

Application for Approval of a Definitive Plan

***Residential Compound
Roosevelt Drive
Acton, MA***

March 2014

***Submitted to:
Acton Planning Board
472 Main Street
Acton, MA 01720***

***Submitted by:
Guido & Helene Gagliano
17 Washington Drive
Acton, MA 01720***

***Prepared by:
Goldsmith, Prest & Ringwall, Inc.
39 Main Street, Suite 301
Ayer, MA 01432***

***Project No:
00159A***



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Residential Compound
Roosevelt Drive, Acton, MA

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Letter of Agent Authorization
Copy of Record Deed
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Copy of Fee Check

Attachments

Residential Compound - Permit Plans (24"x36")
Prepared by Goldsmith, Prest & Ringwall, Inc. Dated March 2014.

Residential Compound - Proof Plan, Loop Cul-De-Sac (24"x36")
Prepared by Goldsmith, Prest & Ringwall, Inc. Dated March 2014.

Narrative to Accompany Stormwater Computations
Prepared by Goldsmith, Prest & Ringwall, Inc. Dated March 12, 2014.

Stormwater System Operations & Maintenance Plan
Prepared by Goldsmith, Prest & Ringwall, Inc. Dated March 2014.

Letter from Attorney Ray Lyons w/ Attachements (Dated March 13, 2014)

Section 1

Form DP - Application for Approval of Definitive Plan

APPLICATION for APPROVAL of DEFINITIVE PLAN

The undersigned herewith submits the accompanying Definitive Plan of property located in the Town of Acton for Approval as a subdivision under the requirements of the Subdivision Control Law and the Rules and Regulations Governing the Subdivision of Land in the Town of Acton.

(Please type or print information in blanks below.)

1. Name of Proposed Subdivision Roosevelt Drive

2. Name of Applicant(s) Guido and Helene Gaglino

Contact Address 17 Washington Drive, Acton, MA 01720 Phone 978-266-2897

3. Name of Property Owner(s) SAME

4. Name of Engineer Goldsmith, Prest & Ringwall, Inc. (GPR)

Address 39 Main Street, Suite 301, Ayer, MA 01432 Phone 978-772-1590

5. Name of Land Surveyor Goldsmith, Prest & Ringwall, Inc. (GPR)

Address 39 Main Street, Suite 301, Ayer, MA 01432 Phone 978-772-1590

6. Deed of property recorded in Middlesex South Registry Of Deeds, Book Number 24657, Page Number 363; and/or registered in Middlesex Registry of Land Court, Certificate of Title Number _____.

7. Zoning District R2, Town Atlas Map No. E-3 Parcel No. 88 & 88-1

Approximate acreage in subdivision 2.71, Number of Lots 3

Total length of road(s) in feet N/A 435 of Residential Compound Drive)

Location and Description of Property The property contains an existing single family home, with a 590'+/- driveway within a wooded lot. The site has frontage on Washington Drive and Monroe Drive.

8. Said plan has ()/ has not (x) evolved from a preliminary plan submitted to the Board on _____ 20 __; and approved (with modifications) () or disapproved () on _____ 20 __.

Helene Gaglino
Applicant(s) Signature, _____ Date

[Signature]
Applicant(s) Signature, _____ Date

Helene Gaglino
Owner(s) Signature, _____ Date

[Signature]
Owner(s) Signature, _____ Date

All owners (in the case of a corporation, an authorized officer; in the case of a trust, all trustees) must sign.

Section 2

Form DIR - Development Impact Report

DEVELOPMENT IMPACT REPORT

Please type or print information in blanks below.

1. Name of Proposed Subdivision Roosevelt Drive
2. Location 17 Washington Drive
3. Name of Applicant(s) Guido & Helene Gagliano
4. Brief Description of the Proposed Project Subdivision of 2.71± acres parcel into 3 lots through the construction of a Residential Compound way.
5. Name of Individual Preparing this DIR Goldsmith, Prest & Ringwall, Inc. (Matthew Bombaci)
 Address 39 Main Street, Suite 301 Business Phone (978) 772-1590
Ayer, MA 01432
6. Professional Credentials Professional Engineer

A. Site Description

7. Present permitted and actual land uses by percentage of the site.

<i>Uses</i>	<i>Percentage</i>
Industrial	0%
Commercial	0%
Residential	100%
Forest	0%
Agricultural	0%
Other (specify)	0%

8. Total acreage on the site: 2.71± acres.

<i>Approximate Acreage</i>	<i>At Present</i>	<i>After Completion</i>
Meadow or Brushland (non agriculture)	N/A	N/A
Forested	1.86±ac.	0.62±ac.
Agricultural (includes orchards, cropland, pasture)	N/A	N/A
Wetland	N/A	N/A
Water Surface Area	N/A	N/A
Flood Plain	N/A	N/A
Unvegetated (rock, earth, or fill)	N/A	N/A
Roads, buildings and other impervious surfaces	0.28±ac.	0.40±ac.
Other (indicate type) <u>Lawn</u>	0.57±ac.	1.69±ac.

9. List the zoning districts in which the site is located and indicate the percentage of the site in each district. *Note: be sure to include overlay zoning districts.*

District	Percentage
Residence 2	100%

10. Predominant soil type(s) on the site: Canton-Charlton-Urban; Loamy Sands & Sandy Loams

Soil drainage (Use the US Natural Resources Conservation Service's definition)

Soil Type	% of the Site
Well drained	100%
Moderately well drained	0%
Poorly drained	0%

11. Are there bedrock outcroppings on the site? yes no

12. Approximate percentage of proposed site with slopes between:

Slope	% of the Site
0 - 10%	70%
10 - 15%	20%
greater than 15%	10%

13. In which of the Groundwater Protection Districts in the site located? How close is the site to a public well? Zone(s) 4 Proximity to a public well: 9,000± feet

14. Does the project site contain any species of plant or animal life that is identified as rare or endangered? (Consult with the Massachusetts National Heritage Program and the Acton Natural Resources Director). yes no

If yes, specify: _____

15. Are there any unusual or unique features on the site such as trees larger than 30 inches D.B.H., bogs, kettle ponds, eskers, drumlins, quarries, distinctive rock formation or granite bridges?

yes no

If yes, specify: _____

16. Are there any established foot paths running through the site or railroad right of ways?

yes no

If yes, specify: _____

17. Is the site presently used by the community or neighborhood as an open space or recreation area?
 yes no

Is the site adjacent to conservation land or a recreation area? yes no

If yes, specify: _____

18. Does the site include scenic views or will the proposed development cause any scenic vistas to be obstructed from view? yes no

If yes, specify: _____

19. Are there wetlands, lakes, ponds, streams, or rivers within or contiguous to the site?
 yes no

If yes, specify: _____

20. Is there any farmland or forest land on the site protected under Chapter 61A or 61B of the Massachusetts General Laws? yes no

If yes, specify: _____

21. Has the site ever been used for the disposal of hazardous waste? Has a 21E Study been conducted for the site? yes no

If yes, specify results: _____

22. Will the proposed activity require use and/or storage of hazardous materials, or generation of hazardous waste? yes no

If yes, specify _____

23. Does the project contain any buildings or sites of historic or archaeological significance? (Consult with the Acton Historic Commission or the Action Historical Society.)

yes no

If yes, please describe _____

24. Is the project contiguous to or does it contain a building in a local historic district or national register district? yes no

25. Is the project contiguous to any section of the Isaac Davis Trail? yes no

If yes, please describe _____

B. Circulation System

26. What is the average weekday traffic and peak hour traffic volumes generated by the proposed subdivision?

Average weekday traffic		28.7±
Average peak hour volumes	morning	2.3±
Average peak hour volumes	evening	3.0±

27. Existing street(s) providing access to proposed subdivision:

Name Monroe Drive Town Classification Local Street

28. Existing intersection(s): list intersections located within 1000 feet of any access to the proposed development:

Name of ways Jackson Drive, Washington Drive & Coolidge Drive

29. Location of existing sidewalks within 1000 feet of the proposed site? Jackson Drive

30. Location of proposed sidewalks and their connection to existing sidewalks:

Neighborhood sidewalk improvements proposed on Musket Drive.

31. Are there parcels of undeveloped land adjacent to the proposed site? yes no

Will access to these undeveloped parcels be provided within the proposed site?

yes no

If yes, please describe _____

If no, please explain why _____

C. Utilities and Municipal Services

32. If dwelling units are to be constructed, what is the total number of bedrooms proposed?

4 Bedrooms

33. If the proposed use of the site is nonresidential, what will the site be specifically used for and how many feet of Gross floor area will be constructed? N/A

34. How will sewage be handled? Individual On-Site Sewage Disposal Systems

35. Storm Drainage

- a. Describe nature, location and surface water body receiving current surface water of the site:

N/A

- b. Describe the proposed storm drainage system and how it will be altered by the proposed development: Pre-development drainage patterns will be maintained. Grassed swales and infiltrating water quality basins are proposed to collect and retain runoff.

- c. Will a NPDES Permit be required? yes no

36. In the event of fire, estimate the response time of the fire department (consult with Fire Dept.)

3-4 minutes

37. Schools (if residential)

a. Projected number of new school age children: 3.9±

b. Distance to nearest school: 0.75± miles

D. Measures to Mitigate Impacts

Attach brief descriptions of the measures that will be taken to:

38. Prevent surface water contamination.
39. Prevent groundwater contamination.
40. Maximize groundwater recharge.
41. Prevent erosion and sedimentation.
42. Maintain slope stability.
43. Design the project to conserve energy.
44. Preserve wildlife habitat.
45. Preserve wetlands.
46. Ensure compatibility with the surrounding land uses.
47. Control peak runoff from the site so that the post-development rate of runoff will be no greater than the predevelopment rate of runoff for the 10-year storm event.
48. Preserve historically significant structures and features on the site.
49. To mitigate the impact of the traffic generated by the development.

Please use layman's terms where possible while still being accurate and comprehensive. Where appropriate, graphics shall be used. List sources of data, reference materials, and methodology used to determine all conclusions. Use additional sheets as necessary.

Supplement to Form DIR – Development Impact Report

D. Measures to Mitigate Impacts

38. Prevent surface water contamination.
Stormwater runoff will be treated in Biofilter Swales along the proposed way and also by Water Quality Basins. The majority of any runoff leaving the site will be collected in the Washington Drive and Monroe Drive municipal drainage infrastructure.
39. Prevent groundwater contamination.
The proposed on-site sewage disposal systems will be designed to meet all state and local regulations.
40. Maximize groundwater recharge.
Stormwater runoff from proposed impervious surfaces will be collected, treated and infiltrated within proposed Water Quality Basins to the maximum extent practicable.
41. Prevent erosion and sedimentation.
The area of disturbance will be minimized to what is only required for post-development conditions. All disturbed areas will be maintained and quickly re-vegetated to prevent erosion and sedimentation from occurring.
42. Maintain slope stability.
All slopes will be maintained by vegetative cover to provide stability.
43. Design the project to conserve energy.
Due to the project consisting of single family dwellings with minimal maintenance required, the impact due to energy consumption will be negligible.
44. Preserve wildlife habitat.
The areas of disturbance will be minimized to that required for post-development conditions. The existing bituminous concrete drive will be re-vegetated.
45. Preserve wetlands.
Not applicable.
46. Ensure compatibility with the surrounding land uses.
The proposed project is similar in nature to the surrounding residential community.
47. Control peak runoff from the site so that the post-development rate of runoff will be no greater than the pre-development rate of runoff for the 10-year storm event.
Stormwater runoff from proposed impervious surfaces will be collected in Biofilter Swales and infiltrated in Water Quality Basins. Additionally, the existing paved driveway will be removed.
48. Preserve historically significant structures and features on the site.
There are no historically significant structures and/or features on the site.
49. To mitigate the impact of the traffic generated by the development.
The project will only result in the increase of traffic on Monroe Drive of 10 vehicle trips per day.

Section 3

Form DC - Designer's Certificate

ACTON PLANNING BOARD

FORM DC

DESIGNER'S CERTIFICATE

I hereby certify that the accompanying plan entitled Permit Plan, Residential
Compound, Washington Dr. Acton, MA dated March. 7, 2014

is correct, stating that the perimeter traverse of the subdivision before adjustment was closed to
an accuracy of a ratio "error of closure" not to exceed 1/15000*; that it is a subdivision of 2.71±
acres conveyed by Egons J. Kubulins & Dagnija R. Kubulins to
Guido Gagliano & Helene P. Gagliano by a deed, dated
Feb. 12, 1999 and recorded in Middlesex County Registry of Deeds, South District,
Book 24657, Page 363.

Other sources of information used in the preparation of the plan are:

1. Other deeds and plans, as follows Pl. 210 of 1967, Pl 221 of 1980,
Pl.942 of 2002 and Abutters deeds as noted on accomp. plan
2. Oral information furnished by _____
3. Other _____

Furthermore, I certify that this survey was made on the ground in accordance with the "Procedural and
Technical Standards for the Practice of Land Surveying", Section 250 CMR** 5.0 between
3/2003 and 2/2014.
(date) (date)



Signed [Signature] 3/7/14
Registered Land Surveyor Date

Address Goldsmith, Prest & Ringwall, Inc.
39 Main St.-Suite 301-Ayer, MA
Registration No. MA PLS# 33,887

*As described in the "1989 Manual of Instructions for the Survey of Lands and Preparation of Plans" published by the Land Court of the Commonwealth of Massachusetts, as most recently amended.

** Code of Massachusetts Regulations

Section 4

Waiver Request Letter



Engineering Solutions
for Land & Structures

March 14, 2014

Acton Planning Board
472 Main Street
Acton, MA 01720

**Subject: Waiver Requests from the Acton Subdivision Rules and Regulations
Roosevelt Drive, Acton, MA**

Dear Board Members:

On behalf of the proponents, Guido and Helene Gagliano, and in accordance with Section 10 of the Subdivision Rules and Regulations for an Optional Residential Compound Plan, GPR respectfully requests the following waivers from the Town of Acton Subdivision Rules and Regulations (adopted August 9, 1965, last amended December 6, 2011):

Section 8 – Design Standards:

Required: Streets shall be designed in accordance with the design standards of this section.

Requested: Waive compliance from the design standards of this section for a Residential Compound Way. Proposed way to meet the requirements set forth in the for Common Driveway Special Permits (Zoning Bylaw Section 3.8.1.5) as allowed per Section 10.1.3 of the Subdivision Rules and Regulations.

Section 9 – Improvements:

Required: Street improvements shall be to the standards set forth in this section.

