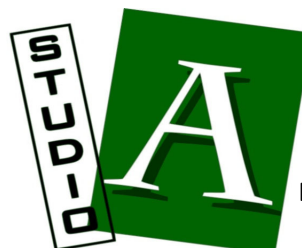


Stormwater Drainage Technical Report

Building 2 I-65 South Commerce Park

August 11, 2022

Prepared by:
Studio A of Indianapolis, Inc.
9511 East 96th Street
Indianapolis, IN 46256



Site Development
Landscape Architecture
Environmental Documents

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1.0. INTRODUCTION

Studio A of Indianapolis, Inc. has completed a development plan and drainage design to support the development of Lot 1 within the I-65 South Commerce Park. Lot 1 will support the construction of Building 2 which will be a 1.2 million square foot warehouse along with truck docks, parking, and associated infrastructure. The Park is located immediately north and east of the intersection of Jim Black Road and S.R. 44, within the City of Franklin in Johnson County, Indiana.

The purpose of this reporting is to demonstrate that the development plan for the site is in compliance with the General Drainage Standards for the City of Franklin. The aerial photograph shown on Figure 1 illustrates the approximate location of Lot 1, and provides land use and context for the development. Although the Lot dimensions represent 81 acres, the drainage analysis will consider 102 acres which will include Lot 1 area, right-of-way, as well as some adjacent areas of Lots 2 and 4 to the south that will be managed in Lot 1 ponds with future planned development.

Existing conditions are discussed in Section 2.0, while a discussion of the proposed conditions and stormwater design are discussed in Section 3.0. Water quality requirements are discussed in Section 4.0 with conclusions thereafter.

2.0. EXISTING CONDITIONS

The existing Lot 1 site covers 81 acres as depicted on Figure 1. As shown on the Figure, the majority of the site consists of row crops which drain generally north and east to the Amity Ditch which drains nearly the entire I-65 South Commerce Park. The only impervious surface on the existing site is associated with the drainage which will come on the site from the right-of-way of Jim Black Road. The site watershed drains along a flow path approximately 1900 feet in length at an average slope of about 0.5% where it intersects the location of the Amity Ditch resulting in an existing time of concentration of a little over a half hour. Details of the existing hydrology are provided in Appendix 'A'.

As provided on Figure 2, there is regulatory floodplain associated with the Amity Ditch. However, aside from proposed stormwater discharge locations, land development for Lot 1 will remain outside the existing floodplain areas.

2.1 USDA Soils

According to the USDA Web Soil Survey (Figure 2), the site consists of Brookston silty clay loam, Crosby silt loam, and Miami silt loam. In the current condition, these soils range from Hydrologic Soil Grouping (HSG) of 'B' to 'D' depending on the existing drainage systems available and are reflected in hydrologic computations in Appendix 'A'. FEMA does not associate this Lot with any Special Flood Hazard Zones, and no known 'hot spots' are associated with the site.

2.2 Offsite Watersheds

There are no measurable offsite flows which impact this existing lot directly. As provided on Figure 1, the property to the west of Lot 1 flows east to an existing culvert beneath Jim Black Road and enters the Amity Ditch without impact to Lot 1. This offsite watershed is detailed on Figure 4 to allow for peak runoff and volume contributions should they become necessary.

Appendix 'A' provides an unabridged account of all hydrologic and hydraulic input and output data associated with the existing condition and routing data. The appropriate Huff distribution is applied to rainfall depths obtained from Technical Reference 20 for the City of Franklin. Table 1 provides a summary of existing discharges; the total representing the total discharge routed in the proposed condition being 102.5 acres.

Table 1: Existing Peak Flow Matrix

EX	Runoff (cfs)
2YR1HR	37.04
2YR2HR	29.99
2YR30MIN	29.72
10YR1HR	85.90
10YR2HR	71.46
10YR30MIN	81.98
100YR30MIN	163.86
100YR1HR	159.28
100YR15MIN	103.24

3.0. PROPOSED SYSTEM DESIGN

Figure 5 provides the overall proposed hydrologic condition of all enumerated onsite watersheds and their respective inlet structure. These all serve to route proposed site stormwater to one of two wet pond detention BMPs.

All catchments denoted in RED route to the northern wet pond, while all catchments denoted in BLUE route to the southern wet pond. Both ponds will discharge east to the Amity Ditch. Of note are base flood elevations along Amity Ditch annotated in black on Figure 5.

The flood elevations shown are not available from the FEMA or IDNR in this portion of Amity Ditch. These elevations have been proposed by work by Christopher Burke, Engineering and represent a proposed full buildout condition of the I-65 South Commerce Park. The Ditch study and assumptions are available upon request.

Percent impervious of the catchment, along with the soils established in Section 2 were input to determine appropriate curve numbers (CN) for volumetric runoff values and ‘C’ values for pipe flow design discharges. These are summarized on the following page in Table 2.

Table 2: Proposed Hydrology

BLD 2	Total (ac)	Impervious	Grass 'B'	Grass 'C'	CN	C
DA POND BLD2 N	7.020	3.112	2.118	1.790	81	0.52
DA POND BLD2 S	9.122	3.429	3.085	2.607	79	0.48
DA706	0.371	0.241	0.071	0.060	87	0.64
DA707	0.570	0.288	0.153	0.129	83	0.55
DA707A	0.193	0.135	0.031	0.026	89	0.67
DA708	0.868	0.838	0.016	0.014	97	0.83
DA709	0.565	0.474	0.049	0.042	93	0.75
DA710	0.751	0.592	0.086	0.073	91	0.72
DA712	0.345	0.240	0.057	0.048	89	0.67
DA713	0.368	0.255	0.061	0.052	88	0.67
DA714	0.761	0.591	0.092	0.078	91	0.72
DA715	0.882	0.611	0.147	0.124	88	0.67
DA716	0.172	0.151	0.011	0.009	94	0.78
DA717	0.205	0.147	0.032	0.027	89	0.68
DA760	0.403	0.283	0.065	0.055	89	0.67
DA761	2.409	1.285	0.610	0.515	84	0.57
DA762	2.309	1.927	0.207	0.175	93	0.75
DA763	2.504	2.131	0.202	0.171	93	0.76
DA764	2.628	2.190	0.238	0.201	93	0.75
DA765	1.773	1.773	0.000	0.000	98	0.90
DA766	0.393	0.306	0.047	0.040	91	0.72
DA767	0.077	0.077	0.000	0.000	98	0.85
DA768	0.300	0.182	0.064	0.054	86	0.61
DA769	0.132	0.112	0.010	0.009	93	0.76
DA770	0.650	0.650	0.000	0.000	98	0.90
DA771	1.418	1.418	0.000	0.000	98	0.90
DA772	1.418	1.418	0.000	0.000	98	0.90
DA774	0.570	0.434	0.074	0.063	91	0.71
DA775	0.331	0.304	0.015	0.012	95	0.80
DA777	0.050	0.043	0.004	0.003	94	0.77
DA778	0.038	0.033	0.002	0.002	94	0.78

Table 2: Proposed Hydrology (cont.)

BLD 2	Total (ac)	Impervious	Grass 'B'	Grass 'C'	CN	C
DA779	0.471	0.420	0.028	0.024	95	0.78
DA780	0.451	0.402	0.026	0.022	95	0.79
DA781	0.691	0.432	0.140	0.119	86	0.63
DA783	0.287	0.237	0.027	0.023	93	0.75
DA784	0.127	0.111	0.009	0.007	94	0.78
DA785	0.748	0.748	0.000	0.000	98	0.90
DA787	1.286	1.245	0.023	0.019	97	0.83
DA788	1.418	1.418	0.000	0.000	98	0.90
DA790	0.994	0.994	0.000	0.000	98	0.85
DA791	1.418	1.418	0.000	0.000	98	0.90
DA793	0.994	0.994	0.000	0.000	98	0.85
DA794	1.418	1.418	0.000	0.000	98	0.90
DA796	0.985	0.985	0.000	0.000	98	0.85
DA797	1.418	1.418	0.000	0.000	98	0.90
DA799	0.994	0.994	0.000	0.000	98	0.85
DA800	1.418	1.418	0.000	0.000	98	0.90
DA802	0.994	0.994	0.000	0.000	98	0.85
DA803	1.418	1.418	0.000	0.000	98	0.90
DA805	0.994	0.994	0.000	0.000	98	0.85
DA806	1.418	1.418	0.000	0.000	98	0.90
DA808	1.022	0.954	0.037	0.031	96	0.81
DA809	0.154	0.128	0.014	0.012	93	0.75
DA810	0.748	0.748	0.000	0.000	98	0.90
DA811	1.418	1.418	0.000	0.000	98	0.90
DA813	0.636	0.372	0.143	0.121	85	0.60
DA814	1.058	0.982	0.041	0.035	96	0.81
DA815	0.982	0.891	0.049	0.042	95	0.79
DA816	0.503	0.305	0.107	0.090	86	0.61
DA817	1.121	0.152	0.525	0.444	71	0.33
DA818	0.923	0.514	0.222	0.187	84	0.58
DA819	0.286	0.232	0.030	0.025	92	0.74
DA823	0.142	0.112	0.016	0.014	91	0.72
DA824	0.456	0.406	0.027	0.023	95	0.78
DA825	0.507	0.451	0.030	0.026	95	0.78
DA826	0.691	0.491	0.109	0.092	89	0.68
DA828	0.230	0.207	0.013	0.011	95	0.79
DA829	0.127	0.110	0.009	0.008	94	0.77
DA830	0.748	0.748	0.000	0.000	98	0.90
DA832	1.285	1.246	0.021	0.018	97	0.83
DA833	1.418	1.418	0.000	0.000	98	0.90
DA835	0.994	0.994	0.000	0.000	98	0.85
DA836	1.418	1.418	0.000	0.000	98	0.90
DA838	0.994	0.994	0.000	0.000	98	0.85
DA839	1.418	1.418	0.000	0.000	98	0.90
DA841	0.985	0.985	0.000	0.000	98	0.85
DA842	1.418	1.418	0.000	0.000	98	0.90
DA844	0.994	0.994	0.000	0.000	98	0.85
DA845	1.418	1.418	0.000	0.000	98	0.90
DA847	0.994	0.994	0.000	0.000	98	0.85
DA848	1.418	1.418	0.000	0.000	98	0.90

Table 2: Proposed Hydrology (cont.)

BLD 2	Total (ac)	Impervious	Grass 'B'	Grass 'C'	CN	C
DA850	0.994	0.994	0.000	0.000	98	0.85
DA851	1.418	1.418	0.000	0.000	98	0.90
DA853	0.894	0.850	0.024	0.020	96	0.82
DA854	1.418	1.418	0.000	0.000	98	0.90
DA856	0.279	0.188	0.049	0.042	88	0.65
DA857	0.142	0.118	0.013	0.011	93	0.75
DA858	0.748	0.748	0.000	0.000	98	0.90
DA860	0.357	0.220	0.074	0.063	86	0.62
DA861	0.214	0.199	0.008	0.007	96	0.81
DA862	0.796	0.750	0.025	0.021	96	0.82
DA863	0.982	0.884	0.053	0.045	95	0.79
DA864	0.497	0.301	0.106	0.090	86	0.61
DA865	0.686	0.108	0.313	0.264	72	0.34
DA866	0.914	0.756	0.086	0.072	93	0.75
DA868B	0.884	0.791	0.051	0.043	95	0.79
DA868A	0.790	0.748	0.023	0.019	96	0.82
DA868	0.664	0.630	0.019	0.016	96	0.82
DA869	0.902	0.394	0.275	0.233	81	0.51
DA870	0.459	0.396	0.034	0.029	94	0.77
DA872	0.360	0.311	0.026	0.022	94	0.77
DA873	0.315	0.144	0.093	0.078	81	0.52
DA874	0.463	0.190	0.148	0.125	80	0.50
DA876	0.347	0.300	0.026	0.022	94	0.77
DA877	0.259	0.259	0.000	0.000	98	0.85
DA878	0.626	0.282	0.186	0.157	81	0.52
Total Pond2 North	35.018	29.307	3.095	2.616	92.9	
Total Pond2 South	67.438	53.177	7.729	6.532	91.4	

As provided above, the hydrologic details have been divided by color code according to which pond the individual watersheds are routed to. This allows the individual watersheds to be aggregated to greatly simplify and shorten the computer output in Appendix 'B' pertaining to the detention calculations. As shown, all BLUE watersheds drain to the south pond prior to discharge to the Amity Ditch, while all RED watersheds will drain directly to the north pond prior to discharge to the Amity Ditch.

3.1 Site Routing

Overall, as detailed above, 35.018 acres of the system are routed to the north pond, while the remaining 67.438 acres will be routed directly south pond. Note that on Figure 5, much of the blue watersheds include area of future development that will not be built at this time as denoted as greyed out line work. The additional future watershed is routed at this time to ensure proper sizing and capacity of the south pond.

3.2 Storm Sewer Design

All onsite watersheds routed to the storm system are less than 5 acres. As such the rational method was used to compute peak inflows to the storm system. All pipes were sized and sloped such that:

- a) The 10-year event peak inflows are less than the Mannings' capacity of the pipe run.
- b) The 10-year event pipe flow results in a flow velocity greater than 2.5 feet/second.
- c) The 100-year event Hydraulic Gradeline (HGL) is below the top of casting of each respective structure.
- d) The inlet casting has capacity to pass the 10-year design event under 50% clogged conditions.

Table 3 on the following page provides a pipe chart illustrating compliance with design criteria (a), (b), and (c) for all new infrastructure. Table 4 provides the inlet capacities regarding item (d). The intensity used in Table 4 assumes a 10 minute time of concentration for all site watersheds.

Table 3: Conveyance Design

PIPE NO.	INC AREA ac	CUM AREA ac	INC RUNOFF COEFF	CUM RUNOFF COEFF.	SUM C * A	TIME CONC. min	I 10 YR. in/hr	I 100 YR in/hr	Q 10 YR cfs	Q 100 YR cfs	PIPE SIZE in	PIPE LENGTH ft	PIPE SLOPE ft/ft	CSTG UP ft	INV UP ft	INV DN ft	VEL. 10 YR fps	HW 10 YR ft	HW 100 YR ft	10-YR CAP cfs
815-814	0.982	0.98	0.79	0.79	0.78	5.00	6.99	9.69	5.4	7.5	15	180	0.0063	723.48	718.36	717.24	5.14	1.62	2.31	5.5
817-816	1.121	1.12	0.33	0.33	0.37	10.00	5.48	7.77	2.0	2.9	12	14	0.0064	722.30	718.16	718.07	4.17	0.93	1.22	3.1
816-814	0.503	1.62	0.61	0.42	0.68	10.00	5.48	7.77	3.7	5.3	15	138	0.0060	722.93	718.07	717.24	4.74	1.20	1.58	5.4
814-813	1.058	3.66	0.81	0.63	2.31	10.00	5.48	7.77	12.7	17.9	24	197	0.0030	723.33	717.24	716.65	4.85	1.99	2.63	13.4
818-813	0.923	0.92	0.58	0.58	0.54	5.00	6.99	9.69	3.7	5.2	12	103	0.0100	724.99	720.68	719.65	5.59	1.57	2.41	3.9
819-813	0.286	0.29	0.74	0.74	0.21	5.00	6.99	9.69	1.5	2.1	12	67	0.0050	723.67	719.98	719.65	3.54	0.76	0.95	2.7
813-812	0.636	5.51	0.60	0.62	3.44	10.00	5.48	7.77	18.8	26.7	24	158	0.0060	723.67	716.65	715.70	6.89	2.77	4.19	19.0
810-809	0.748	0.75	0.90	0.90	0.67	5.00	6.99	9.69	4.7	6.5	15	63	0.0060	727.13	721.20	720.82	4.97	1.43	2.35	5.4
809-808	0.154	0.90	0.75	0.87	0.79	5.00	6.99	9.69	5.5	7.6	15	108	0.0100	724.79	718.28	717.20	6.31	1.64	2.46	7.0
811-808	1.418	1.42	0.90	0.90	1.28	5.00	6.99	9.69	8.9	12.4	18	89	0.0236	723.12	719.30	717.20	9.93	2.02	2.95	17.5
808-807	1.022	3.34	0.81	0.87	2.89	5.00	6.99	9.69	20.2	28.0	24	144	0.0070	721.10	716.70	715.70	7.41	2.98	4.48	20.4
806-805	1.418	1.42	0.90	0.90	1.28	5.00	6.99	9.69	8.9	12.4	18	89	0.0180	723.12	718.80	717.20	8.91	2.02	2.95	15.3
805-804	0.994	2.41	0.85	0.88	2.12	5.00	6.99	9.69	14.8	20.6	24	144	0.0040	721.10	716.28	715.70	5.61	2.24	3.04	15.5
803-802	1.418	1.42	0.90	0.90	1.28	5.00	6.99	9.69	8.9	12.4	18	89	0.0180	723.12	718.80	717.20	8.91	2.02	2.95	15.3
802-801	0.994	2.41	0.85	0.88	2.12	5.00	6.99	9.69	14.8	20.6	24	144	0.0040	721.10	716.28	715.70	5.61	2.24	3.04	15.5
800-799	1.418	1.42	0.90	0.90	1.28	5.00	6.99	9.69	8.9	12.4	18	89	0.0180	723.12	718.80	717.20	8.91	2.02	2.95	15.3
799-798	0.994	2.41	0.85	0.88	2.12	5.00	6.99	9.69	14.8	20.6	24	144	0.0040	721.10	716.28	715.70	5.61	2.24	3.04	15.5
797-796	1.418	1.42	0.90	0.90	1.28	5.00	6.99	9.69	8.9	12.4	18	89	0.0170	723.12	717.79	716.28	8.73	2.02	2.95	14.8
796-795	0.985	2.40	0.85	0.88	2.11	5.00	6.99	9.69	14.8	20.5	24	144	0.0040	721.10	716.28	715.70	5.61	2.23	3.02	15.5
794-793	1.418	1.42	0.90	0.90	1.28	5.00	6.99	9.69	8.9	12.4	18	89	0.0170	723.12	717.79	716.28	8.73	2.02	2.95	14.8
793-792	0.994	2.41	0.85	0.88	2.12	5.00	6.99	9.69	14.8	20.6	24	144	0.0040	721.10	716.28	715.70	5.61	2.24	3.04	15.5
791-790	1.418	1.42	0.90	0.90	1.28	5.00	6.99	9.69	8.9	12.4	18	89	0.0170	723.12	717.79	716.28	8.73	2.02	2.95	14.8
790-789	0.994	2.41	0.85	0.88	2.12	5.00	6.99	9.69	14.8	20.6	24	144	0.0040	721.10	716.28	715.70	5.61	2.24	3.04	15.5
788-787	1.418	1.42	0.90	0.90	1.28	5.00	6.99	9.69	8.9	12.4	18	89	0.0170	723.12	717.88	716.38	8.73	2.02	2.95	14.8
787-786	1.286	2.70	0.85	0.88	2.37	5.00	6.99	9.69	16.6	23.0	24	144	0.0047	721.10	716.38	715.70	6.10	2.45	3.45	16.8
786-784	0.748	0.75	0.90	0.90	0.67	5.00	6.99	9.69	4.7	6.5	15	63	0.0051	727.13	719.62	719.30	4.62	1.43	1.95	5.0
784-783	0.127	0.88	0.78	0.88	0.77	5.00	6.99	9.69	5.4	5.9	15	70	0.0062	725.06	719.30	718.86	5.12	1.61	1.75	5.5
783-782	0.287	1.16	0.75	0.85	0.99	5.00	6.99	9.69	6.9	9.6	15	96	0.0121	722.41	716.86	715.70	7.07	2.09	3.27	7.7

Table 3: Conveyance Design (cont.)

