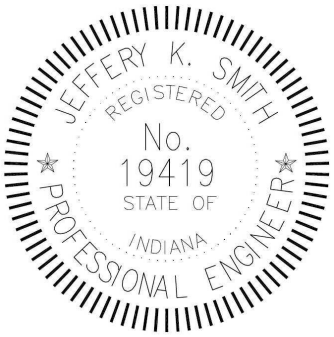
Final Drainage Report for

Patriot Defense Research Park - Buildings #1 And #2

Dated: September 3, 2021



Calculations Prepared By:

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9/3/21

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REPORT INDEX:

TECHNICAL INFORMATION DATA

Summary of Pre-Developed Drainage Conditions:

This project, "Patriot Defense Research Park - Buildings #1 and #2", is located at approximately 1399 Earlywood Dr., Franklin, IN 46131 in 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 an undeveloped parcel that is comprised of a combination of cultivated crops and grass.

Onsite Pre-Basin '1' consists of an undeveloped parcel that is comprised of a combination of cultivated crops and grass. The runoff drains to the east and south to Canary Ditch, which then flows to the southeast from the site. A summary of the release rates are as follows:

Onsite Pre-Basin '1'
A = 29.5 acres CN = 68
Q_2 = 2.30 cfs, Q_{10} = 7.73 cfs, Q_{100} = 21.12 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.

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} = 2.17 cfs, Q_{100} = 7.29 cfs

Summary of Post-Developed Drainage Conditions:

The proposed site improvements for the project will consist of a 26,400 sq. ft. building and an 80,000 sq. ft. building with asphalt parking, stone material storage area, concrete curbs and sidewalks. Additional improvements include the installation of a detention pond, sanitary sewer extension and a storm sewer system and private infrastructure utilities.

The overall site is master planned for future industrial buildings, with an assumed impervious coverage of 72% for an Urban District for light industrial uses. The runoff from the proposed and future improvements, shown as Onsite Post-Basin '1', will be routed through a proposed detention pond with

the outlet release rate controlled by a pond control structure. The outflow from the pond will release east to Canary Creek along the east property line.

The release point to Canary Creek is in floodzone AE (studied floodzone with elevations established) as per FEMA Firm Map #18097C0143 E, effective January 29, 2021. The 100-year tailwater elevation of 758.80 was established via the Firm Map and this elevation was included in the computation of the 100 year flood elevation for the detention pond.

The drainage design for the site meets the requirements of General Drainage Standards, Chapter 6.19 of the City of Franklin Subdivision Control Ordinance. A summary of the drainage runoff and detention pond releases are as follow:

Onsite Post-Basin '1':

A = 29.5 acres CN = 90
Q_2 = 18.05 cfs, Q_{10} = 39.76 cfs, Q_{100} = 71.54 cfs
Detention Pond #1:
N.P. = 752.00, T.O.B. = 761.50, Storage = 652,128 Cu. Ft.
100-yr elev. = 759.33
Detention Outflow (w/o Tailwater):
Q_2 = 1.28 cfs, Q_{10} = 2.30 cfs, Q_{100} = 7.26 cfs
Detention Outflow (w/ Tailwater):
Q_2 = 0.00 cfs, Q_{10} = 0.00 cfs, Q_{100} = 2.10 cfs

Water Quality:

The proposed dry detention 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.

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 "Rational Method" and input into the HYDRAFLOW Storm Sewer Module to calculate the velocity, capacity, hydraulic grade line, gutter and inlet spreads for each

storm sewer system. A weighted coefficient was computed for all storm basins in accordance with Chapter 6.19 of the City of Franklin General Drainage Standards. Individual times of concentration were calculated using Manning Equation. The storm sewer system is sized for a 10-year storm runoff event with no surcharging.

Stormwater Pollution Prevention:

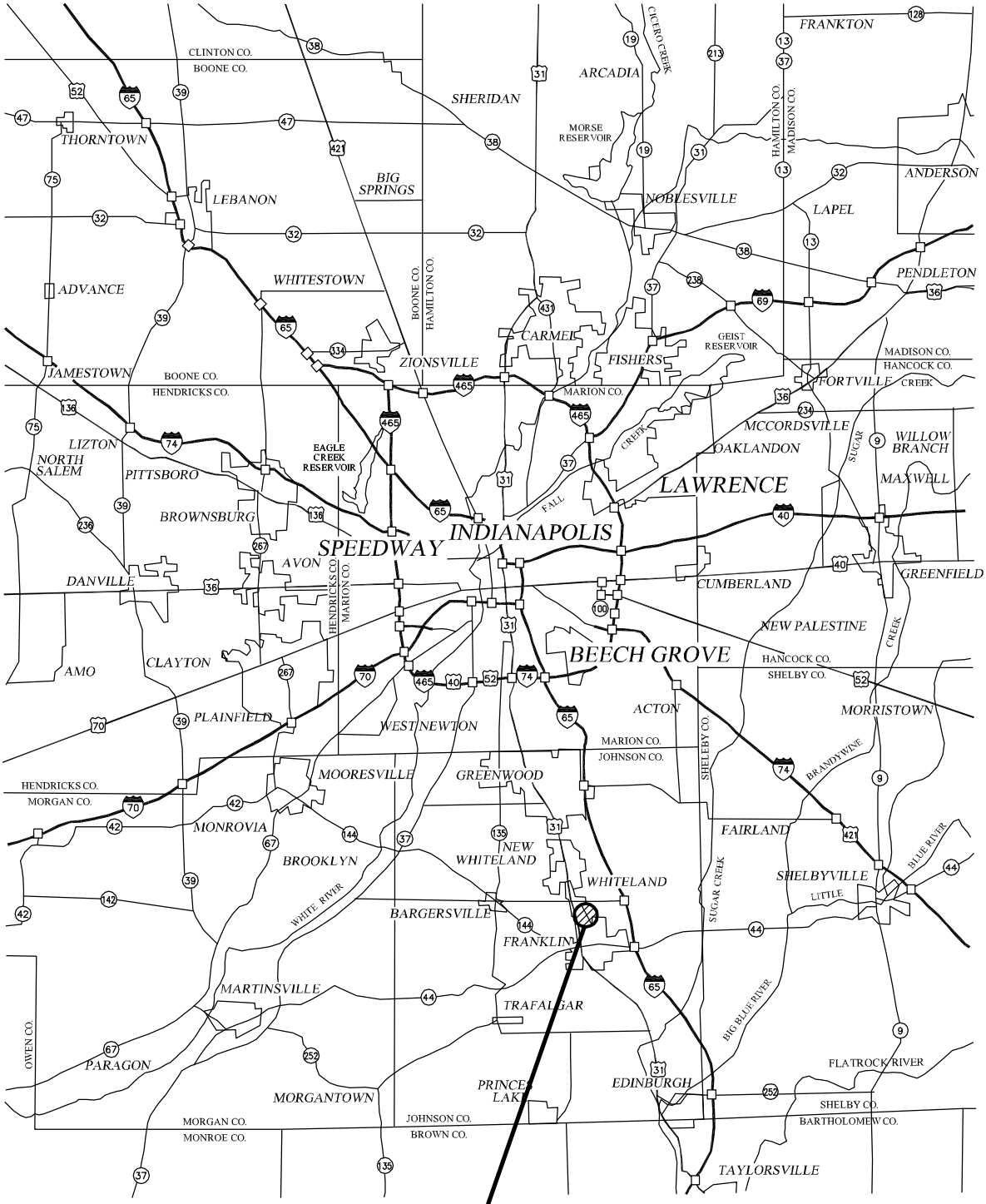
The land disturbing activities will be greater than 1 acre, so a Rule 5 submittal is required. A Stormwater Pollution Prevention Plan (SWPPP) with an activities schedule will be submitted as part of the construction plans. Standard maintenance schedules and details will be included. All swales and pond 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.

Compensatory Storage Summary:

A portion of the project site will have fill added in a shaded Zone "AE", per FEMA Firm Map #18097C0143 E, effective January 29, 2021, therefore a compensatory storage is required.

The compensatory storage calculation was computed via a dirt-take off volume program within the AutoCAD software. The existing and proposed ground conditions were computed within the floodzone area up to the flood elevation as scaled from the current FEMA flood map. This method of calculated the compensatory storage is more accurate then cut/fill cross sections.

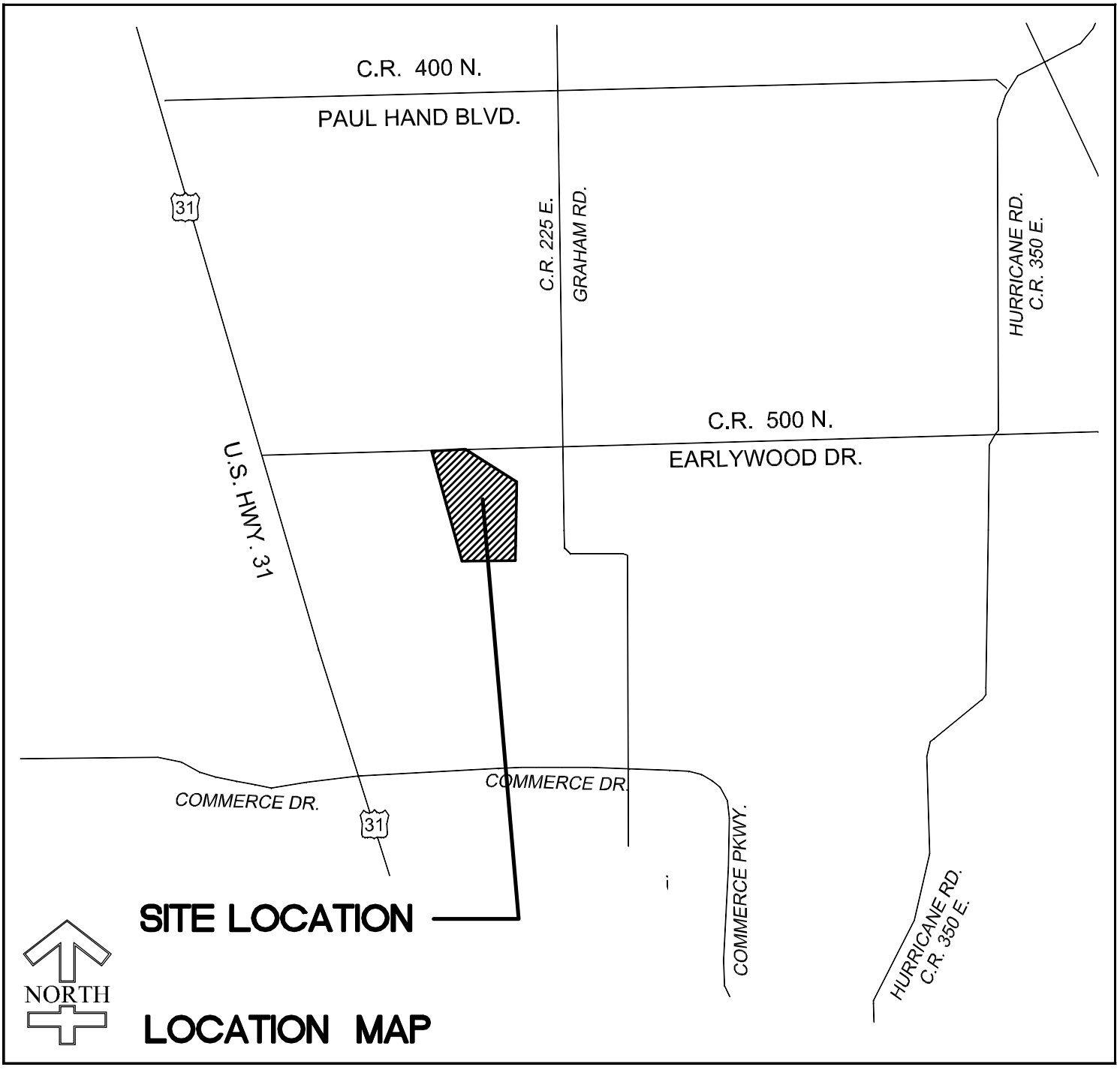
The compensatory storage for construction of the detention improvements requires 1225 cubic yard of fill. A proposed compensatory storage area will be built with 1290 cubic yards of cut for detention; therefore there is no net loss in floodplain storage. A compensatory storage cut/fill map is included in the ‘Watershed Delineation Maps’ portion on this report.



SITE LOCATION

NORTH

AREA MAP

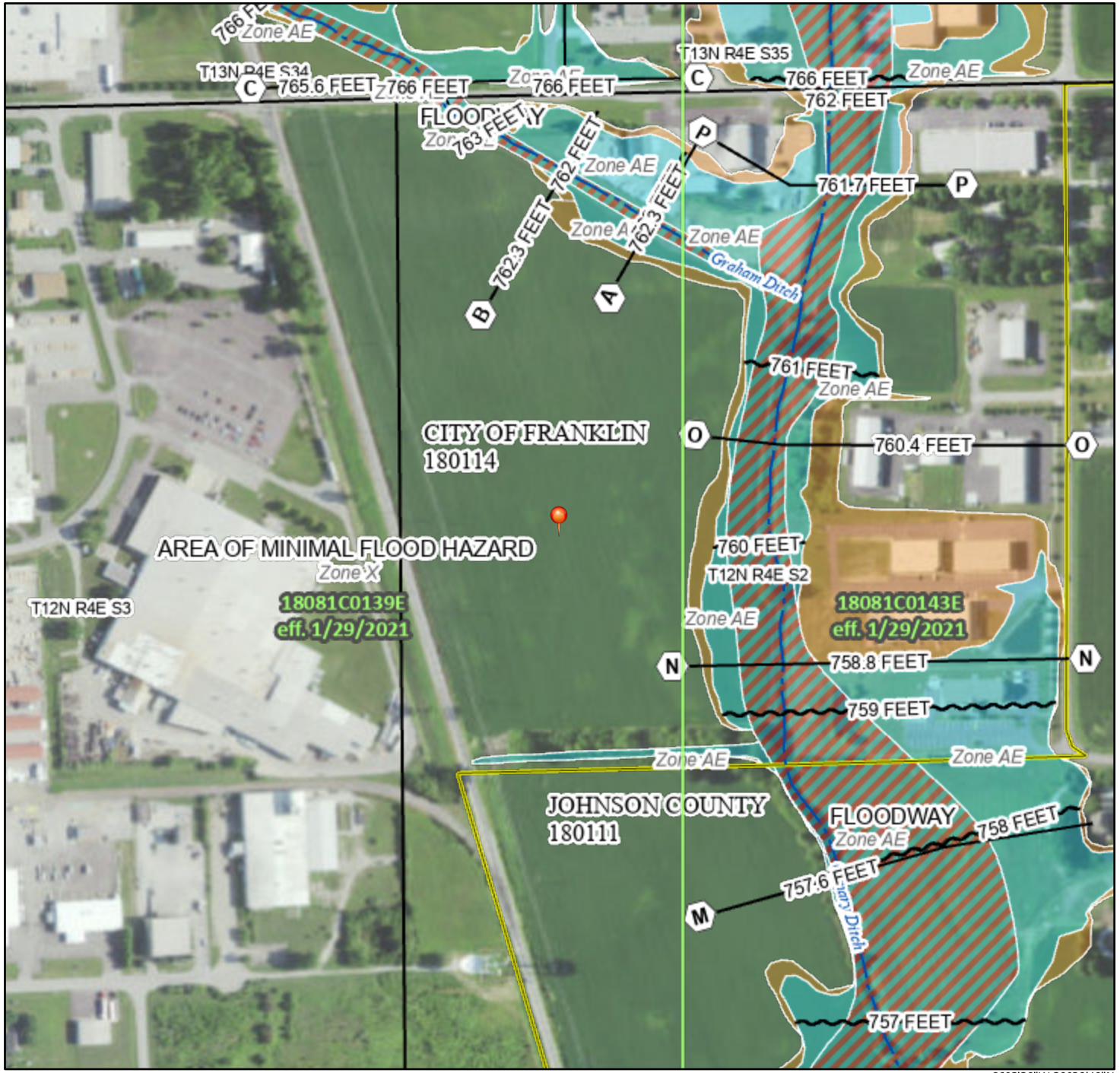


LOCATION MAP

National Flood Hazard Layer FIRMette

FEMA

86°4'8"W 39°31'17"N



86°3'30"W 39°30'49"N

Feet 1:6,000

0 250 500 1,000 1,500 2,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/15/2021 at 12:58 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Map Scale: 1:6,080 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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

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

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

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

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

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

Soil Survey Area: Johnson County, Indiana
Survey Area Data: Version 28, Jun 4, 2020

