

TOWNSHIP OF BERNARDS
ZONING BOARD OF ADJUSTMENT
APPLICATION STATUS FORM

Application No: ZB22-028 Block: 11201 Lot: 3 Zone: E-2

Applicant: SIGNATURE ACQUISITION LLC

Address of Property: 150 ALLEN ROAD

Description: PRELIM/FINAL SITE PLAN, D-4 FAR,
BULK VARIANCES TO RAZE EXISTING BUILDING
AND CONSTRUCT TWO (2) MIXED USE BUILDINGS

APPLICATION CHECKLIST

- | | | | |
|-------------------------------------|------------------------------------------------------|-------------------------------------|----------------------------|
| <input checked="" type="checkbox"/> | Original + ³ 16 copies of Application W-9 | <input checked="" type="checkbox"/> | Engineering Plan/Plot Plan |
| <input checked="" type="checkbox"/> | Site Visit Consent (A) | <input checked="" type="checkbox"/> | Architectural Plans |
| <input checked="" type="checkbox"/> | Ownership Form (B) | <input type="checkbox"/> | Survey |
| <input checked="" type="checkbox"/> | 200' Property Search List (C) | <input type="checkbox"/> | Photographs |
| <input checked="" type="checkbox"/> | Tax Certification (D) | <input checked="" type="checkbox"/> | Wetlands Report/LOI |
| <input type="checkbox"/> | Notice to be Served/Published (E) | <input checked="" type="checkbox"/> | Application Fee |
| <input checked="" type="checkbox"/> | Dimensional Statistics Form (F) | <input checked="" type="checkbox"/> | Escrow Deposit |
| <input checked="" type="checkbox"/> | Contributions Disclosure Form (G) | <input type="checkbox"/> | Imaging Fee |
| | | <input type="checkbox"/> | Tax Map Revision Fee |
| | | <input checked="" type="checkbox"/> | Checklist |

SCHEDULING

- 9.27.22 Original Submission Date
11.11.22 Completeness Deadline (45 days)
 _____ Incomplete Date
 _____ Resubmission Date
 _____ Date Complete
 _____ Time to Act (45/95/120 days)

HEARING

- _____ Notice to Property Owners
 _____ Date of Publication
11.9.22 Completeness Hearing
 _____ Public Hearing
 _____ Carried to Date
 _____ Decision - Approved/Denied
 _____ Resolution Memorialized
 _____ Resolution Published

DISTRIBUTION

- _____ Environmental Comm
 _____ Fire Official
 _____ LCFAS
 _____ Police

NOTES



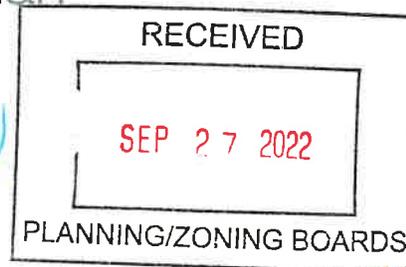
DiFrancesco Bateman
Kunzman, Davis, Lehrer & Flaum, P.C.

15 Mountain Boulevard
Warren, New Jersey 07059

Telephone: (908) 757-7800
Fax: (908) 757-8039
www.newjerseylaw.net

Michael E. Silbert
Associate
Extension 128

msilbert@newjerseylaw.net



September 26, 2022

VIA HAND DELIVERY

Cyndi Kiefer, Secretary
Bernards Township Zoning Board of Adjustment
1 Collyer Lane Basking Ridge, New Jersey 07920

**Re: Signature Acquisitions, LLC
Preliminary and Final Major Site Plan with "D-4" Variance Relief
Block 11201, Lot 3
Bernards Township, NJ 07920**

Dear Ms. Kiefer:

This office represents Signature Acquisitions, LLC (the "Applicant") in connection with an application (the "Application") to the Bernards Township Zoning Board of Adjustment for preliminary and final major site plan approval together with "d-4" and other "c" variance relief for Lot 3, Block 11201 as shown on the Tax Map of the Township of Bernards (more commonly known as 150 Allen Road). In that capacity, we submit the following documents:

1. Original and two (2) copies of the Application for preliminary and final site plan approval with Checklist and related attachments;
2. Three (3) copies of the Site Plan prepared by Gladstone Design, Inc., dated September 16, 2022;
3. Three (3) copies of a Truck Turning Plan prepared by Gladstone Design, Inc., dated September 16, 2022;
4. Three (3) copies of a Fire Service Plan prepared by Gladstone Design, Inc., dated September 16, 2022;
5. Three (3) copies of color-rendered Architectural Plans prepared by Parette Somjen Architects, dated September 16, 2022;

6. Three (3) copies of a Traffic Impact Analysis prepared by Stonefield Engineering, dated September 16, 2022;
7. Three (3) copies of a Stormwater Management Report prepared by Gladstone Design, Inc., dated September 16, 2022;
8. Three (3) copies of an Operations & Maintenance Manual for Stormwater Management Facilities, prepared by Gladstone Design, Inc., dated September 16, 2022;
9. Three (3) copies of a Stormwater Management Testing Report prepared by Geo-Technology Associates, Inc., dated September 2022;
10. Three (3) copies of an Environmental Impact Assessment and Project Report prepared by EcolSciences, Inc., dated September 16, 2022;
11. Original and two (2) copies of a Contribution Disclosure Statement from the Applicant, Owner, and the Applicant's Professionals;
12. Original and two (2) copies of the signed Owner's Consent form (submitted as part of the Application materials);
13. W-9;
14. Certification that taxes are current;
15. Property Owner's List of properties located within 200' of the subject property; and
16. Three (3) copies of the Somerset County Land Development Application and related checklist, to be submitted to the County; and
17. One (1) copy of the Title Report for Block 11201, Lot 3, dated August 1, 2022.

I am also enclosing the following checks:

1. Check in the amount of \$10,861.00 representing the application fee;
2. Check in the amount of \$10,838.42 representing the escrow fee;

Please be advised: (i) three (3) copies of a Boundary Survey; and (ii) a digital file of all the materials submitted above will be provided to the Township under separate cover. Kindly advise as soon as this application is deemed "complete" so that we can provide notice in accordance with the Municipal Land Use Law.

Very truly yours,



Michael E. Silbert

Enc.

cc: Rich Travaglini (via Email)
Shloimy Reichman (via Email)
Rob Moschello (via Email)
Chris Fairfield (via Email)
Jeffrey Lehrer (via Email)

EXHIBIT LIST

1. APPLICATION FOR PRELIMINARY AND FINAL SITE PLAN APPROVAL WITH CHECKLISTS AND ATTACHMENTS – **Page 5**
2. TREE REMOVAL/LAND DISTURBANCE PERMIT APPLICATION – **Page 39**
3. SOMERSET COUNTY LAND DEVELOPMENT APPLICATION (INCLUDING PROOF OF SUBMISSION) – **Page 40**
4. TITLE REPORT – **Page 51**
5. PRELIMINARY AND FINAL SITE PLAN (INCLUDING TRUCK TURNING PLAN AND FIRE SERVICE PLAN) – **Page 141**
6. COLOR-RENDERED ARCHITECTURAL PLANS – **Page 168**
7. STORMWATER MANAGEMENT REPORT – **Page 177**
8. OPERATIONS & MAINTENANCE MANUAL FOR STORMWATER MANAGEMENT FACILITIES – **Page 672**
9. STORMWATER MANAGEMENT TESTING REPORT – **Page 694**
10. ENVIRONMENTAL IMPACT ASSESSMENT AND PROJECT REPORT – **Page 736**

11. TRAFFIC IMPACT STUDY– Page 811

**TOWNSHIP OF BERNARDS
2022 ZONING BOARD OF ADJUSTMENT APPLICATION**

- | | |
|-----------------------------------------------------------------------------------------|------------------------------------------------------------------|
| <input checked="" type="checkbox"/> Bulk or Dimensional ("c") Variance | <input type="checkbox"/> Appeal of Zoning Officer's Decision |
| <input type="checkbox"/> Use ("d") Variance | <input type="checkbox"/> Interpretation of Zoning Ordinance |
| <input type="checkbox"/> Conditional Use ("d") Variance | <input type="checkbox"/> Minor Subdivision |
| <input checked="" type="checkbox"/> Floor Area Ratio, Density, or Height ("d") Variance | <input type="checkbox"/> Major Subdivision - Preliminary / Final |
| <input checked="" type="checkbox"/> Site Plan - Preliminary / Final | <input type="checkbox"/> Other (specify): _____ |

1. APPLICANT: Signature Acquisitions, LLC

Address: 20 Commerce Drive, Cranford, NJ 07016

Phone: (home) _____ (work) (908) 577-7597 (mobile) _____

Email (will be used for official notifications): _____

2. OWNER (if different from applicant): SIG 150, LLC

Address: 20 Commerce Drive, Cranford, NJ 07016

Phone: 212 470-5200 Email (will be used for official notifications): _____

3. ATTORNEY: Jeffrey B. Lehrer

Address: 15 Mountain Blvd., Warren, NJ 07059

Phone: (908) 757-7800 Email (will be used for official notifications): jlehrer@newjerseylaw.net

4. OTHER PROFESSIONALS (Engineer, Architect, etc. Attach additional sheet if necessary): See Attached

Name: Robert C. Moschello, P.E. Profession: Engineer

Address: 265 Main Street, P.P. Box 400, Gladstone, NJ 07934

Phone: (908) 234-0309 Email (will be used for official notifications): rmoschello@gladstonedesign.com

5. PROPERTY INFORMATION: Block(s): 11201 Lot(s): 3 Zone: E-2

Street Address: 150 Allen Road Total Area (square feet/acres): 28.305 Acres

6. ARE THERE ANY PENDING OR PRIOR PLANNING BOARD OR BOARD OF ADJUSTMENT APPLICATIONS INVOLVING THE PROPERTY? No Yes (if yes, explain or attach Board resolution) _____

7. ARE THERE CURRENTLY ANY VIOLATIONS OF THE ZONING ORDINANCE INVOLVING THE PROPERTY? No Yes (if yes, explain) _____

8. ARE THERE ANY DEED RESTRICTIONS OR EASEMENTS AFFECTING THE PROPERTY?

[] No [X] Yes (if yes, explain) See Title Report Attached

9. DESCRIPTION OF THE EXISTING PROPERTY AND THE PROPOSAL/REQUEST: _____

See Attached

10. DESCRIPTION OF REQUESTED VARIANCES OR EXCEPTIONS (include Ordinance section no.):

See Attached

11. THE FOLLOWING ARGUMENTS ARE MADE IN SUPPORT OF THE APPLICATION: _____

See Attached

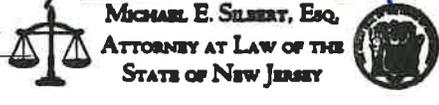
12. NOTARIZED SIGNATURES (ALL APPLICANTS AND OWNERS MUST SIGN):

APPLICANT(S) SIGN HERE:

I/we, Signature Acquisitions, LLC hereby depose and say that all of the above statements and the statements contained in the materials submitted herewith are true and correct.

Signature of Applicant(s): Jeffrey B. Lehrer and Jeffrey B. Lehrer Attorney for Applicant

Sworn and subscribed before me, this 22nd day of September, 2022

Michael E. Silbert
Notary 

OWNER(S) SIGN HERE (IF APPLICANT IS NOT THE OWNER):

If the application is made by a person or entity other than the property owner, or by less than all of the property owners, then the property owner or the additional owners must complete the following:

I/we, _____ the owner(s) of the property described in this application, hereby authorize _____ to act as my/our agent for purposes of making and prosecuting this application and I/we hereby consent to the variance relief (if any) granted and all conditions of approval thereof.

SEE SEPARATE PAGE

Signature of owner(s): _____

Sworn and subscribed before me, this _____ day of _____, 20__.

Notary

Owner's Consent Form

[] No [] Yes (if yes, explain)

9. DESCRIPTION OF THE EXISTING PROPERTY AND THE PROPOSAL/REQUEST:

150 Allen Rd is currently a 185,000 SF
OFFICE BUILDING - WE PROPOSE TO CONVERT IT
TO (2) 130,000 SF LIGHT MANUFACTURING

10. DESCRIPTION OF REQUESTED VARIANCES OR EXCEPTIONS (include Ordinance section no.):

- PARKING VARIANCE
- FAR VARIANCE

11. THE FOLLOWING ARGUMENTS ARE MADE IN SUPPORT OF THE APPLICATION:

- ADDITIONAL PARKING IS NOT IN DEMAND.
- ADDITIONAL FAR WILL NOT HAVE A DETRIMENTAL IMPACT ON ZONE PLAN.

12. NOTARIZED SIGNATURES (ALL APPLICANTS AND OWNERS MUST SIGN):

APPLICANT(S) SIGN HERE:

I/we, _____ and _____ hereby depose and say that all of the above statements and the statements contained in the materials submitted herewith are true and correct.

Signature of Applicant(s): _____ and _____

Sworn and subscribed before me, this _____ day of _____, 20__.

Notary

OWNER(S) SIGN HERE (IF APPLICANT IS NOT THE OWNER):

If the application is made by a person or entity other than the property owner, or by less than all of the property owners, then the property owner or the additional owners must complete the following:

I/we, SIG 150 LLC the owner(s) of the property described in this application,

hereby authorize SIGNATURE ACQUISITION LLC to act as my/our agent for purposes of making and prosecuting this application and I/we hereby consent to the variance relief (if any) granted and all conditions of approval thereof.

Signature of owner(s): [Signature]

Sworn and subscribed before me, this 16th day of September, 2022

[Signature]
Notary



MICHAEL E. SILBERT, Esq.
ATTORNEY AT LAW OF THE
STATE OF NEW JERSEY



DESCRIPTION OF THE PROPERTY AND PROPOSED PROJECT

Applicant is proposing to construct two (2) mixed-use buildings (“Building A” and “Building B”) on property designated as Block 11201, Lot 3 on the Official Tax Map of the Township of Bernards (the “Property”), more commonly known as 150 Allen Road. The Property currently includes an office building consisting of 174,546 SF. The Property is located in the E-2 Zone District.

The Applicant proposes to remove the existing office building and construct two (2) buildings: Building A, consisting of 97,185 SF of light-industrial/manufacturing space and 30,792 SF of office space (127,977 SF total), and Building B, consisting of 101,792 SF of light-industrial/manufacturing space and 28,759 SF of office space (130,551 SF total) on the Property. The total gross floor area of the two proposed buildings is 258,528 SF. 24 trailer loading spaces are proposed (12 at each building) and 328 parking spaces are proposed. Of the 328 parking spaces proposed, 105 existing parking spaces will remain, 88 spaces are to be located under Building A and 89 spaces are to be located under Building B. 14 Make-Ready parking spaces will be provided which count as two spaces each in accordance with P.L. 2021, c.171 (§40:55D-66.18 et al.).

The proposed light manufacturing use of the buildings will be consistent with the Township’s permitted uses in the E-2 Zone and will consist of activity which involves the assembly of products from previously prepared materials and will not involve the synthesis of chemicals or the processing of raw materials.

DESCRIPTION OF VARIANCES AND DESIGN WAIVERS/EXCEPTIONS

The following variances are requested in connection with this application:

1. **Sec. 21-15.2(d), Table 506: Setback for a Building Canopy From A Residential Zone:**

REQUIRED: 100 ft.

PROPOSED: 92 ft.

2. **Sec. 21-10.5(b), Table 402: Max. Building Height:**

MAX PERMITTED: 48 ft.

PROPOSED: 52.6 ft.

3. **Sec. 21-10.5(b), Table 402: Max. Floor Area Ration:**

MAX. PERMITTED: 15%

PROPOSED: 21%

4. **Sec. 21-22.1: Required Number of Spaces** – Whereas manufacturing/warehouse use requires 1 Space/500 SF or 1 space per employee and based upon a total of 198,977 SF of manufacturing space proposed, 399 parking spaces are required. Whereas office space requires 4 Spaces/1,000 SF and based upon a total of 59,551 SF of office space proposed, 240 parking spaces are required.

REQUIRED: 639 Spaces

PROPOSED: 328 Spaces

5. **Sec. 21-14.2(b)(2)(b): Disturbance of Areas with Slopes between 20-25%:**

MAX. PERMITTED : 20% (0.014 Acres)

PROPOSED: 41% (0.029 Acres)

6. **Sec. 21-16.3(b): Max. Retaining Wall Height**

MAX. PERMITTED: 8 ft.

PROPOSED: 13.5 ft.

The following design waivers/exceptions are requested in connection with this application:

1. **Sec. 21-41.2: Light Mounting Height:**

MAX. PERMITTED: 12 ft.

PROPOSED: 16 ft.

2. **Sec. 21-41.3: Average Light Illumination Levels:**

MAX. PERMITTED: Avg. illumination of 0.9 Footcandles

PROPOSED:

- Avg. illumination of 1.1 Footcandles in the loading dock for Building A.
- Avg. illumination of 1.6 Footcandles in the loading dock for Building B.
- Avg. illumination of 1.0 Footcandles in both areas of under building parking.

3. **Sec. 21-45.1: Replacement Trees:**

REQURIED: 649 Replacement Trees

PROPOSED: 176 Replacement Trees

ARGUMENTS IN SUPPORT OF APPLICATION

This application (the "Application") proposes the development of two (2) mixed-use buildings ("Building A" and "Building B", referred to collectively as the "Project") on property designated as Block 11201, Lot 3 on the Official Tax Map of the Township of Bernards (the "Property"), more commonly known as 150 Allen Road. The Property is located in the E-2 zone and it currently includes an office building consisting of 174,546 SF. The following proposed uses are permitted in the E-2 zone: (1) Administrative, business, executive, and professional office buildings; (2) light manufacturing, provided that it does not involve the synthesis of chemicals or the processing of raw materials. The Applicant seeks preliminary and final site plan approval together with "D-4" variance and other bulk variance relief.

Under the *Coventry Square* standard, the subject Property can accommodate the proposed FAR without substantial detriment to the surrounding properties, nor will the proposed FAR substantially impair the intent and purpose of the zone plan and zoning ordinance. The site is particularly suited for more intensive development and can accommodate the proposed floor area which is larger than what is permitted by Ordinance. Notwithstanding the applicant's deviation from the Township's maximum FAR requirements, the site is well suited for office and light-manufacturing uses. The project will not detract from the charm of downtown Basking Ridge. It promotes the Township's stated objective of providing sufficient space in appropriate locations for commercial and industrial uses to meet the needs of all New Jersey citizens. The Project will promote a desirable visual environment through creative development techniques and good civic design and arrangements and will aid in the Township's goal of balancing among various land uses that respects and reflects the goals of the master plan.

There are other bulk variances and design waivers sought in conjunction with this application including but not limited to setbacks, parking, and building height. Further testimony will be provided at the public hearing on this Application.

APPENDIX B, ARTICLE III

Checklist

Application for Preliminary Approval of a Major Subdivision or Site Plan (See Article VII for Details)

Important: Each item must be marked Submitted, Not Applicable or Waiver Requested

No.	Item	Submitted	Not Applicable	Waiver Requested
1	A completed application form and checklist(s). If the application involves a wireless telecommunications tower and/or antennas, all items listed on the Wireless Telecommunications Facilities Checklist must be also be submitted.	X		
2	A certificate from the tax collector indicating that taxes are paid.	X		
3	All required application and escrow deposit fees.	X		
4	Names and addresses of property owners within 200' of the subject property, as disclosed by current tax records and identified by block & lot numbers.	X		
5	Title block indicating:	X		
	a. Name of development and street location.	X		
	b. Name and address of applicant, owner and authorized agent, if any.	X		
	c. Name and address of professional(s) preparing plans including signature, date, license number and seal.	X		
	d. Tax map block and lot numbers.	X		
	e. Date of plan preparation and revision box with date of each revision.	X		
	f. Development application number.	X		
g. Written and graphic scale.	X			
6	Signature of applicant and, if applicant is not owner, signed consent of the owner.	X		
7	Name and address of the attorney representing parties, if any, and the name of each client represented.	X		
8	Signature blocks as required by the Map Filing Law.		X	
9	North arrow giving reference meridian.	X		
10	Copies of any protective covenants or deed restrictions applying to the subject property, including a statement as to whether such covenants or deeds are of record. A copy or abstract of the deed or deeds or other instruments by which title is derived with the names of all owners must also be provided.	X		
11	A key map showing the entire tract and its relation to the surrounding areas, including all roads, zone boundaries and municipal boundaries within one-half (1/2) mile of the subject property at a scale of one (1) inch equals not more than two thousand (2,000) feet.	X		
12	A zoning schedule indicating the zone(s) within which the property is located and required, existing & proposed conditions relative to lot area, width, frontage, yard setbacks, lot coverage, height, floor area, floor area ratio, density, open space, parking, loading, signs, etc.	X		
13	A list of required and obtained regulatory approvals and permits.	X		
14	A list of requested variances and exceptions.	X		
15	The location and dimensions of existing & proposed property lines, existing streets, streets shown on the Township's official map or master plan, structures (indicating the use of each structure and whether existing structures will remain or be removed), building setbacks, rights-of-way, easements, parking & loading areas, driveways, railroads, bridges, culverts, drain pipes, gas transmission lines, overhead utilities, historic sites/structures, wooded areas, watercourses, flood plains, wetlands or other environmentally sensitive areas on and within 200' of the subject property.	X		
16	A wetlands delineation or wetlands absence determination prepared by a qualified consultant and verified by a letter of interpretation from the New Jersey Department of Environmental Protection, if required pursuant to § 21-14.1.a.			X

No.	Item	Submitted	Not Applicable	Waiver Requested
17	Plans & profiles of proposed utility layouts, including water supply, sewage disposal, stormwater drainage, gas, telephone and electricity, showing feasible connections to existing or proposed systems. Plans for individual on-site water supply and/or sewage disposal systems shall be accompanied by the necessary local, county and/or state agency approvals. If service will be provided by an existing utility company, a letter from that company stating that service will be available before occupancy is required.	X		
18	The locations of percolation tests on each existing/proposed lot and a copy of the written approval of the tests and locations from the Bernards Township Health Department, if sewage disposal is to be handled by individual septic system(s). For each lot, the applicant shall submit test locations and written approvals from the Health Department for both a primary and secondary septic disposal field. The applicant must show on the development plan the locations and dimensions of both septic disposal fields.		X	
19	All means of vehicular and pedestrian access to the site from public streets, including locations and dimensions of driveways and curbcuts and any traffic signs, signals, channelization, acceleration and deceleration lanes or other traffic control devices.	X		
20	Site identification sign and street sign locations and details.	X		
21	Existing & proposed topographic contour intervals based on U.S.C. & G.S. datum on and within 200' of the subject property as follows: - up to 3% grade = 1' intervals - over 3% grade = 2' intervals	X		
22	A steep slope map in accordance with § 21-14.2.b, if the property contains any existing slopes of 15% or greater.	X		
23	Spot and finished elevations at all property corners.	X		
24	A landscaping plan showing shade trees, screening, buffering, existing vegetation and limits of clearing, a planting schedule, details of plantings, landscape treatments and other amenities, etc. (see § 21-54.4 for detailed requirements).	X		
25	A tree identification plan and an application for tree removal permit including the following (see § 21-45.3 for detailed requirements):	X		
	a. Location of existing tree canopy and labeling of the canopy areas to be removed and to be preserved.	X		
	b. Location of individual trees with a DBH equal to or greater than six inches identified by size and species within the limit of disturbance and 30 feet beyond the limit of disturbance, labeled to be removed or to be preserved.	X		
	c. Location of individual trees with a DBH equal to or greater than ten inches identified by size and species within the property boundaries, labeled to be removed or to be preserved.	X		
	d. Tree protection details.	X		
	e. A list of all trees to be removed and, if replacement trees are required, a schedule in accordance with the table in § 21-45.1 indicating the number of replacement trees required and the number of replacement trees proposed.	X		
26	A lighting plan in accordance with Section 21-41, including the location, type, height, graphic details and specifications of all existing & proposed lighting. The plan shall show the proposed illumination in footcandle values throughout the site and shall identify the average maintained horizontal illumination in vehicular areas and in sidewalk areas.	X		
27	A soil erosion and sediment control plan, if required pursuant to Section 21-27.	X		
28	A solid waste management plan and a recycling plan, including locations and details of outdoor refuse and recycling storage areas and means of screening, in accordance with Sections 21-40 and 21-40A.	X		

No.	Item	Submitted	Not Applicable	Waiver Requested
29	Plans and profiles of proposed driveways.	X		
30	Plans, typical cross-sections, centerline profiles, tentative grades, curb radii and details of all streets on the site or off the site which are proposed to be improved, including curbing, sidewalks and drainage structures.	X		
31	Construction details in accordance with Township standards.	X		
32	Existing & proposed easements or land reserved for or dedicated to public use, utility use or for the common use of property owners in the development, including a statement of the limits and purpose of the easement rights or dedicated land.	X		
33	Existing & proposed sight triangles.			X
34	Development staging plans.		X	
35	Existing & proposed block and lot numbers.	X		
36	The area in square feet and to the nearest tenth of an acre of all existing and proposed lots.	X		
37	A sketch of the proposed or possible layout or disposition of remaining lands, if any.		X	
38	General soil information including soil logs.	X		
39	Source and date of the current property survey and a copy of the survey showing all existing tract boundary or lot lines with lengths of courses to hundredths of a foot and bearings to half minutes, the error of closure not to exceed one (1) to ten thousand (10,000). The tract boundary or lot lines shall be clearly delineated. All bearings shall be in the New Jersey Plane Coordinate System, with coordinates shown on at least three (3) corners.	X		
40	Appropriate certification blocks as required by the Map Filing Law		X	
41	Monumentation as specified by the Map Filing Law.		X	
42	Metes and bounds description showing dimensions, bearings, curve data, length of tangents, radii, arcs, chords and central angles for all centerlines and rights-of-way and centerline curves on streets.	X		
43	Plans and computations for any storm drainage systems, including locations, details and specifications of all storm sewer lines, catch basins, inlets, manholes, culverts, headwalls, dry wells, ground water recharge basins, detention basins, etc. and existing and proposed drainage area maps.	X		
44	When a stream is proposed for alteration, improvement or relocation or when a drainage structure or fill is proposed over, under, in or along a running stream, intermittent stream, swale or drainageway, evidence of approval or of the request for approval, required modifications or lack of jurisdiction over the improvement by the New Jersey Department of Environmental Protection shall accompany the application (see § 21-54.4 for additional required details).		X	
45	When ditches, streams or watercourses are to be altered, improved or relocated, the method of stabilizing slopes and measures to control erosion and siltation, as well as typical ditch sections and profiles, shall be shown.		X	
46	For a site plan, preliminary elevations and plans of all buildings and structures, showing windows, doors, architectural treatment, roof treatment, roof appurtenances and screening, floor elevations and proposed methods of energy conservation and the locations, dimension and legend(s) of all proposed signs. For a subdivision, the approximate basement and first floor elevation for each house.	X		
47	A list of names and addresses of all stockholders or individual partners owning at least 10% of its stock of any class or at least 10% of the interest in the partnership, as the case may be.	X		

No.	Item	Submitted	Not Applicable	Waiver Requested
48	A Project Report, which may be submitted separately or as part of the Environmental Impact Assessment, including the following (see § 21-54.6 for details). Where individual maps or exhibits are submitted separately to satisfy other checklist requirements, they may be referenced in the Project Report.	X		
	a. Project Description and Statistics Report.	X		
	b. Land Classification Map and Report.	X		
	c. Natural Features Report.	X		
	d. Open Space Plan and Report.	X		
	e. Land Coverage and Drainage Plan and Report.	X		
	f. Soil Erosion and Sedimentation Control Plan and Report.	X		
	g. Sewer and Water Plan and Report.	X		
	h. Circulation Plan and Traffic Report.	X		
	i. Utilities Plan and Report.	X		
	j. Development Schedule Plan.	X		
	k. Variances and Exceptions Report.	X		
	l. Easements and Covenants Report.	X		
49	An Environmental Impact Assessment, including the following (see § 21-54.6.m for details).	X		
	a. Plan and description of the development plan.	X		
	b. Inventory of existing natural resources.	X		
	c. Assessment of environmental impacts.	X		
	d. Unavoidable adverse environmental impacts.	X		
	e. Steps to minimize environmental damage.	X		
	f. Alternatives.	X		
	g. Details and matters to be evaluated:	X		
	(1) Sewerage facilities.	X		
	(2) Water supply.	X		
	(3) Storm water.	X		
	(4) Stream encroachments.	X		
	(5) Floodplains.	X		
	(6) Solid waste disposal.	X		
	(7) Air pollution.	X		
	(8) Traffic.	X		
	(9) Social/economic factors.	X		
	(10) Aesthetics.	X		
	(11) Licenses, permits, etc.	X		
	(12) A copy of the development plan and application form.	X		
50	Delineations of existing and proposed stream buffer conservation areas and stream buffer management plans, if required pursuant to Section 21-14.4.b.	X		
51	Contribution Disclosure Statement, if required pursuant to Section 21-7A.	X		
52	A plan showing all the details required in the procedures of Table 401-A, entitled Maximum Permitted Lot Yield & Minimum Improvable Lot Area Standards, Residential Development, R-1 Through R-7 Zones.		X	
53	For each proposed dwelling, cross sections shall be provided from the center of the road to the rear of the house in existing and proposed conditions; cross sections shall be provided perpendicular to the road through the center of the dwelling to a point 50' to the rear of the dwelling; the cross section shall be provided at a scale of 1" = 10' horizontal and 1" = 10' vertical.		X	
54	A fire service plan, showing on a separate plan sheet(s) information relating to fire safety and emergency response, including: existing and proposed water lines, fire department connections, hydrants and cisterns; widths and turning radii of streets, driveways, parking aisles, emergency access roads and fire lanes; public building entrances; parking spaces; and stormwater drainage basins.	X		

APPENDIX C, ARTICLE III

Checklist

Application for Final Approval of a Major Subdivision or Site Plan

(See Article VII for Details)

Important: Each item must be marked Submitted, Not Applicable or Waiver Requested

No.	Item	Submitted	Not Applicable	Waiver Requested
1	All items required for preliminary approval as set forth in § 21-54.4, unless previously waived by the Board.	X		
2	All additional items required by the Board as a condition of preliminary approval.		X	
3	A certificate from the tax collector indicating that taxes are paid.	X		
4	All required application and escrow deposit fees.	X		
5	Final detailed architectural renderings of each building and sign, including front, side and rear elevations.	X		
6	Final cross-sections, profiles and established grades of all streets, aisles, lanes and driveways and construction documents for all public improvements.	X		
7	Final plans and profiles of all storm sewers.	X		
8	Final plans and profiles of all sanitary sewers.			X
9	Final plans and profiles of all water mains.			X
10	All dimensions of the exterior boundaries of any subdivision, balanced and closed to a precision of one to 10,000, and the dimensions of all lot lines to within one to 20,000. All dimensions, angles and bearings must be tied to at least two permanent monuments not less than 300 feet apart and all information shall be indicated on the plat. At least one corner of the subdivision shall be tied to U.S.C. and G.S. benchmarks with data on the plat as to how the bearings were determined.		X	
11	Proposed street names.		X	
12	A Final Application Comparison Report, including:	X		
	a. The number and type of dwelling units.	X		
	b. The amount of nonresidential floor space.	X		
	c. The type of community facilities and/or structures.	X		
	d. The amount of open space to be preserved.	X		
	e. The nature and cost of public improvements.	X		
	f. The anticipated value of residential and nonresidential construction.	X		
	g. Finalized landscaping and tree removal information pursuant to Sections 21-43 through 21-45.	X		
	h. A comparison to the preliminary development approval, indicating the nature and reasons for any changes to the preliminary approval.	X		

No.	Item	Submitted	Not Applicable	Waiver Requested
13	Organization documents, including:		X	
	a. Articles of incorporation, by-laws and membership rules/regulations for any homeowner's association, condominium association or other organization to maintain the common open space or community facilities.		X	
	b. A copy of the master deed detailing the rights and privileges of individual owners of common property.		X	
	c. A copy of all materials submitted to the Department of Community Affairs as required by the New Jersey Planned Real Estate Development Full Disclosure Act Regulations and evidence of the status of acceptance of and/or approval by the Department of Community Affairs.		X	
	d. Covenants or easements restricting the use of the common open space or elements.		X	
	e. Covenants or agreements requiring homeowners or residents to pay the organization for the maintenance of the common open space and/or community facilities. This shall include a proposed schedule of membership fees for at least the first three years of operation.		X	
14	All easements or covenants affecting any land in the development.	X		
15	All maintenance agreements under which private roads and other facilities will be maintained, refuse collected and other supplementary services provided, if there is to be no homeowners' association, condominium association, open space organization or similar arrangement.	X		
16	An offer of dedication including all legal requirements for valid dedication to the Township or, where appropriate, to another governmental body of roads or other improvements intended for public ownership.		X	

Request for Taxpayer Identification Number and Certification

**Give Form to the
 requester. Do not
 send to the IRS.**

▶ Go to www.irs.gov/FormW9 for instructions and the latest information.

Print or type. See Specific Instructions on page 3.	<p>1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank. Signature Acquisitions, LLC</p> <p>2 Business name/disregarded entity name, if different from above</p>	
	<p>3 Check appropriate box for federal tax classification of the person whose name is entered on line 1. Check only one of the following seven boxes.</p> <p><input checked="" type="checkbox"/> Individual/sole proprietor or single-member LLC <input type="checkbox"/> C Corporation <input type="checkbox"/> S Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Trust/estate</p> <p><input type="checkbox"/> Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=Partnership) ▶ _____</p> <p>Note: Check the appropriate box in the line above for the tax classification of the single-member owner. Do not check LLC if the LLC is classified as a single-member LLC that is disregarded from the owner unless the owner of the LLC is another LLC that is not disregarded from the owner for U.S. federal tax purposes. Otherwise, a single-member LLC that is disregarded from the owner should check the appropriate box for the tax classification of its owner.</p> <p><input type="checkbox"/> Other (see instructions) ▶ _____</p>	<p>4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):</p> <p>Exempt payee code (if any) _____</p> <p>Exemption from FATCA reporting code (if any) _____</p> <p><small>(Applies to accounts maintained outside the U.S.)</small></p>
	<p>5 Address (number, street, and apt. or suite no.) See instructions. 20 Commerce Drive Suite 140</p> <p>6 City, state, and ZIP code Cranford, NJ 07016</p> <p>7 List account number(s) here (optional)</p>	<p>Requester's name and address (optional)</p>

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN*, later.

Note: If the account is in more than one name, see the instructions for line 1. Also see *What Name and Number To Give the Requester* for guidelines on whose number to enter.

Social security number												
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; width: 25px; height: 25px;"></td> <td style="border: 1px solid black; width: 25px; height: 25px;"></td> <td style="border: 1px solid black; width: 25px; height: 25px;"></td> <td style="border: 1px solid black; width: 25px; height: 25px;"></td> <td style="border: 1px solid black; width: 25px; height: 25px;"></td> <td style="border: 1px solid black; width: 25px; height: 25px;"></td> <td style="border: 1px solid black; width: 25px; height: 25px;"></td> <td style="border: 1px solid black; width: 25px; height: 25px;"></td> <td style="border: 1px solid black; width: 25px; height: 25px;"></td> <td style="border: 1px solid black; width: 25px; height: 25px;"></td> <td style="border: 1px solid black; width: 25px; height: 25px;"></td> <td style="border: 1px solid black; width: 25px; height: 25px;"></td> </tr> </table>												
or												
Employer identification number												

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.

Sign Here	Signature of U.S. person ▶	Date ▶ 5/5/2020
------------------	-----------------------------------	------------------------

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to www.irs.gov/FormW9.

Purpose of Form

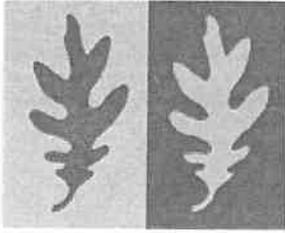
An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following.

- Form 1099-INT (interest earned or paid)

- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding, later.



Township of Bernards

Kevin Sant'Angelo, Tax Collector
1 Collyer Lane, Basking Ridge, NJ 07920
Phone: 908-204-3080; Fax: 908-766-1941; Website: www.bernards.org

September 19, 2022

This is to certify that the property located at Block 11201 Lot 3, otherwise known as 150 Allen Rd. Basking Ridge, NJ is assessed to SIG 150 Allen LLC c/o Signature Acq and the property taxes are paid current through 3rd Quarter 2022.

Very truly yours,

A handwritten signature in black ink, appearing to read 'Kevin Sant'Angelo', is written over a horizontal line.

Kevin Sant'Angelo
Tax Collector



DiFrancesco Bateman
Kunzman, Davis, Lehrer & Flaum, P.C.

15 Mountain Boulevard
Warren, New Jersey 07059

Telephone: (908) 757-7800
Fax: (908) 757-8039
www.newjerseylaw.net

Michael E. Silbert
Associate
Extension 128
msilbert@newjerseylaw.net

September 14, 2022

Kevin Sant'Angelo, Tax Collector
Township of Bernards
One Collyer Lane
Basking Ridge, New Jersey 07921

Re: Block 11201, Lot 3

Dear Mr. Sant'Angelo:

Please allow this letter to serve as a formal request for a Tax Certification that the taxes and assessments on the above-referenced properties are current.

Thank you for your cooperation.

Very truly yours,

Michael E. Silbert



OFFICE OF THE ASSESSOR

TOWNSHIP OF BERNARDS

One Collyer Ln, Basking Ridge, NJ 07920

(908) 204-3082 Fax (908) 766-1643

assessor@bernards.org

200 Foot Property Search

** VALID FOR 90 DAYS **

Date: 09/19/2022

Block: 11201

Property Location: 150 Allen Rd

Lot(s): 3

Applicant: MICHAEL SILBERT

Qual:

Phone : 908-757-7800

Fax:

Email: MSILBERT@NEWJERSEYLAW.NET

PROPERTY OWNER INFORMATION

Owner Name: SIG 150 ALLEN LLC

Address: 150 ALLEN RD

City, State, Zip: Basking Ridge, NJ 07920

Due to the location of the referenced Block and Lot,
the following Fire Company Should be notified:

Liberty Corner Fire Company, P.O. Box 98, Liberty Corner, NJ 07938

Return By:

E-Mail

Mail

Fax

Pick-Up

Name: MICHAEL SILBERT

Address: 150 MOUNTAIN BLVD

City, State, Zip: WARREN, NJ 07059

CERTIFIED BY:

David Centrelli, CTA
Assessor, Township of Bernards

Amount Due: \$10.00

Cash / Check #: _____

Date Paid: _____



Bernards Township

Parcel Offset List

Target Parcel(s): Block-Lot: 11201-3
SIG 150 ALLEN LLC C/O SIGNATURE ACQ

9 parcels fall within 200 feet of this parcel(s).

Block-Lot: 11201-17

D URBANO TRUCKING INC/LMI LANDSCP
C/O 311 ROYCEFIELD RD
HILLSBOROUGH NJ 08844

Block-Lot: 11201-1-Q0066

ENGLISH FARM ASSOCIATES
PO BOX 183
LIBERTY CORNER NJ 07938

Block-Lot: 11201-16

PUBLIC SERVICE ELEC.&GAS CO
CORP PROP/6FLR 80 PRK PLZ
NEWARK NJ 07102

Block-Lot: 9401-10

SKY FARM
177 ALLEN RD
BASKING RIDGE NJ 07920

Block-Lot: 11201-15

SIG 110 ALLEN LLC C/O SIGNATURE ACQ
20 COMMERCE DR; STE #110
CRANFORD NJ 07016

Block-Lot: 11201-2-Q0004

ALLEN CENTER FARM LLC%WALKER MALLOY
157 COLUMBUS AVE #2E
NEW YORK NY 10023

Block-Lot: 11201-5

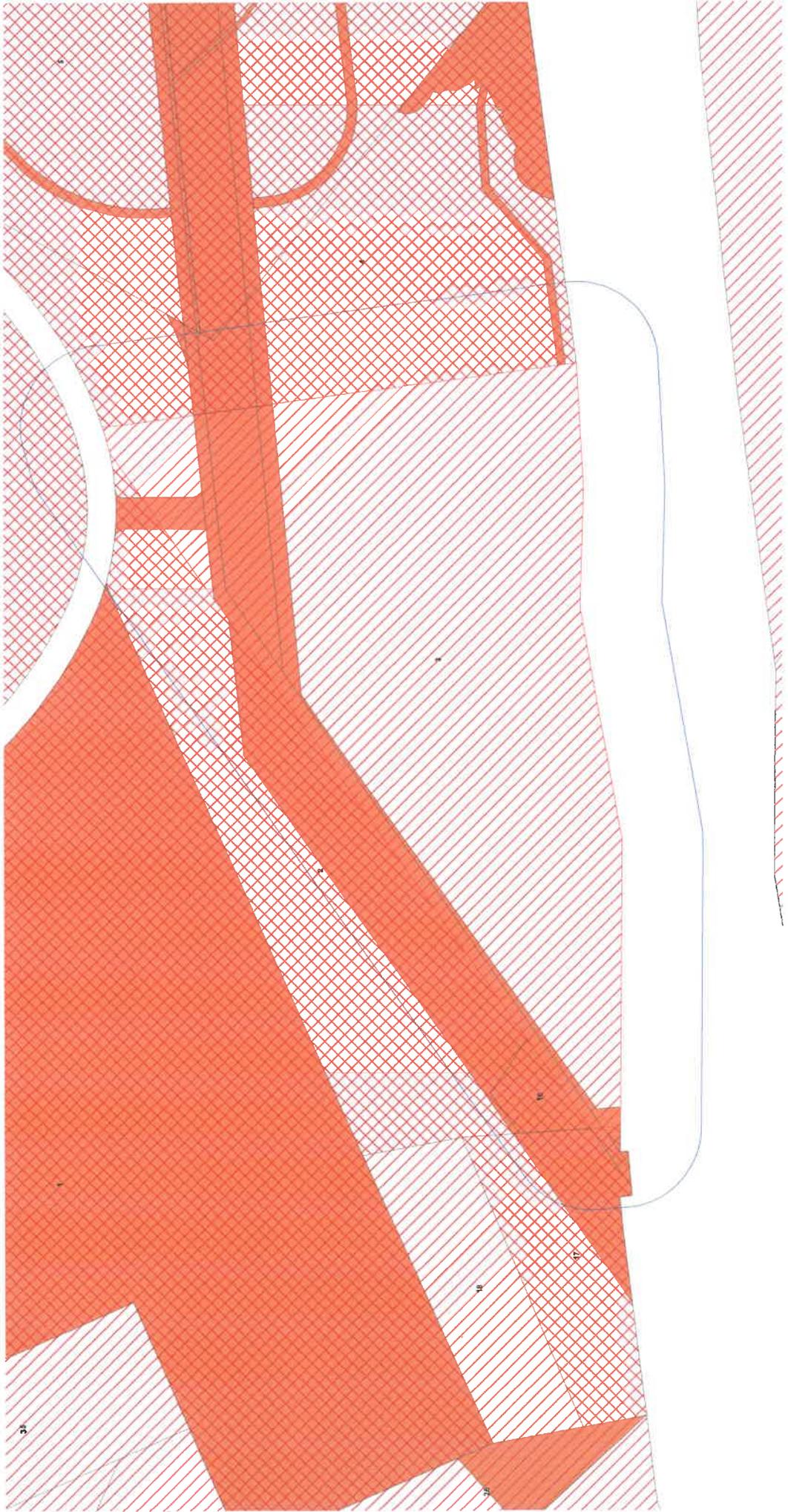
SIG 106 ALLEN LLC C/O SIGNATURE ACQ
20 COMMERCE DR; STE #110
CRANFORD NJ 07016

Block-Lot: 11201-4

GENESIS PROPERTY MANAGEMENT LLC
140 ALLEN RD
BASKING RIDGE NJ 07920

Block-Lot: 11201-2

ALLEN CENTER FARM LLC%WALKER MALLOY
157 COLUMBUS AVE #2E
NEW YORK NY 10023





OFFICE OF THE ASSESSOR

TOWNSHIP OF BERNARDS

ONE COLLYER LANE
BASKING RIDGE, NJ 07920
(908)-204-3082 FAX (908)-766-1644

200 FOOT PROPERTY SEARCH

List of names and addresses of all owners of property as shown on the current tax duplicate located within 200 feet of any part of the property affected by this application. The Township of Bernards accepts no liability for errors hereon. ***The attached list was compiled by the Engineering Department.***

If the property is within 200 feet of an adjoining municipality, the Township Clerk of that municipality should be notified. In addition, the applicant must also obtain the names and addresses of the owners of the land in such adjoining municipalities that are located within 200 feet of the subject premises.

The following is a list of utility companies located within Bernards Township. It is not to be construed as utilities being on or within 200 feet of the property being searched.

- | | | |
|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. ALGONQUIN GAS TRANSMISSION CO
1 Lindbergh Rd
Stony Point, NY 10980
(908) 757-1212 | 6. NEW JERSEY AMERICAN WATER CO
Donna Short, GIS Supervisor
NJ-American Water Company, Inc.
1025 Laurel Oak Rd
Voorhees, NJ 08043 | 10. NEW JERSEY BELL TELEPHONE CO
Edward D. Young III, Secretary
Verizon Legal Dept.
540 Broad St – Room 2001
Newark, NJ 07101
(201) 649-2233 |
| 2. BELL ATLANTIC CORPORATION
Secretary, 46 th Floor
1717 Arch
Philadelphia, PA 19102 | 7. CABLEVISION OF RARITAN VALLEY
275 Centennial Ave; CN6805
Piscataway, NJ 08855
Attn: Margurite Prenderville
Construction Dept | 11. TRANSCONTINENTAL GAS PIPELINE
Division Office
3200 S Wood Ave
Linden, NJ 07036 |
| 3. JCP & L/ GPU
Service Tax Dept
PO Box 1911
Morristown, NJ 07962-1911 | 8. BERNARDS TWP SEWERAGE AUTHORITY
1 Collyer Ln
Basking Ridge, NJ 07920
(908) 204-3002 | 12. VERIZON BUSINESS/MCI
Right of Way Dept.
2400 N Glenville Dr
Richardson, TX 75082 |
| 4. PUBLIC SERVICE ELECTRIC & GAS
Manager – Corporate Properties
80 Park Plaza, T6B
Newark, NJ 07102 | 9. ENVIRONMENTAL DISPOSAL CORP
William Halsey, President
601 State Hwy 202/206
Bedminster, NJ 07921
(908) 234-0677 | |
| 5. VERIZON COMMUNICATIONS
Engineering
290 W Mt Pleasant Ave; Ste 1400
Livingston, NJ 07039-2763 | | |

PLEASE NOTE :
Numbers 1,3,4,5 and 7 are
registered with the Township and
REQUIRE NOTIFICATION

If the property is adjacent to a State Highway, the
COMMISSIONER OF TRANSPORTATION
must be notified at

NEW JERSEY DEPT OF TRANSPORTATION
1035 Parkway Ave., CN600
Trenton, NJ 08625

If the property is adjacent to a County Road, the
SOMERSET COUNTY PLANNING BOARD
must be notified at

SOMERSET COUNTY PLANNING BOARD
PO Box 3000
Somerville, NJ 08876

SUBMIT ORIGINAL AND 16 COPIES

FORM A

**TOWNSHIP OF BERNARDS
PLANNING BOARD / BOARD OF ADJUSTMENT**

SITE INSPECTION CONSENT FORM

Applicant: 516 150, LLC

Block: 11201 Lot: 3

Street Address: 150 Allen Rd.

I, Richard Travaglini ^{on behalf of Abe Brach}, owner of the above property, hereby acknowledge that, upon determination of completeness of the application, a site inspection may be scheduled with the Board for a mutually convenient date and time. I hereby authorize members of the Planning Board/Board of Adjustment and their representatives and consultants to enter onto the property at the time of the site inspection for the purpose of evaluating the application.

Signature:  Date: 9-14-22
Richard Travaglini
SUP - DIRECTOR OF LEASING

**SUBMIT ORIGINAL + 2 COPIES
For Corporations, LLC, LLP ONLY**

STATEMENT OF OWNERSHIP

Corporate or Partnership
Name of Applicant:

Signature Acquisitions, LLC

Address:

20 Commerce Drive - ^{Site} 140
Cranford, NJ 07016

The following is a list of all shareholders and/or partners owning beneficially or having registered in their names not less than ten percent (10%) of the stock of the corporation or interest in a partnership involved in an application hereinabove referred to:

Name: ABE BRACH

Name: _____

Address: 92 EMERSON PL.
BROOKLYN, NY 11205

Address: _____

Name: _____

Name: _____

Address: _____

Address: _____

Name: _____

Name: _____

Address: _____

Address: _____

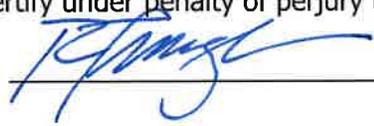
Name: _____

Name: _____

Address: _____

Address: _____

I hereby certify under penalty of perjury that the foregoing is true:

Signature: 

Date: 9/10/22

**SUBMIT ORIGINAL + 2 COPIES
For Corporations, LLC, LLP ONLY**

STATEMENT OF OWNERSHIP

Corporate or Partnership
Name of Applicant:

SIG 150 LLC

Address:

20 COMMERCE DRIVE - SUITE 140
CRANFORD, NJ 07016

The following is a list of all shareholders and/or partners owning beneficially or having registered in their names not less than ten percent (10%) of the stock of the corporation or interest in a partnership involved in an application hereinabove referred to:

Name: ABE BRACH

Name: _____

Address: 92 EMERSON PL.
BROOKLYN, NY 11205

Address: _____

Name: _____

Name: _____

Address: _____

Address: _____

Name: _____

Name: _____

Address: _____

Address: _____

Name: _____

Name: _____

Address: _____

Address: _____

I hereby certify under penalty of perjury that the foregoing is true:

Signature: [Handwritten Signature]

Date: 9-14-22

RICHARD TRAVAGLIANI
SUP. DIRECTOR OF LEASING

SUBMIT 17 COPIES TOTAL

DIMENSIONAL STATISTICS

	REQUIRED	EXISTING	PROPOSED
LOT AREA	5 Acres	28.304 Acres	28.304 Acres
LOT WIDTH	400 ft.	1,724 ft.	1,724 ft.
FRONTAGE	100 ft.	1,929 ft.	1,929 ft.
FRONT YARD SETBACK	100 ft.	224 ft.	102 ft.
REAR YARD SETBACK	100 ft.	N/A	N/A
COMBINED SIDE YARD			
SIDE YARD	75 ft.	109 ft.	101 ft.
COVERAGE	40 %	39.70 %	39.92 %
HEIGHT	48 ft.	49.7 ft.	52.6 ft.
<i>IF REQUIRED,</i> GROSS FLOOR AREA			
<i>IF REQUIRED,</i> FLOOR AREA RATIO	15 %	14.1 %	21%
<i>IF REQUIRED,</i> IMPROVABLE LOT AREA			

SUBMIT ORIGINAL + 2 COPIES
Not for "Bulk" or "C" variances

FORM G

TOWNSHIP OF BERNARDS
PLANNING BOARD/ZONING BOARD OF ADJUSTMENT
CONTRIBUTION DISCLOSURE STATEMENT

Contribution Disclosure Statement Required. Pursuant to Bernards Township Ordinance Section 21-7A (Ordinance #1745, adopted October 26, 2004), Contribution Disclosure Statements are required for certain types of development applications that include a request for a variance or other relief. When required, a Contribution Disclosure Statement must be submitted by all applicants and property owners, as well as all professionals who apply for or provide testimony, plans or reports in support of the application. See Section 21-7A for details.

Applicant: Signature Acquisitions, LLC Application: _____

Pursuant to Bernards Township Ordinance Section 21-7A, I hereby certify that I, or the firm or entity with which I am associated, made the following contributions to or on behalf of a candidate, candidate committee, joint candidates committee, political committee, continuing political committee or political party committee of, or pertaining to, the Township of Bernards, within one year prior to the filing of the above application.

I made no contributions.

I made the following contributions:

Date: _____	Amount: _____	Recipient: _____
Date: _____	Amount: _____	Recipient: _____
Date: _____	Amount: _____	Recipient: _____
Date: _____	Amount: _____	Recipient: _____

Signature:  Date: 9/16/22
Name: RICHARD TRAVAGLINI
Title: SVP - DIRECTOR OF LEASING
Firm: SIGNATURE ACQUISITIONS LLC
Address: 20 COMMERCE DR. SUITE #140
CRANFORD, NJ 07016

SUBMIT ORIGINAL + 2 COPIES
Not for "Bulk" or "C" variances

FORM G

TOWNSHIP OF BERNARDS
PLANNING BOARD/ZONING BOARD OF ADJUSTMENT
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Applicant: SIG 150 LLC Application: _____

Pursuant to Bernards Township Ordinance Section 21-7A, I hereby certify that I, or the firm or entity with which I am associated, made the following contributions to or on behalf of a candidate, candidate committee, joint candidates committee, political committee, continuing political committee or political party committee of, or pertaining to, the Township of Bernards, within one year prior to the filing of the above application.

I made no contributions.

I made the following contributions:

Date: _____	Amount: _____	Recipient: _____
Date: _____	Amount: _____	Recipient: _____
Date: _____	Amount: _____	Recipient: _____
Date: _____	Amount: _____	Recipient: _____

Signature:
Name:
Title:
Firm:
Address:

 Date: 9-14-22
RICHARD TRAVAGLINI
SVP
SIGNATURE ACQUISITIONS, LLC
20 COMMERCE DR. SUITE 140
CRANFORD, NJ 07016

SUBMIT ORIGINAL + 2 COPIES
Not for "Bulk" or "C" variances

FORM G

TOWNSHIP OF BERNARDS
PLANNING BOARD/ZONING BOARD OF ADJUSTMENT
CONTRIBUTION DISCLOSURE STATEMENT

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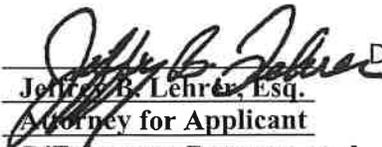
Applicant: Signature Acquisitions, LLC Application: _____

Pursuant to Bernards Township Ordinance Section 21-7A, I hereby certify that I, or the firm or entity with which I am associated, made the following contributions to or on behalf of a candidate, candidate committee, joint candidates committee, political committee, continuing political committee or political party committee of, or pertaining to, the Township of Bernards, within one year prior to the filing of the above application.

I made no contributions.

I made the following contributions:

Date: _____	Amount: _____	Recipient: _____
Date: _____	Amount: _____	Recipient: _____
Date: _____	Amount: _____	Recipient: _____
Date: _____	Amount: _____	Recipient: _____

Signature:  Date: 9/22/2022
Name: Jeffrey B. Lehrer, Esq.
Title: Attorney for Applicant
Firm: DiFrancesco Bateman et al.
Address: 15 Mountain Blvd. Warren, NJ 07059

SUBMIT ORIGINAL + 2 COPIES
Not for "Bulk" or "C" variances

FORM G

TOWNSHIP OF BERNARDS
PLANNING BOARD/ZONING BOARD OF ADJUSTMENT
CONTRIBUTION DISCLOSURE STATEMENT

Contribution Disclosure Statement Required. Pursuant to Bernards Township Ordinance Section 21-7A (Ordinance #1745, adopted October 26, 2004), Contribution Disclosure Statements are required for certain types of development applications that include a request for a variance or other relief. When required, a Contribution Disclosure Statement must be submitted by all applicants and property owners, as well as all professionals who apply for or provide testimony, plans or reports in support of the application. See Section 21-7A for details.

Applicant: Signature Acquisitions, LLC Application: _____

Pursuant to Bernards Township Ordinance Section 21-7A, I hereby certify that I, or the firm or entity with which I am associated, made the following contributions to or on behalf of a candidate, candidate committee, joint candidates committee, political committee, continuing political committee or political party committee of, or pertaining to, the Township of Bernards, within one year prior to the filing of the above application.

I made no contributions.

I made the following contributions:

Date: _____	Amount: _____	Recipient: _____
Date: _____	Amount: _____	Recipient: _____
Date: _____	Amount: _____	Recipient: _____
Date: _____	Amount: _____	Recipient: _____

Signature:
Name:
Title:
Firm:
Address:

 Date: 9-22-2022
EDWARD NEIGHBOUR
SENIOR ASSOCIATE
PABETTE SOMJEN ARCHITECTS
439 ROUTE 46 EAST, ROCKAWAY, NJ 07866

SUBMIT ORIGINAL + 2 COPIES
Not for "Bulk" or "C" variances

FORM G

TOWNSHIP OF BERNARDS
PLANNING BOARD/ZONING BOARD OF ADJUSTMENT
CONTRIBUTION DISCLOSURE STATEMENT

Contribution Disclosure Statement Required. Pursuant to Bernards Township Ordinance Section 21-7A (Ordinance #1745, adopted October 26, 2004), Contribution Disclosure Statements are required for certain types of development applications that include a request for a variance or other relief. When required, a Contribution Disclosure Statement must be submitted by all applicants and property owners, as well as all professionals who apply for or provide testimony, plans or reports in support of the application. See Section 21-7A for details.

Applicant: _____ Application: _____

Pursuant to Bernards Township Ordinance Section 21-7A, I hereby certify that I, or the firm or entity with which I am associated, made the following contributions to or on behalf of a candidate, candidate committee, joint candidates committee, political committee, continuing political committee or political party committee of, or pertaining to, the Township of Bernards, within one year prior to the filing of the above application.

I made no contributions.

I made the following contributions:

Date: _____	Amount: _____	Recipient: _____
Date: _____	Amount: _____	Recipient: _____
Date: _____	Amount: _____	Recipient: _____
Date: _____	Amount: _____	Recipient: _____

Signature:
Name:
Title:
Firm:
Address:

DWS
Dennis C. Loh, P.E.
Vice President
Geo-Technology Assoc, Inc
14 W. HS Fair Dr.
Suite A
Somerset, N.J. 08873

Date: 9/22/22

SUBMIT ORIGINAL + 2 COPIES
Not for "Bulk" or "C" variances

FORM G

TOWNSHIP OF BERNARDS
PLANNING BOARD/ZONING BOARD OF ADJUSTMENT
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Applicant: Signature Acquisitions, LLC Application: _____

Pursuant to Bernards Township Ordinance Section 21-7A, I hereby certify that I, or the firm or entity with which I am associated, made the following contributions to or on behalf of a candidate, candidate committee, joint candidates committee, political committee, continuing political committee or political party committee of, or pertaining to, the Township of Bernards, within one year prior to the filing of the above application.

I made no contributions.

I made the following contributions:

Date: _____	Amount: _____	Recipient: _____
Date: _____	Amount: _____	Recipient: _____
Date: _____	Amount: _____	Recipient: _____
Date: _____	Amount: _____	Recipient: _____

Signature: 
Name: Matthew Seckler
Title: Principal
Firm: Stonefield Engineering
Address: 92 Park Avenue Rutherford, NJ

Date: 9/22/22

SUBMIT ORIGINAL + 2 COPIES
Not for "Bulk" or "C" variances

FORM G

TOWNSHIP OF BERNARDS
PLANNING BOARD/ZONING BOARD OF ADJUSTMENT
CONTRIBUTION DISCLOSURE STATEMENT

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Applicant: _____ Application: _____

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I made no contributions.

I made the following contributions:

Date: _____	Amount: _____	Recipient: _____
Date: _____	Amount: _____	Recipient: _____
Date: _____	Amount: _____	Recipient: _____
Date: _____	Amount: _____	Recipient: _____

Signature: _____

Name: _____

Title: _____

Firm: _____

Address: _____


Robert C. Moschello, P.E.
Director - Engineering
Gladstone Design, Inc.
265 Main Street, Gladstone NJ 07934

Date: 9-15-22

**TOWNSHIP OF BERNARDS
PLANNING BOARD/ZONING BOARD OF ADJUSTMENT**

CONTRIBUTION DISCLOSURE STATEMENT

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Applicant: 150 Allen Road

Pursuant to Bernards Township Ordinance Section 21-7A, I hereby certify that I, or the firm or entity with which I am associated, made the following contributions to or on behalf of a candidate, candidate committee, joint candidates committee, political committee, continuing political committee or political party committee of, or pertaining to, the Township of Bernards, within one year prior to the filing of the above application.

I made no contributions.

I made the following contributions:

Date:	Amount:	Recipient:	_____
Date:	Amount:	Recipient:	_____
Date:	Amount:	Recipient:	_____
Date:	Amount:	Recipient:	_____

Signature: *Karin Tekel*
Name: Karin Tekel
Title: Assistant Vice President
Firm: EcolSciences Inc.
Address: 75 Fleetwood Drive, Suite 250
Rockaway, New Jersey 07866

Date: 9/15/22

PROFESSIONALS LIST

- Attorney: Jeffrey B. Lehrer, Esq.
DiFrancesco, Bateman, Kunzman, Davis, Lehrer, & Flaum, P.C.
15 Mountain Boulevard
Warren, New Jersey 07059
Phone: 908-757-7800 ext. 180
- Engineer: Robert Moschello, P.E.
Gladstone Design, Inc.
265 Main Street
Gladstone, New Jersey 07934
Phone: 908-234-0309
- Architect: Parette Somjen Architects, LLC.
Suite 4
439 Route 46 East
Phone: 973-586-2401
- Traffic Engineer: Stonefield Engineering
92 Park Avenue
Rutherford, New Jersey 07070
Phone: 201-340-4468

FOR ADMINISTRATIVE USE ONLY

PERMIT # GCP- _____ Block _____ Lot _____
Date Received _____
Land Disturbance Fee (\$250) n/a paid check # _____
Building Permit (if applicable) # _____
Date Sent to Tree Protection Committee _____
 Approved Denied _____
Signed: _____

TOWNSHIP OF BERNARDS
TREE REMOVAL / LAND DISTURBANCE
PERMIT APPLICATION



LOCATION OF TREE REMOVAL / WORK SITE

Block 11201 Lot 3 Address 150 Allen Road
Property Owner SIG 150, LLC Phone # 212-470-5200 E-Mail rtravaglini@signatureacq.com

IF APPLICANT IS OTHER THAN PROPERTY OWNER

Applicant's Name Signature Acquisitions, LLC Phone # 908-577-7597
Address 20 Commerce Drive Cranford, NJ 07016 E-Mail rtravaglini@signatureacq.com

PERSON PERFORMING WORK

Company or Individual _____ Phone # _____
Address _____ E-Mail _____

TYPE OF WORK (CHECK ALL THAT APPLY)

Tree Removal Demolition
 Changes in Grade Other _____
 Septic Alterations Other _____

*** MARK TREE(S) TO BE REMOVED WITH A RED "X" ON SITE PRIOR TO REMOVAL ***

SUBMIT DIAGRAM SHOWING THE FOLLOWING:

- Scale
- Location of proposed trees(s) to be removed (identified by number with corresponding species and reason for removal)
 - Location of trees near building and driveway
 - Dimensions and distance from lot lines
 - Location of building foundations
 - Access driveways
 - Lawns and other special use areas
- Proposed changes in grade and total land disturbance in square feet (if applicable) ^{1,2}

¹ As per Township Ordinance #1853, soil erosion and sediment control measures shall be implemented if land disturbance exceeds 2,500 square feet. A \$250 Land Disturbance Review Fee will also be required.

² Should the proposed land disturbance for this permit exceed a total of 5,000 square feet, the soil erosion and sediment control plans shall be submitted to the Somerset-Union Soil Conservation District for certification and approval. For application to the Township, include plans stamped/signed by the District and a copy of the District's certification letter for permit approval, or a copy of the District's approved Request for Determination of Non-Applicability.

Applicant's Signature: Michael Silbert Michael Silbert, Esq. Date: 9/23/00
Attorney for Applicant



DiFrancesco Bateman
Kunzman, Davis, Lehrer & Flaum, P.C.

15 Mountain Boulevard
Warren, New Jersey 07059

Telephone: (908) 757-7800
Fax: (908) 757-8039
www.newjerseylaw.net

Michael E. Silbert
Associate
Extension 128
msilbert@newjerseylaw.net

September 26, 2022

VIA HAND DELIVERY

Somerset County Planning Board
County Administration Building
P.O. Box 3000
20 Grove Street
Somerville, New Jersey 08807

RECEIVED

SEP 27 2022

SOMERSET COUNTY
PLANNING DIVISION

**Re: Signature Acquisitions, LLC
Preliminary and Final Major Site Plan with "D-4" Variance Relief
Block 11201, Lot 3
Bernards Township, NJ 07920**

Dear Sir or Madam:

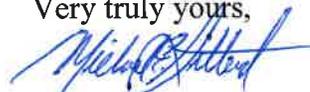
This office represents Signature Acquisitions, LLC (the "Applicant") in connection with an application (the "Application") to the Bernards Township Zoning Board of Adjustment for preliminary and final major site plan approval together with "d-4" and other "c" variance relief for Lot 3, Block 11201 as shown on the Tax Map of the Township of Bernards (more commonly known as 150 Allen Road). In that capacity, we submit the following documents:

1. One (1) copy of the Somerset County Land Development Application and related checklist; and
2. One (1) copy of the Application for preliminary and final site plan approval with attachments;
3. One (1) copy of the Bernards Township Checklist for Preliminary and Final Site Plan approval;
4. One (1) copy of the Site Plan prepared by Gladstone Design, Inc., dated September 16, 2022;

5. One (1) copy of a Truck Turning Plan prepared by Gladstone Design, Inc., dated September 16, 2022;
6. One (1) copy of a Fire Service Plan prepared by Gladstone Design, Inc., dated September 16, 2022;
7. One (1) copy of color-rendered Architectural Plans prepared by Parette Somjen Architects, dated September 16, 2022;
8. One (1) copy of a Traffic Impact Analysis prepared by Stonefield Engineering, dated September 16, 2022;
9. One (1) copy of a Stormwater Management Report prepared by Gladstone Design, Inc., dated September 16, 2022;
10. One (1) copy of an Operations & Maintenance Manual for Stormwater Management Facilities, prepared by Gladstone Design, Inc., dated September 16, 2022;
11. One (1) copy of a Stormwater Management Testing Report prepared by Geo-Technology Associates, Inc., dated September 2022;
12. One (1) copy of an Environmental Impact Assessment and Project Report prepared by EcolSciences, Inc., dated September 16, 2022;

I am also enclosing a check in the amount of \$150.00 which represents the application fee, and a check in the sum of \$25.00 which represents the GIS fee.

Very truly yours,



Michael E. Silbert

Enc.

cc: Rich Travaglini (via Email)
Shloimy Reichman (via Email)
Rob Moschello (via Email)
Chris Fairfield (via Email)
Jeffrey Lehrer (via Email)

SOMERSET COUNTY PLANNING BOARD

Telephone (908) 231-7021; Fax (908) 707-1749; TDD (908) 231-7168
P.O. Box 3000, Somerville, N.J. 08876-1262

LAND DEVELOPMENT APPLICATION FORM CHECKLIST & REVIEW FEE SCHEDULE

The *Somerset County Land Development Review Resolution* requires that certain proposed land development proposals be submitted to the Somerset County Planning Board for review and, where required, approval. Land development activities subject to County Planning Board approval include:

- All subdivisions and resubdivisions of land within Somerset County.
- All site plans for land development
- Change of Use applications

This application form shall be completed by the applicant, or the applicant's designated agent and submitted with all required documents to the Somerset County Planning Board. This application consists of three (3) parts, each of which shall be completed as indicated.

- Part I – Project Information
- Part II – Review Fee Schedule
- Part III – Submission Contents Checklist

One set of plans and supporting documents shall be submitted.

Somerset County is an equal opportunity employer.

PART I – PROJECT INFORMATION

*For new land development applications, complete Sections A-E and sign the application in Section F.
For resubmissions and revisions, fill out Section A, update Sections B-E for any change in information,
and sign the application in Section F.*

SECTION A – PROJECT IDENTIFICATION

PROJECT NAME 150 Allen Road
MUNICIPALITY Bernards Township
BLOCK(S) 11201 LOT(S) 3
STREET ADDRESS 150 Allen Road
TAX MAP PAGE 113 DATE OF PLANS BEING SUBMITTED 9/16/2022
LOCAL BOARD REVIEWING APPLICATION:
PLANNING BOARD BOARD OF ADJUSTMENT
COUNTY PLANNING BOARD FILE # _____ (for resubmissions/revisions)

SECTION B – APPLICANT AND CONTACT INFORMATION

APPLICANT'S NAME Signature Acquisitions, LLC
ADDRESS 20 Commerce Drive Cranford, NJ 07016
TELEPHONE 908-577-7597 FAX _____
E-MAIL rtravaglini@signatureacq.com

PLAN PREPARER'S NAME Robert C. Moschello, P.E.
PLAN PREPARER'S ADDRESS 265 Main Street P.O. Box 400
TELEPHONE 908-234-0309 FAX _____
E-MAIL rmoschello@gladstonedesign.com

ATTORNEY'S NAME Jeffrey B. Lehrer, Esq. & Michael E. Silbert, Esq.
ATTORNEY'S ADDRESS 15 Mountain Blvd. Warren, NJ 07059
TELEPHONE 908-757-7800 ext. 180 FAX _____
E-MAIL jlehrer@newjerseylaw.net

SECTION C – SITE DATA

AREA OF TRACT 28.304 acres
DEDICATED OPEN SPACE 17.004 acres

PUBLIC SEWER YES X NO _____
 PUBLIC WATER YES X NO _____
 REDEVELOPMENT YES _____ NO X

SECTION D – SUBDIVISION INFORMATION

SUBDIVISION TYPE RESIDENTIAL (✓) _____ NONRESIDENTIAL (✓) _____
 NUMBER OF NEW BUILDING LOTS _____
 NEW BUILDING LOTS PROPOSED UNDER FAIR HOUSING ACT _____
 TOTAL AREA OF NEW BUILDING LOTS _____ acres
 AVERAGE AREA OF NEW BUILDING LOTS _____ acres
 NUMBER OF MULI-FAMILY LOTS _____
 LENGTH OF NEW STREET _____ linear feet

SECTION E – SITE PLAN INFORMATION

<u>TYPE (✓)</u>	<u>NUMBER OF UNITS</u>	<u>AMOUNT OF NEW SQ. FOOTAGE</u>	<u>NUMBER OF NEW PARKING SPACES</u>
_____ RESIDENTIAL	_____	_____	_____
Living Units	_____	_____	
Attached Units	_____		
Fair Housing Act Units	_____		
_____ COMMERCIAL/RETAIL			
<u>X</u> _____ OFFICE		<u>59,320</u>	<u>328 Total</u> *Of which 105 are
<u>X</u> _____ INDUSTRIAL/WAREHOUSE		<u>198,977</u>	<u>328 Total</u> existing spaces
_____ PUBLIC/INSTITUTIONAL			
_____ OTHER			

SECTION F - SIGNATURE

SIGNED Michael E. Silbert (SIGNATURE OF APPLICANT OR AGENT)  **MICHAEL E. SILBERT, Esq.**  ATTORNEY AT LAW OF THE STATE OF NEW JERSEY DATE 9/22/22

PART II – REVIEW FEE SCHEDULE

A review fee shall apply to each subdivision and land development submitted to the Somerset County Planning Board for review in accordance with the New Jersey County Enabling Act, Section 40 27-6.2 and 40 27-6.6. Fees shall be submitted with the submission package to the County Planning Board located in the County Administration Building, 20 Grove Street, Somerville, New Jersey. Only certified checks or money orders, payable to Treasurer, County of Somerset, will be accepted. Review will not commence until the proper fees and accompanying plans and supporting documents are received by the County Planning Board. The review fee is non-refundable.

One pre-application meeting and/or submission of a concept plan will be considered by the Planning Board when requested by the applicant. Subsequent meetings and reviews of documents will only be considered upon receipt of a completed Somerset County Land Development Application Form and Checklist with the appropriate fee.

Complete all sections of the fee schedule below that apply.

SECTION A – REVIEW FEE EXEMPTION (Check reason for exemption)

1. _____ Lot line adjustments where no building lots are being created.
2. _____ Minor building additions not on a county road involving less than 1,000 sq. ft. and no additional parking.
3. _____ Plans submitted by a duly recognized nonprofit institution or municipality.
4. _____ Housing units proposed as per the Fair Housing Act. *Only the specific housing units or lots proposed under the Fair Housing Act are exempt from the review fee.*

SECTION B – SUBDIVISION REVIEW FEE (Check appropriate category)

If uncertain whether the proposed development impacts a County facility, the applicant should submit the lesser fee. If the County determines that the project impacts a County facility, the County will notify the applicant as to the correct fee in the first County Planning Board report.

1. _____ A minor subdivision which contains two (2) or fewer new lots, which does not impact a County road or drainage facility as determined by the County.
\$150.00 flat fee \$ _____
2. _____ A minor subdivision which contains two (2) or fewer new lots, which impacts a County road or drainage facility as determined by the County.
\$200.00 flat fee \$ _____
3. _____ A major subdivision which contains three (3) or more new lots, which does not impact a County road or drainage facility as determined by the County.
\$300.00 flat fee \$ _____
4. _____ A major subdivision which contains three (3) or more new lots, which impacts a County road or drainage facility as determined by the County.
\$400.00 flat fee plus \$ _____
\$20.00 per new lot + \$ _____
5. _____ A Final Plat
\$300.00 flat fee \$ _____

SECTION C – SITE PLAN REVIEW FEE (Check appropriate category)

If uncertain whether the proposed development impacts a County facility, the applicant should submit the lesser fee. If the County determines that the project impacts a County facility, the County will notify the applicant upon issuance of the first County Planning Board report.

1. A site plan which does not impact a County road or drainage facility as determined by the County.
\$150.00 flat fee \$ 150.00
2. A site plan which impacts a County road or drainage facility as determined by the County.
\$400.00 flat fee plus \$ _____
\$10.00 per parking stall **Commercial/Office** + \$ _____
\$2.00 per 100 sq. ft. **Industrial** + \$ _____
\$20.00 per dwelling unit **Residential** + \$ _____

For projects requiring a more detailed engineering/planning review, an escrow account may be required to cover the actual cost of completing the review of the project. The County Planning Board will advise the applicant of this amount when applicable.

SECTION D – TOTAL APPLICATION FEE \$ 150.00

SECTION E – REVISION FEE (Check appropriate category)

A revision fee must be submitted for revised plans, stormwater management reports, traffic reports and other supporting documentation.

1. 1st revision - no revision fee
 2. 2nd and each subsequent revision
- \$150.00 Minor Subdivision (2 or fewer new lots)** \$ _____
\$300.00 Major Subdivision (3 or more new lots) \$ _____
\$300.00 All Site Plans \$ _____

SECTION F – GEOGRAPHIC INFORMATION SYSTEM FEE (Check appropriate category)

A separate check shall be submitted for the Geographic Information System fee as listed below.

- \$25.00 per plat plus** \$ _____
\$10.00 per new lot \$ _____
- \$25.00 per site plan if proposed structure is greater the 400 sq. ft.** \$ _____

PART III – COMPLETENESS CHECKLIST

SOMERSET COUNTY LAND DEVELOPMENT COMPLETENESS CHECKLIST

The Somerset County Land Development Application Completeness Checklist is part of the adopted *Somerset County Land Development Review Resolution*. For further clarification concerning items on the checklist refer to the *Land Development Review Resolution*. The *Land Development Review Resolution* may be viewed on the Somerset County website at (www.co.somerset.nj.us/planweb/index.htm; select Planning Division, then Land Development Review). Somerset County Planning and Engineering staffs are authorized to make all determinations on completeness. Please refer to the *Land Development Review Resolution* for appropriate thresholds for traffic and stormwater management reports.

Any applicant seeking a waiver from any item on this completeness checklist shall provide a detailed written explanation for each waiver request being sought. If deemed necessary, this written request and accompanying explanation will be brought before the Somerset County Land Development Committee for review and consideration. The applicant will be advised in writing of the Land Development Committee's decision concerning the waiver request(s).

Somerset County Land Development Completeness Checklist

The following checklist is to be completed and included with the standard application form:

I= Incomplete

NA=Not Applicable

C=Complete

General Requirements

- | I | NA | C | |
|-----------------------|----------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | 1. Completed current County Land Development Application form with all required attachments. (http://www.co.somerset.nj.us/planweb/pdf/appformlist.pdf) |
| <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | 2. Review or revision fees paid in full by certified check. |
| <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | 3. Written description of application. Description must include existing and proposed use. Any items marked not applicable on this checklist must be fully explained within the written description. |
| <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | 4. Copy of complete application as submitted to municipality. |
| <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | 5. Copy of all applications to other review agency (NJDEP, Soil Conservation, Canal Commission, etc.). |
| <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | 6. Historical Impact Statement (if required by Chapter 8 of Resolution). If not applicable, state reason in written description of project. |
| <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | 7. Agricultural Impact Statement (if required by Chapter 8 of Resolution). If not applicable, state reason in written description of project. |
| <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | 8. Recycling Plan Element (if required by Chapter 8 of Resolution). If not applicable, state reason in written description of project. |
| <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | 9. Copy of Highlands Preservation Area Approval (if applicable). Please refer to http://www.highlands.state.nj.us/njhighlands/ for more information on requirements. If not applicable, state reason in written description of project. |
| <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | 10. Number of COAH units must be listed in the written description of application and shown on plan. |

Plan Requirements

- | | | | |
|-----------------------|-----------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | 11. Title page with a legible key map, containing a north arrow, at a scale suitable to easily find the site for a field inspection. The title page must also include the project name and the 3"x 4" County acceptance stamp block. |
| <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | 12. Construction plans showing all proposed improvements to County facilities at a scale of 1"=30' signed and sealed by a professional engineer prepared in accordance with County standards. All sheets are to contain the scale of plan (written and graphic) and a correctly oriented north arrow. Existing features must be shown consistent with the Plan of Survey. |

- | I | NA | C | |
|--------------------------|----------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | 13. County construction details, drawn to scale, and applicable specifications. |
| <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | 14. Title block (Per N.J.S.A.13:40-1.3) containing type/name of application, plan preparer, existing block and lot numbers, and date of plan with revision dates. |
| <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | 15. County facilities and surrounding topography and features must be shown for a minimum distance of 200' beyond the tract boundaries. For projects affecting County facilities this includes pavement, curb, drainage systems, utilities, vegetation, striping, signage (sign type and description), signals and similar features. |
| <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | 16. Zone district of site and adjoining areas, name of applicant, owner and applicant's attorney. |
| <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | 17. Existing and proposed square footage (per floor) and use of building(s) listed. Number and type of new units is to be specified. |
| <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | 18. Current signed and sealed Plan of Survey of the property in question prepared in accordance with N.J.S.A.13:40-5.1. |
| <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | 19. Names of all property owners within 200' with lot and block numbers shown and adjacent lot numbers shown on all sheets. |
| <input type="checkbox"/> | <input checked="" type="radio"/> | <input type="checkbox"/> | 20. Right-of-way dedication(s) to the County consistent with County standards and the County Master Plan shown on the plan with signed and sealed metes and bounds descriptions by a professional land surveyor. |
| <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | 21. Proposed access location and configuration in accordance with Chapter 4 of the Land Development Review Resolution and applicable County standards. |
| <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | 22. For improvements within the County right-of-way, the centerline of the County road is to be defined with bearings, distances and curve data with stationing every 50 feet increasing to the north or east. |
| <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | 23. Lines of sight per County standards shown in plan and profile views with proposed treatment to provide clear lines of sight. Sight easements are to be shown per County standards. |
| <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | 24. Intersection Grading Plan drawn at 1"=20' showing pavement and curb elevations as needed to ensure proper construction and positive drainage control. Superfluous information is to be omitted from the Intersection Grading Plan. |
| <input type="checkbox"/> | <input checked="" type="radio"/> | <input type="checkbox"/> | 25. Cross sections of the County road drawn per County standards at 1"=5' (horizontal and vertical) with existing and proposed elevations. |
| <input type="checkbox"/> | <input checked="" type="radio"/> | <input type="checkbox"/> | 26. Typical roadway section(s) of the County road in accordance with County standards. |

- | | | | |
|--------------------------|----------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I | NA | C | |
| <input type="checkbox"/> | <input checked="" type="radio"/> | <input type="checkbox"/> | 27. Proposed utility connections within the County right-of-way (sanitary, water, gas, electric, etc.) with pavement restoration details and specifications per County standards. |
| <input type="checkbox"/> | <input checked="" type="radio"/> | <input type="checkbox"/> | 28. Profile of driveway or sidestreet intersecting the County road showing smooth profile with grades matching cross sections and intersection-grading plan. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="radio"/> | 29. Provisions for the collection of recyclables in multi-family residential and commercial developments. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="radio"/> | 30. Signage and striping plan per County standards. |
| <input type="checkbox"/> | <input checked="" type="radio"/> | <input type="checkbox"/> | 31. Traffic control plan for construction of improvements to County facilities. |

Stormwater Management Requirements

- | | | | |
|--------------------------|----------------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="radio"/> | 32. Stormwater management report prepared in accordance with County standards, signed and sealed by a professional engineer. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="radio"/> | 33. Full-scale drainage area maps for existing and proposed conditions showing correct delineation of sub-areas, times of concentration with flow paths and slopes, soil and cover types and downstream point of analysis. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="radio"/> | 34. Proposed treatment consistent with County standards for intercepting, detaining and treating all stormwater runoff directed to County facilities. |
| <input type="checkbox"/> | <input checked="" type="radio"/> | <input type="checkbox"/> | 35. Adequate drainage improvements to ensure proper drainage at access point(s) and along the County road. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="radio"/> | 36. Drainage calculations showing proposed drainage facilities in accordance with the appropriate requirements. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="radio"/> | 37. Contours and spot elevations to determine existing and proposed drainage patterns. |

Traffic Requirements

- | | | | |
|--------------------------|--------------------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="radio"/> | 38. Traffic Impact Study including: Existing, No Build, and Build Traffic Volumes, New Trip Distribution Figures, Pass-by Trip Distribution Figures, Site Generated New Trip Figures, Site Generated Pass-by Trip Figures, Site Generated Total Trip Figures, Existing, No Build, Build, and Build with Mitigation Levels of Service Figures, Proposed Mitigation Measures, Sketch of Proposed Mitigation Measures and Cost Estimate for Proposed Mitigation Measures. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="radio"/> | 39. Traffic Impact Study Technical Appendix, including: Traffic Count Data (Manual Count Sheets / ATR's), Trip Generation Calculations, including pass-by calculations, Gravity Model (if applicable) and Capacity Analysis Worksheets. |



Majestic Title Agency

472 Route 22 West , Whitehouse Station, NJ 08889
Phone: 908-823-9100 | Fax: 908-823-9102
www.majestictitle.com

August 1, 2022

DiFrancesco Bateman Kunzman Davis Lehrer & Flaum, PC
15 Mountain Boulevard
Warren, NJ 07059

Re: File Number: **4045730**
Premises: **150 Allen Rd, Township of Bernards**
County: **Somerset, NJ**

REPORT OF TITLE

DEED OF RECORD

Record Owner information is based upon the county records indexed through 07/25/2022.

Record Owner: Sig 150 LLC

Address: 150 Allen Rd
Bernards Township, NJ
Tax Lot/Block: Tax Lot: 2 & 3 Tax Block: 11201
Municipality: Township of Bernards County: Somerset

RESTRICTIONS, GRANTS, EASEMENTS, ETC

- Subject to all matters shown on a certain tax map situated in the Township of Bernards, County of Somerset, State of NJ, in the Somerset County Clerk's Office as Map No. 112.
- Subject to terms, provisions, rights, reservations, covenants, exceptions, provisions, restrictions, easements, grants, right of ways, conditions and agreements to The Holland Company, as contained in record Deed Book R21, page 263, Deed Book S21, page 435.
- Subject to Deed of Easement as contained in record Deed Book 1485, page 216.
- Subject to Deed of Easement as contained in record Deed Book 1485, page 225.
- Subject to terms, provisions, rights, reservations, covenants, exceptions, provisions, restrictions, easements, grants, right of ways, conditions and agreements as contained in record Deed Book 1523, page 110; Deed book 2132, page 515; Deed Book 5516, page 3165; Deed Book 7028, page 3129.
- Subject to Declaration of Easement as contained in record Deed Book 1630, page 621.
- Subject to Modification of Deeds of Easement as contained in Deed Book 2047, page 824.

[Subject to restrictions and easements of record and any state of facts or defendants that would be disclosed by a 60 year search.]

Continued

File No: 4045730

REMARKS: Title searched from 1929 to 07/25/2022.

This report is furnished for informational purposes and reflects the status of title as of the date referenced above. No liability is assumed for non-indexed, mis-indexed, non-recorded or mis-recorded documents. Majestic Title Agency's liability is limited to the fee paid for this report.

This report does not represent an Agreement to Issue Policy, or an opinion as to the marketability of title to the subject premises.

Very Truly Yours,
MAJESTIC TITLE AGENCY

ALLEN CENTER FARM LLC%WALKER MALLOY
ALLEN RD
BASKING RIDGE NJ 07920

Mailing Address
157 COLUMBUS AVE #2E
NEW YORK NY 10023

County: **SOMERSET**
Town: **Bernards Township**
Block: **11201**
Lot: **2**
Qualifier:

<i>Tax Information</i>	
Land Value: \$13,100	Property Type: Vacant Land
Imp. Value:	Assessment Year:
Total Assessment: 13100	Tax Year: 2021
Property Tax: 233.44	Town Tax Rate:

<i>Property Description</i>	
Zoning: R1	Building Description: ROW
Lot Size: 4.35AC	Year Built:
Land Sq. Ft.:	Building Sq. Ft.:
Acres: 4.35	Num. Stories:

<i>Sales History</i>			
Deed Book:	Rec. Date:	Sales Price:	Buyer:
Deed Page:	Deed Date:		Seller:

SIG 150 ALLEN LLC C/O SIGNATURE ACQ
150 ALLEN RD
BASKING RIDGE NJ 07920

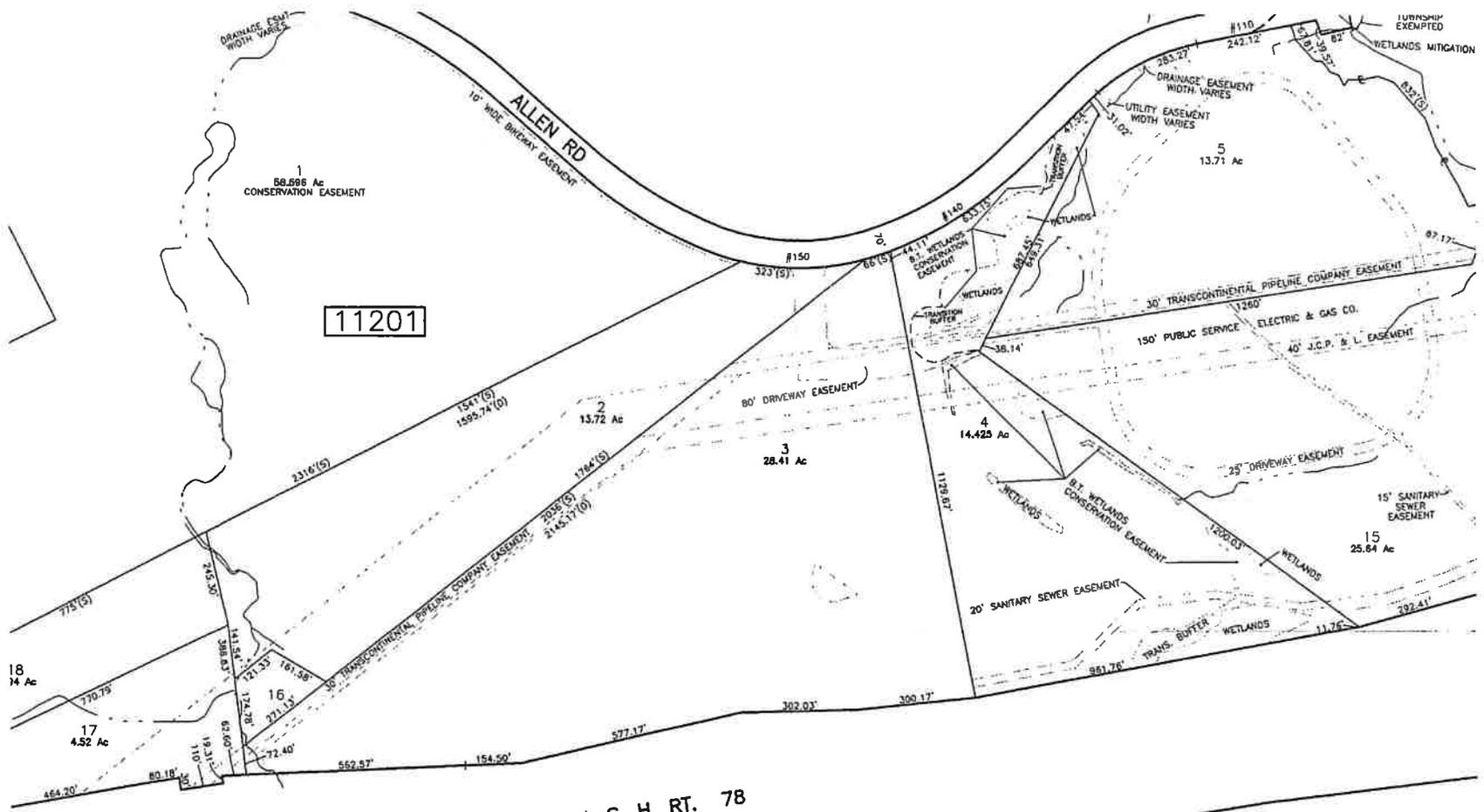
Mailing Address
20 COMMERCE DR; STE #110
CRANFORD NJ 07016

County: **SOMERSET**
 Town: **Bernards Township**
 Block: **11201**
 Lot: **3 - 183,328 REPORTED**
 Qualifier:

Tax Information	
Land Value: \$7,560,000	Property Type: Commercial
Imp. Value: \$12,606,100	Assessment Year:
Total Assessment: 20166100	Tax Year: 2021
Property Tax: 359359.9	Town Tax Rate:

Property Description	
Zoning: E2	Building Description:
Lot Size: 28.0000	Year Built: 1989
Land Sq. Ft.:	Building Sq. Ft.:
Acres: 28.00	Num. Stories:

Most Recent Sale	
Seller:	
Deed Book: 7028	Deed Date: 02/23/2018
Deed Page: 3129	Sale Price: \$25,000,000



11201

N. J. S. H. RT. 78

1
88.896 Ac
CONSERVATION EASEMENT

2
13.72 Ac

3
28.41 Ac

4
14.423 Ac

5
13.71 Ac

15
25.64 Ac

18
14 Ac

17
4.52 Ac

16

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R-21-263

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THIS INDENTURE, made the fifth day of August, in the year of our Lord one thousand nine hundred and twenty nine (1929) BETWEEN Adam Masionis, widower, individually and as Executor of the Last Will and Testament of Paulina deceased, and Peter Masionis, single, of the Township of Hillside in the County and State of New Jersey, party of the first part; The Holland Company, a corporation of New Jersey, with its principal office in the Newark in the County of Essex and State of New Jersey, party of the second part; J. EVERETT BURNETT, that the said party of the first part, for and in consideration of five (\$500.00) dollars, lawful money of the United States of America, to them in hand truly paid by the said party of the second part, at or before the sealing and delivery of these presents, the receipt whereof is hereby acknowledged, and the said party of the second part being therewith fully satisfied, contented and paid, have given, granted, sold, aliened, released, enfeoffed, conveyed and confirmed, and by these presents, do give, grant, bargain, sell, alien, release, enfeoff, convey and confirm unto the said party of the second part, and to its successors and assigns, forever, that certain lot, tract or parcel of land and premises, hereinafter particularly described, situate, lying and being in the Township of Bernards in the County of Somerset State of New Jersey

BEGINNING at a point in the dividing line between lands of Adam Masionis and lands now owned by J. Everett Burnett and distant therein south 56 degrees 44 minutes east 130.86 feet to a corner common to lands of Adam Masionis, lands now or formerly of J. Everett Burnett and lands now or formerly of Theodore C. English and lands now or formerly of Frank J. Fetzer, Jr., said beginning point being also distant northwesterly 75 feet measured at right angles from the monumented center line of the Public Service Electric and Gas Company's Lambertville Transmission Line Right of Way; running thence (1) south 56 degrees 44 minutes east along the dividing line between lands of Adam Masionis and lands now or formerly of J. Everett Burnett, 161.58 feet to a point distant southeasterly 75 feet measured at right angles from the aforementioned center line of right of way; thence (2) south 55 degrees 06 minutes west through and across lands of Adam Masionis, parallel to and distant 75 feet measured southeasterly at right angles from the aforementioned center line of right of way 121.33 feet to a point in the dividing line between lands of Adam Masionis and lands now or formerly of Frank J. Fetzer, Jr.; thence (3) north 04 degrees 01 minute west along the aforementioned dividing line 174.78 feet to a point, said point being distant south 04 degrees 01 minute east 141.54 feet from a corner common to lands of Adam Masionis, lands now or formerly of Frank J. Fetzer, Jr., lands now or formerly of Theodore C. English and lands now or formerly of J. Everett Burnett, said point being also distant 75 feet measured northwesterly at right angles from the aforementioned center line of right of way; thence (4) south 55 degrees 06 minutes east through and across lands of Adam Masionis parallel to and distant 75 feet measured northwesterly at right angles from the aforementioned center line of right of way 121.33 feet to the point and place of beginning.

and subject, however, to the right which is to be reserved and excepted, to use, possess and enjoy the surface of the said land herein described at a certain point crossing to and from the lands on either side of the hereinabove described tract, the crossing being fifty (50) feet in width and the side lines thereof being parallel and distant twenty five (25) feet from the center line thereof; the said center line being as follows:

r. 8/6/29

R-21-264

BEGINNING at a point in the second course of the above described tract in south 55 degrees 06 minutes west 117.12 feet from a point in the dividing line between lands of Adam Masionis and lands now or formerly of J. Everett Burnett; thence north 41 degrees 25 minutes west 75.49 feet to a point in the center line of Electric and Gas Company's Roseland-Lambertville Transmission Line Right of Way being distant 95.65 feet measured southwesterly along said center line from the dividing line between lands of Adam Masionis and lands now or formerly of J. Everett Burnett; thence (2) north 50 degrees 48 minutes west 45 feet to a point; thence north 51 degrees 51 minutes west 41.99 feet to a point in the fourth course of the above described tract, distant therein northeasterly 15.86 feet from a point in the dividing line between lands of Adam Masionis and lands now or formerly of Frank J. Fetzer, Jr., which line is to be used and enjoyed for crossing purposes for pedestrian and vehicular traffic.

The above description being drawn in accordance with a survey made by John J. Civil Engineer and Surveyor, Summit, New Jersey, July 19, 1929.

Being a part of the same premises conveyed by Peter Martin and Anna Masionis to Paulina Masionis, dated December 2, 1922, and recorded December 18, 1922, in the set County Clerk's Office in Book 2 18 of Deeds for said County, page 397, and which Paulina Masionis died seized leaving a Last Will and Testament probated in the County Surrogate's Office devising said lands to the said Adam Masionis.

The party of the first part reserves the right to remove any and all standing timber on the premises herein conveyed whenever the same may be cut by the party of the first part, its successors, agents, employees or assigns.

TOGETHER with all and singular the houses, buildings, trees, ways, watercourses, rights, privileges and advantages, with the appurtenances to the same belonging or in any way pertaining;

ALSO, all the estate, right, title, interest, property, claim and demand, in and out of the said party of the first part, of, in and to the same, and of, in and to any part and parcel thereof;

TO HAVE AND TO HOLD, all and singular the above described land and premises, with appurtenances, unto the said party of the second part, its successors and assigns, for the only proper use, benefit and behoof of the said party of the second part, its successors and assigns, forever.

AND the said Adam Masionis, individually and as Executor of the Last Will and Testament of Paulina Masionis, deceased, and Peter Masionis, do for themselves, their heirs, executors and administrators covenant and agree to and with the said party of the second part, its successors and assigns, that the Estate of Paulina Masionis, is the true and right owner of all and singular the above described land and premises, and of any part and parcel thereof, with the appurtenances thereunto belonging; and that the said land and premises, or any part thereof, at the time of the sealing and delivery of the presents, are not encumbered by any mortgage, judgment or limitation, or by any claim whatsoever, by which the title of the said party of the second part, hereby intended to be made, for the above described land and premises, can or may be in any way altered or defeated in any way whatsoever.

AND ALSO that the said party of the first part now have good right, full power and lawful authority to grant, bargain, sell and convey the said land and premises herein aforesaid;

AND ALSO that Adam Masionis, individually, and Peter Masionis, will warrant and forever defend the said land and premises unto the said The Holland Company,

...and clearly freed and discharged of and from all manner of obligations
... WHEREOF, the said party of the first part have hereunto set their hands
... day and year first above written.

... and delivered : Adam Masionis (L.S.)
... presence of : Individually and as Executor of the
L. W. & T. of Paulina Masionis, dec'd

... JERSEY : Peter Masionis (L.S.)

... SS: BE IT REMEMBERED, that on this 5th day of August, in
... the year of our Lord one thousand nine hundred and twenty nine
... me, the subscriber, — personally appeared Adam Masionis, individually and
... of the Last Will and Testament of Paulina Masionis, dec'd., and Peter Masionis,
... satisfied, are the grantors mentioned in the within Instrument, to whom I first
... the contents thereof, and thereupon they acknowledged that they signed, sealed
... the same as their voluntary act and deed, for the uses and purposes therein

Harry Wright
Master in Chancery of New Jersey

Received and Recorded August 6th, 1929, at 7:20 A. M.

Walter K. Crater,
Clerk.

... Kuser : THIS INDENTURE, made the 2nd day of August, in the year of our
... Lord one thousand nine hundred and twenty nine

... Kuser : BETWEEN Susie Dryden Kuser, widow, of the Township of Bernards
... in the County of Somerset and State of New Jersey, party of

... part;
... John Dryden Kuser, of the Township of Bernards in the County of Somerset and
... Jersey, party of the second part;

... THAT, that the said party of the first part, for and in consideration of one dol-
... valuable consideration, lawful money of the United States of America, to her
... and truly paid by the said party of the second part, at or before the sealing
... of these presents, the receipt whereof is hereby acknowledged, and the said
... the first part being therewith fully satisfied, contented and paid, has given,
... gained, sold, aliened, released, enfeoffed, conveyed and confirmed, and by these
... give, grant, bargain, sell, alien, release, enfeoff, convey and confirm unto
... of the second part, and to his heirs and assigns, forever,
... some certain lots, tracts or parcels of land and premises, hereinafter particu-
... ed, situate, lying and being in the Township of Bernards in the County of Som-
... State of New Jersey.

... TRACT: BEGINNING in the middle of the highway known as the Mine Mountain Road
... of lands of George B. Post, distant eighteen feet and twelve hundredths of
... the stone monument on the southeasterly side of said road and distant also
... one half feet from the middle of a large white oak tree standing near the
... side of the said road, the beginning corner of the second tract hereof, and
... passing over the said monument and through the said tree along the first
... second tract south thirty one degrees east four hundred and thirty eight and
... to the second corner of said second tract; thence (2) along the second line
... second tract and along line of lands of the said George B. Post, south one
... one minutes east three hundred and eighty nine and seven tenths feet to a

S-21-435

Best copy available

UNION : Be it remembered that on this thirtieth day of September,
 in the year of our Lord one thousand nine hundred and twenty nine,
 the subscriber, a Notary Public of New Jersey, personally appeared Peter W.
 Hildegarde Anderson Hunt, - who I am satisfied are the grantors mentioned in the
 instrument, to whom I first made known the contents thereof, and thereupon they
 acknowledged that they signed, sealed and delivered the same as their voluntary act and deed
 in pursuance of the uses and purposes therein expressed.

the said Hildegarde Anderson Hunt being by me privately examined separate and apart
 from her said husband, further acknowledged that she signed, sealed and delivered the same
 as her voluntary act and deed, freely, without any fear, threats or compulsion of her said

Peter Bird (L.S.)
 Notary Public of New Jersey

Received and recorded October 17, 1929 at 8:00 A.M.

Walter K. Crater,
 Clerk

Holland Company, : THIS INDENTURE made this thirtieth day of September,
 : in the year of our Lord one thousand nine hundred and
 Public Service Electric and Gas Company, : twenty nine,
 : BETWEEN The Holland Company, a corporation of the
 State of New Jersey, of the first part,

Public Service Electric and Gas Company, also a corporation of said State, of the
 second part;

WITNESSETH that the said party of the first part for a good and sufficient consideration
 hereunto moving as well as the payment of one dollar (\$1.00) lawful money of the
 United States of America by the said party of the second part to the said party of the first
 part the receipt of which is hereby acknowledged, hath granted, bargained, sold,
 aliened, remised, released, conveyed and confirmed and by these presents doth grant,
 sell, alien, release, enfeoff, convey and confirm unto the said party of the
 second part, its successors and assigns.

That certain lot, tract or parcel of land and premises, hereinafter particularly
 described, situate, lying and being in the Township of Bernards in the County of Somerset
 County of New Jersey.

beginning at a point in the dividing line between lands of Adam Masionis and lands now
 owned by J. Everett Burnett and distant therein south 56 degrees 44 minutes east one
 hundred and thirty feet and eighty-six one-hundredths of a foot (130.86') from a corner common
 to lands of Adam Masionis, lands now or formerly of J. Everett Burnett, lands now or formerly
 owned by C. English and lands now or formerly of Frank J. Fetzer, Jr.; said beginning
 being also distant northwesterly seventy-five feet (75') measured at right angles
 from the monumented center line of the Public Service Electric and Gas Company's Roseland
 Transmission Line Right of way; running thence (1) south 56 degrees 44 minutes
 east along the dividing line between lands of The Holland Company (formerly Adam Masionis)
 lands now or formerly of J. Everett Burnett one hundred sixty one feet and fifty-eight
 one-hundredths of a foot (161.58') to a point distant southeasterly seventy-five ^{feet} (75')
 measured at right angles from the aforementioned center line right of way; thence (2) south
 56 degrees 44 minutes west along line of remaining lands of Adam Masionis, parallel to and
 distant therefrom seventy-five feet (75') measured southeasterly at right angles from the aforementioned
 center line right of way two hundred seventy one feet and thirteen one-hundredths of a

...to a point in the dividing line between lands of The Holland Company
 (formerly Adam Masionis) and lands now or formerly of Frank J. Fetzer, Jr., then
 04 degrees 01 minute west along last mentioned dividing line one hundred seven
 and seventy eight one hundredths of a foot (174.78') to a point, said point being
 south 04 degrees 01 minute east one hundred forty one feet and fifty four one
 of a foot (141.54') from a corner common to lands of Adam Masionis, lands now
 of Frank J. Fetzer, Jr., lands now or formerly of Theodore C. English and lands
 erly of J. Everett Burnett, said point being also distant seventy five feet (75')
 northwesterly at right angles from the aforementioned center line of right of way
 (4) north 55 degrees 06 minutes east along line of other remaining lands of Adam
 parallel to and distant seventy five feet (75') measured northwesterly at right
 the aforementioned center line of right of way one hundred twenty one feet and
 one hundredths of a foot (121.33') to the point and place of beginning.

The above description being drawn in accordance with a survey made by John
 Civil Engineer and Surveyor, Summit, New Jersey, July, 19, 1929.

Subject, however to the reservations, covenants and conditions in a deed
 Masionis, et al., to The Holland Company, dated August 5th, 1929 and recorded in
 Clerk's Office of Somerset County on August 6th, 1929 in Book R-21 of Deeds
 County, on pages 263 etc., contained in the following words:

"Under and subject, however, to the right which is to be reserved and excepted
 use, have, possess, and enjoy the surface of the said land herein described
 point for crossing to and from the lands on either side of the hereinabove
 tract, said crossing being fifty feet (50') in width and the side lines thereof
 parallel and equidistant twenty five (25') feet from the center line thereof,
 center line being described as follows:

Beginning at a point in the second course of the above described tract,
 therein south 55 degrees 06 minutes west one hundred seventeen feet and two
 hundredths of a foot (117.12') from a point in the dividing line between lands
 Masionis and lands now or formerly of J. Everett Burnett; running thence (1)
 degrees 25 minutes west seventy five feet and forty nine one hundredths of a
 to a point in the center line of Public Service Electric and Gas Company's
 ville Transmission Line Right of way, said point being distant ninety five
 five one hundredths of a foot (95.65') measured southwesterly along said
 a point in the dividing line between lands of Adam Masionis and lands now
 J. Everett Burnett; thence (2) north 50 degrees 48 minutes west forty five
 to a point, thence (3) north 75 degrees 51 minutes west forty one feet and
 one hundredths of a foot (41.99') to a point in the fourth course of the above
 tract distant therein northeasterly fifteen feet and eighty six one hundredths
 (15.86') in the dividing line between lands of Adam Masionis and lands now
 Frank J. Fetzer, Jr., which said crossing is to be used and enjoyed for
 for pedestrian and vehicular traffic.

The party of the first part reserves the right to remove any and all
 on the premises herein conveyed whenever the same may be cut by the party of
 part, its successors agents, employees or assigns"

Being the same premises which Adam Masionis, widower, individually and
 the last will and testament of Paulina Masionis, deceased and Peter Masionis
 deed bearing date the fifth day of August, in the year of our Lord one
 hundred and twenty nine, and recorded in the Clerk's Office of the County
 sixth day of August, A.D. 1929, in Book R-21 of Deeds for said County
 granted and conveyed unto the said The Holland Company in fee,

126630

DEED OF EASEMENT.

This Deed of Easement made this 3rd day of August, 1983,
 by Raymond P. Von Culin, Henry J. Brucker, Milton H. Klausmann and
 Maximillian M.E. Spann having an office c/o Max E. Spann, Inc.,
 U.S. Highway No. 202-206 Pluckemin, New Jersey 07978, the
 "Grantor", to Johil/SMC Associates, a limited partnership
 organized and existing under the laws of the State of New Jersey,
 having a place of business c/o Joseph Hilton & Associates
 Incorporated, 630 Fifth Avenue, New York, New York 10111, the
 "Grantee".

COUNTY OF SOMERSET
 CONSIDERATION *add*
 REALTY TRANSFER FEELING
 DATE *8-5-83* BY *AB*

W I T N E S S E T H:

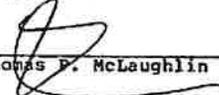
WHEREAS, Grantor is the owner of Lot 7, Block 177 as
 shown on the Tax Map of the Township of Bernards, County of
 Somerset, State of New Jersey; and

WHEREAS, Grantee is purchasing from Grantor that portion
 of Lot 7, Block 177 described as Parcel "A" attached hereto; and

WHEREAS, Grantee is about to construct an office
 building on Parcel A; and

WHEREAS, in connection with such construction the munic-
 ipality has required the creation on Parcel A and the remainder of

Prepared By:


 Thomas P. McLaughlin

BOOK 1485 PAGE 216

r. 8/5/83

Lot 7, Block 177 of a single roadway system to provide for ingress to and egress from Parcel A and the remainder of Lot 7, Block 177 onto Allen Road; and

WHEREAS, in order to effectuate the common ingress and egress roadway system hereinabove described, Grantor has agreed to grant to Grantee, as the owner of Parcel A, a non-exclusive easement over that portion of the remainder of Lot 7, Block 177 hereinafter described, for the purpose of providing ingress to and egress from Parcel A onto Allen Road in exchange for Grantee granting a similar easement to Grantor over a portion of Parcel A.

NOW, THEREFORE, in consideration of the premises and the mutual easement to be granted by separate document by Grantee to Grantor, Grantor hereby grants the following described easement subject to the terms and conditions set forth herein:

1. Grantor as the owner of Lot 7, Block 177 hereby grants to Grantee as the owner of Parcel A a non-exclusive easement over that portion of Lot 7, Block 177 described on Exhibit 1 ("Easement Area") annexed hereto and made a part hereof for the purpose of ingress to and egress from Parcel A onto Allen Road.

2. The easement created hereby shall be subject to the following; (a) any state of facts which a physical inspection and accurate survey of the Easement Area would disclose; and (b) existing rights and easements for public roadways, utilities, water and sewer mains, pipelines and telephone easements, if any, located in the Easement Area.

3. Until such time as Grantor shall develop all or any portion of the remainder of Lot 7, Block 177, Grantee as the owner

of Parcel A agrees, at its sole cost and expense to maintain the Easement Area, including, but not limited to the landscaping and roadway surface. In addition, until such time, Grantee will pay real estate taxes and assessments affecting the Easement Area. At such time as Grantor develops the remainder of Lot 7, Block 177, Grantor agrees, as the owner of the remainder of Lot 7, Block 177 to share the cost of maintaining the Easement Area and the payment of real estate taxes and assessments with Grantee on a pro rata basis, based upon the following fraction; total square footage constructed on the remainder of Lot 7, Block 177 divided by total square footage constructed on Parcel A and the remainder of Lot 7, Block 177. Grantor's responsibility for sharing the cost of maintenance of the Easement Area and payment of real estate taxes and assessments shall not commence by virtue of its using the Easement Area for purposes of ingress and egress from the house presently located on the remainder of Lot 7, Block 177, across the Easement Area to Allen Road.

4. In the event that in connection with the development of the remainder of Lot 7, Block 177, Grantor shall desire or be required to widen the roadway initially to be installed by Grantee, Grantor agrees to restore and repair, including the landscaping, where applicable, any portion of the Easement Area which may be damaged in connection with Grantor's utilization of the Easement Area.

5. The provisions of this Deed of Easement may be abrogated, modified or amended in whole or in part, by the then current owners of Parcel A and the remainder of Lot 7, Block 177,

respectively; it being expressly intended hereby that the consent of any of the tenant's or other occupants of Parcel A and/or the remainder of Lot 7, Block 177 to such abrogation, modification or amendment shall not be required.

6. Nothing contained herein is intended to nor shall be construed as creating any right in or for the benefit of general public nor shall this instrument be construed as a grant for any public purpose other than as set forth herein.

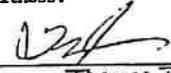
7. This agreement shall inure to the benefit of and be binding upon the respective owners of Parcel A and the remainder of Lot 7, Block 177 and their respective successors and assigns.

8. This Deed of Easement shall be construed in accordance with the laws of the State of New Jersey.

IN WITNESS WHEREOF, Grantor has caused this Deed of Easement to be executed as of the day and year first above written.

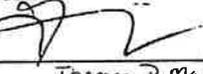
IN WITNESS WHEREOF, Grantor has caused this Deed of Easement to be executed as of the day and year first above written.

Witness:


Witness: Thomas P. McLaughlin


Witness: Thomas P. McLaughlin


Witness: Thomas P. McLaughlin

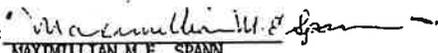

Witness: Thomas P. McLaughlin

GRANTOR:

By: 
RAYMOND P. VON COLIN

By: 
HENRY J. BRUCKER

By: 
MILTON H. KLAUSMANN

By: 
MAXIMILLIAN M.E. SPANN

PARCEL "A" AS REFERRED TO IN DEED OF EASEMENT BETWEEN
RAYMOND P. VON CULIN, HENRY J. BRUCKER, MILTON H. KLAUSMANN
AND MAXIMILLIAN M.E. SPANN AS GRANTOR AND JOHIL/SMC ASSOCIATES

TRACT 1, LOT 1, BLOCK 177 (formerly a part of Lot 7, Block 177)

BEGINNING at a point in the centerline of Allen Road, said point also being the beginning point described in a Deed from J. Everett Burnett to The American League for Physical Culture, said Deed being recorded in the Somerset County Clerk's Office in Deed Book S 22 at page 209 and from said point running the following courses and distances:

1. South 28° 07' 10" East, 59.39 feet to a point; thence,
2. South 28° 50' 20" West, 686.40 feet to a point; thence,
3. South 50° 39' 40" East, 1,194.27 feet to a point on the northerly right-of-way of I-78; thence
4. By the aforesaid right-of-way, South 77° 14' 36" West, 3.38 feet to a point; thence
5. Still by the aforesaid right-of-way, South 82° 09' 24" West, 961.18 feet to a point; thence
6. Leaving the aforesaid right-of-way by other lands of Spann, North 8° 06' 46" West, 1,131.95 feet to a point; thence
7. Still by said lands, North 6° 05' 50" West, 118.62 feet to a point in the title line of Allen Road; thence
8. By said title line, North 73° 02' 50" East, 67.10 feet to a point; thence
9. Still by the same, North 57° 17' 48" East, 526.55 feet to the point and place of Beginning.

CONTAINING 15.0000 acres within said bounds.

EXHIBIT 1

ACCESS ROAD EASEMENT

ALL THAT CERTAIN lot, piece and parcel of land situate in Bernards Township, Somerset County, State of New Jersey, described in accordance with and as shown on a certain Plan #8707, Sheet 1, dated December 21, 1982, prepared by SMC Martin Inc., Consulting Engineers and Land Surveyors, King of Prussia, PA, as follows to wit:

BEGINNING at a point on the southerly proposed right-of-way of Allen Road (70 feet wide), said point being located from a point of intersection with the proposed southerly right-of-way of Allen Road and the boundary lines of now or late English Farms Association and now or late M. Spann et al., along a curve to the left having a radius of 635.00 feet, the arc distance of 78.70 feet having a chord bearing of S 79° 38' 18" E, 78.65 feet; thence from said point of beginning through Lot #2 as shown on said plan by a curve to the right having a radius of 30.00 feet, the arc distance of 43.96 feet to a point of tangency; thence still through same S 0° 46' 08" W, 268.69 feet to a point; thence still through same S 89° 13' 52" E, 185.00 feet to a point of curvature; thence still through same by a curve to the left having a radius of 620.00 feet, the arc distance of 150.37 feet to a point on line with Lot #1 on said plan; thence by same N 8° 06' 46" E, 80.35 feet to a point;

thence through Lot #2, the following five courses and distances:
1) by a curve to the right having a radius of 540.00 feet,
curve, the arc distance of 137.99 feet to a point of tangency,
2) N 89° 13' 52" W, 75.00 feet to a point of curvature, 3) by a
curve to the right having a radius of 30.00 feet, the arc dis-
tance of 47.12 feet to a point of tangency, 4) N 0° 46' 08" E,
158.69 feet to a point of curvature, 5) by a curve to the right
having a radius of 30.00 feet, the arc distance of 43.96 feet to
a point on the proposed southerly right-of-way of Allen Road;
thence along said right-of-way by a curve to the right having a
radius of 635.00 feet, the arc distance of 133.93 feet to the
point and place of beginning.

CONTAINING 1.0118 acres more or less and being a portion of
Lot 2 in Block 177 as shown on the tax map of the Township of
Bernards.

RECORDED

AUG 5 2 14 PM '83

STATE OF NEW JERSEY)
) ss.:
COUNTY OF SOMERSET)

SOMERSET COUNTY
C. R. OLSON, CLERK

I CERTIFY that on August 3, 1983, Raymond P. Von Culin, Henry J. Brucker, Milton H. Klausmann and Maximillian M.E. Spann personally came before me and acknowledged under oath, to my satisfaction, that they are named in and personally signed this document; and that they signed, sealed and delivered this document as their act and deed.


Thomas P. McLaughlin, Esq.
Attorney-at-Law
State of New Jersey

Record & Return to:

Chicago Title Insurance Company
60 Evergreen Place
East Orange, New Jersey 07018
8228-20091/jg

BOOK 1485 PAGE 224

-6-

END OF DOCUMENT

12664

DEED OF EASEMENT

This Deed of Easement made this 3rd day of August, 1983, by Johil/SMC Associates, a limited partnership organized and existing under the laws of the State of New Jersey, having a place of business c/o Joseph Hilton & Associates Incorporated, 630 Fifth Avenue, New York, New York 10111, the "Grantor", to Raymond P. Von Culin, Henry J. Brucker, Milton H. Klausmann and Maximilian H.E. Spann, each having an office c/o Max E. Spann, Inc., U.S. Highway No. 202-206, Pluckemin, New Jersey 07978, the "Grantee".

COUNTY OF SOMERSET	
CONSIDERATION	7000
REALTY TRANSFER FEE	1000
DATE	8/5/83 BY [Signature]

W I T N E S S E T H:

WHEREAS, Grantor is the owner of Lot 1, Block 177 to be shown on the Tax Map of the Township of Bernards, County of Somerset, State of New Jersey, ("Parcel A") and now a part of Lot 7, Block 177; and

WHEREAS, Grantee is the owner of Lot 2, Block 177, to be shown on the Tax Map of the Township of Bernards, County of Somerset, State of New Jersey, ("Parcel B") and now a part of Lot 7, Block 177; and

WHEREAS, Grantor is about to construct an office building on Parcel A; and

WHEREAS, the municipality has required the creation over Parcel A and Parcel B of a single roadway system to provide for

Prepared By:
Wolff & Samson, P.A.

8/5/83


Edward S. Radzely, Esq.
Attorney-at-law of New Jersey

ingress to and egress from Parcel A and Parcel B onto Allen Road; and

WHEREAS, in order to effectuate the common ingress and egress roadway system hereinabove described, Grantor has agreed to grant to Grantee, as the owner of Parcel B, a non-exclusive easement over that portion of Parcel A hereinafter described, for the purpose of providing ingress to and egress from Parcel B onto Allen Road in exchange for Grantee granting a similar easement to Grantor over a portion of Parcel B.

NOW, THEREFORE, in consideration of the premises and the mutual easement to be granted by separate document by Grantee to Grantor, Grantor hereby grants the following described easement subject to the terms and conditions set forth herein:

1. Grantor as the owner of Parcel A hereby grants to Grantee as the owner of Parcel B a non-exclusive easement over that portion of Parcel A described on Exhibit 1 ("Easement Area") annexed hereto and made a part hereof for the purpose of ingress to and egress from Parcel B onto Allen Road.

2. The easement created hereby shall be subject to the following; (a) any state of facts which a physical inspection and accurate survey of the Easement Area would disclose; and (b) existing rights and easements for public roadways, utilities, water and sewer mains, pipelines and telephone easements, if any, located in the Easement Area.

3. Until such time as Grantee shall develop all or any portion of Parcel B and commences to utilize the Easement Area, Grantor as the owner of Parcel A agrees, at its sole cost and expense to maintain the Easement Area, including, but not limited to the landscaping and roadway surface. At such time Grantee develops Parcel B and commences to utilize the Easement Area, Grantee agrees, as the owner of Parcel B to share the cost of maintaining the Easement Area, including taxes and assessments applicable to the Easement Area, with Grantor on a pro-rata basis, based upon the following fraction; total square footage constructed on Parcel B divided by total square footage constructed on Parcel A and Parcel B.

4. In the event that in connection with the development of Parcel B, Grantee shall desire or be required to widen the roadway initially to be installed by Grantor, Grantee agrees to restore and repair, including the landscaping, where applicable, any portion of the Easement Area which may be damaged in connection with Grantee's utilization of the Easement Area.

5. The provisions of this Deed of Easement may be abrogated, modified or amended in whole or in part, by the then current owners of Parcel A and Parcel B, respectively; it being expressly intended hereby that the consent of any of the tenants or other occupants of Parcel A and/or Parcel B to such abrogation, modification or amendment shall not be required.

6. Nothing contained herein is intended to nor shall be construed as creating any right in or for the benefit of the

EXHIBIT 1

ACCESS ROAD EASEMENT

ALL THAT CERTAIN lot, piece and parcel of land situate in Bernards Township, Somerset County, State of New Jersey, described in accordance with and as shown on a certain Plan #8707, Sheet 1, dated December 21, 1982, prepared by SMC Martin, Inc., Consulting Engineers and Land Surveyors, King of Prussia, PA, as follows to wit:

BEGINNING at an interior point dividing Lots #1 and #2 on said plan which point is located the following two courses and distances from the proposed southerly right-of-way line of Allen Road at its intersection with the boundary lines of Lots #1 and #2: 1) S 6° 05' 50" E, 42.14 feet to a point; 2) S 8° 06' 46" E, 206.76 feet to a point on the northerly side of said easement; thence from said point of beginning through Lot #1 by a curve to the left having a radius of 540.00 feet the arc distance of 141.70 feet the chord bearing of N 68° 36' 37" E, 141.30 feet to a point of tangency; thence N 61° 05' 34" E, 121.53 feet to a point on line with lands of Charles H. Pinsan; thence along said lands S 28° 51' 20" W, 149.86 feet to a point thence through said Lot #1 by a curve to the right having a radius of 620.00 feet, the arc distance of 165.55 feet having a chord bearing S 69° 13' 25" W, 165.06 feet to a point on line with Lot #2;

thence along Lot #2, N 8° 06' 46" W, 80.35 feet to the point and
place of beginning.

CONTAINING 0.3937 acres more or less and being a portion of
Lot 1 in Block 177, as shown on the tax map of the Township of
Bernards.

Record & Return to:
Chicago Title Insurance Company
60 Evergreen Place
East Orange, New Jersey 07018
8228-20091/jg

general public nor shall this instrument be construed as a grant for any public purpose other than as set forth herein.

7. This agreement shall inure to the benefit of and binding upon the respective owners of Parcel A and Parcel B and their respective successors and assigns.

8. This Deed of Easement shall be construed in accordance with the laws of the State of New Jersey.

IN WITNESS WHEREOF, Grantor has caused this Deed of Easement to be executed as of the day and year first above written.

WITNESS:

GRANTOR:
JOHIL/SMC ASSOCIATES


Edward S. Radzely

By: 
Joseph Hilton, Partner

STATE OF NEW JERSEY)
COUNTY OF *Essex*) SS.:

I CERTIFY that on August 3, 1983, JOSEPH HILTON, the authorized general partner of Johil/SMC Associates personally came before me and acknowledged under oath, to my satisfaction, that he is named in and personally signed this document; and that he signed, sealed and delivered this document as the act and deed of Johil/SMC Associates.

RECORDED

AUG 5 2 15 PM '83
SOMERSET COUNTY
L. R. OLSON, CLERK


Edward S. Radzely
Attorney at Law of New Jersey

22962 ✓

DEED

This Deed is made on *November 15*, 19 *84*

BETWEEN

LIBERTY HILL ASSOCIATES, a New Jersey partnership, and Raymond P. Von Culin and Betty L. Von Culin, individually, Milton H. Klausmann and Florence H. Klausmann, individually, Maximillian M.E. Spann and Virgiene R. Spann, individually and Henry J. Brucker and Elizabeth E. Brucker, individually

whose address is/o Seal Spout, Allen Road, Liberty Corner, N.J. 07938 referred to as the Grantor.

AND

BIGELOW-QUINLAN PROPERTIES, a New Jersey partnership

whose post office address is 41 Schoolhouse Lane, Morristown, N.J. 07960 referred to as the Grantee.

The words "Grantor" and "Grantee" shall mean all Grantors and all Grantees listed above.

Transfer of Ownership. The Grantor grants and conveys (transfers ownership of) the property described below to the Grantee. This transfer is made for the sum of **FOUR MILLION DOLLARS AND NO CENTS (\$4,000,000.00)**

The Grantor acknowledges receipt of this money.

Tax Map Reference. (N.J.S.A. 46:15-2.1) Municipality of Township of Bernards
Block No. 177 Lot No. 7.02, 10, & 14 Account No.

No property tax identification number is available on the date of this deed. (Check box if applicable.)

Property. The property consists of the land and all the buildings and structures on the land in the Township of Bernards and State of New Jersey. The legal description is:

As described on the attached Schedule A.

As To Lot 7.02

Being the same Property conveyed to Liberty Hill Associates, a New Jersey partnership, by deed from Raymond P. Von Culin, Henry J. Brucker, Milton H. Klausmann and Maximillian M.E. Spann dated August 8, 1983, recorded August 12, 1983 in the Somerset County Clerk's Office in Book 1485 of Deeds as page 667, and by Deed from Raymond P. Von Culin, Henry J. Brucker, Milton H. Klausmann and Maximillian M.E. Spann, and about to be recorded prior to the within Deed.

As To Lots 10 & 14

Being the same Property conveyed to Maximillian M. E. Spann, Milton H. Klausmann, Henry J. Brucker and Raymond P. Von Culin, by Deed from Andrew J. Hompesch and Elizabeth A. Hompesch, his wife, dated November 9, 1971, recorded November 11, 1971 in the Somerset County Clerk's Office in Book 1250 of Deeds at page 872.

COUNTY OF SOMERSET
CONSIDERATION \$4,000,000.00
REALTY TAXES \$15,000.00
DATE 11/15/84 BY [Signature]

Prepared by *[Signature]*
Thomas P. McLaughlin, Esq.

SCHEDULE A

TRACT I: BEGINNING at a point where the easterly side of lands now or formerly of George W. Hoffman and Sons intersects the northerly line of New Jersey State Highway Route No. 78; thence running

- (1) North $3^{\circ}39'10''$ West 72.40 feet to lands of Public Service Electric and Gas Company; thence
- (2) along said lands of Public Service Electric and Gas Company right of way North $55^{\circ}20'40''$ East 271.13 feet; thence
- (3) South $56^{\circ}22'10''$ East 412.96 feet to the northerly side of New Jersey State Highway Route No. 78; thence
- (4) Along said side of New Jersey State Highway Route No. 78 North $89^{\circ}43'10''$ West 562.57 feet to the point and place of Beginning.

TRACT II: BEGINNING at an iron pipe which marks the southeasterly corner of lands now or formerly of Theodore English, and the northeasterly corner of lands now or formerly of George W. Hoffman and Sons; thence running

- (1) South $56^{\circ}22'10''$ East 130.86 feet to lands of Public Service Electric and Gas Company right of way; thence
- (2) Along said lands of Public Service Electric and Gas Company right of way South $55^{\circ}20'40''$ West 121.33 feet to the lands now or formerly of George W. Hoffman and Sons; thence
- (3) Along the side of said last mentioned lands North $3^{\circ}39'10''$ West 141.56 feet to the point and place of Beginning.

TRACT III:

BEGINNING at a point in the center line of Allen Road, said point being the beginning point described in a Deed from J. Everett Burnett to The American League for Physical Culture, said Deed being recorded in the Somerset County Clerk's Office in Deed Book S 22 at page 209 and from said point running the following courses and distances:

- A) Along the original center line of Allen Road (33 feet wide, South $57^{\circ}17'48''$ West, 526.55 feet to a point; thence
- B) Still along the original center line of Allen Road, South $73^{\circ}02'50''$ West, 67.10 feet to the true point and place of Beginning and from said point running the following courses and distances:
 1. South $6^{\circ}05'50''$ East, 118.62 feet to a point; thence
 2. South $8^{\circ}06'46''$ East, 1131.95 feet to a point; thence
 3. South $82^{\circ}09'24''$ West 39.83 feet to a point; thence
 4. South $86^{\circ}38'33''$ West, 300.17 feet to a point; thence
 5. South $88^{\circ}36'44''$ West 302.03 feet to a point; thence
 6. South $79^{\circ}45'49''$ West 577.17 feet to a point; thence
 7. North $89^{\circ}43'10''$ West 154.30 feet to a point; thence
 8. North $36^{\circ}22'10''$ West, 705.40 feet to a point; thence
 9. North $11^{\circ}04'18''$ West 245.30 feet to a point; thence
 10. North $66^{\circ}42'20''$ East 1755.60 feet to a point; thence
 11. South $68^{\circ}17'10''$ East 52.82 feet to a point; thence
 12. North $73^{\circ}02'50''$ East, 171.30 feet to the point and place of Beginning.

(cont'd)

The within conveyance also includes that certain 50' right-of-way access between Tract I and Tract II as described in Deed Book R-21, Page 263, and Deed Book S-21, Page 435 in the Somerset County Clerk's Office, being fifty(50) feet in width and the side lines thereof being parallel and equidistant twenty-five (25) feet from the center line thereof; the said center line being described as follows:

BEGINNING at a point in the second course of the above described tract, distant therein south 55 degrees 06 minutes west 117.12 feet from a point in the dividing line between lands of Adam Masionis and lands now or formerly of J. Everett Burnett; running thence (1) north 41 degrees 25 minutes west 75.49 feet to a point in the center line of Public Service Electric and Gas Company's Roseland-Lambertville Transmission Line Right of Way, said point being distant 95.65 feet measured southwesterly along said center line from a point in the dividing line between lands of Adam Masionis and lands now or formerly of J. Everett Burnett; thence (2) north 50 degrees 48 minutes west 45 feet to a point; thence (3) north 75 degrees 51 minutes west 41.99 feet to a point in the fourth course of the above described tract, distant therein northeasterly 15.86 feet from a point in the dividing line between lands of Adam Masionis and lands now or formerly of Frank J. Fetzner, Jr., which said crossing is to be used and enjoyed for crossing purposes for pedestrian and vehicular traffic.

Also included in the conveyance herein are the rights of the Grantor under that certain Deed of Easement dated August 3, 1983 from Johill/SMC Associates, a limited partnership to Raymond P. Von Culin, Henry J. Brucker, Milton H. Klausmann and Maximillian M.E. Spann, which was recorded in the Somerset County Clerk's Office on August 5, 1983 in Deed Book 1485 at page 225 et seq.

STATE OF NEW JERSEY, COUNTY OF *Somerset* SS.:

I CERTIFY that on November *15th*, 19 *84*.

Maximillian M.E. Spann and Virgiene R. Spann

personally came before me and acknowledged under oath, to my satisfaction, that this person (or if more than one, each person):

- (a) is named in and personally signed the attached Deed;
- (b) signed, sealed and delivered this Deed as his or her act and deed; and
- (c) made this Deed for \$ 4,000,000.00 as the full and actual consideration paid or to be paid for the transfer of title. (Such consideration is defined in N.J.S.A. 46:15-5.)

Prepared by:

Marguerite J. Baranowski
(Print name and title below signature)
 Notary Public MARGUERITE J. BARANOWSKI
 NOTARY PUBLIC OF NEW JERSEY
 My Commission Expires June 8, 1989

N.J.S.A. 46:15-13 (Print signer's name below signature)

Promises by Grantor. The Grantor promises that the Grantor has done no act to encumber the property. This promise is called a "covenant as to grantor's acts" (N.J.S.A. 46:4-6). This promise means that the Grantor has not allowed anyone else to obtain any legal rights which affect the property (such as by making a mortgage or allowing a judgment to be entered against the Grantor).

Signatures. The Grantor signs this Deed as of the date at the top of the first page.

Witnessed by:

Thomas P. McLaughlin
 Thomas P. McLaughlin, Esq. - as to
 Raymond P. Von Culin, Milton H. Klausmann,
 Henry J. Brucker, Betty L. Von Culin, Florence H. Klausmann and Elizabeth E. Brucker

Marguerite J. Baranowski
 as to Maximillian M.E. Spann and
 Virgiene R. Spann

LIBERTY HILL ASSOCIATES, a New Jersey partnership
 By Raymond P. Von Culin, partner & individually
 By Milton H. Klausmann, partner & individually
 By Maximillian M.E. Spann, partner & individually
 By Henry J. Brucker, partner & individually
 Betty L. Von Culin, individually
 Florence H. Klausmann, individually
 Virgiene R. Spann,
 Elizabeth E. Brucker

STATE OF NEW JERSEY, COUNTY OF *Somerset*

I CERTIFY that on *Nov 15*, 19 *84*.

Raymond P. Von Culin, Milton H. Klausmann, Henry J. Brucker, Betty L. Von Culin, Florence H. Klausmann and Elizabeth E. Brucker personally came before me and acknowledged under oath, to my satisfaction, that this person (or if more than one, each person):

- (a) is named in and personally signed this Deed;
- (b) signed, sealed and delivered this Deed as his or her act and deed; and
- (c) made this Deed for \$ 4,000,000.00 as the full and actual consideration paid or to be paid for the transfer of title. (Such consideration is defined in N.J.S.A. 46:15-5.)

Prepared by:

Thomas P. McLaughlin
(Print name and title below signature)
 Thomas P. McLaughlin
 SOMERSET COUNTY Attorney at Law of New Jersey
 L.R. OLSON, CLERK

N.J.S.A. 46:15-13 (Print signer's name below signature)

BOOK *1523* PAGE *112*

END OF DOCUMENT

Prepared by: *Timothy J. [Signature]*
Law

RECORDED
APR 24 2 33 PM '87
SOMERSET COUNTY
R.P. CLERK

21394 . DECLARATION OF EASEMENT

THIS DECLARATION OF EASEMENT, made as of the _____ day of September in the year One Thousand Nine Hundred Eight Six (1986) by the JOHIL/SMC ASSOCIATES, a New Jersey limited partnership having a place of business c/o Joseph Hilton and Associates Incorporated, 444 Madison Avenue, New York, New York 10022, hereinafter referred to as "Grantor", to BIGELOW QUINLAN PROPERTIES, a New Jersey general partnership having an office at 90 East Halsey Rd., Parsippany, New Jersey 07054, hereinafter referred to as "Grantee":

COUNTY OF SOMERSET
CONSIDERATION \$29,860.00
REALTY TRANSFER TAX \$1,194.60
DATE 4-24-87 BY [Signature]

WITNESSETH THAT, for the sum of Twentynine thousand, eight hundred and sixty (\$29,860.00) DOLLARS the Grantor does hereby grant and convey unto the said Grantee, its successors and assigns, forever, a continuous and perpetual non-exclusive right-of-way and easement through, upon and under the Easement Area (as hereinafter defined) for one or more subsurface pipe lines for sanitary sewers and all necessary surface and subsurface appurtenances, subject to the limitations with respect to surface structures hereinafter set forth; the perpetual right to establish, construct, reconstruct, improve, operate, maintain, inspect, protect and repair one or more subsurface pipe lines for sanitary sewers and all necessary surface and subsurface appurtenances within the Easement Area; the perpetual right to do within the Easement Area all that may be necessary for the construction, reconstruction, replacement,

090286
7997/44831
2373-009CRH
RECORDED IN DEED
BOOK 1630 PAGE 621

extension, improvement, betterment, maintenance, inspection, protection, operation and use of one or more subsurface pipe lines for sanitary sewers and all necessary surface and subsurface appurtenances as a part of a sanitary sewerage system to be constructed within the Easement Area, including all incidental rights to protect and preserve installed lines and appurtenances, including but not limited to the right of subjacent lateral support, but only to the extent, if any, required by law; the right to construct and maintain rip rap at stream crossings within the Easement Area and at other places within the Easement Area where such protection may be required to protect installed lines and appurtenances from erosion; the right to reasonably limit loads traversing or bearing upon the surface of the Easement Area to protect the installed lines and appurtenances from stress or damage due to weight, shock, vibration or other similar phenomena; the right to construct and maintain requisite surface and subsurface appurtenances and to take any action that may be reasonably necessary to protect the installed sanitary sewer lines from infiltration, provided, however, that no structure of any kind, including manholes, shall be constructed by Grantee on or above the surface of the Easement Area and all structures or appurtenances shall be flush with the current grade; the perpetual right to use the Easement Area for the purposes aforesaid and remove all buildings, structures and obstructions of whatever kind or character now or hereafter found on or within the Easement Area and also

the perpetual right of free and unobstructed access thereto and use and possession thereof with all manner of persons, machinery, supplies, materials and equipment for the accomplishment of any and all of the foregoing purposes within the Easement Area,

Together with an easement through, under and upon the Construction Area (as hereinafter defined) for the purpose of constructing the sanitary sewer facility to be placed in the Easement Area, including the right for various persons, equipment, supplies and machinery to enter upon and operate in the Construction Area and to take all actions reasonably necessary to facilitate the placement of a sanitary sewer facility in the Easement Area as aforesaid. This grant of access to the Construction Area shall continue until such time as the sanitary sewer facilities have been completed and the condition of the property restored as set forth below, upon which date this Construction Area easement shall terminate and become void. The termination of this Construction Area easement shall have no affect on the grant of right-of-way and easement upon the Easement Area, as described herein. The Construction Area is part of Lot 7.01 in Block 177 on the Tax Map of the Township of Bernards and is more particularly described on Schedule B attached hereto and made a part hereof.

The Easement Area subject to this Declaration of Easement is as follows:

All that certain strip of land located in the Township of Bernards, in the County of Somerset and State of New Jersey, embracing part of Lot 7.01 in Block 177 on the Tax Map of the Township of Bernards, which is more particularly described on Schedule A attached hereto and made a part hereof. Reserving unto the Grantor, its successors, heirs and assigns, forever, the right to use the surface of the Easement Area for any lawful purposes which do not damage or interfere in any way with the Grantee's lawful enjoyment of the permanent non-exclusive easements and rights-of-way created by this Easement Deed, including the right to plant, maintain, and replace trees, shrubs, sod and grass, and the right to construct, maintain and use and to grant others the perpetual non-exclusive easement and right to construct, maintain and use utility lines and facilities, driveway crossings, roadways, paved or unpaved parking lots, and signs, and other similar occupations and encroachments on, across, under and over the Easement Area, provided that any occupation and/or encroachment is made in a good and professional manner, does not interfere with the proper functioning of the sewer system, and is in accordance with the laws, rules, conditions and regulations of any federal, state, county, municipal or other governmental regulatory body having jurisdiction over the matter.

TO HAVE AND TO HOLD unto Grantee and its successors and assigns, for the uses and purposes aforesaid, forever.

By acceptance of this grant the Grantee covenants for the duration of the easements above set forth and with respect to the easements above set forth that:

1. Grantee shall construct and maintain the sewer facilities in conformity with all applicable laws, ordinances and regulations of all federal, state, county and other governmental regulatory bodies having jurisdiction over the matter, and shall construct and maintain the sewer facilities at all times within the Easement Area.

2. Grantee and its respective agents, employees and contractors, as soon as reasonably possible after construction of the sanitary sewer facilities and after all subsequent maintenance and replacement thereof, shall at Grantee's expense, restore the Easement Area and the Construction Area to its prior condition including the filling of all holes and trenches and removal of all debris, it being understood that complete tree restoration shall not be required.

3. Grantee shall use and shall cause its agents, employees, contractors, and suppliers to use reasonable care in the exercise of the rights granted to Grantee herein, and in exercising its rights hereunder, shall preserve and shall cause its agents, employees and contractors to preserve the maximum number of trees which can reasonably be preserved in the Easement Area and the Construction Area. If in the exercise of the easements granted hereunder, it becomes necessary for

Grantee to remove trees from the Easement Area or the Construction Area, Grantee shall remove or cause to be removed any trunks, branches, or other debris caused by such activity from the Easement Area or the Construction Area.

4. Grantee shall indemnify and hold harmless Grantor from and against any and all losses, claims, damages and expenses (including without limitation, costs, claims and actions for personal injury, property damages or death and attorneys fees) relating to or arising from the exercise of the easement rights herein granted by Grantee, or by its agents, employees, contractors, and suppliers.

5. For so long as Grantee shall use the Easement Area, Grantee shall maintain reasonable public liability and property damage insurance with respect to the Easement Area and upon request, Grantor shall be named as an additional insured thereunder. Grantee shall have the right to maintain such insurance under a blanket policy or policies.

6. Grantor shall have direct access to and use of the sanitary sewer facilities and the right to connect to the sanitary sewer facilities free of charge or cost or reimbursement to Grantee or any other party for the cost of installing, constructing, maintaining, and repairing the sanitary sewer facilities, except for the then current on-line charges (i.e., that rate charged to all users of sewer lines that are already constructed and in place) and charges for the actual hook-up con-

nection to the sanitary sewer facilities. Such access, use and right to connect to the sewer facilities shall be for the benefit of that entire area of land owned by Grantor, said lands constituting approximately 15 acres and being Lot 7.01 in Block 177 as shown on the Tax Map of the Township of Bernards.

7. If at any time the maintenance of the sanitary sewer facilities in the Easement Area or the location of Easement Area shall, in Grantor's judgment, interfere with Grantor's development of any lands now owned by Grantor in Bernards Township, Grantee shall upon request of Grantor, and at the sole cost and expense of Grantor, relocate the Easement Area and the sanitary sewer pipe lines therein to such other locations as Grantor shall reasonably direct and which Grantee reasonably deems satisfactory for the purpose of maintaining Grantee's sanitary sewer facilities. Any relocation shall not interfere with the proper functioning of the sewer system and shall additionally be in accordance with the laws, rules, conditions and regulations of any federal, state, county, municipal or other governmental regulatory body having jurisdiction over the matter. The cost of obtaining any approvals to relocate the sewer system as provided for herein shall also be at the sole cost and expense of Grantor.

8. If Grantee discontinues the use of the Easement Area for three (3) consecutive years, the Easements set forth

in this Agreement shall be deemed abandoned by Grantee and this Agreement shall become null and void, and Grantee shall comply with any requirements of any federal, state, county, municipal or other governmental regulatory body applicable to the Grantee's discontinuance of use of any facilities then located within the Easement Area, shall remove any facilities then located within the Easement Area, and shall cap and seal off any structures or pipes belonging to or serving Grantor to which Grantee's facilities had been connected.

9. Grantee agrees that all sanitary sewer lines and other facilities will be placed sufficiently below the surface of the Easement Area so as to permit the paving of the Easement Area and the parking and movement of motor vehicles thereon without damaging or interfering with the existence and operation of Grantee's facilities, it being specifically understood that Grantor's right to pave over the Easement Area is specifically subject to the rights of Grantee as set forth in this Declaration of Easement, including but not limited to the right to reasonably limited loads traversing or bearing upon the surface of the Easement Area.

The Grantor covenants that:

1. Grantor is lawfully seized of the Easement Area and the Construction Area;

2. Grantor has the right to convey the within easements to the Grantee, without the necessity of obtaining any other consents; the signature of no other party(ies) is required to make this Easement Deed binding upon Grantor;

3. The Grantee shall have quiet possession of the Easement Area and the Construction Area free from all encumbrances except the encumbrances, restrictions, easements and agreements of public record on the date hereof and those permitted pursuant to this Easement Deed none of which will impair Grantee's ability to use the Easement Area or the Construction Area for the purposes and in the manner aforesaid;

4. The Grantor will warrant, subject as aforesaid, its title to the Easement Area and the Construction Area against any party claiming by or through Grantor, but not generally.

In all references herein to any parties, persons, entities or corporations, the use of any particular gender or the plural or singular number is intended to include the appropriate gender or number which the text of the within instrument may require.

Whenever in this instrument any party shall be designated or referred to by name or general reference, such designation is intended to and shall have the same effect as if the words "heirs, successors and assigns" were repeated each time.

Assignment of the rights under this Easement Deed by Grantee to the Bernards Township Sewerage Authority or to any other entity then operating or intending to operate the proposed sewerage system shall relieve Grantee of any and all obligations hereunder whether theretofor or thereafter arising.

IN WITNESS WHEREOF, the parties hereto have caused these presents to be duly executed as of the date first mentioned above.

Witness:

-- Johl/SMC Associates, a New Jersey limited partnership

Mary T. Collins

By: Joseph Hilton
JOSEPH HILTON, general partner

-- Bigelow Quinlan Properties, a New Jersey partnership

Attest:

By: "Kestral Realty Corporation, a partner

Chandler Bigelow
Secretary

By: Chandler Bigelow
Chandler Bigelow, Jr.,
President

Attest:

By: "Samos Corporation, a partner

Robert C. Quinlan
Secretary

By: Robert C. Quinlan
Robert C. Quinlan,
President

HL

Schedule A
PERMANENT SEWER EASEMENT (20' WIDE)

ALL that certain parcel of land situate in Bernards Township, Somerset County, New Jersey, more particularly described as follows:

BEGINNING at a point in the line dividing Lot 7.01 in Block 177 to the east from Lot 7.02 of said Block to the west, said point being 20.66 feet measured northerly along said dividing line from its intersection with the northerly line of Interstate Route 78; thence along said line N 8°06'46"W, 20.00 to a point; thence through said Lot 7.01 along the northerly side of the easement the following five (5) courses and distances:

- 1) N 82°45'19"E, 255.18 feet to a point;
- 2) N 49°46'38"E, 225.27 feet to a point;
- 3) N 84°02'27"E, 201.88 feet to a point;
- 4) S 80°49'50"E, 218.01 feet to a point;
- 5) N 85°16'49"E, 29.13 feet to a point in the line dividing the aforesaid Lot 7.01 to the west from Lot 4, Block 177 to the east; thence, along said dividing line S 50°39'40"E, 28.76 feet to a point;

thence, through the aforesaid Lot 7.01, parallel and 20 feet distant from the northerly side of the easement along the southerly side of the easement the following five (5) courses and distances:

- 1) S 85°16'49"W, 52.24 feet to a point;
- 2) N 80°49'50"W, 217.79 feet to a point;
- 3) S 84°02'27"W, 193.06 feet to a point;
- 4) S 49°46'38"W, 225.03 feet to a point;
- 5) S 82°45'19"W, 260.80 feet to the point of BEGINNING, being 18784 square feet or 0.431 acres, more or less

Schedule B

TEMPORARY CONSTRUCTION EASEMENT (40' WIDE)

All that certain parcel of land situate in Bernards Township, Somerset County, New Jersey, more particularly described as follows;

BEGINNING at a point in the line dividing Lot 7.01 in Block 177 to the east from Lot 7.02 of said Block to the west, said point being 10.66 feet measured northerly along said dividing line from its intersection with the northerly line of Interstate Route 78; thence, along said N 8°06'46"W, 40.00 feet to a point; thence through said Lot 7.01 the following five (5) courses and distances;

- 1) N 82°45'19"E, 252.37 feet to a point;
- 2) N 49°46'38"E, 239.23 feet to a point;
- 3) S 40°13'22"E, 40.00 feet to a point;
- 4) S 49°46'38"W, 251.07 feet to a point;
- 5) S 82°45'19"W, 263.60 feet to the point of BEGINNING, being 20125 square feet or 0.462 acres, more or less.

