

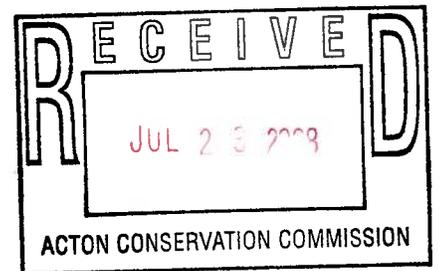
**Supplemental  
Final Environmental Report**

**July 2008**

**Quail Ridge Country Club  
354B Great Road, Skyline Drive  
Acton, MA 01720**

**EOEA #12503**

**Prepared for:  
Quail Ridge Country Club, LLC  
354B Great Road, Skyline Drive  
Acton, MA 01720**



**Prepared by:  
The Law Office of Attorney Arthur P. Bergeron  
27 Prospect Street  
Marlborough, MA 01752**

**In association with:**

**Conley Associates  
214 Cambridge Street  
Boston, MA 02114**

**Stamski & McNary, Inc.  
80 Harris Street  
Acton, MA 01720**

**Grassetti Brothers  
1611 Main Street  
Cotuit, MA 02635**

**This SFEIR is based on prior submissions prepared for Quail Ridge Country Club, LLC by Epsilon Associates, Inc.**

ARTHUR P. BERGERON  
*Attorney-at-Law*  
27 PROSPECT STREET  
MARLBORO, MASSACHUSETTS 01752

PHONE (508) 481-0103

FAX (508) 485-8506

Dear Reviewer:

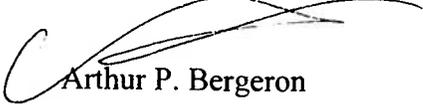
On Behalf of Quail Ridge Country Club, LLC, enclosed please find a copy of a Supplemental Final Environmental Impact Report (SFEIR) for the Quail Ridge Country Club in Acton, MA (EOEA File #12503).

The SFEIR will be noticed for public review on July 23, 2008 in the Environmental Monitor. The publication date begins a 30 day public comment period. Any Comments on the NPC should be forwarded in writing to Secretary Ian A. Bowles at the address given below. Please note the project name in all correspondence.

Secretary Ian A. Bowles  
Executive Office of Energy and Environmental Affairs  
100 Cambridge Street  
Boston, MA 02114

Please note that additional copies of the SFEIR can be obtained by contacting Sandi Austin at 508-481-0101, ext 227. If there are any questions regarding the NPC filing or the project, please contact me 508-481-0101 ext. 226. Thank you.

Very truly yours,

  
Arthur P. Bergeron



# CIRCULATION LIST

Circulation List

Supplemental Final Environmental Impact Report

EOEA File Number: 12503

Quail Ridge Country Club Acton, MA

<p>Secretary of Energy &amp; Environmental Affairs Mr. William Gage, MEPA Analyst 251 Causeway Street, Suite 900 Boston, MA 02114 (3 copies)</p>	<p>Paul Anderson, Deputy Regional Director – Bureau Resource Protection DEP/Central Regional Office 627 Main Street Worcester, MA 01608</p>
<p>Executive Office of Transportation David Mohler, Acting Deputy Secretary for Plannig Ten Park Plaza Boston, MA 02116 - 3969</p>	<p>Massachusetts Historical Commission Ms. Brona Simon, Executive Director The Massachusetts Archives Building 220 Morrissey Boulevard Boston, MA 02125-5128</p>
<p>Acton Conservation Commission Acton Town Hall 472 Main Street Acton, MA 01720 (3 copies)</p>	<p>Acton Planning Department Mr. Roland Bartl, AICP Acton Town Hall 472 Main Street Acton, MA 01720</p>
<p>Acton Board of Selectmen Acton Town Hall 472 Main Street Acton, MA 01720</p>	<p>Acton Board of Health Mr. Doug Halley Acton Town Hall 472 Main Street Acton, MA 01720</p>
<p>Acton Water District Mr. Chris Allen, Manager 693 Mass Avenue P.O. Box 953 Acton, MA 01720</p>	<p>Acton Memorial Library 486 Main Street Acton, MA 01720</p>
<p>Susan Mitchell-Hardt Acton Conservation Trust PO Box 658 Acton, MA 01720</p>	<p>Anderson &amp; Kreiger, LLP Attorney Douglas H. Wilkins One Canal Park, Suite 200 Cambridge, MA 02141</p>
<p>Organization for the Assabet River Ms. Amanda Davis, Executive Director 9 Damonmill Square, Suite 1E Concord, MA 01742</p>	<p>Ms. Mary Michelman, President Acton Citizens for Environmental Safety 6 Magnolia Drive Acton, MA 01720</p>
<p>Ms. Debra Andell 8 Mohawk Drive Acton, MA 01740</p>	<p>Ms. Sally Edwards 14 Freedom Farm Rd Acton, MA 01720</p>
<p>Ms. Carol Holley 39 Pope Road Acton, MA 01720</p>	

**SECRETARY'S CERTIFICATE  
ON THE  
NOTICE OF PROJECT CHANGE**



*The Commonwealth of Massachusetts*  
*Executive Office of Energy and Environmental Affairs*  
 100 Cambridge Street, Suite 900  
 Boston, MA 02114

DEVAL L. PATRICK  
 GOVERNOR  
 TIMOTHY P. MURRAY  
 DEPUTY GOVERNOR  
 IAN A. BOWLES  
 SECRETARY

February 8, 2008

Tel: (617) 626-1000  
 Fax: (617) 626-1181  
<http://www.mass.gov/envir>

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS  
 ON THE  
 NOTICE OF PROJECT CHANGE

PROJECT NAME : Quail Ridge Country Club  
 PROJECT MUNICIPALITY : Great Road - Acton  
 PROJECT WATERSHED : Concord River  
 EOE NUMBER : 12503  
 PROJECT PROPONENT : Quail Ridge Country Club, LLC  
 DATE NOTICED IN MONITOR : December 24, 2007

Pursuant to the Massachusetts Environmental Policy Act (MGL, c.30, ss. 61-62H) and Section 11.10 of the MEPA regulations (301 CMR 11.00), I have reviewed the Notice of Project Change (NPC) submitted on this project and determine that it **requires** the preparation of a Supplemental Environmental Impact Report (EIR).

The project originally consisted of the construction of an 18-hole golf course with a driving range, a 28,000 square foot (sf) clubhouse, three tennis courts, a swimming pool with changing rooms, and a 5,000 sf turf management/cart storage building. The project would consume about 150,000 gallons per day (gpd) or 22 million gallons annually of irrigation water. It would be supplied by two onsite bedrock wells. The project site contains approximately 154.7 acres. The FEIR was found to be adequate on April 1, 2002. In 2003, the proponent submitted an NPC in which the proponent was proposing to withdraw less than 100,000 gpd from its bedrock wells. The proponent also proposed expanding and lining an existing on-site pond to create an approximately 9.4 million-gallon capacity storage pond of which 7.1 million gallons are useable as irrigation water on the project site (June through September). The proponent is proposing to fill the storage pond during non-peak periods (October to May) from its wells. The Acton Water Supply District has also agreed to sell potable water to the proponent on a temporary and seasonal basis. The proponent was subject to a Water Management Act permit. The Secretary determined that the NPC did not require further MEPA review on November 24, 2003.

On December 17, 2007, this NPC was submitted for MEPA review. The proponent is

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proposing to construct approximately 175 age-restricted units (approximately 378,850 sf) in a mix of single-family detached dwellings, town house style duplexes, and garden style residences to be known as the Residences at Quail Ridge (TRQR). The TRQR will replace 9 of the 18 holes on the golf course. Five percent (approximately nine) of the units will be affordable. A 7,500 sf (35-50 seat) restaurant that was part of the original golf course would be built. The golf course driving range would be eliminated. The proposed project will create 19.56 additional acres of impervious area.

Using Land Use Codes (LUC) 230 and 251, the proponent estimated that the TRQR will generate approximately 838 daily vehicle trips. The restaurant was estimated to generate approximately 674 daily vehicle trips using LUC 931. However, the proponent estimated that only 15 percent of the restaurant patrons would originate from points off the site. Therefore, the proponent estimated that the restaurant would generate 102 weekday vehicle trips. Furthermore, with the reduction of the golf course to nine wholes, the proponent reduced the number of golf course trips by 322 fewer weekday vehicle trips. In summary, the proponent has estimated that this NPC would generate an additional 618 weekday vehicle trips and 478 Saturday vehicle trips. The proponent will provide 593 parking spaces for the TRQR with a project total of 798 spaces. In the NPC, the proponent has committed to provide sidewalks along Skyline Drive and the planned TRQR neighborhood.

The proponent has estimated that the TRQR will consume 31,780 gallons per day of potable water and will generate a similar amount of wastewater. Because of the reduction in golf course area, the proponent will reduce the amount of irrigation system water by an estimated 40 percent. As described in the Administrative Consent Order (ACO) in 2003 with MassDEP, the irrigation system for the golf course limited water withdrawals to 100,000 gpd or 900,000 gpd in any three month period. The proponent will impact 3,470 sf of Bordering Vegetated Wetlands (BVW) to construct an access road. It is proposing to replicate approximately 9,820 sf of BVW in an upland area.

The project requires a mandatory EIR pursuant to Section 11.03(1)(a)(2) of the MEPA regulations because it creates ten or more acres of impervious area (19.56 acres). It will require an amended Access Permit from the Massachusetts Highway Department (MassHighway) for access onto Skyline Drive. The project will need to obtain a Groundwater Discharge Permit for its wastewater treatment plant and a Water Distribution System Modification Permit from the Department of Environmental Protection (MassDEP). The proponent has agreed with MassDEP to seek a Water Management Act Permit. It should comply with the National Pollutant Discharge Elimination System (NPDES) General Permit for stormwater discharges from a construction site. The proponent will need to obtain a Programmatic General Permit from the U.S. Army Corps of Engineers. The project will be required to obtain an Order of Conditions from the Acton Conservation Commission. MEPA jurisdiction extends to land alteration, traffic, air quality, wetlands, stormwater, water, and wastewater issues that may have significant environmental impacts.

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### SCOPE

As modified by this scope, the EIR should conform to Section 11.07 of the MEPA regulations for outline and content. The EIR should resolve the remaining issues outlined below. It should address the comments listed at the end of this Certificate to the extent that they are within the scope, and it should include a copy of this Certificate and all comment letters.

#### Project Description & Regulatory Environment

The Supplemental EIR should provide a detailed project description with a summary/history of the project. It should include existing and proposed readable site plans. The Supplemental EIR should describe any project phasing. It should describe each state agency action required for the project. The Supplemental EIR should demonstrate how the project is consistent with the applicable performance standards. It should contain sufficient information to allow the permitting agencies to understand the environmental consequences related to the project. The Supplemental EIR should discuss how this project is compatible with Executive Orders 385 and 418, the Metropolitan Area Planning Council's (MAPC) MetroPlan and Acton's Master Plan, Open Space Plan, and Zoning. Any proposals for Conservation Restrictions and /or easements at the project site should be discussed in the Supplemental EIR.

#### Wetlands

Because the proponent will impact 3,470 sf of Bordering Vegetated Wetlands (BVW), the Wetland Section of the Supplemental EIR should contain an alternatives analysis to ensure that impacts to wetland resource areas and buffer zones are avoided, and where unavoidable impacts occur, impacts are minimized and mitigated. It should quantify the amount of temporary and permanent impacts to the resource areas, and there should be a plan to go along with the discussion. The Supplemental EIR should illustrate that the impacts have been minimized and that the project will be accomplished in a manner that is consistent with the Performance Standards of the Wetlands Regulations (310 CMR 10.00).

The Supplemental EIR should address the significance of the wetland resources and buffer zones on site, including public and private water supply; riverfront areas; flood control; storm damage prevention; fisheries; shellfish; and wildlife habitat. It should identify the location of nearby public water supplies and wells.

All resource area boundaries, riverfront areas, applicable buffer zones, and 100-year flood elevations should be clearly delineated on a plan. Bordering vegetated wetlands that have been delineated in the field should be surveyed, mapped, and located on the plans. Each wetland resource area and riverfront area should be characterized according to 310 CMR 10.00. The text should explain whether the local conservation commission has accepted the resource area boundaries, and any disputed boundary should be identified. The Supplemental EIR should

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provide an accurate measurement of the wetland resource areas and buffer zones that will be affected by the project.

The EIR should identify the proponent's efforts to obtain an Order of Conditions from the Acton Conservation Commission. The Wetland Section of the Supplemental EIR should contain an alternatives analysis to ensure that all wetland impacts are avoided, and where unavoidable impacts occur, impacts are minimized and mitigated. The Supplemental EIR should illustrate that the impacts have been minimized and that the project will be accomplished in a manner that is consistent with the Performance Standards of the Wetlands Regulations (310 CMR 10.00).

