Engineers, Surveyors, Planners, Scientists

MEMO

Date: March 25, 2024

To: City of Dublin

From: Matt Stechschulte, PE, CFM

Subject: Light Bridge SWMP

Copies:

This memo summarizes the stormwater management approach for the Light Bridge 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 72% 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.

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APPENDIX A:

Water Quality Calculations

Project Name: Dublin Smart Parking Lot

Water Quality Volume Calculation

Wet Basins 01 & 02

Area =	26.159	acres
% imp =	0.72	
C =	0.51	
WQv =	0.840	ac-ft

Offsite

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

75% of WQv= 1.354 ac-ft
(for wet basins)

WQv Elevation= 862.92 feet

Water quality volume calculated using the Ohio EPA formula

Ohio EPA formula

$$WQv = \frac{C \times P \times A}{12}$$

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

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

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 1.11 cfs @ 0.00 hrs, Volume= 1.283 af, Atten= 0%, Lag= 0.0 min
Primary = 1.11 cfs @ 0.00 hrs, Volume= 1.283 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 862.92' Surf.Area= 1.564 ac Storage= 1.360 af
Peak Elev= 862.92' @ 0.00 hrs Surf.Area= 1.564 ac Storage= 1.360 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

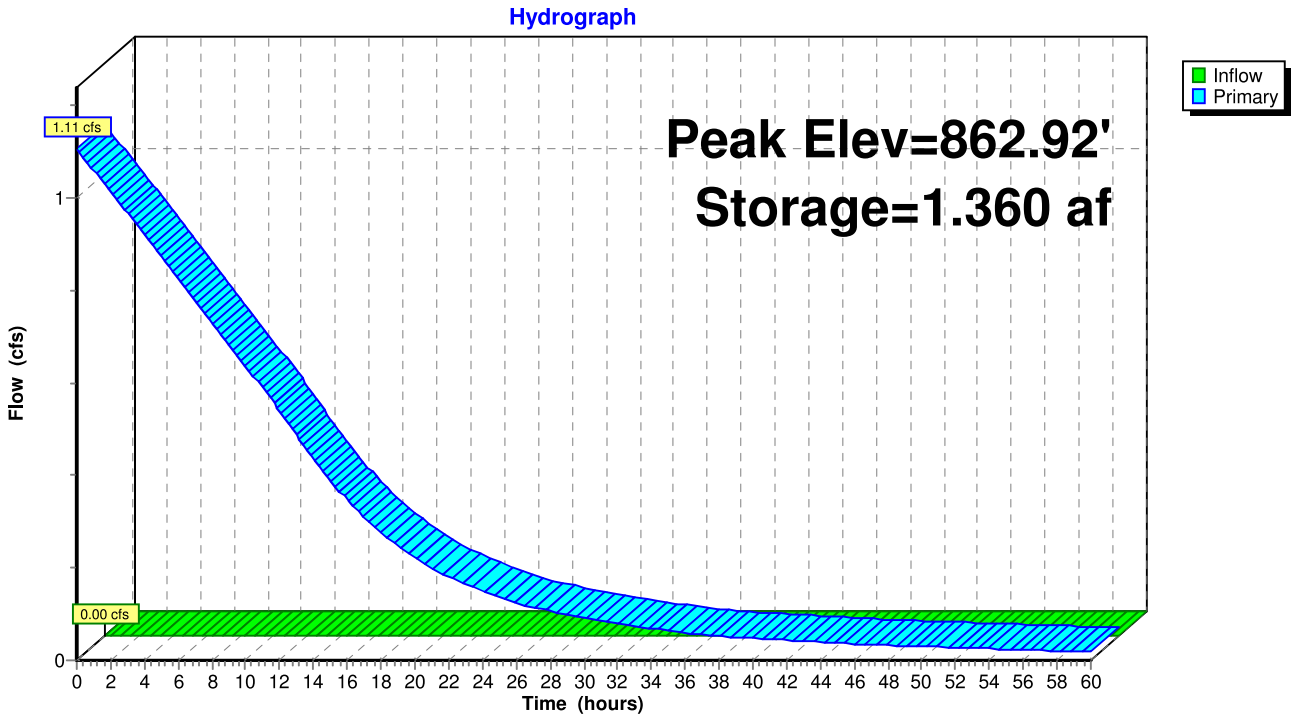
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
862.00	0.827	0.000	0.000
863.00	0.937	0.882	0.882
864.00	1.050	0.993	1.875
865.00	1.165	1.107	2.983
866.00	1.282	1.224	4.207
866.50	1.342	0.656	4.862
867.00	1.401	0.686	5.548

