

STORMWATER ANALYSIS REPORT

for

501-511 LAKE TERRACE

Located at

**BLOCK 7, LOT 2.03
501-511 LAKE TERRACE**

In

**BOROUGH OF BRADLEY BEACH
MONMOUTH COUNTY, NJ**

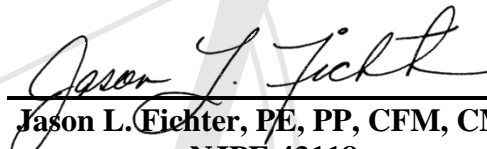
Has been prepared for

**501 LAKE TERRACE, LLC
1412 MAIN STREET
ASBURY PARK, NJ 07712**

on

April 16, 2021

Updated June 1, 2021


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Insite Job #: 20-1472-01

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INTRODUCTION

The proposed project is located at 501 – 511 Lake Terrace in the Borough of Bradley Beach, and is bounded existing residential buildings on all sides. The property is currently fully developed with two existing buildings, walkways and associated parking. The proposed project consists of the reconstruction of concrete walkways, expansion of an existing asphalt parking lot, and associated landscape and lighting improvements.

STORMWATER ANALYSIS SUMMARY

The property currently consists of approximately 60.0% impervious coverage due to the existing buildings. The proposed project is proposing a slight increase of around 5,000 S.F. of impervious coverage to approximately 68.2%. The proposed project will disturb less than one acre in total and does not propose an increase in impervious coverage of more than 0.25 acres and therefore is not considered a major development.

As such, the project is not considered a major development by the Stormwater Control section of the Borough of Bradley Beach Ordinance (Section 396-5) or the NJDEP Stormwater Management requirements (NJAC 7:8) and therefore water quality, water quantity and groundwater recharge measures are not required for the proposed improvements pursuant thereto. Furthermore, since there are no appreciable changes proposed to the land use, land cover, or topography of the site, no changes will occur to the hydrology of the site. Therefore, no additional stormwater management facilities are required.

The impervious coverage, site runoff, and grading design closely matches the existing conditions and will have no negative impact on the project. However, to further improve the proposed improved conditions, we have proposed four (4) drywells to collect the roof runoff from the existing buildings to greatly reduce the stormwater runoff from the site.

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The following 24-hour storm events were studied using the NJ DEP 2-hr Storm distribution:

Storm Frequency (Years)	Rainfall (Inches)
NJ DEP	1.25

II. PRE-DEVELOPMENT CONDITIONS

A summary of the previously discussed drainage areas for the pre-development condition follows below. Refer to the Appendix A for Pre-Development Hydrograph calculations and Appendix C for Pre-Development Drainage Area Map.

PRE-DEVELOPMENT

Watershed A

Watershed A: Total Area 1.18 acres

Subarea Ai: Impervious area tributary to Lake Terrace
Area: 0.75 acres
Runoff Curve Number: CN = 98
Time of concentration: Tc = 10 minutes

Subarea Ap: Pervious area tributary to Lake Terrace
Area: 0.43 acres
Runoff Curve Number: CN = 39
Time of concentration: Tc = 10 minutes

Watershed A: Total Area 0.28 acres

Subarea Bi: Impervious area tributary to Newark Avenue
Area: 0.12 acres
Runoff Curve Number: CN = 98
Time of concentration: Tc = 10 minutes

Subarea Bp: Pervious area tributary to Newark Avenue
Area: 0.16 acres
Runoff Curve Number: CN = 39
Time of concentration: Tc = 10 minutes

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III. POST-DEVELOPMENT CONDITIONS

A summary of the previously discussed drainage areas for the post-development condition follows below. Refer to the Appendix B for Post-Development Hydrograph calculations and Appendix D for a Post-Drainage Area Map.

POST-DEVELOPMENT

Watershed A: Total Area 1.29 acres

Subarea Ai: Impervious Pavement/Concrete area tributary to Lake Terrace
Area: 0.35 acres
Runoff Curve Number: CN = 98
Time of concentration: Tc = 10 minutes

Subarea Roof A: Roof area tributary Subsurface Basin
Area: 0.05 acres
Runoff Curve Number: CN = 98
Time of concentration: Tc = 10 minutes

Subarea Roof B: Roof area tributary Subsurface Basin
Area: 0.15 acres
Runoff Curve Number: CN = 98
Time of concentration: Tc = 10 minutes

Subarea Roof C: Roof area tributary Subsurface Basin
Area: 0.18 acres
Runoff Curve Number: CN = 98
Time of concentration: Tc = 10 minutes

Subarea Roof D: Roof area tributary Subsurface Basin
Area: 0.17 acres
Runoff Curve Number: CN = 98
Time of concentration: Tc = 10 minutes

Subarea Ap: Pervious area tributary to Lake Terrace
Area: 0.39 acres
Runoff Curve Number: CN = 39
Time of concentration: Tc = 10 minutes

Watershed B: Total Area 0.17 acres

Subarea Bi: Impervious area tributary to Newark Avenue
Area: 0.10 acres
Runoff Curve Number: CN = 98
Time of concentration: Tc = 10 minutes

Subarea Bp: Pervious area tributary to Newark Avenue
Area: 0.07 acres
Runoff Curve Number: CN = 39
Time of concentration: Tc = 10 minutes

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STORMWATER MANAGEMENT SUMMARY:

Pre- and Post-development computations for the resultant hydrographs, routing computations, and runoff volumes are appended, respectively, to this report. For each drainage area, the following summaries were generated:

Watershed A

Pre-Development: Subareas Ai, Ap (1.18 ac)

Post-Development: Subareas Ai, Ap (1.29 ac)

Storm (Year)	Pre-Development Peak Flow (cfs)	Post-Development Flow (cfs)	Difference (cfs)
WQ	1.40	0.65	-0.75

Watershed B

Pre-Development: Subareas Bi, Bp (0.28 ac)