STATE OF NEW YORK)
COUNTY OF N.Y.)

BE IT REMEMBERED, that on this 3rd day of October,
1986, before me, the subscriber, a Notary Public of New York,
personally appeared, Joseph Hilton, a general partner in
Johil/SMC Associates, a New Jersey limited partnership, and
she/he thereupon acknowledged that she/he signed the foregoing
instrument on behalf of said partnership, as his/her voluntary
act and deed, and as and for the voluntary act and deed of said
partnership.



(Notarial Seal)

Sharon Ennis
A Notary Public of New York
My commission expires: 1989

SHARON ENNIS
Notary Public, State of New York
Qualified in Westchester County
Commission Expires March 30, 1989

BOOK 1630 PAGE 633

STATE OF NEW YORK)
COUNTY OF) SS.:

BE IT REMEMBERED, that on this 11th day of ~~September~~ February 1986, before me, the subscriber, a Notary Public of New York personally appeared Robert C. Quinlan, President of Samos Corporation, a New Jersey corporation, which is a general partner in Bigelow Quinlan Properties, a New Jersey general partnership, and he thereupon acknowledged that he signed the foregoing instrument as such officer, that the seal affixed to said instrument is the corporate seal of said corporation, and that said instrument is the voluntary act and deed of said corporation, made by virtue of authority from its Board of Directors, and as and for the voluntary act and deed of Bigelow Quinlan Properties, a New Jersey general partnership.



(NOTARIAL SEAL)

Robert A. Cohen

A Notary Public of New York
My commission expires:

ROBERT S. COHEN
Notary Public, State of New York
P.O. Box 22794
Qualified in Nassau County
Commission Expires March 3, 1988

BOOK 1630 PAGE 635

END OF DOCUMENT

IHW

Prepared by: *Robert Silverstein*
Robert Silverstein, Esq.

MODIFICATION OF DEEDS OF EASEMENT

COUNTY OF SOMERSET
CONSIDERATION 1.00
LEGISLATIVE FEE Exempt
DATE 2-10-96 BY SA

THIS MODIFICATION OF DEEDS OF EASEMENT is made as of this 13th day of February, 1996, by and among QUINLAN PROPERTIES, L.P., successor to Raymond P. Von Culin, Henry J. Brucker, Milton H. Klausmann, and Maximilian M.E. Span ("Quinlan") and BRUCE H. LEVITT, ESQ., Bankruptcy Trustee for JOHIL/SMC ASSOCIATES and having an address of 443 Northfield Avenue, West Orange, New Jersey 07052 ("Johil"). All capitalized terms used herein and not defined shall have the meanings ascribed to them in the Deeds of Easement (as defined herein).

WITNESSETH:

WHEREAS, Quinlan is the owner of Lots 7.02 and 7.03 which were formerly a portion of Lot 7, Block 177 as shown on the Tax Map of the Township of Bernards, County of Somerset, State of New Jersey; and

WHEREAS, Johil is the Owner of Lot 7.01, Block 177 as shown on the Tax Map of the Township of Bernards, County of Somerset, State of New Jersey; and

WHEREAS, pursuant to that certain Deed of Easement, dated August 3, 1983, recorded August 5, 1983 in Deed Book 1485, Page 216, in the Somerset County Clerk's Office (the "Quinlan Deed of Easement"), Quinlan's predecessor-in-interest granted to Johil a non-exclusive easement over a portion of Lots 7.02 and 7.03, Block 177 for the purpose of providing ingress to and egress from Lot 7.01, Block 177 onto Allen Road; and

BY THE COUNTY CLERK

142019A

EAR
GENERAL LAND ABSTRACT CO.
P. O. Box 327
Plainsboro, New Jersey 08536-0327
(609) 951-9500 (908) 287-3636

BK2047PG824

RECORDED IN DEED

142019A



WHEREAS, pursuant to that certain Deed of Easement, dated August 3, 1983, recorded August 5, 1983 in Deed Book 1485, Page 225, in the Somerset County Clerk's Office (the "Johil Deed of Easement"), Johil granted to Quinlan's predecessor-in-interest a non-exclusive easement over a portion of Lot 7.01, Block 177 for the purpose of providing ingress to and egress from Lots 7.02 and 7.03, Block 177 onto Allen Road (hereinafter the Johil Deed of Easement and the Quinlan Deed of Easement are sometimes collectively referred to as the "Deeds of Easement"); and

WHEREAS, the existing Deeds of Easements set forth the maintenance obligations for the easement areas located on both properties and provide a cost-sharing mechanism based on the proportionate square footage of the buildings developed or to be developed on the respective properties; and

WHEREAS, Quinlan and Johil desire to amend the Deeds of Easements to provide a revised allocation of maintenance obligations and to provide that, except as expressly provided herein, each party is to be responsible to pay the costs of its own respective maintenance obligations regardless of the square footage of the buildings developed or to be developed on their respective Properties; and

WHEREAS, Quinlan and Johil also desire by this Modification of Deeds of Easement (a) to confirm (i) the grant to Johil of a roadway easement over a portion of Lots 7.02 and 7.03 as set forth in the Quinlan Deed of Easement (and to correct the metes and bounds description of said easement), and (ii) the grant to Quinlan of a roadway easement over a portion of Lot 7.01 as set forth in the Johil Deed of easement and (b) to modify the Deeds of Easement as set forth herein;

NOW, THEREFORE, in consideration of the sum of One Dollar (\$1.00), and other valuable consideration, receipt of which is hereby acknowledged, the parties hereto mutually covenant and agree as follows:

1. Quinlan hereby confirms to Johil the grant to Johil of a perpetual non-exclusive driveway and right-of-way easement over a portion of Lots 7.02 and 7.03, Block 177 described in Exhibit A (the "Johil Easement Area"), attached hereto and made a part hereof (which description corrects and replaces the description set forth in Exhibit 1 to the Quinlan Deed of Easement), for the purpose of providing ingress to and egress from Lot 7.01, Block 177 onto and from Allen Road. In addition, Quinlan hereby grants to Johil a perpetual easement to install, utilize and maintain a directional/ identification sign at the location indicated on the survey attached hereto as Exhibit B and by this reference made a part hereof, which sign may identify Lot 7.01 as "140 Allen Road" as well as identify a single tenant which leases substantially all of the building located thereon and may include a directional arrow. The design of the sign shall be as depicted on Exhibit B-1 attached hereto and by this reference made a part hereof.

2. Johil hereby confirms to Quinlan the grant to Quinlan of a perpetual non-exclusive driveway and right of way easement over a portion of Lot 7.01, Block 177 described in Exhibit C (the "Quinlan Easement Area") attached hereto and made a part hereof for the purpose of providing ingress to and egress from Lots 7.02 and 7.03, Block 177 onto and from Allen Road (hereinafter the Johil Easement Area and the Quinlan Easement Area are sometimes collectively referred to as the "Easement Areas").

3. Paragraph 3 of the Quinlan Deed of Easement is hereby deleted and replaced with the following:

c:\egs\140\ln3.mde

- 3 -

BK2047PG826

"Grantor, as the owner of Lot 7 (now known as lots 7.02 and 7.03), Block 177, at Grantor's sole cost and expense, shall maintain and keep the Easement Area (exclusive of the portion of the Easement Area which is cross-hatched on Exhibit B to that certain Modification of Deeds of Easement between Grantor and Grantee dated February 13, 1996) unobstructed and in good condition and repair, including, without limitation, lighting, landscaping, roadway surfaces and removal of snow from roadway surfaces ("Maintenance Obligations"). In addition, Grantor shall pay real estate taxes and assessments affecting the Easement Area."

4. Paragraph 3 of the Johil Deed of Easement is hereby deleted and replaced with the following:

"Grantor, as the owner of Lots 7.01, Block 177, at Grantor's sole cost and expense, shall maintain and keep the Easement Area and the area on Lot 7.02, Block 177 which is cross-hatched on Exhibit B to that certain Modification of Deeds of Easement Between Grantor and Grantee dated February 13, 1996 unobstructed and in good condition and repair, including, without limitation, lighting, landscaping, roadway surfaces and removal of snow from roadway surfaces ("Maintenance Obligations"). In addition, Grantor shall pay real estate taxes and assessments affecting the Easement Area. All proposed changes to the lighting and landscaping on the area of Lot 7.02, Block 177 which is cross-hatched on Exhibit B shall be subject to the prior approval of Grantee, which approval shall be

granted or denied within seven (7) days of receipt by Grantee of a proposed landscaping and/or lighting plan by Grantor, except that the landscaping depicted on Exhibit D attached hereto is hereby approved by Grantee."

5. In the event that either Johil or Quinlan fails to perform any of its respective Maintenance Obligations within the periods set forth in this Paragraph 5 (said non-performing party being referred to as the "Defaulting Party") then, upon notice to the Defaulting Party, the other party (the "Curing Party") may perform those specific Maintenance Obligations of the Defaulting Party of which the Defaulting Party has received notice (as provided in this Paragraph 5) and which have not been performed within the periods set forth in this Paragraph 5 and the Defaulting Party shall reimburse the Curing Party for the reasonable cost of performing said Maintenance Obligations within ten (10) days of receipt of an invoice evidencing the same (together with reasonable supporting documentation).

(a) In the case of (i) repairs to conditions which do not interfere with daily ingress and egress and (ii) general upkeep and maintenance, the Curing Party shall be entitled to reimbursement if the Curing Party actually performs the obligations of the Defaulting Party that the Defaulting Party fails to perform within fifteen (15) business days after receipt of an initial notice from the Curing Party specifying the obligation(s) to be performed, provided, however, that a second notice, given no sooner than the expiration of the fifteen (15) business day period, has been delivered by the Curing Party to the Defaulting Party stating that the obligation(s) will be performed by the noticing party since the fifteen (15) day notice period expired and the condition was not remedied.

(b) In the case of snow removal or emergency repairs, the Curing Party shall be entitled to reimbursement if the Defaulting Party failed to perform such obligations in a time frame so that occupants of either property working on Mondays through Fridays (but excluding all days that are legal holidays in the State of New Jersey) and during hours no earlier than 8:00 a.m. and no later than 6:00 p.m. are delayed in their arrival or departure from the respective properties significantly in excess of the delays experienced by persons arriving or departing from other buildings in the general area of the properties hereby affected; provided, however, that the Curing Party notified the other party (by telephone or otherwise) prior to commencing such cure and was not provided with reasonable assurance (taking into account past performance, general weather conditions and other relevant factors) that the problem was in the process of being remedied as rapidly as reasonably possible under the then-existing conditions.

(c) Notwithstanding the preceding provisions of this Paragraph 5, (i) each party shall have the right, but not the obligation, at its sole cost and expense (i.e. without reimbursement) to perform any of the Maintenance Obligations of the other party upon reasonable notice to the other party (which, in the case of snow removal or emergency repairs may be telephonic), and (ii) to the extent that either party's use of the portion of the Easement Area which is the responsibility of the other party to maintain is in excess of the normal use of such portion of the Easement Area for general office purposes (i.e., such use includes truck or heavy vehicle access in excess of normal deliveries to a typical general office building of the size of the building in question or includes use of the Easement Area by construction vehicles) and such excess use results in increased Maintenance Obligations for the party responsible for maintaining the area that has been subject to excess use by the other party, the other party shall, within ten

(10) days after receiving an invoice therefor accompanied by reasonable supporting documentation, pay to the party responsible for maintaining the same the reasonable estimated increased cost of such party's Maintenance Obligations resulting from such excess use. The parties agree to cooperate and work in good faith to determine any amount to be reimbursed for excess use and agree that such amount is not likely to be exact, but will, in most instances, have to be a good faith estimate of such increased Maintenance Obligations.

(d) In the event that Johil fails to maintain the sign referred to in Paragraph 1 so that the condition of the sign becomes deteriorated and unsightly, and Johil fails to perform the corrective maintenance within thirty (30) days after receipt of an initial notice from Quinlan specifying the maintenance obligation to be performed, then Quinlan may remove the sign, provided, however, that a second notice given no sooner than the expiration of the thirty (30) day period has been delivered by Quinlan to Johil stating that the sign will be removed since the thirty (30) day notice period has expired and the condition was not remedied. If Quinlan removes the sign pursuant to this paragraph, Johil will nevertheless have the right to reinstall a sign meeting the requirements of Paragraph 1 which is in proper condition.

(e) Each party hereby agrees to indemnify and defend the other party and hold the other party harmless from and against all claims, suits, causes of action, liabilities, costs and expenses of any nature whatsoever for property damage and bodily injury, arising out of, relating to or in connection with the entry by the indemnifying party onto the property of the other party in order to carry out the Maintenance Obligations of the other party (whether or not reimbursement for such performance is provided hereunder) and each party agrees to perform any Maintenance Obligations it undertakes on the other party's property (whether or not reimbursable

hereunder) in a good and workmanlike manner, free from negligence or defects of any kind. Each party hereby agrees to reimburse the other party for any damage to the other party's property caused by any such entry or by the performance by such party of Maintenance Obligations on the other party's property (whether or not reimbursement for such performance is provided hereunder).

(f) Prior to performing any maintenance or improvements in the Johil Easement Area, Johil shall provide Quinlan with evidence of liability and property insurance covering such activities in amounts reasonably acceptable to Quinlan and naming Quinlan as an additional insured.

6. Quinlan and Johil acknowledge and agree that as of the date of this Modification of Deeds of Easement, all obligations with respect to the sharing of costs of the maintenance of the Easement Areas and payment of assessments and real estate taxes to be made pursuant to the Deeds of Easement have been satisfied in full and neither party hereto has any further liability for the payment of same in the future except as expressly set forth herein nor do any other existing state of facts permit the other party to claim that there is a violation or breach of the existing Deeds of Easements.

7. The Deeds of easement, as expressly modified by this Modification of Deeds of Easement, are hereby ratified and affirmed.

8. The Modification of Deeds of Easement shall be recorded in the Clerk's Office of Somerset County, shall be binding on and inure to the benefit of the parties hereto and their respective successors and assigns and shall run with the land.

9. Each party hereto represents to the other that any existing mortgagees having a mortgage encumbering the property that is the subject of this Agreement and is owned by such party has consented to this Modification of Deeds of Easement, a copy of which consent is to be recorded with this document.

10. This Modification of Deeds of Easement may be executed in counterparts, each of which shall constitute an original notwithstanding that each party shall not have executed the same counterpart.

IN WITNESS WHEREOF, the parties hereto have executed this Modification of Deeds of Easement as of the date first above written.

WITNESS:

• • QUINLAN PROPERTIES, L.P.
• • By: Samos Corporation

By: _____
Name:
Its:

Bruce H. Levitt

By: *B-H Levitt*
• • BRUCE H. LEVITT, as
Bankruptcy Trustee for
• • JOHIL/SMC ASSOCIATES

9. Each party hereto represents to the other that any existing mortgagees having a mortgage encumbering the property that is the subject of this Agreement and is owned by such party has consented to this Modification of Deeds of Easement, a copy of which consent is to be recorded with this document.

10. This Modification of Deeds of Easement may be executed in counterparts, each of which shall constitute an original notwithstanding that each party shall not have executed the same counterpart.

IN WITNESS WHEREOF, the parties hereto have executed this Modification of Deeds of Easement as of the date first above written.

WITNESS:

Marilyn Debra

QUINLAN PROPERTIES, L.P.

By: Samos Corporation

By: Robert C. Quinlan
Name: Robert C. Quinlan
Its: President

By: _____

BRUCE H. LEVITT, as
Bankruptcy Trustee for
JOHIL/SMC ASSOCIATES

Exhibit A

ACCESS ROAD EASEMENT
LOT 7.02, BLOCK 177
TOWNSHIP OF BERNARDS, SOMERSET COUNTY, NEW JERSEY

All that certain lot, tract or parcel of land and premise situate, lying and being in Township of Bernards, County of Somerset, and State of New Jersey, being more particularly described as follows.

Beginning at a point on the southerly right-of-way of Allen Road (70' wide), said point being located a distance of 317.73' from an iron pin at the most northwesterly corner of Lot 7.01, Block 177, as shown on the current tax map of Bernards Township and from said point running:

- Thence 1) from said point of beginning on a curve to the right, said curve having a radius of thirty and zero hundredths feet (30.00'), the arc distance of forty-three and ninety-six hundredths feet (43.96') to a point of tangency;
- Thence 2) S00°46'08"W, a distance of two hundred sixty-eight and sixty-nine hundredths feet (268.69');
- Thence 3) S89°13'52"E, a distance of one hundred eighty-five and zero hundredths feet (185.00') to a point of curvature;
- Thence 4) a curve to the left having a radius of six hundred twenty and zero hundredths feet (620.00') and an arc distance of one hundred forty-one and eight hundredths feet (141.08');
- Thence 5) S30°55'54"E, a distance of twenty-three and eighty-seven hundredths feet (23.87') to the line of said Lot 7.01, Block 177;
- Thence 6) along said line N08°06'46"E, a distance of one hundred three and ten hundredths feet (103.10');
- Thence 7) a curve to the right having a radius of five hundred forty and zero hundredths feet (540.00') and an arc distance of one hundred thirty-seven and ninety-nine hundredths feet (137.99') to a point of tangency;
- Thence 8) N89°13'52"W, a distance of seventy-five and zero hundredths feet (75.00') to a point of curvature;
- Thence 9) a curve to the right having a radius of thirty and zero hundredths feet (30.00') and an arc distance of forty-seven and twelve hundredths feet (47.12') to a point of tangency;
- Thence 10) N00°46'08"E, a distance of one hundred fifty-eight and sixty-nine hundredths feet (158.69') to a point of curvature;
- Thence 11) A curve to the right having a radius of thirty and zero hundredths feet (30.00') and an arc distance of forty-three and ninety-six hundredths feet (43.96') to a point on the proposed southerly right-of-way of Allen Road;
- Thence 12) along said right-of-way by a curve to the right having a radius of six hundred thirty-five and zero hundredths feet (635.00') and an arc distance of one hundred thirty-three and ninety-three feet (133.93') to the Point and Place Beginning.

Containing 44,000 square feet or 1.017 acres of land more or less

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As shown on a "Access Road Easement, Lot 7.02, Block 177, Township of Bernards
Somerset County, New Jersey," as prepared by Donald H. Stires Associates, 43 West High
Street, Somerville, New Jersey 08876, dated November 20, 1995.

Richard C. Mathews

Richard C. Mathews
New Jersey Professional Land Surveyor
License No. 29353

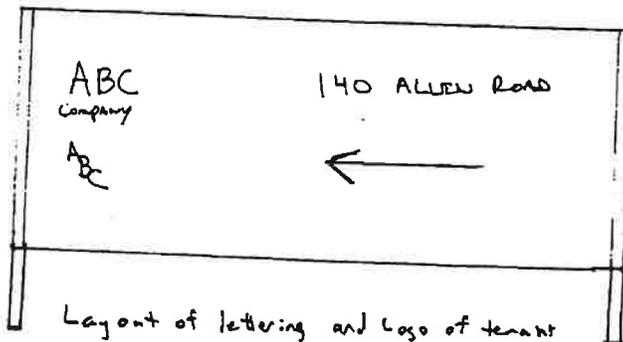
Dated: November 20, 1995
19115003.000

BK2047PG835

EXHIBIT B-1
140 ALLEN ROAD
SIGN

DESCRIPTION : ALUMINUM CONSTRUCTION 1/8" THICK
61" WIDE
24" LONG
TWO POSTS SET IN GROUND; BOTTOM
OF SIGN 14" OFF GROUND

3/30 SCALE



Layout of lettering and Logo of tenant
to be determined.

Sign to be illuminated at night by
1 ground mounted flood light (150 watts)
pointing at sign. Fixture to be located
approximately 4' in front of sign.

BK2047PG836

Exhibit C

ACCESS ROAD EASEMENT

ALL THAT CERTAIN lot, piece and parcel of land situate in Bernards Township, Somerset County, State of New Jersey, described in accordance with and as shown on a certain Plan #8707, Sheet 1, dated December 21, 1982, prepared by SMC Martin, Inc., Consulting Engineers and Land Surveyors, King of Prussia, PA, as follows to wit:

BEGINNING at an interior point dividing Lots #1 and #2 on said plan which point is located the following two courses and distances from the proposed southerly right-of-way line of Allen Road at its intersection with the boundary lines of Lots #1 and #2: 1) S 6° 05' 50" E, 42.14 feet to a point; 2) S 8° 06' 46" E, 206.76 feet to a point on the northerly side of said easement; thence from said point of beginning through Lot #1 by a curve to the left having a radius of 540.00 feet the arc distance of 141.70 feet the chord bearing of N 68° 36' 37" E, 141.30 feet to a point of tangency; thence N 61° 05' 34" E, 121.53 feet to a point on line with lands of Charles R. Pinsen; thence along said lands S 28° 51' 20" W, 149.86 feet to a point thence through said Lot #1 by a curve to the right having a radius of 620.00 feet, the arc distance of 165.55 feet having a chord bearing S 69° 13' 25" W, 165.06 feet to a point on line with Lot #2; thence along Lot #2, N 8° 06' 46" W, 80.35 feet to the point and place of beginning.

CONTAINING 0.3937 acres more or less and being a portion of Lot 1 in Block 177 as shown on the tax map of the Township of Bernards.

BK2047PG837

EXHIBIT D
(Page 2)

LANDSCAPING/SHRUB PLAN
140 ALLEN ROAD

- A. Two (2) Amelanchier Lamarkii - 8' - 10'
- B. Four (4) Prunus Cerasifera - 2.00 - 2.50 Calibur
- C. Twenty (20) Euonymus Alatus Compacta - 30" - 36" B&B
- D. Thirty (3) Juniperus Pfitzeriana - 3 Gal.
- E. Fifty (50) Juniperus Horizontalis Wiltoni - 3 Gal.

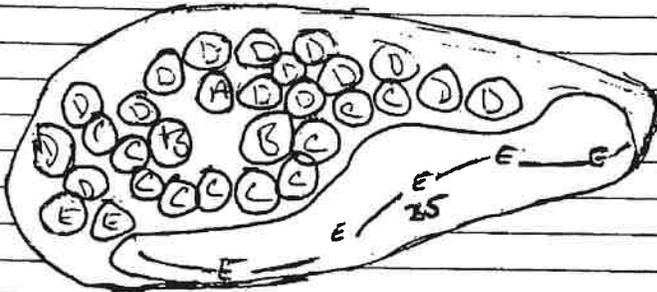
Mulch with in-shrub bed

c:\p0140-mulc.mxd

BK2047PG838

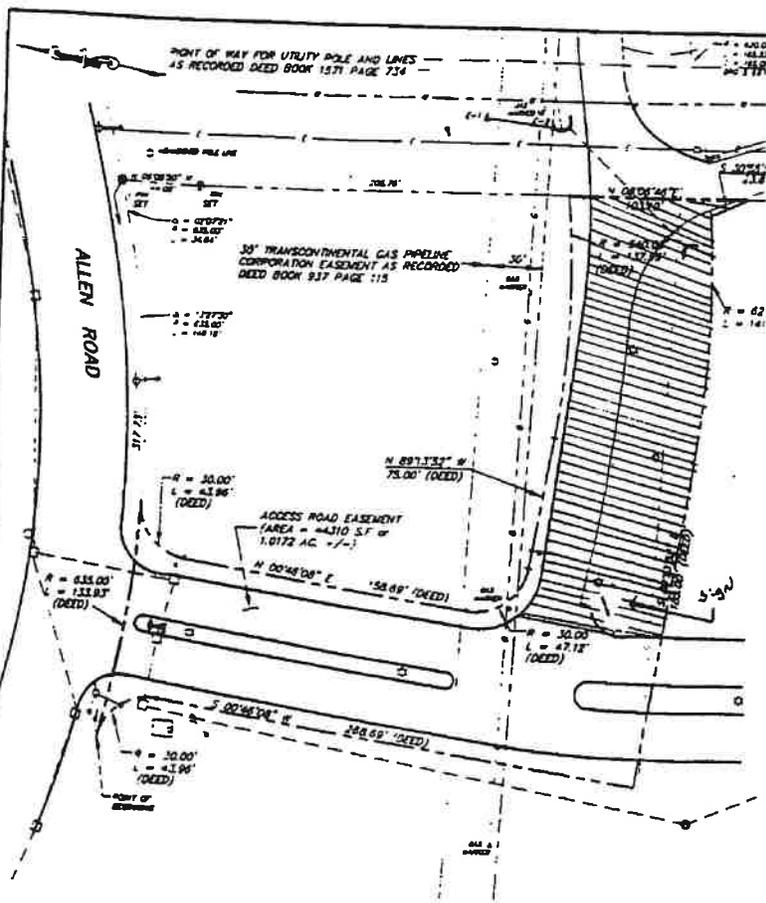
Exhibit D (page 3)

Shrub Areas



BK2047PG839

Exhibit B



BK 204 76840

ACCESS ROAD EASEMENT
LOT 7.02 BLOCK 177



DONALD H. STIRES ASSOCIATE
Engineers • Planners • Surveyors

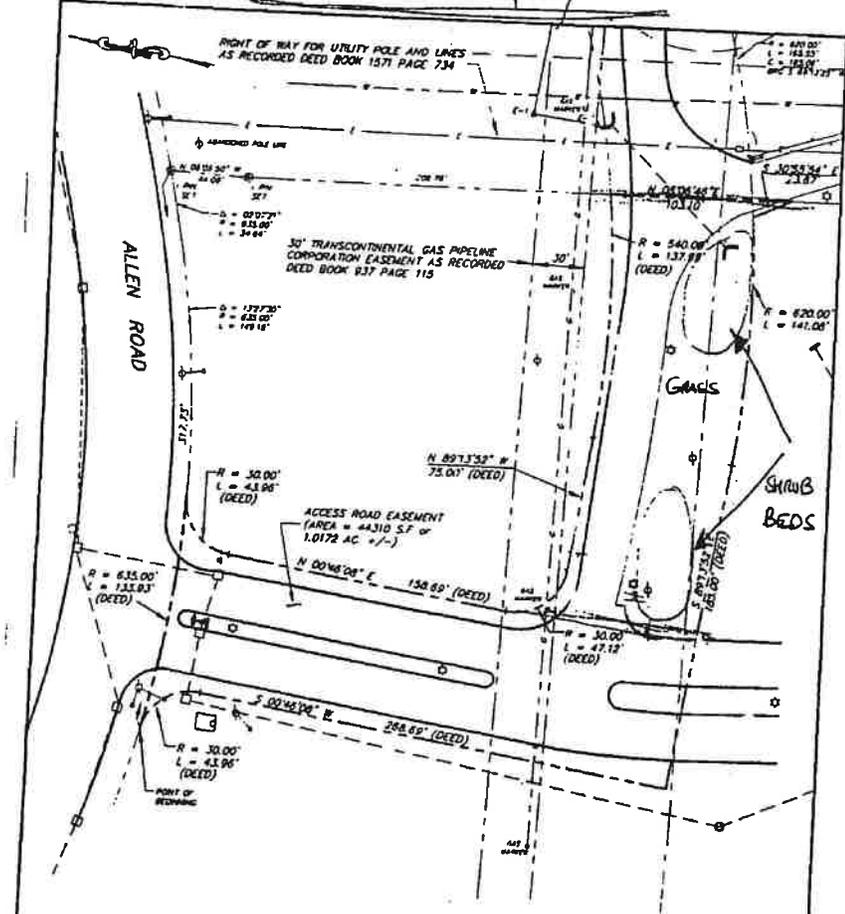
BERNARDS TOWNSHIP SOMERSET COUNTY NEW JERSEY

43 WEST HIGH STREET SOMERVILLE, N.J. 08876
PHONE (908) 729 0230 FAX (908) 707 6807

RICHARD C. MATHEWS
PROFESSIONAL LAND ENGINEERING

SCALE: 1" = 60'

SHRUB + LANDSCAPING PLAN



ACCESS ROAD EASEMENT LOT 7.02 BLOCK 177		 DONALD H. STIRES ASSOCIATES Engineers • Planners • Surveyors
BENARDS TOWNSHIP SOMERSET COUNTY NEW JERSEY		
RICHARD C. MATHEWS PROFESSIONAL LAND SURVEYOR <i>Richard C. Mathews</i>		43 WELLS HIGH STREET SOMERVILLE, N.J. 08876 PHONE: 908-1175 0230 FAX: (908) 391-1111
PROJECT No 95063	N.J. LICENSE No. 29353 DATE 11/17/95	SCALE: 1" = 1'
DRAWN BY: ECI	CHECKED BY: R.C.M.	SHEET NUMBER 1 OF 1

Exhibit D (page 1) BK2047PG841

INDENTURE TRUSTEE CONSENT

UNITED JERSEY BANK, as indenture trustee pursuant to that certain Indenture of Trust dated as of December 1, 1983, by and between the New Jersey Economic Authority and United Jersey Bank, hereby consents to the execution and delivery of that certain Modification of Deeds of Easement by and between Quinlan Properties, L.P. and Bruce H. Levitt, Esq., Bankruptcy Trustee for Johil/SMC Associates, dated February 13, 1996, by Bruce H. Levitt, Esq., in his capacity as Bankruptcy Trustee for Johil/SMC Associates.

February 13, 1996

UNITED JERSEY BANK

RDR
By: Richard D. Rein
Its: Sr. Vice President

ACKNOWLEDGEMENT

State of New Jersey :
County of Essex : ss.

I certify that on February 13, 1996, Richard D. Rein personally came before me and acknowledged to my satisfaction that:

- a. Richard D. Rein, as Sr. Vice President of United Jersey Bank, a New Jersey bank, executed this document on behalf of United Jersey Bank; and
- b. Richard D. Rein was duly authorized to execute this document and did duly sign, seal and deliver this document as the voluntary act and deed of United Jersey Bank.

Sworn to and subscribed
before me the 13th day of
February, 1996.

Cathleen H. Giuliana
CATHLEEN H. GIULIANA
Attorney at Law of New Jersey

H:\DATA\CGI\CONSENT

021396

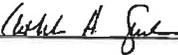
BK2047PG842

ACKNOWLEDGMENT

STATE OF NEW JERSEY :
: ss.:
COUNTY OF Essex :

I CERTIFY that on February 13, 1996, BRUCE H. LEVITT personally came before me and that this person acknowledged under oath, to my satisfaction, that this person:

- (a) is named in and personally signed this document; and
- (b) signed, sealed and delivered this document as his act and deed as Bankruptcy Trustee for Juhl/SMC Associates.



CATHLEEN H. GIULIANA
Attorney at Law of New Jersey

Legal402131.doc

BK2047PG843

ACKNOWLEDGMENT

STATE OF NEW JERSEY

: ss.:

COUNTY OF

I CERTIFY that on February 13, 1996, Robert C. Quinlan personally came before me and that this person acknowledged under oath, to my satisfaction, that:

- (a) Robert C. Quinlan signed, sealed and delivered the attached document as President of Samos Corporation, a N.J. corporation, which corporation is the general partner of Quinlan Properties, L.P., the New Jersey limited partnership named in this document;
- (b) the proper corporate seal of the corporate general partner was affixed; and
- (c) this document was signed and delivered by the corporation as its voluntary act and deed as a general partner on behalf of said partnership by virtue of authority from the Board of Directors of the corporate general partner.

Robert A. Cohen

ROBERT S. COHEN
Notary Public, State of New Jersey
No. 4-5396
Qualification Nassau County, N.J.
Commission Expires March 2, 1997

e:\gr140\lhb3.doc

BK2047PG844

END OF DOCUMENT

3p to 2002/10

Prepared by: Victoria A. Morrison, Esq.

DEED

THIS DEED is made the 27 day of AUGUST, 1997,

BETWEEN

ALLEN CENTER L.L.C., a New Jersey limited liability company, having its principal office at 150 Allen Center, Liberty Corner, New Jersey 07938, referred to as GRANTOR,

AND

ALLEN CENTER FARM L.L.C., a New Jersey limited liability company, having its principal office at 150 Allen Center, Liberty Corner, New Jersey 07938, referred to as GRANTEE. The words "Grantor" and "Grantee" shall mean all Grantors and all Grantees listed above.

COUNTY DE SOMERSET
CONVEYANCE
RECORDS TRANSFER FEE
DATE 9/17/97

Transfer of Ownership. The Grantor grants and conveys (transfers ownership of) the real property described below to the Grantee. This transfer is made for the sum of ONE DOLLAR (\$1.00). The Grantor acknowledges receipt of this money.

Tax Map Reference. (N.J.S.A. 46:15-2.1) Municipality of Bernards Township
Block No. 177, Lot No. 7.03 Q0004 Account No.: _____

No property tax identification number is available on the date of the deed. (Check if applicable)

Property. The property consists of the land and all the buildings and structures on the land in the Township of Bernards, County of Somerset and State of New Jersey. The legal description is:

See Exhibit A description attached hereto and made a part hereof.

Together with all buildings and improvements erected thereon, and all tenements, hereditaments and appurtenances thereto.

The premises are further described and identified as being Tax Lot 7.03 Q0004 in Block 177 as shown on the Tax Map of the Township of Bernards, New Jersey.

Being a portion of the same land and premises conveyed to Allen Center L.L.C., a New Jersey limited liability company by deed from Allen Center L.L.C., a New Jersey limited liability company, successor by merger to Bigelow-Quinlan Properties, L.P., a New Jersey limited partnership, dated _____, 1997, and recorded in the Somerset County Clerk's Office on _____, 1997, in Deed Book _____, Page _____ et seq.

The Grantor reserves for itself and its successors and assigns, a perpetual, non-exclusive easement over the property described on Exhibit A-1 (the "Easement Area") for the purpose of ingress and egress to, from, over, on and across the property conveyed hereby and for the purpose of constructing, maintaining, repairing, restoring, operating and otherwise utilizing utilities and similar services of any kind within, on or under the Easement Area. Grantor also reserves for itself and its successors and assigns, a perpetual, exclusive easement, over the property described on Exhibit A-2 (the "Signage Area") to place, construct, re-construct, repair, expand, maintain and remove signage, subject to any applicable federal, state, county and municipal laws and ordinance with respect to such signage and for the purpose of constructing, maintaining, repairing, restoring, operating and otherwise utilizing utilities and similar services of any kind within, on or under the Signage Area. The Grantor, its successors and assigns hereby assume all obligations and liabilities of the Grantee which are set forth in that certain Modification of Deeds of Easement dated February 13, 1996 and recorded in the Somerset County Clerk's Office on February 20, 1996, in Book 2047, Page 824 et seq. (the "Easement") and agrees to perform and discharge all such obligations and liabilities in a timely fashion. Notwithstanding the foregoing, if at any time the Grantee, its successors or assigns should begin to use the Easement Area in any material fashion, then, Grantee shall pay to Grantor, on a monthly basis, within ten (10) days of receipt of

REC 58/17/1997 02:55:04 04055

SEARCHED: 09/17/97 INDEXED: 09/17/97

2533883 02

BK 2132 PG 515

6/26/97

r, 9/17/97



Schedule A - Item No. 3 - Rider

All that certain parcel of land situate in Bernards Township, Somerset County, New Jersey and known as Lot 7.03 in Block 177 of that Township and being more particularly described as follows:

Beginning at a point in the new southerly line of Allen Road 70 feet wide where said line is intersected by the line dividing the herein described parcel on the southeast from lot 17, in said Block 177 to the northwest; thence, along said southerly line of Allen Road

1. 340.92 feet along the arc of a curve deflecting to the left and having a radius of 635.00 feet (Chord N. 88 degrees 28 minutes 32 seconds E, 336.62 feet) to Lot 7.02; thence along said lot 7.02 and a Public Service Electric and Gas Company right of way
2. S. 55 degrees 20 minutes 40 seconds West, 1813.77 feet to lot 15 in Block 177; thence along said Lot 15,
3. N. 56 degrees 22 minutes 10 seconds West, 161.46 feet to a point, thence
4. S. 56 degrees 20 minutes 40 seconds West, 118.68 feet to a point, thence
5. N. 3 degrees 39 minutes 10 seconds West, 138.65 feet to an iron pipe found for a corner with Lot 16, in said Block 177; thence, along said lot 16
6. N. 11 degrees 04 10 seconds West, 245.30 feet to lot 17; thence, along said lot 17
7. N. 66 degrees 42 minutes 20 seconds E. 1571.57 to the point of Beginning, being 13.161 acres of land, more or less.

BK2132PG516

an invoice therefor, Grantee's equitable share of the maintenance of said Easement Area based on the nature and extent of Grantee's usage thereof.

The rights, liabilities and obligations contained herein shall run with the land and shall be binding upon, and inure to the benefit of, all future owners of the land of Grantor and Grantee.

Type of Deed. The Grantor promises that the Grantor has done no act to encumber the property. This promise is called a "covenant as to grantor's acts" (N.J.S.A. 46:4-6). This promise means that the Grantor has not allowed anyone else to obtain any legal rights which affect the property (such as by making a mortgage or allowing a judgment to be entered against the Grantor). Notwithstanding this covenant, this conveyance is expressly made subject to current real property taxes, zoning and other governmental restrictions, and all covenants, conditions, restrictions, easements, rights-of-way and other matters of record, and such state of facts as an accurate survey would reveal.

Signatures. This Deed is signed and attested to by the Grantor's proper corporate officers as of the date at the top of the first page. Its corporate seal is affixed.

Witness/Attest:

GRANTOR:

ALLEN CENTER L.L.C.

By: AC LIBERTY, INC.,
Managing Member


Robert C. Quinlan,
President

ACKNOWLEDGEMENT

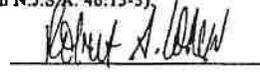
State of New York, County of New York SS:

I certify that on August 27, 1997, Robert C. Quinlan, personally came before me and this person acknowledged under oath, to my satisfaction, that:

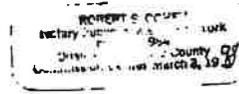
(a) this person signed, sealed and delivered the attached documents as President of AC Liberty, Inc., a New Jersey corporation, which is the Managing Member of the Allen Center L.L.C. named in this document;

(b) this Deed was signed and delivered by the corporation on behalf of Allen Center L.L.C. as its voluntary act and deed by virtue of authority from its Board of Directors; and

(c) the full and actual consideration paid or to be paid for the transfer of title is \$1.00. (Such consideration is defined in N.J.S.A. 46:15-5).



Notary Public
My Commission Expires: (SEAL)



Record and Return:
Victoria A. Morrison, Esq.
Riker, Danzig, Scherer, Hyland
& Perretti LLP
One Speedwell Avenue
Morristown, New Jersey 07962-1981

R. + R.
COMMONWEALTH LAND TITLE INS.
P.O. BOX 532
CEDAR KNOLLS, NJ 07927

2533883.02

8K2132P6517

8/28/97

END OF DOCUMENT

Sp 1100000000

Prepared By:
Paul A. Keenan
Kelley Drye & Warren LLP
Paul A. Keenan, Esq.

DEED IN LIEU OF FORECLOSURE

BRETT A. RADI COUNTY CLERK
SOMERSET COUNTY, NJ
2003 DEC 09 11:17 20 AM
BK 5516 PG: 3165-3175
CONS: \$22,538,465.30 EXEMPT: N
NJ XFER FEE: \$0.00
INSTRUMENT # 2003152525

This Deed is made on November 24, 2003,

between



ALLEN CENTER L.L.C., having a mailing address of 150 Allen Road, Liberty Corner, New Jersey 07938, referred to as Grantor,

and

STATE STREET BANK AND TRUST COMPANY, AS TRUSTEE FOR THE REGISTERED HOLDERS OF GMAC COMMERCIAL MORTGAGE SECURITIES, INC., MORTGAGE PASS-THROUGH CERTIFICATES, SERIES 1997-C2, having an office c/o GMAC Commercial Mortgage Corporation, 650 Dresher Road, Horsham, Pennsylvania 19055-8015, referred to as the Grantee.

Transfer of Ownership. The Grantor grants and conveys to the Grantee the property more particularly described in Schedule A attached hereto and made a part hereof, subject to current real property taxes, zoning and other governmental restrictions, and all covenants, conditions, restrictions, easements, rights-of-way and other matters of record, and such state of facts as an accurate survey would reveal. This transfer is made for the sum of TEN DOLLARS and XX/100 (\$10.00). The Grantor acknowledges receipt of this money.

Tax Map Reference. Block 7.02, Lot 177, Township of Bernards Tax Map.

Property. The property consists of the land and all the buildings and structures on the land in the Township of Bernards, County of Somerset and State of New Jersey. The legal description is set forth on Schedule A which is attached hereto and made a part hereof.

Promises of Grantor. The Grantor promises that the Grantor has done no act to encumber the property, other than the Mortgage (as hereinafter defined). This promise is called a "covenant as to grantor's acts" (N.J.S.A. 46:4-6). This promise means that the Grantor has not allowed anyone else to obtain any legal rights which affect the property (such as by making a mortgage or allowing a judgment to be entered against the Grantor) except the following Mortgage in favor of GMAC Commercial Mortgage Corporation (the "Mortgage"), from the Grantor dated August 27, 1997 and recorded in the Somerset County Clerk's Office on September 17, 1997 in Deed Book 2817 at page 269.

THE GRANTOR AND GRANTEE HEREIN DO NOT INTEND THAT ACCEPTANCE OF THIS DEED IN LIEU OF FORECLOSURE BE DEEMED TO CONSTITUTE A MERGER OF THE MORTGAGE REFERRED TO IN THE PRECEDING PARAGRAPH WITH THE FEE CONVEYED HEREBY.

STATE OF NEW JERSEY
AFFIDAVIT OF CONSIDERATION OR EXEMPTION
(P.L. 1968, c. 49)

or
PARTIAL EXEMPTION
(P.L. 1975, c. 176)

To be recorded with Deed pursuant to P.L. 1968, c. 49, as amended by P.L. 1991, c. 308 (N.J.S.A. 46:15-5 et seq.)

STATE OF NEW JERSEY

COUNTY OF MORRIS

FOR RECORDER'S USE ONLY	
Consideration \$	<u>22,538,455.30</u>
Realty Transfer Fee \$	<u>Exempt</u>
Date	<u>12-9-03</u> By <u>GM</u>

* Use symbol "C" to indicate that fee is exclusively for county use.

(1) PARTY OR LEGAL REPRESENTATIVE (See Instructions #3, 4 and 5 on reverse side.)

Deponent DAVID S. LUSTY, ESQ. (Name), being duly sworn according to law upon his/her oath

deposes and says that he/she is the Attorney-in-Fact for GMAC Commercial Mortgage Corp in a deed dated November 21, 2003
(State whether Grantor, Grantee, Legal Representative, Corporate Officer, Officer of the Co., Lending Institution, etc.)

transferring real property identified as Block No. 7.02 Lot No. 177

located at 150 Allen Road, Bernards Township, New Jersey
(Street Address, Municipality, County)

(2) CONSIDERATION (See Instruction #6.)

Deponent states that, with respect to deed hereto annexed, the actual amount of money and the monetary value of any other thing of value constituting the entire compensation paid or to be paid for the transfer of title to the lands, tenements or other realty, including the remaining amount of any prior mortgage to which the transfer is subject or which is to be assumed and agreed to be paid by the grantee and any other lien or encumbrance thereon not paid, satisfied or removed in connection with the transfer of title is \$ 22,538,455.30
* services for State Street Bank and Trust Company, as Trustee for the registered holders of GMAC Commercial Mortgage Securities Inc., Mortgage Pass-Through Certificates Series 1997-C2

(3) FULL EXEMPTION FROM FEE Deponent claims that this deed transaction is fully exempt from the Realty Transfer Fee imposed by P.L. 1968, c. 49 for the following reason(s): Explain in detail. (See Instruction #7.) Mere reference to exemption symbol is not sufficient.

The deed is being recorded in connection with the release of Allen Center LLC's obligations under that certain Mortgage and Security Agreement dated 8/27/97, recorded in Deed Book 1817, pg 269 on 9/17/97

(4) PARTIAL EXEMPTION FROM FEE

NOTE: All boxes below apply to grantor(s) only. ALL BOXES IN APPROPRIATE CATEGORY MUST BE CHECKED. Failure to do so will void claim for partial exemption. (See Instructions #8 and #9.)

Deponent claims that this deed transaction is exempt from the increased portion of the Realty Transfer Fee imposed by P.L. 1975, c. 176 for the following reason(s):

- A) **SENIOR CITIZEN** (See Instruction #8.)
 - Grantor(s) 62 yrs. of age or over.*
 - One- or two-family residential premises.
 - Owned and occupied by grantor(s) at time of sale.
 - Owners as joint tenants must all qualify except in the case of a spouse.
- B) **BLIND** (See Instruction #8.)
 - Grantor(s) legally blind.*
 - One- or two-family residential premises.
 - Owned and occupied by grantor(s) at time of sale.
 - No owners as joint tenants other than spouse or other qualified exempt owners.
- DISABLED** (See Instruction #8.)
 - Grantor(s) permanently and totally disabled.*
 - One- or two-family residential premises.
 - Receiving disability payments.
 - Owned and occupied by grantor(s) at time of sale.
 - Not gainfully employed.
 - No owners as joint tenants other than spouse or other qualified exempt owners.
- * IN THE CASE OF HUSBAND AND WIFE, ONLY ONE GRANTOR NEED QUALIFY
- C) **LOW AND MODERATE INCOME HOUSING** (See Instruction #8.)
 - Affordable According to HUD Standards.
 - Meets Income Requirements of Region.
 - Reserved for Occupancy.
 - Subject to Resale Controls.
- D) **NEW CONSTRUCTION** (See Instruction #9.)
 - Entirely new improvement.
 - Not previously used for any purpose.
 - Not previously occupied.

Deponent makes this Affidavit to induce the County Clerk or Register of Deeds to record the deed and accept the fee submitted herewith in accordance with the provisions of P.L. 1968, c. 49.

Subscribed and sworn to before me this 9th day of November, 2003
Christine D. Ford (Signature of Deponent)
Christine D. Ford (Signature of Notary)
Name of Deponent (type above line) _____ Name of Grantor (type above line) _____
Address of Deponent _____ Address of Grantor at Time of Sale _____

CHRISTINE D. FORD
NOTARY PUBLIC OF NEW JERSEY
Commission Expires 11/15/2006

FOR OFFICIAL USE ONLY This space for use of County Clerk or Register of Deeds.	
Instrument Number	County <u>Somerset</u>
Deed Number	Book _____ Page _____
Deed Dated	<u>11-24-03</u> Date Recorded <u>12-9-03</u>

IMPORTANT - BEFORE COMPLETING THIS AFFIDAVIT, PLEASE READ THE INSTRUCTIONS ON THE REVERSE SIDE HEREOF. This format is prescribed by the Director, Division of Taxation in the Department of the Treasury, as required by law, and may not be altered without the approval of the Director.

ORIGINAL - To be retained by County.
DUPLICATE - To be forwarded by County to Division of Taxation on partial exemption from fee (N.J.A.C. 18:16 - 8.12)
TRIPLICATE - In your file copy.
ORIGINAL AND DUPLICATE COPY MUST BE SUBMITTED WITH DEED TO COUNTY RECORDING OFFICER

SCHEDULE A

ALL that certain tract or parcel of land and premises situate, lying and being in the Township of Bernards, County of Somerset and State of New Jersey and more particularly described as follows:

[SEE ATTACHED LEGAL DESCRIPTION]

The above premises is also known as Lot 7.02 in Block 177 on the Official Tax Map of the Township of Bernards.

Being the same premises conveyed to Allen Center L.L.C. under confirmatory deed from Allen Center L.L.C., a New Jersey limited liability company, successor by merger to Quinlan Properties, L.P., a New Jersey limited partnership, formerly known as Bigelow Quinlan Properties, L.P., a New Jersey limited partnership, dated August 27, 1997, recorded of September 17, 1997 in Deed Book 2132, page 511.

All that certain parcel of land situate in Bernards Township, Somerset County, New Jersey and known as Lot 7.02 in Block 177 of that Township and being more particularly described as follows:

Beginning at a point in the northerly sideline of New Jersey State Highway Route No. 78 where said highway is intersected by the line dividing the herein described Lot 7.02 to the west from lot 7.01 of said Block 177 to the east; said point being the beginning point of a certain deed between Bigelow-Quinken properties, a New Jersey partnership and themselves, dated July 18, 1985 and recorded at Somerset County in deed book 1548 at page 624 & c.; thence along said sideline of Route 78 the following five courses.

1. S 82 degrees 09 minutes 24 seconds W, 39.83 feet to a monument, thence
2. S 86 degrees 38 minutes 33 seconds W, 300.17 feet to a point, thence
3. N 88 degrees 36 minutes 44 seconds W, 302.03 feet to a point 0.93 feet west of a monument found, thence
4. S 79 degrees 45 minutes 49 seconds W, 577.17 feet to a point 1.12 feet west of a monument found, thence
5. S 89 degrees 43 minutes 10 seconds W, 716.42 feet to a lot 15 of said Block 177; thence along said Lot 15
6. N 3 degrees 39 minutes 10 seconds W, 82.20 feet to the southerly sideline of a public Service Electric & Gas Company, Right of Way 150 feet wide; thence along and crossing said Right of Way
7. N 55 degrees 20 minutes 40 seconds E, 2082.32 feet to the southerly line of Allen Road (70' wide); thence, along said sideline of Allen Road the following two courses
8. 21.14 feet along the arc of a curve deflecting to the left and having a radius of 605.00 feet and a delta angle of 1 degree 54 minutes 29 seconds to a point of compound curvature; thence
9. 35.54 feet along the arc of a curve deflecting to the left and having a radius of 935.00 feet and a delta angle of 2 degrees 10 minutes 39 seconds to the aforementioned Lot 7.01; thence along said lot 7.01 the following two courses and distances
- 10) S 6 degrees 05 minutes 52 seconds E, 42.53 feet to a point, thence
- 11) S 8 degrees 06 minutes 45 seconds E, 1131.95 feet to the point of beginning, being 1,237,113 square feet or 28.400 acres of land.

This description is prepared in accordance with a survey made by Richard W. Carlson and Associates, Inc., dated 09/05/97 and revised to 09/10/97

ACCESS EASEMENT:

All that certain parcel of situate in Bernards Township, Somerset County, New Jersey being part of lot 7.03 in Block 177 of that Township; being an easement reserved in a deed about to be recorded between Allen Center L.L.C. and Allen Center Farm, L.L.C.; More particularly described as follows:

Beginning at a point in the line dividing lot 7.03 from 7.02 said point being in the 10th course in a certain deed "Modification of Deeds of Easement recorded in Somerset County in Deed Book 2047 at page 821 & C.; thence continuing along said course

1. N. 0 degrees 46 minutes 08 seconds E, 51.79 feet to a point of curvature; thence
2. 43.96 feet along the arc of a curve deflecting to the right having a radius of 30.00 feet to a point in the sideline of Allen Road; thence along said road
3. 133.93 feet along the arc of a curvature deflecting to the right having a radius of 635.00 feet to a point; thence
4. 43.96 feet along the arc of a curve deflecting to the right and having a radius of 30.00 feet to a point of tangency; thence
5. S. 0 degrees 46 minutes 08 seconds W 108.69 feet to the aforementioned lot line between Lot line between lots 7.03 and 7.02; thence, along said line
6. N. 55 degrees 20 minutes 40 seconds East 98.32 feet to the point of beginning.

..... Description is prepared in accordance with a survey made by Richard W. Cartson and Associates, Inc., dated 09/05/97 and revised to 09/10/97.

DEED IN LIEU OF FORECLOSURE

Dated: November 24, 2003

ALLEN CENTER L.L.C.,
a New Jersey limited liability company,

Grantor,

-to-

Record & return to:

Commonwealth and Title Insurance Co. ✓
PO Box 532
Cedar Knolls, NJ 07927

P031129

**STATE STREET BANK AND TRUST COMPANY, AS TRUSTEE FOR THE
REGISTERED HOLDERS OF GMAC COMMERCIAL MORTGAGE SECURITIES,
INC., MORTGAGE PASS-THROUGH CERTIFICATES, SERIES 1997-C2,**

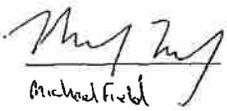
Grantee.

Signatures. The Grantor signs this Deed as of the date at the top of the first page.

WITNESS:

ALLEN CENTER L.L.C.,
A New Jersey limited liability company

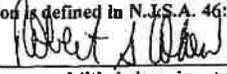
By: AC Liberty Inc.,
a New Jersey corporation
its managing member


Michael Field

By: 
Name: Robert C. Quinlan
Title: President

STATE OF NEW YORK)
COUNTY OF NEW YORK)

BE IT REMEMBERED that on November __, 2003, Robert C. Quinlan, solely in its capacity as president of AC Liberty Inc., the managing partner of Allen Center, L.L.C., a New Jersey limited liability company, the entity named in the within instrument, personally came before me and stated to my satisfaction that he is the person who executed this Deed; that he was authorized to execute this Deed on behalf of said entity; that he executed this deed as the voluntary act and deed of said entity for the purposes herein expressed and that he made this Deed for ~~\$2,528,455.30~~ as the full and actual consideration paid or to be paid for the transfer of title. (Such ~~\$2,528,455.30~~ consideration is defined in N.J.S.A. 46:15-5)



(print name and title below signature)

ROBERTS. COHEN
NOTARY PUBLIC, State of New York

3-3-04 



BRETT A. RADI
SOMERSET COUNTY CLERK
20 GROVE STREET
P.O. BOX 3000
SOMERVILLE, NJ 08876-1262

Recorded: 12/09/2003 11:17:20 AM
Book: OPR 5516 Page: 3165-3173
Instrument No.: 2003152525
DEED 9 PGS \$110.00
CONSIDERATION: \$22,538,455.30
EXEMPTION: N
NJ REALTY TRANSFER FEE: \$0.00
Recorder: KINGMAN

DO NOT DISCARD



2003152525

Steve Peter, County Clerk
 Electronically Recorded Somerset County NJ
 2018 Mar 08 11:28:31 AM
 BK: 7028 PG: 3129-3140
 Instrument # 2018008692
 Fee: \$ 153.00 Doc Type: DEED
 CONS: \$25000000.00 EXEMPT: OS
 NJ XFER FEE: \$299975.00



**SOMERSET COUNTY
 DOCUMENT COVER SHEET**

HON. BRETT A. RADI
 SOMERSET COUNTY CLERK
 PO BOX 3000
 20 GROVE STREET
 SOMERVILLE, NJ 08876

WWW.CO.SOMERSET.NJ.US

(Official Use Only)

DATE OF DOCUMENT: 2018-02-23	TYPE OF DOCUMENT: DEED
FIRST PARTY <i>(Grantor, Mortgagor, Seller or Assignor)</i>	SECOND PARTY <i>(Grantee, Mortgagee, Buyer, Assignee)</i>
150 Allen Road LLC	SIG 150 LLC
ADDITIONAL PARTIES:	

THE FOLLOWING SECTION IS REQUIRED FOR DEEDS ONLY	
MUNICIPALITY: Bernards	MAILING ADDRESS OF GRANTEE: 992 Bedford Avenue Brooklyn, NY 11205
BLOCK: 3	
LOT: 11201	
CONSIDERATION: 25000000.00	

THE FOLLOWING SECTION IS FOR ORIGINAL MORTGAGE BOOKING & PAGING INFORMATION FOR ASSIGNMENTS, RELEASES, SATISFACTIONS, DISCHARGES & OTHER ORIGINAL MORTGAGE AGREEMENTS ONLY			
BOOK	PAGE	INSTRUMENT #	DOCUMENT TYPE
			DEED

**DO NOT REMOVE THIS PAGE
 THIS DOCUMENT COVER SHEET IS PART OF THE SOMERSET COUNTY FILING RECORD
 RETAIN THIS PAGE FOR FUTURE REFERENCE**

Prepared By:

Joshua M. Greenfield, Esq.

DEED

This Deed is made as of February 23, 2018

BETWEEN

150 ALLEN ROAD LLC, a New Jersey limited liability company, having an office at 780 Morris Turnpike, Short Hills, New Jersey 07078, referred to as the **Grantor**,

AND

SIG 150 LLC, a New Jersey limited liability company, having an address at 992 Bedford Avenue, Brooklyn, NY 11205, referred to as the **Grantee**.

The words "Grantor" and "Grantee" shall mean all Grantors and all Grantees listed above.

Transfer of Ownership. The Grantor grants and conveys (transfers ownership of) the property described below to the Grantee. This transfer is made for the sum of TWENTY-FIVE MILLION AND AND NO/100ths DOLLARS (\$25,000,000.00). The Grantor acknowledges receipt of this money.

Tax Map reference. (N.J.S.A. 46:15-1.1) Municipality of Township of Bernards, Block No. 11201, Lot No. 3

No property tax identification number is available on the date of this Deed (check box if applicable).

Property. The property consists of the land and all the buildings and structures on the land in the Township of Bernards, County of Somerset, State of New Jersey owned by Grantor known as 150 Allen Road, Basking Ridge, New Jersey. The legal description is:

See Exhibit "A" attached hereto and made a part hereof.

The property is subject to the exceptions described on Exhibit "B" attached hereto and made a part hereof.

Chain of Title. Being the same property conveyed to Grantor by Deed from The Realty Associates Fund VII, L.P., dated June 3, 2010, recorded June 14, 2010 in the Somerset County Clerk's Office in Deed Book 6327, Page 1907.

Promises by Grantor. The Grantor promises that the Grantor has done no act to encumber the property. This promise is called a "covenant as to the grantor's acts" (N.J.S.A. 46:4-6). This promise means that the Grantor has not allowed anyone else to obtain any legal rights which affect the property (such as by making a mortgage or allowing a judgment to be entered against the Grantor).

[signatures follow]

Signatures. This Deed is signed and attested to by the Grantor's proper officers as of the date at the top of the first page. Its seal is affixed.

ATTEST:

GRANTOR:

150 ALLEN ROAD LLC
a New Jersey limited liability company

By: _____
Name: Kenneth Silverman
Title: Manager

BY:
Name: Patricia Krause
Title: Notary Public

STATE OF NEW JERSEY, COUNTY OF Essex SS.:

I certify that on February 21, 2018, Kenneth Silverman personally came before me and stated to my satisfaction that this person (or if more than one, each person):

- (a) was the maker of the attached deed;
- (b) was authorized to and did execute this deed as Manager of 150 Allen Road LLC, a New Jersey limited liability company, the entity named in this deed; and
- (c) this deed was made for \$25,000,000.00 as the full and actual consideration paid or to be paid for the transfer of title (Such consideration is defined in N.J.S.A. 46:15-5.)

Patricia Krause
(print name and title below signature)

PATRICIA KRAUSE
Notary Public, State of New Jersey
My Commission Expires
March 31, 2020

EXHIBIT A
Legal Description of the Real Property

BEGINNING AT A POINT IN THE NORTHERLY SIDELINE OF NEW JERSEY HIGHWAY ROUTE NO. 78 WHERE SAID HIGHWAY IS INTERSECTED BY THE LINE DIVIDING THE HEREBIN DESCRIBED LOT 7.02 TO THE WEST FROM LOT 7.01 OF SAID BLOCK 177 TO THE EAST; SAID POINT BEING THE BEGINNING POINT OF A CERTAIN DEED BETWEEN BIGHLOW-QUINTEN PROPERTIES, A NEW JERSEY PARTNERSHIP AND THEMSELVES, DATED JULY 18, 1985 AND RECORDED AT SOMERSET COUNTY IN DEED BOOK 1546 AT PAGE 624 & C; : THENCE ALONG SAID SIDELINE OF ROUTE 78 THE FOLLOWING FIVE COURSES:

1. SOUTH 82 DEGREES 09 MINUTES 24 SECONDS WEST, 39.63 FEET TO A MONUMENT, THENCE
2. SOUTH 86 DEGREES 28 MINUTES 33 SECONDS WEST, 300.17 FEET TO A POINT, THENCE
3. NORTH 88 DEGREES 36 MINUTES 44 SECONDS WEST, 302.03 FEET A POINT 0.93 FEET WEST OF A MONUMENT FOUND, THENCE
4. SOUTH 79 DEGREES 45 MINUTES 49 SECONDS WEST, 577.17 FEET TO A POINT 1.12 FEET WEST OF A MONUMENT FOUND, THENCE
5. SOUTH 89 DEGREES 43 MINUTES 16 SECONDS WEST, 716.42 FEET TO A LOT 18 OF SAID BLOCK 177; THENCE ALONG SAID LOT 18
6. NORTH 3 DEGREES 39 MINUTES 10 SECONDS WEST, 82.20 FEET TO THE SOUTHERLY SIDELINE OF A PUBLIC SERVICE ELECTRIC & GAS COMPANY, RIGHT OF WAY 150 FEET WIDE; THENCE ALONG AND CROSSING SAID RIGHT OF WAY
7. NORTH 55 DEGREES 20 MINUTES 40 SECONDS EAST, 2082.32 FEET TO THE SOUTHERLY LINE OF ALLEN ROAD (70 FEET WIDE); THENCE, ALONG SAID SIDELINE OF ALLEN ROAD THE FOLLOWING TWO COURSES
8. NORTH 56 DEGREES 22 MINUTES 10 SECONDS WEST, 161.46 FEET TO THE NORTHERLY LINE OF SAID RIGHT OF WAY; THENCE ALONG SAID NORTHERLY LINE
9. 38.54 FEET ALONG THE ARC OF A CURVE DEFLECTING TO THE LEFT AND HAVING A RADIUS OF 935.00 FEET AND A DELTA ANGLE OF 2 DEGREES 10 MINUTES 39 SECONDS TO THE AFOREMENTIONED LOT 7.01; THENCE ALONG SAID LOT 7.01 THE FOLLOWING TWO COURSES AND DISTANCES
10. SOUTH 6 DEGREES 05 MINUTES 52 SECONDS EAST, 42.53 FEET TO A POINT, THENCE

(This Item Continued On Attached Page)

11. SOUTH 8 DEGREES 06 MINUTES 45 SECONDS EAST, 1131.95 FEET TO THE POINT OF BEGINNING.

THIS DESCRIPTION IS PREPARED IN ACCORDANCE WITH A SURVEY MADE BY RICHARD W. CARLSON AND ASSOCIATES, INC. DATED 09/08/97 AND REVISED TO 09/10/97.

THE ABOVE DESCRIBED PREMISES ARE ALSO DESCRIBED IN ACCORDANCE WITH AN ALTA/ACSM SURVEY PREPARED BY DAVID H. SMITH, P.L.S. DATED AUGUST 11, 2004 AS JOB NO. 23660000 AS FOLLOWS:

BEGINNING AT A POINT ON THE SOUTHERLY SIDELINE OF ALLEN ROAD, SAID POINT BEING NORTH 06 DEGREES 05 MINUTES 51 SECONDS WEST A DISTANCE OF 0.26 FEET FROM THE POINT OF BEGINNING OF A DEED FROM BRUCE H. LEVITT, ESQ. TO SJP ALLEN ROAD LLC, DATED 2/12/1996 AND RECORDED IN THE SOMERSET COUNTY CLERKS OFFICE IN DE 2047/845 & C., THENCE;

1. SOUTH 06 DEGREES 05 MINUTES 51 SECONDS EAST A DISTANCE OF 44.35 FEET TO A POINT;
2. SOUTH 08 DEGREES 06 MINUTES 46 SECONDS EAST A DISTANCE OF 1129.04 FEET TO A POINT IN THE NORTHERLY SIDELINE OF KY STATE HW RT 78;
3. ALONG SAID R.O.W. SOUTH 02 DEGREES 10 MINUTES 02 SECONDS WEST A DISTANCE OF 37.57 FEET TO A POINT;
4. STILL ALONG SAID R.O.W. SOUTH 86 DEGREES 39 MINUTES 11 SECONDS WEST A DISTANCE OF 300.17 FEET TO A POINT;
5. STILL ALONG SAID R.O.W. NORTH 88 DEGREES 36 MINUTES 06 SECONDS WEST A DISTANCE OF 302.03 FEET TO A POINT;
6. STILL ALONG SAID R.O.W. SOUTH 79 DEGREES 46 MINUTES 27 SECONDS WEST A DISTANCE OF 577.17 FEET TO A POINT;
7. STILL ALONG SAID R.O.W. SOUTH 89 DEGREES 49 MINUTES 45 SECONDS WEST A DISTANCE OF 717.98 FEET TO A POINT;
8. NORTH 03 DEGREES 44 MINUTES 59 SECONDS WEST A DISTANCE OF 77.59 FEET TO A POINT;
9. NORTH 50 DEGREES 16 MINUTES 32 SECONDS EAST A DISTANCE OF 2003.44 TO A POINT ON THE SOUTHERLY SIDELINE OF ALLEN ROAD;
10. ALONG SAID SIDELINE THE ARC OF A CURVE TO THE LEFT WHOSE RADIUS IS 635.00 FEET A CENTRAL ANGLE OF 02 DEGREES 02 MINUTES 43 SECONDS A DISTANCE OF 22.67 FEET TO A POINT; SAID POINT HAVING A CHORD BEARING OF NORTH 72 DEGREES 09

MINUTES 29 SECONDS EAST A CHORD DISTANCE OF 22.67 FEET;

11. STILL ALONG SAID SIDELINE THE ARC OF A CURVE TO THE LEFT WHOSE RADIUS IS 915.00 FEET A CENTRAL ANGLE OF 02 DEGREES 05 MINUTES 57 SECONDS A DISTANCE OF 34.26 FEET TO THE POINT OF BEGINNING; SAID POINT HAVING A CHORD BEARING OF NORTH 70 DEGREES 05 MINUTES 09 SECONDS EAST A CHORD DISTANCE OF 34.26 FEET.

TOGETHER WITH AND SUBJECT TO AN ACCESS EASEMENT DESCRIBED AS FOLLOWS:

ALL THAT CERTAIN PARCEL SITUATE IN BERNARDS TOWNSHIP, SOMERSET COUNTY, NEW JERSEY BEING PART OF LOT 7.08 IN BLOCK 177 OF THAT TOWNSHIP BEING AN EASEMENT RESERVED IN A DEED BETWEEN ALLEN CENTER L.L.C. AND ALLEN CENTER FARM, L.L.C., MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT IN THE LINE OF DIVIDING LOT 7.03 FROM 7.02 SAID POINT BEING IN THE 10TH COURSE IN A CERTAIN DEED "MODIFICATION OF DEEDS OF EASEMENTS RECORDED IN SOMERSET COUNTY IN DEED BOOK 2047 AT PAGE 6214C; THENCE CONTINUING ALONG SAID COURSE

1. NORTH 0 DEGREES 46 MINUTES 08 SECONDS EAST, 51.79 FEET TO A POINT OF CURVATURE; THENCE
2. 43.96 FEET ALONG THE ARC OF A CURVE DEFLECTING TO THE RIGHT HAVING A RADIUS OF 30.00 FEET TO A POINT IN THE SIDELINE OF ALLEN ROAD; THENCE ALONG SAID ROAD
3. 133.93 FEET ALONG THE ARC OF A CURVATURE DEFLECTING TO THE RIGHT HAVING A RADIUS OF 635.000 FEET TO A POINT; THENCE
4. 43.96 FEET ALONG THE ARC OF A CURVE DEFLECTING TO THE RIGHT AND HAVING A RADIUS OF 30.00 FEET TO A POINT OF TANGENCY; THENCE
5. SOUTH 0 DEGREES 46 MINUTES 08 SECONDS WEST 108.69 FEET TO THE AFOREMENTIONED LOT LINE BETWEEN LOT LINE BETWEEN LOTS 7.03 AND 7.02; THENCE ALONG SAID LINE
6. NORTH 55 DEGREES 20 MINUTES 40 SECONDS EAST 99.32 FEET TO THE POINT OF BEGINNING.

BEING ALSO KNOWN AS (REPORTED FOR INFORMATIONAL PURPOSES ONLY):

Lot 3, Block 11201, on the official tax map of Township of Bernards, County of Somerset and State of New Jersey (formerly known as Block 177, Lot 7.02)

**EXHIBIT B
(TO DEED)**

EXCEPTIONS

SUBJECT TO:

- (i) Any covenants, conditions, limitations, restrictions, rights of way, encumbrances, encroachments, reservations, easements, agreements and other matters reserved in or established by the provisions of, or permitted under or contemplated by this Agreement.
- (ii) Covenants, conditions, limitations, restrictions, rights, rights of way, encumbrances, encroachments, reservations, easements, agreements and other matters of fact or record.
- (iii) Present and future zoning, subdivision, building, land use, and environmental laws, ordinances, restrictions, resolutions, orders and regulations and all present and future ordinances, laws, regulations and orders of all federal, state, county, municipal or other governments, agencies, boards, bureaus, commissions, authorities and bodies now or hereafter having or acquiring jurisdiction of the Property and the use and improvement thereof,
- (iv) Any state of facts or exception which an accurate survey or an inspection of the Property would show.
- (v) Special assessments now or hereafter becoming a lien.
- (vi) General property taxes for the current tax fiscal year and subsequent tax fiscal years.
- (vii) Any deviation between tax lot lines, fences, curbs, retaining walls, or hedges, if any, and the record lines.
- (viii) Rights, if any, of any utility company, public or private, to maintain and operate lines, pipes, cables, poles, distribution boxes and the like, in, under, over and upon the Property.
- (ix) Sub-surface conditions not disclosed by a recorded instrument.
- (x) Rights of others in and to public streets and sidewalks abutting the Property.
- (xi) Rights of the municipality, public or quasi-public utilities, if any, in and to vacated streets and alleys for maintenance therein of poles, conduits, sewers, etc.
- (xii) All matters shown on ALTA/ACSM Land Title Survey by _____ dated _____ or any current update thereof.
- (xiii) Matters done or suffered by, through or under the Purchaser.

DEED	Dated February 23, 2018
150 ALLEN ROAD LLC, a New Jersey limited liability company, Grantor TO SIG 150 LLC, a New York limited liability company, Grantee	Record and Return To: Allen A. Herman, Esq. Allen A. Herman, P.C. 614 Hempstead Gardens Drive Suite 100 West Hempstead, NY 11552



State of New Jersey

Seller's Residency Certification/Exemption

(Please Print or Type)

SELLER(S) INFORMATION:

Name(s) 150 Allen Road LLC, a New Jersey limited liability company

Current Street Address 780 Morris Turnpike

City, Town, Post Office Box Short Hills State NJ Zip Code 07078

PROPERTY INFORMATION:

Block(s) 11201 Lot(s) 3 Qualifier _____

Street Address 150 Allen Road

City, Town, Post Office Box Bernards (Basking Ridge) State NJ Zip Code 07920

Seller's Percentage of Ownership 100 % Total Consideration \$25,000,000.00

Owner's Share of Consideration \$25,000,000.00 Closing Date 06/23/2008

SELLER'S ASSURANCES (Check the Appropriate Box) (Boxes 2 through 14 apply to Residents and Non-residents):

1. Seller is a resident taxpayer (individual, estate, or trust) of the State of New Jersey pursuant to the New Jersey Gross Income Tax Act, will file a resident gross income tax return, and will pay any applicable taxes on any gain or income from the disposition of this property.
2. The real property being sold or transferred is used exclusively as a principal residence as defined in 26 U.S. Code section 121.
3. Seller is a mortgagor conveying the mortgaged property to a mortgagee in foreclosure or in a transfer in lieu of foreclosure with no additional consideration.
4. Seller, transferor or transferee is an agency or authority of the United States of America, an agency or authority of the State of New Jersey, the Federal National Mortgage Association, the Federal Home Loan Mortgage Corporation, the Government National Mortgage Association, or a private mortgage insurance company.
5. Seller is not an individual, estate, or trust and is not required to make an estimated gross income tax payment.
6. The total consideration for the property is \$1,000 or less so the seller is not required to make an estimated income tax payment.
7. The gain from the sale is not recognized for federal income tax purposes under 26 U.S. Code section 721, 1031, or 1033 (CIRCLE THE APPLICABLE SECTION). If the indicated section does not ultimately apply to this transaction, the seller acknowledges the obligation to file a New Jersey income tax return for the year of the sale and report the recognized gain.
 Seller did not receive non-like kind property.
8. The real property is being transferred by an executor or administrator of a decedent to a devisee or heir to effect distribution of the decedent's estate in accordance with the provisions of the decedent's will or the intestate laws of this State.
9. The real property being sold is subject to a short sale instituted by the mortgagee, whereby the seller has agreed not to receive any proceeds from the sale and the mortgagee will receive all proceeds paying off an agreed amount of the mortgage.
10. The deed is dated prior to August 1, 2004, and was not previously recorded.
11. The real property is being transferred under a relocation company transaction where a trustee of the relocation company buys the property from the seller and then sells the house to a third party buyer for the same price.
12. The real property is being transferred between spouses or incident to a divorce decree or property settlement agreement under 26 U.S. Code section 1041.
13. The property transferred is a cemetery plot.
14. The seller is not receiving net proceeds from the sale. Net proceeds from the sale means the net amount due to the seller on the settlement sheet.

SELLER(S) DECLARATION:

The undersigned understands that this declaration and its contents may be disclosed or provided to the New Jersey Division of Taxation and that any false statement contained herein may be punished by fine, imprisonment, or both. I furthermore declare that I have examined this declaration and, to the best of my knowledge and belief, it is true, correct and complete. By checking this box I certify that a Power of Attorney to represent the seller(s) has been previously recorded or is being recorded simultaneously with the deed to which this form is attached.

06/23/2008
Date

Kenneth Silverman
Signature (Seller) Please indicate if Power of Attorney or Attorney in Fact
By: Kenneth Silverman, Manager

Date

Signature (Seller) Please indicate if Power of Attorney or Attorney in Fact

STATE OF NEW JERSEY
AFFIDAVIT OF CONSIDERATION FOR USE BY SELLER

(Chapter 49, P.L. 1968, as amended through Chapter 83, P.L. 2006) (N.J.S.A. 42:16-5 et seq.)

BEFORE COMPLETING THIS AFFIDAVIT, PLEASE READ THE INSTRUCTIONS ON THE REVERSE SIDE OF THIS FORM.

STATE OF NEW JERSEY COUNTY <u>ESSEX</u> <u>MORRIS</u>	SS. County Municipal Code: <u>1802</u>	FOR RECORDER'S USE ONLY Consideration \$ <u>25,000,000.00</u> RTF paid by seller \$ <u>299,975.00</u> Date <u>3/9/18</u> By <u>SNP</u>
-------------------------------------------------------------	----------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------

Municipality of Property Location: Twp. of Bernards
* Use symbol "C" to indicate that fee is exclusively for county use.

(1) PARTY OR LEGAL REPRESENTATIVE (Instructions 3 and 4 attached)
Deponent, Kenneth Silverman, being duly sworn according to law upon his/her oath, deposes and says that he/she is the Manager of Grantor in a deed dated 02/23/2017 transferring real property identified as Block No. 11201, Lot No. 3 located at 160 Allen Road, Bernards, NJ and annexed thereto.

(2) CONSIDERATION: \$ 25,000,000.00 (Instructions 1 and 5) no prior mortgage to which property is subject.

(3) Property transferred is Class (A) 4B 4C. If property transferred is Class 4A, calculation in Section 3A below is required.

(3A) REQUIRED CALCULATION of Equalized Valuation for all Class 4A (Commercial) Property Transactions:
(Instructions 6A and 7)
Total Assessed Valuation + Director's Ratio = Equalized Assessed Valuation
\$19,431,900.00 + 94.32 % = \$ 20,284,033.08
If Director's Ratio is less than 100%, the equalized valuation will be an amount greater than the assessed value. If Director's Ratio is equal to or in excess of 100%, the assessed value will be equal to the equalized valuation.

(4) FULL EXEMPTION FROM FEE: (Instruction 8)
Deponent states that this deed transaction is fully exempt from the Realty Transfer Fee imposed by C. 49, P.L. 1968, as amended through C. 60, P.L. 2004, for the following reason(s). More reference to the exemption symbol is insufficient. Explain in detail.

(6) PARTIAL EXEMPTION FROM FEE: (Instruction 9) NOTE: All boxes below apply to grantor(s) only. ALL BOXES IN APPROPRIATE CATEGORY MUST BE CHECKED. Failure to do so will void claim for partial exemption.
Deponent claims that this deed transaction is exempt from the State's portion of the Basic, Supplemental and General Purpose Fees, as applicable, imposed by C. 176, P.L. 1976; C. 113, P.L. 2004 and C. 06, P.L. 2004 for the following reason(s):

- A. SENIOR CITIZEN (Instruction 9)
 - Grantor(s) 62 years of age or over*
 - Owned and occupied by grantor(s) at time of sale
 - One- or two-family residential premises
 - Resident of the State of New Jersey
 - Owners as joint tenants must all qualify
- B. BLIND PERSON (Instruction 9)
 - Grantor(s) legally blind*
 - Owned and occupied by grantor(s) at time of sale
 - One- or two-family residential premises
 - Resident of the State of New Jersey
 - Owners as joint tenants must all qualify
- DISABLED PERSON (Instruction 9)
 - Grantor(s) permanently and totally disabled*
 - Grantor(s) receiving disability payments*
 - Grantor(s) not gainfully employed*
 - Owned and occupied by grantor(s) at time of sale
 - One- or two-family residential premises
 - Resident of the State of New Jersey
 - Owners as joint tenants must all qualify
- C. LOW AND MODERATE INCOME HOUSING (Instruction 9)
 - Affordable according to HUD standards
 - Meets income requirements of region
 - Reserved for occupancy
 - Subject to resale controls

(6) NEW CONSTRUCTION (Instructions 2, 10 and 12)
 Entirely new improvement Not previously occupied
 Not previously used for any purpose "New Construction" printed clearly at top of the first page of the deed

(7) RELATED LEGAL ENTITIES TO LEGAL ENTITIES (Instructions 5, 12 and 14)
 No prior mortgage assumed or to which property is subject at time of sale
 No contributions to capital by either grantor or grantee legal entity
 No stock or money exchanged by or between grantor or grantee legal entities

(8) Deponent makes this Affidavit to induce the County Clerk or Registrar of Deeds to record the deed and accept the fee submitted herewith in accordance with the provisions of Chapter 49, P.L. 1968, as amended through Chapter 83, P.L. 2006.

Subscribed and sworn to before me this <u>9th</u> day of <u>March</u> , 20 <u>18</u>	Signature of Deponent <u>Kenneth Silverman, 780 Morris Twpk., Short Hills, NJ 07078</u>	<u>150 Allen Road LLC</u> Grantor Name <u>780 Morris Twpk., Short Hills, NJ 07078</u>
<u>FRANK J. KRAUSE</u> Notary Public, State of New Jersey My Commission Expires <u>March 31, 2020</u>	Deponent Address <u>XXX-XX-X 2 4 0</u> Put 2 digits in Grantor's Soc. Sec. No.	Grantor Address at Time of Sale <u>Madison Twpk. Agency</u> Name/Company if Not a Natural Citizen

County recording officers shall forward one copy of each Affidavit of Consideration for Use by Seller when section 3A is completed to: State of New Jersey - Division of Taxation, P.O. Box 261, Trenton, NJ 08646-0261, Attention: Realty Transfer Fee Unit The Director of the Division of Taxation in the Department of the Treasury has prescribed this form as required by law, and it may not be altered or amended without the prior approval of the Director. For information on the Realty Transfer Fee or to print a copy of this Affidavit, visit the Division of Taxation website at www.state.nj.us/treasury/taxation/information.htm .	FOR OFFICIAL USE ONLY Instrument Number _____ County <u>Somerset</u> Deed Number _____ Book _____ Page _____ Deed Dated _____ Date Recorded <u>3/9/18</u>
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------

RTF-1EE (Rev. 12/09) STATE OF NEW JERSEY
 MUST SUBMIT IN DUPLICATE AFFIDAVIT OF CONSIDERATION FOR USE BY BUYER
 (Chapter 49, P.L. 1968, as amended through Chapter 33, P.L. 2008) (N.J.S.A. 48:15-5 et seq.)
 PLEASE READ THE INSTRUCTIONS ON THE REVERSE SIDE OF THIS FORM BEFORE COMPLETING THIS AFFIDAVIT
 STATE OF NEW JERSEY NEW YORK

COUNTY SARATOGA } SS. County Municipal Code 1302

MUNICIPALITY OF PROPERTY LOCATION Orangetown Twp

(1) PARTY OR LEGAL REPRESENTATIVE (See instructions #3 and #4 on reverse side) XXX-XX-X 257
 Deponent, ABRAHAM BRACH being duly sworn according to law upon his/her oath,
 (Name)
 deposes and says that he/she is the manager of buyer in a deed dated 2/23/2018 transferring
 (Grantor, Legal Representative, Corporate Officer, Officer of Title Company, Lending Institution, etc.)
 real property identified as Block number 17201 Lot number 962 located at
150 ALLEN RD, BASKING RIDGE NJ and annexed thereto.
 (Street Address, Town)

FOR RECORDER'S USE ONLY

Consideration \$ 25,000,000.
 RTF paid by buyer \$ 250,000.00
 Date 3/8/18 By SNP

(2) CONSIDERATION \$ 25000000 (See instructions #1, #5, and #11 on reverse side)
 Entire consideration is in excess of \$1,000,000:

PROPERTY CLASSIFICATION CHECKED OR CIRCLED BELOW IS TAKEN FROM OFFICIAL ASSESSMENT LIST (A PUBLIC RECORD) OF MUNICIPALITY WHERE THE REAL PROPERTY IS LOCATED IN THE YEAR OF TRANSFER. REFER TO N.J.A.C. 18:12-2.2 ET SEQ.

(A) Grantor required to remit the 1% fee, complete (A) by checking off appropriate box or boxes below.

Class 2 - Residential Class 4A - Commercial properties
 Class 3A - Farm property (Regular) and any other real property transferred to same grantee in conjunction with transfer of Class 3A property (if checked, calculation in (E) required below)
 Cooperative unit (four families or less) (See C. 46:8D-3.)
 Cooperative units are Class 4C.

(B) Grantor is not required to remit 1% fee (one or more of following classes being conveyed), complete (B) by checking off appropriate box or boxes below.

Property class. Circle applicable class or classes: 1 3B 4B 4C 15
 Property classes: 1-Vacant Land; 3B - Farm property (Qualified); 4B - Industrial properties; 4C - Apartments; 15 - Public Property, etc. (N.J.A.C. 18:12-2.2 et seq.)
 Exempt organization determined by federal Internal Revenue Service/Internal Revenue Code of 1986, 26 U.S.C. s. 501.
 Incidental to corporate merger or acquisition; equalized assessed valuation less than 20% of total value of all assets exchanged in merger or acquisition. If checked, calculation in (E) required and MUST ATTACH COMPLETED RTF-4.

(C) When grantor transfers properties involving block(s) and lot(s) of two or more classes in one deed, one or more subject to the 1% fee (A), with one or more than one not subject to the 1% fee (B), pursuant to N.J.S.A. 46:15-7.2, complete (C) by checking off appropriate box or boxes and (D).

Property class. Circle applicable class or classes: 1 2 3B 4A 4B 4C 15

(D) EQUALIZED VALUE CALCULATION FOR ALL PROPERTIES CONVEYED, WHETHER THE 1% FEE APPLIES OR DOES NOT APPLY
 Total Assessed Valuation + Director's Ratio = Equalized Valuation

Property Class	\$	+	% = \$
Property Class	\$	+	% = \$
Property Class	\$	+	% = \$
Property Class	\$	+	% = \$

(E) REQUIRED EQUALIZED VALUE CALCULATION FOR ALL CLASS 4A (COMMERCIAL) PROPERTY TRANSACTIONS: (See instructions #6 and #7 on reverse side)

Total Assessed Valuation + Director's Ratio = Equalized Value
\$ 19,310,000.00 + 74.32 % = \$ 20,214,033.68

If Director's Ratio is less than 100%, the equalized valuation will be an amount greater than the assessed valuation. If Director's Ratio is equal to or exceeds 100%, the assessed valuation will be equal to the equalized value.

(3) TOTAL EXEMPTION FROM FEE (See instruction #8 on reverse side)
 Deponent states that this deed transaction is fully exempt from the Realty Transfer Fee imposed by C. 49, P.L. 1968, as amended through Chapter 33, P.L. 2008, for the following reason(s). Mere reference to exemption symbol is insufficient. Explain in detail.

(4) Deponent makes Affidavit of Consideration for Use by Buyer in justice county clerk or register of deeds to record the deed and accept the fee submitted herewith pursuant to the provisions of Chapter 49, P.L. 1968, as amended through Chapter 33, P.L. 2008.

Subscribed and sworn to before me this 23 day of Feb, 2018.

Signature of Deponent: [Signature] Grantee Name: Sis 150 LLC
 Deponent Address: 20 [Address] Grantee Address at Time of Sale: 20 [Address]
 Name/Company of Settlement Officer: Medison Title Company

MARTIN SILVERSTEIN
 Notary Public, State of New York
 No. 01914696011
 Qualified in Nassau County
 Commission Expires Nov. 30, 2018

County recording officers: forward one copy of each RTF-1EE to:

STATE OF NJ - DIVISION OF TAXATION
 PO BOX 251
 TRENTON, NJ 08646-0251
 ATTENTION: REALTY TRANSFER FEE UNIT

FOR OFFICIAL USE ONLY
 Instrument Number _____ County Saratoga
 Deed Number _____ Book _____ Page _____
 Deed Dated _____ Date Recorded 3/8/18

The Director, Division of Taxation, Department of the Treasury has prescribed this form, as required by law. It may not be altered or amended without prior approval of the Director. For further information on the Realty Transfer Fee or to print a copy of this Affidavit or any other relevant forms, visit: www.state.nj.us/treasurytaxation/rtf/localtax.html.

SOIL SURVEY LEGEND

SOIL SYMBOL	SOIL NAME	HSG
MopCb	MOUNT LUCAS-WATCHUNG SILT LOAMS, 6 TO 12 PERCENT SLOPES	C
NemCb	NESHAMINY-MOUNT LUCAS SILT LOAMS, 6 TO 12 PERCENT SLOPES	B
WaaA	WATCHUNG SILT LOAM, 0 TO 2 PERCENT SLOPES	D

SLOPE LEGEND

SLOPE	CATEGORY	AREA	ALLOWABLE DISTURBANCE	PROPOSED DISTURBANCE
0% TO 14.9%		28.051 ACRES	28.05 ACRES (100%)	14.743 ACRES (52%)
15% TO 19.9%		0.095 ACRES	0.038 ACRES (40%)	0.015 ACRES (15%)
20% TO 25%		0.071 ACRES	0.014 ACRES (20%)	0.029 ACRES (41%) ²
GREATER THAN 25%		0.087 ACRES	0.000 ACRES (0%) ¹	0.067 ACRES (77%) ³

¹ IN AREAS WITH SLOPES GREATER THAN 25%, NO DEVELOPMENT, REGRADING OR STRIPPING OF VEGETATION SHALL BE PERMITTED UNLESS THE DISTURBANCE IS FOR ROADWAY CROSSINGS OR UTILITY CONSTRUCTION AND IT CAN BE DEMONSTRATED THAT THE ROADWAY OR UTILITY IMPROVEMENTS ARE NECESSARY IN THE SLOPED AREA FOR THE IMPROVEMENT TO EXIST.
² VARIANCE REQUESTED.
³ DISTURBANCE PERMITTED FOR ROADWAY AND UTILITY CONSTRUCTION.

CURVE TABLE						
CURVE	RADIUS	LENGTH	DELTA	TANGENT	DIRECTION	CHORD
C1	635.00'	22.67'	062°02'43"	11.33'	N 72°16'07" E	22.67'
C2	935.00'	34.26'	062°09'57"	17.13'	N 70°11'46" E	34.26'



REVISIONS		
NO.	DATE	DESCRIPTION



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 Consulting Engineers
 Land Surveyors
 Landscape Architects
 Land Planners
 265 Main Street, P.O. Box 400
 Gladstone, New Jersey 07934
 T: (908) 234-0309
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 NJ Certificate of Authorization
 No. 24GA28034400
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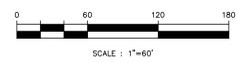
PROJECT
 150 ALLEN ROAD
 LOT 3 BLOCK 11201
 TOWNSHIP OF BERNARDS
 SOMERSET COUNTY
 NEW JERSEY

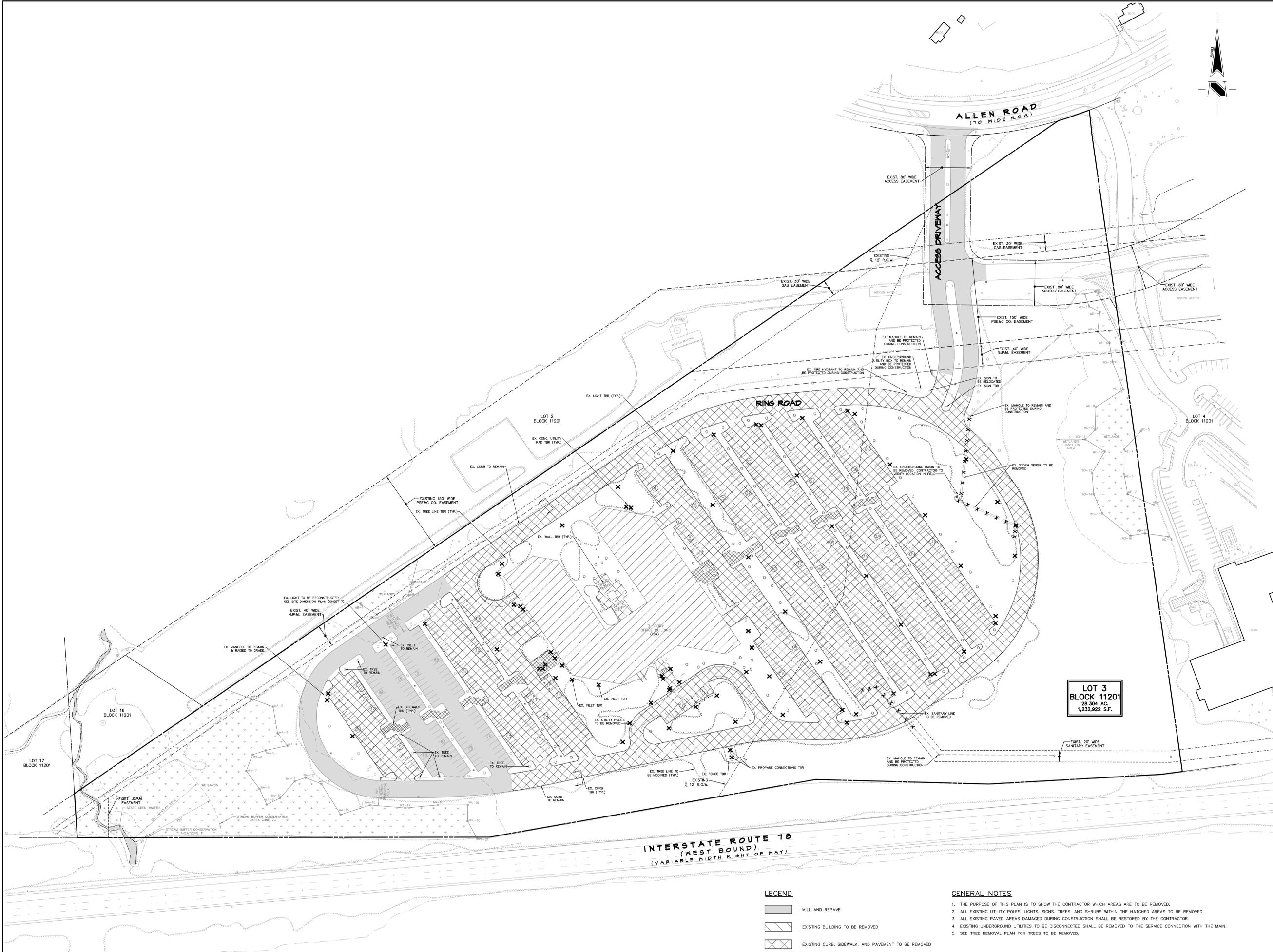
SHEET TITLE
 PRELIMINARY AND FINAL
 MAJOR SITE PLANS
**ENVIRONMENTAL
 CONSTRAINTS PLAN**

DATE	SEPTEMBER 16, 2022
SCALE	1" = 60'
DRAWN	MF
CHKD.	CRF/RMC2
JOB NO.	1114-02
SHEET NO.	2 OF 21

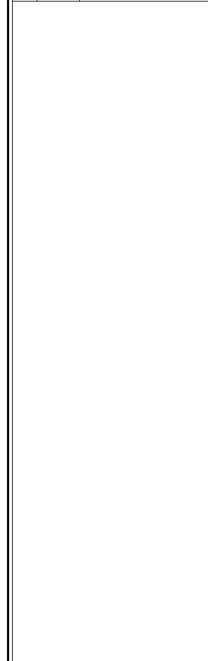
GENERAL NOTES:

- THE PURPOSE OF THESE PLANS IS TO OBTAIN PRELIMINARY AND FINAL MAJOR SITE PLAN APPROVAL FROM THE TOWNSHIP OF BERNARDS ZONING BOARD OF ADJUSTMENT FOR THE CONSTRUCTION OF TWO LIGHT MANUFACTURING BUILDINGS AND ASSOCIATED SITE IMPROVEMENTS.
- BOUNDARY AND TOPOGRAPHIC INFORMATION SHOWN HEREON TAKEN FROM THE FOLLOWING:
 A. PLAN ENTITLED "PROPERTY SURVEY, LOT 3 BLOCK 11201, 150 ALLEN ROAD, TOWNSHIP OF BERNARDS, SOMERSET COUNTY, NJ" DATED NOVEMBER 21, 2017, PREPARED BY PENNONI ASSOCIATES INC.
 B. PLAN ENTITLED "ALLEN RD, BERNARDS, NJ" DATED FEBRUARY 28, 2022, PREPARED BY ROBINSOON AERIAL SURVEYS INC. ELEVATIONS BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
- FRESHWATER WETLANDS, AND WETLANDS TRANSITION AREA SHOWN WERE SUBMITTED TO NJDEP ON JULY 22, 2022 AND IS SUBJECT TO NJDEP REVIEW AND APPROVAL.
- A STREAM LOCATED ON THE WEST END OF THE SUBJECT PROPERTY QUALIFIES FOR A STREAM BUFFER CONSERVATION EASEMENT PER ORDINANCE 21-14.4.
- FRESHWATER WETLANDS BUFFER SUBJECT TO BERNARDS TOWNSHIP CONSERVATION EASEMENT.





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 Robert C. Morris
 Robert C. Moschello, P.E.

ROBERT C. MOSCHELLO, P.E.
 NJ PROFESSIONAL ENGINEER
 LICENSE No. GE44279

PROJECT

150 ALLEN ROAD
 LOT 3 BLOCK 11201
 TOWNSHIP OF BERNARDS
 SOMERSET COUNTY
 NEW JERSEY

SHEET TITLE

PRELIMINARY AND FINAL
 MAJOR SITE PLANS

SITE REMOVALS PLAN

DATE	SEPTEMBER 16, 2022
SCALE	1" = 60'
JOB NO.	1114-02
DRAWN	MF
SHEET NO.	3 OF 21
CHKD.	CRF/RCM2

THIS PLAN IS FOR SITE REMOVAL PURPOSES ONLY

LEGEND

	MILL AND REPAVE
	EXISTING BUILDING TO BE REMOVED
	EXISTING CURB, SIDEWALK, AND PAVEMENT TO BE REMOVED
	TREE TO BE REMOVED (TYP.)
	EX. MISC. ITEM TO BE REMOVED
	EX. MISC. ITEM TO BE REMOVED (TBR)

- GENERAL NOTES**
1. THE PURPOSE OF THIS PLAN IS TO SHOW THE CONTRACTOR WHICH AREAS ARE TO BE REMOVED.
 2. ALL EXISTING UTILITY POLES, LIGHTS, SIGNS, TREES, AND SHRUBS WITHIN THE HATCHED AREAS TO BE REMOVED.
 3. ALL EXISTING PAVED AREAS DAMAGED DURING CONSTRUCTION SHALL BE RESTORED BY THE CONTRACTOR.
 4. EXISTING UNDERGROUND UTILITIES TO BE DISCONNECTED SHALL BE REMOVED TO THE SERVICE CONNECTION WITH THE MAIN.
 5. SEE TREE REMOVAL PLAN FOR TREES TO BE REMOVED.

EXISTING TREES REMOVED:

SPECIES	SIZE AND QUANTITY
ASH:	8"=1
BEECH:	6"=2 8"=0 10"=2 12"=2 18"=0
BIRCH:	6"=13 8"=3 9"=2 10"=1 12"=2 16"=2 18"=2
CEDAR:	8"=2
CRABAPPLE:	6"=17 8"=35 9"=5 10"=30 12"=2
HICKORY:	6"=1 8"=1 10"=3 12"=3 14"=4 15"=5 16"=0 18"=0 20"=2
LOCUST:	8"=4 10"=24 12"=53 13"=0 14"=28 15"=8 16"=17 18"=2 20"=1
MAPLE:	6"=12 8"=3 10"=3 12"=3 14"=4 15"=5 16"=0 18"=0 20"=2
OAK:	8"=1 12"=1 16"=3 18"=2 20"=2 24"=1
PEAR:	36"=0 6"=6 8"=6 10"=6 12"=4 16"=0 18"=0
PINE:	6"=2 8"=11 9"=6 10"=9 12"=21 14"=5 15"=4 16"=1
POPLAR:	6"=1 8"=2 9"=1 10"=2 12"=1 14"=0 16"=4 18"=0 20"=0 24"=1
REDBUD:	12"=2
SPRUCE:	6"=4
SYCAMORE:	8"=1 14"=0 18"=1
TREE OF HEAVEN:	6"=1 10"=1 12"=1

EXISTING TREE SURVEYED

SIZE	QUANTITY	TREE REMOVED
0"-6"	82	60
6"-10"	105	84
10"-12"	217	177
12"-18"	124	89
18"-24"	19	7
24"-30"	0	0
30"-36"	1	0
36"-40"	0	0
40.01" OR GREATER	0	0
TOTAL	548	417

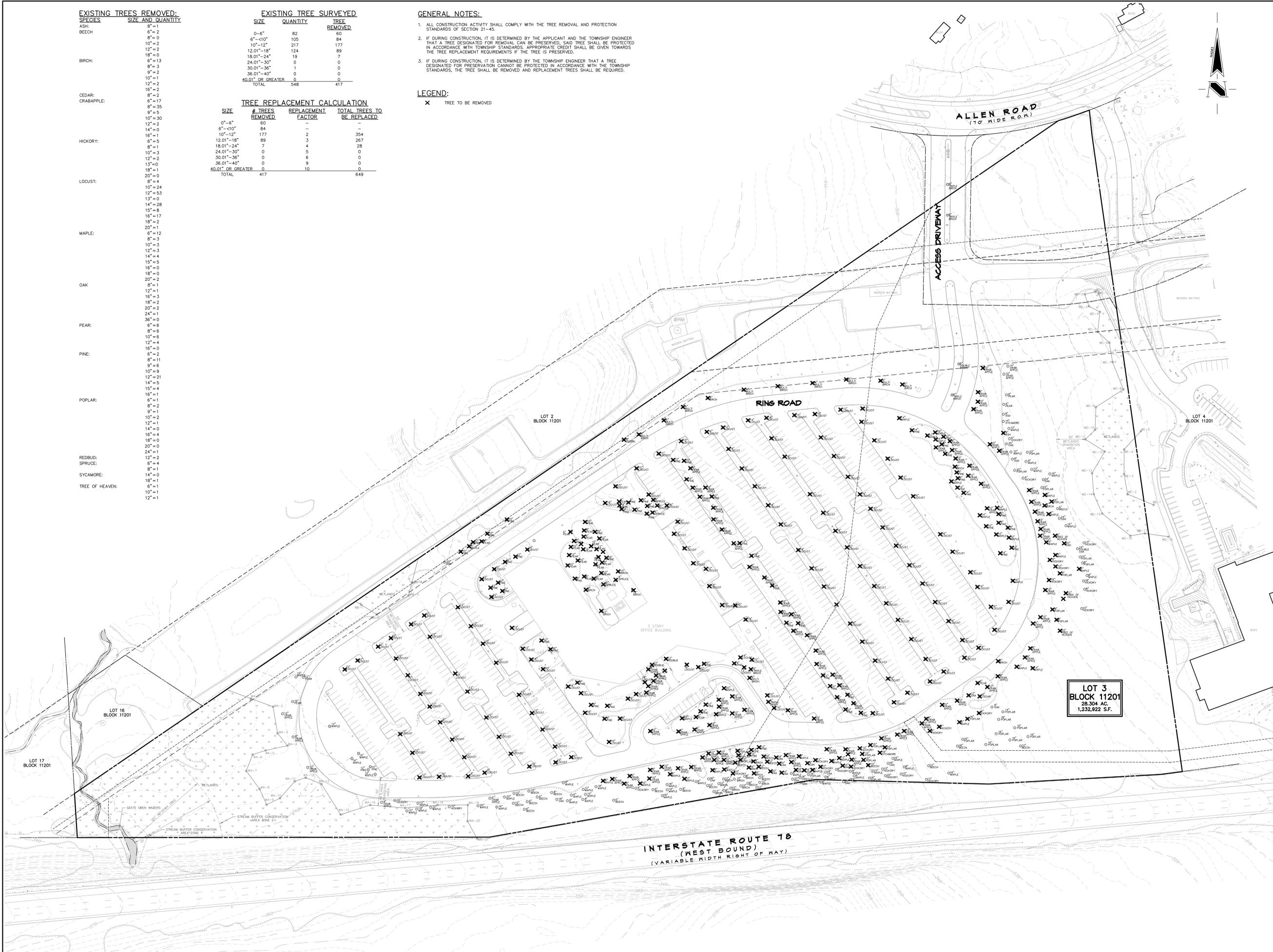
TREE REPLACEMENT CALCULATION

SIZE	# TREES REMOVED	REPLACEMENT FACTOR	TOTAL TREES TO BE REPLACED
0"-6"	60	-	-
6"-10"	84	-	-
10"-12"	177	2	354
12"-18"	89	3	267
18"-24"	7	4	28
24"-30"	0	5	0
30"-36"	0	6	0
36"-40"	0	9	0
40.01" OR GREATER	0	10	0
TOTAL	417		649

GENERAL NOTES:

- ALL CONSTRUCTION ACTIVITY SHALL COMPLY WITH THE TREE REMOVAL AND PROTECTION STANDARDS OF SECTION 21-45.
- IF DURING CONSTRUCTION, IT IS DETERMINED BY THE APPLICANT AND THE TOWNSHIP ENGINEER THAT A TREE DESIGNATED FOR REMOVAL CAN BE PRESERVED, SAID TREE SHALL BE PROTECTED IN ACCORDANCE WITH TOWNSHIP STANDARDS. APPROPRIATE CREDIT SHALL BE GIVEN TOWARDS THE TREE REPLACEMENT REQUIREMENTS IF THE TREE IS PRESERVED.
- IF DURING CONSTRUCTION, IT IS DETERMINED BY THE TOWNSHIP ENGINEER THAT A TREE DESIGNATED FOR PRESERVATION CANNOT BE PROTECTED IN ACCORDANCE WITH THE TOWNSHIP STANDARDS, THE TREE SHALL BE REMOVED AND REPLACEMENT TREES SHALL BE REQUIRED.

LEGEND:
X TREE TO BE REMOVED



REVISIONS

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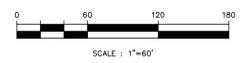
ROBERT C. MOSCHELLO, P.E.
 NJ PROFESSIONAL ENGINEER
 LICENSE No. GE44279

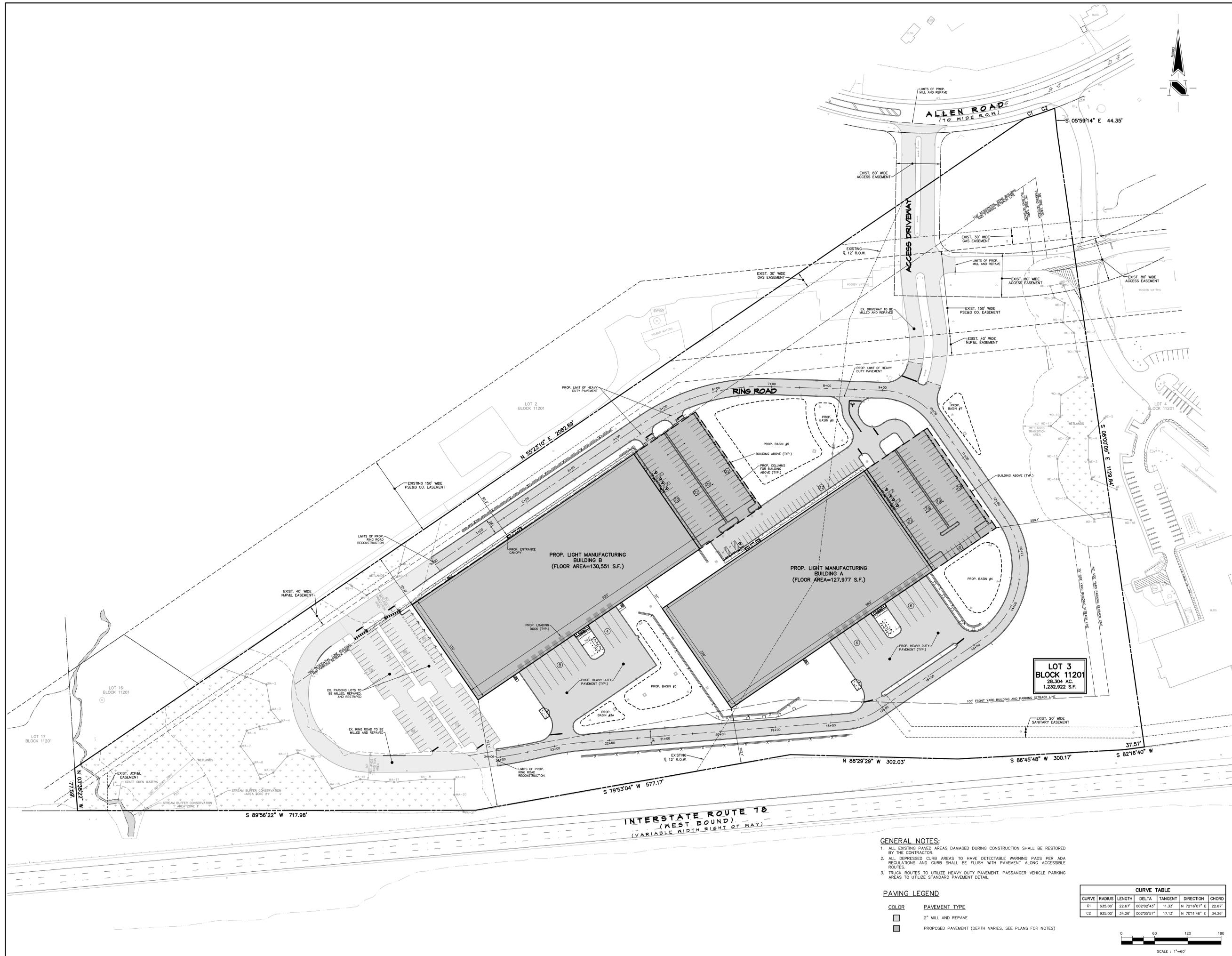
PROJECT
 150 ALLEN ROAD
 LOT 3 BLOCK 11201
 TOWNSHIP OF BERNARDS
 SOMERSET COUNTY
 NEW JERSEY

SHEET TITLE
 PRELIMINARY AND FINAL
 MAJOR SITE PLANS
TREE REMOVAL PLAN

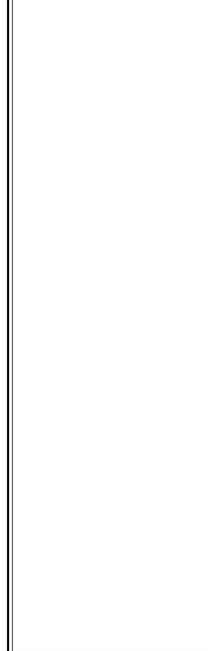
DATE	SEPTEMBER 16, 2022
SCALE	1" = 60'
DRAWN	MF
CHKD.	CRF/RCM2
JOB NO.	1114-02
SHEET NO.	4 OF 21

THIS PLAN IS FOR TREE REMOVAL PURPOSES ONLY





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PROJECT

150 ALLEN ROAD

LOT 3 BLOCK 11201

TOWNSHIP OF BERNARDS
 SOMERSET COUNTY
 NEW JERSEY

SHEET TITLE

PRELIMINARY AND FINAL
 MAJOR SITE PLANS

**OVERALL SITE
 DIMENSION PLAN**

DATE SEPTEMBER 16, 2022

SCALE 1" = 60'

JOB NO. 1114-02

DRAWN MF SHEET NO.

CHKD. CRF/RCM2 5 OF 21

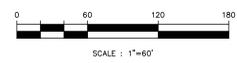
- GENERAL NOTES:**
- ALL EXISTING PAVED AREAS DAMAGED DURING CONSTRUCTION SHALL BE RESTORED BY THE CONTRACTOR.
 - ALL DEPRESSED CURB AREAS TO HAVE DETECTABLE WARNING PADS PER ADA REGULATIONS AND CURB SHALL BE FLUSH WITH PAVEMENT ALONG ACCESSIBLE ROUTES.
 - TRUCK ROUTES TO UTILIZE HEAVY DUTY PAVEMENT. PASSENGER VEHICLE PARKING AREAS TO UTILIZE STANDARD PAVEMENT DETAIL.

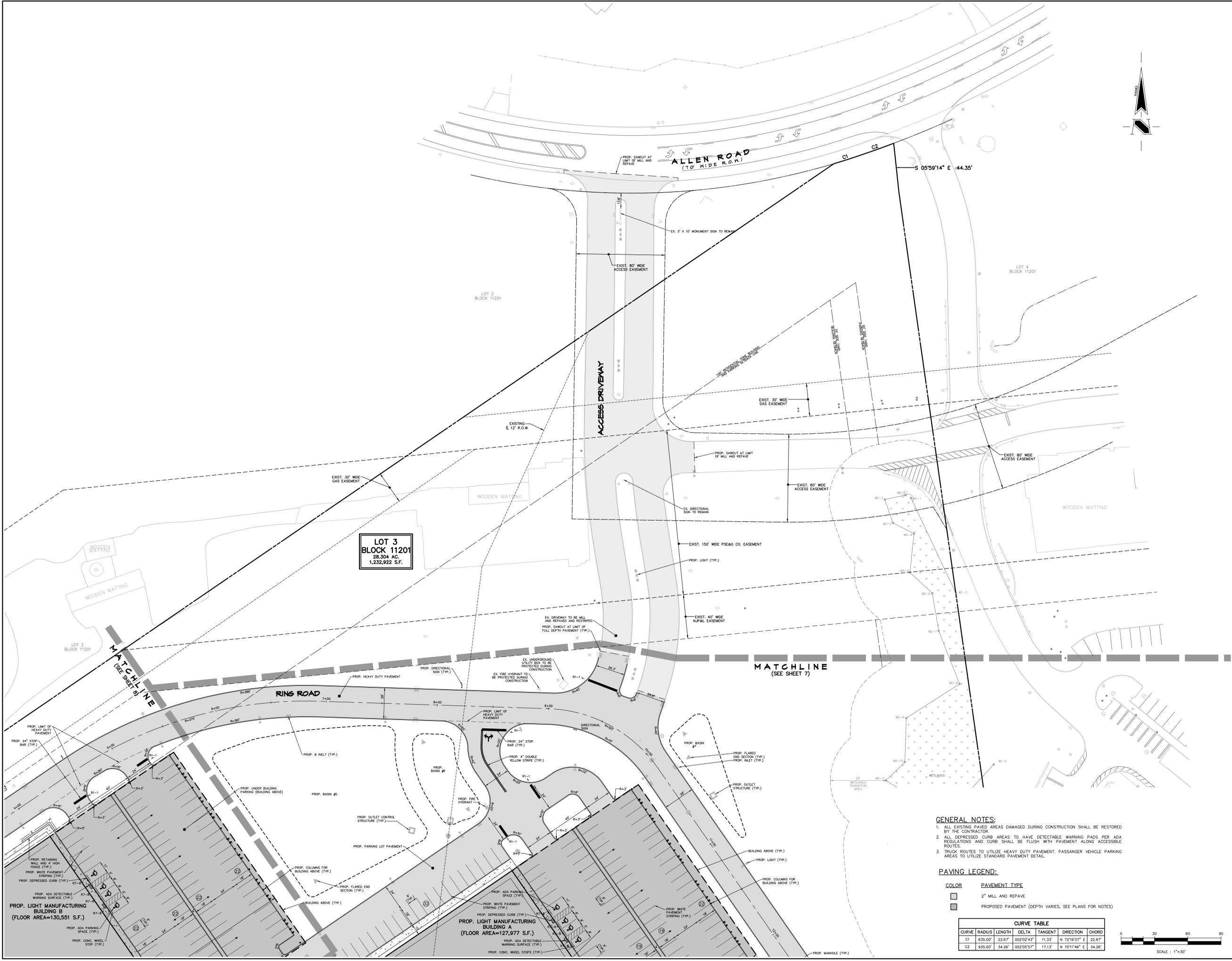
PAVING LEGEND

COLOR	PAVEMENT TYPE
[Light Gray Box]	2" MILL AND REPAVE
[Dark Gray Box]	PROPOSED PAVEMENT (DEPTH VARIES, SEE PLANS FOR NOTES)

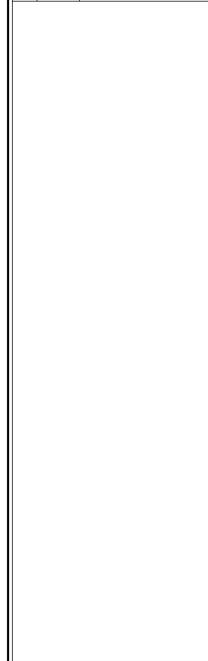
CURVE TABLE

CURVE	RADIUS	LENGTH	DELTA	TANGENT	DIRECTION	CHORD
C1	635.00'	22.67'	002°02'43"	11.33'	N 72°16'07" E	22.67'
C2	935.00'	34.26'	002°05'57"	17.13'	N 70°11'46" E	34.26'





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NO.	DATE	DESCRIPTION



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 LICENSE No. 0E44279

PROJECT
150 ALLEN ROAD
 LOT 3 BLOCK 11201
 TOWNSHIP OF BERNARDS
 SOMERSET COUNTY
 NEW JERSEY

SHEET TITLE
 PRELIMINARY AND FINAL
 MAJOR SITE PLANS
SITE DIMENSION PLAN "A"

DATE
 SEPTEMBER 16, 2022
 SCALE
 1" = 30'
 JOB NO.
 1114-02
 DRAWN
 MF
 SHEET NO.
 6 OF 21
 CHD.
 CRF/RCM2

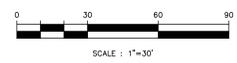
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 - TRUCK ROUTES TO UTILIZE HEAVY DUTY PAVEMENT. PASSENGER VEHICLE PARKING AREAS TO UTILIZE STANDARD PAVEMENT DETAIL.

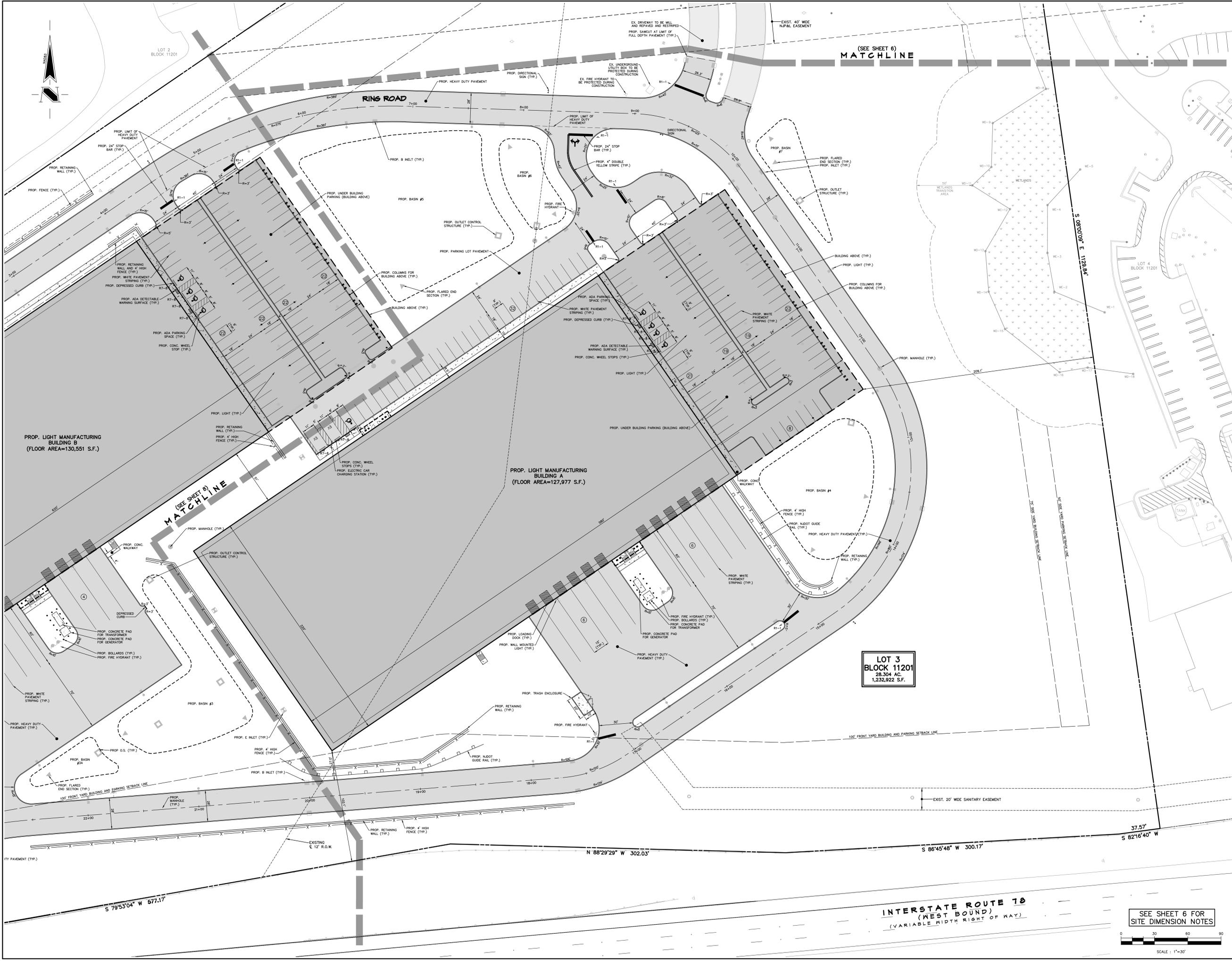
PAVING LEGEND:

COLOR	PAVEMENT TYPE
[White Box]	2" MILL AND REPAVE
[Grey Box]	PROPOSED PAVEMENT (DEPTH VARIES, SEE PLANS FOR NOTES)

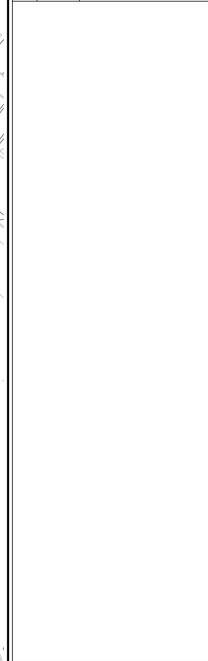
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LICENSE No. 0E44279

PROJECT
150 ALLEN ROAD
LOT 3 BLOCK 11201
TOWNSHIP OF BERNARDS
SOMERSET COUNTY
NEW JERSEY

SHEET TITLE
PRELIMINARY AND FINAL
MAJOR SITE PLANS

SITE DIMENSION PLAN "B"

DATE
SEPTEMBER 16, 2022

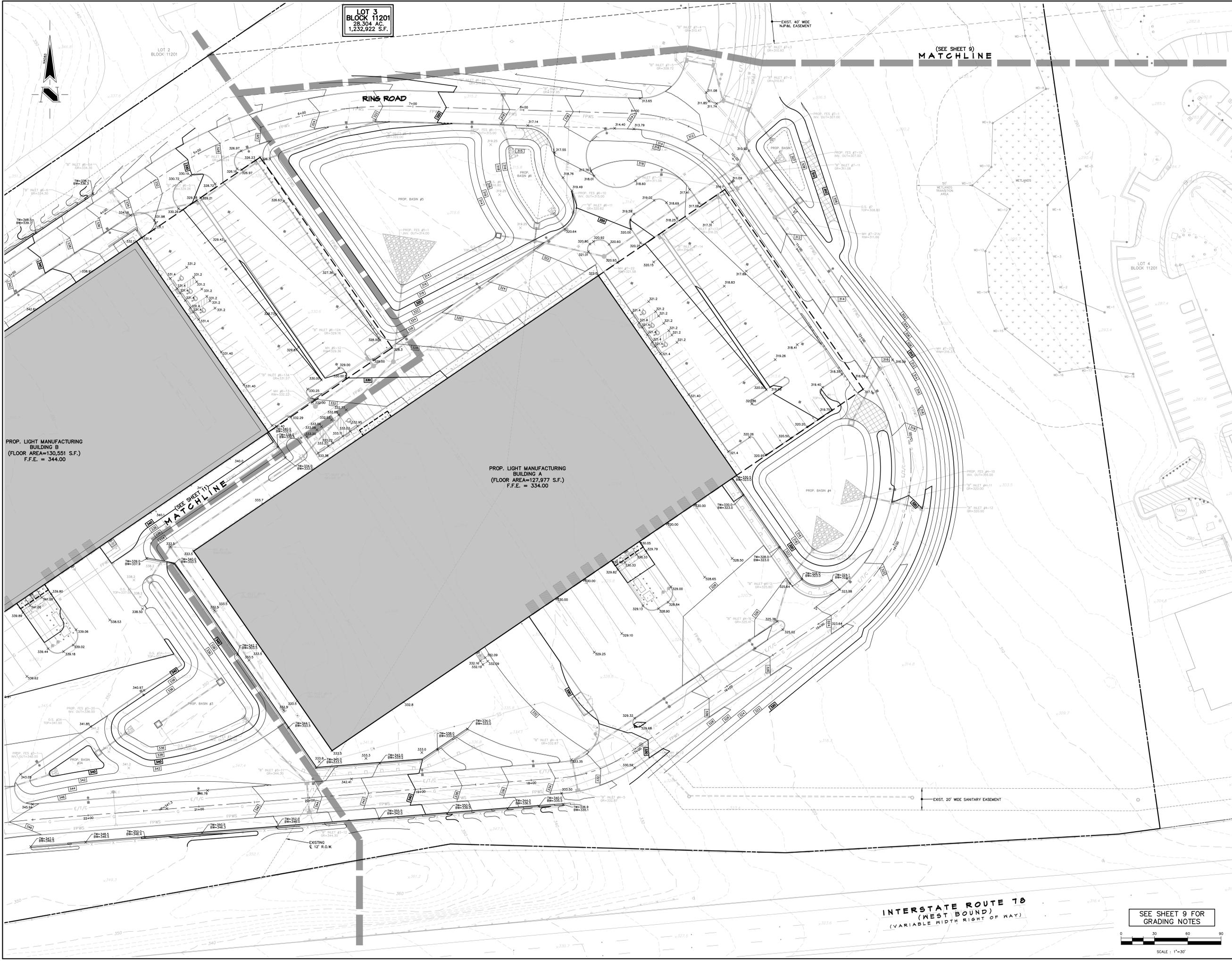
SCALE
1" = 30'

JOB NO.
1114-02

DRAWN
MF

SHEET NO.
7 OF 21

CHKD.
CRF/RCM2



**LOT 3
BLOCK 11201
23,304 AC.
1,232,922 S.F.**

(SEE SHEET 9)
MATCHLINE

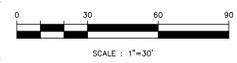
PROP. LIGHT MANUFACTURING
BUILDING B
(FLOOR AREA=130,551 S.F.)
F.F.E. = 344.00

PROP. LIGHT MANUFACTURING
BUILDING A
(FLOOR AREA=127,977 S.F.)
F.F.E. = 334.00

(SEE SHEET 10)
MATCHLINE

**INTERSTATE ROUTE 18
(WEST BOUND)
(VARIABLE WIDTH RIGHT OF WAY)**

SEE SHEET 9 FOR
GRADING NOTES



REVISIONS		
NO.	DATE	DESCRIPTION



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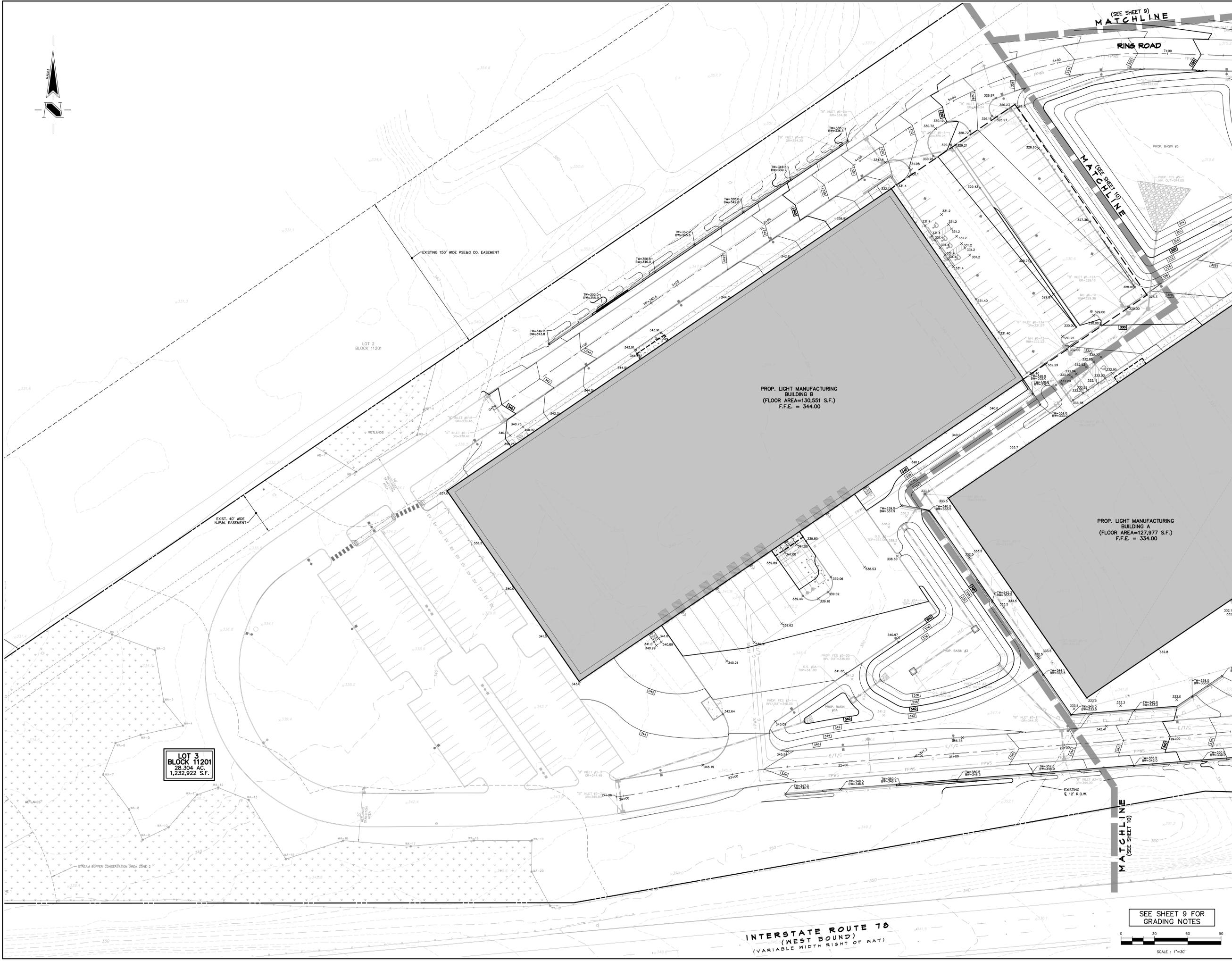
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PROJECT
150 ALLEN ROAD
LOT 3 BLOCK 11201
TOWNSHIP OF BERNARDS
SOMERSET COUNTY
NEW JERSEY

SHEET TITLE
PRELIMINARY AND FINAL
MAJOR SITE PLANS
GRADING PLAN "B"

DATE	SEPTEMBER 16, 2022
SCALE	1" = 30'
JOB NO.	1114-02
DRAWN	MF
SHEET NO.	10 OF 21
CHKD.	CRF/RCM2



LOT 3
BLOCK 11201
28.304 AC.
1,232,922 S.F.

PROP. LIGHT MANUFACTURING
BUILDING B
(FLOOR AREA=130,551 S.F.)
F.F.E. = 344.00

PROP. LIGHT MANUFACTURING
BUILDING A
(FLOOR AREA=127,977 S.F.)
F.F.E. = 334.00

INTERSTATE ROUTE 78
(WEST BOUND)
(VARIABLE WIDTH RIGHT OF WAY)

SEE SHEET 9 FOR
GRADING NOTES



REVISIONS		
NO.	DATE	DESCRIPTION



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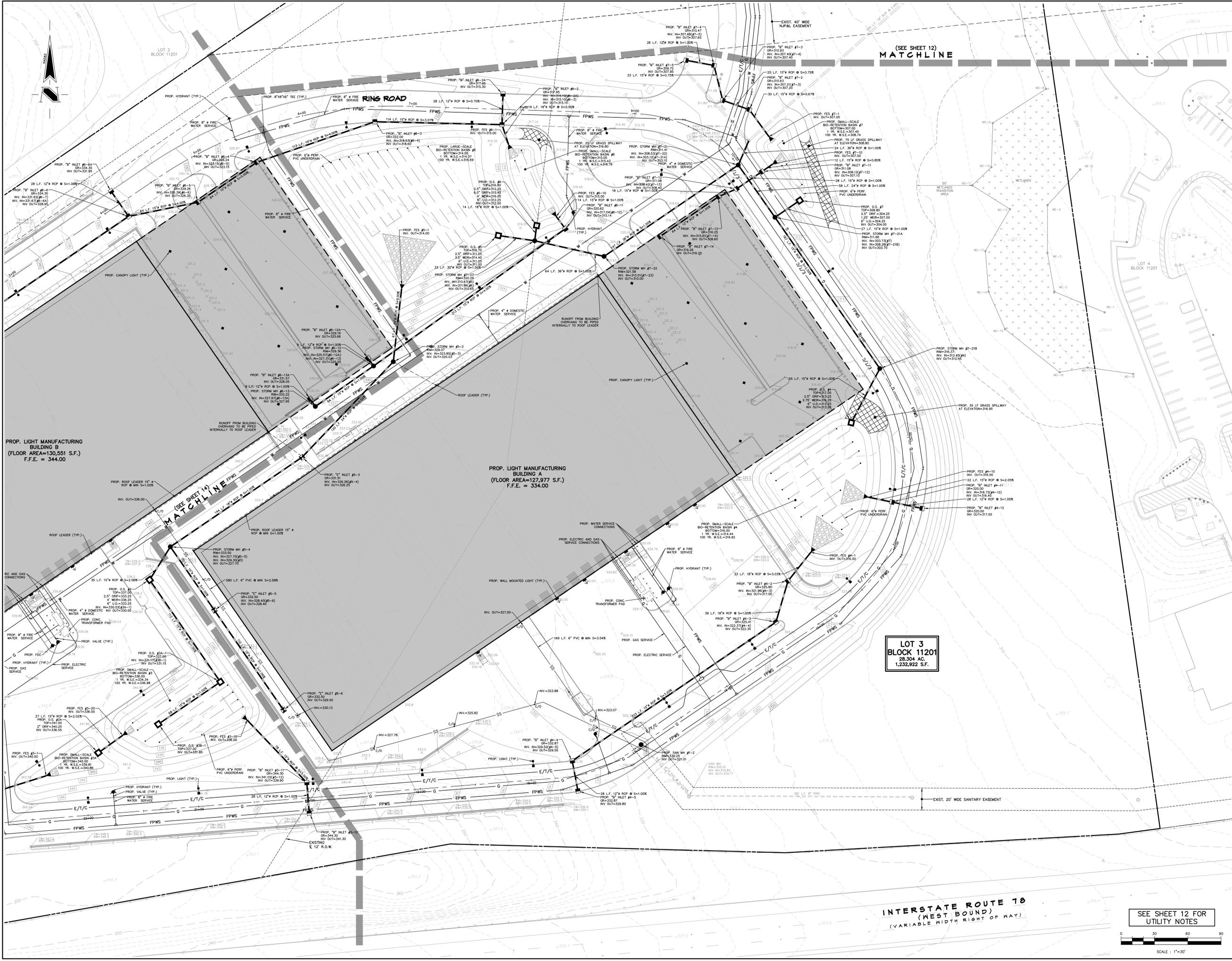
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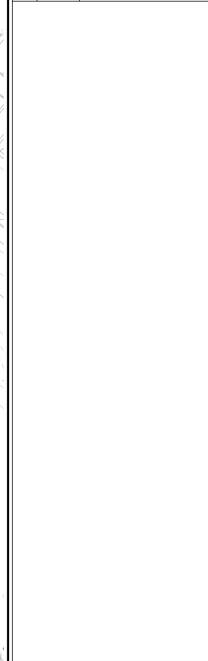
PROJECT
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LOT 3 BLOCK 11201
TOWNSHIP OF BERNARDS
SOMERSET COUNTY
NEW JERSEY

SHEET TITLE
PRELIMINARY AND FINAL
MAJOR SITE PLANS
GRADING PLAN "C"

DATE
SEPTEMBER 16, 2022
SCALE
1" = 30'
JOB NO.
1114-02
DRAWN
MF
SHEET NO.
11 OF 21
CHKD.
CRF/RCM2



REVISIONS		
NO.	DATE	DESCRIPTION



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NJ Certificate of Authorization
 No. 24GA28034400

Ronald A. Kennedy, P.E., P.P., CME, LEED AP
 Kurt T. Hanis, P.L.S.
 Robert C. Morris
 Robert C. Moschello, P.E.