#### Parking

In order to reduce the amount of impervious area, the Supplemental EIR should identify measures to reduce the number of parking spaces from 593 spaces (about 3.39 spaces per unit) to about 350 spaces (about 2.0 spaces per unit) or less. The Supplemental EIR should also indicate how many spaces are required by zoning.

#### Drainage

The quality of stormwater runoff generated by the project should be improved by the implementation of Best Management Practices. The project will create approximately 19.56 acres of new impervious area. The Supplemental EIR should include a detailed description of the proposed drainage system design, including a discussion of the alternatives considered along with their impacts. It should provide pre- and post-drainage calculations. The proponent should recharge roof runoff and should treat stormwater runoff from parking areas and driveways.

Proposed activities, including construction mitigation, erosion and sedimentation control, phased construction, and drainage discharges or overland flow into wetland areas, should be evaluated. The location of detention/infiltration basins and their distances from wetland resource areas, and the expected water quality of the effluent from said basins should be identified. This analysis should address current and expected post-construction water quality (including winter deicing and sanding analyses) of the predicted final receiving water bodies. Sufficient mitigation measures should be incorporated to ensure that no downstream impacts would occur. The drainage analysis should ensure that on- and off-site wetlands are not impacted by changes in stormwater runoff patterns.

The Supplemental EIR should address the performance standards of MassDEP's Stormwater Management Policy. It should address the groundwater recharge issues and demonstrate that the project will meet the Stormwater Management Policy. The EIR should demonstrate that the design of the drainage system is consistent with this policy, or in the alternative, why the proponent is proposing a drainage system design not recommended by

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MassDEP. The proponent should use the MassDEP Stormwater Management Handbook when addressing this issue.

The Supplemental EIR should discuss the consistency of the project with the provisions of the National Pollutant Discharge Elimination System (NPDES) General Permit from the U.S. Environmental Protection Agency for stormwater discharges from construction sites. It should include a discussion of best management practices employed to meet the NPDES requirements, and should include a draft Pollution Prevention Plan. The EIR should identify how this project will comply with the NPDES Phase II Stormwater General Permit, which Acton is required to implement.

The Supplemental EIR should describe the maintenance program for the drainage system, which will be needed to ensure its effectiveness. This maintenance program should outline the actual maintenance operations, responsible parties, and back-up systems.

In the Supplemental EIR, the proponent should consider committing to using a non-sodium based deicer on the project's paved surfaces and limiting the use of chemical fertilizers and pesticides on grass areas maintained by the condominium association. The proponent should incorporate its low impact turf management program and integrated pest management plan for the golf course into its management/maintenance program for the residential units.

The Supplemental EIR should address reducing the amount of impervious area proposed on the project site by alternative layout, providing pervious parking areas, and reduced pavement areas.

#### Water/Wastewater

The Supplemental EIR should identify the source and amount of potable water for the NPC. It should outline the proponent's efforts to reduce water consumption and thereby reduce wastewater generation. It should describe the design of the wastewater package treatment plant, leaching area, and groundwater discharge issues. A site plan should identify the location of the wastewater treatment plant and leaching areas. The EIR should identify the number of proposed bedrooms at the site, and how it determined the 31,780 gpd of wastewater generation. It should address the concerns raised in the comment letters regarding the drip irrigation system in the leaching field. The Supplemental EIR should explain why MassDEP has a Groundwater Discharge Permit application for two-phased project with a flow of 60,000 gpd. Phase I includes 170 age-restricted units, and Phase II includes 412 bedrooms for a senior living facility. This differs from the project described within this NPC.

The Supplemental EIR should describe the background information for the 2003 ACO with MassDEP. As stated earlier, the ACO limited water withdrawals to a certain level. The proponent is now stating that it will reduce water withdrawals for the reduced golf course to 40

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percent of its original estimated demand. However, MassDEP reported in its comment letter that the Water Management Act permit application before it is a request to withdraw 26 million gallons per year (mgy) for use in irrigating the 18-hole golf course. The EIR should discuss when the proponent will inform MassDEP of its reduced irrigation demand for the 9-hole golf course, and it should provide the estimated irrigation demand for the 9-hole golf course.

### Construction

The Supplemental EIR should present a discussion on potential construction period impacts (including but not limited to noise, dust, wetlands, and traffic maintenance) and analyze feasible measures that can avoid or eliminate these impacts. It should identify the amount of blasting required to develop the site for housing. The Supplemental EIR should estimate the amount of fill to be removed or brought to the site. It should identify the number of truck trips required to handle the filling operation and the truck routes proposed to allow for this filling operation. The Supplemental EIR should show where filling will be required on the site.

### Sustainable Design

This project presents a good opportunity to successfully incorporate cost-effective sustainable design elements and construction practices into the project. These elements can minimize environmental impacts and reduce operating costs. The Supplemental EIR should summarize the proponents' efforts to ensure that this project includes Leadership in Energy and Environmental Design (LEED) Certified buildings or the equivalent. I strongly encourage the proponent to consider incorporating elements, such as those noted below, into its project design, construction and management:

- water conservation and reuse of wastewater and stormwater;
- renewable energy technologies to meet energy needs;
- optimization of natural day lighting, passive solar gain, and natural cooling;
- energy efficient HVAC and lighting systems, appliances and other equipment, and solar preheating of air;
- building supplies and materials that are non-toxic, made from recycled materials, and made with low embodied energy ;
- easily accessible and user-friendly recycling system infrastructure incorporated into the building design;
- development of a solid waste reduction plan;
- development of an annual audit program for energy consumption, waste streams, and use of renewable resources;
- LID principles that reduce stormwater, potable water, wastewater, and wetland impacts and that provide water conservation and the reuse of wastewater and stormwater; and
- LEED certification.

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Historical/Archaeological Issues

In its comment letter, the Massachusetts Historical Commission (MHC) has requested that the proponent conduct an archaeological site inspection survey to document the current condition of the archaeological sites and to offer recommendations regarding the site of TRQR. I agree with this request, and I ask the project proponent to undertake this request and summarize the results of this survey in the Supplemental EIR.

Mitigation

The Supplemental EIR should include a separate chapter on mitigation measures. This chapter on mitigation should include a Proposed Section 61 Findings for MassHighway and MassDEP. The Proposed Section 61 Finding should contain a clear commitment to mitigation, an estimate of the individual costs of the proposed mitigation and the identification of the parties responsible for implementing the mitigation. A schedule for the implementation of mitigation should also be included.

The proponent has committed to the following mitigation measures. In the event that the mitigation for the proposed Brookside Shops project is not in place prior to completion of the TRQR project, the proponent has committed to increase the cycle length at the intersection of Great Road/Main Street and to provide optimal phasing. The proponent will replicate approximately 9,820 sf of BVW in an upland area. It has committed to fund the addition of pavement markings including centerlines and edge lines and stop bars at the Great Road/Harris Street intersection. The proponent will provide a formal left turn lane on the Skyline Drive approach to Great Road that can accommodate approximately four vehicles. It will provide a trailhead and visitor parking spaces where the town of Acton open space land abuts the TRQR. If additional blasting is required during construction of the housing, the proponent has pledged not to utilize Perchlorate as a blasting agent. The mitigation section should identify the costs of these measures.

The mitigation commitments listed in the Certificate for the FEIR must be implemented by the proponent along with the measures listed in the NPC and in this Certificate. The proponent must also forward an electronic copy of the draft Section 61 findings to MassDEP and MassHighway.

Response to Comments

In order to ensure that the issues raised by commenters are addressed, the Supplemental EIR should include a Response to Comments section. This directive is not intended to enlarge the scope of the Supplemental EIR beyond what has been expressly identified in this Certificate. Each comment letter should be reprinted in the EIR. I defer to the proponent as it develops the format for this section, but the Response to Comments section should provide clear answers to

EEA #12503

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February 8, 2008

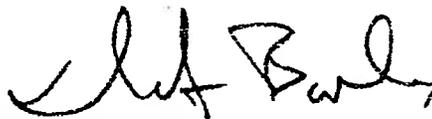
the questions raised.

Circulation

The Supplemental EIR should be circulated in compliance with Section 11.16 of the MEPA regulations and copies should also be sent to the list of "comments received" below and to Acton officials. A copy of the Supplemental EIR should be made available for public review at the Acton Public Library.

February 8, 2008

DATE



Ian A. Bowles

Comments received:

MHC, 1/8/08

Arthur Bergeron, 1/9/08

Sandi Austin, 1/10/08

Carol Holley, 1/14/08

EOT, 1/15/08

EOT, 1/17/08

MassDEP/CERO, 1/22/08

Anderson & Kreiger, 1/23/08

Mary Michelman, Acton Citizens for Environmental Safety, 1/25/08

Sally Edwards, 1/28/08

Debra Andell, 1/28/08

Organization for the Assabet River, 1/29/08

12503npc

IAB/WTG/wtg

**SECRETARY'S CERTIFICATE ON THE  
FINAL ENVIRONMENTAL IMPACT  
REPORT**



JANE SWIFT  
GOVERNOR  
BOB DURAND  
SECRETARY

*The Commonwealth of Massachusetts*  
*Executive Office of Environmental Affairs*  
*251 Causeway Street, Suite 900*  
*Boston, MA 02114-2119*

April 1, 2002

Tel: (617) 626-1000  
Fax: (617) 626-1181  
http://www.mass.gov/eea

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS  
ON THE  
FINAL ENVIRONMENTAL IMPACT REPORT

PROJECT NAME : Quail Ridge Country Club  
PROJECT MUNICIPALITY : Great Road - Acton  
PROJECT WATERSHED : Concord River  
EOEA NUMBER : 12503  
PROJECT PROPONENT : Northwest Development, LLC  
DATE NOTICED IN MONITOR : February 23, 2002

As Secretary of Environmental Affairs, I determine that the Final Environmental Impact Report (FEIR) submitted on the above project adequately and properly complies with the Massachusetts Environmental Policy Act (MGL, c. 20, ss. 61-62H) and with its implementing regulations (301 CMR 11.00).

As described in the FEIR, the proposed project consists of the construction of an 18-hole golf course with a driving range, a 28,000 square foot (sf) clubhouse, three tennis courts, a swimming pool with changing rooms, and a 5,000 sf turf management/cart storage building. Several modifications have been made by the proponent to reduce impacts to the wetland buffer zones. The proponent has increased the number of surface parking spaces to 227 spaces and reoriented the parking lots, tennis courts, and the swimming pool. The project site contains approximately 154.7 acres.

The FEIR resolved many of the remaining issues outlined in the Certificate on the DEIR. According to the Department of Environmental Protection's (DEP) comment letter, it will require additional information on wastewater, water supply and water management during the permitting process. The proponent must address these issues to DEP's satisfaction. I concur that DEP has sufficient permitting authority to ensure that these remaining issues are adequately addressed.

At this time, the proponent is not actively pursuing the

alternative residential development. If it revises its Preferred Alternative to be a residential subdivision, the proponent must submit a Notice of Project Change (NPC) in accordance with 301 CMR 11.10.

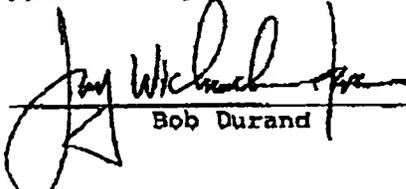
**Mitigation:**

In the FEIR, the proponent has committed to the following mitigation measures:

- Design and implement geometric improvements and install a stop sign at the intersection of Great Road/Skyline Drive (approximately \$40,000);
- Install new traffic signal lenses and detectors at the intersection of Great Road/Main Street (approximately \$5,000 - \$10,000);
- Provide pavement markings at the Harris Road and Skyline Drive approaches to Great Road (approximately \$250);
- Fund enhancements (approximately \$15,750) to pedestrian facilities to the Town of Acton's sidewalk fund;
- Implement a Traffic Demand Management (TDM) Program;
- Implement a monitoring program for the irrigation well and install a state-of-the-art irrigation system that minimizes water usage;
- Fund an independent wetlands monitor for monitoring construction activities (approximately \$7,500);
- Design the stormwater system to meet the Department of Environmental Protection's (DEP) Stormwater Management Guidelines;
- Construct an on-site wastewater system (approximately \$50,000);
- Provide the Massachusetts Historical Commission (MHC) with an additional consultation to resolve all boulder quarry locales and further mitigation measures; and
- Install erosion and sedimentation controls and stabilized construction entrances (approximately \$5,000).