PIPE NO.	INC AREA ac	CUM AREA ac	INC RUNOFF COEFF	CUM RUNOFF COEFF.	SUM C * A	TIME CONC. min	I 10 YR. in/hr	I 100 YR in/hr	Q 10 YR cfs	Q 100 YR cfs	PIPE SIZE in	PIPE LENGTH ft	PIPE SLOPE ft/ft	CSTG UP ft	INV UP ft	INV DN ft	VEL. 10 YR fps	HW 10 YR ft	HW 100 YR ft	10-YR CAP cfs
775-774	0.331	0.33	0.80	0.80	0.26	5.00	6.99	9.69	1.9	2.6	12	36	0.0100	721.43	717.55	717.19	4.85	0.88	1.11	3.9
774-773	0.570	0.90	0.71	0.74	0.67	5.00	6.99	9.69	4.7	6.5	12	83	0.0180	721.43	717.19	715.70	7.44	2.07	3.39	5.2
781-780	0.691	0.69	0.63	0.63	0.44	5.00	6.99	9.69	3.0	4.2	12	49	0.0071	721.95	718.46	718.11	4.68	1.27	1.80	3.3
780-779	0.451	1.14	0.79	0.69	0.79	5.00	6.99	9.69	5.5	7.7	15	148	0.0070	723.52	718.11	717.08	5.40	1.65	2.39	5.8
779-778	0.471	1.61	0.78	0.72	1.16	5.00	6.99	9.69	8.1	11.2	18	109	0.0061	723.36	717.08	716.42	5.68	1.85	2.59	8.9
778-777	0.038	1.65	0.78	0.72	1.19	5.00	6.99	9.69	8.3	11.5	18	24	0.0066	723.95	716.42	716.26	5.90	1.89	2.67	9.2
777-776	0.050	1.70	0.77	0.72	1.23	5.00	6.99	9.69	8.6	11.9	24	184	0.0014	723.81	716.26	716.00	3.31	1.55	1.91	9.2
825-824	0.507	0.51	0.78	0.78	0.40	5.00	6.99	9.69	2.8	3.8	15	168	0.0020	723.34	718.81	718.47	2.87	1.00	1.22	3.1
824-823	0.456	0.96	0.78	0.78	0.75	5.00	6.99	9.69	5.3	7.3	18	106	0.0022	723.34	718.47	718.24	3.44	1.34	1.69	5.3
826-823	0.691	0.69	0.68	0.68	0.47	5.00	6.99	9.69	3.3	4.6	12	92	0.0074	721.38	717.92	717.24	4.82	1.36	2.02	3.3
823-822	0.142	1.80	0.72	0.74	1.32	5.00	6.99	9.69	9.2	12.8	18	181	0.0069	724.82	717.24	716.00	6.08	2.09	3.08	9.4
830-829	0.748	0.75	0.90	0.90	0.67	5.00	6.99	9.69	4.7	6.5	15	64	0.0050	727.13	719.08	718.76	4.59	1.43	1.95	4.9
829-828	0.127	0.88	0.77	0.88	0.77	5.00	6.99	9.69	5.4	7.5	15	71	0.0070	724.82	718.76	718.26	5.39	1.61	2.31	5.9
828-827	0.230	1.11	0.79	0.86	0.95	5.00	6.99	9.69	6.7	9.2	15	105	0.0120	722.21	717.26	716.00	7.02	2.00	3.06	7.7
833-832	1.418	1.42	0.90	0.90	1.28	5.00	6.99	9.69	8.9	12.4	18	90	0.0170	723.12	718.23	716.70	8.73	2.02	2.95	14.8
832-831	1.285	2.70	0.83	0.87	2.34	5.00	6.99	9.69	16.4	22.7	24	151	0.0047	721.10	716.70	716.00	6.06	2.43	3.40	16.7
836-835	1.418	1.42	0.90	0.90	1.28	5.00	6.99	9.69	8.9	12.4	18	90	0.0170	723.12	718.14	716.61	8.73	2.02	2.95	14.8
835-834	0.994	2.41	0.85	0.88	2.12	5.00	6.99	9.69	14.8	20.6	24	151	0.0040	721.10	716.61	716.00	5.63	2.24	3.04	15.6
839-838	1.418	1.42	0.90	0.90	1.28	5.00	6.99	9.69	8.9	12.4	18	90	0.0170	723.12	718.14	716.61	8.73	2.02	2.95	14.8
838-837	0.994	2.41	0.85	0.88	2.12	5.00	6.99	9.69	14.8	20.6	24	151	0.0040	721.10	716.61	716.00	5.63	2.24	3.04	15.6
842-841	1.418	1.42	0.90	0.90	1.28	5.00	6.99	9.69	8.9	12.4	18	90	0.0170	723.12	718.14	716.61	8.73	2.02	2.95	14.8
841-840	0.985	2.40	0.85	0.88	2.11	5.00	6.99	9.69	14.8	20.5	24	151	0.0040	721.10	716.61	716.00	5.63	2.23	3.02	15.6
845-844	1.418	1.42	0.90	0.90	1.28	5.00	6.99	9.69	8.9	12.4	18	90	0.0170	723.12	718.14	716.61	8.73	2.02	2.95	14.8
844-843	0.994	2.41	0.85	0.88	2.12	5.00	6.99	9.69	14.8	20.6	24	151	0.0040	721.10	716.61	716.00	5.63	2.24	3.04	15.6
848-847	1.418	1.42	0.90	0.90	1.28	5.00	6.99	9.69	8.9	12.4	18	90	0.0170	723.12	718.14	716.61	8.73	2.02	2.95	14.8
847-846	0.994	2.41	0.85	0.88	2.12	5.00	6.99	9.69	14.8	20.6	24	151	0.0040	721.10	716.61	716.00	5.63	2.24	3.04	15.6
851-850	1.418	1.42	0.90	0.90	1.28	5.00	6.99	9.69	8.9	12.4	18	90	0.0170	723.12	718.14	716.61	8.73	2.02	2.95	14.8
850-849	0.994	2.41	0.85	0.88	2.12	5.00	6.99	9.69	14.8	20.6	24	151	0.0040	721.10	716.61	716.00	5.63	2.24	3.04	15.6

PIPE NO.	INC AREA	CUM AREA	INC RUNOFF COEFF	CUM RUNOFF COEFF.	SUM C * A	TIME CONC.	I 10 YR.	I 100 YR	Q 10 YR	Q 100 YR	PIPE SIZE	PIPE LENGTH	PIPE SLOPE	CSTG UP	INV UP	INV DN	VEL. 10 YR	HW 10 YR	HW 100 YR	10-YR CAP
	ac	ac				min	in/hr	in/hr	cfs	cfs	in	ft	ft/ft	ft	ft	ft	fps	ft	ft	cfs
	854-853	1.418	1.42	0.90	0.90	1.28	5.00	6.99	9.69	8.9	12.4	18	0.0170	723.12	718.08	716.55	8.73	2.02	2.95	14.8
	853-852	0.894	2.31	0.82	0.87	2.01	5.00	6.99	9.69	14.0	19.5	24	0.0036	721.10	716.55	716.00	5.35	2.15	2.87	14.8
	858-857	0.748	0.75	0.90	0.90	0.67	5.00	6.99	9.69	4.7	6.5	15	0.0050	727.13	719.92	719.60	4.59	1.43	1.95	4.9
	857-856	0.142	0.89	0.75	0.88	0.78	5.00	6.99	9.69	5.7	7.6	15	0.0070	724.37	719.60	719.10	5.40	1.62	2.35	5.9
	856-855	0.279	1.17	0.65	0.82	0.96	5.00	6.99	9.69	6.7	9.3	15	0.0200	722.18	718.10	716.00	8.64	2.02	3.11	9.9
	865-864	0.868	0.87	0.33	0.33	0.29	10.00	5.48	7.77	1.6	2.2	12	0.0040	722.60	719.71	719.66	3.30	0.79	0.98	2.4
	864-862	0.497	1.37	0.61	0.43	0.59	10.00	5.48	7.77	3.2	4.6	12	0.0072	723.16	719.66	718.66	4.75	1.34	2.02	3.3
	863-862	0.982	0.98	0.79	0.79	0.78	5.00	6.99	9.69	5.4	7.5	18	0.0029	723.48	719.10	718.66	3.87	1.37	1.73	6.1
	862-861	0.796	3.14	0.82	0.64	2.02	10.00	5.48	7.77	11.1	15.7	24	0.0081	723.69	718.66	717.75	7.02	1.82	2.34	22.1
	861-860	0.214	3.36	0.81	0.65	2.19	10.00	5.48	7.77	12.0	17.0	24	0.0100	723.94	717.65	717.14	7.56	1.92	2.51	24.5
	866-860	0.914	0.91	0.75	0.75	0.69	5.00	6.99	9.69	4.8	6.6	12	0.0182	722.25	718.56	717.14	7.50	2.14	3.48	5.2
	860-859	0.357	4.63	0.62	0.67	3.10	10.00	5.48	7.77	17.0	24.1	24	0.0048	722.74	717.14	716.00	6.16	2.51	3.66	17.0
	878-877	0.626	0.63	0.52	0.52	0.33	5.00	6.99	9.69	2.3	3.2	12	0.0050	721.30	717.34	717.00	3.89	1.01	1.33	2.7
	877-876	0.259	0.89	0.85	0.62	0.55	5.00	6.99	9.69	3.8	5.3	12	0.0120	721.30	717.00	716.24	6.08	1.60	2.47	4.2
	876-875	0.347	1.23	0.77	0.66	0.81	5.00	6.99	9.69	5.7	7.9	15	0.0080	721.51	716.24	715.70	5.75	1.69	2.47	6.3
					0.00	5.00	6.99	9.69	0.00		18.00		0.01	722.21	718.50	718.42	2.50	0.81	0.98	9.40
	874-873	0.463	0.46	0.50	0.50	0.23	5.00	6.99	9.69	1.6	2.2	12	0.0201	722.21	718.42	718.42	2.50	0.81	0.98	1.7
	873-872	0.315	0.78	0.52	0.51	0.40	5.00	6.99	9.69	2.8	3.8	12	0.0059	722.21	718.42	718.11	4.27	1.17	1.59	3.0
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A review of the above computed pipe dynamics indicate compliance with the referenced criteria. The inlet capacity analysis follows:

Table 4: Inlet Capacity Analysis

Inlet	Area (ac)	C	I (in/hr)	Q10 (cfs)	Casting	Weir Perimeter (ft)	75% Clogged Perimeter (ft)	Orifice Area (sf)	50% Clogged Area (sf)	Stage Under Weir Flow (ft)	Stage Under Orifice Flow (ft)
706	0.357	0.62	4.55	1.01	R-3286-8V	4.40	3.30	0.70	0.35	0.20	0.30
707	0.623	0.49	4.55	1.39	R-3286-8V	4.40	3.30	0.70	0.35	0.25	0.14
708	0.636	0.60	4.55	1.74	R-3287-10V	5.50	4.13	2.10	1.05	0.25	0.02
709	0.565	0.75	4.55	1.93	R-3287-10V	5.50	4.13	2.10	1.05	0.27	0.12
710	0.751	0.72	4.55	2.46	R-3287-10V	5.50	4.13	2.10	1.05	0.32	0.20
712	0.287	0.75	4.55	0.98	R-3010-A	4.60	3.45	1.00	0.50	0.19	0.14
713	0.368	0.67	4.55	1.12	R-3287-10V	5.50	4.13	2.10	1.05	0.19	0.04
714	0.761	0.72	4.55	2.49	R-3287-10V	5.50	4.13	2.10	1.05	0.32	0.20
715	0.882	0.67	4.55	2.69	R-3287-15	7.50	5.63	3.20	1.60	0.27	0.10
716	0.172	0.78	4.55	0.61	R-3286-8V	4.40	3.30	0.70	0.35	0.15	0.11
717	0.205	0.68	4.55	0.63	R-3286-8V	4.40	3.30	0.70	0.35	0.15	0.12
719	0.302	0.64	4.55	0.88	R-3286-8V	4.40	3.30	0.70	0.35	0.19	0.23
721	1.05	0.64	4.55	3.06	R-3287-10V	5.50	4.13	2.10	1.05	0.37	0.30
722	0.81	0.77	4.55	2.84	R-3287-15	7.50	5.63	3.20	1.60	0.28	0.11
725	0.214	0.81	4.55	0.79	R-3010-A	4.60	3.45	1.00	0.50	0.17	0.09
726	1.294	0.74	4.55	4.36	R-3287-15	7.50	5.63	3.20	1.60	0.38	0.26
729	1.342	0.74	4.55	4.52	R-3287-15	7.50	5.63	3.20	1.60	0.39	0.28
732	0.753	0.71	4.55	2.43	R-3287-10V	5.50	4.13	2.10	1.05	0.32	0.19
733	1.167	0.79	4.55	4.19	R-3287-15	7.50	5.63	3.20	1.60	0.37	0.25
736	0.999	0.74	4.55	3.36	R-3287-15	7.50	5.63	3.20	1.60	0.32	0.16
738	0.170	0.76	4.55	0.59	R-3010-A	4.60	3.45	1.00	0.50	0.14	0.05
741	0.974	0.67	4.55	2.97	R-3287-15	7.50	5.63	3.20	1.60	0.29	0.12
742	0.327	0.61	4.55	0.91	R-3010-A	4.60	3.45	1.00	0.50	0.18	0.12
743	0.315	0.61	4.55	0.87	R-3010-A	4.60	3.45	1.00	0.50	0.18	0.11
744	1.309	0.76	4.55	4.53	R-3287-15	7.50	5.63	3.20	1.60	0.39	0.29
745	1.907	0.84	4.55	7.29	R-3572-A	12.30	9.23	4.40	2.20	0.38	0.39
746	2.057	0.85	4.55	7.96	R-3572-A	12.30	9.23	4.40	2.20	0.41	0.47
749	0.282	0.25	4.55	0.32	R-4215-C	11.30	8.48	3.30	1.65	0.05	0.00
750	0.275	0.76	4.55	0.95	R-3287-10V	5.50	4.13	2.10	1.05	0.17	0.03
751	0.224	0.75	4.55	0.76	R-3286-8V	4.40	3.30	0.70	0.35	0.17	0.17
752	0.294	0.75	4.55	1.00	R-3287-10V	5.50	4.13	2.10	1.05	0.17	0.03
753	0.22	0.75	4.55	0.75	R-3286-8V	4.40	3.30	0.70	0.35	0.17	0.16
754	0.161	0.77	4.55	0.56	R-3286-8V	4.40	3.30	0.70	0.35	0.14	0.09
756	3.202	0.25	4.55	3.64	R-4215-C	11.30	8.48	3.30	1.65	0.26	0.17
757	1.116	0.25	4.55	1.27	R-4215-C	11.30	8.48	3.30	1.65	0.13	0.02
759	0.000	0.00	4.55	0.00	R-3010-A	4.60	3.45	1.00	0.50	0.00	0.00
760	0.425	0.68	4.55	1.31	R-3287-15	7.50	5.63	3.20	1.60	0.17	0.02
761	2.291	0.56	4.55	5.84	R-3287-15	7.50	5.63	3.20	1.60	0.46	0.47
762	2.177	0.76	4.55	7.53	R-3572-A	12.30	9.23	4.40	2.20	0.39	0.42
763	2.363	0.77	4.55	8.28	R-3572-A	12.30	9.23	4.40	2.20	0.42	0.50
764	2.482	0.77	4.55	8.70	R-3572-A	12.30	9.23	4.40	2.20	0.43	0.56
766	0.408	0.72	4.55	1.34	R-3287-10V	5.50	4.13	2.10	1.05	0.21	0.06
767	0.077	0.85	4.55	0.30	R-3286-8V	4.40	3.30	0.70	0.35	0.09	0.03
768	0.300	0.61	4.55	0.83	R-3286-8V	4.40	3.30	0.70	0.35	0.18	0.20
769	0.132	0.76	4.55	0.46	R-3010-A	4.60	3.45	1.00	0.50	0.12	0.03

3.3 Detention Design

In order to design the stormwater detention system for the subject site, it is first necessary to determine the allowable release rate for the site. Per the City of Franklin, the 10 year allowable discharge shall be held to 2 year existing peak flow, while the 100 year allowable discharge shall be held to the 10 year existing peak flow. Per Section 2.0 reporting, the allowable release rates will be those in Table 5, below:

Table 5: Allowable Release Rates

10 YR	37.04	cfs
100 YR	85.90	cfs

The largest demands on the stormwater system is associated with the 24-hour event as this produces the highest runoff volumes and staging values and therefore, highest release rates. Appendix ‘B’ provides an unabridged account of all hydrologic and hydraulic input and output data associated with the proposed condition and routing data. The appropriate quartile Huff distribution is applied to the rainfall depths obtained from Technical Reference 20 for the City of Franklin. Table 6 provides a summary of proposed discharges from the stormwater system.