ROBERT C. MOSCHELLO, P.E.
 NJ PROFESSIONAL ENGINEER
 LICENSE No. 0E4279

PROJECT
 150 ALLEN ROAD
 LOT 3 BLOCK 11201
 TOWNSHIP OF BERNARDS
 SOMERSET COUNTY
 NEW JERSEY

SHEET TITLE
 PRELIMINARY AND FINAL
 MAJOR SITE PLANS
 UTILITY PLAN "B"

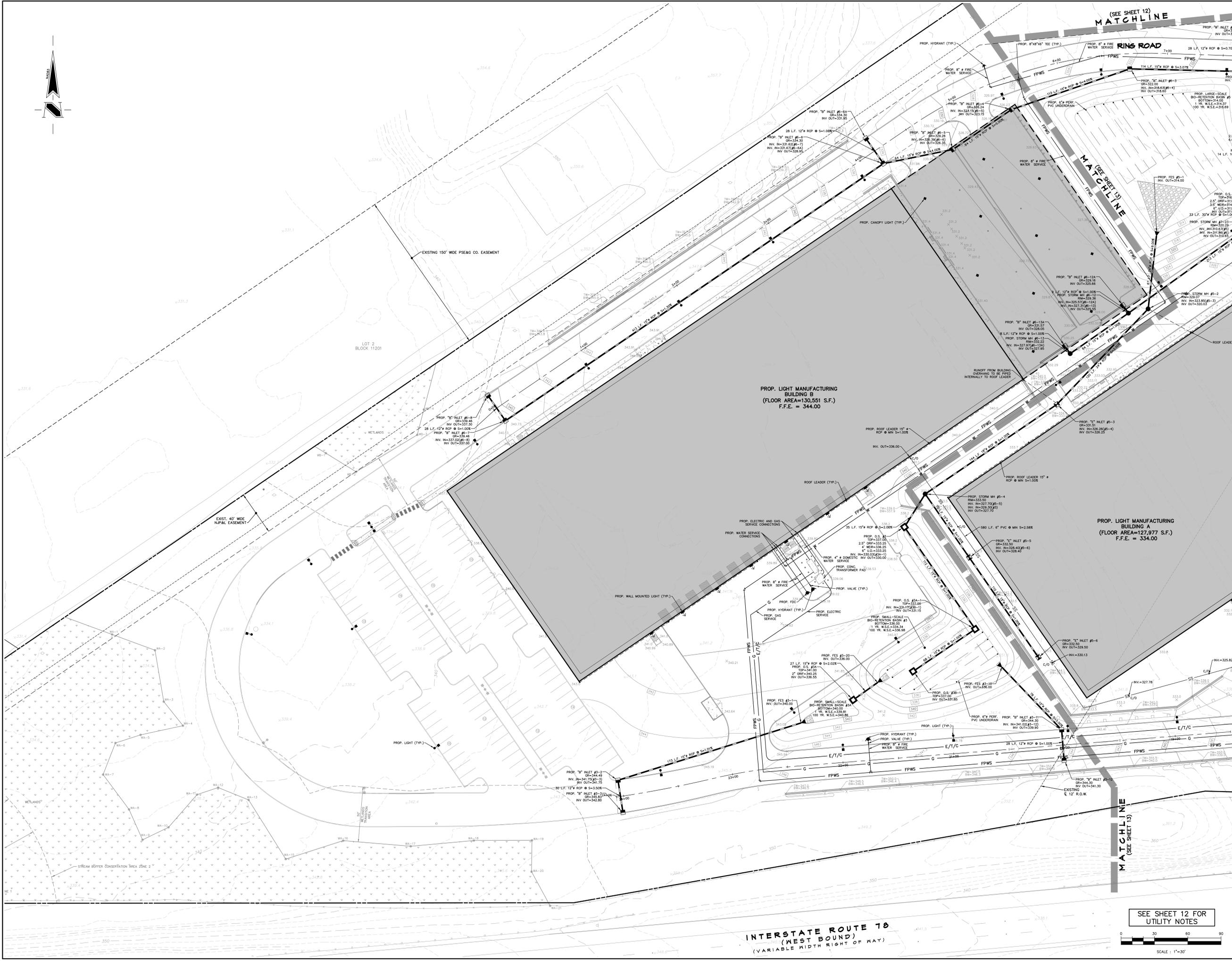
DATE SEPTEMBER 16, 2022
SCALE 1" = 30'
DRAWN MF
CHKD. CRF/RCM2
JOB NO. 1114-02
SHEET NO. 13 OF 21

**LOT 3
 BLOCK 11201
 28.304 AC.
 1,232,922 S.F.**

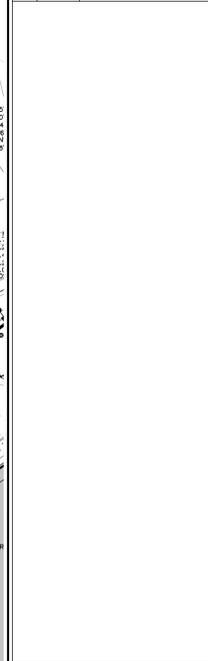
**INTERSTATE ROUTE 10
 (WEST BOUND)
 (VARIABLE WIDTH RIGHT OF WAY)**

**SEE SHEET 12 FOR
 UTILITY NOTES**





REVISIONS		
NO.	DATE	DESCRIPTION



GLADSTONE DESIGN, Inc.
 Consulting Engineers
 Land Surveyors
 Landscape Architects
 Land Planners
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PROJECT
 150 ALLEN ROAD
 LOT 3 BLOCK 11201
 TOWNSHIP OF BERNARDS
 SOMERSET COUNTY
 NEW JERSEY

SHEET TITLE
 PRELIMINARY AND FINAL
 MAJOR SITE PLANS
 UTILITY PLAN "C"

DATE SEPTEMBER 16, 2022
SCALE 1" = 30'
JOB NO. 1114-02
DRAWN MF
SHEET NO. 14 OF 21
CHKD. CRF/RCM2

SEE SHEET 12 FOR UTILITY NOTES



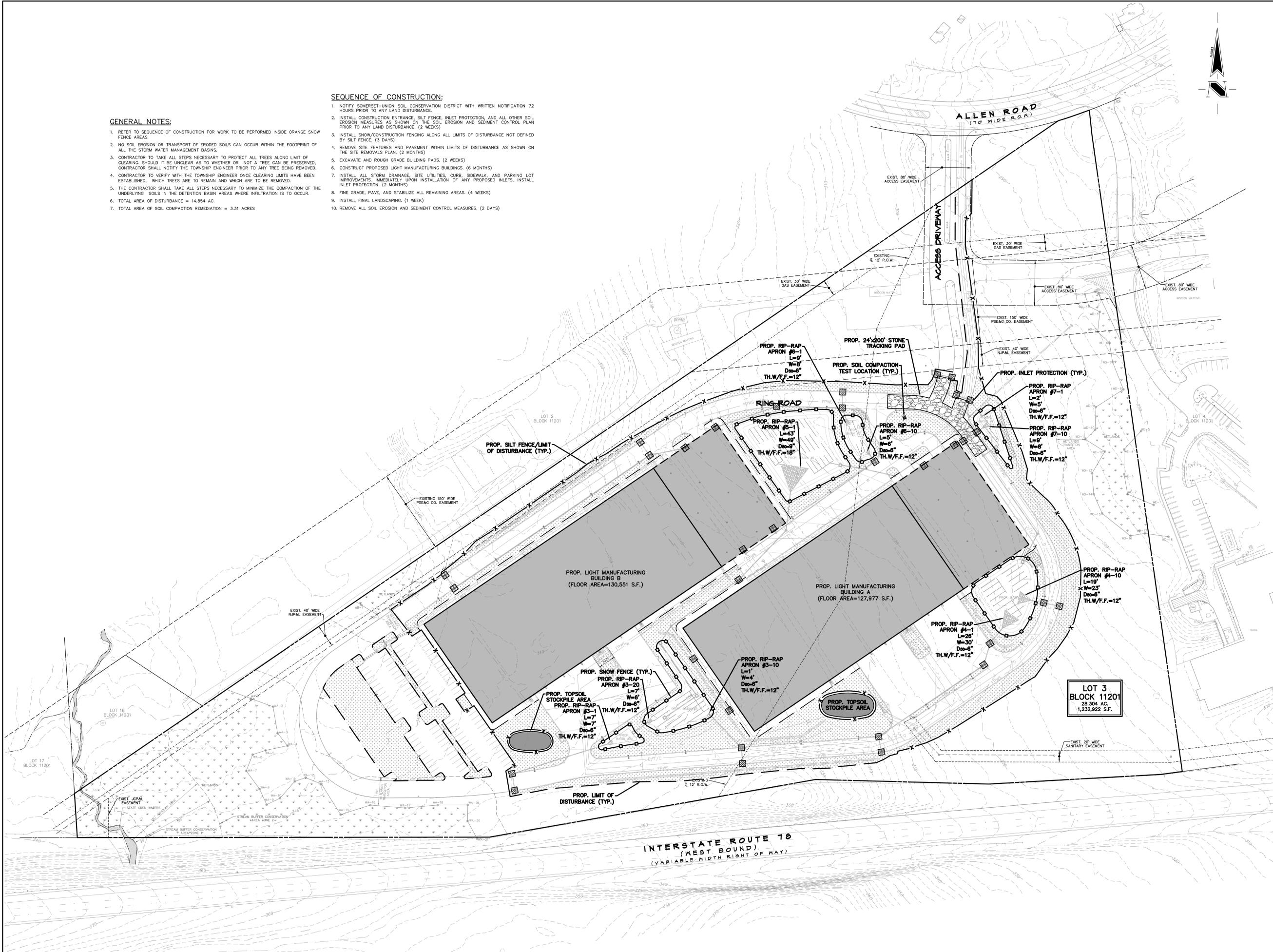
**INTERSTATE ROUTE 78
 (WEST BOUND)
 (VARIABLE WIDTH RIGHT OF WAY)**

GENERAL NOTES:

- REFER TO SEQUENCE OF CONSTRUCTION FOR WORK TO BE PERFORMED INSIDE ORANGE SNOW FENCE AREAS.
- NO SOIL EROSION OR TRANSPORT OF ERODED SOILS CAN OCCUR WITHIN THE FOOTPRINT OF ALL THE STORM WATER MANAGEMENT BASINS.
- CONTRACTOR TO TAKE ALL STEPS NECESSARY TO PROTECT ALL TREES ALONG LIMIT OF CLEARING. SHOULD IT BE UNCLEAR AS TO WHETHER OR NOT A TREE CAN BE PRESERVED, CONTRACTOR SHALL NOTIFY THE TOWNSHIP ENGINEER PRIOR TO ANY TREE BEING REMOVED.
- CONTRACTOR TO VERIFY WITH THE TOWNSHIP ENGINEER ONCE CLEARING LIMITS HAVE BEEN ESTABLISHED, WHICH TREES ARE TO REMAIN AND WHICH ARE TO BE REMOVED.
- THE CONTRACTOR SHALL TAKE ALL STEPS NECESSARY TO MINIMIZE THE COMPACTION OF THE UNDERLYING SOILS IN THE DETENTION BASIN AREAS WHERE INFILTRATION IS TO OCCUR.
- TOTAL AREA OF DISTURBANCE = 14.854 AC.
- TOTAL AREA OF SOIL COMPACTION REMEDIATION = 3.31 ACRES

SEQUENCE OF CONSTRUCTION:

- NOTIFY SOMERSET-UNION SOIL CONSERVATION DISTRICT WITH WRITTEN NOTIFICATION 72 HOURS PRIOR TO ANY LAND DISTURBANCE.
- INSTALL CONSTRUCTION ENTRANCE, SILT FENCE, INLET PROTECTION, AND ALL OTHER SOIL EROSION MEASURES AS SHOWN ON THE SOIL EROSION AND SEDIMENT CONTROL PLAN PRIOR TO ANY LAND DISTURBANCE. (2 WEEKS)
- INSTALL SNOW/CONSTRUCTION FENCING ALONG ALL LIMITS OF DISTURBANCE NOT DEFINED BY SILT FENCE. (3 DAYS)
- REMOVE SITE FEATURES AND PAYEMENT WITHIN LIMITS OF DISTURBANCE AS SHOWN ON THE SITE REMOVALS PLAN. (2 MONTHS)
- EXCAVATE AND ROUGH GRADE BUILDING PADS. (2 WEEKS)
- CONSTRUCT PROPOSED LIGHT MANUFACTURING BUILDINGS. (6 MONTHS)
- INSTALL ALL STORM DRAINAGE, SITE UTILITIES, CURB, SIDEWALK, AND PARKING LOT IMPROVEMENTS. IMMEDIATELY UPON INSTALLATION OF ANY PROPOSED INLETS, INSTALL INLET PROTECTION. (2 MONTHS)
- FINE GRADE, PAVE, AND STABILIZE ALL REMAINING AREAS. (4 WEEKS)
- INSTALL FINAL LANDSCAPING. (1 WEEK)
- REMOVE ALL SOIL EROSION AND SEDIMENT CONTROL MEASURES. (2 DAYS)



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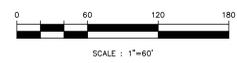
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LOT 3 BLOCK 11201
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SOMERSET COUNTY
NEW JERSEY

SHEET TITLE
PRELIMINARY AND FINAL
MAJOR SITE PLANS
**SOIL EROSION
AND SEDIMENT
CONTROL PLAN**

DATE
SEPTEMBER 16, 2022
SCALE
1" = 60'
JOB NO.
1114-02
DRAWN
MF
SHEET NO.
15 OF 21
CHKD.
CRF/RCM2

THIS PLAN IS FOR SOIL EROSION AND SEDIMENT CONTROL PURPOSES ONLY



GENERAL NOTES:

1. ALL CONSTRUCTION ACTIVITY SHALL COMPLY WITH THE TREE REMOVAL AND PROTECTION STANDARDS OF SECTION 21-45.
2. IF DURING CONSTRUCTION IT IS DETERMINED BY THE TOWNSHIP ENGINEER THAT A TREE DESIGNATED FOR PRESERVATION CANNOT BE PROTECTED IN ACCORDANCE WITH TOWNSHIP STANDARDS, THE TREE SHALL BE REMOVED AND REPLACEMENT TREES SHALL BE REQUIRED.
3. TOTAL REPLACEMENT TREES REQUIRED = 649
4. THE APPLICANT SHALL MAKE A CONTRIBUTION TO THE TOWNSHIP TREE FUND IN THE AMOUNT OF \$300.00 PER TREE FOR REQUIRED REPLACEMENT TREES THAT CANNOT BE PLANTED ON SITE.
TOTAL AMOUNT DUE TO TREE FUND IS: \$141,900.00 (473 TREES X \$300.00/TREE)

PLANTING NOTES:

1. THE CONTRACTOR SHALL LOCATE AND VERIFY THE EXISTENCE AND LOCATION OF ALL UTILITIES PRIOR TO BEGINNING WORK. PLANT MATERIAL SHALL BE FURNISHED AND INSTALLED AS INDICATED, INCLUDING ALL LABOR, MATERIALS, PLANTS, EQUIPMENT, INCIDENTALS AND CLEAN UP.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PLANTING AT CORRECT GRADES AND ALIGNMENT.
3. NO PLANT SHALL BE PUT INTO THE GROUND BEFORE ROUGH GRADING HAS BEEN FINISHED AND APPROVED BY THE PROJECT LANDSCAPE ARCHITECT OR EQUAL.
4. PLANTS SHALL BE TYPICAL OF THEIR SPECIES AND VARIETY, HAVE NORMAL GROWTH HABITS, WELL DEVELOPED BRANCHES, DENSELY FOLIATED VIGOROUS ROOT SYSTEMS, AND BE FREE FROM DEFECTS AND INJURIES.
5. THE CONTRACTOR SHALL REPORT ANY SOIL OR DRAINAGE CONDITIONS CONSIDERED DETRIMENTAL TO THE GROWTH OF THE PLANT MATERIALS.
6. ALL PLANT MATERIAL SHALL BE GUARANTEED BY THE CONTRACTOR TO BE IN VIGOROUS GROWING CONDITION. PROVISION SHALL BE MADE FOR A GROWTH GUARANTEE OF TWO (2) GROWING SEASONS. REPLACEMENTS SHALL BE MADE AT THE BEGINNING OF THE FIRST SUCCEEDING PLANTING SEASON. ALL REPLACEMENTS SHALL HAVE A GUARANTEE EQUAL TO THAT STATED ABOVE.
7. ALL PLANTS SHALL BE BALLED AND WRAPPED OR CONTAINER GROWN AS SPECIFIED. NO CONTAINER GROWN STOCK WILL BE ACCEPTED IF IT IS ROOT BOUND. ALL ROOT WRAPPING MATERIAL MADE OF SYNTHETICS OR PLASTICS SHALL BE REMOVED AT THE TIME OF PLANTING.
8. WITH CONTAINER GROWN STOCK, THE CONTAINER SHALL BE REMOVED AND THE CONTAINER BALL SHALL BE CUT THROUGH THE SURFACE IN THREE EQUALLY SPACED VERTICAL LOCATIONS.
9. THE DAY PRIOR TO PLANTING, THE LOCATION OF ALL TREES AND SHRUBS SHALL BE STAKED FOR APPROVAL BY THE PROJECT LANDSCAPE ARCHITECT OR EQUAL.
10. PLANT MATERIAL SHALL BE PLANTED THE DAY OF DELIVERY. IN THE EVENT THIS IS NOT POSSIBLE, THE CONTRACTORS SHALL PROTECT MATERIAL NOT PLANTED FROM DRYING. PLANTS SHALL NOT REMAIN UNPLANTED FOR LONGER THAN A THREE (3) DAY PERIOD AFTER DELIVERY.
11. QUALITY AND SIZE OF PLANTS, SPREAD OF ROOTS, AND SIZE OF BALLS SHALL BE IN ACCORDANCE WITH THE CURRENT VERSION OF "AMERICAN STANDARD FOR NURSERY STOCK" PUBLISHED BY THE AMERICAN NURSERY AND LANDSCAPE ASSOCIATION.
12. ALL PLANTS SHALL BE PLANTED IN BACKFILL MIX THAT IS THOROUGHLY TAMPED AND WATERED AS BACKFILLING PROGRESSES. NOTHING BUT SUITABLE TOPSOIL, FREE OF DRY SOIL, STIFF CLAY, LITTER, ETC., SHALL BE USED.
13. PLANTS SHALL NOT BE BOUND WITH WIRE OR ROPE AT ANY TIME SO AS NOT TO DAMAGE THE BARK OR BREAK BRANCHES. PLANTS SHALL BE HANDLED FROM THE BOTTOM OF THE BALL ONLY.
14. PLANTING OPERATIONS SHALL BE PERFORMED DURING PERIODS WITHIN THE PLANTING SEASON WHEN WEATHER AND SOIL CONDITIONS ARE SUITABLE AND IN ACCORDANCE WITH ACCEPTED LOCAL PRACTICES. PLANTING SEASONS ARE DEFINED AS MARCH 15 THROUGH MAY 15 AND SEPTEMBER 15 THROUGH NOVEMBER 15. PLANTING IS ACCEPTABLE DURING OTHER MONTHS IF WEATHER PERMITS, THE GROUND IS NOT FROZEN, AND SUPPLEMENTAL WATERING IS PROVIDED IN THE SUMMER.
15. SET ALL PLANTS PLUMB AND STRAIGHT, SET AT SUCH LEVEL THAT, AFTER SETTLEMENT, A NORMAL OR NATURAL RELATIONSHIP TO THE CROWN OF THE PLANT WITH THE GROUND SURFACE WILL BE ESTABLISHED. LOCATE PLANTS IN THE CENTER OF THE PIT.
16. ALL INJURED ROOTS ONE INCH AND GREATER, SHALL BE PRUNED TO MAKE CLEAN ENDS PRIOR TO PLANTING. PRUNE ONLY DEAD BRANCHES. MAIN LEADER OF TREES MUST NOT BE CUT BACK.
17. NO TREE WITH A CUT OR DAMAGED CENTRAL LEADER SHALL BE ACCEPTED.
18. EACH TREE AND SHRUB SHALL BE PRUNED IN ACCORDANCE WITH STANDARD HORTICULTURAL PRACTICE TO PRESERVE NATURAL CHARACTER OF THE PLANT. PRUNING SHALL BE DONE WITH CLEAN SHARP TOOLS. NO MORE THAN 1/3 OF THE PLANTS GROWTH SHALL BE PRUNED.
19. TREES SHALL BE SUPPORTED IMMEDIATELY AFTER PLANTING. TREES THREE (3) INCHES AND OVER IN CALIPER SHALL BE GUYED, UNLESS OTHERWISE NOTED. SMALLER TREES SHALL BE STAKED. GUYING WIRES AND STAKES SHALL BE INSTALLED AS INDICATED.
20. ALL PLANTING BEDS SHALL RECEIVE THREE (3) INCHES OF SHREDED HARDWOOD BARK MULCH TREATED WITH A PRE-EMERGENT HERBICIDE.
21. TOPSOIL MIXTURE FOR BACKFILLING PLANTED AREAS SHALL CONSIST OF TWO PARTS BY VOLUME LOAMY TOPSOIL THOROUGHLY MIXED WITH ONE PART PEAT MOSS OR MANURE.
22. ALL TREES AND SHRUBS SHALL RECEIVE SPRING AND FALL DEEP ROOT FERTILIZATION FOR THE FIRST TWO GROWING SEASONS AFTER TRANSPLANT WITH A PRODUCT AS PER MANUFACTURER'S SPECIFICATIONS.
23. ALL PROPOSED PLANT MATERIAL AND INSTALLATION IS SUBJECT TO THE APPROVAL OF THE TOWNSHIP ENGINEER OR LANDSCAPE ARCHITECT. THE TOWNSHIP ENGINEER OR LANDSCAPE ARCHITECT SHOULD REVIEW PLANT SUBSTITUTIONS FOR APPROVAL PRIOR TO INSTALLATION.
24. SHRUBS LOCATED WITHIN A PARKING AREA SHALL BE TRIMMED TO PROVIDE A MAXIMUM HEIGHT OF 36".
25. ALL TREES TO HAVE A WATER SAUCER SIX (6) INCHES HIGH ADDED DURING PLANTING TO INSURE WATER CONSERVATION AND TO CONCENTRATE MOISTURE TO THE ROOTBALL.
26. ALL PLANTS SHALL BE SPRAYED WITH AN ANTIDESICCANT WITHIN 24 HOURS AFTER PLANTING. IN TEMPERATE ZONES, ALL PLANTS SHALL BE SPRAYED WITH AN ANTIDESICCANT AT THE BEGINNING OF THEIR FIRST WINTER.
27. ALL PLANTS SHALL BE WATERED THOROUGHLY TWICE DURING THE FIRST 24-HOUR PERIOD AFTER PLANTING. ALL PLANTS SHALL THEN BE WATERED REGULARLY OR MORE OFTEN, IF NECESSARY, DURING THE FIRST GROWING SEASON.
28. QUANTITIES SHOWN ARE FOR CONTRACTOR'S CONVENIENCE. PLAN SHALL GOVERN.

TREE AND LAWN PROTECTION DURING CONSTRUCTION:

1. ALL TRENCHING WITHIN THE DRILLPIE OF TREES TO BE SAVED SHALL BE DONE BY HAND OR BY A HYDRAULIC BORING MACHINE.
2. ALL ROOTS ABOVE 1" DIAMETER THAT ARE SEVERED SHALL BE CLEAN CUT WITH HAND PRUNERS OR HAND SAW PRIOR TO BACKFILLING. NO ROOT ENDS SHALL BE LEFT JAGGED OR TORN.
3. BACKFILLING IN SEVERED ROOT AREA SHALL BE DONE AS SOON AS POSSIBLE AFTER DAMAGE. DELAY IN COVERING SEVERED ROOTS WILL RESULT IN DEHYDRATION AND PHYSICAL DAMAGE TO ROOTS. IF NECESSARY, TRENCH OPEN FOR AN EXTENDED PERIOD OF TIME, ANY ROOTS LARGER THAN 1" IN DIAMETER SHALL BE COVERED WITH MOISTENED BURLAP AND/OR MULCH AND KEPT MOST UNTIL BACKFILLED.
4. THERE IS TO BE ABSOLUTELY NO STOCKPILING OF MATERIALS WITHIN THE ROOT ZONE OF TREES TO BE SAVED.
5. THERE SHALL BE ABSOLUTELY NO MACHINERY OPERATED OR STORED WITHIN THE DRILLPIE OF TREES TO BE SAVED.
6. THERE SHALL BE NO CONSTRUCTION MATERIAL OR DEBRIS LEANING AGAINST OR TOUCHING THE TRUNK OF TREES TO BE SAVED.
7. CARE SHALL BE EXERCISED SO THAT NO SPILLS OF ANY TYPE OF LIQUID, ESPECIALLY GASOLINE, PAINTS OR OIL REACH WITHIN THE ROOT ZONE OF TREES TO BE SAVED.
8. CARE SHALL BE EXERCISED SO THAT OVERHEAD BRANCHES ARE NOT DAMAGED.
9. DAMAGED TREE PROTECTION MATERIALS SHALL BE REPAIRED IMMEDIATELY.
10. IF TREE TRUNKS, BRANCHES OR ROOTS ARE WOUNDED, IMMEDIATELY NOTIFY THE PROJECT MANAGER AND TREAT THEM IF APPROPRIATE.

TREE AND LAWN PROTECTION POST-CONSTRUCTION:

1. NO TREE PROTECTION MATERIAL IS TO BE REMOVED UNTIL ALL WORK IS COMPLETE.
2. USE CAUTION WHEN REMOVING ALL TREE PROTECTION MATERIAL.
3. CHECK TREES FOR ANY DAMAGE AND IF ANY IS FOUND, NOTIFY THE PROJECT MANAGER.
4. EXISTING PLANT MATERIAL INDICATED TO BE PROTECTED THAT ARE INJURED OR DESTROYED DURING CONSTRUCTION SHALL BE REPLACED BY THE CONTRACTOR AND BE OF THE SAME SIZE AND VARIETY OF THOSE DESTROYED OR DAMAGED.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING EXISTING LAWN AREAS THAT ARE TO REMAIN. CONTRACTOR SHALL REPAIR ANY DAMAGE TO THESE LAWN AREAS.

SEEDING NOTES:

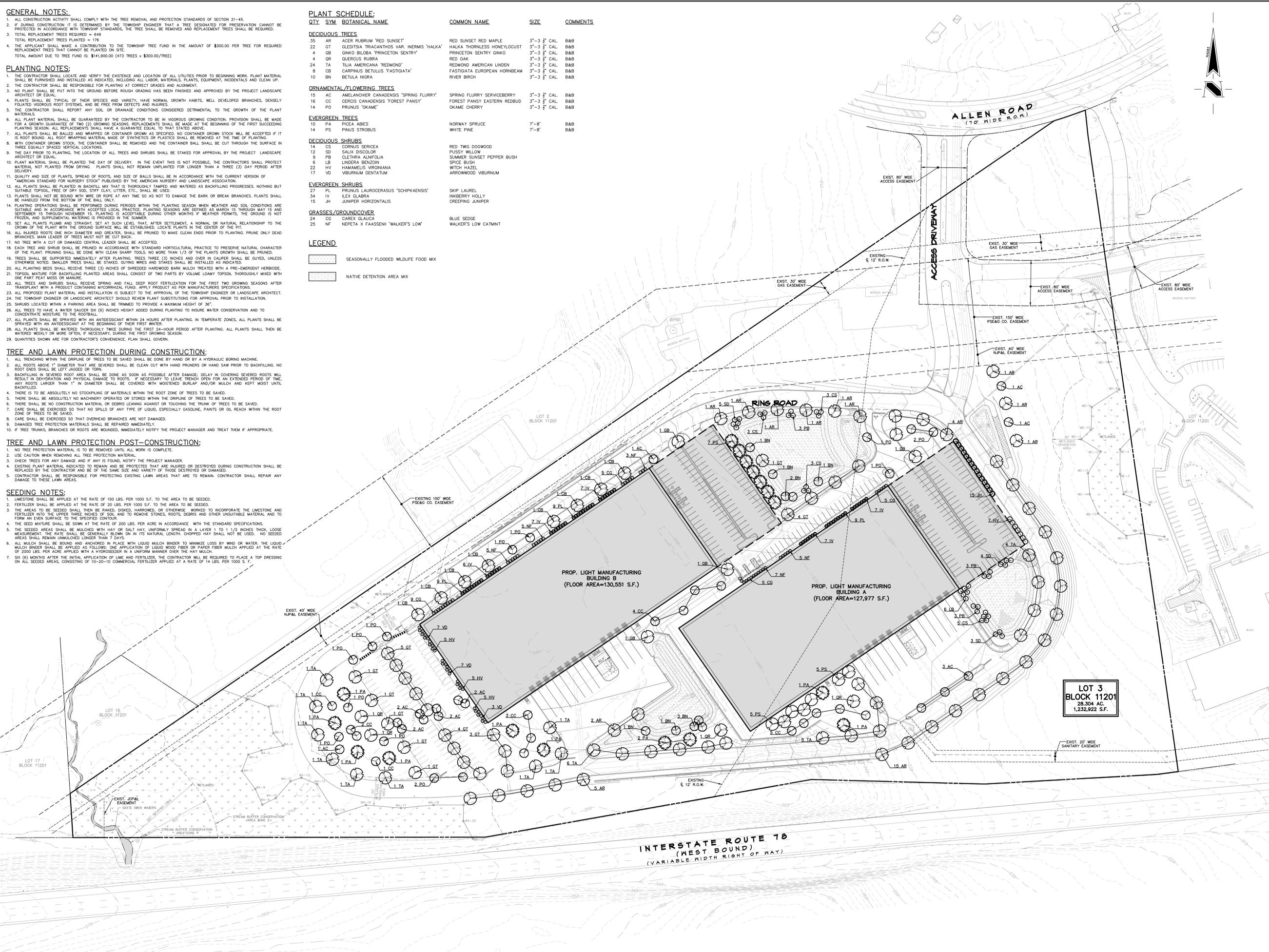
1. LIMESTONE SHALL BE APPLIED AT THE RATE OF 150 LBS. PER 1000 S.F. TO THE AREA TO BE SEEDED.
2. FERTILIZER SHALL BE APPLIED AT THE RATE OF 20 LBS. PER 1000 S.F. TO THE AREA TO BE SEEDED.
3. THE AREAS TO BE SEEDED SHALL THEN BE RAKED, DISKED, HARROWED, OR OTHERWISE WORKED TO INCORPORATE THE LIMESTONE AND FERTILIZER INTO THE UPPER THREE INCHES OF SOIL AND TO REMOVE STONES, ROOTS, DEBRIS AND OTHER UNSUITABLE MATERIAL AND TO FORM AN EVEN SURFACE TO THE SPECIFIED CONTOUR.
4. THE SEED MIXTURE SHALL BE SOWN AT THE RATE OF 200 LBS. PER ACRE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
5. THE SEEDED AREAS SHALL BE MULCHED WITH HAY OR SALT HAY, UNIFORMLY SPREAD IN A LAYER 1 TO 1 1/2 INCHES THICK. LOOSE AREAS SHALL REMAIN UNMULCHED LONGER THAN 7 DAYS.
6. ALL MULCH SHALL BE BOUND AND ANCHORED IN PLACE WITH LIQUID MULCH BINDER TO MINIMIZE LOSS BY WIND OR WATER. THE LIQUID MULCH BINDER SHALL BE APPLIED AS FOLLOWS: ONE APPLICATION OF LIQUID WOOD FIBER OR PAPER FIBER MULCH APPLIED AT THE RATE OF 2000 LBS. PER ACRE APPLIED WITH A HYDRANER IN A UNIFORM MANNER OVER THE HAY MULCH.
7. SIX (6) MONTHS AFTER THE INITIAL APPLICATION OF LIME AND FERTILIZER, THE CONTRACTOR WILL BE REQUIRED TO PLACE A TOP DRESSING ON ALL SEEDED AREAS, CONSISTING OF 10-20-10 COMMERCIAL FERTILIZER APPLIED AT A RATE OF 14 LBS. PER 1000 S. F.

PLANT SCHEDULE:

QTY	SYM	BOTANICAL NAME	COMMON NAME	SIZE	COMMENTS
DECIDUOUS TREES					
35	AR	ACER RUBRUM 'RED SUNSET'	RED SUNSET RED MAPLE	3"-3 1/2" CAL.	B&B
22	GT	GLEDITSIA TRICANTHOS VAR. INERMIS 'HALKA'	HALKA THORNLESS HONEYLOCUST	3"-3 1/2" CAL.	B&B
4	GB	GINKGO BILOBA 'PRINCETON SENTRY'	PRINCETON SENTRY GINKGO	3"-3 1/2" CAL.	B&B
4	OR	QUERCUS RUBRA	RED OAK	3"-3 1/2" CAL.	B&B
24	TA	TILIA AMERICANA 'REDMOND'	REDMOND AMERICAN LINDEN	3"-3 1/2" CAL.	B&B
8	GB	CARPINUS BETULUS 'FASTIGIATA'	FASTIGIATA EUROPEAN HORNBEAM	3"-3 1/2" CAL.	B&B
10	BN	BETULA NIGRA	RIVER BIRCH	3"-3 1/2" CAL.	B&B
ORNAMENTAL/FLOWERING TREES					
15	AC	AMELANCHIER CANADENSIS 'SPRING FLURRY'	SPRING FLURRY SERVICEBERRY	3"-3 1/2" CAL.	B&B
16	CC	CERIS CANADENSIS 'FOREST PANSY'	FOREST PANSY EASTERN REDBUD	3"-3 1/2" CAL.	B&B
14	PO	PRUNUS 'OKAME'	OKAME CHERRY	3"-3 1/2" CAL.	B&B
EVERGREEN TREES					
10	PA	PICEA ABIES	NORWAY SPRUCE	7'-8'	B&B
14	PS	PINUS STROBUS	WHITE PINE	7'-8'	B&B
DECIDUOUS SHRUBS					
14	CS	CORNUS SERICEA	RED TWIG DOGWOOD		
12	SD	SALIX DISCOLOR	FUSSY WILLOW		
9	PB	CLETHRA ALNIFOLIA	SUMMER SUNSET PEPPER BUSH		
6	LB	LINDERA BENZON	SPICE BUSH		
22	HV	HAMAMELIS VIRGINIANA	WITCH HAZEL		
17	VD	VIBURNUM DENTATUM	ARROWWOOD VIBURNUM		
EVERGREEN SHRUBS					
27	PL	PRUNUS LAUROCARASUS 'SCHIPKAENSIS'	SKIP LAUREL		
34	IV	ILEX GLABRA	INKBERRY HOLLY		
15	JH	JUNIPER HORIZONTALIS	CREeping JUNIPER		
GRASSES/GROUND COVER					
24	CG	CAREX GLAUCA	BLUE SEDGE		
25	NF	NEPETA X FAASSENII 'WALKER'S LOW'	WALKER'S LOW CATMINT		

LEGEND

- SEASONALLY FLOODED WILDLIFE FOOD MIX
- NATIVE DETENTION AREA MIX



THIS PLAN IS FOR LANDSCAPING PURPOSES ONLY

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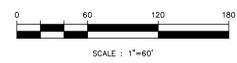
LANDSCAPING PLAN

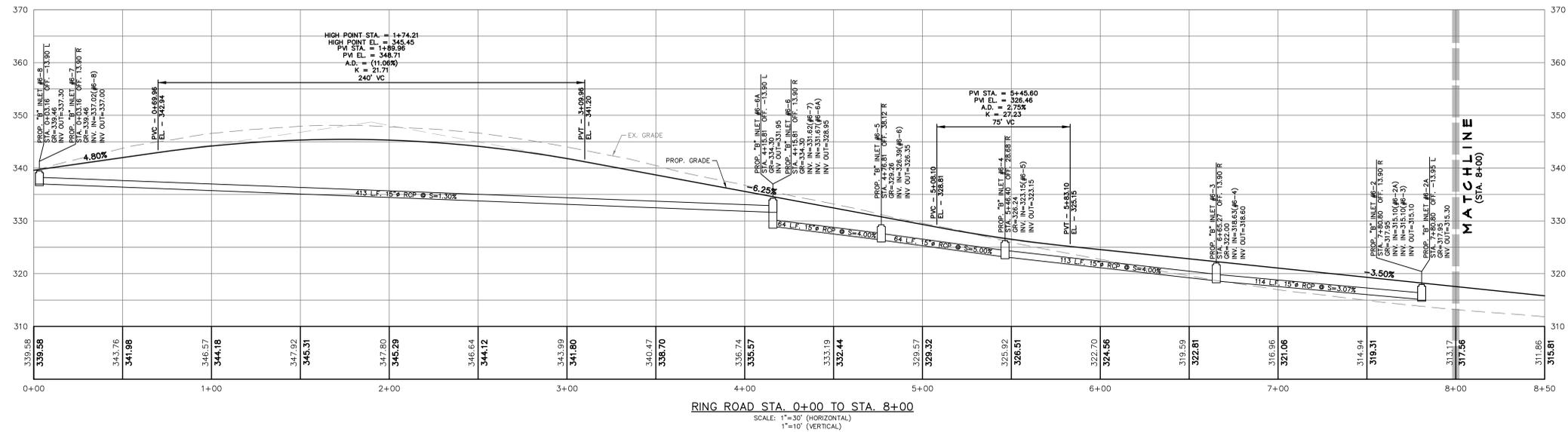
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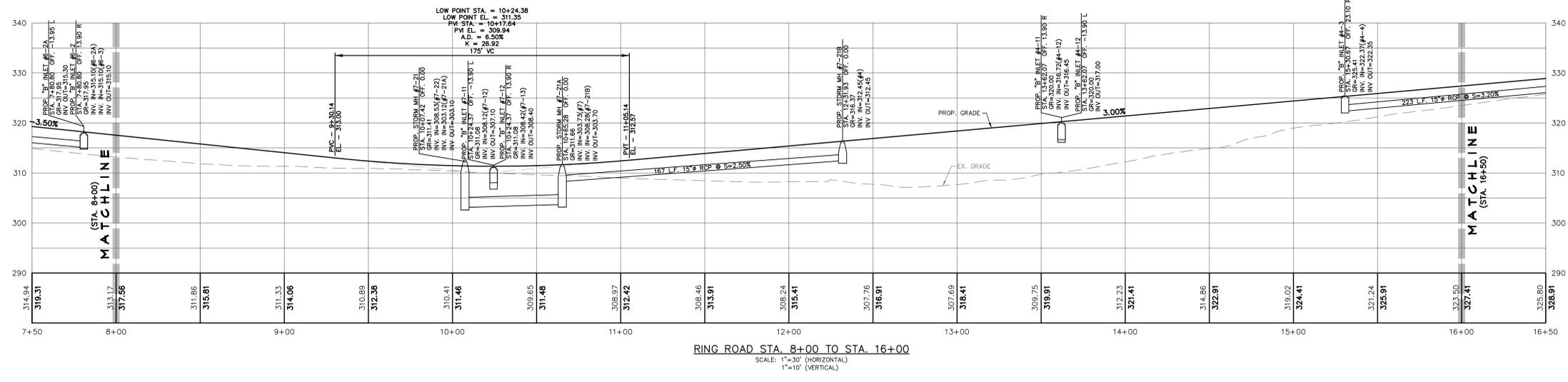
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CHKD. CRF/RCM2 **16 OF 21**

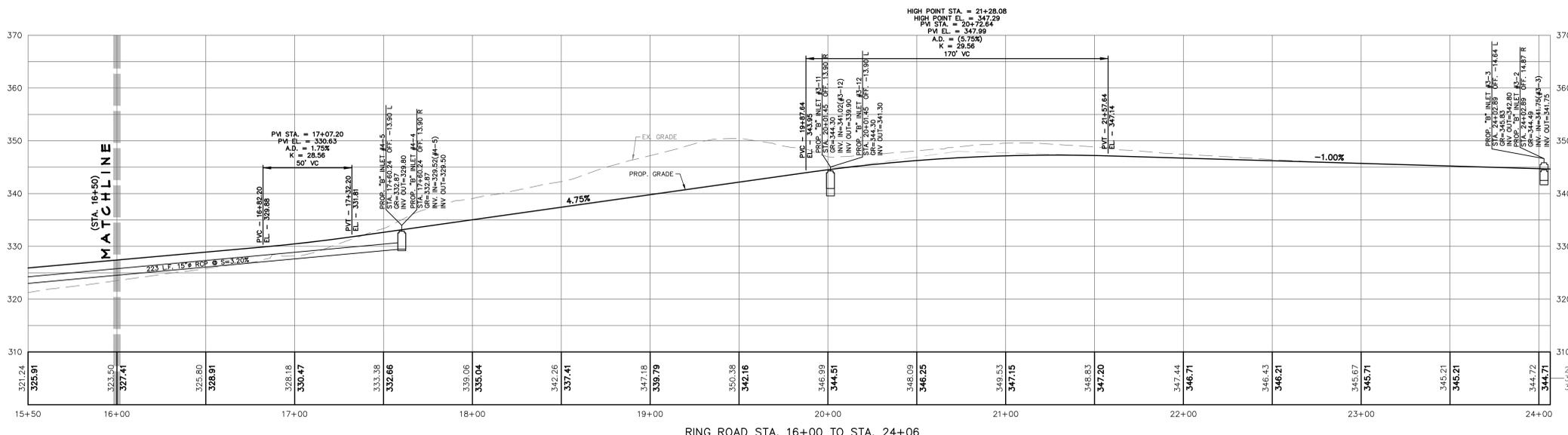




RING ROAD STA. 0+00 TO STA. 8+00
SCALE: 1"=30' (HORIZONTAL)
1"=10' (VERTICAL)



RING ROAD STA. 8+00 TO STA. 16+00
SCALE: 1"=30' (HORIZONTAL)
1"=10' (VERTICAL)



RING ROAD STA. 16+00 TO STA. 24+06
SCALE: 1"=30' (HORIZONTAL)
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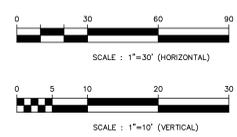
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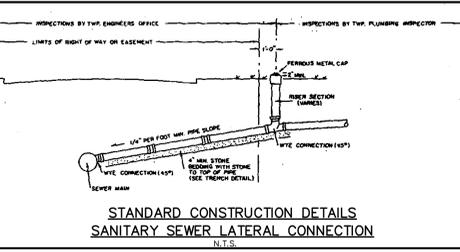
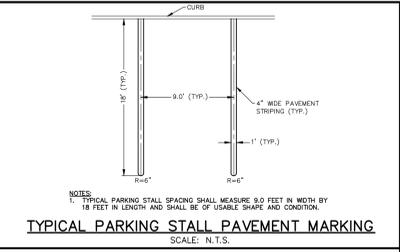
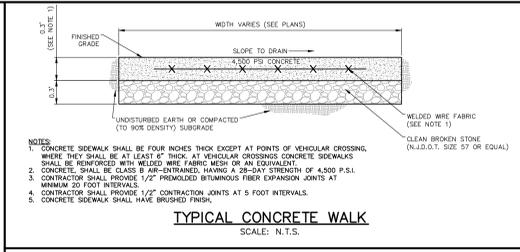
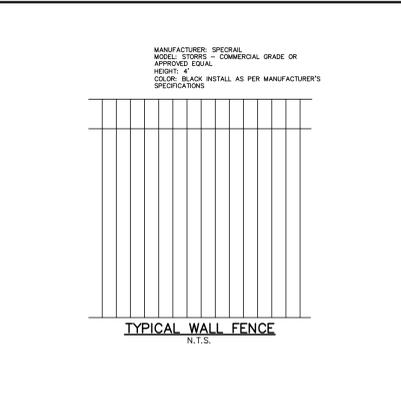
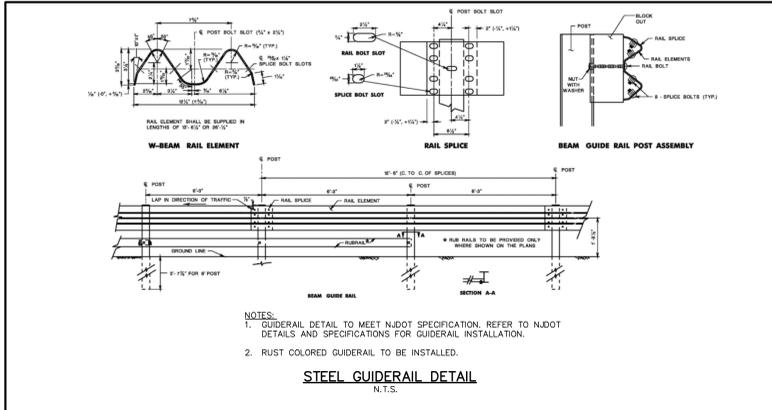
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NEW JERSEY

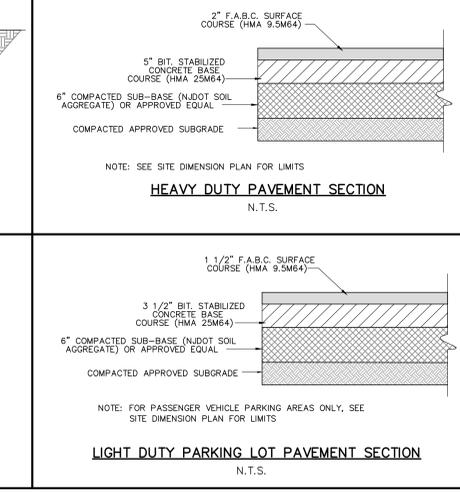
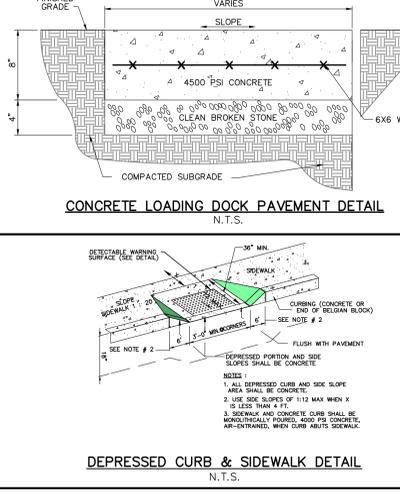
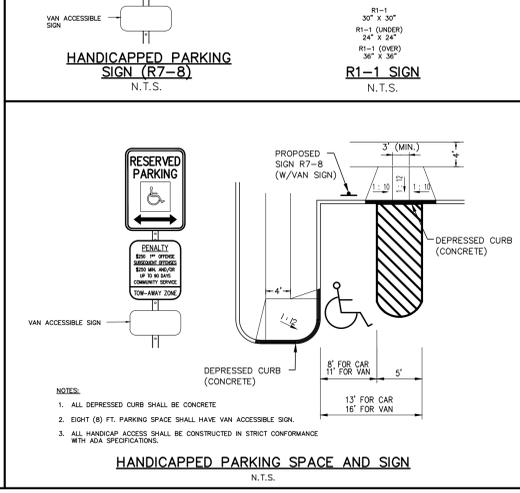
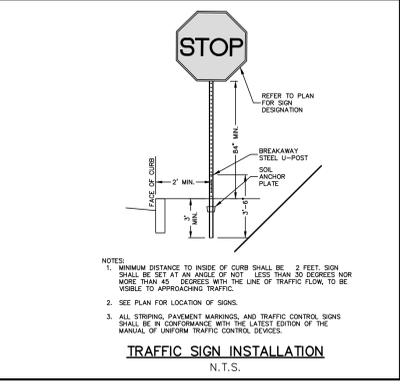
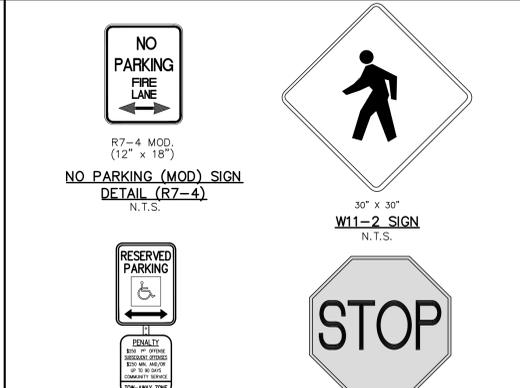
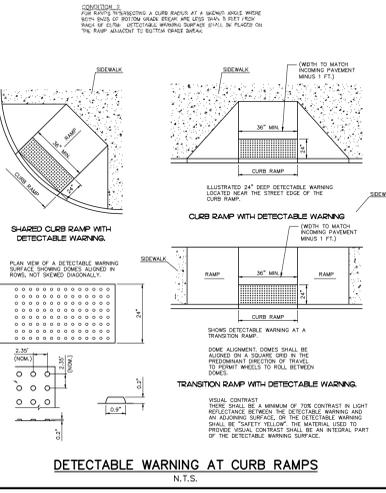
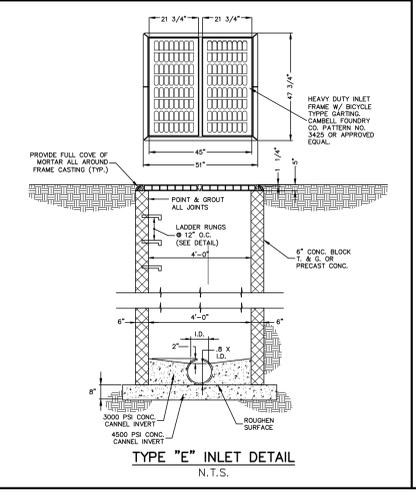
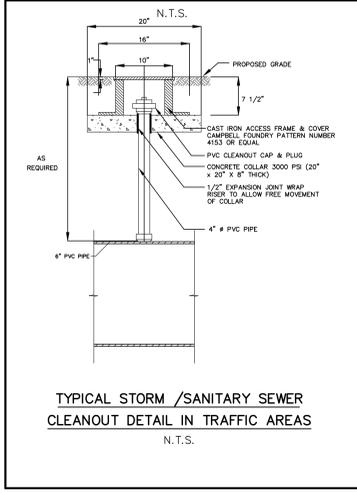
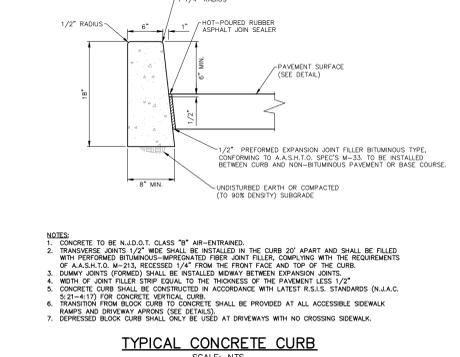
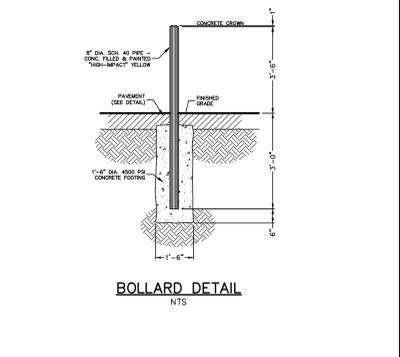
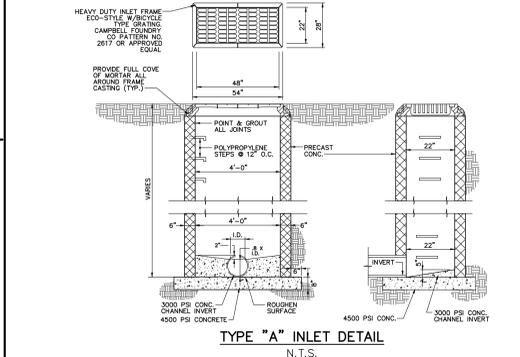
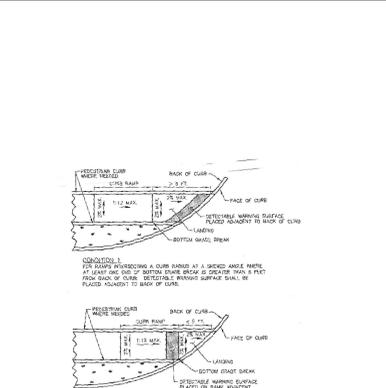
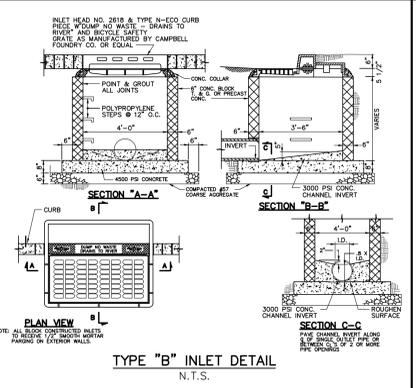
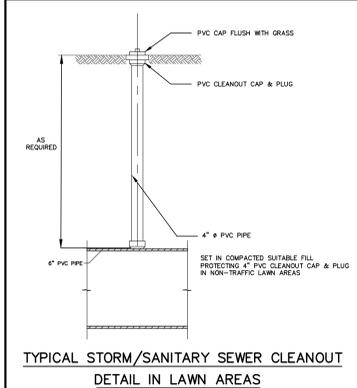
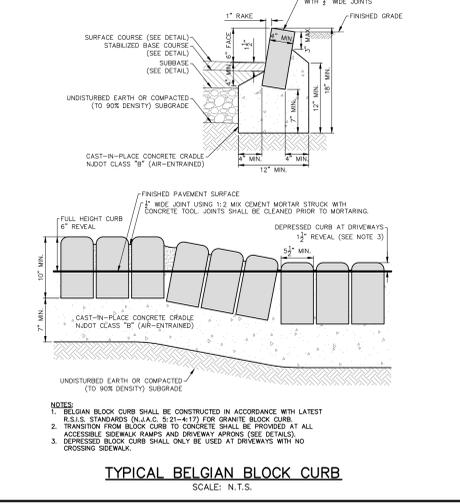
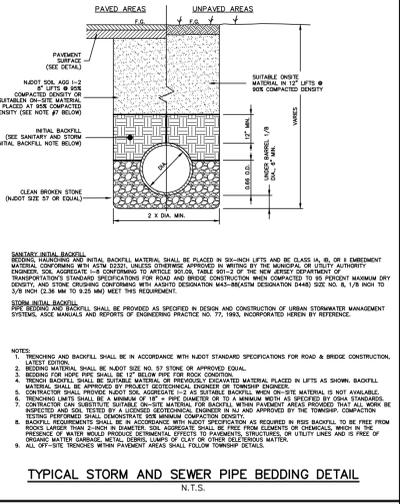
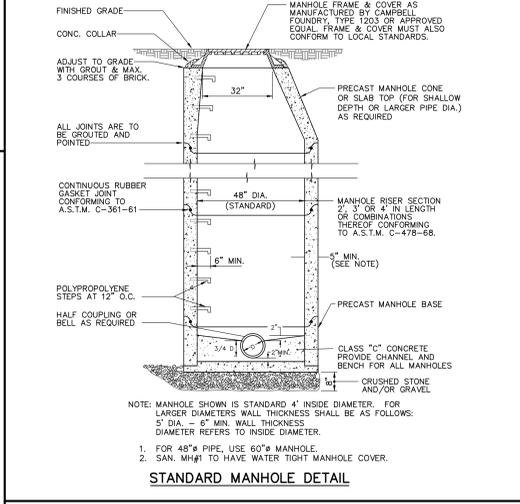
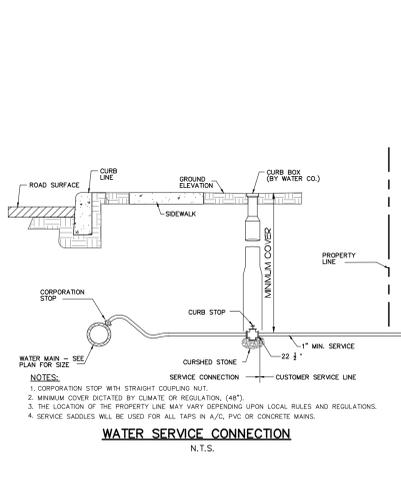
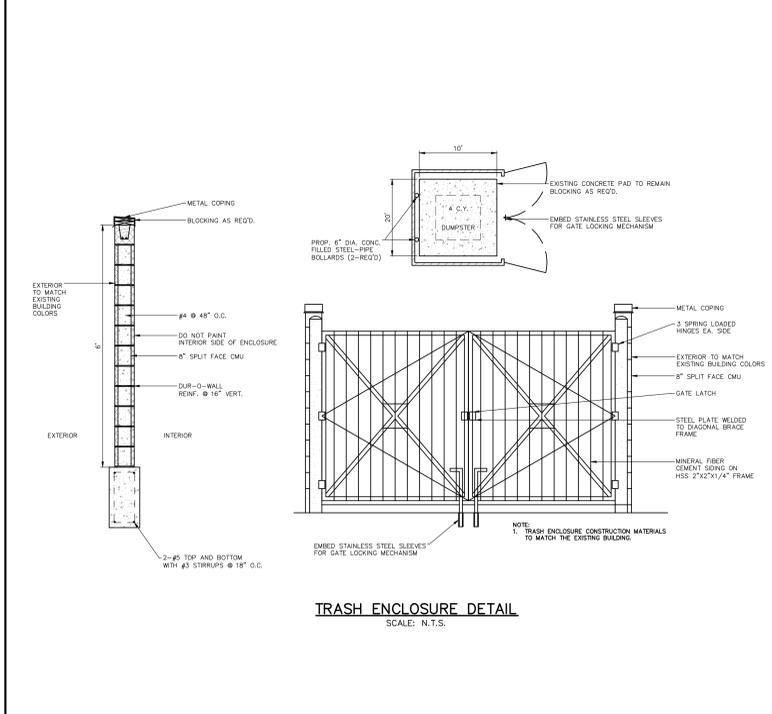
SHEET TITLE
PRELIMINARY AND FINAL
MAJOR SITE PLANS
RING ROAD PROFILE

DATE	SEPTEMBER 16, 2022
SCALE	AS SHOWN
DRAWN	MF
CHKD.	CRF/RCM2
JOB NO.	1114-02
SHEET NO.	18 OF 21





REVISIONS		
NO.	DATE	DESCRIPTION



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 No. 24GA28034400

Ronald A. Kennedy, P.E., P.P., CME, LEED AP
 Kurt T. Hanis, P.L.S.
 Robert C. Morris
 Robert C. Moschello, P.E.

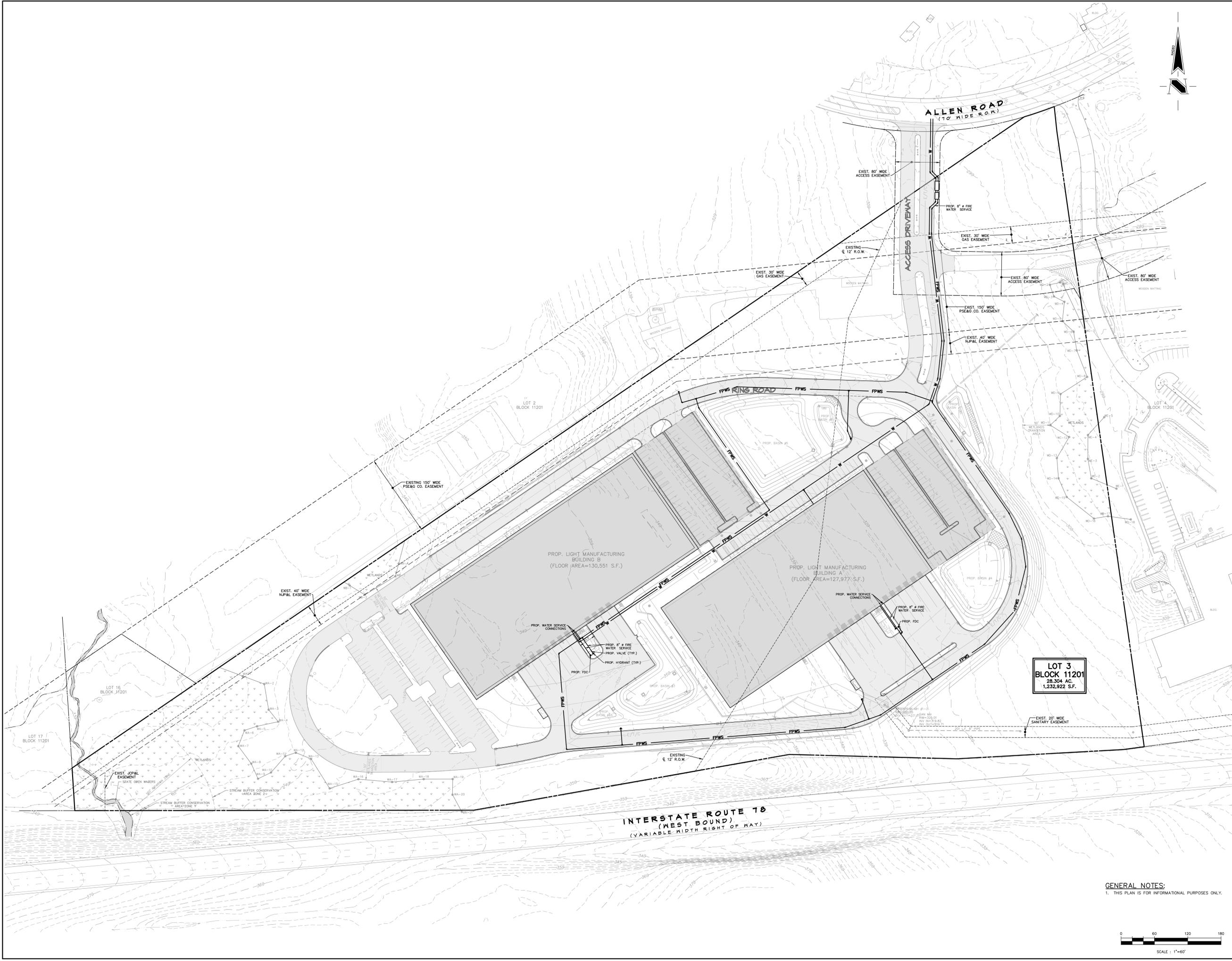
ROBERT C. MOSCHELLO, P.E.
 NJ PROFESSIONAL ENGINEER
 LICENSE No. 6E4279

PROJECT
 150 ALLEN ROAD
 LOT 3 BLOCK 11201
 TOWNSHIP OF BERNARDS
 SOMERSET COUNTY
 NEW JERSEY

SHEET TITLE
 PRELIMINARY AND FINAL
 MAJOR SITE PLANS

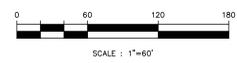
CONSTRUCTION DETAILS
 "A"

DATE	SEPTEMBER 16, 2022
SCALE	AS SHOWN
DRAWN	MF
CHKD.	CRF/RCM2
JOB NO.	1114-02
SHEET NO.	19 OF 21



**LOT 3
BLOCK 11201
28.304 AC.
1,232,922 S.F.**

GENERAL NOTES:
1. THIS PLAN IS FOR INFORMATIONAL PURPOSES ONLY.



REVISIONS		
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Robert C. Morris
Robert C. Moschello, P.E.

ROBERT C. MOSCHELLO, P.E.
NJ PROFESSIONAL ENGINEER
LICENSE No. GE44279

PROJECT

150 ALLEN ROAD

LOT 3 BLOCK 11201

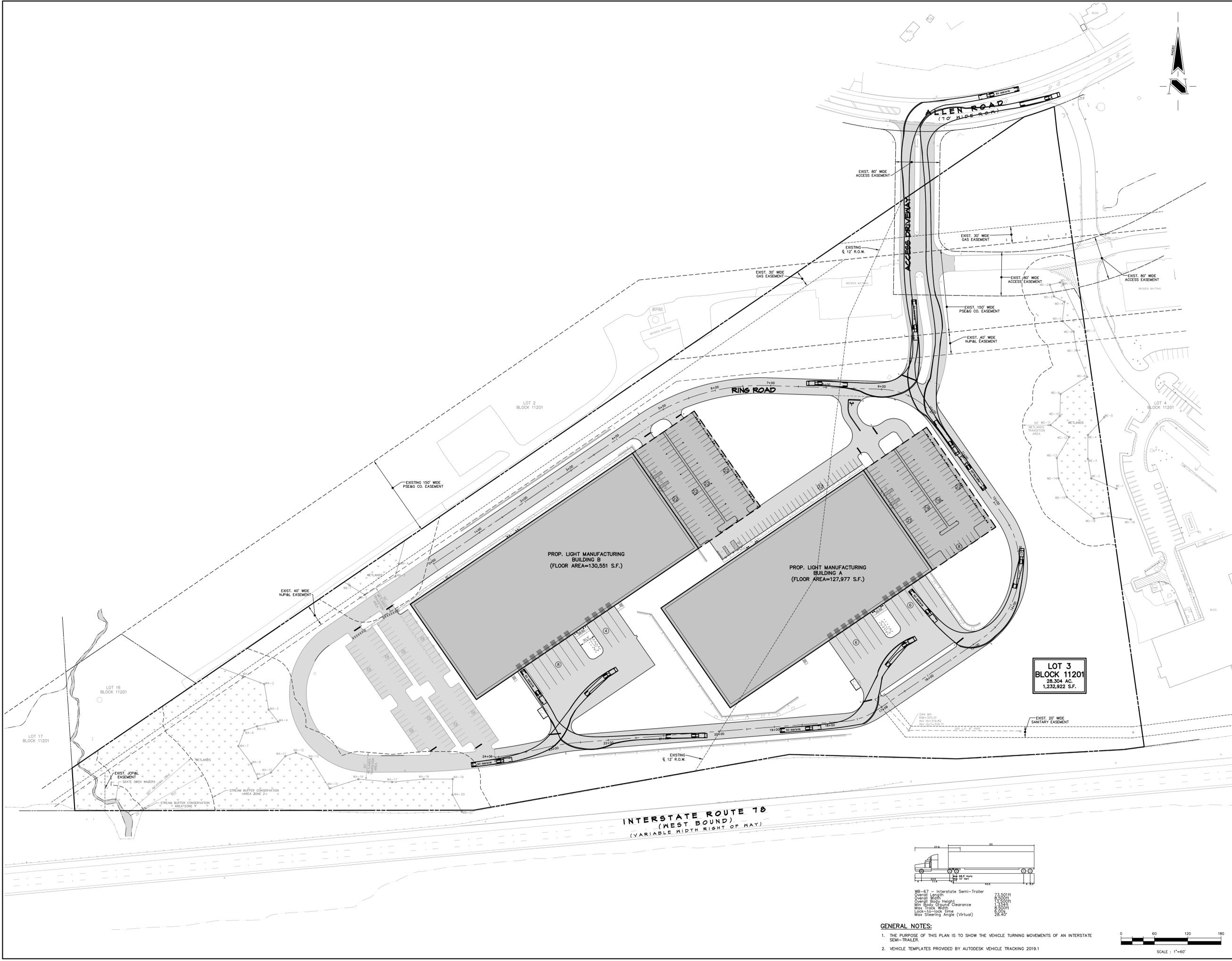
TOWNSHIP OF BERNARDS
SOMERSET COUNTY
NEW JERSEY

SHEET TITLE

PRELIMINARY AND FINAL
MAJOR SITE PLANS

**FIRE SERVICE
PLAN**

DATE	SEPTEMBER 16, 2022
SCALE	1" = 60'
DRAWN	MF
CHKD.	CRF/RCM2
JOB NO.	1114-02
SHEET NO.	1 OF 1



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Robert C. Moschello, P.E.

ROBERT C. MOSCHELLO, P.E.
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PROJECT

150 ALLEN ROAD

LOT 3 BLOCK 11201

TOWNSHIP OF BERNARDS
SOMERSET COUNTY
NEW JERSEY

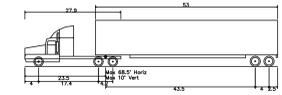
SHEET TITLE

PRELIMINARY AND FINAL
MAJOR SITE PLANS

TRUCK TURNING PLAN

DATE	SEPTEMBER 16, 2022
SCALE	1" = 60'
DRAWN	MF
CHKD.	CRF/RCM2
JOB NO.	1114-02
SHEET NO.	1 OF 1

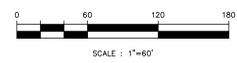
**LOT 3
BLOCK 11201
28,304 AC.
1,232,922 S.F.**



WB-67 - Interstate Semi-Trailer
Overall Length 73.00ft
Overall Body Height 13.50ft
Min Body Ground Clearance 1.34ft
Max Truck Width 8.50ft
Lock-to-lock time 6.00s
Max Steering Angle (Virtual) 25.4°

GENERAL NOTES:

- THE PURPOSE OF THIS PLAN IS TO SHOW THE VEHICLE TURNING MOVEMENTS OF AN INTERSTATE SEMI-TRAILER.
- VEHICLE TEMPLATES PROVIDED BY AUTODESK VEHICLE TRACKING 2019.1



SCALE: 1"=60'

M:\Drawing\114222\supplemental\114222-Track Turning Plan.dwg (PLOT) 11/16/22 10:38:38 AM rcm2.ctb

SOIL SURVEY LEGEND

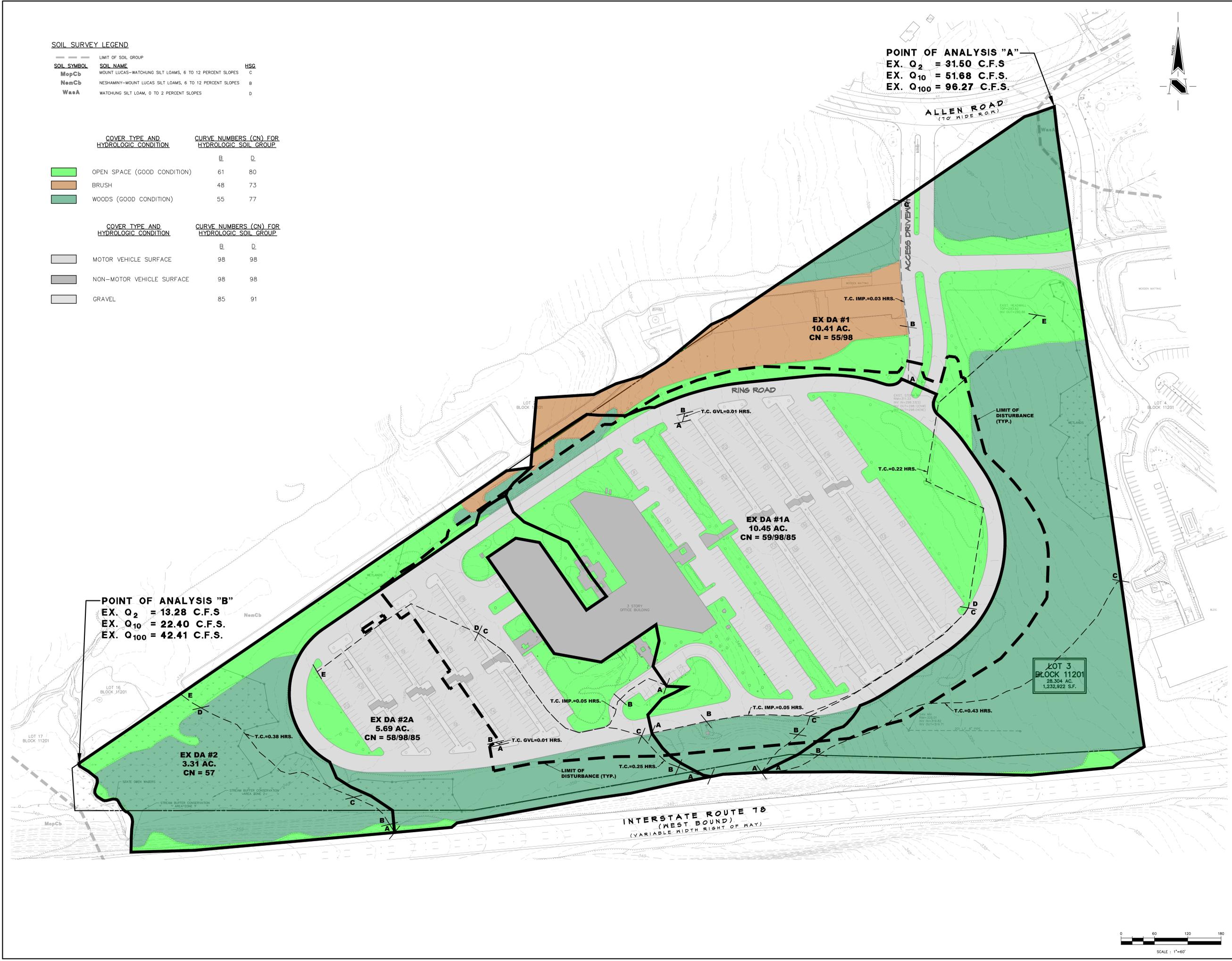
SOIL SYMBOL	SOIL NAME	HSG
MopCb	MOUNT LUCAS-WATCHUNG SILT LOAMS, 6 TO 12 PERCENT SLOPES	C
NemCb	NESHAMINY-MOUNT LUCAS SILT LOAMS, 6 TO 12 PERCENT SLOPES	B
WaaA	WATCHUNG SILT LOAM, 0 TO 2 PERCENT SLOPES	D

COVER TYPE AND HYDROLOGIC CONDITION	CURVE NUMBERS (CN) FOR HYDROLOGIC SOIL GROUP	
	B	D
OPEN SPACE (GOOD CONDITION)	61	80
BRUSH	48	73
WOODS (GOOD CONDITION)	55	77

COVER TYPE AND HYDROLOGIC CONDITION	CURVE NUMBERS (CN) FOR HYDROLOGIC SOIL GROUP	
	B	D
MOTOR VEHICLE SURFACE	98	98
NON-MOTOR VEHICLE SURFACE	98	98
GRAVEL	85	91

POINT OF ANALYSIS "A"
 EX. Q₂ = 31.50 C.F.S.
 EX. Q₁₀ = 51.68 C.F.S.
 EX. Q₁₀₀ = 96.27 C.F.S.

POINT OF ANALYSIS "B"
 EX. Q₂ = 13.28 C.F.S.
 EX. Q₁₀ = 22.40 C.F.S.
 EX. Q₁₀₀ = 42.41 C.F.S.



REVISIONS		
NO.	DATE	DESCRIPTION



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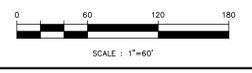
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 Robert C. Morris
 Robert C. Moschello, P.E.

ROBERT C. MOSCHELLO, P.E.
 NJ PROFESSIONAL ENGINEER
 LICENSE No. GE44279

PROJECT
 150 ALLEN ROAD
 LOT 3 BLOCK 11201
 TOWNSHIP OF BERNARDS
 SOMERSET COUNTY
 NEW JERSEY

SHEET TITLE
 PRELIMINARY AND FINAL
 MAJOR SITE PLANS
**EXISTING DRAINAGE
 AREA MAP**

DATE	SEPTEMBER 16, 2022
SCALE	1" = 60'
DRAWN	MF
CHKD.	CRF/RCM2
JOB NO.	1114-02
SHEET NO.	DA-1



SOIL SURVEY LEGEND

SOIL SYMBOL	SOIL NAME	HSG
MopCb	MOUNT LUCAS-WATCHUNG SILT LOAMS, 6 TO 12 PERCENT SLOPES	C
NemCb	NESHAMINY-MOUNT LUCAS SILT LOAMS, 6 TO 12 PERCENT SLOPES	B
WaaA	WATCHUNG SILT LOAM, 0 TO 2 PERCENT SLOPES	D

COVER TYPE AND HYDROLOGIC CONDITION

COVER TYPE AND HYDROLOGIC CONDITION	CURVE NUMBERS (CN) FOR HYDROLOGIC SOIL GROUP	
	B	D
OPEN SPACE (GOOD CONDITION)	61	80
BRUSH	48	73
WOODS (GOOD CONDITION)	55	77

COVER TYPE AND HYDROLOGIC CONDITION

COVER TYPE AND HYDROLOGIC CONDITION	CURVE NUMBERS (CN) FOR HYDROLOGIC SOIL GROUP	
	B	D
MOTOR VEHICLE SURFACE	98	98
NON-MOTOR VEHICLE SURFACE	98	98
GRAVEL	85	91

POINT OF ANALYSIS "A"
 PR. Q₂ = 12.49 C.F.S.
 PR. Q₁₀ = 31.65 C.F.S.
 PR. Q₁₀₀ = 72.36 C.F.S.

POINT OF ANALYSIS "B"
 PR. Q₂ = 5.46 C.F.S.
 PR. Q₁₀ = 10.39 C.F.S.
 PR. Q₁₀₀ = 22.17 C.F.S.



REVISIONS		
NO.	DATE	DESCRIPTION



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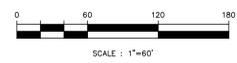
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 Robert C. Moschello, P.E.

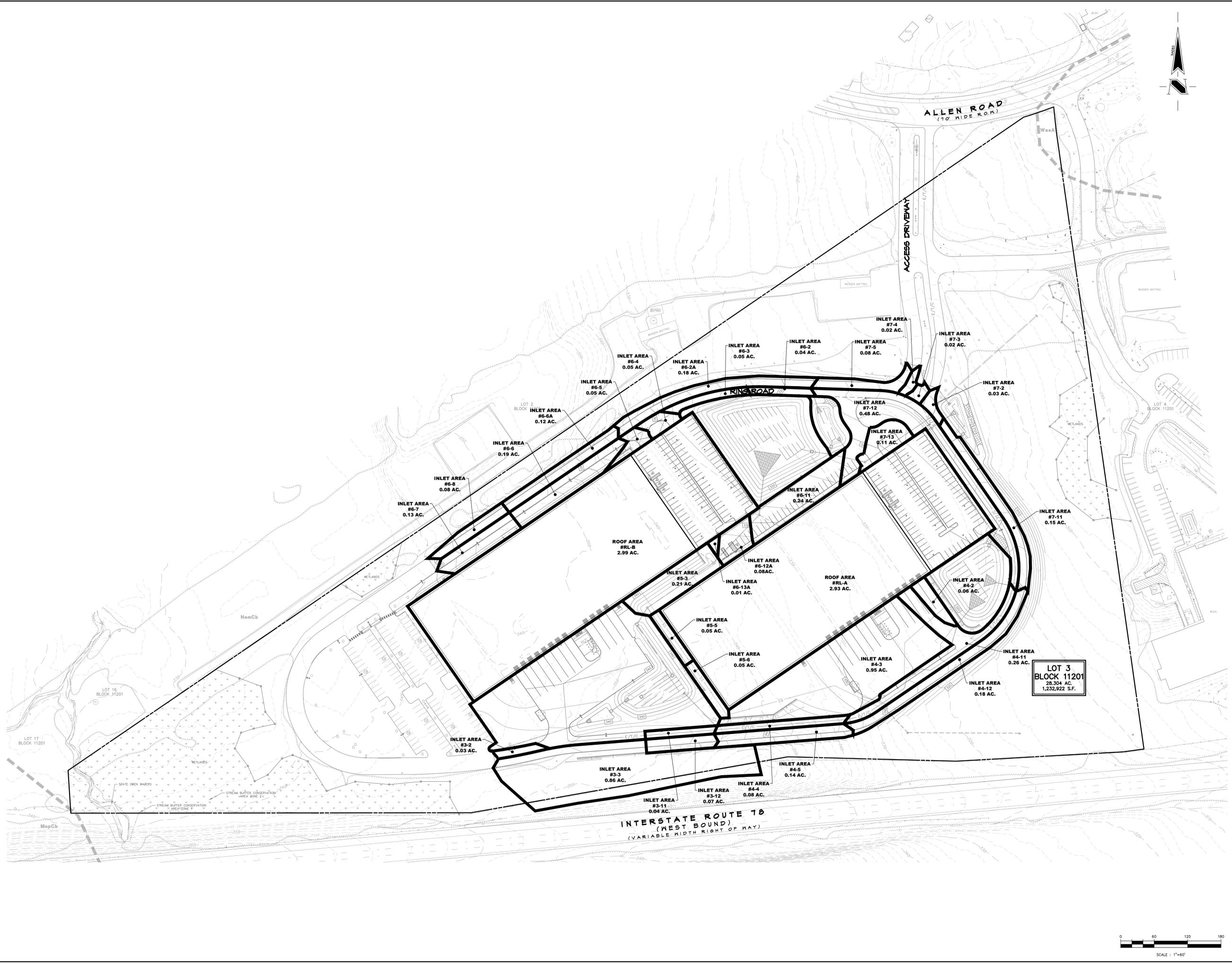
ROBERT C. MOSCHELLO, P.E.
 NJ PROFESSIONAL ENGINEER
 LICENSE No. GE44279

PROJECT
 150 ALLEN ROAD
 LOT 3 BLOCK 11201
 TOWNSHIP OF BERNARDS
 SOMERSET COUNTY
 NEW JERSEY

SHEET TITLE
 PRELIMINARY AND FINAL
 MAJOR SITE PLANS
**PROPOSED DRAINAGE
 AREA MAP**

DATE	SEPTEMBER 16, 2022
SCALE	1" = 60'
DRAWN	MF
CHKD.	CRF/RCM2
JOB NO.	1114-02
SHEET NO.	DA-2





REVISIONS		
NO.	DATE	DESCRIPTION

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Robert C. Moschello, P.E.

ROBERT C. MOSCHELLO, P.E.
NJ PROFESSIONAL ENGINEER
LICENSE No. GE44279

PROJECT

150 ALLEN ROAD

LOT 3 BLOCK 11201

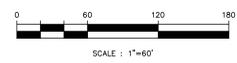
TOWNSHIP OF BERNARDS
SOMERSET COUNTY
NEW JERSEY

SHEET TITLE

PRELIMINARY AND FINAL
MAJOR SITE PLANS

**PROPOSED INLET AREA
MAP**

DATE	SEPTEMBER 16, 2022	
SCALE	1" = 60'	JOB NO. 1114-02
DRAWN	MF	SHEET NO. DA-3
CHKD.	CRF/RCM2	



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fax. 973.586.2401
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PROPOSED PROJECT FOR:
SIGNATURE ACQUISITIONS NEW
WAREHOUSE
150 ALLEN ROAD
BASKING RIDGE, NJ 07920
BLOCK: 11201 LOT: 3

09/16/2022 AGENCY
SUBMISSION

REV	DATE	REMARK
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- | | | |
|---|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0 | | <ul style="list-style-type: none"> Marc R. Parette A.I.A. <ul style="list-style-type: none"> NCARB Registration 44284 New Jersey Architect 10436 New York Architect 024312 Pennsylvania Architect 0147908 Maryland Architect 10445 New Jersey Planner 4981 Alabama Architect 5996 Louisiana Architect 6261 Florida Architect AR 93131 Michigan Architect 150105395 Nevada Architect 6311 Gregory J. Somjen A.I.A. <ul style="list-style-type: none"> NCARB Registration 47178 New Jersey Architect 13349 Massachusetts Architect 9629 Delaware Architect 6616 Virginia Architect 0401 011210 Connecticut Architect 8622 New York Architect 03245-1 Nevada Architect 6280 District Of Columbia Architect 101294 William H. Bannister, A.I.A. <ul style="list-style-type: none"> New Jersey Architect 19142 Connecticut Architect ARI10014499 North Carolina Architect 15027 South Carolina Architect 10382 |
|---|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

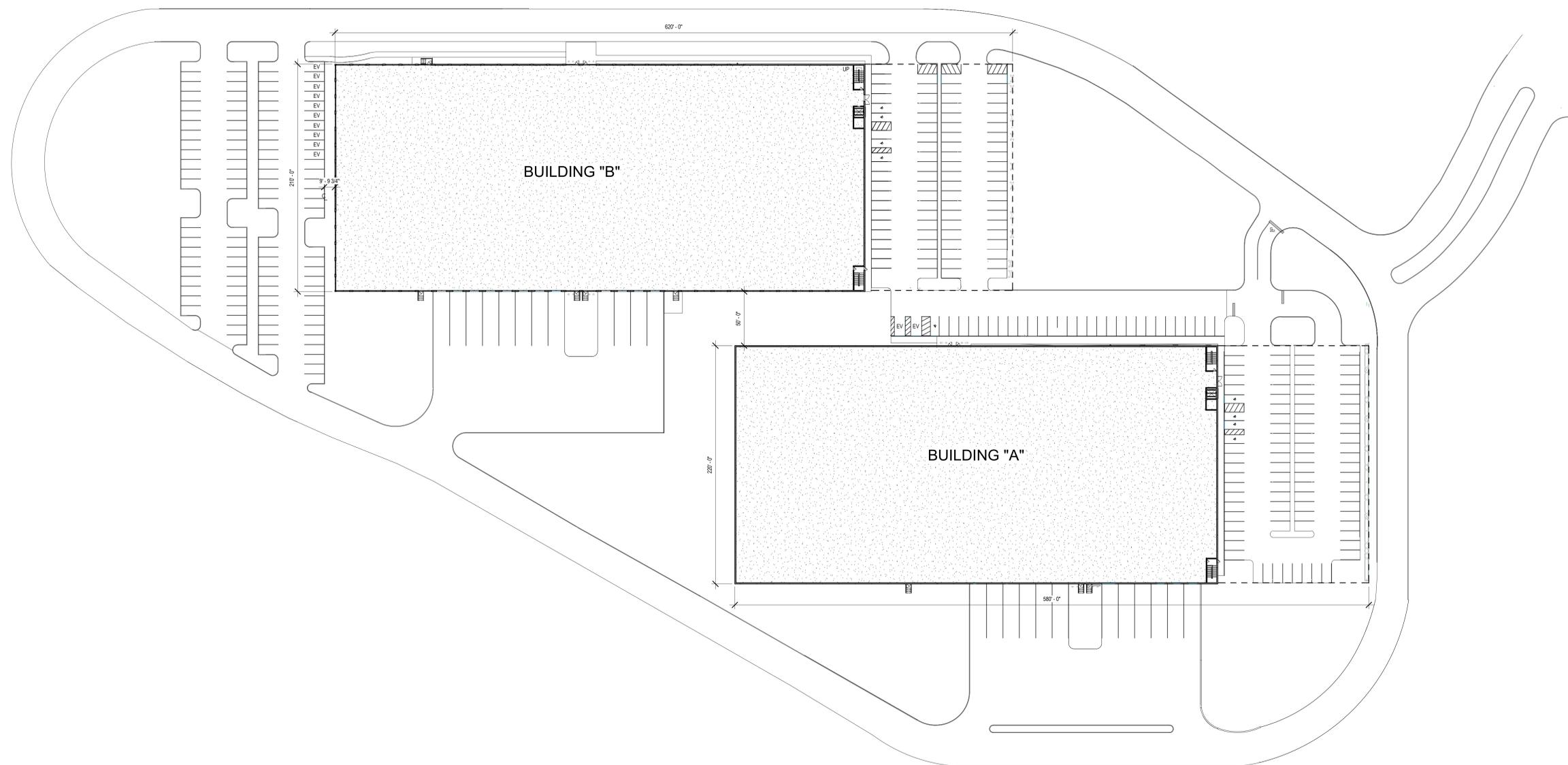
SIGNATURE

SITE PLAN

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Author	DRAWN BY	A1
Project Number	PROJECT NUMBER	

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1 OVERALL PLAN

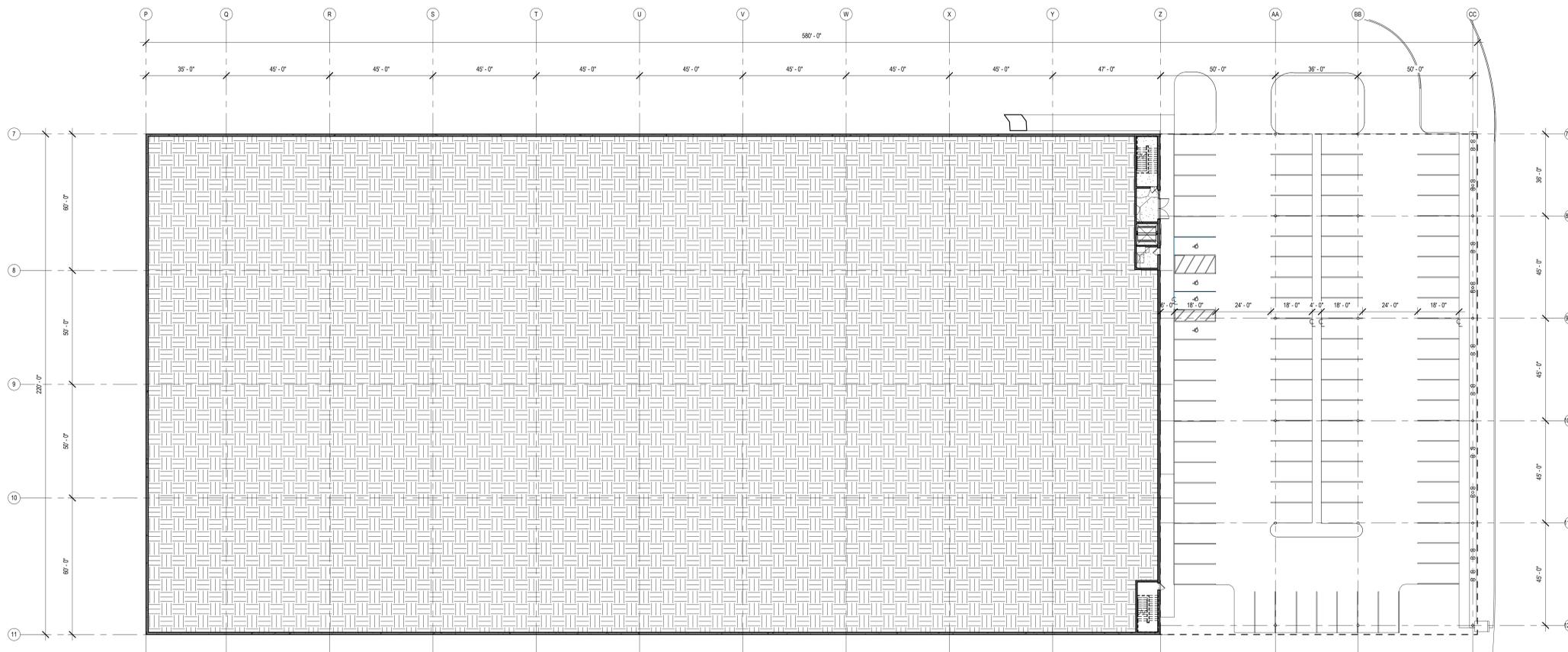
SCALE: 1" = 40'-0"

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BASKING RIDGE, NJ 07920
BLOCK: 11201 LOT: 3



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- Marc R. Parette A.I.A.
 - NCARB Registration 44284
 - New Jersey Architect 10436
 - New York Architect 024312
 - Pennsylvania Architect 0147908
 - Maryland Architect 10445
 - New Jersey Planner 4981
 - Alabama Architect 5996
 - Louisiana Architect 6261
 - Florida Architect AR 93131
 - Michigan Architect 150105095
 - Nevada Architect 6311
- Gregory J. Somjen A.I.A.
 - NCARB Registration 47178
 - New Jersey Architect 13349
 - Massachusetts Architect 9629
 - Delaware Architect 6616
 - Virginia Architect 0401 011210
 - Connecticut Architect 8622
 - New York Architect (03245)-1
 - Nevada Architect 6280
 - District Of Columbia Architect 101294
- William H. Bannister, A.I.A.
 - New Jersey Architect 19142
 - Connecticut Architect ARI10014499
 - North Carolina Architect 15027
 - South Carolina Architect 10382

SIGNATURE

PLAN A LOWER

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Author DRAWN BY	A2
Project Number PROJECT NUMBER	
Date 09/16/2022	© COPYRIGHT 2011 PARETTE SOMJEN ARCHITECTS, L.L.C.

1 BUILDING A FLOOR PLAN PARKING ENTRANCE

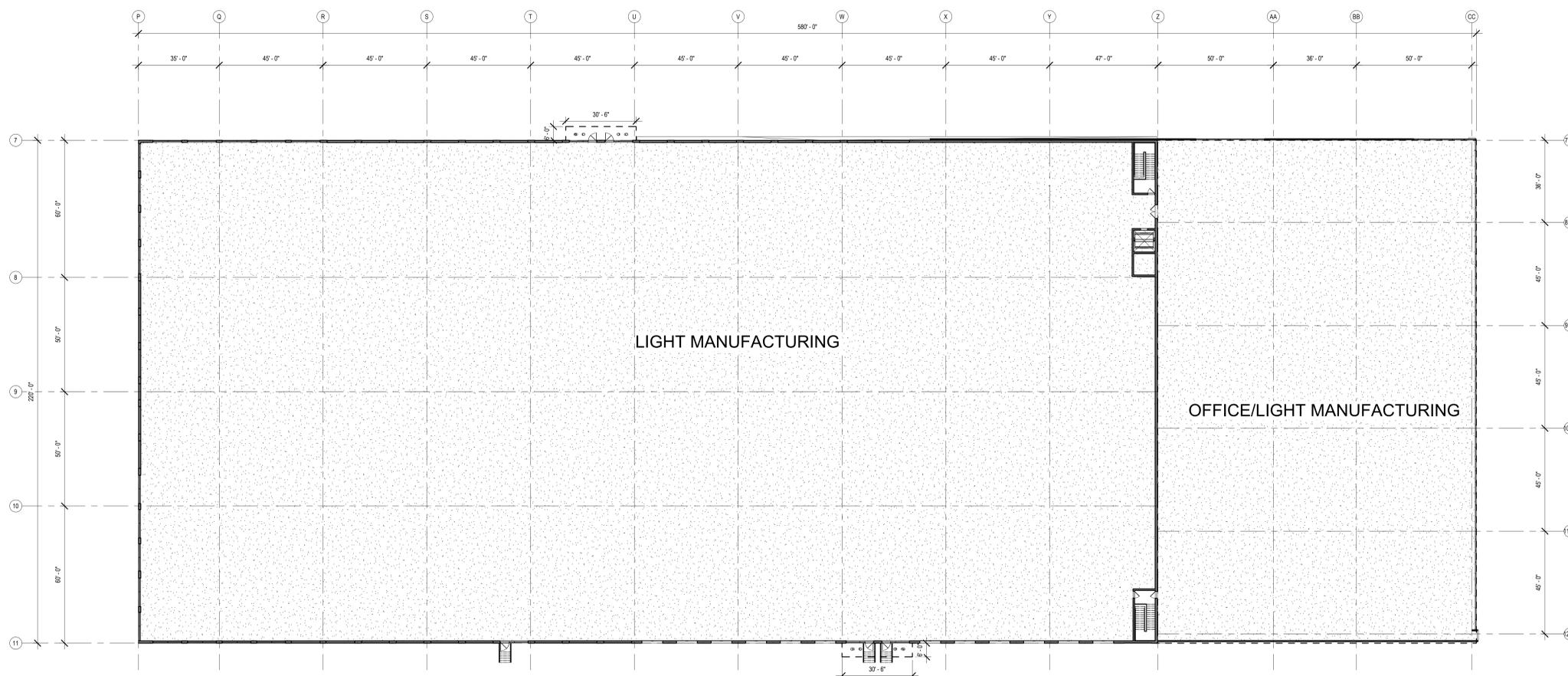
SCALE: 3/64" = 1'-0"

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BLOCK: 11201 LOT: 3



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- Marc R. Parette A.I.A.
NCARB Registration 42264
New Jersey Architect 10436
New York Architect 024312
Pennsylvania Architect 0147908
Maryland Architect 10445
New Jersey Planner 4981
Alabama Architect 5996
Louisiana Architect 6261
Florida Architect AR 93131
Michigan Architect 1501053953
Nevada Architect 6311
- Gregory J. Somjen A.I.A.
NCARB Registration 47178
New Jersey Architect 13349
Massachusetts Architect 9629
Delaware Architect 6616
Virginia Architect 0401 011210
Connecticut Architect 8622
New York Architect 032455-1
Nevada Architect 6280
District Of Columbia Architect 101294
- William H. Bannister, A.I.A.
New Jersey Architect 19142
Connecticut Architect ARI10014499
North Carolina Architect 15027
South Carolina Architect 10382

SIGNATURE

PLAN A UPPER

THE SCALE REPRESENTED ON THESE DRAWINGS IS ONLY VALID IF THE DRAWING IS AT 1/8" = 1'-0". DRAWINGS WHICH ARE NOT PLOTTED AT THE SPECIFIED SHEET SIZE ARE NOT TO SCALE.

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Author DRAWN BY	A3
Project Number PROJECT NUMBER	
Date 09/16/2022	© COPYRIGHT 2011 PARETTE SOMJEN ARCHITECTS, L.L.C.

1 BUILDING A FLOOR PLAN

SCALE: 3/64" = 1'-0"

BUILDING "A" AREA CALCULATIONS		
PROPOSED LIGHT MANUFACTURING:	97,185 SQ FT	76%
PROPOSED OFFICE:	30,792 FT	24%
TOTAL BUILDING FOOTPRINT:	127,977 SQ FT	100%

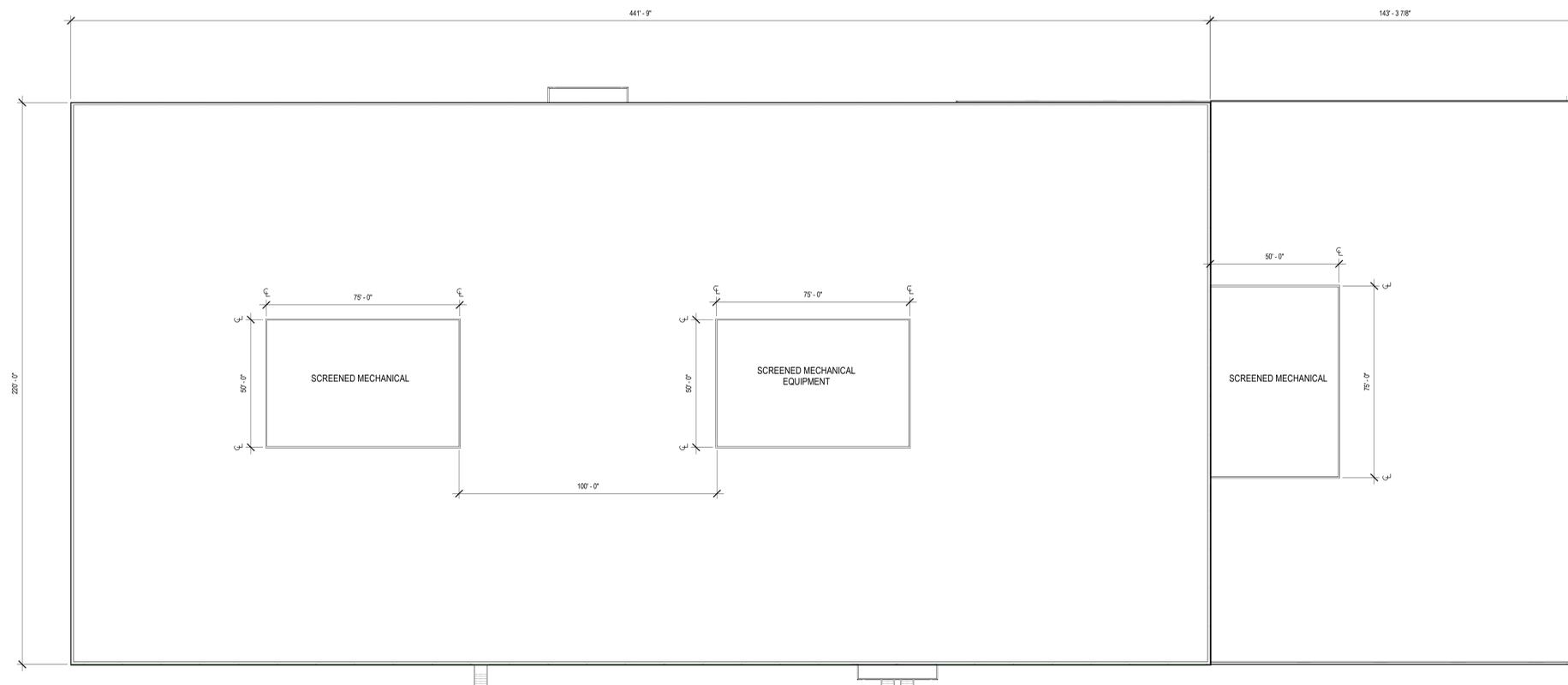
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150 ALLEN ROAD
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BLOCK: 11201 LOT: 3



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 - New York Architect 024312
 - Pennsylvania Architect 014790B
 - Maryland Architect 10445
 - New Jersey Planner 4981
 - Alabama Architect 5996
 - Louisiana Architect 6261
 - Florida Architect AR 93131
 - Michigan Architect 1501053953
 - Nevada Architect 6311
- Gregory J. Somjen A.I.A.
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 - Connecticut Architect 8622
 - New York Architect 032452-1
 - Nevada Architect 6280
 - District Of Columbia Architect 101294
- William H. Bannister, A.I.A.
 - New Jersey Architect 19142
 - Connecticut Architect ARI0014499
 - North Carolina Architect 15027
 - South Carolina Architect 10382

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**BUILDING A ROOF
PLAN**

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1 BUILDING A ROOF PLAN

SCALE: 3/64" = 1'-0"

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PROPOSED PROJECT FOR:
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WAREHOUSE
150 ALLEN ROAD
BASKING RIDGE, NJ 07920
BLOCK: 11201 LOT: 3

09/16/2022 AGENCY
SUBMISSION

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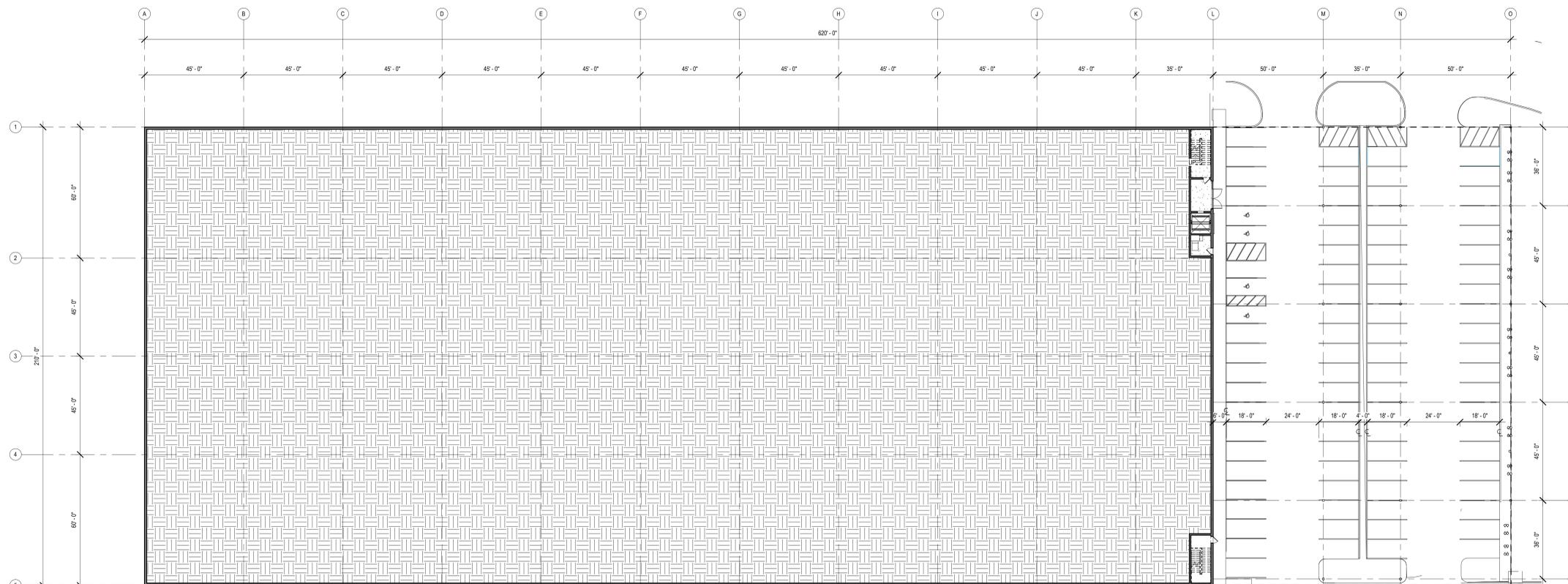
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PLAN B LOWER

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1 BUILDING B FLOOR PLAN PARKING ENTRANCE

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PLAN B UPPER

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1 BUILDING B FLOOR PLAN

SCALE: 3/64" = 1'-0"

BUILDING "B" AREA CALCULATIONS		
PROPOSED LIGHT MANUFACTURING:	101,792 SQ FT	78%
PROPOSED OFFICE:	28,759 SQ FT	22%
TOTAL BUILDING FOOTPRINT:	130,551 SQ FT	100%

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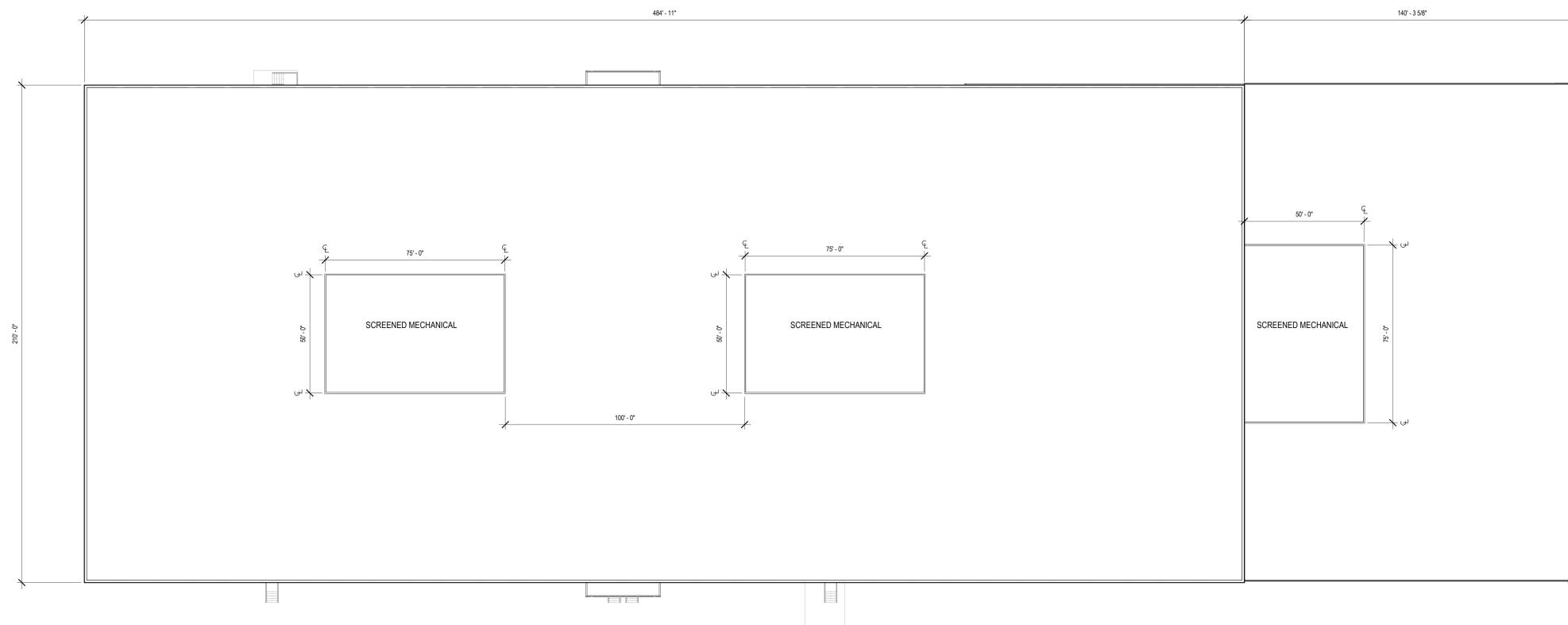
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 - New York Architect 024312
 - Pennsylvania Architect 014790B
 - Maryland Architect 10445
 - New Jersey Planner 4981
 - Alabama Architect 5996
 - Louisiana Architect 6262
 - Florida Architect AR 93131
 - Michigan Architect 1501053953
 - Nevada Architect 6311
- Gregory J. Somjen A.I.A.
 - NCARB Registration 47178
 - New Jersey Architect 13349
 - Massachusetts Architect 9629
 - Delaware Architect 6616
 - Virginia Architect 0401 011210
 - Connecticut Architect 8622
 - New York Architect 032453-1
 - Nevada Architect 6280
 - District Of Columbia Architect 101294
- William H. Bannister, A.I.A.
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1 BUILDING B ROOF PLAN

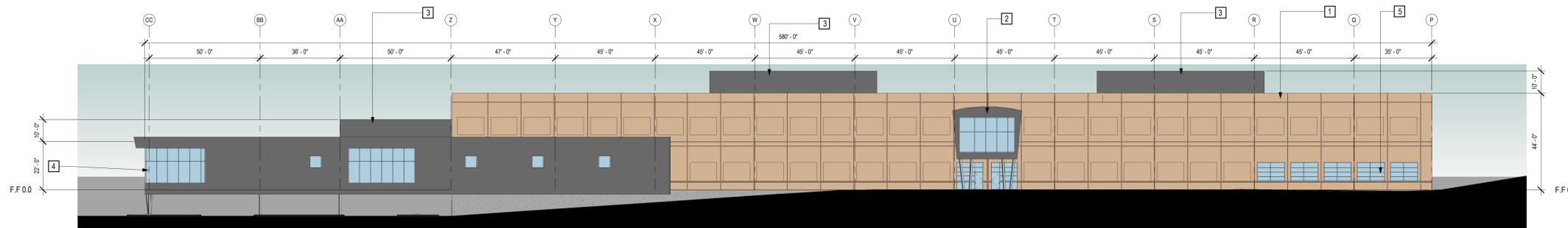
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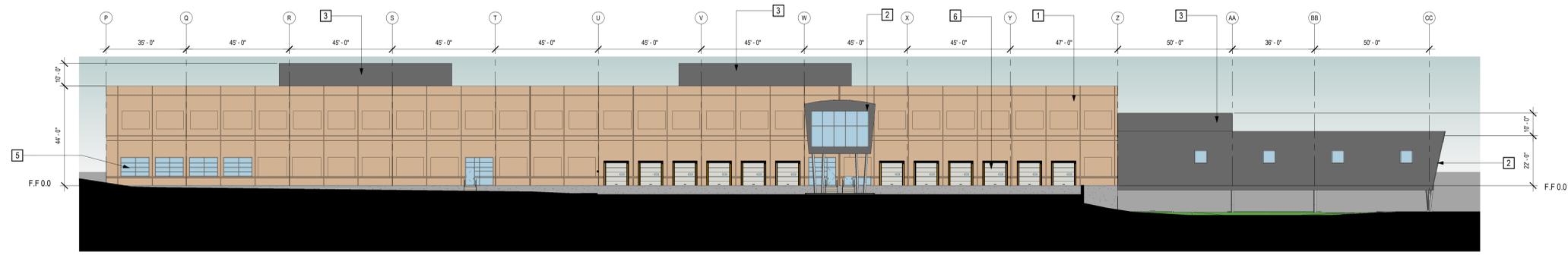


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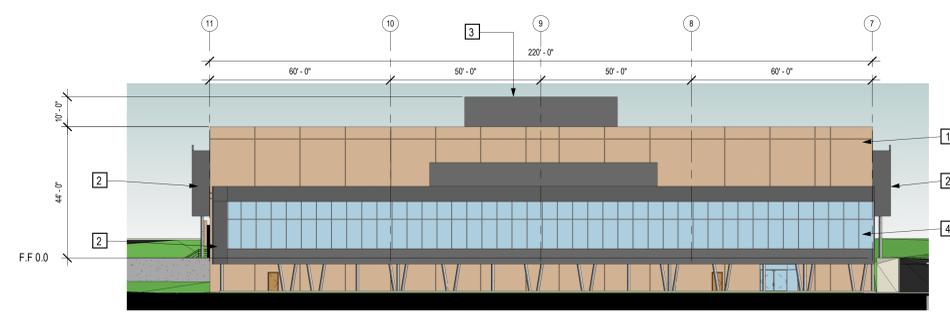
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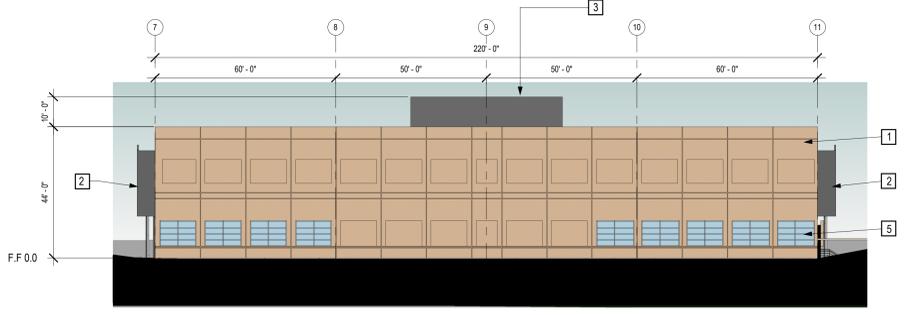
1 BUILDING A NORTH ELEVATION SCALE: 3/64" = 1'-0"



2 BUILDING A SOUTH ELEVATION SCALE: 3/64" = 1'-0"



3 BUILDING A EAST ELEVATION SCALE: 3/64" = 1'-0"



4 BUILDING A WEST ELEVATION SCALE: 3/64" = 1'-0"

ELEVATION MATERIAL NOTES

- 1 PRECAST CONCRETE PANELS
- 2 METAL CLADDING
- 3 10' - 0" MAX HIGH METAL CLAD MECHANICAL SCREEN
- 4 ALUMINUM / GLASS CURTIAN WALL
- 5 ALUMINUM / GLASS WINDOW
- 6 9X10 LOADING DOCK DOOR

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ELEVATIONS

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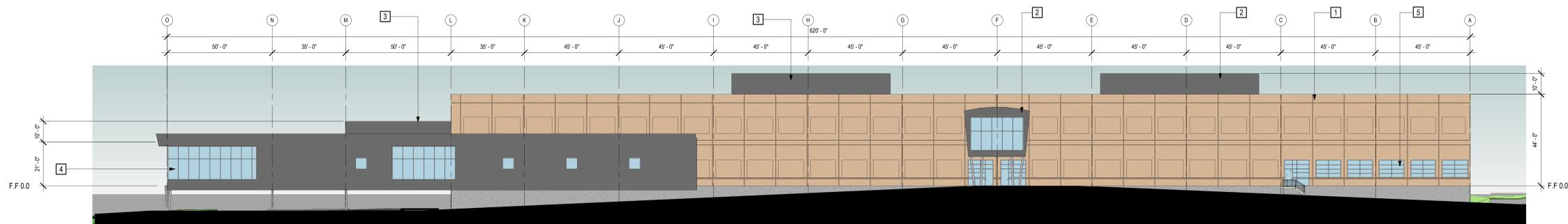
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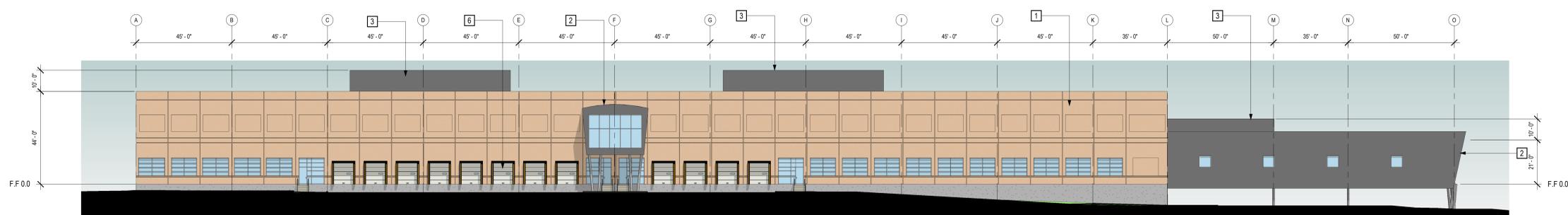


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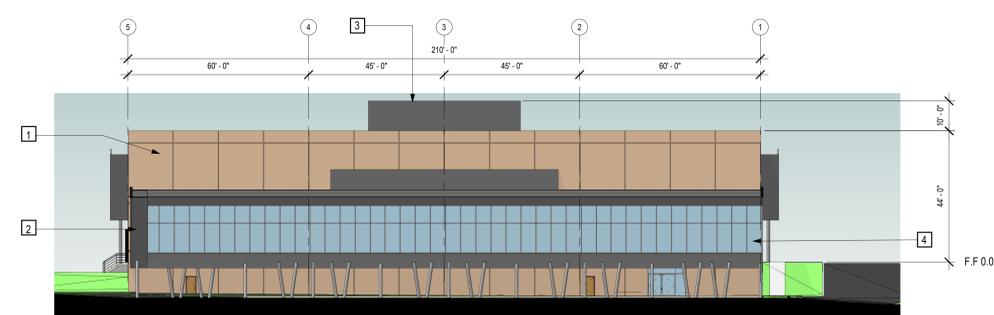
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BLOCK: 11201 LOT: 3



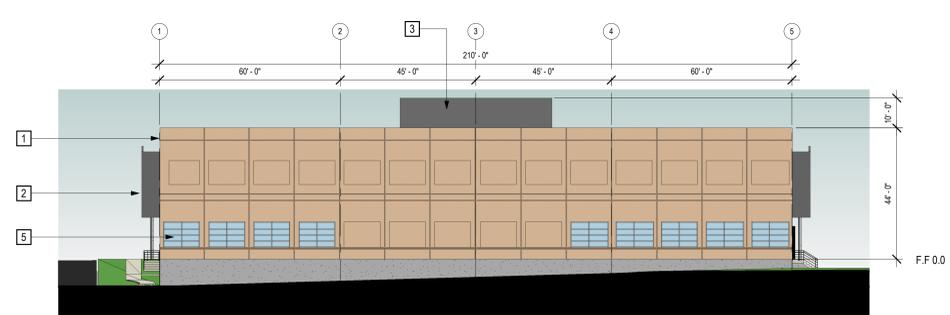
1 BUILDING B NORTH ELEVATION SCALE: 3/64" = 1'-0"



2 BUILDING B SOUTH ELEVATION SCALE: 3/64" = 1'-0"



3 BUILDING B EAST ELEVATION SCALE: 3/64" = 1'-0"



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ELEVATIONS

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Stormwater Management Report

for

150 ALLEN ROAD

BLOCK 11201 LOT 3

Township of Bernards

Somerset County, New Jersey

PREPARED BY:

GLADSTONE DESIGN, INC.

Consulting Engineers | Land Surveyors | Landscape Architects | Land Planners

265 Main Street, P.O. Box 400
Gladstone, New Jersey 07934

September 16, 2022



Robert C. Moschello, P.E.
NJ PROFESSIONAL ENGINEER
LICENSE No. GE44279

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INTRODUCTION

The proposed project is for the redevelopment of an existing office complex located at 150 Allen Road in Bernards Township, Somerset County, New Jersey. The overall property (see **Figure 1**) is comprised of Lot 3, Block 11201 with a total tract area of 28.304 acres. The site has frontage along Allen Road to the North, a reproductive medicine office to the East, Route 78 along the South of the property, and wooded area to the West. The current development consists of one (1) office building, paved parking lots and drive aisles, and associated site improvements.

The proposed redevelopment is to construct two (2) light manufacturing buildings, each with small office space areas contained within each building, loading docks, associated parking lots and site improvements. Stormwater will be managed through four (4) Small-Scale Bioretention basins and one (1) Large-Scale Bioretention basin. The Large-Scale Bioretention basin will detain roof runoff from the proposed light manufacturing buildings. The Bioretention basins will be constructed in accordance with the New Jersey Department Environmental Protection (NJDEP) standards for Small-Scale and Large-Scale Bioretention basins with underdrains. Most of the existing stormwater conveyance system will be removed / rebuilt as necessary to accommodate the proposed development.

EXISTING SITE DATA

TOPOGRAPHY:

The topographic elevations on the site range from around 350 feet above mean sea level (msl) in the center of the subject site, to around 280 feet above msl at the north side of the subject site and 342 to the west side of the subject site (See **Figure 2**). The site topography ranges from moderately sloping around the perimeter of the site to gently sloping out the center of the site. Runoff drains in two directions within the site, to the west and east, to existing storm collection system around the perimeter of the property.

SOILS:

The existing soil stratum is comprised predominantly of two (2) soil groupings; Neshaminy-Mount Lucas Silt Loam (NemCb) and Watchung Silt Loam (WasA).

Neshaminy-Mount Lucas Silt Loam is a 6 to 12 percent sloping series consisting of dark colored basic rocks or loamy residuum weathered from diabase, classified with a Hydrologic Soil Group 'B'. The depth to the water table is more than 80 inches, and the capacity of the most limiting layer to transmit water is moderately high.

Watchung Silt Loam is a 0 to 2 percent sloping series consisting of fine-silty residuum weathered from diabase, classified with a Hydrologic Soil Group 'D'. The depth to the water table is 0 to 12 inches, and the capacity of the most limiting layer to transmit water is very low to moderately high.

REGULATED AREAS:

There are New Jersey Department of Environmental Protection (NJDEP) regulated areas located on the property that impact the development potential of the project. The regulated areas include freshwater wetlands and associated transition areas.

Freshwater wetlands are present in two (2) main locations on the site. A complex of freshwater wetlands is in the northwestern portion of the site along the ring road. The other area of freshwater

wetlands is located to the west and southwest portion of the site along the ring road. An application for a Letter of Interpretation: Line Verification has been submitted to the New Jersey Department of Environmental Protection, Division of Land Resource Protection to verify the delineated limits of wetlands within the subject site.

STORMWATER MANAGEMENT REGULATION COMPLIANCE

The proposed stormwater management system has been designed to meet the requirements of the State Stormwater Management Rules (N.J.A.C. 7:8, adopted March 2, 2021) and the Township's Stormwater Management Ordinance. The project meets the NJDEP definition of a major development for stormwater purposes because it proposes more than 1-acre of land disturbance (14.85 ac. / 647,062 s.f.), more than ¼-acre of new motor vehicle surface (3.36 ac. / 146,361 s.f.). However, when compared to the existing office development, this project proposes a slight increase in impervious coverage from 39.70% (11.24 ac.) of the lot area to 39.92% (11.30 ac.). It should be noted that the proposed development includes a portion of existing driveway to remain (1.90 ac.).

NJDEP identifies four (4) primary requirements for proposed stormwater management measures: Utilization of Non-Structural Stormwater Strategies; Provide peak rate of runoff reduction for erosion and flood control; provide water quality treatment for regulated vehicular surfaces; and provide groundwater recharge facilities. A summary of the compliance and methodology for each of the (4) areas are outlined below.

NON-STRUCTURAL STORMWATER STRATEGIES:

The project utilizes non-structural stormwater strategies, also known as Low Impact Development techniques, which reduce and/or prevent adverse runoff impacts through careful site planning and both nonstructural and structural techniques that preserve the site's natural hydrologic response to precipitation. Low impact development techniques interact with the hydrologic response by controlling stormwater runoff and pollutants closer to the source and providing site design measures that significantly reduce the overall impact of land development on stormwater runoff. The low impact development techniques promote the concept of designing stormwater with nature. The project utilizes existing stormwater facilities which address to the maximum extent practicable the nine nonstructural strategies outlined in the NJDEP Best Management Practices Manual.

RUNOFF QUANTITY STANDARDS:

In accordance with N.J.A.C. 7:8-5.6, the project is required to meet the minimum design and performance standards to control erosion, maintain groundwater recharge, and control stormwater runoff quantity impacts to the development. In order to satisfy the requirements for stormwater runoff quantity impacts, N.J.A.C. 7:8-5.6(b) outlines four criteria to demonstrate compliance. The project utilizes criteria #3, which requires the stormwater management measures be designed so that the post-construction peak runoff rates for the 2, 10, and 100-year storm events are 50, 75, and 80 percent of the pre-construction peak runoff rates. The percentages apply only to the post construction stormwater runoff that is attributable to the portions of the site which the impervious areas under proposed conditions replaced lawn areas under existing conditions. The allowable flow calculations are based upon disturbance within areas for POA "A" and POA "B", which amounts to a total of 14.31 acres of disturbance.

WATER QUALITY STANDARDS:

The stormwater management measures are to be designed to reduce the post-construction load of total suspended solids (TSS) in the stormwater runoff generated by the water quality design storm by 80 percent of the anticipated load from the developed site in accordance with N.J.A.C. 7:8-5.5. Because the project proposes new motor vehicle surface, the development is required to meet water quality regulations. By means of a series of small-scale green bioretention basins, a minimum of 80% TSS removal is provided for all new motor vehicle surfaces.

GROUNDWATER RECHARGE STANDARDS:

The stormwater management measures are to be designed to maintain 100 percent of the average annual pre-construction groundwater recharge volume or to infiltrate the increase in stormwater runoff volume from pre-construction to post-construction for the two-year storm in accordance with N.J.A.C. 7:8-5.4. This project provides infiltration to account for the slight increase in impervious coverage for the site, by infiltrating the difference in the pre- and post-construction 2 year storm.

METHODOLOGY:

Run-off has been generated under both pre- and post-development conditions in accordance with "Part 630 Hydrology, National Engineering Handbook, Chapter 10".

Runoff Curve Numbers

Runoff curve numbers (CN's) have been established by use of the hydrologic soil groups associated with the soils found in the U.S.D.A Natural Resource Conservation Service Web Soil Survey. A composite soil survey map (**See Figure 3**) is provided for review of the general soil characteristics. Run-off curve numbers can be found in **Appendix "A"**.

Time of Concentration

The time of concentration under the existing and proposed conditions has been established by review of the topography shown on the plans. For both existing and proposed drainage areas along with proposed impervious surfaces, time of concentration has been calculated based on the McCuen-Spiess criteria. The included "Time of Concentration and Travel Time" forms have been updated accordingly. Times of concentration can be found in **Appendix "A"** of this report.

Hydrographs

Hydrographs were generated using "Pond Pack" by Haestad Methods. This program is based upon the Soil Conservation Service methodology for tabular hydrographs using the NOAA Type C storm event as detailed in "Part 630 Hydrology, National Engineering Handbook, Chapter 10". The 24-hour rainfall for the four (4) respective storms studied is as follows:

<u>Storm Event</u>	<u>24 Hour Rainfall</u>
1-yr	1.25"-2 Hr. Storm*
2-yr	3.38"
10-yr	5.07"
100-yr	8.28"

*The 1-year storm event used is based on the New Jersey Department of Environmental Protection 1.25-inch/2-hour Stormwater Quality Design Storm.

HYDROLOGIC ANALYSIS

EXISTING FLOW CONDITIONS:

An analysis of the existing site conditions was performed based upon field observation and calculated utilizing the weighted curve number method and runoff hydrographs. An existing conditions land cover analysis (**DA-1**) has been prepared to visualize the existing land cover calculated in the weighted curve number sheets. The existing conditions summary sheet can be found in **Appendix "A-1"** and the hydrographs can be found in **Appendix "B-1"** of this report. The information is summarized in the table below.

EXISTING CONDITIONS (C.F.S.)				
STORM EVENT	POINT "A"	POINT "A" ALLOWABLE FLOW	POINT "B"	POINT "B" ALLOWABLE FLOW
2	30.34	23.00	13.28	10.21
10	49.91	43.87	22.40	19.81
100	93.58	84.53	42.41	38.49

*A summary describing the characteristics of each existing drainage area is outlined below. The drainage areas are depicted on the Existing Drainage Area Map (DA-1) located in **Appendix "I"** of this report. A summary of the allowable calculations can be found in **Appendix "B-2"**.

Existing Drainage Area #1 (10.41 Ac.)

Existing drainage area #1 stormwater runoff flows overland, undetained, away from the existing development's ring road, towards point of analysis "A". This drainage area consists of portions of the existing access boulevard, open space areas, wooded areas, and brush.

Existing Drainage Area #1A (10.45 Ac.)

Existing drainage area #1A stormwater runoff is collected via a storm conveyance system and flows from the high point near the existing office building, towards point of analysis "A". This drainage area consists of portions of open space, wooded areas and impervious areas associated with the existing parking lot, office building, and walkways.

Existing Drainage Area #2 (3.31 Ac.)

Existing drainage area #2 stormwater runoff flows overland, undetained, away from the existing development's ring road, towards point of analysis "B". This drainage area consists of portions of open space areas, wooded areas, and brush.

Existing Drainage Area #2A (5.69 Ac.)

Existing drainage area #2A stormwater runoff is collected via a storm conveyance system and flows from the high point near the existing office building, towards point of analysis "B". This drainage area consists of portions of open space, wooded areas and impervious areas associated with the existing parking lot and walkways.

PROPOSED FLOW CONDITIONS:

An analysis of the proposed site conditions was performed based upon the proposed development depicted on the Site Plans and calculated utilizing the weighted curve number method and runoff hydrographs. The proposed conditions land cover analysis (**DA-2**) has been prepared to visualize the proposed land cover calculated on the weighted curve number sheets. The summary sheets can be found in **Appendix "A-2"** and the hydrographs can be found in **Appendix "B-3"** of this report. The information is summarized in the table below.

PROPOSED CONDITIONS (C.F.S.)				
STORM EVENT	POINT "A"	POINT "A" ALLOWABLE FLOW	POINT "B"	POINT "B" ALLOWABLE FLOW
2	12.49	23.00	5.46	10.21
10	31.65	43.87	10.39	19.81
100	72.36	84.53	22.17	38.49

*A summary describing the characteristics of each proposed drainage area is outlined below. The drainage areas are depicted on the Proposed Drainage Area Map (DA-2) located in **Appendix "I"** of this report. A summary of the allowable calculations can be found in **Appendix "B-2"**.

Proposed Drainage Area #1 (9.92 Ac.)

Proposed drainage area #1 stormwater runoff flows overland, undetained, away from the proposed development's ring road, towards point of analysis "A". This drainage area consists of portions of the existing access boulevard, open space areas, wooded areas, and brush.

Proposed Drainage Area #2 (3.34 Ac.)

Proposed drainage area #2 stormwater runoff flows overland, undetained, away from the proposed development's ring road, towards point of analysis "B". This drainage area consists of portions of open space areas, wooded areas, and brush.

Proposed Drainage Area #2A (2.69 Ac.)

Proposed drainage area #2A consists of the parking area and ring road that will remain from the existing development. The stormwater runoff is collected via a storm conveyance system and flows from the high point near the building, towards point of analysis "B". This drainage area consists of portions of open space, wooded areas and impervious areas associated with the parking lot and walkways.

Proposed Drainage Area #3 (1.61 Ac.)

Proposed drainage area #3 stormwater runoff flows towards small-scale bioretention basin #3 via overland flow and storm conveyance system. Discharge from this basin is directed towards large-scale basin #5 and is ultimately analyzed the at point of analysis "A". This drainage area consists of a portion of impervious associated with the loading dock as well as open space area.

Proposed Drainage Area #3A (0.99 Ac.)

Proposed drainage area #3A stormwater runoff flows towards small-scale bioretention basin #3A via overland flow and storm conveyance system. This basin will provide the recharge required for

the whole site. Discharge from this basin is directed towards large-scale basin #3, and then basin #5 and is ultimately analyzed the at point of analysis “A”. This drainage area consists of a portion of impervious associated with the ring road as well as wooded area and open space area.

Proposed Drainage Area #4 (2.05 Ac.)

Proposed drainage area #4 stormwater runoff flows towards small-scale bioretention basin #4 via overland flow and stormwater conveyance system. The runoff generated by this drainage area is analyzed as part of point of analysis “A”. This drainage area consists of a portion of impervious associated with the loading dock as well as open space areas.

Proposed Drainage Area #5 (6.95 Ac.)

Proposed drainage area #5 stormwater runoff flows towards large-scale bioretention basin #5 via storm conveyance system and overland flow. The runoff generated by this drainage area is analyzed as part of point of analysis “A”. This drainage area consists of roof runoff associated with the light manufacturing building as well as open space areas.

Proposed Drainage Area #6 (1.33 Ac.)

Proposed drainage area #6 stormwater runoff flows towards small-scale bioretention basin #6 via overland flow and stormwater conveyance system. The runoff generated by this drainage area is analyzed as part of point of analysis “A”. This drainage area consists of a portion of open space areas and impervious area associated with a portion of the ring road and parking lot area.

Proposed Drainage Area #7 (0.98 Ac.)

Proposed drainage area #7 stormwater runoff flows towards small-scale bioretention basin #7 via storm conveyance system. The runoff generated by this drainage area is analyzed as part of point of analysis “A”. This drainage area consists of a portion of impervious area associated with the ring road and parking lot as well as open space area.

The tables below outline the proposed site disturbance, motor vehicle surface coverage, and impervious surface coverage for the entire tract:

PROPOSED COVERAGE SUMMARY (ACRES)			
	TOTAL DISTURBANCE	TOTAL MOTOR VEHICULE SURFACE	TOTAL IMPERVIOUS SURFACE
To Point of Analysis “A”	11.53	3.96	9.99
To Point of Analysis “B”	2.78	1.30	1.32

MOTOR VEHICLE SURFACE SUMMARY (ACRES)						
	EXISTING	PROPOSED				
	TOTAL	EXISTING TO REMAIN UNDISTURBED	MILLED & REPAVED	NEW	TOTAL	INCREASE
To Point of Analysis “A”	5.81	0.16	0.44	3.36	3.96	-1.85
To Point of Analysis “B”	2.93	0.00	1.30	0.00	1.30	-1.63

PROPOSED STORMWATER MANAGEMENT FEATURES

The project utilizes large-scale and small-scale bioretention basins for stormwater quantity control and conveyance. Descriptions of the stormwater features are outlined below.

SMALL-SCALE BIORETENTION BASIN: Small-scale bioretention systems are facilities used to address the stormwater quality, recharge and quantity impacts for the proposed project, these basins are designed to treat an inflow drainage area less than 2.5-acres. The systems are used to remove a wide range of pollutants from regulated vehicular surfaces. The systems are designed with a 1.5-foot-thick to 2-foot-thick soil planting bed with vegetation ranging from trees to herbaceous species which provides a minimum of 80% to 90% TSS removal. The stormwater runoff enters the system and is filtered through the soil media before discharging from the basin. The proposed basins are designed with and without underdrains that discharge the runoff once the stormwater is treated.

LARGE-SCALE BIORETENTION BASIN: Bioretention systems are facilities used to address the stormwater quality and quantity impacts for the proposed project. The systems are designed with a 1.5-foot-thick to 2-foot-thick soil planting bed with vegetation ranging from trees to herbaceous species which provides a minimum of 80% to 90% TSS removal. The stormwater runoff enters the system and is filtered through the soil media before discharging from the basin through an underdrain system. The large-scale bioretention basins are designed to reduce peak runoff rates and do not have a limit on the contributory inflow drainage area. Although the large-scale bioretention basins will contain soil media that will treat runoff from the water quality storm event, it's purpose will be for quantity control only.

GROUNDWATER RECHARGE

In order to meet the groundwater recharge requirements, there are two (2) methods that can be utilized. One method is to utilize the New Jersey Ground Water Recharge Spreadsheet (NJGRS) for both existing and proposed conditions. The second is to infiltrate the difference in the two-year storm event from existing and proposed conditions. For this project, the second method has been utilized. The routings for the 2-year storm with infiltration turned on for Basin #3A can be found in **Appendix "B-3"**.

The infiltration rate utilized for the infiltration basin can be found in the Geotechnical Report prepared by GTA. Additional testing shall be performed within the basin footprints to comply with NJDEP BMP requirements.

GROUNDWATER RECHARGE SUMMARY CHART (ac.-ft.)		
STORM EVENT	EXISTING RUNOFF VOLUME	PROPOSED RUNOFF VOLUME
2 yr. storm	3.403	3.391

LOW IMPACT DEVELOPMENT

Nonstructural strategies have been incorporated into the development's design as follows:

1. *Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.* Disturbance in the areas of the property that provide significant hydrologic functions will be minimized to the greatest extent practicable. The proposed

development is located within areas that had been previously developed/disturbed and silt fence shall be installed along the perimeter of the project's disturbance.

2. *Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces.* The project has been designed to reduce the amount impervious proposed to the maximum extent while adhering to the Townships Standards for building and parking setbacks.
3. *Maximize the protection of natural drainage features and vegetation.* Natural drainage features, such as the grassed areas and wooded along the perimeter of the site, will not be disturbed and will be protected by silt fences. In addition to the silt fence, existing drainage patterns and vegetation not within the proposed limits of disturbance will be protected.
4. *Minimize the decrease in the pre-construction "time of concentration".* The project does not propose to decrease the time of concentration from pre-construction conditions to post-construction conditions. This is due to preservation of natural drainage patterns and disconnecting the proposed impervious surface from the existing drainage area.
5. *Minimize land disturbance including clearing and grading.* The project proposes to disturb only the land area necessary for the construction of the proposed development. No areas of the project located outside of the proposed limit of disturbance will be cleared or regraded.
6. *Minimize soil compaction.* Soil compaction is inevitable during the duration of construction of the proposed project; however, care will be given to minimize the soil compaction within the proposed limit of disturbance. The proposed limit of disturbance will be marked out either with survey stakes or silt fence and no construction vehicles will be allowed outside the limit of disturbance. To minimize soil compaction within the limit of disturbance, lighter-weighted construction equipment will be utilized to the greatest extent possible. The project will also utilize phasing techniques, such as constructing and stabilizing areas of the development before moving to another area, to minimize the amount of equipment being moved throughout the site. Prior to the placement of topsoil, soil compaction testing will be done throughout the limits of disturbance, should soil compaction be found, the area will be tilled and scarified to eliminate the compaction as required by soil conservation district.
7. *Provide low maintenance landscaping that encourage retention and planting of native vegetation and minimizes the use of lawns, fertilizers, and pesticides.* The project proposes to utilize low maintenance, native landscaping throughout the development. Existing landscaped and natural areas will be infill planted with native trees and shrubs and invasive species will be removed.
8. *Provide vegetated open-channel conveyance systems discharge into and through stable vegetated areas.* Where applicable open-channel conveyance systems are utilized to convey overland stormwater flow. The channels discharge into stable vegetated areas.

9. *Provide preventative source controls.* The project proposes to utilize trash receptacle around the light manufacturing building development to prevent trash and debris from entering the storm sewer system. In addition to the trash receptacles, a regular maintenance schedule will be adhered to that sweeps the sidewalks and removes any accumulated trash and debris from the site. Within the LID-BMPs for the project, trash racks will be utilized to prevent trash from being discharged out of the storm sewer system. The project will employ a maintenance company to promptly address any maintenance issues.

STORMWATER COLLECTION SYSTEM

The stormwater collection system consists of a series of stormwater inlets and flared end sections connected by reinforced concrete pipe. The collected run-off is directed to the stormwater management facilities previously described. The stormwater collection system is designed in accordance with Bernards Township Ordinance and accepted engineering practices. The Rainfall Intensity Curve was used to generate stormwater intensities based upon the Time of Concentration generated by the “Nomograph for Calculations of Time of Concentration” and a weighted run-off coefficient (“C”) was calculated for each drainage area. Manning’s Equation was used to ensure adequacy of the pipes and The Rational Method was used to generate stormwater flows. The stormwater collection system has been designed to accommodate the 25-year storm. Basin discharge pipes have been designed to accommodate the 100-year storm. The specified inlet casings are compliant with the New Jersey Department of Environmental Protection Stormwater Regulations, details of which can be found on the Construction Detail Sheets.

Nomograph Runoff Coefficients and Rainfall Intensity Curves can be found in **Appendix “H”**.

SOIL EROSION AND SEDIMENT CONTROL

The Soil Erosion and Sediment Control Measures for this project include designed riprap conduit outlet protection apron, perimeter silt fencing, temporary and permanent seeding and mulching, and the installation of temporary stone tracking pads. All provisions are to be in accordance with the “Standards for Soil Erosion and Sediment Control in New Jersey”. The specifics of these soil erosion and sediment control measures are shown on the project site plans. The computations for sizing the conduit outlet protection aprons are provided in **Appendix “H”**. The conduit outlet protection for the discharge into and out of the basin has been designed for the 100-year storm event. The conduit outlet protection is designed in accordance with Section 4.12 of the above noted manual published by the New Jersey State Soil Conservation Committee.

EMERGENCY SPILLWAY

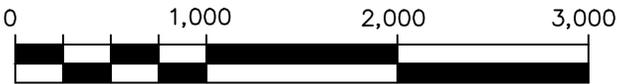
The bioretention basins have an emergency spillway designed using the 100-year + 50% storm event and placing the outlet structure in a closed condition. This has been done to demonstrate that the spillway can handle the storm flow in case of the outlet structure being incapacitated. For the basins where a spillway was not feasible, the Outlet Control Structure and the outlet pipe have been upsized to control the 100-year + 50% storm event. The routing and velocity calculations can be found in **Appendix “F”**.

CONCLUSION

A review of the methodology and analysis used for this stormwater management study reveals that the measures that have been taken to provide water quality treatment with the use of *Best Management Practices* (BMP’s) and the proposed on-site detention facility will maintain the post-

construction peak rates of runoff below allowable rates for the storm events studied and meet water quality. A narrative on the compliance of the project to the low impact development techniques per NJDEP BMP manual has been provided in **Appendix “G”** of this report. Based upon the information provided in this report, it is determined that the basins and other stormwater management facilities can be constructed as proposed without negative impact due to stormwater runoff to areas downstream of the project and construction can take place while adhering to the rules and regulations of State and Local agencies.

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SCALE : 1"=1000'

NOTES:

1. OUTLINE OF PROPERTY IN QUESTION APPROXIMATE FROM PLAN ENTITLED "ALLEN RD" DATED FEBRUARY 28, 2022, PREPARED BY ROBINSON AERIAL SURVEYS INC.

GLADSTONE DESIGN, Inc.

Consulting Engineers
Land Surveyors
Landscape Architects
Land Planners

265 Main Street P.O. Box 400
Gladstone, New Jersey 07934
Telephone (908) 234-0309
Facsimile (908) 719-3320

NJ Certificate of Authorization
No. 24GA28034400

150 ALLEN ROAD
LOT 3 BLOCK 11201
BERNARDS TOWNSHIP
SOMERSET COUNTY, NEW JERSEY

SHEET TITLE:

KEY MAP

REFERENCE:

BING MAPS

DWN.

SG

CHKD.

RCM2

SCALE

1"=1,000'

DATE

09-16-22

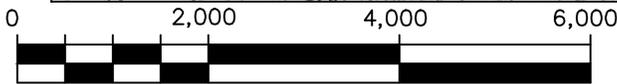
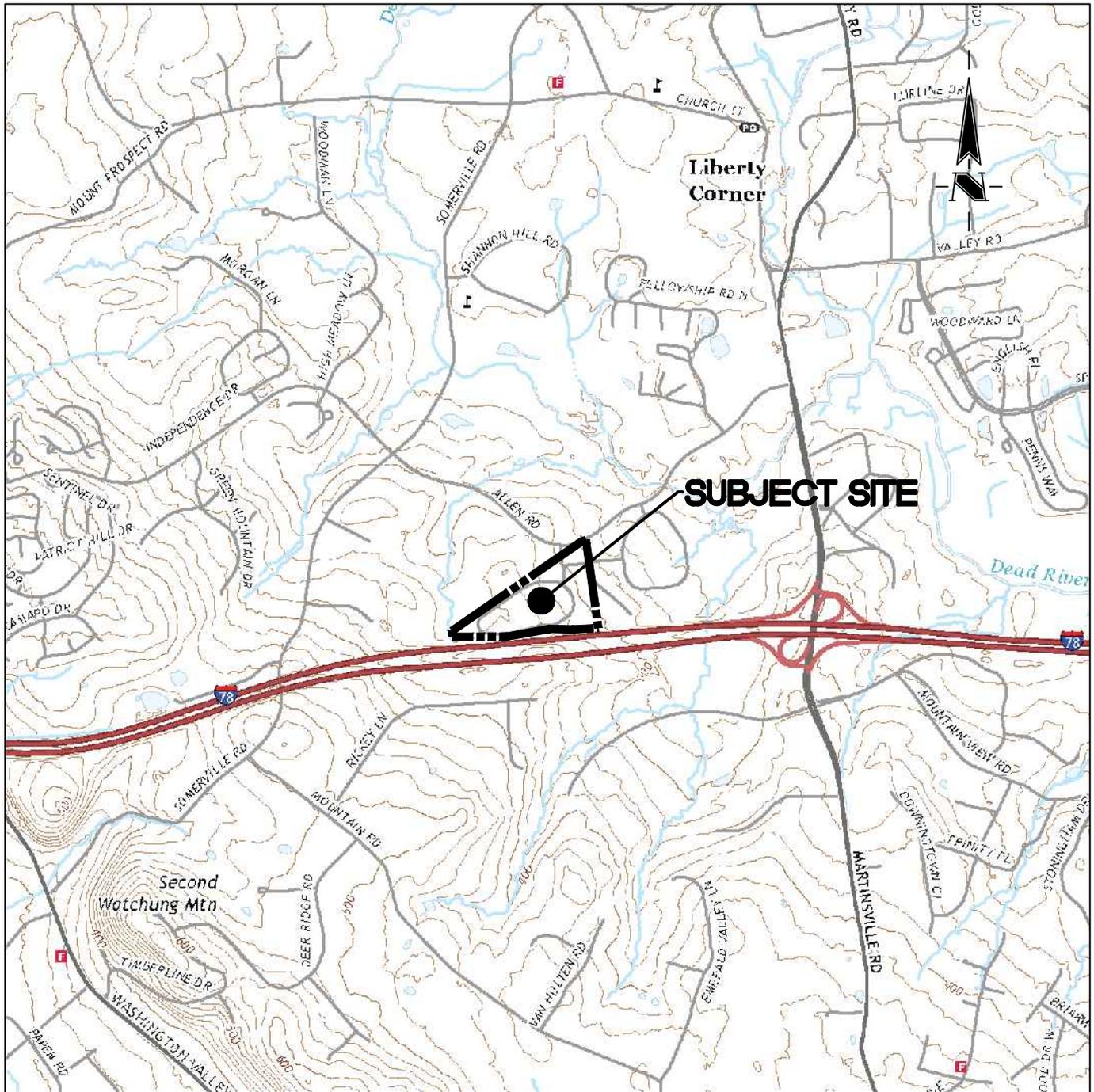
FIG. NO.

1

JOB NO.

1114-02

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SCALE : 1"=2,000'

NOTES:
 1. OUTLINE OF PROPERTY IN QUESTION APPROXIMATE FROM PLAN ENTITLED "ALLEN RD"
 DATED FEBRUARY 28, 2022, PREPARED BY ROBINSON AERIAL SURVEYS INC.

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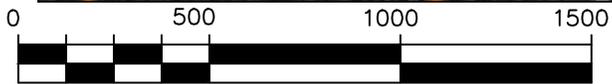
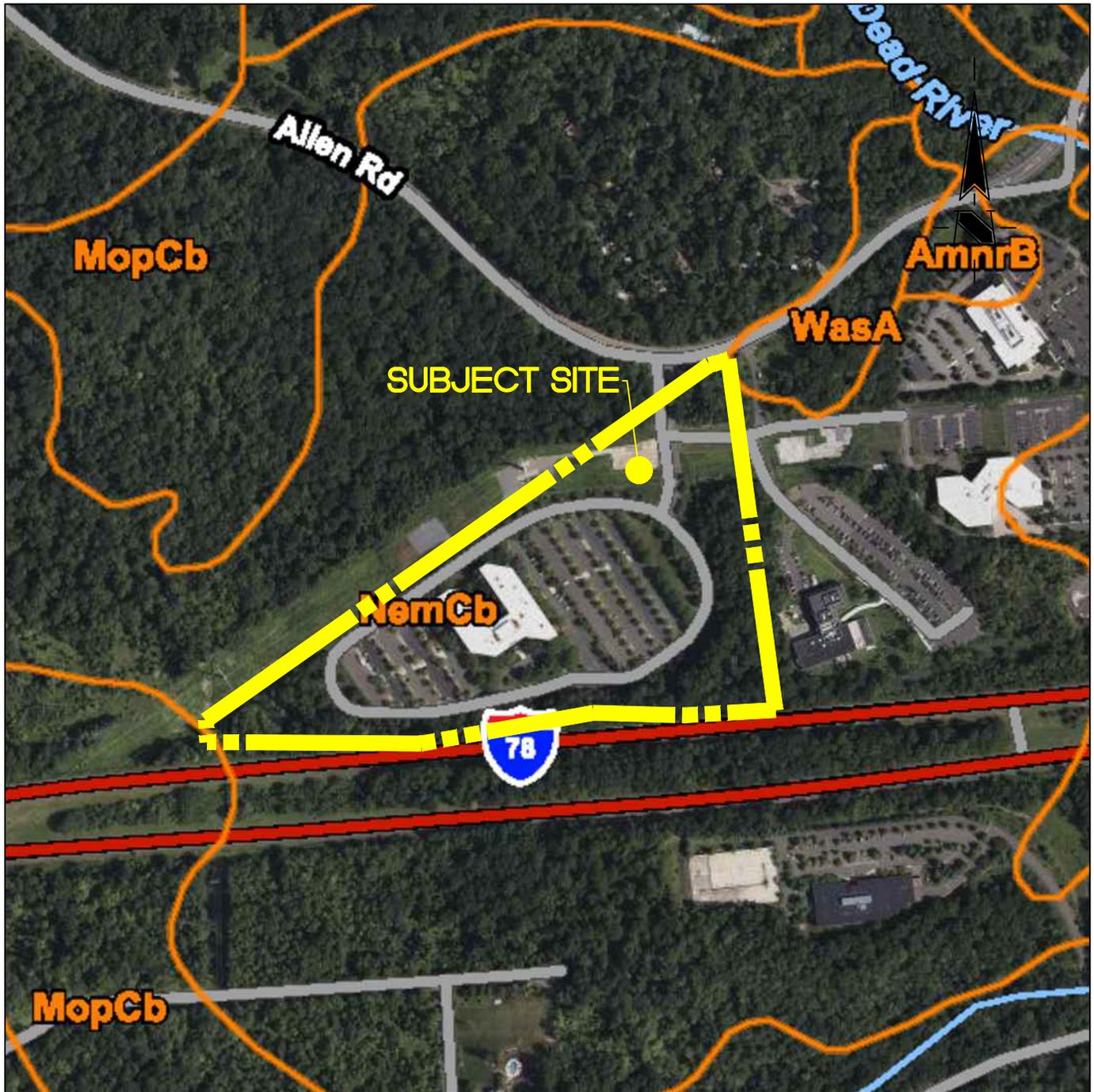
150 ALLEN ROAD
 LOT 3 BLOCK 11201
 BERNARDS TOWNSHIP
 SOMERSET COUNTY, NEW JERSEY

SHEET TITLE:
QUAD MAP

REFERENCE:
**BERNARDSVILLE, CHATHAM,
 MENDHAM, MORRISTOWN
 QUADRANGLE**

DWN.	SG
CHKD.	RCM2
SCALE	1"=2,000'
DATE	09-16-22
FIG. NO.	2
JOB NO.	1114-02

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SCALE : 1"=500'

NOTES:
 1. OUTLINE OF PROPERTY IN QUESTION APPROXIMATE FROM PLAN ENTITLED "ALLEN RD"
 DATED FEBRUARY 28, 2022, PREPARED BY ROBINSON AERIAL SURVEYS INC.

