EMO

Date: May 20, 2020

To: City of Dublin

From: Matt Stechschulte, PE

Subject: The Corners Stormwater Management Plan

Copies:

This memo summarizes the stormwater management approach for the Corners project located at the northwest corner of Rings Road and Frantz Road. The proposed project was analyzed under the Dublin Smart Parking Lot Stormwater Management Plan (SWMP) dated May 19, 2017. The Dublin Smart Parking Lot report accounted for the Corners project area within Subarea 03 which discharges to Wet Basin 01. Wet Basin 01 is interconnected with Wet Basin 02 before discharging east across Frantz Road. Subarea 03 was to be developed at 75% impervious cover per the Smart Parking Lot SWMP. The proposed project was calculated to be 66.8% impervious which is less than what was assumed. Due to the proposed project containing less impervious cover than what was assumed in the Dublin Smart Parking Lot SWMP the existing BMPs (Wet Basins 01 & 02) are able to adequately proposed quantity and quality control for the proposed development without the need for any modifications. Below Table 1 & 2 summarize the differences between the Dublin Smart Parking Lot proposed release rates and basin elevations and what the actual release rates 'and elevations will be based on The Corners project actual impervious cover.

Table 1
Planned vs. Actual Release Rates

Storm Event (yr.)	Subarea 01 and 03 Allowable Release Rates (cfs.)	Subarea 02 Allowable Release Rates (cfs.)	Offsite Release Rates (cfs.)	Total Allowable Release Rates (cfs.)	Proposed Release Rates (cfs.)
1	16.70	4.97	10.74	32.42	~~10.17~~ 9.56
2	16.70	4.97	11.88	33.56	~~13.30~~ 12.85
5	16.70	4.97	13.65	35.33	~~16.62~~ 16.41
10	16.70	4.97	15.14	36.82	~~18.18~~ 18.00
25	16.70	4.97	17.23	38.91	~~20.12~~ 19.98
50	63.37	4.97	19.73	88.07	~~21.37~~ 21.27
100	81.46	24.87	23.25	129.59	~~22.54~~ 22.44

Table 2
Planned vs. Actual Basin Performance Summary

Storm Event (yr.)	Wet Basins 01 and 02 Inflow Rates (cfs.)		Maximum W.S.E., T.O.B. = 867.00 (feet)		Storage Volume Utilized (ac-ft)	
1	~~73.67~~	71.57	~~863.76~~	863.73	~~2.742~~	2.690
2	~~91.18~~	88.93	~~863.95~~	863.91	~~3.078~~	3.002
5	~~115.62~~	113.48	~~864.38~~	864.32	~~3.863~~	3.737
10	~~135.13~~	133.11	~~864.86~~	864.81	~~4.778~~	4.658
25	~~162.21~~	160.43	~~865.52~~	865.47	~~6.098~~	5.975
50	~~185.00~~	183.27	~~866.04~~	866.00	~~7.209~~	7.095
100	~~209.66~~	207.87	~~866.55~~	866.52	~~8.352~~	8.255

Wet Basins 01 & 02 Detention Storage Utilized: ~~8.352~~ 8.255 ac-ft (100-year storm event)
Wet Basins 01 & 02 Detention Storage Provided: 9.388 ac-ft

Due to the reduction to impervious cover the water quality volume also reduces from what was previously assumed in the Dublin Smart Parking Lot SWMP. Table 3 below summarizes the difference between the previously planned water quality calculations and actual water quality calculations based on The Corners proposed site conditions.

Table 3
Planned vs. Actual Water Quality Calculations

Basin Identifier	Tributary area (acres)	Water Quality Volume (ac-ft)		Water Quality Elevation (feet)	
Wet Basins 01 & 02	55.502	~~1.354~~	1.323	~~862.92~~	862.90

Due to The Corners project proposing a reduction to impervious cover from what was previously accounted for in the Dublin Smart Parking Lot SWMP that existing wet basins (Wet Basin 01 & Wet Basin 02) are able to provide adequate quantity and quality control for the proposed site.