Table 6: Wet Pond Staging and Release Summary

	North Pond	South Pond
Normal Pool	716.0	715.7
10 YR Stage	718.4	718.1
10 YR Release	1.8	15.4
100 YR Stage	719.5	719.0
100 YR Release	2.3	24.0
100 YR w/ 100 YR TW	719.9	720.8

The computed release rates summarized above are far below the allowable outfall rate. The release rates reported are maximum rates computed without tailwater in the Amity Ditch. In order to check against flood hazard, the last row is included to report the 100 year stage in each pond when discharging against a 100 year flood event in the Amity Ditch.

3.4 Emergency Overflow Design

With only the development of Lot 1, with full pond construction for future sections, the emergency overflow weir design will be deferred until the adjacent contributions and final pond configurations are set.

4.0. WATER QUALITY DESIGN

To demonstrate the adequacy of the water quality provided by the eastern wet pond BMP, the water quality volume (WQv) routed to each pond must first be computed. This is summarized in Table 7 and 8, below:

Table 7: WQv Computation Summary – North Pond

BLD 2	Total (ac)	Impervious	P (in)	Rv	WQv (ac-ft)
DA POND BLD2 N	7.020	3.112	1	0.449	0.263
DA823	0.142	0.112	1	0.760	0.009
DA824	0.456	0.406	1	0.852	0.032
DA825	0.507	0.451	1	0.850	0.036
DA826	0.691	0.491	1	0.689	0.040
DA828	0.230	0.207	1	0.859	0.016
DA829	0.127	0.110	1	0.832	0.009
DA830	0.748	0.748	1	0.950	0.059
DA832	1.285	1.246	1	0.922	0.099
DA833	1.418	1.418	1	0.950	0.112
DA835	0.994	0.994	1	0.950	0.079
DA836	1.418	1.418	1	0.950	0.112
DA838	0.994	0.994	1	0.950	0.079
DA839	1.418	1.418	1	0.950	0.112
DA841	0.985	0.985	1	0.950	0.078
DA842	1.418	1.418	1	0.950	0.112
DA844	0.994	0.994	1	0.950	0.079
DA845	1.418	1.418	1	0.950	0.112
DA847	0.994	0.994	1	0.950	0.079
DA848	1.418	1.418	1	0.950	0.112
DA850	0.994	0.994	1	0.950	0.079
DA851	1.418	1.418	1	0.950	0.112
DA853	0.894	0.850	1	0.906	0.067
DA854	1.418	1.418	1	0.950	0.112
DA856	0.279	0.188	1	0.655	0.015
DA857	0.142	0.118	1	0.795	0.009
DA858	0.748	0.748	1	0.950	0.059
DA860	0.357	0.220	1	0.605	0.018
DA861	0.214	0.199	1	0.886	0.016
DA862	0.796	0.750	1	0.898	0.060
DA863	0.982	0.884	1	0.860	0.070
DA864	0.497	0.301	1	0.595	0.025
DA865	0.686	0.108	1	0.192	0.011
DA866	0.914	0.756	1	0.794	0.061
Total Pond2 North	35.018	29.307			2.344

Table 8: WQv Computation Summary – South Pond

BLD 2	Total (ac)	Impervious	P (in)	Rv	WQv (ac-ft)
DA POND BLD2 S	9.122	3.429	1	0.388	0.295
DA706	0.371	0.241	1	0.634	0.020
DA707	0.570	0.288	1	0.505	0.024
DA707A	0.193	0.135	1	0.681	0.011
DA708	0.868	0.838	1	0.919	0.066
DA709	0.565	0.474	1	0.805	0.038
DA710	0.751	0.592	1	0.759	0.048
DA712	0.345	0.240	1	0.676	0.019
DA713	0.368	0.255	1	0.673	0.021
DA714	0.761	0.591	1	0.749	0.048
DA715	0.882	0.611	1	0.673	0.049
DA716	0.172	0.151	1	0.843	0.012
DA717	0.205	0.147	1	0.693	0.012
DA760	0.403	0.283	1	0.683	0.023
DA761	2.409	1.285	1	0.530	0.106
DA762	2.309	1.927	1	0.801	0.154
DA763	2.504	2.131	1	0.816	0.170
DA764	2.628	2.190	1	0.800	0.175
DA765	1.773	1.773	1	0.950	0.140
DA766	0.393	0.306	1	0.752	0.025
DA767	0.077	0.077	1	0.950	0.006
DA768	0.300	0.182	1	0.596	0.015
DA769	0.132	0.112	1	0.819	0.009
DA770	0.650	0.650	1	0.950	0.051
DA771	1.418	1.418	1	0.950	0.112
DA772	1.418	1.418	1	0.950	0.112
DA774	0.570	0.434	1	0.735	0.035
DA775	0.331	0.304	1	0.876	0.024
DA777	0.050	0.043	1	0.832	0.003
DA778	0.038	0.033	1	0.844	0.003
DA779	0.471	0.420	1	0.852	0.033
DA780	0.451	0.402	1	0.853	0.032
DA781	0.691	0.432	1	0.613	0.035
DA783	0.287	0.237	1	0.795	0.019
DA784	0.127	0.111	1	0.838	0.009
DA785	0.748	0.748	1	0.950	0.059
DA787	1.286	1.245	1	0.921	0.099
DA788	1.418	1.418	1	0.950	0.112
DA790	0.994	0.994	1	0.950	0.079
DA791	1.418	1.418	1	0.950	0.112

Table 8: WQv Computation Summary – South Pond (cont.)

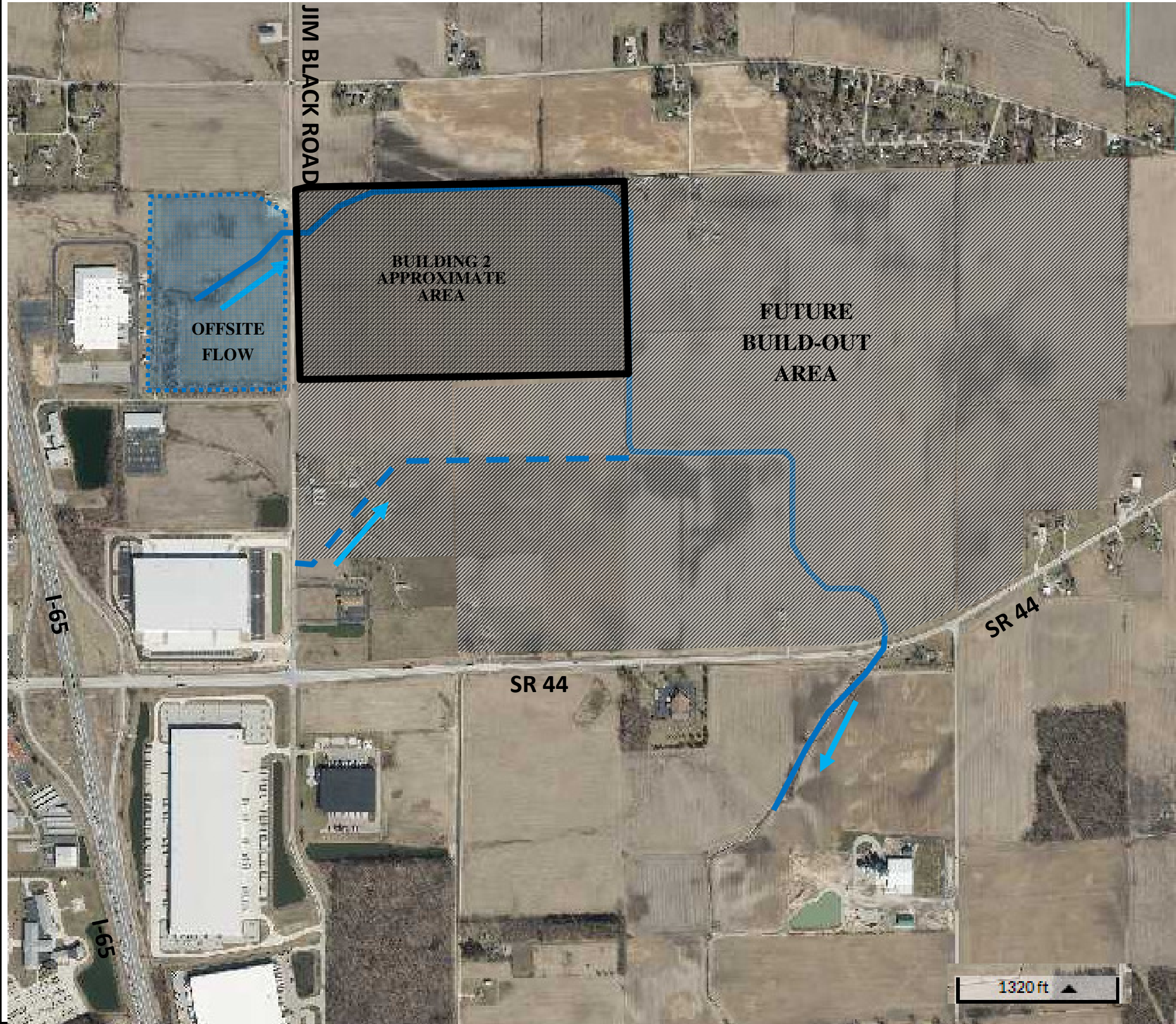
BLD 2	Total (ac)	Impervious	P (in)	Rv	WQv (ac-ft)
DA793	0.994	0.994	1	0.950	0.079
DA794	1.418	1.418	1	0.950	0.112
DA796	0.985	0.985	1	0.950	0.078
DA797	1.418	1.418	1	0.950	0.112
DA799	0.994	0.994	1	0.950	0.079
DA800	1.418	1.418	1	0.950	0.112
DA802	0.994	0.994	1	0.950	0.079
DA803	1.418	1.418	1	0.950	0.112
DA805	0.994	0.994	1	0.950	0.079
DA806	1.418	1.418	1	0.950	0.112
DA808	1.022	0.954	1	0.890	0.076
DA809	0.154	0.128	1	0.799	0.010
DA810	0.748	0.748	1	0.950	0.059
DA811	1.418	1.418	1	0.950	0.112
DA813	0.636	0.372	1	0.576	0.031
DA814	1.058	0.982	1	0.886	0.078
DA815	0.982	0.891	1	0.867	0.071
DA816	0.503	0.305	1	0.596	0.025
DA817	1.121	0.152	1	0.172	0.016
DA818	0.923	0.514	1	0.551	0.042
DA819	0.286	0.232	1	0.779	0.019
DA868B	0.884	0.791	1	0.855	0.063
DA868A	0.790	0.748	1	0.903	0.059
DA868	0.664	0.630	1	0.903	0.050
DA869	0.902	0.394	1	0.443	0.033
DA870	0.459	0.396	1	0.828	0.032
DA872	0.360	0.311	1	0.828	0.025
DA873	0.315	0.144	1	0.462	0.012
DA874	0.463	0.190	1	0.419	0.016
DA876	0.347	0.300	1	0.828	0.024
DA877	0.259	0.259	1	0.950	0.021
DA878	0.626	0.282	1	0.456	0.024
Total Pond2 South	67.438	53.177			4.269

For a watershed and pond of this scale, the drain time of the wet pond will far exceed the extended detention time required by Standard. The primary concern for the water quality design here is to ensure that the ratio of WQv to normal pool volume is at least 3.0 to ensure an adequate volume for which to settle out suspended sediment. Given Table 7 and 8 results, the North Pond should be designed with at least 7.0 ac-ft of storage below normal pool, while the South Pond should provide at least 12.8 ac-ft of storage below normal pool to ensure adequate settling capacity for the proposed inflow. The volumes below NP are summarized in Table 9, below:

Table 9: NP Volume Wet Pond BMP

South Pond				North Pond			
Elevation	Area (sf)	Cum Vol (cf)	Cum Vol (ac-ft)	Elevation	Area (sf)	Cum Vol (cf)	Cum Vol (ac-ft)
706	36029	0	0.00	706	22168	0	0.00
713.99	98295	536624	12.32	713.99	79178	404877	9.29
714	122107	537726	12.34	714	103166	405789	9.32
715.7	149368	768480	17.64	716	135543	644498	14.80

As seen above, the proposed wet ponds exceed the volume requirement in its permanent pool versus the expected WQ inflow volume to allow for long term settlement of suspended sediments.




AMITY DITCH

OWEN TILE

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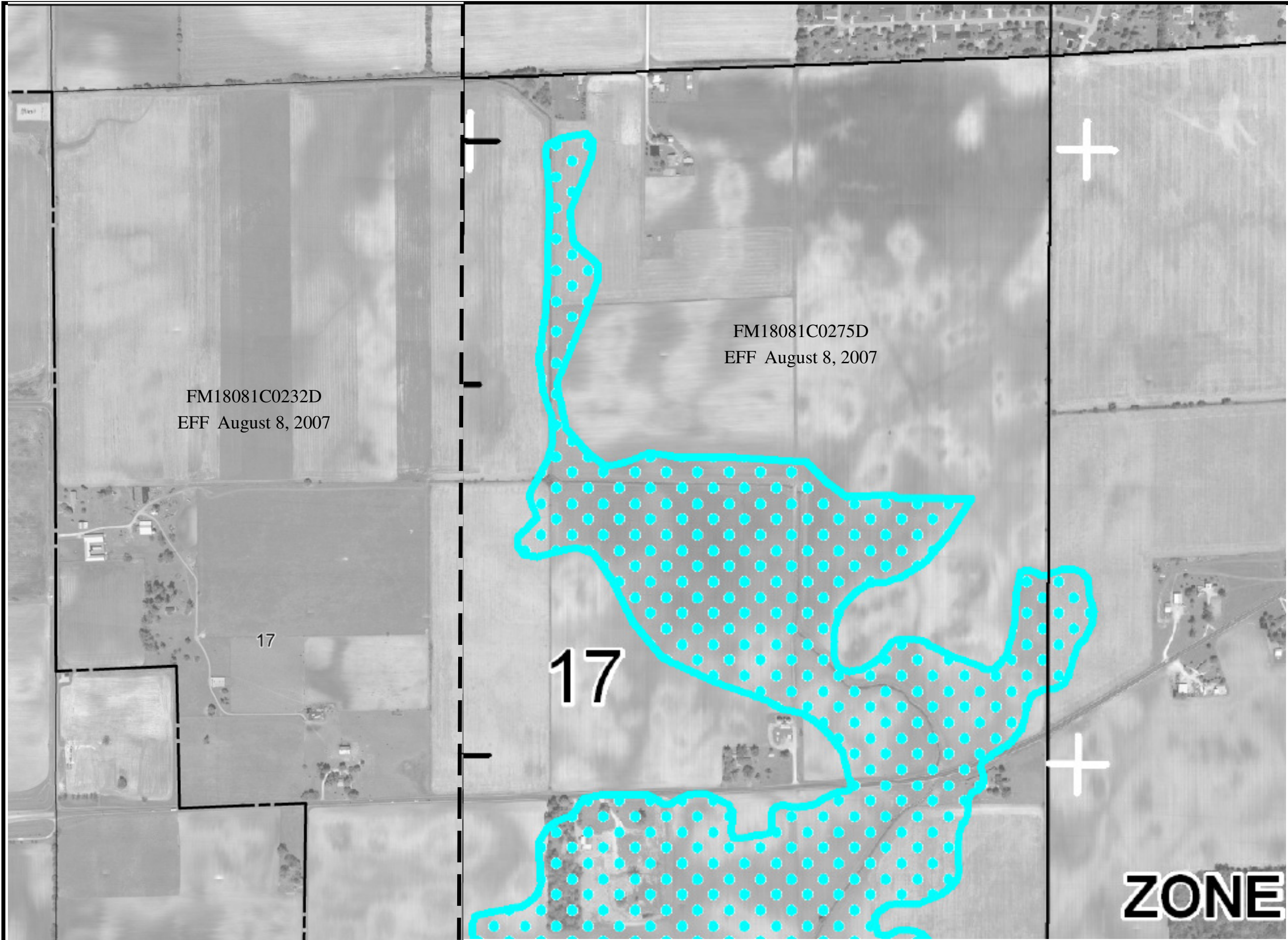