April 1, 2002

DATE

  
 \_\_\_\_\_  
 Bob Durand

cc: David Murphy, DEP/Boston  
 Mary Gardner, DEP/CERO

EOEA #12503

FEIR Certificate

April 1, 2002

Comments received:

MDFW, 2/28/02

Carol Holley, 3/19/02

Carol Holley, 3/24/02

Eleven Concerned Acton Citizens, 3/25/02

DEP/CERO, 3/25/02

MAD, 3/25/02

#12503

RD/WTC/wsq

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# **LIST OF ABBREVIATIONS**

## List of Abbreviations

ACC	Acton Conservation Commission
ACES	Acton Citizens for Environmental Safety
ACO	Administrative Consent Order
AGO	Attorney General's Office
AFUE	Annual Fuel Utilization Efficiency
ALP	Advanced Lighting Package
AWD	Acton Water District
BLSF	Bordering Land Subject to Flooding
BMP	Best Management Practices
BVW	Bordering Vegetated Wetlands
CFL	Compact Fluorescent Light
DEIR	Draft Environmental Impact Report
DEP	Massachusetts Department of Environmental Protection
EOEA	Executive Office of Environmental Affairs
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Administration
FEIR	Final Environmental Impact Report
GPD	Gallons per Day
GPD/SF	Gallons per Day per Square Foot
IPM	Integrated Pest Management
LID	Low Impact Development
MBR	Membrane Bioreactor
MCM	Minimum Control Measures
MGL	Massachusetts General Law
MHC	Massachusetts Historic Commission
MHD	Massachusetts Highway Department
MS4	Municipal Separate Storm Sewer System
NOI	Notice of Intent
NPC	Notice of Project Change
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resource Conservation Service
OAR	Organization for the Assabet River
OTC	Order to Complete
PGP	Programmatic General Permit
QRCC	Quail Ridge Country Club
SCS	Support and Convenience Service
SEER	Seasonal Energy Efficiency Ratio
SFEIR	Supplemental Final Environmental Impact Report
TRQR	The Residences at Quail Ridge
TSS	Total Suspended Solids
WMA	Water Management Act
WQR	Water Quality Certification

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SECRETARY'S CERTIFICATE FEIR

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# SECTION 1

# SECTION 1 EXECUTIVE SUMMARY AND HISTORY

## ***1.1 Project History and Summary***

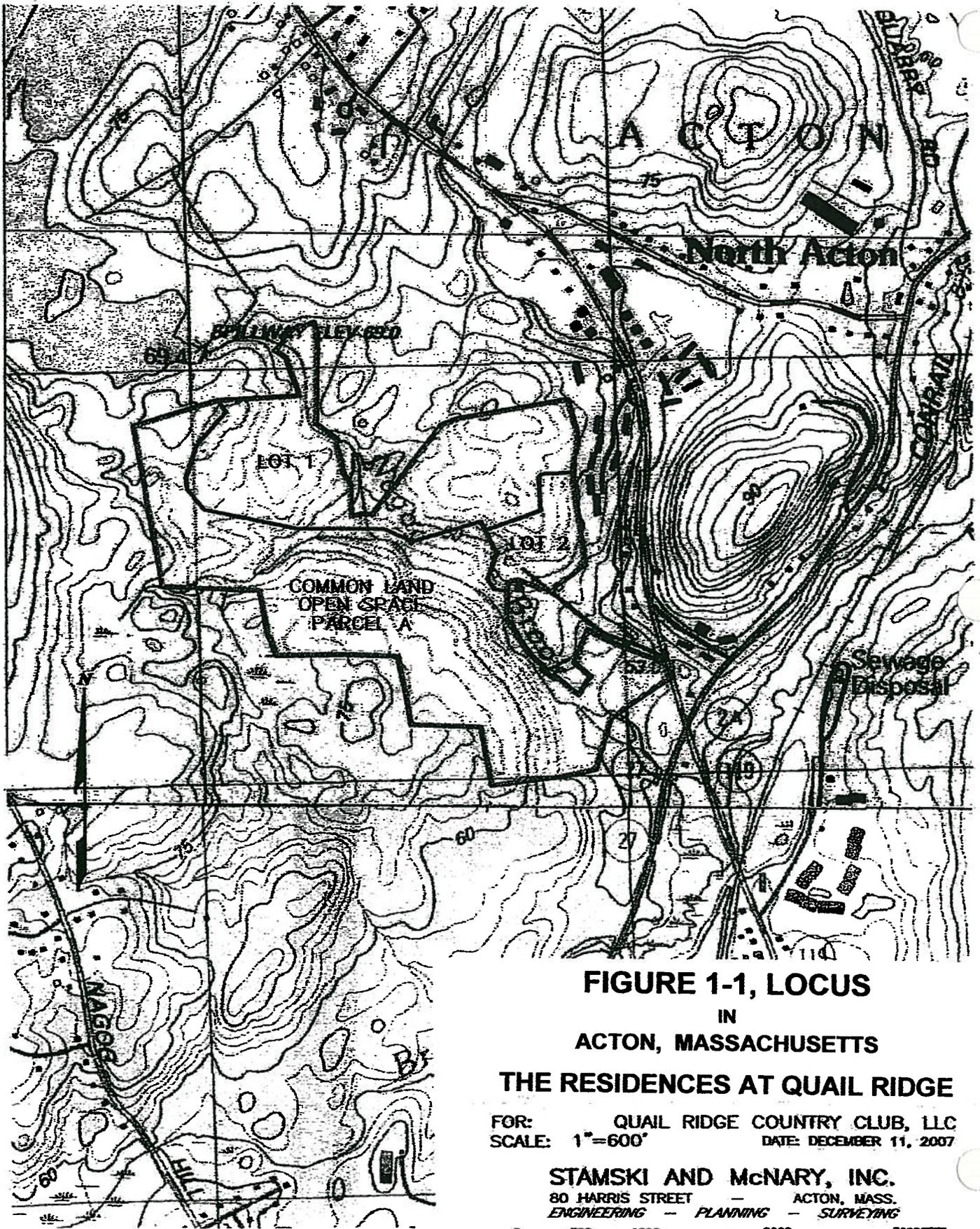
The Proponent, Quail Ridge Country Club, LLC (QRCC) filed an Environmental Notification Form (ENF) on May 9, 2001 (EOEA File number #12503). In November of that same year, QRCC filed a Draft Environmental Impact Report (DEIR) and in the following year filed a Final Environmental Impact Report (FEIR) on February 23, 2002. Two Notices of Project Change (NPC) were filed on November 25, 2003 and December 24, 2007.

The FEIR for QRCC consisted of an 18-hole golf course, a swimming pool, a family center clubhouse, tennis courts, driving range and parking lot on a site of approximately 155 acres in North Acton (See Figure 1-1, Locus). The project is serviced by an irrigation system supplied by groundwater wells and an irrigation pond, and an on-site 10,000 gallons per day (gpd) Title V subsurface sewage disposal system. (See Figure 1-2, Existing Conditions Plan).

The DEIR considered in detail two alternative development scenarios. The preferred alternative investigated an 18-hole golf course with appurtenant facilities. Concurrently, a 300 unit Cluster Residential Subdivision under Massachusetts General Laws (MGL) Chapter 40B was studied. Additionally, as required in the ENF Certificate, the Proponent addressed other potential housing alternatives and a no-build alternative.

The December 24, 2007 NPC described The Residences at Quail Ridge (TRQR) – a Senior Residence pursuant to Section 9B of the Town of Acton Zoning Bylaw. The NPC description consists of 174 units in a mix of single-family detached dwellings, town house style duplexes, and garden style residences located on the northern half of the parcel replacing nine (9) holes of the 18-hole golf course. The nine (9) holes on the southern portion of the parcel will remain. Five percent (5%) of the units will be affordable. (See Figure 1-3, SFEIR Plan and Appendix E for a full size SFEIR plan).

At least 50% of the Project will consist of Common Area, which will be set aside for the benefit of the Condominium association. The Common Area consists of two classes: the open space and common area elements directly appurtenant to the residences on the northern half of the site, and; the 9-hole golf course and elements directly appurtenant, consisting of Support and Convenience Service (SCS), to the golf course on the southern half of the site. The SCS consists of a family center, tennis courts, pool, maintenance facility, and parking lot. A 54 seat, 7,500 sq. ft. restaurant is proposed and would be part of the SCS. TRQR received a Special Permit for a Senior Residence on February 12, 2008 from the Town of Acton Planning Board (APB). The issue of a second access remains and deliberations by the APB will conclude this summer. Under the Special Permit, there is a single access from Skyline Drive to the project and two emergency access points via Hazelnut Street and Palmer Lane through the existing subdivision of Acorn Park. The Proponent submitted a Notice of Intent (NOI) to the Town of Acton Conservation Commission (ACC) on January 3, 2008 and the ACC will conclude its deliberations following the APB's decision on a second access/emergency access through Acorn Park.

