

# **RESIDENCES AT ACORN PARK**

Belmont, Massachusetts

Comprehensive Permit Application  
Under M.G.L. Chapter 40B, Sections 20-23

*Submitted by:*  
AP Cambridge Partners II, LLC

December 9, 2005

Town of Belmont Massachusetts  
**ZONING BOARD OF APPEALS**

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Premises affected: A 15.67 acre parcel of land, on Frontage Road and Acorn Park Drive

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**APPLICATION FOR A COMPREHENSIVE PERMIT  
UNDER GENERAL LAW CHAPTER 40B, SECTIONS 20-23**

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AP Cambridge Partners II, LLC, (hereinafter the "Applicant") hereby applies to the Board of Appeals of the Town of Belmont, Massachusetts, pursuant to General Laws, Chapter 40B, Section 20 through 23, as amended, for the issuance of a Comprehensive Permit authorizing the applicant to construct 300 condominium units to be called "Residences at Acorn Park" on land located on the south side of Frontage Road and the west side of Acorn Park Drive in Belmont, Massachusetts. The applicant and the development are more particularly described in the exhibits hereto annexed and submitted simultaneously herewith, all of which are incorporated herein by reference and constitute the documents required to be submitted by Sections 30.00 and 31.00 of the Rules and Regulations of the Housing Appeals Committee of the Executive Office of Communities and Development.

## REQUEST FOR FINDINGS OF FACT

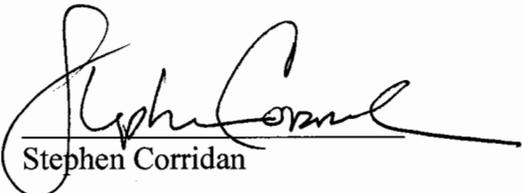
The applicant requests that the Board of Appeals make the following findings of fact in connection with the action of the Board on this application:

1. AP Cambridge Partners H, LLC, a limited dividend organization within the meaning of General Laws, Chapter 40B, is eligible to receive a subsidy under a state or federal affordable housing program after a Comprehensive Permit has been granted.
2. The applicant has shown evidence of its interest in the proposed site sufficient to qualify it as a recipient of a Comprehensive Permit for this site.
3. MassDevelopment, will be the subsidizing agency, administering its Tax-Exempt Bond Program for Rental Housing, a subsidized housing program within the meaning of the procedural regulations of the Housing Appeals Committee (760 CMR:30.01(C)).
4. The number of low or moderate income housing units in the Town of Belmont constitutes less than ten percent (10%) as reported in the latest decennial census of the town and reported by the Department of Housing & Community Development as of August 2005.
5. The development as proposed in the application is consistent with local needs within the meaning of General Laws, Chapter 40B, Section 20.

The applicant respectfully requests the Board of Appeals after complying with the procedural requirements as provided by law, to issue to the applicant a Comprehensive Permit for the development.

AP Cambridge Partners H, LLC

By:

  
Stephen Corridan

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## PROJECT DATA SUMMARY

### 1. Applicant

AP Cambridge Partners II, LLC (the "Applicant") has been organized under the General Laws of the State of Pennsylvania and is qualified to undertake the planning, development and operating of this proposed mixed income rental community in Belmont, MA. The Applicant will develop 299 rental units on a limited dividend basis, as required under all laws and regulations of the Commonwealth of Massachusetts. Robert Engler of Stockard Engler Brigham, LLC is a consultant to the development team with extensive experience on a number of mixed income housing projects over the past 33 years. The Applicant respectfully requests that all notices from the Board in connection with this Application be sent to Robert Engler at Stockard Engler Brigham, LLC, 10 Concord Avenue, Cambridge, MA 02138.

### 2. Description of the Development

The proposed development will consist of 299 rental units consisting of 159-1BR units (685sf), 116-2BR units (1050sf) and 24-3BR units (1450sf). There will be one level of underground parking for each of the 5 buildings. The development qualifies as assisted "low or moderate income housing" within the meaning of Massachusetts General Laws Chapter 40B, section 20 and will provide 60 units (20%) which will serve households earning at or below 50% of area median income and thus will meet the definition of low and moderate income under the statute. The Applicant desires to develop this project pursuant to the guidelines of MassDevelopment's Tax-Exempt Bond Program for Rental Housing under which a site approval letter has been granted.

Preliminary architectural drawings prepared by ADD, Inc. are attached hereto in reduced form and under separate cover as full size drawings.. Preliminary engineering plans prepared by Rizzo Associates are also attached herein in reduced form and under separate cover as full size drawings.

### 3. Local Need

According to figures compiled by the Massachusetts Department of Communities and Development (DHCD), in August 2005, Belmont's subsidized housing inventory represented 2.7% of its total housing stock, well below the threshold requirements established under Chapter 40B of M.G.L.

### 4. Exceptions and Approvals Requested

The proposed site in Belmont is in a Belmont Uplands District within which the proposed use is not allowed. Consequently, an exception of use is required to enable multifamily residential to be constructed. Other exceptions to the Belmont Zoning Bylaw and other local land use regulations are listed in Section 9 of this application. The Applicant hereby requests that all exceptions from, and permits under the Zoning Bylaw and all other applicable bylaws or regulations of the Town of Belmont be granted pursuant to this application and the attached plans; if any specific exceptions have not been listed in this application, the applicant, upon notification of such an oversight, shall promptly amend the list of exceptions to include them.

## CONCLUSION

For all of the foregoing reasons, and for the additional reasons the Applicant will present at the scheduled public hearing on this Application, the Applicant respectfully requests the Board, after complying with the procedural requirements as provided by law, to issue to the Applicant a Comprehensive Permit for the Development.

## SECTION 2 APPLICANT STATUS

The applicant will conform to the limited dividend requirements of Chapter 40B which, in turn, require that the developer abide by whatever such requirements are imposed by the affordable housing program being proposed. Accordingly, a draft of the proposed Regulatory Agreement which governs the limited dividend restrictions under MassDevelopment's Tax-Exempt Bond Program for Rental Housing is attached. This draft document will be finalized, signed and resubmitted to the ZBA prior to the receipt of a building permit from the Town of Belmont.

The Regulatory Agreement stipulates that the developer's profit shall be limited to a annual return on equity no greater than 10%. This limited dividend requirement will be analyzed by a third party Monitoring Agent as chosen by the Town of Belmont. A copy of this report will be filed annually with the Town of Belmont once stabilized occupancy has been reached.

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TAX REGULATORY AGREEMENT

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By and Among

MASSACHUSETTS DEVELOPMENT FINANCE AGENCY

and

**[INSERT NAME OF BORROWER]**

and

**[INSERT NAME OF TRUSTEE]**, as Trustee

\$ \_\_\_\_\_ Massachusetts Development Finance Agency  
[Type] Bonds  
([Project Name] Project)  
Series \_\_\_\_\_

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Dated as of \_\_\_\_\_

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TAX REGULATORY AGREEMENT

THIS TAX REGULATORY AGREEMENT (“Regulatory Agreement”) is made and entered into as of \_\_\_\_\_, by and among MASSACHUSETTS DEVELOPMENT FINANCE AGENCY (the “Issuer”), a body politic and corporate organized and existing under the laws of The Commonwealth of Massachusetts (the “Commonwealth”), **[Insert name of Trustee]** (the “Trustee”), a \_\_\_\_\_, and **[Insert name of Borrower]**, a \_\_\_\_\_ (the “Company”).

WITNESSETH:

WHEREAS, the Issuer is organized under Chapter 23G, as amended, of the General Laws of the Commonwealth (the “Act”) and is empowered under the Act to enter into contracts with respect to the financing of projects (as defined in the Act), which promote industrial, commercial and other economic development and other public purposes of the Act; and

WHEREAS, the Issuer has issued \$ \_\_\_\_\_ in aggregate principal amount of its **[Type]** Bonds (**[Insert Project Name]** Project), Series \_\_\_\_\_ (the “**[Insert Year]** Bonds”) for the purposes of financing a \_\_\_\_\_ unit rental housing development (the “Project”) located on the **[property/properties]** described in Exhibit A hereto intended to qualify as a “qualified residential rental project” within the meaning of Sections 142(a)(7) and 142(d) of the Internal Revenue Code of 1986, as amended; and

WHEREAS, the Issuer, the Trustee and the Company have entered into a Loan Agreement dated as of \_\_\_\_\_ (the “Agreement”), pursuant to which the Issuer will lend to the Company the proceeds of the **[Year]** Bonds, and the Company will agree, among other things, to make loan payments to the Issuer in amounts and at times sufficient, among other things, to pay when due the principal of and the redemption premium, if any, and interest on, the **[Year]** Bonds; and

WHEREAS, the Company has received a comprehensive permit (the “Comprehensive Permit”) from the Zoning Board of Appeals for the City/Town of \_\_\_\_\_ (the “Municipality”) under Chapter 40B of the Massachusetts General Laws, which permit is recorded at the \_\_\_\_\_ County Registry of Deeds/Registry District of the Land Court (the “Registry”) in Book \_\_\_\_\_ at Page \_\_\_\_\_ / as Document No. \_\_\_\_\_; and

WHEREAS, pursuant to the requirements of the Comprehensive Permit and this Regulatory Agreement, the Issuer, or its designated representative, will perform monitoring and enforcement services regarding compliance of the Project with the Affordability Requirement (as hereinafter defined) and compliance of the Company with the Limited Dividend Requirement (as hereinafter defined).

WHEREAS, the Borrower is a Limited Dividend Organization (as hereinafter defined); and

WHEREAS, the Agreement requires the execution and delivery of this Regulatory Agreement;

NOW THEREFORE, in consideration of the mutual covenants and undertakings set forth herein, and intending to be legally bound, the Issuer, Trustee and Company do hereby contract and agree as follows:

SECTION 1. Definitions. In addition to terms defined elsewhere in this Regulatory Agreement, unless otherwise expressly provided herein or unless the context clearly requires otherwise, the following terms shall have the respective meanings set forth below for all purposes of this Regulatory Agreement:

“Actually Outstanding” shall mean, with respect to the **[Insert year]** Bonds, those **[Insert year]** Bonds the principal and interest on which has not yet been fully paid, whether or not such bonds are deemed to be outstanding under the indenture pursuant to which they were issued.

“Adjusted Family Income” shall mean the adjusted gross income of all persons who reside in a single residential rental unit, calculated in the manner prescribed in Section 142(d)(2)(B) of the Code, and determined in accordance with Exhibit B attached hereto.

“Affordable Units” shall mean those units in the Project set aside for occupancy by Lower Income Tenants which shall consist of \_\_\_\_ units, representing at least **[20%/40%]** of the units in the Project.

“Area” shall mean the Metropolitan Statistical Area in which the Project is located, as determined from time to time by the United States Department of Housing and Urban Development (“HUD”).

“Capital Source(s)” shall mean the financial entities, as lender(s) to or partner(s) of, the Owner, providing all or substantially all of the capital necessary to construct the Project, including, without limitation, any developer’s fee loaned or contributed to the Owner and equity from low income housing or historic rehabilitation tax credits.

“Code” shall mean the Internal Revenue Code of 1986, as amended, and any final, temporary or proposed regulations applicable thereto or promulgated thereunder.

“Equity in the Project” shall mean the Owner’s initial equity, as determined in accordance with the Issuer’s equity policy (the “Equity Policy”) and, as certified to the Issuer in the Certified Development Cost Statement pursuant to Section 19 of this Agreement.

“Limited Dividend Organization” shall mean a corporation, partnership, limited liability company or other organization, other than a public agency, which by its

governing articles of organization, operating agreement or partnership agreement prohibits distribution with respect to any one year of operation of more than 10% on said entity's Equity in the Project.

"Lower-Income Tenants" shall mean and include individuals or families with Adjusted Family Income which does not exceed **[fifty percent (50%)/sixty percent (60%)]** of Median Income, adjusted for family size; provided that Adjusted Family Income shall be determined in a manner consistent with determinations of lower income families and area median gross income made under Section 8 of the United States Housing Act of 1937, as amended and the regulations promulgated thereunder. In no event, however, will the occupants of a unit be considered to be Lower-Income Tenants if all the occupants are full-time students (as defined in Section 151(c)(4) of the Code), no one of which is entitled to file a joint federal income tax return.

"Median Income" shall mean the median gross income for the Area, as determined from time to time by HUD. For purposes of determining whether Adjusted Family Income qualifies a tenant for treatment as a Lower-Income Tenant, the Median Income shall be adjusted for family size.

"Qualified Project Period" shall mean the period beginning on the first day on which at least ten percent (10%) of the residential units in the Project are first occupied, and ending on the latest of (i) the date which is **[substantial rehabilitation - fifteen (15)/new construction – thirty (30)]** years after the date on which at least fifty percent (50%) of the residential units in the Project are first occupied; (ii) the first day on which no **[Year]** Bonds are Actually Outstanding; and (iii) the date of which any assistance provided with respect to the Project under Section 8 of the United States Housing Act of 1937, as amended, terminates.

"Related Person" shall mean a person whose relationship to such other person is such that (i) the relationship between such persons would result in a disallowance of losses under Section 267 or 707(b) of the Code, or (ii) such persons are members of the same controlled group of corporations (as defined in Section 1563(a) of the Code, except that "more than 50 percent" shall be substituted for "at least 80 percent" each place it appears therein).

SECTION 2. Rules of Construction. Unless the context clearly requires otherwise, words of the masculine gender shall be construed to include correlative words of the feminine and neuter genders and vice versa, the words of the singular number shall be construed to include correlative words of the plural number and vice versa. This Regulatory Agreement and all the terms and provisions hereof shall be construed to effectuate the purposes set forth herein and to sustain the validity hereof.

The titles and headings of the sections of this Regulatory Agreement have been inserted for convenience of reference only and are not to be considered a part hereof and shall not in any way modify or restrict any of the terms or provisions hereof and shall

never be considered or given any effect in construing this Regulatory Agreement or any provision hereof or in ascertaining intent, if any question of intent shall arise.

Terms and phrases used in this Regulatory Agreement and not defined herein shall have the meanings assigned to those terms in the Agreement.

SECTION 3. Project Restrictions. The Company represents, warrants and agrees that, until the expiration of the Qualified Project Period:

- (a) At no time will either the Company or any Related Person occupy a unit in the Project other than units occupied or to be occupied by agents, employees or representatives of the Company reasonably required for the proper maintenance or management of the Project, and any building or structure containing a unit so occupied will contain at least four units not occupied by the Company or any Related Party;
- (b) The Project shall consist of a building or structure or proximate buildings or structures, (i) each containing one or more similarly constructed residential units which are to be used on other than a transient basis and any facilities which are functionally related and subordinate to such units within the meaning of Sections 142(a)(7) and 142(d) of the Code, and (ii) each unit of which is to be rented or available for rental (except as permitted to be occupied by Company agents, employees or representatives in (a) above) on a continuous basis to members of the general public in accordance with the requirements of Sections 142(a)(7) and 142(d) of the Code;
- (c) The Project shall consist of proximate buildings or structures (buildings or structures are proximate if they are all located on a single parcel of land or several parcels of land which are contiguous except for the interposition of a road, street, stream or similar property) owned for federal income tax purposes by the same person being financed pursuant to a common plan;
- (d) Each dwelling unit in the Project shall consist of separate and complete facilities for living, sleeping, eating, cooking and sanitation for a single person or family; and
- (e) Affordable Units will be substantially similar to all other units in the Project, and Lower-Income Tenants will enjoy equal access to all common facilities included in the Project.

SECTION 4. Rental Restrictions. The Issuer and Company hereby declare their understanding and intent that the Project be a “qualified residential rental project” as described in Sections 142(a)(7) and 142(d) of the Code and agree that:

- (a) Promptly after the first date on which 50% or more of the units in the Project are occupied, the Company shall prepare and execute a Certificate As To Qualified Project Period substantially in the form of Exhibit C attached hereto, and the Company shall cause such Certificate to be duly recorded in the Registry and shall provide a date-stamped copy of such recorded Certificate to the Issuer immediately thereafter.
- (b) Once each unit in the Project is available for occupancy, such unit will be rented or available for rental to the general public on a continuous basis during the Qualified Project Period and that during such Qualified Project Period:
  - (i) the Company will rent the Affordable Units to Lower-Income Tenants such that, at all times during the respective Qualified Project Period, at least **[twenty percent (20%)/forty percent (40%)]** of the completed residential units will be occupied by Lower-Income Tenants (the “Affordability Requirement”) and the Issuer elects to apply the requirements of Section 142(d)(1)(A) of the Code to determine the status of the Project as a “qualified residential rental project” within the meaning of Section 142(d) of the Code;

The monthly rent charged to tenants of Affordable Units shall not exceed the lesser of:

- (1) The fair market rent for existing housing for comparable units in the Area as established by HUD under regulations promulgated at 24 C.F.R. §888.111 (or successor regulations), less the monthly allowance for the utilities and services (excluding telephone) to be paid by the tenant; or
- (2) An amount equal to thirty percent (30%) of the monthly annual income of a Family whose gross income equals **[fifty percent (50%)/sixty percent (60%)]** of the Median Income, as determined by HUD, with adjustment for the number of bedrooms in the unit, as provided by HUD. In determining the maximum monthly rent that may be charged for a unit under this clause (2), the Company shall subtract from the above amount an allowance for any utilities and services (excluding telephone) to be paid by the resident.

A “Family” is defined in 24 C.F.R. §5.403 (or any successor regulations).

Notwithstanding the foregoing, if (i) a tenant of an Affordable Unit is a holder of a rental voucher or certificate under the so-called Section 8 program or an equivalent federal or state rental assistance voucher program (each a “voucher program”) and the Family pays a contribution towards rent of not more than thirty percent (30%) of such Family’s monthly annual income, then the maximum monthly rent (i.e., tenant contribution plus voucher or certificate rental subsidy) may equal the rent allowable under the applicable voucher program and (ii) an Affordable Unit receives federal or state project-based rental subsidy and the Family occupying such Affordable Unit pays a contribution towards rent of not more than thirty percent (30%) of such Family’s monthly annual income, then the maximum monthly rent (i.e., tenant contribution plus project-based rental subsidy) may equal the rent allowable under the applicable project-based rental subsidy program. The maximum monthly contribution that may be paid by a Family under this paragraph shall subtract a monthly allowance for any utilities and services (excluding telephone) to be paid by the Family.

- (ii) the Company shall comply with all applicable federal, state and local laws, regulations, rules and ordinances prohibiting discrimination in the rental of residential property;
- (iii) the Company shall submit to the Secretary of the United States Department of the Treasury (at such time and in such manner as the Secretary shall prescribe) an annual certification as to whether the Project continues to meet the requirements of Section 142(d) of the Code, and the Company acknowledges that failure to do so will subject the Company to penalties under Section 6652(j) of the Code; and
- (iv) the Company shall prepare and submit to the Issuer and the Trustee on or before the first day of January, April, July and October of each year during the Qualified Project Period and within 30 days after any change (but only if material to the Company's continuing compliance with this Regulatory Agreement) in occupancy of a residential unit by a Lower-Income Tenant, a Certificate of Continuing Compliance in substantially the form attached hereto as Exhibit D.

- (c) The Company shall lease or enter into residency agreements for the occupancy of residential units in the Project to Lower-Income Tenants only pursuant to written leases or residency agreements, and each such lease or residency agreement shall be for a term of at least one year plus one day (or the remainder of the tenant's life, if less) in compliance with

the requirements of the Act and shall contain a clause or addendum in substantially the form of Exhibit E attached hereto. The Company shall, upon initial occupancy and annually thereafter, obtain from each Lower-Income Tenant an Income Computation and Certification substantially in the form of Exhibit B hereto and shall obtain and maintain on file from each Lower-Income Tenant evidence reasonably sufficient to verify the Lower-Income Tenant's income and assets, including as may be necessary (i) a copy of such Lower-Income Tenant's most recently filed Federal income tax return, (ii) a verification from the Lower-Income Tenant's employer, if any, of the Lower-Income Tenant's wages and other compensation, and (iii) verification of other sources of income, if any.

- d) For purposes of this Regulatory Agreement, each residential unit in the Project leased to or occupied by Lower-Income Tenants shall be treated as continuing to be leased to or occupied by Lower-Income Tenants, notwithstanding that the Adjusted Family Income of such Lower-Income Tenants, as of any subsequent determination date, may exceed the applicable limitation; provided however that such residential unit shall no longer be considered leased to or occupied by Lower-Income Tenants if the Adjusted Family Income of such tenants exceeds 140% of the applicable limitation and after such determination, but before the next determination, any residential unit of comparable or smaller size in the Project is occupied by new residents who are not Lower-Income Tenants. In addition, each residential unit in the Project which is leased to or occupied by Lower-Income Tenants shall continue to be considered leased to or occupied by Lower-Income Tenants after such residential unit is vacated by such Lower-Income Tenants until such time as such residential unit is reoccupied, other than for a temporary period not in excess of 31 days, at which time a redetermination of whether the residential unit is occupied by Lower-Income Tenants shall be made.
- e) The Company hereby agrees that the Issuer shall not be liable for any losses, damages, costs, expenses or claims whatsoever arising from receipt of review by it (or by any person or entity acting on its behalf) of any certificates or reports as to compliance with the requirements of this Regulatory Agreement. The Company further agrees that the Issuer (or any person or entity acting on its behalf) shall not be obligated to review any such report or certificate, or to take any action as a result thereof, but without prejudice to the right of the Issuer to exercise its rights and remedies hereunder if any such report or certificate discloses non-compliance with the requirements hereof, or if the Issuer otherwise discovers such non-compliance. If the Issuer becomes aware of non-compliance by the Company with the requirements hereof, the Issuer shall promptly give written notice thereof to the Company and the Trustee.