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

Primary OutFlow Max=1.11 cfs @ 0.00 hrs HW=862.92' (Free Discharge)
↑—**1=WQ orifice** (Orifice Controls 1.11 cfs @ 4.06 fps)

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



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**	**1.360**	**862.92**	**1.11**
2.00	0.00	1.185	862.81	1.02
4.00	0.00	1.025	862.70	0.92
6.00	0.00	0.880	862.61	0.83
8.00	0.00	0.751	862.52	0.73
10.00	0.00	0.637	862.44	0.64
12.00	0.00	0.540	862.38	0.54
14.00	0.00	0.459	862.32	0.44
16.00	0.00	0.394	862.28	0.35
18.00	0.00	0.343	862.24	0.28
20.00	0.00	0.302	862.21	0.22
22.00	0.00	0.269	862.19	0.18
24.00	0.00	0.241	862.17	0.15
26.00	0.00	0.219	862.16	0.13
28.00	0.00	0.200	862.14	0.11
30.00	0.00	0.183	862.13	0.09
32.00	0.00	0.169	862.12	0.08
34.00	0.00	0.157	862.11	0.07
36.00	0.00	0.146	862.10	0.06
38.00	0.00	0.137	862.10	0.05
40.00	0.00	0.129	862.09	0.05
42.00	0.00	0.121	862.09	0.04
44.00	0.00	0.114	862.08	0.04
46.00	0.00	0.108	862.08	0.04
48.00	0.00	0.103	862.07	0.03
50.00	0.00	0.097	862.07	0.03
52.00	0.00	0.093	862.07	0.03
54.00	0.00	0.088	862.06	0.02
56.00	0.00	0.085	862.06	0.02
58.00	0.00	0.081	862.06	0.02
60.00	0.00	0.078	862.06	0.02

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APPENDIX B:

Dublin Smart Parking Lot SWMP

A legacy of **experience**. A reputation for **excellence**.

PROJECT SUMMARY

Project Name:	Dublin Smart Parking Lot
Location:	City of Dublin, Franklin County, Ohio
Type:	Stormwater Management Plan
Reviewing Agency:	City of Dublin, Ohio EPA

HYDROLOGIC SUMMARY

Rainfall Data:	City of Dublin Stormwater Management Design Manual	
	1-yr	2.20”
	2-yr	2.63”
	5-yr	3.24”
	10-yr	3.74”
	25-yr	4.44”
	50-yr	5.02”
	100-yr	5.63”
Rainfall Distribution:	NRCS Type II 24 hour	
Detention Policy:	City of Dublin	
Water Quality:	City of Dublin, Ohio EPA	
Hydrology Modeling Program:	Autodesk Storm and Sanitary Analysis 2015	

DESIGN SUMMARY

Detention:	Wet Basin, Bioretention Basins, and Pervious Pavers
Water Quality:	Wet Basin, Bioretention Basins, silva cells, and Pervious Pavers
Receiving Water Body:	Existing storm sewer network that eventually discharges into the Scioto River

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APPENDICES

1.0 INTRODUCTION

The following report provides a detailed analysis and design of the Stormwater Management Plan for the Dublin Smart Parking Lot development in the City of Dublin, Franklin County, Ohio. The proposed site is located along Blazer Parkway, north of Rings Road and west of Frantz Road. The proposed project area involves the development of commercial lot and open space into commercial development and an innovative parking lot involving several stormwater BMPs. The Stormwater management Plan was prepared in accordance with the requirements of both the City of Dublin and the Ohio EPA. The runoff from this site will be routed through a wet basin, bioretention basins, silva cells, or pervious pavers for quantity and quality control before discharging to an existing outfall on the southeast side of the site. The outfall will enter an existing storm sewer network which eventually discharges into the Scioto River.