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

Date(s) aerial images were photographed: Jul 27, 2019—Sep 26, 2019

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Br	Brookston silty clay loam, 0 to 2 percent slopes	52.6	40.8%
CrA	Crosby silt loam, fine-loamy subsoil, 0 to 2 percent slopes	42.3	32.8%
CsB2	Crosby-Miami silt loams, 2 to 4 percent slopes, eroded	2.7	2.1%
MnB2	Miami silt loam, 2 to 6 percent slopes, eroded	8.0	6.2%
UbaA	Urban land-Brookston complex, 0 to 2 percent slopes	8.4	6.5%
UcfA	Urban land-Crosby silt loam complex, fine-loamy subsoil, 0 to 2 percent slopes	14.8	11.5%
Totals for Area of Interest		**128.7**	**100.0%**

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

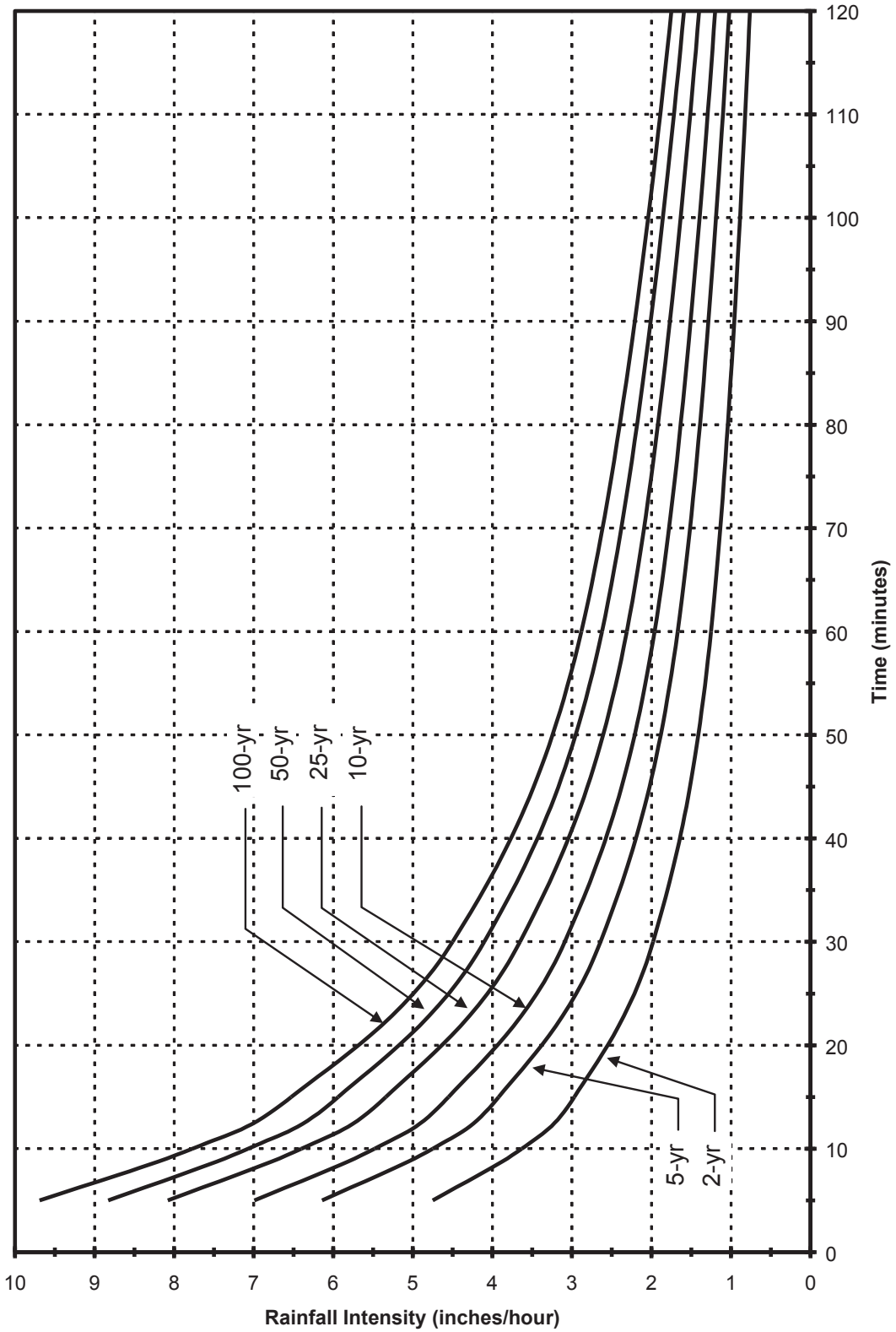


FIGURE 202-01: Indianapolis IDF Curve

	Cumulative storm rainfall (percent) for given storm type			
Cumulative storm time (percent)	*First-quartile*	*Second-quartile*	*Third-quartile*	*Fourth-quartile*
5	16	3	3	2
10	33	8	6	5
15	43	12	9	8
20	52	16	12	10
25	60	22	15	13
30	66	29	19	16
35	71	39	23	19
40	75	51	27	22
45	79	62	32	25
50	82	70	38	28
55	84	76	45	32
60	86	81	57	35
65	88	85	70	39
70	90	88	79	45
75	92	91	85	51
80	94	93	89	59
85	96	95	92	72
90	97	97	95	84
95	98	98	97	92

FIGURE 202-02: Huff Rainfall Distribution
(SOURCE: Bulletin 71, "Rainfall Frequency Atlas of the Midwest", 1992)

% Storm Time	% Precipitation
0	0.0
5	2.7
10	6.5
15	11.0
20	18.1
25	26.0
30	35.9
35	44.7
40	52.9
45	61.0
50	67.9
55	72.5
60	76.5
65	80.2
70	83.8
75	87.2
80	90.7
85	93.3
90	95.9
95	97.9
100	100.0

Estimated Values in Italics

TABLE 202-03: Huff Curve Ordinates
(SOURCE: Purdue, et al, "Statistical Characteristics of Short Time Increment Rainfall")

Worksheet 3: Time of Concentration (T_c) or travel time (T_t)

Project	By	Date
Location	Checked	Date

Check one: ☐ Present ☐ Developed

Check one: ☐ T_c ☐ T_t through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to Tc only)

	Segment ID	
1. Surface description (table 3-1)		
2. Manning's roughness coefficient, n (table 3-1)		
3. Flow length, L (total L † 300 ft) ft		
4. Two-year 24-hour rainfall, P_2 in		
5. Land slope, s ft/ft		
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T_t hr		+ =

Shallow concentrated flow

	Segment ID	
7. Surface description (paved or unpaved)		
8. Flow length, L ft		
9. Watercourse slope, s ft/ft		
10. Average velocity, V (figure 3-1) ft/s		
11. $T_t = \frac{L}{3600\ V}$ Compute T_t hr		+ =

Channel flow

	Segment ID	
12. Cross sectional flow area, a ft^2		
13. Wetted perimeter, p_w ft		
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft		
15 Channel slope, s ft/ft		
16. Manning's roughness coefficient, n		
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$ Compute V ft/s		
18. ~~Flow~~ length, L ft		
19. $T_t = \frac{L}{3600\ V}$ Compute T_t hr		+ =
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) Hr		

FIGURE 203-01: Time of Concentration or Travel Time Worksheet
(SOURCE: 210-VI-TR-55, Second Ed., June 1986)

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

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

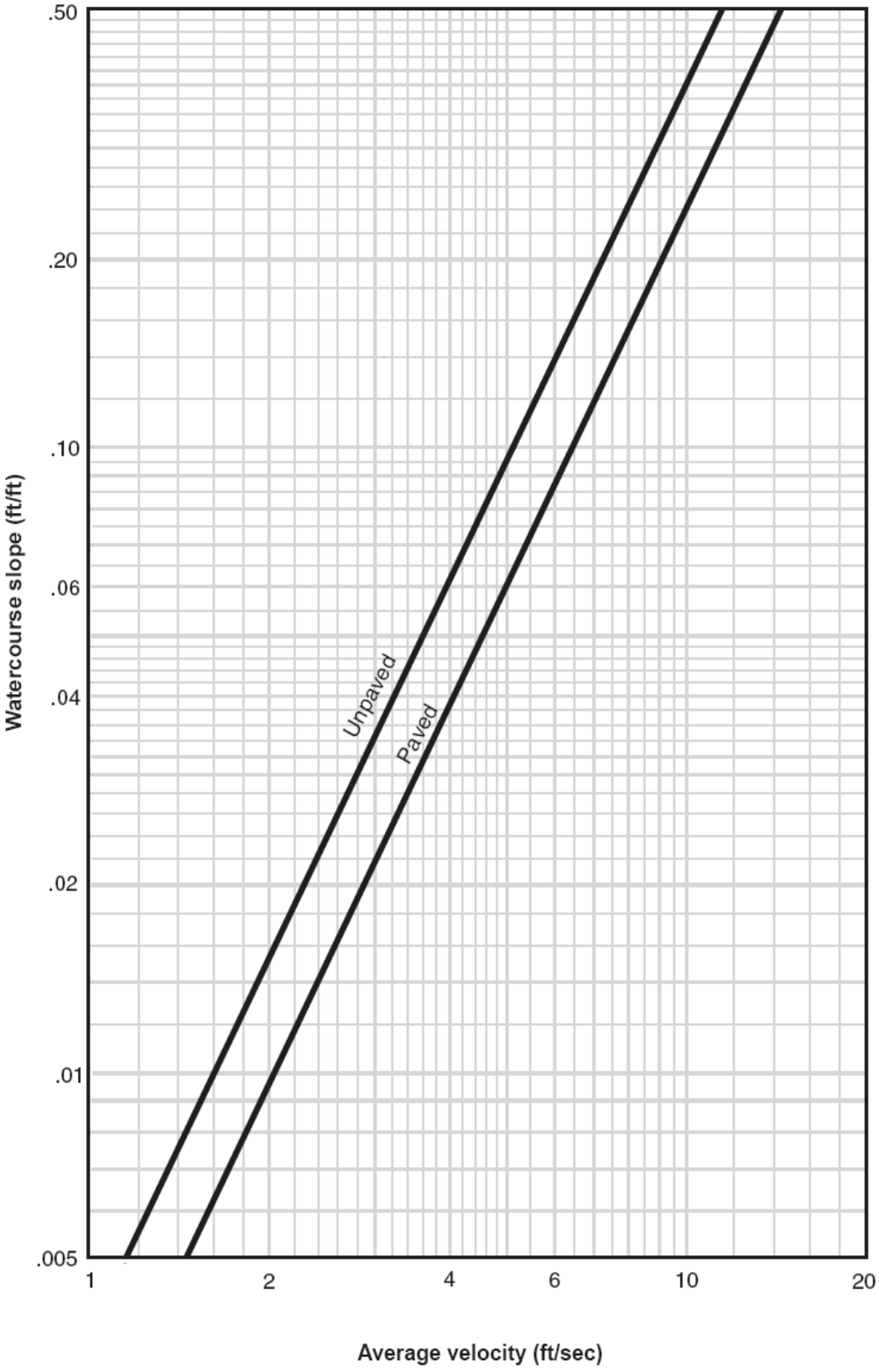


FIGURE 203-02: Average Velocities for Estimating Travel Time for Shallow Concentrated Flow
(SOURCE: 210-VI-TR-55, Second Ed., June 1986)

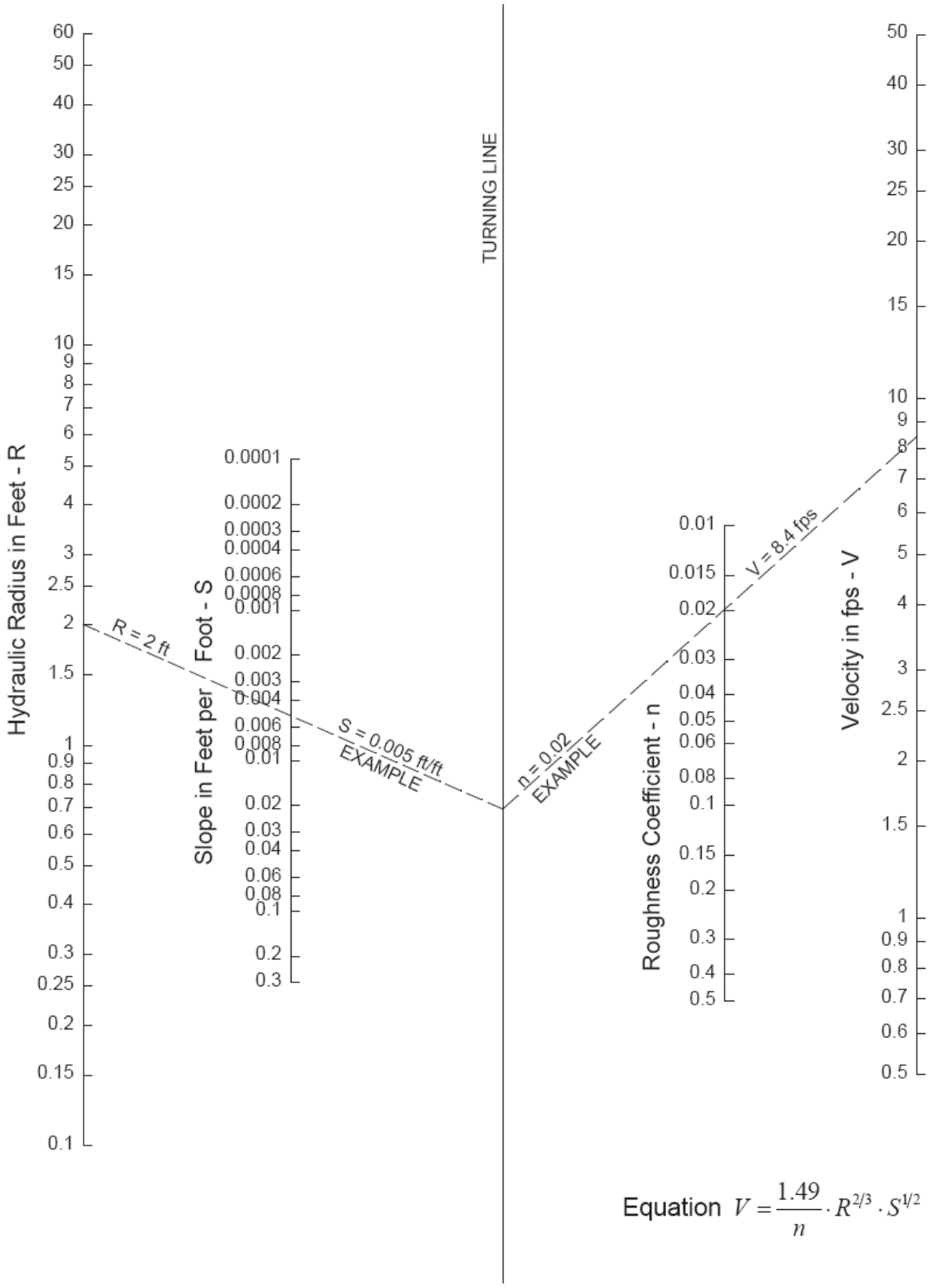


FIGURE 203-03: Nomograph for Solution of Manning Equation
(SOURCE: North Carolina Erosion & Sediment Control Planning & Design Manual, 09/01/88)

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	3.0–6.0	Apparent	Jan–Apr	High.
Fox: FoA, FoB2, [1] FxC2	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: Sn	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: Patriot Defense Research Park By: JPH Date: 9/3/21

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 acres)	Product of CN x area
Br 'B'	Cultivated Farmland (Grassland - Good Condition- Used Per Stormwater Manual)	61	13.65	832.7
CrA, CsB2, MnB2 - 'C'	Cultivated Farmland (Grassland - Good Condition- Used Per Stormwater Manual)	74	15.74	1164.8
				0.0
				0.0
				0.0
				0.0
				0.0
	Impervious Areas	98	0.11	10.8
		Totals=	29.50	2008.19

CN (weighted) = Total Product / Total Area

CN (weighted) = 2008.2 / 29.5

CN (weighted) = **68.1**

US CN = **68**

Time of Concentration

Sheet Flow

$$T.C. = \frac{0.01 \times (0.17 \times 100)^{0.80}}{2.64^{0.50} \times 0.50\%^{0.40}} = 21 \text{ Minutes}$$

Shallow Concentrated

Unpaved: T.C.= 16.1 x 0.50%$^{0.5}$ = 1.14 ft/sec

= 950 feet = 14 Minutes

1.14 ft/sec

Unpaved: T.C.= 16.1 x 0.80%$^{0.5}$ = 1.44 ft/sec

= feet = 0 Minutes

1.44 ft/sec

Channel Flow

X-sec 1.77 Mann 'N' 0.013 2.52 ft/sec

Wet Per. 4.71 Flow Length 0 feet = 0 Minutes

Hyd. R. = 0.38

Chan. Slope 0.18%

Minimum T/C = 5 Minutes T/c Total= **35 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	0.88	1	70	2,036	----	------	------	Pre Onsite 1 - 1 hr.
2	SCS Runoff	1.40	1	109	6,789	----	------	------	Pre Onsite 1 - 2 hr.
3	SCS Runoff	1.53	1	100	10,735	----	------	------	Pre Onsite 1 - 3 hr.
4	SCS Runoff	1.54	1	171	20,116	----	------	------	Pre Onsite 1 - 6 hr.
5	SCS Runoff	2.17	1	365	36,967	----	------	------	Pre Onsite 1 - 12 hr.
6	SCS Runoff	2.30	1	943	48,253	----	------	------	Pre Onsite 1 - 24 hr.