OVERALL SITE LOCATION

I-65 South Commerce Park

Aerial Mapping and Property Boundary

Figure 1

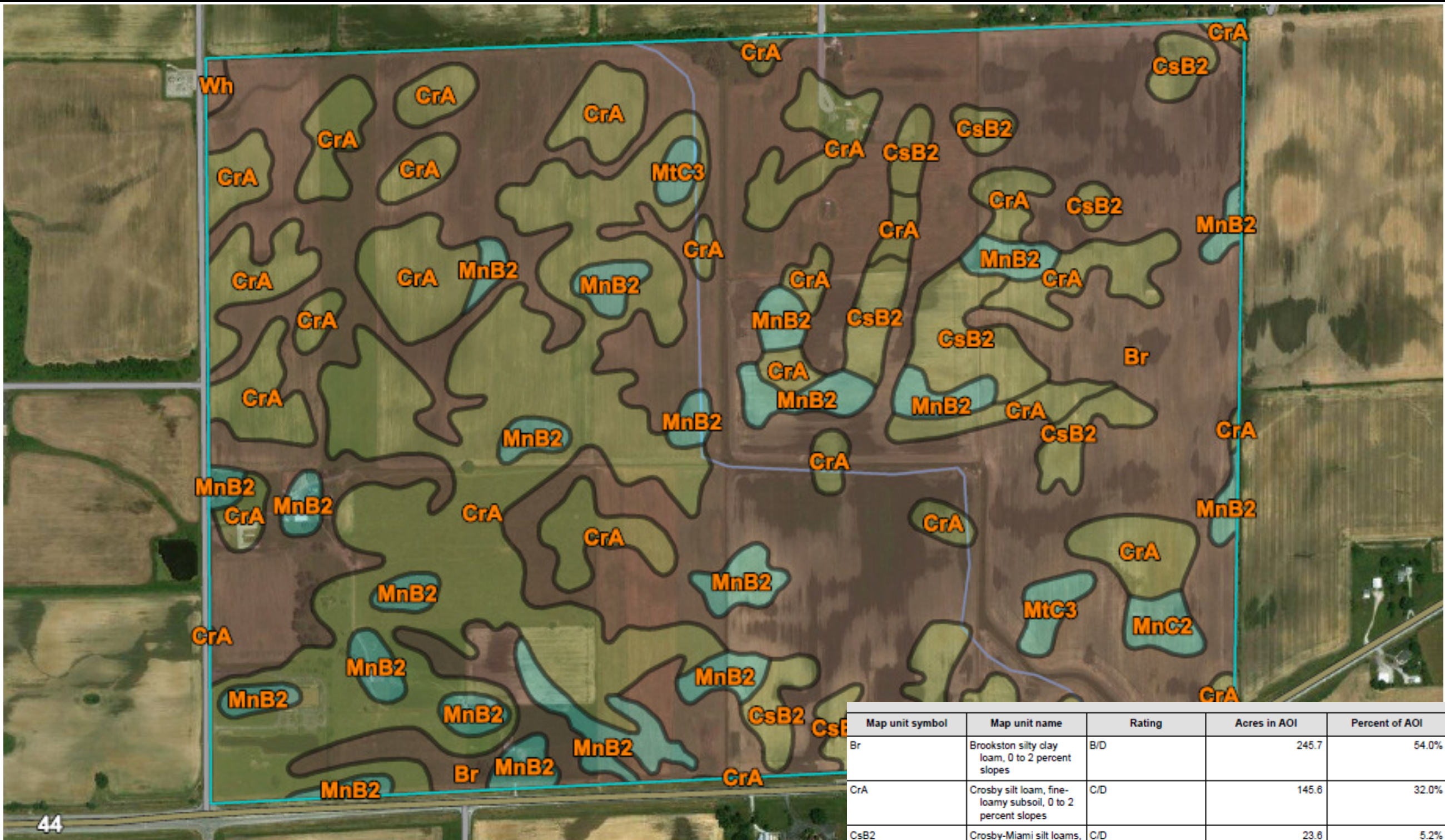


FEMA FIRM

I-65 South Commerce Park

NRCS SOIL MAPPING

Figure 2



Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Br	Brookston silty clay loam, 0 to 2 percent slopes	B/D	245.7	54.0%
CrA	Crosby silt loam, fine-loamy subsoil, 0 to 2 percent slopes	C/D	145.6	32.0%
CsB2	Crosby-Miami silt loams, 2 to 4 percent slopes, eroded	C/D	23.6	5.2%
MnB2	Miami silt loam, 2 to 6 percent slopes, eroded	C	33.9	7.5%
MnC2	Miami silt loam, 6 to 12 percent slopes, eroded	C	2.3	0.5%
MtC3	Miami clay loam, 6 to 12 percent slopes, severely eroded	C	3.4	0.7%
Wh	Whitaker silt loam, 0 to 2 percent slopes	B/D	0.7	0.2%
Totals for Area of Interest			455.1	100.0%

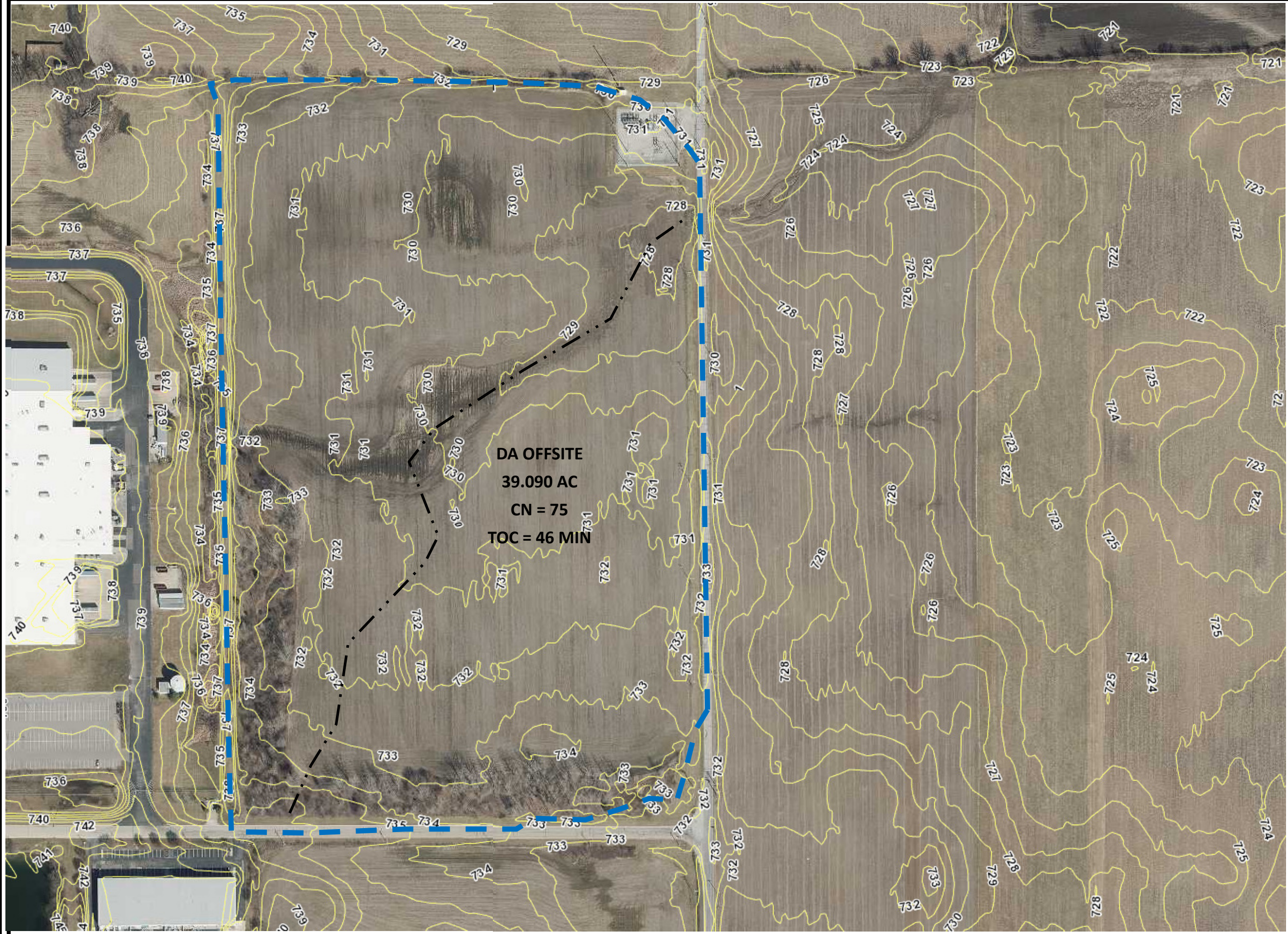
Prepared by:
Studio A of Indianapolis, Inc.



USDA Soil Mapping

Franklin Properties - Buildings OVERALL SITE
NRCS SOIL MAPPING
JOHNSON COUNTY, INDIANA

Figure 3



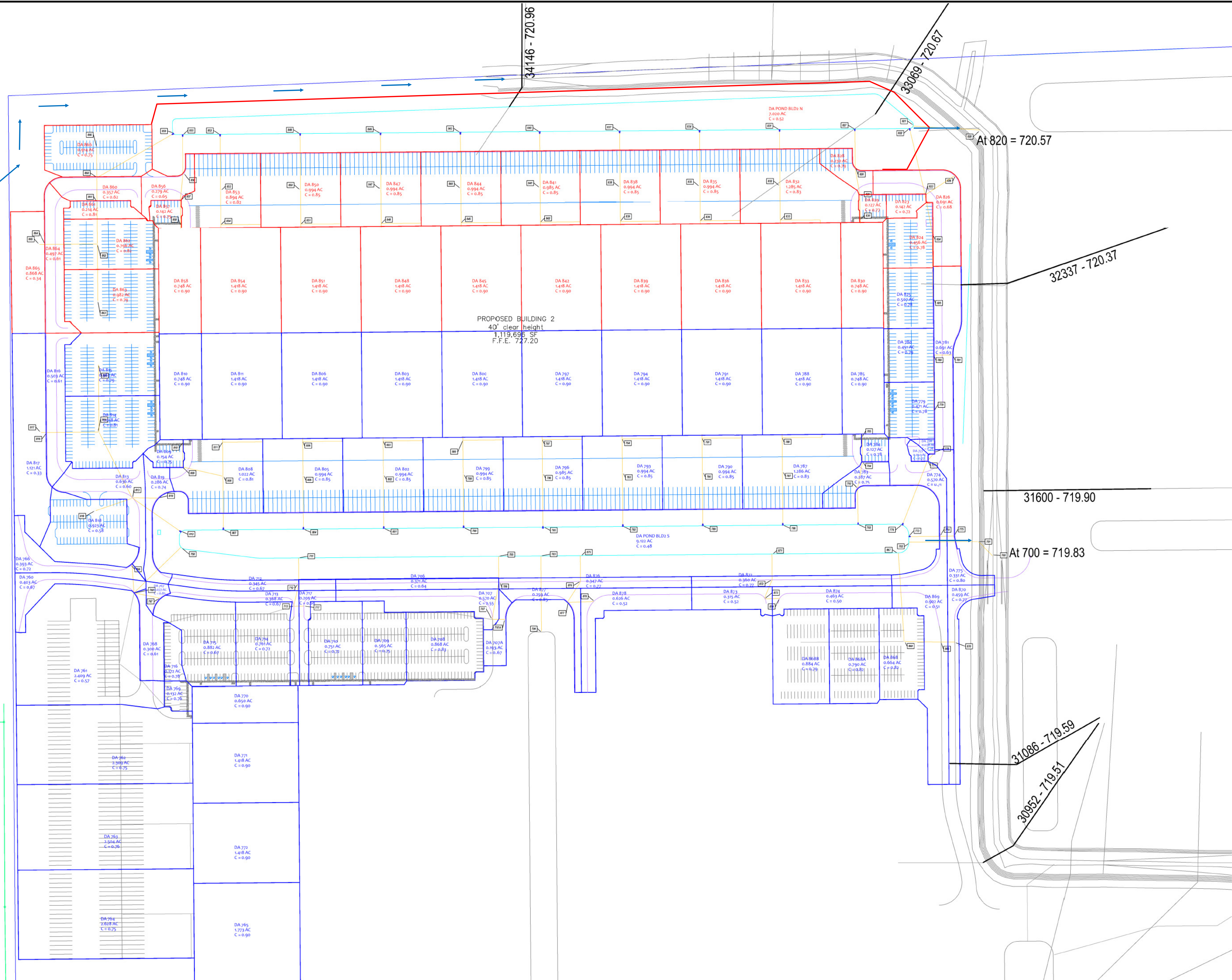
Prepared by:
Studio A of Indianapolis, Inc.



Offsite Flow Area Detail

Franklin Properties
JOHNSON COUNTY, INDIANA

Figure 4



Proposed Delineation and Routing

Franklin Properties - Building 2
JOHNSON COUNTY, INDIANA

Prepared by:
Studio A of Indianapolis, Inc.



Figure 5

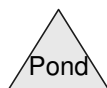
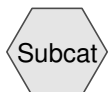
Appendix A

10 YR and 100 YR Existing Condition

Release Rate Analysis



BLD 2 EX



BLD2 Detention

Prepared by Studio A

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Existing Condition Peak Analysis

Indy Huff 1st Quartile 1.00 hrs 2YR1HR Rainfall=1.25"

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Page 2

Summary for Subcatchment 82S: BLD 2 EX

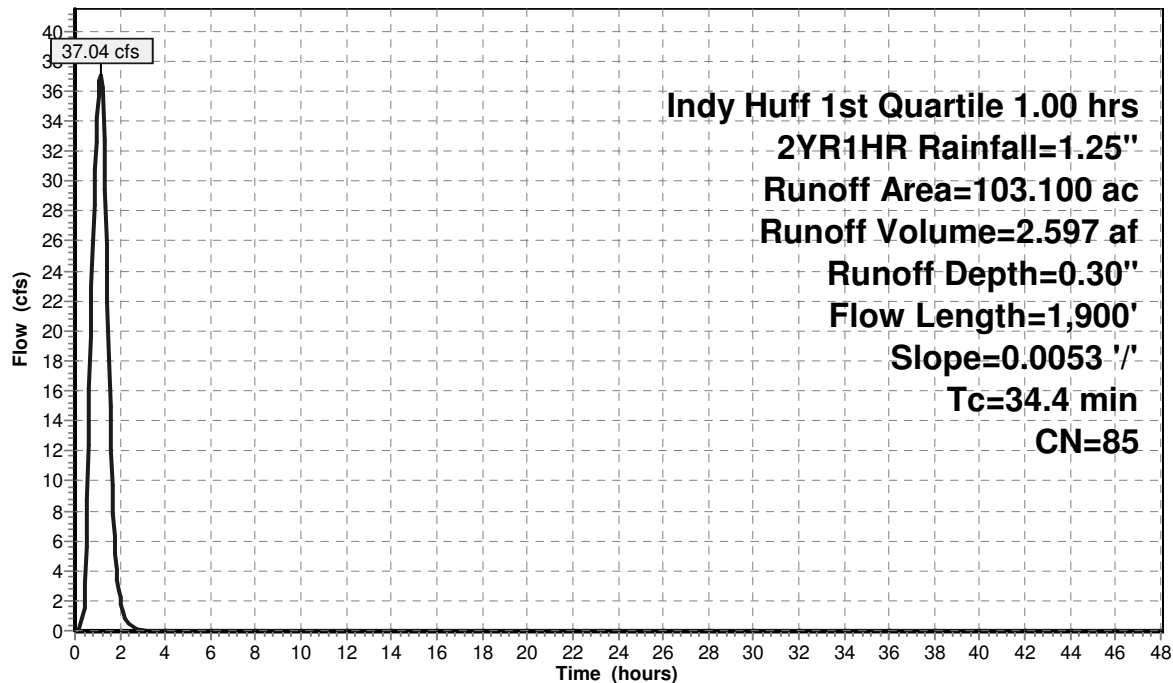
Runoff = 37.04 cfs @ 1.15 hrs, Volume= 2.597 af, Depth= 0.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Indy Huff 1st Quartile 1.00 hrs 2YR1HR Rainfall=1.25"

Area (ac)	CN	Description
0.643	98	Paved parking, HSG D
8.914	82	Row crops, SR + CR, Good, HSG C
93.543	85	Row crops, SR + CR, Good, HSG D
103.100	85	Weighted Average
102.457		99.38% Pervious Area
0.643		0.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0053	0.19		Sheet Flow, Sheet Component
					Cultivated: Residue<=20% n= 0.060 P2= 2.64"
25.6	1,800	0.0053	1.17		Shallow Concentrated Flow, Shallow Component
					Unpaved Kv= 16.1 fps
34.4	1,900	Total			

Subcatchment 82S: BLD 2 EX**Hydrograph**

BLD2 Detention

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Existing Condition Peak Analysis

Indy Huff 1st Quartile 2.00 hrs 2YR2HR Rainfall=1.52"

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Summary for Subcatchment 82S: BLD 2 EX

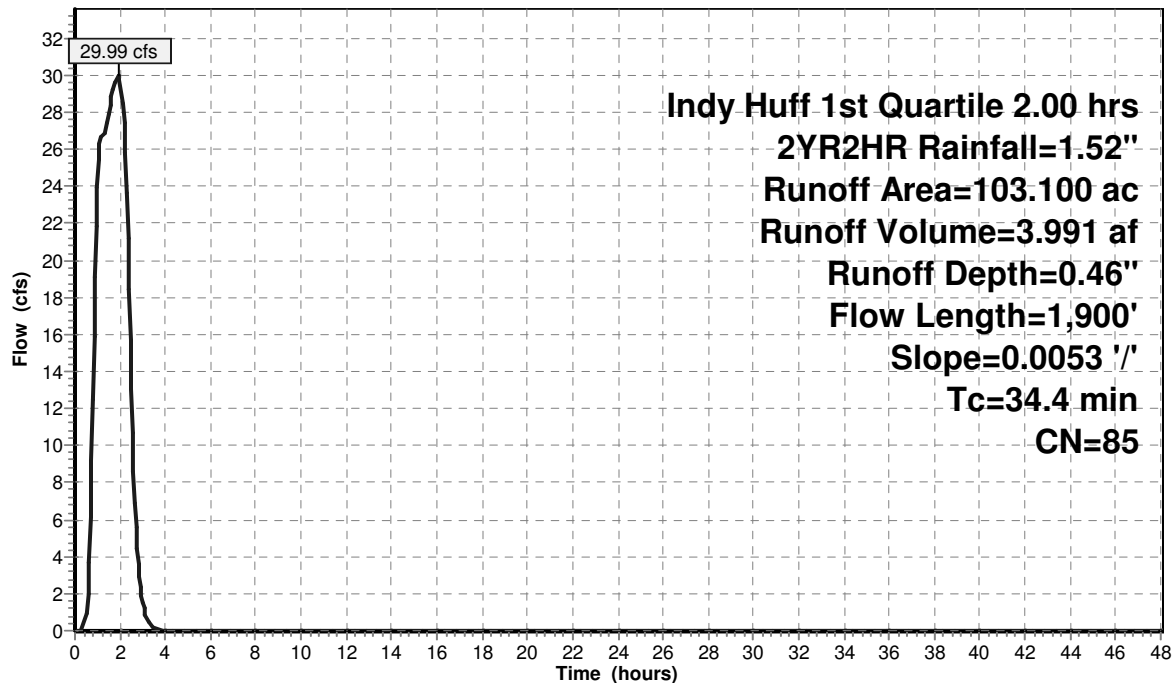
Runoff = 29.99 cfs @ 1.90 hrs, Volume= 3.991 af, Depth= 0.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Indy Huff 1st Quartile 2.00 hrs 2YR2HR Rainfall=1.52"

Area (ac)	CN	Description
0.643	98	Paved parking, HSG D
8.914	82	Row crops, SR + CR, Good, HSG C
93.543	85	Row crops, SR + CR, Good, HSG D
103.100	85	Weighted Average
102.457		99.38% Pervious Area
0.643		0.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0053	0.19		Sheet Flow, Sheet Component
					Cultivated: Residue<=20% n= 0.060 P2= 2.64"
25.6	1,800	0.0053	1.17		Shallow Concentrated Flow, Shallow Component
					Unpaved Kv= 16.1 fps
34.4	1,900	Total			