2.0 HYDROLOGIC ANALYSIS

Hydrologic parameters such as Runoff Curve Number (RCN) and Time of Concentration were determined using standard Natural Resources Conservation Service (NRCS) methodology. The 1-, 2-, 5-, 10-, 25-, 50-, and 100-year storm event discharge amounts were calculated using the NRCS TR-55 method. This analysis reflects the NRCS Type II distribution, 24-hr storm duration. Rainfall depths were obtained from the City of Dublin Stormwater Management Design Manual. The peak flow rates were computed using the Autodesk Storm and Sanitary Analysis 2015 computer program.

3.0 PRE-DEVELOPED ANALYSIS

The pre-developed condition, as seen on Exhibit 1 in Appendix E, consists of open space in Type "C/D" soils (Crosby silt loam, Crosby-Urban land complex, Kokomo silty clay loam, and Miamian silt loam). Pre-developed 01 consists of a commercial building, associated hardscape, and open space for future development. Pre-developed 02 consists of open space. Pre-developed 01, Pre-developed 02, and 4 offsite areas currently drain into an existing wet basin at the southeast corner of the site. The existing wet basin serves as water quantity control for the site before discharging into an existing storm sewer network. The storm sewer network then discharges into the Scioto River.

Pre-developed subarea characteristics are detailed in Table 1. Time of concentration calculations are included in the HydroCAD output in Appendix D. The time of concentration flow paths can be found on Exhibit 1. The pre-developed subareas are located within subareas 1650, 1660, 1680, 1690, 1710, 1720, 1730, and 1740 of the Southwest Unconsolidated Watershed per the City of Dublin's Stormwater master Plan. Table 2 shows the pre-developed peak flow rates for each subarea.

Table 1 - Pre-developed Subarea Characteristics

Subarea Identifier	Tributary Area (acres)	Land Usage	Runoff Curve Number	Percent Impervious	Time of Concentration (min)
Pre-developed 01	25.21	Open space	74	0%	22.9
Pre-developed 02	8.29	Open space	74	0%	19.7

Table 2 - Pre-developed Peak Flow Rates

Storm Event (year)	Pre-developed 01 Peak Flow Rates (cfs)	Pre-developed 02 Peak Flow Rates (cfs)
1	9.40	3.43
2	15.75	5.72
5	26.02	9.42
10	35.27	12.75
25	49.15	17.72
50	61.21	22.04
100	74.30	26.72

4.0 POST-DEVELOPED ANALYSIS

The post-developed conditions, as seen on Exhibit 2 in Appendix E, consist of three subareas. Subarea 01 consists of an existing commercial building, associated parking lot, and the proposed Wet Basins. Subarea 02 consists of the Smart Parking Lot. Subarea 03 consists of open space and an assumed future development equivalent to 75% impervious. The existing wet basin at the southeast side of the site, designed under the "Duke Weeks Realty Corporation at 5100 & 5000 Rings Road Nationwide Campus" report dated September 27, 2000, will be filled in and replaced with Wet Basin 01 and Wet Basin 02 for water quality and quantity control.

Subarea 01, Subarea 03, Offsite 01, Offsite 02, Offsite 03, and Offsite 04 will utilized Wet Basin 01 and Wet Basin 02 (which are interconnected) for water quality and quantity control. Wet Basins 01 and 02 will outlet into a proposed channel, which will release into the existing storm sewer network.

Subarea 02 has been broken up further, as seen on Exhibit 3 in Appendix E, into tributary areas to each BMP. The Dublin Smart Parking lot will have a total of 4 pervious paver areas, 5 bioretention basins, and 4 silva cell systems that will all outlet into the proposed channel, which will release into the existing storm sewer network.

Post-developed subarea characteristics are detailed in Table 3. The breakdown of Subarea 02 is detailed in Table 4. SSA output is provided in Appendix D.