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Tuesday, Sep 7 2021, 2:32 PM

Hyd. No. 6

Pre Onsite 1 - 24 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 2.30 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Drainage area	= 29.50 ac	Curve number	= 68
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 35.0 min
Total precip.	= 2.64 in	Distribution	= Huff-3rd
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 48,253 cuft

(Printed values >= 85% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)
15.17	1.96	15.73	2.30
15.18	1.98	15.75	2.30
15.20	1.99	15.77	2.29
15.22	2.00	15.78	2.29
15.23	2.01	15.80	2.28
15.25	2.03	15.82	2.28
15.27	2.04	15.83	2.27
15.28	2.05	15.85	2.26
15.30	2.06	15.87	2.24
15.32	2.07	15.88	2.23
15.33	2.08	15.90	2.22
15.35	2.10	15.92	2.20
15.37	2.11	15.93	2.18
15.38	2.12	15.95	2.16
15.40	2.13	15.97	2.14
15.42	2.14	15.98	2.13
15.43	2.15	16.00	2.11
15.45	2.16	16.02	2.09
15.47	2.17	16.03	2.07
15.48	2.18	16.05	2.06
15.50	2.20	16.07	2.04
15.52	2.21	16.08	2.03
15.53	2.22	16.10	2.01
15.55	2.23	16.12	2.00
15.57	2.24	16.13	1.99
15.58	2.25	16.15	1.98
15.60	2.26	16.17	1.97
15.62	2.27	16.18	1.96
15.63	2.28		
15.65	2.29		
15.67	2.29	*...End*	
15.68	2.29		
15.70	2.30		
15.72	2.30 <<		

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	6.54	1	60	19,408	----	------	------	Pre Onsite 1 - 1 hr.
2	SCS Runoff	7.73	1	68	36,965	----	------	------	Pre Onsite 1 - 2 hr.
3	SCS Runoff	7.38	1	81	48,250	----	------	------	Pre Onsite 1 - 3 hr.
4	SCS Runoff	6.34	1	110	73,839	----	------	------	Pre Onsite 1 - 6 hr.
5	SCS Runoff	6.65	1	335	102,790	----	------	------	Pre Onsite 1 - 12 hr.
6	SCS Runoff	6.14	1	940	134,489	----	------	------	Pre Onsite 1 - 24 hr.

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Tuesday, Sep 7 2021, 2:33 PM

Hyd. No. 2

Pre Onsite 1 - 2 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 7.73 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Drainage area	= 29.50 ac	Curve number	= 68
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 35.0 min
Total precip.	= 2.40 in	Distribution	= Huff-1st
Storm duration	= 2 hrs	Shape factor	= 484

Hydrograph Volume = 36,965 cuft

(Printed values >= 85% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)
0.92	6.66
0.93	6.82
0.95	6.97
0.97	7.11
0.98	7.23
1.00	7.35
1.02	7.45
1.03	7.53
1.05	7.60
1.07	7.65
1.08	7.69
1.10	7.72
1.12	7.73
1.13	7.73 <<
1.15	7.72
1.17	7.69
1.18	7.65
1.20	7.60
1.22	7.53
1.23	7.45
1.25	7.35
1.27	7.26
1.28	7.15
1.30	7.04
1.32	6.93
1.33	6.82
1.35	6.70
1.37	6.58

...End

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	19.72	1	49	60,578	----	------	------	Pre Onsite 1 - 1 hr.
2	SCS Runoff	21.12	1	60	96,509	----	------	------	Pre Onsite 1 - 2 hr.
3	SCS Runoff	19.60	1	68	120,296	----	------	------	Pre Onsite 1 - 3 hr.
4	SCS Runoff	14.99	1	101	164,100	----	------	------	Pre Onsite 1 - 6 hr.
5	SCS Runoff	14.02	1	331	213,558	----	------	------	Pre Onsite 1 - 12 hr.
6	SCS Runoff	12.11	1	939	280,652	----	------	------	Pre Onsite 1 - 24 hr.

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Tuesday, Sep 7 2021, 2:33 PM

Hyd. No. 2

Pre Onsite 1 - 2 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 21.12 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 29.50 ac	Curve number	= 68
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 35.0 min
Total precip.	= 3.50 in	Distribution	= Huff-1st
Storm duration	= 2 hrs	Shape factor	= 484

Hydrograph Volume = 96,509 cuft

(Printed values >= 85% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)
0.78	18.00
0.80	18.47
0.82	18.89
0.83	19.27
0.85	19.61
0.87	19.91
0.88	20.19
0.90	20.43
0.92	20.64
0.93	20.81
0.95	20.93
0.97	21.03
0.98	21.09
1.00	21.12 <<
1.02	21.11
1.03	21.06
1.05	20.96
1.07	20.83
1.08	20.67
1.10	20.48
1.12	20.26
1.13	20.02
1.15	19.75
1.17	19.47
1.18	19.16
1.20	18.84
1.22	18.50
1.23	18.14

...End

Post-Developed Drainage Conditions

PROJECT: Patriot Defense Research Park DATED: 9/3/21

NAME: JPH

ALLOWABLE RELEASE RATE CALCULATIONS

PRE-DEV. ONSITE BASIN '1'

Time	2 YR	10 YR.	100 YR.
1 hr.	0.88	6.54	19.72
2 hr.	1.40	7.73	21.12
3 hr.	1.53	7.38	19.60
6 hr.	1.54	6.34	14.99
12 hr.	2.17	6.65	14.02
24 hr.	2.30	6.14	12.11

ALLOWABLE RELEASE PNT #1

Q10p = 0.5 Q10e = **2.30** cfs

Q100p = Q10e = **7.73** cfs

10p	100p
0.88	6.54
1.40	7.73
1.53	7.38
1.54	6.34
2.17	6.65
2.30	6.14

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

Project: Patriot Defense Research Park By: JPH Date: 9/3/21

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 acres)	Product of CN x area
Br 'B'	Urban Disticts (Industrial) (72% impervious coverage)	88	13.65	1201.2
CrA, CsB2, MnB2 - 'C'	Urban Disticts (Industrial) (72% impervious coverage)	91	15.74	1432.3
				0.0
				0.0
				0.0
				0.0
				0.0
	Impervious Areas	98	0.11	10.8
		Totals=	29.50	2644.32

CN (weighted) = Total Product / Total Area

CN (weighted) = 2644.3 / 29.5

CN (weighted) = **89.6**

US CN = **90**

Time of Concentration

Sheet Flow

$$T.C. = \frac{0.01 \times (0.17 \times 100)^{0.80}}{2.64^{0.50} \; 0.50\%^{0.40}} = 21 \text{ Minutes}$$

Shallow Concentrated

Paved: T.C.= 20.3 x 1.00%$^{0.5}$ = 2.03 ft/sec

= 213 feet = 2 Minutes

2.03 ft/sec

Unpaved: T.C.= 16.1 x 0.80%$^{0.5}$ = 1.44 ft/sec

= feet = 0 Minutes

1.44 ft/sec

Channel Flow

X-sec	1.77	Mann 'N'	0.013		2.52	ft/sec	
Wet Per.	4.71			Flow Length	1577	feet	= 10 Minutes
Hyd. R. =	0.38						
Chan. Slope	0.18%						

Minimum T/C = 5 Minutes T/c Total= **33 Minutes**

Pond Report

Pond No. 2 - Detention Pond 1 w/ Tailw

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	752.00	45,416	0	0
1.00	753.00	48,621	47,019	47,019
2.00	754.00	52,961	50,791	97,810
3.00	755.00	58,444	55,703	153,512
4.00	756.00	65,890	62,167	215,679
5.00	757.00	74,842	70,366	286,045
6.00	758.00	83,177	79,010	365,055
7.00	759.00	91,484	87,331	452,385
8.00	760.00	99,849	95,667	548,052
9.00	761.00	108,303	104,076	652,128

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise (in)	= 12.00	3.00	7.00	0.00
Span (in)	= 12.00	3.00	7.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 752.00	752.00	753.90	0.00
Length (ft)	= 146.00	0.50	0.50	0.00
Slope (%)	= 1.36	0.50	0.50	0.00
N-Value	= .011	.011	.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)	= 756.30	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

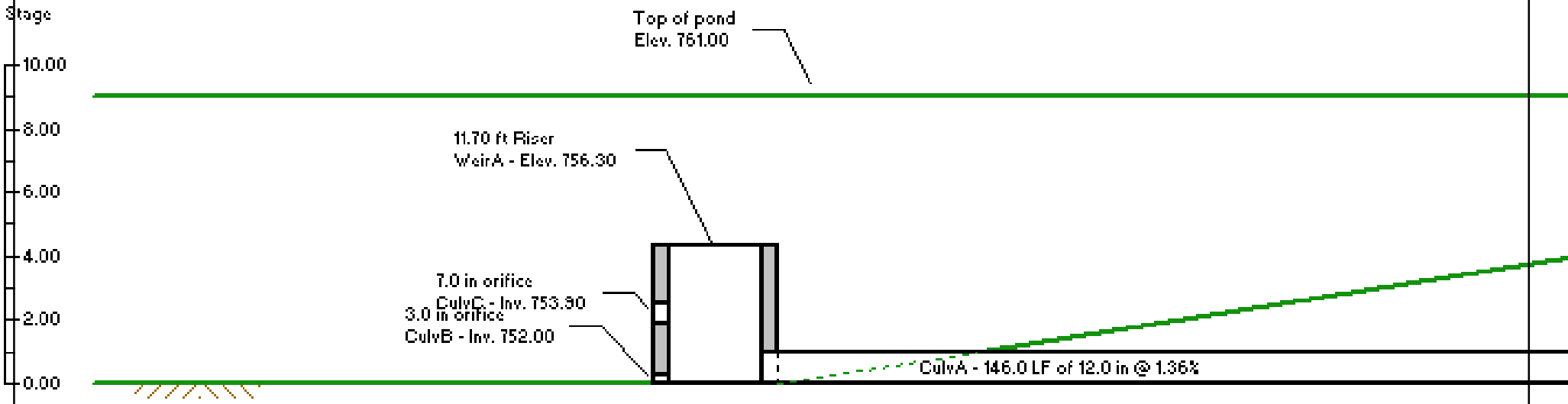
Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 758.80 ft

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	752.00	0.00	0.00	0.00	---	0.00	---	---	---	---	0.00
1.00	47,019	753.00	0.00	0.00	0.00	---	0.00	---	---	---	---	0.00
2.00	97,810	754.00	0.00	0.00	0.00	---	0.00	---	---	---	---	0.00
3.00	153,512	755.00	0.00	0.00	0.00	---	0.00	---	---	---	---	0.00
4.00	215,679	756.00	0.00	0.00	0.00	---	0.00	---	---	---	---	0.00
5.00	286,045	757.00	0.00	0.00	0.00	---	0.00	---	---	---	---	0.00
6.00	365,055	758.00	0.00	0.00	0.00	---	0.00	---	---	---	---	0.00
7.00	452,385	759.00	1.29	0.00	0.00	---	0.00	---	---	---	---	1.29
8.00	548,052	760.00	3.17	0.00	0.00	---	0.00	---	---	---	---	3.17
9.00	652,128	761.00	4.29	0.00	0.00	---	0.00	---	---	---	---	4.29

Detention Pond 1 w/ Tailw



Section

NTS

* Side slope estimated average from contours

Schematic only. Not for construction.

Project Name: Patriot Defense Research Park Project # 21008

Water Quality - Detention Pond

Option #1

20% of Runoff from a 1.25" storm event

Volume= 54,537 c.f. X 0.20 = **10,907 c.f. <== USE**

Option #2

20% of a 0.50" direct runoff

$$\text{Volume} = 29.5 \text{ ac.} \times \frac{43560 \text{ s.f.}}{1 \text{ ac.}} \times \frac{144 \text{ s.-in.}}{1 \text{ s.f.}} \times 0.50\text{-in}$$

= 92,521,440 c.in = 53,543 c.f.

= 53,543 c.f. X 0.20 = 10,709 c.f.

Peak storm event happens at 1.24 inch storm event

Storm event that provides 10,907 c.f. is a 1.25 inch storm event
Peak occurs at 24.25 hrs for the 1.25 inch storm event

24.25 hrs + 24.0 hrs = 48.25 hrs

Pond Elevation at 48.25 hrs = 752.59 n.p. 752.00

Pond Storage Volume at 48.25 hrs = 27,741 c.f. > 10,907 c.f.

$$\frac{1}{47{,}019} = \frac{0.59}{27{,}741}$$

PROJECT NAME: Patriot Defense Research Park
Emergency spillway calculation Pond

Peak 100 Yr. Inflow = 71.54 c.f.s.

1.25 x 71.54 c.f.s. = 89.4

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

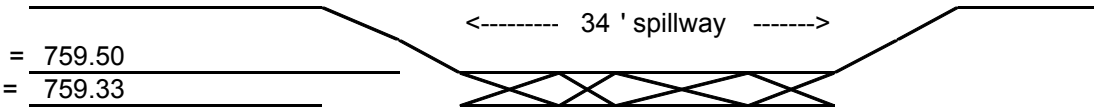
Where Q = outflow
L = length of weir
C = discharge coefficient
H = hydraulic head over weir

89.425 c.f.s. = 2.6 (L) 1
L = 34.39 '

Top of Bank 761.50
Depth of Water= 760.50

<--------- 34 ' spillway ------->

Top of Spill Elev. = 759.50
100 yr. Elev. = 759.33



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	18.05	1	40	52,507	----	------	------	Post Onsite 1 - 1 hr.
2	SCS Runoff	17.62	1	50	74,366	----	------	------	Post Onsite 1 - 2 hr.
3	SCS Runoff	15.83	1	58	88,016	----	------	------	Post Onsite 1 - 3 hr.
4	SCS Runoff	11.13	1	72	114,605	----	------	------	Post Onsite 1 - 6 hr.
5	SCS Runoff	9.81	1	325	153,456	----	------	------	Post Onsite 1 - 12 hr.
6	SCS Runoff	6.94	1	937	176,279	----	------	------	Post Onsite 1 - 24 hr.
7	Reservoir	0.22	1	106	29,982	1	753.09	51,642	Thru Pond 1 - 1 hr.
8	Reservoir	0.26	1	164	37,898	2	753.50	72,649	Thru Pond 1 - 2 hr.
9	Reservoir	0.29	1	223	42,017	3	753.76	85,394	Thru Pond 1 - 3 hr.
10	Reservoir	0.56	1	395	51,704	4	754.19	108,116	Thru Pond 1 - 6 hr.
11	Reservoir	1.17	1	741	77,916	5	754.61	131,994	Thru Pond 1 - 12 hr.
12	Reservoir	1.28	1	1456	87,151	6	754.72	138,128	Thru Pond 1 - 24 hr.
13	Reservoir	0.00	1	0	0	1	753.11	52,507	Thru Pond1w/TW - 1 hr.
14	Reservoir	0.00	1	0	0	2	753.54	74,366	Thru Pond1w/TW - 2 hr.
15	Reservoir	0.00	1	0	0	3	753.81	88,016	Thru Pond1w/TW - 3 hr.
16	Reservoir	0.00	1	0	0	4	754.30	114,605	Thru Pond1w/TW - 6 hr.
17	Reservoir	0.00	1	0	0	5	755.00	153,456	Thru Pond1w/TW - 12hr.
18	Reservoir	0.00	1	0	0	6	755.37	176,279	Thru Pond1w/TW - 24hr.