**SECTION 5. Transfer Restrictions: Covenants to Run With the Land.**

- a) The Company covenants and agrees that the Company will cause or require as a condition precedent to any conveyance, transfer, assignment or any other disposition of the Project prior to the expiration of the Qualified Project Period (a "Transfer") that the transferee of that portion assume in writing, in a form acceptable to the Issuer, all duties and obligations of the Company under this Agreement, including this Section 5 in the event of a subsequent Transfer before the expiration of the applicable Qualified Project Period. The Company shall deliver such written assumption agreement to the Issuer and the Trustee before the Transfer. Any conveyance, transfer or assignment by the Company of the Project not complying with this Section shall be null, void and without effect.
  
- (b) The Company shall cause this Regulatory Agreement to be recorded with the Registry and the covenants contained herein shall run with the land and shall bind the Company and its successors and assigns and all subsequent owners of any part of the Project or any interest therein, and the benefits shall inure to the Issuer and its successors and assigns, during the Qualified Project Period.

SECTION 6. Indemnification of Issuer and Trustee. The Company shall, to the fullest extent permitted by law, indemnify and hold harmless the Issuer and the Trustee and their officers, directors, employees and agents, from and against (a) any and all claims arising from any cause whatsoever in connection with this Regulatory Agreement; (b) any and all claims arising from any act or omission of the Company or any of its agents, servants, employees, or licensees in connection with this Regulatory Agreement; and (c) all costs, reasonable counsel fees, expenses, and liabilities incurred in connection with any such claim or proceeding brought with respect to any thereof. The indemnity provided for in this Section shall not limit any other indemnity given under the Agreement or any other document. If any action or proceeding is brought against the Issuer or the Trustee, as the case may be, or any of their respective officers, directors, officials or employees, with respect to which indemnity may be sought hereunder, the Company, upon notice thereof shall assume the investigation and defense thereof, including the employment of counsel acceptable to the Issuer or the Trustee, as the case may be, and shall be responsible for the payment of all expenses related thereto. The indemnified party shall have the right to employ separate counsel in any such action or proceeding and to participation in the defense thereof, and the Company shall be required to pay the fees and expenses of such separate counsel.

SECTION 7. Reliance. In performing their duties and obligations hereunder, the Issuer and the Trustee may conclusively rely upon statements and certificates of the Company or Lower-Income Tenants believed to be genuine and to have been executed by the proper person or persons, and upon audits of the books and records of the Company pertaining to occupancy of the Project. In addition, the Issuer and the Trustee may consult with counsel of their selection, respectively, and the opinion of such counsel shall

be full and complete authorization and protection in respect of any action taken or suffered by the Issuer or the Trustee hereunder in good faith and in conformity with the opinion of such counsel.

SECTION 8. Access to Development and to Books and Records. The Company will, upon reasonable request, permit the Issuer and the Trustee to have access to, and to inspect and copy, the Company's books and records with respect to the Project and to have access to the Project during normal business hours. Such rights may be exercised by a representative, employee or agent of, or counsel to, the party making the request.

SECTION 9. Term. The terms and provisions of this Regulatory Agreement shall become effective upon its execution and delivery. Except as otherwise provided in this Section, this Regulatory Agreement shall remain in full force and effect until the end of the Qualified Project Period. It is expressly agreed and understood that certain provisions hereof are intended to survive the payment of the [Year] Bonds. The foregoing notwithstanding, this Regulatory Agreement and all restrictions hereunder shall terminate: (A) if there is delivered to the Issuer, the Company and the Trustee an opinion of nationally recognized bond or tax counsel acceptable to the Issuer to the effect that failure to comply with this Regulatory Agreement will not cause interest on the [Year] Bonds to become includable in the gross income of the holders thereof for Federal income tax purposes, or (B) in the event of an involuntary noncompliance caused by fire, seizure, requisition, foreclosure, transfer of title by deed in lieu of foreclosure, condemnation or similar event, or a change in a federal law or an action of a federal agency after the date of issuance of the [Year] Bonds that prevents the Issuer from enforcing the terms of this Regulatory Agreement, but only if, within a reasonable period, either the [Year] Bonds are repaid or amounts received as a consequence of such event are used to provide a residential rental project that meets the terms of this Regulatory Agreement. Notwithstanding the foregoing, such requirements shall continue to apply to the Project subsequent to a foreclosure, transfer of title by deed in lieu of foreclosure or similar event if, at any time subsequent to such event, the obligor on the purpose investment (as defined in Section 1.148-1(b) of the Treasury Regulations) or a Related Person obtains an ownership interest in the Project or any part thereof for Federal tax purposes.

SECTION 10. Enforcement.

- (a) Upon discovery by or notification to the Issuer or the Trustee of any default in the performance or observance of any covenant, agreement or obligation of the Company set forth in this Regulatory Agreement, the Issuer or the Trustee shall promptly notify the Company in writing of the existence and nature of such default. If the Company defaults in the performance or observance of any covenant, agreement or obligation of the Company set forth in this Regulatory Agreement, and if such default remains uncured for a period of sixty (60) days after notice thereof shall have been given by the Issuer or the Trustee to the Company, with a copy of such notice to the others, then the Issuer or the Trustee may declare that

the Company is in default hereunder and may take any one or more of the following steps, at its option:

- (i) by mandamus or other suit, action or proceeding at law or in equity, require the Company to perform its obligations and covenants hereunder, or enjoin any acts or things which may be unlawful or in violation of the rights of the Issuer or the Trustee hereunder;
- (ii) have access to and inspect, examine and make copies of all of the books and records of the Company pertaining to the Project;
- (iii) take whatever other action at law or in equity may appear necessary or desirable to enforce the obligations, covenants and agreements of the Company hereunder; or
- (iv) to recover any monetary damages suffered by the Issuer, the Trustee, or the owners from time to time of the 1999 Bonds as a consequence of any event of default;

provided that in the case of a default that is curable but requires acts to be done or conditions to be remedied which, by their nature, cannot be done or remedied within such 60-day period, and if the Company commences the same within such 60-day period and thereafter diligently and continuously prosecutes the same to completion the time within which the Company may cure shall be extended for such period as may be reasonably necessary in the Issuer's or the Trustee's discretion to cure the same with due diligence (but in no event more than 90 days).

- (b) The Company hereby acknowledges and agrees that money damages will not be an adequate remedy at law for a default by the Company arising from a default hereunder, and therefore the Company agrees that the remedy of specific performance shall be available to the Issuer or the Trustee in any such case, but without prejudice to the availability of monetary damage remedies.
- (c) The Trustee shall have the right, but not the obligation, in accordance with this Section and the provisions of the Trust Agreement, without the consent or approval of the Issuer, to exercise any or all of the Issuer's rights or remedies hereunder, and the Issuer hereby irrevocably appoints the Trustee attorney-in- fact for the purpose of enforcement of this Regulatory Agreement. No delay in enforcing the provisions hereof as to any breach or violation shall impair, damage or waive the right of any party entitled to enforce the same or to obtain relief against or recover for the continuation or repetition of such breach or violation or any similar breach or violation thereof at any later time or times. The Company

agrees to pay, indemnify and hold the Issuer and the Trustee harmless from any and all costs, expenses and fees, including all reasonable attorneys' fees and expenses that may be incurred by the Issuer and the Trustee in enforcing or attempting to enforce this Regulatory Agreement following any default herein on the part of the Company, whether the same shall be enforced by suit or otherwise, and the reasonable fees and expenses of counsel in connection with any opinion to be rendered hereunder.

- (d) No remedy conferred herein or reserved to the Issuer or the Trustee is intended to be exclusive of any other available remedy or remedies, but each and every such remedy shall be cumulative and shall be in addition to every other remedy given hereunder or now or hereafter existing at law or in equity or by statute.
- (e) If the Issuer or Trustee has instituted any proceeding to enforce any right or remedy under this Regulatory Agreement and such proceeding has been discontinued or abandoned for any reason, or has been determined adversely to the Issuer, then and in every such case the Company, the Issuer and the Trustee shall, subject to any determination in such proceeding, be restored severally and respectively to their former positions hereunder, and thereafter all rights and remedies of the Issuer and the Trustee shall continue as though no such proceedings has been instituted.
- (f) No delay or omission of the Issuer or the Trustee to exercise any right or remedy provided hereunder upon a default (except a delay or omission pursuant to a written waiver) shall impair any such right or remedy or constitute a waiver of any such event of default or acquiescence therein. Every right and remedy given by this Section 10 or by law to the Issuer or the Trustee may be exercised from time to time, and as often as may be deemed expedient by the Issuer or the Trustee, as the case may be.
- (g) If any default, violation or breach by the Company under this Regulatory Agreement is not cured to the satisfaction of the Issuer within thirty (30) days after notice to the Company thereof, then the Issuer may send notification to the Company that it is in violation of the terms and conditions of this Regulatory Agreement. The Issuer may exercise any remedy available to it. The Company shall pay all costs and expenses, including reasonable legal fees, incurred by Issuer in enforcing this Agreement, and, in the event of any action by the Issuer against the Company, the Issuer shall be entitled to seek an attachment against the Company's property including, without limitation, its interest in the Project. The Issuer may perfect a lien on the Project by recording/filing one or more certificates setting forth the amount of the costs and expenses due and owing in the Registry. A purchaser of the Project or any portion of it shall be liable for the payment of any unpaid costs and expenses

which were the subject of a recorded/filed certificate prior to the purchaser's acquisition of the Project or portion thereof.

SECTION 11. Governing Law. This Regulatory Agreement shall be governed by the internal laws of The Commonwealth of Massachusetts except to the extent that laws of the United States of America may prevail.

SECTION 12. Amendments. This Regulatory Agreement shall be amended only by a written instrument executed by the parties hereto, and only upon receipt of an opinion of nationally recognized bond or tax counsel acceptable to the Issuer that such amendment or revision will not adversely affect the exclusion from gross income for federal income tax purposes of interest on the [Year] Bonds.

SECTION 13. Notices. Any notice required to be given hereunder shall be given by registered or certified mail at the addresses specified below or at such other addresses as may be specified in writing by the parties hereto:

If to the Issuer:

Massachusetts Development Finance Agency  
75 Federal Street  
Boston, MA 02110  
Attention: General Counsel

If to the Company:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

with a copy to:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

If to the Trustee:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

SECTION 14. Severability. If any provision of this Regulatory Agreement shall be invalid, illegal or unenforceable, the validity, legality and enforceability of the remaining portions shall not in any way be affected or impaired.

SECTION 15. Multiple Counterparts. This Regulatory Agreement may be simultaneously executed in multiple counterparts, all of which shall constitute one and the same instrument and each of which shall be deemed to be an original.

SECTION 16. Limitation of Issuer Liability. It is understood and agreed by the Company that no covenant of the Issuer herein shall give rise to a pecuniary liability of the Issuer or a charge against its general credit or taxing powers. It is further understood and agreed that no covenant or agreement of any member of the Issuer, or any officer, agent, employee or representative of the Issuer or the Trustee, in his or her individual capacity, and none of such persons shall be subject to any personal liability or accountability by reason of the execution hereof, whether by virtue or any constitution, statute or rule of law or by the enforcement of any assessment or penalty, or otherwise.

SECTION 17. Change in Use. The Company understands and acknowledges that Section 150(b)(2) of the Code provides that if the requirements for a “qualified residential rental project” are not met under Section 142(d) of the Code with respect to the Project, no deduction shall be allowed for interest paid on the [Year] Bonds which accrues during the period beginning on the first day of the taxable year in which the Project fails to meet such requirements and ending on the date the Project meets the requirements.

SECTION 18. Monitoring Requirements. The Issuer may, from time to time, engage the service of a third party monitoring agent for purposes of monitoring the Company's performance under this Agreement with respect to the Affordability Requirement and the Limited Dividend Requirement. In such event, such monitoring agent shall have authority to act in all matters relating to the Affordability Requirement and Limited Dividend Requirement pursuant this Agreement. In the event the Issuer engages the service of a monitoring agent, such monitoring agent shall not be held liable for any action taken or omitted under this Agreement so long as it shall have acted in good faith and without gross negligence.

SECTION 19. Limited Dividend Requirement. The Company agrees that throughout the term of this Regulatory Agreement, distribution of return to the Company or to the members, partners, shareholders, or other owners of the Company or the Project shall not exceed ten percent (10%) of the Company's Equity in the Project per year (the “Limited Dividend Requirement”), as determined from financial statements approved by the Issuer, as described below (the “Allowable Profit”). Upon issuance of a final certificate of occupancy for the Project or upon the issuance of final Certificates of Occupancy for all of the units in the Project, the Company shall deliver to the Issuer an itemized statement of total development costs together with the Capital Sources for the Project in form satisfactory to the Issuer (the “Certified Development Cost Statement”) prepared and certified by a certified public accountant satisfactory to the Issuer. The

Issuer shall determine the Owner's Equity in the Project based on the Certified Development Cost Statement.

After all of the units in the Project have been rented, the Company shall initially, and at least once every year thereafter, deliver to the Issuer an itemized statement of income and expenditures for the previous calendar year in form satisfactory to the Issuer (the "Certified Income and Expense Statement") prepared and certified by a certified public accountant satisfactory to the Issuer. The Allowable Profit shall be distributed to the Company or to the members, partners, shareholders, or other owners of the Company only in accordance with the Issuer's Equity Policy. The Certified Income and Expense Statement shall include a statement and certification as to amount of the Allowable Profit distributed to the Company or to the members, partners, shareholders, or other owners of the Company for the prior calendar year.

IN WITNESS WHEREOF, the Issuer, the Trustee and the Company have caused this Agreement to be signed under seal by their fully authorized representatives, all as of the date first written hereinabove.

MASSACHUSETTS DEVELOPMENT FINANCE  
AGENCY

By: \_\_\_\_\_  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Hereunto duly authorized

COMPANY

By: \_\_\_\_\_  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Hereunto duly authorized

ISSUER

By: \_\_\_\_\_  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Hereunto duly authorized

COMMONWEALTH OF MASSACHUSETTS :  
: ss  
COUNTY OF SUFFOLK :

On this, the \_\_ day of \_\_\_\_\_, 200\_\_, before me, the undersigned notary public, personally appeared \_\_\_\_\_, who acknowledged himself to be \_\_\_\_\_, and that he/she, being authorized to do so, executed the foregoing Tax Regulatory Agreement for the purposes therein contained by signing the name of said \_\_\_\_\_, by himself/herself as such \_\_\_\_\_.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

\_\_\_\_\_  
Notary Public  
My Commission Expires:

(SEAL)

COMMONWEALTH OF MASSACHUSETTS :  
: ss  
COUNTY OF SUFFOLK :

On this, the \_\_ day of \_\_\_\_\_, 200\_\_, before me, the undersigned notary public, personally appeared \_\_\_\_\_, who acknowledged himself or herself to be the officer of the Massachusetts Development Finance Agency, and that he or she as such officer, being authorized to do so, executed the foregoing Tax Regulatory Agreement for the purposes therein contained by signing the name of said the Massachusetts Development Finance Agency by himself or herself as such manager.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

\_\_\_\_\_  
Notary Public  
My Commission Expires:

COMMONWEALTH OF MASSACHUSETTS :  
: ss  
COUNTY OF SUFFOLK :

On this, the \_\_ day of \_\_\_\_\_, 200\_\_, before me, the undersigned notary public, personally appeared \_\_\_\_\_ who acknowledged himself or herself to be an authorized signatory of \_\_\_\_\_, and that he or she as such authorized signatory, being authorized to do so, executed the foregoing Tax Regulatory Agreement for the purposes therein contained by signing the name of \_\_\_\_\_ by himself or herself as such authorized signatory.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

\_\_\_\_\_  
Notary Public  
My Commission Expires:

(SEAL)

EXHIBIT A  
LEGAL DESCRIPTION

EXHIBIT B

INCOME COMPUTATION AND CERTIFICATION

Lower Income Tenants

(to be revised per current regulations, as necessary)

Project: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Company: \_\_\_\_\_

I/We, the undersigned, being first duly sworn, state that I/we have read and answered fully, frankly and personally each of the following questions for all persons (including minors) who are to occupy the unit in the above assisted living facility for which this application is made, all of whom are listed below:

<u>Name of Members of the Household</u>	<u>Relationship to Head of Household</u>	<u>Age</u>	<u>Social Security Number</u>	<u>Place of Employment</u>
_____	HEAD	_____	_____	_____
_____	SPOUSE	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

## Income Computation

1. The anticipated income of all of the above persons during the 12-month period beginning this date, is \$ \_\_\_\_\_.

In computing the anticipated income:

- INCLUDE:**
- all wages and salaries, overtime pay, commission, fees, tips and bonuses and other compensation for personal services, before payroll deductions;
  - net income from the operation of a business or profession (without deducting expenditures for business expansion or amortization of capital indebtedness);
  - interest, dividends and other net income of any kind from real or personal property;
  - the full amount of periodic payments received from social security, annuities, insurance policies, retirement funds, pensions, disability or death benefits and other similar types of periodic receipts;
  - payments in lieu of earnings, such as unemployment and disability compensation, workmen's compensation and severance pay;
  - the maximum amount of welfare assistance available to the above persons;
  - periodic and determinable allowances, such as alimony and child support payments and regular contributions and gifts received from persons not residing in the dwelling; and
  - all regular pay, special pay and allowances of a member of the armed forces (whether or not living in the dwelling) who is the head of the household or spouse.
- EXCLUDE:**
- temporary, nonrecurring or sporadic income (including gifts);
  - amounts which are specifically for or in reimbursement of medical expenses;
  - income from employment of children (including foster children) under age 18;

- lump sum additions to family assets, such as inheritances, insurance payments (including payments under health and accident insurance and workmen's compensation), capital gains and settlement for personal or property losses;
- amounts of student financial assistance paid directly to the student or the educational institution;
- special pay to a serviceman head of a family who is away from home and exposed to hostile fire;
- foster child or foster adult care payments; income of a live-in aide; amounts under training program funded by HUD; amounts received by a disabled person that are disregarded for purposes of Supplemental Security Income eligibility because they are set aside under a Plan to Attain Self Sufficiency (PASS);
- amounts received by participants in publicly assisted program specifically for or in reimbursement of out-of-pocket expenses incurred (special equipment, clothing, transportation, child care, etc.) and which are made solely to allow participation in a specific program;
- amounts specifically excluded by any other federal statute from consideration as income for purposes of determining eligibility or benefits under a category of assistance programs that includes assistance under the United States Housing Act of 1937;
- any resident service stipend [(not to exceed \$200 per month)] received by a resident for performing a service for the owner, on a part-time basis, that enhances the quality of life in the development;
- compensation from state or local employment training programs and training of a family member as resident management staff;
- repatriation payments paid by a foreign government pursuant to claims filed under the laws of that government by persons who were persecuted during the Nazi era;
- earnings in excess of [\$480] for each full time student 18 years old or older (excluding the head of household and spouse) and adoption assistance payments in excess of [\$480] per adopted child;

- amounts received as deferred periodic payments of supplemental security income and social security benefits that are received in a lump sum payment;
- amounts received as refunds or rebates for property taxes paid on the dwelling unit; and
- amounts paid by a state agency to a family with a developmentally disabled family member living at home to offset the cost of services and equipment needed to keep the developmentally disabled family member at home.

2. If any of the persons described above (or whose income or contributions was included in item 1) has any savings, bonds, equity in real property or other form of capital investment, provide:

- (a) \$ \_\_\_\_\_ is the total value of all such assets owned by all such persons
- (b) \$ \_\_\_\_\_ is the amount of income expected to be derived from such assets in the \_\_\_\_\_ 12-month period commencing this date
- (c) \$ \_\_\_\_\_ is the amount of such income which is included in item 1

3. (a) Will all of the persons listed in column 1 above be or have they been full-time students during five calendar months of this calendar year at an educational institution (other than a correspondence school) with regular faculty and students? (check one)

YES [ ] NO [ ]

(b) Is any such person (other than nonresident aliens) married and eligible to file a joint federal income tax return? (check one)

YES [ ] NO [ ]

4. I/We acknowledge that all of the above information is relevant to the status under federal income tax law of the interest on the 1999 Bonds issued to finance the apartment for which application is being made. We consent to the disclosure of such information to the Issuer of such 1999 Bonds, the holders of such 1999 Bonds and any trustee acting on their behalf.

THE UNDERSIGNED HEREBY CERTIFY THAT THE INFORMATION SET FORTH ABOVE IS TRUE AND CORRECT. THE UNDERSIGNED ACKNOWLEDGE THAT THE LEASE OR RESIDENCY AGREEMENT FOR THE UNIT TO BE OCCUPIED BY THE UNDERSIGNED MAY BE SUBJECT TO CANCELLATION IF ANY OF THE INFORMATION ABOVE IS NOT TRUE AND CORRECT.