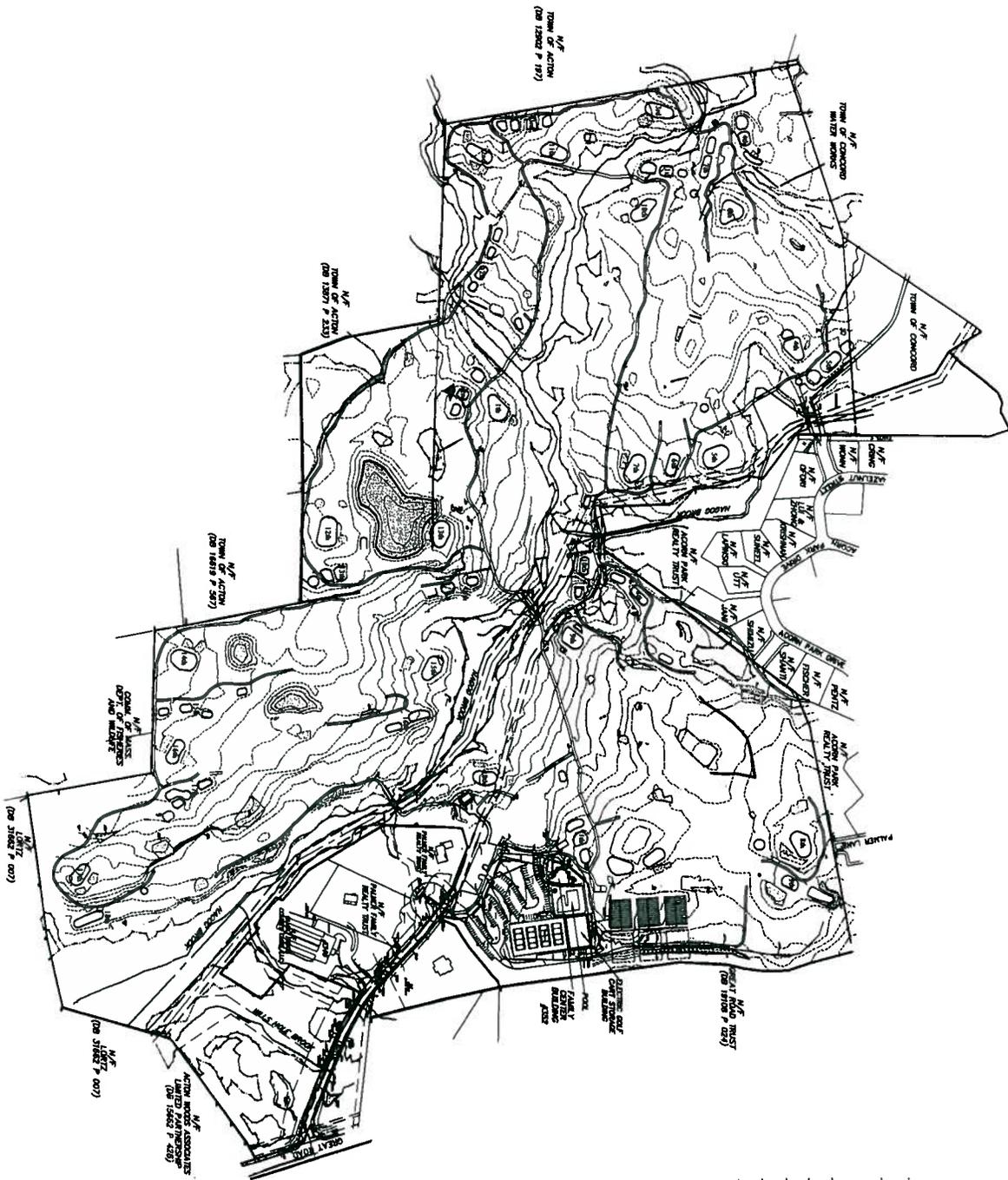


**FIGURE 1-1, LOCUS**  
 IN  
**ACTON, MASSACHUSETTS**  
**THE RESIDENCES AT QUAIL RIDGE**

FOR: QUAIL RIDGE COUNTRY CLUB, LLC  
 SCALE: 1"=600' DATE: DECEMBER 11, 2007

**STAMSKI AND McNARY, INC.**  
 80 HARRIS STREET — ACTON, MASS.  
 ENGINEERING — PLANNING — SURVEYING

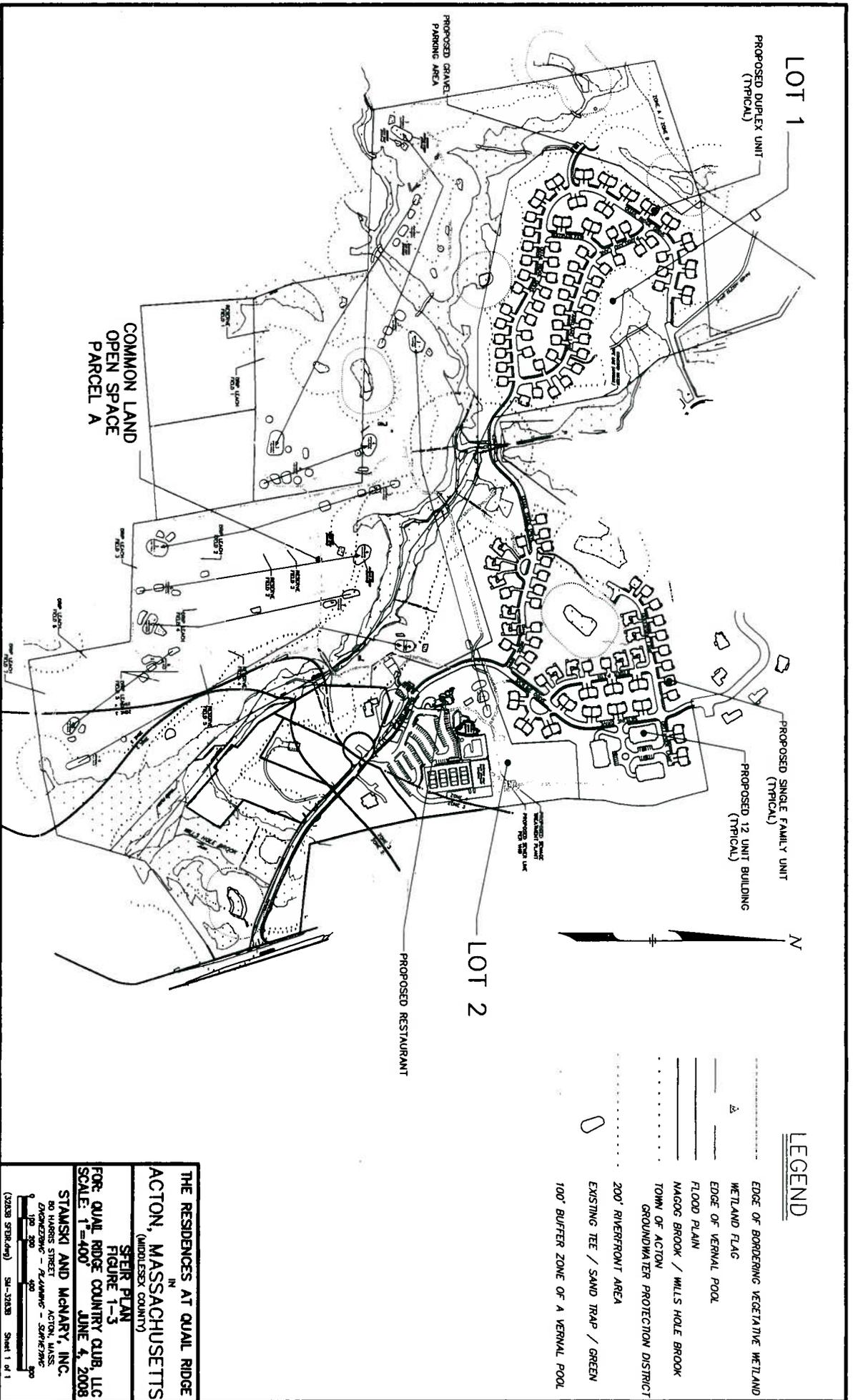




### LEGEND

- EXISTING MAJOR CONTOUR
- EDGE OF BORDERING VEGETATIVE WETLAND
- ▲ WETLAND FLAG
- EDGE OF VERNAL POOL
- FLOOD PLAIN
- MAGOG BROOK / WILLS HOLE BROOK
- TOWN OF CONCORD RIGHT OF WAY EASEMENT
- EXISTING TEE / SAND TRAP / GREEN

**THE RESIDENCES AT QUAIL RIDGE**  
**IN**  
**ACTON, MASSACHUSETTS**  
(ADDRESS: COUNTY)  
**EXISTING CONDITIONS PLAN**  
**FIGURE 1-2**  
**FOR: QUAIL RIDGE COUNTRY CLUB, LLC**  
**SCALE: 1"=400'**  
**JUNE 6, 2008**  
**STAMSKI AND McNARY, INC.**  
 90 HARRIS STREET  
 ACTON, MASS.  
 DRAWING - PLANNING - SITEWORK  
 0 100 200 400 800  
(2X25B East Cordway) SI-2082B Sheet 1 of 1



## **1.2 Summary of Impacts and Compatibility with Performance Standards**

### **1.2.1 Land Alteration**

The Proponent intends to replace 9 holes of the FEIR approved 18-hole golf course with TRQR consisting of 174 age-restricted housing units on approximately 40.3 acres of the 155 acre site. Parking spaces as approved by the APB in its Special Permit consist of 2 parking spaces per residential dwelling unit, 1 parking space for every 3 restaurant seats, 12 visitor spaces, 42 SCS spaces, and 10 spaces for each hole of golf. Therefore, with 174 residential units, 54 restaurant seats and 9 holes of golf, 510 parking spaces have been provided.

### **1.2.2 Wetlands**

The vast majority of the project will be located outside wetland resource areas and Buffer Zones. There will be grading, roadways, utilities, a portion of the drainage system, and several units within the 100 ft. Buffer Zone of a Bordering Vegetated Wetland (BVW), one wetland and stream crossing over Nagog Brook, and some work within the Riverfront Area of Nagog Brook. Work within regulated areas will be very limited and contained largely within areas that were altered previously during the construction of the 18-hole golf course. (See Figure 4-1, Wetland Resource Areas).

### **1.2.3 Stormwater**

The stormwater management system was designed to promote the collection of runoff from various locations of TRQR and will attenuate site runoff up to and including the 100-year storm event. The stormwater management system for TRQR was also designed in accordance with *DEP's Stormwater Management Standards*. To comply with these standards, an integrated system of collection, detention/retention, and infiltration/recharge was designed to maintain post-development peak runoff rates at or less than those experienced under existing watershed conditions. The integrated stormwater management system was also designed to collect and treat runoff generated by the proposed development using deep sump catch basins, *Stormceptor* treatment units, stormwater basins and swales, and the recharge of roof runoff. The implementation of a comprehensive approach to the treatment of runoff in accordance with the *best management practices* of *DEP's Stormwater Management Standards*, the reduction of the golf course from 18- to 9-holes while maintaining current pesticide and herbicide management practices, and the resulting ability to continue to collect and treat runoff that flows overland ensure that stormwater discharged to receiving surface waters and groundwater will be treated to the maximum extent practicable to address water quality requirements. (See Figures 5-01, 5-02, and 5-03, Stormwater Management System).

### **1.2.4 Wastewater**

The total estimated sewage design flow for the Quail Ridge project is 57,835 gpd. Capacity of the proposed wastewater disposal system, therefore, has been designed conservatively to accommodate a project 60,079 gpd. The proposed Quail Ridge Wastewater Treatment Facility will be of the membrane bioreactor (MBR) type and is discussed in detail in section 6.3.2 below. A portion of the effluent will continue to be discharged to the existing Title V leaching field with a

capacity of 10,000 gpd. Additional effluent will be disposed of via the proposed on-site drip irrigation fields, with a design capacity of 50,079 gpd. (See Figure 6-1, Wastewater Treatment System).

### **1.2.5 Potable and Irrigation Water**

Potable water will be supplied by the Town of Acton Water District (AWD). A Water Impact Report was filed with the AWD in June of 2008 and total average day water usage was estimated to be 57,835 gpd. Summer usage will increase to 96,629 due to lawn and plantings irrigation of the grounds at TRQR (this does not include irrigation of the remaining 9-hole golf course, which will continue to be supplied by a deep water well and irrigation pond.). The Condominium will adhere to any AWD summer water conservation measures, including reducing and/or ceasing outside water irrigation at TRQR. Water service will continue to be provided via a two-mile extension of the existing water main in Skyline Drive.

Irrigation for the remaining 9-hole golf course will be provided by the existing deep water well and irrigation pond. Presently the maximum withdrawal allowed is 99,000 gpd. Reduction of the golf course by half will reduce the need for irrigation water on the site by an estimated 40%, however, under an agreement with the Department of Environmental Protection (DEP) and the Attorney General's Office (AGO), the Proponent has submitted to DEP a Water Management Act (WMA) Permit Application. Section 7 will review the DEP permitting process and further discuss anticipated amounts of irrigation water supply needed for the remaining 9-hole golf course.

### **1.2.6 Construction**

There are two construction phases planned for the building of TRQR with the crossing at Nagog Brook serving as the dividing line. Phase 1 includes the construction of the sewage treatment plant and approximately half the units planned for the eastern section of the project. Phase II involves construction on the western half of the project. The restaurant construction at the SCS begins at the end of Phase I and ends midway through Phase II.

## ***1.3 State, Regional and Local Planning Initiatives***

The proposed TRQC at QRCC is compatible with Executive Order 385. It is a cluster development that leaves over 93 acres of the site open space and that avoids and minimizes any impacts to existing water resources including streams and wetlands. Additionally TRQR is compatible with Executive Order 418 in that it provides not only 174 units of age restricted housing but also 5% affordable housing units.

The MAPC MetroPlan lists 65 MetroFuture goals for the greater Boston region. The plan is compatible with Executive Orders 385 and 418. Among these are increased housing built near existing infrastructure including water and transportation. QRCC is located near existing road and rail infrastructure and abuts an existing AWD water main. 5% of the TRQR will be affordable housing units.

In cooperation with the Town of Acton Open Space initiatives, QRCC will retain over 93 acres of open space and provide parking and trailheads for abutting Town of Acton open space.

## **1.4 Regulatory Permits and Related Policies**

### **Federal Permits**

U.S. EPA NPDES General Permit for Stormwater Discharges from Construction Sites  
U.S. EPA NPDES Phase II Stormwater General Permit for Regulated areas of Acton  
U.S. Army of Corps of Engineers Programmatic General Permit (PGP)

### **State Agency Actions**

MEPA Certificate on the Supplemental Final Environmental Impact Report (SFEIR)  
DEP Groundwater Discharge Permit  
DEP Water Distribution System Modification Permit  
Massachusetts Highway Department (MHD) Amended Access Permit  
Massachusetts Historical Commission (MHC)

### **Local Approvals**

APB Senior Residence Special Permit  
ACC Order of Conditions and Local Wetlands By-Law

# SECTION 2

## **SECTION 2 PROJECT DESCRIPTION AND ALTERNATIVES**

### ***2.1 Project Description***

#### **2.1.1 Project Overview**

The December 24, 2007 NPC described TRQR – a Senior Residence pursuant to Section 9B of the Town of Acton Zoning Bylaw. The NPC description consists of 174 units in a mix of single-family detached dwellings, town house style duplexes, and garden style residences located on the northern half of the parcel and north of Nagog Brook, replacing the nine holes of the 18-hole golf course. Five percent (5%) of the units will be affordable.

Over 50% of the Project will consist of Common Area, which will be set aside for the benefit of the Condominium association. The Common Area divides into two classes: the open space and common area elements directly appurtenant to the residences on the northern half of the site and north of Nagog Brook, and; the 9-hole golf course and elements directly appurtenant to the SCS and to the golf course on the southern half of the site. The SCS consists of a family center, tennis courts, pool, maintenance facility, and parking lot. A 54 seat, 7,500 sq. ft. restaurant is proposed as part of the SCS. TRQR has received a Special Permit for a Senior Residence from the APB. The issue of a second access remains and deliberations by the APB will conclude this summer. Under the Special Permit, there is a single access from Skyline Drive to the project and two emergency access points via Hazelnut Street and Palmer Lane through the existing subdivision of Acorn Park. The Proponent submitted an NOI to the ACC on January 3, 2008 and the ACC will conclude its deliberations following the APB decision on a second access/emergency access through Acorn Park.