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Tuesday, Sep 7 2021, 2:44 PM

Hyd. No. 1

Post Onsite 1 - 1 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 18.05 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Drainage area	= 29.50 ac	Curve number	= 90
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 33.0 min
Total precip.	= 1.25 in	Distribution	= Huff-1st
Storm duration	= 1 hrs	Shape factor	= 484

Hydrograph Volume = 52,507 cuft

(Printed values >= 85% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Outflow cfs)
0.52	15.65
0.53	16.17
0.55	16.63
0.57	17.02
0.58	17.32
0.60	17.58
0.62	17.77
0.63	17.91
0.65	18.00
0.67	18.05 <<
0.68	18.05
0.70	18.01
0.72	17.93
0.73	17.82
0.75	17.67
0.77	17.49
0.78	17.26
0.80	17.01
0.82	16.74
0.83	16.44
0.85	16.14
0.87	15.81
0.88	15.46

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Tuesday, Sep 7 2021, 2:47 PM

Hyd. No. 12

Thru Pond 1 - 24 hr.

Hydrograph type	= Reservoir	Peak discharge	= 1.28 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Inflow hyd. No.	= 6	Reservoir name	= Detention Pond 1
Max. Elevation	= 754.72 ft	Max. Storage	= 138,128 cuft

Storage Indication method used. | Outflow hydrograph volume = 87,151 cuft

Hydrograph Discharge Table

(Printed values >= 99% 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
23.73	1.75	754.71	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.27
23.75	1.75	754.71	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.27
23.77	1.75	754.71	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.27
23.78	1.75	754.71	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.27
23.80	1.75	754.71	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.27
23.82	1.75	754.71	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.27
23.83	1.75	754.71	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.27
23.85	1.75	754.71	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.27
23.87	1.75	754.71	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.27
23.88	1.75	754.71	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.27
23.90	1.75	754.72	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.27
23.92	1.75	754.72	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.28
23.93	1.75	754.72	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.28
23.95	1.75	754.72	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.28
23.97	1.75	754.72	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.28
23.98	1.75	754.72	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.28
24.00	1.75	754.72	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.28
24.02	1.75	754.72	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.28
24.03	1.74	754.72	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.28
24.05	1.74	754.72	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.28
24.07	1.72	754.72	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.28
24.08	1.71	754.72	1.28	0.34	0.94	-----	-----	-----	-----	-----	-----	1.28
24.10	1.69	754.72	1.28	0.34	0.94	-----	-----	-----	-----	-----	-----	1.28
24.12	1.66	754.72	1.29	0.34	0.94	-----	-----	-----	-----	-----	-----	1.28
24.13	1.64	754.72	1.29	0.34	0.94	-----	-----	-----	-----	-----	-----	1.28
24.15	1.61	754.72	1.29	0.34	0.94	-----	-----	-----	-----	-----	-----	1.28
24.17	1.57	754.72	1.29	0.34	0.94	-----	-----	-----	-----	-----	-----	1.28
24.18	1.54	754.72	1.29	0.34	0.94	-----	-----	-----	-----	-----	-----	1.28
24.20	1.50	754.72	1.29	0.34	0.94	-----	-----	-----	-----	-----	-----	1.28
24.22	1.45	754.72	1.29	0.35	0.94	-----	-----	-----	-----	-----	-----	1.28
24.23	1.41	754.72	1.29	0.35	0.94	-----	-----	-----	-----	-----	-----	1.28
24.25	1.36	754.72	1.29	0.35	0.94	-----	-----	-----	-----	-----	-----	1.28
24.27	1.31	754.72	1.29	0.35	0.94	-----	-----	-----	-----	-----	-----	1.28 <<
24.28	1.25	754.72	1.29	0.35	0.94	-----	-----	-----	-----	-----	-----	1.28
24.30	1.19	754.72	1.29	0.35	0.94	-----	-----	-----	-----	-----	-----	1.28
24.32	1.13	754.72	1.29	0.35	0.94	-----	-----	-----	-----	-----	-----	1.28
24.33	1.06	754.72	1.29	0.35	0.94	-----	-----	-----	-----	-----	-----	1.28
24.35	1.00	754.72	1.29	0.34	0.94	-----	-----	-----	-----	-----	-----	1.28

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Thru Pond 1 - 24 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
24.37	0.93	754.72	1.29	0.34	0.94	-----	-----	-----	-----	-----	-----	1.28
24.38	0.87	754.72	1.29	0.34	0.94	-----	-----	-----	-----	-----	-----	1.28
24.40	0.82	754.72	1.29	0.34	0.94	-----	-----	-----	-----	-----	-----	1.28
24.42	0.76	754.72	1.28	0.34	0.94	-----	-----	-----	-----	-----	-----	1.28
24.43	0.70	754.72	1.28	0.34	0.94	-----	-----	-----	-----	-----	-----	1.28
24.45	0.65	754.72	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.28
24.47	0.60	754.72	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.28
24.48	0.55	754.72	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.28
24.50	0.51	754.72	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.28
24.52	0.46	754.72	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.28
24.53	0.42	754.72	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.28
24.55	0.38	754.72	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.27
24.57	0.34	754.71	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.27
24.58	0.31	754.71	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.27
24.60	0.27	754.71	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.27
24.62	0.24	754.71	1.28	0.34	0.93	-----	-----	-----	-----	-----	-----	1.27
24.63	0.21	754.71	1.27	0.34	0.93	-----	-----	-----	-----	-----	-----	1.27

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Tuesday, Sep 7 2021, 2:48 PM

Hyd. No. 18

Thru Pond1w/TW - 24hr.

Hydrograph type	= Reservoir	Peak discharge	= 0.00 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Inflow hyd. No.	= 6	Reservoir name	= Detention Pond 1
Max. Elevation	= 755.37 ft	Max. Storage	= 176,279 cuft

Storage Indication method used. | Outflow hydrograph volume = 0 cuft

...End

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	39.76	1	38	112,786	----	------	------	Post Onsite 1 - 1 hr.
2	SCS Runoff	37.97	1	47	153,366	----	------	------	Post Onsite 1 - 2 hr.
3	SCS Runoff	33.35	1	54	176,264	----	------	------	Post Onsite 1 - 3 hr.
4	SCS Runoff	24.11	1	61	222,901	----	------	------	Post Onsite 1 - 6 hr.
5	SCS Runoff	17.08	1	302	270,476	----	------	------	Post Onsite 1 - 12 hr.
6	SCS Runoff	11.80	1	936	318,729	----	------	------	Post Onsite 1 - 24 hr.
7	Reservoir	0.64	1	104	53,012	1	754.24	110,905	Thru Pond 1 - 1 hr.
8	Reservoir	1.42	1	157	84,151	2	754.88	146,785	Thru Pond 1 - 2 hr.
9	Reservoir	1.65	1	214	103,086	3	755.18	164,760	Thru Pond 1 - 3 hr.
10	Reservoir	1.96	1	387	142,372	4	755.66	194,361	Thru Pond 1 - 6 hr.
11	Reservoir	2.18	1	739	180,349	5	756.05	219,256	Thru Pond 1 - 12 hr.
12	Reservoir	2.30	1	1454	209,402	6	756.28	235,731	Thru Pond 1 - 24 hr.
13	Reservoir	0.00	1	0	0	1	754.27	112,786	Thru Pond1w/TW - 1 hr.
14	Reservoir	0.00	1	0	0	2	755.00	153,366	Thru Pond1w/TW - 2 hr.
15	Reservoir	0.00	1	0	0	3	755.37	176,264	Thru Pond1w/TW - 3 hr.
16	Reservoir	0.00	1	0	0	4	756.10	222,901	Thru Pond1w/TW - 6 hr.
17	Reservoir	0.00	1	0	0	5	756.78	270,476	Thru Pond1w/TW - 12hr.
18	Reservoir	0.00	1	0	0	6	757.41	318,729	Thru Pond1w/TW - 24hr.

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Tuesday, Sep 7 2021, 2:45 PM

Hyd. No. 1

Post Onsite 1 - 1 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 39.76 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Drainage area	= 29.50 ac	Curve number	= 90
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 33.0 min
Total precip.	= 1.96 in	Distribution	= Huff-1st
Storm duration	= 1 hrs	Shape factor	= 484

Hydrograph Volume = 112,786 cuft

(Printed values >= 85% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Outflow cfs)	
0.48	34.64	
0.50	35.82	
0.52	36.85	
0.53	37.70	
0.55	38.40	
0.57	38.94	
0.58	39.32	
0.60	39.59	
0.62	39.73	
0.63	39.76	<<
0.65	39.70	
0.67	39.53	
0.68	39.27	
0.70	38.94	
0.72	38.54	
0.73	38.06	
0.75	37.51	
0.77	36.89	
0.78	36.19	
0.80	35.45	
0.82	34.65	
0.83	33.81	

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Tuesday, Sep 7 2021, 2:47 PM

Hyd. No. 12

Thru Pond 1 - 24 hr.

Hydrograph type	= Reservoir	Peak discharge	= 2.30 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Inflow hyd. No.	= 6	Reservoir name	= Detention Pond 1
Max. Elevation	= 756.28 ft	Max. Storage	= 235,731 cuft

Storage Indication method used. | Outflow hydrograph volume = 209,402 cuft

Hydrograph Discharge Table

(Printed values >= 99% 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
20.55	2.84	756.24	2.28	0.43	1.84	-----	-----	-----	-----	-----	-----	2.28
20.57	2.84	756.24	2.28	0.43	1.84	-----	-----	-----	-----	-----	-----	2.28
20.58	2.84	756.24	2.28	0.43	1.84	-----	-----	-----	-----	-----	-----	2.28
20.60	2.84	756.24	2.28	0.43	1.84	-----	-----	-----	-----	-----	-----	2.28
20.62	2.84	756.24	2.28	0.43	1.84	-----	-----	-----	-----	-----	-----	2.28
20.63	2.84	756.24	2.28	0.43	1.84	-----	-----	-----	-----	-----	-----	2.28
20.65	2.84	756.24	2.28	0.43	1.84	-----	-----	-----	-----	-----	-----	2.28
20.67	2.84	756.24	2.28	0.43	1.84	-----	-----	-----	-----	-----	-----	2.28
20.68	2.84	756.24	2.28	0.43	1.84	-----	-----	-----	-----	-----	-----	2.28
20.70	2.84	756.24	2.28	0.43	1.84	-----	-----	-----	-----	-----	-----	2.28
20.72	2.84	756.24	2.28	0.43	1.84	-----	-----	-----	-----	-----	-----	2.28
20.73	2.84	756.24	2.28	0.43	1.84	-----	-----	-----	-----	-----	-----	2.28
20.75	2.84	756.25	2.28	0.43	1.84	-----	-----	-----	-----	-----	-----	2.28
20.77	2.84	756.25	2.28	0.43	1.84	-----	-----	-----	-----	-----	-----	2.28
20.78	2.84	756.25	2.28	0.43	1.84	-----	-----	-----	-----	-----	-----	2.28
20.80	2.84	756.25	2.28	0.43	1.84	-----	-----	-----	-----	-----	-----	2.28
20.82	2.84	756.25	2.28	0.43	1.84	-----	-----	-----	-----	-----	-----	2.28
20.83	2.84	756.25	2.28	0.43	1.84	-----	-----	-----	-----	-----	-----	2.28
20.85	2.84	756.25	2.29	0.43	1.85	-----	-----	-----	-----	-----	-----	2.28
20.87	2.84	756.25	2.29	0.43	1.85	-----	-----	-----	-----	-----	-----	2.28
20.88	2.84	756.25	2.29	0.43	1.85	-----	-----	-----	-----	-----	-----	2.28
20.90	2.84	756.25	2.29	0.43	1.85	-----	-----	-----	-----	-----	-----	2.28
20.92	2.84	756.25	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.28
20.93	2.84	756.25	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.28
20.95	2.84	756.25	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.28
20.97	2.84	756.25	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.28
20.98	2.84	756.25	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.28
21.00	2.84	756.25	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.28
21.02	2.84	756.25	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.28
21.03	2.84	756.25	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.28
21.05	2.84	756.25	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.28
21.07	2.84	756.25	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.28
21.08	2.84	756.25	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.28
21.10	2.84	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.28
21.12	2.84	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.28
21.13	2.84	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.28
21.15	2.85	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.28
21.17	2.85	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.28

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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
21.18	2.85	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.28
21.20	2.85	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.28
21.22	2.85	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.23	2.85	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.25	2.85	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.27	2.85	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.28	2.85	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.30	2.85	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.32	2.85	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.33	2.85	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.35	2.85	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.37	2.85	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.38	2.85	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.40	2.85	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.42	2.85	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.43	2.85	756.27	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.45	2.85	756.27	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.47	2.85	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.48	2.85	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.50	2.85	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.52	2.85	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.53	2.85	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.55	2.85	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.57	2.85	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.58	2.85	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.60	2.85	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.62	2.85	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
21.63	2.84	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
21.65	2.84	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
21.67	2.83	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
21.68	2.82	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
21.70	2.81	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
21.72	2.80	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
21.73	2.78	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
21.75	2.77	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
21.77	2.75	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
21.78	2.73	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
21.80	2.71	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
21.82	2.69	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
21.83	2.66	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
21.85	2.63	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
21.87	2.61	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
21.88	2.58	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
21.90	2.54	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
21.92	2.51	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
21.93	2.47	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
21.95	2.44	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
21.97	2.41	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
21.98	2.37	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.00	2.34	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.02	2.31	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29

Continues on next page...

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
22.03	2.28	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.05	2.25	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.07	2.23	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.08	2.20	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.10	2.18	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.12	2.15	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.13	2.13	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.15	2.11	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.17	2.09	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.18	2.07	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.20	2.05	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.22	2.03	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.23	2.02	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.25	2.00	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.27	1.99	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.28	1.97	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.30	1.96	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.32	1.95	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.33	1.94	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.35	1.93	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.37	1.92	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.38	1.92	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.40	1.91	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.42	1.91	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.43	1.91	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.45	1.90	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.47	1.90	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.48	1.90	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.50	1.90	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.52	1.90	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
22.53	1.90	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.55	1.90	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.57	1.90	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.58	1.90	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.60	1.90	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.62	1.90	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.63	1.90	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.65	1.90	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.67	1.90	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.68	1.90	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.70	1.90	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.72	1.90	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.73	1.90	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.75	1.90	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.77	1.90	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.78	1.90	756.27	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.80	1.90	756.27	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.82	1.91	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.83	1.91	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.85	1.91	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.87	1.92	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29

Continues on next page...

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
22.88	1.93	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.90	1.94	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.92	1.95	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.93	1.97	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.95	1.98	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.97	2.00	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
22.98	2.02	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.00	2.04	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.02	2.07	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.03	2.09	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.05	2.12	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.07	2.15	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.08	2.18	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.10	2.21	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.12	2.25	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.13	2.28	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.15	2.32	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.17	2.35	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.18	2.38	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.20	2.41	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.22	2.45	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.23	2.47	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.25	2.50	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.27	2.53	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.28	2.56	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.30	2.58	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.32	2.61	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.33	2.63	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.35	2.65	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.37	2.67	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.38	2.69	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.40	2.71	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.42	2.73	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.43	2.74	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.45	2.76	756.27	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.47	2.77	756.27	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.48	2.79	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.50	2.80	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.52	2.81	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.53	2.82	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.55	2.83	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.57	2.84	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.58	2.84	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.60	2.85	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.62	2.85	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.63	2.86	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.65	2.86	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
23.67	2.86	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
23.68	2.86	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
23.70	2.86	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
23.72	2.86	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29

Continues on next page...

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
23.73	2.86	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
23.75	2.86	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
23.77	2.86	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
23.78	2.86	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
23.80	2.86	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
23.82	2.86	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
23.83	2.86	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
23.85	2.86	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
23.87	2.86	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
23.88	2.86	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
23.90	2.86	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
23.92	2.86	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
23.93	2.86	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
23.95	2.86	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
23.97	2.86	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
23.98	2.86	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.00	2.86	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.02	2.86	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.03	2.85	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.05	2.83	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.07	2.81	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.08	2.78	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.10	2.75	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.12	2.71	756.28	2.31	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.13	2.67	756.28	2.31	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.15	2.62	756.28	2.31	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.17	2.57	756.28	2.31	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.18	2.51	756.28	2.31	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.20	2.44	756.28	2.31	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.22	2.37	756.28 <<	2.31	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.23	2.30	756.29	2.31	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30 <<
24.25	2.21	756.28 <<	2.31	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.27	2.13	756.28	2.31	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.28	2.04	756.28	2.31	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.30	1.94	756.28	2.31	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.32	1.84	756.28	2.31	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.33	1.73	756.28	2.31	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.35	1.62	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.37	1.52	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.38	1.42	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.40	1.33	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.42	1.24	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.43	1.15	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.30
24.45	1.06	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
24.47	0.98	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
24.48	0.90	756.28	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
24.50	0.83	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
24.52	0.76	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
24.53	0.69	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
24.55	0.62	756.27	2.30	0.44	1.86	-----	-----	-----	-----	-----	-----	2.29
24.57	0.56	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29

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Thru Pond 1 - 24 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
24.58	0.50	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
24.60	0.45	756.27	2.30	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
24.62	0.39	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
24.63	0.34	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
24.65	0.30	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
24.67	0.26	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.29
24.68	0.22	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.28
24.70	0.18	756.26	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.28
24.72	0.15	756.25	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.28
24.73	0.12	756.25	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.28
24.75	0.09	756.25	2.29	0.44	1.85	-----	-----	-----	-----	-----	-----	2.28
24.77	0.07	756.25	2.29	0.43	1.85	-----	-----	-----	-----	-----	-----	2.28
24.78	0.05	756.25	2.28	0.43	1.84	-----	-----	-----	-----	-----	-----	2.28
24.80	0.03	756.24	2.28	0.43	1.84	-----	-----	-----	-----	-----	-----	2.28
24.82	0.02	756.24	2.28	0.43	1.84	-----	-----	-----	-----	-----	-----	2.28
24.83	0.01	756.24	2.28	0.43	1.84	-----	-----	-----	-----	-----	-----	2.28

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Tuesday, Sep 7 2021, 2:48 PM

Hyd. No. 18

Thru Pond1w/TW - 24hr.