Subcatchment 82S: BLD 2 EX**Hydrograph**

BLD2 Detention

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Existing Condition Peak Analysis

Indy Huff 1st Quartile 0.50 hrs 2YR30MIN Rainfall=0.99"

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Summary for Subcatchment 82S: BLD 2 EX

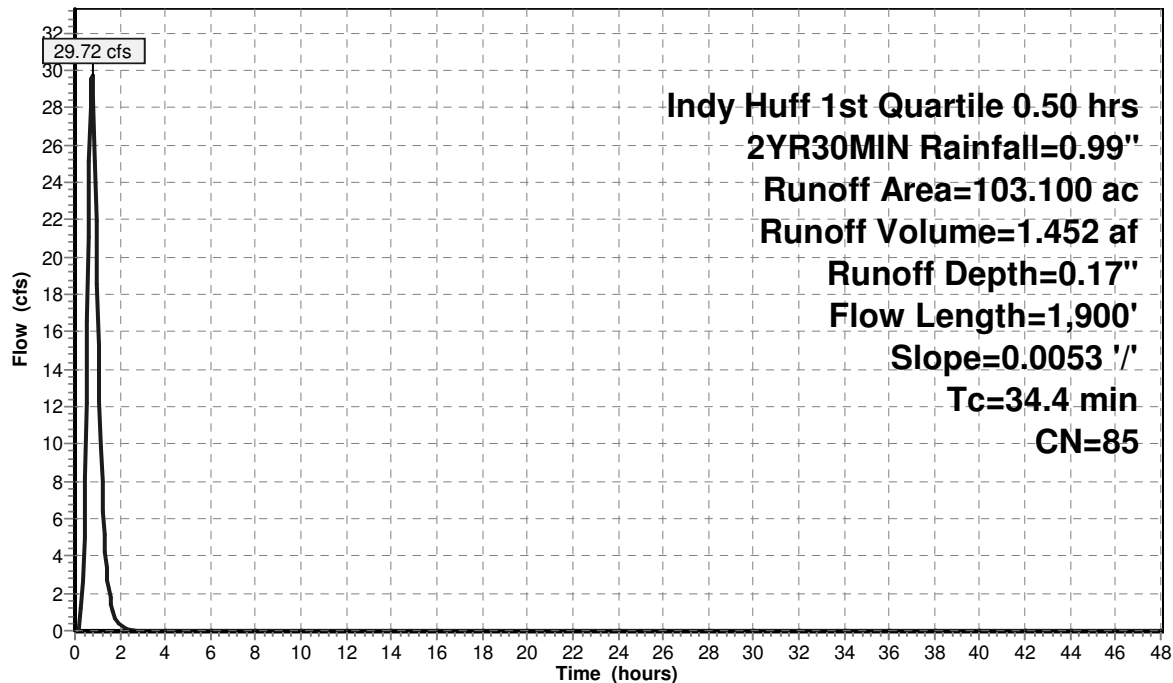
Runoff = 29.72 cfs @ 0.77 hrs, Volume= 1.452 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Indy Huff 1st Quartile 0.50 hrs 2YR30MIN Rainfall=0.99"

Area (ac)	CN	Description
0.643	98	Paved parking, HSG D
8.914	82	Row crops, SR + CR, Good, HSG C
93.543	85	Row crops, SR + CR, Good, HSG D
103.100	85	Weighted Average
102.457		99.38% Pervious Area
0.643		0.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0053	0.19		Sheet Flow, Sheet Component
					Cultivated: Residue<=20% n= 0.060 P2= 2.64"
25.6	1,800	0.0053	1.17		Shallow Concentrated Flow, Shallow Component
					Unpaved Kv= 16.1 fps
34.4	1,900	Total			

Subcatchment 82S: BLD 2 EX**Hydrograph**

BLD2 Detention

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Existing Condition Peak Analysis

Indy Huff 1st Quartile 1.00 hrs 10YR1HR Rainfall=1.96"

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Summary for Subcatchment 82S: BLD 2 EX

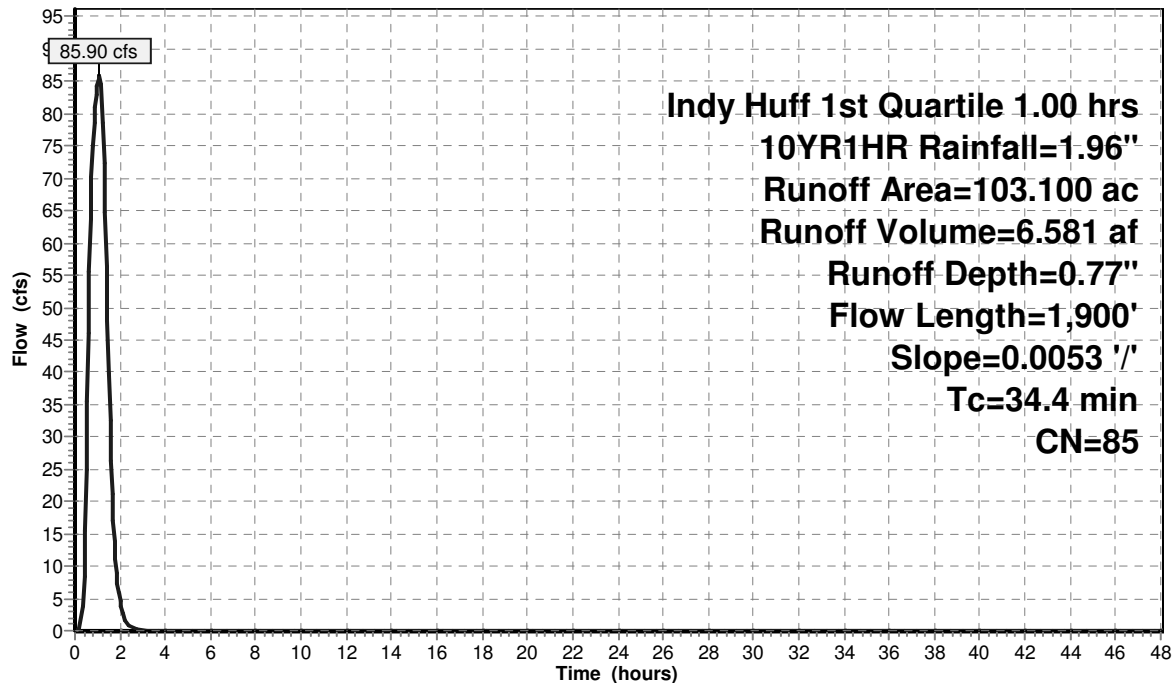
Runoff = 85.90 cfs @ 1.09 hrs, Volume= 6.581 af, Depth= 0.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Indy Huff 1st Quartile 1.00 hrs 10YR1HR Rainfall=1.96"

Area (ac)	CN	Description
0.643	98	Paved parking, HSG D
8.914	82	Row crops, SR + CR, Good, HSG C
93.543	85	Row crops, SR + CR, Good, HSG D
103.100	85	Weighted Average
102.457		99.38% Pervious Area
0.643		0.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0053	0.19		Sheet Flow, Sheet Component
					Cultivated: Residue<=20% n= 0.060 P2= 2.64"
25.6	1,800	0.0053	1.17		Shallow Concentrated Flow, Shallow Component
					Unpaved Kv= 16.1 fps
34.4	1,900	Total			

Subcatchment 82S: BLD 2 EX**Hydrograph**

BLD2 Detention

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Existing Condition Peak Analysis

Indy Huff 1st Quartile 2.00 hrs 10YR2HR Rainfall=2.40"

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Summary for Subcatchment 82S: BLD 2 EX

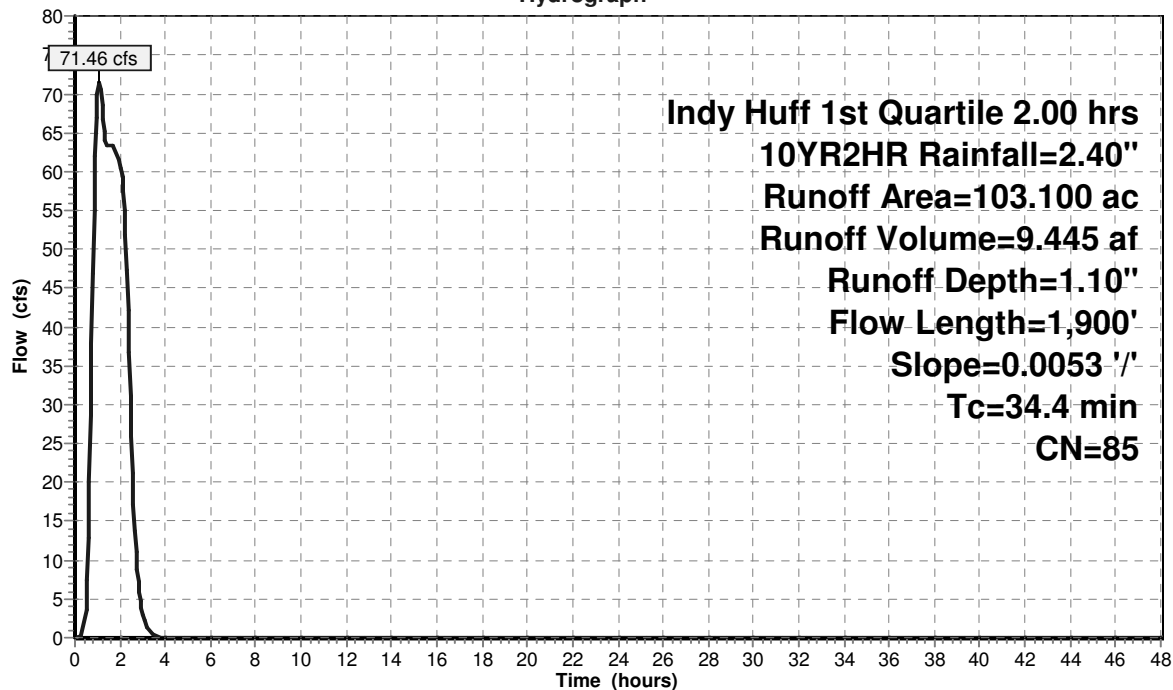
Runoff = 71.46 cfs @ 1.07 hrs, Volume= 9.445 af, Depth= 1.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Indy Huff 1st Quartile 2.00 hrs 10YR2HR Rainfall=2.40"

Area (ac)	CN	Description
0.643	98	Paved parking, HSG D
8.914	82	Row crops, SR + CR, Good, HSG C
93.543	85	Row crops, SR + CR, Good, HSG D
103.100	85	Weighted Average
102.457		99.38% Pervious Area
0.643		0.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0053	0.19		Sheet Flow, Sheet Component
					Cultivated: Residue<=20% n= 0.060 P2= 2.64"
25.6	1,800	0.0053	1.17		Shallow Concentrated Flow, Shallow Component
					Unpaved Kv= 16.1 fps
34.4	1,900	Total			

Subcatchment 82S: BLD 2 EX**Hydrograph**

BLD2 Detention

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Existing Condition Peak Analysis

Indy Huff 1st Quartile 0.50 hrs 10YR30MIN Rainfall=1.55"

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Summary for Subcatchment 82S: BLD 2 EX

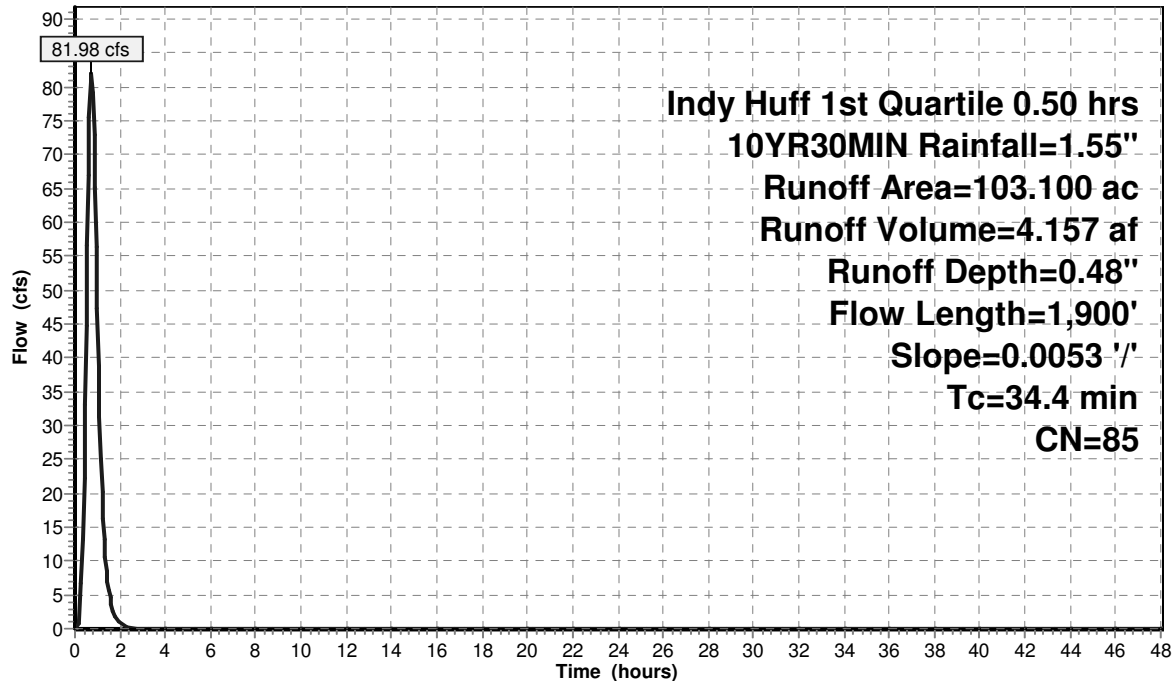
Runoff = 81.98 cfs @ 0.74 hrs, Volume= 4.157 af, Depth= 0.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Indy Huff 1st Quartile 0.50 hrs 10YR30MIN Rainfall=1.55"

Area (ac)	CN	Description
0.643	98	Paved parking, HSG D
8.914	82	Row crops, SR + CR, Good, HSG C
93.543	85	Row crops, SR + CR, Good, HSG D
103.100	85	Weighted Average
102.457		99.38% Pervious Area
0.643		0.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0053	0.19		Sheet Flow, Sheet Component
					Cultivated: Residue<=20% n= 0.060 P2= 2.64"
25.6	1,800	0.0053	1.17		Shallow Concentrated Flow, Shallow Component
					Unpaved Kv= 16.1 fps
34.4	1,900	Total			

Subcatchment 82S: BLD 2 EX**Hydrograph**

BLD2 Detention

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Existing Condition Peak Analysis

Indy Huff 1st Quartile 0.25 hrs 100YR15MIN Rainfall=1.63"

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Summary for Subcatchment 82S: BLD 2 EX

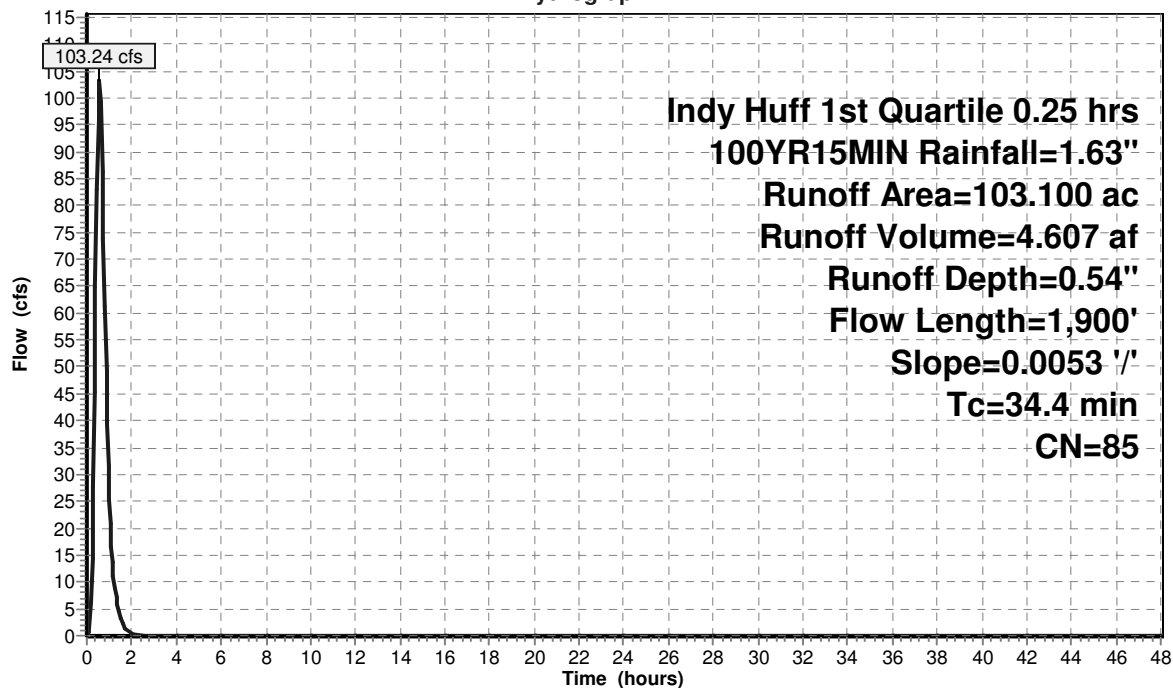
Runoff = 103.24 cfs @ 0.57 hrs, Volume= 4.607 af, Depth= 0.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Indy Huff 1st Quartile 0.25 hrs 100YR15MIN Rainfall=1.63"

Area (ac)	CN	Description
0.643	98	Paved parking, HSG D
8.914	82	Row crops, SR + CR, Good, HSG C
93.543	85	Row crops, SR + CR, Good, HSG D
103.100	85	Weighted Average
102.457		99.38% Pervious Area
0.643		0.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0053	0.19		Sheet Flow, Sheet Component
					Cultivated: Residue<=20% n= 0.060 P2= 2.64"
25.6	1,800	0.0053	1.17		Shallow Concentrated Flow, Shallow Component
					Unpaved Kv= 16.1 fps
34.4	1,900	Total			