Requested: Waive compliance from this section for a Residential Compound Way.

Sincerely,
Goldsmith, Prest & Ringwall, Inc.

Matthew Bombaci, P.E.

Goldsmith, Prest & Ringwall, Inc.

Appendix

February 13, 2014

Subject: 17 Washington Drive
Assessor Ref: E3-88 & 88-1

To Whom It May Concern:

I/we hereby authorize Goldsmith, Prest & Ringwall, Inc., 39 Main Street, Suite 301, Ayer, MA, 978.772.1590, to act as my agent in administrative and civil engineering matters pertaining to the requested permitting at the subject site. This authorization covers the execution of application forms, presentation of plans and designs, and communication with involved parties.

Respectfully,



Guido and or Helene Gagliano
17 Washington Drive
Acton, MA 01720

#24657#363

Handwritten initials

QUITCLAIM DEED

EGONS J. KUBULINS AND DAGNIJA R. KUBULINS, of 17 Washington Drive, Acton, MA 01720, for consideration paid, and in full consideration of Three Hundred Twenty Five Thousand and 00/100 (\$325,000.00) Dollars

GRANTS TO GUIDO GAGLIANO AND HELENE P. GAGLIANO, Husband and Wife, As Tenants by the Entirety, of 17 Washington Drive, Acton, MA

WITH QUITCLAIM COVENANTS, THE PREMISES DESCRIBED IN THE ATTACHED "EXHIBIT A".

Property Address: 17 Washington Drive, Acton, MA 01720

WITNESS MY/OUR HAND(S) AND SEAL(S) this 28th day of June, 1994.

Egons J. Kubulins

Egons J. Kubulins
Dagnija R. Kubulins

Dagnija R. Kubulins

COMMONWEALTH OF MASSACHUSETTS

Worcester North, ss. June 28, 1994

Then personally appeared the above-named Egons J. Kubulins and Dagnija R. Kubulins and acknowledged the foregoing to be his/her/their free act and deed, before me,

Diane Sacco Dalton

NOTARY:
COMMISSION EXPIRES: February 12, 1995

DIANE SACCO DALTON
NOTARY PUBLIC
My Commission Expires
February 12, 1995

TAX 1482.00
EXCISE TAX 1482.00
COMMISSION EXPIRES 02:30
EXCISE TAX
CANCELLED

25.00

293

MSD 06/29/94 11:08:11

1482.00 ***

**** MASS. EXCISE TAX:

"EXHIBIT A"

A certain parcel of land with the buildings thereon situated in Acton, Middlesex County, Massachusetts, being shown as Lot 7 on a plan entitled, "Patriots Hill' Definitive Subdivision of Land in Acton, Mass. surveyed for Demand Resources Corp." dated September, 1979 by Charles A. Perkins Co., Inc., recorded with Middlesex South District Registry of Deeds in Book 13910, Page 81, to which plan references may be had for a more particular description of Lot 7.

Subject to easements, restrictions and agreements of record, in any there by, insofar as the same are now in force and applicable.

For our title to said premises see Deed of Stanley P. Richmond and Karen C. Richmond dated March 5, 1985 recorded with said Deeds in Book 16042, Page 388.

Being the same premises conveyed to the grantor(s) by deed of Stanley P. Richmond, et al dated August 20, 1992 and recorded with Middlesex South District Registry of Deeds in Book 22356, Page 514.



2011 00002601

Bk: 56221 Pg: 511 Doc: DEED
Page: 1 of 2 01/04/2011 03:33 PM

Ja

WARRANTY DEED RESERVING LIFE ESTATE

We, **Guido Gagliano and Helene P. Gagliano**, husband and wife, both of Acton, Massachusetts,

for Consideration paid, and in full consideration of One Dollar (\$1.00),

grant to **Helene Gagliano, Trustee of the Helene Gagliano Investment Trust**, under a Declaration of Trust of even date, a Trustee's Certificate for which to be recorded herewith, of 17 Washington Drive, Acton, Massachusetts 01720,

with *WARRANTY COVENANTS*,

A certain parcel of land with the buildings thereon situated in Acton, Middlesex County, Massachusetts, being shown as Lot 7 on a plan entitled, "Patriots Hill" Definitive Subdivision of Land in Acton, Mass. surveyed for Demand Resources Corp." dated September, 1979 by Charles A. Perkins Co., Inc., recorded with Middlesex South District Registry of Deeds in Book 13910, Page 81, to which plan references may be had for a more particular description of Lot 7.

Said premises are conveyed subject to restrictions, easements and takings of record insofar as they are now in force and applicable.

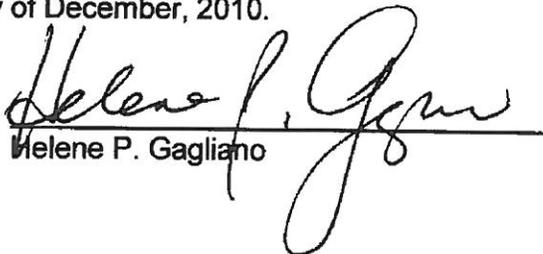
RESERVING UNTO GRANTOR HELENE P. GAGLIANO A LIFE ESTATE, to use and occupy said property, but without the right to receive any rents or profits therefrom which shall instead flow to the remainderman, and without any right of partition.

Being the same premises conveyed to us by deed of Egons J. Kubulins and Dagnija R. Kubulins, dated June 28, 1994, recorded with said Deeds in Book 24657, Page 363.

Witness our hands and seals, this thirteenth day of December, 2010.



Guido Gagliano



Helene P. Gagliano

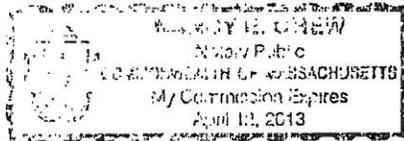
Property Address: 17 Washington Drive, Acton, MA 01720

PLEASE RETURN TO:
Law Offices of
Nancy Catalini Chew
206 Ayer Road
P.O. Box 0667
Harvard, MA 01451
(978) 456-2321

COMMONWEALTH OF MASSACHUSETTS

Worcester, ss:

On this thirteenth day of December, 2010, before me, the undersigned Notary Public, personally appeared Guido Gagliano and Helene P. Gagliano, proved to me through satisfactory evidence of identification, which was personal knowledge, to be the persons whose names are signed on the preceding document, and acknowledged to me that each signed it voluntarily for its stated purpose.



Nancy E. Chew

Nancy E. Chew, Notary Public
My commission expires: 4/12/2013

Property Address: 17 Washington Drive, Acton, MA 01720

PLEASE RETURN TO:
Law Offices of
Nancy Catalini Chew
206 Ayer Road
P.O. Box 0667
Harvard, MA 01451
(978) 456-2321



Town of Acton
 472 Main Street
 Acton, MA 01720
 Telephone (978) 929-6621
 Fax (978) 929-6340

Brian McMullen
 Assessor

Locus: 17 & 17A WASHINGTON DRIVE
Parcel: E3-88, E3-88-1

Parcel ID	LOCATION	Owner	Co-Owner	Mailing Address	City	ST
E3-62	12 JACKSON DR	KAPLAN DAVID A	KAPLAN TINA S	12 JACKSON DR	ACTON, MA	01720
E3-62-1	20 JACKSON DR	RAFUSE PAUL E	MARY ANN	20 JACKSON DR	ACTON, MA	01720
E3-62-4	6 JACKSON DR	PETERSEN JOHN F	PETERSEN CHERYL PIZZO	6 JACKSON DR	ACTON, MA	01720
E3-62-5	4 JACKSON DR	MORRISON JOHN M	MORRISON CAROLYN A	4 JACKSON DR	ACTON, MA	01720
E3-62-7	5 JACKSON DR	UDOKWU CHUBA N	UDOKWU EMMANUELA I	5 JACKSON DR	ACTON, MA	01720
E3-87	7 MONROE DR	EWING MICHAEL J	SCHAAD WENDY S	7 MONROE DR	ACTON, MA	01720
E3-87-11	11 COOLIDGE DR	CARDARELLI PAUL B	CARDARELLI PAMELA F	11 COOLIDGE DR	ACTON, MA	01720
E3-87-17	9 COOLIDGE DR	LINK JANE M		9 COOLIDGE DR	ACTON, MA	01720
E3-87-23	8 COOLIDGE DR	BHUVAN ANANTHANARAYANAN	BHUVAN PREETI	8 COOLIDGE DR	ACTON, MA	01720
E3-87-24	7 COOLIDGE DR	BURIANEK DENNIS A	BURIANEK SARAH E	7 COOLIDGE DR	ACTON, MA	01720
E3-87-25	5 COOLIDGE DR	KOPELMAN PAULA J TRUSTEE		5 COOLIDGE DR	ACTON, MA	01720
E3-87-32	6 COOLIDGE DR	PATTERSON GEORGE WARREN	PATTERSON JENNIFER K	6 COOLIDGE DR	ACTON, MA	01720
E3-87-33	3 COOLIDGE DR	MEDLIN GREGORY B	MEDLIN PAULA P	3 COOLIDGE DR	ACTON, MA	01720
E3-87-36	4 COOLIDGE DR	DEMBSEY DONALD A TRUSTEE	DEMBSEY JUDITH TRUSTEE	4 COOLIDGE DR	ACTON, MA	01720
E3-87-37	19 WASHINGTON DR	GROSSMAN STEPHEN H	GROSSMAN SUSAN COHEN	19 WASHINGTON DRIVE	ACTON, MA	01720
E3-87-48	21 WASHINGTON DR	POISSON GARY G	POISSON LAURA W	21 WASHINGTON DR	ACTON, MA	01720
E3-87-49	22 WASHINGTON DR	RYAN ANGELA M	RYAN JAMES V.R.	22 WASHINGTON DR	ACTON, MA	01720
E3-87-6	13 COOLIDGE DR	THERMIDOR JONATHAN J	THERMIDOR LISA M	13 COOLIDGE DR	ACTON, MA	01720
E3-87-60	24 WASHINGTON DR	DORSEY CHAD W	DORSEY ELIZABETH R J	24 WASHINGTON DR	ACTON, MA	01720
E3-87-66	9 MONROE DR	SETHUMADHAVAN MURALI	GOPALAKRISHNAN PRASANNA	9 MONROE DR	ACTON, MA	01720
E3-87-67	10 MONROE DR	LOBLUNDO JOSEPH R	LOBLUNDO LOUISE M	10 MONROE DR	ACTON, MA	01720
E3-87-68	8 MONROE DR	BARRON JONATHAN R	BARRON HEIDI J	8 MONROE DR	ACTON, MA	01720
E3-94	15 WASHINGTON DR	HOBBS JASON R	HOBBS JULIE M	15 WASHINGTON DR	ACTON, MA	01720
E3-94-1	20 WASHINGTON DR	PHILLIPS MALCOLM DAVID LISTON	PHILLIPS YVONNE M	20 WASHINGTON DR	ACTON, MA	01720
E3-94-2	18 WASHINGTON DR	HARVEY SPENCER G	HARVEY LORI A	18 WASHINGTON DR	ACTON, MA	01720
E3-94-3	16 WASHINGTON DR	COFFEY JAMES G	COFFEY KAREN A	16 WASHINGTON DR	ACTON, MA	01720
E3-94-4	14 WASHINGTON DR	RICCIARDI JOSEPH M	RICCIARDI ZOILA B	14 WASHINGTON DR	ACTON, MA	01720
E3-94-5	13 WASHINGTON DR	PAPACHRISTOS JAMES A	BAGINSKY JUDITH A	13 WASHINGTON DR	ACTON, MA	01720
E3-94-6	15a WASHINGTON DR	O'GRADY DERMOT	O'GRADY ANN	15A WASHINGTON DR	ACTON, MA	01720
E3-94-7	11 WASHINGTON DR	KHUNGER SANJAY	KHUNGER NAMITA	11 WASHINGTON DR	ACTON, MA	01720
E3-94-9	2 JACKSON DR	DANIELL BRIAN	DANIELL MICHELLE	2 JACKSON DR	ACTON, MA	01720
E3-95-25	3 ELIOT CIR	BOWEN WILLIAM E	KATHLEEN	3 ELIOT CIR	ACTON, MA	01720
E3-95-30	5 ELIOT CIR	SHO-HET ORNA	SHO-HET YUVAL	5 ELIOT CIR	ACTON, MA	01720
E3-87-10	14 COOLIDGE DR	GILBERTI DONALD ROBE		14 COOLIDGE DR	ACTON, MA	01720
E3-87-31	4 WILSON LN	VERNER JASON C	VERNER DEBORAH D	4 WILSON LN	ACTON, MA	01720

Brian McMullen
Assessor

Parcel: 17 & 17A WASHINGTON DRIVE
E3-88, E3-88-1

Parcel ID: E3-87-16 LOCATION: 12 COOLIDGE DR Owner: BLAIR BRIAN T Co-Owner: GHANCH ARTEMIS Mailing Address: 12 COOLIDGE DR City: ACTON, MA 01720 ST: ST

Abutters and owners of land directly opposite on any public or private street or way and abutters to the abutters within three hundred feet of the property line all as they appear on the most recent applicable tax list.

HEARING NOTICES FOR ALL SPECIAL PERMITS MUST BE SENT TO THE PLANNING BOARD, TOWN HALL IN THE FOLLOWING TOWNS:

Boxborough, MA 01729 Maynard, MA 01754 Concord, MA 01742 Littleton, MA 01460
Carlisle, MA 01741 Stow, MA 01775 Westford, MA 01886 Sudbury, MA 01776

Kelly Schorr
Acton Assessors Office

2/25/2014

GUIDO GAGLIANO
HELENE P GAGLIANO
17 WASHINGTON DRIVE
ACTON, MA 01720

113
53-8285/2113
BRANCH 3

2/21/14 date

Pay to the
Order of

John A. Acron

\$ 6028.00

Six Thousand Twenty Eight Dollars

Security Features. See back on back.

IC FEDERAL CREDIT UNION
Your money. Your life. All together now.

