ARIA & SUMMIT VILLAGE NORTH MACRO & ARIA MICRO STORMWATER REPORT

Prepared for:

Aria LS, LLC
Columbia, Missouri

and

Unity School of Christianity
Unity Village, MO

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Olsson Project No. B19-0012

olsson

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1. INTRODUCTION

This Stormwater Drainage Study has been prepared to evaluate the stormwater hydrology of multiple developments (current and future) that are being proposed within the watershed. Once fully developed, the area treated by improvements proposed within this study will include:

- Aria: a 22.50-acre apartment development (Zoned RP-4)
- Summit Village North: a 39.42-acre commercial development (Zoned CP-2)
- An approximately 14.96-acre future multi-family residential development along the west side of NW Lee's Summit Road (currently zoned AG and to be rezoned at a future time)

The site is located at the northwest corner of NE Douglas Street and NE Colbern Road, in the NE ¼ of Section 30 & SE ¼ of Section 19, Township 48 North, Range 31 West, entirely within the City of Lee's Summit, Jackson County, Missouri.

Stormwater runoff from the project sites is tributary to Unity Lake Number Two, approximately 1,500 feet downstream of the study area.

This report, intended to serve as the project Macro- and Micro Stormwater Drainage Study for the Aria Development, has been prepared to evaluate the Existing- and Proposed Conditions stormwater hydrology. Refer to Section 7 for hydrologic model input data and simulation results for Existing- and Proposed Conditions. Refer to Section 8 for maps and exhibits depicting the watersheds evaluated in the analyses.

Vicinity Map

1.1. FEMA Floodplain Classification

The FEMA FIRM Panel 29095C-0409G (eff. 20 January, 2017) depict the proposed development areas as "Zone X." This is the FEMA flood insurance rate zone that "corresponds to areas outside the 0.2-percent-annual-chance floodplain, areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by levees. No BFE's or base flood depths are shown for this zone." Refer to the attached FEMA Floodplain Map (Exhibit 8-1.1) for depiction of the established floodplains relative to the project site.

The lower reaches of the modeled sub-watershed that is the subject of this report does include a "Zone AE" boundary along the Little Cedar Creek – Tributary No. 2 channel that forms the main branch of the Unity Village Lake No. 2 impoundment. No construction proposed for these three areas is proposed to affect the boundaries of the defined floodway for this downstream channel.

1.2. Soil Classification

Soil Maps published in the Soil Survey for Jackson County, Missouri categorize soils in this watershed as:

Table 1.2-1. Soil Classifications

HSG	Map Symbol	Type	Land-Form
D	10024	Greenton-Urban Land C'Plx	5% to 9% Slopes
C	10026	Higginsville Silt Loam	5% to 9% Slopes
C	10120	Sharpsburg Silt Loam	2% to 5% Slopes
D	10128	Sharpsburg-Urban Land C'Plx	2% to 5% Slopes
C	10132	Sibley Silt Loam	2% to 5% Slopes
C	10136	Sibley-Urban Land C'Plx	2% to 5% Slopes
D	10141	Snead-Rock Outcrop C'Plx	14% to 30% Slopes
C	10180	Udarents-Urban Land-Sampsel C'Plx	2% to 5% Slopes
C/D	30080	Greenton Silty Clay Loam	5% to 9% Slopes
C	30180	Polo Silt Loam	5% to 9% Slopes

(HSG = Hydrologic Soil Group)

NRCS Runoff Curve Numbers (CN's) in this study have been assigned to tributary areas based upon these Hydrologic Soil Groups and associated existing and proposed land use. The majority of land within the modeled sub-watersheds is previously developed, and the CN's are assigned accordingly. Refer to the Soils Map in Section 8 for distribution of soil types throughout the sub-watersheds.

2. METHODOLOGY

The hydrologic analysis provided in this report utilizes methods prescribed by the City of Lee's Summit, Missouri and the Kansas City Metropolitan Chapter of the APWA "Standard Specifications and Design Criteria," Division V, Section 5600 (February 2011) provides the overall framework for stormwater hydrology. The following approved methods were used in this report to model Existing- and Proposed Conditions for stormwater runoff.

- Haestad Methods, Inc. "PondPack" V8*i* (08.11.01.56).
- NRCS TR-55 Unit Hydrograph Method
- 2-, 10-, and 100-year Return Frequency, 24-hr. Storm Precipitation Depths (TP-40)
- ARC-II Soil Moisture Conditions
- 24-Hour NRCS Type II Rainfall Distribution
- Runoff Curve Numbers per NRCS TR-55 (Tables 2-2a – 2-2c) and APWA Sec.5602.3
- NRCS TR-55 Methods for determination of Time of Concentration and Travel Time.

NOTE: Where detailed information pertaining to channel geometry is unavailable, "length & velocity" estimates for channel-flow Travel Time is utilized per Section 5602.7, Kansas City Metropolitan Chapter- APWA Standard Specifications and Design Criteria.
NOTE: PondPack models utilize "Time of Concentration" rather than "Lag Time" for computing subarea hydrology.

Input data for the Existing- and Proposed Conditions hydrology models and results of computations are included in Section 7. Refer to the attached Drainage Area Maps for Existing- and Proposed Conditions subarea locations, weighted Runoff Curve Numbers, and tributary acreage included in Section 8.

Stormwater runoff models were created for the 2-, 10-, and 100-year design storm events. The precipitation depths used in the analyses have been interpolated from the "Technical Paper No. 40 Rainfall Frequency Atlas of the United States" (TP-40; May 1961) isopluvial maps. The following table depicts the rainfall depths used in this analysis:

Table 2-1. Precipitation Depths

Return Period:	24-hour Precipitation Depth (in):
Water Quality Storm[1]	1.37
2-Year (50% Storm)	3.50
10-Year (10% Storm)	5.34
100-Year (1% Storm)	7.71

[1]The "Water Quality Storm" is defined in the MARC & APWA "Manual of Best Management Practices for Stormwater Quality" as a 24-hr 1.37" rainfall depth. This particular storm event is utilized for proposed water quality analysis.

Each of the PondPack models constructed for this analysis evaluates multiple rainfall events using these three defined design storms.

The overall hydrology defines 3 modeled sub-watersheds (sub-watersheds "A," "B," and "C"), and 21 subareas, encompassing approximately 602 acres overall.

Several offsite subareas are included in the models prepared for this report that will remain unaltered as a result of the proposed development areas. Sub-watersheds "B" and "C" are both offsite regions, as are some portions of sub-watershed "A."

- The Aria property lies within portions of Subareas A3, A4(E), and A5(E).
- The Summit Commercial site is located within Subareas A5(E), A4(W), and A5(E).
- The northern multi-family residential parcel is located within Subarea A1(E).

In accordance with the City-specified criterion and design provision established in the 2011 edition of APWA Section 5600, the proposed stormwater management plan shall "be consistent with the Comprehensive Control Strategy." This requirement establishes the maximum Allowable Release Rates for the 2-year (0.50 cfs/ac), 10-year (2.0 cfs/ac), and 100-year (3.0 cfs/ac) design storms. In addition to the large storm hydrology design constraints, this strategy requires extended detention (≥ 40hr.) of the "Water Quality Storm" runoff volume.

Points of Interest

The hydrologic models prepared for this stormwater Drainage Study include four significant Points of Interest. These are briefly described in as:

- **Point A1,** located at the southern inlet to the Unity Village Lake No. 2 impoundment, the downstream point of interest modeled in this report.
- **Point A2** is the confluence of Channels A and B, located north of an existing sanitary holding basin. All stormwater runoff generated by the Aria and Summit Village projects is conveyed to this point.
- **Point A3** is a culvert in Channel B crossing an access drive for the existing sanitary holding basin
- **Point A4** is a point within Channel A, upstream of Point A2, Portions of the Aria and Summit Village projects contribute flow to this point of interest.
- **Point A5** is the downstream end of an existing pond with a breached embankment within Channel A
- **Point A7** is the downstream end of an existing culvert within Channel A, located at station 25+65 of NE Douglas Street. All stormwater runoff contributed to this point is generated by offsite areas.
- **Point B1** is the downstream end of an existing culver within Channel B, located at station 45+15 of NE Douglas Street. All stormwater runoff contributed to this point is generated b offsite areas.

Several additional points are utilized in the models to assist with the hydrologic analysis for offsite areas. The locations of these points are depicted in the attached Drainage Area Maps, and the results of the analyses are included in tables provided in this narrative, and in the attached modeling output.

In order to provide a direct comparison between the Existing- and Proposed Conditions (Micro- and Macro) hydrology models, efforts have been made to ensure that the points of interest are consistent between these analyses. As noted, additional points to those previously described are included in the hydrologic models, these junctions are of secondary interest to this particular development. Refer to the attached Drainage Area Maps for graphical representation of the modeled subareas and points of interest; refer to Section 7 for schematic view of the PondPack watershed model and connectivity between subareas, channel reaches, and points of interest.

3. EXISTING CONDITIONS ANALYSIS

The purpose of this report is to provide the Macro and Micro Stormwater Drainage analysis to ensure that the proposed site development is compliant with City of Lee's Summit, Missouri requirements. This section of the report will provide the Existing Conditions analysis, representing the current site hydrology. The results of this analysis will be used to establish the "Allowable Release Rates" for the project, and will be compared to those of Proposed Conditions in order to determine the hydrologic effects of the development upon the receiving stormwater conveyances and sub-watersheds.

Runoff Curve Numbers have been developed based upon the current land use obtained from survey data, aerial photographs, and site visits. Refer to Section 7 for Existing Conditions weighted NRCS Runoff Curve Number (CN) and Time of Concentration (T_C) calculations. Table 3-1 contains the hydrologic parameters used to characterize subareas the Existing Conditions PondPack model.

Table 3-1. Existing Conditions Input Data

	Total Area (ac):	Aria Onsite Area (ac):	Summit Village Onsite Area (ac):	Macro-Study Onsite Area (ac):	NRCS Weighted CN:	T_C [1] (hr):
Subarea A1(e):	27.97			12.36	77	0.1736
Subarea A1(w):	43.14				76	0.2511
Subarea A2(e):	3.08				80	0.0875
Subarea A2(w):	23.41				73	0.2133
Subarea A3:	24.53	11.73		11.73	80	0.1356
Subarea A4(e):	9.74	5.89		5.89	79	0.1367
Subarea A4(w):	17.41		7.35	7.35	73	0.1656
Subarea A5(e):	15.16	4.88	5.10	9.98	80	0.1195
Subarea A5(w):	19.76		17.26	17.26	77	0.1682
Subarea A6:	13.45				83	0.1063
Subarea A7:	30.60				76	0.1596
Subarea A8:	21.56				81	0.1299
Subarea A9:	31.84				84	0.1420
Subarea A10:	12.23				94	0.1545
Subtotal:	*293.88*	*22.50*	*29.71*	*64.57*		
Subarea B1:	31.94				79	0.1385
Subarea B2:	48.54				78	0.1987
Subarea B3:	40.69				83	0.1447
Subarea B4-DET:	25.05				94	0.1155
Subarea B4-BYP:	7.42				94	0.0787
Subtotal:	*153.64*	*0*	*0*	*0*		

	Total Area (ac):	Aria Onsite Area (ac):	Summit Village Onsite Area (ac):	Macro-Study Onsite Area (ac):	NRCS Weighted CN:	T_C [1] (hr):
Subarea C1:	45.21				90	0.2860
Subarea C2:	57.13				81	0.3308
Subarea C3:	52.36				83	0.1199
Subtotal:	*154.70*	*0*	*0*	*0*		
Sub-W'Shed A Subtotal:	293.88	22.50	29.71	64.57		
Sub-W'Shed B Subtotal:	153.64	*0*	*0*	*0*		
Sub-W'Shed C Subtotal:	154.70	*0*	*0*	*0*		
Modeled Total:	602.22	22.50	29.71	64.57		

[1] ***Note:*** *Per TR-55 documentation, minimum T_C is 0.10 hours; model is configured with default value of 0.10 hr. minimum Tc.*

These tributary areas, Runoff Curve Numbers (CN), and Times of Concentration (T_C) for the corresponding subareas were used as input to the Existing Conditions PondPack model to evaluate the stormwater hydrology. The subareas representing Existing Conditions for the development and associated sub-watersheds are utilized in the PondPack model to compute the stormwater runoff for the three design storms. The resultant peak discharge rate (Q_P), peak time (T_P), and runoff volume (V_R) for the computed hydrographs of modeled subareas are included in Table 3-2.

Table 3-2. Hydrologic Information – Existing Conditions Summary (Subareas)

	Q_{P-2} (cfs):	T_{P-2} (hr.):	V_{R-2} (ac-ft):	Q_{P-10} (cfs):	T_{P-10} (hr.):	V_{R-10} (ac-ft):	Q_{P-100} (cfs):	T_{P-100} (hr.):	V_{R-100} (ac-ft):
Subarea A-1(e):	80.60	11.97	4.735	149.59	11.96	8.874	240.05	11.96	14.523
Subarea A-1(w):	70.15	12.05	4.908	146.86	12.05	10.132	252.55	12.05	17.597
Subarea A-2(e):	7.64	11.94	0.420	14.90	11.93	0.819	24.63	11.93	1.374
Subarea A-2(w):	34.59	12.03	2.301	76.77	12.03	4.975	136.28	12.03	8.884
Subarea A-3:	79.39	11.93	4.376	138.56	11.93	7.797	214.52	11.93	12.366
Subarea A-4(e):	35.72	11.93	1.964	63.28	11.93	3.543	98.81	11.93	5.662
Subarea A-4(w):	22.01	11.98	1.309	46.91	11.97	2.744	81.64	11.96	4.808
Subarea A-5(e):	31.81	11.93	1.744	58.13	11.93	3.228	92.41	11.93	5.240
Subarea A-5(w):	119.58	11.92	7.015	188.38	11.92	11.352	276.00	11.92	16.975
Subarea A-6:	37.54	11.94	2.083	69.57	11.93	3.904	111.78	11.93	6.390
Subarea A-7:	57.26	12.00	3.482	119.03	11.98	7.186	204.90	11.98	12.481
Subarea A-8:	53.05	11.96	3.070	101.89	11.95	5.907	166.82	11.95	9.826
Subarea A-9:	87.15	11.97	5.138	158.95	11.96	9.507	252.78	11.96	15.435
Subarea A-10:	45.61	11.97	2.890	72.57	11.97	4.733	106.86	11.97	7.128

	Q_{P-2} (cfs):	T_{P-2} (hr.):	V_{R-2} (ac-ft):	Q_{P-10} (cfs):	T_{P-10} (hr.):	V_{R-10} (ac-ft):	Q_{P-100} (cfs):	T_{P-100} (hr.):	V_{R-100} (ac-ft):
Subarea B-1:	70.94	11.97	4.168	140.29	11.96	8.242	234.20	11.95	13.944
Subarea B-2:	94.72	12.03	6.057	190.16	12.01	12.146	320.74	12.00	20.725
Subarea B-3:	106.50	11.97	6.302	197.62	11.96	11.812	317.37	11.96	19.332
Subarea B-4 (BYP):	30.29	11.93	1.753	48.22	11.92	2.871	71.04	11.92	4.324
Subarea B-4 (DET):	99.43	11.94	5.919	158.21	11.94	9.694	232.94	11.94	14.599
Subarea C-1:	124.83	12.05	9.223	209.38	12.05	15.842	317.10	12.05	24.565
Subarea C-2:	104.44	12.09	8.134	200.90	12.08	15.652	329.78	12.08	26.038
Subarea C-3:	142.61	11.95	8.110	264.83	11.94	15.199	425.51	11.94	24.875

The PondPack models created for these analyses include sixteen channel reaches modeled using the Muskingum Method. Various modeled points of interest are connected in the model by these channel reaches. The reach segments account for the time-lagging effect on the hydrograph peaks, including a relatively insignificant amount of peak flow rate attenuation as the flood wave travels downstream. Travel time for each reach is based upon the reach length and average bed-slope. The following table contains the input data for the channel reaches used in the Existing- and Proposed Conditions PondPack models.

Table 3-3. Muskingum Channel Reach Routing Information

Reach I.D.	K (hr.):	X *(coeff.)*:	No. of Sub-reaches	K *(ea. sub-reach) (hr.):*
Route A2~A1:	0.0826	0.25	9	0.0092
Route A4~A2:	0.0288	0.25	3	0.0097
Route A5~A4:	0.0203	0.25	3	0.0067
Route A3~A2:	0.0192	0.25	2	0.0097
Route A6~A5:	0.0378	0.25	4	0.0094
Route A7~A5:	0.0412	0.25	5	0.0083
Route A8~A7:	0.0340	0.25	4	0.0086
Route A9~A7:	0.0390	0.25	4	0.0097
Route A10~A9:	0.0636	0.25	7	0.0092
Route B1~A3:	0.0331	0.25	4	0.0083
Route B2~B1:	0.0162	0.25	2	0.0081
Route B3~B2:	0.0824	0.25	9	0.0092
Route B4~B3:	0.0587	0.25	6	0.0097
Route C1~B1:	0.0210	0.25	3	0.0069
Route C2~C1:	0.0701	0.25	8	0.0089
Route C3~C2:	0.0148	0.25	2	0.0075

The preceding stormwater conveyances have been incorporated into both the Existing- and Proposed Conditions PondPack models. The results of the Existing Conditions hydrologic routing are provided in Table 3.2-1, in Section 3.2, which provides the summary data for the points of interest defined in this Stormwater Drainage Study. Refer to the Existing Conditions Drainage Area Map for the location of the points of interest, modeled subareas, channels, and conveyances, in relation to proposed development area.

The defined subareas and stormwater conveyances, with associated hydrograph attenuation effects have been incorporated into the Existing (and Proposed) Conditions PondPack models. There are also several offsite storage areas included in the Existing- and Proposed Conditions models for the project site. The following section of this report provides the geometric configuration and hydrologic routing summary for existing locations. The results of the Existing Conditions hydrologic routing at the designated Points of Interest are provided in the Section 3.2.

3.1. Existing Stormwater Storage Areas & Detention Facilities

The following information is provided to define the geometry of the outfall structure and storage capacity for the existing modeled storage areas and stormwater detention basins included in the Existing Conditions hydrology models. The routing summary tables provided for each location contain the Existing Conditions hydrologic routing summary for each of the design storm events considered in this analysis.

Point A3 – Culverts at Pump Station Drive Culverts:

An access drive extends across the channel that runs along the northern edge of the Aria project site. This restricted-access drive leads to the pump station that is positioned at the confluence of two channels that define the upper regions of the modeled sub-watershed. The Existing- and Proposed Conditions geometry of the culverts positioned across the existing access drive to the pump station are defined as follows:

Primary Outlet Structure:

Dual 84" Diameter *(modeled equivalent circular: 72" x 96" CMPA Culvert);* Length ≈ 66.6 L.F.
Flowline In / Out ≈ 900.81 / 900.43 (ft; NAVD)

Secondary Outlet Structure:

Roadway (Weir)-

Station (ft):	0	22	43.1	76.73	124.4	157.13	223.83	251	265.18	270.32	277.43
Elevation (ft):	912	910	908.52	907.24	907.44	908.16	908.35	908.6	909	910	912

Culvert flow at the threshold of overtopping/weir-flow is approximately 255 cfs.

The potential storage area upstream from this roadway crossing is defined in the following table based upon storage area for a given elevation. As depicted below, the potential storage area is somewhat modest, relative to the existing conditions flows that are contributed to this location.

Table 3.1-1(a). Existing Storage Volume – Pump Station Drive Storage Area

Elevation (ft; NAVD):	Storage Area (sq. ft.):	Incremental Volume (ft^3):	Cumulative Volume (ac-ft):
900.81	106	0	0.000
901	114	21	0.000
902	691	362	0.009
902.4	908	319	0.016
903	1,252	645	0.031
904	3,270	2,182	0.081
906	7,400	10,393	0.320
908	38,290	41,682	1.276
910	58,812	96,371	3.489
912	84,827	142,847	6.768

Note: *The conic method is used to compute the incremental volume between pond contours. The sum of the computed incremental volumes provides the cumulative pond volume for a given elevation.*

Utilizing these geometric parameters, the following table depicts the stormwater routing summary for this location.

Table 3.1-1(b). Existing Conditions Storage Area Routing – Point A3 – Pump Station Drive Culverts

	Peak Q In (cfs):	T_P In (hr.):	Peak Q Out (cfs):	T_P Out (hr.):	V_R (ac-ft):	Peak WSEL (ft; NAVD):	Max. Storage Volume (ac-ft):
WQv:	102.98	12.15	101.73	12.18	9.704	904.61	0.134
2-Year:	634.58	12.13	630.29	12.15	53.012	908.51	1.750
10-Year:	1,112.93	12.13	1,110.67	12.15	97.981	909.07	2.344
100-Year:	1,600.76	12.16	1,599.37	12.17	159.345	909.51	2.852

The preceding routing summary indicates that the culverts are somewhat under-sized for most large-storm events, though the Water Quality Volume storm event is readily conveyed by this system.

Point A5 – Former Pond:

The Existing- and Proposed Conditions geometry of the outfall structure for the former pond site that is located just north of the Summit Village property is based upon field survey and LIDAR topographic data. This former pond-site has an embankment breach, and therefore provides relatively minimal attenuation for larger precipitation events. The feature does, however affect

the hydrograph timing somewhat, and is therefore included in these models. The following information provides the outfall geometry and storage area for the Existing- and Proposed Conditions PondPack models:

Primary Outlet Structure- Weir Cut through Embankment:

Station (ft):	0	23.88	64.85	167.91	238.1	246.58	251.38	253.1	257.52	263.49	268.12	273.3	297.08	333.5
Elevation (ft):	940	938	936	934	932	930	929	929	930	932	934	936	938	940

The potential storage area upstream from this pond embankment is defined in the following table based upon a stage versus storage area for a given elevation.

Table 3.1-2(a). Existing Storage Volume – Boone Creek Embankment

Elevation (ft; NAVD):	Storage Area (sq. ft.):	Incremental Volume (ft^3):	Cumulative Volume (ac-ft):
929	20,212	0	0.000
930	34,209	26,905	0.618
932	75,878	107,357	3.082
934	98,561	173,945	7.075
936	130,004	227,841	12.306
938	171,091	300,156	19.197
940	226,998	396,774	28.305

Note: *The conic method is used to compute the incremental volume between pond contours.*
The sum of the computed incremental volumes provides the cumulative pond volume for a given elevation .

The following table depicts the stormwater routing summary for this location under each of the modeled precipitation events.

Table 3.1-2(b): Existing Conditions Storage Area Routing – Point A5 – Former Pond

	Peak Q In (cfs):	T_P In (hr.):	Peak Q Out (cfs):	T_P Out (hr.):	V_R (ac-ft):	Peak WSEL (ft; NAVD):	Max. Storage Volume (ac-ft):
WQv:	47.52	12.08	22.44	12.24	3.428	930.22	0.800
2-Year:	317.46	12.05	244.35	12.15	21.086	932.49	3.961
10-Year:	556.14	12.05	493.17	12.12	40.061	933.44	5.849
100-Year:	851.90	12.05	804.09	12.10	66.272	934.16	7.434

Data provided in the preceding table indicates that, while larger storm events are not significantly affected by this feature, the more frequent events do exhibit some hydrograph attenuation at this location.

Point B1 – Lee's Summit Road RCB Culverts (Sta. 45+15):

Lee's Summit Road has a pair of RCB Culverts that convey stormwater across the roadway into the channel that runs along the northern edge of the Aria project site. This RCB includes stormwater flows generated by defined sub-watersheds "B" and "C." The following information provides the outfall geometry and storage area for this location in both Existing- and Proposed Conditions PondPack models:

Primary Outlet Structure:

Dual 10'-w x 7'-ht RCB Culvert; Length ≈ 174.4 L.F.
Flowline In / Out ≈ 916.22 / 911.54 (ft; NAVD)

Secondary Outlet Structure:

Roadway (Weir)-

Station (ft):	0	64.20	155.0	244.3	309.0
Elevation (ft):	930	929	928.68	929	930

Culvert flow at the threshold of overtopping/weir-flow is approximately 1,800 cfs.

Table 3.1-3(a). Existing Storage Volume – Pump Station Drive Storage Area

Elevation (ft; NAVD):	Storage Area (sq. ft.):	Incremental Volume (ft^3):	Cumulative Volume (ac-ft):
916.22	377	0	0
917	2,013	848	0.019
918	8,841	5,024	0.135
919	14,303	11,463	0.398
920	18,052	16,141	0.769
921	21,576	19,788	1.223
922	25,405	23,464	1.761
923	29,240	27,300	2.388
924	39,203	34,100	3.171
925	50,630	44,795	4.199
926	60,928	55,700	5.478
927	71,454	66,121	6.996
928	83,880	77,584	8.777
929	139,252	110,403	11.312
930	178,519	158,480	14.950

Note: *The conic method is used to compute the incremental volume between pond contours.*
The sum of the computed incremental volumes provides the cumulative pond volume for a given elevation .

The following table depicts the stormwater routing summary for this location under each of the modeled precipitation events.

Table 3.1-3(b). Existing Conditions Storage Area Routing – Point B1 – Lee's Summit Drive Culverts (Sta. 45+15)

	Peak Q In (cfs):	T_P In (hr.):	Peak Q Out (cfs):	T_P Out (hr.):	V_R (ac-ft):	Peak WSEL (ft; NAVD):	Max. Storage Volume (ac-ft):
WQv:	101.70	12.11	100.64	12.12	9.245	917.82	0.101
2-Year:	634.00	12.07	615.14	12.11	49.667	921.57	1.519
10-Year:	1,121.63	12.07	1,076.61	12.11	91.457	923.99	3.164
100-Year:	1,726.54	12.06	1,551.65	12.14	148.401	926.77	6.626

Data provided in the preceding table indicates that each of the modeled events are effectively conveyed by the culverts, and sufficient freeboard appears to be available for the 100-year design storm.

Point A7 – NE Douglas Street RCB Culvert (Sta. 25+65):

NE Douglas Street has another RCB Culvert that conveys stormwater across the roadway into the channel that runs into the eastern edge of the Summit Village project site. This culvert conveys stormwater into the project area from upper portions of the defined sub-watershed "A." The following information provides the outfall geometry and storage area for this location in both Existing- and Proposed Conditions PondPack models:

Primary Outlet Structure:

13'-w x 7'-ht RCB Culvert; Length ≈ 174.4 L.F.
Flowline In / Out ≈ 945.3 / 937.5 (ft; NAVD)

Secondary Outlet Structure:

Roadway (Weir)-

Station (ft):	0	46.5	118.2	206.1	276.8	345.4	392.4
Elevation (ft):	958	957	956	955.65	956	957	958

Culvert flow at the threshold of overtopping/weir-flow is approximately 1,213 cfs.

Table 3.1-4(a): Existing Storage Volume – Point A7 – Lee's Summit Road RCB Culvert (Sta. 25+65)

Elevation (ft; NAVD):	Storage Area (sq. ft.):	Incremental Volume (ft^3):	Cumulative Volume (ac-ft):
945.3	273	0	0.000
946	728	338	0.008
947	3,022	1,744	0.048
948	6,247	4,538	0.152
949	19,586	12,298	0.434
950	36,075	27,414	1.064
951	52,213	43,896	2.071
952	62,652	57,353	3.388
953	78,881	70,611	5.009
954	93,052	85,869	6.980
955	109,368	101,100	9.301
956	141,847	125,256	12.177
957	178,341	159,746	15.844
958	220,369	198,985	20.412

Note: *The conic method is used to compute the incremental volume between pond contours.*
The sum of the computed incremental volumes provides the cumulative pond volume for a given elevation .

The following table depicts the stormwater routing summary for this location under each of the modeled precipitation events.

Table 3.1-4(b): Existing Conditions Storage Area Routing – Point A7 – Lee's Summit Drive Culverts (Sta.25+65)

	Peak Q In (cfs):	T_P In (hr.):	Peak Q Out (cfs):	T_P Out (hr.):	V_R (ac-ft):	Peak WSEL (ft; NAVD):	Max. Storage Volume (ac-ft):
WQv:	38.00	12.06	37.95	12.06	2.539	946.33	0.015
2-Year:	236.01	12.02	229.26	12.05	14.58	948.71	0.319
10-Year:	437.94	12.01	397.23	12.07	27.333	950.22	1.251
100-Year:	707.16	12.00	603.32	12.08	44.871	951.80	3.100

Data provided in the preceding table indicates that each of the modeled events is effectively conveyed by this existing culvert, and sufficient freeboard appears to be available for each design storm.

<u>Sub-Basin B4- Stormwater Detention Facility</u>:

The upper reaches of the sub-watershed "B" region includes a relatively large, impervious property that includes an onsite wet-basin stormwater detention facility. The following information provides the modeled outfall geometry and storage area for the Existing - and Proposed Conditions PondPack models:

Primary Outlet Structure:

Inlet Box: 4.2 S.F. Opening; Crest Elev. ≈ 992.0
36" Dia. RCP Discharge Culvert: Length = 280 L.F.
Flowline In / Out ≈ 981 / 976 (ft; NAVD)

Table 3.1-5(a): Existing Storage Volume – Proposed Sub-Basin B4 Detention Facility

Elevation (ft; NAVD):	Storage Area (sq. ft.):	Incremental Volume (ft^3):	Cumulative Volume (ac-ft):
992	75,323	0	0.000
994	88,777	163,916	3.763
996	101,439	190,076	8.127
998	114,890	216,190	13.090

Note: *The conic method is used to compute the incremental volume between pond contours. The sum of the computed incremental volumes provides the cumulative pond volume for a given elevation .*

The following table depicts the stormwater routing summary for this location under each of the modeled precipitation events.

Table 3.1-5(b). Existing Conditions Storage Area Routing – Sub-Basin B4 Detention Facility

	Peak Q In (cfs):	T_P In (hr.):	Peak Q Out (cfs):	T_P Out (hr.):	V_R (ac-ft):	Peak WSEL (ft; NAVD):	Max. Storage Volume (ac-ft):
WQv:	30.27	11.95	8.05	12.15	1.713	992.37	0.642
2-Year:	99.43	11.94	22.46	12.16	5.919	993.25	2.284
10-Year:	158.21	11.94	28.68	12.19	9.694	994.04	3.850
100-Year:	232.94	11.94	34.97	12.24	14.599	995.03	5.948

The preceding routing summary indicates that the existing wet-basin detention facility provides significant attenuation for the modeled events.

Point C2 – Storage Area~Inlet C2:

The Existing- and Proposed Conditions models include a relatively significant storage unit in the defined sub-watershed "C" area. Geometric parameters for this storage area are based upon LIDAR topography and GIS base data. The following information provides the modeled outfall geometry and storage area for the Existing- and Proposed Conditions PondPack models:

Primary Outlet Structure:

Grate Inlet; Crest Elev. ≈ 956.85
Opening Area: 27.2 S.F.
66" Dia. RCP Discharge Culvert: Length = 177 L.F.
Flowline In / Out ≈ 945.7 / 945.1 (ft; NAVD)

Table 3.1-6(a). Existing Storage Volume – Storage Area C2

Elevation (ft; NAVD):	Storage Area (sq. ft.):	Incremental Volume (ft^3):	Cumulative Volume (ac-ft):
956.85	777	0	0
958	10,771	5,536	0.127
960	29,311	38,567	1.012
962	63,479	90,617	3.093
964	98,380	160,590	6.779
966	135,252	232,656	12.120
968	175,712	310,083	19.239
970	245,445	419,220	28.863
972	310,449	554,622	41.595

Note: *The conic method is used to compute the incremental volume between pond contours.*
The sum of the computed incremental volumes provides the cumulative pond volume for a given elevation .

The following table depicts the stormwater routing summary for this location under each of the modeled precipitation events.

Table 3.1-6(b). Existing Conditions Storage Area Routing – Storage Area C2

	Peak Q In (cfs):	T_P In (hr.):	Peak Q Out (cfs):	T_P Out (hr.):	V_R (ac-ft):	Peak WSEL (ft; NAVD):	Max. Storage Volume (ac-ft):
WQv:	21.38	12.02	21.36	12.02	1.338	956.90	0.001
2-Year:	142.28	11.96	137.26	12.00	8.110	957.95	0.115
10-Year:	264.20	11.96	219.81	12.05	15.199	959.67	0.804
100-Year:	423.95	11.96	285.13	12.07	24.875	961.59	2.539

The preceding routing summary indicates that, while the more frequent events are minimally affected by this feature, the larger events to undergo some attenuation.

The previously defined modeled stormwater conveyances and the associated hydrograph attenuation effects from the existing storage areas have been incorporated into both Existing- and Proposed Conditions PondPack models. Each of these storage areas is offsite from the proposed development areas contemplated by this Micro- and Macro Stormwater Drainage Study. The results of the Existing Conditions hydrologic routing are provided in the following section.

3.2. Existing Conditions Hydrologic Modeling Results

The stormwater storage areas and resultant hydrograph attenuation effects are incorporated into the Existing Conditions PondPack models. The results of this hydrologic routing of the hydrographs generated by the modeled subareas through the sub-watersheds are provided in the following summary tables. This information is provided at the defined Points of Interest.

Refer to the Existing Conditions Drainage Area Map for the location of the points in relation to the proposed development areas, modeled subareas, channels, and conveyances.

Table 3.2-1. Hydrologic Information – Existing Conditions Summary (Junctions)

	Q_{P-2} (cfs):	T_{P-2} (hr.):	V_{R-2} (ac-ft):	Q_{P-10} (cfs):	T_{P-10} (hr.):	V_{R-10} (ac-ft):	Q_{P-100} (cfs):	T_{P-100} (hr.):	V_{R-100} (ac-ft):
Point A1:	951.44	12.25	88.044	1,788.62	12.22	166.963	2,759.72	12.19	276.006
Point A2:	911.64	12.17	79.801	1,696.92	12.15	150.049	2,574.53	12.13	246.734
Point A3:	630.29	12.15	53.012	1,110.67	12.15	97.981	1,599.37	12.17	159.345
Point A4:	262.24	12.16	24.068	541.08	12.12	46.274	907.47	12.09	77.131
Point A5:	244.35	12.15	21.086	493.17	12.12	40.061	804.09	12.10	66.272
Point A6:	37.54	11.94	2.083	69.57	11.93	3.904	111.78	11.93	6.390
Point A7:	229.26	12.05	14.580	397.23	12.07	27.333	603.32	12.08	44.871
Point A8:	53.05	11.96	3.070	101.89	11.95	5.907	166.82	11.95	9.826
Point A9:	128.79	12.00	8.028	223.48	11.99	14.240	346.07	11.99	22.563
Point A10:	45.61	11.97	2.890	72.57	11.97	4.733	106.86	11.97	7.128
Point B1:	615.14	12.11	49.667	1,076.61	12.11	91.457	1,551.65	12.14	148.401
Point B2:	242.31	12.05	20.032	446.43	12.04	36.522	715.56	12.03	58.980
Point B3:	153.04	11.99	13.975	266.04	11.98	24.377	411.65	11.97	38.255
Point B4:	48.10	11.94	7.673	71.04	11.93	12.565	98.80	11.93	18.924
Point C1:	350.42	12.09	25.466	604.01	12.10	46.692	890.10	12.10	75.478
Point C2:	232.89	12.04	16.244	417.32	12.07	30.851	614.91	12.08	50.912
Point C3:	142.61	11.95	8.110	264.83	11.94	15.199	425.51	11.94	24.875

The information obtained in this Existing Conditions analysis is utilized to establish the "Allowable Release Rates" (ARR) for the project areas based upon prescriptive discharge rates (i.e. cfs/ac). A summary of the computation of these ARR's is provided in the following section.

3.3. Allowable Release Rate Calculations

The purpose of this Stormwater Drainage Study for the proposed development is to ensure compliance with the current specifications and design criteria in effect for the City of Lee's Summit, Missouri. The Proposed Conditions Micro- and Macro hydrologic analyses are provided in Section 4. Results of that analysis will be compared to the Section 3, Existing Conditions results. The variation in quantity and rate of stormwater discharge between these two models represents the hydrologic effect generated by development of the project site. The Actual- versus Allowable Release Rates for the fully-developed, Proposed Conditions will be evaluated in Section 4 for both Micro- and Macro-Study analyses in order to demonstrate compliance with the design objectives for this project.

The following tables are provided to compute the "Allowable Release Rate" (ARR) for the three design storm events in order to demonstrate compliance with the stated design objectives. The Proposed Conditions Micro- and Macro- Models utilize five defined points of discharge that receive stormwater runoff from the project site. The proposed Stormwater Management Plan for the proposed development areas will evaluate the ARR's at each of these modeled outlet locations.

Allowable Release Rate Calculations:

This section of the Stormwater Drainage Study for the proposed development is provided to establish the project "Allowable Release Rate" (ARR). The ARR is based upon the "Comprehensive Control" strategy provided in the Section 5600 of the APWA "Standard Specifications and Design Criteria" (Feb, 2011). This strategy provides the maximum ARR for the 2-, 10-, and 100-Year Design Storms at 0.50, 2.0, and 3.0 cfs-per-acre, respectively. Additional requirements include Extended Detention of the "Water Quality" design storm (defined as a 1.37" precipitation event).

The following table is provided in order to establish the project ARR for the Aria Micro Stormwater Drainage analysis. The ARR for each of the three modeled events is based upon the sum of the "Allowable Bypass" for offsite flows and the onsite "Allowable Release Rate." In order to prevent skewing the results, the ARR is based upon the Existing Conditions model. This ensures that the allowable bypass flows are not increased by onsite development, and that any diversions of tributary regions that takes place upon development is not incorporated into the allowable rates.

Information presented in the following table depicts the cumulative onsite and offsite areas for each of the Points, and the Existing Conditions peak discharge rates at these locations. From that information, the ARR is established in the second column from the right. The right-hand column depicts the relative difference in peak discharge rate that the proposed stormwater management plan would meet to achieve compliance with these targeted ARR's.

Table 3.3-1. Existing Conditions Release Rate Calculations for Aria Micro Study

Location:	Return Event (Yr):	Existing Conditions Peak Flow Rate (cfs):	Total Area (ac):	Ex. Cond's Release Rate (cfs/ac):	Onsite - - - - - - *(Offsite)* Area (ac):	Allowable Bypass Flows (cfs):	Allowable Onsite Discharge Rate: (cfs):	Prop. Cond. ARR (cfs):	Difference in Flow Rate: (cfs):
Point A1			602.22		22.50				
	2-Year:	951.44		1.58	- - - - - -	915.89	11.25	927.14	-24.30
	10-Year:	1,788.62		2.97	*(579.72)*	1,721.79	45.00	1,766.79	-21.83
	100-Year:	2,759.72		4.58		2,656.61	67.50	2,724.11	-35.61
Point A2			531.11		22.50				
	2-Year:	911.64		1.72	- - - - - -	873.02	11.25	884.27	-27.37
	10-Year:	1,696.92		3.20	*(508.61)*	1,625.03	45.00	1,670.03	-26.89
	100-Year:	2,574.53		4.85		2,465.46	67.50	2,532.96	-41.57
Point A3			332.87		11.73				
	2-Year:	630.29		1.89	- - - - - -	608.08	5.87	613.94	-16.35
	10-Year:	1,110.67		3.34	*(321.14)*	1,071.53	23.46	1,094.99	-15.68
	100-Year:	1,599.37		4.80		1,543.01	35.19	1,578.20	-21.17
Point A4			171.75		10.77				
	2-Year:	262.24		1.53	- - - - - -	245.80	5.39	251.18	-11.06
	10-Year:	541.08		3.15	*(160.98)*	507.15	21.54	528.69	-12.39
	100-Year:	907.47		5.28		850.56	32.31	882.87	-24.60
Point A5			144.60		4.88				
	2-Year:	244.35		1.69	- - - - - -	236.10	2.44	238.54	-5.81
	10-Year:	493.17		3.41	*(139.72)*	476.53	9.76	486.29	-6.88
	100-Year:	804.09		5.56		776.95	14.64	791.59	-12.50
Point A7			96.23		0.00				
	2-Year:	229.26		2.38	- - - - - -	229.26	0.00	229.26	0.00
	10-Year:	397.23		4.13	*(96.23)*	397.23	0.00	397.23	0.00
	100-Year:	603.32		6.27		603.32	0.00	603.32	0.00
Point B1			308.34		0.00				
	2-Year:	615.14		2.00	- - - - - -	615.14	0.00	615.14	0.00
	10-Year:	1,076.61		3.49	*(308.34)*	1,076.61	0.00	1,076.61	0.00
	100-Year:	1,551.65		5.03		1,551.65	0.00	1,551.65	0.00

The greatest required reduction in peak discharge rate occurs at the Point A2 location. This is the anticipated location for the greatest required impact, as that point is located at the confluence of the two channels that convey stormwater runoff from the three subareas (Sub's A3, A4(E), & A5(E)) that include portions of the proposed Aria development site. Although there are five Points of Interest that are being evaluated for stormwater impacts in these models, the ARR tables include the flow data for Points A7 and B1. These are locations upstream from the proposed development sites where the entirety of the runoff hydrographs are

generated by offsite areas. There are additional offsite regions downstream from these two locations, though they do not have discrete modeled point information available for reference.

The Micro-Study section of this report will provide a comparison of these Allowable Release Rates to the computed peak discharge rates at these Points of Interest to demonstrate compliance with the stated design objectives. As with the preceding table for the Aria development Micro-Study, the following table is provided to define the ARR's for the overall Macro-Study.

Table 3.3-2. Existing Conditions Release Rate Calculations for Macro Study

Location:	Return Event (Yr):	Existing Conditions Peak Flow Rate (cfs):	Total Area (ac):	Ex. Cond's Release Rate (cfs/ac):	Onsite - - - - - - *(Offsite)* Area (ac):	Allowable Bypass Flows (cfs):	Allowable Onsite Discharge Rate: (cfs):	Prop. Cond. ARR (cfs):	Difference in Flow Rate: (cfs):
Point A1			602.22		64.57				
	2-Year:	951.44		1.58	- - - - - -	849.43	32.29	881.71	-69.73
	10-Year:	1,788.62		2.97	*(537.65)*	1,596.84	129.14	1,725.98	-62.64
	100-Year:	2,759.72		4.58		2,463.82	193.71	2,657.53	-102.19
Point A2			531.11		52.21				
	2-Year:	911.64		1.72	- - - - - -	822.02	26.11	848.13	-63.51
	10-Year:	1,696.92		3.20	*(478.9)*	1,530.11	104.42	1,634.53	-62.39
	100-Year:	2,574.53		4.85		2,321.44	156.63	2,478.07	-96.46
Point A3			332.87		11.73				
	2-Year:	630.29		1.89	- - - - - -	608.08	5.87	613.94	-16.35
	10-Year:	1,110.67		3.34	*(321.14)*	1,071.53	23.46	1,094.99	-15.68
	100-Year:	1,599.37		4.80		1,543.01	35.19	1,578.20	-21.17
Point A4			171.75		40.48				
	2-Year:	262.24		1.53	- - - - - -	200.43	20.24	220.67	-41.57
	10-Year:	541.08		3.15	*(131.27)*	413.55	80.96	494.51	-46.57
	100-Year:	907.47		5.28		693.59	121.44	815.03	-92.44
Point A5			144.60		27.24				
	2-Year:	244.35		1.69	- - - - - -	198.32	13.62	211.94	-32.41
	10-Year:	493.17		3.41	*(117.36)*	400.27	54.48	454.75	-38.42
	100-Year:	804.09		5.56		652.61	81.72	734.33	-69.76
Point A7			96.23		0.00				
	2-Year:	229.26		2.38	- - - - - -	229.26	0.00	229.26	0.00
	10-Year:	397.23		4.13	*(96.23)*	397.23	0.00	397.23	0.00
	100-Year:	603.32		6.27		603.32	0.00	603.32	0.00
Point B1			308.34		0.00				
	2-Year:	615.14		2.00	- - - - - -	615.14	0.00	615.14	0.00
	10-Year:	1,076.61		3.49	*(308.34)*	1,076.61	0.00	1,076.61	0.00
	100-Year:	1,551.65		5.03		1,551.65	0.00	1,551.65	0.00

The maximum reduction in allowable peak discharge rate in the preceding table for the Macro-Study occurs at the downstream Point of Interest. This is the result of the addition of modeled development of the northern Multi-Family Residential property within Subarea A1(E), as well as the two other development areas- Area and Summit Village.

4. PROPOSED CONDITIONS ANALYSIS

This section of the Stormwater Drainage Study for the proposed development is provided to evaluate the Proposed Conditions hydrology for the project. As in the Existing Conditions analysis, the overall modeled stormwater drainage area for the Micro Study encompasses approximately 602 acres, including 22.5 acres within the proposed development site. Due to a diversion of approximately 2.8 acres from adjacent tributary areas, the overall drainage area is slightly increase to approximately 605 acres in the Macro Study. The following two sub-sections will provide the Proposed Conditions analysis for the Micro- and Macro analyses.

The purpose of this report is to provide the Macro and Micro Stormwater Drainage analysis to ensure that the proposed site development is compliant with City of Lee's Summit requirements. This section of the report will provide the Proposed Conditions analyses, representing the fully developed site hydrology for both Micro- and Macro-Study configurations. The results of this analysis will be compared to those of Existing Conditions in order to determine the hydrologic effects of the development upon the receiving stormwater conveyances and sub-watersheds. Compliance with the project ARR's will also be evaluated through comparison of the Actual- versus Allowable Release Rates at the five defined Points of Interest.

4.1. Aria – Micro Stormwater Model: Proposed Conditions Analysis

This section of the Stormwater Drainage Study for the Aria multi-family residential development is provided to evaluate the Micro-Study Proposed Conditions hydrology for the project. Aria Apartments is a 22.50-acre multi-family development with associated drives, parking, garages, utilities, and a clubhouse with pool amenities.

Proposed Conditions Runoff Curve Numbers have been developed based upon the current Development Plan for this multi-family residential project. Refer to Section 7 for Micro-Study Proposed Conditions weighted NRCS Runoff Curve Number (CN) and Time of Concentration (T_C) calculations. Table 4.1-1 contains the hydrologic parameters used to characterize subareas the Existing Conditions PondPack model.

The tributary areas, Runoff Curve Numbers (CN), and Times of Concentration (T_C) for the corresponding subareas that are provided in Table 4.1-1 are used as input into the Proposed Conditions PondPack model to evaluate the Micro-stormwater hydrology. Subareas included in the Proposed Conditions for the Aria property are utilized in the PondPack model to compute the stormwater runoff for the three design storms. The resultant peak discharge rate (Q_P), peak time (T_P), and runoff volume (V_R) for the computed hydrographs of modeled subareas are included in Table 4.1-2(a). Areas that are unchanged from the Existing Conditions analysis are presented as *grey print* in the following tables.

Table 4.1-1. Micro-Study Proposed Conditions Input Data

	Total Area (ac):	Aria Onsite Area (ac):	Summit Village Onsite Area (ac):	Macro-Study Onsite Area (ac):	NRCS Weighted CN:	T_C [1] (hr):
Subarea A1(e):	*27.97*			*12.36*	*77*	*0.1736*
Subarea A1(w):	*43.14*				*76*	*0.2511*
Subarea A2(e):	*3.08*				*80*	*0.0875*
Subarea A2(w):	*23.41*				*73*	*0.2133*
Subarea A3:	24.06	11.07		11.07	87	0.0639
Subarea A4(e):	11.23	7.34		7.34	86	0.0660
Subarea A4(w):	*17.41*		***7.35***	*7.35*	*73*	*0.1656*
INTERIM_Subarea A5(e):	16.48	4.09	6.04	10.13	82	0.1195
INTERIM_Subarea A5(w):	17.42		16.32	16.32	79	0.1682
Subarea A6:	*13.45*				*83*	*0.1063*
Subarea A7:	*30.6*				*76*	*0.1596*
Subarea A8:	*21.56*				*81*	*0.1299*
Subarea A9:	*31.84*				*84*	*0.1420*
Subarea A10:	*12.23*				*94*	*0.1545*
Subtotal:	*293.88*	*22.50*	*29.71*	*64.57*		
Subarea B1:	*31.94*				*79*	*0.1385*
Subarea B2:	*48.54*				*78*	*0.1987*
Subarea B3:	*40.69*				*83*	*0.1447*
Subarea B4-DET:	*25.05*				*94*	*0.1155*
Subarea B4-BYP:	*7.42*				*94*	*0.0787*
Subtotal:	*153.64*					
Subarea C1:	*45.21*				*90*	*0.2860*
Subarea C2:	*57.13*				*81*	*0.3308*
Subarea C3:	*52.36*				*83*	*0.1199*
Subtotal:	154.70					
Sub-W'Shed A Subtotal:	293.88	22.50	29.71	64.57		
Sub-W'Shed B Subtotal:	*153.64*	*0.00*	*0.00*	*0.00*		
Sub-W'Shed C Subtotal:	*154.70*	*0.00*	*0.00*	*0.00*		
Modeled Total:	602.22	22.50	29.71	64.57		

[1] ***Note:*** *Per TR-55 documentation, minimum T_C is 0.10 hours; model is configured with default value of 0.10 hr. minimum Tc.*

These tributary areas, Runoff Curve Numbers (CN), and Times of Concentration (T_C) for the corresponding subareas were used as input to the Proposed Conditions PondPack model to evaluate the stormwater hydrology for this Micro-Study. The subareas representing Existing-(offsite) and Proposed Conditions (onsite) for the Aria site are utilized in the PondPack model to compute the stormwater runoff for the three design storms. The resultant peak discharge rate

(Q_P), peak time (T_P), and runoff volume (V_R) for the computed hydrographs of modeled subareas are included in Table 4.1-2.

Table 4.1-2(a). Hydrologic Information – Micro-Study Proposed Conditions Summary (Subareas)

Location:	Q_{P-2} (cfs):	T_{P-2} (hr.):	V_{R-2} (ac-ft):	Q_{P-10} (cfs):	T_{P-10} (hr.):	V_{R-10} (ac-ft):	Q_{P-100} (cfs):	T_{P-100} (hr.):	V_{R-100} (ac-ft):
Subarea A-1(e):	*80.60*	*11.97*	*4.735*	*149.59*	*11.96*	*8.874*	*240.05*	*11.96*	*14.523*
Subarea A-1(w):	*70.15*	*12.05*	*4.908*	*146.86*	*12.05*	*10.132*	*252.55*	*12.05*	*17.597*
Subarea A-2(e):	*7.64*	*11.94*	*0.420*	*14.90*	*11.93*	*0.819*	*24.63*	*11.93*	*1.374*
Subarea A-2(w):	*34.59*	*12.03*	*2.301*	*76.77*	*12.03*	*4.975*	*136.28*	*12.03*	*8.884*
Subarea A-3:	79.39	11.93	4.376	138.56	11.93	7.797	214.52	11.93	12.366
Subarea A-4(e):	35.72	11.93	1.964	63.28	11.93	3.543	98.81	11.93	5.662
Subarea A-4(w):	*22.01*	*11.98*	*1.309*	*46.91*	*11.97*	*2.744*	*81.64*	*11.96*	*4.808*
Subarea A-5(e):	31.81	11.93	1.744	58.13	11.93	3.228	92.41	11.93	5.240
Subarea A-5(w):	119.58	11.92	7.015	188.38	11.92	11.352	276.00	11.92	16.975
Subarea A-6:	*37.54*	*11.94*	*2.083*	*69.57*	*11.93*	*3.904*	*111.78*	*11.93*	*6.390*
Subarea A-7:	*57.26*	*12.00*	*3.482*	*119.03*	*11.98*	*7.186*	*204.90*	*11.98*	*12.481*
Subarea A-8:	*53.05*	*11.96*	*3.070*	*101.89*	*11.95*	*5.907*	*166.82*	*11.95*	*9.826*
Subarea A-9:	*87.15*	*11.97*	*5.138*	*158.95*	*11.96*	*9.507*	*252.78*	*11.96*	*15.435*
Subarea A-10:	*45.61*	*11.97*	*2.890*	*72.57*	*11.97*	*4.733*	*106.86*	*11.97*	*7.128*
Subarea B-1:	*70.94*	*11.97*	*4.168*	*140.29*	*11.96*	*8.242*	*234.20*	*11.95*	*13.944*
Subarea B-2:	*94.72*	*12.03*	*6.057*	*190.16*	*12.01*	*12.146*	*320.74*	*12.00*	*20.725*
Subarea B-3:	*106.50*	*11.97*	*6.302*	*197.62*	*11.96*	*11.812*	*317.37*	*11.96*	*19.332*
Subarea B-4 (BYP):	*30.29*	*11.93*	*1.753*	*48.22*	*11.92*	*2.871*	*71.04*	*11.92*	*4.324*
Subarea B-4 (DET):	*99.43*	*11.94*	*5.919*	*158.21*	*11.94*	*9.694*	*232.94*	*11.94*	*14.599*
Subarea C-1:	*124.83*	*12.05*	*9.223*	*209.38*	*12.05*	*15.842*	*317.10*	*12.05*	*24.565*
Subarea C-2:	*104.44*	*12.09*	*8.134*	*200.90*	*12.08*	*15.652*	*329.78*	*12.08*	*26.038*
Subarea C-3:	*142.61*	*11.95*	*8.110*	*264.83*	*11.94*	*15.199*	*425.51*	*11.94*	*24.875*

The hydrologic impact resulting from the Micro-Study Proposed Conditions results is partially revealed by the comparison of the preceding subarea data to those established in Section 3 (Existing Conditions) of this report. The hydrologic conditions for offsite subareas remain unchanged between Existing- and Proposed Conditions analyses. However, the onsite subareas do exhibit changes in impervious cover and diversion of tributary area under Proposed Conditions. The hydrologic impact to the overall sub-watershed of these modified areas will become apparent in the summary tables for the Points of Interest.

The variation in quantity and rate of stormwater discharge between these two models represents the hydrologic effect generated by the proposed development project for given

subareas. The following table depicts the difference in computed subarea hydrology between the Existing- and Proposed Conditions models.

Table 4.1-2(b). Hydrologic Information – Micro-Study Proposed vs. Existing Conditions Summary (Subareas)

Location:	Q_{P-2} (cfs):	T_{P-2} (hr.):	V_{R-2} (ac-ft):	Q_{P-10} (cfs):	T_{P-10} (hr.):	V_{R-10} (ac-ft):	Q_{P-100} (cfs):	T_{P-100} (hr.):	V_{R-100} (ac-ft):
Subarea A-1(e):	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea A-1(w):	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea A-2(e):	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea A-2(w):	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea A-3:	22.11	-0.04	1.031	27.20	-0.03	1.273	30.13	-0.02	1.422
Subarea A-4(e):	14.05	-0.04	0.693	20.31	-0.03	1.030	27.11	-0.03	1.410
Subarea A-4(w):	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea A-5(e):	6.82	n/c	0.381	10.47	n/c	0.617	14.71	-0.01	0.906
Subarea A-5(w):	-1.18	n/c	-0.083	-5.11	-0.01	-0.297	-11.06	n/c	-0.644
Subarea A-6:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea A-7:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea A-8:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea A-9:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea A-10:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea B-1:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea B-2:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea B-3:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea B-4 (BYP):	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea B-4 (DET):	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea C-1:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea C-2:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea C-3:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*

The sign-convention used in the preceding table is: Proposed Conditions minus Existing Conditions. Therefore, negative values indicate a reduction in computed value, whereas positive values reflect an increase. Those locations that do not exhibit any change in computed values are identified by "n/c."

The previously defined stormwater detention basins, outfall structures and resultant hydrograph attenuation effects have been incorporated into the Proposed Conditions PondPack model. The channel reaches defined in the Existing Conditions analysis are also included in this routing. Results of this Proposed Conditions hydrologic routing are provided in the following summary table. This information is provided at the same "Points of Interest" used in the Existing Conditions hydrologic analysis for this Stormwater Drainage Study. Refer to the Proposed Conditions Drainage Area Map for the location of the points of interest in relation to the development site, modeled subareas, channels and conveyances. As in the preceding tables,

locations that are unchanged from the Existing Conditions analysis are presented as grey print in the following tables.

Table 4.1-3(a). Hydrologic Information–Micro-Study Proposed Conditions Summary (Junctions)
Un-Detained Hydrology (for Proposed Summit Village Basin)

Location:	Q_{P-2} (cfs):	T_{P-2} (hr.):	V_{R-2} (ac-ft):	Q_{P-10} (cfs):	T_{P-10} (hr.):	V_{R-10} (ac-ft):	Q_{P-100} (cfs):	T_{P-100} (hr.):	V_{R-100} (ac-ft):
Point A1:	951.76	12.24	90.065	1,777.12	12.22	169.585	2,740.68	12.17	279.101
Point A2:	911.49	12.17	81.823	1,682.90	12.15	152.670	2,537.88	12.13	249.829
Point A3:	627.24	12.16	54.042	1,101.49	12.15	99.254	1,586.19	12.17	160.767
Point A4:	264.71	12.15	25.059	539.12	12.11	47.623	899.94	12.08	78.804
Point A5:	246.05	12.15	21.384	490.30	12.12	40.381	794.09	12.09	66.535
Point A6:	*37.54*	*11.94*	*2.083*	*69.57*	*11.93*	*3.904*	*111.78*	*11.93*	*6.390*
Point A7:	*229.26*	*12.05*	*14.580*	*397.23*	*12.07*	*27.333*	*603.32*	*12.08*	*44.871*
Point A8:	*53.05*	*11.96*	*3.070*	*101.89*	*11.95*	*5.907*	*166.82*	*11.95*	*9.826*
Point A9:	*128.79*	*12.00*	*8.028*	*223.48*	*11.99*	*14.240*	*346.07*	*11.99*	*22.563*
Point A10:	*45.61*	*11.97*	*2.890*	*72.57*	*11.97*	*4.733*	*106.86*	*11.97*	*7.128*
Point B1:	*615.14*	*12.11*	*49.667*	*1,076.61*	*12.11*	*91.457*	*1,551.65*	*12.14*	*148.401*
Point B2:	*242.31*	*12.05*	*20.032*	*446.43*	*12.04*	*36.522*	*715.56*	*12.03*	*58.980*
Point B3:	*153.04*	*11.99*	*13.975*	*266.04*	*11.98*	*24.377*	*411.65*	*11.97*	*38.255*
Point B4:	*48.10*	*11.94*	*7.673*	*71.04*	*11.93*	*12.565*	*98.80*	*11.93*	*18.924*
Point C1:	*350.42*	*12.09*	*25.466*	*604.01*	*12.10*	*46.692*	*890.10*	*12.10*	*75.478*
Point C2:	*232.89*	*12.04*	*16.244*	*417.32*	*12.07*	*30.851*	*614.91*	*12.08*	*50.912*
Point C3:	*142.61*	*11.95*	*8.110*	*264.83*	*11.94*	*15.199*	*425.51*	*11.94*	*24.875*

As previously evaluated for the modeled Subareas, these Proposed Conditions results for the Points of Interest will be compared to those established in Section 3 (Existing Conditions) of this report. The points represent similar locations in both Existing- and Proposed Conditions analyses. Therefore, the variation in quantity and rate of stormwater discharge between these two models represents the hydrologic effect generated by the proposed development. The following table depicts the difference between the Existing- and Proposed Conditions models.