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NJ Certificate of Authorization
 No. 24GA28034400

150 ALLEN ROAD
 LOT 3 BLOCK 11201
 BERNARDS TOWNSHIP
 SOMERSET COUNTY, NEW JERSEY

SHEET TITLE:
SOILS MAP

REFERENCE:
 U.S.D.A. N.R.C.S.
 WEB SOIL SURVEY

DWN.	MF
CHKD.	RCM2
SCALE	1"=500'
DATE	09-16-22
FIG. NO.	3
JOB NO.	1114-02

EXISTING AND PROPOSED RUNOFF CALCULATIONS – APPENDIX A

EXISTING AND PROPOSED RUNOFF CALCULATIONS – APPENDIX A-1
EXISTING CONDITIONS

WORKSHEET 3: TIME OF CONCENTRATION AND TRAVEL TIME

PROJECT: 150 Allen Road
LOCATION: Township Of Bernards, Somerset County

BY: MF **DATE:** 9/16/2022
CHECKED: RCM2 **DATE:** -

SELECT ONE: **PRESENT** DEVELOPED D.A. #1

SELECT ONE: **Tc** Tt

NOTES: SPACE FOR AS MANY AS TWO SEGMENTS PER FLOW CAN BE USED FOR EACH WORKSHEET.
 INCLUDE A MAP, SCHEMATIC, OR DESCRIPTION OF FLOW SEGMENTS

SHEET FLOW

		SEGMENT ID			
1	SURFACE DESCRIPTION			AB	
2	MANNINGS ROUGHNESS COEFF., n			Wooded	
3	LAND SLOPE, s		ft/ft	0.4	
4	MAXIMUM FLOW LENGTH, L (EQ 15-9)		ft	0.15	
5	TWO YEAR 24 HOUR RAINFALL (NOAA)		in	97	
6	Tt (EQ 15-8)	COMPUTE Tt	hr.	3.38	
				0.15	0.15

SHALLOW CONCENTRATED FLOW

		SEGMENT ID			
7	SURFACE DESCRIPTION			BC	
8	FLOW LENGTH, L		ft	Forest with	
9	WATERCOURSE SLOPE, s		ft/ft	660	
10	AVERAGE VELOCITY, V (FIG. 15-4)		ft/s	0.07	
11	Tt=L/3600V (EQ 15-1)	COMPUTE Tt	hr.	0.65	
				0.28	0.28

CHANNEL FLOW

		SEGMENT ID			
12	CROSS SECTIONAL FLOW AREA, a		ft^2		
13	WETTED PERIMETER, Pw		ft		
14	HYDRAULIC RADIUS, r=a/Pw		ft		
15	CHANNEL SLOPE, S		ft/ft		
16	MANNINGS ROUGHNESS COEFF., n				
17	VELOCITY, V (EQ 15-10)		ft/s		
18	FLOW LENGTH, L		ft		
19	Tt=L/3600V (EQ 15-1)		hr		0.00
20	WATERSHED OR SUBAREA Tc OR Tt (EQ 15-7)				0.43
					25.8
				hr	
				min	

WORKSHEET 2: RUNOFF CURVE NUMBER AND RUNOFF

PROJECT: 150 Allen Road
 LOCATION: Bernards Township

BY: MF DATE: 9/16/2022
 CHECKED: RCM2 REV DATE: -

SELECT ONE: **PRESENT**

DEVELOPED _____ D.A. # 1 - IMP

SOIL NAME AND HYDROLOGIC GROUP	COVER DESCRIPTION	CN			AREA IN ACRES	PRODUCT OF CN x AREA
		TABLE 2-2	FIG 2-3	FIG 2-4		
	Motor Vehicle Surface	98			0.65	63.7
TOTALS=					0.65	63.7

CN= $\frac{\text{TOTAL PRODUCT}}{\text{TOTAL AREA}}$ = **98**

WORKSHEET 3: TIME OF CONCENTRATION AND TRAVEL TIME

PROJECT: 150 Allen Road
LOCATION: Township Of Bernards, Somerset County

BY: MF **DATE:** 9/16/2022
CHECKED: RCM2 **DATE:** -

SELECT ONE: PRESENT DEVELOPED D.A. #1-IMP

SELECT ONE: Tc Tt

NOTES: SPACE FOR AS MANY AS TWO SEGMENTS PER FLOW CAN BE USED FOR EACH WORKSHEET.
 INCLUDE A MAP, SCHEMATIC, OR DESCRIPTION OF FLOW SEGMENTS

SHEET FLOW

				SEGMENT ID	
1	SURFACE DESCRIPTION			AB	
2	MANNINGS ROUGHNESS COEFF., n			Pavement	
3	LAND SLOPE, s			0.011	
4	MAXIMUM FLOW LENGTH, L (EQ 15-9)		ft/ft	0.035	
5	TWO YEAR 24 HOUR RAINFALL (NOAA)		ft	100	
6	Tt (EQ 15-8)	COMPUTE Tt	in	3.38	
			hr.	0.02	0.02

SHALLOW CONCENTRATED FLOW

				SEGMENT ID	
7	SURFACE DESCRIPTION			BC	
8	FLOW LENGTH, L		ft	Pavement	
9	WATERCOURSE SLOPE, s		ft/ft	230	
10	AVERAGE VELOCITY, V (FIG. 15-4)		ft/s	0.05	
11	Tt=L/3600V (EQ 15-1)	COMPUTE Tt	hr.	4.5	
				0.01	0.01

CHANNEL FLOW

				SEGMENT ID	
12	CROSS SECTIONAL FLOW AREA, a		ft^2		
13	WETTED PERIMETER, Pw		ft		
14	HYDRAULIC RADIUS, r=a/Pw		ft		
15	CHANNEL SLOPE, S		ft/ft		
16	MANNINGS ROUGHNESS COEFF., n				
17	VELOCITY, V (EQ 15-10)		ft/s		
18	FLOW LENGTH, L		ft		
19	Tt=L/3600V (EQ 15-1)		hr		0.00
20	WATERSHED OR SUBAREA Tc OR Tt (EQ 15-7)				0.03
			hr		1.8
			min		

WORKSHEET 3: TIME OF CONCENTRATION AND TRAVEL TIME

PROJECT: 150 Allen Road
LOCATION: Township Of Bernards, Somerset County

BY: MF **DATE:** 9/16/2022
CHECKED: RCM2 **DATE:** -

SELECT ONE: PRESENT DEVELOPED D.A. #1A

SELECT ONE: Tc Tt

NOTES: SPACE FOR AS MANY AS TWO SEGMENTS PER FLOW CAN BE USED FOR EACH WORKSHEET.
 INCLUDE A MAP, SCHEMATIC, OR DESCRIPTION OF FLOW SEGMENTS

SHEET FLOW

		SEGMENT ID	AB	
1	SURFACE DESCRIPTION		Wooded	
2	MANNINGS ROUGHNESS COEFF., n		0.4	
3	LAND SLOPE, s	ft/ft	0.15	
4	MAXIMUM FLOW LENGTH, L (EQ 15-9)	ft	95	
5	TWO YEAR 24 HOUR RAINFALL (NOAA)	in	3.38	
6	Tt (EQ 15-8)	COMPUTE Tt hr.	0.15	0.15

SHALLOW CONCENTRATED FLOW

		SEGMENT ID	BC	CD
7	SURFACE DESCRIPTION		Forest with	Pavement
8	FLOW LENGTH, L	ft	94	349
9	WATERCOURSE SLOPE, s	ft/ft	0.13	0.06
10	AVERAGE VELOCITY, V (FIG. 15-4)	ft/s	0.85	5
11	Tt=L/3600V (EQ 15-1)	COMPUTE Tt hr.	0.03	0.02
				0.05

CHANNEL FLOW

		SEGMENT ID	DE	
12	CROSS SECTIONAL FLOW AREA, a	ft^2	1.2	
13	WETTED PERIMETER, Pw	ft	3.9	
14	HYDRAULIC RADIUS, r=a/Pw	ft	0.31	
15	CHANNEL SLOPE, S	ft/ft	0.03	
16	MANNINGS ROUGHNESS COEFF., n		0.013	
17	VELOCITY, V (EQ 15-10)	ft/s	9.12	
18	FLOW LENGTH, L	ft	680	
19	Tt=L/3600V (EQ 15-1)	hr	0.02	0.02
20	WATERSHED OR SUBAREA Tc OR Tt (EQ 15-7)			0.22
				13.2
			hr	
			min	

WORKSHEET 3: TIME OF CONCENTRATION AND TRAVEL TIME

PROJECT: 150 Allen Road
LOCATION: Township Of Bernards, Somerset County

BY: MF **DATE:** 9/16/2022
CHECKED: RCM2 **DATE:** -

SELECT ONE: **PRESENT** DEVELOPED D.A. #1A-IMP

SELECT ONE: **Tc** Tt

NOTES: SPACE FOR AS MANY AS TWO SEGMENTS PER FLOW CAN BE USED FOR EACH WORKSHEET.
 INCLUDE A MAP, SCHEMATIC, OR DESCRIPTION OF FLOW SEGMENTS

SHEET FLOW

		SEGMENT ID	AB	
1	SURFACE DESCRIPTION		Pavement	
2	MANNINGS ROUGHNESS COEFF., n		0.011	
3	LAND SLOPE, s	ft/ft	0.025	
4	MAXIMUM FLOW LENGTH, L (EQ 15-9)	ft	100	
5	TWO YEAR 24 HOUR RAINFALL (NOAA)	in	3.38	
6	Tt (EQ 15-8)	COMPUTE Tt hr.	0.02	0.02

SHALLOW CONCENTRATED FLOW

		SEGMENT ID	BC	
7	SURFACE DESCRIPTION		Pavement	
8	FLOW LENGTH, L	ft	534	
9	WATERCOURSE SLOPE, s	ft/ft	0.06	
10	AVERAGE VELOCITY, V (FIG. 15-4)	ft/s	5	
11	Tt=L/3600V (EQ 15-1)	COMPUTE Tt hr.	0.03	0.03

CHANNEL FLOW

		SEGMENT ID		
12	CROSS SECTIONAL FLOW AREA, a	ft^2		
13	WETTED PERIMETER, Pw	ft		
14	HYDRAULIC RADIUS, r=a/Pw	ft		
15	CHANNEL SLOPE, S	ft/ft		
16	MANNINGS ROUGHNESS COEFF., n			
17	VELOCITY, V (EQ 15-10)	ft/s		
18	FLOW LENGTH, L	ft		
19	Tt=L/3600V (EQ 15-1)	hr		0.00
20	WATERSHED OR SUBAREA Tc OR Tt (EQ 15-7)		hr	0.05
			min	3.0

WORKSHEET 3: TIME OF CONCENTRATION AND TRAVEL TIME

PROJECT: 150 Allen Road
LOCATION: Township Of Bernards, Somerset County

BY: MF **DATE:** 9/16/2022
CHECKED: RCM2 **DATE:** -

SELECT ONE: **PRESENT** DEVELOPED D.A. #1A-GVL

SELECT ONE: **Tc** Tt

NOTES: SPACE FOR AS MANY AS TWO SEGMENTS PER FLOW CAN BE USED FOR EACH WORKSHEET.
 INCLUDE A MAP, SCHEMATIC, OR DESCRIPTION OF FLOW SEGMENTS

SHEET FLOW

		SEGMENT ID	AB	
1	SURFACE DESCRIPTION		Gravel	
2	MANNINGS ROUGHNESS COEFF., n		0.011	
3	LAND SLOPE, s	ft/ft	0.03	
4	MAXIMUM FLOW LENGTH, L (EQ 15-9)	ft	10	
5	TWO YEAR 24 HOUR RAINFALL (NOAA)	in	3.38	
6	Tt (EQ 15-8)	COMPUTE Tt hr.	0.01	0.01

SHALLOW CONCENTRATED FLOW

		SEGMENT ID		
7	SURFACE DESCRIPTION			
8	FLOW LENGTH, L	ft		
9	WATERCOURSE SLOPE, s	ft/ft		
10	AVERAGE VELOCITY, V (FIG. 15-4)	ft/s		
11	Tt=L/3600V (EQ 15-1)	COMPUTE Tt hr.		0.00

CHANNEL FLOW

		SEGMENT ID		
12	CROSS SECTIONAL FLOW AREA, a	ft ²		
13	WETTED PERIMETER, Pw	ft		
14	HYDRAULIC RADIUS, r=a/Pw	ft		
15	CHANNEL SLOPE, S	ft/ft		
16	MANNINGS ROUGHNESS COEFF., n			
17	VELOCITY, V (EQ 15-10)	ft/s		
18	FLOW LENGTH, L	ft		
19	Tt=L/3600V (EQ 15-1)	hr		0.00
20	WATERSHED OR SUBAREA Tc OR Tt (EQ 15-7)		hr	0.01
			min	0.6

WORKSHEET 3: TIME OF CONCENTRATION AND TRAVEL TIME

PROJECT: 150 Allen Road
LOCATION: Township Of Bernards, Somerset County

BY: MF **DATE:** 9/16/2022
CHECKED: RCM2 **DATE:** -

SELECT ONE: **PRESENT** DEVELOPED D.A. #2A

SELECT ONE: **Tc** Tt

NOTES: SPACE FOR AS MANY AS TWO SEGMENTS PER FLOW CAN BE USED FOR EACH WORKSHEET.
 INCLUDE A MAP, SCHEMATIC, OR DESCRIPTION OF FLOW SEGMENTS

SHEET FLOW

		SEGMENT ID	AB	
1	SURFACE DESCRIPTION		Wooded	
2	MANNINGS ROUGHNESS COEFF., n		0.4	
3	LAND SLOPE, s	ft/ft	0.06	
4	MAXIMUM FLOW LENGTH, L (EQ 15-9)	ft	61	
5	TWO YEAR 24 HOUR RAINFALL (NOAA)	in	3.38	
6	Tt (EQ 15-8)	COMPUTE Tt hr.	0.15	0.15

SHALLOW CONCENTRATED FLOW

		SEGMENT ID	BC	CD	
7	SURFACE DESCRIPTION		Forest with	Pavement	
8	FLOW LENGTH, L	ft	89	377	
9	WATERCOURSE SLOPE, s	ft/ft	0.04	0.03	
10	AVERAGE VELOCITY, V (FIG. 15-4)	ft/s	0.5	3.5	
11	Tt=L/3600V (EQ 15-1)	COMPUTE Tt hr.	0.05	0.03	0.08

CHANNEL FLOW

		SEGMENT ID	DE		
12	CROSS SECTIONAL FLOW AREA, a	ft^2	1.2		
13	WETTED PERIMETER, Pw	ft	3.9		
14	HYDRAULIC RADIUS, r=a/Pw	ft	0.31		
15	CHANNEL SLOPE, S	ft/ft	0.01		
16	MANNINGS ROUGHNESS COEFF., n		0.013		
17	VELOCITY, V (EQ 15-10)	ft/s	5.26		
18	FLOW LENGTH, L	ft	341		
19	Tt=L/3600V (EQ 15-1)	hr	0.018		0.02
20	WATERSHED OR SUBAREA Tc OR Tt (EQ 15-7)				0.25
				hr	15.0
				min	

WORKSHEET 3: TIME OF CONCENTRATION AND TRAVEL TIME

PROJECT: 150 Allen Road
LOCATION: Township Of Bernards, Somerset County

BY: MF **DATE:** 9/16/2022
CHECKED: RCM2 **DATE:** -

SELECT ONE: **PRESENT** DEVELOPED D.A. #2A-IMP

SELECT ONE: **Tc** Tt

NOTES: SPACE FOR AS MANY AS TWO SEGMENTS PER FLOW CAN BE USED FOR EACH WORKSHEET.
 INCLUDE A MAP, SCHEMATIC, OR DESCRIPTION OF FLOW SEGMENTS

SHEET FLOW

		SEGMENT ID	AB	
1	SURFACE DESCRIPTION		Pavement	
2	MANNINGS ROUGHNESS COEFF., n		0.011	
3	LAND SLOPE, s	ft/ft	0.012	
4	MAXIMUM FLOW LENGTH, L (EQ 15-9)	ft	100	
5	TWO YEAR 24 HOUR RAINFALL (NOAA)	in	3.38	
6	Tt (EQ 15-8)	COMPUTE Tt	0.02	0.02

SHALLOW CONCENTRATED FLOW

		SEGMENT ID	BC	
7	SURFACE DESCRIPTION		Pavement	
8	FLOW LENGTH, L	ft	368	
9	WATERCOURSE SLOPE, s	ft/ft	0.03	
10	AVERAGE VELOCITY, V (FIG. 15-4)	ft/s	3.5	
11	Tt=L/3600V (EQ 15-1)	COMPUTE Tt	0.03	0.03

CHANNEL FLOW

		SEGMENT ID		
12	CROSS SECTIONAL FLOW AREA, a	ft^2		
13	WETTED PERIMETER, Pw	ft		
14	HYDRAULIC RADIUS, r=a/Pw	ft		
15	CHANNEL SLOPE, S	ft/ft		
16	MANNINGS ROUGHNESS COEFF., n			
17	VELOCITY, V (EQ 15-10)	ft/s		
18	FLOW LENGTH, L	ft		
19	Tt=L/3600V (EQ 15-1)	hr		0.00
20	WATERSHED OR SUBAREA Tc OR Tt (EQ 15-7)		hr	0.05
			min	3.0

WORKSHEET 3: TIME OF CONCENTRATION AND TRAVEL TIME

PROJECT: 150 Allen Road
LOCATION: Township Of Bernards, Somerset County

BY: MF **DATE:** 9/16/2022
CHECKED: RCM2 **DATE:** -

SELECT ONE: **PRESENT** DEVELOPED D.A. #2A-GVL

SELECT ONE: **Tc** Tt

NOTES: SPACE FOR AS MANY AS TWO SEGMENTS PER FLOW CAN BE USED FOR EACH WORKSHEET.
 INCLUDE A MAP, SCHEMATIC, OR DESCRIPTION OF FLOW SEGMENTS

SHEET FLOW

		SEGMENT ID	AB	
1	SURFACE DESCRIPTION		Gravel	
2	MANNINGS ROUGHNESS COEFF., n		0.011	
3	LAND SLOPE, s	ft/ft	0.09	
4	MAXIMUM FLOW LENGTH, L (EQ 15-9)	ft	10	
5	TWO YEAR 24 HOUR RAINFALL (NOAA)	in	3.38	
6	Tt (EQ 15-8)	COMPUTE Tt hr.	0.01	0.01

SHALLOW CONCENTRATED FLOW

		SEGMENT ID		
7	SURFACE DESCRIPTION			
8	FLOW LENGTH, L	ft		
9	WATERCOURSE SLOPE, s	ft/ft		
10	AVERAGE VELOCITY, V (FIG. 15-4)	ft/s		
11	Tt=L/3600V (EQ 15-1)	COMPUTE Tt hr.		0.00

CHANNEL FLOW

		SEGMENT ID		
12	CROSS SECTIONAL FLOW AREA, a	ft^2		
13	WETTED PERIMETER, Pw	ft		
14	HYDRAULIC RADIUS, r=a/Pw	ft		
15	CHANNEL SLOPE, S	ft/ft		
16	MANNINGS ROUGHNESS COEFF., n			
17	VELOCITY, V (EQ 15-10)	ft/s		
18	FLOW LENGTH, L	ft		
19	Tt=L/3600V (EQ 15-1)	hr		0.00
20	WATERSHED OR SUBAREA Tc OR Tt (EQ 15-7)	hr		0.01
		min		0.6

EXISTING AND PROPOSED RUNOFF CALCULATIONS – APPENDIX A-2
PROPOSED CONDITIONS

WORKSHEET 3: TIME OF CONCENTRATION AND TRAVEL TIME

PROJECT: 150 Allen Road
LOCATION: Township Of Bernards, Somerset County

BY: MF **DATE:** 9/16/2022
CHECKED: RCM2 **DATE:** -

SELECT ONE: PRESENT **DEVELOPED** D.A. #1

SELECT ONE: **Tc** Tt

NOTES: SPACE FOR AS MANY AS TWO SEGMENTS PER FLOW CAN BE USED FOR EACH WORKSHEET.
 INCLUDE A MAP, SCHEMATIC, OR DESCRIPTION OF FLOW SEGMENTS

SHEET FLOW		SEGMENT ID	AB	
1	SURFACE DESCRIPTION		Wooded	
2	MANNINGS ROUGHNESS COEFF., n		0.4	
3	LAND SLOPE, s	ft/ft	0.15	
4	MAXIMUM FLOW LENGTH, L (EQ 15-9)	ft	97	
5	TWO YEAR 24 HOUR RAINFALL (NOAA)	in	3.38	
6	Tt (EQ 15-8) COMPUTE Tt	hr.	0.15	0.15

SHALLOW CONCENTRATED FLOW		SEGMENT ID	BC	
7	SURFACE DESCRIPTION		Forest with	
8	FLOW LENGTH, L	ft	660	
9	WATERCOURSE SLOPE, s	ft/ft	0.07	
10	AVERAGE VELOCITY, V (FIG. 15-4)	ft/s	0.65	
11	Tt=L/3600V (EQ 15-1) COMPUTE Tt	hr.	0.28	0.28

CHANNEL FLOW		SEGMENT ID		
12	CROSS SECTIONAL FLOW AREA, a	ft^2		
13	WETTED PERIMETER, Pw	ft		
14	HYDRAULIC RADIUS, r=a/Pw	ft		
15	CHANNEL SLOPE, S	ft/ft		
16	MANNINGS ROUGHNESS COEFF., n			
17	VELOCITY, V (EQ 15-10)	ft/s		
18	FLOW LENGTH, L	ft		
19	Tt=L/3600V (EQ 15-1)	hr		0.00
20	WATERSHED OR SUBAREA Tc Or Tt (EQ 15-7)	hr		0.43
		min		25.8

WORKSHEET 3: TIME OF CONCENTRATION AND TRAVEL TIME

PROJECT: 150 Allen Road
LOCATION: Township Of Bernards, Somerset County

BY: MF **DATE:** 9/16/2022
CHECKED: RCM2 **DATE:** -

SELECT ONE: **PRESENT** DEVELOPED D.A. #1-IMP

SELECT ONE: **Tc** Tt

NOTES: SPACE FOR AS MANY AS TWO SEGMENTS PER FLOW CAN BE USED FOR EACH WORKSHEET.
 INCLUDE A MAP, SCHEMATIC, OR DESCRIPTION OF FLOW SEGMENTS

SHEET FLOW		SEGMENT ID	AB	
1	SURFACE DESCRIPTION		Pavement	
2	MANNINGS ROUGHNESS COEFF., n		0.011	
3	LAND SLOPE, s		0.045	
4	MAXIMUM FLOW LENGTH, L (EQ 15-9)		100	
5	TWO YEAR 24 HOUR RAINFALL (NOAA)		3.38	
6	Tt (EQ 15-8) COMPUTE Tt		0.01	0.01

SHALLOW CONCENTRATED FLOW		SEGMENT ID	BC	
7	SURFACE DESCRIPTION		Pavement	
8	FLOW LENGTH, L		230	
9	WATERCOURSE SLOPE, s		0.05	
10	AVERAGE VELOCITY, V (FIG. 15-4)		4.5	
11	Tt=L/3600V (EQ 15-1) COMPUTE Tt		0.01	0.01

CHANNEL FLOW		SEGMENT ID		
12	CROSS SECTIONAL FLOW AREA, a			
13	WETTED PERIMETER, Pw			
14	HYDRAULIC RADIUS, r=a/Pw			
15	CHANNEL SLOPE, S			
16	MANNINGS ROUGHNESS COEFF., n			
17	VELOCITY, V (EQ 15-10)			
18	FLOW LENGTH, L			
19	Tt=L/3600V (EQ 15-1)			0.00
20	WATERSHED OR SUBAREA Tc Or Tt (EQ 15-7)			0.02
			hr	1.2
			min	

WORKSHEET 3: TIME OF CONCENTRATION AND TRAVEL TIME

PROJECT: 150 Allen Road
LOCATION: Township Of Bernards, Somerset County

BY: MF **DATE:** 9/16/2022
CHECKED: RCM2 **DATE:** -

SELECT ONE: PRESENT **DEVELOPED** D.A. #2

SELECT ONE: **Tc** Tt

NOTES: SPACE FOR AS MANY AS TWO SEGMENTS PER FLOW CAN BE USED FOR EACH WORKSHEET.
 INCLUDE A MAP, SCHEMATIC, OR DESCRIPTION OF FLOW SEGMENTS

SHEET FLOW		SEGMENT ID	AB	BC	
1	SURFACE DESCRIPTION		Open Space	Wooded	
2	MANNINGS ROUGHNESS COEFF., n		0.24	0.4	
3	LAND SLOPE, s	ft/ft	0.11	0.11	
4	MAXIMUM FLOW LENGTH, L (EQ 15-9)	ft	17	83	
5	TWO YEAR 24 HOUR RAINFALL (NOAA)	in	3.38	3.38	
6	Tt (EQ 15-8) COMPUTE Tt	hr.	0.03	0.15	0.18

SHALLOW CONCENTRATED FLOW		SEGMENT ID	CD	DE	
7	SURFACE DESCRIPTION		Forest with	Grassed	
8	FLOW LENGTH, L	ft	331	44	
9	WATERCOURSE SLOPE, s	ft/ft	0.03	0.06	
10	AVERAGE VELOCITY, V (FIG. 15-4)	ft/s	0.7	5	
11	Tt=L/3600V (EQ 15-1) COMPUTE Tt	hr.	0.13	0.00	0.13

CHANNEL FLOW		SEGMENT ID			
12	CROSS SECTIONAL FLOW AREA, a	ft^2			
13	WETTED PERIMETER, Pw	ft			
14	HYDRAULIC RADIUS, r=a/Pw	ft			
15	CHANNEL SLOPE, S	ft/ft			
16	MANNINGS ROUGHNESS COEFF., n				
17	VELOCITY, V (EQ 15-10)	ft/s			
18	FLOW LENGTH, L	ft			
19	Tt=L/3600V (EQ 15-1)	hr			0.00
20	WATERSHED OR SUBAREA Tc Or Tt (EQ 15-7)	hr			0.31
		min			18.6

WORKSHEET 2: RUNOFF CURVE NUMBER AND RUNOFF

PROJECT: 150 Allen Road
 LOCATION: Bernards Township

BY: MF DATE: 9/16/2022
 CHECKED: RCM2 REV DATE: -

SELECT ONE: PRESENT

DEVELOPED

D.A. # 2A

SOIL NAME AND HYDROLOGIC GROUP	COVER DESCRIPTION	CN			AREA IN ACRES	PRODUCT OF CN x AREA
		TABLE 2-2	FIG 2-3	FIG 2-4		
B	Open Space	61			0.80	48.8
B	Woods	55			0.57	31.4
TOTALS=					1.37	80.2

CN= $\frac{\text{TOTAL PRODUCT}}{\text{TOTAL AREA}}$ = **59**

WORKSHEET 3: TIME OF CONCENTRATION AND TRAVEL TIME

PROJECT: 150 Allen Road
LOCATION: Township Of Bernards, Somerset County

BY: MF **DATE:** 9/16/2022
CHECKED: RCM2 **DATE:** -

SELECT ONE: PRESENT **DEVELOPED** D.A. #2A

SELECT ONE: **Tc** Tt

NOTES: SPACE FOR AS MANY AS TWO SEGMENTS PER FLOW CAN BE USED FOR EACH WORKSHEET.
 INCLUDE A MAP, SCHEMATIC, OR DESCRIPTION OF FLOW SEGMENTS

SHEET FLOW		SEGMENT ID	AB	BC
1	SURFACE DESCRIPTION		Wooded	
2	MANNINGS ROUGHNESS COEFF., n		0.4	
3	LAND SLOPE, s	ft/ft	0.04	
4	MAXIMUM FLOW LENGTH, L (EQ 15-9)	ft	50	
5	TWO YEAR 24 HOUR RAINFALL (NOAA)	in	3.38	
6	Tt (EQ 15-8) COMPUTE Tt	hr.	0.15	0.15

SHALLOW CONCENTRATED FLOW		SEGMENT ID	CD	DE	
7	SURFACE DESCRIPTION		Forest with	Pavement	
8	FLOW LENGTH, L	ft	82	188	
9	WATERCOURSE SLOPE, s	ft/ft	0.04	0.03	
10	AVERAGE VELOCITY, V (FIG. 15-4)	ft/s	0.5	3.5	
11	Tt=L/3600V (EQ 15-1) COMPUTE Tt	hr.	0.05	0.01	0.06

CHANNEL FLOW		SEGMENT ID	EF	
12	CROSS SECTIONAL FLOW AREA, a	ft^2	1.2	
13	WETTED PERIMETER, Pw	ft	3.9	
14	HYDRAULIC RADIUS, r=a/Pw	ft	0.31	
15	CHANNEL SLOPE, S	ft/ft	0.05	
16	MANNINGS ROUGHNESS COEFF., n		0.013	
17	VELOCITY, V (EQ 15-10)	ft/s	11.77	
18	FLOW LENGTH, L	ft	142	
19	Tt=L/3600V (EQ 15-1)	hr	0.00	0.00
20	WATERSHED OR SUBAREA Tc OR Tt (EQ 15-7)	hr		0.21
		min		12.6

WORKSHEET 3: TIME OF CONCENTRATION AND TRAVEL TIME

PROJECT: 150 Allen Road
LOCATION: Township Of Bernards, Somerset County

BY: MF **DATE:** 9/16/2022
CHECKED: RCM2 **DATE:** -

SELECT ONE: **PRESENT** DEVELOPED D.A. #2A-IMP

SELECT ONE: **Tc** Tt

NOTES: SPACE FOR AS MANY AS TWO SEGMENTS PER FLOW CAN BE USED FOR EACH WORKSHEET.
 INCLUDE A MAP, SCHEMATIC, OR DESCRIPTION OF FLOW SEGMENTS

SHEET FLOW		SEGMENT ID	AB	
1	SURFACE DESCRIPTION		Pavement	
2	MANNINGS ROUGHNESS COEFF., n		0.011	
3	LAND SLOPE, s	ft/ft	0.02	
4	MAXIMUM FLOW LENGTH, L (EQ 15-9)	ft	100	
5	TWO YEAR 24 HOUR RAINFALL (NOAA)	in	3.38	
6	Tt (EQ 15-8) COMPUTE Tt	hr.	0.02	0.02

SHALLOW CONCENTRATED FLOW		SEGMENT ID	BC	
7	SURFACE DESCRIPTION		Pavement	
8	FLOW LENGTH, L	ft	80	
9	WATERCOURSE SLOPE, s	ft/ft	0.03	
10	AVERAGE VELOCITY, V (FIG. 15-4)	ft/s	3.5	
11	Tt=L/3600V (EQ 15-1) COMPUTE Tt	hr.	0.01	0.01

CHANNEL FLOW		SEGMENT ID		
12	CROSS SECTIONAL FLOW AREA, a	ft^2		
13	WETTED PERIMETER, Pw	ft		
14	HYDRAULIC RADIUS, r=a/Pw	ft		
15	CHANNEL SLOPE, S	ft/ft		
16	MANNINGS ROUGHNESS COEFF., n			
17	VELOCITY, V (EQ 15-10)	ft/s		
18	FLOW LENGTH, L	ft		
19	Tt=L/3600V (EQ 15-1)	hr		0.00
20	WATERSHED OR SUBAREA Tc Or Tt (EQ 15-7)	hr		0.03
		min		1.8

WORKSHEET 2:RUNOFF CURVE NUMBER AND RUNOFF

PROJECT: 150 Allen Road
 LOCATION: Bernards Township

BY: MF DATE: 9/16/2022
 CHECKED: RCM2 REV DATE: -

SELECT ONE: PRESENT

DEVELOPED

D.A. # 3

SOIL NAME AND HYDROLOGIC GROUP	COVER DESCRIPTION	CN			AREA IN ACRES	PRODUCT OF CN x AREA
		TABLE 2-2	FIG 2-3	FIG 2-4		
B	Open Space	61			0.81	49.4
TOTALS=					0.81	49.4

CN= $\frac{\text{TOTAL PRODUCT}}{\text{TOTAL AREA}}$ = **61**

WORKSHEET 3: TIME OF CONCENTRATION AND TRAVEL TIME

PROJECT: 150 Allen Road BY: MF DATE: 9/16/2022
 LOCATION: Township Of Bernards, Somerset County CHECKER: RCM2 DATE: -

SELECT ONE: PRESENT **DEVELOPED** D.A. #3-IMP

SELECT ONE: **Tc** Tt

NOTES: SPACE FOR AS MANY AS TWO SEGMENTS PER FLOW CAN BE USED FOR EACH WORKSHEET.
 INCLUDE A MAP, SCHEMATIC, OR DESCRIPTION OF FLOW SEGMENTS

SHEET FLOW		SEGMENT ID	AB		
1	SURFACE DESCRIPTION		Pavement		
2	MANNINGS ROUGHNESS COEFFICIENT, n		0.011		
3	LAND SLOPE, s	ft/ft	0.01		
4	MAXIMUM FLOW LENGTH, L (EQ 15-9)	ft	100		
5	TWO YEAR 24 HOUR RAINFALL (NOAA)	in	3.38		
6	Tt (EQ 15-8) COMPUTE Tt	hr.	0.03		

SHALLOW CONCENTRATED FLOW		SEGMENT ID	BC		
7	SURFACE DESCRIPTION		Pavement		
8	FLOW LENGTH, L	ft	240		
9	WATERCOURSE SLOPE, s	ft/ft	0.03		
10	AVERAGE VELOCITY, V (FIG. 15-4)	ft/s	3.5		
11	Tt=L/3600V (EQ 15-1) COMPUTE Tt	hr.	0.02		

CHANNEL FLOW		SEGMENT ID			
12	CROSS SECTIONAL FLOW AREA, a	ft^2			
13	WETTED PERIMETER, Pw	ft			
14	HYDRAULIC RADIUS, r=a/Pw	ft			
15	CHANNEL SLOPE, S	ft/ft			
16	MANNINGS ROUGHNESS COEFFICIENT, n				
17	VELOCITY, V (EQ 15-10)	ft/s			
18	FLOW LENGTH, L	ft			
19	Tt=L/3600V (EQ 15-1)	hr			
20	WATERSHED OR SUBAREA Tc OR Tt (EQ 15-7)	hr min			

WORKSHEET 2: RUNOFF CURVE NUMBER AND RUNOFF

PROJECT: 150 Allen Road
 LOCATION: Bernards Township

BY: MF DATE: 9/16/2022
 CHECKED: RCM2 REV DATE: -

SELECT ONE: PRESENT

DEVELOPED

D.A. # 3A

SOIL NAME AND HYDROLOGIC GROUP	COVER DESCRIPTION	CN			AREA IN ACRES	PRODUCT OF CN x AREA
		TABLE 2-2	FIG 2-3	FIG 2-4		
B	Open Space	61			0.17	10.4
B	Woods	55			0.70	38.5
TOTALS=					0.87	48.9

CN= $\frac{\text{TOTAL PRODUCT}}{\text{TOTAL AREA}}$ = **56**

WORKSHEET 3: TIME OF CONCENTRATION AND TRAVEL TIME

PROJECT: 150 Allen Road
LOCATION: Township Of Bernards, Somerset County

BY: MF **DATE:** 9/16/2022
CHECKER: RCM2 **DATE:** -

SELECT ONE: PRESENT **DEVELOPED** D.A. #3A

SELECT ONE: **Tc** Tt

NOTES: SPACE FOR AS MANY AS TWO SEGMENTS PER FLOW CAN BE USED FOR EACH WORKSHEET.
 INCLUDE A MAP, SCHEMATIC, OR DESCRIPTION OF FLOW SEGMENTS

SHEET FLOW

1	SURFACE DESCRIPTION		SEGMENT ID
2	MANNINGS ROUGHNESS COEFF., n		
3	LAND SLOPE, s	ft/ft	
4	MAXIMUM FLOW LENGTH, L (EQ 15-9)	ft	
5	TWO YEAR 24 HOUR RAINFALL (NOAA)	in	
6	Tt (EQ 15-8)	hr.	COMPUTE Tt

AB		
Wooded		
0.4		
0.05		
56		
3.38		
0.15		0.15

SHALLOW CONCENTRATED FLOW

7	SURFACE DESCRIPTION		SEGMENT ID
8	FLOW LENGTH, L	ft	
9	WATERCOURSE SLOPE, s	ft/ft	
10	AVERAGE VELOCITY, V (FIG. 15-4)	ft/s	
11	Tt=L/3600V (EQ 15-1)	hr.	COMPUTE Tt

BC	CD	DE
Forest with	Grassed	Pavement
25	12	119
0.05	0.15	0.01
0.55	6	2
0.01	0.00	0.02

CHANNEL FLOW

12	CROSS SECTIONAL FLOW AREA, a	ft^2	SEGMENT ID
13	WETTED PERIMETER, Pw	ft	
14	HYDRAULIC RADIUS, r=a/Pw	ft	
15	CHANNEL SLOPE, S	ft/ft	
16	MANNINGS ROUGHNESS COEFF., n		
17	VELOCITY, V (EQ 15-10)	ft/s	
18	FLOW LENGTH, L	ft	
19	Tt=L/3600V (EQ 15-1)	hr	
20	WATERSHED OR SUBAREA Tc OR Tt (EQ 15-7)		

EF		
1.2		
3.9		
0.31		
0.02		
0.013		
7.44		
205		
0.01		0.01
hr		0.19
min		11.4

WORKSHEET 2: RUNOFF CURVE NUMBER AND RUNOFF

PROJECT: 150 Allen Road
 LOCATION: Bernards Township

BY: MF DATE: 9/16/2022
 CHECKED: RCM2 REV DATE: -

SELECT ONE: PRESENT

DEVELOPED

D.A. # 4

SOIL NAME AND HYDROLOGIC GROUP	COVER DESCRIPTION	CN			AREA IN ACRES	PRODUCT OF CN x AREA
		TABLE 2-2	FIG 2-3	FIG 2-4		
B	Open Space	61			1.00	61.0
TOTALS=					1.00	61.0

CN= $\frac{\text{TOTAL PRODUCT}}{\text{TOTAL AREA}}$ = **61**

WORKSHEET 3: TIME OF CONCENTRATION AND TRAVEL TIME

PROJECT: 150 Allen Road BY: MF DATE: 9/16/2022
 LOCATION: Township Of Bernards, Somerset County CHECKER: RCM2 DATE: -

SELECT ONE: PRESENT **DEVELOPED** D.A. #4

SELECT ONE: **Tc** Tt

NOTES: SPACE FOR AS MANY AS TWO SEGMENTS PER FLOW CAN BE USED FOR EACH WORKSHEET.
 INCLUDE A MAP, SCHEMATIC, OR DESCRIPTION OF FLOW SEGMENTS

SHEET FLOW		SEGMENT ID	AB	
1	SURFACE DESCRIPTION		Open Space	
2	MANNINGS ROUGHNESS COEFFICIENT, n		0.24	
3	LAND SLOPE, s	ft/ft	0.03	
4	MAXIMUM FLOW LENGTH, L (EQ 15-9)	ft	66	
5	TWO YEAR 24 HOUR RAINFALL (NOAA)	in	3.38	
6	Tt (EQ 15-8) COMPUTE Tt	hr.	0.15	0.15

SHALLOW CONCENTRATED FLOW		SEGMENT ID	BC	CD
7	SURFACE DESCRIPTION		Grassed	Pavement
8	FLOW LENGTH, L	ft	165	204
9	WATERCOURSE SLOPE, s	ft/ft	0.02	0.02
10	AVERAGE VELOCITY, V (FIG. 15-4)	ft/s	2.3	2.9
11	Tt=L/3600V (EQ 15-1) COMPUTE Tt	hr.	0.02	0.02
				0.04

CHANNEL FLOW		SEGMENT ID	DE	
12	CROSS SECTIONAL FLOW AREA, a	ft^2	1.2	
13	WETTED PERIMETER, Pw	ft	3.9	
14	HYDRAULIC RADIUS, r=a/Pw	ft	0.31	
15	CHANNEL SLOPE, S	ft/ft	0.14	
16	MANNINGS ROUGHNESS COEFFICIENT, n		0.013	
17	VELOCITY, V (EQ 15-10)	ft/s	19.69	
18	FLOW LENGTH, L	ft	60	
19	Tt=L/3600V (EQ 15-1)	hr	0.00	0.00
20	WATERSHED OR SUBAREA Tc OR Tt (EQ 15-7)	hr		0.19
		min		11.4

WORKSHEET 3: TIME OF CONCENTRATION AND TRAVEL TIME

PROJECT: 150 Allen Road BY: MF DATE: 9/16/2022
 LOCATION: Township Of Bernards, Somerset County CHECKER: RCM2 DATE: -

SELECT ONE: PRESENT **DEVELOPED** D.A. #4-IMP

SELECT ONE: **Tc** Tt

NOTES: SPACE FOR AS MANY AS TWO SEGMENTS PER FLOW CAN BE USED FOR EACH WORKSHEET.
 INCLUDE A MAP, SCHEMATIC, OR DESCRIPTION OF FLOW SEGMENTS

SHEET FLOW

		SEGMENT ID	AB	
1	SURFACE DESCRIPTION		Pavement	
2	MANNINGS ROUGHNESS COEFFICIENT, n		0.011	
3	LAND SLOPE, s	ft/ft	0.04	
4	MAXIMUM FLOW LENGTH, L (EQ 15-9)	ft	100	
5	TWO YEAR 24 HOUR RAINFALL (NOAA)	in	3.38	
6	Tt (EQ 15-8) COMPUTE Tt	hr.	0.02	0.02

SHALLOW CONCENTRATED FLOW

		SEGMENT ID	BC	
7	SURFACE DESCRIPTION		Pavement	
8	FLOW LENGTH, L	ft	298	
9	WATERCOURSE SLOPE, s	ft/ft	0.03	
10	AVERAGE VELOCITY, V (FIG. 15-4)	ft/s	3.5	
11	Tt=L/3600V (EQ 15-1) COMPUTE Tt	hr.	0.02	0.03

CHANNEL FLOW

		SEGMENT ID		
12	CROSS SECTIONAL FLOW AREA, a	ft^2		
13	WETTED PERIMETER, Pw	ft		
14	HYDRAULIC RADIUS, r=a/Pw	ft		
15	CHANNEL SLOPE, S	ft/ft		
16	MANNINGS ROUGHNESS COEFFICIENT, n			
17	VELOCITY, V (EQ 15-10)	ft/s		
18	FLOW LENGTH, L	ft		
19	Tt=L/3600V (EQ 15-1)	hr		0.00
20	WATERSHED OR SUBAREA Tc OR Tt (EQ 15-7)			0.05
		hr		3.0
		min		

WORKSHEET 2:RUNOFF CURVE NUMBER AND RUNOFF

PROJECT: 150 Allen Road
 LOCATION: Bernards Township

BY: MF DATE: 9/16/2022
 CHECKED: RCM2 REV DATE: -

SELECT ONE: PRESENT

DEVELOPED

D.A. # 5

SOIL NAME AND HYDROLOGIC GROUP	COVER DESCRIPTION	CN			AREA IN ACRES	PRODUCT OF CN x AREA
		TABLE 2-2	FIG 2-3	FIG 2-4		
B	Open Space	61			1.03	62.8
TOTALS=					1.03	62.8

CN= $\frac{\text{TOTAL PRODUCT}}{\text{TOTAL AREA}}$ = **61**

WORKSHEET 3: TIME OF CONCENTRATION AND TRAVEL TIME

PROJECT: 150 Allen Road BY: MF DATE: 9/16/2022
 LOCATION: Township Of Bernards, Somerset County CHECKER: RCM2 DATE: -

SELECT ONE: PRESENT **DEVELOPED** D.A. #5

SELECT ONE: **Tc** Tt

NOTES: SPACE FOR AS MANY AS TWO SEGMENTS PER FLOW CAN BE USED FOR EACH WORKSHEET.
 INCLUDE A MAP, SCHEMATIC, OR DESCRIPTION OF FLOW SEGMENTS

SHEET FLOW		SEGMENT ID	AB	
1	SURFACE DESCRIPTION		Open Space	
2	MANNINGS ROUGHNESS COEFFICIENT, n		0.24	
3	LAND SLOPE, s	ft/ft	0.02	
4	MAXIMUM FLOW LENGTH, L (EQ 15-9)	ft	54	
5	TWO YEAR 24 HOUR RAINFALL (NOAA)	in	3.38	
6	Tt (EQ 15-8) COMPUTE Tt	hr.	0.15	0.15

SHALLOW CONCENTRATED FLOW		SEGMENT ID	BC	
7	SURFACE DESCRIPTION		Grassed water	
8	FLOW LENGTH, L	ft	12	
9	WATERCOURSE SLOPE, s	ft/ft	0.02	
10	AVERAGE VELOCITY, V (FIG. 15-4)	ft/s	2.3	
11	Tt=L/3600V (EQ 15-1) COMPUTE Tt	hr.	0.00	0.01

CHANNEL FLOW		SEGMENT ID	DE	
12	CROSS SECTIONAL FLOW AREA, a	ft^2	1.2	
13	WETTED PERIMETER, Pw	ft	3.9	
14	HYDRAULIC RADIUS, r=a/Pw	ft	0.31	
15	CHANNEL SLOPE, S	ft/ft	0.05	
16	MANNINGS ROUGHNESS COEFFICIENT, n		0.04	
17	VELOCITY, V (EQ 15-10)	ft/s	0.013	
18	FLOW LENGTH, L	ft	10.53	
19	Tt=L/3600V (EQ 15-1)	hr	513	0.01
20	WATERSHED OR SUBAREA Tc OR Tt (EQ 15-7)	hr	0.01	0.17
		min		10.2

WORKSHEET 3: TIME OF CONCENTRATION AND TRAVEL TIME

PROJECT: 150 Allen Road BY: MF DATE: 9/16/2022
 LOCATION: Township Of Bernards, Somerset County CHECKER: RCM2 DATE: -

SELECT ONE: PRESENT **DEVELOPED** D.A. #5-IMP

SELECT ONE: **Tc** Tt

NOTES: SPACE FOR AS MANY AS TWO SEGMENTS PER FLOW CAN BE USED FOR EACH WORKSHEET.
 INCLUDE A MAP, SCHEMATIC, OR DESCRIPTION OF FLOW SEGMENTS

SHEET FLOW		SEGMENT ID	AB	
1	SURFACE DESCRIPTION		Smooth Surface	
2	MANNINGS ROUGHNESS COEFFICIENT, n		0.011	
3	LAND SLOPE, s	ft/ft	0.01	
4	MAXIMUM FLOW LENGTH, L (EQ 15-9)	ft	100	
5	TWO YEAR 24 HOUR RAINFALL (NOAA)	in	3.38	
6	Tt (EQ 15-8) COMPUTE Tt	hr.	0.03	0.03

SHALLOW CONCENTRATED FLOW		SEGMENT ID		
7	SURFACE DESCRIPTION			
8	FLOW LENGTH, L	ft		
9	WATERCOURSE SLOPE, s	ft/ft		
10	AVERAGE VELOCITY, V (FIG. 15-4)	ft/s		
11	Tt=L/3600V (EQ 15-1) COMPUTE Tt	hr.		0.00

CHANNEL FLOW		SEGMENT ID		
12	CROSS SECTIONAL FLOW AREA, a	ft^2		
13	WETTED PERIMETER, Pw	ft		
14	HYDRAULIC RADIUS, r=a/Pw	ft		
15	CHANNEL SLOPE, S	ft/ft		
16	MANNINGS ROUGHNESS COEFFICIENT, n			
17	VELOCITY, V (EQ 15-10)	ft/s		
18	FLOW LENGTH, L	ft		
19	Tt=L/3600V (EQ 15-1)	hr		0.00
20	WATERSHED OR SUBAREA Tc OR Tt (EQ 15-7)	hr		0.03
		min		1.8

WORKSHEET 2:RUNOFF CURVE NUMBER AND RUNOFF

PROJECT: 150 Allen Road
 LOCATION: Bernards Township

BY: MF DATE: 9/16/2022
 CHECKED: RCM2 REV DATE: -

SELECT ONE: PRESENT

DEVELOPED

D.A. # 6

SOIL NAME AND HYDROLOGIC GROUP	COVER DESCRIPTION	CN			AREA IN ACRES	PRODUCT OF CN x AREA
		TABLE 2-2	FIG 2-3	FIG 2-4		
B	Open Space	61			0.44	26.8
TOTALS=					0.44	26.8

CN= $\frac{\text{TOTAL PRODUCT}}{\text{TOTAL AREA}}$ = **61**

WORKSHEET 3: TIME OF CONCENTRATION AND TRAVEL TIME

PROJECT: 150 Allen Road BY: MF DATE: 9/16/2022
 LOCATION: Township Of Bernards, Somerset County CHECKER: RCM2 DATE: -

SELECT ONE: PRESENT **DEVELOPED** D.A. #6

SELECT ONE: **Tc** Tt

NOTES: SPACE FOR AS MANY AS TWO SEGMENTS PER FLOW CAN BE USED FOR EACH WORKSHEET.
 INCLUDE A MAP, SCHEMATIC, OR DESCRIPTION OF FLOW SEGMENTS

SHEET FLOW		SEGMENT ID	AB	BC	
1	SURFACE DESCRIPTION		Open Space	Pavement	
2	MANNINGS ROUGHNESS COEFFICIENT, n		0.24	0.011	
3	LAND SLOPE, s	ft/ft	0.02	0.02	
4	MAXIMUM FLOW LENGTH, L (EQ 15-9)	ft	8	51	
5	TWO YEAR 24 HOUR RAINFALL (NOAA)	in	3.38	3.38	
6	Tt (EQ 15-8) COMPUTE Tt	hr.	0.03	0.01	0.04

SHALLOW CONCENTRATED FLOW		SEGMENT ID	CD		
7	SURFACE DESCRIPTION		Pavement		
8	FLOW LENGTH, L	ft	183		
9	WATERCOURSE SLOPE, s	ft/ft	0.06		
10	AVERAGE VELOCITY, V (FIG. 15-4)	ft/s	5		
11	Tt=L/3600V (EQ 15-1) COMPUTE Tt	hr.	0.01		0.01

CHANNEL FLOW		SEGMENT ID	DE		
12	CROSS SECTIONAL FLOW AREA, a	ft^2	1.2		
13	WETTED PERIMETER, Pw	ft	3.9		
14	HYDRAULIC RADIUS, r=a/Pw	ft	0.31		
15	CHANNEL SLOPE, S	ft/ft	0.05		
16	MANNINGS ROUGHNESS COEFFICIENT, n		0.013		
17	VELOCITY, V (EQ 15-10)	ft/s	11.77		
18	FLOW LENGTH, L	ft	395		
19	Tt=L/3600V (EQ 15-1)	hr	0.01		0.01
20	WATERSHED OR SUBAREA Tc OR Tt (EQ 15-7)	hr			0.06
		min			3.6

WORKSHEET 3: TIME OF CONCENTRATION AND TRAVEL TIME

PROJECT: 150 Allen Road BY: MF DATE: 9/16/2022
 LOCATION: Township Of Bernards, Somerset County CHECKER: RCM2 DATE: -

SELECT ONE: PRESENT **DEVELOPED** D.A. #6-IMP

SELECT ONE: **Tc** Tt

NOTES: SPACE FOR AS MANY AS TWO SEGMENTS PER FLOW CAN BE USED FOR EACH WORKSHEET.
 INCLUDE A MAP, SCHEMATIC, OR DESCRIPTION OF FLOW SEGMENTS

SHEET FLOW		SEGMENT ID	AB	
1	SURFACE DESCRIPTION		Smooth	
2	MANNINGS ROUGHNESS COEFFICIENT, n		0.011	
3	LAND SLOPE, s	ft/ft	0.06	
4	MAXIMUM FLOW LENGTH, L (EQ 15-9)	ft	100	
5	TWO YEAR 24 HOUR RAINFALL (NOAA)	in	3.38	
6	Tt (EQ 15-8) COMPUTE Tt	hr.	0.01	0.01

SHALLOW CONCENTRATED FLOW		SEGMENT ID	BC	
7	SURFACE DESCRIPTION		Pavement	
8	FLOW LENGTH, L	ft	245	
9	WATERCOURSE SLOPE, s	ft/ft	0.04	
10	AVERAGE VELOCITY, V (FIG. 15-4)	ft/s	5	
11	Tt=L/3600V (EQ 15-1) COMPUTE Tt	hr.	0.01	0.01

CHANNEL FLOW		SEGMENT ID		
12	CROSS SECTIONAL FLOW AREA, a	ft^2		
13	WETTED PERIMETER, Pw	ft		
14	HYDRAULIC RADIUS, r=a/Pw	ft		
15	CHANNEL SLOPE, S	ft/ft		
16	MANNINGS ROUGHNESS COEFFICIENT, n			
17	VELOCITY, V (EQ 15-10)	ft/s		
18	FLOW LENGTH, L	ft		
19	Tt=L/3600V (EQ 15-1)	hr		0.00
20	WATERSHED OR SUBAREA Tc OR Tt (EQ 15-7)	hr		0.02
		min		1.2

WORKSHEET 2:RUNOFF CURVE NUMBER AND RUNOFF

PROJECT: 150 Allen Road
 LOCATION: Bernards Township

BY: MF DATE: 9/16/2022
 CHECKED: RCM2 REV DATE: -

SELECT ONE: PRESENT

DEVELOPED

D.A. # 7

SOIL NAME AND HYDROLOGIC GROUP	COVER DESCRIPTION	CN			AREA IN ACRES	PRODUCT OF CN x AREA
		TABLE 2-2	FIG 2-3	FIG 2-4		
B	Open Space	61			0.37	22.6
TOTALS=					0.37	22.6

CN= $\frac{\text{TOTAL PRODUCT}}{\text{TOTAL AREA}}$ = **61**

WORKSHEET 3: TIME OF CONCENTRATION AND TRAVEL TIME

PROJECT: 150 Allen Road BY: MF DATE: 9/16/2022
 LOCATION: Township Of Bernards, Somerset County CHECKER: RCM2 DATE: -

SELECT ONE: PRESENT **DEVELOPED** D.A. #7

SELECT ONE: **Tc** Tt

NOTES: SPACE FOR AS MANY AS TWO SEGMENTS PER FLOW CAN BE USED FOR EACH WORKSHEET.
 INCLUDE A MAP, SCHEMATIC, OR DESCRIPTION OF FLOW SEGMENTS

SHEET FLOW		SEGMENT ID	AB	BC	
1	SURFACE DESCRIPTION		Open Space	Pavement	
2	MANNINGS ROUGHNESS COEFFICIENT, n		0.24	0.011	
3	LAND SLOPE, s	ft/ft	0.08	0.08	
4	MAXIMUM FLOW LENGTH, L (EQ 15-9)	ft	58	42	
5	TWO YEAR 24 HOUR RAINFALL (NOAA)	in	3.38	3.38	
6	Tt (EQ 15-8) COMPUTE Tt	hr.	0.08	0.01	0.09

SHALLOW CONCENTRATED FLOW		SEGMENT ID	CD		
7	SURFACE DESCRIPTION		Pavement		
8	FLOW LENGTH, L	ft	90		
9	WATERCOURSE SLOPE, s	ft/ft	0.02		
10	AVERAGE VELOCITY, V (FIG. 15-4)	ft/s	2.9		
11	Tt=L/3600V (EQ 15-1) COMPUTE Tt	hr.	0.01		0.01

CHANNEL FLOW		SEGMENT ID	DE		
12	CROSS SECTIONAL FLOW AREA, a	ft^2	1.2		
13	WETTED PERIMETER, Pw	ft	3.9		
14	HYDRAULIC RADIUS, r=a/Pw	ft	0.31		
15	CHANNEL SLOPE, S	ft/ft	0.08		
16	MANNINGS ROUGHNESS COEFFICIENT, n		0.013		
17	VELOCITY, V (EQ 15-10)	ft/s	14.89		
18	FLOW LENGTH, L	ft	40		
19	Tt=L/3600V (EQ 15-1)	hr	0.00		0.00
20	WATERSHED OR SUBAREA Tc OR Tt (EQ 15-7)	hr			0.10
		min			6.0

WORKSHEET 3: TIME OF CONCENTRATION AND TRAVEL TIME

PROJECT: 150 Allen Road BY: MF DATE: 9/16/2022
 LOCATION: Township Of Bernards, Somerset County CHECKER: RCM2 DATE: -

SELECT ONE: PRESENT **DEVELOPED** D.A. #7-IMP

SELECT ONE: **Tc** Tt

NOTES: SPACE FOR AS MANY AS TWO SEGMENTS PER FLOW CAN BE USED FOR EACH WORKSHEET.
 INCLUDE A MAP, SCHEMATIC, OR DESCRIPTION OF FLOW SEGMENTS

SHEET FLOW		SEGMENT ID	AB	
1	SURFACE DESCRIPTION		Smooth	
2	MANNINGS ROUGHNESS COEFFICIENT, n		0.011	
3	LAND SLOPE, s	ft/ft	0.03	
4	MAXIMUM FLOW LENGTH, L (EQ 15-9)	ft	100	
5	TWO YEAR 24 HOUR RAINFALL (NOAA)	in	3.38	
6	Tt (EQ 15-8) COMPUTE Tt	hr.	0.02	0.02

SHALLOW CONCENTRATED FLOW		SEGMENT ID	BC	
7	SURFACE DESCRIPTION		Pavement	
8	FLOW LENGTH, L	ft	262	
9	WATERCOURSE SLOPE, s	ft/ft	0.02	
10	AVERAGE VELOCITY, V (FIG. 15-4)	ft/s	2.9	
11	Tt=L/3600V (EQ 15-1) COMPUTE Tt	hr.	0.03	0.03

CHANNEL FLOW		SEGMENT ID		
12	CROSS SECTIONAL FLOW AREA, a	ft^2		
13	WETTED PERIMETER, Pw	ft		
14	HYDRAULIC RADIUS, r=a/Pw	ft		
15	CHANNEL SLOPE, S	ft/ft		
16	MANNINGS ROUGHNESS COEFFICIENT, n			
17	VELOCITY, V (EQ 15-10)	ft/s		
18	FLOW LENGTH, L	ft		
19	Tt=L/3600V (EQ 15-1)	hr		0.00
20	WATERSHED OR SUBAREA Tc OR Tt (EQ 15-7)	hr		0.05
		min		3.0

FLOOD ROUTING CALCULATIONS - APPENDIX B

FLOOD ROUTING CALCULATIONS – APPENDIX B-1
EXISTING CONDITIONS

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1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
EX DA#1	Pre-Development 2	2	0.249	12.500	1.05
EX DA#1	Pre-Development 10	10	0.825	12.350	5.96
EX DA#1	Pre-Development 100	100	2.421	12.350	20.71
EX DA#1 - IMP	Pre-Development 2	2	0.170	12.100	2.56
EX DA#1 - IMP	Pre-Development 10	10	0.262	12.100	3.86
EX DA#1 - IMP	Pre-Development 100	100	0.436	12.100	6.32
EX DA#1A	Pre-Development 2	2	0.122	12.250	0.93
EX DA#1A	Pre-Development 10	10	0.351	12.200	3.86
EX DA#1A	Pre-Development 100	100	0.946	12.200	11.31
EX DA#1A - IMP	Pre-Development 2	2	1.733	12.100	25.81
EX DA#1A - IMP	Pre-Development 10	10	2.662	12.100	38.93
EX DA#1A - IMP	Pre-Development 100	100	4.429	12.100	63.76
EX DA#1A - GVL	Pre-Development 2	2	0.085	12.100	1.54
EX DA#1A - GVL	Pre-Development 10	10	0.152	12.100	2.65
EX DA#1A - GVL	Pre-Development 100	100	0.287	12.100	4.75
EX DA#2	Pre-Development 2	2	0.103	12.400	0.53
EX DA#2	Pre-Development 10	10	0.315	12.300	2.55
EX DA#2	Pre-Development 100	100	0.883	12.300	8.18
EX DA#2A	Pre-Development 2	2	0.076	12.250	0.51
EX DA#2A	Pre-Development 10	10	0.225	12.200	2.29
EX DA#2A	Pre-Development 100	100	0.619	12.200	7.08
EX DA#2A - IMP	Pre-Development 2	2	0.802	12.100	11.95
EX DA#2A - IMP	Pre-Development 10	10	1.232	12.100	18.02
EX DA#2A - IMP	Pre-Development 100	100	2.050	12.100	29.52
EX DA#2A - GVL	Pre-Development 2	2	0.063	12.100	1.13
EX DA#2A - GVL	Pre-Development 10	10	0.112	12.100	1.95
EX DA#2A - GVL	Pre-Development 100	100	0.211	12.100	3.50

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
POA-A	Pre-Development 2	2	2.360	12.100	30.34
POA-A	Pre-Development 10	10	4.253	12.100	49.91
POA-A	Pre-Development 100	100	8.518	12.100	93.58
POA-B	Pre-Development 2	2	1.043	12.100	13.28
POA-B	Pre-Development 10	10	1.885	12.100	22.40
POA-B	Pre-Development 100	100	3.764	12.100	42.41

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1

Scenario: Pre-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.430 hours
Area (User Defined)	9.760 acres
<hr/>	
Computational Time Increment	0.057 hours
Time to Peak (Computed)	12.499 hours
Flow (Peak, Computed)	1.05 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.500 hours
Flow (Peak Interpolated Output)	1.05 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	55.000
Area (User Defined)	9.760 acres
Maximum Retention (Pervious)	8.2 in
Maximum Retention (Pervious, 20 percent)	1.6 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.3 in
Runoff Volume (Pervious)	0.249 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.249 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.430 hours
Computational Time Increment	0.057 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1

Scenario: Pre-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	25.72 ft ³ /s
Unit peak time, Tp	0.287 hours
Unit receding limb, Tr	1.147 hours
Total unit time, Tb	1.433 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1

Scenario: Pre-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.430 hours
Area (User Defined)	9.760 acres

Computational Time Increment	0.057 hours
Time to Peak (Computed)	12.384 hours
Flow (Peak, Computed)	6.01 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.350 hours
Flow (Peak Interpolated Output)	5.96 ft ³ /s

Drainage Area	
SCS CN (Composite)	55.000
Area (User Defined)	9.760 acres
Maximum Retention (Pervious)	8.2 in
Maximum Retention (Pervious, 20 percent)	1.6 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.0 in
Runoff Volume (Pervious)	0.826 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.825 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.430 hours
Computational Time Increment	0.057 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1

Scenario: Pre-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	25.72 ft ³ /s
Unit peak time, Tp	0.287 hours
Unit receding limb, Tr	1.147 hours
Total unit time, Tb	1.433 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1

Scenario: Pre-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.430 hours
Area (User Defined)	9.760 acres

Computational Time Increment	0.057 hours
Time to Peak (Computed)	12.327 hours
Flow (Peak, Computed)	20.97 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.350 hours
Flow (Peak Interpolated Output)	20.71 ft ³ /s

Drainage Area	
SCS CN (Composite)	55.000
Area (User Defined)	9.760 acres
Maximum Retention (Pervious)	8.2 in
Maximum Retention (Pervious, 20 percent)	1.6 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.0 in
Runoff Volume (Pervious)	2.421 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	2.421 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.430 hours
Computational Time Increment	0.057 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1

Scenario: Pre-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	25.72 ft ³ /s
Unit peak time, Tp	0.287 hours
Unit receding limb, Tr	1.147 hours
Total unit time, Tb	1.433 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1 - IMP

Scenario: Pre-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.030 hours
Area (User Defined)	0.650 acres
<hr/>	
Computational Time Increment	0.004 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	2.56 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	2.56 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.650 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.1 in
Runoff Volume (Pervious)	0.170 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.170 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.030 hours
Computational Time Increment	0.004 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1 - IMP

Scenario: Pre-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	24.55 ft ³ /s
Unit peak time, Tp	0.020 hours
Unit receding limb, Tr	0.080 hours
Total unit time, Tb	0.100 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1 - IMP

Scenario: Pre-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.030 hours
Area (User Defined)	0.650 acres

Computational Time Increment	0.004 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	3.86 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	3.86 ft ³ /s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.650 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.8 in
Runoff Volume (Pervious)	0.262 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.262 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.030 hours
Computational Time Increment	0.004 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1 - IMP

Scenario: Pre-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	24.55 ft ³ /s
Unit peak time, Tp	0.020 hours
Unit receding limb, Tr	0.080 hours
Total unit time, Tb	0.100 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1 - IMP

Scenario: Pre-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.030 hours
Area (User Defined)	0.650 acres
<hr/>	
Computational Time Increment	0.004 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	6.32 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	6.32 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.650 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	8.0 in
Runoff Volume (Pervious)	0.436 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.436 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.030 hours
Computational Time Increment	0.004 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1 - IMP

Scenario: Pre-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	24.55 ft ³ /s
Unit peak time, Tp	0.020 hours
Unit receding limb, Tr	0.080 hours
Total unit time, Tb	0.100 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1A

Scenario: Pre-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.220 hours
Area (User Defined)	3.310 acres
<hr/>	
Computational Time Increment	0.029 hours
Time to Peak (Computed)	12.232 hours
Flow (Peak, Computed)	0.94 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.250 hours
Flow (Peak Interpolated Output)	0.93 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	59.000
Area (User Defined)	3.310 acres
Maximum Retention (Pervious)	6.9 in
Maximum Retention (Pervious, 20 percent)	1.4 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.4 in
Runoff Volume (Pervious)	0.122 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.122 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.220 hours
Computational Time Increment	0.029 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1A

Scenario: Pre-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	17.05 ft ³ /s
Unit peak time, Tp	0.147 hours
Unit receding limb, Tr	0.587 hours
Total unit time, Tb	0.733 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1A

Scenario: Pre-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.220 hours
Area (User Defined)	3.310 acres
<hr/>	
Computational Time Increment	0.029 hours
Time to Peak (Computed)	12.203 hours
Flow (Peak, Computed)	3.87 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.200 hours
Flow (Peak Interpolated Output)	3.86 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	59.000
Area (User Defined)	3.310 acres
Maximum Retention (Pervious)	6.9 in
Maximum Retention (Pervious, 20 percent)	1.4 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.3 in
Runoff Volume (Pervious)	0.351 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.351 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.220 hours
Computational Time Increment	0.029 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1A

Scenario: Pre-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	17.05 ft ³ /s
Unit peak time, Tp	0.147 hours
Unit receding limb, Tr	0.587 hours
Total unit time, Tb	0.733 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1A

Scenario: Pre-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.220 hours
Area (User Defined)	3.310 acres
<hr/>	
Computational Time Increment	0.029 hours
Time to Peak (Computed)	12.173 hours
Flow (Peak, Computed)	11.32 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.200 hours
Flow (Peak Interpolated Output)	11.31 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	59.000
Area (User Defined)	3.310 acres
Maximum Retention (Pervious)	6.9 in
Maximum Retention (Pervious, 20 percent)	1.4 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.4 in
Runoff Volume (Pervious)	0.946 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.946 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.220 hours
Computational Time Increment	0.029 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1A

Scenario: Pre-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	17.05 ft ³ /s
Unit peak time, Tp	0.147 hours
Unit receding limb, Tr	0.587 hours
Total unit time, Tb	0.733 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1A - GVL

Scenario: Pre-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.010 hours
Area (User Defined)	0.530 acres
<hr/>	
Computational Time Increment	0.001 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	1.54 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	1.54 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	85.000
Area (User Defined)	0.530 acres
Maximum Retention (Pervious)	1.8 in
Maximum Retention (Pervious, 20 percent)	0.4 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.9 in
Runoff Volume (Pervious)	0.084 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.085 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.010 hours
Computational Time Increment	0.001 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1A - GVL

Scenario: Pre-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	60.05 ft ³ /s
Unit peak time, Tp	0.007 hours
Unit receding limb, Tr	0.027 hours
Total unit time, Tb	0.033 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1A - GVL

Scenario: Pre-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.010 hours
Area (User Defined)	0.530 acres

Computational Time Increment	0.001 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	2.65 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	2.65 ft ³ /s

Drainage Area	
SCS CN (Composite)	85.000
Area (User Defined)	0.530 acres
Maximum Retention (Pervious)	1.8 in
Maximum Retention (Pervious, 20 percent)	0.4 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.4 in
Runoff Volume (Pervious)	0.152 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.152 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.010 hours
Computational Time Increment	0.001 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1A - GVL

Scenario: Pre-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	60.05 ft ³ /s
Unit peak time, Tp	0.007 hours
Unit receding limb, Tr	0.027 hours
Total unit time, Tb	0.033 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1A - GVL

Scenario: Pre-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.010 hours
Area (User Defined)	0.530 acres
<hr/>	
Computational Time Increment	0.001 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	4.75 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	4.75 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	85.000
Area (User Defined)	0.530 acres
Maximum Retention (Pervious)	1.8 in
Maximum Retention (Pervious, 20 percent)	0.4 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	6.5 in
Runoff Volume (Pervious)	0.286 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.287 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.010 hours
Computational Time Increment	0.001 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1A - GVL

Scenario: Pre-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	60.05 ft ³ /s
Unit peak time, Tp	0.007 hours
Unit receding limb, Tr	0.027 hours
Total unit time, Tb	0.033 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1A - IMP

Scenario: Pre-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.050 hours
Area (User Defined)	6.610 acres
<hr/>	
Computational Time Increment	0.007 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	25.81 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	25.81 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	6.610 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.1 in
Runoff Volume (Pervious)	1.733 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	1.733 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.050 hours
Computational Time Increment	0.007 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1A - IMP

Scenario: Pre-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	149.79 ft ³ /s
Unit peak time, Tp	0.033 hours
Unit receding limb, Tr	0.133 hours
Total unit time, Tb	0.167 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1A - IMP

Scenario: Pre-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.050 hours
Area (User Defined)	6.610 acres
<hr/>	
Computational Time Increment	0.007 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	38.93 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	38.93 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	6.610 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.8 in
Runoff Volume (Pervious)	2.662 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	2.662 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.050 hours
Computational Time Increment	0.007 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1A - IMP

Scenario: Pre-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	149.79 ft ³ /s
Unit peak time, Tp	0.033 hours
Unit receding limb, Tr	0.133 hours
Total unit time, Tb	0.167 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1A - IMP

Scenario: Pre-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.050 hours
Area (User Defined)	6.610 acres
<hr/>	
Computational Time Increment	0.007 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	63.76 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	63.76 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	6.610 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	8.0 in
Runoff Volume (Pervious)	4.429 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	4.429 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.050 hours
Computational Time Increment	0.007 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#1A - IMP

Scenario: Pre-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	149.79 ft ³ /s
Unit peak time, Tp	0.033 hours
Unit receding limb, Tr	0.133 hours
Total unit time, Tb	0.167 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#2

Scenario: Pre-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.380 hours
Area (User Defined)	3.310 acres
<hr/>	
Computational Time Increment	0.051 hours
Time to Peak (Computed)	12.413 hours
Flow (Peak, Computed)	0.54 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.400 hours
Flow (Peak Interpolated Output)	0.53 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	57.000
Area (User Defined)	3.310 acres
Maximum Retention (Pervious)	7.5 in
Maximum Retention (Pervious, 20 percent)	1.5 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.4 in
Runoff Volume (Pervious)	0.103 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.103 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.380 hours
Computational Time Increment	0.051 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#2

Scenario: Pre-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	9.87 ft ³ /s
Unit peak time, Tp	0.253 hours
Unit receding limb, Tr	1.013 hours
Total unit time, Tb	1.267 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#2

Scenario: Pre-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.380 hours
Area (User Defined)	3.310 acres
<hr/>	
Computational Time Increment	0.051 hours
Time to Peak (Computed)	12.312 hours
Flow (Peak, Computed)	2.58 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.300 hours
Flow (Peak Interpolated Output)	2.55 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	57.000
Area (User Defined)	3.310 acres
Maximum Retention (Pervious)	7.5 in
Maximum Retention (Pervious, 20 percent)	1.5 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.1 in
Runoff Volume (Pervious)	0.315 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.315 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.380 hours
Computational Time Increment	0.051 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#2

Scenario: Pre-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	9.87 ft ³ /s
Unit peak time, Tp	0.253 hours
Unit receding limb, Tr	1.013 hours
Total unit time, Tb	1.267 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#2

Scenario: Pre-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.380 hours
Area (User Defined)	3.310 acres
<hr/>	
Computational Time Increment	0.051 hours
Time to Peak (Computed)	12.312 hours
Flow (Peak, Computed)	8.19 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.300 hours
Flow (Peak Interpolated Output)	8.18 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	57.000
Area (User Defined)	3.310 acres
Maximum Retention (Pervious)	7.5 in
Maximum Retention (Pervious, 20 percent)	1.5 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.2 in
Runoff Volume (Pervious)	0.883 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.883 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.380 hours
Computational Time Increment	0.051 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#2

Scenario: Pre-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	9.87 ft ³ /s
Unit peak time, Tp	0.253 hours
Unit receding limb, Tr	1.013 hours
Total unit time, Tb	1.267 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#2A

Scenario: Pre-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.250 hours
Area (User Defined)	2.240 acres
<hr/>	
Computational Time Increment	0.033 hours
Time to Peak (Computed)	12.267 hours
Flow (Peak, Computed)	0.51 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.250 hours
Flow (Peak Interpolated Output)	0.51 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	58.000
Area (User Defined)	2.240 acres
Maximum Retention (Pervious)	7.2 in
Maximum Retention (Pervious, 20 percent)	1.4 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.4 in
Runoff Volume (Pervious)	0.076 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.076 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.250 hours
Computational Time Increment	0.033 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#2A

Scenario: Pre-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	10.15 ft ³ /s
Unit peak time, Tp	0.167 hours
Unit receding limb, Tr	0.667 hours
Total unit time, Tb	0.833 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#2A

Scenario: Pre-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.250 hours
Area (User Defined)	2.240 acres
<hr/>	
Computational Time Increment	0.033 hours
Time to Peak (Computed)	12.233 hours
Flow (Peak, Computed)	2.30 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.200 hours
Flow (Peak Interpolated Output)	2.29 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	58.000
Area (User Defined)	2.240 acres
Maximum Retention (Pervious)	7.2 in
Maximum Retention (Pervious, 20 percent)	1.4 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.2 in
Runoff Volume (Pervious)	0.225 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.225 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.250 hours
Computational Time Increment	0.033 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#2A

Scenario: Pre-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	10.15 ft ³ /s
Unit peak time, Tp	0.167 hours
Unit receding limb, Tr	0.667 hours
Total unit time, Tb	0.833 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#2A

Scenario: Pre-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.250 hours
Area (User Defined)	2.240 acres
<hr/>	
Computational Time Increment	0.033 hours
Time to Peak (Computed)	12.200 hours
Flow (Peak, Computed)	7.08 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.200 hours
Flow (Peak Interpolated Output)	7.08 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	58.000
Area (User Defined)	2.240 acres
Maximum Retention (Pervious)	7.2 in
Maximum Retention (Pervious, 20 percent)	1.4 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.3 in
Runoff Volume (Pervious)	0.619 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.619 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.250 hours
Computational Time Increment	0.033 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#2A

Scenario: Pre-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	10.15 ft ³ /s
Unit peak time, Tp	0.167 hours
Unit receding limb, Tr	0.667 hours
Total unit time, Tb	0.833 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#2A - GVL

Scenario: Pre-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.010 hours
Area (User Defined)	0.390 acres
<hr/>	
Computational Time Increment	0.001 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	1.13 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	1.13 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	85.000
Area (User Defined)	0.390 acres
Maximum Retention (Pervious)	1.8 in
Maximum Retention (Pervious, 20 percent)	0.4 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.9 in
Runoff Volume (Pervious)	0.062 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.063 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.010 hours
Computational Time Increment	0.001 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#2A - GVL

Scenario: Pre-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	44.19 ft ³ /s
Unit peak time, Tp	0.007 hours
Unit receding limb, Tr	0.027 hours
Total unit time, Tb	0.033 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#2A - GVL

Scenario: Pre-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.010 hours
Area (User Defined)	0.390 acres
<hr/>	
Computational Time Increment	0.001 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	1.95 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	1.95 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	85.000
Area (User Defined)	0.390 acres
Maximum Retention (Pervious)	1.8 in
Maximum Retention (Pervious, 20 percent)	0.4 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.4 in
Runoff Volume (Pervious)	0.112 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.112 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.010 hours
Computational Time Increment	0.001 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#2A - GVL

Scenario: Pre-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	44.19 ft ³ /s
Unit peak time, Tp	0.007 hours
Unit receding limb, Tr	0.027 hours
Total unit time, Tb	0.033 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#2A - GVL

Scenario: Pre-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.010 hours
Area (User Defined)	0.390 acres
<hr/>	
Computational Time Increment	0.001 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	3.50 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	3.50 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	85.000
Area (User Defined)	0.390 acres
Maximum Retention (Pervious)	1.8 in
Maximum Retention (Pervious, 20 percent)	0.4 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	6.5 in
Runoff Volume (Pervious)	0.211 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.211 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.010 hours
Computational Time Increment	0.001 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#2A - GVL

Scenario: Pre-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	44.19 ft ³ /s
Unit peak time, Tp	0.007 hours
Unit receding limb, Tr	0.027 hours
Total unit time, Tb	0.033 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#2A - IMP

Scenario: Pre-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.050 hours
Area (User Defined)	3.060 acres
<hr/>	
Computational Time Increment	0.007 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	11.95 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	11.95 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	3.060 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.1 in
Runoff Volume (Pervious)	0.802 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.802 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.050 hours
Computational Time Increment	0.007 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#2A - IMP

Scenario: Pre-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	69.34 ft ³ /s
Unit peak time, Tp	0.033 hours
Unit receding limb, Tr	0.133 hours
Total unit time, Tb	0.167 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#2A - IMP

Scenario: Pre-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.050 hours
Area (User Defined)	3.060 acres
<hr/>	
Computational Time Increment	0.007 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	18.02 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	18.02 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	3.060 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.8 in
Runoff Volume (Pervious)	1.232 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	1.232 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.050 hours
Computational Time Increment	0.007 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#2A - IMP

Scenario: Pre-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	69.34 ft ³ /s
Unit peak time, Tp	0.033 hours
Unit receding limb, Tr	0.133 hours
Total unit time, Tb	0.167 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#2A - IMP

Scenario: Pre-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.050 hours
Area (User Defined)	3.060 acres
<hr/>	
Computational Time Increment	0.007 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	29.52 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	29.52 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	3.060 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	8.0 in
Runoff Volume (Pervious)	2.050 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	2.050 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.050 hours
Computational Time Increment	0.007 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: EX DA#2A - IMP

Scenario: Pre-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	69.34 ft ³ /s
Unit peak time, Tp	0.033 hours
Unit receding limb, Tr	0.133 hours
Total unit time, Tb	0.167 hours

1114-02 - EXISTING CONDITIONS ROUTINGS

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1114-02 - EXISTING CONDITIONS ROUTINGS

M

Master Network Summary...1

FLOOD ROUTING CALCULATIONS – APPENDIX B-2
ALLOWABLE FLOWS

POINT "A" ALLOWABLE

$$\text{allowable peak} = \text{existing peak} * \left(1 - \frac{\text{area of disturbance}}{\text{total area}} * \text{RSIS red. Factor}\right)$$

2 yr

existing peak = 30.34
area of disturbance = 11.53
RSIS red. Factor = 0.5
total area = 23.83

$$\text{allowable peak} = 23.00$$

10 yr

existing peak = 49.91
area of disturbance = 11.53
RSIS red. Factor = 0.25
total area = 23.83

$$\text{allowable peak} = 43.87$$

100 yr

existing peak = 93.58
area of disturbance = 11.53
RSIS red. Factor = 0.2
total area = 23.83

$$\text{allowable peak} = 84.53$$

POINT "B" ALLOWABLE

$$\text{allowable peak} = \text{existing peak} * \left(1 - \frac{\text{area of disturbance}}{\text{total area}} * \text{RSIS red. Factor}\right)$$

2 yr

existing peak = 13.28
area of disturbance = 2.78
RSIS red. Factor = 0.5
total area = 6.03

$$\text{allowable peak} = 10.21$$

10 yr

existing peak = 22.40
area of disturbance = 2.78
RSIS red. Factor = 0.25
total area = 6.03

$$\text{allowable peak} = 19.81$$

100 yr

existing peak = 42.41
area of disturbance = 2.78
RSIS red. Factor = 0.2
total area = 6.03

$$\text{allowable peak} = 38.49$$

FLOOD ROUTING CALCULATIONS – APPENDIX B-3
PROPOSED CONDITIONS

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Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
PR DA#1	Post-Development 2	2	0.238	12.500	1.00
PR DA#1	Post-Development 10	10	0.788	12.350	5.69
PR DA#1	Post-Development 100	100	2.312	12.350	19.78
PR DA#1 - IMP	Post-Development 2	2	0.157	12.100	2.36
PR DA#1 - IMP	Post-Development 10	10	0.242	12.050	3.55
PR DA#1 - IMP	Post-Development 100	100	0.402	12.050	5.82
PR DA#3	Post-Development 2	2	0.035	12.200	0.33
PR DA#3	Post-Development 10	10	0.095	12.150	1.15
PR DA#3	Post-Development 100	100	0.247	12.150	3.21
PR DA#3 - IMP	Post-Development 2	2	0.210	12.100	3.12
PR DA#3 - IMP	Post-Development 10	10	0.322	12.100	4.71
PR DA#3 - IMP	Post-Development 100	100	0.536	12.100	7.72
PR DA#4	Post-Development 2	2	0.028	12.250	0.17
PR DA#4	Post-Development 10	10	0.090	12.200	0.98
PR DA#4	Post-Development 100	100	0.257	12.150	3.17
PR DA#4 - IMP	Post-Development 2	2	0.275	12.100	4.10
PR DA#4 - IMP	Post-Development 10	10	0.423	12.100	6.18
PR DA#4 - IMP	Post-Development 100	100	0.703	12.100	10.13
PR DA#5	Post-Development 2	2	0.045	12.200	0.43
PR DA#5	Post-Development 10	10	0.121	12.150	1.51
PR DA#5	Post-Development 100	100	0.314	12.150	4.21
PR DA#5 - IMP	Post-Development 2	2	1.553	12.100	23.32
PR DA#5 - IMP	Post-Development 10	10	2.385	12.100	35.16
PR DA#5 - IMP	Post-Development 100	100	3.967	12.100	57.58
PR DA#6	Post-Development 2	2	0.019	12.100	0.26
PR DA#6	Post-Development 10	10	0.052	12.100	0.86
PR DA#6	Post-Development 100	100	0.134	12.100	2.32
PR DA#6 - IMP	Post-Development 2	2	0.233	12.100	3.50
PR DA#6 - IMP	Post-Development 10	10	0.358	12.100	5.27
PR DA#6 - IMP	Post-Development 100	100	0.596	12.050	8.64
PR DA#7	Post-Development 2	2	0.016	12.150	0.19
PR DA#7	Post-Development 10	10	0.044	12.100	0.61
PR DA#7	Post-Development 100	100	0.113	12.100	1.71

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
PR DA#7 - IMP	Post-Development 2	2	0.160	12.100	2.38
PR DA#7 - IMP	Post-Development 10	10	0.246	12.100	3.59
PR DA#7 - IMP	Post-Development 100	100	0.409	12.100	5.88
PR DA#2	Post-Development 2	2	0.104	12.350	0.59
PR DA#2	Post-Development 10	10	0.318	12.250	2.84
PR DA#2	Post-Development 100	100	0.892	12.250	9.09
PR DA#2A - IMP	Post-Development 2	2	0.346	12.100	5.20
PR DA#2A - IMP	Post-Development 10	10	0.532	12.100	7.84
PR DA#2A - IMP	Post-Development 100	100	0.884	12.100	12.84
PR - DA#2A	Post-Development 2	2	0.051	12.200	0.39
PR - DA#2A	Post-Development 10	10	0.145	12.200	1.62
PR - DA#2A	Post-Development 100	100	0.392	12.200	4.72
PR DA#3A	Post-Development 2	2	0.025	12.250	0.15
PR DA#3A	Post-Development 10	10	0.078	12.200	0.85
PR DA#3A	Post-Development 100	100	0.224	12.150	2.75
PR DA#3A - IMP	Post-Development 2	2	0.031	12.100	0.47
PR DA#3A - IMP	Post-Development 10	10	0.048	12.100	0.71
PR DA#3A - IMP	Post-Development 100	100	0.080	12.100	1.16

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
POA-A	Post-Development 2	2	2.941	12.200	12.49
POA-A	Post-Development 10	10	5.205	12.150	31.65
POA-A	Post-Development 100	100	10.206	12.150	72.36
POA-B	Post-Development 2	2	0.500	12.100	5.46
POA-B	Post-Development 10	10	0.995	12.100	10.39
POA-B	Post-Development 100	100	2.168	12.100	22.17

Pond Summary

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Master Network Summary

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)
BASIN #3 (IN)	Post-Development 2	2	0.265	12.100	3.32	(N/A)	(N/A)
BASIN #3 (OUT)	Post-Development 2	2	0.255	12.950	0.28	335.68	0.131
BASIN #3 (IN)	Post-Development 10	10	0.505	12.100	6.50	(N/A)	(N/A)
BASIN #3 (OUT)	Post-Development 10	10	0.496	12.550	1.44	336.43	0.221
BASIN #3 (IN)	Post-Development 100	100	1.046	12.100	13.11	(N/A)	(N/A)
BASIN #3 (OUT)	Post-Development 100	100	1.036	12.200	8.31	336.98	0.302
BASIN #4 (IN)	Post-Development 2	2	0.304	12.100	4.15	(N/A)	(N/A)
BASIN #4 (OUT)	Post-Development 2	2	0.291	12.900	0.28	315.63	0.161
BASIN #4 (IN)	Post-Development 10	10	0.513	12.100	6.87	(N/A)	(N/A)
BASIN #4 (OUT)	Post-Development 10	10	0.501	12.900	0.73	316.34	0.266
BASIN #4 (IN)	Post-Development 100	100	0.961	12.100	12.67	(N/A)	(N/A)
BASIN #4 (OUT)	Post-Development 100	100	0.949	12.250	5.26	316.92	0.365
BASIN #5 (IN)	Post-Development 2	2	1.852	12.100	23.83	(N/A)	(N/A)
BASIN #5 (OUT)	Post-Development 2	2	1.830	12.200	8.44	315.19	0.761
BASIN #5 (IN)	Post-Development 10	10	3.002	12.100	36.64	(N/A)	(N/A)

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Master Network Summary

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)
BASIN #5 (OUT)	Post-Development 10	10	2.979	12.150	19.63	315.84	0.981
BASIN #5 (IN)	Post-Development 100	100	5.317	12.100	66.90	(N/A)	(N/A)
BASIN #5 (OUT)	Post-Development 100	100	5.295	12.150	38.88	316.69	1.293
BASIN #6 (IN)	Post-Development 2	2	0.252	12.100	3.76	(N/A)	(N/A)
BASIN #6 (OUT)	Post-Development 2	2	0.250	12.150	1.43	316.05	0.076
BASIN #6 (IN)	Post-Development 10	10	0.410	12.100	6.14	(N/A)	(N/A)
BASIN #6 (OUT)	Post-Development 10	10	0.408	12.100	5.08	316.43	0.093
BASIN #6 (IN)	Post-Development 100	100	0.730	12.100	10.96	(N/A)	(N/A)
BASIN #6 (OUT)	Post-Development 100	100	0.728	12.100	10.17	316.76	0.109
BASIN #7 (IN)	Post-Development 2	2	0.176	12.100	2.55	(N/A)	(N/A)
BASIN #7 (OUT)	Post-Development 2	2	0.175	12.150	1.28	307.84	0.042
BASIN #7 (IN)	Post-Development 10	10	0.289	12.100	4.21	(N/A)	(N/A)
BASIN #7 (OUT)	Post-Development 10	10	0.288	12.150	3.09	308.26	0.055
BASIN #7 (IN)	Post-Development 100	100	0.522	12.100	7.59	(N/A)	(N/A)
BASIN #7 (OUT)	Post-Development 100	100	0.520	12.150	5.90	308.74	0.073

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Master Network Summary

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)
BASIN #3A (IN)	Post-Development 2	2	0.056	12.100	0.51	(N/A)	(N/A)
BASIN #3A (OUT)	Post-Development 2	2	0.020	12.350	0.22	340.32	0.017
BASIN #3A (IN)	Post-Development 10	10	0.126	12.100	1.31	(N/A)	(N/A)
BASIN #3A (OUT)	Post-Development 10	10	0.088	12.150	1.12	340.55	0.021
BASIN #3A (IN)	Post-Development 100	100	0.304	12.100	3.38	(N/A)	(N/A)
BASIN #3A (OUT)	Post-Development 100	100	0.263	12.200	3.17	340.86	0.028

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR - DA#2A

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.210 hours
Area (User Defined)	1.370 acres
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Computational Time Increment	0.028 hours
Time to Peak (Computed)	12.236 hours
Flow (Peak, Computed)	0.40 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.200 hours
Flow (Peak Interpolated Output)	0.39 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	59.000
Area (User Defined)	1.370 acres
Maximum Retention (Pervious)	6.9 in
Maximum Retention (Pervious, 20 percent)	1.4 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.4 in
Runoff Volume (Pervious)	0.051 ac-ft
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Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.051 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.210 hours
Computational Time Increment	0.028 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR - DA#2A

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	7.39 ft ³ /s
Unit peak time, Tp	0.140 hours
Unit receding limb, Tr	0.560 hours
Total unit time, Tb	0.700 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR - DA#2A

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.210 hours
Area (User Defined)	1.370 acres

Computational Time Increment	0.028 hours
Time to Peak (Computed)	12.180 hours
Flow (Peak, Computed)	1.63 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.200 hours
Flow (Peak Interpolated Output)	1.62 ft ³ /s

Drainage Area	
SCS CN (Composite)	59.000
Area (User Defined)	1.370 acres
Maximum Retention (Pervious)	6.9 in
Maximum Retention (Pervious, 20 percent)	1.4 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.3 in
Runoff Volume (Pervious)	0.145 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.145 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.210 hours
Computational Time Increment	0.028 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR - DA#2A

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	7.39 ft ³ /s
Unit peak time, Tp	0.140 hours
Unit receding limb, Tr	0.560 hours
Total unit time, Tb	0.700 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR - DA#2A

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.210 hours
Area (User Defined)	1.370 acres

Computational Time Increment	0.028 hours
Time to Peak (Computed)	12.180 hours
Flow (Peak, Computed)	4.82 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.200 hours
Flow (Peak Interpolated Output)	4.72 ft ³ /s

Drainage Area	
SCS CN (Composite)	59.000
Area (User Defined)	1.370 acres
Maximum Retention (Pervious)	6.9 in
Maximum Retention (Pervious, 20 percent)	1.4 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.4 in
Runoff Volume (Pervious)	0.392 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.392 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.210 hours
Computational Time Increment	0.028 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR - DA#2A

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	7.39 ft ³ /s
Unit peak time, Tp	0.140 hours
Unit receding limb, Tr	0.560 hours
Total unit time, Tb	0.700 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#1

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.430 hours
Area (User Defined)	9.320 acres

Computational Time Increment	0.057 hours
Time to Peak (Computed)	12.499 hours
Flow (Peak, Computed)	1.00 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.500 hours
Flow (Peak Interpolated Output)	1.00 ft ³ /s

Drainage Area	
SCS CN (Composite)	55.000
Area (User Defined)	9.320 acres
Maximum Retention (Pervious)	8.2 in
Maximum Retention (Pervious, 20 percent)	1.6 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.3 in
Runoff Volume (Pervious)	0.238 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.238 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.430 hours
Computational Time Increment	0.057 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#1

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	24.56 ft ³ /s
Unit peak time, Tp	0.287 hours
Unit receding limb, Tr	1.147 hours
Total unit time, Tb	1.433 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#1

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.430 hours
Area (User Defined)	9.320 acres
<hr/>	
Computational Time Increment	0.057 hours
Time to Peak (Computed)	12.384 hours
Flow (Peak, Computed)	5.74 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.350 hours
Flow (Peak Interpolated Output)	5.69 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	55.000
Area (User Defined)	9.320 acres
Maximum Retention (Pervious)	8.2 in
Maximum Retention (Pervious, 20 percent)	1.6 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.0 in
Runoff Volume (Pervious)	0.788 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.788 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.430 hours
Computational Time Increment	0.057 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#1

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	24.56 ft ³ /s
Unit peak time, Tp	0.287 hours
Unit receding limb, Tr	1.147 hours
Total unit time, Tb	1.433 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#1

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.430 hours
Area (User Defined)	9.320 acres

Computational Time Increment	0.057 hours
Time to Peak (Computed)	12.327 hours
Flow (Peak, Computed)	20.02 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.350 hours
Flow (Peak Interpolated Output)	19.78 ft ³ /s

Drainage Area	
SCS CN (Composite)	55.000
Area (User Defined)	9.320 acres
Maximum Retention (Pervious)	8.2 in
Maximum Retention (Pervious, 20 percent)	1.6 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.0 in
Runoff Volume (Pervious)	2.312 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	2.312 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.430 hours
Computational Time Increment	0.057 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#1

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	24.56 ft ³ /s
Unit peak time, Tp	0.287 hours
Unit receding limb, Tr	1.147 hours
Total unit time, Tb	1.433 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#1 - IMP

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.020 hours
Area (User Defined)	0.600 acres
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Computational Time Increment	0.003 hours
Time to Peak (Computed)	12.099 hours
Flow (Peak, Computed)	2.36 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	2.36 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.600 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.1 in
Runoff Volume (Pervious)	0.157 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.157 ac-ft
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SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.020 hours
Computational Time Increment	0.003 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#1 - IMP

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	33.99 ft ³ /s
Unit peak time, Tp	0.013 hours
Unit receding limb, Tr	0.053 hours
Total unit time, Tb	0.067 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#1 - IMP

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.020 hours
Area (User Defined)	0.600 acres
<hr/>	
Computational Time Increment	0.003 hours
Time to Peak (Computed)	12.099 hours
Flow (Peak, Computed)	3.56 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.050 hours
Flow (Peak Interpolated Output)	3.55 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.600 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.8 in
Runoff Volume (Pervious)	0.242 ac-ft
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Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.242 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.020 hours
Computational Time Increment	0.003 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#1 - IMP

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	33.99 ft ³ /s
Unit peak time, Tp	0.013 hours
Unit receding limb, Tr	0.053 hours
Total unit time, Tb	0.067 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#1 - IMP

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.020 hours
Area (User Defined)	0.600 acres

Computational Time Increment	0.003 hours
Time to Peak (Computed)	12.099 hours
Flow (Peak, Computed)	5.84 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.050 hours
Flow (Peak Interpolated Output)	5.82 ft ³ /s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.600 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	8.0 in
Runoff Volume (Pervious)	0.402 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.402 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.020 hours
Computational Time Increment	0.003 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#1 - IMP

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	33.99 ft ³ /s
Unit peak time, Tp	0.013 hours
Unit receding limb, Tr	0.053 hours
Total unit time, Tb	0.067 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#2

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.310 hours
Area (User Defined)	3.340 acres
<hr/>	
Computational Time Increment	0.041 hours
Time to Peak (Computed)	12.359 hours
Flow (Peak, Computed)	0.59 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.350 hours
Flow (Peak Interpolated Output)	0.59 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	57.000
Area (User Defined)	3.340 acres
Maximum Retention (Pervious)	7.5 in
Maximum Retention (Pervious, 20 percent)	1.5 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.4 in
Runoff Volume (Pervious)	0.104 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.104 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.310 hours
Computational Time Increment	0.041 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#2

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	12.21 ft ³ /s
Unit peak time, Tp	0.207 hours
Unit receding limb, Tr	0.827 hours
Total unit time, Tb	1.033 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#2

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.310 hours
Area (User Defined)	3.340 acres
<hr/>	
Computational Time Increment	0.041 hours
Time to Peak (Computed)	12.276 hours
Flow (Peak, Computed)	2.87 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.250 hours
Flow (Peak Interpolated Output)	2.84 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	57.000
Area (User Defined)	3.340 acres
Maximum Retention (Pervious)	7.5 in
Maximum Retention (Pervious, 20 percent)	1.5 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.1 in
Runoff Volume (Pervious)	0.318 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.318 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.310 hours
Computational Time Increment	0.041 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#2

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	12.21 ft ³ /s
Unit peak time, Tp	0.207 hours
Unit receding limb, Tr	0.827 hours
Total unit time, Tb	1.033 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#2

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.310 hours
Area (User Defined)	3.340 acres
<hr/>	
Computational Time Increment	0.041 hours
Time to Peak (Computed)	12.235 hours
Flow (Peak, Computed)	9.14 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.250 hours
Flow (Peak Interpolated Output)	9.09 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	57.000
Area (User Defined)	3.340 acres
Maximum Retention (Pervious)	7.5 in
Maximum Retention (Pervious, 20 percent)	1.5 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.2 in
Runoff Volume (Pervious)	0.891 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.892 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.310 hours
Computational Time Increment	0.041 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#2

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	12.21 ft ³ /s
Unit peak time, Tp	0.207 hours
Unit receding limb, Tr	0.827 hours
Total unit time, Tb	1.033 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#2A - IMP

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.030 hours
Area (User Defined)	1.320 acres
<hr/>	
Computational Time Increment	0.004 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	5.20 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	5.20 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	1.320 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.1 in
Runoff Volume (Pervious)	0.346 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.346 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.030 hours
Computational Time Increment	0.004 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#2A - IMP

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	49.85 ft ³ /s
Unit peak time, Tp	0.020 hours
Unit receding limb, Tr	0.080 hours
Total unit time, Tb	0.100 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#2A - IMP

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.030 hours
Area (User Defined)	1.320 acres

Computational Time Increment	0.004 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	7.84 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	7.84 ft ³ /s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	1.320 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.8 in
Runoff Volume (Pervious)	0.532 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.532 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.030 hours
Computational Time Increment	0.004 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#2A - IMP

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	49.85 ft ³ /s
Unit peak time, Tp	0.020 hours
Unit receding limb, Tr	0.080 hours
Total unit time, Tb	0.100 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#2A - IMP

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.030 hours
Area (User Defined)	1.320 acres
<hr/>	
Computational Time Increment	0.004 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	12.84 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	12.84 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	1.320 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	8.0 in
Runoff Volume (Pervious)	0.884 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.884 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.030 hours
Computational Time Increment	0.004 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#2A - IMP

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	49.85 ft ³ /s
Unit peak time, Tp	0.020 hours
Unit receding limb, Tr	0.080 hours
Total unit time, Tb	0.100 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.180 hours
Area (User Defined)	0.810 acres
<hr/>	
Computational Time Increment	0.024 hours
Time to Peak (Computed)	12.192 hours
Flow (Peak, Computed)	0.34 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.200 hours
Flow (Peak Interpolated Output)	0.33 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	61.000
Area (User Defined)	0.810 acres
Maximum Retention (Pervious)	6.4 in
Maximum Retention (Pervious, 20 percent)	1.3 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.5 in
Runoff Volume (Pervious)	0.035 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.035 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.180 hours
Computational Time Increment	0.024 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	5.10 ft ³ /s
Unit peak time, Tp	0.120 hours
Unit receding limb, Tr	0.480 hours
Total unit time, Tb	0.600 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.180 hours
Area (User Defined)	0.810 acres

Computational Time Increment	0.024 hours
Time to Peak (Computed)	12.168 hours
Flow (Peak, Computed)	1.18 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	1.15 ft ³ /s

Drainage Area	
SCS CN (Composite)	61.000
Area (User Defined)	0.810 acres
Maximum Retention (Pervious)	6.4 in
Maximum Retention (Pervious, 20 percent)	1.3 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.4 in
Runoff Volume (Pervious)	0.095 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.095 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.180 hours
Computational Time Increment	0.024 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	5.10 ft ³ /s
Unit peak time, Tp	0.120 hours
Unit receding limb, Tr	0.480 hours
Total unit time, Tb	0.600 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.180 hours
Area (User Defined)	0.810 acres

Computational Time Increment	0.024 hours
Time to Peak (Computed)	12.168 hours
Flow (Peak, Computed)	3.25 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	3.21 ft ³ /s

Drainage Area	
SCS CN (Composite)	61.000
Area (User Defined)	0.810 acres
Maximum Retention (Pervious)	6.4 in
Maximum Retention (Pervious, 20 percent)	1.3 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.7 in
Runoff Volume (Pervious)	0.247 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.247 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.180 hours
Computational Time Increment	0.024 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	5.10 ft ³ /s
Unit peak time, Tp	0.120 hours
Unit receding limb, Tr	0.480 hours
Total unit time, Tb	0.600 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3 - IMP

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.050 hours
Area (User Defined)	0.800 acres
<hr/>	
Computational Time Increment	0.007 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	3.12 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	3.12 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.800 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.1 in
Runoff Volume (Pervious)	0.210 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.210 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.050 hours
Computational Time Increment	0.007 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3 - IMP

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	18.13 ft ³ /s
Unit peak time, Tp	0.033 hours
Unit receding limb, Tr	0.133 hours
Total unit time, Tb	0.167 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3 - IMP

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.050 hours
Area (User Defined)	0.800 acres

Computational Time Increment	0.007 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	4.71 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	4.71 ft ³ /s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.800 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.8 in
Runoff Volume (Pervious)	0.322 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.322 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.050 hours
Computational Time Increment	0.007 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3 - IMP

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	18.13 ft ³ /s
Unit peak time, Tp	0.033 hours
Unit receding limb, Tr	0.133 hours
Total unit time, Tb	0.167 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3 - IMP

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.050 hours
Area (User Defined)	0.800 acres

Computational Time Increment	0.007 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	7.72 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	7.72 ft ³ /s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.800 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	8.0 in
Runoff Volume (Pervious)	0.536 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.536 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.050 hours
Computational Time Increment	0.007 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3 - IMP

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	18.13 ft ³ /s
Unit peak time, Tp	0.033 hours
Unit receding limb, Tr	0.133 hours
Total unit time, Tb	0.167 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3A

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.190 hours
Area (User Defined)	0.870 acres
<hr/>	
Computational Time Increment	0.025 hours
Time to Peak (Computed)	12.236 hours
Flow (Peak, Computed)	0.15 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.250 hours
Flow (Peak Interpolated Output)	0.15 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	56.000
Area (User Defined)	0.870 acres
Maximum Retention (Pervious)	7.9 in
Maximum Retention (Pervious, 20 percent)	1.6 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.3 in
Runoff Volume (Pervious)	0.025 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.025 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.190 hours
Computational Time Increment	0.025 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3A

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	5.19 ft ³ /s
Unit peak time, Tp	0.127 hours
Unit receding limb, Tr	0.507 hours
Total unit time, Tb	0.633 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3A

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.190 hours
Area (User Defined)	0.870 acres

Computational Time Increment	0.025 hours
Time to Peak (Computed)	12.185 hours
Flow (Peak, Computed)	0.87 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.200 hours
Flow (Peak Interpolated Output)	0.85 ft ³ /s

Drainage Area	
SCS CN (Composite)	56.000
Area (User Defined)	0.870 acres
Maximum Retention (Pervious)	7.9 in
Maximum Retention (Pervious, 20 percent)	1.6 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.1 in
Runoff Volume (Pervious)	0.078 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.078 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.190 hours
Computational Time Increment	0.025 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3A

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	5.19 ft ³ /s
Unit peak time, Tp	0.127 hours
Unit receding limb, Tr	0.507 hours
Total unit time, Tb	0.633 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3A

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.190 hours
Area (User Defined)	0.870 acres
<hr/>	
Computational Time Increment	0.025 hours
Time to Peak (Computed)	12.160 hours
Flow (Peak, Computed)	2.82 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	2.75 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	56.000
Area (User Defined)	0.870 acres
Maximum Retention (Pervious)	7.9 in
Maximum Retention (Pervious, 20 percent)	1.6 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.1 in
Runoff Volume (Pervious)	0.224 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.224 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.190 hours
Computational Time Increment	0.025 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3A

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	5.19 ft ³ /s
Unit peak time, Tp	0.127 hours
Unit receding limb, Tr	0.507 hours
Total unit time, Tb	0.633 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3A - IMP

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.040 hours
Area (User Defined)	0.120 acres
<hr/>	
Computational Time Increment	0.005 hours
Time to Peak (Computed)	12.096 hours
Flow (Peak, Computed)	0.47 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.47 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.120 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.1 in
Runoff Volume (Pervious)	0.031 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.031 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.040 hours
Computational Time Increment	0.005 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3A - IMP

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	3.40 ft ³ /s
Unit peak time, Tp	0.027 hours
Unit receding limb, Tr	0.107 hours
Total unit time, Tb	0.133 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3A - IMP

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.040 hours
Area (User Defined)	0.120 acres

Computational Time Increment	0.005 hours
Time to Peak (Computed)	12.096 hours
Flow (Peak, Computed)	0.71 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.71 ft ³ /s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.120 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.8 in
Runoff Volume (Pervious)	0.048 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.048 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.040 hours
Computational Time Increment	0.005 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3A - IMP

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	3.40 ft ³ /s
Unit peak time, Tp	0.027 hours
Unit receding limb, Tr	0.107 hours
Total unit time, Tb	0.133 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3A - IMP

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.040 hours
Area (User Defined)	0.120 acres
<hr/>	
Computational Time Increment	0.005 hours
Time to Peak (Computed)	12.096 hours
Flow (Peak, Computed)	1.16 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	1.16 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.120 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	8.0 in
Runoff Volume (Pervious)	0.080 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.080 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.040 hours
Computational Time Increment	0.005 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3A - IMP

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	3.40 ft ³ /s
Unit peak time, Tp	0.027 hours
Unit receding limb, Tr	0.107 hours
Total unit time, Tb	0.133 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#4

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.190 hours
Area (User Defined)	1.000 acres

Computational Time Increment	0.025 hours
Time to Peak (Computed)	12.236 hours
Flow (Peak, Computed)	0.17 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.250 hours
Flow (Peak Interpolated Output)	0.17 ft ³ /s

Drainage Area	
SCS CN (Composite)	56.000
Area (User Defined)	1.000 acres
Maximum Retention (Pervious)	7.9 in
Maximum Retention (Pervious, 20 percent)	1.6 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.3 in
Runoff Volume (Pervious)	0.028 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.028 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.190 hours
Computational Time Increment	0.025 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#4

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	5.96 ft ³ /s
Unit peak time, Tp	0.127 hours
Unit receding limb, Tr	0.507 hours
Total unit time, Tb	0.633 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#4

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.190 hours
Area (User Defined)	1.000 acres

Computational Time Increment	0.025 hours
Time to Peak (Computed)	12.185 hours
Flow (Peak, Computed)	1.00 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.200 hours
Flow (Peak Interpolated Output)	0.98 ft ³ /s

Drainage Area	
SCS CN (Composite)	56.000
Area (User Defined)	1.000 acres
Maximum Retention (Pervious)	7.9 in
Maximum Retention (Pervious, 20 percent)	1.6 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.1 in
Runoff Volume (Pervious)	0.090 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.090 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.190 hours
Computational Time Increment	0.025 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#4

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	5.96 ft ³ /s
Unit peak time, Tp	0.127 hours
Unit receding limb, Tr	0.507 hours
Total unit time, Tb	0.633 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#4

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.190 hours
Area (User Defined)	1.000 acres
<hr/>	
Computational Time Increment	0.025 hours
Time to Peak (Computed)	12.160 hours
Flow (Peak, Computed)	3.24 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	3.17 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	56.000
Area (User Defined)	1.000 acres
Maximum Retention (Pervious)	7.9 in
Maximum Retention (Pervious, 20 percent)	1.6 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.1 in
Runoff Volume (Pervious)	0.257 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.257 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.190 hours
Computational Time Increment	0.025 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#4

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	5.96 ft ³ /s
Unit peak time, Tp	0.127 hours
Unit receding limb, Tr	0.507 hours
Total unit time, Tb	0.633 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#4 - IMP

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.050 hours
Area (User Defined)	1.050 acres
<hr/>	
Computational Time Increment	0.007 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	4.10 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	4.10 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	1.050 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.1 in
Runoff Volume (Pervious)	0.275 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.275 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.050 hours
Computational Time Increment	0.007 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#4 - IMP

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	23.79 ft ³ /s
Unit peak time, Tp	0.033 hours
Unit receding limb, Tr	0.133 hours
Total unit time, Tb	0.167 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#4 - IMP

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.050 hours
Area (User Defined)	1.050 acres

Computational Time Increment	0.007 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	6.18 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	6.18 ft ³ /s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	1.050 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.8 in
Runoff Volume (Pervious)	0.423 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.423 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.050 hours
Computational Time Increment	0.007 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#4 - IMP

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	23.79 ft ³ /s
Unit peak time, Tp	0.033 hours
Unit receding limb, Tr	0.133 hours
Total unit time, Tb	0.167 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#4 - IMP

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.050 hours
Area (User Defined)	1.050 acres
<hr/>	
Computational Time Increment	0.007 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	10.13 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	10.13 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	1.050 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	8.0 in
Runoff Volume (Pervious)	0.704 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.703 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.050 hours
Computational Time Increment	0.007 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#4 - IMP

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	23.79 ft ³ /s
Unit peak time, Tp	0.033 hours
Unit receding limb, Tr	0.133 hours
Total unit time, Tb	0.167 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#5

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.170 hours
Area (User Defined)	1.030 acres
<hr/>	
Computational Time Increment	0.023 hours
Time to Peak (Computed)	12.172 hours
Flow (Peak, Computed)	0.44 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.200 hours
Flow (Peak Interpolated Output)	0.43 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	61.000
Area (User Defined)	1.030 acres
Maximum Retention (Pervious)	6.4 in
Maximum Retention (Pervious, 20 percent)	1.3 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.5 in
Runoff Volume (Pervious)	0.045 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.045 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.170 hours
Computational Time Increment	0.023 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#5

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	6.86 ft ³ /s
Unit peak time, Tp	0.113 hours
Unit receding limb, Tr	0.453 hours
Total unit time, Tb	0.567 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#5

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.170 hours
Area (User Defined)	1.030 acres
<hr/>	
Computational Time Increment	0.023 hours
Time to Peak (Computed)	12.172 hours
Flow (Peak, Computed)	1.53 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	1.51 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	61.000
Area (User Defined)	1.030 acres
Maximum Retention (Pervious)	6.4 in
Maximum Retention (Pervious, 20 percent)	1.3 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.4 in
Runoff Volume (Pervious)	0.121 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.121 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.170 hours
Computational Time Increment	0.023 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#5

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	6.86 ft ³ /s
Unit peak time, Tp	0.113 hours
Unit receding limb, Tr	0.453 hours
Total unit time, Tb	0.567 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#5

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.170 hours
Area (User Defined)	1.030 acres

Computational Time Increment	0.023 hours
Time to Peak (Computed)	12.149 hours
Flow (Peak, Computed)	4.21 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	4.21 ft ³ /s

Drainage Area	
SCS CN (Composite)	61.000
Area (User Defined)	1.030 acres
Maximum Retention (Pervious)	6.4 in
Maximum Retention (Pervious, 20 percent)	1.3 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.7 in
Runoff Volume (Pervious)	0.314 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.314 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.170 hours
Computational Time Increment	0.023 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#5

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	6.86 ft ³ /s
Unit peak time, Tp	0.113 hours
Unit receding limb, Tr	0.453 hours
Total unit time, Tb	0.567 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#5 - IMP

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.030 hours
Area (User Defined)	5.920 acres
<hr/>	
Computational Time Increment	0.004 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	23.32 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	23.32 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	5.920 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.1 in
Runoff Volume (Pervious)	1.552 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	1.553 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.030 hours
Computational Time Increment	0.004 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#5 - IMP

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	223.59 ft ³ /s
Unit peak time, Tp	0.020 hours
Unit receding limb, Tr	0.080 hours
Total unit time, Tb	0.100 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#5 - IMP

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.030 hours
Area (User Defined)	5.920 acres
<hr/>	
Computational Time Increment	0.004 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	35.16 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	35.16 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	5.920 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.8 in
Runoff Volume (Pervious)	2.384 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	2.385 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.030 hours
Computational Time Increment	0.004 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#5 - IMP

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	223.59 ft ³ /s
Unit peak time, Tp	0.020 hours
Unit receding limb, Tr	0.080 hours
Total unit time, Tb	0.100 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#5 - IMP

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.030 hours
Area (User Defined)	5.920 acres
<hr/>	
Computational Time Increment	0.004 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	57.58 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	57.58 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	5.920 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	8.0 in
Runoff Volume (Pervious)	3.966 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	3.967 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.030 hours
Computational Time Increment	0.004 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#5 - IMP

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	223.59 ft ³ /s
Unit peak time, Tp	0.020 hours
Unit receding limb, Tr	0.080 hours
Total unit time, Tb	0.100 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#6

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.060 hours
Area (User Defined)	0.440 acres

Computational Time Increment	0.008 hours
Time to Peak (Computed)	12.112 hours
Flow (Peak, Computed)	0.27 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.26 ft ³ /s

Drainage Area	
SCS CN (Composite)	61.000
Area (User Defined)	0.440 acres
Maximum Retention (Pervious)	6.4 in
Maximum Retention (Pervious, 20 percent)	1.3 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.5 in
Runoff Volume (Pervious)	0.019 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.019 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.060 hours
Computational Time Increment	0.008 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#6

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	8.31 ft ³ /s
Unit peak time, Tp	0.040 hours
Unit receding limb, Tr	0.160 hours
Total unit time, Tb	0.200 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#6

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.060 hours
Area (User Defined)	0.440 acres

Computational Time Increment	0.008 hours
Time to Peak (Computed)	12.112 hours
Flow (Peak, Computed)	0.88 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.86 ft ³ /s

Drainage Area	
SCS CN (Composite)	61.000
Area (User Defined)	0.440 acres
Maximum Retention (Pervious)	6.4 in
Maximum Retention (Pervious, 20 percent)	1.3 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.4 in
Runoff Volume (Pervious)	0.052 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.052 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.060 hours
Computational Time Increment	0.008 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#6

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	8.31 ft ³ /s
Unit peak time, Tp	0.040 hours
Unit receding limb, Tr	0.160 hours
Total unit time, Tb	0.200 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#6

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.060 hours
Area (User Defined)	0.440 acres
<hr/>	
Computational Time Increment	0.008 hours
Time to Peak (Computed)	12.104 hours
Flow (Peak, Computed)	2.34 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	2.32 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	61.000
Area (User Defined)	0.440 acres
Maximum Retention (Pervious)	6.4 in
Maximum Retention (Pervious, 20 percent)	1.3 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.7 in
Runoff Volume (Pervious)	0.134 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.134 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.060 hours
Computational Time Increment	0.008 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#6

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	8.31 ft ³ /s
Unit peak time, Tp	0.040 hours
Unit receding limb, Tr	0.160 hours
Total unit time, Tb	0.200 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#6 - IMP

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.020 hours
Area (User Defined)	0.890 acres
<hr/>	
Computational Time Increment	0.003 hours
Time to Peak (Computed)	12.099 hours
Flow (Peak, Computed)	3.51 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	3.50 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.890 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.1 in
Runoff Volume (Pervious)	0.233 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.233 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.020 hours
Computational Time Increment	0.003 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#6 - IMP

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	50.42 ft ³ /s
Unit peak time, Tp	0.013 hours
Unit receding limb, Tr	0.053 hours
Total unit time, Tb	0.067 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#6 - IMP

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.020 hours
Area (User Defined)	0.890 acres

Computational Time Increment	0.003 hours
Time to Peak (Computed)	12.099 hours
Flow (Peak, Computed)	5.29 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	5.27 ft ³ /s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.890 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.8 in
Runoff Volume (Pervious)	0.358 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.358 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.020 hours
Computational Time Increment	0.003 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#6 - IMP

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	50.42 ft ³ /s
Unit peak time, Tp	0.013 hours
Unit receding limb, Tr	0.053 hours
Total unit time, Tb	0.067 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#6 - IMP

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.020 hours
Area (User Defined)	0.890 acres
<hr/>	
Computational Time Increment	0.003 hours
Time to Peak (Computed)	12.099 hours
Flow (Peak, Computed)	8.66 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.050 hours
Flow (Peak Interpolated Output)	8.64 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.890 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	8.0 in
Runoff Volume (Pervious)	0.596 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.596 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.020 hours
Computational Time Increment	0.003 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#6 - IMP

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	50.42 ft ³ /s
Unit peak time, Tp	0.013 hours
Unit receding limb, Tr	0.053 hours
Total unit time, Tb	0.067 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#7

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.100 hours
Area (User Defined)	0.370 acres
<hr/>	
Computational Time Increment	0.013 hours
Time to Peak (Computed)	12.133 hours
Flow (Peak, Computed)	0.20 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	0.19 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	61.000
Area (User Defined)	0.370 acres
Maximum Retention (Pervious)	6.4 in
Maximum Retention (Pervious, 20 percent)	1.3 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.5 in
Runoff Volume (Pervious)	0.016 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.016 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.100 hours
Computational Time Increment	0.013 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#7

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	4.19 ft ³ /s
Unit peak time, Tp	0.067 hours
Unit receding limb, Tr	0.267 hours
Total unit time, Tb	0.333 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#7

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.100 hours
Area (User Defined)	0.370 acres

Computational Time Increment	0.013 hours
Time to Peak (Computed)	12.120 hours
Flow (Peak, Computed)	0.66 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.61 ft ³ /s

Drainage Area	
SCS CN (Composite)	61.000
Area (User Defined)	0.370 acres
Maximum Retention (Pervious)	6.4 in
Maximum Retention (Pervious, 20 percent)	1.3 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.4 in
Runoff Volume (Pervious)	0.044 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.044 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.100 hours
Computational Time Increment	0.013 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#7

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	4.19 ft ³ /s
Unit peak time, Tp	0.067 hours
Unit receding limb, Tr	0.267 hours
Total unit time, Tb	0.333 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#7

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.100 hours
Area (User Defined)	0.370 acres
<hr/>	
Computational Time Increment	0.013 hours
Time to Peak (Computed)	12.120 hours
Flow (Peak, Computed)	1.79 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	1.71 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	61.000
Area (User Defined)	0.370 acres
Maximum Retention (Pervious)	6.4 in
Maximum Retention (Pervious, 20 percent)	1.3 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.7 in
Runoff Volume (Pervious)	0.113 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.113 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.100 hours
Computational Time Increment	0.013 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#7

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	4.19 ft ³ /s
Unit peak time, Tp	0.067 hours
Unit receding limb, Tr	0.267 hours
Total unit time, Tb	0.333 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#7 - IMP

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

Storm Event	NOAA 2 yr
Return Event	2 years
Duration	100.000 hours
Depth	3.4 in
Time of Concentration (Composite)	0.050 hours
Area (User Defined)	0.610 acres
<hr/>	
Computational Time Increment	0.007 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	2.38 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	2.38 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.610 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.1 in
Runoff Volume (Pervious)	0.160 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.160 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.050 hours
Computational Time Increment	0.007 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#7 - IMP

Scenario: Post-Development 2

Return Event: 2 years

Storm Event: NOAA 2 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	13.82 ft ³ /s
Unit peak time, Tp	0.033 hours
Unit receding limb, Tr	0.133 hours
Total unit time, Tb	0.167 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#7 - IMP

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

Storm Event	NOAA 10 yr
Return Event	10 years
Duration	100.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.050 hours
Area (User Defined)	0.610 acres
<hr/>	
Computational Time Increment	0.007 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	3.59 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	3.59 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.610 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.8 in
Runoff Volume (Pervious)	0.246 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.246 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.050 hours
Computational Time Increment	0.007 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#7 - IMP

Scenario: Post-Development 10

Return Event: 10 years

Storm Event: NOAA 10 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	13.82 ft ³ /s
Unit peak time, Tp	0.033 hours
Unit receding limb, Tr	0.133 hours
Total unit time, Tb	0.167 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#7 - IMP

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Storm Event	NOAA 100 yr
Return Event	100 years
Duration	100.000 hours
Depth	8.3 in
Time of Concentration (Composite)	0.050 hours
Area (User Defined)	0.610 acres
<hr/>	
Computational Time Increment	0.007 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	5.88 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	5.88 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.610 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	8.0 in
Runoff Volume (Pervious)	0.409 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.409 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.050 hours
Computational Time Increment	0.007 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#7 - IMP

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

SCS Unit Hydrograph Parameters

Unit peak, qp	13.82 ft ³ /s
Unit peak time, Tp	0.033 hours
Unit receding limb, Tr	0.133 hours
Total unit time, Tb	0.167 hours

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Outlet Input Data

Label: OS #3

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Requested Pond Water Surface Elevations	
Minimum (Headwater)	333.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	338.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - 1	Forward	TW	333.25	338.00
Rectangular Weir	Weir - 1	Forward	TW	336.25	338.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Outlet Input Data

Label: OS #3

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Structure ID: Orifice - 1	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	333.25 ft
Orifice Diameter	2.5 in
Orifice Coefficient	0.680

Structure ID: Weir - 1	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	336.25 ft
Weir Length	4.00 ft
Weir Coefficient	3.15 (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)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Composite Rating Curve

Label: OS #3

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)	Contributing Structures
333.00	0.00	(N/A)	0.00	None Contributing
333.25	0.00	(N/A)	0.00	None Contributing
333.50	0.07	(N/A)	0.00	Orifice - 1
334.00	0.15	(N/A)	0.00	Orifice - 1
334.50	0.20	(N/A)	0.00	Orifice - 1
335.00	0.24	(N/A)	0.00	Orifice - 1
335.50	0.27	(N/A)	0.00	Orifice - 1
336.00	0.30	(N/A)	0.00	Orifice - 1
336.25	0.32	(N/A)	0.00	Orifice - 1 + Weir - 1
336.50	1.90	(N/A)	0.00	Orifice - 1 + Weir - 1
337.00	8.54	(N/A)	0.00	Orifice - 1 + Weir - 1
337.50	17.99	(N/A)	0.00	Orifice - 1 + Weir - 1
338.00	29.57	(N/A)	0.00	Orifice - 1 + Weir - 1

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Outlet Input Data

Label: OS #3A

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Requested Pond Water Surface Elevations	
Minimum (Headwater)	338.50 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	342.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Rectangular Weir Tailwater Settings	Weir - 1 Tailwater	Forward	TW	340.25 (N/A)	342.00 (N/A)

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Outlet Input Data

Label: OS #3A

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Structure ID: Weir - 1	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	340.25 ft
Weir Length	2.00 ft
Weir Coefficient	3.15 (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)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Composite Rating Curve

Label: OS #3A

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)	Contributing Structures
338.50	0.00	(N/A)	0.00	None Contributing
339.00	0.00	(N/A)	0.00	None Contributing
339.50	0.00	(N/A)	0.00	None Contributing
340.00	0.00	(N/A)	0.00	None Contributing
340.25	0.00	(N/A)	0.00	Weir - 1
340.50	0.79	(N/A)	0.00	Weir - 1
341.00	4.09	(N/A)	0.00	Weir - 1
341.50	8.80	(N/A)	0.00	Weir - 1
342.00	14.58	(N/A)	0.00	Weir - 1

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Outlet Input Data

Label: OS #4

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Requested Pond Water Surface Elevations	
Minimum (Headwater)	313.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	318.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - 1	Forward	TW	313.25	318.00
Rectangular Weir	Weir - 1	Forward	TW	316.25	318.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Outlet Input Data

Label: OS #4

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Structure ID: Orifice - 1	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	313.25 ft
Orifice Diameter	2.5 in
Orifice Coefficient	0.680

Structure ID: Weir - 1	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	316.25 ft
Weir Length	2.75 ft
Weir Coefficient	3.15 (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)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Composite Rating Curve

Label: OS #4

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)	Contributing Structures
313.00	0.00	(N/A)	0.00	None Contributing
313.25	0.00	(N/A)	0.00	None Contributing
313.50	0.07	(N/A)	0.00	Orifice - 1
314.00	0.15	(N/A)	0.00	Orifice - 1
314.50	0.20	(N/A)	0.00	Orifice - 1
315.00	0.24	(N/A)	0.00	Orifice - 1
315.50	0.27	(N/A)	0.00	Orifice - 1
316.00	0.30	(N/A)	0.00	Orifice - 1
316.25	0.32	(N/A)	0.00	Orifice - 1 + Weir - 1
316.50	1.41	(N/A)	0.00	Orifice - 1 + Weir - 1
317.00	5.98	(N/A)	0.00	Orifice - 1 + Weir - 1
317.50	12.48	(N/A)	0.00	Orifice - 1 + Weir - 1
318.00	20.45	(N/A)	0.00	Orifice - 1 + Weir - 1

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Outlet Input Data

Label: OS #5

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Requested Pond Water Surface Elevations

Minimum (Headwater)	311.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	319.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - 1	Forward	TW	311.25	319.00
Rectangular Weir	Weir - 1	Forward	TW	314.40	319.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Outlet Input Data

Label: OS #5

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Structure ID: Orifice - 1	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	311.25 ft
Orifice Diameter	2.5 in
Orifice Coefficient	0.680
Structure ID: Weir - 1	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	314.40 ft
Weir Length	3.50 ft
Weir Coefficient	3.15 (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)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Composite Rating Curve

Label: OS #5

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)	Contributing Structures
311.00	0.00	(N/A)	0.00	None Contributing
311.25	0.00	(N/A)	0.00	None Contributing
311.50	0.07	(N/A)	0.00	Orifice - 1
312.00	0.15	(N/A)	0.00	Orifice - 1
312.50	0.20	(N/A)	0.00	Orifice - 1
313.00	0.24	(N/A)	0.00	Orifice - 1
313.50	0.27	(N/A)	0.00	Orifice - 1
314.00	0.30	(N/A)	0.00	Orifice - 1
314.40	0.32	(N/A)	0.00	Orifice - 1 + Weir - 1
314.50	0.68	(N/A)	0.00	Orifice - 1 + Weir - 1
315.00	5.48	(N/A)	0.00	Orifice - 1 + Weir - 1
315.50	13.10	(N/A)	0.00	Orifice - 1 + Weir - 1
316.00	22.71	(N/A)	0.00	Orifice - 1 + Weir - 1
316.50	33.97	(N/A)	0.00	Orifice - 1 + Weir - 1
317.00	46.66	(N/A)	0.00	Orifice - 1 + Weir - 1
317.50	60.64	(N/A)	0.00	Orifice - 1 + Weir - 1
318.00	75.79	(N/A)	0.00	Orifice - 1 + Weir - 1
318.50	92.03	(N/A)	0.00	Orifice - 1 + Weir - 1
319.00	109.29	(N/A)	0.00	Orifice - 1 + Weir - 1

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Outlet Input Data

Label: OS #6

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Requested Pond Water Surface Elevations

Minimum (Headwater)	312.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	318.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - 1	Forward	TW	312.25	318.00
Orifice-Circular	Orifice - 2	Forward	TW	315.45	318.00
Rectangular Weir	Weir - 1	Forward	TW	316.00	318.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Outlet Input Data

Label: OS #6

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Structure ID: Orifice - 1	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	312.25 ft
Orifice Diameter	2.5 in
Orifice Coefficient	0.680
Structure ID: Orifice - 2	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	315.45 ft
Orifice Diameter	6.0 in
Orifice Coefficient	0.680
Structure ID: Weir - 1	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	316.00 ft
Weir Length	4.00 ft
Weir Coefficient	3.15 (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)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Composite Rating Curve

Label: OS #6

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)	Contributing Structures
312.00	0.00	(N/A)	0.00	None Contributing
312.25	0.00	(N/A)	0.00	None Contributing
312.50	0.07	(N/A)	0.00	Orifice - 1
313.00	0.15	(N/A)	0.00	Orifice - 1
313.50	0.20	(N/A)	0.00	Orifice - 1
314.00	0.24	(N/A)	0.00	Orifice - 1
314.50	0.27	(N/A)	0.00	Orifice - 1
315.00	0.30	(N/A)	0.00	Orifice - 1
315.45	0.33	(N/A)	0.00	Orifice - 1
315.50	0.34	(N/A)	0.00	Orifice - 1 + Orifice - 2
316.00	0.94	(N/A)	0.00	Orifice - 1 + Orifice - 2 + Weir - 1
316.50	5.79	(N/A)	0.00	Orifice - 1 + Orifice - 2 + Weir - 1
317.00	14.22	(N/A)	0.00	Orifice - 1 + Orifice - 2 + Weir - 1
317.50	25.01	(N/A)	0.00	Orifice - 1 + Orifice - 2 + Weir - 1
318.00	37.70	(N/A)	0.00	Orifice - 1 + Orifice - 2 + Weir - 1

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Outlet Input Data

Label: OS #7

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Requested Pond Water Surface Elevations	
Minimum (Headwater)	304.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	310.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - 1	Forward	TW	304.25	310.00
Rectangular Weir	Weir - 1	Forward	TW	307.50	310.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Outlet Input Data

Label: OS #7

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Structure ID: Orifice - 1	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	304.25 ft
Orifice Diameter	2.5 in
Orifice Coefficient	0.680

Structure ID: Weir - 1	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	307.50 ft
Weir Length	1.25 ft
Weir Coefficient	3.15 (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)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Composite Rating Curve

Label: OS #7

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)	Contributing Structures
304.00	0.00	(N/A)	0.00	None Contributing
304.25	0.00	(N/A)	0.00	None Contributing
304.50	0.07	(N/A)	0.00	Orifice - 1
305.00	0.15	(N/A)	0.00	Orifice - 1
305.50	0.20	(N/A)	0.00	Orifice - 1
306.00	0.24	(N/A)	0.00	Orifice - 1
306.50	0.27	(N/A)	0.00	Orifice - 1
307.00	0.30	(N/A)	0.00	Orifice - 1
307.50	0.33	(N/A)	0.00	Orifice - 1 + Weir - 1
308.00	1.75	(N/A)	0.00	Orifice - 1 + Weir - 1
308.50	4.32	(N/A)	0.00	Orifice - 1 + Weir - 1
309.00	7.63	(N/A)	0.00	Orifice - 1 + Weir - 1
309.50	11.56	(N/A)	0.00	Orifice - 1 + Weir - 1
310.00	16.01	(N/A)	0.00	Orifice - 1 + Weir - 1

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Elevation-Volume-Flow Table (Pond)

Label: BASIN #3

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	333.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (acres)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
333.00	0.00	0.000	0.000	0.00	0.00	0.00
333.25	0.00	0.009	0.048	0.00	0.00	4.33
333.50	0.07	0.021	0.048	0.00	0.07	10.22
334.00	0.15	0.044	0.046	0.00	0.15	21.63
334.50	0.20	0.062	0.027	0.00	0.20	30.41
335.00	0.24	0.082	0.051	0.00	0.24	39.76
335.50	0.27	0.115	0.083	0.00	0.27	55.92
336.00	0.30	0.166	0.123	0.00	0.30	80.76
336.25	0.32	0.198	0.130	0.00	0.32	96.10
336.50	1.90	0.231	0.138	0.00	1.90	113.92
337.00	8.54	0.304	0.154	0.00	8.54	155.84
337.50	17.99	0.385	0.170	0.00	17.99	204.50
338.00	29.57	0.475	0.188	0.00	29.57	259.44

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Elevation-Volume-Flow Table (Pond)

Label: BASIN #3A

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	1.0000 in/h

Initial Conditions	
Elevation (Water Surface, Initial)	338.50 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (acres)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
338.50	0.00	0.000	0.000	0.00	0.00	0.00
339.00	0.00	0.002	0.005	0.01	0.01	0.86
339.50	0.00	0.006	0.010	0.01	0.01	2.68
340.00	0.00	0.012	0.015	0.02	0.02	5.64
340.25	0.00	0.016	0.017	0.02	0.02	7.61
340.50	0.79	0.020	0.020	0.02	0.81	10.67
341.00	4.09	0.032	0.026	0.03	4.12	19.55
341.50	8.80	0.047	0.033	0.03	8.84	31.34
342.00	14.58	0.065	0.040	0.04	14.63	45.90

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Elevation-Volume-Flow Table (Pond)

Label: BASIN #4

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Infiltration	
Infiltration Method (Computed)	No Infiltration
Initial Conditions	
Elevation (Water Surface, Initial)	313.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (acres)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
313.00	0.00	0.000	0.000	0.00	0.00	0.00
313.25	0.00	0.011	0.062	0.00	0.00	5.57
313.50	0.07	0.027	0.061	0.00	0.07	13.11
314.00	0.15	0.057	0.059	0.00	0.15	27.73
314.50	0.20	0.080	0.034	0.00	0.20	38.90
315.00	0.24	0.104	0.065	0.00	0.24	50.69
315.50	0.27	0.146	0.105	0.00	0.27	71.13
316.00	0.30	0.211	0.156	0.00	0.30	102.61
316.25	0.32	0.251	0.162	0.00	0.32	121.83
316.50	1.41	0.292	0.167	0.00	1.41	142.83
317.00	5.98	0.379	0.179	0.00	5.98	189.29
317.50	12.48	0.471	0.191	0.00	12.48	240.53
318.00	20.45	0.570	0.203	0.00	20.45	296.15

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Elevation-Volume-Flow Table (Pond)

Label: BASIN #5

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	311.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (acres)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
311.00	0.00	0.000	0.000	0.00	0.00	0.00
311.25	0.00	0.021	0.115	0.00	0.00	10.25
311.50	0.07	0.050	0.113	0.00	0.07	24.10
312.00	0.15	0.105	0.109	0.00	0.15	51.02
312.50	0.20	0.148	0.063	0.00	0.20	71.63
313.00	0.24	0.193	0.120	0.00	0.24	93.47
313.50	0.27	0.271	0.196	0.00	0.27	131.41
314.00	0.30	0.392	0.290	0.00	0.30	189.87
314.40	0.32	0.510	0.303	0.00	0.32	247.27
314.50	0.68	0.541	0.306	0.00	0.68	262.36
315.00	5.48	0.698	0.323	0.00	5.48	343.23
315.50	13.10	0.863	0.340	0.00	13.10	430.97
316.00	22.71	1.038	0.357	0.00	22.71	524.86
316.50	33.97	1.220	0.375	0.00	33.97	624.64
317.00	46.66	1.412	0.393	0.00	46.66	730.16
317.50	60.64	1.613	0.411	0.00	60.64	841.38
318.00	75.79	1.823	0.430	0.00	75.79	958.30
318.50	92.03	2.043	0.449	0.00	92.03	1,080.92
319.00	109.29	2.273	0.469	0.00	109.29	1,209.29

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Elevation-Volume-Flow Table (Pond)

Label: BASIN #6

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	312.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (acres)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
312.00	0.00	0.000	0.000	0.00	0.00	0.00
312.25	0.00	0.002	0.012	0.00	0.00	1.06
312.50	0.07	0.005	0.012	0.00	0.07	2.54
313.00	0.15	0.011	0.011	0.00	0.15	5.35
313.50	0.20	0.015	0.006	0.00	0.20	7.43
314.00	0.24	0.019	0.012	0.00	0.24	9.58
314.50	0.27	0.027	0.019	0.00	0.27	13.34
315.00	0.30	0.039	0.029	0.00	0.30	19.19
315.45	0.33	0.053	0.034	0.00	0.33	26.09
315.50	0.34	0.055	0.035	0.00	0.34	26.93
316.00	0.94	0.074	0.041	0.00	0.94	36.69
316.50	5.79	0.096	0.048	0.00	5.79	52.24
317.00	14.22	0.121	0.055	0.00	14.22	73.01
317.50	25.01	0.151	0.062	0.00	25.01	97.89
318.00	37.70	0.184	0.070	0.00	37.70	126.55

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Elevation-Volume-Flow Table (Pond)

Label: BASIN #7

Scenario: Post-Development 100

Return Event: 100 years

Storm Event: NOAA 100 yr

Infiltration	
Infiltration Method (Computed)	No Infiltration
Initial Conditions	
Elevation (Water Surface, Initial)	304.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (acres)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
304.00	0.00	0.000	0.000	0.00	0.00	0.00
304.25	0.00	0.001	0.007	0.00	0.00	0.61
304.50	0.07	0.003	0.007	0.00	0.07	1.49
305.00	0.15	0.006	0.006	0.00	0.15	3.09
305.50	0.20	0.009	0.004	0.00	0.20	4.34
306.00	0.24	0.011	0.007	0.00	0.24	5.73
306.50	0.27	0.016	0.012	0.00	0.27	8.05
307.00	0.30	0.023	0.017	0.00	0.30	11.52
307.50	0.33	0.033	0.023	0.00	0.33	16.38
308.00	1.75	0.046	0.030	0.00	1.75	24.19
308.50	4.32	0.063	0.037	0.00	4.32	34.91
309.00	7.63	0.084	0.046	0.00	7.63	48.30
309.50	11.56	0.109	0.055	0.00	11.56	64.40
310.00	16.01	0.139	0.065	0.00	16.01	83.36

1114-02 - PROPOSED CONDITIONS ROUTINGS

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WATER QUALITY CALCULATIONS - APPENDIX C

WATER QUALITY CALCULATIONS – APPENDIX C-1
WATER QUALITY DESIGN FLOOD ROUTINGS

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1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
PR - DA#2A	Post-Water Quality Storm	1	0.000	0.050	0.00
PR DA#1	Post-Water Quality Storm	1	0.000	0.050	0.00
PR DA#1 - IMP	Post-Water Quality Storm	1	0.052	1.050	1.84
PR DA#2	Post-Water Quality Storm	1	0.000	0.050	0.00
PR DA#2A - IMP	Post-Water Quality Storm	1	0.115	1.050	4.02
PR DA#3	Post-Water Quality Storm	1	0.000	0.050	0.00
PR DA#3 - IMP	Post-Water Quality Storm	1	0.069	1.050	2.41
PR DA#3A	Post-Water Quality Storm	1	0.000	0.050	0.00
PR DA#3A - IMP	Post-Water Quality Storm	1	0.010	1.050	0.36
PR DA#4	Post-Water Quality Storm	1	0.000	0.050	0.00
PR DA#4 - IMP	Post-Water Quality Storm	1	0.091	1.050	3.17
PR DA#5	Post-Water Quality Storm	1	0.000	0.050	0.00
PR DA#5 - IMP	Post-Water Quality Storm	1	0.516	1.050	18.05
PR DA#6	Post-Water Quality Storm	1	0.000	0.050	0.00
PR DA#6 - IMP	Post-Water Quality Storm	1	0.077	1.050	2.72
PR DA#7	Post-Water Quality Storm	1	0.000	0.050	0.00
PR DA#7 - IMP	Post-Water Quality Storm	1	0.053	1.050	1.84

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
POA-A	Post-Water Quality Storm	1	0.811	1.050	2.79
POA-B	Post-Water Quality Storm	1	0.115	1.050	4.02

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Master Network Summary

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)
BASIN #3 (IN)	Post-Water Quality Storm	1	0.069	1.050	2.41	(N/A)	(N/A)
BASIN #3 (OUT)	Post-Water Quality Storm	1	0.060	1.700	0.18	334.34	0.058
BASIN #3A (IN)	Post-Water Quality Storm	1	0.010	1.050	0.36	(N/A)	(N/A)
BASIN #3A (OUT)	Post-Water Quality Storm	1	0.000	0.350	0.00	339.81	0.009
BASIN #4 (IN)	Post-Water Quality Storm	1	0.091	1.050	3.17	(N/A)	(N/A)
BASIN #4 (OUT)	Post-Water Quality Storm	1	0.079	1.650	0.19	314.44	0.078
BASIN #5 (IN)	Post-Water Quality Storm	1	0.576	1.050	18.15	(N/A)	(N/A)
BASIN #5 (OUT)	Post-Water Quality Storm	1	0.554	1.950	0.32	314.37	0.502
BASIN #6 (IN)	Post-Water Quality Storm	1	0.077	1.050	2.72	(N/A)	(N/A)
BASIN #6 (OUT)	Post-Water Quality Storm	1	0.075	1.300	0.33	315.43	0.053
BASIN #7 (IN)	Post-Water Quality Storm	1	0.053	1.050	1.84	(N/A)	(N/A)
BASIN #7 (OUT)	Post-Water Quality Storm	1	0.051	1.200	0.32	307.45	0.032

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Return Event: 1 years

Label: PR - DA#2A

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Storm Event	Water Quality Storm
Return Event	1 years
Duration	100.000 hours
Depth	1.3 in
Time of Concentration (Composite)	0.210 hours
Area (User Defined)	1.370 acres
<hr/>	
Computational Time Increment	0.028 hours
Time to Peak (Computed)	0.000 hours
Flow (Peak, Computed)	0.00 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	0.050 hours
Flow (Peak Interpolated Output)	0.00 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	59.000
Area (User Defined)	1.370 acres
Maximum Retention (Pervious)	6.9 in
Maximum Retention (Pervious, 20 percent)	1.4 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.0 in
Runoff Volume (Pervious)	0.000 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.000 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.210 hours
Computational Time Increment	0.028 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR - DA#2A

Scenario: Post-Water Quality Storm

Return Event: 1 years

Storm Event: Water Quality Storm

SCS Unit Hydrograph Parameters

Receding/Rising, Tr/Tp	1.670
Unit peak, qp	7.39 ft ³ /s
Unit peak time, Tp	0.140 hours
Unit receding limb, Tr	0.560 hours
Total unit time, Tb	0.700 hours

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Return Event: 1 years

Label: PR DA#1

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Storm Event	Water Quality Storm
Return Event	1 years
Duration	100.000 hours
Depth	1.3 in
Time of Concentration (Composite)	0.430 hours
Area (User Defined)	9.320 acres
<hr/>	
Computational Time Increment	0.057 hours
Time to Peak (Computed)	0.000 hours
Flow (Peak, Computed)	0.00 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	0.050 hours
Flow (Peak Interpolated Output)	0.00 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	55.000
Area (User Defined)	9.320 acres
Maximum Retention (Pervious)	8.2 in
Maximum Retention (Pervious, 20 percent)	1.6 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.0 in
Runoff Volume (Pervious)	0.000 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.000 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.430 hours
Computational Time Increment	0.057 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#1

Scenario: Post-Water Quality Storm

Return Event: 1 years

Storm Event: Water Quality Storm

SCS Unit Hydrograph Parameters

Receding/Rising, Tr/Tp	1.670
Unit peak, qp	24.56 ft ³ /s
Unit peak time, Tp	0.287 hours
Unit receding limb, Tr	1.147 hours
Total unit time, Tb	1.433 hours

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Return Event: 1 years

Label: PR DA#1 - IMP

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Storm Event	Water Quality Storm
Return Event	1 years
Duration	100.000 hours
Depth	1.3 in
Time of Concentration (Composite)	0.020 hours
Area (User Defined)	0.600 acres
<hr/>	
Computational Time Increment	0.003 hours
Time to Peak (Computed)	1.083 hours
Flow (Peak, Computed)	1.86 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	1.050 hours
Flow (Peak Interpolated Output)	1.84 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.600 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.0 in
Runoff Volume (Pervious)	0.052 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.052 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.020 hours
Computational Time Increment	0.003 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#1 - IMP

Scenario: Post-Water Quality Storm

Return Event: 1 years

Storm Event: Water Quality Storm

SCS Unit Hydrograph Parameters

Receding/Rising, Tr/Tp	1.670
Unit peak, qp	33.99 ft ³ /s
Unit peak time, Tp	0.013 hours
Unit receding limb, Tr	0.053 hours
Total unit time, Tb	0.067 hours

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Return Event: 1 years

Label: PR DA#2

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Storm Event	Water Quality Storm
Return Event	1 years
Duration	100.000 hours
Depth	1.3 in
Time of Concentration (Composite)	0.310 hours
Area (User Defined)	3.340 acres
<hr/>	
Computational Time Increment	0.041 hours
Time to Peak (Computed)	0.000 hours
Flow (Peak, Computed)	0.00 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	0.050 hours
Flow (Peak Interpolated Output)	0.00 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	57.000
Area (User Defined)	3.340 acres
Maximum Retention (Pervious)	7.5 in
Maximum Retention (Pervious, 20 percent)	1.5 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.0 in
Runoff Volume (Pervious)	0.000 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.000 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.310 hours
Computational Time Increment	0.041 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#2

Scenario: Post-Water Quality Storm

Return Event: 1 years

Storm Event: Water Quality Storm

SCS Unit Hydrograph Parameters

Receding/Rising, Tr/Tp	1.670
Unit peak, qp	12.21 ft ³ /s
Unit peak time, Tp	0.207 hours
Unit receding limb, Tr	0.827 hours
Total unit time, Tb	1.033 hours

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Return Event: 1 years

Label: PR DA#2A - IMP

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Storm Event	Water Quality Storm
Return Event	1 years
Duration	100.000 hours
Depth	1.3 in
Time of Concentration (Composite)	0.030 hours
Area (User Defined)	1.320 acres
<hr/>	
Computational Time Increment	0.004 hours
Time to Peak (Computed)	1.080 hours
Flow (Peak, Computed)	4.07 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	1.050 hours
Flow (Peak Interpolated Output)	4.02 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	1.320 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.0 in
Runoff Volume (Pervious)	0.114 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.115 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.030 hours
Computational Time Increment	0.004 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Return Event: 1 years

Label: PR DA#2A - IMP

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

SCS Unit Hydrograph Parameters

Receding/Rising, Tr/Tp	1.670
Unit peak, qp	49.85 ft ³ /s
Unit peak time, Tp	0.020 hours
Unit receding limb, Tr	0.080 hours
Total unit time, Tb	0.100 hours

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Return Event: 1 years

Label: PR DA#3

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Storm Event	Water Quality Storm
Return Event	1 years
Duration	100.000 hours
Depth	1.3 in
Time of Concentration (Composite)	0.180 hours
Area (User Defined)	0.810 acres
<hr/>	
Computational Time Increment	0.024 hours
Time to Peak (Computed)	0.000 hours
Flow (Peak, Computed)	0.00 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	0.050 hours
Flow (Peak Interpolated Output)	0.00 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	61.000
Area (User Defined)	0.810 acres
Maximum Retention (Pervious)	6.4 in
Maximum Retention (Pervious, 20 percent)	1.3 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.0 in
Runoff Volume (Pervious)	0.000 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.000 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.180 hours
Computational Time Increment	0.024 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3

Scenario: Post-Water Quality Storm

Return Event: 1 years

Storm Event: Water Quality Storm

SCS Unit Hydrograph Parameters

Receding/Rising, Tr/Tp	1.670
Unit peak, qp	5.10 ft ³ /s
Unit peak time, Tp	0.120 hours
Unit receding limb, Tr	0.480 hours
Total unit time, Tb	0.600 hours

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Return Event: 1 years

Label: PR DA#3 - IMP

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Storm Event	Water Quality Storm
Return Event	1 years
Duration	100.000 hours
Depth	1.3 in
Time of Concentration (Composite)	0.050 hours
Area (User Defined)	0.800 acres
<hr/>	
Computational Time Increment	0.007 hours
Time to Peak (Computed)	1.080 hours
Flow (Peak, Computed)	2.45 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	1.050 hours
Flow (Peak Interpolated Output)	2.41 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.800 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.0 in
Runoff Volume (Pervious)	0.069 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.069 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.050 hours
Computational Time Increment	0.007 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3 - IMP

Scenario: Post-Water Quality Storm

Return Event: 1 years

Storm Event: Water Quality Storm

SCS Unit Hydrograph Parameters

Receding/Rising, Tr/Tp	1.670
Unit peak, qp	18.13 ft ³ /s
Unit peak time, Tp	0.033 hours
Unit receding limb, Tr	0.133 hours
Total unit time, Tb	0.167 hours

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Return Event: 1 years

Label: PR DA#3A

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Storm Event	Water Quality Storm
Return Event	1 years
Duration	100.000 hours
Depth	1.3 in
Time of Concentration (Composite)	0.190 hours
Area (User Defined)	0.870 acres
<hr/>	
Computational Time Increment	0.025 hours
Time to Peak (Computed)	0.000 hours
Flow (Peak, Computed)	0.00 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	0.050 hours
Flow (Peak Interpolated Output)	0.00 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	56.000
Area (User Defined)	0.870 acres
Maximum Retention (Pervious)	7.9 in
Maximum Retention (Pervious, 20 percent)	1.6 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.0 in
Runoff Volume (Pervious)	0.000 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.000 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.190 hours
Computational Time Increment	0.025 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3A

Scenario: Post-Water Quality Storm

Return Event: 1 years

Storm Event: Water Quality Storm

SCS Unit Hydrograph Parameters

Receding/Rising, Tr/Tp	1.670
Unit peak, qp	5.19 ft ³ /s
Unit peak time, Tp	0.127 hours
Unit receding limb, Tr	0.507 hours
Total unit time, Tb	0.633 hours

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Return Event: 1 years

Label: PR DA#3A - IMP

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Storm Event	Water Quality Storm
Return Event	1 years
Duration	100.000 hours
Depth	1.3 in
Time of Concentration (Composite)	0.040 hours
Area (User Defined)	0.120 acres
<hr/>	
Computational Time Increment	0.005 hours
Time to Peak (Computed)	1.083 hours
Flow (Peak, Computed)	0.37 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	1.050 hours
Flow (Peak Interpolated Output)	0.36 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.120 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.0 in
Runoff Volume (Pervious)	0.010 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.010 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.040 hours
Computational Time Increment	0.005 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3A - IMP

Scenario: Post-Water Quality Storm

Return Event: 1 years

Storm Event: Water Quality Storm

SCS Unit Hydrograph Parameters

Receding/Rising, Tr/Tp	1.670
Unit peak, qp	3.40 ft ³ /s
Unit peak time, Tp	0.027 hours
Unit receding limb, Tr	0.107 hours
Total unit time, Tb	0.133 hours

