

APPENDIX D

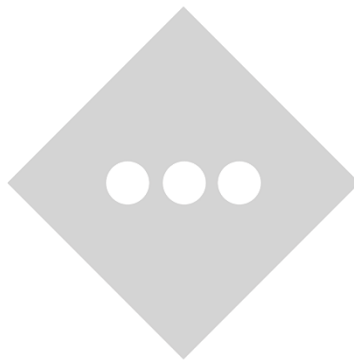
DRAINAGE AREA MAPS

INVENTORY

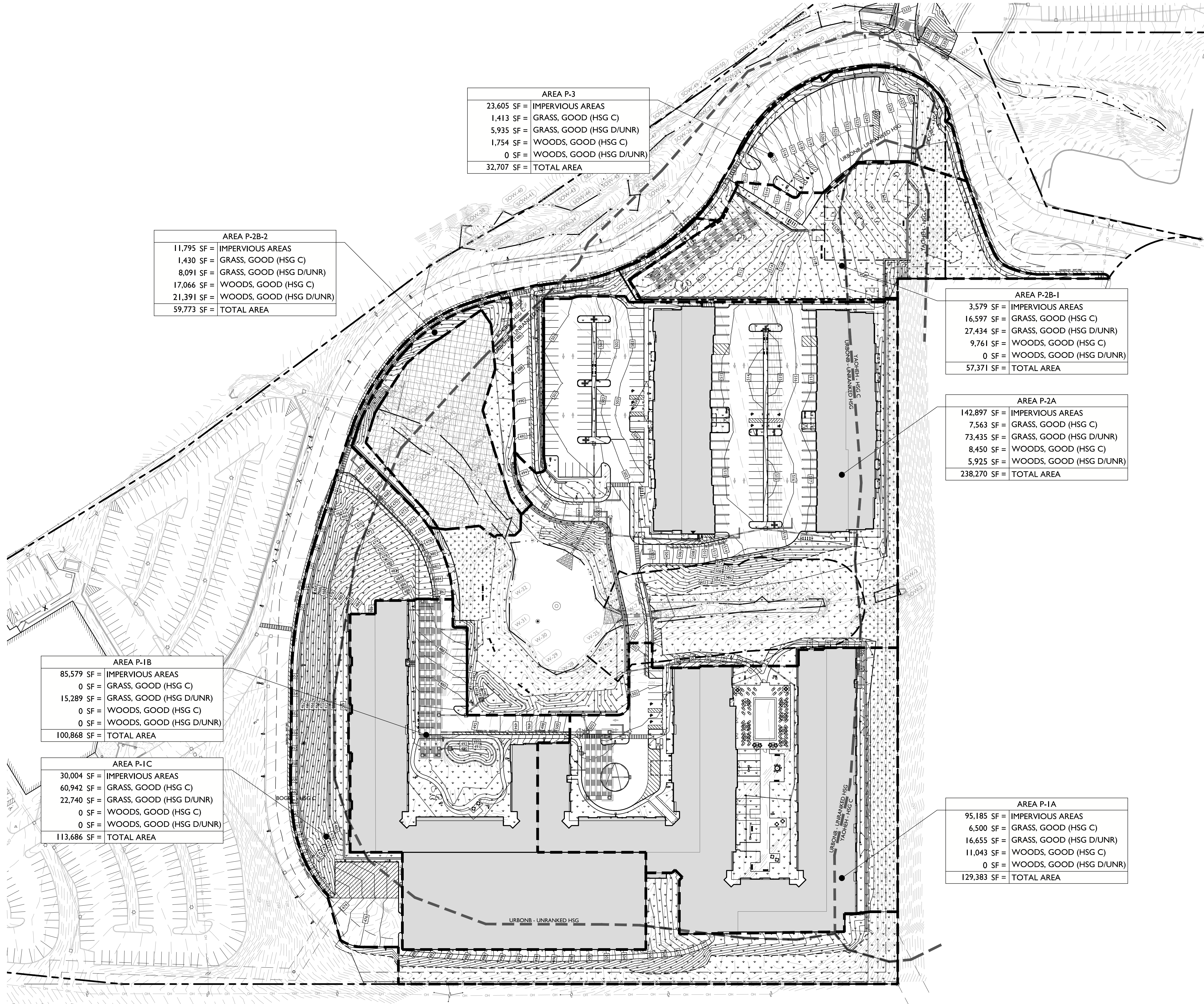
SHEET 1 OF 4: EXISTING DRAINAGE AREA MAP