\_\_\_\_\_  
Tenant

\_\_\_\_\_  
Tenant

Subscribed and sworn to before me this day of \_\_\_\_\_, \_\_\_\_\_

(Notary Seal)

\_\_\_\_\_  
Notary Public in and for The  
Commonwealth of  
Massachusetts My  
Commission Expires:

FOR COMPLETION BY COMPANY ONLY

1. Calculation of eligible tenant income:

Amount entered for entire household  
(as listed in 1 above): \$ \_\_\_\_\_

2. If the amount entered in 2(a) of the income computation above is greater than \$5,000, enter the greater of:

(a) the amount entered in 2(b) of the income computation above less the amount entered in 2(c) of the income computation above;

(b) the amount entered in 2(a) of the income computation above multiplied by the current passbook savings rate (as determined by HUD), less the amount entered in 2(c) or the income computation above; or

(c) zero: \$ \_\_\_\_\_

3. TOTAL ELIGIBLE INCOME  
(Line 1 plus Line 2): \$ \_\_\_\_\_

4. The amount entered in 3 is less than or equal to 60% of Median Income for the area in which the Project is located, as defined under the Agreement ("Lower Income Tenant").

5. Number of apartment unit assigned:

6. This apartment unit was last occupied for a period of at least 31 consecutive days by persons whose aggregate anticipated annual income as certified in the above manner upon their initial occupancy of the apartment unit was [more than] [not more than] 60% of Median Income in the area in which the Project is located, as defined under the Tax Regulatory Agreement.

THE UNDERSIGNED HEREBY CERTIFIES THAT HE/SHE HAS NO KNOWLEDGE OF ANY FACTS WHICH WOULD CAUSE HIM/HER TO BELIEVE THAT ANY OF THE INFORMATION PROVIDED BY THE TENANT MAY BE UNTRUE OR INCORRECT.

[INSERT NAME OF COMPANY

Dated:

By: \_\_\_\_\_

Title: \_\_\_\_\_

\_\_\_\_\_

\*Delete inapplicable clause.

EXHIBIT C

CERTIFICATE AS TO QUALIFIED PROJECT PERIOD

WHEREAS, [**Insert Name of Company**], a Massachusetts \_\_\_\_\_ (the "Company") is the present owner of the rental housing project (the "Project") minced through the issuance of tax-exempt bonds by the Massachusetts Development Finance Agency (the "Issuer") located on the following described land (the "Land") in the County of \_\_\_\_\_ and the Commonwealth of Massachusetts, to-wit:

[insert legal description]

WHEREAS, the Company, the Issuer and \_\_\_\_\_, as trustee, entered into a Tax Regulatory Agreement dated as of \_\_\_\_\_, 200\_\_ (the "Agreement") recorded on \_\_\_\_\_, 200\_\_, in the office of the Registry of Deeds for \_\_\_\_\_ County, Document No. \_\_\_\_\_ and

WHEREAS, the Agreement contains certain covenants and restrictions which run with the land and are binding upon the Company, its successors and assigns at all times during a Qualified Project Period, as therein defined, unless and until such covenants and restrictions are amended, terminated or deleted as provided in the Agreement; and

WHEREAS, the terms and provisions of the Agreement require the filing of an instrument to be executed by the Issuer, and the Company in substantially the form of this Certificate;

NOW THEREFORE, the Company hereby certifies and declares that:

SECTION 1. \_\_\_\_\_, was the date of commencement of the Qualified Project period.

SECTION 2. The first date on which fifty percent (50%) or more of the units in the Project were occupied was \_\_\_\_\_, 200\_\_, and the date which is fifteen (15) years thereafter is \_\_\_\_\_, 200\_\_.

SECTION 3. The final Maturity Date of the [**Insert Year of Bonds**] Bonds is \_\_\_\_\_.

SECTION 4. The date on which any assistance provided with respect to the Project under Section 8 of the United States Housing Act of 1937, as amended, terminates, as provided in [describe any HAP contract, if applicable], is \_\_\_\_\_, 200\_\_, unless said Contract is terminated, in which event the earlier date of termination

of said assistance shall be established by an amendment to this Certificate executed by the Issuer and the Company.

SECTION 5. The date of termination of the Qualified Project Period (the latest of the dates set forth in paragraphs 2, 3 or 4 hereof), until this Certificate is amended, is \_\_\_\_\_, 200\_\_.

Dated under seal this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

[INSERT NAME OF COMPANY]

By: \_\_\_\_\_

Title: \_\_\_\_\_

COMMONWEALTH OF MASSACHUSETTS :  
 : ss  
COUNTY OF :

On this, the \_\_\_\_\_ day of, \_\_\_\_\_ 200\_\_, before me, the undersigned notary public, personally appeared \_\_\_\_\_, who acknowledged himself to be the [Title] of [Insert Name of Company] and that he as such \_\_\_\_\_, being authorized to do so, executed the foregoing Certificate as to Qualified Project Period, for the purposes therein contained by signing the name of said company by himself as such \_\_\_\_\_.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

\_\_\_\_\_  
Notary Public  
My Commission Expires:

(SEAL)

EXHIBIT D

CERTIFICATE OF  
CONTINUING PROGRAM COMPLIANCE

Date: \_\_\_\_\_, 200\_\_

The following information with respect to the Project located in \_\_\_\_\_, Massachusetts (the "Project"), is being provided by **[Insert Name of Borrower]**, a Massachusetts \_\_\_\_\_ (the "Company") to the Massachusetts Development Finance Agency and \_\_\_\_\_, as trustee pursuant to that certain Tax Regulatory Agreement dated as of \_\_\_\_\_ (the "Agreement") with respect to the Project. Capitalized terms, unless defined herein, shall have the same meaning as in the Agreement.

1. \_\_\_\_\_ (fill in number) residential units are available for occupancy
2. \_\_\_\_\_ (fill in number) residential units are occupied
3. The Company has obtained an "Income Computation and Certification" in the form provided as Exhibit B to the Agreement, from each Tenant named below, the income stated therein has been verified as required by the Agreement and each such Certificate is being maintained by the Company in its records with respect to the Project. Attached hereto is a copy of the most recent such Certificate for each such Tenant who signed such a Certificate since \_\_\_\_\_, 200\_\_, the date on which the last "Certificate of Continuing Program Compliance" was filed by the Company.
4. In renting the residential units in the Project, the Company has not given preference to any particular group or class of persons (except for persons who qualify as Lower-Income Tenants), and none of the units listed below as occupied by Lower-Income Tenants have been rented for occupancy entirely by students, no one of which is entitled to file a joint return for federal income tax purposes.
5. An appropriate Income Computation and Certification has been obtained from each Lower-Income Tenant upon initial occupancy of a dwelling unit) and none of the units listed below as occupied by Lower-Income Tenants have been rented for occupancy entirely by students, no one of which is entitled to file a joint return for federal income tax purposes.
6. All of the residential units in the Project have been rented pursuant to written leases or residency agreements complying with the requirements of Section 4(c) of the Agreement, and the term of each lease or residency agreement is for a term at least equal to the shorter of the tenant's life and one year plus one day, in compliance with the requirements of the Act.

7. The information provided in this "Certificate of Continuing Program Compliance" is accurate and complete, and no matters have come to the attention of the Company that would indicate that any of the information provided herein, or in any Certificate obtained from the Tenants named herein, is inaccurate or incomplete in any respect.
  
8. The following residential units (identified by unit number) are presently vacant but have been designated for occupancy by "Lower-Income Tenants", as such term is defined in the Regulatory Agreement and are being held vacant and available for that purpose (for a total of \_\_\_\_\_ units).

Unit Number

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

9. The following residential units have been re-designated as units for Lower Income Tenants since \_\_\_\_\_, 200\_\_\_\_, the date on which the last "Certificate of Continuing Program Compliance" was filed by the Company:

Unit Unit Number	Previous Designation of Unit (if any)	Replacing Number
_____	_____	_____
_____	_____	_____

10. The following residential units are considered to be occupied by Lower-Income Tenants based on the information set forth below:

Unit Number	Name of Tenant Residing in the Unit	Family Size	% Median Income, Adjusted Family Income	Date of Initial Occupancy (or date of most recent income certification)
(1)				
(2)				
(3)				
(4)				
(5)				
(6)				
(7)				
(8)				
(9)				
(10)				

Based on the foregoing, \_\_\_\_\_ (fill in number) of the residential units ( \_% of all residential units) are currently occupied by Lower-Income Tenants.

IN WITNESS WHEREOF, I have hereunto affixed my signature under seal, on behalf of the Company, on \_\_\_\_\_, 200\_\_.  
 [COMPANY]

By: \_\_\_\_\_

Title: \_\_\_\_\_

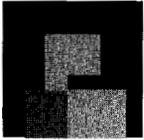
## EXHIBIT E

### Required Lease or Residency Agreement Provisions for Project

#### Section \_\_\_\_\_. TENANT TO FURNISH INFORMATION ABOUT INCOME.

- A. Information to be Furnished. Tenant agrees to provide to Landlord an annual certificate regarding Tenant's income. The certificate shall be provided each year and shall be on a form provided by Landlord. Tenant also agrees, at the request of the Landlord, to provide to Landlord copies of Tenant's federal income tax returns and any other information or certificates requested by Landlord. Landlord agrees to request the income tax returns and information only for the purpose of complying with the rules and regulations of the Department of Treasury or the Internal Revenue Service relating to tax-exempt financing of qualified residential rental housing projects.
- B. Landlord May Disclose Financial Information. Tenant agrees that the certificates, income tax returns and other information provided by Tenant may be disclosed by Landlord to the Department of Treasury, the Internal Revenue Service or any other person as may be required to satisfy Landlord's obligations relating to the tax-exempt financing for the [leased] [occupied] premises.
- C. Failure to Provide Information is Default by Tenant. Tenant agrees that any failure to provide information which Tenant is required to provide under Section A above shall be a default by Tenant of its agreements under the [Lease] [Residency Agreement]. Tenant also agrees that if any of the certificates, tax returns, or information provided by Tenant are untrue, Tenant shall be in default under this [Lease] [Residency Agreement]. In the event of any such default, Landlord shall have the right to exercise any right or remedy described in Section \_\_\_\_ of this [Lease] [Residency Agreement].

**SECTION 3**  
**SITE APPROVAL LETTER**



# MASSDEVELOPMENT

160 Federal Street  
Boston, Massachusetts

February 11, 2005

02110

AP Cambridge Partners II, LLC  
c/o O'Neill Properties  
700 South Henderson Road  
King of Prussia, PA 19406  
Attn: Brian O'Neill

Tel: 617-330-2000

800-445-8030

Fax: 617-330-2001

617-451-3429

Re: Residences at Acorn Park, Belmont (the "Project")  
PROJECT ELIGIBILITY (Site Approval) LETTER

www.massdevelopment.com

Dear Mr. O'Neill:

Massachusetts Development Finance Agency ("MassDevelopment") received the application submitted by AP Cambridge Partners II, LLC (the "Applicant") for financing using the MassDevelopment Tax-Exempt Bond Program for Rental Housing and is providing you with this determination of project eligibility for the above-referenced Project.

MITT ROMNEY  
Governor

KERRY HEALEY  
Lieutenant Governor

ROBERT L. BEAL  
Chairman

ROBERT L. CULVER  
President/CEO

MassDevelopment has reviewed the fundability of the Project under the MassDevelopment Tax-Exempt Bond Program for Rental Housing in accordance with 760 CMR 31.01. After receipt of your application for financing, MassDevelopment provided written notice of the application to the Town of Belmont Board of Selectmen through Mr. Melvin Kleckner, Town Administrator. MassDevelopment provided the Town of Belmont a thirty-day comment period and extended this period, at the Town's request. MassDevelopment received comments concerning the Project from the Board of Selectmen, local residents, and various boards and commissions within the Town of Belmont, as well as the Town of Arlington. At the Town of Belmont's request, MassDevelopment also conducted a site visit with Town officials and community representatives, and additional comments were provided by the Town and community representatives during that visit. All comments received were considered by MassDevelopment in its evaluation of the impact of such comments on the fundability of the Project under the MassDevelopment Tax-Exempt Bond Program for Rental Housing prior to issuing this letter.

Based on the application and information received from the Applicant, the Project involves the following characteristics:

**Applicant:** AP Cambridge Partners II, LLC  
700 South Henderson Road  
King of Prussia, PA 19406

Site: 15.67 acres on the south side of Frontage Road and  
the west side of Acorn Park Drive

This letter is being issued based on the Applicant's request for a project eligibility letter for that portion of the Project located in Belmont. We note that the Project site plan potentially includes a small portion of land shown as open space in the City of Cambridge. The Applicant has not requested a project eligibility letter for the portion of land in Cambridge, and we note that it is for the Applicant to determine whether a comprehensive permit is needed for any Cambridge land that may be included in the Project.

Project: Residences at Acorn Park  
A 300-unit multifamily rental community, consisting of 5 buildings of 4 stories each with one level of underground parking and a community building.

Subsidizing Program: Massachusetts Development Finance Agency  
Tax-Exempt Bond Program for Rental Housing

Low Income Units: 20% of the units will be set aside for tenants with incomes that are less than 50% of the area median income in the Boston Metropolitan Statistical Area, for a period of not less than 30 years.

Unit Mix: Market Rate Units: 60-1BR (760 sf); 120-2BR (1130 sf);  
60-3BR (1350 sf)  
Affordable Units: 15-1BR (760 sf); 30-2BR (1130 sf);  
15-3BR (1350 sf)

Limited Dividend: The Applicant has agreed to enter into a Regulatory Agreement with MassDevelopment whereby the Applicant's profit, cash flow, and distribution of return to the Applicant or to the members or other owners of the Applicant shall be limited as set forth in MassDevelopment's equity and limited dividend policy.

MassDevelopment has reviewed the materials submitted by the Applicant, including preliminary plans, financial projections, and market information, conducted two on-site inspections, and reviewed the comments of the Town and those submitted by the Town of Arlington and other parties and has determined that the Project appears

generally eligible and fundable under the requirements of the MassDevelopment Tax-Exempt Bond Program for Rental Housing, subject to final review of eligibility and approval of financing.

Based on the submitted materials and on-site inspections, MassDevelopment has determined the following:

1. The housing design for the Project is generally appropriate for the Site;
2. The Project appears financially feasible within the housing market in which it is located, based on comparable rentals figures provided by the Applicant;
3. Based on the preliminary pro forma submitted by the Applicant, the Project appears financially feasible based on the Applicant's estimated development costs; and
4. The Applicant meets the general eligibility standards of the MassDevelopment Tax-Exempt Bond Program for Rental Housing.

While the Project housing design has been determined to be generally appropriate for the Site under the provisions of 760 CMR 31.01, MassDevelopment encourages all applicants to consider and utilize smart growth and anti-sprawl elements in the design and planning of their projects.

This determination of project eligibility is not a binding commitment for financing from MassDevelopment; rather, it is a project eligibility letter under the comprehensive permit (G.L. c. 40B) regulations. Any commitment for financing from MassDevelopment is subject to review of the final financing application and the approval of the Board of Directors of MassDevelopment.

Massachusetts Development Finance Agency

By:   
Name: Ann E. Howard  
Title: Chief Operating Officer

**SECTION 4**

DEVELOPMENT TEAM

**SECTION 4**  
**DEVELOPMENT TEAM**

**DEVELOPER:** **AP Cambridge Partners II, LLC**  
700 South Henderson Road  
King of Prussia, PA 19406  
Tel: 610 337-5560  
Contact: Stephen Corridan

**DEVELOPMENT CONSULTANT:** **Stockard Engler Brigham, LLC**  
10 Concord Avenue  
Cambridge, MA 02138  
Tel: 617-876-5900 x 224  
Contact: Bob Engler

**ARCHITECT:** **ADD, Inc.**  
210 Broadway  
Cambridge, MA 02139  
Tel: 617 234 3100  
Contact: Michael Doherty

**CIVIL ENGINEER:** **Rizzo Associates**  
One Grant Street  
Framingham, MA 01701  
Tel: 508 903-2000  
Contact: Brian Sullivan

**TRAFFIC ENGINEER:** **Vanasse & Associates**  
10 New England Business Center  
Andover, MA 01810  
Tel: 978 474-8800  
Contact: Jeffrey Dirk

**ENVIRONMENTAL CONSULTANT:** **Epsilon Associates, Inc.**  
3 Clocktower Place Suite 250  
Maynard, MA 01754  
Tel: 978 897-7100  
Contact: Laura Rome

**LEGAL COUNSEL:** **Nutter, McClennen & Fish, LLP**  
155 Seaport Boulevard  
Boston, MA 02210  
Tel: 617 439-2818  
Contact: James Ward

**SECTION 5**

**SITE CONTROL**

QUITCLAIM DEED

Full  
PARCEL

Properties II, Inc., a Massachusetts corporation, of Cambridge,  
County, Massachusetts, for consideration paid and in full consideration of  
Eleven Thousand Three Hundred Eighty-one Dollars (\$411,381.00),  
Cambridge Partners II, LLC, a Delaware limited liability company,  
address of 395 Arsenal Street, Watertown, Massachusetts 02472, with  
Covenants, the following described premises:

that certain tract or parcel of land with the improvements thereon lying,  
situated and being in Middlesex County, Massachusetts and being more  
particularly described as follows:

A certain parcel of land situated on the State Highway, sometimes called the  
Concord Turnpike, in said Cambridge, bounded and described as follows:

- NORTHEASTERLY on said State Highway, two hundred (200) feet;
- NORTHWESTERLY on the boundary line between Cambridge and Belmont,  
three hundred and twenty (320) feet more or less;
- SOUTHWESTERLY on the brook, two hundred and fifty-three (253) feet  
more or less; and
- SOUTHEASTERLY on land now or late of Dutchland Farms, Inc., three  
hundred and forty (340) feet more or less; containing  
one and 68/100 (1 68/100) acres and being shown as  
Lot C on a plan by Fred A. Joyce, Surveyor, dated  
November 9, 1936, recorded with Middlesex South  
District Deeds in Book 6079, Page 253.

Said premises are conveyed subject to an easement set forth in a grant to  
Cambridge Electric Light Company dated January 7, 1952 and recorded with said  
Deeds in Book 7876, Page 77 and to an Order of Conditions issued by the Cambridge  
Conservation Commission DEP File No. 123-100 recorded on March 31, 1994 in Book  
2442, Paragraph 432, insofar as the same are now in force and applicable.

For Grantor's title see deed from Jeffrey T. Guiney, individually and as  
Trustee, which deed is dated July 18, 1986 and recorded with said Deeds in Book  
17221, Page 267.

Grantor hereby certifies that the Premises constitute all or substantially all of  
the assets of Grantor located within the Commonwealth of Massachusetts.

EXCISE TAX: 1876

WITNESS WHEREOF, Acorn Properties II, Inc. has caused this Deed to be  
on this 24<sup>th</sup> day of June, 1999.  
Clerk

Acorn Properties II, Inc.

By: *Samuel J. Gallo*  
Name: Samuel J. Gallo  
Title: Clerk

Hereunto duly authorized

Commonwealth of Massachusetts

June 24, 1999

\_\_\_\_\_, ss.

Then personally appeared the above-named Samuel J. Gallo, as  
said and acknowledged the foregoing instrument to be the free act and deed of  
Acorn Properties II, Inc., before me

*[Signature]*  
Notary Public  
My Commission Expires: 7-7-2000

/Legal-N/Miles\_Laura/Legal/WPF\_DOCS/deed1.wpf

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**DECLINED**

CAMBRIDGE  
DEEDS REG'S  
MIDDLE SOUTH

QUITCLAIM DEED

Arthur D. Little Real Estate Corporation, a Delaware corporation, of Middlesex County, Massachusetts, successor-by-merger to Acorn Properties, Inc., a Massachusetts corporation (see Certificate of Merger filed with the Middlesex South Registry District of the Land Court as Document No. 735435 and recorded with the Middlesex South Registry of Deeds in Book 18741, Page 7), for consideration in full consideration of Sixteen Million Eight Hundred Fifty-nine Thousand and Three Hundred Thirty-five Dollars (\$16,859,735.00), grants to AP Cambridge Partners, a Delaware limited liability company, having an address of 395 Arsenal Street, Cambridge, Massachusetts 02142, with Quitclaim Covenants, the following described

five parcels of land, with any buildings or improvements thereon, situated in Cambridge and Arlington, Middlesex County, Massachusetts (the "Premises") all as more fully described on Exhibit A attached hereto and made a part hereof, being shown as Lots 1, 2, 3, 4, 7, 12, 13, 14, and 15, on a plan entitled "Plan of Land in Arlington, Belmont and Cambridge, Massachusetts, prepared for Arthur D. Little, Inc. by Boston Survey Consultants" dated October 31, 1978, recorded with Middlesex South District Deeds at the end of Book 13674 (referred to in said Exhibit A as the "Master Plan").

For Grantor's title to Parcels 1 and 2 see deed to Acorn Properties, Inc. dated November 10, 1978 recorded with said Deeds in Book 13581, Page 194; for Grantor's title to Parcels 3 and 4 see Certificate of Title No. 156651 in Registration Book 913, Page 101 at Middlesex South Registry District of the Land Court; for Grantor's title to Parcel 5 see deed to Acorn Properties, Inc. dated November 10, 1978 recorded with said Deeds in Book 13581, Page 202; for Grantor's title to Parcel 6 see deed to Acorn Properties, Inc. dated November 10, 1978 recorded with said Deeds in Book 13581, Page 209; for Grantor's title to Parcels 10 and 12 see deed from Metropolitan Life Insurance Company dated July 22, 1997 recorded with said Deeds in Book 27506, Page 106; and for Grantor's title to Parcel 11 see Certificate of Title No. 208889 in Registration Book 1174, Page 139.