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Return Event: 1 years

Label: PR DA#4

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Storm Event	Water Quality Storm
Return Event	1 years
Duration	100.000 hours
Depth	1.3 in
Time of Concentration (Composite)	0.190 hours
Area (User Defined)	1.000 acres
<hr/>	
Computational Time Increment	0.025 hours
Time to Peak (Computed)	0.000 hours
Flow (Peak, Computed)	0.00 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	0.050 hours
Flow (Peak Interpolated Output)	0.00 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	56.000
Area (User Defined)	1.000 acres
Maximum Retention (Pervious)	7.9 in
Maximum Retention (Pervious, 20 percent)	1.6 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.0 in
Runoff Volume (Pervious)	0.000 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.000 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.190 hours
Computational Time Increment	0.025 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#4

Scenario: Post-Water Quality Storm

Return Event: 1 years

Storm Event: Water Quality Storm

SCS Unit Hydrograph Parameters

Receding/Rising, Tr/Tp	1.670
Unit peak, qp	5.96 ft ³ /s
Unit peak time, Tp	0.127 hours
Unit receding limb, Tr	0.507 hours
Total unit time, Tb	0.633 hours

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Return Event: 1 years

Label: PR DA#4 - IMP

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Storm Event	Water Quality Storm
Return Event	1 years
Duration	100.000 hours
Depth	1.3 in
Time of Concentration (Composite)	0.050 hours
Area (User Defined)	1.050 acres
<hr/>	
Computational Time Increment	0.007 hours
Time to Peak (Computed)	1.080 hours
Flow (Peak, Computed)	3.22 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	1.050 hours
Flow (Peak Interpolated Output)	3.17 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	1.050 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.0 in
Runoff Volume (Pervious)	0.091 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.091 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.050 hours
Computational Time Increment	0.007 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#4 - IMP

Scenario: Post-Water Quality Storm

Return Event: 1 years

Storm Event: Water Quality Storm

SCS Unit Hydrograph Parameters

Receding/Rising, Tr/Tp	1.670
Unit peak, qp	23.79 ft ³ /s
Unit peak time, Tp	0.033 hours
Unit receding limb, Tr	0.133 hours
Total unit time, Tb	0.167 hours

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Return Event: 1 years

Label: PR DA#5

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Storm Event	Water Quality Storm
Return Event	1 years
Duration	100.000 hours
Depth	1.3 in
Time of Concentration (Composite)	0.170 hours
Area (User Defined)	1.030 acres
<hr/>	
Computational Time Increment	0.023 hours
Time to Peak (Computed)	0.000 hours
Flow (Peak, Computed)	0.00 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	0.050 hours
Flow (Peak Interpolated Output)	0.00 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	61.000
Area (User Defined)	1.030 acres
Maximum Retention (Pervious)	6.4 in
Maximum Retention (Pervious, 20 percent)	1.3 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.0 in
Runoff Volume (Pervious)	0.000 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.000 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.170 hours
Computational Time Increment	0.023 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Return Event: 1 years

Label: PR DA#5

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

SCS Unit Hydrograph Parameters

Receding/Rising, Tr/Tp	1.670
Unit peak, qp	6.86 ft ³ /s
Unit peak time, Tp	0.113 hours
Unit receding limb, Tr	0.453 hours
Total unit time, Tb	0.567 hours

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Return Event: 1 years

Label: PR DA#5 - IMP

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Storm Event	Water Quality Storm
Return Event	1 years
Duration	100.000 hours
Depth	1.3 in
Time of Concentration (Composite)	0.030 hours
Area (User Defined)	5.920 acres
<hr/>	
Computational Time Increment	0.004 hours
Time to Peak (Computed)	1.080 hours
Flow (Peak, Computed)	18.25 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	1.050 hours
Flow (Peak Interpolated Output)	18.05 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	5.920 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.0 in
Runoff Volume (Pervious)	0.510 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.516 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.030 hours
Computational Time Increment	0.004 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#5 - IMP

Scenario: Post-Water Quality Storm

Return Event: 1 years

Storm Event: Water Quality Storm

SCS Unit Hydrograph Parameters

Receding/Rising, Tr/Tp	1.670
Unit peak, qp	223.59 ft ³ /s
Unit peak time, Tp	0.020 hours
Unit receding limb, Tr	0.080 hours
Total unit time, Tb	0.100 hours

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Return Event: 1 years

Label: PR DA#6

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Storm Event	Water Quality Storm
Return Event	1 years
Duration	100.000 hours
Depth	1.3 in
Time of Concentration (Composite)	0.060 hours
Area (User Defined)	0.440 acres
<hr/>	
Computational Time Increment	0.008 hours
Time to Peak (Computed)	0.000 hours
Flow (Peak, Computed)	0.00 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	0.050 hours
Flow (Peak Interpolated Output)	0.00 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	61.000
Area (User Defined)	0.440 acres
Maximum Retention (Pervious)	6.4 in
Maximum Retention (Pervious, 20 percent)	1.3 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.0 in
Runoff Volume (Pervious)	0.000 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.000 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.060 hours
Computational Time Increment	0.008 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#6

Scenario: Post-Water Quality Storm

Return Event: 1 years

Storm Event: Water Quality Storm

SCS Unit Hydrograph Parameters

Receding/Rising, Tr/Tp	1.670
Unit peak, qp	8.31 ft ³ /s
Unit peak time, Tp	0.040 hours
Unit receding limb, Tr	0.160 hours
Total unit time, Tb	0.200 hours

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Return Event: 1 years

Label: PR DA#6 - IMP

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Storm Event	Water Quality Storm
Return Event	1 years
Duration	100.000 hours
Depth	1.3 in
Time of Concentration (Composite)	0.020 hours
Area (User Defined)	0.890 acres
<hr/>	
Computational Time Increment	0.003 hours
Time to Peak (Computed)	1.083 hours
Flow (Peak, Computed)	2.75 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	1.050 hours
Flow (Peak Interpolated Output)	2.72 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.890 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.0 in
Runoff Volume (Pervious)	0.077 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.077 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.020 hours
Computational Time Increment	0.003 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#6 - IMP

Scenario: Post-Water Quality Storm

Return Event: 1 years

Storm Event: Water Quality Storm

SCS Unit Hydrograph Parameters

Receding/Rising, Tr/Tp	1.670
Unit peak, qp	50.42 ft ³ /s
Unit peak time, Tp	0.013 hours
Unit receding limb, Tr	0.053 hours
Total unit time, Tb	0.067 hours

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Return Event: 1 years

Label: PR DA#7

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Storm Event	Water Quality Storm
Return Event	1 years
Duration	100.000 hours
Depth	1.3 in
Time of Concentration (Composite)	0.100 hours
Area (User Defined)	0.370 acres
<hr/>	
Computational Time Increment	0.013 hours
Time to Peak (Computed)	0.000 hours
Flow (Peak, Computed)	0.00 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	0.050 hours
Flow (Peak Interpolated Output)	0.00 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	61.000
Area (User Defined)	0.370 acres
Maximum Retention (Pervious)	6.4 in
Maximum Retention (Pervious, 20 percent)	1.3 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.0 in
Runoff Volume (Pervious)	0.000 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.000 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.100 hours
Computational Time Increment	0.013 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Return Event: 1 years

Label: PR DA#7

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

SCS Unit Hydrograph Parameters

Receding/Rising, Tr/Tp	1.670
Unit peak, qp	4.19 ft ³ /s
Unit peak time, Tp	0.067 hours
Unit receding limb, Tr	0.267 hours
Total unit time, Tb	0.333 hours

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Return Event: 1 years

Label: PR DA#7 - IMP

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Storm Event	Water Quality Storm
Return Event	1 years
Duration	100.000 hours
Depth	1.3 in
Time of Concentration (Composite)	0.050 hours
Area (User Defined)	0.610 acres
<hr/>	
Computational Time Increment	0.007 hours
Time to Peak (Computed)	1.080 hours
Flow (Peak, Computed)	1.87 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	1.050 hours
Flow (Peak Interpolated Output)	1.84 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.610 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.0 in
Runoff Volume (Pervious)	0.053 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.053 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.050 hours
Computational Time Increment	0.007 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Return Event: 1 years

Label: PR DA#7 - IMP

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

SCS Unit Hydrograph Parameters

Receding/Rising, Tr/Tp	1.670
Unit peak, qp	13.82 ft ³ /s
Unit peak time, Tp	0.033 hours
Unit receding limb, Tr	0.133 hours
Total unit time, Tb	0.167 hours

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Outlet Input Data

Label: OS #3

Scenario: Post-Water Quality Storm

Return Event: 1 years

Storm Event: Water Quality Storm

Requested Pond Water Surface Elevations

Minimum (Headwater)	333.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	338.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - 1	Forward	TW	333.25	338.00
Rectangular Weir	Weir - 1	Forward	TW	336.25	338.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Outlet Input Data

Return Event: 1 years

Label: OS #3

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Structure ID: Orifice - 1	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	333.25 ft
Orifice Diameter	2.5 in
Orifice Coefficient	0.680

Structure ID: Weir - 1	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	336.25 ft
Weir Length	4.00 ft
Weir Coefficient	3.15 (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)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Composite Rating Curve

Return Event: 1 years

Label: OS #3

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)	Contributing Structures
333.00	0.00	(N/A)	0.00	None Contributing
333.25	0.00	(N/A)	0.00	None Contributing
333.50	0.07	(N/A)	0.00	Orifice - 1
334.00	0.15	(N/A)	0.00	Orifice - 1
334.50	0.20	(N/A)	0.00	Orifice - 1
335.00	0.24	(N/A)	0.00	Orifice - 1
335.50	0.27	(N/A)	0.00	Orifice - 1
336.00	0.30	(N/A)	0.00	Orifice - 1
336.25	0.32	(N/A)	0.00	Orifice - 1 + Weir - 1
336.50	1.90	(N/A)	0.00	Orifice - 1 + Weir - 1
337.00	8.54	(N/A)	0.00	Orifice - 1 + Weir - 1
337.50	17.99	(N/A)	0.00	Orifice - 1 + Weir - 1
338.00	29.57	(N/A)	0.00	Orifice - 1 + Weir - 1

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Outlet Input Data

Label: OS #3A

Scenario: Post-Water Quality Storm

Return Event: 1 years

Storm Event: Water Quality Storm

Requested Pond Water Surface Elevations

Minimum (Headwater)	338.50 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	342.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Rectangular Weir Tailwater Settings	Weir - 1 Tailwater	Forward	TW	340.25 (N/A)	342.00 (N/A)

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Outlet Input Data

Label: OS #3A

Scenario: Post-Water Quality Storm

Return Event: 1 years

Storm Event: Water Quality Storm

Structure ID: Weir - 1	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	340.25 ft
Weir Length	2.00 ft
Weir Coefficient	3.15 (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)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Composite Rating Curve

Return Event: 1 years

Label: OS #3A

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)	Contributing Structures
338.50	0.00	(N/A)	0.00	None Contributing
339.00	0.00	(N/A)	0.00	None Contributing
339.50	0.00	(N/A)	0.00	None Contributing
340.00	0.00	(N/A)	0.00	None Contributing
340.25	0.00	(N/A)	0.00	Weir - 1
340.50	0.79	(N/A)	0.00	Weir - 1
341.00	4.09	(N/A)	0.00	Weir - 1
341.50	8.80	(N/A)	0.00	Weir - 1
342.00	14.58	(N/A)	0.00	Weir - 1

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Outlet Input Data

Label: OS #4

Scenario: Post-Water Quality Storm

Return Event: 1 years

Storm Event: Water Quality Storm

Requested Pond Water Surface Elevations

Minimum (Headwater)	313.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	318.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - 1	Forward	TW	313.25	318.00
Rectangular Weir	Weir - 1	Forward	TW	316.25	318.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Outlet Input Data

Return Event: 1 years

Label: OS #4

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Structure ID: Orifice - 1	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	313.25 ft
Orifice Diameter	2.5 in
Orifice Coefficient	0.680

Structure ID: Weir - 1	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	316.25 ft
Weir Length	2.75 ft
Weir Coefficient	3.15 (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)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Composite Rating Curve

Return Event: 1 years

Label: OS #4

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)	Contributing Structures
313.00	0.00	(N/A)	0.00	None Contributing
313.25	0.00	(N/A)	0.00	None Contributing
313.50	0.07	(N/A)	0.00	Orifice - 1
314.00	0.15	(N/A)	0.00	Orifice - 1
314.50	0.20	(N/A)	0.00	Orifice - 1
315.00	0.24	(N/A)	0.00	Orifice - 1
315.50	0.27	(N/A)	0.00	Orifice - 1
316.00	0.30	(N/A)	0.00	Orifice - 1
316.25	0.32	(N/A)	0.00	Orifice - 1 + Weir - 1
316.50	1.41	(N/A)	0.00	Orifice - 1 + Weir - 1
317.00	5.98	(N/A)	0.00	Orifice - 1 + Weir - 1
317.50	12.48	(N/A)	0.00	Orifice - 1 + Weir - 1
318.00	20.45	(N/A)	0.00	Orifice - 1 + Weir - 1

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Outlet Input Data

Label: OS #5

Scenario: Post-Water Quality Storm

Return Event: 1 years

Storm Event: Water Quality Storm

Requested Pond Water Surface Elevations

Minimum (Headwater)	311.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	319.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - 1	Forward	TW	311.25	319.00
Rectangular Weir	Weir - 1	Forward	TW	314.40	319.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Outlet Input Data

Return Event: 1 years

Label: OS #5

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Structure ID: Orifice - 1	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	311.25 ft
Orifice Diameter	2.5 in
Orifice Coefficient	0.680

Structure ID: Weir - 1	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	314.40 ft
Weir Length	3.50 ft
Weir Coefficient	3.15 (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)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Composite Rating Curve

Return Event: 1 years

Label: OS #5

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)	Contributing Structures
311.00	0.00	(N/A)	0.00	None Contributing
311.25	0.00	(N/A)	0.00	None Contributing
311.50	0.07	(N/A)	0.00	Orifice - 1
312.00	0.15	(N/A)	0.00	Orifice - 1
312.50	0.20	(N/A)	0.00	Orifice - 1
313.00	0.24	(N/A)	0.00	Orifice - 1
313.50	0.27	(N/A)	0.00	Orifice - 1
314.00	0.30	(N/A)	0.00	Orifice - 1
314.40	0.32	(N/A)	0.00	Orifice - 1 + Weir - 1
314.50	0.68	(N/A)	0.00	Orifice - 1 + Weir - 1
315.00	5.48	(N/A)	0.00	Orifice - 1 + Weir - 1
315.50	13.10	(N/A)	0.00	Orifice - 1 + Weir - 1
316.00	22.71	(N/A)	0.00	Orifice - 1 + Weir - 1
316.50	33.97	(N/A)	0.00	Orifice - 1 + Weir - 1
317.00	46.66	(N/A)	0.00	Orifice - 1 + Weir - 1
317.50	60.64	(N/A)	0.00	Orifice - 1 + Weir - 1
318.00	75.79	(N/A)	0.00	Orifice - 1 + Weir - 1
318.50	92.03	(N/A)	0.00	Orifice - 1 + Weir - 1
319.00	109.29	(N/A)	0.00	Orifice - 1 + Weir - 1

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Outlet Input Data

Label: OS #6

Scenario: Post-Water Quality Storm

Return Event: 1 years

Storm Event: Water Quality Storm

Requested Pond Water Surface Elevations

Minimum (Headwater)	312.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	318.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - 1	Forward	TW	312.25	318.00
Orifice-Circular	Orifice - 2	Forward	TW	315.45	318.00
Rectangular Weir	Weir - 1	Forward	TW	316.00	318.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Outlet Input Data

Label: OS #6

Scenario: Post-Water Quality Storm

Return Event: 1 years

Storm Event: Water Quality Storm

Structure ID: Orifice - 1	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	312.25 ft
Orifice Diameter	2.5 in
Orifice Coefficient	0.680
Structure ID: Orifice - 2	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	315.45 ft
Orifice Diameter	6.0 in
Orifice Coefficient	0.680
Structure ID: Weir - 1	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	316.00 ft
Weir Length	4.00 ft
Weir Coefficient	3.15 (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)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Composite Rating Curve

Return Event: 1 years

Label: OS #6

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)	Contributing Structures
312.00	0.00	(N/A)	0.00	None Contributing
312.25	0.00	(N/A)	0.00	None Contributing
312.50	0.07	(N/A)	0.00	Orifice - 1
313.00	0.15	(N/A)	0.00	Orifice - 1
313.50	0.20	(N/A)	0.00	Orifice - 1
314.00	0.24	(N/A)	0.00	Orifice - 1
314.50	0.27	(N/A)	0.00	Orifice - 1
315.00	0.30	(N/A)	0.00	Orifice - 1
315.45	0.33	(N/A)	0.00	Orifice - 1
315.50	0.34	(N/A)	0.00	Orifice - 1 + Orifice - 2
316.00	0.94	(N/A)	0.00	Orifice - 1 + Orifice - 2 + Weir - 1
316.50	5.79	(N/A)	0.00	Orifice - 1 + Orifice - 2 + Weir - 1
317.00	14.22	(N/A)	0.00	Orifice - 1 + Orifice - 2 + Weir - 1
317.50	25.01	(N/A)	0.00	Orifice - 1 + Orifice - 2 + Weir - 1
318.00	37.70	(N/A)	0.00	Orifice - 1 + Orifice - 2 + Weir - 1

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Outlet Input Data

Label: OS #7

Scenario: Post-Water Quality Storm

Return Event: 1 years

Storm Event: Water Quality Storm

Requested Pond Water Surface Elevations

Minimum (Headwater)	304.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	310.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - 1	Forward	TW	304.25	310.00
Rectangular Weir	Weir - 1	Forward	TW	307.50	310.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Outlet Input Data

Return Event: 1 years

Label: OS #7

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Structure ID: Orifice - 1	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	304.25 ft
Orifice Diameter	2.5 in
Orifice Coefficient	0.680

Structure ID: Weir - 1	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	307.50 ft
Weir Length	1.25 ft
Weir Coefficient	3.15 (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)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Composite Rating Curve

Return Event: 1 years

Label: OS #7

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)	Contributing Structures
304.00	0.00	(N/A)	0.00	None Contributing
304.25	0.00	(N/A)	0.00	None Contributing
304.50	0.07	(N/A)	0.00	Orifice - 1
305.00	0.15	(N/A)	0.00	Orifice - 1
305.50	0.20	(N/A)	0.00	Orifice - 1
306.00	0.24	(N/A)	0.00	Orifice - 1
306.50	0.27	(N/A)	0.00	Orifice - 1
307.00	0.30	(N/A)	0.00	Orifice - 1
307.50	0.33	(N/A)	0.00	Orifice - 1 + Weir - 1
308.00	1.75	(N/A)	0.00	Orifice - 1 + Weir - 1
308.50	4.32	(N/A)	0.00	Orifice - 1 + Weir - 1
309.00	7.63	(N/A)	0.00	Orifice - 1 + Weir - 1
309.50	11.56	(N/A)	0.00	Orifice - 1 + Weir - 1
310.00	16.01	(N/A)	0.00	Orifice - 1 + Weir - 1

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Elevation-Volume-Flow Table (Pond)

Return Event: 1 years

Label: BASIN #3

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Infiltration

Infiltration Method (Computed)	No Infiltration
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Initial Conditions

Elevation (Water Surface, Initial)	333.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (acres)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
333.00	0.00	0.000	0.000	0.00	0.00	0.00
333.25	0.00	0.009	0.048	0.00	0.00	4.33
333.50	0.07	0.021	0.048	0.00	0.07	10.22
334.00	0.15	0.044	0.046	0.00	0.15	21.63
334.50	0.20	0.062	0.027	0.00	0.20	30.41
335.00	0.24	0.082	0.051	0.00	0.24	39.76
335.50	0.27	0.115	0.083	0.00	0.27	55.92
336.00	0.30	0.166	0.123	0.00	0.30	80.76
336.25	0.32	0.198	0.130	0.00	0.32	96.10
336.50	1.90	0.231	0.138	0.00	1.90	113.92
337.00	8.54	0.304	0.154	0.00	8.54	155.84
337.50	17.99	0.385	0.170	0.00	17.99	204.50
338.00	29.57	0.475	0.188	0.00	29.57	259.44

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Elevation-Volume-Flow Table (Pond)

Return Event: 1 years

Label: BASIN #3A

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Infiltration

Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	1.0000 in/h

Initial Conditions

Elevation (Water Surface, Initial)	338.50 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (acres)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
338.50	0.00	0.000	0.000	0.00	0.00	0.00
339.00	0.00	0.002	0.005	0.01	0.01	0.86
339.50	0.00	0.006	0.010	0.01	0.01	2.68
340.00	0.00	0.012	0.015	0.02	0.02	5.64
340.25	0.00	0.016	0.017	0.02	0.02	7.61
340.50	0.79	0.020	0.020	0.02	0.81	10.67
341.00	4.09	0.032	0.026	0.03	4.12	19.55
341.50	8.80	0.047	0.033	0.03	8.84	31.34
342.00	14.58	0.065	0.040	0.04	14.63	45.90

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Elevation-Volume-Flow Table (Pond)

Return Event: 1 years

Label: BASIN #4

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Infiltration	
Infiltration Method (Computed)	No Infiltration
Initial Conditions	
Elevation (Water Surface, Initial)	313.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (acres)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
313.00	0.00	0.000	0.000	0.00	0.00	0.00
313.25	0.00	0.011	0.062	0.00	0.00	5.57
313.50	0.07	0.027	0.061	0.00	0.07	13.11
314.00	0.15	0.057	0.059	0.00	0.15	27.73
314.50	0.20	0.080	0.034	0.00	0.20	38.90
315.00	0.24	0.104	0.065	0.00	0.24	50.69
315.50	0.27	0.146	0.105	0.00	0.27	71.13
316.00	0.30	0.211	0.156	0.00	0.30	102.61
316.25	0.32	0.251	0.162	0.00	0.32	121.83
316.50	1.41	0.292	0.167	0.00	1.41	142.83
317.00	5.98	0.379	0.179	0.00	5.98	189.29
317.50	12.48	0.471	0.191	0.00	12.48	240.53
318.00	20.45	0.570	0.203	0.00	20.45	296.15

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Elevation-Volume-Flow Table (Pond)

Return Event: 1 years

Label: BASIN #5

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Infiltration	
Infiltration Method (Computed)	No Infiltration
Initial Conditions	
Elevation (Water Surface, Initial)	311.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (acres)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
311.00	0.00	0.000	0.000	0.00	0.00	0.00
311.25	0.00	0.021	0.115	0.00	0.00	10.25
311.50	0.07	0.050	0.113	0.00	0.07	24.10
312.00	0.15	0.105	0.109	0.00	0.15	51.02
312.50	0.20	0.148	0.063	0.00	0.20	71.63
313.00	0.24	0.193	0.120	0.00	0.24	93.47
313.50	0.27	0.271	0.196	0.00	0.27	131.41
314.00	0.30	0.392	0.290	0.00	0.30	189.87
314.40	0.32	0.510	0.303	0.00	0.32	247.27
314.50	0.68	0.541	0.306	0.00	0.68	262.36
315.00	5.48	0.698	0.323	0.00	5.48	343.23
315.50	13.10	0.863	0.340	0.00	13.10	430.97
316.00	22.71	1.038	0.357	0.00	22.71	524.86
316.50	33.97	1.220	0.375	0.00	33.97	624.64
317.00	46.66	1.412	0.393	0.00	46.66	730.16
317.50	60.64	1.613	0.411	0.00	60.64	841.38
318.00	75.79	1.823	0.430	0.00	75.79	958.30
318.50	92.03	2.043	0.449	0.00	92.03	1,080.92
319.00	109.29	2.273	0.469	0.00	109.29	1,209.29

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Elevation-Volume-Flow Table (Pond)

Label: BASIN #6

Scenario: Post-Water Quality Storm

Return Event: 1 years

Storm Event: Water Quality Storm

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	312.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (acres)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
312.00	0.00	0.000	0.000	0.00	0.00	0.00
312.25	0.00	0.002	0.012	0.00	0.00	1.06
312.50	0.07	0.005	0.012	0.00	0.07	2.54
313.00	0.15	0.011	0.011	0.00	0.15	5.35
313.50	0.20	0.015	0.006	0.00	0.20	7.43
314.00	0.24	0.019	0.012	0.00	0.24	9.58
314.50	0.27	0.027	0.019	0.00	0.27	13.34
315.00	0.30	0.039	0.029	0.00	0.30	19.19
315.45	0.33	0.053	0.034	0.00	0.33	26.09
315.50	0.34	0.055	0.035	0.00	0.34	26.93
316.00	0.94	0.074	0.041	0.00	0.94	36.69
316.50	5.79	0.096	0.048	0.00	5.79	52.24
317.00	14.22	0.121	0.055	0.00	14.22	73.01
317.50	25.01	0.151	0.062	0.00	25.01	97.89
318.00	37.70	0.184	0.070	0.00	37.70	126.55

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

Subsection: Elevation-Volume-Flow Table (Pond)

Return Event: 1 years

Label: BASIN #7

Storm Event: Water Quality Storm

Scenario: Post-Water Quality Storm

Infiltration	
Infiltration Method (Computed)	No Infiltration
Initial Conditions	
Elevation (Water Surface, Initial)	304.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (acres)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
304.00	0.00	0.000	0.000	0.00	0.00	0.00
304.25	0.00	0.001	0.007	0.00	0.00	0.61
304.50	0.07	0.003	0.007	0.00	0.07	1.49
305.00	0.15	0.006	0.006	0.00	0.15	3.09
305.50	0.20	0.009	0.004	0.00	0.20	4.34
306.00	0.24	0.011	0.007	0.00	0.24	5.73
306.50	0.27	0.016	0.012	0.00	0.27	8.05
307.00	0.30	0.023	0.017	0.00	0.30	11.52
307.50	0.33	0.033	0.023	0.00	0.33	16.38
308.00	1.75	0.046	0.030	0.00	1.75	24.19
308.50	4.32	0.063	0.037	0.00	4.32	34.91
309.00	7.63	0.084	0.046	0.00	7.63	48.30
309.50	11.56	0.109	0.055	0.00	11.56	64.40
310.00	16.01	0.139	0.065	0.00	16.01	83.36

1114-02 - WATER QUALITY DESIGN STORM ROUTINGS

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WATER QUALITY CALCULATIONS – APPENDIX C-2
POND DRAWDOWN CHART

TIME VS. ELEVATION SUMMARY

Job No. 1114-02
Date: 9/16/2022
Rev:

Performed By: CR
Check By: AGS

100 YR STORM**

POND	INFILTRATION RATE USED FOR CALCULATIONS (IN/HR)	PEAK TIME (HRS.)	TIME AT WHICH BASIN IS EMPTY (HRS.)	TOTAL DRAW DOWN TIME (HRS.)
Pond #3	UD*	12.20	40.50	28.30
Pond #3A	1.0	12.25	50.00	37.75
Pond #4	UD*	12.15	29.75	17.60
Pond #5	UD*	12.15	24.75	12.60
Pond #6	UD*	12.10	15.00	2.90
Pond #7	UD*	12.10	13.75	1.65

*Under Drained

**Values taken from the routings within the Appendix B-3

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1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
PR - DA#2A	Post-Development 100	100	0.392	12.200	4.72
PR DA#1	Post-Development 100	100	2.312	12.350	19.78
PR DA#1 - IMP	Post-Development 100	100	0.402	12.050	5.82
PR DA#2	Post-Development 100	100	0.892	12.250	9.09
PR DA#2A - IMP	Post-Development 100	100	0.884	12.100	12.84
PR DA#3	Post-Development 100	100	0.247	12.150	3.21
PR DA#3 - IMP	Post-Development 100	100	0.536	12.100	7.72
PR DA#3A	Post-Development 100	100	0.224	12.150	2.75
PR DA#3A - IMP	Post-Development 100	100	0.080	12.100	1.16
PR DA#4	Post-Development 100	100	0.257	12.150	3.17
PR DA#4 - IMP	Post-Development 100	100	0.703	12.100	10.13
PR DA#5	Post-Development 100	100	0.314	12.150	4.21
PR DA#5 - IMP	Post-Development 100	100	3.967	12.100	57.58
PR DA#6	Post-Development 100	100	0.134	12.100	2.32
PR DA#6 - IMP	Post-Development 100	100	0.596	12.050	8.64
PR DA#7	Post-Development 100	100	0.113	12.100	1.71
PR DA#7 - IMP	Post-Development 100	100	0.409	12.100	5.88

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
POA-A	Post-Development 100	100	10.206	12.150	72.36
POA-B	Post-Development 100	100	2.168	12.100	22.17

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Master Network Summary

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)
BASIN #3 (IN)	Post-Development 100	100	1.046	12.100	13.11	(N/A)	(N/A)
BASIN #3 (OUT)	Post-Development 100	100	1.036	12.200	8.31	336.98	0.302
BASIN #3A (IN)	Post-Development 100	100	0.304	12.100	3.38	(N/A)	(N/A)
BASIN #3A (OUT)	Post-Development 100	100	0.263	12.200	3.17	340.86	0.028
BASIN #4 (IN)	Post-Development 100	100	0.961	12.100	12.67	(N/A)	(N/A)
BASIN #4 (OUT)	Post-Development 100	100	0.949	12.250	5.26	316.92	0.365
BASIN #5 (IN)	Post-Development 100	100	5.317	12.100	66.90	(N/A)	(N/A)
BASIN #5 (OUT)	Post-Development 100	100	5.295	12.150	38.88	316.69	1.293
BASIN #6 (IN)	Post-Development 100	100	0.730	12.100	10.96	(N/A)	(N/A)
BASIN #6 (OUT)	Post-Development 100	100	0.728	12.100	10.17	316.76	0.109
BASIN #7 (IN)	Post-Development 100	100	0.522	12.100	7.59	(N/A)	(N/A)
BASIN #7 (OUT)	Post-Development 100	100	0.520	12.150	5.90	308.74	0.073

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #3
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
0.000	0.000	0.000	0.000	0.000	0.000
0.250	0.000	0.000	0.000	0.000	0.000
0.500	0.000	0.000	0.000	0.000	0.000
0.750	0.000	0.000	0.000	0.000	0.000
1.000	0.000	0.000	0.000	0.000	0.000
1.250	0.000	0.000	0.000	0.000	0.000
1.500	0.000	0.000	0.000	0.001	0.001
1.750	0.001	0.001	0.001	0.001	0.002
2.000	0.002	0.002	0.003	0.003	0.003
2.250	0.004	0.004	0.004	0.005	0.005
2.500	0.005	0.006	0.006	0.006	0.007
2.750	0.007	0.008	0.008	0.008	0.009
3.000	0.009	0.009	0.010	0.010	0.010
3.250	0.010	0.011	0.011	0.011	0.011
3.500	0.012	0.012	0.012	0.012	0.013
3.750	0.013	0.013	0.013	0.014	0.014
4.000	0.014	0.014	0.014	0.015	0.015
4.250	0.015	0.015	0.015	0.016	0.016
4.500	0.016	0.016	0.016	0.017	0.017
4.750	0.017	0.017	0.017	0.017	0.018
5.000	0.018	0.018	0.018	0.018	0.018
5.250	0.019	0.019	0.019	0.019	0.019
5.500	0.019	0.019	0.020	0.020	0.020
5.750	0.020	0.020	0.020	0.020	0.021
6.000	0.021	0.021	0.021	0.021	0.021
6.250	0.021	0.022	0.022	0.022	0.022
6.500	0.022	0.022	0.023	0.023	0.023
6.750	0.023	0.023	0.023	0.024	0.024
7.000	0.024	0.024	0.024	0.025	0.025
7.250	0.025	0.025	0.025	0.026	0.026
7.500	0.026	0.026	0.027	0.027	0.027
7.750	0.027	0.028	0.028	0.028	0.028
8.000	0.029	0.029	0.029	0.029	0.030
8.250	0.030	0.030	0.030	0.031	0.031
8.500	0.031	0.031	0.032	0.032	0.032
8.750	0.032	0.033	0.033	0.033	0.034
9.000	0.034	0.034	0.034	0.035	0.035
9.250	0.036	0.036	0.036	0.037	0.037
9.500	0.038	0.038	0.038	0.039	0.040
9.750	0.040	0.041	0.041	0.042	0.042

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #3
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
10.000	0.043	0.044	0.044	0.045	0.046
10.250	0.047	0.048	0.049	0.050	0.050
10.500	0.051	0.052	0.053	0.054	0.056
10.750	0.057	0.058	0.059	0.060	0.062
11.000	0.063	0.064	0.066	0.068	0.070
11.250	0.072	0.075	0.079	0.083	0.086
11.500	0.090	0.095	0.102	0.110	0.118
11.750	0.126	0.136	0.149	0.167	0.187
12.000	0.213	0.242	0.273	0.294	0.302
12.250	0.301	0.297	0.289	0.281	0.273
12.500	0.266	0.260	0.254	0.249	0.245
12.750	0.241	0.239	0.237	0.235	0.233
13.000	0.232	0.230	0.229	0.227	0.226
13.250	0.224	0.223	0.222	0.221	0.219
13.500	0.218	0.217	0.216	0.215	0.214
13.750	0.213	0.212	0.211	0.211	0.210
14.000	0.210	0.209	0.209	0.208	0.208
14.250	0.208	0.207	0.207	0.207	0.206
14.500	0.206	0.206	0.205	0.205	0.205
14.750	0.205	0.204	0.204	0.204	0.204
15.000	0.203	0.203	0.203	0.202	0.202
15.250	0.202	0.202	0.202	0.201	0.201
15.500	0.201	0.201	0.201	0.201	0.201
15.750	0.201	0.201	0.201	0.200	0.200
16.000	0.200	0.200	0.200	0.200	0.200
16.250	0.200	0.200	0.200	0.200	0.200
16.500	0.200	0.199	0.199	0.199	0.199
16.750	0.199	0.199	0.199	0.199	0.199
17.000	0.199	0.199	0.199	0.199	0.199
17.250	0.199	0.198	0.198	0.198	0.198
17.500	0.198	0.198	0.198	0.198	0.198
17.750	0.198	0.198	0.198	0.197	0.197
18.000	0.197	0.197	0.197	0.197	0.196
18.250	0.196	0.196	0.196	0.196	0.195
18.500	0.195	0.195	0.195	0.194	0.194
18.750	0.194	0.194	0.194	0.193	0.193
19.000	0.193	0.192	0.192	0.192	0.192
19.250	0.191	0.191	0.191	0.191	0.190
19.500	0.190	0.190	0.189	0.189	0.189
19.750	0.189	0.188	0.188	0.188	0.187
20.000	0.187	0.187	0.186	0.186	0.186

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #3
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
20.250	0.185	0.185	0.185	0.184	0.184
20.500	0.184	0.183	0.183	0.183	0.182
20.750	0.182	0.182	0.181	0.181	0.181
21.000	0.180	0.180	0.179	0.179	0.179
21.250	0.178	0.178	0.178	0.177	0.177
21.500	0.176	0.176	0.176	0.175	0.175
21.750	0.174	0.174	0.174	0.173	0.173
22.000	0.172	0.172	0.172	0.171	0.171
22.250	0.170	0.170	0.169	0.169	0.169
22.500	0.168	0.168	0.167	0.167	0.166
22.750	0.166	0.165	0.165	0.164	0.164
23.000	0.163	0.162	0.162	0.161	0.161
23.250	0.160	0.160	0.159	0.159	0.158
23.500	0.157	0.157	0.156	0.156	0.155
23.750	0.155	0.154	0.153	0.153	0.152
24.000	0.152	0.151	0.150	0.149	0.148
24.250	0.147	0.146	0.144	0.143	0.142
24.500	0.141	0.140	0.138	0.137	0.136
24.750	0.135	0.134	0.133	0.131	0.130
25.000	0.129	0.128	0.127	0.126	0.125
25.250	0.124	0.123	0.122	0.121	0.120
25.500	0.119	0.118	0.117	0.116	0.115
25.750	0.114	0.113	0.111	0.110	0.109
26.000	0.107	0.106	0.105	0.104	0.103
26.250	0.101	0.100	0.099	0.098	0.097
26.500	0.096	0.095	0.094	0.093	0.092
26.750	0.091	0.090	0.089	0.088	0.087
27.000	0.086	0.086	0.085	0.084	0.083
27.250	0.082	0.082	0.080	0.079	0.078
27.500	0.077	0.076	0.075	0.074	0.073
27.750	0.072	0.071	0.070	0.069	0.068
28.000	0.067	0.067	0.066	0.065	0.064
28.250	0.064	0.063	0.063	0.062	0.061
28.500	0.061	0.060	0.059	0.059	0.058
28.750	0.057	0.057	0.056	0.055	0.055
29.000	0.054	0.053	0.052	0.052	0.051
29.250	0.050	0.049	0.049	0.048	0.047
29.500	0.046	0.046	0.045	0.044	0.044
29.750	0.043	0.042	0.042	0.041	0.041
30.000	0.040	0.040	0.039	0.038	0.038
30.250	0.037	0.037	0.036	0.036	0.035

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #3
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
30.500	0.035	0.034	0.034	0.033	0.033
30.750	0.033	0.032	0.032	0.031	0.031
31.000	0.030	0.030	0.030	0.029	0.029
31.250	0.028	0.028	0.028	0.027	0.027
31.500	0.026	0.026	0.026	0.025	0.025
31.750	0.025	0.024	0.024	0.024	0.023
32.000	0.023	0.023	0.022	0.022	0.022
32.250	0.021	0.021	0.021	0.020	0.020
32.500	0.020	0.020	0.019	0.019	0.019
32.750	0.019	0.018	0.018	0.018	0.018
33.000	0.018	0.017	0.017	0.017	0.017
33.250	0.017	0.016	0.016	0.016	0.016
33.500	0.016	0.016	0.015	0.015	0.015
33.750	0.015	0.015	0.015	0.015	0.014
34.000	0.014	0.014	0.014	0.014	0.014
34.250	0.014	0.014	0.013	0.013	0.013
34.500	0.013	0.013	0.013	0.013	0.013
34.750	0.013	0.013	0.012	0.012	0.012
35.000	0.012	0.012	0.012	0.012	0.012
35.250	0.012	0.012	0.012	0.012	0.012
35.500	0.012	0.011	0.011	0.011	0.011
35.750	0.011	0.011	0.011	0.011	0.011
36.000	0.011	0.011	0.011	0.011	0.011
36.250	0.011	0.011	0.011	0.011	0.011
36.500	0.011	0.010	0.010	0.010	0.010
36.750	0.010	0.010	0.010	0.010	0.010
37.000	0.010	0.010	0.010	0.010	0.010
37.250	0.010	0.010	0.010	0.010	0.010
37.500	0.010	0.010	0.010	0.010	0.010
37.750	0.010	0.010	0.010	0.010	0.010
38.000	0.010	0.010	0.010	0.010	0.010
38.250	0.010	0.010	0.010	0.010	0.010
38.500	0.010	0.010	0.010	0.010	0.009
38.750	0.009	0.009	0.009	0.009	0.009
39.000	0.009	0.009	0.009	0.009	0.009
39.250	0.009	0.009	0.009	0.009	0.009
39.500	0.009	0.009	0.009	0.009	0.009
39.750	0.009	0.009	0.009	0.009	0.009
40.000	0.009	0.009	0.009	0.009	0.009
40.250	0.009	0.009	0.009	0.009	0.009
40.500	0.009	0.009	0.009	0.009	0.009

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #3
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
40.750	0.009	0.009	0.009	0.009	0.009
41.000	0.009	0.009	0.009	0.009	0.009
41.250	0.009	0.009	0.009	0.009	0.009
41.500	0.009	0.009	0.009	0.009	0.009
41.750	0.009	0.009	0.009	0.009	0.009
42.000	0.009	0.009	0.009	0.009	0.009
42.250	0.009	0.009	0.009	0.009	0.009
42.500	0.009	0.009	0.009	0.009	0.009
42.750	0.009	0.009	0.009	0.009	0.009
43.000	0.009	0.009	0.009	0.009	0.009
43.250	0.009	0.009	0.009	0.009	0.009
43.500	0.009	0.009	0.009	0.009	0.009
43.750	0.009	0.009	0.009	0.009	0.009
44.000	0.009	0.009	0.009	0.009	0.009
44.250	0.009	0.009	0.009	0.009	0.009
44.500	0.009	0.009	0.009	0.009	0.009
44.750	0.009	0.009	0.009	0.009	0.009
45.000	0.009	0.009	0.009	0.009	0.009
45.250	0.009	0.009	0.009	0.009	0.009
45.500	0.009	0.009	0.009	0.009	0.009
45.750	0.009	0.009	0.009	0.009	0.009
46.000	0.009	0.009	0.009	0.009	0.009
46.250	0.009	0.009	0.009	0.009	0.009
46.500	0.009	0.009	0.009	0.009	0.009
46.750	0.009	0.009	0.009	0.009	0.009
47.000	0.009	0.009	0.009	0.009	0.009
47.250	0.009	0.009	0.009	0.009	0.009
47.500	0.009	0.009	0.009	0.009	0.009
47.750	0.009	0.009	0.009	0.009	0.009
48.000	0.009	0.009	0.009	0.009	0.009
48.250	0.009	0.009	0.009	0.009	0.009
48.500	0.009	0.009	0.009	0.009	0.009
48.750	0.009	0.009	0.009	0.009	0.009
49.000	0.009	0.009	0.009	0.009	0.009
49.250	0.009	0.009	0.009	0.009	0.009
49.500	0.009	0.009	0.009	0.009	0.009
49.750	0.009	0.009	0.009	0.009	0.009
50.000	0.009	0.009	0.009	0.009	0.009
50.250	0.009	0.009	0.009	0.009	0.009
50.500	0.009	0.009	0.009	0.009	0.009
50.750	0.009	0.009	0.009	0.009	0.009

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #3
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
51.000	0.009	0.009	0.009	0.009	0.009
51.250	0.009	0.009	0.009	0.009	0.009
51.500	0.009	0.009	0.009	0.009	0.009
51.750	0.009	0.009	0.009	0.009	0.009
52.000	0.009	0.009	0.009	0.009	0.009
52.250	0.009	0.009	0.009	0.009	0.009
52.500	0.009	0.009	0.009	0.009	0.009
52.750	0.009	0.009	0.009	0.009	0.009
53.000	0.009	0.009	0.009	0.009	0.009
53.250	0.009	0.009	0.009	0.009	0.009
53.500	0.009	0.009	0.009	0.009	0.009
53.750	0.009	0.009	0.009	0.009	0.009
54.000	0.009	0.009	0.009	0.009	0.009
54.250	0.009	0.009	0.009	0.009	0.009
54.500	0.009	0.009	0.009	0.009	0.009
54.750	0.009	0.009	0.009	0.009	0.009
55.000	0.009	0.009	0.009	0.009	0.009
55.250	0.009	0.009	0.009	0.009	0.009
55.500	0.009	0.009	0.009	0.009	0.009
55.750	0.009	0.009	0.009	0.009	0.009
56.000	0.009	0.009	0.009	0.009	0.009
56.250	0.009	0.009	0.009	0.009	0.009
56.500	0.009	0.009	0.009	0.009	0.009
56.750	0.009	0.009	0.009	0.009	0.009
57.000	0.009	0.009	0.009	0.009	0.009
57.250	0.009	0.009	0.009	0.009	0.009
57.500	0.009	0.009	0.009	0.009	0.009
57.750	0.009	0.009	0.009	0.009	0.009
58.000	0.009	0.009	0.009	0.009	0.009
58.250	0.009	0.009	0.009	0.009	0.009
58.500	0.009	0.009	0.009	0.009	0.009
58.750	0.009	0.009	0.009	0.009	0.009
59.000	0.009	0.009	0.009	0.009	0.009
59.250	0.009	0.009	0.009	0.009	0.009
59.500	0.009	0.009	0.009	0.009	0.009
59.750	0.009	0.009	0.009	0.009	0.009
60.000	0.009	0.009	0.009	0.009	0.009
60.250	0.009	0.009	0.009	0.009	0.009
60.500	0.009	0.009	0.009	0.009	0.009
60.750	0.009	0.009	0.009	0.009	0.009
61.000	0.009	0.009	0.009	0.009	0.009

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #3
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
61.250	0.009	0.009	0.009	0.009	0.009
61.500	0.009	0.009	0.009	0.009	0.009
61.750	0.009	0.009	0.009	0.009	0.009
62.000	0.009	0.009	0.009	0.009	0.009
62.250	0.009	0.009	0.009	0.009	0.009
62.500	0.009	0.009	0.009	0.009	0.009
62.750	0.009	0.009	0.009	0.009	0.009
63.000	0.009	0.009	0.009	0.009	0.009
63.250	0.009	0.009	0.009	0.009	0.009
63.500	0.009	0.009	0.009	0.009	0.009
63.750	0.009	0.009	0.009	0.009	0.009
64.000	0.009	0.009	0.009	0.009	0.009
64.250	0.009	0.009	0.009	0.009	0.009
64.500	0.009	0.009	0.009	0.009	0.009
64.750	0.009	0.009	0.009	0.009	0.009
65.000	0.009	0.009	0.009	0.009	0.009
65.250	0.009	0.009	0.009	0.009	0.009
65.500	0.009	0.009	0.009	0.009	0.009
65.750	0.009	0.009	0.009	0.009	0.009
66.000	0.009	0.009	0.009	0.009	0.009
66.250	0.009	0.009	0.009	0.009	0.009
66.500	0.009	0.009	0.009	0.009	0.009
66.750	0.009	0.009	0.009	0.009	0.009
67.000	0.009	0.009	0.009	0.009	0.009
67.250	0.009	0.009	0.009	0.009	0.009
67.500	0.009	0.009	0.009	0.009	0.009
67.750	0.009	0.009	0.009	0.009	0.009
68.000	0.009	0.009	0.009	0.009	0.009
68.250	0.009	0.009	0.009	0.009	0.009
68.500	0.009	0.009	0.009	0.009	0.009
68.750	0.009	0.009	0.009	0.009	0.009
69.000	0.009	0.009	0.009	0.009	0.009
69.250	0.009	0.009	0.009	0.009	0.009
69.500	0.009	0.009	0.009	0.009	0.009
69.750	0.009	0.009	0.009	0.009	0.009
70.000	0.009	0.009	0.009	0.009	0.009
70.250	0.009	0.009	0.009	0.009	0.009
70.500	0.009	0.009	0.009	0.009	0.009
70.750	0.009	0.009	0.009	0.009	0.009
71.000	0.009	0.009	0.009	0.009	0.009
71.250	0.009	0.009	0.009	0.009	0.009

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #3
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
71.500	0.009	0.009	0.009	0.009	0.009
71.750	0.009	0.009	0.009	0.009	0.009
72.000	0.009	0.009	0.009	0.009	0.009
72.250	0.009	0.009	0.009	0.009	0.009
72.500	0.009	0.009	0.009	0.009	0.009
72.750	0.009	0.009	0.009	0.009	0.009
73.000	0.009	0.009	0.009	0.009	0.009
73.250	0.009	0.009	0.009	0.009	0.009
73.500	0.009	0.009	0.009	0.009	0.009
73.750	0.009	0.009	0.009	0.009	0.009
74.000	0.009	0.009	0.009	0.009	0.009
74.250	0.009	0.009	0.009	0.009	0.009
74.500	0.009	0.009	0.009	0.009	0.009
74.750	0.009	0.009	0.009	0.009	0.009
75.000	0.009	0.009	0.009	0.009	0.009
75.250	0.009	0.009	0.009	0.009	0.009
75.500	0.009	0.009	0.009	0.009	0.009
75.750	0.009	0.009	0.009	0.009	0.009
76.000	0.009	0.009	0.009	0.009	0.009
76.250	0.009	0.009	0.009	0.009	0.009
76.500	0.009	0.009	0.009	0.009	0.009
76.750	0.009	0.009	0.009	0.009	0.009
77.000	0.009	0.009	0.009	0.009	0.009
77.250	0.009	0.009	0.009	0.009	0.009
77.500	0.009	0.009	0.009	0.009	0.009
77.750	0.009	0.009	0.009	0.009	0.009
78.000	0.009	0.009	0.009	0.009	0.009
78.250	0.009	0.009	0.009	0.009	0.009
78.500	0.009	0.009	0.009	0.009	0.009
78.750	0.009	0.009	0.009	0.009	0.009
79.000	0.009	0.009	0.009	0.009	0.009
79.250	0.009	0.009	0.009	0.009	0.009
79.500	0.009	0.009	0.009	0.009	0.009
79.750	0.009	0.009	0.009	0.009	0.009
80.000	0.009	0.009	0.009	0.009	0.009
80.250	0.009	0.009	0.009	0.009	0.009
80.500	0.009	0.009	0.009	0.009	0.009
80.750	0.009	0.009	0.009	0.009	0.009
81.000	0.009	0.009	0.009	0.009	0.009
81.250	0.009	0.009	0.009	0.009	0.009
81.500	0.009	0.009	0.009	0.009	0.009

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #3
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
81.750	0.009	0.009	0.009	0.009	0.009
82.000	0.009	0.009	0.009	0.009	0.009
82.250	0.009	0.009	0.009	0.009	0.009
82.500	0.009	0.009	0.009	0.009	0.009
82.750	0.009	0.009	0.009	0.009	0.009
83.000	0.009	0.009	0.009	0.009	0.009
83.250	0.009	0.009	0.009	0.009	0.009
83.500	0.009	0.009	0.009	0.009	0.009
83.750	0.009	0.009	0.009	0.009	0.009
84.000	0.009	0.009	0.009	0.009	0.009
84.250	0.009	0.009	0.009	0.009	0.009
84.500	0.009	0.009	0.009	0.009	0.009
84.750	0.009	0.009	0.009	0.009	0.009
85.000	0.009	0.009	0.009	0.009	0.009
85.250	0.009	0.009	0.009	0.009	0.009
85.500	0.009	0.009	0.009	0.009	0.009
85.750	0.009	0.009	0.009	0.009	0.009
86.000	0.009	0.009	0.009	0.009	0.009
86.250	0.009	0.009	0.009	0.009	0.009
86.500	0.009	0.009	0.009	0.009	0.009
86.750	0.009	0.009	0.009	0.009	0.009
87.000	0.009	0.009	0.009	0.009	0.009
87.250	0.009	0.009	0.009	0.009	0.009
87.500	0.009	0.009	0.009	0.009	0.009
87.750	0.009	0.009	0.009	0.009	0.009
88.000	0.009	0.009	0.009	0.009	0.009
88.250	0.009	0.009	0.009	0.009	0.009
88.500	0.009	0.009	0.009	0.009	0.009
88.750	0.009	0.009	0.009	0.009	0.009
89.000	0.009	0.009	0.009	0.009	0.009
89.250	0.009	0.009	0.009	0.009	0.009
89.500	0.009	0.009	0.009	0.009	0.009
89.750	0.009	0.009	0.009	0.009	0.009
90.000	0.009	0.009	0.009	0.009	0.009
90.250	0.009	0.009	0.009	0.009	0.009
90.500	0.009	0.009	0.009	0.009	0.009
90.750	0.009	0.009	0.009	0.009	0.009
91.000	0.009	0.009	0.009	0.009	0.009
91.250	0.009	0.009	0.009	0.009	0.009
91.500	0.009	0.009	0.009	0.009	0.009
91.750	0.009	0.009	0.009	0.009	0.009

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #3
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
92.000	0.009	0.009	0.009	0.009	0.009
92.250	0.009	0.009	0.009	0.009	0.009
92.500	0.009	0.009	0.009	0.009	0.009
92.750	0.009	0.009	0.009	0.009	0.009
93.000	0.009	0.009	0.009	0.009	0.009
93.250	0.009	0.009	0.009	0.009	0.009
93.500	0.009	0.009	0.009	0.009	0.009
93.750	0.009	0.009	0.009	0.009	0.009
94.000	0.009	0.009	0.009	0.009	0.009
94.250	0.009	0.009	0.009	0.009	0.009
94.500	0.009	0.009	0.009	0.009	0.009
94.750	0.009	0.009	0.009	0.009	0.009
95.000	0.009	0.009	0.009	0.009	0.009
95.250	0.009	0.009	0.009	0.009	0.009
95.500	0.009	0.009	0.009	0.009	0.009
95.750	0.009	0.009	0.009	0.009	0.009
96.000	0.009	0.009	0.009	0.009	0.009
96.250	0.009	0.009	0.009	0.009	0.009
96.500	0.009	0.009	0.009	0.009	0.009
96.750	0.009	0.009	0.009	0.009	0.009
97.000	0.009	0.009	0.009	0.009	0.009
97.250	0.009	0.009	0.009	0.009	0.009
97.500	0.009	0.009	0.009	0.009	0.009
97.750	0.009	0.009	0.009	0.009	0.009
98.000	0.009	0.009	0.009	0.009	0.009
98.250	0.009	0.009	0.009	0.009	0.009
98.500	0.009	0.009	0.009	0.009	0.009
98.750	0.009	0.009	0.009	0.009	0.009
99.000	0.009	0.009	0.009	0.009	0.009
99.250	0.009	0.009	0.009	0.009	0.009
99.500	0.009	0.009	0.009	0.009	0.009
99.750	0.009	0.009	0.009	0.009	0.009
100.000	0.009	(N/A)	(N/A)	(N/A)	(N/A)

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #3A
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
0.000	0.000	0.000	0.000	0.000	0.000
0.250	0.000	0.000	0.000	0.000	0.000
0.500	0.000	0.000	0.000	0.000	0.000
0.750	0.000	0.000	0.000	0.000	0.000
1.000	0.000	0.000	0.000	0.000	0.000
1.250	0.000	0.000	0.000	0.000	0.000
1.500	0.000	0.000	0.000	0.000	0.000
1.750	0.000	0.000	0.000	0.000	0.000
2.000	0.000	0.000	0.000	0.000	0.000
2.250	0.000	0.000	0.000	0.000	0.000
2.500	0.001	0.001	0.001	0.001	0.001
2.750	0.001	0.001	0.001	0.001	0.001
3.000	0.001	0.001	0.001	0.001	0.001
3.250	0.001	0.001	0.001	0.001	0.001
3.500	0.001	0.001	0.001	0.001	0.001
3.750	0.001	0.001	0.001	0.002	0.002
4.000	0.002	0.002	0.002	0.002	0.002
4.250	0.002	0.002	0.002	0.002	0.002
4.500	0.002	0.002	0.002	0.002	0.002
4.750	0.002	0.002	0.002	0.002	0.002
5.000	0.002	0.002	0.002	0.002	0.002
5.250	0.002	0.002	0.002	0.002	0.002
5.500	0.002	0.002	0.002	0.003	0.003
5.750	0.003	0.003	0.003	0.003	0.003
6.000	0.003	0.003	0.003	0.003	0.003
6.250	0.003	0.003	0.003	0.003	0.003
6.500	0.003	0.003	0.003	0.003	0.003
6.750	0.003	0.003	0.003	0.003	0.003
7.000	0.003	0.004	0.004	0.004	0.004
7.250	0.004	0.004	0.004	0.004	0.004
7.500	0.004	0.004	0.004	0.004	0.004
7.750	0.004	0.004	0.004	0.005	0.005
8.000	0.005	0.005	0.005	0.005	0.005
8.250	0.005	0.005	0.005	0.005	0.005
8.500	0.005	0.006	0.006	0.006	0.006
8.750	0.006	0.006	0.006	0.006	0.006
9.000	0.006	0.006	0.006	0.006	0.006
9.250	0.006	0.006	0.006	0.007	0.007
9.500	0.007	0.007	0.007	0.007	0.007
9.750	0.007	0.007	0.007	0.008	0.008

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #3A
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
10.000	0.008	0.008	0.008	0.008	0.008
10.250	0.008	0.009	0.009	0.009	0.009
10.500	0.009	0.010	0.010	0.010	0.010
10.750	0.011	0.011	0.011	0.012	0.012
11.000	0.013	0.013	0.013	0.014	0.015
11.250	0.015	0.016	0.016	0.017	0.017
11.500	0.017	0.017	0.017	0.018	0.018
11.750	0.018	0.019	0.020	0.020	0.021
12.000	0.023	0.024	0.027	0.028	0.028
12.250	0.027	0.026	0.024	0.023	0.022
12.500	0.022	0.021	0.021	0.021	0.020
12.750	0.020	0.020	0.020	0.019	0.019
13.000	0.019	0.019	0.019	0.018	0.018
13.250	0.018	0.018	0.018	0.018	0.018
13.500	0.018	0.018	0.017	0.017	0.017
13.750	0.017	0.017	0.017	0.017	0.017
14.000	0.017	0.017	0.017	0.017	0.017
14.250	0.017	0.017	0.017	0.017	0.017
14.500	0.017	0.017	0.017	0.017	0.017
14.750	0.017	0.017	0.017	0.017	0.017
15.000	0.017	0.017	0.017	0.017	0.017
15.250	0.017	0.016	0.016	0.016	0.016
15.500	0.016	0.016	0.016	0.016	0.016
15.750	0.016	0.016	0.016	0.016	0.016
16.000	0.016	0.016	0.016	0.016	0.016
16.250	0.016	0.016	0.016	0.016	0.016
16.500	0.016	0.016	0.016	0.016	0.016
16.750	0.016	0.016	0.016	0.016	0.016
17.000	0.016	0.016	0.016	0.016	0.016
17.250	0.016	0.016	0.016	0.016	0.016
17.500	0.016	0.016	0.016	0.016	0.016
17.750	0.016	0.016	0.016	0.016	0.016
18.000	0.016	0.016	0.016	0.016	0.016
18.250	0.016	0.016	0.016	0.016	0.016
18.500	0.016	0.016	0.016	0.016	0.016
18.750	0.016	0.016	0.016	0.016	0.016
19.000	0.016	0.016	0.016	0.016	0.016
19.250	0.016	0.016	0.016	0.016	0.016
19.500	0.016	0.016	0.016	0.016	0.016
19.750	0.016	0.016	0.016	0.016	0.016
20.000	0.016	0.016	0.016	0.016	0.016

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #3A
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
20.250	0.016	0.016	0.016	0.016	0.016
20.500	0.016	0.016	0.016	0.016	0.016
20.750	0.016	0.016	0.016	0.016	0.016
21.000	0.016	0.016	0.016	0.016	0.016
21.250	0.016	0.016	0.016	0.016	0.016
21.500	0.016	0.016	0.016	0.016	0.016
21.750	0.016	0.016	0.016	0.016	0.016
22.000	0.016	0.016	0.016	0.016	0.016
22.250	0.016	0.016	0.016	0.016	0.016
22.500	0.016	0.016	0.016	0.016	0.016
22.750	0.016	0.016	0.016	0.016	0.016
23.000	0.016	0.016	0.016	0.016	0.016
23.250	0.016	0.016	0.016	0.016	0.016
23.500	0.016	0.016	0.016	0.016	0.016
23.750	0.016	0.016	0.016	0.016	0.016
24.000	0.016	0.016	0.016	0.016	0.016
24.250	0.016	0.016	0.016	0.016	0.015
24.500	0.015	0.015	0.015	0.015	0.015
24.750	0.015	0.015	0.015	0.015	0.015
25.000	0.015	0.015	0.014	0.014	0.014
25.250	0.014	0.014	0.014	0.014	0.014
25.500	0.014	0.014	0.014	0.014	0.014
25.750	0.014	0.013	0.013	0.013	0.013
26.000	0.013	0.013	0.013	0.013	0.013
26.250	0.013	0.013	0.013	0.013	0.013
26.500	0.013	0.013	0.012	0.012	0.012
26.750	0.012	0.012	0.012	0.012	0.012
27.000	0.012	0.012	0.012	0.012	0.012
27.250	0.012	0.012	0.012	0.011	0.011
27.500	0.011	0.011	0.011	0.011	0.011
27.750	0.011	0.011	0.011	0.011	0.011
28.000	0.011	0.011	0.010	0.010	0.010
28.250	0.010	0.010	0.010	0.010	0.010
28.500	0.010	0.010	0.010	0.010	0.010
28.750	0.010	0.010	0.010	0.009	0.009
29.000	0.009	0.009	0.009	0.009	0.009
29.250	0.009	0.009	0.009	0.009	0.009
29.500	0.009	0.009	0.009	0.009	0.009
29.750	0.008	0.008	0.008	0.008	0.008
30.000	0.008	0.008	0.008	0.008	0.008
30.250	0.008	0.008	0.008	0.008	0.008

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #3A
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
30.500	0.008	0.008	0.008	0.008	0.008
30.750	0.008	0.007	0.007	0.007	0.007
31.000	0.007	0.007	0.007	0.007	0.007
31.250	0.007	0.007	0.007	0.007	0.007
31.500	0.007	0.007	0.007	0.007	0.007
31.750	0.007	0.007	0.007	0.007	0.006
32.000	0.006	0.006	0.006	0.006	0.006
32.250	0.006	0.006	0.006	0.006	0.006
32.500	0.006	0.006	0.006	0.006	0.006
32.750	0.006	0.006	0.006	0.006	0.006
33.000	0.006	0.006	0.006	0.006	0.006
33.250	0.006	0.006	0.006	0.005	0.005
33.500	0.005	0.005	0.005	0.005	0.005
33.750	0.005	0.005	0.005	0.005	0.005
34.000	0.005	0.005	0.005	0.005	0.005
34.250	0.005	0.005	0.005	0.005	0.004
34.500	0.004	0.004	0.004	0.004	0.004
34.750	0.004	0.004	0.004	0.004	0.004
35.000	0.004	0.004	0.004	0.004	0.004
35.250	0.004	0.004	0.004	0.004	0.004
35.500	0.004	0.004	0.004	0.004	0.004
35.750	0.004	0.003	0.003	0.003	0.003
36.000	0.003	0.003	0.003	0.003	0.003
36.250	0.003	0.003	0.003	0.003	0.003
36.500	0.003	0.003	0.003	0.003	0.003
36.750	0.003	0.003	0.003	0.003	0.003
37.000	0.003	0.003	0.003	0.003	0.003
37.250	0.003	0.003	0.003	0.003	0.003
37.500	0.003	0.003	0.003	0.002	0.002
37.750	0.002	0.002	0.002	0.002	0.002
38.000	0.002	0.002	0.002	0.002	0.002
38.250	0.002	0.002	0.002	0.002	0.002
38.500	0.002	0.002	0.002	0.002	0.002
38.750	0.002	0.002	0.002	0.002	0.002
39.000	0.002	0.002	0.002	0.002	0.002
39.250	0.002	0.002	0.002	0.002	0.002
39.500	0.002	0.002	0.002	0.002	0.002
39.750	0.002	0.002	0.001	0.001	0.001
40.000	0.001	0.001	0.001	0.001	0.001
40.250	0.001	0.001	0.001	0.001	0.001
40.500	0.001	0.001	0.001	0.001	0.001

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #3A
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
40.750	0.001	0.001	0.001	0.001	0.001
41.000	0.001	0.001	0.001	0.001	0.001
41.250	0.001	0.001	0.001	0.001	0.001
41.500	0.001	0.001	0.001	0.001	0.001
41.750	0.001	0.001	0.001	0.001	0.001
42.000	0.001	0.001	0.001	0.001	0.001
42.250	0.001	0.001	0.001	0.001	0.001
42.500	0.001	0.001	0.001	0.001	0.001
42.750	0.001	0.001	0.001	0.001	0.001
43.000	0.001	0.001	0.001	0.001	0.001
43.250	0.001	0.001	0.001	0.001	0.001
43.500	0.001	0.001	0.001	0.001	0.001
43.750	0.001	0.001	0.001	0.001	0.001
44.000	0.001	0.001	0.001	0.001	0.001
44.250	0.001	0.001	0.001	0.001	0.001
44.500	0.001	0.001	0.001	0.001	0.001
44.750	0.001	0.001	0.001	0.001	0.001
45.000	0.001	0.001	0.001	0.001	0.001
45.250	0.001	0.001	0.001	0.001	0.001
45.500	0.001	0.001	0.001	0.001	0.001
45.750	0.001	0.001	0.001	0.001	0.001
46.000	0.001	0.001	0.001	0.001	0.001
46.250	0.001	0.001	0.001	0.001	0.001
46.500	0.001	0.001	0.001	0.001	0.001
46.750	0.001	0.001	0.001	0.001	0.001
47.000	0.001	0.001	0.001	0.001	0.001
47.250	0.001	0.001	0.001	0.001	0.001
47.500	0.001	0.001	0.001	0.001	0.001
47.750	0.001	0.001	0.001	0.001	0.001
48.000	0.001	0.001	0.001	0.001	0.001
48.250	0.001	0.001	0.001	0.001	0.001
48.500	0.001	0.001	0.001	0.001	0.001
48.750	0.001	0.001	0.001	0.001	0.001
49.000	0.001	0.001	0.001	0.001	0.001
49.250	0.001	0.001	0.001	0.001	0.001
49.500	0.001	0.001	0.001	0.001	0.001
49.750	0.001	0.001	0.001	0.001	0.001
50.000	0.001	0.001	0.001	0.001	0.001
50.250	0.001	0.001	0.001	0.001	0.001
50.500	0.001	0.001	0.001	0.001	0.001
50.750	0.001	0.001	0.001	0.001	0.001

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #3A
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
51.000	0.001	0.001	0.001	0.001	0.001
51.250	0.001	0.001	0.001	0.001	0.001
51.500	0.001	0.001	0.001	0.001	0.001
51.750	0.001	0.001	0.001	0.001	0.001
52.000	0.001	0.001	0.001	0.001	0.001
52.250	0.001	0.001	0.001	0.001	0.001
52.500	0.001	0.001	0.001	0.001	0.001
52.750	0.001	0.001	0.001	0.001	0.001
53.000	0.001	0.001	0.001	0.001	0.001
53.250	0.001	0.001	0.001	0.001	0.001
53.500	0.001	0.001	0.001	0.001	0.001
53.750	0.001	0.001	0.001	0.001	0.001
54.000	0.001	0.001	0.001	0.001	0.001
54.250	0.001	0.001	0.001	0.001	0.001
54.500	0.001	0.001	0.001	0.001	0.001
54.750	0.001	0.001	0.001	0.001	0.001
55.000	0.001	0.001	0.001	0.001	0.001
55.250	0.001	0.001	0.001	0.001	0.001
55.500	0.001	0.001	0.001	0.001	0.001
55.750	0.001	0.001	0.001	0.001	0.001
56.000	0.001	0.001	0.001	0.001	0.001
56.250	0.001	0.001	0.001	0.001	0.001
56.500	0.001	0.001	0.001	0.001	0.001
56.750	0.001	0.001	0.001	0.001	0.001
57.000	0.001	0.001	0.001	0.001	0.001
57.250	0.001	0.001	0.001	0.001	0.001
57.500	0.001	0.001	0.001	0.001	0.001
57.750	0.001	0.001	0.001	0.001	0.001
58.000	0.001	0.001	0.001	0.001	0.001
58.250	0.001	0.001	0.001	0.001	0.001
58.500	0.001	0.001	0.001	0.001	0.001
58.750	0.001	0.001	0.001	0.001	0.001
59.000	0.001	0.001	0.001	0.001	0.001
59.250	0.001	0.001	0.001	0.001	0.001
59.500	0.001	0.001	0.001	0.001	0.001
59.750	0.001	0.001	0.001	0.001	0.001
60.000	0.001	0.001	0.001	0.001	0.001
60.250	0.001	0.001	0.001	0.001	0.001
60.500	0.001	0.001	0.001	0.001	0.001
60.750	0.001	0.001	0.001	0.001	0.001
61.000	0.001	0.001	0.001	0.001	0.001

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #3A
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
61.250	0.001	0.001	0.001	0.001	0.001
61.500	0.001	0.001	0.001	0.001	0.001
61.750	0.001	0.001	0.001	0.001	0.001
62.000	0.001	0.001	0.001	0.001	0.001
62.250	0.001	0.001	0.001	0.001	0.001
62.500	0.001	0.001	0.001	0.001	0.001
62.750	0.001	0.001	0.001	0.001	0.001
63.000	0.001	0.001	0.001	0.001	0.001
63.250	0.001	0.001	0.001	0.001	0.001
63.500	0.001	0.001	0.001	0.001	0.001
63.750	0.001	0.001	0.001	0.001	0.001
64.000	0.001	0.001	0.001	0.001	0.001
64.250	0.001	0.001	0.001	0.001	0.001
64.500	0.001	0.001	0.001	0.001	0.001
64.750	0.001	0.001	0.001	0.001	0.001
65.000	0.001	0.001	0.001	0.001	0.001
65.250	0.001	0.001	0.001	0.001	0.001
65.500	0.001	0.001	0.001	0.001	0.001
65.750	0.001	0.001	0.001	0.001	0.001
66.000	0.001	0.001	0.001	0.001	0.001
66.250	0.001	0.001	0.001	0.001	0.001
66.500	0.001	0.001	0.001	0.001	0.001
66.750	0.001	0.001	0.001	0.001	0.001
67.000	0.001	0.001	0.001	0.001	0.001
67.250	0.001	0.001	0.001	0.001	0.001
67.500	0.001	0.001	0.001	0.001	0.001
67.750	0.001	0.001	0.001	0.001	0.001
68.000	0.001	0.001	0.001	0.001	0.001
68.250	0.001	0.001	0.001	0.001	0.001
68.500	0.001	0.001	0.001	0.001	0.001
68.750	0.001	0.001	0.001	0.001	0.001
69.000	0.001	0.001	0.001	0.001	0.001
69.250	0.001	0.001	0.001	0.001	0.001
69.500	0.001	0.001	0.001	0.001	0.001
69.750	0.001	0.001	0.001	0.001	0.001
70.000	0.001	0.001	0.001	0.001	0.001
70.250	0.001	0.001	0.001	0.001	0.001
70.500	0.001	0.001	0.001	0.001	0.001
70.750	0.001	0.001	0.001	0.001	0.001
71.000	0.001	0.001	0.001	0.001	0.001
71.250	0.001	0.001	0.001	0.001	0.001

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #3A
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
71.500	0.001	0.001	0.001	0.001	0.001
71.750	0.001	0.001	0.001	0.001	0.001
72.000	0.001	0.001	0.001	0.001	0.001
72.250	0.001	0.001	0.001	0.001	0.001
72.500	0.001	0.001	0.001	0.001	0.001
72.750	0.001	0.001	0.001	0.001	0.001
73.000	0.001	0.001	0.001	0.001	0.001
73.250	0.001	0.001	0.001	0.001	0.001
73.500	0.001	0.001	0.001	0.001	0.001
73.750	0.001	0.001	0.001	0.001	0.001
74.000	0.001	0.001	0.001	0.001	0.001
74.250	0.001	0.001	0.001	0.001	0.001
74.500	0.001	0.001	0.001	0.001	0.001
74.750	0.001	0.001	0.001	0.001	0.001
75.000	0.001	0.001	0.001	0.001	0.001
75.250	0.001	0.001	0.001	0.001	0.001
75.500	0.001	0.001	0.001	0.001	0.001
75.750	0.001	0.001	0.001	0.001	0.001
76.000	0.001	0.001	0.001	0.001	0.001
76.250	0.001	0.001	0.001	0.001	0.001
76.500	0.001	0.001	0.001	0.001	0.001
76.750	0.001	0.001	0.001	0.001	0.001
77.000	0.001	0.001	0.001	0.001	0.001
77.250	0.001	0.001	0.001	0.001	0.001
77.500	0.001	0.001	0.001	0.001	0.001
77.750	0.001	0.001	0.001	0.001	0.001
78.000	0.001	0.001	0.001	0.001	0.001
78.250	0.001	0.001	0.001	0.001	0.001
78.500	0.001	0.001	0.001	0.001	0.001
78.750	0.001	0.001	0.001	0.001	0.001
79.000	0.001	0.001	0.001	0.001	0.001
79.250	0.001	0.001	0.001	0.001	0.001
79.500	0.001	0.001	0.001	0.001	0.001
79.750	0.001	0.001	0.001	0.001	0.001
80.000	0.001	0.001	0.001	0.001	0.001
80.250	0.001	0.001	0.001	0.001	0.001
80.500	0.001	0.001	0.001	0.001	0.001
80.750	0.001	0.001	0.001	0.001	0.001
81.000	0.001	0.001	0.001	0.001	0.001
81.250	0.001	0.001	0.001	0.001	0.001
81.500	0.001	0.001	0.001	0.001	0.001

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #3A
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
81.750	0.001	0.001	0.001	0.001	0.001
82.000	0.001	0.001	0.001	0.001	0.001
82.250	0.001	0.001	0.001	0.001	0.001
82.500	0.001	0.001	0.001	0.001	0.001
82.750	0.001	0.001	0.001	0.001	0.001
83.000	0.001	0.001	0.001	0.001	0.001
83.250	0.001	0.001	0.001	0.001	0.001
83.500	0.001	0.001	0.001	0.001	0.001
83.750	0.001	0.001	0.001	0.001	0.001
84.000	0.001	0.001	0.001	0.001	0.001
84.250	0.001	0.001	0.001	0.001	0.001
84.500	0.001	0.001	0.001	0.001	0.001
84.750	0.001	0.001	0.001	0.001	0.001
85.000	0.001	0.001	0.001	0.001	0.001
85.250	0.001	0.001	0.001	0.001	0.001
85.500	0.001	0.001	0.001	0.001	0.001
85.750	0.001	0.001	0.001	0.001	0.001
86.000	0.001	0.001	0.001	0.001	0.001
86.250	0.001	0.001	0.001	0.001	0.001
86.500	0.001	0.001	0.001	0.001	0.001
86.750	0.001	0.001	0.001	0.001	0.001
87.000	0.001	0.001	0.001	0.001	0.001
87.250	0.001	0.001	0.001	0.001	0.001
87.500	0.001	0.001	0.001	0.001	0.001
87.750	0.001	0.001	0.001	0.001	0.001
88.000	0.001	0.001	0.001	0.001	0.001
88.250	0.001	0.001	0.001	0.001	0.001
88.500	0.001	0.001	0.001	0.001	0.001
88.750	0.001	0.001	0.001	0.001	0.001
89.000	0.001	0.001	0.001	0.001	0.001
89.250	0.001	0.001	0.001	0.001	0.001
89.500	0.001	0.001	0.001	0.001	0.001
89.750	0.001	0.001	0.001	0.001	0.001
90.000	0.001	0.001	0.001	0.001	0.001
90.250	0.001	0.001	0.001	0.001	0.001
90.500	0.001	0.001	0.001	0.001	0.001
90.750	0.001	0.001	0.001	0.001	0.001
91.000	0.001	0.001	0.001	0.001	0.001
91.250	0.001	0.001	0.001	0.001	0.001
91.500	0.001	0.001	0.001	0.001	0.001
91.750	0.001	0.001	0.001	0.001	0.001

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #3A
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
92.000	0.001	0.001	0.001	0.001	0.001
92.250	0.001	0.001	0.001	0.001	0.001
92.500	0.001	0.001	0.001	0.001	0.001
92.750	0.001	0.001	0.001	0.001	0.001
93.000	0.001	0.001	0.001	0.001	0.001
93.250	0.001	0.001	0.001	0.001	0.001
93.500	0.001	0.001	0.001	0.001	0.001
93.750	0.001	0.001	0.001	0.001	0.001
94.000	0.001	0.001	0.001	0.001	0.001
94.250	0.001	0.001	0.001	0.001	0.001
94.500	0.001	0.001	0.001	0.001	0.001
94.750	0.001	0.001	0.001	0.001	0.001
95.000	0.001	0.001	0.001	0.001	0.001
95.250	0.001	0.001	0.001	0.001	0.001
95.500	0.001	0.001	0.001	0.001	0.001
95.750	0.001	0.001	0.001	0.001	0.001
96.000	0.001	0.001	0.001	0.001	0.001
96.250	0.001	0.001	0.001	0.001	0.001
96.500	0.001	0.001	0.001	0.001	0.001
96.750	0.001	0.001	0.001	0.001	0.001
97.000	0.001	0.001	0.001	0.001	0.001
97.250	0.001	0.001	0.001	0.001	0.001
97.500	0.001	0.001	0.001	0.001	0.001
97.750	0.001	0.001	0.001	0.001	0.001
98.000	0.001	0.001	0.001	0.001	0.001
98.250	0.001	0.001	0.001	0.001	0.001
98.500	0.001	0.001	0.001	0.001	0.001
98.750	0.001	0.001	0.001	0.001	0.001
99.000	0.001	0.001	0.001	0.001	0.001
99.250	0.001	0.001	0.001	0.001	0.001
99.500	0.001	0.001	0.001	0.001	0.001
99.750	0.001	0.001	0.001	0.001	0.001
100.000	0.001	(N/A)	(N/A)	(N/A)	(N/A)

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #4
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
0.000	0.000	0.000	0.000	0.000	0.000
0.250	0.000	0.000	0.000	0.000	0.000
0.500	0.000	0.000	0.000	0.000	0.000
0.750	0.000	0.000	0.000	0.000	0.000
1.000	0.000	0.000	0.000	0.000	0.000
1.250	0.000	0.000	0.000	0.000	0.000
1.500	0.000	0.000	0.001	0.001	0.001
1.750	0.001	0.001	0.002	0.002	0.002
2.000	0.003	0.003	0.004	0.004	0.004
2.250	0.005	0.005	0.006	0.006	0.007
2.500	0.007	0.008	0.008	0.008	0.009
2.750	0.009	0.010	0.010	0.011	0.011
3.000	0.012	0.012	0.013	0.013	0.013
3.250	0.014	0.014	0.014	0.015	0.015
3.500	0.015	0.016	0.016	0.016	0.017
3.750	0.017	0.017	0.018	0.018	0.018
4.000	0.019	0.019	0.019	0.020	0.020
4.250	0.020	0.020	0.021	0.021	0.021
4.500	0.022	0.022	0.022	0.022	0.023
4.750	0.023	0.023	0.024	0.024	0.024
5.000	0.024	0.025	0.025	0.025	0.025
5.250	0.026	0.026	0.026	0.026	0.026
5.500	0.027	0.027	0.027	0.027	0.028
5.750	0.028	0.028	0.028	0.029	0.029
6.000	0.029	0.029	0.030	0.030	0.030
6.250	0.030	0.031	0.031	0.031	0.031
6.500	0.032	0.032	0.032	0.033	0.033
6.750	0.033	0.033	0.034	0.034	0.034
7.000	0.035	0.035	0.035	0.036	0.036
7.250	0.036	0.037	0.037	0.037	0.038
7.500	0.038	0.038	0.039	0.039	0.040
7.750	0.040	0.040	0.041	0.041	0.041
8.000	0.042	0.042	0.043	0.043	0.043
8.250	0.044	0.044	0.045	0.045	0.046
8.500	0.046	0.046	0.047	0.047	0.048
8.750	0.048	0.049	0.049	0.049	0.050
9.000	0.050	0.051	0.051	0.052	0.052
9.250	0.053	0.053	0.054	0.055	0.055
9.500	0.056	0.056	0.057	0.058	0.059
9.750	0.060	0.061	0.062	0.063	0.064

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #4
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
10.000	0.065	0.066	0.067	0.068	0.069
10.250	0.070	0.071	0.072	0.072	0.073
10.500	0.074	0.075	0.076	0.078	0.079
10.750	0.080	0.081	0.083	0.084	0.086
11.000	0.088	0.090	0.092	0.095	0.099
11.250	0.103	0.106	0.109	0.112	0.116
11.500	0.120	0.125	0.132	0.141	0.149
11.750	0.157	0.166	0.179	0.196	0.218
12.000	0.245	0.280	0.320	0.349	0.361
12.250	0.365	0.364	0.360	0.355	0.349
12.500	0.343	0.338	0.331	0.326	0.321
12.750	0.316	0.312	0.309	0.306	0.303
13.000	0.300	0.298	0.296	0.294	0.293
13.250	0.291	0.290	0.288	0.286	0.285
13.500	0.283	0.282	0.280	0.279	0.277
13.750	0.276	0.275	0.274	0.273	0.272
14.000	0.271	0.270	0.269	0.268	0.268
14.250	0.267	0.266	0.266	0.265	0.264
14.500	0.264	0.263	0.263	0.262	0.262
14.750	0.261	0.261	0.260	0.260	0.260
15.000	0.259	0.259	0.258	0.258	0.257
15.250	0.257	0.257	0.256	0.256	0.256
15.500	0.256	0.255	0.255	0.255	0.255
15.750	0.255	0.254	0.254	0.254	0.254
16.000	0.254	0.254	0.253	0.253	0.253
16.250	0.253	0.253	0.253	0.253	0.253
16.500	0.252	0.252	0.252	0.252	0.252
16.750	0.252	0.252	0.252	0.252	0.251
17.000	0.251	0.251	0.251	0.251	0.251
17.250	0.251	0.251	0.250	0.250	0.250
17.500	0.250	0.250	0.249	0.249	0.249
17.750	0.249	0.248	0.248	0.248	0.248
18.000	0.247	0.247	0.247	0.246	0.246
18.250	0.246	0.245	0.245	0.245	0.244
18.500	0.244	0.243	0.243	0.243	0.242
18.750	0.242	0.242	0.241	0.241	0.240
19.000	0.240	0.240	0.239	0.239	0.239
19.250	0.238	0.238	0.237	0.237	0.237
19.500	0.236	0.236	0.235	0.235	0.235
19.750	0.234	0.234	0.233	0.233	0.232
20.000	0.232	0.232	0.231	0.231	0.230

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #4
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
20.250	0.230	0.229	0.229	0.229	0.228
20.500	0.228	0.227	0.227	0.226	0.226
20.750	0.225	0.225	0.224	0.224	0.224
21.000	0.223	0.223	0.222	0.222	0.221
21.250	0.221	0.220	0.220	0.219	0.219
21.500	0.218	0.218	0.217	0.217	0.216
21.750	0.216	0.215	0.215	0.214	0.214
22.000	0.213	0.213	0.212	0.212	0.211
22.250	0.211	0.210	0.209	0.209	0.208
22.500	0.208	0.207	0.206	0.206	0.205
22.750	0.204	0.204	0.203	0.203	0.202
23.000	0.201	0.201	0.200	0.199	0.199
23.250	0.198	0.197	0.197	0.196	0.196
23.500	0.195	0.194	0.194	0.193	0.192
23.750	0.192	0.191	0.191	0.190	0.189
24.000	0.189	0.188	0.187	0.186	0.185
24.250	0.184	0.182	0.181	0.180	0.179
24.500	0.178	0.176	0.175	0.174	0.173
24.750	0.172	0.171	0.169	0.168	0.167
25.000	0.166	0.165	0.164	0.163	0.162
25.250	0.161	0.160	0.159	0.158	0.157
25.500	0.156	0.155	0.154	0.153	0.152
25.750	0.151	0.150	0.149	0.148	0.147
26.000	0.146	0.144	0.143	0.142	0.140
26.250	0.139	0.138	0.137	0.135	0.134
26.500	0.133	0.132	0.130	0.129	0.128
26.750	0.127	0.126	0.125	0.124	0.123
27.000	0.122	0.121	0.120	0.119	0.118
27.250	0.117	0.116	0.115	0.114	0.113
27.500	0.112	0.111	0.110	0.110	0.109
27.750	0.108	0.107	0.106	0.105	0.105
28.000	0.104	0.102	0.101	0.100	0.099
28.250	0.098	0.097	0.096	0.094	0.093
28.500	0.092	0.092	0.091	0.090	0.089
28.750	0.088	0.087	0.086	0.086	0.085
29.000	0.084	0.083	0.083	0.082	0.081
29.250	0.081	0.080	0.080	0.079	0.078
29.500	0.078	0.077	0.077	0.076	0.075
29.750	0.075	0.074	0.073	0.072	0.072
30.000	0.071	0.070	0.070	0.069	0.068
30.250	0.067	0.067	0.066	0.065	0.064

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #4
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
30.500	0.064	0.063	0.062	0.061	0.061
30.750	0.060	0.059	0.058	0.058	0.057
31.000	0.056	0.056	0.055	0.054	0.054
31.250	0.053	0.053	0.052	0.052	0.051
31.500	0.050	0.050	0.049	0.049	0.048
31.750	0.048	0.047	0.047	0.046	0.046
32.000	0.045	0.045	0.044	0.044	0.043
32.250	0.043	0.043	0.042	0.042	0.041
32.500	0.041	0.040	0.040	0.039	0.039
32.750	0.039	0.038	0.038	0.037	0.037
33.000	0.037	0.036	0.036	0.035	0.035
33.250	0.035	0.034	0.034	0.033	0.033
33.500	0.033	0.032	0.032	0.032	0.031
33.750	0.031	0.031	0.030	0.030	0.030
34.000	0.029	0.029	0.029	0.028	0.028
34.250	0.028	0.027	0.027	0.027	0.027
34.500	0.026	0.026	0.026	0.025	0.025
34.750	0.025	0.025	0.024	0.024	0.024
35.000	0.024	0.024	0.023	0.023	0.023
35.250	0.023	0.022	0.022	0.022	0.022
35.500	0.022	0.021	0.021	0.021	0.021
35.750	0.021	0.021	0.020	0.020	0.020
36.000	0.020	0.020	0.020	0.019	0.019
36.250	0.019	0.019	0.019	0.019	0.019
36.500	0.018	0.018	0.018	0.018	0.018
36.750	0.018	0.018	0.018	0.017	0.017
37.000	0.017	0.017	0.017	0.017	0.017
37.250	0.017	0.017	0.017	0.016	0.016
37.500	0.016	0.016	0.016	0.016	0.016
37.750	0.016	0.016	0.016	0.016	0.015
38.000	0.015	0.015	0.015	0.015	0.015
38.250	0.015	0.015	0.015	0.015	0.015
38.500	0.015	0.015	0.015	0.015	0.015
38.750	0.014	0.014	0.014	0.014	0.014
39.000	0.014	0.014	0.014	0.014	0.014
39.250	0.014	0.014	0.014	0.014	0.014
39.500	0.014	0.014	0.014	0.014	0.014
39.750	0.014	0.013	0.013	0.013	0.013
40.000	0.013	0.013	0.013	0.013	0.013
40.250	0.013	0.013	0.013	0.013	0.013
40.500	0.013	0.013	0.013	0.013	0.013

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #4
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
40.750	0.013	0.013	0.013	0.013	0.013
41.000	0.013	0.013	0.013	0.013	0.013
41.250	0.013	0.013	0.013	0.013	0.013
41.500	0.013	0.013	0.013	0.012	0.012
41.750	0.012	0.012	0.012	0.012	0.012
42.000	0.012	0.012	0.012	0.012	0.012
42.250	0.012	0.012	0.012	0.012	0.012
42.500	0.012	0.012	0.012	0.012	0.012
42.750	0.012	0.012	0.012	0.012	0.012
43.000	0.012	0.012	0.012	0.012	0.012
43.250	0.012	0.012	0.012	0.012	0.012
43.500	0.012	0.012	0.012	0.012	0.012
43.750	0.012	0.012	0.012	0.012	0.012
44.000	0.012	0.012	0.012	0.012	0.012
44.250	0.012	0.012	0.012	0.012	0.012
44.500	0.012	0.012	0.012	0.012	0.012
44.750	0.012	0.012	0.012	0.012	0.012
45.000	0.012	0.012	0.012	0.012	0.012
45.250	0.012	0.012	0.012	0.012	0.012
45.500	0.012	0.012	0.012	0.012	0.012
45.750	0.012	0.012	0.012	0.012	0.012
46.000	0.012	0.012	0.012	0.012	0.012
46.250	0.012	0.012	0.012	0.012	0.012
46.500	0.012	0.012	0.012	0.012	0.012
46.750	0.012	0.012	0.012	0.012	0.012
47.000	0.012	0.012	0.012	0.012	0.012
47.250	0.012	0.012	0.012	0.012	0.012
47.500	0.012	0.012	0.012	0.012	0.012
47.750	0.012	0.012	0.012	0.012	0.012
48.000	0.012	0.012	0.012	0.012	0.012
48.250	0.012	0.012	0.012	0.012	0.012
48.500	0.012	0.012	0.012	0.012	0.012
48.750	0.012	0.012	0.012	0.012	0.012
49.000	0.012	0.012	0.012	0.012	0.012
49.250	0.012	0.012	0.012	0.012	0.012
49.500	0.012	0.012	0.012	0.012	0.012
49.750	0.012	0.012	0.012	0.012	0.012
50.000	0.012	0.012	0.012	0.012	0.012
50.250	0.012	0.012	0.012	0.012	0.012
50.500	0.012	0.012	0.012	0.012	0.012
50.750	0.012	0.012	0.012	0.012	0.012

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #4
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
51.000	0.012	0.012	0.012	0.012	0.012
51.250	0.012	0.012	0.012	0.012	0.012
51.500	0.012	0.012	0.012	0.012	0.012
51.750	0.012	0.012	0.012	0.012	0.012
52.000	0.012	0.012	0.012	0.012	0.012
52.250	0.012	0.012	0.012	0.012	0.012
52.500	0.012	0.012	0.012	0.012	0.012
52.750	0.012	0.012	0.012	0.012	0.012
53.000	0.012	0.012	0.012	0.012	0.012
53.250	0.012	0.012	0.012	0.012	0.012
53.500	0.012	0.012	0.012	0.012	0.012
53.750	0.012	0.012	0.012	0.012	0.012
54.000	0.012	0.012	0.012	0.012	0.012
54.250	0.012	0.012	0.012	0.012	0.012
54.500	0.012	0.012	0.012	0.012	0.012
54.750	0.012	0.012	0.012	0.012	0.012
55.000	0.012	0.012	0.012	0.012	0.012
55.250	0.012	0.012	0.012	0.012	0.012
55.500	0.012	0.012	0.012	0.012	0.012
55.750	0.012	0.012	0.012	0.012	0.012
56.000	0.012	0.012	0.012	0.012	0.012
56.250	0.012	0.012	0.012	0.012	0.012
56.500	0.012	0.012	0.012	0.012	0.012
56.750	0.012	0.012	0.012	0.012	0.012
57.000	0.012	0.012	0.012	0.012	0.012
57.250	0.012	0.012	0.012	0.012	0.012
57.500	0.012	0.012	0.012	0.012	0.012
57.750	0.012	0.012	0.012	0.012	0.012
58.000	0.012	0.012	0.012	0.012	0.012
58.250	0.012	0.012	0.012	0.012	0.012
58.500	0.012	0.012	0.012	0.012	0.012
58.750	0.012	0.012	0.012	0.012	0.012
59.000	0.012	0.012	0.012	0.012	0.012
59.250	0.012	0.012	0.012	0.012	0.012
59.500	0.012	0.012	0.012	0.012	0.012
59.750	0.012	0.012	0.012	0.012	0.012
60.000	0.012	0.012	0.012	0.012	0.012
60.250	0.012	0.012	0.012	0.012	0.012
60.500	0.012	0.012	0.012	0.012	0.012
60.750	0.012	0.012	0.012	0.012	0.012
61.000	0.012	0.012	0.012	0.012	0.012

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #4
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
61.250	0.012	0.012	0.012	0.012	0.012
61.500	0.012	0.012	0.012	0.012	0.012
61.750	0.012	0.012	0.012	0.012	0.012
62.000	0.012	0.012	0.012	0.012	0.012
62.250	0.012	0.012	0.012	0.012	0.012
62.500	0.012	0.012	0.012	0.012	0.012
62.750	0.012	0.012	0.012	0.012	0.012
63.000	0.012	0.012	0.012	0.012	0.012
63.250	0.012	0.012	0.012	0.012	0.012
63.500	0.012	0.012	0.012	0.012	0.012
63.750	0.012	0.012	0.012	0.012	0.012
64.000	0.012	0.012	0.012	0.012	0.012
64.250	0.012	0.012	0.012	0.012	0.012
64.500	0.012	0.012	0.012	0.012	0.012
64.750	0.012	0.012	0.012	0.012	0.012
65.000	0.012	0.012	0.012	0.012	0.012
65.250	0.012	0.012	0.012	0.012	0.012
65.500	0.012	0.012	0.012	0.012	0.012
65.750	0.012	0.012	0.012	0.012	0.012
66.000	0.012	0.012	0.012	0.012	0.012
66.250	0.012	0.012	0.012	0.012	0.012
66.500	0.012	0.012	0.012	0.012	0.012
66.750	0.012	0.012	0.012	0.012	0.012
67.000	0.012	0.012	0.012	0.012	0.012
67.250	0.012	0.012	0.012	0.012	0.012
67.500	0.012	0.012	0.012	0.012	0.012
67.750	0.012	0.012	0.012	0.012	0.012
68.000	0.012	0.012	0.012	0.012	0.012
68.250	0.012	0.012	0.012	0.012	0.012
68.500	0.012	0.012	0.012	0.012	0.012
68.750	0.012	0.012	0.012	0.012	0.012
69.000	0.012	0.012	0.012	0.012	0.012
69.250	0.012	0.012	0.012	0.012	0.012
69.500	0.012	0.012	0.012	0.012	0.012
69.750	0.012	0.012	0.012	0.012	0.012
70.000	0.012	0.012	0.012	0.012	0.012
70.250	0.012	0.012	0.012	0.012	0.012
70.500	0.012	0.012	0.012	0.012	0.012
70.750	0.012	0.012	0.012	0.012	0.012
71.000	0.012	0.012	0.012	0.012	0.012
71.250	0.012	0.012	0.012	0.012	0.012

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #4
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
71.500	0.012	0.012	0.012	0.012	0.012
71.750	0.012	0.012	0.012	0.012	0.012
72.000	0.012	0.012	0.012	0.012	0.012
72.250	0.012	0.012	0.012	0.012	0.012
72.500	0.012	0.012	0.012	0.012	0.012
72.750	0.012	0.012	0.012	0.012	0.012
73.000	0.012	0.012	0.012	0.012	0.012
73.250	0.012	0.012	0.012	0.012	0.012
73.500	0.012	0.012	0.012	0.012	0.012
73.750	0.012	0.012	0.012	0.012	0.012
74.000	0.012	0.012	0.012	0.012	0.012
74.250	0.012	0.012	0.012	0.012	0.012
74.500	0.012	0.012	0.012	0.012	0.012
74.750	0.012	0.012	0.012	0.012	0.012
75.000	0.012	0.012	0.012	0.012	0.012
75.250	0.012	0.012	0.012	0.012	0.012
75.500	0.012	0.012	0.012	0.012	0.012
75.750	0.012	0.012	0.012	0.012	0.012
76.000	0.012	0.012	0.012	0.012	0.012
76.250	0.012	0.012	0.012	0.012	0.012
76.500	0.012	0.012	0.012	0.012	0.012
76.750	0.012	0.012	0.012	0.012	0.012
77.000	0.012	0.012	0.012	0.012	0.012
77.250	0.012	0.012	0.012	0.012	0.012
77.500	0.012	0.012	0.012	0.012	0.012
77.750	0.012	0.012	0.012	0.012	0.012
78.000	0.012	0.012	0.012	0.012	0.012
78.250	0.012	0.012	0.012	0.012	0.012
78.500	0.012	0.012	0.012	0.012	0.012
78.750	0.012	0.012	0.012	0.012	0.012
79.000	0.012	0.012	0.012	0.012	0.012
79.250	0.012	0.012	0.012	0.012	0.012
79.500	0.012	0.012	0.012	0.012	0.012
79.750	0.012	0.012	0.012	0.012	0.012
80.000	0.012	0.012	0.012	0.012	0.012
80.250	0.012	0.012	0.012	0.012	0.012
80.500	0.012	0.012	0.012	0.012	0.012
80.750	0.012	0.012	0.012	0.012	0.012
81.000	0.012	0.012	0.012	0.012	0.012
81.250	0.012	0.012	0.012	0.012	0.012
81.500	0.012	0.012	0.012	0.012	0.012

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #4
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
81.750	0.012	0.012	0.012	0.012	0.012
82.000	0.012	0.012	0.012	0.012	0.012
82.250	0.012	0.012	0.012	0.012	0.012
82.500	0.012	0.012	0.012	0.012	0.012
82.750	0.012	0.012	0.012	0.012	0.012
83.000	0.012	0.012	0.012	0.012	0.012
83.250	0.012	0.012	0.012	0.012	0.012
83.500	0.012	0.012	0.012	0.012	0.012
83.750	0.012	0.012	0.012	0.012	0.012
84.000	0.012	0.012	0.012	0.012	0.012
84.250	0.012	0.012	0.012	0.012	0.012
84.500	0.012	0.012	0.012	0.012	0.012
84.750	0.012	0.012	0.012	0.012	0.012
85.000	0.012	0.012	0.012	0.012	0.012
85.250	0.012	0.012	0.012	0.012	0.012
85.500	0.012	0.012	0.012	0.012	0.012
85.750	0.012	0.012	0.012	0.012	0.012
86.000	0.012	0.012	0.012	0.012	0.012
86.250	0.012	0.012	0.012	0.012	0.012
86.500	0.012	0.012	0.012	0.012	0.012
86.750	0.012	0.012	0.012	0.012	0.012
87.000	0.012	0.012	0.012	0.012	0.012
87.250	0.012	0.012	0.012	0.012	0.012
87.500	0.012	0.012	0.012	0.012	0.012
87.750	0.012	0.012	0.012	0.012	0.012
88.000	0.012	0.012	0.012	0.012	0.012
88.250	0.012	0.012	0.012	0.012	0.012
88.500	0.012	0.012	0.012	0.012	0.012
88.750	0.012	0.012	0.012	0.012	0.012
89.000	0.012	0.012	0.012	0.012	0.012
89.250	0.012	0.012	0.012	0.012	0.012
89.500	0.012	0.012	0.012	0.012	0.012
89.750	0.012	0.012	0.012	0.012	0.012
90.000	0.012	0.012	0.012	0.012	0.012
90.250	0.012	0.012	0.012	0.012	0.012
90.500	0.012	0.012	0.012	0.012	0.012
90.750	0.012	0.012	0.012	0.012	0.012
91.000	0.012	0.012	0.012	0.012	0.012
91.250	0.012	0.012	0.012	0.012	0.012
91.500	0.012	0.012	0.012	0.012	0.012
91.750	0.012	0.012	0.012	0.012	0.012

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #4
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
92.000	0.012	0.012	0.012	0.012	0.012
92.250	0.012	0.012	0.012	0.012	0.012
92.500	0.012	0.012	0.012	0.012	0.012
92.750	0.012	0.012	0.012	0.012	0.012
93.000	0.012	0.012	0.012	0.012	0.012
93.250	0.012	0.012	0.012	0.012	0.012
93.500	0.012	0.012	0.012	0.012	0.012
93.750	0.012	0.012	0.012	0.012	0.012
94.000	0.012	0.012	0.012	0.012	0.012
94.250	0.012	0.012	0.012	0.012	0.012
94.500	0.012	0.012	0.012	0.012	0.012
94.750	0.012	0.012	0.012	0.012	0.012
95.000	0.012	0.012	0.012	0.012	0.012
95.250	0.012	0.012	0.012	0.012	0.012
95.500	0.012	0.012	0.012	0.012	0.012
95.750	0.012	0.012	0.012	0.012	0.012
96.000	0.012	0.012	0.012	0.012	0.012
96.250	0.012	0.012	0.012	0.012	0.012
96.500	0.012	0.012	0.012	0.012	0.012
96.750	0.012	0.012	0.012	0.012	0.012
97.000	0.012	0.012	0.012	0.012	0.012
97.250	0.012	0.012	0.012	0.012	0.012
97.500	0.012	0.012	0.012	0.012	0.012
97.750	0.012	0.012	0.012	0.012	0.012
98.000	0.012	0.012	0.012	0.012	0.012
98.250	0.012	0.012	0.012	0.012	0.012
98.500	0.012	0.012	0.012	0.012	0.012
98.750	0.012	0.012	0.012	0.012	0.012
99.000	0.012	0.012	0.012	0.012	0.012
99.250	0.012	0.012	0.012	0.012	0.012
99.500	0.012	0.012	0.012	0.012	0.012
99.750	0.012	0.012	0.012	0.012	0.012
100.000	0.012	(N/A)	(N/A)	(N/A)	(N/A)

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #5
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
0.000	0.000	0.000	0.000	0.000	0.000
0.250	0.000	0.000	0.000	0.000	0.000
0.500	0.000	0.000	0.000	0.000	0.000
0.750	0.000	0.000	0.000	0.000	0.000
1.000	0.001	0.001	0.001	0.002	0.003
1.250	0.005	0.006	0.008	0.009	0.011
1.500	0.013	0.014	0.016	0.018	0.020
1.750	0.022	0.023	0.025	0.026	0.028
2.000	0.029	0.031	0.032	0.034	0.036
2.250	0.037	0.039	0.040	0.042	0.044
2.500	0.045	0.047	0.049	0.050	0.052
2.750	0.054	0.055	0.057	0.059	0.061
3.000	0.063	0.064	0.066	0.068	0.070
3.250	0.072	0.074	0.075	0.077	0.079
3.500	0.081	0.083	0.085	0.087	0.089
3.750	0.091	0.093	0.095	0.097	0.099
4.000	0.101	0.103	0.105	0.107	0.110
4.250	0.113	0.115	0.117	0.120	0.122
4.500	0.124	0.127	0.129	0.131	0.133
4.750	0.135	0.137	0.139	0.141	0.143
5.000	0.145	0.146	0.148	0.150	0.151
5.250	0.153	0.155	0.157	0.159	0.161
5.500	0.163	0.165	0.167	0.170	0.172
5.750	0.175	0.177	0.180	0.183	0.186
6.000	0.189	0.192	0.194	0.196	0.198
6.250	0.200	0.203	0.205	0.207	0.210
6.500	0.212	0.215	0.217	0.220	0.223
6.750	0.226	0.229	0.232	0.235	0.238
7.000	0.242	0.245	0.249	0.253	0.256
7.250	0.260	0.265	0.269	0.272	0.275
7.500	0.278	0.281	0.284	0.288	0.291
7.750	0.294	0.298	0.301	0.305	0.308
8.000	0.312	0.316	0.320	0.324	0.328
8.250	0.332	0.337	0.341	0.346	0.350
8.500	0.355	0.360	0.365	0.370	0.375
8.750	0.381	0.386	0.392	0.396	0.401
9.000	0.406	0.411	0.416	0.421	0.426
9.250	0.432	0.437	0.443	0.449	0.455
9.500	0.462	0.468	0.475	0.482	0.489
9.750	0.496	0.504	0.511	0.519	0.526

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #5
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
10.000	0.533	0.540	0.546	0.552	0.557
10.250	0.562	0.567	0.571	0.574	0.578
10.500	0.581	0.584	0.588	0.592	0.596
10.750	0.599	0.604	0.608	0.612	0.616
11.000	0.621	0.626	0.631	0.637	0.644
11.250	0.651	0.658	0.665	0.673	0.681
11.500	0.688	0.702	0.719	0.736	0.750
11.750	0.770	0.794	0.825	0.862	0.918
12.000	0.993	1.101	1.239	1.293	1.272
12.250	1.242	1.205	1.165	1.123	1.086
12.500	1.054	1.019	0.982	0.950	0.921
12.750	0.897	0.875	0.855	0.837	0.820
13.000	0.804	0.790	0.777	0.765	0.754
13.250	0.745	0.736	0.728	0.721	0.714
13.500	0.707	0.701	0.695	0.689	0.684
13.750	0.679	0.674	0.669	0.665	0.661
14.000	0.657	0.653	0.650	0.646	0.643
14.250	0.640	0.637	0.634	0.632	0.629
14.500	0.627	0.624	0.622	0.620	0.618
14.750	0.615	0.613	0.611	0.609	0.607
15.000	0.605	0.603	0.601	0.600	0.598
15.250	0.596	0.595	0.594	0.592	0.591
15.500	0.590	0.589	0.588	0.587	0.586
15.750	0.585	0.584	0.584	0.583	0.582
16.000	0.582	0.581	0.580	0.580	0.579
16.250	0.579	0.578	0.577	0.577	0.576
16.500	0.576	0.575	0.575	0.574	0.574
16.750	0.573	0.573	0.572	0.572	0.571
17.000	0.571	0.570	0.570	0.569	0.569
17.250	0.569	0.568	0.568	0.567	0.567
17.500	0.566	0.566	0.565	0.565	0.564
17.750	0.564	0.563	0.563	0.563	0.562
18.000	0.562	0.561	0.561	0.561	0.560
18.250	0.560	0.560	0.559	0.559	0.559
18.500	0.559	0.558	0.558	0.558	0.558
18.750	0.558	0.558	0.558	0.557	0.557
19.000	0.557	0.557	0.557	0.557	0.557
19.250	0.557	0.556	0.556	0.556	0.556
19.500	0.556	0.556	0.556	0.556	0.556
19.750	0.556	0.555	0.555	0.555	0.555
20.000	0.555	0.555	0.555	0.555	0.555

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #5
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
20.250	0.555	0.554	0.554	0.554	0.554
20.500	0.554	0.554	0.554	0.554	0.554
20.750	0.554	0.554	0.553	0.553	0.553
21.000	0.553	0.553	0.553	0.553	0.553
21.250	0.553	0.553	0.553	0.552	0.552
21.500	0.552	0.552	0.552	0.552	0.552
21.750	0.552	0.552	0.552	0.552	0.551
22.000	0.551	0.551	0.551	0.551	0.551
22.250	0.551	0.551	0.551	0.551	0.550
22.500	0.550	0.550	0.550	0.550	0.550
22.750	0.550	0.550	0.550	0.550	0.550
23.000	0.549	0.549	0.549	0.549	0.549
23.250	0.549	0.549	0.549	0.549	0.549
23.500	0.548	0.548	0.548	0.548	0.548
23.750	0.548	0.548	0.548	0.548	0.548
24.000	0.548	0.547	0.545	0.544	0.542
24.250	0.540	0.539	0.537	0.536	0.534
24.500	0.533	0.532	0.531	0.530	0.529
24.750	0.528	0.527	0.526	0.525	0.524
25.000	0.523	0.522	0.522	0.521	0.520
25.250	0.520	0.519	0.518	0.518	0.517
25.500	0.517	0.516	0.516	0.515	0.515
25.750	0.514	0.514	0.514	0.513	0.513
26.000	0.512	0.512	0.512	0.511	0.511
26.250	0.511	0.511	0.510	0.510	0.510
26.500	0.509	0.509	0.509	0.509	0.508
26.750	0.508	0.508	0.507	0.507	0.507
27.000	0.506	0.506	0.506	0.505	0.505
27.250	0.505	0.504	0.504	0.503	0.503
27.500	0.503	0.502	0.502	0.502	0.501
27.750	0.501	0.500	0.500	0.499	0.499
28.000	0.498	0.498	0.497	0.497	0.497
28.250	0.496	0.496	0.495	0.494	0.494
28.500	0.493	0.493	0.492	0.492	0.491
28.750	0.491	0.490	0.489	0.489	0.488
29.000	0.488	0.487	0.486	0.486	0.485
29.250	0.484	0.484	0.483	0.482	0.482
29.500	0.481	0.480	0.480	0.479	0.478
29.750	0.478	0.477	0.476	0.475	0.475
30.000	0.474	0.473	0.472	0.471	0.471
30.250	0.470	0.469	0.468	0.467	0.467

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #5
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
30.500	0.466	0.465	0.464	0.463	0.462
30.750	0.462	0.461	0.460	0.459	0.458
31.000	0.457	0.456	0.456	0.455	0.454
31.250	0.453	0.452	0.451	0.450	0.449
31.500	0.448	0.447	0.446	0.445	0.445
31.750	0.444	0.443	0.442	0.441	0.440
32.000	0.439	0.438	0.437	0.436	0.435
32.250	0.434	0.433	0.432	0.431	0.430
32.500	0.429	0.428	0.427	0.426	0.425
32.750	0.424	0.423	0.422	0.421	0.420
33.000	0.419	0.418	0.417	0.416	0.415
33.250	0.413	0.412	0.411	0.410	0.409
33.500	0.408	0.407	0.406	0.405	0.404
33.750	0.403	0.402	0.400	0.399	0.398
34.000	0.397	0.396	0.395	0.394	0.393
34.250	0.392	0.390	0.389	0.388	0.386
34.500	0.385	0.383	0.382	0.381	0.379
34.750	0.378	0.377	0.375	0.374	0.373
35.000	0.371	0.370	0.369	0.368	0.366
35.250	0.365	0.364	0.362	0.361	0.360
35.500	0.359	0.357	0.356	0.355	0.353
35.750	0.352	0.351	0.350	0.348	0.347
36.000	0.346	0.345	0.344	0.342	0.341
36.250	0.340	0.339	0.337	0.336	0.335
36.500	0.334	0.333	0.332	0.330	0.329
36.750	0.328	0.327	0.326	0.325	0.323
37.000	0.322	0.321	0.320	0.319	0.318
37.250	0.317	0.316	0.314	0.313	0.312
37.500	0.311	0.310	0.309	0.308	0.307
37.750	0.306	0.305	0.304	0.303	0.301
38.000	0.300	0.299	0.298	0.297	0.296
38.250	0.295	0.294	0.293	0.292	0.291
38.500	0.290	0.289	0.288	0.287	0.286
38.750	0.285	0.284	0.283	0.282	0.281
39.000	0.280	0.279	0.279	0.278	0.277
39.250	0.276	0.275	0.274	0.273	0.272
39.500	0.271	0.270	0.268	0.267	0.266
39.750	0.264	0.263	0.262	0.260	0.259
40.000	0.258	0.256	0.255	0.254	0.252
40.250	0.251	0.250	0.249	0.247	0.246
40.500	0.245	0.244	0.243	0.242	0.240

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #5
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
40.750	0.239	0.238	0.237	0.236	0.235
41.000	0.234	0.232	0.231	0.230	0.229
41.250	0.228	0.227	0.226	0.225	0.224
41.500	0.223	0.222	0.221	0.220	0.219
41.750	0.218	0.217	0.216	0.215	0.214
42.000	0.213	0.212	0.211	0.210	0.210
42.250	0.209	0.208	0.207	0.206	0.205
42.500	0.204	0.203	0.203	0.202	0.201
42.750	0.200	0.199	0.198	0.198	0.197
43.000	0.196	0.195	0.194	0.194	0.193
43.250	0.192	0.191	0.189	0.188	0.187
43.500	0.186	0.184	0.183	0.182	0.181
43.750	0.180	0.179	0.178	0.177	0.176
44.000	0.174	0.173	0.172	0.171	0.171
44.250	0.170	0.169	0.168	0.167	0.166
44.500	0.165	0.164	0.163	0.162	0.162
44.750	0.161	0.160	0.159	0.158	0.158
45.000	0.157	0.156	0.156	0.155	0.154
45.250	0.153	0.153	0.152	0.151	0.151
45.500	0.150	0.150	0.149	0.148	0.148
45.750	0.147	0.147	0.146	0.145	0.145
46.000	0.144	0.143	0.143	0.142	0.142
46.250	0.141	0.140	0.140	0.139	0.138
46.500	0.138	0.137	0.136	0.135	0.135
46.750	0.134	0.133	0.133	0.132	0.131
47.000	0.131	0.130	0.129	0.128	0.128
47.250	0.127	0.126	0.126	0.125	0.124
47.500	0.123	0.123	0.122	0.121	0.120
47.750	0.120	0.119	0.118	0.117	0.117
48.000	0.116	0.115	0.114	0.114	0.113
48.250	0.112	0.111	0.110	0.110	0.109
48.500	0.108	0.107	0.107	0.106	0.105
48.750	0.104	0.104	0.103	0.103	0.102
49.000	0.101	0.101	0.100	0.100	0.099
49.250	0.099	0.098	0.097	0.097	0.096
49.500	0.096	0.095	0.095	0.094	0.093
49.750	0.093	0.092	0.092	0.091	0.091
50.000	0.090	0.090	0.089	0.089	0.088
50.250	0.088	0.087	0.087	0.086	0.086
50.500	0.085	0.085	0.084	0.084	0.083
50.750	0.083	0.082	0.082	0.081	0.081

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #5
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
51.000	0.080	0.080	0.079	0.079	0.078
51.250	0.078	0.078	0.077	0.077	0.076
51.500	0.076	0.075	0.075	0.074	0.074
51.750	0.074	0.073	0.073	0.072	0.072
52.000	0.071	0.071	0.071	0.070	0.070
52.250	0.069	0.069	0.069	0.068	0.068
52.500	0.067	0.067	0.067	0.066	0.066
52.750	0.065	0.065	0.065	0.064	0.064
53.000	0.063	0.063	0.063	0.062	0.062
53.250	0.062	0.061	0.061	0.061	0.060
53.500	0.060	0.059	0.059	0.059	0.058
53.750	0.058	0.058	0.057	0.057	0.057
54.000	0.056	0.056	0.056	0.055	0.055
54.250	0.055	0.054	0.054	0.054	0.053
54.500	0.053	0.053	0.052	0.052	0.052
54.750	0.051	0.051	0.051	0.051	0.050
55.000	0.050	0.050	0.049	0.049	0.049
55.250	0.049	0.048	0.048	0.048	0.047
55.500	0.047	0.047	0.047	0.046	0.046
55.750	0.046	0.046	0.045	0.045	0.045
56.000	0.045	0.044	0.044	0.044	0.044
56.250	0.043	0.043	0.043	0.043	0.043
56.500	0.042	0.042	0.042	0.042	0.042
56.750	0.041	0.041	0.041	0.041	0.040
57.000	0.040	0.040	0.040	0.040	0.040
57.250	0.039	0.039	0.039	0.039	0.039
57.500	0.038	0.038	0.038	0.038	0.038
57.750	0.038	0.037	0.037	0.037	0.037
58.000	0.037	0.037	0.036	0.036	0.036
58.250	0.036	0.036	0.036	0.036	0.035
58.500	0.035	0.035	0.035	0.035	0.035
58.750	0.035	0.034	0.034	0.034	0.034
59.000	0.034	0.034	0.034	0.033	0.033
59.250	0.033	0.033	0.033	0.033	0.033
59.500	0.033	0.033	0.032	0.032	0.032
59.750	0.032	0.032	0.032	0.032	0.032
60.000	0.031	0.031	0.031	0.031	0.031
60.250	0.031	0.031	0.031	0.031	0.031
60.500	0.030	0.030	0.030	0.030	0.030
60.750	0.030	0.030	0.030	0.030	0.030
61.000	0.030	0.029	0.029	0.029	0.029

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #5
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
61.250	0.029	0.029	0.029	0.029	0.029
61.500	0.029	0.029	0.029	0.029	0.028
61.750	0.028	0.028	0.028	0.028	0.028
62.000	0.028	0.028	0.028	0.028	0.028
62.250	0.028	0.028	0.028	0.027	0.027
62.500	0.027	0.027	0.027	0.027	0.027
62.750	0.027	0.027	0.027	0.027	0.027
63.000	0.027	0.027	0.027	0.027	0.027
63.250	0.026	0.026	0.026	0.026	0.026
63.500	0.026	0.026	0.026	0.026	0.026
63.750	0.026	0.026	0.026	0.026	0.026
64.000	0.026	0.026	0.026	0.026	0.026
64.250	0.025	0.025	0.025	0.025	0.025
64.500	0.025	0.025	0.025	0.025	0.025
64.750	0.025	0.025	0.025	0.025	0.025
65.000	0.025	0.025	0.025	0.025	0.025
65.250	0.025	0.025	0.025	0.025	0.025
65.500	0.025	0.024	0.024	0.024	0.024
65.750	0.024	0.024	0.024	0.024	0.024
66.000	0.024	0.024	0.024	0.024	0.024
66.250	0.024	0.024	0.024	0.024	0.024
66.500	0.024	0.024	0.024	0.024	0.024
66.750	0.024	0.024	0.024	0.024	0.024
67.000	0.024	0.024	0.024	0.024	0.024
67.250	0.024	0.023	0.023	0.023	0.023
67.500	0.023	0.023	0.023	0.023	0.023
67.750	0.023	0.023	0.023	0.023	0.023
68.000	0.023	0.023	0.023	0.023	0.023
68.250	0.023	0.023	0.023	0.023	0.023
68.500	0.023	0.023	0.023	0.023	0.023
68.750	0.023	0.023	0.023	0.023	0.023
69.000	0.023	0.023	0.023	0.023	0.023
69.250	0.023	0.023	0.023	0.023	0.023
69.500	0.023	0.023	0.023	0.023	0.023
69.750	0.023	0.023	0.023	0.023	0.022
70.000	0.022	0.022	0.022	0.022	0.022
70.250	0.022	0.022	0.022	0.022	0.022
70.500	0.022	0.022	0.022	0.022	0.022
70.750	0.022	0.022	0.022	0.022	0.022
71.000	0.022	0.022	0.022	0.022	0.022
71.250	0.022	0.022	0.022	0.022	0.022

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #5
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
71.500	0.022	0.022	0.022	0.022	0.022
71.750	0.022	0.022	0.022	0.022	0.022
72.000	0.022	0.022	0.022	0.022	0.022
72.250	0.022	0.022	0.022	0.022	0.022
72.500	0.022	0.022	0.022	0.022	0.022
72.750	0.022	0.022	0.022	0.022	0.022
73.000	0.022	0.022	0.022	0.022	0.022
73.250	0.022	0.022	0.022	0.022	0.022
73.500	0.022	0.022	0.022	0.022	0.022
73.750	0.022	0.022	0.022	0.022	0.022
74.000	0.022	0.022	0.022	0.022	0.022
74.250	0.022	0.022	0.022	0.022	0.022
74.500	0.022	0.022	0.022	0.022	0.022
74.750	0.022	0.022	0.022	0.022	0.022
75.000	0.022	0.022	0.022	0.022	0.022
75.250	0.022	0.022	0.022	0.022	0.022
75.500	0.022	0.022	0.022	0.022	0.022
75.750	0.022	0.022	0.022	0.022	0.022
76.000	0.022	0.022	0.022	0.022	0.022
76.250	0.022	0.022	0.022	0.022	0.022
76.500	0.022	0.022	0.022	0.022	0.022
76.750	0.022	0.022	0.022	0.022	0.022
77.000	0.022	0.022	0.022	0.022	0.022
77.250	0.022	0.022	0.022	0.022	0.022
77.500	0.022	0.022	0.022	0.022	0.022
77.750	0.022	0.022	0.022	0.022	0.022
78.000	0.022	0.022	0.022	0.022	0.022
78.250	0.022	0.022	0.022	0.022	0.022
78.500	0.022	0.022	0.022	0.022	0.022
78.750	0.022	0.022	0.022	0.022	0.022
79.000	0.022	0.022	0.022	0.022	0.022
79.250	0.022	0.022	0.022	0.022	0.022
79.500	0.022	0.022	0.022	0.022	0.022
79.750	0.022	0.022	0.022	0.022	0.022
80.000	0.022	0.022	0.022	0.022	0.022
80.250	0.022	0.022	0.022	0.022	0.022
80.500	0.022	0.022	0.022	0.022	0.022
80.750	0.022	0.022	0.022	0.022	0.022
81.000	0.022	0.022	0.022	0.022	0.022
81.250	0.022	0.022	0.022	0.022	0.022
81.500	0.022	0.022	0.022	0.022	0.022

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #5
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
81.750	0.022	0.022	0.022	0.022	0.022
82.000	0.022	0.022	0.022	0.022	0.022
82.250	0.022	0.022	0.022	0.022	0.022
82.500	0.022	0.022	0.022	0.022	0.022
82.750	0.022	0.022	0.022	0.022	0.022
83.000	0.022	0.022	0.022	0.022	0.022
83.250	0.022	0.022	0.022	0.022	0.022
83.500	0.022	0.022	0.022	0.022	0.022
83.750	0.022	0.022	0.022	0.022	0.022
84.000	0.022	0.022	0.022	0.022	0.022
84.250	0.022	0.022	0.022	0.022	0.022
84.500	0.022	0.022	0.022	0.022	0.022
84.750	0.022	0.022	0.022	0.022	0.022
85.000	0.022	0.022	0.022	0.022	0.022
85.250	0.022	0.022	0.022	0.022	0.022
85.500	0.022	0.022	0.022	0.022	0.022
85.750	0.022	0.022	0.022	0.022	0.022
86.000	0.022	0.022	0.022	0.022	0.022
86.250	0.022	0.022	0.022	0.022	0.022
86.500	0.022	0.022	0.022	0.022	0.022
86.750	0.022	0.022	0.022	0.022	0.022
87.000	0.022	0.022	0.022	0.022	0.022
87.250	0.022	0.022	0.022	0.022	0.022
87.500	0.022	0.022	0.022	0.022	0.022
87.750	0.022	0.022	0.022	0.022	0.022
88.000	0.022	0.022	0.022	0.022	0.022
88.250	0.022	0.022	0.022	0.022	0.022
88.500	0.022	0.022	0.022	0.022	0.022
88.750	0.022	0.022	0.022	0.022	0.022
89.000	0.022	0.022	0.022	0.022	0.022
89.250	0.022	0.022	0.022	0.022	0.022
89.500	0.022	0.022	0.022	0.022	0.022
89.750	0.022	0.022	0.022	0.022	0.022
90.000	0.022	0.022	0.022	0.022	0.022
90.250	0.022	0.022	0.022	0.022	0.022
90.500	0.022	0.022	0.022	0.022	0.022
90.750	0.022	0.022	0.022	0.022	0.022
91.000	0.022	0.022	0.022	0.022	0.022
91.250	0.022	0.022	0.022	0.022	0.022
91.500	0.022	0.022	0.022	0.022	0.022
91.750	0.022	0.022	0.022	0.022	0.022

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #5
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
92.000	0.022	0.022	0.022	0.022	0.022
92.250	0.022	0.022	0.022	0.022	0.022
92.500	0.022	0.022	0.022	0.022	0.022
92.750	0.022	0.022	0.022	0.022	0.022
93.000	0.022	0.022	0.022	0.022	0.022
93.250	0.022	0.022	0.022	0.022	0.022
93.500	0.022	0.022	0.022	0.022	0.022
93.750	0.022	0.022	0.022	0.022	0.022
94.000	0.022	0.022	0.022	0.022	0.022
94.250	0.022	0.022	0.022	0.022	0.022
94.500	0.022	0.022	0.022	0.022	0.022
94.750	0.022	0.022	0.022	0.022	0.022
95.000	0.022	0.022	0.022	0.022	0.022
95.250	0.022	0.022	0.022	0.022	0.022
95.500	0.022	0.022	0.022	0.022	0.022
95.750	0.022	0.022	0.022	0.022	0.022
96.000	0.022	0.022	0.022	0.022	0.022
96.250	0.022	0.022	0.022	0.022	0.022
96.500	0.022	0.022	0.022	0.022	0.022
96.750	0.022	0.022	0.022	0.022	0.022
97.000	0.022	0.022	0.022	0.022	0.022
97.250	0.022	0.022	0.022	0.022	0.022
97.500	0.022	0.022	0.022	0.022	0.022
97.750	0.022	0.022	0.022	0.022	0.022
98.000	0.022	0.022	0.022	0.022	0.022
98.250	0.022	0.022	0.022	0.022	0.022
98.500	0.022	0.022	0.022	0.022	0.022
98.750	0.022	0.022	0.022	0.022	0.022
99.000	0.022	0.022	0.022	0.022	0.022
99.250	0.022	0.022	0.022	0.022	0.022
99.500	0.022	0.022	0.022	0.022	0.022
99.750	0.022	0.022	0.022	0.022	0.022
100.000	0.022	(N/A)	(N/A)	(N/A)	(N/A)

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #6
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
0.000	0.000	0.000	0.000	0.000	0.000
0.250	0.000	0.000	0.000	0.000	0.000
0.500	0.000	0.000	0.000	0.000	0.000
0.750	0.000	0.000	0.000	0.000	0.000
1.000	0.000	0.000	0.000	0.001	0.001
1.250	0.001	0.001	0.002	0.002	0.002
1.500	0.002	0.002	0.003	0.003	0.003
1.750	0.003	0.003	0.003	0.003	0.004
2.000	0.004	0.004	0.004	0.004	0.004
2.250	0.004	0.004	0.004	0.004	0.004
2.500	0.004	0.004	0.005	0.005	0.005
2.750	0.005	0.005	0.005	0.005	0.005
3.000	0.005	0.005	0.005	0.005	0.005
3.250	0.005	0.005	0.005	0.005	0.005
3.500	0.005	0.005	0.005	0.006	0.006
3.750	0.006	0.006	0.006	0.006	0.006
4.000	0.006	0.006	0.006	0.006	0.006
4.250	0.006	0.006	0.006	0.006	0.006
4.500	0.006	0.006	0.006	0.006	0.006
4.750	0.006	0.007	0.007	0.007	0.007
5.000	0.007	0.007	0.007	0.007	0.007
5.250	0.007	0.007	0.007	0.007	0.007
5.500	0.007	0.007	0.007	0.007	0.007
5.750	0.007	0.007	0.007	0.007	0.007
6.000	0.007	0.008	0.008	0.008	0.008
6.250	0.008	0.008	0.008	0.008	0.008
6.500	0.008	0.008	0.008	0.008	0.008
6.750	0.008	0.008	0.009	0.009	0.009
7.000	0.009	0.009	0.009	0.009	0.009
7.250	0.009	0.009	0.009	0.010	0.010
7.500	0.010	0.010	0.010	0.010	0.010
7.750	0.010	0.010	0.010	0.011	0.011
8.000	0.011	0.011	0.011	0.011	0.011
8.250	0.011	0.012	0.012	0.012	0.012
8.500	0.012	0.012	0.012	0.012	0.013
8.750	0.013	0.013	0.013	0.013	0.013
9.000	0.013	0.013	0.014	0.014	0.014
9.250	0.014	0.014	0.014	0.015	0.015
9.500	0.015	0.015	0.015	0.016	0.016
9.750	0.016	0.016	0.017	0.017	0.018

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #6
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
10.000	0.018	0.019	0.019	0.020	0.020
10.250	0.020	0.021	0.021	0.022	0.022
10.500	0.023	0.023	0.024	0.025	0.026
10.750	0.027	0.028	0.029	0.030	0.032
11.000	0.033	0.035	0.037	0.039	0.041
11.250	0.043	0.046	0.048	0.051	0.054
11.500	0.057	0.061	0.065	0.070	0.074
11.750	0.077	0.079	0.082	0.084	0.089
12.000	0.095	0.102	0.109	0.103	0.093
12.250	0.088	0.084	0.082	0.080	0.079
12.500	0.079	0.078	0.076	0.076	0.075
12.750	0.075	0.075	0.074	0.074	0.074
13.000	0.074	0.073	0.073	0.072	0.072
13.250	0.071	0.070	0.069	0.069	0.068
13.500	0.067	0.066	0.066	0.065	0.064
13.750	0.064	0.063	0.062	0.062	0.062
14.000	0.061	0.061	0.060	0.060	0.060
14.250	0.059	0.059	0.059	0.058	0.058
14.500	0.058	0.058	0.057	0.057	0.057
14.750	0.057	0.056	0.056	0.056	0.056
15.000	0.055	0.055	0.055	0.055	0.055
15.250	0.054	0.054	0.054	0.054	0.053
15.500	0.053	0.053	0.053	0.052	0.052
15.750	0.052	0.051	0.051	0.051	0.050
16.000	0.050	0.050	0.049	0.049	0.049
16.250	0.048	0.048	0.048	0.047	0.047
16.500	0.047	0.046	0.046	0.046	0.045
16.750	0.045	0.044	0.044	0.044	0.043
17.000	0.043	0.042	0.042	0.042	0.041
17.250	0.041	0.040	0.040	0.039	0.039
17.500	0.038	0.038	0.037	0.037	0.036
17.750	0.036	0.035	0.035	0.034	0.034
18.000	0.033	0.033	0.032	0.032	0.031
18.250	0.031	0.030	0.030	0.029	0.029
18.500	0.028	0.028	0.028	0.027	0.027
18.750	0.026	0.026	0.025	0.025	0.024
19.000	0.024	0.023	0.023	0.022	0.022
19.250	0.022	0.021	0.021	0.020	0.020
19.500	0.020	0.020	0.019	0.019	0.018
19.750	0.018	0.018	0.017	0.017	0.017
20.000	0.016	0.016	0.016	0.016	0.015

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #6
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
20.250	0.015	0.015	0.015	0.015	0.015
20.500	0.014	0.014	0.014	0.014	0.014
20.750	0.014	0.013	0.013	0.013	0.013
21.000	0.013	0.013	0.012	0.012	0.012
21.250	0.012	0.012	0.012	0.012	0.011
21.500	0.011	0.011	0.011	0.011	0.011
21.750	0.011	0.011	0.011	0.010	0.010
22.000	0.010	0.010	0.010	0.010	0.010
22.250	0.010	0.010	0.010	0.010	0.010
22.500	0.010	0.010	0.010	0.010	0.009
22.750	0.009	0.009	0.009	0.009	0.009
23.000	0.009	0.009	0.009	0.009	0.009
23.250	0.009	0.009	0.009	0.009	0.009
23.500	0.009	0.009	0.009	0.009	0.009
23.750	0.008	0.008	0.008	0.008	0.008
24.000	0.008	0.008	0.008	0.007	0.007
24.250	0.007	0.006	0.006	0.006	0.005
24.500	0.005	0.005	0.004	0.004	0.004
24.750	0.004	0.004	0.004	0.003	0.003
25.000	0.003	0.003	0.003	0.003	0.003
25.250	0.003	0.003	0.003	0.003	0.003
25.500	0.003	0.003	0.002	0.002	0.002
25.750	0.002	0.002	0.002	0.002	0.002
26.000	0.002	0.002	0.002	0.002	0.002
26.250	0.002	0.002	0.002	0.002	0.002
26.500	0.002	0.002	0.002	0.002	0.002
26.750	0.002	0.002	0.002	0.002	0.002
27.000	0.002	0.002	0.002	0.002	0.002
27.250	0.002	0.002	0.002	0.002	0.002
27.500	0.002	0.002	0.002	0.002	0.002
27.750	0.002	0.002	0.002	0.002	0.002
28.000	0.002	0.002	0.002	0.002	0.002
28.250	0.002	0.002	0.002	0.002	0.002
28.500	0.002	0.002	0.002	0.002	0.002
28.750	0.002	0.002	0.002	0.002	0.002
29.000	0.002	0.002	0.002	0.002	0.002
29.250	0.002	0.002	0.002	0.002	0.002
29.500	0.002	0.002	0.002	0.002	0.002
29.750	0.002	0.002	0.002	0.002	0.002
30.000	0.002	0.002	0.002	0.002	0.002
30.250	0.002	0.002	0.002	0.002	0.002

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #6
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
30.500	0.002	0.002	0.002	0.002	0.002
30.750	0.002	0.002	0.002	0.002	0.002
31.000	0.002	0.002	0.002	0.002	0.002
31.250	0.002	0.002	0.002	0.002	0.002
31.500	0.002	0.002	0.002	0.002	0.002
31.750	0.002	0.002	0.002	0.002	0.002
32.000	0.002	0.002	0.002	0.002	0.002
32.250	0.002	0.002	0.002	0.002	0.002
32.500	0.002	0.002	0.002	0.002	0.002
32.750	0.002	0.002	0.002	0.002	0.002
33.000	0.002	0.002	0.002	0.002	0.002
33.250	0.002	0.002	0.002	0.002	0.002
33.500	0.002	0.002	0.002	0.002	0.002
33.750	0.002	0.002	0.002	0.002	0.002
34.000	0.002	0.002	0.002	0.002	0.002
34.250	0.002	0.002	0.002	0.002	0.002
34.500	0.002	0.002	0.002	0.002	0.002
34.750	0.002	0.002	0.002	0.002	0.002
35.000	0.002	0.002	0.002	0.002	0.002
35.250	0.002	0.002	0.002	0.002	0.002
35.500	0.002	0.002	0.002	0.002	0.002
35.750	0.002	0.002	0.002	0.002	0.002
36.000	0.002	0.002	0.002	0.002	0.002
36.250	0.002	0.002	0.002	0.002	0.002
36.500	0.002	0.002	0.002	0.002	0.002
36.750	0.002	0.002	0.002	0.002	0.002
37.000	0.002	0.002	0.002	0.002	0.002
37.250	0.002	0.002	0.002	0.002	0.002
37.500	0.002	0.002	0.002	0.002	0.002
37.750	0.002	0.002	0.002	0.002	0.002
38.000	0.002	0.002	0.002	0.002	0.002
38.250	0.002	0.002	0.002	0.002	0.002
38.500	0.002	0.002	0.002	0.002	0.002
38.750	0.002	0.002	0.002	0.002	0.002
39.000	0.002	0.002	0.002	0.002	0.002
39.250	0.002	0.002	0.002	0.002	0.002
39.500	0.002	0.002	0.002	0.002	0.002
39.750	0.002	0.002	0.002	0.002	0.002
40.000	0.002	0.002	0.002	0.002	0.002
40.250	0.002	0.002	0.002	0.002	0.002
40.500	0.002	0.002	0.002	0.002	0.002

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #6
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
40.750	0.002	0.002	0.002	0.002	0.002
41.000	0.002	0.002	0.002	0.002	0.002
41.250	0.002	0.002	0.002	0.002	0.002
41.500	0.002	0.002	0.002	0.002	0.002
41.750	0.002	0.002	0.002	0.002	0.002
42.000	0.002	0.002	0.002	0.002	0.002
42.250	0.002	0.002	0.002	0.002	0.002
42.500	0.002	0.002	0.002	0.002	0.002
42.750	0.002	0.002	0.002	0.002	0.002
43.000	0.002	0.002	0.002	0.002	0.002
43.250	0.002	0.002	0.002	0.002	0.002
43.500	0.002	0.002	0.002	0.002	0.002
43.750	0.002	0.002	0.002	0.002	0.002
44.000	0.002	0.002	0.002	0.002	0.002
44.250	0.002	0.002	0.002	0.002	0.002
44.500	0.002	0.002	0.002	0.002	0.002
44.750	0.002	0.002	0.002	0.002	0.002
45.000	0.002	0.002	0.002	0.002	0.002
45.250	0.002	0.002	0.002	0.002	0.002
45.500	0.002	0.002	0.002	0.002	0.002
45.750	0.002	0.002	0.002	0.002	0.002
46.000	0.002	0.002	0.002	0.002	0.002
46.250	0.002	0.002	0.002	0.002	0.002
46.500	0.002	0.002	0.002	0.002	0.002
46.750	0.002	0.002	0.002	0.002	0.002
47.000	0.002	0.002	0.002	0.002	0.002
47.250	0.002	0.002	0.002	0.002	0.002
47.500	0.002	0.002	0.002	0.002	0.002
47.750	0.002	0.002	0.002	0.002	0.002
48.000	0.002	0.002	0.002	0.002	0.002
48.250	0.002	0.002	0.002	0.002	0.002
48.500	0.002	0.002	0.002	0.002	0.002
48.750	0.002	0.002	0.002	0.002	0.002
49.000	0.002	0.002	0.002	0.002	0.002
49.250	0.002	0.002	0.002	0.002	0.002
49.500	0.002	0.002	0.002	0.002	0.002
49.750	0.002	0.002	0.002	0.002	0.002
50.000	0.002	0.002	0.002	0.002	0.002
50.250	0.002	0.002	0.002	0.002	0.002
50.500	0.002	0.002	0.002	0.002	0.002
50.750	0.002	0.002	0.002	0.002	0.002

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #6
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
51.000	0.002	0.002	0.002	0.002	0.002
51.250	0.002	0.002	0.002	0.002	0.002
51.500	0.002	0.002	0.002	0.002	0.002
51.750	0.002	0.002	0.002	0.002	0.002
52.000	0.002	0.002	0.002	0.002	0.002
52.250	0.002	0.002	0.002	0.002	0.002
52.500	0.002	0.002	0.002	0.002	0.002
52.750	0.002	0.002	0.002	0.002	0.002
53.000	0.002	0.002	0.002	0.002	0.002
53.250	0.002	0.002	0.002	0.002	0.002
53.500	0.002	0.002	0.002	0.002	0.002
53.750	0.002	0.002	0.002	0.002	0.002
54.000	0.002	0.002	0.002	0.002	0.002
54.250	0.002	0.002	0.002	0.002	0.002
54.500	0.002	0.002	0.002	0.002	0.002
54.750	0.002	0.002	0.002	0.002	0.002
55.000	0.002	0.002	0.002	0.002	0.002
55.250	0.002	0.002	0.002	0.002	0.002
55.500	0.002	0.002	0.002	0.002	0.002
55.750	0.002	0.002	0.002	0.002	0.002
56.000	0.002	0.002	0.002	0.002	0.002
56.250	0.002	0.002	0.002	0.002	0.002
56.500	0.002	0.002	0.002	0.002	0.002
56.750	0.002	0.002	0.002	0.002	0.002
57.000	0.002	0.002	0.002	0.002	0.002
57.250	0.002	0.002	0.002	0.002	0.002
57.500	0.002	0.002	0.002	0.002	0.002
57.750	0.002	0.002	0.002	0.002	0.002
58.000	0.002	0.002	0.002	0.002	0.002
58.250	0.002	0.002	0.002	0.002	0.002
58.500	0.002	0.002	0.002	0.002	0.002
58.750	0.002	0.002	0.002	0.002	0.002
59.000	0.002	0.002	0.002	0.002	0.002
59.250	0.002	0.002	0.002	0.002	0.002
59.500	0.002	0.002	0.002	0.002	0.002
59.750	0.002	0.002	0.002	0.002	0.002
60.000	0.002	0.002	0.002	0.002	0.002
60.250	0.002	0.002	0.002	0.002	0.002
60.500	0.002	0.002	0.002	0.002	0.002
60.750	0.002	0.002	0.002	0.002	0.002
61.000	0.002	0.002	0.002	0.002	0.002

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #6
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
61.250	0.002	0.002	0.002	0.002	0.002
61.500	0.002	0.002	0.002	0.002	0.002
61.750	0.002	0.002	0.002	0.002	0.002
62.000	0.002	0.002	0.002	0.002	0.002
62.250	0.002	0.002	0.002	0.002	0.002
62.500	0.002	0.002	0.002	0.002	0.002
62.750	0.002	0.002	0.002	0.002	0.002
63.000	0.002	0.002	0.002	0.002	0.002
63.250	0.002	0.002	0.002	0.002	0.002
63.500	0.002	0.002	0.002	0.002	0.002
63.750	0.002	0.002	0.002	0.002	0.002
64.000	0.002	0.002	0.002	0.002	0.002
64.250	0.002	0.002	0.002	0.002	0.002
64.500	0.002	0.002	0.002	0.002	0.002
64.750	0.002	0.002	0.002	0.002	0.002
65.000	0.002	0.002	0.002	0.002	0.002
65.250	0.002	0.002	0.002	0.002	0.002
65.500	0.002	0.002	0.002	0.002	0.002
65.750	0.002	0.002	0.002	0.002	0.002
66.000	0.002	0.002	0.002	0.002	0.002
66.250	0.002	0.002	0.002	0.002	0.002
66.500	0.002	0.002	0.002	0.002	0.002
66.750	0.002	0.002	0.002	0.002	0.002
67.000	0.002	0.002	0.002	0.002	0.002
67.250	0.002	0.002	0.002	0.002	0.002
67.500	0.002	0.002	0.002	0.002	0.002
67.750	0.002	0.002	0.002	0.002	0.002
68.000	0.002	0.002	0.002	0.002	0.002
68.250	0.002	0.002	0.002	0.002	0.002
68.500	0.002	0.002	0.002	0.002	0.002
68.750	0.002	0.002	0.002	0.002	0.002
69.000	0.002	0.002	0.002	0.002	0.002
69.250	0.002	0.002	0.002	0.002	0.002
69.500	0.002	0.002	0.002	0.002	0.002
69.750	0.002	0.002	0.002	0.002	0.002
70.000	0.002	0.002	0.002	0.002	0.002
70.250	0.002	0.002	0.002	0.002	0.002
70.500	0.002	0.002	0.002	0.002	0.002
70.750	0.002	0.002	0.002	0.002	0.002
71.000	0.002	0.002	0.002	0.002	0.002
71.250	0.002	0.002	0.002	0.002	0.002

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #6
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
71.500	0.002	0.002	0.002	0.002	0.002
71.750	0.002	0.002	0.002	0.002	0.002
72.000	0.002	0.002	0.002	0.002	0.002
72.250	0.002	0.002	0.002	0.002	0.002
72.500	0.002	0.002	0.002	0.002	0.002
72.750	0.002	0.002	0.002	0.002	0.002
73.000	0.002	0.002	0.002	0.002	0.002
73.250	0.002	0.002	0.002	0.002	0.002
73.500	0.002	0.002	0.002	0.002	0.002
73.750	0.002	0.002	0.002	0.002	0.002
74.000	0.002	0.002	0.002	0.002	0.002
74.250	0.002	0.002	0.002	0.002	0.002
74.500	0.002	0.002	0.002	0.002	0.002
74.750	0.002	0.002	0.002	0.002	0.002
75.000	0.002	0.002	0.002	0.002	0.002
75.250	0.002	0.002	0.002	0.002	0.002
75.500	0.002	0.002	0.002	0.002	0.002
75.750	0.002	0.002	0.002	0.002	0.002
76.000	0.002	0.002	0.002	0.002	0.002
76.250	0.002	0.002	0.002	0.002	0.002
76.500	0.002	0.002	0.002	0.002	0.002
76.750	0.002	0.002	0.002	0.002	0.002
77.000	0.002	0.002	0.002	0.002	0.002
77.250	0.002	0.002	0.002	0.002	0.002
77.500	0.002	0.002	0.002	0.002	0.002
77.750	0.002	0.002	0.002	0.002	0.002
78.000	0.002	0.002	0.002	0.002	0.002
78.250	0.002	0.002	0.002	0.002	0.002
78.500	0.002	0.002	0.002	0.002	0.002
78.750	0.002	0.002	0.002	0.002	0.002
79.000	0.002	0.002	0.002	0.002	0.002
79.250	0.002	0.002	0.002	0.002	0.002
79.500	0.002	0.002	0.002	0.002	0.002
79.750	0.002	0.002	0.002	0.002	0.002
80.000	0.002	0.002	0.002	0.002	0.002
80.250	0.002	0.002	0.002	0.002	0.002
80.500	0.002	0.002	0.002	0.002	0.002
80.750	0.002	0.002	0.002	0.002	0.002
81.000	0.002	0.002	0.002	0.002	0.002
81.250	0.002	0.002	0.002	0.002	0.002
81.500	0.002	0.002	0.002	0.002	0.002

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #6
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
81.750	0.002	0.002	0.002	0.002	0.002
82.000	0.002	0.002	0.002	0.002	0.002
82.250	0.002	0.002	0.002	0.002	0.002
82.500	0.002	0.002	0.002	0.002	0.002
82.750	0.002	0.002	0.002	0.002	0.002
83.000	0.002	0.002	0.002	0.002	0.002
83.250	0.002	0.002	0.002	0.002	0.002
83.500	0.002	0.002	0.002	0.002	0.002
83.750	0.002	0.002	0.002	0.002	0.002
84.000	0.002	0.002	0.002	0.002	0.002
84.250	0.002	0.002	0.002	0.002	0.002
84.500	0.002	0.002	0.002	0.002	0.002
84.750	0.002	0.002	0.002	0.002	0.002
85.000	0.002	0.002	0.002	0.002	0.002
85.250	0.002	0.002	0.002	0.002	0.002
85.500	0.002	0.002	0.002	0.002	0.002
85.750	0.002	0.002	0.002	0.002	0.002
86.000	0.002	0.002	0.002	0.002	0.002
86.250	0.002	0.002	0.002	0.002	0.002
86.500	0.002	0.002	0.002	0.002	0.002
86.750	0.002	0.002	0.002	0.002	0.002
87.000	0.002	0.002	0.002	0.002	0.002
87.250	0.002	0.002	0.002	0.002	0.002
87.500	0.002	0.002	0.002	0.002	0.002
87.750	0.002	0.002	0.002	0.002	0.002
88.000	0.002	0.002	0.002	0.002	0.002
88.250	0.002	0.002	0.002	0.002	0.002
88.500	0.002	0.002	0.002	0.002	0.002
88.750	0.002	0.002	0.002	0.002	0.002
89.000	0.002	0.002	0.002	0.002	0.002
89.250	0.002	0.002	0.002	0.002	0.002
89.500	0.002	0.002	0.002	0.002	0.002
89.750	0.002	0.002	0.002	0.002	0.002
90.000	0.002	0.002	0.002	0.002	0.002
90.250	0.002	0.002	0.002	0.002	0.002
90.500	0.002	0.002	0.002	0.002	0.002
90.750	0.002	0.002	0.002	0.002	0.002
91.000	0.002	0.002	0.002	0.002	0.002
91.250	0.002	0.002	0.002	0.002	0.002
91.500	0.002	0.002	0.002	0.002	0.002
91.750	0.002	0.002	0.002	0.002	0.002