SHEET 2 OF 4: PROPOSED DRAINAGE AREA MAP

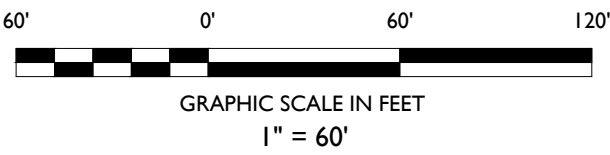
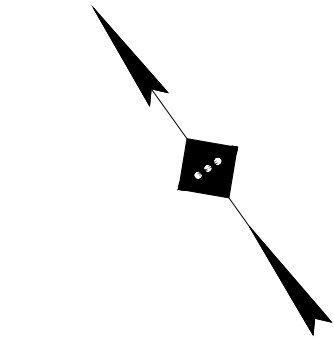
SHEET 3 & 4 OF 4: INLET DRAINAGE AREA MAP



\\0025913\SHAWDON\B70717-1754\BRIE REAL ESTATE GROUP - 10-2020 EXECUTIVE DRIVE, WEST ORANGE, NJ\CA020\K01875021-11-08-1P3\DRAINAGE AREA MAPS.DWG



SYMBOL	DESCRIPTION
	PROPOSED DRAINAGE AREA
	SOIL TYPE BOUNDARY
	PROPOSED GRASSED AREA
	PROPOSED WOODED AREA
	AREA EXCLUDED FROM STUDY



DRAINAGE AREA MAPS

GREEN ESSEX PARTNERS URBAN RENEWAL, LLC

PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT

BLOCK 155, LOTS 40.02, 42.01, & 42.02
100 - 200 EXECUTIVE DRIVE
TOWNSHIP OF WEST ORANGE
ESSEX COUNTY, NEW JERSEY

STONEFIELD

engineering & design

ZACHARY E. CHAPLIN, P.E.
NEW JERSEY LICENSE No. 53605
LICENSED PROFESSIONAL ENGINEER

SCALE: 1" = 60'