The Premises are conveyed subject to, and as the case may be, with the benefit of the rights, easements, covenants, agreements, restrictions, reservations, orders and takings set forth or referred to in the Deeds and the Certificate of Title referenced in the preceding paragraph, all insofar as the same are now in force and applicable.

The Premises are also conveyed subject to two Orders of the City Council of Cambridge relating to Acorn Park, one dated June 27, 1960 recorded with said Deeds in Book 9626, Page 13 and one dated March 13, 1961 recorded with said Deeds in Book 9774, Page 547; to a Zoning Decision by the City of Cambridge, Board of Zoning Appeal, Notice of which is dated June 13, 1990 recorded with said Deeds in

Page 391; and to a Zoning Decision by the City of Cambridge Board of Appeals, Case No. 6301, Notice of which is dated September 16, 1991 with said Deeds in Book 21415, Page 563.

Senior hereby certifies that the Premises together with the premises conveyed to AP Cambridge Partners II, LLC by deed of even delivery and filed for record and recorded herewith constitute all or substantially all of the assets of located within the Commonwealth of Massachusetts.

IN WITNESS WHEREOF, Arthur D. Little Real Estate Corporation has caused to be executed by its Secretary, on this 24th day of \_\_\_\_\_, 1999.

Arthur D. Little Real Estate Corporation

By: Samuel J. Gallo  
Name: Samuel J. Gallo  
Title: Secretary

Hereunto duly authorized

*This Excise Tax  
The amount  
attached to  
original in  
land*

Commonwealth of Massachusetts

Suffolk, ss.

June 24, 1999

Then personally appeared the above-named Samuel J. Gallo, as aforesaid and acknowledged the foregoing instrument to be the free act and deed of Arthur D. Little Real Estate Corporation, before me

[Signature]  
Notary Public  
My Commission Expires: 7-7-2000

EXHIBIT A

3, and 4

iguous parcels of land in Cambridge, Arlington (the last two being registered land) situated on the side of said Acorn Park bounded and described as

Parcel 1

NORTHERLY by Acorn Park by three lines measuring respectively 121.70 feet, 205.26 feet and 98.84 feet;  
 SOUTHERLY by land of Marshall B. Dalton and others, Trustees, 193.45 feet;  
 WESTERLY by Lot Y4 as shown on the plan hereinafter mentioned by two lines measuring respectively 119 feet and 15.48 feet;  
 SOUTHEASTERLY 45.38 feet;  
 SOUTHWESTERLY again, 295.58 feet, said last two lines being along land of Marshall B. Dalton and others, Trustees, shown on said plan as a parcel containing 7,001 square feet, and being the Parcel 2 herein described;  
 NORTHERLY again, by Lot 337 as shown on said plan, 37.27 feet; and  
 SOUTHEASTERLY by land now or late of New England Mutual Life insurance Company, 329.27 feet.

Said parcel is shown on a "Plan of Land in Cambridge and Arlington, Massachusetts", dated Aug. 17, 1956, by William S. Crocker, Inc., Civil Engineers, recorded with said Deeds as Plan No. 251 of 1957, in Book 8915, Page 81, and the same contains according to said Plan 119,627 square feet.

Parcel 2

SOUTHWESTERLY 45.38 feet;  
 SOUTHEASTERLY 295.58 feet; said two lines being along land now of Marshall B. Dalton and others, Trustees, shown on said plan as land of West Cambridge Trust, and being the first parcel herein described;  
 NORTHERLY by Lot 342 as shown on Land Court Subdivision Plan 4351<sup>2</sup>, being Parcel 3 herein described, by two lines measuring respectively 60.73 feet and 123.34 feet;  
 NORTHEASTERLY by Lot 340 as shown on Land Court Subdivision Plan 4351<sup>2</sup>, being Parcel 4 herein described, 81.98 feet  
 NORTHWESTERLY, more WESTERLY by Lot Y3 as shown on Land Court Subdivision Plan 4351<sup>X</sup>, 64.19 feet;

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Parcel is shown on said plan dated August 17, 1956 as the containing 7001 square feet.

Parcel 3

NORTHERLY

on land now or late of Bolton, being Lot 341 on Land Court Subdivision Plan 4351<sup>2</sup>, 236.14 feet; by what was known as the Northerly line of Alewife Brook Parkway, being Parcel 2 herein described, by two lines measuring respectively 60.73 feet and 123.34 feet; and

NORTHWESTERLY

by Lot 340 as shown on said Plan, being Parcel 4 herein described, 61.13 feet.

Said parcel is shown as Lot 342 on said Subdivision Plan 4351<sup>2</sup>, filed in the South Registry District of Middlesex County with Certificate of Title No. 97885, comprises the premises described in said Certificate of Title.

Parcel 4

SOUTHERLY

by what was known as the Northerly line of Alewife Brook Parkway, being Parcel 2 herein described, 81.98 feet;

NORTHWESTERLY

by Lots Y3 and Y2 as shown on Plan hereinafter mentioned, 54.61 feet; and

NORTHEASTERLY

by Lot 339 on said Plan, a portion of which comprises Parcel 3 herein described, 61.13 feet.

Said parcel is shown as Lot 340 on Subdivision Plan 4351Y filed in said Registry District with Certificate of Title No. 93873, and comprises the premises described in said Certificate of Title.

The aforesaid four contiguous parcels are shown as Lot 1 containing 119,627± square feet; Lot 2 containing 7,001± square feet; Lot 3 containing 2,912± square feet; and Lot 4 containing 1,634± square feet respectively on the Master Plan.

Lot 7

Parcel 5

A certain parcel of land situated on the Southerly and Easterly sides of Acorn Park and at the Southeasterly corner of Acorn Park and Concord Turnpike, partly in Cambridge and partly in Arlington, both in Middlesex County, Massachusetts, with the buildings thereon situated and bounded and described as follows:

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NORTHERLY  
WESTERLY

by Acorn Park by three lines measuring respectively 39.65 feet, 209.61 feet, and 289.04 feet;  
by said Acorn Park by two lines measuring respectively 309.53 feet and 63.35 feet;  
on the junction of Acorn Park and Concord Turnpike by a curved line having a radius of 30 feet, 50.79 feet;  
again, on Concord Turnpike 39.67 feet;  
by land of the Commonwealth of Massachusetts, 66.17 feet;  
by the same land by two lines measuring respectively about 390 feet and 225.70 feet;  
again, by the same land, by three lines measuring respectively 239.60 feet, 282.46 feet, and 58.57 feet.  
again, by land now or late of Kingman and others, Trustees, 113.12 feet;  
again, by land now or late of New England Mutual Life Insurance Company, 159.96 feet; and  
again, by the same land, 125 feet.

Said premises comprise a portion of the premises shown on the following three plans; one dated May 4, 1953, by William S. Crocker, Civil engineer, recorded with Middlesex South District Deeds, Book 8110, Page 322, as Plan #1334 of 1953; one dated August 17, 1956, by William S. Crocker, Inc., Civil Engineers, recorded with said Deeds, Book 8915, Page 81, as Plan #251 of 1957; and one dated December 10, 1959, by William S. Crocker, Inc., recorded with said Deeds, Book 9608, Page 81, as Plan #843 of 1960, and said premises contain according to said plans about 125,497 square feet.

The aforesaid parcel is shown as Lot 7 containing 125,504+ square feet on the Master Plan.

Lot 12

Parcel 6

A certain parcel of land with the buildings thereon situated on the Northerly side of Acorn Park, in Cambridge, Middlesex County, Massachusetts, bounded and described as follows:

SOUTHERLY  
WESTERLY

by Acorn Park by two lines measuring respectively 52.86 feet and 77.15 feet;  
by land of New England Mutual Life Insurance Company 126.34 feet;

NORTHERLY by the same land, 130 feet; and  
 SOUTHERLY by the same land, 125 feet.

and premises are shown on a plan marked "Plan of land in  
 Cambridge, Mass." dated Dec. 10, 1959, Revised Feb. 26, 1960, by  
 William S. Crocker, Inc." recorded with Middlesex South District  
 Records, Book 9608, Page 67, and contain according to said plan,  
 285 square feet.

The aforesaid parcel is shown as Lot 12 containing 16,285± square  
 feet on the Master Plan.

lots 13, 14, and 15

Parcel 10

A certain parcel of land with the buildings thereon situated on  
 Concord Turnpike and on Acorn Park, partly in Cambridge and partly  
 in Arlington, both Middlesex County, Massachusetts, bounded and  
 described as follows:

- NORTHERLY on Concord Turnpike, 1.83 feet;
- NORTHEASTERLY on the junction of Concord Turnpike and Acorn Park  
 by a curved line having a radius of 30 feet  
 measuring 43.45 feet;
- EASTERLY on Acorn Park 327.96 feet;
- SOUTHEASTERLY on the same by a curved line having a radius of  
 30 feet measuring 39.41 feet;
- SOUTHERLY on the same 323.47 feet;
- WESTERLY on other land of Gerald W. Blakeley, Jr. et als  
 Trustees, 329.27 feet;
- NORTHERLY on registered land of Marshall B. Dalton and  
 others, Trustees, being Lot 337 as shown on Land  
 Court Subdivision Plan 4351W and a part of Lot F as  
 shown on Land Court Subdivision Plan 4351L, by two  
 lines measuring respectively 336.51 feet and  
 99.75 feet; and
- WESTERLY on the same land 43.45 feet.

The parcel is shown on a plan designated "West Cambridge  
 Industrial Center, Arlington and Cambridge, Mass." dated May 4,  
 1953, by William S. Crocker, Civil Engineer, recorded with said  
 records in Book 8110; Page 322, as Plan No. 1334 of 1953, and  
 contains according to said plan 135,000 square feet.

From said Parcel 10 hereinabove described is a certain land with the buildings thereon situated on the side of Acorn Park, in Cambridge, Middlesex County, Massachusetts, bounded and described as follows:

- by Acorn Park by two lines measuring respectively 52.86 feet and 77.15 feet;
- by land of New England Mutual Life Insurance Company 126.34 feet;
- by the same land, 130 feet; and
- by the same land, 125 feet.

The premises are shown on a plan marked, "Plan of Land in Cambridge, Mass.", dated Dec. 10, 1959, Revised Feb. 26, 1960, by Sam S. Crocker, Inc., recorded with Middlesex South District Book 9608, Page 67, and contain according to said plan 5 square feet.

Parcel 11 (registered land)

Parcel of land with the buildings thereon situated on Concord Turnpike, partly in Arlington and partly in Cambridge both in Middlesex County, Massachusetts, bounded and described as follows:

- NORTHEASTERLY by the Southwesterly line of Concord Turnpike 408.69 feet;
- EASTERLY by land formerly of Herbert F. Allen and now of New England Mutual Life Insurance Company, 43.45 feet;
- SOUTHERLY by what was formerly the Northerly line of Alewife Brook Parkway, being formerly land of the Commonwealth of Massachusetts and in part land of said New England Mutual Life Insurance Company and land of Gerald W. Blakeley, Jr. and others Trustees, 473.53 feet; and
- NORTHWESTERLY by lot 338 as shown on the plan hereinafter mentioned 222 feet.

Said parcel is shown as Lot 337 on said plan.

All of said boundaries are determined by the land Court to be located as shown on a subdivision plan, as approved by the Land Court, filed in the Land Registration Office, a copy of which numbered 4351W is filed in the South Registry District of Middlesex County with Certificate of Title No. 81357 in Registration Book 537, Page 7, being the same premises described in Certificate of Title No. 81357 in said Registry District.

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Parcel 12

Parcel of land situated on the Southerly side of Acorn Park in  
bridge, Middlesex County, Massachusetts, bounded and described  
follows:

SOUTHERLY  
SOUTHERLY

by Acorn Park, 160 feet;  
by other land of Marshall B. Dalton et al,  
Trustees, 125 feet;  
by the same land 159.96 feet; and  
by land now or late of Kingman and others,  
Trustees; 125 feet.

SOUTHERLY  
SOUTHERLY

and premises are shown on a plan marked "Plan of Land in  
bridge, Mass." dated Dec. 10, 1959, by William S. Crocker, Inc.  
recorded with said Deeds Book 9608, Page 81, as Plan 843 of 1960  
contain 19,189 square feet according to said plan.

the aforesaid three parcels are shown as Lot 13 containing  
8,715+ square feet; Lot 14 containing 49,972+ square feet; and  
Lot 15 containing 19,189+ square feet respectively on the Master  
plan.

There is included in this conveyance and Grantor grants to AP Cambridge  
Partners, LLC Grantor's title in and to the fee and soil of that portion  
of Acorn Park in Arlington lying between Lots 7 and 13 as shown on the Master  
plan.

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QUITCLAIM DEED

Arthur D. Little Real Estate Corporation, a Delaware corporation, of Middlesex County, Massachusetts, successor-by-merger to Acorn Properties, Inc., a Massachusetts corporation (see Certificate of Merger filed with the Middlesex South Registry District of the Land Court as Document No. 735435 and recorded with the Middlesex South Registry of Deeds in Book 18741, Page 7), for consideration in full consideration of Sixteen Million Eight Hundred Fifty-nine Thousand and Three Hundred Thirty-five Dollars (\$16,859,735.00), grants to AP Cambridge Partners, a Delaware limited liability company, having an address of 395 Arsenal Street, Cambridge, Massachusetts 02142, with Quitclaim Covenants, the following described premises:

Nine parcels of land, with any buildings or improvements thereon, situated in Cambridge and Arlington, Middlesex County, Massachusetts (the "Premises") all as more fully described on Exhibit A attached hereto and made a part hereof, being shown as Lots 1, 2, 3, 4, 7, 12, 13, 14, and 15, on a plan entitled "Plan of Land in Arlington, Belmont and Cambridge, Massachusetts, prepared for Arthur D. Little, Inc. by Boston Survey Consultants" dated October 31, 1978, recorded with Middlesex South District Deeds at the end of Book 13674 (referred to in said Exhibit A as the "Master Plan").

For Grantor's title to Parcels 1 and 2 see deed to Acorn Properties, Inc. dated November 10, 1978 recorded with said Deeds in Book 13581, Page 194; for Grantor's title to Parcels 3 and 4 see Certificate of Title No. 156651 in Registration Book 913, Page 101 at Middlesex South Registry District of the Land Court; for Grantor's title to Parcel 5 see deed to Acorn Properties, Inc. dated November 10, 1978 recorded with said Deeds in Book 13581, Page 202; for Grantor's title to Parcel 6 see deed to Acorn Properties, Inc. dated November 10, 1978 recorded with said Deeds in Book 13581, Page 209; for Grantor's title to Parcels 10 and 12 see deed from Metropolitan Life Insurance Company dated July 22, 1997 recorded with said Deeds in Book 27506, Page 106; and for Grantor's title to Parcel 11 see Certificate of Title No. 208889 in Registration Book 1174, Page 139.

The Premises are conveyed subject to, and as the case may be, with the benefit of the rights, easements, covenants, agreements, restrictions, reservations, orders and takings set forth or referred to in the Deeds and the Certificate of Title referenced in the preceding paragraph, all insofar as the same are now in force and applicable.

The Premises are also conveyed subject to two Orders of the City Council of Cambridge relating to Acorn Park, one dated June 27, 1960 recorded with said Deeds in Book 9626, Page 13 and one dated March 13, 1961 recorded with said Deeds in Book 9774, Page 547; to a Zoning Decision by the City of Cambridge, Board of Zoning Appeal, Notice of which is dated June 13, 1990 recorded with said Deeds in

Page 391; and to a Zoning Decision by the City of Cambridge Board of Appeals, Case No. 6301, Notice of which is dated September 16, 1991 with said Deeds in Book 21415, Page 563.

Grantor hereby certifies that the Premises together with the premises conveyed to AP Cambridge Partners II, LLC by deed of even delivery and filed for record and recorded herewith constitute all or substantially all of the assets of the Grantor located within the Commonwealth of Massachusetts.

IN WITNESS WHEREOF, Arthur D. Little Real Estate Corporation has caused this deed to be executed by its Secretary, on this 24th day of June, 1999.

Arthur D. Little Real Estate Corporation

By: Samuel J. Gullo  
Name: Samuel J. Gullo  
Title: Secretary

Hereunto duly authorized

Suffolk's Excise Tax  
in the amount  
of \$160 attached to  
the original in  
red lined

Commonwealth of Massachusetts

Suffolk, ss.

June 24, 1999

Then personally appeared the above-named Samuel J. Gullo, as aforesaid and acknowledged the foregoing instrument to be the free act and deed of Arthur D. Little Real Estate Corporation, before me

[Signature]  
Notary Public  
My Commission Expires: 7-7-2000

/LegalG-N/Miles\_Laura/Legal/WPF\_DOCS/deed4a.wpf

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EXHIBIT A

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Parcel 7

A certain parcel of land situated partly in Belmont and partly in  
edge, being registered, bounded and described as follows:

Brook Parkway

parcel is shown as lot 4 on said plan, (Plan No. 20345F).

of said boundaries are determined by the Court to be located as shown on  
division plan, drawn by Schofield Brothers, Inc., Surveyors, dated July  
1989, as approved by the Court, filed in the Land Registration Office, a  
of which is filed in the Registry of Deeds for the South Registry  
District of Middlesex County in Registration Book 1043, Page 130, with  
Certificate 182680....

The aforesaid parcel is shown as Lot 16 on the Master Plan as  
containing 823,492 square feet of land, more or less.

17

Parcel 8

A certain parcel of land, being unregistered, and being wholly in  
said Belmont is bounded and described as follows:

- NORTHEASTERLY 249.13 feet;
- SOUTHEASTERLY 181.08 feet;
- SOUTHWESTERLY 308.33 feet, said three boundaries being by the  
Parcel 7 above described; and
- NORTHWESTERLY by land now or formerly of the Commonwealth of  
Massachusetts, 319.15 feet.

The aforesaid parcel consists of the grantee part of the lot  
containing 70,175 square feet shown on a plan dated November 6,  
1950, recorded with said Deeds as Plan No. 2277 of 1950 in Book  
7686, Page 371, excepting and excluding therefrom, however, those  
portions of said lot which were taken by the Commonwealth of  
Massachusetts by said Taking dated April 27, 1966, being Lots 3-3,  
3-3X, 3-1-T, and 3-3-T on a plan dated April 27, 1966 duly  
recorded with said Taking, recorded with said Deeds Book 11117,  
Page 129.

The aforesaid parcel is shown as Lot 17 on the Master Plan as  
containing 56,000 square feet of land, more or less.

Parcel 9

in parcel of land, being unregistered, and being wholly in said Belmont, is  
and described as follows:

EASTERLY

by the Concord Turnpike by two lines measuring  
respectively 90.67 feet and 268.72 feet;

EASTERLY

by the line forming the boundary between the Town  
of Belmont and the City of Cambridge 320 feet more  
or less;

THWESTERLY

by Parcel 7 above described, 375 feet more or less;  
and

ORTHWESTERLY

by said Parcel 7 by two lines measuring respectively  
160 feet and 113.26 feet.

The aforesaid parcel consists of the greater part of the lot containing about 2 1/2  
acres of land shown on a plan dated February 18, 1938, recorded with said Deeds as  
Plan No. 163 of 1938 in Book 6190, Page 540. There being excepted and excluded  
from said land shown on the last mentioned plan that portion thereof comprising Lot  
3-1 which was taken by the Commonwealth of Massachusetts by a Taking dated  
April 27, 1966.

The aforesaid parcel is shown as Lot 18 on the Master Plan as containing 84,000  
square feet of land, more or less.

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QUITCLAIM DEED

Properties IV, Inc., a Massachusetts corporation, of Cambridge,  
County, Massachusetts for consideration paid and in full consideration of  
ed Forty-three Thousand Four Hundred Forty-three Dollars  
grants to AP Cambridge Partners, LLC, a Delaware limited liability  
having an address of 395 Arsenal Street, Watertown, Massachusetts 02472,  
im Covenants, the following described premises:

parcels of land, with the buildings and improvements thereon, situated in  
Cambridge, Middlesex County, Massachusetts (the "Premises") all as more  
ly described on Exhibit A attached hereto and made a part hereof, being  
own as Lots 5, 6, 8, 9, 10, and 11 on a plan entitled "Plan of Land in  
Belmont and Cambridge, Massachusetts, prepared for Arthur D.  
Little, Inc., by Boston Survey Consultants" dated October 31, 1978, recorded  
with Middlesex South District Deeds at the end of Book 13674 (referred to in  
said Exhibit A as the "Master Plan").

For Grantor's title to Parcel 1, 2 and 6 described in said Exhibit A, see deed  
from Arthur D. Little Real Estate Corporation dated June 10, 1988 recorded  
with said Deeds in Book 19119, Page 375 and for Grantor's title to Parcels 3, 4,  
and 5 described in Exhibit A see Certificate of Title No. 182951, in Registration  
Book 1045, Page 1 at Middlesex South Registry District of the Land Court.