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #6
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
92.000	0.002	0.002	0.002	0.002	0.002
92.250	0.002	0.002	0.002	0.002	0.002
92.500	0.002	0.002	0.002	0.002	0.002
92.750	0.002	0.002	0.002	0.002	0.002
93.000	0.002	0.002	0.002	0.002	0.002
93.250	0.002	0.002	0.002	0.002	0.002
93.500	0.002	0.002	0.002	0.002	0.002
93.750	0.002	0.002	0.002	0.002	0.002
94.000	0.002	0.002	0.002	0.002	0.002
94.250	0.002	0.002	0.002	0.002	0.002
94.500	0.002	0.002	0.002	0.002	0.002
94.750	0.002	0.002	0.002	0.002	0.002
95.000	0.002	0.002	0.002	0.002	0.002
95.250	0.002	0.002	0.002	0.002	0.002
95.500	0.002	0.002	0.002	0.002	0.002
95.750	0.002	0.002	0.002	0.002	0.002
96.000	0.002	0.002	0.002	0.002	0.002
96.250	0.002	0.002	0.002	0.002	0.002
96.500	0.002	0.002	0.002	0.002	0.002
96.750	0.002	0.002	0.002	0.002	0.002
97.000	0.002	0.002	0.002	0.002	0.002
97.250	0.002	0.002	0.002	0.002	0.002
97.500	0.002	0.002	0.002	0.002	0.002
97.750	0.002	0.002	0.002	0.002	0.002
98.000	0.002	0.002	0.002	0.002	0.002
98.250	0.002	0.002	0.002	0.002	0.002
98.500	0.002	0.002	0.002	0.002	0.002
98.750	0.002	0.002	0.002	0.002	0.002
99.000	0.002	0.002	0.002	0.002	0.002
99.250	0.002	0.002	0.002	0.002	0.002
99.500	0.002	0.002	0.002	0.002	0.002
99.750	0.002	0.002	0.002	0.002	0.002
100.000	0.002	(N/A)	(N/A)	(N/A)	(N/A)

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #7
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
0.000	0.000	0.000	0.000	0.000	0.000
0.250	0.000	0.000	0.000	0.000	0.000
0.500	0.000	0.000	0.000	0.000	0.000
0.750	0.000	0.000	0.000	0.000	0.000
1.000	0.000	0.000	0.000	0.000	0.001
1.250	0.001	0.001	0.001	0.001	0.001
1.500	0.001	0.002	0.002	0.002	0.002
1.750	0.002	0.002	0.002	0.002	0.002
2.000	0.002	0.002	0.002	0.002	0.002
2.250	0.002	0.002	0.002	0.002	0.002
2.500	0.002	0.002	0.002	0.002	0.002
2.750	0.002	0.002	0.002	0.002	0.002
3.000	0.002	0.002	0.002	0.002	0.003
3.250	0.003	0.003	0.003	0.003	0.003
3.500	0.003	0.003	0.003	0.003	0.003
3.750	0.003	0.003	0.003	0.003	0.003
4.000	0.003	0.003	0.003	0.003	0.003
4.250	0.003	0.003	0.003	0.003	0.003
4.500	0.003	0.003	0.003	0.003	0.003
4.750	0.003	0.003	0.003	0.003	0.003
5.000	0.003	0.003	0.003	0.003	0.003
5.250	0.003	0.003	0.003	0.003	0.003
5.500	0.003	0.003	0.003	0.003	0.003
5.750	0.003	0.003	0.003	0.003	0.003
6.000	0.003	0.003	0.003	0.003	0.003
6.250	0.003	0.003	0.003	0.003	0.003
6.500	0.003	0.003	0.003	0.003	0.003
6.750	0.003	0.004	0.004	0.004	0.004
7.000	0.004	0.004	0.004	0.004	0.004
7.250	0.004	0.004	0.004	0.004	0.004
7.500	0.004	0.004	0.004	0.004	0.004
7.750	0.004	0.004	0.004	0.004	0.004
8.000	0.004	0.005	0.005	0.005	0.005
8.250	0.005	0.005	0.005	0.005	0.005
8.500	0.005	0.005	0.005	0.005	0.005
8.750	0.005	0.005	0.005	0.005	0.005
9.000	0.005	0.005	0.005	0.005	0.006
9.250	0.006	0.006	0.006	0.006	0.006
9.500	0.006	0.006	0.006	0.007	0.007
9.750	0.007	0.007	0.007	0.007	0.008

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #7
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
10.000	0.008	0.008	0.008	0.008	0.008
10.250	0.009	0.009	0.009	0.009	0.009
10.500	0.010	0.010	0.010	0.011	0.011
10.750	0.012	0.012	0.012	0.013	0.014
11.000	0.014	0.015	0.016	0.017	0.018
11.250	0.020	0.021	0.023	0.024	0.026
11.500	0.028	0.030	0.034	0.036	0.038
11.750	0.040	0.042	0.045	0.047	0.051
12.000	0.056	0.063	0.071	0.073	0.067
12.250	0.060	0.055	0.051	0.049	0.047
12.500	0.046	0.044	0.042	0.041	0.040
12.750	0.039	0.038	0.038	0.037	0.037
13.000	0.037	0.036	0.036	0.036	0.035
13.250	0.035	0.035	0.035	0.035	0.034
13.500	0.034	0.034	0.034	0.034	0.034
13.750	0.033	0.033	0.033	0.033	0.033
14.000	0.033	0.033	0.033	0.033	0.033
14.250	0.033	0.033	0.032	0.032	0.032
14.500	0.032	0.031	0.031	0.031	0.031
14.750	0.030	0.030	0.029	0.029	0.029
15.000	0.028	0.028	0.027	0.027	0.027
15.250	0.026	0.026	0.025	0.025	0.024
15.500	0.024	0.024	0.023	0.023	0.022
15.750	0.022	0.021	0.021	0.020	0.020
16.000	0.019	0.019	0.018	0.018	0.018
16.250	0.017	0.017	0.016	0.016	0.016
16.500	0.015	0.015	0.014	0.014	0.013
16.750	0.013	0.013	0.012	0.012	0.012
17.000	0.011	0.011	0.011	0.010	0.010
17.250	0.010	0.009	0.009	0.009	0.009
17.500	0.008	0.008	0.008	0.008	0.008
17.750	0.007	0.007	0.007	0.007	0.007
18.000	0.007	0.006	0.006	0.006	0.006
18.250	0.006	0.006	0.006	0.006	0.006
18.500	0.005	0.005	0.005	0.005	0.005
18.750	0.005	0.005	0.005	0.005	0.005
19.000	0.005	0.005	0.005	0.005	0.005
19.250	0.005	0.005	0.005	0.005	0.005
19.500	0.005	0.005	0.005	0.005	0.005
19.750	0.005	0.005	0.005	0.005	0.005
20.000	0.005	0.004	0.004	0.004	0.004

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #7
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
20.250	0.004	0.004	0.004	0.004	0.004
20.500	0.004	0.004	0.004	0.004	0.004
20.750	0.004	0.004	0.004	0.004	0.004
21.000	0.004	0.004	0.004	0.004	0.004
21.250	0.004	0.004	0.004	0.004	0.004
21.500	0.004	0.004	0.004	0.004	0.004
21.750	0.004	0.004	0.004	0.004	0.004
22.000	0.004	0.004	0.004	0.004	0.004
22.250	0.004	0.004	0.004	0.004	0.004
22.500	0.004	0.004	0.004	0.004	0.004
22.750	0.004	0.004	0.004	0.004	0.004
23.000	0.004	0.004	0.004	0.004	0.004
23.250	0.004	0.004	0.004	0.003	0.003
23.500	0.003	0.003	0.003	0.003	0.003
23.750	0.003	0.003	0.003	0.003	0.003
24.000	0.003	0.003	0.003	0.003	0.003
24.250	0.002	0.002	0.002	0.002	0.002
24.500	0.002	0.002	0.002	0.002	0.001
24.750	0.001	0.001	0.001	0.001	0.001
25.000	0.001	0.001	0.001	0.001	0.001
25.250	0.001	0.001	0.001	0.001	0.001
25.500	0.001	0.001	0.001	0.001	0.001
25.750	0.001	0.001	0.001	0.001	0.001
26.000	0.001	0.001	0.001	0.001	0.001
26.250	0.001	0.001	0.001	0.001	0.001
26.500	0.001	0.001	0.001	0.001	0.001
26.750	0.001	0.001	0.001	0.001	0.001
27.000	0.001	0.001	0.001	0.001	0.001
27.250	0.001	0.001	0.001	0.001	0.001
27.500	0.001	0.001	0.001	0.001	0.001
27.750	0.001	0.001	0.001	0.001	0.001
28.000	0.001	0.001	0.001	0.001	0.001
28.250	0.001	0.001	0.001	0.001	0.001
28.500	0.001	0.001	0.001	0.001	0.001
28.750	0.001	0.001	0.001	0.001	0.001
29.000	0.001	0.001	0.001	0.001	0.001
29.250	0.001	0.001	0.001	0.001	0.001
29.500	0.001	0.001	0.001	0.001	0.001
29.750	0.001	0.001	0.001	0.001	0.001
30.000	0.001	0.001	0.001	0.001	0.001
30.250	0.001	0.001	0.001	0.001	0.001

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #7
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
30.500	0.001	0.001	0.001	0.001	0.001
30.750	0.001	0.001	0.001	0.001	0.001
31.000	0.001	0.001	0.001	0.001	0.001
31.250	0.001	0.001	0.001	0.001	0.001
31.500	0.001	0.001	0.001	0.001	0.001
31.750	0.001	0.001	0.001	0.001	0.001
32.000	0.001	0.001	0.001	0.001	0.001
32.250	0.001	0.001	0.001	0.001	0.001
32.500	0.001	0.001	0.001	0.001	0.001
32.750	0.001	0.001	0.001	0.001	0.001
33.000	0.001	0.001	0.001	0.001	0.001
33.250	0.001	0.001	0.001	0.001	0.001
33.500	0.001	0.001	0.001	0.001	0.001
33.750	0.001	0.001	0.001	0.001	0.001
34.000	0.001	0.001	0.001	0.001	0.001
34.250	0.001	0.001	0.001	0.001	0.001
34.500	0.001	0.001	0.001	0.001	0.001
34.750	0.001	0.001	0.001	0.001	0.001
35.000	0.001	0.001	0.001	0.001	0.001
35.250	0.001	0.001	0.001	0.001	0.001
35.500	0.001	0.001	0.001	0.001	0.001
35.750	0.001	0.001	0.001	0.001	0.001
36.000	0.001	0.001	0.001	0.001	0.001
36.250	0.001	0.001	0.001	0.001	0.001
36.500	0.001	0.001	0.001	0.001	0.001
36.750	0.001	0.001	0.001	0.001	0.001
37.000	0.001	0.001	0.001	0.001	0.001
37.250	0.001	0.001	0.001	0.001	0.001
37.500	0.001	0.001	0.001	0.001	0.001
37.750	0.001	0.001	0.001	0.001	0.001
38.000	0.001	0.001	0.001	0.001	0.001
38.250	0.001	0.001	0.001	0.001	0.001
38.500	0.001	0.001	0.001	0.001	0.001
38.750	0.001	0.001	0.001	0.001	0.001
39.000	0.001	0.001	0.001	0.001	0.001
39.250	0.001	0.001	0.001	0.001	0.001
39.500	0.001	0.001	0.001	0.001	0.001
39.750	0.001	0.001	0.001	0.001	0.001
40.000	0.001	0.001	0.001	0.001	0.001
40.250	0.001	0.001	0.001	0.001	0.001
40.500	0.001	0.001	0.001	0.001	0.001

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #7
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
40.750	0.001	0.001	0.001	0.001	0.001
41.000	0.001	0.001	0.001	0.001	0.001
41.250	0.001	0.001	0.001	0.001	0.001
41.500	0.001	0.001	0.001	0.001	0.001
41.750	0.001	0.001	0.001	0.001	0.001
42.000	0.001	0.001	0.001	0.001	0.001
42.250	0.001	0.001	0.001	0.001	0.001
42.500	0.001	0.001	0.001	0.001	0.001
42.750	0.001	0.001	0.001	0.001	0.001
43.000	0.001	0.001	0.001	0.001	0.001
43.250	0.001	0.001	0.001	0.001	0.001
43.500	0.001	0.001	0.001	0.001	0.001
43.750	0.001	0.001	0.001	0.001	0.001
44.000	0.001	0.001	0.001	0.001	0.001
44.250	0.001	0.001	0.001	0.001	0.001
44.500	0.001	0.001	0.001	0.001	0.001
44.750	0.001	0.001	0.001	0.001	0.001
45.000	0.001	0.001	0.001	0.001	0.001
45.250	0.001	0.001	0.001	0.001	0.001
45.500	0.001	0.001	0.001	0.001	0.001
45.750	0.001	0.001	0.001	0.001	0.001
46.000	0.001	0.001	0.001	0.001	0.001
46.250	0.001	0.001	0.001	0.001	0.001
46.500	0.001	0.001	0.001	0.001	0.001
46.750	0.001	0.001	0.001	0.001	0.001
47.000	0.001	0.001	0.001	0.001	0.001
47.250	0.001	0.001	0.001	0.001	0.001
47.500	0.001	0.001	0.001	0.001	0.001
47.750	0.001	0.001	0.001	0.001	0.001
48.000	0.001	0.001	0.001	0.001	0.001
48.250	0.001	0.001	0.001	0.001	0.001
48.500	0.001	0.001	0.001	0.001	0.001
48.750	0.001	0.001	0.001	0.001	0.001
49.000	0.001	0.001	0.001	0.001	0.001
49.250	0.001	0.001	0.001	0.001	0.001
49.500	0.001	0.001	0.001	0.001	0.001
49.750	0.001	0.001	0.001	0.001	0.001
50.000	0.001	0.001	0.001	0.001	0.001
50.250	0.001	0.001	0.001	0.001	0.001
50.500	0.001	0.001	0.001	0.001	0.001
50.750	0.001	0.001	0.001	0.001	0.001

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #7
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
51.000	0.001	0.001	0.001	0.001	0.001
51.250	0.001	0.001	0.001	0.001	0.001
51.500	0.001	0.001	0.001	0.001	0.001
51.750	0.001	0.001	0.001	0.001	0.001
52.000	0.001	0.001	0.001	0.001	0.001
52.250	0.001	0.001	0.001	0.001	0.001
52.500	0.001	0.001	0.001	0.001	0.001
52.750	0.001	0.001	0.001	0.001	0.001
53.000	0.001	0.001	0.001	0.001	0.001
53.250	0.001	0.001	0.001	0.001	0.001
53.500	0.001	0.001	0.001	0.001	0.001
53.750	0.001	0.001	0.001	0.001	0.001
54.000	0.001	0.001	0.001	0.001	0.001
54.250	0.001	0.001	0.001	0.001	0.001
54.500	0.001	0.001	0.001	0.001	0.001
54.750	0.001	0.001	0.001	0.001	0.001
55.000	0.001	0.001	0.001	0.001	0.001
55.250	0.001	0.001	0.001	0.001	0.001
55.500	0.001	0.001	0.001	0.001	0.001
55.750	0.001	0.001	0.001	0.001	0.001
56.000	0.001	0.001	0.001	0.001	0.001
56.250	0.001	0.001	0.001	0.001	0.001
56.500	0.001	0.001	0.001	0.001	0.001
56.750	0.001	0.001	0.001	0.001	0.001
57.000	0.001	0.001	0.001	0.001	0.001
57.250	0.001	0.001	0.001	0.001	0.001
57.500	0.001	0.001	0.001	0.001	0.001
57.750	0.001	0.001	0.001	0.001	0.001
58.000	0.001	0.001	0.001	0.001	0.001
58.250	0.001	0.001	0.001	0.001	0.001
58.500	0.001	0.001	0.001	0.001	0.001
58.750	0.001	0.001	0.001	0.001	0.001
59.000	0.001	0.001	0.001	0.001	0.001
59.250	0.001	0.001	0.001	0.001	0.001
59.500	0.001	0.001	0.001	0.001	0.001
59.750	0.001	0.001	0.001	0.001	0.001
60.000	0.001	0.001	0.001	0.001	0.001
60.250	0.001	0.001	0.001	0.001	0.001
60.500	0.001	0.001	0.001	0.001	0.001
60.750	0.001	0.001	0.001	0.001	0.001
61.000	0.001	0.001	0.001	0.001	0.001

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #7
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
61.250	0.001	0.001	0.001	0.001	0.001
61.500	0.001	0.001	0.001	0.001	0.001
61.750	0.001	0.001	0.001	0.001	0.001
62.000	0.001	0.001	0.001	0.001	0.001
62.250	0.001	0.001	0.001	0.001	0.001
62.500	0.001	0.001	0.001	0.001	0.001
62.750	0.001	0.001	0.001	0.001	0.001
63.000	0.001	0.001	0.001	0.001	0.001
63.250	0.001	0.001	0.001	0.001	0.001
63.500	0.001	0.001	0.001	0.001	0.001
63.750	0.001	0.001	0.001	0.001	0.001
64.000	0.001	0.001	0.001	0.001	0.001
64.250	0.001	0.001	0.001	0.001	0.001
64.500	0.001	0.001	0.001	0.001	0.001
64.750	0.001	0.001	0.001	0.001	0.001
65.000	0.001	0.001	0.001	0.001	0.001
65.250	0.001	0.001	0.001	0.001	0.001
65.500	0.001	0.001	0.001	0.001	0.001
65.750	0.001	0.001	0.001	0.001	0.001
66.000	0.001	0.001	0.001	0.001	0.001
66.250	0.001	0.001	0.001	0.001	0.001
66.500	0.001	0.001	0.001	0.001	0.001
66.750	0.001	0.001	0.001	0.001	0.001
67.000	0.001	0.001	0.001	0.001	0.001
67.250	0.001	0.001	0.001	0.001	0.001
67.500	0.001	0.001	0.001	0.001	0.001
67.750	0.001	0.001	0.001	0.001	0.001
68.000	0.001	0.001	0.001	0.001	0.001
68.250	0.001	0.001	0.001	0.001	0.001
68.500	0.001	0.001	0.001	0.001	0.001
68.750	0.001	0.001	0.001	0.001	0.001
69.000	0.001	0.001	0.001	0.001	0.001
69.250	0.001	0.001	0.001	0.001	0.001
69.500	0.001	0.001	0.001	0.001	0.001
69.750	0.001	0.001	0.001	0.001	0.001
70.000	0.001	0.001	0.001	0.001	0.001
70.250	0.001	0.001	0.001	0.001	0.001
70.500	0.001	0.001	0.001	0.001	0.001
70.750	0.001	0.001	0.001	0.001	0.001
71.000	0.001	0.001	0.001	0.001	0.001
71.250	0.001	0.001	0.001	0.001	0.001

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #7
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
71.500	0.001	0.001	0.001	0.001	0.001
71.750	0.001	0.001	0.001	0.001	0.001
72.000	0.001	0.001	0.001	0.001	0.001
72.250	0.001	0.001	0.001	0.001	0.001
72.500	0.001	0.001	0.001	0.001	0.001
72.750	0.001	0.001	0.001	0.001	0.001
73.000	0.001	0.001	0.001	0.001	0.001
73.250	0.001	0.001	0.001	0.001	0.001
73.500	0.001	0.001	0.001	0.001	0.001
73.750	0.001	0.001	0.001	0.001	0.001
74.000	0.001	0.001	0.001	0.001	0.001
74.250	0.001	0.001	0.001	0.001	0.001
74.500	0.001	0.001	0.001	0.001	0.001
74.750	0.001	0.001	0.001	0.001	0.001
75.000	0.001	0.001	0.001	0.001	0.001
75.250	0.001	0.001	0.001	0.001	0.001
75.500	0.001	0.001	0.001	0.001	0.001
75.750	0.001	0.001	0.001	0.001	0.001
76.000	0.001	0.001	0.001	0.001	0.001
76.250	0.001	0.001	0.001	0.001	0.001
76.500	0.001	0.001	0.001	0.001	0.001
76.750	0.001	0.001	0.001	0.001	0.001
77.000	0.001	0.001	0.001	0.001	0.001
77.250	0.001	0.001	0.001	0.001	0.001
77.500	0.001	0.001	0.001	0.001	0.001
77.750	0.001	0.001	0.001	0.001	0.001
78.000	0.001	0.001	0.001	0.001	0.001
78.250	0.001	0.001	0.001	0.001	0.001
78.500	0.001	0.001	0.001	0.001	0.001
78.750	0.001	0.001	0.001	0.001	0.001
79.000	0.001	0.001	0.001	0.001	0.001
79.250	0.001	0.001	0.001	0.001	0.001
79.500	0.001	0.001	0.001	0.001	0.001
79.750	0.001	0.001	0.001	0.001	0.001
80.000	0.001	0.001	0.001	0.001	0.001
80.250	0.001	0.001	0.001	0.001	0.001
80.500	0.001	0.001	0.001	0.001	0.001
80.750	0.001	0.001	0.001	0.001	0.001
81.000	0.001	0.001	0.001	0.001	0.001
81.250	0.001	0.001	0.001	0.001	0.001
81.500	0.001	0.001	0.001	0.001	0.001

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #7
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
81.750	0.001	0.001	0.001	0.001	0.001
82.000	0.001	0.001	0.001	0.001	0.001
82.250	0.001	0.001	0.001	0.001	0.001
82.500	0.001	0.001	0.001	0.001	0.001
82.750	0.001	0.001	0.001	0.001	0.001
83.000	0.001	0.001	0.001	0.001	0.001
83.250	0.001	0.001	0.001	0.001	0.001
83.500	0.001	0.001	0.001	0.001	0.001
83.750	0.001	0.001	0.001	0.001	0.001
84.000	0.001	0.001	0.001	0.001	0.001
84.250	0.001	0.001	0.001	0.001	0.001
84.500	0.001	0.001	0.001	0.001	0.001
84.750	0.001	0.001	0.001	0.001	0.001
85.000	0.001	0.001	0.001	0.001	0.001
85.250	0.001	0.001	0.001	0.001	0.001
85.500	0.001	0.001	0.001	0.001	0.001
85.750	0.001	0.001	0.001	0.001	0.001
86.000	0.001	0.001	0.001	0.001	0.001
86.250	0.001	0.001	0.001	0.001	0.001
86.500	0.001	0.001	0.001	0.001	0.001
86.750	0.001	0.001	0.001	0.001	0.001
87.000	0.001	0.001	0.001	0.001	0.001
87.250	0.001	0.001	0.001	0.001	0.001
87.500	0.001	0.001	0.001	0.001	0.001
87.750	0.001	0.001	0.001	0.001	0.001
88.000	0.001	0.001	0.001	0.001	0.001
88.250	0.001	0.001	0.001	0.001	0.001
88.500	0.001	0.001	0.001	0.001	0.001
88.750	0.001	0.001	0.001	0.001	0.001
89.000	0.001	0.001	0.001	0.001	0.001
89.250	0.001	0.001	0.001	0.001	0.001
89.500	0.001	0.001	0.001	0.001	0.001
89.750	0.001	0.001	0.001	0.001	0.001
90.000	0.001	0.001	0.001	0.001	0.001
90.250	0.001	0.001	0.001	0.001	0.001
90.500	0.001	0.001	0.001	0.001	0.001
90.750	0.001	0.001	0.001	0.001	0.001
91.000	0.001	0.001	0.001	0.001	0.001
91.250	0.001	0.001	0.001	0.001	0.001
91.500	0.001	0.001	0.001	0.001	0.001
91.750	0.001	0.001	0.001	0.001	0.001

1114-02 - 100 YEAR TIME VS. VOLUME

Subsection: Time vs. Volume
 Label: BASIN #7
 Scenario: Post-Development 100

Return Event: 100 years
 Storm Event: NOAA 100 yr

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)				
92.000	0.001	0.001	0.001	0.001	0.001
92.250	0.001	0.001	0.001	0.001	0.001
92.500	0.001	0.001	0.001	0.001	0.001
92.750	0.001	0.001	0.001	0.001	0.001
93.000	0.001	0.001	0.001	0.001	0.001
93.250	0.001	0.001	0.001	0.001	0.001
93.500	0.001	0.001	0.001	0.001	0.001
93.750	0.001	0.001	0.001	0.001	0.001
94.000	0.001	0.001	0.001	0.001	0.001
94.250	0.001	0.001	0.001	0.001	0.001
94.500	0.001	0.001	0.001	0.001	0.001
94.750	0.001	0.001	0.001	0.001	0.001
95.000	0.001	0.001	0.001	0.001	0.001
95.250	0.001	0.001	0.001	0.001	0.001
95.500	0.001	0.001	0.001	0.001	0.001
95.750	0.001	0.001	0.001	0.001	0.001
96.000	0.001	0.001	0.001	0.001	0.001
96.250	0.001	0.001	0.001	0.001	0.001
96.500	0.001	0.001	0.001	0.001	0.001
96.750	0.001	0.001	0.001	0.001	0.001
97.000	0.001	0.001	0.001	0.001	0.001
97.250	0.001	0.001	0.001	0.001	0.001
97.500	0.001	0.001	0.001	0.001	0.001
97.750	0.001	0.001	0.001	0.001	0.001
98.000	0.001	0.001	0.001	0.001	0.001
98.250	0.001	0.001	0.001	0.001	0.001
98.500	0.001	0.001	0.001	0.001	0.001
98.750	0.001	0.001	0.001	0.001	0.001
99.000	0.001	0.001	0.001	0.001	0.001
99.250	0.001	0.001	0.001	0.001	0.001
99.500	0.001	0.001	0.001	0.001	0.001
99.750	0.001	0.001	0.001	0.001	0.001
100.000	0.001	(N/A)	(N/A)	(N/A)	(N/A)

1114-02 - 100 YEAR TIME VS. VOLUME

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WATER QUALITY CALCULATIONS – APPENDIX C-3
GROUNDWATER RECHARGE

1114-02 - EXISTING CONDITIONS ROUTINGS

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
EX DA#1	Pre-Development 2	2	0.249	12.500	1.05
EX DA#1	Pre-Development 10	10	0.825	12.350	5.96
EX DA#1	Pre-Development 100	100	2.421	12.350	20.71
EX DA#1 - IMP	Pre-Development 2	2	0.170	12.100	2.56
EX DA#1 - IMP	Pre-Development 10	10	0.262	12.100	3.86
EX DA#1 - IMP	Pre-Development 100	100	0.436	12.100	6.32
EX DA#1A	Pre-Development 2	2	0.122	12.250	0.93
EX DA#1A	Pre-Development 10	10	0.351	12.200	3.86
EX DA#1A	Pre-Development 100	100	0.946	12.200	11.31
EX DA#1A - IMP	Pre-Development 2	2	1.733	12.100	25.81
EX DA#1A - IMP	Pre-Development 10	10	2.662	12.100	38.93
EX DA#1A - IMP	Pre-Development 100	100	4.429	12.100	63.76
EX DA#1A - GVL	Pre-Development 2	2	0.085	12.100	1.54
EX DA#1A - GVL	Pre-Development 10	10	0.152	12.100	2.65
EX DA#1A - GVL	Pre-Development 100	100	0.287	12.100	4.75
EX DA#2	Pre-Development 2	2	0.103	12.400	0.53
EX DA#2	Pre-Development 10	10	0.315	12.300	2.55
EX DA#2	Pre-Development 100	100	0.883	12.300	8.18
EX DA#2A	Pre-Development 2	2	0.076	12.250	0.51
EX DA#2A	Pre-Development 10	10	0.225	12.200	2.29
EX DA#2A	Pre-Development 100	100	0.619	12.200	7.08
EX DA#2A - IMP	Pre-Development 2	2	0.802	12.100	11.95
EX DA#2A - IMP	Pre-Development 10	10	1.232	12.100	18.02
EX DA#2A - IMP	Pre-Development 100	100	2.050	12.100	29.52
EX DA#2A - GVL	Pre-Development 2	2	0.063	12.100	1.13
EX DA#2A - GVL	Pre-Development 10	10	0.112	12.100	1.95
EX DA#2A - GVL	Pre-Development 100	100	0.211	12.100	3.50

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
POA-A	Pre-Development 2	2	2.360	12.100	30.34
POA-A	Pre-Development 10	10	4.253	12.100	49.91
POA-A	Pre-Development 100	100	8.518	12.100	93.58
POA-B	Pre-Development 2	2	1.043	12.100	13.28
POA-B	Pre-Development 10	10	1.885	12.100	22.40
POA-B	Pre-Development 100	100	3.764	12.100	42.41

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
PR DA#1	Post-Development 2	2	0.238	12.500	1.00
PR DA#1	Post-Development 10	10	0.788	12.350	5.69
PR DA#1	Post-Development 100	100	2.312	12.350	19.78
PR DA#1 - IMP	Post-Development 2	2	0.157	12.100	2.36
PR DA#1 - IMP	Post-Development 10	10	0.242	12.050	3.55
PR DA#1 - IMP	Post-Development 100	100	0.402	12.050	5.82
PR DA#3	Post-Development 2	2	0.035	12.200	0.33
PR DA#3	Post-Development 10	10	0.095	12.150	1.15
PR DA#3	Post-Development 100	100	0.247	12.150	3.21
PR DA#3 - IMP	Post-Development 2	2	0.210	12.100	3.12
PR DA#3 - IMP	Post-Development 10	10	0.322	12.100	4.71
PR DA#3 - IMP	Post-Development 100	100	0.536	12.100	7.72
PR DA#4	Post-Development 2	2	0.028	12.250	0.17
PR DA#4	Post-Development 10	10	0.090	12.200	0.98
PR DA#4	Post-Development 100	100	0.257	12.150	3.17
PR DA#4 - IMP	Post-Development 2	2	0.275	12.100	4.10
PR DA#4 - IMP	Post-Development 10	10	0.423	12.100	6.18
PR DA#4 - IMP	Post-Development 100	100	0.703	12.100	10.13
PR DA#5	Post-Development 2	2	0.045	12.200	0.43
PR DA#5	Post-Development 10	10	0.121	12.150	1.51
PR DA#5	Post-Development 100	100	0.314	12.150	4.21
PR DA#5 - IMP	Post-Development 2	2	1.553	12.100	23.32
PR DA#5 - IMP	Post-Development 10	10	2.385	12.100	35.16
PR DA#5 - IMP	Post-Development 100	100	3.967	12.100	57.58
PR DA#6	Post-Development 2	2	0.019	12.100	0.26
PR DA#6	Post-Development 10	10	0.052	12.100	0.86
PR DA#6	Post-Development 100	100	0.134	12.100	2.32
PR DA#6 - IMP	Post-Development 2	2	0.233	12.100	3.50
PR DA#6 - IMP	Post-Development 10	10	0.358	12.100	5.27
PR DA#6 - IMP	Post-Development 100	100	0.596	12.050	8.64
PR DA#7	Post-Development 2	2	0.016	12.150	0.19
PR DA#7	Post-Development 10	10	0.044	12.100	0.61
PR DA#7	Post-Development 100	100	0.113	12.100	1.71

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
PR DA#7 - IMP	Post-Development 2	2	0.160	12.100	2.38
PR DA#7 - IMP	Post-Development 10	10	0.246	12.100	3.59
PR DA#7 - IMP	Post-Development 100	100	0.409	12.100	5.88
PR DA#2	Post-Development 2	2	0.104	12.350	0.59
PR DA#2	Post-Development 10	10	0.318	12.250	2.84
PR DA#2	Post-Development 100	100	0.892	12.250	9.09
PR DA#2A - IMP	Post-Development 2	2	0.346	12.100	5.20
PR DA#2A - IMP	Post-Development 10	10	0.532	12.100	7.84
PR DA#2A - IMP	Post-Development 100	100	0.884	12.100	12.84
PR - DA#2A	Post-Development 2	2	0.051	12.200	0.39
PR - DA#2A	Post-Development 10	10	0.145	12.200	1.62
PR - DA#2A	Post-Development 100	100	0.392	12.200	4.72
PR DA#3A	Post-Development 2	2	0.025	12.250	0.15
PR DA#3A	Post-Development 10	10	0.078	12.200	0.85
PR DA#3A	Post-Development 100	100	0.224	12.150	2.75
PR DA#3A - IMP	Post-Development 2	2	0.031	12.100	0.47
PR DA#3A - IMP	Post-Development 10	10	0.048	12.100	0.71
PR DA#3A - IMP	Post-Development 100	100	0.080	12.100	1.16

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
POA-A	Post-Development 2	2	2.941	12.200	12.49
POA-A	Post-Development 10	10	5.205	12.150	31.65
POA-A	Post-Development 100	100	10.206	12.150	72.36
POA-B	Post-Development 2	2	0.500	12.100	5.46
POA-B	Post-Development 10	10	0.995	12.100	10.39
POA-B	Post-Development 100	100	2.168	12.100	22.17

Pond Summary

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Master Network Summary

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)
BASIN #3 (IN)	Post-Development 2	2	0.265	12.100	3.32	(N/A)	(N/A)
BASIN #3 (OUT)	Post-Development 2	2	0.255	12.950	0.28	335.68	0.131
BASIN #3 (IN)	Post-Development 10	10	0.505	12.100	6.50	(N/A)	(N/A)
BASIN #3 (OUT)	Post-Development 10	10	0.496	12.550	1.44	336.43	0.221
BASIN #3 (IN)	Post-Development 100	100	1.046	12.100	13.11	(N/A)	(N/A)
BASIN #3 (OUT)	Post-Development 100	100	1.036	12.200	8.31	336.98	0.302
BASIN #4 (IN)	Post-Development 2	2	0.304	12.100	4.15	(N/A)	(N/A)
BASIN #4 (OUT)	Post-Development 2	2	0.291	12.900	0.28	315.63	0.161
BASIN #4 (IN)	Post-Development 10	10	0.513	12.100	6.87	(N/A)	(N/A)
BASIN #4 (OUT)	Post-Development 10	10	0.501	12.900	0.73	316.34	0.266
BASIN #4 (IN)	Post-Development 100	100	0.961	12.100	12.67	(N/A)	(N/A)
BASIN #4 (OUT)	Post-Development 100	100	0.949	12.250	5.26	316.92	0.365
BASIN #5 (IN)	Post-Development 2	2	1.852	12.100	23.83	(N/A)	(N/A)
BASIN #5 (OUT)	Post-Development 2	2	1.830	12.200	8.44	315.19	0.761
BASIN #5 (IN)	Post-Development 10	10	3.002	12.100	36.64	(N/A)	(N/A)

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Master Network Summary

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)
BASIN #5 (OUT)	Post-Development 10	10	2.979	12.150	19.63	315.84	0.981
BASIN #5 (IN)	Post-Development 100	100	5.317	12.100	66.90	(N/A)	(N/A)
BASIN #5 (OUT)	Post-Development 100	100	5.295	12.150	38.88	316.69	1.293
BASIN #6 (IN)	Post-Development 2	2	0.252	12.100	3.76	(N/A)	(N/A)
BASIN #6 (OUT)	Post-Development 2	2	0.250	12.150	1.43	316.05	0.076
BASIN #6 (IN)	Post-Development 10	10	0.410	12.100	6.14	(N/A)	(N/A)
BASIN #6 (OUT)	Post-Development 10	10	0.408	12.100	5.08	316.43	0.093
BASIN #6 (IN)	Post-Development 100	100	0.730	12.100	10.96	(N/A)	(N/A)
BASIN #6 (OUT)	Post-Development 100	100	0.728	12.100	10.17	316.76	0.109
BASIN #7 (IN)	Post-Development 2	2	0.176	12.100	2.55	(N/A)	(N/A)
BASIN #7 (OUT)	Post-Development 2	2	0.175	12.150	1.28	307.84	0.042
BASIN #7 (IN)	Post-Development 10	10	0.289	12.100	4.21	(N/A)	(N/A)
BASIN #7 (OUT)	Post-Development 10	10	0.288	12.150	3.09	308.26	0.055
BASIN #7 (IN)	Post-Development 100	100	0.522	12.100	7.59	(N/A)	(N/A)
BASIN #7 (OUT)	Post-Development 100	100	0.520	12.150	5.90	308.74	0.073

1114-02 - PROPOSED CONDITIONS ROUTINGS

Subsection: Master Network Summary

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)
BASIN #3A (IN)	Post-Development 2	2	0.056	12.100	0.51	(N/A)	(N/A)
BASIN #3A (OUT)	Post-Development 2	2	0.020	12.350	0.22	340.32	0.017
BASIN #3A (IN)	Post-Development 10	10	0.126	12.100	1.31	(N/A)	(N/A)
BASIN #3A (OUT)	Post-Development 10	10	0.088	12.150	1.12	340.55	0.021
BASIN #3A (IN)	Post-Development 100	100	0.304	12.100	3.38	(N/A)	(N/A)
BASIN #3A (OUT)	Post-Development 100	100	0.263	12.200	3.17	340.86	0.028

Infiltration Basin #3A

R = 1.00 in/hr (from soil testing)

Width = 25.00 ft (from BMP design)

Length = 50.00 ft (from BMP design)

x = 12.50 ft

y = 25.00 ft

A = 1,250.00 sf

Hydrograph Vol. In = 0.304 ac-ft (from Pond Pack model for WQ Storm)

Hydrograph Vol. Out = 0.263 ac-ft (from Pond Pack model for WQ Storm)

Infiltration Volume, V = 0.041 ac-ft

= 1,785.96 cf

t = 17.15 hrs $V/(A \cdot R)$

Mounding = 6.991 ft (from Hantush method)

Existing elev. = 346.50 (from soil testing/survey)

GW depth = 180 in (from soil testing)

GW elev. = 331.50

Mounding elev. = 338.49

Infiltration elev. = 338.50 (from BMP design)

CHECK: 0.01 ft to groundwater

Groundwater Mounding does not impact BMP

Input Values

1.00
0.150
1.00
12.500
25.000
17.15
10.00

R Recharge rate (permeability rate) (in/hr)
Specific yield, Sy (dimensionless)
 default value is 0.15; max value is 0.2 provided that a lab test data is submitted
Horizontal hydraulic conductivity (in/hr)
 Kh = 5xRecharge Rate (R) in the costal plan; Kh=R outside the coastal plan
x 1/2 length of basin (x direction, in feet)
y 1/2 width of basin (y direction, in feet)
t Duration of infiltration period (hours)
hi(0) Initial thickness of saturated zone (feet)

16.991
6.991

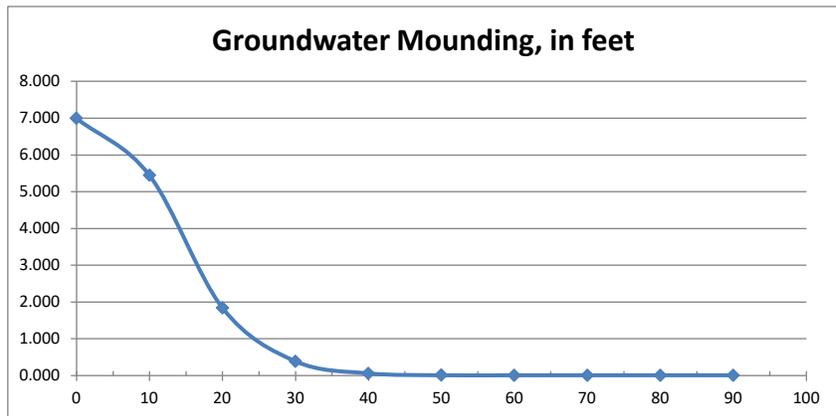
h(max) Maximum thickness of saturated zone (beneath center of basin at end of infiltration period)
Δh(max) Maximum groundwater mounding (beneath center of basin at end of infiltration period)

Distance from
 Ground-water center of basin in x
 Mounding, in feet direction, in feet

6.991	0
5.444	10
1.838	20
0.385	30
0.057	40
0.008	50
0.003	60
0.003	70
0.003	80
0.003	90



Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

STORMWATER PIPING CALCULATIONS - APPENDIX D

PROJECT: 150 Allen Road
 LOCATION: Township of Bernards
 COMPUTED BY: KAL
 CHECKED BY: RCM2

DRAINAGE COMPUTATION SHEET
 STORM FREQUENCY: 25 yr.
 N FACTOR: 0.013

JOB NO.: 1114-02
 DATE: September 16, 2022
 SHEET: 1 OF 1

LOCATION		ACRES		TIME OF CONC. (MIN)							Q(C.F.S.)			V (FT/S)			LENGTH	REMARKS
FROM	TO	SUB	TOTAL	C	CxA(SUB)	SUM CxA	INLET	PIPE	TOT.	I	DESIGN	CAP.	SIZE	SLOPE	DESIGN	FULL		
#3-3	#3-2	0.86	0.86	0.55	0.47	0.47	10	-	10	6.8	3.22	6.66	12	0.035	3.43	8.49	30	
#3-2	FES #3-1	0.03	0.89	0.98	0.03	0.50	10	0.146	10	6.8	3.42	6.49	15	0.0101	1.84	5.29	173	
OS #3A	FES #3-20	0.00	0.00	0.00	0.00	0.00	10	-	10	6.8	3.17	9.18	15	0.0202	2.60	7.48	27	100 YR
#3-12	#3-11	0.07	0.07	0.70	0.05	0.05	10	-	10	6.8	0.33	3.56	12	0.01	4.10	4.54	28	
#3-11	FES #3-10	0.04	0.11	0.95	0.04	0.09	10	0.114	10	6.8	0.59	14.44	15	0.05	4.10	11.77	78	
#4-5	#4-4	0.14	0.14	0.75	0.11	0.11	10	-	10	6.8	0.71	3.56	12	0.01	1.83	4.54	28	
#4-4	#4-3	0.08	0.22	0.95	0.08	0.18	10	0.255	10	6.8	1.23	11.55	15	0.032	3.28	9.42	223	
#4-3	#4-2	0.95	1.17	0.85	0.81	0.99	10	1.133	11	6.8	6.72	10.50	18	0.01	1.84	5.94	39	
#4-2	FES #4-1	0.06	1.23	0.95	0.06	1.05	10	0.353	12	6.8	7.11	18.28	18	0.0303	3.20	10.35	33	
#4-12	#4-11	0.18	0.18	0.96	0.17	0.17	10	-	10	6.8	1.18	3.56	12	0.01	1.83	4.54	28	
#4-11	FES #4-10	0.26	0.44	0.95	0.25	0.42	10	0.255	10	6.8	2.85	9.24	15	0.0205	2.62	7.54	22	
OS #3B-1	OS #3A-1	0.00	0.00	0.00	0.00	0.00	10	-	10	6.8	0.00	6.46	15	0.01	1.83	5.26	68	
OS #3A-1	OS #3	0.00	0.00	0.00	0.00	0.00	10	0.619	11	6.8	0.00	6.46	15	0.01	1.83	5.26	112	
OS #3	MH #5-4	0.00	0.00	0.00	0.00	0.00	10	1.020	11	6.8	8.31	9.13	15	0.02	1.49	7.44	35	100 YR
#5-6	#5-5	0.05	0.05	0.45	0.02	0.02	10	-	10	6.8	0.15	6.46	15	0.01	1.83	5.26	110	
#5-5	MH #5-4	0.05	0.10	0.45	0.02	0.05	10	1.002	11	6.8	0.31	6.46	15	0.01	1.83	5.26	70	
MH #5-4	#5-3	0.00	0.10	0.00	0.00	0.05	10	0.638	12	6.8	8.62	10.50	18	0.01	1.83	5.94	144	100 YR
RL #B	#5-3	2.99	2.99	0.98	2.93	2.93	10	-	10	6.8	19.93	22.61	24	0.01	1.85	7.20	35	
#5-3	MH #5-2	0.21	3.20	0.48	0.10	3.03	10	0.315	10	6.8	28.92	31.98	24	0.02	1.86	10.18	120	100 YR
RL #A	MH #5-2	2.93	2.93	0.98	2.87	2.87	10	-	10	6.8	19.53	22.61	24	0.01	1.85	7.20	44	
MH #5-2	FES #5-1	0.00	2.93	0.00	0.00	2.87	10	0.396	10	6.8	27.84	67.83	24	0.09	5.57	21.60	67	100 YR
#6-8	#6-7	0.08	0.08	0.95	0.08	0.08	10	-	10	6.8	0.52	3.56	12	0.01	1.83	4.54	28	
#6-7	#6-6	0.13	0.21	0.88	0.11	0.19	10	0.255	10	6.8	1.29	7.36	15	0.013	2.09	6.00	413	
#6-6A	#6-6	0.12	0.12	0.91	0.11	0.11	10	-	10	6.8	0.74	3.56	12	0.01	1.82	4.54	28	
#6-6	#6-5	0.19	0.52	0.87	0.17	0.46	10	0.256	10	6.8	3.16	12.91	15	0.04	3.66	10.53	64	
#6-5	#6-4	0.05	0.57	0.95	0.05	0.51	10	0.291	11	6.8	3.48	14.44	15	0.05	4.10	11.77	64	

PROJECT: 150 Allen Road
 LOCATION: Township of Bernards
 COMPUTED BY: KAL
 CHECKED BY: RCM2

DRAINAGE COMPUTATION SHEET
 STORM FREQUENCY: 25 yr.
 N FACTOR: 0.013

JOB NO.: 1114-02
 DATE: September 16, 2022
 SHEET: 1 OF 1

LOCATION		ACRES		TIME OF CONC. (MIN)							Q(C.F.S.)			V (FT/S)			LENGTH	REMARKS
FROM	TO	SUB	TOTAL	C	CxA(SUB)	SUM CxA	INLET	PIPE	TOT.	I	DESIGN	CAP.	SIZE	SLOPE	DESIGN	FULL		
#6-4	#6-3	0.05	0.62	0.85	0.04	0.55	10	0.26	11	6.8	3.77	12.91	15	0.04	3.66	10.53	113	
#6-3	#6-2	0.05	0.67	0.98	0.05	0.60	10	0.515	11	6.8	4.11	11.31	15	0.0307	3.21	9.22	114	
#6-2A	#6-2	0.18	0.18	0.88	0.16	0.16	10	-	10	6.8	1.08	2.98	12	0.007	1.52	3.80	28	
#6-2	FES #6-1	0.04	0.89	0.98	0.04	0.80	10	0.307	10	6.8	5.45	7.42	18	0.005	1.30	4.20	19	
#6-13A	MH #6-13	0.01	0.01	0.98	0.01	0.01	10	-	10	6.8	0.07	3.56	12	0.01	1.83	4.54	8	
MH #6-13	MH #6-12	0.00	0.01	0.00	0.00	0.01	10	0.073	10	6.8	0.07	6.46	15	0.01	1.83	5.26	64	
#6-12A	MH #6-12	0.08	0.08	0.96	0.08	0.08	10	-	10	6.8	0.52	3.56	12	0.01	1.83	4.54	9	
MH #6-12	#6-11	0	0.09	0.00	0.00	0.09	10	0.082	10	6.8	0.59	12.91	15	0.04	3.66	10.53	213	
#6-11	FES #6-10	0.24	0.33	0.96	0.23	0.32	10	0.97	11	6.8	2.16	6.46	15	0.01	1.83	5.26	14	
#7-5	#7-4	0.08	0.08	0.98	0.08	0.08	10	-	10	6.8	0.53	3.56	12	0.01	1.83	4.54	26	
#7-4	#7-3	0.02	0.10	0.98	0.02	0.10	10	0.237	10	6.8	0.67	5.59	15	0.0075	1.66	4.56	33	
#7-3	#7-2	0.01	0.11	0.98	0.01	0.11	10	0.331	11	6.8	0.73	5.59	15	0.0075	1.83	4.56	25	
#7-2	FES #7-1	0.03	0.14	0.98	0.03	0.14	10	0.228	11	6.8	0.93	5.28	15	0.0067	1.05	4.31	30	
#7-14	#7-13	0.00	0.00	0.98	0.00	0.00	10	-	10	6.8	0.00	3.56	12	0.01	1.83	4.54	64	
#7-13	#7-12	0.11	0.11	0.91	0.10	0.10	10	0.583	11	6.8	0.68	6.46	15	0.01	1.83	5.26	18	
#7-12	#7-11	0.48	0.59	0.85	0.41	0.51	10	0.164	11	6.8	3.46	6.46	15	0.01	1.83	5.26	28	
#7-11	FES #7-10	0.15	0.74	0.94	0.14	0.65	10	0.255	11	6.8	4.41	5.95	15	0.0085	1.69	4.85	12	
OS #4	MH #7-21B	0.00	0.00	0.00	0.00	0.00	10	-	10	6.8	5.26	6.46	15	0.01	1.83	5.26	55	100 YR
MH #7-21B	MH #7-21A	0.00	0.00	0.00	0.00	0.00	10	0.501	11	6.8	5.26	10.21	15	0.025	2.90	8.32	167	100 YR
OS #7	MH #7-21A	0.00	0.00	0.00	0.00	0.00	10	-	10	6.8	5.94	6.46	15	0.01	1.84	5.26	27	100 YR
MH #7-21A	MH #7-21	0.00	0.00	0.00	0.00	0.00	10	0.245	10	6.8	11.20	22.61	24	0.01	1.85	7.20	58	100 YR
OS #5	MH #7-23	0.00	0.00	0.00	0.00	0.00	10	-	10	6.8	38.88	41.00	30	0.01	1.86	8.36	33	100 YR
OS #6	MH #7-23	0.00	0.00	0.00	0.00	0.00	10	-	10	6.8	10.17	10.50	18	0.01	1.84	5.94	14	100 YR
MH #7-23	MH #7-22	0.00	0.00	0.00	0.00	0.00	10	0.127	10	6.8	49.05	66.66	36	0.01	1.86	9.44	64	
MH #7-22	MH #7-21	0.00	0.00	0.00	0.00	0.00	10	0.573	11	6.8	49.05	66.66	36	0.01	1.86	9.44	147	
MH #7-21	EX.	0.00	0.00	0.00	0.00	0.00	10	1.317	12	6.8	60.25	66.66	36	0.01	1.86	9.44	24	

SOIL EROSION AND SEDIMENT CONTROL CALCULATIONS - APPENDIX E

Conduit Outlet Protection Calculation Sheet*

Job No. 1114-02
Date: 9/16/2022
Rev Date: -

Performed By: CR
Chck By: RCM2

Comment: Rip Rap Apron #3-1

For areas where tailwater cannot be computed use $TW=0.2D_o$

A. APRON DIMENSIONS

Q(cfs)=	3.42	q=	2.736
D_o (feet)=	1.25		
W_o (feet)	1.25		

L_a (feet)= 7

Q=flow from culvert in cfs.(100 yr. Storm)
 D_o =maximum inside culvert height in feet
 W_o =maximum inside culvert width in feet
q=unit discharge

Where there is no well defined channel immediately downstream use formula below.

For tailwater elevation less than elevation of the center of the pipe:

Width= 7

B. RIPRAP

The median stone diameter, D_{50} , shall be determined from the formula:

D_{50} (feet)= 0.31 $TW= 0.25$

***Min. stone diameter shall be no less than 6"**

*Refer to Standards for Soil Erosion and Sediment Control in New Jersey, Section 12-2 for text pertaining to this worksheet (July 1999.)

Conduit Outlet Protection Calculation Sheet*

Job No. 1114-02
Date: 9/16/2022
Rev Date: -

Performed By: CR
Chck By: RCM2

Comment: Rip Rap Apron #3-10

For areas where tailwater cannot be computed use $TW=0.2D_o$

A. APRON DIMENSIONS

Q(cfs)=	0.59	q= 0.472
Do(feet)=	1.25	
Wo(feet)	1.25	

La(feet)= 1

Q=flow from culvert in cfs.(100 yr. Storm)
Do=maximum inside culvert height in feet
Wo=maximum inside culvert width in feet
q=unit discharge

Where there is no well defined channel immediately downstream use formula below.

For tailwater elevation less than elevation of the center of the pipe:

Width= 4

B. RIPRAP

The median stone diameter, D_{50} , shall be determined from the formula:

$D_{50}(\text{feet})= 0.03$ **TW= 0.25**

***Min. stone diameter shall be no less than 6"**

*Refer to Standards for Soil Erosion and Sediment Control in New Jersey, Section 12-2 for text pertaining to this worksheet (July 1999.)

Conduit Outlet Protection Calculation Sheet*

Job No. 1114-02
Date: 9/16/2022
Rev Date: -

Performed By: CR
Chck By: RCM2

Comment: Rip Rap Apron #3-20

For areas where tailwater cannot be computed use $TW=0.2D_o$

A. APRON DIMENSIONS

Q(cfs)=	3.17	q=	2.536
Do(feet)=	1.25		
Wo(feet)	1.25		

La(feet)= 7

Q=flow from culvert in cfs.(100 yr. Storm)
Do=maximum inside culvert height in feet
Wo=maximum inside culvert width in feet
q=unit discharge

Where there is no well defined channel immediately downstream use formula below.

For tailwater elevation less than elevation of the center of the pipe:

Width= 6

B. RIPRAP

The median stone diameter, D_{50} , shall be determined from the formula:

$D_{50}(\text{feet})= 0.28$ **TW= 0.25**

***Min. stone diameter shall be no less than 6"**

*Refer to Standards for Soil Erosion and Sediment Control in New Jersey, Section 12-2 for text pertaining to this worksheet (July 1999.)

Conduit Outlet Protection Calculation Sheet*

Job No. 1114-02
Date: 9/16/2022
Rev. Date: -

Performed By: CR
Chck By: RCM2

Comment: Rip Rap Apron #4-10

For discharge into detention basins and TW<0.5D0

2-yr WSE= 315.63 FT.

A. APRON DIMENSIONS

Q(cfs)=	2.85	q= 2.28
Do(feet)=	1.25	
Wo(feet)	1.25	

La(feet)= 19

Q=flow from culvert in cfs.(25 yr. Storm)
Do=maximum inside culvert height in feet
Wo=maximum inside culvert width in feet
q=unit discharge

Where there is no well defined channel immediately downstream use formula below.

For tailwater elevation greater than elevation of the center of the pipe:

Width= 23

B. RIPRAP

The median stone diameter, D₅₀, shall be determined from the formula:

D₅₀(feet)= 0.10 TW= 0.625

***Min. stone diameter shall be no less than 6"**

*Refer to Standards for Soil Erosion and Sediment Control in New Jersey, Section 12-2 for text pertaining to this worksheet (July 1999.)

Conduit Outlet Protection Calculation Sheet*

Job No. 1114-02
Date: 9/16/2022

Performed By: CR
Chck By: RCM2

Rev. Date: -

Comment: Rip Rap Apron #5-1

For discharge into detention basins and TW<0.5D0

2-yr WSE= 315.19 FT.

A. APRON DIMENSIONS

Q(cfs)= 27.84 q= 13.92
Do(feet)= 2
Wo(feet) 2

La(feet)= 43

Q=flow from culvert in cfs.(25 yr. Storm)
Do=maximum inside culvert height in feet
Wo=maximum inside culvert width in feet
q=unit discharge

Where there is no well defined channel immediately downstream use formula below.

For tailwater elevation greater than elevation of the center of the pipe:

Width= 49

B. RIPRAP

The median stone diameter, D₅₀, shall be determined from the formula:

D₅₀(feet)= 0.66 TW= 1

***Min. stone diameter shall be no less than 6"**

*Refer to Standards for Soil Erosion and Sediment Control in New Jersey, Section 12-2 for text pertaining to this worksheet (July 1999.)

Conduit Outlet Protection Calculation Sheet*

Job No. 1114-02
Date: 9/16/2022
Rev. Date: -

Performed By: CR
Chck By: RCM2

Comment: Rip Rap Apron #6-1

For discharge into detention basins and TW \geq 0.5D0

2-yr WSE= 316.05 FT.

A. APRON DIMENSIONS

Q(cfs)=	5.45	q= 3.633
Do(feet)=	1.50	
Wo(feet)	1.50	

La(feet)= 9

Q=flow from culvert in cfs.(25 yr. Storm)
Do=maximum inside culvert height in feet
Wo=maximum inside culvert width in feet
q=unit discharge

Where there is no well defined channel immediately downstream use formula below.

For tailwater elevation greater than elevation of the center of the pipe:

Width= 8

B. RIPRAP

The median stone diameter, D50, shall be determined from the formula:

D50(feet)= 0.12 TW= 0.75

***Min. stone diameter shall be no less than 6"**

*Refer to Standards for Soil Erosion and Sediment Control in New Jersey, Section 12-2 for text pertaining to this worksheet (July 1999.)

Conduit Outlet Protection Calculation Sheet*

Job No. 1114-02
Date: 9/16/2022
Rev. Date: -

Performed By: CR
Chck By: RCM2

Comment: Rip Rap Apron #6-10

For discharge into detention basins and TW \geq 0.5D0

2-yr WSE= 316.05 FT.

A. APRON DIMENSIONS

Q(cfs)=	2.16	q= 1.728
Do(feet)=	1.25	
Wo(feet)	1.25	

La(feet)= 5

Q=flow from culvert in cfs.(25 yr. Storm)
Do=maximum inside culvert height in feet
Wo=maximum inside culvert width in feet
q=unit discharge

Where there is no well defined channel immediately downstream use formula below.

For tailwater elevation greater than elevation of the center of the pipe:

Width= 6

B. RIPRAP

The median stone diameter, D50, shall be determined from the formula:

D50(feet)= 0.05 TW= 0.625

***Min. stone diameter shall be no less than 6"**

*Refer to Standards for Soil Erosion and Sediment Control in New Jersey, Section 12-2 for text pertaining to this worksheet (July 1999.)

Conduit Outlet Protection Calculation Sheet*

Job No. 1114-02
Date: 9/16/2022
Rev. Date: -

Performed By: CR
Chck By: RCM2

Comment: Rip Rap Apron #7-1

For discharge into detention basins and TW \geq 0.5D0

2-yr WSE= 307.84 FT.

A. APRON DIMENSIONS

Q(cfs)=	0.93	q= 0.744
Do(feet)=	1.25	
Wo(feet)	1.25	

La(feet)= 2

Q=flow from culvert in cfs.(25 yr. Storm)
Do=maximum inside culvert height in feet
Wo=maximum inside culvert width in feet
q=unit discharge

Where there is no well defined channel immediately downstream use formula below.

For tailwater elevation greater than elevation of the center of the pipe:

Width= 5

B. RIPRAP

The median stone diameter, D50, shall be determined from the formula:

D50(feet)= 0.02 TW= 0.625

***Min. stone diameter shall be no less than 6"**

*Refer to Standards for Soil Erosion and Sediment Control in New Jersey, Section 12-2 for text pertaining to this worksheet (July 1999.)

Conduit Outlet Protection Calculation Sheet*

Job No. 1114-02
Date: 9/16/2022
Rev. Date: -

Performed By: CR
Chck By: RCM2

Comment: Rip Rap Apron #7-10

For discharge into detention basins and $TW \geq 0.5D0$

2-yr WSE= 307.84 FT.

A. APRON DIMENSIONS

Q(cfs)=	4.41	q= 3.528
Do(feet)=	1.25	
Wo(feet)	1.25	

La(feet)= 9

Q=flow from culvert in cfs.(25 yr. Storm)
Do=maximum inside culvert height in feet
Wo=maximum inside culvert width in feet
q=unit discharge

Where there is no well defined channel immediately downstream use formula below.

For tailwater elevation greater than elevation of the center of the pipe:

Width= 8

B. RIPRAP

The median stone diameter, $D50$, shall be determined from the formula:

$D50(\text{feet})= 0.14$ $TW= 0.625$

***Min. stone diameter shall be no less than 6"**

*Refer to Standards for Soil Erosion and Sediment Control in New Jersey, Section 12-2 for text pertaining to this worksheet (July 1999.)

EMERGENCY SPILLWAY CALCULATIONS - APPENDIX F

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1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
PR - DA#2A	Post-100+50 Spillway	150	0.773	12.200	9.35
PR DA#1	Post-100+50 Spillway	150	4.761	12.300	42.17
PR DA#1 - IMP	Post-100+50 Spillway	150	0.609	12.050	8.74
PR DA#2	Post-100+50 Spillway	150	1.796	12.250	18.67
PR DA#2A - IMP	Post-100+50 Spillway	150	1.340	12.100	19.28
PR DA#3	Post-100+50 Spillway	150	0.478	12.150	6.24
PR DA#3 - IMP	Post-100+50 Spillway	150	0.812	12.100	11.59
PR DA#3A	Post-100+50 Spillway	150	0.456	12.150	5.77
PR DA#3A - IMP	Post-100+50 Spillway	150	0.122	12.100	1.75
PR DA#4	Post-100+50 Spillway	150	0.524	12.150	6.63
PR DA#4 - IMP	Post-100+50 Spillway	150	1.066	12.100	15.21
PR DA#5	Post-100+50 Spillway	150	0.608	12.150	8.17
PR DA#5 - IMP	Post-100+50 Spillway	150	6.008	12.100	86.46
PR DA#6	Post-100+50 Spillway	150	0.259	12.100	4.44
PR DA#6 - IMP	Post-100+50 Spillway	150	0.903	12.050	12.97
PR DA#7	Post-100+50 Spillway	150	0.218	12.100	3.32
PR DA#7 - IMP	Post-100+50 Spillway	150	0.619	12.100	8.84

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
POA-A	Post-100+50 Spillway	150	15.222	12.100	176.22
POA-B	Post-100+50 Spillway	150	3.908	12.100	39.32

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)
BASIN #3 (IN)	Post-100+50 Spillway	150	1.802	12.100	23.18	(N/A)	(N/A)
BASIN #3 (OUT)	Post-100+50 Spillway	150	1.498	12.100	21.84	337.20	0.336
BASIN #3A (IN)	Post-100+50 Spillway	150	0.578	12.150	6.53	(N/A)	(N/A)
BASIN #3A (OUT)	Post-100+50 Spillway	150	0.512	12.150	6.58	341.11	0.035
BASIN #4 (IN)	Post-100+50 Spillway	150	1.590	12.100	20.70	(N/A)	(N/A)

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Master Network Summary

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)
BASIN #4 (OUT)	Post-100+50 Spillway	150	1.220	12.100	19.20	317.21	0.416
BASIN #5 (IN)	Post-100+50 Spillway	150	8.114	12.100	115.25	(N/A)	(N/A)
BASIN #5 (OUT)	Post-100+50 Spillway	150	6.818	12.100	94.59	318.23	1.925
BASIN #6 (IN)	Post-100+50 Spillway	150	1.163	12.100	17.41	(N/A)	(N/A)
BASIN #6 (OUT)	Post-100+50 Spillway	150	1.052	12.100	18.12	317.14	0.129
BASIN #7 (IN)	Post-100+50 Spillway	150	0.837	12.100	12.15	(N/A)	(N/A)
BASIN #7 (OUT)	Post-100+50 Spillway	150	0.762	12.100	12.27	308.92	0.080

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR - DA#2A

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

Storm Event	NOAA 100+50
Return Event	150 years
Duration	100.000 hours
Depth	12.4 in
Time of Concentration (Composite)	0.210 hours
Area (User Defined)	1.370 acres

Computational Time Increment	0.028 hours
Time to Peak (Computed)	12.180 hours
Flow (Peak, Computed)	9.60 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.200 hours
Flow (Peak Interpolated Output)	9.35 ft ³ /s

Drainage Area	
SCS CN (Composite)	59.000
Area (User Defined)	1.370 acres
Maximum Retention (Pervious)	6.9 in
Maximum Retention (Pervious, 20 percent)	1.4 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	6.8 in
Runoff Volume (Pervious)	0.773 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.773 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.210 hours
Computational Time Increment	0.028 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR - DA#2A

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

SCS Unit Hydrograph Parameters

Unit peak, qp	7.39 ft ³ /s
Unit peak time, Tp	0.140 hours
Unit receding limb, Tr	0.560 hours
Total unit time, Tb	0.700 hours

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#1

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

Storm Event	NOAA 100+50
Return Event	150 years
Duration	100.000 hours
Depth	12.4 in
Time of Concentration (Composite)	0.430 hours
Area (User Defined)	9.320 acres

Computational Time Increment	0.057 hours
Time to Peak (Computed)	12.327 hours
Flow (Peak, Computed)	42.58 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.300 hours
Flow (Peak Interpolated Output)	42.17 ft ³ /s

Drainage Area	
SCS CN (Composite)	55.000
Area (User Defined)	9.320 acres
Maximum Retention (Pervious)	8.2 in
Maximum Retention (Pervious, 20 percent)	1.6 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	6.1 in
Runoff Volume (Pervious)	4.762 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	4.761 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.430 hours
Computational Time Increment	0.057 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#1

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

SCS Unit Hydrograph Parameters

Unit peak, qp	24.56 ft ³ /s
Unit peak time, Tp	0.287 hours
Unit receding limb, Tr	1.147 hours
Total unit time, Tb	1.433 hours

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#1 - IMP

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

Storm Event	NOAA 100+50
Return Event	150 years
Duration	100.000 hours
Depth	12.4 in
Time of Concentration (Composite)	0.020 hours
Area (User Defined)	0.600 acres
<hr/>	
Computational Time Increment	0.003 hours
Time to Peak (Computed)	12.099 hours
Flow (Peak, Computed)	8.76 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.050 hours
Flow (Peak Interpolated Output)	8.74 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.600 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	12.2 in
Runoff Volume (Pervious)	0.609 ac-ft
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Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.609 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.020 hours
Computational Time Increment	0.003 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#1 - IMP

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

SCS Unit Hydrograph Parameters

Unit peak, qp	33.99 ft ³ /s
Unit peak time, Tp	0.013 hours
Unit receding limb, Tr	0.053 hours
Total unit time, Tb	0.067 hours

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#2

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

Storm Event	NOAA 100+50
Return Event	150 years
Duration	100.000 hours
Depth	12.4 in
Time of Concentration (Composite)	0.310 hours
Area (User Defined)	3.340 acres
<hr/>	
Computational Time Increment	0.041 hours
Time to Peak (Computed)	12.235 hours
Flow (Peak, Computed)	18.86 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.250 hours
Flow (Peak Interpolated Output)	18.67 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	57.000
Area (User Defined)	3.340 acres
Maximum Retention (Pervious)	7.5 in
Maximum Retention (Pervious, 20 percent)	1.5 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	6.5 in
Runoff Volume (Pervious)	1.796 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	1.796 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.310 hours
Computational Time Increment	0.041 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#2

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

SCS Unit Hydrograph Parameters

Unit peak, qp	12.21 ft ³ /s
Unit peak time, Tp	0.207 hours
Unit receding limb, Tr	0.827 hours
Total unit time, Tb	1.033 hours

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Return Event: 150 years

Label: PR DA#2A - IMP

Storm Event: NOAA 100+50

Scenario: Post-100+50 Spillway

Storm Event	NOAA 100+50
Return Event	150 years
Duration	100.000 hours
Depth	12.4 in
Time of Concentration (Composite)	0.030 hours
Area (User Defined)	1.320 acres
<hr/>	
Computational Time Increment	0.004 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	19.28 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	19.28 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	1.320 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	12.2 in
Runoff Volume (Pervious)	1.340 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	1.340 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.030 hours
Computational Time Increment	0.004 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#2A - IMP

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

SCS Unit Hydrograph Parameters

Unit peak, qp	49.85 ft ³ /s
Unit peak time, Tp	0.020 hours
Unit receding limb, Tr	0.080 hours
Total unit time, Tb	0.100 hours

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

Storm Event	NOAA 100+50
Return Event	150 years
Duration	100.000 hours
Depth	12.4 in
Time of Concentration (Composite)	0.180 hours
Area (User Defined)	0.810 acres

Computational Time Increment	0.024 hours
Time to Peak (Computed)	12.168 hours
Flow (Peak, Computed)	6.29 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	6.24 ft ³ /s

Drainage Area	
SCS CN (Composite)	61.000
Area (User Defined)	0.810 acres
Maximum Retention (Pervious)	6.4 in
Maximum Retention (Pervious, 20 percent)	1.3 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	7.1 in
Runoff Volume (Pervious)	0.478 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.478 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.180 hours
Computational Time Increment	0.024 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

SCS Unit Hydrograph Parameters

Unit peak, qp	5.10 ft ³ /s
Unit peak time, Tp	0.120 hours
Unit receding limb, Tr	0.480 hours
Total unit time, Tb	0.600 hours

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3 - IMP

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

Storm Event	NOAA 100+50
Return Event	150 years
Duration	100.000 hours
Depth	12.4 in
Time of Concentration (Composite)	0.050 hours
Area (User Defined)	0.800 acres
<hr/>	
Computational Time Increment	0.007 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	11.59 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	11.59 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.800 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	12.2 in
Runoff Volume (Pervious)	0.812 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.812 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.050 hours
Computational Time Increment	0.007 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3 - IMP

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

SCS Unit Hydrograph Parameters

Unit peak, qp	18.13 ft ³ /s
Unit peak time, Tp	0.033 hours
Unit receding limb, Tr	0.133 hours
Total unit time, Tb	0.167 hours

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3A

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

Storm Event	NOAA 100+50
Return Event	150 years
Duration	100.000 hours
Depth	12.4 in
Time of Concentration (Composite)	0.190 hours
Area (User Defined)	0.870 acres
<hr/>	
Computational Time Increment	0.025 hours
Time to Peak (Computed)	12.160 hours
Flow (Peak, Computed)	5.88 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	5.77 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	56.000
Area (User Defined)	0.870 acres
Maximum Retention (Pervious)	7.9 in
Maximum Retention (Pervious, 20 percent)	1.6 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	6.3 in
Runoff Volume (Pervious)	0.456 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.456 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.190 hours
Computational Time Increment	0.025 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3A

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

SCS Unit Hydrograph Parameters

Unit peak, qp	5.19 ft ³ /s
Unit peak time, Tp	0.127 hours
Unit receding limb, Tr	0.507 hours
Total unit time, Tb	0.633 hours

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Return Event: 150 years

Label: PR DA#3A - IMP

Storm Event: NOAA 100+50

Scenario: Post-100+50 Spillway

Storm Event	NOAA 100+50
Return Event	150 years
Duration	100.000 hours
Depth	12.4 in
Time of Concentration (Composite)	0.040 hours
Area (User Defined)	0.120 acres
<hr/>	
Computational Time Increment	0.005 hours
Time to Peak (Computed)	12.096 hours
Flow (Peak, Computed)	1.75 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	1.75 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.120 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	12.2 in
Runoff Volume (Pervious)	0.122 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.122 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.040 hours
Computational Time Increment	0.005 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#3A - IMP

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

SCS Unit Hydrograph Parameters

Unit peak, qp	3.40 ft ³ /s
Unit peak time, Tp	0.027 hours
Unit receding limb, Tr	0.107 hours
Total unit time, Tb	0.133 hours

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#4

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

Storm Event	NOAA 100+50
Return Event	150 years
Duration	100.000 hours
Depth	12.4 in
Time of Concentration (Composite)	0.190 hours
Area (User Defined)	1.000 acres
<hr/>	
Computational Time Increment	0.025 hours
Time to Peak (Computed)	12.160 hours
Flow (Peak, Computed)	6.76 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	6.63 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	56.000
Area (User Defined)	1.000 acres
Maximum Retention (Pervious)	7.9 in
Maximum Retention (Pervious, 20 percent)	1.6 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	6.3 in
Runoff Volume (Pervious)	0.524 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.524 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.190 hours
Computational Time Increment	0.025 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#4

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

SCS Unit Hydrograph Parameters

Unit peak, qp	5.96 ft ³ /s
Unit peak time, Tp	0.127 hours
Unit receding limb, Tr	0.507 hours
Total unit time, Tb	0.633 hours

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#4 - IMP

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

Storm Event	NOAA 100+50
Return Event	150 years
Duration	100.000 hours
Depth	12.4 in
Time of Concentration (Composite)	0.050 hours
Area (User Defined)	1.050 acres
<hr/>	
Computational Time Increment	0.007 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	15.21 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	15.21 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	1.050 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	12.2 in
Runoff Volume (Pervious)	1.066 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	1.066 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.050 hours
Computational Time Increment	0.007 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#4 - IMP

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

SCS Unit Hydrograph Parameters

Unit peak, qp	23.79 ft ³ /s
Unit peak time, Tp	0.033 hours
Unit receding limb, Tr	0.133 hours
Total unit time, Tb	0.167 hours

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#5

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

Storm Event	NOAA 100+50
Return Event	150 years
Duration	100.000 hours
Depth	12.4 in
Time of Concentration (Composite)	0.170 hours
Area (User Defined)	1.030 acres
<hr/>	
Computational Time Increment	0.023 hours
Time to Peak (Computed)	12.149 hours
Flow (Peak, Computed)	8.18 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	8.17 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	61.000
Area (User Defined)	1.030 acres
Maximum Retention (Pervious)	6.4 in
Maximum Retention (Pervious, 20 percent)	1.3 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	7.1 in
Runoff Volume (Pervious)	0.608 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.608 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.170 hours
Computational Time Increment	0.023 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#5

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

SCS Unit Hydrograph Parameters

Unit peak, qp	6.86 ft ³ /s
Unit peak time, Tp	0.113 hours
Unit receding limb, Tr	0.453 hours
Total unit time, Tb	0.567 hours

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#5 - IMP

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

Storm Event	NOAA 100+50
Return Event	150 years
Duration	100.000 hours
Depth	12.4 in
Time of Concentration (Composite)	0.030 hours
Area (User Defined)	5.920 acres
<hr/>	
Computational Time Increment	0.004 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	86.46 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	86.46 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	5.920 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	12.2 in
Runoff Volume (Pervious)	6.008 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	6.008 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.030 hours
Computational Time Increment	0.004 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#5 - IMP

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

SCS Unit Hydrograph Parameters

Unit peak, qp	223.59 ft ³ /s
Unit peak time, Tp	0.020 hours
Unit receding limb, Tr	0.080 hours
Total unit time, Tb	0.100 hours

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#6

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

Storm Event	NOAA 100+50
Return Event	150 years
Duration	100.000 hours
Depth	12.4 in
Time of Concentration (Composite)	0.060 hours
Area (User Defined)	0.440 acres

Computational Time Increment	0.008 hours
Time to Peak (Computed)	12.104 hours
Flow (Peak, Computed)	4.46 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	4.44 ft ³ /s

Drainage Area	
SCS CN (Composite)	61.000
Area (User Defined)	0.440 acres
Maximum Retention (Pervious)	6.4 in
Maximum Retention (Pervious, 20 percent)	1.3 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	7.1 in
Runoff Volume (Pervious)	0.260 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.259 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.060 hours
Computational Time Increment	0.008 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#6

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

SCS Unit Hydrograph Parameters

Unit peak, qp	8.31 ft ³ /s
Unit peak time, Tp	0.040 hours
Unit receding limb, Tr	0.160 hours
Total unit time, Tb	0.200 hours

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#6 - IMP

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

Storm Event	NOAA 100+50
Return Event	150 years
Duration	100.000 hours
Depth	12.4 in
Time of Concentration (Composite)	0.020 hours
Area (User Defined)	0.890 acres
<hr/>	
Computational Time Increment	0.003 hours
Time to Peak (Computed)	12.099 hours
Flow (Peak, Computed)	13.00 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.050 hours
Flow (Peak Interpolated Output)	12.97 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.890 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	12.2 in
Runoff Volume (Pervious)	0.903 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.903 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.020 hours
Computational Time Increment	0.003 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#6 - IMP

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

SCS Unit Hydrograph Parameters

Unit peak, qp	50.42 ft ³ /s
Unit peak time, Tp	0.013 hours
Unit receding limb, Tr	0.053 hours
Total unit time, Tb	0.067 hours

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#7

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

Storm Event	NOAA 100+50
Return Event	150 years
Duration	100.000 hours
Depth	12.4 in
Time of Concentration (Composite)	0.100 hours
Area (User Defined)	0.370 acres
<hr/>	
Computational Time Increment	0.013 hours
Time to Peak (Computed)	12.120 hours
Flow (Peak, Computed)	3.45 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	3.32 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	61.000
Area (User Defined)	0.370 acres
Maximum Retention (Pervious)	6.4 in
Maximum Retention (Pervious, 20 percent)	1.3 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	7.1 in
Runoff Volume (Pervious)	0.218 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.218 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.100 hours
Computational Time Increment	0.013 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#7

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

SCS Unit Hydrograph Parameters

Unit peak, qp	4.19 ft ³ /s
Unit peak time, Tp	0.067 hours
Unit receding limb, Tr	0.267 hours
Total unit time, Tb	0.333 hours

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#7 - IMP

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

Storm Event	NOAA 100+50
Return Event	150 years
Duration	100.000 hours
Depth	12.4 in
Time of Concentration (Composite)	0.050 hours
Area (User Defined)	0.610 acres
<hr/>	
Computational Time Increment	0.007 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	8.84 ft ³ /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	8.84 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.610 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	12.2 in
Runoff Volume (Pervious)	0.619 ac-ft
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.619 ac-ft
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.050 hours
Computational Time Increment	0.007 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Unit Hydrograph Summary

Label: PR DA#7 - IMP

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

SCS Unit Hydrograph Parameters

Unit peak, qp	13.82 ft ³ /s
Unit peak time, Tp	0.033 hours
Unit receding limb, Tr	0.133 hours
Total unit time, Tb	0.167 hours

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Elevation-Volume-Flow Table (Pond)

Label: BASIN #3

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

Infiltration	
Infiltration Method (Computed)	No Infiltration
Initial Conditions	
Elevation (Water Surface, Initial)	333.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (acres)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
333.00	0.00	0.000	0.000	0.00	0.00	0.00
333.50	0.00	0.021	0.048	0.00	0.00	10.15
334.00	0.00	0.044	0.046	0.00	0.00	21.48
334.50	0.00	0.062	0.027	0.00	0.00	30.21
335.00	0.00	0.082	0.051	0.00	0.00	39.53
335.50	0.00	0.115	0.083	0.00	0.00	55.65
336.00	0.00	0.166	0.123	0.00	0.00	80.46
336.50	0.00	0.231	0.138	0.00	0.00	112.01
337.00	0.00	0.304	0.154	0.00	0.00	147.30
337.50	53.46	0.385	0.170	0.00	53.46	239.97
338.00	151.20	0.475	0.188	0.00	151.20	381.07

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Elevation-Volume-Flow Table (Pond)

Label: BASIN #3A

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	1.0000 in/h

Initial Conditions	
Elevation (Water Surface, Initial)	338.50 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (acres)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
338.50	0.00	0.000	0.000	0.00	0.00	0.00
339.00	0.00	0.002	0.005	0.01	0.01	0.86
339.50	0.00	0.006	0.010	0.01	0.01	2.68
340.00	0.00	0.012	0.015	0.02	0.02	5.64
340.50	0.00	0.020	0.020	0.02	0.02	9.88
340.90	0.00	0.029	0.025	0.02	0.02	14.23
341.00	1.59	0.032	0.026	0.03	1.62	17.05
341.50	23.42	0.047	0.033	0.03	23.46	45.96
342.00	58.15	0.065	0.040	0.04	58.19	89.47

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Elevation-Volume-Flow Table (Pond)

Label: BASIN #4

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	313.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (acres)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
313.00	0.00	0.000	0.000	0.00	0.00	0.00
313.50	0.00	0.027	0.061	0.00	0.00	13.04
314.00	0.00	0.057	0.059	0.00	0.00	27.58
314.50	0.00	0.080	0.034	0.00	0.00	38.70
315.00	0.00	0.104	0.065	0.00	0.00	50.46
315.50	0.00	0.146	0.105	0.00	0.00	70.86
316.00	0.00	0.211	0.156	0.00	0.00	102.30
316.50	0.00	0.292	0.167	0.00	0.00	141.41
316.95	0.00	0.370	0.178	0.00	0.00	178.99
317.00	1.23	0.379	0.179	0.00	1.23	184.54
317.50	44.97	0.471	0.191	0.00	44.97	273.02
318.00	118.62	0.570	0.203	0.00	118.62	394.31

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Elevation-Volume-Flow Table (Pond)

Label: BASIN #5

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	311.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (acres)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
311.00	0.00	0.000	0.000	0.00	0.00	0.00
311.50	0.00	0.050	0.113	0.00	0.00	24.02
312.00	0.00	0.105	0.109	0.00	0.00	50.87
312.50	0.00	0.148	0.063	0.00	0.00	71.43
313.00	0.00	0.193	0.120	0.00	0.00	93.24
313.50	0.00	0.271	0.196	0.00	0.00	131.13
314.00	0.00	0.392	0.290	0.00	0.00	189.56
314.50	0.00	0.541	0.306	0.00	0.00	261.68
315.00	0.00	0.698	0.323	0.00	0.00	337.75
315.50	0.00	0.863	0.340	0.00	0.00	417.87
316.00	0.00	1.038	0.357	0.00	0.00	502.15
316.50	0.00	1.220	0.375	0.00	0.00	590.67
316.70	0.00	1.296	0.382	0.00	0.00	627.28
317.00	8.28	1.412	0.393	0.00	8.28	691.78
317.50	36.06	1.613	0.411	0.00	36.06	816.81
318.00	74.70	1.823	0.430	0.00	74.70	957.22
318.50	117.09	2.043	0.449	0.00	117.09	1,105.99
319.00	132.36	2.273	0.469	0.00	132.36	1,232.36

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Elevation-Volume-Flow Table (Pond)

Label: BASIN #6

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	312.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (acres)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
312.00	0.00	0.000	0.000	0.00	0.00	0.00
312.50	0.00	0.005	0.012	0.00	0.00	2.47
313.00	0.00	0.011	0.011	0.00	0.00	5.20
313.50	0.00	0.015	0.006	0.00	0.00	7.23
314.00	0.00	0.019	0.012	0.00	0.00	9.34
314.50	0.00	0.027	0.019	0.00	0.00	13.07
315.00	0.00	0.039	0.029	0.00	0.00	18.89
315.50	0.00	0.055	0.035	0.00	0.00	26.59
316.00	0.00	0.074	0.041	0.00	0.00	35.75
316.50	0.00	0.096	0.048	0.00	0.00	46.45
316.80	0.00	0.111	0.052	0.00	0.00	53.65
317.00	7.04	0.121	0.055	0.00	7.04	65.83
317.50	46.12	0.151	0.062	0.00	46.12	119.00
318.00	103.52	0.184	0.070	0.00	103.52	192.37

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

Subsection: Elevation-Volume-Flow Table (Pond)

Label: BASIN #7

Scenario: Post-100+50 Spillway

Return Event: 150 years

Storm Event: NOAA 100+50

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	304.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (acres)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
304.00	0.00	0.000	0.000	0.00	0.00	0.00
304.50	0.00	0.003	0.007	0.00	0.00	1.42
305.00	0.00	0.006	0.006	0.00	0.00	2.94
305.50	0.00	0.009	0.004	0.00	0.00	4.14
306.00	0.00	0.011	0.007	0.00	0.00	5.49
306.50	0.00	0.016	0.012	0.00	0.00	7.77
307.00	0.00	0.023	0.017	0.00	0.00	11.22
307.50	0.00	0.033	0.023	0.00	0.00	16.05
308.00	0.00	0.046	0.030	0.00	0.00	22.45
308.50	0.00	0.063	0.037	0.00	0.00	30.60
308.80	0.00	0.075	0.042	0.00	0.00	36.39
309.00	21.13	0.084	0.046	0.00	21.13	61.79
309.50	138.36	0.109	0.055	0.00	138.36	191.21
310.00	310.56	0.139	0.065	0.00	310.56	377.91

1114-02 - EMERGENCY SPILLWAY STORM ROUTINGS

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LOW IMPACT DEVELOPMENT CHECKLIST - APPENDIX G

New Jersey Stormwater Best Management Practices Manual

February 2004

A P P E N D I X A

Low Impact Development Checklist

A checklist for identifying nonstructural stormwater management strategies incorporated into proposed land development

According to the NJDEP Stormwater Management Rules at N.J.A.C. 7:8, the groundwater recharge, stormwater quality, and stormwater quantity standards established by the Rules for major land development projects must be met by incorporating nine specific nonstructural stormwater management strategies into the project's design to the maximum extent practicable.

To accomplish this, the Rules require an applicant seeking land development approval from a regulatory board or agency to identify those nonstructural strategies that have been incorporated into the project's design. In addition, if an applicant contends that it is not feasible to incorporate any of the specific strategies into the project's design, particularly for engineering, environmental, or safety reasons, the Rules further require that the applicant provide a basis for that contention.

This checklist has been prepared to assist applicants, site designers, and regulatory boards and agencies in ensuring that the nonstructural stormwater management requirements of the Rules are met. It provides an applicant with a means to identify both the nonstructural strategies incorporated into the development's design and the specific low impact development BMPs (LID-BMPs) that have been used to do so. It can also help an applicant explain the engineering, environmental, and/or safety reasons that a specific nonstructural strategy could not be incorporated into the development's design.

The checklist can also assist municipalities and other land development review agencies in the development of specific requirements for both nonstructural strategies and LID-BMPs in zoning and/or land use ordinances and regulations. As such, where requirements consistent with the Rules have been adopted, they may supersede this checklist.

Finally, the checklist can be used during a pre-design meeting between an applicant and pertinent review personnel to discuss local nonstructural strategies and LID-BMPs requirements in order to optimize the development's nonstructural stormwater management design.

Since this checklist is intended to promote the use of nonstructural stormwater management strategies and provide guidance in their incorporation in land development projects, municipalities are permitted to revise it as necessary to meet the goals and objectives of their specific stormwater management program and plan within the limits of N.J.A.C. 7:8.

Low Impact Development Checklist

A checklist for identifying nonstructural stormwater management strategies incorporated into proposed land development

Municipality: Township of Bernards

County: Somerset Date: September 19th, 2022

Review board or agency: Township of Bernards Zoning Board of Adjustments

Proposed land development name: 150 Allen Road

Lot(s): 3 Block(s): 11201

Project or application number: 1114-02

Applicant's name: Signature Aquisitions (or SIG150 ALLEN LLC)

Applicant's address: 20 Commerce Drive, Cranford, NJ 07016

Telephone: (212) 470-5200 Fax: _____

Email address: info@signatureacq.com

Designer's name: Robert C. Moschello, P.E., Gladstone Design, Inc.

Designer's address: 265 Main Street, PO Box 400, Gladstone, NJ 07934

Telephone: (908) 234-0309 Fax: _____

Email address: rmoschello@gladstonedesign.com

Part 2: Review of Local Stormwater Management Regulations

Title and date of stormwater management regulations used in development design:

NJ Stormwater Regulations (NJAC 7:8)

Do regulations include nonstructural requirements? Yes: _____ No: X

If yes, briefly describe: The Township of Bernards ordinance does not explicitly require nonstructural requirements, however it does required compliance with NJAC 7:8 where Nonstructural requirements are encouraged to achieve the various strategies outlined in the regulations for low

impact development.

List LID-BMPs prohibited by local regulations: N/A

Pre-design meeting held? Yes: X Date: 2022 No: _____

Meeting held with: Design Engineer, Property Owner, and the Township Professional

Pre-design site walk held? Yes: X Date: 2022 No: _____

Site walk held with: Design Engineer and Owner

Other agencies with stormwater review jurisdiction:

Name: Somerset County Planning Board

Required approval: Planning Board Approval

Name: Somerset-Union Soil Conservation District

Required approval: SESC Certification

Name: _____

Required approval: _____

Part 3: Nonstructural Strategies and LID-BMPs in Design

3.1 Vegetation and Landscaping

Effective management of both existing and proposed site vegetation can reduce a development's adverse impacts on groundwater recharges and runoff quality and quantity. This section of the checklist helps identify the vegetation and landscaping strategies and nonstructural LID-BMPs that have been incorporated into the proposed development's design to help maintain existing recharge rates and/or minimize or prevent increases in runoff quantity and pollutant loading.

A. Has an inventory of existing site vegetation been performed? Yes: No: _____

If yes, was this inventory a factor in the site's layout and design? Yes: No: _____

B. Does the site design utilize any of the following nonstructural LID-BMPs?

Preservation of natural areas? Yes: No: _____ If yes, specify % of site: +/-46%

Native ground cover? Yes: No: _____ If yes, specify % of site: +/-46%

Vegetated buffers? Yes: No: _____ If yes, specify % of site: +/-35%

C. Do the land development regulations require these nonstructural LID-BMPs?

Preservation of natural areas? Yes: _____ No: If yes, specify % of site: _____

Native ground cover? Yes: _____ No: If yes, specify % of site: _____

Vegetated buffers? Yes: _____ No: If yes, specify % of site: _____

D. If vegetated filter strips or buffers are utilized, specify their functions:

Reduce runoff volume increases through lower runoff coefficient: Yes: _____ No:

Reduce runoff pollutant loads through runoff treatment: Yes: _____ No:

Maintain groundwater recharge by preserving natural areas: Yes: _____ No:

3.2 Minimize Land Disturbance

Minimizing land disturbance is a nonstructural LID-BMP that can be applied during both the development's construction and post-construction phases. This section of the checklist helps identify those land disturbance strategies and nonstructural LID-BMPs that have been incorporated into the proposed development's design to minimize land disturbance and the resultant change in the site's hydrologic character.

A. Have inventories of existing site soils and slopes been performed? Yes: X No: _____

If yes, were these inventories factors in the site's layout and design? Yes: X No: _____

B. Does the development's design utilize any of the following nonstructural LID-BMPs?

Restrict permanent site disturbance by land owners? Yes: _____ No: X

If yes, how: _____

Restrict temporary site disturbance during construction? Yes: X No: _____

If yes, how: The design utilizes existing infrastructure to prevent unnecessary and new disturbance.

Consider soils and slopes in selecting disturbance limits? Yes: _____ No: X

If yes, how: _____

C. Specify percentage of site to be cleared: 3% Regraded: 52%

D. Specify percentage of cleared areas done so for buildings: 0%

For driveways and parking: 0% For roadways: 3%

E. What design criteria and/or site changes would be required to reduce the percentages in C and D above?

The development utilizes existing disturbed land to prevent new disturbance, however the site has unique existing conditions and required to be regraded. To minimize regrading the previously undisturbed land retaining walls were implemented into the design.

F. Specify site's hydrologic soil group (HSG) percentages:

HSG A: _____ HSG B: 98% HSG C: 1% HSG D: 1%

G. Specify percentage of each HSG that will be permanently disturbed:

HSG A: _____ HSG B: 40% HSG C: _____ HSG D: _____

H. Locating site disturbance within areas with less permeable soils (HSG C and D) and minimizing disturbance within areas with greater permeable soils (HSG A and B) can help maintain groundwater recharge rates and reduce runoff volume increases. In light of the HSG percentages in F and G above, what other practical measures if any can be taken to achieve this?

Majority of the site is located in HSG B soil, however majority of the development is proposed in previously developed area.

I. Does the site include Karst topography? Yes: _____ No: X

If yes, discuss measures taken to limit Karst impacts:

3.3 Impervious Area Management

New impervious surfaces at a development site can have the greatest adverse effect on groundwater recharge and stormwater quality and quantity. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into a proposed development's design to comprehensively manage the extent and impacts of new impervious surfaces.

A. Specify impervious cover at site: Existing: 489,510 sq. ft. (39.70%) Proposed: 492,189 sq. ft. (39.92%)

B. Specify maximum site impervious coverage allowed by regulations: 493,168 sq. ft. (40%)

C. Compare proposed street cartway widths with those required by regulations:

Type of Street	Proposed Cartway Width (feet)	Required Cartway Width (feet)
Residential access – low intensity		
Residential access – medium intensity		
Residential access – high intensity with parking		
Residential access – high intensity without parking		
Neighborhood		
Minor collector – low intensity without parking		
Minor collector – with one parking lane		
Minor collector – with two parking lanes	24 Ft.	24 Ft.
Minor collector – without parking		
Major collector	28 Ft.	24 Ft.

D. Compare proposed parking space dimensions with those required by regulations:

Proposed: 9 ft. x 18 ft. Regulations: 9 ft. x 18 ft.

E. Compare proposed number of parking spaces with those required by regulations:

Proposed: 328 parking spaces Regulations: 639 parking spaces

F. Specify percentage of total site impervious cover created by buildings: 21%

By driveways and parking: 9% By roadways: 10%

G. What design criteria and/or site changes would be required to reduce the percentages in F above?

In order to reduce the above percentages, a reduction in the overall scope of the project would be required to reduce the percentage of the site impervious that is driveway or parking or warehouse.

H. Specify percentage of total impervious area that will be unconnected:

Total site: 0% Buildings: 0% Driveways and parking: _____ Roads: _____

I. Specify percentage of total impervious area that will be porous:

Total site: 0% Buildings: _____ Driveways and parking: _____ Roads: _____

J. Specify percentage of total building roof area that will be vegetated: 0%

K. Specify percentage of total parking area located beneath buildings: 5%

L. Specify percentage of total parking located within multi-level parking deck: N/A

3.4 Time of Concentration Modifications

Decreasing a site's time of concentration (Tc) can lead directly to increased site runoff rates which, in turn, can create new and/or aggravate existing erosion and flooding problems downstream. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into the proposed development's design to effectively minimize such Tc decreases.

When reviewing Tc modification strategies, it is important to remember that a drainage area's Tc should reflect the general conditions throughout the area. As a result, Tc modifications must generally be applied throughout a drainage area, not just along a specific Tc route.

A. Specify percentage of site's total stormwater conveyance system length that will be:

Storm sewer: 55% Vegetated swale: 5% Natural channel: 0%

Stormwater management facility: 40% Other: 0%

Note: the total length of the stormwater conveyance system should be measured from the site's downstream property line to the downstream limit of sheet flow at the system's headwaters.

B. What design criteria and/or site changes would be required to reduce the storm sewer percentages and increase the vegetated swale and natural channel percentages in A above?

A reduction in overall scope of the project would decrease the amount of storm sewer and increase potential for the addition of vegetated swales.

C. In conveyance system subareas that have overland or sheet flow over impervious surfaces or turf grass, what practical and effective site changes can be made to:

Decrease overland flow slope: A portion of the site was left undisturbed and the redeveloped portion has been regraded to have a more consistent slope rather than a stepped terrain which currently exists.

Increase overland flow roughness: Area of overland flow will have native ground cover rather than turf grass to increase the overland flow roughness.

3.5 Preventative Source Controls

The most effective way to address water quality concerns is by pollution prevention. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into the proposed development's design to reduce the exposure of pollutants to prevent their release into the stormwater runoff.

A. Trash Receptacles **N/A**

Specify the number of trash receptacles provided: _____

Specify the spacing between the trash receptacles: _____

Compare trash receptacles proposed with those required by regulations:

Proposed: _____ Regulations: _____

B. Pet Waste Stations **N/A**

Specify the number of pet waste stations provided: _____

Specify the spacing between the pet waste stations: _____

Compare pet waste stations proposed with those required by regulations:

Proposed: _____ Regulations: _____

C. Inlets, Trash Racks, and Other Devices that Prevent Discharge of Large Trash and Debris

Specify percentage of total inlets that comply with the NJPDES storm drain inlet criteria: 100%

D. Maintenance

Specify the frequency of the following maintenance activities:

Street sweeping: Proposed: Quarterly Regulations: N/A

Litter collection: Proposed: Weekly Regulations: N/A

Identify other stormwater management measures on the site that prevent discharge of large trash and debris:

Trash racks on the outlet structure, weekly maintenance staff

E. Prevention and Containment of Spills N/A

Identify locations where pollutants are located on the site, and the features that prevent these pollutants from being exposed to stormwater runoff:

Pollutant: _____ Location: _____

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: _____ Location: _____

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: _____ Location: _____

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: _____ Location: _____

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: _____ Location: _____

Part 4: Compliance with Nonstructural Requirements of NJDEP Stormwater Management Rules

1. Based upon the checklist responses above, indicate which nonstructural strategies have been incorporated into the proposed development's design in accordance with N.J.A.C. 7:8-5.3(b):

No.	Nonstructural Strategy	Yes	No
1.	Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.	X	
2.	Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces.	X	
3.	Maximize the protection of natural drainage features and vegetation.	X	
4.	Minimize the decrease in the pre-construction time of concentration.	X	
5.	Minimize land disturbance including clearing and grading.	X	
6.	Minimize soil compaction.	X	
7.	Provide low maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers, and pesticides.	X	
8.	Provide vegetated open-channel conveyance systems discharge into and through stable vegetated areas.	X	
9.	Provide preventative source controls.	X	

2. For those strategies that have not been incorporated into the proposed development's design, provide engineering, environmental, and/or safety reasons. Attached additional pages as necessary.

REFERENCES - APPENDIX H

REFERENCES:

1. "150 Allen Road, Preliminary and Final Major Site Plans," dated September 16, 2022, prepared by Gladstone Design, Inc.
2. New Jersey Stormwater Best Management Practices Manual dated April 2004, revised to March 2, 2021, New Jersey Division of Watershed Management.
3. National Engineering Handbook, Part 630 Hydrology dated September 1997, revised to July 2004, United States Department of Agriculture Natural Resources Conservation Service.

PRE- AND POST-DEVELOPMENT DRAINAGE AREA MAPS - APPENDIX I

150 Allen Road

**OPERATIONS & MAINTENANCE MANUAL
FOR
STORMWATER MANAGEMENT FACILITIES**

**BLOCK 11201 LOT 3
TOWNSHIP OF BERNARDS
SOMERSET COUNTY, NEW JERSEY**

**BY
GLADSTONE DESIGN, INC.
265 Main Street
Gladstone, New Jersey 07934**

September 16, 2022

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INTRODUCTION

The proposed project “150 Allen Road” is located in Bernards Township, Somerset County, New Jersey. The site (See **Figure 1**) is comprised of Block 11201, Lot 3 with a total tract area of 28.304 acres. The proposed project consists of two (2) light manufacturing buildings and associated site improvements.

This report has been prepared to set forth the operations and maintenance guidelines for the stormwater management measures proposed to manage the runoff from the proposed improvements only.

BACKGROUND DATA

The proposed development consists of a series of various stormwater facilities. The site contains five (5) Small-Scale Bioretention basins, one (1) Large-Scale Bioretention basin, and a Storm Sewer Conveyance System located throughout the property which collect runoff and discharge it at the various locations on-site. These components are highlighted on the 150 Allen Road, Property Owners Maintenance and Inspection Plan (**Figure 2**).

This report has been written pursuant to N.J.A.C. 7:8-5.8 Stormwater Management Maintenance Requirements.

OPERATION

The stormwater facilities have been designed to provide for water quality, infiltration, and flood attenuation. Water Quality will be provided via infiltration through the Small-Scale Bioretention basin soil media, where it will provide a min. of 80% TSS removal. Recharge will be provided within the Small-Scale Bioretention basin without an underdrain. Detention will occur in the Large-Scale Bioretention basin. The bioretention basins have been planted with a specified plant mix to aid in the removal of pollutants from the run-off.

Bioretention Basin

The proposed Bioretention Basins are designed as flood attenuation and water quality enhancement facilities through the use of wetland plantings, detention, and infiltration. The Bioretention Basins are designed for surface storage of the volume of runoff generated by the 1.25 inch 2-hour water quality storm and infiltration through wetland plantings and layers of soil, sand, and gravel with a perforated under-drain system. The larger storm events are passed through by the use of an outlet structure with an overflow weir. The soil planting layer and sand layer will treat the runoff and allow a medium for infiltration to take place into the gravel and underdrain system.

The total suspended solids (TSS) removal rate for a Bioretention Basin is 80%. This value was obtained from the New Jersey Department of Environmental Protection Best Management Practices Manual, dated March 2021 for Chapter 9.7, Small-Scale Bioretention Systems.

The following is a list of the major components that make up this segment of the stormwater management facilities with a brief description of what each one consists of and how it operates.

Impoundment Area: This is the area that will store the runoff from the storm events and perform as the residual flood storage area. This portion includes all the ancillary items listed below as part of its design. This area will remain dry until a storm event occurs and at which time will begin to store runoff at a volume dependent on the intensity of the storm. The level of water in the impoundment area will be directly related to the infiltration of water through the soil planting material and the outlet structure.

Berm with Outlet Structure: As part of the Bioretention Basin, a small berm has been created with an outlet structure that will detain the water quality design storm event for a finite period of time. The outlet structure is comprised of a wall with an orifice/weir plate and trash rack to prevent clogging.

Riprap Aprons: There are a series of riprap aprons located throughout the impoundment area. The purpose of these aprons is to prevent erosion from the runoff entering into the basin from the stormwater conveyance system.

Storm Sewer Conveyance System

The storm sewer conveyance system is an integral part of the overall stormwater management facilities. Its purpose is to convey the runoff to the Bioretention Basin and/or other stormwater management facilities previously described. The system is comprised of two components, the catch basins for collecting the runoff and the pipes themselves for the conveyance of runoff.

OWNERSHIP AND MAINTENANCE RESPONSIBILITY

During construction the developer of the project shall be the owner and responsible for maintenance.

Construction and Maintenance

Sig150 Allen LLC
20 Commerce Drive
Cranford, NJ 07016
Tel: (908) 557-7597

The Emergency Access and maintenance rights must be given to the municipality and to the county, but not obligate them, in the circumstance where emergency maintenance must be performed to ensure public safety. Such as the event that the facility fails to function as anticipated, for example, if the basin does not drain completely within 72 hours of a storm event. The owner or association shall be responsible for the costs of any emergency maintenance and/or operation performed by the Municipality or County.

CONSTRUCTION

Due to the use of infiltration at the proposed stormwater management facilities, additional steps must be taken during construction to ensure that there is no un-necessary compaction of the existing soil layers below the proposed facilities. A series of additional construction steps must be utilized to maintain the underlying permeability rates of the existing soils. These steps have been detailed out below and can also be found on the accompanying Site Plans. These protected areas are shown on **Figure 2** of this report.

1. Prior to the start of construction, areas where infiltration is to occur are to be fenced off with orange snow fencing as per the Site Plans.
2. The contractor shall enter this area only once during initial site clearing to remove any trees and strip the existing topsoil layer. This area is to remain fenced off to prevent construction traffic from traversing the area and compacting the existing soil while the remaining portion of the site is cleared.
3. The detention, water quality, and infiltration facilities shall be constructed first and stabilized, seeded, and fenced off to prevent any further access to these areas during construction, except for maintenance of the basins which may include sediment removal and cleaning.

INSPECTION/MAINTENANCE

The property owner will have the obligation to inspect and maintain the Stormwater Facilities as described below. The inspections shall be performed by a representative of the property owner who is in charge of maintaining the property and grounds and who has responsibility to maintain these facilities. It will be the responsibility of this person to complete the Quarterly Report Form (a copy of which can be found in **Appendix "A"**) and provide copies to the Township Engineer. This person shall also evaluate the effectiveness of the plan at least once per year and adjust the plan as needed, copies of which shall be submitted to the Township Engineer and Municipality if changes have been made. In addition, copies of the quarterly report forms shall be submitted on a yearly basis to the Municipality and shall be available along with copies of this plan upon request to any public entity with administrative, environmental, or safety authority over the site. A Stormwater Management Facilities Log Sheet is included in **Appendix "D"** where any necessary corrective or preventative actions to be taken or that were performed can be noted.

This section of the report has been broken down into the various components of the Stormwater Facilities and the maintenance and inspection required for them. In **Appendix "B"** of this report is a maintenance checklist which has been created for this project and can be used as an aid in determining when the inspections should take place and which tasks to perform. It should also be used by the responsible party in charge during the actual inspection so that the items can be marked off after each component has been inspected.

Bioretention Basins

The stormwater management facilities described above and shown on **Figure 2** are necessary for water quality treatment and flood storage. The chart located in **Appendix "B"** summarizes the schedule of inspections for each component. These inspections must be performed to ensure proper functioning of the facility.

The bioretention basins shall be inspected per the schedule listed in the maintenance and inspection chart and after every storm event consisting of 1 inch of rainfall or more.

In order to access these facilities for a visual inspection, an access point has been provided for maintenance personal to enter into the area. These access points can also be used to bring equipment into the facilities for maintenance and upkeep.

The purpose of the inspection is to identify operational conditions including the conditions of berms, outlet structures, underground piping, and the overall facility. Inspections are also to identify effectiveness of regularly scheduled preventative maintenance procedures and the associated timing of implementation of corrective measures.

The outlet structures and access risers located at each facility must be inspected for clogging and excessive debris and sediment accumulation at least four times annually as well as after every storm exceeding 1 inch of rainfall. These components include trash racks, pipes, and riprap or gabion aprons. These components must be kept free of debris and sediment, all unwanted vegetation growth should be removed, and areas of flow kept clear at all times.

Sediment removal shall take place when the facilities are dry. Disposal of debris, trash, sediment, and other waste material shall be done at a licensed disposal/recycling facility and in compliance with all applicable local, state, and federal waste regulations. No material shall be stockpiled or stored on-site once removed from the facility. The property owner shall supply copies of records showing the material has been carted off to the proper disposal centers as part of the annual report to the Borough.

The basin draw down times should be used to evaluate the system's actual performance annually. If significant increases or decreases in the normal drain time are observed or if the 72-hour maximum is exceeded, the system's planting soil bed, underdrain system, and both groundwater and tailwater levels must be evaluated and appropriate measures taken to comply with the maximum drain time requirements and maintain the proper functioning of the system. The planting soil bed at the bottom of the system should be inspected at least twice annually. The permeability rate of the soil bed material may also be retested. If the water fails to infiltrate 72 hours after the end of the storm, corrective measures must be taken.

Mowing and/or trimming of vegetation must be performed on a regular schedule. Grass should be mowed at least once a month during the growing season. It will be the responsibility of the property owner to maintain the limit of the stormwater facilities. Vegetated areas must be inspected at least bi-annually (May 1st and November 1st) for erosion and scour. Vegetated areas should also be inspected during the same schedule listed above for unwanted growth, which should be removed with minimum disruption to the planting soil bed and remaining vegetation. Should the representative of the property owner during their normal course of inspection notice an issue with the storm water facilities located in the public areas, that person should notify Bernards Township immediately.

It is recommended that all inspections be performed after all rain events have stopped and the facilities have been thoroughly drained. No personnel should enter into a stormwater facility while it is still holding water. Should the need arise to enter a stormwater facility while it is still holding water, the proper equipment shall be utilized including but not limited to a boat, life jacket, diving gear, and ropes. Maintenance personnel should be familiar with the basic description of how the overall stormwater management system operates and its major components. Additional training may be required for the operation and care of specialized equipment as well as the use of safety equipment.

Should the Township during one of its inspections, notice an issue with the 150 Allen Road Stormwater Facilities, they should notify the property owner immediately as well.

When establishing or restoring vegetation, biweekly inspections of vegetation health should be performed during the first growing season or until the vegetation is established. Once established, inspections of vegetation health, density, and diversity should be performed at least twice annually during both the growing and non-growing seasons. The vegetative cover should be maintained at a minimum of 85% cover. If vegetation has greater than 15% damage, the area should be reestablished in accordance with the original specifications and the inspection requirements presented above.

All use of fertilizer, mechanical treatments, pesticides should be used minimally and only as necessary to assure optimum vegetation health. All vegetation deficiencies should be addressed without the use of fertilizers and pesticides whenever possible.

All structural components must be inspected for cracking, subsidence, spalling, erosion, and deterioration at least annually (May 1st). Structural damage to outlet, drywell, trash racks, and pipes must be repaired promptly. The urgency of the repairs will depend upon the nature of the damage and its effects on the safety and operation of the facility. The analysis of structural damage and the design and performance of structural repairs should only be undertaken by a Professional Engineer licensed in the State of New Jersey.

Damage to embankments, and side slopes must be repaired promptly. Typical problems include settlement, scouring, cracking, sloughing, animal burrows and rutting. The urgency of the repairs will depend upon the nature of the damage and its effect on the safety and operation of the facility. The analysis of damage and the design and performance of geotechnical repairs should only be undertaken by qualified personnel at the direction of the consulting Professional Engineer.

Please see the chart located in **Appendix "B"** which lists out the various components and their inspection schedule.

Storm Sewer Conveyance System

As described above, the storm sewer conveyance system collects and conveys the runoff from the on-site areas into the bioretention basin and/or other stormwater management facilities previously described. This system is comprised of a series of inlets and storm pipe which must be maintained and inspected as per the chart at the end of this section.

The purpose of the inspection will be to identify any debris or objects that may clog or impede the flow of stormwater into the inlets. Special attention should be given to the structures in the fall after the leaves have fallen from the trees. The inlet grates should be kept clean of any leaves as they can cause clogging and prevent the runoff from entering into the system.

Attention should be given to the inlet casings and manhole covers to make sure they are firmly secured. Should any manhole covers come loose, they should promptly be reset, should any inlet casings become dislodged by vehicles, they shall be reset at once.

The proposed pipes should be inspected to identify any clogs or debris that would prevent the runoff from flowing through the system. A visual inspection can be performed from the headwalls with a flashlight to look into the pipe network and check for debris and that is the extent to which the property owner's representative is required to inspect. Any access to confined spaces such as the manholes and pipes themselves should be done by licensed professionals trained to work in confined spaces should the need arise to perform any work in those places.

Please see the chart located in **Appendix "B"** which lists out the various components and their inspection schedule.

EQUIPMENT AND MATERIALS

The following is a list of maintenance equipment and materials that would be required for the general maintenance of the Stormwater Management Facilities. It will be at the discretion of the property owner whether to perform the work themselves or hire a landscape and or maintenance service to maintain the Stormwater Facilities. Should the property owner choose to hire a service to maintain the Stormwater Facilities, the responsibility of inspecting the facilities per the above report will still be the job of the property owner's representative. The following is a list of general maintenance equipment and materials for the various Stormwater Components and what equipment may be needed to maintain them. The equipment may be rented for a particular task or stored on-site as part of the maintenance program.

1. Grass
 - a) Riding Mowers
 - b) Hand Mowers
 - c) Power Trimmers
 - d) Power Edger's
 - e) Seed Spreaders
 - f) De-Thatching Equipment
 - g) Grass clipping and Leaf Collection Equipment
2. Vegetation
 - a) Saws
 - b) Pruning Shears
 - c) Hedge Trimmers
 - d) Wood Chippers
3. Debris, Trash, Filter Cartridge, and Sediment Removal Equipment

- a) Manhole Cover Pry Bar
 - b) Absorbent Pads
 - c) Stadia Rod
 - d) Vacuum Truck
 - e) Loader
 - f) Backhoe
 - g) Grader
 - h) Pump for Dewatering
4. Miscellaneous
- a) Shovels
 - b) Rakes
 - c) Picks
 - d) Wheelbarrows
 - e) Gloves
5. Materials
- a) Topsoil
 - b) Fill
 - c) Seed
 - d) Soil Amenities
 - e) Mulch
 - f) Paint Removers
 - g) Concrete Repair Material

The above list is comprised of equipment that will be required for general maintenance tasks. It is not the responsibility of the property owner to have all the equipment listed above stored on-site at all times but should have readily available access to it for maintenance purposes.

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SCALE : 1"=1000'

NOTES:

1. OUTLINE OF PROPERTY IN QUESTION APPROXIMATE FROM PLAN ENTITLED "ALLEN RD" DATED FEBRUARY 28, 2022, PREPARED BY ROBINSON AERIAL SURVEYS INC.

GLADSTONE DESIGN, Inc.

Consulting Engineers
Land Surveyors
Landscape Architects
Land Planners

265 Main Street P.O. Box 400
Gladstone, New Jersey 07934
Telephone (908) 234-0309
Facsimile (908) 719-3320

NJ Certificate of Authorization
No. 24GA28034400

150 ALLEN ROAD
LOT 3 BLOCK 11201
BERNARDS TOWNSHIP
SOMERSET COUNTY, NEW JERSEY

SHEET TITLE:

KEY MAP

REFERENCE:

BING MAPS

DWN.

SG

CHKD.

RCM2

SCALE

1"=1,000'

DATE

07-27-2022

FIG. NO.

1

JOB NO.

1114-02

REVISIONS		
NO.	DATE	DESCRIPTION

**GLADSTONE
DESIGN, Inc.**

Consulting Engineers
Land Surveyors
Landscape Architects
Land Planners

265 Main Street, P.O. Box 400
Gladstone, New Jersey 07934
T: (908) 234-0309
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NJ Certificate of Authorization
No. 24GA28034400

Ronald A. Kennedy, P.E., P.P., CME, LEED AP
Kurt T. Hanie, P.L.S.
Robert C. Morris
Robert C. Moschello, P.E.

ROBERT C. MOSCHELLO, P.E.
NJ PROFESSIONAL ENGINEER
LICENSE No. GE44279

PROJECT

150 ALLEN ROAD

LOT 3 BLOCK 11201

TOWNSHIP OF BERNARDS
SOMERSET COUNTY
NEW JERSEY

SHEET TITLE

PRELIMINARY AND FINAL
MAJOR SITE PLANS

**PROPERTY OWNER'S
MAINTENANCE AND
INSPECTION PLAN**

DATE
SEPTEMBER 16, 2022

SCALE
1" = 100'

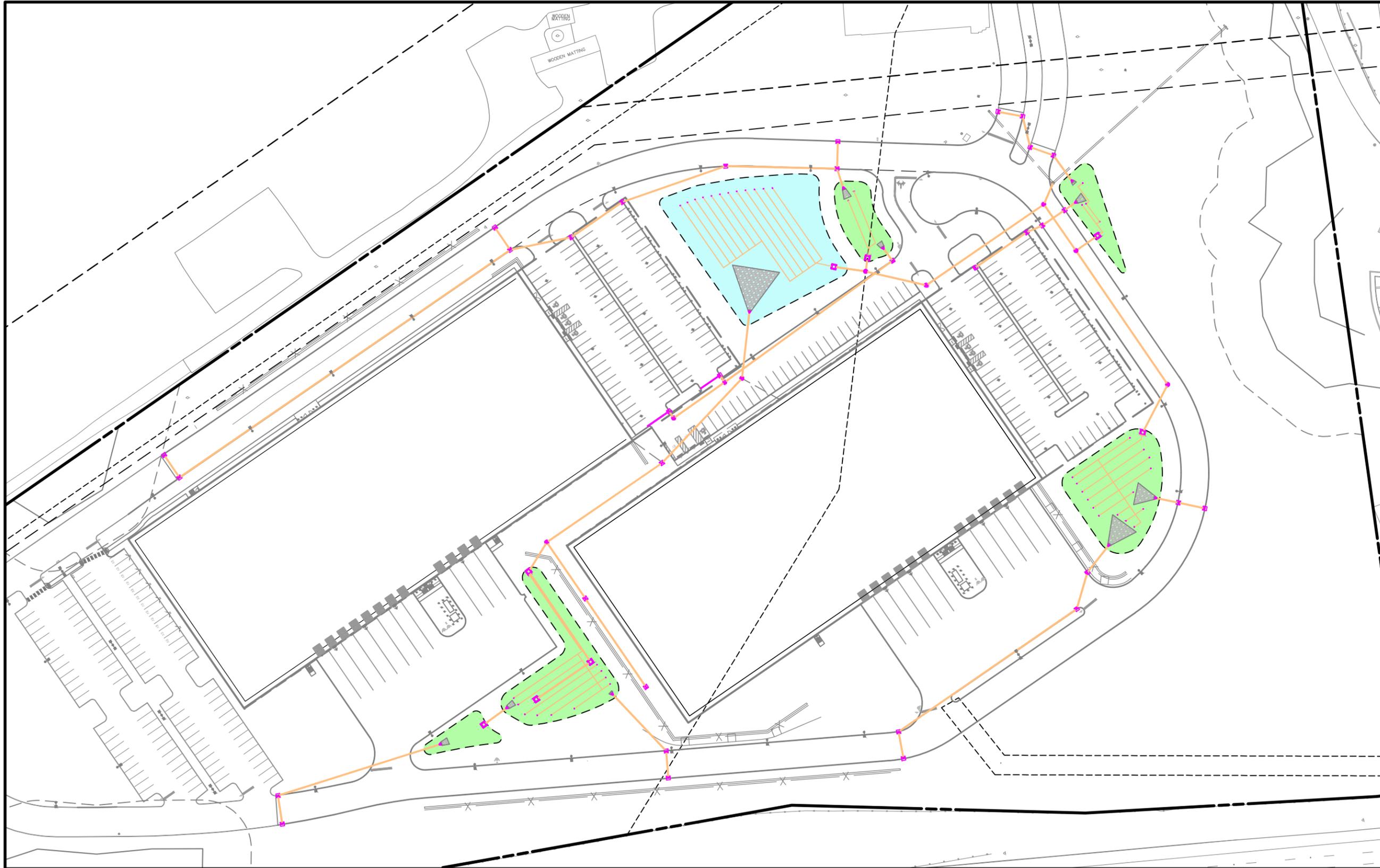
JOB NO.
1114-02

DRAWN
CR

SHEET NO.

CHKD.
CRF/RCM2

FIG. 2



LEGEND

- STORMWATER PIPING
- LARGE-SCALE BIORETENTION BASIN
- STORMWATER STRUCTURES
- SMALL-SCALE BIORETENTION BASIN

M:\Drawings\1114-02\Report Mapping\1114-02 REPORT MAPPING - O&M FIGURE 2.dwg, 9/19/2022 3:44:32 PM, craia, DWG To PDF - Overwrite.pc3, 1:1

STORMWATER MANAGEMENT MAINTENANCE CHECKLIST - APPENDIX B

REFERENCES:

1. Stormwater Management Report for 150 Allen Road, dated September 16, 2022, prepared by Gladstone Design, Inc.
2. New Jersey Stormwater Best Management Practices Manual dated March 2021, New Jersey Division of Watershed Management.

STORMWATER MANAGEMENT FACILITIES LOG SHEET – APPENDIX D

150 Allen Road
Stormwater Management Facilities
Log Sheet

Stormwater Management Facility	Corrective Action	Preventative Action

Exceptions and Notes:

Signed _____ Date _____

Print Name

Phone Number

MAINTENANCE COST ESTIMATE – APPENDIX E

150 ALLEN ROAD STORMWATER MANAGEMENT MAINTENANCE
ESTIMATE

MAINTENANCE TASK	ESTIMATE
REMOVE DEBRIS FROM BASIN (MONTHLY)	\$600.00
REMOVE SEDIMENT FROM BASIN (AS REQUIRED)	\$10,000.00
CLEAN INLETS (YEARLY)	\$2,500.00

TIME VS. ELEVATION SUMMARY

Job No. 1114-02
Date: 9/16/2022
Rev:

Performed By: CR
Check By: AGS

100 YR STORM**

POND	INFILTRATION RATE USED FOR CALCULATIONS (IN/HR)	PEAK TIME (HRS.)	TIME AT WHICH BASIN IS EMPTY (HRS.)	TOTAL DRAW DOWN TIME (HRS.)
Pond #3	UD*	12.20	40.50	28.30
Pond #3A	1.0	12.25	50.00	37.75
Pond #4	UD*	12.15	29.75	17.60
Pond #5	UD*	12.15	24.75	12.60
Pond #6	UD*	12.10	15.00	2.90
Pond #7	UD*	12.10	13.75	1.65

*Under Drained

**Values taken from the routings within the Appendix B-3



STORMWATER MANAGEMENT TESTING REPORT

150 Allen Road

Bernards Township, Somerset County, New Jersey

September 2022

Prepared For:

SIGNATURE ACQUISITIONS

20 Commerce Drive
Cranford, New Jersey 07016

Attn: Mr. Richard Travaglini
Senior Vice President – Director of Leasing

Prepared By:

GEO-TECHNOLOGY ASSOCIATES, INC.

Geotechnical and Environmental Consultants

14 Worlds Fair Drive, Suite A
Somerset, New Jersey 08873

GTA Job No: 31221640

GEO-TECHNOLOGY ASSOCIATES, INC.

GEOTECHNICAL AND
ENVIRONMENTAL CONSULTANTS

A Practicing Geoprofessional Business Association Member Firm



September 13, 2022

Signature Acquisitions
20 Commerce Drive
Cranford, New Jersey 07016

Attn: Mr. Richard Travaglini
Senior Vice President – Director of Leasing

Re: Stormwater Management Testing Report
150 Allen Road
Bernards Township, Somerset County, New Jersey

Dear Rich:

In accordance with our agreement dated August 1, 2022 and executed on August 3, 2022, Geo-Technology Associates, Inc. (GTA) has performed a geotechnical engineering exploration for the planning and design of proposed stormwater management (SWM) facilities related to 2 proposed light-manufacturing buildings to be constructed in Bernards Township, Somerset County, New Jersey. The exploration included 15 test pits within proposed and potential SWM basin areas, visually classifying the encountered soils, performing in-situ infiltration tests, and performing limited laboratory testing. The results of the field and laboratory testing, and GTA's recommendations regarding the design and construction of the proposed SWM basins are included in this report.

GTA appreciates the opportunity to have been of assistance to you on this project. Please contact our office at (732) 271-9301 if you have questions or require additional information.

Very truly yours,
GEO-TECHNOLOGY ASSOCIATES, INC.

Allison Tether, P.G.
Senior Project Manager

Dennis C. Loh, P.E.
Vice President

AFS/AMT/DCL
Job No. 31221640
Attachments

14 Worlds Fair Drive, Suite A, Somerset, NJ 08873 (732) 271-9301

◆ Abingdon, MD ◆ Baltimore, MD ◆ Laurel, MD ◆ Frederick, MD ◆ Waldorf, MD ◆ New Castle, DE ◆ Georgetown, DE
◆ Somerset, NJ ◆ NYC Metro ◆ Pittsburgh Metro ◆ Quakertown, PA ◆ Scranton/Wilkes-Barre, PA ◆ York, PA
◆ Northeastern, OH ◆ Sterling, VA ◆ Nashville, TN ◆ Charlotte, NC ◆ Raleigh, NC ◆ Orlando, FL

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STORMWATER MANAGEMENT TESTING REPORT

**150 ALLEN ROAD
BERNARDS TOWNSHIP
SOMERSET COUNTY, NEW JERSEY
SEPTEMBER 2022**

INTRODUCTION

This report presents the results of a geotechnical exploration and in-situ infiltration testing performed by Geo-Technology Associates, Inc. (GTA) for the planning and design of stormwater management (SWM) facilities related to 2 proposed light-manufacturing buildings to be constructed in Bernards Township, Somerset County, New Jersey. The site is located at 150 Allen Road and identified as Lot 3 in Block 11201 on the Bernards Township tax map. Please refer to the Site Location Map, which is Figure 1 in Appendix A of this report.

GTA was provided with a plan prepared by Gladstone Design, Inc. titled “Soil Testing Locations” dated April 11, 2022 and a plan titled “Overall Site Dimension Plan” dated August 2022. The plans indicate the site boundaries, existing site features and topography, the layout and dimensions of the proposed light-manufacturing buildings and pavement areas, the layout of proposed and potential SWM basin areas throughout the site, and the locations of 15 requested explorations within the SWM basin areas. The plan was marked-up to show the proposed basin bottom elevations and requested test depths at each of the exploration locations.

The scope of this study included a field exploration, laboratory testing, and geotechnical engineering analyses. The field exploration included the observation of 15 test pit excavations within the proposed and potential SWM basin areas. In-situ infiltration testing was performed adjacent to each test pit within at depths ranging from about 6 inches to 6 feet below the existing surface grades. Limited laboratory testing was performed on soil samples obtained from the explorations to assist in characterizing the general subsurface conditions. The conclusions and recommendations presented in this report were derived from engineering analyses of field and laboratory data, and preliminary information for the proposed SWM basins as detailed herein.

SITE CONDITIONS

The site is located at 150 Allen Road and is bounded by U.S. Route 78 to the south, a transmission line right-of-way to the north, and wooded areas to the east and west. At the time of our study, an existing 3-story office building was located in the central portion of the site and associated at-grade asphalt paved parking lots were located adjacently east and west of the building. Open lawn areas were present adjacently north and south of the existing building, and landscaped islands with trees were present throughout the parking lots. Access to the site was provided from one location along Allen Road to the northeast.

Based on our review of the topographic information indicated on the plans provided to us, the existing ground surface generally slopes from about Elevation (EL) 350 feet in the central portion of the site down to about EL 340 feet in the western portion and EL 310 feet in the eastern portion of the site.

PROPOSED SWM BASIN CONSTRUCTION

Based on the plans provided to us, we understand that the proposed site improvements will include 8 proposed stormwater management basins (SWM) located in the northeastern corner of the property and along the southern property boundary. Based on scaled measurements, the 3 northeastern basins will have footprint areas ranging from about 4,000 to 32,800 square feet and the basin bottoms will be established between about EL 299.5 to EL 305.5 feet. The southeastern basin will have a footprint area of 13,500 square feet and the basin bottom will be established at EL 302.5 feet. The 3 south-central basins will have footprint areas of ranging from about 3,900 to 12,700 square feet and the basin bottoms will be established at EL 323.5 to EL 342.5 feet below existing surface grades, and the southwestern basin will have a footprint area of approximately 13,460 square feet and the basin bottom will be established at EL 328.5 feet.

SITE GEOLOGY

The subject site is situated within the Piedmont physiographic province characterized by a low rolling plain divided by a series of higher ridges and predominantly underlain by sedimentary rocks of Triassic and Jurassic age. According to the *Bedrock Geologic Map of the Bernardsville Quadrangle, Morris and Somerset Counties, New Jersey (GMS 12-2, 2012)* published by the United States Geological Survey, the site is underlain by the Lower Jurassic age Preakness Basalt. The

formation is described as dark greenish-gray to black, very fine-grained, dense, hard basalt. The unit can be as much as 1,040 feet thick.

According to the *Surficial Geology of the Bernardsville Quadrangle, Morris and Somerset Counties, New Jersey (OFM 74, 2008)* published by the New Jersey Geological Survey, the site overburden soils of the site are mapped as weathered basalt. The weathered basalt is described as reddish-yellow, reddish-brown, and light gray to yellowish-brown clayey silt and silty clay to clayey coarse sand with some to many subangular pebbles and cobbles of basalt. The unit can be as much as 50 feet thick.

Please refer to the referenced publications for more detailed descriptions of the geologic members.

SUBSURFACE EXPLORATION

The subsurface exploration program consisted of excavating 15 test pits at the requested locations within the proposed and potential SWM basin areas. The test pits were excavated by Heritage Contracting Company, Inc. on August 10 and 11, 2022 using a John Deere 410G rubber-tire backhoe and extended to depths ranging from approximately 2 to 15 feet below the existing surface grades. The exploration locations were selected by Gladstone Design, Inc. and located in the field by GTA using existing site features as reference. In-situ infiltration tests were performed adjacent to each test pit at depths ranging from about 6 inches to 6 feet below the ground surface.

The approximate locations of the explorations performed for this study are shown on the Test Pit Location Plan, which is included as Figure 2 in Appendix A. Detailed descriptions of the encountered subsurface conditions are indicated on the Logs of Test Pits, which are presented in Appendix B. The ground surface elevations indicated on the exploration logs were obtained from interpolation between topographic contours indicated on the plans provided to us and should be considered approximate.

Soil samples obtained from the test pits were brought to GTA's laboratory for visual classification by a geotechnical engineer and limited laboratory testing. The soil descriptions shown

on the logs are therefore based on visual observation of the samples, supplemented by the laboratory results.

LABORATORY TESTING

Laboratory testing performed for this study included grain-size distribution and Atterberg Limits testing for classification of the soils in accordance with the Unified Soil Classification System (USCS), and natural moisture content determinations. Detailed results of the laboratory testing performed for this study are included in Appendix C. The results of the testing are summarized in the following table:

SUMMARY OF LABORATORY TESTING

Test Pit Location	Depth (Ft.)	LL (%)	PI (%)	USCS Classification	NMC (%)	Fines (%)
TP-4	1½	NV	NP	Silty GRAVEL (GM)	8.8	29.8
TP-8	8	43.3	12.6	SILT (ML)	23.5	92.0
TP-9	4	NV	NV	SILT with sand (ML)	37.4	74.7
TP-11	7	38.0	11.7	SILT (ML)	26.0	86.4
TP-15	½	NV	NP	Silty GRAVEL (GM)	6.5	35.3

Note: LL=Liquid Limit, PI=Plastic Index, NP=Non-plastic, NV=Not Verified, NMC=Natural Moisture Content, Fines=Material passing the #200 sieve

SUBSURFACE CONDITIONS

In general, an approximately 5- to 7-inch-thick layer of topsoil was encountered at the ground surface in the test pits performed for this study, averaging about 6 inches. Existing fill materials were encountered beneath the topsoil in 10 of the 15 test pits performed for this study. The fill generally extended to depths ranging from about 2 to 6 feet below the ground surface and consisted of silty gravel with sand, cobbles, boulders. Buried topsoil layers were observed below the fill in Test Pits TP-8, TP-9, and TP-15. Test Pit TP-3 in the southeastern corner of the site and Test Pits TP-11 and TP-12 in the western portion of the site encountered filter fabric and 3-inch diameter clean stone at depths of about 3½ feet, 8 feet, and 7 feet, respectively. The stone continued to a depth of at least 6 feet in Test Pit TP-3, and 14 feet in Test Pits TP-11 and TP-12. All 3 test pits were terminated due to significant sidewall collapse and did not encounter the surface of natural soils.

The natural soils encountered below the topsoil and fill materials appear to be consistent with the geologic mapping. In general, the subsurface profile consisted of sandy silt and silty gravel residual soils with varying amounts of sand, cobbles, and boulders. In Test Pits TP-7, TP-8, TP-9 and TP-10 performed in the south-central portion of the site, the silt soils extended to the completion depths of the test pits.

The surface of highly-weathered basalt bedrock was encountered in 8 of the 15 test pits at depths ranging from about 6 inches to 7 feet below the existing grades. The test pits were typically able to penetrate a few feet below the initial weathered rock surface. Refusal to further excavation with the John Deere 410G backhoe was encountered on weathered rock and boulders at depths ranging from approximately 2 feet to 10 feet below the existing surface grades.

Groundwater seepage was not encountered in test pits performed for this study. Long-term groundwater readings were not obtained because the explorations were backfilled upon completion for safety considerations. However, moderate seepage of perched water was observed in Test Pits TP-7 and TP-9 at depth of about 4 feet below the ground surface. Fluctuations in the groundwater level typically occur due to several factors, including variations in precipitation, seasonal changes, and site development activities. It should be anticipated that seepage of water perched atop the relatively impermeable natural fine-grained soils may also occur at potentially shallow depths throughout the site.

INFILTRATION TEST RESULTS

In-situ infiltration tests were attempted at each of the test pit locations using a double-ring infiltrometer in accordance with the ASTM D 3385 test procedure. The tests were performed at depths ranging from approximately 6 inches to 6 feet below the ground surface within the fill and natural soils. However, due to the presence of cobbles and boulders and highly-weathered rock at relatively shallow depths, the double-ring infiltrometers could not be properly seated at several test pits locations, which resulted in water visibly leaking out of the bottom of the double-ring test apparatus. The results of the infiltration tests performed for this study are summarized in the following table.

SUMMARY OF INFILTRATION TEST RESULTS

Test Pit Location	Approximate Test Depth* (ft)	Final Water Level Drop (in)	Time Interval (min)	USCS Classification	Measured Infiltration Rate (in/hr)
TP-1**	1½	-	-	Highly-weathered ROCK (HW)	-
TP-2**	½	-	-	Highly-weathered ROCK (HW)	-
TP-3**	1	-	-	FILL – Silty GRAVEL with sand (GM)	-
TP-4**	1½	-	-	FILL – Silty GRAVEL with sand (GM)	-
TP-5	1	1½	2	Highly-weathered ROCK (HW)	45
TP-6**	1	-	-	FILL – Silty GRAVEL with cobbles (GM)	-
TP-7**	3	-	-	FILL – Silty GRAVEL with cobbles (GM)	-
TP-8	8	¾	60	SILT (ML)	0.75
TP-9	7	¼	30	SILT with sand (ML)	0.5
TP-10	4½	¼	30	SILT with cobbles (ML)	0.5
TP-11	7	½	30	FILL – SILT with cobbles (ML)	1
TP-12	5	0	30	FILL – Sandy SILT with cobbles (ML)	0
TP-13**	1	-	-	Silty GRAVEL with cobbles (GM)	-
TP-14	4½	½	30	Sandy SILT with gravel (ML)	1
TP-15	6	0	60	SILT (ML)	0

*Beneath the existing ground surface.

**Infiltration test terminated due to water visibly leaking from the bottom of the test apparatus.

Note: A factor of safety of at least 2 should be applied to the measured infiltration rates for design purposes.

CONCLUSIONS AND RECOMMENDATIONS

The primary conditions that affect the capacity to infiltrate water are the soil gradation and density properties and the presence of hydraulically restrictive layers such as silt or clay (fines), rock, or groundwater, each of which would restrict the flow of water into the underlying aquifer. The subsurface profile generally consisted of natural sandy silt and silty gravel residual soils with varying amounts of cobbles and boulders, similar materials used as fill to raise grades to existing surface elevations, and highly-weathered basalt bedrock was encountered at relatively shallow depths in several of the test pits.

Based on the results of the infiltration testing, it is GTA's professional opinion that the silt soils tested were generally not receptive to infiltration, which is typical for fine-grained soils. Infiltration tests were attempted within the silty gravel soils and atop the highly-weathered bedrock; however, the double-ring infiltrometers could not be properly seated due to the presence of gravel- and cobble-sized basalt fragments, which resulted in water visibly leaking out of the bottom of the double-ring test apparatus. Soil types containing appreciable amounts of gravel and larger rocks are also not conducive to laboratory testing to determine soil permeability. The infiltration test performed atop the highly-weathered rock in Test Pit TP-5 did not have visible leakage, though we believe the resulting infiltration rate of 45 inches per hour may not be representative of the material.

Chapter 12 of the NJ Stormwater BMP Manual states that infiltration tests should be performed within the most restrictive layer within 8 feet of the proposed infiltration elevations. Therefore, per the Chapter 12 guidance, basin flood testing should be performed to establish the permeability rate of the bedrock encountered at the test pit locations. A basin flood test involves excavating a "basin" within a minimum bottom area of 50 square feet. If groundwater or perched water seepage is observed within the basin, the basin flood test shall not be used. If no seepage is observed, the basin shall be filled with 12 inches (about 375 gallons) of water and allowed to drain completely. The basins generally extend at least 2 feet into bedrock to ensure that, once filled, the 12 inches of water will be fully contained within the excavated rock.

It will be important to limit disturbance and compaction of the soils at the planned infiltration surface during construction. Infiltration areas should not be exposed to unstabilized runoff that may contribute to sedimentation and clogging of the subgrade, and possible system failure, prior to the completion of construction. Where possible, the operation of heavy construction equipment directly on the infiltration area subgrades should be avoided or kept to a minimum. After grubbing and rough grading, infiltration areas should be tilled with a disc or rotary tiller followed by a leveling drag to restore the soils to a loose condition.

Construction oversight by competent engineering personnel during installation of stormwater management facilities is critical to successful functioning of the system. Ideally, construction oversight should be provided by the geotechnical engineer, or qualified representative, retained by the project owner to document construction operations and assure that project specifications and

special construction requirements are met. Periodic inspection and maintenance of the system will be required to maximize the efficiency and design life of the system.

ADDITIONAL SERVICES

We recommended that GTA be retained to provide geotechnical consultation and construction observation and testing services as outlined below:

- Basin flood testing for SWM design per Chapter 12 guidance.
- Review final site plans to evaluate if they conform to the intent of this report.
- Provide on-site observation during SWM basin construction.
- Perform infiltration testing at the time of construction after the basin subgrades have been properly prepared.

LIMITATIONS

This report, including all supporting exploration logs, field data, field notes, laboratory test data, calculations, estimates, and other documents prepared by GTA in connection with this Project have been prepared for the exclusive use of Signature Acquisitions (Client) pursuant to the Agreement between GTA and Client dated August 1, 2022 and executed on August 3, 2022, and in accordance with generally accepted engineering practice. All terms and conditions set forth in the Agreement and the General Provisions attached thereto are incorporated herein by reference. No warranty, express or implied, is made herein. Use and reproduction of this report by any other person without the expressed written permission of GTA and Client is unauthorized and such use is at the sole risk of the user.

The analysis and recommendations contained in this report are based on the data obtained from limited observation and testing of the encountered materials. Test pits indicate subsurface conditions only at specific locations and times, and only at the depths penetrated. They do not necessarily reflect strata or variations that may exist between the exploration locations. Consequently, the analysis and recommendations must be considered preliminary until the subsurface conditions can be verified by direct observation at the time of construction. If variations

of subsurface conditions from those described in this report are noted during construction, recommendations in this report may need to be re-evaluated.

In the event that any changes in the nature, design, or location of the facilities are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed, and conclusions of this report are verified in writing. GTA is not responsible for any claims, damages, or liability associated with interpretation of subsurface data or reuse of the subsurface data or engineering analysis without the expressed written authorization of GTA.

The scope of our services for this geotechnical exploration did not include any environmental assessment or investigation for the presence or absence of wetlands, or hazardous or toxic materials in the soil, surface water, groundwater or air, on or below or around this site. Any statements in this report or on the logs regarding odors or unusual or suspicious items or conditions observed are strictly for the information of our Client.

This report and the attached logs are instruments of service. The subject matter of this report is limited to the facts and matters stated herein. Absence of a reference to any other conditions or subject matter shall not be construed by the reader to imply approval by the writer.

31221640

GEO-TECHNOLOGY ASSOCIATES, INC.

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer

will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the “Findings” Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site’s subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report’s Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals’ misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals’ plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note*

conspicuously that you’ve included the material for information purposes only. To avoid misunderstanding, you may also want to note that “informational purposes” means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled “limitations,” many of these provisions indicate where geotechnical engineers’ responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a “phase-one” or “phase-two” environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer’s services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, *proper implementation of the geotechnical engineer’s recommendations will not of itself be sufficient to prevent moisture infiltration.* **Confront the risk of moisture infiltration** by including building-envelope or mold specialists on the design team. **Geotechnical engineers are not building-envelope or mold specialists.**



Telephone: 301/565-2733

e-mail: info@geoprofessional.org www.geoprofessional.org

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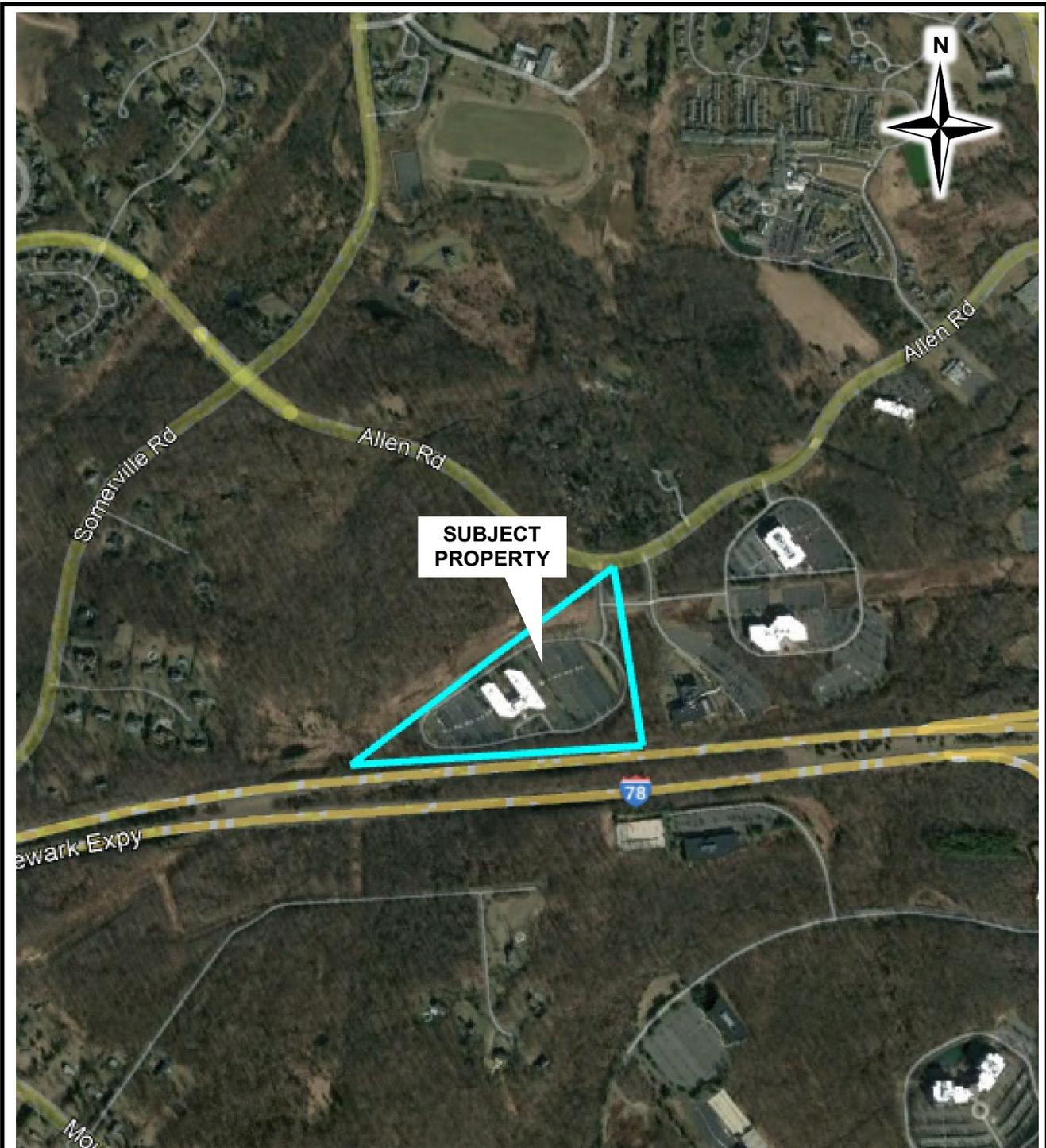
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Note: Site boundary is approximate.

SITE LOCATION MAP



14 Worlds Fair Drive, Suite A
Somerset, New Jersey 08873
(732) 271-9301
fax (732) 271-9306

GEO-TECHNOLOGY ASSOCIATES, INC.

150 ALLEN ROAD

Bernards Township,
Somerset County, New Jersey

Prepared For: Signature Acquisitions

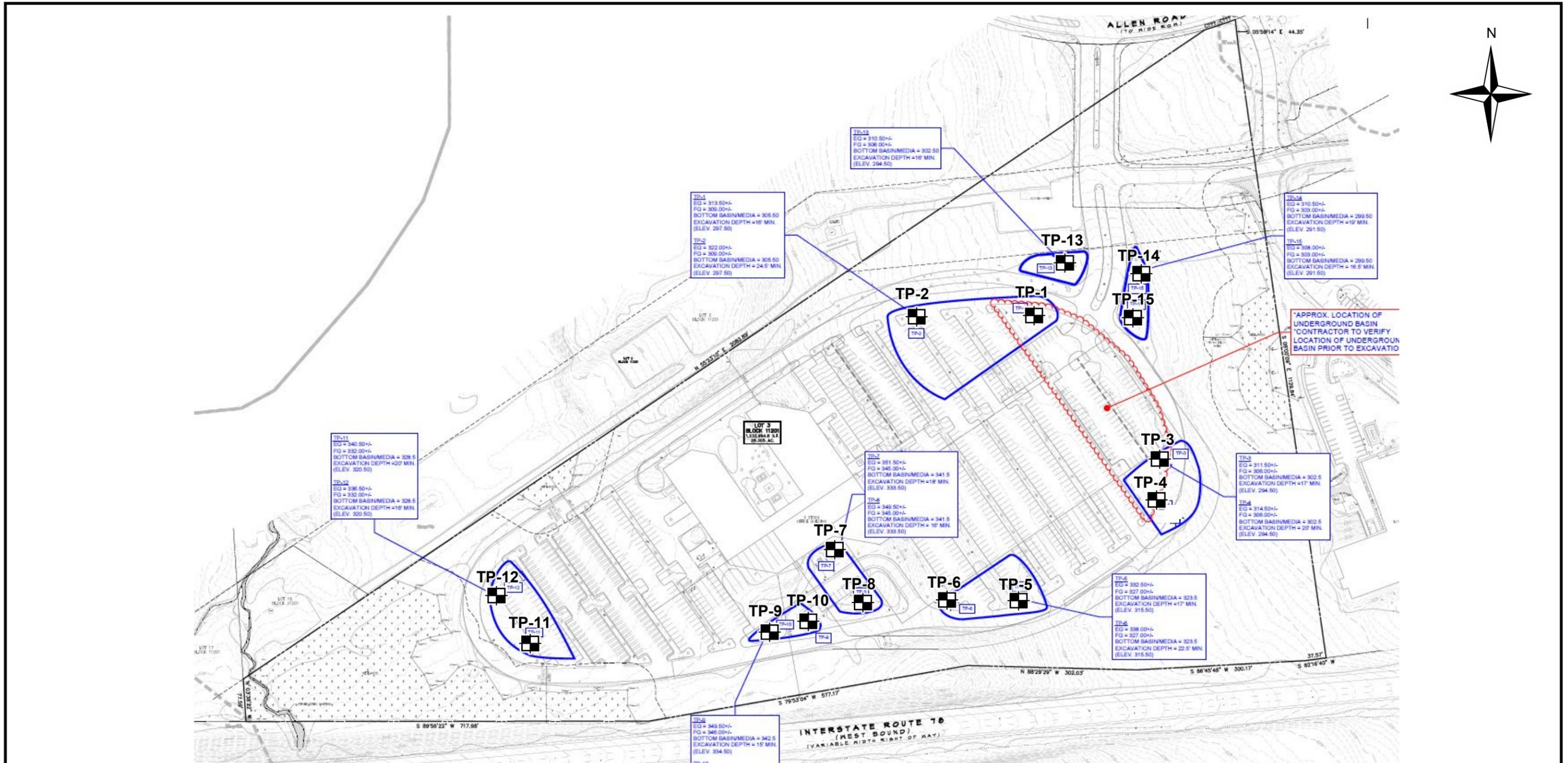
SOURCE: Google Maps

SCALE: NTS

DATE: AUG. 2022

PROJECT #: 31221640

Figure 1



*Base plan prepared by Gladstone Design, Inc. titled "Overall Site Dimension Plan" dated August 2022.