Subcatchment 82S: BLD 2 EX**Hydrograph**

BLD2 Detention

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Existing Condition Peak Analysis

Indy Huff 1st Quartile 1.00 hrs 100YR1HR Rainfall=2.88"

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Summary for Subcatchment 82S: BLD 2 EX

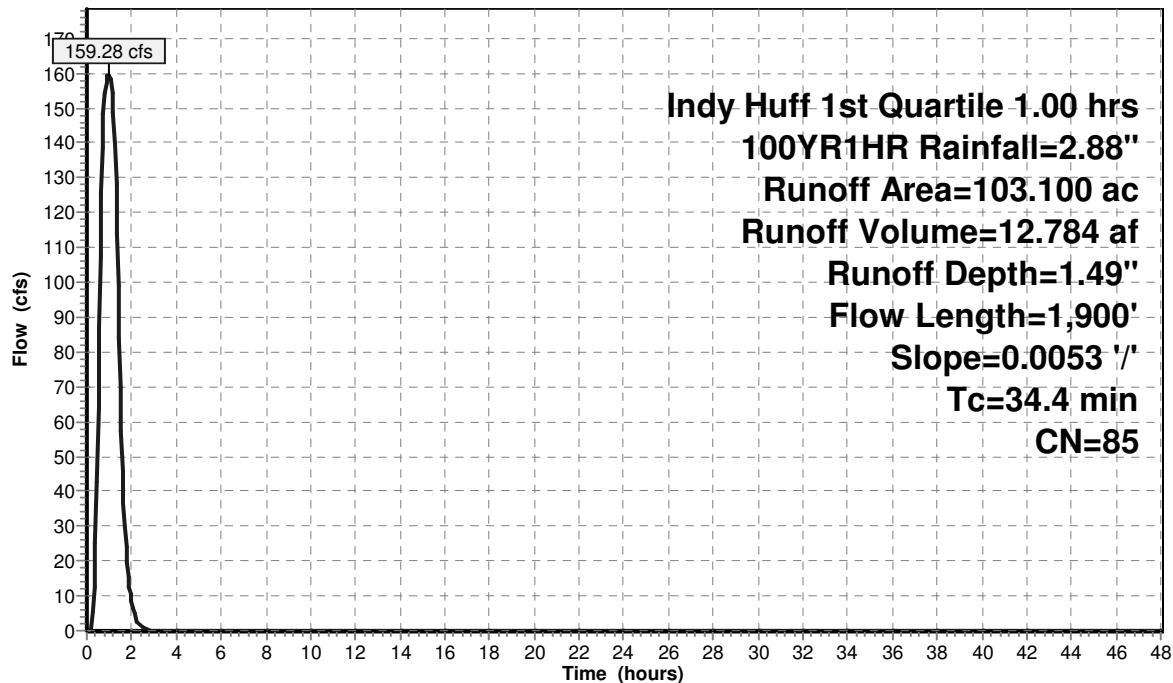
Runoff = 159.28 cfs @ 0.96 hrs, Volume= 12.784 af, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Indy Huff 1st Quartile 1.00 hrs 100YR1HR Rainfall=2.88"

Area (ac)	CN	Description
0.643	98	Paved parking, HSG D
8.914	82	Row crops, SR + CR, Good, HSG C
93.543	85	Row crops, SR + CR, Good, HSG D
103.100	85	Weighted Average
102.457		99.38% Pervious Area
0.643		0.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0053	0.19		Sheet Flow, Sheet Component
					Cultivated: Residue<=20% n= 0.060 P2= 2.64"
25.6	1,800	0.0053	1.17		Shallow Concentrated Flow, Shallow Component
					Unpaved Kv= 16.1 fps
34.4	1,900	Total			

Subcatchment 82S: BLD 2 EX**Hydrograph**

BLD2 Detention

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Existing Condition Peak Analysis

Indy Huff 1st Quartile 0.50 hrs 100YR30MIN Rainfall=2.25"

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Summary for Subcatchment 82S: BLD 2 EX

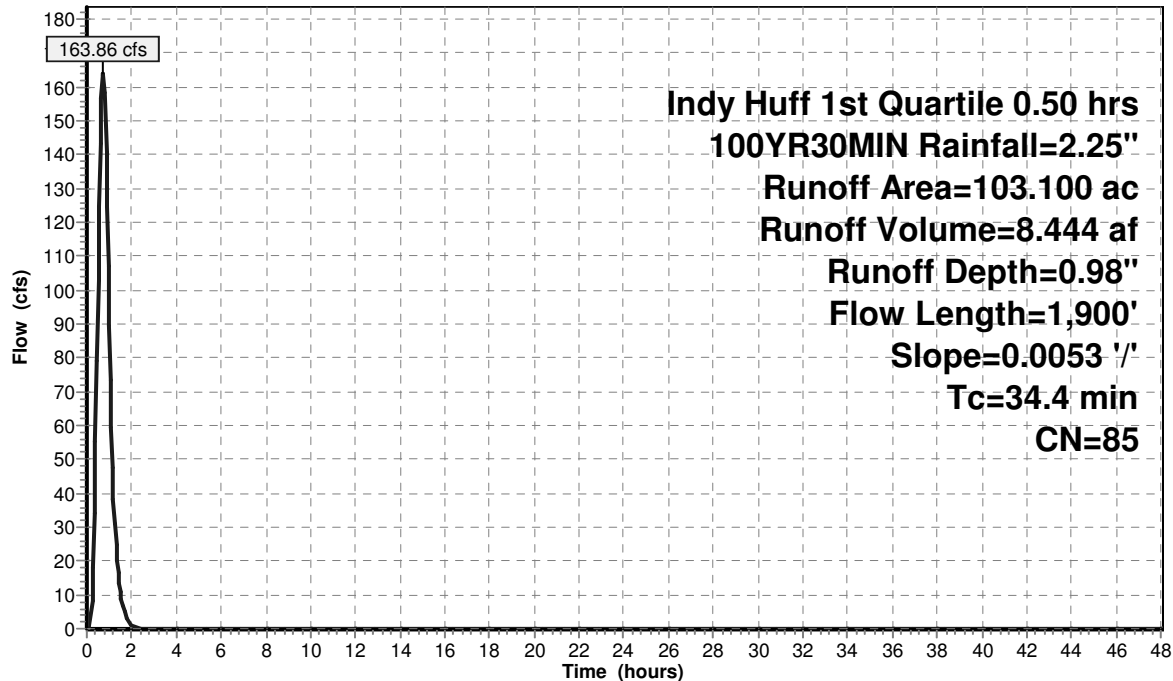
Runoff = 163.86 cfs @ 0.72 hrs, Volume= 8.444 af, Depth= 0.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Indy Huff 1st Quartile 0.50 hrs 100YR30MIN Rainfall=2.25"

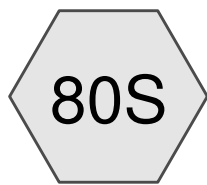
Area (ac)	CN	Description
0.643	98	Paved parking, HSG D
8.914	82	Row crops, SR + CR, Good, HSG C
93.543	85	Row crops, SR + CR, Good, HSG D
103.100	85	Weighted Average
102.457		99.38% Pervious Area
0.643		0.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0053	0.19		Sheet Flow, Sheet Component
					Cultivated: Residue<=20% n= 0.060 P2= 2.64"
25.6	1,800	0.0053	1.17		Shallow Concentrated Flow, Shallow Component
					Unpaved Kv= 16.1 fps
34.4	1,900	Total			

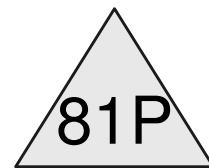
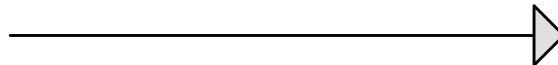
Subcatchment 82S: BLD 2 EX**Hydrograph**

Appendix B

10 YR and 100 YR Proposed Condition
Modeling



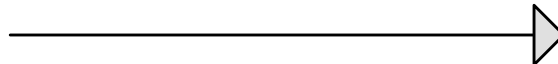
BLD2 Pond North



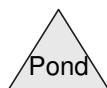
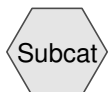
BLD2 Pond North



BLD2 Pond South



BLD2 Pond South



Routing Diagram for BLD2 Detention

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BLD2 Detention

Prepared by Studio A

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Proposed Condition - No Tailwater

Indy Huff 4th Quartile 10YR24HR Rainfall=4.08"

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Page 2

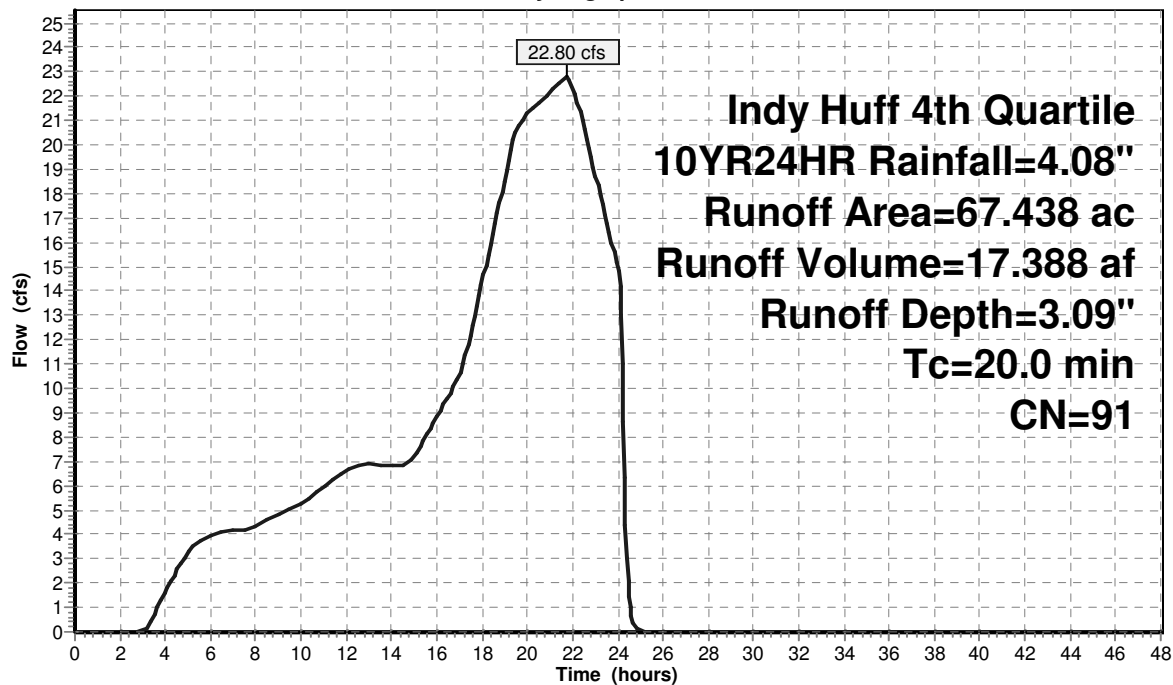
Summary for Subcatchment 78S: BLD2 Pond South

Runoff = 22.80 cfs @ 21.78 hrs, Volume= 17.388 af, Depth= 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Indy Huff 4th Quartile 10YR24HR Rainfall=4.08"

Area (ac)	CN	Description
* 67.438	91	
67.438		100.00% Pervious Area

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

Subcatchment 78S: BLD2 Pond South**Hydrograph**

BLD2 Detention

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Proposed Condition - No Tailwater

Indy Huff 4th Quartile 10YR24HR Rainfall=4.08"

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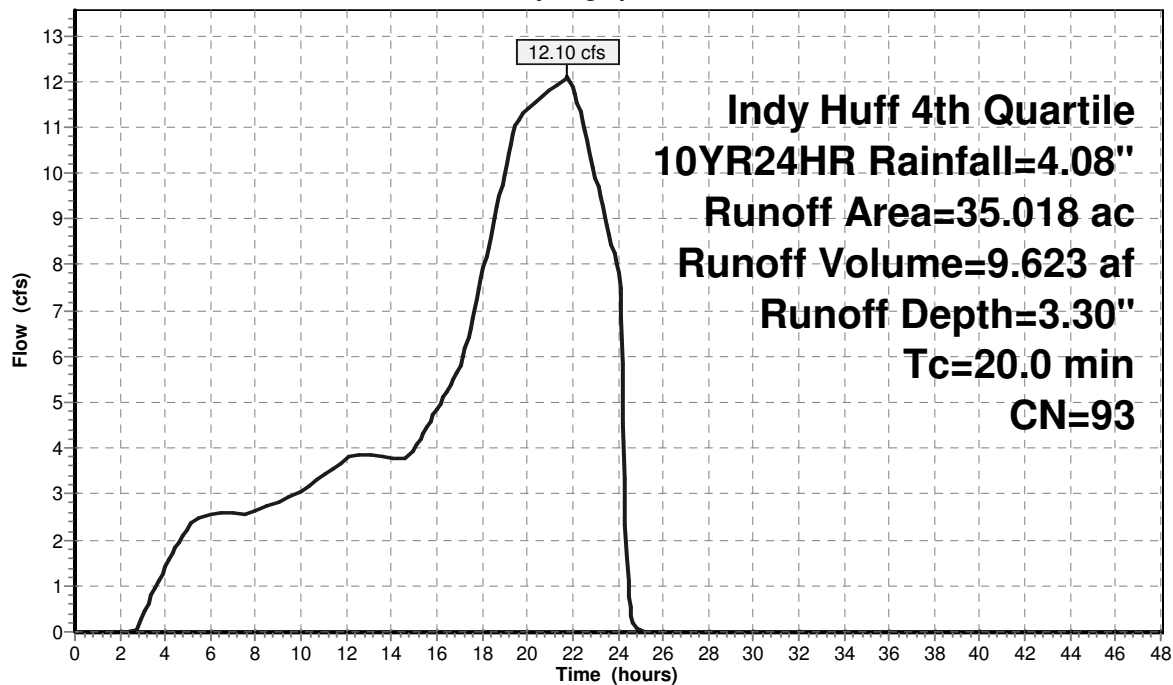
Summary for Subcatchment 80S: BLD2 Pond North

Runoff = 12.10 cfs @ 21.78 hrs, Volume= 9.623 af, Depth= 3.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Indy Huff 4th Quartile 10YR24HR Rainfall=4.08"

Area (ac)	CN	Description
* 35.018	93	
35.018		100.00% Pervious Area

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

Subcatchment 80S: BLD2 Pond North**Hydrograph**

BLD2 Detention

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Proposed Condition - No Tailwater

Indy Huff 4th Quartile 10YR24HR Rainfall=4.08"

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Summary for Pond 79P: BLD2 Pond South

Inflow Area = 67.438 ac, 0.00% Impervious, Inflow Depth = 3.09" for 10YR24HR event
 Inflow = 22.80 cfs @ 21.78 hrs, Volume= 17.388 af
 Outflow = 15.44 cfs @ 23.86 hrs, Volume= 15.477 af, Atten= 32%, Lag= 125.0 min
 Primary = 15.44 cfs @ 23.86 hrs, Volume= 15.477 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 718.11' @ 23.86 hrs Surf.Area= 188,597 sf Storage= 407,971 cf

Plug-Flow detention time= 497.0 min calculated for 15.477 af (89% of inflow)
 Center-of-Mass det. time= 452.3 min (1,504.5 - 1,052.2)

Volume	Invert	Avail.Storage	Storage Description
#1	715.70'	1,020,607 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
715.70	149,368	0	0
716.00	154,209	45,537	45,537
717.00	170,410	162,310	207,846
718.00	186,712	178,561	386,407
719.00	203,115	194,914	581,321
720.00	219,618	211,367	792,687
721.00	236,222	227,920	1,020,607

Device	Routing	Invert	Outlet Devices
#1	Primary	715.70'	36.0" Round Culvert L= 237.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 715.70' / 715.00' S= 0.0030 '/ Cc= 0.900 n= 0.025, Flow Area= 7.07 sf

Primary OutFlow Max=15.44 cfs @ 23.86 hrs HW=718.11' (Free Discharge)

↑ **1=Culvert** (Barrel Controls 15.44 cfs @ 3.46 fps)

BLD2 Detention

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Proposed Condition - No Tailwater

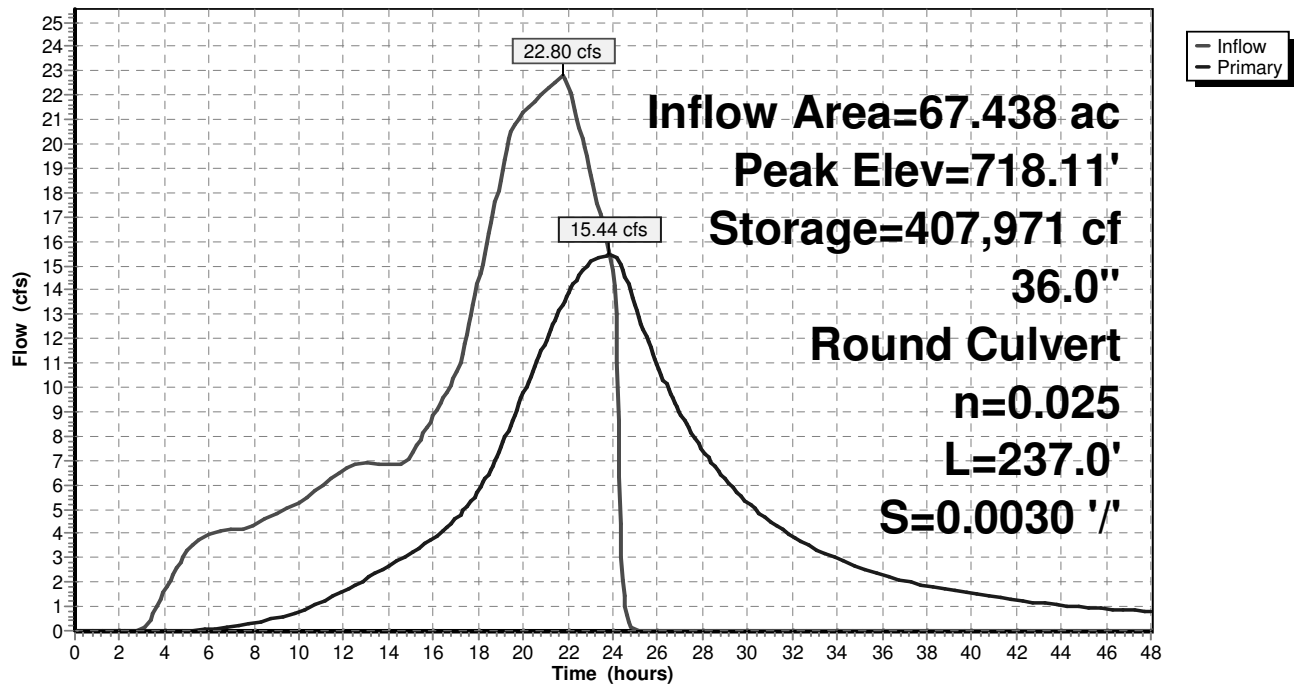
Indy Huff 4th Quartile 10YR24HR Rainfall=4.08"