The Premises are conveyed subject to a Grant of Easement from Gerald W.  
Blakely, Jr., et al, Trustees of West Cambridge Trust to Cambridge Electric  
Light Company and the New England Telephone and Telegraph Company  
dated May 25, 1953 recorded with said Deeds in Book 8110, Page 321; an  
Order of the City Council of Cambridge relating to Acorn Park which Order is  
dated March 13, 1961, recorded with said Deeds in Book 9774, Page 547; an  
Order of Conditions issued by the Cambridge Conservation Commission Dep.  
File No. 123-95 recorded in Book 22895, Page 353 and filed as Document  
895359, as amended by Amended Order of Conditions recorded in Book 24282,  
Page 187 and filed as Document 938616 and by Second Amended Order of  
Conditions recorded in Book 25352, Page 107 and filed as Document No.  
973949; an Order of Conditions issued by the Cambridge Conservation  
Commission Department File No. 123-112 recorded in Book 25803, Page 279, as  
affected by Certificate of Compliance recorded in Book 28699, Page 162.

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Registered land portions of the Premises are conveyed subject to and with the restrictions, rights, agreements, easements, reservations, covenants, linkings referenced in said Certificate of Title No. 182951 insofar as the law in full force and applicable.

Grantor hereby certifies that the Premises constitute all or substantially all of the Premises of Grantor located within the Commonwealth of Massachusetts.

WITNESS WHEREOF, Acorn Properties IV, Inc. has caused this Deed to be signed by its Clerk on this 24th day of June, 1999.

*Excise Tax  
in the amount  
attached to  
original in  
red lined*

Acorn Properties IV, Inc.

By: *Samuel J. Gullo*  
Name: Samuel J. Gullo  
Title: Clerk

Hereunto duly authorized

Commonwealth of Massachusetts

Suffolk, ss.

June 24, 1999

Then personally appeared the above-named Samuel J. Gullo, as aforesaid and acknowledged the foregoing instrument to be the free act and deed of Acorn Properties IV, Inc., before me

*[Signature]*  
Notary Public  
My Commission Expires: 7-7-2000

EXHIBIT A

Parcel 1

Parcel of land on the Southerly side of Acorn Park (called Burton Street) in said Cambridge shown on Plan of Cambridge Industrial Center, Arlington and Cambridge, Massachusetts, dated May 4, 1953 by William S. Crocker, Civil Engineer, said Plan being recorded with said Deeds Book 8110, Page 3 and described as follows:

on Acorn Park (as laid out and shown on said Plan which layout has since been changed Northerly of its location on said Plan);  
on land of Eugene A. Kingman, et al Trustees 219.72 feet;  
on land of the Commonwealth of Massachusetts, 91.43 feet; and  
on the same 218.82 feet.

Containing according to said Plan, 19,950 feet.

The aforesaid parcel is shown as Lot 5 containing 19,950± square feet on the Master Plan.

Parcel 2

A parcel of land in said Cambridge bounded and described as follows:

Beginning at a point in the western end of Acorn Park, thence running by a line in Acorn Park as now laid out, south 89° 26' 46" east a distance of 85.15 feet; thence about easterly by a curved line with a radius of 2168.28 feet, by a line in Acorn Park, as now laid out, a distance of 209.61 feet; thence turning and running southwesterly by the southeasterly line of Acorn Park as now laid out and by land now or formerly of Marshall B. Dalton et al, Trustees, a distance of 287.36 feet thence turning and running north 16° 22' 16" west by land now or formerly of the Commonwealth of Massachusetts and the end of Acorn Park as now laid out a distance of 38.10 feet to the point of beginning.

Said parcel is shown on a plan designated "Plan of Land in Cambridge and Arlington, Massachusetts" dated August 17, 1956, by William S. Crocker, Inc., Civil Engineers, recorded with said Deeds, Book 8915, Page 81 and contains according to said Plan, 3,727 square feet.

Excluded, however, from Parcel 2 hereinabove described is a portion which is bounded and described as follows:

parcel of land situated on the Southerly side of said bounded and described as follows:

SOUTHERLY by said Acorn Park, 199.65 feet;  
 by a lot containing 18,016 square feet of land on a plan hereinbelow referred to, being land now or formerly of Marshall B. Dalton et als Trustees, 195.99 feet; and  
 by the remainder of the second parcel above described being a lot containing 2,541 square feet shown on the plan hereinafter mentioned, 18.40 feet.

Said parcel is shown on a plan entitled "Plan of Land in Edge, Mass." dated Dec. 10, 1959 by William S. Crocker, Inc. and with said Deeds Book 9608, Page 81 and containing according to said plan, 1,179 square feet more or less.

The aforesaid parcel is shown as Lot 6 containing 2,541± square feet on the Master Plan.

Four contiguous parcels of land (the first three being registered) situated on the northerly side of said Acorn Park, bounded and described as follows:

Parcel 3

SOUTHEASTERLY by land now or formerly of The Commonwealth of Massachusetts-Metropolitan District Commission-Alewife Brook Parkway, 460.82 feet;  
 SOUTHERLY by lot 1 as shown on plan hereinafter mentioned 120.64 feet;  
 WESTERLY by land now or formerly of Lancaster H. Heustis, 637.31 feet; and  
 NORTHEASTERLY by lands now or formerly of First National Stores, Inc. and of Franklin Wyman et al., 712.37 feet.

Said parcel is shown as lot 2 on said plan.

All of said boundaries are determined by the Court to be located as shown on a subdivision plan, as approved by the Court, filed in the Land Registration Office, a copy of which is filed in the Registry of Deeds for the South Registry District of Middlesex County in Registration Book 592, Page 155, with Certificate 92505.

Parcel 4

SOUTHERLY by the Northerly line of Alewife Brook Parkway, 134.48 feet;  
 SOUTHWESTERLY by land now or formerly of Henry O. Cushman, 111.64 feet;  
 NORTHWESTERLY by lot P as shown on plan hereinafter mentioned, 111.64 feet;  
 NORTHEASTERLY by lot Q as shown on plan hereinafter mentioned, 111.64 feet.

Parcel 5

by the Northerly line of Alewife Brook Parkway,  
64.19 feet;  
Westerly by lot Y<sup>4</sup> as shown on said plan hereinafter  
mentioned, 195.60 feet;  
Westerly by lot P on said plan, 100 feet;  
Westerly by lots W and X<sup>1</sup> on said plan, 160.98 feet;  
Westerly 25 feet; and  
Westerly 80 feet, by lot Y<sup>2</sup> on said plan; and  
Westerly by lot 338 on said plan, 29.61 feet.

Said parcel is shown as lot Y<sup>3</sup> on said plan.

All of said boundaries are determined by the Court to be  
as shown on a subdivision plan, as approved by the Court,  
and in the land Registration Office, a copy of which is filed in  
the Registry of Deeds for the South Registry District of Middlesex  
County in Registration Book 537, Page 6, with Certificate 81356.

Parcel 6 - *Recorded Land*

That parcel beginning at a point in Cambridge in the Westerly  
boundary of land now or late of Gerald W. Blakeley, Jr., et als,  
Trustees, distant 193.45 feet on bearing south 16° 22' 16" east  
from the easterly corner of land now or late of Marshall B.  
Dalton, et als, Trustees (Land Court Case No. 25650);

Thence running north 89° 26' 46" west by land now or formerly of  
the Commonwealth of Massachusetts a distance of 478.21 feet to  
land now or late of said Dalton, et als, Trustees;

Then turning and running in a northeasterly direction by a line  
with a radius of 5453.83 feet, a distance of 383.87 feet to a  
point;

Thence turning slightly and running north 65° 11' 23" east a  
distance of 76.95 feet to a point;

Thence turning and running south 16° 22' 16" east, a distance of  
193.45 feet to the point of beginning; containing 42,868 square  
feet according to said plan.

The aforesaid four constituent parcels are shown as Lot 8  
containing 198,340± square feet, Lot 9 containing 12,654± square  
feet, Lot 10 containing 21,051± square feet, and Lot 11 containing  
42,868± square feet respectively on the Master Plan.

QUITCLAIM DEED

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Acorn Properties III, Inc., a Massachusetts corporation, of Cambridge, Middlesex County, Massachusetts for consideration paid and in full consideration of One Hundred Ninety-six Thousand Eight Hundred Twenty-two Dollars (\$196,822.00), grants to AP Cambridge Partners, LLC, a Delaware limited liability company, having an address of 395 Arsenal Street, Watertown, Massachusetts 02472, subject to all Easements and Covenants, the following described premises:

Two parcels of land with any buildings or improvements thereon situated in Cambridge, Middlesex County, Massachusetts (the "Premises") all as more fully described on Exhibit A attached hereto and made a part hereof.

For Grantor's title see Certificate of Title No. 182949, in Registration Book 1044, Page 199.

Grantor hereby certifies that the Premises constitute all or substantially all of the assets of Grantor located within the Commonwealth of Massachusetts.

IN WITNESS WHEREOF, Acorn Properties III, Inc. has caused this Deed to be executed by its Clerk on this 24 day of June, 1999.

*Massachusetts Excise Tax stamps in the amount of \$1,810.20 attached to duplicate original in Registered Land.*

Acorn Properties III, Inc.

By: *Samuel J. Guallo*  
Name: Samuel J. Guallo  
Title: Clerk

Hereunto duly authorized

Commonwealth of Massachusetts

Suffolk, ss.

June 24, 1999

Then personally appeared the above-named Samuel J. Guallo, as aforesaid and acknowledged the foregoing instrument to be the free act and deed of Acorn Properties III, Inc., before me

*[Signature]*  
Notary Public  
My Commission Expires:  
7-7-2000

EXHIBIT A

at certain parcel of land situated in Cambridge in the  
of Middlesex, Commonwealth of Massachusetts, bounded and  
described as follows:

SOUTHEASTERLY by lot F as shown on plan hereinafter  
mentioned, one hundred and thirty-five feet;

SOUTHWESTERLY, eighty feet, and

SOUTHEASTERLY, fifteen feet, by lot X<sup>2</sup> on said plan;

SOUTHWESTERLY by lot Y<sup>1</sup> on said plan, ninety feet;

NORTHWESTERLY by lot W on said plan, one hundred and fifty  
feet; and

NORTHEASTERLY by lots R and Q on said plan, one hundred and  
seventy feet.

Said parcel is shown as lot X<sup>1</sup> on said plan.

All of said boundaries are determined by the Court to be  
located as shown on a subdivision plan, as approved by the Court,  
filed in the Land Registration Office, a copy of which is filed in  
the Registry of Deeds for the South Registry District of Middlesex  
County in Registration Book 530, Page 158 with Certificate 80108  
(Plan 4351V).

Together with the right to use the right of way twenty feet  
wide and one hundred eighty feet long extending Northwesterly from  
the said premises to the State Highway as shown on said plan, in  
common with others entitled thereto, for all purposes for which  
private ways are commonly used in the City of Cambridge.

Also another certain parcel of land in said Cambridge,  
bounded and described as follows:

SOUTHWESTERLY by lot Y as shown on plan hereinafter  
mentioned, seventy and 98/100 feet;

NORTHWESTERLY by lot P on said plan, one hundred and fifty  
feet;

NORTHEASTERLY by lot R on said plan, seventy and 98/100 feet;  
and

SOUTHEASTERLY by lot X on said plan, one hundred and fifty  
feet.

Said parcel is shown as lot W on said plan.

If said boundaries are determined by the Court to be shown on a subdivision plan, as approved by the Court, the Land Registration Office, a copy of which is filed in the Registry of Deeds for the South Registry District of Middlesex in Registration Book 495, Page 381, with Certificate 74199 (51V).

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Said lots X<sup>1</sup> and W are subject to and have the benefit of matters set forth in Certificate 91043 in Registration Book Page 93, at said Registry District, to the extent the same will in force and effect.

Said Lot X<sup>1</sup> is also subject to the following matters of record:

- (1) Order by the City of Cambridge dated June 29, 1959 and registered as Document 343901, for a drain and sewer;
- (2) Easement granted to the City of Cambridge dated September 29, 1959 and registered as Document 349600 for a drain for sewer and water pipe; and
- (3) Easement granted to Cambridge Electric Light Company dated July 30, 1959 and registered as Document 350198 for underground conduit and wires.

**SECTION 6**

**PLANS & DRAWINGS**

*(full size drawings under separate cover)*

**STORMWATER MANAGEMENT**

**WASTEWATER MANAGEMENT**

## 6 Stormwater Management

### 6.1 Existing Conditions

#### 6.1.1 Site Characteristics

The project site is 15.6 acres in size consisting primarily of wooded areas. As per Technical Release 55 (TR-55) from Urban Hydrology for Small Watersheds (dated June 1986), prepared by the Soil Conservation Service, the hydraulic condition of the existing on-site vegetation is woods (fair condition).

**Table 1 Existing Conditions Land Use Breakdown**

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Land Use	Acreage
Woods	15.6

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Per the Soil Survey Report for Middlesex County, Massachusetts Interim, Fourth Edition (dated July 1995), Atlas Number 41, the majority of the project site is soil number 555 (Hydrologic Soil Group 'B') and the remaining portion of the site is soil number 46 (Hydrologic Soil Group 'D').

#### Runoff Curve Number (CN)

The project site consists primarily of wooded areas. The hydraulic condition of the existing on-site vegetation is woods (fair condition) based on field investigations and review of aerial maps of the site. Technical Release 55 (TR-55) from *Urban Hydrology for Small Watersheds* (dated June 1986), prepared by the Soil Conservation Service, defines woods (fair condition) as "grazed, but not burned, and some forest litter covers the soil." The on-site woods have some forest litter covering the ground and barren areas between the trees. Comments were raised regarding the land use selection of woods (fair condition). It was suggested that the land use selection should be woods (good condition). TR-55 defines woods (good condition) as "protected from grazing, and litter and brush adequately cover the soil." The proponent did not select woods (good condition) as the existing on-site land use, since the *Massachusetts Supplement for the TR-55 Hydrology Procedure* (dated April 1990), further states that land use of woods with dense underbrush should be avoided in calculating time of concentrations used to generate runoff hydrographs for the watershed because the Manning's roughness coefficient for this cover type is extrapolated from research data and does not represent typical conditions in the northeast region of the United States.

#### Time of Concentration

The drainage flow paths used to calculate the time of concentrations under existing and proposed conditions have been added to Figure 1, Existing Conditions Watershed Plan and Figure 3, Proposed Conditions Watershed Plan.

## 6.1.2 Site Surface Drainage

The hydrologic study area for this project consists of approximately 11.23 acres and includes a portion of Acorn Park Drive. The hydrologic study area is smaller in size than the total site property, since no site improvements are proposed for the portion of the property located east of Acorn Park Drive.

The site is located within the Mystic River Basin Watershed. Little River, located south of the site, flows to the northeast into Alewife Brook. Alewife Brook, located to the south of Route 2, flows to the east and then the north, where it joins with Mystic River.

More specifically, the overall Little River watershed is approximately 8.16 square miles or 5,222 acres in size. The project study area of 11.23 acres is approximately 0.2 percent (%) of the overall Little River watershed area of 5,222 acres.

The potential for flooding of downstream receiving water bodies and adjacent properties due to the proposed project is of concern by residents in the community. The intent of the proposed stormwater management systems is to mitigate for any impacts of the proposed site improvements on the overall watershed and to maintain and improve (to the extent practical) the existing conditions.

Table 2 summarizes the existing conditions drainage basin characteristics. Under Existing Conditions, the project site is divided into four (4) drainage basins (refer to Figure 1, Existing Conditions Watershed Plan).

**Table 2 Existing Conditions Drainage Basin Characteristics**

<b>Drainage Basin Identification</b>	<b>Receiving Water bodies</b>	<b>Total Area (acres)</b>	<b>Slope of Land (%)</b>	<b>Hydrologic Soil Group</b>	<b>Land Use</b>
Basin 1S	Swale/Little Pond	2.26	2-7%	B/D	Woods Pavement
Basin 2S	Swale/Little Pond	1.89	1-4%	B/D	Woods Pavement
Basin 3S	Wetland/Little River	2.26	0.5-3%	B/D	Woods
Basin 4S	Little River	4.82	1-9%	B/D	Woods
<b>Total Study Area</b>		<b>11.23</b>			

Notes: Hydrologic Soil Group 'B' refers to soils having a moderate infiltration rate.  
Hydrologic Soil Group 'D' refers to soils having a slow infiltration rate (high runoff potential).

Runoff in Drainage Basin 1S sheet flows north to an existing drainage swale located along Frontage Road, which outfalls to Little Pond. Little Pond is hydraulically connected to Little River.

Runoff in Drainage Basin 2S sheet flows east to an existing drainage swale adjacent to Acorn Park Drive. During storms greater than the 2-year, 24-hour storm event, stormwater within the existing drainage swale stages to and above elevation 9.5. Once stormwater reaches elevation 9.5, it discharges over a 5-foot earthen weir to the downstream swale located along Frontage Road, which outfalls to Little Pond and ultimately to Little River.

Runoff in Drainage Basin 3S sheet flows southeasterly to an existing wetland located adjacent to Acorn Park Drive, hydraulically connected to Little River.

Runoff in Drainage Basin 4S sheet flows southwesterly to Little River.



### 6.1.3 Floodplain

The project site is located partially within the 100-year floodplain of Little River. The site and Little River are located within the Mystic River Basin Watershed.

According to the FIRM Flood Insurance Rate Map (Panel No. 250182 0001 B), the 100-year Flood Boundary (Zone A5) is at elevation 8.20+/- feet, NGVD for the project site.

In the case of this project, however, the proponent is anticipating a change to the mapped base flood elevation to increase to 9.8 NGVD. A FEMA analysis of this watershed is currently underway and preliminary results support the higher 100-year floodplain elevation of 9.8 NGVD.

## 6.2 Proposed Conditions

### 6.2.1 Site Surface Drainage

As previously noted, the proposed site improvements include the construction of five residential buildings, each with below grade parking, and additional surface parking. The following table summarizes the proposed condition land use breakdown for the site.

**Table 3 Proposed Conditions Land Use Breakdown**

Land Use	Acreage
Woods	4.45
Building	1.80
Impervious	2.81
Open Space	2.17
<b>Total Study Area</b>	<b>11.23</b>

The proposed stormwater management facilities will include two (2) existing water quality grassed or vegetated swales, two (2) surface detention basins, one (1) surface retention basin, one (1) 15' wide grass filter strip and four (4) sub-surface detention/infiltration (infiltration chambers) systems, as shown on Figure 2, Proposed Grading and Drainage Plan. One of the water quality swales is an existing swale adjacent to Acorn Park Drive which discharges to an existing swale along Frontage Road and ultimately to Little Pond. The other water quality swale outfalls to Little River.

Under proposed conditions, the study area will be divided into ten drainage basins as shown on Figure 3, Proposed Conditions Watershed Plan.

Table 5.3-4 summarizes the basin characteristics for the proposed condition drainage basins.





**Table 4 Proposed Conditions Drainage Basin Characteristics**

<b>Drainage Basin Identification</b>	<b>Stormwater Management System/Receiving Waterbody</b>	<b>Total Area (acres)</b>	<b>Slope of Land (%)</b>	<b>Hydrologic Soil Group</b>	<b>Land Use</b>
Basin 1S	Detention Basin 2 Swale/Little Pond	0.34	1%	B	Grass Pavement
Basin 2S	Detention Infiltration System 1	0.20	1%	B	Pavement
Basin 3S	Detention Infiltration System 2	0.96	1%	D	Roof Grass Pavement
Basin 4S	Detention Basin 1/ Wetland/Little River	1.06	2%	B/D	Roof Grass Pavement
Basin 5S	Detention Infiltration System 4	0.81	1%	B	Roof Grass Pavement
Basin 6S	Retention Basin A	1.11	1-3%	B	Roof Grass Pavement
Basin 7S	Detention Infiltration System 3	0.45	-	B	Roof
Basin 8S	Swale/ Wetland/Little River	2.29	1-3%	B/D	Woods Grass Pavement
Basin 9S	Wetland/Little River	2.76	1-2%	B/D	Woods Grass
Basin 10S	Swale/Wetland/Little River	1.27	1-7%	D	Woods Grass
<b>Total Study Area</b>		<b>11.23</b>			

Notes: Hydrologic Soil Group 'B' refers to soils having a moderate infiltration rate (medium runoff potential). Hydrologic Soil Group 'D' refers to soils having a slow infiltration rate (high runoff potential).

Runoff in Drainage Basin 1S sheet flows north across the parking lot and is collected in a drainage system which outfalls into Detention Basin 2 then is culverted into an existing drainage swale located along Frontage Road, which outfalls to Little Pond. Little Pond is hydraulically connected to Little River.

Stormwater runoff from the proposed parking area within Basin 2S will be collected and conveyed through a drainage system to a detention/infiltration system (IC-1) designed to provide peak attenuation and allow for recharge of groundwater. An 8" overflow pipe will be connected from IC-1 to a proposed catch basin located at the entrance drive.

Stormwater runoff from Building E's roof leaders and proposed parking areas in Drainage Basin 3S will be collected and conveyed through a drainage system to a detention/infiltration system (IC-2) designed to provide peak rate attenuation and allow for recharge of groundwater. An 8" overflow pipe will be connected from IC-2 to a proposed catch basin at the northern side of the parking lot.