Table 4.1-3(b). Hydrologic Information – Comparison of Results:
Micro- Proposed vs. Existing Conditions Summary (Junctions) Un-Detained Hydrology

Location:	Q_{P-2} (cfs):	T_{P-2} (hr.):	V_{R-2} (ac-ft):	Q_{P-10} (cfs):	T_{P-10} (hr.):	V_{R-10} (ac-ft):	Q_{P-100} (cfs):	T_{P-100} (hr.):	V_{R-100} (ac-ft):
Point A1:	0.32	-0.01	2.021	-11.50	n/c	2.622	-19.04	-0.02	3.095
Point A2:	-0.15	n/c	2.022	-14.02	n/c	2.621	-36.65	n/c	3.095
Point A3:	-3.05	0.01	1.030	-9.18	n/c	1.273	-13.18	n/c	1.422
Point A4:	2.47	-0.01	0.991	-1.96	-0.01	1.349	-7.53	-0.01	1.673
Point A5:	1.70	n/c	0.298	-2.87	n/c	0.320	-10.00	-0.01	0.263
Point A6:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point A7:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point A8:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point A9:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point A10:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point B1:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point B2:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point B3:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point B4:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point C1:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point C2:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point C3:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*

The sign-convention used in the preceding table is: Proposed Conditions minus Existing Conditions. Therefore, negative values indicate a reduction in computed value, whereas positive values reflect an increase. Those locations that do not exhibit any change in computed values are identified by "n/c."

Information presented in the preceding table exhibits a reduction in peak rates, relative to the existing conditions model. This is the result of reduced times of concentration that occur with Aria development. Overall runoff volumes exhibit modest increase.

The following table is provided to examine the difference between the computed peak discharge rates and the established ARR's for the Aria Micro-Study.

Table 4.1-4. Allowable Release Rate Evaluation – Proposed Conditions Micro Model – Without Detention

Location:	Event:	Computed Peak Discharge Rate (cfs):	ARR (cfs):	Difference (cfs):
Point A1	2-Year:	951.76	927.14	24.62
	10-Year:	1777.12	1,766.79	10.33
	100-Year:	2740.68	2,724.11	16.57
Point A2	2-Year:	911.49	884.27	27.22
	10-Year:	1682.9	1,670.03	12.87
	100-Year:	2537.88	2,532.96	4.92
Point A3	2-Year:	627.24	613.94	13.30
	10-Year:	1101.49	1,094.99	6.50
	100-Year:	1586.19	1,578.20	7.99
Point A4	2-Year:	264.71	251.18	13.53
	10-Year:	539.12	528.69	10.43
	100-Year:	899.94	882.87	17.07
Point A5	2-Year:	246.05	238.54	7.51
	10-Year:	490.3	486.29	4.01
	100-Year:	794.09	791.59	2.50

The sign-convention utilized for the information presented in the preceding table is based upon "Computed Rate minus ARR." Therefore, positive values indicate an exceedance of the Allowable Release Rate, whereas negative values would indicate a peak rate that is lower than the ARR, thereby meeting the targeted peak discharge rates. The difference in the rates depicted in this table are all in exceedance of the targeted rates, therefore stormwater detention is required for the project.

Proposed Summit Village Stormwater Detention Facility:

Based upon the Proposed Conditions analysis, it is apparent that some form of stormwater detention will be require for this project. The Aria project is quite limited with opportunities to provide onsite stormwater detention to meet the project ARR's. Preliminary analysis has indicated that, due to the proximity of the Aria property, supplemental stormwater detention outside the Aria boundaries would be required to accommodate the full development of the overall project area. Therefore an alternate location has been evaluated for the project. This option entails construction of a new stormwater detention facility within the future Summit Village property. That basin is proposed to be constructed as a Water-Quality facility, with the intent of allowing the Summit Village site to meet their obligations for 40-hour extended

detention upon development of that site. The remaining two properties will, however utilize the performance of this basin in order to meet their obligations to meet the project Allowable Release Rates. Following is the Proposed Conditions geometry for the outlet structure:

Primary Outlet Structure:
24" Diameter HDPE Culvert; Length ≈ 110.18 L.F.
Flowline In / Out ≈ 931.33 / 930.00 (ft; NAVD)
Water Quality Treatment Orifice: 4" Dia.; Invert Elev. = 933.75
Includes Inlet Protection Grate
Secondary Orifice: 8" Dia.; Invert Elev. = 937.00
Concrete Inlet – Riser Box: 4' x 4' (Inside),
3 Sides Open (E, S, & W-sides)
Opening crest elevation = 940.50 (3-sides), 10" ht.

Secondary Outlet Structure:
Emergency Spillway (Weir) 110' L x 2.5' H with 3:1 side slopes; Crest Elev. = 947.50.

Discharge through the proposed Composite Outlet at the threshold of overtopping/weir-flow is approximately 56.2 cfs.

The proposed basin's storage area is provided in the following table. This proposed storage area is designed as the final configuration for the facility; it is intended to provide the necessary detention for the three separate development areas, and provide the 40-hour Extended Detention for the majority of the Summit Village property (it may be impractical to convey runoff from some areas in the northwestern portion of the property).

Table 4.1-5(a). Proposed Conditions Storage Volume – Summit Village Stormwater Detention Facility

Elevation (ft; NAVD):	Storage Area (sq. ft.):	Incremental Volume (ft^3):	Cumulative Volume (ac-ft):
933.75	1,541	0	0
934	18,901	2,153	0.049
935	20,680	19,784	0.504
936	29,182	24,809	1.073
937	36,039	32,550	1.820
938	38,936	37,478	2.681
939	41,890	40,404	3.608
940	44,900	43,386	4.604
941	47,967	46,425	5.670
942	51,091	49,521	6.807
943	54,271	52,673	8.016
944	57,508	55,882	9.299

Elevation (ft; NAVD):	Storage Area (sq. ft.):	Incremental Volume (ft^3):	Cumulative Volume (ac-ft):
945	60,801	59,147	10.657
946	64,151	62,469	12.091
947	67,557	65,847	13.603
948	72,529	70,028	15.210
949	75,756	74,137	16.912
950	79,010	77,377	18.688

Note: *The conic method is used to compute the incremental volume between pond contours. The sum of the computed incremental volumes provides the cumulative pond volume for a given elevation .*

Utilizing these geometric parameters in the Proposed Conditions model, the following table depicts the stormwater routing summary for this location.

Table 4.1-5(b). Micro-Study Proposed Conditions Hydrologic Routing Summary– Summit Village Stormwater Detention Facility

	Peak Q In (cfs):	T_P In (hr.):	Peak Q Out (cfs):	T_P Out (hr.):	V_R (ac-ft):	Peak WSEL (ft; NAVD):	Max. Storage Volume (ac-ft):
WQv:	9.23	12.03	0.36	17.53	0.635	934.64	0.337
2-Year:	73.27	11.97	2.32	15.42	4.356	938.10	2.767
10-Year:	140.58	11.96	7.63	13.36	8.399	940.57	5.200
100-Year:	230.66	11.96	45.69	12.24	13.994	942.25	7.100

The preceding routing summary indicates that the extended detention aspect of this facility provides substantial attenuation of the Water Quality design storm. However, the other three modeled events also exhibit substantial effects from this proposed facility. In an effort to retain the 40-hour (min.) draw-down for Water Quality treatment, yet reduce excessive long-term ponding, a secondary orifice is provided to allow the water surface elevations to be effectively lowered to the Water Quality pool elevation shortly after termination of the design storm events that are in exceedance of the defined Water Quality Storm.

The proposed stormwater detention facility is included in the PondPack modeling for the following table output. These Micro-Study Proposed Conditions results will be compared to the Existing Conditions in the following table. Areas that are unchanged from the Existing Conditions analysis are presented as *grey print* in the following tables.

Table 4.1-6(a). Hydrologic Information – Micro- Proposed Conditions Summary (Junctions)
Including Proposed Summit Village Detention Basin

Location:	Q_{P-2} (cfs):	T_{P-2} (hr.):	V_{R-2} (ac-ft):	Q_{P-10} (cfs):	T_{P-10} (hr.):	V_{R-10} (ac-ft):	Q_{P-100} (cfs):	T_{P-100} (hr.):	V_{R-100} (ac-ft):
Point A1:	892.12	12.25	89.909	1,645.08	12.23	169.234	2,528.80	12.21	278.693
Point A2:	851.94	12.18	81.668	1,558.44	12.17	152.323	2,371.99	12.17	249.423
Point A3:	627.24	12.16	54.042	1,101.49	12.15	99.254	1,586.19	12.17	160.767
Point A4:	208.69	12.18	24.905	417.94	12.17	47.276	717.01	12.15	78.399
Point A5:	192.86	12.17	21.230	386.37	12.17	40.034	659.34	12.16	66.130
Point A6:	*37.54*	*11.94*	*2.083*	*69.57*	*11.93*	*3.904*	*111.78*	*11.93*	*6.390*
Point A7:	*229.26*	*12.05*	*14.580*	*397.23*	*12.07*	*27.333*	*603.32*	*12.08*	*44.871*
Point A8:	*53.05*	*11.96*	*3.070*	*101.89*	*11.95*	*5.907*	*166.82*	*11.95*	*9.826*
Point A9:	*128.79*	*12.00*	*8.028*	*223.48*	*11.99*	*14.240*	*346.07*	*11.99*	*22.563*
Point A10:	*45.61*	*11.97*	*2.890*	*72.57*	*11.97*	*4.733*	*106.86*	*11.97*	*7.128*
Point B1:	*615.14*	*12.11*	*49.667*	*1,076.61*	*12.11*	*91.457*	*1,551.65*	*12.14*	*148.401*
Point B2:	*242.31*	*12.05*	*20.032*	*446.43*	*12.04*	*36.522*	*715.56*	*12.03*	*58.980*
Point B3:	*153.04*	*11.99*	*13.975*	*266.04*	*11.98*	*24.377*	*411.65*	*11.97*	*38.255*
Point B4:	*48.10*	*11.94*	*7.673*	*71.04*	*11.93*	*12.565*	*98.80*	*11.93*	*18.924*
Point C1:	*350.42*	*12.09*	*25.466*	*604.01*	*12.10*	*46.692*	*890.10*	*12.10*	*75.478*
Point C2:	*232.89*	*12.04*	*16.244*	*417.32*	*12.07*	*30.851*	*614.91*	*12.08*	*50.912*
Point C3:	*142.61*	*11.95*	*8.110*	*264.83*	*11.94*	*15.199*	*425.51*	*11.94*	*24.875*

The following table provides a comparison between the Micro-Study Proposed Conditions (with detention) and the Existing Conditions modeled results. As indicated by the grey font, the lowest five modeled points within the sub-watershed are the only locations that exhibit hydrologic impacts

Table 4.1-6(b). Hydrologic Information – Comparison of Results:
Micro- Proposed vs. Existing Conditions Summary (Junctions) Detained Hydrology

Location:	Q_{P-2} (cfs):	T_{P-2} (hr.):	V_{R-2} (ac-ft):	Q_{P-10} (cfs):	T_{P-10} (hr.):	V_{R-10} (ac-ft):	Q_{P-100} (cfs):	T_{P-100} (hr.):	V_{R-100} (ac-ft):
Point A1:	-59.32	n/c	1.865	-143.54	0.01	2.271	-230.92	0.02	2.687
Point A2:	-59.70	0.01	1.867	-138.48	0.02	2.274	-202.54	0.04	2.689
Point A3:	-3.05	0.01	1.030	-9.18	n/c	1.273	-13.18	n/c	1.422
Point A4:	-53.55	0.02	0.837	-123.14	0.05	1.002	-190.46	0.06	1.268
Point A5:	-51.49	0.02	0.144	-106.80	0.05	-0.027	-144.75	0.06	-0.142
Point A6:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point A7:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point A8:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point A9:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point A10:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*

Location:	Q_{P-2} (cfs):	T_{P-2} (hr.):	V_{R-2} (ac-ft):	Q_{P-10} (cfs):	T_{P-10} (hr.):	V_{R-10} (ac-ft):	Q_{P-100} (cfs):	T_{P-100} (hr.):	V_{R-100} (ac-ft):
Point B1:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point B2:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point B3:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point B4:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point C1:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point C2:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point C3:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*

The sign-convention used in the preceding table is: Proposed Conditions minus Existing Conditions. Therefore, negative values indicate a reduction in computed value, whereas positive values reflect an increase. Those locations that do not exhibit any change in computed values are identified by "n/c."

Information presented in the preceding table exhibits a reduction in peak rates, relative to the existing conditions model. This is the result of reduced times of concentration that occur with Aria development. Overall runoff volumes exhibit modest increase.

The following table is provided to examine the difference between the computed peak discharge rates and the established ARR's for the Aria Micro-Study.

Table 4.1-7. Allowable Release Rate Evaluation – Proposed Conditions Micro Study (With Detention)

Location:	Event:	Computed Peak Discharge Rate (cfs):	ARR (cfs):	Difference (cfs):
Point A1	2-Year:	892.12	927.14	-35.02
	10-Year:	1645.08	1,766.79	-121.71
	100-Year:	2528.8	2,724.11	-195.31
Point A2	2-Year:	851.94	884.27	-32.33
	10-Year:	1558.44	1,670.03	-111.59
	100-Year:	2371.99	2,532.96	-160.97
Point A3	2-Year:	627.24	613.94	**13.30**
	10-Year:	1101.49	1,094.99	**6.50**
	100-Year:	1586.19	1,578.20	**7.99**
Point A4	2-Year:	208.69	251.18	-42.49
	10-Year:	417.94	528.69	-110.75
	100-Year:	717.01	882.87	-165.86
Point A5	2-Year:	192.86	238.54	-45.68
	10-Year:	386.37	486.29	-99.92
	100-Year:	659.34	791.59	-132.25

Note: The sign-convention utilized for the information presented in the preceding table is based upon "Computed Rate minus ARR." Positive values indicate an exceedance of the ARR; negative values indicate that the peak rate is lower than the ARR.

The difference in the rates depicted in this table are generally in compliance with the targeted rates; the proposed stormwater management facility provides adequate attenuation for the primary Channel "A" tributary. The information provided in the preceding table does demonstrate that there is one exception: Point A3. This is the terminal end of the Channel "B" tributary, immediately upstream from confluence at Point A2.

Although the ARR is exceeded at the Point A3 location, the Proposed Conditions analysis does exhibit a reduction in peak discharge rate relative to Existing Conditions *(flows are reduced to: -3.05 cfs, -9.18 cfs, and -13.18 cfs for the 2-, 10-, and 100-year events, respectively).* This proposed stormwater management plan for the Aria Development meets and exceeds the design objectives for the remainder of the project area.

4.2. Macro Stormwater Model: Proposed Conditions Analysis

This section of the Stormwater Drainage Study for the Aria multi-family residential development is provided to evaluate the Macro-Study Proposed Conditions hydrology for the project. Proposed conditions include the fully-developed condition of Aria, Summit Village North, and the Multi-Family Residential developments.

Proposed Conditions Runoff Curve Numbers have been developed based upon the current Development Plan for this multi-family residential project. Refer to Section 7 for Macro-Study Proposed Conditions weighted NRCS Runoff Curve Number (CN) and Time of Concentration (T_C) calculations. These values, summarized in Table 4.2-1 are used as input into the Proposed Conditions PondPack model to evaluate the Macro-Study Proposed Conditions PondPack model to compute the stormwater runoff for the three design storms. The resultant peak discharge rate (Q_P), peak time (T_P), and runoff volume (V_R) for the computed hydrographs of modeled subareas are included in Table 4.2-2(a). Areas that are unchanged from the Existing Conditions analysis are presented as *grey print* in the following tables.

Table 4.2-1. Macro-Study Proposed Conditions Input Data

	Total Area (ac):	Aria Onsite Area (ac):	Summit Village Onsite Area (ac):	Macro-Study Onsite Area (ac):	NRCS Weighted CN:	T_C [1] (hr):
Subarea A1(e):	30.57		14.96	14.96	83	0.1401
Subarea A1(w):	*43.14*				*76*	*0.2511*
Subarea A2(e):	*3.08*				*80*	*0.0875*
Subarea A2(w):	*23.41*				*73*	*0.2133*
Subarea A3:	24.06	11.07		11.07	87	0.0639
Subarea A4(e):	11.23	7.34		7.34	86	0.0660
Subarea A4(w):	12.07		2.01	2.01	75	0.1377
Subarea A5(e):	10.81	3.91	0.64	4.55	84	0.0862

	Total Area (ac):	Aria Onsite Area (ac):	Summit Village Onsite Area (ac):	Macro-Study Onsite Area (ac):	NRCS Weighted CN:	T_C [1] (hr):
Subarea A5(w):	28.64	0.18	27.27	27.45	95	0.0598
Subarea A6:	*13.45*				*83*	*0.1063*
Subarea A7:	*30.6*				*76*	*0.1596*
Subarea A8:	*21.56*				*81*	*0.1299*
Subarea A9:	*31.84*				*84*	*0.1420*
Subarea A10:	*12.23*				*94*	*0.1545*
Subtotal:	*296.69*	*22.50*	*44.88*	*67.38*		
Subarea B1:	*31.94*				*79*	*0.1385*
Subarea B2:	*48.54*				*78*	*0.1987*
Subarea B3:	*40.69*				*83*	*0.1447*
Subarea B4-DET:	*25.05*				*94*	*0.1155*
Subarea B4-BYP:	*7.42*				*94*	*0.0787*
Subtotal:	*153.64*					
Subarea C1:	*45.21*				*90*	*0.2860*
Subarea C2:	*57.13*				*81*	*0.3308*
Subarea C3:	*52.36*				*83*	*0.1199*
Subtotal:	154.70					
Sub-W'Shed A Subtotal:	296.69	22.50	44.88	67.38		
Sub-W'Shed B Subtotal:	*153.64*	*0.00*	*0.00*	*0.00*		
Sub-W'Shed C Subtotal:	*154.70*	*0.00*	*0.00*	*0.00*		
Modeled Total:	605.03	22.50	44.88	67.38		

[1] ***Note:*** *Per TR-55 documentation, minimum T_C is 0.10 hours; model is configured with default value of 0.10 hr. minimum Tc.*

As noted, these tributary areas, Runoff Curve Numbers (CN), and Times of Concentration (T_C) for the corresponding subareas were used as input to the Proposed Conditions PondPack model to evaluate the stormwater hydrology for the Macro-Study section of this report. The subareas representing Existing- (offsite) and Proposed Conditions (onsite) for the development sites are utilized in the PondPack model to compute the stormwater runoff for the three design storms. The resultant peak discharge rate (Q_P), peak time (T_P), and runoff volume (V_R) for the computed hydrographs of modeled subareas are included in Table 4.2-2(a).

Table 4.2-2(a). Hydrologic Information – Macro- Proposed Conditions Summary (Subareas)

Location:	Q_{P-2} (cfs):	T_{P-2} (hr.):	V_{R-2} (ac-ft):	Q_{P-10} (cfs):	T_{P-10} (hr.):	V_{R-10} (ac-ft):	Q_{P-100} (cfs):	T_{P-100} (hr.):	V_{R-100} (ac-ft):
Subarea A-1(e):	80.60	11.97	4.735	149.59	11.96	8.874	240.05	11.96	14.523
Subarea A-1(w):	*70.15*	*12.05*	*4.908*	*146.86*	*12.05*	*10.132*	*252.55*	*12.05*	*17.597*
Subarea A-2(e):	*7.64*	*11.94*	*0.420*	*14.90*	*11.93*	*0.819*	*24.63*	*11.93*	*1.374*

Location:	Q_{P-2} (cfs):	T_{P-2} (hr.):	V_{R-2} (ac-ft):	Q_{P-10} (cfs):	T_{P-10} (hr.):	V_{R-10} (ac-ft):	Q_{P-100} (cfs):	T_{P-100} (hr.):	V_{R-100} (ac-ft):
Subarea A-2(w):	*34.59*	*12.03*	*2.301*	*76.77*	*12.03*	*4.975*	*136.28*	*12.03*	*8.884*
Subarea A-3:	79.39	11.93	4.376	138.56	11.93	7.797	214.52	11.93	12.366
Subarea A-4(e):	35.72	11.93	1.964	63.28	11.93	3.543	98.81	11.93	5.662
Subarea A-4(w):	22.01	11.98	1.309	46.91	11.97	2.744	81.64	11.96	4.808
Subarea A-5(e):	31.81	11.93	1.744	58.13	11.93	3.228	92.41	11.93	5.240
Subarea A-5(w):	119.58	11.92	7.015	188.38	11.92	11.352	276.00	11.92	16.975
Subarea A-6:	*37.54*	*11.94*	*2.083*	*69.57*	*11.93*	*3.904*	*111.78*	*11.93*	*6.390*
Subarea A-7:	*57.26*	*12.00*	*3.482*	*119.03*	*11.98*	*7.186*	*204.90*	*11.98*	*12.481*
Subarea A-8:	*53.05*	*11.96*	*3.070*	*101.89*	*11.95*	*5.907*	*166.82*	*11.95*	*9.826*
Subarea A-9:	*87.15*	*11.97*	*5.138*	*158.95*	*11.96*	*9.507*	*252.78*	*11.96*	*15.435*
Subarea A-10:	*45.61*	*11.97*	*2.890*	*72.57*	*11.97*	*4.733*	*106.86*	*11.97*	*7.128*
Subarea B-1:	*70.94*	*11.97*	*4.168*	*140.29*	*11.96*	*8.242*	*234.20*	*11.95*	*13.944*
Subarea B-2:	*94.72*	*12.03*	*6.057*	*190.16*	*12.01*	*12.146*	*320.74*	*12.00*	*20.725*
Subarea B-3:	*106.50*	*11.97*	*6.302*	*197.62*	*11.96*	*11.812*	*317.37*	*11.96*	*19.332*
Subarea B-4 (BYP):	*30.29*	*11.93*	*1.753*	*48.22*	*11.92*	*2.871*	*71.04*	*11.92*	*4.324*
Subarea B-4 (DET):	*99.43*	*11.94*	*5.919*	*158.21*	*11.94*	*9.694*	*232.94*	*11.94*	*14.599*
Subarea C-1:	*124.83*	*12.05*	*9.223*	*209.38*	*12.05*	*15.842*	*317.10*	*12.05*	*24.565*
Subarea C-2:	*104.44*	*12.09*	*8.134*	*200.90*	*12.08*	*15.652*	*329.78*	*12.08*	*26.038*
Subarea C-3:	*142.61*	*11.95*	*8.110*	*264.83*	*11.94*	*15.199*	*425.51*	*11.94*	*24.875*

As in the Micro-Study section, the hydrologic impact resulting from the Macro-Study Proposed Conditions results is partially revealed by the comparison of the preceding subarea data to those established in Section 3 (Existing Conditions) of this report. The hydrologic conditions for offsite subareas remain unchanged between Existing- and Proposed Conditions analyses. Onsite subareas do exhibit changes in impervious cover and diversion of tributary area under Proposed Conditions. The hydrologic impact to the overall sub-watershed of these modified areas will become apparent in the summary tables for the Points of Interest.

The variation in quantity and rate of stormwater discharge between these two models represents the hydrologic effect generated by the proposed development project for given subareas. The following table depicts the difference in computed subarea hydrology between the Existing- and Proposed Conditions models.

Table 4.2-2(b). Hydrologic Information – Macro- Proposed Conditions Summary (Subareas)

Location:	Q_{P-2} (cfs):	T_{P-2} (hr.):	V_{R-2} (ac-ft):	Q_{P-10} (cfs):	T_{P-10} (hr.):	V_{R-10} (ac-ft):	Q_{P-100} (cfs):	T_{P-100} (hr.):	V_{R-100} (ac-ft):
Subarea A-1(e):	26.69	-0.04	1.401	39.27	-0.03	2.091	52.23	-0.03	2.848
Subarea A-1(w):	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea A-2(e):	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea A-2(w):	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea A-3:	22.11	-0.04	1.031	27.20	-0.03	1.273	30.13	-0.02	1.422
Subarea A-4(e):	14.05	-0.04	0.693	20.31	-0.03	1.030	27.11	-0.03	1.410
Subarea A-4(w):	-5.55	-0.03	-0.402	-13.94	-0.02	-0.956	-26.58	-0.03	-1.799
Subarea A-5(e):	-4.59	-0.02	-0.323	-12.78	-0.02	-0.804	-24.59	-0.02	-1.524
Subarea A-5(w):	81.14	-0.08	4.659	109.93	-0.08	6.560	142.66	-0.06	8.727
Subarea A-6:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea A-7:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea A-8:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea A-9:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea A-10:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea B-1:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea B-2:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea B-3:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea B-4 (BYP):	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea B-4 (DET):	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea C-1:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea C-2:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Subarea C-3:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*

The sign-convention used in the preceding table is: Proposed Conditions minus Existing Conditions. Therefore, negative values indicate a reduction in computed value, whereas positive values reflect an increase. Those locations that do not exhibit any change in computed values are identified by "n/c."

The previously defined stormwater detention basins, outfall structures and resultant hydrograph attenuation effects have been incorporated into the Macro-Study Proposed Conditions PondPack model. The channel reaches defined in the Existing Conditions analysis are also included in this routing. Results of this Proposed Conditions hydrologic routing are provided in the following summary table. This information is provided at the same "Points of Interest" used in the Existing Conditions hydrologic analysis for this Stormwater Drainage Study. Refer to the Proposed Conditions Drainage Area Map for the location of the points of interest in relation to the development sites, modeled subareas, channels and conveyances. As in the preceding tables, locations that are unchanged from the Existing Conditions analysis are presented as *grey print* in the following tables.

Table 4.2-3(a). Hydrologic Information – Macro- Proposed Conditions Summary (Junctions)
Un-Detained Hydrology (for Proposed Summit Village Basin)

Location:	Q_{P-2} (cfs):	T_{P-2} (hr.):	V_{R-2} (ac-ft):	Q_{P-10} (cfs):	T_{P-10} (hr.):	V_{R-10} (ac-ft):	Q_{P-100} (cfs):	T_{P-100} (hr.):	V_{R-100} (ac-ft):
Point A1:	995.87	12.23	95.101	1,824.38	12.20	176.156	2,798.83	12.16	287.092
Point A2:	950.93	12.16	85.458	1,718.23	12.13	157.150	2,579.14	12.10	254.972
Point A3:	627.24	12.16	54.042	1,101.49	12.15	99.254	1,586.19	12.17	160.767
Point A4:	307.13	12.10	28.695	593.74	12.07	52.103	958.22	12.05	83.947
Point A5:	286.38	12.11	25.422	538.08	12.08	45.817	848.49	12.06	73.476
Point A6:	*37.54*	*11.94*	*2.083*	*69.57*	*11.93*	*3.904*	*111.78*	*11.93*	*6.390*
Point A7:	*229.26*	*12.05*	*14.580*	*397.23*	*12.07*	*27.333*	*603.32*	*12.08*	*44.871*
Point A8:	*53.05*	*11.96*	*3.070*	*101.89*	*11.95*	*5.907*	*166.82*	*11.95*	*9.826*
Point A9:	*128.79*	*12.00*	*8.028*	*223.48*	*11.99*	*14.240*	*346.07*	*11.99*	*22.563*
Point A10:	*45.61*	*11.97*	*2.890*	*72.57*	*11.97*	*4.733*	*106.86*	*11.97*	*7.128*
Point B1:	*615.14*	*12.11*	*49.667*	*1,076.61*	*12.11*	*91.457*	*1,551.65*	*12.14*	*148.401*
Point B2:	*242.31*	*12.05*	*20.032*	*446.43*	*12.04*	*36.522*	*715.56*	*12.03*	*58.980*
Point B3:	*153.04*	*11.99*	*13.975*	*266.04*	*11.98*	*24.377*	*411.65*	*11.97*	*38.255*
Point B4:	*48.10*	*11.94*	*7.673*	*71.04*	*11.93*	*12.565*	*98.80*	*11.93*	*18.924*
Point C1:	*350.42*	*12.09*	*25.466*	*604.01*	*12.10*	*46.692*	*890.10*	*12.10*	*75.478*
Point C2:	*232.89*	*12.04*	*16.244*	*417.32*	*12.07*	*30.851*	*614.91*	*12.08*	*50.912*
Point C3:	*142.61*	*11.95*	*8.110*	*264.83*	*11.94*	*15.199*	*425.51*	*11.94*	*24.875*

As previously evaluated for the modeled Subareas, these Macro-Study Proposed Conditions results for the Points of Interest will be compared to those established in Section 3 (Existing Conditions) of this report. The points represent similar locations in both Existing- and Proposed Conditions analyses. Therefore, the variation in quantity and rate of stormwater discharge between these two models represents the hydrologic effect generated by the proposed development. The following table depicts the difference between the Existing- and Proposed Conditions models without provisions for onsite stormwater detention.

Table 4.2-3(b). Hydrologic Information – Comparison of Results:
Macro- Proposed vs. Existing Conditions Summary (Junctions) Un-Detained Hydrology

Location:	Q_{P-2} (cfs):	T_{P-2} (hr.):	V_{R-2} (ac-ft):	Q_{P-10} (cfs):	T_{P-10} (hr.):	V_{R-10} (ac-ft):	Q_{P-100} (cfs):	T_{P-100} (hr.):	V_{R-100} (ac-ft):
Point A1:	44.43	-0.02	7.057	35.76	-0.02	9.193	39.11	-0.03	11.086
Point A2:	39.29	-0.01	5.657	21.31	-0.02	7.101	4.61	-0.03	8.238
Point A3:	-3.05	0.01	1.030	-9.18	n/c	1.273	-13.18	n/c	1.422
Point A4:	44.89	-0.06	4.627	52.66	-0.05	5.829	50.75	-0.04	6.816
Point A5:	42.03	-0.04	4.336	44.91	-0.04	5.756	44.40	-0.04	7.204
Point A6:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*

Location:	Q_{P-2} (cfs):	T_{P-2} (hr.):	V_{R-2} (ac-ft):	Q_{P-10} (cfs):	T_{P-10} (hr.):	V_{R-10} (ac-ft):	Q_{P-100} (cfs):	T_{P-100} (hr.):	V_{R-100} (ac-ft):
Point A7:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point A8:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point A9:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point A10:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point B1:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point B2:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point B3:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point B4:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point C1:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point C2:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point C3:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*

The sign-convention used in the preceding table is: Proposed Conditions minus Existing Conditions. Therefore, negative values indicate a reduction in computed value, whereas positive values reflect an increase. Those locations that do not exhibit any change in computed values are identified by "n/c."

Information presented in the preceding table exhibits an increase in peak rates at most Points of Interest, relative to the existing conditions model. This is the result of the substantial increased imperviousness for the onsite areas.

Additional analysis is required to determine whether the performance of the proposed development is able to establish compliance with the proposed stormwater management objectives. The following table is provided to examine the difference between the computed peak discharge rates and the established ARR's for the Aria Micro-Study.

Table 4.2-4. Allowable Release Rate Evaluation – Proposed Conditions Macro Model – Without Detention

Location:	Event:	Computed Peak Discharge Rate (cfs):	ARR (cfs):	Difference (cfs):
Point A1	2-Year:	995.87	881.71	114.16
	10-Year:	1824.38	1,725.98	98.40
	100-Year:	2798.83	2,657.53	141.30
Point A2	2-Year:	950.93	848.13	102.80
	10-Year:	1718.23	1,634.53	83.70
	100-Year:	2579.14	2,478.07	101.07
Point A3	2-Year:	627.24	613.94	13.30
	10-Year:	1101.49	1,094.99	6.50
	100-Year:	1586.19	1,578.20	7.99

Point A4	2-Year:	307.13	220.67	86.46
	10-Year:	593.74	494.51	99.23
	100-Year:	958.22	815.03	143.19
Point A5	2-Year:	286.38	211.94	74.44
	10-Year:	538.08	454.75	83.33
	100-Year:	848.49	734.33	114.16

The sign-convention utilized for the information presented in the preceding table is based upon "Computed Rate minus ARR." Therefore, positive values indicate an exceedance of the Allowable Release Rate, whereas negative values would indicate a peak rate that is lower than the ARR, thereby meeting the targeted peak discharge rates. The difference in the rates depicted in this table are all in exceedance of the targeted rates. Though the increased peak discharge rates at the defined Points of Interest are relatively moderate, these exceedances are of noticeably greater magnitude.

Proposed Summit Village Stormwater Detention Facility:

The proposed stormwater management facility that is defined in the Micro Study section of this report is configured for the fully-developed geometry. Therefore, the basin geometry is not repeated in this section. Utilizing the effects of this basin, the following table depicts the stormwater routing summary for the Macro-Study Proposed Conditions.

Table 4.2-5. Proposed Conditions Hydrologic Routing Summary– Summit Village Stormwater Detention Facility

	Peak Q In (cfs):	T_P In (hr.):	Peak Q Out (cfs):	T_P Out (hr.):	V_R (ac-ft):	Peak WSEL (ft; NAVD):	Max. Storage Volume (ac-ft):
WQv:	43.36	11.94	0.73	18.83	2.475	936.94	1.774
2-Year:	155.93	11.93	15.35	12.46	9.098	940.71	5.356
10-Year:	256.29	11.93	47.49	12.17	15.256	943.07	8.102
100-Year:	385.43	11.93	53.94	12.25	23.365	946.28	12.513

The preceding routing summary indicates that, under Macro-Study Proposed Conditions, this basin provides substantial attenuation of the modeled design storm events. The maximum storage volume for each of the modeled design storms is greater than 50% of the total runoff volume contributed to this facility. Section 8 of this report includes hydrographs for this proposed stormwater management facility.

Results of this Proposed Conditions hydrologic routing, including the proposed stormwater detention facility are provided in the following summary table. This information is provided at the same "Points of Interest" used in the Existing Conditions hydrologic analysis for this Stormwater Drainage Study. Refer to the Proposed Conditions Drainage Area Map for the location of the points of interest in relation to the development sites, modeled subareas, channels and conveyances. As in the preceding tables, locations that are unchanged from the Existing Conditions analysis are presented as *grey print* in the following tables.

Table 4.2-6(a). Hydrologic Information – Micro- Proposed Conditions Summary (Junctions)
Including Proposed Summit Village Detention Basin

Location:	Q_{P-2} (cfs):	T_{P-2} (hr.):	V_{R-2} (ac-ft):	Q_{P-10} (cfs):	T_{P-10} (hr.):	V_{R-10} (ac-ft):	Q_{P-100} (cfs):	T_{P-100} (hr.):	V_{R-100} (ac-ft):
Point A1:	881.14	12.25	94.760	1,651.01	12.24	175.751	2,483.99	12.20	286.642
Point A2:	839.83	12.18	85.119	1,567.54	12.18	156.749	2,335.81	12.18	254.524
Point A3:	627.24	12.16	54.042	1,101.49	12.15	99.254	1,586.19	12.17	160.767
Point A4:	199.00	12.19	28.356	435.54	12.19	51.702	683.93	12.17	83.500
Point A5:	187.47	12.18	25.084	413.94	12.18	45.416	646.72	12.17	73.030
Point A6:	*37.54*	*11.94*	*2.083*	*69.57*	*11.93*	*3.904*	*111.78*	*11.93*	*6.390*
Point A7:	*229.26*	*12.05*	*14.580*	*397.23*	*12.07*	*27.333*	*603.32*	*12.08*	*44.871*
Point A8:	*53.05*	*11.96*	*3.070*	*101.89*	*11.95*	*5.907*	*166.82*	*11.95*	*9.826*
Point A9:	*128.79*	*12.00*	*8.028*	*223.48*	*11.99*	*14.240*	*346.07*	*11.99*	*22.563*
Point A10:	*45.61*	*11.97*	*2.890*	*72.57*	*11.97*	*4.733*	*106.86*	*11.97*	*7.128*
Point B1:	*615.14*	*12.11*	*49.667*	*1,076.61*	*12.11*	*91.457*	*1,551.65*	*12.14*	*148.401*
Point B2:	*242.31*	*12.05*	*20.032*	*446.43*	*12.04*	*36.522*	*715.56*	*12.03*	*58.980*
Point B3:	*153.04*	*11.99*	*13.975*	*266.04*	*11.98*	*24.377*	*411.65*	*11.97*	*38.255*
Point B4:	*48.10*	*11.94*	*7.673*	*71.04*	*11.93*	*12.565*	*98.80*	*11.93*	*18.924*
Point C1:	*350.42*	*12.09*	*25.466*	*604.01*	*12.10*	*46.692*	*890.10*	*12.10*	*75.478*
Point C2:	*232.89*	*12.04*	*16.244*	*417.32*	*12.07*	*30.851*	*614.91*	*12.08*	*50.912*
Point C3:	*142.61*	*11.95*	*8.110*	*264.83*	*11.94*	*15.199*	*425.51*	*11.94*	*24.875*

As with the Micro-Study, these Macro-Study Proposed Conditions results for the Points of Interest will be compared to those established in Section 3 (Existing Conditions) of this report. The points represent similar locations in both Existing- and Proposed Conditions analyses. Therefore, the variation in quantity and rate of stormwater discharge between these two models represents the hydrologic effect generated by the proposed development. The following table depicts the difference between the Existing- and Proposed Conditions models, including the effects of the proposed onsite stormwater detention facility.

Table 4.2-6(b). Hydrologic Information – Comparison of Results:
Micro- Proposed Conditions Summary (Junctions) Detained Hydrology

Location:	Q_{P-2} (cfs):	T_{P-2} (hr.):	V_{R-2} (ac-ft):	Q_{P-10} (cfs):	T_{P-10} (hr.):	V_{R-10} (ac-ft):	Q_{P-100} (cfs):	T_{P-100} (hr.):	V_{R-100} (ac-ft):
Point A1:	-70.30	n/c	6.716	-137.61	0.02	8.788	-275.73	0.01	10.636
Point A2:	-71.81	0.01	5.318	-129.38	0.03	6.700	-238.72	0.05	7.790
Point A3:	-3.05	0.01	1.030	-9.18	n/c	1.273	-13.18	n/c	1.422
Point A4:	-63.24	0.03	4.288	-105.54	0.07	5.428	-223.54	0.08	6.369
Point A5:	-56.88	0.03	3.998	-79.23	0.06	5.355	-157.37	0.07	6.758
Point A6:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point A7:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point A8:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point A9:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point A10:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point B1:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point B2:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point B3:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point B4:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point C1:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point C2:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*
Point C3:	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*	*n/c*

The sign-convention used in the preceding table is: Proposed Conditions minus Existing Conditions. Therefore, negative values indicate a reduction in computed value, whereas positive values reflect an increase. Those locations that do not exhibit any change in computed values are identified by "n/c."

Data presented in the preceding table depicts the significant reduction in peak rates relative to the Existing Conditions model along the Channel "A" tributary. There is not change from the Micro-Study Proposed Conditions at the Point A3 location. Although the peak discharge rates are reduced at the modeled Points of Interest, further analysis is required to establish compliance with the project's stormwater management objectives.

The following table is provided to examine the difference between the computed Proposed Conditions peak discharge rates and the established ARR's for the overall development's Macro-Study.

Table 4.2-7. Allowable Release Rate Evaluation – Proposed Conditions Macro Study (W/Detention)

Location:	Event:	Computed Peak Discharge Rate (cfs):	ARR (cfs):	Difference (cfs):
Point A1	2-Year:	881.14	881.71	-0.57
	10-Year:	1651.01	1,725.98	-74.97
	100-Year:	2483.99	2,657.53	-173.54
Point A2	2-Year:	839.83	848.13	-8.30
	10-Year:	1567.54	1,634.53	-66.99
	100-Year:	2335.81	2,478.07	-142.26
Point A3	2-Year:	627.24	613.94	**13.30**
	10-Year:	1101.49	1,094.99	**6.50**
	100-Year:	1586.19	1,578.20	**7.99**
Point A4	2-Year:	199	220.67	-21.67
	10-Year:	435.54	494.51	-58.97
	100-Year:	683.93	815.03	-131.10
Point A5	2-Year:	187.47	211.94	-24.47
	10-Year:	413.94	454.75	-40.81
	100-Year:	646.72	734.33	-87.61

Note: The sign-convention utilized for the information presented in the preceding table is based upon "Computed Rate minus ARR." Positive values indicate an exceedance of the ARR; negative values indicate that the peak rate is lower than the ARR.

The difference in the rates depicted in this table are generally in compliance with the targeted rates; the proposed stormwater management facility provides adequate attenuation for the primary tributary Channel "A." The information provided in the preceding table does demonstrate that there is one exception, at Point A3. This is the terminal end of the Channel "B" tributary, immediately upstream from confluence at Point A2.

Although the ARR is exceeded at the Point A3 location, the Proposed Conditions analysis does exhibit a reduction in peak discharge rate relative to Existing Conditions *(flows are reduced to: -3.05 cfs, -9.18 cfs, and -13.18 cfs for the 2-, 10-, and 100-year events, respectively**).*** This proposed stormwater management plan for the Aria Development meets and exceeds the design objectives for the remainder of the project area.

4.3. Proposed Stormwater Best Management Practices

This section of the study will address water quality treatment for the Aria site. Both, the Summit Village North and Multi-Family Residential sites will be required to provide an analysis during the development of those areas. The proposed stormwater management plan for the Aria development includes provisions for "Best Management Practices" (BMP's) to assist with stormwater volume mitigation and water quality protection. While the City of Lee's Summit has not adopted the Mid America Regional Council and American Public Works Association "Manual of Best Management Practices for Stormwater Quality" (Oct. 2012), 40-hr extended detention of the water quality storm volume generated by the development is required. In the sections above, it has been shown that the proposed detention basin does provide 40-hr extended detention for the Summit Village North land area tributary to the basin, however the treatment provided will be further evaluated and discussed with the future micro stormwater study at the time the Summit Village North area is developed.

Due to the location of the proposed detention basin in relation to the Aria site, it is not possible to convey stormwater runoff from the Aria site into the basin for extended detention treatment. In lieu of extended detention for the Aria site, various water quality treatment devices are being proposed to both reduce the total volume of stormwater leaving the site and to treat the stormwater that does leave the site.

Filtration Trenches

To offset the volume of water that the water quality storm event generates, multiple filtration trenches are being proposed throughout the Aria site to capture and filter stormwater from building rooftops and parking areas. All roof drains for the apartment buildings and the clubhouse will be daylighted, with water discharging at grade and being conveyed through the filtration trenches placed around the perimeter of each building. By constructing the trenches with a gravel storage section entirely wrapped with filter fabric and capped with topsoil, runoff will be filtered and treated multiple times prior to being infiltrated into surrounding soils or collected in underdrains and conveyed offsite.

Depressed Areas

Along with the filtration trenches, select parking lot islands and other small green spaces throughout the development will be graded to provide sumped storage areas for additional parking lot runoff to pond and infiltrate.

SNOUTs

In addition to the proposed filtration trenches and depressed areas, SNOUTs will be added to the downstream end of all storm sewer lines, prior to stormwater being discharged offsite. The SNOUT system includes an extended sump within the structure and a 'hood' over the outlet pipe. The SNOUT system acts as an interceptor of additional floatables and oils that enter the

system from areas not treated by the filtration trenches and promotes settlement of solids in the sump of the structure. Further documentation of the SNOUT system is included in Section 8 of this report.

Together, filtration trenches, depressed areas, and SNOUTs will result in a reduction of water volume leaving the site, and will provide interception of suspended solids, floatables, and oils prior to discharge into the downstream creek.

To quantify the benefit of the proposed treatment, the Level of Service guidelines from the BMP Manual are being utilized to compare the proposed treatment value rating to what would be provided by 40-hr extended dry detention. From the BMP Manual, 40-hr extended dry detention provides a Level of Service (LoS) of 4.0 for the treated area. Assuming the entirety of the Aria site (22.50 acres) is captured by the extended dry detention basin, the resulting Value Rating is 90.00. By providing filtration (LoS=7.5) for 8.53 acres and SNOUT treatment (LoS=3.0) for the remaining 10.89 acres that is conveyed by onsite storm sewers, the Aria site is providing a total Value Rating of 96.64, exceeding the treatment level provided by extended dry detention. In addition to the increased Value Rating for the site, the filtration trenches will potentially reduce the volume of stormwater leaving the site by approximately 24,553 cubic feet (0.56 ac-ft) during the water quality storm event.

Table 4.3-1. Value Rating Calculation

Treatment	Level of Service	Treated Area	Value Rating
Filtration	7.5	8.53	63.98
SNOUT	3.0	10.89	32.67
Total			**96.64**
40-hr Extended Dry Detention	4.0	22.50	90.00
Total			**90.00**

Additional treatment calculations and exhibits can be found in Sections 7 and 8, respectively.

5. SUMMARY

As shown in the discussion and tables presented in the previous sections, although the allowable release rate is exceeded by at point A3 by 2% during the 2-yr event, and less than 1% during the 10- and 100-yr events, the allowable release rates are met at downstream point A1 and peak flowrates at all points are reduced from existing conditions. See Tables 5-1 and 5-2, below, for a summary comparison of Existing, Allowable, and Proposed peak flowrates during both the Micro and Macro conditions.

Table 5-1. Micro- Peak Flowrate Comparison

Location:	Event:	Existing Flowrate (cfs):	ARR (cfs):	Proposed Flowrate (cfs):	Difference (Existing vs. Proposed) (cfs):	Difference (ARR vs. Proposed) (cfs):
Point A1	2-Year:	951.44	927.14	892.12	-59.32	-35.02
	10-Year:	1,788.62	1,766.79	1,645.08	-143.54	-121.71
	100-Year:	2,759.72	2,724.11	2,528.80	-230.92	-195.31
Point A2	2-Year:	911.64	884.27	851.94	-89.70	-32.33
	10-Year:	1,696.92	1,670.03	1,558.44	-138.48	-111.59
	100-Year:	2,574.53	2,532.96	2,371.99	-202.54	-160.97
Point A3	2-Year:	630.29	613.94	627.24	**-3.05**	**13.30**
	10-Year:	1,110.67	1,094.99	1,101.49	**-9.18**	**6.50**
	100-Year:	1,599.37	1,578.20	1,586.19	**-13.18**	**7.99**
Point A4	2-Year:	262.24	251.18	208.69	-53.55	-42.49
	10-Year:	541.08	528.69	417.94	-123.14	-110.75
	100-Year:	907.47	882.87	717.01	-190.46	-165.86
Point A5	2-Year:	244.35	238.54	192.86	-51.49	-45.68
	10-Year:	493.17	486.29	386.37	-106.80	-99.92
	100-Year:	804.09	791.59	659.34	-144.75	-132.25

Note: The sign-convention utilized for the information presented in the preceding table is based upon "Proposed Rate minus Existing (or ARR)." Positive values indicate an exceedance of the Existing (or ARR); negative values indicate that the peak rate is lower than the Existing (or ARR).

Table 5-2. Macro- Peak Flowrate Comparison

Location:	Event:	Existing Flowrate (cfs):	ARR (cfs):	Proposed Flowrate (cfs):	Difference (Existing vs. Proposed) (cfs):	Difference (ARR vs. Proposed) (cfs):
Point A1	2-Year:	951.44	881.71	881.14	-70.30	-0.57
	10-Year:	1,788.62	1,725.98	1,651.01	-137.61	-74.97
	100-Year:	2,759.72	2,657.53	2,483.99	-275.73	-173.54
Point A2	2-Year:	911.64	848.13	839.83	-71.81	-8.30
	10-Year:	1,696.92	1,634.53	1,567.54	-129.38	-66.99
	100-Year:	2,574.53	2,478.07	2,335.81	-238.72	-142.26
Point A3	2-Year:	630.29	613.94	627.24	**-3.05**	**13.30**
	10-Year:	1,110.67	1,094.99	1,101.49	**-9.18**	**6.50**
	100-Year:	1,599.37	1,578.20	1,586.19	**-13.18**	**7.99**
Point A4	2-Year:	262.24	220.67	199.00	-63.24	-21.67
	10-Year:	541.08	494.51	435.54	-105.54	-58.97
	100-Year:	907.47	815.03	683.93	-223.54	-131.10
Point A5	2-Year:	244.35	211.94	187.47	-56.88	-24.47
	10-Year:	493.17	454.75	413.94	-79.23	-40.81
	100-Year:	804.09	734.33	646.72	-157.37	-87.61

Note: The sign-convention utilized for the information presented in the preceding table is based upon "Proposed Rate minus Existing (or ARR)." Positive values indicate an exceedance of the Existing (or ARR); negative values indicate that the peak rate is lower than the Existing (or ARR).

While 40-hr extended dry detention is not provided for the Aria development, filtration trenches, depressed infiltration areas, and SNOUT treatment systems will be installed to reduce the volume of water leaving the site and remove floatables, solids, and oils from stormwater prior to discharging into the downstream channel, resulting in a higher Value Rating for the Aria site than 40-hr extended dry detention would provide.

6. CONCLUSION

Multiple developments are proposed within the watershed analyzed by this study. Once fully developed, the area treated by the proposed detention basin and water quality systems include:

- Aria: a 22.50-acre apartment development (Zoned RP-4)
- Summit Village North: a 39.42-acre commercial development (Zoned CP-2)
- An approximately 14.96-acre future multi-family residential development along the west side of NW Lee's Summit Road (currently zoned AG and to be rezoned at a future time)

As shown in the tables presented in the sections above, it has been determined that the peak runoff rates for the study area are reduced from the pre-developed conditions at all points analyzed. Comprehensive Control requirements are also met at all points, for all storm events except for point A3 upstream of point A1, at which, peak rates are increased from allowable by a maximum 2%.

A waiver is being requested for point A3 to exceed allowable release rates, while remaining below existing peak rates. Due to site constraints and the location of the proposed detention basin, it is infeasible to reduce the peak rates at this location to meet the calculated allowable rates. Further, point A1, less than 200-ft downstream of point A3 meets the allowable rates in all storm events.

A waiver is also being requested for 40-hr extended detention of the water quality storm event for the Aria site. As stated in section 4, filtration trenches and SNOUT treatment systems are being proposed to reduce the volume of water leaving the site and to remove floatables, solids, and oils from stormwater that is not infiltrated, prior to leaving the site. Further, using calculations provided in the MARC BMP Manual, the proposed system of filtration trenches and SNOUTs results in a higher Value Rating for the Aria site than extended detention provides.

The results of this study demonstrate the overall compliance with the City of Lee's Summit design criteria. We therefore request approval of this stormwater management report.

7. CALCULATIONS AND MODEL RESULTS

Aria Apartments & Macro Stormwater Drainage Study
TC Calculations- Existing Conditions-

Worksheet : Time of Concentration (Tc) and Travel Time (TT)

Existing Conditions

Subarea:	A1(e):	A1(w):	A2(e):	A2(w):	A3:	A4(e):	A4(w):	A5(e):	A5(w):	A6:	A7:	A8:	A9:	A10:	B1:	B2:	B3:	B4(DT):	B4(BP):	C1:	C2:	C3:
Sheet Flow:																						
Manning's "n":	0.050	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.050	0.050	0.050	0.060	0.060	0.050	0.013	0.013	0.013	0.013	0.013
Flow Length, L (ft):	93	100	100	90	100	100	100	100	100	100	100	100	100	100	100	100	100	149	100	140	110	125
Two-Year Rainfall, P2 (in):	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Land Slope, S (ft/ft):	0.0428	0.0116	0.0374	0.0079	0.0473	0.0418	0.0248	0.0384	0.0192	0.0356	0.0285	0.0184	0.0219	0.0635	0.0235	0.0157	0.0176	0.0404	0.0396	0.0070	0.0040	0.0110
(0.007(nL)^0.8) / (P2^0.5 *S^0.4)	**0.0451**	**0.0933**	**0.0584**	**0.1000**	**0.0532**	**0.0559**	**0.0688**	**0.0578**	**0.0763**	**0.0596**	**0.0651**	**0.0670**	**0.0625**	**0.0408**	**0.0703**	**0.0826**	**0.0682**	**0.0229**	**0.0168**	**0.0440**	**0.0453**	**0.0335**
Shallow Concentrated Flow:																						
Surface Description	UNPAVED	UNPAVED	UNPAVED	UNPAVED	UNPAVED	UNPAVED	UNPAVED	UNPAVED	UNPAVED	UNPAVED	UNPAVED	UNPAVED	UNPAVED	PAVED	UNPAVED	UNPAVED	UNPAVED	PAVED	PAVED	UNPAVED	UNPAVED	PAVED
Flow Length, L (ft)	868	1306	340	1246	811	869	1138	611	910	605	873	605	467	1075	508	907	425	972	656	1020	1294	544
Watercourse Slope, S (ft/ft)	0.0645	0.0643	0.0941	0.0626	0.0715	0.0713	0.0580	0.0786	0.0549	0.0496	0.0504	0.0496	0.0600	0.0167	0.0590	0.0640	0.0800	0.0206	0.0210	0.0098	0.0077	0.0220
Average Velocity, V (ft/s)	4.10	4.09	4.95	4.04	4.31	4.31	3.89	4.52	3.78	3.59	3.62	3.59	3.95	2.63	3.92	4.08	4.56	2.92	2.95	1.60	1.42	3.02
L / (3600*V)	**0.0588**	**0.0887**	**0.0191**	**0.0857**	**0.0522**	**0.0560**	**0.0814**	**0.0375**	**0.0669**	**0.0468**	**0.0669**	**0.0468**	**0.0328**	**0.1137**	**0.0360**	**0.0617**	**0.0259**	**0.0925**	**0.0619**	**0.1774**	**0.2539**	**0.0501**
Channel Flow:																						
Flow Length, L (ft)	1754	1742	252	695	761	625	555	609	632	0	695	579	1175	0	1158	1368	1275	0	0	1630	1138	1307
Channel Slope, S (ft/ft)	0.0137	0.0138	0.0079	0.0173	0.0135	0.0192	0.0216	0.0041	0.0127		0.0167	0.0242	0.0136		0.0294	0.0124	0.0141			0.0061	0.0299	0.0214
Velocity (ft/s)[1]	7.00	7.00	7.00	7.00	7.00	7.00	10.00	7.00	7.00	N/A	7.00	10.00	7.00	N/A	10.00	7.00	7.00	N/A	N/A	7.00	10.00	10.00
T3 (hr):	**0.0696**	**0.0691**	**0.0100**	**0.0276**	**0.0302**	**0.0248**	**0.0154**	**0.0242**	**0.0251**	**0**	**0.0276**	**0.0161**	**0.0466**	**0**	**0.0322**	**0.0543**	**0.0506**	**0**	**0**	**0.0647**	**0.0316**	**0.0363**
T_c =T1 + T2 + T3:	**0.1736**	**0.2511**	**0.0875**	**0.2133**	**0.1356**	**0.1367**	**0.1656**	**0.1195**	**0.1682**	**0.1063**	**0.1596**	**0.1299**	**0.1420**	**0.1545**	**0.1385**	**0.1987**	**0.1447**	**0.1155**	**0.0787**	**0.2860**	**0.3308**	**0.1199**

[1] ***Note: Where indicated, Channel Flow is approximated by Length & Velocity per APWA 5602.7 B.***

Travel Time:	A2~A1	A3~A2	A4~A2	A5~A4	A6~A5	A7~A5	A8~A7	A9~A7	A10~A9	B1~A3	B2~B1	C1~B1	B3~B2	B4~B3	C2~C1	C3~C2
Reach Length, L (ft)	2081	485	726	732	1359	1038	858	983	1603	835	409	530	2076	1480	1766	534
Channel Slope, S (ft/ft)	0.0125	0.0124	0.0165	0.0328	0.0221	0.0077	0.0163	0.0142	0.0187	0.0145	0.0147	0.0151	0.0106	0.0166	0.0102	0.0389
Velocity (ft/s)[1]	7.00	7.00	7.00	10.00	10.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	10.00
T3 (hr):	**0.0826**	**0.0192**	**0.0288**	**0.0203**	**0.0378**	**0.0412**	**0.0340**	**0.0390**	**0.0636**	**0.0331**	**0.0162**	**0.0210**	**0.0824**	**0.0587**	**0.0701**	**0.0148**

[1] ***Note: Unless otherwise indicated, Channel Flow is approximated by Length & Velocity per APWA 5602.7 B and Mannings Eq.***

Aria Apartments & Macro Stormwater Drainage Study
TC Calculations- Proposed Conditions-

Worksheet : Time of Concentration (Tc) and Travel Time (TT)

Existing Conditions

Subarea:	A1(e):	A1(w):	A2(e):	A2(w):	A3:	A4(e):	A4(w):	A5(e):	A5(w):	A6:	A7:	A8:	A9:	A10:	B1:	B2:	B3:	B4:	B4(BP):	C1:	C2:	C3:
Sheet Flow:																						
Manning's "n":	0.050	0.060	0.060	0.060	0.013	0.013	0.060	0.013	0.013	0.060	0.060	0.050	0.050	0.050	0.060	0.060	0.050	0.013	0.013	0.013	0.013	0.013
Flow Length, L (ft):	93	100	100	90	220	100	100	175	120	100	100	100	100	100	100	100	100	149	100	140	110	125
Two-Year Rainfall, P2 (in):	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Land Slope, S (ft/ft):	0.0428	0.0116	0.0374	0.0079	0.3460	0.0364	0.0248	0.0216	0.0220	0.0356	0.0285	0.0184	0.0219	0.0635	0.0235	0.0157	0.0176	0.0404	0.0396	0.0070	0.0040	0.0110
0.007(nL)^0.8 / (P2^0.5 *S^0.4)	**0.0451**	**0.0933**	**0.0584**	**0.1000**	**0.0133**	**0.0174**	**0.0688**	**0.0335**	**0.0246**	**0.0596**	**0.0651**	**0.0670**	**0.0625**	**0.0408**	**0.0703**	**0.0826**	**0.0682**	**0.0229**	**0.0168**	**0.0440**	**0.0453**	**0.0335**
Shallow Concentrated Flow:																						
Surface Description	PAVED	UNPAVED	UNPAVED	UNPAVED	PAVED	PAVED	UNPAVED	PAVED	PAVED	UNPAVED	UNPAVED	UNPAVED	UNPAVED	PAVED	UNPAVED	UNPAVED	UNPAVED	PAVED	PAVED	UNPAVED	UNPAVED	PAVED
Flow Length, L (ft)	360	1306	340	1246	240	186	578	286	300	605	873	605	467	1075	508	907	425	972	656	1020	1294	544
Watercourse Slope, S (ft/ft)	0.0375	0.0643	0.0941	0.0626	0.0215	0.0215	0.0588	0.0224	0.0250	0.0496	0.0504	0.0496	0.0600	0.0167	0.0590	0.0640	0.0800	0.0206	0.0210	0.0098	0.0077	0.0220
Average Velocity, V (ft/s)	3.94	4.09	4.95	4.04	2.98	2.98	3.91	3.04	3.21	3.59	3.62	3.59	3.95	2.63	3.92	4.08	4.56	2.92	2.95	1.60	1.42	3.02
L / (3600*V)	**0.0254**	**0.0887**	**0.0191**	**0.0857**	**0.0224**	**0.0173**	**0.0410**	**0.0261**	**0.0259**	**0.0468**	**0.0669**	**0.0468**	**0.0328**	**0.1137**	**0.0360**	**0.0617**	**0.0259**	**0.0925**	**0.0619**	**0.1774**	**0.2539**	**0.0501**
Channel Flow:																						
Flow Length, L (ft)	1754	1742	252	695	712	1125	1003	957	335	0	695	579	1175	0	1158	1368	1275	0	0	1630	1138	1307
Channel Slope, S (ft/ft)	0.0137	0.0138	0.0079	0.0173	0.0135	0.0356	0.0399	0.0253	0.0400		0.0167	0.0242	0.0136		0.0294	0.0124	0.0141			0.0061	0.0299	0.0214
Velocity (ft/s)[1]	7.00	7.00	7.00	7.00	7.00	10.00	10.00	10.00	10.00	N/A	7.00	10.00	7.00	N/A	10.00	7.00	7.00	N/A	N/A	7.00	10.00	10.00
T3 (hr):	**0.0696**	**0.0691**	**0.0100**	**0.0276**	**0.0283**	**0.0313**	**0.0279**	**0.0266**	**0.0093**	**0**	**0.0276**	**0.0161**	**0.0466**	**0**	**0.0322**	**0.0543**	**0.0506**	**0**	**0**	**0.0647**	**0.0316**	**0.0363**
T_c =T1 + T2 + T3:	**0.1401**	**0.2511**	**0.0875**	**0.2133**	**0.0639**	**0.0660**	**0.1377**	**0.0862**	**0.0598**	**0.1063**	**0.1596**	**0.1299**	**0.1420**	**0.1545**	**0.1385**	**0.1987**	**0.1447**	**0.1155**	**0.0787**	**0.2860**	**0.3308**	**0.1199**