PROJECT ID: T-17554

TITLE:
PROPOSED DRAINAGE AREA MAP

DRAWING:
2 OF 4

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Phone 718.606.8305

TOWNSHIP RESUBMISSION

NJDEP RESUBMISSION

NJDEP SUBMISSION

ISSUED FOR REVIEW

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DESCRIPTION

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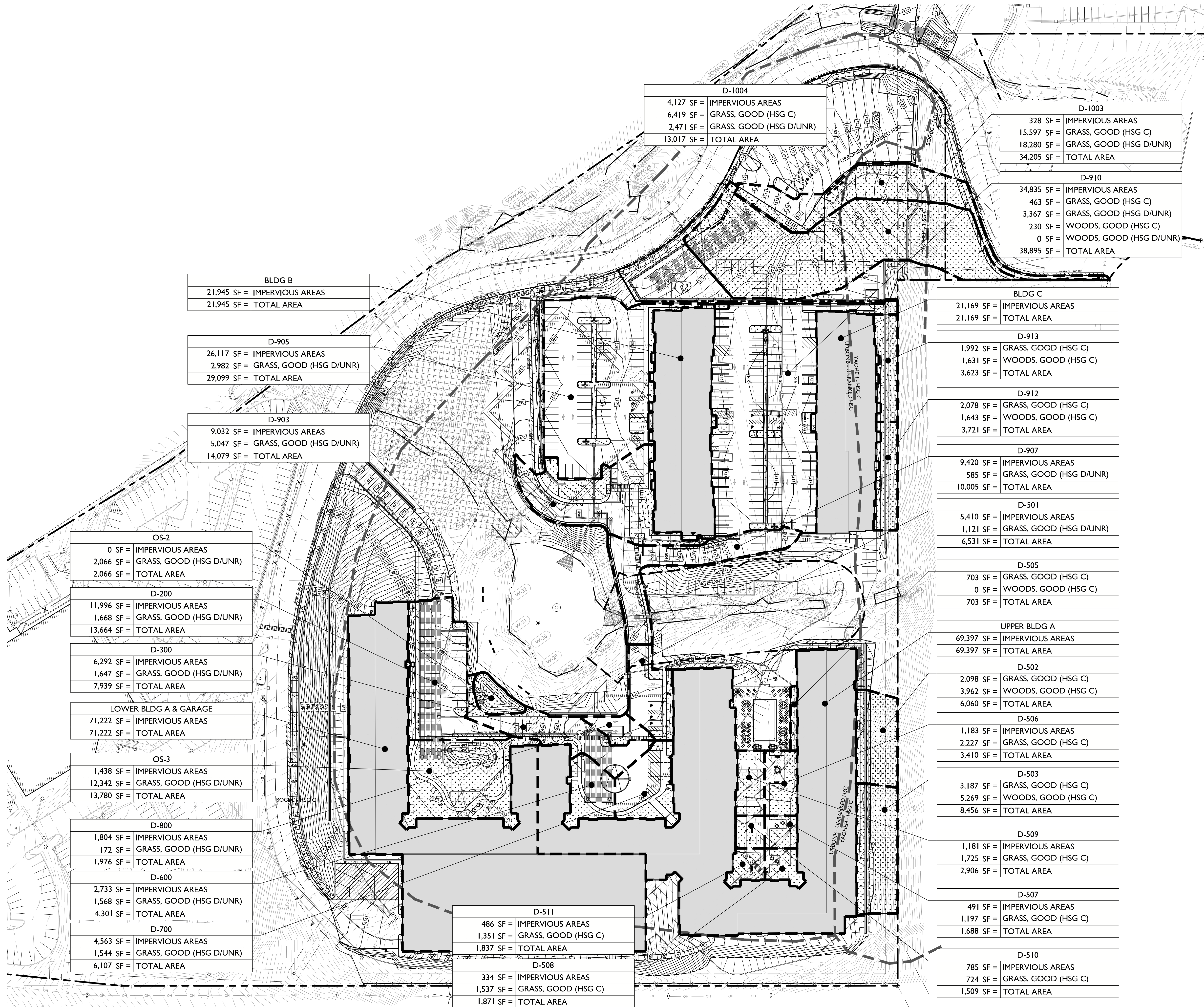
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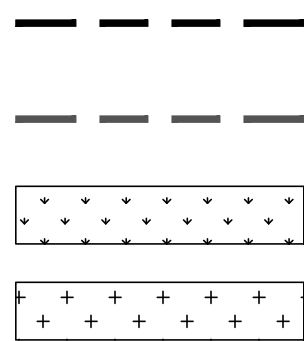
ISSUE

DESCRIPTION

\\002591\SHAWDON\B170717_17054\NEW REAL ESTATE GROUP - 10-2020 EXECUTIVE DRIVE - WEST ORANGE, NJ\CAD\DWG\B170717_17054\DRAINAGE AREA MAPS.DWG



SYMBOL



DESCRIPTION

PROPOSED INLET AREA

SOIL TYPE BOUNDARY

PROPOSED GRASSED AREA

PROPOSED WOODED AREA

NOT APPROVED FOR CONSTRUCTION

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**GREEN ESSEX PARTNERS URBAN
RENEWAL, LLC**

**PROPOSED MULTI-FAMILY
RESIDENTIAL DEVELOPMENT**

BLOCK 155, LOTS 40.02, 42.01, & 42.02
100 - 200 EXECUTIVE DRIVE
TOWNSHIP OF WEST ORANGE
ESSEX COUNTY, NEW JERSEY

ZACHARY E. CHAPLIN, P.E.
NEW JERSEY LICENSE No. 53605
LICENSED PROFESSIONAL ENGINEER

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SCALE: 1" = 60' PROJECT ID: T-17354