Runoff from Building D's roof leaders and proposed parking area in Drainage Basin 4S will be collected and conveyed through a drainage system to Detention Basin 1 which provides water quality and quantity control prior to discharge to the existing wetland adjacent to Frontage Road.

Stormwater runoff from Building C's roof leaders and parking areas within Drainage Basin 5S will be collected and conveyed through a drainage system to a detention/infiltration system (IC-4), designed to provide peak rate attenuation and allow for recharge of groundwater. An 8" overflow pipe will be connected from IC-4 to a proposed catch basin located between Building E and Building D.

Stormwater runoff from the proposed parking area and Building B's roof leaders within Drainage Basin 6S will be collected and conveyed through a drainage system to Retention Basin A designed to provide peak rate attenuation and allows recharge of groundwater.

Stormwater runoff from Building A's roof leaders, within Drainage Basin 7S, will be collected into a detention/infiltration system (IC-3) designed to provide peak attenuation and allow for recharge of groundwater. An 8" overflow pipe will be connected to IC-3 and will outlet into the proposed swale at the southern side of the site.

Runoff within Drainage basin 8S sheet flows from a proposed parking lot across a grass filter strip which provides water quality control, then conveyed through a grassed swale adjacent to Acorn Park Drive which provides water quality and quantity control prior to discharging to an existing wetland.

Stormwater runoff from Drainage Basin 9S sheet flows southwesterly towards Little River.

Runoff from Drainage Basin 10S sheet flows north to an existing drainage swale located adjacent to Frontage Road, which outfalls to Little Pond which is hydraulically connected to Little River.

## 6.2.2 Proposed Methods of Stormwater Management

A comprehensive stormwater management plan has been prepared for the project to provide both quality and quantity controls for stormwater runoff. The stormwater management plan is in full compliance with the performance standards described in the DEP Stormwater Management Policy (1997). A copy of the DEP Stormwater Management Form for the project is included in Appendix A.

The proposed stormwater management system includes two (2) surface detention basins, one (1) surface retention basin, one (1) 15' wide grass bio-filter strip, five (5) oil/grit separators and four (4) sub-surface detention/infiltration systems. Stormwater runoff from the site will be collected and conveyed through a drainage system to the stormwater management systems. Surface runoff from paved areas to catch basins will be conveyed through oil/grit separators prior to discharging to the sub-surface detention systems.

The grass bio-filter strip provides pollutant removal through sedimentation, filtration, nutrient uptake and infiltration, and control and conveys it at low velocities to protect against erosion. The detention basins design provides for water quality treatment by allowing the settling of particulates and associated pollutants. A sediment forebay located at the inlets to the detention basins will reduce stormwater velocity and promote efficient settling of suspended solids.

Table 5 summarizes the proposed Stormwater Management System.

**Table 5 Summary of Proposed Stormwater Management Systems**

Stormwater Management Method	Stormwater Management Identification	Approximate Dimensions (feet by feet)	Peak Storage Volume (cubic feet)	100-year Peak Water Surface Elevation (feet) NGVD	Top of Berm Elevation (feet) NGVD
Retention Basin A	5P	50' x 220'	21,569	9.2	10.5
Detention Basin 1	6P	150' x 35'	14,199	8.3	10.2
Detention Basin 2	7P	20' x 90'	7,459	8.9	10.5
Infiltration System 1	IC-1	30' x 40'	2,868	10.1	11.5 *
Infiltration System 2	IC-2	50' x 120'	14,799	11.7	12.0 *
Infiltration System 3	IC-3	35' x 70'	5,525	11.6	12.0 *
Infiltration System 4	IC-4	85' x 70'	11,282	11.5	12.0 *

\*Top of infiltration pipe

As shown in Table 5, the detention systems will contain the 100-year peak elevation, meaning that no adverse flooding impacts will occur on Acorn Park Drive, Frontage Road or abutting properties.

### **6.3 DEP Stormwater Management Guidelines**

#### **6.3.1 Stormwater Quality**

The site is located in the Mystic River Basin Watershed to Little River, which abuts the site to the south. The project has been designed to treat 1.0 inches of runoff from all new impervious surfaces. The backup calculations are located in Appendix A. Stormwater runoff from the proposed project will be treated in water quality swales, oil/grit separators, detention basins, or a combination of these three prior to discharge. The proposed project design will inhibit transport of erosion, sediment, oil and grease, nutrients, pathogens, road salt, or debris. Therefore, no impairment of water quality will occur to impact resident and anadromous fish species that use Little Pond, Little River, or Alewife Brook.

#### **6.3.2 Stormwater Quantity**

To determine the peak rate of discharge for existing and proposed conditions, runoff hydrographs were generated for the 2-, 10-, 25- and 100-year, 24-hour storm events using the SCS TR-20 Method and Type III rainfall distribution. Under proposed conditions, the post-development runoff hydrographs were flood routed through the proposed stormwater management facilities (detention/infiltration system, detention basins and water quality swales). The pre- versus post-development peak discharge rates were compared to demonstrate that the post-development peak discharge rates will not exceed pre-development discharge rates.

Table 6 summarizes the total rainfall amounts input into the HydroCAD© analyses for the 2-, 10-, 25- and 100-year storm events.

**Table 6 Total Rainfall versus Storm Frequency**

<b>Storm Event</b>	<b>Duration (hours)</b>	<b>Total Rainfall Amounts (inches)</b>
2-year	24	3.3
10-year	24	4.6
25-year	24	5.4
100-year	24	6.6

The rainfall amounts summarized in Table 6 are based on review of the precipitation values for Massachusetts contained in the Massachusetts Supplement for the TR-55 Hydrology Procedure (210-EFM, Amend. MA1 April 1990), Technical Publication, TP-40.

Table 7 summarizes the pre- and post-development discharge rates determined in the hydrologic/hydraulic analyses performed for the study area. The backup data for the analyses is contained in Appendix A.

**Table 7 Pre- versus Post -Development Peak Discharge Rates**

<b>Storm Event</b>	<b>Pre-Development Rate (CFS)</b>	<b>Post-Development Rate (CFS)</b>
2-Year, 24-Hour	6.2	6.1
10-Year, 24-Hour	13.1	11.7
25-Year, 24-Hour	17.9	15.8
100-Year, 24-Hour	25.5	22.7

The pre- versus post-development peak discharge rates were compared to demonstrate that the post-development peak discharge rates will not exceed pre-development discharge rates.

As shown in Table 7, the post-development discharge rate for each storm event is less than the peak discharge rate under pre-development conditions. Therefore, the proposed project meets DEP Stormwater Management Standard No. 2 – Peak Discharge Rates, meaning that there will be no adverse impacts to downstream waterbodies, Acorn Park Drive, Frontage Road or abutting properties.

### **6.3.3 Groundwater Recharge**

Under proposed conditions, impervious surfaces (i.e., roof tops, pavement) will be added to the site. The additional stormwater runoff and loss of groundwater recharge due to the increase in impervious surfaces will be mitigated in accordance with DEP Stormwater Management Standard No. 3 – Groundwater Recharge by infiltrating the roof runoff from the buildings and a portion of the parking area.

According to the Middlesex Soils Survey, the project site is located within Hydrological Soil Groups 'B' and 'D'. Based on the DEP Stormwater Management Guidelines, the required groundwater recharge volumes for Hydrological Soil Groups 'B' and 'D' are as follows:

Hydrological Soil Group 'B': 0.25 inches of runoff multiplied by the total impervious area overlying Type 'B' soils.

Hydrological Soil Group 'D': Waived (Because the soils are not conducive to infiltration).

On the basis of these recharge volumes, the required groundwater recharge volume (based on the most conservative Type 'B' soil classification) is 0.08 acre-feet. (3.866 ac. x 0.25")

The proposed detention/infiltration system will infiltrate 0.10 acre-feet of stormwater runoff, thereby exceeding the required DEP recharge standard. Backup calculations are included in Appendix A.

Groundwater elevations within the vicinity of the proposed swales, detention basin and infiltration system were based on borings performed on-site. The boring logs are included in a report entitled, Hydrogeological Report, Frontage Road Office Center (March 6, 2001) prepared by McPhail Associates, Inc. and Epsilon Associates, Inc. In addition, the observed high water table elevation below the proposed detention/infiltration systems was based on site specific groundwater monitoring described in the Groundwater Monitoring Report (dated August 28, 2001) prepared by McPhail Associates, Inc. The observed high groundwater elevations and the elevations at the bottom of the systems are listed below in Table 8. As shown, there is no groundwater interception through the bottom of the stormwater management systems.

**Table 8 Observed High Groundwater Elevations**

<b>Stormwater Management System</b>	<b>Bottom Elevation</b>	<b>Groundwater Elevation</b>
Retention Basin A	7.0	4.7
Detention Basin 1	6.0	4.2
Detention Basin 2	7.0	5.5
Infiltration System 1	8.5	6.0
Infiltration System 2	8.0	6.0
Infiltration System 3	8.5	7.5
Infiltration System 4	8.0	4.5

During final design of the project, additional groundwater data will be collected to ensure that acceptable separation distances will be maintained.

Percolation tests will be performed near the proposed detention/infiltration system and detention basin as part of the final design. The current design uses a constant infiltration rate of 0.52 inches per hour based on hydrologic soil properties classified by United States Department of Agriculture soil texture for Hydrologic Soil Type 'B'. Given the current understanding of the soils on-site, this rate is considered a conservative estimate of the actual infiltration rate.

#### **6.3.4 TSS Removal Rates**

To achieve the required 80 percent total suspended solids (TSS) removal (Standard No. 4), the stormwater management system has been designed to incorporate Best Management Practices (BMP) as outlined in the DEP Stormwater Management Handbook. These include street sweeping (10% removal), deep sump and hooded

catchbasins (25% removal), dry detention basin (70% removal), grassed water quality swales (70% removal) and oil/grit separators (25% removal). The proposed BMPs are described below.

Street Sweeping. The proposed design incorporates street sweeping as a BMP to control the amount of sediment that enters the drainage system. Street sweeping will occur at least two times a year, once coinciding with the end of the winter sanding season and once during the late fall. Efforts will also be made to provide street sweeping immediately following winter snowmelt when road sand and other sediments have accumulated.

Deep Sump Catchbasins. The on-site drainage collection system will incorporate deep sump catchbasins, which will serve to trap sediment and floatables. Sumps will be four-feet deep, and hoods will be provided with vacuum-breaks to avoid siphoning of floatables out of the catchbasin.

Grassed Bio-Filter Strip. A grassed 15 foot wide grassed bio-filter strip will be utilized at the southern side of the site. The strip is planted with vegetation and materials to help capture pollutants, develop nitrogen uptake and to decrease runoff velocity prior to discharging into adjacent wetlands. According to the DEP Stormwater Guidelines, swales capture approximately 70 percent of TSS.

Detention Basins. The detention basins will include a sediment forebay to assist in settling of suspended solids. According to the DEP Stormwater Guidelines, detention basins capture approximately 70 percent of TSS.

Oil/Grit Separators. The proposed design of the on-site drainage system will incorporate oil/grit separators prior to discharging to the underground detention system. According to DEP Stormwater Guidelines, oil/grit separators are similar to deep sump catch basins and capture 25% of TSS.

Underground Infiltration System. Each system consists of a series of perforated pipes surrounded with drain rock and filter fabric. The pavement runoff is directed through the catchbasins and an oil/grit separator prior to discharging into the infiltration system. The infiltration systems used for this project capture approximately 70% of TSS.

As shown in Table 9, the incorporation of these BMP measures will remove approximately 80 % of the TSS in the water column from the proposed impervious surfaces. The composite TSS removal rate of at least 80% was obtained by calculating the TSS removal rate percentage per proposed BMPs "treatment train" for each basin and multiplying by the prorated contributing impervious area.

**Table 9 Total Suspended Solids Removal Rate**

<b>BMP Methods (TSS Removal Rate%)</b>	<b>Composite TSS Removal Rate Percentage (%)<sup>(1)</sup></b>
Street Sweeping (10%)/ Deep Sump Catchbasins (25%)/ Grassed Bio-Filter Strip (70%)	80.0
Street Sweeping (10%)/ Deep Sump Catchbasins (25%)/ Detention Basin (70%)	80.0
Street Sweeping (10%)/ Deep Sump Catchbasins (25%)/ Oil/Grit Separators (25%)/ Infiltration System (70%)	<u>85.0</u>
<b>CUMULATIVE TOTAL</b>	<b>82.0</b>

Notes: <sup>1</sup>Refer to TSS Removal Calculation Worksheets for each basin within Appendix A.

### **6.3.5 Erosion and Sedimentation Controls**

The following erosion and sedimentation control devices will be implemented to prevent erosion both during and after construction.

- ◆ Initially an erosion control barrier, consisting of a silt fence staked by hay bales, will be installed at the limit of work.
- ◆ The temporary sedimentation basins will be constructed in the location of the permanent water quality swales and the detention basin. However, the detention/infiltration system will not be used as a temporary sediment trap for construction utilities. A temporary sedimentation basin will be located upgradient of the detention/infiltration system. The temporary sedimentation basins will be cleaned prior to final grading and stabilization of the water quality swales and the detention basin. The temporary sedimentation basin located upgradient of the detention/infiltration system will be removed.
- ◆ Construction entrance apron pads will be constructed at the main site access drive to prevent the tracking of sediment on vehicle tires from transport onto adjacent streets.
- ◆ Silt bags will be installed at all existing catchbasin structures to prevent silt from entering the existing drainage lines.

- ◆ During construction, cut and fill slopes will be stabilized immediately upon completion with loam, hydro-seeding and erosion control blankets.
- ◆ All drainage outfalls will include rip-rap aprons in order to mitigate discharge velocities and minimize erosion potential.
- ◆ Temporary haybales will be placed around all new catchbasins, and maintained throughout the duration of construction to prevent silt material from entering the drainage system.

### **6.3.6 Operation and Maintenance Plan**

An Operation and Maintenance Plan for the project site has been prepared in accordance with DEP Stormwater Management Standard No. 9.

The Stormwater Management System will be the overall responsibility of the Owner. The General Contractor (under Contract with the Owner) will appoint a Project Manager who will be responsible during construction. A Facility Manager, hired by the owner, will be responsible after construction completion.

Short-term impacts may occur during construction activities. To minimize these impacts, a comprehensive soil and erosion control plan will be implemented prior to any project construction activities. The primary items of the soil and erosion control plan are outlined below.

- ◆ Erosion and sedimentation control devices will be installed along the perimeter of the proposed work area. In addition to providing for sediment deposition and reducing runoff during storm events, the barrier will limit work areas for equipment operators.
- ◆ Erosion and sedimentation control devices will be inspected daily during periods of active construction and bi-weekly during the remainder of the construction period. During the construction activities, erosion control devices will be placed at catchbasins to prevent sediment from reaching discharge points.
- ◆ Heavy equipment will not be allowed to operate on the surface location where the detention/infiltration system is planned because soil compaction could adversely affect the long-term performance of the system. Diversion berms or staked and lined haybales will be used around the perimeter of the system during its construction. Manual removal or light earth-moving equipment will be used for excavation and construction of the detention/infiltration system. Excavated material from this area will be located downgradient to prevent redeposition of this material into the system during runoff events.
- ◆ Stockpiles of cut trees and excavated and/or fill materials will be consolidated outside of wetland resources areas. If a temporary stockpile area is necessary within

the 100-foot Buffer Zone, it will be protected with appropriate erosion controls, such as hay mulch, grass seed, haybale barriers, or a combination of the above to minimize erosion. At the conclusion of the project, stockpiles will be removed from the 100-foot Buffer Zone, original elevations will be restored, and the areas stabilized.

- ◆ If necessary, temporary drainage swales will be used to divert stormwater to temporary sedimentation basins. The swales will be constructed with hay bale check dams to prevent erosion. The check dams will be spaced at intervals no greater than 100 feet. The temporary basin will be constructed where the permanent basin has been designed. The basins will be cleaned out prior to final grading and stabilization.
- ◆ During construction, disturbed areas will be kept to a minimum, and vegetative stabilization of these areas will occur as soon as possible. Areas that cannot be restored or stabilized immediately will be mulched to prevent any potential erosion or sedimentation.
- ◆ Temporary seeding, mulching, or other suitable stabilization measures will be used to protect exposed critical areas, should unprotected soils remain exposed for prolonged periods. Following construction, and once disturbed areas have been stabilized, erosion controls will be removed.

The schedule for inspection and maintenance during and after construction is described below.

Schedule for Inspection and Maintenance during construction:

- ◆ *Erosion Control Barrier:* The erosion control barrier will be installed prior to commencement of construction and inspected weekly, prior to storm events and immediately after storm events to ensure its integrity. The erosion control barrier will be repaired as necessary to prevent erosion.
- ◆ *Construction Entrance Aprons:* The construction entrance aprons will be installed prior to commencement of construction and inspected weekly. The construction entrance aprons will be replaced when debris becomes noticeable on the existing pavement surfaces opposite the construction side.
- ◆ *Slope Stabilization:* Slope stabilization controls will be installed immediately upon obtaining final grades as shown on the project plans. Areas in failure will be re-graded to final grade and stabilized as necessary.
- ◆ *Baled Hay Silt Barrier around Catchbasins:* The catchbasin barriers will be installed immediately after installation of catchbasin grates and will be inspected weekly, prior to storm events and immediately after storm events. Catchbasin barriers will be replaced in areas of failure.

- ◆ *Riprap Slope Protection:* Slopes requiring riprap protection will be installed to obtain final grade.
- ◆ *Infiltration System:* These systems will not be constructed until after the site has been stabilized and will not be used as a temporary sediment trap during construction. Diversion berms or staked and lined haybales will be utilized around the perimeter of the system during its construction. Manual removal or light earth-moving equipment will be used for excavation and construction of the detention/infiltration system. All excavated material from this area will be located downgradient to prevent redeposition of this material in the system during runoff events.
- ◆ *Swales:* Temporary erosion and sediment controls will be utilized during construction. Mulch anchoring will be done immediately after seeding.
- ◆ *Detention Basins:* The detention basins will be inspected immediately after storm events and cleaned to remove sediment buildup. The control structure will be inspected immediately after storm events and cleaned whenever sediment clogs the structure.
- ◆ *Construction Completion:* The entire stormwater management system will be inspected upon completion of construction. Sediment will be removed from the system at this time.

Schedule for Inspection and Maintenance after Construction:

- ◆ *Street sweeping:* Street sweeping will occur at least twice a year, once coinciding with the end of the winter sanding season and once during the late fall.
- ◆ *Catchbasins, Area Drains and Drop Inlets:* The removal of sediments and trash will occur when catchbasins, area drains and drop inlets are cleaned out. At a minimum, catchbasins, area drains and drop inlets will be inspected quarterly and cleaned on a semi-annual basis. Disposal of accumulated sediment will be performed in accordance with applicable local, state and federal guidelines and regulations.
- ◆ *Infiltration System:* After construction, the detention/infiltration system will be inspected after every major storm for the first year to ensure proper function. Thereafter, the system will be inspected twice per year, with cleaning occurring as needed.
- ◆ *Swales:* Swales will be inspected at least semi-annually, and maintenance and repairs made as necessary. Additional inspections will be scheduled during the first few months to make sure the vegetation is adequately established. Repairs and reseeded will be done as required. Swales will be mowed at least once per year. The grass will not be cut too often or shorter than four inches, to maintain the

effectiveness of the swale for pollutant removal and nutrient intake. Sediment and debris will be removed manually, at least once per year, before the vegetation is adversely impacted.

- ◆ *Sediment Forebay*: The sediment forebay located within the detention basins will be inspected and cleaned at least once per year. A 4"x4" wooden marker post will be placed in each basin forebay. If the forebay fills up by 50%, it shall be cleaned. Sediments will be handled and disposed in accordance with local, state and federal guidelines and regulations.
- ◆ *Detention Basin*: Once constructed, the detention basins will be inspected after several storm events to confirm drainage system functions, bank stability, and vegetation growth. Problems will be addressed immediately. During the first six months of operation, the basin will be inspected immediately after significant storm events and cleaned to remove sediment buildup. The control structure will be inspected and cleaned when sediment appears to have clogged the structure. Thereafter, the basin will be inspected annually and sediment will be removed as necessary or at a minimum once every 10 years. At least twice during the growing season, the side slopes will be mowed, and accumulated trash and debris will be removed. Accumulated sediment in forebay will also be removed at this time.
- ◆ The entire stormwater management system, including piping, catchbasins, and manholes will be cleaned prior to final site acceptance. Sediment and debris will be removed and disposed of in accordance with local, state and federal guidelines and regulations.

Snow removal and storage: Snow plowing on the property will be done as winter conditions warrant. Snow will be removed from the paved roadways and parking areas using plows and other equipment, as necessary. Signs designating snow pile areas will be kept in place. Snow storage areas will be located in pervious areas on-site that will promote slow infiltration to prevent ponding and prevent draining directly towards the adjacent wetlands. The snow storage areas will be inspected frequently. Removal of sediment from the snow storage areas will occur every spring.

Ice Melt: Calcium chloride, or a similar ice melt product that does not contain sodium, will be used on paved roadways, parking areas, drives, and walkways on the property.