Hydrograph type	= Reservoir	Peak discharge	= 0.00 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Inflow hyd. No.	= 6	Reservoir name	= Detention Pond 1
Max. Elevation	= 757.41 ft	Max. Storage	= 318,729 cuft

Storage Indication method used. | Outflow hydrograph volume = 0 cuft

...End

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	71.54	1	36	199,129	----	------	------	Post Onsite 1 - 1 hr.
2	SCS Runoff	66.32	1	45	260,376	----	------	------	Post Onsite 1 - 2 hr.
3	SCS Runoff	58.33	1	50	297,524	----	------	------	Post Onsite 1 - 3 hr.
4	SCS Runoff	42.55	1	55	361,333	----	------	------	Post Onsite 1 - 6 hr.
5	SCS Runoff	26.66	1	300	428,936	----	------	------	Post Onsite 1 - 12 hr.
6	SCS Runoff	18.20	1	936	515,678	----	------	------	Post Onsite 1 - 24 hr.
7	Reservoir	1.94	1	100	123,638	1	755.63	192,749	Thru Pond 1 - 1 hr.
8	Reservoir	3.87	1	151	177,488	2	756.42	244,961	Thru Pond 1 - 2 hr.
9	Reservoir	6.79	1	199	212,871	3	756.66	262,004	Thru Pond 1 - 3 hr.
10	Reservoir	6.90	1	325	273,486	4	756.76	269,327	Thru Pond 1 - 6 hr.
11	Reservoir	7.09	1	549	334,819	5	757.04	289,078	Thru Pond 1 - 12 hr.
12	Reservoir	7.26	1	1102	403,245	6	757.33	312,198	Thru Pond 1 - 24 hr.
13	Reservoir	0.00	1	0	0	1	755.73	199,129	Thru Pond1w/TW - 1 hr.
14	Reservoir	0.00	1	0	0	2	756.64	260,377	Thru Pond1w/TW - 2 hr.
15	Reservoir	0.00	1	0	0	3	757.15	297,524	Thru Pond1w/TW - 3 hr.
16	Reservoir	0.00	1	0	0	4	757.95	361,333	Thru Pond1w/TW - 6 hr.
17	Reservoir	0.00	1	0	0	5	758.73	428,936	Thru Pond1w/TW - 12hr.
18	Reservoir	2.10	1	1463	80,738	6	759.33	483,726	Thru Pond1w/TW - 24hr.

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Tuesday, Sep 7 2021, 2:46 PM

Hyd. No. 1

Post Onsite 1 - 1 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 71.54 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 29.50 ac	Curve number	= 90
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 33.0 min
Total precip.	= 2.88 in	Distribution	= Huff-1st
Storm duration	= 1 hrs	Shape factor	= 484

Hydrograph Volume = 199,129 cuft

(Printed values >= 85% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)
0.47	63.09
0.48	65.12
0.50	66.88
0.52	68.35
0.53	69.52
0.55	70.42
0.57	71.05
0.58	71.39
0.60	71.54 <<
0.62	71.49
0.63	71.24
0.65	70.82
0.67	70.25
0.68	69.51
0.70	68.65
0.72	67.67
0.73	66.57
0.75	65.35
0.77	64.01
0.78	62.55
0.80	61.00

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Tuesday, Sep 7 2021, 2:47 PM

Hyd. No. 12

Thru Pond 1 - 24 hr.

Hydrograph type	= Reservoir	Peak discharge	= 7.26 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Inflow hyd. No.	= 6	Reservoir name	= Detention Pond 1
Max. Elevation	= 757.33 ft	Max. Storage	= 312,198 cuft

Storage Indication method used. | Outflow hydrograph volume = 403,245 cuft

Hydrograph Discharge Table

(Printed values >= 99% 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
17.02	12.04	757.22	7.21	0.02	0.13	-----	7.04	-----	-----	-----	-----	7.19
17.03	11.92	757.23	7.21	0.02	0.13	-----	7.04	-----	-----	-----	-----	7.20
17.05	11.81	757.23	7.21	0.02	0.13	-----	7.05	-----	-----	-----	-----	7.20
17.07	11.68	757.23	7.21	0.02	0.13	-----	7.05	-----	-----	-----	-----	7.20
17.08	11.54	757.24	7.22	0.02	0.13	-----	7.05	-----	-----	-----	-----	7.20
17.10	11.40	757.24	7.22	0.02	0.13	-----	7.06	-----	-----	-----	-----	7.21
17.12	11.25	757.24	7.22	0.02	0.13	-----	7.06	-----	-----	-----	-----	7.21
17.13	11.09	757.24	7.22	0.02	0.12	-----	7.06	-----	-----	-----	-----	7.21
17.15	10.93	757.25	7.22	0.02	0.12	-----	7.07	-----	-----	-----	-----	7.21
17.17	10.78	757.25	7.22	0.02	0.12	-----	7.07	-----	-----	-----	-----	7.21
17.18	10.64	757.25	7.23	0.02	0.12	-----	7.07	-----	-----	-----	-----	7.22
17.20	10.50	757.26	7.23	0.02	0.12	-----	7.07	-----	-----	-----	-----	7.22
17.22	10.36	757.26	7.23	0.02	0.12	-----	7.07	-----	-----	-----	-----	7.22
17.23	10.23	757.26	7.23	0.02	0.12	-----	7.08	-----	-----	-----	-----	7.22
17.25	10.11	757.26	7.23	0.02	0.12	-----	7.08	-----	-----	-----	-----	7.22
17.27	9.98	757.26	7.23	0.02	0.12	-----	7.08	-----	-----	-----	-----	7.23
17.28	9.87	757.27	7.23	0.02	0.12	-----	7.08	-----	-----	-----	-----	7.23
17.30	9.76	757.27	7.24	0.02	0.12	-----	7.09	-----	-----	-----	-----	7.23
17.32	9.65	757.27	7.24	0.02	0.12	-----	7.09	-----	-----	-----	-----	7.23
17.33	9.55	757.27	7.24	0.02	0.12	-----	7.09	-----	-----	-----	-----	7.23
17.35	9.45	757.27	7.24	0.02	0.12	-----	7.09	-----	-----	-----	-----	7.23
17.37	9.36	757.28	7.24	0.02	0.12	-----	7.09	-----	-----	-----	-----	7.23
17.38	9.27	757.28	7.24	0.02	0.12	-----	7.09	-----	-----	-----	-----	7.23
17.40	9.19	757.28	7.24	0.02	0.12	-----	7.09	-----	-----	-----	-----	7.24
17.42	9.11	757.28	7.24	0.02	0.12	-----	7.10	-----	-----	-----	-----	7.24
17.43	9.04	757.28	7.24	0.02	0.12	-----	7.10	-----	-----	-----	-----	7.24
17.45	8.97	757.28	7.24	0.02	0.12	-----	7.10	-----	-----	-----	-----	7.24
17.47	8.91	757.28	7.24	0.02	0.12	-----	7.10	-----	-----	-----	-----	7.24
17.48	8.85	757.29	7.25	0.02	0.12	-----	7.10	-----	-----	-----	-----	7.24
17.50	8.80	757.29	7.25	0.02	0.12	-----	7.10	-----	-----	-----	-----	7.24
17.52	8.75	757.29	7.25	0.02	0.12	-----	7.10	-----	-----	-----	-----	7.24
17.53	8.71	757.29	7.25	0.02	0.12	-----	7.10	-----	-----	-----	-----	7.24
17.55	8.67	757.29	7.25	0.02	0.12	-----	7.11	-----	-----	-----	-----	7.24
17.57	8.64	757.29	7.25	0.02	0.12	-----	7.11	-----	-----	-----	-----	7.24
17.58	8.61	757.29	7.25	0.02	0.12	-----	7.11	-----	-----	-----	-----	7.25
17.60	8.59	757.29	7.25	0.02	0.12	-----	7.11	-----	-----	-----	-----	7.25
17.62	8.57	757.29	7.25	0.02	0.12	-----	7.11	-----	-----	-----	-----	7.25
17.63	8.55	757.30	7.25	0.02	0.12	-----	7.11	-----	-----	-----	-----	7.25

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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
17.65	8.54	757.30	7.25	0.02	0.12	-----	7.11	-----	-----	-----	-----	7.25
17.67	8.54	757.30	7.25	0.02	0.12	-----	7.11	-----	-----	-----	-----	7.25
17.68	8.54	757.30	7.25	0.02	0.12	-----	7.11	-----	-----	-----	-----	7.25
17.70	8.54	757.30	7.25	0.02	0.12	-----	7.11	-----	-----	-----	-----	7.25
17.72	8.54	757.30	7.25	0.02	0.12	-----	7.11	-----	-----	-----	-----	7.25
17.73	8.54	757.30	7.25	0.02	0.12	-----	7.12	-----	-----	-----	-----	7.25
17.75	8.54	757.30	7.25	0.02	0.12	-----	7.12	-----	-----	-----	-----	7.25
17.77	8.54	757.30	7.26	0.02	0.12	-----	7.12	-----	-----	-----	-----	7.25
17.78	8.54	757.30	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.25
17.80	8.54	757.31	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.25
17.82	8.54	757.31	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.25
17.83	8.54	757.31	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.25
17.85	8.55	757.31	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.25
17.87	8.55	757.31	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.26
17.88	8.55	757.31	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.26
17.90	8.55	757.31	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.26
17.92	8.55	757.31	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.26
17.93	8.55	757.31	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.26
17.95	8.55	757.31	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.26
17.97	8.55	757.32	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.26
17.98	8.55	757.32	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.26
18.00	8.55	757.32	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.26
18.02	8.55	757.32	7.26	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.03	8.54	757.32	7.26	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.05	8.52	757.32	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.07	8.50	757.32	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.08	8.47	757.32	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.10	8.44	757.32	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.12	8.40	757.32	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.13	8.36	757.32	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.15	8.31	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.17	8.26	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.18	8.20	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.20	8.14	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.22	8.07	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.23	7.99	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.25	7.91	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.27	7.83	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.28	7.73	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.30	7.64	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.32	7.54	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.33	7.43	757.33 <<	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.35	7.32	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.37	7.22	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26 <<
18.38	7.13	757.33 <<	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.40	7.03	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.42	6.94	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.43	6.85	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.45	6.77	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.47	6.69	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.48	6.61	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26

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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
18.50	6.53	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.52	6.46	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.53	6.40	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.55	6.33	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.57	6.27	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.58	6.21	757.33	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.60	6.15	757.32	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.62	6.10	757.32	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.63	6.05	757.32	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.65	6.01	757.32	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.67	5.97	757.32	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.68	5.93	757.32	7.27	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.70	5.89	757.32	7.26	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.72	5.86	757.32	7.26	0.02	0.11	-----	7.13	-----	-----	-----	-----	7.26
18.73	5.83	757.32	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.26
18.75	5.80	757.32	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.26
18.77	5.78	757.31	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.26
18.78	5.76	757.31	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.26
18.80	5.75	757.31	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.26
18.82	5.73	757.31	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.26
18.83	5.72	757.31	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.26
18.85	5.72	757.31	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.26
18.87	5.71	757.31	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.25
18.88	5.71	757.31	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.25
18.90	5.72	757.31	7.26	0.02	0.11	-----	7.12	-----	-----	-----	-----	7.25
18.92	5.72	757.30	7.26	0.02	0.12	-----	7.12	-----	-----	-----	-----	7.25
18.93	5.72	757.30	7.26	0.02	0.12	-----	7.12	-----	-----	-----	-----	7.25
18.95	5.72	757.30	7.25	0.02	0.12	-----	7.12	-----	-----	-----	-----	7.25
18.97	5.72	757.30	7.25	0.02	0.12	-----	7.11	-----	-----	-----	-----	7.25
18.98	5.72	757.30	7.25	0.02	0.12	-----	7.11	-----	-----	-----	-----	7.25
19.00	5.72	757.30	7.25	0.02	0.12	-----	7.11	-----	-----	-----	-----	7.25
19.02	5.72	757.30	7.25	0.02	0.12	-----	7.11	-----	-----	-----	-----	7.25
19.03	5.72	757.30	7.25	0.02	0.12	-----	7.11	-----	-----	-----	-----	7.25
19.05	5.72	757.29	7.25	0.02	0.12	-----	7.11	-----	-----	-----	-----	7.25
19.07	5.72	757.29	7.25	0.02	0.12	-----	7.11	-----	-----	-----	-----	7.25
19.08	5.72	757.29	7.25	0.02	0.12	-----	7.11	-----	-----	-----	-----	7.25
19.10	5.72	757.29	7.25	0.02	0.12	-----	7.11	-----	-----	-----	-----	7.24
19.12	5.72	757.29	7.25	0.02	0.12	-----	7.10	-----	-----	-----	-----	7.24
19.13	5.72	757.29	7.25	0.02	0.12	-----	7.10	-----	-----	-----	-----	7.24
19.15	5.72	757.29	7.25	0.02	0.12	-----	7.10	-----	-----	-----	-----	7.24
19.17	5.72	757.29	7.25	0.02	0.12	-----	7.10	-----	-----	-----	-----	7.24
19.18	5.72	757.29	7.24	0.02	0.12	-----	7.10	-----	-----	-----	-----	7.24
19.20	5.72	757.28	7.24	0.02	0.12	-----	7.10	-----	-----	-----	-----	7.24
19.22	5.72	757.28	7.24	0.02	0.12	-----	7.10	-----	-----	-----	-----	7.24
19.23	5.71	757.28	7.24	0.02	0.12	-----	7.10	-----	-----	-----	-----	7.24
19.25	5.70	757.28	7.24	0.02	0.12	-----	7.10	-----	-----	-----	-----	7.24
19.27	5.69	757.28	7.24	0.02	0.12	-----	7.10	-----	-----	-----	-----	7.24
19.28	5.68	757.28	7.24	0.02	0.12	-----	7.09	-----	-----	-----	-----	7.24
19.30	5.66	757.28	7.24	0.02	0.12	-----	7.09	-----	-----	-----	-----	7.23
19.32	5.64	757.28	7.24	0.02	0.12	-----	7.09	-----	-----	-----	-----	7.23
19.33	5.62	757.27	7.24	0.02	0.12	-----	7.09	-----	-----	-----	-----	7.23