#### **2.1.2 Existing Environment**

As shown on Figure 1-1, Locus, the project site, consisting of 154.7 acres, is located on the westerly side of Route 2A/119 (Great Road) in North Acton, approximately 500 feet north of the Route 2A/119 and Route 27 intersection. The project site, with direct access off Great Road via Skyline Drive, is the present home of the QRCC, which consists of the following:

- an 18-hole golf course with associated tee boxes, fairways, greens, and landscaping;
- a Family Center with administrative offices, pro shop, fitness rooms, associated locker rooms, and snack bar;
- four tennis courts;
- a swimming pool;
- a maintenance building; and
- associated parking.

The existing QRCC and its associated uses are served currently by town water for potable water, on-site wells for irrigation needs, and an approved 10,000-gallon per day subsurface sewage disposal system. Figure 1-2, Existing Conditions Plan, depicts current site conditions at the QRCC.

The site is bounded by Town of Acton conservation land to the west, Town of Concord Water Supply to the north and Massachusetts Division of Fisheries and Wildlife to the south; single

and multi-family residences to the northeast; and commercial development and residential to the east, along Great Road. Moderately sloped with several prominent hills, much of the project site remains predominately wooded with the exception of golf course features. Based on Natural Resource Conservation Service (NRCS) soils maps, on-site soils consist of Scarborough mucky fine sandy loam (Soils Group D), Wareham loamy fine sand (Soils Group C), Whitman fine sandy loam (Soils Group D), Charlton-Hollis-Rock outcrop complex (Soils Group B), Hollis-Rock outcrop-Charlton complex Hinckley loamy sand (Soils Group C) and Scituate fine sandy loam (Soils Group A).

The site contains five (5) uncertified vernal pools and an extensive area of wetlands and flood plain border Nagog and Will's Hole Brooks. Nagog Pond is located to the north of the project site and drains via a spillway to Nagog Brook, which flows intermittently to the southeast, roughly bisecting the property. Will's Hole Brook and several small tributaries also flow through the site, joining Nagog Brook before it leaves the property continuing in a southeasterly direction to its confluence with Nashoba Brook. This larger brook in turn flows to the south, through Warner's Pond in West Concord before draining into the Assabet River north of the Concord Route 2 Rotary. Figure 4-1, Wetland Resource Areas, depicts existing site related brooks, wetland resource areas and flood plains on the project site.

Nagog Pond also serves as public drinking water source for the Town of Concord. The Zone A for the Pond is located along the northerly property line of the site with a small area extending onto the project site. The southeast corner of the site is also located within a Zone II for the Town of Acton municipal water supply well Conant I, which is located approximately 1,300 feet to the south. Several public and private water supply wells are located within one half mile of the project site. Figure 4-3, Public Water Supplies, depicts the locations of the Zone A to Nagog Pond, the Zone II for the Town's Conant I well, and the IWPA's for the four public water supply wells serving individual condominiums and apartment complexes located within a half mile of the site.

### **2.1.3 Changes to the Project since the FEIR**

The Secretary's FEIR Certificate (see Section 1.2.1 The Secretary's Certificate on the FEIR) for QRCC was issued on April 1, 2002.

TRQR will replace one-half (1/2) of the FEIR approved 18-hole golf course. Only the nine holes on the southern end of the course and south of Nagog Brook will continue to be in operation. The northern half of the course will be converted to age-restricted residences (55 and over). The following are the material changes to the project.

#### **Land Alteration**

The Proponent intends to replace nine holes of the FEIR approved 18-hole golf course with TRQR consisting of a 174 age-restricted housing units on approximately 40.3 acres of the 155-acre site. Parking spaces as required by the APB in its Special Permit consists of 2 parking spaces per residential dwelling unit, 1 parking space for every 3 restaurant seats, and 10 spaces for each hole of golf. Therefore, with 174 residential units, 54 restaurant seats, and 9 holes of golf, 510 parking spaces were provided by TQRR and approved by the APB, which has

the discretion to determine a sufficient number of "parking spaces for visitors, accessory facilities, and services" (Acton Zoning Bylaw Section 9B.6).

Impervious coverage associated with the buildings, parking, roads, and side of TRQR totals 20.8 acres. This is a reduction in impervious area of approximately 2.6 acres (11%) from the 23.4 acres reported in the NPC.

### **Wetlands**

The vast majority of the project will be located outside wetland resource areas and Buffer Zones. There will be grading, roadways, utilities, drainage systems, and several units within the 100' Buffer Zone of a BVW, one wetland and stream crossing over Nagog Brook, and some work within the Riverfront Area of Nagog Brook. Work within regulated areas will be very limited and contained largely within areas that were previously altered during the construction of the 18-hole golf course.

### **Stormwater**

The stormwater management system is designed to promote the collection of runoff and will attenuate site runoff up to and including the 100-year storm event. The stormwater management system for TRQC was also designed in accordance with *DEP's Stormwater Management Standards*. To comply with the standards, an integrated system of collection, detention/retention, and infiltration/recharge was designed to maintain developed peak runoff rates at or less than those experienced under existing watershed conditions. The integrated stormwater management system was also designed to collect and treat runoff generated by the proposed development with deep sump catch basins, *Stormceptor* treatment units, stormwater basins and swales, and the recharge of roof runoff. The implementation of a comprehensive approach to the treatment of runoff, in accordance with the *best management practices* of *DEP's Stormwater Management Standards*, the reduction of the golf course from 18- to 9-holes while maintaining current pesticide, and herbicide management practices, and the continued collection and treatment of runoff that flows overland contribute to the goal of ensuring that the water quality of stormwater discharges, and as a result that of receiving waters, is maintained and improved to the maximum extent possible.

### **Wastewater**

The total estimated sewage design flow for TRQR is 57,835 gpd. The proposed wastewater disposal system capacity, therefore, has been designed conservatively to accommodate a project 60,079 gpd. The proposed Quail Ridge Wastewater Treatment Facility will be of the MBR type. A portion of the effluent will continue to be discharged to the existing Title V leaching field with a capacity of 10,000 gpd. Additional effluent will be disposed of via the proposed drip irrigation fields, with a design capacity of 50,079 gpd, located throughout the remaining 9-hole golf course.

### **Potable and Irrigation Water**

Potable water will be supplied by the AWD. A Water Impact Report was filed with the AWD in June of 2008. As described in an application to the AWD, water usage is estimated to be 57,835 gpd. Summer usage will increase to 96,629 due to lawn and plantings irrigation of the grounds at TRQR. This does not include irrigation of the remaining 9-hole golf course, which will

continue to be supplied a by deep water well, and irrigation pond. The Condominium will adhere to any AWD summer water conservation measures including reducing and/or ceasing outside water irrigation at the TRQR. Water service will continue to be provided via a two-mile extension of the water main at the SCS on Skyline Drive.

Irrigation for the remaining 9-hole golf course will be provided by an existing deep water well and irrigation pond. Presently the maximum withdrawal allowed is 99,000 gpd. Reduction of the golf course by half will reduce the need for irrigation water on the site by an estimated 40%. However, under an agreement with the DEP and the AGO, the Proponent has submitted to DEP a WMA. Section 7 will review the DEP permitting process and further discuss the anticipated amounts of irrigation water supply needed for the remaining 9-hole golf course.

### **Construction**

There are two phases planned for the building of TRQR. Phase 1 includes the construction of the sewage treatment plant and, roughly, half the units planned for the eastern section of the project. Phase II involves construction on the western half of the project. The restaurant construction at the SCS begins at the end of Phase I and ends midway through Phase II. The dividing line between the two phases is the Nagog Brook Road crossing.

### **Mitigation & Proposed Section 61 Findings**

Proposed Section 61 Findings in accordance with the requirements of MGL Chapter 30, Section 61 are included in Section 11. State agencies are required to "review, evaluate, and determine the impact on the natural environment of all works, projects, or activities conducted by them and use all practicable means and measures to minimize damage to the environment." It also asks that reviewing agencies describe environmental impacts, if any, and include a finding that all available measures have been taken to avoid or minimize those impacts.

### **2.2 No Build Alternative**

The QRCC is not a viable business model. Originally conceived as a private country club with a limited number of members, the required membership needed to both pay the debt service and continue first-rate operations was never achieved despite 5 years of attempts by the existing membership and the owners of the course. Although recruitment efforts are ongoing and the 18-hole Country Club will operate through the 2008 season, it is the Proponent's intention not to operate as an 18-hole golf course in 2009. To avoid a sale of the property that could result in more of the 155-acre site being developed, the proponent developed a plan that has earned the Town of Acton support in keeping over 50% of the parcel open while building needed housing.

# SECTION 3

## SECTION 3 LAND ALTERATIONS

### 3.1 Zoning Requirements (Parking)

The Acton Zoning Bylaw requires 2 parking spaces per residential dwelling unit, 1 parking space for every 3 restaurant seats, and 10 spaces for each hole of golf. Parking spaces as approved by the APB in its Special Permit consist of 2 parking spaces per residential dwelling unit, 1 parking space for every 3 restaurant seats, 12 visitor spaces, 42 SCS spaces, and 10 spaces for each hole of golf. Therefore, with 174 residential units, 54 restaurant seats and 9 holes of golf, 510 parking spaces have been provided by TQRR and approved by the APB, which has the discretion to determine a sufficient number of "parking spaces for visitors, accessory facilities, and services" (Acton Zoning Bylaw Section 9B.6).

**Table 3-1 Parking Summary**

Zoning Requirement	# UNITS	Approved by APB& Provided by TRQR
Residential 2 spaces/dwelling	174 dwellings	348
Restaurant 1 space/3 seats	54	18
Golf Course 10 spaces/hole	9 holes	90
Visitor Spaces		12
SCS Spaces		42
	Total:	510

#### 3.1.1 Alternatives to Reduce Area of Impervious Pavement

##### 3.1.1.1 Alternative Layouts

One of the project alternatives, initially presented to the Planning Board under the Senior Residence Special Permit application, had significantly more pavement and roof cover. Several portions of the project were modified in order to reduce impervious coverage in response to the Secretary's Certificate.

Building footprints of the single and duplex units were reduced in size by 6% and 19% respectively from the initial conceptual design of the site resulting in a significant reduction in impervious coverage.

The elimination of three (3) proposed single-family residences in the westerly portion of the residential development area, adjacent to the Concord Water Works property, brought the total residential unit count from 177 units to 174 units. With the elimination of these units, a common access driveway and individual driveways were also removed and replaced with a short driveway that will provide access to a proposed trailhead parking area.

Another change to the proposed layout was the elimination of the portion of Greenside Lane. This portion of roadway was terminated with a Tee-turnaround and resulted in the elimination of approximately 300 feet of roadway. In addition, approximately 60 feet of Greenside Lane was eliminated at its easterly end further reducing impervious coverage.

Parking spaces will be eliminated near the proposed restaurant, where Skyline Drive will be extended from the end of the existing portion of the roadway that was built in connection with QRCC. An area that was to be constructed in connection with the un-built QRCC clubhouse will not be built. The proposed mail stop will be adjacent to 11 new parking spaces in the same vicinity. When the new spaces and eliminated spaces are considered in this area, the net result is the elimination of 57 parking spaces. All of these spaces are associated with the SCS aspect of the project rather than directly related to the residential units. One hundred fifty (150) parking spaces will regularly be available in the SCS area. The total required number of parking spaces required by Zoning is, as noted above, left to the discretion of the Planning Board.

Compact car spaces are provided in a number of areas to reduce the amount of impervious coverage further. With dimensions of 8.5 feet wide by 15 feet long, there is a reduction in area 39 square feet per space when compared to standard spaces, which have dimensions of 9 feet by 18.5 feet. With 41 such spaces provided in the SCS area, there was a reduction of about 1,600 square feet of impervious coverage.

During the permitting of QRCC, there was a concern that adequate parking spaces would be available during various events. In order to minimize impervious coverage, a valet parking plan was developed, which utilized the aisles in the SCS parking lot and one of the tennis courts to store vehicles. This temporary valet parking scheme allows for 76 additional parking spaces with no increase in impervious coverage.

These modifications result in a total impervious coverage of 20.8 acres, which includes buildings, parking, walks, paths and roads. This is a reduction in impervious area of approximately 2.6 acres (11%) from the 23.4 acres reported in the NPC.

### **3.1.1.2 Pervious Pavement**

Pervious gravel pavement will be used in the trailhead parking area in order to promote infiltration and groundwater recharge. The use of a gravel surface in this area is appropriate given the low intensity of use that is expected. Pervious pavement is not appropriate for other areas given the higher intensity of expected vehicle trips and parking.