### **6.3.7 Floodplain**

The project will result in an increase in the 100-year floodplain volume available on site. The construction of a small section of parking area/driveway and portions of three buildings will impact the 100-year floodplain of Little Pond (which outfalls to Little River). In order to bring the grade up in these areas to (construct the driveway and buildings),

approximately 36,809 cubic feet (cf) of the 100-year floodplain will be filled between elevations 5.0 and 9.8 (refer to Figure 4 and Table 10).

In accordance with the Town of Belmont Zoning By-laws, floodplain compensation was provided on a foot-by-foot basis. Compensatory calculations were performed for the project site. Existing and proposed floodplain storage volumes were compared to demonstrate that the proposed site improvements would create a net increase in the 100-year floodplain storage volume available to Little River.



To compensate for the loss in floodplain storage, compensatory storage volume will be created on-site between elevations 5.0 and 9.8, in two areas adjacent to the impacted floodplain (see Figure 5). The compensatory storage areas will be hydraulically connected to the existing floodplain along the northern and southerly portions of the site. This will ensure that during the 100-year storm, water within Little Pond will backflow into the compensatory storage areas. The purpose of the compensatory storage areas is to replicate the existing floodplain and to ensure that the floodplain of Little Pond will continue to function as it does under existing conditions. The compensatory volume will provide a net increase in storage at the same elevations from which existing floodplain storage is being removed.

It should be noted that credit for storage volume within the compensatory storage area was taken only for new floodplain storage volume created at each incremental contour elevation. No credit for compensatory storage was taken for existing floodplain storage volumes.

Tables 10 through 12 summarize the 100-year floodplain (elevation 9.8) impacts and compensatory storage.

**Table 10      Impacts to the 100-Year Floodplain**

<b>Increment</b>	<b>Area (square feet)</b>	<b>Average Area (square feet)</b>	<b>Cumulative Storage Volume</b>
5.0	0	0	0
6.0	3,117	1,559	1,559
7.0	5,114	4,116	5,675
8.0	8,887	7,001	12,676
9.0	13,636	11,262	23,938
9.8	18,542	12,871	36,809
<b>TOTAL</b>			<b>36,809</b>

**Table 11 100-Year Floodplain Compensatory Storage**

<b>Increment</b>	<b>Area (square feet)</b>	<b>Average Area (square feet)</b>	<b>Cumulative Storage Volume (cubic feet)</b>
5.0	0	0	0
6.0	3,386	1,693	1,693
7.0	5,791	4,589	6,282
8.0	10,072	7,932	14,214
9.0	16,551	13,312	27,526
9.8	20,319	14,748	42,274
<b>TOTAL</b>			<b>42,274</b>

**Table 12 100-Year Floodplain Compensatory Storage Analysis**

<b>Increment</b>	<b>Impacts to the Existing 100 year Flood Plain (cubic feet)</b>	<b>Proposed Compensatory Storage (cubic feet)</b>
5.0	0	0
6.0	1,559	1,693
7.0	5,675	6,282
8.0	12,676	14,214
9.0	23,938	27,526
9.8	36,809	42,274
<b>TOTAL</b>	<b>36,809</b>	<b>42,274</b>

To compensate for the loss of floodplain storage of approximately 36,809 cf, approximately 42,274 cf of compensatory storage volume (approximately a 10% increase in available volume) will be created on-site between elevation 5.0 and 9.8. This represents a net increase of approximately 5,465 cf of storage volume.



### **6.3.8 Town of Belmont Zoning By-Laws**

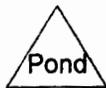
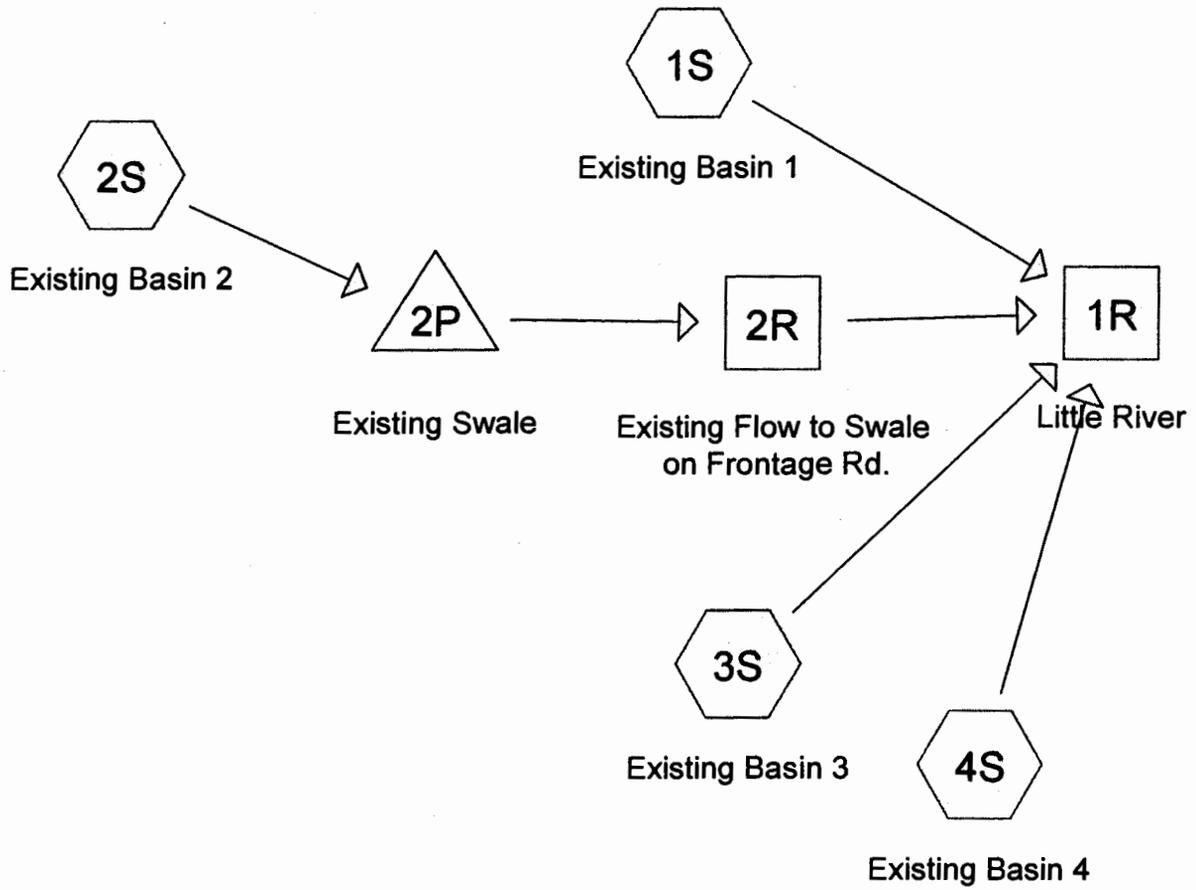
The project conforms to the Standards outlined in Section 6B.7-Stormwater Management Facilities of the Town of Belmont Zoning By-Law Amendment (dated May 28, 2002) as described below.

- ◆ The post-development discharge rates for the 2-, 10-, 25- and 100-year storm events do not exceed the pre-development discharge rates.
- ◆ Building roof drainage will be piped directly to an underground infiltration system sized to meet the DEP groundwater recharge requirements for the site.
- ◆ Stormwater runoff from on-site paved areas will be collected and conveyed through deep sump catchbasins and storm drain pipes to adjacent stormwater management systems. The pipe capacity of the storm drain system will be designed to convey the 10-year storm frequency.
- ◆ Proposed detention basin(s) and swale(s) will detain the difference in pre- versus post-development stormwater discharge rates from the site.
- ◆ Proposed detention basin(s) will have adequate storage volume to contain the peak elevation during the 100-year storm event within its top of bank.
- ◆ Compensatory storage volume provided due to loss of floodplain storage of Little River will result in a net increase of 5,465 cf of volume within the 100-year floodplain.
- ◆ Creation of an acceptable Stormwater Facilities Maintenance Plan. Refer to Section 6.3.6.

***HydroCAD Calculations***

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***Stormwater Management  
Rizzo Associates, Inc.***



**Existing Conditions**

Type III 24-hr 2-Year Storm Rainfall=3.30"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: Existing Basin 1**Runoff Area=2.260 ac Runoff Depth=1.28"  
Flow Length=420' Tc=15.2 min CN=77 Runoff=2.47 cfs 0.241 af**Subcatchment 2S: Existing Basin 2**Runoff Area=1.890 ac Runoff Depth=0.78"  
Flow Length=410' Tc=22.6 min CN=68 Runoff=0.97 cfs 0.123 af**Subcatchment 3S: Existing Basin 3**Runoff Area=2.260 ac Runoff Depth=0.83"  
Flow Length=610' Tc=20.6 min CN=69 Runoff=1.30 cfs 0.157 af**Subcatchment 4S: Existing Basin 4**Runoff Area=4.820 ac Runoff Depth=0.69"  
Flow Length=380' Tc=12.7 min CN=66 Runoff=2.55 cfs 0.278 af**Reach 1R: Little River**Inflow=6.15 cfs 0.693 af  
Outflow=6.15 cfs 0.693 af**Reach 2R: Existing Flow to Swale on Frontag** Peak Depth=0.04' Max Vel=0.2 fps Inflow=0.05 cfs 0.018 af  
n=0.150 L=125.0' S=0.0320 '/' Capacity=19.84 cfs Outflow=0.05 cfs 0.017 af**Pond 2P: Existing Swale**Peak Elev=9.52' Storage=4,595 cf Inflow=0.97 cfs 0.123 af  
Outflow=0.05 cfs 0.018 af**Total Runoff Area = 11.230 ac Runoff Volume = 0.799 af Average Runoff Depth = 0.85"**

**Existing Conditions**

Type III 24-hr 2-Year Storm Rainfall=3.30"

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**Subcatchment 1S: Existing Basin 1**

Runoff = 2.47 cfs @ 12.20 hrs, Volume= 0.241 af, Depth= 1.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-Year Storm Rainfall=3.30"

Area (ac)	CN	Description
0.250	60	WOODS (FAIR CONDITION) TYPE B
1.940	79	WOODS (FAIR CONDITION) TYPE D
0.070	98	EXISTING ACORN PARK ROADWAY
2.260	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0540	0.1		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.30"
1.6	130	0.0770	1.4		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.4	240	0.0220	0.7		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.2	420	Total			

**Subcatchment 2S: Existing Basin 2**

Runoff = 0.97 cfs @ 12.34 hrs, Volume= 0.123 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-Year Storm Rainfall=3.30"

Area (ac)	CN	Description
1.230	60	WOODS (FAIR CONDITION) TYPE B
0.550	79	WOODS (FAIR CONDITION) TYPE D
0.110	98	EXISTING ACORN PARK ROAD
1.890	68	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	50	0.0100	0.1		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.30"
4.9	280	0.0360	0.9		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.7	80	0.0130	0.8		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.6	410	Total			

**Existing Conditions**

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Type III 24-hr 2-Year Storm Rainfall=3.30"

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**Subcatchment 3S: Existing Basin 3**

Runoff = 1.30 cfs @ 12.30 hrs, Volume= 0.157 af, Depth= 0.83"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-Year Storm Rainfall=3.30"

Area (ac)	CN	Description
1.400	60	WOODS (FAIR CONDITION) TYPE B
0.660	79	WOODS (FAIR CONDITION) TYPE D
0.200	98	Pavement
2.260	69	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	50	0.0140	0.1		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.30"
6.1	340	0.0350	0.9		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.5	220	0.0050	6.8	287.70	<b>Channel Flow,</b> Area= 42.0 sf Perim= 36.0' r= 1.17' n= 0.017
20.6	610	Total			

**Subcatchment 4S: Existing Basin 4**

Runoff = 2.55 cfs @ 12.19 hrs, Volume= 0.278 af, Depth= 0.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-Year Storm Rainfall=3.30"

Area (ac)	CN	Description
1.510	79	Woods, Fair, HSG D
3.310	60	Woods, Fair, HSG B
4.820	66	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0950	0.1		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.30"
5.0	290	0.0380	1.0		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
1.2	40	0.0130	0.6		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
12.7	380	Total			

**Existing Conditions**

Type III 24-hr 2-Year Storm Rainfall=3.30"

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**Reach 1R: Little River**

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 11.230 ac, Inflow Depth = 0.74" for 2-Year Storm event  
Inflow = 6.15 cfs @ 12.21 hrs, Volume= 0.693 af  
Outflow = 6.15 cfs @ 12.21 hrs, Volume= 0.693 af, Atten= 0%, Lag= 0.0 min

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

**Reach 2R: Existing Flow to Swale on Frontage Rd.**

Inflow Area = 1.890 ac, Inflow Depth = 0.12" for 2-Year Storm event  
Inflow = 0.05 cfs @ 19.77 hrs, Volume= 0.018 af  
Outflow = 0.05 cfs @ 20.05 hrs, Volume= 0.017 af, Atten= 0%, Lag= 17.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Max. Velocity= 0.2 fps, Min. Travel Time= 9.7 min  
Avg. Velocity = 0.2 fps, Avg. Travel Time= 10.6 min

Peak Depth= 0.04' @ 19.89 hrs  
Capacity at bank full= 19.84 cfs  
Inlet Invert= 8.00', Outlet Invert= 4.00'  
5.00' x 1.50' deep channel, n= 0.150 Length= 125.0' Slope= 0.0320 '/  
Side Slope Z-value= 1.5 '/

**Pond 2P: Existing Swale**

Inflow Area = 1.890 ac, Inflow Depth = 0.78" for 2-Year Storm event  
Inflow = 0.97 cfs @ 12.34 hrs, Volume= 0.123 af  
Outflow = 0.05 cfs @ 19.77 hrs, Volume= 0.018 af, Atten= 95%, Lag= 445.5 min  
Primary = 0.05 cfs @ 19.77 hrs, Volume= 0.018 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2  
Peak Elev= 9.52' @ 19.77 hrs Surf.Area= 4,537 sf Storage= 4,595 cf  
Plug-Flow detention time= 538.8 min calculated for 0.018 af (15% of inflow)  
Center-of-Mass det. time= 378.7 min ( 1,269.8 - 891.1 )

#	Invert	Avail.Storage	Storage Description
1	8.00'	5,777 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
8.00	1,428	0	0
9.00	3,322	2,375	2,375
9.80	5,184	3,402	5,777

#	Routing	Invert	Outlet Devices
1	Primary	9.50'	5.0' long x 1.0' 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

**Existing Conditions**

Type III 24-hr 2-Year Storm Rainfall=3.30"

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Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31  
3.32

Primary OutFlow Max=0.04 cfs @ 19.77 hrs HW=9.52' (Free Discharge)

↳1=Broad-Crested Rectangular Weir (Weir Controls 0.04 cfs @ 0.4 fps)

**Existing Conditions**

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Type III 24-hr 10-Year Storm Rainfall=4.60"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: Existing Basin 1**Runoff Area=2.260 ac Runoff Depth=2.29"  
Flow Length=420' Tc=15.2 min CN=77 Runoff=4.53 cfs 0.431 af**Subcatchment 2S: Existing Basin 2**Runoff Area=1.890 ac Runoff Depth=1.59"  
Flow Length=410' Tc=22.6 min CN=68 Runoff=2.16 cfs 0.251 af**Subcatchment 3S: Existing Basin 3**Runoff Area=2.260 ac Runoff Depth=1.66"  
Flow Length=610' Tc=20.6 min CN=69 Runoff=2.83 cfs 0.313 af**Subcatchment 4S: Existing Basin 4**Runoff Area=4.820 ac Runoff Depth=1.46"  
Flow Length=380' Tc=12.7 min CN=66 Runoff=6.20 cfs 0.585 af**Reach 1R: Little River**Inflow=13.11 cfs 1.473 af  
Outflow=13.11 cfs 1.473 af**Reach 2R: Existing Flow to Swale on Frontag** Peak Depth=0.19' Max Vel=0.6 fps Inflow=0.55 cfs 0.145 af  
n=0.150 L=125.0' S=0.0320 '/' Capacity=19.84 cfs Outflow=0.55 cfs 0.144 af**Pond 2P: Existing Swale**Peak Elev=9.62' Storage=5,007 cf Inflow=2.16 cfs 0.251 af  
Outflow=0.55 cfs 0.145 af**Total Runoff Area = 11.230 ac Runoff Volume = 1.580 af Average Runoff Depth = 1.69"**

**Existing Conditions**

Type III 24-hr 10-Year Storm Rainfall=4.60"

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**Subcatchment 1S: Existing Basin 1**

Runoff = 4.53 cfs @ 12.19 hrs, Volume= 0.431 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-Year Storm Rainfall=4.60"

Area (ac)	CN	Description
0.250	60	WOODS (FAIR CONDITION) TYPE B
1.940	79	WOODS (FAIR CONDITION) TYPE D
0.070	98	EXISTING ACORN PARK ROADWAY
2.260	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0540	0.1		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.30"
1.6	130	0.0770	1.4		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.4	240	0.0220	0.7		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.2	420	Total			

**Subcatchment 2S: Existing Basin 2**

Runoff = 2.16 cfs @ 12.31 hrs, Volume= 0.251 af, Depth= 1.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-Year Storm Rainfall=4.60"

Area (ac)	CN	Description
1.230	60	WOODS (FAIR CONDITION) TYPE B
0.550	79	WOODS (FAIR CONDITION) TYPE D
0.110	98	EXISTING ACORN PARK ROAD
1.890	68	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	50	0.0100	0.1		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.30"
4.9	280	0.0360	0.9		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.7	80	0.0130	0.8		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.6	410	Total			

**Existing Conditions**

Type III 24-hr 10-Year Storm Rainfall=4.60"

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**Subcatchment 3S: Existing Basin 3**

Runoff = 2.83 cfs @ 12.28 hrs, Volume= 0.313 af, Depth= 1.66"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-Year Storm Rainfall=4.60"

Area (ac)	CN	Description
1.400	60	WOODS (FAIR CONDITION) TYPE B
0.660	79	WOODS (FAIR CONDITION) TYPE D
0.200	98	Pavement
2.260	69	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	50	0.0140	0.1		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.30"
6.1	340	0.0350	0.9		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.5	220	0.0050	6.8	287.70	Channel Flow, Area= 42.0 sf Perim= 36.0' r= 1.17' n= 0.017
20.6	610	Total			

**Subcatchment 4S: Existing Basin 4**

Runoff = 6.20 cfs @ 12.17 hrs, Volume= 0.585 af, Depth= 1.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-Year Storm Rainfall=4.60"

Area (ac)	CN	Description
1.510	79	Woods, Fair, HSG D
3.310	60	Woods, Fair, HSG B
4.820	66	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0950	0.1		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.30"
5.0	290	0.0380	1.0		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.2	40	0.0130	0.6		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.7	380	Total			

**Existing Conditions**

Type III 24-hr 10-Year Storm Rainfall=4.60"

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**Reach 1R: Little River**

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 11.230 ac, Inflow Depth = 1.57" for 10-Year Storm event  
 Inflow = 13.11 cfs @ 12.19 hrs, Volume= 1.473 af  
 Outflow = 13.11 cfs @ 12.19 hrs, Volume= 1.473 af, Atten= 0%, Lag= 0.0 min

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

**Reach 2R: Existing Flow to Swale on Frontage Rd.**

Inflow Area = 1.890 ac, Inflow Depth = 0.92" for 10-Year Storm event  
 Inflow = 0.55 cfs @ 13.03 hrs, Volume= 0.145 af  
 Outflow = 0.55 cfs @ 13.14 hrs, Volume= 0.144 af, Atten= 1%, Lag= 7.0 min

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

Max. Velocity= 0.6 fps, Min. Travel Time= 3.8 min

Avg. Velocity = 0.3 fps, Avg. Travel Time= 6.4 min

Peak Depth= 0.19' @ 13.07 hrs

Capacity at bank full= 19.84 cfs

Inlet Invert= 8.00', Outlet Invert= 4.00'

5.00' x 1.50' deep channel, n= 0.150 Length= 125.0' Slope= 0.0320 '/'

Side Slope Z-value= 1.5 '/'

**Pond 2P: Existing Swale**

Inflow Area = 1.890 ac, Inflow Depth = 1.59" for 10-Year Storm event  
 Inflow = 2.16 cfs @ 12.31 hrs, Volume= 0.251 af  
 Outflow = 0.55 cfs @ 13.03 hrs, Volume= 0.145 af, Atten= 75%, Lag= 42.8 min  
 Primary = 0.55 cfs @ 13.03 hrs, Volume= 0.145 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 9.62' @ 13.03 hrs Surf.Area= 4,762 sf Storage= 5,007 cf

Plug-Flow detention time= 224.6 min calculated for 0.145 af (58% of inflow)

Center-of-Mass det. time= 106.6 min ( 975.2 - 868.6 )

#	Invert	Avail.Storage	Storage Description
1	8.00'	5,777 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
8.00	1,428	0	0
9.00	3,322	2,375	2,375
9.80	5,184	3,402	5,777

#	Routing	Invert	Outlet Devices
1	Primary	9.50'	5.0' long x 1.0' 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

**Existing Conditions**

Type III 24-hr 10-Year Storm Rainfall=4.60"

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Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31  
3.32

Primary OutFlow Max=0.55 cfs @ 13.03 hrs HW=9.62' (Free Discharge)

←1=Broad-Crested Rectangular Weir (Weir Controls 0.55 cfs @ 0.9 fps)