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Pond 79P: BLD2 Pond South

Hydrograph



BLD2 Detention

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Proposed Condition - No Tailwater

Indy Huff 4th Quartile 10YR24HR Rainfall=4.08"

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Summary for Pond 81P: BLD2 Pond North

Inflow Area = 35.018 ac, 0.00% Impervious, Inflow Depth = 3.30" for 10YR24HR event
 Inflow = 12.10 cfs @ 21.78 hrs, Volume= 9.623 af
 Outflow = 1.81 cfs @ 24.39 hrs, Volume= 4.376 af, Atten= 85%, Lag= 156.7 min
 Primary = 1.81 cfs @ 24.39 hrs, Volume= 4.376 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 718.35' @ 24.39 hrs Surf.Area= 174,069 sf Storage= 363,294 cf

Plug-Flow detention time= 1,105.8 min calculated for 4.372 af (45% of inflow)
 Center-of-Mass det. time= 816.8 min (1,848.3 - 1,031.5)

Volume	Invert	Avail.Storage	Storage Description
#1	716.00'	883,468 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
716.00	135,543	0	0
717.00	151,883	143,713	143,713
718.00	168,323	160,103	303,816
719.00	184,863	176,593	480,409
720.00	201,504	193,184	673,593
721.00	218,246	209,875	883,468

Device	Routing	Invert	Outlet Devices
#1	Primary	716.00'	12.0" Round Culvert L= 179.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 716.00' / 715.50' S= 0.0028 '/' Cc= 0.900 n= 0.025, Flow Area= 0.79 sf

Primary OutFlow Max=1.81 cfs @ 24.39 hrs HW=718.35' (Free Discharge)
 ↑ **1=Culvert** (Barrel Controls 1.81 cfs @ 2.31 fps)

BLD2 Detention

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Proposed Condition - No Tailwater

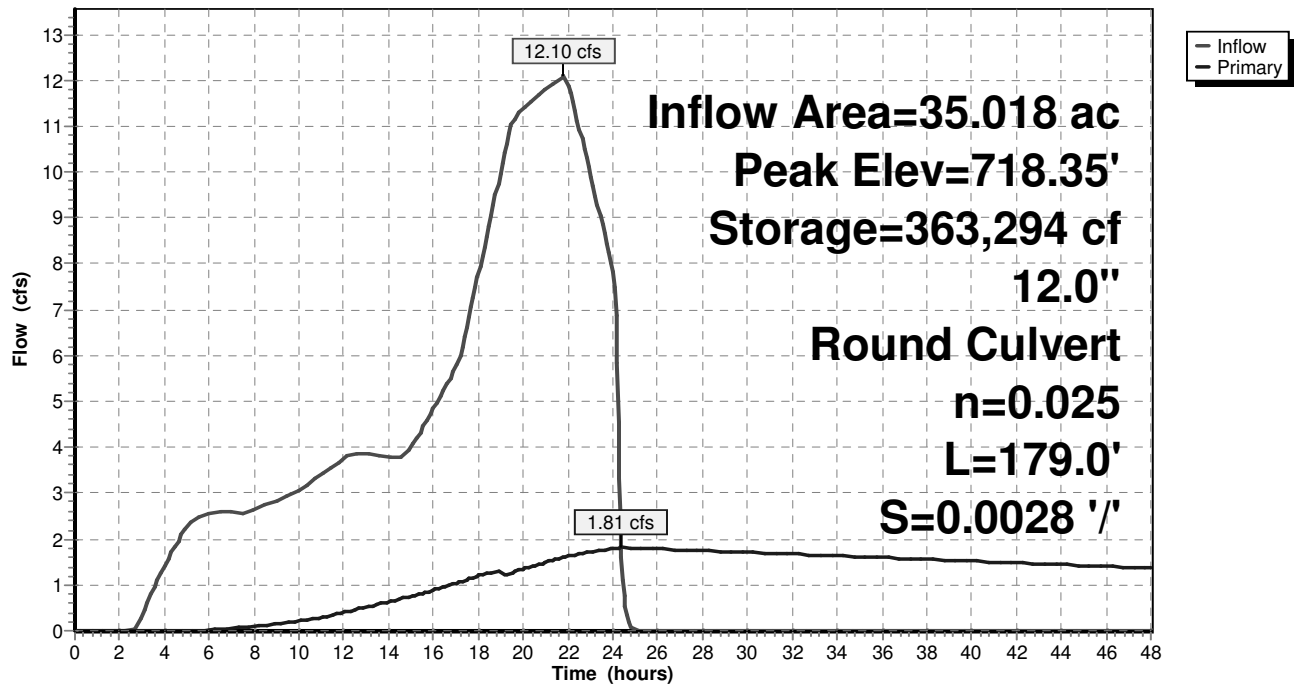
Indy Huff 4th Quartile 10YR24HR Rainfall=4.08"

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Pond 81P: BLD2 Pond North

Hydrograph



BLD2 Detention

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Proposed Condition - No Tailwater

Indy Huff 4th Quartile 100YR24HR Rainfall=6.00"

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Summary for Subcatchment 78S: BLD2 Pond South

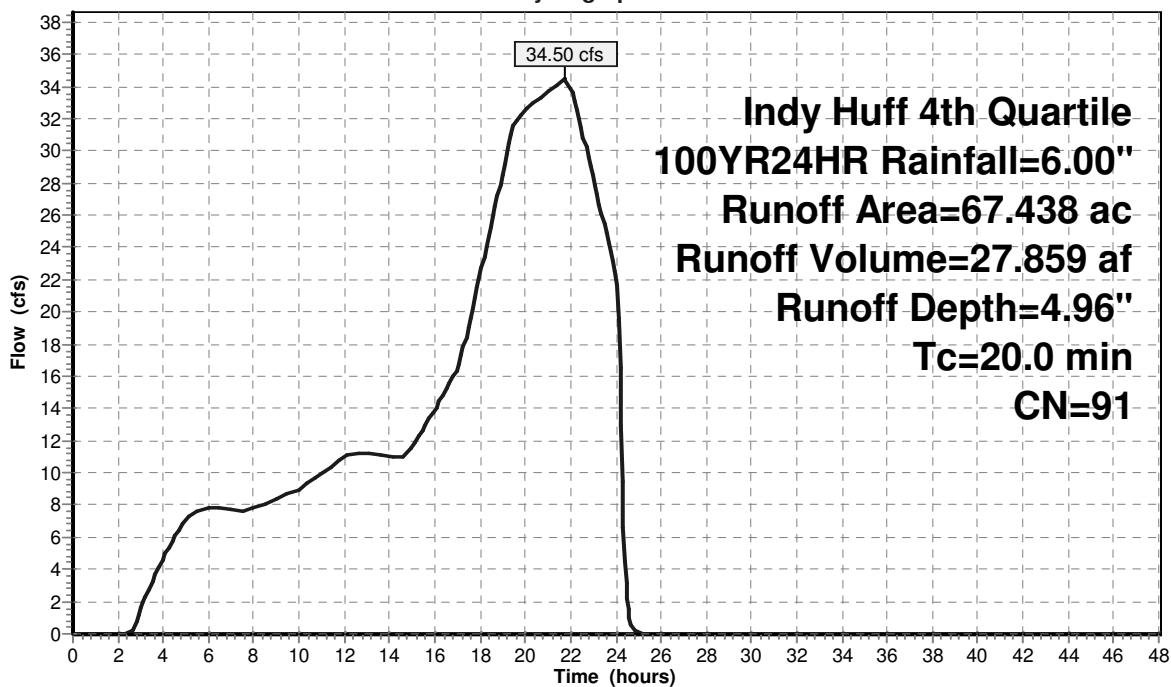
Runoff = 34.50 cfs @ 21.77 hrs, Volume= 27.859 af, Depth= 4.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Indy Huff 4th Quartile 100YR24HR Rainfall=6.00"

Area (ac)	CN	Description
* 67.438	91	
67.438		100.00% Pervious Area

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

Subcatchment 78S: BLD2 Pond South**Hydrograph**

BLD2 Detention

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Proposed Condition - No Tailwater

Indy Huff 4th Quartile 100YR24HR Rainfall=6.00"

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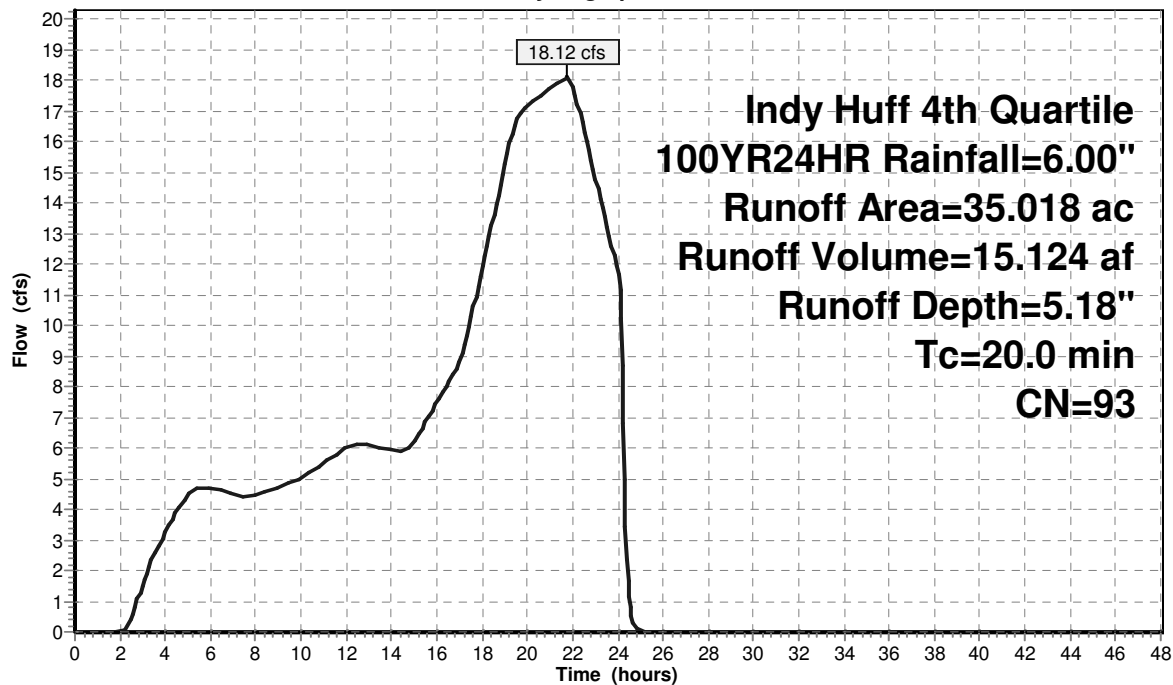
Summary for Subcatchment 80S: BLD2 Pond North

Runoff = 18.12 cfs @ 21.77 hrs, Volume= 15.124 af, Depth= 5.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Indy Huff 4th Quartile 100YR24HR Rainfall=6.00"

Area (ac)	CN	Description
* 35.018	93	
35.018		100.00% Pervious Area

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

Subcatchment 80S: BLD2 Pond North**Hydrograph**

BLD2 Detention

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Proposed Condition - No Tailwater

Indy Huff 4th Quartile 100YR24HR Rainfall=6.00"

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Summary for Pond 79P: BLD2 Pond South

Inflow Area = 67.438 ac, 0.00% Impervious, Inflow Depth = 4.96" for 100YR24HR event
 Inflow = 34.50 cfs @ 21.77 hrs, Volume= 27.859 af
 Outflow = 23.97 cfs @ 23.74 hrs, Volume= 25.787 af, Atten= 31%, Lag= 117.8 min
 Primary = 23.97 cfs @ 23.74 hrs, Volume= 25.787 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 718.95' @ 23.74 hrs Surf.Area= 202,225 sf Storage= 570,328 cf

Plug-Flow detention time= 436.7 min calculated for 25.760 af (92% of inflow)
 Center-of-Mass det. time= 405.5 min (1,429.1 - 1,023.6)

Volume	Invert	Avail.Storage	Storage Description
#1	715.70'	1,020,607 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
715.70	149,368	0	0
716.00	154,209	45,537	45,537
717.00	170,410	162,310	207,846
718.00	186,712	178,561	386,407
719.00	203,115	194,914	581,321
720.00	219,618	211,367	792,687
721.00	236,222	227,920	1,020,607

Device	Routing	Invert	Outlet Devices
#1	Primary	715.70'	36.0" Round Culvert L= 237.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 715.70' / 715.00' S= 0.0030 '/ Cc= 0.900 n= 0.025, Flow Area= 7.07 sf

Primary OutFlow Max=23.97 cfs @ 23.74 hrs HW=718.95' (Free Discharge)

↑ **1=Culvert** (Barrel Controls 23.97 cfs @ 3.90 fps)

BLD2 Detention

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Proposed Condition - No Tailwater

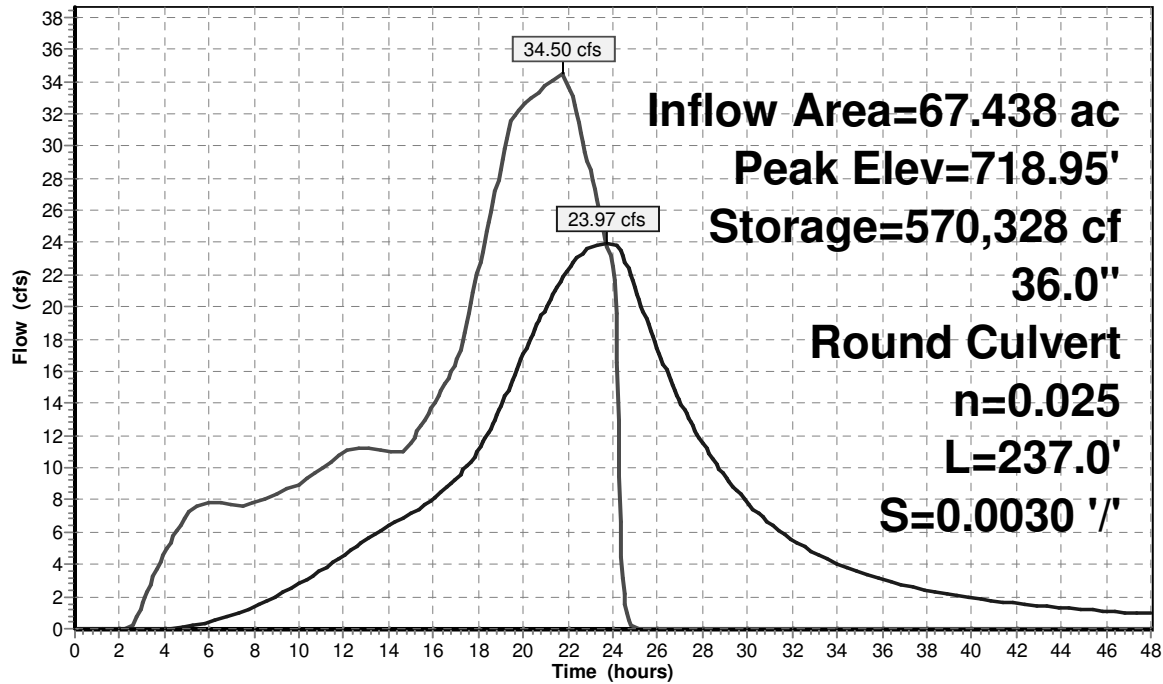
Indy Huff 4th Quartile 100YR24HR Rainfall=6.00"

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Pond 79P: BLD2 Pond South

Hydrograph



BLD2 Detention

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Proposed Condition - No Tailwater

Indy Huff 4th Quartile 100YR24HR Rainfall=6.00"

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Summary for Pond 81P: BLD2 Pond North

Inflow Area = 35.018 ac, 0.00% Impervious, Inflow Depth = 5.18" for 100YR24HR event
 Inflow = 18.12 cfs @ 21.77 hrs, Volume= 15.124 af
 Outflow = 2.31 cfs @ 24.41 hrs, Volume= 6.042 af, Atten= 87%, Lag= 158.4 min
 Primary = 2.31 cfs @ 24.41 hrs, Volume= 6.042 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 719.50' @ 24.41 hrs Surf.Area= 193,104 sf Storage= 573,997 cf

Plug-Flow detention time= 1,157.6 min calculated for 6.042 af (40% of inflow)
 Center-of-Mass det. time= 800.1 min (1,806.4 - 1,006.3)

Volume	Invert	Avail.Storage	Storage Description
#1	716.00'	883,468 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
716.00	135,543	0	0
717.00	151,883	143,713	143,713
718.00	168,323	160,103	303,816
719.00	184,863	176,593	480,409
720.00	201,504	193,184	673,593
721.00	218,246	209,875	883,468

Device	Routing	Invert	Outlet Devices
#1	Primary	716.00'	12.0" Round Culvert L= 179.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 716.00' / 715.50' S= 0.0028 '/ Cc= 0.900 n= 0.025, Flow Area= 0.79 sf

Primary OutFlow Max=2.31 cfs @ 24.41 hrs HW=719.50' (Free Discharge)
 ↑ **1=Culvert** (Barrel Controls 2.31 cfs @ 2.94 fps)

BLD2 Detention

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Proposed Condition - No Tailwater