Helene P. Gagliano

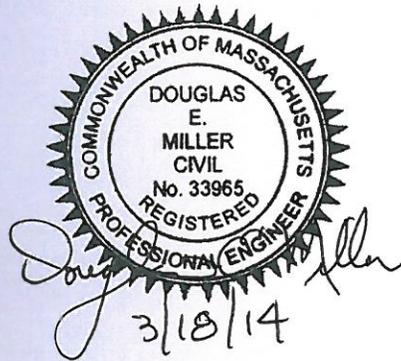
For

⑆ 211382850⑆ 00106564⑆ 0113 82

Stormwater Management Report

***Residential Compound
Roosevelt Drive
Acton, MA***

March 2014



**Submitted to:
Acton Planning Board
472 Main Street
Acton, MA 01720**

**Submitted by:
Guido & Helene Gagliano
17 Washington Drive
Acton, MA 01720**

**Prepared by:
Goldsmith, Prest & Ringwall, Inc.
39 Main Street, Suite 301
Ayer, MA 01432**

**Project No:
00159A**



Engineering Solutions
for Land & Structures

March 12, 2014

Acton Planning Board
472 Main Street
Acton, MA 01720

RE: Narrative to Accompany Stormwater Computations
Definitive Subdivision / Residential Compound Development
Roosevelt Drive, Acton, MA

Dear Board Members:

This narrative and the attached stormwater computations are intended to accompany plans for the proposed Definitive Subdivision / Residential Compound Development at 17 Washington Drive in North Acton, MA. Attached to this narrative are calculations that support a final engineering design as required by the Acton Planning Board Subdivision Rules and Regulations. Site specific information is presented under two scenarios, "pre-development" and "post-development" conditions, so that potential impacts due to the project can be identified, quantified and, as necessary, mitigated.

The final design intent seeks to meet the following interrelated goals:

1. Limit stormwater runoff rates to abutting residential properties for the 2-, 10- and 100-year storm events to existing (pre-development) levels;
2. Prevent appreciable sediment and other suspended solids and contaminants transport by trapping them on site via Low-Impact Design (LID) Best Management Practices (BMP's);
3. Provide adequate drainage for new surfaces;
4. Maintain existing drainage patterns while providing a cost-effective engineering solution that addresses regulatory as well as real-world constraints.

Existing Site Description

The subject site is a 2.71± acre parcel on the northwest side of Washington Drive. The site is bordered to the southwest by residential properties which front on Coolidge Drive, to the northwest by Monroe Drive and residential properties which front on Monroe Drive, to the east by residential properties which front on Washington Drive and Jackson Drive, and to southeast

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by Washington Drive. The site contains an existing residential dwelling (#17 Washington Drive) located on the northwest portion of the parcel, 660± feet from Washington Drive. Attendant to the dwelling is surrounding yard area, an existing well, an existing sewage disposal system, and an existing 660± foot bituminous concrete driveway from Washington Drive. The remainder of the parcel is woodland and there are no resource areas on or adjacent to the parcel. The majority of the site slopes either towards the residential properties east of the parcel or to the southwest towards Washington Drive. The parent material soils, as taken from NRCS soil mapping, are Narragansett Silt Loam of hydraulic soil group 'B' (HSG 'B').

The watershed under study contains 2.71± acres which includes the entire subject parcel. Under the pre-development scenario, the site has been divided into 3 subcatchments, as shown on plan entitled "WATERSHED MAP – EXISTING CONDITIONS", included within 'Attachment 1' to this narrative.

Project Description

The proposed development is for the subdivision of the parcel into three residential lots through the construction of a 428± foot long, 12 foot wide Residential Compound Way off of Monroe Drive as allowed per Section 10 of the Subdivision Rules and Regulations. The proposed private right-of-way will provide frontage for two lots, one lot containing the existing dwelling and a second lot for a proposed dwelling at the westernmost portion of the site. A proposed third lot will use the parcel's existing frontage on Washington Drive, with a proposed dwelling located adjacent to Washington Drive.

The proposed stormwater management system has been designed to utilize Low-Impact Development (LID) low maintenance techniques and avoid typical structural practices. Stormwater runoff from the proposed Residential Compound Way and the two lots with frontage on the proposed way will be collected in a 6 inch deep Biofilter Swale on the east side of the proposed way. The Biofilter Swale will transport stormwater runoff into one of two Water Quality Basins on the east side of the proposed way. The Water Quality Basins are designed to retain and infiltrate stormwater runoff, with a level spreader outlet for larger rain events.

Under the post-development scenario, the site has been divided into 5 subcatchments, as shown on the plan entitled "WATERSHED MAP – DEVELOPED CONDITIONS" included within 'Attachment 2' to this narrative.

Hydrologic and Hydraulic Computation Methodology

Runoff rates and volumes were computed using the Soil Conservation Service TR-20 Method entitled "Urban Hydrology for Small Watersheds". The following 24-hour rainfall events were analyzed:

Frequency (years): 2, 10 and 100

Runoff from the site has been analyzed at 3 analysis points (AP) under both pre-development and post-development conditions. Stormwater runoff discharging to the southwest into the Washington Drive stormwater infrastructure is analyzed as AP-1. Stormwater runoff discharging towards the abutting residential properties to the east is analyzed as AP-2. Stormwater runoff discharging to the north into the Monroe Drive drainage infrastructure is analyzed as AP-3. These drainage patterns will be maintained through the implementation of the proposed Stormwater Management Plan.

Discharge rates of the calculated runoff for both conditions analyzed are displayed in the following table:

Pre-Development (cfs)

Analysis Point	2-YR	10-YR	100-YR
AP 1	0.4	1.1	2.4
AP 2	0.5	1.5	3.3
AP 3	0.1	0.4	0.8
AP TOTAL	1.0	3.0	6.5

Post-Development (cfs)

Analysis Point	2-YR	10-YR	100-YR
AP 1	0.3	1.1	2.4
AP 2	0.3	1.3	3.3
AP 3	0.2	0.5	1.1
AP TOTAL	0.8	2.9	6.8

Pre-Development vs. Post-Development (cfs)

Analysis Point	2-YR	10-YR	100-YR
AP 1	-0.1	0.0	0.0
AP 2	-0.2	-0.2	0.0
AP 3	0.1	0.1	0.3
AP TOTAL	-0.2	-0.1	0.3

As shown on the above summary, rates of discharge are maintained or reduced for all storms to Washington Drive as well as the critical analysis point, the abutting residential properties to the east (AP-2). There is a slight increase of runoff to Monroe Drive, due to the installation of the paved connection to the Monroe Drive which must drain back into the roadway. The increase to Monroe Drive is negligible and should not burden the existing drainage infrastructure.

Conclusion

The stormwater management design meets applicable standards of the Acton Subdivision Rules and Regulations through the employment of a Low-Impact Development Design that requires minimal maintenance. Please feel free to contact this office with any questions.

Sincerely,
Goldsmith, Prest & Ringwall, Inc.


Matthew Bombaci, P.E.

Attachment 1:

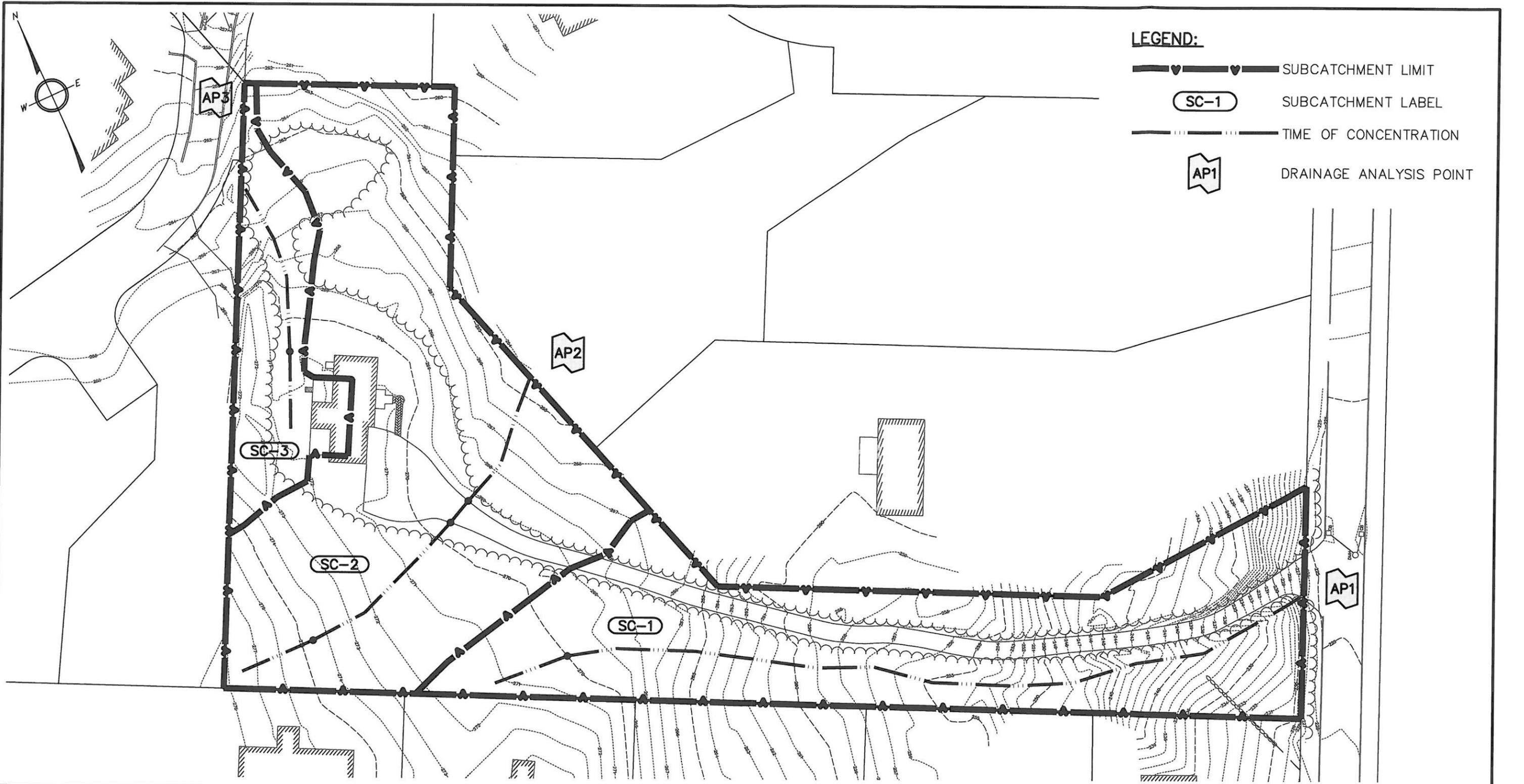
- Watershed Map – Existing Conditions (11"x17")
- Pre-Development Watershed Computations

Attachment 2:

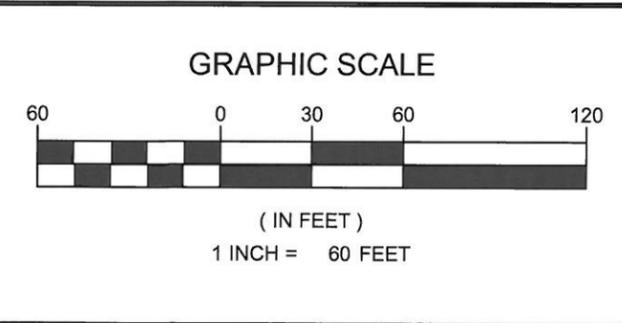
- Watershed Map – Developed Conditions (11"x17")
- Post-Development Watershed Computations

Attachment 1

Pre-Development Watershed Computations



- LEGEND:**
- SUBCATCHMENT LIMIT
 - SUBCATCHMENT LABEL
 - TIME OF CONCENTRATION
 - DRAINAGE ANALYSIS POINT



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PREPARED FOR:
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17 WASHINGTON DRIVE
ACTON, MA 01720

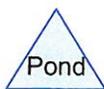
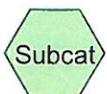
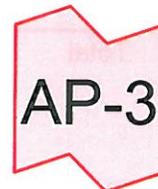
DES'D BY: MKB CHK'D BY: DEM

DATE: FEBRUARY 2014

**WATERSHED MAP –
EXISTING CONDITIONS**

17 WASHINGTON DRIVE
ACTON, MA 01720

PROJECT: 00159A 1 of 2



Routing Diagram for Pre-Development

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Pre-Development

Type III 24-hr 2-YR Rainfall=3.10"

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Summary for Subcatchment SC-1:

Area draining to Washington Drive.

Runoff = 0.4 cfs @ 12.32 hrs, Volume= 2,173 cf, Depth> 0.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
5,523	98	Paved parking, HSG B
36,624	60	Woods, Fair, HSG B
5,332	61	>75% Grass cover, Good, HSG B
47,479	65	Weighted Average
41,956		88.37% Pervious Area
5,523		11.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	50	0.0200	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.10"
5.4	491	0.0916	1.51		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
17.9	541	Total			

Summary for Subcatchment SC-2:

Area draining to east.

Runoff = 0.5 cfs @ 12.21 hrs, Volume= 2,483 cf, Depth> 0.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
1,371	98	Roofs, HSG B
3,937	98	Paved parking, HSG B
39,973	60	Woods, Fair, HSG B
12,971	61	>75% Grass cover, Good, HSG B
58,252	64	Weighted Average
52,944		90.89% Pervious Area
5,308		9.11% Impervious Area

Pre-Development

Type III 24-hr 2-YR Rainfall=3.10"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0600	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.10"
1.9	118	0.0424	1.03		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	18	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.3	90	0.0556	1.18		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.4	276	Total			

Summary for Subcatchment SC-3:

Area draining to east.

Runoff = 0.1 cfs @ 12.13 hrs, Volume= 528 cf, Depth> 0.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
1,256	98	Roofs, HSG B
4,562	60	Woods, Fair, HSG B
6,540	61	>75% Grass cover, Good, HSG B
12,358	64	Weighted Average
11,102		89.84% Pervious Area
1,256		10.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.10"
1.2	112	0.0536	1.62		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.9	162	Total			

Summary for Link AP-1:

Washington Drive

Inflow Area = 47,479 sf, 11.63% Impervious, Inflow Depth > 0.55" for 2-YR event
 Inflow = 0.4 cfs @ 12.32 hrs, Volume= 2,173 cf
 Primary = 0.4 cfs @ 12.32 hrs, Volume= 2,173 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Pre-Development

Type III 24-hr 2-YR Rainfall=3.10"

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Summary for Link AP-2:

Abutters to East

Inflow Area = 58,252 sf, 9.11% Impervious, Inflow Depth > 0.51" for 2-YR event
Inflow = 0.5 cfs @ 12.21 hrs, Volume= 2,483 cf
Primary = 0.5 cfs @ 12.21 hrs, Volume= 2,483 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP-3:

Monroe Drive

Inflow Area = 12,358 sf, 10.16% Impervious, Inflow Depth > 0.51" for 2-YR event
Inflow = 0.1 cfs @ 12.13 hrs, Volume= 528 cf
Primary = 0.1 cfs @ 12.13 hrs, Volume= 528 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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Type III 24-hr 10-YR Rainfall=4.50"

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Summary for Subcatchment SC-1:

Area draining to Washington Drive.