Project Name: Dublin Smart Parking Lot

<u>Water Quality Volume Calculation</u>

<u>*Wet Basins 01 & 02*</u>

Area =	26.159 acres
% imp =	0.69
C =	0.49
WQv =	0.799 ac-ft

<u>*Offsite*</u>

Area =	29.343 acres
% imp =	0.73
C =	0.53
WQv =	0.965 ac-ft

75% of WQv= | 1.323 | ac-ft
(for wet basins)

WQv Elevation= | 862.90 | feet

Water quality volume calculated using the Ohio EPA formula

<u>Ohio EPA formula</u>

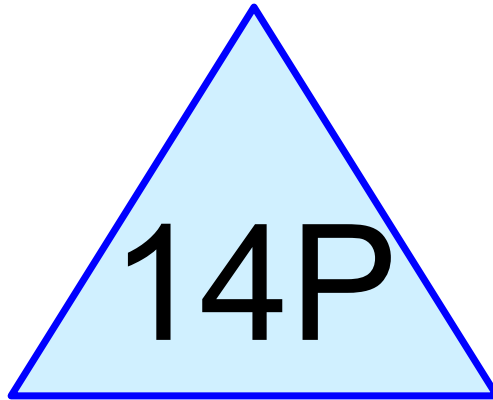$$WQv = \frac{C \times P \times A}{12}$$
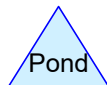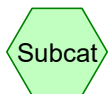
A = area (acres)
P = 0.75"
C = runoff coefficient (calculated using the ASCE method)

$$C = 0.858i^3 - 0.78i^2 + 0.774i + 0.04$$

Where i = fraction of post-construction impervious surface

14P

Wet Basins 01 & 02 WQ @ 862.92'

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-year	Type II 24-hr		Default	24.00	1	2.20	2
2	2-year	Type II 24-hr		Default	24.00	1	2.63	2
3	5-year	Type II 24-hr		Default	24.00	1	3.24	2
4	10-year	Type II 24-hr		Default	24.00	1	3.74	2
5	25-year	Type II 24-hr		Default	24.00	1	4.44	2
6	50-year	Type II 24-hr		Default	24.00	1	5.02	2
7	100-year	Type II 24-hr		Default	24.00	1	5.63	2

Summary for Pond 14P: Wet Basins 01 & 02 WQ @ 862.92'

Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	
Outflow	=	1.09 cfs @	0.00 hrs,	Volume=	1.252 af,	Atten= 0%, Lag= 0.0 min
Primary	=	1.09 cfs @	0.00 hrs,	Volume=	1.252 af	

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 862.90'   Surf.Area= 1.560 ac   Storage= 1.329 af
Peak Elev= 862.90' @ 0.00 hrs   Surf.Area= 1.560 ac   Storage= 1.329 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	862.00'	5.548 af	**Wet Basin 01 (Prismatic)** Listed below (Recalc)
#2	862.00'	3.834 af	**Wet Basin 02 (Prismatic)** Listed below (Recalc)
		9.382 af	Total Available Storage

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
862.00	0.827	0.000	0.000
863.00	0.937	0.882	0.882
864.00	1.050	0.993	1.875
865.00	1.165	1.107	2.983
866.00	1.282	1.224	4.207
866.50	1.342	0.656	4.862
867.00	1.401	0.686	5.548

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
862.00	0.566	0.000	0.000
863.00	0.642	0.604	0.604
864.00	0.720	0.681	1.285
865.00	0.801	0.760	2.045
866.00	0.884	0.843	2.888
866.50	0.950	0.459	3.347
867.00	0.998	0.487	3.834

Device	Routing	Invert	Outlet Devices
#1	Primary	862.00'	**5.0" Vert. WQ orifice X 2.00** C= 0.600
			Limited to weir flow at low heads

Primary OutFlow Max=1.09 cfs @ 0.00 hrs HW=862.90'   (Free Discharge)
└─**1=WQ orifice** (Orifice Controls 1.09 cfs @ 4.00 fps)

Pond 14P: Wet Basins 01 & 02 WQ @ 862.92'

Hydrograph

Peak Elev=862.90'
Storage=1.329 af

Legend: Inflow, Primary

1.09 cfs

0.00 cfs

Flow (cfs)

Time (hours)