Table 3 - Post-developed Subarea Characteristics

Subarea Identifier	Tributary Area (acres)	Land Usage	Runoff Curve Number	Percent Impervious	Time of Concentration (min)
Subarea 01	14.97	Commercial Development	91	70%	5.0
Subarea 02	8.29	Parking Lot	96	90%	5.0
Subarea 03	10.24	Future Commercial Development	92	75%	5.0
Offsite 01	9.91	Commercial Development	94	85%	10.0
Offsite 02	11.21	Commercial Development	93	78%	8.5
Offsite 03	2.50	Open Space	74	0%	9.0
Offsite 04	5.72	Commercial Development	94	85%	10.0

Table 4 - Dublin Smart Lot Subarea Characteristics

BMP Identifier	Tributary Area (acres)	Control Type
Bioretention Basin 01	1.39	Quality and Quantity
Bioretention Basin 02	0.52	Quality and Quantity
Bioretention Basin 03	1.35	Quality and Quantity
Bioretention Basin 04	0.81	Quality and Quantity
Bioretention Basin 05	1.44	Quality and Quantity
Pervious Pavers 01	0.28	Quality and Quantity
Pervious Pavers 02	0.63	Quality and Quantity
Pervious Pavers 03	0.28	Quality and Quantity
Pervious Pavers 04	0.65	Quality and Quantity
Wet Basin 01	0.52	Quality and Quantity
Wet Basin 02	0.43	Quality and Quantity

The 1-year runoff volume for Subareas 01 and 03 increases to 2.882 ac-ft, an increase of 207% from the existing condition (Pre-developed 01), which results in 25-year critical storm event.

$$\% \text{ Increase} = [(2.882 - 0.940)/0.940] \times 100 = 207\%$$
25-Yr Critical Storm

The 1-year runoff volume for Subarea 02 increases to 1.222 ac-ft, an increase of 295% from the existing condition, which results in 50-year critical storm event.

$$\% \text{ Increase} = [(1.222 - 0.309)/0.309] \times 100 = 295\%$$
50-Yr Critical Storm

Table 5 shows the allowable release rates for Subareas 01 and 03 per the Dublin Master Plan. Table 6 shows the allowable release rates for Subarea 02 per the Dublin Master Plan. Table 7 shows the total allowable release rates and the proposed release rates to the proposed channel. Table 8 shows the performance summary for all of the BMPs onsite.

Table 5 - Subareas 01 and 03 Allowable Release Rates/Acre (Dublin Master Plan)

Allowable Release Rates per Acre

Southwest Unconsolidated

Sub-Basin	1-year	2-year	5-year	10-year	25-year	50-year	100-year
1650	1.00	1.20	1.70	2.10	2.70	3.60	4.40
1660	1.50	2.10	3.20	4.00	4.80	5.80	6.60
1680	1.00	1.30	1.70	2.10	2.80	3.70	4.50
1690	0.80	1.00	1.30	1.70	2.20	3.00	3.80
1710	0.60	0.70	1.00	1.20	1.70	2.30	3.00
1720	1.70	2.20	2.80	3.40	4.20	5.20	6.00
1730	0.90	1.10	1.40	1.90	2.60	3.60	4.70
1740	1.00	1.20	1.60	2.10	2.90	4.00	5.10

Post-Developed Area per Sub-Basin

Sub-Basin	Area (Acres)
1650	2.52
1660	0.32
1680	0.03
1690	0.14
1710	21.74
1720	0.11
1730	0.11
1740	0.24

Allowable Release Rates per Acre

Southwest Unconsolidated

Sub-Basin	1-year	2-year	5-year	10-year	25-year	50-year	100-year
1650	2.52	3.02	4.28	5.29	6.80	9.07	11.08
1660	0.47	0.66	1.01	1.26	1.51	1.83	2.08
1680	0.03	0.04	0.06	0.07	0.09	0.12	0.15
1690	0.11	0.14	0.19	0.24	0.31	0.43	0.54
1710	13.04	15.22	21.74	26.09	36.96	50.00	65.22
1720	0.18	0.23	0.30	0.36	0.45	0.55	0.64
1730	0.10	0.12	0.15	0.21	0.29	0.40	0.52
1740	0.24	0.29	0.39	0.51	0.70	0.97	1.23
Total	16.70	19.73	28.11	34.03	47.11	63.37	81.46