# **SECTION 4**

## **SECTION 4 WETLANDS**

### **4.1 OVERVIEW**

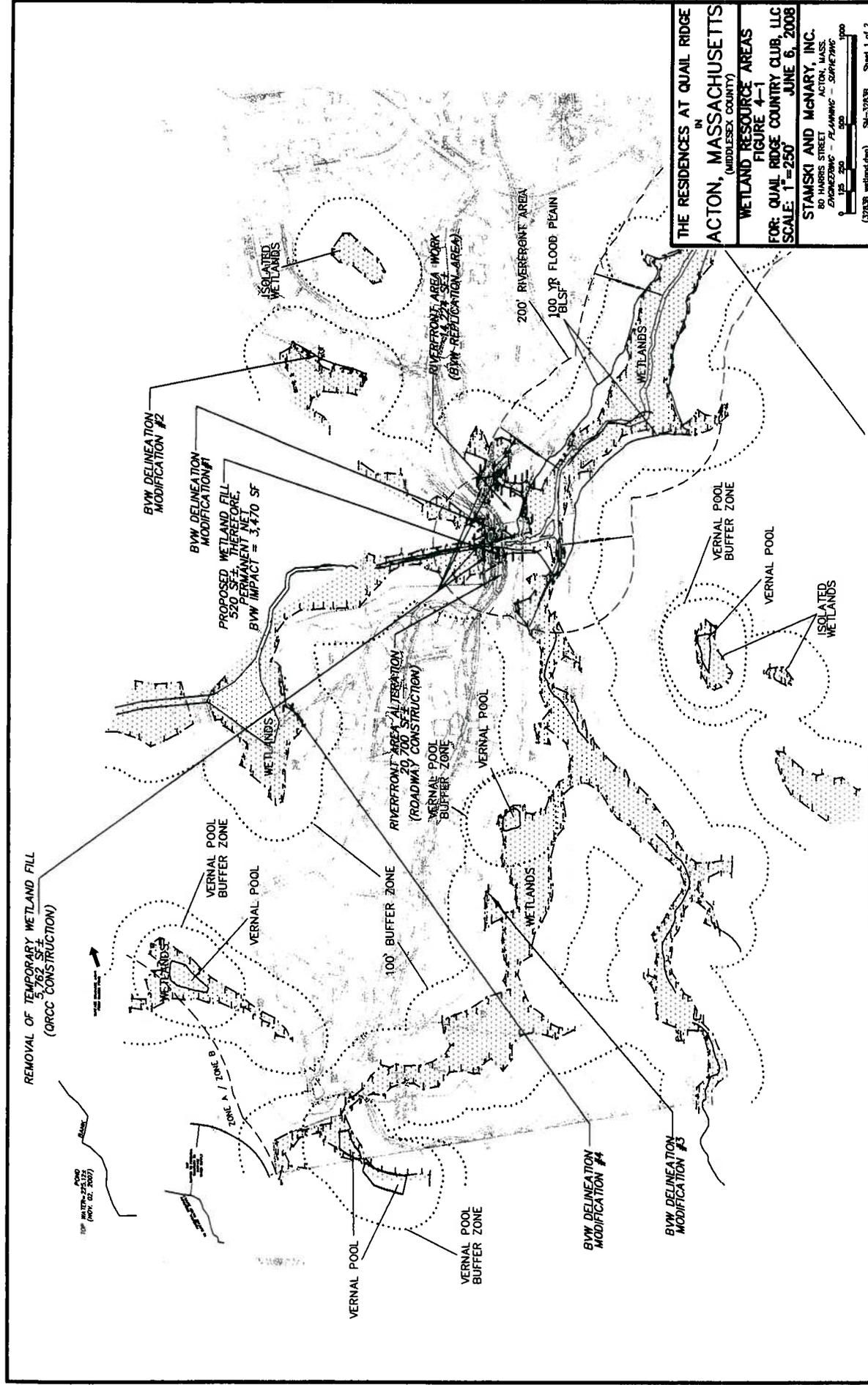
The proposed project consists of 174 age-restricted units of housing, made up of a mix of single-family detached dwellings, townhouse style duplexes and garden style residences. The project will be built over a period of 5 to 7 years and eliminate 9 of the existing golf holes, with 9 golf holes, family center, swimming pool, maintenance facility, tennis courts and parking remaining. The vast majority of the project will be located outside wetland resource areas and Buffer Zones. There will be grading, roadways, utilities, drainage systems, and several units within the 100' Buffer Zone of a BVW, one wetland and stream crossing over Nagog Brook, and some work within the Riverfront Area of Nagog Brook and Will's Hole Brook. Work within regulated areas will be very limited and contained largely within areas that were previously altered during the construction of the 18-hole golf course.

TRQR will conserve forested, wetland, and meadow-like areas by clustering units outside all required buffer zones. Forested areas will be maintained along the entire abutting border, including the southern border with the existing golf course. Areas bordering the 9-hole golf course and TRQR will be allowed to naturalize, adding a further buffer to wetland resource areas.

The Proponent submitted an NOI to the ACC on January 3, 2008. As discussed in the NPC, most flags delineating resource areas have remained in place except for several areas where they were lost to weather. Consequently, the ACC and the proponent's wetland consultant, EcoTec, Inc., reviewed the wetland boundary and several modifications were made to update the BVW boundary. These modifications are reflected on the current plans and the ACC and proponent are in agreement with respect to resource area boundaries. Figure 4-1, Wetland Resource Areas, depicts the boundaries of all wetland resource areas.

#### **4.1.1 Alternatives**

In general, the project has been designed to minimize impacts on wetland resource areas and buffer zones. The roads and buildings were situated on the northerly portion of the site to avoid multiple wetland and stream crossings and minimize intrusion into the associated riverfront areas and buffer zones. The configuration of this northerly portion of the site consists of the largest tracks of upland allowing the project to be built with virtually all of the buildings outside of the wetland buffer zones. Where a wetland and stream crossing is needed, it occurs over the intermittent portion of Nagog Brook, in a location where the wetland is at its narrowest and where the area had been altered previously. The northerly portion of the site also abuts developed land with an existing roadway that terminates at the property line, eliminating the need for more wetland crossings and impacts. The southerly portion of the site, containing over 93 acres, will be maintained as open space and abuts town and state conservation lands, creating an expansive undeveloped green tract. The project has been proposed with 174 residential units where the Acton Zoning Bylaw would allow a density of 446 units. This smaller development footprint further reduces the potential impact to wetland resource areas relative to the higher densities that would be allowed under the Acton Bylaw. As discussed in detail in section 4.2.4.3 below, several alternatives were explored for the proposed wetlands crossing



**THE RESIDENCES AT QUAIL RIDGE**  
 IN  
**ACTON, MASSACHUSETTS**  
 (MIDDLESEX COUNTY)  
**WETLAND RESOURCE AREAS**  
**FIGURE 4-1**  
**FOR: QUAIL RIDGE COUNTRY CLUB, LLC**  
**SCALE: 1" = 250'** JUNE 6, 2008  
**STAMSKI AND McNARY, INC.**  
 10 HARRIS STREET, SUITE 200  
 BOSTON, MASSACHUSETTS 02118  
 PHONE: 617-267-1100  
 FAX: 617-267-1101  
 (32038 wetland.dwg) SA-32038 Sheet 1 of 2

before identifying the current proposal as the alternative with the least environmental and wetland impacts.

## **4.2 RESOURCE AREAS**

The following resource areas are found on the site of the proposed TRQR development: Bank; Land under Water and Waterways; Riverfront Areas; Bordering Vegetated Wetlands; and Land subject to Flooding (100-Year Floodplain). These resource areas and the project's compliance with related performance standards are described in detail below.

### **4.2.1 Bank**

Banks are associated with the intermittent and perennial streams on site and are areas where groundwater discharges to the surface or, under some circumstances, where surface water recharges the ground water. Pursuant to 310 CMR 10.54, banks are likely to be significant to water supply, ground water supply, flood control, storm damage prevention, prevention of pollution, and to the protection of fisheries and wildlife habitat. Since site-related intermittent streams do not support fish populations, they are not significant to the fisheries interest of the WPA. Vegetation along banks maintains stability that, in turn, protects water quality by reducing erosion and siltation. The topography, plant community composition and structure, and soil structure of the bank provide food, shelter, migratory areas, and breeding areas for wildlife. Banks also confine floodwaters during the most frequent storms and prevent the spread of water to adjacent lands. No work is proposed within any bank in conjunction with TRQR.

### **4.2.2 Land under Water Bodies and Waterways**

The boundary of Land under Water Bodies and Waterways is the mean annual low water level of site-related streams. Pursuant to 310 CMR 10.56, this resource area is likely to be significant to water supply, ground water supply, flood control, storm damage prevention, prevention of pollution and to the protection of fisheries and wildlife habitat. Since site-related intermittent streams do not support a fish population, they are not significant to the fisheries interest of the WPA. The organic soils and sediments located under water serve as traps for toxic substances and contribute to the detention and removal of dissolved and particulate nutrients from the surface water above. Further, the plant community composition and structure, hydrologic regime, topography, soil composition, and water quality of the land under water provide food, shelter, migratory and overwintering areas, and breeding areas for wildlife. No work is proposed within Land under Water Bodies and Waterways in conjunction with TRQR.

### **4.2.3 Bordering Vegetated Wetlands (BVW)**

A very limited area of BVW will be altered near the proposed stream crossing associated with Quail Ridge Drive. The actual amount of wetland fill proposed in connection with the construction of the 174-unit TRQR is approximately 520 square feet. Approximately 2,950 square feet of wetland that was filled in connection with the previous construction of the 18-hole golf course, pursuant to the Order of Conditions issued and extended by the ACC, dated March 20, 2002, will be left in place. Therefore, the total wetland fill associated with the proposed stream crossing, including the previously permitted fill, is 3,470 square feet.

Work associated with the 18-hole golf course included unanticipated wetland filling and impacts associated with the construction of a temporary road that will now be removed. As part of the TRQR project, affected areas will be restored to BVW. The total proposed wetland replication area will be 14,224 square feet, resulting in a net increase of 6,200 square feet of BVW.

Project compliance with the Massachusetts Wetlands Regulations (310 CMR 10.00) and related Performance Standards are discussed below. In addition, the project as currently designed, complies with the more stringent standards of the Acton Wetland Bylaw and its associated regulations.

#### **4.2.3.1 Compliance with Performance Standards for BVW (310 CMR 10.55(4)(b))**

Local Conservation Commissions may issue an Order of Conditions permitting work that results in the loss of up to 5000 square feet of BVW, provided that the area is replaced in accordance with the following general conditions and any additional, specific conditions the Conservation Commission deems necessary to ensure that the replacement area will function in a manner similar to the area the will be lost.

General Condition 1: The surface area of the replacement area to be created ("the replacement area") shall be equal to that of the area that will be lost ("the lost area").

- TRQC Design Provision: The proposed replacement area is 14,224 square feet, which is greater than the lost area of 3,470 square feet associated with the proposed Quail Ridge Drive.

General Condition 2: The ground water and surface elevation of the replacement area shall be approximately equal to that of the lost area:

- TRQC Design Provision: The proposed replacement area will be located immediately downstream and to the east of the area of BVW to be filled. Generally, the elevation of the area to be filled ranges between elevation 175 and 184 feet National Geodetic Vertical Datum of 1929 (NGVD29) while the elevation of the area to be replicated ranges between 174 and 183 feet NGVD29. The proposed replication area has existing BVW to the west, south and east, making it an ideal location for replication with respect to ground water and surface elevation.

General Condition 3: The overall horizontal configuration and location of the replacement area with respect to the bank shall be similar to that of the lost area:

- TRQC Design Provision: The replacement area is located approximately 20 feet downstream from the bank of the stream adjacent to the filled area. It will have a similar horizontal configuration as the area to be filled with east to west dimensions approximately equal to north to south dimensions.

General Condition 4: The replacement area shall have unrestricted hydraulic connection to the same water body or waterway associated with the lost area;

- TRQC Design Provision: The proposed replacement area will have an unrestricted hydraulic connection to the adjacent BVW that surrounds it on three sides.

General Condition 5: The replacement area shall be located within the same general area of the water body or reach of the waterway as the lost area;

- TRQC Design Provision: The replacement area is proposed within the same general area of the reach of Nagog Brook as the lost area.

General Condition 6: At least 75% of the surface of the replacement area shall be re-established with indigenous wetland plant species within two growing seasons, and prior to said vegetative re-establishment any exposed soil in the replacement area shall be temporarily stabilized to prevent erosion in accordance with standard U.S. Soil Conservation Service methods;

- TRQC Design Provision: The Wetland Crossing and Replication Details (Figure 4-2) show in detail a planting plan with a list of specific indigenous wetland plants and locations. Construction Sequence and Procedure are also outlined on this figure.