Post-Development: Subareas Bi, Bp (0.17 ac)

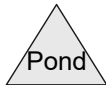
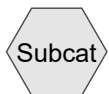
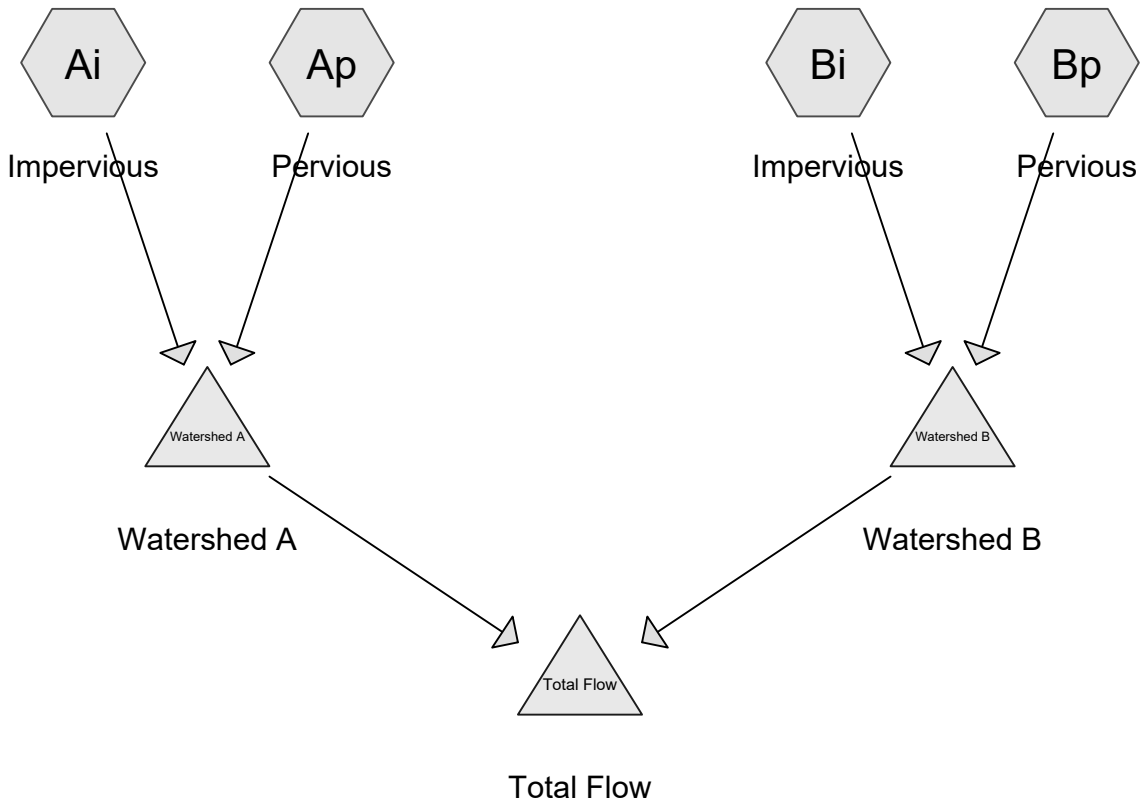
Storm (Year)	Pre-Development Peak Flow (cfs)	Post-Development Flow (cfs)	Difference (cfs)
WQ	0.22	0.19	-0.03

CONCLUSION

The proposed development will not significantly change stormwater runoff from the site. The grading efforts do not significantly change any of the existing drainage patterns and the design was prepared in accordance with the Borough's requirements to maintain site stability throughout.

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A. Pre-Development Flow Calculations



Predevelopment HydroCAD

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.590	39	>75% Grass cover, Good, HSG A (Ap, Bp)
0.870	98	Paved parking, HSG A (Ai, Bi)
1.460	74	TOTAL AREA

Predevelopment HydroCAD

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NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

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Summary for Subcatchment Ai: Impervious

Runoff = 1.40 cfs @ 1.17 hrs, Volume= 0.065 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.750	98	Paved parking, HSG A
0.750		100.00% Impervious Area

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

Predevelopment HydroCAD

NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

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Summary for Subcatchment Ap: Pervious

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.430	39	>75% Grass cover, Good, HSG A
0.430		100.00% Pervious Area

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

Predevelopment HydroCAD

NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

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Summary for Subcatchment Bi: Impervious

Runoff = 0.22 cfs @ 1.17 hrs, Volume= 0.010 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.120	98	Paved parking, HSG A
0.120		100.00% Impervious Area

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

Predevelopment HydroCAD

NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

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Summary for Subcatchment Bp: Pervious

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.160	39	>75% Grass cover, Good, HSG A
0.160		100.00% Pervious Area

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

Predevelopment HydroCAD

NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

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Summary for Pond Total Flow: Total Flow

Inflow Area = 1.460 ac, 59.59% Impervious, Inflow Depth = 0.62" for NJDEP 2-Hr WQ event
Inflow = 1.62 cfs @ 1.17 hrs, Volume= 0.075 af
Primary = 1.62 cfs @ 1.17 hrs, Volume= 0.075 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Predevelopment HydroCAD

NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

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Summary for Pond Watershed A: Watershed A

Inflow Area = 1.180 ac, 63.56% Impervious, Inflow Depth = 0.66" for NJDEP 2-Hr WQ event
Inflow = 1.40 cfs @ 1.17 hrs, Volume= 0.065 af
Primary = 1.40 cfs @ 1.17 hrs, Volume= 0.065 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Predevelopment HydroCAD

NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

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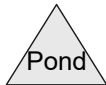
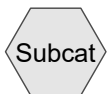
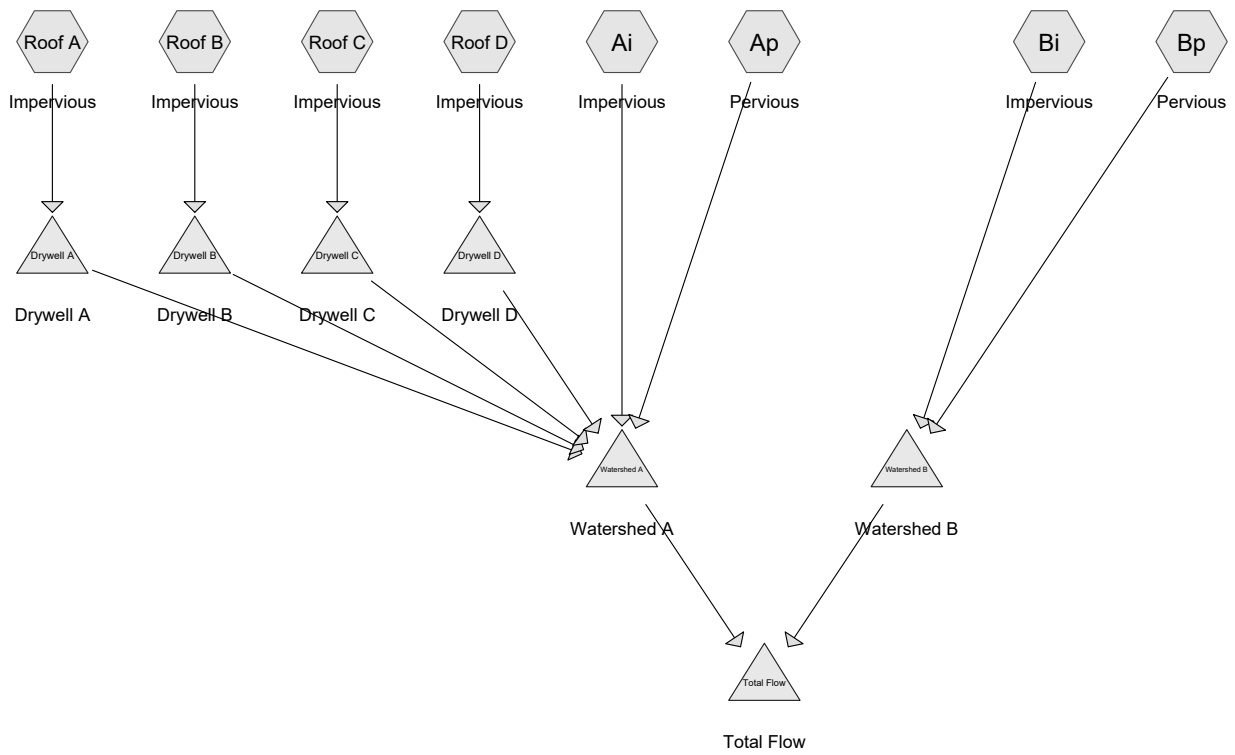
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Summary for Pond Watershed B: Watershed B

Inflow Area = 0.280 ac, 42.86% Impervious, Inflow Depth = 0.44" for NJDEP 2-Hr WQ event
Inflow = 0.22 cfs @ 1.17 hrs, Volume= 0.010 af
Primary = 0.22 cfs @ 1.17 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

B. Post-Development Flow Calculations



Routing Diagram for Postdevelopment HydroCAD
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Postdevelopment HydroCAD

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.460	39	>75% Grass cover, Good, HSG A (Ap, Bp)
0.450	98	Paved parking, HSG A (Ai, Bi)
0.550	98	Roofs, HSG A (Roof A, Roof B, Roof C, Roof D)
1.460	79	TOTAL AREA

Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment Ai: Impervious	Runoff Area=0.350 ac 100.00% Impervious Runoff Depth=1.03" Tc=10.0 min CN=98 Runoff=0.65 cfs 0.030 af
Subcatchment Ap: Pervious	Runoff Area=0.390 ac 0.00% Impervious Runoff Depth=0.00" Tc=10.0 min CN=39 Runoff=0.00 cfs 0.000 af
Subcatchment Bi: Impervious	Runoff Area=0.100 ac 100.00% Impervious Runoff Depth=1.03" Tc=10.0 min CN=98 Runoff=0.19 cfs 0.009 af
Subcatchment Bp: Pervious	Runoff Area=0.070 ac 0.00% Impervious Runoff Depth=0.00" Tc=10.0 min CN=39 Runoff=0.00 cfs 0.000 af
Subcatchment Roof A: Impervious	Runoff Area=0.050 ac 100.00% Impervious Runoff Depth=1.03" Tc=10.0 min CN=98 Runoff=0.09 cfs 0.004 af
Subcatchment Roof B: Impervious	Runoff Area=0.150 ac 100.00% Impervious Runoff Depth=1.03" Tc=10.0 min CN=98 Runoff=0.28 cfs 0.013 af
Subcatchment Roof C: Impervious	Runoff Area=0.180 ac 100.00% Impervious Runoff Depth=1.03" Tc=10.0 min CN=98 Runoff=0.34 cfs 0.016 af
Subcatchment Roof D: Impervious	Runoff Area=0.170 ac 100.00% Impervious Runoff Depth=1.03" Tc=10.0 min CN=98 Runoff=0.32 cfs 0.015 af
Pond Drywell A: Drywell A	Peak Elev=1.90' Storage=0.004 af Inflow=0.09 cfs 0.004 af Outflow=0.00 cfs 0.000 af
Pond Drywell B: Drywell B	Peak Elev=1.74' Storage=0.013 af Inflow=0.28 cfs 0.013 af Outflow=0.00 cfs 0.000 af
Pond Drywell C: Drywell C	Peak Elev=1.55' Storage=0.016 af Inflow=0.34 cfs 0.016 af Outflow=0.00 cfs 0.000 af
Pond Drywell D: Drywell D	Peak Elev=1.70' Storage=0.015 af Inflow=0.32 cfs 0.015 af Outflow=0.00 cfs 0.000 af
Pond Total Flow: Total Flow	Inflow=0.84 cfs 0.039 af Primary=0.84 cfs 0.039 af
Pond Watershed A: Watershed A	Inflow=0.65 cfs 0.030 af Primary=0.65 cfs 0.030 af
Pond Watershed B: Watershed B	Inflow=0.19 cfs 0.009 af Primary=0.19 cfs 0.009 af