[1] ***Note: Where indicated, Channel Flow is approximated by Length & Velocity per APWA 5602.7 B.***

Travel Time:	A2~A1	A3~A2	A4~A2	A5~A4	A6~A5	A7~A5	A8~A7	A9~A7	A10~A9	B1~A3	B2~B1	C1~B1	B3~B2	B4~B3	C2~C1	C3~C2
Reach Length, L (ft)	2081	485	726	732	470	1038	858	983	1603	835	409	530	2076	1480	1766	534
Channel Slope, S (ft/ft)	0.0125	0.0124	0.0165	0.0328	0.0256	0.0077	0.0163	0.0142	0.0187	0.0145	0.0147	0.0151	0.0106	0.0166	0.0102	0.0389
Velocity (ft/s)[1]	7.00	7.00	7.00	10.00	10.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	10.00
T3 (hr):	**0.0826**	**0.0192**	**0.0288**	**0.0203**	**0.0131**	**0.0412**	**0.0340**	**0.0390**	**0.0636**	**0.0331**	**0.0162**	**0.0210**	**0.0824**	**0.0587**	**0.0701**	**0.0148**

[1] ***Note: Unless otherwise indicated, Channel Flow is approximated by Length & Velocity per APWA 5602.7 B and Mannings Eq.***

Aria Micro- and Macro Stormwater Drainage Study
NRCS Curve Number Calculations

Existing Conditions (03 APR 20)

Location ID:	Total Area (ac):	Aria (Micro) Onsite Area (ac):	Summit Village Onsite Area (ac):	Onsite Area Macro-Study (ac):	Weighted NRCS CN:
Subarea A1(e):	27.97			12.36	77
Subarea A1(w):	43.14				76
Subarea A2(e):	3.08				80
Subarea A2(w):	23.41				73
Subarea A3:	24.53	11.73		11.73	80
Subarea A4(e):	9.74	5.89		5.89	79
Subarea A4(w):	17.41		7.35	7.35	73
Subarea A5(e):	15.16	4.88	5.10	9.98	80
Subarea A5(w):	19.76		17.26	17.26	77
Subarea A6:	13.45				83
Subarea A7:	30.6				76
Subarea A8:	21.56				81
Subarea A9:	31.84				84
Subarea A10:	12.23				94
Subtotal:	*293.88*	*22.50*	*29.71*	*64.57*	
Subarea B1:	31.94				79
Subarea B2:	48.54				78
Subarea B3:	40.69				83
Subarea B4-DET:	25.05				94
Subarea B4-BYP:	7.42				94
Subtotal:	*153.64*	*0.00*	*0.00*	*0.00*	
Subarea C1:	45.21				90
Subarea C2:	57.13				81
Subarea C3:	52.36				83
Subtotal:	154.70	0.00	0.00	0.00	

Sub-W'Shed A Subtotal:	293.88	22.50	29.71	64.57
Sub-W'Shed B Subtotal:	153.64	0.00	0.00	0.00
Sub-W'Shed C Subtotal:	154.70	0.00	0.00	0.00
Modeled Total:	602.22	22.50	29.71	64.57

									2-ACRE		1/2 ACRE														
Land Use:	Water/ Impervious	Commercial		R/W		Multi-Family Residential		Single-Family Residential		Single-Family Residential		Row Crops C & T (Good)		Pasture (Fair)		Pasture (Good)		Woods-Grass Combination (Fair)		Open Space (Good)		Woods (Fair)		Woods (Good)		
HSG:		Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	
CN:	98	94	95	92	93	88	91	77	82	80	85	80	82	79	84	74	80	76	82	74	80	73	79	70	77	Weighted CN:
Subarea A1(e):	0.27			0.61				2.12								8.98	6.67							2.83	6.49	76.57
Subarea A1(w):	0.49											6.69	1.93			8.39	1.58					6.09	0.67	4.94	12.36	76.12
Subarea A2(e):				0.14												0.34	2.60									79.88
Subarea A2(w):												4.39									1.55	0.79		15.98	0.70	72.85
Subarea A3:				3.64	1.45					0.94		1.06				9.43	6.97		1.04							80.33
Subarea A4(e):												4.52	0.36	0.42	0.70		0.12					1.13	2.49			79.25
Subarea A4(w):												1.62		3.14								4.25		8.40		73.29
Subarea A5(e):				1.75	0.51							3.76	0.23	4.80								4.01	0.10			79.68
Subarea A5(w):				1.36								5.81		1.69								10.90				76.88
Subarea A6:				2.92	0.51			5.16	4.41												0.45					82.60
Subarea A7:				1.90	0.63					2.50										25.57						76.00
Subarea A8:				2.25	3.11															8.00	8.20					80.90
Subarea A9:		11.46	2.18	1.39	0.22															16.59						83.55
Subarea A10:		4.05	5.86	1.04	1.28																					94.20
Subarea B1:				1.50	0.46			20.14	1.46	7.19	1.19															79.14
Subarea B2:				11.26																37.28						78.18
Subarea B3:		8.29	0.97			13.51														17.92						83.22
Subarea B4-DET:		14.71	9.25	0.40	0.69																					94.31
Subarea B4-BYP:		4.33	2.76	0.12	0.21																					94.31
Subarea C1:		15.20		22.85																7.16						89.82
Subarea C2:				21.60																35.53						80.81
Subarea C3:	17.56	1.77				1.29														31.74						83.07

Aria Micro Stormwater Drainage Study
NRCS Curve Number Calculations

Proposed Conditions (24 JUL 20)

Location ID:	Total Area (ac):	Aria (Micro) Onsite Area (ac):	Summit Village Onsite Area (ac):	Onsite Area Macro-Study (ac):	Weighted NRCS CN:
Subarea A1(e):	27.97			12.36	77
Subarea A1(w):	43.14				76
Subarea A2(e):	3.08				80
Subarea A2(w):	23.41				73
Subarea A3:	24.06	11.07		11.07	87
Subarea A4(e):	11.23	7.34		7.34	86
Subarea A4(w):	17.41		7.35	7.35	73
INTERIM_Subarea A5(e):	16.48	4.09	6.04	10.13	82
INTERIM_Subarea A5(w):	17.42		16.32	16.32	79
Subarea A6:	13.45				83
Subarea A7:	30.6				76
Subarea A8:	21.56				81
Subarea A9:	31.84				84
Subarea A10:	12.23				94
Subtotal:	*293.88*	*22.50*	*29.71*	*64.57*	
Subarea B1:	31.94				79
Subarea B2:	48.54				78
Subarea B3:	40.69				83
Subarea B4-DET:	25.05				94
Subarea B4-BYP:	7.42				94
Subtotal:	*153.64*				
Subarea C1:	45.21				90
Subarea C2:	57.13				81
Subarea C3:	52.36				83
Subtotal:	154.70				

Sub-W'Shed A Subtotal:	293.88	22.50	29.71	64.57
Sub-W'Shed B Subtotal:	153.64	0.00	0.00	0.00
Sub-W'Shed C Subtotal:	154.70	0.00	0.00	0.00
Modeled Total:	602.22	22.50	29.71	64.57

								2-ACRE		1/2 ACRE															
Land Use:	Water/ Impervious	Commercial		R/W		Multi-Family Residential		Single-Family Residential		Single-Family Residential		Row Crops C & T (Good)		Pasture (Fair)		Pasture (Good)		Woods-Grass Combination (Fair)		Open Space (Good)		Woods (Fair)		Woods (Good)		
HSG:		Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	
CN:	98	94	95	92	93	88	91	77	82	80	85	80	82	79	84	74	80	76	82	74	80	73	79	70	77	Weighted CN:
Subarea A1(e):	0.27			0.61				2.12								8.98	6.67							2.83	6.49	76.57
Subarea A1(w):	0.49											6.69	1.93			8.39	1.58					6.09	0.67	4.94	12.36	76.12
Subarea A2(e):				0.14												0.34	2.60									79.88
Subarea A2(w):												4.39									1.55	0.79		15.98	0.70	72.85
Subarea A3:				3.66	1.36		11.07			0.94		0.00				1.03	4.96		1.04							87.45
Subarea A4(e):				0.04			7.33					0.00	0.00	0.00	0.22		0.12					1.03	2.49			86.44
Subarea A4(w):												1.62		3.14								4.25		8.40		73.29
INTERIM_Subarea A5(e):				1.56	0.51		4.10					1.74	0.23	3.62								4.62	0.10			82.11
INTERIM_Subarea A5(w):	1.03			1.36								5.81		0.79						8.43						79.05
Subarea A6:				2.92	0.51			5.16	4.41												0.45					82.60
Subarea A7:				1.90	0.63					2.50										25.57						76.00
Subarea A8:				2.25	3.11															8.00	8.20					80.90
Subarea A9:		11.46	2.18	1.39	0.22															16.59						83.55
Subarea A10:		4.05	5.86	1.04	1.28																					94.20
Subarea B1:				1.50	0.46			20.14	1.46	7.19	1.19															79.14
Subarea B2:				11.26																37.28						78.18
Subarea B3:		8.29	0.97			13.51														17.92						83.22
Subarea B4-DET:		14.71	9.25	0.40	0.69																					94.31
Subarea B4-BYP:		4.33	2.76	0.12	0.21																					94.31
Subarea C1:		15.20		22.85																7.16						89.82
Subarea C2:				21.60																35.53						80.81
Subarea C3:	17.56	1.77				1.29														31.74						83.07

Macro Stormwater Drainage Study
NRCS Curve Number Calculations

Proposed Conditions (27 JUL 20)

Location ID:	Total Area (ac):	Aria (Micro) Onsite Area (ac):	Summit Village Onsite Area (ac):	Onsite Area Macro-Study (ac):	Weighted NRCS CN:
Subarea A1(e):	30.57		14.96	14.96	83
Subarea A1(w):	*43.14*				*76*
Subarea A2(e):	*3.08*				*80*
Subarea A2(w):	*23.41*				*73*
Subarea A3:	24.06	11.07		11.07	87
Subarea A4(e):	11.23	7.34		7.34	86
Subarea A4(w):	12.07		2.01	2.01	75
Subarea A5(e):	10.81	3.91	0.64	4.55	84
Subarea A5(w):	28.64	0.18	27.27	27.45	95
Subarea A6:	*13.45*				*83*
Subarea A7:	*30.6*				*76*
Subarea A8:	*21.56*				*81*
Subarea A9:	*31.84*				*84*
Subarea A10:	*12.23*				*94*
Subtotal:	*296.69*	*22.50*	*44.88*	*67.38*	
Subarea B1:	*31.94*				*79*
Subarea B2:	*48.54*				*78*
Subarea B3:	*40.69*				*83*
Subarea B4-DET:	*25.05*				*94*
Subarea B4-BYP:	*7.42*				*94*
Subtotal:	*153.64*				
Subarea C1:	*45.21*				*90*
Subarea C2:	*57.13*				*81*
Subarea C3:	*52.36*				*83*
Subtotal:	154.70				

									2-ACRE		1/2 ACRE														
Land Use:	Water/ Impervious	Commercial		R/W		Multi-Family Residential		Single-Family Residential		Single-Family Residential		Row Crops C & T (Good)		Pasture (Fair)		Pasture (Good)		Woods-Grass Combination (Fair)		Open Space (Good)		Woods (Fair)		Woods (Good)		
HSG:		Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Type C	Type D	Weighted CN:
CN:	98	94	95	92	93	88	91	77	82	80	85	80	82	79	84	74	80	76	82	74	80	73	79	70	77	
	0.27			0.61		14.96		0.00								1.37	6.15							1.32	5.89	83.03
	0.49											*6.69*	*1.93*			*8.39*	*1.58*					*6.09*	*0.67*	*4.94*	*12.36*	*76.12*
				0.14												*0.34*	*2.60*									*79.88*
												4.39									*1.55*	*0.79*		*15.98*	*0.70*	*72.85*
				3.66	1.36		11.07			0.94		0.00				1.03	4.96		1.04							87.45
				0.04			7.33					0.00	0.00	0.00	0.22		0.12					1.03	2.49			86.44
			2.01									0.00		0.20								1.75		8.11		74.75
1.5			*0.39*	1.51	0.51		4.10							0.45								3.85	0.00			84.47
			27.52	1.12			0.00					0.00		0.00								0.00				94.88
				2.92	*0.51*			*5.16*	*4.41*												*0.45*					*82.60*
				1.90	*0.63*					*2.50*										*25.57*						*76.00*
				2.25	*3.11*															*8.00*	*8.20*					*80.90*
		11.46	*2.18*	*1.39*	*0.22*															*16.59*						*83.55*
		4.05	*5.86*	*1.04*	*1.28*																					*94.20*
				1.50	*0.46*			*20.14*	*1.46*	*7.19*	*1.19*															*79.14*
				11.26																*37.28*						*78.18*
		8.29	*0.97*			*13.51*														*17.92*						*83.22*
		14.71	*9.25*	*0.40*	*0.69*																					*94.31*
		4.33	*2.76*	*0.12*	*0.21*																					*94.31*
		15.20		*22.85*																*7.16*						*89.82*
				21.60																*35.53*						*80.81*
	17.56	*1.77*				*1.29*														*31.74*						*83.07*

Sub-W'Shed A Subtotal:	296.69	22.50	44.88	67.38
Sub-W'Shed B Subtotal:	*153.64*	*0.00*	*0.00*	*0.00*
Sub-W'Shed C Subtotal:	*154.70*	*0.00*	*0.00*	*0.00*
Modeled Total:	605.03	22.50	44.88	67.38

PROJECT NAME - Proposed Conditions Allowable Release Rate Calculations

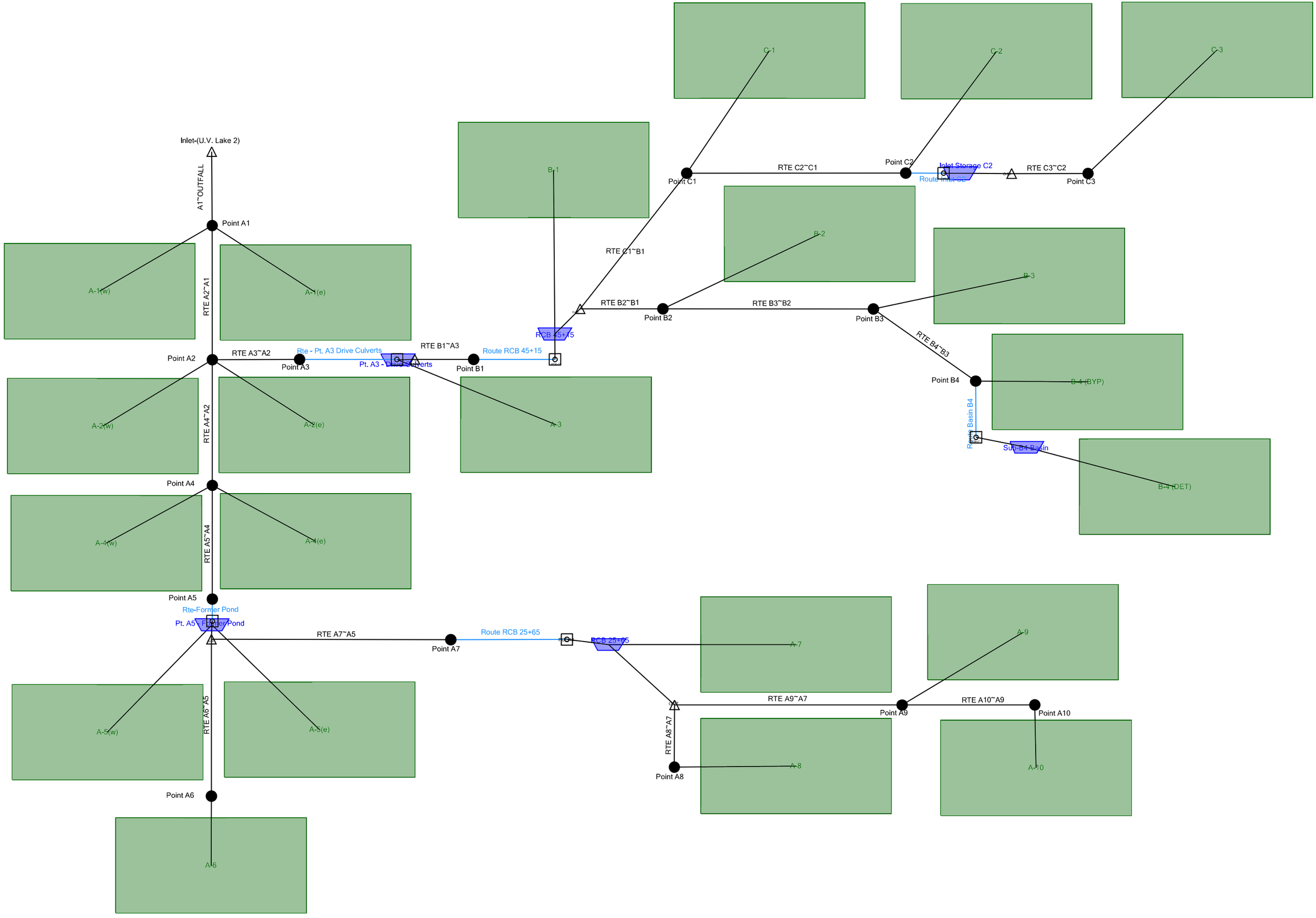
24-Aug-20

Total Area (ac):	Total Trib. Area (ac):	Aria Study) (Micro Onsite Area (ac):	Summit Village-Onsite Area (ac):	Macro - Onsite Area (ac):
Point A7:	96.23	0.00	0.00	0.00
Point A5:	144.6	4.88	22.36	27.24
Point A4:	171.75	10.77	29.71	40.48
Point B1:	308.34	0.00	0.00	0.00
Point A3:	332.87	11.73	0.00	11.73
Point A2:	531.11	22.50	29.71	52.21
Point A1:	602.22	22.50	29.71	64.57

Storm Event:	Onsite ARR (cfs/ac):
2-Yr:	0.50
10-Yr:	2.00
100-Yr:	3.00

Project Site:	Exist. Cond. Onsite Area:
Aria (ac):	22.50
North-MFR (ac):	12.36
Summit Village (ac):	29.81

Existing Conditions Release Rate Calculations:					Aria Micro:	Summit Village:	Macro - Model:	Aria Micro:	Summit Village:	Macro - Model:	Aria Micro:	Summit Village:	Macro - Model:	Aria Micro:	Summit Village:	Macro - Model:	Aria Micro:	Summit Village:	Macro - Model:
Location:	Return Event (Yr):	Peak Flow Rate (cfs):	Total Area (ac):	Existing Conditions Release Rate (cfs/ac):	Onsite Area (ac):	Onsite Area (ac):	Onsite Area (ac):	Allowable Bypass (cfs):	Allowable Bypass (cfs):	Allowable Bypass (cfs):	Allowable Onsite Discharge Rate (cfs):	Allowable Onsite Discharge Rate (cfs):	Allowable Onsite Discharge Rate (cfs):	Prop. Cond. ARR (cfs):	Prop. Cond. ARR (cfs):	Prop. Cond. ARR (cfs):	Difference in Flow Rate (cfs):	Difference in Flow Rate (cfs):	Difference in Flow Rate (cfs):
Point A1			602.22		22.50	29.71	64.57	*579.72*	*572.51*	*537.65*									***Point A1***
	2	951.44	602.22	1.58				915.89	904.50	849.43	11.25	14.86	32.29	927.14	919.36	881.71	-24.30	-32.08	-69.73
	10	1,788.62	602.22	2.97				1,721.79	1,700.38	1,596.84	45.00	59.42	129.14	1,766.79	1,759.80	1,725.98	-21.83	-28.82	-62.64
	100	2,759.72	602.22	4.58				2,656.61	2,623.57	2,463.82	67.50	89.13	193.71	2,724.11	2,712.70	2,657.53	-35.61	-47.02	-102.19
Point A2			531.11		22.50	29.71	52.21	*508.61*	*501.40*	*478.90*									***Point A2***
	2	911.64	531.11	1.72				873.02	860.64	822.02	11.25	14.86	26.11	884.27	875.50	848.13	-27.37	-36.14	-63.51
	10	1,696.92	531.11	3.20				1,625.03	1,602.00	1,530.11	45.00	59.42	104.42	1,670.03	1,661.42	1,634.53	-26.89	-35.50	-62.39
	100	2,574.53	531.11	4.85				2,465.46	2,430.51	2,321.44	67.50	89.13	156.63	2,532.96	2,519.64	2,478.07	-41.57	-54.89	-96.46
Point A3			332.87		11.73	0.00	11.73	*321.14*	*332.87*	*321.14*									***Point A2***
	2	630.29	332.87	1.89				608.08	630.29	608.08	5.87	0.00	5.87	613.94	630.29	613.94	-16.35	0.00	-16.35
	10	1,110.67	332.87	3.34				1,071.53	1,110.67	1,071.53	23.46	0.00	23.46	1,094.99	1,110.67	1,094.99	-15.68	0.00	-15.68
	100	1,599.37	332.87	4.80				1,543.01	1,599.37	1,543.01	35.19	0.00	35.19	1,578.20	1,599.37	1,578.20	-21.17	0.00	-21.17
Point A4			171.75		10.77	29.71	40.48	*160.98*	*142.04*	*131.27*									***Point A4***
	2	262.24	171.75	1.53				245.80	216.88	200.43	5.39	14.86	20.24	251.18	231.73	220.67	-11.06	-30.51	-41.57
	10	541.08	171.75	3.15				507.15	447.48	413.55	21.54	59.42	80.96	528.69	506.90	494.51	-12.39	-34.18	-46.57
	100	907.47	171.75	5.28				850.56	750.49	693.59	32.31	89.13	121.44	882.87	839.62	815.03	-24.60	-67.85	-92.44
Point A5			144.60		4.88	22.36	27.24	*139.72*	*122.24*	*117.36*									***Point A5***
	2	244.35	144.60	1.69				236.10	206.57	198.32	2.44	11.18	13.62	238.54	217.75	211.94	-5.81	-26.60	-32.41
	10	493.17	144.60	3.41				476.53	416.91	400.27	9.76	44.72	54.48	486.29	461.63	454.75	-6.88	-31.54	-38.42
	100	804.09	144.60	5.56				776.95	679.75	652.61	14.64	67.08	81.72	791.59	746.83	734.33	-12.50	-57.26	-69.76
Point A7			96.23		0.00	0.00	0.00	*96.23*	*96.23*	*96.23*									***Point A7***
	2	229.26	96.23	2.38				229.26	229.26	229.26	0.00	0.00	0.00	229.26	229.26	229.26	0.00	0.00	0.00
	10	397.23	96.23	4.13				397.23	397.23	397.23	0.00	0.00	0.00	397.23	397.23	397.23	0.00	0.00	0.00
	100	603.32	96.23	6.27				603.32	603.32	603.32	0.00	0.00	0.00	603.32	603.32	603.32	0.00	0.00	0.00
Point B1			308.34		0.00	0.00	0.00	*308.34*	*308.34*	*308.34*									***Point B1***
	2	615.14	308.34	2.00				615.14	615.14	615.14	0.00	0.00	0.00	615.14	615.14	615.14	0.00	0.00	0.00
	10	1,076.61	308.34	3.49				1,076.61	1,076.61	1,076.61	0.00	0.00	0.00	1,076.61	1,076.61	1,076.61	0.00	0.00	0.00
	100	1,551.65	308.34	5.03				1,551.65	1,551.65	1,551.65	0.00	0.00	0.00	1,551.65	1,551.65	1,551.65	0.00	0.00	0.00


Inlet-(U.V. Lake 2)
A1~OUTFALL
Point A1
A-1(w)
A-1(e)
RTE A2~A1
Point A2
RTE A3~A2
Point A3
Rte - Pt. A3 Drive Culverts
Pt. A3 - Drive Culverts
RTE B1~A3
Route RCB 45+15
Point B1
A-2(w)
A-2(e)
A-3
RTE A4~A2
Point A4
A-4(w)
A-4(e)
RTE A5~A4
Point A5
Rte-Former Pond
Pt. A5 - Former Pond
RTE A7~A5
Route RCB 25+65
Point A7
A-5(w)
A-5(e)
RTE A6~A5
Point A6
A-6
B-1
RCB 45+15
RTE C1~B1
Point C1
C-1
RTE C2~C1
Point C2
C-2
Inlet Storage C2
Route Inlet C2
RTE C3~C2
Point C3
C-3
B-2
RTE B2~B1
Point B2
RTE B3~B2
Point B3
B-3
RTE B4~B3
Point B4
B-4 (BYP)
Route Basin B4
Sub-B4 Basin
B-4 (DET)
A-7
RTE A8~A7
Point A8
A-8
RTE A9~A7
Point A9
A-9
RTE A10~A9
Point A10
A-10

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Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
A-1(e)	WQv	1	0.370	12.0600	4.08
A-1(e)	2-Yr (TP-40)	2	3.334	12.0100	53.91
A-1(e)	10-Yr (TP-40)	10	6.783	11.9900	110.32
A-1(e)	100-Yr (TP-40)	100	11.675	11.9900	187.82
A-1(w)	WQv	1	0.503	12.1200	4.08
A-1(w)	2-Yr (TP-40)	2	4.908	12.0500	70.15
A-1(w)	10-Yr (TP-40)	10	10.132	12.0500	146.86
A-1(w)	100-Yr (TP-40)	100	17.597	12.0500	252.55
A-2(e)	WQv	1	0.058	12.0100	0.89
A-2(e)	2-Yr (TP-40)	2	0.420	11.9400	7.64
A-2(e)	10-Yr (TP-40)	10	0.819	11.9300	14.90
A-2(e)	100-Yr (TP-40)	100	1.374	11.9300	24.63
A-2(w)	WQv	1	0.179	12.1100	0.96
A-2(w)	2-Yr (TP-40)	2	2.301	12.0300	34.59
A-2(w)	10-Yr (TP-40)	10	4.975	12.0300	76.77
A-2(w)	100-Yr (TP-40)	100	8.884	12.0300	136.28
A-3	WQv	1	0.459	12.0200	6.62
A-3	2-Yr (TP-40)	2	3.345	11.9700	57.28
A-3	10-Yr (TP-40)	10	6.524	11.9600	111.36
A-3	100-Yr (TP-40)	100	10.944	11.9500	184.39
A-4(e)	WQv	1	0.163	12.0300	2.25
A-4(e)	2-Yr (TP-40)	2	1.271	11.9700	21.67
A-4(e)	10-Yr (TP-40)	10	2.513	11.9600	42.97
A-4(e)	100-Yr (TP-40)	100	4.252	11.9600	71.70
A-4(w)	WQv	1	0.133	12.0800	0.84
A-4(w)	2-Yr (TP-40)	2	1.711	12.0100	27.56
A-4(w)	10-Yr (TP-40)	10	3.700	11.9900	60.85
A-4(w)	100-Yr (TP-40)	100	6.607	11.9900	108.22
A-5(e)	WQv	1	0.284	12.0200	4.22
A-5(e)	2-Yr (TP-40)	2	2.067	11.9500	36.40
A-5(e)	10-Yr (TP-40)	10	4.032	11.9500	70.91
A-5(e)	100-Yr (TP-40)	100	6.764	11.9500	117.00
A-5(w)	WQv	1	0.261	12.0500	2.93
A-5(w)	2-Yr (TP-40)	2	2.356	12.0000	38.44
A-5(w)	10-Yr (TP-40)	10	4.792	12.0000	78.45
A-5(w)	100-Yr (TP-40)	100	8.248	11.9800	133.34
A-6	WQv	1	0.344	12.0000	5.57
A-6	2-Yr (TP-40)	2	2.083	11.9400	37.54
A-6	10-Yr (TP-40)	10	3.904	11.9300	69.57
A-6	100-Yr (TP-40)	100	6.390	11.9300	111.78
A-7	WQv	1	0.357	12.0500	3.73
A-7	2-Yr (TP-40)	2	3.482	12.0000	57.26
A-7	10-Yr (TP-40)	10	7.186	11.9800	119.03
A-7	100-Yr (TP-40)	100	12.481	11.9800	204.90
A-8	WQv	1	0.449	12.0200	6.79
A-8	2-Yr (TP-40)	2	3.070	11.9600	53.05
A-8	10-Yr (TP-40)	10	5.907	11.9500	101.89
A-8	100-Yr (TP-40)	100	9.826	11.9500	166.82
A-9	WQv	1	0.897	12.0100	14.25
A-9	2-Yr (TP-40)	2	5.138	11.9700	87.15
A-9	10-Yr (TP-40)	10	9.507	11.9600	158.95
A-9	100-Yr (TP-40)	100	15.435	11.9600	252.78
A-10	WQv	1	0.836	11.9700	13.89
A-10	2-Yr (TP-40)	2	2.890	11.9700	45.61

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
A-10	10-Yr (TP-40)	10	4.733	11.9700	72.57
A-10	100-Yr (TP-40)	100	7.128	11.9700	106.86
B-1	WQv	1	0.535	12.0300	7.35
B-1	2-Yr (TP-40)	2	4.168	11.9700	70.94
B-1	10-Yr (TP-40)	10	8.242	11.9600	140.29
B-1	100-Yr (TP-40)	100	13.944	11.9500	234.20
B-2	WQv	1	0.724	12.0600	8.13
B-2	2-Yr (TP-40)	2	6.057	12.0300	94.72
B-2	10-Yr (TP-40)	10	12.146	12.0100	190.16
B-2	100-Yr (TP-40)	100	20.725	12.0000	320.74
B-3	WQv	1	1.040	12.0200	16.20
B-3	2-Yr (TP-40)	2	6.302	11.9700	106.50
B-3	10-Yr (TP-40)	10	11.812	11.9600	197.62
B-3	100-Yr (TP-40)	100	19.332	11.9600	317.37
B-4 (BYP)	WQv	1	0.507	11.9300	9.23
B-4 (BYP)	2-Yr (TP-40)	2	1.753	11.9300	30.29
B-4 (BYP)	10-Yr (TP-40)	10	2.871	11.9200	48.22
B-4 (BYP)	100-Yr (TP-40)	100	4.324	11.9200	71.04
C-1	WQv	1	2.197	12.0800	29.72
C-1	2-Yr (TP-40)	2	9.223	12.0500	124.83
C-1	10-Yr (TP-40)	10	15.842	12.0500	209.38
C-1	100-Yr (TP-40)	100	24.565	12.0500	317.10
C-2	WQv	1	1.190	12.1300	12.16
C-2	2-Yr (TP-40)	2	8.134	12.0900	104.44
C-2	10-Yr (TP-40)	10	15.652	12.0800	200.90
C-2	100-Yr (TP-40)	100	26.038	12.0800	329.78
C-3	WQv	1	1.338	12.0000	21.39
C-3	2-Yr (TP-40)	2	8.110	11.9500	142.61
C-3	10-Yr (TP-40)	10	15.199	11.9400	264.83
C-3	100-Yr (TP-40)	100	24.875	11.9400	425.51
B-4 (DET)	WQv	1	1.713	11.9500	30.27
B-4 (DET)	2-Yr (TP-40)	2	5.919	11.9400	99.43
B-4 (DET)	10-Yr (TP-40)	10	9.694	11.9400	158.21
B-4 (DET)	100-Yr (TP-40)	100	14.599	11.9400	232.94

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
Point A1	WQv	1	14.538	12.2900	125.91
Point A1	2-Yr (TP-40)	2	88.044	12.2500	951.44
Point A1	10-Yr (TP-40)	10	166.963	12.2200	1,788.62
Point A1	100-Yr (TP-40)	100	276.006	12.1900	2,759.72
Point A2	WQv	1	13.665	12.2100	123.16
Point A2	2-Yr (TP-40)	2	79.801	12.1700	911.64
Point A2	10-Yr (TP-40)	10	150.049	12.1500	1,696.92
Point A2	100-Yr (TP-40)	100	246.734	12.1300	2,574.53
Point A3	WQv	1	9.704	12.1800	101.73
Point A3	2-Yr (TP-40)	2	53.012	12.1500	630.29
Point A3	10-Yr (TP-40)	10	97.981	12.1500	1,110.67
Point A3	100-Yr (TP-40)	100	159.345	12.1700	1,599.37
Point A4	WQv	1	3.724	12.2600	23.49
Point A4	2-Yr (TP-40)	2	24.068	12.1600	262.24
Point A4	10-Yr (TP-40)	10	46.274	12.1200	541.08

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
Point A4	100-Yr (TP-40)	100	77.131	12.0900	907.47
Point A5	WQv	1	3.428	12.2400	22.44
Point A5	2-Yr (TP-40)	2	21.086	12.1500	244.35
Point A5	10-Yr (TP-40)	10	40.061	12.1200	493.17
Point A5	100-Yr (TP-40)	100	66.272	12.1000	804.09
Point A6	WQv	1	0.344	12.0000	5.57
Point A6	2-Yr (TP-40)	2	2.083	11.9400	37.54
Point A6	10-Yr (TP-40)	10	3.904	11.9300	69.57
Point A6	100-Yr (TP-40)	100	6.390	11.9300	111.78
Point A7	WQv	1	2.539	12.0600	37.95
Point A7	2-Yr (TP-40)	2	14.580	12.0500	229.26
Point A7	10-Yr (TP-40)	10	27.333	12.0700	397.23
Point A7	100-Yr (TP-40)	100	44.871	12.0800	603.32
Point A8	WQv	1	0.449	12.0200	6.79
Point A8	2-Yr (TP-40)	2	3.070	11.9600	53.05
Point A8	10-Yr (TP-40)	10	5.907	11.9500	101.89
Point A8	100-Yr (TP-40)	100	9.826	11.9500	166.82
Point A9	WQv	1	1.733	12.0200	27.80
Point A9	2-Yr (TP-40)	2	8.028	12.0000	128.79
Point A9	10-Yr (TP-40)	10	14.240	11.9900	223.48
Point A9	100-Yr (TP-40)	100	22.563	11.9900	346.07
Point A10	WQv	1	0.836	11.9700	13.89
Point A10	2-Yr (TP-40)	2	2.890	11.9700	45.61
Point A10	10-Yr (TP-40)	10	4.733	11.9700	72.57
Point A10	100-Yr (TP-40)	100	7.128	11.9700	106.86
Point B1	WQv	1	9.245	12.1200	100.64
Point B1	2-Yr (TP-40)	2	49.667	12.1100	615.14
Point B1	10-Yr (TP-40)	10	91.457	12.1100	1,076.61
Point B1	100-Yr (TP-40)	100	148.401	12.1400	1,551.65
Point B2	WQv	1	3.985	12.0900	37.89
Point B2	2-Yr (TP-40)	2	20.032	12.0500	242.31
Point B2	10-Yr (TP-40)	10	36.522	12.0400	446.43
Point B2	100-Yr (TP-40)	100	58.980	12.0300	715.56
Point B3	WQv	1	3.260	12.0200	30.59
Point B3	2-Yr (TP-40)	2	13.975	11.9900	153.04
Point B3	10-Yr (TP-40)	10	24.377	11.9800	266.04
Point B3	100-Yr (TP-40)	100	38.255	11.9700	411.65
Point B4	WQv	1	2.221	12.0100	14.66
Point B4	2-Yr (TP-40)	2	7.673	11.9400	48.10
Point B4	10-Yr (TP-40)	10	12.565	11.9300	71.04
Point B4	100-Yr (TP-40)	100	18.924	11.9300	98.80
Point C1	WQv	1	4.725	12.0900	59.47
Point C1	2-Yr (TP-40)	2	25.466	12.0900	350.42
Point C1	10-Yr (TP-40)	10	46.692	12.1000	604.01
Point C1	100-Yr (TP-40)	100	75.478	12.1000	890.10
Point C2	WQv	1	2.528	12.0400	30.94
Point C2	2-Yr (TP-40)	2	16.244	12.0400	232.89
Point C2	10-Yr (TP-40)	10	30.851	12.0700	417.32
Point C2	100-Yr (TP-40)	100	50.912	12.0800	614.91
Point C3	WQv	1	1.338	12.0000	21.39
Point C3	2-Yr (TP-40)	2	8.110	11.9500	142.61
Point C3	10-Yr (TP-40)	10	15.199	11.9400	264.83
Point C3	100-Yr (TP-40)	100	24.875	11.9400	425.51
Inlet-(U.V. Lake 2)	WQv	1	14.538	12.2900	125.91
Inlet-(U.V. Lake 2)	2-Yr (TP-40)	2	88.044	12.2500	951.44

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
Inlet-(U.V. Lake 2)	10-Yr (TP-40)	10	166.963	12.2200	1,788.62
Inlet-(U.V. Lake 2)	100-Yr (TP-40)	100	276.006	12.1900	2,759.72

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
RCB 25+65 (IN)	WQv	1	2.539	12.0600	38.00	(N/A)	(N/A)
RCB 25+65 (OUT)	WQv	1	2.539	12.0600	37.95	946.3266	0.015
RCB 25+65 (IN)	2-Yr (TP-40)	2	14.580	12.0200	236.01	(N/A)	(N/A)
RCB 25+65 (OUT)	2-Yr (TP-40)	2	14.580	12.0500	229.26	948.7083	0.319
RCB 25+65 (IN)	10-Yr (TP-40)	10	27.333	12.0100	437.94	(N/A)	(N/A)
RCB 25+65 (OUT)	10-Yr (TP-40)	10	27.333	12.0700	397.23	950.2162	1.251
RCB 25+65 (IN)	100-Yr (TP-40)	100	44.871	12.0000	707.16	(N/A)	(N/A)
RCB 25+65 (OUT)	100-Yr (TP-40)	100	44.871	12.0800	603.32	951.7960	3.100
RCB 45+15 (IN)	WQv	1	9.245	12.1100	101.70	(N/A)	(N/A)
RCB 45+15 (OUT)	WQv	1	9.245	12.1200	100.64	917.8193	0.101
RCB 45+15 (IN)	2-Yr (TP-40)	2	49.667	12.0700	634.00	(N/A)	(N/A)
RCB 45+15 (OUT)	2-Yr (TP-40)	2	49.667	12.1100	615.14	921.5701	1.519
RCB 45+15 (IN)	10-Yr (TP-40)	10	91.457	12.0700	1,121.63	(N/A)	(N/A)
RCB 45+15 (OUT)	10-Yr (TP-40)	10	91.457	12.1100	1,076.61	923.9927	3.164
RCB 45+15 (IN)	100-Yr (TP-40)	100	148.401	12.0600	1,726.54	(N/A)	(N/A)
RCB 45+15 (OUT)	100-Yr (TP-40)	100	148.401	12.1400	1,551.65	926.7702	6.626
Inlet Storage C2 (IN)	WQv	1	1.338	12.0200	21.38	(N/A)	(N/A)
Inlet Storage C2 (OUT)	WQv	1	1.338	12.0200	21.36	956.9016	0.001
Inlet Storage C2 (IN)	2-Yr (TP-40)	2	8.110	11.9600	142.28	(N/A)	(N/A)
Inlet Storage C2 (OUT)	2-Yr (TP-40)	2	8.110	12.0000	137.26	957.9495	0.115
Inlet Storage C2 (IN)	10-Yr (TP-40)	10	15.199	11.9600	264.20	(N/A)	(N/A)
Inlet Storage C2 (OUT)	10-Yr (TP-40)	10	15.199	12.0500	219.81	959.6693	0.804
Inlet Storage C2 (IN)	100-Yr (TP-40)	100	24.875	11.9600	423.95	(N/A)	(N/A)
Inlet Storage C2 (OUT)	100-Yr (TP-40)	100	24.875	12.0700	285.13	961.5938	2.539

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Sub-B4 Basin (IN)	WQv	1	1.713	11.9500	30.27	(N/A)	(N/A)
Sub-B4 Basin (OUT)	WQv	1	1.713	12.1500	8.05	992.3653	0.642
Sub-B4 Basin (IN)	2-Yr (TP-40)	2	5.919	11.9400	99.43	(N/A)	(N/A)
Sub-B4 Basin (OUT)	2-Yr (TP-40)	2	5.919	12.1600	22.46	993.2524	2.284
Sub-B4 Basin (IN)	10-Yr (TP-40)	10	9.694	11.9400	158.21	(N/A)	(N/A)
Sub-B4 Basin (OUT)	10-Yr (TP-40)	10	9.694	12.1900	28.68	994.0428	3.850
Sub-B4 Basin (IN)	100-Yr (TP-40)	100	14.599	11.9400	232.94	(N/A)	(N/A)
Sub-B4 Basin (OUT)	100-Yr (TP-40)	100	14.599	12.2400	34.97	995.0349	5.948
Pt. A3 - Drive-Culverts (IN)	WQv	1	9.704	12.1500	102.98	(N/A)	(N/A)
Pt. A3 - Drive-Culverts (OUT)	WQv	1	9.704	12.1800	101.73	904.6071	0.134
Pt. A3 - Drive-Culverts (IN)	2-Yr (TP-40)	2	53.012	12.1300	634.58	(N/A)	(N/A)
Pt. A3 - Drive-Culverts (OUT)	2-Yr (TP-40)	2	53.012	12.1500	630.29	908.5071	1.750
Pt. A3 - Drive-Culverts (IN)	10-Yr (TP-40)	10	97.981	12.1300	1,112.93	(N/A)	(N/A)
Pt. A3 - Drive-Culverts (OUT)	10-Yr (TP-40)	10	97.981	12.1500	1,110.67	909.0715	2.344
Pt. A3 - Drive-Culverts (IN)	100-Yr (TP-40)	100	159.345	12.1600	1,600.76	(N/A)	(N/A)
Pt. A3 - Drive-Culverts (OUT)	100-Yr (TP-40)	100	159.345	12.1700	1,599.37	909.5054	2.852
Pt. A5 - Former Pond (IN)	WQv	1	3.428	12.0800	47.52	(N/A)	(N/A)
Pt. A5 - Former Pond (OUT)	WQv	1	3.428	12.2400	22.44	930.2196	0.800
Pt. A5 - Former Pond (IN)	2-Yr (TP-40)	2	21.086	12.0500	317.46	(N/A)	(N/A)
Pt. A5 - Former Pond (OUT)	2-Yr (TP-40)	2	21.086	12.1500	244.35	932.4878	3.961

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Pt. A5 - Former Pond (IN)	10-Yr (TP-40)	10	40.061	12.0500	556.14	(N/A)	(N/A)
Pt. A5 - Former Pond (OUT)	10-Yr (TP-40)	10	40.061	12.1200	493.17	933.4389	5.849
Pt. A5 - Former Pond (IN)	100-Yr (TP-40)	100	66.272	12.0500	851.90	(N/A)	(N/A)
Pt. A5 - Former Pond (OUT)	100-Yr (TP-40)	100	66.272	12.1000	804.09	934.1565	7.434

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1736 hours
Area (User Defined)	27.970 acres

Computational Time Increment	0.0231 hours
Time to Peak (Computed)	11.9900 hours
Flow (Peak, Computed)	187.83 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9900 hours
Flow (Peak Interpolated Output)	187.82 ft³/s

Drainage Area	
SCS CN (Composite)	77.000
Area (User Defined)	27.970 acres
Maximum Retention (Pervious)	2.99 in
Maximum Retention (Pervious, 20 percent)	0.60 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.01 in
Runoff Volume (Pervious)	11.675 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	11.675 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1736 hours
Computational Time Increment	0.0231 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	182.55 ft³/s
Unit peak time, Tp	0.1157 hours
Unit receding limb, Tr	0.4629 hours
Total unit time, Tb	0.5787 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.2511 hours
Area (User Defined)	43.140 acres

Computational Time Increment	0.0335 hours
Time to Peak (Computed)	12.0528 hours
Flow (Peak, Computed)	252.68 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	12.0500 hours
Flow (Peak Interpolated Output)	252.55 ft³/s

Drainage Area	
SCS CN (Composite)	76.000
Area (User Defined)	43.140 acres
Maximum Retention (Pervious)	3.16 in
Maximum Retention (Pervious, 20 percent)	0.63 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.89 in
Runoff Volume (Pervious)	17.597 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	17.597 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.2511 hours
Computational Time Increment	0.0335 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	194.66 ft³/s
Unit peak time, Tp	0.1674 hours
Unit receding limb, Tr	0.6696 hours
Total unit time, Tb	0.8370 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1545 hours
Area (User Defined)	12.230 acres

Computational Time Increment	0.0206 hours
Time to Peak (Computed)	11.9686 hours
Flow (Peak, Computed)	106.99 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9700 hours
Flow (Peak Interpolated Output)	106.86 ft³/s

Drainage Area	
SCS CN (Composite)	94.000
Area (User Defined)	12.230 acres
Maximum Retention (Pervious)	0.64 in
Maximum Retention (Pervious, 20 percent)	0.13 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	6.99 in
Runoff Volume (Pervious)	7.128 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	7.128 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1545 hours
Computational Time Increment	0.0206 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	89.69 ft³/s
Unit peak time, Tp	0.1030 hours
Unit receding limb, Tr	0.4120 hours
Total unit time, Tb	0.5150 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1000 hours
Area (User Defined)	3.080 acres

Computational Time Increment	0.0133 hours
Time to Peak (Computed)	11.9333 hours
Flow (Peak, Computed)	24.66 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9300 hours
Flow (Peak Interpolated Output)	24.63 ft³/s

Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	3.080 acres
Maximum Retention (Pervious)	2.50 in
Maximum Retention (Pervious, 20 percent)	0.50 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.35 in
Runoff Volume (Pervious)	1.374 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1.374 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1000 hours
Computational Time Increment	0.0133 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	34.90 ft³/s
Unit peak time, Tp	0.0667 hours
Unit receding limb, Tr	0.2667 hours
Total unit time, Tb	0.3333 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.2133 hours
Area (User Defined)	23.410 acres

Computational Time Increment	0.0284 hours
Time to Peak (Computed)	12.0301 hours
Flow (Peak, Computed)	136.29 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	12.0300 hours
Flow (Peak Interpolated Output)	136.28 ft³/s

Drainage Area	
SCS CN (Composite)	73.000
Area (User Defined)	23.410 acres
Maximum Retention (Pervious)	3.70 in
Maximum Retention (Pervious, 20 percent)	0.74 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.55 in
Runoff Volume (Pervious)	8.884 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	8.884 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.2133 hours
Computational Time Increment	0.0284 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	124.35 ft³/s
Unit peak time, Tp	0.1422 hours
Unit receding limb, Tr	0.5688 hours
Total unit time, Tb	0.7110 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1356 hours
Area (User Defined)	24.530 acres

Computational Time Increment	0.0181 hours
Time to Peak (Computed)	11.9509 hours
Flow (Peak, Computed)	184.58 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9500 hours
Flow (Peak Interpolated Output)	184.39 ft³/s

Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	24.530 acres
Maximum Retention (Pervious)	2.50 in
Maximum Retention (Pervious, 20 percent)	0.50 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.35 in
Runoff Volume (Pervious)	10.944 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	10.944 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1356 hours
Computational Time Increment	0.0181 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	204.97 ft³/s
Unit peak time, Tp	0.0904 hours
Unit receding limb, Tr	0.3616 hours
Total unit time, Tb	0.4520 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1367 hours
Area (User Defined)	9.740 acres

Computational Time Increment	0.0182 hours
Time to Peak (Computed)	11.9567 hours
Flow (Peak, Computed)	71.86 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9600 hours
Flow (Peak Interpolated Output)	71.70 ft³/s

Drainage Area	
SCS CN (Composite)	79.000
Area (User Defined)	9.740 acres
Maximum Retention (Pervious)	2.66 in
Maximum Retention (Pervious, 20 percent)	0.53 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.24 in
Runoff Volume (Pervious)	4.252 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	4.252 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1367 hours
Computational Time Increment	0.0182 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	80.73 ft³/s
Unit peak time, Tp	0.0911 hours
Unit receding limb, Tr	0.3645 hours
Total unit time, Tb	0.4557 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1656 hours
Area (User Defined)	17.410 acres

Computational Time Increment	0.0221 hours
Time to Peak (Computed)	11.9894 hours
Flow (Peak, Computed)	108.26 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9900 hours
Flow (Peak Interpolated Output)	108.22 ft³/s

Drainage Area	
SCS CN (Composite)	73.000
Area (User Defined)	17.410 acres
Maximum Retention (Pervious)	3.70 in
Maximum Retention (Pervious, 20 percent)	0.74 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.55 in
Runoff Volume (Pervious)	6.607 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	6.607 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1656 hours
Computational Time Increment	0.0221 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	119.12 ft³/s
Unit peak time, Tp	0.1104 hours
Unit receding limb, Tr	0.4416 hours
Total unit time, Tb	0.5520 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1195 hours
Area (User Defined)	15.160 acres

Computational Time Increment	0.0159 hours
Time to Peak (Computed)	11.9500 hours
Flow (Peak, Computed)	117.00 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9500 hours
Flow (Peak Interpolated Output)	117.00 ft³/s

Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	15.160 acres
Maximum Retention (Pervious)	2.50 in
Maximum Retention (Pervious, 20 percent)	0.50 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.35 in
Runoff Volume (Pervious)	6.763 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	6.764 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1195 hours
Computational Time Increment	0.0159 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	143.74 ft³/s
Unit peak time, Tp	0.0797 hours
Unit receding limb, Tr	0.3187 hours
Total unit time, Tb	0.3983 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1682 hours
Area (User Defined)	19.760 acres

Computational Time Increment	0.0224 hours
Time to Peak (Computed)	11.9758 hours
Flow (Peak, Computed)	133.37 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9800 hours
Flow (Peak Interpolated Output)	133.34 ft³/s

Drainage Area	
SCS CN (Composite)	77.000
Area (User Defined)	19.760 acres
Maximum Retention (Pervious)	2.99 in
Maximum Retention (Pervious, 20 percent)	0.60 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.01 in
Runoff Volume (Pervious)	8.248 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	8.248 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1682 hours
Computational Time Increment	0.0224 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	133.11 ft³/s
Unit peak time, Tp	0.1121 hours
Unit receding limb, Tr	0.4485 hours
Total unit time, Tb	0.5607 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1063 hours
Area (User Defined)	13.450 acres

Computational Time Increment	0.0142 hours
Time to Peak (Computed)	11.9339 hours
Flow (Peak, Computed)	112.10 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9300 hours
Flow (Peak Interpolated Output)	111.78 ft³/s

Drainage Area	
SCS CN (Composite)	83.000
Area (User Defined)	13.450 acres
Maximum Retention (Pervious)	2.05 in
Maximum Retention (Pervious, 20 percent)	0.41 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.70 in
Runoff Volume (Pervious)	6.390 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	6.390 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1063 hours
Computational Time Increment	0.0142 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	143.36 ft³/s
Unit peak time, Tp	0.0709 hours
Unit receding limb, Tr	0.2835 hours
Total unit time, Tb	0.3543 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1596 hours
Area (User Defined)	30.600 acres

Computational Time Increment	0.0213 hours
Time to Peak (Computed)	11.9806 hours
Flow (Peak, Computed)	204.96 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9800 hours
Flow (Peak Interpolated Output)	204.90 ft³/s

Drainage Area	
SCS CN (Composite)	76.000
Area (User Defined)	30.600 acres
Maximum Retention (Pervious)	3.16 in
Maximum Retention (Pervious, 20 percent)	0.63 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.89 in
Runoff Volume (Pervious)	12.482 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	12.481 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1596 hours
Computational Time Increment	0.0213 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	217.24 ft³/s
Unit peak time, Tp	0.1064 hours
Unit receding limb, Tr	0.4256 hours
Total unit time, Tb	0.5320 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1299 hours
Area (User Defined)	21.560 acres

Computational Time Increment	0.0173 hours
Time to Peak (Computed)	11.9508 hours
Flow (Peak, Computed)	166.91 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9500 hours
Flow (Peak Interpolated Output)	166.82 ft³/s

Drainage Area	
SCS CN (Composite)	81.000
Area (User Defined)	21.560 acres
Maximum Retention (Pervious)	2.35 in
Maximum Retention (Pervious, 20 percent)	0.47 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.47 in
Runoff Volume (Pervious)	9.826 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	9.826 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1299 hours
Computational Time Increment	0.0173 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	188.06 ft³/s
Unit peak time, Tp	0.0866 hours
Unit receding limb, Tr	0.3464 hours
Total unit time, Tb	0.4330 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1420 hours
Area (User Defined)	31.840 acres

Computational Time Increment	0.0189 hours
Time to Peak (Computed)	11.9659 hours
Flow (Peak, Computed)	252.90 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9600 hours
Flow (Peak Interpolated Output)	252.78 ft³/s

Drainage Area	
SCS CN (Composite)	84.000
Area (User Defined)	31.840 acres
Maximum Retention (Pervious)	1.90 in
Maximum Retention (Pervious, 20 percent)	0.38 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.82 in
Runoff Volume (Pervious)	15.435 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	15.435 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1420 hours
Computational Time Increment	0.0189 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	254.06 ft³/s
Unit peak time, Tp	0.0947 hours
Unit receding limb, Tr	0.3787 hours
Total unit time, Tb	0.4733 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1385 hours
Area (User Defined)	31.940 acres

Computational Time Increment	0.0185 hours
Time to Peak (Computed)	11.9479 hours
Flow (Peak, Computed)	234.20 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9500 hours
Flow (Peak Interpolated Output)	234.20 ft³/s

Drainage Area	
SCS CN (Composite)	79.000
Area (User Defined)	31.940 acres
Maximum Retention (Pervious)	2.66 in
Maximum Retention (Pervious, 20 percent)	0.53 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.24 in
Runoff Volume (Pervious)	13.943 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	13.944 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1385 hours
Computational Time Increment	0.0185 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	261.30 ft³/s
Unit peak time, Tp	0.0923 hours
Unit receding limb, Tr	0.3693 hours
Total unit time, Tb	0.4617 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1987 hours
Area (User Defined)	48.540 acres

Computational Time Increment	0.0265 hours
Time to Peak (Computed)	12.0015 hours
Flow (Peak, Computed)	321.22 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	12.0000 hours
Flow (Peak Interpolated Output)	320.74 ft³/s

Drainage Area	
SCS CN (Composite)	78.000
Area (User Defined)	48.540 acres
Maximum Retention (Pervious)	2.82 in
Maximum Retention (Pervious, 20 percent)	0.56 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.12 in
Runoff Volume (Pervious)	20.725 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	20.725 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1987 hours
Computational Time Increment	0.0265 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	276.79 ft³/s
Unit peak time, Tp	0.1325 hours
Unit receding limb, Tr	0.5299 hours
Total unit time, Tb	0.6623 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1447 hours
Area (User Defined)	40.690 acres

Computational Time Increment	0.0193 hours
Time to Peak (Computed)	11.9619 hours
Flow (Peak, Computed)	317.74 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9600 hours
Flow (Peak Interpolated Output)	317.37 ft³/s

Drainage Area	
SCS CN (Composite)	83.000
Area (User Defined)	40.690 acres
Maximum Retention (Pervious)	2.05 in
Maximum Retention (Pervious, 20 percent)	0.41 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.70 in
Runoff Volume (Pervious)	19.331 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	19.332 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1447 hours
Computational Time Increment	0.0193 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	318.61 ft³/s
Unit peak time, Tp	0.0965 hours
Unit receding limb, Tr	0.3859 hours
Total unit time, Tb	0.4823 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1000 hours
Area (User Defined)	7.420 acres

Computational Time Increment	0.0133 hours
Time to Peak (Computed)	11.9200 hours
Flow (Peak, Computed)	71.04 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9200 hours
Flow (Peak Interpolated Output)	71.04 ft³/s

Drainage Area	
SCS CN (Composite)	94.000
Area (User Defined)	7.420 acres
Maximum Retention (Pervious)	0.64 in
Maximum Retention (Pervious, 20 percent)	0.13 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	6.99 in
Runoff Volume (Pervious)	4.324 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	4.324 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1000 hours
Computational Time Increment	0.0133 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	84.07 ft³/s
Unit peak time, Tp	0.0667 hours
Unit receding limb, Tr	0.2667 hours
Total unit time, Tb	0.3333 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1155 hours
Area (User Defined)	25.050 acres

Computational Time Increment	0.0154 hours
Time to Peak (Computed)	11.9350 hours
Flow (Peak, Computed)	233.88 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9400 hours
Flow (Peak Interpolated Output)	232.94 ft³/s

Drainage Area	
SCS CN (Composite)	94.000
Area (User Defined)	25.050 acres
Maximum Retention (Pervious)	0.64 in
Maximum Retention (Pervious, 20 percent)	0.13 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	6.99 in
Runoff Volume (Pervious)	14.599 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	14.599 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1155 hours
Computational Time Increment	0.0154 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	245.74 ft³/s
Unit peak time, Tp	0.0770 hours
Unit receding limb, Tr	0.3080 hours
Total unit time, Tb	0.3850 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.2860 hours
Area (User Defined)	45.210 acres

Computational Time Increment	0.0381 hours
Time to Peak (Computed)	12.0501 hours
Flow (Peak, Computed)	317.13 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	12.0500 hours
Flow (Peak Interpolated Output)	317.10 ft³/s

Drainage Area	
SCS CN (Composite)	90.000
Area (User Defined)	45.210 acres
Maximum Retention (Pervious)	1.11 in
Maximum Retention (Pervious, 20 percent)	0.22 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	6.52 in
Runoff Volume (Pervious)	24.565 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	24.565 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.2860 hours
Computational Time Increment	0.0381 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	179.11 ft³/s
Unit peak time, Tp	0.1907 hours
Unit receding limb, Tr	0.7627 hours
Total unit time, Tb	0.9533 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.3308 hours
Area (User Defined)	57.130 acres

Computational Time Increment	0.0441 hours
Time to Peak (Computed)	12.0852 hours
Flow (Peak, Computed)	330.94 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	12.0800 hours
Flow (Peak Interpolated Output)	329.78 ft³/s

Drainage Area	
SCS CN (Composite)	81.000
Area (User Defined)	57.130 acres
Maximum Retention (Pervious)	2.35 in
Maximum Retention (Pervious, 20 percent)	0.47 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.47 in
Runoff Volume (Pervious)	26.038 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	26.038 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.3308 hours
Computational Time Increment	0.0441 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	195.68 ft³/s
Unit peak time, Tp	0.2205 hours
Unit receding limb, Tr	0.8821 hours
Total unit time, Tb	1.1027 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1199 hours
Area (User Defined)	52.360 acres

Computational Time Increment	0.0160 hours
Time to Peak (Computed)	11.9420 hours
Flow (Peak, Computed)	426.20 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9400 hours
Flow (Peak Interpolated Output)	425.51 ft³/s

Drainage Area	
SCS CN (Composite)	83.000
Area (User Defined)	52.360 acres
Maximum Retention (Pervious)	2.05 in
Maximum Retention (Pervious, 20 percent)	0.41 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.70 in
Runoff Volume (Pervious)	24.875 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	24.875 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1199 hours
Computational Time Increment	0.0160 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	494.80 ft³/s
Unit peak time, Tp	0.0799 hours
Unit receding limb, Tr	0.3197 hours
Total unit time, Tb	0.3997 hours

Elevation (ft)	Planimeter (ft^2)	Area (acres)	A1+A2+sqr (A1*A2) (acres)	Volume (ac-ft)	Volume (Total) (ac-ft)
956.8500	0.0	0.018	0.000	0.000	0.000
958.0000	0.0	0.247	0.332	0.127	0.127
960.0000	0.0	0.673	1.328	0.885	1.012
962.0000	0.0	1.457	3.120	2.080	3.093
964.0000	0.0	2.259	5.530	3.687	6.779
966.0000	0.0	3.105	8.012	5.341	12.120
968.0000	0.0	4.034	10.678	7.119	19.239
970.0000	0.0	5.635	14.436	9.624	28.863
972.0000	0.0	7.127	19.099	12.732	41.595