Runoff = 1.1 cfs @ 12.27 hrs, Volume= 5,239 cf, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.50"

Area (sf)	CN	Description
5,523	98	Paved parking, HSG B
36,624	60	Woods, Fair, HSG B
5,332	61	>75% Grass cover, Good, HSG B
47,479	65	Weighted Average
41,956		88.37% Pervious Area
5,523		11.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	50	0.0200	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.10"
5.4	491	0.0916	1.51		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
17.9	541	Total			

Summary for Subcatchment SC-2:

Area draining to east.

Runoff = 1.5 cfs @ 12.18 hrs, Volume= 6,126 cf, Depth> 1.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.50"

Area (sf)	CN	Description
1,371	98	Roofs, HSG B
3,937	98	Paved parking, HSG B
39,973	60	Woods, Fair, HSG B
12,971	61	>75% Grass cover, Good, HSG B
58,252	64	Weighted Average
52,944		90.89% Pervious Area
5,308		9.11% Impervious Area

Pre-Development

Type III 24-hr 10-YR Rainfall=4.50"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0600	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.10"
1.9	118	0.0424	1.03		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	18	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.3	90	0.0556	1.18		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.4	276	Total			

Summary for Subcatchment SC-3:

Area draining to east.

Runoff = 0.4 cfs @ 12.11 hrs, Volume= 1,301 cf, Depth> 1.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.50"

Area (sf)	CN	Description
1,256	98	Roofs, HSG B
4,562	60	Woods, Fair, HSG B
6,540	61	>75% Grass cover, Good, HSG B
12,358	64	Weighted Average
11,102		89.84% Pervious Area
1,256		10.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.10"
1.2	112	0.0536	1.62		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.9	162	Total			

Summary for Link AP-1:

Washington Drive

Inflow Area = 47,479 sf, 11.63% Impervious, Inflow Depth > 1.32" for 10-YR event
 Inflow = 1.1 cfs @ 12.27 hrs, Volume= 5,239 cf
 Primary = 1.1 cfs @ 12.27 hrs, Volume= 5,239 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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Type III 24-hr 10-YR Rainfall=4.50"

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Summary for Link AP-2:

Abutters to East

Inflow Area = 58,252 sf, 9.11% Impervious, Inflow Depth > 1.26" for 10-YR event
Inflow = 1.5 cfs @ 12.18 hrs, Volume= 6,126 cf
Primary = 1.5 cfs @ 12.18 hrs, Volume= 6,126 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP-3:

Monroe Drive

Inflow Area = 12,358 sf, 10.16% Impervious, Inflow Depth > 1.26" for 10-YR event
Inflow = 0.4 cfs @ 12.11 hrs, Volume= 1,301 cf
Primary = 0.4 cfs @ 12.11 hrs, Volume= 1,301 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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Type III 24-hr 100-YR Rainfall=6.50"

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Summary for Subcatchment SC-1:

Area draining to Washington Drive.

Runoff = 2.4 cfs @ 12.26 hrs, Volume= 10,724 cf, Depth> 2.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=6.50"

Area (sf)	CN	Description
5,523	98	Paved parking, HSG B
36,624	60	Woods, Fair, HSG B
5,332	61	>75% Grass cover, Good, HSG B
47,479	65	Weighted Average
41,956		88.37% Pervious Area
5,523		11.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	50	0.0200	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.10"
5.4	491	0.0916	1.51		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
17.9	541	Total			

Summary for Subcatchment SC-2:

Area draining to east.

Runoff = 3.3 cfs @ 12.17 hrs, Volume= 12,719 cf, Depth> 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=6.50"

Area (sf)	CN	Description
1,371	98	Roofs, HSG B
3,937	98	Paved parking, HSG B
39,973	60	Woods, Fair, HSG B
12,971	61	>75% Grass cover, Good, HSG B
58,252	64	Weighted Average
52,944		90.89% Pervious Area
5,308		9.11% Impervious Area

Pre-Development

Type III 24-hr 100-YR Rainfall=6.50"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0600	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.10"
1.9	118	0.0424	1.03		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	18	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.3	90	0.0556	1.18		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.4	276	Total			

Summary for Subcatchment SC-3:

Area draining to east.

Runoff = 0.8 cfs @ 12.11 hrs, Volume= 2,701 cf, Depth> 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=6.50"

Area (sf)	CN	Description
1,256	98	Roofs, HSG B
4,562	60	Woods, Fair, HSG B
6,540	61	>75% Grass cover, Good, HSG B
12,358	64	Weighted Average
11,102		89.84% Pervious Area
1,256		10.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.10"
1.2	112	0.0536	1.62		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.9	162	Total			

Summary for Link AP-1:

Washington Drive

Inflow Area = 47,479 sf, 11.63% Impervious, Inflow Depth > 2.71" for 100-YR event
 Inflow = 2.4 cfs @ 12.26 hrs, Volume= 10,724 cf
 Primary = 2.4 cfs @ 12.26 hrs, Volume= 10,724 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Pre-Development

Type III 24-hr 100-YR Rainfall=6.50"

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Page 10

Summary for Link AP-2:

Abutters to East

Inflow Area = 58,252 sf, 9.11% Impervious, Inflow Depth > 2.62" for 100-YR event
Inflow = 3.3 cfs @ 12.17 hrs, Volume= 12,719 cf
Primary = 3.3 cfs @ 12.17 hrs, Volume= 12,719 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP-3:

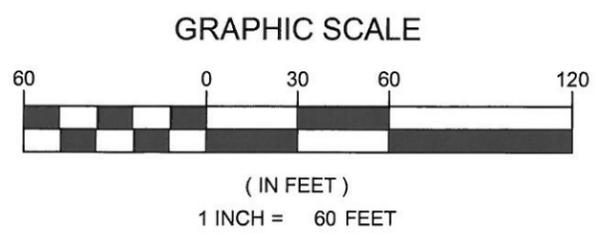
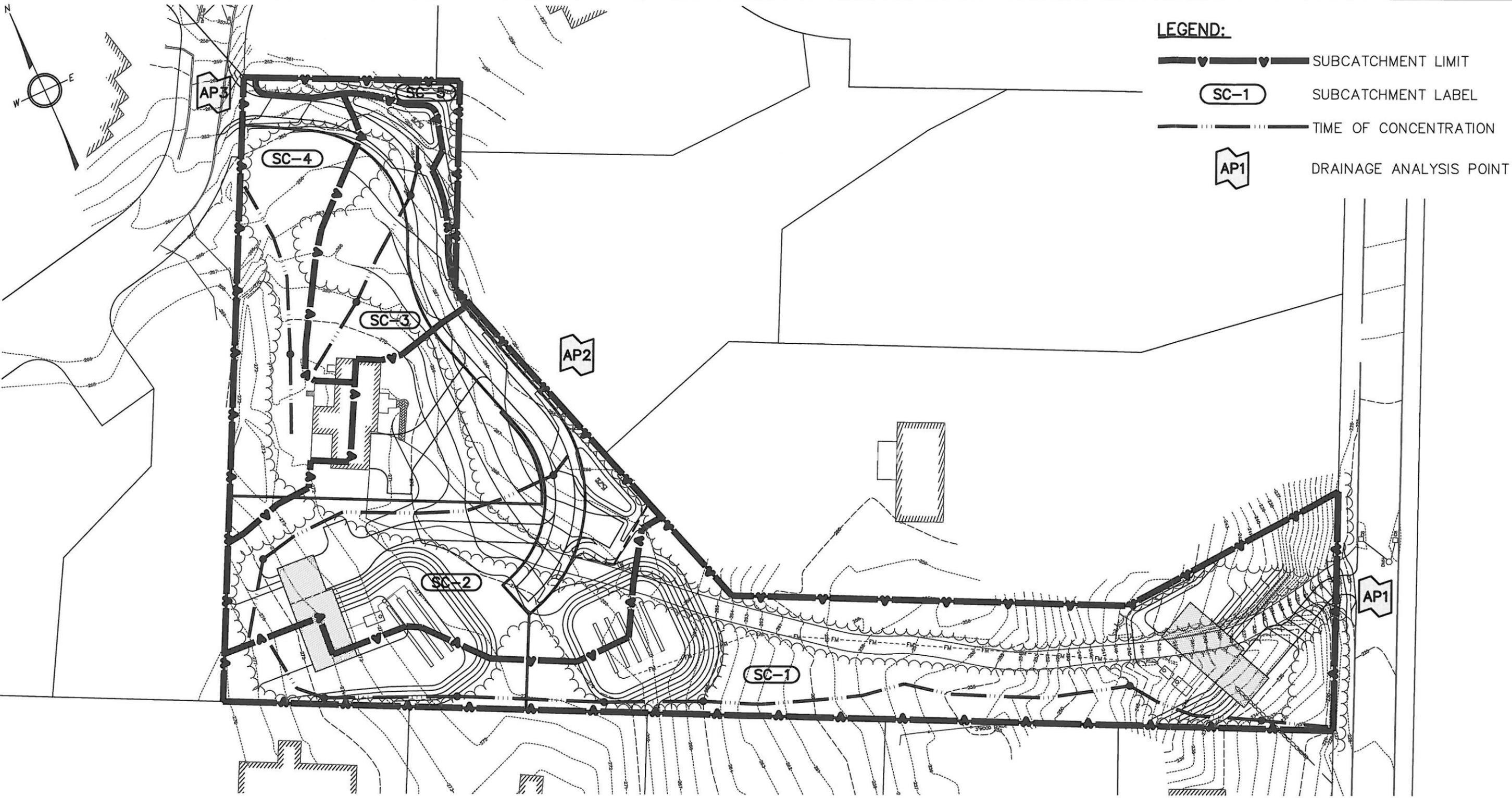
Monroe Drive

Inflow Area = 12,358 sf, 10.16% Impervious, Inflow Depth > 2.62" for 100-YR event
Inflow = 0.8 cfs @ 12.11 hrs, Volume= 2,701 cf
Primary = 0.8 cfs @ 12.11 hrs, Volume= 2,701 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Attachment 2

Post-Development Watershed Computations



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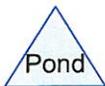
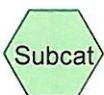
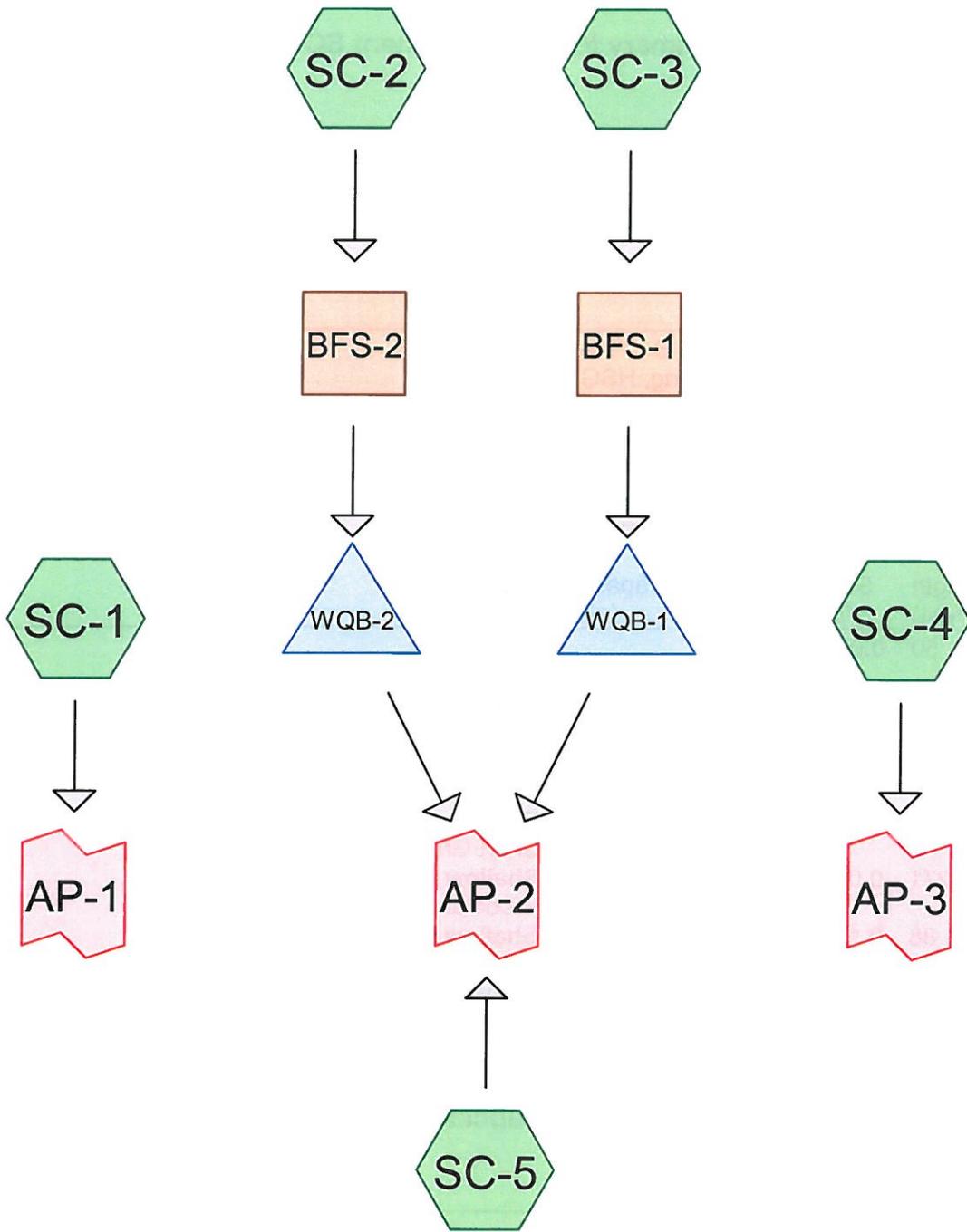
PREPARED FOR:
GUIDO & HELENE GAGLIANO
17 WASHINGTON DRIVE
ACTON, MA 01720

**WATERSHED MAP —
DEVELOPED CONDITIONS**

17 WASHINGTON DRIVE
ACTON, MA 01720

DES'D BY: MKB	CHK'D BY: DEM
DATE: FEBRUARY 2014	

PROJECT: 00159A	2 of 2
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Routing Diagram for Post-Development
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Post-Development

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Type III 24-hr 2-YR Rainfall=3.10"

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Summary for Subcatchment SC-1:

Area draining to Washington Drive.