J:\20190873\Reports\Stormwater\Modeling\
2017-0259 Dublin Smart Park 2017-5-4
Prepared by EMH&T
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Type II 24-hr 1-year Rainfall=2.20"
Printed 5/20/2020
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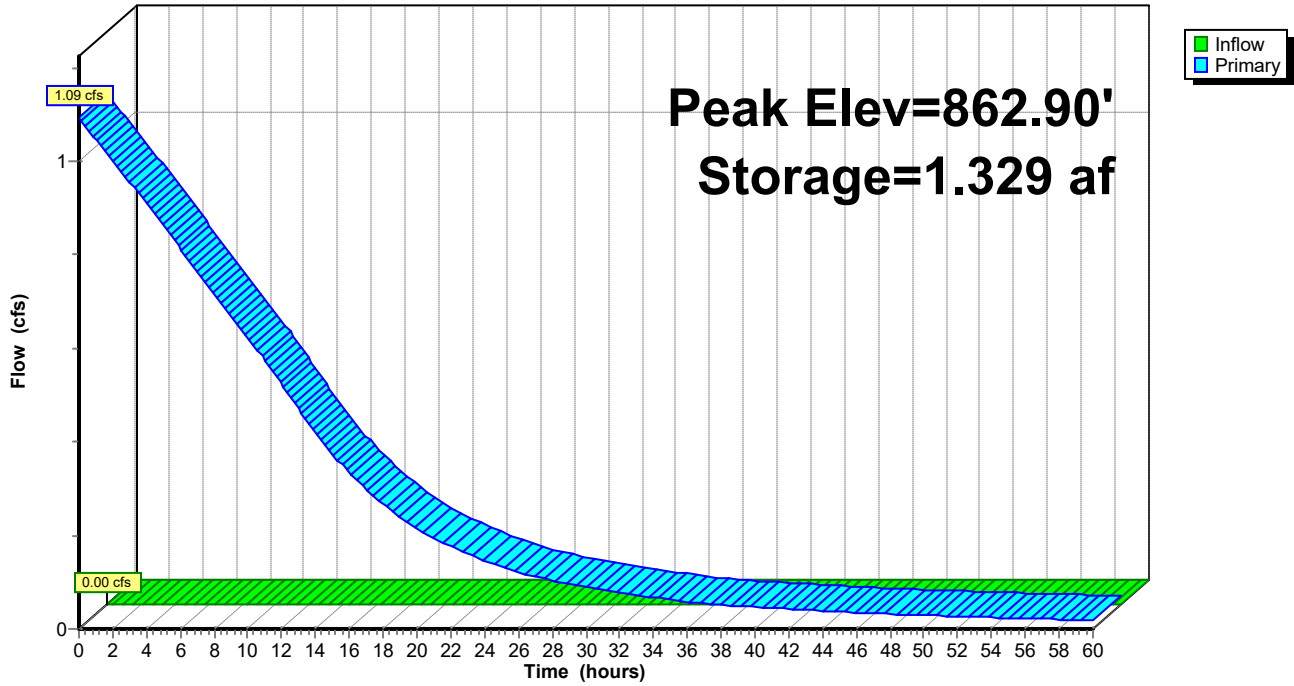
Hydrograph for Pond 14P: Wet Basins 01 & 02 WQ @ 862.92'

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	**0.00**	**1.329**	**862.90**	**1.09**
2.00	0.00	1.156	862.79	1.00
4.00	0.00	0.999	862.69	0.91
6.00	0.00	0.856	862.59	0.81
8.00	0.00	0.730	862.51	0.72
10.00	0.00	0.619	862.43	0.62
12.00	0.00	0.524	862.37	0.52
14.00	0.00	0.447	862.31	0.42
16.00	0.00	0.385	862.27	0.33
18.00	0.00	0.335	862.24	0.27
20.00	0.00	0.296	862.21	0.21
22.00	0.00	0.264	862.19	0.18
24.00	0.00	0.237	862.17	0.15
26.00	0.00	0.215	862.15	0.12
28.00	0.00	0.197	862.14	0.10
30.00	0.00	0.181	862.13	0.09
32.00	0.00	0.167	862.12	0.08
34.00	0.00	0.155	862.11	0.07
36.00	0.00	0.145	862.10	0.06
38.00	0.00	0.136	862.10	0.05
40.00	0.00	0.127	862.09	0.05
42.00	0.00	0.120	862.09	0.04
44.00	0.00	0.113	862.08	0.04
46.00	0.00	0.107	862.08	0.04
48.00	0.00	0.102	862.07	0.03
50.00	0.00	0.097	862.07	0.03
52.00	0.00	0.092	862.07	0.03
54.00	0.00	0.088	862.06	0.02
56.00	0.00	0.084	862.06	0.02
58.00	0.00	0.080	862.06	0.02
60.00	0.00	0.077	862.06	0.02