General Condition 7: The replacement area shall be provided in a manner that is consistent with all General Performance Standards for each resource area in Part III of 310 CMR 10.00.

- TRQC Design Provision: The replacement area will be located within the Riverfront Area of Nagog Brook and will meet the performance standards of 310 CMR 10.58 (4). The replacement area will not result in the alteration of other resource areas.

As discussed in more detail in sections 4.2.4 and 4.5 below, significant provisions have been incorporated into the design plans to avoid, minimize, and mitigate adverse impacts to the BWV. The proposed crossing is located where the amount of wetland filling is minimized. Other potential wetland crossings are avoided by concentrating development primarily to the north of the wetlands that bisect the property rather than distributing it in a manner that would have required multiple and more extensive wetland crossings. In addition, the minimum width of roadway acceptable to the APB has been proposed and extensive retaining walls will be constructed along both sides of the crossing to minimize encroachment into wetland resource areas. Finally, the wetland crossing is proposed in an area that has already been altered rather than in an undeveloped area. As noted above, the area of wetlands to be replicated is well in excess of the minimum required by the regulations.

#### **4.2.4 Riverfront Area**

On May 11, 2001, the ACC issued an Order of Resource Area Delineation confirming that Will's Hole Brook is a perennial stream with an associated Riverfront Area and that all other on-site streams were intermittent. During the development of design plans for TRQR, the ACC requested that the status of Nagog Brook be re-evaluated in consideration of the current regulations (310 CMR 10.58). With the assistance of the ACC Administrator, Stamski and McNary, Inc., determined that Nagog Brook did not flow for four separate days within a 12 month period upstream of the proposed wetland crossing, during a non-drought period. Therefore, Nagog Brook is perennial downstream of the proposed crossing. A tributary to Nagog Brook, downstream of the proposed crossing, also appeared to flow perennially from a point approximately 150 feet west of the confluence. The associated Riverfront Areas are shown on Figure 4-1, Wetland Resource Plan.

Based on this re-evaluation, there are approximately 30.7 acres of Riverfront Area located on site. This Riverfront Area is defined by a 200' horizontal buffer zone measured parallel to the mean annual high water line of perennial streams. There are three perennial streams located on site: Will's Hole Brook, which flows from the north along the eastern property line and under the existing Skyline Drive to join Nagog Brook; Nagog Brook, which transitions from intermittent





stream to perennial stream just south of the proposed wetland crossing before flowing off site to the southeast; and a short portion of a tributary to Nagog Brook that flows perennially from a point approximately 150 feet west of the confluence.

#### **4.2.4.1 Compliance with Performance Standards as set forth in 310 CMR 10.58(4) for Riverfront Areas (RFA)**

**Protection of Other Resource Areas:** The work shall meet the performance standards of all other resource areas in the RFA.

TRQC Design Provision: All work within wetland resource areas shall meet the requirements of corresponding performance standards set forth in 310 CMR 10.00 and, where appropriate, the more stringent requirements of the town of Acton Wetlands Bylaw. Work within other resources areas will be limited to the work in connection with the wetland and stream crossing. This includes proposed BWV filling with required replication in accordance with 310 CMR 10.55 (4)(b) that is described below. This also includes work that is associated with the completion of the Country Club in the same location within Bordering Land Subject to Flooding (BLSF). The work within the BLSF is simply the removal of a temporary wetland crossing that was required for construction.

**Protection of Rare Species:** No project may be permitted within the RFA that will have an adverse effect on specified habitat sites of rare wetland or upland, vertebrate or invertebrate species... or which will have any adverse effect on vernal pool habitat certified prior to the filing of a NOI.

TRQC Design Provision: No work is proposed within specified habitat sites of rare wetland or upland, vertebrate or invertebrate species. In addition, no work will have any adverse effect on vernal pool habitat.

**Practicable and Substantially Equivalent Economic Alternatives:** There must be no practicable and substantially equivalent economic alternative to the proposed project with less adverse effects on the interests of the WPA.

TRQC Design Provision: The site contains several intermittent streams and extensive areas of BWV that limit alternatives to the proposed alteration within the Riverfront Area. There are two proposed activities within the Riverfront Area: 1) the wetland crossing for Quail Ridge Drive at Nagog Brook; and 2) necessary site work within the Riverfront Area.

#### **Alternatives Analysis of Riverfront Area Work**

##### **1. Access to Uplands on the West Side of Nagog Brook Adjacent to Nagog Pond**

- **Alternative #1 – Access to Upland outside of the Riverfront Area**

Since the site is essentially bisected by the Riverfront Area associated with Nagog Brook., access to the uplands on the west side of Nagog Brook via Hazelnut Street in the Acorn Park Development is the only potential alternative with no Riverfront Area

impact. Although the Concord Water Department does have limited gated access to their water treatment facility located to the north of the site from Hazelnut Street, an APB straw poll limited this to emergency access only. Notwithstanding the straw poll, the APB, in its Senior Residence Special Permit Decision, required that Hazelnut Street be considered a secondary means of access for the project. Consequently, there is no alternative from Hazelnut Street providing upland access that is entirely outside of the Riverfront Area and acceptable to the APB.

- **Alternative #2 – Access to Upland through alternative on-site location**

Potential locations for upland area access that avoid crossing the Riverfront Area were also investigated. The only public streets abutting the project aside from Hazelnut Street, mentioned above, are Palmer Lane and Great Road. The Riverfront Area associated with Nagog Brook must be crossed to access the upland from either street. There are no other means of access from a public street that would not significantly impact presently undisturbed woodland, Buffer Zones and Bordering Vegetated Wetlands, and/or Riverfront Area.

- **Alternative #3 – Access to Upland through Proposed Wetland Crossing Location (Preferred Alternative)**

Since the area has already been impacted by the construction of the golf course, the proposed access location was selected due to its relatively limited impact on the Riverfront Area, Buffer Zone, and Bordering Vegetated Wetlands. The area of the proposed wetland and stream crossing presently contains several golf boxes, a fairway, a temporary wetland crossing, a wooden bridge wetland crossing and a cart path for golf carts. It is also the location that requires the shortest crossing distance and, therefore, least disturbance of resource area.

Based on the requirements of the ACC and the state wetlands regulations, public safety concerns, the opinion of the APB, the lack of other options for access to the upland in question and the degree to which the proposed crossing area has already been altered, the preferred alternative is the only access available to the proponent and the alternative that minimizes potential impacts to resource areas most effectively.

## **2. Site Work within the Riverfront Area**

- **Alternative #1 – Keeping Work outside of the Riverfront Area**

The work that is proposed within the Riverfront Area consists of elevation and wetland dependant drainage structures and, at the request of the APB, the construction of a sidewalk along Skyline Drive and the slight widening of Skyline Drive near Great Road. Locating drainage structures outside of the Riverfront Area would result in significant reduction in the functionality of the proposed stormwater management system.

- **Alternative #2 – Proposed Location of Work within the Riverfront Area (preferred alternative)**

The proposed drainage structure locations allow for proper sizing and proper slope throughout the drainage system. The proposed infiltration trench near the existing

barn will provide for treatment and recharge of runoff from existing impervious surfaces. This results in an improvement in stormwater management over the existing condition.

The sidewalk along the existing Skyline Drive and the widening of the Skyline Drive intersection with Great Road were added to the project at the APB's request to improve public safety. Since Will's Hole Brook flows underneath Skyline Drive, it is not possible to keep the proposed sidewalk and widening outside of the Riverfront Area. This alternative was selected since alternative #1 would decrease the functionality of the drainage system and construction of the requested sidewalk and Skyline Drive widening outside of the Riverfront Area is not possible.

**The work, including proposed mitigation measures, must have no significant adverse impact on the RFA to protect the interests identified in M.G.L.c.131,§40:**

Pursuant to 310 CMR 10.58 (4)(d)1. Within 200 foot riverfront areas, the issuing authority may allow the alteration of up to 10% of the riverfront area within a lot recorded after October 6, 1997, provided that: a. If there is not a 100 foot wide area of undisturbed vegetation within the riverfront area, existing vegetative cover shall be preserved or extended to the maximum extent feasible to approximate a 100 foot wide corridor of natural vegetation. Replication and compensatory storage required to meet other resource area performance standards are allowed within this area; structural stormwater management measures may be allowed only when there is no practicable alternative. Temporary impacts where necessary for installation of linear site-related utilities are allowed, provided the area be restored to its natural conditions. Proposed work which does not meet the requirement of 310 CMR 10.58(4)(d)1.a. may be allowed only if an applicant demonstrates by a preponderance of evidence from a competent source that an area of undisturbed vegetation with an overall average width of 100 feet will provide equivalent protection of the riverfront area, or that a partial rebuttal of the presumptions of significance is sufficient to justify a lesser area of undisturbed vegetation

TRQC Design Provision: An alteration of approximately 24,800 square feet of riverfront area is associated with the proposed Quail Ridge Drive wetland and stream crossing, sidewalk construction and widening of Skyline Drive near Great Road. This amounts to only 1.8% of the riverfront area within the site. In the immediate area of the crossing of Nagog Brook, there is not a 100 foot wide area of undisturbed vegetation within the riverfront area. This area was extensively altered in connection with the Country Club construction when Nagog Brook was deemed intermittent. However, aside from the roadway improvements, the land within 100 feet of Nagog Brook will largely remain in a vegetated condition, except those features that were constructed in conjunction with the Country Club when Nagog Brook was deemed intermittent. Existing vegetative cover will be preserved to the maximum feasible extent to approximate a 100 foot wide corridor of natural vegetation. Furthermore, the 200 foot riverfront area will remain primarily in a vegetated state. Replication areas will be required to meet other resource area performance standards and are allowed within this area. Structural stormwater management measures are proposed within portions of the riverfront area since there is no practicable alternative. There will be temporary impacts necessary for installation of a force main that will deliver tertiary treated sewage effluent from the proposed wastewater treatment facility on one side of Nagog Brook to drip dispersal areas that will be located on portions of the remaining golf

barn will provide for treatment and recharge of runoff from existing impervious surfaces. This results in an improvement in stormwater management over the existing condition.

The sidewalk along the existing Skyline Drive and the widening of the Skyline Drive intersection with Great Road were added to the project at the APB's request to improve public safety. Since Will's Hole Brook flows underneath Skyline Drive, it is not possible to keep the proposed sidewalk and widening outside of the Riverfront Area. This alternative was selected since alternative #1 would decrease the functionality of the drainage system and construction of the requested sidewalk and Skyline Drive widening outside of the Riverfront Area is not possible.

**The work, including proposed mitigation measures, must have no significant adverse impact on the RFA to protect the interests identified in M.G.L.c.131,§40:**

Pursuant to 310 CMR 10.58 (4)(d)1. Within 200 foot riverfront areas, the issuing authority may allow the alteration of up to 10% of the riverfront area within a lot recorded after October 6, 1997, provided that: a. If there is not a 100 foot wide area of undisturbed vegetation within the riverfront area, existing vegetative cover shall be preserved or extended to the maximum extent feasible to approximate a 100 foot wide corridor of natural vegetation. Replication and compensatory storage required to meet other resource area performance standards are allowed within this area; structural stormwater management measures may be allowed only when there is no practicable alternative. Temporary impacts where necessary for installation of linear site-related utilities are allowed, provided the area be restored to its natural conditions. Proposed work which does not meet the requirement of 310 CMR 10.58(4)(d)1.a. may be allowed only if an applicant demonstrates by a preponderance of evidence from a competent source that an area of undisturbed vegetation with an overall average width of 100 feet will provide equivalent protection of the riverfront area, or that a partial rebuttal of the presumptions of significance is sufficient to justify a lesser area of undisturbed vegetation

TRQC Design Provision: An alteration of approximately 24,800 square feet of riverfront area is associated with the proposed Quail Ridge Drive wetland and stream crossing, sidewalk construction and widening of Skyline Drive near Great Road. This amounts to only 1.8% of the riverfront area within the site. In the immediate area of the crossing of Nagog Brook, there is not a 100 foot wide area of undisturbed vegetation within the riverfront area. This area was extensively altered in connection with the Country Club construction when Nagog Brook was deemed intermittent. However, aside from the roadway improvements, the land within 100 feet of Nagog Brook will largely remain in a vegetated condition, except those features that were constructed in conjunction with the Country Club when Nagog Brook was deemed intermittent. Existing vegetative cover will be preserved to the maximum feasible extent to approximate a 100 foot wide corridor of natural vegetation. Furthermore, the 200 foot riverfront area will remain primarily in a vegetated state. Replication areas will be required to meet other resource area performance standards and are allowed within this area. Structural stormwater management measures are proposed within portions of the riverfront area since there is no practicable alternative. There will be temporary impacts necessary for installation of a force main that will deliver tertiary treated sewage effluent from the proposed wastewater treatment facility on one side of Nagog Brook to drip dispersal areas that will be located on portions of the remaining golf

#### **4.5.1 Compliance with Massachusetts Stream Crossing Standards**

The crossing must comply with the Massachusetts Stream Crossing Standards. The crossing will consist of an open bottom box culvert that will span the entire stream and its floodplain. The bank-full conditions width at the crossing was determined to be 12 feet as determined by field observation of high water marks. The actual top of the bank at the crossing is approximately 20 feet wide at its widest location. The bridge spans range from 24 feet to 35 feet in order to allow the placement of a hay-bale siltation barrier at the top of the bank and avoid the filling of the flood plain. The bridge sections are 5' wide so nine sections are required to accommodate the required roadway cross section of 45'. The height of the box selected was 10' to allow for a 4' embedment into the existing ground. The opening must comply with the openness ratio requirement of .25 as specified in the Standards.