**Existing Conditions**

Type III 24-hr 25-Year Storm Rainfall=5.40"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: Existing Basin 1**

Runoff Area=2.260 ac Runoff Depth=2.95"  
Flow Length=420' Tc=15.2 min CN=77 Runoff=5.87 cfs 0.556 af

**Subcatchment 2S: Existing Basin 2**

Runoff Area=1.890 ac Runoff Depth=2.16"  
Flow Length=410' Tc=22.6 min CN=68 Runoff=3.00 cfs 0.340 af

**Subcatchment 3S: Existing Basin 3**

Runoff Area=2.260 ac Runoff Depth=2.24"  
Flow Length=610' Tc=20.6 min CN=69 Runoff=3.89 cfs 0.423 af

**Subcatchment 4S: Existing Basin 4**

Runoff Area=4.820 ac Runoff Depth=2.00"  
Flow Length=380' Tc=12.7 min CN=66 Runoff=8.76 cfs 0.804 af

**Reach 1R: Little River**

Inflow=17.90 cfs 2.015 af  
Outflow=17.90 cfs 2.015 af

**Reach 2R: Existing Flow to Swale on Frontag**

Peak Depth=0.35' Max Vel=0.8 fps Inflow=1.59 cfs 0.234 af  
n=0.150 L=125.0' S=0.0320 ' Capacity=19.84 cfs Outflow=1.57 cfs 0.233 af

**Pond 2P: Existing Swale**

Peak Elev=9.74' Storage=5,524 cf Inflow=3.00 cfs 0.340 af  
Outflow=1.59 cfs 0.234 af

**Total Runoff Area = 11.230 ac Runoff Volume = 2.122 af Average Runoff Depth = 2.27"**

**Existing Conditions**

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Type III 24-hr 25-Year Storm Rainfall=5.40"

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**Subcatchment 1S: Existing Basin 1**

Runoff = 5.87 cfs @ 12.19 hrs, Volume= 0.556 af, Depth= 2.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-Year Storm Rainfall=5.40"

Area (ac)	CN	Description
0.250	60	WOODS (FAIR CONDITION) TYPE B
1.940	79	WOODS (FAIR CONDITION) TYPE D
0.070	98	EXISTING ACORN PARK ROADWAY
2.260	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0540	0.1		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.30"
1.6	130	0.0770	1.4		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.4	240	0.0220	0.7		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.2	420	Total			

**Subcatchment 2S: Existing Basin 2**

Runoff = 3.00 cfs @ 12.31 hrs, Volume= 0.340 af, Depth= 2.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-Year Storm Rainfall=5.40"

Area (ac)	CN	Description
1.230	60	WOODS (FAIR CONDITION) TYPE B
0.550	79	WOODS (FAIR CONDITION) TYPE D
0.110	98	EXISTING ACORN PARK ROAD
1.890	68	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	50	0.0100	0.1		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.30"
4.9	280	0.0360	0.9		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.7	80	0.0130	0.8		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.6	410	Total			

**Existing Conditions**

Type III 24-hr 25-Year Storm Rainfall=5.40"

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**Subcatchment 3S: Existing Basin 3**

Runoff = 3.89 cfs @ 12.27 hrs, Volume= 0.423 af, Depth= 2.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-Year Storm Rainfall=5.40"

Area (ac)	CN	Description
1.400	60	WOODS (FAIR CONDITION) TYPE B
0.660	79	WOODS (FAIR CONDITION) TYPE D
0.200	98	Pavement
2.260	69	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	50	0.0140	0.1		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.30"
6.1	340	0.0350	0.9		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.5	220	0.0050	6.8	287.70	<b>Channel Flow,</b> Area= 42.0 sf Perim= 36.0' r= 1.17' n= 0.017
20.6	610	Total			

**Subcatchment 4S: Existing Basin 4**

Runoff = 8.76 cfs @ 12.16 hrs, Volume= 0.804 af, Depth= 2.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-Year Storm Rainfall=5.40"

Area (ac)	CN	Description
1.510	79	Woods, Fair, HSG D
3.310	60	Woods, Fair, HSG B
4.820	66	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0950	0.1		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.30"
5.0	290	0.0380	1.0		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
1.2	40	0.0130	0.6		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
12.7	380	Total			

**Existing Conditions**

Type III 24-hr 25-Year Storm Rainfall=5.40"

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**Reach 1R: Little River**

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 11.230 ac, Inflow Depth = 2.15" for 25-Year Storm event  
 Inflow = 17.90 cfs @ 12.19 hrs, Volume= 2.015 af  
 Outflow = 17.90 cfs @ 12.19 hrs, Volume= 2.015 af, Atten= 0%, Lag= 0.0 min

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

**Reach 2R: Existing Flow to Swale on Frontage Rd.**

Inflow Area = 1.890 ac, Inflow Depth = 1.48" for 25-Year Storm event  
 Inflow = 1.59 cfs @ 12.67 hrs, Volume= 0.234 af  
 Outflow = 1.57 cfs @ 12.75 hrs, Volume= 0.233 af, Atten= 1%, Lag= 4.7 min

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

Max. Velocity= 0.8 fps, Min. Travel Time= 2.6 min

Avg. Velocity = 0.4 fps, Avg. Travel Time= 5.6 min

Peak Depth= 0.35' @ 12.70 hrs

Capacity at bank full= 19.84 cfs

Inlet Invert= 8.00', Outlet Invert= 4.00'

5.00' x 1.50' deep channel, n= 0.150 Length= 125.0' Slope= 0.0320 ' /'

Side Slope Z-value= 1.5 ' /'

**Pond 2P: Existing Swale**

Inflow Area = 1.890 ac, Inflow Depth = 2.16" for 25-Year Storm event  
 Inflow = 3.00 cfs @ 12.31 hrs, Volume= 0.340 af  
 Outflow = 1.59 cfs @ 12.67 hrs, Volume= 0.234 af, Atten= 47%, Lag= 21.7 min  
 Primary = 1.59 cfs @ 12.67 hrs, Volume= 0.234 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 9.74' @ 12.67 hrs Surf.Area= 5,045 sf Storage= 5,524 cf

Plug-Flow detention time= 170.6 min calculated for 0.233 af (69% of inflow)

Center-of-Mass det. time= 70.4 min ( 930.0 - 859.6 )

#	Invert	Avail.Storage	Storage Description
1	8.00'	5,777 cf	Custom Stage Data (Prismatic) Listed below
	Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet) Cum.Store (cubic-feet)
	8.00	1,428	0 0
	9.00	3,322	2,375 2,375
	9.80	5,184	3,402 5,777
#	Routing	Invert	Outlet Devices
1	Primary	9.50'	5.0' long x 1.0' 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

**Existing Conditions**

Type III 24-hr 25-Year Storm Rainfall=5.40"

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Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31  
3.32

Primary OutFlow Max=1.58 cfs @ 12.67 hrs HW=9.74' (Free Discharge)

↳1=Broad-Crested Rectangular Weir (Weir Controls 1.58 cfs @ 1.3 fps)

**Existing Conditions**

Type III 24-hr 100-Year Storm Rainfall=6.60"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: Existing Basin 1**

Runoff Area=2.260 ac Runoff Depth=4.00"  
Flow Length=420' Tc=15.2 min CN=77 Runoff=7.93 cfs 0.753 af

**Subcatchment 2S: Existing Basin 2**

Runoff Area=1.890 ac Runoff Depth=3.08"  
Flow Length=410' Tc=22.6 min CN=68 Runoff=4.34 cfs 0.484 af

**Subcatchment 3S: Existing Basin 3**

Runoff Area=2.260 ac Runoff Depth=3.18"  
Flow Length=610' Tc=20.6 min CN=69 Runoff=5.58 cfs 0.598 af

**Subcatchment 4S: Existing Basin 4**

Runoff Area=4.820 ac Runoff Depth=2.89"  
Flow Length=380' Tc=12.7 min CN=66 Runoff=12.92 cfs 1.160 af

**Reach 1R: Little River**

Inflow=25.54 cfs 2.861 af  
Outflow=25.54 cfs 2.861 af

**Reach 2R: Existing Flow to Swale on Frontag**

Peak Depth=0.43' Max Vel=0.9 fps Inflow=2.31 cfs 0.351 af  
n=0.150 L=125.0' S=0.0320 '/' Capacity=19.84 cfs Outflow=2.23 cfs 0.350 af

**Pond 2P: Existing Swale**

Peak Elev=9.81' Storage=5,777 cf Inflow=4.34 cfs 0.484 af  
Outflow=2.31 cfs 0.351 af

**Total Runoff Area = 11.230 ac Runoff Volume = 2.995 af Average Runoff Depth = 3.20"**

**Existing Conditions**

Type III 24-hr 100-Year Storm Rainfall=6.60"

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**Subcatchment 1S: Existing Basin 1**

Runoff = 7.93 cfs @ 12.19 hrs, Volume= 0.753 af, Depth= 4.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-Year Storm Rainfall=6.60"

Area (ac)	CN	Description
0.250	60	WOODS (FAIR CONDITION) TYPE B
1.940	79	WOODS (FAIR CONDITION) TYPE D
0.070	98	EXISTING ACORN PARK ROADWAY
2.260	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0540	0.1		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.30"
1.6	130	0.0770	1.4		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.4	240	0.0220	0.7		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.2	420	Total			

**Subcatchment 2S: Existing Basin 2**

Runoff = 4.34 cfs @ 12.30 hrs, Volume= 0.484 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-Year Storm Rainfall=6.60"

Area (ac)	CN	Description
1.230	60	WOODS (FAIR CONDITION) TYPE B
0.550	79	WOODS (FAIR CONDITION) TYPE D
0.110	98	EXISTING ACORN PARK ROAD
1.890	68	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	50	0.0100	0.1		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.30"
4.9	280	0.0360	0.9		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.7	80	0.0130	0.8		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.6	410	Total			

**Existing Conditions**

Type III 24-hr 100-Year Storm Rainfall=6.60"

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**Subcatchment 3S: Existing Basin 3**

Runoff = 5.58 cfs @ 12.27 hrs, Volume= 0.598 af, Depth= 3.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-Year Storm Rainfall=6.60"

Area (ac)	CN	Description
1.400	60	WOODS (FAIR CONDITION) TYPE B
0.660	79	WOODS (FAIR CONDITION) TYPE D
0.200	98	Pavement
2.260	69	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	50	0.0140	0.1		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.30"
6.1	340	0.0350	0.9		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.5	220	0.0050	6.8	287.70	Channel Flow, Area= 42.0 sf Perim= 36.0' r= 1.17' n= 0.017
20.6	610	Total			

**Subcatchment 4S: Existing Basin 4**

Runoff = 12.92 cfs @ 12.16 hrs, Volume= 1.160 af, Depth= 2.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-Year Storm Rainfall=6.60"

Area (ac)	CN	Description
1.510	79	Woods, Fair, HSG D
3.310	60	Woods, Fair, HSG B
4.820	66	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0950	0.1		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.30"
5.0	290	0.0380	1.0		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.2	40	0.0130	0.6		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.7	380	Total			

**Existing Conditions**

Type III 24-hr 100-Year Storm Rainfall=6.60"

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**Reach 1R: Little River**

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 11.230 ac, Inflow Depth = 3.06" for 100-Year Storm event  
 Inflow = 25.54 cfs @ 12.18 hrs, Volume= 2.861 af  
 Outflow = 25.54 cfs @ 12.18 hrs, Volume= 2.861 af, Atten= 0%, Lag= 0.0 min

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

**Reach 2R: Existing Flow to Swale on Frontage Rd.**

Inflow Area = 1.890 ac, Inflow Depth = 2.23" for 100-Year Storm event  
 Inflow = 2.31 cfs @ 12.35 hrs, Volume= 0.351 af  
 Outflow = 2.23 cfs @ 12.45 hrs, Volume= 0.350 af, Atten= 3%, Lag= 6.0 min

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

Max. Velocity= 0.9 fps, Min. Travel Time= 2.3 min

Avg. Velocity = 0.4 fps, Avg. Travel Time= 4.9 min

Peak Depth= 0.43' @ 12.40 hrs

Capacity at bank full= 19.84 cfs

Inlet Invert= 8.00', Outlet Invert= 4.00'

5.00' x 1.50' deep channel, n= 0.150 Length= 125.0' Slope= 0.0320 '/'

Side Slope Z-value= 1.5 '/'

**Pond 2P: Existing Swale**

[93] Warning: Storage range exceeded by 0.01'

Inflow Area = 1.890 ac, Inflow Depth = 3.08" for 100-Year Storm event  
 Inflow = 4.34 cfs @ 12.30 hrs, Volume= 0.484 af  
 Outflow = 2.31 cfs @ 12.35 hrs, Volume= 0.351 af, Atten= 47%, Lag= 3.1 min  
 Primary = 2.31 cfs @ 12.35 hrs, Volume= 0.351 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 9.81' @ 12.35 hrs Surf.Area= 5,184 sf Storage= 5,777 cf

Plug-Flow detention time= 150.4 min calculated for 0.351 af (72% of inflow)

Center-of-Mass det. time= 58.7 min ( 908.1 - 849.4 )

#	Invert	Avail.Storage	Storage Description
1	8.00'	5,777 cf	Custom Stage Data (Prismatic) Listed below
	Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)      Cum.Store (cubic-feet)
	8.00	1,428	0                      0
	9.00	3,322	2,375                2,375
	9.80	5,184	3,402                5,777
#	Routing	Invert	Outlet Devices
1	Primary	9.50'	5.0' long x 1.0' breadth Broad-Crested Rectangular Weir

**Existing Conditions**

Type III 24-hr 100-Year Storm Rainfall=6.60"

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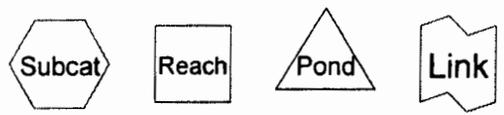
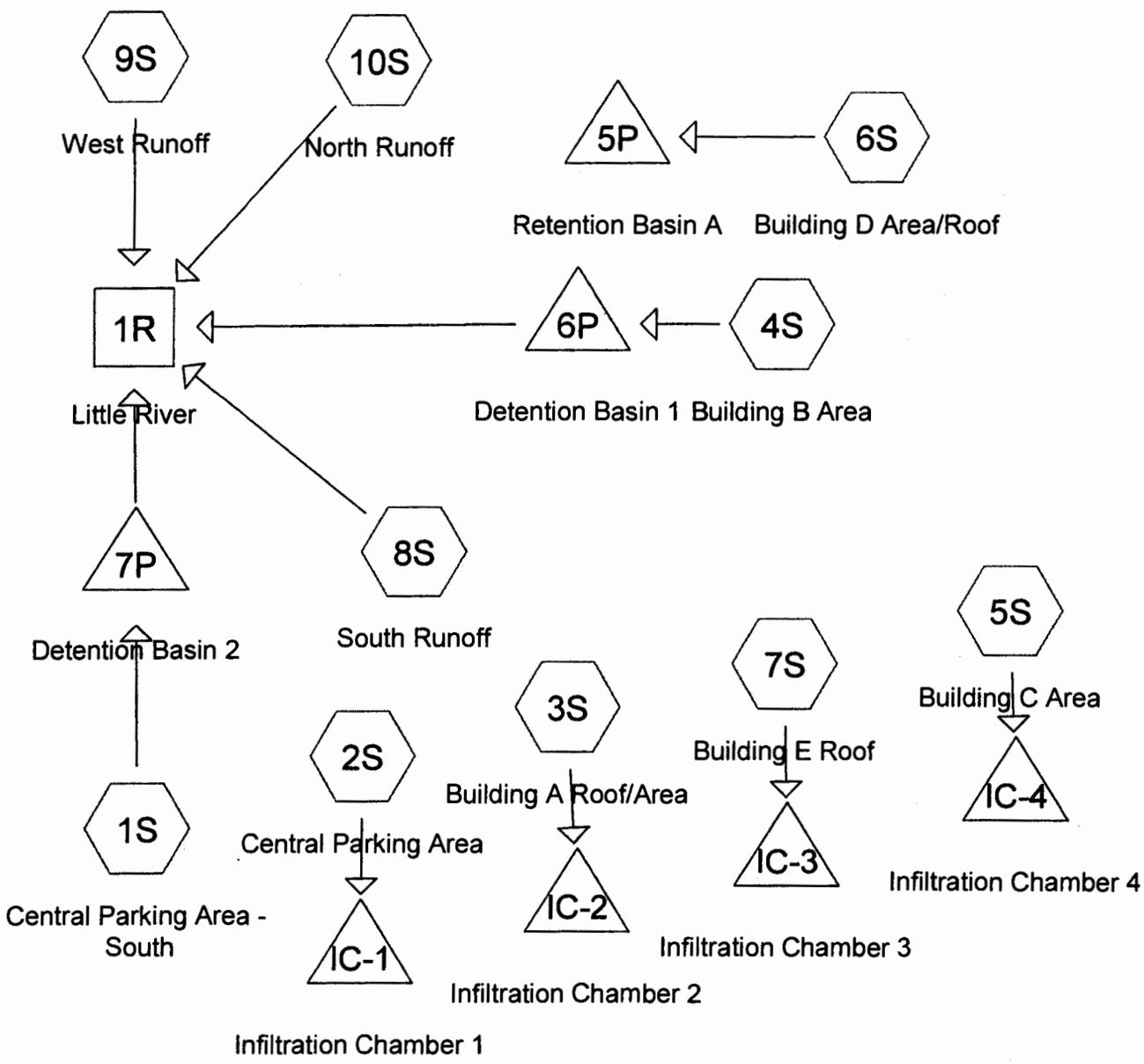
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Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	1.80	2.00	2.50	3.00
Coef. (English)	2.69	2.72	2.75	2.85	2.98	3.08	3.20	3.28	3.31	3.30	3.31	3.32

Primary OutFlow Max=2.31 cfs @ 12.35 hrs HW=9.81' (Free Discharge)

↳1=Broad-Crested Rectangular Weir (Weir Controls 2.31 cfs @ 1.5 fps)



**Drainage Diagram for Proposed Conditions**  
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**Proposed Conditions**

Type III 24-hr 2-Year Storm Rainfall=3.30"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment 1S: Central Parking Area - South</b>	Runoff Area=0.338 ac	Runoff Depth=2.17"
	Flow Length=210'	Tc=1.8 min CN=89 Runoff=0.99 cfs 0.061 af
<b>Subcatchment 2S: Central Parking Area</b>	Runoff Area=0.196 ac	Runoff Depth=2.45"
	Flow Length=140'	Tc=1.4 min CN=92 Runoff=0.65 cfs 0.040 af
<b>Subcatchment 3S: Building A Roof/Area</b>	Runoff Area=0.956 ac	Runoff Depth=2.95"
	Tc=5.0 min CN=97	Runoff=3.13 cfs 0.235 af
<b>Subcatchment 4S: Building B Area</b>	Runoff Area=1.061 ac	Runoff Depth=2.45"
	Flow Length=270'	Tc=1.8 min CN=92 Runoff=3.45 cfs 0.216 af
<b>Subcatchment 5S: Building C Area</b>	Runoff Area=0.810 ac	Runoff Depth=2.85"
	Flow Length=102'	Tc=1.1 min CN=96 Runoff=2.98 cfs 0.192 af
<b>Subcatchment 6S: Building D Area/Roof</b>	Runoff Area=1.106 ac	Runoff Depth=2.00"
	Flow Length=238'	Tc=1.7 min CN=87 Runoff=3.03 cfs 0.185 af
<b>Subcatchment 7S: Building E Roof</b>	Runoff Area=0.454 ac	Runoff Depth=3.07"
	Tc=5.0 min CN=98	Runoff=1.51 cfs 0.116 af
<b>Subcatchment 8S: South Runoff</b>	Runoff Area=2.291 ac	Runoff Depth=1.28"
	Flow Length=835'	Tc=7.4 min CN=77 Runoff=3.20 cfs 0.245 af
<b>Subcatchment 9S: West Runoff</b>	Runoff Area=2.758 ac	Runoff Depth=0.93"
	Flow Length=217'	Tc=18.5 min CN=71 Runoff=1.92 cfs 0.215 af
<b>Subcatchment 10S: North Runoff</b>	Runoff Area=1.266 ac	Runoff Depth=1.34"
	Flow Length=238'	Tc=8.6 min CN=78 Runoff=1.79 cfs 0.142 af
<b>Reach 1R: Little River</b>	Inflow=6.14 cfs	0.601 af
	Outflow=6.14 cfs	0.601 af
<b>Pond 5P: Retention Basin A</b>	Peak Elev=7.78'	Storage=4,215 cf Inflow=3.03 cfs 0.185 af
		Outflow=0.12 cfs 0.138 af
<b>Pond 6P: Detention Basin 1</b>	Peak Elev=8.00'	Storage=5,007 cf Inflow=3.45 cfs 0.216 af
	Discarded=0.12 cfs 0.150 af	Primary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.150 af
<b>Pond 7P: Detention Basin 2</b>	Peak Elev=7.34'	Storage=839 cf Inflow=0.99 cfs 0.061 af
	Discarded=0.12 cfs 0.061 af	Primary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.061 af
<b>Pond IC-1: Infiltration Chamber 1</b>	Peak Elev=9.43'	Storage=409 cf Inflow=0.65 cfs 0.040 af
		Outflow=0.12 cfs 0.040 af