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2017-0259 Dublin Smart Park 2017-5-4
Prepared by EMH&T
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Multi-Event Tables
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Events for Pond 14P: Wet Basins 01 & 02 WQ @ 862.92'

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1-year	**0.00**	**1.09**	**862.90**	**1.329**

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2017-0259 Dublin Smart Park 2017-5-4
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GRAPHIC SCALE

0   25   50   100

1 inch = 50 feet
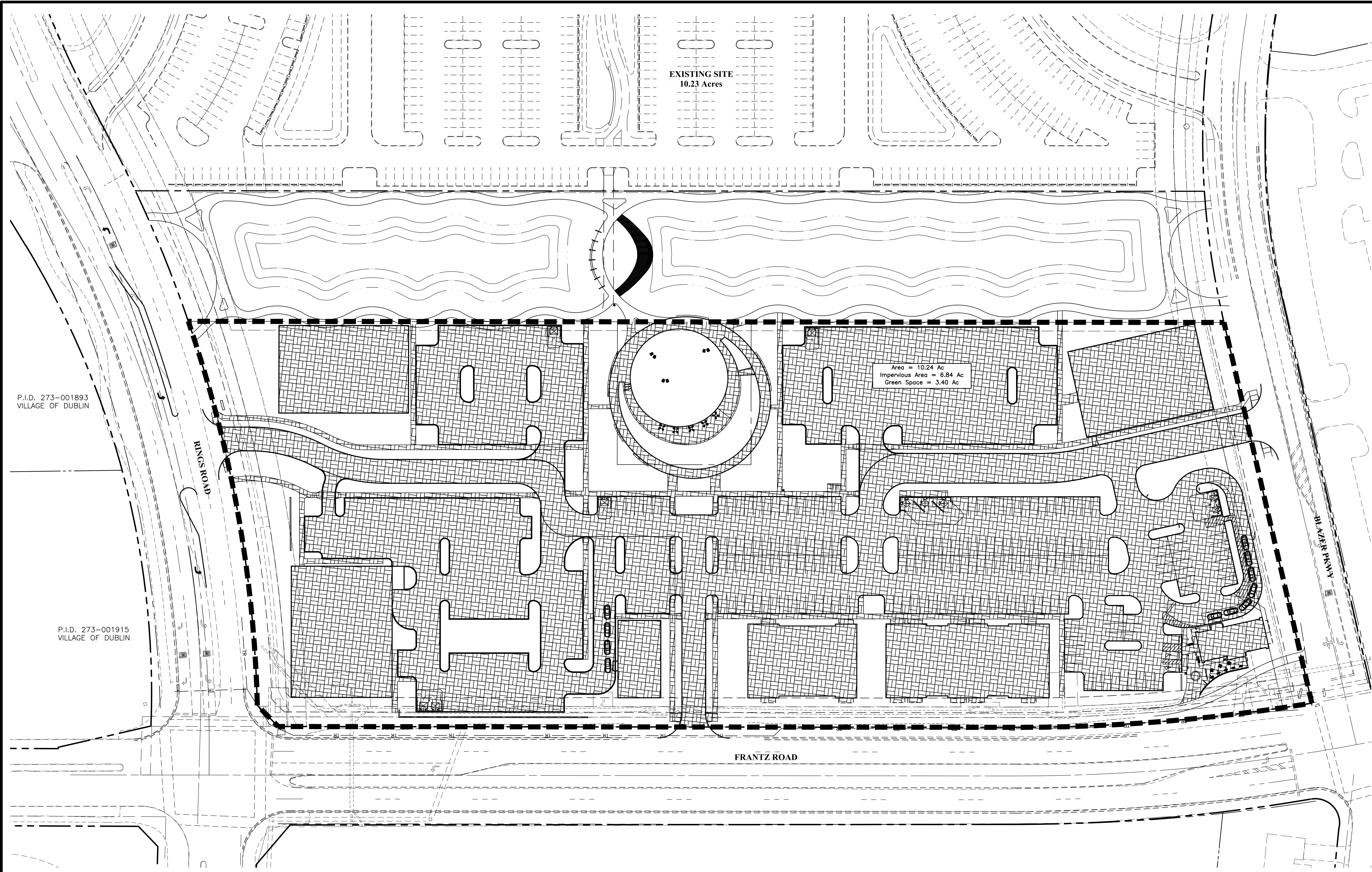
EXISTING SITE
10.23 Acres