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Thru Pond 1 - 24 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
19.35	5.60	757.27	7.24	0.02	0.12	-----	7.09	-----	-----	-----	-----	7.23
19.37	5.57	757.27	7.24	0.02	0.12	-----	7.09	-----	-----	-----	-----	7.23
19.38	5.54	757.27	7.24	0.02	0.12	-----	7.09	-----	-----	-----	-----	7.23
19.40	5.51	757.27	7.24	0.02	0.12	-----	7.09	-----	-----	-----	-----	7.23
19.42	5.48	757.27	7.23	0.02	0.12	-----	7.08	-----	-----	-----	-----	7.23
19.43	5.44	757.27	7.23	0.02	0.12	-----	7.08	-----	-----	-----	-----	7.23
19.45	5.40	757.27	7.23	0.02	0.12	-----	7.08	-----	-----	-----	-----	7.23
19.47	5.35	757.26	7.23	0.02	0.12	-----	7.08	-----	-----	-----	-----	7.22
19.48	5.31	757.26	7.23	0.02	0.12	-----	7.08	-----	-----	-----	-----	7.22
19.50	5.26	757.26	7.23	0.02	0.12	-----	7.08	-----	-----	-----	-----	7.22
19.52	5.21	757.26	7.23	0.02	0.12	-----	7.08	-----	-----	-----	-----	7.22
19.53	5.16	757.26	7.23	0.02	0.12	-----	7.08	-----	-----	-----	-----	7.22
19.55	5.10	757.26	7.23	0.02	0.12	-----	7.07	-----	-----	-----	-----	7.22
19.57	5.05	757.26	7.23	0.02	0.12	-----	7.07	-----	-----	-----	-----	7.22
19.58	5.00	757.25	7.23	0.02	0.12	-----	7.07	-----	-----	-----	-----	7.22
19.60	4.96	757.25	7.22	0.02	0.12	-----	7.07	-----	-----	-----	-----	7.22
19.62	4.91	757.25	7.22	0.02	0.12	-----	7.07	-----	-----	-----	-----	7.21
19.63	4.87	757.25	7.22	0.02	0.12	-----	7.07	-----	-----	-----	-----	7.21
19.65	4.82	757.25	7.22	0.02	0.12	-----	7.06	-----	-----	-----	-----	7.21
19.67	4.78	757.24	7.22	0.02	0.12	-----	7.06	-----	-----	-----	-----	7.21
19.68	4.74	757.24	7.22	0.02	0.13	-----	7.06	-----	-----	-----	-----	7.21
19.70	4.71	757.24	7.22	0.02	0.13	-----	7.06	-----	-----	-----	-----	7.21
19.72	4.67	757.24	7.22	0.02	0.13	-----	7.06	-----	-----	-----	-----	7.21
19.73	4.64	757.24	7.22	0.02	0.13	-----	7.05	-----	-----	-----	-----	7.20
19.75	4.60	757.24	7.21	0.02	0.13	-----	7.05	-----	-----	-----	-----	7.20
19.77	4.57	757.23	7.21	0.02	0.13	-----	7.05	-----	-----	-----	-----	7.20
19.78	4.54	757.23	7.21	0.02	0.13	-----	7.05	-----	-----	-----	-----	7.20
19.80	4.52	757.23	7.21	0.02	0.13	-----	7.05	-----	-----	-----	-----	7.20
19.82	4.49	757.23	7.21	0.02	0.13	-----	7.05	-----	-----	-----	-----	7.20
19.83	4.47	757.22	7.21	0.02	0.13	-----	7.04	-----	-----	-----	-----	7.20
19.85	4.44	757.22	7.21	0.02	0.13	-----	7.04	-----	-----	-----	-----	7.19
19.87	4.42	757.22	7.21	0.02	0.13	-----	7.04	-----	-----	-----	-----	7.19

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Tuesday, Sep 7 2021, 2:48 PM

Hyd. No. 18

Thru Pond1w/TW - 24hr.

Hydrograph type	= Reservoir	Peak discharge	= 2.10 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Inflow hyd. No.	= 6	Reservoir name	= Detention Pond 1
Max. Elevation	= 759.33 ft	Max. Storage	= 483,726 cuft

Storage Indication method used. | Outflow hydrograph volume = 80,738 cuft

Hydrograph Discharge Table

(Printed values >= 99% 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
24.13	4.02	759.32	2.08	-----	-----	-----	-----	-----	-----	-----	-----	2.08
24.15	3.95	759.32	2.08	-----	-----	-----	-----	-----	-----	-----	-----	2.08
24.17	3.87	759.32	2.09	-----	-----	-----	-----	-----	-----	-----	-----	2.09
24.18	3.78	759.32	2.09	-----	-----	-----	-----	-----	-----	-----	-----	2.09
24.20	3.68	759.32	2.09	-----	-----	-----	-----	-----	-----	-----	-----	2.09
24.22	3.58	759.32	2.09	-----	-----	-----	-----	-----	-----	-----	-----	2.09
24.23	3.46	759.32	2.09	-----	-----	-----	-----	-----	-----	-----	-----	2.09
24.25	3.34	759.32	2.09	-----	-----	-----	-----	-----	-----	-----	-----	2.09
24.27	3.21	759.33	2.10	-----	-----	-----	-----	-----	-----	-----	-----	2.10
24.28	3.07	759.33	2.10	-----	-----	-----	-----	-----	-----	-----	-----	2.10
24.30	2.92	759.33	2.10	-----	-----	-----	-----	-----	-----	-----	-----	2.10
24.32	2.77	759.33	2.10	-----	-----	-----	-----	-----	-----	-----	-----	2.10
24.33	2.61	759.33	2.10	-----	-----	-----	-----	-----	-----	-----	-----	2.10
24.35	2.45	759.33	2.10	-----	-----	-----	-----	-----	-----	-----	-----	2.10
24.37	2.30	759.33	2.10	-----	-----	-----	-----	-----	-----	-----	-----	2.10
24.38	2.15	759.33 <<	2.10	-----	-----	-----	-----	-----	-----	-----	-----	2.10 <<
24.40	2.00	759.33 <<	2.10	-----	-----	-----	-----	-----	-----	-----	-----	2.10
24.42	1.87	759.33	2.10	-----	-----	-----	-----	-----	-----	-----	-----	2.10
24.43	1.73	759.33	2.10	-----	-----	-----	-----	-----	-----	-----	-----	2.10
24.45	1.60	759.33	2.10	-----	-----	-----	-----	-----	-----	-----	-----	2.10
24.47	1.48	759.33	2.10	-----	-----	-----	-----	-----	-----	-----	-----	2.10
24.48	1.36	759.33	2.10	-----	-----	-----	-----	-----	-----	-----	-----	2.10
24.50	1.25	759.33	2.10	-----	-----	-----	-----	-----	-----	-----	-----	2.10
24.52	1.14	759.33	2.10	-----	-----	-----	-----	-----	-----	-----	-----	2.10
24.53	1.04	759.32	2.09	-----	-----	-----	-----	-----	-----	-----	-----	2.09
24.55	0.94	759.32	2.09	-----	-----	-----	-----	-----	-----	-----	-----	2.09
24.57	0.84	759.32	2.09	-----	-----	-----	-----	-----	-----	-----	-----	2.09
24.58	0.76	759.32	2.09	-----	-----	-----	-----	-----	-----	-----	-----	2.09
24.60	0.67	759.32	2.09	-----	-----	-----	-----	-----	-----	-----	-----	2.09
24.62	0.59	759.32	2.09	-----	-----	-----	-----	-----	-----	-----	-----	2.09
24.63	0.52	759.32	2.09	-----	-----	-----	-----	-----	-----	-----	-----	2.09
24.65	0.45	759.32	2.08	-----	-----	-----	-----	-----	-----	-----	-----	2.08
24.67	0.39	759.32	2.08	-----	-----	-----	-----	-----	-----	-----	-----	2.08

...End

Water Quality Calculations

Project Name: Patriot Defense Research Park Project # 21008

Water Quality - Detention Pond

Option #1

20% of Runoff from a 1.25" storm event

Volume= 54,537 c.f. X 0.20 = **10,907 c.f. <== USE**

Option #2

20% of a 0.50" direct runoff

$$\text{Volume} = 29.5 \text{ ac.} \times \frac{43560 \text{ s.f.}}{1 \text{ ac.}} \times \frac{144 \text{ s.-in.}}{1 \text{ s.f.}} \times 0.50\text{-in}$$

= 92,521,440 c.in = 53,543 c.f.

= 53,543 c.f. X 0.20 = 10,709 c.f.

Peak storm event happens at 1.24 inch storm event

Storm event that provides 10,907 c.f. is a 1.25 inch storm event
Peak occurs at 24.25 hrs for the 1.25 inch storm event

24.25 hrs + 24.0 hrs = 48.25 hrs

Pond Elevation at 48.25 hrs = 752.59 n.p. 752.00

Pond Storage Volume at 48.25 hrs = 27,741 c.f. > 10,907 c.f.

$$\frac{1}{47{,}019} = \frac{0.59}{27{,}741}$$

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	1.35	3	360	54,537	----	------	------	Post Onsite 1 - WQ 1.25IN EVENT
2	SCS Runoff	1.33	3	360	53,733	----	------	------	Post Onsite 1 - WQ 0.5IN EVENT
4	Reservoir	0.20	3	1455	50,372	1	752.90	42,538	Thru Pond - 1 hr.

Hydrograph Report

Hydraflow Hydrographs by Intelisolve | Tuesday, Sep 7 2021, 2:24 PM

Hyd. No. 4

Thru Pond - 1 hr.

Hydrograph type	= Reservoir	Peak discharge	= 0.20 cfs
Storm frequency	= 2 yrs	Time interval	= 3 min
Inflow hyd. No.	= 1	Reservoir name	= Detention Pond 1
Max. Elevation	= 752.90 ft	Max. Storage	= 42,538 cuft

Storage Indication method used. | Outflow hydrograph volume = 50,372 cuft

Hydrograph Discharge Table

(Printed values >= 10% 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
3.20	1.07	752.11	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
3.25	1.08	752.11	0.02	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
3.30	1.10	752.12	0.03	0.02	-----	-----	-----	-----	-----	-----	-----	0.02
3.35	1.11	752.12	0.03	0.03	-----	-----	-----	-----	-----	-----	-----	0.03
3.40	1.13	752.12	0.03	0.03	-----	-----	-----	-----	-----	-----	-----	0.03
3.45	1.15	752.13	0.03	0.03	-----	-----	-----	-----	-----	-----	-----	0.03
3.50	1.16	752.13	0.03	0.03	-----	-----	-----	-----	-----	-----	-----	0.03
3.55	1.18	752.14	0.03	0.03	-----	-----	-----	-----	-----	-----	-----	0.03
3.60	1.19	752.14	0.04	0.03	-----	-----	-----	-----	-----	-----	-----	0.03
3.65	1.20	752.15	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
3.70	1.20	752.15	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
3.75	1.20	752.15	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
3.80	1.19	752.16	0.04	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
3.85	1.18	752.16	0.05	0.04	-----	-----	-----	-----	-----	-----	-----	0.04
3.90	1.18	752.17	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
3.95	1.18	752.17	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
4.00	1.18	752.18	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
4.05	1.18	752.18	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
4.10	1.19	752.18	0.05	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
4.15	1.20	752.19	0.06	0.05	-----	-----	-----	-----	-----	-----	-----	0.05
4.20	1.21	752.19	0.06	0.06	-----	-----	-----	-----	-----	-----	-----	0.06
4.25	1.22	752.20	0.06	0.06	-----	-----	-----	-----	-----	-----	-----	0.06
4.30	1.23	752.20	0.06	0.06	-----	-----	-----	-----	-----	-----	-----	0.06
4.35	1.25	752.21	0.06	0.06	-----	-----	-----	-----	-----	-----	-----	0.06
4.40	1.26	752.21	0.07	0.06	-----	-----	-----	-----	-----	-----	-----	0.06
4.45	1.27	752.22	0.07	0.06	-----	-----	-----	-----	-----	-----	-----	0.06
4.50	1.28	752.22	0.07	0.07	-----	-----	-----	-----	-----	-----	-----	0.07
4.55	1.29	752.23	0.07	0.07	-----	-----	-----	-----	-----	-----	-----	0.07
4.60	1.30	752.23	0.07	0.07	-----	-----	-----	-----	-----	-----	-----	0.07
4.65	1.31	752.23	0.07	0.07	-----	-----	-----	-----	-----	-----	-----	0.07
4.70	1.32	752.24	0.07	0.07	-----	-----	-----	-----	-----	-----	-----	0.07
4.75	1.32	752.24	0.08	0.07	-----	-----	-----	-----	-----	-----	-----	0.07
4.80	1.33	752.25	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
4.85	1.34	752.25	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
4.90	1.33	752.26	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
4.95	1.32	752.26	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
5.00	1.30	752.27	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
5.05	1.29	752.27	0.08	0.08	-----	-----	-----	-----	-----	-----	-----	0.08

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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
22.95	0.29	752.88	0.20	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
23.00	0.34	752.88	0.20	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
23.05	0.37	752.88	0.20	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
23.10	0.40	752.88	0.20	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
23.15	0.43	752.88	0.20	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
23.20	0.45	752.89	0.20	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
23.25	0.46	752.89	0.20	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
23.30	0.46	752.89	0.20	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
23.35	0.46	752.89	0.20	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
23.40	0.46	752.89	0.20	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
23.45	0.46	752.89	0.20	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
23.50	0.46	752.89	0.20	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
23.55	0.46	752.89	0.20	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
23.60	0.46	752.89	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
23.65	0.46	752.89	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
23.70	0.46	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
23.75	0.47	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
23.80	0.47	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
23.85	0.47	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
23.90	0.47	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
23.95	0.47	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
24.00	0.47	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
24.05	0.44	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
24.10	0.40	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
24.15	0.34	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
24.20	0.25	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
24.25	0.18	752.90 <<	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20 <<
24.30	0.12	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
24.35	0.07	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
24.40	0.04	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
24.45	0.01	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
24.50	0.00	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
24.55	0.00	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
24.60	0.00	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
24.65	0.00	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
24.70	0.00	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
24.75	0.00	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
24.80	0.00	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
24.85	0.00	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
24.90	0.00	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
24.95	0.00	752.90	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
25.00	0.00	752.89	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
25.05	0.00	752.89	0.20	0.20	-----	-----	-----	-----	-----	-----	-----	0.20
25.10	0.00	752.89	0.20	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
25.15	0.00	752.89	0.20	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
25.20	0.00	752.89	0.20	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
25.25	0.00	752.89	0.20	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
25.30	0.00	752.89	0.20	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
25.35	0.00	752.89	0.20	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
25.40	0.00	752.89	0.20	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
25.45	0.00	752.89	0.20	0.19	-----	-----	-----	-----	-----	-----	-----	0.19

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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
45.90	0.00	752.62	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
45.95	0.00	752.61	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
46.00	0.00	752.61	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
46.05	0.00	752.61	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
46.10	0.00	752.61	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
46.15	0.00	752.61	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
46.20	0.00	752.61	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
46.25	0.00	752.61	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
46.30	0.00	752.61	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
46.35	0.00	752.61	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
46.40	0.00	752.61	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
46.45	0.00	752.61	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
46.50	0.00	752.61	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
46.55	0.00	752.61	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
46.60	0.00	752.61	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
46.65	0.00	752.61	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
46.70	0.00	752.61	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
46.75	0.00	752.61	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
46.80	0.00	752.60	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
46.85	0.00	752.60	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
46.90	0.00	752.60	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
46.95	0.00	752.60	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
47.00	0.00	752.60	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
47.05	0.00	752.60	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
47.10	0.00	752.60	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
47.15	0.00	752.60	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
47.20	0.00	752.60	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
47.25	0.00	752.60	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
47.30	0.00	752.60	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
47.35	0.00	752.60	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
47.40	0.00	752.60	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
47.45	0.00	752.60	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
47.50	0.00	752.60	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
47.55	0.00	752.60	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
47.60	0.00	752.60	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
47.65	0.00	752.59	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
47.70	0.00	752.59	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
47.75	0.00	752.59	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
47.80	0.00	752.59	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
47.85	0.00	752.59	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
47.90	0.00	752.59	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
47.95	0.00	752.59	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
48.00	0.00	752.59	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
48.05	0.00	752.59	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
48.10	0.00	752.59	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
48.15	0.00	752.59	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
48.20	0.00	752.59	0.16	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
48.25	0.00	752.59	0.15	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
48.30	0.00	752.59	0.15	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
48.35	0.00	752.59	0.15	0.15	-----	-----	-----	-----	-----	-----	-----	0.15
48.40	0.00	752.59	0.15	0.15	-----	-----	-----	-----	-----	-----	-----	0.15

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Storm Sewer Calculations

Patriot Defense Research Park — Storm Sewer Calculations

STR. #			Ac.	(%)		Coefficient	
603	Weighted "C" Factor =	Prop./Fut. Roof	2.00	29%	x	0.90 =	0.26
		Prop./Fut. Pavement	2.90	41%	x	0.85 =	0.35
Area =		Lawn/Landscape	2.11	30%	x	0.20 =	0.06
7.01 Acres						Weighted 'C'	**0.67**

"T/C" = 5 Minute Time of Concentration used for Industrial

STR. #			Ac.	(%)		Coefficient	
605	Weighted "C" Factor =	Prop./Fut. Roof	0.65	10%	x	0.90 =	0.09
		Prop./Fut. Pavement	3.20	50%	x	0.85 =	0.42
Area =		Lawn/Landscape	2.61	40%	x	0.20 =	0.08
6.46 Acres						Weighted 'C'	**0.59**

"T/C" = 5 Minute Time of Concentration used for Industrial

STR. #			Ac.	(%)		Coefficient	
609	Weighted "C" Factor =	Prop./Fut. Roof	0.00	0%	x	0.90 =	0.00
		Prop./Fut. Pavement	0.22	73%	x	0.85 =	0.62
Area =		Lawn/Landscape	0.08	27%	x	0.20 =	0.05
0.30 Acres						Weighted 'C'	**0.68**