Elevation (ft)	Planimeter (ft^2)	Area (acres)	A1+A2+sqr (A1*A2) (acres)	Volume (ac-ft)	Volume (Total) (ac-ft)
900.8100	0.0	0.002	0.000	0.000	0.000
901.0000	0.0	0.003	0.008	0.000	0.000
902.0000	0.0	0.016	0.025	0.008	0.009
902.4000	0.0	0.021	0.055	0.007	0.016
903.0000	0.0	0.029	0.074	0.015	0.031
904.0000	0.0	0.075	0.150	0.050	0.081
906.0000	0.0	0.170	0.358	0.239	0.320
908.0000	0.0	0.879	1.435	0.957	1.276
910.0000	0.0	1.350	3.319	2.212	3.489
912.0000	0.0	1.947	4.919	3.279	6.768

Elevation (ft)	Planimeter (ft^2)	Area (acres)	A1+A2+sqr (A1*A2) (acres)	Volume (ac-ft)	Volume (Total) (ac-ft)
929.0000	0.0	0.464	0.000	0.000	0.000
930.0000	0.0	0.785	1.853	0.618	0.618
932.0000	0.0	1.742	3.697	2.465	3.082
934.0000	0.0	2.263	5.990	3.993	7.075
936.0000	0.0	2.984	7.846	5.231	12.306
938.0000	0.0	3.928	10.336	6.891	19.197
940.0000	0.0	5.211	13.663	9.109	28.305

Elevation (ft)	Planimeter (ft^2)	Area (acres)	A1+A2+sqr (A1*A2) (acres)	Volume (ac-ft)	Volume (Total) (ac-ft)
945.3000	0.0	0.006	0.000	0.000	0.000
946.0000	0.0	0.017	0.033	0.008	0.008
947.0000	0.0	0.069	0.120	0.040	0.048
948.0000	0.0	0.143	0.313	0.104	0.152
949.0000	0.0	0.450	0.847	0.282	0.434
950.0000	0.0	0.828	1.888	0.629	1.064
951.0000	0.0	1.199	3.023	1.008	2.071
952.0000	0.0	1.438	3.950	1.317	3.388
953.0000	0.0	1.811	4.863	1.621	5.009
954.0000	0.0	2.136	5.914	1.971	6.980
955.0000	0.0	2.511	6.963	2.321	9.301
956.0000	0.0	3.256	8.626	2.875	12.177
957.0000	0.0	4.094	11.002	3.667	15.844
958.0000	0.0	5.059	13.704	4.568	20.412

Elevation (ft)	Planimeter (ft^2)	Area (acres)	A1+A2+sqr (A1*A2) (acres)	Volume (ac-ft)	Volume (Total) (ac-ft)
916.2200	0.0	0.009	0.000	0.000	0.000
917.0000	0.0	0.046	0.075	0.019	0.019
918.0000	0.0	0.203	0.346	0.115	0.135
919.0000	0.0	0.328	0.789	0.263	0.398
920.0000	0.0	0.414	1.112	0.371	0.769
921.0000	0.0	0.495	1.363	0.454	1.223
922.0000	0.0	0.583	1.616	0.539	1.761
923.0000	0.0	0.671	1.880	0.627	2.388
924.0000	0.0	0.900	2.348	0.783	3.171
925.0000	0.0	1.162	3.085	1.028	4.199
926.0000	0.0	1.399	3.836	1.279	5.478
927.0000	0.0	1.640	4.554	1.518	6.996
928.0000	0.0	1.926	5.343	1.781	8.777
929.0000	0.0	3.197	7.603	2.535	11.312
930.0000	0.0	4.098	10.915	3.638	14.950

Elevation (ft)	Planimeter (ft^2)	Area (acres)	A1+A2+sqr (A1*A2) (acres)	Volume (ac-ft)	Volume (Total) (ac-ft)
992.0000	0.0	1.729	0.000	0.000	0.000
994.0000	0.0	2.038	5.644	3.763	3.763
996.0000	0.0	2.329	6.545	4.364	8.127
998.0000	0.0	2.638	7.445	4.963	13.090

Requested Pond Water Surface Elevations	
Minimum (Headwater)	992.0000 ft
Increment (Headwater)	0.1000 ft
Maximum (Headwater)	998.0000 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Area	Orifice - 1	Forward	Culvert - 1	992.0000	998.0001
Culvert-Circular	Culvert - 1	Forward	TW	981.0000	998.0001
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: Orifice - 1 Structure Type: Orifice-Area	
Number of Openings	1
Elevation	992.0000 ft
Orifice Area	4.2 ft²
Top Elevation	992.8300 ft
Datum Elevation	992.0000 ft
Orifice Coefficient	0.600

Structure ID: Culvert - 1 Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	36.0 in
Length	280.00 ft
Length (Computed Barrel)	280.04 ft
Slope (Computed)	0.018 ft/ft

Outlet Control Data	
Manning's n	0.013
Ke	0.500
Kb	0.007
Kr	0.500
Convergence Tolerance	0.0010 ft

Inlet Control Data	
Equation Form	Form 1
K	0.0098
M	2.0000
C	0.0398
Y	0.6700
T1 ratio (HW/D)	1.151
T2 ratio (HW/D)	1.298
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	984.4539 ft	T1 Flow	42.85 ft³/s
T2 Elevation	984.8936 ft	T2 Flow	48.97 ft³/s

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.0100 ft
Tailwater Tolerance (Maximum)	0.5000 ft
Headwater Tolerance (Minimum)	0.0100 ft
Headwater Tolerance (Maximum)	0.5000 ft
Flow Tolerance (Minimum)	0.001 ft^3/s
Flow Tolerance (Maximum)	10.000 ft^3/s

Requested Pond Water Surface Elevations	
Minimum (Headwater)	956.8500 ft
Increment (Headwater)	0.1000 ft
Maximum (Headwater)	972.0000 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Area	Grate Inlet	Forward	66" RCP	956.8500	972.0001
Culvert-Circular	66" RCP	Forward	TW	945.7000	972.0001
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: Grate Inlet Structure Type: Orifice-Area	
Number of Openings	1
Elevation	956.8500 ft
Orifice Area	27.2 ft²
Top Elevation	0.0000 ft
Datum Elevation	0.0000 ft
Orifice Coefficient	0.600

Structure ID: 66" RCP Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	66.0 in
Length	177.00 ft
Length (Computed Barrel)	177.00 ft
Slope (Computed)	0.003 ft/ft

Outlet Control Data	
Manning's n	0.013
Ke	0.200
Kb	0.003
Kr	0.500
Convergence Tolerance	0.0010 ft

Inlet Control Data	
Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	1.094
T2 ratio (HW/D)	1.196
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	951.7149 ft	T1 Flow	195.01 ft³/s
T2 Elevation	952.2753 ft	T2 Flow	222.87 ft³/s

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.0100 ft
Tailwater Tolerance (Maximum)	0.5000 ft
Headwater Tolerance (Minimum)	0.0100 ft
Headwater Tolerance (Maximum)	0.5000 ft
Flow Tolerance (Minimum)	0.001 ft^3/s
Flow Tolerance (Maximum)	10.000 ft^3/s

Requested Pond Water Surface Elevations	
Minimum (Headwater)	900.8100 ft
Increment (Headwater)	0.1000 ft
Maximum (Headwater)	912.0000 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Culvert-Circular	Culvert - 1	Forward	TW	900.8100	912.0001
Irregular Weir	Weir - 1	Forward	TW	907.2400	912.0001
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: Culvert - 1 Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	84.0 in
Length	66.60 ft
Length (Computed Barrel)	66.60 ft
Slope (Computed)	0.006 ft/ft

Outlet Control Data	
Manning's n	0.026
Ke	0.200
Kb	0.009
Kr	0.500
Convergence Tolerance	0.0010 ft

Inlet Control Data	
Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	1.092
T2 ratio (HW/D)	1.194
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	908.4573 ft	T1 Flow	356.37 ft³/s
T2 Elevation	909.1704 ft	T2 Flow	407.28 ft³/s

Structure ID: Weir - 1
Structure Type: Irregular Weir

Station (ft)	Elevation (ft)
0.00	912.00
22.00	910.00
43.10	908.52
76.73	907.24
124.40	907.44
157.13	908.16
223.83	908.35
251.00	908.60
265.18	909.00
270.32	910.00
277.43	912.00

Lowest Elevation	907.2400 ft
Weir Coefficient	2.80 (ft^0.5)/s

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.0100 ft
Tailwater Tolerance (Maximum)	0.5000 ft
Headwater Tolerance (Minimum)	0.0100 ft
Headwater Tolerance (Maximum)	0.5000 ft
Flow Tolerance (Minimum)	0.001 ft³/s
Flow Tolerance (Maximum)	10.000 ft³/s

Requested Pond Water Surface Elevations	
Minimum (Headwater)	929.0000 ft
Increment (Headwater)	0.1000 ft
Maximum (Headwater)	940.0000 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Irregular Weir	Weir - 1	Forward	TW	929.0000	940.0001
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: Weir - 1
Structure Type: Irregular Weir

Station (ft)	Elevation (ft)
0.00	940.00
23.88	938.00
64.85	936.00
167.91	934.00
238.10	932.00
246.58	930.00
251.38	929.00
253.10	929.00
257.52	930.00
263.49	932.00
268.12	934.00
273.30	936.00
297.08	938.00
333.50	940.00

Lowest Elevation	929.0000 ft
Weir Coefficient	2.80 (ft^0.5)/s

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.0100 ft
Tailwater Tolerance (Maximum)	0.5000 ft
Headwater Tolerance (Minimum)	0.0100 ft
Headwater Tolerance (Maximum)	0.5000 ft
Flow Tolerance (Minimum)	0.001 ft³/s
Flow Tolerance (Maximum)	10.000 ft³/s

Requested Pond Water Surface Elevations	
Minimum (Headwater)	945.3000 ft
Increment (Headwater)	0.1000 ft
Maximum (Headwater)	958.0000 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Culvert-Box	RCB: 13 x 7 x 125.8'	Forward	TW	945.3000	958.0001
Irregular Weir	Roadway Weir	Forward	TW	955.6500	958.0001
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: RCB: 13 x 7 x 125.8' Structure Type: Culvert-Box	
Number of Barrels	1
Width	13.00 ft
Height	7.00 ft
Length	125.80 ft
Length (Computed Barrel)	126.04 ft
Slope (Computed)	0.062 ft/ft

Outlet Control Data	
Manning's n	0.013
Ke	0.200
Kb	0.002
Kr	0.500
Convergence Tolerance	0.0010 ft

Inlet Control Data	
Equation Form	Form 2
K	0.4860
M	0.6670
C	0.0249
Y	0.8300
T1 ratio (HW/D)	1.121
T2 ratio (HW/D)	1.197
Slope Correction Factor	-0.500

Use unsubmerged inlet control 1 equation below T1 elevation.
Use submerged inlet control 1 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	953.1456 ft	T1 Flow	842.67 ft³/s
T2 Elevation	953.6818 ft	T2 Flow	963.05 ft³/s

Structure ID: Roadway Weir
Structure Type: Irregular Weir

Station (ft)	Elevation (ft)
0.00	958.00
46.50	957.00
118.20	956.00
206.10	955.65
276.80	956.00
345.40	957.00
392.40	958.00

Lowest Elevation	955.6500 ft
Weir Coefficient	2.60 (ft^0.5)/s

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.0100 ft
Tailwater Tolerance (Maximum)	0.5000 ft
Headwater Tolerance (Minimum)	0.0100 ft
Headwater Tolerance (Maximum)	0.5000 ft
Flow Tolerance (Minimum)	0.001 ft³/s
Flow Tolerance (Maximum)	10.000 ft³/s

Requested Pond Water Surface Elevations	
Minimum (Headwater)	916.2200 ft
Increment (Headwater)	0.1000 ft
Maximum (Headwater)	930.0000 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Culvert-Box	RCB: 2x 10 x 7 x 174.4'	Forward	TW	916.2200	930.0001
Irregular Weir	Roadway Weir	Forward	TW	928.6800	930.0001
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: RCB: 2x 10 x 7 x 174.4' Structure Type: Culvert-Box	
Number of Barrels	2
Width	10.00 ft
Height	7.00 ft
Length	174.40 ft
Length (Computed Barrel)	174.46 ft
Slope (Computed)	0.027 ft/ft

Outlet Control Data	
Manning's n	0.013
Ke	0.400
Kb	0.002
Kr	0.500
Convergence Tolerance	0.0010 ft

Inlet Control Data	
Equation Form	Form 2
K	0.5450
M	0.6670
C	0.0451
Y	0.7300
T1 ratio (HW/D)	1.257
T2 ratio (HW/D)	1.437
Slope Correction Factor	-0.500

Use unsubmerged inlet control 1 equation below T1 elevation.
Use submerged inlet control 1 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	925.0181 ft	T1 Flow	648.21 ft³/s
T2 Elevation	926.2817 ft	T2 Flow	740.81 ft³/s

Structure ID: Roadway Weir
Structure Type: Irregular Weir

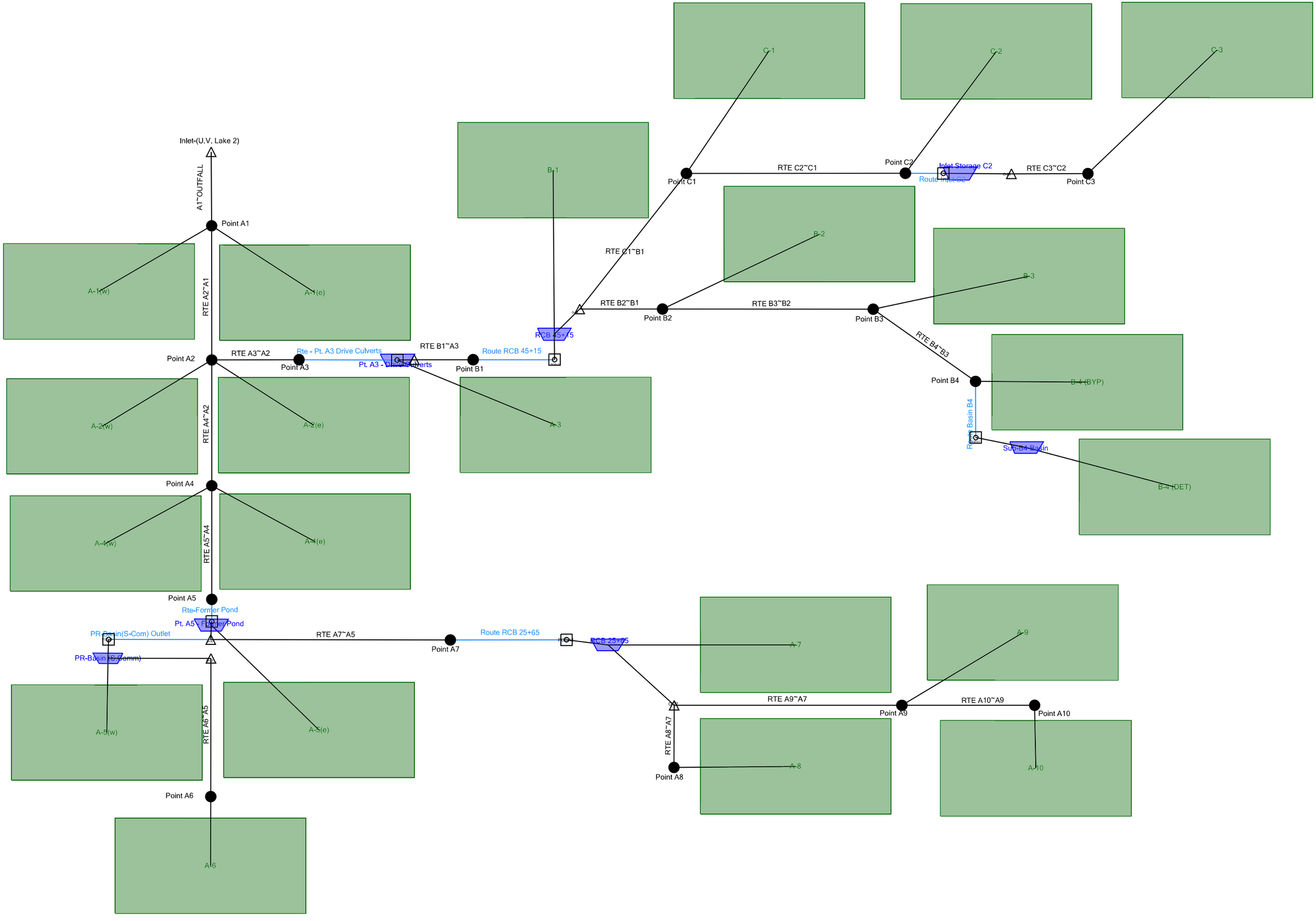
Station (ft)	Elevation (ft)
0.00	930.00
64.20	929.00
155.00	928.68
244.30	929.00
309.00	930.00

Lowest Elevation	928.6800 ft
Weir Coefficient	2.60 (ft^0.5)/s

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.0100 ft
Tailwater Tolerance (Maximum)	0.5000 ft
Headwater Tolerance (Minimum)	0.0100 ft
Headwater Tolerance (Maximum)	0.5000 ft
Flow Tolerance (Minimum)	0.001 ft³/s
Flow Tolerance (Maximum)	10.000 ft³/s


Inlet-(U.V. Lake 2)
A1~OUTFALL
Point A1
A-1(w)
A-1(e)
RTE A2~A1
Point A2
RTE A3~A2
Point A3
Rte - Pt. A3 Drive Culverts
Pt. A3 - Drive Culverts
RTE B1~A3
Point B1
Route RCB 45+15
RCB 45+15
B-1
C-1
C-2
C-3
Point C1
RTE C2~C1
Point C2
Inlet Storage C2
Route Inlet C2
RTE C3~C2
Point C3
RTE C1~B1
B-2
RTE B2~B1
Point B2
RTE B3~B2
Point B3
B-3
RTE B4~B3
Point B4
B-4 (BYP)
Route Basin B4
Sub-B4 Basin
B-4 (DET)
A-2(w)
A-2(e)
A-3
RTE A4~A2
Point A4
A-4(w)
A-4(e)
RTE A5~A4
Point A5
Rte-Former Pond
Pt. A5 - Former Pond
PR-Basin(S-Com) Outlet
PR-Basin (S-Comm)
RTE A7~A5
Point A7
Route RCB 25+65
RCB 25+65
A-5(w)
A-5(e)
RTE A6~A5
Point A6
A-6
A-7
A-9
RTE A9~A7
Point A9
RTE A10~A9
Point A10
RTE A8~A7
Point A8
A-8
A-10

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Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
A-1(e)	WQv	1	0.781	12.0100	12.20
A-1(e)	2-Yr (TP-40)	2	4.735	11.9700	80.60
A-1(e)	10-Yr (TP-40)	10	8.874	11.9600	149.59
A-1(e)	100-Yr (TP-40)	100	14.523	11.9600	240.05
A-1(w)	WQv	1	0.503	12.1200	4.08
A-1(w)	2-Yr (TP-40)	2	4.908	12.0500	70.15
A-1(w)	10-Yr (TP-40)	10	10.132	12.0500	146.86
A-1(w)	100-Yr (TP-40)	100	17.597	12.0500	252.55
A-2(e)	WQv	1	0.058	12.0100	0.89
A-2(e)	2-Yr (TP-40)	2	0.420	11.9400	7.64
A-2(e)	10-Yr (TP-40)	10	0.819	11.9300	14.90
A-2(e)	100-Yr (TP-40)	100	1.374	11.9300	24.63
A-2(w)	WQv	1	0.179	12.1100	0.96
A-2(w)	2-Yr (TP-40)	2	2.301	12.0300	34.59
A-2(w)	10-Yr (TP-40)	10	4.975	12.0300	76.77
A-2(w)	100-Yr (TP-40)	100	8.884	12.0300	136.28
A-3	WQv	1	0.897	11.9500	15.75
A-3	2-Yr (TP-40)	2	4.376	11.9300	79.39
A-3	10-Yr (TP-40)	10	7.797	11.9300	138.56
A-3	100-Yr (TP-40)	100	12.366	11.9300	214.52
A-4(e)	WQv	1	0.382	11.9500	6.61
A-4(e)	2-Yr (TP-40)	2	1.964	11.9300	35.72
A-4(e)	10-Yr (TP-40)	10	3.543	11.9300	63.28
A-4(e)	100-Yr (TP-40)	100	5.662	11.9300	98.81
A-4(w)	WQv	1	0.123	12.0500	1.22
A-4(w)	2-Yr (TP-40)	2	1.309	11.9800	22.01
A-4(w)	10-Yr (TP-40)	10	2.744	11.9700	46.91
A-4(w)	100-Yr (TP-40)	100	4.808	11.9600	81.64
A-5(e)	WQv	1	0.305	11.9600	5.06
A-5(e)	2-Yr (TP-40)	2	1.744	11.9300	31.81
A-5(e)	10-Yr (TP-40)	10	3.228	11.9300	58.13
A-5(e)	100-Yr (TP-40)	100	5.240	11.9300	92.41
A-5(w)	WQv	1	2.131	11.9300	38.52
A-5(w)	2-Yr (TP-40)	2	7.015	11.9200	119.58
A-5(w)	10-Yr (TP-40)	10	11.352	11.9200	188.38
A-5(w)	100-Yr (TP-40)	100	16.975	11.9200	276.00
A-6	WQv	1	0.344	12.0000	5.57
A-6	2-Yr (TP-40)	2	2.083	11.9400	37.54
A-6	10-Yr (TP-40)	10	3.904	11.9300	69.57
A-6	100-Yr (TP-40)	100	6.390	11.9300	111.78
A-7	WQv	1	0.357	12.0500	3.73
A-7	2-Yr (TP-40)	2	3.482	12.0000	57.26
A-7	10-Yr (TP-40)	10	7.186	11.9800	119.03
A-7	100-Yr (TP-40)	100	12.481	11.9800	204.90
A-8	WQv	1	0.449	12.0200	6.79
A-8	2-Yr (TP-40)	2	3.070	11.9600	53.05
A-8	10-Yr (TP-40)	10	5.907	11.9500	101.89
A-8	100-Yr (TP-40)	100	9.826	11.9500	166.82
A-9	WQv	1	0.897	12.0100	14.25
A-9	2-Yr (TP-40)	2	5.138	11.9700	87.15
A-9	10-Yr (TP-40)	10	9.507	11.9600	158.95
A-9	100-Yr (TP-40)	100	15.435	11.9600	252.78
A-10	WQv	1	0.836	11.9700	13.89
A-10	2-Yr (TP-40)	2	2.890	11.9700	45.61
A-10	10-Yr (TP-40)	10	4.733	11.9700	72.57

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
A-10	100-Yr (TP-40)	100	7.128	11.9700	106.86
B-1	WQv	1	0.535	12.0300	7.35
B-1	2-Yr (TP-40)	2	4.168	11.9700	70.94
B-1	10-Yr (TP-40)	10	8.242	11.9600	140.29
B-1	100-Yr (TP-40)	100	13.944	11.9500	234.20
B-2	WQv	1	0.724	12.0600	8.13
B-2	2-Yr (TP-40)	2	6.057	12.0300	94.72
B-2	10-Yr (TP-40)	10	12.146	12.0100	190.16
B-2	100-Yr (TP-40)	100	20.725	12.0000	320.74
B-3	WQv	1	1.040	12.0200	16.20
B-3	2-Yr (TP-40)	2	6.302	11.9700	106.50
B-3	10-Yr (TP-40)	10	11.812	11.9600	197.62
B-3	100-Yr (TP-40)	100	19.332	11.9600	317.37
B-4 (BYP)	WQv	1	0.507	11.9300	9.23
B-4 (BYP)	2-Yr (TP-40)	2	1.753	11.9300	30.29
B-4 (BYP)	10-Yr (TP-40)	10	2.871	11.9200	48.22
B-4 (BYP)	100-Yr (TP-40)	100	4.324	11.9200	71.04
C-1	WQv	1	2.197	12.0800	29.72
C-1	2-Yr (TP-40)	2	9.223	12.0500	124.83
C-1	10-Yr (TP-40)	10	15.842	12.0500	209.38
C-1	100-Yr (TP-40)	100	24.565	12.0500	317.10
C-2	WQv	1	1.190	12.1300	12.16
C-2	2-Yr (TP-40)	2	8.134	12.0900	104.44
C-2	10-Yr (TP-40)	10	15.652	12.0800	200.90
C-2	100-Yr (TP-40)	100	26.038	12.0800	329.78
C-3	WQv	1	1.338	12.0000	21.39
C-3	2-Yr (TP-40)	2	8.110	11.9500	142.61
C-3	10-Yr (TP-40)	10	15.199	11.9400	264.83
C-3	100-Yr (TP-40)	100	24.875	11.9400	425.51
B-4 (DET)	WQv	1	1.713	11.9500	30.27
B-4 (DET)	2-Yr (TP-40)	2	5.919	11.9400	99.43
B-4 (DET)	10-Yr (TP-40)	10	9.694	11.9400	158.21
B-4 (DET)	100-Yr (TP-40)	100	14.599	11.9400	232.94

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
Point A1	WQv	1	17.430	12.2900	126.08
Point A1	2-Yr (TP-40)	2	94.760	12.2500	881.14
Point A1	10-Yr (TP-40)	10	175.751	12.2400	1,651.01
Point A1	100-Yr (TP-40)	100	286.642	12.2000	2,483.99
Point A2	WQv	1	16.147	12.2100	121.95
Point A2	2-Yr (TP-40)	2	85.119	12.1800	839.83
Point A2	10-Yr (TP-40)	10	156.749	12.1800	1,567.54
Point A2	100-Yr (TP-40)	100	254.524	12.1800	2,335.81
Point A3	WQv	1	10.141	12.1800	102.92
Point A3	2-Yr (TP-40)	2	54.042	12.1600	627.24
Point A3	10-Yr (TP-40)	10	99.254	12.1500	1,101.49
Point A3	100-Yr (TP-40)	100	160.767	12.1700	1,586.19
Point A4	WQv	1	5.769	12.2700	21.14
Point A4	2-Yr (TP-40)	2	28.356	12.1900	199.00
Point A4	10-Yr (TP-40)	10	51.702	12.1900	435.54
Point A4	100-Yr (TP-40)	100	83.500	12.1700	683.93

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
Point A5	WQv	1	5.264	12.2500	19.54
Point A5	2-Yr (TP-40)	2	25.084	12.1800	187.47
Point A5	10-Yr (TP-40)	10	45.416	12.1800	413.94
Point A5	100-Yr (TP-40)	100	73.030	12.1700	646.72
Point A6	WQv	1	0.344	12.0000	5.57
Point A6	2-Yr (TP-40)	2	2.083	11.9400	37.54
Point A6	10-Yr (TP-40)	10	3.904	11.9300	69.57
Point A6	100-Yr (TP-40)	100	6.390	11.9300	111.78
Point A7	WQv	1	2.539	12.0600	37.95
Point A7	2-Yr (TP-40)	2	14.580	12.0500	229.26
Point A7	10-Yr (TP-40)	10	27.333	12.0700	397.23
Point A7	100-Yr (TP-40)	100	44.871	12.0800	603.32
Point A8	WQv	1	0.449	12.0200	6.79
Point A8	2-Yr (TP-40)	2	3.070	11.9600	53.05
Point A8	10-Yr (TP-40)	10	5.907	11.9500	101.89
Point A8	100-Yr (TP-40)	100	9.826	11.9500	166.82
Point A9	WQv	1	1.733	12.0200	27.80
Point A9	2-Yr (TP-40)	2	8.028	12.0000	128.79
Point A9	10-Yr (TP-40)	10	14.240	11.9900	223.48
Point A9	100-Yr (TP-40)	100	22.563	11.9900	346.07
Point A10	WQv	1	0.836	11.9700	13.89
Point A10	2-Yr (TP-40)	2	2.890	11.9700	45.61
Point A10	10-Yr (TP-40)	10	4.733	11.9700	72.57
Point A10	100-Yr (TP-40)	100	7.128	11.9700	106.86
Point B1	WQv	1	9.245	12.1200	100.64
Point B1	2-Yr (TP-40)	2	49.667	12.1100	615.14
Point B1	10-Yr (TP-40)	10	91.457	12.1100	1,076.61
Point B1	100-Yr (TP-40)	100	148.401	12.1400	1,551.65
Point B2	WQv	1	3.985	12.0900	37.89
Point B2	2-Yr (TP-40)	2	20.032	12.0500	242.31
Point B2	10-Yr (TP-40)	10	36.522	12.0400	446.43
Point B2	100-Yr (TP-40)	100	58.980	12.0300	715.56
Point B3	WQv	1	3.260	12.0200	30.59
Point B3	2-Yr (TP-40)	2	13.975	11.9900	153.04
Point B3	10-Yr (TP-40)	10	24.377	11.9800	266.04
Point B3	100-Yr (TP-40)	100	38.255	11.9700	411.65
Point B4	WQv	1	2.221	12.0100	14.66
Point B4	2-Yr (TP-40)	2	7.673	11.9400	48.10
Point B4	10-Yr (TP-40)	10	12.565	11.9300	71.04
Point B4	100-Yr (TP-40)	100	18.924	11.9300	98.80
Point C1	WQv	1	4.725	12.0900	59.47
Point C1	2-Yr (TP-40)	2	25.466	12.0900	350.42
Point C1	10-Yr (TP-40)	10	46.692	12.1000	604.01
Point C1	100-Yr (TP-40)	100	75.478	12.1000	890.10
Point C2	WQv	1	2.528	12.0400	30.94
Point C2	2-Yr (TP-40)	2	16.244	12.0400	232.89
Point C2	10-Yr (TP-40)	10	30.851	12.0700	417.32
Point C2	100-Yr (TP-40)	100	50.912	12.0800	614.91
Point C3	WQv	1	1.338	12.0000	21.39
Point C3	2-Yr (TP-40)	2	8.110	11.9500	142.61
Point C3	10-Yr (TP-40)	10	15.199	11.9400	264.83
Point C3	100-Yr (TP-40)	100	24.875	11.9400	425.51
Inlet-(U.V. Lake 2)	WQv	1	17.430	12.2900	126.08
Inlet-(U.V. Lake 2)	2-Yr (TP-40)	2	94.760	12.2500	881.14
Inlet-(U.V. Lake 2)	10-Yr (TP-40)	10	175.751	12.2400	1,651.01

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
Inlet-(U.V. Lake 2)	100-Yr (TP-40)	100	286.642	12.2000	2,483.99

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
RCB 25+65 (IN)	WQv	1	2.539	12.0600	38.00	(N/A)	(N/A)
RCB 25+65 (OUT)	WQv	1	2.539	12.0600	37.95	946.33	0.015
RCB 25+65 (IN)	2-Yr (TP-40)	2	14.580	12.0200	236.01	(N/A)	(N/A)
RCB 25+65 (OUT)	2-Yr (TP-40)	2	14.580	12.0500	229.26	948.71	0.319
RCB 25+65 (IN)	10-Yr (TP-40)	10	27.333	12.0100	437.94	(N/A)	(N/A)
RCB 25+65 (OUT)	10-Yr (TP-40)	10	27.333	12.0700	397.23	950.22	1.251
RCB 25+65 (IN)	100-Yr (TP-40)	100	44.871	12.0000	707.16	(N/A)	(N/A)
RCB 25+65 (OUT)	100-Yr (TP-40)	100	44.871	12.0800	603.32	951.80	3.100
RCB 45+15 (IN)	WQv	1	9.245	12.1100	101.70	(N/A)	(N/A)
RCB 45+15 (OUT)	WQv	1	9.245	12.1200	100.64	917.82	0.101
RCB 45+15 (IN)	2-Yr (TP-40)	2	49.667	12.0700	634.00	(N/A)	(N/A)
RCB 45+15 (OUT)	2-Yr (TP-40)	2	49.667	12.1100	615.14	921.57	1.519
RCB 45+15 (IN)	10-Yr (TP-40)	10	91.457	12.0700	1,121.63	(N/A)	(N/A)
RCB 45+15 (OUT)	10-Yr (TP-40)	10	91.457	12.1100	1,076.61	923.99	3.164
RCB 45+15 (IN)	100-Yr (TP-40)	100	148.401	12.0600	1,726.54	(N/A)	(N/A)
RCB 45+15 (OUT)	100-Yr (TP-40)	100	148.401	12.1400	1,551.65	926.77	6.626
Inlet Storage C2 (IN)	WQv	1	1.338	12.0200	21.38	(N/A)	(N/A)
Inlet Storage C2 (OUT)	WQv	1	1.338	12.0200	21.36	956.90	0.001
Inlet Storage C2 (IN)	2-Yr (TP-40)	2	8.110	11.9600	142.28	(N/A)	(N/A)
Inlet Storage C2 (OUT)	2-Yr (TP-40)	2	8.110	12.0000	137.26	957.95	0.115
Inlet Storage C2 (IN)	10-Yr (TP-40)	10	15.199	11.9600	264.20	(N/A)	(N/A)
Inlet Storage C2 (OUT)	10-Yr (TP-40)	10	15.199	12.0500	219.81	959.67	0.804
Inlet Storage C2 (IN)	100-Yr (TP-40)	100	24.875	11.9600	423.95	(N/A)	(N/A)
Inlet Storage C2 (OUT)	100-Yr (TP-40)	100	24.875	12.0700	285.13	961.59	2.539

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Sub-B4 Basin (IN)	WQv	1	1.713	11.9500	30.27	(N/A)	(N/A)
Sub-B4 Basin (OUT)	WQv	1	1.713	12.1500	8.05	992.37	0.642
Sub-B4 Basin (IN)	2-Yr (TP-40)	2	5.919	11.9400	99.43	(N/A)	(N/A)
Sub-B4 Basin (OUT)	2-Yr (TP-40)	2	5.919	12.1600	22.46	993.25	2.284
Sub-B4 Basin (IN)	10-Yr (TP-40)	10	9.694	11.9400	158.21	(N/A)	(N/A)
Sub-B4 Basin (OUT)	10-Yr (TP-40)	10	9.694	12.1900	28.68	994.04	3.850
Sub-B4 Basin (IN)	100-Yr (TP-40)	100	14.599	11.9400	232.94	(N/A)	(N/A)
Sub-B4 Basin (OUT)	100-Yr (TP-40)	100	14.599	12.2400	34.97	995.03	5.948
Pt. A3 - Drive-Culverts (IN)	WQv	1	10.141	12.1500	104.15	(N/A)	(N/A)
Pt. A3 - Drive-Culverts (OUT)	WQv	1	10.141	12.1800	102.92	904.63	0.136
Pt. A3 - Drive-Culverts (IN)	2-Yr (TP-40)	2	54.042	12.1400	631.39	(N/A)	(N/A)
Pt. A3 - Drive-Culverts (OUT)	2-Yr (TP-40)	2	54.042	12.1600	627.24	908.50	1.745
Pt. A3 - Drive-Culverts (IN)	10-Yr (TP-40)	10	99.254	12.1400	1,104.09	(N/A)	(N/A)
Pt. A3 - Drive-Culverts (OUT)	10-Yr (TP-40)	10	99.254	12.1500	1,101.49	909.06	2.334
Pt. A3 - Drive-Culverts (IN)	100-Yr (TP-40)	100	160.767	12.1600	1,587.99	(N/A)	(N/A)
Pt. A3 - Drive-Culverts (OUT)	100-Yr (TP-40)	100	160.767	12.1700	1,586.19	909.49	2.839
Pt. A5 - Former Pond (IN)	WQv	1	5.291	12.0900	40.44	(N/A)	(N/A)
Pt. A5 - Former Pond (OUT)	WQv	1	5.264	12.2500	19.54	930.15	0.739
Pt. A5 - Former Pond (IN)	2-Yr (TP-40)	2	25.151	12.0700	246.56	(N/A)	(N/A)
Pt. A5 - Former Pond (OUT)	2-Yr (TP-40)	2	25.084	12.1800	187.47	932.14	3.332

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Pt. A5 - Former Pond (IN)	10-Yr (TP-40)	10	45.488	12.0900	462.19	(N/A)	(N/A)
Pt. A5 - Former Pond (OUT)	10-Yr (TP-40)	10	45.416	12.1800	413.94	933.19	5.341
Pt. A5 - Former Pond (IN)	100-Yr (TP-40)	100	73.105	12.1100	680.22	(N/A)	(N/A)
Pt. A5 - Former Pond (OUT)	100-Yr (TP-40)	100	73.030	12.1700	646.72	933.84	6.707
PR-Basin (Summit-Village) (IN)	WQv	1	2.475	11.9400	43.36	(N/A)	(N/A)
PR-Basin (Summit-Village) (OUT)	WQv	1	2.447	18.8300	0.73	936.94	1.774
PR-Basin (Summit-Village) (IN)	2-Yr (TP-40)	2	9.098	11.9300	155.93	(N/A)	(N/A)
PR-Basin (Summit-Village) (OUT)	2-Yr (TP-40)	2	8.827	12.4600	15.35	940.71	5.356
PR-Basin (Summit-Village) (IN)	10-Yr (TP-40)	10	15.256	11.9300	256.29	(N/A)	(N/A)
PR-Basin (Summit-Village) (OUT)	10-Yr (TP-40)	10	14.928	12.1700	47.49	943.07	8.102
PR-Basin (Summit-Village) (IN)	100-Yr (TP-40)	100	23.365	11.9300	385.43	(N/A)	(N/A)
PR-Basin (Summit-Village) (OUT)	100-Yr (TP-40)	100	22.993	12.2500	53.94	946.28	12.513

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1401 hours
Area (User Defined)	1,331,629.200 ft²

Computational Time Increment	0.0187 hours
Time to Peak (Computed)	11.9552 hours
Flow (Peak, Computed)	240.75 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9600 hours
Flow (Peak Interpolated Output)	240.05 ft³/s

Drainage Area	
SCS CN (Composite)	83.000
Area (User Defined)	1,331,629.200 ft²
Maximum Retention (Pervious)	2.05 in
Maximum Retention (Pervious, 20 percent)	0.41 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.70 in
Runoff Volume (Pervious)	14.523 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	14.523 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1401 hours
Computational Time Increment	0.0187 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	247.23 ft³/s
Unit peak time, Tp	0.0934 hours
Unit receding limb, Tr	0.3736 hours
Total unit time, Tb	0.4670 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1000 hours
Area (User Defined)	134,164.800 ft²

Computational Time Increment	0.0133 hours
Time to Peak (Computed)	11.9333 hours
Flow (Peak, Computed)	24.66 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9300 hours
Flow (Peak Interpolated Output)	24.63 ft³/s

Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	134,164.800 ft²
Maximum Retention (Pervious)	2.50 in
Maximum Retention (Pervious, 20 percent)	0.50 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.35 in
Runoff Volume (Pervious)	1.374 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1.374 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1000 hours
Computational Time Increment	0.0133 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	34.90 ft³/s
Unit peak time, Tp	0.0667 hours
Unit receding limb, Tr	0.2667 hours
Total unit time, Tb	0.3333 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1000 hours
Area (User Defined)	1,048,053.600 ft²

Computational Time Increment	0.0133 hours
Time to Peak (Computed)	11.9333 hours
Flow (Peak, Computed)	214.57 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9300 hours
Flow (Peak Interpolated Output)	214.52 ft³/s

Drainage Area	
SCS CN (Composite)	87.000
Area (User Defined)	1,048,053.600 ft²
Maximum Retention (Pervious)	1.49 in
Maximum Retention (Pervious, 20 percent)	0.30 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	6.17 in
Runoff Volume (Pervious)	12.366 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	12.366 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1000 hours
Computational Time Increment	0.0133 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	272.61 ft³/s
Unit peak time, Tp	0.0667 hours
Unit receding limb, Tr	0.2667 hours
Total unit time, Tb	0.3333 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1000 hours
Area (User Defined)	489,178.800 ft²

Computational Time Increment	0.0133 hours
Time to Peak (Computed)	11.9333 hours
Flow (Peak, Computed)	98.84 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9300 hours
Flow (Peak Interpolated Output)	98.81 ft³/s

Drainage Area	
SCS CN (Composite)	86.000
Area (User Defined)	489,178.800 ft²
Maximum Retention (Pervious)	1.63 in
Maximum Retention (Pervious, 20 percent)	0.33 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	6.05 in
Runoff Volume (Pervious)	5.662 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	5.662 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1000 hours
Computational Time Increment	0.0133 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	127.24 ft³/s
Unit peak time, Tp	0.0667 hours
Unit receding limb, Tr	0.2667 hours
Total unit time, Tb	0.3333 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1377 hours
Area (User Defined)	525,769.200 ft²

Computational Time Increment	0.0184 hours
Time to Peak (Computed)	11.9524 hours
Flow (Peak, Computed)	81.76 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9600 hours
Flow (Peak Interpolated Output)	81.64 ft³/s

Drainage Area	
SCS CN (Composite)	75.000
Area (User Defined)	525,769.200 ft²
Maximum Retention (Pervious)	3.33 in
Maximum Retention (Pervious, 20 percent)	0.67 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.78 in
Runoff Volume (Pervious)	4.809 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	4.808 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1377 hours
Computational Time Increment	0.0184 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	99.32 ft³/s
Unit peak time, Tp	0.0918 hours
Unit receding limb, Tr	0.3672 hours
Total unit time, Tb	0.4590 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1000 hours
Area (User Defined)	470,883.600 ft²

Computational Time Increment	0.0133 hours
Time to Peak (Computed)	11.9333 hours
Flow (Peak, Computed)	92.47 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9300 hours
Flow (Peak Interpolated Output)	92.41 ft³/s

Drainage Area	
SCS CN (Composite)	84.000
Area (User Defined)	470,883.600 ft²
Maximum Retention (Pervious)	1.90 in
Maximum Retention (Pervious, 20 percent)	0.38 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.82 in
Runoff Volume (Pervious)	5.240 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	5.240 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1000 hours
Computational Time Increment	0.0133 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	122.48 ft³/s
Unit peak time, Tp	0.0667 hours
Unit receding limb, Tr	0.2667 hours
Total unit time, Tb	0.3333 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1000 hours
Area (User Defined)	1,247,558.400 ft²

Computational Time Increment	0.0133 hours
Time to Peak (Computed)	11.9200 hours
Flow (Peak, Computed)	276.00 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9200 hours
Flow (Peak Interpolated Output)	276.00 ft³/s

Drainage Area	
SCS CN (Composite)	95.000
Area (User Defined)	1,247,558.400 ft²
Maximum Retention (Pervious)	0.53 in
Maximum Retention (Pervious, 20 percent)	0.11 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	7.11 in
Runoff Volume (Pervious)	16.975 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	16.975 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1000 hours
Computational Time Increment	0.0133 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	324.50 ft³/s
Unit peak time, Tp	0.0667 hours
Unit receding limb, Tr	0.2667 hours
Total unit time, Tb	0.3333 hours

Elevation (ft)	Planimeter (ft²)	Area (ft²)	A1+A2+sqr (A1*A2) (ft²)	Volume (ac-ft)	Volume (Total) (ac-ft)
933.75	0.0	1,541.000	0.000	0.000	0.000
934.00	0.0	18,901.000	25,838.892	0.049	0.049
935.00	0.0	20,680.000	59,351.500	0.454	0.504
936.00	0.0	29,182.000	74,427.906	0.570	1.073
937.00	0.0	36,039.000	97,650.772	0.747	1.820
938.00	0.0	38,936.000	112,434.505	0.860	2.681
939.00	0.0	41,890.000	121,212.001	0.928	3.608
940.00	0.0	44,900.000	130,158.894	0.996	4.604
941.00	0.0	47,967.000	139,275.171	1.066	5.670
942.00	0.0	51,091.000	148,562.363	1.137	6.807
943.00	0.0	54,271.000	158,019.000	1.209	8.016
944.00	0.0	57,508.000	167,645.060	1.283	9.299
945.00	0.0	60,801.000	177,440.581	1.358	10.657
946.00	0.0	64,151.000	187,405.542	1.434	12.091
947.00	0.0	67,557.000	197,539.976	1.512	13.603
948.00	0.0	72,529.000	210,084.869	1.608	15.210
949.00	0.0	75,756.000	222,409.941	1.702	16.912
950.00	0.0	79,010.000	232,131.894	1.776	18.688

Requested Pond Water Surface Elevations	
Minimum (Headwater)	933.75 ft
Increment (Headwater)	0.10 ft
Maximum (Headwater)	950.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Primary Discharge OR (4" Dia)	Forward	Discharge Culvert (24" HDPE)	933.75	950.00
Orifice-Circular	Secondary Orifice (8" Dia)	Forward	Discharge Culvert (24" HDPE)	937.00	950.00
Orifice-Area	Field Inlet (4' x 4' Riser)	Forward	Discharge Culvert (24" HDPE)	940.50	950.00
Culvert-Circular	Discharge Culvert (24" HDPE)	Forward	TW	931.33	950.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: Discharge Culvert (24" HDPE) Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	24.0 in
Length	110.18 ft
Length (Computed Barrel)	110.19 ft
Slope (Computed)	0.012 ft/ft

Outlet Control Data	
Manning's n	0.013
Ke	0.500
Kb	0.012
Kr	0.500
Convergence Tolerance	0.00 ft

Inlet Control Data	
Equation Form	Form 1
K	0.0098
M	2.0000
C	0.0398
Y	0.6700
T1 ratio (HW/D)	1.154
T2 ratio (HW/D)	1.301
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	933.64 ft	T1 Flow	15.55 ft³/s
T2 Elevation	933.93 ft	T2 Flow	17.77 ft³/s

Structure ID: Primary Discharge OR (4" Dia) Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	933.75 ft
Orifice Diameter	4.0 in
Orifice Coefficient	0.600

Structure ID: Field Inlet (4' x 4' Riser) Structure Type: Orifice-Area	
Number of Openings	3
Elevation	940.50 ft
Orifice Area	3.3 ft²
Top Elevation	941.33 ft
Datum Elevation	940.50 ft
Orifice Coefficient	0.600

Structure ID: Secondary Orifice (8" Dia) Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	937.00 ft
Orifice Diameter	8.0 in
Orifice Coefficient	0.600

Structure ID: TW Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft³/s
Flow Tolerance (Maximum)	10.000 ft³/s

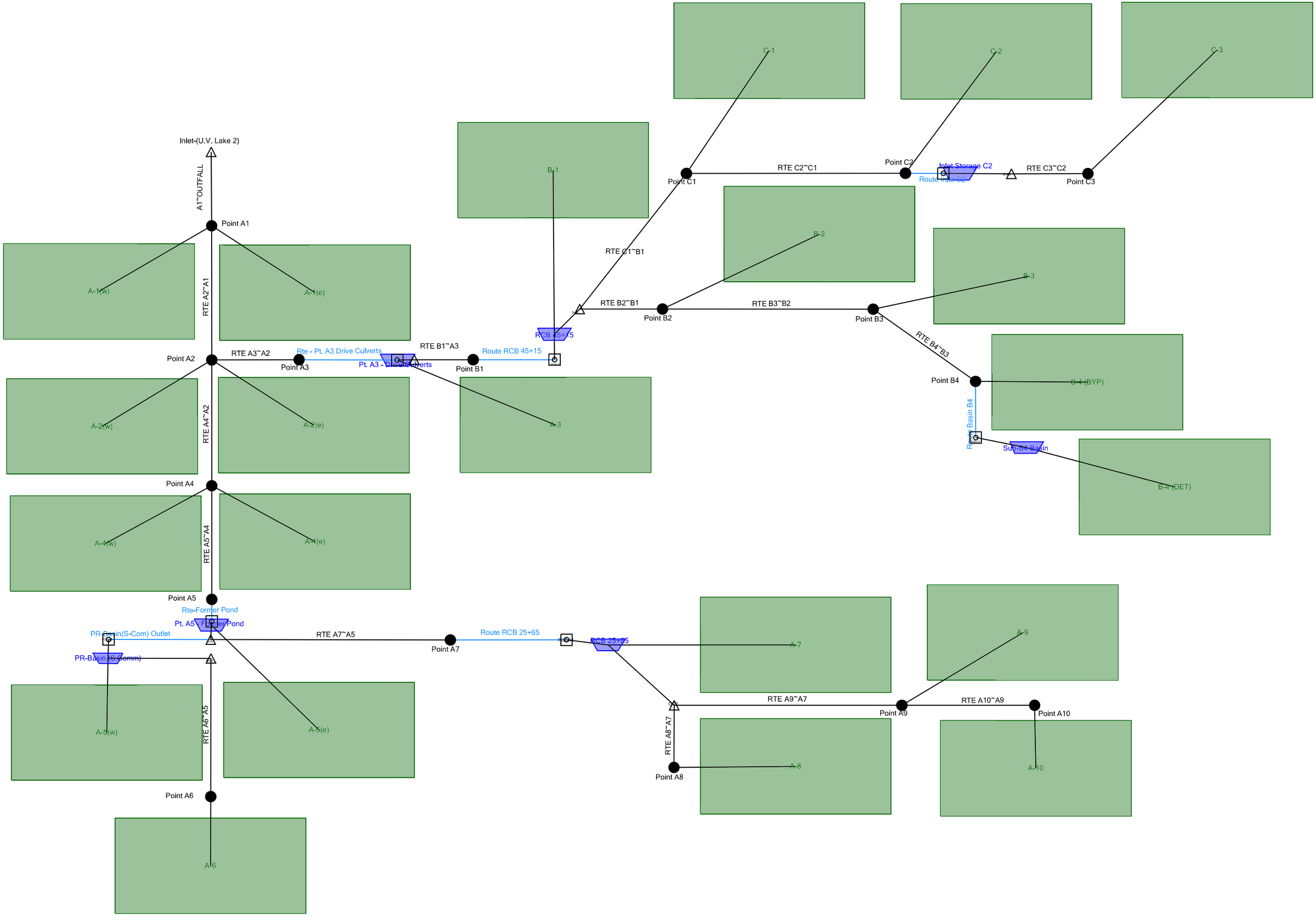
Inlet-(U.V. Lake 2)
A1~OUTFALL
Point A1
A-1(w)
A-1(e)
RTE A2~A1
Point A2
RTE A3~A2
Point A3
Rte - Pt. A3 Drive Culverts
Pt. A3 - Drive Culverts
RTE B1~A3
Point B1
Route RCB 45+15
RCB 45+15
B-1
C-1
C-2
C-3
Point C1
RTE C2~C1
Point C2
Inlet Storage C2
Route Inlet C2
RTE C3~C2
Point C3
RTE C1~B1
B-2
RTE B2~B1
Point B2
RTE B3~B2
Point B3
B-3
RTE B4~B3
Point B4
B-4 (BYP)
Route Basin B4
Sub-B4 Basin
B-4 (DET)
A-2(w)
A-2(e)
A-3
RTE A4~A2
Point A4
A-4(w)
A-4(e)
RTE A5~A4
Point A5
Rte-Former Pond
Pt. A5 - Former Pond
PR-Basin(S-Com) Outlet
PR-Basin (S-Comm)
RTE A7~A5
Point A7
Route RCB 25+65
RCB 25+65
A-5(w)
A-5(e)
RTE A6~A5
Point A6
A-6
A-7
A-9
RTE A9~A7
Point A9
RTE A10~A9
Point A10
RTE A8~A7
Point A8
A-8
A-10

Table of Contents

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
A-1(e)	WQv	1	0.370	12.0600	4.08
A-1(e)	2-Yr (TP-40)	2	3.334	12.0100	53.91
A-1(e)	10-Yr (TP-40)	10	6.783	11.9900	110.32
A-1(e)	100-Yr (TP-40)	100	11.675	11.9900	187.82
A-1(w)	WQv	1	0.503	12.1200	4.08
A-1(w)	2-Yr (TP-40)	2	4.908	12.0500	70.15
A-1(w)	10-Yr (TP-40)	10	10.132	12.0500	146.86
A-1(w)	100-Yr (TP-40)	100	17.597	12.0500	252.55
A-2(e)	WQv	1	0.058	12.0100	0.89
A-2(e)	2-Yr (TP-40)	2	0.420	11.9400	7.64
A-2(e)	10-Yr (TP-40)	10	0.819	11.9300	14.90
A-2(e)	100-Yr (TP-40)	100	1.374	11.9300	24.63
A-2(w)	WQv	1	0.179	12.1100	0.96
A-2(w)	2-Yr (TP-40)	2	2.301	12.0300	34.59
A-2(w)	10-Yr (TP-40)	10	4.975	12.0300	76.77
A-2(w)	100-Yr (TP-40)	100	8.884	12.0300	136.28
A-3	WQv	1	0.897	11.9500	15.75
A-3	2-Yr (TP-40)	2	4.376	11.9300	79.39
A-3	10-Yr (TP-40)	10	7.797	11.9300	138.56
A-3	100-Yr (TP-40)	100	12.366	11.9300	214.52
A-4(e)	WQv	1	0.382	11.9500	6.61
A-4(e)	2-Yr (TP-40)	2	1.964	11.9300	35.72
A-4(e)	10-Yr (TP-40)	10	3.543	11.9300	63.28
A-4(e)	100-Yr (TP-40)	100	5.662	11.9300	98.81
A-4(w)	WQv	1	0.133	12.0800	0.84
A-4(w)	2-Yr (TP-40)	2	1.711	12.0100	27.56
A-4(w)	10-Yr (TP-40)	10	3.700	11.9900	60.85
A-4(w)	100-Yr (TP-40)	100	6.607	11.9900	108.22
A-5(e)	WQv	1	0.381	12.0100	5.98
A-5(e)	2-Yr (TP-40)	2	2.448	11.9500	43.22
A-5(e)	10-Yr (TP-40)	10	4.649	11.9500	81.38
A-5(e)	100-Yr (TP-40)	100	7.670	11.9400	131.71
A-5(w)	WQv	1	0.292	12.0400	3.77
A-5(w)	2-Yr (TP-40)	2	2.273	12.0000	37.26
A-5(w)	10-Yr (TP-40)	10	4.495	11.9900	73.34
A-5(w)	100-Yr (TP-40)	100	7.604	11.9800	122.28
A-6	WQv	1	0.344	12.0000	5.57
A-6	2-Yr (TP-40)	2	2.083	11.9400	37.54
A-6	10-Yr (TP-40)	10	3.904	11.9300	69.57
A-6	100-Yr (TP-40)	100	6.390	11.9300	111.78
A-7	WQv	1	0.357	12.0500	3.73
A-7	2-Yr (TP-40)	2	3.482	12.0000	57.26
A-7	10-Yr (TP-40)	10	7.186	11.9800	119.03
A-7	100-Yr (TP-40)	100	12.481	11.9800	204.90
A-8	WQv	1	0.449	12.0200	6.79
A-8	2-Yr (TP-40)	2	3.070	11.9600	53.05
A-8	10-Yr (TP-40)	10	5.907	11.9500	101.89
A-8	100-Yr (TP-40)	100	9.826	11.9500	166.82
A-9	WQv	1	0.897	12.0100	14.25
A-9	2-Yr (TP-40)	2	5.138	11.9700	87.15
A-9	10-Yr (TP-40)	10	9.507	11.9600	158.95
A-9	100-Yr (TP-40)	100	15.435	11.9600	252.78
A-10	WQv	1	0.836	11.9700	13.89
A-10	2-Yr (TP-40)	2	2.890	11.9700	45.61
A-10	10-Yr (TP-40)	10	4.733	11.9700	72.57

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
A-10	100-Yr (TP-40)	100	7.128	11.9700	106.86
B-1	WQv	1	0.535	12.0300	7.35
B-1	2-Yr (TP-40)	2	4.168	11.9700	70.94
B-1	10-Yr (TP-40)	10	8.242	11.9600	140.29
B-1	100-Yr (TP-40)	100	13.944	11.9500	234.20
B-2	WQv	1	0.724	12.0600	8.13
B-2	2-Yr (TP-40)	2	6.057	12.0300	94.72
B-2	10-Yr (TP-40)	10	12.146	12.0100	190.16
B-2	100-Yr (TP-40)	100	20.725	12.0000	320.74
B-3	WQv	1	1.040	12.0200	16.20
B-3	2-Yr (TP-40)	2	6.302	11.9700	106.50
B-3	10-Yr (TP-40)	10	11.812	11.9600	197.62
B-3	100-Yr (TP-40)	100	19.332	11.9600	317.37
B-4 (BYP)	WQv	1	0.507	11.9300	9.23
B-4 (BYP)	2-Yr (TP-40)	2	1.753	11.9300	30.29
B-4 (BYP)	10-Yr (TP-40)	10	2.871	11.9200	48.22
B-4 (BYP)	100-Yr (TP-40)	100	4.324	11.9200	71.04
C-1	WQv	1	2.197	12.0800	29.72
C-1	2-Yr (TP-40)	2	9.223	12.0500	124.83
C-1	10-Yr (TP-40)	10	15.842	12.0500	209.38
C-1	100-Yr (TP-40)	100	24.565	12.0500	317.10
C-2	WQv	1	1.190	12.1300	12.16
C-2	2-Yr (TP-40)	2	8.134	12.0900	104.44
C-2	10-Yr (TP-40)	10	15.652	12.0800	200.90
C-2	100-Yr (TP-40)	100	26.038	12.0800	329.78
C-3	WQv	1	1.338	12.0000	21.39
C-3	2-Yr (TP-40)	2	8.110	11.9500	142.61
C-3	10-Yr (TP-40)	10	15.199	11.9400	264.83
C-3	100-Yr (TP-40)	100	24.875	11.9400	425.51
B-4 (DET)	WQv	1	1.713	11.9500	30.27
B-4 (DET)	2-Yr (TP-40)	2	5.919	11.9400	99.43
B-4 (DET)	10-Yr (TP-40)	10	9.694	11.9400	158.21
B-4 (DET)	100-Yr (TP-40)	100	14.599	11.9400	232.94

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
Point A1	WQv	1	15.322	12.2900	124.27
Point A1	2-Yr (TP-40)	2	89.909	12.2500	892.12
Point A1	10-Yr (TP-40)	10	169.234	12.2300	1,645.08
Point A1	100-Yr (TP-40)	100	278.693	12.2100	2,528.80
Point A2	WQv	1	14.448	12.2100	121.41
Point A2	2-Yr (TP-40)	2	81.668	12.1800	851.94
Point A2	10-Yr (TP-40)	10	152.323	12.1700	1,558.44
Point A2	100-Yr (TP-40)	100	249.423	12.1700	2,371.99
Point A3	WQv	1	10.141	12.1800	102.92
Point A3	2-Yr (TP-40)	2	54.042	12.1600	627.24
Point A3	10-Yr (TP-40)	10	99.254	12.1500	1,101.49
Point A3	100-Yr (TP-40)	100	160.767	12.1700	1,586.19
Point A4	WQv	1	4.071	12.2700	20.77
Point A4	2-Yr (TP-40)	2	24.905	12.1800	208.69
Point A4	10-Yr (TP-40)	10	47.276	12.1700	417.94
Point A4	100-Yr (TP-40)	100	78.399	12.1500	717.01