TITLE:

**PROPOSED INLET
AREA MAP**

DRAWING:

3 OF 4

DESCRIPTION

BY

DATE

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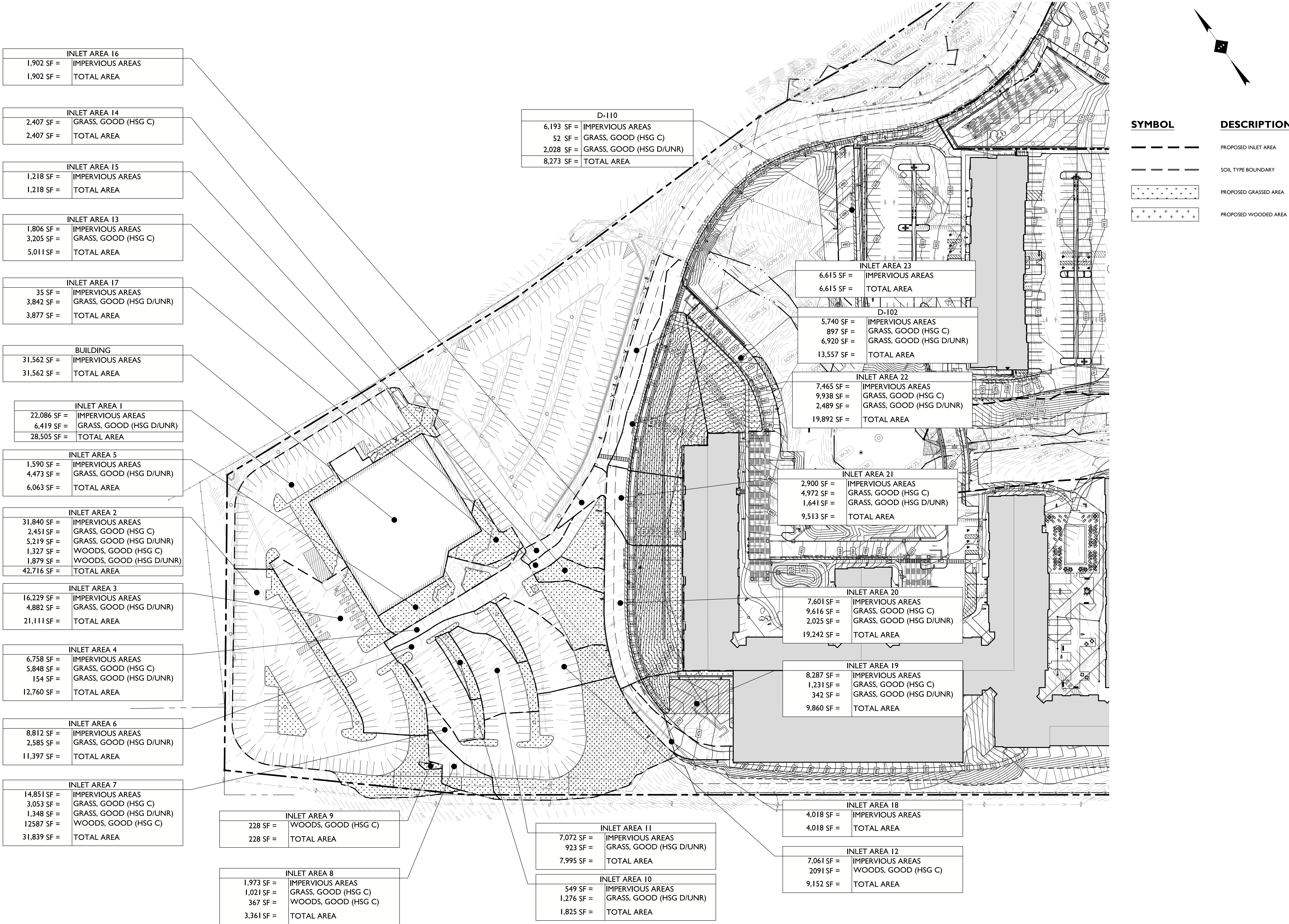
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TOWNSHIP RESUBMISSION				NIDEP RESUBMISSION				NIDEP SUBMISSION				ISSUED FOR REVIEW				DESCRIPTION	
DATE	BY	DATE	BY	DATE	BY	DATE	BY	DATE	BY	DATE	BY	DATE	BY	DATE	BY	DATE	BY
03/19/2021	DD	01/08/2021	DD	08/14/2020	DD	03/19/2020	DD										
4		3		2		1											