Total Runoff Area = 1.460 ac Runoff Volume = 0.086 af Average Runoff Depth = 0.71"
31.51% Pervious = 0.460 ac 68.49% Impervious = 1.000 ac

Postdevelopment HydroCAD

NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

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Summary for Subcatchment Ai: Impervious

Runoff = 0.65 cfs @ 1.17 hrs, Volume= 0.030 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.350	98	Paved parking, HSG A
0.350		100.00% Impervious Area

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

Postdevelopment HydroCAD

NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

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Summary for Subcatchment Ap: Pervious

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.390	39	>75% Grass cover, Good, HSG A
0.390		100.00% Pervious Area

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

Postdevelopment HydroCAD

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Summary for Subcatchment Bi: Impervious

Runoff = 0.19 cfs @ 1.17 hrs, Volume= 0.009 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.100	98	Paved parking, HSG A
0.100		100.00% Impervious Area

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

Postdevelopment HydroCAD

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Summary for Subcatchment Bp: Pervious

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.070	39	>75% Grass cover, Good, HSG A
0.070		100.00% Pervious Area

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

Postdevelopment HydroCAD

NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

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Summary for Subcatchment Roof A: Impervious

Runoff = 0.09 cfs @ 1.17 hrs, Volume= 0.004 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.050	98	Roofs, HSG A
0.050		100.00% Impervious Area

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

Postdevelopment HydroCAD

NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

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Summary for Subcatchment Roof B: Impervious

Runoff = 0.28 cfs @ 1.17 hrs, Volume= 0.013 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.150	98	Roofs, HSG A
0.150		100.00% Impervious Area

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

Postdevelopment HydroCAD

NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

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Summary for Subcatchment Roof C: Impervious

Runoff = 0.34 cfs @ 1.17 hrs, Volume= 0.016 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.180	98	Roofs, HSG A
0.180		100.00% Impervious Area

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

Postdevelopment HydroCAD

NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

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Summary for Subcatchment Roof D: Impervious

Runoff = 0.32 cfs @ 1.17 hrs, Volume= 0.015 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.170	98	Roofs, HSG A
0.170		100.00% Impervious Area

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

Summary for Pond Drywell A: Drywell A

Inflow Area = 0.050 ac, 100.00% Impervious, Inflow Depth = 1.03" for NJDEP 2-Hr WQ event
 Inflow = 0.09 cfs @ 1.17 hrs, Volume= 0.004 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 Peak Elev= 1.90' @ 3.10 hrs Surf.Area= 0.005 ac Storage= 0.004 af

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

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.003 af	2.54'W x 81.00'L x 2.21'H Field A 0.010 af Overall - 0.002 af Embedded = 0.009 af x 40.0% Voids
#2A	0.50'	0.001 af	ADS N-12 12" x 4 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf
		0.005 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	3.50'	2.0" x 2.0" Horiz. Grate C= 0.600 in 2.0" x 2.0" Grate (100% open area) Limited to weir flow at low heads

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

Pond Drywell A: Drywell A - Chamber Wizard Field A

Chamber Model = ADS N-12 12" (ADS N-12® Pipe)

Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf

Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf

4 Chambers/Row x 20.00' Long = 80.00' Row Length +6.0" End Stone x 2 = 81.00' Base Length

1 Rows x 14.5" Wide + 8.0" Side Stone x 2 = 2.54' Base Width

6.0" Base + 14.5" Chamber Height + 6.0" Cover = 2.21' Field Height

4 Chambers x 16.2 cf = 64.8 cf Chamber Storage

4 Chambers x 20.9 cf = 83.7 cf Displacement

454.8 cf Field - 83.7 cf Chambers = 371.1 cf Stone x 40.0% Voids = 148.4 cf Stone Storage

Chamber Storage + Stone Storage = 213.2 cf = 0.005 af

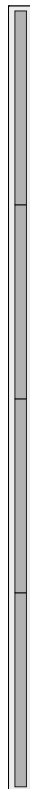
Overall Storage Efficiency = 46.9%

Overall System Size = 81.00' x 2.54' x 2.21'

4 Chambers

16.8 cy Field

13.7 cy Stone



Summary for Pond Drywell B: Drywell B

Inflow Area = 0.150 ac, 100.00% Impervious, Inflow Depth = 1.03" for NJDEP 2-Hr WQ event
 Inflow = 0.28 cfs @ 1.17 hrs, Volume= 0.013 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 Peak Elev= 1.74' @ 3.10 hrs Surf.Area= 0.015 ac Storage= 0.013 af

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

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.011 af	2.54'W x 261.00'L x 2.21'H Field A 0.034 af Overall - 0.006 af Embedded = 0.027 af x 40.0% Voids
#2A	0.50'	0.005 af	ADS N-12 12" x 13 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf
		0.016 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	3.50'	2.0" x 2.0" Horiz. Grate C= 0.600 in 2.0" x 2.0" Grate (100% open area) Limited to weir flow at low heads

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

Pond Drywell B: Drywell B - Chamber Wizard Field A

Chamber Model = ADS N-12 12" (ADS N-12® Pipe)

Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf

Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf

13 Chambers/Row x 20.00' Long = 260.00' Row Length +6.0" End Stone x 2 = 261.00' Base Length

1 Rows x 14.5" Wide + 8.0" Side Stone x 2 = 2.54' Base Width

6.0" Base + 14.5" Chamber Height + 6.0" Cover = 2.21' Field Height

13 Chambers x 16.2 cf = 210.6 cf Chamber Storage

13 Chambers x 20.9 cf = 272.2 cf Displacement

1,465.6 cf Field - 272.2 cf Chambers = 1,193.5 cf Stone x 40.0% Voids = 477.4 cf Stone Storage