Table 6 - Subarea 02 Allowable Release Rates/Acre (Dublin Master Plan)

Allowable Release Rates per Acre *Southwest Unconsolidated*

Sub-Basin	1-year	2-year	5-year	10-year	25-year	50-year	100-year
1710	0.6	0.7	1.0	1.2	1.7	2.3	3.0

Post-Developed Area per Sub-Basin

Sub-Basin	Area (Acres)
1710	8.29

Allowable Release Rates per Acre *Southwest Unconsolidated*

Sub-Basin	1-year	2-year	5-year	10-year	25-year	50-year	100-year
1710	4.97	5.80	8.29	9.95	14.09	19.07	24.87
Total	4.97	5.80	8.29	9.95	14.09	19.07	24.87

Table 7 - Total Allowable and Proposed 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
2	16.70	4.97	11.88	33.56	13.30
5	16.70	4.97	13.65	35.33	16.62
10	16.70	4.97	15.14	36.82	18.18
25	16.70	4.97	17.23	38.91	20.12
50	63.37	4.97	19.73	88.07	21.37
100	81.46	24.87	23.25	129.59	22.54

*Based on a 25-year critical storm
**Based on a 50-year critical storm
***From "Offsite 01: Lucent Site", "Offsite 02: Blazer Tech Offices", "Offsite 03: Triangle Outparcel", and "Offsite 04: Cendant Site"; "Existing 36-inch outlet pipe" node in SSA
****From "EX00_Outlet" node in SSA

Table 8 - BMP Performance Summary
Wet Basins 01 and 02

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	863.76	2.742
2	91.18	863.95	3.078
5	115.62	864.38	3.863
10	135.13	864.86	4.778
25	162.21	865.52	6.098
50	185.00	866.04	7.209
100	209.66	866.55	8.352

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

Bioretention Basin 01

Storm Event (yr.)	Bioretention Basin 01 Inflow Rates (cfs.)	Maximum W.S.E., T.O.B. = 867.14 (feet)	Storage Volume Utilized (ac-ft)
1	3.63	866.17	0.093
2	4.45	866.26	0.103
5	5.61	866.39	0.116
10	6.56	866.47	0.126
25	7.87	866.56	0.138
50	8.95	866.71	0.154
100	10.09	866.90	0.180

Bioretention Basin 01 Detention Storage Utilized: 0.180 ac-ft (100-year storm event)
Bioretention Basin 01 Detention Storage Provided: 0.213 ac-ft

Bioretention Basin 02

Storm Event (yr.)	Bioretention Basin 02 Inflow Rates (cfs.)	Maximum W.S.E., T.O.B. = 867.17 (feet)	Storage Volume Utilized (ac-ft)
1	1.36	866.26	0.029
2	1.66	866.31	0.031
5	2.09	866.36	0.032
10	2.45	866.42	0.033
25	2.94	866.68	0.041
50	3.34	866.90	0.049
100	3.77	867.13	0.057

Bioretention Basin 02 Detention Storage Utilized: 0.057 ac-ft (100-year storm event)
Bioretention Basin 02 Detention Storage Provided: 0.059 ac-ft

Bioretention Basin 03

Storm Event (yr.)	Bioretention Basin 03 Inflow Rates (cfs.)	Maximum W.S.E., T.O.B. = 867.10 (feet)	Storage Volume Utilized (ac-ft)
1	3.53	866.08	0.084
2	4.33	866.18	0.093
5	5.46	866.29	0.104
10	6.38	866.37	0.111
25	7.65	866.61	0.135
50	8.71	866.82	0.158
100	9.81	867.04	0.184

Bioretention Basin 03 Detention Storage Utilized: 0.184 ac-ft (100-year storm event)
Bioretention Basin 03 Detention Storage Provided: 0.191 ac-ft