Runoff = 0.3 cfs @ 12.31 hrs, Volume= 1,972 cf, Depth> 0.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
2,388	98	Roofs, HSG B
1,087	98	Paved parking, HSG B
20,603	60	Woods, Fair, HSG B
25,991	61	>75% Grass cover, Good, HSG B
50,069	63	Weighted Average
46,594		93.06% Pervious Area
3,475		6.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 3.10"
1.1	84	0.0357	1.32		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.1	93	0.0216	0.73		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.5	62	0.0806	1.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
3.5	271	0.0660	1.28		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.5	88	0.1590	2.79		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.5	42	0.0714	1.34		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
16.5	690	Total			

Summary for Subcatchment SC-2:

Area draining to Water Quality Basin #2.

Runoff = 0.6 cfs @ 12.17 hrs, Volume= 2,575 cf, Depth> 0.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.10"

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Type III 24-hr 2-YR Rainfall=3.10"

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Area (sf)	CN	Description
2,491	98	Roofs, HSG B
7,369	98	Paved parking, HSG B
1,632	60	Woods, Fair, HSG B
26,353	61	>75% Grass cover, Good, HSG B
37,845	71	Weighted Average
27,985		73.95% Pervious Area
9,860		26.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 3.10"
2.2	196	0.0459	1.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	15	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
10.6	261	Total			

Summary for Subcatchment SC-3:

Area draining to Water Quality Basin #1.

Runoff = 0.1 cfs @ 12.16 hrs, Volume= 638 cf, Depth> 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
207	98	Roofs, HSG B
1,723	98	Paved parking, HSG B
10,148	61	>75% Grass cover, Good, HSG B
12,078	67	Weighted Average
10,148		84.02% Pervious Area
1,930		15.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 3.10"
0.9	75	0.0400	1.40		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	19	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	13	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.5	157	Total			

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Type III 24-hr 2-YR Rainfall=3.10"

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Summary for Subcatchment SC-4:

Area draining to Monroe Drive.

Runoff = 0.2 cfs @ 12.12 hrs, Volume= 767 cf, Depth> 0.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
1,257	98	Roofs, HSG B
893	98	Paved parking, HSG B
4,195	60	Woods, Fair, HSG B
9,193	61	>75% Grass cover, Good, HSG B
15,538	66	Weighted Average
13,388		86.16% Pervious Area
2,150		13.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.10"
1.2	112	0.0536	1.62		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.9	162	Total			

Summary for Subcatchment SC-5:

Area draining directly to abutters to east.

Runoff = 0.0 cfs @ 12.14 hrs, Volume= 86 cf, Depth> 0.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
644	60	Woods, Fair, HSG B
1,914	61	>75% Grass cover, Good, HSG B
2,558	61	Weighted Average
2,558		100.00% Pervious Area

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

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Type III 24-hr 2-YR Rainfall=3.10"

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Summary for Reach BFS-1:

Biofilter Swale

Inflow Area = 12,078 sf, 15.98% Impervious, Inflow Depth > 0.63" for 2-YR event
 Inflow = 0.1 cfs @ 12.16 hrs, Volume= 638 cf
 Outflow = 0.1 cfs @ 12.25 hrs, Volume= 633 cf, Atten= 14%, Lag= 5.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.33 fps, Min. Travel Time= 5.8 min
 Avg. Velocity = 0.14 fps, Avg. Travel Time= 14.0 min

Peak Storage= 44 cf @ 12.25 hrs
 Average Depth at Peak Storage= 0.15'
 Bank-Full Depth= 0.50' Flow Area= 1.8 sf, Capacity= 1.1 cfs

2.00' x 0.50' deep channel, n= 0.150 Sheet flow over Short Grass
 Side Slope Z-value= 3.0 '/' Top Width= 5.00'
 Length= 115.0' Slope= 0.0174 '/'
 Inlet Invert= 266.50', Outlet Invert= 264.50'



Summary for Reach BFS-2:

Biofilter Swale

Inflow Area = 37,845 sf, 26.05% Impervious, Inflow Depth > 0.82" for 2-YR event
 Inflow = 0.6 cfs @ 12.17 hrs, Volume= 2,575 cf
 Outflow = 0.6 cfs @ 12.24 hrs, Volume= 2,561 cf, Atten= 11%, Lag= 4.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.37 fps, Min. Travel Time= 5.1 min
 Avg. Velocity = 0.16 fps, Avg. Travel Time= 12.0 min

Peak Storage= 173 cf @ 12.24 hrs
 Average Depth at Peak Storage= 0.45'
 Bank-Full Depth= 0.50' Flow Area= 1.8 sf, Capacity= 0.7 cfs

2.00' x 0.50' deep channel, n= 0.240 Sheet flow over Dense Grass
 Side Slope Z-value= 3.0 '/' Top Width= 5.00'
 Length= 115.0' Slope= 0.0174 '/'
 Inlet Invert= 266.25', Outlet Invert= 264.25'

Post-Development

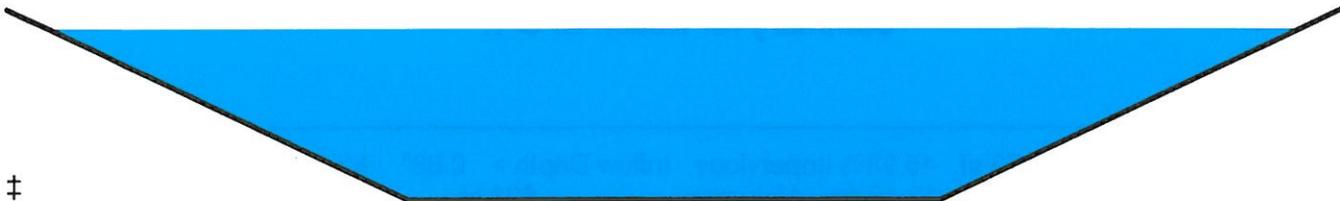
Type III 24-hr 2-YR Rainfall=3.10"

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Summary for Pond WQB-1:

Inflow Area = 12,078 sf, 15.98% Impervious, Inflow Depth > 0.63" for 2-YR event
 Inflow = 0.1 cfs @ 12.25 hrs, Volume= 633 cf
 Outflow = 0.0 cfs @ 14.13 hrs, Volume= 612 cf, Atten= 85%, Lag= 113.0 min
 Discarded = 0.0 cfs @ 14.13 hrs, Volume= 612 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 262.57' @ 14.13 hrs Surf.Area= 505 sf Storage= 224 cf

Plug-Flow detention time= 155.4 min calculated for 612 cf (97% of inflow)
 Center-of-Mass det. time= 137.9 min (1,036.6 - 898.7)

Volume	Invert	Avail.Storage	Storage Description
#1	262.00'	481 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
262.00	285	83.0	0	0	285
263.00	709	138.8	481	481	1,276

Device	Routing	Invert	Outlet Devices
#1	Discarded	262.00'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	262.75'	10.0' long x 4.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.36 2.52 2.70 2.68 2.67 2.67 2.65 2.66 2.66 2.67 2.70 2.70 2.72 2.75 2.81 2.93 3.10

Discarded OutFlow Max=0.0 cfs @ 14.13 hrs HW=262.57' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=262.00' TW=0.00' (Dynamic Tailwater)

↑**2=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Summary for Pond WQB-2:

Inflow Area = 37,845 sf, 26.05% Impervious, Inflow Depth > 0.81" for 2-YR event
 Inflow = 0.6 cfs @ 12.24 hrs, Volume= 2,561 cf
 Outflow = 0.4 cfs @ 12.50 hrs, Volume= 2,431 cf, Atten= 35%, Lag= 15.9 min
 Discarded = 0.1 cfs @ 12.50 hrs, Volume= 1,889 cf
 Primary = 0.3 cfs @ 12.50 hrs, Volume= 542 cf

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Type III 24-hr 2-YR Rainfall=3.10"

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 264.80' @ 12.50 hrs Surf.Area= 1,125 sf Storage= 632 cf

Plug-Flow detention time= 113.2 min calculated for 2,431 cf (95% of inflow)

Center-of-Mass det. time= 87.1 min (970.4 - 883.3)

Volume	Invert	Avail.Storage	Storage Description
#1	264.00'	870 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
264.00	488	111.1	0	0	488
265.00	1,319	216.8	870	870	3,251

Device	Routing	Invert	Outlet Devices
#1	Discarded	264.00'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	264.75'	10.0' long x 4.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.36 2.52 2.70 2.68 2.67 2.67 2.65 2.66 2.66 2.67 2.70 2.70 2.72 2.75 2.81 2.93 3.10

Discarded OutFlow Max=0.1 cfs @ 12.50 hrs HW=264.80' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=0.3 cfs @ 12.50 hrs HW=264.80' TW=0.00' (Dynamic Tailwater)

↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 0.3 cfs @ 0.55 fps)

Summary for Link AP-1:

Washington Drive

Inflow Area = 50,069 sf, 6.94% Impervious, Inflow Depth > 0.47" for 2-YR event
Inflow = 0.3 cfs @ 12.31 hrs, Volume= 1,972 cf
Primary = 0.3 cfs @ 12.31 hrs, Volume= 1,972 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP-2:

Abutters to East

Inflow Area = 52,481 sf, 22.47% Impervious, Inflow Depth > 0.14" for 2-YR event
Inflow = 0.3 cfs @ 12.50 hrs, Volume= 628 cf
Primary = 0.3 cfs @ 12.50 hrs, Volume= 628 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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Type III 24-hr 2-YR Rainfall=3.10"

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Summary for Link AP-3:

Monroe Drive

Inflow Area = 15,538 sf, 13.84% Impervious, Inflow Depth > 0.59" for 2-YR event
Inflow = 0.2 cfs @ 12.12 hrs, Volume= 767 cf
Primary = 0.2 cfs @ 12.12 hrs, Volume= 767 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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Type III 24-hr 10-YR Rainfall=4.50"

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Summary for Subcatchment SC-1:

Area draining to Washington Drive.

Runoff = 1.1 cfs @ 12.26 hrs, Volume= 4,994 cf, Depth> 1.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.50"

Area (sf)	CN	Description
2,388	98	Roofs, HSG B
1,087	98	Paved parking, HSG B
20,603	60	Woods, Fair, HSG B
25,991	61	>75% Grass cover, Good, HSG B
50,069	63	Weighted Average
46,594		93.06% Pervious Area
3,475		6.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 3.10"
1.1	84	0.0357	1.32		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.1	93	0.0216	0.73		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.5	62	0.0806	1.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
3.5	271	0.0660	1.28		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.5	88	0.1590	2.79		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.5	42	0.0714	1.34		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
16.5	690	Total			

Summary for Subcatchment SC-2:

Area draining to Water Quality Basin #2.

Runoff = 1.5 cfs @ 12.16 hrs, Volume= 5,495 cf, Depth> 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.50"

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Type III 24-hr 10-YR Rainfall=4.50"

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Area (sf)	CN	Description
2,491	98	Roofs, HSG B
7,369	98	Paved parking, HSG B
1,632	60	Woods, Fair, HSG B
26,353	61	>75% Grass cover, Good, HSG B
37,845	71	Weighted Average
27,985		73.95% Pervious Area
9,860		26.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 3.10"
2.2	196	0.0459	1.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	15	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
10.6	261	Total			

Summary for Subcatchment SC-3:

Area draining to Water Quality Basin #1.

Runoff = 0.4 cfs @ 12.15 hrs, Volume= 1,470 cf, Depth> 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.50"

Area (sf)	CN	Description
207	98	Roofs, HSG B
1,723	98	Paved parking, HSG B
10,148	61	>75% Grass cover, Good, HSG B
12,078	67	Weighted Average
10,148		84.02% Pervious Area
1,930		15.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 3.10"
0.9	75	0.0400	1.40		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	19	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	13	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.5	157	Total			

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Type III 24-hr 10-YR Rainfall=4.50"

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Summary for Subcatchment SC-4:

Area draining to Monroe Drive.

Runoff = 0.5 cfs @ 12.11 hrs, Volume= 1,806 cf, Depth> 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR Rainfall=4.50"

Area (sf)	CN	Description
1,257	98	Roofs, HSG B
893	98	Paved parking, HSG B
4,195	60	Woods, Fair, HSG B
9,193	61	>75% Grass cover, Good, HSG B
15,538	66	Weighted Average
13,388		86.16% Pervious Area
2,150		13.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.10"
1.2	112	0.0536	1.62		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.9	162	Total			

Summary for Subcatchment SC-5:

Area draining directly to abutters to east.