Chamber Storage + Stone Storage = 688.0 cf = 0.016 af

Overall Storage Efficiency = 46.9%

Overall System Size = 261.00' x 2.54' x 2.21'

13 Chambers

54.3 cy Field

44.2 cy Stone



Summary for Pond Drywell C: Drywell C

Inflow Area = 0.180 ac, 100.00% Impervious, Inflow Depth = 1.03" for NJDEP 2-Hr WQ event
 Inflow = 0.34 cfs @ 1.17 hrs, Volume= 0.016 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 Peak Elev= 1.55' @ 3.10 hrs Surf.Area= 0.020 ac Storage= 0.016 af

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

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.014 af	2.54'W x 341.00'L x 2.21'H Field A 0.044 af Overall - 0.008 af Embedded = 0.036 af x 40.0% Voids
#2A	0.50'	0.006 af	ADS N-12 12" x 17 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf
		0.021 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	3.50'	2.0" x 2.0" Horiz. Grate C= 0.600 in 2.0" x 2.0" Grate (100% open area) Limited to weir flow at low heads

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

Pond Drywell C: Drywell C - Chamber Wizard Field A

Chamber Model = ADS N-12 12" (ADS N-12® Pipe)

Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf

Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf

17 Chambers/Row x 20.00' Long = 340.00' Row Length +6.0" End Stone x 2 = 341.00' Base Length

1 Rows x 14.5" Wide + 8.0" Side Stone x 2 = 2.54' Base Width

6.0" Base + 14.5" Chamber Height + 6.0" Cover = 2.21' Field Height

17 Chambers x 16.2 cf = 275.4 cf Chamber Storage

17 Chambers x 20.9 cf = 355.9 cf Displacement

1,914.9 cf Field - 355.9 cf Chambers = 1,559.0 cf Stone x 40.0% Voids = 623.6 cf Stone Storage

Chamber Storage + Stone Storage = 899.0 cf = 0.021 af

Overall Storage Efficiency = 46.9%

Overall System Size = 341.00' x 2.54' x 2.21'

17 Chambers

70.9 cy Field

57.7 cy Stone



Summary for Pond Drywell D: Drywell D

Inflow Area = 0.170 ac, 100.00% Impervious, Inflow Depth = 1.03" for NJDEP 2-Hr WQ event
 Inflow = 0.32 cfs @ 1.17 hrs, Volume= 0.015 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 Peak Elev= 1.70' @ 3.10 hrs Surf.Area= 0.018 ac Storage= 0.015 af

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

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.013 af	2.54'W x 301.00'L x 2.21'H Field A 0.039 af Overall - 0.007 af Embedded = 0.032 af x 40.0% Voids
#2A	0.50'	0.006 af	ADS N-12 12" x 15 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf
		0.018 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	3.50'	2.0" x 2.0" Horiz. Gate C= 0.600 in 2.0" x 2.0" Grate (100% open area) Limited to weir flow at low heads

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

Pond Drywell D: Drywell D - Chamber Wizard Field A

Chamber Model = ADS N-12 12" (ADS N-12® Pipe)

Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf

Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf

15 Chambers/Row x 20.00' Long = 300.00' Row Length +6.0" End Stone x 2 = 301.00' Base Length

1 Rows x 14.5" Wide + 8.0" Side Stone x 2 = 2.54' Base Width

6.0" Base + 14.5" Chamber Height + 6.0" Cover = 2.21' Field Height

15 Chambers x 16.2 cf = 243.0 cf Chamber Storage

15 Chambers x 20.9 cf = 314.0 cf Displacement

1,690.2 cf Field - 314.0 cf Chambers = 1,376.2 cf Stone x 40.0% Voids = 550.5 cf Stone Storage

Chamber Storage + Stone Storage = 793.5 cf = 0.018 af

Overall Storage Efficiency = 46.9%

Overall System Size = 301.00' x 2.54' x 2.21'

15 Chambers

62.6 cy Field

51.0 cy Stone



Summary for Pond Total Flow: Total Flow

Inflow Area = 1.460 ac, 68.49% Impervious, Inflow Depth = 0.32" for NJDEP 2-Hr WQ event
Inflow = 0.84 cfs @ 1.17 hrs, Volume= 0.039 af
Primary = 0.84 cfs @ 1.17 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Postdevelopment HydroCAD

NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

Prepared by Insite Engineering LLC

Printed 4/15/2021

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Page 21

Summary for Pond Watershed A: Watershed A

Inflow Area = 1.290 ac, 69.77% Impervious, Inflow Depth = 0.28" for NJDEP 2-Hr WQ event
Inflow = 0.65 cfs @ 1.17 hrs, Volume= 0.030 af
Primary = 0.65 cfs @ 1.17 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Postdevelopment HydroCAD

Prepared by Insite Engineering LLC

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NJ DEP 2-hr NJDEP 2-Hr WQ Rainfall=1.25"

Printed 4/15/2021

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Summary for Pond Watershed B: Watershed B

Inflow Area = 0.170 ac, 58.82% Impervious, Inflow Depth = 0.61" for NJDEP 2-Hr WQ event
Inflow = 0.19 cfs @ 1.17 hrs, Volume= 0.009 af
Primary = 0.19 cfs @ 1.17 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

C. Pre-development Drainage Area Map

PROJECT INFORMATION

501-511 LAKE TERRACE

PROJECT LOCATION: BLOCK 7, LOT 2.03
501-511 LAKE TERRACE
BOROUGH OF BRADLEY BEACH
MONMOUTH COUNTY, NJ
TAX MAP SHEET #1

OWNER:
501 LAKE TERRACE, LLC
1412 MAIN STREET
ASBURY PARK, NJ 07712
(732) 772-5656

APPLICANT:
501 LAKE TERRACE, LLC
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(732) 772-5656

APPLICANT'S PROFESSIONALS

ATTORNEY:
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49 MARKET STREET
MORRISTOWN, NJ 07960

ARCHITECT:
MICHAEL SAVARESE ASSOCIATES
34 SYCAMORE AVENUE, UNIT #1E
LITTLE SILVER, NJ 07739

LANDSCAPE ARCHITECT:
BML STUDIO, LLC
11 PERMINKLE DRIVE
BARNEGAT, NJ 08005

SURVEYOR:
INSITE SURVEYING, LLC
1955 ROUTE 34, SUITE 1A
WALL, NJ 07719



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ELECTRIC	RED
GAS	YELLOW
COMMUNICATION / TV	ORANGE
WATER	BLUE
SEWER	GREEN
TEMP. SURVEY MARKINGS	MAGENTA
PROPOSED EXCAVATION	WHITE



InSite Engineering, LLC
CERTIFICATE OF AUTHORIZATION: 24GA28083200
1955 ROUTE 34, SUITE 1A, WALL, NJ 07719
732-531-7100 (PH) 732-531-7344 (FAX)
InSite@InSiteEng.net www.InSiteEng.net

LICENSED IN: NEW JERSEY, NEW YORK, PENNSYLVANIA, DELAWARE, CONNECTICUT, NORTH CAROLINA, COLORADO, & DISTRICT OF COLUMBIA

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Jason K. Fichter
JASON K. FICHTER, PE, PP, CFM, CME
NJPE #3718 NJPP #726 PAPE 61968
DEPE 3013 NYPE 802285 CPE 23391
NCPCE 33336 DCPE 900682 COPE 38605

REVISIONS

Rev. #	Date	Description
2	05/01/21	REV. PER CLIENT COMMENTS
1	05/06/21	REV. PER COUNTY COMMENTS
0	11/20/20	INITIAL RELEASE

SCALE: 1"=20'
DATE: 11/20/20
JOB #: 20-1472-01
CAD ID: 20-1472-01r2

DESIGNED BY: CMB
DRAWN BY: JLS
CHECKED BY: JLF

NOT FOR CONSTRUCTION

APPROVED BY:

FOR CONSTRUCTION

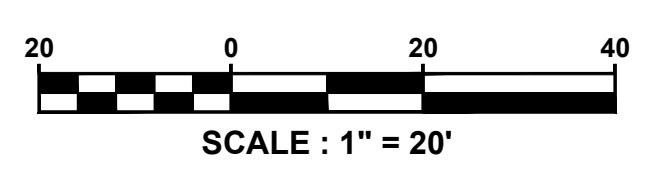
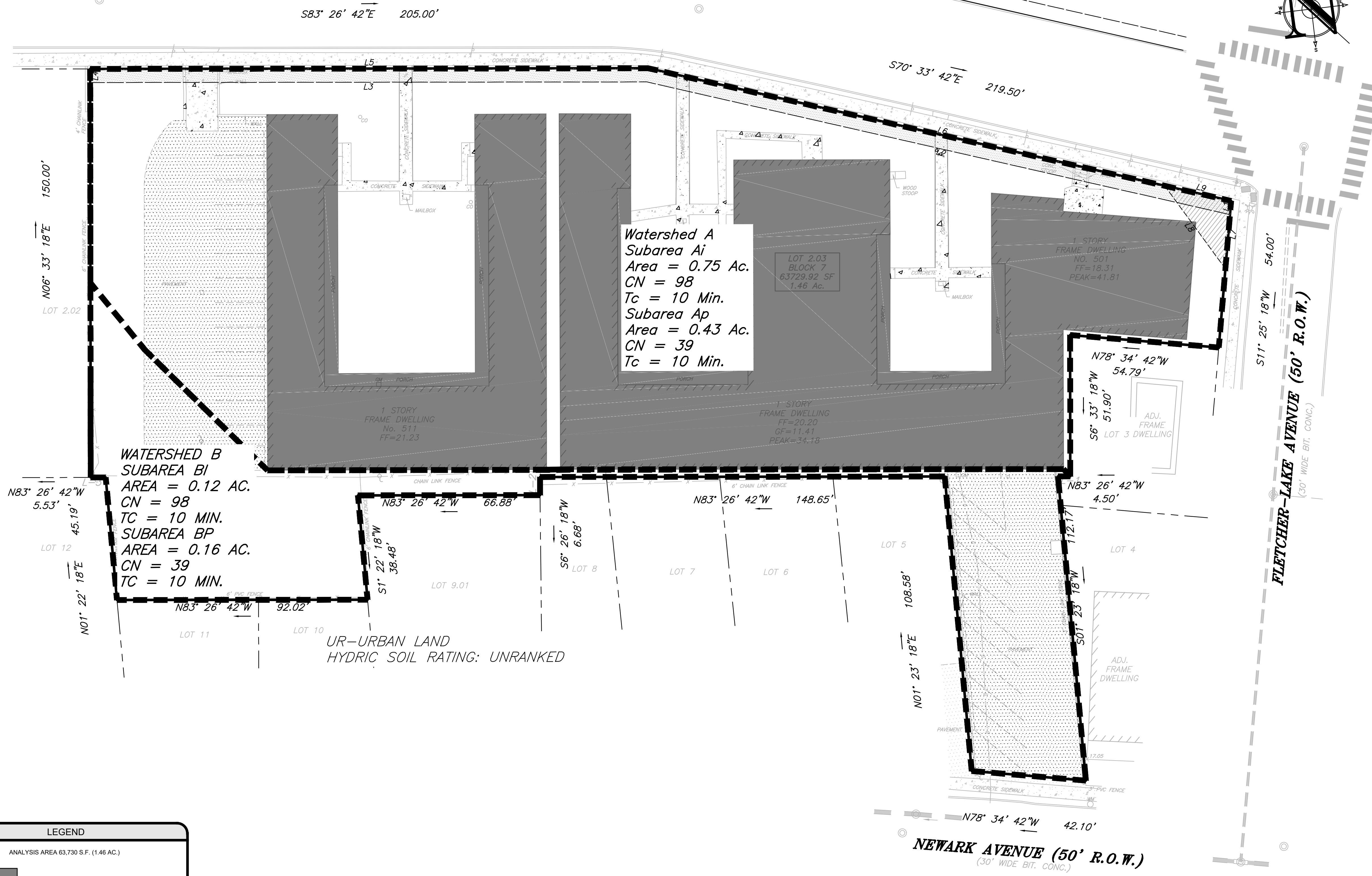
PLAN INFORMATION

PRELIMINARY & FINAL
MAJOR SITE PLAN

SHEET TITLE:
PRE-DEVELOPMENT
DRAINAGE AREA MAP

SHEET NO.:
1 OF 2

LAKE TERRACE (COUNTY ROUTE 18)
(50' R.O.W.)



LEGEND

EXISTING	PROPOSED
BOUNDARY LINE	BOUNDARY LINE
CONTOUR LINE	CONTOUR LINE
SPOT ELEVATION	SPOT ELEVATION
BUILDING	BUILDING
WALL	WALL
GAS	GAS
WATER	WATER
INLET	INLET
STORM	STORM
SANITARY MAIN	SANITARY MAIN
SANITARY LATERAL	SANITARY LATERAL
OVERHEAD WIRE	OVERHEAD WIRE
ELECTRIC	ELECTRIC
TELEPHONE	TELEPHONE
UTILITY POLE	UTILITY POLE
HYDRANT	HYDRANT
SIGN POST	SIGN POST
FENCE	FENCE
LIGHT FIXTURE	LIGHT FIXTURE
TEST PIT LOCATION	TEST PIT LOCATION
GRADE FLOW ARROW	GRADE FLOW ARROW
SWALE CENTER LINE	SWALE CENTER LINE

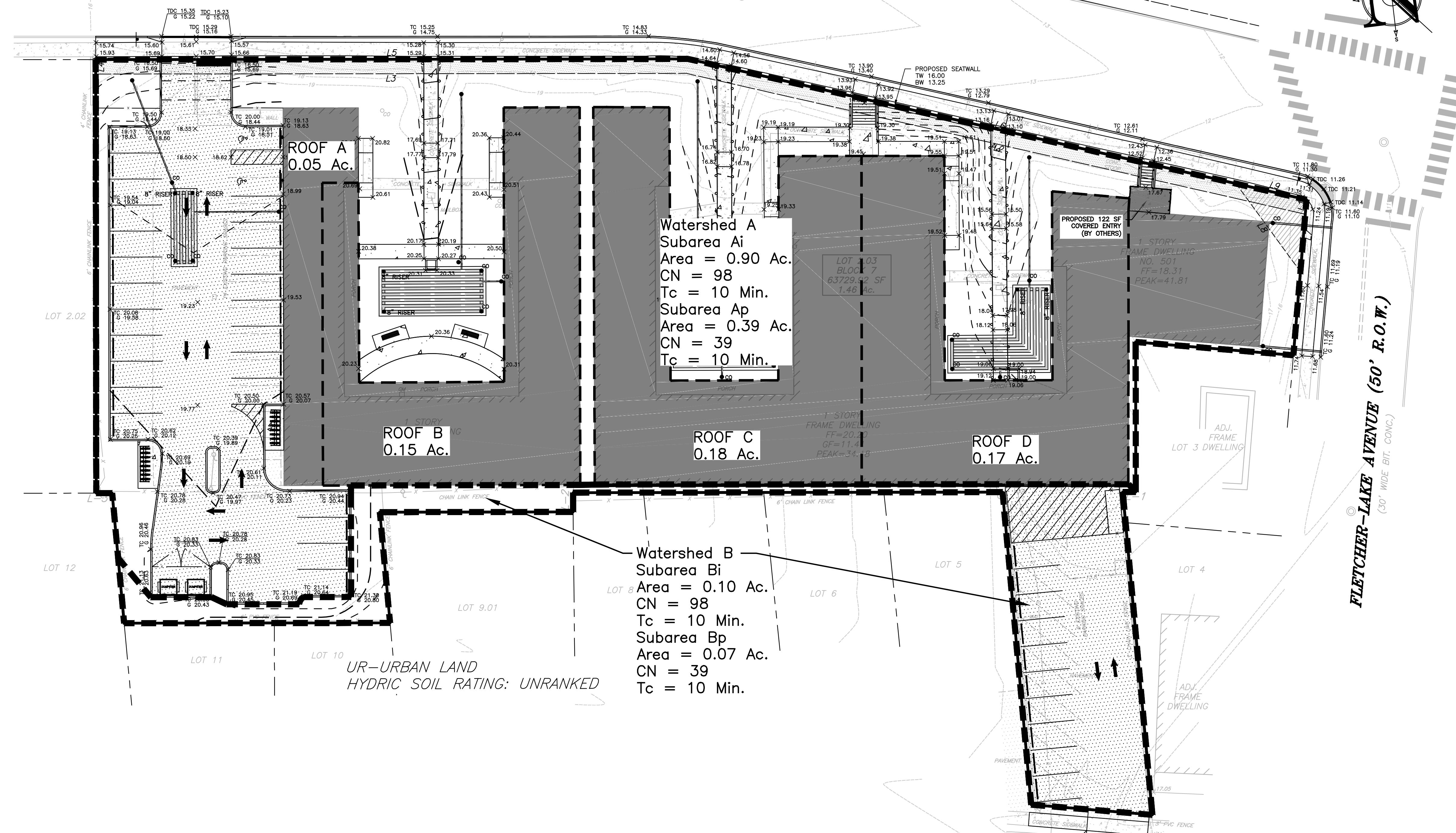
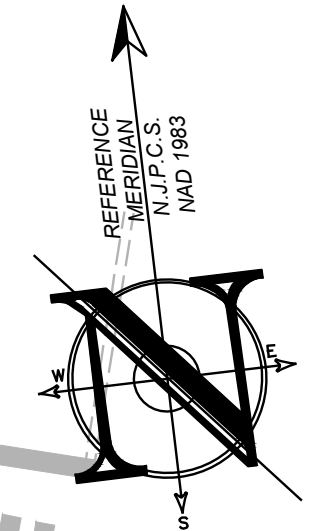
LEGEND