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
Point A5	WQv	1	3.555	12.2500	19.16
Point A5	2-Yr (TP-40)	2	21.230	12.1700	192.86
Point A5	10-Yr (TP-40)	10	40.034	12.1700	386.37
Point A5	100-Yr (TP-40)	100	66.130	12.1600	659.34
Point A6	WQv	1	0.344	12.0000	5.57
Point A6	2-Yr (TP-40)	2	2.083	11.9400	37.54
Point A6	10-Yr (TP-40)	10	3.904	11.9300	69.57
Point A6	100-Yr (TP-40)	100	6.390	11.9300	111.78
Point A7	WQv	1	2.539	12.0600	37.95
Point A7	2-Yr (TP-40)	2	14.580	12.0500	229.26
Point A7	10-Yr (TP-40)	10	27.333	12.0700	397.23
Point A7	100-Yr (TP-40)	100	44.871	12.0800	603.32
Point A8	WQv	1	0.449	12.0200	6.79
Point A8	2-Yr (TP-40)	2	3.070	11.9600	53.05
Point A8	10-Yr (TP-40)	10	5.907	11.9500	101.89
Point A8	100-Yr (TP-40)	100	9.826	11.9500	166.82
Point A9	WQv	1	1.733	12.0200	27.80
Point A9	2-Yr (TP-40)	2	8.028	12.0000	128.79
Point A9	10-Yr (TP-40)	10	14.240	11.9900	223.48
Point A9	100-Yr (TP-40)	100	22.563	11.9900	346.07
Point A10	WQv	1	0.836	11.9700	13.89
Point A10	2-Yr (TP-40)	2	2.890	11.9700	45.61
Point A10	10-Yr (TP-40)	10	4.733	11.9700	72.57
Point A10	100-Yr (TP-40)	100	7.128	11.9700	106.86
Point B1	WQv	1	9.245	12.1200	100.64
Point B1	2-Yr (TP-40)	2	49.667	12.1100	615.14
Point B1	10-Yr (TP-40)	10	91.457	12.1100	1,076.61
Point B1	100-Yr (TP-40)	100	148.401	12.1400	1,551.65
Point B2	WQv	1	3.985	12.0900	37.89
Point B2	2-Yr (TP-40)	2	20.032	12.0500	242.31
Point B2	10-Yr (TP-40)	10	36.522	12.0400	446.43
Point B2	100-Yr (TP-40)	100	58.980	12.0300	715.56
Point B3	WQv	1	3.260	12.0200	30.59
Point B3	2-Yr (TP-40)	2	13.975	11.9900	153.04
Point B3	10-Yr (TP-40)	10	24.377	11.9800	266.04
Point B3	100-Yr (TP-40)	100	38.255	11.9700	411.65
Point B4	WQv	1	2.221	12.0100	14.66
Point B4	2-Yr (TP-40)	2	7.673	11.9400	48.10
Point B4	10-Yr (TP-40)	10	12.565	11.9300	71.04
Point B4	100-Yr (TP-40)	100	18.924	11.9300	98.80
Point C1	WQv	1	4.725	12.0900	59.47
Point C1	2-Yr (TP-40)	2	25.466	12.0900	350.42
Point C1	10-Yr (TP-40)	10	46.692	12.1000	604.01
Point C1	100-Yr (TP-40)	100	75.478	12.1000	890.10
Point C2	WQv	1	2.528	12.0400	30.94
Point C2	2-Yr (TP-40)	2	16.244	12.0400	232.89
Point C2	10-Yr (TP-40)	10	30.851	12.0700	417.32
Point C2	100-Yr (TP-40)	100	50.912	12.0800	614.91
Point C3	WQv	1	1.338	12.0000	21.39
Point C3	2-Yr (TP-40)	2	8.110	11.9500	142.61
Point C3	10-Yr (TP-40)	10	15.199	11.9400	264.83
Point C3	100-Yr (TP-40)	100	24.875	11.9400	425.51
Inlet-(U.V. Lake 2)	WQv	1	15.322	12.2900	124.27
Inlet-(U.V. Lake 2)	2-Yr (TP-40)	2	89.909	12.2500	892.12
Inlet-(U.V. Lake 2)	10-Yr (TP-40)	10	169.234	12.2300	1,645.08

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
Inlet-(U.V. Lake 2)	100-Yr (TP-40)	100	278.693	12.2100	2,528.80

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
RCB 25+65 (IN)	WQv	1	2.539	12.0600	38.00	(N/A)	(N/A)
RCB 25+65 (OUT)	WQv	1	2.539	12.0600	37.95	946.33	0.015
RCB 25+65 (IN)	2-Yr (TP-40)	2	14.580	12.0200	236.01	(N/A)	(N/A)
RCB 25+65 (OUT)	2-Yr (TP-40)	2	14.580	12.0500	229.26	948.71	0.319
RCB 25+65 (IN)	10-Yr (TP-40)	10	27.333	12.0100	437.94	(N/A)	(N/A)
RCB 25+65 (OUT)	10-Yr (TP-40)	10	27.333	12.0700	397.23	950.22	1.251
RCB 25+65 (IN)	100-Yr (TP-40)	100	44.871	12.0000	707.16	(N/A)	(N/A)
RCB 25+65 (OUT)	100-Yr (TP-40)	100	44.871	12.0800	603.32	951.80	3.100
RCB 45+15 (IN)	WQv	1	9.245	12.1100	101.70	(N/A)	(N/A)
RCB 45+15 (OUT)	WQv	1	9.245	12.1200	100.64	917.82	0.101
RCB 45+15 (IN)	2-Yr (TP-40)	2	49.667	12.0700	634.00	(N/A)	(N/A)
RCB 45+15 (OUT)	2-Yr (TP-40)	2	49.667	12.1100	615.14	921.57	1.519
RCB 45+15 (IN)	10-Yr (TP-40)	10	91.457	12.0700	1,121.63	(N/A)	(N/A)
RCB 45+15 (OUT)	10-Yr (TP-40)	10	91.457	12.1100	1,076.61	923.99	3.164
RCB 45+15 (IN)	100-Yr (TP-40)	100	148.401	12.0600	1,726.54	(N/A)	(N/A)
RCB 45+15 (OUT)	100-Yr (TP-40)	100	148.401	12.1400	1,551.65	926.77	6.626
Inlet Storage C2 (IN)	WQv	1	1.338	12.0200	21.38	(N/A)	(N/A)
Inlet Storage C2 (OUT)	WQv	1	1.338	12.0200	21.36	956.90	0.001
Inlet Storage C2 (IN)	2-Yr (TP-40)	2	8.110	11.9600	142.28	(N/A)	(N/A)
Inlet Storage C2 (OUT)	2-Yr (TP-40)	2	8.110	12.0000	137.26	957.95	0.115
Inlet Storage C2 (IN)	10-Yr (TP-40)	10	15.199	11.9600	264.20	(N/A)	(N/A)
Inlet Storage C2 (OUT)	10-Yr (TP-40)	10	15.199	12.0500	219.81	959.67	0.804
Inlet Storage C2 (IN)	100-Yr (TP-40)	100	24.875	11.9600	423.95	(N/A)	(N/A)
Inlet Storage C2 (OUT)	100-Yr (TP-40)	100	24.875	12.0700	285.13	961.59	2.539

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Sub-B4 Basin (IN)	WQv	1	1.713	11.9500	30.27	(N/A)	(N/A)
Sub-B4 Basin (OUT)	WQv	1	1.713	12.1500	8.05	992.37	0.642
Sub-B4 Basin (IN)	2-Yr (TP-40)	2	5.919	11.9400	99.43	(N/A)	(N/A)
Sub-B4 Basin (OUT)	2-Yr (TP-40)	2	5.919	12.1600	22.46	993.25	2.284
Sub-B4 Basin (IN)	10-Yr (TP-40)	10	9.694	11.9400	158.21	(N/A)	(N/A)
Sub-B4 Basin (OUT)	10-Yr (TP-40)	10	9.694	12.1900	28.68	994.04	3.850
Sub-B4 Basin (IN)	100-Yr (TP-40)	100	14.599	11.9400	232.94	(N/A)	(N/A)
Sub-B4 Basin (OUT)	100-Yr (TP-40)	100	14.599	12.2400	34.97	995.03	5.948
Pt. A3 - Drive-Culverts (IN)	WQv	1	10.141	12.1500	104.15	(N/A)	(N/A)
Pt. A3 - Drive-Culverts (OUT)	WQv	1	10.141	12.1800	102.92	904.63	0.136
Pt. A3 - Drive-Culverts (IN)	2-Yr (TP-40)	2	54.042	12.1400	631.39	(N/A)	(N/A)
Pt. A3 - Drive-Culverts (OUT)	2-Yr (TP-40)	2	54.042	12.1600	627.24	908.50	1.745
Pt. A3 - Drive-Culverts (IN)	10-Yr (TP-40)	10	99.254	12.1400	1,104.09	(N/A)	(N/A)
Pt. A3 - Drive-Culverts (OUT)	10-Yr (TP-40)	10	99.254	12.1500	1,101.49	909.06	2.334
Pt. A3 - Drive-Culverts (IN)	100-Yr (TP-40)	100	160.767	12.1600	1,587.99	(N/A)	(N/A)
Pt. A3 - Drive-Culverts (OUT)	100-Yr (TP-40)	100	160.767	12.1700	1,586.19	909.49	2.839
Pt. A5 - Former Pond (IN)	WQv	1	3.555	12.0900	41.31	(N/A)	(N/A)
Pt. A5 - Former Pond (OUT)	WQv	1	3.555	12.2500	19.16	930.14	0.731
Pt. A5 - Former Pond (IN)	2-Yr (TP-40)	2	21.282	12.0600	254.88	(N/A)	(N/A)
Pt. A5 - Former Pond (OUT)	2-Yr (TP-40)	2	21.230	12.1700	192.86	932.18	3.398

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Pt. A5 - Former Pond (IN)	10-Yr (TP-40)	10	40.103	12.0700	438.40	(N/A)	(N/A)
Pt. A5 - Former Pond (OUT)	10-Yr (TP-40)	10	40.034	12.1700	386.37	933.10	5.149
Pt. A5 - Former Pond (IN)	100-Yr (TP-40)	100	66.203	12.0800	700.34	(N/A)	(N/A)
Pt. A5 - Former Pond (OUT)	100-Yr (TP-40)	100	66.130	12.1600	659.34	933.86	6.772
PR-Basin (Summit-Village) (IN)	WQv	1	0.635	12.0300	9.23	(N/A)	(N/A)
PR-Basin (Summit-Village) (OUT)	WQv	1	0.635	17.5300	0.36	934.64	0.337
PR-Basin (Summit-Village) (IN)	2-Yr (TP-40)	2	4.356	11.9700	73.27	(N/A)	(N/A)
PR-Basin (Summit-Village) (OUT)	2-Yr (TP-40)	2	4.254	15.4200	2.32	938.10	2.767
PR-Basin (Summit-Village) (IN)	10-Yr (TP-40)	10	8.399	11.9600	140.58	(N/A)	(N/A)
PR-Basin (Summit-Village) (OUT)	10-Yr (TP-40)	10	8.121	13.3600	7.63	940.57	5.200
PR-Basin (Summit-Village) (IN)	100-Yr (TP-40)	100	13.994	11.9600	230.66	(N/A)	(N/A)
PR-Basin (Summit-Village) (OUT)	100-Yr (TP-40)	100	13.662	12.2400	45.69	942.25	7.100

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1000 hours
Area (User Defined)	1,048,053.600 ft²

Computational Time Increment	0.0133 hours
Time to Peak (Computed)	11.9333 hours
Flow (Peak, Computed)	214.57 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9300 hours
Flow (Peak Interpolated Output)	214.52 ft³/s

Drainage Area	
SCS CN (Composite)	87.000
Area (User Defined)	1,048,053.600 ft²
Maximum Retention (Pervious)	1.49 in
Maximum Retention (Pervious, 20 percent)	0.30 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	6.17 in
Runoff Volume (Pervious)	12.366 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	12.366 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1000 hours
Computational Time Increment	0.0133 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	272.61 ft³/s
Unit peak time, Tp	0.0667 hours
Unit receding limb, Tr	0.2667 hours
Total unit time, Tb	0.3333 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1000 hours
Area (User Defined)	489,178.800 ft²

Computational Time Increment	0.0133 hours
Time to Peak (Computed)	11.9333 hours
Flow (Peak, Computed)	98.84 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9300 hours
Flow (Peak Interpolated Output)	98.81 ft³/s

Drainage Area	
SCS CN (Composite)	86.000
Area (User Defined)	489,178.800 ft²
Maximum Retention (Pervious)	1.63 in
Maximum Retention (Pervious, 20 percent)	0.33 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	6.05 in
Runoff Volume (Pervious)	5.662 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	5.662 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1000 hours
Computational Time Increment	0.0133 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	127.24 ft³/s
Unit peak time, Tp	0.0667 hours
Unit receding limb, Tr	0.2667 hours
Total unit time, Tb	0.3333 hours

Storm Event	100-Yr (TP-40)
Return Event	100 years
Duration	72.0000 hours
Depth	7.71 in
Time of Concentration (Composite)	0.1195 hours
Area (User Defined)	717,868.800 ft²

Computational Time Increment	0.0159 hours
Time to Peak (Computed)	11.9341 hours
Flow (Peak, Computed)	131.75 ft³/s
Output Increment	0.0100 hours
Time to Flow (Peak Interpolated Output)	11.9400 hours
Flow (Peak Interpolated Output)	131.71 ft³/s

Drainage Area	
SCS CN (Composite)	82.000
Area (User Defined)	717,868.800 ft²
Maximum Retention (Pervious)	2.20 in
Maximum Retention (Pervious, 20 percent)	0.44 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.58 in
Runoff Volume (Pervious)	7.670 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	7.670 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.1195 hours
Computational Time Increment	0.0159 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	156.26 ft³/s
Unit peak time, Tp	0.0797 hours
Unit receding limb, Tr	0.3187 hours
Total unit time, Tb	0.3983 hours

Elevation (ft)	Planimeter (ft²)	Area (ft²)	A1+A2+sqr (A1*A2) (ft²)	Volume (ac-ft)	Volume (Total) (ac-ft)
933.75	0.0	1,541.000	0.000	0.000	0.000
934.00	0.0	18,901.000	25,838.892	0.049	0.049
935.00	0.0	20,680.000	59,351.500	0.454	0.504
936.00	0.0	29,182.000	74,427.906	0.570	1.073
937.00	0.0	36,039.000	97,650.772	0.747	1.820
938.00	0.0	38,936.000	112,434.505	0.860	2.681
939.00	0.0	41,890.000	121,212.001	0.928	3.608
940.00	0.0	44,900.000	130,158.894	0.996	4.604
941.00	0.0	47,967.000	139,275.171	1.066	5.670
942.00	0.0	51,091.000	148,562.363	1.137	6.807
943.00	0.0	54,271.000	158,019.000	1.209	8.016
944.00	0.0	57,508.000	167,645.060	1.283	9.299
945.00	0.0	60,801.000	177,440.581	1.358	10.657
946.00	0.0	64,151.000	187,405.542	1.434	12.091
947.00	0.0	67,557.000	197,539.976	1.512	13.603
948.00	0.0	72,529.000	210,084.869	1.608	15.210
949.00	0.0	75,756.000	222,409.941	1.702	16.912
950.00	0.0	79,010.000	232,131.894	1.776	18.688

Requested Pond Water Surface Elevations	
Minimum (Headwater)	933.75 ft
Increment (Headwater)	0.10 ft
Maximum (Headwater)	950.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Primary Discharge OR (4" Dia.)	Forward	Discharge Culvert (24" HDPE)	933.75	950.00
Orifice-Circular	Secondary Orifice (8" Dia.)	Forward	Discharge Culvert (24" HDPE)	937.00	950.00
Orifice-Area	Field Inlet (4' x 4' Riser)	Forward	Discharge Culvert (24" HDPE)	940.50	950.00
Culvert-Circular	Discharge Culvert (24" HDPE)	Forward	TW	931.33	950.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: Discharge Culvert (24" HDPE) Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	24.0 in
Length	110.18 ft
Length (Computed Barrel)	110.19 ft
Slope (Computed)	0.012 ft/ft

Outlet Control Data	
Manning's n	0.013
Ke	0.500
Kb	0.012
Kr	0.500
Convergence Tolerance	0.00 ft

Inlet Control Data	
Equation Form	Form 1
K	0.0098
M	2.0000
C	0.0398
Y	0.6700
T1 ratio (HW/D)	1.154
T2 ratio (HW/D)	1.301
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	933.64 ft	T1 Flow	15.55 ft³/s
T2 Elevation	933.93 ft	T2 Flow	17.77 ft³/s

Structure ID: Primary Discharge OR (4" Dia.) Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	933.75 ft
Orifice Diameter	4.0 in
Orifice Coefficient	0.600

Structure ID: Field Inlet (4' x 4' Riser) Structure Type: Orifice-Area	
Number of Openings	3
Elevation	940.50 ft
Orifice Area	3.3 ft²
Top Elevation	941.33 ft
Datum Elevation	940.50 ft
Orifice Coefficient	0.600

Structure ID: Secondary Orifice (8" Dia.) Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	937.00 ft
Orifice Diameter	8.0 in
Orifice Coefficient	0.600

Structure ID: TW Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft³/s
Flow Tolerance (Maximum)	10.000 ft³/s

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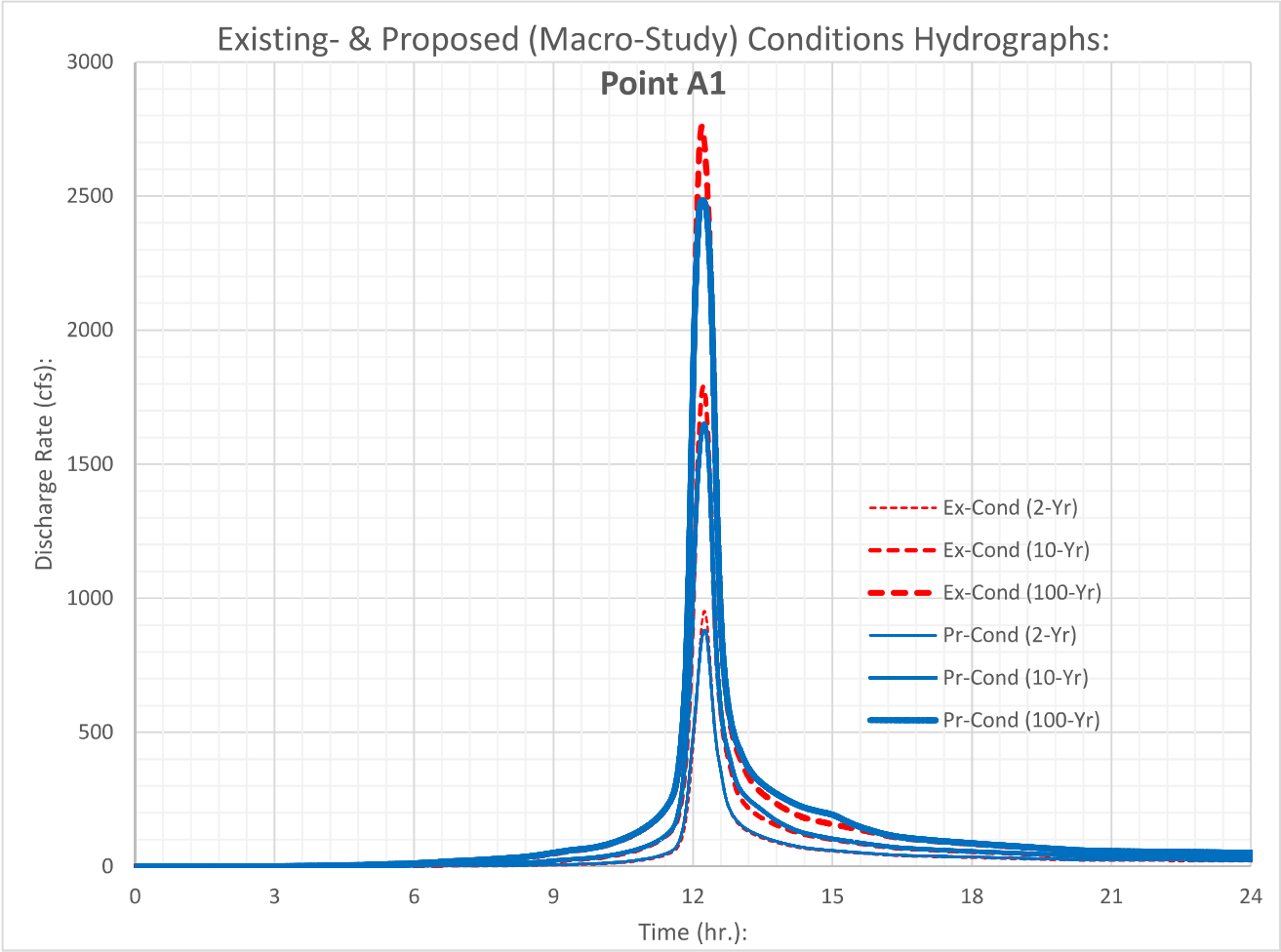
8. EXHIBITS AND HYDROGRAPHS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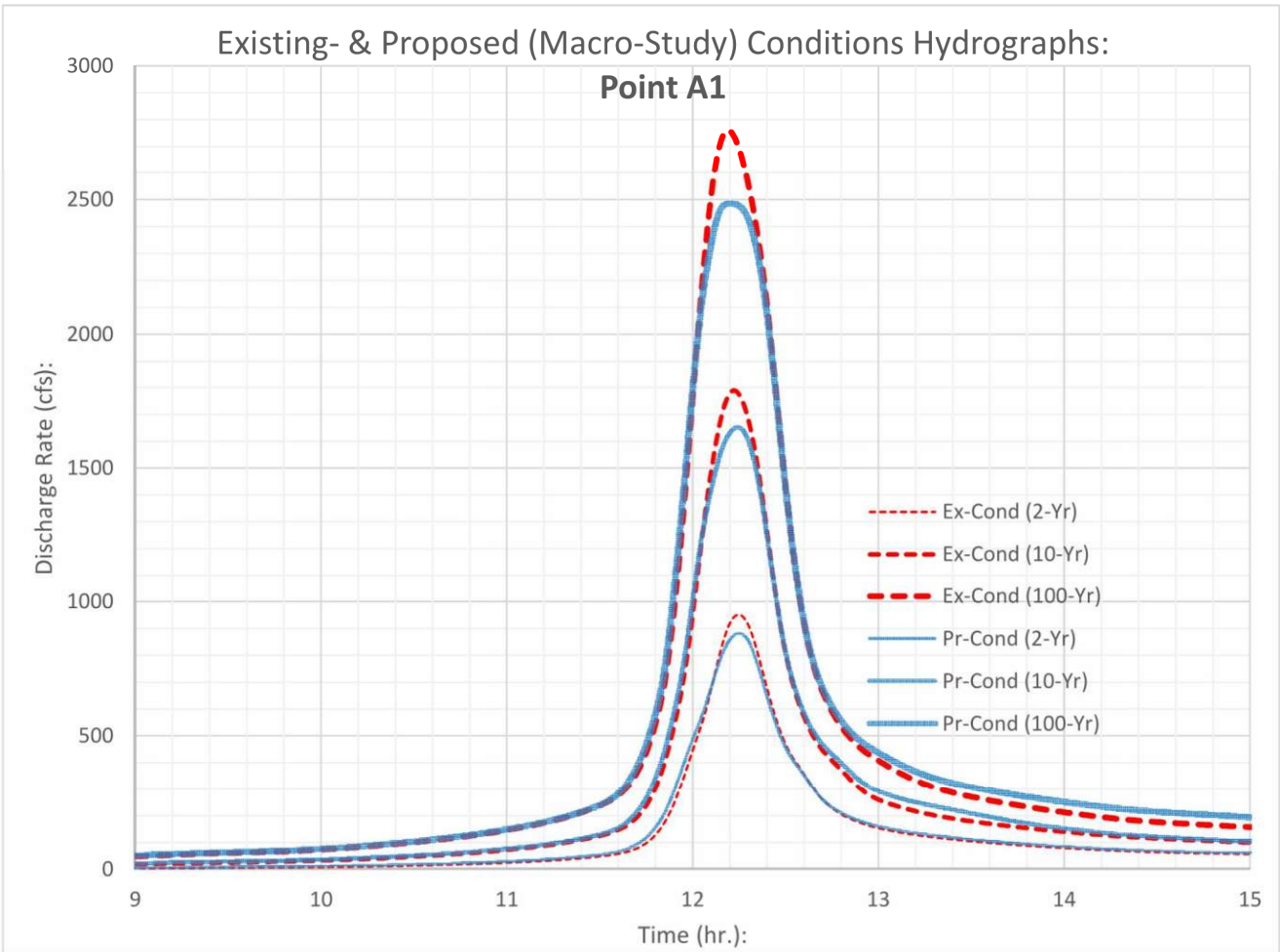
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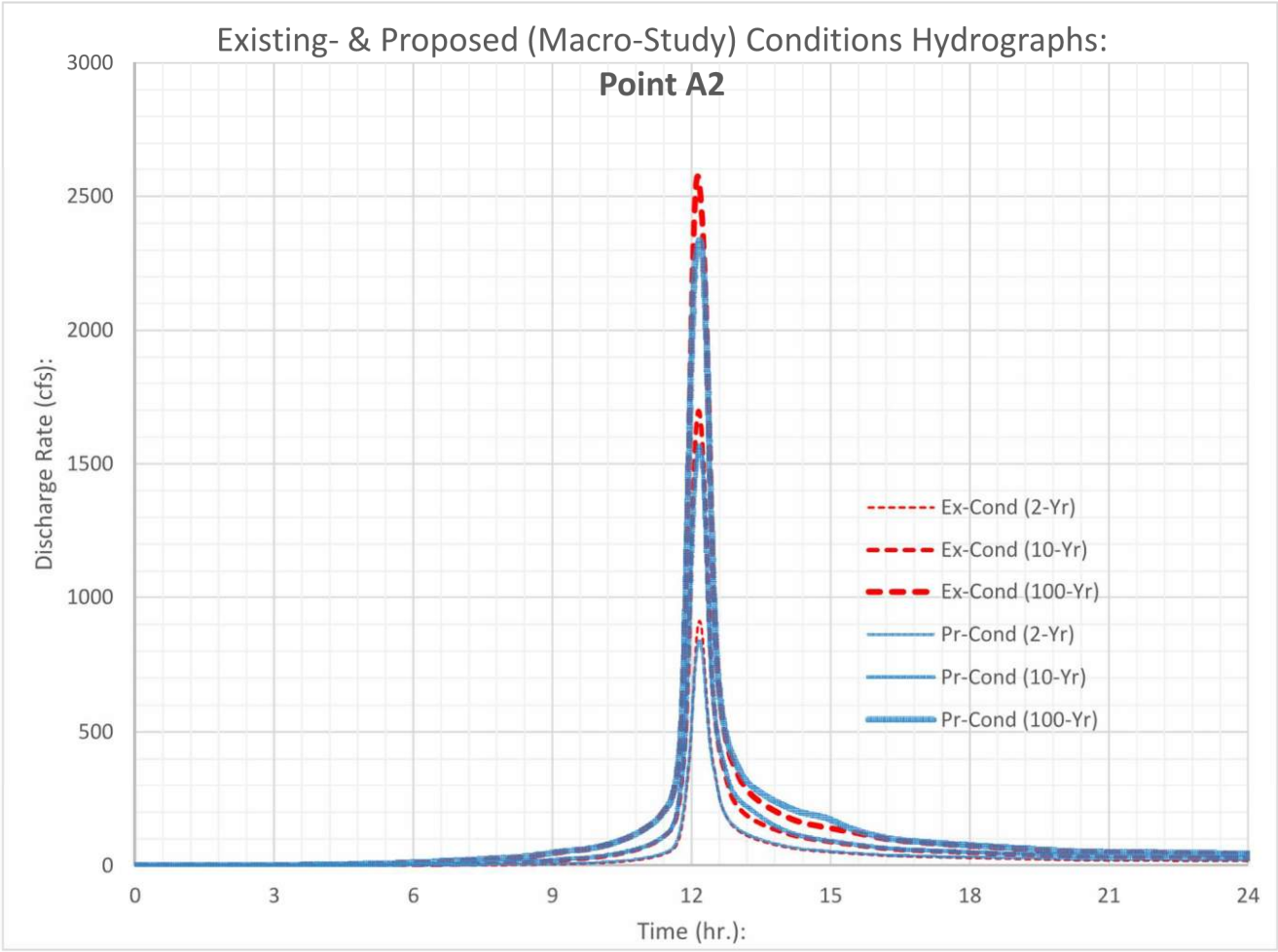
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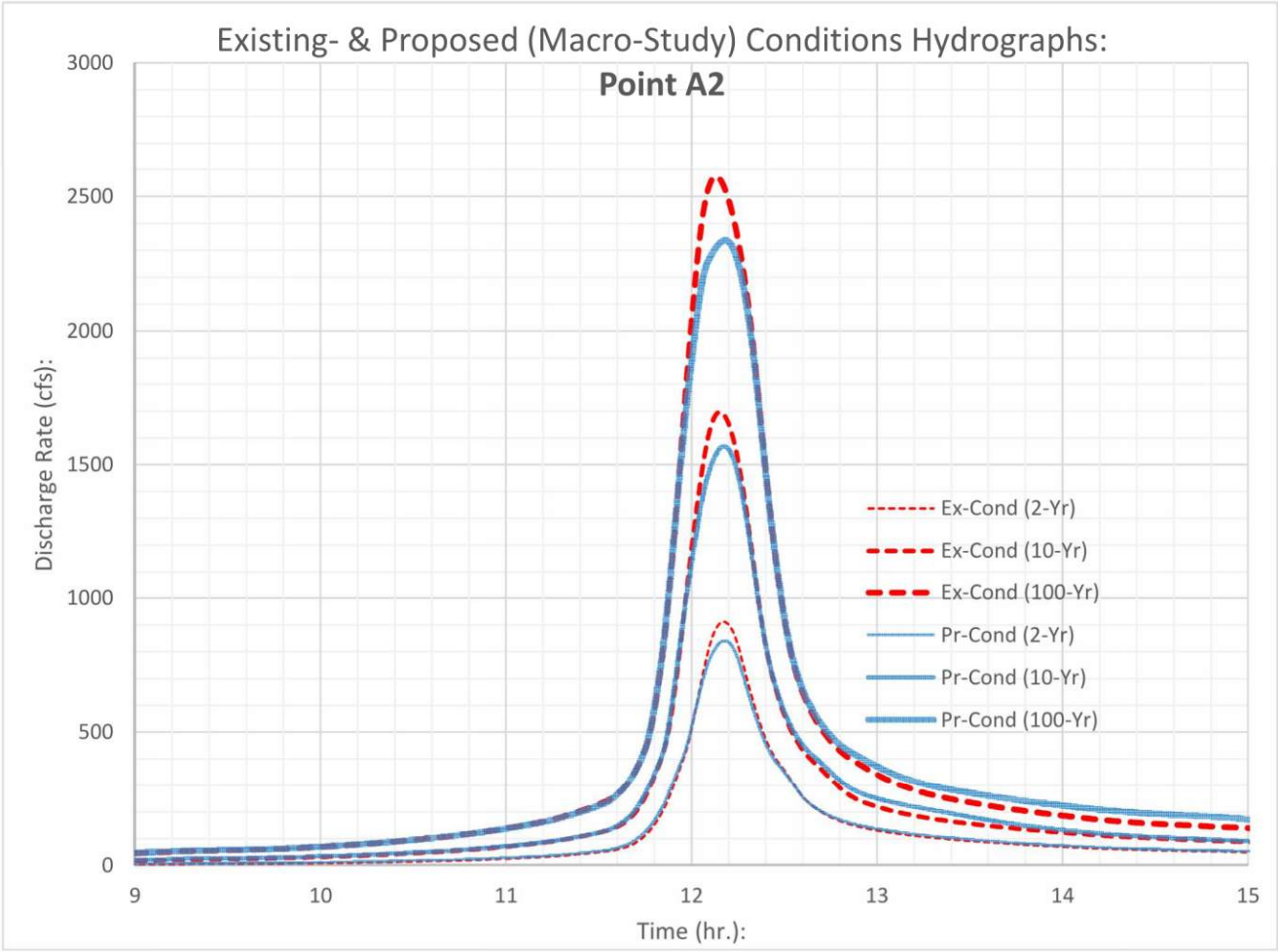
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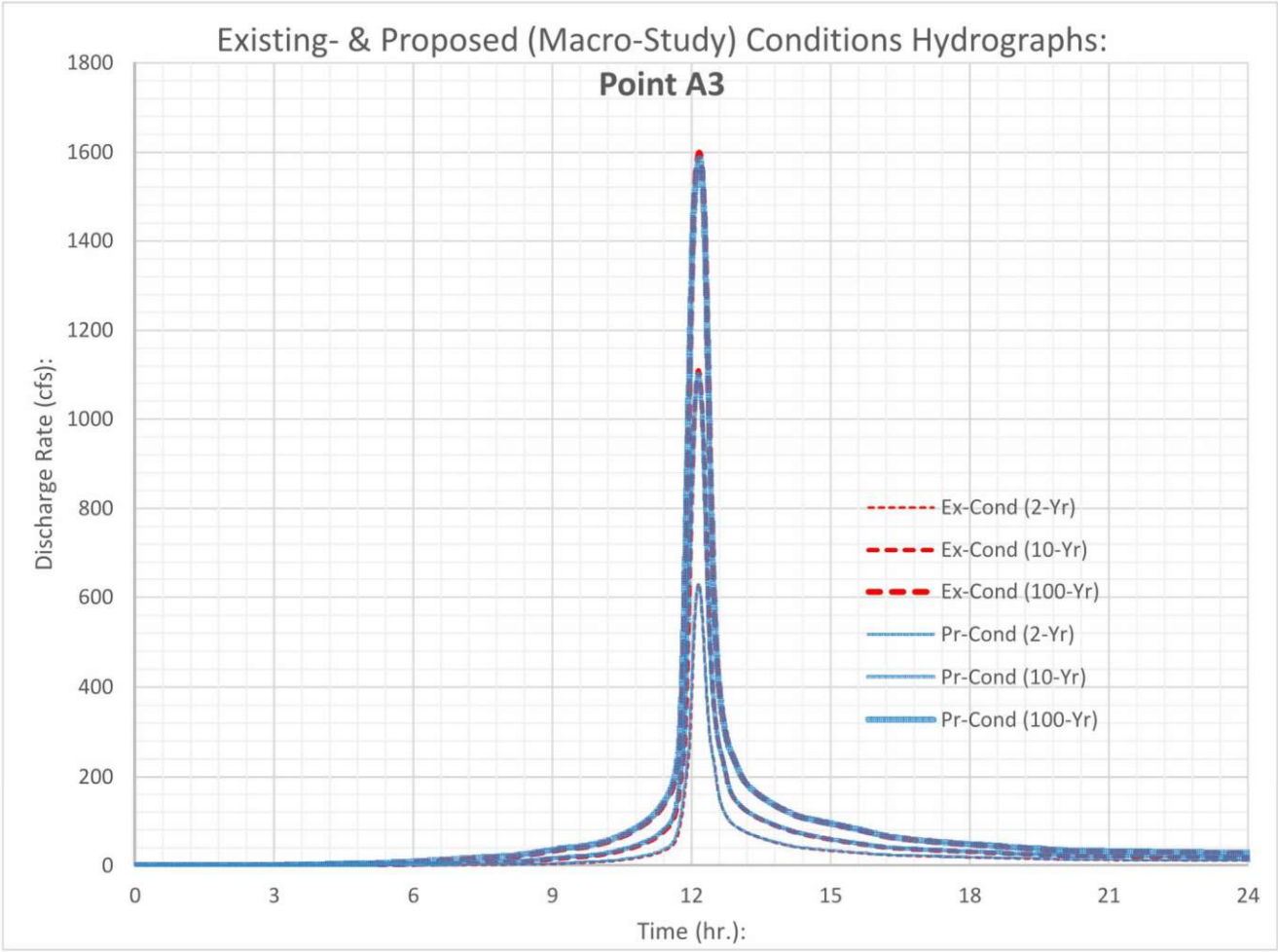
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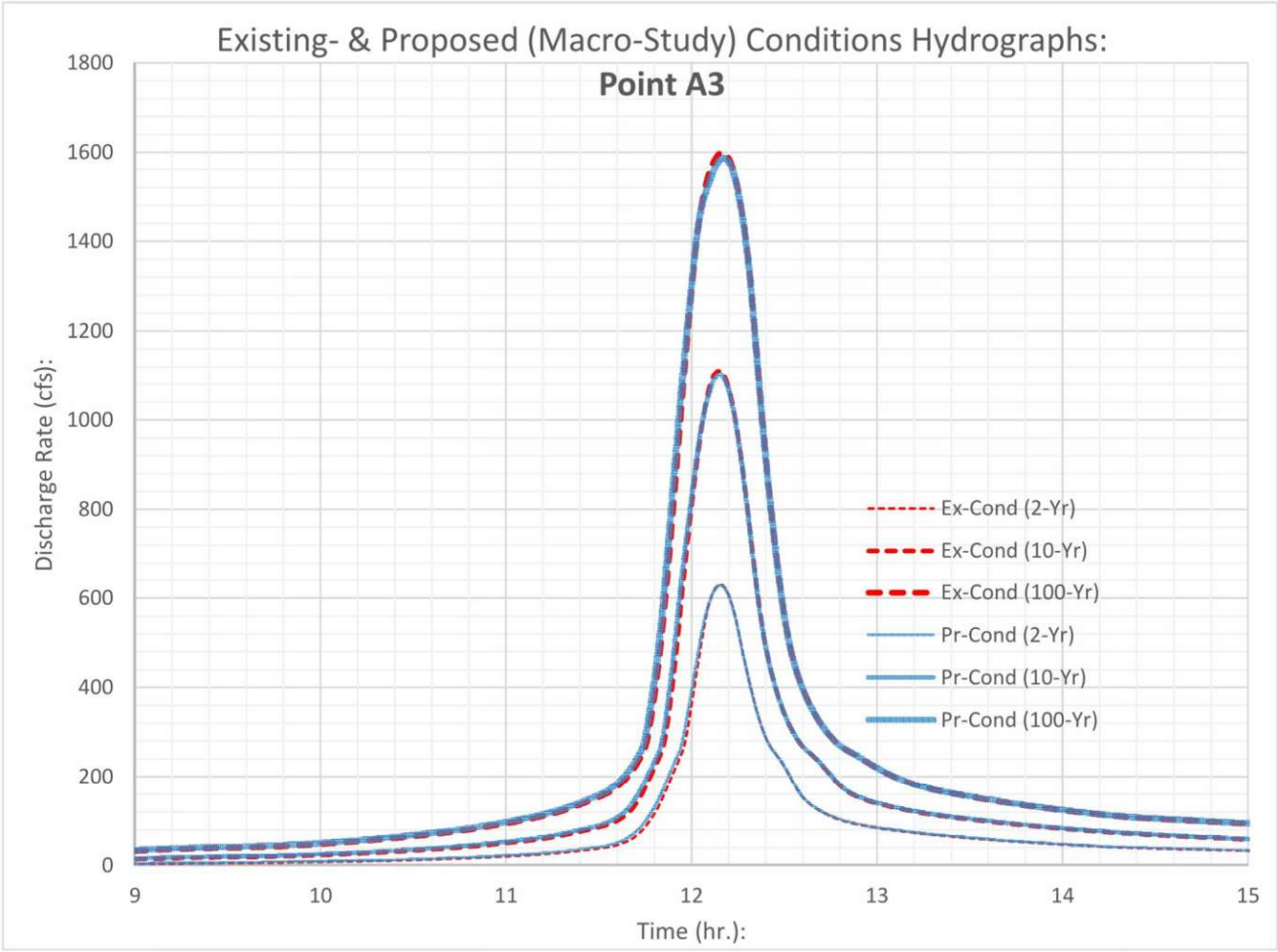
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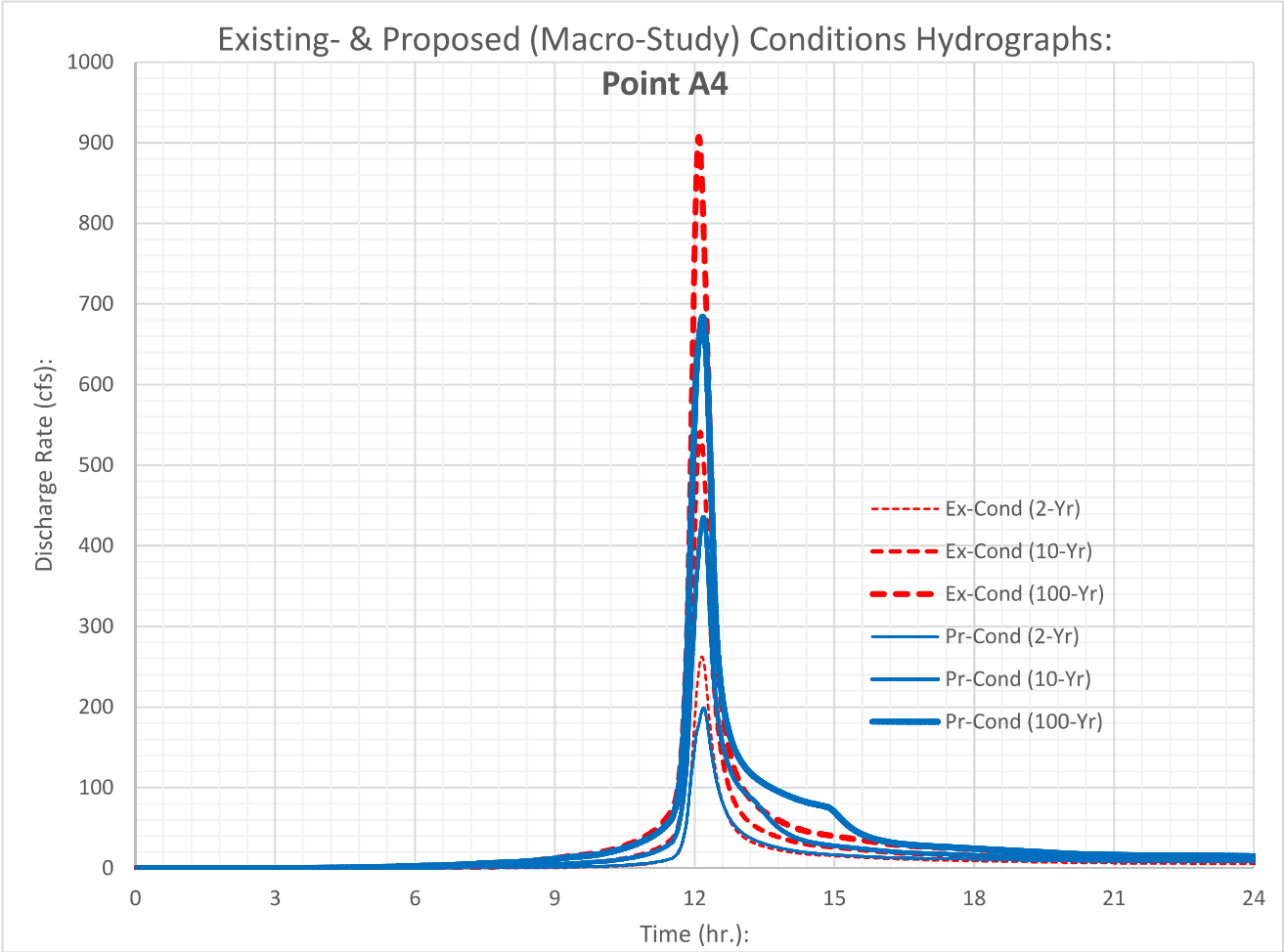
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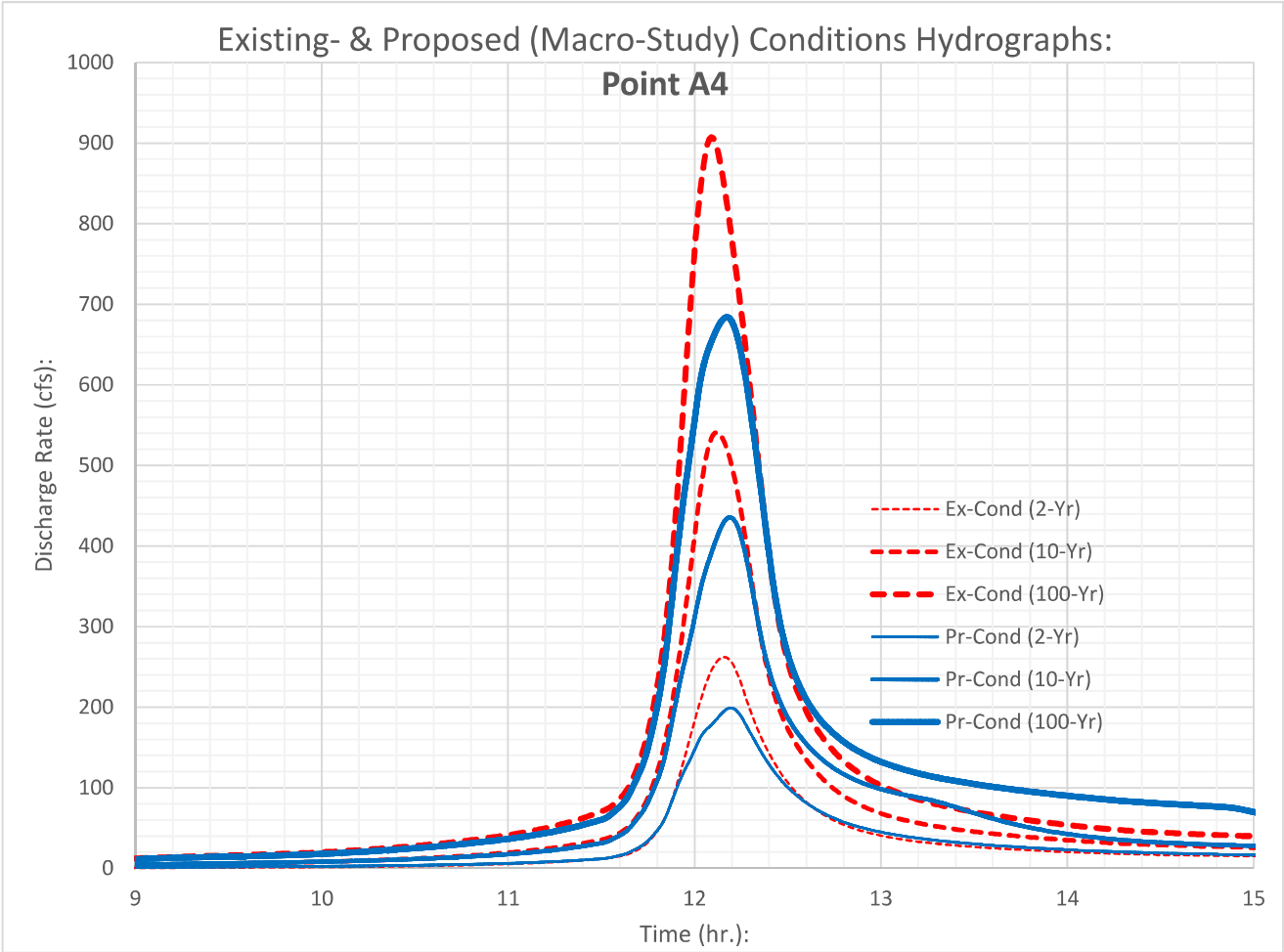
Pr-Cond (100-Yr)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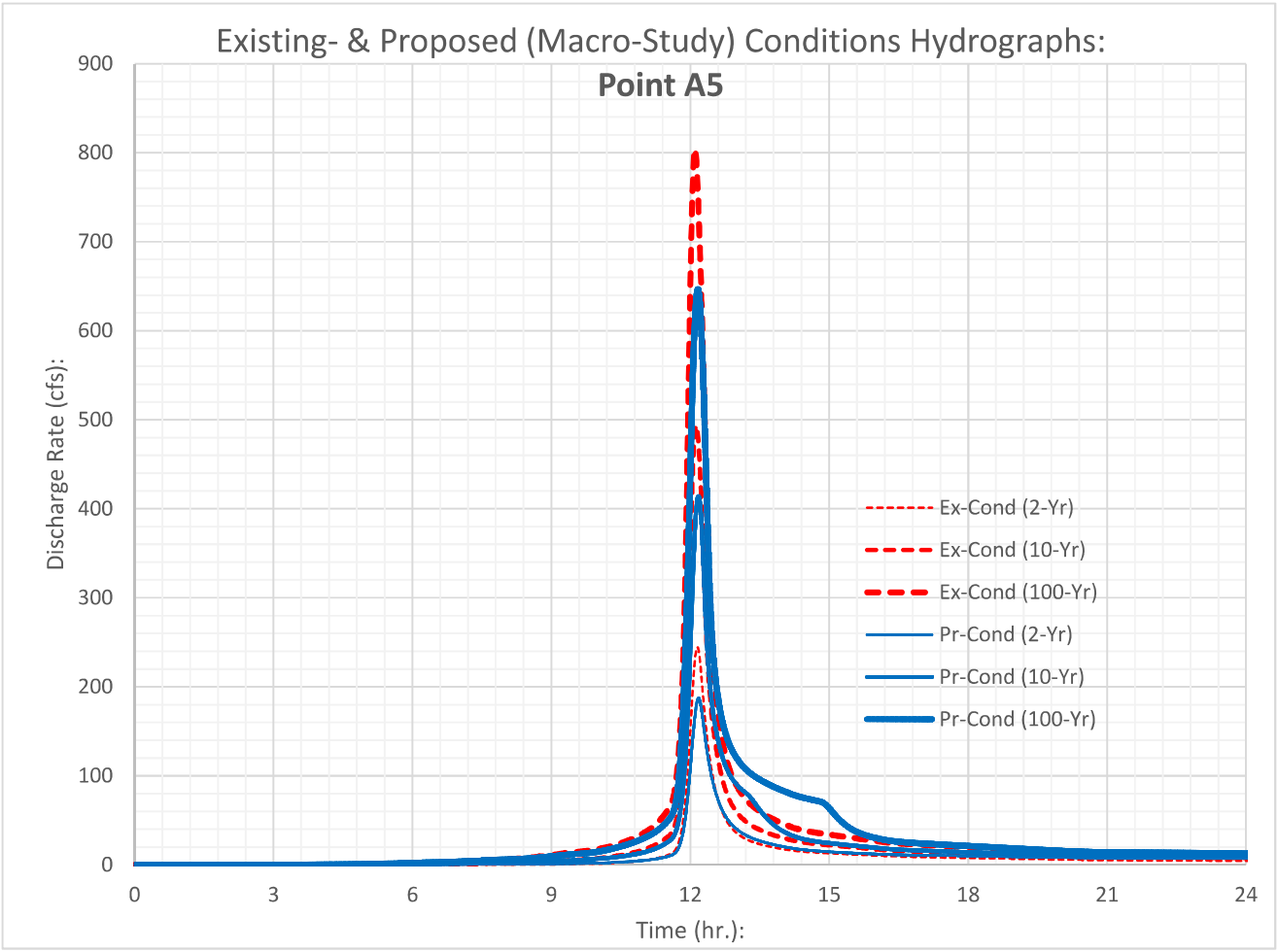
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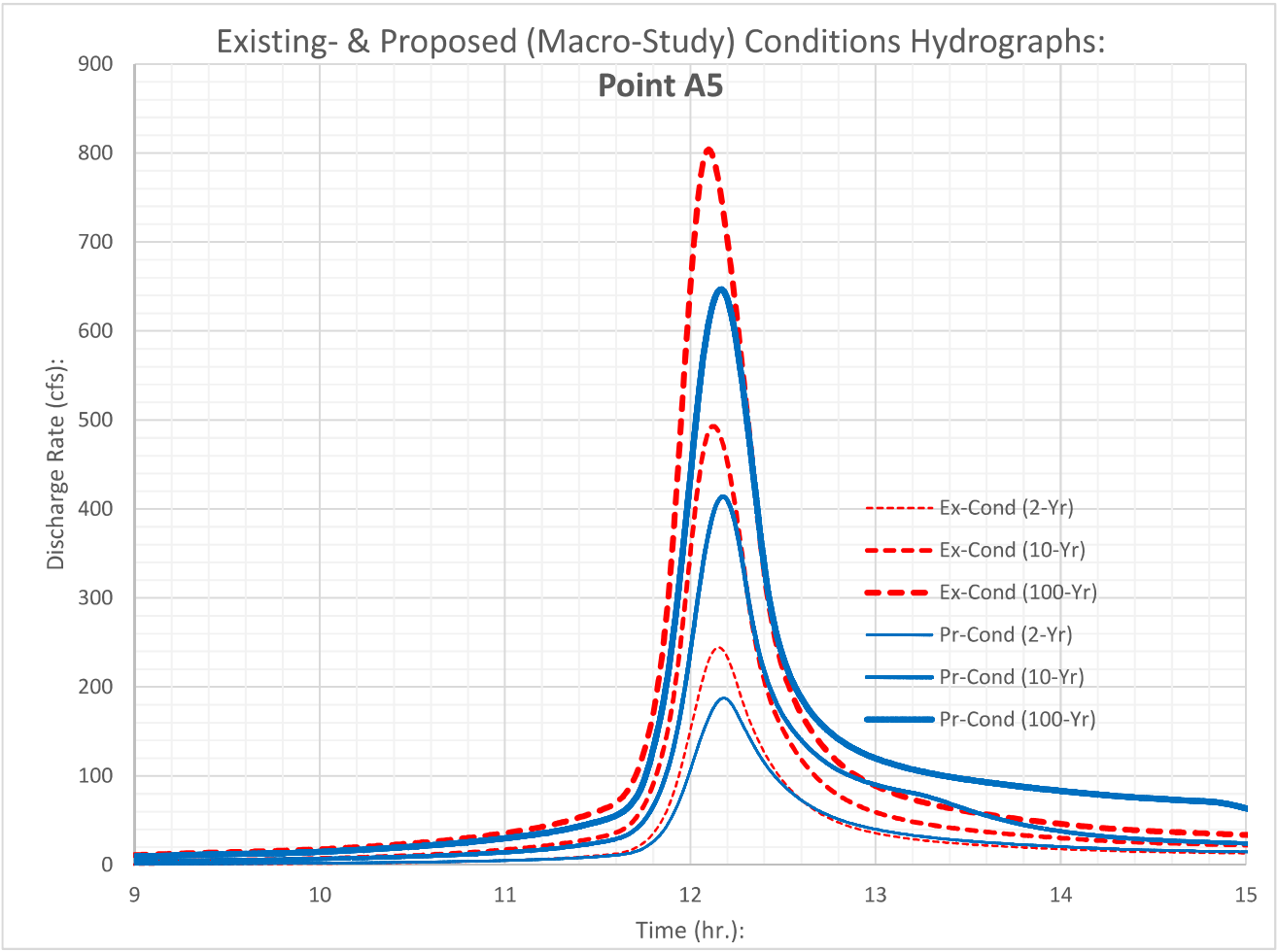
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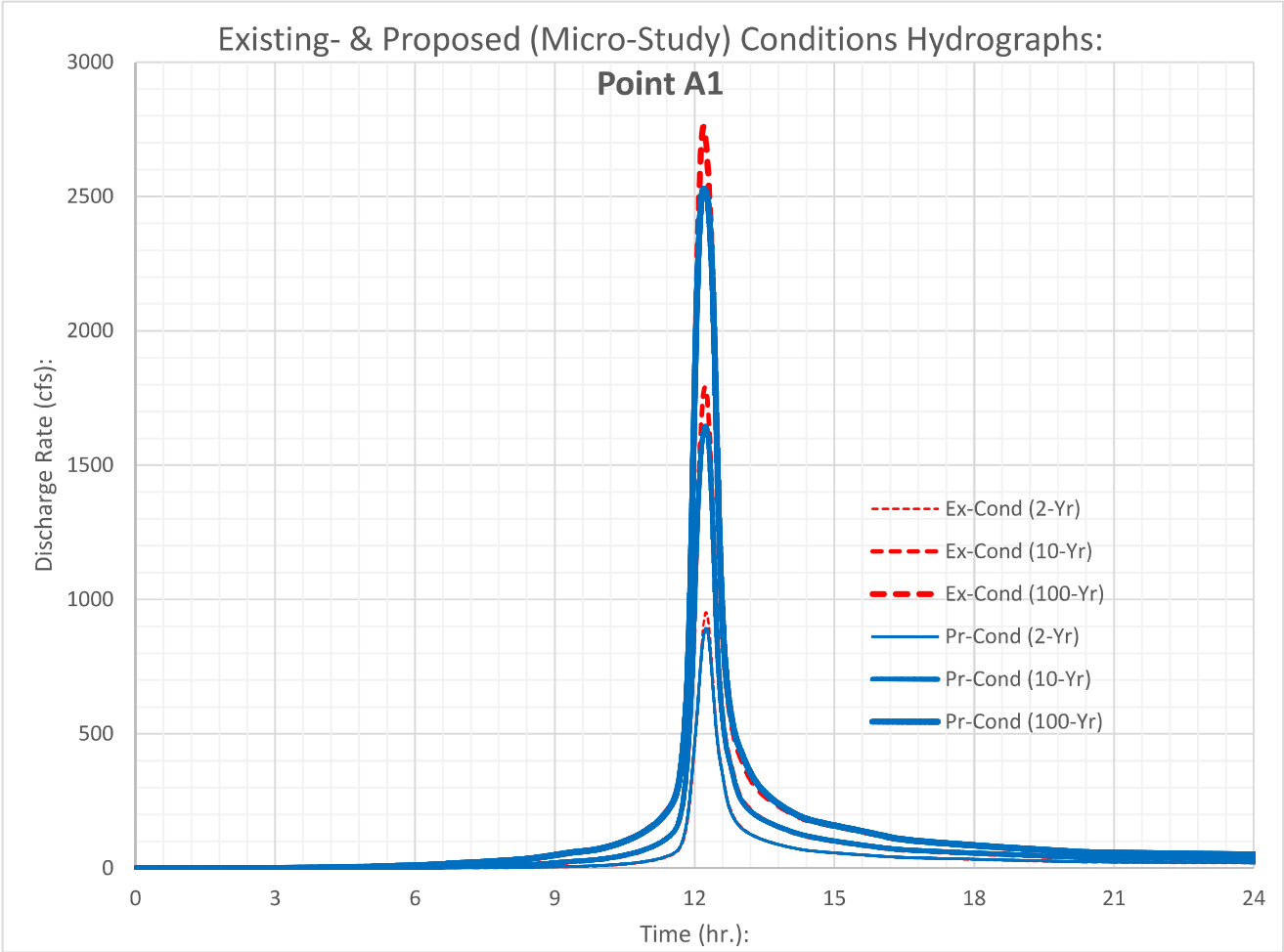
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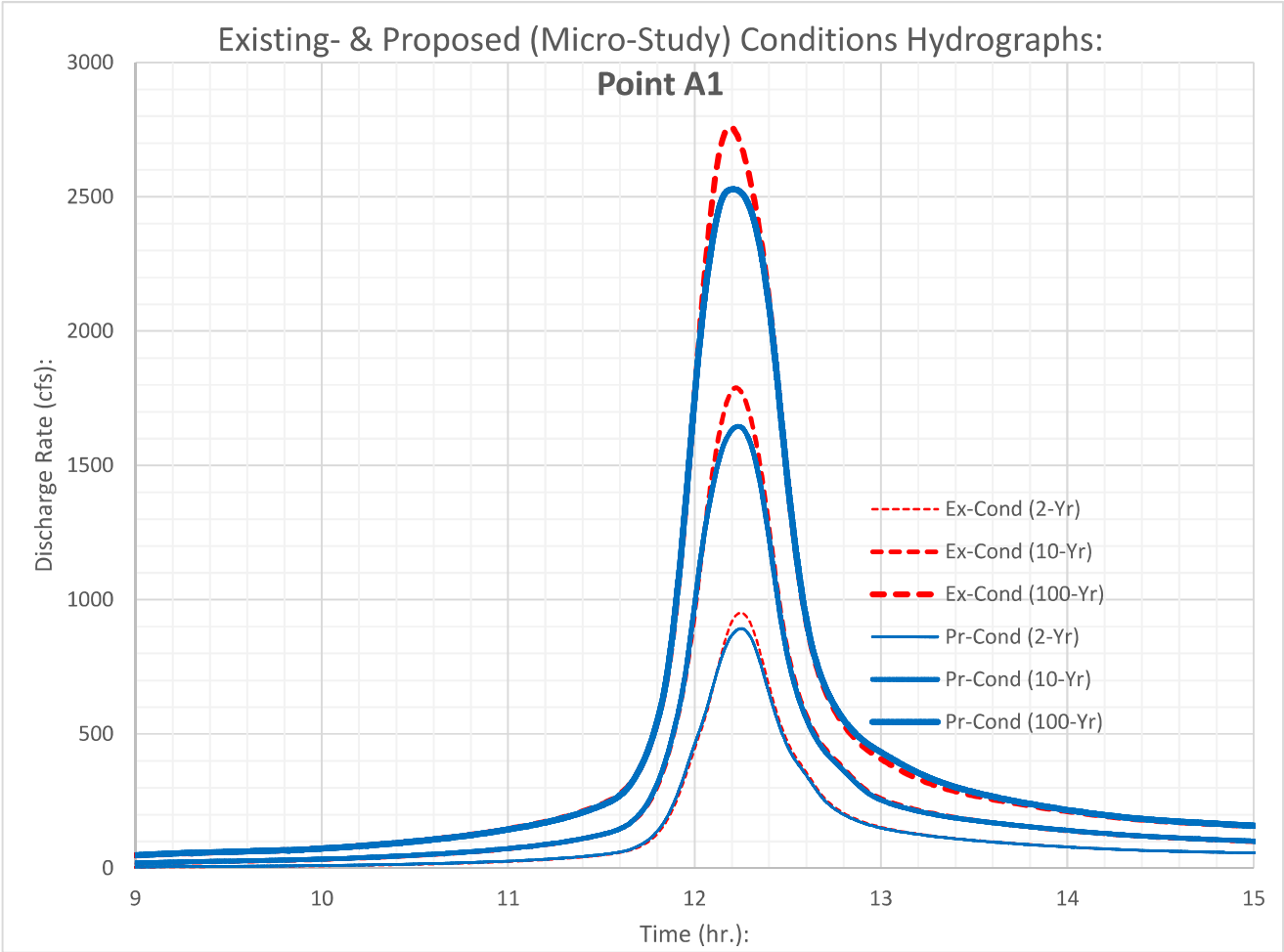
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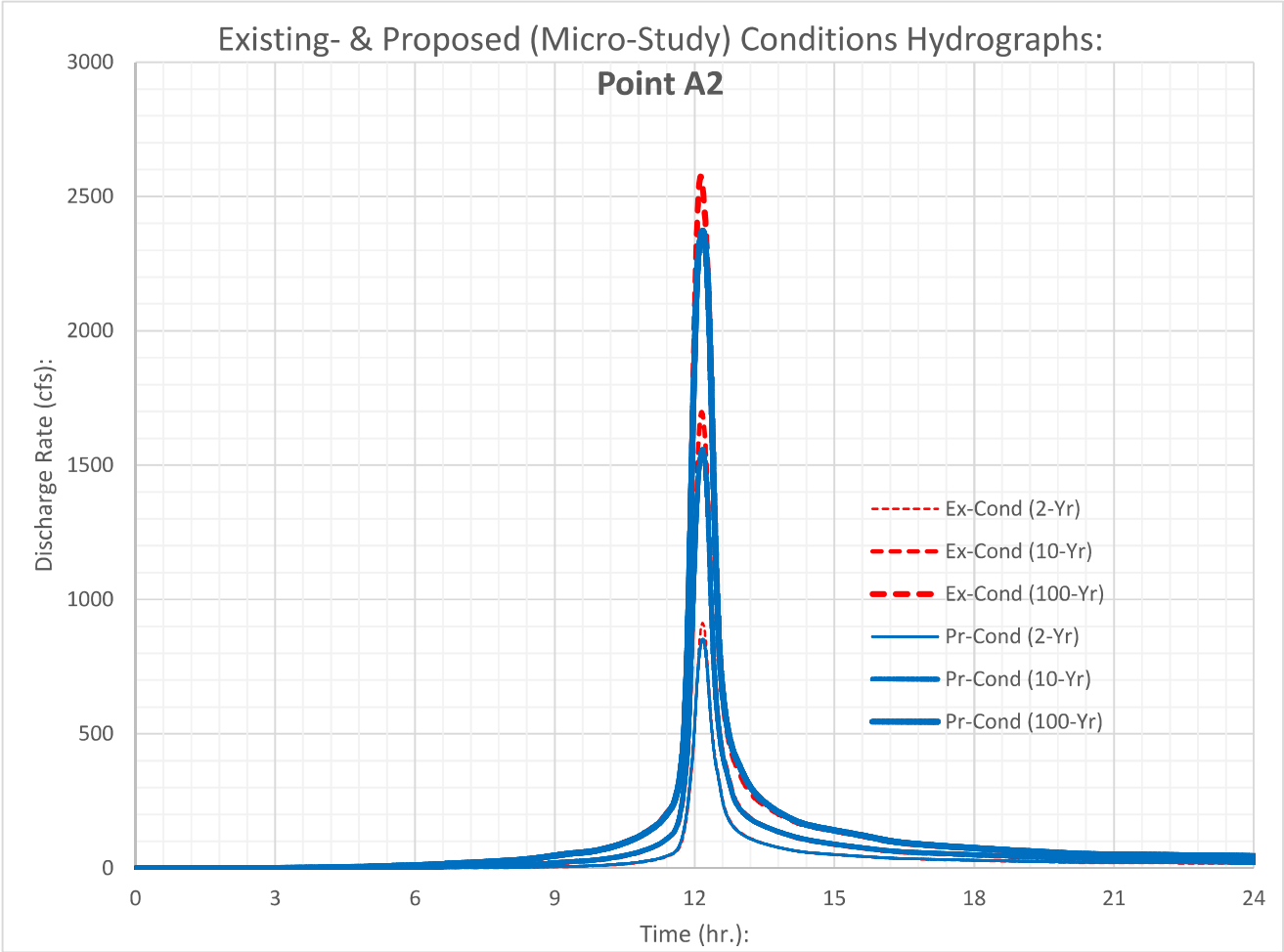
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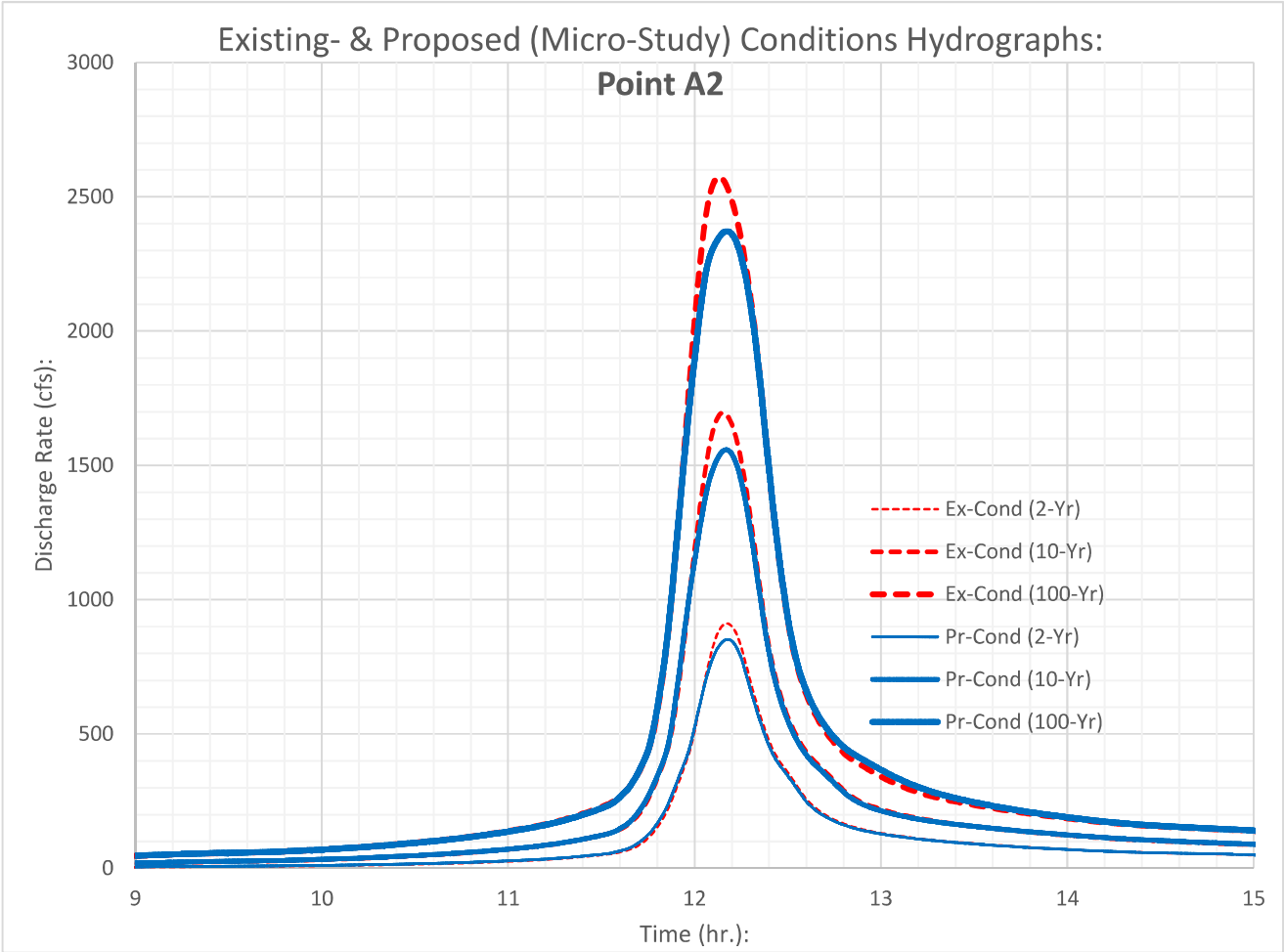
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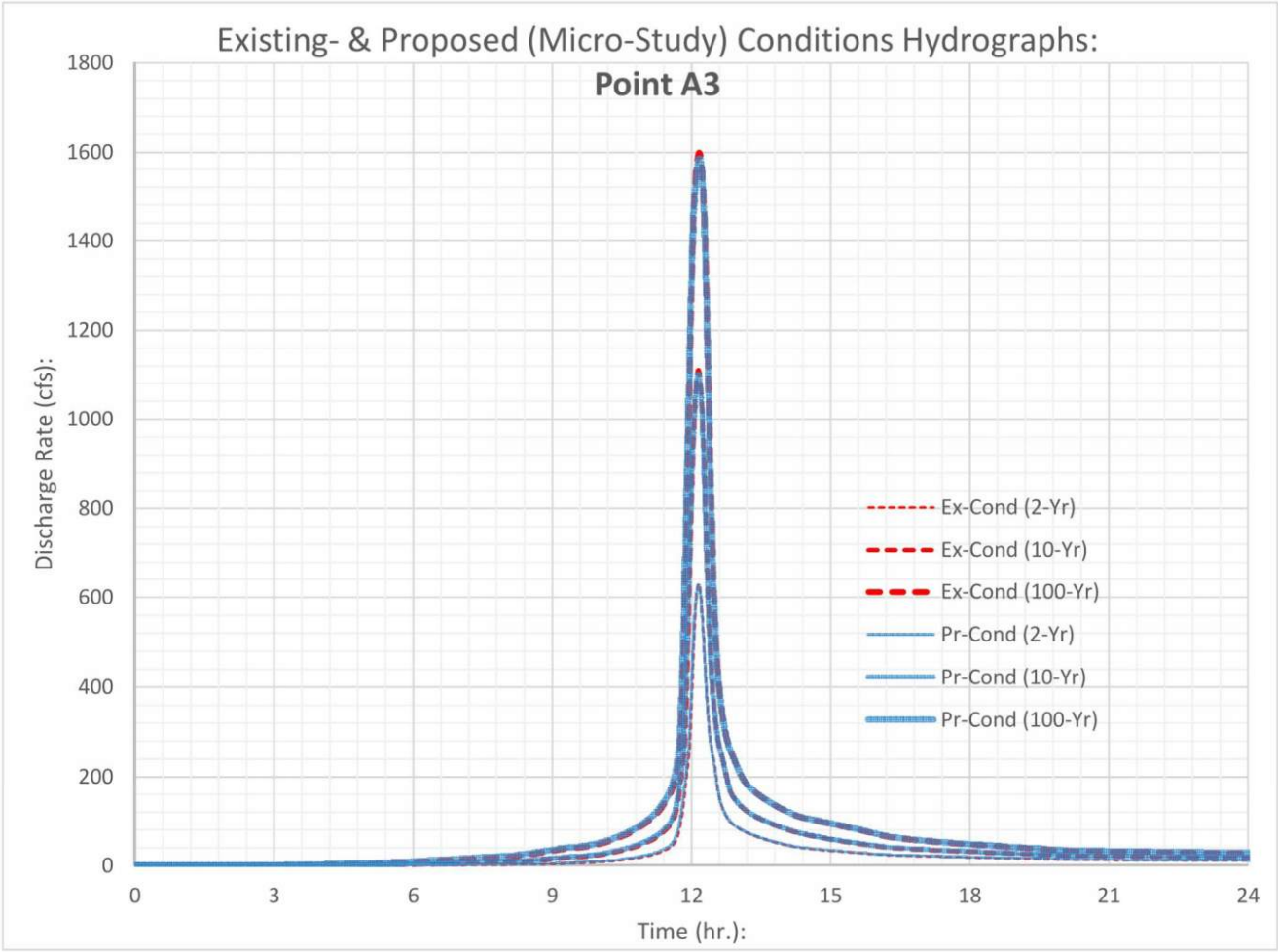
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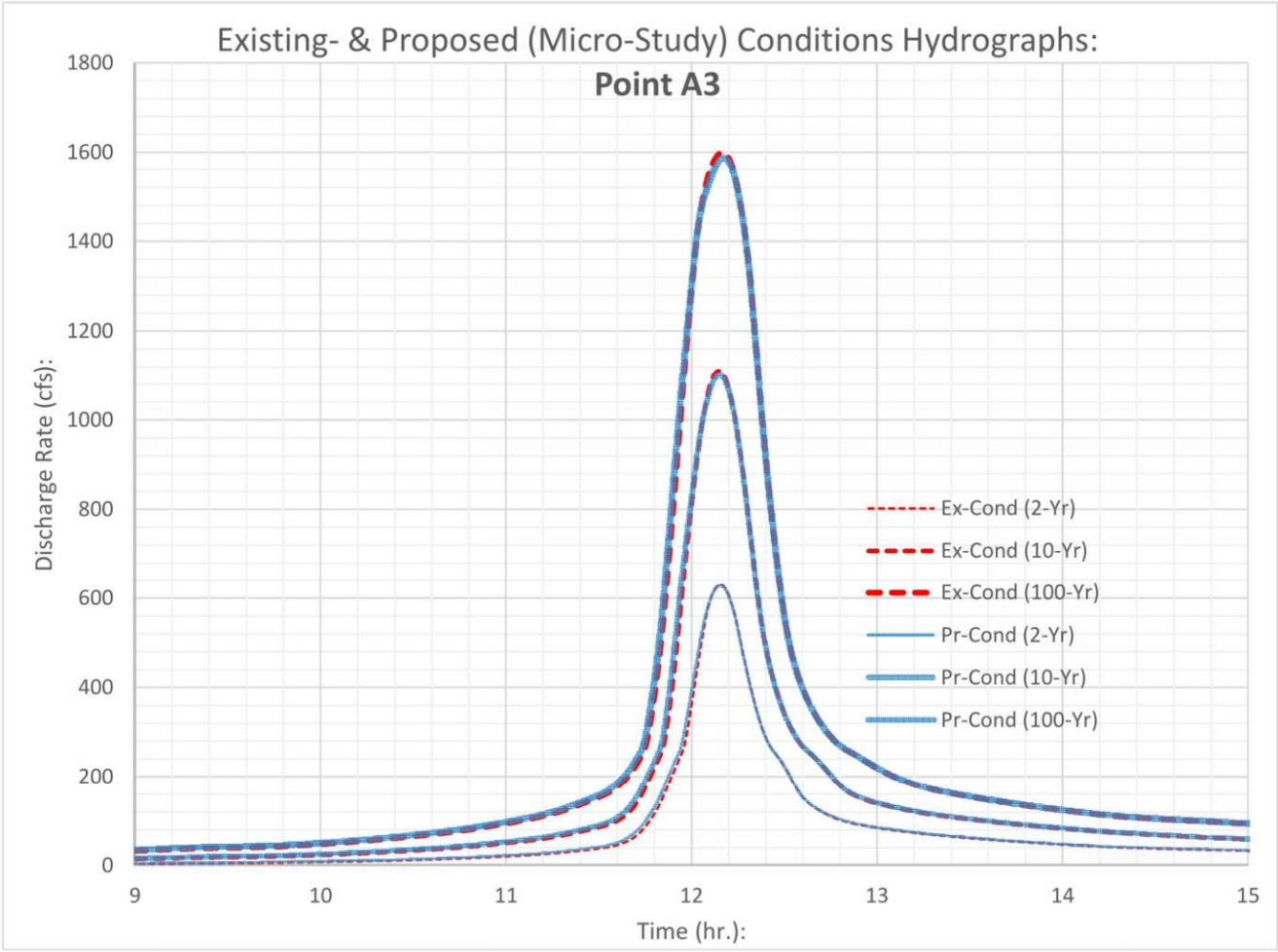
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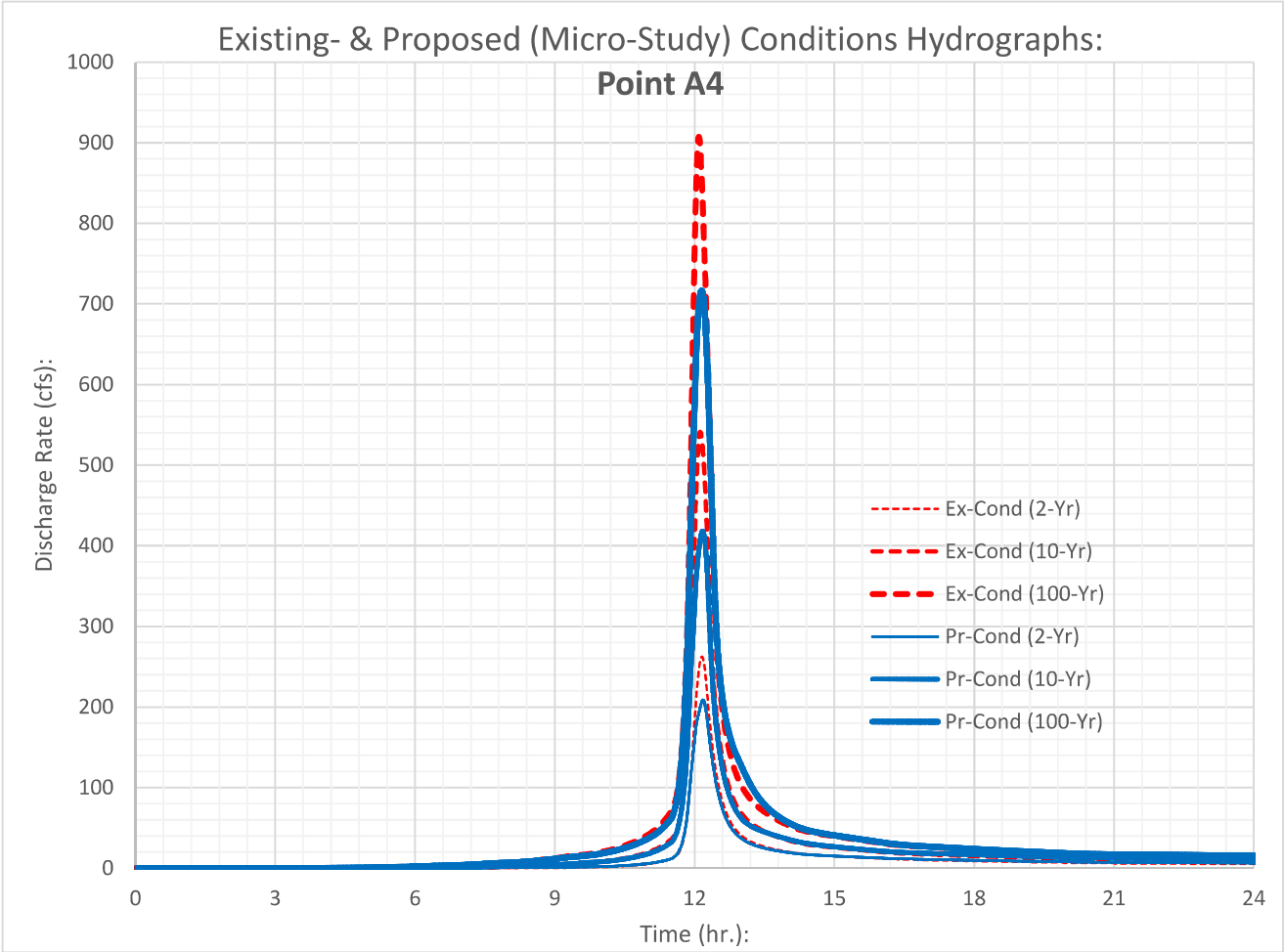
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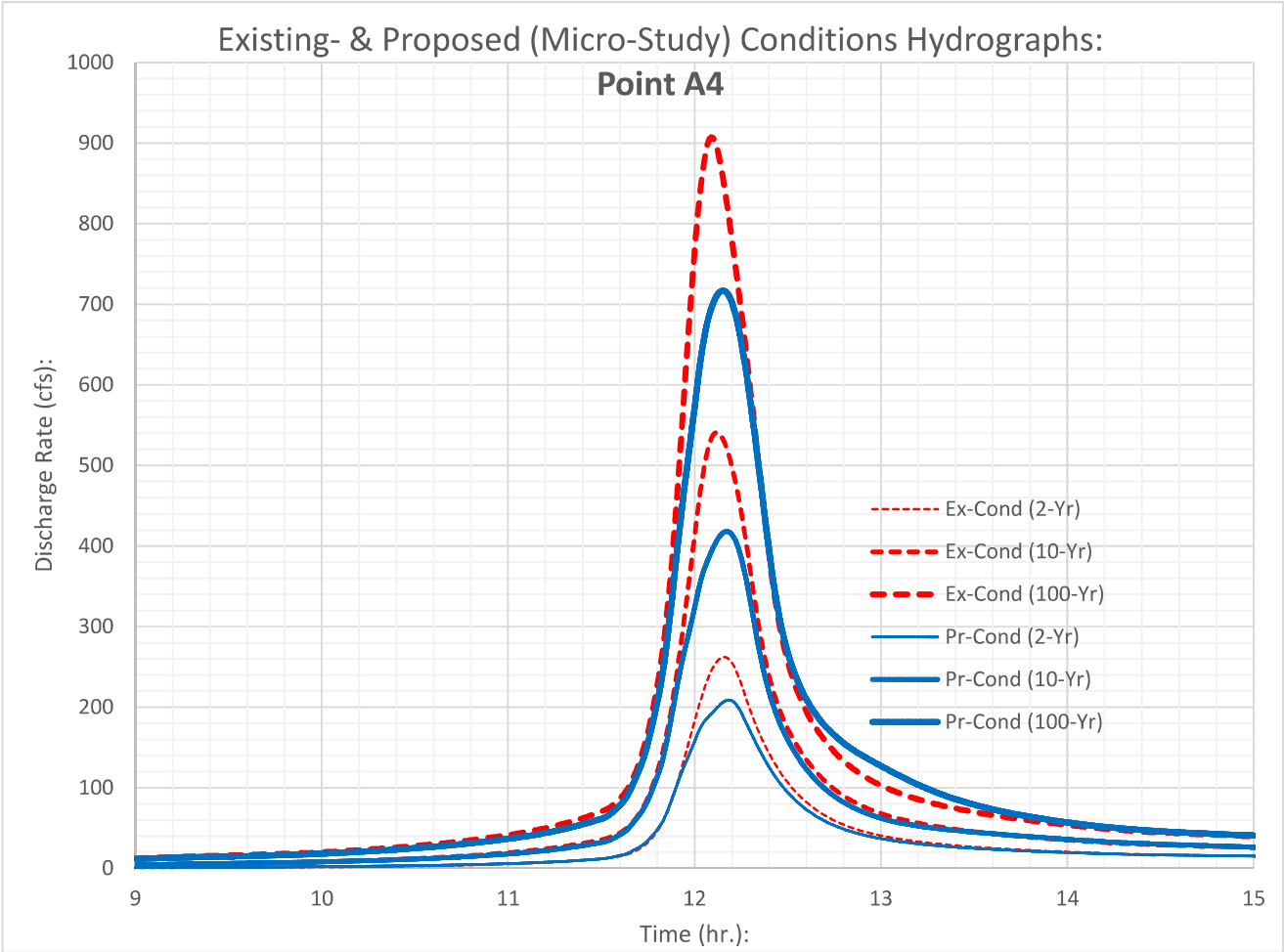
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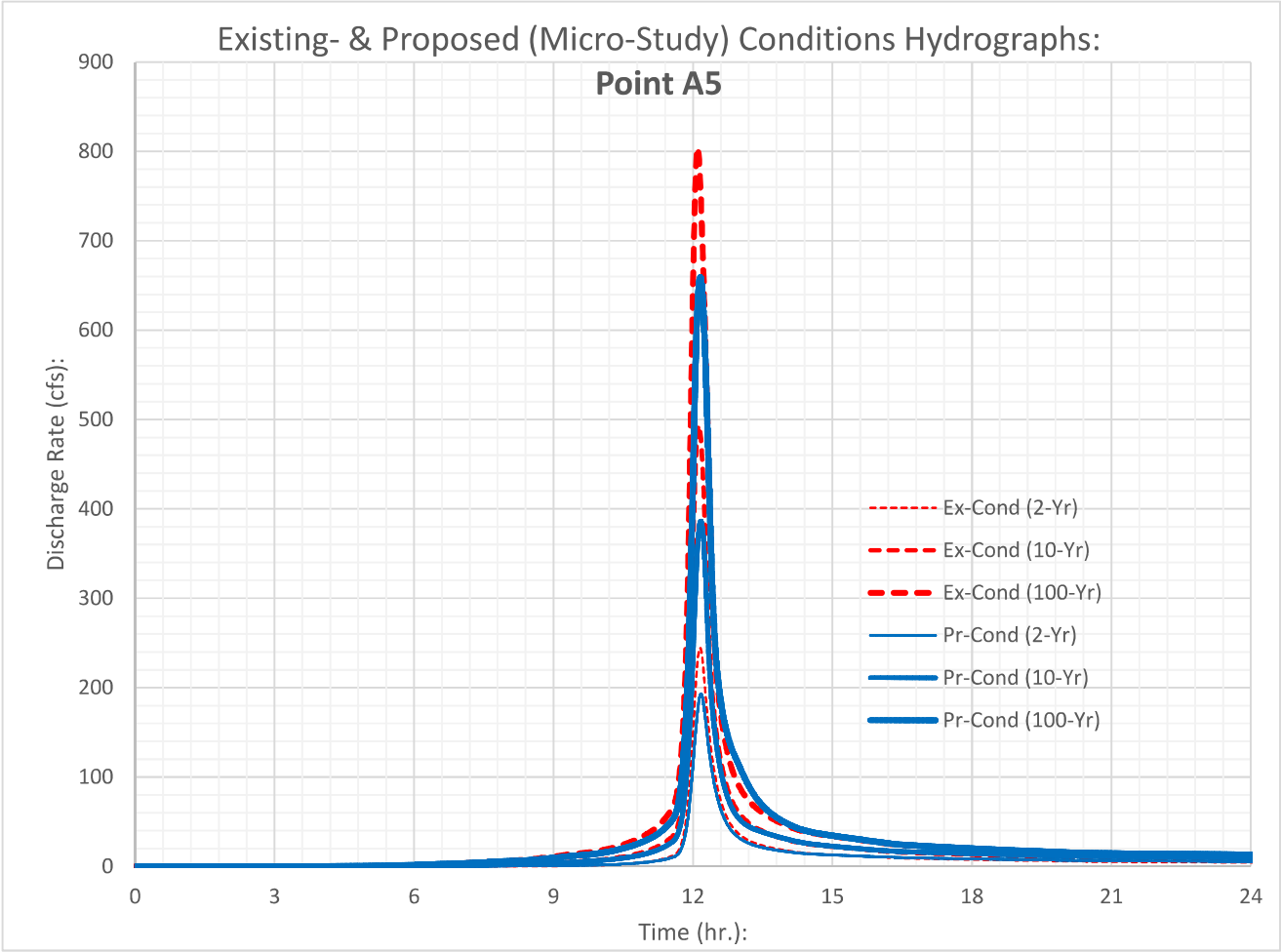
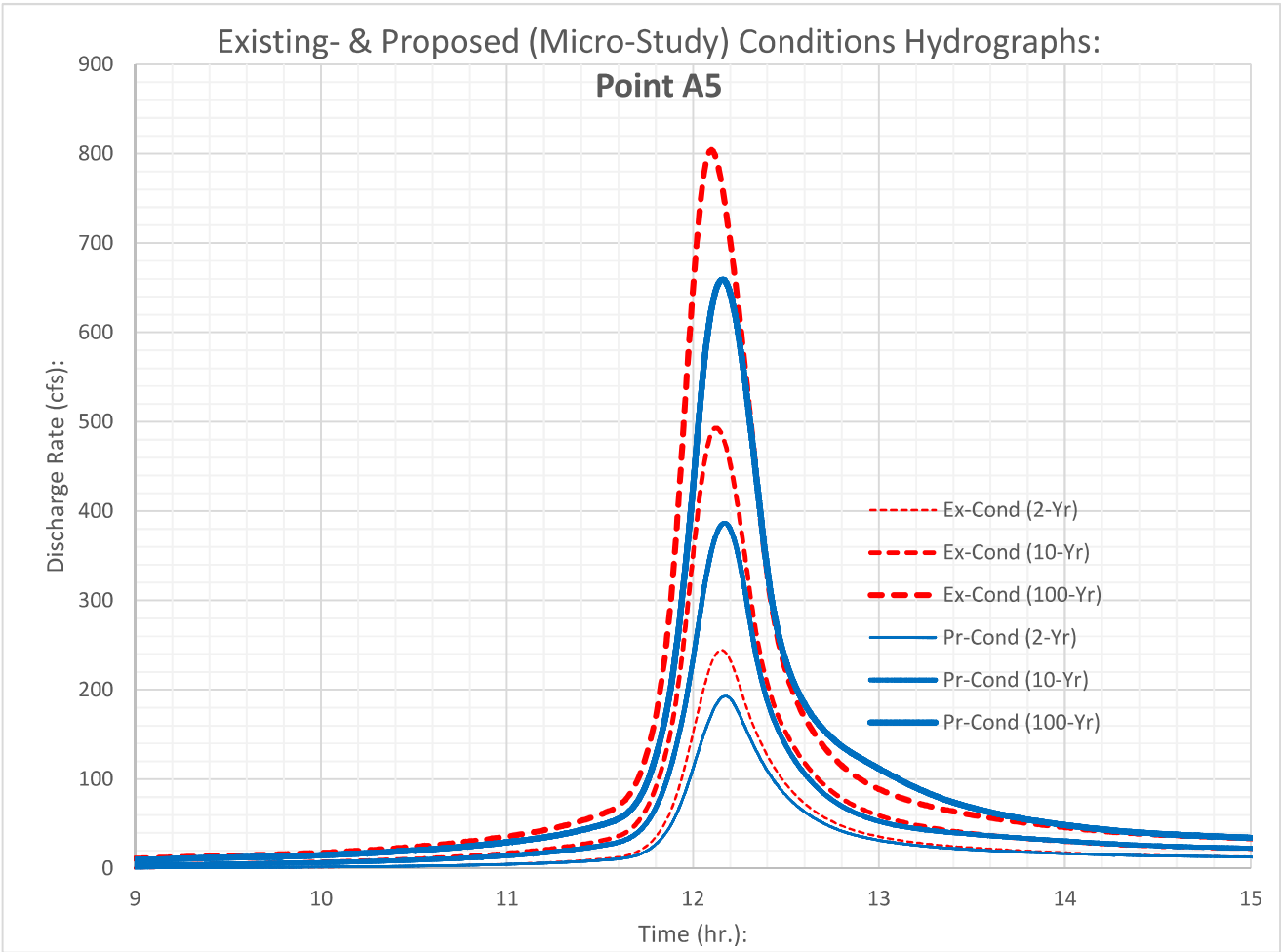
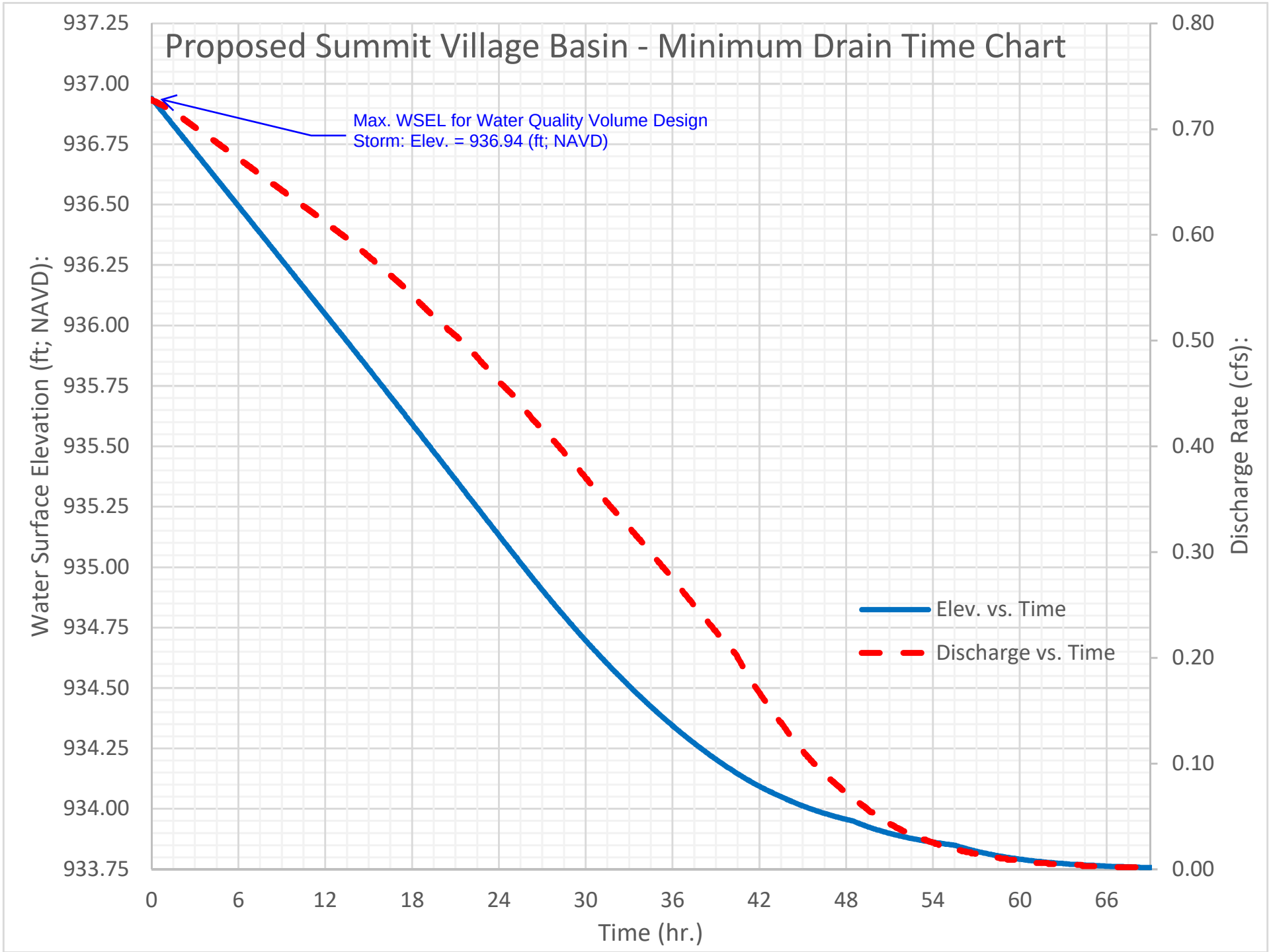
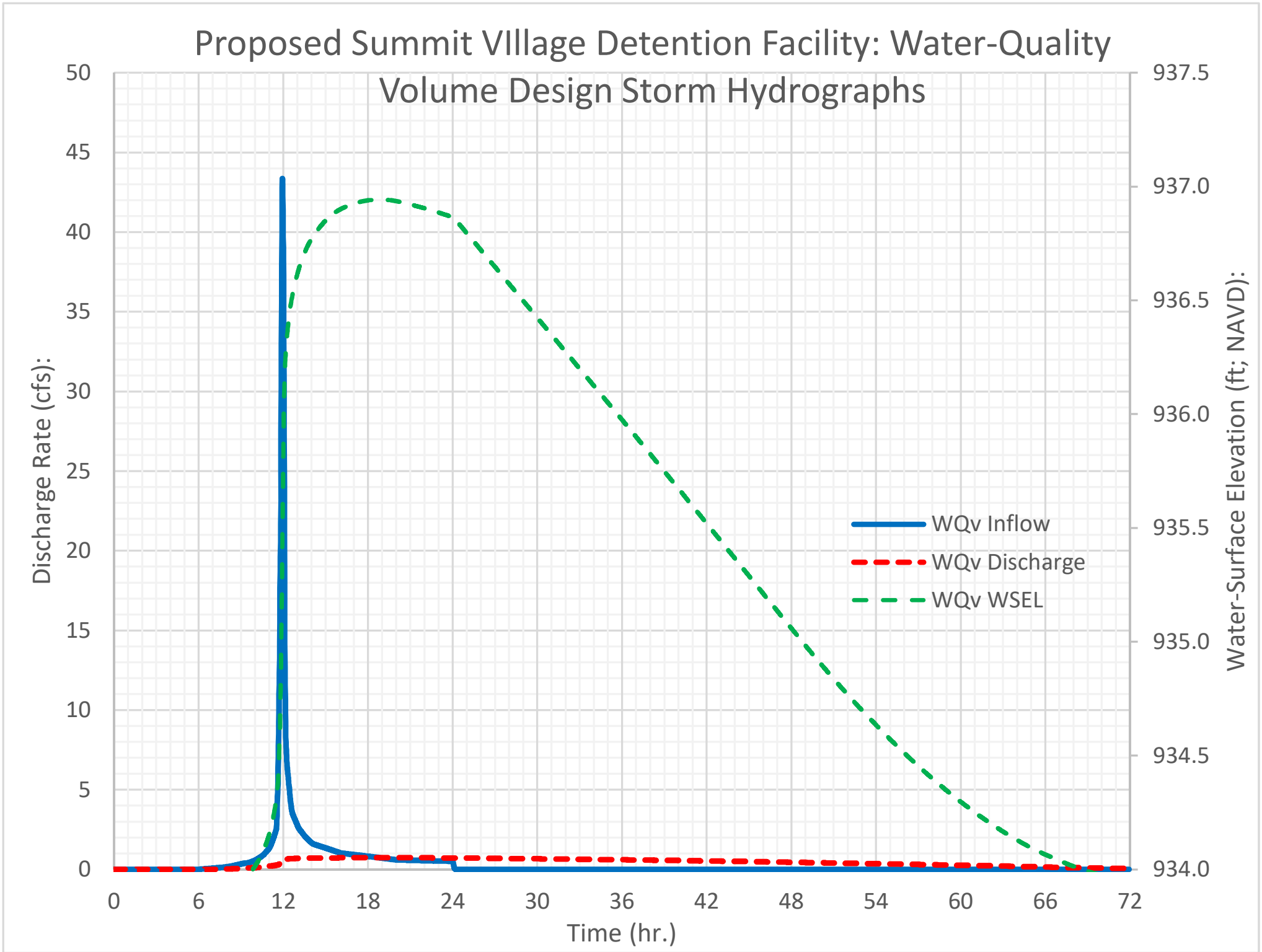
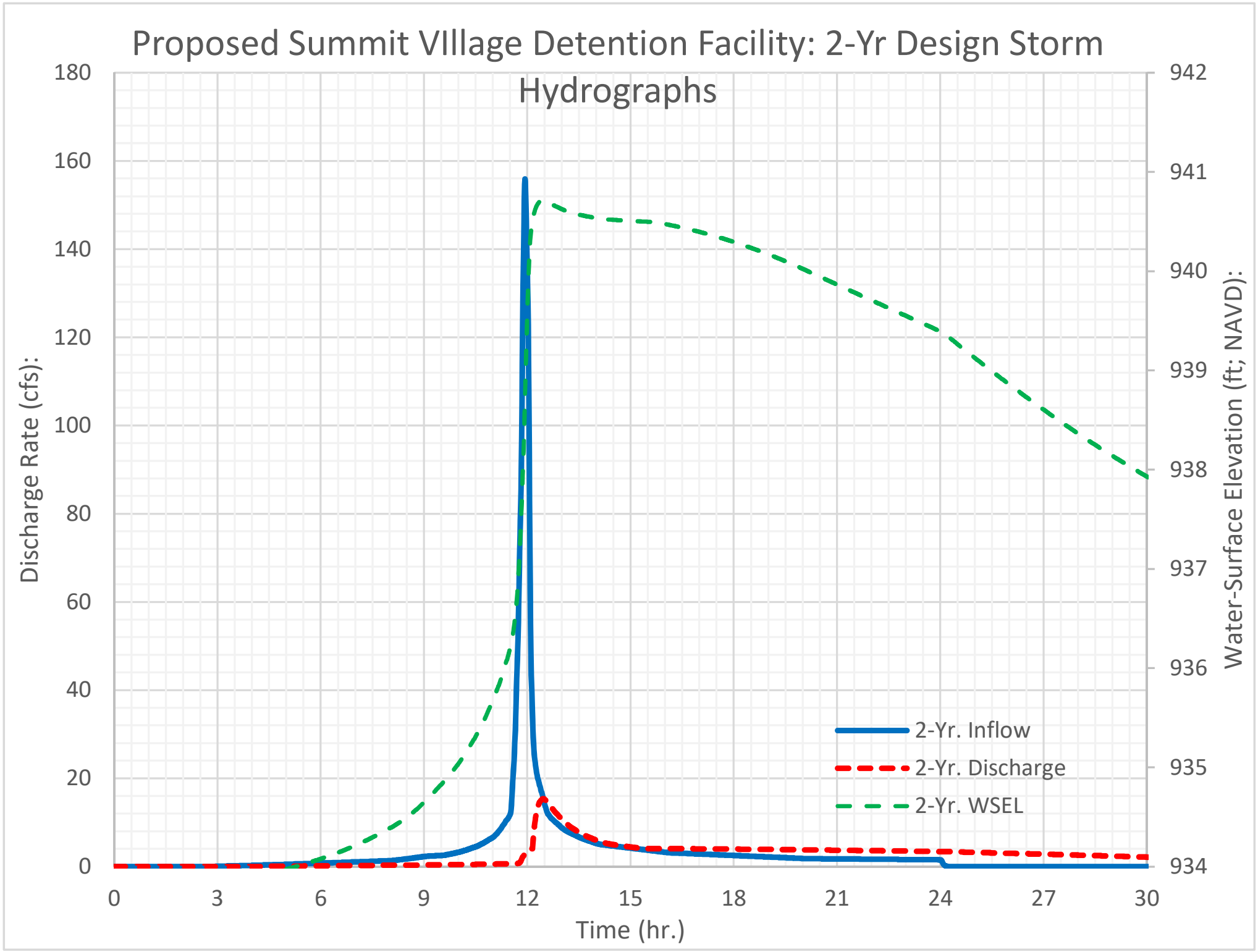
Pr-Cond (10-Yr)
Pr-Cond (100-Yr)

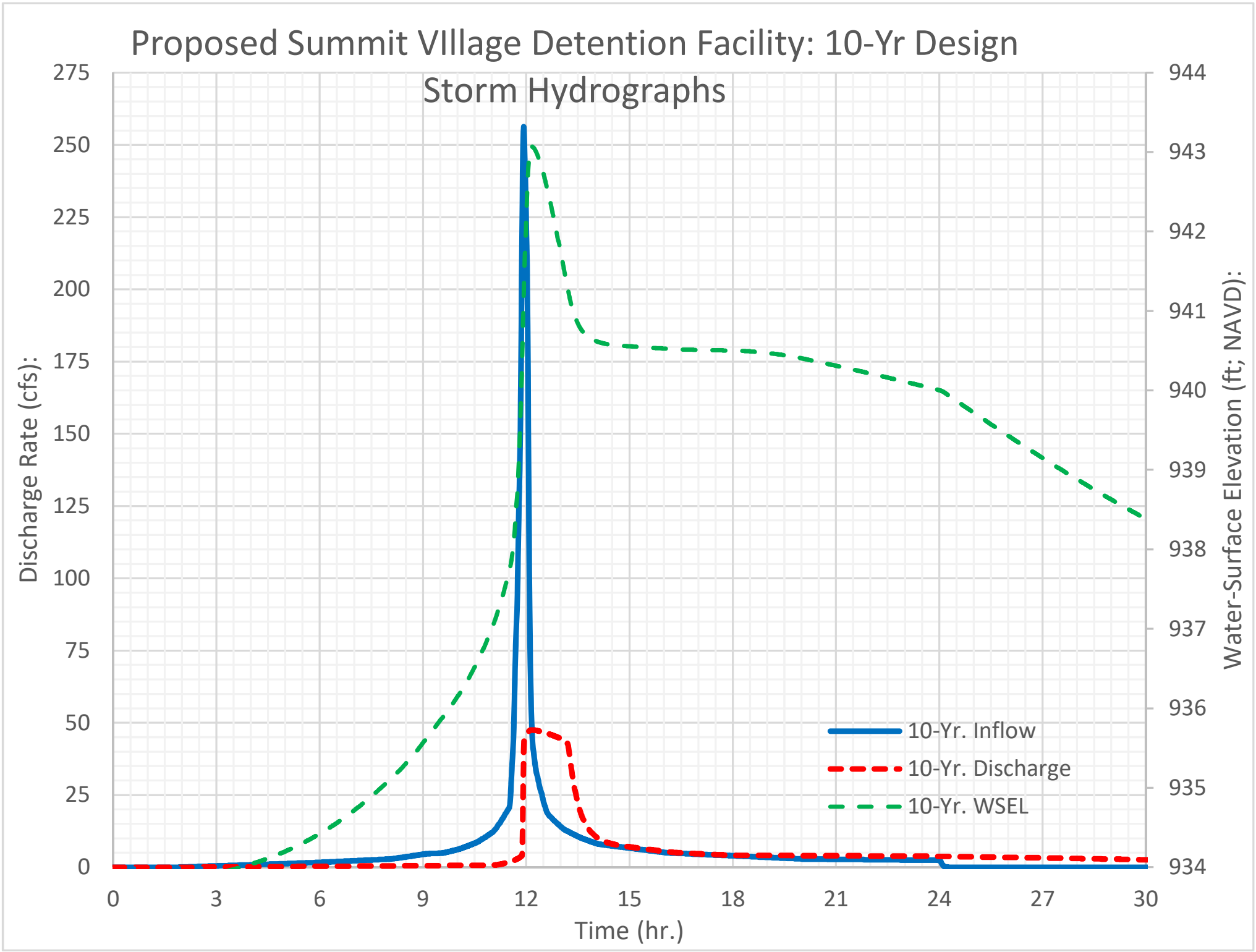

Existing- & Proposed (Micro-Study) Conditions Hydrographs:
Point A5
Discharge Rate (cfs):
Time (hr.):
Ex-Cond (2-Yr)
Ex-Cond (10-Yr)
Ex-Cond (100-Yr)
Pr-Cond (2-Yr)
Pr-Cond (10-Yr)
Pr-Cond (100-Yr)

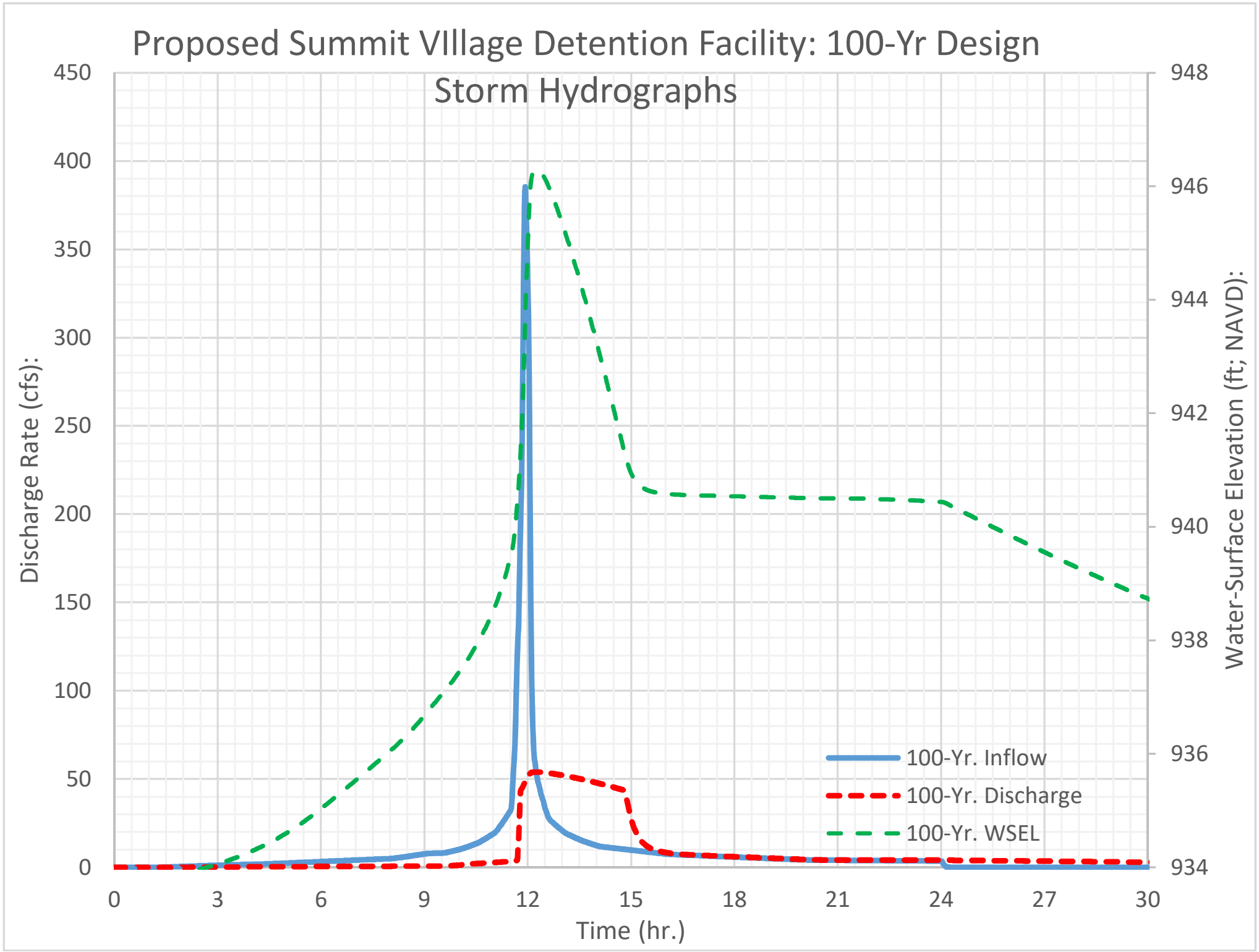

Existing- & Proposed (Micro-Study) Conditions Hydrographs:
Point A5
Discharge Rate (cfs):
Time (hr.):
Ex-Cond (2-Yr)
Ex-Cond (10-Yr)
Ex-Cond (100-Yr)
Pr-Cond (2-Yr)
Pr-Cond (10-Yr)
Pr-Cond (100-Yr)


Proposed Summit Village Basin - Minimum Drain Time Chart
Max. WSEL for Water Quality Volume Design Storm: Elev. = 936.94 (ft; NAVD)
Water Surface Elevation (ft; NAVD):
Discharge Rate (cfs):
Time (hr.)
Elev. vs. Time
Discharge vs. Time
937.25
937.00
936.75
936.50
936.25
936.00
935.75
935.50
935.25
935.00
934.75
934.50
934.25
934.00
933.75
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0
6
12
18
24
30
36
42
48
54
60
66


Proposed Summit VIllage Detention Facility: Water-Quality Volume Design Storm Hydrographs
Discharge Rate (cfs):
Water-Surface Elevation (ft; NAVD):
Time (hr.)
WQv Inflow
WQv Discharge
WQv WSEL
0
5
10
15
20
25
30
35
40
45
50
934.0
934.5
935.0
935.5
936.0
936.5
937.0
937.5
0
6
12
18
24
30
36
42
48
54
60
66
72


Proposed Summit VIllage Detention Facility: 2-Yr Design Storm Hydrographs
Discharge Rate (cfs):
Water-Surface Elevation (ft; NAVD):
Time (hr.)
0
20
40
60
80
100
120
140
160
180
934
935
936
937
938
939
940
941
942
0
3
6
9
12
15
18
21
24
27
30
2-Yr. Inflow
2-Yr. Discharge
2-Yr. WSEL


Proposed Summit VIllage Detention Facility: 10-Yr Design Storm Hydrographs
Discharge Rate (cfs):
Water-Surface Elevation (ft; NAVD):
Time (hr.)
0
25
50
75
100
125
150
175
200
225
250
275
934
935
936
937
938
939
940
941
942
943
944
0
3
6
9
12
15
18
21
24
27
30
10-Yr. Inflow
10-Yr. Discharge
10-Yr. WSEL

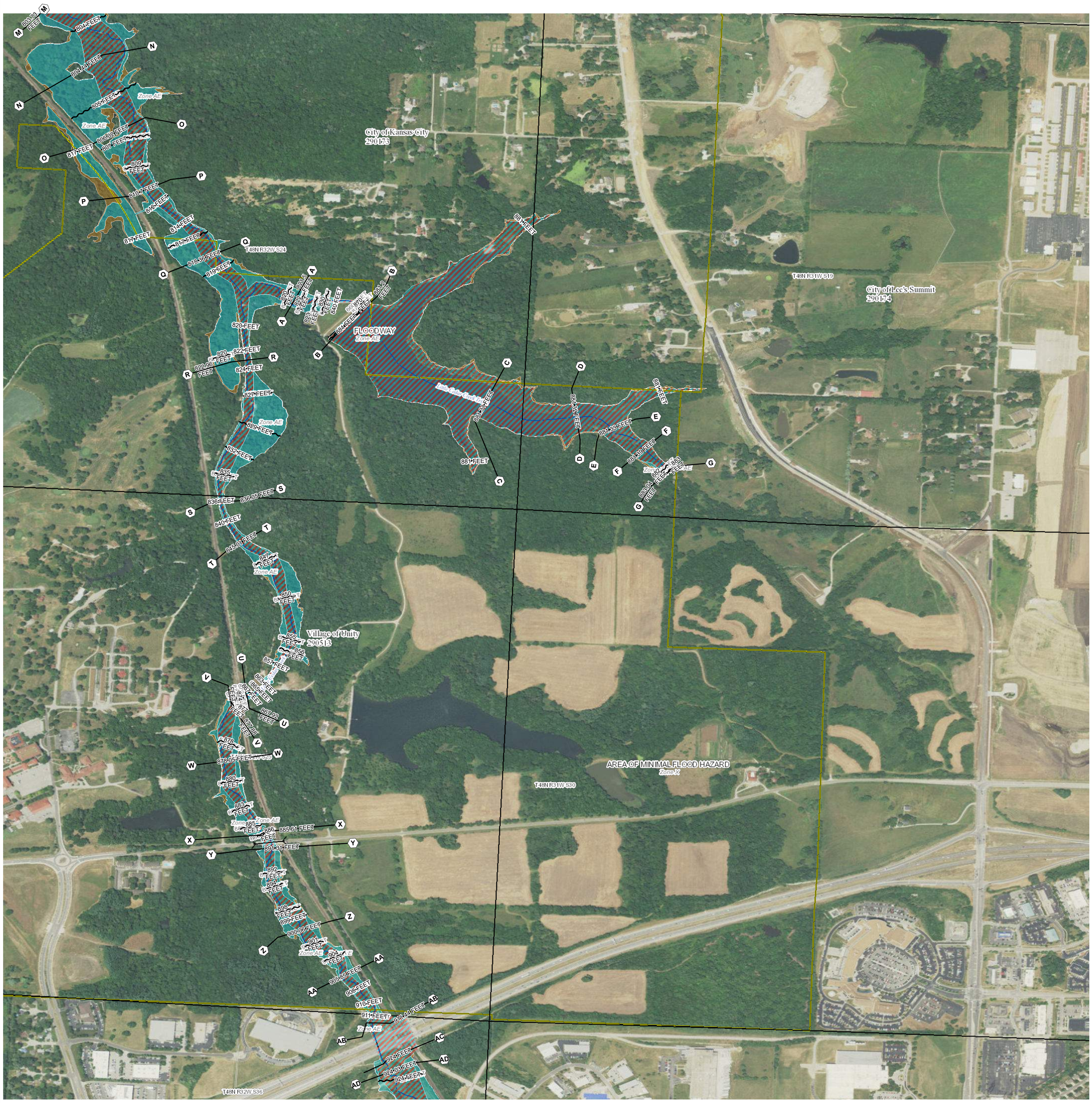

Proposed Summit VIllage Detention Facility: 100-Yr Design Storm Hydrographs
Discharge Rate (cfs):
Water-Surface Elevation (ft; NAVD):
Time (hr.)
0
50
100
150
200
250
300
350
400
450
934
936
938
940
942
944
946
948
0
3
6
9
12
15
18
21
24
27
30
100-Yr. Inflow
100-Yr. Discharge
100-Yr. WSEL

ARIA APARTMENTS
WATER QUALITY TREATMENT

	Total Drainage Area to Outfall						Filtration/Depression Treated Area						
Sub-Area	Area (s.f.)	Imp. Area (s.f.)	Perv. Area (s.f.)	Imp. %	Rv	WQv (cu.ft.)	Area (s.f.)	Imp. Area (s.f.)	Perv. Area (s.f.)	Imp. %	Rv	WQv (cu.ft.)	Remaining WQv to Treat (cu.ft.)
A	230685	184063	46622	79.79%	0.768	20229.30	73469	48725.1257	24744	66.32%	0.647	5425.89	14803.407
B	32492	20647	11845	63.54%	0.622	2306.95	17685	10151	7534	57.40%	0.567	1143.97	1162.987
C	26220	11677	14543	44.53%	0.451	1349.48	26220	11677	14543	44.53%	0.451	1349.48	0.000
D	135790	83108	52682	61.20%	0.601	9314.48	49091	23322	25769	47.51%	0.478	2676.56	6637.918
E	44817	38951	5866	86.91%	0.832	4258.05	5546	3555	1991	64.10%	0.627	396.93	3861.111
F	18292	16132	2160	88.19%	0.844	1761.98	4096	2985	1111	72.88%	0.706	330.09	1431.890
G	357596	239993	117603	67.11%	0.654	26700.56	157078	90489.3146	66589	57.61%	0.568	10194.43	16506.125
OFFSITE	134143	37447	96696	27.92%	0.301	4613.41	38389	27411	10978	71.40%	0.693	3035.62	1577.795
TOTAL	**980035**	**632018**	**348017**	**64.49%**	**0.630**	**70534.22**	**371574**	**218315.44**	**153259**	**58.75%**	**0.579**	**24552.98**	**45981.23**
	22.50					1.62	8.53						

Filtration / SNOUT Treatment			
Treatment	LoS	VR	Treated Area
Filtration	7.5	63.98	8.53
SNOUT	3	32.67	10.89
TOTAL		**96.64**	**19.42**
40-hr Extended Dry Detention			
Extended Detention	**4**	**90.0**	**22.50**

94°24'22.95"W 38°58'14.11"N



USGS The National Map: Orthoimagery. Data refreshed April 2020

94°22'29.6"W 38°56'8.44"N

FLOOD HAZARD INFORMATION

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

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Basemap information shown on this FIRM was provided in digital format by USDA, Farm Service Agency (FSA). This information was derived from NAIP, dated April 11, 2018.

This map was exported from FEMA's National Flood Hazard Layer (NFHL) on **8/26/2020 8:37 AM** 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. For additional information, please see the Flood Hazard Mapping Updates Overview Fact Sheet at https://www.fema.gov/media-library/assets/documents/118418

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. 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.

SCALE

Map Projection:
GCS, Geodetic Reference System 1980;
Vertical Datum: NAVD88
For information about the specific vertical datum for elevation features, datum conversions, or vertical monuments used to create this map, please see the Flood Insurance Study (FIS) Report for your community at https://msc.fema.gov

N

1 inch = 500 feet 1:6,000

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

0 50 100 200 300 400 Meters

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

JACKSON COUNTY, MISSOURI AND INCORPORATED AREAS

PANEL 409 OF 605

Panel Contains:

COMMUNITY	NUMBER	PANEL
CITY OF KANSAS CITY	290173	0409
VILLAGE OF UNITY	290513	0409
CITY OF LEE'S SUMMIT	290174	0409

MAP NUMBER
29095C0409G
EFFECTIVE DATE
January 20, 2017

94° 34' 58" W
94° 33' 22" W
38° 58' 34" N
38° 56' 24" N
379600
379200
378800
379400
380000
380600
381200
381800
382400
383000
383600
4314800
4314200
4313600
4313000
4312400
4311800
4311200
10120
10128
10026
10142
10141
10143
10148
30080
30180
10132
10024
10136
10122
10116
10117
10113
10180
99001
36083
Lees Summit
Lees Summit Rd
Unity Vlg
Douglas
Nw Douglas St
Nw Town Centre Blvd
Ne Town Centre Dr
Nw Colbern Rd
Ne Leinweber Rd
Ne Strother Rd
Strother
83rd
83rd St
E 85th St
E 86th Ter
87th
Driveway
Rhinehart
Rhinehart Rd
Nw Blue Pkwy
Blue Pkwy
Unity Cir S
Access Rd Unity Village
Bannister
Colbern
Ward Rd
Little Cedar Creek
Turner Rd
Ne Manhattan Dr
Ralph Powell
Independence
Independence Ave
Exit 10a
Exit 10b
Exit 9
Ramp
470
I-70
35
291
Ne Missouri Rd
Ne Mulberry St
Ne Cedar St
Ne Pollard Rd
Ne Bell Dr
Ne Auburn Dr
Nw Whitestone Dr
Todd George
Ne Remmel Dr
Ne Beech Rd
May Brook
Soil Map may not be valid at this scale.
Map Scale: 1:8,260 if printed on D landscape (34" x 22") sheet.
Meters
0 100 200 400 600
Feet
0 400 800 1600 2400
N
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

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 1:24,000.

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: Jackson County, Missouri
Survey Area Data: Version 20, Sep 16, 2019

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

Date(s) aerial images were photographed: Sep 6, 2019—Nov 16, 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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
10000	Arisburg silt loam, 1 to 5 percent slopes	C	19.2	0.7%
10024	Greenton-Urban land complex, 5 to 9 percent slopes	D	294.2	10.0%
10026	Higginsville silt loam, 5 to 9 percent slopes	C	64.2	2.2%
10113	Oska silty clay loam, 5 to 9 percent slopes, eroded	D	26.5	0.9%
10116	Sampsel silty clay loam, 2 to 5 percent slopes	C/D	22.2	0.8%
10117	Sampsel silty clay loam, 5 to 9 percent slopes	C/D	61.8	2.1%
10120	Sharpsburg silt loam, 2 to 5 percent slopes	C	232.0	7.9%
10122	Sharpsburg silt loam, 5 to 9 percent slopes, eroded	C	5.2	0.2%
10128	Sharpsburg-Urban land complex, 2 to 5 percent slopes	D	206.3	7.0%
10132	Sibley silt loam, 2 to 5 percent slopes	C	253.0	8.6%
10136	Sibley-Urban land complex, 2 to 5 percent slopes	C	458.4	15.6%
10141	Snead-Rock outcrop complex, 14 to 30 percent slopes	D	194.8	6.6%
10142	Snead-Rock outcrop complex, 5 to 14 percent slopes	D	287.3	9.8%
10143	Snead-Urban land complex, 9 to 30 percent slopes	D	1.6	0.1%
10180	Udarents-Urban land-Sampsel complex, 2 to 5 percent slopes	C	40.4	1.4%
30080	Greenton silty clay loam, 5 to 9 percent slopes	C/D	684.9	23.3%
30180	Polo silt loam, 5 to 9 percent slopes, eroded	C	43.7	1.5%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
36083	Kennebec silt loam, 1 to 4 percent slopes, occasionally flooded	C	2.1	0.1%
99001	Water		39.4	1.3%
Totals for Area of Interest			**2,937.2**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Location ID:	Total Area (ac):	Aria (Micro) Onsite Area (ac):	Summit Village Onsite Area (ac):	Onsite Area Macro-Study (ac):	Weighted NRCS CN:
Subarea A1(e):	27.97			12.36	77
Subarea A1(w):	43.14				76
Subarea A2(e):	3.08				80
Subarea A2(w):	23.41				73
Subarea A3:	24.53	11.73		11.73	80
Subarea A4(e):	9.74	5.89		5.89	79
Subarea A4(w):	17.41		7.35	7.35	73
Subarea A5(e):	15.16	4.88	5.10	9.98	80
Subarea A5(w):	19.76		17.26	17.26	77
Subarea A6:	13.45				83
Subarea A7:	30.6				76
Subarea A8:	21.56				81
Subarea A9:	31.84				84
Subarea A10:	12.23				94
Subtotal:	*293.88*	*22.50*	*29.71*	*64.57*	
Subarea B1:	31.94				79
Subarea B2:	48.54				78
Subarea B3:	40.69				83
Subarea B4-DET:	25.05				94
Subarea B4-BYP:	7.42				94
Subtotal:	*153.64*	*0.00*	*0.00*	*0.00*	
Subarea C1:	45.21				90
Subarea C2:	57.13				81
Subarea C3:	52.36				83
Subtotal:	154.70	0.00	0.00	0.00	

Sub-W'Shed A Subtotal:	293.88	22.50	29.71	64.57
Sub-W'Shed B Subtotal:	153.64	0.00	0.00	0.00
Sub-W'Shed C Subtotal:	154.70	0.00	0.00	0.00
Modeled Total:	602.22	22.50	29.71	64.57

BOUNDARY LEGEND

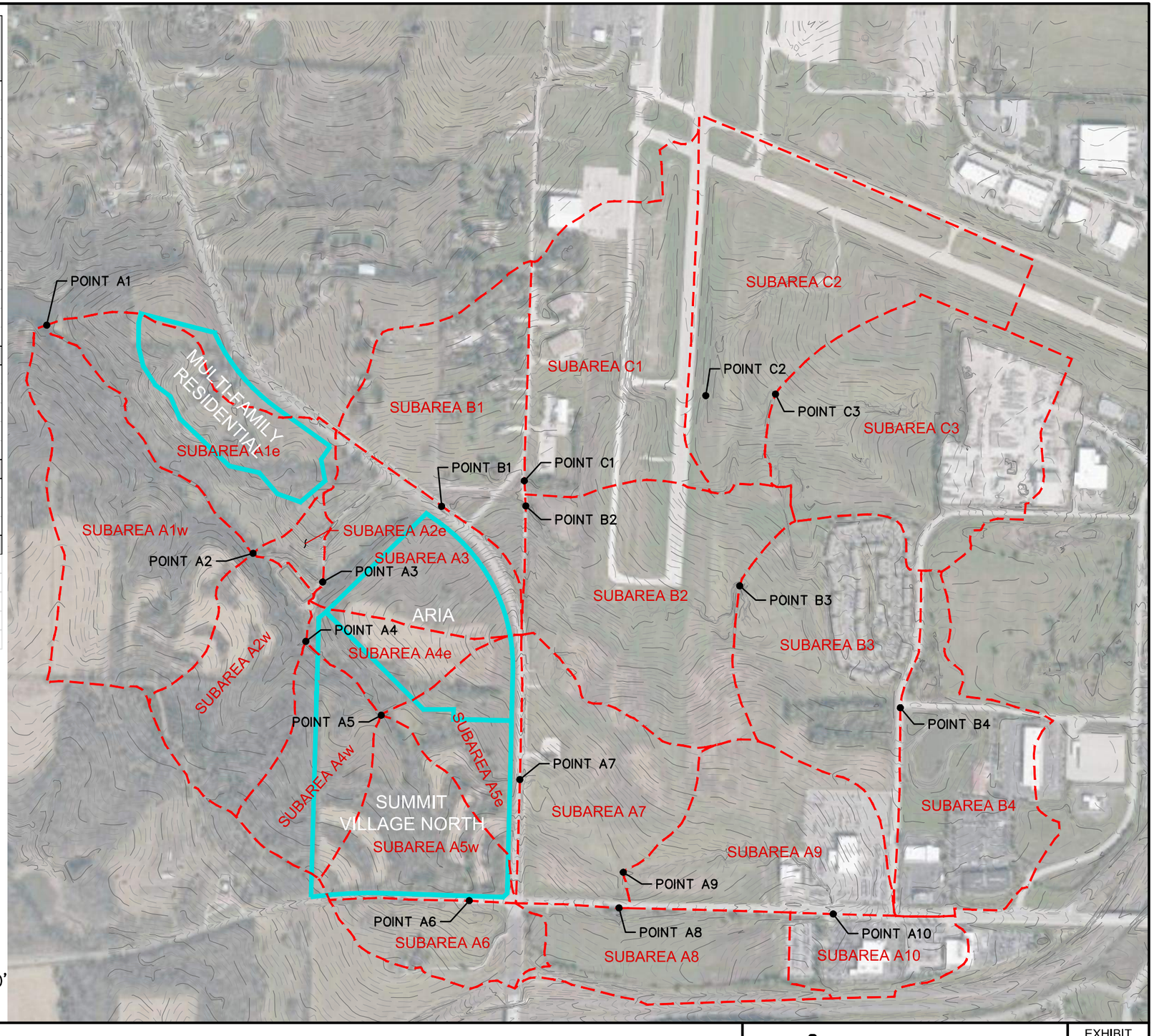
SITE BOUNDARY

TRIBUTARY DRAINAGE BOUNDARY

N

0' 350' 700' 1400'

SCALE IN FEET



DWG: F:\2019\0001-0500\019-0012-B\40-Design\Exhibits\EX-300_Existing_Conditions\EX-300_Existing_Conditions_B190012.dwg

PROJECT NO:	B19-0012
DRAWN BY:	NDH
DATE:	08/27/2020

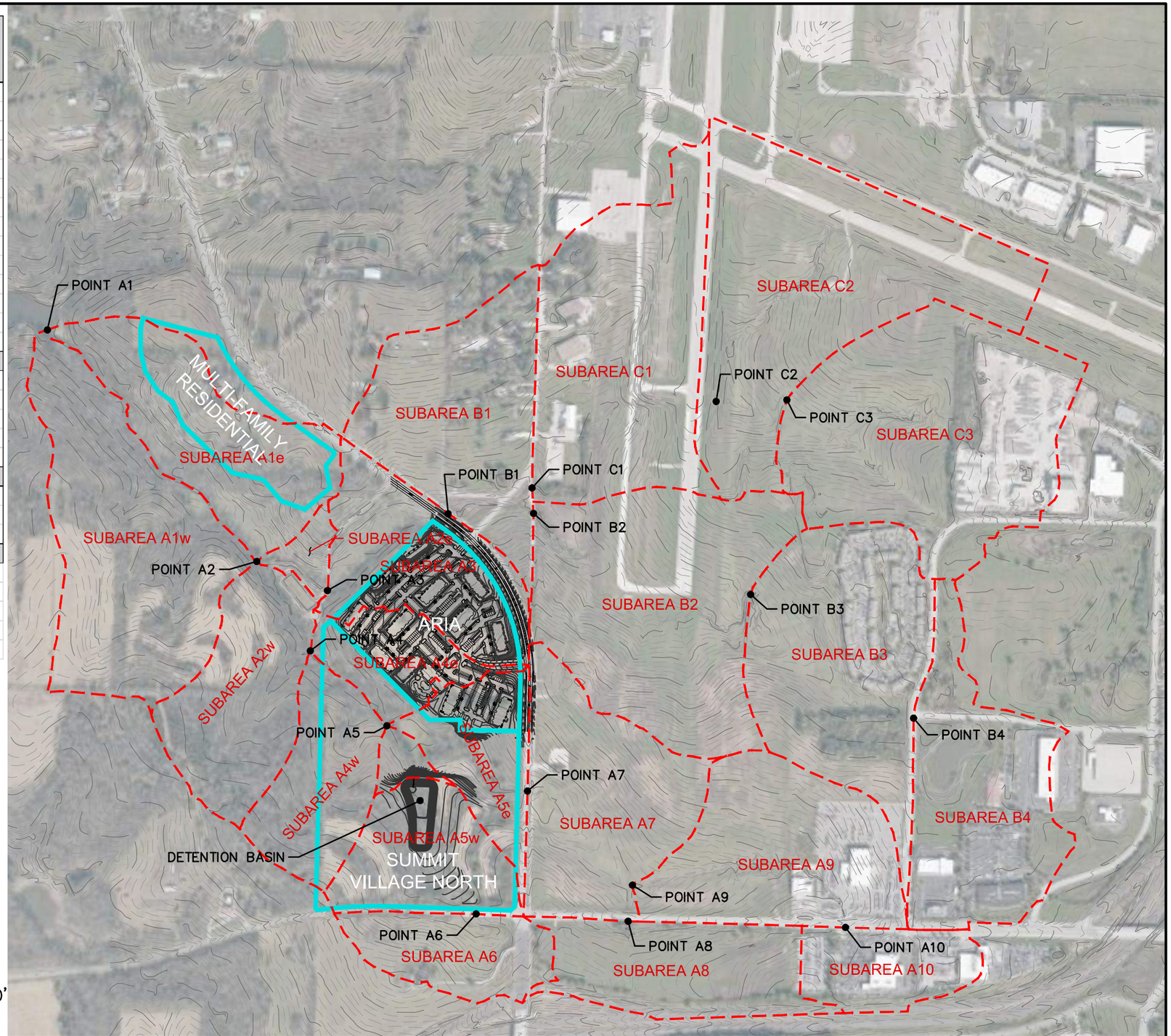
EXISTING CONDITIONS

olsson
1301 Burlington Street
North Kansas City, MO 64116
TEL 816.361.1177

EXHIBIT

EX-300

Location ID:	Total Area (ac):	Aria (Micro) Onsite Area (ac):	Summit Village Onsite Area (ac):	Onsite Area Macro-Study (ac):	Weighted NRCS CN:
Subarea A1(e):	*27.97*			*12.36*	*77*
Subarea A1(w):	*43.14*				*76*
Subarea A2(e):	*3.08*				*80*
Subarea A2(w):	*23.41*				*73*
Subarea A3:	24.06	11.07		11.07	87
Subarea A4(e):	11.23	7.34		7.34	86
Subarea A4(w):	*17.41*		*7.35*	*7.35*	*73*
INTERIM_Subarea A5(e):	16.48	4.09	6.04	10.13	82
INTERIM_Subarea A5(w):	17.42	0.00	16.32	16.32	79
Subarea A6:	*13.45*				*83*
Subarea A7:	*30.6*				*76*
Subarea A8:	*21.56*				*81*
Subarea A9:	*31.84*				*84*
Subarea A10:	*12.23*				*94*
Subtotal:	*293.88*	*22.50*	*29.71*	*64.57*	
Subarea B1:	*31.94*				*79*
Subarea B2:	*48.54*				*78*
Subarea B3:	*40.69*				*83*
Subarea B4-DET:	*25.05*				*94*
Subarea B4-BYP:	*7.42*				*94*
Subtotal:	*153.64*				
Subarea C1:	*45.21*				*90*
Subarea C2:	*57.13*				*81*
Subarea C3:	*52.36*				*83*
Subtotal:	154.70				
Sub-W'Shed A Subtotal:	293.88	22.50	29.71	64.57	
Sub-W'Shed B Subtotal:	*153.64*	*0.00*	*0.00*	*0.00*	
Sub-W'Shed C Subtotal:	*154.70*	*0.00*	*0.00*	*0.00*	
Modeled Total:	602.22	22.50	29.71	64.57	



BOUNDARY LEGEND

SITE BOUNDARY

TRIBUTARY DRAINAGE BOUNDARY

N

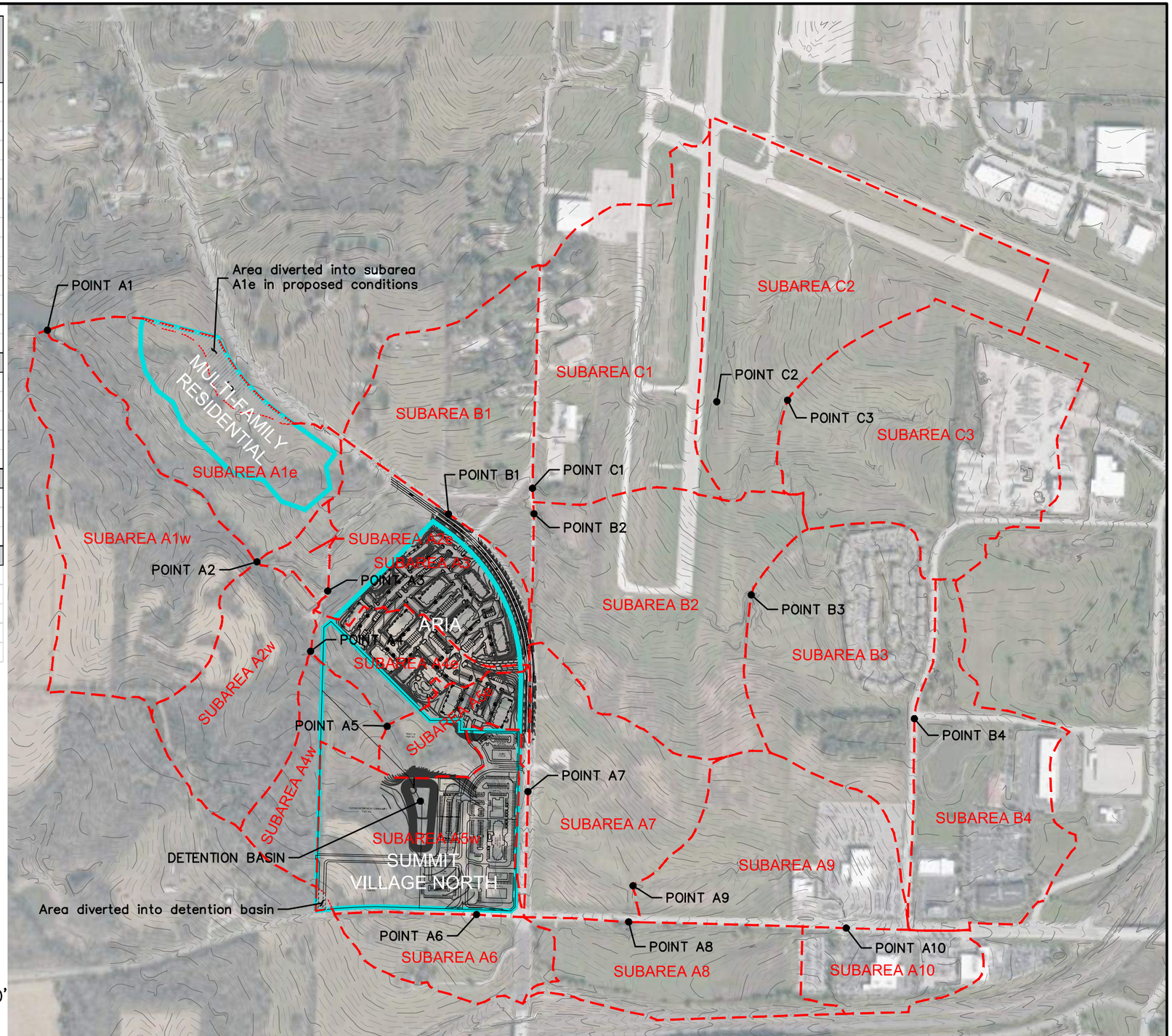
0' 350' 700' 1400'

SCALE IN FEET

DWG: F:\2019\0001-0500\019-0012-B\40-Design\Exhibits\EX-301_Micro_Conditions_B190012.dwg

PROJECT NO: B19-0012	ARIA MICRO CONDITIONS	olsson 1301 Burlington Street North Kansas City, MO 64116 TEL 816.361.1177	EXHIBIT EX-301
DRAWN BY: NDH			
DATE: 08/27/2020			

Location ID:	Total Area (ac):	Aria (Micro) Onsite Area (ac):	Summit Village Onsite Area (ac):	Onsite Area Macro-Study (ac):	Weighted NRCS CN:
Subarea A1(e):	30.57		14.96	14.96	83
Subarea A1(w):	*43.14*				*76*
Subarea A2(e):	*3.08*				*80*
Subarea A2(w):	*23.41*				*73*
Subarea A3:	24.06	11.07		11.07	87
Subarea A4(e):	11.23	7.34		7.34	86
Subarea A4(w):	12.07	0.00	2.01	2.01	75
Subarea A5(e):	10.81	3.91	0.64	4.55	84
Subarea A5(w):	28.64	0.18	27.27	27.45	95
Subarea A6:	*13.45*				*83*
Subarea A7:	*30.6*				*76*
Subarea A8:	*21.56*				*81*
Subarea A9:	*31.84*				*84*
Subarea A10:	*12.23*				*94*
Subtotal:	*296.69*	*22.50*	*44.88*	*67.38*	
Subarea B1:	*31.94*				*79*
Subarea B2:	*48.54*				*78*
Subarea B3:	*40.69*				*83*
Subarea B4-DET:	*25.05*				*94*
Subarea B4-BYP:	*7.42*				*94*
Subtotal:	*153.64*				
Subarea C1:	*45.21*				*90*
Subarea C2:	*57.13*				*81*
Subarea C3:	*52.36*				*83*
Subtotal:	154.70				
Sub-W'Shed A Subtotal:	296.69	22.50	44.88	67.38	
Sub-W'Shed B Subtotal:	*153.64*	*0.00*	*0.00*	*0.00*	
Sub-W'Shed C Subtotal:	*154.70*	*0.00*	*0.00*	*0.00*	
Modeled Total:	605.03	22.50	44.88	67.38	



BOUNDARY LEGEND

SITE BOUNDARY

TRIBUTARY DRAINAGE BOUNDARY

N

0’ 350’ 700’ 1400’

SCALE IN FEET

DWG: F:\2019\0001-0500\019-0012-B\40-Design\Exhibits\EX-302_Macro_Conditions_B190012.dwg

PROJECT NO: B19-0012	MACRO CONDITIONS	olsson 1301 Burlington Street North Kansas City, MO 64116 TEL 816.361.1177	EXHIBIT EX-302
DRAWN BY: NDH			
DATE: 08/27/2020			

Sub-Area	Total Drainage Area to Outfall				Filtration/Depression Treated Area				Remaining WQv to Treat (cu.ft.)
	Area (s.f.)	Imp. %	Rv	WQv (cu.ft.)	Area (s.f.)	Imp. %	Rv	WQv (cu.ft.)	
A	230685	79.79%	0.768	20229.30	73469	66.32%	0.647	5425.89	14803.407
B	32492	63.54%	0.622	2306.95	17685	57.40%	0.567	1143.97	1162.987
C	26220	44.53%	0.451	1349.48	26220	44.53%	0.451	1349.48	0.000
D	135790	61.20%	0.601	9314.48	49091	47.51%	0.478	2676.56	6637.918
E	44817	86.91%	0.832	4258.05	5546	64.10%	0.627	396.93	3861.111
F	18292	88.19%	0.844	1761.98	4096	72.88%	0.706	330.09	1431.890
G	357596	67.11%	0.654	26700.56	157078	57.61%	0.568	10194.43	16506.125
OFFSITE	134143	27.92%	0.301	4613.41	38389	71.40%	0.693	3035.62	1577.795
TOTAL	**980035**	**64.49%**	**0.630**	**70534.22**	**371574**	**58.75%**	**0.579**	**24552.98**	**45981.23**

Filtration / SNOUT Treatment			
Treatment	LoS	VR	Treated Area
Filtration	7.5	63.98	8.53
SNOUT	3	32.67	10.89
TOTAL		**96.64**	**19.42**

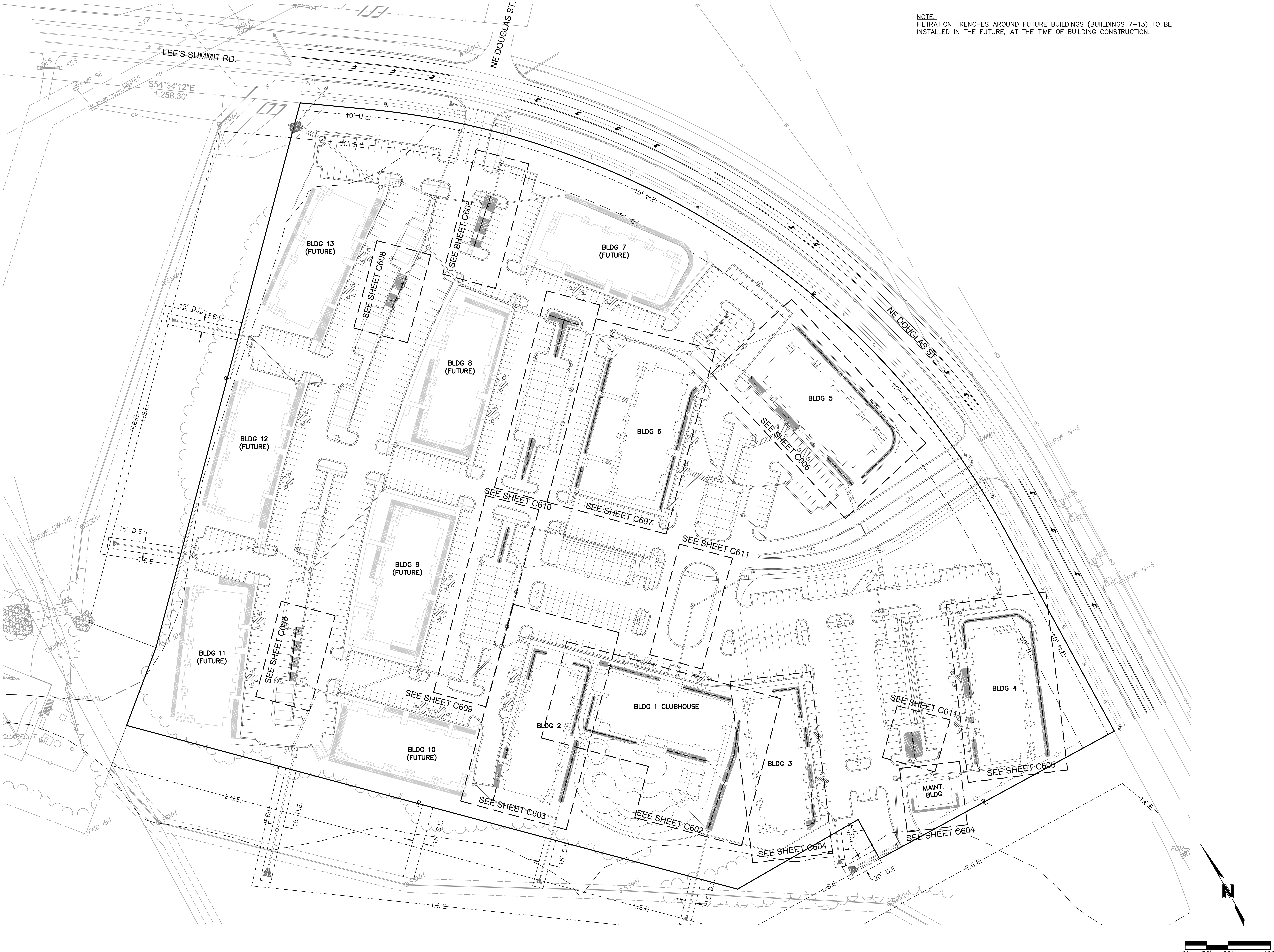
BOUNDARY LEGEND

- DRAINAGE BOUNDARY
- FILTRATION TREATED AREA
- DEPRESSION STORAGE TREATED AREA

DWG: F:\2019\0001-0500\019-0012-B\40-Design\Exhibits\EX-303_Water_Quality\EX-303_Aria_Water_Quality_B190012.dwg

PROJECT NO: B19-0012	ARIA WATER QUALITY	olsson 1301 Burlington Street North Kansas City, MO 64116 TEL 816.361.1177	EXHIBIT EX-303
DRAWN BY: NDH			
DATE: 02/03/2021			

NOTE:
FILTRATION TRENCHES AROUND FUTURE BUILDINGS (BUIILDINGS 7-13) TO BE INSTALLED IN THE FUTURE, AT THE TIME OF BUILDING CONSTRUCTION.



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NICHOLAS D. HEISER, P.E.
MO# 2015000555

NO. REV.	DATE	REVISIONS DESCRIPTION	BY
1	2021.02.04	REVISED PER CITY COMMENTS	

REVISIONS

FILTRATION TRENCH LAYOUT
SITE DEVELOPMENT PLANS

ARIA APARTMENTS
PHASE 1

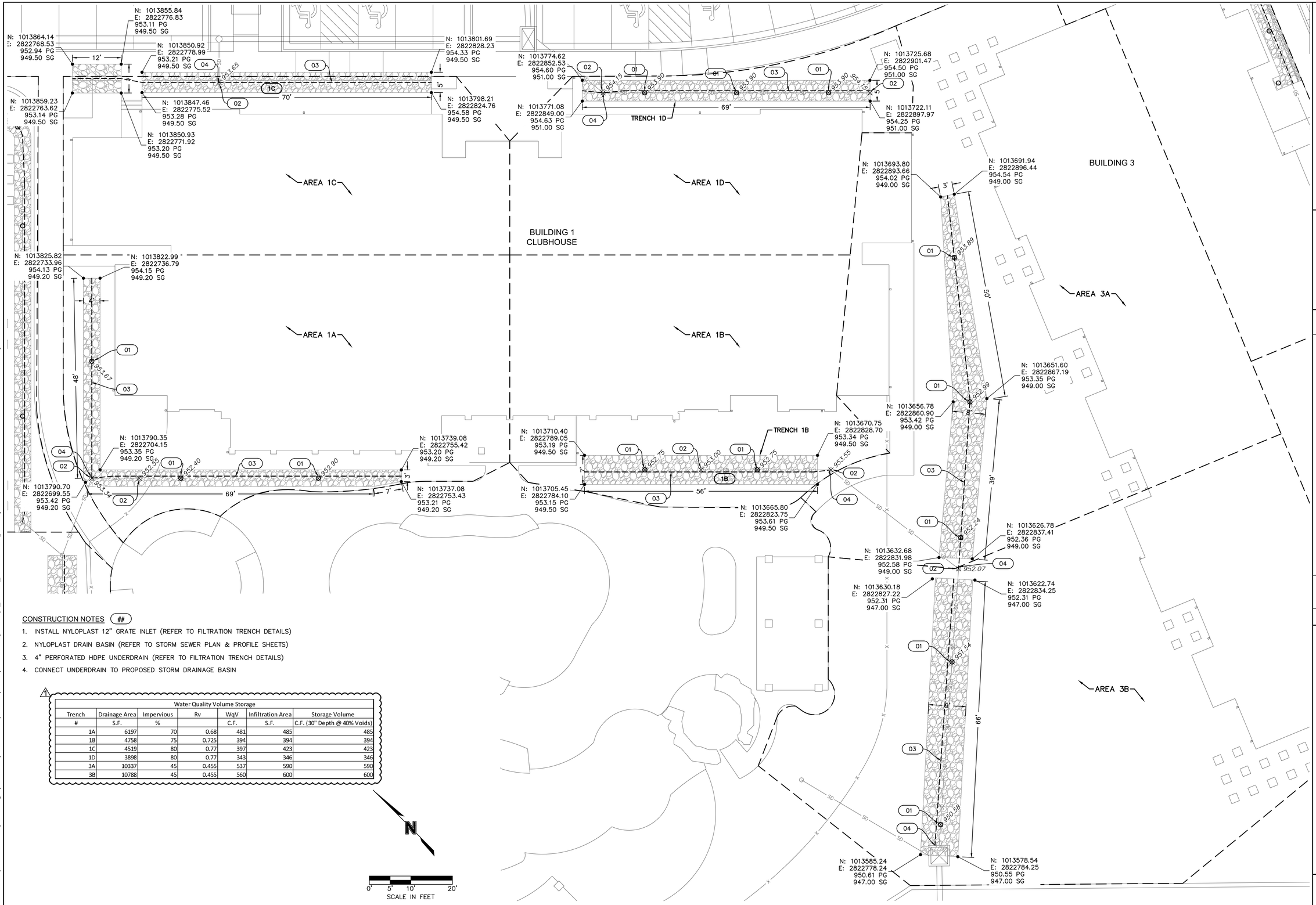
LEE'S SUMMIT, MO

2020

drawn by:	M.J.D.
checked by:	N.D.H.
designed by:	M.J.D.
QA/QC by:	N.D.H.
project no.:	019-0012-B
date:	2020.08.27

SHEET
C601

File: F:\2019\0001-0500\019-0012-B\40-Design\AutoCAD\Final Plans\Sheets\GNCV\Site Development\C_BMP01_ B190012.dwg ~ Layout: INFILTRATION TRENCH GENERAL LAYOUT ~ Last Saved By: mdiebolt ~ Plot Date: 2019.10.01 03:03 PM



CONSTRUCTION NOTES (##)

1. INSTALL NYLOPLAST 12" GRATE INLET (REFER TO FILTRATION TRENCH DETAILS)
2. NYLOPLAST DRAIN BASIN (REFER TO STORM SEWER PLAN & PROFILE SHEETS)
3. 4" PERFORATED HDPE UNDERDRAIN (REFER TO FILTRATION TRENCH DETAILS)
4. CONNECT UNDERDRAIN TO PROPOSED STORM DRAINAGE BASIN

1

Water Quality Volume Storage

Trench	Drainage Area	Impervious	Rv	WqV	Infiltration Area	Storage Volume
#	S.F.	%		C.F.	S.F.	C.F. (30" Depth @ 40% Voids)
1A	6197	70	0.68	481	485	485
1B	4758	75	0.725	394	394	394
1C	4519	80	0.77	397	423	423
1D	3898	80	0.77	343	346	346
3A	10337	45	0.455	537	590	590
3B	10788	45	0.455	560	600	600

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MO# 2015000555

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FILTRATION TRENCH PLAN
SITE DEVELOPMENT PLANS

ARIA APARTMENTS
PHASE 1

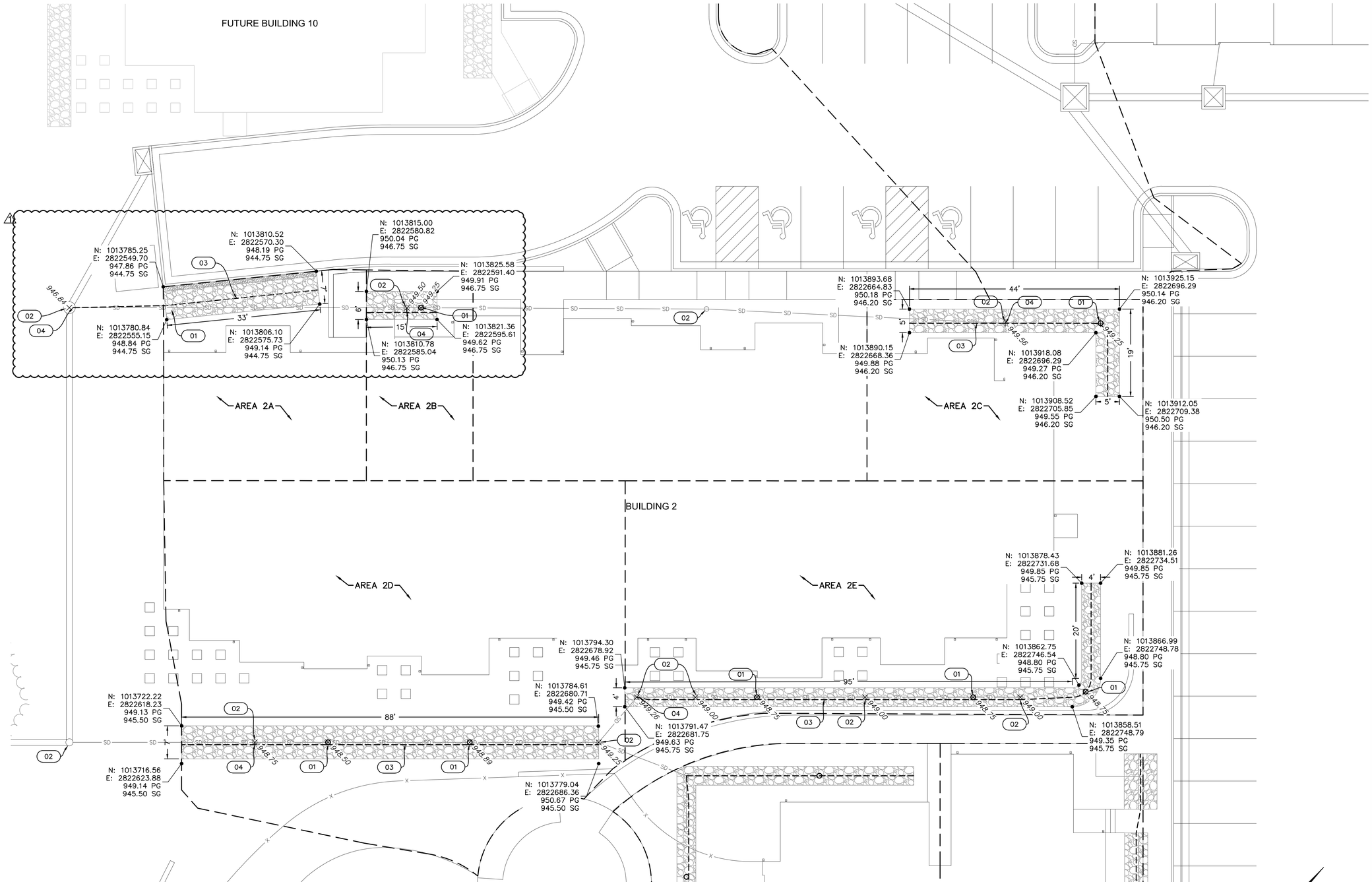
LEE'S SUMMIT, MO

2020

drawn by: M.J.D.
checked by: N.D.H.
designed by: M.J.D.
QA/QC by: N.D.H.
project no.: 019-0012-B
date: 2020.08.27

SHEET
C602

File: F:\2019\0001-0500\019-0012-B\40-Design\AutoCAD\Final Plans\Sheets\GNCV\Site Development\C_BMP01_ B190012.dwg ~ Layout: INFILTRATION TRENCH PLAN ~ Last Saved By: mdiebolt ~ Plot Date: 2019.10.01 03:03 PM



1

Water Quality Volume Storage						
Trench	Drainage Area	Impervious	Rv	WqV	Infiltration Area	Storage Volume
#	S.F.	%		C.F.	S.F.	C.F. (30" Depth @ 40% Voids)
2A	1855	80	0.77	163	228	228
2B	1005	80	0.77	88	89	89
2C	2246	60	0.59	151	290	290
2C	6977	70	0.68	542	618	618
2E	5524	65	0.635	400	485	485

CONSTRUCTION NOTES (##)

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2. NYLOPLAST DRAIN BASIN (REFER TO STORM SEWER PLAN & PROFILE SHEETS)
3. 4" PERFORATED HDPE UNDERDRAIN (REFER TO FILTRATION TRENCH DETAILS)
4. CONNECT UNDERDRAIN TO PROPOSED STORM DRAINAGE BASIN

N

0' 5' 10' 20'
SCALE IN FEET

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NO. REV.	DATE	REVISIONS DESCRIPTION	BY
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REVISIONS

FILTRATION TRENCH PLAN
SITE DEVELOPMENT PLANS

ARIA APARTMENTS
PHASE 1

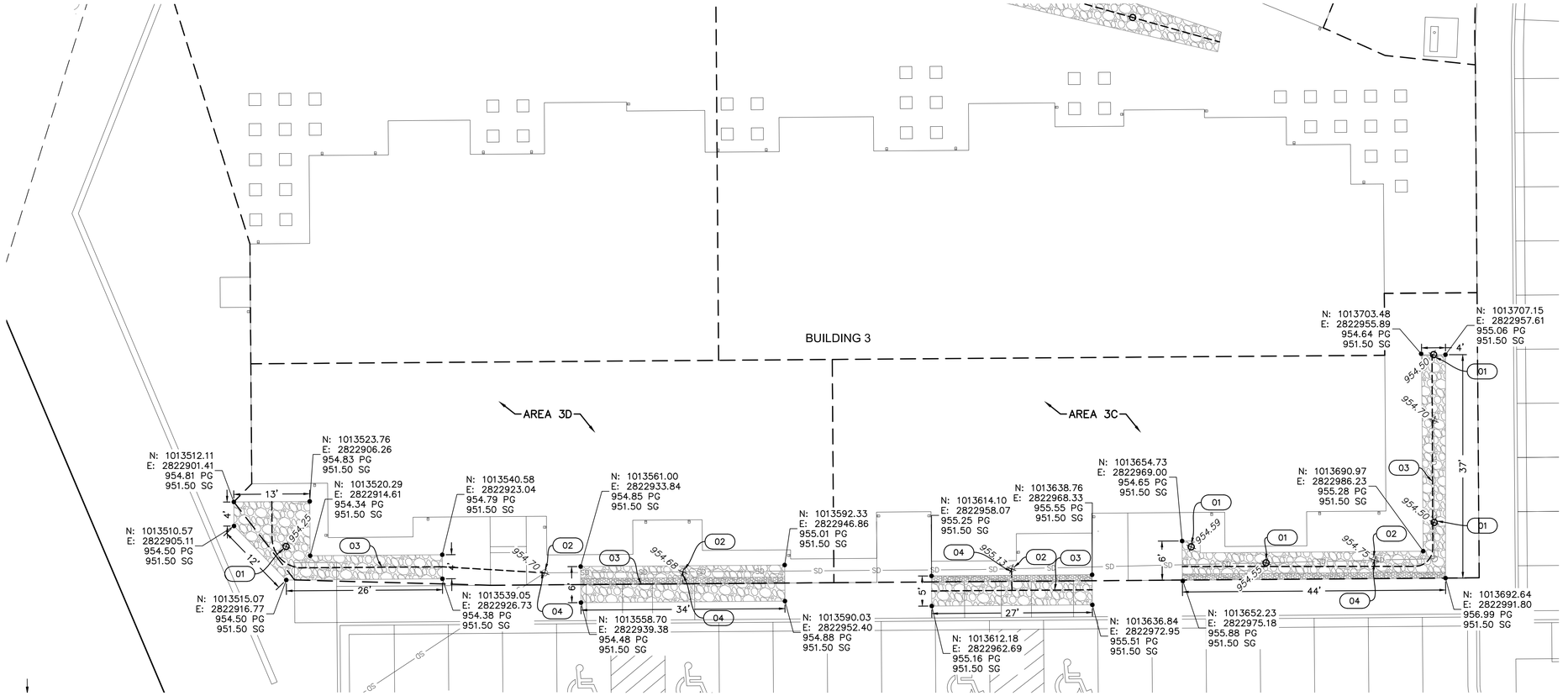
LEE'S SUMMIT, MO

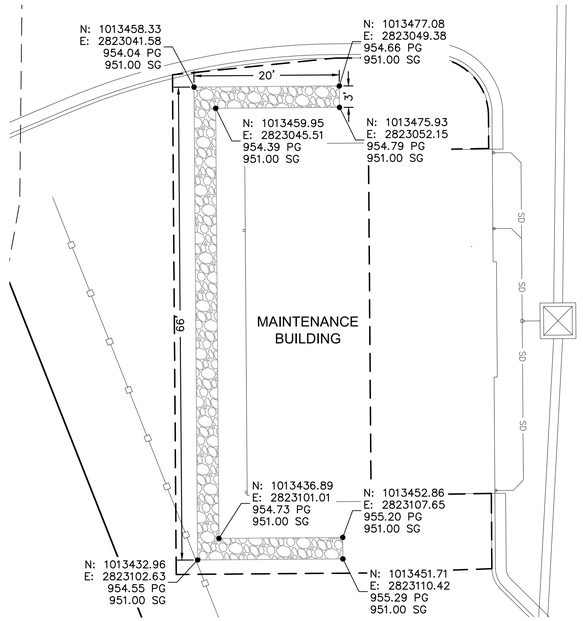
2020

drawn by: M.J.D.
checked by: N.D.H.
designed by: M.J.D.
QA/QC by: N.D.H.
project no.: 019-0012-B
date: 2020.08.27

SHEET
C603

File: F:\2019\0001-0500\019-0012-B\40-Design\AutoCAD\Final Plans\Sheets\GNCV\Site Development\C_BMP01_ B190012.dwg ~ Layout: INFILIRATION TRENCH PLAN (2) ~ Last Saved By: mdiebolt ~ Plot Date: 2019.10.01 03:03 PM





1

Water Quality Volume Storage						
Trench	Drainage Area	Impervious	Rv	WqV	Infiltration Area	Storage Volume
#	S.F.	%		C.F.	S.F.	C.F. (30" Depth @ 40% Voids)
3C	4142	85	0.815	385	461	461
3D	3789	90	0.86	372	417	417
Maint.	2310	50	0.5	132	302	302

CONSTRUCTION NOTES (##)

1. INSTALL NYLOPLAST 12" GRATE INLET (REFER TO FILTRATION TRENCH DETAILS)
2. NYLOPLAST DRAIN BASIN (REFER TO STORM SEWER PLAN & PROFILE SHEETS)
3. 4" PERFORATED HDPE UNDERDRAIN (REFER TO FILTRATION TRENCH DETAILS)
4. CONNECT UNDERDRAIN TO PROPOSED STORM DRAINAGE BASIN

N

0' 5' 10' 20'
SCALE IN FEET

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MO# 2015000555

NO. REV.	DATE	REVISIONS DESCRIPTION	BY
1	2021.02.04	REVISED PER CITY COMMENTS	

REVISIONS

FILTRATION TRENCH PLAN
SITE DEVELOPMENT PLANS

ARIA APARTMENTS
PHASE 1

LEES SUMMIT, MO

2020

drawn by: M.J.D.
checked by: N.D.H.
designed by: M.J.D.
QA/QC by: N.D.H.
project no.: 019-0012-B
date: 2020.08.27

SHEET
C604

File: F:\2019\0001-0500\019-0012-B\40-Design\AutoCAD\Final Plans\Sheets\GNCV\Site Development\C_BMP01_ B190012.dwg ~ Layout: INFILTRATION TRENCH PLAN (3) ~ Last Saved By: mdiebolt ~ Plot Date: 2019.10.01 03:03 PM

Water Quality Volume Storage						
Trench	Drainage Area	Impervious	Rv	WqV	Filtration Area	Storage Volume
#	S.F.	%		C.F.	S.F.	C.F. (30" Depth @ 40% Voids)
4A	8394	30	0.32000	307	562	562
4B	5116	85	0.81500	476	481	481
4C	2380	75	0.72500	197	208	208
4D	8158	35	0.36500	340	363	363
4E	13836	35	0.36500	577	596	596

N

0' 5' 10' 20'
SCALE IN FEET

CONSTRUCTION NOTES (##)

1. INSTALL NYLOPLAST 12" GRATE INLET (REFER TO FILTRATION TRENCH DETAILS)
2. NYLOPLAST DRAIN BASIN (REFER TO STORM SEWER PLAN & PROFILE SHEETS)
3. 4" PERFORATED HDPE UNDERDRAIN (REFER TO FILTRATION TRENCH DETAILS)
4. CONNECT UNDERDRAIN TO PROPOSED STORM DRAINAGE BASIN

10' U.E.

N: 1013600.10
E: 2823317.63
957.76 PG
954.40 SG

N: 1013595.30
E: 2823316.14
957.65 PG
953.50 SG

N: 1013606.79
E: 2823320.38
957.60 PG
954.40 SG

N: 1013528.15
E: 2823288.23
958.87 PG
953.50 SG

N: 1013523.33
E: 2823286.81
958.88 PG
954.50 SG

N: 1013431.44
E: 2823248.62
958.64 PG
954.50 SG

N: 1013433.76
E: 2823243.08
958.40 PG
954.50 SG

N: 1013628.36
E: 2823309.56
958.02 PG
954.40 SG

N: 1013597.22
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957.92 PG
953.50 SG

N: 1013530.07
E: 2823283.61
958.68 PG
953.50 SG

N: 1013525.63
E: 2823281.27
958.79 PG
954.50 SG

N: 1013601.63
E: 2823313.94
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954.40 SG

N: 1013606.64
E: 2823315.98
957.61 PG
954.40 SG

N: 1013625.24
E: 2823306.65
958.14 PG
954.40 SG

AREA 4D

AREA 4E

BUILDING 4

AREA 4A

AREA 4B

AREA 4C

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954.40 SG

N: 1013621.26
E: 2823223.52
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954.40 SG

N: 1013655.31
E: 2823244.71
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954.40 SG

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E: 2823234.68
958.50 PG
954.40 SG

N: 1013596.06
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955.25 SG

N: 1013557.50
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955.25 SG

N: 1013530.98
E: 2823178.02
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954.40 SG

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953.50 SG

N: 1013474.24
E: 2823151.19
956.92 PG
953.50 SG

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MO# 2015000555

NO. REV.	DATE	REVISIONS DESCRIPTION	BY
1	2021.02.04	REVISED PER CITY COMMENTS	

REVISIONS

FILTRATION TRENCH PLAN
SITE DEVELOPMENT PLANS

ARIA APARTMENTS
PHASE 1

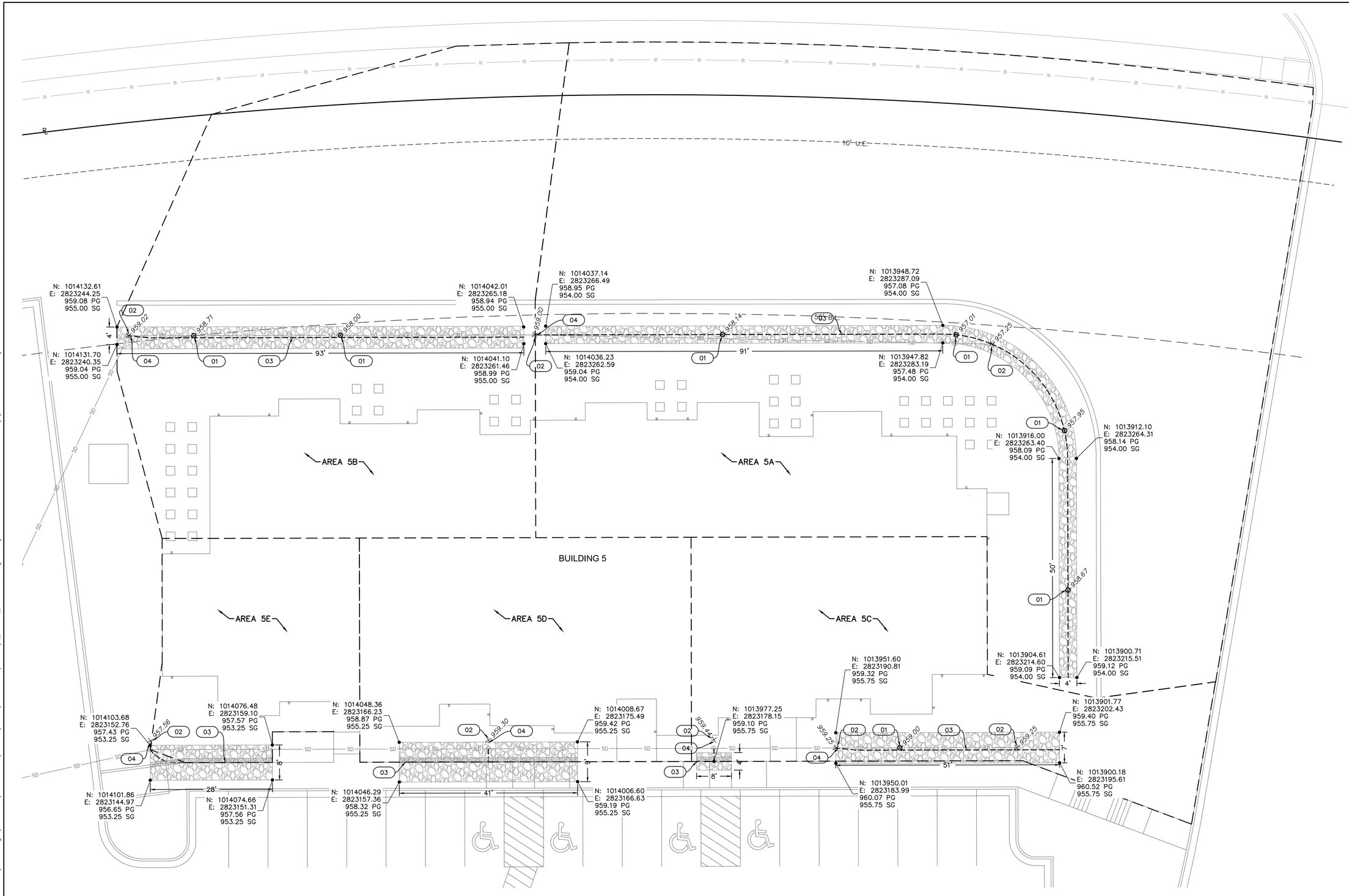
LEE'S SUMMIT, MO

2020

drawn by: M.J.D.
checked by: N.D.H.
designed by: M.J.D.
QA/QC by: N.D.H.
project no.: 019-0012-B
date: 2020.08.27

SHEET
C605

File: F:\2019\0001-0500\019-0012-B\40-Design\AutoCAD\Final Plans\Sheets\QNCV\Site Development\C_BMP01_ B190012.dwg ~ Layout: INFILTRATION TRENCH PLAN (4) ~ Last Saved By: mdiebolt ~ Plot Date: 2019.10.01 03:03 PM



Water Quality Volume Storage						
Trench	Drainage Area	Impervious	Rv	WqV	Infiltration Area	Storage Volume
#	S.F.	%		C.F.	S.F.	C.F. (30" Depth @ 40% Voids)
5A	20453	25	0.275	642	742	742
5B	9479	33	0.347	376	465	465
5C	4605	70	0.68	358	358	358
5D	3888	80	0.77	342	371	371
5E	2135	80	0.77	188	223	223

CONSTRUCTION NOTES (##)

1. INSTALL NYLOPLAST 12" GRATE INLET (REFER TO FILTRATION TRENCH DETAILS)
2. NYLOPLAST DRAIN BASIN (REFER TO STORM SEWER PLAN & PROFILE SHEETS)
3. 4" PERFORATED HDPE UNDERDRAIN (REFER TO FILTRATION TRENCH DETAILS)
4. CONNECT UNDERDRAIN TO PROPOSED STORM DRAINAGE BASIN

N

0' 5' 10' 20'
SCALE IN FEET

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NICHOLAS D. HEISER, P.E.
MO# 2015000555

NO. REV.	DATE	REVISIONS DESCRIPTION	BY
1	2021.02.04	REVISED PER CITY COMMENTS	

REVISIONS

FILTRATION TRENCH PLAN
SITE DEVELOPMENT PLANS

ARIA APARTMENTS
PHASE 1

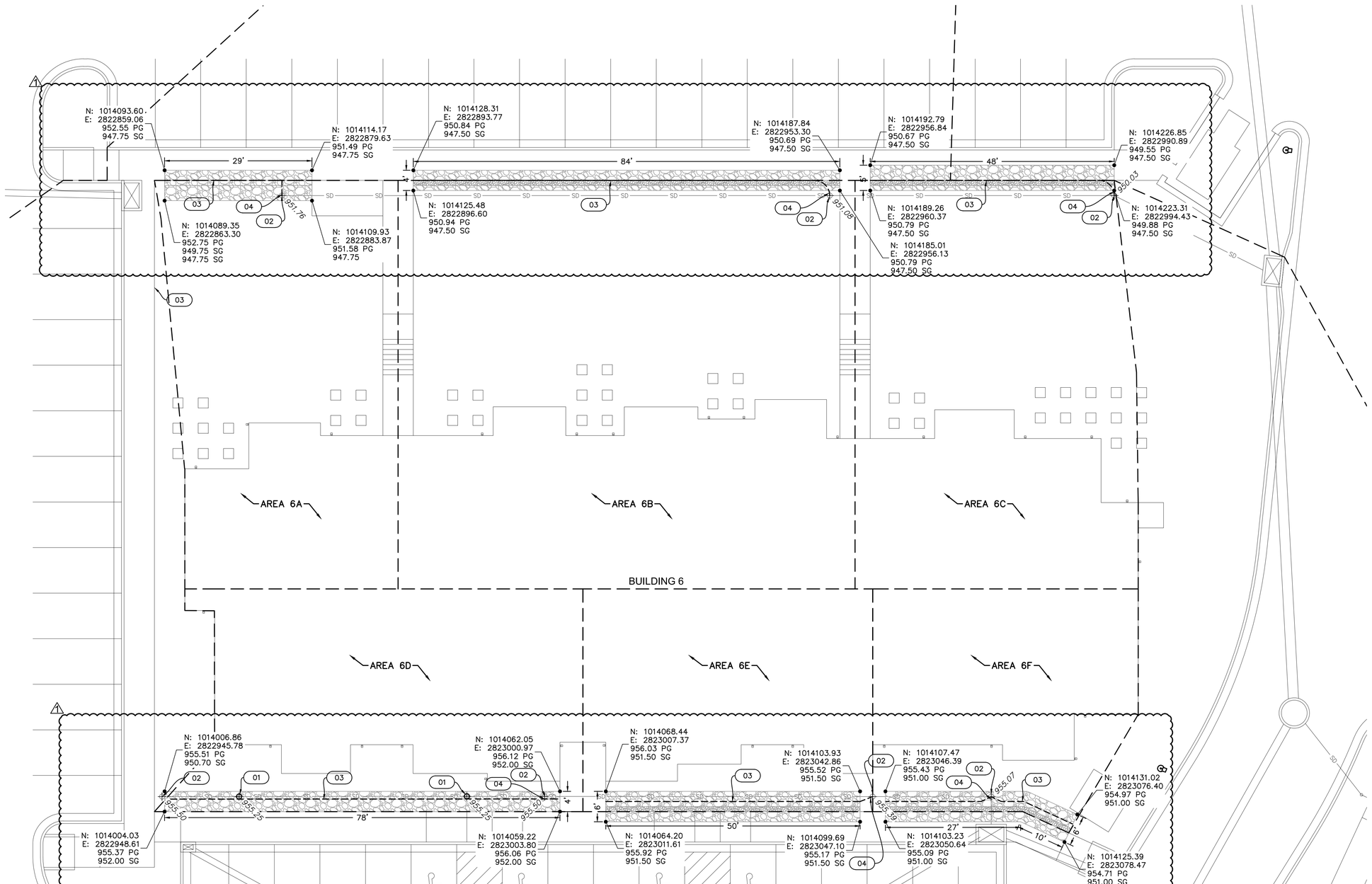
LEE'S SUMMIT, MO

2020

drawn by: M.J.D.
checked by: N.D.H.
designed by: M.J.D.
QA/QC by: N.D.H.
project no.: 019-0012-B
date: 2020.08.27