Bioretention Basin 04

Storm Event (yr.)	Bioretention Basin 04 Inflow Rates (cfs.)	Maximum W.S.E., T.O.B. = 866.50 (feet)	Storage Volume Utilized (ac-ft)
1	2.11	865.34	0.053
2	2.59	865.52	0.067
5	3.26	865.62	0.074
10	3.81	865.70	0.079
25	4.57	865.93	0.098
50	5.20	866.18	0.121
100	5.86	866.46	0.147

Bioretention Basin 04 Detention Storage Utilized: 0.147 ac-ft (100-year storm event)
Bioretention Basin 04 Detention Storage Provided: 0.215 ac-ft

Bioretention Basin 05

Storm Event (yr.)	Bioretention Basin 05 Inflow Rates (cfs.)	Maximum W.S.E., T.O.B. = 867.10 (feet)	Storage Volume Utilized (ac-ft)
1	3.75	866.13	0.096
2	3.63	866.23	0.107
5	5.80	866.35	0.120
10	6.77	866.43	0.131
25	8.13	866.54	0.144
50	9.24	866.69	0.161
100	10.41	866.87	0.188

Bioretention Basin 05 Detention Storage Utilized: 0.188 ac-ft (100-year storm event)
Bioretention Basin 05 Detention Storage Provided: 0.221 ac-ft

Pervious Pavers Basin 100-year Detention Summary

Basin	Outlet Structure Number	Total Tributary Area (Ac.)	Pervious Pavers Surface Area (ft^2)	Total 100-year Peak Inflow Rates (cfs.)	Total 100-year proposed release rates (cfs.)	Total Storage Volume Utilized (ac-ft)	Max. W.S.E. (feet)	Top of Pavement Elevation (feet)
01-02	9	0.911	10,156	6.61	1.74	0.235	866.31	867.50
03-04	13	0.924	10,009	6.74	0.41	0.282	866.86	867.50

5.0 OUTLET DESIGN

The proposed outlet structures are designed to release runoff from the post-developed site at or below the allowable release rates calculated in Tables 5 for Subareas 01 and 03, and Table 8 for Subarea 02. The proposed outlet structures described below are preliminary and subject to change upon final design. The location of these structures can be seen on Exhibit 2 in Appendix E.

Proposed Outlet Structure 1 – Wet Basin 02

- Normal Pool – 862.00 ft.
- Top of Bank – 867.00 ft.
- 100-year – 866.55 ft.
- 1st stage outlet – (2) 5-inch orifices, cut into submerged riser pipe, invert at 862.00 ft.
- 2nd stage outlet – (2) 36-inch wide by 8-inch high window, invert at 863.20 ft.
- 3rd stage outlet – Neenah R-4871 grate, top of casting at 865.00 ft.
- Tailwater Control – 36-inch outlet pipe with 2.87% slope, invert at 862.00 ft.

Proposed Outlet Structure – Wet Basin 01

- Normal Pool – 862.00 ft.
- Top of Bank – 867.00 ft.

- 100-year – 866.55 ft.
- 1st stage outlet – Submerged 24-inch pipe with 0.00% slope, invert 859.00 ft.
- Tailwater Control – Wet Basin 02

Proposed Outlet Structure 8 – Bioretention Basin 01

- Top of Soil Media – 865.14 ft.
- Top of Bank – 867.14 ft.
- 100-year – 866.90 ft.
- 1st stage outlet – Biomedia, invert at 865.14 ft.
- 2nd stage outlet – Neenah R-4871 grate, top of casting 866.14 ft.
- Tailwater Control – 18-inch outlet pipe with 0.25% slope, invert at 862.64 ft.

Proposed Outlet Structure 5 – Bioretention Basin 02

- Top of Soil Media – 865.17 ft.
- Top of Bank – 867.17 ft.
- 100-year – 867.13 ft.
- 1st stage outlet – Biomedia, invert at 865.17 ft.
- 2nd stage outlet – Neenah R-4871 grate, top of casting 866.17 ft.
- Tailwater Control – 12-inch orifice plate on the 18-inch outlet pipe with 0.25% slope, invert at 862.67 ft.