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DRAINAGE AREA MAPS

GREEN ESSEX PARTNERS URBAN RENEWAL, LLC

PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT

BLOCK 155, LOTS 40.02, 42.01, & 42.02
TOWNSHIP OF WEST ORANGE
ESSEX COUNTY, NEW JERSEY

ZACHARY E. CHAPLIN, P.E.
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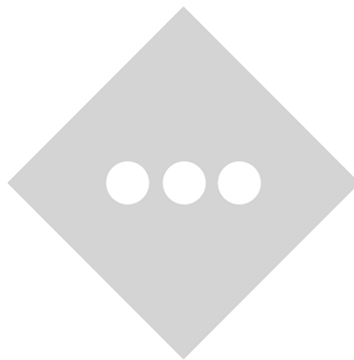
SCALE: 1" = 60' PROJECT ID: T-17354

TITLE:
DOWNSTREAM INLET AREA MAP

DRAWING:
4 OF 4

APPENDIX E

LOW IMPACT DEVELOPMENT CHECKLIST



Low Impact Development Checklist

A checklist for identifying nonstructural stormwater management strategies incorporated into proposed land development

Municipality: Township of West Orange

County: Essex Date: August 14, 2020

Review board or agency: West Orange Planning Board, DEP DLUR, HEPSCD

Proposed land development name: Proposed Multi-Family Residential Development

Lot(s): 40.02, 42.01, & 42.02 Block(s): 155

Project or application number: _____

Applicant's name: Green Essex Partners Urban Renewal, LLC

Applicant's address: 16 Microlab Road, Suite A, Livingston, NJ 07039

Telephone: 973-992-2443 Fax: _____

Email address: jschwartz@bnerealestate.com

Designer's name: Stonefield Engineering & Design, LLC

Designer's address: 92 Park Avenue, Rutherford, New Jersey 07070

Telephone: 201-340-4468 Fax: 201-340-4472

Email address: zchaplin@stonefieldeng.com

Part 1: Description of Nonstructural Approach to Site Design

In narrative form, provide an overall description of the nonstructural stormwater management approach and strategies incorporated into the proposed site's design. Attach additional pages as necessary. Details of each nonstructural strategy are provided in Part 3 below.

Green Essex Partners Urban Renewal, LLC is proposing to redevelop Block 155, Lots 40.02, 42.01, & 42.02 (herein referred to as the "project site") to accommodate three multi-family residential buildings (425 units total), a parking garage (570 spaces), and an amenity area for residents. Additional improvements include off-street parking lots, stormwater management improvements, lighting, and landscaping.

There are several environmentally sensitive areas on the project site including: flood hazard areas, riparian zones, and freshwater wetlands transition areas. These areas are clustered along two ditches: one along the northerly edge of the property and another that bisects the property running from east to west. Emphasis was placed during the design phase to limit disturbance within these areas to the maximum extent feasible. Additionally, consideration was given to the area of steep slopes and wooded regions along the banks of the tributary in regards to stormwater discharge and disturbance limits.

The areas outside of the immediate building and amenity areas will be planted with low maintenance, native plantings. Disturbed pervious areas along or within the environmentally sensitive areas will also be planted with native plantings to enhance the vegetative areas along the tributary.

In accordance with the Hudson, Essex, Passaic Soil Conservation District requirements; all proposed open space areas will be tilled post-development to mitigate any excessive soil compaction that may have occurred during construction.