Runoff = 0.1 cfs @ 12.11 hrs, Volume= 230 cf, Depth> 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR Rainfall=4.50"

Area (sf)	CN	Description
644	60	Woods, Fair, HSG B
1,914	61	>75% Grass cover, Good, HSG B
2,558	61	Weighted Average
2,558		100.00% Pervious Area

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

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Type III 24-hr 10-YR Rainfall=4.50"

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Summary for Reach BFS-1:

Biofilter Swale

Inflow Area = 12,078 sf, 15.98% Impervious, Inflow Depth > 1.46" for 10-YR event
Inflow = 0.4 cfs @ 12.15 hrs, Volume= 1,470 cf
Outflow = 0.4 cfs @ 12.20 hrs, Volume= 1,463 cf, Atten= 9%, Lag= 3.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Max. Velocity= 0.46 fps, Min. Travel Time= 4.2 min

Avg. Velocity = 0.17 fps, Avg. Travel Time= 11.1 min

Peak Storage= 90 cf @ 12.20 hrs

Average Depth at Peak Storage= 0.28'

Bank-Full Depth= 0.50' Flow Area= 1.8 sf, Capacity= 1.1 cfs

2.00' x 0.50' deep channel, n= 0.150 Sheet flow over Short Grass

Side Slope Z-value= 3.0 ' / ' Top Width= 5.00'

Length= 115.0' Slope= 0.0174 ' / '

Inlet Invert= 266.50', Outlet Invert= 264.50'



Summary for Reach BFS-2:

Biofilter Swale

Inflow Area = 37,845 sf, 26.05% Impervious, Inflow Depth > 1.74" for 10-YR event
Inflow = 1.5 cfs @ 12.16 hrs, Volume= 5,495 cf
Outflow = 1.3 cfs @ 12.22 hrs, Volume= 5,475 cf, Atten= 9%, Lag= 3.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Max. Velocity= 0.46 fps, Min. Travel Time= 4.2 min

Avg. Velocity = 0.19 fps, Avg. Travel Time= 10.0 min

Peak Storage= 336 cf @ 12.22 hrs

Average Depth at Peak Storage= 0.74'

Bank-Full Depth= 0.50' Flow Area= 1.8 sf, Capacity= 0.7 cfs

2.00' x 0.50' deep channel, n= 0.240 Sheet flow over Dense Grass

Side Slope Z-value= 3.0 ' / ' Top Width= 5.00'

Length= 115.0' Slope= 0.0174 ' / '

Inlet Invert= 266.25', Outlet Invert= 264.25'

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Type III 24-hr 10-YR Rainfall=4.50"

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Summary for Pond WQB-1:

Inflow Area = 12,078 sf, 15.98% Impervious, Inflow Depth > 1.45" for 10-YR event
 Inflow = 0.4 cfs @ 12.20 hrs, Volume= 1,463 cf
 Outflow = 0.3 cfs @ 12.37 hrs, Volume= 1,341 cf, Atten= 19%, Lag= 10.0 min
 Discarded = 0.0 cfs @ 12.37 hrs, Volume= 892 cf
 Primary = 0.3 cfs @ 12.37 hrs, Volume= 449 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 262.80' @ 12.37 hrs Surf.Area= 610 sf Storage= 350 cf

Plug-Flow detention time= 126.7 min calculated for 1,341 cf (92% of inflow)
 Center-of-Mass det. time= 85.5 min (954.7 - 869.3)

Volume #1	Invert	Avail.Storage	Storage Description			
	262.00'	481 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
262.00	285	83.0	0	0	285	
263.00	709	138.8	481	481	1,276	

Device	Routing	Invert	Outlet Devices																		
#1	Discarded	262.00'	1.020 in/hr Exfiltration over Wetted area																		
#2	Primary	262.75'	10.0' long x 4.5' breadth Broad-Crested Rectangular Weir																		
			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	1.80	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	
			Coef. (English)	2.36	2.52	2.70	2.68	2.67	2.67	2.65	2.66	2.66	2.66	2.67	2.70	2.70	2.72	2.75	2.81	2.93	3.10

Discarded OutFlow Max=0.0 cfs @ 12.37 hrs HW=262.80' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.2 cfs @ 12.37 hrs HW=262.80' TW=0.00' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 0.2 cfs @ 0.51 fps)

Summary for Pond WQB-2:

Inflow Area = 37,845 sf, 26.05% Impervious, Inflow Depth > 1.74" for 10-YR event
 Inflow = 1.3 cfs @ 12.22 hrs, Volume= 5,475 cf
 Outflow = 1.3 cfs @ 12.25 hrs, Volume= 5,171 cf, Atten= 2%, Lag= 2.1 min
 Discarded = 0.1 cfs @ 12.25 hrs, Volume= 2,356 cf
 Primary = 1.2 cfs @ 12.25 hrs, Volume= 2,815 cf

Post-Development

Type III 24-hr 10-YR Rainfall=4.50"

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 264.89' @ 12.25 hrs Surf.Area= 1,208 sf Storage= 732 cf

Plug-Flow detention time= 67.3 min calculated for 5,160 cf (94% of inflow)
Center-of-Mass det. time= 38.5 min (897.3 - 858.8)

Volume	Invert	Avail.Storage	Storage Description
#1	264.00'	870 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
264.00	488	111.1	0	0	488
265.00	1,319	216.8	870	870	3,251

Device	Routing	Invert	Outlet Devices
#1	Discarded	264.00'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	264.75'	10.0' long x 4.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.36 2.52 2.70 2.68 2.67 2.67 2.65 2.66 2.66 2.67 2.70 2.70 2.72 2.75 2.81 2.93 3.10

Discarded OutFlow Max=0.1 cfs @ 12.25 hrs HW=264.89' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=1.2 cfs @ 12.25 hrs HW=264.89' TW=0.00' (Dynamic Tailwater)

↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 1.2 cfs @ 0.88 fps)

Summary for Link AP-1:

Washington Drive

Inflow Area =	50,069 sf, 6.94% Impervious, Inflow Depth > 1.20" for 10-YR event
Inflow =	1.1 cfs @ 12.26 hrs, Volume= 4,994 cf
Primary =	1.1 cfs @ 12.26 hrs, Volume= 4,994 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP-2:

Abutters to East

Inflow Area =	52,481 sf, 22.47% Impervious, Inflow Depth > 0.80" for 10-YR event
Inflow =	1.3 cfs @ 12.34 hrs, Volume= 3,493 cf
Primary =	1.3 cfs @ 12.34 hrs, Volume= 3,493 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Post-Development

Type III 24-hr 10-YR Rainfall=4.50"

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Summary for Link AP-3:

Monroe Drive

Inflow Area = 15,538 sf, 13.84% Impervious, Inflow Depth > 1.39" for 10-YR event
Inflow = 0.5 cfs @ 12.11 hrs, Volume= 1,806 cf
Primary = 0.5 cfs @ 12.11 hrs, Volume= 1,806 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Post-Development

Type III 24-hr 100-YR Rainfall=6.50"

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Summary for Subcatchment SC-1:

Area draining to Washington Drive.

Runoff = 2.4 cfs @ 12.24 hrs, Volume= 10,527 cf, Depth> 2.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=6.50"

Area (sf)	CN	Description
2,388	98	Roofs, HSG B
1,087	98	Paved parking, HSG B
20,603	60	Woods, Fair, HSG B
25,991	61	>75% Grass cover, Good, HSG B
50,069	63	Weighted Average
46,594		93.06% Pervious Area
3,475		6.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 3.10"
1.1	84	0.0357	1.32		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.1	93	0.0216	0.73		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.5	62	0.0806	1.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
3.5	271	0.0660	1.28		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.5	88	0.1590	2.79		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.5	42	0.0714	1.34		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
16.5	690	Total			

Summary for Subcatchment SC-2:

Area draining to Water Quality Basin #2.

Runoff = 2.9 cfs @ 12.15 hrs, Volume= 10,408 cf, Depth> 3.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=6.50"

Post-Development

Type III 24-hr 100-YR Rainfall=6.50"

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Area (sf)	CN	Description
2,491	98	Roofs, HSG B
7,369	98	Paved parking, HSG B
1,632	60	Woods, Fair, HSG B
26,353	61	>75% Grass cover, Good, HSG B
37,845	71	Weighted Average
27,985		73.95% Pervious Area
9,860		26.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 3.10"
2.2	196	0.0459	1.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	15	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
10.6	261	Total			

Summary for Subcatchment SC-3:

Area draining to Water Quality Basin #1.

Runoff = 0.8 cfs @ 12.14 hrs, Volume= 2,927 cf, Depth> 2.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=6.50"

Area (sf)	CN	Description
207	98	Roofs, HSG B
1,723	98	Paved parking, HSG B
10,148	61	>75% Grass cover, Good, HSG B
12,078	67	Weighted Average
10,148		84.02% Pervious Area
1,930		15.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 3.10"
0.9	75	0.0400	1.40		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	19	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	13	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.5	157	Total			

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Type III 24-hr 100-YR Rainfall=6.50"

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Summary for Subcatchment SC-4:

Area draining to Monroe Drive.

Runoff = 1.1 cfs @ 12.11 hrs, Volume= 3,643 cf, Depth> 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=6.50"

Area (sf)	CN	Description
1,257	98	Roofs, HSG B
893	98	Paved parking, HSG B
4,195	60	Woods, Fair, HSG B
9,193	61	>75% Grass cover, Good, HSG B
15,538	66	Weighted Average
13,388		86.16% Pervious Area
2,150		13.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.10"
1.2	112	0.0536	1.62		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.9	162	Total			

Summary for Subcatchment SC-5:

Area draining directly to abutters to east.

Runoff = 0.2 cfs @ 12.10 hrs, Volume= 500 cf, Depth> 2.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=6.50"

Area (sf)	CN	Description
644	60	Woods, Fair, HSG B
1,914	61	>75% Grass cover, Good, HSG B
2,558	61	Weighted Average
2,558		100.00% Pervious Area

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

Post-Development

Type III 24-hr 100-YR Rainfall=6.50"

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Summary for Reach BFS-1:

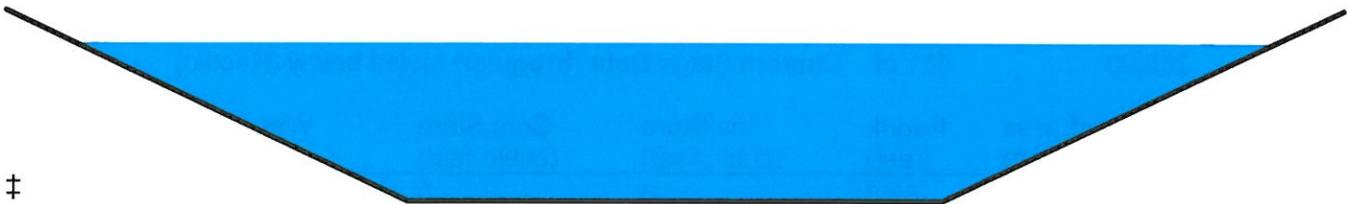
Biofilter Swale

Inflow Area = 12,078 sf, 15.98% Impervious, Inflow Depth > 2.91" for 100-YR event
 Inflow = 0.8 cfs @ 12.14 hrs, Volume= 2,927 cf
 Outflow = 0.8 cfs @ 12.18 hrs, Volume= 2,917 cf, Atten= 7%, Lag= 2.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.57 fps, Min. Travel Time= 3.4 min
 Avg. Velocity = 0.21 fps, Avg. Travel Time= 9.2 min

Peak Storage= 154 cf @ 12.18 hrs
 Average Depth at Peak Storage= 0.41'
 Bank-Full Depth= 0.50' Flow Area= 1.8 sf, Capacity= 1.1 cfs

2.00' x 0.50' deep channel, n= 0.150 Sheet flow over Short Grass
 Side Slope Z-value= 3.0 '/' Top Width= 5.00'
 Length= 115.0' Slope= 0.0174 '/'
 Inlet Invert= 266.50', Outlet Invert= 264.50'



Summary for Reach BFS-2:

Biofilter Swale

Inflow Area = 37,845 sf, 26.05% Impervious, Inflow Depth > 3.30" for 100-YR event
 Inflow = 2.9 cfs @ 12.15 hrs, Volume= 10,408 cf
 Outflow = 2.6 cfs @ 12.21 hrs, Volume= 10,380 cf, Atten= 9%, Lag= 3.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.50 fps, Min. Travel Time= 3.9 min
 Avg. Velocity = 0.22 fps, Avg. Travel Time= 8.6 min

Peak Storage= 601 cf @ 12.21 hrs
 Average Depth at Peak Storage= 1.20'
 Bank-Full Depth= 0.50' Flow Area= 1.8 sf, Capacity= 0.7 cfs

2.00' x 0.50' deep channel, n= 0.240 Sheet flow over Dense Grass
 Side Slope Z-value= 3.0 '/' Top Width= 5.00'
 Length= 115.0' Slope= 0.0174 '/'
 Inlet Invert= 266.25', Outlet Invert= 264.25'

Post-Development

Type III 24-hr 100-YR Rainfall=6.50"

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Summary for Pond WQB-1:

Inflow Area = 12,078 sf, 15.98% Impervious, Inflow Depth > 2.90" for 100-YR event
 Inflow = 0.8 cfs @ 12.18 hrs, Volume= 2,917 cf
 Outflow = 0.8 cfs @ 12.20 hrs, Volume= 2,691 cf, Atten= 1%, Lag= 1.0 min
 Discarded = 0.0 cfs @ 12.20 hrs, Volume= 1,044 cf
 Primary = 0.7 cfs @ 12.20 hrs, Volume= 1,646 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 262.85' @ 12.20 hrs Surf.Area= 633 sf Storage= 380 cf

Plug-Flow detention time= 72.8 min calculated for 2,685 cf (92% of inflow)
 Center-of-Mass det. time= 34.1 min (882.0 - 847.9)

Volume	Invert	Avail.Storage	Storage Description
#1	262.00'	481 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
262.00	285	83.0	0	0	285
263.00	709	138.8	481	481	1,276

Device	Routing	Invert	Outlet Devices
#1	Discarded	262.00'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	262.75'	10.0' long x 4.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.36 2.52 2.70 2.68 2.67 2.67 2.65 2.66 2.66 2.67 2.70 2.70 2.72 2.75 2.81 2.93 3.10

Discarded OutFlow Max=0.0 cfs @ 12.20 hrs HW=262.85' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.7 cfs @ 12.20 hrs HW=262.85' TW=0.00' (Dynamic Tailwater)

↑ **2=Broad-Crested Rectangular Weir** (Weir Controls 0.7 cfs @ 0.74 fps)

Summary for Pond WQB-2:

Inflow Area = 37,845 sf, 26.05% Impervious, Inflow Depth > 3.29" for 100-YR event
 Inflow = 2.6 cfs @ 12.21 hrs, Volume= 10,380 cf
 Outflow = 2.6 cfs @ 12.23 hrs, Volume= 9,872 cf, Atten= 1%, Lag= 1.3 min
 Discarded = 0.1 cfs @ 12.23 hrs, Volume= 2,780 cf
 Primary = 2.5 cfs @ 12.23 hrs, Volume= 7,092 cf

Post-Development

Type III 24-hr 100-YR Rainfall=6.50"

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 264.97' @ 12.23 hrs Surf.Area= 1,290 sf Storage= 833 cf

Plug-Flow detention time= 41.4 min calculated for 9,851 cf (95% of inflow)
Center-of-Mass det. time= 15.5 min (855.1 - 839.7)

Volume #1	Invert 264.00'	Avail.Storage 870 cf	Storage Description Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
264.00	488	111.1	0	0	488	
265.00	1,319	216.8	870	870	3,251	

Device	Routing	Invert	Outlet Devices											
#1	Discarded	264.00'	1.020 in/hr Exfiltration over Wetted area											
#2	Primary	264.75'	10.0' long x 4.5' breadth Broad-Crested Rectangular Weir											
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00											
			2.50 3.00 3.50 4.00 4.50 5.00 5.50											
			Coef. (English) 2.36 2.52 2.70 2.68 2.67 2.67 2.65 2.66 2.66											
			2.67 2.70 2.70 2.72 2.75 2.81 2.93 3.10											

Discarded OutFlow Max=0.1 cfs @ 12.23 hrs HW=264.97' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=2.5 cfs @ 12.23 hrs HW=264.97' TW=0.00' (Dynamic Tailwater)

↑2=Broad-Crested Rectangular Weir (Weir Controls 2.5 cfs @ 1.12 fps)

Summary for Link AP-1:

Washington Drive

Inflow Area = 50,069 sf, 6.94% Impervious, Inflow Depth > 2.52" for 100-YR event
 Inflow = 2.4 cfs @ 12.24 hrs, Volume= 10,527 cf
 Primary = 2.4 cfs @ 12.24 hrs, Volume= 10,527 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP-2:

Abutters to East

Inflow Area = 52,481 sf, 22.47% Impervious, Inflow Depth > 2.11" for 100-YR event
 Inflow = 3.3 cfs @ 12.22 hrs, Volume= 9,238 cf
 Primary = 3.3 cfs @ 12.22 hrs, Volume= 9,238 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Post-Development

Type III 24-hr 100-YR Rainfall=6.50"

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Summary for Link AP-3:

Monroe Drive

Inflow Area = 15,538 sf, 13.84% Impervious, Inflow Depth > 2.81" for 100-YR event
Inflow = 1.1 cfs @ 12.11 hrs, Volume= 3,643 cf
Primary = 1.1 cfs @ 12.11 hrs, Volume= 3,643 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Stormwater System Operation and Maintenance Plan

*Residential Compound
Roosevelt Drive
Acton, MA*

March 2014

Submitted to:
*Acton Planning Board
472 Main Street
Acton, MA 01720*

Submitted by:
*Guido & Helene Gagliano
17 Washington Drive
Acton, MA 01720*

Prepared by:
*Goldsmith, Prest & Ringwall, Inc.
39 Main Street, Suite 301
Ayer, MA 01432*

Project No:
00159A

**STORMWATER SYSTEM OPERATION
AND MAINTENANCE PLAN
Residential Compound
Roosevelt Drive, Acton, MA
Date: March 2014**

Preface:

The goal of this manual is to improve water quality by initiating performance standards for the operation and maintenance of stormwater management structures, facilities, and recognized practices.