SHEET
C606

File: F:\2019\0001-0500\019-0012-B\40-Design\AutoCAD\Final Plans\Sheets\GNCV\Site Development\C_BMP01_ B190012.dwg ~ Layout: INFILTRATION TRENCH PLAN (5) ~ Last Saved By: mdiebolt ~ Plot Date: 2019.10.01 03:03 PM



Water Quality Volume Storage						
Trench	Drainage Area	Impervious	Rv	WqV	Infiltration Area	Storage Volume
#	S.F.	%		C.F.	S.F.	C.F. (30" Depth @ 40% Voids)
6A	3553	40	0.41	166	174	174
6B	7275	38	0.392	326	336	336
6C	4408	38	0.392	197	240	240
6D	3301	75	0.725	273	312	312
6E	2516	80	0.77	221	301	301
6F	2220	72	0.698	177	225	225

CONSTRUCTION NOTES (##)

1. INSTALL NYLOPLAST 12" GRATE INLET (REFER TO FILTRATION TRENCH DETAILS)
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3. 4" PERFORATED HDPE UNDERDRAIN (REFER TO FILTRATION TRENCH DETAILS)
4. CONNECT UNDERDRAIN TO PROPOSED STORM DRAINAGE BASIN

0' 5' 10' 20'
SCALE IN FEET

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MO# 2015000555

NO. REV.	DATE	REVISIONS DESCRIPTION	BY
1	2021.02.04	REVISED PER CITY COMMENTS	

REVISIONS

FILTRATION TRENCH PLAN
SITE DEVELOPMENT PLANS

ARIA APARTMENTS
PHASE 1

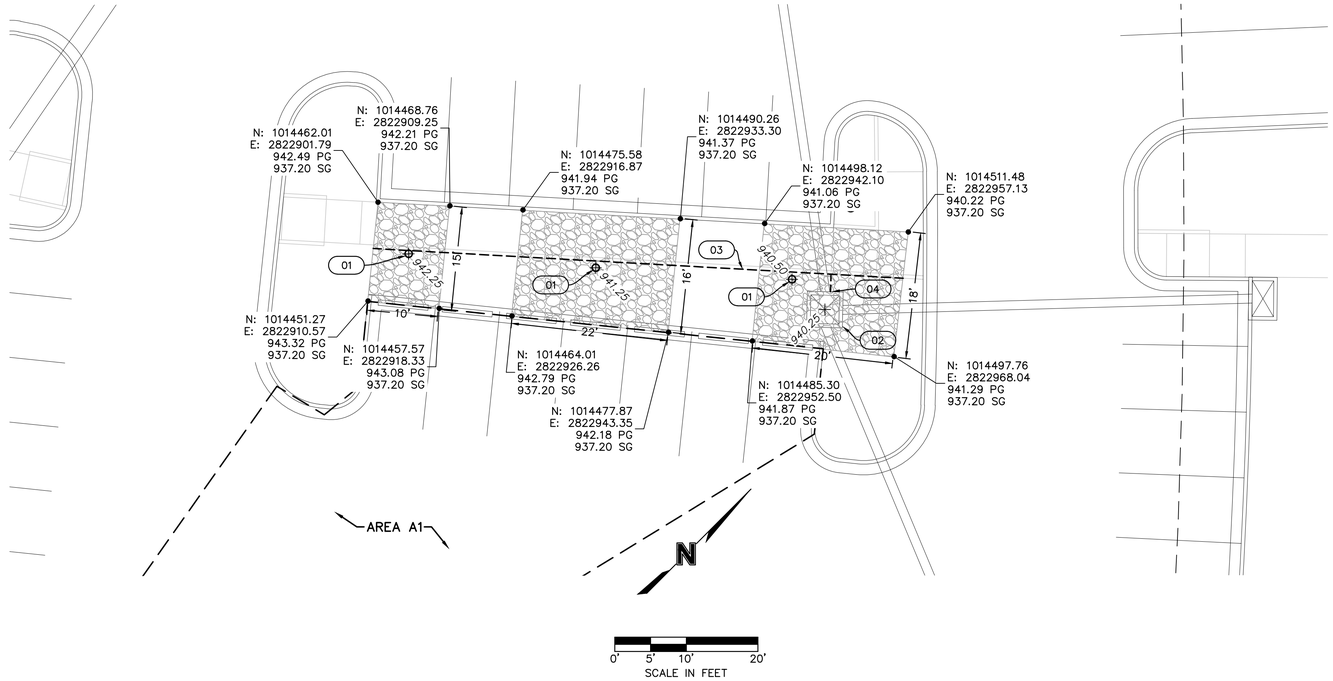
LEE'S SUMMIT, MO

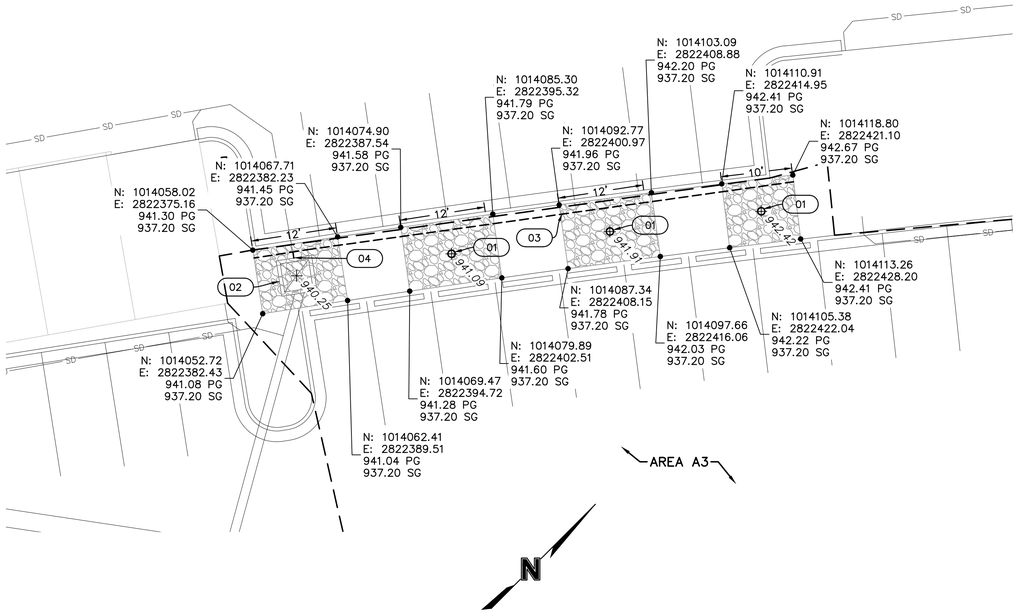
2020

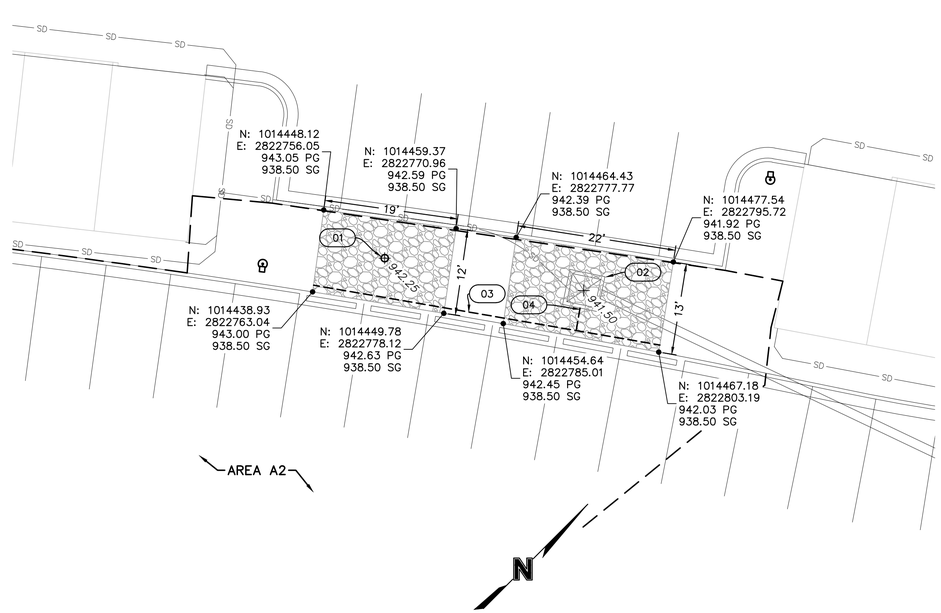
drawn by: M.J.D.
checked by: N.D.H.
designed by: M.J.D.
QA/QC by: N.D.H.
project no.: 019-0012-B
date: 2020.08.27

SHEET
C607

File: F:\2019\0001-0500\019-0012-B\40-Design\AutoCAD\Final Plans\Sheets\GNCV\Site Development\C_BMP01_ B190012.dwg ~ Layout: INFILTRATION TRENCH PLAN (6) ~ Last Saved By: mdiebolt ~ Plot Date: 2019.10.01 03:03 PM







Water Quality Volume Storage						
Trench #	Drainage Area S.F.	Impervious %	Rv	WqV C.F.	Infiltration Area S.F.	Storage Volume C.F. (30" Depth @ 40% Voids)
A1	9990	85	0.815	930	822	822
A2	18511	85	0.815	1722	495	495
A3	19403	85	0.815	1805	431	431

CONSTRUCTION NOTES (##)

1. INSTALL NYLOPLAST 12" GRATE INLET (REFER TO FILTRATION TRENCH DETAILS)
2. FIELD INLET (REFER TO STORM SEWER PLAN & PROFILE SHEETS)
3. 4" PERFORATED HDPE UNDERDRAIN (REFER TO FILTRATION TRENCH DETAILS)
4. CONNECT UNDERDRAIN TO PROPOSED STORM DRAINAGE BASIN

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MO CERTIFICATE OF AUTHORITY #:001592
1301 BURLINGTON, SUITE 105
NORTH KANSAS CITY, MO 64116
TEL 816.361.1177
www.olsson.com

NICHOLAS D. HEISER, P.E.
MO# 2015000555

NO. REV.	DATE	REVISIONS DESCRIPTION	BY
1	2021.02.04	REVISED PER CITY COMMENTS	

REVISIONS

FILTRATION TRENCH PLAN
SITE DEVELOPMENT PLANS

ARIA APARTMENTS
PHASE 1

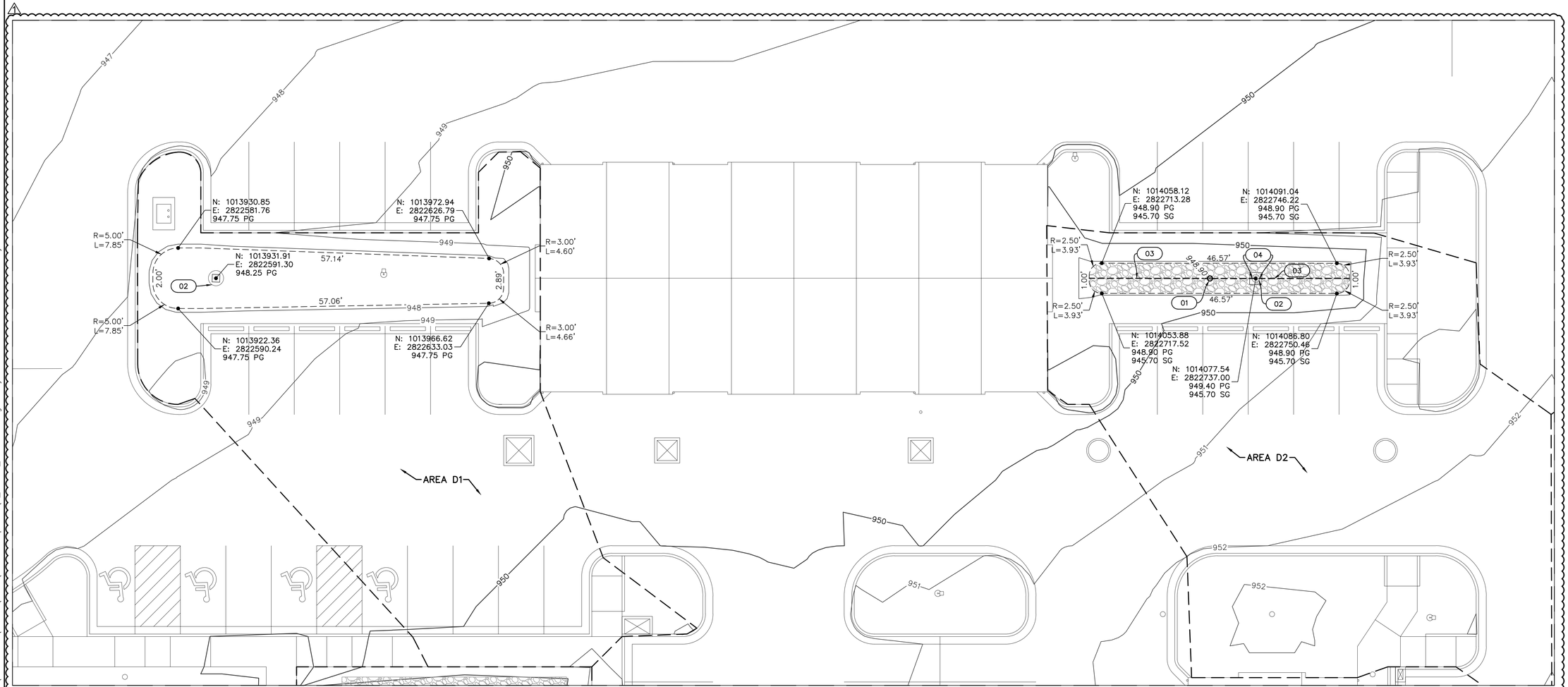
LEE'S SUMMIT, MO

2020

drawn by: M.J.D.
checked by: N.D.H.
designed by: M.J.D.
QA/QC by: N.D.H.
project no.: 019-0012-B
date: 2020.08.27

SHEET
C608

File: F:\2019\0001-0500\019-0012-B\40-Design\AutoCAD\Final Plans\Sheets\GNCV\Site Development\C_BMP01_ B190012.dwg ~ Layout: INFILTRATION TRENCH PLAN (7) ~ Last Saved By: mdiebolt ~ Plot Date: 2019.10.01 03:03 PM



Water Quality Volume Storage - Depressed Areas								
	Drainage Area	Impervious	Rv	WqV	Surface Area	Ponding Depth	Provided Depth	Provided Vol
ID	S.F.	%		C.F.	S.F.	in	in.	C.F.
D1	5968	60	0.59	402	812	5.94	6.00	406

Water Quality Volume Storage - Depressed Areas w/ Filtration											
	Drainage Area	Impervious	Rv	WqV	Surface Area	Ponding Depth	Provided Ponding Vol	Filtration Area	Trench Depth	Trench Storage Volume	Total Storage Volume
ID	S.F.	%		C.F.	S.F.	in	C.F.	S.F.	in.	C.F. (@ 40% Voids)	C.F.
D2	7124	60	0.59	480	310	6.00	155	310	32	331	486

CONSTRUCTION NOTES (##)

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2. STORM INLET (REFER TO STORM SEWER PLAN & PROFILE SHEETS)
3. 4" PERFORATED HDPE UNDERDRAIN (REFER TO FILTRATION TRENCH DETAILS)
4. CONNECT UNDERDRAIN TO PROPOSED STORM DRAINAGE BASIN

N

0' 5' 10' 20'
SCALE IN FEET

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MO# 2015000555

NO. REV.	DATE	REVISIONS DESCRIPTION	BY
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REVISIONS

FILTRATION TRENCH PLAN
SITE DEVELOPMENT PLANS

ARIA APARTMENTS
PHASE 1

LEE'S SUMMIT, MO

2020

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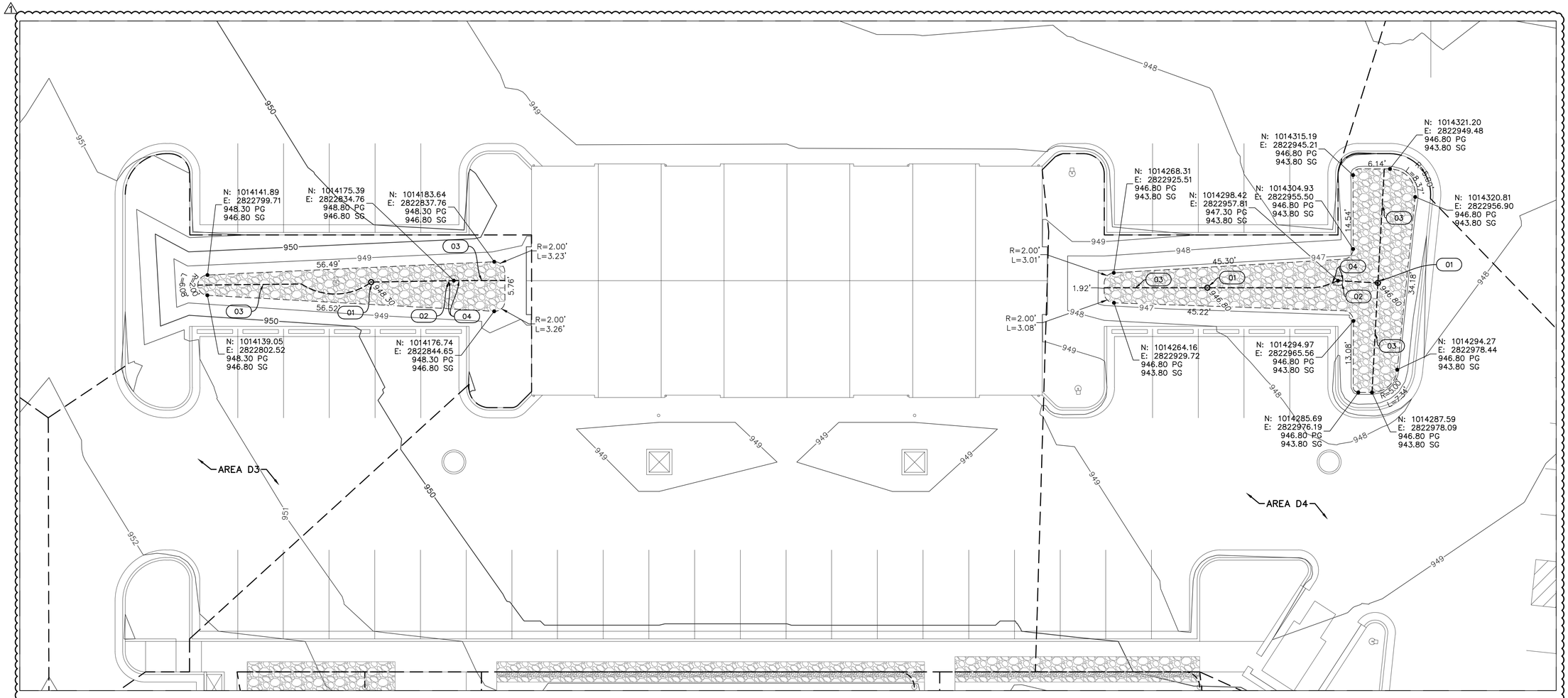
checked by: N.D.H.
designed by: M.J.D.
QA/QC by: N.D.H.
project no.: 019-0012-B
date: 2020.08.27

SHEET
C609

File: F:\2019\0001-0500\019-0012-B\40-Design\AutoCAD\Final Plans\Sheets\GNCV\Site Development\C_BMP03_ B190012.dwg ~ Layout: BMP PLAN ~ Last Saved By: mdiebolt ~ Plot Date: 2019.10.01 03:03 PM



Water Quality Volume Storage - Depressed Areas w/ Filtration											
Drainage Area ID	Drainage Area	Impervious	Rv	WqV	Surface Area	Ponding Depth	Provided Ponding Vol	Filtration Area	Trench Depth	Trench Storage Volume	Total Storage Volume
ID	S.F.	%		C.F.	S.F.	in	C.F.	S.F.	in.	C.F. (@ 40% Voids)	C.F.
D3	6173	65	0.635	413	500	6.00	250	500	12	200	450
D4	13691	75	0.725	1133	843	6.00	422	843	30	843	1265

CONSTRUCTION NOTES (##)

1. INSTALL NYLOPLAST 12" GRATE INLET (REFER TO FILTRATION TRENCH DETAILS)
2. STORM INLET (REFER TO STORM SEWER PLAN & PROFILE SHEETS)
3. 4" PERFORATED HDPE UNDERDRAIN (REFER TO FILTRATION TRENCH DETAILS)
4. CONNECT UNDERDRAIN TO PROPOSED STORM DRAINAGE BASIN

N

0' 5' 10' 20'
SCALE IN FEET

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NICHOLAS D. HEISER, P.E.
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FILTRATION TRENCH PLAN
SITE DEVELOPMENT PLANS

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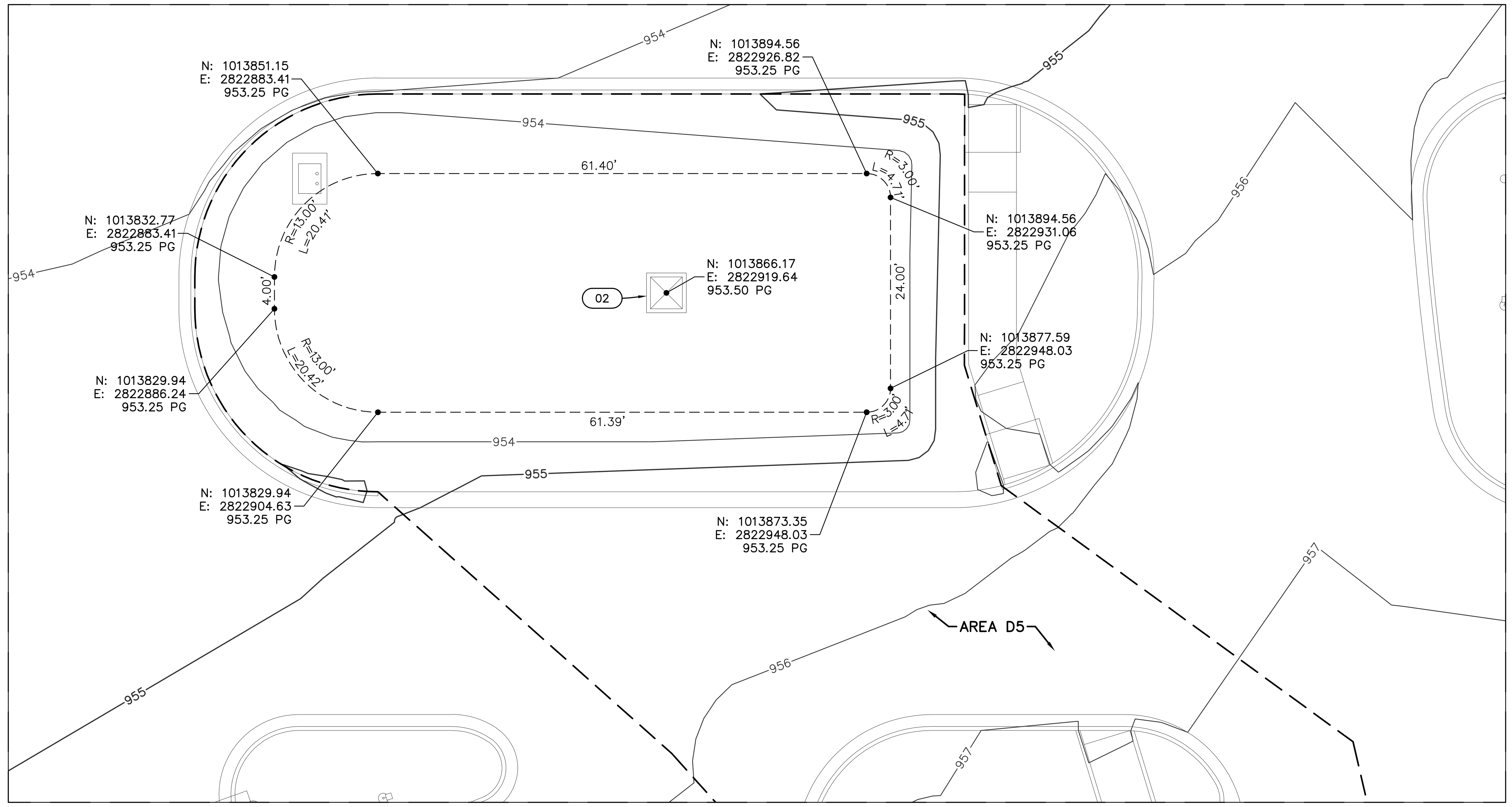
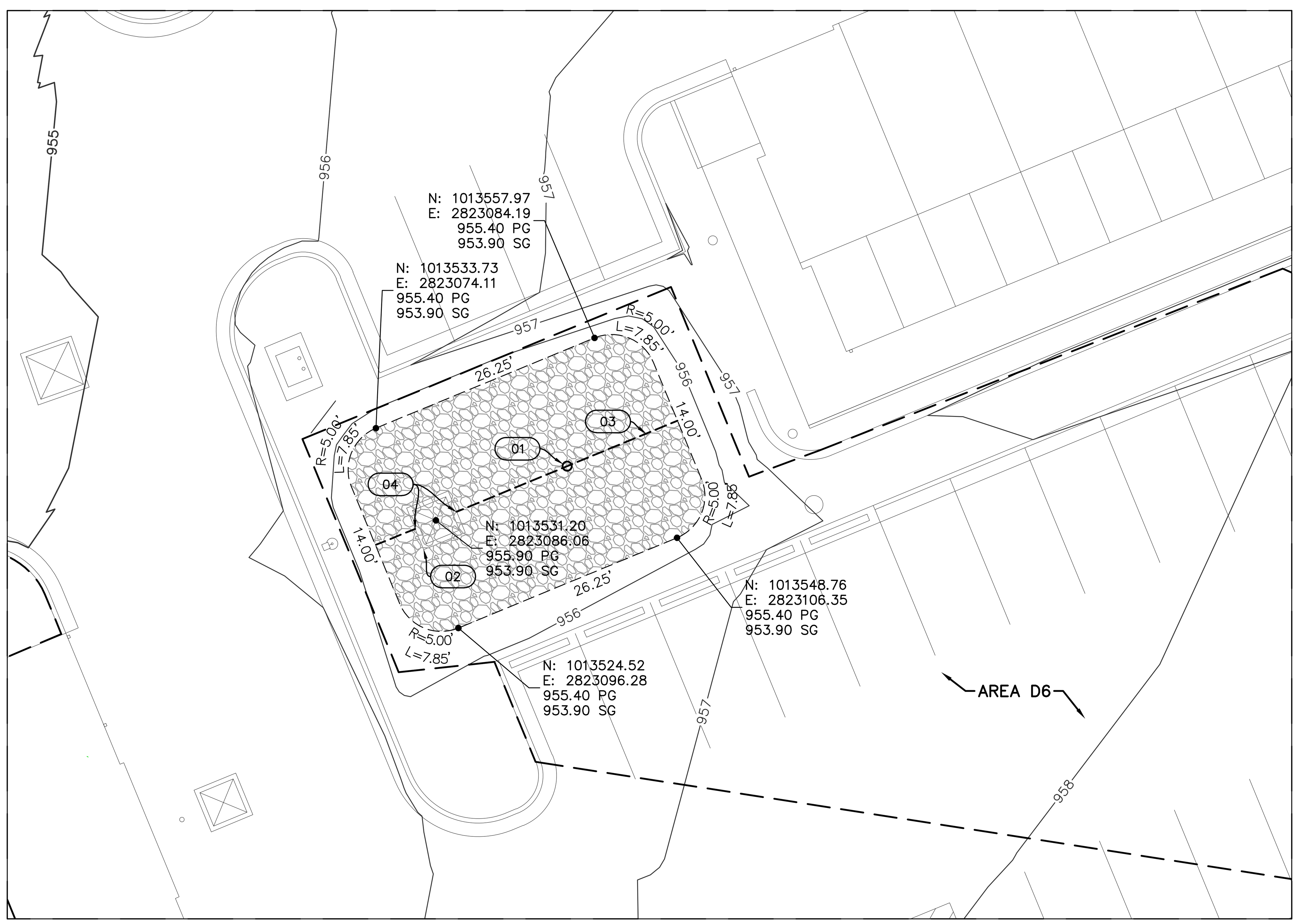
SHEET
C610





Water Quality Volume Storage - Depressed Areas								
Drainage Area ID	Drainage Area	Impervious	Rv	WqV	Surface Area	Required Depth	Provided Depth	Provided Vol
ID	S.F.	%		C.F.	S.F.	in	in.	C.F.
D5	9700	36	0.374	414	2245	2.21	3.00	561

Water Quality Volume Storage - Depressed Areas w/ Filtration											
Drainage Area ID	Drainage Area	Impervious	Rv	WqV	Surface Area	Ponding Depth	Provided Ponding Vol	Filtration Area	Trench Depth	Trench Storage Volume	Total Storage Volume
ID	S.F.	%		C.F.	S.F.	in	C.F.	S.F.	in.	C.F. (@ 40% Voids)	C.F.
D6	8582	62	0.608	596	848	6.00	424	848	12	339	763

CONSTRUCTION NOTES (##)

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FILTRATION TRENCH PLAN
SITE DEVELOPMENT PLANS

ARIA APARTMENTS
PHASE 1

LEE'S SUMMIT, MO

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project no.:	019-0012-B
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SHEET
C611

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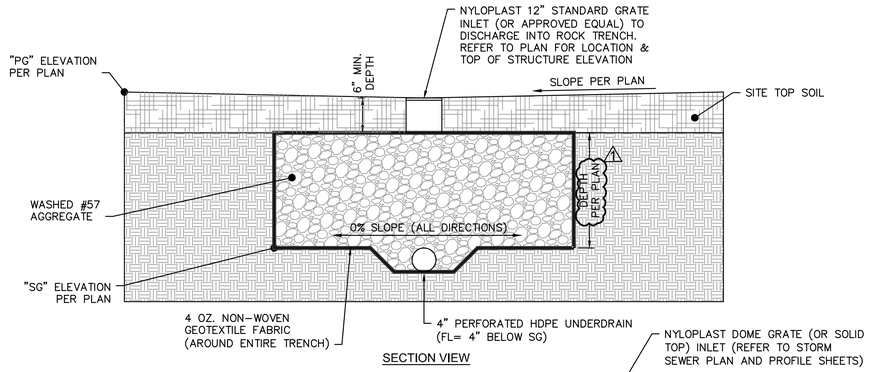
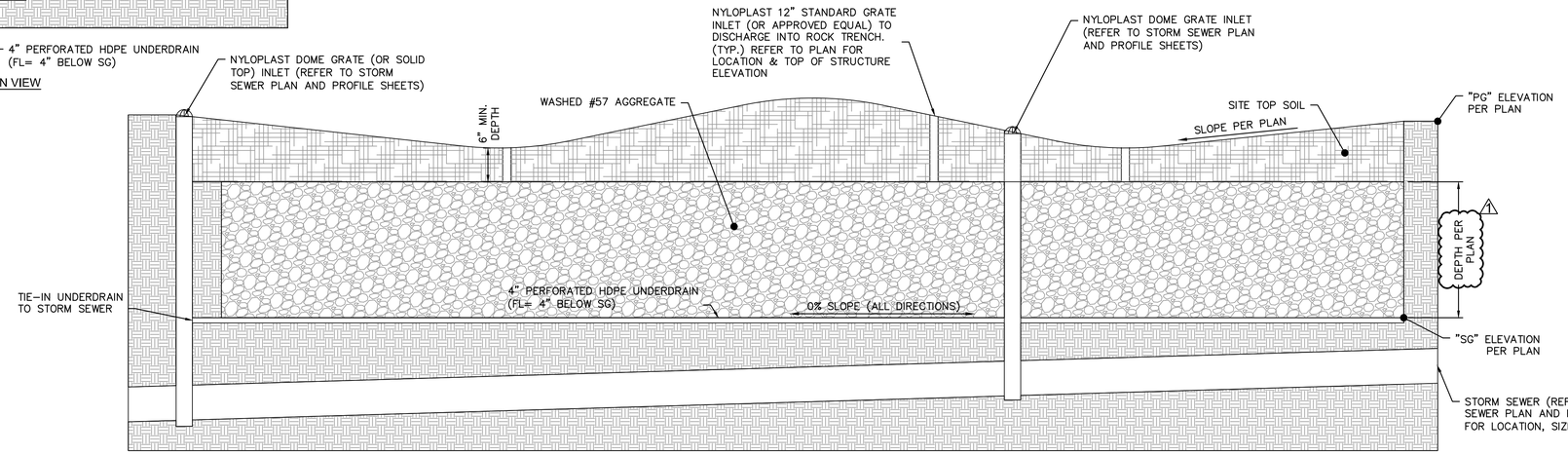
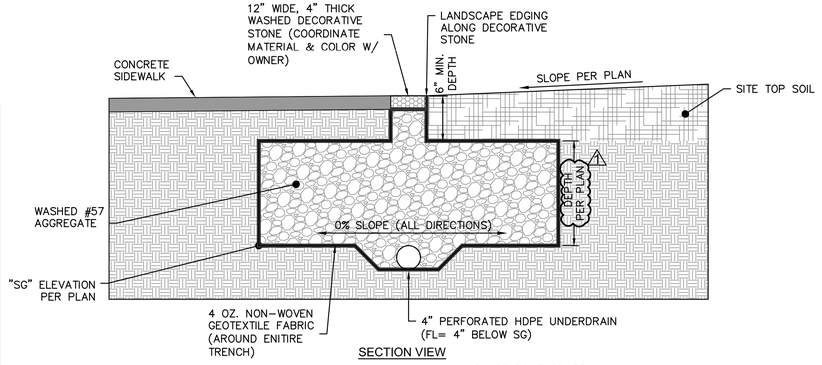


SECTION VIEW

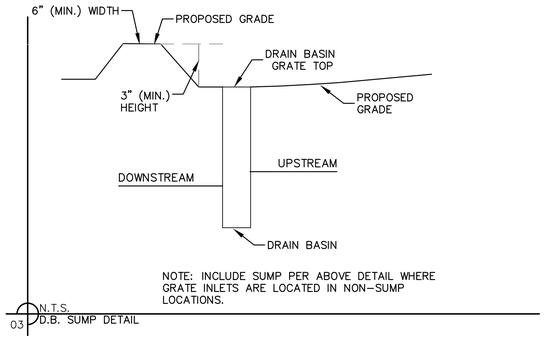


PROFILE VIEW

01 N.T.S.
FILTRATION TRENCH DETAIL A

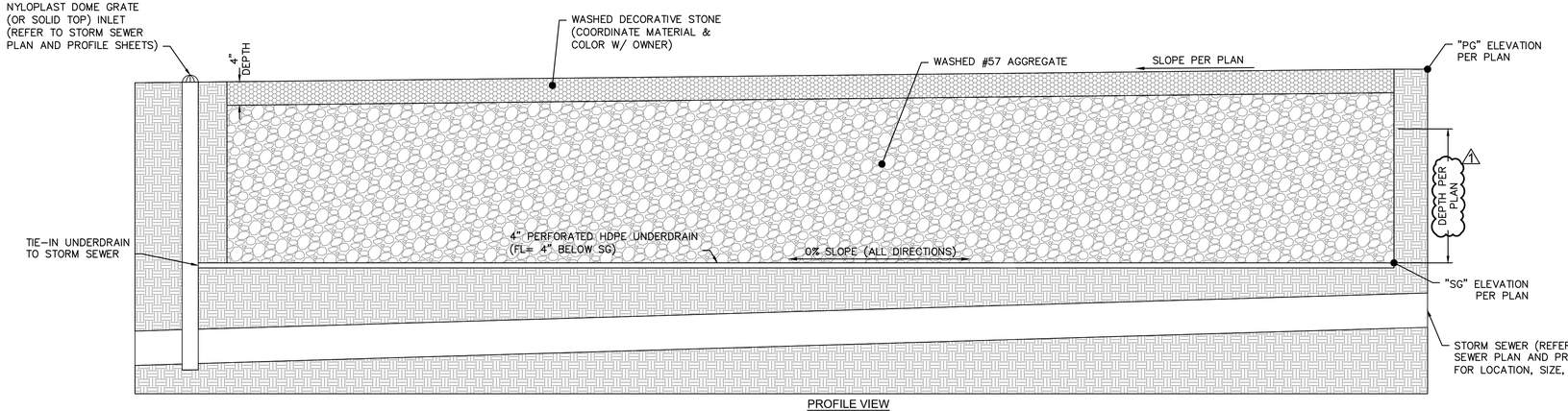


SECTION VIEW



NOTE: INCLUDE SUMP PER ABOVE DETAIL WHERE GRATE INLETS ARE LOCATED IN NON-SUMP LOCATIONS.

03 N.T.S.
D.B. SUMP DETAIL



PROFILE VIEW

02 N.T.S.
FILTRATION TRENCH DETAIL B

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NICHOLAS D. HEISER, P.E.
MO# 2015000555

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REVISIONS

DETAIL SHEET
SITE DEVELOPMENT PLANS

ARIA APARTMENTS
PHASE 1

LEE'S SUMMIT, MO

2020

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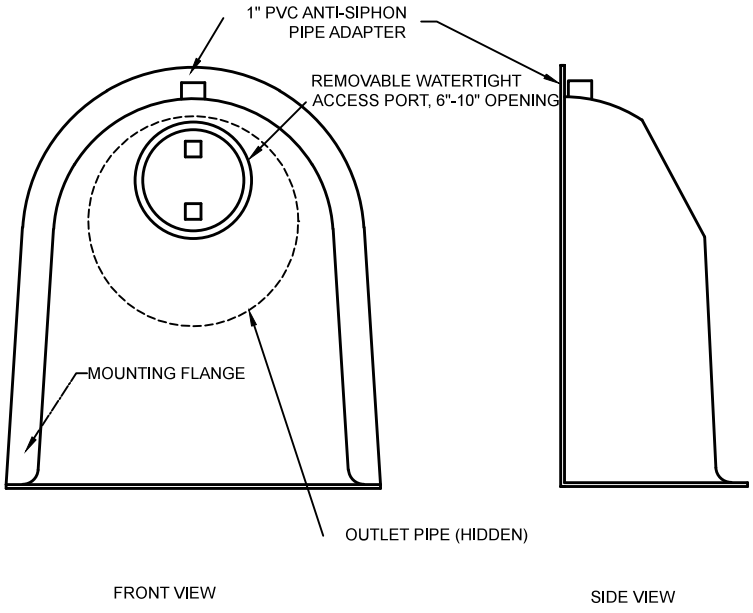
project no.: 019-0012-B
date: 2020.08.27

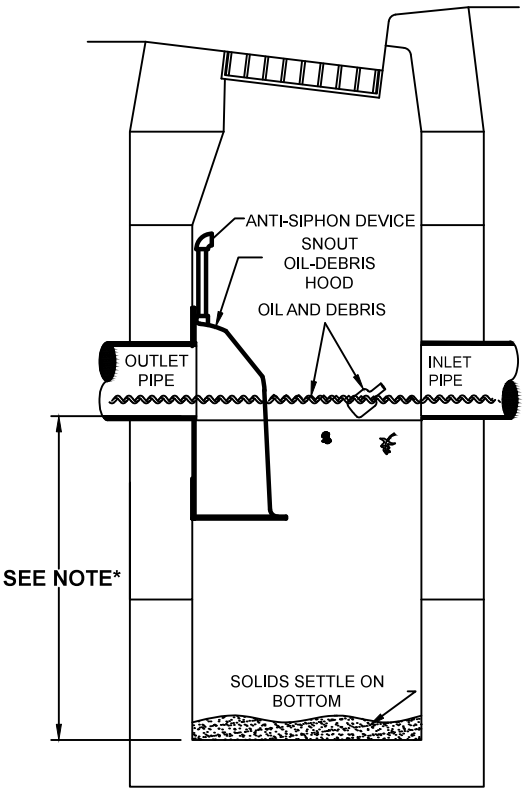
SHEET
C908

CONFIGURATION DETAIL



SNOUT OIL-WATER-DEBRIS SEPARATOR

TYPICAL INSTALLATION



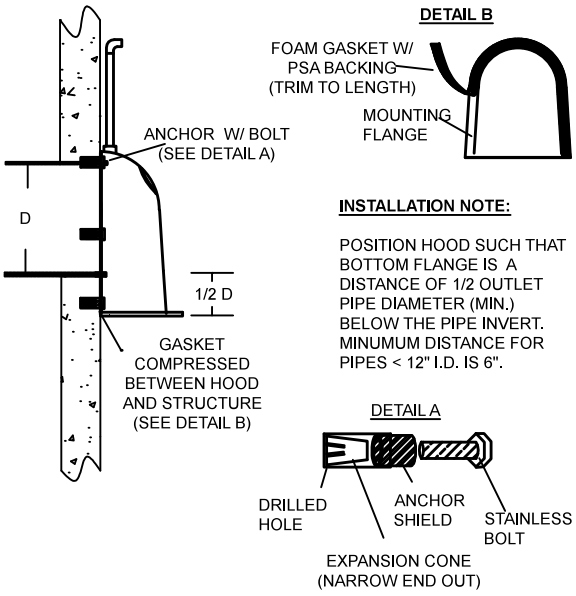
***NOTE-** SUMP DEPTH OF 36" MIN. FOR UP TO 12" ID PIPE. OUTLET. FOR PIPES 15" ID AND ABOVE SUMP DEPTH OF 2.5 TO 3 TIMES PIPE ID RECOMMENDED (E.G. 5' DEEP for 24" PIPE)

NOTES:

1. ALL HOODS AND TRAPS FOR CATCH BASINS AND WATER QUALITY STRUCTURES SHALL BE AS MANUFACTURED BY:
   BEST MANAGEMENT PRODUCTS, INC.
   9 MATHEWS DRIVE, UNIT A1-A2.
   EAST HADDAM, CT 06423
   TOLL FREE: (800) 504-8008 OR (888) 434-0277, FAX: (877) 434-3197
   WEB SITE: www.bmpinc.com
   OR PRE-APPROVED EQUAL
2. ALL HOODS SHALL BE CONSTRUCTED OF A GLASS REINFORCED RESIN COMPOSITE WITH ISO GEL COAT EXTERIOR FINISH WITH A MINIMUM 0.125" LAMINATE THICKNESS.
3. ALL HOODS SHALL BE EQUIPPED WITH A WATERTIGHT ACCESS PORT, A MOUNTING FLANGE, AND AN ANTI-SIPHON VENT PIPE AND ELBOW AS DRAWN. (SEE CONFIGURATION DETAIL)
4. THE SIZE AND POSITION OF THE HOOD SHALL BE DETERMINED BY OUTLET PIPE SIZE AS PER MANUFACTURER'S RECOMMENDATION (SNOUT SIZE ALWAYS LARGER THAN PIPE SIZE).
5. THE BOTTOM OF THE HOOD SHALL EXTEND DOWNWARD A MINIMUM DISTANCE EQUAL TO 1/2 THE OUTLET PIPE DIAMETER WITH A MINIMUM DISTANCE OF 6" FOR PIPES <12" I.D.
6. THE ANTI-SIPHON VENT SHALL EXTEND ABOVE HOOD BY MINIMUM OF 3" AND A MAXIMUM OF 12" ACCORDING TO STRUCTURE CONFIGURATION.
7. THE SURFACE OF THE STRUCTURE WHERE THE HOOD IS MOUNTED SHALL BE FINISHED SMOOTH AND FREE OF LOOSE MATERIAL AND PIPE SHALL BE FINISHED FLUSH TO WALL.
8. ALL STRUCTURE JOINTS SHALL BE WATERTIGHT.
9. THE HOOD SHALL BE SECURELY ATTACHED TO STRUCTURE WALL WITH $\frac{3}{8}$" STAINLESS STEEL BOLTS AND OIL-RESISTANT GASKET AS SUPPLIED BY MANUFACTURER. (SEE INSTALLATION DETAIL)
10. INSTALLATION INSTRUCTIONS SHALL BE FURNISHED WITH MANUFACTURER SUPPLIED INSTALLATION KIT.
    INSTALLATION KIT SHALL INCLUDE:
    A. INSTALLATION INSTRUCTIONS
    B. PVC ANTI-SIPHON VENT PIPE AND ADAPTER
    C. OIL-RESISTANT CRUSHED CELL FOAM GASKET WITH PSA BACKING
    D. 3/8" STAINLESS STEEL BOLTS
    E. ANCHOR SHIELDS

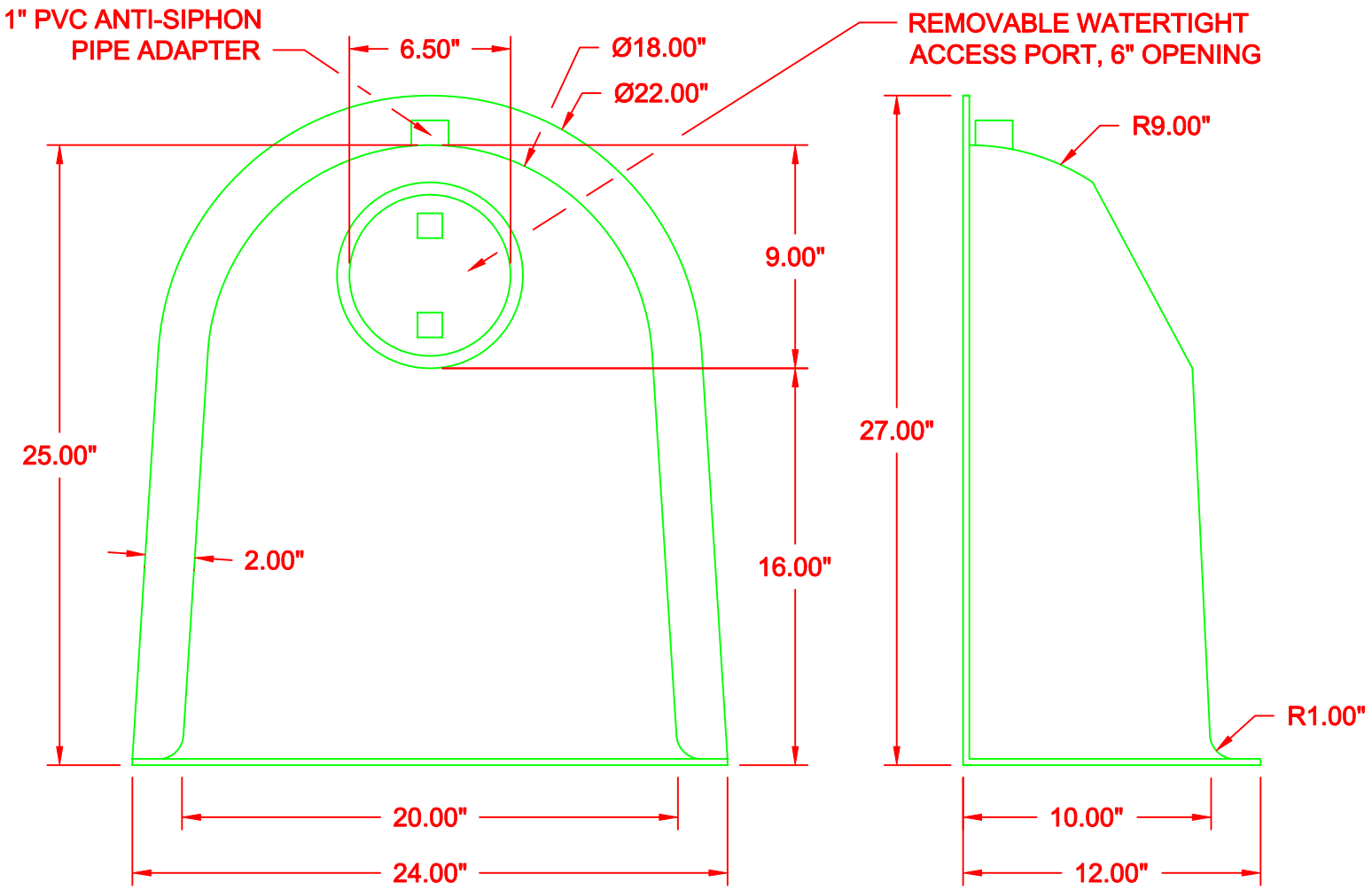
US Patent # 6126817, 7951294, 7857966, 8512556
Canada Patent # 2285146, 2690156, 2690156 others pending

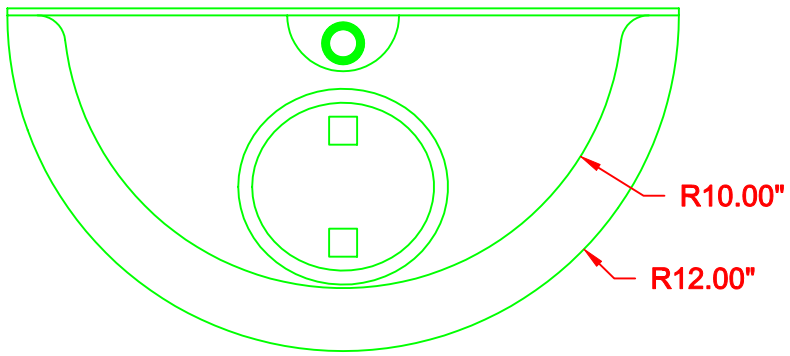
INSTALLATION DETAIL



HOOD SPECIFICATION FOR CATCH BASINS AND WATER QUALITY STRUCTURES

DESCRIPTION	DATE	SCALE
OIL- DEBRIS HOOD SPECIFICATION AND INSTALLATION (TYPICAL)	09/08/18	NONE
	DRAWING NUMBER	SP-SN



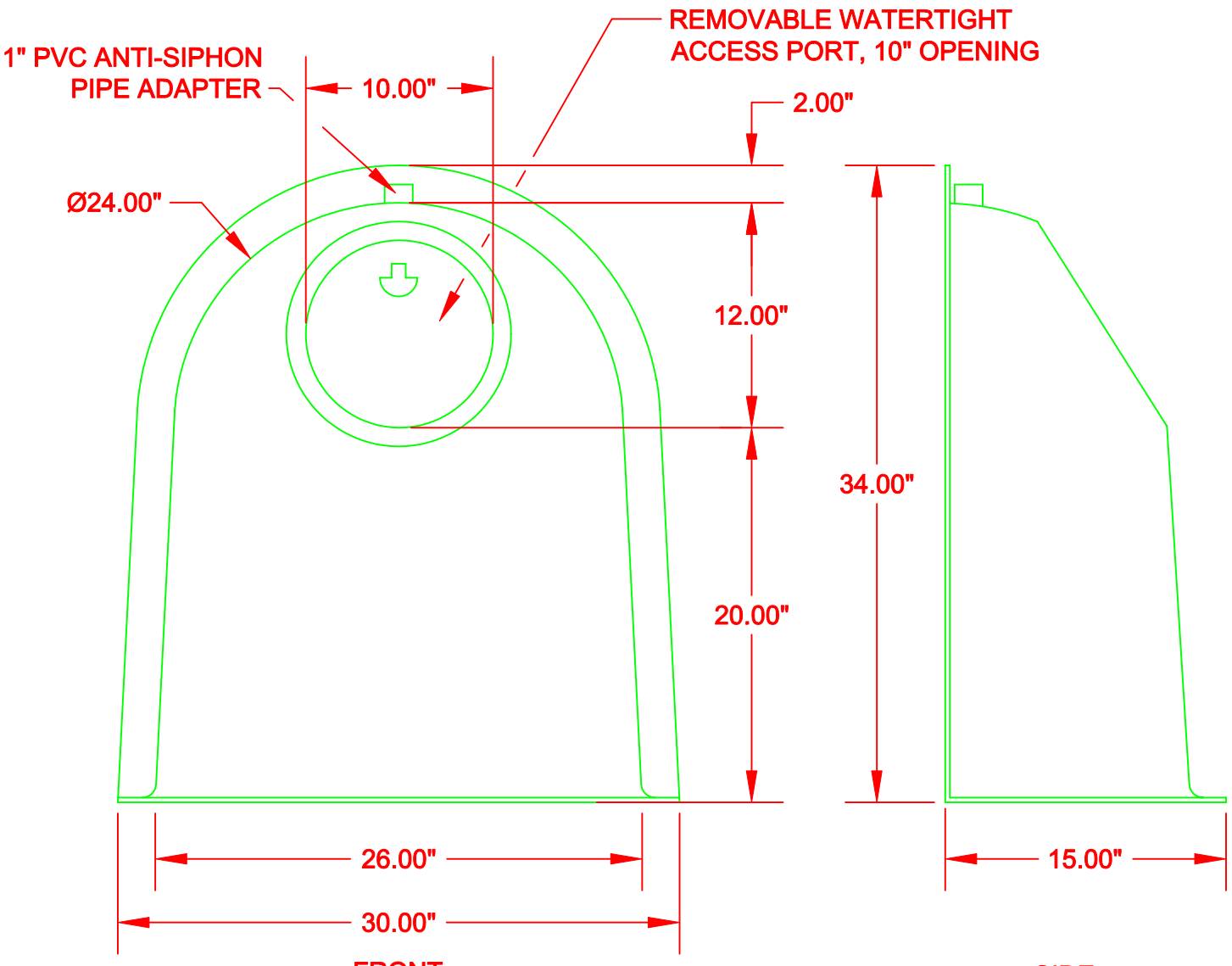


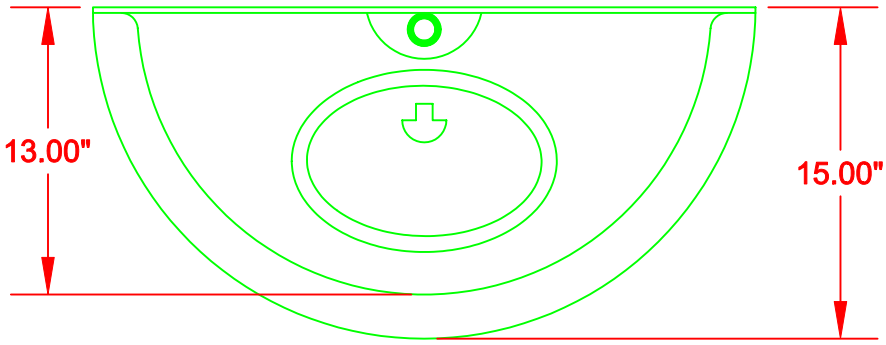
PLAN

US PATENT #6126817 ADDITIONAL PATENTS PENDING

BMP, INC.
53 MT. ARCHER ROAD, LYME, CT. 06371
(800) 504-8008 FAX: (860)434-3195

DESCRIPTION	DATE	SCALE
18F SNOUT OIL & DEBRIS STOP	09/14/99	NONE
	DRAWING NUMBER	
	18F	





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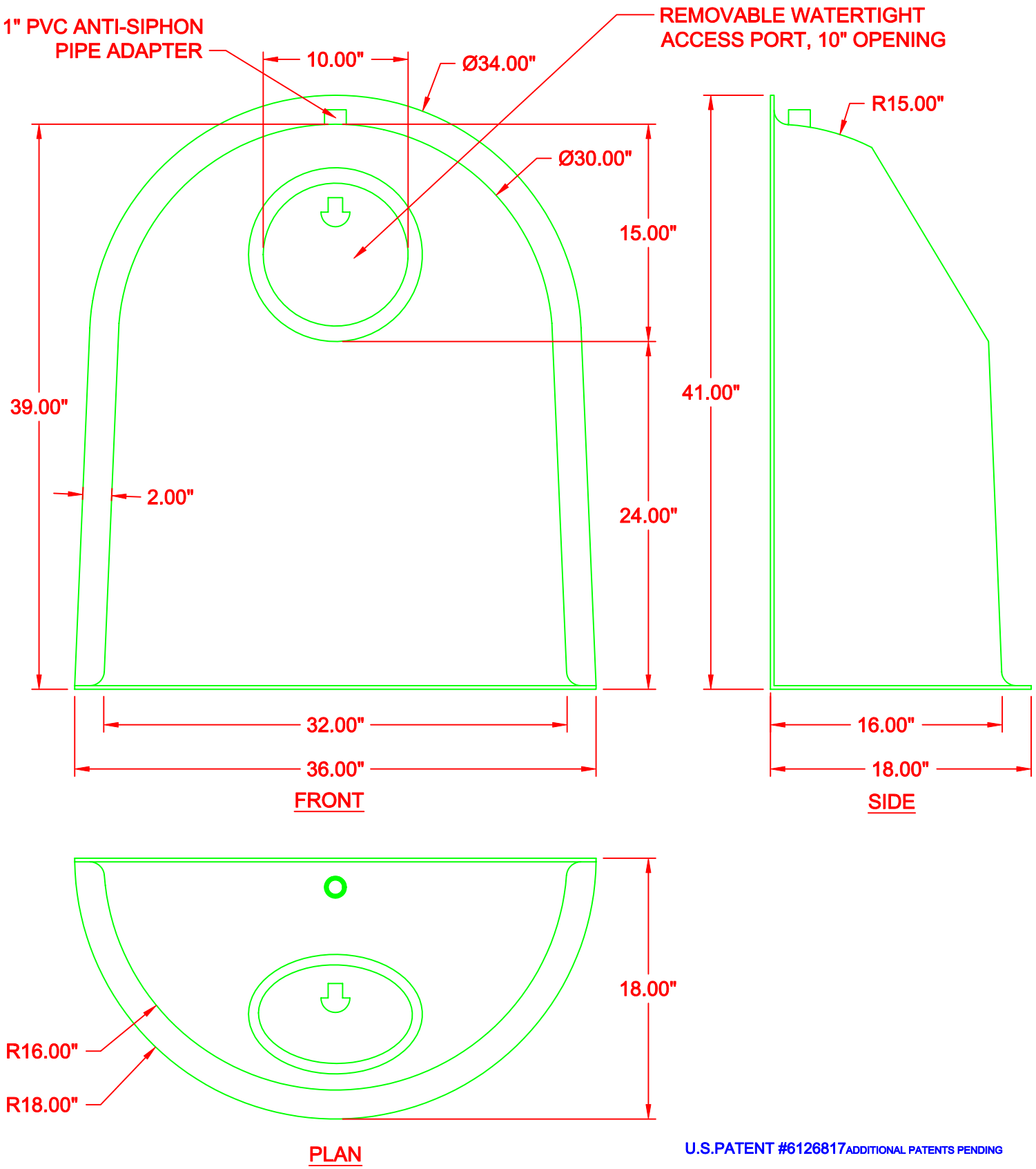
DESCRIPTION	DATE	SCALE
24F SNOUT OIL & DEBRIS STOP	09/20/99	NONE
	DRAWING NUMBER	
	24F	



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(800) 504-8008 FAX: (860)434-3195

DESCRIPTION	DATE	SCALE
30F SNOUT OIL & DEBRIS STOP	09/15/99	NONE
	DRAWING NUMBER	
	3OF	

ARIA & SUMMIT VILLAGE NORTH
MACRO & ARIA MICRO STORMWATER REPORT

Lee's Summit, MO

August 2020
Revised: February 2021
Olsson Project No. B19-0012