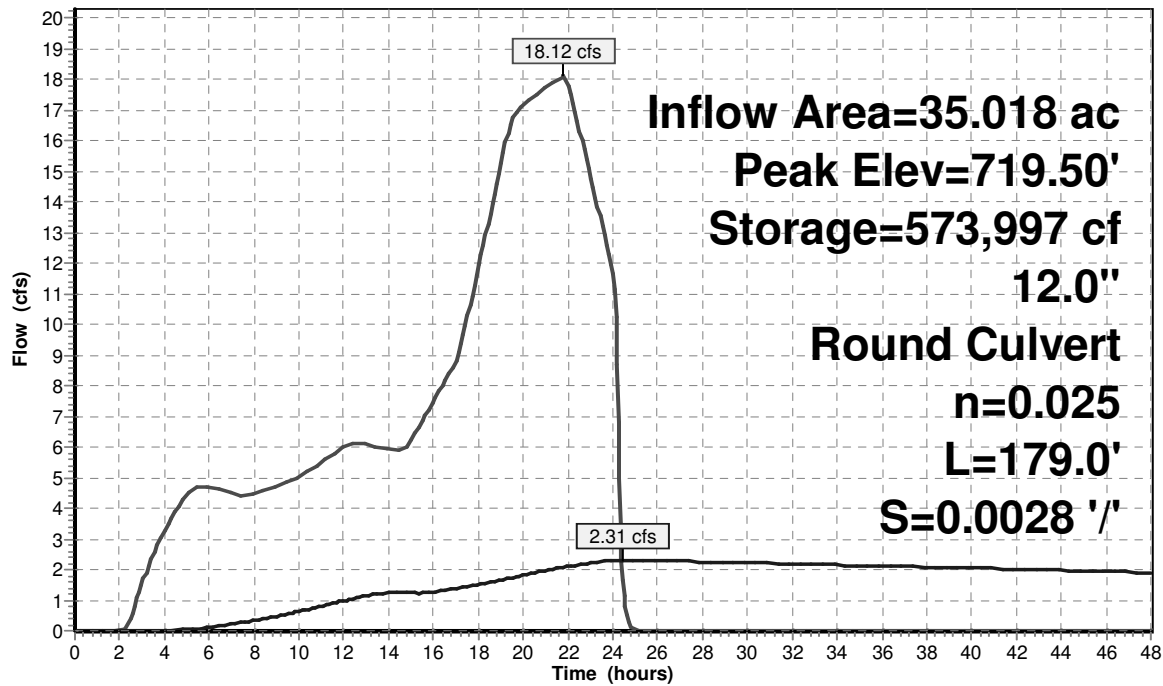
Indy Huff 4th Quartile 100YR24HR Rainfall=6.00"

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Pond 81P: BLD2 Pond North

Hydrograph

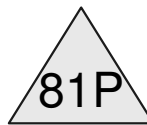


Appendix C

100 YR Event with
100 YR Tailwater Amity Ditch



BLD2 Pond North



BLD2 Pond North



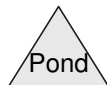
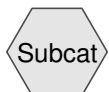
BLD2 Pond South



BLD2 Pond South



TW at STR 700



Routing Diagram for BLD2 Detention

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BLD2 Detention

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Proposed Condition - 100 YR Tailwater

Indy Huff 4th Quartile 100YR24HR Rainfall=6.00"

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Summary for Subcatchment 78S: BLD2 Pond South

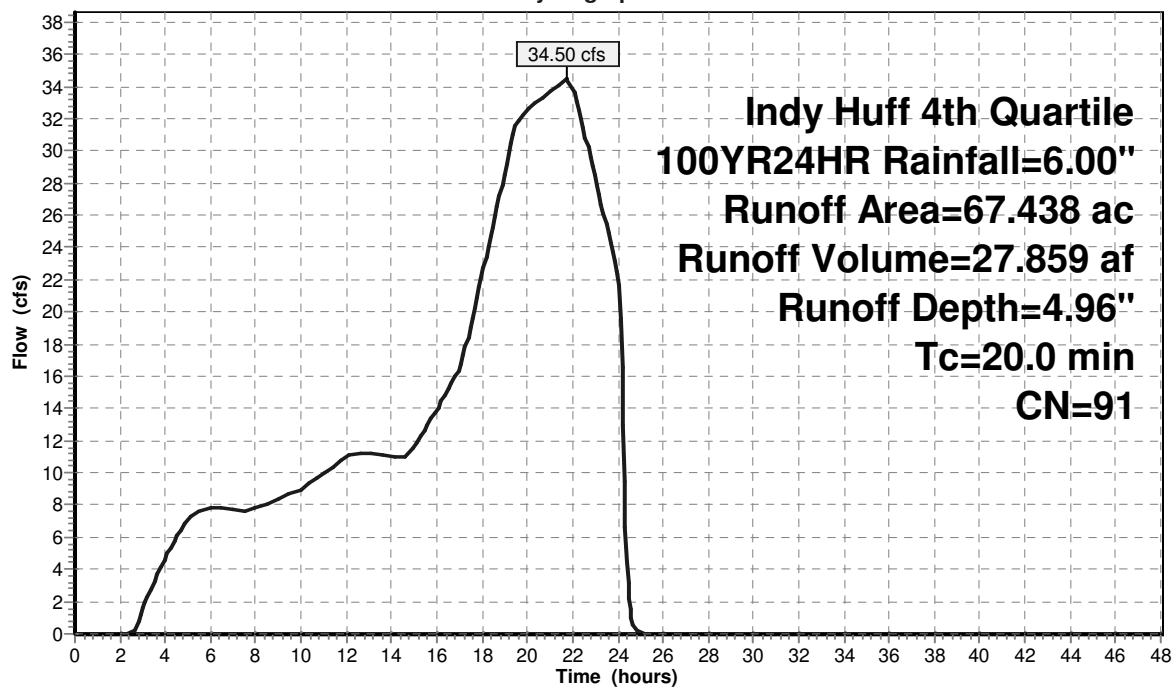
Runoff = 34.50 cfs @ 21.77 hrs, Volume= 27.859 af, Depth= 4.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Indy Huff 4th Quartile 100YR24HR Rainfall=6.00"

Area (ac)	CN	Description
* 67.438	91	
67.438		100.00% Pervious Area

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

Subcatchment 78S: BLD2 Pond South**Hydrograph**

BLD2 Detention

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Proposed Condition - 100 YR Tailwater

Indy Huff 4th Quartile 100YR24HR Rainfall=6.00"

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Summary for Subcatchment 80S: BLD2 Pond North

Runoff = 18.12 cfs @ 21.77 hrs, Volume= 15.124 af, Depth= 5.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

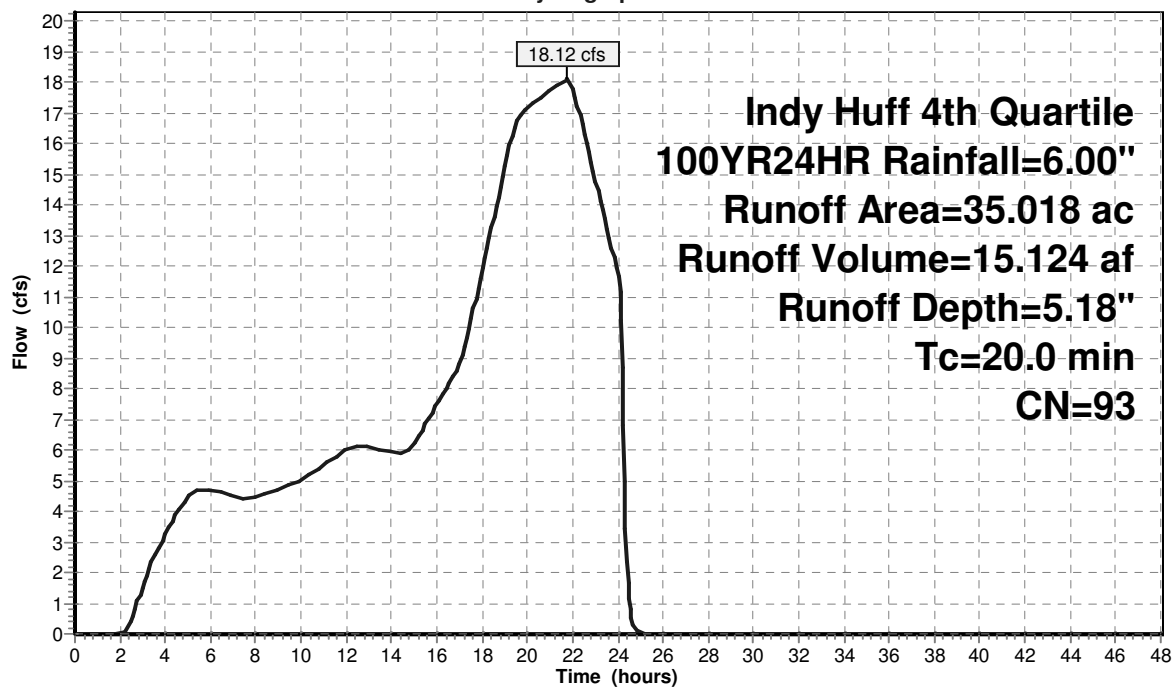
Indy Huff 4th Quartile 100YR24HR Rainfall=6.00"

Area (ac)	CN	Description
* 35.018	93	
35.018		100.00% Pervious Area

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

Subcatchment 80S: BLD2 Pond North

Hydrograph



— Runoff

BLD2 Detention

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Proposed Condition - 100 YR Tailwater

Indy Huff 4th Quartile 100YR24HR Rainfall=6.00"

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Summary for Pond 79P: BLD2 Pond South

Inflow Area = 67.438 ac, 0.00% Impervious, Inflow Depth = 4.96" for 100YR24HR event
 Inflow = 34.50 cfs @ 21.77 hrs, Volume= 27.859 af
 Outflow = 19.95 cfs @ 24.13 hrs, Volume= 10.462 af, Atten= 42%, Lag= 141.6 min
 Primary = 19.95 cfs @ 24.13 hrs, Volume= 10.462 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 720.81' @ 24.13 hrs Surf.Area= 233,032 sf Storage= 975,533 cf

Plug-Flow detention time= 800.7 min calculated for 10.451 af (38% of inflow)
 Center-of-Mass det. time= 437.4 min (1,461.0 - 1,023.6)

Volume	Invert	Avail.Storage	Storage Description
#1	715.70'	1,020,607 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
715.70	149,368	0	0
716.00	154,209	45,537	45,537
717.00	170,410	162,310	207,846
718.00	186,712	178,561	386,407
719.00	203,115	194,914	581,321
720.00	219,618	211,367	792,687
721.00	236,222	227,920	1,020,607

Device	Routing	Invert	Outlet Devices
#1	Primary	715.70'	36.0" Round Culvert L= 237.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 715.70' / 715.00' S= 0.0030 '/ Cc= 0.900 n= 0.025, Flow Area= 7.07 sf

Primary OutFlow Max=19.95 cfs @ 24.13 hrs HW=720.81' TW=719.84' (Dynamic Tailwater)

↑ **1=Culvert** (Outlet Controls 19.95 cfs @ 2.82 fps)

BLD2 Detention

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Proposed Condition - 100 YR Tailwater

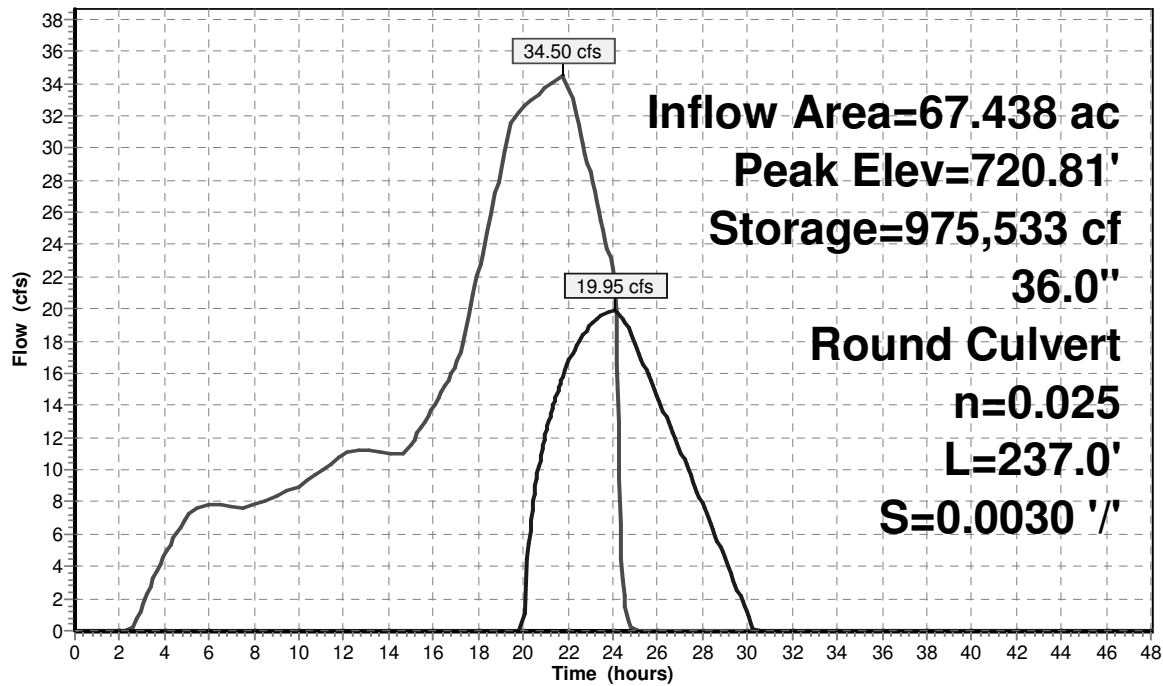
Indy Huff 4th Quartile 100YR24HR Rainfall=6.00"

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Pond 79P: BLD2 Pond South

Hydrograph



BLD2 Detention

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Proposed Condition - 100 YR Tailwater

Indy Huff 4th Quartile 100YR24HR Rainfall=6.00"

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Summary for Pond 81P: BLD2 Pond North

Inflow Area = 35.018 ac, 0.00% Impervious, Inflow Depth = 5.18" for 100YR24HR event
 Inflow = 18.12 cfs @ 21.77 hrs, Volume= 15.124 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 719.93' @ 25.15 hrs Surf.Area= 200,277 sf Storage= 658,786 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	716.00'	883,468 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
716.00	135,543	0	0
717.00	151,883	143,713	143,713
718.00	168,323	160,103	303,816
719.00	184,863	176,593	480,409
720.00	201,504	193,184	673,593
721.00	218,246	209,875	883,468

Device	Routing	Invert	Outlet Devices
#1	Primary	716.00'	12.0" Round Culvert X 0.00 L= 179.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 716.00' / 715.50' S= 0.0028 '/ Cc= 0.900 n= 0.025, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=716.00' (Free Discharge)
 ↑ **1=Culvert** (Controls 0.00 cfs)

BLD2 Detention

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Proposed Condition - 100 YR Tailwater

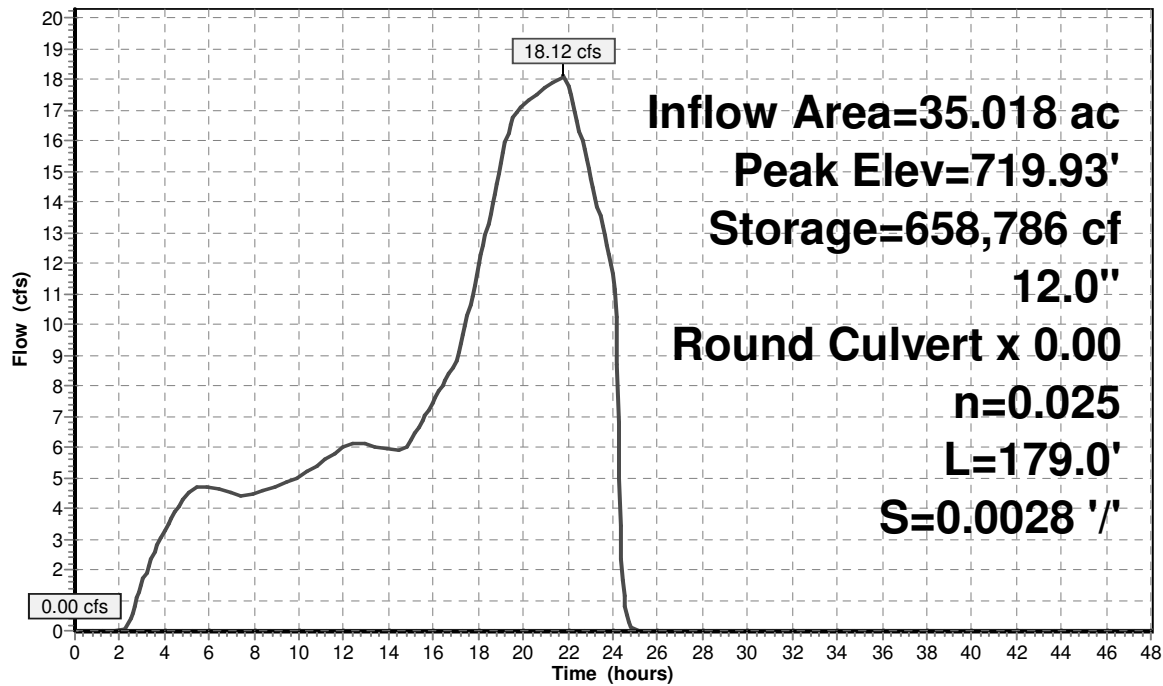
Indy Huff 4th Quartile 100YR24HR Rainfall=6.00"

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Pond 81P: BLD2 Pond North

Hydrograph



BLD2 Detention

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Proposed Condition - 100 YR Tailwater

Indy Huff 4th Quartile 100YR24HR Rainfall=6.00"

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Summary for Pond 84P: TW at STR 700

Inflow Area = 67.438 ac, 0.00% Impervious, Inflow Depth = 1.86" for 100YR24HR event
Inflow = 19.95 cfs @ 24.13 hrs, Volume= 10.462 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Peak Elev= 719.84' @ 48.00 hrs Surf.Area= 1,000.000 ac Storage= 10.462 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	719.83'	1,000.000 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
719.83	1,000.000	0.000	0.000
720.83	1,000.000	1,000.000	1,000.000

Pond 84P: TW at STR 700

Hydrograph