LEGEND:

TP-X  Indicates the numbers and approximate locations of test pits performed by GTA for this study.

TEST PIT LOCATION PLAN		150 ALLEN ROAD	
 GEO-TECHNOLOGY ASSOCIATES, INC.		Bernards Township, Somerset County, New Jersey Prepared For: Signature Acquisitions	
		14 Worlds Fair Drive, Suite A Somerset, New Jersey 08873 (732) 271-9301 fax (732) 271-9306	
DESIGN BY: *	DRAWN BY: DSP	REVIEWED BY: AMT	
SCALE: NTS	DATE: AUG. 2022	PROJECT #: 31221640	

Figure 2

NOTES FOR EXPLORATION LOGS

KEY TO USCS TERMINOLOGY AND GRAPHIC SYMBOLS

MAJOR DIVISIONS (BASED UPON ASTM D 2488)			SYMBOLS	
			GRAPHIC	LETTER
COARSE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LESS THAN 15% PASSING THE NO. 200 SIEVE)		GW
		GRAVELS WITH FINES (MORE THAN 15% PASSING THE NO. 200 SIEVE)		GP
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LESS THAN 15% PASSING THE NO. 200 SIEVE)		SW
		SANDS WITH FINES (MORE THAN 15% PASSING THE NO. 200 SIEVE)		SP
		SANDS WITH FINES (MORE THAN 15% PASSING THE NO. 200 SIEVE)		SM
		SANDS WITH FINES (MORE THAN 15% PASSING THE NO. 200 SIEVE)		SC
FINE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILT OR CLAY (<15% RETAINED ON THE NO. 200 SIEVE)			ML
	SILT OR CLAY WITH SAND OR GRAVEL (15% TO 30% RETAINED ON THE NO. 200 SIEVE)			CL
	SANDY OR GRAVELLY SILT OR CLAY (>30% RETAINED ON THE NO. 200 SIEVE)			OL
	ELASTIC SILTS AND FAT CLAYS LIQUID LIMIT LESS THAN 50			MH
	ELASTIC SILTS AND FAT CLAYS LIQUID LIMIT GREATER THAN 50			CH
HIGHLY ORGANIC SOILS				OH
HIGHLY ORGANIC SOILS				PT

NOTE: DUAL SYMBOLS ARE USED TO INDICATE COARSE-GRAINED SOILS WHICH CONTAIN AN ESTIMATED 5 TO 15% FINES BASED ON VISUAL CLASSIFICATION OR BETWEEN 5 AND 12% FINES BASED ON LABORATORY TESTING; AND FINE-GRAINED SOILS WHEN THE PLOT OF LIQUID LIMIT & PLASTICITY INDEX VALUES FALLS IN THE PLASTICITY CHART'S CROSS-HATCHED AREA. FINE-GRAINED SOILS ARE CLASSIFIED AS ORGANIC (OL OR OH) WHEN ENOUGH ORGANIC PARTICLES ARE PRESENT TO INFLUENCE ITS PROPERTIES. LABORATORY TEST RESULTS ARE USED TO SUPPLEMENT SOIL CLASSIFICATION BY THE VISUAL-MANUAL PROCEDURES OF ASTM D 2488.

ADDITIONAL TERMINOLOGY AND GRAPHIC SYMBOLS

ADDITIONAL DESIGNATIONS	DESCRIPTION		GRAPHIC SYMBOLS
	TOPSOIL		
	MAN MADE FILL		
	GLACIAL TILL		
	COBBLES AND BOULDERS		
RESIDUAL SOIL DESIGNATIONS	DESCRIPTION	"N" VALUE	
	HIGHLY WEATHERED ROCK	50 TO 50/1"	
	PARTIALLY WEATHERED ROCK	MORE THAN 50 BLOWS FOR 1" OF PENETRATION OR LESS, AUGER PENETRABLE	

COARSE-GRAINED SOILS (GRAVEL AND SAND)

DESIGNATION	BLOWS PER FOOT (BPF) "N"
VERY LOOSE	0 - 4
LOOSE	5 - 10
MEDIUM DENSE	11 - 30
DENSE	31 - 50
VERY DENSE	>50

NOTE: "N" VALUE DETERMINED AS PER ASTM D 1586

FINE-GRAINED SOILS (SILT AND CLAY)

CONSISTENCY	BPF "N"
VERY SOFT	<2
SOFT	2 - 4
MEDIUM STIFF	5 - 8
STIFF	9 - 15
VERY STIFF	16 - 30
HARD	>30

NOTE: ADDITIONAL DESIGNATIONS TO ADVANCE SAMPLER INDICATED IN BLOW COUNT COLUMN:
 WOH = WEIGHT OF HAMMER
 WOR = WEIGHT OF ROD(S)

SAMPLE TYPE

DESIGNATION	SYMBOL
SOIL SAMPLE	S-
SHELBY TUBE	U-
ROCK CORE	R-

WATER DESIGNATION

DESCRIPTION	SYMBOL
ENCOUNTERED DURING DRILLING	
UPON COMPLETION OF DRILLING	
24 HOURS AFTER COMPLETION	

NOTE: WATER OBSERVATIONS WERE MADE AT THE TIME INDICATED. POROSITY OF SOIL STRATA, WEATHER CONDITIONS, SITE TOPOGRAPHY, ETC. MAY CAUSE WATER LEVEL CHANGES.

LOG OF TEST PIT NO. TP-1

PROJECT: **150 Allen Road**
 PROJECT LOCATION: **Bernards Township, Somerset County, NJ**
 CLIENT: **Signature Acquisitions**

PROJECT NO.: **31221640**

DATE STARTED: **8/10/2022**
 DATE COMPLETED: **8/10/2022**
 CONTRACTOR: **Heritage Contracting Company, Inc.**
 EQUIPMENT: **John Deere 410G**

GROUNDWATER ENCOUNTERED: **N/E**
 GROUND SURFACE ELEVATION: **313.5 Ft.**
 DATUM: **Topo**
 LOGGED BY: **AFS**
 CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
313.0	0			6 In. of Topsoil	
312.0		GM		Dark yellow-brown (10YR 4/6), moist, Silty GRAVEL with sand and cobbles (possible fill) [Gravelly Loam per USDA]	- Infiltration test attempted at 1-1/2 Ft., terminated due to leakage. - Hard excavating at 1-1/2 Ft. to completion depth.
		HW		Dark yellow-brown (10YR 4/6) and dark gray (10YR 4/1), moist, Highly-weathered ROCK (Basalt)	
307.5	5			Test pit terminated at 6 Ft. due to refusal on weathered rock.	
	10				
	15				
	20				
	25				
	30				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.



GEO-TECHNOLOGY ASSOCIATES, INC.

14 Worlds Fair Drive, Suite A
 Somerset, NJ 08873

LOG OF TEST PIT NO. TP-1

LOG OF TEST PIT NO. TP-2

PROJECT: **150 Allen Road**
 PROJECT LOCATION: **Bernards Township, Somerset County, NJ**
 CLIENT: **Signature Acquisitions**

PROJECT NO.: **31221640**

DATE STARTED: **8/11/2022**
 DATE COMPLETED: **8/11/2022**
 CONTRACTOR: **Heritage Contracting Company, Inc.**
 EQUIPMENT: **John Deere 410G**

GROUNDWATER ENCOUNTERED: **N/E**
 GROUND SURFACE ELEVATION: **322 Ft.**
 DATUM: **Topo**
 LOGGED BY: **AFS**
 CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
321.5	0		△	6 In. of Topsoil	- Landscape stones at ground surface.
320.0		HW	△	Dark yellow-brown (10YR 4/6) and dark gray (10YR 4/1), moist, Highly-weathered ROCK (Basalt)	
				Test pit terminated at 2 Ft. due to refusal on boulders.	- Hard excavating at 1/2 Ft. to completion depth. - Infiltration test attempted at 1 Ft., terminated due to leakage.
	5				
	10				
	15				
	20				
	25				
	30				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.



GEO-TECHNOLOGY ASSOCIATES, INC.

14 Worlds Fair Drive, Suite A
 Somerset, NJ 08873

LOG OF TEST PIT NO. TP-2

LOG OF TEST PIT NO. TP-3

PROJECT: **150 Allen Road**
 PROJECT LOCATION: **Bernards Township, Somerset County, NJ**
 CLIENT: **Signature Acquisitions**

PROJECT NO.: **31221640**

DATE STARTED: **8/10/2022**
 DATE COMPLETED: **8/10/2022**
 CONTRACTOR: **Heritage Contracting Company, Inc.**
 EQUIPMENT: **John Deere 410G**

GROUNDWATER ENCOUNTERED: **N/E**
 GROUND SURFACE ELEVATION: **311.5 Ft.**
 DATUM: **Topo**
 LOGGED BY: **AFS**
 CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
311.0	0			6 In. of Topsoil	- Infiltration test attempted at 1 Ft., terminated due to leakage. - Partial sidewall collapse at 3-1/2 Ft. - Possible dry well at 3- 1/2 Ft.
				FILL - Dark yellow-brown (10YR 4/6), moist, silty gravel with sand [Gravelly Loam per USDA] - with cobbles and boulders at 1 Ft. - with filter fabric and 3" clean stone at 3-1/2 Ft.	
305.5	5			Test pit terminated at 6 Ft. due to sidewall collapse.	
	10				
	15				
	20				
	25				
	30				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.



GEO-TECHNOLOGY ASSOCIATES, INC.

14 Worlds Fair Drive, Suite A
 Somerset, NJ 08873

LOG OF TEST PIT NO. TP-3

LOG OF TEST PIT NO. TP-4

PROJECT: **150 Allen Road**
 PROJECT LOCATION: **Bernards Township, Somerset County, NJ**
 CLIENT: **Signature Acquisitions**

PROJECT NO.: **31221640**

DATE STARTED: **8/10/2022**
 DATE COMPLETED: **8/10/2022**
 CONTRACTOR: **Heritage Contracting Company, Inc.**
 EQUIPMENT: **John Deere 410G**

GROUNDWATER ENCOUNTERED: **N/E**
 GROUND SURFACE ELEVATION: **314.5 Ft.**
 DATUM: **Topo**
 LOGGED BY: **AFS**
 CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
314.0	0			6 In. of Topsoil	
				FILL - Brown (10YR 4/3), moist, silty gravel with sand [Gravelly Loam per USDA]	
312.5		GM		Dark yellow-brown (10YR 4/6), moist, Silty GRAVEL with cobbles and boulders [Gravelly Loam per USDA]	- Infiltration test attempted at 1-1/2 Ft., terminated due to leakage. - NMC = 8.8% - Hard excavating at 3 Ft. to completion depth.
311.5		HW		Dark yellow-brown (10YR 4/6) and dark gray (10YR 4/1), moist, Highly-weathered ROCK (Basalt)	
310.0	5			Test pit terminated at 4 Ft. 6 In. due to refusal on weathered rock.	
	10				
	15				
	20				
	25				
	30				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.



GEO-TECHNOLOGY ASSOCIATES, INC.

14 Worlds Fair Drive, Suite A
 Somerset, NJ 08873

LOG OF TEST PIT NO. TP-4

LOG OF TEST PIT NO. TP-5

PROJECT: **150 Allen Road**
 PROJECT LOCATION: **Bernards Township, Somerset County, NJ**
 CLIENT: **Signature Acquisitions**

PROJECT NO.: **31221640**

DATE STARTED: **8/10/2022**
 DATE COMPLETED: **8/10/2022**
 CONTRACTOR: **Heritage Contracting Company, Inc.**
 EQUIPMENT: **John Deere 410G**

GROUNDWATER ENCOUNTERED: **N/E**
 GROUND SURFACE ELEVATION: **332.5 Ft.**
 DATUM: **Topo**
 LOGGED BY: **AFS**
 CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
332.0	0			6 In. of Topsoil	
330.5		HW		Dark yellow-brown (10YR 4/6) and dark gray (10YR 4/1), moist, Highly-weathered ROCK (Basalt)	- Hard excavating at 1 Ft. to completion depth. - Infiltration rate = 45 in/hr at 1 Ft.
				Test pit terminated at 2 Ft. due to refusal on weathered rock.	
	5				
	10				
	15				
	20				
	25				
	30				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.



GEO-TECHNOLOGY ASSOCIATES, INC.

14 Worlds Fair Drive, Suite A
 Somerset, NJ 08873

LOG OF TEST PIT NO. TP-5

LOG OF TEST PIT NO. TP-6

PROJECT: **150 Allen Road**
 PROJECT LOCATION: **Bernards Township, Somerset County, NJ**
 CLIENT: **Signature Acquisitions**

PROJECT NO.: **31221640**

DATE STARTED: **8/11/2022**
 DATE COMPLETED: **8/11/2022**
 CONTRACTOR: **Heritage Contracting Company, Inc.**
 EQUIPMENT: **John Deere 410G**

GROUNDWATER ENCOUNTERED: **N/E**
 GROUND SURFACE ELEVATION: **338 Ft.**
 DATUM: **Topo**
 LOGGED BY: **AFS**
 CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
337.5	0			6 In. of Topsoil	
		GM		Brown (10YR 4/3), moist, Silty GRAVEL with cobbles and boulders [Gravelly Loam per USDA]	- Hard excavating at 1/2 Ft. to completion depth. - Infiltration test attempted at 10 In., terminated due to leakage.
336.0		HW		Dark yellow-brown (10YR 4/6) and dark gray (10YR 4/1), moist, Highly-weathered ROCK (Basalt)	
334.0	5			Test pit terminated at 4 Ft. 6 In. due to refusal on weathered rock.	
	10				
	15				
	20				
	25				
	30				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.



GEO-TECHNOLOGY ASSOCIATES, INC.

14 Worlds Fair Drive, Suite A
 Somerset, NJ 08873

LOG OF TEST PIT NO. TP-6

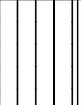
LOG OF TEST PIT NO. TP-7

PROJECT: **150 Allen Road**
 PROJECT LOCATION: **Bernards Township, Somerset County, NJ**
 CLIENT: **Signature Acquisitions**

PROJECT NO.: **31221640**

DATE STARTED: **8/11/2022**
 DATE COMPLETED: **8/11/2022**
 CONTRACTOR: **Heritage Contracting Company, Inc.**
 EQUIPMENT: **John Deere 410G**

GROUNDWATER ENCOUNTERED: **N/E**
 GROUND SURFACE ELEVATION: **351.5 Ft.**
 DATUM: **Topo**
 LOGGED BY: **AFS**
 CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
350.9	0			7 In. of Topsoil	
				FILL - Dark yellow-brown (10YR 4/6), moist, silty gravel with cobbles and boulders [Gravelly Loam per USDA] - with PVC pipe (4 In. diameter) at 2-1/2 Ft.	
347.5	5	ML		Dark yellow-brown (10YR 4/6), moist, Sandy SILT with cobbles and boulders [Silt per USDA]	- Offset location by 10 Ft. - Infiltration test attempted at 3 Ft., terminated due to leakage. - Moderate perched water seepage at 4 Ft.
344.5	7			Test pit terminated at 7 Ft. due to refusal on boulders.	
	10				
	15				
	20				
	25				
	30				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.



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 14 Worlds Fair Drive, Suite A
 Somerset, NJ 08873

LOG OF TEST PIT NO. TP-7

LOG OF TEST PIT NO. TP-8

PROJECT: **150 Allen Road**
 PROJECT LOCATION: **Bernards Township, Somerset County, NJ**
 CLIENT: **Signature Acquisitions**

PROJECT NO.: **31221640**

DATE STARTED: **8/11/2022**
 DATE COMPLETED: **8/11/2022**
 CONTRACTOR: **Heritage Contracting Company, Inc.**
 EQUIPMENT: **John Deere 410G**

GROUNDWATER ENCOUNTERED: **N/E**
 GROUND SURFACE ELEVATION: **349.5 Ft.**
 DATUM: **Topo**
 LOGGED BY: **AFS**
 CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
349.0	0			6 In. of Topsoil	
				FILL - Dark yellow-brown (10YR 4/6), moist, silty gravel with sand [Gravelly Loam per USDA] - with cobbles and boulders at 1 Ft. - with filter fabric at 3 Ft.	
344.5	5	ML		- with buried topsoil layer (6 In. in thickness) at 4-1/2 Ft. Dark yellow-brown (10YR 4/6), moist, SILT [Silt per USDA]	
	10				- Infiltration rate = 0.75 in/hr at 8 Ft. - NMC = 23.5%
334.5	15			Test pit complete at 15 Ft.	
	20				
	25				
	30				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.



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LOG OF TEST PIT NO. TP-8

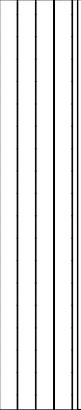
LOG OF TEST PIT NO. TP-9

PROJECT: **150 Allen Road**
 PROJECT LOCATION: **Bernards Township, Somerset County, NJ**
 CLIENT: **Signature Acquisitions**

PROJECT NO.: **31221640**

DATE STARTED: **8/11/2022**
 DATE COMPLETED: **8/11/2022**
 CONTRACTOR: **Heritage Contracting Company, Inc.**
 EQUIPMENT: **John Deere 410G**

GROUNDWATER ENCOUNTERED: **N/E**
 GROUND SURFACE ELEVATION: **349.5 Ft.**
 DATUM: **Topo**
 LOGGED BY: **AFS**
 CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
349.0	0			6 In. of Topsoil	
				FILL - Dark yellow-brown (10YR 4/6), moist, silty gravel with sand, cobbles, and boulders [Gravelly Loam per USDA]	
				- with buried topsoil layer (12 In. in thickness) at 3 Ft.	
345.5	5	ML		Dark yellow-brown (10YR 4/6), moist, SILT with sand [Silt per USDA]	- NMC = 37.4% - Moderate perched water seepage at 4 Ft. - Infiltration rate = 0.5 in/hr at 7 Ft.
334.5	15			Test pit complete at 15 Ft.	
	20				
	25				
	30				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.



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LOG OF TEST PIT NO. TP-9

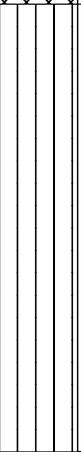
LOG OF TEST PIT NO. TP-10

PROJECT: **150 Allen Road**
 PROJECT LOCATION: **Bernards Township, Somerset County, NJ**
 CLIENT: **Signature Acquisitions**

PROJECT NO.: **31221640**

DATE STARTED: **8/11/2022**
 DATE COMPLETED: **8/11/2022**
 CONTRACTOR: **Heritage Contracting Company, Inc.**
 EQUIPMENT: **John Deere 410G**

GROUNDWATER ENCOUNTERED: **N/E**
 GROUND SURFACE ELEVATION: **346.5 Ft.**
 DATUM: **Topo**
 LOGGED BY: **AFS**
 CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
346.0	0			6 In. of Topsoil	- Hard excavating at 1 Ft.
				FILL - Dark yellow-brown (10YR 4/6), moist, silty gravel with sand and cobbles [Gravelly Loam per USDA]	
343.5	5	ML		Dark yellow-brown (10YR 4/6), moist, SILT with cobbles [Silt per USDA]	- Infiltration rate = 0.5 in/hr at 4-1/2 Ft.
331.5	15			Test pit complete at 15 Ft.	
	20				
	25				
	30				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.



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 14 Worlds Fair Drive, Suite A
 Somerset, NJ 08873

LOG OF TEST PIT NO. TP-10

LOG OF TEST PIT NO. TP-11

PROJECT: **150 Allen Road**
 PROJECT LOCATION: **Bernards Township, Somerset County, NJ**
 CLIENT: **Signature Acquisitions**

PROJECT NO.: **31221640**

DATE STARTED: **8/11/2022**
 DATE COMPLETED: **8/11/2022**
 CONTRACTOR: **Heritage Contracting Company, Inc.**
 EQUIPMENT: **John Deere 410G**

GROUNDWATER ENCOUNTERED: **N/E**
 GROUND SURFACE ELEVATION: **340.5 Ft.**
 DATUM: **Topo**
 LOGGED BY: **AFS**
 CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
340.0	0		[Cross-hatched symbol]	6 In. of Topsoil	
				FILL - Dark yellow-brown (10YR 4/6), moist, silty gravel with cobbles [Gravelly Loam per USDA]	- Hard excavating at 1/2 Ft.
	5			- Brown (10YR 4/3), moist, silt with cobbles and boulders [Silt per USDA] at 4 Ft.	
	10			- with filter fabric and 3" clean stone at 8 Ft.	- Infiltration rate = 1 in/hr at 7 Ft. - NMC = 26.0% - Sidewall collapse at 8 Ft. - Possible dry well at 8 Ft.
326.5	15			Test pit terminated at 14 Ft. due to sidewall collapse.	
	20				
	25				
	30				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.



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 14 Worlds Fair Drive, Suite A
 Somerset, NJ 08873

LOG OF TEST PIT NO. TP-11

LOG OF TEST PIT NO. TP-12

Sheet 1 of 1

PROJECT: **150 Allen Road**
 PROJECT LOCATION: **Bernards Township, Somerset County, NJ**
 CLIENT: **Signature Acquisitions**

PROJECT NO.: **31221640**

DATE STARTED: **8/11/2022**
 DATE COMPLETED: **8/11/2022**
 CONTRACTOR: **Heritage Contracting Company, Inc.**
 EQUIPMENT: **John Deere 410G**

GROUNDWATER ENCOUNTERED: **N/E**
 GROUND SURFACE ELEVATION: **336.5 Ft.**
 DATUM: **Topo**
 LOGGED BY: **AFS**
 CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
336.0	0		[Cross-hatched symbol]	6 In. of Topsoil FILL - Dark yellow-brown (10YR 4/6), moist, silty gravel with cobbles [Gravelly Loam per USDA] - Brown (10YR 4/3), moist, sandy silt with cobbles and boulders [Silt per USDA] at 4 Ft.	- Hard excavating at 1 Ft.
	5		[Cross-hatched symbol]	- with filter fabric and 3" clean stone at 7 Ft.	- Infiltration rate = 0 in/hr at 5 Ft. - Sidewall collapse at 7 Ft. - Possible dry well at 7 Ft.
322.5	15			Test pit terminated at 14 Ft. due to sidewall collapse.	
	20				
	25				
	30				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.



GEO-TECHNOLOGY ASSOCIATES, INC.

14 Worlds Fair Drive, Suite A
 Somerset, NJ 08873

LOG OF TEST PIT NO. TP-12

Sheet 1 of 1

LOG OF TEST PIT NO. TP-13

PROJECT: **150 Allen Road**
 PROJECT LOCATION: **Bernards Township, Somerset County, NJ**
 CLIENT: **Signature Acquisitions**

PROJECT NO.: **31221640**

DATE STARTED: **8/10/2022**
 DATE COMPLETED: **8/10/2022**
 CONTRACTOR: **Heritage Contracting Company, Inc.**
 EQUIPMENT: **John Deere 410G**

GROUNDWATER ENCOUNTERED: **N/E**
 GROUND SURFACE ELEVATION: **310.5 Ft.**
 DATUM: **Topo**
 LOGGED BY: **AFS**
 CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
310.1	0	GM		5 In. of Topsoil	- Infiltration test attempted at 1 Ft., terminated due to leakage. - Hard excavating at 2 Ft. to completion depth.
308.5	1.5	HW		Dark yellow-brown (10YR 4/6), moist, Silty GRAVEL with cobbles [Gravelly Loam per USDA]	
304.0	5			Dark yellow-brown (10YR 4/6) and dark gray (10YR 4/1), moist, Highly-weathered ROCK (Basalt)	
	6.5			Test pit terminated at 6 Ft. 6 In. due to refusal on weathered rock.	
	10				
	15				
	20				
	25				
	30				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.



GEO-TECHNOLOGY ASSOCIATES, INC.

14 Worlds Fair Drive, Suite A
 Somerset, NJ 08873

LOG OF TEST PIT NO. TP-13

LOG OF TEST PIT NO. TP-14

Sheet 1 of 1

PROJECT: **150 Allen Road**
 PROJECT LOCATION: **Bernards Township, Somerset County, NJ**
 CLIENT: **Signature Acquisitions**

PROJECT NO.: **31221640**

DATE STARTED: **8/10/2022**
 DATE COMPLETED: **8/10/2022**
 CONTRACTOR: **Heritage Contracting Company, Inc.**
 EQUIPMENT: **John Deere 410G**

GROUNDWATER ENCOUNTERED: **N/E**
 GROUND SURFACE ELEVATION: **310.5 Ft.**
 DATUM: **Topo**
 LOGGED BY: **AFS**
 CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
310.0	0			6 In. of Topsoil	
				FILL - Dark yellow-brown(10YR 4/6), moist, silty gravel with sand and cobbles [Gravelly Loam per USDA] - with boulders at 1 Ft. - with buried concrete slab (6 In. in thickness) at 1-1/2 Ft.	- Hard excavating at 1 Ft.
306.0	5	ML		- Dark yellow-brown (10YR 4/6), moist, silty sand with bricks [Sandy Loam per USDA] at 4 Ft.	- Infiltration rate = 1 in/hr at 4-1/2 Ft.
305.0		HW		Dark yellow-brown (10YR 4/6), moist, Sandy SILT with gravel [Silt per USDA]	
				Dark yellow-brown (10YR 4/6) and dark gray (10YR 4/1), moist, Highly-weathered ROCK (Basalt)	- Hard excavating at 5 Ft. to completion depth.
300.5	10			Test pit terminated at 10 Ft. due to refusal on weathered rock.	
	15				
	20				
	25				
	30				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.



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14 Worlds Fair Drive, Suite A
 Somerset, NJ 08873

LOG OF TEST PIT NO. TP-14

Sheet 1 of 1

LOG OF TEST PIT NO. TP-15

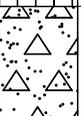
Sheet 1 of 1

PROJECT: **150 Allen Road**
 PROJECT LOCATION: **Bernards Township, Somerset County, NJ**
 CLIENT: **Signature Acquisitions**

PROJECT NO.: **31221640**

DATE STARTED: **8/10/2022**
 DATE COMPLETED: **8/10/2022**
 CONTRACTOR: **Heritage Contracting Company, Inc.**
 EQUIPMENT: **John Deere 410G**

GROUNDWATER ENCOUNTERED: **N/E**
 GROUND SURFACE ELEVATION: **308 Ft.**
 DATUM: **Topo**
 LOGGED BY: **AFS**
 CHECKED BY: **AMT**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
307.5	0			6 In. of Topsoil	- NMC = 6.5% - Hard excavating at 1 Ft.
				FILL - Dark yellow-brown (10YR 4/6), moist, silty gravel with sand and cobbles [Gravelly Loam per USDA] - with boulders at 1 Ft.	
	5			- with buried topsoil layer (12 In. in thickness) at 5 Ft.	- Infiltration rate = 0 in/hr at 6 Ft. - Hard excavating at 7 Ft. to completion depth.
302.0		ML		Dark yellow-brown (10YR 4/6), moist, SILT [Silt per USDA]	
301.0		HW		Dark yellow-brown (10YR 4/6) and dark gray (10YR 4/1), moist, Highly-weathered ROCK (Basalt)	
298.0	10			Test pit terminated at 10 Ft. due to refusal on weathered rock.	
	15				
	20				
	25				
	30				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.



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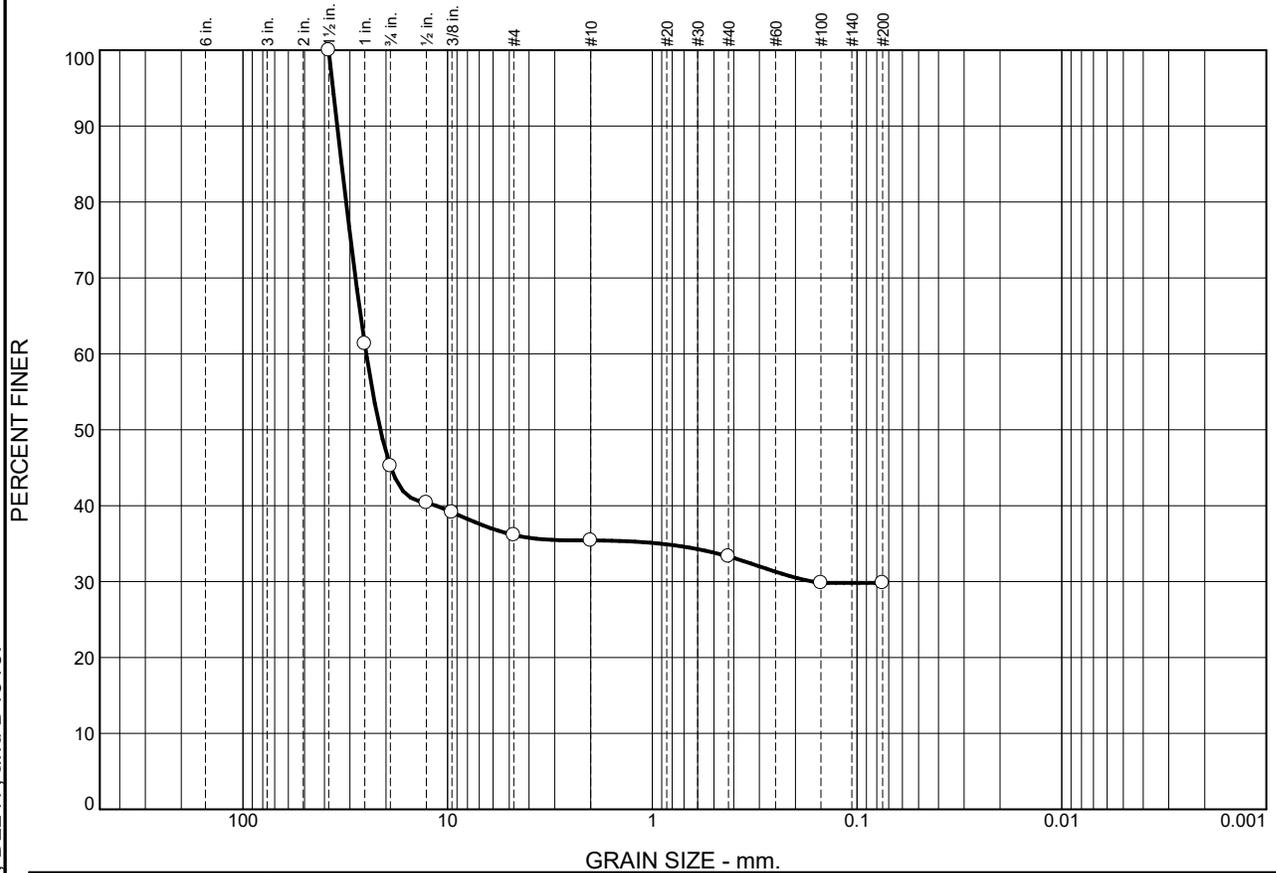
14 Worlds Fair Drive, Suite A
 Somerset, NJ 08873

LOG OF TEST PIT NO. TP-15

Sheet 1 of 1

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□ □ □ □ □ □ **X** □ □ □
□
□ □ □ □ **r** □ □ □ **r** □ □ □ □ □ □ □ □

Particle Size Distribution Report



ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	54.8	9.1	0.7	2.1	3.5	29.8	

LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
NP	NP	32.9553	24.9616	21.3145	0.1649				

Material Description						USCS	AASHTO
Silty GRAVEL						GM	A-2-4(0)

Project No. 31221640 **Client:** Signature Acquisitions
Project: 150 Allen Road

Source of Sample: TP-4 **Depth:** 1.5

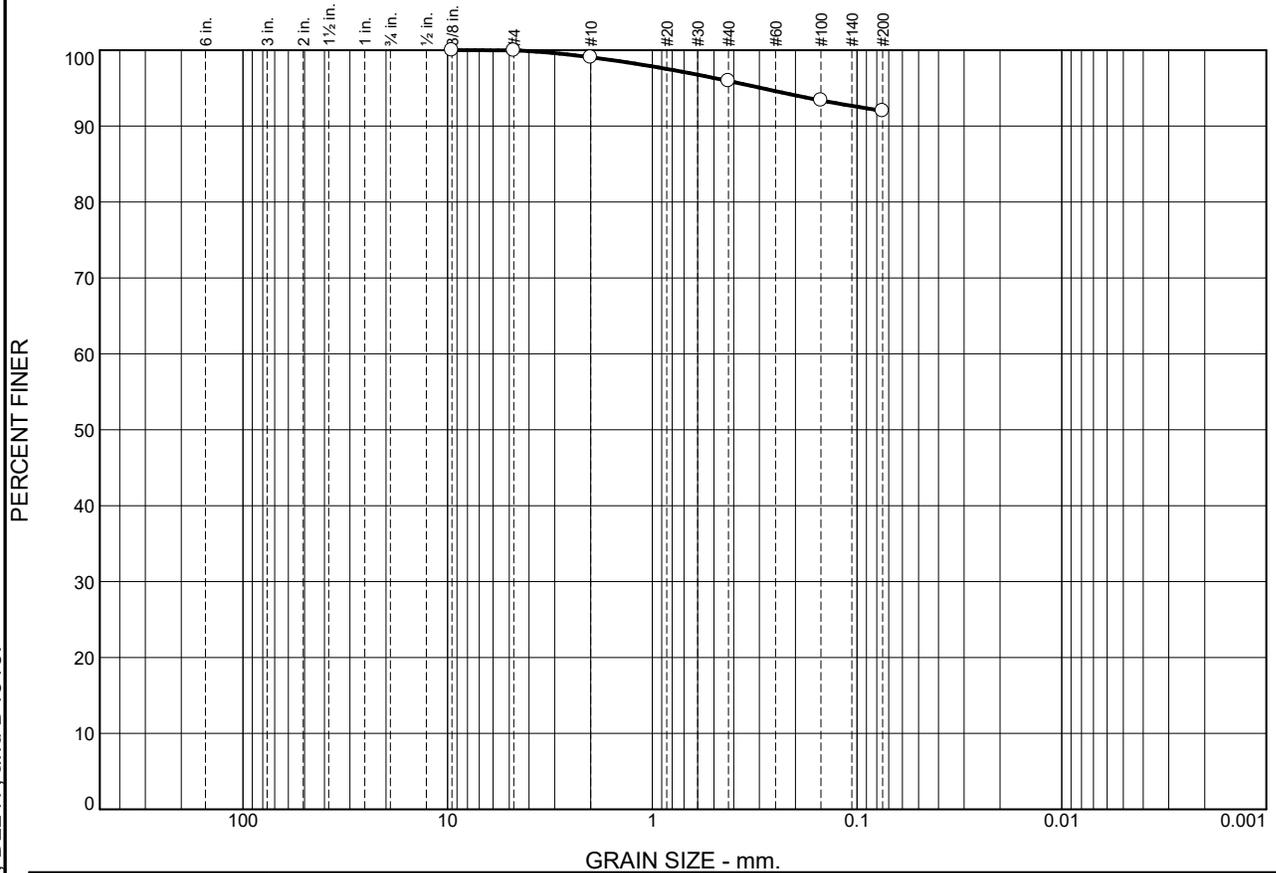
Remarks:
 ○ NMC = 8.8%



Figure

Tested By: DRC/AFS **Checked By:** AFS

Particle Size Distribution Report



ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.9	3.2	3.9	92.0	

LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
43.3	30.7								

Material Description						USCS	AASHTO
SILT						ML	A-7-5(14)

Project No. 31221640 **Client:** Signature Acquisitions
Project: 150 Allen Road

Source of Sample: TP-8 **Depth:** 8

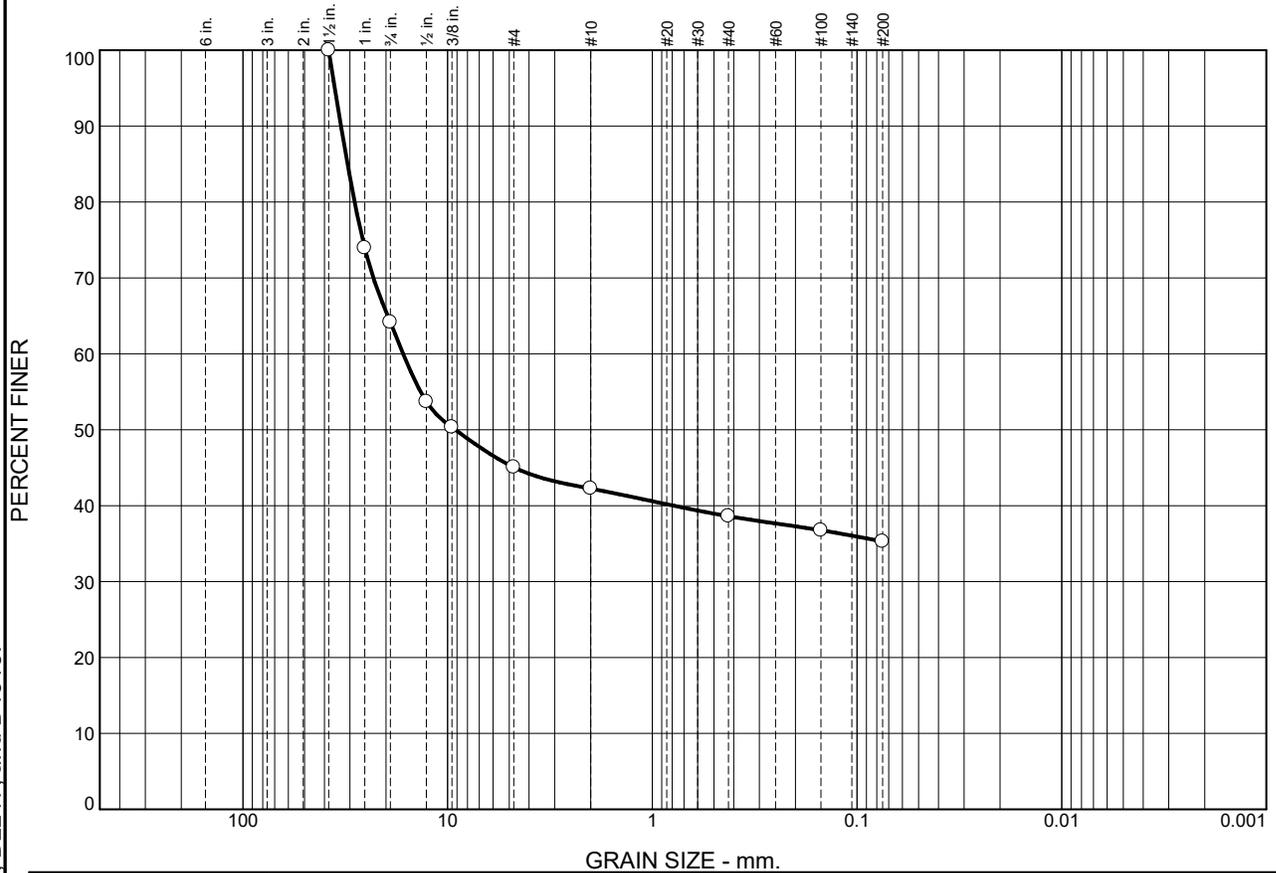
Remarks:
 ○ NMC = 23.5%



Figure

Tested By: DRC/AFS **Checked By:** AFS

Particle Size Distribution Report



ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	35.8	19.1	2.8	3.7	3.3	35.3	

LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
NV	NP	30.8313	16.4851	9.1717					

Material Description	USCS	AASHTO
Silty GRAVEL	GM	A-2-4(0)

Project No. 31221640 **Client:** Signature Acquisitions
Project: 150 Allen Road

Source of Sample: TP-15 **Depth:** 0.5

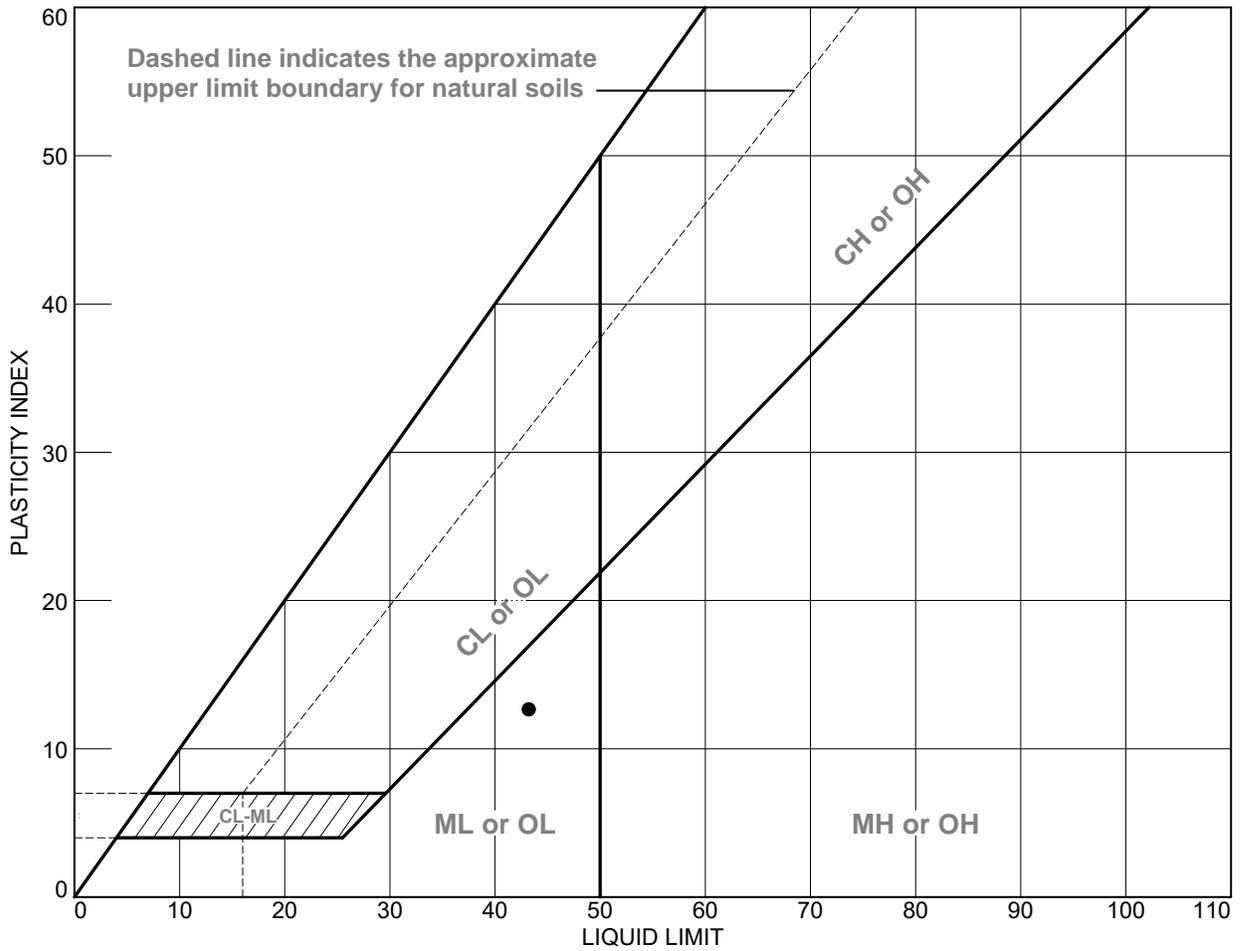
Remarks:
 ONMC = 6.5%



Figure

Tested By: DRC/AFS **Checked By:** AFS

LIQUID AND PLASTIC LIMITS TEST REPORT - ASTM D4318



ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	TP-8		8	23.5	30.7	43.3	12.6	ML



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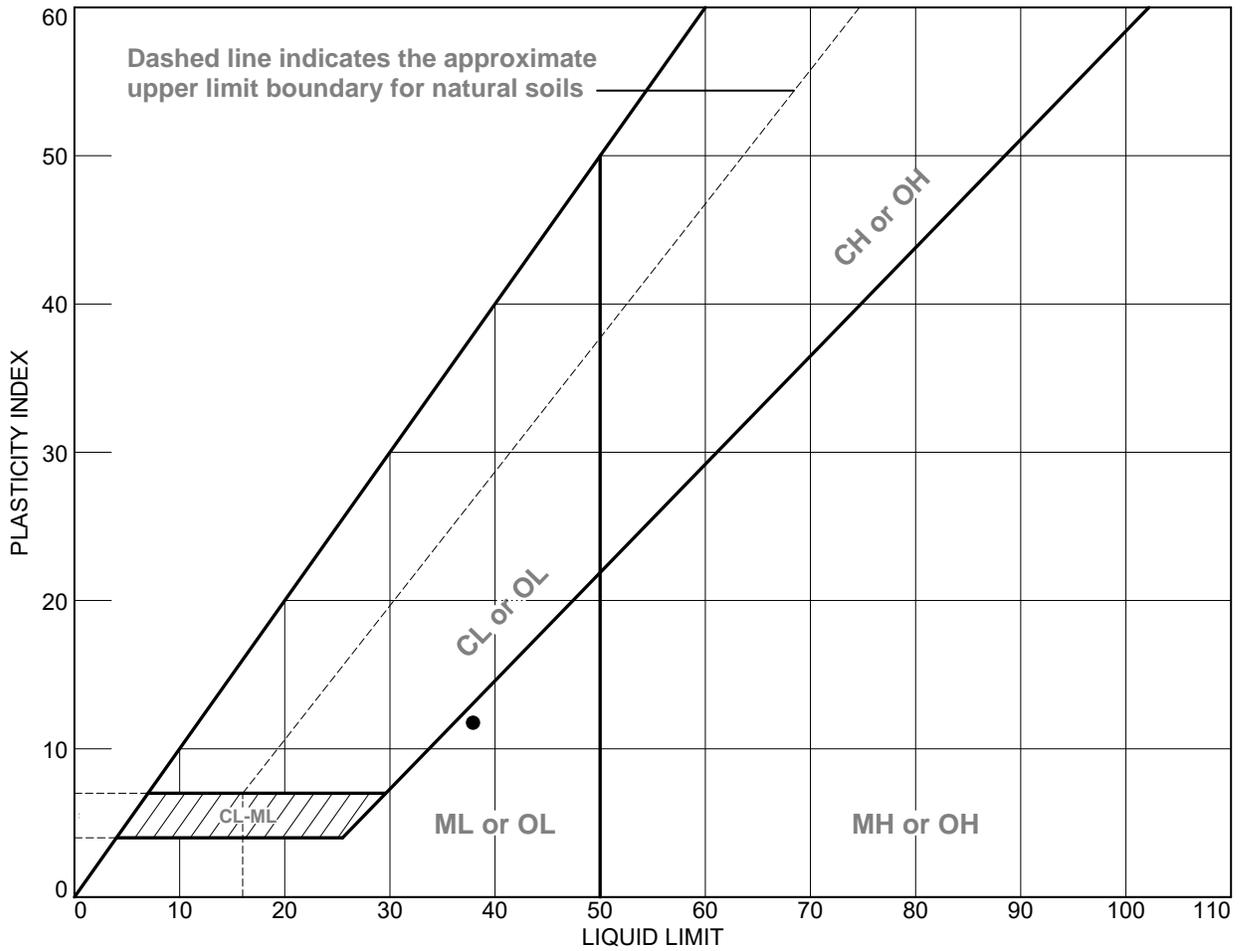
Client: Signature Acquisitions
Project: 150 Allen Road
Project No.: 31221640

Figure

Tested By: DRC/AFS

Checked By: AFS

LIQUID AND PLASTIC LIMITS TEST REPORT - ASTM D4318



ASTM Specifications performed by include: D421, D422, D2216, D2217, and D4318.

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	TP-11		7	26.0	26.3	38.0	11.7	ML



GEO-TECHNOLOGY ASSOCIATES, INC.
14 Worlds Fair Drive, Suite A
Somerset, NJ 08873

Client: Signature Acquisitions
Project: 150 Allen Road
Project No.: 31221640

Figure

Tested By: DRC/AFS

Checked By: AFS

**PROJECT REPORT AND
ENVIRONMENTAL IMPACT ASSESSMENT
FOR
BLOCK 11201, LOT 3
TOWNSHIP OF BERNARDS
SOMERSET COUNTY, NEW JERSEY**

Prepared for:

Signature Acquisitions
20 Commerce Drive
Cranford, New Jersey, 07016

Prepared by:

EcolSciences, Inc.
75 Fleetwood Drive, Suite 250
Rockaway, New Jersey 07866
(973) 366-9500

September 16, 2022

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ATTACHMENT C – CUSTOM SOIL RESOURCE REPORT

ATTACHMENT D – QUALIFICATIONS OF PREPARERS

I. EXECUTIVE SUMMARY

Signature Acquisitions of Cranford, New Jersey proposes a redevelopment project on a 28.3± acre site known as Block 11201, Lot 3 in the Township of Bernards, Somerset County, New Jersey. The site is occupied by an office building and associated parking area and is characterized by upland forest, upland field, and wetlands. Overhead and underground utility lines cross the northern portion of the site. An unnamed tributary of the Dead River is located in the extreme southwestern corner of the site. The site is within the Upper Passaic River watershed of the Passaic River Drainage Basin.

The proposed redevelopment project includes the construction of two light manufacturing/office buildings and associated parking. Building A will consist of a total of 126,980 square feet (SF) building with 30,360 SF for office space and 96,620 SF for lab/light manufacturing space. Building B will consist of a total of 129,561 SF building with 28,461 SF for office space and 101,100 SF for lab/light manufacturing space. A total of 326 parking spaces will be provided, which includes 189 parking spaces below the proposed office spaces for each building. The remainder of the parking spaces will be surface parking. A total of 24 loading docks will be provided. The site will continue to be accessed by the existing driveway from Allen Road.

Stormwater from the proposed project will be collected by a series of inlets and catch basins and will be conveyed to a proposed stormwater management system. This system consists of four small-scale bioretention basins and one large-scale bioretention basin. The large-scale bioretention basin will detain roof runoff from the proposed light manufacturing buildings. The stormwater management system has been designed to meet the New Jersey Department of Environmental Protection (NJDEP)'s non-structural stormwater strategies, runoff quantity, water quality, and ground water recharge standards and Bernards Township's standards.

The principal impacts of the proposed project are those associated with a minor decrease in impervious surfaces. Temporary impacts will occur during the construction phase of the project and include soil loss, and increased noise and dust levels. All impacts will be minimized through appropriate mitigation procedures and best management practices. The project is located on a site designated for office use and is compatible with surrounding land uses, which are dominated by mixed uses.

This Project Report and Environmental Impact Assessment has been prepared by EcolSciences, Inc. of Rockaway, New Jersey in accordance with Bernards Township's Ordinance §21-54.6 and is intended to support plans prepared by Gladstone Design, Inc. of Gladstone, New

Jersey. The following chapters provide a project description, an inventory of existing environmental conditions on and around the site, an assessment of potential impacts associated with the proposed construction, and a description of performance controls designed to mitigate adverse impacts.

II. DESCRIPTION OF THE DEVELOPMENT PLAN

A. General Description

Signature Acquisitions proposes a redevelopment project on a 28.3± acre site known as Block 11201, Lot 3 in the Township of Bernards, Somerset County, New Jersey (Figures 1 and 2). The site is occupied by an office building and associated parking area and is characterized by upland forest, upland field, and wetlands. Overhead and underground utility lines cross the northern portion of the site. An unnamed tributary of the Dead River is located in the extreme southwestern corner of the site. The site is bordered to the west by utility easements and woodlands, to the east by office development, to the north by Allen Road, and to the south by Interstate Route 78.

The proposed redevelopment project includes the construction of two light manufacturing/office buildings and associated parking. Building A will consist of a total of 126,980 SF building with 30,360 SF for office space and 96,620 SF for lab/light manufacturing space. Building B will consist of a total of 129,561 SF building with 28,461 SF for office space and 101,100 SF for lab/light manufacturing space. A total of 326 parking spaces will be provided, which includes 189 parking spaces below the proposed office spaces for each building. The remainder of the parking spaces will be surface parking. A total of 24 loading docks will be provided. The site will continue to be accessed by the existing driveway from Allen Road.

B. Zoning and Planning

According to the New Jersey State Plan, the vast majority of the site are mapped within the Suburban Planning Area (PA2). The Suburban Planning Area, having utility infrastructure, is expected to accommodate much of the market demand for future growth and new development in the state (New Jersey State Planning Commission, 2001). The state plan encourages centers as the focus for development; however, any development in the environs (areas outside centers) should be planned and located to maintain the existing character of the environs.

According to the New Jersey State Plan, the extreme southwestern portion of the site along Interstate Route 78 is mapped within the Fringe Planning Area (PA3). In the Fringe Planning Area, the State Plan's intention is to: Accommodate growth in Centers; protect the environs primarily as open lands; revitalize cities and towns; protect the character of existing stable communities; protect natural resources; provide a buffer between more developed Metropolitan and Suburban Planning Areas and less developed Rural and Environmentally Sensitive Planning Areas; and confine programmed sewers and public water services to Centers. (New Jersey State Planning Commission, 2001).

The site is located within the Office (E-2) District of Bernards Township. This redevelopment has been designed to be in accordance with bulk requirements of the E-2 District. However, there are some proposed variances with the requirements. For a list of these, please refer to the site plans prepared by Gladstone Design, Inc. (2022).

C. Sanitary Sewage

Wastewater generated within the proposed redevelopment will be provided through connection to existing on-site facilities. Wastewater will be conveyed to the Harrison Brook sewage treatment plant for disposal. It is estimated that the prior office development generated an approximate 17,455 gallons per day (gpd) of wastewater (Gladstone Design, Inc., 2022). It is estimated that the proposed redevelopment will generate an approximate average of 9,775 gpd of wastewater (Gladstone Design, Inc., 2022).

D. Potable Water Supply

Potable water for the proposed redevelopment will be obtained from the New Jersey American Water Company (NJAWC) water system and will tie into the existing on-site water mains. It is estimated that the prior office development has an average approximate potable water demand of 21,818 gpd (Gladstone Design, Inc., 2022). The estimated demand for potable water for the proposed redevelopment is approximately an average 11,281 gpd (Gladstone Design, Inc., 2022).

E. Stormwater Management Facilities

Stormwater from the proposed project will be collected by a series of inlets and catch basins and will be conveyed to a proposed stormwater management system. This system consists of four small-scale bioretention basins and one large-scale bioretention basin. The large-scale bioretention basin will detain roof runoff from the proposed light manufacturing buildings. The stormwater management system has been designed to meet the NJDEP's non-structural stormwater strategies, runoff quantity, water quality, and ground water recharge standards and Bernards Township's standards. For specific details regarding the proposed stormwater management system, refer to the Stormwater Management Report prepared for the project by Gladstone Design, Inc. (2022).

F. Utilities Plan

All other utilities (natural gas, electricity, cable television, and telephone) will be provided to the proposed project by existing on-site lines.

G. Solid Waste Plan

All construction debris generated on-site and any existing on-site debris will be transported by a licensed waste hauler, in accordance with the requirements of the Somerset County Department of Health.

Solid waste generated by the project will be collected by a private hauler and transported to an approved landfill for disposal. The Township of Bernards, in conjunction with Somerset County, has developed a recycling program that requires the recycling of glass, aluminum, metal cans, plastic bottles, corrugated cardboard, magazines, and newspaper.

H. Artificial Lighting

Lighting will be provided for public safety and security purposes. To the extent possible, lighting fixtures will direct lighting downward to minimize sky glow. For details on the lighting design, please refer to the Lighting Plan prepared for the project by Gladstone Design, Inc. (2022).

III. INVENTORY OF EXISTING NATURAL RESOURCES

A thorough inventory of environmental conditions is a fundamental prerequisite to an understanding of a land tract's ecological and cultural history, current condition, and suitability for alternative future uses. The inventory of existing environmental conditions in this chapter is divided into systematic and logical subsections that treat each aspect of the site and vicinity in detail, and collectively define the constraints to future land use.

A. Geology

The portions of New Jersey that have similar sequences of rock types, geological structures, and geological history have been characterized as Physiographic Provinces - major areas of the state that have experienced specific geological histories and that have similar characteristics at present. From northwest to southeast across the State, the major physiographic provinces are: Appalachian Ridge and Valley, Highlands, Piedmont, and Coastal Plain. Each of these physiographic provinces has regional subdivisions, and each is also a continuation of larger regions in the northeastern United States (Widmer, 1964; Robichaud and Buell, 1973).

Bernards Township is located on the northern edge of the Piedmont and southern edge of the Highlands provinces. The site is situated in the Newark Basin, located within the Piedmont Physiographic Province. The western edge of the Newark Basin is formed by the Highlands escarpment extending from Mahwah through Boonton and Morristown to Gladstone, and separating the Highlands from the Piedmont province. Mud, clays, silts, and gravel were washed from the Highlands slopes and surrounding upland areas and deposited in broad alluvial fans on the basin floor. These deposits compacted and hardened to form the characteristic sedimentary reddish-brown sandstones, siltstones, shales, and conglomerates of the Brunswick Group. The Brunswick Group also contains igneous basalt units, which are the result of three major volcanic eruptions that spread lava across the Newark Basin (Morris County Planning Board, 2000).

According to NJ-GeoWeb (NJDEP, last updated August 4, 2021), the vast majority of the site is underlain by Weathered Basalt. Weathered Basalt consists of reddish yellow to brown clayey silt with basalt fragments that can be as much as 10 feet thick. The small area long the unnamed tributary of the Dead River is underlain by Alluvium. Alluvium consists of reddish yellow, yellowish brown, brown, and gray sand, gravel, silt, minor clay and peat (NJDEP, last updated August 4, 2021). Alluvium can be as much as 20 feet thick.

Below the surficial deposits, the site is underlain by the Preakness Basalt, which is characterized by fine- to coarse-grained basalt (Drake et al. 1996).

B. Topography

The topography of a site or area is a description of the variation in elevation of the land surface with horizontal distance; topography is generally described by contour maps where points of equal elevation are connected by smooth contours. The surficial topography of a site or area reflects the underlying geology as altered by geomorphological processes; the surficial topography, in turn, directly influences the drainage patterns, watercourses, soils, and biological communities evolving on the particular site.

The site is relatively level to gently sloping with elevations ranging from 280 feet in the northeastern portion of the site to 359 feet in the southern portion.

C. Soils

Soils are formed through the interaction of a variety of physical, chemical, and biological factors that include climate, parent material, topography, biological activities, and time. The degree to which any or all of these factors affect the local soil characteristics is quite variable, generally leading to the formation of a mosaic of soil types in any particular locality. The United States Department of Agriculture (USDA) has, through the Natural Resources Conservation Service (NRCS), mapped soils in detail; for New Jersey, the results of these soil surveys are issued for each county.

According to USDA NRCS web soil survey (last modified July 31, 2019), one soil unit occurs on the site: Neshaminy-Mount Lucas silt loams, 6 to 12 percent slopes, very stony (NemCb). A copy of the Custom Soil Resource Report, which includes a soil unit map, is included in Attachment C. Table 1 lists the soil characteristics, limitations and suitabilities. A brief description of the soil per the USDA NRCS is provided as follows:

Neshaminy-Mount Lucas (NemCb) – These well-drained or moderately well-drained soil units consist of approximately 55 percent Neshaminy or similar soils and 35 percent Mount Lucas or similar soils. The parent material is dark colored basic rocks or loamy residuum weathered from diabase. They are moderately strongly sloping on hills. Available water supply is moderate. The depth to seasonal high water table for the Neshaminy portion is more than 80 inches. The depth to seasonal high water table for the Mount Lucas portion is from 6 to 30 inches. The depth to restrictive layer for the Neshaminy portion is 48 to 80 inches to lithic bedrock. The depth to restrictive layer for the Mount Lucas portion is 48 to 60 inches to lithic bedrock.

Geo-Technology Associates, Inc. (September 2022) excavated 15 test pits within the proposed and potential stormwater basins within the project site. The surface of highly-weathered

Table 1: Soil Characteristics, Limitations, and Suitabilities

Parameter	Neshaminy-Mount Lucas (NemCb)
Texture	Silt loam
Slope (%)	6 - 12
Depth to Bedrock (inches)*	69
Depth to Seasonal High Water Table (inches)*	19
Saturated Hydraulic Conductivity (Ksat) (micrometers/second)	3.6020
Available Water Capacity (cm./cm. soil)	0.13
pH	5.7
Erosion Hazard (Factor K)	0.37
Limitations for Small Commercial Buildings	Somewhat limited (slope, depth to saturated zone)
Limitations for Local Roads and Streets	Somewhat limited (frost action, depth to saturated zone, slope)

* = measurements taken using a weighted average of all soil components within unit

Source: USDA, NRCS, last modified July 31, 2019

basalt bedrock was encountered in 8 of the 15 test pits at depths ranging from about 6 inches to 7 feet below the existing grades. The test pits were typically able to penetrate a few feet below the initial weathered rock surface. Refusal to further excavation with the backhoe was encountered on weathered rock and boulders at depths ranging from approximately 2 feet to 10 feet below the existing surface grades. No ground water was encountered in any of the test pits. However, moderate seepage of perched water was observed in Test Pits TP-7 and TP-9 at depth of about 4 feet below the ground surface.

D. Ground Water Quantity and Quality

Ground water is all water within the soil and subsurface strata that is not at the surface of the land. It includes water that is within the earth that supplies wells and springs. Ground water resources are often functionally linked to overlying land areas and surface water bodies; ground water is often recharged through "outcrop" areas at the land surface and ground water discharges ("seeps") may contribute to base flows of streams and rivers.

The ground water yields of any particular geological formation are a function of the porosity and permeability of the material comprising the formation (consolidated rock or unconsolidated deposits). Porosity describes the water-containing spaces between individual mineral grains, while permeability is the ease or difficulty with which water is transmitted through interconnecting spaces in the formation. Formations lacking open spaces between the mineral grains have both low porosity and low permeability. Weathering and cracking of the parent bedrock can induce secondary porosity in the formation; water can accumulate and move through these fractures in the primary rock formation.

Nearly all the ground water in Bernards Township originates from local precipitation. This water seeps into and is stored within consolidated rock fractures or among unconsolidated sediments. Therefore, the underlying geologic structure of a site will determine the amount and availability of ground water resources. Because the site is located along the second Watchung Mountain basalt ridge, available ground water supplies are expected to be very low. This is due to hardness of basalt, which makes it resistant to weathering and, therefore, resistant to fractures in which water may be stored. The safe yield for basalt bedrock is approximately 85,000 gallons per day per square mile (Bernards Township NRI, 1975).

In general, ground water supplies from Bernards Township are of good quality. However, basalt wells may be high in iron and other minerals that contribute to hard water (Bernards Township NRI, 1975). Bernards Township potable water supplies are allocated by the New Jersey American Water Company. Water is obtained from the Passaic River, wells, and the Raritan River.

The site is underlain by the Basalt aquifer, which consists of hard, dense, and highly-fractured igneous rocks (NJDEP, August 4, 2021). Ground water is stored and transmitted in fractures. Water is normally fresh, slightly to highly alkaline, moderately hard, and of the calcium-bicarbonate type (G.C. Herman et al., 1998). The basalt aquifer is given an aquifer rank of D, where ground water wells provide a median yield from 25 to 100 gallons per minute (gpm) of water (G.C. Herman et al., 1998).

Geo-Technology Associates, Inc. (September 2022) excavated 15 test pits within the proposed and potential stormwater basins within the project site. No ground water was encountered in any of the test pits. However, moderate seepage of perched water was observed in Test Pits TP-7 and TP-9 at depth of about 4 feet below the ground surface.

E. Surface Water Quantity and Quality

Surface waters include lakes, rivers, ponds, and streams - water bodies at the surface of the land. These waters serve as valuable habitats for aquatic organisms; collect, store and distribute water from rainfall; and serve as important aesthetic and recreational features.

The site is mapped within one Hydrologic Unit Code – 14 (HUC-14) drainage basin. Overland runoff is toward the on-site unnamed tributary of the Dead River. The NJDEP has classified the Dead River and its unnamed tributaries as FW2-NT (Non-Trout) (NJDEP, Last Amended April 6, 2020).

The NJDEP (June 24, 2021) published a “DRAFT 2018/2020 New Jersey Integrated Water Quality Assessment Report (Integrated Report)”, which is intended to provide an effective tool for maintaining high quality waters and improving the quality of waters that do not attain their designated uses. The Integrated Report describes attainment of the designated uses specified in New Jersey's Surface Water Quality Standards (N.J.A.C. 7:9B), which include: aquatic life (general), aquatic life (trout), recreation, public water supply, fish consumption, and shellfish consumption (NJDEP, June 24, 2021). The Integrated Report includes management strategies, including Total Maximum Daily Loads (TMDLs), under development to achieve surface water quality standards and attain the designated uses of the waters (NJDEP, June 24, 2021). TMDLs represent the assimilative or carrying capacity of the receiving water taking into consideration point and nonpoint sources of pollution, natural background, and surface water withdrawals (NJDEP, June 24, 2021).

The NJDEP assesses each applicable designated use for all of the State's 293 subwatersheds (assessment units), to determine whether each subwatershed is "fully supporting" the use, "not supporting" the use, or if insufficient information is available to assess the use. A subwatershed is "fully supporting" a designated use only if data for the minimum suite of parameters are available and there are no exceedances of the applicable criteria for each parameter in the suite. If data are available for only some of the minimum suite of parameters, the use is not assessed due to insufficient information. If any one parameter associated with a designated use exceeds the applicable criteria, then the subwatershed is "not supporting" for the designated use.

The site is located within the Dead River (above Harrison Brook) assessment unit (NJDEP, June 24, 2021). This assessment unit had "insufficient information" for Fish Consumption, Water Supply, and Primary Recreation (NJDEP, June 24, 2021). This assessment unit was "fully supporting" for Aquatic Life (General) (NJDEP, June 24, 2021).

By definition, FW-2 waters are suitable for public potable water supply after required treatment. This classification requires that waters be acceptable for primary contact recreation, industrial and agricultural use, and maintenance and migration of the established biota. The Non-Trout (NT) suffix indicates that the waters do not possess the properties suitable for the maintenance of trout species, i.e., high dissolved oxygen levels, relatively low summer temperatures, and low pollutant loadings. However, more tolerant fish species, particularly warm-water species, may flourish in such waters.

F. Vegetation

Vegetation is the plant life or the total plant cover that is found in a specific area, whether indigenous or introduced by humans. The Piedmont Physiographic Province of New Jersey contains a moderately diverse mixture of major terrestrial plant habitats, including freshwater marshes, swamps and floodplains, upland valleys and slopes, upland ridges, and rock outcrops (Robichaud and Buell, 1973). This habitat diversity results in a mosaic of plant communities occurring in small areas, a situation rather different from the more homogeneous habitat conditions and plant communities found in more southern portions of the state, and less inherently "patchy" than habitats of more severe topographic relief in the Highlands and Ridge and Valley provinces to the north.

Based upon species composition, soils, and apparent hydrology noted during field investigation performed by EcolSciences, four vegetative communities were identified within the

site: upland forest/woodland, upland field, palustrine deciduous forested (PFO1) wetlands, and palustrine emergent (PEM) wetlands. Each community is briefly described below.

Upland Forest/Woodland - This community is generally found in the northeastern and southeastern portions of the site. Canopy vegetation includes American beech, tuliptree, shag-bark hickory, red maple, and northern white oak. The woody understory commonly includes American beech, northern spicebush, white ash, Virginia-creeper, smooth blackhaw, shag-bark hickory, and privet. The sparse groundcover includes Japanese stilt grass and sweet wood-reed.

Upland Field - This community is located in the electric transmission powerline in the northeastern portion of the site. Scattered woody shrubs and vines commonly include Allegheny blackberry, and rambler rose. Ground cover is dominated by wrinkle-leaf goldenrod.

Palustrine forested deciduous wetland (PFO1) - This community is restricted to the extreme western and eastern portions of the site. Canopy vegetation consists of sugar maple, white ash, and swamp white oak. The woody understory commonly includes rambler rose, and American hornbeam. Ground cover is dominated by Japanese stile grass and arrow-leaf tearthumb.

Palustrine emergent wetland (PEM) - This community is restricted to a small portion of the electric transmission powerline in the extreme northeastern portion of the site. Ground cover commonly includes small carp grass, purple loosestrife, arrow-leaf tearthumb, and Japanese stilt grass.

G. Wildlife

The utility of an area as wildlife habitat depends on many factors. All wildlife species require food, water, cover, and space. The relative abundance or lack of these resources in relation to each species' particular requirements will, in part, determine the species composition and distribution of a particular area. In addition, the types of vegetative communities present, the size, shape, and complexity of the habitat(s), and the surrounding land uses will further interact to determine the success of various wildlife species at the location being considered. Some wildlife species have demonstrated great adaptability and tolerance to the human presence; others are less able to tolerate such activities and are displaced to more suitable habitats, if such are available and accessible.

Several of the site's features combine to limit its potential to support a large and diversified wildlife population. The site is developed, located within a developed portion of the township, and is surrounded on two sides by roadways, which limit access to the site for large-sized wildlife.

However, the site does contain some habitat that can be utilized by a variety of wildlife tolerant of human disturbance. On the site, the oaks within the uplands provide mast for rodents, whereas associated insects finding cover and feeding on the broad-leaved trees provide food for insectivorous birds. The shrub layer is moderate providing cover for shelter and resting. Overall, the site provides habitat for wildlife species that are tolerant of human disturbance.

During EcolSciences' field investigations on September 20, 2021 and August 4, 2022 the following species were observed by sight, call, tracks, or other signs: white-tailed deer, eastern chipmunk, gray squirrel, green frog, rock pigeon, northern flicker, blue jay, house wren, American robin, gray catbird, cedar waxwing, black-and-white warbler, chipping sparrow, song sparrow, northern cardinal, red-winged blackbird, and American goldfinch.

Starting in July 2002, the Natural Heritage Program (NHP) of the NJDEP Office of Natural Lands Management adopted use of the Landscape Project to supplement threatened and endangered species data requests. The Landscape Project was developed by the NJDEP, Division of Fish & Wildlife, Endangered & Nongame Species Program (ENSP). It is a wildlife habitat-mapping program that is used to identify and map critical habitats for endangered, threatened, and special concern species. This approach takes documented records of threatened and endangered wildlife and, based on a species-specific model or "occurrence area", maps areas of suitable habitat contiguous to the record as critical wildlife habitat. Each critical habitat patch appears as a shaded color from light to dark (5 Ranks) indicating its relative priority ranking. Rank 1 is the lowest priority ranking, while Rank 5 is the highest priority ranking. Rank 1 meets the minimum area requirement, but no data exists for the presence of priority species (New Jersey Division of Fish and Wildlife, 2017). This is the NJDEP's lowest priority ranking and is defined as areas meeting the minimum size requirements but with no documented sightings of threatened or endangered species. Rank 2 contains records for priority species, which are species of special concern. Ranks 3, 4, and 5 indicate that the identified land cover type has been identified as providing habitat for State threatened (Rank 3), State endangered (Rank 4), or Federally threatened or endangered (Rank 5) species.

According to the Landscape Project (Version 3.3), the undeveloped portions of the site are mapped within Ranks 2 and 3 habitats (Figure 3). The Rank 2 habitats contain occurrences of three bird species of special concern (great blue heron, Kentucky warbler, and worm-eating warbler). According to the NJDEP, special concern refers to species that are not listed as threatened or endangered, but whose status is being monitored by the Endangered and Nongame Species Program. Currently, no specific regulatory protections are extended to these species. The Rank 3

habitat has an occurrence of the State-threatened wood turtle (*Glyptemys insculpta*) and two bird species of the special concern (Kentucky warbler and worm-eating warbler).

Wood turtles require both terrestrial and aquatic habitats. Favored terrestrial habitats are typically characterized by mosaics of forest, field, shrubs, and agricultural lands, although wood turtles also occur in more monotypic areas (NJDEP, January 2013). Suitable aquatic habitat for the wood turtle includes streams or rivers featuring flowing water of varying depths, undercut banks, exposed roots, muskrat burrows, fish populations, and evidence of good water quality (e.g., trout-associated waters). They use such streams and rivers for breeding and hibernating but are primarily terrestrial from mid-May to October (NJDEP, January 2013). Wood turtles are an extremely mobile species that have been documented to move one mile or more along a stream corridor, and exhibit familiarity with wetland habitats one mile or more from an initial capture point, however, potential barriers to wood turtle movement (e.g., road crossings, lakes) along a particular stream corridor may negatively affect habitat suitability (NJDEP, January 2013). According to the Landscape Project (Version 3.3), the project site is not located within mapped wood turtle habitats. The mapped habitat corresponds to a small area in the northern portion of the site.

A request for information regarding threatened and endangered species was sent to the Natural Heritage Program. Their response generally corresponds to the Landscape Project (Version 3.3) habitat mapping (see Attachment B).

H. Aquatic Biota

Aquatic biota comprises various macroinvertebrates including insects (largely immature forms), worms, mollusks (snails, clams), and crustaceans (scuds, shrimp, water fleas etc.) generally found within freshwater and estuarine environments. Macroinvertebrate species play an integral role in the aquatic food web and their presence and relative abundance are governed by environmental conditions and by the pollution tolerance of the respective species. The overall community thus is holistically reflective of conditions in its environment and can be used as an indicator of the water or habitat quality of a waterbody (NJDEP, December 2012).

The NJDEP (December 2012) conducts biological monitoring studies of the state's waterbodies and ranks water quality for these sites using the Rapid Bioassessment Protocol II method devised by the USEPA.

The NJDEP has established a few monitoring stations along Dead River and its unnamed tributaries. However, the closest downstream station is approximately 4.75 miles downstream at

King George Road. During the most recent surveys in 2018, they found this station to have a poor High Gradient Macroinvertebrate Index (HGMI) with a marginal habitat assessment (NJDEP, last updated August 4, 2021). The HGMI is derived from a series of scoring criteria and rating categories for a region of New Jersey. A poor rating has extreme changes in structure of biological community and major loss of ecosystem function. There are extreme changes in structure and wholesale changes in taxonomic composition. There are extreme alterations from normal densities and distributions and organism condition is often poor. Ecosystem functions are severely altered.

I. Critical Environmental Features

There are certain features of any tract of land that either have more inherent environmental value or are more susceptible to perturbation, or both, that are generally termed "critical environmental features". Such critical environmental features may be special habitats such as wetlands; they may also be features that require special planning and permitting (steep slopes and floodplains). The existing properties of such features are summarized in the following subsections:

1. Wetlands

Wetlands are lands where water saturation is the dominant factor determining the nature of soil development and the types of plants and animal communities living in the soil and on its surface. Wetlands are transitional areas between terrestrial and aquatic systems and are unique biological habitats of socioeconomic value. Wetlands moderate extremes in water flow, aid in the natural purification of water, and may be areas of groundwater recharge. According to regulations promulgated by the United States Army Corps of Engineers (COE) and the Environmental Protection Agency (EPA) (33 CFR Section 323.2 and 40 CFR Section 230.2, respectively) and pursuant to the New Jersey Freshwater Wetlands Protection Act (1987), wetlands are those areas that are inundated or saturated with surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

EcolSciences delineated wetlands on the site. An application for a Letter of Interpretation-Line Verification (LOI) has been submitted to the NJDEP, which will verify the extent of the wetlands and transition areas on the site. It is anticipated that the NJDEP will classify the wetlands as intermediate resource value with a standard 50-foot transition area. The wetland boundary line and transition area line, to be verified by the NJDEP, are shown on the site plans prepared by Gladstone Design Inc. (2022).

2. Floodways and Floodplains

The area inundated by the flood waters of a river or stream is termed the floodplain. Within the floodplain can be found several subdivisions: the channel, where normal, non-floodplain flow is confined; the floodway, or terrestrial areas on the margins of the channel that show permanent terracing effects of repeated flooding; and the flood fringe, or areas landward of the floodway that may be inundated during more severe (and less frequent) storms. Taken together, these areas constitute the flood hazard area around a river or stream.

According to FEMA mapping (Effective September 28, 2007, Community Panel No. 34035C0064E), no portions of the site are located within the floodway, special flood hazard area subject to inundation by the 1 percent annual chance flood (formerly known as the 100-year flood), and area of 0.2 percent annual chance flood (formerly known as the 500-year flood) of the Dead River.

In addition to regulating activities within floodways and floodplains, the Flood Hazard Area Control Act Rules (N.J.A.C. 7:13 et seq.) also provides a riparian zone adjacent to all regulated waters. The riparian zones are 50, 150 or 300 feet in width along each side of regulated surface waters throughout the State. The riparian zone width depends on the environmental resources being protected, with the most protective 300-foot riparian zone applicable to waters designated as C1 and certain upstream tributaries. Certain waters supporting trout or habitats of threatened or endangered species critically dependent on the watercourse to survive receive a 150-foot riparian zone. Regulated waters not identified above would have a 50-foot riparian zone.

Overland runoff is toward the on-site unnamed tributary of the Dead River. The NJDEP has classified the Dead River and its unnamed tributaries as FW2-NT (NJDEP, Last Amended April 6, 2020). According to the Landscape Project (Version 3.3), habitat for State-listed wildlife species that is critically dependent on the watercourse to survive is mapped just downstream of the site along this tributary. Based upon the above information, it is expected that the on-site unnamed tributary of the Dead River would have a 150-foot riparian zone.

3. Steep Slopes

The slope of the ground surface is calculated as the relationship of rise (vertical change) to run (horizontal change), often expressed as a percentage. Gentle slopes encourage the formation of deep soils that often have low erosion hazard; steeper slopes tend to have shallower soils with more potential for erosion.

According to the Bernards Township Ordinance, “Environmentally Restricted Lands” includes slopes in excess of 25 percent and “Restricted Lands” include slopes in excess of 15 percent but less than 25 percent. According to the Bernards Township Master Plan (Bernards Township Master Plan, March 2010), there are two small areas of restricted slopes within the site. One area is located in the center of the site and the other area is located in the northeastern portion along Allen Road.

According to Gladstone Design, Inc. (2022), 0.09-acre of the site has slopes >25 percent and 0.07-acre has slopes of 20 to 24.99 percent. Approximately 0.09-acre of the site has slopes of 15 to 19.99 percent (Gladstone Design, Inc., 2022). The majority of these steep slopes are associated with man-made disturbances scattered around the site.

J. Air Quality

The Federal and State environmental regulatory agencies have established permissible concentrations, termed the National Ambient Air Quality Standards (NAAQS), for six principal pollutants including carbon monoxide, lead, nitrogen dioxide, ozone, particle pollution, and sulfur dioxide. These standards have been shown to reduce to an acceptable level the risk of health effects to vulnerable human populations, primarily the young, the elderly, and those with respiratory ailments. Primary standards define air quality levels intended to protect the public health including “sensitive” populations such as asthmatics, children, and the elderly. The secondary standards define levels of air quality intended to protect the public welfare including protection against decreased visibility and damage to animals, crops, vegetation, and buildings (EPA, 2021).

The NJDEP annual air quality reports summarize the air quality monitoring data for that particular year in New Jersey. The State of New Jersey has been monitoring air quality since 1965. The most recent NJDEP Air Quality Summary Report available is for the year 2020. Based on the 2020 annual air quality report, the entire state of New Jersey is in non-attainment for the ozone NAAQS. New Jersey’s northern nonattainment area is classified as “moderate” for the 0.08 ppm and 0.07 ppm 8-hour ozone standards and “serious” for the 0.075 ppm 8-hour ozone standard. A “moderate” area has an ozone range from 0.081 to 0.093 parts per million (EPA, 2018). A “serious” area has a design value of 0.093 up to but not including 0.105 ppm (EPA, 2018). New Jersey was in attainment in 2020 for the remaining five principal pollutants including PM, nitrogen dioxide, sulfur dioxide, carbon monoxide, and lead (NJDEP, November 23, 2021).

The NJDEP annual air quality reports also provide information on longer-term trends in the state, providing summary data for all monitoring locations from 1965 to the latest year reported. Examination of those data indicates that New Jersey has shown a somewhat erratic downward trend in the ozone standard, and is getting close to meeting the ozone NAAQS. There has been a steady decline in overall particulate matter (PM) _{2.5}, which is now in compliance with the NAAQS. A sharp increase and subsequent decrease in sulfur dioxide concentrations in New Jersey occurred in 2013 as a result of a coal-burning facility across the Delaware River in Pennsylvania. The facility has since ceased operations under a court agreement, and sulfur dioxide levels in New Jersey have returned to meeting the NAAQS for sulfur dioxide. The State of New Jersey has long been in compliance with the NAAQS for the remaining three principal pollutants including nitrogen dioxide, carbon monoxide, and lead (NJDEP, November 23, 2021).

These positive trends in air quality have been occurring despite significant population increases in the central and southern regions of the state, and the concomitant increase in vehicular traffic associated with population growth. These countervailing trends appear to be the result of more effective emissions controls on vehicle exhausts and on industrial emissions, the net result of which is a decline in overall air loadings since air monitoring began in 1965 as summarized in the NJDEP report for 2020.

In 2020, the NJDEP Bureau of Air Monitoring (BAM) operated 31 ambient air monitoring stations (NJDEP, November 23, 2021). The Chester NJDEP air quality monitoring station is located in the general vicinity of the site. At Chester, nitrogen dioxide, ozone, sulfur dioxide, particulates, and toxics are monitored. The summary data included in this report indicates that the Chester station did not exceed the 8-Hour Primary Standard for ozone and had no exceedance days of the 8-Hour ozone NAAQS.

K. Sound Characteristics and Levels

Sound is conducted through air as a series of pressure waves having kinetic energy. The kinetic energy of these sound waves can be quantified in decibels - scalar units that are geometrically related to the energy of the sound at the receptor. A doubling in the sound energy will yield an increase of 6 dB. The decibel (dBA) scale ranges from 0 for the threshold of perception of sound to approximately 130 dBA for the threshold of pain at the ear; a quiet residential street may have noises in the 55-60 dBA range, while heavy street traffic generates noises in the 85-95 dBA range (EPA, 1976). The "A" suffix means that the sound energy characteristics have been weighted to emphasize the upper audible frequency ranges (A-weighting).

The site is located in a suburban area with surrounding mixed office uses. Interstate Route 78 is located adjacent to southern site boundary. Allen Road, a moderately traveled road, is located along a portion of the northern site boundary. Sounds generated by traffic passing the site on these and the other adjacent roads dominate the range of perceived sounds along the perimeters of the site. During peak hours, traffic along these roads could generate sound levels of 70 to 85 dBA at points approximately 50 feet from the roadway. Sound levels would be lower (i.e., 55-70 dBA) during less dense traffic and at points further away from the roadway. At points in the interior of the site, well away from roads, sound levels are likely to be typical of a normal suburban residential area, in the range of 53-57 dBA (EPA, 1976).

L. Demography

The demographic characteristics of a municipality define the characteristics of the human population living in this municipality - the population size, rate and direction of change in size, age structure, etc. These characteristics provide a perspective for assessing the degree to which a proposed development will affect the municipality.

According to the 2020 Census, the Township of Bernards had a population of 27,830 people, a 2.7% increase over the 2010 census population of 26,652 (United States Census Bureau, Last Revised: October 8, 2021). This translates into a 0.4% annual increase for this particular time period, smaller than the Somerset County growth rate of 0.7% per year (United States Census Bureau, Last Revised: October 8, 2021).

M. Land Use

The development of a site is in many cases a major alteration of the features of a site. The extent to which such change in land use is significant depends in part on the existing land use(s) on the site and in surrounding areas, and on the zoning constraints selected for the land by the governing municipality.

The site is zoned by the Township as E-2 District, which is a permitted use. The site is bordered to the west by utility easements and woodlands, to the east by office development, to the north by Allen Road, and to the south by Interstate Route 78.

N. Cultural, Historic, and/or Archaeological Resources

Cultural resources are man-made or man-modified features of the environment, including objects, structures, site and districts deemed to be of cultural significance. Such resources may be

pre-historic or historic in age and are often worthy of preservation to provide present and future generations with a sense of the peoples who once lived and worked in a particular locality.

The site is occupied by an office building and associated parking area. Overhead and underground utility lines cross the northern portion of the site. Based on a review of the GIS layers “NJDEP Historic Districts, Properties, and Site Grid Map of New Jersey (NJDEP, NHR, HPO, 2021), a portion of the PSE&G Roseland to Branchburg Segment of the Roseland to Pleasant Valley Transmission Line Historic District is mapped in the northern portion of the site. According to the New Jersey and National Registers of Historic Places (NJDEP, Last updated March 23, 2022), the Public Service Electric & Gas Company (PSE&G) Roseland to Branchburg Segment of the Roseland to Pleasant Valley Transmission Line has been given an opinion of eligibility by the State Historic Preservation Office. Due to the age of the existing lattice towers, PSE&G is in the process of replacing the towers with monopoles. It appears that this tower replacement has commenced in the vicinity of the site.

IV. ASSESSMENT OF ENVIRONMENTAL IMPACT

This chapter addresses the potential impacts to the environmental resources of the project site and surrounding areas that could result from the proposed development. Potential impacts are first discussed generally, then according to the specific topics set forth in the preceding chapter that inventoried environmental characteristics of the site. The incorporation of mitigation measures during construction and operational phases of the proposed project are cited here in the context of the potential impacts; reference is made again to these mitigating measures in the following chapter.

In general, the principal environmental impacts associated with the proposed project result from temporary disturbances to soils and vegetation. In the absence of appropriate control measures, clearing of vegetated tracts of land for construction and access to construction sites could reduce the productivity of the soil and create unsightly conditions and fugitive dust. Precipitation falling on disturbed areas could tend to erode fine soil particles and, in the absence of appropriate controls, increase loadings to areas receiving stormwater runoff. As will be detailed below, these potential adverse effects will be minimized by adherence to the Soil Erosion and Sediment Control Plan, as approved by the Somerset-Union Soil Conservation Service District.

The principal environmental impact associated with the project would be the direct and indirect influences on the surrounding area associated with the slightly expanded use of the site.

Potential impacts on specific natural or human resources are discussed in the following sections.

A. Geology

Potential impacts to the project site's geological integrity are typically related to the location and extent of bedrock disturbance resulting from the construction phase. According to the USDA NRCS, the depth to restrictive layer for the Neshaminy portion is 48 to 80 inches to lithic bedrock. The depth to restrictive layer for the Mount Lucas portion is 48 to 60 inches to lithic bedrock. However, the underlying shallow bedrock - the upper stratum of the Brunswick Formation - is "rippable" and can be excavated using standard excavation equipment and techniques. Thus, no significant impacts to the project area's geological integrity are anticipated from the construction of the proposed development.

B. Topography

Potential impacts to the topography of the project site are related to the extent of excavation and/or filling required to achieve the desired topography for construction of the proposed buildings,

parking area, and stormwater management system. The topography within the project area is primarily gently sloping. As indicated on the grading plan, some modifications to the existing topography are proposed. Cutting and grading will be required for the proposed buildings, parking area, and stormwater management system. Throughout the site, soil erosion and sediment control measures will minimize soil loss and erosion wherever grading is proposed. Where changes to existing topography are planned, the proposed contours will be graded to meet the existing contours. Overall, the grading plan calls for no significant change to the existing site conditions; the general topographic and drainage characteristics of the site will be retained.

C. Soils

In the absence of appropriate control measures, construction activities may result in both short-term and long-term impacts related to soil loss. Removal of topsoil and organic layers could reduce the productivity of the soils, remove ground cover vegetation, and create unsightly conditions. During construction, the potential for soil disturbance will be minimal and will be limited to the area surrounding the proposed buildings, parking area, and stormwater management system. During the entire construction period, soil loss and associated adverse impacts will be minimized by strict adherence to the measures specified in the Soil Erosion and Sediment Control Plan, as approved by the Somerset-Union Soil Conservation District.

These soil erosion measures include the crushed stone cleaning blanket at construction roadway intersections with paved roads, installation of inlet protection for all catch basins and installation of silt fences around the proposed project site. Immediately following rough grading, all disturbed soils will be protected from erosion and soil loss by temporary seeding and mulching. Permanent vegetation will be established as soon as possible after final grading, as specified in the site plans. In areas where grading is necessary, rapid stabilization of all disturbed soil areas will minimize adverse effects related to soil loss or erosion. For a complete description of the soil erosion and sediment control measures, please refer to the plans prepared by Gladstone Design, Inc. (2022).

No long-term effects on the soils of the site are anticipated. The rapid stabilization of soils with vegetative cover, and the replacement of existing vegetation with landscaped areas, will minimize long-term soil losses from the site.

D. Ground Water Quantity and Quality

Recharge to ground water reservoirs comes from precipitation percolating through overlying soil and rock strata; thus, the quality of ground water is in part a function of the land use in recharge

areas of ground water aquifers. Many communities of northern New Jersey rely heavily on groundwater aquifers for domestic water supplies, and the perpetuation of good water quality in those aquifers is an environmental concern of high priority.

Construction of the proposed development is not expected to have an adverse impact on the ground water resources of the project area. No ground water withdrawal is proposed within the site, and no private wells will be used to supply potable water for the project. It is estimated that the proposed redevelopment will generate 9,775 gpd of wastewater, which is considerably less than the prior office development (Gladstone Design, Inc., 2022). The estimated demand for potable water for the proposed redevelopment is 11,281 gpd, which is considerably less than the prior office development (Gladstone Design, Inc., 2022).

Groundwater recharge is not required for this site since the proposed redevelopment proposes a decrease in impervious surfaces and therefore would result in a negative recharge deficit.

E. Surface Water Quantity and Quality

The construction of the proposed project is expected to have a minimal impact to the on-site streams and the surface water resources in the vicinity of the project area. Potential short-term impacts to surface water quality are generally associated with soil loss, erosion, and sedimentation during construction activities. As previously described in Section C (Soils) of this chapter, soil disturbance will be largely confined to areas surrounding the proposed buildings, parking area, and stormwater management system. Any adverse impacts will be minimized by the installation and maintenance of proven soil erosion and sediment control measures presented in the plans. These measures will retain disturbed soil sediment within the areas of construction and will mitigate the potential for sediment being transported to the on-site stream.

Stormwater from the proposed project will be collected by a series of inlets and catch basins and will be conveyed to a proposed stormwater management system. This system consists of four small-scale bioretention basins and one large-scale bioretention basin. The large-scale bioretention basin will detain roof runoff from the proposed light manufacturing buildings. The stormwater management system has been designed to meet the NJDEP's non-structural stormwater strategies, runoff quantity, water quality, and ground water recharge standards and Bernards Township's standards. For specific details regarding the proposed stormwater management system, refer to the Stormwater Management Report prepared for the project by Gladstone Design, Inc. (2022).

F. Vegetation

Construction for the proposed project will require removal of some of the existing vegetation from the site. Approximately 14.79 acres will be disturbed by the proposed project. However, the vast majority of this is located within the previously disturbed area. Only approximately 1.625 acres will be in areas of previously undisturbed land. A landscaping plan will be implemented to mitigate for the loss of vegetation which includes ornamental trees, evergreen trees, deciduous trees, and shrubs. In addition, the stormwater basins will be planted with suitable grasses and perennials. Please refer to the site plans prepared by Gladstone Design, Inc. (2022) for details on the landscaping.

G. Wildlife

The project site is only mapped within Rank 2 Landscape Project (Version 3.3) habitats that contain occurrences of bird special concern species (great blue heron, Kentucky warbler, and worm-eating warbler). The Rank 3 Landscape Project (Version 3.3) habitat polygon that contains a wood occurrence will not be disturbed. Additionally, the wetland habitats on the site will not be disturbed and will retain a natural vegetated upland buffer to further protect this community and its inhabitants. In addition, the project site is more than 150 feet from State open waters. Therefore, it is not anticipated that the proposed project should adversely affect wood turtle.

The construction of the proposed development is not expected to have a significant adverse impact to local wildlife species. The project site's developed nature and the surrounding land uses limits the site's potential for a large and diversified wildlife population. Noise, heavy equipment, and human activity during the construction phase of the project will cause most mobile wildlife species to move from the site into adjacent undeveloped areas. However, impacts to wildlife are expected to be minimal because, as noted previously, the wildlife species likely to be present on the project site are those tolerant of the human presence. These species are generally common in suburban areas of New Jersey. The developed site will continue to offer habitat for these species.

H. Aquatic Biota

The biomonitoring studies of Dead River performed by NJDEP revealed a low diversity of benthic macroinvertebrates, principally taxa characterized as tolerant of poor water quality. Impacts to the on-site stream's aquatic biota are expected to be minimal. As mentioned in Section E of this chapter (Surface Water Quantity and Quality), stormwater from the proposed project will be conveyed to a proposed stormwater management system. The system has been designed to detain stormwater such that sediment and associated pollutants will be removed from the water column

and will not be released to the on-site streams and waterbodies. This stormwater system is also designed to release stormwater at a controlled rate.

I. Critical Environmental Features

1. Wetlands

Wetlands and transition areas on the site will not be disturbed by construction of the proposed project.

2. Floodways and Floodplains

The project site does not appear to be constrained by floodplains or riparian zones. Therefore, no floodplains or riparian zones will be disturbed by the proposed project.

3. Steep Slopes

According to Gladstone Design, Inc. (2022), 0.063-acre of slopes that are >25 percent will be disturbed, which is permitted per the ordinance for roadway and utility construction. According to Gladstone Design, Inc. (2022), 0.015-acre of slopes of 20 to 24.99 percent will be disturbed and approximately 0.009-acre of the site that has slopes of 15 to 19.99 percent (Gladstone Design, Inc., 2022), which comply with the allowable disturbance limits.

J. Air Quality

Short-term air quality impacts during construction are related to production of fugitive dust and generation of emissions from exhausts of construction vehicles. Mitigating measures, including dust control practices and the use on construction equipment of efficient air pollution control devices meeting applicable State/Federal specifications, will minimize adverse effects on local air quality.

Long-term air quality impacts will be related primarily to automobile exhaust emissions, primarily carbon monoxide (CO), hydrocarbons, and nitrogen oxides (NO_x). However, the magnitude of the environmental effects attributable to the automotive traffic associated with the proposed project will not affect regional air quality.

K. Sound Characteristics and Levels

Short-term generation of noise levels elevated over existing ambient levels will be generated during the construction of the proposed project. Sound levels generated during the construction phase can be expected in the range of 66 to 78 dBA at a distance of 50 feet from construction

equipment, based upon the use of best available technology for noise reduction (EPA, 1976). The construction equipment included in this range consists of backhoes, concrete mixers, bulldozers, pavers, and trucks. To minimize adverse impacts to ambient noise levels during the construction period, construction equipment will only be operated during construction periods permitted by local law.

During the operational phase of the development, the principal sources of sound will continue to be vehicular traffic from Interstate Route 78 and Allen Road. In addition, fixed mechanical equipment (e.g., air conditioning units), lawn maintenance equipment (e.g., lawn mowers and leaf blowers), and human voices will be an influence during low traffic periods.

L. Demography

The proposed project is not residential in nature and should not generate any changes in population or school-age children.

M. Land Use

The proposed project will result in the redevelopment of a site from office use to light manufacturing use. This use is anticipated in Bernards Township's zoning of the site in the E-2 District. The proposed project is compatible with the mixed land uses adjacent to the site and in the surrounding area.

N. Cultural, Historic, and/or Archaeological Resources

The majority of the project site is located within previous office development. The proposed project is not expected to adversely impact any known cultural or historical resources.

V. UNAVOIDABLE IMPACTS

The applicant, its engineers, and its consultants have proposed and planned a redevelopment project that will continue to be relatively compatible with surrounding land uses. The proposed redevelopment has been designed with careful attention to the natural resources of the project site and its surroundings, and with due consideration for the quality of life experienced by residents of Bernards Township. Due to this careful planning, most adverse environmental impacts have been avoided or minimized by design. However, no project can be built and operated without generating some degree of adverse impact on some aspect of the natural or man-made environment. As discussed in the preceding chapter, most potential impacts have been minimized by sound design decisions in the planning stages of the project. Moreover, compliance with State permit and Township ordinance conditions for regulated activities will protect wetlands, wetland transition areas, and surface water bodies. This chapter identifies the probable adverse environmental impacts of the proposed improvements.

In general, the principal short-term environmental impacts associated with the construction phase of the proposed improvements result from temporary disturbances to soils and from the clearing of vegetation. In the absence of appropriate control measures, clearing of vegetated tracts of land for construction and access to construction sites could reduce the productivity of the soil and create unsightly conditions and fugitive dust. Precipitation falling on disturbed areas could tend to erode fine soil particles and, in the absence of appropriate controls, increase loadings to areas receiving stormwater runoff. These potential adverse effects will be managed by adherence to the Soil Erosion and Sediment Control Plan, as approved by the Somerset-Union Soil Conservation District.

The principal long-term impact associated with the project is the commitment of natural resources resulting from a minor change in land use. The proposed project will result in the redevelopment of 14.79 acres of the site. The mitigating measures described in the preceding chapters will serve to minimize the potential impacts to natural resources in the project area.

VI. STEPS TO MINIMIZE ENVIRONMENTAL IMPACTS

A number of potential impacts associated with construction and operation of the proposed project were identified in Chapter IV. Environmental protective measures that can minimize or eliminate environmental impacts are summarized below. Some have already been included in the project plans; others will be implemented during the construction phases. Many of the measures identified below have already been discussed in the preceding chapter, in the context of the particular environmental features in which they are identified.

A. Soils and Surface Water Resources

- Existing topography will be maintained to the greatest extent possible in the site planning to minimize the amount of grading required.
- Sediment filter fences will be erected around and/or down slope of disturbed areas to prevent sediment from being transported into the on-site wetland areas.
- Upon completion of final grading, all disturbed areas will receive a final seeding and mulching in accordance with the Soil Erosion and Sediment Control Plan.
- All side slopes shall be protected from erosion by top soiling, seeding, and mulching as soon as possible after final grading.
- All soil erosion and sediment control measures shall be kept in place until construction is complete and/or the disturbed area is stabilized.
- All work will be done in accordance with the Standards for Soil Erosion and Sediment Control in New Jersey.

B. Air Quality

- Construction vehicles that are to operate upon the public highways of the State of New Jersey will comply with the regulations as required by N.J.A.C. 7:27-14 and 15.
- Disposal of incinerable wastes by open burning will not be permitted.
- Exhaust systems and emission control devices on all construction machinery will be maintained in good operating condition.
- Vehicles transporting fill, dirt, or other materials will be covered with canvas or similar material.

C. Sound levels

- To minimize noise generated by construction equipment, mufflers or similar noise abatement devices will be in good operating condition on all construction machinery.
- Silencers, shields, or enclosures will be used around all stationary noise-generating equipment.
- Operation of machinery will be limited to work periods permitted by local law.

VII. ALTERNATIVES

The proposed plan has been designed to conform to zoning requirements of the E-2 District of Bernards Township, to be consistent with other surrounding land uses, and to be sensitive to the environmental constraints of the site. Various concepts were evaluated; the culmination of those evaluations is the proposed plan.

A no-build alternative would leave the site in its existing condition. The site is occupied by an office building and associated parking area and is characterized by upland forest, upland field, and wetlands. Overhead and underground utility lines cross the northern portion of the site. The no-build alternative would not permit the redevelopment of the site to accommodate the current market needs and would not generate the public benefit of providing employment opportunities for the visitors and residents of the Township of Bernards. The impact on the natural environment would be positive, as there would be no additional disturbance to the site. This would avoid the limited environmental impacts described in Chapter V above. However, as discussed above the proposed disturbance in any event is minimal in nature. The no-build alternative was rejected because it would deter the adaptive reuse of the site in accordance with the Township's zoning as proposed.

VIII. REFERENCES

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ATTACHMENT A

Figures

Figure 1: USGS Site Location

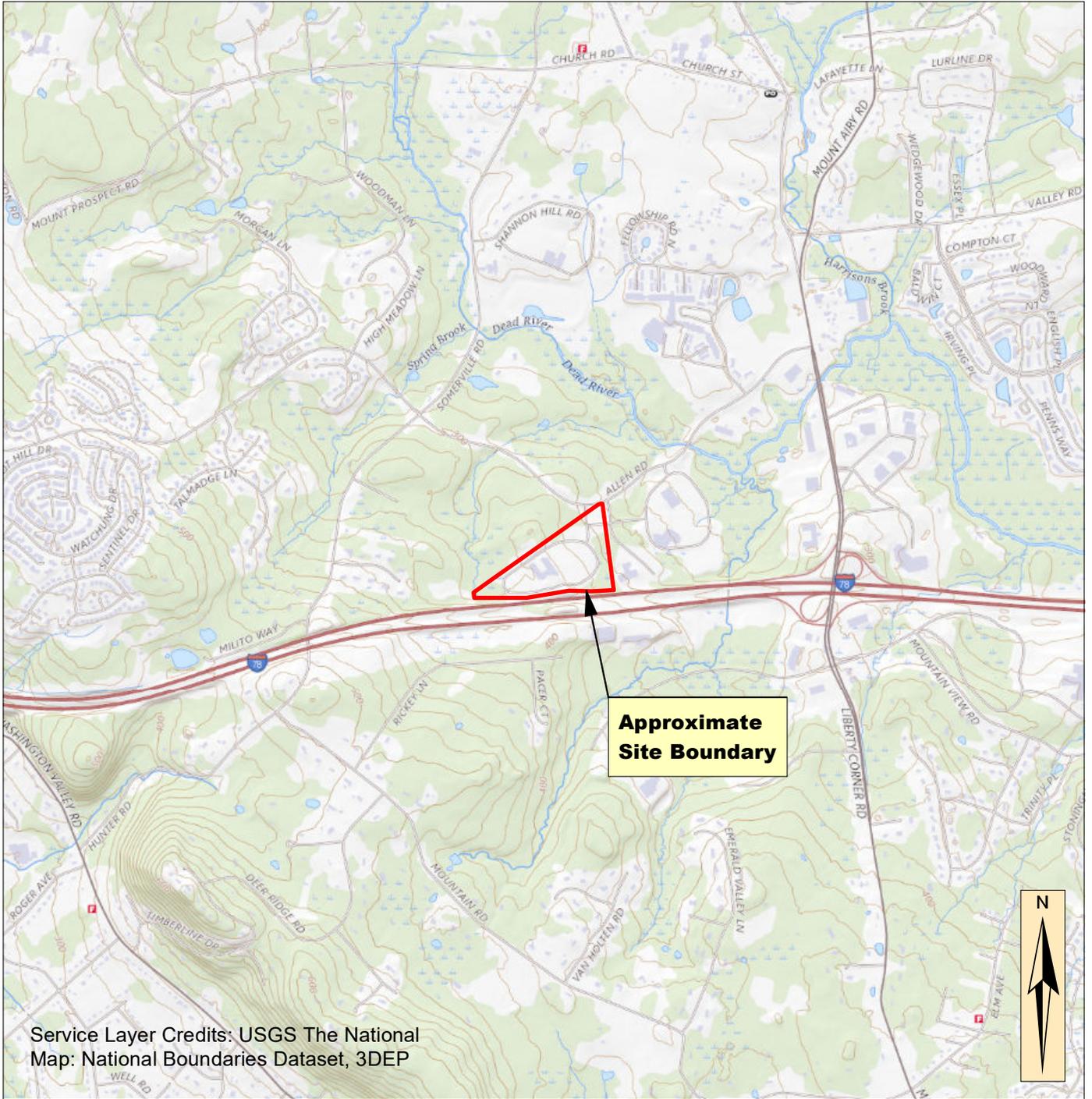
Figure 2: 2020 Aerial Imagery

Figure 3: Landscape Project

Figure 4: Historic Resources

EcolSciences, Inc.

Environmental Management & Regulatory Compliance



Service Layer Credits: USGS The National Map: National Boundaries Dataset, 3DEP



SITE LOCATION

State Plane Coordinates (New Jersey NAD 83)
467,332' E; 661,035' N

FIGURE 1: USGS SITE LOCATION

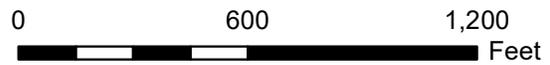
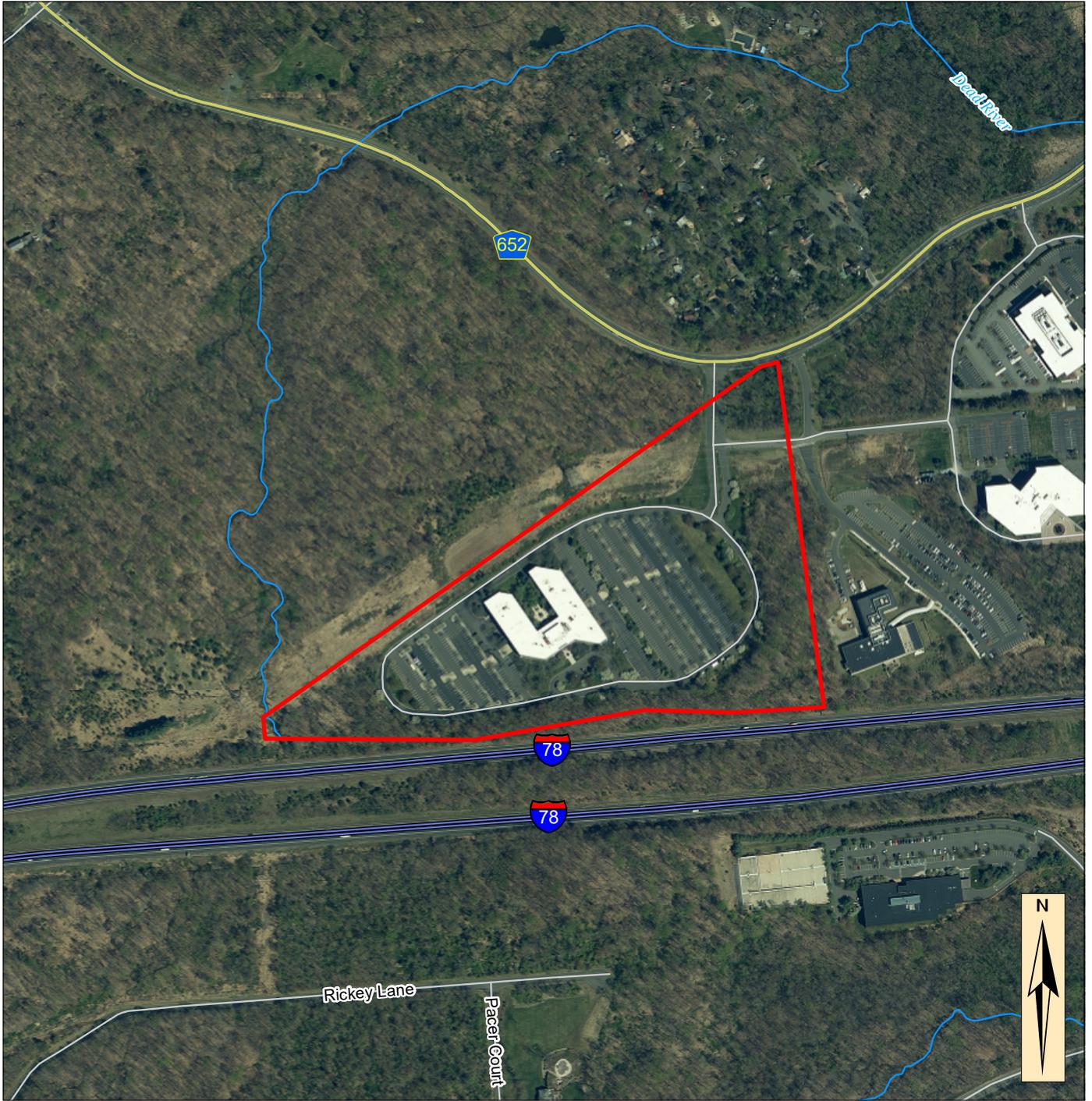
Block 11201, Lot 3
Township of Bernards
Somerset County, New Jersey

USGS The National Map. 2020 (Bernardsville NJ Quadrangle)

EcolSciences, Inc.
Environmental Management & Regulatory Compliance

Date: 9/22/21

Scale 1:24,000



Legend

- Approximate Site Boundary
- ~ Streams

FIGURE 2: 2020 AERIAL IMAGERY

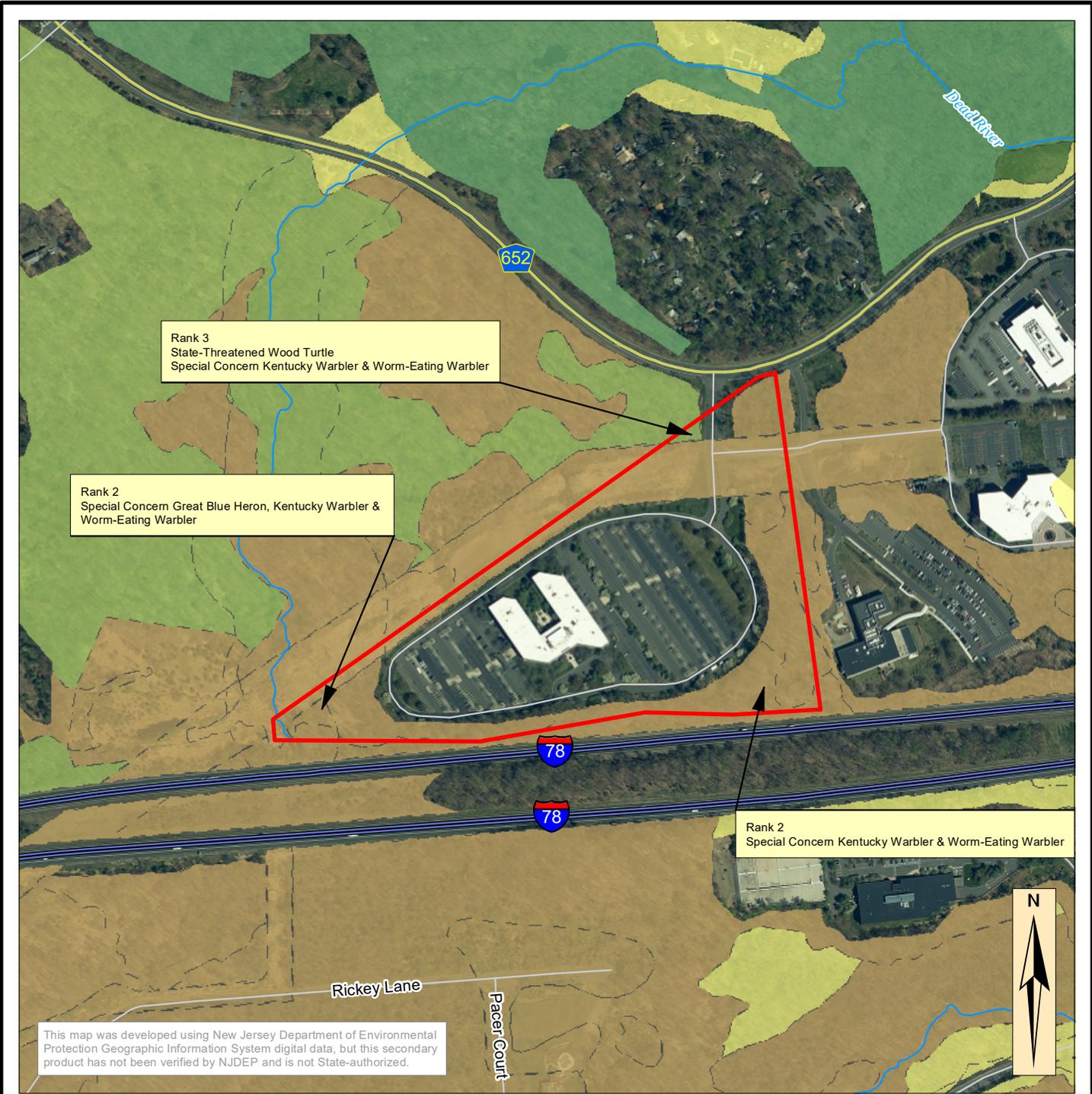
Block 11201, Lot 3
 Township of Bernards
 Somerset County, New Jersey

Source: NJGIT, OGIS. 2021. NJ 2020 High Resolution Orthophotography.

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 Environmental Management & Regulatory Compliance

Date: 7/11/22

Scale 1:6,000



Approximate site boundary

Species-Based Habitat

RANK

- Rank 1 - Habitat specific requirements
- Rank 2 - Special Concern
- Rank 3 - State Threatened
- Rank 4 - State Endangered
- Rank 5 - Federal Listed

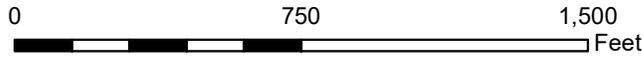


FIGURE 3: LANDSCAPE PROJECT

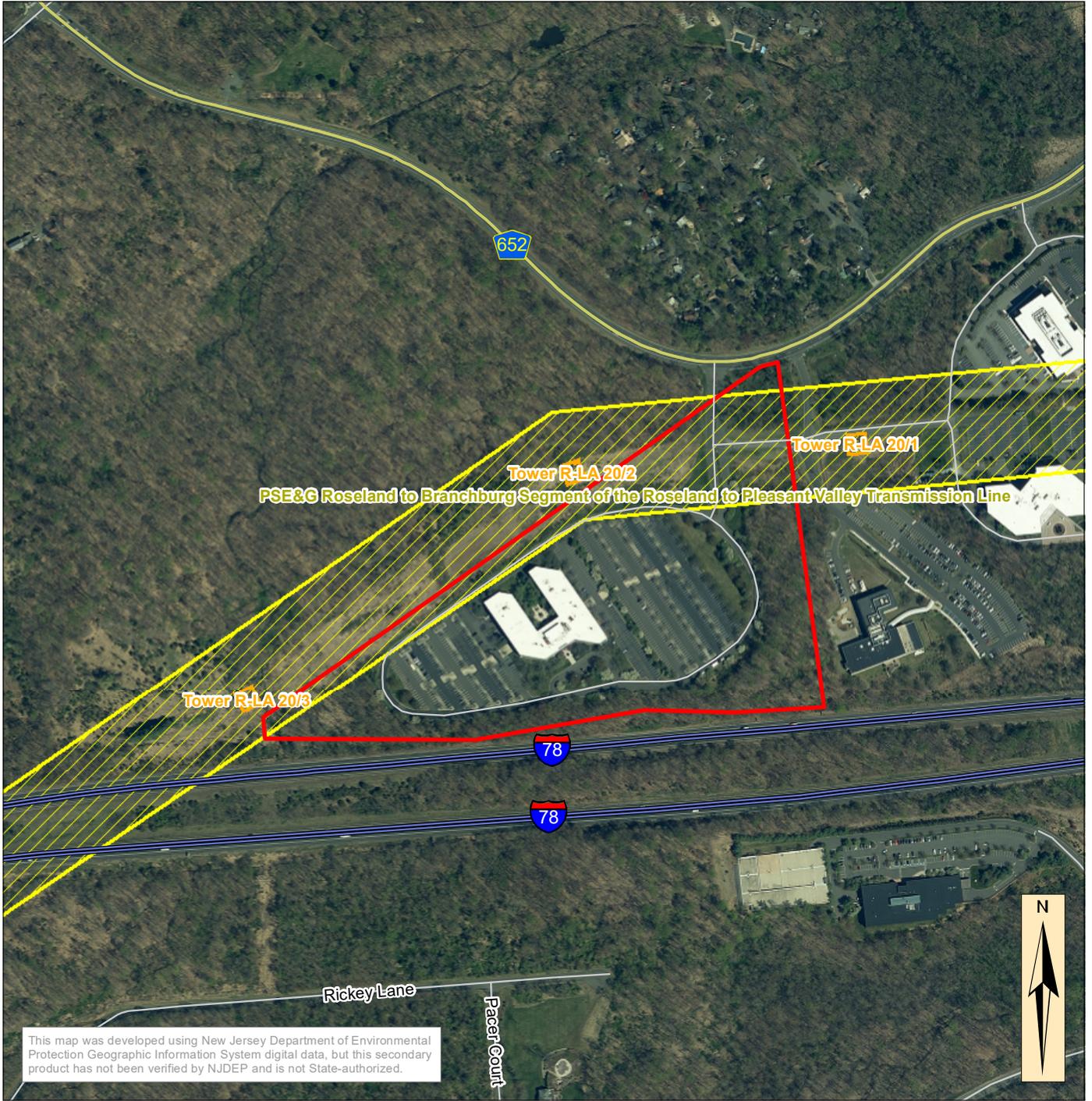
Block 11201, Lot 3
Township of Bernards
Somerset County, New Jersey

Sources:
NJDEP, DFW, ENSP. 2017. New Jersey's Landscape Project (Version 3.3).
NJOIT, OGIS. 2021. NJ 2020 High Resolution Orthophotography.

EcolSciences, Inc.
Environmental Management & Regulatory Compliance

Date: 7/11/22

Scale 1:6,000



This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not State-authorized.



Legend

-  Approximate Site Boundary
-  Historic Properties
-  Archaeological Site Grid
-  Historic Districts

FIGURE 4: HISTORIC RESOURCES	
Block 11201, Lot 3 Township of Bernards Somerset County, New Jersey	
<small>Sources: NJDEP, NHR, HPO. 2022. NJDEP Historic Property Features, Properties, Districts, and Site Grid Map of NJ. NJOIT, OGIS. 2021. NJ 2020 High Resolution Orthophotography.</small>	
EcolSciences, Inc. Environmental Management & Regulatory Compliance	Date: 7/11/22 Scale 1:6,000

ATTACHMENT B

Pertinent Correspondence

EcolSciences, Inc.

Environmental Management & Regulatory Compliance



State of New Jersey

MAIL CODE 501-04

DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATE PARKS, FORESTS & HISTORIC SITES

OFFICE OF NATURAL LANDS MANAGEMENT

501 East State Street

P.O. Box 420, Mail Code 501-04

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PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

SHAWN M. LATOURETTE
Commissioner

July 26, 2022

Karin Tekel
EcolSciences, Inc.
75 Fleetwood Drive, Suite 250
Rockaway, NJ 07866

Re: EN21-135 Signature-Bernards
Block(s) - 11201, Lot(s) - 3
Bernards Township, Somerset County

Dear Ms. Tekel:

Thank you for your data request regarding rare species information for the above referenced project site.

Searches of the Natural Heritage Database and the Landscape Project (Version 3.3) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the map(s) submitted with the Natural Heritage Data Request Form into our GIS. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Landscape Project habitat mapping and the Biotics Database for occurrences of any rare wildlife species or wildlife habitat on the referenced site. The Natural Heritage Database was searched for occurrences of rare plant species or ecological communities that may be on the project site. Please refer to Table 1 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented on site. A detailed report is provided for each category coded as 'Yes' in Table 1.

We have also checked the Landscape Project habitat mapping and Biotics Database for occurrences of rare wildlife species or wildlife habitat in the immediate vicinity (within ¼ mile) of the referenced site. Additionally, the Natural Heritage Database was checked for occurrences of rare plant species or ecological communities within ¼ mile of the site. Please refer to Table 2 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented within the immediate vicinity of the site. Detailed reports are provided for all categories coded as 'Yes' in Table 2. These reports may include species that have also been documented on the project site.

We have also checked the Landscape Project habitat mapping and Biotics Database for all occurrences of rare wildlife species or wildlife habitat within one mile of the referenced site. Please refer to Table 3 (attached) to determine if any rare wildlife species or wildlife habitat is documented within one mile of the project site. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on the project site.

For requests submitted in order to make a riparian zone width determination as part of a Flood Hazard Area Control Act (FHACA) rule application, we report records for all rare plant species and ecological communities tracked by the Natural Heritage Program that may be on, or in the immediate vicinity of, your project site. A subset of these plant species is also covered by the FHACA rules when the records are located within one mile of the project site. One-mile searches for FHACA plant species will only report precisely located occurrences for those wetland plant species identified under the FHACA regulations as being critically dependent on the watercourse. Please refer to Table 3 (attached) to determine if any precisely located rare wetland plant species covered by the FHACA rules have been documented. Detailed reports are

provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on, or in the immediate vicinity of, the project site.

The Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State's best habitats for rare and endangered species and ecological communities. Please refer to Tables 1, 2 and 3 (attached) to determine if any priority sites are located on, in the immediate vicinity, or within one mile of the project site.

A list of rare plant species and ecological communities that have been documented from the county (or counties), referenced above, can be downloaded from <https://nj.gov/dep/parksandforests/natural/heritage/database.html>. If suitable habitat is present at the project site, the species in that list have potential to be present.

Status and rank codes used in the tables and lists are defined in EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS, which can be downloaded from https://nj.gov/dep/parksandforests/natural/docs/nhpcodes_2010.pdf.

Beginning May 9, 2017, the Natural Heritage Program reports for wildlife species will utilize data from Landscape Project Version 3.3. If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive web application at the following URL, <https://njdep.maps.arcgis.com/apps/webappviewer/index.html?id=0e6a44098c524ed99bf739953cb4d4c7>, or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program at (609) 292-9400.

For additional information regarding any Federally listed plant or animal species, please contact the U.S. Fish & Wildlife Service, New Jersey Field Office at <http://www.fws.gov/northeast/njfieldoffice/endangered/consultation.html>.

Information supplied by the Natural Heritage Program summarizes existing data known to the program at the time of the request regarding the biological elements (species and/or ecological communities) or their locations. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,



Robert J. Cartica
Administrator

c: NHP File No. 22-4007465-25411

Table 1: On Site Data Request Search Results (6 Possible Reports)

<u>Report Name</u>	<u>Included</u>	<u>Number of Pages</u>
1. Possibly on Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites On Site	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	Yes	1 page(s) included

**Rare Wildlife Species or Wildlife Habitat on the
Project Site Based on Search of
Landscape Project 3.3 Species Based Patches**

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
<i>Aves</i>								
	Great Blue Heron	Ardea herodias	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Kentucky Warbler	Oporornis formosus	Breeding Sighting	2	NA	Special Concern	G5	S3B,S3N
	Worm-eating Warbler	Helmitheros vermivorum	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
<i>Reptilia</i>								
	Wood Turtle	Glyptemys insculpta	Occupied Habitat	3	NA	State Threatened	G3	S2

**Other Animal Species
On the Project Site Based on
Additional Species Tracked by
Endangered and Nongame Species Program**

Scientific Name	Common Name	Federal Protection Status	State Protection Status	Grank	Srank
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Invertebrate Animals

Metarranthis pilosaria	Coastal Bog Metarranthis			G3G4	S3S4
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Total number of records: 1

Table 2: Vicinity Data Request Search Results (6 possible reports)

<u>Report Name</u>	<u>Included</u>	<u>Number of Pages</u>
1. Immediate Vicinity of the Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within the Immediate Vicinity	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat In the Immediate Vicinity of Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat In the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	Yes	1 page(s) included

**Rare Wildlife Species or Wildlife Habitat Within the
Immediate Vicinity of the Project Site Based on Search of
Landscape Project 3.3 Species Based Patches**

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
<i>Aves</i>								
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Great Blue Heron	Ardea herodias	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Kentucky Warbler	Oporornis formosus	Breeding Sighting	2	NA	Special Concern	G5	S3B,S3N
	Wood Thrush	Hylocichla mustelina	Breeding Sighting	2	NA	Special Concern	G4	S3B,S4N
	Worm-eating Warbler	Helmitheros vermivorum	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
<i>Mammalia</i>								
	Indiana Bat	Myotis sodalis	Maternity Colony	5	Federally Listed Endangered	State Endangered	G2	S1
<i>Reptilia</i>								
	Wood Turtle	Glyptemys insculpta	Occupied Habitat	3	NA	State Threatened	G3	S2

**Other Animal Species
In the Immediate Vicinity of the Project Site Based on
Additional Species Tracked by
Endangered and Nongame Species Program**

Scientific Name	Common Name	Federal Protection Status	State Protection Status	Grank	Srank
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Invertebrate Animals

Metarranthis pilosaria	Coastal Bog Metarranthis			G3G4	S3S4
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Total number of records: 1

**Table 3: Within 1 Mile for Riparian Zone Width Determination
(6 possible reports)**

<u>Report Name</u>	<u>Included</u>	<u>Number of Pages</u>
1. Rare Plant Species Occurrences for Riparian Zone Width Determination (Flood Hazard Area Control Act Rule Application) - Within One Mile of the Project Site Based on Search of Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites for Riparian Zone Width Determination - Within One Mile of the Project Site	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat for Riparian Zone Width Determination - Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	2 page(s) included
4. Vernal Pool Habitat for Riparian Zone Width Determination - Within One Mile of the Project Site Based on Search of Landscape Project 3.3	Yes	1 page(s) included
5. Rare Wildlife Species or Wildlife Habitat for Riparian Zone Width Determination - Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species for Riparian Zone Width Determination - Within One Mile of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	Yes	1 page(s) included

<p>Rare Wildlife Species or Wildlife Habitat for Riparian Zone Width Determination Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches</p>

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
<i>Aves</i>								
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Barred Owl	Strix varia	Non-breeding Sighting	3	NA	State Threatened	G5	S2B,S2N
	Great Blue Heron	Ardea herodias	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Great Blue Heron	Ardea herodias	Nesting Colony	2	NA	Special Concern	G5	S3B,S4N
	Kentucky Warbler	Oporornis formosus	Breeding Sighting	2	NA	Special Concern	G5	S3B,S3N
	Wood Thrush	Hylocichla mustelina	Breeding Sighting	2	NA	Special Concern	G4	S3B,S4N
	Worm-eating Warbler	Helmitheros vermivorum	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
<i>Mammalia</i>								
	Indiana Bat	Myotis sodalis	Maternity Colony	5	Federally Listed Endangered	State Endangered	G2	S1
<i>Reptilia</i>								
	Bog Turtle	Glyptemys muhlenbergii	Occupied Habitat	5	Federally Listed Threatened	State Endangered	G3	S1

<p>Rare Wildlife Species or Wildlife Habitat for Riparian Zone Width Determination Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches</p>

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
	Spotted Turtle	<i>Clemmys guttata</i>	Occupied Habitat	2	NA	Special Concern	G5	S3
	Wood Turtle	<i>Glyptemys insculpta</i>	Occupied Habitat	3	NA	State Threatened	G3	S2

**Vernal Pool Habitat for Riparian Zone Width Determination
Within One Mile of the Project Site
Based on Search of Landscape Project 3.3**

Vernal Pool Habitat Type	Vernal Pool Habitat ID
Vernal habitat area	2897
Total number of records:	1

**Other Animal Species for Riparian Zone Width Determination
 Within One Mile of the Project Site
 Based on Additional Species Tracked by
 Endangered and Nongame Species Program**

Scientific Name	Common Name	Federal Protection Status	State Protection Status	Grank	Srank
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Invertebrate Animals

Metarranthis pilosaria	Coastal Bog Metarranthis			G3G4	S3S4
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Total number of records: 1

ATTACHMENT C

Custom Soil Resource Report

EcolSciences, Inc.

Environmental Management & Regulatory Compliance

Custom Soil Resource Report for **Somerset County, New Jersey**

**Block 11201, Lot 3 - Township of
Bernards**



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Map Scale: 1:3,280 if printed on A landscape (11" x 8.5") sheet.



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

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: Somerset County, New Jersey
 Survey Area Data: Version 18, Jun 1, 2020

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

Date(s) aerial images were photographed: Sep 14, 2020—Oct 3, 2020

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
NemCb	Neshaminy-Mount Lucas silt loams, 6 to 12 percent slopes, very stony	27.6	100.0%
Totals for Area of Interest		27.6	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

Custom Soil Resource Report

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Somerset County, New Jersey

NemCb—Neshaminy-Mount Lucas silt loams, 6 to 12 percent slopes, very stony

Map Unit Setting

National map unit symbol: 1j52b
Elevation: 80 to 2,000 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Neshaminy, very stony, and similar soils: 55 percent
Mount lucas, very stony, and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Neshaminy, Very Stony

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Dark colored basic rocks or loamy residuum weathered from diabase

Typical profile

A1 - 0 to 4 inches: silt loam
A2 - 4 to 10 inches: silt loam
BA - 10 to 14 inches: gravelly silt loam
Bt1 - 14 to 22 inches: gravelly silt loam
Bt2 - 22 to 46 inches: gravelly clay loam
C - 46 to 80 inches: cobbly loam
R - 80 to 90 inches: weathered bedrock

Properties and qualities

Slope: 6 to 12 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 48 to 80 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s

Custom Soil Resource Report

Hydrologic Soil Group: B
Hydric soil rating: No

Description of Mount Lucas, Very Stony

Setting

Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Dark colored basic rocks or loamy residuum weathered from diabase

Typical profile

A - 0 to 8 inches: silt loam
BA - 8 to 14 inches: silt loam
Bt - 14 to 35 inches: silt loam
C - 35 to 56 inches: cobbly loam
R - 56 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 6 to 12 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 48 to 60 inches to lithic bedrock
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 6 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Lawrenceville

Percent of map unit: 5 percent
Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Legore

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Custom Soil Resource Report

ATTACHMENT D

Qualifications of Preparers

EcolSciences, Inc.

Environmental Management & Regulatory Compliance

KARIN TEKEL, SPWS

EDUCATION:

*M.S. Hydrologic Sciences, June 2001
University of California, Davis, California*

*B.S. Environmental Science, May 1997
Rutgers University, New Brunswick, New Jersey*

*B.S. Natural Resource Management, May 1997
Rutgers University, New Brunswick, New Jersey*

AREAS OF EXPERTISE:

*Environmental Impact Statement
Regulatory Analysis and Compliance
Wetland Delineation and Permitting
Threatened and Endangered Species Surveys
Ecological Field Studies and Habitat Assessment
Geographic Information Systems (GIS)*

CERTIFICATIONS:

*Senior Professional Wetland Scientist (Society of Wetland Scientists)
#1621
Wetland Delineation Certificate – Rutgers University OCPE
NJDEP’s Flood Hazard Area Certification Program – Montclair State
University
Recognized Qualified Bog Turtle Surveyor in New Jersey (USFWS)
Recognized Qualified Bog Turtle Surveyor in Hudson River/
Housatonic Recovery Unit in New York, Massachusetts, and
Connecticut (USFWS)*

PROFESSIONAL ASSOCIATIONS:

Member of Society of Wetland Scientists since 2001

EXPERIENCE:

Ms. Tekel is an Assistant Vice President with EcolSciences, Inc. Her responsibilities include: the delineation of wetlands based on the Federal Manual for Identifying and Delineating Jurisdictional Wetlands, the preparation of applications for Letters of Interpretation, Transition Area Waivers, General Permits, and Individual Permits in accordance with the New Jersey Freshwater Wetlands Protection Act, Flood Hazard Area Control Act, Coastal Zone Management Rules, the implementation and documentation of wildlife and botanical habitat assessments and species surveys, and the use of Geographic Information Systems (GIS) in its capacity as an instrument of environmental analysis.

Prior to joining EcolSciences, Inc., Ms. Tekel was employed as a Research Assistant at the Water Resources Center of the University of California in conjunction with obtaining a Master of Science in Hydrologic Sciences. A summary of Ms. Tekel relevant experience includes:



Wetland Delineations

- Conducted wetland delineations using the Federal Manual three-parameter approach using vegetation, soils, and hydrology.
- Assisted in the wetland delineation on a 243-acre property in the Township of Lafayette, New Jersey.
- Led a wetland delineation on a 274-acre property in the Township of Andover, New Jersey.
- Assisted in the wetland delineation for a 1,510±-acre Duke Farms property in New Jersey.

Permitting

- Prepared and obtained New Jersey Department of Environmental Protection (NJDEP) Freshwater Wetlands and Waterfront Development Permits and U.S. Army Corps of Engineers (USACE) Nationwide Permits for the closure of three abandoned landfills and the construction on the landfill cap of over 1,000,000 square feet of state-of-the-art warehousing. The waterfront development permits ultimately authorized filling below mean high water for the landfill closure and the development of the project on the landfill cap.
- Prepared and obtained over 500 applications for Letters of Interpretation, General Permits, Transition Area Waivers, and Individual Permits pursuant to the NJDEP Freshwater Wetlands Protection Act.
- Prepared and obtained NJDEP Freshwater Wetlands and Coastal Area Facility Review Act (CAFRA) Permit for a 10-acre property in the City of Pleasantville, New Jersey. The project involves the construction of multi-family residential units divided on the site of the former Pleasantville High School, which has since been demolished. All of the required permits were obtained for the project.
- Prepared and obtained NJDEP Highlands Preservation Area Resource Area Determinations for two properties in the Township of Roxbury, New Jersey.
- Prepared and obtained Highlands Exemptions for proposed single-family residences in the Highlands Preservation Area.
- Prepared Joint Applications for USACE Section 404 Permit and Pennsylvania Water Obstruction and Encroachment Permit for sites in Pennsylvania.
- Prepared Wetlands Individual Permit application for a major residential development on ±100 acres of a former golf course spanning two towns in Bergen County, New Jersey. The development plan includes the remediation of pesticide contaminated soils through blending. Also prepared Flood Hazard Area Permit supporting documentation, which included information concerning the restoration of a stream corridor, and prepared municipal Environmental Impact Statements for submission to the two towns. The permits were obtained and the project has begun construction.



- Prepared Freshwater Wetlands and CAFRA permit applications, with supporting documentation, for the expansion of several sand mines on ±1,000 acres in Cumberland County, New Jersey. The permits were obtained, and the expansions are ongoing.
- Prepared Waterfront Development and Freshwater Wetlands permit applications, with supporting documentation, for the construction of a hotel on an existing shopping center site in Hudson County, New Jersey. Public access, threatened and endangered species, and stormwater management were of primary concern. The permits were obtained.
- Prepared and obtained Flood Hazard Area Verifications, Individual Permits, and Hardship Exceptions pursuant to the NJDEP Flood Hazard Area Control Act Rules. Evaluated properties for riparian zone widths.
- Evaluated properties for environmental sensitive areas and prepared Habitat Suitability Determinations for possible inclusion in the sewer service areas in New Jersey.

Corridor/Utility Experience

- Prepared necessary permitting for a petroleum product pipeline relocation underneath the Arthur Kill and Newark Bay and adjacent uplands and wetlands. Applications were submitted to the USACE, New York State Department of Environmental Conservation, New York State Department of State, New York State Office of General Services, NJDEP, and New Jersey Bureau of Tidelands. Issues addressed within the application support documents included impacts to essential fish habitat, freshwater and tidal wetlands, and navigation. All of the required permits were obtained for the project and the project was completed.
- Designed, directed, and participated in wetland delineations, ecological studies, regulatory assessment and regulatory compliance for several proposed underground oil pipelines, upgrade/replacement to electric transmission rights of ways (ROW), and sanitary sewer alignments, and their associated access roads throughout New Jersey.
- Managed complex electronic transmission ROW upgrade projects from planning to construction stages. This included the leading of large-scale field efforts including wetland delineations, threatened and endangered wildlife and plant assessments and surveys, vernal habitat assessments and surveys, and pre-construction monitoring. Worked with project teams to minimize disturbances to regulated areas, managed permitting efforts when needed, and negotiated with NJDEP to solve permitting concerns.
- Monitoring of construction and/or maintenance activities within environmentally sensitive areas along various overhead electric transmission and gas pipeline ROWs. Tasks include delineating and monitoring regulated activities within environmentally sensitive areas for the purposes of natural resources protection (wetlands, waters, and threatened and endangered species), soil and sediment erosion control, access road maintenance and repair, and ROW vegetation maintenance, including herbicide application, mowing, hand-cutting, and tree-cutting.



Wetland/Riparian Zone Mitigation

- Assisted in the preparation of a riparian zone and freshwater wetlands mitigation plan for remediation and subsequent redevelopment within regulated areas for a site in the Borough of Upper Saddle River, New Jersey.
- Conducted multi-year monitoring of remediated and restored wetlands and transition areas pursuant to an approved NJDEP Freshwater Wetlands General Permit Number 4 for a site in Hanover Township, New Jersey. The monitoring includes the evaluation of wetlands hydrology and hydric soils.
- Prepared a transition area restoration planting plan pursuant to a NJDEP Special Activity Waiver for a site in Denville Township, New Jersey.
- Conducted multi-year monitoring of wetlands habitat restoration project. This included the establishment and surveys of plant quadrats, supervision of planting of native shrubs and herbaceous species, and supervision of invasive species treatment and removal using herbicide and manual removal.

Municipal Environmental Impacts Statements

- Prepared over 100 Environmental Impact Statements and Assessments for residential, industrial, and commercial projects throughout New Jersey.
- Prepared an Environmental Impact Assessment for Virgin Spa at Natirar on a 90-acre property in the Borough of Peapack and Gladstone, New Jersey.
- Provided expert testimony concerning wetlands and flood hazard area issues at a municipal hearing for a preliminary and final site plan approval application for a site in Wayne Township, New Jersey.

Vernal Habitats

- Led over 200 vernal habitat assessments and surveys in accordance with survey protocols developed by the NJDEP. Pertinent information was gathered on hydrology, vegetation, observed reptile and amphibian species, and weather conditions.
- Assisted in the preparation of two vernal habitat creation plans, which involved the selection of suitable native vegetation and consultation with the project engineer concerning hydrologic budget, lining material, topographic contours, and construction methodology.

Avian Studies

- Led surveys for the State-endangered (breeding) Northern Goshawk (*Accipiter gentilis*), (breeding) Red-Shouldered Hawk (*Buteo lineatus*), State-threatened Barred Owl (*Strix varia*), special concern (breeding) Broad-Winged Hawk (*Buteo platypterus*), (breeding) Cooper's Hawk (*Accipiter cooperii*), and (breeding) Sharp-Shinned Hawk (*Accipiter striatus*) in New Jersey. Surveys included call surveys and nest/tree cavity searches.



- Led surveys for the State-endangered (breeding) Golden-Winged Warbler (*Vermivora chrysoptera*) in accordance with the Cornell Lab of Ornithology's Golden-Winged Warbler Atlas Project (1999-2005). Surveys included call surveys and habitat assessments.
- Led surveys for the State-threatened Red-Headed Woodpecker (*Melanerpes erythrocephalus*) in New Jersey. Surveys included call and cavity nest surveys.
- Assisted in grassland bird surveys for State-threatened Grasshopper Sparrow (*Ammodramus savannarum*), Savannah Sparrow (*Passerculus sandwichensis*), and Bobolink (*Dolichonyx oryzivorus*) in New Jersey.

Snake Studies

- Assisted in diurnal and nocturnal road cruising, grid searches, and drift fence trapping surveys for State-threatened Northern Pine Snake (*Pituophis melanoleucus melanoleucus*) for multiple properties in the Townships of Barnegat, Stafford, and Toms River New Jersey. The surveys were approved by the NJDEP and Pinelands Commission.
- Conducted radio telemetry for Northern Pine Snakes for multiple properties in the Townships of Stafford and Toms River, New Jersey.
- Assisted in grid searches and drift fence trapping for Northern Pine Snake and State-endangered Timber Rattlesnake (*Crotalus horridus*) on multiple properties in the Townships of Manchester and Stafford. The surveys were approved by the NJDEP and Pinelands Commission.
- Assisted in Timber Rattlesnake gestation surveys at two survey locations associated with an overhead electric transmission line in Morris and Sussex Counties, New Jersey.

Salamander Studies

- Conducted field surveys for the State-endangered Blue-Spotted Salamander (*Ambystoma laterale*) and State-Threatened Long-Tailed Salamander (*Eurycea longicauda longicauda*).
- Led Blue-Spotted Salamander surveys on multiple overhead electric transmission lines in Essex and Morris Counties, New Jersey.

Turtle Studies

- Led Phase I and Phase II Surveys for Federally-threatened and State-endangered Bog Turtle (*Glyptemys muhlenbergii*).
- Assisted in Phase III trapping and radio telemetry for Bog Turtle.
- Prepared over 25 Bog Turtle Phase II Survey Reports for many sites in New Jersey and York County, Pennsylvania.
- Prepared Bog Turtle Phase I Survey Reports for Pocono Manor Inn and Resort and Transcontinental Gas Pipeline Corporation ROW in Pennsylvania, and Tennessee Gas Pipeline ROW in New Jersey.



- Led Bog Turtle Phase I and Phase II surveys on multiple overhead electric transmission line upgrade projects or for routine maintenance for multiple sites in New Jersey.
- Conducted surveys for the State-threatened Wood Turtle (*Clemmys insculpta*) for several sites throughout New Jersey.
- Conducted a long-term Wood Turtle survey that involves radio telemetry of adults and hatchlings, hibernacula surveys, nesting surveys, and nest protection.

Rare Plant Studies

- Conducted several surveys for rare plants including the Federally-threatened and State-endangered Small Whorled Pogonia (*Isotria medeoloides*), Swamp Pink (*Helonias bullata*), and Knieskern's Beaked-Rush (*Rhynchospora knieskerni*), State-endangered Willow-Leaf Aster (*Symphyotrichum praealtum* var. *praealtum*), and Pinelands Commission-listed Little Ladies' Tresses (*Spiranthes tuberosa*).

University Research Studies

- Collected field observational data on individual wetland plant species pertaining to nutrient resorption.
- Conducted vegetation surveys for percent cover, biomass estimations, and community composition for inland Californian freshwater marshes.
- Performed streamflow measurements, groundwater, and infiltration analyses.
- Conducted mesocosm experiments to assess the response of selected wetland plant species (native and introduced) to nutrient enrichment and two different water levels.

PUBLICATIONS:

Rejmánková, Eliska and Karin Tekel. Start July 1, 1998. Technical Completion Report. Life History Strategies of California Native Plants: Implications for Wetland Creation and Restoration. University of California, Davis, Center for Water Resources. http://www.waterresources.ucr.edu/wrc/publications/rejmankova_W-907.pdf

Tekel, Karin Jean. 2001. Thesis (M.S.). The relationship between water quality and plant functional groups in freshwater wetlands. University of California, Davis.





TRAFFIC IMPACT STUDY

PROPOSED LIGHT MANUFACTURING DEVELOPMENT

Proposed Light
Manufacturing Development
150 Allen Road
Bernards Township Somerset
County, New Jersey

Prepared For:
Sig150 Allen LLC

September 16, 2022
SE&D Job No. PRI-220206



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STONEFIELD

92 Park Avenue, Rutherford, NJ 07070

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Intersection of Liberty Corner Road and Interstate Route 78 EB Ramp
Intersection of Liberty Corner Road and Interstate Route 78 WB Ramp
Intersection of Liberty Corner Road and Allen Road

INTRODUCTION

This Traffic Impact Study was prepared to investigate the potential impacts of the proposed light manufacturing development on the adjacent roadway network. The subject property is located along Allen Road in the Township of Bernards, Somerset County, New Jersey. The site location is shown on appended **Figure 1**.

The subject property is designated as Block 11201, Lot 3 as depicted on the Township of Bernards Tax Map. The site has approximately 66 feet of frontage along Allen Road and approximately 1,896 feet of frontage along Interstate Route 78. The existing site is occupied by a three (3) story, 174,546 square-foot footprint, office building known as The Offices at Liberty Corner. Access is presently provided via one (1) full-movement driveway along Allen Road, with cross-access provided to the Block 11201, Lots 4, 5, and 15. Under the proposed development program, the existing structures would be razed, and two (2) separate light manufacturing buildings (known as Building A and Building B) would be constructed. Building A would be 127,977 square-feet and Building B would be 130,551 square-feet, for a total of 258,528 square-feet. Access is proposed to remain via one (1) full-movement driveway along Allen Road, with cross-access provided to the Block 11201, Lots 4, 5, and 15.

METHODOLOGY

Stonefield Engineering & Design, LLC has prepared this Traffic Impact Study in accordance with the recommended guidelines and practices outlined by the Institute of Transportation Engineers (ITE) within Transportation Impact Analyses for Site Development. A detailed field investigation was performed to assess the existing conditions of the adjacent roadway network. A data collection effort was completed to identify the existing traffic volumes at the study intersections to serve as a base for the traffic analyses. Capacity analysis, a procedure used to estimate the traffic-carrying ability of roadway facilities over a range of defined operating conditions, was performed using the Highway Capacity Manual, 6th Edition (HCM) and the Synchro II Software for all study conditions to assess the roadway operations.

For an unsignalized intersection, Level of Service (LOS) A indicates operations with delay of less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 50 seconds per vehicle. For a signalized intersection, LOS A indicates operations with delay of less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 80 seconds per vehicle. The Technical Appendix contains the Highway Capacity Analysis Detail Sheets for the study intersections analyzed in this assessment. The traffic signal timing utilized within the signalized analysis is based on timing directives provided by the NJDOT and Somerset County.

2022 EXISTING CONDITION

2022 EXISTING ROADWAY CONDITIONS

The proposed light manufacturing development is located along Allen Road in the Township of Bernards, Somerset County, New Jersey. The subject property is designated as Block 11201, Lot 3 as depicted on the Township of Bernards Tax Map. The site has approximately 66 feet of frontage along Allen Road and approximately 1,896 feet of frontage along Interstate Route 78. Land uses in the area are a mix of commercial, industrial, and residential.

Interstate Route 78 is classified as an Urban Interstate roadway with a general east-west orientation and is under the jurisdiction of the New Jersey Department of Transportation (NJDOT). Along the site frontage, the roadway provides three (3) lanes of travel in each direction, separated by a grass median, and has a posted speed limit of 65 mph. Curb and sidewalk are not provided, shoulders are provided along both sides of the roadway, and on-street parking is not permitted. Interstate Route 78 provides east-west mobility throughout the New Jersey and access to Pennsylvania to the west.