Part 2: Review of Local Stormwater Management Regulations

Title and date of stormwater management regulations used in development design:

NJAC 7:8, West Orange Ordinance Section 25-29 Stormwater Control

Do regulations include nonstructural requirements? Yes: NJAC 7:8 only No: _____

If yes, briefly describe: Per Section 7:8-5.3, to the maximum extent practicable, the standards in NJAC 7:8-5.4 and 5.5 shall be met by incorporating nonstructural stormwater management strategies at NJAC 7:8-5.3 into the design.

List LID-BMPs prohibited by local regulations: None.

Pre-design meeting held? Yes: X Date: March 2, 2018 No: _____

Meeting held with: Dennis Contois (conference call to discuss Applicability Determination)

Pre-design site walk held? Yes: X Date: 12/11/2017 No: _____

Site walk held with: Zachary Chaplin & Sonja Ommundsen of Stonefield Engineering

Other agencies with stormwater review jurisdiction:

Name: Township of West Orange Planning Board

Required approval: Preliminary & Final Major Site Plan Approval

Name: Hudson Essex Passaic Soil Conservation District

Required approval: Soil Erosion and Sediment Control Plan Certification

Name: New Jersey Department of Environmental Protection (Division of Land Use Regulation)

Required approval: Flood Hazard Area Individual Permit, Freshwater Wetland LOI and General Permits

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: X No:

If yes, was this inventory a factor in the site's layout and design? Yes: X No:

B. Does the site design utilize any of the following nonstructural LID-BMPs?

Preservation of natural areas? Yes: X No: If yes, specify % of site: 19.1%

Native ground cover? Yes: X No: If yes, specify % of site: 20%

Vegetated buffers? Yes: No: X If yes, specify % of site: N/A

C. Do the land development regulations require these nonstructural LID-BMPs?

Preservation of natural areas? Yes: No: X If yes, specify % of site: N/A

Native ground cover? Yes: No: X If yes, specify % of site: N/A

Vegetated buffers? Yes: No: X If yes, specify % of site: N/A

D. If vegetated filter strips or buffers are utilized, specify their functions:

Reduce runoff volume increases through lower runoff coefficient: Yes: N/A No: N/A

Reduce runoff pollutant loads through runoff treatment: Yes: N/A No: N/A

Maintain groundwater recharge by preserving natural areas: Yes: N/A No: N/A

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: X No:

If yes, how: The freshwater wetland transition area compensation will be deed restricted per NJAC 7:7A-8.2

Restrict temporary site disturbance during construction? Yes: X No:

If yes, how: Construction fencing will be installed along the limit of disturbance between the proposed development and the environmentally sensitive areas (riparian zone / FWW transition area)

Consider soils and slopes in selecting disturbance limits? Yes: X No:

If yes, how: The embankments along the respective channels are very steep and based on field visits and the soils report, the stormwater basin outfalls were sited properly.

C. Specify percentage of site to be cleared: 73.7% Regraded: 73.7%

D. Specify percentage of cleared areas done so for buildings: 22.3%

For driveways and parking: 31.6% For roadways: 0%

E. What design criteria and/or site changes would be required to reduce the percentages in C and D above?

The proposed development was designed in accordance with a redevelopment plan that was
developed by the municipality. The extent of disturbance is in keeping with what the Township has
envisioned for the property.

F. Specify site's hydrologic soil group (HSG) percentages:

HSG A: _____ HSG B: _____ HSG C: 29.5% HSG D: 70.5%

G. Specify percentage of each HSG that will be permanently disturbed:

HSG A: _____ HSG B: _____ HSG C: 91.6% HSG D: 70.9%

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?

The site is not located within an area of highly permeable soils (A/B). Emphasis was placed on limiting
disturbance along the environmentally sensitive areas and steep slopes along the banks of the streams.

I. Does the site include Karst topography?

Yes: _____ No: X

If yes, discuss measures taken to limit Karst impacts:

Not applicable.

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: 439,040 SF Proposed: 430,131 SF

B. Specify maximum site impervious coverage allowed by regulations: 65%

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	24 FT	24 FT
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		
Minor collector – without parking		
Major collector		

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: 820 spaces Regulations: 819 spaces

F. Specify percentage of total site impervious cover created by buildings: 22.3%
By driveways and parking: 31.6% By roadways: 5.8%

G. What design criteria and/or site changes would be required to reduce the percentages in F above?

The building and parking densities are based on what is permissible per the Township
Redevelopment Plan.

H. Specify percentage of total impervious area that will be unconnected:

Total site: 0% Buildings: 0% Driveways and parking: N/A Roads: N/A

I. Specify percentage of total impervious area that will be porous:

Total site: 0.0% Buildings: N/A Driveways and parking: N/A Roads: N/A

J. Specify percentage of total building roof area that will be vegetated: 0.0%

K. Specify percentage of total parking area located beneath buildings: 5.1%

L. Specify percentage of total parking located within multi-level parking deck: 69.5%

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: 100% Vegetated swale: 0.0% Natural channel: 0.0%

Stormwater management facility: 0.0% Other: N/A

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?

The density and use of the project is in keeping with the Township Redevelopment Plan objectives

and is not compatible with the utilization of swales, though the development does seek to maintain

those existing already on site.

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: The areas in which stormwater runoff flows over impervious surfaces

are already designed to minimum slopes (1% - 3%) and as a result a small retaining wall needs to be

installed along the low side of the side to make up for the flattening of the project area.

Increase overland flow roughness: The majority of areas in which runoff flows over impervious

surfaces are asphalt materials which have one of the highest levels of roughness for travel surfaces.

Disturbed pervious areas flowing directly to the points of interest will be planted with native species.

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

Specify the number of trash receptacles provided: 15 (estimated)

Specify the spacing between the trash receptacles: Internally collected

Compare trash receptacles proposed with those required by regulations:

Proposed: 15 (estimated) Regulations: Not specified

B. Pet Waste Stations

Specify the number of pet waste stations provided: TBD

Specify the spacing between the pet waste stations: TBD

Compare pet waste stations proposed with those required by regulations:

Proposed: TBD Regulations: Not specified

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: None contemplated Regulations: Not specified

Litter collection: Proposed: Weekly (estimated) Regulations: Weekly

Identify other stormwater management measures on the site that prevent discharge of large trash and debris:

E. Prevention and Containment of Spills

Identify locations where pollutants are located on the site, and the features that prevent these pollutants from being exposed to stormwater runoff:

Pollutant: None anticipated (residential / retail) Location: N/A

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.

Minimize Impervious Surfaces - The project proposes less coverage than what is allowed by municipal code and reduces coverage relative to the existing use. feasible due

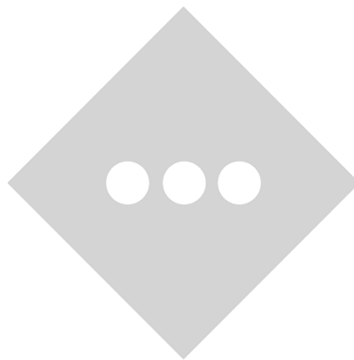
Minimize ToC Impacts - The project area is currently entirely developed and the topography is extremely steep, so it is unfeasible to minimize ToC impacts.

Minimize Disturbance - The extent of the project scope is in keep with the envisioned development of the subject site per the Redevelopment Plan. Disturbance is minimized along environmental areas.

Vegetated Conveyance - The site maintains existing vegetated conveyance to the maximum extent possible, providing additional vegetation where possible.

APPENDIX F

RIP RAP PAD CALCULATIONS



OUTLET NO. OUT-1

OUTLET PARAMETERS

PIPE WIDTH: 2.00 FT

PIPE HEIGHT: 2.00 FT

FLOW AT OUTLET: 15.84 CFS

UNIT DISCHARGE: 7.92 CFS/FT

TAILWATER DEPTH: 1.00 FT

TAILWATER? YES

APRON DIMENSIONS

LENGTH: 16.80 FT

RIPRAP SIZE: 3.01 IN*

WIDTH: 22.80 FT

*A minimum riprap size of 6" shall be used.

WIDTH (OUTLET): 6.00 FT

RIP-RAP SIZING CHART				
ID#	L (FT)	W1 (FT)	W2 (FT)	D50 (IN)
OUT-1	16.80	22.80	6.00	6.00