"T/C" = 5 Minute Time of Concentration used for Industrial

STR. #			Ac.	(%)		Coefficient	
610	Weighted "C" Factor =	Prop./Fut. Roof	0.00	0%	x	0.90 =	0.00
		Prop./Fut. Pavement	0.23	52%	x	0.85 =	0.44
Area =		Lawn/Landscape	0.21	48%	x	0.20 =	0.10
0.44 Acres						Weighted 'C'	**0.54**

"T/C" = 5 Minute Time of Concentration used for Industrial

STR. #			Ac.	(%)		Coefficient	
612	Weighted "C" Factor =	Prop./Fut. Roof	0.18	19%	x	0.90 =	0.17
		Prop./Fut. Pavement	0.42	45%	x	0.85 =	0.38
Area =		Lawn/Landscape	0.33	35%	x	0.20 =	0.07
0.93 Acres						Weighted 'C'	**0.63**

"T/C" = 5 Minute Time of Concentration used for Industrial

STR. #			Ac.	(%)		Coefficient	
614	Weighted "C" Factor =	Prop./Fut. Roof	0.06	33%	x	0.90 =	0.30
		Prop./Fut. Pavement	0.09	50%	x	0.85 =	0.43
Area =		Lawn/Landscape	0.03	17%	x	0.20 =	0.03
0.18 Acres						Weighted 'C'	**0.76**

"T/C" = 5 Minute Time of Concentration used for Industrial

STR. #			Ac.	(%)		Coefficient	
615	Weighted "C" Factor =	Prop./Fut. Roof	0.00	0%	x	0.90 =	0.00
		Prop./Fut. Pavement	0.20	83%	x	0.85 =	0.71
Area =		Lawn/Landscape	0.04	17%	x	0.20 =	0.03
0.24 Acres						Weighted 'C'	**0.74**

"T/C" = 5 Minute Time of Concentration used for Industrial

Patriot Defense Research Park — Storm Sewer Calculations

STR. #			Ac.	(%)		Coefficient	
616	**Weighted "C" Factor =**	Prop./Fut. Roof	0.10	4%	x	0.90 =	0.03
		Prop./Fut. Pavement	0.50	19%	x	0.85 =	0.16
Area =		Lawn/Landscape	1.99	77%	x	0.20 =	0.15
2.59 Acres						Weighted 'C'	**0.35**

"T/C" = 5 Minute Time of Concentration used for Industrial

STR. #			Ac.	(%)		Coefficient	
617	**Weighted "C" Factor =**	Prop./Fut. Roof	0.00	0%	x	0.90 =	0.00
		Prop./Fut. Pavement	0.25	52%	x	0.85 =	0.44
Area =		Lawn/Landscape	0.23	48%	x	0.20 =	0.10
0.48 Acres						Weighted 'C'	**0.54**

"T/C" = 5 Minute Time of Concentration used for Industrial

STR. #			Ac.	(%)		Coefficient	
618	**Weighted "C" Factor =**	Prop./Fut. Roof	0.00	0%	x	0.90 =	0.00
		Prop./Fut. Pavement	0.25	27%	x	0.85 =	0.23
Area =		Lawn/Landscape	0.67	73%	x	0.20 =	0.15
0.92 Acres						Weighted 'C'	**0.38**

"T/C" = 5 Minute Time of Concentration used for Industrial

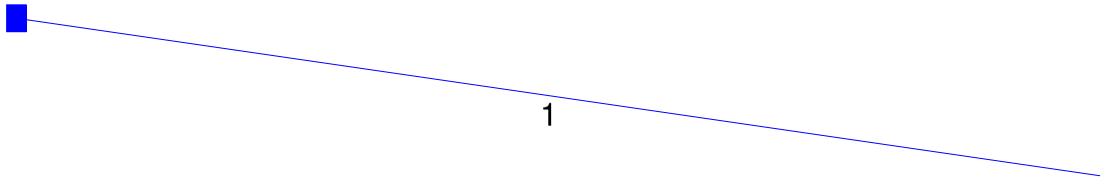
STR. #			Ac.	(%)		Coefficient	
620	**Weighted "C" Factor =**	Prop./Fut. Roof	0.22	6%	x	0.90 =	0.05
		Prop./Fut. Pavement	0.75	19%	x	0.85 =	0.16
Area =		Lawn/Landscape	2.90	75%	x	0.20 =	0.15
3.87 Acres						Weighted 'C'	**0.37**

"T/C" = 5 Minute Time of Concentration used for Industrial

STR. #			Ac.	(%)		Coefficient	
622	**Weighted "C" Factor =**	Prop./Fut. Roof	0.18	10%	x	0.90 =	0.09
		Prop./Fut. Pavement	1.38	74%	x	0.85 =	0.63
Area =		Lawn/Landscape	0.31	17%	x	0.20 =	0.03
1.87 Acres						Weighted 'C'	**0.75**

"T/C" = 5 Minute Time of Concentration used for Industrial

Hydraflow Plan View



Project file: 602-603 Storm Design.stm	IDF file: MARION.IDF	No. Lines: 1	09-02-2021

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	603	32.80	36 c	340.0	756.00	757.00	0.294	757.83	759.50	0.00	End

Project File: 602-603 Storm Design.stm | IDF File: MARION.IDF | Total No. Lines: 1 | Run Date: 09-02-2021

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	340.0	7.01	7.01	0.67	4.70	4.70	5.0	5.0	7.0	32.80	36.17	6.25	36	0.29	757.00	756.00	759.50	757.83	765.30	0.00	603

Project File: 602-603 Storm Design.stm | IDF File: MARION.IDF | Total number of lines: 1 | Run Date: 09-02-2021

NOTES: Intensity = 57.92 / (Inlet time + 9.10) ^ 0.80; Return period = 10 Yrs. ; Initial tailwater elevation = 757.83 (ft)

Hydraflow Plan View

Project file: 604-605 Storm Design.stm	IDF file: MARION.IDF	No. Lines: 1	09-02-2021

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	605	47.10	42 c	100.0	756.80	757.00	0.200	758.90	759.66	0.00	End

Project File: 604-605 Storm Design.stm | IDF File: MARION.IDF | Total No. Lines: 1 | Run Date: 09-02-2021

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

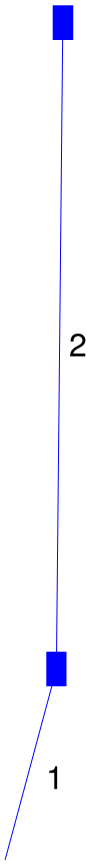
Hydraflow Storm Sewer Tabulation

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	100.0	6.46	6.46	0.59	3.81	3.81	5.0	5.0	7.0	47.10	44.99	6.90	42	0.20	757.00	756.80	759.66	758.90	765.30	0.00	605

Project File: 604-605 Storm Design.stm | IDF File: MARION.IDF | Total number of lines: 1 | Run Date: 09-02-2021

NOTES: Intensity = 57.92 / (Inlet time + 9.10) ^ 0.80; Return period = 10 Yrs. ; Initial tailwater elevation = 758.90 (ft)

Hydraflow Plan View



Project file: 608-610 Storm Design.stm	IDF file: MARION.IDF	No. Lines: 2	08-18-2021

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	609	4.35	18 c	39.0	760.00	760.07	0.177	760.80	761.10	0.00	End
2	610	1.66	12 c	120.0	760.07	760.43	0.304	761.10	761.34	0.00	1

Project File: 608-610 Storm Design.stm | IDF File: MARION.IDF | Total No. Lines: 2 | Run Date: 08-18-2021

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	39.0	0.59	1.03	0.70	0.41	0.65	5.0	5.8	6.7	4.35	4.41	3.95	18	0.18	760.07	760.00	761.10	760.80	763.37	0.00	609
2	1	120.0	0.44	0.44	0.54	0.24	0.24	5.0	5.0	7.0	1.66	1.96	2.16	12	0.30	760.43	760.07	761.34	761.10	763.28	763.37	610

Project File: 608-610 Storm Design.stm

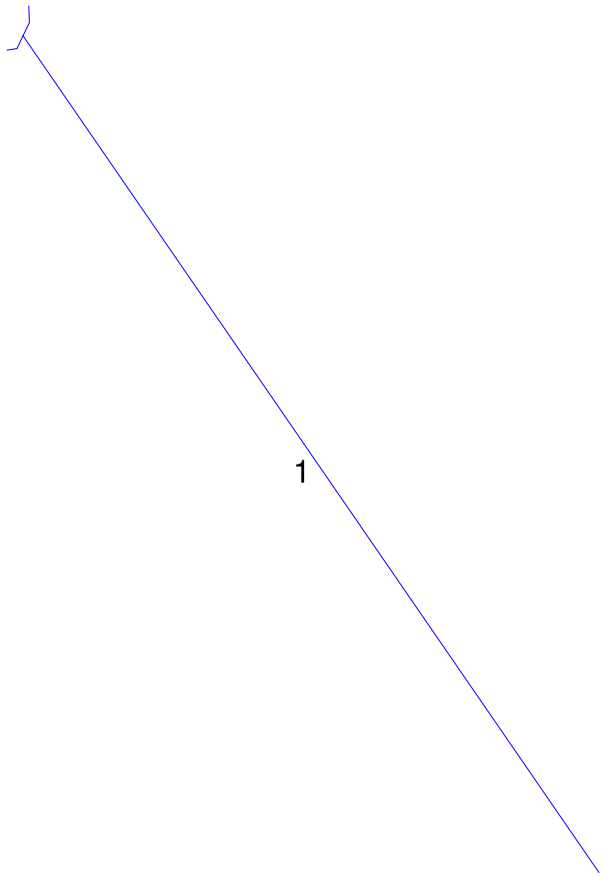
IDF File: MARION.IDF

Total number of lines: 2

Run Date: 08-18-2021

NOTES: Intensity = 57.92 / (Inlet time + 9.10) ^ 0.80; Return period = 10 Yrs. ; Initial tailwater elevation = 760.80 (ft)

Hydraflow Plan View



Project file: 611-612 Storm Design.stm	IDF file: MARION.IDF	No. Lines: 1	08-18-2021

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	612	16.17	27 c	74.0	757.90	758.10	0.270	759.28	759.86	0.00	End

Project File: 611-612 Storm Design.stm | IDF File: MARION.IDF | Total No. Lines: 1 | Run Date: 09-02-2021

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

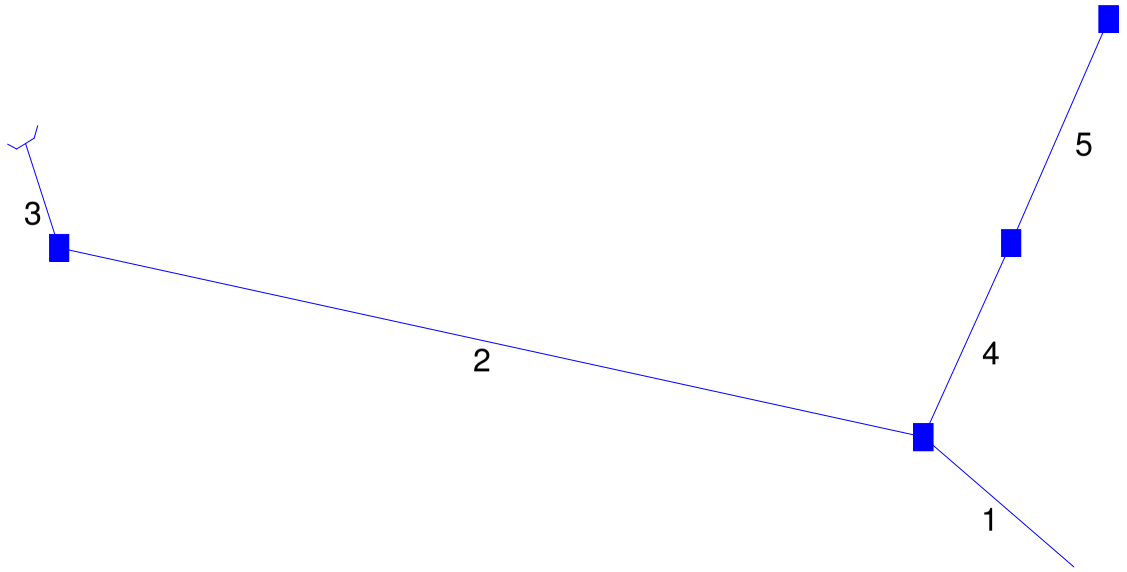
Hydraflow Storm Sewer Tabulation

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	74.0	0.93	0.93	0.63	0.59	0.59	5.0	5.0	7.0	16.17	16.10	5.59	27	0.27	758.10	757.90	759.86	759.28	764.70	0.00	612

Project File: 611-612 Storm Design.stm | IDF File: MARION.IDF | Total number of lines: 1 | Run Date: 09-02-2021

NOTES: Intensity = 57.92 / (Inlet time + 9.10) ^ 0.80; Return period = 10 Yrs. ; Initial tailwater elevation = 759.28 (ft)

Hydraflow Plan View



Project file: 613-618 Storm Design.stm	IDF file: MARION.IDF	No. Lines: 5	08-18-2021

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	614	12.38	21 c	30.0	759.20	759.40	0.667	760.49	760.80	0.00	End
2	615	7.34	18 c	148.0	759.40	760.30	0.608	760.80	761.42	0.00	1
3	616	6.33	12 c	14.0	760.30	760.85	3.928	761.42	761.84	0.00	2
4	617	4.47	15 c	28.0	759.40	759.95	1.964	760.80	760.80	0.00	1
5	618	2.70	12 c	32.0	759.95	760.27	1.000	760.80	760.97	0.00	4

Project File: 613-618 Storm Design.stm | IDF File: MARION.IDF | Total No. Lines: 5 | Run Date: 09-02-2021

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	30.0	0.18	4.41	0.76	0.14	1.84	5.0	5.6	6.7	12.38	12.93	6.26	21	0.67	759.40	759.20	760.80	760.49	764.30	0.00	614
2	1	148.0	0.24	2.83	0.61	0.15	1.05	5.0	5.0	7.0	7.34	8.19	4.74	18	0.61	760.30	759.40	761.42	760.80	764.30	764.30	615
3	2	14.0	2.59	2.59	0.35	0.91	0.91	5.0	5.0	7.0	6.33	7.06	8.07	12	3.93	760.85	760.30	761.84	761.42	765.00	764.30	616
4	1	28.0	0.48	1.40	0.54	0.26	0.65	5.0	5.2	6.9	4.47	9.05	4.34	15	1.96	759.95	759.40	760.80	760.80	763.43	764.30	617
5	4	32.0	0.92	0.92	0.42	0.39	0.39	5.0	5.0	7.0	2.70	3.56	4.21	12	1.00	760.27	759.95	760.97	760.80	763.43	763.43	618

Project File: 613-618 Storm Design.stm | IDF File: MARION.IDF | Total number of lines: 5 | Run Date: 09-02-2021

NOTES: Intensity = 57.92 / (Inlet time + 9.10) ^ 0.80; Return period = 10 Yrs. ; Initial tailwater elevation = 760.49 (ft)

Patriot Defense Research Park
INLET DEPTH CALCULATION

INLET # 609 Neenah R- 3501 Casting

Discharge Rate (Qi) =	2.88	c.f.s.
Perimeter of Grate Opening (P) =	4.6	ft.
Area of Grate Opening (Ai) =	1.40	sq. ft.

Grate acting as weir (depths less than 0.3 ft.):
Qi = 3.0P[(d)^1.5]
Grate acting as orifice (depths greater than 0.4 ft.):
Qi = 4.89(Ai)[(d)^0.5]

			CHECKED
Weir flow depth =	0.35	ft.	**OK**
Orifice flow depth =	0.18	ft.	**OK**
Allowable Depth =	0.50	ft.	

INLET # 610 Neenah R- 3501 Casting

Discharge Rate (Qi) =	1.66	c.f.s.
Perimeter of Grate Opening (P) =	4.6	ft.
Area of Grate Opening (Ai) =	1.40	sq. ft.

Grate acting as weir (depths less than 0.3 ft.):
Qi = 3.0P[(d)^1.5]
Grate acting as orifice (depths greater than 0.4 ft.):
Qi = 4.89(Ai)[(d)^0.5]

			CHECKED
Weir flow depth =	0.24	ft.	**OK**
Orifice flow depth =	0.06	ft.	**OK**
Allowable Depth =	0.50	ft.	