Openness ratio = (Height of box x Width of box)/Length of box > .25 (all calculations in meters)

Height of Box = 3'/3.28' per meter = 0.915 m

Width of Box = 24'/3.28' per meter = 7.32 m

Length of Box = 45'/3.28' per meter = 13.72 m

Openness Ratio = (0.915 x 7.32)/13.72 = 0.49 > .25 ok

The requirement for the opening of the bridge significantly exceeds sizing requirements from a hydrologic perspective. The proposed bridge will span the entire floodplain, therefore further hydraulic analysis is not needed.

#### **4.5.2 Wetland Crossing Construction Sequence**

- Install a siltation barrier prior or the commencement of any construction at all locations and set siltation barrier lines in locations staked by the design engineer.
- Notify ACC forty-eight hours prior to starting construction.
- Clear and grub area within wetlands crossing and designated area for wetlands replication.
- Excavate material within wetlands replication area to one foot below the final grades shown on the plan and stockpile excavated material outside of buffer zone.
- Strip organic material from area within wetlands crossing and spread excavated organic material over wetlands replication area. Complete wetland replication area in compliance with "Procedures for Construction of Wetland Replication Area."
- Install retaining walls and culvert.
- Place and compact gravel fill for Quail Ridge Road within retaining walls at the wetland crossing.
- Stabilize slopes in wetland fill areas with six inches of loam and hydroseeding. Install proposed underground utilities.
- Install roadway surface.

Quail Ridge Drive has one wetland crossing with an open bottom box culvert. As discussed above, no reasonable alternative access to the upland located to the west of Nagog Brook and adjacent to Nagog Pond is available due to the location of Nagog Brook, which bisects the property. Additionally, there are several locations on site where foundation drain outlets and stormwater drainage outlets must be located within 25 feet of the BVW.

Portions of the sewer force main will also be located in the Buffer Zone within 25 feet of the BVW. The force main will, however, be suspended from an existing wooden bridge where it crosses the BVW and Nagog Brook. Additionally, the Skyline Drive sidewalk, required by the APB to provide access from the site to Great Road, will also be located within 25 feet of the BVW.

Grading associated with upland access and around small portions of approximately nine (9) buildings will also be located within the 100-foot Buffer Zone of a BVW. The setbacks from the wetlands to all buildings, driveways, and roadways, however, exceed 75 feet. Finally, several existing stormwater basins will be expanded in order to mitigate stormwater runoff. While grading in the buffer zone will be necessary, the expansion of these basins will be on the upland side of existing earthen berms, thereby maintaining existing setbacks from the BVW.

#### **4.4 BORDERING LAND SUBJECT TO FLOODING (BLSF) - 100-Year Flood Plain**

The Federal Emergency Management Agency's (FEMA) Federal Flood Insurance Rate Map identifies a Zone AE associated with Nagog Brook on the site. The Flood Insurance Study establishes the elevation of the 100-year water surface in the range of 151 to 213 feet, NGVD29. These elevations were taken from the most recently available flood profile data prepared for the Town of Acton under the National Flood Insurance Program, dated January 6, 1988, (administered by the Federal Emergency Management Agency). Pursuant to 310 CMR 10.00, this area is classified as BLSF.

BLSF is likely to be significant to flood control, storm damage prevention and certain portions are likely to be significant to the protection of wildlife habitat. No alteration of the floodplain is proposed. In the vicinity of the proposed stream crossing, an open-bottom box culvert is proposed that will span Nagog Brook and its associated 100-year floodplain, i.e. without filling floodplain. The temporary wetland crossing at Nagog Brook that was associated with the 18-hole golf course construction will be removed and the floodplain will be restored to its original condition as required in the Quail Ridge Country Club Order of Conditions.

#### **4.5 WETLAND CROSSING**

The project includes crossing Nagog Brook with the proposed Quail Ridge Drive at station 11+0. The crossing is necessary in order to extend Quail Ridge Drive (via Skyline Drive) and access the northwest upland portion of the property (See Figure 4-2, Wetland Crossing and Replication Details). The filled area equals 3,470 sq. ft. and the crossing consists of a modular block retaining wall supporting a thirty-foot bridge span. The Proponent proposes the following to mitigate the BVW crossing.

- Loam and seed all disturbed surfaces that have not been stabilized.
- Remove siltation barriers after all vegetation is established and the ACC has issued a Certificate of Compliance.

### **4.5.3 Wetland Replacement**

A 14,224 square foot wetland replication will be added adjacent to the crossing and is designed in accordance with DEP's "Procedures for Construction of Wetland Replication Areas." This area is significantly greater than the lost area of 3,470 square feet associated with the proposed Quail Ridge Drive. The existing wetland area to be altered contains several temporary and permanent wetland crossings being used by the existing golf course. When replicated, the proposed wetland replacement area will include the development of a dense under story that offers superior wildlife habitat diversity by providing good cover for small mammals and amphibians, supports high numbers of insects for insect eating birds, and provides good cover and nesting sites for birds.

The replacement area is proposed within the same general area of the reach of Nagog Brook as the lost area and will be provided with an unrestricted hydraulic connection to the adjacent BVW that surrounds it on three sides. The area is located within the Riverfront Area of Nagog Brook and will meet the performance standards of 310 CMR 10.58 (4) and not result in the alteration of other resource areas.

Significant design provisions have been made to avoid, minimize, and mitigate adverse impacts to the BVW. The proposed crossing is located where the amount of wetland filling will be minimized. Other potential wetland crossings have been entirely avoided by concentrating development primarily to the north of the wetlands that bisect the property rather than distributing it in a manner that would have required multiple and more extensive wetland crossings. In addition, the minimum width of roadway acceptable to the APB has been proposed and extensive retaining walls will be constructed along both sides of the crossing to minimize encroachment into wetland resource areas. Finally, the wetland crossing has been proposed in an area that has already been altered rather than in undeveloped area. As noted above, the area of wetlands to be replicated is well in excess of the minimum required by the regulations.

The proposed replacement area will be located immediately downstream and to the east of the area of BVW to be filled with existing BVW to the west, south and east, making it an ideal location for replication with respect to ground water and surface elevation. Generally, the elevation of the area to be filled ranges between elevation 175 and 184 feet NGVD29 while the elevation of the area to be replicated will range between 174 and 183 feet NGVD29 and maintain a similar horizontal configuration as the area to be filled, with east to west dimensions generally the same as the north to south dimensions.

The Wetland Crossing and Replication Details, Figure 4-2, shows in detail a planting scheme with a list of specific indigenous wetland plants and locations. The wetland replication area is designed with characteristics similar to those of the existing BVW. Planting in the replication area will range from Serviceberry to Pussy Willow to Arrowwood Viburnum. In addition, a 12" log and hummocks will be located in the replication area to maintain further the existing wetland character. As required, the elevation and slope of the replication area are in line with the altered area. Finally, a comprehensive replication area plan was prepared to maximize the successful

development of the new wetland. The ACC's ultimate authority and the Certificate of Compliance ensure that the replacement area will be completed in an acceptable manner.

Extensive Wetland Crossing and Replication Details and a discussion of Construction Sequence and Procedures were included in the Notice of Intent filed with the ACC and are also discussed below. The Construction Sequence for the Wetland Crossing requires simultaneous construction of the replication area and the alteration of the wetland for the crossing.

#### **4.5.3.1 Construction Procedure for Wetland Replication Area**

- Install and maintain siltation barriers on the edge of the existing wetland adjacent to the proposed replication area and adjacent to the proposed roadway crossing of wetland.
- Excavate and grade the replication area to a depth of approximately one foot below the final grades shown on the plans.
- Excavation of wetland area to be disturbed by roadway construction will occur after the replication wetland has been excavated to subgrade. The topsoil or peat from the fill area shall be transferred directly to the replication area. Vegetation, shrubs, root balls, and small tree stumps will not be removed. Vegetation will be trimmed to make it workable. All root clusters will be moved into replication area. Stockpiling of material shall be allowed only temporarily. Additional fill required to bring replication area to grade will be composed of at 25% peat and 75% loam mixture.
- The replication areas should be graded to be level with the adjacent natural wetland. Hand leveling and raking will be used to avoid soil compaction. Any potholes or depressions will be filled to avoid stagnant puddles. Any berms between created and natural wetlands will be removed to allow unrestricted hydraulic connection
- Side slopes at the replication area will not exceed a 2:1 slope and shall be loamed and seeded immediately. Hummocks, rocks, logs, stumps, micro-pool and plantings shall then be installed.
- Following construction of the replication area, staked hay bales will be placed between the replication area and any disturbed upland areas to prevent siltation to the replication area.
- If after one growing season, wetland vegetation has not become established on the replication area floor by natural colonization, a wetlands replication area planting plan will be carried out under the supervision of the ACC consisting of the following:
  - A 50% peat and 50% loam mixture shall be hand spread throughout replication areas to a 6" thickness.
  - Replication area shall then be planted with an equal distribution of red maple saplings, high bush blueberry, sweet pepperbush and cinnamon fern set at 5 foot random spacing
  - Replication area will then be seeded with a hydrophilic grass mixture or Redtop, Bluejoint, and Switchgrass at a rate of 1 pound per 1,000 square feet
- The replication area, vegetated naturally or with commercially purchased supplements, will be inspected at the end of the first and second growing seasons. Replication and repairs will be scheduled as needed to provide adequate cover.

## **4.6 STATUS OF WETLANDS FILING WITH THE ACTON CONSERVATION COMMISSION**

### **4.6.1 Permitting Status**

A Notice of Intent for the proposed work was filed with the ACC on January 3, 2008. Since the APB, in its Senior Residence Special Permit Decision, required a number of changes that are being incorporated into the final plans, the ACC has allowed the public hearing to remain open until revisions to final design plans have been completed.

### **4.6.2 Resource Boundary Review Status**

As discussed above, the wetland boundary was established initially in conjunction with QRCC. Since work impacts on the wetland resources and buffer zones are very limited, the wetland boundaries in several areas have been reevaluated to ensure their accuracy. As previously noted, the status of Nagog Brook was reconsidered and the applicability of the Rivers Act agreed upon with the ACC with regard to the extent of the perennial portion of the stream. Portions of the BVW boundary that were near proposed work areas were reviewed and slightly modified in four locations. These areas are indicated on Figure 4-1, Wetland Resource Areas. The first is near the proposed wetland crossing. The commission wanted this area reevaluated in light of the extensive work associated with the construction of the golf course, including the temporary construction crossing, to ensure that the area is restored properly. Delineation of wetland boundaries in the other three areas exhibited only minor changes. All boundary review work was completed under the commission's oversight, documented, and accepted by the commission. The ACC agrees with the wetland boundaries shown on the plans.

## **4.7 PUBLIC WATER SUPPLIES PROXIMATE TO THE PROJECT**

Nagog Pond is currently used by the Town of Concord as a source for public drinking water. Although the associated Zone A extends slightly onto the northern portion of the project site, the pond and the pump station (located at the spillway, upstream of Nagog Brook) are located upgradient of the proposed project.

The southeast corner of the site is located within a Zone II for the Town of Acton municipal water supply well, Conant I. Conant Well I is located downgradient of the project, approximately 1,300 feet from its closest boundary. Four public water supply wells, serving individual condominiums and apartment complexes, are also located within one half mile of the project site. Figure 4-3, Public Water Supplies, shows the locations of the Zone A, the Zone II, and the Interim Wellhead Protection Areas for the public water supply wells.