ANALYSIS AREA 63,730 S.F. (1.46 AC.)	BUILDING AREA: 40.8% (25,987 S.F.) (0.60 AC.)
PAVEMENT AREA: 16.0% (10,216 S.F.) (0.23 AC.)	CONCRETE AREA: 3.2% (2,038 S.F.) (0.04 AC.)
NO HATCH	OPEN SPACE: 40.0% (25,489 S.F.) (0.59 AC.)
ANALYSIS AREA BOUNDARY:	TOTAL IMPERVIOUS AREA: 60.0% (38,241 S.F.) (0.87 AC.)
	TOTAL PERVIOUS AREA: 40.0% (25,489 S.F.) (0.59 AC.)

File: S:\Web\1472 - 501 Lake Terrace, LLC\20-1472-01 - 501-511 Lake Terrace_Bradley Beach, NJ\2014720100\MapSupport\01 - Development_Maps\Map - 03-Pre-Development_Drainage_Map.dwg
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D. Post-development Drainage Area Map

LAKE TERRACE (COUNTY ROUTE 18)
(50' R.O.W.)



ROOF A
0.05 Ac.

ROOF B
0.15 Ac.

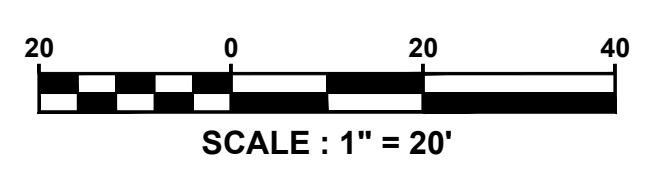
ROOF C
0.18 Ac.

ROOF D
0.17 Ac.

Watershed A
Subarea Ai
Area = 0.90 Ac.
CN = 98
Tc = 10 Min.
Subarea Ap
Area = 0.39 Ac.
CN = 39
Tc = 10 Min.

Watershed B
Subarea Bi
Area = 0.10 Ac.
CN = 98
Tc = 10 Min.
Subarea Bp
Area = 0.07 Ac.
CN = 39
Tc = 10 Min.

UR-URBAN LAND
HYDRIC SOIL RATING: UNRANKED



File: S:\Web\142 - 501 Lake Terrace, LLC\20-1472-01 - 501-511 Lake Terrace_Bradley Beach, NJ\2014720100\Map\Support\01 - Development_Maps.dwg -> 04-Post-Development_Map
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LEGEND	
EXISTING	PROPOSED

LEGEND	
	ANALYSIS AREA 63,730 S.F. (1.46 AC.)
	BUILDING AREA: 41.0% (26,109 S.F.) (0.60 AC.)
	PAVEMENT AREA: 22.8% (14,535 S.F.) (0.34 AC.)
	CONCRETE AREA: 4.4% (2,821 S.F.) (0.06 AC.)
	OPEN SPACE: 31.8% (20,265 S.F.) (0.46 AC.)
	ANALYSIS AREA BOUNDARY:
	TOTAL IMPERVIOUS AREA: 68.2% (43,465 S.F.) (1.00 AC.)
	TOTAL PERVIOUS AREA: 31.8% (20,265 S.F.) (0.46 AC.)

PROJECT INFORMATION

501-511 LAKE TERRACE

PROJECT LOCATION: BLOCK 7, LOT 2.03
501-511 LAKE TERRACE
BOROUGH OF BRADLEY BEACH
MONMOUTH COUNTY, NJ
TAX MAP SHEET #1

OWNER: 501 LAKE TERRACE, LLC
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(732) 772-5656

APPLICANT: 501 LAKE TERRACE, LLC
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APPLICANT'S PROFESSIONALS:
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ARCHITECT: MICHAEL SAVARESE ASSOCIATES
34 SYCAMORE AVENUE, UNIT #1E
LITTLE SILVER, NJ 07739

LANDSCAPE ARCHITECT: BML STUDIO, LLC
11 PERKINWILE DRIVE
BARNEGAT, NJ 08005

SURVEYOR: INSITE SURVEYING, LLC
1955 ROUTE 34, SUITE 1A
WALL, NJ 07719



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ELECTRIC	RED
GAS	YELLOW
COMMUNICATION / TV	ORANGE
WATER	BLUE
SEWER	GREEN
TEMP. SURVEY MARKINGS	MAGENTA
PROPOSED EVALUATION	WHITE

IN SITE
Engineering + Surveying + Planning

InSite Engineering, LLC
CERTIFICATE OF AUTHORIZATION: 24GA28083200
1955 ROUTE 34, SUITE 1A, WALL, NJ 07719
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Jason F. Fichter, PE, PP, CFM, CME
JASON F. FICHTER, PE, PP, CFM, CME
NJPE #3718 NJPP #726 PAPE 61968
DEPE 3013 NYPE 802285 CIPPE 23391
NCPPE 33336 DCPPE 800682 CCOPE 38605

REVISIONS

Rev. #	Date	Comment
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1	05/06/21	REV. PER COUNTY COMMENTS
0	11/20/20	INITIAL RELEASE

SCALE: 1"=20' DESIGNED BY: CMB
DATE: 11/20/20 DRAWN BY: JLS
JOB #: 20-1472-01 CHECKED BY: JLF
CAD ID: 20-1472-01r2

NOT FOR CONSTRUCTION APPROVED BY:

FOR CONSTRUCTION PLAN INFORMATION

PRELIMINARY & FINAL MAJOR SITE PLAN

POST-DEVELOPMENT DRAINAGE AREA MAP