Proposed Outlet Structure 4 – Bioretention Basin 03

- Top of Soil Media – 865.00 ft.
- Top of Bank – 867.10 ft.
- 100-year – 867.04 ft.
- 1st stage outlet – Biomedia, invert at 865.00 ft.
- 2nd stage outlet – Neenah R-4871 grate, top of casting 866.00 ft.
- Tailwater Control – 18-inch outlet pipe with 0.25% slope, invert at 862.44 ft.

Proposed Outlet Structure 3 – Bioretention Basin 04

- Top of Soil Media – 864.50 ft.
- Top of Bank – 867.00 ft.
- 100-year – 866.46 ft.
- 1st stage outlet – Biomedia, invert at 864.50 ft.
- 2nd stage outlet – Neenah R-4871 grate, top of casting 865.50 ft.
- Tailwater Control – 18-inch outlet pipe with 0.25% slope, invert at 862.00 ft.

Proposed Outlet Structure 12 – Bioretention Basin 05

- Top of Soil Media – 865.10 ft.
- Top of Bank – 867.10 ft.
- 100-year – 866.87 ft.
- 1st stage outlet – Biomedia, invert at 865.10 ft.
- 2nd stage outlet – Neenah R-4871 grate, top of casting 866.10 ft.
- Tailwater Control – 18-inch outlet pipe with 0.25% slope, invert at 862.60 ft.

Proposed Outlet Structure 9 – Pervious Pavers 01-02

- Invert of Stone Storage – 863.79 feet
- Top of Stone Storage – 867.24 feet
- Lowest Pavement Elevation – 867.50 feet
- 1st stage outlet – (2) 1-inch orifices cut into caps of underdrains, invert 863.79 ft.
- 2nd stage outlet – 4-foot long sharp crested weir, top of weir at 865.70 ft.
- Tailwater Control – 15-inch outlet pipe with 0.37% slope, invert 863.79 ft.

Proposed Outlet Structure 13 – Pervious Pavers 03-04

- Invert of Stone Storage – 863.79 feet
- Top of Stone Storage – 867.24 feet
- Lowest Pavement Elevation – 867.50 feet
- 1st stage outlet – (2) 1-inch orifices cut into caps of underdrains, invert 863.79 ft.
- 2nd stage outlet – 4-foot long sharp crested weir, top of weir at 866.80 ft.
- Tailwater Control – 12-inch outlet pipe with 0.44% slope, invert 863.79 ft.

6.0 WATER QUALITY

The Ohio EPA requires that the water quality volume for wet basins and pervious pavers be detained for a period of 24 hours while releasing less than half of that volume in less than 8 hours. Water quality drawdown for each basin will be provided by the basin's 1st stage outlet listed in Section 5.0. Water quality calculations are provided in Appendix C.

Table 9 - 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	862.92
Pervious Pavers 01-02	0.911	0.042	864.25
Pervious Pavers 03-04	0.924	0.042	864.26

*75% of WQv for Wet Basins

To meet water quality requirements, the surface area required for Bioretention Basins is designed to have 1 foot of head on the biomedia. Table 10 summarizes the water quality calculations for the Bioretention Basins

Table 10 - Bioretention Basin Summary Data

Bioretention Basin	100% Water Quality Volume (ac-ft)	Water Quality Elevation (feet)	Required Biomedia Area (sq-ft)	Provided Biomedia Area (sq-ft)
01	0.063	865.88	2726	3206
02	0.024	866.11	1019	999
03	0.062	865.83	2649	2836
04	0.037	865.11	1584	2399
05	0.066	865.85	2814	3265

7.0 SEDIMENT BASIN CALCULATIONS

The Ohio EPA requires that during construction a site must provide a means by which to control the sediment laden runoff from the construction site. For each acre of drainage area that is tributary to the sediment basin, a drawdown volume of 67 yd^3 is provided above the normal pool elevation. The basin will additionally provide more than the required 37 yd^3 of settling volume below the normal pool elevation for each acre of disturbed area tributary to the basin.