Area   = 10.24 Ac
Impervious Area = 6.84 Ac
Green Space = 3.40 Ac
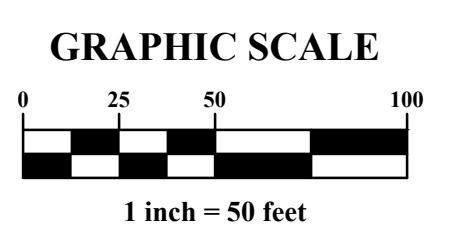
P.I.D. 273-001893
VILLAGE OF DUBLIN

P.I.D. 273-001915
VILLAGE OF DUBLIN

RINGS ROAD

BLAZER PKWY

FRANTZ ROAD

REVISIONS

MARK   DATE   DESCRIPTION

CLIENT NAME

CITY OF COLUMBUS, FRANKLIN COUNTY, OHIO
PRELIMINARY DEVELOPMENT PLAN
FOR
THE CORNERS
SITE PLAN
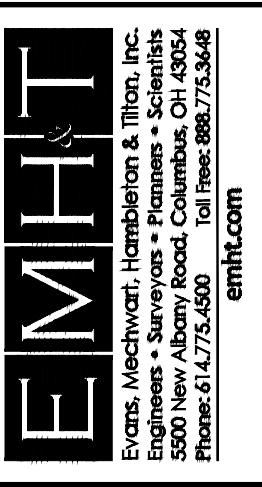
DATE
September 3, 2019

SCALE
1" = 50'

JOB NO.
2019-0873

SHEET
4/6

PRELIMINARY
NOT TO BE USED FOR
CONSTRUCTION

PLAN SET DATE
September 3, 2019

GRAPHIC SCALE

0 50 100 200

1 inch = 100 feet

Offsite 01:
Lucent Site

Offsite 02:
Blazer Tech Offices

Offsite 03:
Triangle Outparcel

Offsite 04:
Cendant Site

Subarea 01

Subarea 02

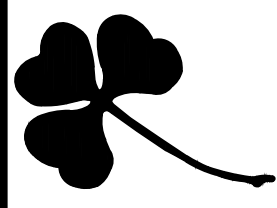Subarea 03

Wet Basin 01

Wet Basin 02
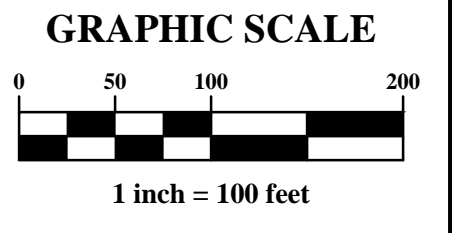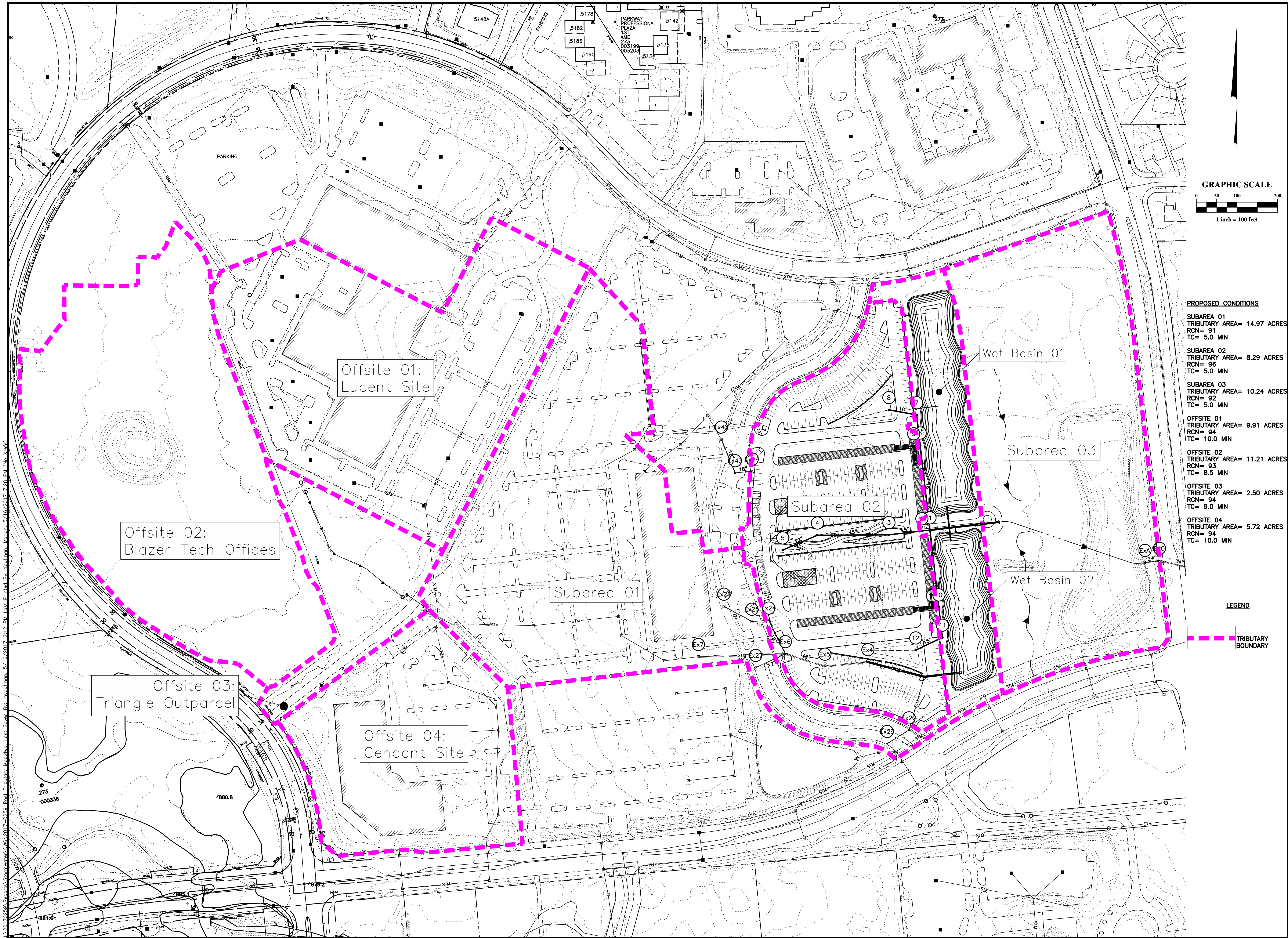
PROPOSED CONDITIONS

SUBAREA 01
TRIBUTARY AREA= 14.97 ACRES
RCN= 91
TC= 5.0 MIN

SUBAREA 02
TRIBUTARY AREA= 8.29 ACRES
RCN= 96
TC= 5.0 MIN

SUBAREA 03
TRIBUTARY AREA= 10.24 ACRES
RCN= 92
TC= 5.0 MIN

OFFSITE 01
TRIBUTARY AREA= 9.91 ACRES
RCN= 94
TC= 10.0 MIN

OFFSITE 02
TRIBUTARY AREA= 11.21 ACRES
RCN= 93
TC= 8.5 MIN

OFFSITE 03
TRIBUTARY AREA= 2.50 ACRES
RCN= 94
TC= 9.0 MIN

OFFSITE 04
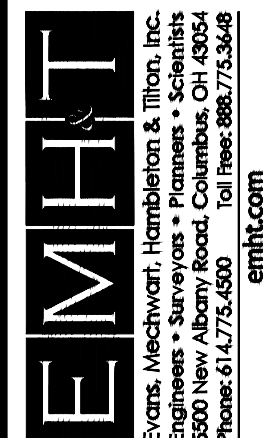TRIBUTARY AREA= 5.72 ACRES
RCN= 94
TC= 10.0 MIN

LEGEND

----- TRIBUTARY BOUNDARY