INLET # 614 Neenah R- 3286 Casting

Discharge Rate (Qi) =	0.96	c.f.s.
Perimeter of Grate Opening (P) =	4.40	ft.
Area of Grate Opening (Ai) =	0.70	sq. ft.

Grate acting as weir (depths less than 0.3 ft.):
Qi = 3.0P[(d)^1.5]
Grate acting as orifice (depths greater than 0.4 ft.):
Qi = 4.89(Ai)[(d)^0.5]

			CHECKED
Weir flow depth =	0.17	ft.	**OK**
Orifice flow depth =	0.08	ft.	**OK**
Allowable Depth =	0.50	ft.	

Patriot Defense Research Park
INLET DEPTH CALCULATION

INLET # 615 Neenah R- 3286 Casting

Discharge Rate (Qi) =	1.02	c.f.s.
Perimeter of Grate Opening (P) =	4.40	ft.
Area of Grate Opening (Ai) =	0.70	sq. ft.

Grate acting as weir (depths less than 0.3 ft.):
Qi = 3.0P[(d)^1.5]
Grate acting as orifice (depths greater than 0.4 ft.):
Qi = 4.89(Ai)[(d)^0.5]

			CHECKED
Weir flow depth =	0.18	ft.	OK
Orifice flow depth =	0.09	ft.	OK
Allowable Depth =	0.50	ft.	

INLET # 617 Neenah R- 3501 Casting

Discharge Rate (Qi) =	1.81	c.f.s.
Perimeter of Grate Opening (P) =	4.6	ft.
Area of Grate Opening (Ai) =	1.40	sq. ft.

Grate acting as weir (depths less than 0.3 ft.):
Qi = 3.0P[(d)^1.5]
Grate acting as orifice (depths greater than 0.4 ft.):
Qi = 4.89(Ai)[(d)^0.5]

			CHECKED
Weir flow depth =	0.26	ft.	OK
Orifice flow depth =	0.07	ft.	OK
Allowable Depth =	0.50	ft.	

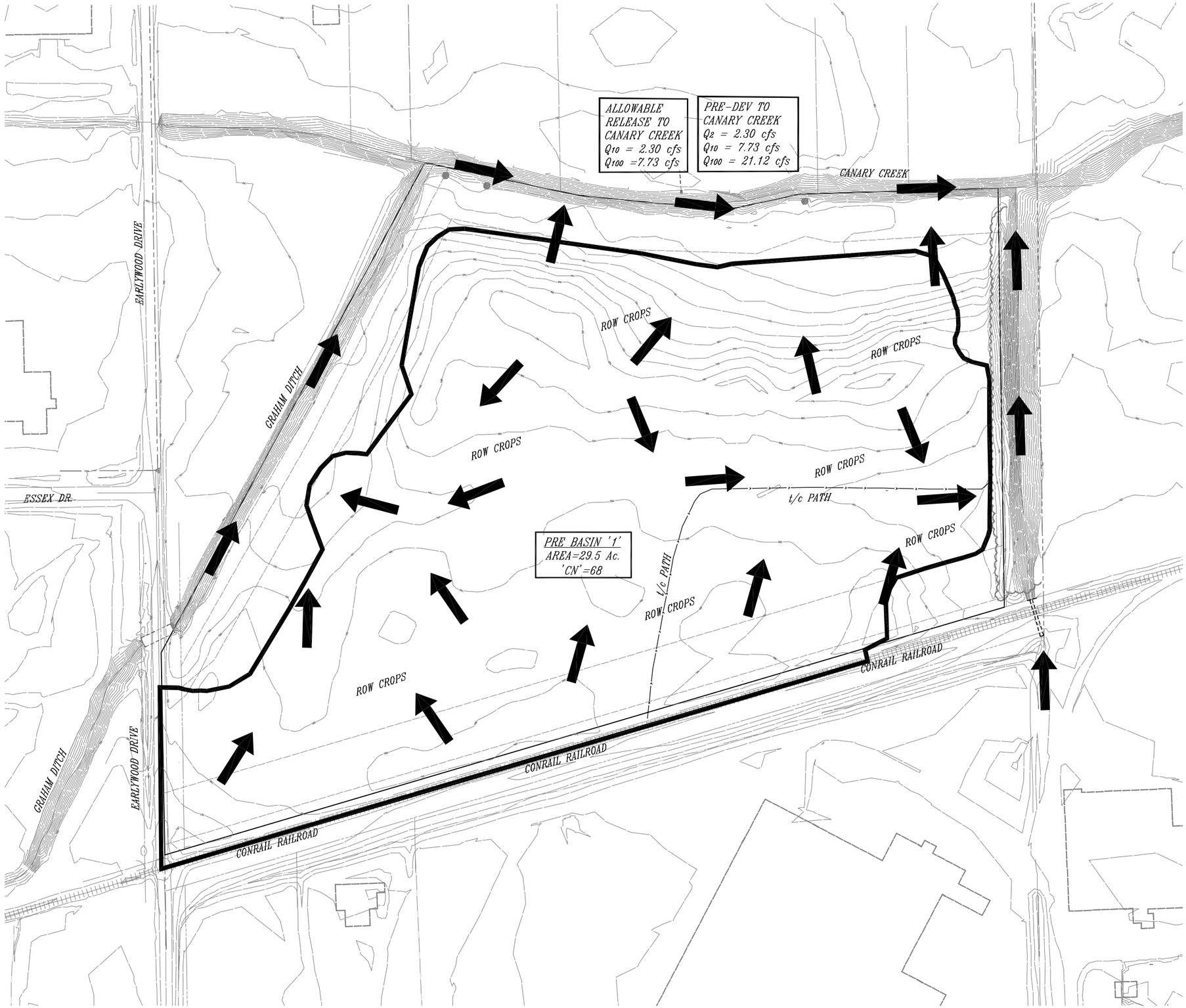
INLET # 618 Neenah R- 3501 Casting

Discharge Rate (Qi) =	2.70	c.f.s.
Perimeter of Grate Opening (P) =	4.6	ft.
Area of Grate Opening (Ai) =	1.40	sq. ft.

Grate acting as weir (depths less than 0.3 ft.):
Qi = 3.0P[(d)^1.5]
Grate acting as orifice (depths greater than 0.4 ft.):
Qi = 4.89(Ai)[(d)^0.5]

			CHECKED
Weir flow depth =	0.34	ft.	OK
Orifice flow depth =	0.16	ft.	OK
Allowable Depth =	0.50	ft.	

Watershed Delineation Maps



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	DATE
REVISION	
SYMBOL	
SCALE 1"=200'	
DRAWN JPH	
CHECKED JKS	
CERTIFIED	

PROJECT
PATRIOT DEFENSE RESEARCH PARK
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
PRE-DEVELOPMENT DRAINAGE MAP

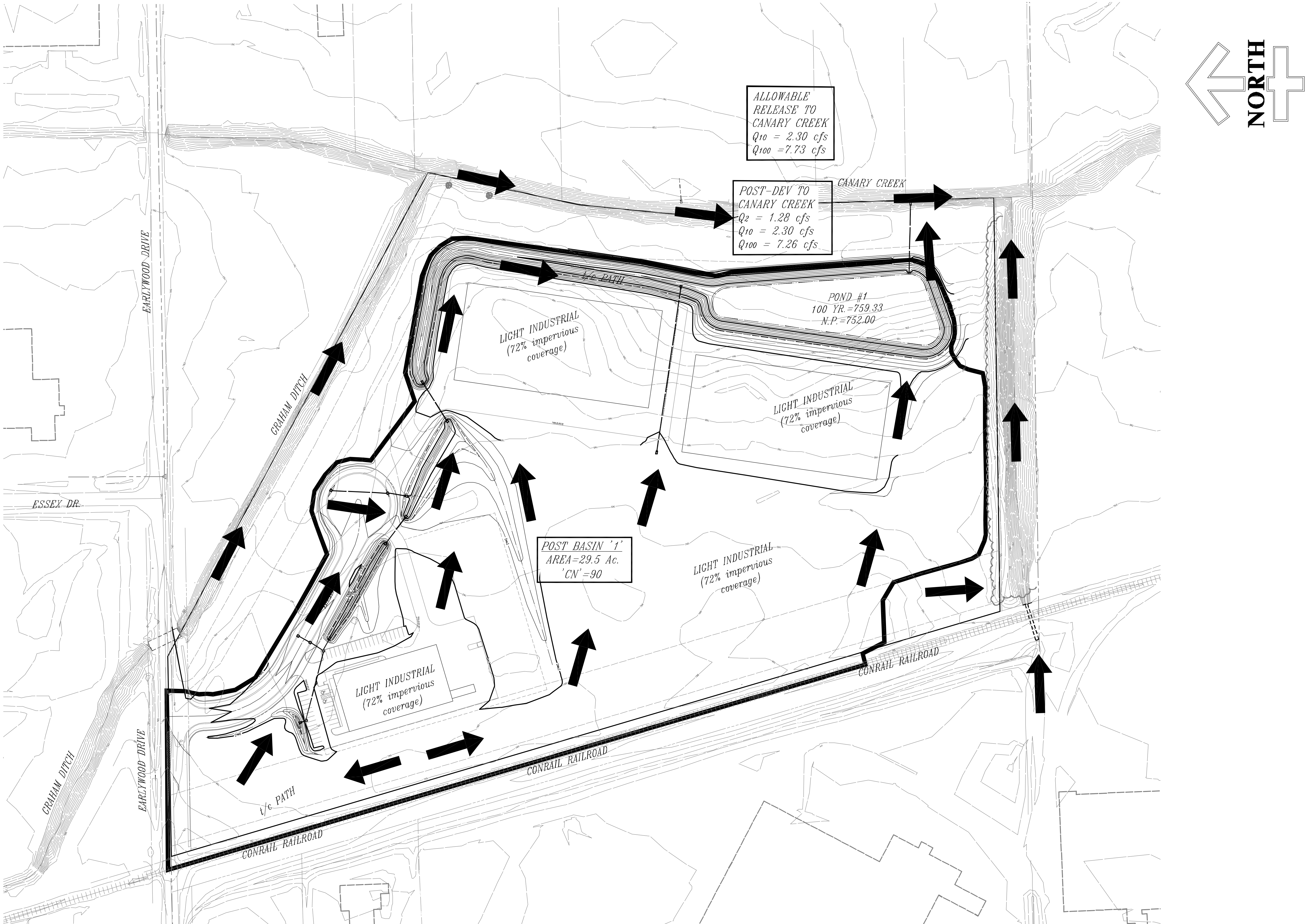
PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING-LAND SURVEYING-CONSTRUCTION LAYOUT
1257 Airport Parkway, Suite A - Greenwood, Indiana 46143
(317)-882-5005

JOB NUMBER
21008

SHEET
1

OF **1** SHEETS

DATE
SEPTEMBER 3, 2021



REVISION	SYMBOL	DATE

SCALE 1"=200'
DRAWN JPH
CHECKED JKS
CERTIFIED – –

PROJECT: PATRIOT DEFENSE RESEARCH PARK
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE: POST-DEVELOPMENT DRAINAGE MAP

PROJECTS *plus*
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING-LAND SURVEYING-CONSTRUCTION LAYOUT
1257 Airport Parkway Suite A - Greenwood, Indiana 46143
(317)-882-5003

JOB NUMBER **21008**
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PROJECT
PATRIOT DEFENSE RESEARCH PARK
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
BUILDING #1 – STORM SEWER DRAINAGE MAP

SCALE	SYMBOL	REVISION	DATE
1"=200'			
DRAWN JPH			
CHECKED JKS			
CERTIFIED _____			

PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING-LAND SURVEYING-CONSTRUCTION LAYOUT
1257 Airport Parkway, Suite A – Greenwood, Indiana 46143
(317)-882-5035

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SHEET
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SEPTEMBER 3, 2021

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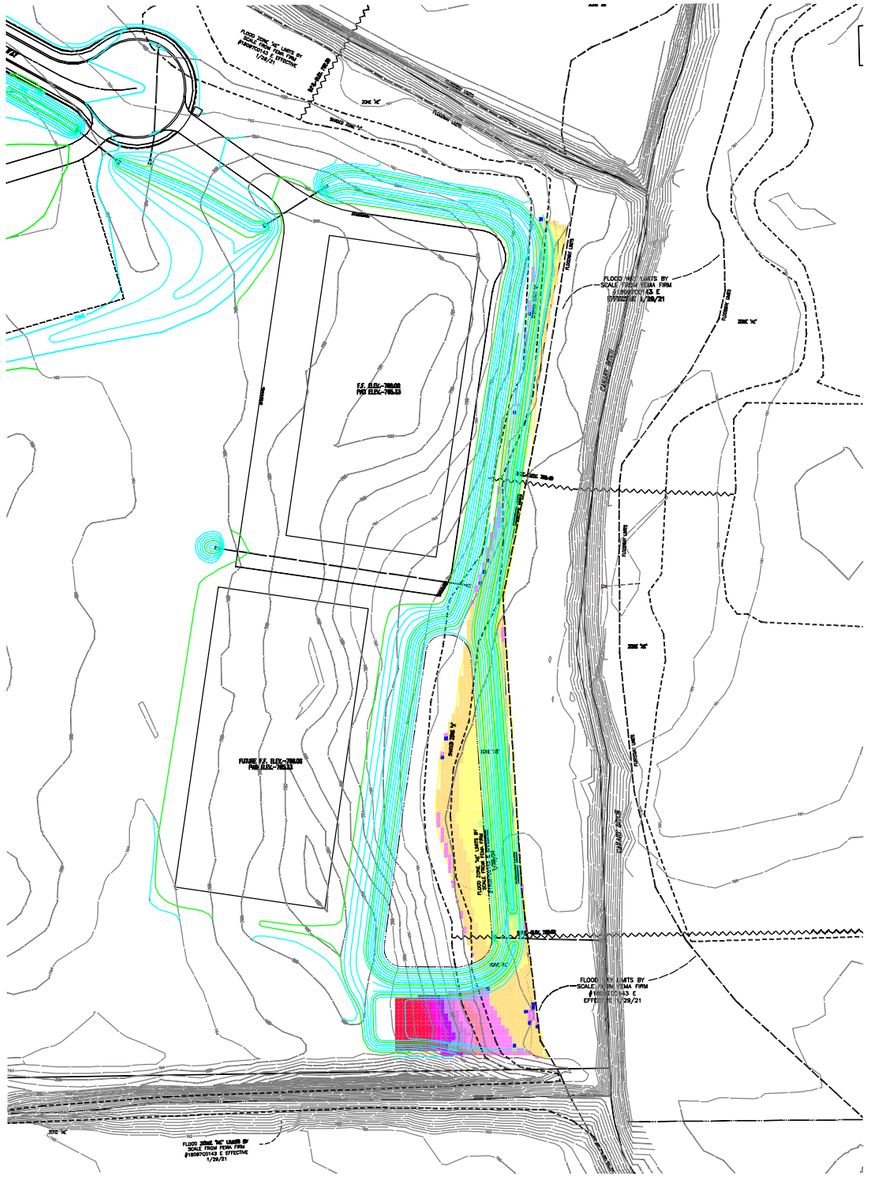

CUT–FILL DEPTH

= 5.0
= 4.5
= 4.0
= 3.5
= 3.0
= 2.5
= 2.0
= 1.5
= 1.0
= 0.5
= FILL ABOVE BALANCE LINE
= ZERO BALANCE LINE
= CUT BELOW BALANCE LINE
= −0.5
= −1.0
= −1.5
= −2.0
= −2.5
= −3.0
= −3.5
= −4.0
= −4.5
= −5.0

PROJECT# : 21008
PROJECT NAME : PATRIOT DEFENSE
Filename: 21008dirt_comp-storg.dwg - Calculation Dated: Tue, Sep 07 2021 - 11:49am
Datafile Used : G:\Jobs\21008\Dirt Balance\21008Dirt-comp-storg.dat
Imperial Units : Area(sq.yds) Volume(cu.yds)

Subsite	Strip	Pregrade	Area	Topsoil	Cut(x1)	Fill(x1)	Net Total
Lawn1	0.000	0.000	8032.7	0.0	−1290.5	1225.4	−65.1
Site Totals =			8032.7	0.0	−1290.5	1225.4	−65.1

NORTH
SCALE 1" = 200'

PROJECT
PATRIOT DEFENSE RESEARCH PARK
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
COMPENSATORY STORAGE

PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING–LAND SURVEYING–CONSTRUCTION LAYOUT
1257 Airport Parkway, Suite A - Greenwood, Indiana 46142
(317)-882-5003

SCALE: 1"=200'
DRAWN JPH
DRAWING: 21008DIRT

SHEET 1
OF 1 SHEETS

DATE
SEPTBEMBER 7, 2021