This manual is set up to explain how to operate and maintain Best Management Practices that control erosion and minimize delivery of sediment and other pollutants to surrounding water and air.

- | | |
|-----------|--|
| Chapter 1 | is an introduction to the site and describes the Best Management Practices used on this site. |
| Chapter 2 | outlines the inspection and maintenance schedules for the site. |
| Chapter 3 | shows the location of the Best Management Practices used on-site. |
| Chapter 4 | outlines the operation and function of the Best Management Practices. |
| Chapter 5 | describes how and when the Best Management Practices should be inspected and how frequently they must be maintained and cleaned. |

1. Introduction:

The subject site is a 2.71± acre parcel on the northwest side of Washington Drive. The site is bordered to the southwest by residential properties which front on Coolidge Drive, to the northwest by Monroe Drive and residential properties which front on Monroe Drive, to the east by residential properties which front on Washington Drive and Jackson Drive, and to southeast by Washington Drive. The site contains an existing residential dwelling (#17 Washington Drive) located on the northwest portion on the parcel, 660± feet from Washington Drive. Attendant to the dwelling is surrounding yard area, an existing well, an existing sewage disposal system, and an existing 660± foot bituminous concrete driveway from Washington Drive. The remainder of the parcel is woodland and there are no resource areas on or adjacent to the parcel. The majority of the site slopes either towards the residential properties east of the parcel or to the southwest towards Washington Drive.

The proposed development is for the subdivision of the parcel into three residential lots through the construction of a 442± foot long, 12 foot wide Residential Compound Way off of Monroe Drive as allowed per Section 10 of the Subdivision Rules and Regulations. The proposed private right-of-way will provide frontage for two lots, one lot containing the existing dwelling and a second lot for a proposed dwelling at the westernmost portion of the site. A proposed third lot will use the parcel's existing frontage on Washington Drive, with a proposed dwelling located adjacent to Washington Drive.

The proposed stormwater management system has been designed to utilize Low-Impact Development (LID) low maintenance techniques and avoid typical structural practices. Stormwater runoff from the proposed Residential Compound Way and the two lots with frontage on the proposed way will be collected in a 6 inch deep Biofilter Swale on the east side of the proposed way. The Biofilter Swale will transport stormwater runoff into one of two Water Quality Basins on the east side of the proposed way. The Water Quality Basins are designed to retain and infiltrate stormwater runoff, with a level spreader outlet for larger rain events.

To control erosion and minimize delivery of sediment and other pollutants into the atmosphere and adjacent wetlands, Best Management Practices (BMP's) have been provided within the site's stormwater management system. These practices include but are not limited to:

- Biofilter Swales;
- Water Quality Basins.

This manual is designed to help responsible parties become aware of urban non-point pollution problems and to provide detailed information about operating and maintaining stormwater management practices. The success of the Best Management Practices is dependent on their continued operations and maintenance.

2. Maintenance Requirements:

BMP's Owners:

- The OWNERS of the BMP's shall be the person, persons, trust, corporation, etc., or their successors who have title to the land for Lot 1 & Lot 2. It is anticipated that all BMP's will be owned by Guido & Helene Gagliano, until the title of land upon which they are located is transferred. At that time, the purchaser of the property will assume all responsibilities set forth within this document.

Operation and Maintenance Responsibilities:

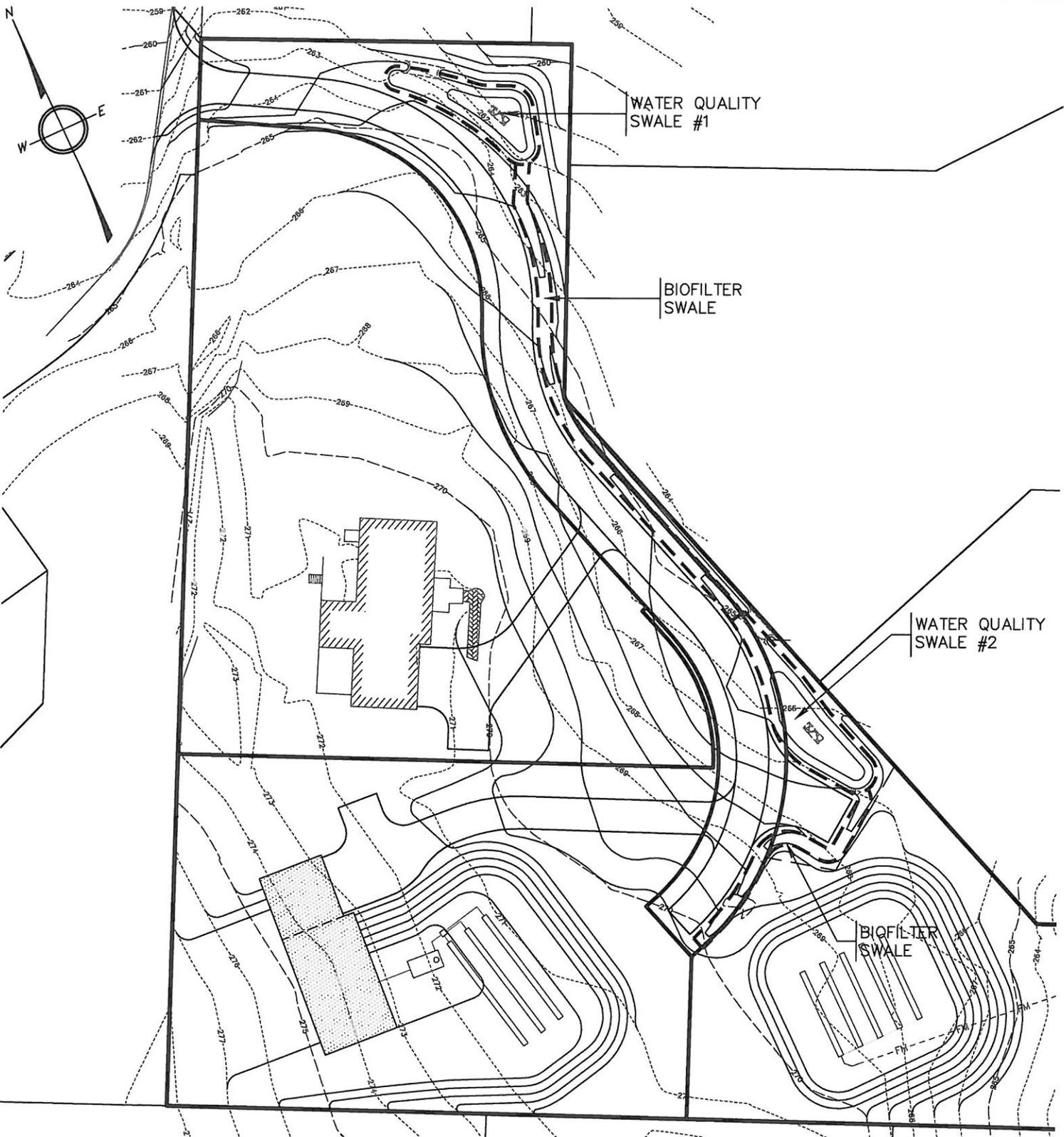
- The party or parties responsible for the funding, operation and maintenance of the BMP's shall be the OWNER or their designees.
- BMP's each have specific maintenance requirements to ensure long-term effectiveness. These stormwater management systems will be operated, inspected and maintained on a regular basis **by a qualified professional with expertise in inspecting drainage system components**. All of the stormwater BMP's shall be kept in good working order at all times.
- A maintenance agreement providing for the funding, operation and maintenance of all the stormwater management BMP's shall be provided.

Source of Funding for Operation and Maintenance:

- The party or parties responsible for the funding, operation and maintenance of the BMP's shall be the OWNER or their designees.
- A maintenance agreement providing for the funding, operation and maintenance of all the stormwater management BMP's shall be provided.

Schedule for Inspection and Maintenance:

- BMP's each have specific maintenance requirements to ensure long-term effectiveness. These stormwater management systems will be operated, inspected and maintained on a regular basis in accordance with this manual. All of the stormwater BMP's shall be kept in good working order at all times.
- As a minimum, the OWNER shall follow the general guidelines outlined herein for the BMP's provided on this site.
- An Operation and Maintenance log must be maintained for the last three years, outlining inspections, repairs, replacement and disposal for each Best Management Practice (BMP). In the case of disposal, the log shall indicate the type and material and the disposal location.



SCALE: 1"=50'	
JOB: 00159A	
BY: MKB	CHK: DEM
DATE: FEB. 2014	
4 OF 5	

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for Land & Structures

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VOICE: 978.772.1590 FAX: 978.772.1591
www.gpr-inc.com

17 WASHINGTON DRIVE
ACTON, MASSACHUSETTS

BMP LOCUS

4. Operation of Best Management Practices:

Biofilter Swales – are traditional vegetated open channels that are designed to provide for non-erosive conveyance of stormwater runoff. The functions of biofilter swales include:

- Vegetated, stormwater conveyance;
- Compatible with LID design practices and accents landscaping;
- Less expensive than curb and gutter.

Water Quality Basins – are shallow vegetated basins designed to retain and infiltrate stormwater runoff, the functions of a water quality basin include:

- Remove suspended solids;
- Limit peak flow discharge to reduce local and downstream flooding;
- Provide groundwater recharge.

5. Inspection and Maintenance of Best Management Practices:

Biofilter Swales:

At a minimum, biofilter swales shall be inspected after every major storm event (1-inch of rain or greater) for the first six (6) months and twice per year thereafter. Sediment and debris shall be removed from biofilter swales once per year. Grass within the swale shall be mowed as necessary to maintain the grass height between three (3) and six (6) inches. Remove grass clippings and inspect for signs of erosion and the formation of rills and/or gullies. Reseed or reseed with an alternative grass species if the original grass cover is not successfully established. When reseeding, incorporate practices such as hydroseeding with a tackifier, blanket or similar practice to ensure that no scour occurs in the grass channel, while the seeds germinate and develop roots.

Water Quality Basins:

At a minimum, inspect water quality basins after every major storm event (1-inch of rain or greater) to insure basin is operating as intended and no standing water is present over an extended period of time. Examine the wick outlet for evidence of clogging, the embankment for tree/brush growth, and erosion within the basin and banks. Make any necessary repairs immediately.

Mow water quality basins at least twice per year. Also remove trash and debris from the basins at this time. Inspect vegetation growing at the bottom of the basin every spring, and remove invasive species and excess growth. Remove sediment from the bottom of the basin every year in the fall or at a time the bottom of the basin is dry.

Overall Site Issues

Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1	Are discharge points and receiving waters free of any sediment deposits?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2	Are storm drain inlets properly working?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3	Is trash/litter from site areas collected and placed in covered dumpsters?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5	Are materials that are potential stormwater contaminants stored inside or under cover?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6	(Other)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Non-Compliance

Describe any incidents of non-compliance not described above:

CERTIFICATION STATEMENT

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”

Print name and title: _____

Signature: _____ **Date:** _____

Attorney Ray Lyons

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Harvard, MA 01451

Licensed to Practice in Massachusetts
Maine, and New Hampshire.

(978) 456-8400
E-mail: raylyons@raylyons.com

March 17, 2014

Roland Bartl, Town Planner
Town of Acton
472 Main Street
Acton, MA 01720

Re: Gagliano property/Residential Compound Plan/Roosevelt Drive

Dear Mr. Bartl:

I represent Helene Gagliano, owner of two lots located at 17 Washington Street (the "Property"), and her husband, Guido Gagliano. Their property has frontage on Washington Drive and Monroe Drive. They are preparing plans to subdivide their property into three lots under Acton's Residential Compound Development zoning bylaw. One lot will have frontage and access on Washington Drive, the other two lots will have frontage on a new subdivision road ("Roosevelt Drive") with access from Monroe Drive.

This letter authorizes you and other town officials to enter the Property to conduct inspections during the subdivision approval process and while construction is underway until the roadway is fully released from the Planning Board's construction bond. Please note that Guido and Helen live in the house located on the Property; we request the courtesy of 24 hours prior notice before any town official enters the Property. Town officials may also enter at any time, without prior notice, if accompanied by any of the following people: Bruce Ringwall or other employees of GPR, Inc., the General Contractor and his agents (to be named before construction begins), or me.

The property is currently subject to two mortgages, one recorded at the Middlesex South Registry of Deeds at Book 53745, Page 432, the other at Book 56059, Page 520.