Liberty Corner Road (CR 525) is classified as an Urban Minor Arterial roadway with a general north-south orientation and is under the jurisdiction of Somerset County. The roadway generally provides two (2) lanes of travel in each direction, with additional lanes provided at key intersections to facilitate turning movements and has a posted speed limit of 45 mph. Curb is provided along both sides of the roadway, sidewalk is not provided, shoulders are not provided, and on-street parking is not permitted. Liberty Corner Road provides north-south mobility throughout Somerset County and provides access to Interstate Route 287 to the north and Interstate 78 to the south, for a mix of commercial and residential uses along its length.

Allen Road (CR 652) is classified as an Urban Major Collector roadway with a general east-west orientation and is under the jurisdiction of Somerset County. Along the site frontage, the roadway provides one (1) lane of travel along both sides of the roadway, intermittently separated by a two-way left-turn lane, and has a posted speed limit of 40 mph. Curb is provided along both sides of the roadway, sidewalk is not provided, shoulders are provided along both sides of the roadway, and on-street parking is not permitted. Allen Road provides east-west mobility through Bernards Township and the surrounding municipalities for a mix of commercial and residential developments along its length.

Liberty Corner Road and the Interstate Route 78 Eastbound ramps intersect to form a T-intersection controlled by a two (2)-phase traffic signal operating on a 60 or 90-second fixed background cycle. The northbound approach of Liberty Corner Road provides three (3) exclusive through lanes and one (1) unsignalized right-turn ramp-entrance lane and the southbound approach of Liberty Corner Road provides two

(2) exclusive through lanes and one (1) unsignalized right-turn ramp-entrance lane. The eastbound approach of the Interstate Route 78 Eastbound exit ramp provides two (2) exclusive left-turn lanes and two (2) exclusive right-turn lanes.

Liberty Corner Road and the Interstate Route 78 Westbound ramps intersect to form a T-intersection controlled by a two (2)-phase traffic signal operating on a 60 or 90-second fixed background cycle. The northbound and southbound approaches of Liberty Corner Road provide two (2) exclusive through lanes and one (1) unsignalized right-turn ramp-entrance lane. The westbound approach of the Interstate Route 78 westbound exit ramp provides two (2) exclusive left-turn lanes and one exclusive right-turn lane.

Liberty Corner Road, Allen Road, and the driveway for Tamke Tree Experts intersect to form a four (4)-leg intersection controlled by a three (3)-phase traffic signal operating on a 90-second fixed background cycle. The northbound and southbound approaches of Liberty Corner Road provide one (1) exclusive left-turn lane, one (1) exclusive through lanes, and one (1) shared through/right-turn lane. The eastbound approach of Allen Road provides one (1) shared left-turn/through lane and one (1) exclusive right-turn lane. The westbound approach of the Tamke Tree Experts driveway provides one (1) shared full-movement lane. Crosswalks and pedestrian signals are provided along the easterly, westerly, and southerly legs of the intersection.

2022 EXISTING TRAFFIC VOLUMES

Manual turning movement counts were collected during the typical weekday morning and weekday evening time periods to evaluate existing traffic conditions and identify the specific hours when traffic activity on the adjacent roadways is at a maximum and could be potentially impacted by the development of the site. Turning movement counts were collected at the following intersections:

- ◆ Liberty Corner Road and Interstate Route 78 Eastbound Ramps
- ◆ Liberty Corner Road and Interstate Route 78 Westbound Ramps
- ◆ Liberty Corner Road and Allen Road
- ◆ Allen Road and Site Driveway

Specifically, manual turning movement counts were conducted on Tuesday, August 2, 2022, from 7:00 a.m. to 9:00 a.m. and from 4:00 p.m. to 7:00 p.m.

The study time periods were chosen as they are representative of the peak periods of both the adjacent roadway network and the proposed development. The traffic volume data was collected and analyzed to identify the design peak hour in accordance with HCM and ITE guidelines. Based on the review of the count data the weekday morning network peak hour occurred from 8:00 a.m. to 9:00 a.m. and the weekday evening network peak hour occurred from 4:45 p.m. to 5:45 p.m.

It should be noted that the traffic counts were conducted in the month of August, which typically experiences lower traffic volumes than other months. In order to provide an analysis of traffic volumes during a typical or average month, seasonal adjustment factors were applied. The seasonal adjustment factors applied were obtained from the Seasonal Factors 2019 Table data published by the NJDOT. The seasonal adjustment factors were applied to the as-counted traffic volumes to generate the 2022 Existing Volumes for the weekday morning and weekday evening peak hours. The Technical Appendix contains a summary of the turning movement count data. The 2022 Existing weekday morning and weekday evening peak-hour volumes are summarized on appended **Figure 2**.

2022 EXISTING LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was conducted for the 2022 Existing Condition during the weekday morning and weekday evening peak hours at the study intersections and existing site driveway. Under the existing condition, the signalized intersection of Interstate Route 78 Eastbound Ramp and Liberty Corner Road is calculated to operate at overall Level of Service B during the weekday morning and weekday evening peak hours. The signalized intersection of Interstate Route 78 Westbound Ramp and Liberty Corner Road is calculated to operate at overall Level of Service B during the weekday morning and weekday evening peak hours. The signalized intersection of Liberty Corner Road and Allen Road is calculated to operate at overall Level of Service B during the weekday morning and weekday evening peak hours. The turning movements at the unsignalized intersection of Allen Road and the site driveway are calculated to operate at Level of Service A during the weekday morning peak hour and Level of Service B or better during the weekday evening peak hour.

2024 NO-BUILD CONDITION

BACKGROUND GROWTH

The 2022 Existing Condition traffic volume data was grown to a future horizon year of 2024, which is a conservative estimate for when the proposed light manufacturing development is expected to be fully constructed. In accordance with industry guidelines, the existing traffic volumes at the study intersections were increased by 1.75% annually for two (2) years. The 1.75% background growth rate was obtained from NJDOT Annual Background Growth Rate Table.

2024 NO-BUILD TRAFFIC VOLUMES

The background growth rate was applied to the 2022 Existing Traffic Volumes to calculate the 2024 No-Build Traffic Volumes for the weekday morning and weekday evening peak hours. These volumes are summarized on appended **Figure 3**.

2024 NO-BUILD LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was also conducted for the 2024 No-Build Condition during the weekday morning and weekday evening peak hours at the study intersections and existing site driveway. The signalized intersection of Interstate Route 78 Eastbound Ramp and Liberty Corner Road is calculated to operate generally consistent with the findings of the Existing Condition during the weekday morning and weekday evening peak hours. The signalized intersection of Interstate Route 78 Westbound Ramp and Liberty Corner Road is calculated to operate generally consistent with the findings of the Existing Condition during the weekday morning and weekday evening peak hours. The signalized intersection of Liberty Corner Road and Allen Road is calculated to operate generally consistent with the findings of the Existing Condition during the weekday morning and weekday evening peak hours. The turning movements at the unsignalized intersection of Allen Road and the site driveway are calculated to operate generally consistent with the findings of the Existing Condition during the weekday morning and weekday evening peak hours.

2024 BUILD CONDITION

The site-generated traffic volume of the proposed light manufacturing development was estimated to identify the potential impacts of the project. For the purpose of this analysis, a complete project “build out” is assumed within two (2) years of the preparation of this study.

TRIP GENERATION

In order to determine the impact of the proposed development on the roadway network in the event that the proposed tenant vacates the building, trip generation projections for the proposed warehouse were also prepared utilizing the ITE’s Trip Generation Manual, 11th Edition. Trip generation rates associated with Land Use 140 “Manufacturing” were cited for the 127,977 square-foot and 130,551 square-foot light manufacturing buildings. It should be noted light manufacturing does not exist as a land use within ITE’s Trip Generation Manual, 11th Edition. Through review of the ITE Land Use definitions, it was determined that Land Use 140 “Manufacturing” is most analogous to the permitted light manufacturing use, as described in the Township E-2 Zone Ordinance, and best matches the proposed use of this development. **Table I** provides the weekday morning and weekday evening trip generation volumes associated with the proposed development.

TABLE 1 – PROPOSED TRIP GENERATION

Land Use	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
	Enter	Exit	Total	Enter	Exit	Total
127,977 SF Light Manufacturing <i>ITE Land Use 140</i>	67	21	88	29	66	95
130,551 SF Light Manufacturing <i>ITE Land Use 140</i>	67	22	89	30	67	96
Total	134	43	177	59	133	191

ITE’s Trip Generation Manual, 11th Edition also provides separate trip generation rates for passenger vehicles and trucks for Land Use 140 “Manufacturing”. **Table 2** provides the weekday morning and weekday evening passenger vehicle and truck trip generation volumes associated with the proposed development.

TABLE 2 – PROPOSED TRIP GENERATION – TRUCK & PASSENGER VEHICLE TRIPS

Land Use	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
	Enter	Exit	Total	Enter	Exit	Total
Truck Trips	4	4	8	3	5	8
Passenger Vehicle Trips	130	39	169	56	128	183
Total	134	43	177	59	133	191

It should be noted that the proposed light manufacturing development would be replacing the previously operational office development that was located at this site. In order to determine the impacts of the proposed development over those of the previous development, the trip generation for both the proposed and previously operational developments were compared below in **Table 3**. Trip generation rates associated with Land Use 710 “General Office Building” were cited for the 174,546 square-feet of previously operational office building.

TABLE 3 – TRIP GENERATION COMPARISON

Land Use	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
	Enter	Exit	Total	Enter	Exit	Total
Proposed 258,528 SF Light Manufacturing <i>ITE Land Use 140</i>	134	43	177	59	133	191
Previous 176,546 SF Office <i>ITE Land Use 710</i>	240	33	273	45	221	266
Difference	-106	+10	-96	+14	-88	-74

As can be seen in Table 3, the proposed light manufacturing development would generate significantly less traffic than the previously operational office development. As such, the impact of the proposed light manufacturing development on the roadway network would be a fraction of the impact of the office development.

TRIP ASSIGNMENT/DISTRIBUTION

The trips generated by the proposed development were distributed according to a Journey-to-Work Model prepared for the site using the 2010 census data with Bernards Township as a place of work and the access management plan of the site. The methodology used in the preparation of the Journey-To-Work Model utilizes the location of Bernards employees’ place of residence, identified through 2010 Census Data published by the US Census Bureau, divided by municipality, in the surrounding area to determine the trip distribution. The Journey-To-Work Model can be found the Appendix. The results of the Journey-To-Work Model were used to distribute the site-generated traffic along the adjacent roadway network and are summarized in **Table 4**.

TABLE 4 – JOURNEY-TO-WORK MODEL TRIP DISTRIBUTION

Destination	Percentage
From North – Liberty Corner Road SB	18%
From South – I-78 EB	7%
From South – I-78 WB	28%
From South – Liberty Corner Road NB	18%
From West – Allen Road EB	29%
TOTAL	100%

The “New” Site-Generated Traffic Volumes are illustrated on **Figure 4**.

2024 BUILD TRAFFIC VOLUMES

The site-generated trips were added to the 2024 No-Build Traffic Volumes to calculate the 2024 Build Traffic Volumes and are shown on appended **Figure 5**.

2024 BUILD LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was also conducted for the 2024 Build Condition during the weekday morning and weekday evening peak hours at the study intersections and proposed site driveway. Appended **Table AI** compare the Existing, No-Build, and Build Conditions Level of Service and delay values.

The signalized intersection of Interstate Route 78 Eastbound Ramp and Liberty Corner Road is calculated to operate generally consistent with the findings of the No-Build Condition during the weekday morning and weekday evening peak hours. The signalized intersection of Interstate Route 78 Westbound Ramp and Liberty Corner Road is calculated to operate generally consistent with the findings of the No-Build Condition during the weekday morning and weekday evening peak hours. The signalized intersection of Liberty Corner Road and Allen Road is calculated to operate generally consistent with the findings of the No-Build Condition during the weekday morning and weekday evening peak hours. The turning movements at the unsignalized intersection of Allen Road and the site driveway are calculated to operate at Level of Service C or better during the weekday morning and weekday evening peak hours.

SITE CIRCULATION/PARKING SUPPLY

A review was conducted of the proposed light manufacturing development using the Site Plan prepared by Gladstone Design, Inc, dated September 16, 2022. In completing this review, particular attention was focused on the site access, circulation, and parking supply.

Access is proposed to remain via one (1) full-movement driveway along Allen Road, with cross-access provided to the Block 11201, Lots 4, 5, and 15. The two (2) proposed buildings would be located central to the site, and both would have a parking garage located along the easterly side of the building. Loading spaces would be located along the southerly side of each building. Additional parking would be provided along the northerly side of Building A and to the west of Building B. Two-way circulation about the site would be provided via circulating roadway with a minimum width of 28 feet. Two-way circulation about the parking garages and other parking areas would be provided via 24-foot-wide drive aisles. The loading areas would provide two-way drive aisles with a minimum width of 70 feet.

Regarding the parking requirements for the proposed development, the Bernards Township Ordinance requires one (1) space per 500 square-feet of light manufacturing space and one (1) space per 1,000 square-feet of office space. For the proposed development with a total of 198,977 square-feet of light manufacturing space and 59,551 square-feet of office space, this equates to 629 required spaces. The site would provide 314 total parking spaces, inclusive of nine (9) ADA accessible parking spaces. The spaces would be nine (9) feet wide by 18 feet deep in accordance with industry standards.

As per P.L. 2021, c.171 (C.40:55D-66.18 et al.), all non-residential projects involving a parking garage or parking lot, except retailers with fewer than 25 parking spaces, must provide parking spaces pre-wired for electric vehicle charging stations (“make-ready”) according to the following requirements:

- *1 make-ready space if the garage or lot has 50 or fewer spaces;*
- *2 make-ready spaces if the garage or lot has between 51 and 75 spaces;*

- 3 make-ready spaces if the garage or lot has between 76 and 100 spaces;
- 4 make-ready spaces if the garage or lot has between 101 and 150 spaces (at least one of which must be accessible for people with disabilities).
- At least 4% of the total parking spaces if the garage or lot has over 150 spaces (at least 5% of which must be accessible for people with disabilities).

For the proposed parking supply of 314 parking spaces, this equates to 14 make-ready spaces with one (1) being ADA accessible. The electric vehicle requirements consider electric vehicle spaces as a minimum of two (2) parking spaces for the purpose of satisfying parking requirements, up to a 10% reduction of total requirement. As such, the development plan would be considered to provide 328 (314 + 14) total parking spaces.

The parking supply was evaluated with respect to data published within the ITE's Parking Generation, 5th Edition, for Land Use 140 "Manufacturing." It should be noted that ITE's definition for Land Use 140 "Manufacturing," includes "In addition to the actual production of goods, a manufacturing facility typically has an office and may provide space for warehouse, research, and associated functions." The average parking demand rate during the peak period for Land Use 140 "Manufacturing" is 0.93 vehicles per 1,000 square-feet. For the 258,528 square-foot light manufacturing development, this equates to 240 parking spaces. As such, the proposed parking supply of 328 spaces would be sufficient to support the parking demand of the site.

CONCLUSIONS

This report was prepared to examine the potential traffic impact of the proposed light manufacturing development. The analysis findings, which have been based on industry-standard guidelines, indicate that the proposed development would not have a significant impact on the traffic operations of the adjacent roadway network, especially compared to the use previously occupying the site. The site driveways and on-site layout have been designed to provide for effective access to and from the subject property. Based on use of the site, industry data, and local characteristics of the site and surrounding area, the parking supply would be sufficient to support this project.

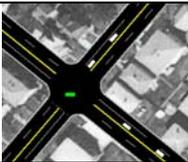
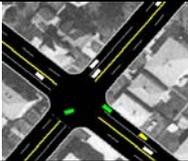
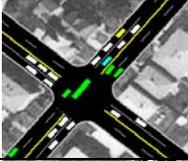
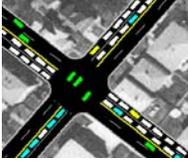
TECHNICAL APPENDIX

LEVEL OF SERVICE/AVERAGE CONTROL DELAY CRITERIA

LEVEL OF SERVICE /AVERAGE CONTROL DELAY CRITERIA

The ability of a roadway to effectively accommodate traffic demand is determined through an assessment of the volume-to-capacity ratio, delay and Level of Service of the lane group and/or intersection. The volume-to-capacity ratio is the ratio of traffic flow rate to capacity for a given transportation facility. As defined within the Highway Capacity Manual, 6th Edition (HCM), intersection delay is the total additional travel time experienced by drivers, passengers, or pedestrians as a result of control measures and interaction with other users of the facility, divided by the volume departing from the corresponding cross section of the facility. Level of service is a qualitative measure describing operational conditions within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience.

For an unsignalized intersection, LOS A indicates operations with delay less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 50 seconds per vehicle. For a signalized intersection, LOS A indicates operations with delay less than 10 seconds per vehicle and LOS F denotes operations with delay in excess of 80 seconds per vehicle.

	Level Of Service (LOS)	Signalized Delay Range (average control delay in sec/veh)	Unsignalized Delay Range (average control delay in sec/veh)
	A	<=10	<=10
	B	>10 and <=20	>10 and <=15
	C	>20 and <=35	>15 and <=25
	D	>35 and <=55	>25 and <=35
	E	>55 and <=80	>35 and <=50
	F	>80	>50

Source: Highway Capacity Manual, 6th Edition

STONEFIELD

Table A1
Comparative Level of Service (Delay) Tables
X (n) = Level of Service (seconds of delay)

Intersection	Lane Group	2022 Existing Condition		2024 No-Build Condition		2024 Build Condition	
		AM Peak LOS (Delay)	PM Peak LOS (Delay)	AM Peak LOS (Delay)	PM Peak LOS (Delay)	AM Peak LOS (Delay)	PM Peak LOS (Delay)
Interstate Route 78 EB Ramp (EB) and Liberty Corner Road (NB/SB)	EB Left	D (38.5)	D (41.0)	D (38.3)	D (41.1)	D (38.1)	D (41.2)
	EB Right	D (36.3)	D (40.7)	D (36.0)	D (40.8)	D (35.7)	D (40.8)
	NB Through	A (3.9)	A (2.3)	A (4.0)	A (2.3)	A (4.1)	A (2.3)
	SB Through	A (0.3)	A (7.0)	A (0.3)	A (7.1)	A (0.3)	A (7.2)
	Overall	B (11.8)	B (10.6)	B (11.8)	B (10.7)	B (11.7)	B (10.7)
Interstate Route 78 WB Ramp (WB) and Liberty Corner Road (NB/SB)	WB Left	C (28.9)	D (38.6)	C (28.4)	D (37.9)	C (27.0)	D (36.9)
	WB Right	D (47.2)	D (42.7)	D (48.6)	D (43.4)	D (52.6)	D (45.0)
	NB Through	A (3.5)	A (0.1)	A (3.9)	A (0.1)	A (4.7)	A (0.1)
	SB Through	A (0.3)	A (4.4)	A (0.4)	A (4.8)	A (0.4)	A (5.2)
	Overall	B (12.1)	B (12.3)	B (12.5)	B (12.6)	B (13.6)	B (12.7)
Allen Road/Driveway (EB/WB) and Liberty Corner Road (NB/SB)	EB Left/Through	D (37.4)	D (45.4)	D (37.5)	D (45.0)	D (37.8)	D (41.8)
	EB Right	C (31.4)	D (37.5)	C (31.6)	D (37.0)	C (28.3)	C (34.7)
	WB Left/through/Right	D (39.6)	D (37.5)	D (39.8)	D (37.1)	D (40.2)	C (34.3)
	NB Left	B (14.2)	A (8.3)	B (17.1)	A (9.1)	C (29.8)	B (12.9)
	NB Through	A (0.4)	A (6.0)	A (0.4)	A (6.3)	A (0.4)	A (7.8)
	NB Through/Right	A (0.4)	A (6.0)	A (0.4)	A (6.3)	A (0.4)	A (7.8)
	SB Left	A (7.5)	A (0.0)	A (7.7)	A (0.0)	A (9.3)	A (0.0)
	SB Through	B (13.6)	B (12.1)	B (14.3)	B (12.8)	B (17.8)	B (16.3)
	SB Through/Right	B (13.7)	B (12.1)	B (14.4)	B (12.9)	B (18.1)	B (16.3)
Overall	B (13.1)	B (16.1)	B (13.9)	B (16.5)	B (17.6)	B (18.7)	
Allen Road (EB/WB) and Site Driveway (NB)	WB Left	A (8.5)	A (8.2)	A (8.6)	A (8.3)	A (9.2)	A (8.5)
	NB Left/Right	A (0.0)	B (11.8)	A (0.0)	B (12.0)	C (16.4)	C (15.7)

TURNING MOVEMENT COUNT DATA



Imperial Traffic & Data Collection
www.imperialtdc.com
PO BOX 4637

Cherry Hill, New Jersey, United States 08034
609-706-6100 hfurey@imperialtdc.com

Project: Liberty Corner Road
Municipality: Bernards Twp, Somerset County,
NJ
Setup: GP
Location: 40.645524, -74.575684

Count Name: 1. Liberty Corner Road and Rt 78
EB Ramp
Site Code: 1
Start Date: 08/02/2022
Page No: 1

Turning Movement Data

Start Time	On/Off Ramp Eastbound						On Ramp Westbound						Liberty Crossing Road Northbound						Liberty Crossing Road Southbound						Int. Total
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	
7:00 AM	0	47	0	23	0	70	0	0	0	0	0	0	0	0	60	68	0	128	0	0	66	67	0	133	331
7:15 AM	0	70	0	29	0	99	0	0	0	0	0	0	0	0	88	74	0	162	0	0	84	66	0	150	411
7:30 AM	0	69	0	35	0	104	0	0	0	0	0	0	0	0	104	85	0	189	2	0	112	94	0	208	501
7:45 AM	0	85	0	44	0	129	0	0	0	0	0	0	0	0	116	69	0	185	0	0	149	66	0	215	529
Hourly Total	0	271	0	131	0	402	0	0	0	0	0	0	0	0	368	296	0	664	2	0	411	293	0	706	1772
8:00 AM	0	89	0	44	0	133	0	0	0	0	0	0	0	0	116	96	0	212	1	0	136	84	0	221	566
8:15 AM	0	64	0	30	0	94	0	0	0	0	0	0	0	0	121	101	0	222	0	0	138	96	0	234	550
8:30 AM	0	63	0	40	0	103	0	0	0	0	0	0	0	0	135	75	0	210	0	0	184	109	0	293	606
8:45 AM	0	85	0	48	0	133	0	0	0	0	0	0	0	0	126	81	0	207	1	0	242	96	0	339	679
Hourly Total	0	301	0	162	0	463	0	0	0	0	0	0	0	0	498	353	0	851	2	0	700	385	0	1087	2401
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	0	31	0	18	0	49	0	0	0	0	1	0	0	0	126	79	0	205	0	0	169	107	0	276	530
4:15 PM	0	31	0	21	0	52	0	0	0	0	1	0	0	0	112	78	0	190	0	0	156	100	0	256	498
4:30 PM	0	33	0	23	0	56	0	0	0	0	0	0	0	0	125	93	0	218	0	0	153	119	0	272	546
4:45 PM	0	32	0	24	0	56	0	0	0	0	0	0	0	0	85	83	0	168	0	0	155	107	0	262	486
Hourly Total	0	127	0	86	0	213	0	0	0	0	2	0	0	0	448	333	0	781	0	0	633	433	0	1066	2060
5:00 PM	0	24	0	18	0	42	0	0	0	0	0	0	0	0	143	100	0	243	0	0	143	137	0	280	565
5:15 PM	0	31	0	31	0	62	0	0	0	0	0	0	0	0	125	81	0	206	0	0	183	105	0	288	556
5:30 PM	0	35	0	16	0	51	0	0	0	0	0	0	0	0	112	94	0	206	1	0	206	110	0	317	574
5:45 PM	0	34	0	26	0	60	0	0	0	0	0	0	0	0	94	64	0	158	0	0	172	78	0	250	468
Hourly Total	0	124	0	91	0	215	0	0	0	0	0	0	0	0	474	339	0	813	1	0	704	430	0	1135	2163
6:00 PM	0	37	0	16	0	53	0	0	0	0	0	0	0	0	103	64	0	167	1	0	151	70	0	222	442
6:15 PM	0	37	0	23	0	60	0	0	0	0	0	0	0	0	90	41	0	131	3	0	157	68	0	228	419
6:30 PM	0	21	0	12	0	33	0	0	0	0	0	0	1	0	83	47	0	131	0	0	120	59	0	179	343
6:45 PM	0	29	0	14	0	43	0	0	0	0	0	0	0	0	75	43	0	118	1	0	143	55	0	199	360
Hourly Total	0	124	0	65	0	189	0	0	0	0	0	0	1	0	351	195	0	547	5	0	571	252	0	828	1564
Grand Total	0	947	0	535	0	1482	0	0	0	0	2	0	1	0	2139	1516	0	3656	10	0	3019	1793	0	4822	9960
Approach %	0.0	63.9	0.0	36.1	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	58.5	41.5	-	-	0.2	0.0	62.6	37.2	-	-	-
Total %	0.0	9.5	0.0	5.4	-	14.9	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	21.5	15.2	-	36.7	0.1	0.0	30.3	18.0	-	48.4	-
Lights	0	917	0	516	-	1433	0	0	0	0	-	0	1	0	2078	1498	-	3577	10	0	2944	1772	-	4726	9736
% Lights	-	96.8	-	96.4	-	96.7	-	-	-	-	-	-	100.0	-	97.1	98.8	-	97.8	100.0	-	97.5	98.8	-	98.0	97.8
Buses	0	9	0	5	-	14	0	0	0	0	-	0	0	0	17	10	-	27	0	0	16	2	-	18	59
% Buses	-	1.0	-	0.9	-	0.9	-	-	-	-	-	-	0.0	-	0.8	0.7	-	0.7	0.0	-	0.5	0.1	-	0.4	0.6
Trucks	0	21	0	14	-	35	0	0	0	0	-	0	0	0	44	8	-	52	0	0	59	19	-	78	165
% Trucks	-	2.2	-	2.6	-	2.4	-	-	-	-	-	-	0.0	-	2.1	0.5	-	1.4	0.0	-	2.0	1.1	-	1.6	1.7



Imperial Traffic & Data Collection
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PO BOX 4637

Cherry Hill, New Jersey, United States 08034
609-706-6100 hfurey@imperialtdc.com

Project: Liberty Corner Road
Municipality: Bernards Twp, Somerset County,
NJ
Setup: GP
Location: 40.645524, -74.575684

Count Name: 1. Liberty Corner Road and Rt 78
EB Ramp
Site Code: 1
Start Date: 08/02/2022
Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

Start Time	On/Off Ramp Eastbound						On Ramp Westbound						Liberty Crossing Road Northbound						Liberty Crossing Road Southbound						Int. Total
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	
8:00 AM	0	89	0	44	0	133	0	0	0	0	0	0	0	0	116	96	0	212	1	0	136	84	0	221	566
8:15 AM	0	64	0	30	0	94	0	0	0	0	0	0	0	0	121	101	0	222	0	0	138	96	0	234	550
8:30 AM	0	63	0	40	0	103	0	0	0	0	0	0	0	0	135	75	0	210	0	0	184	109	0	293	606
8:45 AM	0	85	0	48	0	133	0	0	0	0	0	0	0	0	126	81	0	207	1	0	242	96	0	339	679
Total	0	301	0	162	0	463	0	0	0	0	0	0	0	0	498	353	0	851	2	0	700	385	0	1087	2401
Approach %	0.0	65.0	0.0	35.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	58.5	41.5	-	-	0.2	0.0	64.4	35.4	-	-	-
Total %	0.0	12.5	0.0	6.7	-	19.3	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	20.7	14.7	-	35.4	0.1	0.0	29.2	16.0	-	45.3	-
PHF	0.000	0.846	0.000	0.844	-	0.870	0.000	0.000	0.000	0.000	-	0.000	0.000	0.000	0.922	0.874	-	0.958	0.500	0.000	0.723	0.883	-	0.802	0.884
Lights	0	290	0	158	-	448	0	0	0	0	-	0	0	0	478	350	-	828	2	0	684	381	-	1067	2343
% Lights	-	96.3	-	97.5	-	96.8	-	-	-	-	-	-	-	-	96.0	99.2	-	97.3	100.0	-	97.7	99.0	-	98.2	97.6
Buses	0	1	0	1	-	2	0	0	0	0	-	0	0	0	8	0	-	8	0	0	3	1	-	4	14
% Buses	-	0.3	-	0.6	-	0.4	-	-	-	-	-	-	-	-	1.6	0.0	-	0.9	0.0	-	0.4	0.3	-	0.4	0.6
Trucks	0	10	0	3	-	13	0	0	0	0	-	0	0	0	12	3	-	15	0	0	13	3	-	16	44
% Trucks	-	3.3	-	1.9	-	2.8	-	-	-	-	-	-	-	-	2.4	0.8	-	1.8	0.0	-	1.9	0.8	-	1.5	1.8
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Imperial Traffic & Data Collection
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609-706-6100 hfurey@imperialtdc.com

Project: Liberty Corner Road
Municipality: Bernards Twp, Somerset County,
NJ
Setup: GP
Location: 40.645524, -74.575684

Count Name: 1. Liberty Corner Road and Rt 78
EB Ramp
Site Code: 1
Start Date: 08/02/2022
Page No: 6

Turning Movement Peak Hour Data (4:45 PM)

Start Time	On/Off Ramp Eastbound						On Ramp Westbound						Liberty Crossing Road Northbound						Liberty Crossing Road Southbound						Int. Total
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	
4:45 PM	0	32	0	24	0	56	0	0	0	0	0	0	0	0	85	83	0	168	0	0	155	107	0	262	486
5:00 PM	0	24	0	18	0	42	0	0	0	0	0	0	0	0	143	100	0	243	0	0	143	137	0	280	565
5:15 PM	0	31	0	31	0	62	0	0	0	0	0	0	0	0	125	81	0	206	0	0	183	105	0	288	556
5:30 PM	0	35	0	16	0	51	0	0	0	0	0	0	0	0	112	94	0	206	1	0	206	110	0	317	574
Total	0	122	0	89	0	211	0	0	0	0	0	0	0	0	465	358	0	823	1	0	687	459	0	1147	2181
Approach %	0.0	57.8	0.0	42.2	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	56.5	43.5	-	-	0.1	0.0	59.9	40.0	-	-	-
Total %	0.0	5.6	0.0	4.1	-	9.7	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	21.3	16.4	-	37.7	0.0	0.0	31.5	21.0	-	52.6	-
PHF	0.000	0.871	0.000	0.718	-	0.851	0.000	0.000	0.000	0.000	-	0.000	0.000	0.000	0.813	0.895	-	0.847	0.250	0.000	0.834	0.838	-	0.905	0.950
Lights	0	118	0	89	-	207	0	0	0	0	-	0	0	0	462	356	-	818	1	0	672	451	-	1124	2149
% Lights	-	96.7	-	100.0	-	98.1	-	-	-	-	-	-	-	-	99.4	99.4	-	99.4	100.0	-	97.8	98.3	-	98.0	98.5
Buses	0	1	0	0	-	1	0	0	0	0	-	0	0	0	2	0	-	2	0	0	10	1	-	11	14
% Buses	-	0.8	-	0.0	-	0.5	-	-	-	-	-	-	-	-	0.4	0.0	-	0.2	0.0	-	1.5	0.2	-	1.0	0.6
Trucks	0	3	0	0	-	3	0	0	0	0	-	0	0	0	1	2	-	3	0	0	5	7	-	12	18
% Trucks	-	2.5	-	0.0	-	1.4	-	-	-	-	-	-	-	-	0.2	0.6	-	0.4	0.0	-	0.7	1.5	-	1.0	0.8
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Imperial Traffic & Data Collection
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Count Name: 2. Liberty Corner Road and Rt 78
 WB Ramp
 Site Code: 2
 Start Date: 08/02/2022
 Page No: 1

Project: Liberty Corner Road
 Municipality: Berlin, Camden County, NJ
 Setup: GP
 Location: 40.648193, -74.575188

Turning Movement Data

Start Time	On Ramp Eastbound						On/Off Ramp Westbound						Liberty Corner Road Northbound						Liberty Corner Road Southbound						Int. Total
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	
7:00 AM	0	0	0	0	0	0	0	21	0	60	0	81	0	0	92	9	0	101	0	0	110	30	0	140	322
7:15 AM	0	0	0	0	0	0	0	40	0	75	0	115	0	0	149	17	0	166	0	0	108	32	0	140	421
7:30 AM	0	0	0	0	0	0	0	51	0	96	0	147	0	0	155	21	0	176	0	0	162	64	0	226	549
7:45 AM	0	0	0	0	0	0	0	71	0	101	0	172	0	0	178	21	0	199	0	0	149	45	0	194	565
Hourly Total	0	0	0	0	0	0	0	183	0	332	0	515	0	0	574	68	0	642	0	0	529	171	0	700	1857
8:00 AM	0	0	0	0	0	0	0	58	0	111	0	169	0	0	194	19	0	213	0	0	158	47	0	205	587
8:15 AM	0	0	0	0	0	0	0	61	0	104	0	165	0	0	150	27	0	177	0	0	173	48	0	221	563
8:30 AM	0	0	0	0	0	0	0	81	0	143	0	224	0	0	183	28	0	211	0	0	219	45	0	264	699
8:45 AM	0	0	0	0	0	0	0	81	0	96	0	177	0	0	198	27	0	225	0	0	247	28	0	275	677
Hourly Total	0	0	0	0	0	0	0	281	0	454	0	735	0	0	725	101	0	826	0	0	797	168	0	965	2526
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	0	0	0	1	0	1	0	58	0	71	0	129	0	0	123	36	0	159	0	0	212	106	0	318	607
4:15 PM	0	0	0	0	0	0	0	61	0	63	0	124	0	0	108	34	0	142	0	0	199	86	0	285	551
4:30 PM	0	0	0	0	0	0	0	59	0	79	0	138	0	0	118	36	0	154	0	0	227	82	0	309	601
4:45 PM	0	0	0	0	0	0	0	57	0	80	0	137	0	0	99	29	0	128	0	0	208	78	0	286	551
Hourly Total	0	0	0	1	0	1	0	235	0	293	0	528	0	0	448	135	0	583	0	0	846	352	0	1198	2310
5:00 PM	0	0	0	0	0	0	0	55	0	96	0	151	0	0	110	55	0	165	0	0	228	89	0	317	633
5:15 PM	0	0	0	1	0	1	0	71	0	105	0	176	0	0	109	47	0	156	0	0	227	80	0	307	640
5:30 PM	0	0	0	0	0	0	0	100	0	107	0	207	0	0	117	36	0	153	0	0	220	56	0	276	636
5:45 PM	0	0	0	0	0	0	0	72	0	99	0	171	0	0	104	33	0	137	0	0	180	54	0	234	542
Hourly Total	0	0	0	1	0	1	0	298	0	407	0	705	0	0	440	171	0	611	0	0	855	279	0	1134	2451
6:00 PM	0	0	0	0	0	0	0	71	0	127	0	198	0	0	115	26	0	141	0	0	157	40	0	197	536
6:15 PM	0	0	0	0	0	0	0	77	0	133	0	210	1	0	114	17	0	132	1	0	154	35	0	190	532
6:30 PM	0	0	0	0	0	0	0	56	0	141	0	197	0	0	89	17	0	106	0	0	120	35	0	155	458
6:45 PM	0	0	0	0	0	0	0	69	0	99	0	168	0	0	86	16	0	102	0	0	122	33	0	155	425
Hourly Total	0	0	0	0	0	0	0	273	0	500	0	773	1	0	404	76	0	481	1	0	553	143	0	697	1951
Grand Total	0	0	0	2	0	2	0	1270	0	1986	0	3256	1	0	2591	551	0	3143	1	0	3580	1113	0	4694	11095
Approach %	0.0	0.0	0.0	100.0	-	-	0.0	39.0	0.0	61.0	-	-	0.0	0.0	82.4	17.5	-	-	0.0	0.0	76.3	23.7	-	-	-
Total %	0.0	0.0	0.0	0.0	-	0.0	0.0	11.4	0.0	17.9	-	29.3	0.0	0.0	23.4	5.0	-	28.3	0.0	0.0	32.3	10.0	-	42.3	-
Lights	0	0	0	2	-	2	0	1235	0	1954	-	3189	1	0	2524	523	-	3048	1	0	3517	1095	-	4613	10852
% Lights	-	-	-	100.0	-	100.0	-	97.2	-	98.4	-	97.9	100.0	-	97.4	94.9	-	97.0	100.0	-	98.2	98.4	-	98.3	97.8
Buses	0	0	0	0	-	0	0	10	0	1	-	11	0	0	21	3	-	24	0	0	9	5	-	14	49
% Buses	-	-	-	0.0	-	0.0	-	0.8	-	0.1	-	0.3	0.0	-	0.8	0.5	-	0.8	0.0	-	0.3	0.4	-	0.3	0.4
Trucks	0	0	0	0	-	0	0	25	0	31	-	56	0	0	46	25	-	71	0	0	54	13	-	67	194
% Trucks	-	-	-	0.0	-	0.0	-	2.0	-	1.6	-	1.7	0.0	-	1.8	4.5	-	2.3	0.0	-	1.5	1.2	-	1.4	1.7



Imperial Traffic & Data Collection

www.imperialtdc.com

PO BOX 4637

Cherry Hill, New Jersey, United States 08034

609-706-6100 hfurey@imperialtdc.com

Count Name: 2. Liberty Corner Road and Rt 78

WB Ramp

Site Code: 2

Start Date: 08/02/2022

Page No: 4

Project: Liberty Corner Road
 Municipality: Berlin, Camden County, NJ
 Setup: GP
 Location: 40.648193, -74.575188

Turning Movement Peak Hour Data (8:00 AM)

Start Time	On Ramp Eastbound						On/Off Ramp Westbound						Liberty Corner Road Northbound						Liberty Corner Road Southbound						Int. Total
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	
8:00 AM	0	0	0	0	0	0	0	58	0	111	0	169	0	0	194	19	0	213	0	0	158	47	0	205	587
8:15 AM	0	0	0	0	0	0	0	61	0	104	0	165	0	0	150	27	0	177	0	0	173	48	0	221	563
8:30 AM	0	0	0	0	0	0	0	81	0	143	0	224	0	0	183	28	0	211	0	0	219	45	0	264	699
8:45 AM	0	0	0	0	0	0	0	81	0	96	0	177	0	0	198	27	0	225	0	0	247	28	0	275	677
Total	0	0	0	0	0	0	0	281	0	454	0	735	0	0	725	101	0	826	0	0	797	168	0	965	2526
Approach %	0.0	0.0	0.0	0.0	-	-	0.0	38.2	0.0	61.8	-	-	0.0	0.0	87.8	12.2	-	-	0.0	0.0	82.6	17.4	-	-	-
Total %	0.0	0.0	0.0	0.0	-	0.0	0.0	11.1	0.0	18.0	-	29.1	0.0	0.0	28.7	4.0	-	32.7	0.0	0.0	31.6	6.7	-	38.2	-
PHF	0.000	0.000	0.000	0.000	-	0.000	0.000	0.867	0.000	0.794	-	0.820	0.000	0.000	0.915	0.902	-	0.918	0.000	0.000	0.807	0.875	-	0.877	0.903
Lights	0	0	0	0	-	0	0	273	0	447	-	720	0	0	704	88	-	792	0	0	786	160	-	946	2458
% Lights	-	-	-	-	-	-	-	97.2	-	98.5	-	98.0	-	-	97.1	87.1	-	95.9	-	-	98.6	95.2	-	98.0	97.3
Buses	0	0	0	0	-	0	0	2	0	0	-	2	0	0	6	2	-	8	0	0	2	1	-	3	13
% Buses	-	-	-	-	-	-	-	0.7	-	0.0	-	0.3	-	-	0.8	2.0	-	1.0	-	-	0.3	0.6	-	0.3	0.5
Trucks	0	0	0	0	-	0	0	6	0	7	-	13	0	0	15	11	-	26	0	0	9	7	-	16	55
% Trucks	-	-	-	-	-	-	-	2.1	-	1.5	-	1.8	-	-	2.1	10.9	-	3.1	-	-	1.1	4.2	-	1.7	2.2
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Imperial Traffic & Data Collection

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PO BOX 4637

Cherry Hill, New Jersey, United States 08034

609-706-6100 hfurey@imperialtdc.com

Count Name: 2. Liberty Corner Road and Rt 78

WB Ramp

Site Code: 2

Start Date: 08/02/2022

Page No: 6

Project: Liberty Corner Road
 Municipality: Berlin, Camden County, NJ
 Setup: GP
 Location: 40.648193, -74.575188

Turning Movement Peak Hour Data (4:45 PM)

Start Time	On Ramp Eastbound						On/Off Ramp Westbound						Liberty Corner Road Northbound						Liberty Corner Road Southbound						Int. Total
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	
4:45 PM	0	0	0	0	0	0	0	57	0	80	0	137	0	0	99	29	0	128	0	0	208	78	0	286	551
5:00 PM	0	0	0	0	0	0	0	55	0	96	0	151	0	0	110	55	0	165	0	0	228	89	0	317	633
5:15 PM	0	0	0	1	0	1	0	71	0	105	0	176	0	0	109	47	0	156	0	0	227	80	0	307	640
5:30 PM	0	0	0	0	0	0	0	100	0	107	0	207	0	0	117	36	0	153	0	0	220	56	0	276	636
Total	0	0	0	1	0	1	0	283	0	388	0	671	0	0	435	167	0	602	0	0	883	303	0	1186	2460
Approach %	0.0	0.0	0.0	100.0	-	-	0.0	42.2	0.0	57.8	-	-	0.0	0.0	72.3	27.7	-	-	0.0	0.0	74.5	25.5	-	-	-
Total %	0.0	0.0	0.0	0.0	-	0.0	0.0	11.5	0.0	15.8	-	27.3	0.0	0.0	17.7	6.8	-	24.5	0.0	0.0	35.9	12.3	-	48.2	-
PHF	0.000	0.000	0.000	0.250	-	0.250	0.000	0.708	0.000	0.907	-	0.810	0.000	0.000	0.929	0.759	-	0.912	0.000	0.000	0.968	0.851	-	0.935	0.961
Lights	0	0	0	1	-	1	0	273	0	385	-	658	0	0	430	164	-	594	0	0	870	299	-	1169	2422
% Lights	-	-	-	100.0	-	100.0	-	96.5	-	99.2	-	98.1	-	-	98.9	98.2	-	98.7	-	-	98.5	98.7	-	98.6	98.5
Buses	0	0	0	0	-	0	0	7	0	0	-	7	0	0	2	1	-	3	0	0	5	2	-	7	17
% Buses	-	-	-	0.0	-	0.0	-	2.5	-	0.0	-	1.0	-	-	0.5	0.6	-	0.5	-	-	0.6	0.7	-	0.6	0.7
Trucks	0	0	0	0	-	0	0	3	0	3	-	6	0	0	3	2	-	5	0	0	8	2	-	10	21
% Trucks	-	-	-	0.0	-	0.0	-	1.1	-	0.8	-	0.9	-	-	0.7	1.2	-	0.8	-	-	0.9	0.7	-	0.8	0.9
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



TRAFFIC & DATA COLLECTION

Imperial Traffic & Data Collection
www.imperialtdc.com
PO BOX 4637

Cherry Hill, New Jersey, United States 08034
609-706-6100 hfurey@imperialtdc.com

Project: Liberty Corner Road
Municipality: Bernards Twp, Somerset County,
NJ
Setup: GP
Location: 40.655745, -74.576435

Count Name: 3. Liberty Corner Road and Allen
Road
Site Code: 3
Start Date: 08/02/2022
Page No: 1

Turning Movement Data

Start Time	Allen Road Eastbound						Buisness Driveway Westbound						Liberty Corner Road Northbound						Liberty Corner Road Southbound						Int. Total
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	
7:00 AM	0	14	0	50	0	64	0	0	0	0	0	0	0	39	86	1	0	126	0	0	103	19	0	122	312
7:15 AM	0	17	0	55	0	72	0	2	1	1	0	4	0	48	141	0	0	189	0	0	95	22	0	117	382
7:30 AM	0	27	1	77	0	105	0	4	0	4	0	8	0	57	143	1	0	201	0	0	145	28	0	173	487
7:45 AM	0	21	0	49	0	70	0	0	0	1	0	1	0	70	145	0	0	215	0	0	162	48	0	210	496
Hourly Total	0	79	1	231	0	311	0	6	1	6	0	13	0	214	515	2	0	731	0	0	505	117	0	622	1677
8:00 AM	0	17	0	67	0	84	0	1	0	0	0	1	0	93	139	1	0	233	0	0	151	45	0	196	514
8:15 AM	0	30	0	74	0	104	0	1	0	0	0	1	0	82	110	0	0	192	0	1	174	48	0	223	520
8:30 AM	0	33	0	95	0	128	0	2	0	0	0	2	0	76	168	0	0	244	0	0	208	53	0	261	635
8:45 AM	0	26	1	86	0	113	0	2	0	0	0	2	0	70	146	1	0	217	0	0	227	63	0	290	622
Hourly Total	0	106	1	322	0	429	0	6	0	0	0	6	0	321	563	2	0	886	0	1	760	209	0	970	2291
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	0	30	0	85	0	115	0	1	0	0	0	1	0	43	167	3	0	213	0	1	161	21	0	183	512
4:15 PM	0	33	0	83	0	116	0	7	0	1	0	8	0	38	140	0	0	178	0	0	152	26	0	178	480
4:30 PM	0	58	0	74	0	132	0	4	0	2	0	6	0	61	135	2	1	198	0	1	170	29	0	200	536
4:45 PM	0	44	0	82	0	126	0	0	0	0	0	0	0	40	140	0	0	180	0	0	155	38	0	193	499
Hourly Total	0	165	0	324	0	489	0	12	0	3	0	15	0	182	582	5	1	769	0	2	638	114	0	754	2027
5:00 PM	0	51	0	90	0	141	0	3	1	0	0	4	0	56	169	0	0	225	0	0	151	37	0	188	558
5:15 PM	0	58	0	91	0	149	0	0	0	0	0	0	0	66	149	0	0	215	0	0	167	30	0	197	561
5:30 PM	0	48	0	87	0	135	0	0	0	0	0	0	0	75	155	0	0	230	0	0	137	27	0	164	529
5:45 PM	0	36	0	56	0	92	0	0	0	0	0	0	0	48	174	0	0	222	0	0	134	23	0	157	471
Hourly Total	0	193	0	324	0	517	0	3	1	0	0	4	0	245	647	0	0	892	0	0	589	117	0	706	2119
6:00 PM	0	41	0	53	0	94	0	0	0	0	0	0	0	71	163	0	0	234	0	0	101	26	0	127	455
6:15 PM	0	32	0	51	0	83	0	0	0	0	0	0	0	95	166	0	0	261	0	0	99	28	0	127	471
6:30 PM	0	31	0	49	0	80	0	0	0	0	0	0	0	94	133	0	0	227	0	0	87	29	0	116	423
6:45 PM	0	20	0	47	0	67	0	0	0	1	0	1	0	69	133	0	0	202	0	1	98	18	0	117	387
Hourly Total	0	124	0	200	0	324	0	0	0	1	0	1	0	329	595	0	0	924	0	1	385	101	0	487	1736
Grand Total	0	667	2	1401	0	2070	0	27	2	10	0	39	0	1291	2902	9	1	4202	0	4	2877	658	0	3539	9850
Approach %	0.0	32.2	0.1	67.7	-	-	0.0	69.2	5.1	25.6	-	-	0.0	30.7	69.1	0.2	-	-	0.0	0.1	81.3	18.6	-	-	-
Total %	0.0	6.8	0.0	14.2	-	21.0	0.0	0.3	0.0	0.1	-	0.4	0.0	13.1	29.5	0.1	-	42.7	0.0	0.0	29.2	6.7	-	35.9	-
Lights	0	657	2	1385	-	2044	0	22	2	9	-	33	0	1273	2823	6	-	4102	0	3	2815	640	-	3458	9637
% Lights	-	98.5	100.0	98.9	-	98.7	-	81.5	100.0	90.0	-	84.6	-	98.6	97.3	66.7	-	97.6	-	75.0	97.8	97.3	-	97.7	97.8
Buses	0	7	0	0	-	7	0	0	0	0	-	0	0	1	22	0	-	23	0	0	16	6	-	22	52
% Buses	-	1.0	0.0	0.0	-	0.3	-	0.0	0.0	0.0	-	0.0	-	0.1	0.8	0.0	-	0.5	-	0.0	0.6	0.9	-	0.6	0.5
Trucks	0	3	0	16	-	19	0	5	0	1	-	6	0	17	57	3	-	77	0	1	46	12	-	59	161
% Trucks	-	0.4	0.0	1.1	-	0.9	-	18.5	0.0	10.0	-	15.4	-	1.3	2.0	33.3	-	1.8	-	25.0	1.6	1.8	-	1.7	1.6



Imperial Traffic & Data Collection
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Project: Liberty Corner Road
 Municipality: Bernards Twp, Somerset County,
 NJ
 Setup: GP
 Location: 40.655745, -74.576435

Count Name: 3. Liberty Corner Road and Allen
 Road
 Site Code: 3
 Start Date: 08/02/2022
 Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

Start Time	Allen Road Eastbound						Buisness Driveway Westbound						Liberty Corner Road Northbound						Liberty Corner Road Southbound						Int. Total
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	
8:00 AM	0	17	0	67	0	84	0	1	0	0	0	1	0	93	139	1	0	233	0	0	151	45	0	196	514
8:15 AM	0	30	0	74	0	104	0	1	0	0	0	1	0	82	110	0	0	192	0	1	174	48	0	223	520
8:30 AM	0	33	0	95	0	128	0	2	0	0	0	2	0	76	168	0	0	244	0	0	208	53	0	261	635
8:45 AM	0	26	1	86	0	113	0	2	0	0	0	2	0	70	146	1	0	217	0	0	227	63	0	290	622
Total	0	106	1	322	0	429	0	6	0	0	0	6	0	321	563	2	0	886	0	1	760	209	0	970	2291
Approach %	0.0	24.7	0.2	75.1	-	-	0.0	100.0	0.0	0.0	-	-	0.0	36.2	63.5	0.2	-	-	0.0	0.1	78.4	21.5	-	-	-
Total %	0.0	4.6	0.0	14.1	-	18.7	0.0	0.3	0.0	0.0	-	0.3	0.0	14.0	24.6	0.1	-	38.7	0.0	0.0	33.2	9.1	-	42.3	-
PHF	0.000	0.803	0.250	0.847	-	0.838	0.000	0.750	0.000	0.000	-	0.750	0.000	0.863	0.838	0.500	-	0.908	0.000	0.250	0.837	0.829	-	0.836	0.902
Lights	0	101	1	319	-	421	0	5	0	0	-	5	0	313	542	2	-	857	0	1	746	201	-	948	2231
% Lights	-	95.3	100.0	99.1	-	98.1	-	83.3	-	-	-	83.3	-	97.5	96.3	100.0	-	96.7	-	100.0	98.2	96.2	-	97.7	97.4
Buses	0	4	0	0	-	4	0	0	0	0	-	0	0	1	7	0	-	8	0	0	4	5	-	9	21
% Buses	-	3.8	0.0	0.0	-	0.9	-	0.0	-	-	-	0.0	-	0.3	1.2	0.0	-	0.9	-	0.0	0.5	2.4	-	0.9	0.9
Trucks	0	1	0	3	-	4	0	1	0	0	-	1	0	7	14	0	-	21	0	0	10	3	-	13	39
% Trucks	-	0.9	0.0	0.9	-	0.9	-	16.7	-	-	-	16.7	-	2.2	2.5	0.0	-	2.4	-	0.0	1.3	1.4	-	1.3	1.7
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

3. Liberty Corner Road and Allen Road - TMC

Provided by: Imperial Traffic & Data Collection

Tue Aug 2, 2022

PO Box 4637, Cherry Hill, NJ, 08003, US

Forced Peak (4:45 PM - 5:45 PM)

All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 976145, Location: 40.655745, -74.576435, Site Code: 3

Leg Direction	Allen Road Eastbound						Buisness Driveway Westbound						Liberty Corner Road Northbound						Liberty Corner Road Southbound						Int
	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	
Time																									
2022-08-02 4:45PM	44	0	82	0	126	0	0	0	0	0	0	0	40	140	0	0	180	0	0	155	38	0	193	0	499
5:00PM	51	0	90	0	141	0	3	1	0	0	4	0	56	169	0	0	225	0	0	151	37	0	188	0	558
5:15PM	58	0	91	0	149	0	0	0	0	0	0	0	66	149	0	0	215	0	0	167	30	0	197	0	561
5:30PM	48	0	87	0	135	0	0	0	0	0	0	0	75	155	0	0	230	0	0	137	27	0	164	0	529
Total	201	0	350	0	551	0	3	1	0	0	4	0	237	613	0	0	850	0	0	610	132	0	742	0	2147
% Approach	36.5%	0%	63.5%	0%	-	-	75.0%	25.0%	0%	0%	-	-	27.9%	72.1%	0%	0%	-	-	0%	82.2%	17.8%	0%	-	-	-
% Total	9.4%	0%	16.3%	0%	25.7%	-	0.1%	0%	0%	0%	0.2%	-	11.0%	28.6%	0%	0%	39.6%	-	0%	28.4%	6.1%	0%	34.6%	-	-
PHF	0.866	-	0.962	-	0.924	-	0.250	0.250	-	-	0.250	-	0.790	0.907	-	-	0.924	-	-	0.913	0.868	-	0.942	-	0.957
Lights	200	0	346	0	546	-	3	1	0	0	4	-	236	609	0	0	845	-	0	594	130	0	724	-	2119
% Lights	99.5%	0%	98.9%	0%	99.1%	-	100%	100%	0%	0%	100%	-	99.6%	99.3%	0%	0%	99.4%	-	0%	97.4%	98.5%	0%	97.6%	-	98.7%
Articulated Trucks and Single-Unit Trucks	0	0	4	0	4	-	0	0	0	0	0	-	1	2	0	0	3	-	0	9	1	0	10	-	17
% Articulated Trucks and Single-Unit Trucks	0%	0%	1.1%	0%	0.7%	-	0%	0%	0%	0%	0%	-	0.4%	0.3%	0%	0%	0.4%	-	0%	1.5%	0.8%	0%	1.3%	-	0.8%
Buses	1	0	0	0	1	-	0	0	0	0	0	-	0	2	0	0	2	-	0	7	1	0	8	-	11
% Buses	0.5%	0%	0%	0%	0.2%	-	0%	0%	0%	0%	0%	-	0%	0.3%	0%	0%	0.2%	-	0%	1.1%	0.8%	0%	1.1%	-	0.5%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn



TRAFFIC & DATA COLLECTION

Imperial Traffic & Data Collection

www.imperialtdc.com

PO BOX 4637

Cherry Hill, New Jersey, United States 08034

609-706-6100 hfurey@imperialtdc.com

Project: Liberty Corner Road
 Municipality: Bernards Twp, Somerset County,
 NJ
 Setup: GP
 Location: 40.649909, -74.587291

Count Name: 5. Allen Road and Site Driveway
 Site Code: 5
 Start Date: 08/02/2022
 Page No: 1

Turning Movement Data

Start Time	Allen Road Eastbound					Allen Road Westbound					Site Driveway Northbound					Int. Total
	U-Turn	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Peds	App. Total	U-Turn	Left	Right	Peds	App. Total	
7:00 AM	0	40	0	0	40	0	2	16	0	18	0	0	0	0	0	58
7:15 AM	0	60	3	0	63	0	2	20	0	22	0	1	0	0	1	86
7:30 AM	0	85	1	0	86	0	2	32	0	34	0	0	0	0	0	120
7:45 AM	0	64	1	0	65	0	4	34	0	38	0	0	0	0	0	103
Hourly Total	0	249	5	0	254	0	10	102	0	112	0	1	0	0	1	367
8:00 AM	0	81	1	0	82	0	6	47	0	53	0	0	0	0	0	135
8:15 AM	0	109	3	0	112	0	4	40	0	44	0	0	0	0	0	156
8:30 AM	0	117	4	0	121	0	6	59	0	65	0	0	0	0	0	186
8:45 AM	0	119	2	0	121	0	4	56	0	60	0	0	0	0	0	181
Hourly Total	0	426	10	0	436	0	20	202	0	222	0	0	0	0	0	658
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	0	59	1	0	60	0	0	64	0	64	0	1	5	0	6	130
4:15 PM	0	61	0	0	61	0	2	67	0	69	0	0	4	0	4	134
4:30 PM	0	68	0	0	68	0	0	83	0	83	0	1	4	0	5	156
4:45 PM	0	62	0	0	62	0	0	73	0	73	0	2	3	0	5	140
Hourly Total	0	250	1	0	251	0	2	287	0	289	0	4	16	0	20	560
5:00 PM	0	49	0	0	49	0	1	97	0	98	0	2	5	0	7	154
5:15 PM	0	77	0	0	77	0	0	97	0	97	0	1	4	0	5	179
5:30 PM	0	85	0	0	85	0	3	86	0	89	0	1	1	0	2	176
5:45 PM	0	63	1	0	64	1	0	84	0	85	0	3	1	0	4	153
Hourly Total	0	274	1	0	275	1	4	364	0	369	0	7	11	0	18	662
6:00 PM	0	56	0	0	56	0	0	101	0	101	0	0	1	0	1	158
6:15 PM	0	59	0	0	59	0	0	112	0	112	0	1	3	0	4	175
6:30 PM	0	61	0	0	61	0	0	113	0	113	0	0	0	0	0	174
6:45 PM	0	52	0	0	52	0	0	95	0	95	0	0	2	0	2	149
Hourly Total	0	228	0	0	228	0	0	421	0	421	0	1	6	0	7	656
Grand Total	0	1427	17	0	1444	1	36	1376	0	1413	0	13	33	0	46	2903
Approach %	0.0	98.8	1.2	-	-	0.1	2.5	97.4	-	-	0.0	28.3	71.7	-	-	-
Total %	0.0	49.2	0.6	-	49.7	0.0	1.2	47.4	-	48.7	0.0	0.4	1.1	-	1.6	-
Lights	0	1410	17	-	1427	1	35	1349	-	1385	0	13	33	-	46	2858
% Lights	-	98.8	100.0	-	98.8	100.0	97.2	98.0	-	98.0	-	100.0	100.0	-	100.0	98.4
Buses	0	7	0	-	7	0	0	8	-	8	0	0	0	-	0	15
% Buses	-	0.5	0.0	-	0.5	0.0	0.0	0.6	-	0.6	-	0.0	0.0	-	0.0	0.5
Trucks	0	10	0	-	10	0	1	19	-	20	0	0	0	-	0	30
% Trucks	-	0.7	0.0	-	0.7	0.0	2.8	1.4	-	1.4	-	0.0	0.0	-	0.0	1.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-



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Project: Liberty Corner Road
 Municipality: Bernards Twp, Somerset County,
 NJ
 Setup: GP
 Location: 40.649909, -74.587291

Count Name: 5. Allen Road and Site Driveway
 Site Code: 5
 Start Date: 08/02/2022
 Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

Start Time	Allen Road Eastbound					Allen Road Westbound					Site Driveway Northbound					Int. Total
	U-Turn	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Peds	App. Total	U-Turn	Left	Right	Peds	App. Total	
8:00 AM	0	81	1	0	82	0	6	47	0	53	0	0	0	0	0	135
8:15 AM	0	109	3	0	112	0	4	40	0	44	0	0	0	0	0	156
8:30 AM	0	117	4	0	121	0	6	59	0	65	0	0	0	0	0	186
8:45 AM	0	119	2	0	121	0	4	56	0	60	0	0	0	0	0	181
Total	0	426	10	0	436	0	20	202	0	222	0	0	0	0	0	658
Approach %	0.0	97.7	2.3	-	-	0.0	9.0	91.0	-	-	0.0	0.0	0.0	-	-	-
Total %	0.0	64.7	1.5	-	66.3	0.0	3.0	30.7	-	33.7	0.0	0.0	0.0	-	0.0	-
PHF	0.000	0.895	0.625	-	0.901	0.000	0.833	0.856	-	0.854	0.000	0.000	0.000	-	0.000	0.884
Lights	0	420	10	-	430	0	20	187	-	207	0	0	0	-	0	637
% Lights	-	98.6	100.0	-	98.6	-	100.0	92.6	-	93.2	-	-	-	-	-	96.8
Buses	0	4	0	-	4	0	0	6	-	6	0	0	0	-	0	10
% Buses	-	0.9	0.0	-	0.9	-	0.0	3.0	-	2.7	-	-	-	-	-	1.5
Trucks	0	2	0	-	2	0	0	9	-	9	0	0	0	-	0	11
% Trucks	-	0.5	0.0	-	0.5	-	0.0	4.5	-	4.1	-	-	-	-	-	1.7
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

5. Allen Road and Site Driveway - TMC

Tue Aug 2, 2022

Forced Peak (4:45 PM - 5:45 PM)

All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 976150, Location: 40.649909, -74.587291, Site Code: 5

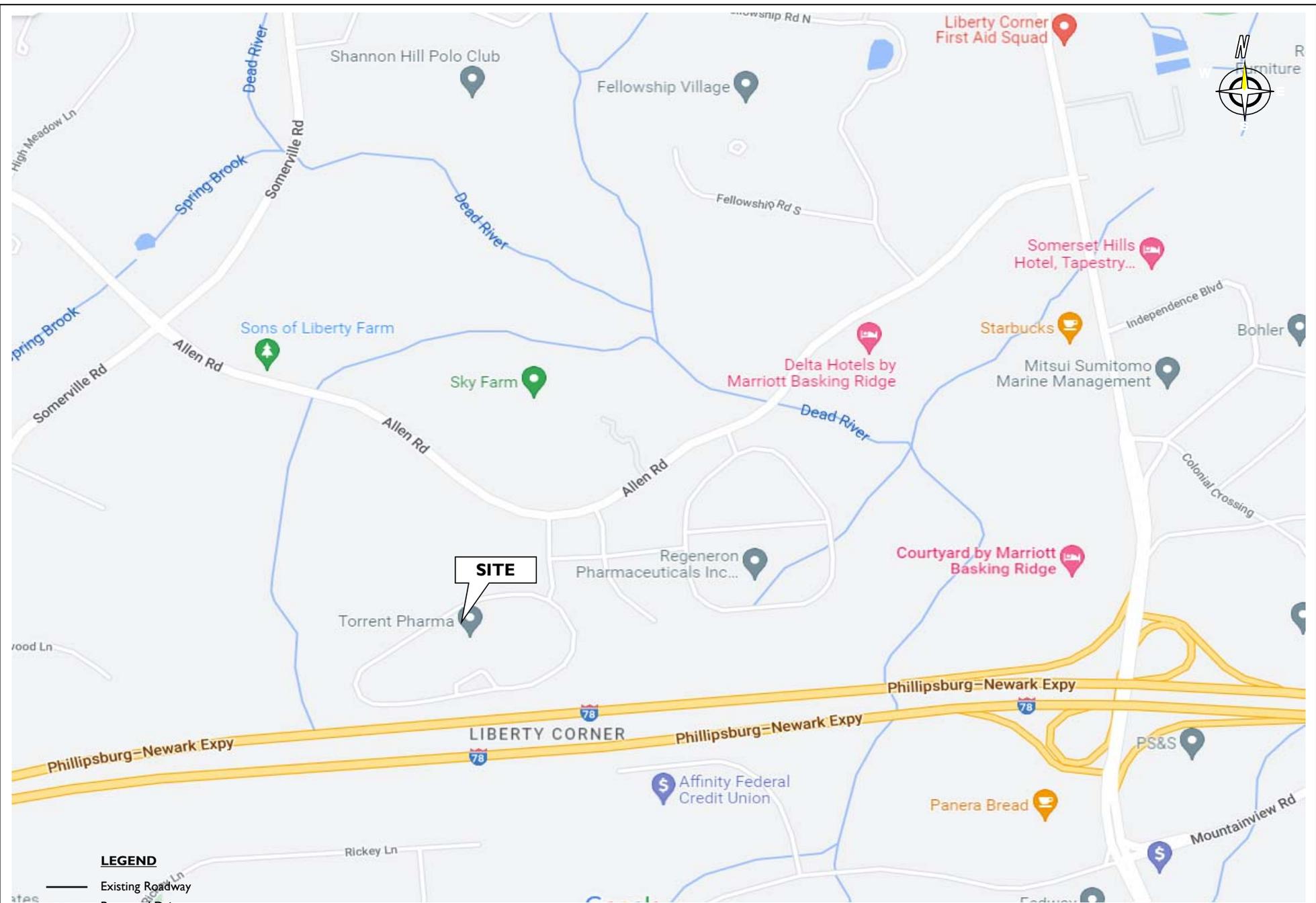
Provided by: Imperial Traffic & Data Collection

PO Box 4637, Cherry Hill, NJ, 08003, US

Leg Direction	Allen Road Eastbound					Allen Road Westbound					Site Driveway Northbound					
Time	T	R	U	App	Ped*	L	T	U	App	Ped*	L	R	U	App	Ped*	Int
2022-08-02 4:45PM	62	0	0	62	0	0	73	0	73	0	2	3	0	5	0	140
5:00PM	49	0	0	49	0	1	97	0	98	0	2	5	0	7	0	154
5:15PM	77	0	0	77	0	0	97	0	97	0	1	4	0	5	0	179
5:30PM	85	0	0	85	0	3	86	0	89	0	1	1	0	2	0	176
Total	273	0	0	273	0	4	353	0	357	0	6	13	0	19	0	649
% Approach	100%	0%	0%	-	-	1.1%	98.9%	0%	-	-	31.6%	68.4%	0%	-	-	-
% Total	42.1%	0%	0%	42.1%	-	0.6%	54.4%	0%	55.0%	-	0.9%	2.0%	0%	2.9%	-	-
PHF	0.803	-	-	0.803	-	0.333	0.910	-	0.911	-	0.750	0.650	-	0.679	-	0.906
Lights	270	0	0	270	-	3	351	0	354	-	6	13	0	19	-	643
% Lights	98.9%	0%	0%	98.9%	-	75.0%	99.4%	0%	99.2%	-	100%	100%	0%	100%	-	99.1%
Articulated Trucks and Single-Unit Trucks	3	0	0	3	-	1	0	0	1	-	0	0	0	0	-	4
% Articulated Trucks and Single-Unit Trucks	1.1%	0%	0%	1.1%	-	25.0%	0%	0%	0.3%	-	0%	0%	0%	0%	-	0.6%
Buses	0	0	0	0	-	0	2	0	2	-	0	0	0	0	-	2
% Buses	0%	0%	0%	0%	-	0%	0.6%	0%	0.6%	-	0%	0%	0%	0%	-	0.3%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

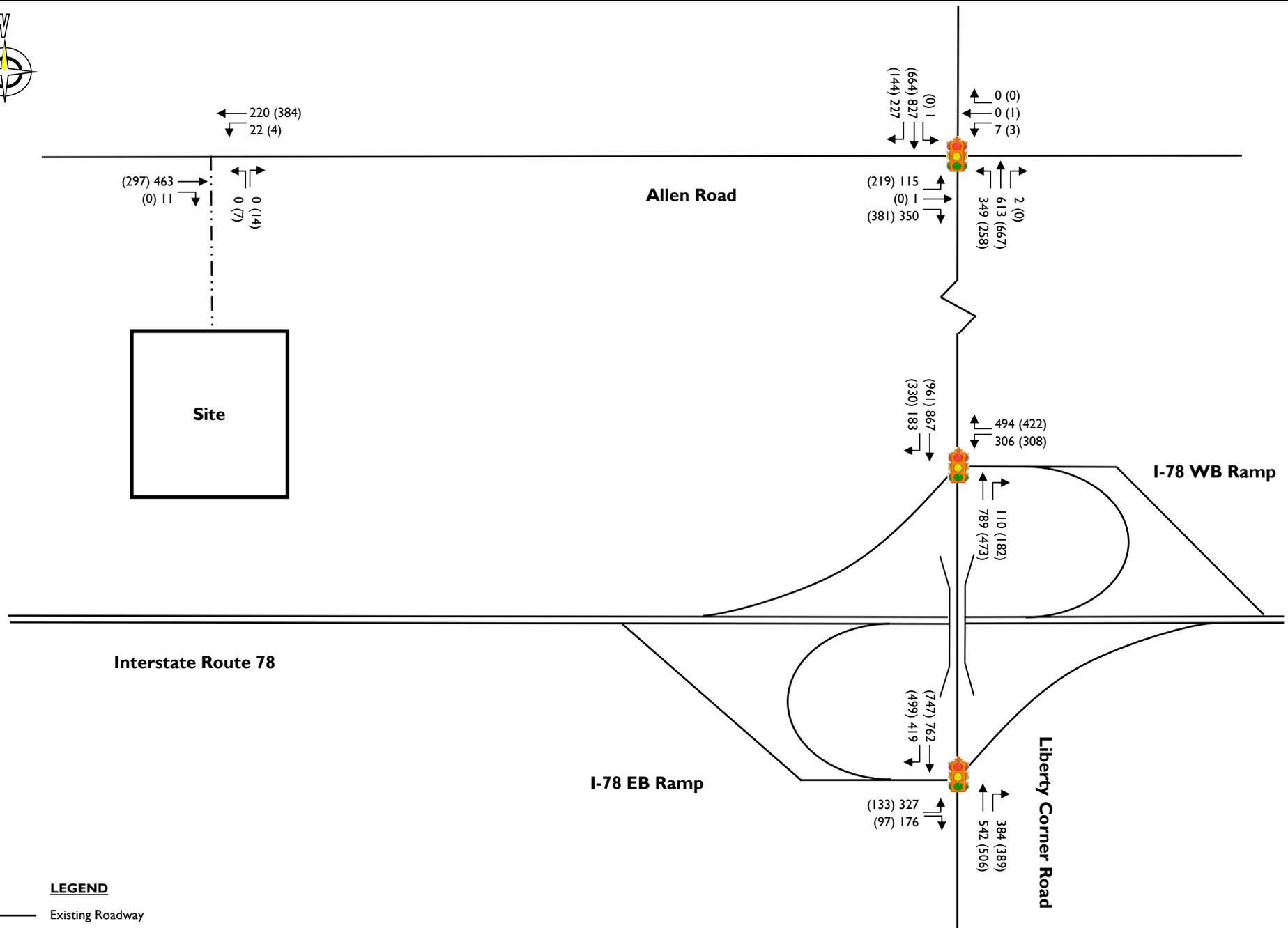
FIGURES



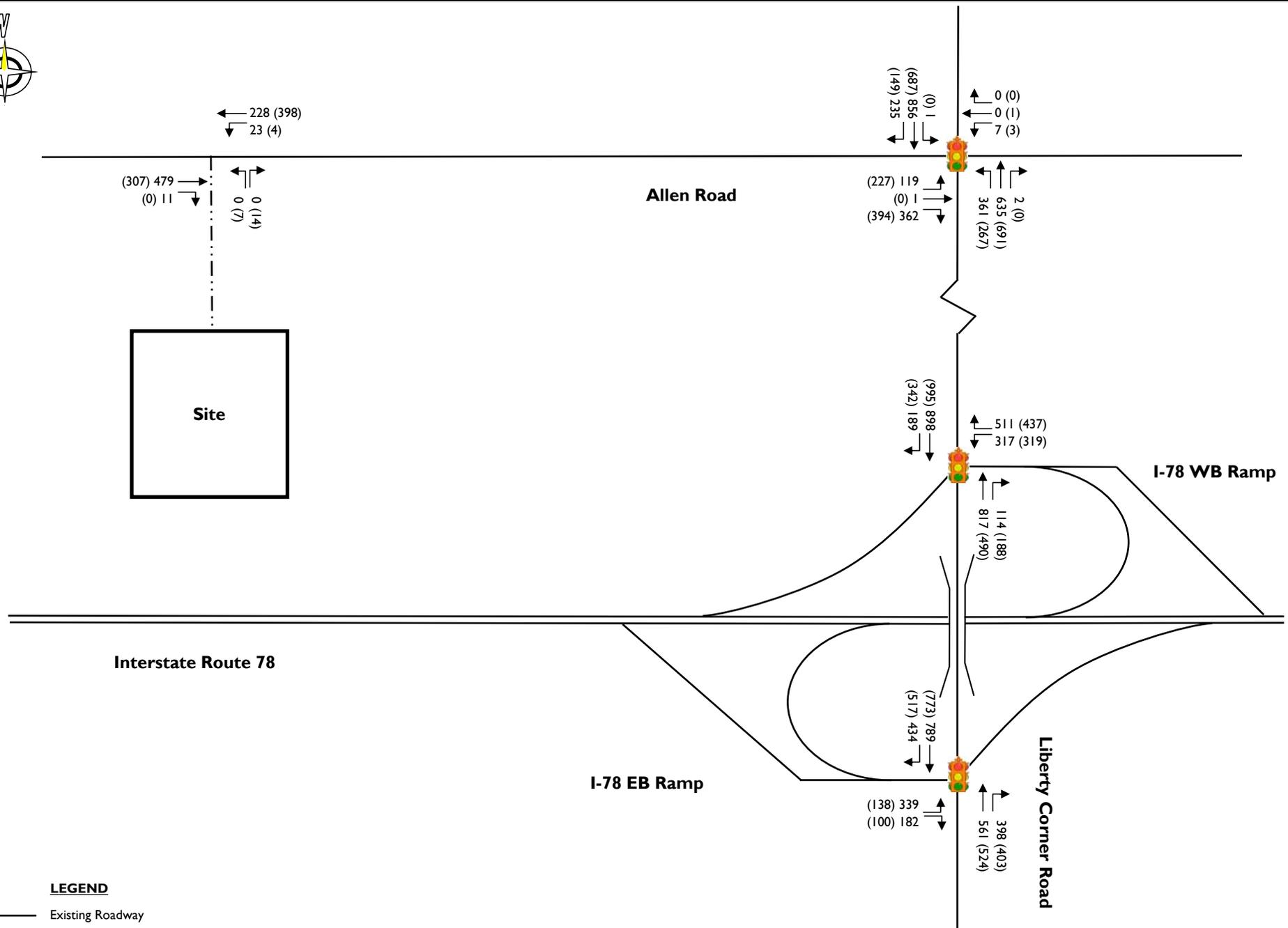
LEGEND

-  Existing Roadway
-  Proposed Driveway
-  Existing Private Driveway
-  Signalized Intersection
-  Signalized Intersection

<h1>STONEFIELD</h1>	<p>Proposed Manufacturing Development 150 Allen Road Bernards Township, Somerset County, New Jersey Traffic Impact Study</p>	<p>FIGURE I Site Location Map</p>
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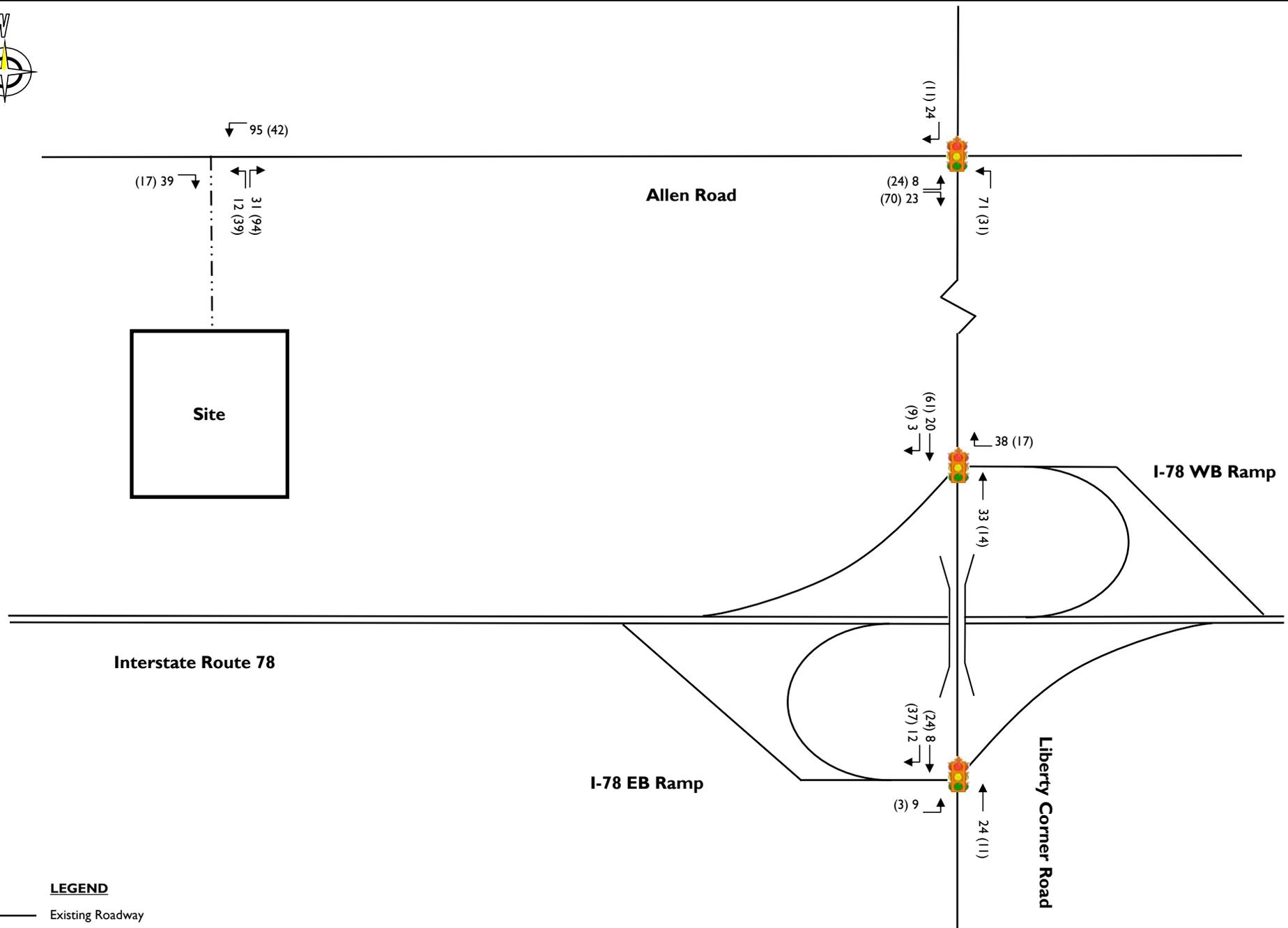
STONEFIELD	Proposed Manufacturing Development 150 Allen Road Bernards Township, Somerset County, New Jersey Traffic Impact Study	FIGURE 2 2022 Existing Traffic Volumes
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LEGEND

- Existing Roadway
- Proposed Driveway
- Existing Private Driveway
- AM (PM) Peak Hour Volumes
- Signalized Intersection

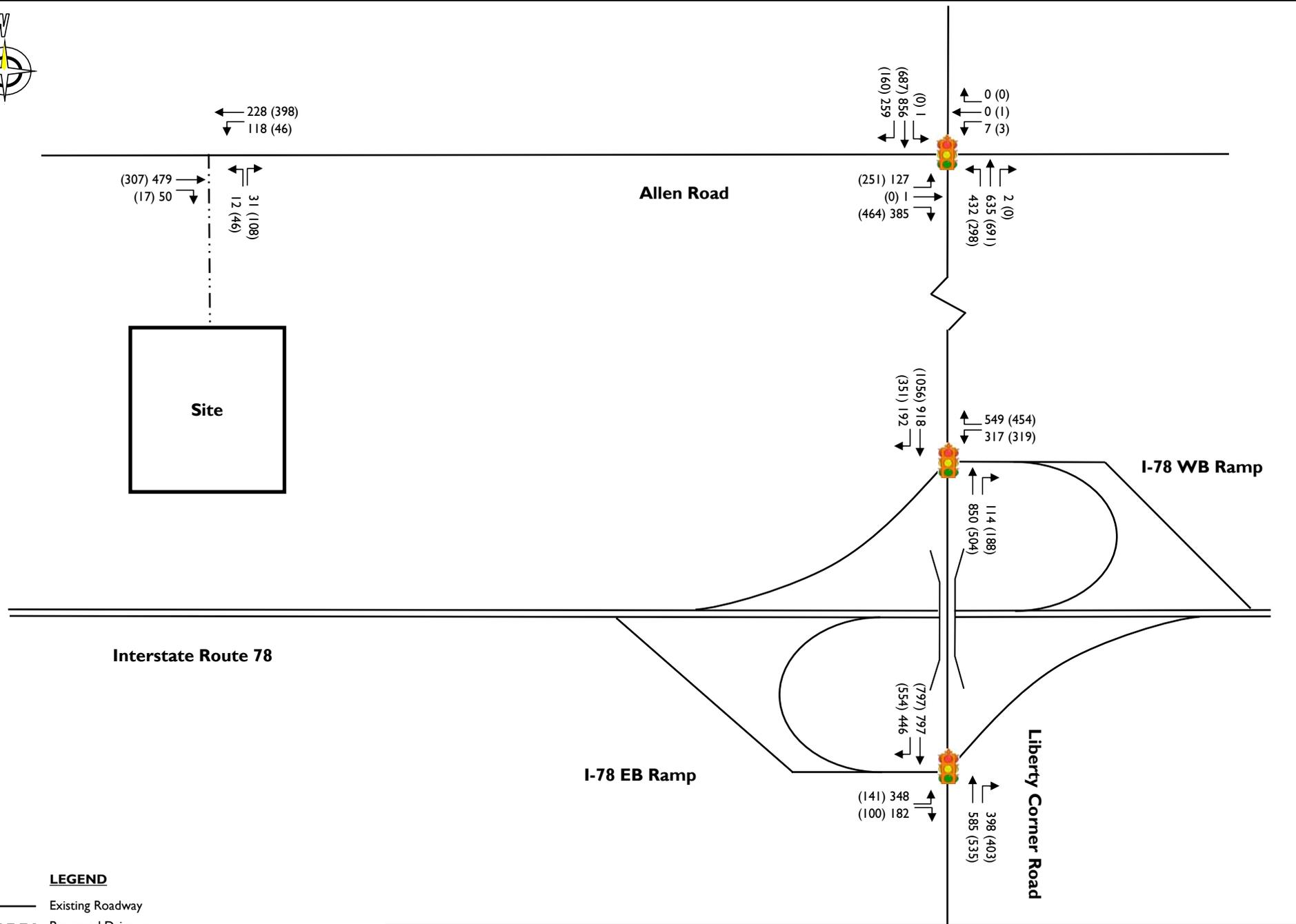
<h1>STONEFIELD</h1>	<p>Proposed Manufacturing Development</p> <p>150 Allen Road</p> <p>Bernards Township, Somerset County, New Jersey</p> <p>Traffic Impact Study</p>	<p>FIGURE 3</p> <p>2024 No-Build Traffic Volumes</p>
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LEGEND

- Existing Roadway
- - - Proposed Driveway
- · - Existing Private Driveway
- ← AM (PM) Peak Hour Volumes
- Signalized Intersection

STONEFIELD	Proposed Manufacturing Development 150 Allen Road Bernards Township, Somerset County, New Jersey Traffic Impact Study	FIGURE 4 "New" Site-Generated Traffic Volumes
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STONEFIELD	Proposed Manufacturing Development	FIGURE 5 2024 Build Traffic Volumes
	150 Allen Road	
	Bernards Township, Somerset County, New Jersey Traffic Impact Study	

CAPACITY ANALYSIS DETAIL SHEETS

HCM 6th TWSC
1: Site Driveway & Allen Road

2022 Existing Condition
Weekday Morning Peak Hour

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	463	11	22	220	0	0
Future Vol, veh/h	463	11	22	220	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	125	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	1	0	0	8	0	0
Mvmt Flow	526	13	25	250	0	0

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	539	0	833
Stage 1	-	-	-	-	533
Stage 2	-	-	-	-	300
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	1040	-	341
Stage 1	-	-	-	-	593
Stage 2	-	-	-	-	756
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1040	-	333
Mov Cap-2 Maneuver	-	-	-	-	333
Stage 1	-	-	-	-	593
Stage 2	-	-	-	-	738

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1040	-
HCM Lane V/C Ratio	-	-	-	0.024	-
HCM Control Delay (s)	0	-	-	8.5	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0.1	-

HCM 6th Signalized Intersection Summary

3: Liberty Corner Road & Allen Road

2022 Existing Condition
Weekday Morning Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↕		↖	↕	
Traffic Volume (veh/h)	115	1	350	7	0	0	349	613	2	1	827	227
Future Volume (veh/h)	115	1	350	7	0	0	349	613	2	1	827	227
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1900	1885	1648	1900	1900	1856	1841	1900	1900	1870	1841
Adj Flow Rate, veh/h	128	1	237	8	0	0	388	681	2	1	919	252
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	5	0	1	17	0	0	3	4	0	0	2	4
Cap, veh/h	297	2	408	158	0	0	478	2537	7	537	1624	444
Arrive On Green	0.13	0.13	0.13	0.13	0.00	0.00	0.24	1.00	1.00	0.00	0.59	0.59
Sat Flow, veh/h	1631	13	1598	582	0	0	1767	3577	11	1810	2757	755
Grp Volume(v), veh/h	129	0	237	8	0	0	388	333	350	1	592	579
Grp Sat Flow(s),veh/h/ln	1644	0	1598	582	0	0	1767	1749	1839	1810	1777	1735
Q Serve(g_s), s	0.0	0.0	11.7	0.6	0.0	0.0	8.1	0.0	0.0	0.0	18.5	18.5
Cycle Q Clear(g_c), s	6.0	0.0	11.7	6.6	0.0	0.0	8.1	0.0	0.0	0.0	18.5	18.5
Prop In Lane	0.99		1.00	1.00		0.00	1.00		0.01	1.00		0.43
Lane Grp Cap(c), veh/h	299	0	408	158	0	0	478	1240	1304	537	1047	1022
V/C Ratio(X)	0.43	0.00	0.58	0.05	0.00	0.00	0.81	0.27	0.27	0.00	0.57	0.57
Avail Cap(c_a), veh/h	299	0	408	158	0	0	674	1240	1304	956	1047	1022
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.80	0.80	0.80	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.4	0.0	29.3	39.5	0.0	0.0	10.1	0.0	0.0	7.5	11.4	11.4
Incr Delay (d2), s/veh	1.0	0.0	2.1	0.1	0.0	0.0	4.2	0.4	0.4	0.0	2.2	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.0	4.5	0.2	0.0	0.0	3.0	0.1	0.1	0.0	6.6	6.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.4	0.0	31.4	39.6	0.0	0.0	14.2	0.4	0.4	7.5	13.6	13.7
LnGrp LOS	D	A	C	D	A	A	B	A	A	A	B	B
Approach Vol, veh/h		366			8			1071			1172	
Approach Delay, s/veh		33.5			39.6			5.4			13.6	
Approach LOS		C			D			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	3.2	69.8		17.0	14.0	59.0		17.0				
Change Period (Y+Rc), s	3.0	6.0		5.0	3.0	6.0		5.0				
Max Green Setting (Gmax), s	21.0	43.0		12.0	21.0	43.0		12.0				
Max Q Clear Time (g_c+I1), s	2.0	2.0		13.7	10.1	20.5		8.6				
Green Ext Time (p_c), s	0.0	4.1		0.0	0.9	7.7		0.0				

Intersection Summary

HCM 6th Ctrl Delay	13.1
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary

4: Liberty Corner Road & I-78 WB Ramp

2022 Existing Condition
Weekday Morning Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↖	↗	↘		↖	↗		↖	↗
Traffic Volume (veh/h)	0	0	0	306	0	494	0	789	110	0	867	183
Future Volume (veh/h)	0	0	0	306	0	494	0	789	110	0	867	183
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No		No		No				No
Adj Sat Flow, veh/h/ln				2051	2067	2150	0	2051	1887	0	2084	2018
Adj Flow Rate, veh/h				340	0	378	0	877	0	0	963	0
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				3	2	2	0	3	13	0	1	5
Cap, veh/h				925	0	432	0	2454		0	2493	
Arrive On Green				0.24	0.00	0.24	0.00	0.84	0.00	0.00	1.00	0.00
Sat Flow, veh/h				3906	0	1822	0	3999	1599	0	4063	1710
Grp Volume(v), veh/h				340	0	378	0	877	0	0	963	0
Grp Sat Flow(s),veh/h/ln				1953	0	1822	0	1948	1599	0	1979	1710
Q Serve(g_s), s				6.5	0.0	18.0	0.0	4.7	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s				6.5	0.0	18.0	0.0	4.7	0.0	0.0	0.0	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				925	0	432	0	2454		0	2493	
V/C Ratio(X)				0.37	0.00	0.88	0.00	0.36		0.00	0.39	
Avail Cap(c_a), veh/h				1085	0	506	0	2454		0	2493	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.33	1.33	1.00	2.00	2.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.95	0.00	0.00	0.74	0.00
Uniform Delay (d), s/veh				28.7	0.0	33.1	0.0	3.1	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh				0.2	0.0	14.1	0.0	0.4	0.0	0.0	0.3	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.0	0.0	9.4	0.0	1.3	0.0	0.0	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				28.9	0.0	47.2	0.0	3.5	0.0	0.0	0.3	0.0
LnGrp LOS				C	A	D	A	A		A	A	
Approach Vol, veh/h					718			877			963	
Approach Delay, s/veh					38.6			3.5			0.3	
Approach LOS					D			A			A	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		63.7				63.7		26.3				
Change Period (Y+Rc), s		7.0				7.0		5.0				
Max Green Setting (Gmax), s		53.0				53.0		25.0				
Max Q Clear Time (g_c+I1), s		6.7				2.0		20.0				
Green Ext Time (p_c), s		6.7				7.6		1.3				

Intersection Summary

HCM 6th Ctrl Delay	12.1
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
5: Liberty Corner Road & I-78 EB Ramp

2022 Existing Condition
Weekday Morning Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗		↖↗					↑↑↑	↖		↑↑	↖
Traffic Volume (veh/h)	327	0	176	0	0	0	0	542	384	0	762	419
Future Volume (veh/h)	327	0	176	0	0	0	0	542	384	0	762	419
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	2034	0	2051				0	2034	2084	0	2067	2084
Adj Flow Rate, veh/h	372	0	200				0	616	0	0	866	0
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	4	0	3				0	4	1	0	2	1
Cap, veh/h	531	0	432				0	4029		0	2849	
Arrive On Green	0.14	0.00	0.14				0.00	0.73	0.00	0.00	1.00	0.00
Sat Flow, veh/h	3759	0	3059				0	5737	1766	0	4031	1766
Grp Volume(v), veh/h	372	0	200				0	616	0	0	866	0
Grp Sat Flow(s),veh/h/ln	1879	0	1529				0	1851	1766	0	1964	1766
Q Serve(g_s), s	8.5	0.0	5.4				0.0	3.1	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	8.5	0.0	5.4				0.0	3.1	0.0	0.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	531	0	432				0	4029		0	2849	
V/C Ratio(X)	0.70	0.00	0.46				0.00	0.15		0.00	0.30	
Avail Cap(c_a), veh/h	1671	0	1360				0	4029		0	2849	
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	0.93	0.00
Uniform Delay (d), s/veh	36.8	0.0	35.5				0.0	3.8	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.7	0.0	0.8				0.0	0.1	0.0	0.0	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	2.0				0.0	0.8	0.0	0.0	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.5	0.0	36.3				0.0	3.9	0.0	0.0	0.3	0.0
LnGrp LOS	D	A	D				A	A		A	A	
Approach Vol, veh/h		572						616			866	
Approach Delay, s/veh		37.7						3.9			0.3	
Approach LOS		D						A			A	
Timer - Assigned Phs		2		4				6				
Phs Duration (G+Y+Rc), s		72.3		17.7				72.3				
Change Period (Y+Rc), s		7.0		5.0				7.0				
Max Green Setting (Gmax), s		38.0		40.0				38.0				
Max Q Clear Time (g_c+I1), s		5.1		10.5				2.0				
Green Ext Time (p_c), s		4.2		2.2				6.4				

Intersection Summary

HCM 6th Ctrl Delay	11.8
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	297	0	4	384	7	14
Future Vol, veh/h	297	0	4	384	7	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	125	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	1	0	25	1	0	0
Mvmt Flow	326	0	4	422	8	15

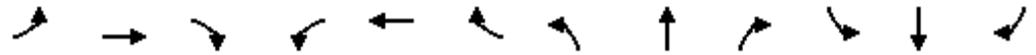
Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	326	0	756
Stage 1	-	-	-	-	326
Stage 2	-	-	-	-	430
Critical Hdwy	-	-	4.35	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.425	-	3.5
Pot Cap-1 Maneuver	-	-	1115	-	379
Stage 1	-	-	-	-	736
Stage 2	-	-	-	-	660
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1115	-	377
Mov Cap-2 Maneuver	-	-	-	-	377
Stage 1	-	-	-	-	736
Stage 2	-	-	-	-	657

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	11.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	552	-	-	1115	-
HCM Lane V/C Ratio	0.042	-	-	0.004	-
HCM Control Delay (s)	11.8	-	-	8.2	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

HCM 6th Signalized Intersection Summary
3: Liberty Corner Road & Allen Road

2022 Existing Condition
Weekday Evening Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕		↗	↕↗		↗	↕↗	
Traffic Volume (veh/h)	219	0	381	3	1	0	258	667	0	0	664	144
Future Volume (veh/h)	219	0	381	3	1	0	258	667	0	0	664	144
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1900	1885	1900	1900	1900	1900	1885	1900	1900	1856	1870
Adj Flow Rate, veh/h	228	0	267	3	1	0	269	695	0	0	692	150
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	0	1	0	0	0	0	1	0	0	3	2
Cap, veh/h	336	0	420	91	23	0	521	2544	0	532	1758	381
Arrive On Green	0.19	0.00	0.19	0.19	0.19	0.00	0.07	0.71	0.00	0.00	0.61	0.61
Sat Flow, veh/h	1429	0	1598	177	120	0	1810	3676	0	1810	2882	624
Grp Volume(v), veh/h	228	0	267	4	0	0	269	695	0	0	423	419
Grp Sat Flow(s),veh/h/ln	1429	0	1598	296	0	0	1810	1791	0	1810	1763	1743
Q Serve(g_s), s	0.0	0.0	16.3	0.1	0.0	0.0	5.7	7.7	0.0	0.0	13.5	13.6
Cycle Q Clear(g_c), s	17.0	0.0	16.3	17.0	0.0	0.0	5.7	7.7	0.0	0.0	13.5	13.6
Prop In Lane	1.00		1.00	0.75		0.00	1.00		0.00	1.00		0.36
Lane Grp Cap(c), veh/h	336	0	420	113	0	0	521	2544	0	532	1075	1063
V/C Ratio(X)	0.68	0.00	0.64	0.04	0.00	0.00	0.52	0.27	0.00	0.00	0.39	0.39
Avail Cap(c_a), veh/h	521	0	625	275	0	0	586	2544	0	727	1075	1063
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.92	0.92	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	43.0	0.0	35.9	37.4	0.0	0.0	7.6	5.7	0.0	0.0	11.0	11.0
Incr Delay (d2), s/veh	2.4	0.0	1.6	0.1	0.0	0.0	0.7	0.2	0.0	0.0	1.1	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	0.0	6.3	0.1	0.0	0.0	1.8	2.4	0.0	0.0	5.0	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.4	0.0	37.5	37.5	0.0	0.0	8.3	6.0	0.0	0.0	12.1	12.1
LnGrp LOS	D	A	D	D	A	A	A	A	A	A	B	B
Approach Vol, veh/h		495			4			964			842	
Approach Delay, s/veh		41.1			37.5			6.6			12.1	
Approach LOS		D			D			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	84.1		25.9	11.0	73.1		25.9				
Change Period (Y+Rc), s	3.0	6.0		5.0	3.0	6.0		5.0				
Max Green Setting (Gmax), s	12.0	49.0		35.0	12.0	49.0		35.0				
Max Q Clear Time (g_c+I1), s	0.0	9.7		19.0	7.7	15.6		19.0				
Green Ext Time (p_c), s	0.0	4.9		1.9	0.3	5.4		0.0				

Intersection Summary

HCM 6th Ctrl Delay	16.1
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
4: Liberty Corner Road & I-78 WB Ramp

2022 Existing Condition
Weekday Evening Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↘	↙	↗		↑↑	↗		↑↑	↗
Traffic Volume (veh/h)	0	0	0	308	0	422	0	473	182	0	961	330
Future Volume (veh/h)	0	0	0	308	0	422	0	473	182	0	961	330
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No		No		No		No		No
Adj Sat Flow, veh/h/ln				2034	2067	2167	0	2084	2067	0	2067	2084
Adj Flow Rate, veh/h				321	0	179	0	493	0	0	1001	0
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %				4	2	1	0	1	2	0	2	1
Cap, veh/h				500	0	237	0	2920		0	2897	
Arrive On Green				0.13	0.00	0.13	0.00	1.00	0.00	0.00	0.74	0.00
Sat Flow, veh/h				3875	0	1836	0	4063	1752	0	4031	1766
Grp Volume(v), veh/h				321	0	179	0	493	0	0	1001	0
Grp Sat Flow(s),veh/h/ln				1938	0	1836	0	1979	1752	0	1964	1766
Q Serve(g_s), s				7.1	0.0	8.5	0.0	0.0	0.0	0.0	8.1	0.0
Cycle Q Clear(g_c), s				7.1	0.0	8.5	0.0	0.0	0.0	0.0	8.1	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				500	0	237	0	2920		0	2897	
V/C Ratio(X)				0.64	0.00	0.76	0.00	0.17		0.00	0.35	
Avail Cap(c_a), veh/h				775	0	367	0	2920		0	2897	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.99	0.00	0.00	0.87	0.00
Uniform Delay (d), s/veh				37.2	0.0	37.8	0.0	0.0	0.0	0.0	4.2	0.0
Incr Delay (d2), s/veh				1.4	0.0	4.9	0.0	0.1	0.0	0.0	0.3	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.4	0.0	4.1	0.0	0.1	0.0	0.0	2.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				38.6	0.0	42.7	0.0	0.1	0.0	0.0	4.4	0.0
LnGrp LOS				D	A	D	A	A		A	A	
Approach Vol, veh/h					500			493			1001	
Approach Delay, s/veh					40.1			0.1			4.4	
Approach LOS					D			A			A	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		73.4				73.4		16.6				
Change Period (Y+Rc), s		7.0				7.0		5.0				
Max Green Setting (Gmax), s		60.0				60.0		18.0				
Max Q Clear Time (g_c+I1), s		2.0				10.1		10.5				
Green Ext Time (p_c), s		3.3				8.1		1.1				

Intersection Summary

HCM 6th Ctrl Delay	12.3
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
5: Liberty Corner Road & I-78 EB Ramp

2022 Existing Condition
Weekday Evening Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗		↖↗					↑↑↑	↖		↑↑	↖
Traffic Volume (veh/h)	133	0	97	0	0	0	0	506	389	0	747	499
Future Volume (veh/h)	133	0	97	0	0	0	0	506	389	0	747	499
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No					No			No		
Adj Sat Flow, veh/h/ln	2051	0	2100				0	2084	2084	0	2067	2067
Adj Flow Rate, veh/h	140	0	102				0	533	0	0	786	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	0	0				0	1	1	0	2	2
Cap, veh/h	294	0	243				0	4488		0	3099	
Arrive On Green	0.08	0.00	0.08				0.00	0.79	0.00	0.00	0.53	0.00
Sat Flow, veh/h	3789	0	3132				0	5876	1766	0	4031	1752
Grp Volume(v), veh/h	140	0	102				0	533	0	0	786	0
Grp Sat Flow(s),veh/h/ln	1895	0	1566				0	1896	1766	0	1964	1752
Q Serve(g_s), s	3.2	0.0	2.8				0.0	2.0	0.0	0.0	9.8	0.0
Cycle Q Clear(g_c), s	3.2	0.0	2.8				0.0	2.0	0.0	0.0	9.8	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	294	0	243				0	4488		0	3099	
V/C Ratio(X)	0.48	0.00	0.42				0.00	0.12		0.00	0.25	
Avail Cap(c_a), veh/h	758	0	626				0	4488		0	3099	
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	0.67	0.67
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	0.93	0.00
Uniform Delay (d), s/veh	39.8	0.0	39.6				0.0	2.2	0.0	0.0	6.8	0.0
Incr Delay (d2), s/veh	1.2	0.0	1.2				0.0	0.1	0.0	0.0	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	1.1				0.0	0.4	0.0	0.0	2.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.0	0.0	40.7				0.0	2.3	0.0	0.0	7.0	0.0
LnGrp LOS	D	A	D				A	A		A	A	
Approach Vol, veh/h		242						533			786	
Approach Delay, s/veh		40.9						2.3			7.0	
Approach LOS		D						A			A	
Timer - Assigned Phs		2		4				6				
Phs Duration (G+Y+Rc), s		78.0		12.0				78.0				
Change Period (Y+Rc), s		7.0		5.0				7.0				
Max Green Setting (Gmax), s		60.0		18.0				60.0				
Max Q Clear Time (g_c+I1), s		4.0		5.2				11.8				
Green Ext Time (p_c), s		3.7		0.7				5.8				

Intersection Summary

HCM 6th Ctrl Delay	10.6
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th TWSC
1: Site Driveway & Allen Road

2024 No-Build Condition
Weekday Morning Peak Hour

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	479	11	23	228	0	0
Future Vol, veh/h	479	11	23	228	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	125	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	1	0	0	8	0	0
Mvmt Flow	544	13	26	259	0	0

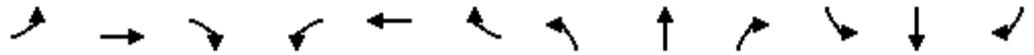
Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	557	0	862 551
Stage 1	-	-	-	-	551 -
Stage 2	-	-	-	-	311 -
Critical Hdwy	-	-	4.1	-	6.4 6.2
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	-	-	2.2	-	3.5 3.3
Pot Cap-1 Maneuver	-	-	1024	-	328 538
Stage 1	-	-	-	-	581 -
Stage 2	-	-	-	-	748 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1024	-	320 538
Mov Cap-2 Maneuver	-	-	-	-	320 -
Stage 1	-	-	-	-	581 -
Stage 2	-	-	-	-	729 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1024	-
HCM Lane V/C Ratio	-	-	-	0.026	-
HCM Control Delay (s)	0	-	-	8.6	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0.1	-

HCM 6th Signalized Intersection Summary
3: Liberty Corner Road & Allen Road

2024 No-Build Condition
Weekday Morning Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↕		↖	↕	
Traffic Volume (veh/h)	119	1	362	7	0	0	361	635	2	1	856	235
Future Volume (veh/h)	119	1	362	7	0	0	361	635	2	1	856	235
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1900	1885	1648	1900	1900	1856	1841	1900	1900	1870	1841
Adj Flow Rate, veh/h	132	1	250	8	0	0	401	706	2	1	951	261
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	5	0	1	17	0	0	3	4	0	0	2	4
Cap, veh/h	298	2	416	154	0	0	471	2537	7	523	1610	441
Arrive On Green	0.13	0.13	0.13	0.13	0.00	0.00	0.25	1.00	1.00	0.00	0.58	0.58
Sat Flow, veh/h	1638	12	1598	556	0	0	1767	3577	10	1810	2757	754
Grp Volume(v), veh/h	133	0	250	8	0	0	401	345	363	1	612	600
Grp Sat Flow(s),veh/h/ln	1650	0	1598	556	0	0	1767	1749	1839	1810	1777	1735
Q Serve(g_s), s	0.0	0.0	12.0	0.6	0.0	0.0	8.5	0.0	0.0	0.0	19.7	19.8
Cycle Q Clear(g_c), s	6.2	0.0	12.0	6.8	0.0	0.0	8.5	0.0	0.0	0.0	19.7	19.8
Prop In Lane	0.99		1.00	1.00		0.00	1.00		0.01	1.00		0.43
Lane Grp Cap(c), veh/h	300	0	416	154	0	0	471	1240	1304	523	1038	1013
V/C Ratio(X)	0.44	0.00	0.60	0.05	0.00	0.00	0.85	0.28	0.28	0.00	0.59	0.59
Avail Cap(c_a), veh/h	300	0	416	154	0	0	659	1240	1304	942	1038	1013
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.78	0.78	0.78	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.5	0.0	29.2	39.7	0.0	0.0	11.0	0.0	0.0	7.7	11.9	11.9
Incr Delay (d2), s/veh	1.0	0.0	2.4	0.1	0.0	0.0	6.1	0.4	0.4	0.0	2.5	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.0	4.8	0.2	0.0	0.0	4.2	0.2	0.2	0.0	7.1	7.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.5	0.0	31.6	39.8	0.0	0.0	17.1	0.4	0.4	7.7	14.3	14.4
LnGrp LOS	D	A	C	D	A	A	B	A	A	A	B	B
Approach Vol, veh/h		383			8			1109			1213	
Approach Delay, s/veh		33.6			39.8			6.5			14.4	
Approach LOS		C			D			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	3.2	69.8		17.0	14.4	58.6		17.0				
Change Period (Y+Rc), s	3.0	6.0		5.0	3.0	6.0		5.0				
Max Green Setting (Gmax), s	21.0	43.0		12.0	21.0	43.0		12.0				
Max Q Clear Time (g_c+I1), s	2.0	2.0		14.0	10.5	21.8		8.8				
Green Ext Time (p_c), s	0.0	4.3		0.0	0.9	7.9		0.0				

Intersection Summary

HCM 6th Ctrl Delay	13.9
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
4: Liberty Corner Road & I-78 WB Ramp

2024 No-Build Condition
Weekday Morning Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↘	↙	↗		↑↑	↗		↑↑	↗
Traffic Volume (veh/h)	0	0	0	317	0	511	0	817	114	0	898	189
Future Volume (veh/h)	0	0	0	317	0	511	0	817	114	0	898	189
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No		No		No		No		No
Adj Sat Flow, veh/h/ln				2051	2067	2150	0	2051	1887	0	2084	2018
Adj Flow Rate, veh/h				352	0	397	0	908	0	0	998	0
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				3	2	2	0	3	13	0	1	5
Cap, veh/h				960	0	448	0	2419		0	2458	
Arrive On Green				0.25	0.00	0.25	0.00	0.83	0.00	0.00	1.00	0.00
Sat Flow, veh/h				3906	0	1822	0	3999	1599	0	4063	1710
Grp Volume(v), veh/h				352	0	397	0	908	0	0	998	0
Grp Sat Flow(s),veh/h/ln				1953	0	1822	0	1948	1599	0	1979	1710
Q Serve(g_s), s				6.7	0.0	18.9	0.0	5.3	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s				6.7	0.0	18.9	0.0	5.3	0.0	0.0	0.0	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				960	0	448	0	2419		0	2458	
V/C Ratio(X)				0.37	0.00	0.89	0.00	0.38		0.00	0.41	
Avail Cap(c_a), veh/h				1085	0	506	0	2419		0	2458	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.33	1.33	1.00	2.00	2.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.95	0.00	0.00	0.71	0.00
Uniform Delay (d), s/veh				28.1	0.0	32.7	0.0	3.4	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh				0.2	0.0	15.9	0.0	0.4	0.0	0.0	0.4	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.1	0.0	10.1	0.0	1.5	0.0	0.0	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				28.4	0.0	48.6	0.0	3.9	0.0	0.0	0.4	0.0
LnGrp LOS				C	A	D	A	A		A	A	
Approach Vol, veh/h					749			908			998	
Approach Delay, s/veh					39.1			3.9			0.4	
Approach LOS					D			A			A	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		62.9				62.9		27.1				
Change Period (Y+Rc), s		7.0				7.0		5.0				
Max Green Setting (Gmax), s		53.0				53.0		25.0				
Max Q Clear Time (g_c+I1), s		7.3				2.0		20.9				
Green Ext Time (p_c), s		7.0				8.0		1.2				

Intersection Summary

HCM 6th Ctrl Delay	12.5
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
 5: Liberty Corner Road & I-78 EB Ramp

2024 No-Build Condition
 Weekday Morning Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗		↖↗					↑↑↑	↖		↑↑	↖
Traffic Volume (veh/h)	339	0	182	0	0	0	0	561	398	0	789	434
Future Volume (veh/h)	339	0	182	0	0	0	0	561	398	0	789	434
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	2034	0	2051				0	2034	2084	0	2067	2084
Adj Flow Rate, veh/h	385	0	207				0	638	0	0	897	0
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	4	0	3				0	4	1	0	2	1
Cap, veh/h	546	0	445				0	4006		0	2833	
Arrive On Green	0.15	0.00	0.15				0.00	0.72	0.00	0.00	1.00	0.00
Sat Flow, veh/h	3759	0	3059				0	5737	1766	0	4031	1766
Grp Volume(v), veh/h	385	0	207				0	638	0	0	897	0
Grp Sat Flow(s),veh/h/ln	1879	0	1529				0	1851	1766	0	1964	1766
Q Serve(g_s), s	8.8	0.0	5.6				0.0	3.3	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	8.8	0.0	5.6				0.0	3.3	0.0	0.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	546	0	445				0	4006		0	2833	
V/C Ratio(X)	0.70	0.00	0.47				0.00	0.16		0.00	0.32	
Avail Cap(c_a), veh/h	1671	0	1360				0	4006		0	2833	
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	0.92	0.00
Uniform Delay (d), s/veh	36.6	0.0	35.3				0.0	3.9	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.7	0.0	0.8				0.0	0.1	0.0	0.0	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.0	2.1				0.0	0.8	0.0	0.0	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.3	0.0	36.0				0.0	4.0	0.0	0.0	0.3	0.0
LnGrp LOS	D	A	D				A	A		A	A	
Approach Vol, veh/h		592						638			897	
Approach Delay, s/veh		37.5						4.0			0.3	
Approach LOS		D						A			A	
Timer - Assigned Phs		2		4				6				
Phs Duration (G+Y+Rc), s		71.9		18.1				71.9				
Change Period (Y+Rc), s		7.0		5.0				7.0				
Max Green Setting (Gmax), s		38.0		40.0				38.0				
Max Q Clear Time (g_c+I1), s		5.3		10.8				2.0				
Green Ext Time (p_c), s		4.3		2.3				6.7				

Intersection Summary

HCM 6th Ctrl Delay	11.8
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th TWSC
1: Site Driveway & Allen Road

2024 No-Build Condition
Weekday Evening Peak Hour

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	307	0	4	398	7	14
Future Vol, veh/h	307	0	4	398	7	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	125	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	1	0	25	1	0	0
Mvmt Flow	337	0	4	437	8	15

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	337	0	782
Stage 1	-	-	-	-	337
Stage 2	-	-	-	-	445
Critical Hdwy	-	-	4.35	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.425	-	3.5
Pot Cap-1 Maneuver	-	-	1104	-	366
Stage 1	-	-	-	-	728
Stage 2	-	-	-	-	650
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1104	-	365
Mov Cap-2 Maneuver	-	-	-	-	365
Stage 1	-	-	-	-	728
Stage 2	-	-	-	-	647

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	12
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	540	-	-	1104	-
HCM Lane V/C Ratio	0.043	-	-	0.004	-
HCM Control Delay (s)	12	-	-	8.3	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

HCM 6th Signalized Intersection Summary
3: Liberty Corner Road & Allen Road

2024 No-Build Condition
Weekday Evening Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	227	0	394	3	1	0	267	691	0	0	687	149
Future Volume (veh/h)	227	0	394	3	1	0	267	691	0	0	687	149
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1900	1885	1900	1900	1900	1900	1885	1900	1900	1856	1870
Adj Flow Rate, veh/h	236	0	280	3	1	0	278	720	0	0	716	155
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	0	1	0	0	0	0	1	0	0	3	2
Cap, veh/h	345	0	434	91	23	0	506	2523	0	514	1732	375
Arrive On Green	0.20	0.00	0.20	0.20	0.20	0.00	0.08	0.70	0.00	0.00	0.60	0.60
Sat Flow, veh/h	1429	0	1598	172	116	0	1810	3676	0	1810	2882	624
Grp Volume(v), veh/h	236	0	280	4	0	0	278	720	0	0	438	433
Grp Sat Flow(s),veh/h/ln	1429	0	1598	289	0	0	1810	1791	0	1810	1763	1743
Q Serve(g_s), s	0.0	0.0	17.0	0.1	0.0	0.0	6.1	8.2	0.0	0.0	14.5	14.5
Cycle Q Clear(g_c), s	17.5	0.0	17.0	17.6	0.0	0.0	6.1	8.2	0.0	0.0	14.5	14.5
Prop In Lane	1.00		1.00	0.75		0.00	1.00		0.00	1.00		0.36
Lane Grp Cap(c), veh/h	345	0	434	114	0	0	506	2523	0	514	1059	1048
V/C Ratio(X)	0.68	0.00	0.64	0.04	0.00	0.00	0.55	0.29	0.00	0.00	0.41	0.41
Avail Cap(c_a), veh/h	521	0	630	266	0	0	566	2523	0	710	1059	1048
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.91	0.91	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	42.6	0.0	35.4	37.0	0.0	0.0	8.2	6.0	0.0	0.0	11.6	11.7
Incr Delay (d2), s/veh	2.4	0.0	1.6	0.1	0.0	0.0	0.8	0.3	0.0	0.0	1.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	0.0	6.6	0.1	0.0	0.0	2.0	2.6	0.0	0.0	5.4	5.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.0	0.0	37.0	37.1	0.0	0.0	9.1	6.3	0.0	0.0	12.8	12.9
LnGrp LOS	D	A	D	D	A	A	A	A	A	A	B	B
Approach Vol, veh/h		516			4			998			871	
Approach Delay, s/veh		40.7			37.1			7.0			12.8	
Approach LOS		D			D			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	83.5		26.5	11.4	72.1		26.5				
Change Period (Y+Rc), s	3.0	6.0		5.0	3.0	6.0		5.0				
Max Green Setting (Gmax), s	12.0	49.0		35.0	12.0	49.0		35.0				
Max Q Clear Time (g_c+I1), s	0.0	10.2		19.5	8.1	16.5		19.6				
Green Ext Time (p_c), s	0.0	5.1		2.0	0.3	5.7		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			16.5									
HCM 6th LOS			B									
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 6th Signalized Intersection Summary

4: Liberty Corner Road & I-78 WB Ramp

2024 No-Build Condition
Weekday Evening Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↘	↙	↗		↑↑	↗		↑↑	↗
Traffic Volume (veh/h)	0	0	0	319	0	437	0	490	188	0	995	342
Future Volume (veh/h)	0	0	0	319	0	437	0	490	188	0	995	342
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No		No		No			No	
Adj Sat Flow, veh/h/ln				2034	2067	2167	0	2084	2067	0	2067	2084
Adj Flow Rate, veh/h				332	0	194	0	510	0	0	1036	0
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %				4	2	1	0	1	2	0	2	1
Cap, veh/h				531	0	251	0	2889		0	2866	
Arrive On Green				0.14	0.00	0.14	0.00	1.00	0.00	0.00	0.73	0.00
Sat Flow, veh/h				3875	0	1836	0	4063	1752	0	4031	1766
Grp Volume(v), veh/h				332	0	194	0	510	0	0	1036	0
Grp Sat Flow(s),veh/h/ln				1938	0	1836	0	1979	1752	0	1964	1766
Q Serve(g_s), s				7.3	0.0	9.2	0.0	0.0	0.0	0.0	8.7	0.0
Cycle Q Clear(g_c), s				7.3	0.0	9.2	0.0	0.0	0.0	0.0	8.7	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				531	0	251	0	2889		0	2866	
V/C Ratio(X)				0.63	0.00	0.77	0.00	0.18		0.00	0.36	
Avail Cap(c_a), veh/h				775	0	367	0	2889		0	2866	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.99	0.00	0.00	0.85	0.00
Uniform Delay (d), s/veh				36.7	0.0	37.5	0.0	0.0	0.0	0.0	4.5	0.0
Incr Delay (d2), s/veh				1.2	0.0	5.9	0.0	0.1	0.0	0.0	0.3	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.5	0.0	4.5	0.0	0.1	0.0	0.0	2.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				37.9	0.0	43.4	0.0	0.1	0.0	0.0	4.8	0.0
LnGrp LOS				D	A	D	A	A		A	A	
Approach Vol, veh/h					526			510			1036	
Approach Delay, s/veh					39.9			0.1			4.8	
Approach LOS					D			A			A	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		72.7				72.7		17.3				
Change Period (Y+Rc), s		7.0				7.0		5.0				
Max Green Setting (Gmax), s		60.0				60.0		18.0				
Max Q Clear Time (g_c+I1), s		2.0				10.7		11.2				
Green Ext Time (p_c), s		3.4				8.5		1.1				

Intersection Summary

HCM 6th Ctrl Delay	12.6
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
5: Liberty Corner Road & I-78 EB Ramp

2024 No-Build Condition
Weekday Evening Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔		↔↔					↑↑↑	↔		↑↑	↔
Traffic Volume (veh/h)	138	0	100	0	0	0	0	524	403	0	773	517
Future Volume (veh/h)	138	0	100	0	0	0	0	524	403	0	773	517
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	2051	0	2100				0	2084	2084	0	2067	2067
Adj Flow Rate, veh/h	145	0	105				0	552	0	0	814	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	0	0				0	1	1	0	2	2
Cap, veh/h	294	0	243				0	4488		0	3099	
Arrive On Green	0.08	0.00	0.08				0.00	0.79	0.00	0.00	0.53	0.00
Sat Flow, veh/h	3789	0	3132				0	5876	1766	0	4031	1752
Grp Volume(v), veh/h	145	0	105				0	552	0	0	814	0
Grp Sat Flow(s),veh/h/ln	1895	0	1566				0	1896	1766	0	1964	1752
Q Serve(g_s), s	3.3	0.0	2.9				0.0	2.0	0.0	0.0	10.2	0.0
Cycle Q Clear(g_c), s	3.3	0.0	2.9				0.0	2.0	0.0	0.0	10.2	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	294	0	243				0	4488		0	3099	
V/C Ratio(X)	0.49	0.00	0.43				0.00	0.12		0.00	0.26	
Avail Cap(c_a), veh/h	758	0	626				0	4488		0	3099	
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	0.67	0.67
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	0.92	0.00
Uniform Delay (d), s/veh	39.8	0.0	39.6				0.0	2.2	0.0	0.0	6.9	0.0
Incr Delay (d2), s/veh	1.3	0.0	1.2				0.0	0.1	0.0	0.0	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	1.1				0.0	0.4	0.0	0.0	3.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.1	0.0	40.8				0.0	2.3	0.0	0.0	7.1	0.0
LnGrp LOS	D	A	D				A	A		A	A	
Approach Vol, veh/h		250						552			814	
Approach Delay, s/veh		41.0						2.3			7.1	
Approach LOS		D						A			A	
Timer - Assigned Phs		2		4				6				
Phs Duration (G+Y+Rc), s		78.0		12.0				78.0				
Change Period (Y+Rc), s		7.0		5.0				7.0				
Max Green Setting (Gmax), s		60.0		18.0				60.0				
Max Q Clear Time (g_c+I1), s		4.0		5.3				12.2				
Green Ext Time (p_c), s		3.8		0.7				6.0				

Intersection Summary

HCM 6th Ctrl Delay	10.7
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection						
Int Delay, s/veh	1.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	479	50	118	228	12	31
Future Vol, veh/h	479	50	118	228	12	31
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	125	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	1	0	0	8	0	0
Mvmt Flow	544	57	134	259	14	35

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	601	0	1100
Stage 1	-	-	-	-	573
Stage 2	-	-	-	-	527
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	986	-	237
Stage 1	-	-	-	-	568
Stage 2	-	-	-	-	596
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	986	-	205
Mov Cap-2 Maneuver	-	-	-	-	205
Stage 1	-	-	-	-	568
Stage 2	-	-	-	-	515

Approach	EB	WB	NB
HCM Control Delay, s	0	3.1	16.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	365	-	-	986	-
HCM Lane V/C Ratio	0.134	-	-	0.136	-
HCM Control Delay (s)	16.4	-	-	9.2	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.5	-	-	0.5	-

HCM 6th Signalized Intersection Summary
3: Liberty Corner Road & Allen Road

2024 Build Condition
Weekday Morning Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	127	1	385	7	0	0	432	635	2	1	856	259
Future Volume (veh/h)	127	1	385	7	0	0	432	635	2	1	856	259
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1900	1885	1648	1900	1900	1856	1841	1900	1900	1870	1841
Adj Flow Rate, veh/h	141	1	276	8	0	0	480	706	2	1	951	288
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	5	0	1	17	0	0	3	4	0	0	2	4
Cap, veh/h	300	2	480	147	0	0	506	2537	7	493	1463	441
Arrive On Green	0.13	0.13	0.13	0.13	0.00	0.00	0.33	1.00	1.00	0.00	0.54	0.54
Sat Flow, veh/h	1653	12	1598	500	0	0	1767	3577	10	1810	2690	811
Grp Volume(v), veh/h	142	0	276	8	0	0	480	345	363	1	627	612
Grp Sat Flow(s),veh/h/ln	1665	0	1598	500	0	0	1767	1749	1839	1810	1777	1724
Q Serve(g_s), s	0.0	0.0	12.0	0.6	0.0	0.0	12.1	0.0	0.0	0.0	22.4	22.6
Cycle Q Clear(g_c), s	6.6	0.0	12.0	7.2	0.0	0.0	12.1	0.0	0.0	0.0	22.4	22.6
Prop In Lane	0.99		1.00	1.00		0.00	1.00		0.01	1.00		0.47
Lane Grp Cap(c), veh/h	302	0	480	147	0	0	506	1240	1304	493	966	938
V/C Ratio(X)	0.47	0.00	0.57	0.05	0.00	0.00	0.95	0.28	0.28	0.00	0.65	0.65
Avail Cap(c_a), veh/h	302	0	480	147	0	0	623	1240	1304	911	966	938
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.74	0.74	0.74	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.7	0.0	26.6	40.1	0.0	0.0	12.2	0.0	0.0	9.3	14.5	14.5
Incr Delay (d2), s/veh	1.1	0.0	1.7	0.2	0.0	0.0	17.6	0.4	0.4	0.0	3.4	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	4.9	0.2	0.0	0.0	6.5	0.1	0.1	0.0	8.5	8.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.8	0.0	28.3	40.2	0.0	0.0	29.8	0.4	0.4	9.3	17.8	18.1
LnGrp LOS	D	A	C	D	A	A	C	A	A	A	B	B
Approach Vol, veh/h		418			8			1188			1240	
Approach Delay, s/veh		31.5			40.2			12.3			17.9	
Approach LOS		C			D			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	3.2	69.8		17.0	18.1	54.9		17.0				
Change Period (Y+Rc), s	3.0	6.0		5.0	3.0	6.0		5.0				
Max Green Setting (Gmax), s	21.0	43.0		12.0	21.0	43.0		12.0				
Max Q Clear Time (g_c+I1), s	2.0	2.0		14.0	14.1	24.6		9.2				
Green Ext Time (p_c), s	0.0	4.3		0.0	0.9	7.6		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			17.6									
HCM 6th LOS			B									
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 6th Signalized Intersection Summary

4: Liberty Corner Road & I-78 WB Ramp

2024 Build Condition
Weekday Morning Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↖	↖	↖		↗	↗		↗	↗
Traffic Volume (veh/h)	0	0	0	317	0	549	0	850	114	0	918	192
Future Volume (veh/h)	0	0	0	317	0	549	0	850	114	0	918	192
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No		No		No				No
Adj Sat Flow, veh/h/ln				2051	2067	2150	0	2051	1887	0	2084	2018
Adj Flow Rate, veh/h				352	0	439	0	944	0	0	1020	0
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				3	2	2	0	3	13	0	1	5
Cap, veh/h				1030	0	481	0	2349	0	0	2387	0
Arrive On Green				0.26	0.00	0.26	0.00	0.80	0.00	0.00	1.00	0.00
Sat Flow, veh/h				3906	0	1822	0	3999	1599	0	4063	1710
Grp Volume(v), veh/h				352	0	439	0	944	0	0	1020	0
Grp Sat Flow(s),veh/h/ln				1953	0	1822	0	1948	1599	0	1979	1710
Q Serve(g_s), s				6.6	0.0	21.0	0.0	6.4	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s				6.6	0.0	21.0	0.0	6.4	0.0	0.0	0.0	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				1030	0	481	0	2349	0	0	2387	0
V/C Ratio(X)				0.34	0.00	0.91	0.00	0.40	0.00	0.00	0.43	0.00
Avail Cap(c_a), veh/h				1085	0	506	0	2349	0	0	2387	0
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.33	1.33	1.00	2.00	2.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.95	0.00	0.00	0.65	0.00
Uniform Delay (d), s/veh				26.8	0.0	32.1	0.0	4.2	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh				0.2	0.0	20.5	0.0	0.5	0.0	0.0	0.4	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.0	0.0	11.7	0.0	1.9	0.0	0.0	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				27.0	0.0	52.6	0.0	4.7	0.0	0.0	0.4	0.0
LnGrp LOS				C	A	D	A	A		A	A	
Approach Vol, veh/h					791			944			1020	
Approach Delay, s/veh					41.2			4.7			0.4	
Approach LOS					D			A			A	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		61.3				61.3		28.7				
Change Period (Y+Rc), s		7.0				7.0		5.0				
Max Green Setting (Gmax), s		53.0				53.0		25.0				
Max Q Clear Time (g_c+I1), s		8.4				2.0		23.0				
Green Ext Time (p_c), s		7.4				8.3		0.7				

Intersection Summary

HCM 6th Ctrl Delay	13.6
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
 5: Liberty Corner Road & I-78 EB Ramp

2024 Build Condition
 Weekday Morning Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔		↔↔					↑↑↑	↔		↑↑	↔
Traffic Volume (veh/h)	348	0	182	0	0	0	0	585	398	0	797	446
Future Volume (veh/h)	348	0	182	0	0	0	0	585	398	0	797	446
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	2034	0	2051				0	2034	2084	0	2067	2084
Adj Flow Rate, veh/h	395	0	207				0	665	0	0	906	0
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	4	0	3				0	4	1	0	2	1
Cap, veh/h	557	0	454				0	3990		0	2822	
Arrive On Green	0.15	0.00	0.15				0.00	0.72	0.00	0.00	1.00	0.00
Sat Flow, veh/h	3759	0	3059				0	5737	1766	0	4031	1766
Grp Volume(v), veh/h	395	0	207				0	665	0	0	906	0
Grp Sat Flow(s),veh/h/ln	1879	0	1529				0	1851	1766	0	1964	1766
Q Serve(g_s), s	9.0	0.0	5.6				0.0	3.4	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	9.0	0.0	5.6				0.0	3.4	0.0	0.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	557	0	454				0	3990		0	2822	
V/C Ratio(X)	0.71	0.00	0.46				0.00	0.17		0.00	0.32	
Avail Cap(c_a), veh/h	1671	0	1360				0	3990		0	2822	
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	0.91	0.00
Uniform Delay (d), s/veh	36.5	0.0	35.0				0.0	4.1	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.7	0.0	0.7				0.0	0.1	0.0	0.0	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.0	2.1				0.0	0.9	0.0	0.0	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.1	0.0	35.7				0.0	4.1	0.0	0.0	0.3	0.0
LnGrp LOS	D	A	D				A	A		A	A	
Approach Vol, veh/h		602						665			906	
Approach Delay, s/veh		37.3						4.1			0.3	
Approach LOS		D						A			A	
Timer - Assigned Phs		2		4			6					
Phs Duration (G+Y+Rc), s		71.7		18.3			71.7					
Change Period (Y+Rc), s		7.0		5.0			7.0					
Max Green Setting (Gmax), s		38.0		40.0			38.0					
Max Q Clear Time (g_c+I1), s		5.4		11.0			2.0					
Green Ext Time (p_c), s		4.6		2.3			6.8					

Intersection Summary

HCM 6th Ctrl Delay		11.7	
HCM 6th LOS		B	

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection						
Int Delay, s/veh	3.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	307	17	46	398	46	108
Future Vol, veh/h	307	17	46	398	46	108
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	125	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	1	0	25	1	0	0
Mvmt Flow	337	19	51	437	51	119

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	356	0	886 347
Stage 1	-	-	-	-	347 -
Stage 2	-	-	-	-	539 -
Critical Hdwy	-	-	4.35	-	6.4 6.2
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	-	-	2.425	-	3.5 3.3
Pot Cap-1 Maneuver	-	-	1086	-	318 701
Stage 1	-	-	-	-	720 -
Stage 2	-	-	-	-	589 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1086	-	303 701
Mov Cap-2 Maneuver	-	-	-	-	303 -
Stage 1	-	-	-	-	720 -
Stage 2	-	-	-	-	561 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	15.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	503	-	-	1086	-
HCM Lane V/C Ratio	0.336	-	-	0.047	-
HCM Control Delay (s)	15.7	-	-	8.5	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	1.5	-	-	0.1	-

HCM 6th Signalized Intersection Summary
3: Liberty Corner Road & Allen Road

2024 Build Condition
Weekday Evening Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕		↗	↕↗		↗	↕↗	
Traffic Volume (veh/h)	251	0	464	3	1	0	298	691	0	0	687	160
Future Volume (veh/h)	251	0	464	3	1	0	298	691	0	0	687	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1900	1885	1900	1900	1900	1900	1885	1900	1900	1856	1870
Adj Flow Rate, veh/h	261	0	353	3	1	0	310	720	0	0	716	167
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	0	1	0	0	0	0	1	0	0	3	2
Cap, veh/h	395	0	512	108	29	0	485	2399	0	478	1567	365
Arrive On Green	0.23	0.00	0.23	0.23	0.23	0.00	0.09	0.67	0.00	0.00	0.55	0.55
Sat Flow, veh/h	1429	0	1598	222	124	0	1810	3676	0	1810	2838	662
Grp Volume(v), veh/h	261	0	353	4	0	0	310	720	0	0	445	438
Grp Sat Flow(s),veh/h/ln	1429	0	1598	346	0	0	1810	1791	0	1810	1763	1736
Q Serve(g_s), s	0.0	0.0	21.2	0.1	0.0	0.0	7.7	9.1	0.0	0.0	16.6	16.6
Cycle Q Clear(g_c), s	19.0	0.0	21.2	19.0	0.0	0.0	7.7	9.1	0.0	0.0	16.6	16.6
Prop In Lane	1.00		1.00	0.75		0.00	1.00		0.00	1.00		0.38
Lane Grp Cap(c), veh/h	395	0	512	137	0	0	485	2399	0	478	973	959
V/C Ratio(X)	0.66	0.00	0.69	0.03	0.00	0.00	0.64	0.30	0.00	0.00	0.46	0.46
Avail Cap(c_a), veh/h	521	0	653	240	0	0	519	2399	0	674	973	959
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.90	0.90	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	39.9	0.0	32.6	34.2	0.0	0.0	10.7	7.5	0.0	0.0	14.8	14.8
Incr Delay (d2), s/veh	1.9	0.0	2.1	0.1	0.0	0.0	2.2	0.3	0.0	0.0	1.5	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.6	0.0	8.2	0.1	0.0	0.0	2.8	3.0	0.0	0.0	6.4	6.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.8	0.0	34.7	34.3	0.0	0.0	12.9	7.8	0.0	0.0	16.3	16.3
LnGrp LOS	D	A	C	C	A	A	B	A	A	A	B	B
Approach Vol, veh/h		614			4			1030			883	
Approach Delay, s/veh		37.7			34.3			9.3			16.3	
Approach LOS		D			C			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	79.7		30.3	12.9	66.7		30.3				
Change Period (Y+Rc), s	3.0	6.0		5.0	3.0	6.0		5.0				
Max Green Setting (Gmax), s	12.0	49.0		35.0	12.0	49.0		35.0				
Max Q Clear Time (g_c+I1), s	0.0	11.1		23.2	9.7	18.6		21.0				
Green Ext Time (p_c), s	0.0	5.1		2.1	0.2	5.7		0.0				

Intersection Summary

HCM 6th Ctrl Delay	18.7
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
4: Liberty Corner Road & I-78 WB Ramp

2024 Build Condition
Weekday Evening Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↖	↗	↘		↖	↗		↖	↗
Traffic Volume (veh/h)	0	0	0	319	0	454	0	504	188	0	1056	351
Future Volume (veh/h)	0	0	0	319	0	454	0	504	188	0	1056	351
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No		No		No				No
Adj Sat Flow, veh/h/ln				2034	2067	2167	0	2084	2067	0	2067	2084
Adj Flow Rate, veh/h				332	0	212	0	525	0	0	1100	0
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %				4	2	1	0	1	2	0	2	1
Cap, veh/h				565	0	268	0	2854	0	0	2831	0
Arrive On Green				0.15	0.00	0.15	0.00	1.00	0.00	0.00	0.72	0.00
Sat Flow, veh/h				3875	0	1836	0	4063	1752	0	4031	1766
Grp Volume(v), veh/h				332	0	212	0	525	0	0	1100	0
Grp Sat Flow(s),veh/h/ln				1938	0	1836	0	1979	1752	0	1964	1766
Q Serve(g_s), s				7.2	0.0	10.0	0.0	0.0	0.0	0.0	9.8	0.0
Cycle Q Clear(g_c), s				7.2	0.0	10.0	0.0	0.0	0.0	0.0	9.8	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				565	0	268	0	2854	0	0	2831	0
V/C Ratio(X)				0.59	0.00	0.79	0.00	0.18		0.00	0.39	
Avail Cap(c_a), veh/h				775	0	367	0	2854	0	0	2831	0
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.99	0.00	0.00	0.81	0.00
Uniform Delay (d), s/veh				35.9	0.0	37.1	0.0	0.0	0.0	0.0	4.9	0.0
Incr Delay (d2), s/veh				1.0	0.0	7.9	0.0	0.1	0.0	0.0	0.3	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.4	0.0	5.0	0.0	0.1	0.0	0.0	2.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				36.9	0.0	45.0	0.0	0.1	0.0	0.0	5.2	0.0
LnGrp LOS				D	A	D	A	A		A	A	
Approach Vol, veh/h					544			525			1100	
Approach Delay, s/veh					40.1			0.1			5.2	
Approach LOS					D			A			A	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		71.9				71.9		18.1				
Change Period (Y+Rc), s		7.0				7.0		5.0				
Max Green Setting (Gmax), s		60.0				60.0		18.0				
Max Q Clear Time (g_c+I1), s		2.0				11.8		12.0				
Green Ext Time (p_c), s		3.5				9.2		1.1				

Intersection Summary

HCM 6th Ctrl Delay	12.7
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
 5: Liberty Corner Road & I-78 EB Ramp

2024 Build Condition
 Weekday Evening Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗		↖↗					↑↑↑	↖		↑↑	↖
Traffic Volume (veh/h)	141	0	100	0	0	0	0	535	403	0	797	554
Future Volume (veh/h)	141	0	100	0	0	0	0	535	403	0	797	554
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	2051	0	2100				0	2084	2084	0	2067	2067
Adj Flow Rate, veh/h	148	0	105				0	563	0	0	839	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	0	0				0	1	1	0	2	2
Cap, veh/h	294	0	243				0	4488		0	3099	
Arrive On Green	0.08	0.00	0.08				0.00	0.79	0.00	0.00	0.53	0.00
Sat Flow, veh/h	3789	0	3132				0	5876	1766	0	4031	1752
Grp Volume(v), veh/h	148	0	105				0	563	0	0	839	0
Grp Sat Flow(s),veh/h/ln	1895	0	1566				0	1896	1766	0	1964	1752
Q Serve(g_s), s	3.4	0.0	2.9				0.0	2.1	0.0	0.0	10.6	0.0
Cycle Q Clear(g_c), s	3.4	0.0	2.9				0.0	2.1	0.0	0.0	10.6	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	294	0	243				0	4488		0	3099	
V/C Ratio(X)	0.50	0.00	0.43				0.00	0.13		0.00	0.27	
Avail Cap(c_a), veh/h	758	0	626				0	4488		0	3099	
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	0.67	0.67
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	0.91	0.00
Uniform Delay (d), s/veh	39.8	0.0	39.6				0.0	2.2	0.0	0.0	7.0	0.0
Incr Delay (d2), s/veh	1.3	0.0	1.2				0.0	0.1	0.0	0.0	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	1.1				0.0	0.4	0.0	0.0	3.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.2	0.0	40.8				0.0	2.3	0.0	0.0	7.2	0.0
LnGrp LOS	D	A	D				A	A		A	A	
Approach Vol, veh/h		253						563			839	
Approach Delay, s/veh		41.0						2.3			7.2	
Approach LOS		D						A			A	
Timer - Assigned Phs		2		4				6				
Phs Duration (G+Y+Rc), s		78.0		12.0				78.0				
Change Period (Y+Rc), s		7.0		5.0				7.0				
Max Green Setting (Gmax), s		60.0		18.0				60.0				
Max Q Clear Time (g_c+I1), s		4.1		5.4				12.6				
Green Ext Time (p_c), s		3.9		0.7				6.3				

Intersection Summary

HCM 6th Ctrl Delay	10.7
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

TRAFFIC SIGNAL TIMING DIRECTIVE

Martinsville-Liberty Corner Road (County Route 525) and Allen Road (County Route 652)
Bernards Township

TIMING SCHEDULE
WITHOUT PEDESTRIAN ACTUATION

PHASE	INDICATION #									TIMING		
	1-3	4,5	6-8	9,10	11,12	13,14	15,16	P1-P4	P5,P6	MAX 1	MAX 2	MAX 3
A MARTINSVILLE-LIBERTY CORNER ROAD LEAD LEFTS	←G/R	R	←G/R	R	R	R/G→	R	DW	DW	7 - 21	7 - 12	7 - 15
CHANGE	←Y/R	R	←Y/R	R	R	R/Y→	R	DW	DW	3	3	3
B MARTINSVILLE-LIBERTY CORNER ROAD NB/SB ROW	G	G	G	G	R	R	R	DW	DW	62 - 43	82 - 49	46
CHANGE	Y	Y	Y	Y	R	R	R	DW	DW	4	4	4
CLEARANCE	R	R	R	R	R	R	R	DW	DW	2	2	2
C ALLEN ROAD EB/WB ROW	R	R	R	R	G	G/G→	G	DW	DW	7 - 12	7 - 35	7 - 25
CHANGE	R	R	R	R	Y	Y/G→ ¹²	Y	DW	DW	3	3	3
CLEARANCE	R	R	R	R	R	R/G→ ¹²	R	DW	DW	2	2	2
EMERGENCY FLASH	Y	Y	Y	Y	R	R	R	DARK	DARK	-	-	-
OFFSET³										29.0	110	-

WITH PEDESTRIAN ACTUATION

PHASE	INDICATION #									TIMING		
	1-3	4,5	6-8	9,10	11,12	13,14	15,16	P1-P4	P5,P6	MAX 1	MAX 2	MAX 3
A MARTINSVILLE-LIBERTY CORNER ROAD LEAD LEFTS	←G/R	R	←G/R	R	R	R/G→	R	DW	DW	7-21	7-12	7-15
CHANGE	←Y/R	R	←Y/R	R	R	R/Y→	R	DW	DW	3	3	3
B MARTINSVILLE-LIBERTY CORNER ROAD NB/SB ROW	G	G	G	G	R	R	R	W	DW	34 - 20	54 - 36	33
PEDESTRIAN CLEARANCE	G	G	G	G	R	R	R	FDW	DW	13	13	13
CHANGE	Y	Y	Y	Y	R	R	R	DW	DW	4	4	4
CLEARANCE	R	R	R	R	R	R	R	DW	DW	2	2	2
C ALLEN ROAD EB/WB ROW	R	R	R	R	G	G/G→	G	DW	W	7	7	7
PEDESTRIAN CLEARANCE	R	R	R	R	G	G/G→	G	DW	FDW	15	15	15
VEHICLE EXTENSION	R	R	R	R	G	G/G→	G	DW	DW	0	0-13	0-3
CHANGE	R	R	R	R	Y	Y/G→ ¹²	Y	DW	DW	3	3	3
CLEARANCE	R	R	R	R	R	R/G→ ¹²	R	DW	DW	2	2	2
EMERGENCY FLASH	Y	Y	Y	Y	R	R	R	DARK	DARK	-	-	-
OFFSET³										29.0	110	-

SIGNAL SEQUENCE NOTES

- Manual control and memory circuits shall be disconnected.
- Vehicle extension is to be set at 2 seconds.
- The offsets are measured from the beginning of yellow (change) for Phase B - Martinsville-Liberty Corner Road NB/SB ROW at this intersection to the beginning of yellow (change) for Phase B - Mount Airy Road NB/SB ROW at this intersection of Mount Airy Road (County Route 525) and Valley Road (County Route 512). For these coordinated periods, the signal shall operate with a 90 sec. background cycle during MAX 1 and a 110 sec. background cycle during MAX 3.
- The Martinsville-Liberty Corner Road Left-Turn lanes are to operate independently but concurrently if actuation occurs on both approaches. Each left turn lane shall be capable of extending or terminating separately. If one of the left turn lanes terminates, the non-conflicting through movement shall be initiated prior to Phase B - Martinsville-Liberty Corner Road NB/SB ROW.
- The signal shall rest in Phase B - Martinsville-Liberty Corner Road NB/SB ROW.
- Phase A - Martinsville-Liberty Corner Road Lead Lefts may be skipped in absence of demand.
- Phase A shall only follow Phase C.
- Phase A must be followed by Phase B.
- Phases C can be skipped in the absence of demand.
- The loops for the right-turn lane on Allen Road EB shall have delay unit set to 5 seconds.
- The signal will be set to "free" operation and shall rest in Phase B - Martinsville-Liberty Corner Road NB/SB ROW during MAX 3.
- The signal shall display a yellow ball ("Y") and red ball ("R") only if Phase A is skipped.

HOURS OF OPERATION

- MAX 1 TO OPERATE MONDAY - FRIDAY, 7:00AM TO 9:00AM
- MAX 2 TO OPERATE MONDAY - FRIDAY, 4:00PM TO 6:00PM
- MAX 3 TO OPERATE AT ALL OTHER TIMES

I-78 EB Ramps and Martinsville Road
Bernards & Warren Townships, Somerset County

60 and 90 Second Background and 48-59 Seconds Variable Cycle

<u>Phase</u>	<u>Signal Indications</u>		<u>Time</u>			
	<u>1-8</u>	<u>9-14</u>	<u>I</u> (60 sec.)	<u>II</u> (90 sec.)	<u>III</u> (90 sec.)	<u>IV</u>
A. Martinsville Road ROW	G	R	41-30	71-38	71-60	29
Change	Y	R	5*	5**	5***	5
Clearance	R	R	2	2	2	2
B. I-78 EB Exit Ramp	R	G	7-18	7-40	7-18	7-18
Change	R	Y	3	3	3	3
Clearance	R	R	2	2	2	2
Emergency Flash	Y	R	-	-	-	-

NOTES:

1. The manual control cord is to be removed.
2. The memory circuit is to be off and the vehicle extension interval is to be set at 2 seconds for Phase B.

* An Offsets of 34 seconds is to be measured from the beginning of yellow to Martinsville Road at the I-78 WB Ramp.

** An Offsets of 45 seconds is to be measured from the beginning of yellow to Martinsville Road at I-78 WB Ramp.

*** An Offsets of 37 seconds is to be measured from the beginning of yellow to Martinsville Road at I-78 WB Ramp.

Hours of Operation

- Plan I 9:00 AM – 4:00 PM, Monday- Friday
- Plan II 6:30 AM – 9:00 AM, Monday- Friday
- Plan III 4:00 PM – 6:00 PM, Monday- Friday
- Plan IV 48-59 seconds Variable Cycle at all other times.

I-78 WB Ramps and Martinsville Road
Bernards & Warren Townships, Somerset County

60 and 90 Seconds Background & 48-59 Seconds Variable Cycle

<u>Phase</u>	<u>Signal Indications</u>		<u>Time</u>			
	<u>1-7</u>	<u>8-12</u>	<u>I</u> (60 sec.)	<u>II</u> (90 sec.)	<u>III</u> (90 sec.)	<u>IV</u>
A. Martinsville Road ROW	G	R	41-30	71-53	71-60	29
Change	Y	R	5*	5*	5*	5
Clearance	R	R	2	2	2	2
B. I-78 WB Exit Ramp	R	G	7-18	7-25	7-18	7-18
Change	R	Y	3	3	3	3
Clearance	R	R	2	2	2	2
Emergency Flash	Y	R	-	-	-	-

NOTES:

1. The manual control cord is to be removed.
2. The memory circuit is to be off and the vehicle extension interval is to be set at 2 seconds for Phase B.

* An Offsets of 0 seconds is to be measured from the beginning of yellow to Martinsville Road traffic at I-78 WB Ramp.

Hours of Operation

- Plan I 9:00 AM – 4:00 PM, Monday- Friday
- Plan II 6:30 AM – 9:00 AM, Monday- Friday
- Plan III 4:00 PM – 6:00 PM, Monday- Friday
- Plan IV 48-59 seconds Variable Cycle at all other times.