Wet Basins 01 and 02 will be used as sediment basins during construction. Sediment Basin Calculations are described in Table 11 below and provided within Appendix C.

Table 11 - Sediment Basin Calculations

Basin	Tributary area (acres)	Disturbed Area (acres)	Required Dewatering Volume (ac-ft)	Dewatering Elevation (feet)	Required Sediment Storage Volume (ac-ft)	Provided Sediment Storage Volume (ac-ft)	Orifice Size (inches)
01 & 02	63.79	34.45	2.65	863.71	0.79	2.69	6”

8.0 CONCLUSION

The proposed stormwater management plan for the Dublin Smart Parking Lot meets all requirements for detention and water quality as set forth by the City of Dublin and the Ohio EPA.

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

PARKWAY PROFESSIONAL PLAZA 1ST AMD 273 003199 003203

PARKING

GRAPHIC SCALE

0 50 100 200

1 inch = 100 feet

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= 10.0 MIN

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

LEGEND

TRIBUTARY BOUNDARY

REVISIONS

MARK	DATE	DESCRIPTION

CITY OF DUBLIN, FRANKLIN COUNTY, OHIO
STORMWATER MANAGEMENT PLAN
FOR

DUBLIN SMART PARKING LOT

POST-TRIBUTARY MAP

EMH&T
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Fax: 614.775.4800
emht.com

DATE
May 16, 2017

SCALE
1" = 100'

JOB NO.
2017-0259

SHEET
Exhibit 2

J:\2017\0259\Reports\Stormwater\DWG\2017-0259 Post Tributary Map.dwg Last Saved By: dturney 5/19/2017 7:22 AM Last Printed By: Turney, Dawn 5/19/2017 7:23 AM (No Xrefs)

EMH&T

APPENDIX C:

Exhibits

J:\2023\2023-1033\Dwg\04Sheets\Exhibits\Impervious Exhibit\20231033-Impervious Exhibit.dwg, Last Saved By: jseiple, Jackson, 3/25/2024 9:37 AM Last Printed By: Seiple, Jackson, 3/25/2024 9:37 AM (No Xrefs)

Pullbox w/ Splice Kits

Electric Pullbox

Ex 18" Stm

1.5 HP Well Pump Station

120V Receptacle

Well Pump Control Floats

Pond Irrigation Pump Station

Pond Fountain

Existing Wet Basin 01
NP = 862.00
100yr = 866.55
Bottom of Basin = 859.00

12" Well Fill Pipe

Pond Fountain

Ex 12" Stm

Ex 20' Drainage Esmt (O.R. 19507D05)

Ex 20' Esmt (O.R. 24590H19)

PROP BUILDING

Light Pole (Typ)

Light Pole (Typ)

FH

6" FHL

LEGEND

1171 / 1170	Contours
	Curb
STM	Storm Sewer
SAN	Sanitary Sewer
WM	Water Main
EDB	Electric Duct Bank
OHE	Overhead Electric Line
E	Underground Electric Line
FO	Telecomm Duct Bank
GM	Gas Main
UGL	Lighting Conduit
	Existing Impervious Area
	Proposed Impervious Area

Site Information
Total Site Area: 1.683 acres

Impervious Area
Prop Building = 12,571 sf
Prop Parking Lot/Drive Apron = 20,415 sf
Playground = 6,829 sf
Prop Sidewalk = 1,615 sf
Ex Sidewalk = 3,616 sf
Ex Private Drive = 7,618 sf
TOTAL = 52,664 sf (1.21 acres)

Pervious Area: .474 acres

Existing Impervious: .258 acres
Proposed Impervious: .951 acres

GRAPHIC SCALE
0 10 20 40
1 inch = 20 feet

REVISIONS			
MARK	DATE	DESCRIPTION	

CITY OF DUBLIN, FRANKLIN COUNTY, OHIO
EXHIBIT
FOR
LIGHTBRIDGE ACADEMY
IMPERVIOUS EXHIBIT

EMHT
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Toll Free: 888.775.3648
emht.com

DATE
March 25, 2024

SCALE
1" = 20'

JOB NO.
2023-1033

SHEET
1/1