I also enclose a "Declaration of Easement and Maintenance, Residential Compound, Private Way Maintenance Agreement and Covenant, Roosevelt Drive" and Form RC "Restrictive Covenant" for your review.

Please call me if you have any questions or requests.

Very truly yours,

A handwritten signature in black ink that reads "Ray Lyons". The signature is written in a cursive style with a large, prominent "R" and "L".

Ray Lyons

Enclosures

cc: Bruce Ringwall, Helene and Guido Gagliano

**DECLARATION OF EASEMENT AND MAINTENANCE
RESIDENTIAL COMPOUND
PRIVATE WAY MAINTENANCE AGREEMENT AND COVENANT
ROOSEVELT DRIVE, ACTON**

This ___ day of _____ 2014, I, Helene Gagliano, individually and as trustee of the Helene Gagliano Investment Trust, (the "Declarant") as owner in fee simple of Lot 1A, Lot 2A, and 3A on Roosevelt Drive in Acton, Massachusetts, (collectively, the "Premises") as shown on a plan entitled "Residential Compound, Plan of Lots, 17 Washington Drive, Acton, MA, Owner/Applicant: Guido & Helene Gagliano" prepared by GPR, Goldsmith, Prest & Ringwall, Inc., and dated March 7, 2014, recorded herewith as Plan No. _____ of 2014 (the "Plan"), hereby make and declare the Premises subject to the following perpetual rights and easements for the benefit of Lot 1A and Lot 2A as provided herein and to use the areas identified as "Roosevelt Drive" and "Drainage Easement & Use Limitation Area "C"" on the Plan in common with each other and others from time to time entitled to use Roosevelt Drive, for all purposes for which private ways are now or may hereafter be used in the Town of Acton, including without limitation, access on foot and in motor vehicles and to install, maintain, replace, remove and use underground utility lines and pipes (but not above ground utility lines and pipes), including without limitation sewers, drains, water mains, gas pipes, electric lines, fire hydrants, telephone lines and cable television lines therein and thereunder, (all of which shall remain the property of the person(s) installing such utilities.)

1. With respect to said rights and easements as shown and described, the Declarant and her successors and assigns hereby declares the following regarding the Premises and Roosevelt Drive and its related drainage and utility facilities:

- (a) Roosevelt Drive shall be designed and built and the underground utilities installed in accordance with the CODE OF THE TOWN OF ACTON, MASSACHUSETTS and as shown on the Plan. Lot 1A and Lot 2A's owners and their successors and assigns (the "Owners") shall thereafter maintain

Roosevelt Drive and utilities in a manner sufficient to provide safe and reasonable access and a reasonable maximum of attractiveness, livability, and amenity. The Owners, singularly or together, shall hold the right to enforce these requirements.

- (b) Except as expressly provided herein, the easements, rights and privileges established, created and granted by this instrument shall be exclusively for the benefit of, and restricted solely to, the owners of record title in fee simple of the Owners, their immediate families, tenants and the immediate families of such tenants, and guests who are residents in occupancy of dwellings on the Premises for the duration of their tenancies, but the same is not intended nor shall it be construed as creating any rights in or for the benefit of the general public or any rights in or to any portion of the Premises;
- (c) "Use Limitation Area "A"" on Lot 2A as shown on the Plan is for the exclusive use by and benefit of Lot 1A, even as to Lot 2A;
- (d) "Use Limitation Area "B"" on Lot 3A as shown on the Plan is for the exclusive use by and benefit of Lot 2A, even as to Lot 3A;
- (e) The "Drainage Easement & Use Limitation Area "C"" on Lot 3A as shown on the Plan is for the exclusive use by and benefit of Lot 1A and Lot 2A, even as to Lot 3A, and is appurtenant to Roosevelt Drive;
- (f) The owner of Lot 3A shall not be responsible for any expenses related to Roosevelt Drive or its related utilities and appurtenances;
- (g) Except as provided herein, the Owners shall have the right to use and enjoy the foregoing rights and easements in common with each other and others legally entitled thereto;
- (h) No person shall park or allow any vehicle to stand or idle in Roosevelt Drive at any time whatsoever except for temporary loading and unloading. Notwithstanding any other provision herein, express or implied to the contrary, no person shall make any use of Roosevelt Drive which shall

interfere with the Owners' use and enjoyment of and access to their respective Lots;

- (i) If in connection with the exercise of said rights and easements either of the Owners shall make any excavations within Roosevelt Drive, the owner so excavating will as soon as possible restore said portion and the surface thereof to its prior condition;
 - (j) The Owners agree to and shall indemnify and hold each other, and their successors and assigns, harmless from and against any and all loss, damage or liability for injury or damage to persons or property arising from the construction, repair, maintenance, use, and exercise of said rights and easements created herein, except to the extent caused by their own negligence.
2. In addition to the other rights and obligations provided herein, construction, repairs, maintenance and grounds keeping with respect to Roosevelt Drive shall include, without limitation:
- (a) Construction/Repairs/Replacement: Roosevelt Drive shall be constructed and maintained in good condition suitable for the safe passage by emergency vehicles, passenger vehicles, and pedestrians and for access as hereinabove described.
 - (b) Snow Removal: The removal and disposal of all snow accumulation of 1.0 inches or more from Roosevelt Drive shall be shared equally by the Owners. The Owners shall, unless other mutually acceptable arrangements are made beforehand, agree upon a snow clearance and removal company on or before November 1st of each calendar year. The Owners hold the right and easement to deposit ice and snow removed from Roosevelt Drive onto the property of the other within Roosevelt Drive right of way, provided that such ice and snow shall not be deposited onto paved areas and/or areas used by either Owners for pedestrian and/or vehicular passage within their respective properties or parking areas, and the Owners shall otherwise be respectful of the landscaping on each other's property and shall not deposit such ice and snow in any manner which shall materially interfere with the other's use and

enjoyment of their property. The Owners shall use only environmentally safe materials to melt, clear, or remove ice and snow.

- (c) Grounds keeping: The removal and disposal of fallen limbs and trees and the clearing and removal of all brush, foliage, rubbish and debris which is or may be unsightly and/or may obstruct the line of sight of vehicles using Roosevelt Drive shall be undertaken by the Owners on a periodic or more frequent basis as necessary. The removal and disposal of litter on the grounds and the proper maintenance of grass, trees and bushes along Roosevelt Drive and/or are in the immediate area thereof or within sight lines necessary for proper navigation on or within Roosevelt Drive shall be completed on a periodic basis.
- (d) Drainage: The drainage system shall be installed in accordance with the Plan and maintained and kept clear at all times.
- (e) Siltation: All maintenance, repairs, and construction within Roosevelt Drive shall be conducted in a manner that minimizes the amount of siltation and erosion that may be carried in Roosevelt Drive or the drainage system.
- (f) Cost: The cost of such construction, repairs, maintenance, grounds keeping and snow and ice removal from Roosevelt Drive shall, except as otherwise provided in this Agreement, be divided equally between the Owners.

3. Arbitration. In the event of a dispute by and between the Owners arising under this Declaration or in the event an Owner does not agree to a determination, decision or action of the other with respect to the provisions herein, said disputing party shall notify the other party in writing within thirty (30) days of such decision, determination or action of the other party and, in the event that such dispute shall thereafter not be resolved between the parties hereto, then either the dissenting or the non-dissenting party may submit the matter to arbitration before a single arbitrator in Middlesex or Worcester County, Massachusetts, according to the rules then prevailing of the American Arbitration Association or any successor organization performing like functions, and the determination of such Arbitrator shall be final and conclusive and binding upon all parties. The costs of such arbitration shall be divided between the

Owners on an equal basis, each paying one-half of the cost thereof.

4. Run with the Land. The rights, easements, covenants, restrictions, benefits, and obligations hereunder shall be perpetual and run with the land.

5. Amendments. This Declaration may be abrogated, modified, rescinded or amended in whole or in part only if and to the extent that: (a) such action does not violate the Code of the Town of Acton, Massachusetts, any statute or regulation, or any permit related to the Plan and (b) both Owners agree, in writing duly recorded with the appropriate Registry of Deeds; and may not otherwise be abrogated, modified, rescinded or amended in whole or in part. The Owners shall execute any additional documents required by the Town of Acton or otherwise reasonably required to enable Roosevelt Drive to be used to service Lot 1A and 2A.

For Declarant's title see deed recorded at Book 25611, Page 511, and Trustee's Certificate recorded at Book 25611, Page 509 that remains in full force and effect without amendment as declared therein.

Witness my hand and seal this _____ day of March 2014.

COMMONWEALTH OF MASSACHUSETTS

Middlesex, ss

On this _____ day of March 2014, before me, the undersigned notary public, personally appeared Helene Gagliano, individually and as trustee of the Helene Gagliano Investment Trust, known to me personally to be the person whose name is signed on the preceding document, and acknowledged to me that she signed it voluntarily and for its stated purpose.

Notary Public: Ray Lyons
My Commission expires: June 15, 2018

ACTON PLANNING BOARD

FORM RC

RESTRICTIVE COVENANT

In consideration of the approval by the Planning Board of the Town of Acton, Massachusetts (hereinafter referred to as the Board), of a plan of land located in Acton, Middlesex County, Massachusetts entitled "Residential Compound, Plan of Lots, 17 Washington Drive, Acton, MA, Owner/Applicant: Guido & Helene Gagliano" prepared by GPR, Goldsmith, Prest & Ringwall, Inc., and dated March 17, 2014, and approved by the Board on _____ and the waiver by the Board of a bond or other security for the construction of the ways and the installation of certain services shown on said plan, in compliance with the Town of Acton, Massachusetts (the "Town") Subdivision Rules and Regulations, last amended on December 6, 2011, I, Helene Gagliano, trustee of the Helene Gagliano Investment Trust (the "Developer"), having a usual place of business at 17 Washington Drive, Acton, MA, and my successors and assigns, hereby covenants and agrees with the Board and the Town as follows:

1. The undersigned Developer is the owner in fee simple absolute of all the land included in the subdivision and that there are no mortgages of record or otherwise on any of said land, except for those described below, and that the present holders of said mortgages have assented to this covenant prior to its execution by the Developer.
2. The Developer shall not sell or convey any lot in the subdivision or erect or place any permanent building on any lot until the construction of ways and installation of municipal services necessary to adequately serve such lot has been completed in accordance with the following:
 - a) The Subdivision Control Law and the Acton Planning Board's Rules and Regulations governing this subdivision.
 - b) The certificate of approval and the conditions of approval specified therein, issued by the Planning Board, dated _____.
 - c) The definitive plan as approved and as qualified by the certificate of approval.
 - d) Other document(s), namely: _____
3. However, a mortgagee who acquires title to the mortgaged premises by foreclosure or otherwise and any succeeding owner of the mortgaged premises or part thereof may sell or convey any lot, subject only to that portion of this covenant which provides that no lot be sold or conveyed or built upon until ways and services have been provided to serve such lot.
4. The Developer will expeditiously and diligently proceed to construct the ways shown on the aforesaid plan and in the event that the Board concludes, in its sole discretion, that the Developer is not so constructing such ways, the Developer shall provide additional security other than this

covenant sufficient in the Board's opinion for the construction and completion of such ways and services as shown on the aforesaid plan or for a portion thereof. Such additional securities shall comply with the requirements of the Town's Subdivision Rules and Regulations, provided, however, that the Board shall determine the date by which the work, for which additional security must be posted, shall be completed.

5. This covenant shall be binding upon the executors, administrators, devisees, heirs, successors and assigns of the Developer and shall constitute a covenant running with the land included in the subdivision and shall operate as restrictions upon the land.

6. Nothing herein shall be deemed to prohibit a conveyance by a single deed subject to this covenant, of either the entire parcel of land shown on the subdivision plan or of all lots not previously released by the Planning Board.

7. Particular lots within the subdivision shall be released from this covenant upon the recording of a certificate of performance executed by the Planning Board and enumerating the specific lots to be released.

8. The Developer agrees to record this covenant with the Middlesex County Registry of Deeds, forthwith. Reference to this covenant shall be entered upon the definitive subdivision plan as approved.

9. A deed of any part of the subdivision in violation of the covenant shall be voidable by the grantee prior to the release of the covenant; but not later than three (3) years from the date of such deed.

10. This covenant shall be executed before endorsement of the approval of the definitive plan by the Planning Board and shall take effect upon such endorsement.

11. Upon final completion of the construction of ways and installation of municipal services as specified herein, on or before _____, the Planning Board shall release this covenant by an appropriate instrument, duly acknowledged. Failure to complete construction and installation within the time specified herein or such later date as may be approved by the Planning Board shall constitute reason for rescission by the Board of the approval of the plan.

12. Nothing herein shall prohibit the applicant from varying the method of securing the construction of ways and installation of municipal services from time to time or from securing by one, or in part by one and in part by another of the methods described in M.G.L., Chapter 41, Section 81-U, as long as such security is sufficient in the opinion of the Planning Board to secure performance of the construction and installation.

13. The land included in the subdivision is encumbered by and subject to the following mortgages which, however, are subordinated to this covenant:

- a) Mortgage granted by the Developer to IC Federal Credit Union, recorded on October 29, 2009 with the Middlesex South Registry of Deeds at Book 53745, Page 432; and
- b) Mortgage granted by the Developer to IC Federal Credit Union, recorded on December 14, 2010 at Book 56059, Page 520.

Witness my hand and seal this _____ day of March 2014.

COMMONWEALTH OF MASSACHUSETTS

Middlesex, ss

On this _____ day of March 2014, before me, the undersigned notary public, personally appeared Helene Gagliano, individually and as trustee of the Helene Gagliano Investment Trust, known to me personally to be the person whose name is signed on the preceding document, and acknowledged to me that she signed it voluntarily and for its stated purpose.

Notary Public: Ray Lyons
My Commission expires: June 15, 2018

ASSENT OF MORTGAGE HOLDER

IN WITNESS WHEREOF, the mortgage holder(s) assents to this covenant and agrees to subordinate said mortgage(s) to this covenant, signed under seal as of the _____ day of _____, 2014.

IC FEDERAL CREDIT UNION

By _____

COMMONWEALTH OF MASSACHUSETTS

Middlesex, ss. _____, 2014

Then personally appeared the above named _____, known to me personally to be the person whose name is signed on the preceding document, and acknowledged to me that she/he signed it voluntarily and for its stated purpose and that the foregoing instrument is his/her free act and deed and the free act and deed of IC Federal Credit Union, before me.

Notary Public:

My Commission expires: