Draft Environmental Impact Statement- Vol. 2 (Appendix)

Brynwood Golf & Country Club

568 Bedford Road
Town of North Castle
Westchester County
New York

(Section 2, Block 8, Lot 7.C1A)

Prepared for **Brynwood Partners, LLC**
New York, New York

Prepared by
VHB Engineering, Surveying and Landscape Architecture, P.C.

White Plains, New York

Date Submitted: March 22, 2013
Date Revised: June 4, 2013
Date Accepted: June 11, 2013
Public Hearing Date: June 27, 2013

DEIS Comments Due By: 30 days after close of hearing

VIII. APPENDIX

Volume 2:

A. All SEQRA documentation, including a copy of the Environmental Assessment Form (EAF), the Positive Declaration and the DEIS Scope
B. Copies of all official correspondence related to issues discussed in the DEIS
C. Petition and Proposed Zoning Amendment
D. Report on Preliminary Subsurface Soil and Foundation Investigation (Carlin Simpson & Associates, 2/13/13)
E. Integrated Turfgrass and Pest Management Plan with Environmental Risk Assessment (ITPMP), (A. Martin Petrovic, March 2013)
F. Stormwater Pollution Prevention Plan (SWPPP), (John Meyer Consulting, PC, March 13, 2013) *Note: Appendices under separate cover*
G. Phase IA Archeological and Historic Resources investigation (Historical Perspectives, Inc., January 2013)
H. Wetland/Natural Resources documentation (including correspondence regarding wetlands and vegetation, Tree survey lists, Soils and Wetland Delineation Report, HGM model sheets, NYSDEC Management of Dredged Sediments information)
I. Proposed Surface Water Sampling Program (LBG, 2/12/13); Surface Water Sampling Program, Leggette Brashears & Graham (May 13, 2013)
J. Town of North Castle Water District No. 2 Well Field Parcel, Town of North Castle, NY (Leggette, Brashears & Graham, Inc. March 2013)
K. Memorandum from VHB regarding school children generation (dated 6/5/12)

VOLUME 3:

L. Phase 1 Environmental Site Assessment (ESA) (Ecosystems Strategies, Inc., 5/15/08)
M. Traffic Impact Analysis (Maser Consulting, PA, March 2013; revised May 2013)
N. Air Quality Appendix (VHB)
O. Noise Appendix (VHB)
P. Brynwood Golf & Country Club Residential Analysis (HR&A, March 18, 2013)
Q. Brynwood Spill Prevention and Containment Protocol (2013)
R. 72- Hour Pump Test Report (Leggette Brashears & Graham, June 2013)

APPENDIX A

617.20
Appendix A
State Environmental Quality Review
FULL ENVIRONMENTAL ASSESSMENT FORM

Purpose: The full EAF is designed to help applicants and agencies determine, in an orderly manner, whether a project or action may be significant. The question of whether an action may be significant is not always easy to answer. Frequently, there are aspects of a project that are subjective or unmeasurable. It is also understood that those who determine significance may have little or no formal knowledge of the environment or may not be technically expert in environmental analysis. In addition, many who have knowledge in one particular area may not be aware of the broader concerns affecting the question of significance.

The full EAF is intended to provide a method whereby applicants and agencies can be assured that the determination process has been orderly, comprehensive in nature, yet flexible enough to allow introduction of information to fit a project or action.

Full EAF Components: The full EAF is comprised of three parts:

Part 1: Provides objective data and information about a given project and its site. By identifying basic project data, it assists a reviewer in the analysis that takes place in Parts 2 and 3.

Part 2: Focuses on identifying the range of possible impacts that may occur from a project or action. It provides guidance as to whether an impact is likely to be considered small to moderate or whether it is a potentially-large impact. The form also identifies whether an impact can be mitigated or reduced.

Part 3: If any impact in Part 2 is identified as potentially-large, then Part 3 is used to evaluate whether or not the impact is actually important.

THIS AREA FOR LEAD AGENCY USE ONLY

DETERMINATION OF SIGNIFICANCE -- Type 1 and Unlisted Actions

Identify the Portions of EAF completed for this project: ☑ Part 1 ☐ Part 2 ☐ Part 3

Upon review of the information recorded on this EAF (Parts 1 and 2 and 3 if appropriate), and any other supporting information, and considering both the magnitude and importance of each impact, it is reasonably determined by the lead agency that:

☐ A. The project will not result in any large and important impact(s) and, therefore, is one which **will not** have a significant impact on the environment, therefore **a negative declaration will be prepared.**

☐ B. Although the project could have a significant effect on the environment, there will not be a significant effect for this Unlisted Action because the mitigation measures described in PART 3 have been required, therefore **a CONDITIONED negative declaration will be prepared.***

☐ C. The project may result in one or more large and important impacts that may have a significant impact on the environment, therefore **a positive declaration will be prepared**.

*A Conditioned Negative Declaration is only valid for Unlisted Actions

Brynwood Golf & Country Club

Name of Action

North Castle Town Board

Name of Lead Agency

Print or Type Name of Responsible Officer in Lead Agency

Title of Responsible Officer

Signature of Responsible Officer in Lead Agency

Signature of Preparer (If different from responsible officer)

September 25, 2012

Date

website

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PART 1--PROJECT INFORMATION
Prepared by Project Sponsor

NOTICE: This document is designed to assist in determining whether the action proposed may have a significant effect on the environment. Please complete the entire form, Parts A through E. Answers to these questions will be considered as part of the application for approval and may be subject to further verification and public review. Provide any additional information you believe will be needed to complete Parts 2 and 3.

It is expected that completion of the full EAF will be dependent on information currently available and will not involve new studies, research or investigation. If information requiring such additional work is unavailable, so indicate and specify each instance.

Name of Action: Brynwood Golf & Country Club

Location of Action (include Street Address, Municipality and County)

568 Bedford Road, North Castle, Westchester County, NY (see Exhibit 1, Site Location)

Name of Applicant/Sponsor: Brynwood Partners LLC

Address: 505 Fifth Avenue

City / PO: New York State: NY Zip Code: 10017

Business Telephone: (212) 775-1111

Name of Owner (if different): (same)

Address:

City / PO: State: Zip Code:

Business Telephone:

Description of Action:

The Proposed Action is the development of an adult oriented residential community at the existing golf/country club, and improvements to club facilities and amenities and the golf course. The residential neighborhood would include a mix of golf condominium units: 64 Golf Residences (58 two-bedroom units and 6 three-bedroom units), 14 Club Villas (three-bedroom units), 5 detached Golf Cottages (4 bedroom units); as well as 5 Fairway Residences (3 bedroom units) in one building south of the clubhouse. Total unit count would be 88 residential units. Proposed club improvements include relocation of tennis courts closer to the clubhouse (and reduction in number from 14 to 6 courts), construction of a new tennis viewing pavilion, as well as a new outdoor pool and patio area, and parking for the club in the existing parking lot (to be improved with added landscaping). Proposed renovations to the club include a reduction in banquet hall size and a new pool and patio. Renovations and improvements to the existing 18-hole golf course are proposed, as well as upgrades to the existing on-site sewage treatment plant. Water supply is proposed to be from on-site wells.

The Proposed Action includes amendments to the North Castle Zoning Ordinance, a special permit for the "golf course community," site plan approval and wetlands permit. Approval may also be required to subdivide the "golf course community" from the golf/country club.

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Please Complete Each Question--Indicate N.A. if not applicable

A. SITE DESCRIPTION

Physical setting of overall project, both developed and undeveloped areas.

1. Present Land Use: ☐ Urban ☐ Industrial ☐ Commercial ☐ Residential (suburban) ☐ Rural (non-farm)
   ☐ Forest ☐ Agriculture ☑ Other Existing country club and related amenities, 18-hole golf course, parking, tennis courts, ponds, wooded open space

2. Total acreage of project area: 156 acres.

APPROXIMATE ACREAGE	PRESENTLY	AFTER COMPLETION
Meadow or Brushland (Non-agricultural)	0 acres	0 acres
Forested	43.7 acres	36.6 acres
Agricultural (Includes orchards, cropland, pasture, etc.)	0 acres	0 acres
Wetland (Freshwater ~~or tidal as per Articles 24,25 of ECL~~)	6.5 local acres	8.8 local acres
Water Surface Area	incl.above acres	incl. above acres
Unvegetated (Rock, earth or fill)	0.1 acres	0.1 acres
Roads, buildings and other paved surfaces	12.0 acres	18.0 acres
Other (Indicate type) golf course/lawns & landscape	88.6/ 5.1 acres	87.4/ 5.1 acres

3. What is predominant soil type(s) on project site? Ub, PnB and CrC are predominant (also CsD, ChC, Rhb, RdB, LcB, SuB, PnC, ChD)
   a. Soil drainage: ☑ Well drained 77 % of site ☑ Moderately well drained 17 % of site.
      ☑ Poorly drained 6 % of site
   b. If any agricultural land is involved, how many acres of soil are classified within soil group 1 through 4 of the NYS Land Classification System? NA acres (see 1 NYCRR 370).

4. Are there bedrock outcroppings on project site? ■ Yes ☐ No
   a. What is depth to bedrock 0 to 5'+ (in feet)

5. Approximate percentage of proposed project site with slopes:
   ☑ 0-10% 47 % ☑ 10- 15% 19 % ☑ 15% or greater 34 %

6. Is project substantially contiguous to, or contain a building, site, or district, listed on the State or National Registers of Historic Places? ☐ Yes ■ No

7. Is project substantially contiguous to a site listed on the Register of National Natural Landmarks? ☐ Yes ■ No

8. What is the depth of the water table? 1.5 to 6'+ (in feet)

9. Is site located over a primary, principal, or sole source aquifer? ☐ Yes ■ No

10. Do hunting, fishing or shell fishing opportunities presently exist in the project area? ☐ Yes ■ No

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11. Does project site contain any species of plant or animal life that is identified as threatened or endangered? ☐ Yes ☒ No

According to:

North Castle Biodiversity Plan (Metropolitan Conservation Alliance, 2007) and statewide database

Identify each species:

none known

12. Are there any unique or unusual land forms on the project site? (i.e., cliffs, dunes, other geological formations?

☐ Yes ☒ No

Describe:

13. Is the project site presently used by the community or neighborhood as an open space or recreation area?

☒ Yes ☐ No

If yes, explain:

private golf course/country club on site since 1961.

14. Does the present site include scenic views known to be important to the community? ☐ Yes ☒ No

note: views of distant hills available from private club (but not from public roadways)

15. Streams within or contiguous to project area:

un-named stream to south of the site

a. Name of Stream and name of River to which it is tributary

tributary to Long Island Sound via Byram River

16. Lakes, ponds, wetland areas within or contiguous to project area:

Locally regulated wetlands and ponds on site

b. Size (in acres):

6.54 acres of locally regulated wetlands; including approx. 4 acres of open water (ponds)

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17. Is the site served by existing public utilities? ☒ Yes ☐ No

a. If **YES,** does sufficient capacity exist to allow connection? ☐ Yes ☒ No

b. If **YES**, will improvements be necessary to allow connection? ☒ Yes ☐ No

18. Is the site located in an agricultural district certified pursuant to Agriculture and Markets Law, Article 25-AA, Section 303 and 304? ☐ Yes ☒ No

19. Is the site located in or substantially contiguous to a Critical Environmental Area designated pursuant to Article 8 of the ECL, and 6 NYCRR 617? ☐ Yes ☒ No

20. Has the site ever been used for the disposal of solid or hazardous wastes? ☐ Yes ☒ No

B. Project Description

1. Physical dimensions and scale of project (fill in dimensions as appropriate).

a. Total contiguous acreage owned or controlled by project sponsor: 156 acres.

b. Project acreage to be developed: 24.5 acres initially; 24.5 acres ultimately.

c. Project acreage to remain undeveloped: 131.5 acres.

d. Length of project, in miles: NA (if appropriate)

e. If the project is an expansion, indicate percent of expansion proposed. tbd %

f. Number of off-street parking spaces existing 345 ; proposed approx. 180 club/194 residential spaces

g. Maximum vehicular trips generated per hour: 46PM/39AM (upon completion of project)?

h. If residential: Number and type of housing units:

	One Family	Two Family	Multiple Family	Condominium
Initially				88
Ultimately				88

i. Dimensions (in feet) of largest proposed structure: 39.5' height; 90' width; 180' length.

j. Linear feet of frontage along a public thoroughfare project will occupy is? 1500'+ ft.

2. How much natural material (i.e. rock, earth, etc.) will be removed from the site? TBD tons/cubic yards.

3. Will disturbed areas be reclaimed ☒ Yes ☐ No ☐ N/A

a. If yes, for what intended purpose is the site being reclaimed?

Areas disturbed for grading that are not proposed to be impervious will be reclaimed as either landscaped areas and/or golf course areas

b. Will topsoil be stockpiled for reclamation? ☒ Yes ☐ No

c. Will upper subsoil be stockpiled for reclamation? ☒ Yes ☐ No

4. How many acres of vegetation (trees, shrubs, ground covers) will be removed from site? approx. 7.1 acres.

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5. Will any mature forest (over 100 years old) or other locally-important vegetation be removed by this project?

[■] Yes [ ] No

6. If single phase project: Anticipated period of construction: N/A months, (including demolition)

7. If multi-phased:

   a. Total number of phases anticipated TBD (number)

   b. Anticipated date of commencement phase 1: 3 month 2014 year, (including demolition)

   c. Approximate completion date of final phase: TBD month TBD year.

   d. Is phase 1 functionally dependent on subsequent phases? [ ] Yes [■] No

8. Will blasting occur during construction? [■] Yes [ ] No

9. Number of jobs generated: during construction 300 ; after project is complete 75

10. Number of jobs eliminated by this project 0 .

11. Will project require relocation of any projects or facilities? [■] Yes [ ] No

    If yes, explain:

    Relocation of tennis courts and some club facilities; golf maintenance facility may be expanded. (Detail will be provided in EIS)

12. Is surface liquid waste disposal involved? [■] Yes [ ] No

    a. If yes, indicate type of waste (sewage, industrial, etc) and amount sewage: expansion of on-site STP

    b. Name of water body into which effluent will be discharged on-site stream, as per current permit

13. Is subsurface liquid waste disposal involved? [ ] Yes [■] No Type

14. Will surface area of an existing water body increase or decrease by proposal? [■] Yes [ ] No

    If yes, explain:

    Existing ponds on golf course may be expanded to improve aesthetics, manage storm water, irrigation and/or wetland mitigation.

15. Is project or any portion of project located in a 100 year flood plain? [ ] Yes [■] No

16. Will the project generate solid waste? [■] Yes [ ] No

    a. If yes, what is the amount per month? TBD tons

    b. If yes, will an existing solid waste facility be used? [■] Yes [ ] No

    c. If yes, give name (private carters) ; location TBD(to licensed facilities)

    d. Will any wastes not go into a sewage disposal system or into a sanitary landfill? [ ] Yes [■] No

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e. If yes, explain:

17. Will the project involve the disposal of solid waste? ☐ Yes ☒ No

a. If yes, what is the anticipated rate of disposal? _______ tons/month.

b. If yes, what is the anticipated site life? _______ years.

18. Will project use herbicides or pesticides? ☒ Yes ☐ No

19. Will project routinely produce odors (more than one hour per day)? ☐ Yes ☒ No

20. Will project produce operating noise exceeding the local ambient noise levels? ☐ Yes ☒ No

21. Will project result in an increase in energy use? ☒ Yes ☐ No

If yes, indicate type(s)

Energy use for residential units and club facilities (electricity, heating oil, fossil fuels)

22. If water supply is from wells, indicate pumping capacity TBD gallons/minute.

23. Total anticipated water usage per day 32,300 gallons/day.

24. Does project involve Local, State or Federal funding? ☐ Yes ☒ No

If yes, explain:

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25. Approvals Required:

	Yes	No	Type	Submittal Date
~~City~~, Town, ~~Village~~ Board	[x] Yes	[ ] No	Zoning Amendments; Special Permit; possible Water Dist. Extension; approval of sewer and water works corporations.	
~~City~~, Town, ~~Village~~ Planning Board	[x] Yes	[ ] No	Site Plan, Wetland Permit, Potential Subdivision	
~~City~~, Town Zoning Board	[ ] Yes	[x] No		
City, County Health Department	[x] Yes	[ ] No	Sewage Treatment Plant Expansion; Water System	
Other Local Agencies	[x] Yes	[ ] No	County Planning Board	
Other Regional Agencies	[ ] Yes	[ ] No		
State Agencies	[x] Yes	[ ] No	NYSDEC (SWPPP);water supply NYSDOT (HWP) NYSDECwastewaterSPDES	
Federal Agencies	[ ] Yes	[x] No		

C. Zoning and Planning Information

1. Does proposed action involve a planning or zoning decision? [x] Yes [ ] No

If Yes, indicate decision required:

- [x] Zoning amendment
- [ ] Zoning variance
- [ ] New/revision of master plan
- [x] Subdivision
- [x] Site plan
- [x] Special use permit
- [ ] Resource management plan
- [ ] Other

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2. What is the zoning classification(s) of the site?

R-2A (residential, min. 2 acre lot)

3. What is the maximum potential development of the site if developed as permitted by the present zoning?

49 single-family homes on min. 2-acre lots

4. What is the proposed zoning of the site?

R-2A with "golf course community" and "membership club" special permits

5. What is the maximum potential development of the site if developed as permitted by the proposed zoning?

Golf/country club and residential, generally as proposed with up to 88 units

6. Is the proposed action consistent with the recommended uses in adopted local land use plans? ☐ Yes ☒ No

Town Development Plan map (1996) indicates "private recreation"

7. What are the predominant land use(s) and zoning classifications within a ¼ mile radius of proposed action?

Land Use:
Public school, single-family residential, highway, open space, private recreation (private tennis club, private neighborhood recreation/open space in Windmill Farms).

Zoning:
R-4A, R-2A, R-1A, R-1.5 A

8. Is the proposed action compatible with adjoining/surrounding land uses with a ¼ mile? ☒ Yes ☐ No

9. If the proposed action is the subdivision of land, how many lots are proposed? TBD

a. What is the minimum lot size proposed? TBD

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10. Will proposed action require any authorization(s) for the formation of sewer or water districts? ☒ Yes ☐ No

Approval of water works and sewer works corporations; possible expansion of North Castle Water District No. 2; private sewer district will remain the same; with upgrades to ST Plant as required to accommodate Proposed Action.

11. Will the proposed action create a demand for any community provided services (recreation, education, police, fire protection?

☒ Yes ☐ No

a. If yes, is existing capacity sufficient to handle projected demand? ☒ Yes ☐ No

Private roads within project, and taxes generated are anticipated to offset most municipal costs from project (detail to be provided in EIS)

12. Will the proposed action result in the generation of traffic significantly above present levels? ☒ Yes ☐ No

a. If yes, is the existing road network adequate to handle the additional traffic. ☒ Yes ☐ No

TBD (Traffic Impact Study to be provided in EIS).

D. Informational Details

Attach any additional information as may be needed to clarify your project. If there are or may be any adverse impacts associated with your proposal, please discuss such impacts and the measures which you propose to mitigate or avoid them.

E. Verification

I certify that the information provided above is true to the best of my knowledge.

Applicant/Sponsor Name B. Von Ohlsen, VHB for Brynwood Date Sept. 25, 2012

Signature Bonnie Von Ohlsen

Title Senior Project Manager

If the action is in the Coastal Area, and you are a state agency, complete the Coastal Assessment Form before proceeding with this assessment.

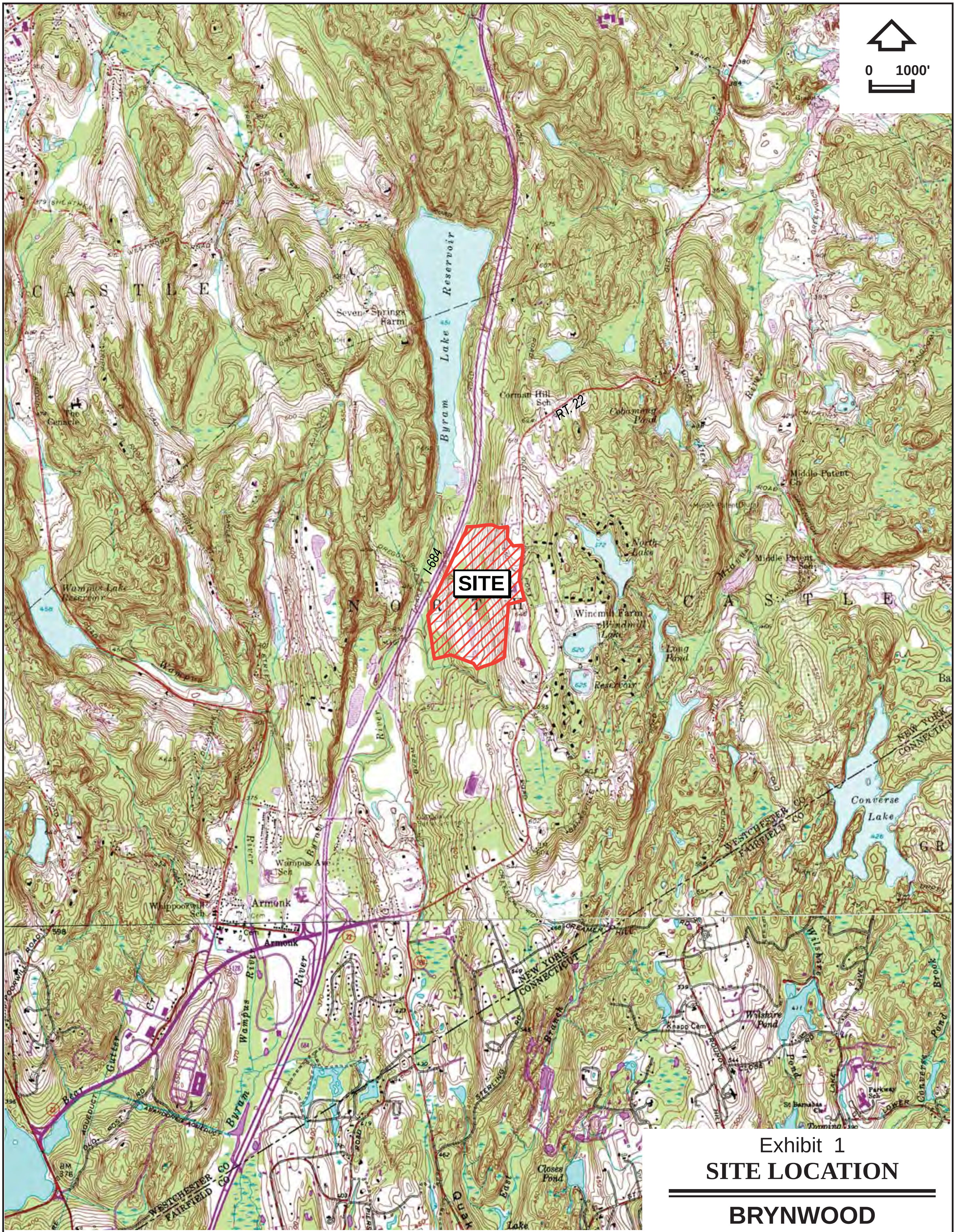

Exhibit 1

SITE LOCATION

BRYNWOOD
North Castle, New York

VHB Saccardi & Schiff

SOURCE: Geographic Information Systems Clearinghouse

State Environmental Quality Review
POSITIVE DECLARATION
Notice of Intent to Prepare a Draft EIS
Determination of Significance
Notice of Scoping Session

This notice is issued pursuant to Part 617 of the implementing regulations pertaining to Article 8 (State Environmental Quality Review Act) of the Environmental Conservation Law.

The Town of North Castle Town Board, acting as Lead Agency, has determined that the proposed action described below may have a significant effect on the environment and that a Draft Environmental Impact Statement will be prepared.

Date: November 8, 2012

Name of Action: Brynwood Golf & Country Club

SEQRA Status: Type I

Description of Action: Application for the development of an adult oriented residential community at the existing Brynwood golf/country club, and improvements to club facilities and amenities and the golf course. The residential neighborhood would include a mix of golf condominium units: 64 Golf Residences (58 two-bedroom units and 6 three-bedroom units), 14 Club Villas (three-bedroom units), 5 detached Golf Cottages (4 bedroom units); as well as 5 Fairway Residences (3 bedroom units) in one building south of the clubhouse. Total unit count would be 88 residential units.

Proposed club improvements include relocation of tennis courts closer to the clubhouse (and reduction in number from (14 to 6 courts), construction of a new tennis viewing pavilion, as well as a new outdoor pool and patio area, and parking for the club in the existing parking lot (to be improved with added landscaping).

Proposed renovations to the club include a reduction in banquet hall size and a new pool and patio.

Renovations and improvements to the existing 18-hole golf course are proposed, as well as upgrades to the existing on-site sewage treatment plant. Water supply is proposed to be from on-site wells.

The Proposed Action includes amendments to the North Castle Zoning Ordinance, a special permit for the "golf course community," site plan approval and wetlands permit. Approval may also be required to subdivide the "golf course community" from the golf/country club and amendments to the Town Comprehensive Plan Update 1996.

Location: Located in the Town of North Castle
568 Bedford Road, North Castle, Westchester County, NY
Tax Lot: Section 2, Block 08, Lot 7.C1A

Reasons Supporting This Determination:

Based upon a review of the applicant's submitted Full Environmental Assessment Form and all other application materials that were prepared for this action, the Lead Agency has determined that the proposed action may have the following significant adverse impacts:

1. The potential for significant impacts related to land use, zoning, and public policy. The Proposed Action would change the land use on the property from private membership club to an adult oriented residential community, requiring amendments to the Town Comprehensive Plan and Town Code.

2. The potential for significant natural resources impacts. The proposed construction would result in the physical alteration of approximately 150 acres, including land with slopes in excess of 15%, with shallow depth to bedrock and containing areas of existing vegetation, wildlife habitat as well as impacts to Town-regulated wetland buffers and Town-regulated trees.

3. The potential for significant open space impacts. The proposed construction would result in the physical alteration of approximately 150 acres and would change the land use on the property from private membership club to an adult oriented residential community.

4. The potential for significant impacts related to historic and cultural resources. The statewide inventory of archaeological resources maintained by the New York State Museum and the New York State Office of Parks, Recreation, and Historic Preservation indicate that the project is located within an area considered to be sensitive with regard to archaeological resources.

5. The potential for significant impacts related to the provision of community facilities and services. The proposed project may create additional demand for police, fire, highway maintenance, and solid waste services.

6. The potential for significant impacts related to the provision of school services. The proposed project may create additional demand for school children.

7. The potential for significant construction impacts. The proposed construction would continue for more than 1 year.

8. The potential for significant impacts related to air quality and greenhouse gas emissions. The proposed project would create new stationery and mobile sources of potential air pollutants and greenhouse gases.

9. The potential for significant impacts related to stormwater runoff. The proposed construction will require a discharge permit.

10. The potential for significant impacts related to water and sewer infrastructure. The provision of central sewerage on the site and the construction of water supply wells with greater than 45 gallons per minute pumping capacity.

11. The potential for significant design/visual resource impacts and neighborhood character impacts. The construction of an adult oriented residential community at an existing golf/country club.

12. The potential for significant impacts related to conflicts with the adopted Comprehensive Plan. The Proposed Action may conflict with officially adopted plans or goals.

13. The potential for significant impacts related to hazardous materials. Runoff from the site may contain fertilizers and pesticides and may affect water quality.

14. The potential for significant impacts related to transportation. Traffic as a result of the Proposed Action may affect the existing roadway network.

Scoping Information:

Scoping of the issues to be contained in the EIS will be conducted. The Applicant has prepared a draft scope for consideration and is attached to this document. Involved agencies should provide written comments reflecting their concerns, jurisdictions and information needs sufficient to ensure that the EIS will be adequate to support their SEQR findings.

In addition, the Lead Agency will hold a public scoping session on Monday, November 26, 2012 at 7:00 PM at the following location:

Hergenhan Recreation Center
40 Maple Avenue
Armonk, NY 10504

Lead Agency: Town of North Castle Town Board
Town Hall
15Bedford Road
Armonk, New York 10504

Lead Agency Contact Person: Adam R. Kaufman, AICP, Director of Planning
Town of North Castle
17 Bedford Road
Armonk, NY 10504
Telephone: (914) 273-3542
Fax: (914) 273-3554
E-mail: planning@northcastleny.com

<u>A Copy Of This Notice Has Been Sent To The Following Involved and Interested Agencies</u>:

Town of North Castle Planning Board, Town Hall Annex, 17 Bedford Road, Armonk, New York 10504

Town of North Castle Town Board, Town Hall, 15, Bedford Road, Armonk, New York 10504

U.S. Army Corps of Engineers, Jacob Javits Federal Building, 26 Federal Plaza, New York 10278

Commissioner, New York State Department of Environmental Conservation, 625 Broadway, Albany, New York 12233-1011

Region 3, New York State Department of Environmental Conservation, 21 South Putt Corners Road, New Paltz, New York 12561

Deputy Commissioner Historic Preservation, New York State Office of Parks, Recreation and Historic Preservation, Empire State Plaza, Agency Building 1, 20th Floor, Albany. New York 12238

Westchester County Department of Health, Attn: Commissioner, 145 Huguenot St., New Rochelle, New York 10801

Sal Misiti, Town of North Castle, Department of Sewer and Water, 115 Business Park Drive, Armonk, New York 10504

Dr. William Donohue, Superintendent, Byram Hills School District, 12 Tripp Lane, Armonk, NY 10504

Open Space Committee, 17 Bedford Road, Armonk, New York 10504

New York State Department of Transportation, SEQR Unit, Traffic Engineering & Safety Division
4 Burnett Blvd., Poughkeepsie, New York 12603

John Fava, Chairman, Town of North Castle Conservation Board, Town Hall Annex, 17 Bedford Road, Armonk, New York 10504

Beata Buhl Tatka, Chairman, Town of North Castle Architectural Review Board, Town Hall Annex, 17 Bedford Road, Armonk, New York 10504

Building Inspector, Town Hall Annex - 17 Bedford Road, Armonk, New York 10504

Sue Snyder, Superintendent, Town of North Castle Parks and Recreation Department, 40 Maple Avenue, Armonk, New York 10504

Jamie Norris, Highway Superintendent, Town of North Castle, Town Hall, 15 Bedford Road, Armonk, New York 10504

Fire Commissioners, Town of North Castle Fire District No. 2, PO Box 188, Armonk, New York 10504

Westchester County Planning Board, Attn: Ed Buroughs, AICP, Commissioner, 432 Michaelian Office Building, 148 Martine Avenue, White Plains, New York 10601

The Environmental Notice Bulletin (ENB), enb@gw.dec.state.ny.us

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SCOPING DOCUMENT *DRAFT*
10/30/12
Draft Environmental Impact Statement

Name of Proposed Action:

Brynwood Golf & Country Club

Location: 568 Bedford Road
Town of North Castle, Westchester County, New York

SEQRA Classification: Type 1

Prepared By:
VHB Engineering, Surveying and Landscape Architecture, PC
50 Main Street, Suite 360
White Plains, New York 10606
914-467-6600
Contacts: John Saccardi, Bonnie Von Ohlsen

Date Adopted: _____________________

DRAFT
SCOPING DOCUMENT
BRYNWOOD DRAFT ENVIRONMENTAL IMPACT STATEMENT

INTRODUCTION

A Draft Environmental Impact Statement (DEIS) will be prepared in accordance with the requirements of 6 NYCRR Part 617.9, to assess the potentially significant adverse environmental impacts of the redevelopment of a 156-acre site with a proposed 88-unit residential community, as well as renovations to the existing Brynwood Golf & Country Club clubhouse, recreational facilities and existing 18-hole golf course. The Proposed Action includes amendments to the Zoning Code of the Town of North Castle to create a new residential special permit use in the R-2A One-Family Residential District of the Town to be known as "Golf Course Community", as well as changes to the regulations governing "Membership Clubs". The proposed development site is located at 568 Bedford Road (NYS Route 22), in North Castle, Westchester County, New York.

PROJECT SCOPING

This Scoping Document identifies the potentially significant adverse environmental impacts of the Proposed Action, and the mitigation measures for any such impacts, that will be addressed in the DEIS.

DESCRIPTION OF THE PROPOSED ACTION

The project sponsor and property owner, Brynwood Partners, LLC (the "Applicant"), is proposing to develop 88 residential units on the site to provide a new residential and lifestyle option in the Town of North Castle, and to improve the facilities and golf course of the Brynwood Golf & Country Club. Currently, the site is improved with the facilities of the former Canyon Club, including a golf course, swimming pool, tennis courts and clubhouse, which has recently been renovated. The proposed residential use is not currently permitted in the R2A One-Family Residential District. The Proposed Action includes amendments to the Zoning Code of the Town of North Castle to establish a new residential special permit use in the R-2A One-Family Residential District to be known as "Golf Course Community," which would be subject to Town Board approval. The Zoning Code is also proposed to be amended to modify certain of the regulations applicable to "Membership Clubs." In addition, the Town's Comprehensive Plan would be amended, as necessary, to reflect the proposed use.

REQUIRED APPROVALS

At this time it is anticipated that the following approvals and permits will be required:

Type of Approval	Agency
Zoning Code amendments and Special Permit (if Zoning Code amendments are adopted); Comprehensive Plan amendments; Possible Water District No. 2 extension and approval of sewer and water works corporations	North Castle Town Board
Site Plan approval, Wetland Permit, Subdivision approval	North Castle Planning Board
Water supply; sewage treatment plant expansion	Westchester County Health Department
General Municipal Law project review	Westchester County Planning Board
Highway work permit	NYS Department of Transportation
Stormwater SPDES Permit, Stormwater Pollution Prevention Plan approval, modification to wastewater treatment plant SPDES Permit	NYS Department of Environmental Conservation

GENERAL SCOPING CONSIDERATIONS

The Applicant will prepare a site-specific, project specific Draft Environmental Impact Statement (DEIS) addressing all items identified in this Scoping Document. The Applicant will incorporate information from other development underway or proposed in the local vicinity *[consult with town planner on specific projects to include]* and include, where appropriate, discussions on cumulative adverse impacts.

The DEIS will discuss relevant and material facts and evaluate the reasonable alternatives to the Proposed Action identified in this Scoping Document. It will be clearly and concisely written in plain language that can be easily read and understood by the public. Highly technical material will be summarized and, if it must be included in its entirety, will be referenced in the DEIS and included as an appendix. In addition, all project correspondence from involved and interested agencies will be included in an appendix to the DEIS.

The DEIS will be written in the third person without use of the terms I, we, and our. Narrative discussions will be accompanied to the greatest extent possible by illustrative tables and graphics. All graphics will clearly identify the project area. Each potential impact category (such as land use and zoning impacts, and traffic impacts) will be the subject of a separate section describing existing conditions, anticipated impacts, and proposed mitigation.

The full DEIS will be made available to the Lead Agency in both hard copy and electronic formats. The electronic format will be in Adobe Acrobat (.pdf) file. When the DEIS is accepted for public review by the Lead Agency, sufficient hard copies will be provided to allow placement of a copy at the local library and Town Planning Department for public review during normal business hours. In addition, the full DEIS will be posted on the internet for public review as required by law.

CONTENTS OF THE DEIS

Cover Sheet listing title of project, location, identification as a DEIS, Lead Agency, Applicant, preparer, and relevant dates (i.e. date of document preparation and spaces for dates of DEIS acceptance, public hearing, final date for acceptance of comments). A list of preparers will include the firm name, contact name, address, and phone number for all consultants who helped prepare the document. The Lead Agency and Applicant will be identified with a contact name and a phone number as well.

Table of Contents including listings of primary DEIS sections and subsections, tables, figures, drawings, appendices, and any items that may be submitted under separate cover (and identified as such), with page numbers listed for each.

I Executive Summary

The Executive Summary will include a brief description of the Proposed Action and a listing of all potential significant adverse environmental impacts and proposed mitigation measures. A summary will be provided of the approvals and permits required, and of the alternatives to the Proposed Action that are evaluated in the DEIS. The Executive Summary will only include information that is found elsewhere in the main body of the DEIS.

II Description of Proposed Action

A. Site Location
B. Site History, Existing Uses and Facilities
C. Zoning
    1. Existing Zoning - including description of existing “Membership Club” Special Permit
    2. Proposed Zoning: “Golf Course Community” and modifications to the regulations for “Membership Clubs”
    3. Middle Income Housing
D. Proposed Development Plan
    1. Site Access and Circulation
    2. Club Core/Clubhouse
        a. Dining Facilities
        b. Recreation Facilities (Pools and Tennis)
        c. Club Parking
    3. Proposed Residential Development
        a. Residential Unit Types and architectural design
        b. Residential Parking

b. Club lifestyle/memberships for residents

4. Golf Course
   a. Proposed golf course renovations
   b. Maintenance area
   c. Integrated Pest Management Program
5. Utilities
   a. Sanitary Sewer and wastewater treatment plant
   b. Water Supply
   c. Stormwater

E. Project Purpose, Needs and Benefits

F. Involved Agencies and Required Approvals

III <u>Existing Environmental Conditions, Anticipated Impacts and Mitigation</u>

A. Land Use and Zoning

1. Existing Conditions
- On Site
- Surrounding Area (within ½ mile)
- Relevant Planning Studies
  - Town Comprehensive Plan
  - *Town Open Space Inventory*
  - County "Patterns" and Westchester 2025

2. Anticipated Impacts
   a. Describe potential impacts of the Proposed Action in relation to existing land uses on site, surrounding land uses, and to policies in relevant planning studies.
   b. Compliance with the Comprehensive Plan and other documents
3. Mitigation

B. Visual and Community Character

1. Existing Conditions
   a. Views to the site from surrounding roadways (Route 22, Coman Hill School; and abutting homes on Embassy Court, Ilana Court and Evergreen Row)
   b. Views from the site to surrounding areas
2. Anticipated Impacts (illustrate with sketches, photo-simulations, or cross sections, as appropriate)
   a. Views to the site from surrounding roadways and areas described above (post-development)
   b. Views from the site to surrounding areas (post-development)
3. Mitigation (describe proposed architectural character, proposed landscaping and buffering)

C. Geology and Soils

1. Existing Conditions
2. Anticipated Impacts

a. Preliminary grading plan and limit of disturbance line
b. Cut and fill earthwork estimate (clubhouse and residential area; golf course)
b. Blasting potential

3. Mitigation (including preliminary erosion control plan; and blasting mitigation plan, if required)

D. Topography and Steep Slopes

1. Existing Conditions – provide slope map of site including slope categories of 0-15%, 15-25%, and 25% and greater
2. Anticipated Impacts – provide limit of disturbance line on preliminary grading plan and describe potential impacts to steep slopes (25% and greater)
3. Mitigation (including description of preliminary erosion control plan and slope stabilization measures)

E. Vegetation and Wildlife

1. Existing Conditions
   a. Vegetation - provide tree survey of trees over 8” dbh (in accordance with North Castle Tree Preservation Code), within the preliminary limit of disturbance and provide mapping of vegetative communities on site
   b. Wildlife - provide data investigating any rare, threatened or endangered species on site using NYSDEC and NYNHP database, as well as review of North Castle Biodiversity Plan (MCA, 2006)
2. Anticipated Impacts
   a. Describe anticipated tree removal, both for golf course renovations and for residential development
   b. Describe potential impacts to vegetative communities, as well as potential impacts to wildlife on site
3. Mitigation

F. Watercourses, Wetlands and Waterbodies

1. Existing Conditions
   a. Describe watercourses and ponds on site
   b. Provide jurisdictional delineations for wetlands
   c. Provide functional analysis of existing wetland communities
   d. Provide acreage of regulated wetlands and buffers
2. Anticipated Impacts
   a. Watercourses and ponds
   b. Wetlands and Wetland Buffers
   c. Describe regulated activities and permits required for those activities
3. Mitigation (include description of permit procedures, as well as Integrated Pest Management Program)

G. Stormwater Management

1. Existing Conditions – describe pre- and post-development drainage conditions for the residential and club core development areas
2. Anticipated Impacts
   a. Stormwater Quantity
   b. Stormwater Quality
3. Mitigation (stormwater management plan)

H. Hydrogeology and Water Supply

1. Existing Conditions (include description, location and use of existing wells, water storage facilities, current water supply for clubhouse and golf course)
2. Anticipated Impacts
   a. Groundwater recharge with project
   b. Monitoring of limited sample of surrounding wells to determine potential drawdown impacts
   c. Describe future demand for potable water for both residential and clubhouse components
   d. Describe fire protection demand
   e. Describe irrigation demand, including demand during grow-in period
   f. Describe water storage
3. Mitigation

I. Wastewater

1. Existing Conditions (existing wastewater treatment plant location, description, capacity, outfall; existing SPDES permit)
2. Anticipated Impacts (wastewater generation; club and residential)
3. Mitigation (describe upgrade to the existing wastewater treatment plant to accommodate the residential component)

J. Cultural Resources

1. Existing Conditions (Phase 1A Study to describe archeological and historical resources on site, if any)
2. Anticipated Impacts (include potential impacts to archeological or historical resources)
3. Mitigation (including subsequent Phase 1B study, if required)

K. Traffic

1. Existing Conditions – describe surrounding road system
   a. Existing Traffic Volumes for the Weekday Peak AM and PM Hours at the following intersections:
      -Route 22 and Chestnut Ridge

-Route 22 and Baldwin Road
-Route 22 and Club Access
-Route 22 and Upland Lane/Coman Hill Elementary School
-Route 22 and Tripp Lane/Byram Hills High School
-Route 22 and Banksville Road
-Route 22 and North Greenwich Road (Route 433)

b. Capacity Analysis (Level of Service) for each of the above intersections (SYNCHRO Analysis)
c. Route 22 Accident Data (for latest 3 years)
d. Provide existing parking count for club

2. Anticipated Impacts
   a. "No Build" Traffic Volumes/Capacity Analysis - to include background traffic growth and other proposed projects in the area (to be provided by the Town)
   b. "Build" Traffic Volumes/Capacity Analysis - to include anticipated trip generation for the Proposed Action
   c. Sight Distance at Site Access
   d. Parking Analysis
3. Mitigation

L. Community Facilities and Services

1. Existing Conditions
   a. Schools (including enrollment projections and capacities)
   b. Police
   c. Fire Protection/EMS
   d. Open Space and Recreation
   e. Solid Waste
2. Anticipated Impacts
   a. Schools
   b. Police
   c. Fire Protection/EMS
   d. Open Space and Recreation
   e. Solid Waste
3. Mitigation

M. Economics/Fiscal

1. Existing Conditions
   a. Taxes to each jurisdiction
   b. Employment
2. Anticipated Impacts
   a. Taxes to each jurisdiction
   b. Service costs
      1. Town of North Castle
      2. School District
   c. Employment - Construction and permanent jobs, including summer jobs for local

youth
d. "Halo effect" - secondary impacts to local businesses and services
3. Mitigation

IV Significant Adverse Impacts That Cannot be Avoided
1. Long Term
2. Short Term Construction Impacts (including mitigation measures)

V Alternatives
1. No Action
2. Existing R-2A Zoning:
    A. Conventional Subdivision
    B. Conservation Subdivision
3. 98-Unit Plan
4. Alternatives to Tripp Lane access to Byram Hills High School
5. Connection to Public Water Supply: Describe potential impacts, improvements required and procedures necessary to connect the project to North Castle Water District No. 2.

VI Growth Inducement

VII Effects on Energy and Irreplaceable Commitment of Resources

VIII Appendix
A. SEQRA Documentation (SEQRA Notices, Adopted Scoping Document)
B. Other Project Correspondence
C. Proposed Zoning Code amendments
D. Technical Studies
- Natural Resource Reports (Wetlands, Vegetation and Wildlife)
- Stormwater Management Report
- Water Supply Report
- Phase 1A Cultural Resources Report
- Traffic Impact Study

NOTICE OF PUBLIC SCOPING MEETING
PURSUANT TO THE STATE ENVIRONMENTAL QUALITY REVIEW ACT (SEQRA)

Lead Agency: Town of North Castle Town Board

Name of Action: Brynwood Golf & Country Club

Purpose of Meeting: To provide an opportunity for the public to identify specific issues and environmental impacts that should be addressed in a Draft Environmental Impact Statement (DEIS) for the Brynwood Golf & Country Club.

Meeting Time and Date: 7:00 pm on Monday November 26, 2012.

Meeting Location: Hergenhan Recreation Center, 40 Maple Avenue, Armonk, NY 10504

Draft Scoping Document: A Draft Scoping Document, prepared by the Applicant, is available online for public review and comment (http://www.northcastleny.com/Brynwood.php). The Draft Scoping Document identifies the significant environmental conditions and resources that are proposed to be addressed in the DEIS.

Conduct of Meeting: Sign-up cards will be available for any persons wishing to speak, and a record will be made of the comments presented. The meeting will not be a question and answer session, but is intended to provide as many people as possible with the opportunity to provide meaningful input specific to the scope and content of the DEIS. The Supervisor will call speakers in turn, and if necessary, will set appropriate time limits. Written comments will also be accepted.

Comment Deadline: Written comments regarding issues to be addressed in the DEIS for Brynwood Golf & Country Club will be accepted until 7:00 pm on November 26, 2012. Written comments will be given the same consideration as oral comments made at the public scoping meeting. Please send written comments to Adam R. Kaufman, AICP, Director of Planning, Town of North Castle, 17 Bedford Road, Armonk, NY 10504, Telephone: (914) 273-3542, Fax: (914) 273-3554, E-mail: planning@northcastleny.com Please include your name and address when submitting a comment (no anonymous comments will be accepted).

Future Steps: A Final Scoping Document is expected to be completed by November 28, 2012, based on full consideration of the comments submitted on the Draft Scoping Document. Subsequently, a DEIS will be prepared in accordance with the Final Scoping Document, and will contain detailed information regarding the proposed action, potential environmental impacts, and appropriate measures to avoid, minimize, and/or mitigate any significant impacts encountered. The DEIS will be made available for public review and comment following its acceptance by the Lead Agency. Following public review and comment on the DEIS, the SEQRA process cannot be concluded until a Final Environmental Impact Statement (FEIS) is prepared followed by issuance of a Findings Statement by the Lead Agency.

FINAL SCOPE
BRYNWOOD GOLF & COUNTRY CLUB
TOWN OF NORTH CASTLE
WESTCHESTER COUNTY, NEW YORK

DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)
SCOPE OF ISSUES TO BE ADDRESSED
January 16, 2013

<u>Name of Project</u>:	Brynwood Golf & Country Club
<u>Project Location</u>:	Located in the Town of North Castle 568 Bedford Road, North Castle, Westchester County, NY Tax Lot: Section 2, Block 08, Lot 7.C1A
<u>SEQRA Classification</u>:	Type I Action
<u>Lead Agency</u>:	Town of North Castle Town Board Town Hall 17 Bedford Road Armonk, New York 10504 (914) 273-3542
<u>Lead Agency Contact</u>:	Adam R. Kaufman, AICP Director of Planning 17 Bedford Road Armonk, New York 10504 Telephone: (914) 273-3542
<u>Scoping Session</u>:	Hergenhan Recreation Center 40 Maple Avenue Armonk, NY 10504 November 26, 2012 – 7:00 pm
<u>Written Scoping Comments:</u>	Written scoping comments were received until close of business on December 6, 2012; directed to: Adam R. Kaufman, AICP, Director of Planning, Town of North Castle, 17 Bedford Road, Armonk, NY 10504 Telephone: (914) 273-3542
<u>Date Adopted:</u>	January 23, 2013

TABLE OF CONTENTS/ORGANIZATION OF THE DEIS SCOPE

INTRODUCTION

A Draft Environmental Impact Statement (DEIS) will be prepared in accordance with the requirements of 6 NYCRR Part 617.9, to assess the potentially significant adverse environmental impacts of the redevelopment of a 156-acre site with a proposed 88-unit residential community, as well as renovations to the existing Brynwood Golf & Country Club clubhouse, recreational facilities and existing 18-hole golf course. The Proposed Action includes amendments to the Zoning Code of the Town of North Castle to create a new residential special permit use in the R-2A One-Family Residential District of the Town to be known as "Golf Course Community", as well as changes to the regulations governing "Membership Clubs". The proposed development site is located at 568 Bedford Road (NYS Route 22), in North Castle, Westchester County, New York.

DESCRIPTION OF THE PROPOSED ACTION

The project sponsor and property owner, Brynwood Partners, LLC (the "Applicant") has submitted an application for the development of an adult oriented residential community at the existing Brynwood Golf & Country Club, and improvements to club facilities and amenities and the golf course. The residential neighborhood would include a mix of golf condominium units: 64 Golf Residences (58 two-bedroom units and 6 three-bedroom units), 14 Club Villas (three-bedroom units), 5 detached Golf Cottages (4 bedroom units); as well as 5 Fairway Residences (3 bedroom units) in one building south of the clubhouse. The total unit count would be 88 residential units.

Proposed club improvements include relocation of tennis courts closer to the clubhouse (and reduction in number from (14 to 6 courts), construction of a new tennis viewing pavilion, as well as improvements to the existing outdoor pool and patio area, improvements to the existing club house/banquet hall, and parking for the club in the existing parking lot (to be improved with added landscaping). Renovations and improvements to the existing 18-hole golf course are also proposed, as well as upgrades to the existing on-site sewage treatment plant. Water supply is proposed to be from on-site wells.

The Proposed Action includes amendments to the Zoning Code of the Town of North Castle to establish a new residential special permit use in the R-2A One-Family Residential District to be known as "Golf Course Community," which would be subject to Town Board approval. The Zoning Code is also proposed to be amended to modify certain of the regulations applicable to "Membership Clubs." In addition, the Town's Comprehensive Plan (1996 Update) would be amended, as necessary, to reflect the proposed use.

REQUIRED APPROVALS

At this time it is anticipated that the following approvals and permits will be required:

Type of Approval	Agency
Zoning Code amendments and Special Permit (if Zoning Code amendments are adopted); Comprehensive Plan amendments; Possible Water District No. 2 extension and approval of sewer and water works corporations	North Castle Town Board
Site Plan approval, Wetland Permit, Steep Slope permit (if required), Subdivision approval	North Castle Planning Board
Water supply; sewage treatment plant expansion	Westchester County Health Department
General Municipal Law project review	Westchester County Planning Board
Highway work permit	NYS Department of Transportation
Stormwater SPDES Permit, Stormwater Pollution Prevention Plan approval, modification to wastewater treatment plant SPDES Permit	NYS Department of Environmental Conservation

GENERAL GUIDELINES

The Applicant will prepare a site-specific, project specific Draft Environmental Impact Statement (DEIS) addressing all items identified in this Scoping Document. The Applicant will incorporate information from other development underway or proposed in the local vicinity [consult with town planner on specific projects to include] and include, where appropriate, discussions on cumulative adverse impacts.

The DEIS will discuss relevant and material facts and evaluate the reasonable alternatives to the Proposed Action identified in this Scoping Document. It will be clearly and concisely written in plain language that can be easily read and understood by the public. Highly technical material will be summarized and, if it must be included in its entirety, will be referenced in the DEIS and included as an appendix. In addition, all project correspondence from involved and interested agencies as well as correspondence received from individuals and groups interested in the project will be included in an appendix to the DEIS.

The DEIS will be written in the third person without use of the terms I, we, and our. Narrative discussions will be accompanied to the greatest extent possible by illustrative tables and graphics. All graphics will clearly identify the project area. Each potential impact category (such as land use and zoning impacts, and traffic impacts) will be the subject of a separate section describing existing conditions, anticipated impacts, and proposed mitigation.

The full DEIS will be made available to the Lead Agency in both hard copy and electronic formats. The electronic format will be in Adobe Acrobat (.pdf) file. When the DEIS is accepted for public review by the Lead Agency, sufficient hard copies will be provided to allow placement of a copy at the local library and Town Planning Department for public review during normal business hours. In addition, the full DEIS will be posted on the internet for public review as required by law.

CONTENTS OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

I. INTRODUCTORY MATERIAL

A. **Cover Sheet.** The DEIS shall be preceded by a cover sheet that identifies the following:

1. That it is a Draft Environmental Impact Statement.

2. The name or descriptive title of the Proposed Action.

3. Location: Street names, Town of North Castle, Westchester County, New York, as well as the tax map designation numbers of all properties that are part of the subject parcel.

4. The Town of North Castle Town Board as the Lead Agency for the project and the name and telephone number of the following persons to be contacted for further information: Town of North Castle – Adam R. Kaufman, AICP, (914) 273-3542

5. The name and address of the Project Sponsor, and the name and telephone number of a contact person representing the Project Sponsor.

6. The name and address of the primary preparer(s) of the DEIS and the name and telephone number of a contact person representing the preparer(s).

7. Date of acceptance of the DEIS [Note: Specific calendar date to be inserted later].

8. Deadline by which comments on the DEIS are due [Note: Specific calendar date to be inserted later].

B. **List of Consultants Involved With the Project.** The names, addresses and project responsibilities of all consultants involved with the project shall be listed.

C. **Table of Contents.** All headings which appear in the text shall be presented in the Table of Contents along with the appropriate page numbers. In addition, the Table of Contents shall include a list of figures, a list of tables, a list of appendix items, and a list of additional DEIS volumes, if any.

II. EXECUTIVE SUMMARY

The DEIS shall include an executive summary. The summary shall only include information found elsewhere in the main body of the DEIS and shall be organized as follows:

A. **Brief Description of the Proposed Action.**

B. List of Involved Agencies and Required Approvals/Permits.

C. Anticipated Impacts and Proposed Mitigation. Brief listing of the anticipated impacts and proposed mitigation measures for each impact issue discussed in the DEIS. The presentation format shall be simple and concise.

D. Project Alternatives. Brief description of the project alternatives considered in the DEIS. A table shall be presented which assesses and compares each alternative relative to the various impact issues.

III. DESCRIPTION OF PROPOSED ACTION

A. Site Location, Description and History

The site description shall include the following:

1. General location; acreage; existing zoning; and tax map designations.
2. Site history.
3. Frontage and access (vehicular and pedestrian).
4. Existing buildings and facilities, other site improvements and uses.
5. Environmental characteristics, including topography, steep slopes, wetlands, bedrock outcrops, etc., and Critical Environmental Area(s) (map required).
6. Description of any existing easements, restrictions and/or other conditions that affect the future development and use of the subject site.
7. Regional and local roadway network (map required).

B. Detailed Description of Proposed Action

The description of the Proposed Action shall include the following:

1. Description of the proposed development plan:

   The daily or peak activities occurring on-site shall determine the extent of the impact with regard to water usage, sewage disposal, traffic, noise and others. The description of the proposed action should identify the functions which may occur on-site. Will there be tournaments, weddings or other party functions, multiple functions in one day, in addition to the residential component of the project?

a. Site Access and Circulation
   - Operational information including vehicular access, traffic circulation, emergency access, fire protection, golf course maintenance facilities, and site security.
   - Description of Proposed Site Access(es), including a discussion of emergency access roads, maintenance issues and whether the facility will be gated to control access to the subject site.

b. Club Core/Clubhouse
   - Dining Facilities
   - Recreation Facilities (Pools and Tennis)
   - Club Parking

c. Proposed Residential Development
   - Residential Unit Types and architectural design
   - Type of ownership proposed (i.e., fee-simple, condo, rental)
   - Residential Parking
   - Relationship between residential units and golf club, including membership and dues requirements
   - Guidelines/prohibitions/restrictions with respect to rental of for-sale units

d. Golf Course
   - Proposed golf course renovations
   - Proposed changes to maintenance area
   - Maintenance programs for grounds and golf course
   - Integrated Turf and Pest Management Program
   - Irrigation needs and water sources
   - Discuss potential participation in the Audubon Sanctuary Program or Wildlife Links program as they relate to an environmental plan for the existing golf course.

e. Utilities
   - Sanitary Sewer and wastewater treatment plant
   - Water Supply
   - Stormwater

The above description shall at a minimum contain the following:

a. Site layout plans, including golf course improvements
b. Floor plans (internal layout) of the proposed structures
c. Parking
d. Gross Floor Area analysis and building footprint analysis
e. Proposed Preliminary Grading Plan

f. Proposed Limits of Disturbance
g. Area of land to be cleared (square foot and percent of site), new impervious surfaces (square foot and percent of site)
h. Proposed signage
i. Proposed lighting plan, photometric plan and lighting details
j. Location of proposed wells
k. Location of central sewage facility
l. Location of proposed stormwater management facilities
m. Proposed architectural plans including graphic depictions of façades, building materials, screening of mechanicals and any green building technology
n. Preliminary Landscaping Plan
o. Description of proposed conservation easement
p. Preliminary wetland mitigation plan
q. Proposed development timetable (starting from completion of SEQR), construction schedule and phasing/sequencing plan
r. Estimated timetable for reaching full occupancy of the proposed residential development

2. Zoning:

a. Existing Zoning - including description of existing “Membership Club” Special Permit
b. Proposed Zoning: “Golf Course Community” and modifications to the regulations for “Membership Clubs” including a discussion of the standards to be used in approving such special permit and an inventory of other parcels in the Town that would be subject to such special permit use.
c. Zoning conformance chart

3. Ownership and proposed management of the golf course and other on-site recreational amenities and open space areas, including a discussion and description of the conservation easement to be provided. Discuss the roles and relationship between the developer, homeowners, and management of the club and how these roles may change over time. Describe any plans for use of condominium and/or homeowner associations and their areas of responsibility. Discuss how the undertakings, agreements or representations of the Applicant will be binding upon successor owners or developers.

4. Description and plans describing/depicting adult oriented residential community operations and facilities. Show residential layout, describe unit types, open spaces, site amenities, pedestrian amenities (sidewalks, trails, trees).

5. Description of off-site improvements, if any.

6. Summarize the affordable housing component of the proposed project, and refer to the chapter where it is detailed (IV.B, Affordable Housing).

7. Description of Accessory uses, including but not limited to club amenities, dining facilities, short term lodging/guest suites, recreation facilities, and concierge services/amenities.

C. **Project Purpose, Needs and Benefits.** The purpose and objectives of the proposed action will be described from a regional, local, neighborhood and site perspective. Also, the public need for and/or public benefits from implementation of the proposed action are to be identified and described for the Town of North Castle. For needs and benefits not supported by the Town's comprehensive plan, justification should be provided.

D. **Required Approvals.** List all required County, State, regional and Federal agency approvals, if applicable. A list of all Involved and Interested Agencies shall also be provided.

IV. ENVIRONMENTAL ANALYSES

The DEIS shall include a discussion of the existing conditions, potentially significant adverse impacts and proposed mitigation measures for the following:

A. Land Use, Zoning and Public Policy

1. Existing Conditions

a. Describe existing land uses and zoning district designations on the subject site, and in the surrounding area (within a 1/2-mile from the site boundaries).

b. Summarize history of land use (where readily available) and current land use on the following properties:
- Coman Hill School
- Armonk Tennis Club
- Windmill Farm neighborhood
- Benedict Nursery
- Byram Hills High School
- Congregation B'nai Yisrael of Armonk
- St. Nersess Armenian Seminary (not yet built) – 486 Bedford Road
- Surrounding residential areas within ½ mile

c. Generally discuss land use plans and regulations for the site and for areas studied in Section IV.A.1.a-b above.

d. Discuss recommendations of the Town's Comprehensive Plan (1996 Update) applicable to the site and to the areas studied in Section IV.A.1.a-b above.

e. Discuss the Town of North Castle Open Space Inventory (to be provided by town planning department) applicable to the site and to the areas studied in Section IV.A.1.a-b above.

f. Generally discuss recommendations of the Westchester County master plan entitled "Westchester 2025" and "Patterns" applicable to the site and to the areas studied in Section IV.A.1.a-b above.

2. Potential Impacts

a. Describe the compatibility of the proposed action with existing land uses and zoning district designations on the subject site and within the areas studied in Section IV.A.1.a-b above.

b. Describe how the proposed development will comply with the requirements of all easements, restrictive covenants and/or other conditions established over the years concerning the use and development of the subject site. Describe any easements, conservation or otherwise, to be provided as part of the proposed action.

c. Discuss the consistency of the proposed use with articulated land use and planning policies and recommendations of the Town, Westchester County, State and Federal Government and other pertinent agencies for the subject site and the areas studied in Section IV.A.1.a-b above to the extent these policies are relevant to the proposed action.

d. Discuss proposed zoning amendments and describe how the zoning amendments would affect development of the project site and other properties within the same zoning district. Set forth the specific zoning standards that are proposed and why such zoning standards are appropriate.

e. Consider cumulative impacts of other development proposals that are currently planned or proposed for the area surrounding the subject site, using the list of proposed projects to be provided by the town.

3. Mitigation Measures

Describe mitigation measures including, but not limited to methods such as plan configuration and design, use of buffers and screening, building design changes, and conservation easements to reduce potential impacts on the surrounding community.

B. Affordable Housing

1. Existing Conditions

a. Generally describe existing Middle Income units in North Castle.

b. Describe and summarize United States District Court for the Southern District of New York Stipulation and Order of Settlement and Dismissal in the case of *United States of America ex rel. Anti-Discrimination Center of Metro New York, Inc. v. Westchester County, New York* (the "Stipulation").

c. Discuss Westchester County Housing Opportunity Commission's ("HOC") Affordable Housing Allocation Plan.

2. Potential Impacts

a. Describe the Proposed Action's affordable housing component. Describe the location, quantity, size, type, and potential income target of affordable housing to be created.

b. Describe how the Proposed Action's affordable housing component will comply with the Stipulation.

c. Describe the process that will be undertaken to review the proposed affordable housing units in terms of the Stipulation Agreement.

d. Include an evaluation of potential significant impacts associated with the affordable housing, whether proposed on-site or off-site (i.e., water, sewer, storm drainage, grading, impacts associated with the additional units, etc.).

3. Mitigation Measures

Describe mitigation measures including the on-site construction of affordable units.

C. Visual Resources and Community Character

1. Existing Conditions

a. Provide analysis of the existing visual character of the subject site as viewed from surrounding roads (including but not limited to all frontage roads as well as Interstate 684) and surrounding properties (including but not limited to Coman Hill School and abutting homes on Embassy Court, Ilana Court and Evergreen Row), based upon use of photographs, sight line diagrams and/or cross-sections, as appropriate. Existing views shall be clearly described in narrative form and supplemented with appropriate graphic illustrations.

b. Describe representative key existing views from the site to surrounding areas.

2. Potential Impacts

a. Provide analysis of the visual character of the subject site after development as viewed from surrounding roads (including but not limited to all frontage roads as well as Interstate 684) and surrounding properties (including but not limited to Coman Hill School and abutting homes on Embassy Court, Ilana Court and Evergreen Row), based upon use of photographs, computer/photo-simulations, sight line diagrams and/or cross-sections, as appropriate. Altered views shall be clearly described in narrative form and supplemented with appropriate graphic illustrations. Any plans to erect walls, fences and/or gates along some or all of the subject site's perimeter during construction and after development of the subject site shall be identified, including but not limited to a description of the type, materials and height of proposed walls, fencing and/or gates.

b. Assess the visual impact of the proposed project in context with other existing structures in the study area.

c. Provide architectural renderings, details and/or photosimulations illustrating height massing, scale and façade treatments. Photosimulations shall use photographs of existing and proposed conditions during the leafless seasons.

d. The water system to service the project may require a storage tank to supply domestic and fire flows. If the tanks are on-grade or elevated, address the visual impact of the structure.

e. Describe impacts associated with proposed lighting plan and how lighting may impact adjoining properties.

f. Describe potential impacts on existing neighborhood character. This shall include an analysis of the existing and proposed setback width/landscaped buffer along Route 22 in the vicinity of the proposed residential units.

3. Mitigation Measures

Potential mitigation measures could include:

a. Measures aimed at reducing visual impacts.

b. Preservation of existing trees.

c. Establishment of larger setbacks from property lines.

d. Reducing height of structures.

d. Establishment of Clearing Limit Lines to depict maximum limits of areas of disturbance.

e. Landscaping, including buffer/screening plans.

f. Other.

D. Historic, Archaeological and Cultural Resources

1. Existing Conditions

a. Describe historic resources on the subject site. Include information obtained from the New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP) and North Castle Historical Society.

b. Prepare a Phase 1A Cultural Resources Study, as well as Phase 1B and Phase 2 Studies, if recommended by the Phase 1A Study. Evaluate the potential for any archaeological resources on the subject site.

c. Identify any properties listed on the State or National Register of Historic Places on or within a 1/2-mile of the subject site's boundaries.

d. Identify locally-designated historic properties within a 1/4-mile of the subject site's boundaries.

e. Identify and map any existing on-site stone walls proposed to be disturbed. Also provide a discussion and location map of the historic mile marker on the site.

2. Potential Impacts

a. Discuss proposed removal of existing buildings and other structures, including but not limited to stone walls. Discuss any impacts to the historic mile marker.

b. Describe impacts to any historic, archaeological or locally designated resources identified in Section IV.C.1. above.

3. Mitigation Measures

Potential mitigation measures could include:

a. Preserve historic and archeological resources on the subject site.

b. Other.

E. Vegetation and Wildlife

1. Vegetation

a. Existing Conditions

(1) Woody and herbaceous species on the subject site.

- Provide distribution of vegetative cover types for the entire site (map required).
- General species abundance.
- Approximate age and sizes of woody species.

(2) Presence of threatened, rare or endangered plant species on or near the subject site based upon existing available data (NYSDEC, NYNHP and North Castle Biodiversity Plan) and recent field inspection (map required). Include description of species and size.

(3) Presence of trees greater than twenty-four (24) inches in diameter at breast height along interior roadways providing construction

access to and along Route 22 roadway frontage of the subject site. Include description of species, size and special condition.

(4) Survey of location, species, size and special condition of individual trees on the subject site that are regulated by Chapter 192 (Tree Preservation) of the Code of the Town of North Castle (i.e., trees greater than eight (8) inches in diameter at breast height (DBH) in areas proposed to be disturbed, including significant trees) (map required).

(5) Location of unique trees on the subject site that are not regulated by the Town (if any).

b. Potential Impacts

(1) Description of proposed limits of site disturbance and impacts to each vegetative cover type and threatened, rare or endangered plant species on entire site (if any); and other trees (including specimen trees) identified in Section IV.D.1.a. above.

(2) Cumulative loss of vegetation, overall and by vegetative cover type, upon project completion.

(3) Describe vegetation to remain as a result of residential construction, especially at critical buffering locations, such as the site's property lines.

(4) Describe unique or specimen trees worthy of preservation as part of the residential development, and discussion of any compelling reasons justifying the removal of such trees.

(5) Discuss increased erosion potential resulting from removal of vegetation.

(6) Discuss potential loss of water retention capabilities of soil resulting from removal of vegetation.

(7) Describe changes to wetlands vegetative composition, if any.

(8) Impacts of construction traffic on street trees located along interior roadways providing construction access to the subject site, as identified in Section IV.D.1.a.3. above.

c. Mitigation Measures

Potential mitigation measures could include:

(1) Utilization of existing cleared areas to maximum extent possible.

(2) Establishment of Clearing Limit Lines and Clearing and Grading Limit Lines (if not the same) to depict maximum limits of areas of disturbance.

(3) Schematic landscape plan for the subject site showing proposed planting areas, as well as their design intent and function (e.g., visual buffer, wetland enhancement, wildlife, street trees, slope stabilization, formal garden, etc). Typical plant lists for each of specified functions shall be provided. Include a description of the resulting planting character of the site and the length of time it will take to achieve that character.

(4) Buffer screening to reduce impacts on neighboring properties and area roadways.

(5) Preservation of trees identified in Section IV.D.1.b.. above, to the maximum extent possible.

(6) Proposed method of identification and preservation of specimen (significant) trees, to the maximum extent possible.

(7) Other.

2. Wildlife

a. Existing Conditions

(1) Site-specific analysis of resident and migratory wildlife, including aquatic, amphibian, reptile, mammal and bird species. Assessment shall examine habitat functions (i.e., breeding habitat, transitional, staging areas, feeding and roosting sites and travel lanes).

(2) Presence of threatened, rare or endangered species on or near the subject site based upon existing available data (NYSDEC, NYNHP and North Castle Biodiversity Plan) and recent field inspection.

(3) Species abundance.

b. Potential Impacts

(1) Impact on habitat and habitat functions caused by site development (e.g., clearing of vegetation, loss of wetlands).

- Forests
- Riparian areas
- Wetlands
- Other

(2) Presence of threatened, rare or endangered species on or near the subject site based upon existing available data (NYSDEC, NYNHP and North Castle Biodiversity Plan) and recent field inspection.

(3) Potential impact to species abundance.

c. Mitigation Measures

Potential mitigation measures could include:

(1) Preservation of existing conditions (e.g., forested areas, wetlands).

(2) Protection of water bodies and wetlands.

(3) Preservation and creation of wildlife corridors.

(4) Fertilizer, Herbicide, Fungicide and Pesticide Application Plan/Integrated Turf and Pest Management Plan (ITPMP).

(5) Planting plan.

(6) Naturalization of out of play areas (areas between fairways, etc.).

(7) Other measures proposed to encourage wildlife and minimize potential impacts.

(8) Measures to discourage geese from inhabiting the subject site.

(9) Other.

F. Geology and Soils

1. Existing Conditions

a. Describe regional and bedrock geology.

b. Discuss any special geological features on or adjacent to the subject site, including but not limited to the location of significant rock outcrops. Provide map identifying all such features.

c. Identify and list soil types on the site based on site specific mapping and USDA NRCS Web Soils Survey, with discussion of soil characteristics. Include a soils map and identify location of areas of sensitive soils (soils with shallow depth to bedrock, shallow water table, high erodibility characteristics or having greater than 20% clay content). Provide tables indicating soil characteristics (e.g., construction-related and long-term erosion potential, runoff, permeability), limitations and suitability of each soil type for particular land uses, specifically, roads, driveways, sewage disposal areas, underground utility installation, and home construction.

2. Potential Impacts

a. Describe and show preliminary grading plan and limit of disturbance line.

b. Describe import/export of excavation/fill trucks/day, route of trucking. Prepare preliminary cut and fill analysis for proposed development (preliminary grading plan required) and provide cut and fill earthwork estimate. Discuss quality of fill to be brought onto the subject site from off-site locations (if any). Discuss whether on-site rock crushing is proposed. If so, discuss rock crushing procedures to be followed.

c. Describe impacts to special geological features of the subject site, if any. Describe location and amount of blasting anticipated, if any. Include map showing areas of potential blasting activities. Describe blasting procedures to be followed and materials to be used. Discuss compliance with Chapter 71 (Blasting and Explosives) of the Code of the Town of North Castle.

d. Describe soil types to be impacted, and to what extent, with a grading limit line indicated on the preliminary grading plan.

e. Discuss potential impacts of soil limitations on proposed action.

3. Mitigation Measures

Potential mitigation measures could include:

a. Preliminary Sedimentation and Erosion Control Plan based upon NYSDEC requirements. Include discussion of initial installation by phase, maintenance, contingency and emergency measures, notification procedures in the event of failure of sedimentation and erosion control measures, and timing of removal.

b. Corrective measures necessary to overcome any soil limitations.

c. Blasting mitigation plan, including a discussion of alternatives to blasting (e.g., cutting, ripping, chipping); a description of blasting activities, methods and schedules; and a description of the procedures that will be followed to document existing conditions, notify neighboring properties and the pertinent municipal jurisdiction(s) of the timing of blasting activities and remediate potential impacts.

d. Rock crushing mitigation plan (if rock crushing is proposed), including a discussion of alternatives to on-site crushing; a description of crushing activities, methods and schedules.

e. Construction Phasing Plan.

f. Other.

G. Topography and Steep Slopes

1. Existing Conditions

a. Describe existing topography, variation in elevation and relationship to surrounding topography.

b. Prepare slope analysis of the overall site showing slope categories 0-15%, 15-25%, 25% and greater (map required).

2. Potential Impacts

a. Describe potential impacts to the steep slopes (25% and greater) on the entire site.

b. Describe steep slope permits required in North Castle based upon post-construction steep slopes analysis as required by Section 213-17 (Steep Slopes) of the Code of the Town of North Castle.

3. Mitigation Measures

a. Preliminary Sedimentation and Erosion Control Plan prepared for the areas where construction is proposed on the site.

b. Describe erosion control measures and/or stabilization methods proposed to meet requirements of Section 213-17 (Steep Slopes) of the Code of the Town of North Castle.

c. Use of retaining walls to minimize proposed grading.

d. Other.

H. Wetlands and Surface Water Resources

1. Existing Conditions

a. Delineate in the field, survey for accurate location and map existing Town of North Castle, NYSDEC and U.S Army Corps of Engineers (USACOE) wetlands on the subject site using wetlands definition appropriate to each jurisdiction. All wetlands should be identified regardless of size.

b. Identify and map existing Town of North Castle, NYSDEC and USACOE wetlands within a distance expanded as necessary to include all areas that are functionally related to and which might reasonably be expected to be impacted by development of the subject site (based upon watershed analysis completed in Section IV.H.2.a.(1) below), based upon the best available data sources. All wetlands should be identified regardless of size.

c. For each on-site wetland, indicate:
- Location.
- Wetlands type, including soils, vegetation and hydrology.
- Wetlands acreage (approximate for off-site wetlands).
- Pertinent jurisdiction.
- Wetlands functions, as identified in Chapter 209 (Wetlands and Drainage) of the Code of the Town of North Castle. Functional analysis shall be based upon one of the accepted methodologies, such as the U.S. Army Corps of Engineers HGM (hydrogeomorphic model), EPW (Evaluation of Planned Wetlands) model or Hollands-Magee Method.

d. Identify total wetlands acreage on the subject site and percent of site occupied by all wetlands, regulated wetlands and regulated wetlands buffer/adjacent areas using definitions appropriate to each jurisdiction identified in Section IV.G.2.a.(1) above.

e. Describe the interconnectivity between wetlands and water resources, including Byram Lake.

f. Describe existing surface water bodies (including classification), drainage patterns and discharge points based upon site-specific watershed analysis.

g. Identify any applicable regulatory authorities including Town, NYCDEP, NYSDEC, and the USACOE.

2. Potential Impacts

a. Identify acreage of and provide functional analysis of existing wetland communities and wetland buffer/adjacent areas to be disturbed. Discuss area to be disturbed, types of potential disturbance, impact to functional values of the wetland, impacts to wetlands from increased sedimentation, changes to wetland vegetative composition, modifications to hydrology and hydroperiod. Include discussion of impacts of the existing irrigation ponds on existing hydrology, including off-site wetlands.

b. Describe regulated activities and permits required for local, State and Federal jurisdictions.

c. Describe potential for and evaluate the impact of increased concentrations of fertilizer, pesticides, herbicides, fungicides and other chemicals proposed for use on the subject site in the existing and proposed wetlands.

d. Include qualitative analysis of impacts on upstream and downstream wetlands within the watersheds of which the subject site is a part due to changes in site layout.

e. Include qualitative analysis of construction-related and long-term impacts to wetlands and their functions, including impact on wildlife habitat, pollution abatement capabilities, stormwater control capabilities, changes in water budget and aesthetic value based upon evaluation methodology described in Section IV.G.2.a.(3) above. Redo the evaluation as if the proposed construction were in place to compare the before and after values.

f. Describe impacts to wetland and watercourse buffer areas, including any impacts associated with the construction of stormwater management basins.

g. Discuss potential alterations to drainage patterns and the resultant effects on wetlands and streams.

h. Describe whether sustainable stream flows are present to support the pond system.

i. Describe long term controls to minimize sedimentation to the ponds.

j. Describe dredging operations, if proposed, analysis of pond spoils to determine if beneficial use determination (BUD) can be obtained from NYSDEC.

k. For each of above analyses also include consideration of cumulative impacts of other developments planned or proposed as per list of developments to be supplied by Lead Agency.

3. Mitigation Measures

Potential mitigation measures could include:

a. Avoidance of wetland areas.

b. Minimization of wetland impacts.

c. Replacement and enhancement of wetlands and wetland buffer/adjacent areas. Creation of new wetlands and/or ponds on-site, including a description of their size, vegetative composition and proposed function.

d. Increased buffer/adjacent areas.

e. Describe measures in ITPMP for fertilizer, pesticide, herbicide, fungicide and other chemical concentrations in existing and proposed wetlands through avoidance and containment, respectively. Include description of provisions for eliminating the application of fertilizer, herbicide, fungicide and pesticide or the use of organic chemicals as opposed to standard chemicals.

f. Prepare a risk assessment of proposed fertilizer and pesticide usage and release. Discuss mitigation measures that will be taken to ensure that chemical compounds applied to the golf course will not be leached to groundwater or discharged to surface waters at concentrations that would exceed background concentration levels. Discuss goals and enforcement, monitoring, and remedial action impact measures. Enforcement shall include notification to the Town of North Castle of monitoring results.

g. Participation in the Audubon Sanctuary Program/Wildlife Links Program to include environmental planning, wildlife and habitat management, education, chemical use reduction and safety, water conservation and water quality management.

h. Other.

I. Stormwater Management

1. Existing Conditions

a. Discuss existing stormwater runoff quality and quantity within the watersheds of which the subject site is a part, with modeling for 1-, 10-, 25-, and 100-year storm events. Include quantitative measurements of existing surface water quality by monitoring locations where surface water enters and exits the subject site The specific protocol to be followed for purposes of conducting this study, including but not limited to the frequency and duration of testing and the parameters to be tested, shall be developed by the Applicant, and submitted to the Lead Agency for review and approval.

b. Generally discuss existing conditions in the relevant watershed, including a review of the Byram River Watershed Management Plan, if that watershed is impacted.

c. Discuss existing drainage patterns and existing discharge points of drainage. Describe pre- and post-development drainage conditions for the residential and club core development areas.

d. Discuss existing point and nonpoint pollution sources within the watersheds of which the subject site is a part.

(1) Subsurface sewage disposal systems.

(2) Roadway runoff.

(3) Grass clippings and other organic materials containing chemical residues.

(4) Other.

e. Description of existing (and proposed, if different) Mianus Watershed Regulations, if applicable.

f. Describe flooding issues, if any, and any identified 100-year floodplains in the vicinity of the project site.

2. Potential Impacts

a. Stormwater runoff quantity; volume of stormwater runoff and peak discharge rates within the watersheds of which the subject site is a part for 1-, 10-, 25-, and 100-year storm events.

b. Surface water quality and quantity impacts on receiving wetlands, streams, ponds, tributary watercourses, and the 100-year floodplain within the watersheds of which the subject site is a part. Include potential short-term and long-term impacts of runoff carrying fertilizers, pesticides, herbicides, fungicides and other chemicals from the golf course, lawns, roadways and other impervious surfaces, and sedimentation.

c. Description of stormwater permits required from the New York State Department of Environmental Conservation (NYSDEC) or other agencies having jurisdiction.

d. Discuss any proposed erosion control improvements at the ravine running through fairway No. 15.

e. Discuss potential alterations to drainage patterns and the resultant effects on floodplains, if any

f. Discuss impacts associated with construction of proposed infrastructure.

g. For each of above analyses also include consideration of cumulative impacts of other developments planned or proposed in the immediate area of the subject site. (List of developments to be supplied by Lead Agency.)

3. Mitigation Measures

Potential mitigation measures could include:

a. Description of erosion and sedimentation control measures to protect water bodies, wetlands, and tributary watercourses (if impacted), and maintenance of such measures during construction.

b. Stormwater Pollution Prevention Plan (SWPPP) prepared for the entire site in accordance with the Chapter 173 of the Town Code.

c. Discussion of Fertilizer, Herbicide, Fungicide and Pesticide Application Plan (IPMTP). A draft plan to address long-term surface and groundwater quality. This Plan could include an environmental monitoring program.

d. Compliance with the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activities (Permit #GP 0-010-001).

e. Green Infrastructure

f. Describe measures that would be implemented to minimize impacts on water resources during and after construction, including reuse of stormwater for on-site irrigation.

g. Other.

J. Hydrogeology, Groundwater and Water Supply

1. Existing Conditions

a. Describe the groundwater geology of the subject site and its viability for wells.

b. Describe existing wells and water supply on and within a distance of not less than 1/4-mile from the site boundaries, expanded as necessary to include all areas that are functionally related to and which might reasonably be expected to be impacted by development of the subject site based upon hydrogeological analysis. Discuss pertinent characteristics of well water supply sources as identified in Sections IV.I.1.a above. For public water supply sources, discuss existing capacity, pressure and volume under all conditions of flow.

c. Describe existing water storage facilities and current water supply for clubhouse and golf course.

d. Describe the location of the nearest public water supply and discuss applicable connection policies.

e. Generically describe historic use of fertilizer, pesticides, herbicides, fungicides and other chemicals on the subject site.

f. Identify existing water quality requirements of applicable agencies for drinking water.

g. Describe location and capacity of aquifers and recharge areas on the subject site and in areas surrounding the subject site.

h. Describe groundwater resources and existing state and Federally designated aquifers, if applicable.

i. Describe existing on-site water resources and wells, as they relate to irrigation use. Present storage, water needs and pumping requirements.

2. Potential Impacts

a. Describe how the project will meet its water supply needs. Consider both the development of on-site wells and the possible connections to the public water supply. This discussion shall describe the impacts, improvements required and procedures necessary to connect to North Castle Water District No. 2.

b. Describe quantity of water required for the proposed development for potable consumption, irrigation (during grow-in period), fire-fighting purposes and accessory uses, based upon consideration of total average daily and maximum daily site population, peak usage on a daily basis and seasonal requirements.

c. Discuss groundwater recharge with the proposed action.

d. Discuss generally anticipated impacts on capacity of wells within a distance of ¼-mile from the site boundaries, expanded as necessary to include all areas that are functionally related to and which might reasonably be expected to be impacted by development of the subject site based upon hydrogeological analysis, including under drought conditions.

e. Describe anticipated water demand and availability (for potable consumption and irrigation purposes). Describe existing wells within ¼-mile of the project site. Study whether all wells within ¼ -mile of project are drawing from the same aquifer that would serve the site water (and irrigation) system. Data regarding existing off-site wells shall be based upon existing data sources as well as responses to questionnaires mailed to homeowners to request well information. Proof of notification regarding the attempt to obtain information from property owners shall be provided to the Lead Agency.

f. Identify potential impacts on groundwater recharge and to groundwater quality and quantity. Describe anticipated needs for domestic, club, fire protection and irrigation use for both average and peak use. Conduct 72 hour pump tests on proposed groundwater supply source. Include off-site well monitoring program to determine potential water level interference on neighboring wells. Include monitoring of surface waters to identify if proposed production wells are under the influence of surface waters. Analysis of supply wells drawdown and influence on neighboring wells. All pump tests shall be conducted in accordance with NYSDEC recommended pump test procedures for water supply applications.

g. Conduct a bedrock aquifer impact assessment. Compute water budget, comparing aquifer recharge data with the project withdrawals from the bedrock aquifer.

h. Describe potential for groundwater pollution from fertilizers, pesticides, herbicides, fungicides and other chemicals proposed for use on the subject site. Identify fertilizers and pesticides to be used on the course.

i. Discuss potential impacts related to construction of proposed infrastructure.

j. Describe proposed water storage.

k. Describe potential groundwater impacts from maintenance wash down area, golf carts and maintenance vehicles, if any.

l. For each of above analyses also include consideration of cumulative impacts of other developments planned or proposed as per list of developments to be supplied by Lead Agency.

3. Mitigation Measures

Potential mitigation measures could include:

a. Connection to a public water supply system.

b. Appropriate sizing of facilities, including demonstration that proposed method of water supply and/or storage (if proposed) will satisfactorily serve the potable consumption, accessory uses and fire-fighting needs of the proposed development.

c. Measures to reduce water consumption for irrigation purposes as well as for the residential and clubhouse project components.

d. Describe provisions for groundwater recharge, water supply availability.

e. Other

K. Wastewater

1. Existing Conditions

a. Describe the existing wastewater treatment plant location, capacity, outfall location, and existing SPDES permit. Describe the extent of existing sanitary sewage facilities on the subject site, and the location of the nearest public sanitary sewer.

2. Potential Impacts

a. Provide anticipated wastewater generation rates for the proposed development, including consideration of seasonal variations conditions.

b. Provide description of proposed upgrades to the existing wastewater treatment plant to accommodate the proposed residential project component.

c. Discuss impacts related to construction of proposed infrastructure.

d. Explain operation, ownership, safeguards, and default.

e. Provide the existing SPDES Permit and its parameters relative to NYSDEC approval and proposed upgrades.

f. Will increased discharge limits from this site restrict future Town of North Castle Sewer District #2 Treatment Plant expansion?

g. Gray water reuse.

3. Mitigation Measures

Potential mitigation measures could include:

a. Upgrades to the existing wastewater treatment plant.

b. Other.

L. Community Facilities and Services

1. Schools

a. Existing Conditions

(1) Describe the location of the subject site in relation to the public school district that serves the site.

(2) Provide a discussion of existing public school facilities, capacities and enrollment projections.

b. Potential Impacts

(1) Project the school-age population and the impact of the proposed development under three scenarios: 1) an adult-oriented/targeted (55+) community (Proposed Action); 2) a primary, permanent resident population of for-sale units with school-aged children based upon the typical mix of the housing types in Westchester County; and 3) a primary, permanent resident population of rental units with school-aged children based upon the typical mix of the housing types in Westchester County. . In addition, this analysis should project the potential school-aged population associated with the affordable housing component of the project and assess all related school impacts. Evaluate existing enrollments, trends and capacities of the Byram Hills school district.

(2) Evaluate the impacts of projected enrollment increases on the school district, school facilities and budgets. Consider long term cumulative impacts of enrollment increases within the district. Communicate with the school district and evaluate the potential for the need for new buildings, fields or other facilities. Impacts on property tax revenues to the School District and other taxing jurisdictions should take into consideration the need for capital improvements resulting from the proposed project.

c. Mitigation Measures

Potential mitigation measures could include:

(1) Inclusion of age-restrictions in the proposed zoning amendments.

2. Open Space and Recreation

a. Existing Conditions

(1) Identify and describe existing open space on the property. The existing golf course should be considered open space for the purposes of this EIS.

(2) Identify any existing trails on the subject site and their linkage to mapped trails located in the surrounding area within a 1/4-mile of the subject site's boundaries, if applicable.

b. Potential Impacts

(1) Describe potential impacts to open space areas.

(2) Discuss the open space plan for the proposed development, including any proposed conservation easements. This discussion should include the portion of the site to be included in the easement and name the party who would hold the easement. Discuss opportunities for public access to the site in conjunction with a conservation easement.

(3) Discuss the proposed recreation facilities for the new residential units and whether there would an increased demand for recreational facilities generated by the proposed development.

c. Mitigation Measures.

(1) Any proposed mitigation as a result of impact to open space.

(2) Discuss how the existing golf course is to be protected and maintained as open space through a conservation easement. .

(3) Discuss the potential for connections of on-site open spaces to off-site open spaces and how this could be implemented and maintained.

(4) Other.

3. Police Protection

a. Existing Conditions

(1) A discussion of staff size and organization of Police Department in town. This discussion shall include the location of stations in relation to the subject site; average response time to the subject site for service provider; service ratio for service provider; and

adequacy of access for service provider, with confirmation requested in writing from service provider.

b. Potential Impacts

(1) Increased demand for services (based upon normal usage of the subject site) and allocation of responsibilities between service providers.

(2) Discussion of potential increased costs for service provider, if any.

(3) Adequacy of access to/from and on the subject site, including roadway surface and width, barriers and maintenance.

(4) Concerns of Police Department.

(5) For each of above analyses, also include consideration of cumulative impacts of other developments planned or proposed in the immediate area of the subject site. (List of developments to be supplied by Lead Agency.)

c. Mitigation Measures

Potential mitigation measures could include:

(1) Property taxes generated.

(2) Site access modifications.

(3) Other.

4. Fire Protection, Ambulance and EMS

a. Existing Conditions

(1) A discussion of the size of existing force and organization of service providers. This discussion shall include the location of stations in relation to the subject site; number and type of apparatus for service providers; average response time to the subject site for service providers; adequacy of access for service providers, with confirmation requested in writing from service providers.

(2) Water supply and capacity for fire-fighting purposes.

b. Potential Impacts

(1) Increased demand for services (based upon normal usage of the subject site).

(2) Increased costs for service providers, if any.

(3) Adequacy of access to/from and on the subject site, including roadway surface and width, barriers and maintenance.

(4) Concerns of Fire Department, Ambulance Corps and emergency medical providers.

(5) Fire protection water supply and pressure.

(6) For each of above analyses, also include consideration of cumulative impacts of other developments planned or proposed in the immediate area of the subject site. (List of developments to be supplied by Lead Agency).

c. Mitigation Measures

Potential mitigation measures could include:

(1) Property taxes generated.

(2) Site access modifications.

(3) Road and driveway design modifications.

(4) Alternative water supply source(s).

(5) Other.

5. Solid Waste

a. Existing Conditions

Describe amount of solid waste currently being generated by existing facilities on the subject site and where it is disposed.

b. Potential Impacts

Estimate quantity of solid waste to be generated by the proposed development and indicate how it will be disposed of. Discuss impacts of increased solid waste on capacity of processing facilities.

c. Mitigation Measures

Potential mitigation measures could include:

(1) Conformance with local and State recycling plans.

(2) Other.

6. Other Utilities (Gas, Electric, Telephone, Cable TV)

a. Existing Conditions

(1) Describe existing service to the subject site by each service provider. Identify the location of service lines and other infrastructure elements (e.g., existing antennas) (map required).

b. Potential Impacts

Potential mitigation measures could include:

(1) Discuss proposed expanded and/or new service to the subject site by each service provider.

c. Mitigation Measures

7. Town Highway Department

a. Existing Conditions

(1) Identify the municipal departments or other entity responsible for maintenance (including snow-plowing) of existing access roadways (i.e., Route 22).

(2) Describe existing maintenance program, including type and frequency of service provided by service provider(s).

(3) Describe adequacy of access to the subject site for service provider(s), with confirmation requested in writing from NYSDOT

b. Potential Impacts

(1) Increased demand for services (based upon normal usage of the subject site) and allocation of responsibilities between service provider(s).

(2) Increase costs for service provider(s), if any.

(3) Adequacy of access to/from and on the subject site, including consideration of existing and proposed roadway conditions.

(4) Concerns of service provider(s).

(5) For each of above analysis, include consideration of cumulative impacts of other developments planned or proposed in the immediate area of the subject site. (List of developments to be supplied by Lead Agency.)

c. Mitigation Measures

Potential mitigation measures could include:

(1) Property taxes generated.

(2) Site access modifications.

(3) Road design modifications.

(4) Other.

M. Traffic and Transportation

1. Existing Conditions.

a. Provide description (number of lanes, posted speed limits, travel-way width, surface treatment and condition, general curvature and grades, drainage, parking, traffic controls, vehicle classification restrictions and general character) of Route 22 between Chestnut Ridge Road and the I-684 interchange. Include a description of the intersections along this section.

b. Conduct automated traffic recorder (ATR) counts at the following locations to obtain data on hourly/daily volumes for at least 3 days of the week (Wednesday, Thursday, Friday) and Saturday:

(1) Bedford Road (NYS Route 22), between Upland and Tripp Lane
(2) Bedford Road (NYS Route 22), between Creemer Road and Cox Avenue

This data shall be used to identify peak hours and traffic volumes for each day. This will enable the Applicant to identify different peak hours.

c. Conduct manual peak period turning movement counts at the following intersections:

(1) Route 22 and Chestnut Ridge
(2) Route 22 and Baldwin Road
(3) Route 22 and Club Access
(4) Route 22 and Upland Lane/Coman Hill Elementary School
(5) Route 22 and Tripp Lane/Byram Hills High School
(6) Route 22 and Banksville Road
(7) Route 22 and North Greenwich Road (Route 433)
(8) Route 22 and NB I-684 ramps
(9) Route 22 and SB I-684 ramps

These counts should be performed on a typical weekday (Tuesday through Thursday) from 6:30 AM to 9:00 AM and from 3 PM to 6 PM. Assuming that the combined peak hour-volumes of Route 22 traffic and the traffic added by the 88 homes on Saturday are lower compared to the combined volumes for both weekday peaks, (to be demonstrated by applicant's traffic engineer) no intersection analysis (counts and level of service analysis) is needed for Saturdays.

For the weekday pm peak two peaks should be analyzed: school peak and commuter peak. A traffic generation rate should be developed for the proposed homes for the school peak hour, possibly based on some local counts. A sampling of vehicle classifications shall be provided for two intersections. Turning volumes shall be shown graphically for each peak hour.

d. Complete intersection capacity analyses for existing conditions at each intersection listed above using SYNCHRO software, using the HCM 2000 version.

e. Evaluate accident history along roadways and at intersections listed above for the most recent 3-year period. Indicate crashes by type (fatality, injury and PDO, pedestrian or bicycle) for each intersection and each segment. New York State and local police department data shall be included.

f. Complete analysis of existing sight distance at project entry points.

2. Potential Impacts

a. Complete intersection capacity analyses for future no-build conditions including an annual growth factor (to be confirmed by NYSDOT) applied to existing baseline volumes and including all developments planned or proposed in the immediate area of the subject site. (List of developments to be supplied by Town.)

b. Complete projection of site-generated traffic and distribution on area roadways based upon accepted trip generation rates for the project components. The % traffic distribution should be justified by relevant turning movement counts.

c. Complete intersection capacity analyses of build conditions, compare to the conditions for future w/o project. The comparisons should include delays, LOS, number of vehicles by approach movement, and percent changes for each approach movement caused by project.

d. Assess parking impacts of proposed project.

e. Evaluate safety concerns regarding existing and proposed roadways, addressing sight distances, grades, conflict points and roadway width.

f. Evaluate impact of gate house installation and operation on traffic circulation at the gate, including emergency service access, if proposed.

g. Evaluate potential alternative access, including alternatives to Tripp Lane access to Byram Hills High School.

h. Complete projection of construction traffic, including volumes (number of trips), type and size of vehicles, hours of operation, duration, and trip routing and origin/destination of construction vehicles. Include discussion of construction traffic for removal of excess fill from the subject site (if any). Provide estimate of number of trips and information on type and capacity of vehicle(s) to be used and trip routing for such vehicles (e.g., directed toward I-684, use of local roads, or both).

i. Identify primary access paths for passenger vehicles, emergency vehicles, delivery vehicles and pedestrians.

3. Mitigation Measures

Propose mitigation measures shall address: 1) significant impacts of the project; and 2) difficult traffic conditions that exist today and in the future. Potential mitigation measures could include:

a. Proposed roadway improvements, including sight distance improvements.

b. Types of improvements (as needed), e.g., traffic control at intersections and intersection improvements. Responsibility and jurisdiction for improvements and funding there-of.

c. Alternative emergency-only access point(s).

d. Remediation plan for repair of local streets damaged during construction.

e. Measures to safeguard the public during the construction process.

f. Traffic calming measures.

g. Other.

N. Socioeconomic/Fiscal Resources

1. Existing Conditions

a. Describe demographic characteristics of the Town of North Castle.

b. Calculate existing tax revenues to the Town of North Castle, Byram Hills Central School District, Westchester County, and New York State from the existing club facility.

c. Identify number of existing employees at the existing club facility.

d. Generally discuss existing economic trends in the golfing industry locally, in the State and nation as a whole. Include discussion of similar types of developments (golf/residential) and their success/failure. In addition, discuss any previous experience with residential/golf course development held by the Applicant. If none, so note.

2. Potential Impacts

a. Project the resident population by age categories and users to be generated by the proposed development both directly and indirectly using recognized projection methodology and numerical factors. Conduct all analyses as if proposed dwelling units were primary, full time, permanent residences.

b. Describe how the development will be marketed to reach the targeted active adult market. Provide detail as to the market viability of the proposed unit mix, type, and target audience. Analyze demand for golf course community projects in current housing climate. Summarize details of the project market study and include such study as an appendix to the DEIS (with proprietary information redacted, as necessary).

c. Estimate the expected economic impacts to the local economy during the construction period. Identify the number of jobs (in person-years) to be generated directly and indirectly as a result of construction. Calculate income to the local economy from sales of construction material, construction labor and sales tax. This analysis shall also include a schedule of anticipated tax revenue receipts to show how much in taxes would be paid each year starting from commencement of construction through final completion and Certificates of Occupancy for all construction.

d. Prepare a fiscal impact analysis identifying any increase in costs to be incurred by the provider of each community service described in the Community Facilities and Services section of the DEIS in meeting the potential demand for said services.

e. Prepare an economic impact analysis of the proposed project. This analysis shall include an analysis of the economic impacts of both the residential and commercial components of the project (i.e., club portion of project) and how these two project components are related

f. Calculate projected tax revenues to the Town of North Castle, Byram Hills Central School District, Westchester County, and New York State from the club facility and proposed residential component. This analysis shall also include a comparison of the projected tax revenues resulting from the proposed project with current tax revenues generated from the existing club use on the project site as well as a discussion of the difference in projected tax revenues between a for-sale residential project (fee simple and condo) and rental project.

g. Identify approximate number of employees that would be generated by the proposed project, including information with regard to seasonal and/or part time employees. Evaluate negative and positive effects resulting from relocation of existing jobs on-site due to the demolition/renovation of the existing club facility with generation of new jobs from the proposed project.

h. Discuss potential fiscal impacts to the Town and community should the golf course and/or club house be closed sometime in the future. This shall include an analysis of the potential loss of projected property tax and sales tax revenue (for both a condominium scenario and fee simple scenario). Generally discuss the fiscal impacts on tax revenues from the proposed conservation easement.

i. Estimate the expected economic impacts to the local real estate market and the marketability of similar residential housing units with potentially higher taxes as compared to the proposed residential units (for both a condominium scenario and fee simple scenario).

3. Mitigation Measures

a. Describe any measures that would be pursued to ensure that the anticipated tax revenues will meet or exceed anticipated costs for any needed increases in community services.

b. Other.

O. Air Quality and Greenhouse Gas Emissions

These subjects shall be addressed in the DEIS with respect to the short-term impacts associated with construction-related activities (dust and fumes from site work and traffic in the case of Air Quality) as well as with respect to the long-term impacts associated with the permanent operation of the subject site after development.

1. Existing Conditions.

a. Identify and describe air quality pollutants of concern (dust and carbon monoxide at a minimum).

b. Identify any large stationary sources of air pollution in the project vicinity, as well as any existing odors related to the existing on-site sewage treatment plant.

c. Discuss compliance with pertinent ambient air quality standards.

d. Identify if any air emissions permits are required in relation to the proposed sewage treatment plant upgrades.

e. Identify and describe greenhouse gas emissions of concern as described in NYSDEC Policy *Guide for Assessing Energy Use and Greenhouse Gas Emissions in an Environmental Impact Statement.*

2. Potential Impacts.

a. Conduct a screening analysis following the procedures outlined in NYSDOT's Environmental Procedures Manual. The impacts of the emissions from stationary sources at the project site shall be assessed. In addition, discuss any potential changes to odors associated with upgrades to the on-site sewage treatment plant.

b. Conduct a Greenhouse Gas (GHG) analysis following the procedures outlined in NYSDEC's *Guide for Assessing Energy Use and Greenhouse Gas Emissions in an Environmental Impact Statement*. The impacts of the emissions from stationary sources at the project site shall be assessed.

3. Mitigation Measures.

a. Green technology to be implemented during the construction and operation of the project.

b. Other

P. Noise.

1. Existing Conditions

a. Describe ambient noise conditions on and near the subject site. Identify existing sources (e.g., airplane traffic, vehicle traffic and grounds maintenance equipment) and decibel levels on the subject site and along the property lines of the subject site.

2. Potential Impacts

a. Discuss noise associated with increased traffic traveling to and from the subject site after the proposed development is in operation. Identify potential sources and decibel levels. Evaluate noise levels associated with the project based upon "DEC Policy DEP 00-1: Assessing and Mitigating Noise Impacts".

b. Describe noise that may be generated during construction of the proposed development and its likely duration, including consideration of on-site noise (e.g., blasting, construction equipment) and construction traffic noise on area roadways. Identify potential sources and decibel levels. Evaluate noise levels associated with the project based upon "DEC Policy DEP 00-1: Assessing and Mitigating Noise Impacts".

c. Discuss how the proposed development will comply with the requirements of Chapter 137 (Noise) of the Code of the Town of North Castle, both during construction and over the long-term once the proposed development has been completed.

3. Mitigation Measures

Discussion of potential mitigation measures, if applicable, based upon "DEC Policy DEP 00-1: Assessing and Mitigating Noise Impacts".

Q. Hazardous Materials

1. Existing Conditions

a. A Phase I Environmental Site Assessment (ESA) of the entire project site shall be conducted to determine among other things, whether there is the presence of asbestos, lead paint, and/or any other regulated materials within the portions of the existing building to be demolished. The findings of the Phase I ESA shall be summarized in the DEIS and the full Phase I ESA and any supplemental investigation shall be included as an appendix to the DEIS.

2. Potential Impacts

a. Describe how contaminants, if any, will be abated prior to commencement of construction.

b. Identify any hazardous materials (including gasoline, fertilizer, pesticides, herbicides, fungicides and other chemicals on the subject site) to be generated or stored on the project site in both the construction and operations periods of the proposed project. Describe storage, application and disposal practices to be implemented for these hazardous materials.

This discussion shall include an examination of chemical storage, whether on-site or off-site, as well as rinsing of application devices and vehicles and the transportation of chemicals to and from the site.

3. Mitigation Measures

a. Describe mitigation measures, best management practices to be utilized during construction and operation of the project.

b. Other.

R. Construction

1. Existing Conditions

a. Introduction

2. Potential Impacts

a. Describe proposed construction phasing (for all project component – i.e. golf course, club house and residential units), overall schedule for project completion, and hours of construction operation.

b. Describe the equipment and materials storage and/or staging area, anticipated number of construction workers, anticipated lighting and security, and the delivery means and methods.

c. Describe the erosion and sediment control plan for the proposed project and any stormwater management practices to be used on a temporary basis.

d. Describe how the infrastructure relevant to the completion of each phase will be implemented, and any potential impacts.

e. Assess the potential environmental impacts anticipated due to demolition of existing on-site structures and construction of the proposed project. This assessment should consider the length and duration of potential impacts, by phase and type. This assessment of impacts shall include, but is not limited to, construction/demolition traffic, noise, air quality, GHG emissions, dust, erosion and sedimentation and its impact on the surrounding area, including the Coman Hill School.

3. Mitigation Measures

a. Discuss construction management techniques.

b. Enforcement.

c. Erosion control plans.

d. Ideal management practices to be employed, along with mechanisms to minimize impacts related to partial project completion.

e. Other.

V. REASONABLE ALTERNATIVES TO BE CONSIDERED

The description and evaluation of the following alternatives to the Proposed Action shall address all of the topics in Section IV of this document, shall be at a level of detail sufficient to permit an assessment of the alternatives discussed as compared to the Proposed Action (100 scale preliminary grading plan), shall be analyzed in terms of the impact issues listed above in summary and matrix format, and shall reflect compliance with all applicable regulations of the Town of North Castle. Alternatives shall include the following:

A. Alternative 1: No Action.

B. Alternative 2: Existing R-2A Zoning - Conventional Subdivision. This alternative will consider development of the project site as a conventional as-of-right subdivision under the existing R-2A Zoning, taking into account existing environmental features on the site, all existing zoning and other Town Code requirements. In addition, this analysis should generally discuss the feasibility of providing individual wells to each lot as well as an evaluation of the proposed wastewater disposal system and alternatives (on-site wasterwater treatment plant or septic). The analysis of the above alternative shall include, at a minimum, an evaluation of area of clearing required by vegetative community, wetlands and wetlands buffer/adjacent area disturbance, steep slope disturbance, visual impacts as viewed from public roadways, traffic generation, impacts to water and wastewater, impacts to community facilities and services, including schools, and socioeconomic/fiscal impacts (tax revenues). The alternative should be accompanied by a conceptual conventional subdivision layout plan and other relevant graphics needed to assess the anticipated impacts.

C. Alternative 3: Existing R-2A Zoning - Conservation Subdivision. This alternative will consider development of the project site as a conservation subdivision in accordance with the existing R-2A zoning for the site, taking into account existing environmental features on the site, all existing zoning and other Town Code requirements. In addition, this analysis should generally discuss the feasibility of providing individual wells to each lot as well as an evaluation of the proposed wastewater disposal system and alternatives (on-site wasterwater treatment plant or septic). The analysis of the above alternative shall include, at a minimum, an evaluation of area of clearing required by vegetative community, wetlands and wetlands buffer/adjacent area disturbance, steep slope disturbance, visual impacts as viewed from public roadways, traffic generation, impacts to water and wastewater, impacts to community facilities and services, including schools, and socioeconomic/fiscal impacts (tax revenues). The alternative should be accompanied by a conceptual conservation subdivision layout plan and other relevant graphics needed to assess the anticipated impacts.

D. **Alternative 4: Cluster Subdivision in Reduced Development Site.** This alternative will analyze a cluster, fee simple, development (88 unit max) within the same approximately 14 acre project site under consideration in the Proposed Action. This alternative will explore changes to the proposed zoning text amendments that would be needed to support this alternative. The analysis of the above alternative shall include, at a minimum, an evaluation of the area of clearing required by vegetative community, wetlands and wetlands buffer/adjacent area disturbance, steep slope disturbance, visual impacts as viewed from public roadways, traffic generation, impacts to water and wastewater, impacts to community facilities and services, including schools, and socioeconomic/fiscal impacts (tax revenues).The alternative should be accompanied by a conceptual cluster subdivision layout plan to be located within the approximately 14-acre housing development site included in the Proposed Action and other relevant graphics needed to assess the anticipated impacts. If this alternative is deemed infeasible due to financial constraints, this analysis will provide sufficient analysis to document and verify this finding.

E. **Alternative 5: Reduced Density Alternative (60/75/As-of-Right units).** This alternative will analyze the impacts of a reduced-density development plan under three scenarios: 1) 60 Unit Development Plan; 2) 75 Unit Development Plan; and 3) development plan based on the as-of-right number of units determined under Alternative 2 above. This alternative will explore changes to the proposed zoning text amendments (i.e. increased setbacks, height, etc.) that would be needed to support a reduction in density. For example, whether a one hundred foot landscaped setback from Route 22 is feasible. In addition, the analysis of the above alternative shall include, at a minimum, an evaluation of area of clearing required by vegetative community, wetlands and wetlands buffer/adjacent area disturbance, steep slope disturbance, visual impacts as viewed from public roadways, traffic, impacts to water and wastewater, impacts to community facilities and services, including schools, and socioeconomic/fiscal impacts (tax revenues). The alternative should be accompanied by a conceptual alternative site plan and other relevant graphics needed to assess the anticipated impacts. If this alternative is deemed infeasible due to financial constraints, this analysis will provide sufficient analysis to document and verify this finding.

VI. ADVERSE IMPACTS THAT CANNOT BE AVOIDED IF THE PROPOSED ACTION IS IMPLEMENTED

VII. OTHER REQUIRED ANALYSES

A. Irreversible and Irretrievable Commitment of Resources

B. Impacts on the Use and Conservation of Energy

C. Growth Inducing Aspects of Proposed Action. This section should evaluate the effects of the proposed action as it relates to the potential increase in permanent residential population in the Town of North Castle. The growth inducing aspect of the proposed action will describe and evaluate any potential that the proposed action may have for triggering further development in terms of attracting similar, additional, or ancillary uses, significant increases in local population, increasing the demand for support facilities, and increasing the commercial and residential development potential for the local area. This section shall generally discuss secondary and cumulative impacts to housing, commercial economic development, additional traffic, water and wastewater needs.

VIII. SOURCES AND BIBLIOGRAPHY

IX. APPENDICES

A. All SEQRA documentation, including a copy of the Environmental Assessment Form (EAF), the Positive Declaration and the DEIS Scope.

B. Copies of all official correspondence related to issues discussed in the DEIS.

C. Copies of all technical studies, in their entirety, including the following:

1. Drainage Study
2. Traffic Study
3. Architectural, Historic and/or Archaeological Reports
4. Phase I Environmental Site Assessment (ESA)
5. Wetland Evaluation
6. Water Supply Report
7. Sewer Waste Assimilation Study (if required)
8. Correspondence from Interested Individuals and/or Groups

Issues Raised During Scoping That Have Been Determined By the Lead Agency to Not Be Relevant Or Not Environmentally Significant – See Attached Memorandum.

LIST OF INVOLVED AND INTERESTED AGENCIES

(Lead Agency) Town of North Castle Town Board, Town Hall, 15, Bedford Road, Armonk, New York 10504

Town of North Castle Planning Board, Town Hall Annex, 17 Bedford Road, Armonk, New York 10504

U.S. Army Corps of Engineers, Jacob Javits Federal Building, 26 Federal Plaza, New York 10278

Commissioner, New York State Department of Environmental Conservation, 625 Broadway, Albany, New York 12233-1011

Region 3, New York State Department of Environmental Conservation, 21 South Putt Corners Road, New Paltz, New York 12561

New York State Department of Transportation, SEQR Unit, Traffic Engineering & Safety Division
4 Burnett Blvd., Poughkeepsie, New York 12603

Deputy Commissioner Historic Preservation, New York State Office of Parks, Recreation and
Historic Preservation, Empire State Plaza, Agency Building 1, 20th Floor, Albany, New York 12238

Westchester County Department of Health, Attn: Commissioner, 145 Huguenot St., New Rochelle, New York 10801

Westchester County Planning Board, Attn: Ed Buroughs, AICP, Commissioner, 432 Michaelian Office Building, 148 Martine Avenue, White Plains, New York 10601

Sal Misiti, Town of North Castle, Department of Sewer and Water, 115 Business Park Drive, Armonk, New York 10504

John Fava, Chairman, Town of North Castle Conservation Board, Town Hall Annex, 17 Bedford Road, Armonk, New York 10504

Beata Buhl Tatka, Chairman, Town of North Castle Architectural Review Board, Town Hall Annex, 17 Bedford Road, Armonk, New York 10504

Building Inspector, Town Hall Annex - 17 Bedford Road, Armonk, New York 10504

Dr. William Donohue, Superintendent, Byram Hills School District, 12 Tripp Lane, Armonk, NY 10504

Sue Snyder, Superintendent, Town of North Castle Parks and Recreation Department, 40 Maple Avenue, Armonk, New York 10504

Jamie Norris, Highway Superintendent, Town of North Castle, Town Hall, 15 Bedford Road, Armonk, New York 10504

Fire Commissioners, Town of North Castle Fire District No. 2, PO Box 188, Armonk, New York 10504

North Castle Open Space Committee, 17 Bedford Road, Armonk, New York 10504

Residents of Windmill Inc. (address to be provided)

The Environmental Notice Bulletin (ENB), enb@gw.dec.state.ny.us

BFJ Planning

MEMORANDUM

Via email

To: Supervisor Howard B. Arden and Members of the North Castle Town Board

From: Frank S. Fish, FAICP, Principal and Sarah K. Yackel, AICP, Associate Principal
Contact: T. 212.353.7375 F. 212.353.7494 E. s.yackel@bfjplanning.com

Subject: Brynwood Golf & Country Club Scoping Document – Summary of scoping comments not included in the Final Scoping Document

Date: January 3, 2013

In preparing the Final Draft Scoping Document for the Brynwood Golf & Country Club Draft Environmental Impact Statement (DEIS) that was submitted to the Town Board on December 12, 2012, we carefully considered all of the scoping comments received during the DEIS Scoping Session held on November 26, 2012 and during the written public comment period that closed on December 6, 2012. Following the close of the formal public scoping period the Town Board allowed for additional public comment on the Final Draft Scoping Document; this public comment period closed on December 31, 2012. The Final Scoping Document (dated January 4, 2013) considered not only the comments made during the formal scoping comment period, but also those comments made during the subsequent comment period.

Ten (10) people made comments during the Scoping Session and eight (8) written comment letters were received during the formal scoping comment period. Additionally, six (6) comment letters were received on the Final Drft Scoping Document during the subsequent comment period. As is evident in the Final Scoping Document, many of the received comments were incorporated; however some of the comments were not. Comments that were not incorporated generally fall into two categories: 1) comments that were considered to be beyond the scope of the State Environmental Quality Review Act (SEQR) process; and 2) comments that were deemed to be presumptive in that they presumed certain environmental impacts would occur without the benefit of seeing the analysis of impacts that will be provided in the DEIS.

With respect to the first category of comments identified above, the purpose of SEQR "is to incorporate the consideration of environmental factors into the existing planning, review and decision-making process…" [NYCRR Part 617.1(c)] and SEQR further defines the environment as the "physical conditions that will be affected by a proposed action, including land, air, water, minerals, flora, fauna, noise, resources of agricultural, archaeological, historic or aesthetic significance, existing patterns of population concentration, distribution of growth, existing community of neighborhood character, and human health" [NYCRR Part 617.2(1)]. Comments deemed to be outside the scope and purpose of the SEQR-definition of environment have not been included.

With respect to the second category of comments, while these comments are potentially valid and relevant, they were not asking for specific environmental issues to be studied but rather were making comments on the actual project proposal. It was determined that these comments would be more appropriately made during the DEIS public comment period once the analysis of potential project impacts has been conducted.

In addition, the specific wording of many of the comments was not included verbatim in the Scope as the essence/intent of the comments was already captured in the Scope. Finally, certain other comments were not specifically incorporated into the sections identified by the commentor as they were included in other sections of the DEIS Scope. For example, certain commenters requested the inclusion of additional alternatives analyzing various scenarios for determining school children and water impacts; the Scope was not revised to include these as specific project alternatives, but rather these alternative analysis scenarios were included in the environmental analysis chapters (DEIS Chapter IV).

Below is a summary of the Scoping comments not included in the Final Draft Scope. This summary is broken into the two categories outlined above and does not specifically reference individual commenters, but rather provides a generally summary of the types of comments and issues not included.

1. Comments Deemed to be Beyond the Scope of SEQR:

- Requests for detailed financial statements and disclosures from the project Applicant. Financial information (i.e. market study, tax and revenue projections, etc.) where needed to assess potentially significant adverse environmental impacts has been included; however, requests for financial disclosures or other proprietary information have not.
- Construction budget information – This request is outside the scope of this SEQR review as it conflates issues that are more properly addressed during the subsequent Special Permit and Site Plan Review processes with that of zoning. Conditions guaranteeing the project as presented and analyzed during this SEQR review are best addressed as part of conditions of these future approvals processes. Further, if the Applicant's project or plan for the project site substantially differs from that considered during this SEQR review, the Applicant would be required to conduct additional environmental review under SEQR.
- Land value study showing cost per square foot of developable real estate. (Speculation is not grounds for a scope item.)
- Economic viability of the proposed development's water system and costs associated with developing, constructing and maintaining such a facility. (see comment above regarding construction budget)
- Comments speculating on the future plans of the Applicant with respect to the project site.
- Request for analysis of school children to be generated by the project based on potential future sales prices starting at the highest price reasonably anticipated, then considering the school impacts at 95% of that price, and then 90% and on down. A detailed analysis of school children impacts under several scenarios is included in the Scope; however, the methodology suggested here was not.
- Alternatives analyzing the use of the golf course lands in the event the golf course does not remain

financially viable. (Covenants, easements and deed restrictions can specifically address this issue and have been included for analysis in the Scope.)

- Stormwater design beyond the "100 year storm" – The Scope requires that in accordance with Town Code and New York State Department of Environmental Conservation (NYSDEC) requirements, the DEIS will provide analysis for 1, 10, 25 and 100 year storm events. According to the Town's consulting engineer, John Kellard of Kellard Sessions Consulting P.C. analysis and modeling in excess of these requirements is not necessary.
- Disturbed wetlands – no reference to disturbed wetlands has been included as the Scope requires that the DEIS identify and map all existing Town, NYSDEC and United States Army Corps of Engineers regulated wetlands.

2. Presumptive Comments/Potential DEIS Comments:

- Detailed site plan review comments on the Proposed Action and "As-of-Right" plan. (These types of comments should be made during the DEIS public review period.)
- In-door air quality impacts and associated mitigation to adjacent Coman Hills High School. (The DEIS needs to first determine whether there are impacts to air quality.)
- Assumption of STAR exemptions in the analysis of tax impacts. (This comment should be made once the analysis of the tax impacts has been conducted in the DEIS.)
- Analysis of "spot zoning." (This analysis can be done in the Final EIS, if applicable.)
- Requests for control mechanisms to be tied to the Zoning approval to be imposed on the Applicant should the project as proposed in the DEIS differ from that ultimately developed. (These types of comments should be made during the DEIS public review period.)
- Preserve Old Post Road stone mile marker. (It must first be determined in the DEIS - Historic, Archaeological and Cultural Resources chapter – whether there will be any impacts to the Old Post Road stone mile marker.)
- Detailed review comments on the project's projected tax revenues and associated tax implications from the generation of school children. (These types of comments should be made during the DEIS public review period.)
- Questions related to specific project details. (These comments should be made during the DEIS public review period once the Applicant has provided all of the information required by the Scoping Document.)

APPENDIX B

ARMONK INDEPENDENT FIRE COMPANY
P.O. BOX 116 • ARMONK, NEW YORK 10504
OFFICE OF THE CHIEF
TEL. 914.273.3357 FAX 914.273.3178

January 22, 2013

Lauren E. Wang, Planner
VHB Engineering, Surveying and Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, NY 10606

Dear Ms. Wang,

The following information is provided in response to your January 7, 2013 letter regarding the Environmental Impact Statement for the proposed development to the existing Brynwood Golf and Country Club. The specific items have been addressed:

Existing Conditions

(1) *A discussion of the size of existing force and organization of service providers. The discussion shall include the location of stations in relation to the subject site; number and type of apparatus for service providers; average response time to the subject site for service responders; adequacy of access for service providers, with confirmation requested in writing from service providers.*

The Armonk Fire Department provides Fire and EMS protection for Fire District #2 which includes Brynwood. The Fire Department is a 100 percent volunteer organization, and currently has approximately 50 active members. The Fire Station is located at 400 Bedford road; 1.5 miles from 568 Bedford Road. Below is a listing of the number and type of apparatus available:

- Basic Life Support Ambulances: 3
- 1500 Gallon per minute (GPM) Pumpers: 3
- Rescue/1500 GPM pumper: 1
- 3000 Gallon/1500 GPM Tanker: 1
- All Terrain Vehicle: 1
- Chief's vehicles: 3
- Utility Vehicle: 1

The average response time was calculated using actual responses to 568 Bedford Road for the past five years. During this period there were 30 calls and an average response time of seven minutes and 34 seconds.

In order to provide access for ambulances and fire apparatus, roads and pathways must be wide enough to get close to the homes/units. Ambulances are 9'6" high, 8' wide and 24' long. Our Fire apparatus is 10'2" high, 9' wide and 36' long. In addition the roads must be able to support our Tanker weighing (GVWR) 67,600 pounds. In addition to Armonk Fire

Department apparatus, the roadways must be able to accommodate ladder trucks from neighboring towns.

(2) Water Supply and Capacity for fighting purposes

Water flow for firefighting is unknown by this department. One hydrant near the existing clubhouse is a private hydrant, and we have no information regarding water flow, pressure, etc. In addition, history proves that hydrants across the street in the Windmill neighborhood have not always been reliable during fire department operations.

If in fact the hydrant systems do not produce enough water pressure and flow, we would opt to utilize tanker operations. Depending on the size of the structure and amount of fire, we would calculate the amount of additional tankers needed to respond from mutual aid departments.

Potential Impacts

(1) Increased demand for services (based on normal usage of the subject site)

It is unknown what if any the increase in catering, golf, etc. activities may be. Over the past five years there have been 30 alarms at 568 Bedford Road, averaging 6 per year. Due to the anticipated increase in activities at the site, an additional 2-3 calls per year can probably be assumed.

In regard to the demand for services from the 88 planned housing units, we utilized a development in town with a similar number of residential units for the purpose of estimating potential call volume. Whippoorwill Ridge for the past five years has averaged eight (8) EMS calls and five (5) fire related calls per year. According to information on the Brynwoodvision website these units are being marketed to empty nesters. These empty nesters are an older population, and based on our experiences, older populations tend generate more ambulance calls. With the older population our best guestimate is that there will probably be an additional 12-15 ambulance calls per year for this site.

Fire Calls, which includes everything non-EMS, including Carbon Monoxide, Fire Alarms, smell of smoke, actual fires, etc., is more difficult to estimate. Placement of detector heads is critical to avoid false alarms. If these heads are located too close to a kitchen or bathroom, there is the potential for numerous false alarms. In addition, the buildings that have underground parking would be more susceptible to Carbon Monoxide alarms based upon the ventilation systems of the garage. At this time, the best guess estimate would be an additional 8-15 fire calls per year.

(2) Increased costs for service providers, if any

The additional calls will cause an increase in fuel consumption for the vehicles and additional costs associated with medical supplies. It is hoped that the tax revenues received from this site would offset those costs.

In regard to fire protection in the parking garages, if sprinklers and standpipes are not provided the District may have to purchase an additional firefighting vehicle with a low height which could be utilized to fight fires in the parking garage. The approximately 200 foot distance from the entrance to the furthest underground parking space may necessitate this type of vehicle to adequately fight a fire and protect the structure.

(3) *Adequacy of access to/from the subject site, including roadway surface and width, barriers and maintenance.*

Based upon the size and weight of our apparatus adequate access must be provided. Ambulance access must have wide enough roadways and paths to get close to the homes/units. All necessary equipment including a stretcher must be carried or wheeled to the emergency location and then returned with the patient to the ambulance. We request that there be no dead-end streets like the one shown on Exhibit 2 – draft rendering – this would be unacceptable. On this same rendering the yellow hatched paths should be large enough for Fire Department use.

(4) *Concerns of Fire Department, Ambulance Corps and Emergency medical providers.*

Many of our concerns are listed above; below please find additional concerns, requests:

- The water Supply should be designed by a professional engineer and submitted to the Fire Department for review
- Although not required by code, we would like to have all buildings fully sprinkled including the below grade parking.
- We are concerned about Carbon Monoxide levels in and around the parking garage. This concern may be alleviated by the design of the structure and/or integrated ventilation systems.
- In the buildings which plan to have elevators, we would prefer that the elevator cars to be able to hold a 6 foot stretcher with ease to better care for patients as needed.
- Any additional call volume puts strains on our Volunteer Fire Department. It is hoped that some of these new residents may be willing to join the Fire Department as firefighters or EMT's. Unfortunately, it has been our experience that with other recent housing constructed in town that this has not been the case.
- We also have a concern that affordable housing be available for our existing members so they can stay in the community and be able to respond. It is our hope that affordable housing be provided with this proposed development.

(5) *Fire protection water supply pressure*

We would like hydrants to have adequate pressure and flow for fire protection. For normal pressure, they hydrant should have a minimum of 50 psi to maximum of 120 psi. Fire flow should be a minimum of 1000 gallons per minute.

(6) *For each of above analyses, also include consideration of potential impacts of other developments planned or proposed in the immediate area of the subject site. (List developments to be supplied by Lead Agency)*

At this time we are not aware of any other developments planned for this area. However having better operating hydrants can potentially impact the entire area with providing those neighbors with better fire protection.

If you should need anything further, please don't hesitate to contact us. Chairman Bruce Wuebber: 914-273-2984 ncfd2@optonline.net and Chief Luci Labriola-Cuffe: 914-273-3357 ArmonkFireChief@optonline.net

Thank you,

Bruce Wuebber
Chairman of Board of Fire Commissioners

Luci E. Labriola-Cuffe
Chief of Operations

State of New York
Department of Transportation
Region 8
4 Burnett Boulevard
Poughkeepsie, New York 12603
www.dot.ny.gov

William J. Gorton, P.E.
Acting Regional Director

Joan McDonald
Commissioner

January 23, 2013

VHB Engineering, Surveying and Landscape Architecture, PC
Ms. Lauren Wang – Planner
50 Main St, Suite 360
White Plains NY 10606

Re: NYSDOT SEQRA# 13-0003
Brynwood Golf & Country Club
Town of North Castle
Westchester County

Dear Ms. Wang:

We are in receipt of your letter dated 1/7/13 and the artist's rendering of the above development.

Depending upon the size of the proposed improvement or impact to the NYSDOT Right-of-Way, additional engineering details would be required. Some of these details may include a Traffic Impact/Accident Study, SYNCHRO analysis for all affected highways/intersections, Site Plan (SP), Accident Counter-measures/Mitigation, Highway Improvement Plan (HIP), and/or other submissions as directed by the Permit Engineer.

For general questions regarding the permit process, please review the NYSDOT website www.dot.ny.gov/index. All required HWP forms are located there as well.

Thank you for your interest in highway safety.

Very truly yours,

Mary McCullough
SEQRA/ HWP Unit

cc: M. Sassi, Regional Highway Work Coordinator
Westchester County Planning Board

Wang, Lauren

From: Jamie Norris <northcastledpw@gmail.com>
Sent: Friday, January 25, 2013 12:26 PM
To: Wang, Lauren
Subject: Brynwood Golf & Country Club EIS

Lauren Wang,

The proposed development of 88 units at 568 Bedford Road AKA NYS Rt. 22 will not increase demands for services.

Thanks
Jamie

From the desk of
Jamie D. Norris
General Foreman
North Castle D.P.W.
Department of Streets and Maintenance
Office: 914-273-3561
Fax: 914-273-0839

TOWN OF NORTH CASTLE

15 BEDFORD ROAD
Armonk, New York 10504

Established 1736

WILLIAM A. FISHER
Chief of Police

DEPARTMENT OF POLICE
Tel: 914-273-9500
Fax: 914-273-5412

February 19th, 2013

Ms. Lauren E. Wang
VHB Engineering
50 Main Street
White Plains, NY 10606

Dear Ms. Wang:
In response to your letter of inquiry dated January 24th, 2013 regarding the proposed development of an 88 unit residential community and renovations to the existing Brynwood Golf & Country Club located at 568 Bedford Rd, Armonk, NY, I provide the following data:

The Town of North Castle Police Department is currently staffed by 29 Officers which includes the Chief of Police, 2 Lieutenants, 5 Patrol Sergeants, 1 Detective Sergeant, 2 Detectives, and 18 Patrolmen. Our police headquarters is located within the Town Hall at 15 Bedford Road in Armonk. We have one satellite substation which is unmanned. It is located at 10 Clove Road in North White Plains. An average response time to this project location is estimated to be 5 - 8 minutes and is dependent upon other demands for service and/or the severity of the calls. Access to the site appears adequate based on the drawing provided. Definitive analysis of the access cannot be determined from an artist drawing. The North Castle Police Department responded to 13,142 calls for service in 2008, 13,513 in 2009 12,422 in 2011 and 11,572 in 2012. The population of the Town of North Castle was 10,061 in 1990, 10,849 in 2000 and 11,841 in 2010.

This proposed structure will add to the demand and responsibilities of the North Castle Police Department to some unknown degree. The addition of 88 residential units and corresponding residents at this location will require some type of semi-regular police response and assistance. The additional traffic on Route 22 will have some impact on the daily flow and with this increase, require an unknown increase in police assistance. This will translate to some additional cost, but I have no way to calculate what that expense may be. The intersections on Route 22 already see congestion especially during the morning commute. The Town of North Castle relies on volunteer fire and ambulance services. The North Castle Police Department provides initial response to fire and ambulance calls and provides initial care when necessary. One other pending construction project is the assisted living facility at 90 Business Park Drive.

I believe that I have covered the questions in your letter of inquiry. If you require additional information, please do not hesitate to contact me at (914) 273-9500.

Very truly yours,

Lieutenant Peter Simonsen

January 7, 2013

Luci Labriola-Cuffe, Chief
Armonk Fire Department
PO Box 116
Armonk NY, 10504

Re: Brynwood Golf & Country Club Draft Environmental Impact Statement

Dear Ms. Labriola-Cuffe,

We are planning consultants currently in the process of preparing a Draft Environmental Impact Statement (DEIS) for a proposed development of an 88-unit residential community and renovations to the existing Brynwood Golf & Country Club. We note that you met with Nicole Emmons and Anthony Guccione, the architect and engineer on the project team, on December 6, 2012 about this proposed project.

As you know, the subject site (the "Site") is located at 568 Bedford Road (NYS Route 22) and is designated on the Tax Assessment Map of the Town as Section 2, Block 8, Lot 7.C1A, and consists of approximately 156 acres. (See ***Exhibit 1***). This Project is proposed in conjunction with an amendment to the Town of North Castle Zoning Ordinance to add "Golf Course Community" as a Special Permit Use.

The Site fronts on and has direct access to the west side of Bedford Road via a private driveway that leads to the clubhouse and parking area (See ***Exhibit 2***). This is the only access for vehicles and pedestrians. The Site is bordered to the east by I-684, to the north by a residential community, to the west by Bedford Road and Coman Hill School, and to the south by open space, residential uses and Armonk Tennis Club.

We have been asked by the Town to discuss the existing conditions and potential impact of the proposed Project on fire and emergency services in the area. In this context, we would appreciate your written responses to the following items, which we would include in the DEIS.

Existing Conditions

(1) A discussion of the size of existing force and organization of service providers. This discussion shall include the location of stations in relation to the subject site; number and type of apparatus for service providers; average response time to the subject site for service providers; adequacy of access for service providers, with confirmation requested in writing from service providers.
(2) Water supply and capacity for fire-fighting purposes.

Potential Impacts

(1) Increased demand for services (based upon normal usage of the subject site).
(2) Increased costs for service providers, if any.
(3) Adequacy of access to/from and on the subject site, including roadway surface and width, barriers and maintenance.
(4) Concerns of Fire Department, Ambulance Corps and emergency medical providers.

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email: info@vhb.com
www.vhb.com

(5) *Fire protection water supply and pressure.*
(6) *For each of above analyses, also include consideration of potential impacts of other developments planned or proposed in the immediate area of the subject site. (List of developments to be supplied by Lead Agency).*

A detailed description of the impacts of the project will be provided in the DEIS. You will have an opportunity to review and comment on the DEIS once it is ready for distribution.

If you need further clarification for the project or the requested information please feel free to contact me at 914-467-6624. Otherwise, I look forward to your written response.

Sincerely,

Lauren E. Wang
Planner
VHB Engineering, Surveying and Landscape Architecture, P.C.

Enclosures

January 7, 2013

Richard Peters
New York State Department of Transportation
Eleanor Roosevelt State Office Building
4 Burnett Boulevard
Poughkeepsie, NY 12603

Re: Brynwood Golf & Country Club Draft Environmental Impact Statement

Dear Mr. Peters,

We are planning consultants currently in the process of preparing a Draft Environmental Impact Statement (DEIS) for a proposed development of an 88-unit residential community and renovations to the existing Brynwood Golf & Country Club.

The subject site (the “Site”) is located at 568 Bedford Road (NYS Route 22) in North Castle and is designated on the Tax Assessment Map of the Town as Section 2, Block 8, Lot 7.C1A, and consists of approximately 156 acres. (See ***Exhibit 1***). This Project is proposed in conjunction with an amendment to the Town of North Castle Zoning Ordinance to add “Golf Course Community” as a Special Permit Use.

The Site fronts on and has direct access to the west side of Bedford Road via a private driveway that leads to the clubhouse and parking area (See ***Exhibit 2***). This is the only access for vehicles and pedestrians. The Site is bordered to the east by I-684, to the north by a residential community, to the west by Bedford Road and Coman Hill School, and to the south by open space, residential uses and Armonk Tennis Club.

We have been asked by the Town to discuss the existing conditions and potential impact of the proposed Project on the adequacy of access to the subject site for service provider(s). In this context, we would appreciate your written response, which we would include in the DEIS.

A detailed description of the impacts of the project will be provided in the DEIS. You will have an opportunity to review and comment on the DEIS once it is ready for distribution.

If you need further clarification for the project or the requested information please feel free to contact me at 914-467-6624. Otherwise, I look forward to your written response.

Sincerely,

Lauren E. Wang
Planner
VHB Engineering, Surveying and Landscape Architecture, P.C.

Enclosures

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January 7, 2013

Jamie Norris
General Foreman
Town of North Castle Highway Department
17 Bedford Road
Armonk, NY 10504

Re: Brynwood Golf & Country Club Draft Environmental Impact Statement

Dear Mr. Norris,

We are planning consultants currently in the process of preparing a Draft Environmental Impact Statement (DEIS) for a proposed development of an 88-unit residential community and renovations to the existing Brynwood Golf & Country Club.

The subject site (the "Site") is located at 568 Bedford Road (NYS Route 22) and is designated on the Tax Assessment Map of the Town as Section 2, Block 8, Lot 7.C1A, and consists of approximately 156 acres. (See ***Exhibit 1***). This Project is proposed in conjunction with an amendment to the Town of North Castle Zoning Ordinance to add "Golf Course Community" as a Special Permit Use.

The Site fronts on and has direct access to the west side of Bedford Road via a private driveway that leads to the clubhouse and parking area (See ***Exhibit 2***). This is the only access for vehicles and pedestrians. The Site is bordered to the east by I-684, to the north by a residential community, to the west by Bedford Road and Coman Hill School, and to the south by open space, residential uses and Armonk Tennis Club.

We have been asked by the Town to discuss the existing conditions and potential impact of the proposed Project the town highway department services. It is noted that the site is currently privately maintained in terms of snowplowing and interim road maintenance, and would continue as such after development. No town roadways are proposed on site. In this context, we would appreciate your written responses to the following items, which we would include in the DEIS.

Existing Conditions

(1) Identify the municipal departments or other entity responsible for maintenance (including snow-plowing) of existing access roadways (i.e., Route 22).
(2) Describe existing maintenance program, including type and frequency of service provided by service provider(s).

Potential Impacts

(1) Increased demand for services (based upon normal usage of the subject site) and allocation of responsibilities between service provider(s).
(2) Increase costs for service provider(s), if any.

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(3) Adequacy of access to/from and on the subject site, including consideration of existing and proposed roadway conditions.
(4) Concerns of service provider(s).
(5) *For each of above analysis, include consideration of potential impacts of other developments planned or proposed in the immediate area of the subject site. (List of developments to be supplied by Lead Agency.)*

A detailed description of the impacts of the project will be provided in the DEIS. You will have an opportunity to review and comment on the DEIS once it is ready for distribution.

If you need further clarification for the project or the requested information please feel free to contact me at 914-467-6624. Otherwise, I look forward to your written response.

Sincerely,

Lauren E. Wang
Planner
VHB Engineering, Surveying and Landscape Architecture, P.C.

Enclosures

VHB Engineering, Surveying and Landscape Architecture, P.C. | Affiliated with Vanasse Hangen Brustlin, Inc.

Planning
Transportation
Land Development
Environmental

January 7, 2013

Robert D'Angelo, Police Chief
North Castle Police Department
15 Bedford Road
Armonk, New York 10504

Re: Brynwood Golf & Country Club Draft Environmental Impact Statement

Dear Mr. D'Angelo,

We are planning consultants currently in the process of preparing a Draft Environmental Impact Statement (DEIS) for a proposed development of an 88-unit residential community and renovations to the existing Brynwood Golf & Country Club.

The subject site (the "Site") is located at 568 Bedford Road (NYS Route 22) and is designated on the Tax Assessment Map of the Town as Section 2, Block 8, Lot 7.C1A, and consists of approximately 156 acres. (See ***Exhibit 1***). This Project is proposed in conjunction with an amendment to the Town of North Castle Zoning Ordinance to add "Golf Course Community" as a Special Permit Use.

The Site fronts on and has direct access to the west side of Bedford Road via a private driveway that leads to the clubhouse and parking area (See ***Exhibit 2***). This is the only access for vehicles and pedestrians. The Site is bordered to the east by I-684, to the north by a residential community, to the west by Bedford Road and Coman Hill School, and to the south by open space, residential uses and Armonk Tennis Club.

We have been asked by the Town to discuss the existing conditions and potential impact of the proposed Project on police services in the area. In this context, we would appreciate your written responses to the following items, which we would include in the DEIS.

Existing Conditions

(1) A discussion of staff size and organization of Police Department in town. This discussion shall include the location of stations in relation to the subject site; average response time to the subject site for service provider; service ratio for service provider; and adequacy of access for service provider, with confirmation requested in writing from service provider.

Potential Impacts

(1) Increased demand for services (based upon normal usage of the subject site) and allocation of responsibilities between service providers.
(2) Discussion of potential increased costs for service provider, if any.
(3) Adequacy of access to/from and on the subject site, including roadway surface and width, barriers and maintenance.
(4) Concerns of Police Department.

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(5) *For each of above analyses, also include consideration of potential impacts of other developments planned or proposed in the immediate area of the subject site. (List of developments to be supplied by Lead Agency.)*

A detailed description of the impacts of the project will be provided in the DEIS. You will have an opportunity to review and comment on the DEIS once it is ready for distribution.

If you need further clarification for the project or the requested information please feel free to contact me at 914-467-6624. Otherwise, I look forward to your written response.

Sincerely,

Lauren E. Wang
Planner
VHB Engineering, Surveying and Landscape Architecture, P.C.

Enclosures

APPENDIX C

DELBELLO DONNELLAN WEINGARTEN WISE & WIEDERKEHR, LLP

COUNSELLORS AT LAW

THE GATEWAY BUILDING
ONE NORTH LEXINGTON AVENUE
WHITE PLAINS, NEW YORK 10601

(914) 681-0200
FACSIMILE (914) 684-0288

THOMAS R. BEIRNE
BRIAN T. BELOWICH°
ANN FARRISSEY CARLSON°
ALFRED B. DELBELLO
ALFRED E. DONNELLAN†
JANET J. GIRIS▼
FRANK J. HAUPEL
ROBERT HERMANN
FAITH G. MILLER
PATRICK M. REILLY
ELIOT M. SCHUMAN
BRADLEY D. WANK*
MARK P. WEINGARTEN°
EVAN WIEDERKEHR
LEE S. WIEDERKEHR
PETER J. WISE, AICP †

JACOB E. AMIR
JENNIFER M. JACKMAN°
ERIC J. MANDELL
SUSAN CURRIE MOREHOUSE
MICHAEL J. SCHWARZ°
DANIEL G. WALSH
HEIDI WINSLOW

ANDREW J. BALINT
RICHARD BEMPORAD
GERALD K. GEIST
BRANDON R. SALL★
DAVID R. SELZNICK & CO., LLP
COUNSEL

°MEMBER OF NY & CT BARS
†MEMBER OF NY & NJ BARS
*MEMBER OF NY & DC BARS
▼MEMBER OF NY, NJ & MA BARS
★MEMBER OF NY, NJ, CT & FL BARS

September 25, 2012

By Hand Delivery
Supervisor Howard B. Arden
Members of the Town Board
Town of North Castle
15 Bedford Road
Armonk, New York 10504

Re: Brynwood Golf & Country Club: 568 Bedford Road, Armonk, New York

Dear Supervisor Arden and Members of the Town Board:

We represent Brynwood Partners LLC ("Petitioner"), the owner of Brynwood Golf & Country Club. On behalf of the Petitioner, and pursuant to New York Town Law Sections 264 and 265, and Article XIII of Chapter 213 of the North Castle Town Code, we respectfully submit to the Town Board the enclosed Petition for amendments to the North Castle Zoning Ordinance (i) modifying the regulations governing "Membership Clubs," and (ii) establishing "Golf Course Community" as a new residential special permit use in the R-2A One-Family Residence District of the Town. This Petition supersedes a prior petition submitted to the Town on August 31, 2012. If the requested amendments are adopted by the Town, the Petitioner intends to develop a community of eighty-eight (88) luxury condominium residences designed for active adults, ten (10) fewer than previously proposed. In all other respects, the development program proposed under this Petition is the same as previously proposed.

We respectfully request that at your regularly scheduled meeting on September 27, 2012, the Town Board: (i) declare its intent to serve as lead agency for coordinated review of the project under the State Environmental Quality Review Act; (ii) authorize circulation of the notice of lead agency intent to all potentially involved and interested agencies; and (iii) refer the Petition to the Planning Board for initial review and report as required under Section 213-68.C of the Town Zoning Ordinance.

Thank you for your consideration.

Very truly yours

MARK P. WEINGARTEN

Enc.
cc: Richard L. O'Rourke, Esq., Special Counsel
Roland A. Baroni, Jr., Esq., Town Attorney
Adam R. Kaufman, AICP, Director of Planning
Jeffrey B. Mendell
Edward Baquero
Spencer Romoff, Esq.
Megan Maciejowski
Peter J. Wise, Esq.
Jim Tinson, AIA
Nicole Emmons, AIA
John Saccardi, AICP
Bonnie Von Ohlsen, RLA

TOWN BOARD: TOWN OF NORTH CASTLE
COUNTY OF WESTCHESTER: STATE OF NEW YORK
---X
In the Matter of the Application of

BRYNWOOD PARTNERS LLC **PETITION**

For amendments to Sections 213-3, 213-19 (Schedule of Residence District Regulations) and 213-33 of the Zoning Ordinance of the Town of North Castle (i) modifying the regulations governing "Membership Clubs," and (ii) establishing "Golf Course Community" as a new special permit use in the R-2A One-Family Residence District, affecting real property owned by Petitioner commonly known as 568 Bedford Road and designated on the Tax Assessment Map of the Town as Section 2, Block 8, Lot 7.C1A.

---X

Brynwood Partners LLC (the "Petitioner"), by its attorneys DelBello Donnellan Weingarten Wise & Wiederkehr, LLP, hereby petitions the Town Board of the Town of North Castle pursuant to New York Town Law Sections 264 and 265 and Article XIII of Chapter 213 of the Code of the Town of North Castle (the "Zoning Ordinance"), as follows:

THE PETITIONER

1. The Petitioner is limited liability company duly organized and existing under the laws of the State of Delaware (and authorized to do business in the State of New York), having its address at 505 Fifth Avenue, New York, New York 10017. The principal members of the Petitioner are Corigin of New York City, JBM Realty of Greenwich, Connecticut and Florida East Coast Realty, Inc. ("FECR") of Miami, Florida.

2. Corigin is a vertically integrated real estate company with in-house expertise in acquisition, asset repositioning, adaptive reuse, ground-up development and the disciplines of architecture, construction, sales, marketing, finance, legal and accounting. Corigin has a strong record of success and has invested in numerous development projects in its eighteen year history with over $2 billion in asset value. Corigin's current transactions encompass more than five (5) million square feet of residential and commercial real estate projects in New York, New Jersey and Florida. Additionally, Corigin is the largest private provider of student housing to New York University ("NYU"), currently housing more than 2,400 of its students in buildings owned and managed by Corigin and net leased to NYU.

3. JBM Realty was founded in 1983 and is a private company focusing on the development, financing and sale of residential and commercial properties. The principal of JBM Realty is Jeffrey B. Mendell. Mr. Mendell has been a resident of the Town of North Castle (the "Town") since 1994. Mr. Mendell's most recent project was the development of Greenwich Shore, a luxury rental apartment project overlooking Long Island Sound in Greenwich, Connecticut. Earlier in his career, Mr. Mendell was an executive with Citicorp Real Estate, Inc. in New York City, President of National Realty & Development Corp. of Purchase, New York, where he was responsible for all aspects of a fourteen (14) million square foot portfolio of shopping centers, office parks and a residential construction business based in New Jersey, and President of RFR/Davis, Davis & Partners and affiliated companies, where he supervised all aspects of the development, construction and management of a portfolio of over 1500 luxury residential apartments in Manhattan.

4. FECR has been developing real estate, primarily in the State of Florida, for over sixty (60) years and is responsible for the development of over sixty (60) million square feet. A

fully integrated, family-owned and operated business under the direction of legendary developer Tibor Halo, FECR constructs and develops single-family homes, residential and commercial high-rises, government buildings, marinas, high-end retail centers, warehouse complexes and telecommunications centers. Among other projects, FECR was the driving force behind the master planned transformation of Miami's Omni/Venetia area into what is now known as the Media and Entertainment District, which covers six square blocks on the northern edge of downtown Miami, and includes residences, hotels, high-end retail space and Sea Isle Marina and Yachting Center, a full-service marina and home of the Miami International Boat Show.

THE PROPERTY

5. The Petitioner is the owner of the real property commonly known as 568 Bedford Road (New York State Route 22) and designated on the Tax Assessment Map of the Town of North Castle as Section 2, Block 8, Lot 7.C1A (the "Property"). The Property is the site of the golf and country club formerly known as "Canyon Club." The Petitioner acquired the Property in December, 2009.

6. Shortly after acquiring the Property, the Petitioner engaged Hart Howerton, an internationally acclaimed team of architects, planners, landscape architects, and interior designers based in New York City, to be the architect and master planner for renovations to existing club facilities and for the proposed new residential community described below; and hired world-renowned Troon Golf of Scottsdale, Arizona as operator of the club and golf course. In April, 2010, the Petitioner completed the first significant renovations to the clubhouse and core amenities in more than forty years, and reopened as Brynwood Golf & Country Club (the "Club"). Approximately fifty percent (50%) of the members of the Club are residents of the Town.

7. The Property fronts on the west side of Bedford Road and consists of approximately 156 acres. The Property is currently improved with an 18-hole golf course with a practice range, putting green and chipping green. There are fourteen (14) outdoor tennis courts located near the clubhouse. The existing structures on the Property include an approximately 65,000 square foot clubhouse with outdoor pool and terrace. The clubhouse contains twenty-two (22) guest suites, a ballroom, restaurant and bar, men's and women's locker rooms, lounge areas, administrative offices and a golf pro shop. Other structures include a detached golf cart storage facility, a maintenance garage attached to the clubhouse, a tennis cabana and golf halfway houses. Related on-site service buildings and facilities include an on-site wastewater treatment facility operated under a New York State Pollution Discharge Elimination System permit.

8. The Property is located in the R-2A One-Family Residence District ("R-2A District") of the Town. "Membership clubs" (which include golf and country clubs and similar recreation facilities) are permitted in the R-2A District upon the issuance by the Town Board of a special permit under Section 213-33.I of the Zoning Ordinance. The Property was first approved for use as a membership based golf and country club pursuant to a special permit granted by the Zoning Board of Appeals of the Town on April 14, 1961. The club was initially known as the Bel-Aire Country Club.

THE PROPOSED AMENDMENTS TO THE ZONING ORDINANCE REGULATIONS GOVERNING MEMBERSHIP CLUBS

9. The special permit for operation of the golf and country club has been amended, extended and re-issued numerous times by the Zoning Board of Appeals, and then under successor zoning codes, by the Town Board, most recently in April, 2000, to permit a professional tennis tournament to be held at the Property in May of that year. The specific

conditions to the use of the Property and operation of the club imposed by the Zoning Board of Appeals and Town Board were last materially amended in June, 1978, to permit the club to "conduct outside affairs such as dinners, dances, weddings, [and] catering to persons who are not primarily members of the club."

10. The Property has been continuously used and operated as a golf and country club since 1964. In the almost fifty years since, the economics of golf and country clubs have changed significantly, primarily due to the ever-increasing costs of operating a labor-intensive enterprise that in the northeastern United States incurs year-round expenses but can only be fully operated for half the year. These economic changes have made the traditional private "not-for-profit" equity membership model increasingly difficult to sustain, as demonstrated by the recent failures of Hampshire Country Club in Mamaroneck and Ridgeway Country Club in White Plains, among others in the region and elsewhere.

11. To the Petitioner's knowledge, the Town's current regulations for membership clubs, which are set forth in Section 213-33.I of the Zoning Ordinance, have not been revised in a considerable time. The regulations permit only the traditional "not-for-profit" equity membership model of club ownership and operation. Thus, the definition of "club, membership" in Section 213-3 of the Zoning Ordinance: (a) defines "membership club" as "land, buildings and facilities operated by a membership corporation, association or fraternal order"; (b) requires the members of the membership corporation, association or fraternal order to have "a financial interest in and method of control of, the assets and management of the club"; and (c) expressly provides that a membership club shall not be operated primarily for profit. In addition to operational control, the special permit regulations for a membership club require the "membership club" to own or lease the club property (Section 213-33.I(5) of the Zoning Ordinance).

12. These traditional regulations are not sufficiently flexible to permit the business model that Petitioner respectfully submits is necessary to ensure the economic viability of the Club and induce continuing capital investment under current and foreseeable economic conditions, in which the Club – including its golf course, recreational facilities and dining amenities – would be operated for the benefit of members (and the public, to the extent permitted under the special permit) by a professional owner/manager for profit. This alternative model differs from the traditional equity model by exposing the club owner, rather than the members, to unknown financial risk and budget overruns.

13. To permit this business model as well as the more traditional model (in which a club property typically is owned by a for-profit entity and is leased to a not-for-profit "membership" corporation), the Petitioner proposes that the definition of "membership club" and the special permit regulations governing membership clubs be amended as set forth in **Exhibit A** attached to this Petition.

14. In addition to the changes to permit alternative business models, the Petitioner also proposes amendments to the special permit regulations to: (a) introduce a provision that expressly identifies the different uses permitted as part of a membership golf and country club, including golf and tennis pro shops, health, fitness and spa facilities, facilities for the operation and maintenance of the club including employee and management housing and buildings for the storage and repair of golf carts, restaurants and other food and beverage service facilities which primarily serve club members and their guests but which may also serve the general public at outings and catered events; (b) permit lodging rooms/suites for use by club members and their guests, guests attending catered special events, and club management and employees; and (c)

permit compact car parking spaces. The text of the proposed amendments is set forth in **Exhibit A**.

THE PROPOSED "GOLF COURSE COMMUNITY"

15. To further ensure the financial stability of the Brynwood Golf and Country Club, the Petitioner proposes to develop at the Property an ownership residential community geared to an active adult lifestyle, in which all homeowners will be required to be members of the Club. As shown on the conceptual plan attached as **Exhibit B** to this Petition, the "Residences at Brynwood" would consist of eighty-eight (88) residences located on an approximately 14.7 acre portion of the 156 acre site, leaving 141 acres of preserved open space. The residential portion of site would be comprised of two parcels: an approximately 14.5 acre parcel in the northeast corner of the Property fronting on Bedford Road (the "North Parcel"), on which all but five (5) of the units would be located, and an approximately 9,000 square foot parcel due west of the Club's existing parking area and south of the clubhouse (the "South Parcel"). The two (2) residential parcels would be subdivided from the remainder of the site.

16. As shown on **Exhibit B**, the residences would be in nineteen (19) structures on the North Parcel, and one (1) structure on the South Parcel, all generally sited within currently developed areas and located to maximize views of the adjoining golf course. On the North Parcel, five (5) of the structures would be four-bedroom "Golf Cottages," four (4) of the structures would each contain ten (10) two-bedroom "Golf Residences," three (3) of the structures would each contain six (6) two-bedroom and two (2) three-bedroom "Golf Residences," and seven (7) structures would each contain two (2) three-bedroom "Club Villas." The structure on the South Parcel would contain five (5) three-bedroom "Fairway Residences" and potentially up to four (4) lodging rooms/suites. The Club Villa structures, which would be

designed to emulate single-family homes, would be located nearer to Bedford Road than the higher density Golf Residence structures, which would step down the existing slope away from Bedford Road and toward the golf course. The residences are currently anticipated to range from 1,900 square feet (two-bedroom Golf Residences) to 3,200 square feet (three-bedroom Fairway Residences and four-bedroom Golf Cottages). Sixteen (16) of the Golf Residences would be served by grade level accessory cabanas and "plunge" pools. Each of the residences would be served by two (2) garage parking spaces.

17. The architectural character and massing of the residential buildings would be rooted in the historic building traditions of the Town, Westchester County and surrounding region. Asymmetrical volumes, varying roof types and heights and a combination of materials such as shingles, painted wood and stucco would help create a picturesque arrangement of homes set in a natural landscape. Details would include a variety of wood bracket and rafter designs, window and door arrangements, and porches and terraces. Organized outdoor courtyards, pedestrian paths, and preservation of vegetation in undisturbed areas would encourage a sympathetic relationship of the structures fitting into the land. The landscape treatment along Bedford Road would include the use of stone walls and preservation of partial views to the west and existing large specimen trees.

18. The community would be geared to active adults and homeownership would be burdened by required membership in the Club. Given this, the Petitioner respectfully submits that the community would not generate a significant number of school children. The Petitioner will in due course provide the Town Board with appropriate expert analysis to support this conclusion, which will in turn be supported in part by data from similar golf course communities in Westchester County and the region.

19. The Petitioner will also provide to the Town Board an analysis of potential fiscal impacts of the proposed development (and of the other improvements to the Club discussed below). This analysis will show that the tax revenues to be generated to the Byram Hills Central School District and the Town would significantly exceed the costs to the taxing jurisdictions of the additional services they would provide to the community above and beyond the services already being provided to the Club.

20. The community and the Club would be served by the existing on-site wastewater treatment facility, which would be improved and expanded as necessary to meet all regulatory requirements, and are proposed to be served by existing and new on-site community water wells. Water would also continue to be drawn from the existing ponds for golf course irrigation.

21. The residential community would be accessed solely from N.Y.S. Route 22 (Bedford Road) at a common entrance with the Club. The Petitioner will provide to the Town Board a traffic impact study prepared by a qualified professional demonstrating that Route 22 and all potentially affected intersections have adequate capacity to serve the traffic that would be generated by the residences and that development of the residences would not cause any significant traffic impacts.

22. The proposed residential community would provide desirable age-targeted housing of a type not currently available in the Town. For all of the reasons discussed above, the Petitioner respectfully submits that the development of the community would not have any significant adverse impacts on the Town and its residents, and would in fact provide numerous net benefits to the Town and its residents.

THE PROPOSED AMENDMENTS TO THE ZONING ORDINANCE TO PERMIT THE GOLF COURSE COMMUNITY

23. Residences at the density proposed by the Petitioner (i.e., 88 residences on a site of approximately 14.7 acres) are not permitted under the existing regulations of the R-2A District.

24. To permit the community to be developed, the Petitioner requests that the Town Board amend the regulations of the R-2A District to add a new special permit use to be known as "golf course community." Under the proposed definition, a golf course community would be "a residential community designed for and marketed to active adults in which the central focus of the community is an affiliated membership club having an 18-hole golf course and other recreational facilities which adjoins the site of the golf course community." The definition would also require the owners of all residences in a golf course community to be members of the affiliated club.

25. The definition and the proposed special permit regulations for a golf course community are set forth in **Exhibit C** attached to this Petition. The special permit regulations are designed to restrict golf course communities by requiring the community to be affiliated with a currently existing membership club which has an 18-hole golf course and adjoins the site of the community, which must in turn have frontage on, and be directly accessed from, a State highway.

26. The regulations restate the requirement that all homeowners must be members of the affiliated club. The proposed regulations also acknowledge that the golf course of the affiliated membership club functions as the open space for the golf course community, and that preservation of that open space is the basis for the permitted density of a golf course community. The regulations therefore expressly provide that as a condition of site development plan approval

of a golf course community, the affiliated membership club must record in the Westchester County Clerk's office a declaration of covenants and restrictions pursuant to which the owner of the membership club property agrees that for so long as the affiliated golf course community exists, the property shall be used solely for a membership club in accordance with the requirements of the Zoning Ordinance, and the portion of the property on which the golf course is located shall be maintained either as a golf course or otherwise as open space.

27. The regulations would also establish special bulk, dimensional and parking requirements for a golf course community including a maximum permitted density of one "density unit" (as already defined in the Zoning Ordinance) per 12,000 square feet of the aggregate lot area of all lots comprising the community.

28. To maximize the ability of a golf course community to weather the kind of economic conditions that have been experienced for the past several years and permit the community to respond to other changes in marketplace demand, the regulations would permit certain types of limited design flexibility after site development plan approval is granted without need for additional or amended site development plan approval provided that: (a) overall density (measured in density units) and building coverage are not increased, and minimum yards are not decreased, from the amounts previously approved by the Planning Board; (b) the overall number of off-street parking spaces continues to comply with the Zoning Ordinance; (c) no principal building or structure is located any closer to any property line than under the approved site development plan; (d) the landscape plan approved by the Planning Board for the site frontage on the State highway and all yards and/or designated buffer areas which do not abut the adjoining membership club is not materially changed; (e) the Town Director of Planning determines and certifies to the Town Building Inspector that the overall architectural design and character of the

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golf course community is not materially changed; and (f) the Town Director of Planning determines and certifies to the Town Building Inspector that the changes do not present any new or different significant adverse environmental impacts, or significant adverse environmental impacts greater in degree than addressed in the initial review of the golf course community under the State Environmental Quality Review Act, and that any impacts requiring mitigation are adequately mitigated by the measures already imposed in connection with the site development plan approval of the golf course community.

THE PROPOSED IMPROVEMENTS TO THE GOLF COURSE AND OTHER CLUB FACILITIES

29. The Petitioner also intends to make further improvements to the core facilities and amenities of the Club, continuing the comprehensive renovation that began in 2010 with improvements to the clubhouse interior.

30. As shown on the conceptual plan attached as **Exhibit D** to this Petition, the clubhouse would be completely renovated and would include: (a) a new entry façade with expanded porte cochere facing Bedford Road; (b) a reconfigured service entry; and (c) a new pool with surrounding terraces. The existing clubhouse building would be reduced from approximately 65,000 square feet to approximately 62,000 square feet and would contain all current uses including lodging and new uses such as spa and fitness facilities and employee housing, and additional food and beverage service facilities. The existing tennis courts would be relocated closer to the clubhouse and reduced in number from fourteen (14) to six (6). A new tennis viewing pavilion of approximately 800 square feet would also be constructed. The design of the clubhouse would respond sensitively to the architectural traditions of the Town, County and region and integrate contextually into the established landscape along Bedford Road.

31. To improve on-site traffic movement after Club events, the Petitioner would construct a new exit from the Club parking area, limited to right-turns onto Bedford Road.

32. A new golf course maintenance building would be constructed in the vicinity of the existing wastewater treatment facility, which would be expanded and up-graded to accommodate the demand from the golf course community.

33. The golf course would be renovated and improved under the direction of Rees Jones, Inc. of Montclair, New Jersey, a renowned international golf course design firm that offers a classical approach, decades of experience and a family heritage of excellence. The improvements include adding additional championship and forward tees, select rebuilding of existing tees to improve playability and drainage, installing drainage in twelve (12) of the existing greens, constructing seven (7) new green surfaces and green complexes, rebuilding all greenside bunkers and fairway bunkers, installing ten to twelve (10-12) additional fairway bunkers, relocating three (3) golf holes to improve the golf course experience and minor grading on select fairways. The existing ponds would be expanded to improve storm drainage storage and increase capacity for golf course irrigation.

COMPLIANCE WITH THE STATE ENVIRONMENTAL QUALITY REVIEW ACT

34. Under the State Environmental Quality Review Act and the regulations promulgated thereunder ("SEQRA"), the project and the actions directly and indirectly proposed by this Petition are classified as "Type I." A full Environmental Assessment Form prepared by VHB Engineering, Surveying and Landscape Architecture, P.C. and dated September 25, 2012 is attached as **Exhibit E** to this Petition for the Town Board's review and consideration.

35. The Petitioner requests that at its meeting on September 27, 2012, the Town Board declare its intent to serve as lead agency for review of the project under SEQRA, and authorize the circulation of notice of intent to all potentially involved and interested agencies.

CONCLUSION

36. The proposed changes to the permitted business model for membership club ownership and operation would facilitate the significant capital investment that is necessary to sustain a club in difficult economic environments, and that simply cannot be attracted by the traditional not-for-profit model. Permitting the alternative business model would not negatively impact the Town, because the operation of a membership club would in all events remain subject to control through the special permit, regardless of the form of club ownership and management.

37. The Petitioner would comply with any requirements that the Town may adopt for the provision by multi-family residential developers of off-site affordable housing. The Petitioner respectfully submits that the proposed new golf course community would benefit the Town by expanding housing opportunities for adult residents with grown children who wish to remain in the Town but no longer have need for the larger home where their family was raised; and by providing a significant new source of tax revenue to the Town and Byram Hills Central School District that would exceed the costs of services provided by these taxing jurisdictions to the community. The architecture of the community would be consistent with local architectural traditions, and would embrace modern environmentally sensitive design concepts.

38. The development of the golf course community would help ensure the future financial viability and sustainability of the Club, with result in the preservation of one of the Town's significant recreational open spaces.

WHEREFORE, the Petitioner respectfully requests that the Town Board grant this Petition and amend the Zoning Ordinance as set forth herein.

Dated: White Plains, New York
September 25, 2012

Respectfully submitted,
Mark P. Weingarten, Esq.
Peter J. Wise, Esq.
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Exhibit A

AMENDMENTS TO THE TOWN OF NORTH CASTLE ZONING ORDINANCE REGULATIONS GOVERNING MEMBERSHIP CLUBS

Underlined text is added; ~~strikethrough~~ text is deleted.

I. Amend the definition of “Club, Membership” in Section 213-3 to read as follows:

CLUB, MEMBERSHIP - Land, buildings and facilities operated ~~by a membership corporation, association or fraternal order~~ for the use and benefit of members and their guests primarily for ~~the purpose of accommodating~~ recreational ~~athletic, social, literary or similar activities~~ purposes, including golf clubs, country clubs, tennis and swimming clubs and similar facilities. ~~The members of the membership corporation, association or fraternal order shall have a financial interest in and method of control of, the assets and management of the club.~~ A “membership club” shall not ~~be operated primarily for profit nor~~ regularly render services to the general public. However, club facilities including golf courses and other recreational facilities, restaurants and food service facilities, and lodging facilities may be reserved and used by the general public on a fee basis for outings and special events.

II. Amend Section 213-33.I (special permit requirements for membership clubs) to read as follows:

(1) Purpose. It is the purpose and intent of this section to encourage the use of land in residence districts for recreational facilities, such as golf courses, tennis and swimming clubs and similar facilities, to provide for the recreational needs of the Town. It is the further purpose and intent of permitting such uses to encourage the maintenance of significant tracts of land as open space to protect and enhance the environmental and visual quality of the Town. Finally, it is the purpose and intent of this section to assure that such diverse types of recreational uses are developed and managed so as to protect the quality of the environment and the property values of adjacent and nearby residential areas.

(2) Location and use.

(a) Where clubs do not front on or have direct access to a major or a collector road as shown on the Town Development Plan Map, the intensity of use shall be limited by the Town Board to the extent necessary to assure that the expected average traffic generation of such use will not exceed that which would be expected if the premises were developed for permitted residential purposes.

(b) Uses and facilities customarily part of a club shall be permitted, including but not limited to golf driving ranges, golf practice greens, golf and tennis pro shops, swimming pools, tennis courts and other recreational facilities, health, fitness and spa facilities, facilities for the operation and maintenance of the club including employee and management housing and buildings for the storage and repair of golf carts, and subject to applicable federal, State and Westchester County laws and regulations, fueling and fuel storage facilities, facilities for the storage and mixing of fertilizers and pesticides, water supply wells and facilities, golf course irrigation facilities and on-site sanitary sewage treatment facilities. A club may have one or more restaurants, cafés and other food service facilities which primarily serve club members and their guests but which may also serve the general public at outings and catered events.

(c) Lodging rooms/suites for use by club members and their guests, guests attending catered special events, and club management and employees, but not the general public, shall be permitted. Lodging rooms/suites shall not have kitchens or food preparation facilities.

(3) Buffer area. A landscaped buffer area of at least 25 feet in width shall be required along all lot lines adjoining or across the street from properties in residence districts, except a lot line adjoining a golf course community.

(4) Special setback requirements. All active recreational facilities, such as tennis courts and swimming pools, shall be located out of doors. However, where the scale of buildings and setbacks are such that placing such uses indoors would relate harmoniously to the existing residential character of the district in which the membership club is located, they may be placed within permanent or temporary structures. Except with respect to an adjoining golf course community, ~~S~~such facilities shall be set back from adjacent residential property boundaries at least twice the minimum distance required for residential buildings in said district, except that the Town Board may permit a reduction of this additional setback requirement where, because of topography or the installation of additional buffer landscaping and/or fencing, the Town Board determines that any potential adverse external effect of such facility can be effectively reduced.

(5) Management. The use and management of any facility under the terms of any special permit approval shall be the responsibility of the membership club ~~which shall either own or lease the property~~. Suitable evidence, such as organizational documents, shall be provided as a part of the special permit application to describe the organizational structure and operating rules of the club.

(6) Parking. Each parking space shall be at least 8 ½ feet wide and 18 feet long if unenclosed and at least 9 feet wide if bordered by walls or columns on two or more sides. Up to 33% of parking spaces may, with Planning Board approval, be designed and reserved for compact cars. Compact car spaces shall be at least 7 ½ feet wide and 15 feet long, shall be in locations approved by the Planning Board and shall be clearly marked as being reserved for compact cars only. Backup and

maneuvering aisles between rows of parking spaces shall be a minimum of 24 feet wide.

~~(6)~~(7) Other requirements. In addition to the special standards described above, any club shall comply with any other requirements deemed appropriate by the Town Board in accordance with the requirements of Article VIII herein.

<u>Exhibit C</u>

AMENDMENTS TO THE TOWN OF NORTH CASTLE ZONING ORDINANCE TO PERMIT THE GOLF COURSE COMMUNITY

<u>Underlined</u> text is added; ~~strikethrough~~ text is deleted.

I. Amend Section 213-3 to add a new definition of "Golf Course Community," as follows:

<u>GOLF COURSE COMMUNITY - A residential community designed for active adults in which the central focus of the community is an affiliated membership club having an 18 hole golf course and other recreational facilities which adjoins the site of the golf course community. The owners of all residences in a golf course community shall be required to be members of the affiliated club.</u>

II. Amend Column 2 of the Schedule of Residence District Regulations (Section 213-19) to add a new permitted principal use subject to additional standards (special permit use) as set forth in Article VII entitled "Golf Course Community in the R-2A District."

III. Amend Section 213-33 to add a new subsection U, as follows:

<u>U. Golf course community.</u>

<u>(1) Purpose and intent. It is the purpose and intent of this subsection U to permit the development of a residential community designed for active adults in which the central focus of the community is an affiliated membership club having an 18 hole golf course and other recreational facilities. It is the further purpose and intent of this subsection to encourage the preservation of golf courses, thereby providing for the recreational needs of the Town and the maintenance of significant open space. It is the further purpose and intent of this subsection U to provide flexibility of design for a golf course community, so that the types and designs of dwelling units to be constructed can be changed as needed to respond to changes in marketplace demand, provided that, among other requirements set forth in subsection 7, below, overall density and building coverage are not increased, and minimum yards are not decreased, from the amounts approved by the Planning Board as part of the site development plan approval of the golf course community under Article VIII of this chapter.</u>

<u>(2) Eligibility. A golf course community is permitted only in the R-2A District in affiliation with a membership club existing on the date of adoption of this subsection U which has an 18 hole golf course and adjoins the site of the golf course community. The site of a golf course community shall be comprised of one or more lots or parcels having an aggregate minimum area of 14 acres, and must have at least 1,000 feet of frontage on, and be directly accessed from, a State highway. The lots and/or parcels that together comprise a golf course community</u>

are not required to be contiguous, provided that each such lot or parcel adjoins the affiliated membership club, and all such parcels and lots shall together comprise one "lot" (as defined in § 213-3 of this chapter) for all purposes of this chapter.

(3) Uses. The permitted principal use shall be detached, semi-detached, attached and multifamily dwelling units. Permitted accessory uses shall be all uses in Column 3 of the Schedule of Residence District Regulations (§ 213-19).

(4) Dimensional and parking requirements. The dimensional and parking requirements in this subsection U(4) shall supersede the Schedule of Residence District Regulations (§ 213-19 of this chapter) and the Schedule of Off-Street Parking Requirements (§ 213-45 of this chapter). All such requirements, including but not limited to maximum density, maximum building coverage, minimum yards and required off-street parking, shall apply to the golf course community site as a whole, notwithstanding that the site may be comprised of more than one lot and/or parcel, or that the site may from time to time be subdivided, resubdivided, or converted to condominium, cooperative and/or homeowners' association ownership, and all determinations and calculations relating to such requirements shall be made with reference to the boundaries of the entire golf course community and as though the site of the golf course community is a single lot, even though it is or will be comprised of more than one lot and/or parcel.

(a) Density. The maximum permitted density shall not exceed one density unit, as defined in § 213-3 of this chapter, per 12,000 square feet of the aggregate net lot area (as defined in § 213-3 of this chapter) of all lots comprising the site.

(b) Building coverage. The maximum building coverage shall be determined by the Planning Board in connection with site development plan approval.

(c) Maximum building height. The maximum building height shall be 3 stories and 39 ½ feet to the mean level of the primary roof, measured from the level of the finished grade at the main entry to the building.

(d) Minimum yards. The minimum front yard shall be 50 feet. The minimum side yard and rear yards shall be determined by the Planning Board in connection with site development plan approval.

Unenclosed porches, stairs and decks may not encroach into minimum required yards except where built with sufficient vertical clearance and then only up to 5 feet into such yards.

(e) Minimum floor area. Minimum gross floor area per dwelling unit shall not be less than the following:

[1] efficiency: 450 square feet;

[2] one-bedroom: 700 square feet;
[3] two-bedrooms: 900 square feet; and
[4] three-bedrooms: 1,100 square feet.

For purposes of this subsection, the Planning Board may allow balconies or paved terraces to be counted toward the minimum gross floor area requirement in an amount not to exceed 5% of that requirement.

(f) Off-street parking.

[1] The minimum required parking for all dwelling units shall be 2 spaces per dwelling unit. An amount equal to at least 10% of the total number of required spaces shall not be reserved for specific dwelling units and shall be available for the use of visitors and guests.

[2] Each parking space shall be at least 8 ½ feet wide and 18 feet long if unenclosed and at least 9 feet wide if bordered by walls or columns on two or more sides. Backup and maneuvering aisles between rows of parking spaces shall be at least 24 feet wide.

[3] Up to 33% of parking spaces may, with Planning Board approval, be designed and reserved for compact cars. Such compact car spaces shall be at least 7 ½ feet wide and 15 feet long, shall be in locations approved by the Planning Board and shall be clearly marked as being reserved for compact cars only.

[4] Up to 25% of enclosed spaces may, with Planning Board approval, be tandem spaces.

(5) Privacy considerations.

(a) Visual privacy shall be preserved for residents through the proper design of rear yards and/or patio spaces. Proper screening through the use of vegetation, fencing and partially or fully enclosed patios shall be provided.

(b) Audio privacy shall be maintained by requiring proper standards for solid party walls that will satisfactorily limit sound transmission between adjoining dwelling units.

(6) Water and sewerage facilities. All dwelling units shall be served by either public or central water and sewage treatment facilities, and no certificate of occupancy shall be issued for a dwelling unit until it is connected to approved and functioning water and sewage treatment facilities. Water and sewerage facilities

shall be designed in accordance with the standards and subject to approval of the Westchester County Department of Health and the New York State Department of Environmental Conservation, as applicable.

(7) Design flexibility. To permit a golf course community to respond to changes in marketplace demand, until the golf course community is completed in accordance with the site development plan approved by the Planning Board under Article VIII of this chapter, the types of dwelling units and residential buildings to be constructed can be changed from time to time without any required additional, supplemental or amended site development plan approval, between semi-detached, attached and multi-family units and buildings, and within any of these types between single and multi-floor dwelling units, provided that:

(a) the overall density (measured in density units as set forth subsection 4(a), above) and building coverage of the golf course community are not increased, and minimum yards are not decreased, from the amounts approved by the Planning Board as part of the site development plan approval of the golf course community;

(b) the overall number of off-street parking spaces continues to comply with subsection 4(f)[1], above;

(c) no principal building or structure is located any closer to any property line than under the approved site development plan;

(d) the landscape plan approved by the Planning Board for the site frontage on the State highway and all yards and/or designated buffer areas which do not abut the adjoining membership club is not materially changed;

(e) the Town Director of Planning determines and certifies to the Town Building Inspector that the overall architectural design and character of the golf course community is not materially changed; and

(f) the Town Director of Planning determines and certifies to the Town Building Inspector that the changes do not present any new or different significant adverse environmental impacts, or significant adverse environmental impacts greater in degree than addressed in the initial review of the golf course community under the State Environmental Quality Review Act, and that any impacts requiring mitigation are adequately mitigated by the measures already imposed in connection with the site development plan approval of the golf course community.

(8) Affiliation with membership club.

(a) A golf course community must be affiliated with an adjoining membership club. Such affiliation shall be established by the requirement that except for the initial developer/sponsor of the golf course community and successor sponsors/owners of units which have not yet been sold for owner occupancy, the owner of a dwelling unit of the golf course community must for the duration of ownership be a member (whether individually or as a family) of the membership club. The terms and conditions of membership shall be determined by the membership club.

(b) The golf course of the affiliated membership club functions as the open space for the golf course community, and preservation of that open space is the basis for the permitted density of a golf course community. Accordingly, as a condition of site development plan approval of a golf course community, the affiliated membership club shall record in the Westchester County Clerk's office a declaration of covenants and restrictions pursuant to which the membership club agrees that for so long as the affiliated golf course community exists, the property which as of the date of site development plan approval of the golf course community is subject to the membership club special permit shall be used solely for a membership club in accordance with the requirements of § 213-33.I of this chapter, as may be amended from time to time, and the portion of the property on which the golf course is located shall either be maintained as a golf course or otherwise as open space. The declaration of covenants and restrictions shall be in form and substance reasonably acceptable to the Town Attorney.

APPENDIX D

CARLIN • SIMPSON & ASSOCIATES

Consulting Geotechnical and Environmental Engineers

61 Main Street, Sayreville, New Jersey 08872
Tel. (732) 432-5757
Fax. (732) 432-5717

Principal:
Robert B. Simpson, P.E.

Associates:
Robert H. Barnes, P.E.
Meredith R. Anke, P.E.
Kurt W. Anke
Eric J. Shaw

13 February 2013

JBM Realty
10 Glenville Street
Greenwich, CT 06831

Attn: Mr. Jeffrey B. Mendell
Chairman & CEO

Re: Report on Preliminary Subsurface Soil and Foundation Investigation
Brynwood Club Development
Bedford Road
Town of North Castle, NY (12-175)

Dear Mr. Mendell:

In accordance with our proposal dated 20 November 2012 and your subsequent authorization, we have completed a Preliminary Subsurface Soil and Foundation Investigation for the referenced site. The purpose of this study is to preliminarily determine the nature and engineering properties of the subsurface soil and bedrock as well as the groundwater conditions for the planned development, to recommend a practical foundation scheme, to determine the allowable bearing capacity of the site soils, and to determine the soil permeability in the new stormwater management areas.

We understand that the planned construction will consist of 21 new structures, roadways, parking areas, retaining walls, tennis courts, underground utilities, and a stormwater management system. To guide us in our study, you have provided us with a site plan that indicates the existing site conditions and the location of the planned new development.

Our scope of work for this project included the following:

1. Reviewed the proposed layout, the existing site conditions, the expected soil conditions, and planned this study.

2. Retained General Borings, Inc. to advance 11 test borings at the subject site.

3. Retained Traficante Contracting Inc. to excavate 18 test pits at the subject site.

4. Laid out the boring and test pit locations in the field, provided full time inspection of the explorations, obtained soil samples, and prepared detailed logs and a Boring and Test Pit Location Plan.

5. Performed three (3) field percolation tests and one (1) borehole permeability test.

6. Performed soil identification tests on selected soil samples in our laboratory.

7. Analyzed the field and laboratory test data and prepared this report containing the results of this study.

SITE DESCRIPTION

The project site is located on the Brynwood Club property on Bedford Road in North Castle, Westchester County, New York. The subject property is currently occupied by a golf club with a clubhouse building, tennis courts, and a few smaller out-structures. The proposed development area is also occupied by an asphalt paved parking lot and driveways as well as grass lawn areas and wooded areas. There are numerous existing underground utilities located throughout the property.

Within the proposed development area, the existing site grades vary from approximately elevation +610.0 at the southwest corner of the subject site and the westernmost portion of the site, to elevation +640.0 on the east side of the existing clubhouse building, to elevation +674.5 in the existing tennis court area in the northeastern portion of the property.

SUBSURFACE CONDITIONS

To determine the subsurface soil, bedrock, and groundwater conditions at the site, we advanced 11 test borings and 18 test pits at the site. The borings and test pits were performed at the locations shown on the enclosed Boring and Test Pit Location Plan. Detailed logs have been prepared and are included in this report. Our field engineer visually identified all soil samples and selected soil samples were tested in our laboratory. The results of these tests are also included in this report.

Soil

The soil descriptions shown on the boring and test pit logs are based on the Burmister Classification System. In this system, the soil is divided into three components: Sand (S), Silt ($) and Gravel (G). The major component is indicated in all capital letters, the lesser in lower case letters. The following modifiers indicate the quantity of each lesser component:

Modifier	Quantity
trace (t)	0 -10%
little (l)	10% - 20%
some (s)	20% - 35%
and (a)	35% - 50%

The subsurface soil conditions observed in the borings and test pits can be summarized as follows:

Stratum 1
Topsoil

The surface layer at most of the boring and test pit locations consists of brown topsoil that typically ranges from about 0'3" to 0'10" in thickness.

Stratum 2
Existing Fill

Beneath the topsoil and at the surface in three (3) of the borings (B-6, B-8, and B-9) and six (6) of the test pits (TP-2, TP-9, TP-10, TP-12, TP-14, and TP-16) is existing fill that consists of loose to medium dense brown coarse to fine SAND, little (to and) Silt, trace (to some) coarse to fine Gravel. Cobbles, boulders, and debris were also present within the fill at some of the test locations. The existing fill was encountered to depths ranging from 1'0" to 7'0" beneath the existing ground surface. Test pit TP-9 was terminated in the fill at a final depth of 6'9" beneath the ground surface.

Stratum 3
Sandy Silt or Silty Sand

Underlying the topsoil and existing fill is virgin soil that is comprised of medium dense to dense brown, light brown, or gray brown SILT some (to and), coarse to fine Sand, trace (to little) coarse to fine Gravel or coarse to fine SAND, little (to and) Silt, trace (to and) coarse to fine Gravel, with occasional cobbles and boulders. The Sandy Silt or Silty Sand stratum continued to depths ranging from 2'0" to 12'0" below the existing ground surface. Boring B-8 and test pits TP-8, TP-10, and TP-12 were terminated in this stratum at final depths ranging from 5'0" to 12'0" beneath the ground surface.

Stratum 4
Sand or Sandy Gravel

Below the Sandy Silt or Silty Sand at several test locations is completely weathered Gneiss bedrock that generally consists of dense to very dense brown or gray brown coarse to fine SAND, little (to some) Silt, trace (to some) coarse to fine Gravel or coarse to fine GRAVEL and, coarse to fine Sand, trace Silt. Where encountered in the borings and test pits, the completely weathered bedrock was present at depths ranging from 2'0" to 7'0" beneath the ground surface and continued to depths ranging from 4'7" to 15'2" below the existing ground surface.

Stratum 5
Gneiss Bedrock

Gneiss bedrock was encountered at 22 of the 29 test locations. Where encountered in the borings and test pits, gneiss bedrock was observed at depths ranging from 1'8" to 15'2" beneath the existing ground surface. In general, the quality of the bedrock will improve with depth.

At boring B-10, the bedrock was cored between the depths of 2’0” and 7’0”. The core recovery was 86% and the Rock Quality Designation (RQD) of the recovered core was 53%. This indicates that the quality of the upper five (5) feet of the Gneiss bedrock is fair. The Gneiss bedrock is moderately weathered and in a blocky and seamy condition.

Groundwater

Observations for groundwater were made during sampling and upon completion of the drilling operations at each boring location. In auger drilling operations, water is not introduced into the boreholes, and the groundwater position can often be determined by observing water flowing into or out of the boreholes. Furthermore, visual observation of the soil samples retrieved during the auger drilling and in the test pits can often be used in evaluating the groundwater conditions.

Groundwater was encountered in test pit TP-8 at a depth of 4’1” (+609.9), in test pit TP-13 at a depth of 4’10” (+631.2), and in boring B-8 at a depth of 3’3” (+608.3) beneath the ground surface. Groundwater was not encountered in any of the other borings or test pits that were performed at the subject site during this investigation.

Variations in the location of the long-term water table may occur as a result of changes in precipitation, evaporation, surface water runoff, and other factors not immediately apparent at the time of this exploration. Based on the site conditions, trapped groundwater may be encountered in the silty site soils and/or along the soil/rock interface during wet periods. Proper groundwater control measures will be required in the event that trapped water is encountered in the site excavations.

Bedrock

Bedrock was encountered in 22 of the 29 explorations that were performed at the site during this investigation. Completely weathered bedrock was encountered at ten (10) test locations at depths ranging from 2’0” to 7’0” below the existing ground surface. Harder bedrock was encountered in the remaining locations and below the completely weathered rock at depths ranging from 1’8” to 15’2” beneath the ground surface. These depths correspond to bedrock elevations ranging between approximately elevation +611.5 and elevation +669.8.

Based on the boring and test pit data and the site plans provided to this office, bedrock was encountered above the planned finished floor elevation in portions of the site. The observed depth to bedrock at each boring and test pit location is summarized in Table 1 in the following section of this report.

The bedrock encountered at the site consists of weathered Gneiss. Based on our experience, the in-situ bedrock will range from highly weathered, fractured rock to massive, intact rock. Penetration into the bedrock with excavation equipment will depend of the degree of weathering and fracturing in the rock. We anticipate that the ”rippability” of the bedrock will be variable and very limited. Based on our observations, harder rock will be encountered and blasting and/or the use of hydraulic hammers will be required to excavate the harder, intact bedrock. Rock removal is discussed further in a separate section of this report.

EVALUATION

At the time of this report, the proposed layout, the proposed finished floor elevations, and the site grading were preliminary. Therefore, the following evaluation is preliminary in nature and has been generalized for the expected development. The recommendations below are intended for planning purposes only and are not intended for final design and construction. Additional subsurface investigation will be required for the proposed buildings and retaining walls. Preliminarily, we estimate that an additional 12 to 15 explorations will be required for this project. Once the site plans have been further developed, a copy shall be forwarded to our office so that we can review it along with the recommendations in this report. At that time, we will provide specific recommendations for additional subsurface investigation. After the supplemental investigation has been completed, additional geotechnical recommendations will be provided for the project site. As a result, the recommendations within this report are subject to change.

Based on the preliminary site plans, we understand that the planned construction will consist of 21 new structures that will include seven (7) golf residences, seven (7) club villas, five (5) golf cottages, one (1) fairway residences building, and one (1) clubhouse building. The proposed construction will also include new asphalt paved roadways and parking areas, retaining walls, tennis courts, underground utilities, and a stormwater management system.

The grading plan provided to this office indicates that the proposed finished floor elevations vary across the site. In addition, the fairway residences, golf cottages, and golf residences will have basements. Based on the existing and proposed grades, cuts ranging up to approximately 14’0” and fills ranging up to approximately 10’0” are expected to achieve the proposed floor slab subgrade elevations. In the proposed pavement areas, cuts ranging up to approximately 6’0” and fills ranging up to approximately 8’0” are expected to achieve the proposed pavement subgrade elevations.

The boring and test pit data indicates that there is existing fill (Stratum 2) present in portions of the site to depths ranging from 1’0” to 7’0” below the existing ground surface. The existing fill generally consists of loose to medium dense Sand with varying amounts of Silt and Gravel and occasional cobbles, boulders, and debris. Underlying the existing fill is medium dense to dense Sandy Silt or Silty Sand (Stratum 3). The Sandy Silt or Silty Sand is underlain by dense to very dense completely weathered Gneiss bedrock (Stratum 4) in areas followed by more competent Gneiss bedrock (Stratum 5), which was encountered at depths ranging from 2’0” to 15’2” beneath the existing ground surface. The existing fill and bedrock observations are summarized in Table 1 below.

Table 1 - Summary of Boring and Test Pit Data

Boring or Test Pit No.	Approximate Ground Surface Elevation	Depth to Bottom of Existing Fill (Elevation)	Depth to Weathered Bedrock (Elevation)	Depth to Bedrock or Auger Refusal (Elevation)
B-1	+661.0	NE	5’0” (+656.0)	8’0” (+653.0)
B-2	+628.0	NE	NE	7’0” (+621.0)
B-3	+620.0	NE	2’0” (+618.0)	4’9” (+615.3)
B-4	+628.0	NE	2’0” (+626.0)	10’6” (+617.5)
B-5	+623.0	NE	2’0” (+621.0)	8’6” (+614.5)
B-6	+617.0	1’0” (+616.0)	NE	5’6” (+611.5)
B-7	+628.0	NE	5’0” (+623.0)	15’2” (+612.8)
B-8	+609.0	5’6” (+603.5)	NE	NE to 12’0”
B-9	+674.0	7’0” (+667.0)	7’0” (+667.0)	7’6” (+666.5)
B-10	+638.8	NE	NE	2’0” (+636.8)
B-11	+640.0	NE	4’0” (+636.0)	5’6” (+634.5)
TP-1	+662.0	NE	NE	2’0” (+660.0)
TP-2	+672.0	1’10” (+670.2)	NE	4’4” (+667.7)
TP-3	+672.0	NE	NE	2’2” (+669.8)
TP-4	+672.0	NE	NE	3’6” (+668.5)
TP-5	+670.0	NE	3’8” (+666.3)	4’9” (+665.3)
TP-6	+672.0	NE	2’10” (+669.2)	4’7” (+667.4)
TP-7	+620.0	NE	NE	2’8” (+617.3)
TP-8	+614.0	NE	NE	NE to 5’0”
TP-9	+628.0	>6’9” (<+621.3)	NE	NE to 6’9”
TP-10	+625.0	3’0” (+622.0)	NE	NE to 8’0”
TP-11	+642.0	NE	3’9” (+638.3)	6’0” (+636.0)
TP-12	+635.0	5’0” (+630.0)	NE	NE to 6’6”
TP-13	+636.0	NE	NE	7’5” (+628.6)
TP-14	+625.0	5’0” (+620.0)	NE	5’0” (+620.0)
TP-15	+668.0	NE	NE	1’8” (+666.3)
TP-16	+651.0	1’10” (+649.2)	NE	4’10” (+646.2)
TP-17	+655.0	NE	NE	NE to 1’0”
TP-18	+670.0	NE	NE	NE to 7’0”

Notes: NE – Not Encountered
B-8: Groundwater at +608.3
TP-8: Groundwater at +609.9
TP-9: Terminated in the Existing Fill
TP-13: Groundwater at +631.2

<u>Removal of Existing Structures from New Building and Pavement Areas</u>

<u>Building Areas</u>

The site plan indicates that existing structures are present in some of the proposed building areas. The existing structures will be removed as part of the proposed development. All debris resulting from the demolition of these items must be completely removed from the new building areas, extending at least ten (10) feet beyond the new building limits, where practical. This shall include the complete removal of all foundations, walls, slabs, utilities, sidewalks, pavement, and miscellaneous debris. Where the removal of existing items or associated materials extends below the planned building, the resulting excavations shall be backfilled with new compacted fill as described below.

Existing utilities, where they are encountered within the planned building areas, should be either abandoned or rerouted around the new structures. Once the utility has been rerouted or abandoned, the section of pipe and any associated structure within the building areas should be completely removed. The removal of the pipe and structure must also include any loose fill around the pipe or structure. After the pipe, associated structure, and associated loose backfill have been removed, the resulting excavation shall be backfilled with new controlled fill as described below.

New compacted fill shall consist of either suitable on-site soil or imported sand and gravel. Imported sand and gravel fill shall contain less than 20% by weight passing a No. 200 sieve. The fill shall be placed in layers not exceeding one (1) foot in loose thickness. In the proposed building area, new fill shall be compacted to at least 95% of its Maximum Modified Dry Density (ASTM D1557). Each layer shall be compacted, tested, and approved prior to placing subsequent layers.

<u>Pavement Areas</u>

In the proposed pavement areas, any existing structures and debris resulting from the demolition of the structures must be completely removed from the new pavement areas, extending at least five (5) feet beyond the new paving limits, where practical. The excavations resulting from the removal of existing items shall be backfilled using controlled compacted fill. New fill shall consist of either suitable on-site soil or imported sand and gravel placed in one (1) foot loose layers and compacted to at least 92% of its Maximum Modified Dry Density (ASTM D1557).

<u>Implications of Existing Fill</u>

The boring data indicates that existing fill is present in portions of the site. Where encountered in the borings and test pits, the fill extended to depths ranging from 1’0” to 7’0” beneath the existing ground surface. These depths correspond to elevations ranging from approximately +603.5 to elevation +670.2. The depth of the existing fill is expected to be variable and may be deeper in unexplored areas of the site and around the existing site buildings.

The existing fill is not an acceptable bearing material for the new building foundations or floor slabs. The consistency and density of the fill material are not predictable. Certain areas may contain clean dense soils while other areas may contain loose material, topsoil, and/or debris. The existing fill creates the possibility of intolerable differential settlements under loading.

To eliminate the potential for damaging differential settlements, we recommend that the existing fill be completely removed from the new building areas. Based on the existing grades and the proposed finished floor elevations, we expect that some of the existing fill will be removed during the planned building excavations. However, existing fill is expected to be encountered below the planned subgrade elevation in portions of the site. Undercutting of the subgrade will be required in these areas to remove the existing fill or otherwise unsuitable materials from the building areas. The over-excavated areas shall then be replaced with new structural fill, as necessary, to achieve the planned subgrade elevations.

To further evaluate the existing fill conditions in and around the planned building areas, we recommend that a series of supplemental test pits be performed at the time of construction. The test pits should be conducted under the full time observation of a Carlin-Simpson & Associates representative. These test pits will allow us to confirm the consistency, thickness, and horizontal limits of the existing fill material.

Provided that the existing fill and any other unsuitable materials encountered during construction are removed, it is our opinion that the new structural fill and virgin soils can adequately support the new building foundations and floor slabs.

Rock Removal - Blasting Issues

As discussed above, bedrock was encountered at 22 of the 29 test locations during this study. The bedrock was encountered at depths ranging from 1’8” to 15’2” beneath the ground surface. These depths correspond to bedrock elevations ranging between approximately elevation +611.5 and elevation +669.8. Based on the site plans provided to this office, bedrock was encountered above the planned finished floor elevation in portions of the site. Bedrock may also be encountered at higher elevations in the unexplored areas of the site.

The bedrock encountered in the borings and test pits consists of weathered Gneiss. Based on our experience, the in-situ bedrock will range from highly weathered, fractured rock to massive, intact rock. To excavate the rock, the upper 1’0” to 5’0” of rock may be “rippable” by using large construction equipment. The use of hydraulic hammers and/or blasting will be required in order to achieve deeper excavations. Zones of weathered rock may exist deeper than 5’0” but conditions are expected to be highly variable. Hard rock will be encountered during construction.

In order to develop the site, rock removal will be required in areas to achieve the proposed grades. Rock removal may also be required for the new pavement and utilities in portions of the site. Rock blasting will likely be required to achieve the proposed grades in areas. Nearby buildings and existing underground utilities could be affected by the blasting.

The Blasting Contractor should avoid over-blasting the rock. Over-blasting will disturb the deeper intact rock that will be used as bearing material for the proposed foundations and floor slab.

The blasting operation will be monitored by a seismologist using a seismograph. The Peak Particle Velocity emanating from any blast will be restricted to 2.0 in/sec. Each blast will be monitored to insure that this criteria is not exceeded.

The U.S. Bureau of Mines [Nicholas et al (1971)] has established that a threshold of 4.0 in/sec will likely crack plaster and thus they recommend that the safe vibrational criterion be 2.0 in/sec. This criterion has been used successfully in the industry. Each blast will be monitored independently to insure that this criterion is not exceeded. The monitoring results shall be provided to the Blasting Contractor as soon as possible so that the blasting program can be modified if necessary.

We recommend that a minimum of four (4) monitoring points be established, to the north, east, south and west of the planned blast area. The seismograph sensors should be placed near the closest structure and at any structures identified during the pre-blast survey that are considered to be susceptible to vibration damage.

Prior to the start of any construction, a Blasting Management Plan shall be prepared by the Blasting Contractor for this project. This plan shall be in accordance with State regulations and the Explosive Materials Code, NFPA No. 495, National Fire Prevention Association. Additionally, all blasting should adhere to the provisions of 29 CFR Ch. XVII Section 1910.109 for explosives and blasting agents and to all local requirements.

Prior to any blasting work being done, a licensed professional engineer shall be retained to perform a detailed pre-blast survey of existing structures located within 500 feet of the planned blast area. The pre-blast survey shall be conducted in accordance with the requirements of local authorities. A copy of all reports prepared by the licensed engineer shall be submitted to the Town Engineer and the Owner’s representative in a timely manner.

Prior to the beginning of blasting, a notice will be sent to all residential and commercial property owners within a 500 foot radius of the blast area. This notification will be given at least 48 hours before blasting takes place. A contact person will be established and named in this notice to respond to all concerns raised by nearby residents during the blasting phase of the project. The contact person will respond to any inquiries within 24 hours.

Preparation of New Building Areas and Removal of Existing Fill

In order to prepare the building areas for construction, all surface materials such as topsoil, asphalt, and surface vegetation shall be removed from the planned building areas, extending at least ten (10) feet beyond the new construction limits, where feasible.

The boring data indicates that existing fill is present within portions the proposed building areas. Fill material may also be present in other unexplored portions of the site. Where encountered in the test borings, the existing fill extended to depths ranging from about 1'0" to 7'0" below the existing ground surface. As shown in Table 1 above, the approximate bottom of the fill material ranges from elevation +603.5 to elevation +670.2. The existing fill is expected to vary in thickness across the site and may extend deeper in the unexplored areas and around the existing site structures.

After the surface materials are removed, the existing fill shall be excavated from the new building areas. The removal of the existing fill from the new building areas shall extend through the existing fill, down to the virgin soil or weathered bedrock. At the bottom of the excavation, the removal of the unsuitable material shall extend horizontally beyond the building lines a minimum distance of three (3) feet plus a distance equal to the depth of the excavation below the planned finished floor elevation. For example, if the removal of the existing fill extends vertically five (5) feet below the planned finished floor elevation, the excavation must extend horizontally a minimum of eight (8) feet (3 feet plus 5 feet) beyond the new building line at that location.

The removal of the existing fill from the planned building areas shall be performed under the full time observation of Carlin-Simpson & Associates. The on-site representative from Carlin-Simpson & Associates shall direct the Contractor during this operation to ensure that all of the unsuitable material has been removed from the proposed building areas.

During the removal of the unsuitable material from the building areas, the Contractor should segregate the potentially re-usable existing fill material from the non-reusable fill (i.e. debris and topsoil). The on-site representative from Carlin-Simpson & Associate shall evaluate the suitability of the excavated materials for use as structural fill during the excavation and prior to its re-use. Potentially usable fill should be stockpiled and covered with tarps or plastic sheeting for protection from excess moisture. Any fill material that is wet must be dried prior to its re-use.

After the surface materials and existing fill have been removed and prior to the placement of new structural fill, the exposed subgrade must be graded level and proofrolled by several passes of a vibratory drum roller. The proofrolling operation is necessary to densify the underlying soils. Carlin-Simpson & Associates shall be retained to observe the proofrolling of the subgrade. If any soft or otherwise unsuitable soils are noted, the unsuitable material shall be removed and replaced with new structural fill. Carlin-Simpson & Associates shall be responsible for determining what material, if any, is to be removed and will direct the contractor during this operation.

New structural fill required to achieve final grades shall consist of either suitable on-site soil or imported sand and gravel. Imported fill shall contain less than 20% by weight passing a No. 200 sieve. The structural fill shall be placed in layers not exceeding one (1) foot in loose thickness and each layer shall be compacted to at least 95% of its Maximum Modified Dry Density (ASTM D1557). Each layer must be compacted, tested, and approved prior to placing subsequent layers. The suitability of the excavated soil for reuse as structural fill is discussed in a following section of this report.

After the installation of structural fill has been completed to the required subgrade elevations, the virgin soil and new structural fill may be used to support the proposed building foundations and floor slabs.

New Building Foundations

According to the boring data, the foundation bearing materials will consist of medium dense to dense virgin soil, weathered bedrock, and new structural fill. Foundations for the proposed structures may be designed as a shallow spread footing bearing on the virgin soil, weathered bedrock, or new structural fill utilizing a net allowable bearing pressure of 4,000 psf (2.0 TSF).

Exterior footings shall bear at a depth of at least 42 inches below finished outside grade for protection from frost. Interior column footings may bear on the virgin soil, weathered bedrock, or new structural fill just below the floor slab provided the building is heated during winter. Column footings shall have a minimum dimension of 30 inches. The wall footings shall have a minimum width of 18 inches.

Prior to the placement of formwork, reinforcement steel, and concrete, the bearing subgrade soil shall be cleaned of all loose soil and compacted with several passes of a small vibratory drum trench compactor (i.e. Wacker Model RT560), a heavy vibratory plate tamper (i.e. Wacker BPU 3545A or equivalent), or “jumping jack” style tamper (i.e. Wacker Model BS 600). This must be performed under the inspection of a representative from Carlin-Simpson & Associates. If instability is observed during the compaction of the bearing subgrade, the soft soil shall be removed and replaced with new compacted fill.

Where rock is encountered in the foundation excavations, “Special Construction Procedures” must be employed. When continuous wall footings or closely spaced column footings (20 feet or less) bear on dissimilar material (i.e. rock and soil) the potential for differential movement exists. A footing bearing in rock will not move, whereas a footing bearing on soil will settle slightly due to the compressive nature of all soils when subjected to new loads. The area between movement and non-movement will develop a (shear) stress point. Cracks in foundations and walls will be the result from such movement. Therefore, continuous wall footings must bear either entirely on rock or entirely on soil for any individual building. Alternatively, for larger structures, transition zones can be constructed to create a gradual transition from a soil to a rock bearing subgrade.

Adjacent column footings greater than 20 feet apart may bear on dissimilar material (i.e. soil and rock). Any individual column footing must bear entirely on the same type bearing material (i.e. all soil or all rock).

Where rock and soil both exist at the bearing elevation within a foundation excavation, the footings must either be lowered to bear entirely on rock, or a minimum of 18 inches of rock must be removed from below planned footing bottom. The over-excavated 18 inches must then be filled with a granular material having a maximum particle size of ½-inch and containing at least 15% but not more than 30% material by weight passing a No. 200 sieve. The fill shall be placed in six (6) inch layers and each layer shall be compacted to at least 95% of its Maximum Modified Dry Density (ASTM D1557). This procedure will create a "cushion" atop the rock and reduce the potential for differential movement. For soft, rippable rock, this procedure will not be required.

If during the excavation for continuous foundations, the transition from soil to rock is gradual (i.e. from medium dense soil to dense weathered rock to very dense rock) over a distance of 20 feet or more, the "Special Construction Procedures" may not be required. This would have to be evaluated in the field on a case-by-case basis by the representative from Carlin-Simpson & Associates at the time of construction.

Where the transition from rock to soil is abrupt within the excavation for continuous wall foundations, transition zones can be constructed by over-excavating the rock in steps and increasing the "soil cushion" thickness over a distance of 24 feet or more. To construct the transition zone, the bedrock is over-excavated in a series of steps, each step being six (6) inches in depth and at least eight (8) feet in length. The first step is six (6) inches deep, the second step is 12 inches deep, and the final step is 18 inches deep. The over-excavation is then backfilled with the soil cushion material described above.

Floor Slab

After the footings and foundation walls are installed, fill will be required to backfill the excavations and to raise grades in the building areas to the slab subgrade elevations. New fill for the floor slab shall consist of either suitable on-site soil or imported sand and gravel containing less than 20% material by weight passing a No. 200 sieve. The fill shall be placed in layers not exceeding one (1) foot in loose thickness and each layer shall be compacted to at least 92% of its Maximum Modified Dry Density (ASTM D1557). Fill layers shall be compacted, tested, and approved before placing subsequent layers.

The floor may be designed as a slab on grade, bearing on virgin soil, weathered bedrock, bedrock, or new structural fill. We recommend a Modulus of Subgrade Reaction (k) of 200 pounds per cubic inch (pci) be used for design. A six (6) inch layer of 3/4-inch crushed stone is recommended beneath the concrete slab for additional support and drainage. In the event that the floor slab is constructed directly on Gneiss bedrock, a minimum of 12 inches of crushed stone or DGA should be provided beneath the floor slab for drainage and to act as a cushion on the rock. Sump pits and pumps are recommended where basements are planned.

Settlement

Settlement of individual footings, designed in accordance with recommendations presented in this report, is expected to be within tolerable limits for the proposed structure. For footings placed on natural soils or new compacted fill approved by Carlin-Simpson & Associates and constructed in accordance with the requirements outlined in this report, maximum total settlement is expected to be on the order of 1/2-inch or less. Maximum differential settlement between adjacent columns or load bearing walls is expected to be half the total settlement.

The above settlement values are based on our engineering experience with similar soil conditions and the anticipated structural loading, and are to guide the Structural Engineer with his design. To minimize difficulties during the foundation installation phase, it is critical that Carlin-Simpson & Associates be retained to observe the foundation bearing surfaces and to confirm the recommended bearing pressures and that the existing fill and unsuitable materials have been removed from beneath the new foundations.

Foundation Walls

In the event that foundation walls are required, the soil adjacent to the building walls will exert a horizontal pressure against the walls. This pressure is based on the soil density and Coefficient of Earth Pressure at Rest (k_o), which is applicable to non-yielding building walls. We estimate that the backfill material will have an in-place (moist) density of about 130 pcf and a k_o of 0.5. Based on these properties, the soil will produce an Equivalent Fluid Pressure of 65 pcf against the building walls.

For sliding, the coefficient of friction between concrete and the virgin site soils or new structural fill is 0.45. For clean sound rock, a friction coefficient of 0.55 can be used. Where passive lateral earth pressure is to be included in the design of the wall, a design value of 195 psf/ft may be used. This is based on a Coefficient of Passive Earth Pressure (k_p) of 3.0, an in-place soil backfill density of 130 pcf, and a factor of safety of 2.0.

Where foundation walls are required, we recommend that a footing drain be placed around the exterior of the new structure to prevent water from accumulating against the foundation wall. This drain may consist of a minimum four (4) inch diameter, rigid wall perforated PVC pipe surrounded by at least 12 inches of 3/4-inch clean crushed stone. The stone shall be wrapped in a geotextile fabric, Mirafi 140N or equivalent. The foundation drainpipe should be extended to daylight or to the stormwater collection system. The outside face of the foundation wall, where it extends below grade, must be damp proofed or waterproofed.

The foundation walls should be backfilled with suitable structural fill placed in layers up to one (1) foot in loose thickness. The new fill should be compacted with a vibratory drum trench compactor (i.e. Wacker Model RT560), a heavy vibratory plate tamper (i.e. Wacker BPU 3545A or equivalent) or “jumping jack” style tamper (i.e. Wacker Model BS 600) to at least 92% of its Maximum Modified Dry Density (ASTM D1557). Heavy equipment should not be operated near the wall as damage to the wall could occur.

Outside the structure, the backfill placed adjacent to the foundation walls and above the footing drain shall consist of either clean crushed stone or an imported sand and gravel mixture containing less than 10% by weight passing a No. 200 sieve and placed in layers not exceeding one (1) foot in thickness. This clean sand and gravel or crushed stone backfill shall extend a minimum of one (1) foot horizontally from the back face of the foundation walls, and shall extend vertically up the wall face to two (2) feet below the finished ground surface elevation.

Beyond this point, the foundation walls should be backfilled with suitable soil placed in layers up to one (1) foot in thickness. The new fill should be compacted with a vibratory drum trench compactor (i.e. Wacker Model RT560), a heavy vibratory plate tamper (i.e. Wacker BPU 3545A or equivalent), or "jumping jack" style tamper (i.e. Wacker Model BS 600) to at least 92% of its Maximum Modified Dry Density (ASTM D1557). Heavy equipment should not be operated near the walls as damage to the walls could occur. Material excavated from the cut areas on site will be suitable for reuse as compacted fill, provided that it remains relatively dry enough to be adequately compacted to the required density and does not contain any debris or organic material (i.e. topsoil and roots).

Seismic Design Considerations

From site-specific test boring data, the Site Class was determined from Table 1615.1.1 of the New York State Building Code. The site-specific data used to determine the Site Class typically includes soil test borings to determine Standard Penetration resistances (N-values). Based on the average N-values in the upper 100 feet of soil profile, the site can be classified as Site Class C – Very Dense Soil and Soft Rock Profile.

New structures should be designed to resist stress produced by lateral forces computed in accordance with Section 1615 of the New York State Building Code. The values in Table 2 shall be used for this project. Based on the information obtained from the borings, it is our opinion that the potential for liquefaction of the native soils at the site due to earthquake activity is relatively low.

Table 2 – Seismic Design Parameter Values

Mapped Spectral Response Acceleration for Short Periods, [Fig 1615 (1)]	S_S=0.347g
Mapped Spectral Response Acceleration at 1-Second Period, [Fig 1615 (2)]	S_{S1}=0.070g
Site Coefficient [Table 1615.1.2 (1)]	F_a=1.20
Site Coefficient [Table 1615.1.2 (2)]	F_v=1.70
Max Considered Earthquake Spectral Response for Short Periods [Eq 16-16]	S_{MS}=0.416g
Max Considered Earthquake Spectral Respond at 1-Second Period [Eq 16-17]	S_{M1}=0.119g
Design Spectral Response Acceleration for Short Periods [Eq 16-18]	S_{DS}=0.278g
Design Spectral Response Acceleration for 1-Second Period [Eq 16-19]	S_{D1}=0.079g

Site Retaining Walls

In order to develop the site, retaining walls will be required in areas. The site retaining walls may be designed as either cast-in-place steel reinforced concrete walls or geogrid reinforced modular block (MSE) walls. The preliminary site plans show five (5) retaining walls. The maximum exposed height of these walls ranges from approximately seven (7) feet to 12 feet but the top and bottom wall elevations were not finalized at the time of this report.

The following recommendations are preliminary in nature based on the boring and test pit data from other areas of the project site during this investigation. The recommendations below are intended for planning purposes only and are not intended for final design and construction. A supplemental subsurface investigation is required for the proposed retaining walls so that additional design recommendations can be provided.

In the event that existing fill materials are present within the proposed wall areas, these materials must be completely removed from the limits of new wall construction. The removal of the topsoil or other unsuitable fill materials shall extend horizontally a minimum distance of five (5) feet beyond the front face of the new wall or extend horizontally a minimum distance equivalent to the vertical depth of the required excavation below the proposed wall base or foundation bearing elevation, whichever is greater. This is required to ensure that all unsuitable material has been removed from beneath the wall base or foundation zone of influence, which shall be defined by an imaginary plane projecting downward and away from the front edge of the wall base or foundation on a one horizontal to one vertical (1H:1V) projection.

The foundations for the new retaining wall may be placed on the virgin soil, weathered bedrock, or on new compacted fill approved by Carlin-Simpson & Associates. New compacted fill shall consist of either suitable on-site soil or imported sand and gravel. Imported fill shall contain less than 20% by weight passing the No. 200 sieve. The fill shall be placed in one (1) foot thick loose layers and compacted to at least 95% of its Maximum Modified Dry Density. Preliminarily, the footings or base of the wall can be designed using a net design bearing pressure of 4,000 psf (2.0 TSF).

For MSE walls, the wall base or foundation must be adequately embedded for internal and global stability. The embedment depth will be determined by the Wall Design Engineer. For reinforced concrete walls, the footing or base of the wall shall bear at least 42 inches below finished grade of the outside face of the wall for protection from frost. The wall foundation or base may bear at shallower depths when installed directly on the bedrock since rock is not susceptible to frost. Where both soil and rock are encountered within the wall foundation or base excavation, the “Special Construction Procedures” discussed above for the building foundations must be utilized.

Drains must be provided behind the retaining walls to prevent the buildup of hydrostatic pressure against the walls. The drain should consist of a 4-inch diameter perforated PVC pipe, surrounded with 3/4-inch clean crushed stone and wrapped in a geotextile fabric, Mirafi 140N or equivalent. The drain should be installed behind the base or foundation of the retaining wall to collect the water behind the wall and be connected into the site stormwater collection system or extended to daylight beyond the wall area.

Backfill placed directly behind the retaining walls shall consist of either suitable on-site soil or imported sand and gravel containing less than 20% by weight passing a No. 200 sieve. Each layer shall be compacted using a hand guided mechanical tamper to 92% of its Maximum Modified Dry Density (ASTM D1557). Excessive compaction adjacent to the retaining walls must be avoided. Layers shall be tested and approved before placing subsequent layers. Large compaction equipment must not be used within ten (10) feet of the new walls to prevent potential damage to the walls.

The soil adjacent to the site retaining walls will exert a horizontal pressure against the walls. This pressure is based on the soil density and the Coefficient of Active Earth Pressure (k_a). We estimate that the backfill material will have an in-place (moist) density of about 130 pcf and an angle of internal friction (ϕ) of 30^o. For design, soil cohesion is assumed to be zero for the foundation soil, retained soil, and reinforced backfill. The active earth pressure coefficient (k_a) is 0.33 provided the grade behind the wall is level. Based on these properties, the retained soil will produce an Equivalent Fluid Pressure of 42.9 pcf against the retaining walls. If a sloping grade exists behind the new walls, the k_a and the Equivalent Fluid Pressure must be adjusted accordingly. In addition, any surcharge loads from structures, vehicles, or other retaining walls (i.e. tiered walls) must be considered in the wall design.

For sliding, the friction coefficient between mass concrete and the virgin site soils or new compacted fill is 0.45. For clean sound rock, a friction coefficient of 0.55 can be used. Where passive lateral earth pressure is to be included in the design of the wall, a maximum design value of 195 psf/ft may be used. This is based on a Coefficient of Passive Earth Pressure (k_p) of 3.0, an in-place soil backfill density of 130 pcf, and a factor of safety of 2.0.

The Wall Design Engineer shall prepare a complete wall design (i.e. drawings, specifications, and calculations), which shall be designed and sealed by a Professional Engineer registered in the State of New York and submitted to Carlin-Simpson & Associates for review and approval. MSE retaining walls shall be designed in accordance with the recommendations of the NCMA Design Manual for Segmental Retaining Walls (Current Edition).

The MSE wall design shall consider the internal stability of the reinforced soil mass and shall be in completed accordance with acceptable engineering practice. In addition, external stability, including sliding, overturning, and bearing, as well as global slope stability shall be evaluated in accordance with acceptable engineering practice.

The MSE Wall Designer Engineer shall be responsible for determining the required geogrid reinforcement lengths and elevations based on his stability analysis (including global stability) and the properties of the geogrid reinforcement used in the design. We anticipate that in the critical areas of the wall, global stability will be the controlling design criteria for the design of the geogrid reinforcement.

Stormwater Management Areas

We understand that the planned development will include one or more stormwater management areas. The preliminary grading plan shows a proposed infiltration basin with a forebay in the western portion of the project site. The plan also indicates that the basin will have a bottom elevation at +610.0. We also understand that there is an alternate stormwater management area in the southwestern portion of the site, near the proposed fairway residences building. However, at the time this report was prepared, the proposed stormwater management system had not been designed and the location, grades, and invert elevations of the system had not been finalized.

During this study, four (4) borings, one (1) test pit, one (1) borehole permeability test, and four (4) percolation tests were performed within or near the possible stormwater management areas at the locations shown on the attached Boring and Test Pit Location Plan. The proposed test depths were provided by the project Site Engineer. The test depths were modified, however, based on the depth to bedrock encountered at the test locations.

The soil conditions encountered within the proposed infiltration basin area consist of a surface layer of topsoil (Stratum 1), approximately 0'6" to 0'9" in thickness, followed by existing fill (Stratum 2) in boring B-6. Below the topsoil and fill is virgin soil that consists of layers of Sandy Silt, Silty Sand, Sandy Gravel, Gravelly Sand, or Silty Gravelly Sand (Strata 3 and 4) followed by Gneiss bedrock (Stratum 5). Bedrock was encountered in the proposed infiltration basin area at depths ranging from 2'8" to 8'6" beneath the ground surface. These depths correspond to bedrock elevations ranging between elevation +611.5 and elevation +617.3, which is above the proposed bottom elevation of the infiltration basin.

In the alternate stormwater management area, the topsoil was underlain by approximately 5'6" of existing fill (Stratum 2) followed by layers of Sandy Silt and Silty Sand (Stratum 3). Groundwater was encountered in this portion of the site at depths ranging from 0'6" to 3'3" below the ground surface, which corresponds to groundwater levels ranging from approximately elevation +608.3 to elevation +613.2. The boring and test pit observations are summarized in Table 1 above.

In December 2012 and January 2013, permeability tests were performed within the proposed stormwater management areas. One (1) borehole permeability test (BP-4) and four (4) percolation tests (P-1 through P-4) were performed. The infiltration rates at the test locations are summarized in Table 3 below.

Table 3 – Field Permeability Test Results

Permeability Test No.	Permeability Test Depth (Elevation)	Permeability Rate	Soil Description
BP-4	7'0" (+621.0)	2.4 in/hour	Brown coarse to fine SAND, little Silt, some (+) coarse to fine Gravel
P-1	3'6" (+616.5)	>20 in/hour	Brown coarse to fine GRAVEL and, coarse to fine Sand, trace Silt
P-2	1'8" (+610.3)	NR	*Groundwater encountered 0'6" below the ground surface*
P-3	2'8" (+613.3)	>20 in/hour	Brown coarse to fine SAND, some Silt, and (-) coarse to fine Gravel
P-4	2'0" (+613.0)	NR	*Groundwater encountered 1'10" below the ground surface*

NR – Not Recorded

Based on the field tests, the virgin soil in the areas of tests P-1 and P-3 has a permeability rate that exceeds 20 inches per hour. However, these tests were performed at elevations of +616.5 and +613.3, which are approximately 6'6" and 3'3" higher than the planned bottom of the proposed infiltration basin. Bedrock was encountered at depths of 4'9" (+615.3) and 5'6" (+611.5) below the surface at these test locations. In the event the virgin soil in the areas of tests P-1 and P-3 can be utilized for the stormwater management system, a permeability rate of 10 inches per hour should be used for preliminary design. This design permeability rate includes a factor of safety of 2.0.

Field permeability tests could not be performed at test locations P-2 and P-4 during this study since groundwater was encountered at depths of 0'6" (+611.5) and 1'10" (+613.2) below the ground surface, respectively. Should stormwater management areas be planned in other portions of the site, they must be evaluated on a case-by-case basis.

The stormwater management system should be designed in accordance with the applicable New York State Department of Conservation (NYSDEC) regulations and the New York State Stormwater Management Design Manual (August 2010). The testing requirements are outlined in Appendix D of the manual. The testing that was performed during this preliminary study was for initial feasibility testing for the stormwater management areas. Therefore, additional testing within the proposed subsurface system areas will be required to confirm the soil conditions and infiltration rates at the bottom of the system and to finalize the design of the system.

Pavement

We understand that the proposed construction will also include new asphalt paved driveways and parking areas. Based on the preliminary grading plan provided to this office, cuts ranging up to approximately 6'0" and fills ranging up to approximately 8'0" are anticipated to achieve the proposed pavement subgrade elevations. To prepare the new pavement areas, the existing surface materials (i.e. topsoil, vegetation, asphalt, etc.) must be removed from the planned pavement areas.

After all surface materials have been removed; the exposed subgrade that is either at or below the planned subgrade elevation shall be proofrolled with a large vibratory drum roller (i.e. Dynapac 250 or equivalent) to densify the underlying soils. The on-site representative from Carlin-Simpson & Associates shall witness the proofrolling operation. If any excessive movement is noted during the proofrolling, the soft or unsuitable soil shall be removed and replaced with new compacted fill.

Areas where existing fill is encountered shall be compacted in place. Carlin-Simpson & Associates must evaluate these areas for the presence of soft or unsuitable material within the existing fill matrix. Portions of this fill may have to be removed and replaced with new compacted fill. Carlin-Simpson & Associates will determine this during construction.

Where new fill is required to achieve final grades, it shall consist of either suitable on-site soil or imported sand and gravel. Imported sand and gravel shall contain less than 20% by weight passing a No. 200 sieve. New fill shall be placed in layers not exceeding one

(1) foot in loose thickness and each layer shall be compacted to at least 92% of its Maximum Modified Dry Density (ASTM D1557). After the planned subgrade has been proofrolled and new compacted fill has been placed as required, the new pavement subbase may be placed on the existing site soils and new compacted fill.

When new fill is placed on a sloped subgrade, the fill layers must be benched a minimum of three (3) feet into the existing embankment. Fill layers shall be placed in horizontal layers, beginning at the base of the slope. End dumping over the top of a slope is not permitted.

The new pavement subbase may be placed on engineer-approved densified existing fill, virgin soil, or new compacted fill. A minimum of six (6) inches of dense graded aggregate (DGA) is recommended for the subbase layer for drainage and additional pavement support. We recommend that the following pavement sections be used for the parking lots and driveways. These pavement sections are subject to local government approval.

Parking Lots (Light Duty)

1 ½”	Asphalt Wearing Surface Course	NYSDOT, Type 6F
2”	Asphalt Base Course	NYSDOT, Type 1
6”	Stone Subbase (DGA)	NYSDOT, Type 4
	Approved Compacted Subgrade (Minimum CBR = 10)	

Driveways (Medium Duty)

1 ½”	Asphalt Wearing Surface Course	NYSDOT, Type 6F
2 ½”	Asphalt Base Course	NYSDOT, Type 1
8”	Stone Subbase (DGA)	NYSDOT, Type 4
	Approved Compacted Subgrade (Minimum CBR = 10)	

Based on the boring and test pit data, we anticipate that the existing site soils and new compacted fill will provide a CBR value that is equal to or greater than 10, which can adequately support the above pavement sections.

Utilities

New utilities may bear in the virgin soil, existing fill, new compacted fill, weathered rock, or rock. The bottom of all trenches should be excavated clean so a hard bottom is provided for pipe support. If any soft areas or unsuitable existing fill conditions are encountered during the construction operation, these materials must be removed and replaced with new compacted fill.

In the event that the trench bottom becomes soft due to the inflow of surface or trapped water, the soft soil shall be removed and the excavation filled with a minimum of six (6) inches of 3/4-inch clean crushed stone to provide a firm base for support of the pipe. Sump pits and pumps should be adequate to keep the excavations dry.

After the utility is installed, the trench must be backfilled with compacted fill. The fill shall consist of suitable on-site soil or imported sand and gravel containing less than 20% by weight passing a No. 200 sieve. Large rock fragments must not be placed directly against the pipe. Controlled compacted fill shall be placed in one (1) foot loose layers and each layer shall be compacted to at least 92% of its Maximum Modified Dry Density (ASTM D1557). The backfill must be free of topsoil, debris and large boulders or rock fragments.

Temporary Construction Excavations

Temporary construction excavations shall be conducted in accordance with the most recent OSHA guidelines or applicable federal, state, or local codes. Based on the results of the borings and test pits, we believe the site soils and rock would have the following classifications as defined by OSHA guidelines.

Soil/Rock Type	**Possible Classification**
On Site Fill	Type "C"
Virgin Sandy Soils	Type "B" or "C"
Weathered or Intact Bedrock	Type "A" or Stable Rock

Further evaluation of the site soil deposits will be required in the field by a qualified person at the time of the excavation to determine the proper OSHA classification and allowable slope configuration. Temporary support (i.e. sheeting and shoring) should be used for any excavation that cannot be sloped or benched in accordance with the applicable regulations.

Suitability of the In-Situ Soils for Use as Compacted Fill

The suitability of each soil stratum for use as compacted fill is discussed below.

Stratum 1 Topsoil — Topsoil is not suitable for use as compacted fill. During construction, it may be stockpiled on site for later use in the landscaped areas or removed from the site.

Stratum 2 Existing Fill — The existing fill that was encountered at the site generally consists of brown coarse to fine Sand, little (to and) Silt, trace (to some) coarse to fine Gravel with occasional cobbles, boulders, and debris. Some of the existing fill may be suitable for use as compacted fill at the site provided that it remains relatively dry for optimum compaction and that any debris (i.e. concrete, wood, etc.) and organic material (i.e. topsoil, roots, etc.) have been removed prior to its reuse.

Strata 3 & 4 Sandy Silt, Silty Sand, — The virgin site soils that may be excavated during construction consist of layers of Sandy Silt, Silty Sand, Sand or Sandy Gravel with occasional cobbles and boulders. This material is generally suitable for use as

Sand, or Sandy Gravel

compacted fill, provided that it remains relatively dry for optimum compaction. Large cobbles and boulders shall not be used as new structural fill in the proposed building areas or in utility trenches.

<u>Stratum 5</u>
Gneiss Bedrock

Excavated rock may also be used as fill material for the building and paved areas provided that the material conforms to the required gradation, is well-graded, and has been approved prior to use by Carlin-Simpson & Associates. All rock fill must be well blended with smaller rock fragments and/or soil. Open voids within the rock fill matrix must be avoided. Small boulders up to 24 inches in diameter may be placed in parking lot fills deeper than ten (10) feet below the finished pavement. Boulders must not be clustered and must be sufficiently surrounded with soil fill. We recommend that the boulders and excavated rock be processed by a crusher to provide suitable fill material for the building and pavement areas.

Rock fill shall be placed in 12-inch loose layers and compacted with multiple passes of a large vibratory roller to a firm and non-yielding state as determined by the on-site representative from Carlin-Simpson & Associates. Rock fill should not be used where it will interfere with the installation of foundations or utilities. Also, it shall not be used as backfill directly against concrete walls or utilities. Use of rock fill within the planned building and pavement areas shall be limited to the gradations limitations provided in Table 4 below.

<u>Table 4 - Gradation Limitations for Rock Fill</u>

Area	**Location**	**Maximum Particle Size**
Building Area	Within 4 feet of Finished Floor	3 inches
	More than 4 feet below Finished Floor	12 inches
Pavement Area	Within 4 feet of Finished Grade	6 inches
	More than 4 feet below Finished Grade	18 inches
	More than 10 feet below Finished Grade	24 inches

Proper moisture conditioning of the soil will be required. In the event that the on-site material is too wet at the time of placement and cannot be adequately compacted, the soil should be aerated and allowed to dry or the material removed and a drier cleaner fill material used. In the event that the on-site material is too dry at the time of placement and cannot be adequately compacted, water may be needed to increase the soil moisture content for proper compaction.

The in-situ soils which exist throughout the site may become soft and weave if exposed to excessive moisture and construction traffic. The instability will occur quickly when exposed to these elements and it will be difficult to stabilize the subgrade. We recommend that adequate site drainage be implemented early in the construction schedule and if the subgrade becomes wet, the Contractor should limit construction activity until the soil has dried.

GENERAL

The findings, conclusions and recommendations presented in this report represent our professional opinions concerning subsurface conditions at the site. The opinions presented are relative to the dates of our site work and should not be relied on to represent conditions at later dates or at locations not explored. The opinions included herein are based on information provided to us, the data obtained at specific locations during the study and our past experience. If additional information becomes available that might impact our geotechnical opinions, it will be necessary for Carlin-Simpson & Associates to review the information, reassess the potential concerns, and re-evaluate our conclusions and recommendations. Additional subsurface exploration may be required.

Regardless of the thoroughness of a geotechnical exploration, there is the possibility that conditions between borings and test pits will differ from those encountered at specific boring or test pit locations, that conditions are not as anticipated by the designers and/or the contractors, or that either natural events or the construction process have altered the subsurface conditions. These variations are an inherent risk associated with subsurface conditions in this region and the approximate methods used to obtain the data. These variations may not be apparent until construction.

The professional opinions presented in this geotechnical report are not final. Field observations and foundation installation monitoring by the geotechnical engineer, as well as soil density testing and other quality assurance functions associated with site earthwork and foundation construction, are an extension of this report. Therefore, Carlin-Simpson & Associates should be retained by the Owner to observe all earthwork and foundation construction, to document that the conditions anticipated in this study actually exist, and to finalize or amend our conclusions and recommendations Carlin-Simpson & Associates is not responsible or liable for the conclusions and recommendations presented in this report if Carlin-Simpson & Associates does not perform these observation and testing services.

Therefore, in order to preserve continuity in this project, the Owner must retain the services of Carlin-Simpson & Associates to provide full time geotechnical related monitoring and testing during construction. At a minimum, this shall include the observation and testing of the following: 1) the removal of existing fill and unsuitable soil, where required; 2) the proofrolling of the subgrade soil prior to the placement of new compacted fill; 3) the placement and compaction of controlled fill; 4) the excavation for the building foundations; 5) the preparation of the subgrade for the floor slabs and pavement areas; and 6) the construction of the proposed retaining walls.

This report has been prepared in accordance with generally accepted geotechnical engineering practice. No other warranty is expressed or implied. The evaluations and recommendations presented in this report are based on the available project information, as well as on the results of the exploration. Carlin-Simpson & Associates should be given the opportunity to review the final drawings and site plans for this project to determine if changes to the recommendations outlined in this report are needed. Should the nature of the project change, these recommendations should be re-evaluated.

This report is provided for the exclusive use of JBM Realty and the project specific design team and may not be used or relied upon in connection with other projects or by other third parties. Carlin-Simpson & Associates disclaims liability for any such third party use or reliance without express written permission. Use of this report or the findings, conclusions or recommendations by others will be at the sole risk of the user. Carlin-Simpson & Associates is not responsible or liable for the interpretation by others of the data in this report, nor their conclusions, recommendations or opinions.

If the conditions encountered during construction vary significantly from those stated in this report, this office should be notified immediately so that additional recommendations can be made.

Thank you for allowing us to assist you with this project. Should you have any questions or comments, please contact this office.

Very truly yours,

CARLIN-SIMPSON & ASSOCIATES

M. Anke

MEREDITH R. ANKE, P.E.
Project Engineer

Robert Simpson

ROBERT B. SIMPSON, P.E.

File No. 12-175

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-1
Project: Proposed Renovations, Byrnwood Club Development, North Castle, NY		SHEET NO.: 1 of 1
Client: JBM Realty		JOB NUMBER: 12-175
Drilling Contractor: General Borings, Inc.		ELEVATION: +661.0

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			START DATE: 18 Dec 12
No water encountered				DIA.	3 1/4"	1 3/8"			FINISH DATE: 18 Dec 12
				WGHT		140#			DRILLER: T. McGovern
				FALL		30"			INSPECTOR: JB

DATUM:

Depth (ft.)	Casing Blows per Foot	Sample No.	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			7		Clay Tennis Court 0'6"	
1		S-1	9		Br $ a (+), cf S, l (-) mf G	Rec = 17"
			12			moist
2			14			
			19		same	
3		S-2	23		Brown SILT and (+), coarse to fine	Rec = 15"
			50/3"		Sand, little (-) medium to fine Gravel	moist
4						possible weathered rock in tip
5					5'0"	
			29		Br cf S, l (+) $ (completely weathered gneiss)	
6		S-3	75/4"			Rec = 6"
					Brown coarse to fine SAND, little (+)	moist
7					Silt (completely weathered Gneiss)	
		S-4	70/3"			Rec = 3"
8					8'0"	moist
					End of Boring @ 8'0"	Auger refusal @ 8'0"
9						
10						
11						
12						
13						
14						
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17						
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19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-2
Project: Proposed Renovations, Byrnwood Club Development, North Castle, NY		**SHEET NO.:** 1 of 1
Client: JBM Realty		**JOB NUMBER:** 12-175
Drilling Contractor: General Borings, Inc.		**ELEVATION:** +628.0

GROUNDWATER					CASING	SAMPLE	CORE	TUBE		
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			DATUM:	
No water encountered				DIA.	3 1/4"	1 3/8"			START DATE:	18 Dec 12
				WGHT		140#			FINISH DATE:	18 Dec 12
				FALL		30"			DRILLER:	T. McGovern
									INSPECTOR:	JB

Depth (ft.)	Casing Blows per Foot	Sample No.	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			2		**Topsoil** 0'6"	
1		S-1	3		Br $ a (+), cf S, t mf G	Rec = 15"
			2			moist
2			2			
			3		same	
3		S-2	9			Rec = 16"
			11		**Brown SILT and (+), coarse to fine**	moist
4			15		**Sand, trace medium to fine Gravel**	
5						
			10		same	
6		S-3	12			Rec = 17"
			16			moist
7			50/3"		7'0"	weathered rock in tip
					End of Boring @ 7'0"	Auger refusal @ 7'0"
8						
9						
10						
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22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-3
Project: Proposed Renovations, Byrnwood Club Development, North Castle, NY		SHEET NO.: 1 of 1
Client: JBM Realty		JOB NUMBER: 12-175
Drilling Contractor: General Borings, Inc.		ELEVATION: +620.0

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			DATUM:
No water encountered				DIA.	3 1/4"	1 3/8"			START DATE: 18 Dec 12
				WGHT		140#			FINISH DATE: 18 Dec 12
				FALL		30"			DRILLER: T. McGovern
									INSPECTOR: JB

Depth (ft.)	Casing Blows per Foot	Sample No.	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			3		**Topsoil** 0'6"	
1		**S-1**	6		Br $ a (-), cf S, t mf G	Rec = 17"
			6		**Brown SILT and (-), coarse to fine**	moist
2			14		**Sand, trace medium to fine Gravel** 2'0"	
		S-2	25/5"		Lt br cf G a, cf S, t $ (completely weathered gneiss)	Rec = 5"
3					**Light brown coarse to fine GRAVEL**	moist
					and, coarse to fine Sand, trace	
4					**Silt (completely weathered Gneiss)**	
			23		Br cf G s, cf S, t $ (completely weathered gneiss)	
5		**S-3**	75/3"		4'9"	Rec = 6"
					End of Boring @ 4'9"	moist
6						Auger refusal @ 4'9"
7						
8						
9						
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CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-4
Project: Proposed Renovations, Byrnwood Club Development, North Castle, NY		**SHEET NO.:** 1 of 1
Client: JBM Realty		**JOB NUMBER:** 12-175
Drilling Contractor: General Borings, Inc.		**ELEVATION:** +628.0

GROUNDWATER					CASING	SAMPLE	CORE	TUBE		
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			DATUM:	
No water encountered				DIA.	3 1/4"	1 3/8"			START DATE:	18 Dec 12
				WGHT		140#			FINISH DATE:	18 Dec 12
				FALL		30"			DRILLER:	T. McGovern
									INSPECTOR:	JB

Depth (ft.)	Casing Blows per Foot	Sample No.	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			2		**Topsoil** 0'6"	
1		S-1	1		Br cf S, a $, t f G	Rec = 14"
			2		**Brown coarse to fine SAND, and**	moist
2			2		**Silt, trace fine Gravel** 2'0"	
			10		Gr cf S t $, a cf G (completely weathered gneiss)	
3		S-2	20			Rec = 13"
			45			moist
4			35			weathered rock 3'-4'
5						
			9		Br cf S, l $, s (+) cf G (completely weathered gneiss)	
6		S-3	11			Rec = 17"
			13		**Brown coarse to fine SAND, little**	moist
7			10		**Silt, some (+) coarse to fine Gravel**	
			18		same **(completely weathered Gneiss)**	
8		S-4	26			Rec = 14"
			30			moist
9			43			
10						
		S-5	75/6"		same 10'6"	Refusal on spoon @ 10'6"
11					**End of Boring @ 10'6"**	
12						
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21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-5
Project: Proposed Renovations, Byrnwood Club Development, North Castle, NY		**SHEET NO.:** 1 of 1
Client: JBM Realty		**JOB NUMBER:** 12-175
Drilling Contractor: General Borings, Inc.		**ELEVATION:** +623.0

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			**DATUM:**
No water encountered				DIA.	3 1/4"	1 3/8"			**START DATE:** 18 Dec 12
				WGHT		140#			**FINISH DATE:** 18 Dec 12
				FALL		30"			**DRILLER:** T. McGovern
									INSPECTOR: JB

Depth (ft.)	Casing Blows per Foot	Sample No.	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			2		Br cf S, s (+) $, t f G	
1		S-1	2		**Brown coarse to fine SAND,**	Rec = 17"
			3		**some (+) Silt, trace fine Gravel**	moist
2			13		2'0"	
			22		Br cf S, l $, s cf G	
3		S-2	10			Rec = 17"
			16		**Brown coarse to fine SAND, little**	moist
4			26		**Silt, some coarse to fine Gravel**	weathered rock in tip
					(completely weathered Gneiss)	
5						
			23		same, weathered gneiss	
6		S-3	62			Rec = 18"
			55			moist
7			81			weathered rock
8						
					8'6"	Auger refusal @ 8'6"
9					**End of Boring @ 8'6"**	
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-6

Project:	**Proposed Renovations, Byrnwood Club Development, North Castle, NY**	**SHEET NO.:**	1 of 1
Client:	**JBM Realty**	**JOB NUMBER:**	12-175
Drilling Contractor:	**General Borings, Inc.**	**ELEVATION:**	+617.0

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	DATUM:	
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			START DATE:	19 Dec 12
No water encountered				DIA.	3 1/4"	1 3/8"			FINISH DATE:	19 Dec 12
				WGHT		140#			DRILLER:	T. McGovern
				FALL		30"			INSPECTOR:	KWA

Depth (ft.)	Casing Blows per Foot	Sample No.	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			2		**Topsoil** 0'6"	
1		**S-1**	6		FILL (Br cf S, l $) 1'0"	Rec = 10"
			5		**FILL (Brown coarse to fine SAND, little Silt)**	moist
2			10			
			12		Br cf S, s $, a (-) cf G	
3		**S-2**	11			Rec = 11"
			11		same	moist
4			52		**Brown coarse to fine SAND, some Silt, and (-) coarse to fine Gravel**	
5						
		S-3	75/2"		5'6"	No recovery
6					**End of Boring @ 5'6"**	Auger refusal @ 5'6"
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-7
Project: Proposed Renovations, Byrnwood Club Development, North Castle, NY		SHEET NO.: 1 of 1
Client: JBM Realty		JOB NUMBER: 12-175
Drilling Contractor: General Borings, Inc.		ELEVATION: +628.0

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	DATUM:
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			START DATE: 19 Dec 12
No water encountered				DIA.	3 1/4"	1 3/8"			FINISH DATE: 19 Dec 12
				WGHT		140#			DRILLER: T. McGovern
				FALL		30"			INSPECTOR: KWA

Depth (ft.)	Casing Blows per Foot	Sample No.	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			2		**Topsoil** 0'6"	
1		S-1	4		Br cf S, l $,l f G	Rec = 18"
			4			moist
2			5			
			13		same	
3		S-2	28		**Brown coarse to fine SAND,**	Rec = 17"
			21		**little Silt, little fine Gravel**	moist
4			22			
5					5'0"	
			12		Br cf S, l $, t f G (completely weathered gniess)	
6		S-3	14			Rec = 15"
			19			moist
7			28		**Brown coarse to fine SAND, little**	very dense augering 7'-10'
					Silt, trace fine Gravel (completely	
8					**weathered Geniss)**	
9						
10						
			75		same	
11		S-4	50/3"			Rec = 6"
						moist
12						very dense augering 10'-15'
13						
14						
15						
		S-4	50/2"		same 15'2"	No recovery
16					**End of Boring @ 15'2"**	Spoon bouncing @ 15'2"
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-8

Project:	**Proposed Renovations, Byrnwood Club Development, North Castle, NY**	**SHEET NO.:**	1 of 1
Client:	**JBM Realty**	**JOB NUMBER:**	12-175
Drilling Contractor:	**General Borings, Inc.**	**ELEVATION:**	+609.0

GROUNDWATER					CASING	SAMPLE	CORE	TUBE		
									DATUM:	
DATE	**TIME**	**DEPTH**	**CASING**	**TYPE**	**HSA**	**SS**			**START DATE:**	19 Dec 12
19 Dec 12	**1130**	**3'3"**	**None**	**DIA.**	**3 1/4"**	**1 3/8"**			**FINISH DATE:**	19 Dec 12
				WGHT		**140#**			**DRILLER:**	T. McGovern
				FALL		**30"**			**INSPECTOR:**	KWA

Depth (ft.)	Casing Blows per Foot	Sample No.	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			2		**Brown Topsoil** 0'6"	
1		**S-1**	4		FILL (Br cf S, a $, t cf G)	Rec = 4"
			8			moist
2			7			
			10		FILL (same)	
3		**S-2**	11			No recovery
			11		**FILL (Brown coarse to fine SAND,**	moist
4			13		**and Silt, trace coarse to fine Gravel)**	
5						
			13		FILL (same) 5'6"	
6		**S-3**	8		Mtld gr, or br Cy $ s, cf S, w/t roots	Rec = 18"
			7		**Mottled gray, orange brown Clayey**	moist
7			8		**SILT some, coarse to fine Sand, with** 7'0"	
			8		**roots**	
8		**S-4**	8		Gr br cf S, s (+) $, l cf G	Rec = 15"
			7			wet
9			8		**Gray brown coarse to fine SAND,**	
					some (+) Silt, little coarse to fine	
10					**Gravel**	
			15		same, l cf G	
11		**S-5**	25			Rec = 16"
			26			wet
12			35		12'0"	
					End of Boring @ 12'0"	
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-9
Project: Proposed Renovations, Byrnwood Club Development, North Castle, NY		**SHEET NO.:** 1 of 1
Client: JBM Realty		**JOB NUMBER:** 12-175
Drilling Contractor: General Borings, Inc.		**ELEVATION:** +674.0

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			DATUM:
No water encountered				DIA.	3 1/4"	1 3/8"			START DATE: 19 Dec 12
				WGHT		140#			FINISH DATE: 19 Dec 12
				FALL		30"			DRILLER: T. McGovern
									INSPECTOR: KWA

Depth (ft.)	Casing Blows per Foot	Sample No.	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			8		**Clay Tennis Court** 0'6"	
1		S-1	8		FILL (Br cf S, s $, s (+) cf G)	Rec = 17"
			8			moist
2			17			
			17		FILL (same)	
3		S-2	12			Rec = 15"
			7		**FILL (Brown coarse to fine Sand,**	moist
4			13		**some Silt, some (+) coarse to fine**	
					Gravel)	
5						
			10		FILL (Br cf S, s $, l cf G)	
6		S-3	4			Rec = 15"
			5			moist
7			11		7'0"	
		S-4	50/3"		**Highly to moderately weathered** 7'6"	Rec = 3"
8					**Gneiss**	moist
					Eknd of Boring @ 7'6"	Auger refusal @ 7'0"
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-10
Project: Proposed Renovations, Byrnwood Club Development, North Castle, NY		**SHEET NO.:** 1 of 1
Client: JBM Realty		**JOB NUMBER:** 12-175
Drilling Contractor: General Borings, Inc.		**ELEVATION:** +638.8

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			**DATUM:**
No water encountered				DIA.	3 1/4"	1 3/8"			**START DATE:** 19 Dec 12
				WGHT		140#			**FINISH DATE:** 19 Dec 12
				FALL		30"			**DRILLER:** T. McGovern
									INSPECTOR: JB

Depth (ft.)	Casing Blows per Foot	Sample No.	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			2		**Topsoil** 0'1"	
1		S-1	3		Br cf $ s, cf S, l cf G	Rec = 15"
			6		**Brown coarse to fine SILT some, coarse to**	moist
2			50/3"		**fine Sand, little coarse to fine Gravel** 2'0"	Auger refusal @ 2'0"
3						
		Run #1			**Gray, white Gneiss**	Run #1
4						2'0"-7'0"
						Run = 60"
5					5'0"	Rec = 52" = 86%
					Soil seam	RQD = 53%
6					5'8"	
					Gray, white Gneiss	
7					7'0"	
					End of Boring @ 7'0"	
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-11
Project: Proposed Renovations, Byrnwood Club Development, North Castle, NY		SHEET NO.: 1 of 1
Client: JBM Realty		JOB NUMBER: 12-175
Drilling Contractor: General Borings, Inc.		ELEVATION: +640.0

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			DATUM:
No water encountered				DIA.	3 1/4"	1 3/8"			START DATE: 19 Dec 12
				WGHT		140#			FINISH DATE: 19 Dec 12
				FALL		30"			DRILLER: T. McGovern
									INSPECTOR: KWA

Depth (ft.)	Casing Blows per Foot	Sample No.	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			2		**Topsoil**	
1		S-1	3		0'9"	Rec = 20"
			3		Br cf S, l (+) $	moist
2			7			
			5		same, dk br	
3		S-2	6		**Brown coarse to fine SAND,**	Rec = 17"
			8		**little (+) Silt**	moist
4			23		4'0"	
5					**Completely to highly weathered**	
					Gneiss	
6					5'6"	Auger refusal @ 5'6"
					End of Boring @ 5'6"	
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

Byrnwood Club Development
Bedford Road
Town of New Castle, NY
(12-175)

3 January 2013

TEST PIT LOGS

TP-1	Elevation +662		
0-0’9”	Brown Topsoil		
0’9”-2’0”	Brown coarse to fine SAND, and Silt, trace (+) medium to fine Gravel	medium dense	moist
2’0”	Gneiss bedrock No water encountered		

TP-2	Elevation +672		
0-1’10”	FILL (Brown coarse to fine SAND, some silt, little (-) coarse to fine Gravel, with topsoil)	medium dense	moist
1’10”-4’4”	Light brown coarse to fine SAND, some (+) Silt	medium dense	moist
4’4”	Gneiss bedrock No water encountered		

TP-3	Elevation +672		
0-0’9”	Dark brown Topsoil with surface debris		
0’9”-2’2”	Brown coarse to fine SAND, some Silt	medium dense	moist
2’2”	Gneiss bedrock No water encountered		

Byrnwood Club Development
Bedford Road
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3 January 2013

TEST PIT LOGS

TP-4	Elevation +672		
0-0’6”	Brown Topsoil		
0’6”-3’6”	Brown coarse to fine SAND, and (-) Silt, some coarse to fine Gravel	medium dense	moist
3’6”	Gneiss bedrock No water encountered		

TP-5	Elevation +670		
0-0’7”	Brown Topsoil		
0’7”-3’8”	Light brown coarse to fine SAND, some (+) Silt	medium dense	moist
3’8”-4’9”	Brown coarse to fine SAND, some Silt (completely weathered gneiss)	dense	moist
4’9”	Gneiss bedrock No water encountered		

Byrnwood Club Development
Bedford Road
Town of New Castle, NY
(12-175)

3 January 2013

TEST PIT LOGS

TP-6	Elevation +672		
0-0’10”	Brown Topsoil		
0’10”-2’10”	Light brown coarse to fine SAND, some (-) Silt, little coarse to fine Gravel	medium dense	moist
2’10”-4’7”	Brown coarse to fine SAND, some Silt, little coarse to fine Gravel (completely weathered gneiss)	dense	moist
4’7”	Gneiss bedrock No water encountered		

TP-7	Elevation +620		
0-0’9”	Brown Topsoil		
0’9”-2’8”	Brown coarse to fine SAND, some Silt, trace coarse to fine Gravel	medium dense	moist
2’8”	Probable Gneiss bedrock		
	Test pit abandoned No water encountered		

TP-8	Elevation +614		
0-0’8”	Dark brown Topsoil		
0’8”-5’0”	Mottled orange brown, gray coarse to fine SAND, and (-) Silt	medium dense	moist
	Groundwater encountered @ 4’1”	slow inflow	

Byrnwood Club Development
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3 January 2013

TEST PIT LOGS

TP-9	Elevation +628		
0-0'4"	Topsoil		
0'4"-6'9"	FILL (Brown coarse to fine SAND, some (+) Silt, some (+) coarse to fine Gravel, with cobbles and boulders)	medium dense	moist
6'9"	FILL (Gray coarse to fine SAND, trace (+) Silt)	medium dense	moist
	Possible cover over for utility Test pit was abandoned		
	No water encountered		

TP-10	Elevation +625		
0-0'4"	Topsoil		
0'4"-3'0"	FILL (Boulders with topsoil)	loose	moist
3'0"-8'0"	Brown coarse to fine SAND, some (+) Silt	medium dense	moist
	No water encountered		

Byrnwood Club Development
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3 January 2013

TEST PIT LOGS

TP-11	Elevation +642		
0-0'6"	Brown Topsoil		
0'6"-3'9"	Brown coarse to fine SAND, some Silt, little coarse to fine Gravel, with occasional cobbles and boulders	medium dense	moist
3'9"-6'0"	Brown coarse to fine SAND, little (+) Silt, some coarse to fine Gravel (completely weathered gneiss)	dense	moist
6'0"	Weathered Gneiss bedrock No water encountered		

TP-12	Elevation +635		
0-0'6"	Brown Topsoil		
0'6"-5'0"	FILL (Brown coarse to fine SAND, some (+) Silt, little (-) coarse to fine Gravel, with trace of debris)	loose	moist
5'0"-6'6"	Orange brown, gray coarse to fine SAND and Silt	dense	moist
	Refusal on boulder No water encountered		

TEST PIT LOGS

TP-13	Elevation +636		
0-0’9”	Brown Topsoil with roots		
0’9”-6’3”	Brown coarse to fine SAND, and Silt, little coarse to fine Gravel	medium dense	moist
6’3”-7’5”	Brown coarse to fine SAND, some (+) Silt, little (-) coarse to fine Gravel	dense	moist
7’5”	Gneiss bedrock		
	Groundwater encountered @ 4’10”	slow inflow	

TP-14	Elevation +625		
0-0’3”	Brown Topsoil		
0’3”-3’4”	FILL (Gray brown coarse to fine SAND, some Silt, little coarse to fine Gravel, with cobbles and boulders)	loose	moist
3’4”-5’0”	FILL (Brown coarse to fine SAND, little Silt)	medium dense	moist
5’0”	Gneiss bedrock No water encountered		

Byrnwood Club Development
Bedford Road
Town of New Castle, NY
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4 January 2013

TEST PIT LOGS

TP-15	Elevation +668		
0-0'3"	Brown Topsoil		
0'3"-1'8"	Brown coarse to fine SAND, some (+) Silt, some (-) coarse to fine Gravel, with occasional cobbles and boulders	medium dense	moist
1'8"	Gneiss bedrock No water encountered		

TP-16	Elevation +651		
0-0'8"	Dark brown Topsoil		
0'8"-1'10"	FILL (Brown coarse to fine SAND, some (+) Silt, trace medium to fine Gravel, with cobbles)	medium dense	moist
1'10"-4'10"	Brown coarse to fine SAND, some (+) Silt, trace medium to fine Gravel	medium dense	moist
4'10"	Gneiss bedrock No water encountered		

Byrnwood Club Development
Bedford Road
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(12-175)

4 January 2013

TEST PIT LOGS

TP-17 Elevation +655

0-0’3”	Topsoil		
0’3”-1’0”	Brown coarse to fine SAND, some (+) Silt, little coarse to fine Gravel	medium dense	moist
	Encountered irrigation pipes Test pit abandoned No water encountered		

TP-18 Elevation +670

0-0’10”	Brown Topsoil		
0’10”-7’0”	Brown SILT and, coarse to fine Sand, little (-) medium to fine Gravel	medium dense	moist
	No water encountered		

Byrnwood Club Development
Bedford Road
Town of New Castle, NY
(12-175)

18 -19 December 2012

Borehole Permeability Test (B-4)

Ground Surface Elevation: +628.0
Top of Casing Elevation: +631.5
Bottom of Test Hole Elevation: +621.0
Test Hole Depth from Ground Surface Elevation: 7'0" (84")

Pre-Soak:

Start Date: 18 Dec 2012 Time: 1545 Water Level*: 4'4"
End Date: 19 Dec 2012 Time: 0900 Water Level*: 7'1"

33" drop H_2O in 1035 minutes (17 hr. 15 min.) = 0.03 inches per minute

Test:

Start Date: 19 Dec 2012 Time: 1000 Water Level*: 4'3"
End Date: 19 Dec 2012 Time: 1515 Water Level*: 5'3.5"

12.5" drop H_2O in 315 minutes (5 hr. 15 min.) = 0.04 inches per minute

Time	Water Level*	Interval Water Level Drop (Inches)	Cumulative Water Level Drop (Inches)
1000	4'3"	0	0
1100	4'6"	3	3
1200	4'8"	2	5
1300	4'10"	2	7
1400	5'1"	3	10
1515	5'3.5"	2.5	12.5

Water Level* - Depth below top of casing (elevation +631.5)

Byrnwood Club Development
Bedford Road
Town of New Castle, NY
(12-175)

3 January 2013

<u>Percolation Test P-1</u>
(Elevation +620)

Test hole depth 42" from ground surface elevation

<u>Pre-Soak</u>

0-10 min, 22" drop of H2O (pipe drained)
22" drop H2O in 10 minutes = 2.20 inches per minute

<u>Test Run #1</u>

5 min, 15" drop H2O (re-filled pipe)

<u>Test Run #2</u>

5 min, 14" drop H2O (re-filled pipe)

<u>Test Run #3</u>

5 min, 12" drop H2O (re-filled pipe)

<u>Final Test Reading</u>

Start @ 1245, 14" from top of pipe
Finish @ 1300, 36" drop from top of pipe (pipe drained)
22" drop H2O in 15 minutes = 1.46 inches per minute

<u>Percolation Hole P-2</u>
(Elevation + 612)

Test hole depth 20" from ground elevation
Groundwater @ 0'6" below surface
Percolation test unable to be performed

Byrnwood Club Development
Bedford Road
Town of New Castle, NY
(12-175)

3 January 2013

Percolation Test P-3
(Elevation + 616)

Test hole depth 32" from ground surface elevation

Pre-Soak

0-24 min, 17" drop of H_2O (pipe drained)
17" drop H_2O in 24 minutes = 0.71 inches per minute

Test Run #1

5 min, 5" drop H_2O (re-filled pipe)

Test Run #2

5 min, 5" drop H_2O (re-filled pipe)

Test Run #3

5 min, 4" drop H_2O (re-filled pipe)

Final Test Reading

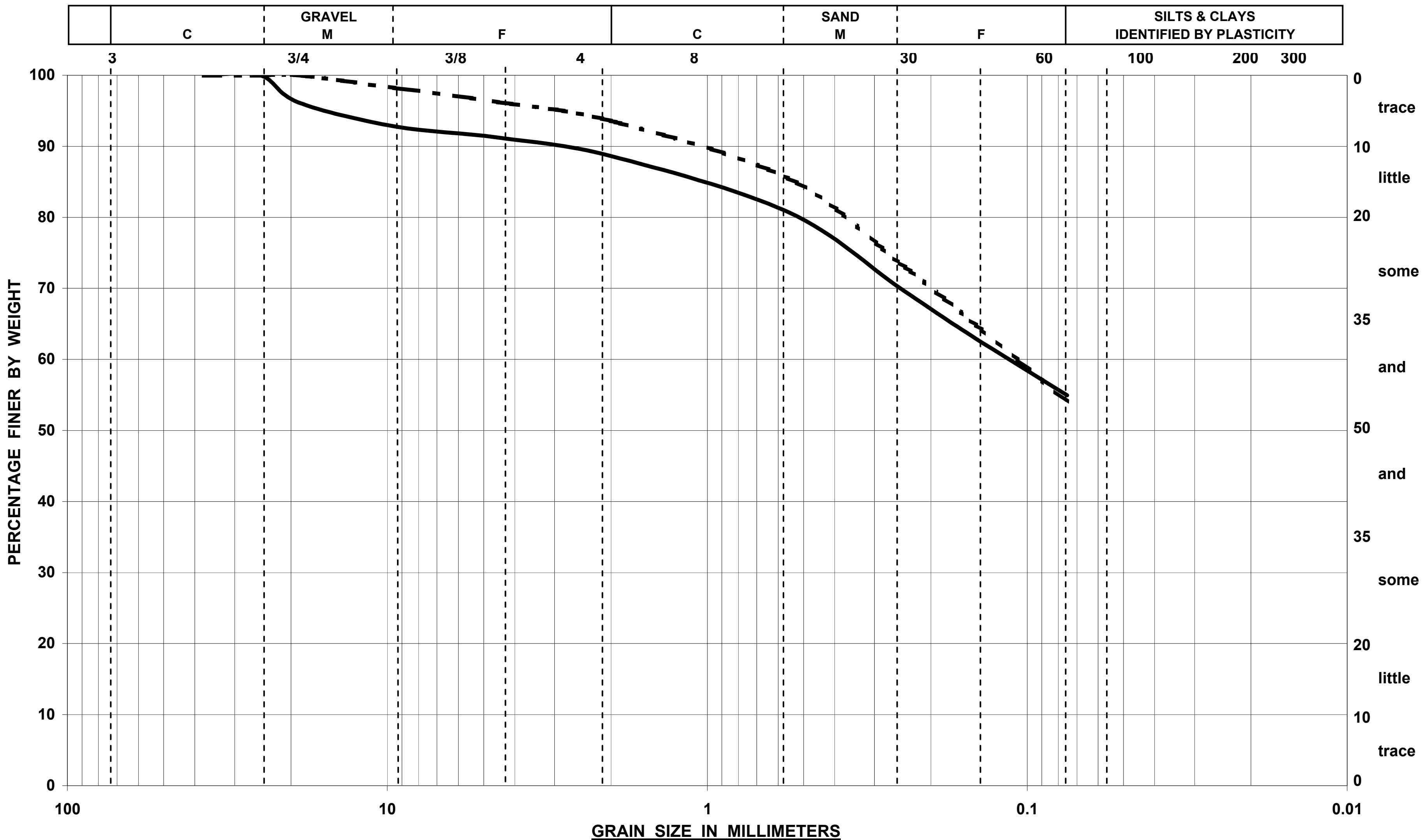
Start @ 1535, 15" from top of pipe
Finish @ 1605, 28" drop from top of pipe
13" drop H_2O in 30 minutes = 0.43 inches per minute

Percolation Hole P-4
(Elevation + 615)

Test hole depth 24" from ground elevation
Groundwater @ 1'10" below surface
Percolation test unable to be performed

CARLIN-SIMPSON & ASSOCIATES
SAYREVILLE, NJ 08872

SIEVE ANALYSIS

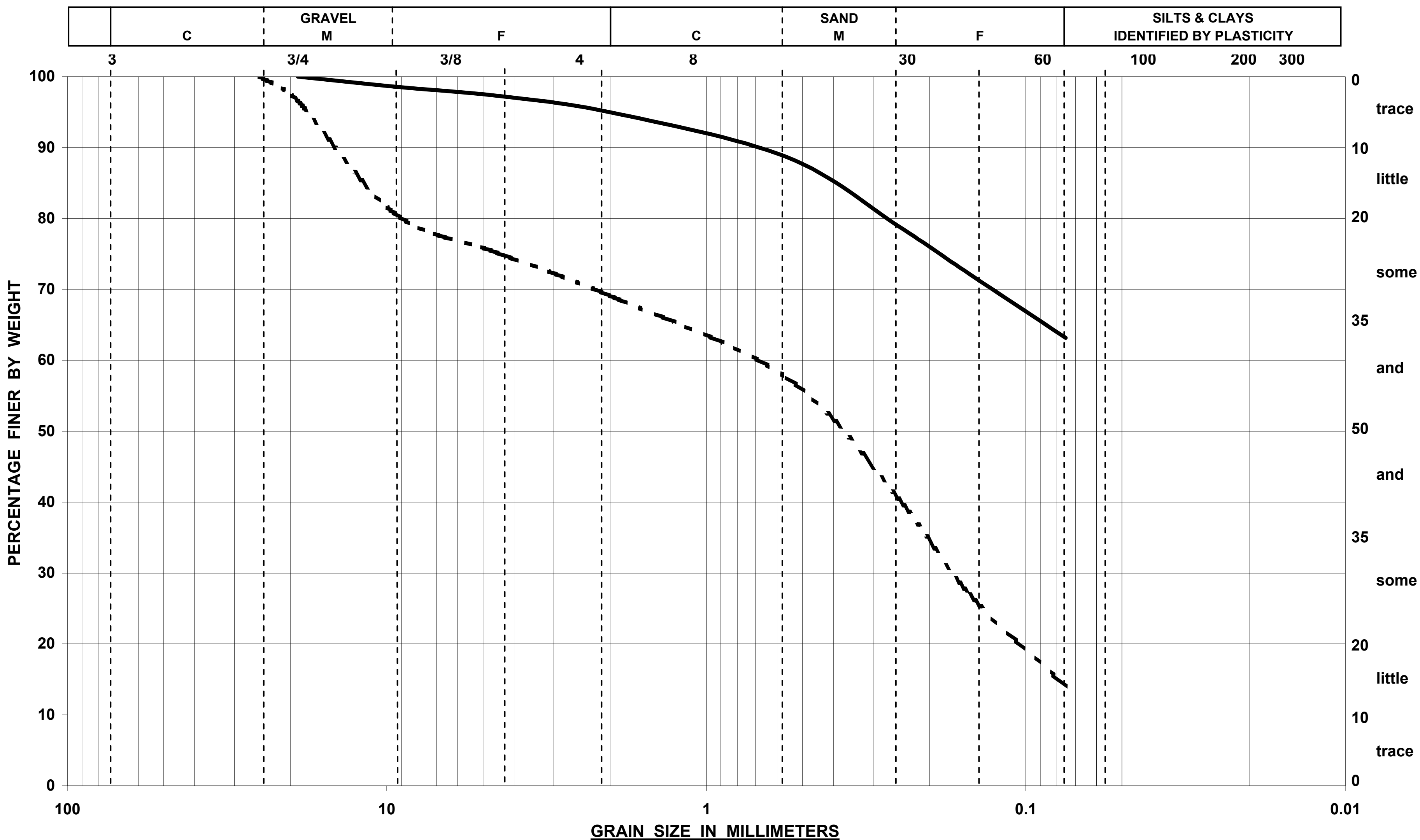


SYMBOL	BORING	SAMPLE	DEPTH	DESCRIPTION	NAT MC
———	B-1	S-1	0' 0" - 2' 0"	Brown SILT and (+), coarse to fine Sand, little (-) medium to fine Gravel	14.0%
— -	B-2	S-2	2' 0" - 4' 0"	Brown SILT and (+), coarse to fine Sand, trace medium to fine Gravel	14.2%

PROJECT Brynwood Club, Bedford Road, North Castle, NY **BY** MW **DATE** 7-Jan-13 **JOB NO** 12-175

CARLIN-SIMPSON & ASSOCIATES
SAYREVILLE, NJ 08872

SIEVE ANALYSIS

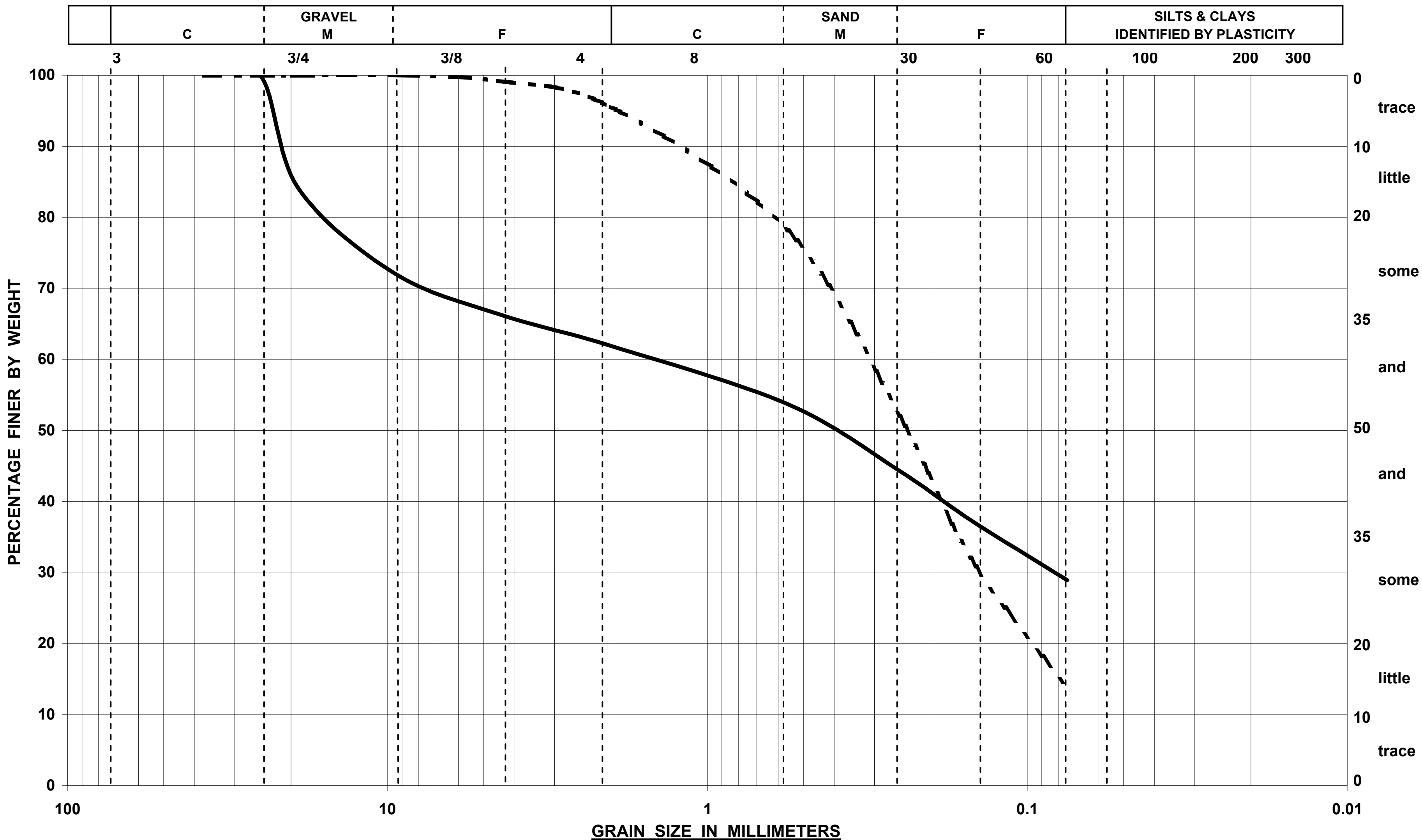


SYMBOL	BORING	SAMPLE	DEPTH	DESCRIPTION	NAT MC
———	B-3	S-1	0' 0" - 2' 0"	Brown SILT and (-), coarse to fine Sand, trace medium to fine Gravel	24.2%
— -	B-4	S-3	5' 0" - 7' 0"	Brown coarse to fine SAND, little Silt, some (+) medium to fine Gravel	12.1%

PROJECT Brynwood Club, Bedford Road, North Castle, NY **BY** MW **DATE** 7-Jan-13 **JOB NO** 12-175

CARLIN-SIMPSON & ASSOCIATES
SAYREVILLE, NJ 08872

SIEVE ANALYSIS

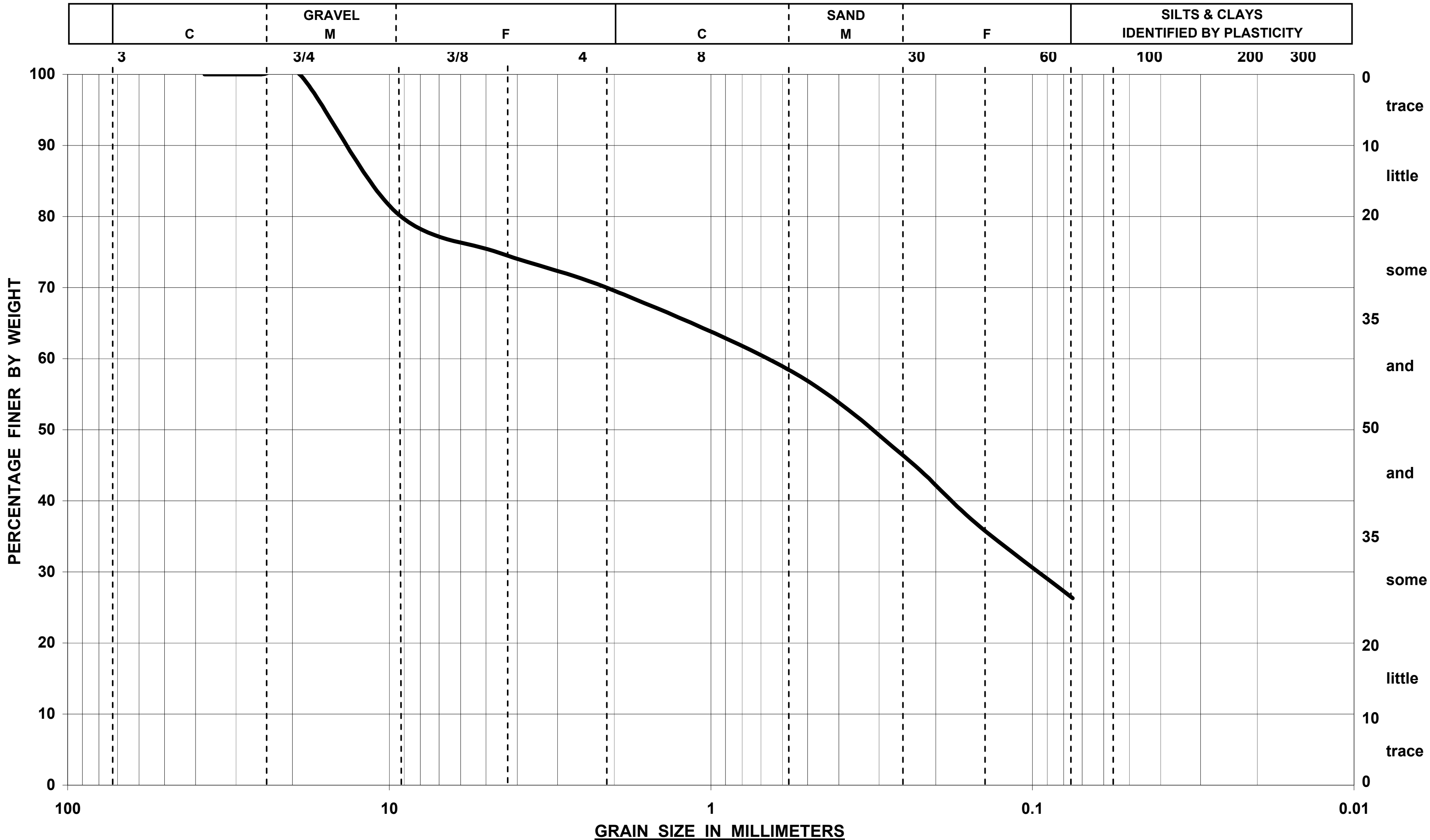


SYMBOL	BORING	SAMPLE	DEPTH	DESCRIPTION	NAT MC
————	B-6	S-2	2' 0" - 4' 0"	Brown coarse to fine Sand, some Silt, and (-) coarse to fine Gravel	9.9%
— -	B-7	S-3	5' 0" - 7' 0"	Brown coarse to fine SAND, little Silt, trace fine Gravel	8.7%

PROJECT Brynwood Club, Bedford Road, North Castle, NY **BY** MW **DATE** 10-Jan-13 **JOB NO** 12-175

CARLIN-SIMPSON & ASSOCIATES
SAYREVILLE, NJ 08872

SIEVE ANALYSIS

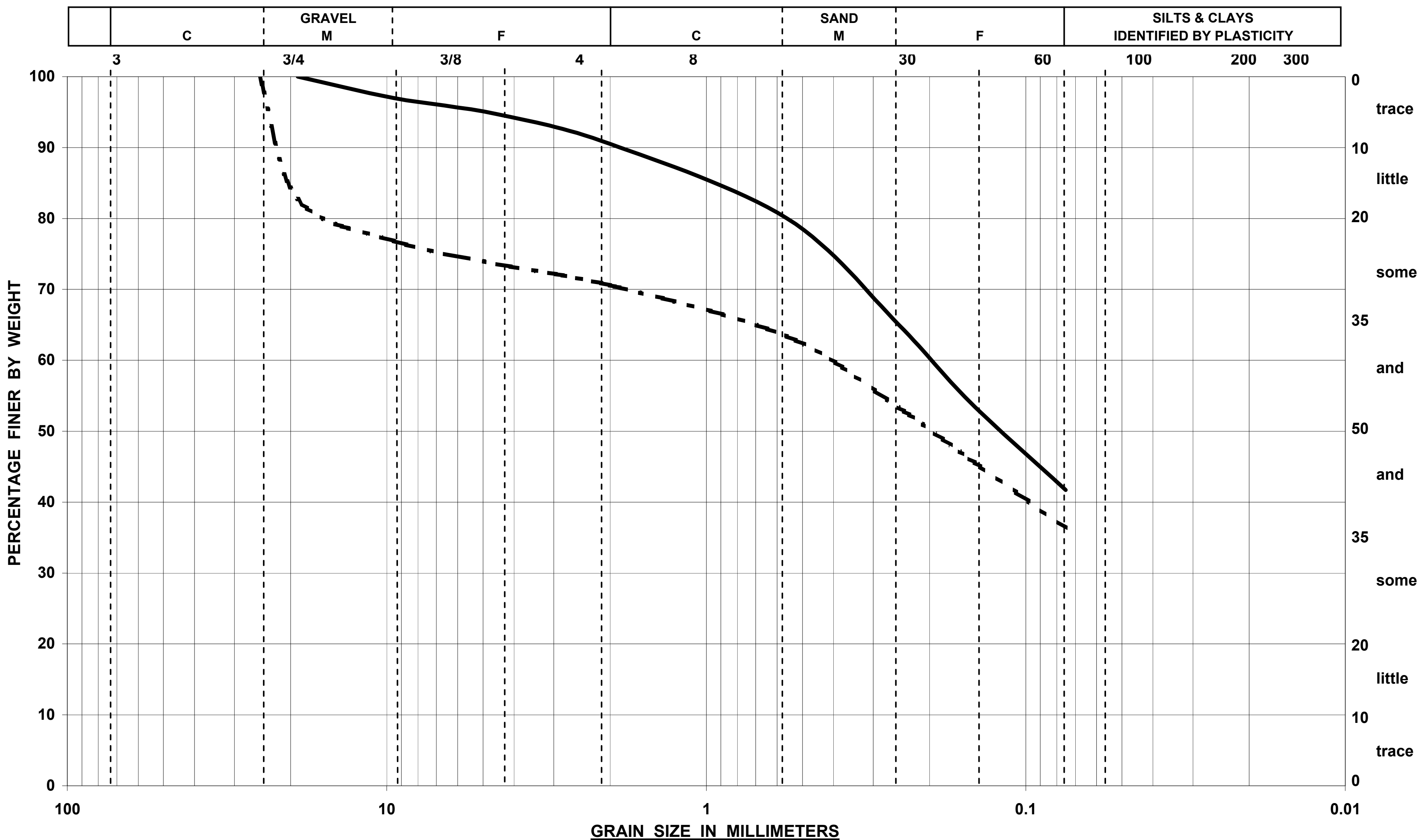


SYMBOL	BORING	SAMPLE	DEPTH	DESCRIPTION	NAT MC
——	B-9	S-2	2' 0" - 4' 0"	FILL (brown coarse to fine Sand, some Silt, some (+) medium to fine Gravel	15.0%

PROJECT Brynwood Club, Bedford Road, North Castle, NY **BY** MW **DATE** 7-Jan-13 **JOB NO** 12-175

CARLIN-SIMPSON & ASSOCIATES
SAYREVILLE, NJ 08872

SIEVE ANALYSIS

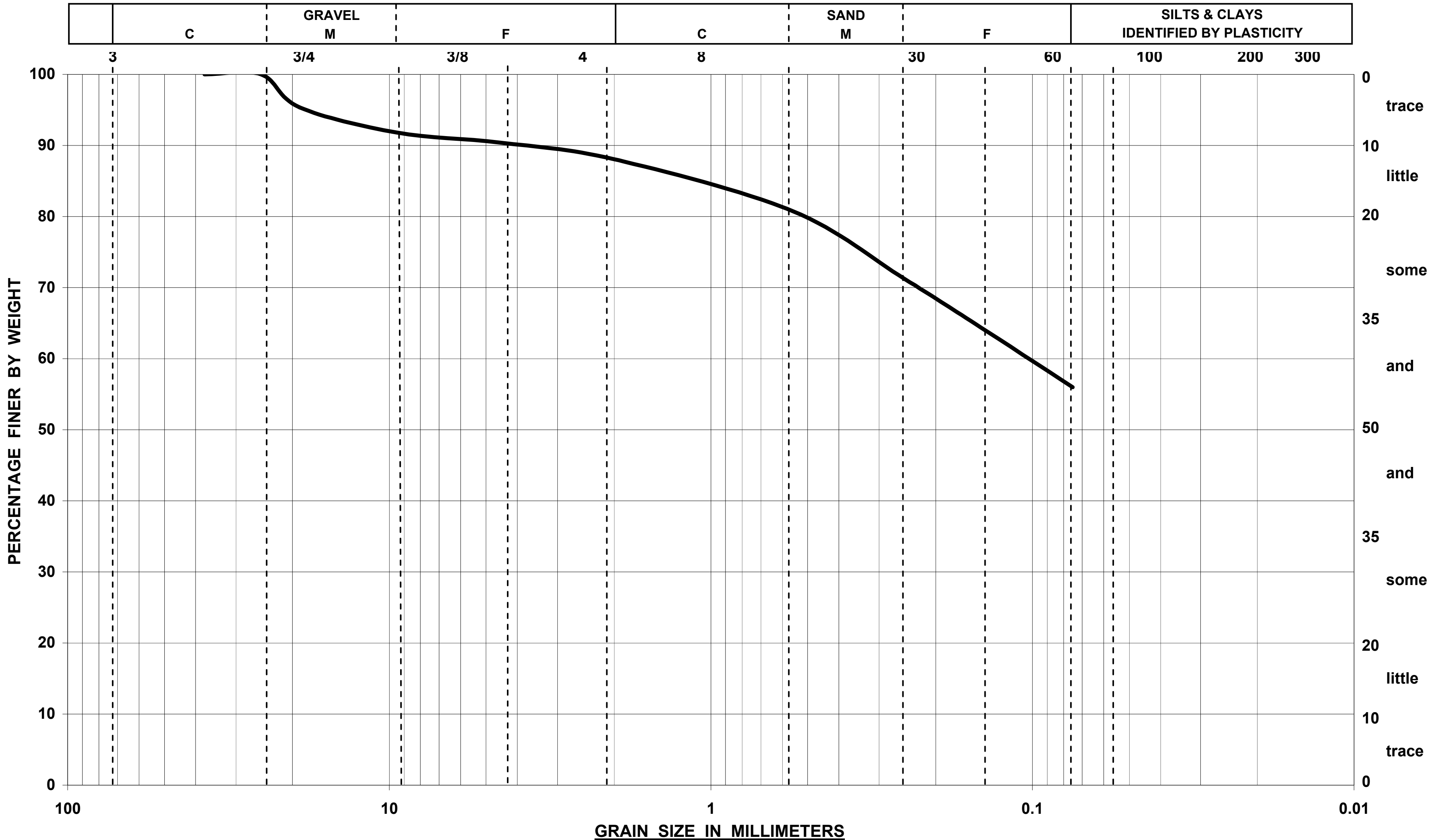


SYMBOL	Test Pit	SAMPLE	DEPTH	DESCRIPTION	NAT MC
———	TP-1	S-1		Brown coarse to fine SAND, and Silt, trace (+) medium to fine Gravel	18.2%
— -	TP-4	S-1		Brown coarse to fine Sand, and (-) Silt, some coarse to fine Gravel	14.0%

PROJECT Brynwood Club, Bedford Road, North Castle, NY **BY** MW **DATE** 7-Jan-13 **JOB NO** 12-175

CARLIN-SIMPSON & ASSOCIATES
SAYREVILLE, NJ 08872

SIEVE ANALYSIS



SYMBOL	Test Pit	SAMPLE	DEPTH	DESCRIPTION	NAT MC
——	TP-18	S-1	0' 10" - 7' 0"	Brown SILT and, coarse to fine Sand, little (-) medium to fine Gravel	18.0%

PROJECT Brynwood Club, Bedford Road, North Castle, NY **BY** MW **DATE** 7-Jan-13 **JOB NO** 12-175

GENERAL NOTES:

1. GENERAL LAYOUT WAS OBTAINED FROM A DRAWING PREPARED BY JOHN MEYER CONSULTING, PC ENTITLED "TEST PIT PLAN, BRYNWOOD CLUB, BEDFORD ROAD (NY 22), TOWN OF NORTH CASTLE NEW YORK," DRAWING TP-1, DATED DECEMBER 17, 2012.

2. BORING, TEST PIT, PERMEABILITY TEST, AND PERCOLATION TEST LOCATIONS WERE LAID OUT IN THE FIELD BY CARLIN-SIMPSON & ASSOCIATES (CSA).

3. BORINGS (B-1 THROUGH B-11) WERE PERFORMED BY GENERAL BORINGS INC. ON 18 & 19 DECEMBER 2012 UNDER THE FULL TIME INSPECTION OF CSA.

4. THE BOREHOLE PERMEABILITY TEST (BP-4) WAS PERFORMED BY CARLIN-SIMPSON ASSOCIATES (CSA) ON 18 & 19 DECEMBER 2012.

5. PERCOLATION TESTS (P-1, P-2, AND P-3) WERE PERFORMED BY CARLIN-SIMPSON ASSOCIATES (CSA) ON 3 JANUARY 2013.

6. TEST PITS (TP-1 THROUGH TP-18) WERE PERFORMED BY TRAFICANTE CONTRACTING, INC ON 3 & 4 JANUARY 2013 UNDER THE FULL TIME INSPECTION OF CSA.

7. LOCATIONS ARE APPROXIMATE.

LEGEND:

- BORING LOCATION
- TEST PIT LOCATION
- PERCOLATION TEST LOCATION
- BOREHOLE PERMEABILITY TEST LOCATION

ROBERT B. SIMPSON, P.E.
PROFESSIONAL ENGINEER

LICENSE NO. SIGNATURE

BORING & TEST PIT LOCATION PLAN

BRYNWOOD CLUB DEVELOPMENT
NORTH CASTLE, NEW YORK

DRAWN	SCALE
JGB	1" = 60'
CHECKED	DATE
RBS	18 JAN 13
PROJECT NO.	DWG NO.
12-175	FIG -1
APPROVED	

CARLIN-SIMPSON AND ASSOCIATES
61 Main Street
Sayreville, NJ 08872

Consulting Geotechnical and Environmental Engineers

APPENDIX E

Integrated Turfgrass and Pest Management Plan (ITPMP) with Environmental Risk Assessment for the Brynwood Golf & Country Club, North Castle, NY

Prepared By

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Trumansburg, New York 14886

And

Andrew S. Thompson
Golf Course Superintendent
Brynwood Golf & Country Club
Troon Golf, Inc

March 18, 2013

INTRODUCTION

The project is combinations of an ownership residential community with 88 residences (of mixed types of condominiums) on approximately 14.7 acres of the 156-acre site and a golf course. The existing golf course will go through a complete renovation. The adjacent land use includes a school south of the property.

A properly maintained golf course with established turfgrass cover and mature tree stands provides much-needed green space relief from urban development. The filtering ability of dense, healthy turf and its thatch layer can be utilized to ensure pollutants do not reach groundwater or enter rivers and streams. A golf course can be an attractive and effective transition between agricultural and urban landscapes and provides for the preservation or creation of areas useful to wildlife. When managed in an environmentally conscious manner, golf courses can enhance the quality of life within a neighborhood.

This report has two parts: 1) the Integrated Turfgrass Management-Environmental Risk Assessment Plan (ITPMP) for the Brynwood Golf & Country Club and the Residential Lawn Management Plan (RLMP) . The ITPMP and RLMP contains a program of fertilizer, pest control options and other maintenance practices to be used on this golf course and on the lawns. This program was designed to serve as the maintenance blueprint for Brynwood Golf & Country Club. Both plans rely heavily on environmental friendly practices including the use of: natural organic fertilizers that suppress diseases, pest resistant grasses, biological control material as the first line of defense against pests and careful use of fertilizers and water for irrigation.

Part I: The Golf Course Integrated Turfgrass Management-Environmental Risk Assessment Plan

In general, golf course superintendents, as a group of professionals, are committed to the preservation of the ecology and the wildlife and share the concern for the preservation of the golf course site's environmental quality. The golf course superintendent, with the use of the Troon Golf Standards and Procedures Manual, will be responsible for implementing this ITPMP program.

As with any new or existing golf course, a fertilizer and pest control program must show flexibility to deal with two very important variables: weather and nature. The initial year(s) or grow-in period that often lasts up to 2 seasons will require higher than normal annual inputs of fertilizers and limited use of pest control materials in order to promote rapid establishment of cover, which reduces soil erosion and minimizes the likelihood of weed infestation.

The basic philosophy of this ITPMP is to produce a healthy pest-resistant golf-playing surface that will have little or no impact on the surrounding environment. Selection and use of fertilizers and pest control materials will be based on producing a healthy plant while not contaminating either surface water (via runoff) or groundwater (via leaching). There is little or no evidence that golf courses have or will contaminate surface or ground water (Baris et al., 2010, Cohen et al., 1990, 1999; Cohen and Durborow, 1994; Petrovic, 1994; Shirk, 1996). There are over 40 golf courses in the NY, NJ and CT region that are using an ITPMP developed by Petrovic, many with surface and ground water quality monitoring. It has been found following these site-specific ITPMP has resulted in protection of surface and ground water quality for contamination from either nutrients or pesticides.

The golf course superintendent of the Brynwood Golf Course will utilize every available method to minimize the risk of contaminating any surface water or ground water. Thus, the purpose of this report is to present a site specific analysis that meets the goals of having a healthy pest-resistant golf playing surface that poses little or no threat to the environment on or surrounding this site. The ITPMP conforms to the principles of sustainable resource management developed by Audubon International for golf courses.

The property is currently working towards becoming a Certified Audubon Cooperative Sanctuary. Audubon provides the tools to thoroughly perform a site assessment of the property and form an environmental plan of action which can be implemented to help effect wildlife habitat and wetland management, reduce chemical use and create and safer protocol for needed use, become more efficient with water use, manage the quality of not only water systems on the property but surrounding water systems as well as groundwater, and finally will help Brynwood to reach out to the surrounding community to educate and communicate what Brynwood is doing to positively impact the local community. Implementation of new environmental programs and initiatives will help improve environmental performance and community relations, reduce environmental and legal liability, have a significant impact on the financial bottom line, and overall will enhance Brynwood's contribution to the conservation of environmental resources.

The ITPMP also conforms to the best management practices for golf course turf management being developed by Cornell University (Petrovic a co-author).

The report presented here was compiled from the following information: review of the existing IPM plan from Troon Golf, site specific soil properties from VHB and corresponding soil data provided by the USDA- National Resource Conservation Service for these soils, the hydrogeology, groundwater and water supply information from VHB, golf course improvement plan from Reese Jones-golf course architect, environmental fate assessment (risk to surface and ground water) of the currently registered pesticides in the state of New York for golf course use by model simulation (WIN PST, pesticide risk assessment models developed by USDA-NRCS), and extensive literature search on the environment fate of fertilizers and pesticides, integrated pest management programs and fertility requirements for golf course turf. This report provides an environmentally sound fertilizer and pest management program to be followed by the golf course management personnel. Any chemical (fertilizer or pesticide) found by this environmental risk assessment to pose a high risk to humans or aquatic wildlife in either surface or groundwater will not be recommended to be used on this golf course. A few pesticides with an intermediate risk to humans or aquatic wildlife may be used on a very small area (greens) under very controlled conditions as a last resort when other control measures are lacking.

For the pests that are likely to invade Brynwood Golf Course, there are several pesticides registered for their control. Taking this into consideration as well as the need to protect surface and groundwater from contamination and to reduce the exposure of humans and wildlife to highly toxic pesticides, pesticides were selected that have a low potential for either leaching or runoff from the soils on this site. The evaluation included determining the potential of each registered pesticide for contamination of water on a soil-by-soil basis based on soil properties of this site.

In order to preserve and enhance the natural resources, this design and management plan has adopted the principles in the following report.

I. Planning and Policies

The project will incorporate environmentally responsible golf principles in all aspects of planning and development of this site. The environmentally responsible golf principles include: designing the golf course with care to protect environmentally sensitive areas and to minimize the micro-climatic conditions that favor pests and discourage healthy turf; use low maintenance-pest resistant grasses; follow sound integrated pest management (IPM) practices that use pesticides as a last resort and only pesticides with a low risk to humans and wildlife; careful and precise use of water and fertilizers to provide for healthy-pest resistant turf while minimizing the impact on environment.

II. Alternative Pest Controls

The Brynwood Golf Course will employ IPM techniques to minimize pest problems. This includes:

a) Reliable and accurate pest identification
b) Monitoring pest populations and related damage to ensure treatments will only be applied where and when necessary and when they will be most effective.
c) Establishment of injury levels that can be tolerated before control measures are implemented.
d) Use of combinations of the following treatment methods to control pests in a manner that achieves a high level of effectiveness while minimizing environmental impact.

i) Biological Controls - release of predatory/parasitic insects, conservation of natural enemies.
ii) Cultural Controls - use of resistant cultivars, encouragement of diverse plant communities, optimal management of irrigation, aeration and other management techniques to maximize plant vigor and reduce susceptibility to pests.
iii) Physical Controls – after construction sanitation, pruning, protective weed barriers, etc. will be used to reduce weed problems.
iv) Mechanical Controls - roto-tilling areas repeatedly to kill perennial weeds during renovations, etc.
v) Chemical Controls - use of products that are target specific, have short residual lives and have low environmental impacts.

For each pest anticipated on this golf course, the following is a detailed IPM plan. The basic premise underlying this integrated pest management (IPM) plan is that a healthy plant will be most resistant to pest attacks and will recover much faster than less healthy turf. Therefore, the golf course superintendent will follow the standard accepted maintenance practices like proper mowing (height and frequency); topdressing and cultivation for thatch management and compaction alleviation as examples. What follows is a discussion of practices that more directly affect pest problems and are part of the IPM program.

Each golf course is managed differently based on numerous factors. The following is the recommended management routine that is typical of similar golf courses in the area.

Mowing: Greens and tees will be mowed 6 to 7 times per week during the major growing portion of the year (April-November). Fairways will be mowed 3 to 5 times per week with clippings left in place when ever possible. Roughs will be mowed one to three times per week and clippings left in place.

Clipping Management: Clippings collected from greens, and tees will either be spread in rough areas or be part on the on-site compost-recycling program. Clippings from all other areas will be left in place whenever feasible. If cutworms become a major problem on greens/tees, clippings from greens/tees in June and July will not be place within 100 feet of any green to reduce the population of cutworms.

Cultivation: Several times each year, the greens, tees, fairways and trafficked sections of the roughs will be cultivated to alleviate soil compaction caused from foot traffic from golfers and vehicular traffic. The cultivation methods used will include shallow core cultivation, deep drill and water injection on greens/tees during the summer months if necessary. A soil penetrometer will be used to judge the need for cultivation. Compacted soils are much more prone to runoff and therefore, cultivation is necessary to protect surface water quality.

Topdressing: Topdressing is a practice of adding a small amount of soil (sand) to the surface of the turf so as to reduce the development of thatch while smoothing and firming the putting surface. Greens and tees will be topdressed with the same material used to construct the root zone typically on a bi-weekly interval during most of the active part of the growing season or as needed based on the turfgrass growth rate.

Pest Management Goals and Philosophy

The basic goal and philosophy of this Integrated Pest Management (IPM) program is to produce a healthy, pest resistant golf-playing surface that will have little or no impact on the surrounding environment. Every available pest management practice will be utilized with the goal of using pesticides as a last resort after all other control options have been followed. The sections of the golf course to be renovated provides the opportunity to construct a system that is less prone to stress, which is often the main cause of pest damage or invasion of weedy species. This can be accomplished by: 1) establishing grasses that are best adapted for the golf courses and are pest resistant, 2) by providing a soil system to minimize the stress caused by the golfer and is well drained and 3) reducing moisture plant stress by having an irrigation system that can provide the necessary amount of water needed by the plant (thus reducing over irrigation which can lead to the potential for ground/surface water contamination or more pest problems). Thus, the purpose of this IPM Program is to summarize the approach that meets the goals of developing a healthy pest resistant golf-playing surface that poses little or no threat to the environment on or surrounding this site. This IPM plan is to be used as a decision making tool by the golf course superintendent.

The components of this IPM plan are: proper grass selection, mapping of the property, developing the site specific pest knowledge base, yearly IPM plan development, using action thresholds, soil, plant tissue and water testing, weather record collection, pest management options (cultural, biological and pesticidal) and yearly evaluation on the effectiveness of program and modification of plan.

Turfgrass Selection: Performance and Pest Resistance Criteria

Even though there are over 7,500 species in the grass family, only a handful of species is used on golf courses. The main reason for such a few species being used is the relatively short cutting height demands of golf course playing conditions. For greens in New York, only two species could be used, creeping bentgrass (*Agrostis palustris*) and velvet bentgrass (*Agrostis canina*). Velvet bentgrass is currently being evaluated and in the future may be a grass to use, but has been experiencing problems of with standing and recovering from traffic. There are several varieties of creeping bentgrass available. The one best suited for the climate and with good resistance to the major disease problems anticipated at this golf course (Anthracnose, Brown patch and Dollar spot) and reduces annual bluegrass invasion should be used at Brynwood. Varieties of creeping bentgrass to be used on greens will be selected by the Troon Golf Sr. Vice President of Science and Agronomy, the golf course architect and golf course superintendent based on varieties suited best for New York based on Nation Turfgrass Evaluation Program (NTEP) USDA data and from the Cornell University Turfgrass Program.

Options for grasses on tees and fairways/approaches are somewhat broader. Tees can use creeping bentgrass and in a few cases a slightly higher turf like Kentucky bluegrass (*Poa pratenses*). On the golf course at Brynwood, fairways could be either be a mixture of Kentucky bluegrass with perennial ryegrass (*Lolium perenne*) or creeping/colonial bentgrasses with fine fescues. The advantage of perennial ryegrass is that it requires less water, has somewhat less disease problems, is resistant to surface feeding insects (if endophytic varieties are used, which is highly recommended) and does not produce much thatch that can be harmful to turf. Perennial ryegrass, however, is a short lived perennial requiring at least bi-annual over-seeding, is subject to winter kill during prolonged periods of ice cover or hard winters, and has been heavily damaged by a new disease called gray leaf spot. Due to gray leaf spot problems on perennial ryegrass, fairways will be established with blend of several low maintenance bentgrass cultivars with other grasses. Tees will be established with creeping bentgrass. The varieties to be used will be suited best for New York based on Nation Turfgrass Evaluation Program (NTEP) USDA data and from the Cornell University Turfgrass Program.

Roughs are often established with very low maintenance grasses that are mowed higher than fairways/approaches, are to be irrigated less and require minimal fertilization. This golf course will establish the primary roughs with this in mind using a mixture of fine fescues (red, chewing or hard fescue, all *Festuca*) and low maintenance Kentucky bluegrass. At least two varieties of each species should be used to seed roughs to increase the genetic diversity so as to be ecologically competitive under the ever-changing climatic conditions. The final selection of cultivars will be made at the time of seeding using NTEP data and recommendations from Cornell University Turfgrass Program. Native areas that receive limited mowing and play will be established with fine fescues.

<u>Establishment Methods and Seeding Rates</u>

All fairways and roughs will be seeded and mulched used to enhance germination and reduce the potential for erosion. The elevated areas around the greens and tees maybe stabilized with a lightweight non-woven erosion control blanket or sodded. The playing surface of the greens and tees will be seeded with drop or cyclone-type seeder. Seeding rates are as follows: greens and tees will be seeded with creeping bentgrass at a rate of 1.5 lb. of pure live seed/1000 sq. ft. Fairways and tees will be seeded at a rate of 65 lbs./acre and the rough at a rate of 174 lbs. seed/acre.

A starter fertilizer will be applied just prior to sodding or seeded after final grading is complete (construction). For greens and tees, 1 to 2 lbs. of nitrogen/1000 sq. ft. will be applied prior to seeding and then the first year fertilization program will be followed as found in Tables 5 & 6. On fairways and roughs, a starter fertilizer will be used to supply about 0.5 lbs. of N/1000 sq. ft. and then followed by the nitrogen fertilization program shown in Table 6. The amount of other nutrients (phosphorus, potassium, calcium and magnesium) will be applied prior to seeding or sodding on greens, tees, fairways and roughs based on soil test recommendations so as to provide for rapid establishment, less erosion potential and less chance of phosphorus runoff. Based on the New York State Law and Westchester County Law, phosphorus can be applied to sites being established or renovated.

Based on the pest occurrences of golf courses in New York, Table 1 contains the anticipated pests for Brynwood Golf Course.

Table 1. Anticipated pests on Brynwood Golf and Country based on current pest occurances.

Occurrence	Greens	Tees	Fairways	Roughs
Frequent	Dollar Spot, Anthracnose Hyperodes,	Dollar Spot, Hyperodes	Dollar Spot, Hyperodes	Dollar Spot, Hyperodes, Crabgrass, Goosegrass, Broadleafs
Occasionally	Brown Patch, Summer patch, Yellow Patch, Pink Snow Mold, Moss/Algae Cutworms, Annual bluegrass	Summer Patch, Brown Patch, Anthracnose Pink Snow Mold, Cutworms, White Grubs, Annual bluegrass	Summer Patch, Anthracnose, Brown Patch, Pink Snow Mold, Cutworms, White Grubs Annual bluegrass	Red Thread, White Grubs, Chinch bugs
Seldom	Pythium, Gray Snow Mold, Leaf Spots, Necrotic Ring Spot, Red Thread, White grubs,	Pythium, Grey Snow Mold, Leaf Spots, Necrotic Ring Spot, Fairy Ring, Red Thread, Crabgrass, Goosegrass, Broadleafs	Pythium, Grey Snow Mold, Leaf Spots, Necrotic Ring Spot, Fairy Ring, Red Thread, Crabgrass, Goosegrass, Broadleafs	Pythium, Grey Snow Mold, Leaf Spots, Necrotic Ring Spot, Fairy Ring,

It is anticipated that these pests will occur during the periods shown in Table 2.

Table 2. Occurrence of anticipated pest on Brynwood Golf Course.

Pest	**Month(s) of Pest Occurrence**
Diseases	
dollar spot	May-September
brown Patch	July-August
pink snow mold	November-April
red thread	May-October
summer patch	June-August
Pythium blight	June-August
Insects	
white grubs	July-May
cutworms	May-September
chinch bug	June-September
Hyperodes	April-August
Weeds	
broad leafs	all year
crabgrass	May-October
annual Bluegrass	all year
moss	all year

The scientific names and biological information for each pest are contained in the following section. This list will be updated as site-specific pest knowledge is obtained.

IPM Plan

The IPM plan for Brynwood golf course is broken down by pest management group and contains pest biology information for New York State (Rossi et al., 2013), actions thresholds, cultural control, biological control and pesticide control options to be followed by the golf course staff. All control options will be integrated and implemented with pesticides only being applied as a last resort when other methods have failed and significant pest damage is likely. All pesticide for use on Brynwood golf course have a low potential for both surface and ground water contamination (based on the risk assessment found later in this report) except where noted for reasons of the lack of control with other options.

DISEASE PESTS

Two out of the six pests that are anticipated to occur most often on this golf course are diseases. Fungi cause most diseases that attack turfgrass. The following are descriptions of each of the most prevalent diseases (frequently and occasionally, Table 1) and the "state of the art" IPM practices that will be followed on this golf course:

Dollar Spot (Sclerotinia homoeocarpa)

Dollar Spot is a foliar disease that is favored by temperatures between 61-81° and too low a level of a nitrogen level in the plant tissue. It will likely be the most prevalent disease on this golf course and would occur on this site from June to September. Dollar spot is easily recognizable, slow to develop and to cause damage. Bentgrass used on greens will be the most susceptible of the grasses used. The use of bentgrasses on greens that have a low amount of dollar spot is necessary. Daily scouting should be used to determine the extent of occurrence and range of this disease on the golf course. Natural organic disease suppressive fertilizers like Ringer Compost Plus and Greens Restore have been shown to reduce the incidence of Dollar spot by 45% (Nelson, 1990) and will be used as part of the fertilization program. Tissue testing may be used to help maintain the nitrogen level (>4.5%) in the plant at a level to suppress disease development.

Biofungicides that can be used are (see Table 3 for more details) are *Bacillus licheniformis* strain SB 3086 (EcoGuard Biofungicide) and *Pseudomonas aureofaciens* strain TX-1 (Spot-Less Biofungicide).A mineral oil made from isoparafin (Civitas with Harmonizer) has been shown to reduce dollar spot problems, especially in combination with the fungicide boscalid (low risk pesticide on this site). Damage from this disease even with these cultural and biofungicides controls may exceed the acceptable level on this golf course; thus, fungicide applications are very likely to be needed. Fungicides should be used only when 1) an outbreak in indicator sites has been observed in excess of the threshold (5 spots/sq.yd. for greens/tees and 10 spots/sq.yd. for fairways) and when weather conditions still favor disease development (temperatures 70 to 85 F and humid. The Dollar spot predictor (http://www.nrcc.cornell.edu/grass/) will also be used to determine the risk of a dollar spot outbreak. Fungicides to be used first must be registered for dollar spot control and also have a low or very low risk of surface or groundwater contaminations (Table 7).

Anthracnose (Colletotrichum graminicola)

Symptoms of this disease can be seen in cool, wet weather but the most likely period of turfgrass damage can be seen in warm weather (71-82° F) under drought conditions. Anthracnose is most damaging to annual bluegrass and creeping bentgrass during drought conditions and when the plants are deficient in nitrogen. It is likely that this stress-induced disease may only be a minor pest problem on golf courses, especially if annual bluegrass encroachment is discouraged and stress levels reduced through proper management (i.e. fertilization, irrigation, and the use of compaction resistant/well drained soils on greens/tees).

This disease is most likely to occur during warm summer months of mid-June through August. Scouting should be done if this disease becomes a recurring problem. A threshold has not been established for anthracnose. Biofungicide that can be used is (see Table 3 for more details) are *Bacillus licheniformis* strain SB 3086 (EcoGuard

Biofungicide). A mineral oil made from isoparafin (Civitas with Harmonizer) has been shown to reduce anthracnose problems. Fungicides to be used first must be registered for anthracnose control and also have a low or very low risk of surface or groundwater contaminations (Table 7).

Brown Patch (Rhizoctonia solani and zeae)

This disease occurs under conditions of warm (>85 F) and very humid weather as well as in cool wet weather. It is expected that the warm weather Brown patch will occur in July to September during most years and the cool weather version in April/May and September/October. Conditions that can reduce the severity of this disease are to avoid excessive nitrogen fertilization, to water minimally and provide for good air movement and water drainage. All three of these practices can be followed where possible. The fertilization program will provide optimum level of nutrients for plant growth based on soil tests, grass nutritional requirements. Nitrogen fertilization should be suspended prior to favorable Brown Patch conditions. Part of the fertilization program will also contain disease suppressive, highly composted natural organic fertilizers (i.e. Sustain and Ringer) that have been shown to reduce the incidence of Brown patch by 75% (Nelson, 1990), thus reducing the need for fungicides. Irrigation will be provided to supply only the amount needed to replace the amount used by the plant.

The presence of Brown patch will be confirmed by daily scouting during periods of warm to hot weather is highly recommended and treatments made if the threshold is exceeded (one spot/yd. on greens/tees and two spot/yd. on fairways) and 24-48 hr. weather forecast indicates conditions are favorable for disease development.The pesticide selection is based on the risk assessment where only fungicides with a low potential for both surface and ground water contamination will be used (Table 7). The selection procedure will also involve following a program to reduce the chance of developing a strain of fungi resistant to a specific fungicide or class of fungicide. If more than one fungicide is needed to control Brown patch in the same year, then a different type/class of fungicide would be used next. Classes of fungicides would also be rotated. For every other systemic fungicide application a benzimidazole class fungicide would be used, then followed by one of the dicarboximides fungicides or sterol inhibitors. This rotating of classes/types of fungicides will be followed for all diseases.

Pink Snow Mold (Microdochium nivale)

Pink snow mold is a fungal disease that is favored by temperatures in the range of 32 to 40 F and wet conditions with or without snow cover. It is likely to occur on this site from November to April the following year. Avoiding heavy late fall water- soluble nitrogen application can reduce the severity (no late nitrogen applications will be made). However, fungicides are the only control method available at this time although there is some disease suppression with the natural organic fertilizers to be used on this golf course. Scouting is not practical for this disease with snow cover. During other cool-wet periods without snow cover, scouting should be followed before a treatment is made. If the threshold of one spot/sq.yd. on greens/tees and two spots/sq.yd. on fairways is exceeded and short term weather forecasts are calling for cool-wet weather (32-40 F), then a fungicide application will be made. Fungicides to be used first must be registered for pink snowmold control and also have a low or very low risk of surface or groundwater contaminations (Table 7).

Summer Patch (Magneporthe spp)

These diseases will most likely be found on this site from June to August. Over fertilization with nitrogen and extremes in water will increase the likelihood of the disease. The damage to the turfgrass plant occurs in April-May, well in advance of the symptoms. Thus, a preventative fungicide program is necessary on sites that have had a history of Summer Patch (azoxystrobin, fenarimol, myclobutanil or triadimefon) and Take-all patch (azoxystrobin or fenarimol) problems. A fungicide application needs to be made in the spring before June. Fungicides to be used first must be registered for Summer patch control and also have a low or very low risk of surface or groundwater contaminations (Table 7).

Table 3. Bio-fungicides.

Common Name	**Sample Trade Name(s)[1]**	**Formulation[2]**	**Rate Range (per 1,000 sq. ft.)**	**FRAC Code**	**EPA Reg. No.**
Bacillus licheniformis strain SB 3086	EcoGuard Biofungicide	0.14EC	20 fl. oz.	NC	70127-2
Bacillus subtillis, strain GB 03	Companion Liquid Biological Fungicide		4-6 fl. oz.	F6	71065-3
Bacillus subtilis, strain QST 713	Serenade Garden Lawn Disease Control	1.34 F	5.0 fl. oz.	F6	69592-12
	Rhapsody	1.34F	2.0-10.0 fl. oz.	F6	69592-19
Pseudomonas aureofaciens strain TX-1	Spot-Less Biofungicide	1L	0.73-1.47 fl. oz.	–	75801-1
Polyoxin D Zinc salt	Endorse	2.5W	4 oz.	19	66330-41
Mono and di-potassium salts of phosphorus acid	Vital	54.5EC	3.0-6.0 fl. oz.	33	42519-24
	Magellan	52.6L	4.1-8.2 fl. oz.	33	228-387

[1] Trade names shown are examples of products available and are not meant to be an exhaustive list.
[2] EC = emulsifiable concentrate; F = flowable; L = liquid; W = wettable powder. Rossi et al., 2013)

Pythium Blight/Pythium Root Rot (Pythium aphanidermatum and spp.)

Pythium blight is the most rapidly developing and devastating disease to attack golf courses and if it does occur on this golf course it would be in June and August. It is favored by excessive nitrogen fertilization (the fertilization program outlined in a later section avoids over-fertilization) and very wet (90% humidity for 14 hrs.) and hot weather (>85 F and night temperatures not below 70 F). Poorly drained or over-watered areas often show the disease first.

Death of an entire green, tee or fairway can occur in hours once the pathogen becomes active. Thus, quite often a preventative fungicide program is utilized to reduce the risk of catastrophic damage to the golf course. If preventative measures are not taken, then very frequent scouting of the golf course is required to determine if the disease-causing organism is active. Weather has a large effect and it is anticipated that Pythium blight will only occur occasionally on this golf course.

Scouting and weather forecasts will be used to determine an action plan. When temperatures are above 85 F and humidity levels are also high (>90% for at least 14 hrs.), an active scouting plan will be followed. Naturally wet areas of the golf course and any sites with poor air movement will be scouted first to determine if the disease is active. As this course matures, other sites that have shown to be prone to Pythium blight will also be scouted. If the Pythium blight organism is found to be actively growing on these indicator sites and the 24 hr. weather forecast calls for hot (>85 F) and humid weather to continue, then a fungicide application would be recommended at least on the areas showing the first outbreak (indicator sites). No night watering will be used during this time to reduce the amount of free water on the leaf surfaces necessary for disease infection. Disease forecasting equipment can be used to predict the time of application. Fungicides to be used first must be registered for Pythium control and also have a low or very low risk of surface or groundwater contaminations (Table 7).

The cooler weather Pythium root rot occurs at temperatures from 50 to 70 F, under wet conditions. Scouting is difficult for this disease since a plant disease diagnostic laboratory must confirm the presence of this disease. Therefore, if the visual symptoms of this disease are present and laboratory results confirm the active presence of this organism, then a fungicide application to only portions of the site showing symptoms will be made.

WEEDS

It is anticipated that, after the first year of establishment of this golf course, weed problems will tend to be minimal. This is a result of sound golf course cultural/pest control practices that will produce a dense-competitive environment against weed encroachment. Thus, the anticipated weeds on this golf course will be limited to annual bluegrass (potentially on all sites of the golf course), moss on greens and broad leaf weeds (limited mostly to fairways and roughs).

Annual Bluegrass

Annual bluegrass (Poa annua spp. Reptans/annua) is a very common weed that invades golf courses. It is well adapted to short mowing, heavily trafficked sites, soils high in pH and phosphorus, and wet soil/poorly drained conditions. Thus, the management program of this golf course is designed to reduce annual bluegrass competitiveness by: 1) keeping soil pH at 6.5 or below, 2) providing for good drainage, 3) irrigating to a minimum,

4) using compaction resistant soils (like the sand used on greens), 5) following a disease/insect management program to maintain a dense turfgrass stand and 6) following a fertilization program that is optimal for the growth of the turfgrasses used here but not too high in phosphorus, which favors annual bluegrass.

Even with all of these measures, annual bluegrass can still invade this golf course. Thus, it is anticipated that some other control measures will be necessary. There are experimental biological control agents for annual bluegrass that may some day be commercially available. Chemical control is limited and generally involves the use of either plant growth suppressants or a traditional herbicide.

Each spring and late August the amount of annual bluegrass for all greens and fairways will be mapped. When the late August mapping indicates more than 1% of the area contains annual bluegrass plants some form of treatment will be necessary to further reduce its spread. The Type II Plant Growth Regulators's (paclobutrazol and flurprimidol, each has a low or very low risk of surface or groundwater contaminations ,Table 7).) have been shown to be the most effective in reducing annual bluegrass populations over a period of time. Higher cut creeping bentgrass turf on fairways tends to be a more conducive environment for reducing annual bluegrass compared to putting greens and tees with more chronic and focused surface disruption.

The most effective programs include multiple applications throughout the season that provide a cumulative reduction. Type II Plant Growth Regulators's programs have been shown to reduce fairway populations as much as 70 percent in two years. This type of success is usually achieved when a comprehensive cultural management program of reduced fertility and irrigation plus overseeding programs to favor the more hardy and desirable creeping bentgrass turf are used.

Broadleaf Weeds

Broad leaf weeds (BLW) commonly occur on established golf course fairways and roughs and thus are considered a major pest problem on these sites. Clover is a commonly occurring BLW that is favored by soil pH around 7 and by dry soils. Thus, on this golf course it would be anticipated that clover would be found on the unirrigated areas (roughs) and maybe on fairways. One of the best ways to reduce broadleaf weed problems on golf courses is to produce a dense-competitive turfgrass stand by following the overall turfgrass management program to be used on this golf course: proper fertilization/irrigation practices and reducing pest damage that opens the turf to invasion by weeds. However, broad leaf weeds may likely still invade this golf course. Weed population and locations will be scouted and mapped at least twice a year (early June and mid-September). Since broadleaf weeds may be confined to a small area, pesticide applications will only be made on areas with weeds present in excess of the threshold; two weed plants per sq.yd. on fairways and five per sq.yd. on roughs, thus reducing the amount of pesticide applied and limiting the treated area. Herbicides to be used first must be registered for broadleaf weed control and also have a low or very low risk of surface or groundwater contaminations (Table 7).

Crabgrass

Crabgrass is an annual grassy weed that invades thin turf. Thus, all the cultural practices to be used on Brynwood golf course will encourage a dense stand of turf and reduce the incidence of crabgrass. Practices such as the fertilizing, irrigation and disease/insect control programs to be used on this golf course will produce a dense turf that restricts light from reaching the soil surface. Crabgrass seeds require light for germination or open soil patches at least 2 inches in diameter. These management practices help significantly; however, when a golfer takes a divot the soil is exposed to light and crabgrass seeds can germinate and invade the turf. Some fine fescue varieties have been shown to resist a crabgrass invasion and will be used in roughs to reduce crabgrass.

There are two herbicidal control programs, preemergence and postemergence. These terms refer to herbicide applications made before or after the crabgrass seeds germinate, respectively. The preemergent herbicides must be applied in advance of the period of germination of crabgrass, usually starting in April. A problem with this approach is that you are not sure whether crabgrass will be present or not. If it is not present, then the application has been wasted.

Postemergent herbicides are few and require careful timing for good control. Mapping the amount and location of young crabgrass plants in early summer will be used to determine if small areas will need treatment. All of the management practices listed in this report (fertilization, irrigation, pest control, mowing, etc.) are designed to product a dense turf that reduces the chances of crabgrass invasion. The fairways and roughs will be scouted at weekly intervals starting in early May and continue until mid-August. Sections of fairways with one or more crabgrass plants per sq. yd. and more the 3 for roughs will be considered for a herbicide treatment. Herbicides to be used first must be registered for crabgrass control and also have a low or very low risk of surface or groundwater contaminations (Table 7).

Moss

Bryum argenteum, silvery thread moss, is a significant pest problem on golf courses throughout the US. Superintendent surveys conducted by Cornell University researchers indicate that close mowing and surface organic matter accumulation are highly correlated with increased moss invasion. This is partially done to close mowing of older greens with less dense grasses than the latest bentgrass cultivars. Controlling moss is favored by acid soil/water conditions. The sand used on greens will be of an acidic nature (if available) and irrigation water pH will be carefully monitored. Copper hydroxide and a dish detergent (Ultra Dawn), applied at two-week intervals in both spring and fall, have shown to reduce moss levels to an acceptable level. Copper has an intermediate risk on greens and tees, thus if copper is to be used it must be applied very carefully to only a small areas at a time when the weather forecast does not predict heavy rainfall with in 48 hours of the anticipated application (to reduce risk to aquatic wildlife). Recently, carfentrazone (a low risk herbicide) has been labeled for selective moss control in bentgrass golf course putting greens. Carfentrazone is a contact herbicide with little or no residual activity that provides selective postemergence control of broadleaf weeds and silvery thread moss (*Bryum argenteum*) in turfgrass.

Renovation

It may be necessary at times to renovate small section of the golf course. Renovation often includes using a non-selective herbicide to remove the existing weed and turf vegetation. The non-selective herbicides glufosinate or glyphosate will be used or the purpose since they had a low risk to both humans and aquatic wildlife on this site.

INSECT PESTS

Insect problems anticipated on this golf course are restricted to just a few insects mostly Hyperodes on greens, tees and fairways, white grubs in tees and fairways and cutworms on greens. There are grasses that contain endophytic fungi that are resistant to certain surface feeding insects like cutworm, sod webworm and chinchbug. The grasses that will be used in the roughs are endophytic, thus are resistant to the surface feeding insects. Creeping bentgrasses (used on greens/tees and fairways) at this time do not contain endophytes and therefore are not resistant to surface feeding insects. Currently there are no turfgrasses resistant to root feeding insects like grubs.

Biological control options are available for most of the insect pests anticipated on this golf course and will be the first line of control. Only after biological control options have been shown to be ineffective will a synthetic insecticide be used.

One of the best practices to follow in an insect control program is to have a systematic sampling/monitoring scheme. It has been found that insect pests of turf like cutworms and white grubs do not uniformly cover the entire golf course. In fact it has been shown that grubs are confined to certain parts of the golf course and even small sections of fairways or roughs. Therefore, it is highly recommended that prior to any insecticide application a sampling protocol be followed and treatment be confined to only the areas where the insects are found.

Hyperodes

The annual bluegrass weevil (ABW) is a burgeoning pest of turfgrass in the northeastern United States. This native beetle is most prevalent and injurious in low-cut, high maintenance turf such as golf course greens, tees and fairways. The insect was first reported damaging turfgrass in Connecticut as early as 1931. Until the last 20 years or so, damage had been concentrated in the metropolitan New York area. ABW larvae and adults feed primarily on annual bluegrass (Poa annua L.), a major component of many golf course playing surfaces. Annual bluegrass is often considered a weed by golf course superintendents since it is an aggressive invader of newly seeded stands of creeping bentgrass. When annual bluegrass becomes the dominant grass species in fairways and putting greens, however, superintendents resort to managing it, rather than eliminating it. ABW has also been reported to feed on creeping bentgrass and perennial ryegrass. In areas where annual bluegrass is prevalent, high populations of weevils will cause substantial areas of dead turf that affect both the visual and functional quality of golf course turf.

ABW can be challenging to monitor due to its small size. In the spring, mower baskets can be monitored for adults because they are picked up along with clippings. This can be a useful way to stay abreast of when adults are appearing in spring, and, with more careful monitoring, on which areas of the course they are most prevalent. Some areas of the course may always harbor ABW so it is a good idea to monitor consistently those historically affected areas from year to year. Adult ABW reinvade short-mown turf soon after snow melt and soil thaw, from late March to April.

A more site-specific approach to monitor adults is to pour a soapy disclosing solution on the turf. The standard method is to mix 1 fluid ounce lemon-scented dish detergent in 2 gallons water and apply it over to 2-3 square feet of turf. The soap acts as an irritant, forcing adults to emerge from the thatch and ascend to the surface where they can be counted. Shallow soil core sampling or simply digging around at the soil surface/thatch interface will reveal older larvae and pupae. Older larvae look like grains of rice with brown heads; pupae resemble adults but are creamy white until their color darkens before adult emergence. If more detailed information is desired, larvae of all sizes (even stem boring stages) will float to the surface when an infested core is submerged and agitated in a saturated salt solution. This is a good way to confirm that your adult controls were adequate; if too many larvae are found, the application may have been poorly timed to suppress adults and another application against adults of the developing population may be necessary.

Damage thresholds are 30-80 larvae/sq. ft. for the spring generation. Given summer heat stress, thresholds drop to 10-40 larvae/sq. ft. for the summer generation. Nevertheless, field experience indicates that action may have to be taken at thresholds as low as 5-10 larvae/sq. ft. in order to avoid injury and minimize the threat of the subsequent generation.

Traditionally, golf course superintendents have targeted early spring adult populations that represent overwintering insects returning to the short mowed turf. A preventive insecticide application is then made to suppress adult populations before the insects begin to lay eggs. The timing of spring applications can be based on a plant phenological indicator. The most widely used is the period that occurs between Forsythia V. full bloom, and dogwood (Cornus florida L.) , full bract. It is better to make the spring application a little late than a little early so aim for the time when Forsythia is in full bloom and has already acquired many new leaves (i.e. “half gold/half green”). Insecticides to be used first must be registered for ABW control and also have a low or very low risk of surface or groundwater contaminations (Table 7).

Cutworms

Black cutworms are anticipated to be an infrequent insect problem on this golf course. This insect does not usually overwinter in New York. Adults each spring fly in from the southeastern U.S., usually arriving in late spring-early summer (May-June). The adults lay eggs that hatch in two to three weeks as small larvae, the destructive phase of this insect. A second generation can hatch later in the summer. Cutworm larvae spend three days in the soil, often in old aerifier holes. At dusk they emerge and feed on the foliage of the grass and the damage is confined to a small zone surrounding their daytime home.

It is unlikely that the entire golf course at any one time will contain cutworms in excess of the action threshold. Action thresholds will be discussed in a later section. Therefore, monitoring and sampling of the population is necessary to substantially reduce the amount of the golf course that will need to be treated. Scouting for this insect will involve a two-step process. In May each year, 10 to 20 black light and/or pheromone trays will be placed out on the golf course to attract/collect adult cutworms as they arrive at this golf course. Every other day the number of adult black cutworm adults in each trap will be counted. Two weeks after the adults begin showing up in the traps, the second phase of scouting will commence. This involves placing an irritant solution (soap or pyrethrum) on sections of each green, tee and fairway at bi-weekly intervals through June, July and August. If the number of cutworm larvae exceed one/sq.yd. on greens/tees and five/sq.yd. on fairways, then a control regime will be followed. The smaller the larvae the easier they are to control, so the initial scouting is very important. Also, biocontrols are most effective on small larvae. Another cultural control method is to place greens clippings no closer than 100 feet of any green since mowing collects eggs. Several nights mowing (before 3 am) during the first appearance of cutworm has been shown to reduce the amount of cutworm on greens.

The control for cutworms will first rely on a biocontrol method and if this does not give acceptable control (threshold still above limit after one week), then an insecticide will be used. The bacteria biocontrol available is <u>Bacillus</u> <u>thurgingiensis var. kurstaki</u> (BT). It takes 2 to 7 seven days to kill the cutworm larvae; thus, one week after the application the areas will be sampled with the irritant solution to determine the effectiveness of the biocontrol. Another biological control option is an entomopathogenic nematodes which have been shown to have a good chance of success in managing cutworms. Use the nematode species *Steinernema carpocapsae*. If populations of cutworm larvae are still in excess of the threshold, a second application of the two bio-control materials will be made and effectiveness determined one week later. If after two applications of the biocontrol materials the population of cutworm larvae is still above the threshold limit, then a traditional insecticide (registered for cutworm control and also have a low or very low risk of surface or groundwater contaminations, Table 7) will be applied. As with the biocontrols, the effectiveness of the traditional insecticides will be evaluated one week after application before any additional treatment will be made.

<u>White Grubs</u>

There are several species of insects that have a destructive larval stage known as white grubs. These include Japanese beetle, Oriental Beetle, Asiatic Garden Beetle and European Chafer. The most destructive stages of these insects are their grub or larval stage in which the third and largest instar occurs later in the fall.

The population of grubs will be determined as follows before any insecticidal treatment will be made. Each golf hole will be mapped once in late July or early August each year for the extent, location and species of grub using the maps found in the appendix. Sampling consists of a crew of individuals with cup cutters. On fairways and roughs, taking a sample at 20 yd. spacing will follow a grid sampling technique. Greens and tees will be sampled at 20 ft. intervals. The sample involves extracting the turf and top 2-3" of soil and observing the number and species of grubs in each sample. When the threshold is exceeded, then a treatment will be made. Thresholds are: 18 to 36 May beetle grubs/ sq. yd., 21 to 72 European chafer grubs/sq. yd., 96 to 180 Asiatic garden and masked chafer grubs/sq. yd. and 54 to 180 Oriental and Japanese beetle grubs/sq. yd. Treatments are most effective in early August when the grubs are very small. Spot treatments will be made.

The bacteria biocontrol available is Bacillus thurgingiensis var. kurstaki (BT) will be used first to control white grubs when found on sites exceeding the threshold. The effectiveness will be determined by repeated sampling the treated sites one week after application. An application will only be made if the grubs are near the soil surface and the soils are moist. If the biocontrol applications has failed to lower the white grub population below the threshold level, then an insecticide (registered for white grub control and also have a low or very low risk of surface or groundwater contaminations, Table 7) will be applied to the sites still having populations above the threshold level.

As with the biocontrol nematodes, one week after the traditional insecticide application the grub population will again be sampled on the treated sites and only if threshold levels are still exceeded would an additional insecticide application be made.

Other Insect Pests

There is some likelihood that other insects will attack the grasses found on this golf course. These could include Hyperodes weevil, sod webworm and Ataenius beetle grub. There are biocontrol products (BT bacteria) available for sod webworm and Ataenius control and will be used as the first line of defense. If control is unsuccessful and these insects are still causing damage, then an insecticide will be used.

Pest Scouting, Monitoring and Action Thresholds

Scouting is one of the most common disease management practices followed by golf course superintendents. The extent and form of the scouting program varies widely between superintendents. Many superintendents rely on indicator sites or "hot spots" as areas where diseases (or other pests) first occur and use these sites as early warning signs. Many golf courses are now having pest populations mapped during a scouting visit. In this way a more permanent record of pest pressure is recorded and the effectiveness of control options evaluated. The Brynwood Golf Course will follow an aggressive scouting program as outlined in the discussion section for each pest. The scouting forms found at the end of this section will be used by this golf course to monitor pest populations.

Monitoring for pests involves determining the location and number of pests or area affected by pests. Thresholds for pest occurrence have been developed for many golf course pests and will be used to determine if a pesticides application is warranted. Table 4 contains action threshold values for most of the pests that are anticipated to occur on this golf course.

Table 4. Pest action thresholds for the Brynwood Golf Course.

Pest	Greens/tees	Fairways	Roughs
	-------------------------	#/sq.yd	-------------------------
Diseases			
Dollar spot	5*	10	-
Brown Patch	1	2	-
Pink Snow mold	1	2	-
Anthracnose	------- not determine -------		
Summer patch	UD**	UD	-
Insects			
May beetle grubs	27-36	27-36	27-36
European chafer grubs	21-72	21-72	21-72
Asiatic garden & Mask chafer grubs	96-180	96-180	96-180
Oriental & Japanese beetle grubs	54-180	54-180	54-180
cutworm	1	5	-
Ataenius	270-450	270-450	180
Hyperodes	36	54	72
Weeds			
broadleaf's	1	2	5
crabgrass	1	1	3
ann. bluegrass	1	9	-

* #/sq.yd. depending on pest. For diseases of Dollar spot and Brown Patch these are the numbers of spots/patches per sq.yd. For insects and weeds it is the number of each organism per sq. yd. ****** UD=upon detection, in conjunction with weather conditions.

If environmental conditions favor continued pest pressure, the action threshold has been exceeded and other non-pesticidal options have been tried, then a pesticide will be applied. The threshold values may be changed as pest history on this golf course warrants modification (i.e. too much or too little pest damage at a given threshold).

Application Procedures

To protect the adjoining properties from drift of the pesticide spray, all areas to be treated with pesticides, a shrouded sprayer will be used whenever possible to apply pesticides. The shrouded sprayer applies the pesticide spray directly on the turf reducing drift to near zero at wind speeds less than 15 mph. Granular application will also be used to reduce the potential for any off-site movement of pesticides and fertilizers via spray drift. No applications of pesticides or fertilizer will be made within 48 hours of a predicted heavy rainfall event (except for imminent threat of rapidly developing diseases like Pythium blight and Brown Patch). Only after all other pest management options have been tried will pesticides be applied to areas that exceed thresholds and that the climatic conditions indicated above still favor pest damage so as to minimize the amount of pesticides to be used. Spot treatments will be the rule not the exception.

Anticipated Frequency

Pesticides: It is nearly impossible to develop a pesticide application schedule in advance of the building of a golf course if the principles of IPM are to be followed. The major premise of an IPM program is to use all options in controlling a pest and when it is necessary to apply a pesticide it must be applied at the proper time for optimal control. Only a preventative program could be developed in advance of operating a golf course. Preventative programs are only necessary for a few turfgrass diseases. It would be very likely that an all preventative program would lead to applying fungicides when it was not necessary, increasing the risk of environmental damage and greater likelihood of developing fungi resistant to fungicides.

e. Evaluation of turf management and pest treatment effectiveness to document program successes and determine if changes are necessary.

The as built golf plans will be used to develop a hole by hole GPS map of the golf course to be used to record the location of all pests during scouting and monitoring. As part of a permanent record, the golf course will maintain the pest occurrence maps to be used to develop the site-specific pest knowledge base. This will also be used to evaluate the effectiveness of the current IPM plan and used to modify the plan if necessary.

III. Fertilizer and Pesticide Use and Pesticide Selection based on Risk Assessment

The Brynwood Golf Course will apply fertilizers and pesticides in a very careful manner. The following outlines the practices to be followed:

3.1 Will use only products registered for use in the United States and New York for only their specified and approved function.

3.2 Will store all fertilizer and pesticides in an area conforming to all state and local regulations that include but are not necessarily limited to:

a) a locked area clearly marked to indicate chemical storage;
b) an operating ventilation fan discharging exhaust to the outside clear of windows of other buildings or public areas;

c) a solid floor impermeable to liquid and surrounded by curbing to contain any spilled or leaked material.

3.3 All mixing and loading of pesticides will be performed in accordance with all state regulations.

3.4 Will dispose of all pesticide containers and pesticide wastes in accordance with provincial regulations.

3.5 All handling and spraying of pesticides to be performed under the strict supervision of trained and licensed pesticide applicators. The golf course superintendent will insure compliance.

3.6 Pesticides will be applied only when wind conditions ensure a minimum of drift and when there are as few golfers and general public present as possible.

3.7 Protect water quality by maintaining a buffer zone between all water bodies and areas of fertilizer and pesticide application. When pesticides are applied near water, use low-pressure spray nozzles will be used to further reduce chance of drift.

3.8 The golf course will communicate with members of the golfing and non-golfing community the nature of the application. This will be done with posting signs at the clubhouse and the entrance to the golf course indicating the date of the application, the product to be used and a contact person and phone number. This will be done for application that are schedule in advance. For emergency application, the areas treated will be flagged. Posting at the clubhouse will also be done for the fertilizer application outlined in Tables 4 and 5.

3.9 Apply only the amount necessary to control the target pest and only apply when pest population warrants treatment, as determined by pest monitoring, and only apply to affected areas. The details are contained in the IPM section above.

3.10 Apply fertilizer only in quantities and types that can be utilized by the plant to minimize leaching and runoff potential. Fertilizer laws for NYS and Westchester County will be followed.

Unlike for pesticide programs, it is possible to develop in advance a comprehensive nitrogen fertilization schedule. For other nutrients like phosphorus, potassium, calcium and magnesium, soil test result information will be used to develop the fertilization program. Factors important in the development of such a program include the site specific soil properties, clipping management, nutrient requirements of grass species/cultivar, irrigation plan, desired level of quality, interaction with pest populations and environmental considerations.

Conditions set for in the NYS and Westchester County Fertilizer Restriction Law are as follows:

1. Prohibits the use of phosphorus-containing lawn (any turf) fertilizer unless:

    (a) establishing a new lawn during the first growing season or

    (b) a soil test shows that the lawn does not have enough phosphorus.

2. Prohibit the application of lawn fertilizer on impervious surfaces (sidewalk, drive way or road) and require pick up of fertilizer applied or spilled onto impervious surfaces.
3. Prohibit the application of lawn fertilizers within 20 feet of any surface water except:

    (a) where there is a continuous vegetative buffer of at least 10 feet; or

    (b) where the fertilizer is applied by a device with a spreader guard, deflector shield or drop spreader at least three feet from surface water

4. Prohibit the application of lawn fertilizer between December 1st and April 1st

5. Prohibit the application of lawn fertilizers within 20 feet of any surface water[1] except:

    (a) where there is a continuous vegetative buffer of at least 10 feet; or

    (b) where the fertilizer is applied by a device with a spreader guard, deflector shield or drop spreader at least three feet from surface water

    this does not apply to sites being established

    this is for all fertilizers not just ones that contain phosphorus

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[1] This applies to all fertilizers and not just those containing phosphorus, but does not apply to turf establishment.

To comply with the Westchester County and New York State laws, soil samples will be taken as necessary and tested for plant available nutrients. Such soil test results will be used to determine the amounts of nutrients like phosphorus, calcium, magnesium and potassium that are needed on this site. Soil samples will be sent to Agro-One (see website for details on sampling and sample submission), Ithaca, New York or of an authority of similar expertise which uses recommendations developed at Cornell University or of an authority of similar expertise.

Clippings will be removed from the greens and tees, while clipping will be returned in the fairways and roughs. Clipping management was used in developing the nitrogen application rates shown below. The basic fertilization program is shown in Tables 5 and 6.

Determining Fertilization Applications: Soil testing and visual inspections will be used to determine the need for a fertilization application. Soils testing is used to determine the amount of available nutrients currently found in the soil and the amount of nutrients needed to be applied to provide for healthy plant growth. Soil testing will be used to determine the basic quarterly application rates for phosphorus, potassium, calcium and magnesium. Soil samples will be collected in December on all greens, tees and fairways/approaches until it has been determined that certain sections are similar and fewer samples will be necessary. Soil pH modification will be done to maintain a pH in the range of 5.5 to 6.0, based on the soil testing results. Limestone will be used to raise pH if soil test results indicate the needed and the amount will be based on the soil test recommendation. Limestone applied to turf has been shown to only change pH in the surface few inches of the soil.

Table 5. Recommended fertilization program for the greens/tees at the Brynwood Golf Course.

April	May	June	July	Aug.	Sept.	Oct.-Nov	Total/ Yr.
First year							
-- lbs/1000 sq.ft.--							
Fert*	Fert	----Disease suppressive fert-----			Fert	Fert	
0.5	0.25	0.5	0.5	0.5	0.5	1.0	3.75 N
	------------------------ If Fertigation is used ----------------------						
	0.25	0.5	0.5	0.5	0.5		2.25 N
						Total N	**6.0 (8.0^)**
Future years							
Fert*	Fert	------Disease suppressive fert-----			Fert	Fert	
0.5		0.4	0.4	0.4		0.5	2.2 N
	-------------------- If Fertigation is used ---------------------						
	0.25	0.25	0.25	0.25	0.25		1.25

Total N 3.45

***** Fert= soluble and other slow release nitrogen sources urea, ammonium sulfate, IBDU, methylene urea (Nutralene, Scotts), coated urea (sulfur, resin or polymer coated) and natural organic (Milorganite, Nature Safe, etc). ^ At establishment 2 lbs of N/1,000 sq-ft will be applied as a starter fertilizer. Maximum soluble nitrogen rate for urea and ammonium sulfate is 0.4 lbs N/1000 sq.ft per application to reduce nitrate leaching (Petrovic and Barlow, 2012)

Table 6. Recommended fertilization program for fairways and roughs for the Brynwood Golf Course.

Apr.	May	June	July		Aug.	Sept.	Oct./Nov.	Yearly Total
			lbs of Nitrogen/1000 sq.ft.					
			Fairways, during establishment					
0.75	0.75	0.75	0.75	0.75	1.0		0.75	5.5 Nitrogen
			Fairways, following establishment					
	0.5	0.5	0.5		0.5		0.5	2.5 Nitrogen
			Roughs, during establishment					
0.5	0.5	0.5		0.5	0.5			2.5 Nitrogen
			Roughs, following establishment*					
	0.5				0.5			1.0 Nitrogen

* Roughs will only be fertilized when density drops by 25 %.

The nitrogen application for roughs following establishment consists of clippings being returned to roughs during mowing and from fairways. Sources to be used include any of the following: urea, ammonium sulfate and slow release materials: IBDU, methylene urea (Nutralene, Scotts), natural organic (Sustane, Ringers, Milorganite, Nature Safe) and coated urea's (sulfur, resin and polymer). Fertigation is expected to be about half of the nitrogen applied to fairways. Maximum soluble nitrogen rate for urea and ammonium sulfate is 0.7 lbs N/1000 sq.ft per application to reduce nitrate leaching (Petrovic and Barlow, 2012).
In no case will the phosphorus application, associated with the use of natural organic fertilizers, exceed the soil testing recommendation level. Tissue testing will be used on fairways to adjust applications.

Fertigation Program: Apply a small amount of water soluble fertilizer via the irrigation system will be practiced as irrigation water needs to be applied. The irrigation season usually runs from May through October. Tissue testing will be used to determine application amount so as to maintain 3-6 % N in the clippings) in mid-April and ending in late September. Backflow prevention will be used on the irrigation system if fertigation injectors are to be used.

The amounts of nitrogen fertilizer to be applied will likely be reduced by 50 % within the first 10 to 25 years due to the fact that a lesser amount of the fertilizer nitrogen will be retained by soil as soil organic matter. Tissue testing may be used to help judge the need for fertilization and will be used to reduce the amounts of nitrogen fertilizer applied over time.

This overall fertigation program incorporates a balanced approach to fertilization. The amount of each nutrient applied will provide for adequate plant growth, will not over or under stimulate growth at the expense of disease resistance or weed encroachment, will act in a disease suppressive manner by the use of natural organic fertilizer (Sustane or Ringer) and will not lead to either a significant amount of runoff or leaching because there will not be a large pool of water soluble nutrients available at one time. This program will avoid several of the major factors that encourage nitrate leaching. There is no late fall fertilization, use of low rates of highly water soluble sources, careful irrigation and low total amounts of nitrogen applied (Petrovic and Barlow, 2012; Petrovic, 1990; Morton et al., 1988) and the rates of application are low, thus resulting in little soluble nitrogen available for off site transport. Small amounts of soluble nitrogen fertilizer (0.10 lbs. nitrogen/1000 sq.ft.) may be applied if the turf is off color between scheduled applications. No fertilizers will be applied in advance of inclement weather predictions (48 hr) to further reduce the likelihood of leaching or runoff.

The fertilizer nutrients of concern from an environmental perspective are nitrogen (as nitrate) and phosphorus (phosphates). Nitrate can cause a reduction in the quality of water in a drinking water source or cause eutrophication of streams, ponds or lakes. Phosphorus is needed in small amounts by turfgrass and is mostly of concern for surface water eutrophication. This fertilization program addresses the need to protect water quality from fertilizers contaminating surface and ground water.

Phosphorus can be a problem in runoff, but in well managed turfgrass situations as described here, phosphorus runoff from turf seldom occurs due to the high amount of water infiltration into the soil and proper management (Easton and Petrovic, 2008; Soldat and Petrovic, 2008). Phosphorus runoff has been a problem in traditional agricultural production when erosion has occurred or the application of phosphorus was in excess of the amount need for plant growth (based on soil tests). Upon established turf erosion is eliminated. On the Brynwood Golf Course, phosphorus (potassium, pH modification and other nutrients other than nitrogen) applications will be based on soil test results to insure that the proper amounts be applied to provide for acceptable plant health and avoiding excesses that can lead to contamination of surface water. Soil testing will be done just prior to establishment to determine the amount of phosphorus to apply at seeding/sodding and once per year thereafter for maintenance applications. All greens, tees, fairways and roughs will be sampled. The natural organic fertilizers that will be used for much of the fertilization program and will supply most of the phosphorus needs. Soil testing done just prior to seeding will give actual amounts needed on each green, tee, fairway and rough.

3.11 The environmental risk assessment is composed of two parts. First, the surface and ground water contamination (runoff and leaching) potential of all pesticides registered for use on golf courses in New York for the soils of this site was evaluated. Second, the pesticides identified to have a high potential risk to humans or aquatic wildlife will not be used on this golf course. Pesticide that had an intermediate risk to humans or aquatic wildlife may be used only if there no other control options available and only on very limited bases applied under a very strict set of conditions. Pesticides with a low potential for both humans and aquatic wildlife will be used only after all other pest control measures have failed. Pesticides that are safest to humans and wildlife will be used first.

The following is a list of pesticides registered for use in New York and were evaluated for risk to surface and ground water contamination by WINPST.

Fungicides and fungicide combinations:azoxystrobin (USEPA reduced risk pesticide, RR), azoxystrobin + propiconazole, azoxystrobin + difenoconizole, boscalid (RR), chloroneb chlorothalonil, chlorothalonil + propiconazole, chlorothalonil + thiophanate-methyl, chlorothalonil +ASM, copper hydroxide + mancozeb, cyazofamid, etridiazole, fenarimol, fludioxonil, fludioxonil + chlorothalonil + propiconazole, fluopicolide + propamocarb hydrochloride, flutolanil, fosetyl-al, iprodione, mancozeb, metalaxyl (mefenoxam), metconazole, mineral oil, myclobutanil, polyoxin D zinc salt, propamocarb, propiconazole, pyraclostrobin, pyraclostrobin + boscalid, tebuconazole, thiophanate-methyl, thiophanate-methyl + iprodione, triadimefon, trifloxystrobin, trifloxystrobin + triadimefon, vinclozalin.

Biofungicides: *Bacillus licheniformis* strain SB 3086, *Bacillus subtillis*, strain GB 03, *Bacillus subtilis*, strain QST 713, *Pseudomonas aureofaciens* strain TX-1, Polyoxin D Zinc salt, Mono and di-potassium salts of phosphorus acid.

Insecticides: Abamectin, acephate, azadirachtin, *Bacillus thuringiensis*, subsp. *Kurstaki*, *Beauveria bassiana*, bifenthrin, boric acid, carbaryl , chlorantraniliprole, chlorpyrifos, cyfluthrin, lambda-cyhalothrin, deltamethrin, bifenthrin + carbaryl, bifenthrin + imidacloprid, cyfluthrin + imidacloprid, hydramethylnon, imidacloprid, indoxacarb, *Paenibacillus popilliae*, permethrin, spinosad, trichlorfon.

Plant Growth Regulators: Paclobutrizol, ethephon, mefluidide, trinexapac-ethyl, trinexapac-ethyl plus paclobutrazol.

Herbicides: 2,4-D, 2,4-DP + MCPP + dicamba, 2,4-D + 2,4-DP + dicamba, 2,4-D + clopyralid + dicamba, 2,4-D + triclopyr + fluroxypyr, 2,4-D +dicamba + fluroxypyr, 2,4-D + 2,4-DP + fluroxypyr, 2,4-D + sulfentrazone + dicamba +MCPP, 2,4-D + dicamba + penoxsulam, acetic acid, benefin, benefin + trifluralin, benefin + oryzalin, bensulide, bentazon, bispyribac sodium, bromoxynil, carfentrazone-ethyl, carfentrazone +2,4-D + MCPP +dicamba, carfentrazone + MCPA + MCPP + dicamba, clopyralid, clopyralid +

2,4-D +triclopyr, dithiopyr, ethofumesate, fenoxaprop, fluroxypyr + triclopyr, fluazifop-p-butyl, glufosinate, glyphosate, halosulfuron, indaziflam + diquat + glyphosate, iron HEDTA, MCPA + clopyralid + dicamba, MCPA + triclopyr + dicamba, metsulfuron-methyl, mesotrione, oxadiazon, pelargonic acid, pendimethalin, penoxsulam, penoxsulam + dicamba, primisulfuron-methyl, prodiamine, quinclorac-carfentrazone, siduron, triclopyr, triclopyr + 2,4-D, triclopyr + clopyralid, trifluralin.

The assessment of the potential risk to humans (as a drinking water source) and aquatic wildlife (fish) of each registered pesticide on each soil (see appendix) found on the site was performed by using the Windows Pesticide Screening Tool (WIN PST). WIN PST is a computerized information delivery system developed by the US Department of Agriculture and the National Resource Conservation Service based on the GLEAMS model (Leonard et al. 1987). Refer to the appendix for an explanation of WIN PST and other information related to the pesticides that were evaluated.

A summary of the pesticide fate as determined by the WIN PST analysis for the soils on greens, tees, fairways and roughs is contained in the appendix of this report.

The greens and tees will be built as a sand-based system to provide a compaction resistant/well drained system and create a healthy pest- resistant playing surface. Based on the WIN PST analysis, greens/tees will be built with about 1 % organic matter, by weight. In the appendix the greens/tees soil will be referred to as Windsor soil having the above characteristics. Greens/tees will also have a sub-drainage system in which the drainage water will be diverted to water quality swales and not directly discharged into surface water. Soils on fairways and roughs (Woodbridge, Paxton, Ridgebury, Charlton and Chatfield which are also equivalent to Leichester, Riverhead and Sutton loams) are the existing soils referred to in the appendix of WIN PST results.

The results of the environmental risk assessment of the pesticides by WIN PST screened on the soils of this site, as seen in Table 7. Pesticides with either a high risk to humans or wildlife will not be used on this golf course and pesticides with an intermediate risk to either humans or wildlife will be only used to spot treat areas only if all other control measures fail.

Table 7. The potential risk to humans and aquatic wildlife (fish) in surface water (S. water) and groundwater (G. water) from pesticides considered for use on Brynwood Golf Course (and for lawns) site, based on WINPST analysis.

	Humans				Aquatic wildlife			
	Greens, tees		Fairways and roughs*		Greens, tees		Fairways, roughs *	
Pesticides	**G. water**	**S. water**	**G. water**	**S. water**	**G. water**	**S. water**	**G. water**	**S. water**
2,4-D	low	low	low	low	very low	v. low	v. low	v. low
AMS	v. low	v. low	v. low	v. low	v. low	v. low	v. low	v. low
Abamectin	low	**interm**	low	**interm.**	**Interm.**	**high**	**Interm.**	**High**
Acephate	low	**interm.**	v. low	v. low	low	**interm**	v. low	v. low
Acetic acid	v. low	v. low	v. low	v. low	v. low	v. low	v. low	v. low
Azadirachtin	v. low	v. low	v. low	v. low	**Interm.**	Low	**Interm.**	low
azoxystrobin	v. low	v. low	v. low	low	v. low	v. low	v. low	low
Bacillus licheni-formis SB3086	v. low	v. low	v. low	v. low	v. low	v. low	v. low	v. low
Bacillus subtilis GB03	v. low	v. low	v. low	v. low	v. low	v. low	v. low	v. low
B. subtilis QST 713	v. low	v. low	v. low	v. low	v. low	v. low	v. low	v. low
B. thuringiensis – kurstaki								

	v. low	v. low	v. low	v. low	v. low	v. low	v. low	v. low
benefin	low	low	v. low	**interm.**	low	low	v. low	**interm.**
Bensulide	low	low	v. low	**interm.**	low	low	v. low	**interm.**
bifenthrin	v. low	low	**interm.**	**high**	v. low	low	**interm.**	**High**
Bispyribac-sodium	v. low	v. low	v. low	v. low	v. low	v. low	v. low	v. low
Boric acid	v. low	v. low	v. low	v. low	v. low	v. low	v. low	v. low
Bosocalid	v. low	v. low	v. low	v. low	low	low	v. low	low
Bromoxynil	v. low	low	v. low	low	v. low	low	v. low	low
carbaryl	v. low	low	v. low	low	v. low	low	v. low	low
cartfentrazone	v. low	v. low	v. low	v. low	v. low	low	v. low	low
Chloroneb	v. low	low	v. low	v. low	v. low	low	v. low	v. low
chlorothalonil	v. low	low	v.low	low	low	**interm.**	low	**interm.**
Chlorpyrifos	**interm.**	Low	**interm.**	Low	**interm.**	**high**	**interm.**	**high**
Clopyralid	v. low	v. low	v. low	v. low	v. low	v. low	v. low	v. low
Copper hydroxide	v. low	v. low	v. low	v. low	low	**interm.**	low	**high**
Cyazofamid	v. low	v. low	v. low	v. low	v. low	low	v. low	v. low
Cyfluthrin	v. low	v. low	v. low	v. low	**interm.**	**high**	**interm.**	**high**
deltamethrin	v. low	low	v. low	low	**interm.**	**high**	**interm.**	**high**
dicloprop (2,4-DP)	low	low	low	low	v. low	v. low	v. low	v. low
dicamba	v. low	v. low	v. low	v. low	low	low	low	low
Difenoconazole	low	**interm.**	**interm.**	**High**	**interm.**	**high**	**interm.**	**X. high**
Diquat dibromide	v. low	low	v. low	v. low	v. low	low	v. low	v. low
dithiopyr	**interm.**	low	v. low	**Interm.**	**Interm.**	low	v. low	**Interm.**
Ethephon	v. low	low	v. low	v. low	v. low	v. low	v. low	v. low
ethofumesate	v. low	v. low	v. low	low	low	low	v. low	**interm.**
etridiazole	v. low	low	v. low	low	v. low	low	v. low	low
fenarimol	v. low	v. low	v. low	v. low	v. low	low	v. low	low
fenoxaprop-et	v. low	low	v. low	low	v. low	low	v. low	low
Fluazifop-butyl	v. low	low	v. low	low	v. low	low	v. low	low
Fludioxonil	v. low	v. low	v. low	v. low	v. low	low	v. low	**Interm.**
Fluopicolide	v. low	v. low	v. low	v. low	low	low	v. low	low
Fluroxypyr	v. low	v. low	v. low	v. low	v. low	v. low	v. low	v. low
flutolanil	v. low	v. low	v. low	v. low	low	low	v. low	low
fosetyl-al	v. low	v. low	v. low	v. low	v. low	v. low	v. low	v. low
glufosinate	v. low	v. low	v. low	v. low	v. low	v. low	v. low	v. low
glyphosate	v. low	v. low	v. low	low	v. low	v. low	v. low	low
halosulfuron	v. low	v. low	v. low	v. low	v. low	v. low	v. low	v. low
Hydramethylnon	**interm.**	**high**	**interm.**	**high**	low	**interm.**	v. low	**interm.**
imadicloprid	v. low	v. low	v. low	v. low	v. low	v. low	v. low	v. low
Indoxacarb	v. low	v. low	v. low	v. low	low	**interm.**	low	**interm.**
iprodione	low	**interm.**	low	**high**	v. low	low	v. low	low
lambda-cyhalothrin	low	**interm.**	low	**interm.**	**interm.**	**High**	**interm.**	**High**
MCPA	low	low	v. low	low	low	low	v. low	low
MCPP (mecoprop)	**interm.**	**high**	low	**interm.**	v. low	v. low	v. low	v. low
mancozeb	low	**interm.**	**interm.**	**high**	low	**interm.**	low	**high**
metalaxyl	v. low	v. low	v. low	low	v. low	low	low	v. low
Mefluidide	v. low	v. low	v. low	v. low	v. low	v. low	v. low	v. low
Mesotrione	v. low	low	v. low	low	v. low	v. low	v. low	v. low
Metconazole	v. low	v. low	v. low	v. low	low	low	v. low	low
Metsulfuron-methy	v. low	v. low	v. low	v. low	v. low	v. low	v. low	v. low
phosphorous acid	v. low	v. low	v. low	v. low	**interm.**	low	v. low	low
MSMA	low	low	low	low	v. low	v. low	v. low	low
Myclobutanil	v. low	v. low	v. low	v. low	low	low	v. low	low
oxadiazon	**interm.**	low	**interm.**	low	low	**interm.**	l ow	**interm.**
paclobutrazol	v. low	v. low	v. low	v. low	v. low	v. low	v. low	v. low
pendimethalin	v. low	low	v. low	low	low	**interm.**	Low	**interm.**
Penoxsulam	v. low	v. low	v. low	v. low	v. low	v. low	v. low	v. low
Permethrin	v. low	low	v. low	low	**interm.**	**High**	**interm.**	**High**
Primisulfuron-methyl	**interm.**	low	v. low	**Interm.**	v. low	v. low	v. low	v. low
prodiamine	v. low	low	v. low	low	v. low	low	v. low	low
propamocarb	v. low	v. low	v. low	v. low	v. low	v. low	v. low	v. low
propiconazole	**interm.**	**interm.**	Low	**high**	low	low	v. low	low
Pyraclostrobin	v. low	v. low	v. low	v. low	low	**interm.**	Low	**high**
Quinclorac	v. low	v. low	v. low	v. low	v. low	v. low	v. low	v. low
Siduron	v. low	v. low	v. low	v. low	low	low	v. low	**interm.**
spinosyn A & D	v. low	v. low	v. low	v. low	v. low	v. low	v. low	v. low
Sulfentrazone	low	low	v. low	low	v. low	v. low	v. low	v. low
Tebuconazole	low	low	v. low	**interm.**	low	low	v. low	**interm.**

thiophanate-methyl	v. low	low		v. low	low	low	**interm.**	low		**interm**.
triadimefon	low	low		v. low	**interm.**	low	low	v. low		low
triadimenol	low	low		v. low	**interm.**	V. low	v. low	v. low		v. low
trichlorfon	**high**	**interm.**		Low	**interm.**	**interm.**	low	v. low		low
triclopyr	v. low	v. low		v. low	v. low	v. low	v. low	v. low		v. low
trifloxystrobin	v. low	v. low		v. low	v. low	low	**interm.**	Low		**interm.**
trifluralin	v. low	low		v. low	low	**interm.**	**high**	**interm.**		**High**
Trinexapac-ethyl	v. low	v. low		v. low	v. low	v. low	v. low	v. low		v. low
vinclozalin	**interm.**	**interm.**		Low	**interm.**	low	low	v. low		low

* Includes the worst risk assessment ranking from any of the soils found on this site.

4. Wildlife and Wildlife Habitats

4.1 Native vegetation will be used to provide habitat for indigenous species whenever possible.

4.2 On the long term, native groundcover or shrubs that may be removed during any construction or renovation projects involving non-golf areas will be replaced with indigenous plant species.

5. Water Use

5.1 The Brynwood Golf Course will irrigate only the areas requiring water and limit the amount applied to the amount actually required by the plant.

The modern computer-controlled irrigation system used on today's golf courses like the proposed Brynwood Golf Course is very flexible to be able to irrigate to the amount needed for adequate plant growth while not over irrigating. Over-irrigation can make many disease problems more severe, can lead to a significantly greater likelihood for either pesticide or nitrate leaching into groundwater and runoff into surface waters (Petrovic, 1990 and 1994) and can waste upwards of 50 % more water than is actually needed.

This golf course will apply water based on an estimate of the amount of water used by the turfgrass plant. This irrigation system will either have a weather station linked to the controller that estimates plant water use and will irrigate accordingly or use evapotranspiration rate data provided by the North East Climate Center, Ithaca, NY. This proper amount of irrigation will be applied to minimize any environmental impact, reduce the potential for pest problems, reduce the waste of water from excess irrigation and produce a healthy pest-resistant grass. Greens, tees and fairways will be irrigated. Water from the on-site pond may be used for irrigation.

ITPMP Use and Reporting Requirements

The golf course superintendent will have the responsibility of implementing the ITPMP and reporting on all phases of the project, from renovation to yearly maintenance. Implementation will involve developing an operational manual that utilizes the information found in this report. Following renovation of the golf course, the operational ITPMP will be provided to the Town each year showing additions, changes and deletions to the previous years plan in a summary section. By February of each year the applicant will provide the Town with report of the previous years activities that will include the following information:

1. The materials used at establishment (construction of new areas); actual grasses (species and variety) used by location and seeding rate (or sod used) and establishment date, fertilizer materials used (rates and dates of application by location including soil test results), amount of mulch used and location applied, amount of lime if applied to which areas on what date(s). The superintendent will provide the Town this information so as to determine compliance with the ITPMP. After the first year this section will contain information on any over seeding or sodding that was done the previous year.

2. Irrigation Protocol: how amount of irrigation was determined, monthly summary of irrigation amount by location.

3. IPM Program: results from pest scouting showing location and amounts of pests by date, table containing all pest control applications (including cultural, biological and chemical control used) listing date, location, rate of application and material used.

4. Suggested changes to the ITPMP: the applicant may upon review of the history of the site suggest changes to the ITPMP, which may include adoption of new technologies, materials and deletions of materials to be used. Any new pesticide to be considered for use will go through a risk assessment using the currently acceptable method. With in a reasonable time frame of three months, the Town must notify the applicant of their decision on approving modifications to the ITPMP.

Part II. Residential Lawn Management Plan

Introduction: The purpose of this report is to provide an environmentally sound residential lawn management plan (RLMP) that can be followed by the landscape maintenance firms to be hired by the Brynwood Homeowners Association. This RLMP contains a turfgrass management plan with the goal of reducing the need for chemical applications including fertilizers and pesticides.

The philosophy of the RLMP is to reduce the need for pesticides. To do this, first the lawns will be seeded or sodded with pest resistant grasses best adapted to the site conditions. If pests become a problem then non-chemical approaches to pest control, like the use of biological control agents will be initially utilized. If pests persist and the death of large areas of turf is likely, or large sections of low-density weeds are present, then a pesticide application may be considered. This approach would be taken because dead turf or lawns with extensive weedy species have been shown to be much more prone to nitrogen, phosphorus and pesticide leaching and runoff, thus presenting a risk to the water quality. (Easton, Z.M., and A.M. Petrovic. 2004; and Easton, Z.M. and Petrovic, 2008). Accordingly, a healthier growth of turf assists in the prevention of nitrogen, phosphorus and pesticide leaching and runoff.

Grasses to be used: As it is anticipated that good quality lawns will be expected by the residents of the Brynwood Golf & County Club, the site requires grasses with a good quality but which will require little or no inputs of nutrient, water and pest control materials. Therefore, Kentucky bluegrass and perennial ryegrass are recommended to be used. If over seeding is necessary, perennial ryegrass will be used. Perennial ryegrass is recommended because it establishes quickly and has endophytes that provide resistance to surface feeding insects. However, as new seed types and mixtures are continually developed, it is to be understood that substitute seed types or mixtures can be utilized if they have the attributes of rapid establishment and resistance to surface feeding insects. Low maintencnce grasses will be used to the greatest extent possible so that less fertilizer, water and pest control will be needed. On heavily shaded sites, fine fescues may be used as a major part of the mix. On lower visual quality and that has little or no traffic sites, clover can be used to further lower the amount of fertilizer nitrogen that is needed and for a more drought tolerant landscape. All varieties to be used should conform to the recommendations from Cornell University (see website www.hort.cornell.edu/turf) or of an authority of similar expertise (National Turfgrass Evaluation Program).

Establishment Procedures: Whenever possible the grasses should be seeded in early fall for best results. If this is not possible, early spring seeding can be done but there is a risk of unacceptable weed invasion. Sodding with similar grasses can be done at any time the year when sod is available for rapid establishment, but should be used on slope>8% or if the site will be established in the summer, assuming irrigation is avaliable. New York State and Westchester County laws allow for phosphorus containing fertilizers to be applied at establishment, while precluding the use of such fertilizers subsequent to establishment, unless tests indicate inadequate amounts of phosphorus in the soil. The amount of fertilizer needed should be based on soil testing. A soil sample will be collected after the final site preparation has been completed. One sample for each lawn site should be sent to Agro-One (see website for details on sampling and sample submission), Ithaca, New York or of an authority of similar expertise which uses recommendations developed at Cornell University or of an authority of similar expertise. The results will be used to determine the amount of starter fertilizer needed for successful establishment, if soil pH modifying materials are needed and if the soil is suitable as a topsoil. Applying starter fertilizer based on soil testing is a best management practice (BMP) used to reduce phosphorus contamination of surface and ground water. Following the proper establishment techniques such as seeding at the best time, fertilizer and liming at rates based on soil testing will provide the necessary conditions to start a healthy pest-resistant lawn.

Based on the soil testing results, the existing soil may need to be improved to have success in the lawn establishment and requiring less water and fertilizer application. Where possible all onsite soil with be used and if necessary a high quality compost (at least 70 % organic matter on a dry weight basis) will be added (incorporated into the top four to six inches) to the lawns prior to establishment at a rate of about 130 cubic yards per acre to develop a good quality topsoil. To the extent possible at least 6 inches of good quality topsoil described above will be used on all lawn sites.

Fertilization Program :Factors important in the development of an environmentally sound fertilization program include: the use of site specific soil properties based on soil testing, nutrient requirements of grasses, desired level of quality, interaction with pest populations and environmental considerations. A healthy dense turfgrass stand is necessary for a good quality lawn and to have fewer pest problems, meaning a lower need for pesticides. The fertilizer nutrients of concern from an environmental perspective are nitrogen (as nitrate in ground and surface water) and phosphorus (phosphates). Nitrate can cause a reduction in the quality of water in terms of either as a drinking water source (health advisory limit for nitrate is 10 mg/L) or by having an impact on eutrophication of surface waters. Phosphorus on the other hand is mostly a concern of surface water eutrophication.

The goals of this fertilization program are to provide the nutrient requirements of the turfgrass plants that produce a healthy, growing lawn that will resist weed and insect attacks, while not in any way adversely impacting the surface or ground water on or off this site. Westchester County and New York State have laws that regulate the use of fertilizers on lawn. The laws as outline previously in the golf course section will be followed. To comply with the Westchester County and New York State laws, soil samples will be taken as necessary and tested for plant available nutrients. Such soil test results will be used to determine the amounts of nutrients like phosphorus, calcium, magnesium and potassium that are needed on this site. Soil samples will be sent to Agro-One (see website for details on sampling and sample submission), Ithaca, New York or of an authority of similar expertise which uses recommendations developed at Cornell

<table>
<tr><th></th><th colspan="6">SUGGESTED TIMING OF FERTILIZER APPLICATION</th></tr>
<tr><th>Number of Applications</th><th>Winter Spring Jan - April</th><th>May Mid-late</th><th>Summer Months</th><th>September Early</th><th>October Early</th><th>November-December</th></tr>
<tr><td>None to one</td><td rowspan="3">Not allowed by law.

Not beneficial to the lawn.</td><td></td><td rowspan="3">Do not fertilize unless you are regularly irrigating your lawn.

Usually stressful time for turf especially if not irrigated.</td><td>❋</td><td></td><td rowspan="3">No fertilizer is recommended, not allowed by law.</td></tr>
<tr><td>two</td><td>❋</td><td>❋</td><td></td></tr>
<tr><td>three</td><td>❋</td><td>❋</td><td>❋</td></tr>
</table>

University or of an authority of similar expertise. The table above shows a recommended fertilizer program developed by Cornell University for lawns that will be fertilized one to three times per year.
In all case no more that 3 lbs of nitrogen fertilizer will be applied per 1000 sq.ft. per year. The fertilizers to be used in will contain mostly synthetic or natural organic slow release materials. Using slow release fertilizer sources have been shown to reduce the likelihood of nitrate leaching or runoff (Petrovic, 1990).

<u>Pest Management Program:</u> The components of this lawn pest management program consist of understanding the biology of pests likely to be found at Seven Spring, and control options that rely heavily on the principals of integrated pest management (IPM) including options like biological and cultural control, and if necessary, the infrequent use of pesticides) and pesticide environmental risk assessment.. It is expected that little if any pesticide would be used because of the healthy turfgrass-soil ecological system this site and project will have and will only be used infrequently.

Anticipated Pests

Lawns in Westchester County have the following typical pests: broadleaf weeds, annual grassy weeds like crabgrass, white grubs, chinch bug, sod webworm and bluegrass billbugs. In some cases diseases may cause some damage.

WEEDS

Weeds by definition are plants out of place. On lawns, plants that are weeds are out of place because they are unsightly and increase the risk of phosphorus runoff. Other weeds with flowers like clover attract bees and produce pollen that can cause allergic reactions in some individuals.

Weed problems are most often associated with thin-damaged turf. Thus, one of the major control practices is to produce a dense-competitive environment against weed encroachment.

BROADLEAF WEEDS: Broadleaf weeds anticipated on this site are clover, dandelion, plantain, and ground ivy, which often invade thin turf. Following a proper management program as outlined in this report will reduce the encroachment of these broadleaf weeds.

ANNUAL GRASSY WEEDS: Crabgrass and goosegrass are annual grassy weeds that invade thin turf. Thus, the management practices recommended in this report encourage a dense stand of turf reduces the incidence of crabgrass and goosegrass. Practices such as a good fertilization program and insect control that produce a dense turf restrict light from reaching the soil surface

INSECTS

Insects can be a problem on lawns because they will eat and kill the grass, resulting in the greater likelihood of runoff problems. The main turfgrass insect pest anticipated is white grubs that eat the root system. There are non-chemical biocontrol approaches to insect control available commercially. Some, however, have been proven ineffective. Biological control options should be the first line of control. Only after the biological control practices have been tried and failed will synthetic-organic insecticides be considered for use. The biocontrols are milky spore disease and nematodes for white grub control. Milky spore has proven to be ineffective, while insect parasitic nematodes have been shown to give good control if used properly.

One of the best practices to follow in an insect control program is to implement a systematic sampling/monitoring scheme. It has been found that insect pests of turf like white grubs do not uniformly cover the entire lawn.

White Grubs: There are several species of insects that have a destructive larval stage known as white grubs. These include Japanese Beetle, Oriental Beetle, Asiatic Garden Beetle, and European Chaffer. The population of these insects should be evaluated before any treatment is made. Treatments are most effective in early August when the grubs are very small and before they damage the turfgrass root system. After the site is established, milky spore powder will be applied to each lawn to help reduce the amount of white grubs.

OTHER INSECTS: It is not uncommon to find other insects damaging turf in this region of the state. Insects like sod webworm and chinch bug are likely to occur on this site. The grasses selected for this site are mostly resistant to these surface-feeding insects.

DISEASES

It is not anticipated that disease will be a pest on the lawns. If diseases do become a problem, diseases suppressive natural organic fertilizers (Sustane, Ringers and Nature Safe) will be used as part of the fertilization program to reduce disease problems and fungicides may be applied. An organic approach is to use compost tea to reduce disease damage.

PESTICIDE RISK ASSESSMENT

In the unlikely event that the other lawn management practices are ineffective for pest control, a selective few pesticides may be used, provided they have successfully undergone water quality risk assessment. The assessment of the potential impacts of pesticides registered for control of the anticipated pests for each soil found on the site was performed by using the WIN PST (Windows Pesticide Screening Tool, version 2.0062B) method. The results are found in Table 7 and will used to select a pesticide if found to be necessary. For this site, pesticides that are found to have a low risk to humans are in effect considered reduce risk. However, in order to protect against the unlikelihood of runoff of a pesticide, only pesticides with a low risk to humans from runoff will be included in the list of low risk pesticides for a given pest.

RENOVATION

Lawns may need to be renovated at times and there may be a need to kill the existing vegetation and reseed or sod. The natural organic method of vinegar/acidic acid or the steam/hot water methods could be used prior to re-establishment. A soil test should be conducted to see if any phosphorus fertilizer is needed. These practices will be followed to protect the environment by using environmentally friendly vegetation control measures and that phosphorus will only be used if it is found to be needed

FERTILIZER AND PEST CONTROL APPLICATION PROCEDURES

All application of fertilizers and pesticides (synthetic or organic) will be made when conditions of heavy rain are not forecasted for at least 48 hours and not between December 1 and April 1. Weather services are available to easily track current weather conditions and for weather forecasts. To conform to Westchester County and New York State law, any fertilizer (or pesticide) that is applied to a sidewalk, driveway or road will be immediately picked up.

Other Maintenance Practices

Mowing will be done as frequently as needed and clippings returned to the lawns whenever possible to reduce the need for additional fertilizer. The mowing height will be as tall as practically feasible to encourage a deep root system and healthier lawn. In most cases the mowing height will be at least 3 inches. Clippings will only be removed when excessive clippings are present due to a lack of mowing during extended periods of wet weather.

If lawns are to be irrigated the irrigation will be based on the simple premise of irrigating to replace the amount used by the plant and evaporated from the soil, known as evapotranspiration rate (ET rate). The Northeast Climate Center (Ithaca, NY, at the website http://www.nrcc.cornell.edu/grass.html) provides weekly estimated ET values for lawns in Westchester County and this amount will be used to irrigate the lawns. Irrigation in this form will provide enough moisture to have a dense lawn that resists runoff but will not be excessive that either wastes water or increases the likelihood of nitrogen, phosphorus or pesticide leaching or runoff. On sites to be irrigated, each week the determined amount of irrigation will be applied to maintance turf density and health of the lawn.

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WIN PST Soil/Pesticide Information and Risk Assessment Results

Pesticide Active Ingredient Rating Report

Active Ingredient Common Name	pH	Solubility in Water (ppm)	Half Life (days)	KOC (mL/g)	Human Toxicity (ppb)	Fish Toxicity MATC* (ppb)	Fish Toxicity STV	SPISP II Pesticde Ratings Leaching	Runoff Solution	Runoff Adsorbed	Exposure Adjusted Toxicity Category Water Human	Water Fish	Sediment Fish
ACTIVE INGREDIENTS													
100% Azoxystrobin Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		6.7	65	1590	1,260.00	168.00	267,120.00	V (f)	I (f)	I (f)	V	L	V
100% boscalid Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		6	200	1225	153.00	167.00	204,575.00	L (f)	I (f)	I (f)	V	L	V
100% Chloroneb Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		8	130	1650	91.00	531.00	876,150.00	V (f)	I (f)	I (f)	L	V	V
100% Chlorothalonil Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		.6	30	1380	15.00	4.40	6,072.00	V (f)	L (f)	L (f)	I	H	L
100% AMS Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		684000	14	30	2,000.00	43,476.00	1,304,280.00	I (f)	L (f)	L (f)	V	V	V
100% Copper hydroxide Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard	6.00	4	1600	4000	1,000.00	6.10	24,400.00	V (f)	I (f)	I (f)	V	H	V
100% Cyazofamid Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard	7.00	.107	3	1338	6,650.00	127.00	169,926.00	V (f)	L (f)	L (f)	V	L	V

Pesticide Active Ingredient Rating Report

Active Ingredient Common Name	pH	Solubility in Water (ppm)	Half Life (days)	KOC (mL/g)	Human Toxcicity (ppb)	Fish Toxicity MATC* (ppb)	Fish Toxicity STV	SPISP II Pesticde Ratings Leaching	Runoff Solution	Runoff Adsorbed	Exposure Adjusted Toxicity Category Water Human	Water Fish	Sediment Fish
100% Difenoconazole Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		15	49	3494	7.00	.07	244.58	V (f)	I (f)	I (f)	H	X	I
100% Etridiazole Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		50	20	1000	11.00	170.00	170,000.00	V (f)	L (f)	L (f)	I	L	V
100% Fenarimol Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		14	360	600	455.00	430.00	258,000.00	I (f)	I (f)	L (f)	V	L	V
100% Fludioxonil Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		1.8	182	1614	210.00	33.00	53,262.00	V (f)	I (f)	I (f)	V	I	V
100% Fluopicolide Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		2.9	271	321	1,400.00	155.00	49,755.00	I (f)	I (f)	L (f)	V	L	V
100% Flutolanil Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		9.6	116	800	4,200.00	337.00	269,600.00	L (f)	I (f)	L (f)	V	L	V
100% Fosetyl-Al Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		120000	0.1	20	21,000.00	14,711.00	294,220.00	V (f)	L (f)	L (f)	V	V	V

Pesticide Active Ingredient Rating Report

Active Ingredient Common Name	pH	Solubility in Water (ppm)	Half Life (days)	KOC (mL/g)	Human Toxicity (ppb)	Fish Toxicity MATC* (ppb)	Fish Toxicity STV (ppb)	SPISP II Pesticde Ratings: Leaching	Runoff: Solution	Runoff: Adsorbed	Exposure Adjusted Toxicity Category: Water Human	Water Fish	Sediment Fish
100% Iprodione Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		13.9	14	700	8.00	378.00	264,600.00	V (f)	I (f)	L (f)	H	L	V
100% Mancozeb Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		6	70	2000	5.80	3.20	6,400.00	V (f)	I (f)	I (f)	H	H	L
100% Mefenoxam Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		26000	7	660	518.00	35.00	23,100.00	V (f)	L (f)	L (f)	V	I	V
100% Metconazole Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		30.4	120	1001	336.00	300.00	300,300.00	L (f)	I (f)	I (f)	V	L	V
100% Myclobutanil Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		142	66	500	175.00	330.00	165,000.00	L (f)	I (f)	L (f)	V	L	V
100% Polyoxin D zinc salt Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		200000	12	20				I (f)	L (f)	L (f)			
100% Propamocarb hydrochloride Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		1000000	30	1000000	700.00	37,500.00	7,500,000,000.0	V (f)	L (f)	L (f)	V	V	V

Pesticide Active Ingredient Rating Report

Active Ingredient Common Name	pH	Solubility in Water (ppm)	Half Life (days)	KOC (mL/g)	Human Toxcicity (ppb)	Fish Toxicity MATC* (ppb)	Fish Toxicity STV	SPISP II Pesticde Ratings: Leaching	Runoff: Solution	Runoff: Adsorbed	Exposure Adjusted Toxicity Category: Water Human	Water Fish	Sediment Fish
100% Propiconazole Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		110	110	1000	9.10	134.00	134,000.00	L (f)	I (f)	I (f)	H	L	V
100% Pyraclostrobin Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard	4.00	2.3	83	11000	210.00	3.90	42,900.00	V (f)	I (f)	I (f)	V	H	V
100% Tebuconazole Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		25	610	1000	21.00	17.00	17,000.00	L (f)	I (f)	I (f)	I	I	L
100% Thiophanate-methyl Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		3.5	10	1830	30.00	2.70	4,941.00	V (f)	L (f)	L (f)	I	H	L
100% Triadimefon Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		71.5	26	300	28.00	169.00	50,700.00	L (f)	I (f)	L (f)	I	L	V
100% Triadimenol Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		47	300	1000	27.00	2,295.00	2,295,000.00	L (f)	I (f)	I (f)	I	V	V
100% Trifloxystrobin Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		.61	5	2709	350.00	5.80	15,712.20	V (f)	L (f)	L (f)	V	H	L

Pesticide Active Ingredient Rating Report

Active Ingredient Common Name	pH	Solubility in Water (ppm)	Half Life (days)	KOC (mL/g)	Human Toxcicity (ppb)	Fish Toxicity MATC* (ppb)	Fish Toxicity STV	SPISP II Pesticde Ratings: Leaching	Runoff: Solution	Runoff: Adsorbed	Exposure Adjusted Toxicity Category: Water Human	Water Fish	Sediment Fish
100% Vinclozolin Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		1000	20	100	8.40	120.00	12,000.00	L (f)	L (f)	L (f)	H	L	L
100% Bacillus licheniformis SB3086 Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		1	20	3500	50,000.00	510.00	1,785,000.00	V (f)	L (f)	L (f)	V	V	V
100% Bacillus subtilis GB03 Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		1	20	3500	50,000.00	510.00	1,785,000.00	V (f)	L (f)	L (f)	V	V	V
100% Bacillus subtilis strain QST 713 Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		1	20	3500	50,000.00	510.00	1,785,000.00	V (f)	L (f)	L (f)	V	V	V
100% Mono- and di- potassium salts of phosphorous acid Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		200000	12	20	50,000.00	20.00	400.00	I (f)	L (f)	L (f)	V	I	I
100% Abamectin Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		5	28	5000	2.80	.006	30.00	V (f)	L (f)	L (f)	H	X	H
100% Acephate Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		818000	3	2	2.80	2,726.00	5,452.00	V (f)	L (f)	L (f)	H	V	L

Pesticide Active Ingredient Rating Report

Active Ingredient Common Name	pH	Solubility in Water (ppm)	Half Life (days)	KOC (mL/g)	Human Toxcicity (ppb)	Fish Toxicity MATC* (ppb)	Fish Toxicity STV	SPISP II Pesticde Ratings: Leaching	Runoff: Solution	Runoff: Adsorbed	Exposure Adjusted Toxicity Category: Water Human	Water Fish	Sediment Fish
100% Azadirachtin Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		.05	26	7	225.00	11.00	77.00	I (f)	L (f)	L (f)	V	I	H
100% Bacillus thuringiensis subsp. kurstaki (B.t.k.) cryIA(c) protein segment Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		1	120	3500	50,000.00	510.00	1,785,000.00	V (f)	I (f)	I (f)	V	V	V
100% Bifenthrin Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		.1	26	240000	10.00	.06	14,400.00	V (f)	L (f)	L (f)	I	X	L
100% Boric acid Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		47200	500	50	630.00	19,953.00	997,650.00	I (f)	I (f)	L (f)	V	V	V
100% Carbaryl Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		120	10	300	70.00	27.00	8,100.00	V (f)	L (f)	L (f)	L	I	L
100% Chlorpyrifos Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		.4	30	6070	2.00	.37	2,245.90	V (f)	L (f)	L (f)	H	X	L
100% Cyfluthrin Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		.002	30	100000	175.00	.01	1,000.00	V (f)	L (f)	L (f)	V	X	I

Pesticide Active Ingredient Rating Report

Active Ingredient Common Name	pH	Solubility in Water (ppm)	Half Life (days)	KOC (mL/g)	Human Toxcicity (ppb)	Fish Toxicity MATC* (ppb)	Fish Toxicity STV	SPISP II Pesticde Ratings Leaching	Runoff Solution	Runoff Adsorbed	Exposure Adjusted Toxicity Category Water Human	Water Fish	Sediment Fish
100% lambda-Cyhalothrin													
Reg No:													
PC_Code:		.005	30	180000	7.00	.04	7,200.00	V (f)	L (f)	L (f)	H	X	L
Method: Foliar													
Area: Broadcast													
Rate: Standard													
100% Deltamethrin													
Reg No:													
PC_Code:		.0002	104	186067	70.00	.02	3,721.34	V (f)	L (f)	I (f)	L	X	L
Method: Foliar													
Area: Broadcast													
Rate: Standard													
100% Hydramethylnon													
Reg No:													
PC_Code:		.006	10	730000	.21	8.90	6,497,000.00	V (f)	L (f)	L (f)	X	H	V
Method: Foliar													
Area: Broadcast													
Rate: Standard													
100% Imidacloprid													
Reg No:													
PC_Code:		580	127	440	399.00	1,200.00	528,000.00	I (f)	I (f)	L (f)	V	V	V
Method: Foliar													
Area: Broadcast													
Rate: Standard													
100% Indoxacarb													
Reg No:													
PC_Code:		.2	65	6450	140.00	2.10	13,545.00	V (f)	L (f)	I (f)	V	H	L
Method: Foliar													
Area: Broadcast													
Rate: Standard													
100% Permethrin, mixed cis,trans													
Reg No:													
PC_Code:		.006	30	100000	37.00	.35	35,000.00	V (f)	L (f)	L (f)	I	X	V
Method: Foliar													
Area: Broadcast													
Rate: Standard													
100% Spinosyn A													
Reg No:													
PC_Code:		89.4	0.4	16420	188.00	692.00	11,362,640.00	V (f)	L (f)	L (f)	V	V	V
Method: Foliar													
Area: Broadcast													
Rate: Standard													

Pesticide Active Ingredient Rating Report

Active Ingredient Common Name	pH	Solubility in Water (ppm)	Half Life (days)	KOC (mL/g)	Human Toxcicity (ppb)	Fish Toxicity MATC* (ppb)	Fish Toxicity STV	SPISP II Pesticde Ratings Leaching	Runoff Solution	Runoff Adsorbed	Exposure Adjusted Toxicity Category Water Human	Water Fish	Sediment Fish	Method / Area / Rate
100% Spinosyn D Reg No: PC_Code:		.495	14.5	20000	188.00	692.00	13,840,000.00	V (f)	L (f)	L (f)	V	V	V	Method: Foliar Area: Broadcast Rate: Standard
100% Trichlorfon Reg No: PC_Code:		120000	10	10	1.40	25.00	250.00	I (f)	L (f)	L (f)	H	I	I	Method: Foliar Area: Broadcast Rate: Standard
100% Paclobutrazol Reg No: PC_Code:		35	200	400	175.00	4,076.00	1,630,400.00	I (f)	I (f)	L (f)	V	V	V	Method: Foliar Area: Broadcast Rate: Standard
100% Trinexapac-ethyl Reg No: PC_Code:	4.90	2800	2	102	221.00	573.00	58,446.00	V (f)	L (f)	L (f)	V	V	V	Method: Foliar Area: Broadcast Rate: Standard
100% Mefluidide Reg No: PC_Code:		180	4	200	2,100.00	19,076.00	3,815,200.00	V (f)	L (f)	L (f)	V	V	V	Method: Foliar Area: Broadcast Rate: Standard
100% Ethephon Reg No: PC_Code:		1239000	10	100000	126.00	26,628.00	2,662,800,000.00	V (f)	L (f)	L (f)	V	V	V	Method: Foliar Area: Broadcast Rate: Standard
100% Acetic acid Reg No: PC_Code:		50000	12	200	50,000.00	510.00	102,000.00	L (f)	L (f)	L (f)	V	V	V	Method: Foliar Area: Broadcast Rate: Standard

Pesticide Active Ingredient Rating Report

Active Ingredient Common Name	pH	Solubility in Water (ppm)	Half Life (days)	KOC (mL/g)	Human Toxcicity (ppb)	Fish Toxicity MATC* (ppb)	Fish Toxicity STV	SPISP II Pesticde Ratings Leaching	Runoff Solution	Runoff Adsorbed	Exposure Adjusted Toxicity Category Water Human	Water Fish	Sediment Fish
100% Benfluralin Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		.1	40	9000	210.00	3.10	27,900.00	V (f)	L (f)	I (f)	V	H	V
100% Bensulide Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		5.6	120	1000	46.00	36.00	36,000.00	L (f)	I (f)	I (f)	I	I	V
100% Bispyribac-sodium Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		73300	10	60	700.00	20,392.00	1,223,520.00	L (f)	L (f)	L (f)	V	V	V
100% Bromoxynil Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		.08	8	192	10.00	283.00	54,336.00	V (f)	L (f)	L (f)	I	L	V
100% Carfentrazone-ethyl Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		12	4	866	3,500.00	16.00	13,856.00	V (f)	L (f)	L (f)	V	I	L
100% Clopyralid Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		1000	30	2	3,500.00	20,832.00	41,664.00	I (f)	L (f)	L (f)	V	V	V
100% Dicamba Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		4500	14	5	4,000.00	126.00	630.00	I (f)	L (f)	L (f)	V	L	I

Pesticide Active Ingredient Rating Report

Active Ingredient Common Name	pH	Solubility in Water (ppm)	Half Life (days)	KOC (mL/g)	Human Toxcicity (ppb)	Fish Toxicity MATC* (ppb)	Fish Toxicity STV	SPISP II Pesticde Ratings Leaching	Runoff Solution	Runoff Adsorbed	Exposure Adjusted Toxicity Category Water Human	Water Fish	Sediment Fish
100% Dithiopyr													
Reg No:													
PC_Code:		1.4	400	800	25.00	28.00	22,400.00	I (f)	I (f)	L (f)	I	I	V
Method: Foliar													
Area: Broadcast													
Rate: Standard													
100% Ethofumesate													
Reg No:													
PC_Code:		50	30	340	2,800.00	59.00	20,060.00	L (f)	I (f)	L (f)	V	I	V
Method: Foliar													
Area: Broadcast													
Rate: Standard													
100% Fenoxaprop-ethyl													
Reg No:													
PC_Code:		.8	9	9490	18.00	35.00	332,150.00	V (f)	L (f)	L (f)	I	I	V
Method: Foliar													
Area: Broadcast													
Rate: Standard													
100% Fluroxypyr													
Reg No:													
PC_Code:	7.00	136000	36.3	200	3,500.00	2,349.00	469,800.00	L (f)	I (f)	L (f)	V	V	V
Method: Foliar													
Area: Broadcast													
Rate: Standard													
100% Fluazifop-butyl													
Reg No:													
PC_Code:		2	21	3000	70.00	238.00	714,000.00	V (f)	L (f)	L (f)	L	L	V
Method: Foliar													
Area: Broadcast													
Rate: Standard													
100% Glufosinate-ammonium													
Reg No:													
PC_Code:		1370000	7	100	140.00	1,985.00	198,500.00	V (f)	L (f)	L (f)	V	V	V
Method: Foliar													
Area: Broadcast													
Rate: Standard													
100% Glyphosate													
Reg No:													
PC_Code:		12000	47	3500	700.00	8,290.00	29,015,000.00	V (f)	I (f)	I (f)	V	V	V
Method: Foliar													
Area: Broadcast													
Rate: Standard													

Pesticide Active Ingredient Rating Report

Active Ingredient Common Name	pH	Solubility in Water (ppm)	Half Life (days)	KOC (mL/g)	Human Toxcicity (ppb)	Fish Toxicity MATC* (ppb)	Fish Toxicity STV	SPISP II Pesticde Ratings Leaching	Runoff Solution	Runoff Adsorbed	Exposure Adjusted Toxicity Category Water Human	Water Fish	Sediment Fish
100% Halosulfuron-methyl Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard	7.00	1630	14	100	700.00	3,585.00	358,500.00	L (f)	L (f)	L (f)	V	V	V
100% Diquat dibromide Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		718000	1000	1000000	20.00	933.00	933,000,000.00	V (f)	L (f)	I (f)	I	V	V
100% MCPA Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		825	25	110	30.00	258.00	28,380.00	L (f)	L (f)	L (f)	I	L	V
100% Metsulfuron-methyl Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard	7.00	9500	120	35	1,750.00	6,000.00	210,000.00	I (f)	I (f)	L (f)	V	V	V
100% Mesotrione Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard	4.60	160	18	390	49.00	15,906.00	6,203,340.00	V (f)	L (f)	L (f)	I	V	V
100% Mesotrione Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard	4.60	160	18	390	49.00	15,906.00	6,203,340.00	V (f)	L (f)	L (f)	I	V	V
100% Oxadiazon Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		.7	60	3200	3.50	1.20	3,840.00	V (f)	L (f)	I (f)	H	H	L

Pesticide Active Ingredient Rating Report

Active Ingredient Common Name	pH	Solubility in Water (ppm)	Half Life (days)	KOC (mL/g)	Human Toxcicity (ppb)	Fish Toxicity MATC* (ppb)	Fish Toxicity STV	SPISP II Pesticde Ratings: Leaching	Runoff: Solution	Runoff: Adsorbed	Exposure Adjusted Toxicity Category: Water Human	Water Fish	Sediment Fish
100% Pendimethalin Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		.275	90	5000	70.00	7.90	39,500.00	V (f)	L (f)	I (f)	L	H	V
100% Penoxsulam Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard	5.00	5.7	15	260	103.00	10,200.00	2,652,000.00	L (f)	L (f)	L (f)	V	V	V
100% Primisulfuron-methyl Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard	7.00	70	30	50	42.00	12,673.00	633,650.00	I (f)	I (f)	L (f)	I	V	V
100% Prodiamine Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		.013	120	13000	35.00	17.00	221,000.00	V (f)	L (f)	I (f)	I	I	V
100% Quinclorac Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		64	913	32	2,660.00	22,271.00	712,672.00	I (f)	I (f)	L (f)	V	V	V
100% Siduron Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		18	90	420	52,500.00	13.00	5,460.00	L (f)	I (f)	L (f)	V	I	L
100% Triclopyr Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		435	155	27	350.00	23,714.00	640,278.00	I (f)	I (f)	L (f)	V	V	V

Pesticide Active Ingredient Rating Report

Active Ingredient Common Name	pH	Solubility in Water (ppm)	Half Life (days)	KOC (mL/g)	Human Toxcicity (ppb)	Fish Toxicity MATC* (ppb)	Fish Toxicity STV	SPISP II Pesticde Ratings Leaching	Runoff Solution	Runoff Adsorbed	Exposure Adjusted Toxicity Category Water Human	Water Fish	Sediment Fish
100% Trifluralin Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		.3	60	8000	10.00	.46	3,680.00	V (f)	L (f)	I (f)	I	X	L
100% MCPP, DMA salt Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard	7.00	660000	21	20	7.00	22,380.00	447,600.00	I (f)	L (f)	L (f)	H	V	V
100% 2,4-DP, dimethylamine salt Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		200000	10	26	35.00	21,937.00	570,362.00	L (f)	L (f)	L (f)	I	V	V
100% Sulfentrazone Reg No: PC_Code: Method: Foliar Area: Broadcast Rate: Standard		400	541	104	98.00	4,183.00	435,032.00	I (f)	I (f)	L (f)	L	V	V

Pesticide Active Ingredient Rating Report

Active Ingredient Common Name	pH	Solubility in Water (ppm)	Half Life (days)	KOC (mL/g)	Human Toxcicity (ppb)	Fish Toxicity MATC* (ppb)	Fish Toxicity STV	SPISP II Pesticde Ratings Leaching	Runoff Solution	Runoff Adsorbed	Exposure Adjusted Toxicity Category Water Human	Water Fish	Sediment Fish

LEGEND

X -- eXtra high
H -- High
I -- Intermediate
L -- Low
V -- Very low

Conditions that affect ratings:
(none) -- Broadcast application (default); applied to more than 1/2 the field
b -- Banded application; applied to 1/2 the field or less
p -- Spot application; applied to 1/10 of the field or less

(none) -- Surface applied (default); applied to the soil surface
i -- Soil incorporated; with light tillage or irrigation
f -- Foliar application; directed spray at nearly full crop/weed canopy

(none) -- Standard application rate (default); greater than 1/4 lb/acre
l -- Low rate of application; 1/10 to 1/4 lb/acre
 -- Ultra Low rate of application; 1/10 lb/acre or less

SPISP II P-Ratings:
Leaching -- Pesticide Leaching Potential
Runoff Solution -- Pesticide Solution Runoff Potential
Runoff Adsorbed -- Pesticide Adsorbed Runoff Potential

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

407C Charlton	407D Charlton	305B Paxton
80% FSL Hydro: B	85% FSL Hydro: B	85% FSL Hydro: C
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% 6 H1 Depth: 2	OM% 6 H1 Depth: 2	OM% 3.5 H1 Depth: 8

ACTIVE INGREDIENTS

AI: 2,4-DP, dimethylamine salt

	407C Loss Potential	407C Human Hazard	407C Fish Hazard	407D Loss Potential	407D Human Hazard	407D Fish Hazard	305B Loss Potential	305B Human Hazard	305B Fish Hazard
Leaching:	L (f<dry>)	L	V	L (f<dry>)	L	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	V	L (f<dry>)	L	V	L (f<dry>)	L	V
Adsorbed:	L (f<dry>)		V	L (fs<dry>)		V	L (f<dry>)		V

AI: AMS

	407C Loss Potential	407C Human Hazard	407C Fish Hazard	407D Loss Potential	407D Human Hazard	407D Fish Hazard	305B Loss Potential	305B Human Hazard	305B Fish Hazard
Leaching:	I (f<dry>)	V	V	I (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (fs<dry>)		V	L (f<dry>)		V

AI: Abamectin

	407C Loss Potential	407C Human Hazard	407C Fish Hazard	407D Loss Potential	407D Human Hazard	407D Fish Hazard	305B Loss Potential	305B Human Hazard	305B Fish Hazard
Leaching:	V (f<dry>)	L	I	V (f<dry>)	L	I	V (f<dry>)	L	I
Solution:	L (f<dry>)	I	H	L (f<dry>)	I	H	L (f<dry>)	I	H
Adsorbed:	L (f<dry>)		I	L (fs<dry>)		I	L (f<dry>)		I

AI: Acephate

	407C Loss Potential	407C Human Hazard	407C Fish Hazard	407D Loss Potential	407D Human Hazard	407D Fish Hazard	305B Loss Potential	305B Human Hazard	305B Fish Hazard
Leaching:	V (f<dry>)	L	V	V (f<dry>)	L	V	V (f<dry>)	L	V
Solution:	L (f<dry>)	I	V	L (f<dry>)	I	V	L (f<dry>)	I	V
Adsorbed:	L (f<dry>)		L	L (fs<dry>)		L	L (f<dry>)		L

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

407C Charlton
80% **FSL** Hydro: **B**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **6** H1 Depth: **2**

407D Charlton
85% **FSL** Hydro: **B**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **6** H1 Depth: **2**

305B Paxton
85% **FSL** Hydro: **C**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **3.5** H1 Depth: **8**

ACTIVE INGREDIENTS

AI: Acetic acid

407C Charlton

	Loss Potential	**Human Hazard**	**Fish Hazard**
Leaching:	L (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

407D Charlton

	Loss Potential	**Human Hazard**	**Fish Hazard**
Leaching:	L (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (fs<dry>)		V

305B Paxton

	Loss Potential	**Human Hazard**	**Fish Hazard**
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

AI: Azadirachtin

407C Charlton

	Loss Potential	**Human Hazard**	**Fish Hazard**
Leaching:	I (f<dry>)	V	I
Solution:	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		I

407D Charlton

	Loss Potential	**Human Hazard**	**Fish Hazard**
Leaching:	I (f<dry>)	V	I
Solution:	L (f<dry>)	V	L
Adsorbed:	L (fs<dry>)		I

305B Paxton

	Loss Potential	**Human Hazard**	**Fish Hazard**
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		I

AI: Azoxystrobin

407C Charlton

	Loss Potential	**Human Hazard**	**Fish Hazard**
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V

407D Charlton

	Loss Potential	**Human Hazard**	**Fish Hazard**
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	L
Adsorbed:	I (fs<dry>)		V

305B Paxton

	Loss Potential	**Human Hazard**	**Fish Hazard**
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	L
Adsorbed:	I (f<dry>)		V

AI: Bacillus licheniformis SB3086

407C Charlton

	Loss Potential	**Human Hazard**	**Fish Hazard**
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

407D Charlton

	Loss Potential	**Human Hazard**	**Fish Hazard**
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (fs<dry>)		V

305B Paxton

	Loss Potential	**Human Hazard**	**Fish Hazard**
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

Map unit	**407C** **Charlton**	**407D** **Charlton**	**305B** **Paxton**
Percent / Texture / Hydro	80% **FSL** Hydro: **B**	85% **FSL** Hydro: **B**	85% **FSL** Hydro: **C**
Survey area	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% / H1 Depth	OM% **6** H1 Depth: **2**	OM% **6** H1 Depth: **2**	OM% **3.5** H1 Depth: **8**

ACTIVE INGREDIENTS

AI: Bacillus subtilis GB03

	407C Loss Potential	407C Human Hazard	407C Fish Hazard	407D Loss Potential	407D Human Hazard	407D Fish Hazard	305B Loss Potential	305B Human Hazard	305B Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (fs<dry>)		V	L (f<dry>)		V

AI: Bacillus subtilis strain QST 713

	407C Loss Potential	407C Human Hazard	407C Fish Hazard	407D Loss Potential	407D Human Hazard	407D Fish Hazard	305B Loss Potential	305B Human Hazard	305B Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (fs<dry>)		V	L (f<dry>)		V

AI: Bacillus thuringiensis subsp. kurstaki (B.t.k.) cryIA(c) protein segment

	407C Loss Potential	407C Human Hazard	407C Fish Hazard	407D Loss Potential	407D Human Hazard	407D Fish Hazard	305B Loss Potential	305B Human Hazard	305B Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	I (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	I (fs<dry>)		V	I (f<dry>)		V

AI: Benfluralin

	407C Loss Potential	407C Human Hazard	407C Fish Hazard	407D Loss Potential	407D Human Hazard	407D Fish Hazard	305B Loss Potential	305B Human Hazard	305B Fish Hazard
Leaching:	V (f<dry>)	V	L	V (f<dry>)	V	L	V (f<dry>)	V	L
Solution:	L (f<dry>)	V	I	L (f<dry>)	V	I	L (f<dry>)	V	I
Adsorbed:	L (f<dry>)		V	I (fs<dry>)		V	I (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

407C Charlton	407D Charlton	305B Paxton
80% **FSL** Hydro: **B**	85% **FSL** Hydro: **B**	85% **FSL** Hydro: **C**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **6** H1 Depth: **2**	OM% **6** H1 Depth: **2**	OM% **3.5** H1 Depth: **8**

ACTIVE INGREDIENTS

AI: Bensulide

407C Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<dry>)	L	L
Solution:	L (f<dry>)	L	L
Adsorbed:	L (f<dry>)		V

407D Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<dry>)	L	L
Solution:	L (f<dry>)	L	L
Adsorbed:	I (fs<dry>)		V

305B Paxton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	I	I
Adsorbed:	I (f<dry>)		V

AI: Bifenthrin

407C Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	I
Solution:	L (f<dry>)	L	H
Adsorbed:	L (f<dry>)		L

407D Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	I
Solution:	L (f<dry>)	L	H
Adsorbed:	L (fs<dry>)		L

305B Paxton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	I
Solution:	L (f<dry>)	L	H
Adsorbed:	L (f<dry>)		L

AI: Bispyribac-sodium

407C Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

407D Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (fs<dry>)		V

305B Paxton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

AI: Boric acid

407C Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	I (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

407D Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	I (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (fs<dry>)		V

305B Paxton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

NRCS Natural Resources Conservation Service

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

407C Charlton	407D Charlton	305B Paxton
80% FSL Hydro: B	85% FSL Hydro: B	85% FSL Hydro: C
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% 6 H1 Depth: 2	OM% 6 H1 Depth: 2	OM% 3.5 H1 Depth: 8

ACTIVE INGREDIENTS

AI: Bromoxynil

	407C Loss Potential	407C Human Hazard	407C Fish Hazard	407D Loss Potential	407D Human Hazard	407D Fish Hazard	305B Loss Potential	305B Human Hazard	305B Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	L	L (f<dry>)	L	L	L (f<dry>)	L	L
Adsorbed:	L (f<dry>)		V	L (fs<dry>)		V	L (f<dry>)		V

AI: Carbaryl

	407C Loss Potential	407C Human Hazard	407C Fish Hazard	407D Loss Potential	407D Human Hazard	407D Fish Hazard	305B Loss Potential	305B Human Hazard	305B Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	L	L (f<dry>)	L	L	L (f<dry>)	L	L
Adsorbed:	L (f<dry>)		L	L (fs<dry>)		L	L (f<dry>)		L

AI: Carfentrazone-ethyl

	407C Loss Potential	407C Human Hazard	407C Fish Hazard	407D Loss Potential	407D Human Hazard	407D Fish Hazard	305B Loss Potential	305B Human Hazard	305B Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	L	L (f<dry>)	V	L	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		L	L (fs<dry>)		L	L (f<dry>)		L

AI: Chloroneb

	407C Loss Potential	407C Human Hazard	407C Fish Hazard	407D Loss Potential	407D Human Hazard	407D Fish Hazard	305B Loss Potential	305B Human Hazard	305B Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	V	L (f<dry>)	L	V	I (f<dry>)	L	V
Adsorbed:	L (f<dry>)		V	I (fs<dry>)		V	I (f<dry>)		V

NRCS Natural Resources Conservation Service

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

407C Charlton	407D Charlton	305B Paxton
80% **FSL** Hydro: **B**	85% **FSL** Hydro: **B**	85% **FSL** Hydro: **C**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **6** H1 Depth: **2**	OM% **6** H1 Depth: **2**	OM% **3.5** H1 Depth: **8**

ACTIVE INGREDIENTS

AI: Chlorothalonil

	407C Loss Potential	Human Hazard	Fish Hazard	407D Loss Potential	Human Hazard	Fish Hazard	305B Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	L	V (f<dry>)	V	L	V (f<dry>)	V	L
Solution:	L (f<dry>)	L	I	L (f<dry>)	L	I	L (f<dry>)	L	I
Adsorbed:	L (f<dry>)		L	L (fs<dry>)		L	L (f<dry>)		L

AI: Chlorpyrifos

	407C Loss Potential	Human Hazard	Fish Hazard	407D Loss Potential	Human Hazard	Fish Hazard	305B Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	L	I	V (f<dry>)	L	I	V (f<dry>)	L	I
Solution:	L (f<dry>)	I	H	L (f<dry>)	I	H	L (f<dry>)	I	H
Adsorbed:	L (f<dry>)		L	L (fs<dry>)		L	L (f<dry>)		L

AI: Clopyralid

	407C Loss Potential	Human Hazard	Fish Hazard	407D Loss Potential	Human Hazard	Fish Hazard	305B Loss Potential	Human Hazard	Fish Hazard
Leaching:	I (f<dry>)	V	V	I (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (fs<dry>)		V	L (f<dry>)		V

AI: Copper hydroxide

	407C Loss Potential	Human Hazard	Fish Hazard	407D Loss Potential	Human Hazard	Fish Hazard	305B Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	L	V (f<dry>)	V	L	V (f<dry>)	V	L
Solution:	L (f<dry>)	V	I	L (f<dry>)	V	I	I (f<dry>)	V	H
Adsorbed:	L (f<dry>)		V	I (fs<dry>)		V	I (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

407C **Charlton**	**407D** **Charlton**	**305B** **Paxton**
80% **FSL** Hydro: **B**	85% **FSL** Hydro: **B**	85% **FSL** Hydro: **C**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **6** H1 Depth: **2**	OM% **6** H1 Depth: **2**	OM% **3.5** H1 Depth: **8**

ACTIVE INGREDIENTS

AI: Cyazofamid

	Loss Potential	Human Hazard	Fish Hazard	Loss Potential	Human Hazard	Fish Hazard	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	L	L (f<dry>)	V	L	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V	L (fs<dry>)		V	L (f<dry>)		V

AI: Cyfluthrin

	Loss Potential	Human Hazard	Fish Hazard	Loss Potential	Human Hazard	Fish Hazard	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	I	V (f<dry>)	V	I	V (f<dry>)	V	I
Solution:	L (f<dry>)	V	H	L (f<dry>)	V	H	L (f<dry>)	V	H
Adsorbed:	L (f<dry>)		L	L (fs<dry>)		L	L (f<dry>)		L

AI: Deltamethrin

	Loss Potential	Human Hazard	Fish Hazard	Loss Potential	Human Hazard	Fish Hazard	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	I	V (f<dry>)	V	I	V (f<dry>)	V	I
Solution:	L (f<dry>)	L	H	L (f<dry>)	L	H	L (f<dry>)	L	H
Adsorbed:	L (f<dry>)		L	I (fs<dry>)		L	I (f<dry>)		L

AI: Dicamba

	Loss Potential	Human Hazard	Fish Hazard	Loss Potential	Human Hazard	Fish Hazard	Loss Potential	Human Hazard	Fish Hazard
Leaching:	I (f<dry>)	V	L	I (f<dry>)	V	L	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	L	L (f<dry>)	V	L	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		L	L (fs<dry>)		L	L (f<dry>)		L

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

407C Charlton	407D Charlton	305B Paxton
80% FSL Hydro: B	85% FSL Hydro: B	85% FSL Hydro: C
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% 6 H1 Depth: 2	OM% 6 H1 Depth: 2	OM% 3.5 H1 Depth: 8

ACTIVE INGREDIENTS

AI: Difenoconazole

	407C Loss Potential	407C Human Hazard	407C Fish Hazard	407D Loss Potential	407D Human Hazard	407D Fish Hazard	305B Loss Potential	305B Human Hazard	305B Fish Hazard
Leaching:	V (f<drv>)	L	I	V (f<drv>)	L	I	V (f<drv>)	L	I
Solution:	L (f<drv>)	I	H	L (f<drv>)	I	H	I (f<drv>)	H	X
Adsorbed:	L (f<drv>)		L	I (fs<drv>)		I	I (f<drv>)		I

AI: Diquat dibromide

	407C Loss Potential	407C Human Hazard	407C Fish Hazard	407D Loss Potential	407D Human Hazard	407D Fish Hazard	305B Loss Potential	305B Human Hazard	305B Fish Hazard
Leaching:	V (f<drv>)	V	V	V (f<drv>)	V	V	V (f<drv>)	V	V
Solution:	L (f<drv>)	L	V	L (f<drv>)	L	V	L (f<drv>)	L	V
Adsorbed:	L (f<drv>)		V	I (fs<drv>)		V	I (f<drv>)		V

AI: Dithiopyr

	407C Loss Potential	407C Human Hazard	407C Fish Hazard	407D Loss Potential	407D Human Hazard	407D Fish Hazard	305B Loss Potential	305B Human Hazard	305B Fish Hazard
Leaching:	I (f<drv>)	I	I	I (f<drv>)	I	I	V (f<drv>)	V	V
Solution:	L (f<drv>)	L	L	L (f<drv>)	L	L	I (f<drv>)	I	I
Adsorbed:	L (f<drv>)		V	L (fs<drv>)		V	L (f<drv>)		V

AI: Ethephon

	407C Loss Potential	407C Human Hazard	407C Fish Hazard	407D Loss Potential	407D Human Hazard	407D Fish Hazard	305B Loss Potential	305B Human Hazard	305B Fish Hazard
Leaching:	V (f<drv>)	V	V	V (f<drv>)	V	V	V (f<drv>)	V	V
Solution:	L (f<drv>)	V	V	L (f<drv>)	V	V	L (f<drv>)	V	V
Adsorbed:	L (f<drv>)		V	L (fs<drv>)		V	L (f<drv>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

407C Charlton	407D Charlton	305B Paxton
80% FSL Hydro: B	85% FSL Hydro: B	85% FSL Hydro: C
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% 6 H1 Depth: 2	OM% 6 H1 Depth: 2	OM% 3.5 H1 Depth: 8

ACTIVE INGREDIENTS

AI: Ethofumesate

407C Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<dry>)	V	L
Solution:	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V

407D Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<dry>)	V	L
Solution:	L (f<dry>)	V	L
Adsorbed:	L (fs<dry>)		V

305B Paxton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	I
Adsorbed:	L (f<dry>)		V

AI: Etridiazole

407C Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	L
Adsorbed:	L (f<dry>)		V

407D Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	L
Adsorbed:	L (fs<dry>)		V

305B Paxton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	L
Adsorbed:	L (f<dry>)		V

AI: Fenarimol

407C Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	I (f<dry>)	V	L
Solution:	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V

407D Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	I (f<dry>)	V	L
Solution:	L (f<dry>)	V	L
Adsorbed:	L (fs<dry>)		V

305B Paxton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V

AI: Fenoxaprop-ethyl

407C Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	L
Adsorbed:	L (f<dry>)		V

407D Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	L
Adsorbed:	L (fs<dry>)		V

305B Paxton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	L
Adsorbed:	L (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

407C Charlton	407D Charlton	305B Paxton
80% FSL Hydro: B	85% FSL Hydro: B	85% FSL Hydro: C
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% 6 H1 Depth: 2	OM% 6 H1 Depth: 2	OM% 3.5 H1 Depth: 8

ACTIVE INGREDIENTS

AI: Fluazifop-butyl

407C Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	L
Adsorbed:	L (f<dry>)		V

407D Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	L
Adsorbed:	L (fs<dry>)		V

305B Paxton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	L
Adsorbed:	L (f<dry>)		V

AI: Fludioxonil

407C Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V

407D Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	L
Adsorbed:	I (fs<dry>)		V

305B Paxton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	I
Adsorbed:	I (f<dry>)		V

AI: Fluopicolide

407C Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	I (f<dry>)	V	L
Solution:	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V

407D Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	I (f<dry>)	V	L
Solution:	L (f<dry>)	V	L
Adsorbed:	L (fs<dry>)		V

305B Paxton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V

AI: Fluroxypyr

407C Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

407D Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (fs<dry>)		V

305B Paxton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

407C Charlton
80% **FSL** Hydro: **B**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **6** H1 Depth: **2**

407D Charlton
85% **FSL** Hydro: **B**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **6** H1 Depth: **2**

305B Paxton
85% **FSL** Hydro: **C**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **3.5** H1 Depth: **8**

ACTIVE INGREDIENTS

AI: Flutolanil

407C Charlton

	Loss Potential	**Human Hazard**	**Fish Hazard**
Leaching:	L (f<dry>)	V	L
Solution:	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V

407D Charlton

	Loss Potential	**Human Hazard**	**Fish Hazard**
Leaching:	L (f<dry>)	V	L
Solution:	L (f<dry>)	V	L
Adsorbed:	L (fs<dry>)		V

305B Paxton

	Loss Potential	**Human Hazard**	**Fish Hazard**
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V

AI: Fosetyl-Al

407C Charlton

	Loss Potential	**Human Hazard**	**Fish Hazard**
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

407D Charlton

	Loss Potential	**Human Hazard**	**Fish Hazard**
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (fs<dry>)		V

305B Paxton

	Loss Potential	**Human Hazard**	**Fish Hazard**
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

AI: Glufosinate-ammonium

407C Charlton

	Loss Potential	**Human Hazard**	**Fish Hazard**
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

407D Charlton

	Loss Potential	**Human Hazard**	**Fish Hazard**
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (fs<dry>)		V

305B Paxton

	Loss Potential	**Human Hazard**	**Fish Hazard**
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

AI: Glyphosate

407C Charlton

	Loss Potential	**Human Hazard**	**Fish Hazard**
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

407D Charlton

	Loss Potential	**Human Hazard**	**Fish Hazard**
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	I (fs<dry>)		V

305B Paxton

	Loss Potential	**Human Hazard**	**Fish Hazard**
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	V
Adsorbed:	I (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

407C Charlton	407D Charlton	305B Paxton
80% **FSL** Hydro: **B**	85% **FSL** Hydro: **B**	85% **FSL** Hydro: **C**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **6** H1 Depth: **2**	OM% **6** H1 Depth: **2**	OM% **3.5** H1 Depth: **8**

ACTIVE INGREDIENTS

AI: Halosulfuron-methyl

	407C Loss Potential	Human Hazard	Fish Hazard	407D Loss Potential	Human Hazard	Fish Hazard	305B Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<dry>)	V	V	L (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (fs<dry>)		V	L (f<dry>)		V

AI: Hydramethylnon

	407C Loss Potential	Human Hazard	Fish Hazard	407D Loss Potential	Human Hazard	Fish Hazard	305B Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	I	L	V (f<dry>)	I	L	V (f<dry>)	I	L
Solution:	L (f<dry>)	H	I	L (f<dry>)	H	I	L (f<dry>)	H	I
Adsorbed:	L (f<dry>)		V	L (fs<dry>)		V	L (f<dry>)		V

AI: Imidacloprid

	407C Loss Potential	Human Hazard	Fish Hazard	407D Loss Potential	Human Hazard	Fish Hazard	305B Loss Potential	Human Hazard	Fish Hazard
Leaching:	I (f<dry>)	V	V	I (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	I (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (fs<dry>)		V	L (f<dry>)		V

AI: Indoxacarb

	407C Loss Potential	Human Hazard	Fish Hazard	407D Loss Potential	Human Hazard	Fish Hazard	305B Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	L	V (f<dry>)	V	L	V (f<dry>)	V	L
Solution:	L (f<dry>)	V	I	L (f<dry>)	V	I	L (f<dry>)	V	I
Adsorbed:	L (f<dry>)		L	I (fs<dry>)		L	I (f<dry>)		L

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

407C Charlton	407D Charlton	305B Paxton
80% FSL Hydro: B	85% FSL Hydro: B	85% FSL Hydro: C
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% 6 H1 Depth: 2	OM% 6 H1 Depth: 2	OM% 3.5 H1 Depth: 8

ACTIVE INGREDIENTS

AI: Iprodione

	407C Loss Potential	407C Human Hazard	407C Fish Hazard	407D Loss Potential	407D Human Hazard	407D Fish Hazard	305B Loss Potential	305B Human Hazard	305B Fish Hazard
Leaching:	V (f<dry>)	L	V	V (f<dry>)	L	V	V (f<dry>)	L	V
Solution:	L (f<dry>)	I	L	L (f<dry>)	I	L	I (f<dry>)	H	L
Adsorbed:	L (f<dry>)		V	L (fs<dry>)		V	L (f<dry>)		V

AI: MCPA

	407C Loss Potential	407C Human Hazard	407C Fish Hazard	407D Loss Potential	407D Human Hazard	407D Fish Hazard	305B Loss Potential	305B Human Hazard	305B Fish Hazard
Leaching:	L (f<dry>)	L	L	L (f<dry>)	L	L	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	L	L (f<dry>)	L	L	L (f<dry>)	L	L
Adsorbed:	L (f<dry>)		V	L (fs<dry>)		V	L (f<dry>)		V

AI: MCPP, DMA salt

	407C Loss Potential	407C Human Hazard	407C Fish Hazard	407D Loss Potential	407D Human Hazard	407D Fish Hazard	305B Loss Potential	305B Human Hazard	305B Fish Hazard
Leaching:	I (f<dry>)	H	V	I (f<dry>)	H	V	V (f<dry>)	L	V
Solution:	L (f<dry>)	I	V	L (f<dry>)	I	V	L (f<dry>)	I	V
Adsorbed:	L (f<dry>)		V	L (fs<dry>)		V	L (f<dry>)		V

AI: Mancozeb

	407C Loss Potential	407C Human Hazard	407C Fish Hazard	407D Loss Potential	407D Human Hazard	407D Fish Hazard	305B Loss Potential	305B Human Hazard	305B Fish Hazard
Leaching:	V (f<dry>)	L	L	V (f<dry>)	L	L	V (f<dry>)	L	L
Solution:	L (f<dry>)	I	I	L (f<dry>)	I	I	I (f<dry>)	H	H
Adsorbed:	L (f<dry>)		L	I (fs<dry>)		L	I (f<dry>)		L

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

407C Charlton	407D Charlton	305B Paxton
80% FSL Hydro: B	85% FSL Hydro: B	85% FSL Hydro: C
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% 6 H1 Depth: 2	OM% 6 H1 Depth: 2	OM% 3.5 H1 Depth: 8

ACTIVE INGREDIENTS

AI: Mefenoxam

	407C Loss Potential	Human Hazard	Fish Hazard	407D Loss Potential	Human Hazard	Fish Hazard	305B Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	L	L (f<dry>)	V	L	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V	L (fs<dry>)		V	L (f<dry>)		V

AI: Mefluidide

	407C Loss Potential	Human Hazard	Fish Hazard	407D Loss Potential	Human Hazard	Fish Hazard	305B Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (fs<dry>)		V	L (f<dry>)		V

AI: Mesotrione

	407C Loss Potential	Human Hazard	Fish Hazard	407D Loss Potential	Human Hazard	Fish Hazard	305B Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	V	L (f<dry>)	L	V	L (f<dry>)	L	V
Adsorbed:	L (f<dry>)		V	L (fs<dry>)		V	L (f<dry>)		V

AI: Mesotrione

	407C Loss Potential	Human Hazard	Fish Hazard	407D Loss Potential	Human Hazard	Fish Hazard	305B Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	V	L (f<dry>)	L	V	L (f<dry>)	L	V
Adsorbed:	L (f<dry>)		V	L (fs<dry>)		V	L (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

407C Charlton	407D Charlton	305B Paxton
80% FSL Hydro: B	85% FSL Hydro: B	85% FSL Hydro: C
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% 6 H1 Depth: 2	OM% 6 H1 Depth: 2	OM% 3.5 H1 Depth: 8

ACTIVE INGREDIENTS

AI: Metconazole

	Loss Potential	Human Hazard	Fish Hazard	Loss Potential	Human Hazard	Fish Hazard	Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<dry>)	V	L	L (f<dry>)	V	L	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	L	L (f<dry>)	V	L	I (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V	I (fs<dry>)		V	I (f<dry>)		V

AI: Metsulfuron-methyl

	Loss Potential	Human Hazard	Fish Hazard	Loss Potential	Human Hazard	Fish Hazard	Loss Potential	Human Hazard	Fish Hazard
Leaching:	I (f<dry>)	V	V	I (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	I (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (fs<dry>)		V	L (f<dry>)		V

AI: Mono- and di- potassium salts of phosphorous acid

	Loss Potential	Human Hazard	Fish Hazard	Loss Potential	Human Hazard	Fish Hazard	Loss Potential	Human Hazard	Fish Hazard
Leaching:	I (f<dry>)	V	I	I (f<dry>)	V	I	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	L	L (f<dry>)	V	L	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		L	L (fs<dry>)		L	L (f<dry>)		L

AI: Myclobutanil

	Loss Potential	Human Hazard	Fish Hazard	Loss Potential	Human Hazard	Fish Hazard	Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<dry>)	V	L	L (f<dry>)	V	L	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	L	L (f<dry>)	V	L	I (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V	L (fs<dry>)		V	L (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

407C **Charlton**	407D **Charlton**	305B **Paxton**
80% **FSL** Hydro: **B**	85% **FSL** Hydro: **B**	85% **FSL** Hydro: **C**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **6** H1 Depth: **2**	OM% **6** H1 Depth: **2**	OM% **3.5** H1 Depth: **8**

ACTIVE INGREDIENTS

AI: Oxadiazon

	407C Loss Potential	407C Human Hazard	407C Fish Hazard	407D Loss Potential	407D Human Hazard	407D Fish Hazard	305B Loss Potential	305B Human Hazard	305B Fish Hazard
Leaching:	V (f<dry>)	L	L	V (f<dry>)	L	L	V (f<dry>)	L	L
Solution:	L (f<dry>)	I	I	L (f<dry>)	I	I	L (f<dry>)	I	I
Adsorbed:	L (f<dry>)		L	I (fs<dry>)		L	I (f<dry>)		L

AI: Paclobutrazol

	407C Loss Potential	407C Human Hazard	407C Fish Hazard	407D Loss Potential	407D Human Hazard	407D Fish Hazard	305B Loss Potential	305B Human Hazard	305B Fish Hazard
Leaching:	I (f<dry>)	V	V	I (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	I (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (fs<dry>)		V	L (f<dry>)		V

AI: Pendimethalin

	407C Loss Potential	407C Human Hazard	407C Fish Hazard	407D Loss Potential	407D Human Hazard	407D Fish Hazard	305B Loss Potential	305B Human Hazard	305B Fish Hazard
Leaching:	V (f<dry>)	V	L	V (f<dry>)	V	L	V (f<dry>)	V	L
Solution:	L (f<dry>)	L	I	L (f<dry>)	L	I	L (f<dry>)	L	I
Adsorbed:	L (f<dry>)		V	I (fs<dry>)		V	I (f<dry>)		V

AI: Penoxsulam

	407C Loss Potential	407C Human Hazard	407C Fish Hazard	407D Loss Potential	407D Human Hazard	407D Fish Hazard	305B Loss Potential	305B Human Hazard	305B Fish Hazard
Leaching:	L (f<dry>)	V	V	L (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (fs<dry>)		V	L (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

407C Charlton	407D Charlton	305B Paxton
80% FSL Hydro: B	85% FSL Hydro: B	85% FSL Hydro: C
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% 6 H1 Depth: 2	OM% 6 H1 Depth: 2	OM% 3.5 H1 Depth: 8

ACTIVE INGREDIENTS

AI: Permethrin, mixed cis,trans

407C Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	I
Solution:	L (f<dry>)	L	H
Adsorbed:	L (f<dry>)		V

407D Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	I
Solution:	L (f<dry>)	L	H
Adsorbed:	L (fs<dry>)		V

305B Paxton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	I
Solution:	L (f<dry>)	L	H
Adsorbed:	L (f<dry>)		V

AI: Polyoxin D zinc salt

407C Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	I (f<dry>)	?	?
Solution:	L (f<dry>)	?	?
Adsorbed:	L (f<dry>)		?

407D Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	I (f<dry>)	?	?
Solution:	L (f<dry>)	?	?
Adsorbed:	L (fs<dry>)		?

305B Paxton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	?	?
Solution:	L (f<dry>)	?	?
Adsorbed:	L (f<dry>)		?

AI: Primisulfuron-methyl

407C Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	I (f<dry>)	I	V
Solution:	L (f<dry>)	L	V
Adsorbed:	L (f<dry>)		V

407D Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	I (f<dry>)	I	V
Solution:	L (f<dry>)	L	V
Adsorbed:	L (fs<dry>)		V

305B Paxton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	I	V
Adsorbed:	L (f<dry>)		V

AI: Prodiamine

407C Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	L
Adsorbed:	L (f<dry>)		V

407D Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	L
Adsorbed:	I (fs<dry>)		V

305B Paxton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	L
Adsorbed:	I (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

407C Charlton	407D Charlton	305B Paxton
80% FSL Hydro: B	85% FSL Hydro: B	85% FSL Hydro: C
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% 6 H1 Depth: 2	OM% 6 H1 Depth: 2	OM% 3.5 H1 Depth: 8

ACTIVE INGREDIENTS

AI: Propamocarb hydrochloride

407C Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<drv>)	V	V
Solution:	L (f<drv>)	V	V
Adsorbed:	L (f<drv>)		V

407D Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<drv>)	V	V
Solution:	L (f<drv>)	V	V
Adsorbed:	L (fs<drv>)		V

305B Paxton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<drv>)	V	V
Solution:	L (f<drv>)	V	V
Adsorbed:	L (f<drv>)		V

AI: Propiconazole

407C Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<drv>)	I	L
Solution:	L (f<drv>)	I	L
Adsorbed:	L (f<drv>)		V

407D Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<drv>)	I	L
Solution:	L (f<drv>)	I	L
Adsorbed:	I (fs<drv>)		V

305B Paxton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<drv>)	L	V
Solution:	I (f<drv>)	H	L
Adsorbed:	I (f<drv>)		V

AI: Pyraclostrobin

407C Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<drv>)	V	L
Solution:	L (f<drv>)	V	I
Adsorbed:	L (f<drv>)		V

407D Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<drv>)	V	L
Solution:	L (f<drv>)	V	I
Adsorbed:	I (fs<drv>)		V

305B Paxton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<drv>)	V	L
Solution:	I (f<drv>)	V	H
Adsorbed:	I (f<drv>)		V

AI: Quinclorac

407C Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	I (f<drv>)	V	V
Solution:	L (f<drv>)	V	V
Adsorbed:	L (f<drv>)		V

407D Charlton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	I (f<drv>)	V	V
Solution:	L (f<drv>)	V	V
Adsorbed:	L (fs<drv>)		V

305B Paxton

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<drv>)	V	V
Solution:	I (f<drv>)	V	V
Adsorbed:	L (f<drv>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

407C Charlton	407D Charlton	305B Paxton
80% **FSL** Hydro: **B**	85% **FSL** Hydro: **B**	85% **FSL** Hydro: **C**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **6** H1 Depth: **2**	OM% **6** H1 Depth: **2**	OM% **3.5** H1 Depth: **8**

ACTIVE INGREDIENTS

AI: Siduron

	407C Loss Potential	Human Hazard	Fish Hazard	407D Loss Potential	Human Hazard	Fish Hazard	305B Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<dry>)	V	L	L (f<dry>)	V	L	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	L	L (f<dry>)	V	L	I (f<dry>)	V	I
Adsorbed:	L (f<dry>)		L	L (fs<dry>)		L	L (f<dry>)		L

AI: Spinosyn A

	407C Loss Potential	Human Hazard	Fish Hazard	407D Loss Potential	Human Hazard	Fish Hazard	305B Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (fs<dry>)		V	L (f<dry>)		V

AI: Spinosyn D

	407C Loss Potential	Human Hazard	Fish Hazard	407D Loss Potential	Human Hazard	Fish Hazard	305B Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (fs<dry>)		V	L (f<dry>)		V

AI: Sulfentrazone

	407C Loss Potential	Human Hazard	Fish Hazard	407D Loss Potential	Human Hazard	Fish Hazard	305B Loss Potential	Human Hazard	Fish Hazard
Leaching:	I (f<dry>)	L	V	I (f<dry>)	L	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	V	L (f<dry>)	L	V	I (f<dry>)	L	V
Adsorbed:	L (f<dry>)		V	L (fs<dry>)		V	L (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

407C Charlton	407D Charlton	305B Paxton
80% FSL Hydro: B	85% FSL Hydro: B	85% FSL Hydro: C
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% 6 H1 Depth: 2	OM% 6 H1 Depth: 2	OM% 3.5 H1 Depth: 8

ACTIVE INGREDIENTS

AI: Tebuconazole

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<dry>)	L	L
Solution:	L (f<dry>)	L	L
Adsorbed:	L (f<dry>)		L

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<dry>)	L	L
Solution:	L (f<dry>)	L	L
Adsorbed:	I (fs<dry>)		L

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	I	I
Adsorbed:	I (f<dry>)		L

AI: Thiophanate-methyl

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	L
Solution:	L (f<dry>)	L	I
Adsorbed:	L (f<dry>)		L

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	L
Solution:	L (f<dry>)	L	I
Adsorbed:	L (fs<dry>)		L

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	L
Solution:	L (f<dry>)	L	I
Adsorbed:	L (f<dry>)		L

AI: Triadimefon

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<dry>)	L	L
Solution:	L (f<dry>)	L	L
Adsorbed:	L (f<dry>)		V

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<dry>)	L	L
Solution:	L (f<dry>)	L	L
Adsorbed:	L (fs<dry>)		V

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	I	L
Adsorbed:	L (f<dry>)		V

AI: Triadimenol

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<dry>)	L	V
Solution:	L (f<dry>)	L	V
Adsorbed:	L (f<dry>)		V

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<dry>)	L	V
Solution:	L (f<dry>)	L	V
Adsorbed:	I (fs<dry>)		V

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	I	V
Adsorbed:	I (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

407C Charlton	407D Charlton	305B Paxton
80% FSL Hydro: B	85% FSL Hydro: B	85% FSL Hydro: C
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% 6 H1 Depth: 2	OM% 6 H1 Depth: 2	OM% 3.5 H1 Depth: 8

ACTIVE INGREDIENTS

AI: Trichlorfon

	407C Loss Potential	Human Hazard	Fish Hazard	407D Loss Potential	Human Hazard	Fish Hazard	305B Loss Potential	Human Hazard	Fish Hazard
Leaching:	I (f<drv>)	H	I	I (f<drv>)	H	I	V (f<drv>)	L	V
Solution:	L (f<drv>)	I	L	L (f<drv>)	I	L	L (f<drv>)	I	L
Adsorbed:	L (f<drv>)		L	L (fs<drv>)		L	L (f<drv>)		L

AI: Triclopyr

	407C Loss Potential	Human Hazard	Fish Hazard	407D Loss Potential	Human Hazard	Fish Hazard	305B Loss Potential	Human Hazard	Fish Hazard
Leaching:	I (f<drv>)	V	V	I (f<drv>)	V	V	V (f<drv>)	V	V
Solution:	L (f<drv>)	V	V	L (f<drv>)	V	V	I (f<drv>)	V	V
Adsorbed:	L (f<drv>)		V	L (fs<drv>)		V	L (f<drv>)		V

AI: Trifloxystrobin

	407C Loss Potential	Human Hazard	Fish Hazard	407D Loss Potential	Human Hazard	Fish Hazard	305B Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<drv>)	V	L	V (f<drv>)	V	L	V (f<drv>)	V	L
Solution:	L (f<drv>)	V	I	L (f<drv>)	V	I	L (f<drv>)	V	I
Adsorbed:	L (f<drv>)		L	L (fs<drv>)		L	L (f<drv>)		L

AI: Trifluralin

	407C Loss Potential	Human Hazard	Fish Hazard	407D Loss Potential	Human Hazard	Fish Hazard	305B Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<drv>)	V	I	V (f<drv>)	V	I	V (f<drv>)	V	I
Solution:	L (f<drv>)	L	H	L (f<drv>)	L	H	L (f<drv>)	L	H
Adsorbed:	L (f<drv>)		L	I (fs<drv>)		L	I (f<drv>)		L

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

407C Charlton	407D Charlton	305B Paxton
80% **FSL** Hydro: **B**	85% **FSL** Hydro: **B**	85% **FSL** Hydro: **C**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **6** H1 Depth: **2**	OM% **6** H1 Depth: **2**	OM% **3.5** H1 Depth: **8**

ACTIVE INGREDIENTS

AI: Trinexapac-ethyl

	407C Loss Potential	Human Hazard	Fish Hazard	407D Loss Potential	Human Hazard	Fish Hazard	305B Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<drv>)	V	V	V (f<drv>)	V	V	V (f<drv>)	V	V
Solution:	L (f<drv>)	V	V	L (f<drv>)	V	V	L (f<drv>)	V	V
Adsorbed:	L (f<drv>)		V	L (fs<drv>)		V	L (f<drv>)		V

AI: Vinclozolin

	407C Loss Potential	Human Hazard	Fish Hazard	407D Loss Potential	Human Hazard	Fish Hazard	305B Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<drv>)	I	L	L (f<drv>)	I	L	V (f<drv>)	L	V
Solution:	L (f<drv>)	I	L	L (f<drv>)	I	L	L (f<drv>)	I	L
Adsorbed:	L (f<drv>)		L	L (fs<drv>)		L	L (f<drv>)		L

AI: boscalid

	407C Loss Potential	Human Hazard	Fish Hazard	407D Loss Potential	Human Hazard	Fish Hazard	305B Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<drv>)	V	L	L (f<drv>)	V	L	V (f<drv>)	V	V
Solution:	L (f<drv>)	V	L	L (f<drv>)	V	L	I (f<drv>)	V	L
Adsorbed:	L (f<drv>)		V	I (fs<drv>)		V	I (f<drv>)		V

AI: lambda-Cyhalothrin

	407C Loss Potential	Human Hazard	Fish Hazard	407D Loss Potential	Human Hazard	Fish Hazard	305B Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<drv>)	L	I	V (f<drv>)	L	I	V (f<drv>)	L	I
Solution:	L (f<drv>)	I	H	L (f<drv>)	I	H	L (f<drv>)	I	H
Adsorbed:	L (f<drv>)		L	L (fs<drv>)		L	L (f<drv>)		L

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

70B Ridgebury	255B Windsor	311B Woodbridge
80% **FSL** Hydro: **C**	80% **LS** Hydro: **A**	80% **FSL** Hydro: **C**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **5.5** H1 Depth: **5**	OM% **1** H1 Depth: **12**	OM% **6** H1 Depth: **9**

ACTIVE INGREDIENTS

AI: 2,4-DP, dimethylamine salt

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	L (f<dry>)	L	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	V	L (f<dry>)	L	V	L (f<dry>)	L	V
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: AMS

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	I (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Abamectin

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	L	I	V (f<dry>)	L	I	V (f<dry>)	L	I
Solution:	L (f<dry>)	I	H	L (f<dry>)	I	H	L (f<dry>)	I	H
Adsorbed:	L (f<dry>)		I	L (f<dry>)		I	L (f<dry>)		I

AI: Acephate

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	L	V	V (f<dry>)	L	V	V (f<dry>)	L	V
Solution:	L (f<dry>)	I	V	L (f<dry>)	I	V	L (f<dry>)	I	V
Adsorbed:	L (f<dry>)		L	L (f<dry>)		L	L (f<dry>)		L

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

70B Ridgebury	255B Windsor	311B Woodbridge
80% **FSL** Hydro: **C**	80% **LS** Hydro: **A**	80% **FSL** Hydro: **C**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **5.5** H1 Depth: **5**	OM% **1** H1 Depth: **12**	OM% **6** H1 Depth: **9**

ACTIVE INGREDIENTS

AI: Acetic acid

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	L (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Azadirachtin

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	I (f<dry>)	V	I	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	L	L (f<dry>)	V	L	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		I	L (f<dry>)		I	L (f<dry>)		I

AI: Azoxystrobin

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	L	L (f<dry>)	V	L	I (f<dry>)	V	L
Adsorbed:	I (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Bacillus licheniformis SB3086

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

70B Ridgebury	255B Windsor	311B Woodbridge
80% **FSL** Hydro: **C**	80% **LS** Hydro: **A**	80% **FSL** Hydro: **C**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **5.5** H1 Depth: **5**	OM% **1** H1 Depth: **12**	OM% **6** H1 Depth: **9**

ACTIVE INGREDIENTS

AI: Bacillus subtilis GB03

70B Ridgebury:

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

255B Windsor:

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

311B Woodbridge:

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

AI: Bacillus subtilis strain QST 713

70B Ridgebury:

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

255B Windsor:

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

311B Woodbridge:

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

AI: Bacillus thuringiensis subsp. kurstaki (B.t.k.) cryIA(c) protein segment

70B Ridgebury:

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	V
Adsorbed:	I (f<dry>)		V

255B Windsor:

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

311B Woodbridge:

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

AI: Benfluralin

70B Ridgebury:

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	L
Solution:	L (f<dry>)	V	I
Adsorbed:	I (f<dry>)		V

255B Windsor:

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	L
Solution:	L (f<dry>)	V	I
Adsorbed:	L (f<dry>)		V

311B Woodbridge:

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	L
Solution:	L (f<dry>)	V	I
Adsorbed:	L (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

70B Ridgebury	255B Windsor	311B Woodbridge
80% FSL Hydro: C	80% LS Hydro: A	80% FSL Hydro: C
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% 5.5 H1 Depth: 5	OM% 1 H1 Depth: 12	OM% 6 H1 Depth: 9

ACTIVE INGREDIENTS

AI: Bensulide

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	L (f<dry>)	L	L	V (f<dry>)	V	V
Solution:	I (f<dry>)	I	I	L (f<dry>)	L	L	I (f<dry>)	I	I
Adsorbed:	I (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Bifenthrin

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	I	V (f<dry>)	V	I	V (f<dry>)	V	I
Solution:	L (f<dry>)	L	H	L (f<dry>)	L	H	L (f<dry>)	L	H
Adsorbed:	L (f<dry>)		L	L (f<dry>)		L	L (f<dry>)		L

AI: Bispyribac-sodium

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	L (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Boric acid

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	I (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	V	L (f<dry>)	V	V	I (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

70B Ridgebury	255B Windsor	311B Woodbridge
80% **FSL** Hydro: **C**	80% **LS** Hydro: **A**	80% **FSL** Hydro: **C**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **5.5** H1 Depth: **5**	OM% **1** H1 Depth: **12**	OM% **6** H1 Depth: **9**

ACTIVE INGREDIENTS

AI: Bromoxynil

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	L	L (f<dry>)	L	L	L (f<dry>)	L	L
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Carbaryl

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	L	L (f<dry>)	L	L	L (f<dry>)	L	L
Adsorbed:	L (f<dry>)		L	L (f<dry>)		L	L (f<dry>)		L

AI: Carfentrazone-ethyl

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	L	L (f<dry>)	V	L	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		L	L (f<dry>)		L	L (f<dry>)		L

AI: Chloroneb

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	I (f<dry>)	L	V	L (f<dry>)	L	V	I (f<dry>)	L	V
Adsorbed:	I (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

NRCS Natural Resources Conservation Service

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

70B Ridgebury	255B Windsor	311B Woodbridge
80% FSL Hydro: C	80% LS Hydro: A	80% FSL Hydro: C
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% 5.5 H1 Depth: 5	OM% 1 H1 Depth: 12	OM% 6 H1 Depth: 9

ACTIVE INGREDIENTS

AI: Chlorothalonil

	70B Loss Potential	Human Hazard	Fish Hazard	255B Loss Potential	Human Hazard	Fish Hazard	311B Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	L	V (f<dry>)	V	L	V (f<dry>)	V	L
Solution:	L (f<dry>)	L	I	L (f<dry>)	L	I	L (f<dry>)	L	I
Adsorbed:	L (f<dry>)		L	L (f<dry>)		L	L (f<dry>)		L

AI: Chlorpyrifos

	70B Loss Potential	Human Hazard	Fish Hazard	255B Loss Potential	Human Hazard	Fish Hazard	311B Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	L	I	V (f<dry>)	L	I	V (f<dry>)	L	I
Solution:	L (f<dry>)	I	H	L (f<dry>)	I	H	L (f<dry>)	I	H
Adsorbed:	L (f<dry>)		L	L (f<dry>)		L	L (f<dry>)		L

AI: Clopyralid

	70B Loss Potential	Human Hazard	Fish Hazard	255B Loss Potential	Human Hazard	Fish Hazard	311B Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V	I (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Copper hydroxide

	70B Loss Potential	Human Hazard	Fish Hazard	255B Loss Potential	Human Hazard	Fish Hazard	311B Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	L	V (f<dry>)	V	L	V (f<dry>)	V	L
Solution:	I (f<dry>)	V	H	L (f<dry>)	V	I	I (f<dry>)	V	H
Adsorbed:	I (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

70B Ridgebury	255B Windsor	311B Woodbridge
80% FSL Hydro: C	80% LS Hydro: A	80% FSL Hydro: C
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% 5.5 H1 Depth: 5	OM% 1 H1 Depth: 12	OM% 6 H1 Depth: 9

ACTIVE INGREDIENTS

AI: Cyazofamid

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	L	L (f<dry>)	V	L	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Cyfluthrin

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	I	V (f<dry>)	V	I	V (f<dry>)	V	I
Solution:	L (f<dry>)	V	H	L (f<dry>)	V	H	L (f<dry>)	V	H
Adsorbed:	L (f<dry>)		L	L (f<dry>)		L	L (f<dry>)		L

AI: Deltamethrin

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	I	V (f<dry>)	V	I	V (f<dry>)	V	I
Solution:	L (f<dry>)	L	H	L (f<dry>)	L	H	L (f<dry>)	L	H
Adsorbed:	I (f<dry>)		L	L (f<dry>)		L	L (f<dry>)		L

AI: Dicamba

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	I (f<dry>)	V	L	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	L	L (f<dry>)	V	L	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		L	L (f<dry>)		L	L (f<dry>)		L

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

70B Ridgebury	255B Windsor	311B Woodbridge
80% **FSL** Hydro: **C**	80% **LS** Hydro: **A**	80% **FSL** Hydro: **C**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **5.5** H1 Depth: **5**	OM% **1** H1 Depth: **12**	OM% **6** H1 Depth: **9**

ACTIVE INGREDIENTS

AI: Difenoconazole

	70B Ridgebury Loss Potential	Human Hazard	Fish Hazard	255B Windsor Loss Potential	Human Hazard	Fish Hazard	311B Woodbridge Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	L	I	V (f<dry>)	L	I	V (f<dry>)	L	I
Solution:	I (f<dry>)	H	X	L (f<dry>)	I	H	I (f<dry>)	H	X
Adsorbed:	I (f<dry>)		I	L (f<dry>)		L	L (f<dry>)		L

AI: Diquat dibromide

	70B Ridgebury Loss Potential	Human Hazard	Fish Hazard	255B Windsor Loss Potential	Human Hazard	Fish Hazard	311B Woodbridge Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	V	L (f<dry>)	L	V	L (f<dry>)	L	V
Adsorbed:	I (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Dithiopyr

	70B Ridgebury Loss Potential	Human Hazard	Fish Hazard	255B Windsor Loss Potential	Human Hazard	Fish Hazard	311B Woodbridge Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V	I (f<dry>)	I	I	V (f<dry>)	V	V
Solution:	I (f<dry>)	I	I	L (f<dry>)	L	L	I (f<dry>)	I	I
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Ethephon

	70B Ridgebury Loss Potential	Human Hazard	Fish Hazard	255B Windsor Loss Potential	Human Hazard	Fish Hazard	311B Woodbridge Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

70B Ridgebury	255B Windsor	311B Woodbridge
80% FSL Hydro: C	80% LS Hydro: A	80% FSL Hydro: C
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% 5.5 H1 Depth: 5	OM% 1 H1 Depth: 12	OM% 6 H1 Depth: 9

ACTIVE INGREDIENTS

AI: Ethofumesate

	70B Loss Potential	Human Hazard	Fish Hazard	255B Loss Potential	Human Hazard	Fish Hazard	311B Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V	L (f<dry>)	V	L	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	I	L (f<dry>)	V	L	I (f<dry>)	V	I
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Etridiazole

	70B Loss Potential	Human Hazard	Fish Hazard	255B Loss Potential	Human Hazard	Fish Hazard	311B Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	L	L (f<dry>)	L	L	L (f<dry>)	L	L
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Fenarimol

	70B Loss Potential	Human Hazard	Fish Hazard	255B Loss Potential	Human Hazard	Fish Hazard	311B Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V	I (f<dry>)	V	L	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	L	L (f<dry>)	V	L	I (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Fenoxaprop-ethyl

	70B Loss Potential	Human Hazard	Fish Hazard	255B Loss Potential	Human Hazard	Fish Hazard	311B Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	L	L (f<dry>)	L	L	L (f<dry>)	L	L
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

70B Ridgebury	255B Windsor	311B Woodbridge
80% FSL Hydro: C	80% LS Hydro: A	80% FSL Hydro: C
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% 5.5 H1 Depth: 5	OM% 1 H1 Depth: 12	OM% 6 H1 Depth: 9

ACTIVE INGREDIENTS

AI: Fluazifop-butyl

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	L	L (f<dry>)	L	L	L (f<dry>)	L	L
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Fludioxonil

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	I	L (f<dry>)	V	L	I (f<dry>)	V	I
Adsorbed:	I (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Fluopicolide

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	I (f<dry>)	V	L	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	L	L (f<dry>)	V	L	I (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Fluroxypyr

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	L (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	V	L (f<dry>)	V	V	I (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

70B Ridgebury	255B Windsor	311B Woodbridge
80% FSL Hydro: C	80% LS Hydro: A	80% FSL Hydro: C
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% 5.5 H1 Depth: 5	OM% 1 H1 Depth: 12	OM% 6 H1 Depth: 9

ACTIVE INGREDIENTS

AI: Flutolanil

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	L (f<dry>)	V	L	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	L	L (f<dry>)	V	L	I (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Fosetyl-Al

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Glufosinate-ammonium

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Glyphosate

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	V	L (f<dry>)	V	V	I (f<dry>)	V	V
Adsorbed:	I (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

70B Ridgebury	255B Windsor	311B Woodbridge
80% FSL Hydro: C	80% LS Hydro: A	80% FSL Hydro: C
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% 5.5 H1 Depth: 5	OM% 1 H1 Depth: 12	OM% 6 H1 Depth: 9

ACTIVE INGREDIENTS

AI: Halosulfuron-methyl

70B Ridgebury

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

255B Windsor

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

311B Woodbridge

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

AI: Hydramethylnon

70B Ridgebury

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	I	L
Solution:	L (f<dry>)	H	I
Adsorbed:	L (f<dry>)		V

255B Windsor

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	I	L
Solution:	L (f<dry>)	H	I
Adsorbed:	L (f<dry>)		V

311B Woodbridge

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	I	L
Solution:	L (f<dry>)	H	I
Adsorbed:	L (f<dry>)		V

AI: Imidacloprid

70B Ridgebury

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

255B Windsor

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	I (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

311B Woodbridge

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

AI: Indoxacarb

70B Ridgebury

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	L
Solution:	L (f<dry>)	V	I
Adsorbed:	I (f<dry>)		L

255B Windsor

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	L
Solution:	L (f<dry>)	V	I
Adsorbed:	L (f<dry>)		L

311B Woodbridge

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	L
Solution:	L (f<dry>)	V	I
Adsorbed:	L (f<dry>)		L

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

70B **Ridgebury**
80% **FSL** Hydro: **C**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **5.5** H1 Depth: **5**

255B **Windsor**
80% **LS** Hydro: **A**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **1** H1 Depth: **12**

311B **Woodbridge**
80% **FSL** Hydro: **C**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **6** H1 Depth: **9**

ACTIVE INGREDIENTS

AI: Iprodione

70B Ridgebury:

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	L	V
Solution:	I (f<dry>)	H	L
Adsorbed:	L (f<dry>)		V

255B Windsor:

Loss Potential	Human Hazard	Fish Hazard
V (f<dry>)	L	V
L (f<dry>)	I	L
L (f<dry>)		V

311B Woodbridge:

Loss Potential	Human Hazard	Fish Hazard
V (f<dry>)	L	V
I (f<dry>)	H	L
L (f<dry>)		V

AI: MCPA

70B Ridgebury:

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	L
Adsorbed:	L (f<dry>)		V

255B Windsor:

Loss Potential	Human Hazard	Fish Hazard
L (f<dry>)	L	L
L (f<dry>)	L	L
L (f<dry>)		V

311B Woodbridge:

Loss Potential	Human Hazard	Fish Hazard
V (f<dry>)	V	V
L (f<dry>)	L	L
L (f<dry>)		V

AI: MCPP, DMA salt

70B Ridgebury:

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	L	V
Solution:	L (f<dry>)	I	V
Adsorbed:	L (f<dry>)		V

255B Windsor:

Loss Potential	Human Hazard	Fish Hazard
I (f<dry>)	H	V
L (f<dry>)	I	V
L (f<dry>)		V

311B Woodbridge:

Loss Potential	Human Hazard	Fish Hazard
V (f<dry>)	L	V
L (f<dry>)	I	V
L (f<dry>)		V

AI: Mancozeb

70B Ridgebury:

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	L	L
Solution:	I (f<dry>)	H	H
Adsorbed:	I (f<dry>)		L

255B Windsor:

Loss Potential	Human Hazard	Fish Hazard
V (f<dry>)	L	L
L (f<dry>)	I	I
L (f<dry>)		L

311B Woodbridge:

Loss Potential	Human Hazard	Fish Hazard
V (f<dry>)	L	L
I (f<dry>)	H	H
L (f<dry>)		L

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

70B Ridgebury	255B Windsor	311B Woodbridge
80% FSL Hydro: C	80% LS Hydro: A	80% FSL Hydro: C
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% 5.5 H1 Depth: 5	OM% 1 H1 Depth: 12	OM% 6 H1 Depth: 9

ACTIVE INGREDIENTS

AI: Mefenoxam

70B Ridgebury

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V

255B Windsor

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V

311B Woodbridge

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V

AI: Mefluidide

70B Ridgebury

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

255B Windsor

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

311B Woodbridge

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

AI: Mesotrione

70B Ridgebury

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	V
Adsorbed:	L (f<dry>)		V

255B Windsor

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	V
Adsorbed:	L (f<dry>)		V

311B Woodbridge

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	V
Adsorbed:	L (f<dry>)		V

AI: Mesotrione

70B Ridgebury

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	V
Adsorbed:	L (f<dry>)		V

255B Windsor

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	V
Adsorbed:	L (f<dry>)		V

311B Woodbridge

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	L	V
Adsorbed:	L (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

70B Ridgebury	255B Windsor	311B Woodbridge
80% FSL Hydro: C	80% LS Hydro: A	80% FSL Hydro: C
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% 5.5 H1 Depth: 5	OM% 1 H1 Depth: 12	OM% 6 H1 Depth: 9

ACTIVE INGREDIENTS

AI: Metconazole

70B Ridgebury

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	L
Adsorbed:	I (f<dry>)		V

255B Windsor

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<dry>)	V	L
Solution:	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V

311B Woodbridge

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V

AI: Metsulfuron-methyl

70B Ridgebury

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

255B Windsor

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	I (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

311B Woodbridge

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

AI: Mono- and di- potassium salts of phosphorous acid

70B Ridgebury

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		L

255B Windsor

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	I (f<dry>)	V	I
Solution:	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		L

311B Woodbridge

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		L

AI: Myclobutanil

70B Ridgebury

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V

255B Windsor

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	L (f<dry>)	V	L
Solution:	L (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V

311B Woodbridge

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	L
Adsorbed:	L (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

70B Ridgebury	255B Windsor	311B Woodbridge
80% **FSL** Hydro: **C**	80% **LS** Hydro: **A**	80% **FSL** Hydro: **C**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **5.5** H1 Depth: **5**	OM% **1** H1 Depth: **12**	OM% **6** H1 Depth: **9**

ACTIVE INGREDIENTS

AI: Oxadiazon

70B Ridgebury:

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	L	L
Solution:	L (f<dry>)	I	I
Adsorbed:	I (f<dry>)		L

255B Windsor:

Loss Potential	Human Hazard	Fish Hazard
V (f<dry>)	L	L
L (f<dry>)	I	I
L (f<dry>)		L

311B Woodbridge:

Loss Potential	Human Hazard	Fish Hazard
V (f<dry>)	L	L
L (f<dry>)	I	I
L (f<dry>)		L

AI: Paclobutrazol

70B Ridgebury:

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

255B Windsor:

Loss Potential	Human Hazard	Fish Hazard
I (f<dry>)	V	V
L (f<dry>)	V	V
L (f<dry>)		V

311B Woodbridge:

Loss Potential	Human Hazard	Fish Hazard
V (f<dry>)	V	V
I (f<dry>)	V	V
L (f<dry>)		V

AI: Pendimethalin

70B Ridgebury:

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	L
Solution:	L (f<dry>)	L	I
Adsorbed:	I (f<dry>)		V

255B Windsor:

Loss Potential	Human Hazard	Fish Hazard
V (f<dry>)	V	L
L (f<dry>)	L	I
L (f<dry>)		V

311B Woodbridge:

Loss Potential	Human Hazard	Fish Hazard
V (f<dry>)	V	L
L (f<dry>)	L	I
L (f<dry>)		V

AI: Penoxsulam

70B Ridgebury:

	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V

255B Windsor:

Loss Potential	Human Hazard	Fish Hazard
L (f<dry>)	V	V
L (f<dry>)	V	V
L (f<dry>)		V

311B Woodbridge:

Loss Potential	Human Hazard	Fish Hazard
V (f<dry>)	V	V
L (f<dry>)	V	V
L (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

70B Ridgebury	255B Windsor	311B Woodbridge
80% **FSL** Hydro: **C**	80% **LS** Hydro: **A**	80% **FSL** Hydro: **C**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **5.5** H1 Depth: **5**	OM% **1** H1 Depth: **12**	OM% **6** H1 Depth: **9**

ACTIVE INGREDIENTS

AI: Permethrin, mixed cis,trans

	Loss Potential	Human Hazard	Fish Hazard	Loss Potential	Human Hazard	Fish Hazard	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<drv>)	V	I	V (f<drv>)	V	I	V (f<drv>)	V	I
Solution:	L (f<drv>)	L	H	L (f<drv>)	L	H	L (f<drv>)	L	H
Adsorbed:	L (f<drv>)		V	L (f<drv>)		V	L (f<drv>)		V

AI: Polyoxin D zinc salt

	Loss Potential	Human Hazard	Fish Hazard	Loss Potential	Human Hazard	Fish Hazard	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<drv>)	?	?	I (f<drv>)	?	?	V (f<drv>)	?	?
Solution:	L (f<drv>)	?	?	L (f<drv>)	?	?	L (f<drv>)	?	?
Adsorbed:	L (f<drv>)		?	L (f<drv>)		?	L (f<drv>)		?

AI: Primisulfuron-methyl

	Loss Potential	Human Hazard	Fish Hazard	Loss Potential	Human Hazard	Fish Hazard	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<drv>)	V	V	I (f<drv>)	I	V	V (f<drv>)	V	V
Solution:	I (f<drv>)	I	V	L (f<drv>)	L	V	I (f<drv>)	I	V
Adsorbed:	L (f<drv>)		V	L (f<drv>)		V	L (f<drv>)		V

AI: Prodiamine

	Loss Potential	Human Hazard	Fish Hazard	Loss Potential	Human Hazard	Fish Hazard	Loss Potential	Human Hazard	Fish Hazard
Leaching:	V (f<drv>)	V	V	V (f<drv>)	V	V	V (f<drv>)	V	V
Solution:	L (f<drv>)	L	L	L (f<drv>)	L	L	L (f<drv>)	L	L
Adsorbed:	I (f<drv>)		V	L (f<drv>)		V	L (f<drv>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

70B Ridgebury	255B Windsor	311B Woodbridge
80% FSL Hydro: C	80% LS Hydro: A	80% FSL Hydro: C
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% 5.5 H1 Depth: 5	OM% 1 H1 Depth: 12	OM% 6 H1 Depth: 9

ACTIVE INGREDIENTS

AI: Propamocarb hydrochloride

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Propiconazole

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	L	V	L (f<dry>)	I	L	V (f<dry>)	L	V
Solution:	I (f<dry>)	H	L	L (f<dry>)	I	L	I (f<dry>)	H	L
Adsorbed:	I (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Pyraclostrobin

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	L	V (f<dry>)	V	L	V (f<dry>)	V	L
Solution:	I (f<dry>)	V	H	L (f<dry>)	V	I	I (f<dry>)	V	H
Adsorbed:	I (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Quinclorac

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	I (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	V	L (f<dry>)	V	V	I (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

70B Ridgebury	255B Windsor	311B Woodbridge
80% **FSL** Hydro: **C**	80% **LS** Hydro: **A**	80% **FSL** Hydro: **C**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **5.5** H1 Depth: **5**	OM% **1** H1 Depth: **12**	OM% **6** H1 Depth: **9**

ACTIVE INGREDIENTS

AI: Siduron

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	L (f<dry>)	V	L	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	I	L (f<dry>)	V	L	I (f<dry>)	V	I
Adsorbed:	L (f<dry>)		L	L (f<dry>)		L	L (f<dry>)		L

AI: Spinosyn A

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Spinosyn D

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Sulfentrazone

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	I (f<dry>)	L	V	V (f<dry>)	V	V
Solution:	I (f<dry>)	L	V	L (f<dry>)	L	V	I (f<dry>)	L	V
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

70B Ridgebury	255B Windsor	311B Woodbridge
80% **FSL** Hydro: **C**	80% **LS** Hydro: **A**	80% **FSL** Hydro: **C**
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% **5.5** H1 Depth: **5**	OM% **1** H1 Depth: **12**	OM% **6** H1 Depth: **9**

ACTIVE INGREDIENTS

AI: Tebuconazole

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	L (f<dry>)	L	L	V (f<dry>)	V	V
Solution:	I (f<dry>)	I	I	L (f<dry>)	L	L	I (f<dry>)	I	I
Adsorbed:	I (f<dry>)		L	L (f<dry>)		L	L (f<dry>)		L

AI: Thiophanate-methyl

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	L	V (f<dry>)	V	L	V (f<dry>)	V	L
Solution:	L (f<dry>)	L	I	L (f<dry>)	L	I	L (f<dry>)	L	I
Adsorbed:	L (f<dry>)		L	L (f<dry>)		L	L (f<dry>)		L

AI: Triadimefon

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	L (f<dry>)	L	L	V (f<dry>)	V	V
Solution:	I (f<dry>)	I	L	L (f<dry>)	L	L	I (f<dry>)	I	L
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Triadimenol

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	L (f<dry>)	L	V	V (f<dry>)	V	V
Solution:	I (f<dry>)	I	V	L (f<dry>)	L	V	I (f<dry>)	I	V
Adsorbed:	I (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

70B Ridgebury	255B Windsor	311B Woodbridge
80% FSL Hydro: C	80% LS Hydro: A	80% FSL Hydro: C
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% 5.5 H1 Depth: 5	OM% 1 H1 Depth: 12	OM% 6 H1 Depth: 9

ACTIVE INGREDIENTS

AI: Trichlorfon

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	L	V	I (f<dry>)	H	I	V (f<dry>)	L	V
Solution:	L (f<dry>)	I	L	L (f<dry>)	I	L	L (f<dry>)	I	L
Adsorbed:	L (f<dry>)		L	L (f<dry>)		L	L (f<dry>)		L

AI: Triclopyr

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	I (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	V	L (f<dry>)	V	V	I (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Trifloxystrobin

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	L	V (f<dry>)	V	L	V (f<dry>)	V	L
Solution:	L (f<dry>)	V	I	L (f<dry>)	V	I	L (f<dry>)	V	I
Adsorbed:	L (f<dry>)		L	L (f<dry>)		L	L (f<dry>)		L

AI: Trifluralin

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	I	V (f<dry>)	V	I	V (f<dry>)	V	I
Solution:	L (f<dry>)	L	H	L (f<dry>)	L	H	L (f<dry>)	L	H
Adsorbed:	I (f<dry>)		L	L (f<dry>)		L	L (f<dry>)		L

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

70B Ridgebury	255B Windsor	311B Woodbridge
80% FSL Hydro: C	80% LS Hydro: A	80% FSL Hydro: C
Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610	Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610
OM% 5.5 H1 Depth: 5	OM% 1 H1 Depth: 12	OM% 6 H1 Depth: 9

ACTIVE INGREDIENTS

AI: Trinexapac-ethyl

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	V (f<dry>)	V	V	V (f<dry>)	V	V
Solution:	L (f<dry>)	V	V	L (f<dry>)	V	V	L (f<dry>)	V	V
Adsorbed:	L (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: Vinclozolin

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	L	V	L (f<dry>)	I	L	V (f<dry>)	L	V
Solution:	L (f<dry>)	I	L	L (f<dry>)	I	L	L (f<dry>)	I	L
Adsorbed:	L (f<dry>)		L	L (f<dry>)		L	L (f<dry>)		L

AI: boscalid

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	V	V	L (f<dry>)	V	L	V (f<dry>)	V	V
Solution:	I (f<dry>)	V	L	L (f<dry>)	V	L	I (f<dry>)	V	L
Adsorbed:	I (f<dry>)		V	L (f<dry>)		V	L (f<dry>)		V

AI: lambda-Cyhalothrin

	70B Loss Potential	70B Human Hazard	70B Fish Hazard	255B Loss Potential	255B Human Hazard	255B Fish Hazard	311B Loss Potential	311B Human Hazard	311B Fish Hazard
Leaching:	V (f<dry>)	L	I	V (f<dry>)	L	I	V (f<dry>)	L	I
Solution:	L (f<dry>)	I	H	L (f<dry>)	I	H	L (f<dry>)	I	H
Adsorbed:	L (f<dry>)		L	L (f<dry>)		L	L (f<dry>)		L

Soil / Pesticide Interaction Loss Potential and Hazard Rating Report

L E G E N D

X -- eXtra high
H -- High
I -- Intermediate
L -- Low
V -- Very low

Conditions that affect ratings:
(none) -- Broadcast application (default); applied to more than 1/2 the field
b -- Banded application; applied to 1/2 the field or less
p -- Spot application; applied to 1/10th of the field or less

(none) -- Surface applied (default); applied to the soil surface
i -- Soil incorporated; with light tillage or irrigation
f -- Foliar application; directed spray at nearly full crop/weed canopy

(none) -- Standard application rate (default); greater than 1/4 lb/acre
l -- Low rate of application; 1/10 to 1/4 lb/acre
 -- Ultra Low rate of application; 1/10 lb/acre or less

m -- There are surface connected macropores (cracks) that go at least 24 inches deep.
w -- The high water table comes within 24" of the surface during the growing season.
s -- The field slope is greater than 15%.

<none> -- Default condition for all climates that have rainfall/irrigation after pesticide application
<dry> -- Exception for arid climates that have a low probability of rainfall and no irrigation afer pesticide application

SPISP II I-Ratings:
Leaching -- Soil / Pesticide Interaction Leaching Potential
Solution -- Soil / Pesticide Interaction Solution Runoff Potential
Adsorbed -- Soil / Pesticide Interaction Adsorbed Runoff Potential

Soil Sensitivity to Pesticide Loss Rating Report

Hampden and Hampshire Counties, Massachusetts, Eastern Part: MA610

Musym	Seq	%	Name	Texture	Hydro	Kfactor	Depth	OM%	Leaching	Runoff Solution	Runoff Adsorbed
407C	1	80	Charlton	FSL	B	0.2	2	6	H	I	I
			Slope greater than 15%: False Cracks (macropores) deeper than 24": False High Water Table within 24": False								
407D	1	85	Charlton	FSL	B	0.2	2	6	H	I	H (s)
			Slope greater than 15%: True Cracks (macropores) deeper than 24": False High Water Table within 24": False								
305B	1	85	Paxton	FSL	C	0.24	8	3.5	L	H	H
			Slope greater than 15%: False Cracks (macropores) deeper than 24": False High Water Table within 24": False								
70B	1	80	Ridgebury	FSL	C	0.24	5	5.5	L	H	H
			Slope greater than 15%: False Cracks (macropores) deeper than 24": False High Water Table within 24": False								
255B	1	80	Windsor	LS	A	0.17	12	1	H	L	L
			Slope greater than 15%: False Cracks (macropores) deeper than 24": False High Water Table within 24": False								
311B	1	80	Woodbridge	FSL	C	0.2	9	6	L	H	I
			Slope greater than 15%: False Cracks (macropores) deeper than 24": False High Water Table within 24": False								

Soil Sensitivity to Pesticide Loss Rating Report

Musym	Seq	%	Name	Texture	Hydro	Kfactor	Depth	OM%	Leaching	Runoff Solution	Runoff Adsorbed

LEGEND

H -- High
I -- Intermediate
L -- Low
V -- Very Low

Conditions that affect ratings:
- m -- There are surface connected macropores (cracks) that go at least 24 inches deep.
- w -- The high water table comes within 24" of the surface during the growing season.
- s -- The field slope is greater than 15%.

SPISP II Soil Ratings:
- Leaching -- Soil Leaching Potential
- Runoff - Solution -- Soil Solution Runoff Potential
- Runoff - Adsorbed -- Soil Adsorbed Runoff Potential

APPENDIX F

D R A F T
STORMWATER POLLUTION PREVENTION PLAN

BRYNWOOD GOLF & COUNTRY CLUB

568 BEDFORD ROAD (NY 22)
TOWN OF NORTH CASTLE
WESTCHESTER COUNTY, NEW YORK

Applicant/Operator/ Owner: **Brynwood Partners, LLC**
505 Fifth Avenue
New York, NY 10017
Contact: Jeffrey B. Mendell
Phone: (203) 531-7480 Ext. 25

Prepared by: JMC
JOHN MEYER CONSULTING, PC

120 Bedford Road
Armonk, NY 10504

JMC Project 10126

Draft: 03/13/2013

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REFERENCED DRAWINGS FOR SWPPP DESIGN AND DETAILS

JOHN MEYER CONSULTING, PC SITE PLANS

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OEC-1	"Overall Existing Conditions Plan"
OLP-1	"Overall Site Layout Plan"
OGP-1	"Overall Site Grading Plan"
OES-1	"Overall Erosion and Sediment Control Plan"
SP-1	"Site Layout Plan"
SP-2	"Site Grading Plan"
SP-3	"Site Utilities Plan"

HART HOWERTON PARTNERS, LTD. PLANS

Dwg. No.	Title
	"Landscape Concept Plan"

I. INTRODUCTION

This Stormwater Pollution Prevention Plan (SWPPP) has been prepared for the 156.3 acre Brynwood Golf and Club site, located in the Town of North Castle, Westchester County, New York (hereinafter referred to as the "Site"). The site is bordered by Bedford Road (NY 22) to the east and Interstate 684 to the west. The development has been designed in accordance with the following:

- Requirements of the New York State Department of Environmental Conservation (NYSDEC) SPDES General Permit No. GP-0-10-001, effective January 29, 2010.
- Chapter 173 “Stormwater Management” of the Town of North Castle Zoning Code.

The site is currently a golf and country club. Brynwood Partners, LLC is proposing to redevelop the site within an 88-unit residential community and renovate the existing clubhouse, recreational facilities and 18-hole golf course.

II. STORMWATER MANAGEMENT PLANNING

In order to be eligible for coverage under the NYSDEC SPDES General Permit No. GP-0-10-001 for Stormwater Discharges from Construction Activities, the Stormwater Pollution Prevention Plan (SWPPP) includes stormwater management practices (SMP's) from the publication "New York State Stormwater Management Design Manual," last revised August 2010.

A Stormwater Pollution Prevention Plan has been prepared for this project because it is a construction activity that involves soil disturbance of more than one acre of land.
The proposed stormwater facilities have been designed such that the quantity and quality of stormwater runoff during and after construction are not adversely altered or are enhanced when compared to pre-development conditions.

Based on the GIS information provided by the website of the New York State Office of Parks, Recreation and Historic Places, the site does not contain, nor is it immediately adjacent to any properties listed on the State or National Register of Historic Places.

The Five Step Process for Stormwater Site Planning and Practice Selection

Stormwater management using green infrastructure is summarized in the five step process described below. The five step process was adhered to when developing this SWPPP. Information is provided in this SWPPP which documents compliance with the required process as follows:

Step 1: Site Planning

Implement planning practices that protect natural resources and utilize the hydrology of the site. Strong consideration must be given to reducing impervious cover to aid in the preservation of natural resources including protecting natural areas, avoiding sensitive areas and minimizing grading and soil disturbance.

Step 2: Determine Water Quality Treatment Volume (WQv)

Determine the required WQv for the site based on the site layout, impervious areas and sub-catchments. This initial calculation of WQv will have to be revised after green infrastructure techniques are applied. The following method has been used to calculate the WQv.

- **90% Rule -** According to the New York State Stormwater Design Manual, Section 4.1, the water quality volume is determined from the 90% rule. The method is based on 90% of the average annual stormwater runoff volume which must be provided due to impervious surfaces. The Water Quality Volume (denoted as the WQv) is designed to improve water quality sizing to capture and treat 90% of the average annual stormwater runoff volume. The WQv is directly related to the amount of impervious cover created at a site. The average rainfall storm depth for 90% of storms in New York State in one year is used to calculate a volume of runoff. The rainfall depth depends on the location of the site within the state. From this depth of rainfall, the required water quality volume is calculated.

<u>Step 3: Runoff Reduction Volumes (RRv) by Applying Green Infrastructure Techniques and Standard SMP's</u>

RRv is required for this project since it is a combination of both new development and redevelopment.

Green infrastructure techniques or standard SMP's with RRv capacity can potentially reduce the required WQv by incorporating combinations of green infrastructure techniques and standard SMP's within each drainage area on the site.

Green infrastructure techniques are grouped into two categories:

- Practices resulting in a reduction of contributing area such as preservation/restoration of conservation areas, vegetated channels, etc.
- Practices resulting in a reduction of contributing volume such as green roofs, stormwater planters, and rain gardens.

Apply a combination of green infrastructure techniques and standard SMPs with RRv capacity to provide 100% of the WQv calculated in Step 2. If the RRv calculated in this step is greater than or equal to the WQv in Step 2, the RRv requirement has been met and Step 4 can be skipped. If the RRv provided cannot meet or exceed 100% of the WQv, the project must, at a minimum, reduce a percentage of the runoff from impervious areas to be constructed on the site. The percent reduction is based on the Hydrologic Soil Group(s) (HSG) of the site and is defined as Specific Reduction Factor (S).

The following green infrastructure techniques and practices are provided to meet the minimum RRv:

- **Conservation of Natural Areas**
- **Sheet Flow to Riparian Buffers or Filter Ships**
- **Vegetated Swales**
- **Tree Planting/Tree Pits**
- **Disconnection of Rooftop Runoff**
- **Stream Daylighting**
- **Rain Gardens**
- **Green Roofs**
- **Stormwater Planters**
- **Rain Barrels and Asterns**
- **Porous Paving**
- **Standard Practices with RRv Capacity**
    - **Stormwater Filtering Systems**
    - **Infiltration Practices**

The Minimum RRv capacity required must be provided by green infrastructure techniques to verify that the RRv requirement has been met. The RRv that is provided by the green infrastructure techniques can then be subtracted from the Total Required WQv that must be provided by the SMP's.

<u>Step 4: Apply Standard Stormwater Management Practices to Address Remaining Water Quality Volume</u>

Apply the standard SMP's to meet additional water quality volume requirements that cannot be addressed by applying the green infrastructure techniques. The standard SMP's with RRv capacity must be implemented to verify that the RRv requirement has been met.

<u>Step 5: Apply Volume and Peak Rate Control Practices to Meet Water Quantity Requirements</u>

The Channel Protection Volume (CPv), Overbank Flood Control (Qp) and Extreme Flood Control (Qf) must be met for the plan to be completed. This is accomplished by using practices such as infiltration basins, dry detention basins, etc. to meet water quantity requirements. The following standards must be met:

- Infiltrations Basins
- Stormwater Ponds

1. Stream Channel Protection (CPv)

Stream Channel Protection Volume Requirements (CPv) are designed to protect stream channels from erosion. In New York State this goal is accomplished by providing 24-hour extended detention of the one-year, 24-hour storm event, remained from runoff reduction. Reduction of runoff for meeting stream channel protection objectives, where site conditions allow, is encouraged and the volume reduction achieved through green infrastructure can be deducted from CPv. Trout waters may be exempted from the 24-hour ED requirement, with only 12 hours of extended detention required to meet this criterion. Detention time may be calculated using either a center of mass method or plug flow calculation method.

CPv is not required because reduction of the entire CPv volume is achieved at a site through green infrastructure and infiltration systems.

2. Overbank Flood (Qp) which is the 10 year storm.

Overbank control requires storage to attenuate the post development 10-year, 24-hour peak discharge rate (Qp) to predevelopment rates.

The overbank flood control requirement (Qp) does not apply in certain conditions, including:

- The site discharges directly tidal waters or fifth order (fifth downstream) or larger streams.

- A downstream analysis reveals that overbank control is not needed.

3. **Extreme Storm (Qf) which is the 100 year storm.**

100 Year Control requires storage to attenuate the post development 100-year, 24-hour peak discharge rate (Qf) to predevelopment rates.

The 100-year storm control requirement can be waived if:

- The site discharges directly tidal waters or fifth order (fifth downstream) or larger streams.
- Development is prohibited within the ultimate 100-year floodplain
- A downstream analysis reveals that 100-year control is not needed.

Based on the foregoing, this project is eligible for coverage under NYSDEC SPDES General Permit No. GP-0-10-001.

III. STUDY METHODOLOGY

Runoff rates were calculated based upon the standards set forth by the United States Department of Agriculture Natural Resources Conservation Service Technical Release 55, Urban Hydrology for Small Watersheds (TR-55), dated June 1986. The methodology set forth in TR-55 considers a multitude of characteristics for watershed areas including soil types, soil permeability, vegetative cover, time of concentration, topography, rainfall intensity, ponding areas, etc.

The 1, 10, 25, and 100 year storm recurrence intervals were reviewed in the design of the stormwater management facilities (see Appendices A & B Existing/Proposed Hydrologic Calculations).

Anticipated drainage conditions were analyzed taking into account the rate of runoff which will result from the construction of buildings, parking areas and other impervious surfaces associated with the site development.

Base Data and Design Criteria

For the stormwater management analysis, the following base information and methodology were used:

1. The site drainage patterns and outfall facilities were reviewed by John Meyer Consulting personnel for the purpose of gathering background data and confirming existing mapping of the watershed areas.

2. An Existing Drainage Area Map was developed from the topographical survey. The drainage area map reflects the existing conditions within and around the project area.

3. A Proposed Drainage Area Map was developed from the proposed grading design superimposed over the topographical survey. The drainage area map reflects the proposed conditions within the project area and the existing conditions to remain in the surrounding area.

4. The United States Department of Agriculture (USDA) Web Soil Survey of the site available on its website at http://websoilsurvey.nrcd.usda.gov.

5. The United States Department of Agriculture Natural Resources Conservation Service National Engineering Handbook, Section 4 - Hydrology", dated March 1985.

6. The United States Department of Agriculture Natural Resources Conservation Service Technical Report No. 55, Urban Hydrology for Small Watersheds (TR-55), dated June 1986.

7. United States Department of Commerce Weather Bureau Technical Release No. 40 Rainfall Frequency Atlas of the United States.

8. The time of concentration was calculated using the methods described in Chapter 3 of TR-55, Second Edition, June 1986. Manning's kinematics wave equation was used to determine the travel time of sheet flow. The 2-year 24 hour precipitation amount of 3.42 inches was used in the equation for all storm events. The travel time for shallow concentrated flow was computed using Figure 3-1 and Table 3-1 of TR-55. Manning's Equation was used to determine the travel time for channel reaches.

9. All hydrologic calculations were performed with the Bentley PondPack V8i software package.

10. The New York State Stormwater Management Design Manual, revised August 2010.

11. New York Standards and Specifications for Erosion and Sediment Control, August 2005.

12. The storm flows for the 1, 10, 25, and 100 year recurrence interval storms were analyzed for the total watershed areas. The Type III distribution design storm for a 24 hour duration was used and the mass rainfall for each design storm is as follows:

24 Hour Rainfall Amounts

Design Storm Recurrence Interval	Inches of Rainfall
1 Year	2.81
10 Year	5.12
25 Year	6.44
100 Year	9.14

IV. EXISTING CONDITIONS

The site is currently a golf and country club. It consists of a clubhouse building with 22 guest suites, an outdoor pool and terrace and an 18-hole golf course with a driving range and practice putting and chipping greens, and associated parking, driveways and landscaping; There are 14 tennis courts to the north of the clubhouse. The site also includes a maintenance building, a wastewater treatment plant building, a golf cart storage building, a snack bar building and a tennis building.

The following natural features, conservation areas, resource areas and drainage patterns of the project site have been identified and utilized to develop Drawing DA-1 “Existing Drainage Area Map” which is included in Appendix J:

- Wetlands
- Waterways
- Wetland buffers
- Forest, vegetative cover
- Topography (contour lines, existing flow paths, steep slopes, etc.)
- Soil (hydrologic soil groups, highly erodible soils, etc.)
- Bedrock, significant geology features

Based on the USDA Web soil survey, all on-site soils (within the drainage area) are well drained, moderately well drained, somewhat excessively drained and excessively drained and belong to hydrologic groups B and C. The soil types, boundaries and drainage areas/designations are depicted on Drawing DA-1 within Appendix J. The majority of the site, designated as Existing Drainage Area 1, is within the Bryam River Watershed. A small portion of the site, designated as Existing Drainage Area 2, is within the Mianus River Watershed.

Six separate Discharge Points were identified for comparing peak rates of runoff in existing and proposed conditions.

The following is a description of each of the drainage areas analyzed in the existing conditions analysis:

Existing Drainage Area 1A (EDA 1A) is 15.66 acres and consists of hole seven, portions of holes 5 and 6, and woods. Stormwater runoff from EDA 1A flows west and discharges to a wetland at the southwest corner of the site, designated as Discharge Point 1A (DP 1A).

Existing Drainage Area 1B (EDA 1B) is 11.42 acres and consists of portions of holes 5 and 6, as well as woods. Stormwater runoff from EDA 1B flows west to a small wetland along the western property line designated as Discharge Point 1B (DP 1B).

<u>Existing Drainage Area 1C</u> is further divided into ten sub-drainage areas (EDA 1C-1 through EDA 1C-10). Stormwater runoff from sub-drainage areas EDA 1C-1 through EDA 1C-8 flows east and west to ponds and water courses that eventually discharge from the site at Discharge Point 1C-6 (DP 1C-6).

<u>Existing Drainage Area 1C-1 (EDA 1C-1)</u> is 9.66 acres and consists of the majority of hole 8 and a portion of hole 2, woods and Pond 1. Stormwater runoff from EDA 1C-1 flows west to Pond 1. Pond 1 outlets to the north to Pond 2 via two 12” pipes.

<u>Existing Drainage Area 1C-2 (EDA 1C-2)</u> is 53.26 acres and consists of holes 9 and 18, portions of holes 1, 3, 4 and 17, the existing club house, parking lot, pool area, cart shed, maintenance building, eight tennis courts, driveways and woods. EDA 1C-2 also includes off-site school and residential property to the east. Stormwater runoff from the club core areas is collected by roof drains and drain inlets and is piped down to Pond 2. Stormwater runoff from the golf course areas flows east and west to Pond 2. Pond 2 outlets to Pond 3 via a vertical rectangular weir.

<u>Existing Drainage Area 1C-3 (EDA 1C-3)</u> is 6.54 acres and consists of portions of holes 3 and 17, woods and Pond 3. Stormwater runoff from EDA 1C-3 flows east and west to Pond 3. Pond 3 outlets to Pond 6 via two 10” pipes.

<u>Existing Drainage Area 1C-4 (EDA 1C-4)</u> is 4.85 acres and consists of portions of holes 3, 4 and 17, woods and Pond 6. Stormwater runoff from EDA 1C-4 flows east and west to Pond 6. Pond 6 outlets to a water course via a stone weir.

<u>Existing Drainage Area 1C-5 (EDA 1C-5)</u> is 2.56 acres and consists of the existing wastewater treatment plant building, woods and a small pond. The small pond outlets to the north, via a 24” pipe under hole 16, to a watercourse.

Existing Drainage Area 1C-6 (EDA 1C-6) is 13.07 acres and consists of the majority of the driving range, hole 16 and woods. Stormwater runoff from EDA 1C-6 flows overland to an existing watercourse which flows west to Discharge Point 1C-6 (DP 1C-6).

Existing Drainage Area 1C-7 (EDA 1C-7) is 5.67 acres and consists of the northern portion of the driving range, a portion of hole 14, woods and Pond 4. Stormwater runoff from EDA 1C-7 flows west to Pond 4. Pond 4 outlets to Pond 5 via a vertical rectangular weir.

Existing Drainage Area 1C-8 (EDA 1C-8) is 8.99 acres and consists of portions of holes 13, 14 and 15, woods and Pond 5. Stormwater runoff from EDA 1C-8 flows west to Pond 5. An outlet control structure for Pond 5 discharges to the watercourse in EDA 1C-6 via a 30 inch pipe.

Existing Drainage Area 1C-9 (EDA 1C-9) is 6.68 acres and consists of portions of holes 13, 14 and 15. Stormwater runoff from EDA 1C-9 flows west to Discharge Point 1C-9 (DP 1-9).

Existing Drainage Area 1C-10 (EDA 1C-10) is 20.02 acres and consists of holes 10, 11 and 12, a tennis court and woods. EDA 1C-10 also includes off-site residential area to the east. Stormwater runoff from EDA 1C-10 flows west to a swale and then north and discharges to a wetland designated as Discharge Point 1C-10 (DP 1C-10).

Existing Drainage Area 2 (EDA 2) is within the Mianus River Watershed. EDA 2 is 3.37 acres and consists of three tennis courts, driveways, grassed areas and woods. Stormwater runoff from EDA 2 flows east to a swale and then south, under the existing driveway and discharges to the west via a culvert under Route 22 at Discharge Point 2 (DP 2).

The existing peak rates of runoff for each storm are shown in the table below:

Table 1
Summary of Existing Peak Rates of Runoff in Existing Conditions
(Cubic Feet per Second)

Storm Recurrence Interval	DP 1A	DP 1B	DP 1C-6	DP 1C-9	DP 1C-10	DA 1 (Byram)	DA 2 (Mianus)
1 year	1.81	1.11	6.18	2.39	2.76	14.25	2.40
10 year	16.53	11.50	38.44	11.73	22.70	100.90	7.91
25 year	28.28	19.95	82.69	18.37	38.08	187.37	11.41
100 year	55.59	39.72	328.44	33.14	73.55	530.44	18.82

The existing volumes of runoff are shown in the table below:

Table 2
Summary of Existing Runoff Volumes
(Cubic Feet)

Storm Recurrence Interval	DP 1A	DP 1B	DP 1C-6	DP 1C-9	DP 1C-10	DA 1 (Byram)	DA 2 (Mianus)
1 year	15,133	9,931	314,121	11,056	21,383	371,624	9,643
10 year	77,687	53,809	723,513	43,818	104,386	1,003,213	30,046
25 year	125,500	87,815	1,062,958	67,096	166,989	1,510,358	43,459
100 year	238,686	168,902	1,907,078	120,105	314,156	2,748,927	72,765

V. PROPOSED CONDITIONS

Brynwood Partners, LLC proposes to renovate the existing clubhouse, construct a new pool area, construct a Fairway Residences building to the west of the existing parking lot and construct new parking, driveways, sidewalks and landscaping. The construction of a variety of residential buildings including Club Villas, Golf Residences and Golf Cottages is proposed to the north of the clubhouse along with the associated private roadways, sidewalks, driveways, parking areas and landscaping. Six tennis courts will be constructed between the proposed residential development and the clubhouse. The golf course will be renovated and improved. The improvements include additional championship and forward tees, select rebuilding rebuilding of existing tees, constructing seven new greens, rebuilding, bunkers, additional fairway bunkers, relocating three golf holes and regarding of select fairways. The existing ponds will be expanded to improve surface water storage and increase capacity for golf course irrigation. A new maintenance facility is proposed in the vicinity of the existing wastewater treatment plant which includes a new wastewater treatment plant, a one story maintenance building, a two story storage/office building, a water storage tank and a water treatment plant. Various stormwater management facilities are proposed to provide mitigation for water quality and water quantity.

The on-site stormwater runoff from the impervious surface including building rooftops, driveway, parking areas and sidewalks will be collected and conveyed by drainage manholes and catch basins to a network of high density polyethylene (HDPE) drain pipe installed underground with discharges to proposed water quality mitigation facilities and surface and subsurface stormwater infiltration systems.

Furthermore, in addition to these practices, the overall design of the project is consistent with the latest trends in Low Impact Development which includes multiple "disconnected" impervious areas. The combination of stormwater ponds, bioretention and rain gardens provide redundant opportunities to enhance water quality and mitigate stormwater runoff rates from the development areas. This will result in additional infiltration not considered in the SWPPP's hydrologic model, resulting in a conservative analysis.

This section describes the design and analysis of the proposed conditions used to demonstrate that the SWPPP meets the requirements of the General Permit.

The Five Step Process For Stormwater Site Planning and Practice Selection

Step 1: Site Planning

The following practices and site features were incorporated in the site design:

- Preserving hydrology - Maintaining drainage divides
- Wetlands and buffers

- Forest, vegetative cover – The maximum amount of forest and vegetative cover has been maintained.
- Topography (contour lines, existing flow paths, steep slopes, etc.) has been disturbed to the minimum extent practicable.
- Soil (hydrologic soil groups, highly erodible soils, etc.)
- Bedrock, significant geology features have been accounted for.

Step 2: Determine Water Quality Treatment Volume (WQv)

According to the New York State Stormwater Design Manual, Section 4.1, the water quality volume is determined from the 90% rule.

Drainage Area	Water Quality Volume Required (CF)
PDA 1C-2-2	7,428
PDA 1C-2-6	2,374
PDA 1C-2-7	27,196

Step 3: Runoff Reduction Volumes (RRv) by Applying Green Infrastructure Techniques and Standard SMP's

- **Rain Gardens**
  Rain gardens are proposed to collect runoff from the rooftops of Club Villas.
- **Stormwater Planters**
  Stormwater Planters are proposed to collect runoff from the western portion of the rooftop of Fairway Residences.
- **Permeable Paving**
  FlexiPave and permeable pavers are proposed for parking areas and pavements, respectively.
- **Bioretention**

Bioretention systems are proposed to collect stormwater runoff from rooftops of Club Villas V-2 thru V-5, Golf Residences L-1 through L-3 and from parking areas and driveways near the golf cottages.

Water Quality Volume achieved using the green infrastructure techniques mentioned above is summarized below:

Drainage Area	**Water Quality Volume provided using Green Infrastructures (CF)**
PDA 1C-2-2	7,166
PDA 1C-2-6	903
PDA 1C-2-7	34,286

Step 4: Apply Standard Stormwater Management Practices to Address Remaining Water Quality Volume

INFILTRATION SYSTEMS

Infiltration Basin (I-2)

Description

An infiltration practice that stores the water quality volume in a shallow depression, before it is infiltrated it into the ground.

Manufactured Infiltration System

Description

An infiltration practice that stores the water quality volume in subsurface chambers before it is infiltrated.

Non Standard/Alternative SMP's to Address Remaining Water Quality Volume (for Redevelopment Projects)

- Hydrodynamic Separators

Step 5: Apply Volume and Peak Rate Control Practices to Meet Water Quantity Requirements

- **DETENTION PONDS**

  Description

  A practice that stores the water quantity volume and discharges it at a controlled rate.

All practices exceed the required elements of SMP criteria as outlined in Chapter 6 of the NYS Stormwater Management Design Manual. A summary of each category is provided below.

1. Feasibility – Stormwater infiltration systems are designed based upon unique physical environmental considerations noted in the NYS Stormwater Management Design Manual (NYSSMDM) Table 7.2 "Physical Feasibility Matrix".

2. Conveyance – The design conveys runoff to the designed stormwater infiltration systems in a manner that is safe, minimizes erosion and disruption to natural drainage channel and promotes filtering and infiltration.

3. Pretreatment – All stormwater management systems provide pretreatment in accordance with NYSSMDM design guidelines.
4. Treatment Geometry – The plan provides water quality treatment in accordance with NYSSMDM guidelines noted Table 6.1 "Water Quality Volume Distributing in Pond

Design".

5. Environmental/Landscaping – Extensive landscaping has been provided for each proposed practice to enhance pollutant removal and provide aesthetic enhancement to the property.

6. Maintenance – Maintenance for the environment practices has been provided and is contained with the SWPPP Report as required. Maintenance access is provided in the design plans.

In order to determine the post-development rates of runoff generated on-site, the following drainage areas were analyzed in the post-development conditions. These areas are graphically depicted on Drawing DA-2 "Proposed Drainage Area Map" located in Appendix "J".

Six separate Discharge Points were identified for comparing peak rates of runoff in existing and proposed conditions.

The following is a description of each of the drainage areas analyzed in the proposed conditions analysis:

<u>Proposed Drainage Area 1A (PDA 1A)</u> is 16.30 acres and is similar to EDA 1A with the following improvements; hole 7 will be completely renovated and the tees on hole 4 will be renovated.

<u>Proposed Drainage Area 1B (PDA 1B)</u> is 11.52 acres and is similar to EDA 1B with the following improvements; minor grading on hole 5, complete renovation of hole 6 and a new green and approach on hole 15. A water quality area is proposed on hole 6 between the tees and fairway.

<u>Proposed Drainage Area 1C</u> is further divided into ten sub-drainage areas (PDA 1C-1 through PDA 1C-10). Stormwater runoff from sub-drainage areas PDA 1C-1 through PDA 1C-8 flows east and west to ponds and watercourses that eventually discharge from the site at Discharge Point 1C-6 (DP 1C-6).

<u>Proposed Drainage Area 1C-1 (PDA 1C-1)</u> is 9.56 acres and is similar to EDA 1C-1 with the

following improvements; the tee and approach area on hole 2 will be renovated, hole 8 will be completely renovated and Pond 1 will be expanded to the south.

Proposed Drainage Area 1C-2 (PDA 1C-2) is further divided into seven sub-drainage areas PDA 1C-2-1 through PDA 1C-2-7.

Proposed Drainage Area 1C-2-1 (PDA 1C-2-1) is 40.83 acres and consists of the golf course and off-site areas of EDA 1C-2 with the following improvements; the tees and approach areas on holes 1, 9 and 18 will be renovated, the approach on hole 17 will be renovated, the tees on hole 3 will be renovated and the approach on hole 4 will be renovated. Pond 2 is proposed to be expanded to the southeast and southwest.

Proposed Drainage Area 1C-2-2 (PDA 1C-2-2) is 5.16 acres and consists of the renovated clubhouse, a new pool and terrace area, a Fairway Residences building to the west of the renovated parking area, new parking, driveways, sidewalks and landscaping. Stormwater runoff from PDA 1C-2-2 will be collected by drain inlets and roof drain leaders and piped to the existing storm drain system. Green infrastructure practices proposed within PDA 1C-2-2 are porous pavement for parking spaces, porous pavers for driveway and cart path areas and a stormwater planter for the west side of the Fairway Residences building. Stormwater runoff will be conveyed through a hydrodynamic water quality structure prior to discharging to the existing storm drain system.

Proposed Drainage Area 1C-2-3 (PDA 1C-2-3) is 0.48 acres and consists of the driveway to the north of the clubhouse area, as well as landscaped and grassed areas. Stormwater runoff will be conveyed through a hydrodynamic water quality quality structure and connect to a new storm drain system down to Pond 2.

Proposed Drainage Area 1C-2-4 (PDA 1C-2-4) is 1.39 acres and consists of a new wastewater treatment plant building, a covered storage area, a one-story maintenance building, a two-story storage/office building, a maintenance yard, driveway and grass areas. Green roofs are proposed for the wastewater treatment plant and the covered storage area. Stormwater runoff from the other buildings, the driveway and maintenance yard will be conveyed through a hydrodynamic water quality structure prior to discharging to a subsurface infiltration system which will outlet to an existing swale which leads down to Pond 2.

Proposed Drainage Area 1C-2-5 (PDA 1C-2-5) is 1.00 acres and consists of the six proposed tennis courts. Stormwater runoff from PDA 1C-2-5 would be collected by drains and conveyed to a subsurface infiltration system which will discharge to a new storm drain system down to Pond 2.

Proposed Drainage Area 1C-2-6 (PDA 1C-2-6) is 0.62 acres and consists of the Golf Cottage driveways, parking and a portion of Drive B. Stormwater runoff from PDA 1C-2-6 will be treated by a proposed bioretention area. The bioretention area will overflow to the proposed storm drain system down to Pond 2.

Proposed Drainage Area 1C-2-7 (PDA 1C-2-7) is 11.23 acres and consists of portions of Drives A and B, Drive C, five Golf Cottages, seven Golf Residences, seven Club Villas, sidewalks, driveways and grass and landscape areas. Stormwater runoff from PDA 1C-2-7 will be collected by drain inlets and roof drain leaders and piped to a proposed infiltration basin on the west side of the residential development. Green infrastructure practices proposed within PDA 1C-2-7 include porous pavement for parking, porous pavers for driveways, bioretention areas and rain gardens. The proposed infiltration basin will provide runoff reduction and water quality volume and the overflow from the basin will be piped to Discharge Point 1C-10. A bypass structure will divert the water quality flow to the infiltration basin and excess flows will be diverted to the proposed storm drain system down to Pond 2.

Proposed Drainage Area 1C-3 (PDA 1C-3) is 6.53 acres and is similar to EDA 1C-3 with the following improvements; the fairways on holes 3 and 17 will be regraded.

Proposed Drainage Area 1C-4-1 (PDA 1C-4-1) is 6.55 acres and is similar to EDA 1C-4 except for the addition of woods from EDA 1C-5 and the following improvements; renovations to the approach on hole 3, renovations to the hole 4 and 17 tees and expanding Pond 6 to the east.

Proposed Drainage Area 1C-4-2 (PDA 1C-4-2) is 0.23 acres and consists of a proposed water tank, water treatment plant and driveway area. Stormwater runoff from PDA 1C-4-2 will be collected by roof drain leaders and drain inlets and conveyed to a subsurface infiltration system under a tee on hole 17 which will discharge to the expanded Pond 6.

Proposed Drainage Area 1C-5 (PDA 1C-5) is 1.30 acres and consists of portions of new tees for holes 4, 14 and 16.

Proposed Drainage Area 1C-6 (PDA 1C-6) is 11.64 acres and is similar to EDA 1C-16 with the following improvements; new tees on holes 14 and 17, and the removal of the existing hole 15 green.

Proposed Drainage Area 1C-7 (PDA 1C-7) is 4.00 acres and consists of the golf course portion of EDA 1C-7 with the following improvements; new tees for holes 12 and 14.

Proposed Drainage Area 1C-8 (PDA 1C-8) is 10.47 acres and is similar to EDA 1C-8 with the following improvements; relocation of the tees on holes 12 and 13 and renovation of the green and approach on hole 11. A water quality area is proposed to the east of Pond 5.

Proposed Drainage Area 1C-9 (PDA 1C-9) is 9.46 acres and is similar to EDA 1C-9 with the addition of the portions of holes 11 and 12, and the following improvements; new fairway grading on hole 11, new green and fairway grading for hole 12, renovations to the hole 14 green area and new tees for hole 15.

Proposed Drainage Area 1C-10 (PDA 1C-10) is 12.29 acres and consists of a new hole 10 and new tees on hole 11. PDA 1C-10 also includes off-site residential area to the east. Stormwater runoff from PDA 1C-10 flows west to a proposed cart path, is collected by drain inlets and piped to a wetland designated as Discharge Point 1C-10 (DP 1C-10).

Proposed Drainage Area 2 (PDA 2) is within the Mianus River Watershed. PDA 2 is 1.89 acres and consists of driveways, grassed areas and woods. Stormwater runoff from PDA 2 flows east to a swale and then south, under the existing driveway and discharges to the west via a culvert under Route 22 at Discharge Point 2 (DP 2).

The peak rates of runoff to the design point of each of the analyzed drainage areas for each storm are shown on the table below:

Table 3
Summary of Proposed Peak Rates of Runoff
(Cubic Feet per Second)

Storm Recurrence Interval	DP 1A	DP 1B	DP 1C-6	DP 1C-9	DP 1C-10	DA 1 (Byram)	DA 2 (Mianus)
1 year	1.89	1.34	6.83	3.03	1.72	14.81	1.60
10 year	17.20	12.43	37.42	16.05	12.12	95.22	5.04
25 year	29.41	21.17	72.15	25.38	19.96	168.07	7.19
100 year	57.81	41.45	241.76	46.26	38.32	425.60	11.73

Table 4
Summary of Proposed Runoff Volumes
(Cubic Feet)

Storm Recurrence Interval	DP 1A	DP 1B	DP 1C-6	DP 1C-9	DP 1C-10	DA 1 (Byram)	DA 2 (Mianus)
1 year	15,739	11,139	357,362	14,466	14,387	413,093	5,766
10 year	80,798	57,179	725,648	59,477	67,094	990,196	17,513
25 year	130,526	92,369	1,067,095	91,814	106,357	1,488,161	25,170
100 year	248,245	175,671	1,874,092	165,890	198,052	2,661,950	41,823

VI. SOIL EROSION & SEDIMENT CONTROL

A potential impact of the proposed development on any soils or slopes will be that of erosion and transport of sediment during construction. An Erosion and Sediment Control Management Program will be established for the proposed development, beginning at the start of construction and continuing throughout its course, as outlined in the "New York State Standards and Specifications for Erosion and Sediment Control," dated August 2005. A continuing maintenance program will be implemented for the control of sediment transport and erosion control after construction and throughout the useful life of the project.

The Operator shall have a qualified professional conduct an assessment of the site prior to the commencement of construction and certify that the appropriate erosion and sediment controls, as shown on the Sediment & Erosion Control Plans, have been adequately installed to ensure overall preparedness of the site for the commencement of construction. In addition, the Operator shall have a qualified professional conduct one site inspection at least every seven calendar days and at least two site inspections every seven calendar days when greater than five acres of soil is disturbed at any one time.

Prior to the commencement of construction activity, the owner or operator must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP; and the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP. The owner or operator shall have each of the contractors and subcontractors identify at least one person from their company that will be responsible for implementation of the SWPPP. This person shall be known as the trained contractor. The owner or operator shall ensure that at least one trained contractor is on site on a daily basis when soil disturbance activities are being performed.
The owner or operator shall have each of the contractors and subcontractors identified above sign a copy of the certification statement provided in Appendix H before they commence any construction activity.

Soil Description

As provided by the United States Department of Agriculture, Soil Conservation Service "Web Soil Survey," soil classifications which exist on the subject site are described below.

Soils are placed into four hydrologic groups: A, B, C, and D. In the definitions of the classes, infiltration rate is the rate at which water enters the soil at the surface and is controlled by the surface conditions. Transmission rate is the rate at which water moves in the soil and is controlled by soil properties. Definitions of the classes are as follows:

A. (Low runoff potential). The soils have a high infiltration rate even when thoroughly wetted. They chiefly consist of deep, well drained to excessively drained sands or gravels. They have a high rate of water transmission.

B. The soils have a moderate infiltration rate when thoroughly wetted. They chiefly are moderately deep to deep, moderately well drained to well drained soils that have moderately fine to moderately coarse textures. They have a moderate rate of water transmission.

C. The soils have a slow infiltration rate when thoroughly wetted. They chiefly have a layer that impedes downward movement of water or have moderately fine to fine texture. They have a slow rate of water transmission.

D. (High runoff potential). The soils have a very slow infiltration rate when thoroughly wetted. They chiefly consist of clay soils that have a high swelling potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. They have a very slow rate of water transmission.

A soil's tendency to erode is also described in the USDA web soil survey. The ratings in this interpretation indicate the hazard of soil loss from unsurfaced areas. The ratings are based on soil erosion factor K, slope, and content of rock fragments. The hazard is described as "slight," "moderate," or "SEVERE." A rating of "slight" indicates that little or no erosion is likely; "moderate" indicates that some erosion is likely, that the temporarily unsurfaced / unstabilized during construction may require occasional maintenance, and that simple erosion-control measures are needed; and "SEVERE" indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that erosion-control measures are needed.

Per the Soil Survey and site specific mapping, the following soils listed below are present at the site. Following this list is a detailed description of each soil type found on the property:

SYM.	HYDRO. SOIL GROUP	DESCRIPTION
ChC		Charlton Loam, 8 to 15 Percent Slopes
ChD		Charlton Loam, 15 to 25 Percent Slopes
CrC		Charlton-Chatfield Complex, Rolling, Very Rocky
CsD		Chatfield-Charlton Complex, Hilly, Very Rocky
PnB		Paxton Fine Sandy Loam, 2 to 8 Percent Slopes
PnC		Paxton Fine Sandy Loam, 8 to 15 Percent Slopes
RdA		Ridgebury Loam, 0 to 3 Percent Slopes
RdB		Ridgebury Loam, 3 to 8 Percent Slopes
SuB		Sutton Loam, 3 to 8 Percent Slopes
Ub		Udorthents, Smoothed
Uc		Udorthents, Wet Substratum
UIC		Urban Land-Charlton-Chatfield Complex, Rolling, Very Rocky
WdB		Woodbridge Loam, 3 to 8 Percent Slopes
WdC		Woodbridge Loam, 8 to 15 Percent Slopes

On-Site Pollution Prevention

There are temporary pollution prevention measures used to control litter and construction debris on site, such as:

- Temporary Riser and Anti-Vortex Device
- Silt Fence
- Baled Filter
- Baled Fence and Checks
- Baled Erosion Fence
- Silt Sack
- Stone Check Dam
- Water Bars
- Excavated Drop Inlet Protection
- Curb Drop Inlet Protection
- Stone & Block Drop Inlet Protection

There will be inlet protection provided for all storm drains and inlets with the use of curb gutter inlet protection structures and stone & block drop inlet protection, which keep silt, sediment and construction litter and debris out of the on-site stormwater drainage system.

All construction material shall be stored in designated staging areas. Roll-off containers shall be placed on site and all empty containers, construction debris and litter shall be placed in the containers. The Site Contractor shall have a spill prevention and response plan, as well as materials on site to remediate a spill.

Sequence of Construction

Construction shall be sequenced in such a manner that any area which is disturbed shall first be protected with erosion and sediment controls as indicated on the plan. Particular requirements are given as follows:

A. Stake limit of disturbance boundary with orange construction fence. Install stabilized construction entrances. Clear the area to be developed.

B. Install all silt fences.

C. Grub the area to be constructed.

D. Provide stone check dams at regular intervals in the diversion swales.

E. Construct temporary sediment basins/traps.

F. Remove and stockpile topsoil. Install silt fencing around the temporary topsoil stockpile location for erosion control purposes.

G. Proceed with rough grading of the area under active construction.

H. Initial stormwater infiltration basin excavation should be carried to within 2 feet of the final elevation of the basin floor. Final excavation to the finished grade should be deferred until all disturbed areas have been stabilized.

I. Install the storm drainage system consisting of catch basins, manholes and underground storm pipes along with the erosion and sediment control devices associated with the storm drainage system (i.e. Inlet protection, stone check dams, etc., as shown on the plans).

J. Install utilities (sanitary sewer, water, gas, electric, telephone, etc.), as required.

K. Install green infrastructure practices including rain garden and biofilter.

L. Begin road construction including subbase and base pavement sections.

M. Finish grading, redistribute topsoil and establish vegetation and/or landscaping.

N. Complete final grading for the stormwater infiltration basin.

O. Clean pavements and storm drain system of all accumulated sediment in conjunction with the removal of all temporary sediment and erosion control devices.

P. Complete building construction.

<u>Temporary Control Measures</u>

Temporary control measures and facilities will include silt fences, interceptor swales, stabilized construction entrances, temporary seeding, mulching and sediment traps with temporary riser and anti-vortex devices.

Throughout the construction of the proposed development, temporary control facilities will be implemented to control on-site erosion and sediment transfer. Interceptor swales, if required, will be used to direct stormwater runoff to temporary sediment traps for settlement. The sediment traps will be constructed as part of this project will serve as temporary sediment basins to remove sediment and pollutants from the stormwater runoff produced during construction.

Descriptions of the temporary sediment & erosion controls that will be used during the development of the site including silt fence, stabilized construction entrance, seeding, mulching and inlet protection are as follows:

1. Silt Fence is constructed using a geotextile fabric. The fence will be either 18 inches or 30 inches high. The height of the fence can be increased in the event of placing these devices on uncompacted fills or extremely loose undisturbed soils. The fences will not be placed in areas which receive concentrated flows such as ditches, swales and channels nor will the filter fabric material be placed across the entrance to pipes, culverts, spillway structures, sediment traps or basins.

2. Stabilized Construction Entrance consists of AASHTO No. 1 rock. The rock entrance will be a minimum of 50 feet in length by 20 feet in width by 8 inches in depth.

3. Seeding will be used to create a vegetative surface to stabilize disturbed earth until at least 70% of the disturbed area has a perennial vegetative cover. This amount is required to adequately function as a sediment and erosion control facility. Grass lining will also be used to line temporary channels and the surrounding disturbed areas.

4. Mulching is used as an anchor for seeding and disturbed areas to reduce soil loss due to storm events. These areas will be mulched with straw at a rate of 3 tons per acre such that the mulch forms a continuous blanket. Mulch must be placed after seeding or within 48 hours after seeding is completed.

5. Inlet Protection will be provided for all stormwater basins and inlets with the use of curb & gutter inlet protection and stone & block inlet protection structures, which will keep silt, sediment and construction debris out of the storm system. Existing structures within existing paved areas will be protected using “Silt Sacks” inside the structures.

6. Erosion Control Matting will be utilized on slopes and within swales, where applicable, to provide stabilization in advance of vegetation being established. Such matting will be

biodegradable to facilitate long term growth of vegetation in swales, on slopes and within stormwater management facilities.

7. Sediments Traps will be used with the permanent SMP's until their contributing areas drainage are stabilized. Once stabilized, the temporary risers will be removed and final grading/planting of the basins will be completed for permanent use as Stormwater Management basins.

8. Temporary Riser and Anti-Vortex Devices- are placed at the bottom of the temporary sediment basins where they intercept and collect debris and litter from the pond before they can enter the off-site storm drainage system.

9. Stone Check Dams are small barriers of crushed stone which will be laid across the grass swales which are approximately 12 inches high, located every one foot of elevation change along the swales so that the crest elevation of the downstream dam is at the same elevation of the toe of the upstream dam.

The contractor shall be responsible for maintaining the temporary sediment and erosion control measures throughout construction. This maintenance will include, but not be limited to, the following tasks:

1. For dust control purposes, moisten all exposed graded areas with water at least twice a day in those areas where soil is exposed and cannot be planted with a temporary cover due to construction operations or the season (December through March).

2. Inspection of erosion and sediment control measures shall be performed at the end of each construction day and immediately following each rainfall event. All required repairs shall be immediately executed by the contractor.

3. Sediment deposits shall be removed when they reach approximately ⅓ the height of the silt fence. All such sediment shall be properly disposed of in fill areas on the site, as directed by the Owner’s Field Representative. Fill shall be protected following disposal with mulch,

temporary and/or permanent vegetation and be completely circumscribed on the downhill side by silt fence.

4. Rake all exposed areas parallel to the slope during earthwork operations.

5. Following final grading, the disturbed area shall be stabilized with a permanent surface treatment (i.e. turf grass, pavement or sidewalk). During rough grading, areas which are not to be disturbed for fourteen or more days shall be stabilized with the temporary seed mixture, as defined on the plans. Seed all piles of dirt in exposed soil areas that will not receive a permanent surface treatment.

Permanent Control Measures and Facilities for Long Term Protection

Towards the completion of construction, permanent sediment and erosion control measures will be developed for long term erosion protection. The following permanent control measures and facilities have been proposed to be implemented for the project:

1. Vegetated Swales will function to provide additional treatment of stormwater runoff by removal of pollutants and will promote a reduction of peak flows and provide runoff infiltration.

2. Infiltration Basins will be used to treat the runoff volume generated from the developed area and provide improvement to water quality control. The proposed basins will provide water quality for 90% of the average annual stormwater runoff volume. The water quality volume will be retained and higher storms will be released gradually. Refer to the water quality volume calculations, in Appendix 'C'.

3. Biofilters are a shallow depression that treats stormwater as it flows through a soil matrix, and is returned to the storm drain system. This practice will consist of a stone diaphragm, grass strip at 2% slope and a layer of mulch, which will enable removal of pollutants and sediment generated by the parking areas.

4. Rain Gardens which are shallow depressions that treat stormwater as it flows through a soil matrix, and is either returned to the storm drain system or discharged overland. These practices will consist of a ponding depth of 6 inches, grass/landscaping with a layer of mulch, 12 to 18 inches of soil media, 6 to 12 inches of washed stone, which will enable removal of pollutants and sediment generated by the rooftop and other small impervious areas. Refer to Appendix C for the Rain Garden Runoff Reduction Volume Calculations.

5. CDS Water Quality Structure will be used to provide pretreatment of the water quality flow rate for separating sediment, debris, floatables, etc. from the runoff prior to discharge to the SMP's.

6. Catch Basins will be used to remove some of the coarse sand and grit sediment before entering the drainage system. Each catch basin will be constructed with an 18 inch deep sump.

7. Seeding of at least 70% perennial vegetative cover will be used to produce a permanent uniform erosion resistant surface. The seeded areas will be mulched with straw at a rate of 3 tons per acre such that the mulch forms a continuous blanket.

Specifications for Soil Restoration and Final Stabilization of Graded Areas

Prior to the final stabilization of the disturbed areas, soil restoration will be required for all vegetated areas to recover the original properties and porosity of the soil. Soil Restoration Requirements are provided on Table 5 below:

Table 5

Soil Restoration Requirements

<table>
<tr><th>Type of Soil Disturbance</th><th colspan="2">Soil Restoration Requirement</th><th>Comments/Examples</th></tr>
<tr><td>No soil disturbance</td><td colspan="2">Restoration not permitted</td><td>Preservation of Natural Features</td></tr>
<tr><td>Minimal soil disturbance</td><td colspan="2">Restoration not required</td><td>Clearing and grubbing</td></tr>
<tr><td rowspan="2">Areas where topsoil is stripped only – no change in grade</td><td>HSG A&B</td><td>HSG C&D</td><td rowspan="2">Protect area from any ongoing construction activities</td></tr>
<tr><td>apply 6 inches of topsoil</td><td>Aerate* and apply 6 inches of topsoil</td></tr>
<tr><td rowspan="2">Areas of cut or fill</td><td>HSG A&B</td><td>HSG C&D</td><td rowspan="2">Clearing and grubbing</td></tr>
<tr><td>Aerate and apply 6 inches of topsoil</td><td>Apply full Soil Restoration**</td></tr>
<tr><td>Heavy traffic areas on site (especially) in a zone 5-25 feet around buildings but not within a 5 foot perimeter around foundation walls)</td><td colspan="2">Apply full Soil Restoration (decompaction and compost enhancement)</td><td></td></tr>
<tr><td>Areas where Runoff Reduction and/or Infiltration practices are applied</td><td colspan="2">Restoration not required, but may be applied to enhance the reduction specified for appropriate practices.</td><td>Keep construction equipment from crossing these areas. To protect newly installed practice from any ongoing construction activities construct a single phase operation fence area.</td></tr>
<tr><td>Redevelopment projects</td><td colspan="2">Soil Restoration is required on redevelopment projects in areas where existing impervious area will be converted to pervious area.</td><td></td></tr>
</table>

* Aeration includes the use of machines such as tractor-drawn implements with coulters making a narrow slit in the soil, a roller with many spikes making indentations in the soil, or prongs which function like a mini-subsoiler.

** Per "Deep Ripping and De-compaction, DEC 2008."

During periods of relatively low to moderate subsoil moisture, the disturbed subsoils are returned to rough grade and the following full soil restoration steps applied:

1. Apply 3 inches of compost over subsoil.

2. Till compost into subsoil to a depth of at least 12 inches using a cat-mounted ripper, tractor-mounted disc, or tiller, mixing, and circulating air and compost into subsoils.

3. Rock-pick until uplifted stone/rock materials of four inches and larger size are cleaned off the site.

<u>Specifications for Final Stabilization of Graded Areas</u>

Final stabilization of graded areas consists of the placement of topsoil and installation of landscaping (unless the area is to be paved, or a building is to be constructed in the location). Topsoil is to be spread as soon as grading operations are completed. Topsoil is to be placed to a minimum depth of six inches on all embankments, planting areas and seeding/sod areas. The subgrade is to be scarified to a depth of two inches to provide a bond of the topsoil with the subsoil. Topsoil is to be raked to an even surface and cleared of all debris, roots, stones and other unsatisfactory material.

Planting operations shall be conducted under favorable weather conditions as follows:

- Permanent Lawns - April 15 (provided soil is frost-free and not excessively moist) to May 15; August 15 to October 15.
- Temporary Lawn Seeding - if outside of the time periods noted above, the areas shall be seeded immediately on completion of topsoil operations with annual ryegrass (Italian rye) at a rate of six pounds per 1,000 square feet. Temporary lawn installation is permitted provided the soil is frost-free and not excessively moist. The permanent lawn is to be installed the next planting season.

On slopes with a grade of 3 horizontal to 1 vertical or greater, and in swales, a geotextile netting or mat shall be installed for stabilization purposes as shown on the Plans. Seeded areas are to be mulched with straw or hay at an application rate of 70-90 pounds per 1,000 s.f. Straw or hay mulch must be spread uniformly and anchored immediately after spreading to prevent wind blowing. Mulches must be inspected periodically and in particular after rainstorms to check for erosion. If erosion is observed, additional mulch must be applied. Netting shall be inspected after rainstorms for dislocation or failure; any damage shall be repaired immediately.

All denuded surfaces which will be exposed for a period of over two months or more shall be temporarily hydroseeded with (a) perennial ryegrass at a rate of 40 lbs per acre (1.0 lb per 1000 square feet); (b) Certified "Aroostook" winter rye (cereal rye) @ 100 lb per acre (2.5 lb/1000 s.f.) to be used in the months of October and November.

Permanent turfgrass cover is to consist of a seed mixture as follows:

(a) <u>Sunny sites</u>

Kentucky Bluegrass	2.0-2.6 pounds/1000 square feet
Perennial Ryegrass	0.6-0.7 pounds/1000 square feet
Fine Fescue	0.4-0.6 pounds/1000 square feet

(b) <u>Shady sites</u>

Kentucky Bluegrass	0.8-1.0 pounds/1000 square feet
Perennial Ryegrass	0.6-0.7 pounds/1000 square feet
Fine Fescue	2.6-3.3 pounds/1000 square feet

All plant materials shall comply with the standards of the American Association Of Nurserymen with respect to height and caliper as described in its publication American Standard for Nursery Stock, latest edition.

VII. CONSTRUCTION PHASE AND POST-CONSTRUCTION MAINTENANCE

During the construction phase and following construction of the project, a number of maintenance measures will be taken with respect to the site maintenance. Measures to be taken included the following:

1. During Construction

A comprehensive erosion and sediment control plan will be in place during the construction period. Maintenance measures for erosion and sediment controls will include:

Prior to the commencement of construction activity, the owner or operator must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP; and the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP. The owner or operator shall have each of the contractors and subcontractors identify at least one person from their company that will be responsible for implementation of the SWPPP. This person shall be known as the trained contractor. The owner or operator shall ensure that at least one trained contractor is on site on a daily basis when soil disturbance activities are being performed. The owner or operator shall have each of the contractors and subcontractors identified above sign a copy of the certification statement provided in Appendix H before they commence any construction activity.

A qualified professional acceptable to the municipality will be hired by the owner or operator to monitor the installation and maintenance of the sediment and erosion control plans. The qualified professional shall report directly to the Engineering Consultant and shall be responsible for ensuring compliance with the design of the sediment and erosion control plans.

The qualified professional so hired will inspect all sediment and erosion control measures at least every seven calendar days. In the event that there has been a variance with the design of the sediment and erosion control measures so that the ability of the measures to adequately perform the intended function is lessened or compromised and/or the facilities are not adequately maintained, the qualified professional shall be required to report such variance to the Engineering Consultant within 48 hours and shall be empowered to order immediate repairs to the sediment and erosion control measures.

The qualified professional will also be responsible for observing the adequacy of the vegetation growth (trees, shrubs, groundcovers and turfgrasses) in newly graded areas and for ordering additional plantings in the event that the established plant materials do not adequately protect the ground surface from erosion.

2. Following Construction

Site maintenance activities on the property will include:

- Grounds maintenance, including mowing of lawns;
- Planting of trees, shrubs and groundcovers; pruning of trees and shrubs;
- Application of fertilizer and herbicides;
- Maintenance of stormwater management area;

Grounds maintenance on the site will be performed by landscaping contractor.

Fertilizer is typically applied twice in the year - once in the spring and once in the fall. The application of fertilizer is usually necessary to maintain healthy lawn growth due to competition for nutrients with trees and shrubs and since the clippings are often removed. It is not recommended that fertilizer be applied during the summer. It is at this time that lawns are typically dormant.

Fertilizers come in three basic types: (1) Organic; (2) Soluble synthetic and (3) Slow release.

Organic fertilizers are derived from plant or animal waste. Since they are heavier and bulkier than other fertilizers, it is necessary to apply a much greater amount at one time. Soluble synthetic fertilizers are predictable with determining the exact impact on a lawn. However more applications are necessary since their effect is often short term. Slow release fertilizers have a high percentage of nitrogen so quantities that need be handled at one time are smaller. Slow release fertilizers will be utilized by the project.

A complete fertilizer contains all three of the primary nutrients - nitrogen (N), phosphorus (P) and potassium in the form of potash (K). Typically, a 3-1-2 ratio of nutrients (N-P-K) is used for lawn applications.

Fertilizer shall be applied by the landscape contractor in accordance with the manufacturer's instructions. The application of fertilizer does require some skill on the part of the operator. Should there be a spill of fertilizer, the landscape contractor shall be required to scrape or vacuum it up. The area will then be watered in accordance with the manufacturer's instructions to ensure that the fertilizer becomes soluble and available to plants and does not run off.

Brynwood Partners, LLC will be responsible for the long-term operation and maintenance of the permanent stormwater management practices. The permanent stormwater management practices shall be maintained in accordance with the Maintenance Inspection Checklists provided in Appendix G.

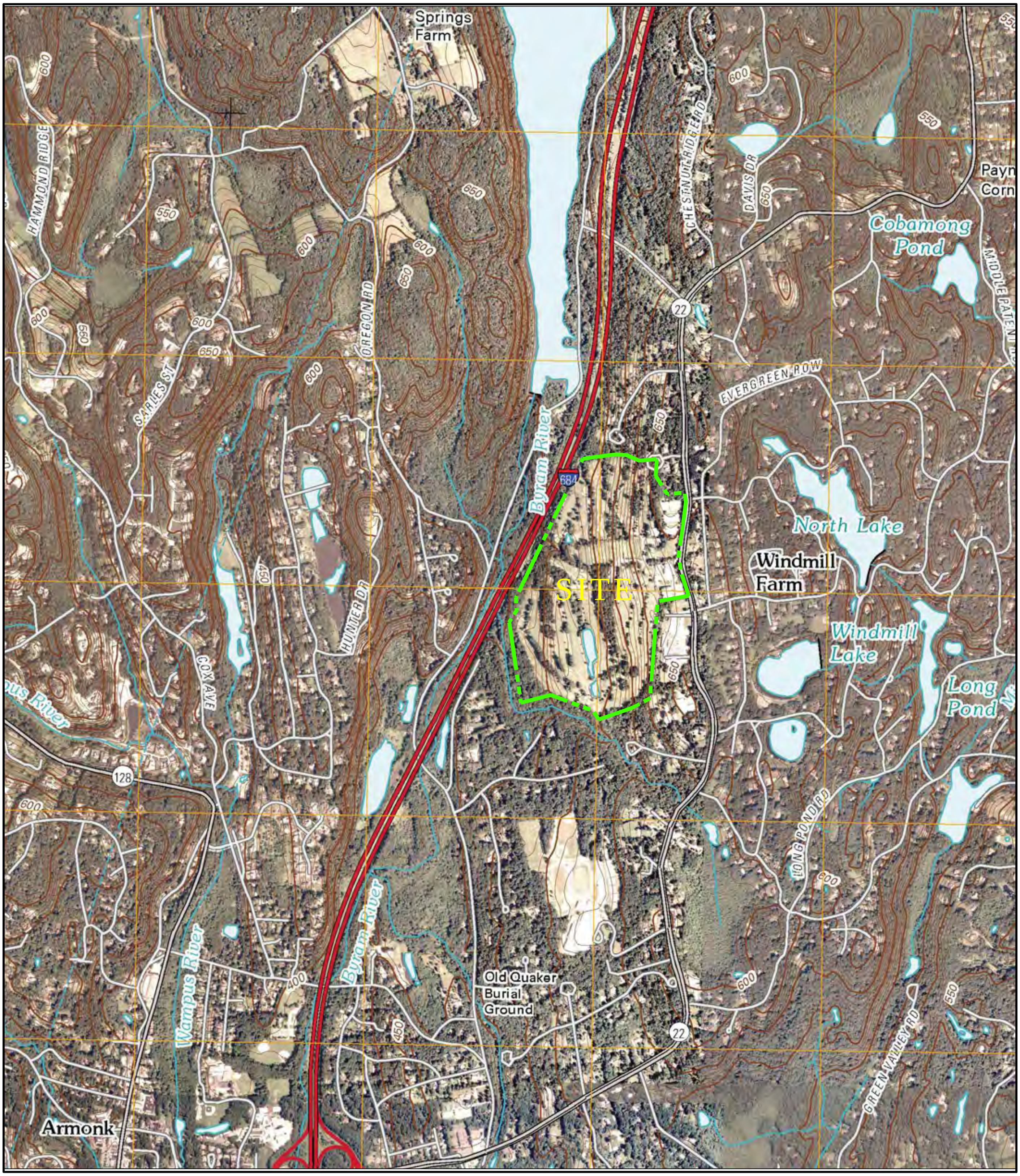
VIII. CONCLUSIONS

This Stormwater Pollution Prevention Plan has been prepared to describe the project's pre and post-development stormwater management improvements and its sediment and erosion control improvements to be utilized during construction. The proposed permanent improvements and the interim improvements to be utilized during construction have been designed in accordance with the requirements of the:

- New York State Department of Environmental Conservation (NYSDEC) SPDES General Permit No. GP-0-10-001, effective January 29, 2010.
- Chapter 173 "Stormwater Management" of the Town of North Castle Zoning Code.
- New York State Stormwater Management Design Manual.

The project employs a variety of practices to enhance stormwater quality and reduce peak rates of runoff associated with the proposed improvements. These measures include design of green practices and stormwater infiltration facilities.

Based on the foregoing, it is our professional opinion that the proposed improvements will provide water quantity and quality enhancements which exceed the above mentioned requirements and are not anticipated to have any adverse impacts to the site or any surrounding areas.



BRYNWOOD CLUB

BEDFORD ROAD (NY 22) TOWN OF NORTH CASTLE, NEW YORK

SITE LOCATION MAP

DATE: 03/07/2013 JMC PROJECT: 10126

FIGURE: 1 SCALE: 1" = 2000'

JMC
JOHN MEYER CONSULTING, PC
SITE DEVELOPMENT CONSULTANTS
120 BEDFORD ROAD • ARMONK, NY 10504
VOICE (914) 273-5225 • FAX (914) 273-2102
WWW.JOHNMEYERCONSULTING.COM

10126-SITE-LOCATION.dwg

(SWPPP appendices and plans to be reproduced by John Meyer Consulting, PC, under separate cover, as requested)

APPENDIX A

EXISTING HYDROLOGIC CALCULATIONS

APPENDIX B

PROPOSED HYDROLOGIC CALCULATIONS

APPENDIX C

NYSDEC STORMWATER SIZING CALCULATIONS

APPENDIX D

REPORT ON PRELIMINARY SUBSURFACE SOIL AND FOUNDATION INVESTIGATION

APPENDIX E

CONSTRUCTION INSPECTION CHECKLISTS

APPENDIX F

TEMPORARY EROSION AND SEDIMENT CONTROL INSPECTION AND MAINTENANCE CHECKLISTS

APPENDIX G

PERMANENT STORMWATER PRACTICE OPERATION, MAINTENANCE AND MANAGEMENT INSPECTION CHECKLISTS

APPENDIX H

CONTRACTOR’S CERTIFICATION

APPENDIX I

DRAFT STORMWATER MANAGEMENT CONTROL FACILITY MAINTENANCE AND ACCESS AGREEMENT

APPENDIX J

DRAWINGS

APPENDIX G

HISTORICAL PERSPECTIVES INC.

Phase I Archaeological and Historic Resources Investigation
Brynwood Golf and Country Club
568 Bedford Road (NYS Route 22), Armonk, Town of North Castle
Westchester County, New York

Phase I Archaeological and Historic Resources Investigation
Brynwood Golf and Country Club
568 Bedford Road (NYS Route 22), Armonk, Town of North Castle
Westchester County, New York

Prepared For:

VHB Engineering, Surveying and Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, NY 10606

Prepared By:

Historical Perspectives, Inc.
P.O. Box 529
Westport, CT 06881

Authors:
Julie Abell Horn, M.A., R.P.A.
Christine Flaherty, M.A.
Cece Saunders, M.A., R.P.A.

January 2013

MANAGEMENT SUMMARY

SHPO Project Review Number (if available):

Involved State and Federal Agencies: **NYS DOT, NYS DEC**

Phase of Survey: **Phase IA Archaeological and Historic Resources Investigation**

Location Information
- Location: **568 Bedford Road (NY 22)**
- Minor Civil Division: **11910, North Castle**
- County: **Westchester**

Survey Area
- Length: **varies**
- Width: **varies**
- Number of Acres Surveyed: **156**

USGS 7.5 Minute Quadrangle Map: **Mount Kisco**

Archaeological Survey Overview
- Number & Interval of Shovel Tests: **N/A**
- Number & Size of Units: **N/A**
- Width of Plowed Strips: **N/A**
- Surface Survey Transect Interval: **N/A**

Results of Archaeological Survey
- Number & name of precontact sites identified: **N/A**
- Number & name of historic sites identified: **N/A**
- Number & name of sites recommended for Phase II/Avoidance: **N/A**

Results of Architectural Survey
- Number of buildings/structures/cemeteries within project area: **9 buildings**
- Number of buildings/structures/cemeteries adjacent to project area: **numerous buildings and one 18th century cemetery (250 feet to east); residential area**
- Number of previously determined NRHP listed or eligible buildings/structures/cemeteries/districts: **none**
- Number of identified eligible buildings/structures/cemeteries/districts: **none**

Report Authors(s): **Julie Abell Horn, M.A. R.P.A., Christine Flaherty, M.A., and Cece Saunders, M.A., R.P.A., Historical Perspectives, Inc.**

Date of Report: **January 2013**

EXECUTIVE SUMMARY

Brynwood Partners, LLC proposes to develop an adult oriented residential community at the existing Brynwood Golf & Country Club, to make improvements to the club facilities, to add amenities to the complex, and undertake new designs for the golf course. The site is located at 568 Bedford Road (NYS Route 22), in Armonk, Town of North Castle, Westchester County, New York (Figures 1, 2a-2g, and 3). The Proposed Action includes amendments to the Zoning Code of the Town of North Castle to create a new residential special permit use in the R-2A One-Family Residential District of the Town to be known as "Golf Course Community", as well as changes to the regulations governing "Membership Clubs". The residential neighborhood (Figure 4) would include a mix of golf condominium units: 64 Golf Residences (58 two-bedroom units and 6 three-bedroom units), 14 Club Villas (three-bedroom units), 5 detached Golf Cottages (4 bedroom units); as well as 5 Fairway Residences (3 bedroom units) in one building south of the clubhouse. The total unit count would be 88 residential units. Proposed club improvements include relocation of tennis courts closer to the clubhouse (and reduction in number from 14 to 6 courts), construction of a new tennis viewing pavilion, as well as improvements to the existing outdoor pool and patio area, improvements to the existing club house/banquet hall, and parking for the club in the existing parking lot (to be improved with added landscaping). Renovations and improvements to the existing 18-hole golf course are also proposed, as well as upgrades to the existing on-site sewage treatment plant (Figure 5a). Water supply is proposed to be from on-site wells (Figure 5b).

A Draft Environmental Impact Statement (DEIS) will be prepared in accordance with the requirements of the New York State Environmental Quality Review (SEQR), 6 NYCRR Part 617.9, to assess the potentially significant adverse environmental impacts of the redevelopment of the 156-acre site with the proposed 88-unit residential community, as well as renovations to the existing Brynwood Golf & Country Club clubhouse, recreational facilities and existing 18-hole golf course (Figures 4 and 5a-5b). One component of the required DEIS is an assessment of cultural resources within the Brynwood project site.

At the request of the project sponsors, Historical Perspectives, Inc. (HPI) has undertaken a Phase IA Archaeological and Historic Resources Investigation of the project site. The scope of this study is based on both New York State requirements (SEQR Handbook 2010; New York Archaeological Council 1994; NYSOPRHP 2005, 2010), as well as additional requirements set forth by the Town of North Castle in the DEIS scope (as adopted January 23, 2013). The tasks for the Phase IA Archaeological and Historic Resources Investigation were:

1. To identify any potential archaeological resources that might have been present on the site;
2. To examine the construction history of the study site in order to estimate the probability that any such potential resources might have survived and remain on the site undisturbed;
3. To identify any previously recorded archaeological sites and surveys within one mile of the project site;
4. To identify any historic or architectural resources on or substantially contiguous to the project site that have been listed, designated eligible, or may be eligible for the State and National Registers of Historic Places (S/NRHP);
5. To identify any historic or architectural resources within one-half mile that are listed on the S/NRHP and within one-quarter mile that are locally designated historic resources; and
6. To identify and map historic stone walls on the project site.

For the purpose of this report the entire ca. 156-acre project site is considered the Archaeological Area of Potential Effect (APE), while the Architectural APE is considered to include the ca. 156-acre project site as well as the area substantially contiguous to the project site. According to SEQR, the term "substantially contiguous" is intended to cover situations where a proposed activity is not directly adjacent to a sensitive resource, but is in close enough proximity that it could potentially have an impact. Generally, this would include resources that could be seen from "long vistas" at ground level, until project development heights are finalized and an official viewscape can be determined. For the purposes of this study, HPI considers one-quarter mile from the project site to be the approximate distance used to comply with this requirement.

From what is known of precontact period settlement patterns in Westchester County, most habitation and processing sites are found in sheltered, elevated sites close to wetland features, major waterways, and with nearby sources of fresh water. In its natural condition, prior to the transformation of the project site from farm and woodland to golf courses, there were many parts of the property that would have met these criteria. Particularly, those locations nearest to Red

Brook Glen on the south side of the property and the Byram River on the west side of the property would have had high precontact sensitivity. Other sections of the project site that had relatively level areas also may have been sensitive for hunting sites. However, the disturbance to the project site during the twentieth century has been vast – there were two separate golf courses located on the property from the 1920s-1930s, both of which appear to have gone through at least one reconfiguration each. And creation of the present Brynwood golf course necessitated even greater amounts of grading and filling to construct the much larger course encompassing the entire site. Aerial photographs, as shown in Figures 22-25, illustrate the incredible degree to which the original landform was manipulated during the mid-twentieth century. While golf courses often follow the original landscape, modification is unavoidable. Greens, tee boxes, and bunkers are almost always artificial. Although many water hazards may be natural in origin, they are usually channeled, ponded, and shaped for drainage control. The flow of play often requires the installation of fairways in roughly parallel positions, dictating changes in the natural landform. The installation of underground drainage pipes and the inevitable irrigation system also contribute to subsurface impacts.

With these known disturbances in mind, it is still possible that several discrete locations at the periphery of the existing golf course may retain precontact sensitivity. These areas are relatively level stretches along the southwestern sides of the project site, in proximity to Red Brook Glen and the Byram River and in locations within or just bordering the site's wooded areas. Two precontact period archaeological sites were identified along these waterways during the mid-1990s, both just over the Brynwood property border, and it is possible, if disturbance is not too great, that additional portions of these or other precontact sites could be located on the project site in proximity to these sites. Figure 27 illustrates the limited locations where HPI concludes there is potential precontact sensitivity. There are both golf course renovations/improvements planned along the edge of this wood line, overlapping the sensitive area, and a new well proposed within the wooded area noted as sensitive.

Archival research has shown that there were historic farm complex structures along the Route 22 side of the project site from at least the 1850s through the 1920s. There appear to have been two clusters of structures, one in the approximate location of the present Brynwood club house, and the second in the approximate location of the area south of the tennis courts and north of the entry driveway. Based on the amount of construction that has occurred for the present club house area, HPI concludes that the area south of the entry driveway where the club house is situated no longer retains historic period archaeological sensitivity. However, the area north of the entry driveway, which currently contains a swing set and an open grassy lawn, was part of a former fairway, but otherwise was undeveloped. A soil boring completed as part of the recent geotechnical study indicates no obvious fill in this area, although there may have been grading that has removed some soils. Unlike precontact resources, historic period archaeological resources are not as dependent on the preservation of the original landform, as they may have been deposited in deeper trash pits or shaft features, such as wells, privies, or cisterns that could still be present despite later disturbance. Thus, it is possible that remains from the historic farm complex that once was located here could survive despite the changes to the area, and as such HPI concludes that this section retains historic period sensitivity, as shown on Figure 27. This area is slated for new development as part of the proposed project.

Additionally, the project survey and the site inspection revealed that there are numerous stone walls throughout the project site, as highlighted on Figures 2a-g. Many of these stone walls represent former property lines or farming plots, while others may have been built as retaining walls in sloping sections of the property. Some of the stone walls clearly are more modern in origin, such as some of the ones lining the cart paths that likely were installed during construction of the golf course. However, the large majority of the stone walls appear to pre-date the golf course use of the property, which began in the 1920s.

Architectural resources to be considered for the present project include resources within the project site boundaries, as well as resources substantially contiguous to the project site. As noted above, there are nine structures on the project site, all of which post-date the acquisition of the property in 1963 and creation of the present golf course facility in 1964. None of the buildings have reached 50 years old, and none are architecturally significant.

There are no formally listed or eligible S/NRHP properties within one-half mile of the project site, nor any locally landmarked properties within one-quarter mile of the project site. However, there are several properties identified as part of this project that are situated on the east side of Route 22 (with addresses on Upland Lane and Evergreen Row) and are may be visible from the project site. The substantial stone wall with gates that runs along the border of the Windmill Farms development on the east side of Route 22 is also visible from the project site, and the cemetery on North Lane may also be visible. All the remaining structures identified within the project site vicinity and shown on Figure 26 do not appear to be visible from the project site. None of these resources have been evaluated for S/NRHP eligibility, although many are under consideration for Town of North Castle local designation.

Based on these conclusions, HPI recommends the following measures. Due to the heightened precontact and historic period archaeological sensitivity at two discrete locations within the project site, a Phase IB archaeological testing program should be undertaken in these areas prior to any construction of either new development or golf course improvements, including new well construction. The testing should consist of a systematic shovel testing program in all of the identified areas that are not obviously disturbed, as well as investigations of any recovered historical period features. As noted above, portions of the area noted as sensitive for precontact archaeological resources are slated for golf course renovations and improvements, and a new well is proposed within this area also. The area identified as sensitive for historic period archaeological resources is part of the new development area. If project plans change and these areas will not be impacted by the proposed improvements, including temporary usage during construction or by landscaping, then archaeological testing may not be necessary. All Phase IB testing should be implemented according to applicable archaeological standards (New York Archaeological Council 1994, NYSOPRHP 2005).

Additionally, HPI recommends that all stone walls on the project site be preserved to the extent possible. While it is likely that some walls may need to be removed to accommodate proposed development, HPI recommends that whenever possible, these walls be incorporated into the new design, and/or be stabilized if they are deteriorating, such as the stone walls located along the east side of the project site along the Route 22 shoulder. The Old Post Road historic milestone marker located just north of the entrance to the Brynwood property, on the west shoulder of Route 22 should be preserved. A construction management plan to protect this marker should be implemented prior to the initiation of site activities to protect against accidental damage during construction.

Last, there are several architectural resources that are visible from the project site on the east side of Route 22, which while presently not officially documented at the Town, State, or National level, nonetheless have historic value and should be considered as part of the impacts analyses. HPI recommends that the proposed development along the Route 22 portion of the project site be appropriately set back and screened from view, so that there are no impact concerns for these resources. It is HPI's recommendation that the historic Route 22 corridor in this area should remain as unchanged as possible.

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22. Example of level terrace area south of active tennis courts near Route 22. View looking southwest.

23. Example of rolling, artificial topography northwest of maintenance building. View looking north.

24. Example of sculpted topography (note bunkers in background) and artificial ponds. View looking west.

25. Example of sloped topography and cart paths. View looking southwest.

26. Man-made ponds in south-central portion of property. Pump house is in far background. View looking northeast.

27. Stone wall along Route 22 boundary of property. View looking southwest.

28. Stone wall within interior of property. View looking northeast.

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30. Stone walls in wooded section of property with near Red Brook Glen and Interstate 684 in background. View looking southwest.

31. Stone ring surrounding underground sewer components. View looking northwest.

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33. Architectural resource 1. Stone entry gate and gate house to Windmill Farms at Windmill Road. View looking east.

34. Architectural resource 2. 1 Spruce Hollow Road. View looking southeast from Route 22.

35. Architectural resource 3. 2 Upland Lane. View looking southeast from Route 22.

36. Architectural resource 4. 18 Maple Way, Paterno Administration house. View looking southeast from Maple Way.

37. Architectural resource 5. 8 Upland Lane, circular ice house. View looking northwest from Upland Lane.

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39. Architectural resource 7. Carpenter-Forman cemetery. View looking southeast from North Lane at Evergreen Row.

40. Architectural resource 8. 28 Evergreen Row. View looking northeast from Evergreen Row.

41. Architectural resource 9. 604 Bedford Road. View looking northwest from Route 22.

42. Architectural resource 10. 601 Bedford Road, former Byram Lake Country Club staff housing. View looking northeast from Route 22.

43. Architectural resource 10. 601 Bedford Road, Byram Lake Country Club house stone ruins. View looking east from Route 22.

44. Architectural resource 11. 70 Old Byram Lake Road, Stone Wheel Farm. View looking northeast from Old Byram Lake Road.

45. Architectural resource 12. 63 Old Byram Lake Road, possible former mill buildings. View looking northwest from Old Byram Lake Road, with mill pond in left background.

TABLES

I. INTRODUCTION

Brynwood Partners, LLC proposes to develop an adult oriented residential community at the existing Brynwood Golf & Country Club, to make improvements to the club facilities, to add amenities to the complex, and undertake new designs for the golf course. The site is located at 568 Bedford Road (NYS Route 22), in Armonk, Town of North Castle, Westchester County, New York (Figures 1, 2a-2g, and 3). The Proposed Action includes amendments to the Zoning Code of the Town of North Castle to create a new residential special permit use in the R-2A One-Family Residential District of the Town to be known as "Golf Course Community", as well as changes to the regulations governing "Membership Clubs". The residential neighborhood (Figure 4) would include a mix of golf condominium units: 64 Golf Residences (58 two-bedroom units and 6 three-bedroom units), 14 Club Villas (three-bedroom units), 5 detached Golf Cottages (4 bedroom units); as well as 5 Fairway Residences (3 bedroom units) in one building south of the clubhouse. The total unit count would be 88 residential units. Proposed club improvements include relocation of tennis courts closer to the clubhouse (and reduction in number from 14 to 6 courts), construction of a new tennis viewing pavilion, as well as improvements to the existing outdoor pool and patio area, improvements to the existing club house/banquet hall, and parking for the club in the existing parking lot (to be improved with added landscaping). Renovations and improvements to the existing 18-hole golf course are also proposed, as well as upgrades to the existing on-site sewage treatment plant (Figure 5a). Water supply is proposed to be from on-site wells (Figure 5b).

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This Phase IA Archaeological and Historic Resources Investigation was prepared to satisfy the requirements of New York State's environmental review process, as administered through the Office of Parks, Recreation and Historic Preservation (OPRHP) (New York Archaeological Council 1994; NYSOPRHP 2005, 2010). The HPI project team consisted of Julie Abell Horn, M.A., R.P.A., who conducted research, the site walkover, and wrote the report;

Christine Flaherty, M.A., who assisted with the research; and Cece Saunders, M.A., R.P.A. who managed the project and provided editorial and interpretive assistance.

II. METHODOLOGY

The present study entailed review of various resources.

- Historic maps and aerial photographs were reviewed to provide an overview of the topography and a chronology of land usage for the study site. Data was collected at the New York Public Library, the Tarrytown Historical Society, and the North Castle Historical Society, as well as through online sources.
- Primary and secondary sources relating to the project site and its vicinity were reviewed at the North Castle Historical Society and using books and online sources.
- Selected deeds and other property records were reviewed. Data was obtained at the Westchester County Clerk's office, as well as Town of North Castle's Building Department, Tax Assessor, and Planning Department.
- Survey maps (JMC 2012-2013; Hart Howerton 2010) and a Phase I Site Assessment (Ecosystems Strategies, Inc. 2008) were provided by the project sponsor.
- A site file search was conducted using materials available at the OPRHP.
- The North Castle Landmarks Preservation Committee Chair, Susan Shimer, was consulted concerning locally designated historic resources, and provided background material about a number of nearby properties. Sharon Tomback of the North Castle Historical Society also provided background material.
- Last, site visits were conducted on December 20, 2012 and January 14, 2013 to assess any obvious or unrecorded subsurface disturbance to document historic resources on, adjacent to, and in the vicinity of the property.

III. BACKGROUND RESEARCH

A. CURRENT CONDITIONS

The Brynwood project site contains an 18-hole golf course on its interior section, as well as a complex of buildings and other recreational facilities on the portion of the property fronting Route 22 (Figures 2a-g; 3). The buildings on the property include the following:

- A one-story with basement, stone-faced main club house and adjoining swimming pool, constructed in 1964 and renovated in the mid-1990s (Photographs 1-5);
- A one-story brick golf cart storage building south of the club house, constructed in 1993 (Photograph 6);
- A two-story brick, concrete block, and frame maintenance building north of the club house, with a small frame shed in the maintenance yard to its west, constructed in 1964 (Photographs 7-9);
- A small, one-story concrete block former pump house building east of the maintenance building (Photograph 10);
- A one-story frame snack shop with outdoor tables located northwest of the maintenance building, constructed in 1985 (Photograph 11);
- A one-story frame octagonal and rectangular-shaped tennis pro shop located northeast of the maintenance building, constructed in 1985 (Photograph 12);
- A large, two story frame sewage plant, located on the interior of the property, constructed in ca. 1990 (Photographs 13 and 14); and
- A pump house located at the northern end of the two large ponds in the central portion of the golf course.

A number of frame shelters and other small amenities such as drinking fountains are situated within the golf course. There are 14 tennis courts at the northern end of the building complex, grouped into four sets. Three of the sets are located northeast of the maintenance building near Route 22 and the fourth set is located immediately north of the maintenance building (Photographs 15-16). A former frame judge's stand is located between the northernmost set of tennis courts, which are abandoned and in poor condition (Photographs 17-18). The tennis courts north of the maintenance building were constructed by the early 1970s. The remaining tennis courts were built in 1974. There is a large paved parking lot south of the club house (Photograph 19). A historic Old Post Road mile marker (inscribed

"39 Miles From New York") is located just north of the entrance to the Brynwood property, on the west shoulder of Route 22, surrounded by a stone and concrete structure colloquially known as a "dog house" (Photograph 20).

The golf course, with its areas of artificially leveled, rolling, undulating, and sculpted topography, contains several man-made ponds, paved cart paths, various bunkers, elevated tee boxes, and other man-made topographical features (Photographs 21-26). There also are a considerable number of stone walls (highlighted on Figures 2a-g), many of which are remnants of former property lines and farming plots (Photographs 26-30). There are deeply (ca. 6 feet below grade) buried irrigation lines threaded throughout the golf course, as well as former septic system components (tanks, pipes, manholes, leaching fields, etc.), modern sewer system components (pipes, vaults, manholes, etc.), water lines servicing drinking fountains, and buried electrical lines (Photographs 31-32).

B. TOPOGRAPHY AND HYDROLOGY

Early maps of the vicinity of the study area record the topography and environment of the area at the beginning of historic development. A topographical map made in the late nineteenth century shows that in its natural condition the project site contained a somewhat terraced landform (U.S.G.S. 1899; see Figure 12). Bedford Road/Route 22 is located along a relatively flat ridge, as is the eastern edge of the project site that borders the road. Here, natural elevations ranged from ca. 650 feet above sea level along Route 22, to ca. 620 feet above sea level at the western side of the ridge line. Moving west, the project site was more heavily sloped, dropping ca. 100 feet in elevation before reaching a second terrace, at ca. 500-520 feet above sea level and corresponding to the approximate location of the modern ponds running north-west through the center of the site. The far western side of the project site contained sloping terrain, again, dropping down to ca. 400 feet above sea level near the western property boundary. An update and more detailed topographical map from 1955 showed similar conditions, albeit with more nuances and slightly different elevation measurements, no doubt in some part due to better mapping efforts (U.S.G.S. 1955).

The transformation during the twentieth century of the project site from farm and woodland to golf courses, as will be described in more detail, below, necessitated a significant amount of landform modification. While overall elevations within the project site may not have changed significantly enough to be recorded by topographical maps, it should be assumed that the majority of the project site was subjected to varying amounts of grading and filling to create the original golf course features, which in later years were modified again as the courses changed configurations. The last major change to the golf course was in the 1960s, when the current course was created. Today, the landform of the golf course is heavily sculpted, particularly in areas where there are fairways, greens, bunkers, and ponds. Figure 6 shows the degree to which the project site is sloped; all areas with greater than 12 percent slope are colored.

The project site is several hundred feet east of the Byram River, which runs roughly north-south along the approximate former alignment of Byram Lake Road and near present Interstate 684. Byram Lake is located northwest of the project site. A perennial tributary of the Byram River, called Red Brook Glen or Sniffen Brook, runs along the southern boundary of the project site, and cuts across the southwestern corner of the property before joining the Byram River near the Interstate 684 alignment. The ponds on the project site are man-made, although these locations may have originally contained some low lying wet areas not substantial enough to be depicted on the earlier topographical maps.

C. SOILS

There are a number of soils mapped for the project site (U.S.D.A. 2012). These soils are described in the table below and shown on Figure 7.

Table 1: Soils mapped within the project site

Name	Soil Horizon Depth cm(in)	Texture, Inclusions	Slope %	Drainage	Landform
Charlton loam (ChC)	0-8 in 8-24 in 24-60 in	Lo SaLo SaLo	8-15	Well	Hills, ridges and till plains

Name	Soil Horizon Depth cm(in)	Texture, Inclusions	Slope %	Drainage	Landform
Charlton loam (ChD)	0-8 in 8-24 in 24-60 in	Lo SaLo SaLo	15-25	Well	Hills, ridges and till plains
Chatfield-Charlton complex, hilly, very rocky (CrC)	0-7 in 7-24 in 24-28 in	Lo FlaSiLo Bedrock	15-35	Well	Hills and ridges
Chatfield-Charlton complex, hilly, very rocky (CsD)	0-7 in 7-24 in 24-28 in	Lo FlaSiLo Bedrock	15-35	Well	Hills and ridges
Leicester loam, stony (LcB)	0-8 in 8-26 in 26-60 in	Lo SaLo SaLo	3-8	Somewhat poorly	Hills, ridges, and till plains
Paxton fine sandy loam (PnB)	0-10 in 10-20 in 20-60 in	FiSaLo Lo GrlSaLo	2-8	Well	Drumlinoid ridges, hills, till plains
Ridgebury loam (RdB)	0-8 in 8-16 in 16-26 in 26-34 in 34-60 in	Lo SaLo GrlFSaLo GrlFSaLo GrlLo	3-8	Poorly and Somewhat Poorly	Lower hillsides along small drainageways
Riverhead loam (RhB)	0-6 in 6-25 in 25-30 in 30-60 in	Lo SaLo LoSa LoSa	3-8	Well	Deltas, terraces
Sutton loam (SuB)	0-9 in 9-27 in 27-60 in	Lo GrlFiSaLo GrlFiSaLo	3-8	Moderately well	Hills, ridges, till plains
Udorthents, smoothed (Ub)	0-4 in 4-70 in	GrlLo VGrlLo	0-8	Moderately well	N/A

Key: Soils: Lo-Loam, Sa-Sand, Si-Silt
Other: Fi-Fine, Grl-Gravelly, V-Very

As part of the current project, a geotechnical study was completed in which 11 test borings, 18 test pits, 1 borehole permeability test and 3 percolation tests were completed (Carlin, Simpson & Associates 2013). Appendix A shows the location of these explorations and the lab results.

The soil tests were placed at various locations within the proposed development area along the Route 22 portion of the project site. The geotechnical report summarized that most borings and test pits contained brown topsoil, 3-10 inches thick, with existing fill observed either beneath the topsoil or at the surface in 3 of the 11 borings and 6 of the 18 test pits. The fill was described as brown silty sand or silty sand with gravel, with cobbles and boulders. The fill in some tests contained debris, topsoil, and roots. It ranged in depth from 1’10” to 6’9” below the existing ground surface. Below the topsoil and/or the fill were natural soils described as medium dense to very dense brown, light brown, or gray sandy silt, sandy clayey silt, silty sand, silty sand with gravel, or sandy gravel. Gneiss bedrock ranged in depth from 1’8” to 15’2” below the existing ground surface, with weathered gneiss bedrock often found above the bedrock, at depths of 2-7’ below the existing ground surface. Groundwater was only encountered in two tests, at depths of 4’1” and 3’3” below grade, suggesting that in these cases the groundwater was trapped within soil layers.

D. ARCHAEOLOGICAL AND HISTORIC SITES AND SURVEYS

Records from the OPRHP and the New York State Museum (NYSM) identified 24 archaeological sites within a one mile radius of the project site, although it appears that several of the same sites are noted twice, with different numbers from the two offices. Below is a list of these sites and their descriptions.

Table 2: Archaeological Sites within a one mile radius of the project site

NYSOPRHP Site #/Name	NYSM Site #/Name	Distance from APE	Time Period	Site Type
	5174 Finch's Rockshelter	Location is general, ca. 0.4 mile east	Unknown precontact	Rockshelter
	5173	Location is general, ca. 0.8 mile southeast	Unknown precontact	Rockshelter
	5170	Location is general, ca. 0.5 mile southwest	Unknown precontact	Rockshelter
	5167	Location is general, abutting project site at southeast end	Unknown precontact	Burial Ground
	5168	Location is general, ca. 0.3 mile southwest	Unknown precontact	Camp
	5169	Location is general, ca. 0.5 mile west	Unknown precontact	Rockshelter
	5165	Location is general, overlapping northwest end of project site	Unknown precontact	Village
	5166	Location is general, ca. 0.5 mile north	Unknown precontact	Camp
	8552	Location is general, ca. 0.1 mile northwest	Unknown precontact	Camp
11910.00007 Rockshelter III		Ca. 0.3 mile southwest	Unknown precontact	Rockshelter
11910.00055 Red Brook Glen Prehistoric Site #1		Abutting on south	Late Archaic	Camp
11910.00056 Red Brook Glen Prehistoric Site #2		Abutting on west	Middle-Late Woodland	Camp
11910.00006 Rockshelter II		Ca. 0.2 mile west	Unknown precontact	Rockshelter
11910.00004 Camp Site I		Ca. 0.2 mile southwest	Unknown precontact	Camp
11910.00003 Burial Ground Site		Ca. 0.1 mile west	Woodland	Burial ground
11910.00005 Rockshelter I		Ca. 0.2 mile west	Unknown precontact	Rockshelter
11910.00002 Village Site		Ca. 0.2 mile northwest, at the south end of Byram Lake	Unknown precontact	Village
11901.000297 Seven Springs Area 11, Locus 1		Ca. 0.9 mile northwest	Late Archaic	Camp
11901.000293 Seven Springs Area 8, W30S30		Ca. 0.9 mile northwest	Unknown precontact	Single quartz flake

NYSOPRHP Site #/Name	NYSM Site #/Name	Distance from APE	Time Period	Site Type
11901.000295 Seven Springs Area 10, Locus 1		Ca. 0.8 mile northwest	Unknown precontact	Lithic scatter
11901.000294 Seven Springs Area 8, W50S120		Ca. 0.8 mile northwest	Unknown precontact	Quartzite uniface
11901.000296 Seven Springs Area 10, Locus 2		Ca. 0.7 mile northwest	Unknown precontact	Camp
11901.000282 Seven Springs Area 1, Locus 1		Ca. 0.6 mile northwest	Unknown precontact	Quarry
11901.000298 Seven Springs Area 12, Locus 1		Ca. 0.6 mile northwest	Unknown precontact	Lithic scatter

There have been a number of precontact camps, rockshelters, and a burial ground reported along the Byram River immediately west and southwest of the project site, on both sides of Byram Lake Road and Interstate 684. Additionally, two precontact sites have been recorded along both sides of Red Brook Glen (a.k.a. Sniffen Brook), the tributary of the Byram River that runs immediately adjacent to the south and western sides of the project site. These sites were identified as part of the Red Brook Subdivision project (Weigand and Abraham 1996). Site 11910.00055, Red Brook Glen Prehistoric Site #1, was recorded abutting the Brynwood property line on the south, on the north bank of Red Brook Glen, and Site 11910.00056, Red Brook Glen Prehistoric Site #2, was recorded on the west side of Red Brook Glen, approximately 100 feet west of the Brynwood property line. Site 11910.00055, Red Brook Glen Prehistoric Site #1 was determined through Phase I and II archaeological investigations to be a single-component Late Archaic camp site or hunting station, and eligible for the S/NRHP. The site measured ca. 1500 square meters. It was recommended that the site be preserved through avoidance, which has occurred. Site 11910.00056, Red Brook Glen Prehistoric Site #2, was determined not eligible for the S/NRHP (Weigand and Abraham 1996).

Several additional archaeological survey reports within a one-mile radius of the project site also were reviewed at the OPRHP, including work for two other subdivisions west of Interstate 684 and the Byram River, the Leisure Farm Subdivision (Sheffield Archaeological Consultants 1994), the Benjamin Wall Subdivision (Weigand 1996), and the Seven Springs Farm project development on the west side of Byram Lake (HPI 2000, 2003, 2004, 2005).

There are no historic structures on, adjacent, or within one-half mile of the project site that have been listed or determined eligible for the S/NRHP. The closest S/NRHP eligible or listed property is Smith’s Tavern, at 440 Bedford Road, approximately one mile to the south of the project site. Additionally, there are no historic structures on, adjacent, or within one-quarter mile of the project site that have been given official local landmark designation. The closest locally designated historic landmarks are the residential property at 481 Bedford Road, approximately one mile to the south of the project site, as well as Smith’s Tavern, noted above.

However, as will be described in more detail below, the North Castle Historical Society is working on a historic resources survey known as the Century Homes Designation, which will document historic structures one hundred years or older within the Town of North Castle boundaries. There are a number of resources that have been identified as part of this large survey that are within the project site vicinity, some within one-quarter mile of the project site. This large survey is underway and may be completed in the next few years, although it is unclear at this point whether the survey will result in the creation of an official Town of North Castle local historic district (Shimer, personal communication 2013).

E. HISTORY OF THE PROJECT SITE

Eighteenth and Nineteenth Centuries

The project site falls within the Middle Patent of North Castle, which was granted in 1701 (Scharf 1886, Vol. 2:630). What is now known as Route 22 was an early thoroughfare through the Patent, and later became part of the Old Post Road, created during the first decades of the eighteenth century, which ran north from New York City and then diverged on paths to Bennington, Vermont and Boston, Massachusetts. The 39th milestone of the Old Post Road is located just north of the entrance to the Brynwood property, on the west shoulder of Route 22 (Lander and Lederer 1989).

The Byram River, located just west of the project site, was a natural resource that was utilized by generations of millers and manufacturers. One of the earliest known saw mills on the Byram River was constructed just south of what is now Byram Dam on Byram Lake, prior to the Revolutionary War. Its original owner was Aaron Forman, a colonial militia captain and Town supervisor in 1757-1758. In 1804, Forman's heirs conveyed the mill to his son-in-law Jotham Carpenter, who owned the mill until 1825. The next millwright was local landowner Isaac Tripp, who used the mill to saw boards and lumber, and also had a chairmaking business. Isaac's son John P. Tripp owned the mill next, operating it until ca. 1904 when it was demolished as part of New York City's Kensico watershed property (North Castle Historical Records, Vol. 2:17; Liber 1039/369).

The 1851 Sidney map (Figure 8) illustrates that the project site contained two structures attributed to "I. Tripp" located in the vicinity of the modern entrance to the project site on Route 22. The Tripp family owned about 130 acres on the west side of Route 22, and much of this acreage fell within the project site (Liber 1039/369). A second landowner, Hiram Finch, had a structure just south of the project site on Route 22, on property now held by the Coman Hill School. However, much of the southern portion of the project site was part of the Finch property, which totaled 83 acres (Liber 1505/184). According to Town of North Castle Historian Doris Finch Watson, Hiram Finch (1817-1897) was a well-known shoe manufacturer in Armonk. His home and business both were located on Route 22, and he also owned a general store and ran the mail and passenger stage line from North Castle to Kensico and Port Chester (Watson 1997). Both the 1850 and 1860 Federal Censuses for North Castle indicate that Tripp and Finch were wealthy landowners with extended families. Occupations of residents along Route 22 during this time generally were either farmers or shoemakers.

The 1868 Beers map (Figure 9) shows similar conditions to the 1851 Sidney map, but provides additional details. By this time, the Tripp property (now showing just one building) was attributed to "I. and J.P. Tripp" (Isaac and John P.), and a roadway was shown leading from the Tripp house on Route 22 down through the project site to the saw mill at the base of Byram Lake. A second saw mill (next to two small mill ponds) was located further down the Byram River, just west of the project site. Nearly identical conditions are shown again on the 1872 Beers map and the 1881 Bromley map (Figure 10). The 1893 Bien map (Figure 11), the 1899 U.S.G.S. map (Figure 12), the 1900 Hyde map, and the 1901 Bromley map also indicate similar conditions, although the Bien map no longer shows the Finch structure south of the project site.

Twentieth Century

By around the turn of the twentieth century, however, conditions along Route 22 began to change considerably, as old farming families began to sell their large properties to new owners, often dividing them into smaller parcels in the process. After many decades of single family ownership in the nineteenth century, during the first decades of the twentieth century properties changed hands with increasing frequency.

From the turn of the twentieth century through the 1940s, the project site was owned and occupied by two different series of people, with the dividing line between the north and south parcels located at the approximate entry drive to the Brynwood property. The northern portion of the project site was known historically as the Tripp property and the southern portion the Finch property.

Table 3 details the property changes to the northern portion of the project site.

Table 3: Northern parcel (Tripp property) conveyances

Grantor	Grantee	Year	Notes
John P Tripp	Isaac R. and Josephine H. Tripp	1901	Liber 1594/45, 90 acres
Isaac R. and Josephine H. Tripp	Austin Kimball	1906	Liber 1760/210, 90 acres
Austin and Dorothy Kimball	Thomas J. Loftus	1914	Liber 2053/89
Thomas J. and Mary R. Loftus	Emma B. Wilson	1917	Liber 2137/130, 82 acres
Emma B. Wilson	Rudolph T. Falk & others	1927/29	Libers 2762/321 and 2909/164
Rudolph T. Falk & others	Jamestone Realty Corp.	1930	Liber 3064/1

By contrast Table 4 details the property changes to the southern portion of the project site.

Table 4: Southern parcel (Finch property) conveyances

Grantor	Grantee	Year	Notes
Hiram Finch, (execs. of)	Norman W. Lander & wife	1898	Liber 1505/184, 83 acres
Norman W. Lander & others	Anna S. Watkins	1906	Liber 1769/432, part of same parcel from Finch to Lander
Anna & John H. Watkins	Tremont Terrace Corp.	1923	Liber 2461/425, two parcels: 149 and 20 acres
Tremont Terrace Corp.	Hugh K. Prichett	1924	Liber 2510/163
Hugh Prichett	Caroline Prichett	1927	Liber 2798/342
Caroline Prichett	N.C.W. Realty Corp.	1927	Liber 2804/77

Within the project site, structures associated with the Tripp portion of the property (later Kimball, Loftus, Wilson, and Falk) were located on either side of the entry drive to the modern entrance to the Brynwood property, while structures associated with the Finch portion of the property (Landers, Watkins) were located off the project site, in the area now part of the Coman Hill School parcel. Maps made during the first decades of the twentieth century generally show these conditions, although there are inaccuracies on some maps, most notably the 1908 Hyde map (Figure 13), which shows that the roadway leading from Route 22 down to the former mill site was further north than on earlier maps, and illustrates a different alignment of Route 22. The 1911 and 1914 Bromley maps both indicate that the former Tripp buildings were attributed to T.J. Loftus and on the former Finch property there were structures attributed to Watkins.

Although the Watkins building was not located on the project site itself, its history is an integral part of the Brynwood story. The former structure was an enormous stone mansion, probably constructed for the wealthy banker John H. Watkins and his wife Anna in the early years of the twentieth century. Both the 1910 federal census and the 1915 New York State census for North Castle indicate that the Watkins and their servants were living on the property. By the early 1920s the Watkins were no longer listed on the property, and in 1923 they sold the parcel to the Tremont Terrace Corporation, who the next year conveyed the same property to Hugh Prichett, another wealthy banker. The Prichett family, who were listed as living in Yonkers in the 1915 New York State census and Manhattan in the 1920 federal census, moved to the property and were listed as occupants in the 1925 New York State census. An article about the Prichett family and the house on Bedford Road notes that there were four children in the family and a number of servants. The family sold the property in 1927; Hugh Prichett died in 1928 (Tomback 1995).

- North Castle Golf & Tennis Club

That same year, in 1927, marked the beginning of the Brynwood property's new role as a recreational facility. The N.C.W. Realty Corporation sold the former Prichett property to the North Castle Golf & Tennis Club, a newly formed organization that created the first golf course on the project site. The stone mansion became the club house, and the grounds became the golf course. By the spring of 1928, the club was open, and included dining and grill rooms, a large ball room and a card room (*Dobbs Ferry Register* May 18, 1928). In August 1928, it was reported that of the 350 memberships, 300 had already been taken. Nine holes of the golf course had been completed, with the remaining nine holes to be finished in the fall. There was one tennis court already in use, with two others to be built, and a swimming pool to be completed the following spring. The club offered trap shooting, obstacle golf "on the west terrace," and a stocked stable of horses for riding. The club house could accommodate 30 overnight guests (*Scarsdale Inquirer* August 24, 1928).

A promotional brochure for the club illustrated both the exterior (Figure 14) and interior of the club house, as well as the grounds and layout of the golf course (Figure 15). The club advertised itself as an egalitarian institution, with equal rights afforded to its female members. It espoused:

> At the North Castle Golf and Tennis Club the ladies can play secure in the knowledge that they have the same rights on the course or courts, at any time, as the men. The ladies can invite male guests and play along with their husbands or members of the family, feeling they are not being extended a privilege, but merely exercising the rights of a member (North Castle Golf and Tennis Club n.d.).

The 1930 Hopkins map (Figure 16) illustrates the new North Castle Golf and Tennis Club holdings on the southern portion of the project site, as well as the Falk property on the northern portion of the project site, with several structures shown fronting Route 22, just north of the modern entry to the property.

- Signal Hill Country Club

By the end of 1930, however, the second stage of the project site's transformation had begun, when the northern portion of the property also was turned into a golf course. An article in December 1930 noted the following:

> The Signal Hill Country Club, Inc. has acquired 143 acres on the Armonk-Bedford Road for about $475,000. The property comprises the 60-acre Albert J. Stone farm estate, including a stone residence and outbuildings and the 83-acre farm opposite, formerly known as the Wilson place (*New York Evening Post* December 6, 1930).

The Stone farm and estate was located on both sides of Route 22 just north of the project site, as shown on the 1930 Hopkins map (Figure 16). By May of the following year, the Signal Hill Country Club had opened, featuring an 18-hole golf course, tennis, riding, and fishing and boating on adjoining Byram Lake. The golf course was located on the northern part of the project site, while the club house for the Signal Hill Country Club was located on the former Stone farm, east of Route 22 and off the project site at 601 Bedford Road (*Mount Vernon Daily Argus* May 31, 1931; *Pelham Sun* May 28, 1931; Figure 17). The ruins of the large stone clubhouse, formerly a private mansion, can still be seen from Route 22, adjacent to a large water tank, and clearly removed from the project site.

- Westchester Embassy Golf and Country Club and Byram Lake Country Club

Economics of opening and maintaining golf courses and country clubs during the Great Depression of the 1930s were difficult. In 1933, both the North Castle Golf and Country Club (on the south side of the project site) and the Signal Hill Country Club (on the north side of the project site) were acquired by new owners. The North Castle Golf and Country Club became the Westchester Embassy Golf and Country Club, and was to be managed by the group that ran the "21" restaurant in Manhattan, with Frank Hunter as the chairman (*Dobbs Ferry Register* April 14, 1933). A promotional brochure for the new club (Figures 18 and 19) showed a different configuration of the golf course, although it is unclear whether these changes actually occurred (Figure 20). Other changes to the club included reduced membership rates and reduced prices at the restaurant. The Signal Hill Country Club became the Byram Lake Country Club (*Mount Vernon Daily Argus* May 10, 1933; May 12, 1933). It does not appear that the golf course on the northern part of the project site was altered at this time; it was said that the course was in good condition.

Finances remained a problem as the 1930s unfolded. A newspaper article from 1934 indicated that many country clubs had begun running cabarets to supplement their other activities. The Embassy Club hosted "dancing under the stars" on the terrace of the clubhouse during this time (*Niagara Falls Gazette* July 17, 1934). However, the following year, in 1935, there was again a change in management, this time to a group called the Florida Year Round Club, headed by Nelson P. Davies of White Plains, who signed a three-year lease to run the Embassy Club, with a promise to bring the "four-ball match tournament" to the club in the winter (*Mount Vernon Daily Argus* April 29, 1935). In 1936, the Byram Lake Country Club was taken over by the Sportsman's Club of Westchester, and the golf course was "completely renovated" (*Yonkers Herald Statesman* June 10, 1936). An advertisement from 1937 indicated the name had not changed, however (Figure 21).

The Embassy Club property on the southern side of the project site, despite its frequent changes in management, still could not stay afloat. In July 1937, after years of attempts to turn a profit, the facility was sold at a mortgage sale. A newspaper account noted: "This particular golf course has been a financial failure practically every year, requiring reorganizations, reductions of interest, etc." (*Yonkers Herald Statesman* July 20, 1937). It appears that the new owner of the property was Charles V. Paterno, a successful builder and real estate developer who went on to purchase large swaths of land on both sides of Route 22 (including area now covered by the Windmill Farms development), and soon after also acquired the Byram Lake Country Club property on the north side of the project site (Liber 3655/68).

By the winter of 1937-1938, both the Westchester Embassy Club and the Byram Lake Country Club portions of the project site were being operated under one management team. Perhaps the first endeavor on the combined properties was for winter sports. An article notes:

> Miles of hills adapted for skiing and tobogganing are available. Under the management of Vincent de P. Peters, country club and sports operator in Westchester for the last decade, the properties have been developed for winter sports. Ten types of runs, some for beginners and fast sharp inclines more than a quarter of a mile for the more adept, have been laid out. Horses are available to pull skiers up slope. A large oval surface ice rink is planned (*Mount Vernon Daily Argus* January 20, 1938).

That spring, it was announced that the two clubs had been consolidated and would operate the golf courses under one management team. The Embassy Club clubhouse would service both facilities, and the Byram Lake golf course would be devoted almost entirely to tournament play (*Mount Vernon Daily Argus* April 11, 1939).

Merging the two country clubs in 1938-1939 appears to have been the last attempt to keep the golf courses operating on the project site. By the early 1940s, both courses had closed. Newspaper accounts indicate that the property was used for dog shows and competitions during the 1940s, although it is unclear what, if other functions, the property held. The disposition of the property was an issue during this period as well. In 1944, Paterno proposed that the project site be turned into a cemetery, but community opposition prevented it from occurring (*Mount Vernon Daily Argus* February 12, 1944; February 14, 1944; *Yonkers Herald Statesman* February 19, 1944). Over the winter of 1949-1950, the Byram Lake Country Club portion of the project site was used for skiing. An account says:

> Armonk ski tow will open Thursday at the former Byram Lake Country Club grounds. Owners of the new enterprise are Theodore Hamburger of 36 Devoe Avenue, Lawrence Schneider of 121 Franklin Avenue, Albert Spence of Armonk and Boyd P. Brown of Bedford Village. The 950-foot tow will service a 350-foot wide slope. The machinery operating the tow is capable of transporting 1200 skiers an hour, letting off a skier at the top every 50 seconds. There is a completely renovated "warming cottage" nearby and parking facilities can accommodate over 1000 cars (*Yonkers Herald Statesman* December 10, 1949).

The 1953 Hagstrom map indicates landowners at mid-century, and shows the extent of the Paterno holdings on both sides of Route 22, including the project site. In 1955, the first of the Windmill Farms houses east of the project site and Route 22 were built (*Yonkers Herald Statesman* 1955). Both former country club houses met with fiery ends during the 1950s: the former Embassy Club house burned in 1953 and the former Byram Lake Country Club house at 601 Bedford Road burned in 1957. The Embassy Club house ruins, which were located on the Coman Hill school property, have been dismantled, but the Byram Lake Country Club house ruins are still standing and visible from Route 22. Both of these former club houses are outside of the project site boundaries.

During the 1950s, Charles V. Paterno's heirs began to sell the family's land on either side of Route 22. Many of the sales were for home lots within Windmill Farms, but during this period the project site was sold as well, to developers Mac Welson and Edward J. Tobin. In 1963, the project site was sold by Tobin to Gerald Schwartz and

John R. Miseo of J&G Realty Co. (the parcel then included land extending to Byram Lake Road on the west that in 1964 was taken by New York City for the Kensico watershed) (Liber 6309/337).

- Bel-Aire Club, Greenwood Country Club, and Canyon Club

In June 1963, ground was broken for the present golf course on the project site, originally called the Bel-Aire Club (*Yonkers Herald Statesman* June 21, 1963). The two former 18-hole golf courses on the north and south sides of the property were reconfigured into one larger course by noted golf course designer Albert Zikorus of Bethany, Connecticut. Zikorus oriented the majority of the holes north-south to avoid late afternoon sun glare and shadows. The course included a watering system, comfort stations, shelter areas, and refrigerated drinking fountains. The clubhouse was noted as two and a half stories with stone facing, with a dining room to seat 500 and 29 guest rooms. Other amenities included a pool, tennis courts, and a maintenance building where workers lived. The builders, Miseo and Swartz, had recently completed and sold the Woodcrest Club in Muttontown, Long Island (*Yonkers Herald Statesman* December 11, 1963; December 2, 1964).

The transformation of the project site during the early 1960s was extensive. The property had not been an active golf course for over 20 years when it was purchased in 1963, and in addition the layout of the new course was considerably different than the two previous and separate versions. Aerial photographs taken before (Figure 22), during (Figures 23 and 24), and after (Figure 25) the course was completed illustrate the significant degree of earthmoving that occurred in order to create the new golf course and facilities. In addition, the ponds on the site were created by excavating lower lying areas.

Building and Tax Department records on file at the Town of North Castle, as well as the Phase I Site Assessment completed in 2008 (Ecosystems Strategies, Inc. 2008) document a number of changes to the property from the 1960s-present. In ca. 1972, the name of the facility was changed to the Greenwood Country Club, but by 1974 the name had again changed, to the Canyon Club, a moniker that would endure until 2010, when the present Brynwood name was established. New tennis courts were built in ca. 1974 and in ca. 1990, a new sewer system was constructed to replace the old, failing, septic system. The present golf cart storage facility south of the clubhouse was built in 1992-1993. In 1995, additional upgrades to the facility included a new one-story addition to the clubhouse, facing the pool; new stairs, railings, and retaining walls around the pool and the clubhouse; a new roof for the clubhouse; and various other smaller renovations. The golf course has continued to have periodic maintenance over the years.

F. ARCHITECTURAL RESOURCES

As described in the Current Conditions section, there are nine structures on the project site, all of which post-date the acquisition of the property in 1963 and creation of the present golf course facility in 1964. None of the buildings have reached 50 years old, and none are architecturally significant.

Also, as noted above, there are no formally listed or eligible S/NRHP properties within one-half mile of the project site, nor any locally landmarked properties within one-quarter mile of the project site. However, the project site context is a neighborhood containing many buildings and structures over 50 years in age, with a large number of these resources 100 years or older. The Century Homes Club survey underway by the North Castle Historical Society is in the process of identifying resources in the Town, and the North Castle Landmarks Preservation Committee has provided information about a number of these properties within approximately one-quarter mile of the project site. These, and several additional properties identified as part of the present project, are listed in the table, below. Locations are shown on Figure 26 and photographs are provided for these resources. Dates have been provided by the North Castle Landmarks Preservation Committee (Shimer 2013, Woodyard 2013) and through historic map research. While this list does not include all structures over 50 years old in the project site vicinity (for example, many of the Windmill Farms houses to the east of the project site were constructed in the mid-1950s), it does highlight some of the oldest properties in the area.

Table 5: Architectural Resources in the project site vicinity

Location on Figure 26	Address and name	Approximate year built	Visible from the project site?	Photograph number
1	Stone gate house, Windmill Road and Route 22	1950s	No	33
2	1 Spruce Hollow Road	1820	No	34
3	2 Upland Lane	1880s	Yes	35
4	18 Maple Way Paterno Administration house	1940s	No	36
5	8 Upland Lane circular ice house	Unknown	No	37
6	15 Evergreen Row Carpenter House	Ca. 1790	Yes	38
7	North Lane at Evergreen Row Carpenter-Forman cemetery	1740+	Parts may be visible	39
8	28 Evergreen Row	1880s	No	40
9	604 Bedford Road	1920s?	No	41
10	601 Bedford Road Byram Lake Country Club house stone ruins and former staff house	1906	No	42, 43
11	70 Old Byram Lake Road Stone Wheel Farm	1880s	No	44
12	63 Old Byram Lake Road Mill buildings?	Possibly 1880s	No	45, 46

As the table shows, there are several properties on the east side of Route 22 (with addresses on Upland Lane and Evergreen Row) that may be considered substantially contiguous to the project site. The substantial stone walls with gates that run along the border of the Windmill Farms development on the east side of Route 22 are also substantially contiguous (Photographs 47 and 48), and the cemetery on North Lane could also be considered substantially contiguous. The remaining structures, while within the study area, do not appear to be visible from the project site.

IV. CONCLUSIONS

A. PRECONTACT SENSITIVITY

From what is known of precontact period settlement patterns in Westchester County, most habitation and processing sites are found in sheltered, elevated sites close to wetland features, major waterways, and with nearby sources of fresh water. In its natural condition, prior to the transformation of the project site from farm and woodland to golf courses, there were many parts of the property that would have met these criteria. Particularly, those locations nearest to Red Brook Glen on the south side of the property and the Byram River on the west side of the property would have had high precontact sensitivity. Other sections of the project site that had relatively level areas also may have been sensitive for hunting sites. However, the disturbance to the project site during the twentieth century has been vast – there were two separate golf courses located on the property from the 1920s-1930s, both of which appear to have gone through at least one reconfiguration each. And creation of the present Brynwood golf course necessitated even greater amounts of grading and filling to construct the much larger course encompassing the entire site. Aerial photographs, as shown in Figures 22-25, illustrate the incredible degree to which the original landform was manipulated during the mid-twentieth century. While golf courses often follow the original landscape, modification is unavoidable. Greens, tee boxes, and bunkers are almost always artificial. Although many water hazards may be natural in origin, they are usually channeled, ponded, and shaped for drainage control. The flow of play often requires the installation of fairways in roughly parallel positions, dictating changes in the natural landform. The installation of underground drainage pipes and the inevitable irrigation system also contribute to subsurface impacts.

With these known disturbances in mind, it is still possible that several discrete locations at the periphery of the existing golf course may retain precontact sensitivity. These areas are relatively level stretches along the southwestern sides of the project site, in proximity to Red Brook Glen and the Byram River and in locations within or just bordering the site's wooded areas. Two precontact period archaeological sites were identified along these waterways during the mid-1990s, both just over the Brynwood property border, and it is possible, if disturbance is not too great, that additional portions of these or other precontact sites could be located on the project site in proximity to these sites. Figure 27 illustrates the limited locations where HPI concludes there is potential precontact sensitivity. There are both golf course renovations/improvements planned along the edge of this wood line, overlapping the sensitive area, and a new well proposed within the wooded area noted as sensitive.

B. HISTORICAL PERIOD SENSITIVITY

Archival research has shown that there were historic farm complex structures along the Route 22 side of the project site from at least the 1850s through the 1920s. There appear to have been two clusters of structures, one in the approximate location of the present Brynwood club house, and the second in the approximate location of the area south of the tennis courts and north of the entry driveway. Based on the amount of construction that has occurred for the present club house area, HPI concludes that the area south of the entry driveway where the club house is situated no longer retains historic period archaeological sensitivity. However, the area north of the entry driveway, which currently contains a swing set and an open grassy lawn, was part of a former fairway, but otherwise was undeveloped. A soil boring completed as part of the recent geotechnical study indicates no obvious fill in this area, although there may have been grading that has removed some soils. Unlike precontact resources, historic period archaeological resources are not as dependent on the preservation of the original landform, as they may have been deposited in deeper trash pits or shaft features, such as wells, privies, or cisterns that could still be present despite later disturbance. Thus, it is possible that remains from the historic farm complex that once was located here could survive despite the changes to the area, and as such HPI concludes that this section retains historic period sensitivity, as shown on Figure 27. This area is slated for new development as part of the proposed project.

Additionally, the project survey and the site inspection revealed that there are numerous stone walls throughout the project site, as highlighted on Figures 2a-g. Many of these stone walls represent former property lines or farming plots, while others may have been built as retaining walls in sloping sections of the property. Some of the stone walls clearly are more modern in origin, such as some of the ones lining the cart paths that likely were installed during construction of the golf course. However, the large majority of the stone walls appear to pre-date the golf course use of the property, which began in the 1920s.

C. ARCHITECTURAL RESOURCES

Architectural resources to be considered for the present project include resources within the project site boundaries, as well as resources substantially contiguous to the project site. As noted above, there are nine structures on the project site, all of which post-date the acquisition of the property in 1963 and creation of the present golf course facility in 1964. None of the buildings have reached 50 years old, and none are architecturally significant.

Also, as noted above, there are no formally listed or eligible S/NRHP properties within one-half mile of the project site, nor any locally landmarked properties within one-quarter mile of the project site. However, there are several properties identified as part of this project that are situated on the east side of Route 22 (with addresses on Upland Lane and Evergreen Row) and are may be visible from the project site. The substantial stone wall with gates that runs along the border of the Windmill Farms development on the east side of Route 22 is also visible from the project site, and the cemetery on North Lane may also be visible. All the remaining structures identified within the project site vicinity and shown on Figure 26 do not appear to be visible from the project site. None of these resources have been evaluated for S/NRHP eligibility, although many are under consideration for Town of North Castle local designation.

V. RECOMMENDATIONS

Based on these conclusions, HPI recommends the following measures. Due to the heightened precontact and historic period archaeological sensitivity at two discrete locations within the project site, a Phase IB archaeological testing program should be undertaken in these areas prior to any construction of either new development or golf course improvements, including new well construction. The testing should consist of a systematic shovel testing program in all of the identified areas that are not obviously disturbed, as well as investigations of any recovered historical period features. As noted above, portions of the area noted as sensitive for precontact archaeological resources are slated for golf course renovations and improvements, and a new well is proposed within this area also. The area identified as sensitive for historic period archaeological resources is part of the new development area. If project plans change and these areas will not be impacted by the proposed improvements, including temporary usage during construction or by landscaping, then archaeological testing may not be necessary. All Phase IB testing should be implemented according to applicable archaeological standards (New York Archaeological Council 1994, NYSOPRHP 2005).

Additionally, HPI recommends that all stone walls on the project site be preserved to the extent possible. While it is likely that some walls may need to be removed to accommodate proposed development, HPI recommends that whenever possible, these walls be incorporated into the new design, and/or be stabilized if they are deteriorating, such as the stone walls located along the east side of the project site along the Route 22 shoulder. The Old Post Road historic milestone marker located just north of the entrance to the Brynwood property, on the west shoulder of Route 22 should be preserved. A construction management plan to protect this marker should be implemented prior to the initiation of site activities to protect against accidental damage during construction.

Last, there are several architectural resources that are visible from the project site on the east side of Route 22, which while presently not officially documented at the Town, State, or National level, nonetheless have historic value and should be considered as part of the impacts analyses. HPI recommends that the proposed development along the Route 22 portion of the project site be appropriately set back and screened from view, so that there are no impact concerns for these resources. It is HPI’s recommendation that the historic Route 22 corridor in this area should remain as unchanged as possible.

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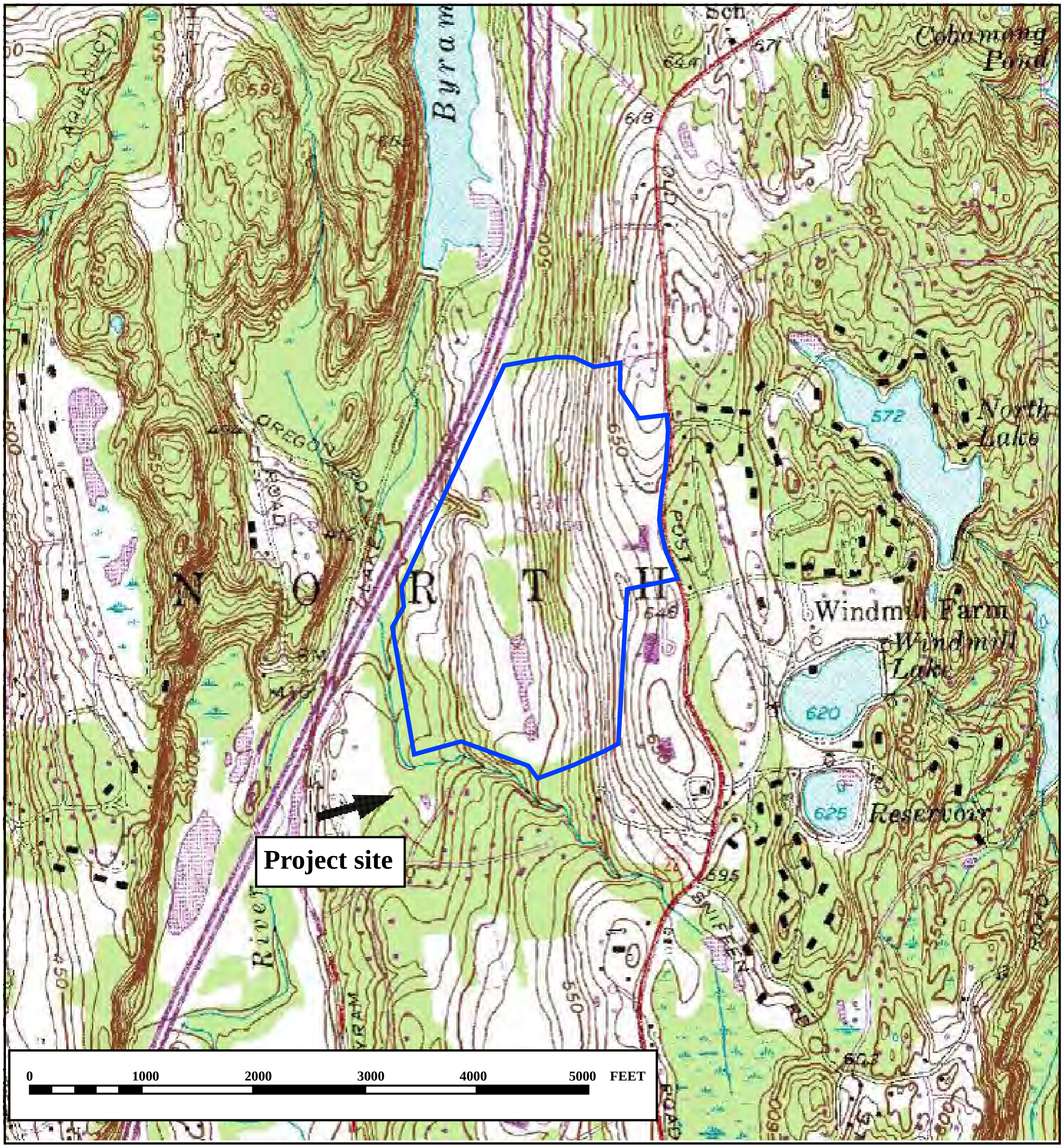

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Figure 1: Project site on *Mount Kisco, New York-Connecticut* 7.5 Minute Quadrangle (U.S.G.S. 1986).

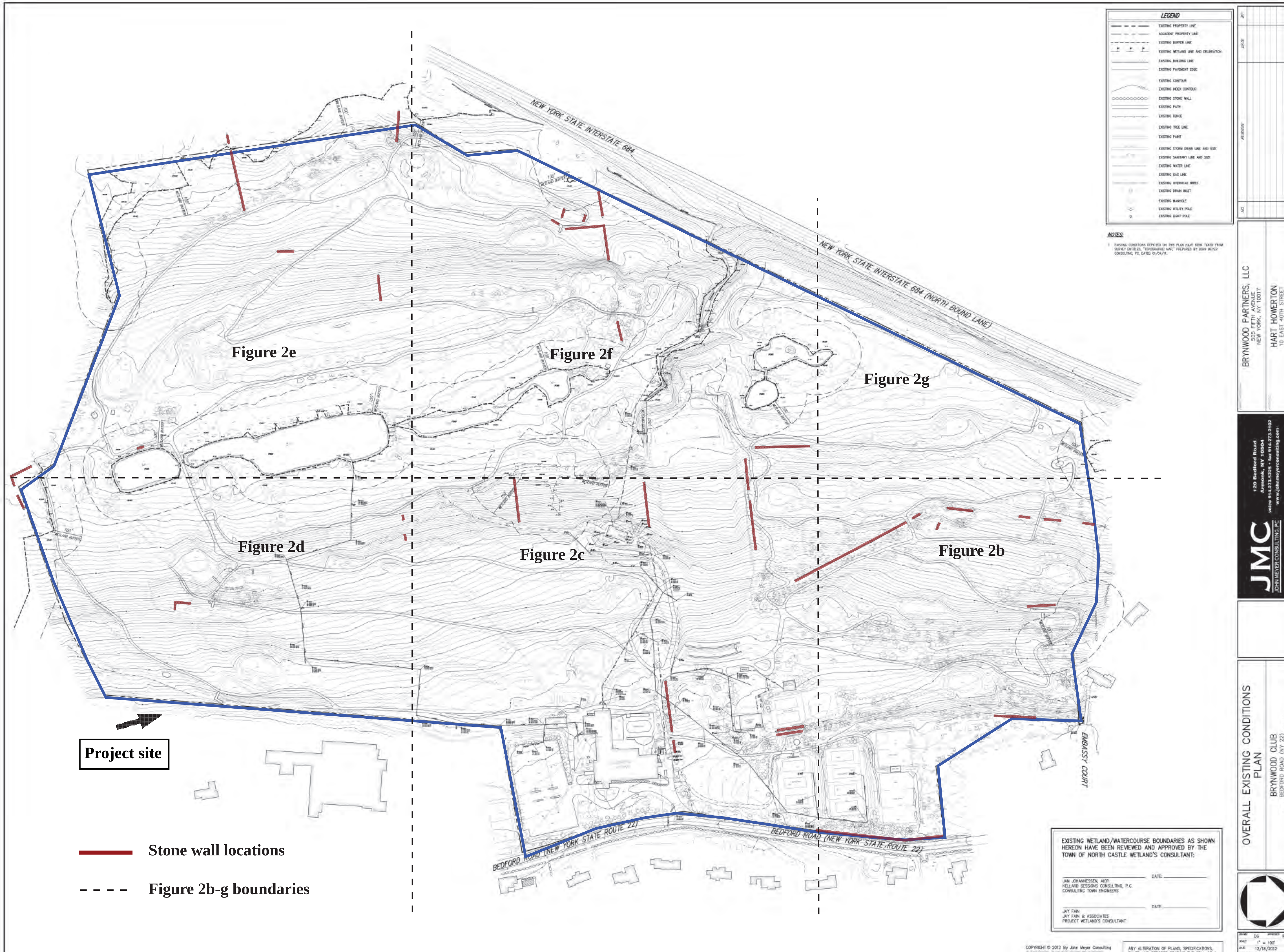

Figure 2a: Overall project site topographical survey showing existing conditions and stone walls (JMC 2012).

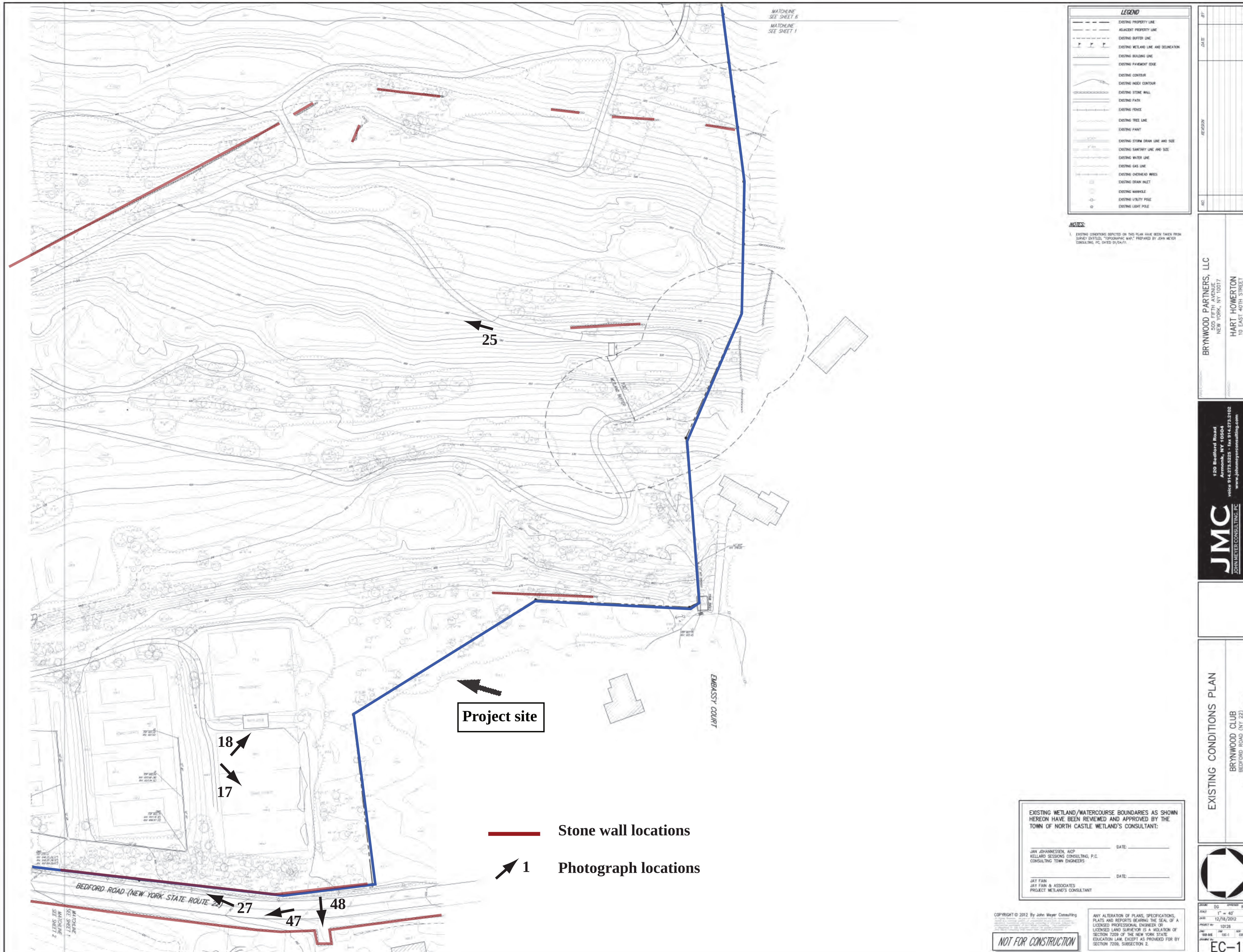

Figure 2b: Section of project site topographical survey showing existing conditions, stone walls, and photograph locations (JMC 2012).

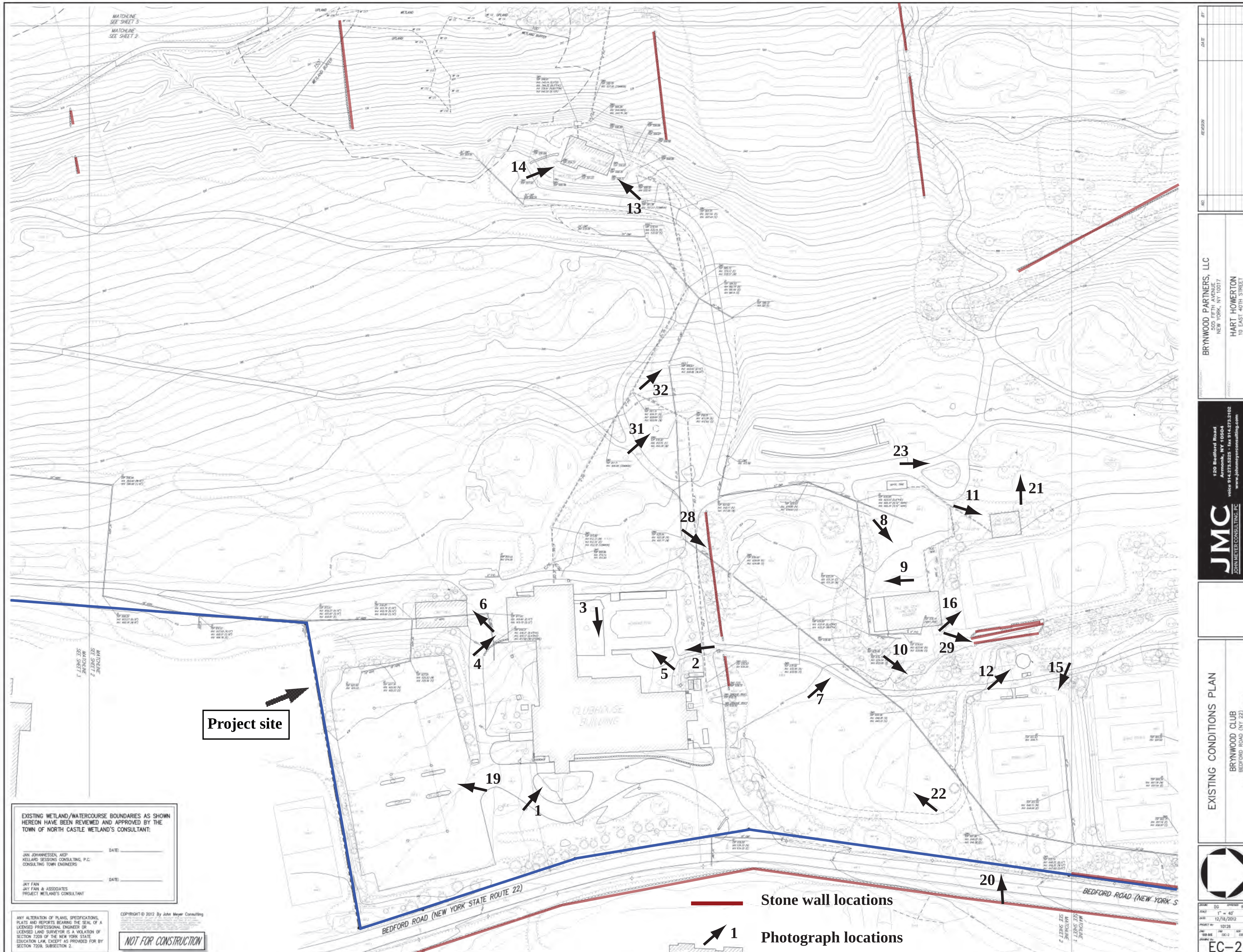

Figure 2c: Section of project site topographical survey showing existing conditions, stone walls, and photograph locations (JMC 2012).

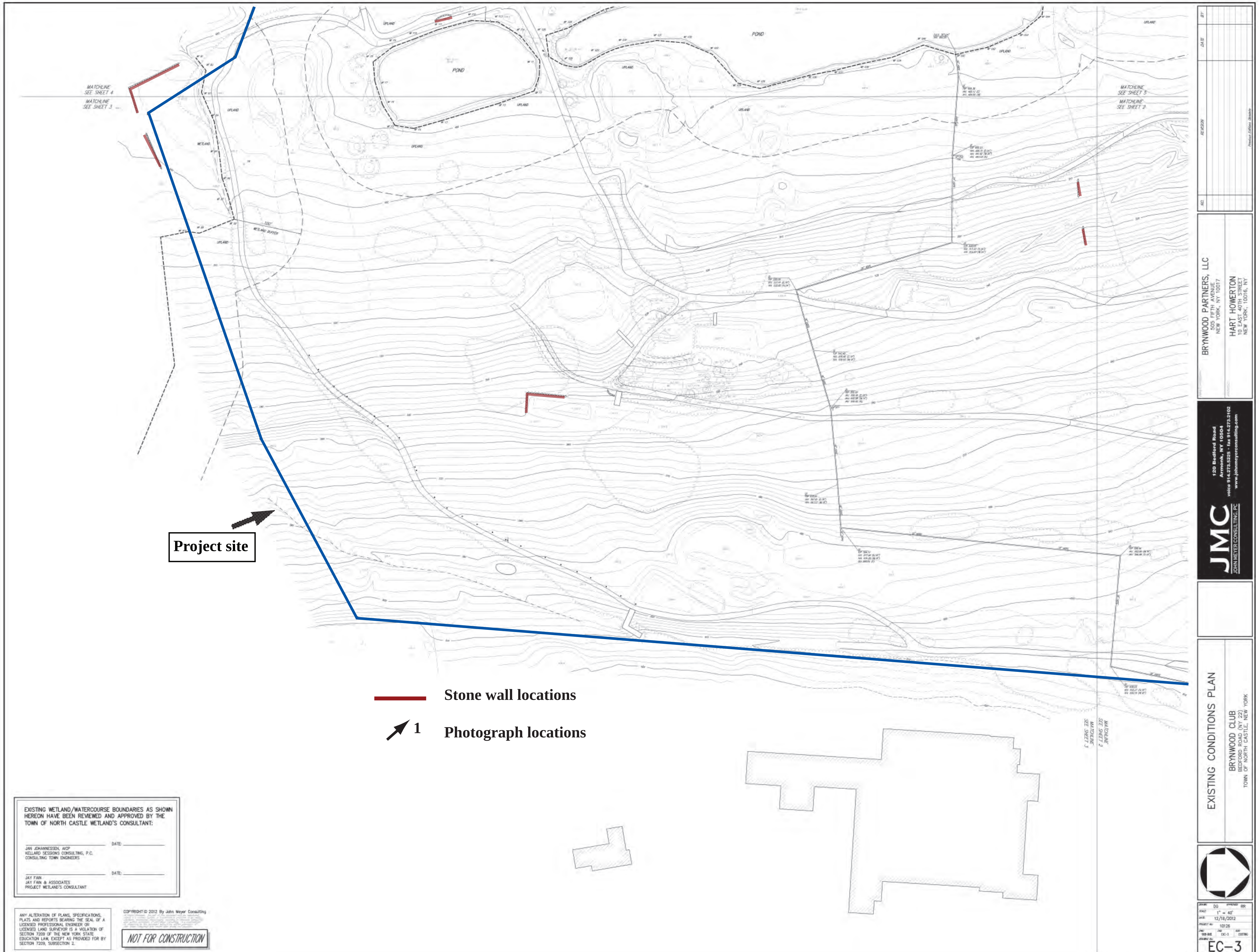

Figure 2d: Section of project site topographical survey showing existing conditions, stone walls, and photograph locations (JMC 2012).

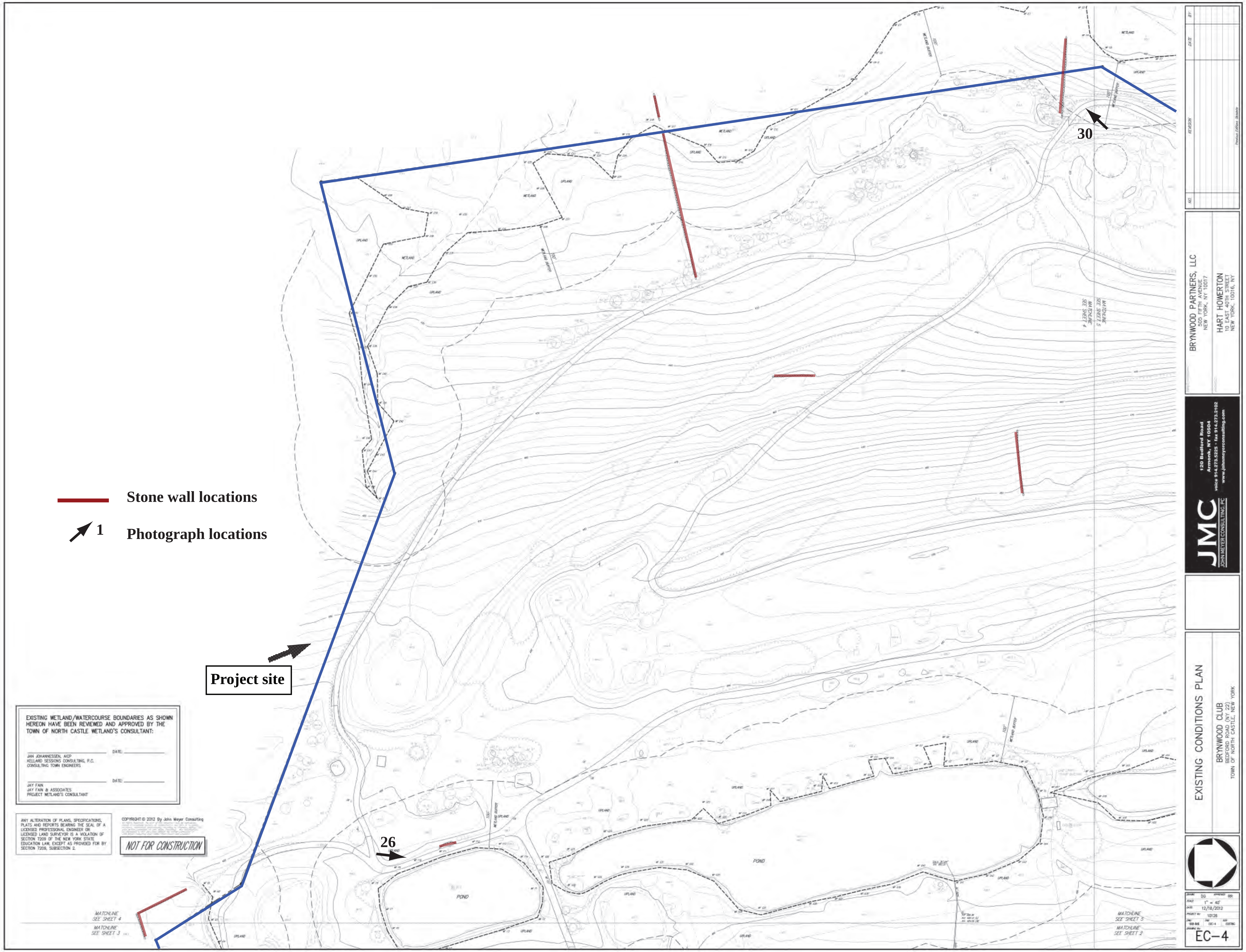

Figure 2e: Section of project site topographical survey showing existing conditions, stone walls, and photograph locations (JMC 2012).

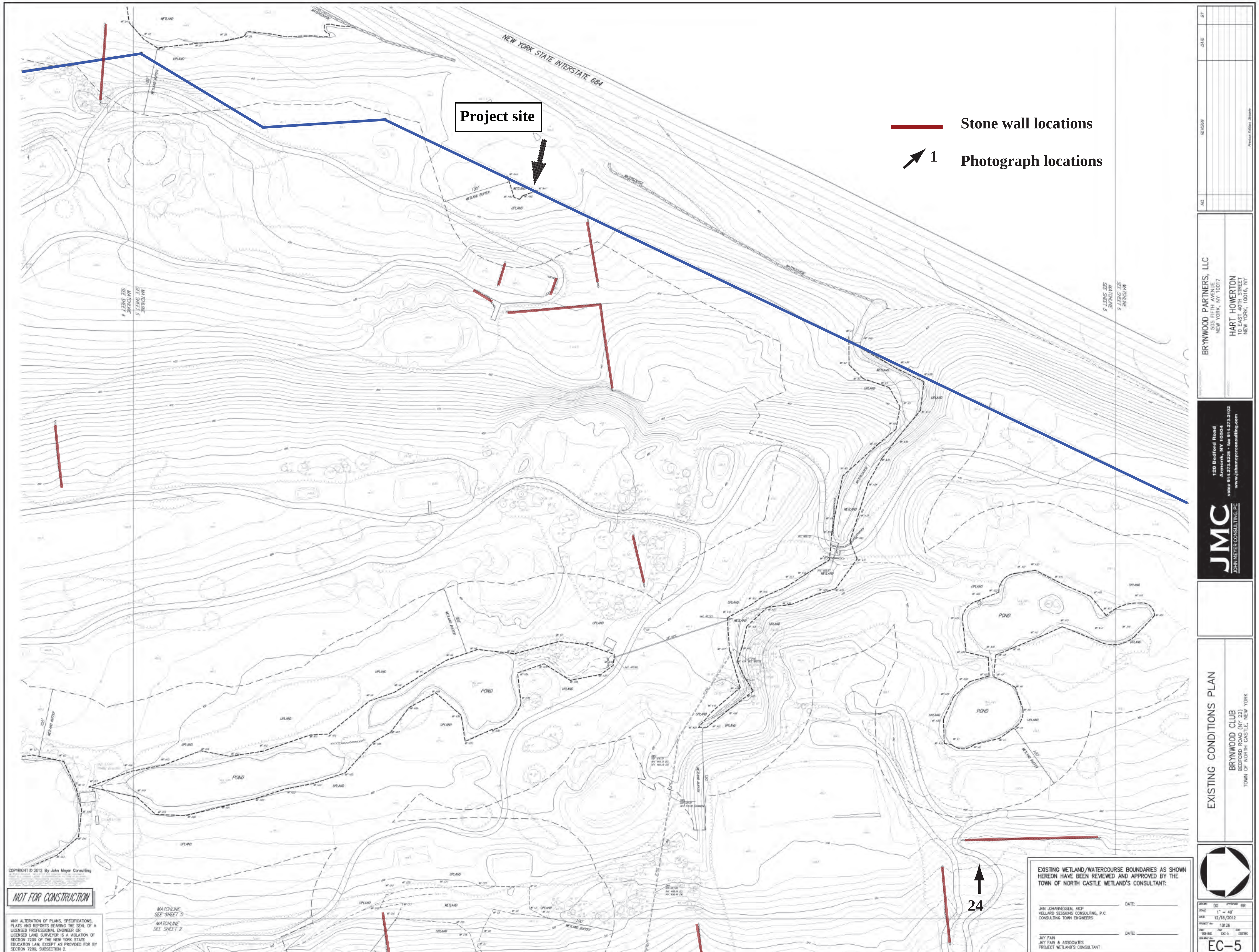

Figure 2f: Section of project site topographical survey showing existing conditions, stone walls, and photograph locations (JMC 2012).

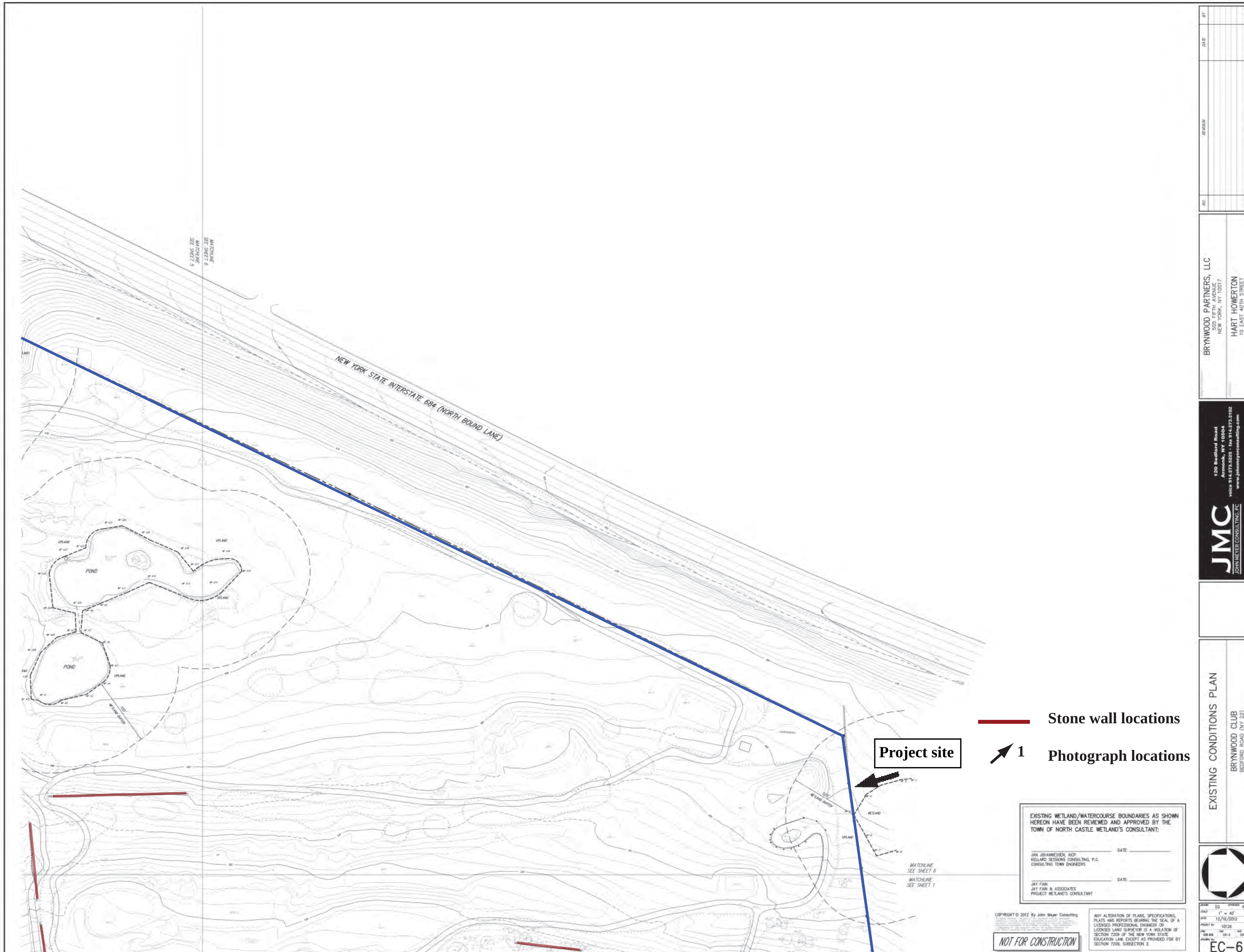

Figure 2g: Section of project site topographical survey showing existing conditions, stone walls, and photograph locations (JMC 2012).

Figure 3: Existing conditions survey including numbered fairways (Hart Howerton 2010).

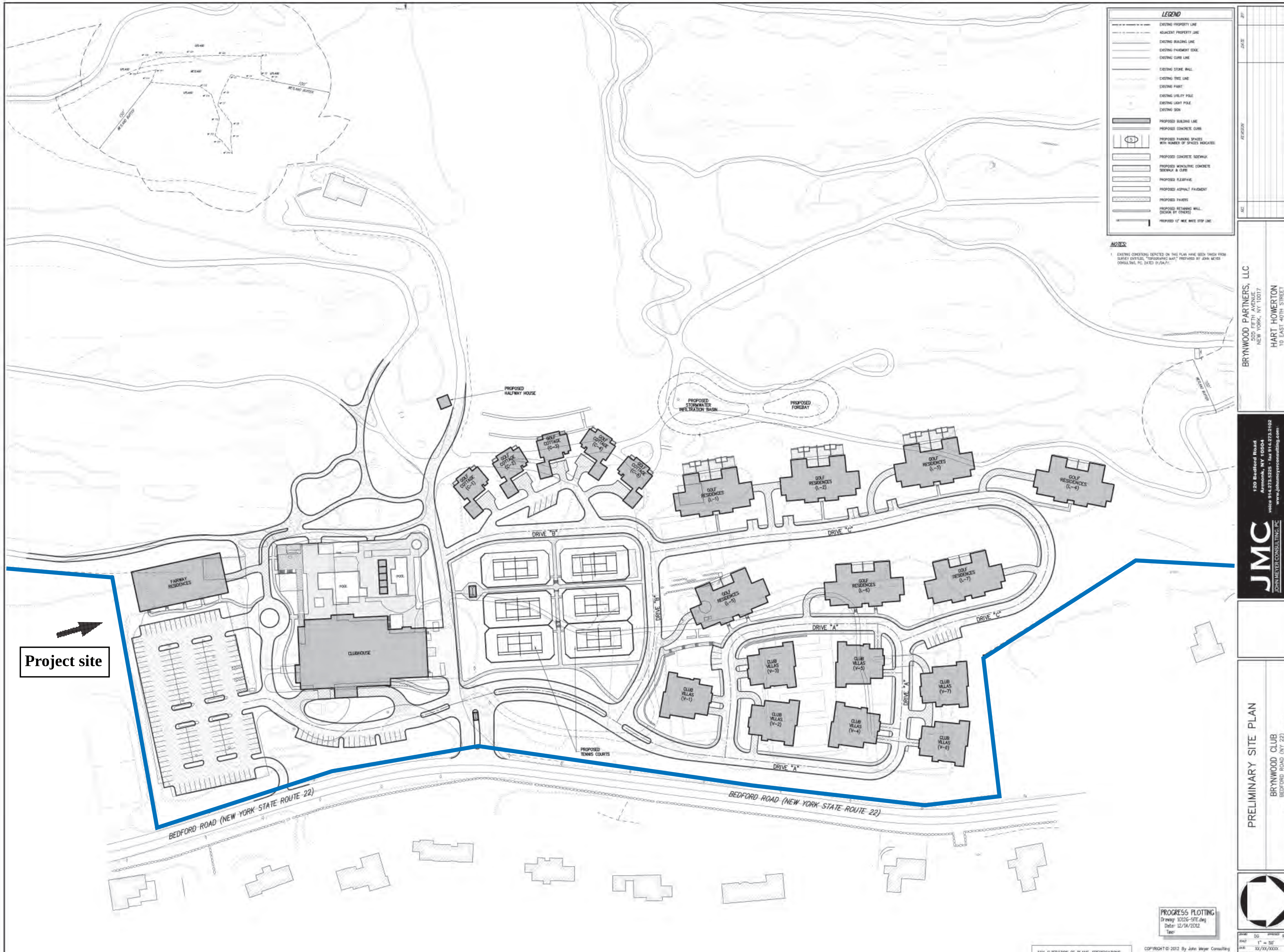

Figure 4: Preliminary site plan showing proposed new development (JMC 2012).

Figure 5a: Project site showing preliminary grading plan and limits of disturbance within golf course (JMC 2013).

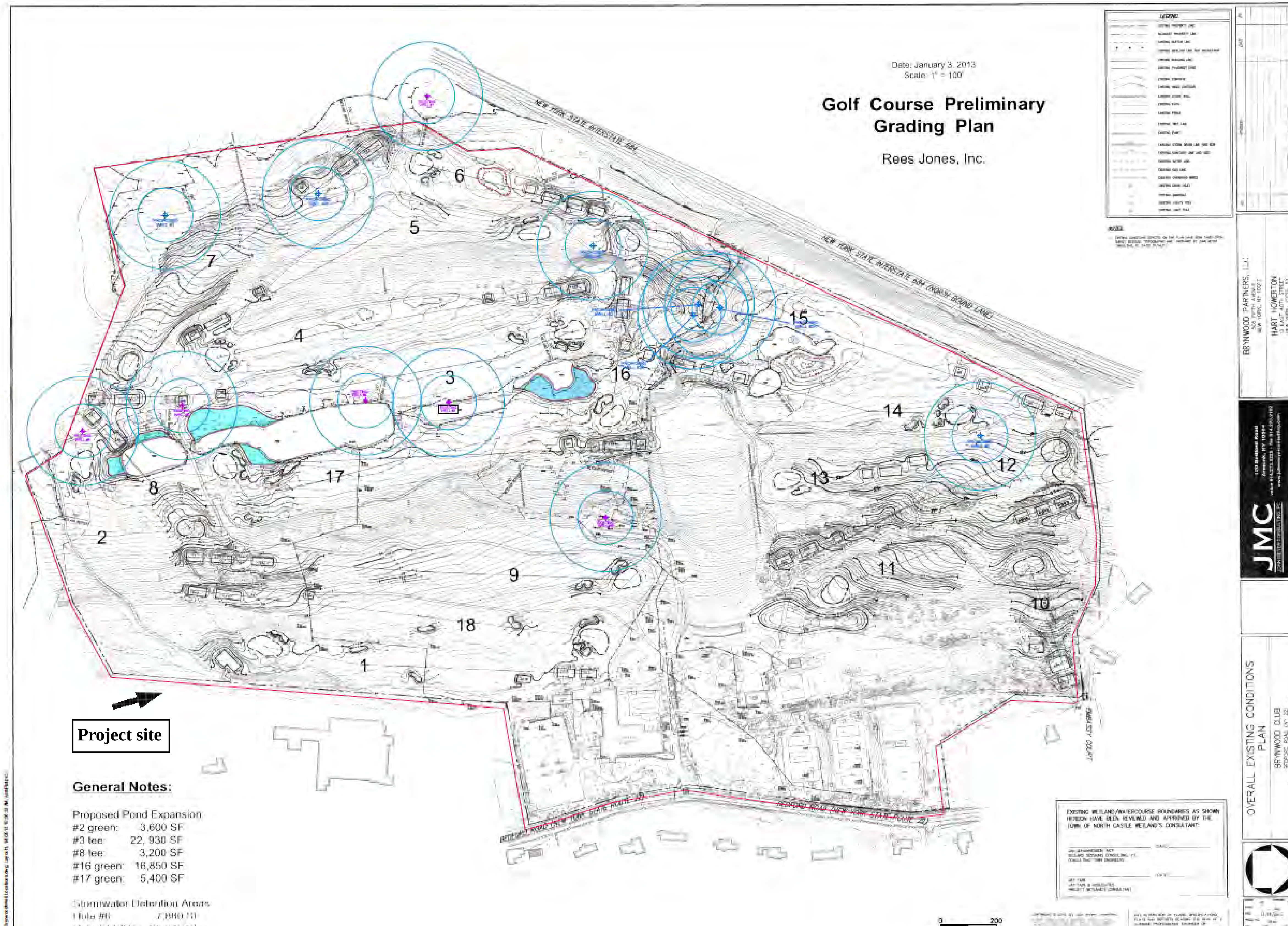

Figure 5b: Project site showing preliminary grading plan with proposed well locations (JMC 2013).

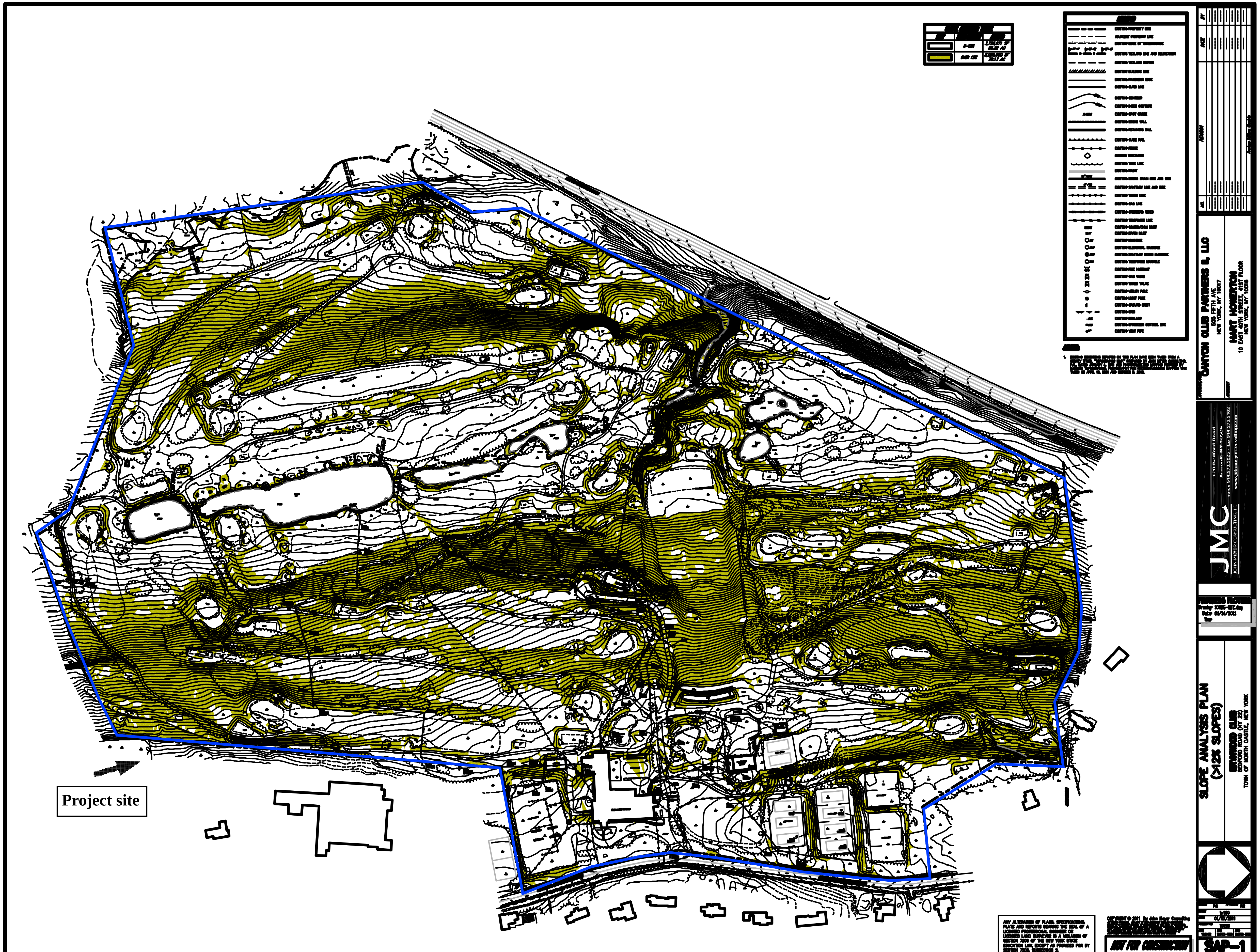

Figure 6: Project site showing areas of more than 12 percent slopes (in color) and less than 12 percent slopes (uncolored) (JMC 2011).

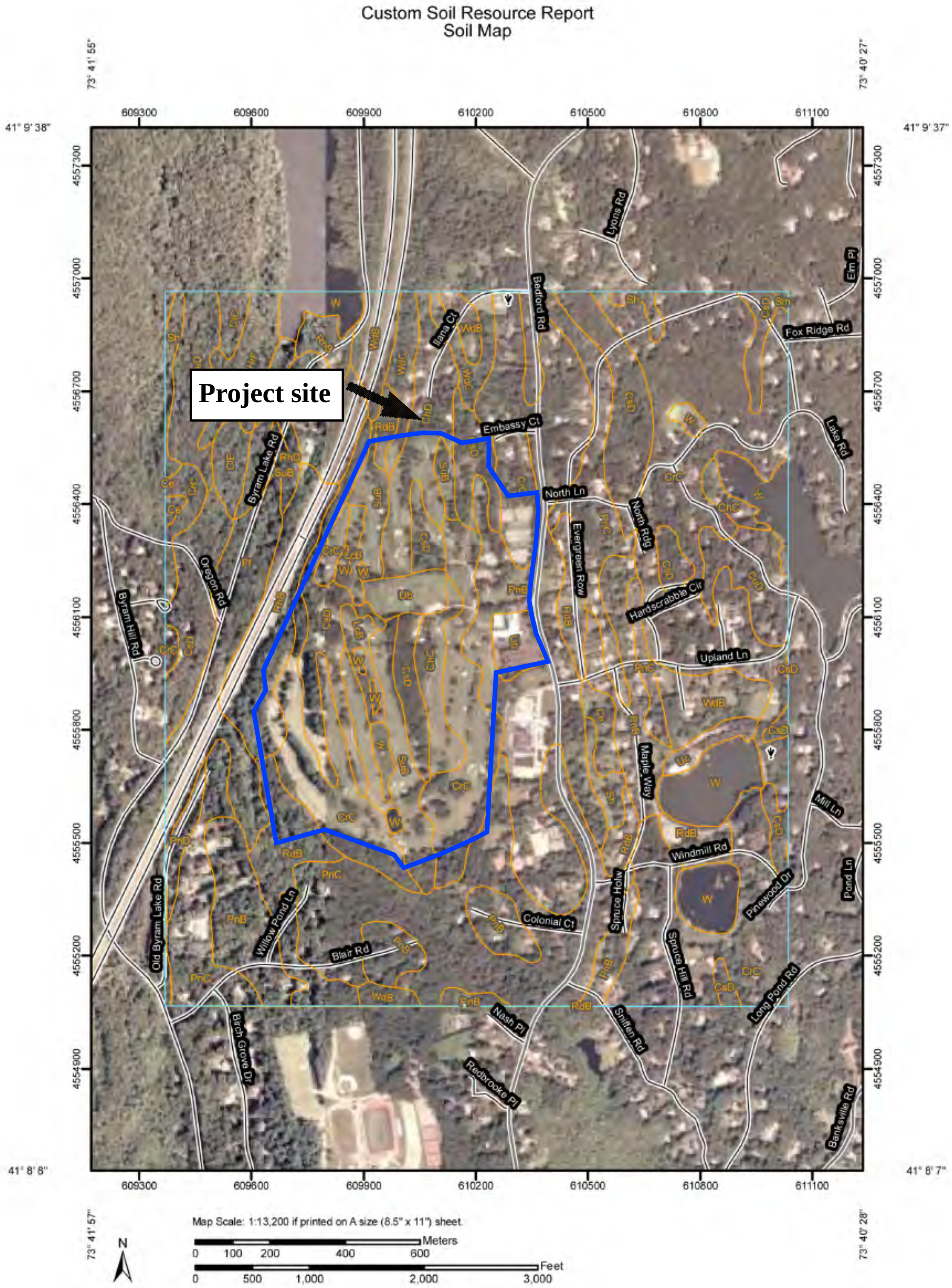

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Figure 7: Project site on web soil survey (U.S.D.A. 2012).

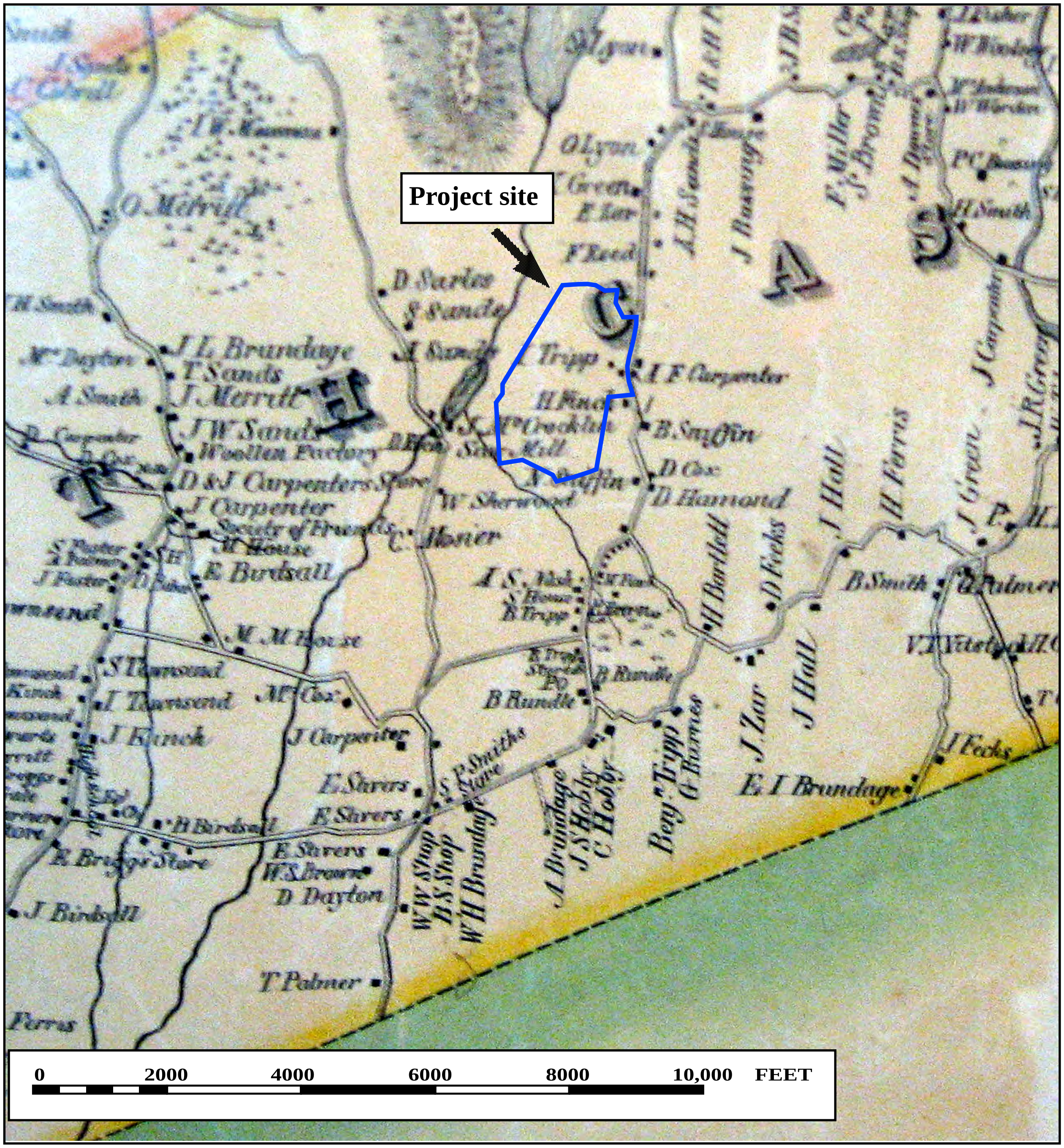

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Figure 8: Project site on *Map of Westchester County, New York* (Sidney and Neff 1851).

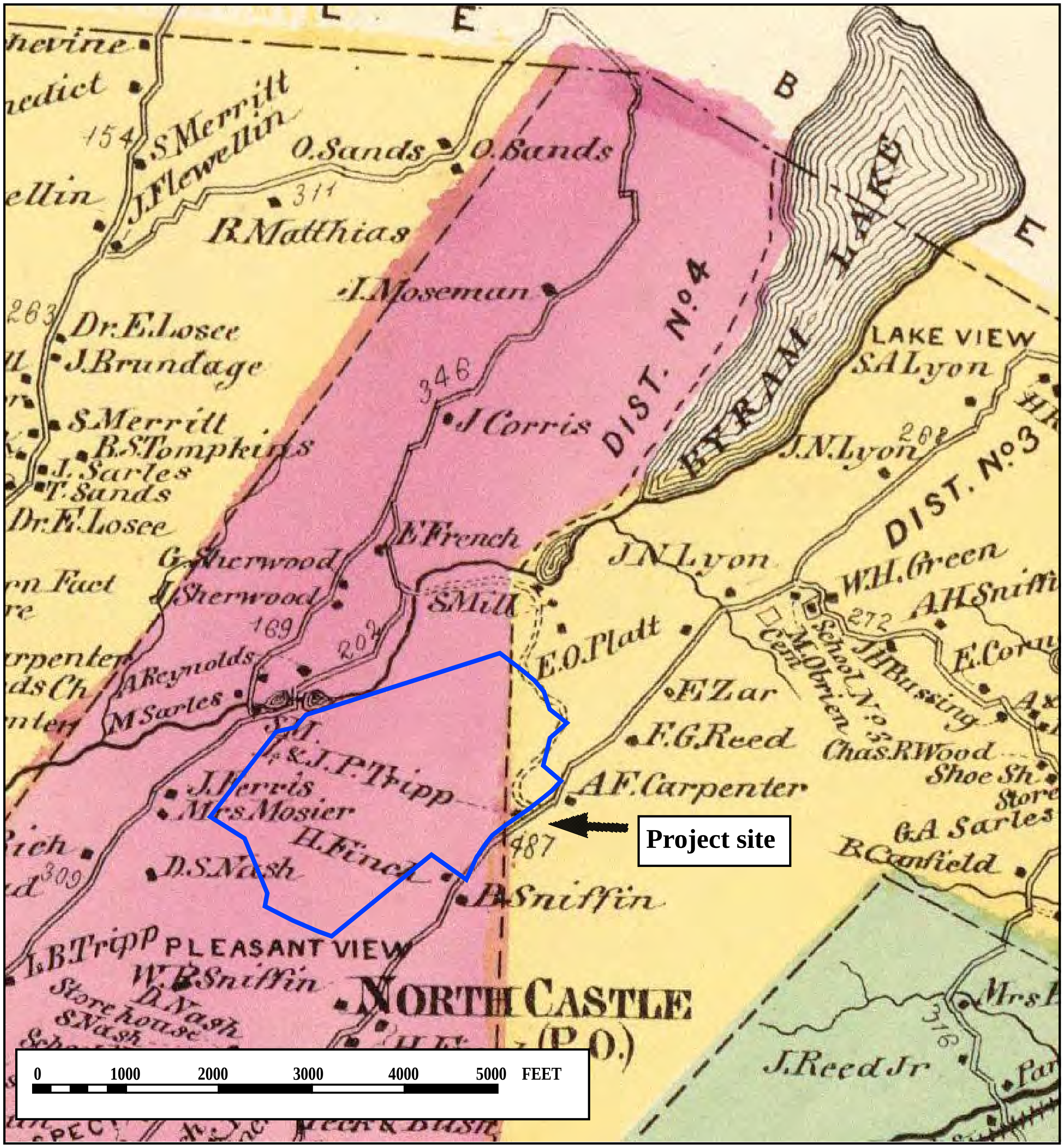

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Figure 9: Project site on *Atlas of New York and Vicinity* (Beers 1868).

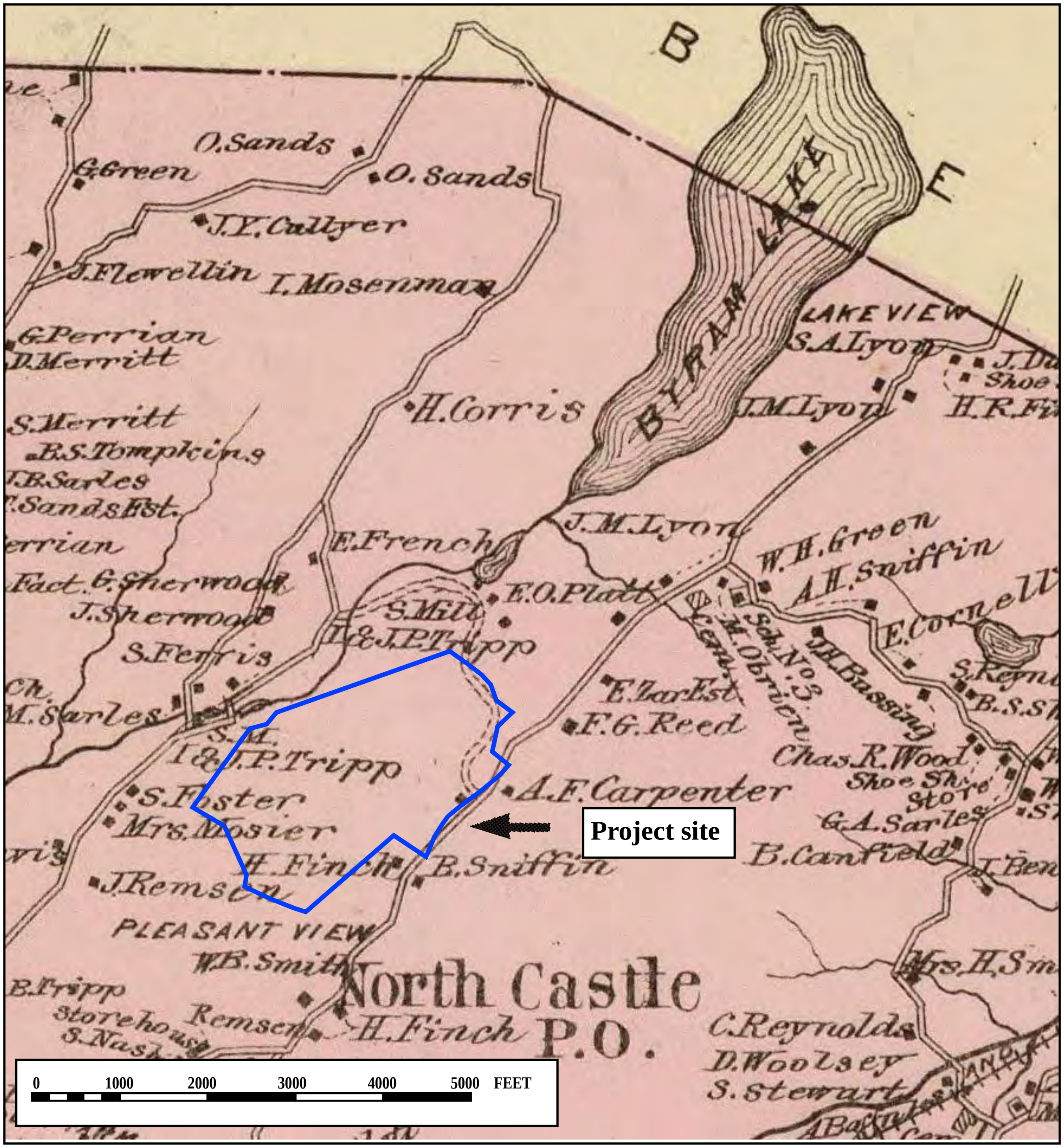

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Figure 10: Project site on *Atlas of Westchester County, New York* (Bromley 1881).

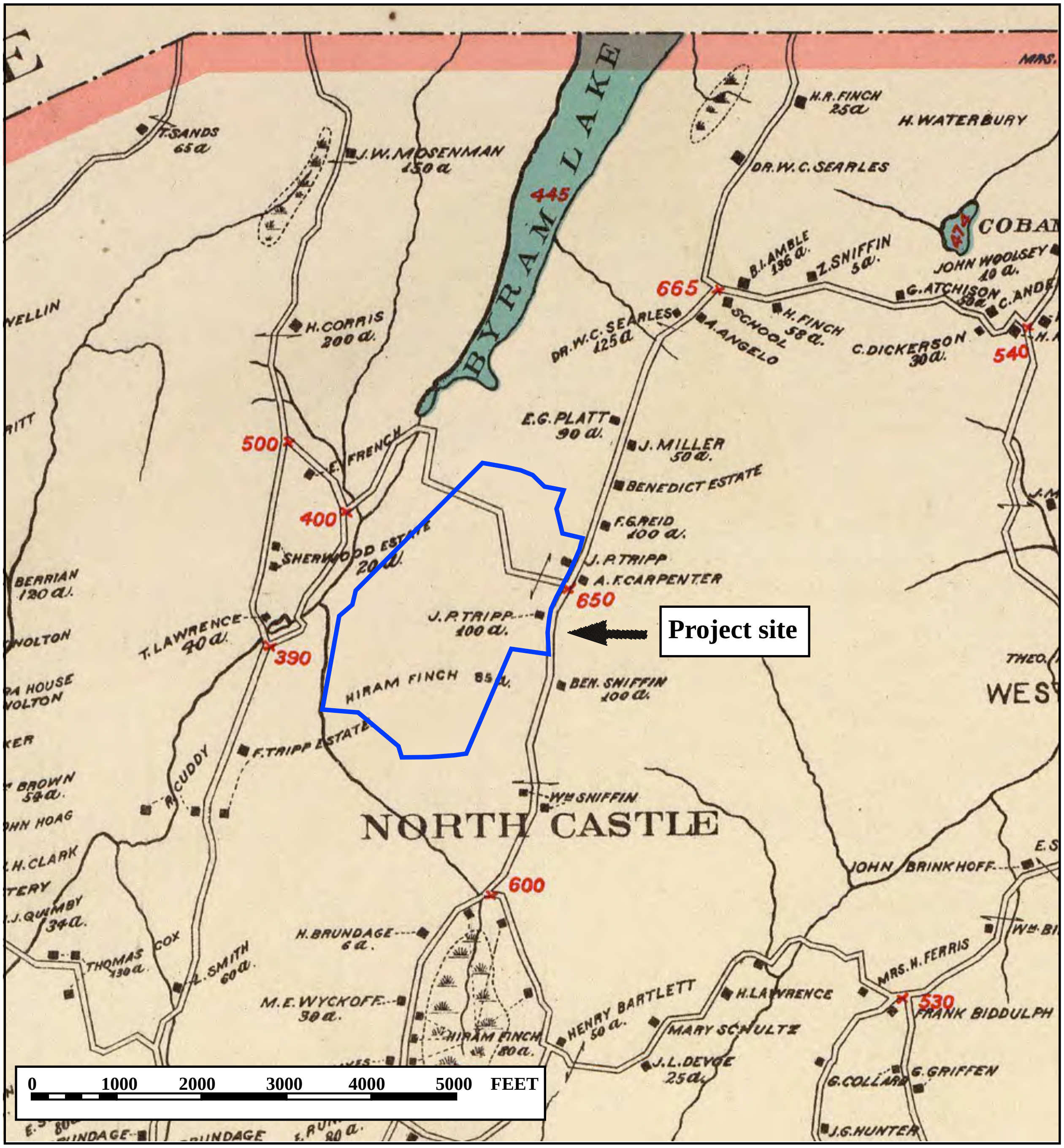

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Figure 11: Project site on *Town of North Castle* (Bien 1893).

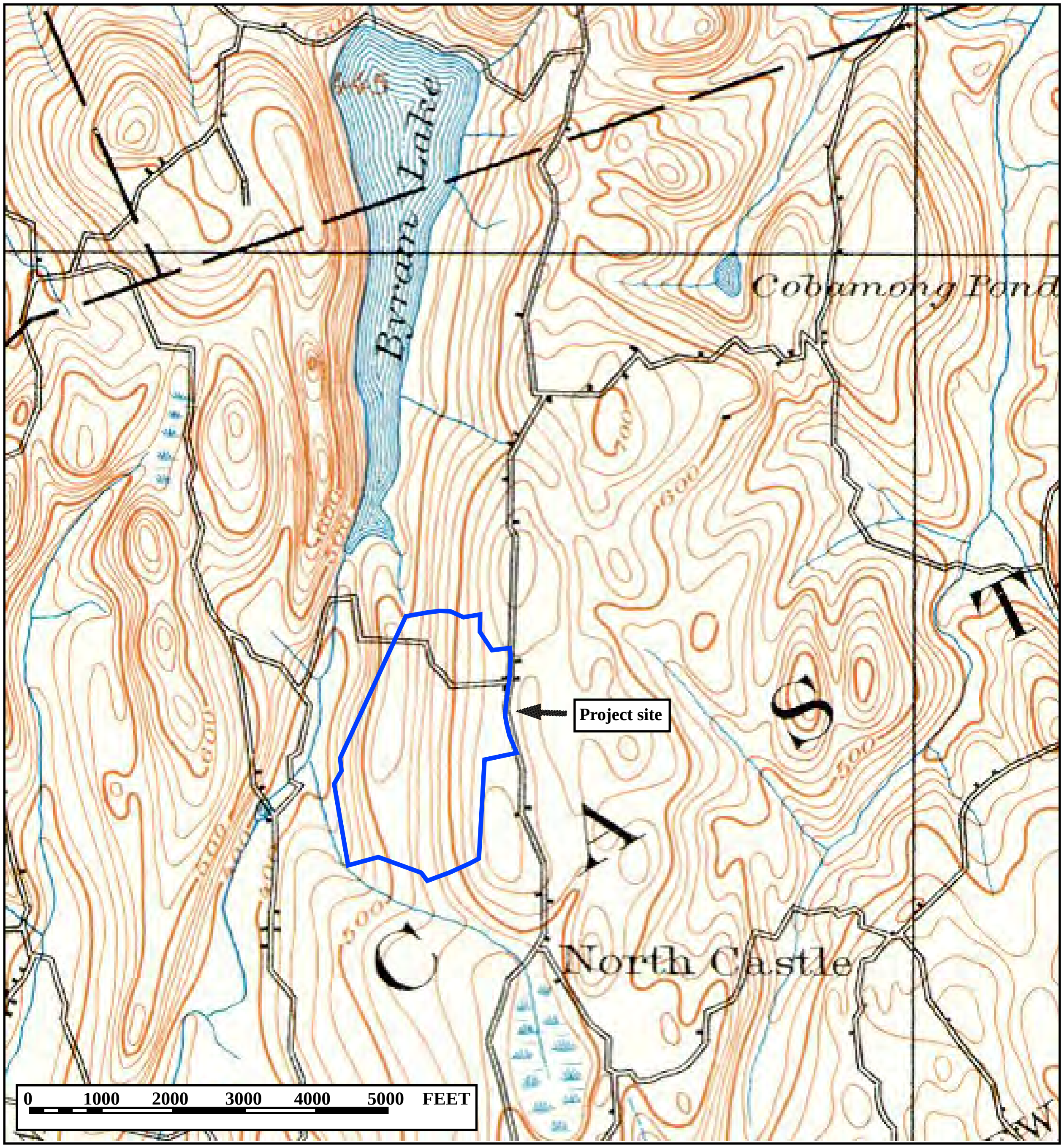

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Figure 12: Project site on *Stamford, Connecticut-New York* 15 Minute Quadrangle (U.S.G.S. 1899).

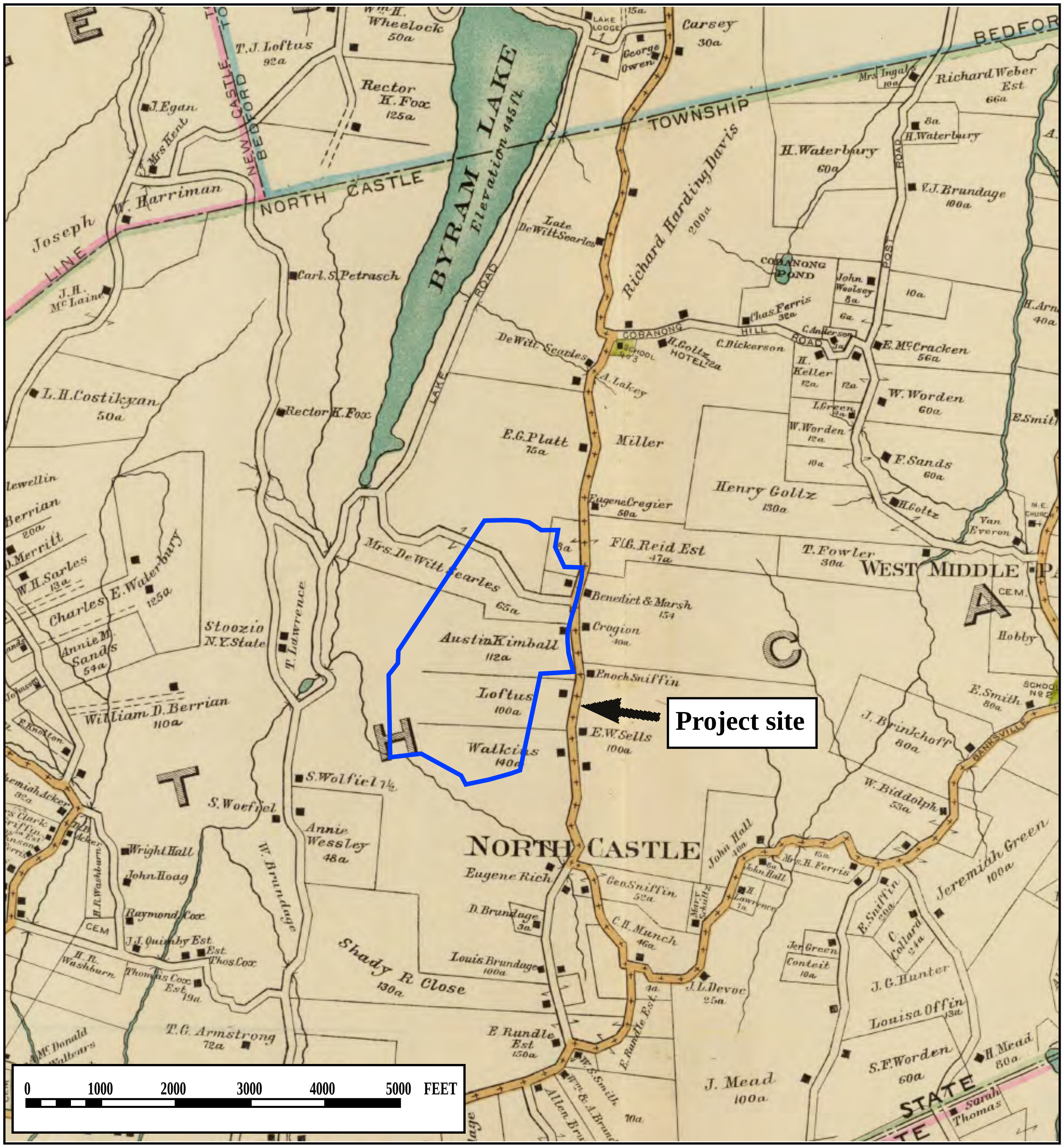

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Figure 13: Project site on *Atlas of the Rural Country District North of New York City* (Hyde 1908).

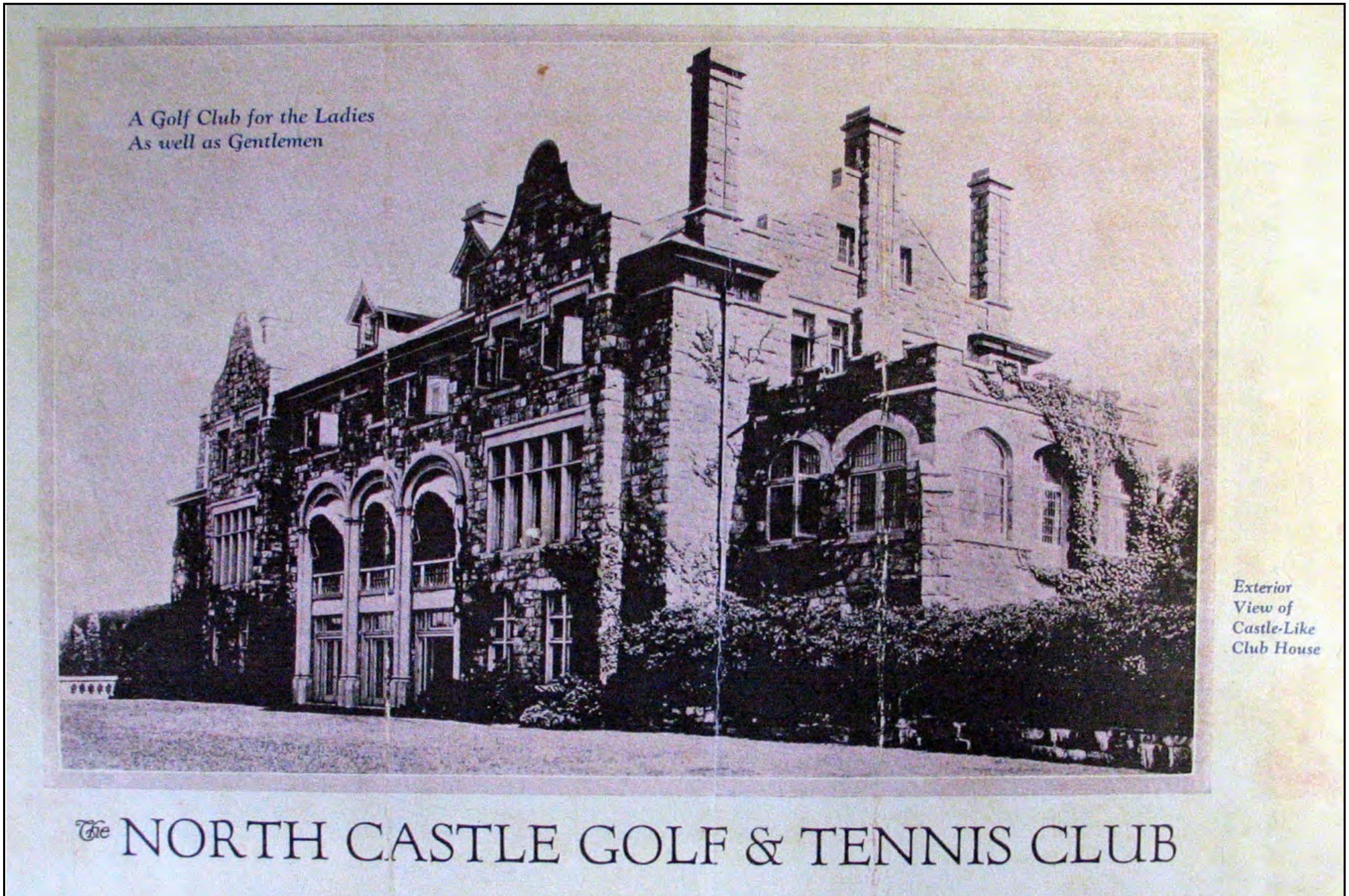

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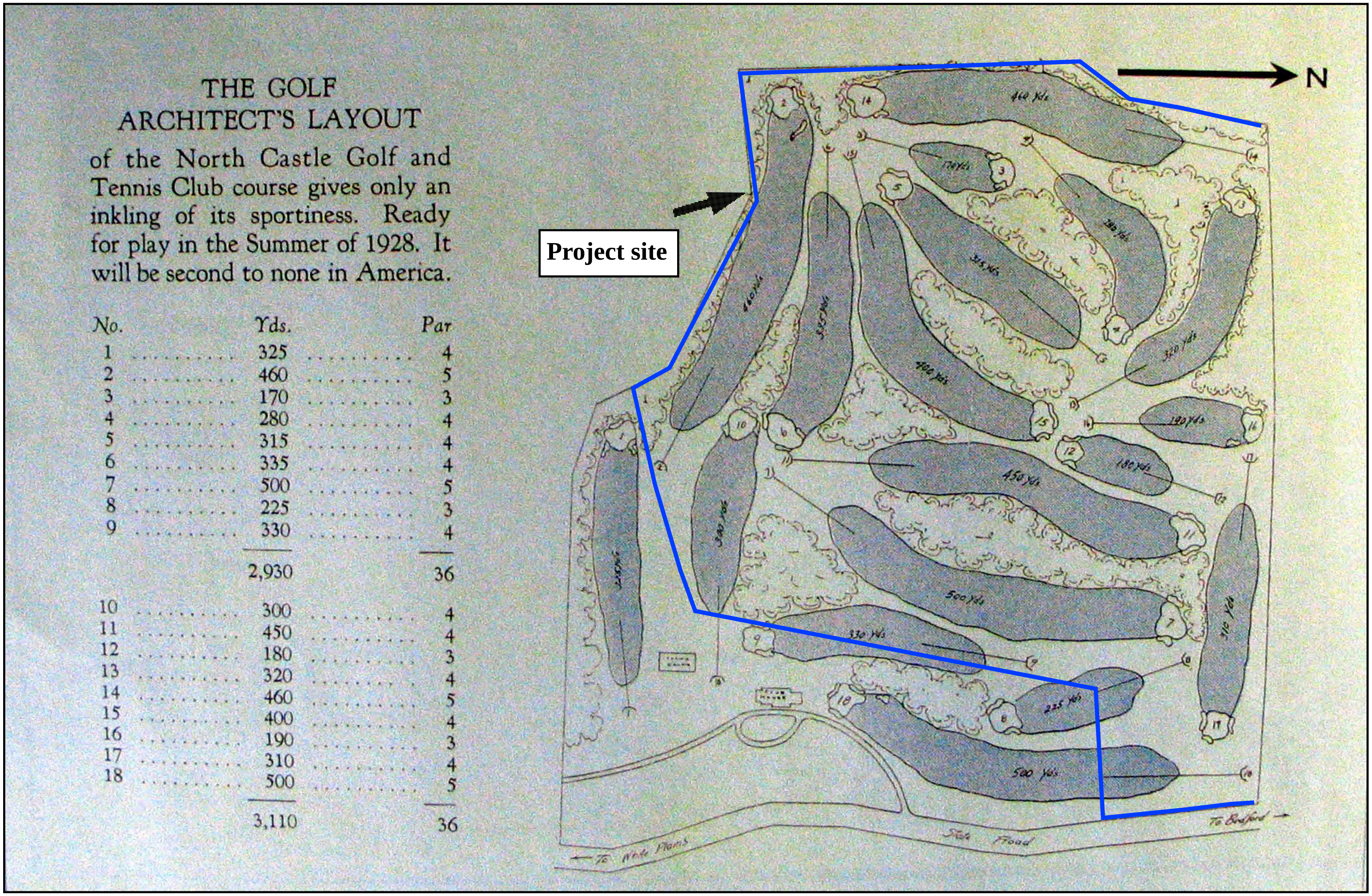
Figure 14: View of North Castle Golf and Tennis Club club house ca. 1928.



THE GOLF ARCHITECT'S LAYOUT

of the North Castle Golf and Tennis Club course gives only an inkling of its sportiness. Ready for play in the Summer of 1928. It will be second to none in America.

No.	Yds.	Par
1	325	4
2	460	5
3	170	3
4	280	4
5	315	4
6	335	4
7	500	5
8	225	3
9	330	4
	2,930	36
10	300	4
11	450	4
12	180	3
13	320	4
14	460	5
15	400	4
16	190	3
17	310	4
18	500	5
	3,110	36

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Figure 15: North Castle Golf and Tennis Club golf course layout ca. 1928.

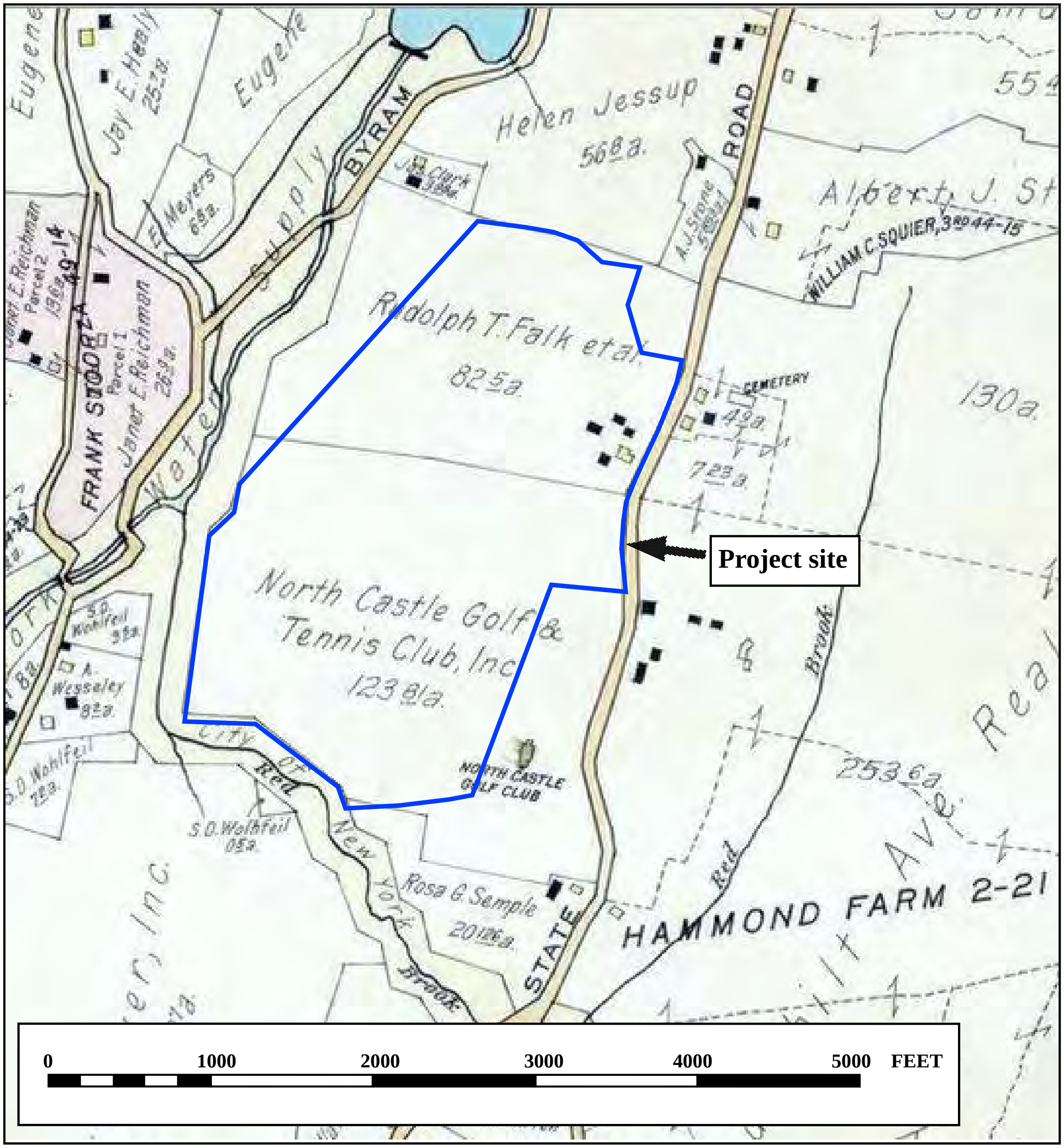

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Figure 16: Project site on *Atlas of Westchester County, New York* (Hopkins 1930).

The Beautiful

SIGNAL HILL COUNTRY CLUB

at Armonk **Just Open** Westchester

SPECIAL OPENING RATE—FIRST SEASON ONLY

Golf—Tennis—Riding—Boating—Swimming

SIGNAL HILL is a strictly private Country Club with a carefully restricted selected membership. It is situated on the highest point in Westchester County, commanding a view from Long Island Sound to the Hudson River. It has been a show place for years—deriving its name from the site of Beacon Fires in Revolutionary Times.

GOLF—The new 18-hole course is of full championship character, second to none in the Metropolitan area. TENNIS—The courts are the finest clay composition available. RIDING—A stable of fine saddle horses is maintained for use on miles of surrounding bridle paths. FISHING AND BOATING—The Club's property adjoins Byrum Lake where good fishing and small boating are to be enjoyed. CLUB LIFE—The Club House was one of the most lovely private country homes. Its atmosphere with that of the estate, lends itself to charming social relationships and activity.

$150

DIRECTIONS—Located about six miles north of White Plains at Armonk on Route 22, the road to Bedford. To reach the Club from New York City and points north, take the Bronx River Parkway to Kensico Dam, turn right at the dam on to the State Road marked Route 22, road to Armonk, and continue to Route 22 to the club house gate.

Write for descriptive booklet

SIGNAL HILL COUNTRY CLUB

Club House Phone: Bedford Village 425

512 FIFTH AVENUE NEW YORK CITY

New York Office Phone: Vanderbilt 3-2624, 6905

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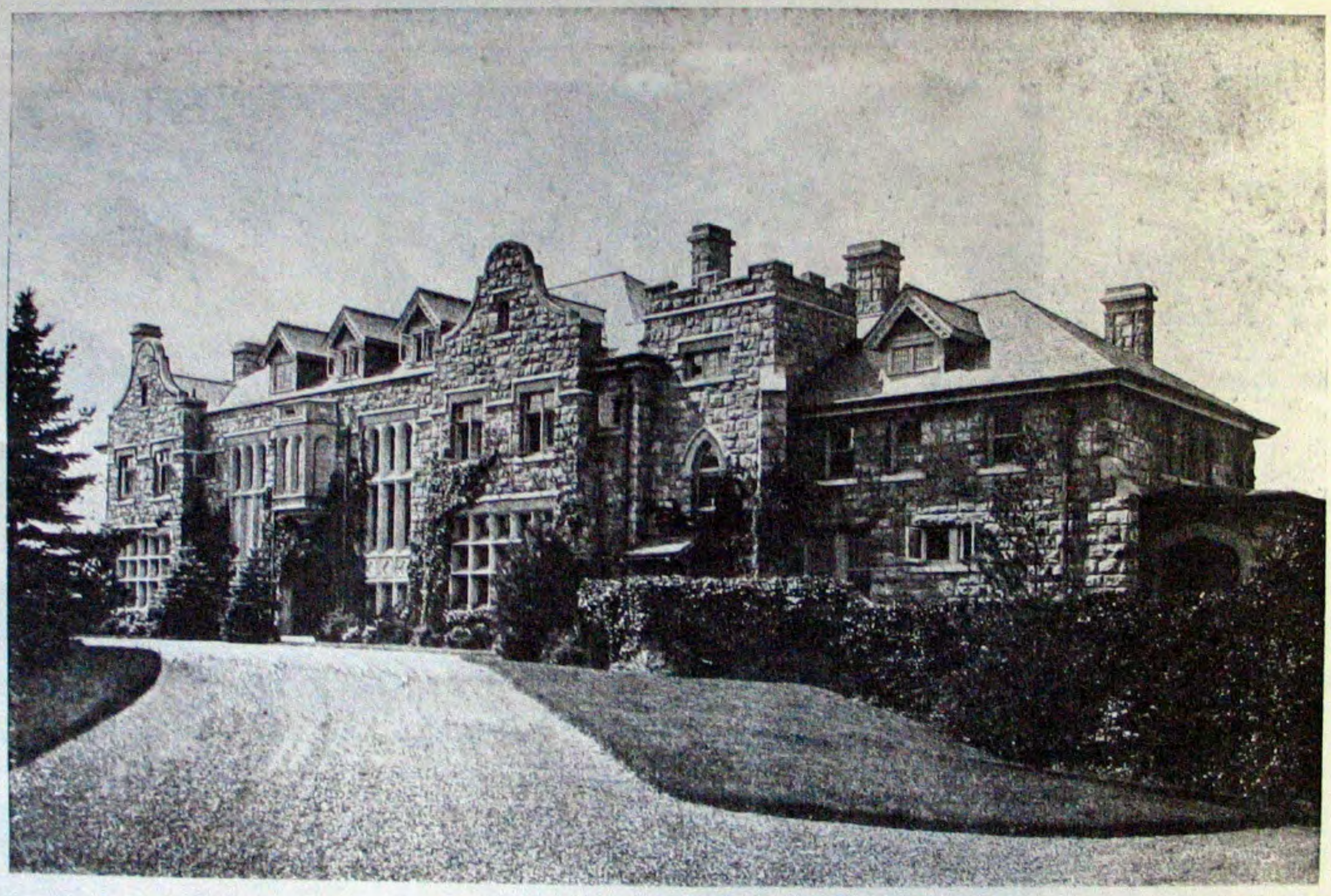
Westchester County, New York

Figure 17: Signal Hill Country Club advertisement (*Pelham Sun* 1931).



WESTCHESTER EMBASSY CLUB

formerly

NORTH CASTLE GOLF AND COUNTRY CLUB

Phase IA Archaeological and Historic Resources Investigation
Brynwood Golf and Country Club
568 Bedford Road (NYS Route 22), Armonk, Town of North Castle
Westchester County, New York

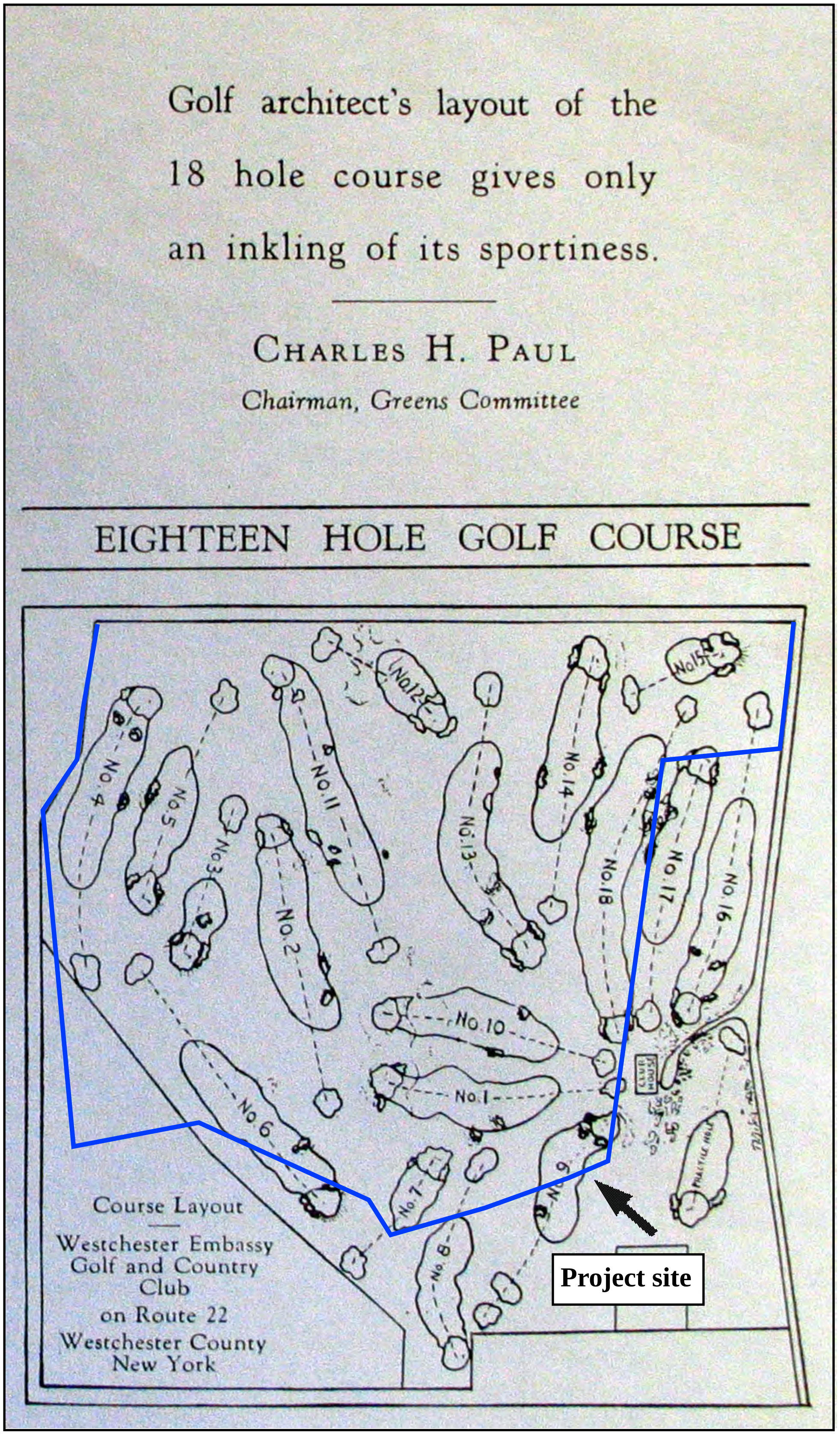
Figure 18: View of Westchester Embassy Club club house ca. 1933.

AT THE EIGHTEENTH HOLE, A LONG SHOT

THE course winds around the beautiful hills and woods on the club grounds and is developed on land ideally adapted for golf, due to its contour. The rolling fairways and greens are things of beauty.

Phase IA Archaeological and Historic Resources Investigation
Brynwood Golf and Country Club
568 Bedford Road (NYS Route 22), Armonk, Town of North Castle
Westchester County, New York

Figure 19: View of Westchester Embassy Club golf course ca. 1933.



Golf architect's layout of the 18 hole course gives only an inkling of its sportiness.

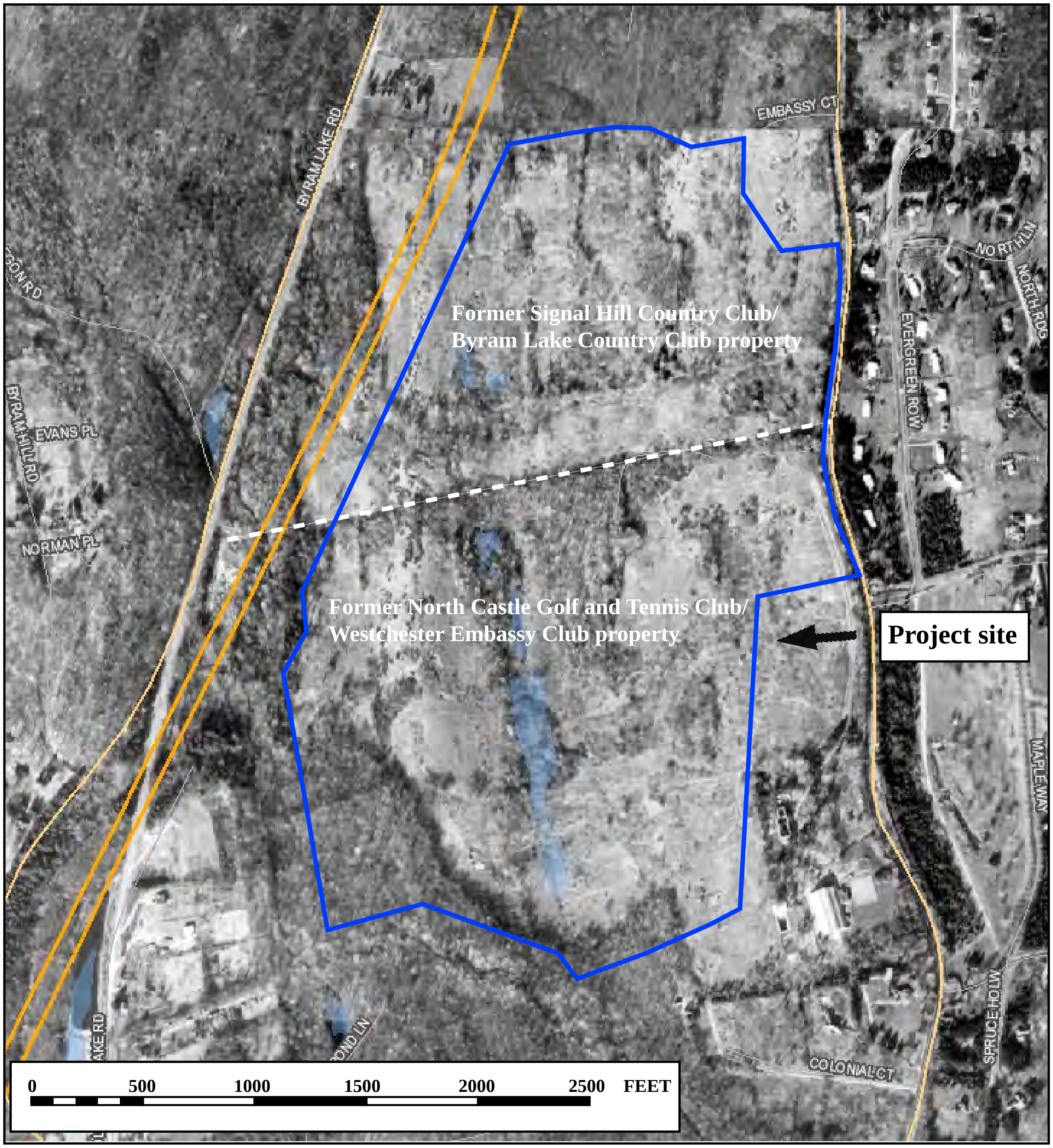
CHARLES H. PAUL
Chairman, Greens Committee

EIGHTEEN HOLE GOLF COURSE

Phase IA Archaeological and Historic Resources Investigation
Brynwood Golf and Country Club
568 Bedford Road (NYS Route 22), Armonk, Town of North Castle
Westchester County, New York

Figure 20: Westchester Embassy Club golf course layout ca. 1933.

Figure 21: Byram Lake Country Club advertisement (*Yonkers Herald Statesman* 1937).



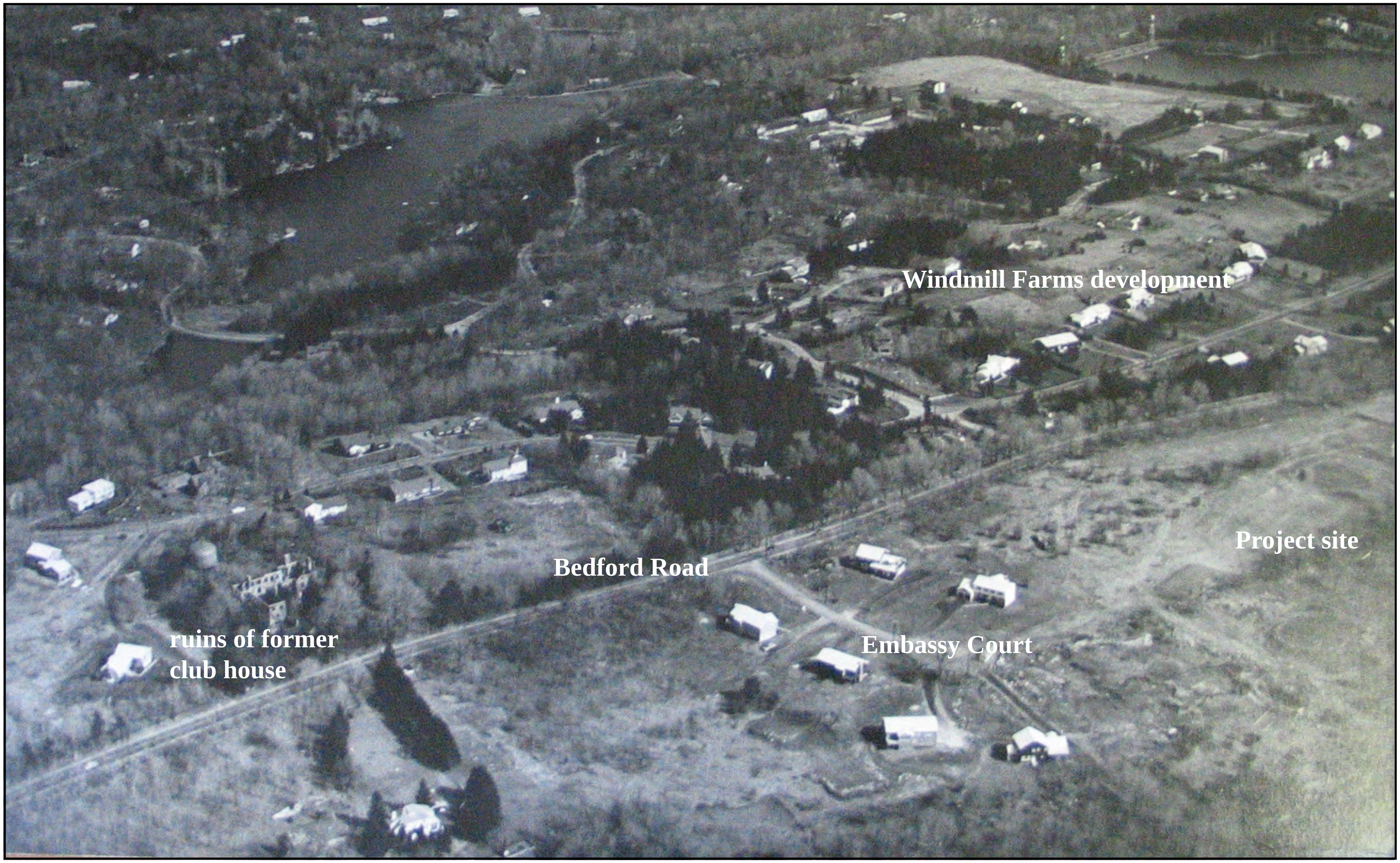
Phase IA Archaeological and Historic Resources Investigation
Brynwood Golf and Country Club
568 Bedford Road (NYS Route 22), Armonk, Town of North Castle
Westchester County, New York

N

Figure 22: Project site on 1960 aerial photograph with current roads and ponds overlaid.

Phase IA Archaeological and Historic Resources Investigation
Brynwood Golf and Country Club
568 Bedford Road (NYS Route 22), Armonk, Town of North Castle
Westchester County, New York

Figure 23: Aerial photograph showing southern portion of project site under construction in 1964.



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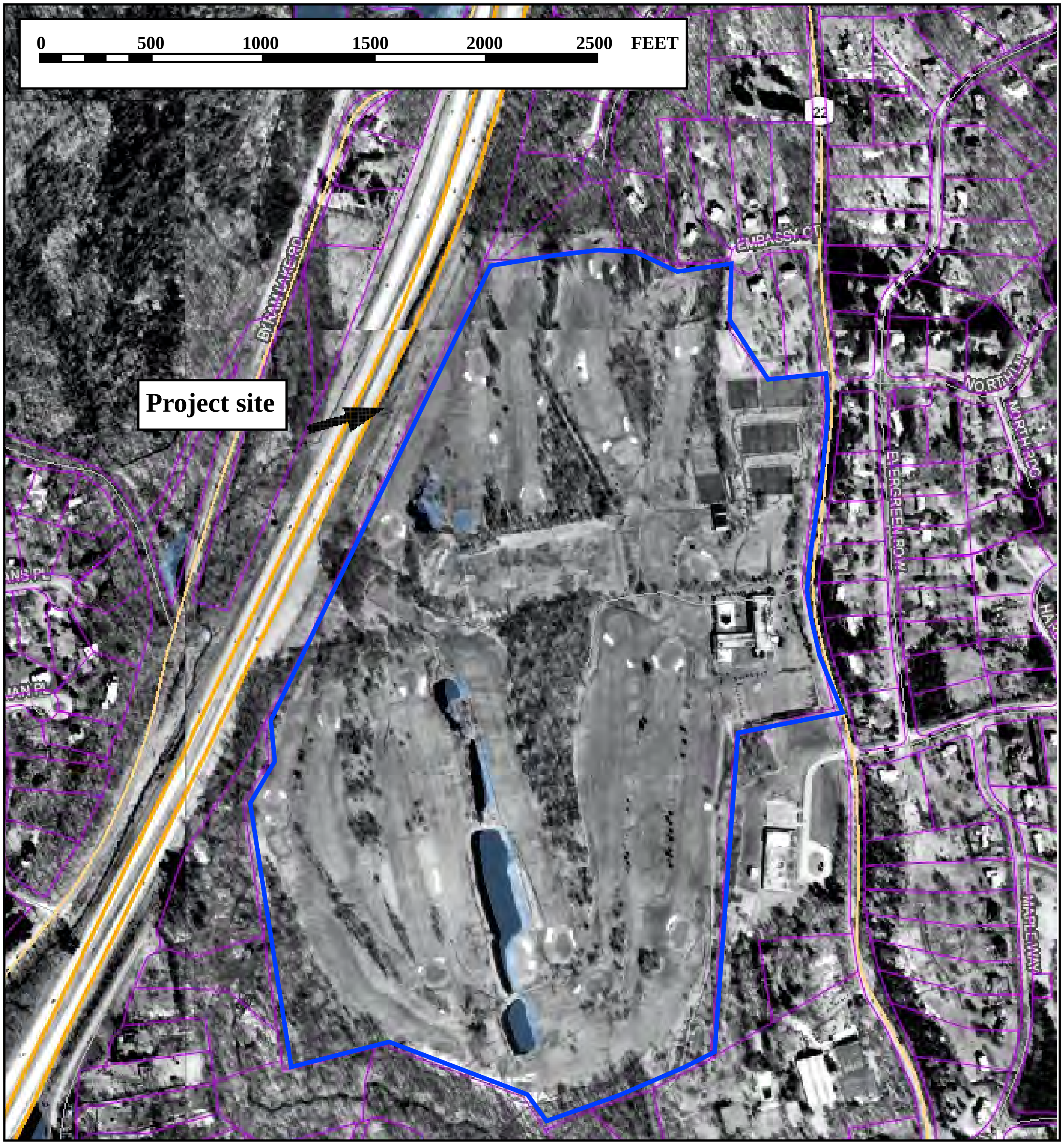
Brynwood Golf and Country Club
568 Bedford Road (NYS Route 22), Armonk, Town of North Castle
Westchester County, New York

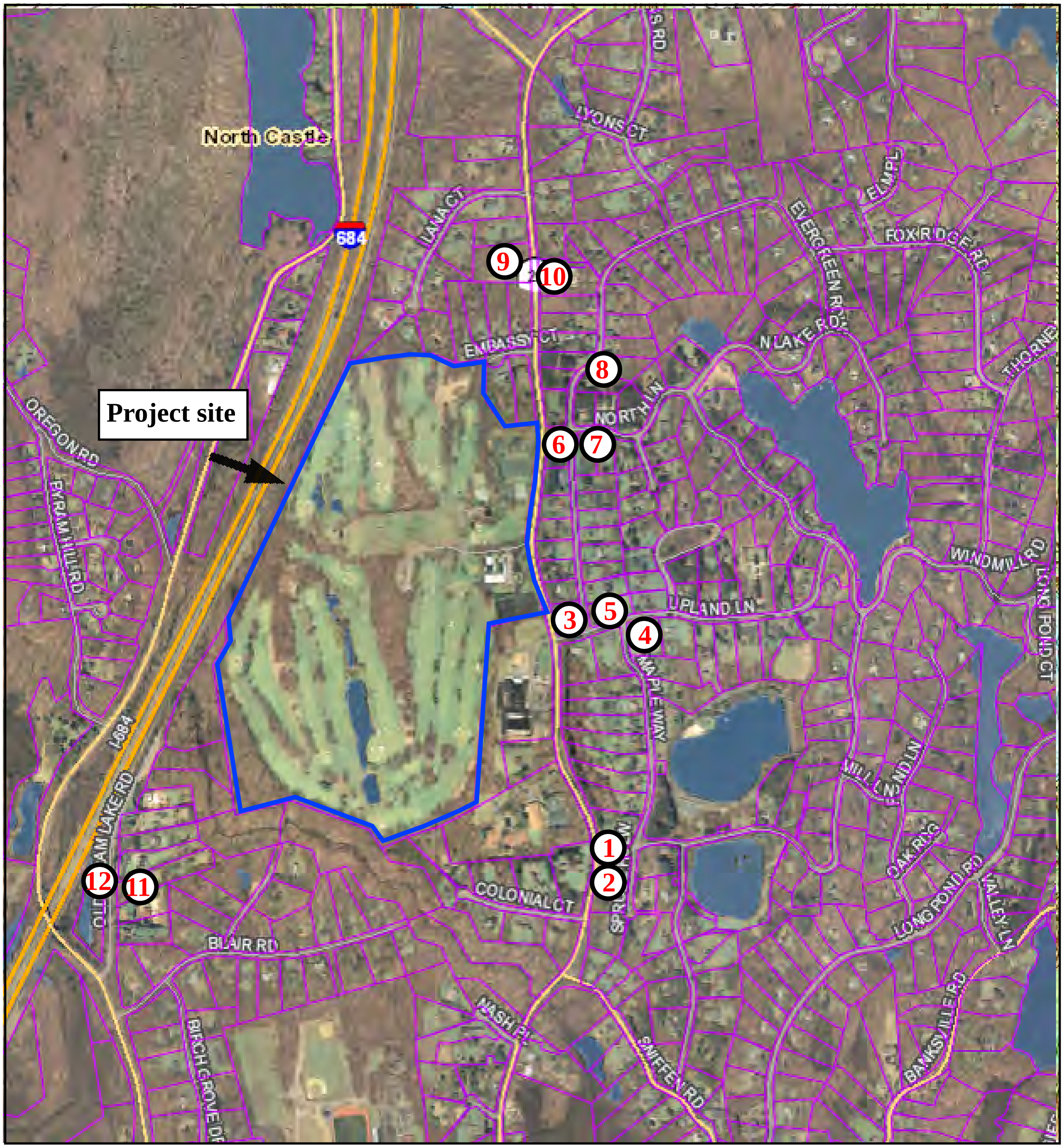
Figure 24: Aerial photograph showing northern portion of project site under construction in 1964.



Phase IA Archaeological and Historic Resources Investigation
Brynwood Golf and Country Club
568 Bedford Road (NYS Route 22), Armonk, Town of North Castle
Westchester County, New York

N

Figure 25: Project site on 1976 aerial photograph with current roads and ponds overlaid.



Phase IA Archaeological and Historic Resources Investigation
Brynwood Golf and Country Club
568 Bedford Road (NYS Route 22), Armonk, Town of North Castle
Westchester County, New York

N

Figure 26: Location of Architectural Resources in proximity to project site (Westchester County GIS).

0 1000 2000 3000 4000 5000 FEET

Figure 27: Overall project site topographical survey showing archaeological sensitivity and stone walls (JMC 2012).

Photograph 1: Brynwood club house showing main entrance. View looking northwest.

Photograph 2: Brynwood club house showing guest rooms wing in background. View looking south.


Photograph 3: Brynwood club house showing 1990s addition. View looking east.


Photograph 4: Brynwood club house showing southern extension. View looking northwest.


Photograph 5: Swimming pool adjoining Brynwood club house. View looking southwest.


Photograph 6: Golf cart storage building south of the club house, constructed in 1993. View looking southwest.


Photograph 7: Maintenance building north of the club house. View looking northwest.


Photograph 8: Rear of maintenance building showing parking area. View looking east.


Photograph 9: Small frame shed in the maintenance building yard. View looking south.


Photograph 10: Former pump house building east of the maintenance building. View looking northeast.

Photograph 11: Snack shop with outdoor tables located northwest of the maintenance building, constructed in 1985. View looking northeast.

Photograph 12: Tennis pro shop located northeast of the maintenance building, constructed in 1985. View looking northwest.

Photograph 13: Sewage plant, located on the interior of the property. View looking southwest.

Photograph 14: Sewage plant, located on the interior of the property. View looking northwest.


Photograph 15: Tennis courts along Route 22. View looking southeast.


Photograph 16: Tennis courts near snack shop. View looking northwest.

Photograph 17: Abandoned tennis courts at northeastern end of property. View looking northeast.

Photograph 18: Former judge's stand between abandoned tennis courts at northeastern end of property. View looking northwest.


Photograph 19: Large paved parking lot south of club house. View looking southwest.


Photograph 20: Historic Old Post Road mile marker just north of the entrance to the Brynwood property, on the west shoulder of Route 22. View looking west.


Photograph 21: Example of level terrace area within golf course west of club house. View looking west.


Photograph 22: Example of level terrace area south of active tennis courts near Route 22. View looking southwest.

Photograph 23: Example of rolling, artificial topography northwest of maintenance building. View looking north.

Photograph 24: Example of sculpted topography (note bunkers in background) and artificial ponds. View looking west.

Photograph 25: Example of sloped topography and cart paths. View looking southwest.

Photograph 26: Man-made ponds in south-central portion of property. Pump house is in far background. View looking northeast.


Photograph 27: Stone wall along Route 22 boundary of property. View looking southwest.


Photograph 28: Stone wall within interior of property. View looking northeast.


Photograph 29: Stone walls set into slope on interior of property. View looking northeast.


Photograph 30: Stone walls in wooded section of property with near Red Brook Glen and Interstate 684 in background. View looking southwest.


Photograph 31: Stone ring surrounding underground sewer components. View looking northwest.


Photograph 32: Concrete vault for underground sewer components. View looking northwest.

Photograph 33: Architectural resource 1. Stone entry gate and gate house to Windmill Farms at Windmill Road. View looking east.

Photograph 34: Architectural resource 2. 1 Spruce Hollow Road. View looking southeast from Route 22.


Photograph 35: Architectural resource 3. 2 Upland Lane. View looking southeast from Route 22.


Photograph 36: Architectural resource 4. 18 Maple Way, Paterno Administration house. View looking southeast from Maple Way.

Photograph 37: Architectural resource 5. 8 Upland Lane, circular ice house. View looking northwest from Upland Lane.


Photograph 38: Architectural resource 6. 15 Evergreen Row, Carpenter House. View looking southeast from Route 22.

Photograph 39: Architectural resource 7. Carpenter-Forman cemetery. View looking southeast from North Lane at Evergreen Row.


Photograph 40: Architectural resource 8. 28 Evergreen Row. View looking northeast from Evergreen Row.


Photograph 41: Architectural resource 9. 604 Bedford Road. View looking northwest from Route 22.


Photograph 42: Architectural resource 10. 601 Bedford Road, former Byram Lake Country Club servants' house. View looking northeast from Route 22.

Photograph 43: Architectural resource 10. 601 Bedford Road, Byram Lake Country Club house stone ruins. View looking east from Route 22.

Photograph 44: Architectural resource 11. 70 Old Byram Lake Road, Stone Wheel Farm. View looking northeast from Old Byram Lake Road.

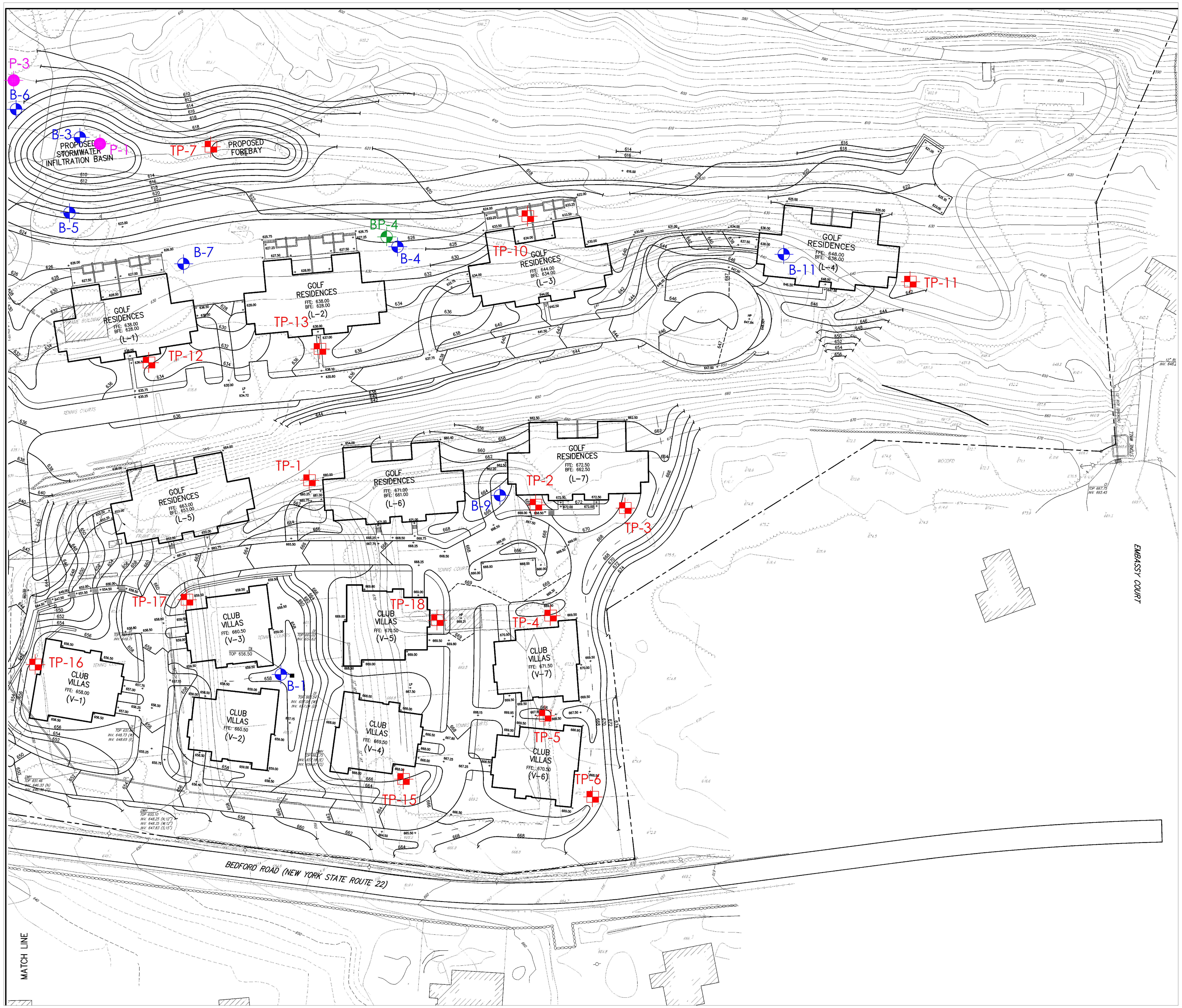
Photograph 45: Architectural resource 12. 63 Old Byram Lake Road, possible former mill buildings View looking northwest from Old Byram Lake Road, with mill pond in left background.

Photograph 46: Architectural resource 12. 63 Old Byram Lake Road, possible former mill building complex View looking northwest from Old Byram Lake Road, with mill pond in left background.


Photograph 47: Substantial stone wall not on the project site but along the east side of Route 22 across from project site. View looking southeast from near northeast end of project site boundary.


Photograph 48: Substantial stone walls and gate leading to North Lane not on the project site but along the east side of Route 22 and across from project site. View looking east from Route 22.

APPENDIX A: GEOTECHNICAL RESULTS



GENERAL NOTES:

1. GENERAL LAYOUT WAS OBTAINED FROM A DRAWING PREPARED BY JOHN MEYER CONSULTING, PC ENTITLED "PRELIMINARY GRADING PLAN, BRYNWOOD CLUB, BEDFORD ROAD (NY 22), TOWN OF NORTH CASTLE NEW YORK," DRAWING PGP-1 DATED OCTOBER 15, 2012.
2. BORING, TEST PIT, PERMEABILITY, AND PERCOLATION TEST LOCATIONS WERE LAID OUT IN THE FIELD BY CARLIN-SIMPSON & ASSOCIATES (CSA).
3. BORINGS (B-1 THROUGH B-11) WERE PERFORMED BY GENERAL BORINGS INC. ON 18 & 19 DECEMBER 2012 UNDER THE FULL TIME INSPECTION OF CSA.
4. BOREHOLE PERMEABILITY TEST (BP-4) WAS PERFORMED BY CARLIN-SIMPSON ASSOCIATES (CSA) ON 18 & 19 DECEMBER 2012.
5. PERCOLATION TEST (P- THROUGH P-4) WERE PERFORMED BY CARLIN-SIMPSON ASSOCIATES (CSA) ON 3 JANUARY 2013.
6. TEST PITS (TP-1 THROUGH TP-18) WERE PERFORMED BY TRAFICANTE CONTRACTING, INC ON 3 & 4 JANUARY 2013 UNDER THE FULL TIME INSPECTION OF CSA.
7. LOCATIONS ARE APPROXIMATE.

LEGEND:

- BORING LOCATION
- TEST PIT LOCATION
- PERCOLATION TEST LOCATION
- BOREHOLE PERMEABILITY TEST LOCATION

ROBERT B. SIMPSON, P.E.
PROFESSIONAL ENGINEER

LICENSE NO. SIGNATURE

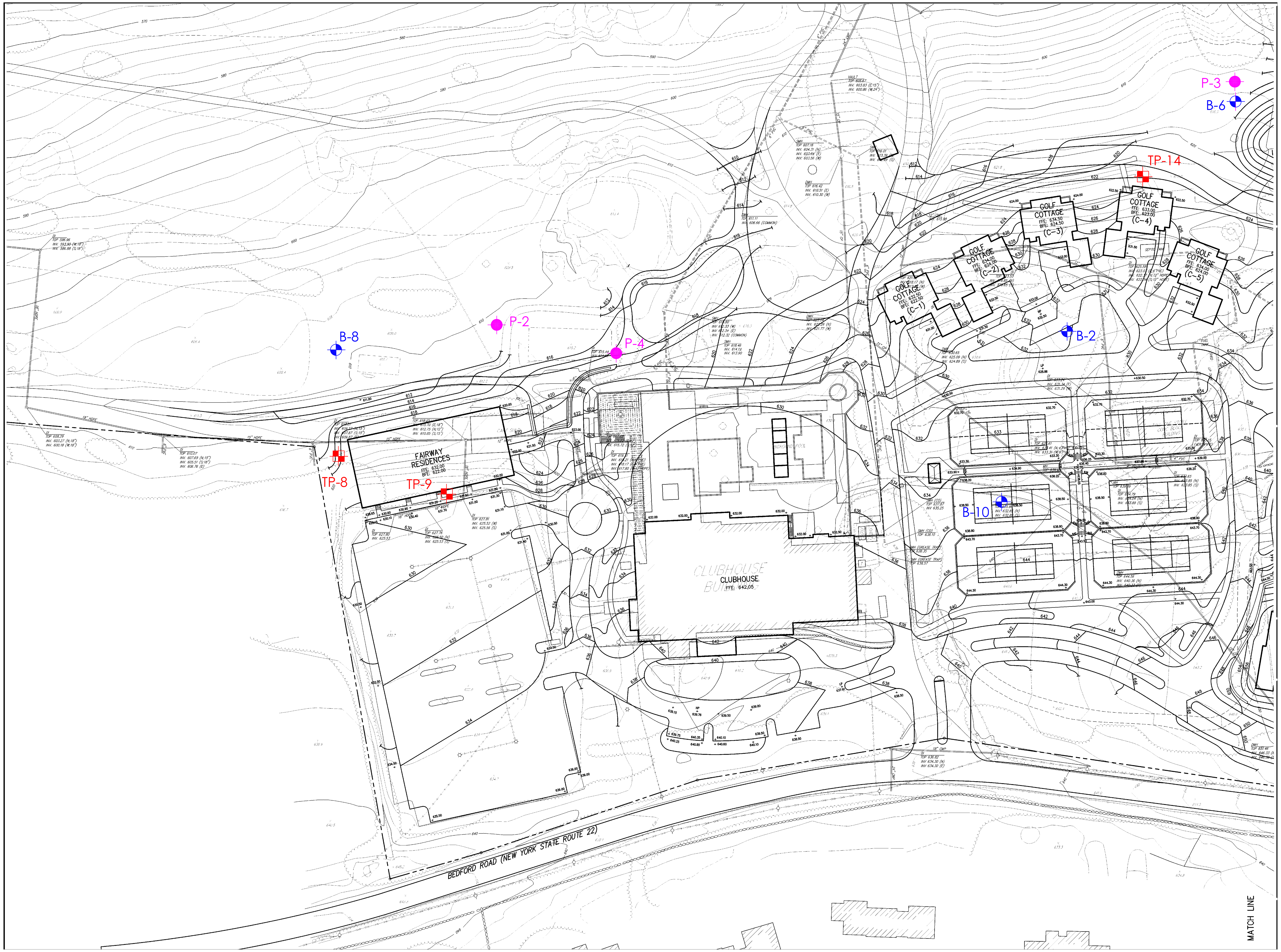
BORING & TEST PIT LOCATION PLAN

BRYNWOOD CLUB DEVELOPMENT
ARMONK, NEW YORK

DRAWN JGB	SCALE 1" = 50'
CHECKED RBS	DATE 18 JAN 13
PROJECT NO. 12-175	DWG NO. FIG -1
APPROVED	

CARLIN-SIMPSON AND ASSOCIATES
61 Main Street
Sayreville, NJ 08872

Consulting Geotechnical and Environmental Engineers



GENERAL NOTES:

1. GENERAL LAYOUT WAS OBTAINED FROM A DRAWING PREPARED BY JOHN MEYER CONSULTING, PC ENTITLED "PRELIMINARY GRADING PLAN, BRYNWOOD CLUB, BEDFORD ROAD (NY 22), TOWN OF NORTH CASTLE NEW YORK," DRAWING PGP-2 DATED OCTOBER 15, 2012.
2. BORING, TEST PIT, PERMEABILITY, AND PERCOLATION TEST LOCATIONS WERE LAID OUT IN THE FIELD BY CARLIN-SIMPSON & ASSOCIATES (CSA).
3. BORINGS (B-1 THROUGH B-11) WERE PERFORMED BY GENERAL BORINGS INC. ON 18 & 19 DECEMBER 2012 UNDER THE FULL TIME INSPECTION OF CSA.
4. BOREHOLE PERMEABILITY TEST (BP-4) WAS PERFORMED BY CARLIN-SIMPSON ASSOCIATES (CSA) ON 18 & 19 DECEMBER 2012.
5. PERCOLATION TEST (P-1 THROUGH P-4) WERE PERFORMED BY CARLIN-SIMPSON ASSOCIATES (CSA) ON 3 JANUARY 2013.
6. TEST PITS (TP-1 THROUGH TP-18) WERE PERFORMED BY TRAFICANTE CONTRACTING, INC ON 3 & 4 JANUARY 2013 UNDER THE FULL TIME INSPECTION OF CSA.
7. LOCATIONS ARE APPROXIMATE.

LEGEND:

- BORING LOCATION
- TEST PIT LOCATION
- PERCOLATION TEST LOCATION
- BOREHOLE PERMEABILITY TEST LOCATION

ROBERT B. SIMPSON, P.E.
PROFESSIONAL ENGINEER

LICENSE NO. SIGNATURE

BORING & TEST PIT LOCATION PLAN

BRYNWOOD CLUB DEVELOPMENT
ARMONK, NEW YORK

DRAWN: JGB	SCALE: 1" = 50'	CARLIN-SIMPSON AND ASSOCIATES 61 Main Street Sayreville, NJ 08872
CHECKED: RBS	DATE: 18 JAN 13	
PROJECT NO. 12-175	DWG NO. FIG -2	Consulting Geotechnical and Environmental Engineers
APPROVED		

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG *DRAFT*	BORING NUMBER B-1
Project: Proposed Renovations, Byrnwood Club Development, North Castle, NY		**SHEET NO.:** 1 of 1
Client: JBM Realty		**JOB NUMBER:** 12-175
Drilling Contractor: General Borings, Inc.		**ELEVATION:** +661.0

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	DATUM:
DATE	**TIME**	**DEPTH**	**CASING**	**TYPE**	HSA	SS			**START DATE:** 18 Dec 12
No water encountered				**DIA.**	3 1/4"	1 3/8"			**FINISH DATE:** 18 Dec 12
				WGHT		140#			**DRILLER:** T. McGovern
				FALL		30"			**INSPECTOR:** JB

Depth (ft.)	Casing Blows per Foot	Sample No.	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			7		**Clay Tennis Court** 0'6"	
1		**S-1**	9		Br cf S, s (+) $, t f G	Rec = 17"
			12			moist
2			14			
			19		same	
3		**S-2**	23		**Brown coarse to fine SAND,**	Rec = 15"
			50/3"		**some (+) Silt, trace fine Gravel**	moist
4						possible weathered rock in tip
5					5'0"	
			29		Br cf S, l (+) $ (completely weathered gneiss)	
6		**S-3**	75/4"			Rec = 6"
					Brown coarse to fine SAND, little (+)	moist
7					**Silt (completely weathered Gneiss)**	
		S-4	70/3"			Rec = 3"
8					8'0"	moist
					End of Boring @ 8'0"	Auger refusal @ 8'0"
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG *DRAFT*	BORING NUMBER B-2
Project: Proposed Renovations, Byrnwood Club Development, North Castle, NY		**SHEET NO.:** 1 of 1
Client: JBM Realty		**JOB NUMBER:** 12-175
Drilling Contractor: General Borings, Inc.		**ELEVATION:** +628.0

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	DATUM:
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			START DATE: 18 Dec 12
No water encountered				DIA.	3 1/4"	1 3/8"			FINISH DATE: 18 Dec 12
				WGHT		140#			DRILLER: T. McGovern
				FALL		30"			INSPECTOR: JB

Depth (ft.)	Casing Blows per Foot	Sample No.	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			2		**Topsoil** 0'6"	
1		S-1	3		Br cf S, a $, t f G	Rec = 15"
			2			moist
2			2			
			3		Br cf S, s (+) $	
3		S-2	9			Rec = 16"
			11		**Brown coarse to fine Sand, and**	moist
4			15		**Silt, trace fine Gravel**	
5						
			10		same	
6		S-3	12			Rec = 17"
			16			moist
7			50/3"		7'0"	weathered rock in tip
					End of Boring @ 7'0"	Auger refusal @ 7'0"
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG *DRAFT*	BORING NUMBER B-3

Project:	**Proposed Renovations, Byrnwood Club Development, North Castle, NY**	**SHEET NO.:**	1 of 1
Client:	**JBM Realty**	**JOB NUMBER:**	12-175
Drilling Contractor:	**General Borings, Inc.**	**ELEVATION:**	+620.0

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	DATUM:	
DATE	**TIME**	**DEPTH**	**CASING**	**TYPE**	**HSA**	**SS**			**START DATE:**	18 Dec 12
No water encountered				**DIA.**	**3 1/4"**	**1 3/8"**			**FINISH DATE:**	18 Dec 12
				WGHT		**140#**			**DRILLER:**	T. McGovern
				FALL		**30"**			**INSPECTOR:**	JB

Depth (ft.)	Casing Blows per Foot	Sample No.	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			3		**Topsoil** 0'6"	
1		**S-1**	6		Br cf S, t $, l (+) G	Rec = 17"
			6		**Brown coarse to fine SAND, trace**	moist
2			14		**Silt, little (+) Gravel** 2'0"	
		S-2	25/5"		Lt br cf G a, cf S, t $ (completely weathered gneiss)	Rec = 5"
3					**Light brown, brown coarse to fine**	moist
					Gravel and, coarse to fine Sand, trace	
4					**Silt (completely weathered Gneiss)**	
			23		Br cf G s, cf S, t $ (completely weathered gneiss)	
5		**S-3**	75/3"		4'9"	Rec = 6"
					End of Boring @ 4'9"	moist
6						Auger refusal @ 4'9"
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG *DRAFT*	BORING NUMBER B-4
Project: Proposed Renovations, Byrnwood Club Development, North Castle, NY		**SHEET NO.:** 1 of 1
Client: JBM Realty		**JOB NUMBER:** 12-175
Drilling Contractor: General Borings, Inc.		**ELEVATION:** +628.0

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	DATUM:
DATE	**TIME**	**DEPTH**	**CASING**	**TYPE**	HSA	SS			**START DATE:** 18 Dec 12
No water encountered				**DIA.**	3 1/4"	1 3/8"			**FINISH DATE:** 18 Dec 12
				WGHT		140#			**DRILLER:** T. McGovern
				FALL		30"			**INSPECTOR:** JB

Depth (ft.)	Casing Blows per Foot	Sample No.	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			2		**Topsoil** 0'6"	
1		**S-1**	1		Br cf S, a $, t f G	Rec = 14"
			2		**Brown coarse to fine SAND, and**	moist
2			2		**Silt, trace fine Gravel** 2'0"	
			10		Gr cf G s, cf S, t $ (completely weathered gneiss)	
3		**S-2**	20			Rec = 13"
			45			moist
4			35			weathered rock 3'-4'
5						
			9		Br cf G s, cf S, t $ (completely weathered gneiss)	
6		**S-3**	11			Rec = 17"
			13		**Brown coarse to fine GRAVEL some,**	moist
7			10		**coarse to fine Sand, trace Silt**	
			18		same **(completely weathered Gneiss)**	
8		**S-4**	26			Rec = 14"
			30			moist
9			43			
10						
		S-5	75/6"		same 10'6"	Refusal on spoon @ 10'6"
11					**End of Boring @ 10'6"**	
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG *DRAFT*	BORING NUMBER B-5

Project:	**Proposed Renovations, Byrnwood Club Development, North Castle, NY**	**SHEET NO.:**	1 of 1
Client:	**JBM Realty**	**JOB NUMBER:**	12-175
Drilling Contractor:	**General Borings, Inc.**	**ELEVATION:**	+623.0

GROUNDWATER					**CASING**	**SAMPLE**	**CORE**	**TUBE**	**DATUM:**	
DATE	**TIME**	**DEPTH**	**CASING**	**TYPE**	**HSA**	**SS**			**START DATE:**	18 Dec 12
No water encountered				**DIA.**	**3 1/4"**	**1 3/8"**			**FINISH DATE:**	18 Dec 12
				WGHT		**140#**			**DRILLER:**	T. McGovern
				FALL		**30"**			**INSPECTOR:**	JB

Depth (ft.)	Casing Blows per Foot	Sample No.	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			2		Br cf S, s (+) $, t f G	
1		**S-1**	2		**Brown coarse to fine SAND,**	Rec = 17"
			3		**some (+) Silt, trace fine Gravel**	moist
2			13		2'0"	
			22		Br cf S, l $, s cf G	
3		**S-2**	10			Rec = 17"
			16		**Brown coarse to fine SAND, little**	moist
4			26		**Silt, some coarse to fine Gravel**	weathered rock in tip
					(completely weathered Gneiss)	
5						
			23		same, weathered gneiss	
6		**S-3**	62			Rec = 18"
			55			moist
7			81			weathered rock
8						
					8'6"	Auger refusal @ 8'6"
9					**End of Boring @ 8'6"**	
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG *DRAFT*	BORING NUMBER B-6

Project:	**Proposed Renovations, Byrnwood Club Development, North Castle, NY**	**SHEET NO.:**	1 of 1
Client:	**JBM Realty**	**JOB NUMBER:**	12-175
Drilling Contractor:	**General Borings, Inc.**	**ELEVATION:**	+617.0

GROUNDWATER					**CASING**	**SAMPLE**	**CORE**	**TUBE**	**DATUM:**	
DATE	**TIME**	**DEPTH**	**CASING**	**TYPE**	**HSA**	**SS**			**START DATE:**	19 Dec 12
No water encountered				**DIA.**	**3 1/4"**	**1 3/8"**			**FINISH DATE:**	19 Dec 12
				WGHT		**140#**			**DRILLER:**	T. McGovern
				FALL		**30"**			**INSPECTOR:**	KWA

Depth (ft.)	Casing Blows per Foot	Sample No.	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION		REMARKS
			2		**Topsoil**	0'6"	
1		**S-1**	6		FILL (Br cf S, l $)	1'0"	Rec = 10"
			5		**FILL (Brown coarse to fine SAND, little Silt)**		moist
2			10				
			12		Br cf S, s (+) $, l cf G		
3		**S-2**	11				Rec = 11"
			11		same		moist
4			52		**Brown coarse to fine SAND, some (+) Silt, little coarse to fine Gravel**		
5							
		S-3	75/2"			5'6"	No recovery
6					**End of Boring @ 5'6"**		Auger refusal @ 5'6"
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG *DRAFT*	BORING NUMBER B-7
Project: Proposed Renovations, Byrnwood Club Development, North Castle, NY		SHEET NO.: 1 of 1
Client: JBM Realty		JOB NUMBER: 12-175
Drilling Contractor: General Borings, Inc.		ELEVATION: +628.0

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			DATUM:
No water encountered				DIA.	3 1/4"	1 3/8"			START DATE: 19 Dec 12
				WGHT		140#			FINISH DATE: 19 Dec 12
				FALL		30"			DRILLER: T. McGovern
									INSPECTOR: KWA

Depth (ft.)	Casing Blows per Foot	Sample No.	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			2		**Topsoil** 0'6"	
1		S-1	4		Br cf S, l $,l f G	Rec = 18"
			4			moist
2			5			
			13		same	
3		S-2	28		**Brown coarse to fine SAND,**	Rec = 17"
			21		**little Silt, little fine Gravel**	moist
4			22			
5					5'0"	
			12		Br cf S, l $, l f G (completely weathered gniess)	
6		S-3	14			Rec = 15"
			19			moist
7			28		**Brown coarse to fine SAND, little**	very dense augering 7'-10'
					Silt, little fine Gravel (completely to	
8					**highly weathered Geniss)**	
9						
10						
			75		same	
11		S-4	50/3"			Rec = 6"
						moist
12						very dense augering 10'-15'
13						
14						
15						
		S-4	50/2"		same 15'2"	No recovery
16					**End of Boring @ 15'2"**	Spoon bouncing @ 15'2"
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG *DRAFT*	BORING NUMBER B-8

Project:	**Proposed Renovations, Byrnwood Club Development, North Castle, NY**	**SHEET NO.:**	1 of 1
Client:	**JBM Realty**	**JOB NUMBER:**	12-175
Drilling Contractor:	**General Borings, Inc.**	**ELEVATION:**	+609.0

GROUNDWATER					**CASING**	**SAMPLE**	**CORE**	**TUBE**	**DATUM:**	
DATE	**TIME**	**DEPTH**	**CASING**	**TYPE**	**HSA**	**SS**			**START DATE:**	19 Dec 12
19 Dec 12	**1130**	**3'3"**	**None**	**DIA.**	**3 1/4"**	**1 3/8"**			**FINISH DATE:**	19 Dec 12
				WGHT		**140#**			**DRILLER:**	T. McGovern
				FALL		**30"**			**INSPECTOR:**	KWA

Depth (ft.)	**Casing Blows per Foot**	**Sample No.**	**Blows on Sample Spoon per 6"**	**Sym**	**IDENTIFICATION**	**REMARKS**
			2		**Brown Topsoil** 0'6"	
1		**S-1**	4		FILL (Br cf S, a $, t cf G)	Rec = 4"
			8			moist
2			7			
			10		FILL (same)	
3		**S-2**	11			No recovery
			11		**FILL (Brown coarse to fine Sand,**	moist
4			13		**and Silt, trace coarse to fine Gravel)**	
5						
			13		FILL (same) 5'6"	
6		**S-3**	8		Mtld gr, or br Cy $ s, cf S, w/t roots	Rec = 18"
			7		**Mottled gray, orange brown Clayey**	moist
7			8		**SILT some, coarse to fine Sand, with** 7'0"	
			8		**roots**	
8		**S-4**	8		Gr br cf S, s (+) $, l cf G	Rec = 15"
			7			wet
9			8		**Gray brown coarse to fine SAND,**	
					some (+) Silt, little coarse to fine	
10					**Gravel**	
			15		same, l cf G	
11		**S-5**	25			Rec = 16"
			26			wet
12			35		12'0"	
					End of Boring @ 12'0"	
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG *DRAFT*	BORING NUMBER B-9

Project:	**Proposed Renovations, Byrnwood Club Development, North Castle, NY**	**SHEET NO.:**	1 of 1
Client:	**JBM Realty**	**JOB NUMBER:**	12-175
Drilling Contractor:	**General Borings, Inc.**	**ELEVATION:**	+674.0

GROUNDWATER					**CASING**	**SAMPLE**	**CORE**	**TUBE**	**DATUM:**	
DATE	**TIME**	**DEPTH**	**CASING**	**TYPE**	**HSA**	**SS**			**START DATE:**	19 Dec 12
No water encountered				**DIA.**	**3 1/4"**	**1 3/8"**			**FINISH DATE:**	19 Dec 12
				WGHT		**140#**			**DRILLER:**	T. McGovern
				FALL		**30"**			**INSPECTOR:**	KWA

Depth (ft.)	Casing Blows per Foot	Sample No.	Blows on Sample Spoon per 6"	IDENTIFICATION	REMARKS
			8	**Clay Tennis Court** 0'6"	
1		**S-1**	8	FILL (Br cf S, s $, s cf G)	Rec = 17"
			8		moist
2			17		
			17	FILL (same)	
3		**S-2**	12		Rec = 15"
			7	**FILL (Brown coarse to fine Sand,**	moist
4			13	**some Silt, some coarse to fine Gravel)**	
5					
			10	FILL (Br cf S, s $, l cf G)	
6		**S-3**	4		Rec = 15"
			5		moist
7			11	7'0"	
		S-4	50/3"	**Highly to moderately** 7'6"	Rec = 3"
8				**weathered Gneiss**	moist
				Eknd of Boring @ 7'6"	Auger refusal @ 7'0"
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG *DRAFT*	BORING NUMBER B-10

Project:	**Proposed Renovations, Byrnwood Club Development, North Castle, NY**	**SHEET NO.:**	1 of 1
Client:	**JBM Realty**	**JOB NUMBER:**	12-175
Drilling Contractor:	**General Borings, Inc.**	**ELEVATION:**	+638.8

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	DATUM:	
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			START DATE:	19 Dec 12
No water encountered				DIA.	3 1/4"	1 3/8"			FINISH DATE:	19 Dec 12
				WGHT		140#			DRILLER:	T. McGovern
				FALL		30"			INSPECTOR:	JB

Depth (ft.)	Casing Blows per Foot	Sample No.	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
		S-1	2		**Topsoil** 0'1"	
1			3		Br cf $ s, cf S, l cf G	Rec = 15"
			6		**Brown coarse to fine SILT some, coarse to**	moist
2			50/3"		**fine Sand, little coarse to fine Gravel** 2'0"	Auger refusal @ 2'0"
3		Run #1				
					Gray, white Gneiss	Run #1
4						2'0"-7'0"
						Run = 60"
5					5'0"	Rec = 52" = 86%
					Soil seam	RQD = 53%
6					5'8"	
					Gray, white Gneiss	
7					7'0"	
					End of Boring @ 7'0"	
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG *DRAFT*	BORING NUMBER B-11

Project:	**Proposed Renovations, Byrnwood Club Development, North Castle, NY**	**SHEET NO.:**	1 of 1
Client:	**JBM Realty**	**JOB NUMBER:**	12-175
Drilling Contractor:	**General Borings, Inc.**	**ELEVATION:**	+640.0

GROUNDWATER					**CASING**	**SAMPLE**	**CORE**	**TUBE**	**DATUM:**	
DATE	**TIME**	**DEPTH**	**CASING**	**TYPE**	**HSA**	**SS**			**START DATE:**	19 Dec 12
No water encountered				**DIA.**	**3 1/4"**	**1 3/8"**			**FINISH DATE:**	19 Dec 12
				WGHT		**140#**			**DRILLER:**	T. McGovern
				FALL		**30"**			**INSPECTOR:**	KWA

Depth (ft.)	Casing Blows per Foot	Sample No.	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			2		**Topsoil**	
1		**S-1**	3		0'9"	Rec = 20"
			3		Br cf S, l (+) $	moist
2			7			
			5		same, dk br	
3		**S-2**	6		**Brown coarse to fine SAND,**	Rec = 17"
			8		**little (+) Silt**	moist
4			23		4'0"	
5					**Completely to highly**	
					weathered Gneiss	
6					5'6"	Auger refusal @ 5'6"
					End of Boring @ 5'6"	
7						
8						
9						
10						
11						
12						
13						
14						
15						
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19						
20						
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22						

Byrnwood Club Development
Bedford Road
Town of New Castle, NY
(12-175)

3 January 2013

TEST PIT LOGS

TP-1	Elevation +662		
0-0’9”	Brown Topsoil		
0’9”-2’0”	Brown coarse to fine SAND, some Silt, little (+) coarse to fine Gravel	medium dense	moist
2’0”	Gneiss bedrock		
TP-2	Elevation +672		
0-1’10”	FILL (Brown coarse to fine SAND, some silt, little (-) coarse to fine Gravel, with topsoil)	medium dense	moist
1’10”-4’4”	Light brown coarse to fine SAND, some (+) Silt	medium dense	moist
4’4”	Gneiss bedrock		
TP-3	Elevation +672		
0-0’9”	Dark brown Topsoil with surface debris		
0’9”-2’2”	Brown coarse to fine SAND, some Silt	medium dense	moist
2’2”	Gneiss bedrock		

DRAFT

TP-4	Elevation +672		
0-0’6”	Brown Topsoil		
0’6”-3’6”	Brown coarse to fine SAND, some (+) Silt, little coarse to fine Gravel	medium dense	moist
3’6”	Gneiss bedrock No water encountered		
TP-5	Elevation +670		
0-0’7”	Brown Topsoil		
0’7”-3’8”	Light brown coarse to fine SAND, some (+) Silt	medium dense	moist
3’8”-4’9”	Brown coarse to fine SAND, some Silt (completely weathered gneiss)	dense	moist
4’9”	Gneiss bedrock No water encountered		
TP-6	Elevation +672		
0-0’10”	Brown Topsoil		
0’10”-2’10”	Light brown coarse to fine SAND, some (-) Silt, little coarse to fine Gravel	medium dense	moist
2’10”-4’7”	Brown coarse to fine SAND, some Silt, little coarse to fine Gravel (completely weathered gneiss)	dense	moist
4’7”	Gneiss bedrock No water encountered		

TP-7	Elevation +620		
0-0’9”	Brown Topsoil		
0’9”-2’8”	Brown coarse to fine SAND, some Silt, trace coarse to fine Gravel	medium dense	moist
2’8”	Probable gneiss bedrock		
	Test abandoned		

TP-8	Elevation +614		
0-0’8”	Dark brown Topsoil		
0’8”-5’0”	Mottled orange brown, gray coarse to fine SAND, and (-) Silt	medium dense	moist
	Groundwater encountered @ 4’1”	slow inflow	

TP-9	Elevation +628		
0-0’4”	Topsoil		
0’4”-6’9”	FILL (Brown coarse to fine SAND, some (+) Silt, some (+) coarse to fine Gravel, with cobbles and boulders)	medium dense	moist
6’9”	FILL (Gray coarse to fine SAND, trace (+) Silt)		
	Possible cover over for utility Test pit was abandoned		
	No water encountered		

TP-10	Elevation +625		
0-0'4"	Topsoil		
0'4"-3'0"	FILL (Boulders with topsoil)		
3'0"-8'0"	Brown coarse to fine SAND, some (+) Silt	medium dense	moist
	No water encountered		

TP-11	Elevation +642		
0-0'6"	Brown Topsoil		
0'6"-3'9"	Brown coarse to fine SAND, some Silt, little coarse to fine Gravel, with occasional cobbles and boulders	medium dense	moist
3'9"-6'0"	Brown coarse to fine SAND, little (+) Silt, some coarse to fine Gravel (completely weathered gneiss)	dense	moist
6'0"	Weathered gneiss bedrock		
	No water encountered		

<u>TP-12</u>	Elevation +635		
0-0’6”	Brown Topsoil		
0’6”-5’0”	FILL (Brown coarse to fine SAND, some (+) Silt, little (-) coarse to fine Gravel, with trace of debris)		
5’0”-6’6”	Orange brown, gray coarse to fine SAND and Silt	dense	moist
	Refusal on boulder		
	No water encountered		

<u>TP-13</u>	Elevation +636		
0-0’9”	Brown Topsoil with roots		
0’9”-6’3”	Brown coarse to fine Sand, and Silt, little coarse to fine Gravel	medium dense	moist
6’3”-7’5”	Brown coarse to fine SAND, some (+) Silt, little (-) coarse to fine Gravel	dense	moist
7’5”	Gneiss bedrock		
	Groundwater encountered @ 4’10”	slow inflow	

TP-14	Elevation +623		
0-0'3"	Brown Topsoil		
0'3"-3'4"	FILL (Gray brown coarse to fine SAND, some Silt, little coarse to fine Gravel, with cobbles and boulders)		
3'4"-5'0"	FILL (Brown coarse to fine SAND, little Silt)		
5'0"	Gneiss bedrock		

TP-15	Elevation +668		
0-0'3"	Brown Topsoil		
0'3"-1'8"	Brown coarse to fine SAND, some (+) Silt, some (-) coarse to fine Gravel, with occasional cobbles and boulders	medium dense	moist
1'8"	Gneiss bedrock		
	No water encountered		

TP-16	Elevation +651		
0-0'8"	Dark brown Topsoil		
0'8"-1'10"	FILL (Brown coarse to fine SAND, some (+) Silt, trace medium to fine Gravel, with cobbles)	medium dense	moist
1'10"-4'10"	Brown coarse to fine SAND, some (+) Silt, trace medium to fine Gravel	medium dense	moist
4'10"	Gneiss bedrock		
	No water encountered		

<u>TP-17</u>	Elevation +655		
0-0’3”	Topsoil		
0’3”-1’0”	Brown coarse to fine SAND, some (+) Silt, little coarse to fine Gravel	medium dense	moist
	Hit irrigation wires, test pit abandoned		

<u>TP-18</u>	Elevation +670		
0-0’10”	Brown Topsoil		
0’10”-7’0”	Brown coarse to fine Sand, and Silt, little coarse to fine Gravel	medium dense	moist
	No water encountered		

APPENDIX H

3/8/13 10126
PM
PS
AG

KELLARD SESSIONS CONSULTING, P.C.

John Kellard, P.E.
David Sessions, RLA, AICP

MEMORANDUM

TO: North Castle Planning Board

CC: Adam Kaufman, AICP
John Fava, Conservation Board Chairman
Kristina E. Burbank, AICP
John Meyer Consulting, P.C.
Brynwood Partners, LLC

FROM: David J. Sessions, RLA, AICP DJS.
Kellard Sessions Consulting, P.C.
Town Wetland Consultant

DATE: March 8, 2013

RE: Site Development & Preliminary Subdivision Application
Brynwood Subdivision
568 Bedford Road
Section 2, Block 8, Lot 7.C1A

On November 16, 2012, this office conducted a wetland boundary confirmation on the above-referenced property.

The boundary was reviewed in the field based on the following plans, prepared by John Meyer Consulting, P.C.:

- "Overall Existing Conditions Plan" (Sheet OEC-1), dated (last revised) February 7, 2013
- "Existing Conditions Plan" (Sheets EC-1, EC-2, EC-3, EC-4, EC-5 and EC-6), dated (last revised) February 14, 2013

Based upon our field investigation, the wetland boundary illustrated on the above-referenced plans accurately reflects the extent of locally regulated wetlands both on and immediately adjacent to the subject property.

Please contact me should you have any questions.

DJS/dc

T:\Northcastle\Corresp\016WetlandPermits\NC2117JJ-NCPB-Brynwood-WetlandConf-Memo-3-13.wpd

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Fish, Wildlife & Marine Resources
New York Natural Heritage Program
625 Broadway, 5th Floor, Albany, New York 12233-4757
Phone: (518) 402-8935 • **Fax:** (518) 402-8925
Website: www.dec.ny.gov

Joe Martens
Commissioner

November 26, 2012

Jay Fain
Jay Fain & Associates
134 Round Hill Rd
Fairfield, CT 06824

Dear Mr. Fain:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to an Environmental Assessment for the Proposed Brynwood Club – Addition of Residential Development, site as indicated on your enclosed map, located in the Town of North Castle, Westchester County.

We have no records of rare or state listed animals or plants, or significant natural communities, on or in the immediate vicinity of your site.

The absence of data does not necessarily mean that rare or state-listed species, or significant natural communities, do not exist on or adjacent to the proposed site. Rather, our files currently do not contain information which indicates their presence. For most sites, comprehensive field surveys have not been conducted. We cannot provide a definitive statement on the presence or absence of all rare or state-listed species or significant natural communities. This information should not be substituted for on-site surveys that may be required for environmental assessment.

Our databases are continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

This response applies only to known occurrences of rare or state-listed animals and plants, significant natural communities and other significant habitats maintained in the Natural Heritage Databases. Your project may require additional review or permits; for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the appropriate NYS DEC Regional Office, Division of Environmental Permits, as listed at www.dec.ny.gov/about/39381.html.

Sincerely,
Jean Pietrusiak
Jean Pietrusiak, Information Services
NYS Department Environmental Conservation

Enc.
cc: Reg,. 3, Wildlife Mgr.

1099

BRYNWOOD GOLF COURSE
EXISTING SUBSTANTIAL TREE SURVEY
SORTED BY TAG #

Tag #	DBH (inches)	Common Name	Scientific Name	Condition	Health	Structure	Canopy	Recomendation	Notes	Removals
1	26	White Ash	Fraxinus americana	P	SA	M2	D	Hazard		
2	28	Red Maple	Acer rubrum	F	SA	S	D	Prune		
3	28	Honeylocust	Gledistsia tricanthos inermis	E	H	S	D		Specimen	X
4	40	Norway Maple	Acer platanoides	P	SA	M2	D	Hazard	Broken	X
5	28	Norway Maple	Acer platanoides	P	SA	M2	D	Hazard	Broken	X
6	36	Horse Chestnut	Aesculus hippocastanum	P	SA	S	D	Hazard	Hollow-Broken	X
7	40	Norway Maple	Acer platanoides	P	SA	M2	D	Hazard		X
8	26	Norway Maple	Acer platanoides	P	SA	S	D	Hazard	Wire hazard	X
9	26	Norway Maple	Acer platanoides	P	SA	S	D	Hazard	Wire hazard	X
10	48	Sugar Maple	Acer saccharum	F	A	S	D	Prune	3-Leader	X
11	38	Norway Maple	Acer platanoides	P	SA	M2	C	Hazard		X
12	42	Norway Maple	Acer platanoides	P	A	M3	C	Hazard	Split,broken limbs	X
13	28	White Ash	Fraxinus americana	Dead		M4		Hazard	Dead	X
14	26	Mocknut Hickory	Carya glabra	F	A	M2	D		Split, 1 leader bad	X
15	26	White Ash	Fraxinus americana	P	SA	S	D	Hazard	Declining	X
16	24	White Ash	Fraxinus americana	P	A	M2	D		Diseased	X
17	28	Norway Maple	Acer platanoides	F	A	S	D		Broken tips	X
18	28	Sugar Maple	Acer saccharum	F	A	S	D	Prune	Save	
19	26	Norway Maple	Acer platanoides	F	A	S	D			X
20	24	Mocknut Hickory	Carya glabra	F	A	S	D	Prune		X
21	28	Black Locust	Robinia pseudoacacia	P	SA	S	D			X
22	28	Black Locust	Robinia pseudoacacia	P	SA	S	D			X
23	32	Black Locust	Robinia pseudoacacia	P	SA	S	D			X
24	26	Mocknut Hickory	Carya glabra	F	A	M3	C		Tip damage	
25	24	Sugar Maple	Acer saccharum	G	H	S	C			
26	28	Tree of Heaven	Ailanthus altissima	F	A	S	C	Hazard	Hazard to road	
27	24	Sugar Maple	Acer saccharum	G	H	S	C		Town tree	
28	24	Sugar Maple	Acer saccharum	F	A	S	C		OK	
29	30	Sugar Maple	Acer saccharum	F	A	M3	C	Hazard	Wire hazard	
30	28	Cottonwood	Populus deltoides	P	SA	S	D		Vines on tree	
31	28	Cottonwood	Populus deltoides	P	SA	S	D		Vines on tree	X
32	24	Cottonwood	Populus deltoides	P	A	S	D		Vines on tree	X
33	30	Cottonwood	Populus deltoides	P	SA	S	D		Tip die back	
34	28	White Ash	Fraxinus americana	P	SA	S	C		Tip die back	
35	26	White Ash	Fraxinus americana	P	SA	S	C		Leaning	
36	26	Sugar Maple	Acer saccharum	G	A	S	D			
37	26	White Ash	Fraxinus americana	P	A	S	C		Tip die back	
38	26	Sugar Maple	Acer saccharum	F	A	M2	C			
39	30	Tulip	Liriodendron tulipifera	F	A	M3	D	Save	Nice	
40	24	Scotch Pine	Pinus sylvestris	Dead					Dead	X
41	24	Black Birch	Betula lenta	F	A	S	C			X
42	30	White Ash	Fraxinus americana	F	A	S	D			X

BRYNWOOD GOLF COURSE
EXISTING SUBSTANTIAL TREE SURVEY
SORTED BY TAG #

Tag #	DBH (inches)	Common Name	Scientific Name	Condition	Health	Structure	Canopy	Recomendation	Notes	Removals
43	44	Weeping Willow	Salix babylonica	G	H	M3	C		Specimen	
44	28	Weeping Willow	Salix babylonica	F	A	M2	C			
45	26	Weeping Willow	Salix babylonica	F	A	S	C			
46	60	Weeping Willow	Salix babylonica	F	A	M2	C			
47	34	Cottonwood	Populus deltoides	F	H	S	C			X
48	28	Sugar Maple	Acer saccharum	F	A	S	C		Leaning	X
49	28	White Ash	Fraxinus americana	F	A	S	C			
50	28	White Ash	Fraxinus americana	P	SA	M2	D	Hazard		X
51	28	Black Locust	Robinia pseudoacacia	P	SA	M2	D			X
52	28	Norway Spruce	Picea abies	G	H	S	D			X
53	30	Black Locust	Robinia pseudoacacia	P	SA	S	D			X
54	24	Mocknut Hickory	Carya glabra	Dead				Hazard	Dead/Broken	X
55	28	Black Locust	Robinia pseudoacacia	F	A	S	C			X
56		reserved								
57	50	Sugar Maple	Acer saccharum	G	A	M3	O	Save	Specimen	
58	24	Black Cherry	Prunus serotina	P	SA	S	D		Sig. tip die back	X
59	28	Black Locust	Robinia pseudoacacia	F	SA	S	D		Declining	X
60	30	Black Locust	Robinia pseudoacacia	F	A	M2	D		Declining	X
61	26	Black Locust	Robinia pseudoacacia	F	A	S	D		Declining	X
62	36	Red Maple	Acer rubrum	F	A	M4	D			X
63	24	Mocknut Hickory	Carya glabra	F	A	S	C		Some tip die back	X
64	26	Mocknut Hickory	Carya glabra	F	A	S	C		Some tip die back	X
65	26	White Ash	Fraxinus americana	P	SA	M2	C		Vine covered	X
66	28	White Ash	Fraxinus americana	P	SA	M2	C			X
67	28	Black Birch	Betula lenta	G	H	S	O		Nice open grown	
68	26	White Ash	Fraxinus americana	Dead				Hazard		X
69	44	White Ash	Fraxinus americana	P	SA	S	D			X
70	28	White Ash	Fraxinus americana	P	SA	M2	D			X
71	40	American Elm	Ulmus americana	F	A	S	D		Leaning, tip die back	X
72	28	Red Maple	Acer rubrum	F	A	M2	D		Specimen	X
73	28	White Ash	Fraxinus americana	F	A	S	D		Tip die back	X
74	46	Sugar Maple	Acer saccharum	F	A	M2	D		Nice, some tip death	X
75	26	White Ash	Fraxinus americana	F	A	M	C			X
76	28	White Ash	Fraxinus americana	F	A	M	C			X
77	26	Sugar Maple	Acer saccharum	G	H	S	C			X
78	30	White Ash	Fraxinus americana	F	A	M2	C			X
79	24	White Ash	Fraxinus americana	F	SA	S	C	Hazard		
80	28	Cottonwood	Populus deltoides	F	A	S	C		Vines on tree	X
81	38	Cottonwood	Populus deltoides	G	H	S	D		Vines on tree	X
82	26	Black Birch	Betula lenta	P	SA	S	C		Cankered, hollow	X
83	38	Red Oak	Quercus rubra	G	H	S	C			
84	30	Red Oak	Quercus rubra	G	H	S	C			

BRYNWOOD GOLF COURSE
EXISTING SUBSTANTIAL TREE SURVEY
SORTED BY TAG #

Tag #	DBH (inches)	Common Name	Scientific Name	Condition	Health	Structure	Canopy	Recomendation	Notes	Removals
85	30	Red Oak	Quercus rubra	G	H	S	C			X
86	28	Red Oak	Quercus rubra	G	H	S	C			X
87	40	Red Oak	Quercus rubra	G	A	M2	D	Prune		
88	28	Red Oak	Quercus rubra	G	H	S	C			X
89	28	Red Oak	Quercus rubra	G	H	S	C			X
90	28	Red Maple	Acer rubrum	F	A	S	C		Leaning, poor form	X
91	40	White Oak	Quercus alba	G	H	S	O	Save	Specimen	
92	24	White Oak	Quercus alba	G	A	M	D		Some broken branches	
93	28	Red Oak	Quercus rubra	G	H	S	D			X
94	28	Red Oak	Quercus rubra	G	H	S	D		Specimen	
95	28	Red Oak	Quercus rubra	G	H	M2	D			X
96	24	Red Oak	Quercus rubra	G	H	M2	C			X
97	24	White Ash	Fraxinus americana	P	SA	S	C		Vines on tree	X
98	26	Red Oak	Quercus rubra	G	H	S	C		Some tip die back	X
99	28	Mocknut Hickory	Carya glabra	G	A	M2	D		Some broken branches	
100	36	Cottonwood	Populus deltoides	F	A	S	D		Broken top	
101	28	Sugar Maple	Acer saccharum	G	H	S	D			X
102	34	Cottonwood	Populus deltoides	P	SA	S	D		Broken top/rot	
103	28	Black Birch	Betula lenta	F	A	M2	C		Declining	X
104	24	Mocknut Hickory	Carya glabra	G	A	S	C		Some broken branches	
105	24	Sugar Maple	Acer saccharum	P	SA	S	C	Hazard		X
106	30	Red Maple	Acer rubrum	G	A	M2	C		Some broken branches	X
107	24	Black Cherry	Prunus serotina						Not 24 "	X
108	30	Red Maple	Acer rubrum	F	A	M3	C		Broken crown	X
109	28	Red Maple	Acer rubrum	F	A	S	C		Vine covered	
110	36	Red Maple	Acer rubrum	P	SA	M2	C		Dead leader	X
111	26	White Ash	Fraxinus americana	Dead		M2		Hazard		X
112	26	Mocknut Hickory	Carya glabra	F	A	M3	C			
113	30	White Ash	Fraxinus americana	Dead				Hazard		X
114	26	Mocknut Hickory	Carya glabra	G	H	S	C		Broken tips	X
115		reserved								X
116	26	Mocknut Hickory	Carya glabra	G	H	S	C			X
117	24	Black Birch	Betula lenta	F	A	S	C			
118	24	American Elm	Ulmus americana	F	SA	S	C		Broken top	
119	28	Red Maple	Acer rubrum	F	A	M3	C			X
120	24	Tulip	Liriodendron tulipifera	F	A	S	C		Broken branches	X
121	24	White Ash	Fraxinus americana	P	SA	M	C			X
122	24	White Ash	Fraxinus americana	P	SA	M2	C			X
123	26	White Ash	Fraxinus americana	P	SA	M2	C	Hazard		
124	26	White Pine	Pinus strobus	G	H	S	D			
125	24	Norway Maple	Acer platanoides	F	A	M2	D			
126	24	Red Pine	Pinus resinosa	F	A	S	D			

Tag #	DBH (inches)	Common Name	Scientific Name	Condition	Health	Structure	Canopy	Recomendation	Notes	Removals
127	24	White Pine	Pinus strobus	F	A	M2	D			
128	26	Sugar Maple	Acer saccharum	F	A	S	C			
129	24	White Ash	Fraxinus americana	P	SA	M2	D			
130	48	Sugar Maple	Acer saccharum	F	A	M2	D	Save	Specimen, some tip die back	
131	28	Black Locust	Robinia pseudoacacia	F	A	S	C	Hazard		
132	26	Norway Maple	Acer platanoides	F	A	S	C		Check	
133	24	White Ash	Fraxinus americana	F	A	S	D			
134	28	White Ash	Fraxinus americana	P	SA	S	D		Severe decline	X
135	30	White Ash	Fraxinus americana	F	SA	S	D		Broken crown/ tip die back	X
136	30	White Pine	Pinus strobus	P	A	S	D		Broken limbs	
137	28	Norway Maple	Acer platanoides	F	A	M3	D			
138	30	White Pine	Pinus strobus	G	H	S	C			
139	24	White Pine	Pinus strobus	G	H	S	C			
140	24	White Pine	Pinus strobus	G	H	S	C			
141	28	Tulip	Liriodendron tulipifera	G	H	S	C			
142	30	White Ash	Fraxinus americana	G	H	S	C			
143	28	Tulip	Liriodendron tulipifera	G	H	S	C			
144	30	White Ash	Fraxinus americana	F	A	S	C		Broken crown	
145	30	Tulip	Liriodendron tulipifera	G	H	S	C			
146	24	Black Locust	Robinia pseudoacacia	F	A	S	C	Hazard		
147	24	Black Locust	Robinia pseudoacacia	F	A	S	C	Hazard		
148	24	Black Locust	Robinia pseudoacacia	F	A	S	C	Hazard		
149	24	Black Locust	Robinia pseudoacacia	F	A	S	C	Hazard		
150	28	Black Locust	Robinia pseudoacacia	F	A	S	C	Hazard		
151	28	Tulip	Liriodendron tulipifera	F	SA	S	C		Broken crown	X
152	28	Black Locust	Robinia pseudoacacia	P	SA	S	C	Hazard		X
153	26	Tulip	Liriodendron tulipifera	P	SA	S	C	Hazard		X
154	28	Tulip	Liriodendron tulipifera	F	A	S	C		Broken top	
155	26	Tulip	Liriodendron tulipifera	G	H	S	C			
156	36	Red Oak	Quercus rubra	G	H	S	C		Specimen	
157	28	White Ash	Fraxinus americana	F	A	M2	C			
158	24	American Elm	Ulmus americana	G	H	S	C			
159	24	White Ash	Fraxinus americana	P	SA	S	C		Possibly dead	
160	30	Sugar Maple	Acer saccharum	G	H	M3	D			
161	28	Tulip	Liriodendron tulipifera	F	A	S	C		Broken top	
162	24	Sugar Maple	Acer saccharum	F	A	S	C		Leaning	
163	30	Tulip	Liriodendron tulipifera	F	A	S	C			
164	26	White Ash	Fraxinus americana	P	SA	S	C	Hazard		
165	28	Sugar Maple	Acer saccharum	G	H	S	C			
166	26	Tulip	Liriodendron tulipifera	G	H	S	D			
167	28	Sugar Maple	Acer saccharum	G	H	S	C			
168	30	White Ash	Fraxinus americana	G	H	S	C			

Tag #	DBH (inches)	Common Name	Scientific Name	Condition	Health	Structure	Canopy	Recomendation	Notes	Removals
169	30	Red Maple	Acer rubrum	P	SA	M2	C		Broken	
170	52	Black Cherry	Prunus serotina	F	SA	M2	D		Die back	X
171	30	Red Maple	Acer rubrum	F	A	M2	C			
172	24	Red Maple	Acer rubrum	F	A	M3	C			X
173	24	Red Maple	Acer rubrum	F	A	M2	C			
174	24	Black Birch	Betula lenta	F	SA	M4	D		Split, broken	
175	30	Red Maple	Acer rubrum	F	A	M2	D		Broken crown	
176	36	Red Oak	Quercus rubra	G	H	S	D	Save	Specimen	
177	28	Shagbark Hickory	Carya ovata	G	H	S	D	Save	Specimen	
178	30	Red Oak	Quercus rubra	G	H	S	D	Save	Specimen	
179	30	Red Maple	Acer rubrum	F	A	S	D			X
180	50	Weeping Willow	Salix babylonica	P	SA	M		Hazard	Broken	X
181	38	Weeping Willow	Salix babylonica	Dead					Broken	X
182	60	Weeping Willow	Salix babylonica	Dead					Broken	X
183	28	Cottonwood	Populus deltoides	F	H	S	C			X
184		Duplicate							Same tree as 47	X
185	30	Black Locust	Robinia pseudoacacia	F	SA	S	C	Hazard		
186	28	Black Locust	Robinia pseudoacacia	F	SA	S	C	Hazard		
187	28	Black Locust	Robinia pseudoacacia	F	SA	S	C	Hazard		
188	28	Black Locust	Robinia pseudoacacia	F	SA	S	C	Hazard		
189	24	Norway Maple	Acer platanoides	G	H	S	D			
190	30	Red Oak	Quercus rubra	G	H	S	C			X
191	24	Cottonwood	Populus deltoides	F	A	S	C		Vines on tree	X
192	28	Cottonwood	Populus deltoides	F	A	S	C			X
193	28	Cottonwood	Populus deltoides	F	A	S	C		Leaning	
194	30	Cottonwood	Populus deltoides	F	A	S	D			
195	28	Cottonwood	Populus deltoides	F	H	S	C			
196	26	Red Oak	Quercus rubra	F	A	S	C		Broken top	
197	26	Red Oak	Quercus rubra	G	A	S	D	Prune	Needs pruning	
198	28	Red Maple	Acer rubrum	F	A	M3	C		Broken	
199	28	Red Oak	Quercus rubra	G	H	M2	D	Save	Specimen	
200	30	Red Oak	Quercus rubra	G	H	S	D	Save	Specimen	X
201	24	Red Maple	Acer rubrum	G	A	S	C			X
202	26	White Ash	Fraxinus americana	P	SA	S	D	Hazard		X
203	28	Mocknut Hickory	Carya glabra	F	A	S	D		Vines on tree	
204	28	Mocknut Hickory	Carya glabra	G	A	S	D		Vines on tree	
205	28	Mocknut Hickory	Carya glabra	G	A	S	D		Vines on tree	X
206	26	Shagbark Hickory	Carya ovata	G	H	S	D		Vines on tree	X
207	28	White Ash	Fraxinus americana	F	A	M2	C			
208	44	Cottonwood	Populus deltoides	F	H	M2	C			
209	26	Cottonwood	Populus deltoides	F	A	S	C			X
210	26	Cottonwood	Populus deltoides	F	A	S	C			X

Tag #	DBH (inches)	Common Name	Scientific Name	Condition	Health	Structure	Canopy	Recomendation	Notes	Removals
211	24	Cottonwood	Populus deltoides	P	SA	S	C		Lighting struck	
212	26	Cottonwood	Populus deltoides	F	H	S	C			X
213	26	Cottonwood	Populus deltoides	F	H	S	C			X
214	28	Red Oak	Quercus rubra	F	A	S	C		Check	
215	40	Cottonwood	Populus deltoides	F	A	S	C		Check	
216	24	Sugar Maple	Acer saccharum	G	H	S	C			X
217	28	Red Oak	Quercus rubra	G	H	S	C			X
218	28	Mocknut Hickory	Carya glabra	G	H	S	D			X
219	24	Red Maple	Acer rubrum	F	A	M3	C		Broken top	X
220	26	Red Maple	Acer rubrum	G	H	S	C			X
221	26	Black Cherry	Prunus serotina	G	H	S	C			X
222	26	Red Maple	Acer rubrum	G	H	S	C			X
223	28	Red Maple	Acer rubrum	F	A	S	C		Hollow at base	
224	26	Red Maple	Acer rubrum	G	H	S	C			X
225	38	Red Maple	Acer rubrum	F	A	M4	C		Broken top	
226	38	Black Cherry	Prunus serotina					Hazard	Dead	
227	44	Red Oak	Quercus rubra	G	H	S	D		Specimen	X
228	40	Red Oak	Quercus rubra	G	H	S	C			X
229	30	Red Oak	Quercus rubra	G	H	S	C			X
230	48	Red Oak	Quercus rubra	G	H	M2	D			X
231	26	Red Oak	Quercus rubra	G	A	S	C		Tip die back	X
232	30	Red Oak	Quercus rubra	G	A	S	C		Tip die back	X
233	38	Red Oak	Quercus rubra	G	H	S	C			X
234	26	Sugar Maple	Acer saccharum	G	H	S	C			X
235	30	American Elm	Ulmus americana	F	A	S	C		Tip die back	X
236	24	Sugar Maple	Acer saccharum	F	A	S	C		Tip die back	X
237	28	American Elm	Ulmus americana	G	H	S	D			X
238	34	Sugar Maple	Acer saccharum	G	H	S	C			X
239	30	Sugar Maple	Acer saccharum	P	A	M3	D			X
240	28	Sugar Maple	Acer saccharum	G	A	S	D			X
241	28	Sugar Maple	Acer saccharum	G	A	S	D			X

BRYNWOOD GOLF COURSE
EXISTING SIGNIFICANT TREE SURVEY
SORTED BY SPECIES

Tag #	DBH (inches)	Common Name	Scientific Name	Condition	Health	Structure	Canopy	Recomendation	Notes	Removals
71	40	American Elm	Ulmus americana	F	A	S	D		Leaning, tip die back	X
118	24	American Elm	Ulmus americana	F	SA	S	C		Broken top	
158	24	American Elm	Ulmus americana	G	H	S	C			
235	30	American Elm	Ulmus americana	F	A	S	C		Tip die back	X
237	28	American Elm	Ulmus americana	G	H	S	D			X
41	24	Black Birch	Betula lenta	F	A	S	C			X
67	28	Black Birch	Betula lenta	G	H	S	O		Nice open grown	
82	26	Black Birch	Betula lenta	P	SA	S	C		Cankered, hollow	X
103	28	Black Birch	Betula lenta	F	A	M2	C		Declining	X
117	24	Black Birch	Betula lenta	F	A	S	C			
174	24	Black Birch	Betula lenta	F	SA	M4	D		Split, broken	
58	24	Black Cherry	Prunus serotina	P	SA	S	D		Sig. tip die back	X
107	24	Black Cherry	Prunus serotina						Not 24 "	X
170	52	Black Cherry	Prunus serotina	F	SA	M2	D		Die back	X
221	26	Black Cherry	Prunus serotina	G	H	S	C			X
226	38	Black Cherry	Prunus serotina					Hazard	Dead	
21	28	Black Locust	Robinia pseudoacacia	P	SA	S	D			X
22	28	Black Locust	Robinia pseudoacacia	P	SA	S	D			X
23	32	Black Locust	Robinia pseudoacacia	P	SA	S	D			X
51	28	Black Locust	Robinia pseudoacacia	P	SA	M2	D			X
53	30	Black Locust	Robinia pseudoacacia	P	SA	S	D			X
55	28	Black Locust	Robinia pseudoacacia	F	A	S	C			X
59	28	Black Locust	Robinia pseudoacacia	F	SA	S	D		Declining	X
60	30	Black Locust	Robinia pseudoacacia	F	A	M2	D		Declining	X
61	26	Black Locust	Robinia pseudoacacia	F	A	S	D		Declining	X
131	28	Black Locust	Robinia pseudoacacia	F	A	S	C	Hazard		
146	24	Black Locust	Robinia pseudoacacia	F	A	S	C	Hazard		
147	24	Black Locust	Robinia pseudoacacia	F	A	S	C	Hazard		
148	24	Black Locust	Robinia pseudoacacia	F	A	S	C	Hazard		
149	24	Black Locust	Robinia pseudoacacia	F	A	S	C	Hazard		
150	28	Black Locust	Robinia pseudoacacia	F	A	S	C	Hazard		
152	28	Black Locust	Robinia pseudoacacia	P	SA	S	C	Hazard		X
185	30	Black Locust	Robinia pseudoacacia	F	SA	S	C	Hazard		
186	28	Black Locust	Robinia pseudoacacia	F	SA	S	C	Hazard		
187	28	Black Locust	Robinia pseudoacacia	F	SA	S	C	Hazard		
188	28	Black Locust	Robinia pseudoacacia	F	SA	S	C	Hazard		
30	28	Cottonwood	Populus deltoides	P	SA	S	D		Vines on tree	
31	28	Cottonwood	Populus deltoides	P	SA	S	D		Vines on tree	X
32	24	Cottonwood	Populus deltoides	P	A	S	D		Vines on tree	X
33	30	Cottonwood	Populus deltoides	P	SA	S	D		Tip die back	
47	34	Cottonwood	Populus deltoides	F	H	S	C			X

BRYNWOOD GOLF COURSE
EXISTING SIGNIFICANT TREE SURVEY
SORTED BY SPECIES

Tag #	DBH (inches)	Common Name	Scientific Name	Condition	Health	Structure	Canopy	Recomendation	Notes	Removals
80	28	Cottonwood	Populus deltoides	F	A	S	C		Vines on tree	X
81	38	Cottonwood	Populus deltoides	G	H	S	D		Vines on tree	X
100	36	Cottonwood	Populus deltoides	F	A	S	D		Broken top	
102	34	Cottonwood	Populus deltoides	P	SA	S	D		Broken top/rot	
183	28	Cottonwood	Populus deltoides	F	H	S	C			X
191	24	Cottonwood	Populus deltoides	F	A	S	C		Vines on tree	X
192	28	Cottonwood	Populus deltoides	F	A	S	C			X
193	28	Cottonwood	Populus deltoides	F	A	S	C		Leaning	
194	30	Cottonwood	Populus deltoides	F	A	S	D			
195	28	Cottonwood	Populus deltoides	F	H	S	C			
208	44	Cottonwood	Populus deltoides	F	H	M2	C			
209	26	Cottonwood	Populus deltoides	F	A	S	C			X
210	26	Cottonwood	Populus deltoides	F	A	S	C			X
211	24	Cottonwood	Populus deltoides	P	SA	S	C		Lighting struck	
212	26	Cottonwood	Populus deltoides	F	H	S	C			X
213	26	Cottonwood	Populus deltoides	F	H	S	C			X
215	40	Cottonwood	Populus deltoides	F	A	S	C		Check	
184		Duplicate							Same tree as 47	X
3	28	Honeylocust	Gledistsia tricanthos inermis	E	H	S	D		Specimen	X
6	36	Horse Chestnut	Aesculus hippocastanum	P	SA	S	D	Hazard	Hollow-Broken	X
14	26	Mocknut Hickory	Carya glabra	F	A	M2	D		Split, 1 leader bad	X
20	24	Mocknut Hickory	Carya glabra	F	A	S	D	Prune		X
24	26	Mocknut Hickory	Carya glabra	F	A	M3	C		Tip damage	
54	24	Mocknut Hickory	Carya glabra	Dead				Hazard	Dead/Broken	X
63	24	Mocknut Hickory	Carya glabra	F	A	S	C		Some tip die back	X
64	26	Mocknut Hickory	Carya glabra	F	A	S	C		Some tip die back	X
99	28	Mocknut Hickory	Carya glabra	G	A	M2	D		Some broken branches	
104	24	Mocknut Hickory	Carya glabra	G	A	S	C		Some broken branches	
112	26	Mocknut Hickory	Carya glabra	F	A	M3	C			
114	26	Mocknut Hickory	Carya glabra	G	H	S	C		Broken tips	X
116	26	Mocknut Hickory	Carya glabra	G	H	S	C			X
203	28	Mocknut Hickory	Carya glabra	F	A	S	D		Vines on tree	
204	28	Mocknut Hickory	Carya glabra	G	A	S	D		Vines on tree	
205	28	Mocknut Hickory	Carya glabra	G	A	S	D		Vines on tree	X
218	28	Mocknut Hickory	Carya glabra	G	H	S	D			X
4	40	Norway Maple	Acer platanoides	P	SA	M2	D	Hazard	Broken	X
5	28	Norway Maple	Acer platanoides	P	SA	M2	D	Hazard	Broken	X
7	40	Norway Maple	Acer platanoides	P	SA	M2	D	Hazard		X
8	26	Norway Maple	Acer platanoides	P	SA	S	D	Hazard	Wire hazard	X
9	26	Norway Maple	Acer platanoides	P	SA	S	D	Hazard	Wire hazard	X
11	38	Norway Maple	Acer platanoides	P	SA	M2	C	Hazard		X

BRYNWOOD GOLF COURSE
EXISTING SIGNIFICANT TREE SURVEY
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Tag #	DBH (inches)	Common Name	Scientific Name	Condition	Health	Structure	Canopy	Recomendation	Notes	Removals
12	42	Norway Maple	Acer platanoides	P	A	M3	C	Hazard	Split,broken limbs	X
17	28	Norway Maple	Acer platanoides	F	A	S	D		Broken tips	X
19	26	Norway Maple	Acer platanoides	F	A	S	D			X
125	24	Norway Maple	Acer platanoides	F	A	M2	D			
132	26	Norway Maple	Acer platanoides	F	A	S	C		Check	
137	28	Norway Maple	Acer platanoides	F	A	M3	D			
189	24	Norway Maple	Acer platanoides	G	H	S	D			
52	28	Norway Spruce	Picea abies	G	H	S	D			X
2	28	Red Maple	Acer rubrum	F	SA	S	D	Prune		
62	36	Red Maple	Acer rubrum	F	A	M4	D			X
72	28	Red Maple	Acer rubrum	F	A	M2	D		Specimen	X
90	28	Red Maple	Acer rubrum	F	A	S	C		Leaning, poor form	X
106	30	Red Maple	Acer rubrum	G	A	M2	C		Some broken branches	X
108	30	Red Maple	Acer rubrum	F	A	M3	C		Broken crown	X
109	28	Red Maple	Acer rubrum	F	A	S	C		Vine covered	
110	36	Red Maple	Acer rubrum	P	SA	M2	C		Dead leader	X
119	28	Red Maple	Acer rubrum	F	A	M3	C			X
169	30	Red Maple	Acer rubrum	P	SA	M2	C		Broken	
171	30	Red Maple	Acer rubrum	F	A	M2	C			
172	24	Red Maple	Acer rubrum	F	A	M3	C			X
173	24	Red Maple	Acer rubrum	F	A	M2	C			
175	30	Red Maple	Acer rubrum	F	A	M2	D		Broken crown	
179	30	Red Maple	Acer rubrum	F	A	S	D			X
198	28	Red Maple	Acer rubrum	F	A	M3	C		Broken	
201	24	Red Maple	Acer rubrum	G	A	S	C			X
219	24	Red Maple	Acer rubrum	F	A	M3	C		Broken top	X
220	26	Red Maple	Acer rubrum	G	H	S	C			X
222	26	Red Maple	Acer rubrum	G	H	S	C			X
223	28	Red Maple	Acer rubrum	F	A	S	C		Hollow at base	
224	26	Red Maple	Acer rubrum	G	H	S	C			X
225	38	Red Maple	Acer rubrum	F	A	M4	C		Broken top	
83	38	Red Oak	Quercus rubra	G	H	S	C			
84	30	Red Oak	Quercus rubra	G	H	S	C			
85	30	Red Oak	Quercus rubra	G	H	S	C			X
86	28	Red Oak	Quercus rubra	G	H	S	C			X
87	40	Red Oak	Quercus rubra	G	A	M2	D	Prune		
88	28	Red Oak	Quercus rubra	G	H	S	C			X
89	28	Red Oak	Quercus rubra	G	H	S	C			X
93	28	Red Oak	Quercus rubra	G	H	S	D			X
94	28	Red Oak	Quercus rubra	G	H	S	D		Specimen	
95	28	Red Oak	Quercus rubra	G	H	M2	D			X

BRYNWOOD GOLF COURSE
EXISTING SIGNIFICANT TREE SURVEY
SORTED BY SPECIES

Tag #	DBH (inches)	Common Name	Scientific Name	Condition	Health	Structure	Canopy	Recomendation	Notes	Removals
96	24	Red Oak	Quercus rubra	G	H	M2	C			X
98	26	Red Oak	Quercus rubra	G	H	S	C		Some tip die back	X
156	36	Red Oak	Quercus rubra	G	H	S	C		Specimen	
176	36	Red Oak	Quercus rubra	G	H	S	D	Save	Specimen	
178	30	Red Oak	Quercus rubra	G	H	S	D	Save	Specimen	
190	30	Red Oak	Quercus rubra	G	H	S	C			X
196	26	Red Oak	Quercus rubra	F	A	S	C		Broken top	
197	26	Red Oak	Quercus rubra	G	A	S	D	Prune	Needs pruning	
199	28	Red Oak	Quercus rubra	G	H	M2	D	Save	Specimen	
200	30	Red Oak	Quercus rubra	G	H	S	D	Save	Specimen	X
214	28	Red Oak	Quercus rubra	F	A	S	C		Check	
217	28	Red Oak	Quercus rubra	G	H	S	C			X
227	44	Red Oak	Quercus rubra	G	H	S	D		Specimen	X
228	40	Red Oak	Quercus rubra	G	H	S	C			X
229	30	Red Oak	Quercus rubra	G	H	S	C			X
230	48	Red Oak	Quercus rubra	G	H	M2	D			X
231	26	Red Oak	Quercus rubra	G	A	S	C		Tip die back	X
232	30	Red Oak	Quercus rubra	G	A	S	C		Tip die back	X
233	38	Red Oak	Quercus rubra	G	H	S	C			X
126	24	Red Pine	Pinus resinosa	F	A	S	D			
56		reserved								
115		reserved								X
40	24	Scotch Pine	Pinus sylvestris	Dead					Dead	X
177	28	Shagbark Hickory	Carya ovata	G	H	S	D	Save	Specimen	
206	26	Shagbark Hickory	Carya ovata	G	H	S	D		Vines on tree	X
10	48	Sugar Maple	Acer saccharum	F	A	S	D	Prune	3-Leader	X
18	28	Sugar Maple	Acer saccharum	F	A	S	D	Prune	Save	
25	24	Sugar Maple	Acer saccharum	G	H	S	C			
27	24	Sugar Maple	Acer saccharum	G	H	S	C		Town tree	
28	24	Sugar Maple	Acer saccharum	F	A	S	C		OK	
29	30	Sugar Maple	Acer saccharum	F	A	M3	C	Hazard	Wire hazard	
36	26	Sugar Maple	Acer saccharum	G	A	S	D			
38	26	Sugar Maple	Acer saccharum	F	A	M2	C			
48	28	Sugar Maple	Acer saccharum	F	A	S	C		Leaning	X
57	50	Sugar Maple	Acer saccharum	G	A	M3	O	Save	Specimen	
74	46	Sugar Maple	Acer saccharum	F	A	M2	D		Nice, some tip death	X
77	26	Sugar Maple	Acer saccharum	G	H	S	C			X
101	28	Sugar Maple	Acer saccharum	G	H	S	D			X
105	24	Sugar Maple	Acer saccharum	P	SA	S	C	Hazard		X
128	26	Sugar Maple	Acer saccharum	F	A	S	C			
130	48	Sugar Maple	Acer saccharum	F	A	M2	D	Save	Specimen, some tip die back	

BRYNWOOD GOLF COURSE
EXISTING SIGNIFICANT TREE SURVEY
SORTED BY SPECIES

Tag #	DBH (inches)	Common Name	Scientific Name	Condition	Health	Structure	Canopy	Recomendation	Notes	Removals
160	30	Sugar Maple	Acer saccharum	G	H	M3	D			
162	24	Sugar Maple	Acer saccharum	F	A	S	C		Leaning	
165	28	Sugar Maple	Acer saccharum	G	H	S	C			
167	28	Sugar Maple	Acer saccharum	G	H	S	C			
216	24	Sugar Maple	Acer saccharum	G	H	S	C			X
234	26	Sugar Maple	Acer saccharum	G	H	S	C			X
236	24	Sugar Maple	Acer saccharum	F	A	S	C		Tip die back	X
238	34	Sugar Maple	Acer saccharum	G	H	S	C			X
239	30	Sugar Maple	Acer saccharum	P	A	M3	D			X
240	28	Sugar Maple	Acer saccharum	G	A	S	D			X
241	28	Sugar Maple	Acer saccharum	G	A	S	D			X
26	28	Tree of Heaven	Ailanthus altissima	F	A	S	C	Hazard	Hazard to road	
39	30	Tulip	Liriodendron tulipifera	F	A	M3	D	Save	Nice	
120	24	Tulip	Liriodendron tulipifera	F	A	S	C		Broken branches	X
141	28	Tulip	Liriodendron tulipifera	G	H	S	C			
143	28	Tulip	Liriodendron tulipifera	G	H	S	C			
145	30	Tulip	Liriodendron tulipifera	G	H	S	C			
151	28	Tulip	Liriodendron tulipifera	F	SA	S	C		Broken crown	X
153	26	Tulip	Liriodendron tulipifera	P	SA	S	C	Hazard		X
154	28	Tulip	Liriodendron tulipifera	F	A	S	C		Broken top	
155	26	Tulip	Liriodendron tulipifera	G	H	S	C			
161	28	Tulip	Liriodendron tulipifera	F	A	S	C		Broken top	
163	30	Tulip	Liriodendron tulipifera	F	A	S	C			
166	26	Tulip	Liriodendron tulipifera	G	H	S	D			
43	44	Weeping Willow	Salix babylonica	G	H	M3	C		Specimen	
44	28	Weeping Willow	Salix babylonica	F	A	M2	C			
45	26	Weeping Willow	Salix babylonica	F	A	S	C			
46	60	Weeping Willow	Salix babylonica	F	A	M2	C			
180	50	Weeping Willow	Salix babylonica	P	SA	M		Hazard	Broken	X
181	38	Weeping Willow	Salix babylonica	Dead					Broken	X
182	60	Weeping Willow	Salix babylonica	Dead					Broken	X
1	26	White Ash	Fraxinus americana	P	SA	M2	D	Hazard		
13	28	White Ash	Fraxinus americana	Dead		M4		Hazard	Dead	X
15	26	White Ash	Fraxinus americana	P	SA	S	D	Hazard	Declining	X
16	24	White Ash	Fraxinus americana	P	A	M2	D		Diseased	X
34	28	White Ash	Fraxinus americana	P	SA	S	C		Tip die back	
35	26	White Ash	Fraxinus americana	P	SA	S	C		Leaning	
37	26	White Ash	Fraxinus americana	P	A	S	C		Tip die back	
42	30	White Ash	Fraxinus americana	F	A	S	D			X
49	28	White Ash	Fraxinus americana	F	A	S	C			
50	28	White Ash	Fraxinus americana	P	SA	M2	D	Hazard		X

BRYNWOOD GOLF COURSE
EXISTING SIGNIFICANT TREE SURVEY
SORTED BY SPECIES

Tag #	DBH (inches)	Common Name	Scientific Name	Condition	Health	Structure	Canopy	Recomendation	Notes	Removals
65	26	White Ash	Fraxinus americana	P	SA	M2	C		Vine covered	X
66	28	White Ash	Fraxinus americana	P	SA	M2	C			X
68	26	White Ash	Fraxinus americana	Dead				Hazard		X
69	44	White Ash	Fraxinus americana	P	SA	S	D			X
70	28	White Ash	Fraxinus americana	P	SA	M2	D			X
73	28	White Ash	Fraxinus americana	F	A	S	D		Tip die back	X
75	26	White Ash	Fraxinus americana	F	A	M	C			X
76	28	White Ash	Fraxinus americana	F	A	M	C			X
78	30	White Ash	Fraxinus americana	F	A	M2	C			X
79	24	White Ash	Fraxinus americana	F	SA	S	C	Hazard		
97	24	White Ash	Fraxinus americana	P	SA	S	C		Vines on tree	X
111	26	White Ash	Fraxinus americana	Dead		M2		Hazard		X
113	30	White Ash	Fraxinus americana	Dead				Hazard		X
121	24	White Ash	Fraxinus americana	P	SA	M	C			X
122	24	White Ash	Fraxinus americana	P	SA	M2	C			X
123	26	White Ash	Fraxinus americana	P	SA	M2	C	Hazard		
129	24	White Ash	Fraxinus americana	P	SA	M2	D			
133	24	White Ash	Fraxinus americana	F	A	S	D			
134	28	White Ash	Fraxinus americana	P	SA	S	D		Severe decline	X
135	30	White Ash	Fraxinus americana	F	SA	S	D		Broken crown/ tip die back	X
142	30	White Ash	Fraxinus americana	G	H	S	C			
144	30	White Ash	Fraxinus americana	F	A	S	C		Broken crown	
157	28	White Ash	Fraxinus americana	F	A	M2	C			
159	24	White Ash	Fraxinus americana	P	SA	S	C		Possibly dead	
164	26	White Ash	Fraxinus americana	P	SA	S	C	Hazard		
168	30	White Ash	Fraxinus americana	G	H	S	C			
202	26	White Ash	Fraxinus americana	P	SA	S	D	Hazard		X
207	28	White Ash	Fraxinus americana	F	A	M2	C			
91	40	White Oak	Quercus alba	G	H	S	O	Save	Specimen	
92	24	White Oak	Quercus alba	G	A	M	D		Some broken branches	
124	26	White Pine	Pinus strobus	G	H	S	D			
127	24	White Pine	Pinus strobus	F	A	M2	D			
136	30	White Pine	Pinus strobus	P	A	S	D		Broken limbs	
138	30	White Pine	Pinus strobus	G	H	S	C			
139	24	White Pine	Pinus strobus	G	H	S	C			
140	24	White Pine	Pinus strobus	G	H	S	C			

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SOILS MAPPING & WETLAND/WATERCOURSE DELINEATION FOR BRYNWOOD GOLF & COUNTRY CLUB, NORTH CASTLE, NEW YORK

PROPERTY LOCATION AND DESCRIPTION:

LAND USE: Golf Course/Country Club

ACRES: 156+/-

ADDRESS: Bedford Road, North Castle, NY

REPORT COMPLETED FOR:

NAME: Megan Maciejowski
BRYNWOOD PARTNERS LLC

ADDRESS: c/o Corigin Real Estate Group
505 Fifth Avenue,
New York, NY 10017

MAPPING AND DELINEATION METHODOLOGY

Soils analysis, as described in this report, is intended as an inventory and evaluation of the existing soil characteristics on the subject property. A first order soil survey in accordance with the principles and practices noted in the USDA publication *Soil Survey Manual* (1993) was completed at the site. Soil units mapped in the field correspond with those in the USDA publication *Soil Survey of Putnam and Westchester Counties, New York* (1994).

Wetland identification was based on the presence of poorly and very poorly drained soils and/or a prevalence of hydrophytic vegetation. Soil types were identified by observation of soil morphology (soil texture, color, structure, etc.). To observe the morphology of the property's soils, numerous two-foot deep test pits and/or hand borings were completed throughout the site. Prevalence of hydrophytic vegetation was confirmed by visually determining the dominant plant species in each vegetation community in accordance with the Onsite Routine Determination method as described in the 1989 manual titled *Corps of Engineers Wetland Delineation Manual* (Manual) by the Environmental Laboratory. Transects were located perpendicular to and at representative points along the perceived boundaries of the wetland areas identified on the property. Soil morphologies and vegetation were observed at sampling points along the transects. Sampling began well outside the bounds of the wetland and continued towards it until hydric soils and/or a prevalence of hydrophytic vegetation were observed. This point on each transect was marked (flagged) with an orange surveyor's tape labeled "Wetland Boundary". The complete boundary of every wetland area is located along the lines that connect these sequentially numbered boundary points.

The wetland and watercourse boundaries are subject to change until adopted by the Town.

DATE AND CONDITIONS AT TIME OF INSPECTION

DATE: 10/2012 INSPECTED BY: Jay Fain

WEATHER: Variable

SOIL MOISTURE CONDITIONS: [ ] DRY [X] MOIST [ ] WET FROST DEPTH: N/A SNOW DEPTH: N/A

CERTIFICATION

JAY FAIN, PRINCIPAL, SOIL SCIENTIST

WETLAND/WATERCOURSE IDENTIFIED

FLAG NUMBERS	WETLAND TYPE	SOIL TYPE	COMMENTS
AA1-AA4	Disturbed	**Ub** Udorthents	Disturbed/filled
A1-A39	Perennial Watercourse	**CtC** Chatfield-Hollis	Well defined/rocky
A1-A30	Pond	**Open Water**	
B1-B10	Disturbed	**Ub** Udorthents	Disturbed, surface soil removed
C1-C22	Seep/Disturbed	**RdA/Ub** Ridgebury/ Udorthents	
D1-D9	Red Maple Swamp	**RdA** Ridgebury	
E10-E59	Red Maple Swamp	**RdA** Ridgebury	
F1-F14	Pond	**Open Water**	
G1-G45	Pond	**Open Water**	
H1-H38	Pond	**Open Water**	
WC1-WC7	Disturbed	**-0-**	Golf course drainage
11-18	Seep	**RdA** Ridgebury	Off-site

SOIL MAP UNITS

Each soil map unit that was identified on the property represents a specific area on the landscape and consists of one or more soils for which the unit is named. Other soils (inclusions that are generally too small to be delineated separately) may account for 10 to 15 percent of the map unit. The mapped units are identified in the following table by name and symbol and typical characteristics (parent material, drainage class, high water table, depth to bedrock, and slope) of each unit are provided. These are generally the primary characteristics to be considered in land use planning and management. A narrative that defines each characteristic and describes their land use implications follows the table. Complete descriptions of each soil map unit can be found in the *Soil Survey of Putnam and Westchester Counties, New York* (1994).

UPLAND SOILS

SOIL		PARENT MATERIAL	SLOPE %	DRAINAGE CLASS	HIGH WATER TABLE			DEPTH TO BEDROCK (in)
SYM.	NAME				DEPTH (ft)	KIND	MOS.	
ChB ChC ChD ChE	Charlton loam	Loose Glacial Till	2-8 8-15 15-25 25-35	Well Drained	>6.0	--	--	>60
ClE	Charlton loam, very stony	Loose Glacial Till	2-8 8-15 15-25 25-35 35-45	Well Drained	>6.0	--	--	>60
CrC	Charlton-Chatfield complex, rolling, very rocky	Loose Glacial Till Loose Glacial Till	2-15 2-15	Well Drained Well Drained & Somewhat Excessively Drained	>6.0 >6.0	-- --	-- --	>60 20-40
CsD	Chatfield- Charleton complex, hilly, very rocky	Loose Glacial Till Loose Glacial Till	15-35 15-35	Well Drained & Somewhat Excessively Drained Well Drained	>6.0 >6.0	-- --	-- --	20-40 >60
CtC	Chatfield- Hollis- Rock outcrop complex, rolling	Loose Glacial Till Loose Glacial Till --	3-15 3-15 3-15	Well Drained Somewhat Excessively Drained --	>6.0 -- --	-- -- --	-- -- --	20-40 10-20 0
CuD	Chatfield- Hollis- Rock outcrop complex, hilly	Loose Glacial Till Loose Glacial Till --	15-35 15-35 15-35	Well Drained Somewhat Excessively Drained --	>6.0 -- --	-- -- --	-- -- --	20-40 10-20 0
Ff	Fluvaquents-Udifluvents complex, frequently flooded	Alluvium	0-3	Well Drained to Very Poorly Drained	1.0-1.5 1.5-3.0	Apparent Apparent	Oct.-Jun. Nov.-Apr.	>60

SYM.	NAME	MATERIAL	%	CLASS	DEPTH (ft)	KIND	MOS.	BEDROCK (in)
HrF	Hollis- Rock outcrop complex,very steep	Loose Glacial Till --	35-60 --	Well Drained Somewhat Excessively Drained --	>6.0 --	-- --	-- --	10-20 0
PnB PnC PnD	Paxton fine sandy loam	Compact Glacial Till	2-8 8-15 15-25	Well Drained	1.5-2.5	Perched	Feb.-Apr.	>60
RhA RhB RhC RhD RhE	Riverhead loam	Glacial Outwash	0-3 3-8 8-15 15-25 25-50	Well Drained	>6.0	--	--	>60
SbB SbC SbD	Stockbridge Silt loam	Loose Glacial Till	2-8 8-15 15-25	Well Drained	>6.0	--	--	>60
SgC	Stockbridge-Rock outcrop complex, rolling	Loose Glacial Till	5-15	Well Drained	>6.0	--	--	>60
SuA SuB	Sutton loam	Loose Glacial Till	0-3 3-8	Moderately Well Drained	1.5-2.5	Apparent	Nov.-Apr.	>60
WdA WdB WdC	Woodbridge loam	Compact Glacial Till	0-3 3-8 8-15	Moderately Well Drained	1.5-2.5	--	Nov.-May	>60

WETLAND SOILS

SOIL		PARENT MATERIAL	SLOPE %	DRAINAGE CLASS	HIGH WATER TABLE			DEPTH TO BEDROCK (in)
SYM.	NAME				DEPTH (ft)	KIND	MOS.	
Ub	Udorthents, smoothed	Properties and characteristics are variable. Further investigations necessary to document characteristics.						
RdA RdB	Ridgebury loam	Compact Glacial Till	0-3 3-8	Poorly Drained, Somewhat Poorly Drained	0.0-1.05	Perched	Nov.-May	>60

SOIL CHARACTERISTICS: DEFINITIONS AND LAND USE IMPLICATIONS

PARENT MATERIAL: Parent material is the unconsolidated organic and mineral material in which soil forms. Soil inherits characteristics, such as mineralogy and texture, from its parent material. Glacial till is unsorted, nonstratified glacial drift consisting of clay, silt, sand and boulders transported and deposited by glacial ice.

SOIL CHARACTERISTICS: DEFINITIONS AND LAND USE IMPLICATIONS

PARENT MATERIAL: Parent material is the unconsolidated organic and mineral material in which soil forms. Soil inherits characteristics, such as mineralogy and texture, from its parent material. Glacial till is unsorted, nonstratified glacial drift consisting of clay, silt, sand and boulders transported and deposited by glacial ice. Glacial outwash consists of gravel, sand and silt, which is commonly stratified, deposited by glacial melt water. Alluvium is material such as sand, silt or clay deposited on land by streams. Organic deposits consist of decomposed plant and animal parts.

A soil's texture affects the ease of digging, filling and compacting and the permeability of a soil. Generally sand and gravel soils, such as outwash soils, have higher permeability rates than most glacial till soils. Soil permeability effects the cost to design and construct subsurface sanitary disposal facilities and, if too slow or too fast, may preclude their use. Outwash soils are generally excellent sources of natural aggregates (sand and gravel) suitable for commercial use, such as construction subbase material. Organic layers in soils can cause movement of structural footings. Compacted glacial till layers make excavating more difficult and may preclude the use of subsurface sanitary disposal systems or increase their design and construction costs if fill material is required.

DRAINAGE CLASS: Drainage class refers to the frequency and duration of periods of soil saturation or partial saturation during soil formation. Seven classes of natural drainage classes exist. They range from excessively drained, where water is removed from the soil very rapidly, to very poorly drained, where water is removed so slowly that free water remains at or near the soil surface during most of the growing season. Soil drainage affects the type and growth of plants found in an area. When landscaping or gardening, drainage class information can be used to assure that proposed plants are adapted to existing drainage conditions or that necessary alterations to drainage conditions (irrigation or drainage systems) are provided to assure plant survival.

HIGH WATER TABLE: High water table is the highest level of a saturated zone in the soil in most years. The water table can effect when shallow excavations can be made; the ease of the excavations, construction, and grading; and the supporting capacity of the soil. Shallow water tables may preclude the use of subsurface sanitary disposal systems or increase design and construction costs if fill material is required.

DEPTH TO BEDROCK: The depth to bedrock refers to the depth to fixed rock. Bedrock depth affects the ease and cost of construction, such as digging, filling, compacting and planting. Shallow depth bedrock may preclude the use of subsurface sanitary disposal systems or increase design and construction costs if fill material is required.

SLOPE: Generally soils with steeper slopes increase construction costs, increase the potential for erosion and sedimentation impacts, and reduce the feasibility of locating subsurface sanitary disposal facilities.

Soil Map—Westchester County, New York
(Brynwood - Armonk, NY)

Map Scale: 1:7,230 if printed on A size (8.5" x 11") sheet.

0 50 100 200 300 Meters

0 250 500 1,000 1,500 Feet

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Units

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features

- Gully
- Short Steep Slope
- Other

Political Features

- Cities

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:7,230 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 18N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Westchester County, New York
Survey Area Data: Version 8, Sep 18, 2012

Date(s) aerial images were photographed: 7/31/2006

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Wetland Functional Evaluation by Application of the Rapid Procedure for Assessing Wetland Functional Capacity

The *Rapid Assessment Procedure for Assessing Wetland Functional Capacity* was developed by Dennis Magee and Garrett Hollands (1998) to provide a method to assess functional capacity for the glaciated northeast and midwest. The methodology is used to assess the functional capacity for each of eight functions for depressional, slope, lacustrine fringe, extensive peatland, flat and riverine wetlands.

It is important to recognize this procedure is not **HGM**. **HGM** is based on the knowledge that the geomorphic setting of a wetland and its hydrology play a role in determining its characteristics and hence its functional attributes. The assessment procedure developed by Hollands and Magee offers general examples of regional subclasses which the authors believe are applicable to the northeast. To use the foundation provided by this procedure to build an **HGM** model for the glaciated northeast, adequate reference wetland data would need to be established.

In summary, the Hollands and Magee method was developed to provide a functional assessment tool based on the principles of **HGM** classification for use in situations where time and cost factors prohibit the establishment of a reference wetlands but where a rapid functional assessment is needed.

The use of the Holland and Magee method was specified in the *Brynwood Golf and Country Club Final Scope*. The model was applied to those on-site wetlands where, because of relevant vegetative characteristics, use of the model was appropriate. These include Wetlands W-1, W-2, W-5 and W-6. Results are exhibited in Table 1, Functional Capacity Scores Indices. It is important to note that the values resulting are simply a method for comparing different wetland systems and the values themselves are not relevant.

Also, as required by the Project scope, the model was run pre- and post-development for Wetland W-5, the only wetland system. This information is exhibited in Table2. Functional capacity of this wetland is increased due to the re-introduction of significant lacustrine fringe.

BRYNWOOD GOLF COURSE

Table 2

Rapid Assessment Procedure for Assessing Wetland Functional Capacity-Comparison of Pre and Post Construction Conditions

Function	Functional Capacity Index Scores	
	Pond system-pre enhancement Lacustrine (W5)	Pond system- post enhancement Lacustrine (W5)
Modification of Ground Water Discharge	1.0	1.0
Modification of Ground Water Recharge	.61	.61
Storm and Flood Water Storage	.26	.23
Modification of Stream Flow	.33	.35
Modification of Water Quality	.32	.53
Export of Detritus	.42	.57
Contribution to Abundance of Wetland Vegetation	0	.50
Contribution to Abundance of Wetland Fauna	.25	.47

BRYNWOOD GOLF COURSE

Table 1

Rapid assessment Procedure for Assessing Wetland Functional Capacity

Function	Functional Capacity Index Scores			
	Edge seep Slope (W1)	Central seep Slope (W2)	Pond system Lacustrine (W5)	Disturbed Slope (W6)
Modification of Ground Water Discharge	1.0	1.0	1.0	1.0
Modification of Ground Water Recharge	N/A	N/A	.61	N/A
Storm and Flood Water Storage	.42	.42	.26	.48
Modification of Stream Flow	.66	.66	.33	.66
Modification of Water Quality	.66	.60	.32	.60
Export of Detritus	1.0	.93	.42	.93
Contribution to Abundance of Wetland Vegetation	.6	.6	0	.46
Contribution to Abundance of Wetland Fauna	.38	.44	.25	.47

WETLAND INVENTORY DATA

Project Number: Brynwood Golf Course

Date: Feb 2013, re-observed April, 2013

Wetland Number: (W5) Lacustrine (Irrigation Ponds) / Depressional

Aerial Photo Numbers:

USGS Quadrangle: Mt. Kisco

Field Investigators: JF, VL

PART 1 - CHARACTERIZATION of WETLAND

SURFACE WATER FLOW VECTORS

Condition	Percent/Acreage	
		Depressional
		Slope
		Flat
		Extensive Peatland
	used both	Lacustrine Fringe
		Riverine
	2.87% / 4.48Ac	Lacustrine

VEGETATION TYPES

Type	Percent/Acreage
Forested Wetland	
Evergreen	
Needle-leaved	
Deciduous	
Broad-leaved	
Needle-leaved	
Scrub Shrub	
Evergreen	
Broad-leaved	
Needle-leaved	
Deciduous	
Broad-leaved	>1%
Needle-leaved	
Emergent Wetland	
Persistent	>1%
Non-persistent	
Aquatic Bed	99% / 4.44
Total	

SOIL TYPES

Histosol
- Fibric ☐
- Hemic ☐
- Sapric ☐

Mineral Hydric Soil
- Gravelly ☐
- Sandy ☐
- Silty ☒
- Clayey ☐

GEOLOGY

Surficial: Glacial till

Bedrock: Granite / Gneiss

Comments: Very little vegetation minor grasses/sedges at narrow edge. Occasional tree at edge

PLANT SPECIES

Species	OW	FW	F	FU	OU	DOM	COM	OCC	C	S	TS	LS	H
Acer rubrum			X					X	X				
Salix babylonica								X	X				
Carex comosa	X							X					X
Panicum virgatum			X					X					X
Juncus effusus		X						X					X
Phragmites aust.		X						X					X
Poa sp.				X		X							X

OW	Obligate Wetland	COM	Common
FW	Facultative Wetland	OCC	Occasional
F	Facultative	C	Canopy
FU	Facultative Upland	S	Sapling
OU	Obligate Upland	TS	Tall Shrub
DOM	Dominant	LS	Low Shrub
		H	Herb

PRE-EMPTIVE STATUS

No	Public ownership	No	Documented habitat for state or federal listed species
No	Wildlife management area	No	Regionally scarce wetland category
No	Fisheries management area	NO	Historic/archaeologic area
No	Designated State or Federal protected wetland		

WETLAND INVENTORY DATA (continued)

PART 2 - CHARACTERIZATION of MODEL VARIABLES

LANDSCAPE VARIABLES

Size:
- ☒ Small (<10 acres)
- ☐ Medium (10-100 acres)
- ☐ Large (>100 acres)

Wetland Juxtaposition:
- ☐ Connected Upstream and Downstream
- ☐ Only Connected Above
- ☒ Only Connected Below
- ☐ Other Wetlands Nearby but not Connected
- ☐ Wetland Isolated

Fire Occurence and Frequency:
- ☐ Natural; Predictable Frequency
- ☐ Natural; Sporadic Frequency
- ☐ Human-caused; Predictable
- ☐ Human-caused; Sporadic
- ☐ Rare Event
- ☒ No Evidence

Regional Scarcity:
- ☒ Not Scarce (>5% of total wetland area of region)
- ☐ Scarce (<5% of total wetland area of region)

Watershed Land Use: golf course
- ☒ > 50% urbanized
- ☐ 25-50% urbanized
- ☐ 0-25% urbanized

HYDROLOGIC VARIABLES

Surface Water Level Fluctuation of Wetland: artificially maintained
- ☐ High Fluctuation
- ☒ Low Fluctuation
- ☐ Never Inundated

Frequency of Overbank Flooding:
- ☐ Return Interval > 5 yrs.
- ☐ Return Interval 2-5 yrs.
- ☐ Return Interval 1-2 yrs.
- ☒ No Overbank Flooding

pH:
- ☐ Acid <5.5
- ☒ Circumneutral 5.5-7.4
- ☐ Alkaline >7.4
- ☐ No Water

Surficial Geologic Deposit Under Wetland
- ☐ Low Permeability Stratified Deposits
- ☐ High Permeability Stratified Deposits
- ☒ Glacial Till

Wetland Land Use:
- ☒ High Intensity (ie. agriculture) irrigation
- ☐ Moderate Intensity (ie. forestry)
- ☐ Low Intensity (ie. open space)

Wetland Water Regime:
- ☒ Wet: Perm Flooded, Intermittently Exposed, Semiperm. Flooded
- ☐ Drier: Seasonally Flooded, Temporarily Flooded, Saturated

Basin Topographic Gradient:
- ☒ High Gradient >2%
- ☐ Low Gradient <2%

Degree of Outlet Restriction:
- ☒ Restricted Outflow
- ☐ Unrestricted Outflow
- ☐ No Outflow

Ratio of Wetland Area to Watershed Area:
- ☐ High >10%
- ☒ Low <10%

Microrelief of Wetland Surface:
- ☐ Pronounced >45 cm
- ☐ Well Developed 15-45 cm
- ☐ Poorly Developed <15 cm
- ☒ Absent

Inlet/Outlet Class:
- ☐ No Inlet/No Outlet
- ☐ No Inlet/Intermittent Outlet
- ☒ No Inlet/Perennial Outlet
- ☐ Intermittent Inlet/No Outlet
- ☐ Intermittent Inlet/Intermittent Outlet
- ☐ Intermittent Outlet/Perennial Outlet
- ☐ Perennial Inlet/No Outlet
- ☐ Perennial Inlet/ Intermittent Outlet
- ☐ Perennial Inlet/Perennial Outlet

Nested Piezometer Data:
- ☐ Recharge
- ☐ Discharge
- ☐ Horizontal Flow
- ☒ Not Available

Relationship of Wetlands' Substrate Elevation to Regional Piezometric Surface:
- ☐ Piez. Surface Above or at Substrate elev.
- ☐ Piez. Surface below Substrate elev.
- ☒ Not Available

Evidence of Sedimentation:
- ☐ No Evidence Observed
- ☒ Sediment Observed on Wetland Substrate
- ☐ Fluvaquent Soils

Evidence of Seeps and Springs:
- ☒ No Seeps or Springs
- ☐ Seeps Observed
- ☐ Perennial Spring
- ☐ Intermittent Spring

SOIL VARIABLES

Soil Lacking:
- ☒

Histosol:
- ☐ Fibric
- ☐ Hemic
- ☐ Sapric

Mineral Hydric Soil:
- ☐ Gravelly
- ☐ Sandy
- ☐ Silty
- ☐ Clayey

VEGETATION VARIABLES

Vegetation Lacking:
- ☒

Dominant Wetland Type:
- ☐ Forested - Evergreen - Needle-leaved
- ☐ Forested - Deciduous - Broad-leaved
- ☐ Forested - Deciduous - Needle-leaved
- ☐ Scrub Shrub - Evergreen - Broad-leaved
- ☐ Scrub Shrub - Evergreen - Needle-leaved
- ☐ Scrub Shrub - Deciduous - Broad-leaved
- ☐ Scrub Shrub - Deciduous - Needle-leaved
- ☐ Emergent - Persistent
- ☐ Emergent - Non-persistent
- ☒ Aquatic Bed

Number of Types & Relative Proportions:

Number of Types
- ☐ Actual #
- ☐ 5
- ☐ 4
- ☐ 3
- ☐ 2
- ☒ 1

Evenness of Distribution
- ☒ Even Distribution
- ☐ Moderately Even Distribution
- ☐ Highly Uneven Distribution

Vegetation Density/Dominance:
- ☒ Sparse (0-20%)
- ☐ Low Density (20-40%)
- ☐ Medium Density (40-60%)
- ☐ High Density (60-80%)
- ☐ Very High Density (80-100%)

Vegetative Interspersion:
- ☐ High (small groupings, diverse and interspersed)
- ☐ Moderate (broken irregular rings)
- ☒ Low (large patches, concentric rings)

Number of Layers and Percent Cover:

Number of Layers
- ☐ 6 or > (actual #)
- ☐ 5
- ☐ 4
- ☐ 3
- ☐ 2
- ☒ 1

% Cover
1. submergents: 99%
2. floating:
3. moss-lichen:
4. short herb: >1%
5. tall herb:
6. dwarf shrub:
7. short shrub:
8. tall shrub:
9. sapling:
10. tree: >1%

Plant Species Diversity:
- ☒ Low 1-2 plots sampled
- ☐ Medium 3-4 plots sampled
- ☐ High 5 or more plots sampled

Proportion of Animal Food Plants:
- ☒ Low (5-25% cover)
- ☐ Medium (25-50% cover)
- ☐ High (>50% cover)

Cover Distribution: No cover of veg.
- ☐ Continuous Cover
- ☐ Small Scattered Patches
- ☐ 1 or More Large Patches; Parts of Site Open
- ☒ Solitary, Scattered Stems

Dead Woody Material:
- ☐ Abrundant (>50 of wetland surface)
- ☐ Moderately Abrundant (25-50% of surface)
- ☒ Low Abrundance (0-25% of surface)

Interspersion of Cover and Open Water:
- ☐ 26-75% Scattered or Peripheral
- ☐ >75% Scattered or Peripheral
- ☐ <25% Scattered or Peripheral
- ☒ 100% Cover or Open Water

Stream Sinuosity: N/A
- ☐ Highly Convoluted (index 1.50 or >)
- ☐ Moderately Convoluted (index 1.25-1.50)
- ☐ Straight/Slightly Irreg. (index) 1.10-1.25

Presence of Islands:
- ☐ Several to Many
- ☒ One or Few
- ☐ Absent

2.9.1 Modification of Ground Water Discharge

VARIABLES	CONDITIONS HGM TYPES:	D	S	R	F
		WEIGHTS			
Indicators of Disfunction					
• Inlet/Outlet Class	• perennial inlet/no outlet	0	0	0	0
• Nested Piezometer Data	• recharge condition	0	0	0	0
• Relationship to Regional Piezo-metric Surface	• wetland substrate elevation above piezometric surface	0	0	0	0
Direct Indicators of Function					
• Presence of Springs and Seeps	• evidence of perennial seeps or springs	18	15	15	18
• Nested Piezometer Data	• discharge condition	18	15	15	18
• Relationship to Regional Peizometeric Surface	• wetland substrate elevation below piezometric surface	18	15	15	18
• Inlet/Outlet Class	• no inlet/perennial outlet	$\boxed{18}$	15	15	18
Primary Variables					
• Microrelief of Wetland Surface	• pronounced	3	3	3	3
	• well developed	2	2	2	2
	• poorly developed	1	1	1	1
	• absent	0	0	0	0
• Inlet/Outlet Class	• perennial inlet/perennial outlet	3	3	0	3
	• intermittent inlet/perennial outlet	2	2	0	2
	• all other classes	0	0	0	0
• pH	• alkaline	3	3	3	3
	• circumneutral	2	2	2	2
	• acid	0	0	0	0
	• no water present	0	0	0	0
• Surficial Geologic Deposit Under Wetland	• high permeability stratified deposits	3	3	3	3
	• low permeability stratified deposits	2	2	2	2
	• glacial till	1	1	1	1
• Wetland Water Regime	• wet; permanently flooded, intermittently exposed, semipermanently flooded	3	0	3	3
	• drier; seasonally flooded, temporarily flooded, saturated	1	0	1	1

(continued)

2.9.1 Modification of Ground Water Discharge (Continued)

VARIABLES	CONDITIONS	HGM TYPES:	D	S	R	F
			WEIGHTS			
• Soil Type	• histosol		3	3	3	3
	• mineral hydric soil		1	1	1	1
			–	–	–	–
		Total Score:	18			
		Model Range:	3-18	2-15	3-15	3-18
		Functional Capacity Index:	Total Score / 18	— / 15	— / 15	— / 18
		Index Range:	0.19-1.0	0.16-1.0	0.22-1.0	0.19-1.0 = 1

Note: This model can be applied to both year long and seasonal discharge wetlands.

If the wetland is seasonally fluctuating between recharge and discharge, then reduce the above score by one half (1/2), because the wetland only functions in a discharge mode for roughly half the year.

2.9.2 Modification of Ground Water Recharge

VARIABLES	CONDITIONS	HGM TYPES:	D	L	EP	R	F
			WEIGHTS				
Indicators of Disfunction							
• Inlet/Outlet Class	• no inlet/perennial outlet; intermittent inlet/perennial outlet		0				0
• Nested Piezometer Data	• discharge condition		0	0	0	0	0
• Relationship to Regional Piezometric Surface	• wetland substrate elevation above or at piezometric surface		0	0	0	0	0
• Presence of Seeps and Springs	• presence of seeps or springs		0	0	0	0	0

(continued)

2.9.2 Modification of Ground Water Recharge (Continued)

VARIABLES	CONDITIONS HGM TYPES:	D	L	EP	R	F
		WEIGHTS				
Direct Indicators of Function						
• Inlet/Outlet Class	• perennial inlet/no outlet	21				21
• Nested Piezometer Data	• recharge condition	21				21
• Relationship to Regional Peizometeric Surface	• wetland substrate elevation below piezometric surface	21				21
Primary Variables						
• Microrelief of Wetland Surface	• Poorly Developed	3	3	1	3	3
	• Absent	3	3	1	3	3
	• Well Developed	2	2	2	2	2
	• Pronounced	1	1	3	1	1
• Inlet/Outlet Class	• Perennial Inlet/Intermittent Outlet	3	0	0	0	3
	• All Other Classes	0	0	0	0	0
• pH	• Acid	3	3	3	3	3
	• Circumneutral	2	2	2	2	2
	• Alkaline	1	1	1	1	1
	• No water present	0	0	0	0	0
• Surficial Geologic Deposit Under Wetland	• Glacial Till	3	1	1	1	3
	• Low Permeability Stratified Deposits	2	2	2	2	2
	• High Permeability Stratified Deposits	1	3	3	3	1
• Surface Water Level Fluctuation of the Wetland	• High Fluctuation	3	3	0	3	3
	• Low Fluctuation	2	2	0	2	2
	• Never Inundated	1	1	0	1	1
• Wetland Water Regime	• Drier: Seasonally Flooded, Temporarily Flooded, Saturated	3	3	0	3	3
	• Wet: Permanently Flooded, Intermittently Exposed, Semipermanently Flooded	1	1	0	1	1
• Soil Type	• Gravelly or Sandy Mineral Hydric	3	3	0	3	3
	• Silty or Clayey Mineral Hydric	2	2	0	2	2
	• Sapric Histosol	1	1	0	1	1
	• Fibric or Hemic Histosol	0	0	3	0	0
	Total Score:	13	11			
	Model Range:	4-21	4-18	2-12	4-18	4-21
	Functional Capacity Index:	Total Score / 21	11 / 18	/ 12	/ 18	/ 21
	Index Range:	0.19-1.0	0.22-1.0	0.16-1.0	0.22-1.0	0.19-1.0

= .61 For L
.619 For D

Note: This model should be applied to both year long and seasonal recharge wetlands.

If the wetland is seasonally fluctuating between recharge and discharge, then reduce the above score by one half (1/2), because the wetland only functions in a recharge mode for roughly half the year.

2.9.3 Storm and Flood-Water Storage

VARIABLES	CONDITIONS	HGM TYPES: D	S	L	EP	R	F
		WEIGHTS					
Indicators of disfunction	none						
Direct Indicators of Function	no outlet	27	21				30
Primary Variables							
• Inlet/Outlet Class	• perennial inlet/intermittent outlet	3	3	0	0	0	3
	• intermittent inlet/intermittent outlet	2	2	0	0	0	2
	• no inlet/intermittent outlet	1	1	0	0	0	1
	• non inlet/perennial outlet	1	1	0	0	0	1
	• intermittent inlet/perennial outlet	1	1	0	0	0	1
	• perennial inlet/perennial outlet	1	1	0	0	0	1
• Degree of Outlet Restriction	• restricted	3	0	0	0	0	3
	• unrestricted	0	0	0	0	0	0
• Basin Topographic Gradient	• low gradient	3	3	0	3	3	3
	• high gradient	1	1	0	0	1	1
• Wetland Water Regime	• Drier: seasonally flooded, temporarily flooded, saturated	3	3	3	0	3	3
	• Wet: permanently flooded, intermittently exposed, semipermanently flooded	1	1	1	0	1	1
• Surface Water Level Fluctuation of the Wetland	• high fluctuation	3	0	3	0	3	3
	• low fluctuation	2	0	2	0	2	2
	• never inundated	0	0	0	0	0	0
• Ratio of Wetland Area to Watershed Area	• large	3	3	3	0	3	3
	• small	1	1	1	0	1	1
• Microrelief of Wetland Surface	• pronounced	3	3	3	3	3	3
	• well developed	2	2	2	2	2	2
	• poorly developed	1	1	1	1	1	1
	• absent	0	0	0	0	0	0
• Frequency of Overbank Flooding	• overbank flooding absent	0	0	0	0	0	0
	• return interval of >5 yrs	0	0	1	0	1	1
	• return interval of 2-5 yrs	0	0	2	0	2	2
	• return interval of 1-2 yrs	0	0	3	0	3	3
• Vegetation Density/Dominance	• high/very high	3	3	3	3	3	3
	• moderate	2	2	2	2	2	2
	• sparse/low	1	1	1	1	1	1
	• no vegetation	0	0	0	0	0	0

(continued)

2.9.3 Storm and Flood-Water Storage (Continued)

VARIABLES	CONDITIONS	HGM TYPES:	D	S	L	EP	R	F
			WEIGHTS					
• Dead Woody Material	• abundant		3	3	3	3	3	3
	• moderately abundant		2	2	2	2	2	2
	• sparse		1	1	1	1	1	1
	• absent		0	0	0	0	0	0
		Total Score:	9		4			
		Model Range:	4-27	4-21	2-21	0-12	3-24	4-30
		Functional Capacity Index:	Total Score / 27	— / 21	4 / 21	— / 12	— / 24	— / 30
		Index Range:	0.15-1.0	0.19-1.0	0.09-1.0	0-1.0	0.12-1.0	0.13-1.0

=.33
=.19
Avg = .26

2.9.4 Modification of Stream Flow
(This model is identical for all HGM types)

VARIABLES	CONDITIONS	WEIGHTS
Indicators of Disfunction	no outlet	0
Direct Indicators of Function	none	

Primary Variables .26 = low   1 = high

Storm and Flood Water Storage Function Model Score			Modification of Groundwater Discharge Function Model Score			
High*	3	x	High	3	=	9
Mod	2	x	High	3	=	6
Low	1	x	High	3	=	$\boxed{3}$
High	3	x	Mod	2	=	6
Mod	2	x	Mod	2	=	4
Low	1	x	Mod	2	=	2
High	3	x	Low	1	=	3
Mod	2	x	Low	1	=	2
Low	1	x	Low	1	=	1

Total Score:

Model Range: 1-9

Functional Capacity Index: Total Score / 9

Index Range: 0.11-1.0

3/9 = .33

*High = FCI of 0.67-1.0, Mod = FCI of 0.34-0.66, Low = FCI of 0-0.33 for the Storm and Flood Water Storage and Modification of Ground Water Discharge Function Model Scores.

2.9.5 Modification of Water Quality

VARIABLES	CONDITIONS	HGM TYPES: D	S	L	EP	R	F
		WEIGHTS					
Indicators of disfunction	none						
Direct Indicators of Function	evidence of sedimentation	18	15	12	12	12	18
Primary Variables							
• Wetland Land Use	• low intensity	3	3	3	3	3	3
	• moderate intensity	2	2	2	2	2	2
	• high intensity	1	1	1	1	1	1
• Degree of Outlet Restriction	• restricted outflow	3	0	0	0	0	3
	• no outlet	2	0	0	0	0	2
	• unrestricted outflow	1	0	0	0	0	1
• Inlet/Outlet Type	• no outlet	3	3	0	0	0	3
	• intermittent outlet	2	2	0	0	0	2
	• perennial outlet	1	1	0	0	0	1
• Dominant Wetland Type	• forested wetland	3	3	3	3	3	3
	• scrub-shrub	2	2	2	2	2	2
	• emergent wetland	2	2	2	2	2	2
	• aquatic bed	1	0	0	0	0	0
	• no vegetation	0	0	0	0	0	0
• Cover Distribution	• forming a continuous cover	3	3	3	3	3	3
	• growing in small scattered patches	2	2	2	2	2	2
	• one or more large patches	1	1	1	1	1	1
	• solitary scattered stems	1	1	1	1	1	1
	• no vegetation	0	0	0	0	0	0
• Soil Type	• histosol or clayey soil	3	3	3	3	3	3
	• silty soil	2	2	2	0	2	2
	• sandy or gravelly soil	1	1	1	0	1	1
	Total Score:	7		3			
	Model Range:	4-18	3-15	2-12	1-12	2-12	4-18
	Functional Capacity Index:	Total Score / 18	/ 15	3 / 12	/ 12	/ 12	/ 18
	Index Range:	0.22-1.0	0.20-1.0	0.16-1.0	0.8-1.0	0.16-1.0	0.22-1.0

= .38 = .25

Avg = .32

2.9.6 Export of Detritus

VARIABLES	CONDITIONS / HGM TYPES:	D	S	L	EP	R	F
		WEIGHTS					
Indicators of disfunction	no outlet	0	0		0		0
Direct Indicators of Function	none						
Primary Variables							
• Wetland Land Use	• moderate intensity	3	3	3	3	3	3
	• low intensity	2	2	2	2	2	2
	• high intensity	1	1	1	1	1	1
• Degree of Outlet Restriction	• unrestricted outflow	3	0	0	0	0	3
	• restricted outflow	1	0	0	0	0	1
• Inlet/Outlet Class	• perennial outlet	3	3	0	0	0	3
	• intermittent outlet	1	1	0	0	0	1
• Wetland Water Regime	• drier: seasonally flooded, temporarily flooded, saturated	3	3	3	0	3	3
	• wet: permanently flooded, intermittently exposed, semipermanently flooded	1	1	1	1	1	1
• Vegetation Density/Dominance	• high/very high	3	3	3	3	3	3
	• medium	2	2	2	2	2	2
	• sparse/low	1	1	1	1	1	1
	• no vegetation	0	0	0	0	0	0
• Soil Type	• mineral hydric soil	3	3	3	3	3	3
	• histosol	1	1	1	1	1	1
	Total Score:	9		4			
	Model Range:	5-18	4-15	3-12	2-10	3-12	5-18
	Functional Capacity Index:	Total Score / 18	— / 15	4 / 12	— / 10	— / 12	— / 18
	Index Range:	0.27-1.0	0.26-1.0	0.25-1.0	0.20-1.0	0.25-1.0	0.27-1.0

=.5 =.33

Avg = .42

2.9.7 Contribution to Abundance and Diversity of Wetland Vegetation
(This model is identical for all HGM types)

VARIABLES		CONDITIONS	WEIGHTS
Indicators of Disfunction		no vegetation	$\boxed{0}$
Direct Indicators of Function		none	
Primary Variables			
•	Plant Species Diversity	• high diversity • medium diversity • low diversity	5 3 1
•	Vegetation Density/Dominance	• high/very high • medium • sparse/low	5 3 1
•	Wetland Juxtaposition	• connected upstream and downstream • connected above or below • other wetlands nearby but not connected (400 m or closer) • isolated	5 3 1 0

Total Score:	
Model Range:	2-15
Functional Capacity Index:	= Total Score / 15
Index Range:	0.13-1.0

= 0

2.9.8 Contribution to Abundance and Diversity of Wetland Fauna

(This model is identical for all HGM types except Slope Wetlands for which "Interspersion of Vegetation Cover and Open Water" does not apply))

VARIABLES	CONDITIONS	WEIGHTS
Direct Indicators of Disfunction	none	
Direct Indicators of Function	none	
Primary Variables		
• Watershed Land Use	• low intensity (0-25% urbanized)	3
	• moderate intensity (25-50% urbanized)	2
	• high intensity (>50% urbanized)	1
• Wetland Land Use	• low intensity	3
	• moderate intensity	2
	• high intensity	1
• Wetland Water Regime	• wet: permanently flooded, intermittently exposed, semipermanently flooded	3
	• drier: seasonally flooded, temporarily flooded, saturated	1
• Microrelief of Wetland Surface	• pronounced	3
	• well developed	2
	• poorly developed	1
	• absent	0
• Number of Wetland types and Relative Proportions	• 5 or more types	3
	• 3-4 types	2
	• 1-2 types	1
	• no vegetation	0
	• even distribution	3
	• moderately even distribution	2
	• highly uneven distribution	1
	• no vegetation	0
• Vegetation Interspersion	• high interspersion	3
	• moderate interspersion	2
	• low interspersion	1
	• no vegetation	0
• Number of Layers and Percent Cover	• 5 or more layers	3
	• 3-4 layers	2
	• 1-2 layers	1
	• no vegetation	0
	• layers well developed (>50% cover)	3
	• layers with moderate cover (26-50% cover)	2
		1
	• layers poorly distinguishable (<25% cover)	0
	• no vegetation	0

(continued)

WETLAND INVENTORY DATA

Project Number: Brynwood Golf Course **Date:** Feb 2013, re-observed April, 2013

Wetland Number: (WL) Slope wetland – southern property edge

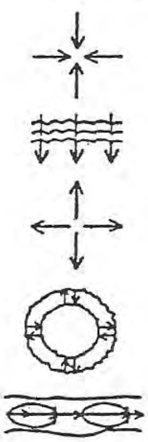
Aerial Photo Numbers: ______

USGS Quadrangle: Mt. Kisco

Field Investigators: J.F, VL

PART 1 - CHARACTERIZATION of WETLAND

SURFACE WATER FLOW VECTORS



Condition	Percent/Acreage	
	____	Depressional
	.23% / .36 AC.	Slope (circled) / Flat
	____	Extensive Peatland
	____	Lacustrine Fringe
	____	Riverine

VEGETATION TYPES

Type	Percent/Acreage
Forested Wetland	
Evergreen	
Needle-leaved	____
Deciduous	
Broad-leaved	____
Needle-leaved	____
Scrub Shrub	
Evergreen	
Broad-leaved	____
Needle-leaved	____
Deciduous	
Broad-leaved	>1% / .002
Needle-leaved	____
Emergent Wetland	
Persistent	99% / .168AC
Non-persistent	____
Aquatic Bed	____
Total	.17AC

SOIL TYPES

Histosol
- Fibric ☐
- Hemic ☐
- Sapric ☐

Mineral Hydric Soil
- Gravelly ☐
- Sandy ☐
- Silty ☒
- Clayey ☐

GEOLOGY

Surficial: GLACIAL TILL

Bedrock: GRANITE / GNEISS

Comments: Mostly all skunk cabbage, scattered Lindera bushes

PLANT SPECIES

Species	OW	FW	F	FU	OU	DOM	COM	OCC	C	S	TS	LS	H
Symplocarpus foetidus	☒	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☒
Lindera benzoin	☐	☒	☐	☐	☐	☐	☐	☒	☐	☐	☒	☐	☐

OW	Obligate Wetland	COM	Common
FW	Facultative Wetland	OCC	Occasional
F	Facultative	C	Canopy
FU	Facultative Upland	S	Sapling
OU	Obligate Upland	TS	Tall Shrub
DOM	Dominant	LS	Low Shrub
		H	Herb

PRE-EMPTIVE STATUS

NO	Public ownership	NO	Documented habitat for state or federal listed species
NO	Wildlife management area	NO	Regionally scarce wetland category
NO	Fisheries management area	NO	Historic/archaeologic area
NO	Designated State or Federal protected wetland		

WETLAND INVENTORY DATA (continued)

PART 2 - CHARACTERIZATION of MODEL VARIABLES

LANDSCAPE VARIABLES

e:
- [x] Small (<10 acres)
- [ ] Medium (10-100 acres)
- [ ] Large (>100 acres)

tland Juxtaposition:
- [ ] Connected Upstream and Downstream
- [ ] Only Connected Above
- [x] Only Connected Below
- [ ] Other Wetlands Nearby but not Connected
- [ ] Wetland Isolated

e Occurence and Frequency:
- [ ] Natural; Predictable Frequency
- [ ] Natural; Sporadic Frequency
- [ ] Human-caused; Predictable
- [ ] Human-caused; Sporadic
- [ ] Rare Event
- [x] No Evidence

ional Scarcity:
- [x] Not Scarce (>5% of total wetland area of region)
- [ ] Scarce (<5% of total wetland area of region)

tershed Land Use:
- [x] > 50% urbanized
- [ ] 25-50% urbanized
- [ ] 0-25% urbanized

HYDROLOGIC VARIABLES

ace Water Level Fluctuation of Wetland:
- [ ] High Fluctuation
- [x] Low Fluctuation
- [ ] Never Inundated

Irrigation adjacent

uency of Overbank Flooding:
- [ ] Return Interval > 5 yrs.
- [ ] Return Interval 2-5 yrs.
- [ ] Return Interval 1-2 yrs.
- [x] No Overbank Flooding

- [ ] Acid <5.5
- [x] Circumneutral 5.5-7.4
- [ ] Alkaline >7.4
- [ ] No Water

icial Geologic Deposit Under Wetland
- [ ] Low Permeability Stratified Deposits
- [ ] High Permeability Stratified Deposits
- [x] Glacial Till

land Land Use:
- [ ] High Intensity (ie. agriculture)
- [x] Moderate Intensity (ie. forestry)
- [ ] Low Intensity (ie. open space)

land Water Regime:
- [ ] Wet: Perm Flooded, Intermittently Exposed, Semiperm. Flooded
- [x] Drier: Seasonally Flooded, Temporarily Flooded, Saturated

n Topographic Gradient:
- [x] High Gradient >2%
- [ ] Low Gradient <2%

ee of Outlet Restriction:
- [ ] Restricted Outflow
- [x] Unrestricted Outflow
- [ ] No Outflow

o of Wetland Area to Watershed Area:
- [ ] High >10%
- [x] Low <10%

Microrelief of Wetland Surface:
- [ ] Pronounced >45 cm
- [ ] Well Developed 15-45 cm
- [x] Poorly Developed <15 cm
- [ ] Absent

Inlet/Outlet Class:
- [ ] No Inlet/No Outlet
- [ ] No Inlet/Intermittent Outlet
- [ ] No Inlet/Perennial Outlet
- [ ] Intermittent Inlet/No Outlet
- [ ] Intermittent Inlet/Intermittent Outlet
- [ ] Intermittent Outlet/Perennial Outlet
- [ ] Perennial Inlet/No Outlet
- [ ] Perennial Inlet/ Intermittent Outlet
- [x] Perennial Inlet/Perennial Outlet

Nested Piezometer Data:
- [ ] Recharge
- [ ] Discharge
- [ ] Horizontal Flow
- [x] Not Available

Relationship of Wetlands' Substrate Elevation to Regional Piezometric Surface:
- [ ] Piez. Surface Above or at Substrate elev.
- [ ] Piez. Surface below Substrate elev.
- [x] Not Available

Evidence of Sedimentation:
- [x] No Evidence Observed
- [ ] Sediment Observed on Wetland Substrate
- [ ] Fluvaquent Soils

Evidence of Seeps and Springs:
- [ ] No Seeps or Springs
- [x] Seeps Observed
- [ ] Perennial Spring
- [ ] Intermittent Spring

SOIL VARIABLES

Soil Lacking:
- [ ]

Histosol:
- [ ] Fibric
- [ ] Hemic
- [ ] Sapric

Mineral Hydric Soil:
- [ ] Gravelly
- [ ] Sandy
- [x] Silty
- [ ] Clayey

VEGETATION VARIABLES

Vegetation Lacking:
- [ ]

Dominant Wetland Type:
- [ ] Forested - Evergreen - Needle-leaved
- [ ] Forested - Deciduous - Broad-leaved
- [ ] Forested - Deciduous - Needle-leaved
- [ ] Scrub Shrub - Evergreen - Broad-leaved
- [ ] Scrub Shrub - Evergreen - Needle-leaved
- [ ] Scrub Shrub - Deciduous - Broad-leaved
- [ ] Scrub Shrub - Deciduous - Needle-leaved
- [x] Emergent - Persistent
- [ ] Emergent - Non-persistent
- [ ] Aquatic Bed

Number of Types & Relative Proportions:

Number of Types
- [ ] Actual #
- [ ] 5
- [ ] 4
- [ ] 3
- [ ] 2
- [x] 1

Evenness of Distribution
- [x] Even Distribution
- [ ] Moderately Even Distribution
- [ ] Highly Uneven Distribution

Vegetation Density/Dominance:
- [ ] Sparse (0-20%)
- [ ] Low Density (20-40%)
- [ ] Medium Density (40-60%)
- [x] High Density (60-80%)
- [ ] Very High Density (80-100%)

Vegetative Interspersion:
- [ ] High (small groupings, diverse and interspersed)
- [ ] Moderate (broken irregular rings)
- [x] Low (large patches, concentric rings)

Number of Layers and Percent Cover:

Number of Layers
- [ ] 6 or > (actual #)
- [ ] 5
- [ ] 4
- [ ] 3
- [x] 2
- [ ] 1

% Cover
1. submergents:
2. floating:
3. moss-lichen:
4. short herb: 99%
5. tall herb:
6. dwarf shrub:
7. short shrub: 1%
8. tall shrub:
9. sapling:
10. tree:

Plant Species Diversity:
- [x] Low 1-2 plots sampled
- [ ] Medium 3-4 plots sampled
- [ ] High 5 or more plots sampled

Proportion of Animal Food Plants:
- [x] Low (5-25% cover)
- [ ] Medium (25-50% cover)
- [ ] High (>50% cover)

Cover Distribution:
- [x] Continuous Cover
- [ ] Small Scattered Patches
- [ ] 1 or More Large Patches; Parts of Site Open
- [ ] Solitary, Scattered Stems

Dead Woody Material:
- [ ] Abrundant (>50 of wetland surface)
- [ ] Moderately Abrundant (25-50% of surface)
- [x] Low Abrundance (0-25% of surface)

Interspersion of Cover and Open Water:
- [ ] 26-75% Scattered or Peripheral
- [ ] >75% Scattered or Peripheral
- [ ] <25% Scattered or Peripheral
- [x] 100% Cover or Open Water

NA

Stream Sinuosity:
- [ ] Highly Convoluted (index 1.50 or >)
- [ ] Moderately Convoluted (index 1.25-1.50)
- [x] Straight/Slightly Irreg. (index) 1.10-1.25

Presence of Islands:
- [ ] Several to Many
- [ ] One or Few
- [x] Absent

2.9.1 Modification of Ground Water Discharge

VARIABLES	CONDITIONS HGM TYPES:	WEIGHTS D	S	R	F
Indicators of Disfunction					
• Inlet/Outlet Class	• perennial inlet/no outlet	0	0	0	0
• Nested Piezometer Data	• recharge condition	0	0	0	0
• Relationship to Regional Piezo-metric Surface	• wetland substrate elevation above piezometric surface	0	0	0	0
Direct Indicators of Function					
• Presence of Springs and Seeps	• evidence of perennial seeps or springs	18	15	15	18
• Nested Piezometer Data	• discharge condition	18	15	15	18
• Relationship to Regional Peizometeric Surface	• wetland substrate elevation below piezometric surface	18	15	15	18
• Inlet/Outlet Class	• no inlet/perennial outlet	18	15	15	18
Primary Variables					
• Microrelief of Wetland Surface	• pronounced	3	3	3	3
	• well developed	2	2	2	2
	• poorly developed	1	1	1	1
	• absent	0	0	0	0
• Inlet/Outlet Class	• perennial inlet/perennial outlet	3	3	0	3
	• intermittent inlet/perennial outlet	2	2	0	2
	• all other classes	0	0	0	0
• pH	• alkaline	3	3	3	3
	• circumneutral	2	2	2	2
	• acid	0	0	0	0
	• no water present	0	0	0	0
• Surficial Geologic Deposit Under Wetland	• high permeability stratified deposits	3	3	3	3
	• low permeability stratified deposits	2	2	2	2
	• glacial till	1	1	1	1
• Wetland Water Regime	• wet; permanently flooded, inter-mittently exposed, semipermanently flooded	3	0	3	3
	• drier; seasonally flooded, tempo-rarily flooded, saturated	1	0	1	1

(continued)

2.9.1 Modification of Ground Water Discharge (Continued)

VARIABLES	CONDITIONS	HGM TYPES:	D	S	R	F
			WEIGHTS			
• Soil Type	• histosol		3	3	3	3
	• mineral hydric soil		1	1	1	1
			—	—	—	—
		Total Score:				
		Model Range:	3-18	2-15	3-15	3-18
		Functional Capacity Index:	Total Score / 18	15 / 15	— / 15	— / 18
		Index Range:	0.19-1.0	0.16-1.0	0.22-1.0	0.19-1.0

Note: This model can be applied to both year long and seasonal discharge wetlands.

If the wetland is seasonally fluctuating between recharge and discharge, then reduce the above score by one half (1/2), because the wetland only functions in a discharge mode for roughly half the year.

2.9.2 Modification of Ground Water Recharge

N/A to SLOPE

VARIABLES	CONDITIONS	HGM TYPES:	D	L	EP	R	F
			WEIGHTS				
Indicators of Disfunction							
• Inlet/Outlet Class	• no inlet/perennial outlet; intermittent inlet/perennial outlet		0				0
• Nested Piezometer Data	• discharge condition		0	0	0	0	0
• Relationship to Regional Piezometric Surface	• wetland substrate elevation above or at piezometric surface		0	0	0	0	0
• Presence of Seeps and Springs	• presence of seeps or springs		0	0	0	0	0

(continued)

2.9.2 Modification of Ground Water Recharge (Continued)

VARIABLES	CONDITIONS HGM TYPES:	D	L	EP	R	F
		WEIGHTS				
Direct Indicators of Function						
• Inlet/Outlet Class	• perennial inlet/no outlet	21				21
• Nested Piezometer Data	• recharge condition	21				21
• Relationship to Regional Peizometeric Surface	• wetland substrate elevation below piezometric surface	21				21
Primary Variables						
• Microrelief of Wetland Surface	• Poorly Developed	3	3	1	3	3
	• Absent	3	3	1	3	3
	• Well Developed	2	2	2	2	2
	• Pronounced	1	1	3	1	1
• Inlet/Outlet Class	• Perennial Inlet/Intermittent Outlet	3	0	0	0	3
	• All Other Classes	0	0	0	0	0
• pH	• Acid	3	3	3	3	3
	• Circumneutral	2	2	2	2	2
	• Alkaline	1	1	1	1	1
	• No water present	0	0	0	0	0
• Surficial Geologic Deposit Under Wetland	• Glacial Till	3	1	1	1	3
	• Low Permeability Stratified Deposits	2	2	2	2	2
	• High Permeability Stratified Deposits	1	3	3	3	1
• Surface Water Level Fluctuation of the Wetland	• High Fluctuation	3	3	0	3	3
	• Low Fluctuation	2	2	0	2	2
	• Never Inundated	1	1	0	1	1
• Wetland Water Regime	• Drier: Seasonally Flooded, Temporarily Flooded, Saturated	3	3	0	3	3
	• Wet: Permanently Flooded, Intermittently Exposed, Semipermanently Flooded	1	1	0	1	1
• Soil Type	• Gravelly or Sandy Mineral Hydric	3	3	0	3	3
	• Silty or Clayey Mineral Hydric	2	2	0	2	2
	• Sapric Histosol	1	1	0	1	1
	• Fibric or Hemic Histosol	0	0	3	0	0
	Total Score:					
	Model Range:	4-21	4-18	2-12	4-18	4-21
	Functional Capacity Index:	Total Score / 21	18	12	18	21
	Index Range:	0.19-1.0	0.22-1.0	0.16-1.0	0.22-1.0	0.19-1.0

N/A

Note: This model should be applied to both year long and seasonal recharge wetlands.

If the wetland is seasonally fluctuating between recharge and discharge, then reduce the above score by one half (1/2), because the wetland only functions in a recharge mode for roughly half the year.

2.9.3 Storm and Flood-Water Storage

VARIABLES	CONDITIONS	HGM TYPES: D	S	L	EP	R	F
		WEIGHTS					
Indicators of disfunction	none						
Direct Indicators of Function	no outlet	27	21				30
Primary Variables							
• Inlet/Outlet Class	• perennial inlet/intermittent outlet	3	3	0	0	0	3
	• intermittent inlet/intermittent outlet	2	2	0	0	0	2
	• no inlet/intermittent outlet	1	1	0	0	0	1
	• non inlet/perennial outlet	1	1	0	0	0	1
	• intermittent inlet/perennial outlet	1	1	0	0	0	1
	• perennial inlet/perennial outlet	1	1	0	0	0	1
• Degree of Outlet Restriction	• restricted	3	0	0	0	0	3
	• unrestricted	0	0	0	0	0	0
• Basin Topographic Gradient	• low gradient	3	3	0	3	3	3
	• high gradient	1	1	0	0	1	1
• Wetland Water Regime	• Drier: seasonally flooded, temporarily flooded, saturated	3	3	3	0	3	3
	• Wet: permanently flooded, intermittently exposed, semipermanently flooded	1	1	1	0	1	1
• Surface Water Level Fluctuation of the Wetland	• high fluctuation	3	0	3	0	3	3
	• low fluctuation	2	0	2	0	2	2
	• never inundated	0	0	0	0	0	0
• Ratio of Wetland Area to Watershed Area	• large	3	3	3	0	3	3
	• small	1	1	1	0	1	1
• Microrelief of Wetland Surface	• pronounced	3	3	3	3	3	3
	• well developed	2	2	2	2	2	2
	• poorly developed	1	1	1	1	1	1
	• absent	0	0	0	0	0	0
• Frequency of Overbank Flooding	• overbank flooding absent	0	0	0	0	0	0
	• return interval of >5 yrs	0	0	1	0	1	1
	• return interval of 2-5 yrs	0	0	2	0	2	2
	• return interval of 1-2 yrs	0	0	3	0	3	3
• Vegetation Density/Dominance	• high/very high	3	3	3	3	3	3
	• moderate	2	2	2	2	2	2
	• sparse/low	1	1	1	1	1	1
	• no vegetation	0	0	0	0	0	0

(continued)

2.9.3 Storm and Flood-Water Storage (Continued)

VARIABLES	CONDITIONS	HGM TYPES:	D	S	L	EP	R	F
			WEIGHTS					
• Dead Woody Material	• abundant		3	3	3	3	3	3
	• moderately abundant		2	2	2	2	2	2
	• sparse		1	1	1	1	1	1
	• absent		0	0	0	0	0	0
			—	—	—	—	—	—
		Total Score:		9				
		Model Range:	4-27	4-21	2-21	0-12	3-24	4-30
		Functional Capacity Index:	Total Score / 27	9 / 21	— / 21	— / 12	— / 24	— / 30
		Index Range:	0.15-1.0	0.19-1.0	0.09-1.0	0-1.0	0.12-1.0	0.13-1.0

.42

2.9.4 Modification of Stream Flow
(This model is identical for all HGM types)

VARIABLES	CONDITIONS	WEIGHTS
Indicators of Disfunction	no outlet	0
Direct Indicators of Function	none	

Primary Variables .42 = MOD.

1 = HIGH

Storm and Flood Water Storage Function Model Score			Modification of Groundwater Discharge Function Model Score			
High*	3	x	High	3	=	9
Mod	2	x	High	3	=	$\boxed{6}$
Low	1	x	High	3	=	3
High	3	x	Mod	2	=	6
Mod	2	x	Mod	2	=	4
Low	1	x	Mod	2	=	2
High	3	x	Low	1	=	3
Mod	2	x	Low	1	=	2
Low	1	x	Low	1	=	1

Total Score:

Model Range: 1-9

Functional Capacity Index: Total Score / 9 $\frac{6}{9}$ = .66

Index Range: 0.11-1.0

*High = FCI of 0.67-1.0, Mod = FCI of 0.34-0.66, Low = FCI of 0-0.33 for the Storm and Flood Water Storage and Modification of Ground Water Discharge Function Model Scores.

2.9.5 Modification of Water Quality

VARIABLES	CONDITIONS	HGM TYPES:	D	S	L	EP	R	F
			WEIGHTS					
Indicators of disfunction	none							
Direct Indicators of Function	evidence of sedimentation		18	15	12	12	12	18
Primary Variables								
• Wetland Land Use	• low intensity		3	3	3	3	3	3
	• moderate intensity		2	2	2	2	2	2
	• high intensity		1	1	1	1	1	1
• Degree of Outlet Restriction	• restricted outflow		3	0	0	0	0	3
	• no outlet		2	0	0	0	0	2
	• unrestricted outflow		1	0	0	0	0	1
• Inlet/Outlet Type	• no outlet		3	3	0	0	0	3
	• intermittent outlet		2	2	0	0	0	2
	• perennial outlet		1	1	0	0	0	1
• Dominant Wetland Type	• forested wetland		3	3	3	3	3	3
	• scrub-shrub		2	2	2	2	2	2
	• emergent wetland		2	2	2	2	2	2
	• aquatic bed		1	0	0	0	0	0
	• no vegetation		0	0	0	0	0	0
• Cover Distribution	• forming a continuous cover		3	3	3	3	3	3
	• growing in small scattered patches		2	2	2	2	2	2
	• one or more large patches		1	1	1	1	1	1
	• solitary scattered stems		1	1	1	1	1	1
	• no vegetation		0	0	0	0	0	0
• Soil Type	• histosol or clayey soil		3	3	3	3	3	3
	• silty soil		2	2	2	0	2	2
	• sandy or gravelly soil		1	1	1	0	1	1
		Total Score:	—	— 10	—	—	—	—
		Model Range:	4-18	3-15	2-12	1-12	2-12	4-18
		Functional Capacity Index:	Total Score / 18	10 / 15	— / 12	— / 12	— / 12	— / 18
		Index Range:	0.22-1.0	0.20-1.0	0.16-1.0	0.8-1.0	0.16-1.0	0.22-1.0

.66

2.9.6 Export of Detritus

VARIABLES	CONDITIONS	HGM TYPES:	WEIGHTS D	S	L	EP	R	F
Indicators of disfunction	no outlet		0	0		0		0
Direct Indicators of Function	none							
Primary Variables								
• Wetland Land Use	• moderate intensity		3	3	3	3	3	3
	• low intensity		2	2	2	2	2	2
	• high intensity		1	1	1	1	1	1
• Degree of Outlet Restriction	• unrestricted outflow		3	0	0	0	0	3
	• restricted outflow		1	0	0	0	0	1
• Inlet/Outlet Class	• perennial outlet		3	3	0	0	0	3
	• intermittent outlet		1	1	0	0	0	1
• Wetland Water Regime	• drier: seasonally flooded, temporarily flooded, saturated		3	3	3	0	3	3
	• wet: permanently flooded, intermittently exposed, semipermanently flooded		1	1	1	1	1	1
• Vegetation Density/Dominance	• high/very high		3	3	3	3	3	3
	• medium		2	2	2	2	2	2
	• sparse/low		1	1	1	1	1	1
	• no vegetation		0	0	0	0	0	0
• Soil Type	• mineral hydric soil		3	3	3	3	3	3
	• histosol		1	1	1	1	1	1
		Total Score:	—	—	—	—	—	—
		Model Range:	5-18	4-15	3-12	2-10	3-12	5-18
		Functional Capacity Index:	Total Score / 18	15 / 15	— / 12	— / 10	— / 12	— / 18
		Index Range:	0.27-1.0	0.26-1.0	0.25-1.0	0.20-1.0	0.25-1.0	0.27-1.0

1.0

2.9.7 Contribution to Abundance and Diversity of Wetland Vegetation
(This model is identical for all HGM types)

VARIABLES		CONDITIONS	WEIGHTS
Indicators of Disfunction		no vegetation	0
Direct Indicators of Function		none	
Primary Variables			
•	Plant Species Diversity	• high diversity	5
		• medium diversity	3
		• low diversity	1
•	Vegetation Density/Dominance	• high/very high	5
		• medium	3
		• sparse/low	1
•	Wetland Juxtaposition	• connected upstream and downstream	5
		• connected above or below	3
		• other wetlands nearby but not connected (400 m or closer)	1
		• isolated	0
		Total Score:	1
		Model Range:	2-15
		Functional Capacity Index:	= Total Score / 15
		Index Range:	0.13-1.0

.6

2.9.8 Contribution to Abundance and Diversity of Wetland Fauna

(This model is identical for all HGM types except Slope Wetlands for which "Interspersion of Vegetation Cover and Open Water" does not apply))

VARIABLES	CONDITIONS	WEIGHTS
Direct Indicators of Disfunction	none	
Direct Indicators of Function	none	
Primary Variables		
• Watershed Land Use	• low intensity (0-25% urbanized)	3
	• moderate intensity (25-50% urbanized)	2
	• high intensity (>50% urbanized)	1
• Wetland Land Use	• low intensity	3
	• moderate intensity	2
	• high intensity	1
• Wetland Water Regime	• wet: permanently flooded, intermittently exposed, semipermanently flooded	3
	• drier: seasonally flooded, temporarily flooded, saturated	1
• Microrelief of Wetland Surface	• pronounced	3
	• well developed	2
	• poorly developed	1
	• absent	0
• Number of Wetland types and Relative Proportions	• 5 or more types	3
	• 3-4 types	2
	• 1-2 types	1
	• no vegetation	0
	• even distribution	3
	• moderately even distribution	2
	• highly uneven distribution	1
	• no vegetation	0
• Vegetation Interspersion	• high interspersion	3
	• moderate interspersion	2
	• low interspersion	1
	• no vegetation	0
• Number of Layers and Percent Cover	• 5 or more layers	3
	• 3-4 layers	2
	• 1-2 layers	1
	• no vegetation	0
	• layers well developed (>50% cover)	3
	• layers with moderate cover (26-50% cover)	2
	• layers poorly distinguishable (<25% cover)	1
	• no vegetation	0

(continued)

2.9.8 Contribution to Abundance and Diversity of Wetland Fauna (Continued)

VARIABLES	CONDITIONS	WEIGHTS
• Interspersion of Vegetation Cover and Open Water	• 26-75% scattered or peripheral	3
	• >75% scattered or peripheral	2
	• <25% scattered or peripheral	N/A 1
	• 100% cover or open water	1
	• no vegetation	0
• Size	• large (>100 acres)	3
	• medium (10-100 acres)	2
	• small (<10 acres)	1
• Wetland Juxtaposition	• other wetlands within 400 m and connected above or below	3
	• other wetlands within 400 m but not connected	1
	• wetland isolated	0

Slope Wetlands:

Model Range: 4-33

Functional Capacity Index = $\frac{\text{Total Score}}{33}$

Index Range: 0.12-1.0

All Other HGM Types:

Total Score: 14

Model Range: 4-36

Functional Capacity Index = $\frac{\text{Total Score}}{36}$

Index Range 0.11-1.0

.38

WETLAND INVENTORY DATA

Project Number: Brynwood Golf Course **Date:** Feb. 2013, re-observed April, 2013

Wetland Number: (W2) Slope wetland in site center

Aerial Photo Numbers:

USGS Quadrangle: Mt. Kisco

Field Investigators: J.F, VL

PART 1 - CHARACTERIZATION of WETLAND

SURFACE WATER FLOW VECTORS

Condition	Percent/Acreage
Depressional	
Slope	.16%/0.26Ac.
Flat	
Extensive Peatland	
Lacustrine Fringe	
Riverine	

PLANT SPECIES

Species	OW	FW	F	FU	OU	DOM	COM	OCC	C	S	TS	LS	H
Cornus sericea		X						X				X	
Salix purpurea		X						X			X		
Lonicera morrowi				X				X				X	
Rubus occidentalis				X				X				X	
Rosa multiflora				X				X			X		
Cladastrus orbiculatus				X				X				X	
Lindera benzoin		X						X			X		
Phragmites aust.	X							X					X
Symplocarpus foetidus	X							X					X

OW Obligate Wetland
FW Facultative Wetland
F Facultative
FU Facultative Upland
OU Obligate Upland
DOM Dominant
COM Common
OCC Occasional
C Canopy
S Sapling
TS Tall Shrub
LS Low Shrub
H Herb

VEGETATION TYPES

Type	Percent/Acreage
Forested Wetland	
Evergreen	
Needle-leaved	
Deciduous	
Broad-leaved	
Needle-leaved	
Scrub Shrub	
Evergreen	
Broad-leaved	
Needle-leaved	
Deciduous	
Broad-leaved	95%/0.247
Needle-leaved	
Emergent Wetland	
Persistent	5%/0.013
Non-persistent	
Aquatic Bed	
Total	.26AC

SOIL TYPES

Histosol
- Fibric ☐
- Hemic ☐
- Sapric ☐

Mineral Hydric Soil
- Gravelly ☐
- Sandy ☐
- Silty ☒
- Clayey ☐

GEOLOGY

Surficial: Glacial Till

Bedrock: Granite, Gneiss

Comments: Adj. canopy of Sugar Maples, seep @ source, some lindera in wooded area with various shrubs and invasives @ edge of turf.

PRE-EMPTIVE STATUS

no Public ownership
no Wildlife management area
no Fisheries management area
no Designated State or Federal protected wetland
no Documented habitat for state or federal listed species
no Regionally scarce wetland category
no Historic/archaeologic area

WETLAND INVENTORY DATA (continued)

PART 2 - CHARACTERIZATION of MODEL VARIABLES

LANDSCAPE VARIABLES

Size:
- [x] Small (<10 acres)
- [ ] Medium (10-100 acres)
- [ ] Large (>100 acres)

Wetland Juxtaposition:
- [ ] Connected Upstream and Downstream
- [ ] Only Connected Above
- [x] Only Connected Below
- [ ] Other Wetlands Nearby but not Connected
- [ ] Wetland Isolated

Fire Occurence and Frequency:
- [ ] Natural; Predictable Frequency
- [ ] Natural; Sporadic Frequency
- [ ] Human-caused; Predictable
- [ ] Human-caused; Sporadic
- [ ] Rare Event
- [x] No Evidence

Regional Scarcity:
- [x] Not Scarce (>5% of total wetland area of region)
- [ ] Scarce (<5% of total wetland area of region)

Watershed Land Use:
- [x] > 50% urbanized
- [ ] 25-50% urbanized
- [ ] 0-25% urbanized

HYDROLOGIC VARIABLES

ace Water Level Fluctuation of Wetland:
- [ ] High Fluctuation
- [x] Low Fluctuation
- [ ] Never Inundated

Fequency of Overbank Flooding:
- [ ] Return Interval > 5 yrs.
- [ ] Return Interval 2-5 yrs.
- [ ] Return Interval 1-2 yrs.
- [x] No Overbank Flooding

pH
- [ ] Acid <5.5
- [x] Circumneutral 5.5-7.4
- [ ] Alkaline >7.4
- [ ] No Water

icial Geologic Deposit Under Wetland
- [ ] Low Permeability Stratified Deposits
- [ ] High Permeability Stratified Deposits
- [x] Glacial Till

land Land Use:
- [ ] High Intensity (ie. agriculture)
- [x] Moderate Intensity (ie. forestry)
- [ ] Low Intensity (ie. open space)

land Water Regime:
- [ ] Wet: Perm Flooded, Intermittently Exposed, Semiperm. Flooded
- [x] Drier: Seasonally Flooded, Temporarily Flooded, Saturated

h Topographic Gradient:
- [x] High Gradient >2%
- [ ] Low Gradient <2%

ee of Outlet Restriction:
- [x] Restricted Outflow
- [ ] Unrestricted Outflow
- [ ] No Outflow

o of Wetland Area to Watershed Area:
- [ ] High >10%
- [x] Low <10%

Microrelief of Wetland Surface:
- [ ] Pronounced >45 cm
- [ ] Well Developed 15-45 cm
- [ ] Poorly Developed <15 cm
- [x] Absent

Inlet/Outlet Class:
- [ ] No Inlet/No Outlet
- [ ] No Inlet/Intermittent Outlet
- [ ] No Inlet/Perennial Outlet
- [ ] Intermittent Inlet/No Outlet
- [ ] Intermittent Inlet/Intermittent Outlet
- [ ] Intermittent Outlet/Perennial Outlet
- [ ] Perennial Inlet/No Outlet
- [ ] Perennial Inlet/ Intermittent Outlet
- [x] Perennial Inlet/Perennial Outlet

Nested Piezometer Data:
- [ ] Recharge
- [ ] Discharge
- [ ] Horizontal Flow
- [x] Not Available

Relationship of Wetlands' Substrate Elevation to Regional Piezometric Surface:
- [ ] Piez. Surface Above or at Substrate elev.
- [ ] Piez. Surface below Substrate elev.
- [x] Not Available

Evidence of Sedimentation:
- [x] No Evidence Observed
- [ ] Sediment Observed on Wetland Substrate
- [ ] Fluvaquent Soils

Evidence of Seeps and Springs:
- [ ] No Seeps or Springs
- [x] Seeps Observed
- [ ] Perennial Spring
- [ ] Intermittent Spring

SOIL VARIABLES

Soil Lacking:
- [ ]

Histosol:
- [ ] Fibric
- [ ] Hemic
- [ ] Sapric

Mineral Hydric Soil:
- [ ] Gravelly
- [ ] Sandy
- [x] Silty
- [ ] Clayey

VEGETATION VARIABLES

Vegetation Lacking:
- [ ]

Dominant Wetland Type:
- [ ] Forested - Evergreen - Needle-leaved
- [x] Forested - Deciduous - Broad-leaved
- [ ] Forested - Deciduous - Needle-leaved
- [ ] Scrub Shrub - Evergreen - Broad-leaved
- [ ] Scrub Shrub - Evergreen - Needle-leaved
- [x] Scrub Shrub - Deciduous - Broad-leaved
- [ ] Scrub Shrub - Deciduous - Needle-leaved
- [ ] Emergent - Persistent
- [ ] Emergent - Non-persistent
- [ ] Aquatic Bed

Number of Types & Relative Proportions:

Number of Types
- [ ] Actual #
- [ ] 5
- [ ] 4
- [ ] 3
- [x] 2
- [ ] 1

Evenness of Distribution
- [ ] Even Distribution
- [x] Moderately Even Distribution
- [ ] Highly Uneven Distribution

Vegetation Density/Dominance:
- [ ] Sparse (0-20%)
- [ ] Low Density (20-40%)
- [x] Medium Density (40-60%)
- [ ] High Density (60-80%)
- [ ] Very High Density (80-100%)

Vegetative Interspersion:
- [ ] High (small groupings, diverse and interspersed)
- [x] Moderate (broken irregular rings)
- [ ] Low (large patches, concentric rings)

Number of Layers and Percent Cover:

Number of Layers
- [ ] 6 or > (actual #)
- [ ] 5
- [ ] 4
- [ ] 3
- [x] 2
- [ ] 1

% Cover
1. submergents:
2. floating:
3. moss-lichen:
4. short herb:
5. tall herb: 5%
6. dwarf shrub:
7. short shrub:
8. tall shrub: 95% - edges
9. sapling:
10. tree:

Plant Species Diversity:
- [ ] Low 1-2 plots sampled
- [x] Medium 3-4 plots sampled
- [ ] High 5 or more plots sampled

Proportion of Animal Food Plants:
- [ ] Low (5-25% cover)
- [x] Medium (25-50% cover)
- [ ] High (>50% cover)

Cover Distribution:
- [ ] Continuous Cover
- [x] Small Scattered Patches
- [ ] 1 or More Large Patches; Parts of Site Open
- [ ] Solitary, Scattered Stems

Dead Woody Material:
- [ ] Abrundant (>50 of wetland surface)
- [ ] Moderately Abrundant (25-50% of surface)
- [x] Low Abrundance (0-25% of surface)

Interspersion of Cover and Open Water:
- [ ] 26-75% Scattered or Peripheral
- [ ] >75% Scattered or Peripheral
- [ ] <25% Scattered or Peripheral
- [x] 100% Cover or Open Water

Stream Sinuosity:
- [ ] Highly Convoluted (index 1.50 or >)
- [ ] Moderately Convoluted (index 1.25-1.50)
- [x] Straight/Slightly Irreg. (index) 1.10-1.25

Presence of Islands:
- [ ] Several to Many
- [ ] One or Few
- [x] Absent

2.9.1 Modification of Ground Water Discharge (Continued)

VARIABLES	CONDITIONS HGM TYPES:	WEIGHTS D	S	R	F
• Soil Type	• histosol	3	3	3	3
	• mineral hydric soil	1	1	1	1
		—	—	—	—
	Total Score:				
	Model Range:	3-18	2-15	3-15	3-18
	Functional Capacity Index:	Total Score / 18	15 / 15	— / 15	— / 18
	Index Range:	0.19-1.0	0.16-1.0	0.22-1.0	0.19-1.0

1.0

Note: This model can be applied to both year long and seasonal discharge wetlands.

If the wetland is seasonally fluctuating between recharge and discharge, then reduce the above score by one half (1/2), because the wetland only functions in a discharge mode for roughly half the year.

2.9.2 Modification of Ground Water Recharge

N/A to Slope

VARIABLES	CONDITIONS HGM TYPES:	WEIGHTS D	L	EP	R	F
Indicators of Disfunction						
• Inlet/Outlet Class	• no inlet/perennial outlet; intermittent inlet/perennial outlet	0				0
• Nested Piezometer Data	• discharge condition	0	0	0	0	0
• Relationship to Regional Piezometric Surface	• wetland substrate elevation above or at piezometric surface	0	0	0	0	0
• Presence of Seeps and Springs	• presence of seeps or springs	0	0	0	0	0

(continued)

2.9.2 Modification of Ground Water Recharge (Continued)

N/A

VARIABLES	CONDITIONS	HGM TYPES: D	L	EP	R	F
		WEIGHTS				
Direct Indicators of Function						
• Inlet/Outlet Class	• perennial inlet/no outlet	21				21
• Nested Piezometer Data	• recharge condition	21				21
• Relationship to Regional Peizometeric Surface	• wetland substrate elevation below piezometric surface	21				21
Primary Variables						
• Microrelief of Wetland Surface	• Poorly Developed	3	3	1	3	3
	• Absent	3	3	1	3	3
	• Well Developed	2	2	2	2	2
	• Pronounced	1	1	3	1	1
• Inlet/Outlet Class	• Perennial Inlet/Intermittent Outlet	3	0	0	0	3
	• All Other Classes	0	0	0	0	0
• pH	• Acid	3	3	3	3	3
	• Circumneutral	2	2	2	2	2
	• Alkaline	1	1	1	1	1
	• No water present	0	0	0	0	0
• Surficial Geologic Deposit Under Wetland	• Glacial Till	3	1	1	1	3
	• Low Permeability Stratified Deposits	2	2	2	2	2
	• High Permeability Stratified Deposits	1	3	3	3	1
• Surface Water Level Fluctuation of the Wetland	• High Fluctuation	3	3	0	3	3
	• Low Fluctuation	2	2	0	2	2
	• Never Inundated	1	1	0	1	1
• Wetland Water Regime	• Drier: Seasonally Flooded, Temporarily Flooded, Saturated	3	3	0	3	3
	• Wet: Permanently Flooded, Intermittently Exposed, Semipermanently Flooded	1	1	0	1	1
		—	—	—	—	—
• Soil Type	• Gravelly or Sandy Mineral Hydric	3	3	0	3	3
	• Silty or Clayey Mineral Hydric	2	2	0	2	2
	• Sapric Histosol	1	1	0	1	1
	• Fibric or Hemic Histosol	0	0	3	0	0
	Total Score:					
	Model Range:	4-21	4-18	2-12	4-18	4-21
	Functional Capacity Index:	Total Score / 21	/ 18	/ 12	/ 18	/ 21
	Index Range:	0.19-1.0	0.22-1.0	0.16-1.0	0.22-1.0	0.19-1.0

N/A

Note: This model should be applied to both year long and seasonal recharge wetlands.

If the wetland is seasonally fluctuating between recharge and discharge, then reduce the above score by one half (1/2), because the wetland only functions in a recharge mode for roughly half the year.

2.9.3 Storm and Flood-Water Storage

VARIABLES	CONDITIONS	WEIGHTS D	S	L	EP	R	F
Indicators of disfunction	none						
Direct Indicators of Function	no outlet	27	21				30
Primary Variables							
• Inlet/Outlet Class	• perennial inlet/intermittent outlet	3	3	0	0	0	3
	• intermittent inlet/intermittent outlet	2	2	0	0	0	2
	• no inlet/intermittent outlet	1	1	0	0	0	1
	• non inlet/perennial outlet	1	1	0	0	0	1
	• intermittent inlet/perennial outlet	1	1	0	0	0	1
	• perennial inlet/perennial outlet	1	1	0	0	0	1
• Degree of Outlet Restriction	• restricted	3	0	0	0	0	3
	• unrestricted	0	0	0	0	0	0
• Basin Topographic Gradient	• low gradient	3	3	0	3	3	3
	• high gradient	1	1	0	0	1	1
• Wetland Water Regime	• Drier: seasonally flooded, temporarily flooded, saturated	3	3	3	0	3	3
	• Wet: permanently flooded, intermittently exposed, semipermanently flooded	1	1	1	0	1	1
• Surface Water Level Fluctuation of the Wetland	• high fluctuation	3	0	3	0	3	3
	• low fluctuation	2	0	2	0	2	2
	• never inundated	0	0	0	0	0	0
• Ratio of Wetland Area to Watershed Area	• large	3	3	3	0	3	3
	• small	1	1	1	0	1	1
• Microrelief of Wetland Surface	• pronounced	3	3	3	3	3	3
	• well developed	2	2	2	2	2	2
	• poorly developed	1	1	1	1	1	1
	• absent	0	0	0	0	0	0
• Frequency of Overbank Flooding	• overbank flooding absent	0	0	0	0	0	0
	• return interval of >5 yrs	0	0	1	0	1	1
	• return interval of 2-5 yrs	0	0	2	0	2	2
	• return interval of 1-2 yrs	0	0	3	0	3	3
• Vegetation Density/Dominance	• high/very high	3	3	3	3	3	3
	• moderate	2	2	2	2	2	2
	• sparse/low	1	1	1	1	1	1
	• no vegetation	0	0	0	0	0	0

(continued)

2.9.3 Storm and Flood-Water Storage (Continued)

VARIABLES	CONDITIONS	HGM TYPES:	D	S	L	EP	R	F
			WEIGHTS					
• Dead Woody Material	• abundant • moderately abundant • sparse • absent		3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0
		Total Score:		9				
		Model Range:	4-27	4-21	2-21	0-12	3-24	4-30
		Functional Capacity Index:	Total Score / 27	9 / 21	/ 21	/ 12	/ 24	/ 30
		Index Range:	0.15-1.0	0.19-1.0	0.09-1.0	0-1.0	0.12-1.0	0.13-1.0

.42

2.9.4 Modification of Stream Flow
(This model is identical for all HGM types)

VARIABLES	CONDITIONS	WEIGHTS
Indicators of Disfunction	no outlet	0
Direct Indicators of Function	none	

Primary Variables .42=MOD

1 = HIGH

Storm and Flood Water Storage Function Model Score			Modification of Groundwater Discharge Function Model Score			
High*	3	x	High	3	=	9
Mod	2	x	High	3	=	$\boxed{6}$
Low	1	x	High	3	=	3
High	3	x	Mod	2	=	6
Mod	2	x	Mod	2	=	4
Low	1	x	Mod	2	=	2
High	3	x	Low	1	=	3
Mod	2	x	Low	1	=	2
Low	1	x	Low	1	=	1

Total Score:	
Model Range:	1-9
Functional Capacity Index:	Total Score / 9
Index Range:	0.11-1.0

$\frac{6}{9} = .66$

*High = FCI of 0.67-1.0, Mod = FCI of 0.34-0.66, Low = FCI of 0-0.33 for the Storm and Flood Water Storage and Modification of Ground Water Discharge Function Model Scores.

2.9.5 Modification of Water Quality

VARIABLES	CONDITIONS	HGM TYPES: D	S	L	EP	R	F
		WEIGHTS					
Indicators of disfunction	none						
Direct Indicators of Function	evidence of sedimentation	18	15	12	12	12	18
Primary Variables							
• Wetland Land Use	• low intensity	3	3	3	3	3	3
	• moderate intensity	2	2	2	2	2	2
	• high intensity	1	1	1	1	1	1
• Degree of Outlet Restriction	• restricted outflow	3	0	0	0	0	3
	• no outlet	2	0	0	0	0	2
	• unrestricted outflow	1	0	0	0	0	1
• Inlet/Outlet Type	• no outlet	3	3	0	0	0	3
	• intermittent outlet	2	2	0	0	0	2
	• perennial outlet	1	1	0	0	0	1
• Dominant Wetland Type	• forested wetland	3	3	3	3	3	3
	• scrub-shrub	2	2	2	2	2	2
	• emergent wetland	2	2	2	2	2	2
	• aquatic bed	1	0	0	0	0	0
	• no vegetation	0	0	0	0	0	0
• Cover Distribution	• forming a continuous cover	3	3	3	3	3	3
	• growing in small scattered patches	2	2	2	2	2	2
	• one or more large patches	1	1	1	1	1	1
	• solitary scattered stems	1	1	1	1	1	1
	• no vegetation	0	0	0	0	0	0
• Soil Type	• histosol or clayey soil	3	3	3	3	3	3
	• silty soil	2	2	2	0	2	2
	• sandy or gravelly soil	1	1	1	0	1	1
	Total Score:		9				
	Model Range:	4-18	3-15	2-12	1-12	2-12	4-18
	Functional Capacity Index:	Total Score / 18	9 / 15	/ 12	/ 12	/ 12	/ 18
	Index Range:	0.22-1.0	0.20-1.0	0.16-1.0	0.8-1.0	0.16-1.0	0.22-1.0

, 60

2.9.6 Export of Detritus

VARIABLES	CONDITIONS	HGM TYPES: D	S	L	EP	R	F
		WEIGHTS					
Indicators of disfunction	no outlet	0	0		0		0
Direct Indicators of Function	none						
Primary Variables							
• Wetland Land Use	• moderate intensity	3	3	3	3	3	3
	• low intensity	2	2	2	2	2	2
	• high intensity	1	1	1	1	1	1
• Degree of Outlet Restriction	• unrestricted outflow	3	0	0	0	0	3
	• restricted outflow	1	0	0	0	0	1
• Inlet/Outlet Class	• perennial outlet	3	3	0	0	0	3
	• intermittent outlet	1	1	0	0	0	1
• Wetland Water Regime	• drier: seasonally flooded, temporarily flooded, saturated	3	3	3	0	3	3
	• wet: permanently flooded, intermittently exposed, semipermanently flooded	1	1	1	1	1	1
• Vegetation Density/Dominance	• high/very high	3	3	3	3	3	3
	• medium	2	2	2	2	2	2
	• sparse/low	1	1	1	1	1	1
	• no vegetation	0	0	0	0	0	0
• Soil Type	• mineral hydric soil	3	3	3	3	3	3
	• histosol	1	1	1	1	1	1
	Total Score:		14				
	Model Range:	5-18	4-15	3-12	2-10	3-12	5-18
	Functional Capacity Index:	Total Score / 18	14 / 15	— / 12	— / 10	— / 12	— / 18
	Index Range:	0.27-1.0	0.26-1.0	0.25-1.0	0.20-1.0	0.25-1.0	0.27-1.0

.93

2.9.7 Contribution to Abundance and Diversity of Wetland Vegetation
(This model is identical for all HGM types)

VARIABLES		CONDITIONS	WEIGHTS
Indicators of Disfunction		no vegetation	0
Direct Indicators of Function		none	
Primary Variables			
•	Plant Species Diversity	• high diversity • medium diversity • low diversity	5 3 1
•	Vegetation Density/Dominance	• high/very high • medium • sparse/low	5 3 1
•	Wetland Juxtaposition	• connected upstream and downstream • connected above or below • other wetlands nearby but not connected (400 m or closer) • isolated	5 3 1 0
		Total Score:	9
		Model Range:	2-15
		Functional Capacity Index:	= Total Score / 15
		Index Range:	0.13-1.0

.6

2.9.8 Contribution to Abundance and Diversity of Wetland Fauna

(This model is identical for all HGM types except Slope Wetlands for which "Interspersion of Vegetation Cover and Open Water" does not apply))

VARIABLES	CONDITIONS	WEIGHTS
Direct Indicators of Disfunction	none	
Direct Indicators of Function	none	
Primary Variables		
• Watershed Land Use	• low intensity (0-25% urbanized)	3
	• moderate intensity (25-50% urbanized)	2
	• high intensity (>50% urbanized)	1
• Wetland Land Use	• low intensity	3
	• moderate intensity	2
	• high intensity	1
• Wetland Water Regime	• wet: permanently flooded, intermittently exposed, semipermanently flooded	3
	• drier: seasonally flooded, temporarily flooded, saturated	1
• Microrelief of Wetland Surface	• pronounced	3
	• well developed	2
	• poorly developed	1
	• absent	0
• Number of Wetland types and Relative Proportions	• 5 or more types	3
	• 3-4 types	2
	• 1-2 types	1
	• no vegetation	0
	• even distribution	3
	• moderately even distribution	2
	• highly uneven distribution	1
	• no vegetation	0
• Vegetation Interspersion	• high interspersion	3
	• moderate interspersion	2
	• low interspersion	1
	• no vegetation	0
• Number of Layers and Percent Cover	• 5 or more layers	3
	• 3-4 layers	2
	• 1-2 layers	1
	• no vegetation	0
	• layers well developed (>50% cover)	3
	• layers with moderate cover (26-50% cover)	2
	• layers poorly distinguishable (<25% cover)	1
	• no vegetation	0

(continued)

2.9.8 Contribution to Abundance and Diversity of Wetland Fauna (Continued)

VARIABLES	CONDITIONS		WEIGHTS
• Interspersion of Vegetation Cover and Open Water	• 26-75% scattered or peripheral	N/A	3
	• >75% scattered or peripheral		2
	• <25% scattered or peripheral		1
	• 100% cover or open water		1
	• no vegetation		0
• Size	• large (>100 acres)		3
	• medium (10-100 acres)		2
	• small (<10 acres)		1
• Wetland Juxtaposition	• other wetlands within 400 m and connected above or below		3
	• other wetlands within 400 m but not connected		1
	• wetland isolated		0

Slope Wetlands:

Model Range: 4-33

Functional Capacity Index = $\frac{\text{Total Score}}{33}$

Index Range: 0.12-1.0

All Other HGM Types:

Total Score: 16

Model Range: 4-36

Functional Capacity Index = $\frac{\text{Total Score}}{36}$

Index Range 0.11-1.0

$\frac{16}{36} = .44$

WETLAND INVENTORY DATA

Project Number: Brynwood

Wetland Number: (W6) Slope Wetland

Date: Feb 2013, re-observed April 2013

Aerial Photo Numbers:

USGS Quadrangle: Mt. Kisco

Field Investigators: J. F, VL

PART 1 - CHARACTERIZATION of WETLAND

SURFACE WATER FLOW VECTORS

Condition	Percent/Acreage	
	—	Depressional
	.0024 / .37	Slope
	—	Flat
	—	Extensive Peatland
	—	Lacustrine Fringe
	—	Riverine

VEGETATION TYPES

Type	Percent/Acreage
Forested Wetland	
Evergreen	
Needle-leaved	—
Deciduous	
Broad-leaved	—
Needle-leaved	—
Scrub Shrub	
Evergreen	
Broad-leaved	
Needle-leaved	—
Deciduous	—
Broad-leaved	95% / .35
Needle-leaved	
Emergent Wetland	
Persistent	5% / .02
Non-persistent	—
Aquatic Bed	—
Total	.37 AC

SOIL TYPES

Histosol
- Fibric ☐
- Hemic ☐
- Sapric ☐

Mineral Hydric Soil
- Gravelly ☐
- Sandy ☐
- Silty ☒
- Clayey ☐

GEOLOGY

Surficial: Glacial till

Bedrock: Granite / Gneiss

Comments: Disturbed area, invasive species dominate

PLANT SPECIES

Species	OW	FW	F	FU	OU	DOM	COM	OCC	C	S	TS	LS	H
Multiflora Rose				X				X			X		
Green Briar				X				X		X			
Privet				X				X			X		
Phragmites Aust.	X							X					X

OW Obligate Wetland
FW Facultative Wetland
F Facultative
FU Facultative Upland
OU Obligate Upland
DOM Dominant

COM Common
OCC Occasional
C Canopy
S Sapling
TS Tall Shrub
LS Low Shrub
H Herb

PRE-EMPTIVE STATUS

- No — Public ownership
- No — Wildlife management area
- No — Fisheries management area
- No — Designated State or Federal protected wetland
- No — Documented habitat for state or federal listed species
- No — Regionally scarce wetland category
- No — Historic/archaeologic area

WETLAND INVENTORY DATA

PART 2 - CHARACTERIZATION of MODEL VARIABLES (continued)

LANDSCAPE VARIABLES

Size:
- ☒ Small (<10 acres)
- ☐ Medium (10-100 acres)
- ☐ Large (>100 acres)

Wetland Juxtaposition:
- ☐ Connected Upstream and Downstream
- ☐ Only Connected Above
- ☒ Only Connected Below
- ☐ Other Wetlands Nearby but not Connected
- ☐ Wetland Isolated

Fire Occurence and Frequency:
- ☐ Natural; Predictable Frequency
- ☐ Natural; Sporadic Frequency
- ☐ Human-caused; Predictable
- ☐ Human-caused; Sporadic
- ☐ Rare Event
- ☒ No Evidence

Regional Scarcity:
- ☒ Not Scarce (>5% of total wetland area of region)
- ☐ Scarce (<5% of total wetland area of region)

Watershed Land Use:
- ☒ > 50% urbanized golf course
- ☐ 25-50% urbanized
- ☐ 0-25% urbanized

HYDROLOGIC VARIABLES

Surface Water Level Fluctuation of Wetland:
- ☐ High Fluctuation
- ☐ Low Fluctuation
- ☒ Never Inundated

Frequency of Overbank Flooding:
- ☐ Return Interval > 5 yrs.
- ☐ Return Interval 2-5 yrs.
- ☐ Return Interval 1-2 yrs.
- ☒ No Overbank Flooding

pH:
- ☐ Acid <5.5
- ☒ Circumneutral 5.5-7.4
- ☐ Alkaline >7.4
- ☐ No Water

rficial Geologic Deposit Under Wetland
- ☐ Low Permeability Stratified Deposits
- ☐ High Permeability Stratified Deposits
- ☒ Glacial Till

tland Land Use:
- ☒ High Intensity (ie. agriculture)
- ☐ Moderate Intensity (ie. forestry)
- ☐ Low Intensity (ie. open space)

land Water Regime:
- ☐ Wet: Perm Flooded, Intermittently Exposed, Semiperm. Flooded
- ☒ Drier: Seasonally Flooded, Temporarily Flooded, Saturated

Topographic Gradient:
- High Gradient >2%
- Low Gradient <2%

e of Outlet Restriction:
- Restricted Outflow
- Unrestricted Outflow
- No Outflow

of Wetland Area to Watershed Area:
- High >10%
- Low <10%

Microrelief of Wetland Surface:
- ☐ Pronounced >45 cm
- ☐ Well Developed 15-45 cm
- ☒ Poorly Developed <15 cm
- ☐ Absent

Inlet/Outlet Class:
- ☐ No Inlet/No Outlet
- ☐ No Inlet/Intermittent Outlet
- ☐ No Inlet/Perennial Outlet
- ☐ Intermittent Inlet/No Outlet
- ☐ Intermittent Inlet/Intermittent Outlet
- ☐ Intermittent Outlet/Perennial Outlet
- ☐ Perennial Inlet/No Outlet
- ☐ Perennial Inlet/ Intermittent Outlet
- ☒ Perennial Inlet/Perennial Outlet

Nested Piezometer Data:
- ☐ Recharge
- ☐ Discharge
- ☐ Horizontal Flow
- ☒ Not Available

Relationship of Wetlands' Substrate Elevation to Regional Piezometric Surface:
- ☐ Piez. Surface Above or at Substrate elev.
- ☐ Piez. Surface below Substrate elev.
- ☒ Not Available

Evidence of Sedimentation:
- ☒ No Evidence Observed
- ☐ Sediment Observed on Wetland Substrate
- ☐ Fluvaquent Soils

Evidence of Seeps and Springs:
- ☐ No Seeps or Springs
- ☒ Seeps Observed
- ☐ Perennial Spring
- ☐ Intermittent Spring

SOIL VARIABLES

Soil Lacking:
- ☐

Histosol:
- ☐ Fibric
- ☐ Hemic
- ☐ Sapric

Mineral Hydric Soil:
- ☐ Gravelly
- ☐ Sandy
- ☒ Silty
- ☐ Clayey

VEGETATION VARIABLES

Vegetation Lacking:
- ☐

Dominant Wetland Type:
- ☐ Forested - Evergreen - Needle-leaved
- ☐ Forested - Deciduous - Broad-leaved
- ☐ Forested - Deciduous - Needle-leaved
- ☐ Scrub Shrub - Evergreen - Broad-leaved
- ☐ Scrub Shrub - Evergreen - Needle-leaved
- ☒ Scrub Shrub - Deciduous - Broad-leaved
- ☐ Scrub Shrub - Deciduous - Needle-leaved
- ☐ Emergent - Persistent
- ☐ Emergent - Non-persistent
- ☐ Aquatic Bed

Number of Types & Relative Proportions:

Number of Types
- ☐ Actual #
- ☐ 5
- ☐ 4
- ☒ 3
- ☐ 2
- ☐ 1

Evenness of Distribution
- ☐ Even Distribution
- ☒ Moderately Even Distribution
- ☐ Highly Uneven Distribution

Vegetation Density/Dominance:
- ☐ Sparse (0-20%)
- ☐ Low Density (20-40%)
- ☒ Medium Density (40-60%)
- ☐ High Density (60-80%)
- ☐ Very High Density (80-100%)

Vegetative Interspersion:
- ☐ High (small groupings, diverse and interspersed)
- ☒ Moderate (broken irregular rings)
- ☐ Low (large patches, concentric rings)

Number of Layers and Percent Cover:

Number of Layers
- ☐ 6 or > (actual #)
- ☐ 5
- ☐ 4
- ☒ 3
- ☐ 2
- ☐ 1

% Cover
1. submergents:
2. floating:
3. moss-lichen:
4. ~~short herb:~~
5. tall herb:
6. dwarf shrub:
7. ~~short shrub:~~
8. ~~tall shrub:~~
9. sapling:
10. tree:

Plant Species Diversity:
- ☒ Low 1-2 plots sampled
- ☐ Medium 3-4 plots sampled
- ☐ High 5 or more plots sampled

Proportion of Animal Food Plants:
- ☒ Low (5-25% cover)
- ☐ Medium (25-50% cover)
- ☐ High (>50% cover)

Cover Distribution:
- ☐ Continuous Cover
- ☒ Small Scattered Patches
- ☐ 1 or More Large Patches; Parts of Site Open
- ☐ Solitary, Scattered Stems

Dead Woody Material:
- ☐ Abrundant (>50 of wetland surface)
- ☐ Moderately Abrundant (25-50% of surface)
- ☒ Low Abrundance (0-25% of surface)

Interspersion of Cover and Open Water: N/A
- ☐ 26-75% Scattered or Peripheral
- ☐ >75% Scattered or Peripheral
- ☐ <25% Scattered or Peripheral
- ☐ 100% Cover or Open Water

Stream Sinuosity:
- ☐ Highly Convoluted (index 1.50 or >)
- ☐ Moderately Convoluted (index 1.25-1.50)
- ☒ Straight/Slightly Irreg. (index) 1.10-1.25

Presence of Islands:
- ☐ Several to Many
- ☐ One or Few
- ☒ Absent

2.9.1 **Modification of Ground Water Discharge**

VARIABLES	CONDITIONS HGM TYPES:	WEIGHTS D	S	R	F
Indicators of Disfunction					
• Inlet/Outlet Class	• perennial inlet/no outlet	0	0	0	0
• Nested Piezometer Data	• recharge condition	0	0	0	0
• Relationship to Regional Piezo-metric Surface	• wetland substrate elevation above piezometric surface	0	0	0	0
Direct Indicators of Function					
• Presence of Springs and Seeps	• evidence of perennial seeps or springs	18	15	15	18
• Nested Piezometer Data	• discharge condition	18	15	15	18
• Relationship to Regional Peizometeric Surface	• wetland substrate elevation below piezometric surface	18	15	15	18
• Inlet/Outlet Class	• no inlet/perennial outlet	18	15	15	18
Primary Variables					
• Microrelief of Wetland Surface	• pronounced	3	3	3	3
	• well developed	2	2	2	2
	• poorly developed	1	1	1	1
	• absent	0	0	0	0
• Inlet/Outlet Class	• perennial inlet/perennial outlet	3	3	0	3
	• intermittent inlet/perennial outlet	2	2	0	2
	• all other classes	0	0	0	0
• pH	• alkaline	3	3	3	3
	• circumneutral	2	2	2	2
	• acid	0	0	0	0
	• no water present	0	0	0	0
• Surficial Geologic Deposit Under Wetland	• high permeability stratified deposits	3	3	3	3
	• low permeability stratified deposits	2	2	2	2
	• glacial till	1	1	1	1
• Wetland Water Regime	• wet; permanently flooded, inter-mittently exposed, semipermanently flooded	3	0	3	3
	• drier; seasonally flooded, tempo-rarily flooded, saturated	1	0	1	1

(continued)

2.9.1 **Modification of Ground Water Discharge** (Continued)

VARIABLES	CONDITIONS HGM TYPES:	WEIGHTS D	S	R	F
• Soil Type	• histosol	3	3	3	3
	• mineral hydric soil	1	1	1	1
		—	—	—	—
	Total Score:				
	Model Range:	3-18	2-15	3-15	3-18
	Functional Capacity Index:	Total Score / 18	— / 15	— / 15	— / 18
	Index Range:	0.19-1.0	0.16-1.0	0.22-1.0	0.19-1.0

Note: This model can be applied to both year long and seasonal discharge wetlands.

If the wetland is seasonally fluctuating between recharge and discharge, then reduce the above score by one half (1/2), because the wetland only functions in a discharge mode for roughly half the year.

1.0

2.9.2 **Modification of Ground Water Recharge** N/A for Slope

VARIABLES	CONDITIONS HGM TYPES:	WEIGHTS D	L	EP	R	F
Indicators of Disfunction						
• Inlet/Outlet Class	• no inlet/perennial outlet; intermittent inlet/perennial outlet	0				0
• Nested Piezometer Data	• discharge condition	0	0	0	0	0
• Relationship to Regional Piezometric Surface	• wetland substrate elevation above or at piezometric surface	0	0	0	0	0
• Presence of Seeps and Springs	• presence of seeps or springs	0	0	0	0	0

(continued)

2.9.2 Modification of Ground Water Recharge (Continued)

VARIABLES	CONDITIONS	D	L	EP	R	F
	HGM TYPES:	WEIGHTS				
Direct Indicators of Function						
• Inlet/Outlet Class	• perennial inlet/no outlet	21				21
• Nested Piezometer Data	• recharge condition	21				21
• Relationship to Regional Peizometeric Surface	• wetland substrate elevation below piezometric surface	21				21
Primary Variables						
• Microrelief of Wetland Surface	• Poorly Developed	3	3	1	3	3
	• Absent	3	3	1	3	3
	• Well Developed	2	2	2	2	2
	• Pronounced	1	1	3	1	1
• Inlet/Outlet Class	• Perennial Inlet/Intermittent Outlet	3	0	0	0	3
	• All Other Classes	0	0	0	0	0
• pH	• Acid	3	3	3	3	3
	• Circumneutral	2	2	2	2	2
	• Alkaline	1	1	1	1	1
	• No water present	0	0	0	0	0
• Surficial Geologic Deposit Under Wetland	• Glacial Till	3	1	1	1	3
	• Low Permeability Stratified Deposits	2	2	2	2	2
	• High Permeability Stratified Deposits	1	3	3	3	1
• Surface Water Level Fluctuation of the Wetland	• High Fluctuation	3	3	0	3	3
	• Low Fluctuation	2	2	0	2	2
	• Never Inundated	1	1	0	1	1
• Wetland Water Regime	• Drier: Seasonally Flooded, Temporarily Flooded, Saturated	3	3	0	3	3
	• Wet: Permanently Flooded, Intermittently Exposed, Semipermanently Flooded	1	1	0	1	1
• Soil Type	• Gravelly or Sandy Mineral Hydric	3	3	0	3	3
	• Silty or Clayey Mineral Hydric	2	2	0	2	2
	• Sapric Histosol	1	1	0	1	1
	• Fibric or Hemic Histosol	0	0	3	0	0
	Total Score:					
	Model Range:	4-21	4-18	2-12	4-18	4-21
	Functional Capacity Index:	Total Score / 21	/ 18	/ 12	/ 18	/ 21
	Index Range:	0.19-1.0	0.22-1.0	0.16-1.0	0.22-1.0	0.19-1.0

Note: This model should be applied to both year long and seasonal recharge wetlands.

If the wetland is seasonally fluctuating between recharge and discharge, then reduce the above score by one half (1/2), because the wetland only functions in a recharge mode for roughly half the year.

N/A to slope

2.9.3 Storm and Flood-Water Storage

VARIABLES	CONDITIONS	D	S	L	EP	R	F
	HGM TYPES:	D	S	L	EP	R	F
Indicators of disfunction	none						
Direct Indicators of Function	no outlet						
Primary Variables		27	21				30
• Inlet/Outlet Class	• perennial inlet/intermittent outlet	3	3	0	0	0	3
	• intermittent inlet/intermittent outlet	2	2	0	0	0	2
	• no inlet/intermittent outlet	1	1	0	0	0	1
	• non inlet/perennial outlet	1	1	0	0	0	1
	• intermittent inlet/perennial outlet	1	1	0	0	0	1
	• perennial inlet/perennial outlet	1	1	0	0	0	1
• Degree of Outlet Restriction	• restricted	3	0	0	0	0	3
	• unrestricted	0	0	0	0	0	0
• Basin Topographic Gradient	• low gradient	3	3	0	3	3	3
	• high gradient	[illegible]	1	0	0	1	1
• Wetland Water Regime	• Drier: seasonally flooded, temporarily flooded, saturated	3	3	3	0	3	3
	• Wet: permanently flooded, intermittently exposed, semipermanently flooded	1	1	1	0	1	1
• Surface Water Level Fluctuation of the Wetland	• high fluctuation	3	0	3	0	3	3
	• low fluctuation	2	0	2	0	2	2
	• never inundated	0	0	0	0	0	0
• Ratio of Wetland Area to Watershed Area	• large	3	3	3	0	3	3
	• small	1	1	1	0	1	1
• Microrelief of Wetland Surface	• pronounced	3	3	3	3	3	3
	• well developed	2	2	2	2	2	2
	• poorly developed	1	1	1	1	1	1
	• absent	0	0	0	0	0	0
• Frequency of Overbank Flooding	• overbank flooding absent	0	0	0	0	0	0
	• return interval of >5 yrs	0	0	1	0	1	1
	• return interval of 2-5 yrs	0	0	2	0	2	2
	• return interval of 1-2 yrs	0	0	3	0	3	3
• Vegetation Density/Dominance	• high/very high	3	3	3	3	3	3
	• moderate	2	2	2	2	2	2
	• sparse/low	1	1	1	1	1	1
	• no vegetation	0	0	0	0	0	0

(continued)

2.9.3 Storm and Flood-Water Storage (Continued)

VARIABLES	CONDITIONS	HGM TYPES:	D	S	L	EP	R	F
• Dead Woody Material	• abundant		3	3	3	3	3	3
	• moderately abundant		2	2	2	2	2	2
	• sparse		1	1	1	1	1	1
	• absent		0	0	0	0	0	0
		Total Score:		10				
		Model Range:	4-27	4-21	2-21	0-12	3-24	4-30
		Functional Capacity Index:	Total Score / 27	10 / 21	/ 21	/ 12	/ 24	/ 30
		Index Range:	0.15-1.0	0.19-1.0	0.09-1.0	0-1.0	0.12-1.0	0.13-1.0

.48

2.9.4 Modification of Stream Flow
(This model is identical for all HGM types)

VARIABLES	CONDITIONS	WEIGHTS
Indicators of Disfunction	no outlet	0
Direct Indicators of Function	none	

Primary Variables mod high

Storm and Flood Water Storage Function Model Score			Modification of Groundwater Discharge Function Model Score			
High*	3	x	High	3	=	9
Mod	2	x	High	3	=	6
Low	1	x	High	3	=	3
High	3	x	Mod	2	=	6
Mod	2	x	Mod	2	=	4
Low	1	x	Mod	2	=	2
High	3	x	Low	1	=	3
Mod	2	x	Low	1	=	2
Low	1	x	Low	1	=	1

Total Score:

Model Range: 1-9

Functional Capacity Index: Total Score / 9   6/9 = .66

Index Range: 0.11-1.0

*High = FCI of 0.67-1.0, Mod = FCI of 0.34-0.66, Low = FCI of 0-0.33 for the Storm and Flood Water Storage and Modification of Ground Water Discharge Function Model Scores.

2.9.6 Export of Detritus

VARIABLES	CONDITIONS	HGM TYPES: WEIGHTS D	S	L	EP	R	F
Indicators of disfunction	no outlet	0	0		0		0
Direct Indicators of Function	none						
Primary Variables							
• Wetland Land Use	• moderate intensity	3	3	3	3	3	3
	• low intensity	2	2	2	2	2	2
	• high intensity	1	1	1	1	1	1
• Degree of Outlet Restriction	• unrestricted outflow	3	0	0	0	0	3
	• restricted outflow	1	0	0	0	0	1
• Inlet/Outlet Class	• perennial outlet	3	3	0	0	0	3
	• intermittent outlet	1	1	0	0	0	1
• Wetland Water Regime	• drier: seasonally flooded, temporarily flooded, saturated	3	3	3	0	3	3
	• wet: permanently flooded, intermittently exposed, semipermanently flooded	1	1	1	1	1	1
• Vegetation Density/Dominance	• high/very high	3	3	3	3	3	3
	• medium	2	2	2	2	2	2
	• sparse/low	1	1	1	1	1	1
	• no vegetation	0	0	0	0	0	0
• Soil Type	• mineral hydric soil	3	3	3	3	3	3
	• histosol	1	1	1	1	1	1
	Total Score:	—	14 —	—	—	—	—
	Model Range:	5-18	4-15	3-12	2-10	3-12	5-18
	Functional Capacity Index:	Total Score / 18	14 / 15	/ 12	/ 10	/ 12	/ 18
	Index Range:	0.27-1.0	0.26-1.0	0.25-1.0	0.20-1.0	0.25-1.0	0.27-1.0

.93

2.9.7 Contribution to Abundance and Diversity of Wetland Vegetation

(This model is identical for all HGM types)

VARIABLES		CONDITIONS	WEIGHTS
Indicators of Disfunction		no vegetation	0
Direct Indicators of Function		none	
Primary Variables			
•	Plant Species Diversity	• high diversity • medium diversity • low diversity	5 3 1
•	Vegetation Density/Dominance	• high/very high • medium • sparse/low	5 3 1
•	Wetland Juxtaposition	• connected upstream and downstream • connected above or below • other wetlands nearby but not connected (400 m or closer) • isolated	5 3 1 0

Total Score:	7
Model Range:	2-15
Functional Capacity Index:	= Total Score / 15
Index Range:	0.13-1.0

-46

2.9.8 Contribution to Abundance and Diversity of Wetland Fauna

(This model is identical for all HGM types except Slope Wetlands for which "Interspersion of Vegetation Cover and Open Water" does not apply))

VARIABLES	CONDITIONS	WEIGHTS
Direct Indicators of Disfunction	none	
Direct Indicators of Function	none	
Primary Variables		
• Watershed Land Use	• low intensity (0-25% urbanized)	3
	• moderate intensity (25-50% urbanized)	2
	• high intensity (>50% urbanized)	1
• Wetland Land Use	• low intensity	3
	• moderate intensity	2
	• high intensity	1
• Wetland Water Regime	• wet: permanently flooded, intermittently exposed, semipermanently flooded	3
	• drier: seasonally flooded, temporarily flooded, saturated	1
• Microrelief of Wetland Surface	• pronounced	3
	• well developed	2
	• poorly developed	1
	• absent	0
• Number of Wetland types and Relative Proportions	• 5 or more types	3
	• 3-4 types	2
	• 1-2 types	1
	• no vegetation	0
	• even distribution	3
	• moderately even distribution	2
	• highly uneven distribution	1
	• no vegetation	0
• Vegetation Interspersion	• high interspersion	3
	• moderate interspersion	2
	• low interspersion	1
	• no vegetation	0
• Number of Layers and Percent Cover	• 5 or more layers	3
	• 3-4 layers	2
	• 1-2 layers	1
	• no vegetation	0
	• layers well developed (>50% cover)	3
	• layers with moderate cover (26-50% cover)	2
	• layers poorly distinguishable (<25% cover)	1
		0
	• no vegetation	0

(continued)

2.9.8 Contribution to Abundance and Diversity of Wetland Fauna (Continued)

W/A

VARIABLES	CONDITIONS	WEIGHTS
• Interspersion of Vegetation Cover and Open Water	• 26-75% scattered or peripheral	3
	• >75% scattered or peripheral	2
	• <25% scattered or peripheral	1
	• 100% cover or open water	1
	• no vegetation	0
• Size	• large (> 100 acres)	3
	• medium (10-100 acres)	2
	• small (< 10 acres)	1
• Wetland Juxtaposition	• other wetlands within 400 m and connected above or below	3
	• other wetlands within 400 m but not connected	1
	• wetland isolated	0

Slope Wetlands:

Model Range: 4-33

Functional Capacity Index = Total Score / 33

Index Range: 0.12-1.0

All Other HGM Types:

Total Score: 15

Model Range: 4-36

Functional Capacity Index = Total Score / 36

Index Range 0.11-1.0

WETLAND INVENTORY DATA

Project Number: Brynwood
Date: May 2013 - theoretical
Wetland Number: Ponds - post construction
Aerial Photo Numbers:
USGS Quadrangle: Mt. Kisco
Field Investigators: J.F, VL

PART 1 - CHARACTERIZATION of WETLAND

SURFACE WATER FLOW VECTORS

Condition	Percent/Acreage	
	___	Depressional
	___	Slope
	___	Flat
	___ use both	Extensive Peatland
		Emergent Marsh
	.008 / 1.25AC	Lacustrine Fringe
	___	Riverine

VEGETATION TYPES

Type	Percent/Acreage
Forested Wetland	
Evergreen	
Needle-leaved	___
Deciduous	
Broad-leaved	___
Needle-leaved	___
Scrub Shrub	
Evergreen	
Broad-leaved	___
Needle-leaved	___
Deciduous	
Broad-leaved	___
Needle-leaved	___
Emergent Wetland	
Persistent	5% / .06
Non-persistent	95% / 1.19
Aquatic Bed	___
Total	___

SOIL TYPES

Histosol
- Fibric ☐
- Hemic ☐
- Sapric ☐

Mineral Hydric Soil
- Gravelly ☐
- Sandy ☐
- Silty ☐
- Clayey ☐

GEOLOGY

Surficial: Glacial till

Bedrock: Granite/Gneiss

Comments: Ponds enlarged and emergent vegetation added

PLANT SPECIES

ADDED

Species	OW	FW	F	FU	OU	DOM	COM	OCC	C	S	TS	LS	H
Iris versicolor	X							X					X
Juncus effusus	X							X					X
Peltandra virginica	X							X					X
Pontederia cordata	X							X					X
Saggitaria lat.	X							X					X
Schoenoplectus	X							X					X
button bush (shrub)	X							X					X

OW	Obligate Wetland	COM	Common
FW	Facultative Wetland	OCC	Occasional
F	Facultative	C	Canopy
FU	Facultative Upland	S	Sapling
OU	Obligate Upland	TS	Tall Shrub
DOM	Dominant	LS	Low Shrub
		H	Herb

PRE-EMPTIVE STATUS

no	Public ownership	no	Documented habitat for state or federal listed species
no	Wildlife management area	no	Regionally scarce wetland category
no	Fisheries management area	no	Historic/archaeologic area
no	Designated State or Federal protected wetland		

WETLAND INVENTORY DATA (continued)

PART 2 - CHARACTERIZATION of MODEL VARIABLES

LANDSCAPE VARIABLES

e:
- [x] Small (<10 acres)
- [ ] Medium (10-100 acres)
- [ ] Large (>100 acres)

tland Juxtaposition:
- [ ] Connected Upstream and Downstream
- [ ] Only Connected Above
- [x] Only Connected Below
- [ ] Other Wetlands Nearby but not Connected
- [ ] Wetland Isolated

e Occurence and Frequency:
- [ ] Natural; Predictable Frequency
- [ ] Natural; Sporadic Frequency
- [ ] Human-caused; Predictable
- [ ] Human-caused; Sporadic
- [ ] Rare Event
- [x] No Evidence

ional Scarcity:
- [x] Not Scarce (>5% of total wetland area of region)
- [ ] Scarce (<5% of total wetland area of region)

tershed Land Use:
- [x] > 50% urbanized
- [ ] 25-50% urbanized
- [ ] 0-25% urbanized

HYDROLOGIC VARIABLES

ace Water Level Fluctuation of Wetland:
- [ ] High Fluctuation
- [x] Low Fluctuation
- [ ] Never Inundated

uency of Overbank Flooding:
- [ ] Return Interval > 5 yrs.
- [ ] Return Interval 2-5 yrs.
- [ ] Return Interval 1-2 yrs.
- [x] No Overbank Flooding

- [ ] Acid <5.5
- [x] Circumneutral 5.5-7.4
- [ ] Alkaline >7.4
- [ ] No Water

icial Geologic Deposit Under Wetland
- [ ] Low Permeability Stratified Deposits
- [ ] High Permeability Stratified Deposits
- [x] Glacial Till

land Land Use:
- [x] High Intensity (ie. agriculture)
- [ ] Moderate Intensity (ie. forestry)
- [ ] Low Intensity (ie. open space)

land Water Regime:
- [x] Wet: Perm Flooded, Intermittently Exposed, Semiperm. Flooded
- [ ] Drier: Seasonally Flooded, Temporarily Flooded, Saturated

n Topographic Gradient:
- [x] High Gradient >2%
- [ ] Low Gradient <2%

ee of Outlet Restriction:
- [x] Restricted Outflow
- [ ] Unrestricted Outflow
- [ ] No Outflow

o of Wetland Area to Watershed Area:
- [ ] High >10%
- [x] Low <10%

Microrelief of Wetland Surface:
- [ ] Pronounced >45 cm
- [ ] Well Developed 15-45 cm
- [ ] Poorly Developed <15 cm
- [x] Absent

Inlet/Outlet Class:
- [ ] No Inlet/No Outlet
- [ ] No Inlet/Intermittent Outlet
- [x] No Inlet/Perennial Outlet
- [ ] Intermittent Inlet/No Outlet
- [ ] Intermittent Inlet/Intermittent Outlet
- [ ] Intermittent Outlet/Perennial Outlet
- [ ] Perennial Inlet/No Outlet
- [ ] Perennial Inlet/ Intermittent Outlet
- [ ] Perennial Inlet/Perennial Outlet

Nested Piezometer Data:
- [ ] Recharge
- [ ] Discharge
- [ ] Horizontal Flow
- [x] Not Available

Relationship of Wetlands' Substrate Elevation to Regional Piezometric Surface:
- [ ] Piez. Surface Above or at Substrate elev.
- [ ] Piez. Surface below Substrate elev.
- [x] Not Available

Evidence of Sedimentation:
- [ ] No Evidence Observed
- [x] Sediment Observed on Wetland Substrate
- [ ] Fluvaquent Soils

Evidence of Seeps and Springs:
- [x] No Seeps or Springs
- [ ] Seeps Observed
- [ ] Perennial Spring
- [ ] Intermittent Spring

SOIL VARIABLES

Soil Lacking:
- [ ]

Histosol:
- [ ] Fibric
- [ ] Hemic
- [ ] Sapric

Mineral Hydric Soil:
- [ ] Gravelly
- [ ] Sandy
- [x] Silty
- [ ] Clayey

VEGETATION VARIABLES

Vegetation Lacking:
- [ ]

Dominant Wetland Type:
- [ ] Forested - Evergreen - Needle-leaved
- [ ] Forested - Deciduous - Broad-leaved
- [ ] Forested - Deciduous - Needle-leaved
- [ ] Scrub Shrub - Evergreen - Broad-leaved
- [ ] Scrub Shrub - Evergreen - Needle-leaved
- [ ] Scrub Shrub - Deciduous - Broad-leaved
- [ ] Scrub Shrub - Deciduous - Needle-leaved
- [ ] Emergent - Persistent
- [x] Emergent - Non-persistent
- [ ] Aquatic Bed

Number of Types & Relative Proportions:

Number of Types	Evenness of Distribution
[ ] Actual #	[ ] Even Distribution
[ ] 5	[ ] Moderately Even Distribution
[ ] 4	[x] Highly Uneven Distribution
[ ] 3	
[ ] 2	
[x] 1	

Vegetation Density/Dominance:
- [x] Sparse (0-20%)
- [x] Low Density (20-40%)
- [ ] Medium Density (40-60%)
- [ ] High Density (60-80%)
- [ ] Very High Density (80-100%)

Vegetative Interspersion:
- [ ] High (small groupings, diverse and interspersed)
- [ ] Moderate (broken irregular rings)
- [ ] Low (large patches, concentric rings)

Number of Layers and Percent Cover:

Number of Layers	% Cover
[ ] 6 or > (actual #)	1. submergents:
[ ] 5	2. floating: 2%
[ ] 4	3. moss-lichen:
[ ] 3	4. short herb: 93 % emergent.
[x] 2	5. tall herb:
[ ] 1	6. dwarf shrub:
	7. short shrub: 5 %
	8. tall shrub:
	9. sapling:
	10. tree:

Plant Species Diversity:
- [ ] Low 1-2 plots sampled
- [x] Medium 3-4 plots sampled
- [ ] High 5 or more plots sampled

Proportion of Animal Food Plants:
- [ ] Low (5-25% cover)
- [x] Medium (25-50% cover)
- [ ] High (>50% cover)

Cover Distribution:
- [ ] Continuous Cover
- [ ] Small Scattered Patches
- [x] 1 or More Large Patches; Parts of Site Open
- [ ] Solitary, Scattered Stems

Dead Woody Material:
- [ ] Abrundant (>50 of wetland surface)
- [ ] Moderately Abrundant (25-50% of surface)
- [x] Low Abrundance (0-25% of surface)

Interspersion of Cover and Open Water:
- [ ] 26-75% Scattered or Peripheral
- [x] >75% Scattered or Peripheral
- [ ] <25% Scattered or Peripheral
- [ ] 100% Cover or Open Water

Stream Sinuosity: N/A
- [ ] Highly Convoluted (index 1.50 or >)
- [ ] Moderately Convoluted (index 1.25-1.50)
- [ ] Straight/Slightly Irreg. (index) 1.10-1.25

Presence of Islands:
- [ ] Several to Many
- [x] One or Few
- [ ] Absent

2.9.1 Modification of Ground Water Discharge

VARIABLES	CONDITIONS HGM TYPES:	D	S	R	F
		WEIGHTS			
Indicators of Disfunction					
• Inlet/Outlet Class	• perennial inlet/no outlet	0	0	0	0
• Nested Piezometer Data	• recharge condition	0	0	0	0
• Relationship to Regional Piezometric Surface	• wetland substrate elevation above piezometric surface	0	0	0	0
Direct Indicators of Function					
• Presence of Springs and Seeps	• evidence of perennial seeps or springs	18	15	15	18
• Nested Piezometer Data	• discharge condition	18	15	15	18
• Relationship to Regional Peizometeric Surface	• wetland substrate elevation below piezometric surface	18	15	15	18
• Inlet/Outlet Class	• no inlet/perennial outlet	18	15	15	18
Primary Variables					
• Microrelief of Wetland Surface	• pronounced	3	3	3	3
	• well developed	2	2	2	2
	• poorly developed	1	1	1	1
	• absent	0	0	0	0
• Inlet/Outlet Class	• perennial inlet/perennial outlet	3	3	0	3
	• intermittent inlet/perennial outlet	2	2	0	2
	• all other classes	0	0	0	0
• pH	• alkaline	3	3	3	3
	• circumneutral	2	2	2	2
	• acid	0	0	0	0
	• no water present	0	0	0	0
• Surficial Geologic Deposit Under Wetland	• high permeability stratified deposits	3	3	3	3
	• low permeability stratified deposits	2	2	2	2
	• glacial till	1	1	1	1
• Wetland Water Regime	• wet; permanently flooded, intermittently exposed, semipermanently flooded	3	0	3	3
	• drier; seasonally flooded, temporarily flooded, saturated	1	0	1	1

(continued)

2.9.1 **Modification of Ground Water Discharge** (Continued) N/A

VARIABLES	CONDITIONS HGM TYPES:	D	S	R	F
		WEIGHTS			
• Soil Type	• histosol	3	3	3	3
	• mineral hydric soil	1	1	1	1
		–	–	–	–
	Total Score:				
	Model Range:	3-18	2-15	3-15	3-18
	Functional Capacity Index:	Total Score / 18	/ 15	/ 15	/ 18
	Index Range:	0.19-1.0	0.16-1.0	0.22-1.0	0.19-1.0

Note: This model can be applied to both year long and seasonal discharge wetlands.

If the wetland is seasonally fluctuating between recharge and discharge, then reduce the above score by one half (1/2), because the wetland only functions in a discharge mode for roughly half the year.

2.9.2 **Modification of Ground Water Recharge**

VARIABLES	CONDITIONS HGM TYPES:	D	L	EP	R	F
		WEIGHTS				
Indicators of Disfunction						
• Inlet/Outlet Class	• no inlet/perennial outlet; intermittent inlet/perennial outlet	0				0
• Nested Piezometer Data	• discharge condition	0	0	0	0	0
• Relationship to Regional Piezometric Surface	• wetland substrate elevation above or at piezometric surface	0	0	0	0	0
• Presence of Seeps and Springs	• presence of seeps or springs	0	0	0	0	0

(continued)

2.9.3 Storm and Flood-Water Storage

VARIABLES	CONDITIONS	HGM TYPES: D	S	L	EP	R	F
		WEIGHTS					
Indicators of disfunction	none						
Direct Indicators of Function	no outlet	27	21				30
Primary Variables							
• Inlet/Outlet Class	• perennial inlet/intermittent outlet	3	3	0	0	0	3
	• intermittent inlet/intermittent outlet	2	2	0	0	0	2
	• no inlet/intermittent outlet	1	1	0	0	0	1
	• non inlet/perennial outlet	1	1	0	0	0	1
	• intermittent inlet/perennial outlet	1	1	0	0	0	1
	• perennial inlet/perennial outlet	1	1	0	0	0	1
• Degree of Outlet Restriction	• restricted	3	0	0	0	0	3
	• unrestricted	0	0	0	0	0	0
• Basin Topographic Gradient	• low gradient	3	3	0	3	3	3
	• high gradient	1	1	0	0	1	1
• Wetland Water Regime	• Drier: seasonally flooded, temporarily flooded, saturated	3	3	3	0	3	3
	• Wet: permanently flooded, intermittently exposed, semipermanently flooded	1	1	1	0	1	1
• Surface Water Level Fluctuation of the Wetland	• high fluctuation	3	0	3	0	3	3
	• low fluctuation	2	0	2	0	2	2
	• never inundated	0	0	0	0	0	0
• Ratio of Wetland Area to Watershed Area	• large	3	3	3	0	3	3
	• small	1	1	1	0	1	1
• Microrelief of Wetland Surface	• pronounced	3	3	3	3	3	3
	• well developed	2	2	2	2	2	2
	• poorly developed	1	1	1	1	1	1
	• absent	0	0	0	0	0	0
• Frequency of Overbank Flooding	• overbank flooding absent	0	0	0	0	0	0
	• return interval of >5 yrs	0	0	1	0	1	1
	• return interval of 2-5 yrs	0	0	2	0	2	2
	• return interval of 1-2 yrs	0	0	3	0	3	3
• Vegetation Density/Dominance	• high/very high	3	3	3	3	3	3
	• moderate	2	2	2	2	2	2
	• sparse/low	1	1	1	1	1	1
	• no vegetation	0	0	0	0	0	0

(continued)

2.9.5 Modification of Water Quality

VARIABLES	CONDITIONS	HGM TYPES: D	S	L	EP	R	F
		WEIGHTS					
Indicators of disfunction	none						
Direct Indicators of Function	evidence of sedimentation	18	15	12	12	12	18
Primary Variables							
• Wetland Land Use	• low intensity	3	3	3	3	3	3
	• moderate intensity	2	2	2	2	2	2
	• high intensity	1	1	1	1	1	1
• Degree of Outlet Restriction	• restricted outflow	3	0	0	0	0	3
	• no outlet	2	0	0	0	0	2
	• unrestricted outflow	1	0	0	0	0	1
• Inlet/Outlet Type	• no outlet	3	3	0	0	0	3
	• intermittent outlet	2	2	0	0	0	2
	• perennial outlet	1	1	0	0	0	1
• Dominant Wetland Type	• forested wetland	3	3	3	3	3	3
	• scrub-shrub	2	2	2	2	2	2
	• emergent wetland	2	2	2	2	2	2
	• aquatic bed	1	0	0	0	0	0
	• no vegetation	0	0	0	0	0	0
• Cover Distribution	• forming a continuous cover	3	3	3	3	3	3
	• growing in small scattered patches	2	2	2	2	2	2
	• one or more large patches	1	1	1	1	1	1
	• solitary scattered stems	1	1	1	1	1	1
	• no vegetation	0	0	0	0	0	0
• Soil Type	• histosol or clayey soil	3	3	3	3	3	3
	• silty soil	2	2	2	0	2	2
	• sandy or gravelly soil	1	1	1	0	1	1
	Total Score:	10					
	Model Range:	4-18	3-15	2-12	1-12	2-12	4-18
	Functional Capacity Index:	Total Score / 18	— / 15	6 / 12	— / 12	— / 12	— / 18
	Index Range:	0.22-1.0	0.20-1.0	0.16-1.0	0.8-1.0	0.16-1.0	0.22-1.0

.55 .5 .53

2.9.6 Export of Detritus

VARIABLES	CONDITIONS	HGM TYPES: D	S	L	EP	R	F
		WEIGHTS					
Indicators of disfunction	no outlet	0	0		0		0
Direct Indicators of Function	none						
Primary Variables							
• Wetland Land Use	• moderate intensity	3	3	3	3	3	3
	• low intensity	2	2	2	2	2	2
	• high intensity	1	1	1	1	1	1
• Degree of Outlet Restriction	• unrestricted outflow	3	0	0	0	0	3
	• restricted outflow	1	0	0	0	0	1
• Inlet/Outlet Class	• perennial outlet	3	3	0	0	0	3
	• intermittent outlet	1	1	0	0	0	1
• Wetland Water Regime	• drier: seasonally flooded, temporarily flooded, saturated	3	3	3	0	3	3
	• wet: permanently flooded, intermittently exposed, semipermanently flooded	1	1	1	1	1	1
• Vegetation Density/Dominance	• high/very high	3	3	3	3	3	3
	• medium	2	2	2	2	2	2
	• sparse/low	1	1	1	1	1	1
	• no vegetation	0	0	0	0	0	0
• Soil Type	• mineral hydric soil	3	3	3	3	3	3
	• histosol	1	1	1	1	1	1
	Total Score:	10		7			
	Model Range:	5-18	4-15	3-12	2-10	3-12	5-18
	Functional Capacity Index:	Total Score / 18	— / 15	7 / 12	— / 10	— / 12	— / 18
	Index Range:	0.27-1.0	0.26-1.0	0.25-1.0	0.20-1.0	0.25-1.0	0.27-1.0

.56 (Avg) .58 = .57

2.9.7 Contribution to Abundance and Diversity of Wetland Vegetation
(This model is identical for all HGM types)

VARIABLES		CONDITIONS	WEIGHTS
Indicators of Disfunction		no vegetation	0
Direct Indicators of Function		none	
Primary Variables			
•	Plant Species Diversity	• high diversity • medium diversity • low diversity	5 3 1
•	Vegetation Density/Dominance	• high/very high • medium • sparse/low	5 3 1
•	Wetland Juxtaposition	• connected upstream and downstream • connected above or below • other wetlands nearby but not connected (400 m or closer) • isolated	5 3 1 0
		Total Score:	9
		Model Range:	2-15
		Functional Capacity Index:	= Total Score / 15
		Index Range:	0.13-1.0

.6

2.9.8 Contribution to Abundance and Diversity of Wetland Fauna

(This model is identical for all HGM types except Slope Wetlands for which "Interspersion of Vegetation Cover and Open Water" does not apply))

VARIABLES	CONDITIONS	WEIGHTS
Direct Indicators of Disfunction	none	
Direct Indicators of Function	none	
Primary Variables		
• Watershed Land Use	• low intensity (0-25% urbanized)	3
	• moderate intensity (25-50% urbanized)	2
	• high intensity (>50% urbanized)	1
• Wetland Land Use	• low intensity	3
	• moderate intensity	2
	• high intensity	1
• Wetland Water Regime	• wet: permanently flooded, intermittently exposed, semipermanently flooded	3
	• drier: seasonally flooded, temporarily flooded, saturated	1
• Microrelief of Wetland Surface	• pronounced	3
	• well developed	2
	• poorly developed	1
	• absent	0
• Number of Wetland types and Relative Proportions	• 5 or more types	3
	• 3-4 types	2
	• 1-2 types	1
	• no vegetation	0
	• even distribution	3
	• moderately even distribution	2
	• highly uneven distribution	1
	• no vegetation	0
• Vegetation Interspersion	• high interspersion	3
	• moderate interspersion	2
	• low interspersion	1
	• no vegetation	0
• Number of Layers and Percent Cover	• 5 or more layers	3
	• 3-4 layers	2
	• 1-2 layers	1
	• no vegetation	0
	• layers well developed (>50% cover)	3
	• layers with moderate cover (26-50% cover)	2
		1
	• layers poorly distinguishable (<25% cover)	0
	• no vegetation	0

(continued)

2.9.8 Contribution to Abundance and Diversity of Wetland Fauna (Continued)

VARIABLES	CONDITIONS	WEIGHTS
• Interspersion of Vegetation Cover and Open Water	• 26-75% scattered or peripheral	3
	• >75% scattered or peripheral	2
	• <25% scattered or peripheral	1
	• 100% cover or open water	1
	• no vegetation	0
• Size	• large (> 100 acres)	3
	• medium (10-100 acres)	2
	• small (< 10 acres)	1
• Wetland Juxtaposition	• other wetlands within 400 m and connected above or below	3
	• other wetlands within 400 m but not connected	1
	• wetland isolated	0

Slope Wetlands:

Model Range: 4-33

Functional Capacity Index = Total Score / 33

Index Range: 0.12-1.0

All Other HGM Types:

Total Score: 17

Model Range: 4-36

Functional Capacity Index = Total Score / 36

Index Range 0.11-1.0

.47

Region 3 Upland Disposal/Management of Dredged Sediments

The following guidance is applicable to projects in Region 3 (Westchester, Putnam, Dutchess, Rockland, Orange, Sullivan and Ulster Counties) which involve upland disposal/management of dredged sediments where such disposal/management is not authorized under a permit issued pursuant Article 15, 24, 25 or 34 of the Environmental Conservation Law or a Water Quality Certification issued under section 401 of the Federal Water Pollution Control Act.

Dredged sediments which are not managed in accordance with a permit issued under the authorities listed above are a solid waste subject to regulation under 6 NYCRR Part 360 Solid Waste Management Facilities Regulations. Part 360 regulations require disposal at an authorized solid waste management facility. As an alternative to disposal in a landfill, under certain circumstances, dredged sediments can be managed in accordance with a generic or case-specific beneficial use determination (BUD). Requirements for obtaining a BUD are outlined below.

Dredged spoils which are determined to be uncontaminated, cease to be a solid waste and are unregulated when used as fill material in accordance with the generic BUD at 6 NYCRR Part 360-1.15(b)(7). Dredge spoils which exhibit moderate levels of contamination may still be eligible for beneficial use but require a case-specific BUD issued by the Department in accordance with 6 NYCRR Part 360-1.15(d). In either case, it is necessary to sample the dredged sediments, perform chemical analysis and submit the results of analysis to the Department for review. To assist applicants in collecting appropriate sediment quality data to support reliance on the generic BUD or issuance of a case-specific BUD, the following sampling and analysis guidelines are provided. This information is presented as guidance only and alternative sampling/analysis plans may be approved on a case by case basis. Applicants are encouraged to contact the Region 3/solid waste program at 845-256-3134 to discuss sampling requirements for specific projects. Prior to carrying out the sampling, it is recommended that a sediment sampling and analysis plan be submitted to the Department for review and comment. For all dredging projects in Region 3, applicants should contact the Division of Environmental Permits at 845-256-3054 to determine applicable permit requirements.

Sampling Method: Collect undisturbed dredge cores which are representative of the entire depth interval and the entire dredge project area.

The number of samples required are based on the number of cubic yards to be dredged. The number required are as follows:

Sample Requirements	
# Cubic Yards	**Minimum # Samples**
Under 5,000	1 for each 1,000 Cubic Yards
5,000-10,000	6
10,000-20,000	7
20,000-30,000	8
Over 30,000	* Contact DEC *

The Department may require additional samples in areas of known contamination. In cases where sampling costs appear excessive in relation to total project costs (i.e., greater than 15%), contact the Regional Office to discuss ways of reducing sampling costs while maintaining adequate characterization of sediment characteristics.

Parameters to be Analyzed:

At a minimum, each sample should be analyzed for volatile organic compounds (EPA 8260B), semi-volatile organic compounds (EPA 8270C), pesticides (EPA 8081A), PCBs (EPA 8082), and the following toxic metals (EPA6010B): arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc.

In case where sediments to be dredged consist primarily of sand and gravel, requirements for chemical testing may be waived. In such cases, applicants should submit results of testing for particle size analysis and total organic carbon. In general, chemical analysis will not be required for samples which contain less than 10% of particles passing the number 200 sieve and less than 0.5% total organic carbon.

APPENDIX I

LEGGETTE, BRASHEARS & GRAHAM, INC.

PROFESSIONAL GROUNDWATER AND
ENVIRONMENTAL ENGINEERING SERVICES
----
4 RESEARCH DRIVE, SUITE 301
SHELTON, CT 06484
(203) 929-8555
FAX (203) 926-9140
www.lbgweb.com

February 12, 2013

Mr. Jeffrey Mendell
Senior Project Manager
Corigin Real Estate Group
505 Fifth Avenue
New York, NY 10017

Via Electronic Transmission

RE: Surface-Water Sampling Program
Brynwood Golf & Country Club
Armonk, New York

Dear Mr. Mendell:

The following Surface-Water Sampling Program is proposed for the Brynwood Golf & Country Club to address the item in Section IV.I.1.a in the Draft Environmental Impact Statement (DEIS), Scope of Issues to be Addressed, January 23, 2013. The sampling program has been designed to monitor existing and future stormwater runoff water-quality from the project site.

Onsite Surface-Water Features

The Brynwood Club property is located near the upgradient edge of the local watershed boundary (figure 1). The main surface-water features at the project site consist of five irrigation ponds located in the central area of the golf course and a stream which originates in the center of the property and flows west to the property boundary (figure 2).

The majority of the stormwater runoff collected from the upgradient area of the property is discharged into the onsite irrigation ponds. The central stream channel is fed by overflow from the irrigation ponds as well as discharge from the onsite wastewater treatment facility.

A small wetland area with an intermittent stream is also present along the southwestern property boundary. This surface-water feature encompasses a very small portion of the project site and is not part of the onsite stormwater system and does not receive any other man-made discharges from the property. This wetland feature is not considered a significant onsite surface-water feature for this sampling program.

Surface-Water Sampling Location

One surface-water sampling location is proposed in the central stream channel on the project (figure 2). The sampling location is downstream of the confluence of the irrigation pond outflow channels and the wastewater treatment plant discharge. Samples collected from this location will be representative of the surface-water quality exiting the property.

Because of the location of the project site near the upgradient watershed boundary (figure 1), there are no significant sources of surface water entering the project site from upstream/upgradient locations. Therefore, no entry point surface-water sample locations are proposed.

Surface-Water Sampling Frequency and Duration

Surface-water samples will be collected during a background monitoring period (pre-construction) and for a period of five year following the start of construction activities on the project site. During the background monitoring period, water samples will be collected once per month during the growing season (March through October) for one year. The surface-water samples will be collected following a precipitation event where the total precipitation exceeds 0.5 inch within a 24-hour period. This type of precipitation event occurs approximately one to three times per month during the growing season. The surface-water samples will be collected within 24 hours of the precipitation total reaching 0.5 inch. Precipitation monitoring will be conducted using a manual rain gage on the project site during the sampling program.

Following the start of construction, surface-water samples will be collected once per season (spring, summer and fall) during the growing season for a period of three years. After three years, assuming no significant water-quality concerns have been noted, the sampling frequency will be reduced to twice per year (spring and fall) for two years. This is a total of six years of surface-water monitoring, including the background monitoring phase (approximately 1 year) and the site development phase (5 years). If at the end of the proposed sampling program period no significant water-quality concerns have been noted, the surface-water sampling program will be discontinued.

Sampling Parameters

For each proposed sampling event, surface-water samples will be collected and analyzed for nitrate, nitrite, total phosphorous, total suspended solids, biological oxygen demand, turbidity and chloride. In addition, the physical parameters of pH, temperature, specific conductance and dissolved oxygen will be measured from surface-water at the sampling location using a hand-held water-quality meter at the time the samples are collected.

Physical parameter and analytical water-quality results will be recorded on the attached summary table. The data will be compared to the Class GA groundwater and Class A surface water standards and/or guidance values presented in the New York State Department of Environmental Conservation (NYSDEC), Division of Water Technical and Operational Guidance Series 1.1.1 (TOGS); Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, 1998 (revised 2004) and Analytical Detectability and Quantitation Guidelines for Selected Environmental Parameters, 1998.

Reporting

A summary of the surface-water quality results from the sampling program will be included in the DEIS/FEIS submissions for the project. Following receipt of project approval, annual reports will be submitted to the Town Engineer until the discontinuation of the sampling program according to the schedule described above.

Should you have any questions, please contact LBG at (203) 929-8555.

Very truly yours,

LEGGETTE, BRASHEARS & GRAHAM, INC.

Stacy Stieber
Senior Hydrogeologist

Reviewed by:

Thomas P. Cusack, CPG
Principal

SS:cmm
Enclosures
cc: Robert Roth – John Meyer Consulting
H:\Brynwood\2013\Proposed sampling program.doc

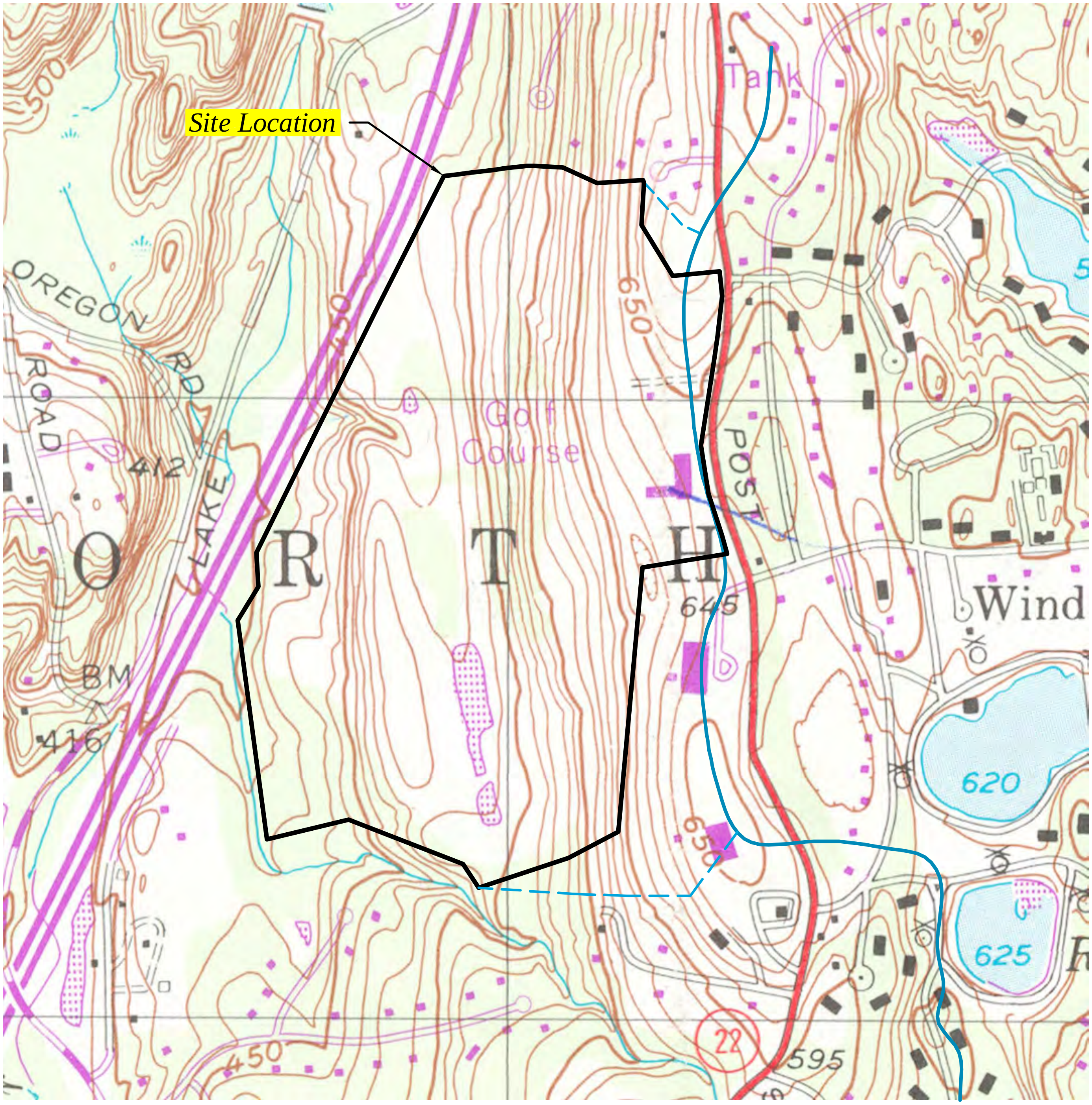
BRYNWOOD GOLF & COUNTRY CLUB
ROUTE 22
ARMONK, NEW YORK

Surface-Water Quality Physical Parameters and Laboratory Results

Sample Date	Sample Time	Precipitation Total (inches)	pH (S.U.)	Temperature (^{o}C)	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/l)	Nitrate (mg/l)	Nitrite (mg/l)	Total Phosphorous (mg/l)	TSS (mg/l)	BOD (mg/l)	Turbidity (NTU)	Chloride (mg/l)
NYSDEC Guidance Value			6.0-9.0	--	--	--	10	1	0.02	20	2	--	250

TSS Total Suspended Solids
BOD Biological Oxygen Demand
S.U. standard unit
mS/cm millisiemens per centimeter
mg/l milligrams per liter
NTU nephelometric turbidity unit

H:\Brynwood\2013\Summary table.doc



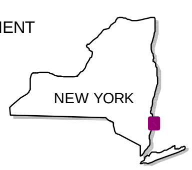
SOURCE: USGS TOPOGRAPHIC QUADRANGLE MOUNT KISCO, NEW YORK-CONNECTICUT (1998)

LEGEND

PROPERTY BOUNDARY

WATERSHED BOUNDARY

EXTENT OF UPGRADIENT RECHARGE AREA



QUADRANGLE LOCATION

0 800

SCALE IN FEET

N

BRYNWOOD GOLF & COUNTRY CLUB
ROUTE 22
ARMONK, NEW YORK

WATERSHED AREA

DATE	REVISED	PREPARED BY: LEGGETTE, BRASHEARS & GRAHAM, INC. Professional Groundwater and Environmental Engineering Services 4 Research Drive Suite 301 Shelton, Connecticut 06484 (203) 929-8555

DRAWN:	RAC	CHECKED:	SS	DATE:	02/06/13	FIGURE:	1

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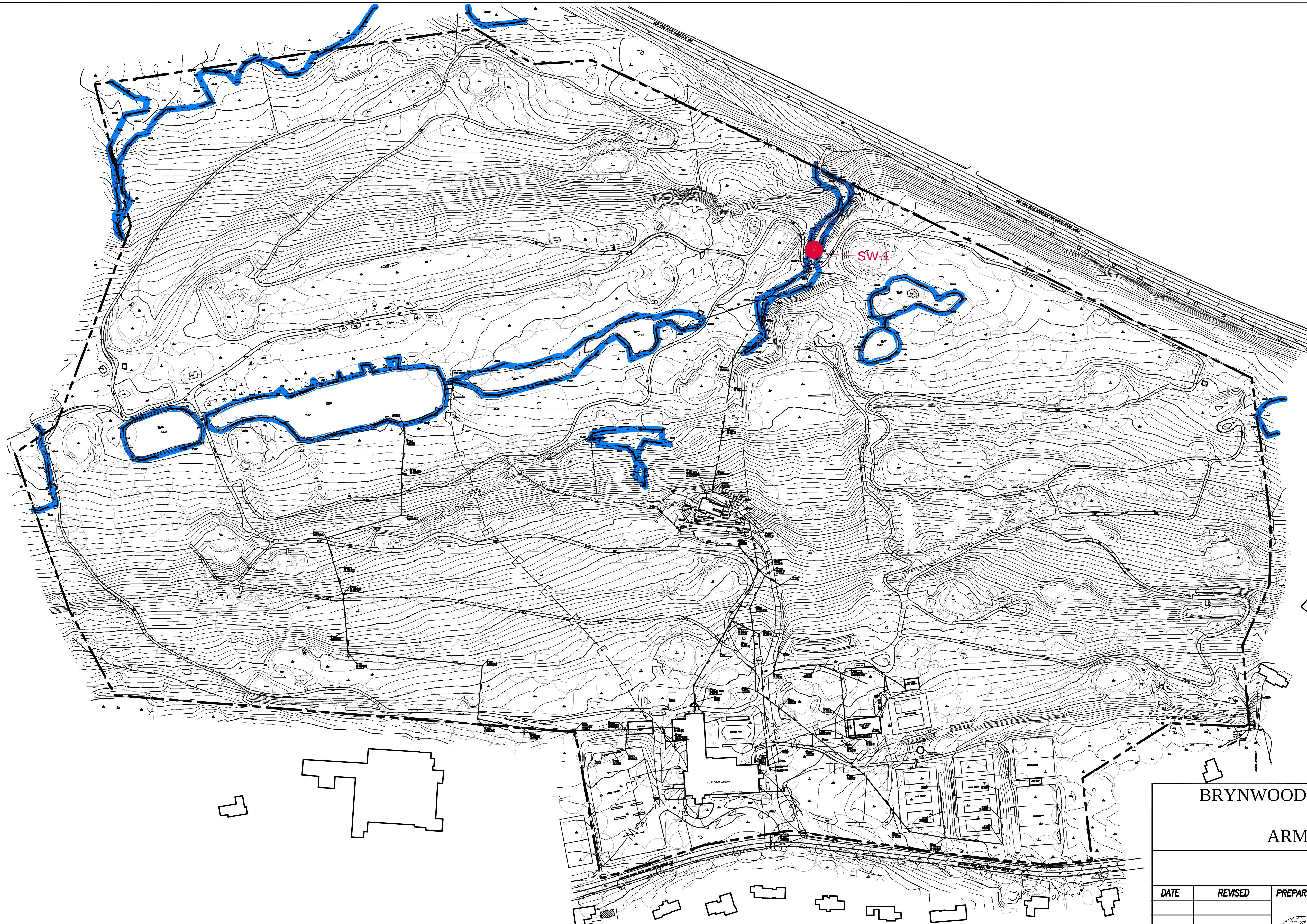

LEGEND

PROPERTY BOUNDARY

WETLAND/SURFACE WATER EXTENT

SW-1 SAMPLE LOCATION

BRYNWOOD GOLF & COUNTRY CLUB
ROUTE 22
ARMONK, NEW YORK

SITE MAP

DATE	REVISED

PREPARED BY: LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Groundwater and Environmental Engineering Services
4 Research Drive
Suite 301
Shelton, Connecticut 06484
(203) 929-8555

DRAWN:	RAC	CHECKED:	SS	DATE:	02/06/13	FIGURE:	2

LEGGETTE, BRASHEARS & GRAHAM, INC.

PROFESSIONAL GROUNDWATER AND
ENVIRONMENTAL ENGINEERING SERVICES

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4 RESEARCH DRIVE, SUITE 301
SHELTON, CT 06484
(203) 929-8555
FAX (203) 926-9140
www.lbgweb.com

May 13, 2013

Mr. Jeffrey Mendell
Senior Project Manager
Corigin Real Estate Group
505 Fifth Avenue
New York, NY 10017

Via Electronic Transmission

RE: Surface-Water Sampling Program
Brynwood Golf & Country Club
Armonk, New York

Dear Mr. Mendell:

The following are the water-quality results to date for the Surface-Water Sampling Program the was initiated at the Brynwood Golf & Country Club (figure 1) in March 2013 to address the item in Section IV.I.1.a in the Draft Environmental Impact Statement (DEIS), Scope of Issues to be Addressed, January 23, 2013. The sampling program has been designed to monitor existing and future storm-water runoff water quality from the project site.

Surface-Water Sampling Location

Surface-water samples were collected from one surface-water sampling location in the central stream channel on the project (figure 2). The sampling location is downstream of the confluence of the irrigation pond outflow channels and the wastewater treatment plant discharge. Samples collected from this location are representative of the surface-water quality exiting the property.

Because of the location of the project site near the upgradient watershed boundary (figure 1), there are no significant sources of surface water entering the project site from upstream/upgradient locations. Therefore, no entry point surface-water sample locations are present.

Surface-Water Samples Collected

Currently, the surface-water sample collection schedule is on a once per month basis and the samples are collected following a precipitation event where the total precipitation exceeds 0.5 inch within a 24-hour period. The surface-water samples are collected within 24 hours of the precipitation total reaching 0.5 inch. Precipitation monitoring was conducted using a manual rain gage on the project site during the sampling program.

To date, two sampling events have been conducted, the first on March 28, 2013 and the second on April 12, 2013. The samples collected were taken to York Analytical Laboratories, Inc. in Stratford, CT for analysis for nitrate, nitrite, total phosphorous, total suspended solids, biological oxygen demand, turbidity and chloride. In addition, the physical parameters of pH, temperature, specific conductance and dissolved oxygen were measured from surface water at the sampling location using a hand-held water-quality meter at the time the samples were collected.

The results of the laboratory analyses and physical parameter measurements collected are shown table 1. The sample results have been compared to Class GA groundwater and Class A surface-water standards and/or guidance values presented in the New York State Department of Environmental Conservation (NYSDEC), Division of Water Technical and Operational Guidance Series 1.1.1 (TOGS); Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, 1998 (revised 2004) and Analytical Detectability and Quantitation Guidelines for Selected Environmental Parameters, 1998. No criteria exceedances have been reported in the samples collected to date. Copies of the laboratory reports for the March and April sampling events are included in Appendix I.

The surface-water sampling program will continue with sample collection scheduled to be conducted once per month through November 2013. As proposed, following the start of construction, surface-water samples will be collected once per season (spring, summer and fall) during the growing season for a period of three years. After three years, assuming no significant water-quality concerns have been noted, the sampling frequency will be reduced to twice per year (spring and fall) for two years. This is a total of six years of surface-water monitoring, including the background monitoring phase (approximately 1 year) and the site development phase (5 years). If at the end of the proposed sampling program period no significant water-quality concerns have been noted, the surface-water sampling program will be discontinued.

Should you have any questions, please contact LBG at (203) 929-8555.

Very truly yours,

LEGGETTE, BRASHEARS & GRAHAM, INC.

Stacy Stieber
Senior Hydrogeologist

Reviewed by:

Thomas P. Cusack, CPG
Principal

SS:cmm
Enclosures
cc: Robert Roth
H:\Brynwood\2013\Sampling program May 2013 summary.doc

TABLE

TABLE 1

BRYNWOOD GOLF & COUNTRY CLUB
ROUTE 22
ARMONK, NEW YORK

Surface-Water Quality Physical Parameters and Laboratory Results

Sample Date	Sample Time	Precipitation Total (inches)	pH (S.U.)	Temperature (^{o}C)	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/l)	Nitrate (mg/l)	Nitrite (mg/l)	Total Phosphorous (mg/l)	TSS (mg/l)	5-Day BOD (mg/l)	Turbidity (NTU)	Chloride (mg/l)
3/28/13	12:00	0.50	6.10	12.63	.201	12.65	1.02	ND<0.05	0.026	2.40	ND<1.0	0.850	22.1
4/12/13	10:00	0.60	6.04	9.40	.172	8.16	0.688	ND<0.05	0.185	12.8	ND<1.0	5.00	16.6
NYSDEC Guidance Value			6.0-9.0	--	--	--	10	1	--	20	2	--	250

TSS Total Suspended Solids
BOD Biological Oxygen Demand
S.U. standard unit
mS/cm millisiemens per centimeter
mg/l milligrams per liter
NTU nephelometric turbidity unit

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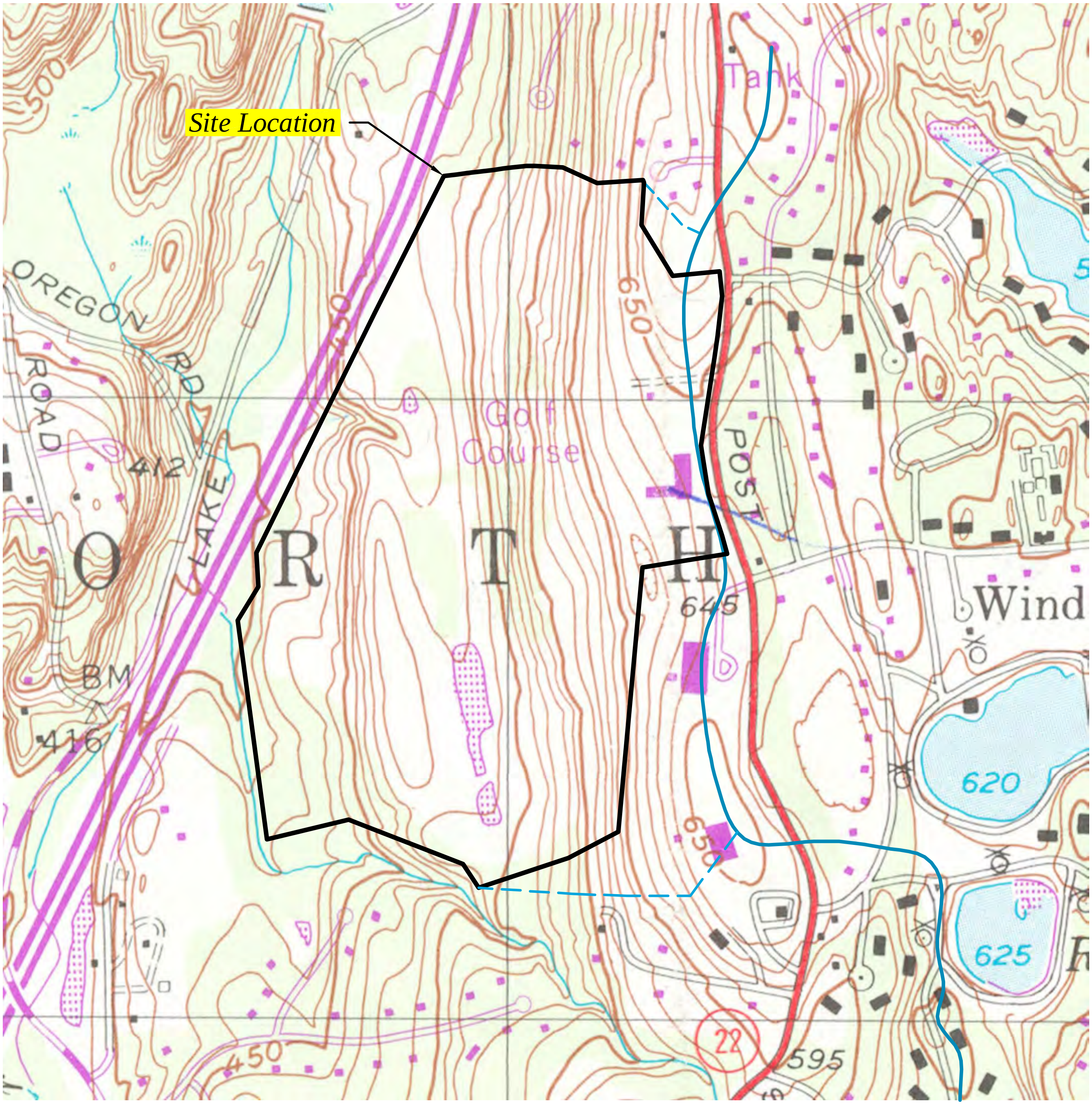
FIGURES



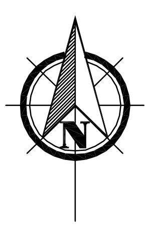
SOURCE: USGS TOPOGRAPHIC QUADRANGLE MOUNT KISCO, NEW YORK-CONNECTICUT (1998)

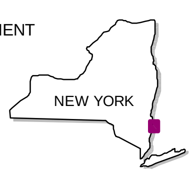
LEGEND

PROPERTY BOUNDARY

WATERSHED BOUNDARY

EXTENT OF UPGRADIENT RECHARGE AREA





QUADRANGLE LOCATION

0 800

SCALE IN FEET

BRYNWOOD GOLF & COUNTRY CLUB
ROUTE 22
ARMONK, NEW YORK

WATERSHED AREA

DATE	REVISED

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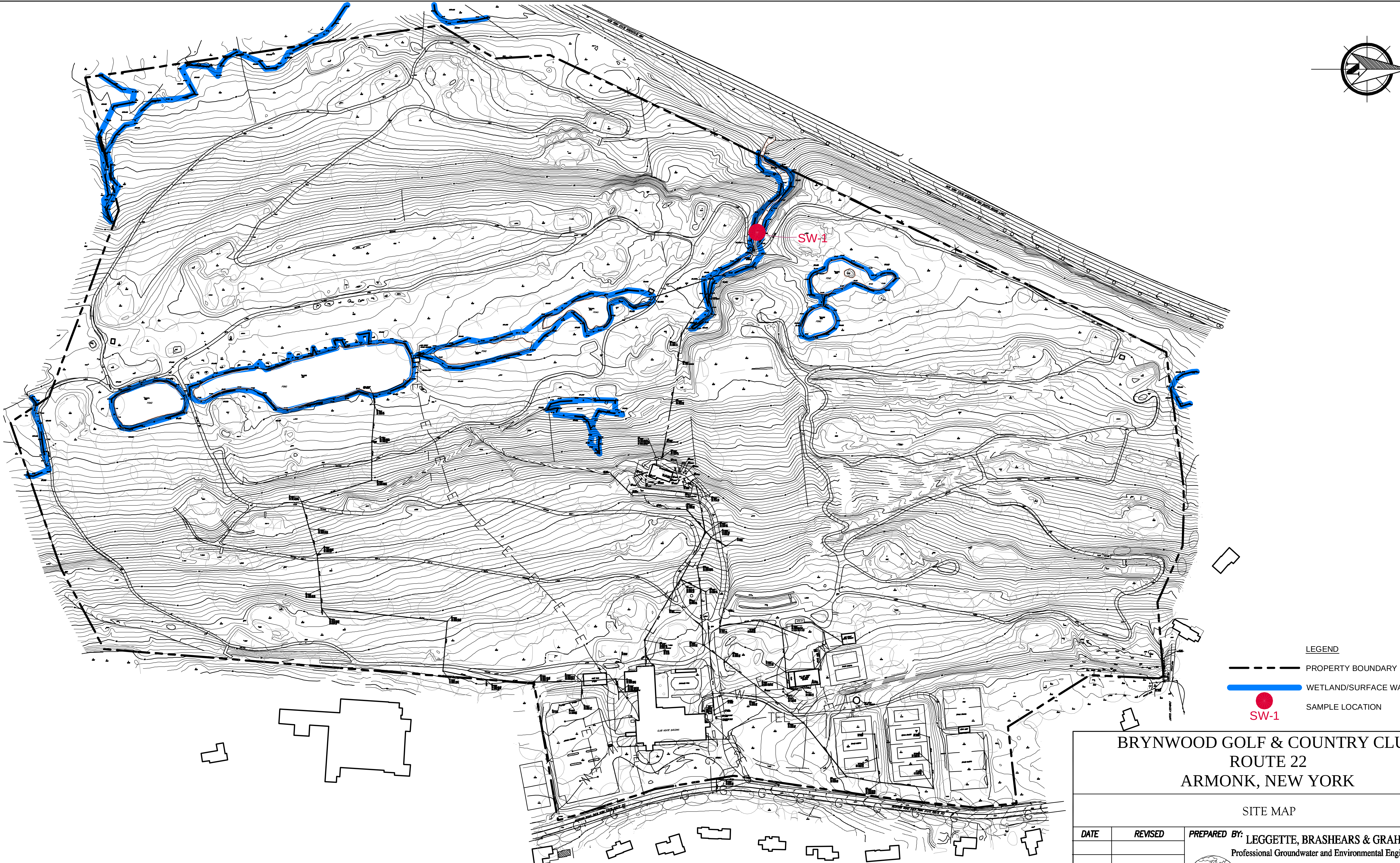
(203) 929-8555

DRAWN:	RAC	CHECKED:	SS	DATE:	02/06/13	FIGURE:	1



LEGEND

PROPERTY BOUNDARY

WETLAND/SURFACE WATER EXTENT

SAMPLE LOCATION

SW-1

0 300

SCALE IN FEET

BRYNWOOD GOLF & COUNTRY CLUB
ROUTE 22
ARMONK, NEW YORK

SITE MAP

DATE	REVISED

PREPARED BY: LEGGETTE, BRASHEARS & GRAHAM, INC.
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DRAWN:	RAC	CHECKED:	SS	DATE:	02/06/13	FIGURE:	2

APPENDIX J

TOWN OF NORTH CASTLE
WATER DISTRICT NO. 2 WELL FIELD PARCEL
(T) NORTH CASTLE, NEW YORK

Prepared For:

Town of North Castle

March 2013

Prepared By:

LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Groundwater and Environmental Engineering Services
4 Research Drive, Suite 301
Shelton, CT 06484

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TOWN OF NORTH CASTLE
WATER DISTRICT NO. 2 WELL FIELD PARCEL
(T) NORTH CASTLE, NEW YORK

INTRODUCTION

The following is a discussion of the potable water-supply development for the proposed Brynwood Project. The two alternatives that have been reviewed with the Town included the development of an onsite supply by drilling bedrock wells, which is presently being conducted on the Brynwood site, or interconnection to the Town of North Castle Water District No. 2-Windmill Farm. The following report focuses on an assessment of the second alternative which is interconnect to Water District No. 2 (the District). As part of the assessment, LBG conducted a hydrogeologic review additional of water-supply development alternatives on the District's well field parcel (figure 1). In addition, potential infrastructure upgrade requirements that would likely be needed to accommodate the connection of the Brynwood Project are outlined.

Water Demand

The proposed potable water-supply source for the Brynwood Project will provide water to the proposed 88 residential units and the community clubhouse. The irrigation requirements of the golf course will be supplied by the existing onsite irrigation ponds and are not considered here. The estimated average water demand for the 88 units and clubhouse is about 51,955 gpd (36.1 gpm).

The New York State Department of Health (NYSDOH) requires that a water-supply source capacity equal or exceed the peak water demand of a service area with the best well out of service. For a proposed development, the peak water demand is calculated as twice the average water demand estimate. Therefore, for Brynwood, the water-supply source developed must have the capacity to produce 103,910 gpd or about 72.2 gpm (gallons per minute) with the most productive well (best well) out of service. These source capacity requirements apply to both the onsite source development and connection to the Town Water District.

The District presently supplies water to the existing Brynwood Clubhouse. Currently, the Water District does not have sufficient surplus capacity to meet the water demand requirements of the proposed build-out at Brynwood.

The District currently serves an estimated population of 1,200 people with 368 service connections. In 2009, the District replaced one older supply well (Well 1) located at the Windmill Farms well field with a new water-supply source (Well 5). The present water supply consists of four sand and gravel production Wells 2, 3, 4 and 5. The yield capacity of the wells is as follows:

Well 2 - 50 gpm
Well 3 - 100 gpm
Well 4 - 190 gpm
Well 5 - 280 gpm

The existing New York State Department of Environmental Conservation (NYSDEC) water-taking permit limits the taking from the District wells to 290 gpm (0.42 mgd (million gallon per day)). Well 5 is eliminated from the total yield due to the redundancy requirement (best well out of service). In addition, Wells 2, 3 and 5 cannot be operated simultaneously due to mutual water-level interference effects.

From LBG's in-house records, the 2012 monthly average water demand for Water District #2 is 166,030 gpd and the maximum peak water demand is 364,832 gpd (July 2012) (Appendix I). Including the peak water demand of Brynwood of 103,910 gpd, the combined peak demand would be 468,742 gpd or about 325 gpm. Therefore, the combined yield of the Water District's wells would need to be a minimum of 325 gpm, with the best producing well out of service, to meet the combined peak demand.

Presently, with the best well out of service, the Water District maximum permitted yield is 290 gpm. The development of an additional well(s) with a yield of 50 -100 gpm to augment the existing supply would be needed at the well field if Brynwood were to connect to the District.

HYDROGEOLOGIC SETTING

Both the sand and gravel and bedrock aquifers along the Mianus River corridor have significant potential to develop high-yielding well(s). In the valley corridor along the Mianus River, large water supplies adequate for municipal needs can be obtained from the sand and gravel deposits and underlying bedrock units. The key hydrogeologic features on the large

Town-owned well field parcel are the Mianus River and the valley setting underlain by a significant sand and gravel aquifer.

The hydrogeologic assessment of the well field parcel completed by LBG included a review of previous studies completed by LBG for the well field parcel; a fracture-trace analysis using aerial photographs and topographic maps; a review of groundwater recharge to the local aquifer; a review of aquifer mapping and previously published and unpublished reports by the United States Geological Survey (USGS); and a review of available groundwater explorations studies. In addition, LBG conducted a site visit to identify key hydrogeologic features.

AQUIFER TYPES

Groundwater in the study region is developed from two aquifer types; sand and gravel aquifers and bedrock aquifers. The sand and gravel aquifers are considered the most prolific in Westchester County. Although not as prolific as the better sand and gravel aquifer units, the bedrock aquifers in the study region are utilized for development of numerous public water supplies in the study region. The bedrock aquifers are generally dependable and suitable groundwater sources.

SAND AND GRAVEL AQUIFERS

Sand and gravel aquifers, also called unconsolidated stratified-drift deposits, are the best source for development of large quantities of groundwater. However, the sand and gravel aquifers which are capable of supporting high-yielding wells are of limited areal extent near the District's well field parcel.

To be viable high-yield aquifers, the unconsolidated deposits must contain pores or open spaces which can fill with water, and these openings must be large enough to permit water to move through them toward wells at an adequate rate. Individual pores in a fine-grained material like clay or silt are extremely small and, although the water content is high, water cannot move readily through the tiny pore spaces. This means clay and silt formations will not yield adequate water for development of high-yielding wells.

Coarser sand and gravel material contains less water storage but has larger open spaces through which water can move more readily. Therefore, saturated coarse sand and gravel formations are more suitable for development of high-yielding wells. Figure 2 delineates the sand and gravel aquifer boundary likely to be encountered during drilling. It should be understood that not all of the mapped sand and gravel deposits would be suitable for groundwater supply development.

The surficial geology and sand and gravel deposits have been mapped (figure 2) utilizing the Westchester County 208 Study (Geraghty & Miller, 1978). The significant surficial geologic formations, including sand and gravel deposits, have been identified as follows.

Glacial Till (t)

Portions of the upland areas on the well field parcel and surrounding area are overlain by a mantle of till (figure 2). The till can extend from the upland area, underlying the unconsolidated deposits in lower valley plain settings. In areas of valley settings where the surficial soils overlying bedrock are relatively thin, till will likely be encountered at a relatively shallow depth. Till is an unstratified, heterogenous, relatively impermeable mixture of clay, unsorted sand, gravel and stone to boulder size material. Till has low permeability and is considered a poor aquifer due to low yields, even for domestic use.

Aquifers of Glacial Origin

Glacial deposits vary in shape, size and thickness in the study region (figure 2). Stratified-drift outwash deposits **(og)** formed from glacial meltback and, as meltwater flowed from the glaciers, it carried the gravel, sand, silt and clay held in the ice and deposited the material downstream. The aquifer material is not continuous vertically, but occurs in layers interbedded with silty and clayey lenses. The fine-grained materials were deposited by sluggish streams capable of transporting only silt- and clay-size particles or during temporary glacial-lake environments resulting from ice damming. However, at times, the streams were regenerated and during these periods of high flow, coarse-grained materials were deposited by swifter meltwater streams. The best aquifers are glacial outwash materials deposited by swifter meltwater streams. Such outwash deposits are the best sand and gravel aquifers in the study region and are highly permeable and readily recharged.

The District obtains its water from four existing sand and gravel wells located in the Mianus River valley on the southeastern portion of the well field parcel. As shown on figure 2, the sand and gravel aquifer is only mapped along the valley setting and paralleling the Mianus River corridor. The stratified-drift glacial deposits form the Mianus River Aquifer. Geologic logs from wells completed to date on the well field parcel indicate that the aquifer is unconfined and, in areas where suitable aquifer material is encountered, the material is predominately coarse sand and gravel. The extent of the aquifer widens to the north of the well field. The thickness of the sand and gravel aquifer material along the eastern side of the valley, north of the well field, has been extensively mined for commercial purposes. The topographic contours shown on figure 2 are no longer valid for this portion of the valley and, in some areas, the ground is more level than shown. In addition, the pond in the center portion of the well field parcel is manmade, likely from the mining of sand and gravel material. Areas of shallow exposed bedrock at the surface were observed during LBG's site visit to the well field, northeast of Well 4 and also east of the onsite pond. Further study of the upland areas east and west of the river corridor indicate the overburden material is relatively thin and the sand and gravel aquifer pinches off in the upland setting at the well field. Based on the available data from previous studies conducted by LBG, it seems likely the most suitable sand and gravel aquifer material for potential well development with reasonable saturated thickness is located along the center corridor of the valley setting. This is the case in the area of the existing District wells that are located along the southern extent of the mapped aquifer (figure 2). The aquifer in this area is prolific, as demonstrated from high-yielding production wells completed to date. The depth of the sand and gravel aquifer at the District well field ranges from about 38 to 72 feet in thickness. A test boring (TW-3) drilled in 2006 south of the pond encountered bedrock at approximately 14 feet. Because of the shallow depth to bedrock and unsaturated conditions of the soil overlying the bedrock, further exploration of this area was not considered.

No exploratory test well drilling has been completed north of TW-3. This area remains virtually unexplored to date, and appears favorable to target the development of additional high-yield sand and gravel wells.

BEDROCK AQUIFERS

Groundwater also occurs in the bedrock units underlying the study area (figure 3). The bedrock units may be high-yielding aquifers if there is sufficient secondary porosity and permeability, properties that result from post-depositional changes to the rock fabric. The bedrock aquifers which underlie the study area possess excellent water-bearing properties.

Groundwater occurs in bedrock units in secondary pores, joints, fractures, solution cavities, fault zones and other secondary openings. The yield of bedrock aquifers varies greatly, depending on the bedrock type, and the secondary porosity and permeability exhibited by the bedrock units. The permeability of a bedrock unit depends on the degree of interconnection of fractures, joints and other secondary openings. Bedrock aquifers in the Town of North Castle are developed from igneous and metamorphic rocks. Figure 3 delineates bedrock aquifers likely to be encountered during drilling. No bedrock test wells have been completed to date on the well field parcel.

Inwood Marble (OCi)

OCi consists of white-whitish gray calcite and dolomite marble. The unit occurs along the valley setting, paralleling the river corridor in the study region.

The metamorphism of limestone and dolomite forms marble. The marble units exhibit similar characteristics to carbonate units; however, fewer solution cavities are reported. The marble bedrock units likely exhibit low primary permeability based on the porosity of the bedrock units; and secondary permeability caused by the presence of many interconnected fractures, joints and bedding planes can result in moderate to high permeability. The bedrock unit is less resistant to erosion than adjacent bedrock rock units and, as a result, occurs in the valley areas in the study region. The unit is brittle and under deformational stress forms numerous open fractures. Water is contained in the many interconnected fractures, joints and other secondary openings. Wells completed in this bedrock aquifer at favorable well sites may be expected to yield from 50 to 150 gpm.

Fordham Gneiss (f) and Manhattan Formation (Om)

Fordham Gneiss (**f**) consists of undifferentiated gneiss bedrock units and **Om** consists of undifferentiated schist units. These gneiss and schist bedrock units are mapped on the upland areas east (**f**) and west (**Om**) of the valley setting in the study region.

The general appearance of these units show light and dark minerals. The gneiss appears as randomly-speckled layers and the schist exhibits strong foliated crystalline rock that has a well-developed parallelism of appearance minerals present. These schist and gneiss units are highly resistant to weathering and to erosion from previous glaciation. The erosion resistance is reflected by the more rugged topography and higher altitudes in the areas underlain by these rock types in the study region.

The original solid structure of schist and gneiss bedrock units are generally unfavorable for storage or transmission of groundwater. However, previous tectonic displacement and metamorphic changes to these bedrock units have enhanced the potential usefulness of these bedrock units in Westchester County for water supply. These changes include jointing, fracturing and weathering of the bedrock. Over long intervals of geologic time, the hydraulic capability of the schist and gneiss bedrock units has improved so they can store and transmit groundwater in fractures, joint systems and weathered zones. The porosity of weathered zones can be significant and the porosity can be increased by as much as 35 percent (Driscoll, 1986) in the upper portion of the bedrock unit.

In general, schist and gneiss exhibit very low primary permeability and secondary permeability caused by the presence of interconnected fractures can be low to moderate. Water is contained in fractures, joints, faults and weathered zones. Wells drilled at favorable well sites would likely yield between 25 gpm and 75 gpm. High yields are obtained from highly-fractured and jointed units with a relatively good degree of interconnection.

GROUNDWATER AVAILABILITY

Groundwater in both sand and gravel aquifers and bedrock aquifers is a renewable resource that is continuously replenished by precipitation, but the volume of groundwater in storage and the available recharge varies greatly between aquifer types in the study region. The use of groundwater has significantly increased in the study region since the 1960s and early

1970s. A water-budget analysis compares long-term withdrawals of groundwater to recharge estimates for a study region.

Recharge is generally related to precipitation, but the amount of rainfall which becomes groundwater recharge is difficult to measure directly. In Westchester County, the average precipitation is about 50 inches per year. About half this amount is lost to evaporation and transpiration processes; the remainder is available to become surface- and groundwater runoff. Groundwater recharge results from the portion of total rainfall and snowmelt that infiltrates the soil and overburden materials.

The sand and gravel aquifers of Westchester County are recharged from precipitation which falls directly on the surface of the aquifer, from groundwater flow from surrounding hills and, most importantly, from significant streams or overlying surface-water bodies. A portion of the total runoff that infiltrates into the soil and overburden materials (including sand and gravel aquifers) eventually recharges the bedrock fracture system and is available for capture by bedrock wells.

When wells completed in the sand and gravel and bedrock aquifers are pumped, the hydraulic head is lowered in the aquifer unit, the downward flow gradient is increased and the rate of recharge may be increased. For this reason, a stream which bisects a thick deposit of saturated, permeable sand and gravel or a water body on top of a sand and gravel deposit may function as a reservoir which can increase the potential recharge to the sand and gravel aquifer. Similarly, a thick section of saturated, permeable sand and gravel material overlying a bedrock formation acts as a reservoir which can increase the potential to recharge the bedrock aquifer, enhancing the prospect of relatively high yields.

There is no precipitation data available specifically for North Castle. Records for nearby Westchester County Airport located in White Plains, New York indicate that the average annual precipitation there is 50.45 inches. Precipitation during a one-year-in-30 drought (3.3 percent probability of recurrence) decreases to about 36.0 inches or about 71 percent of the average annual precipitation in the vicinity of the study area.

The amount of rainfall that becomes groundwater recharge is difficult to measure directly. An estimate developed by the United States Geological Survey (USGS) for recharge to similar sand and gravel deposits in the nearby Fishkill-Beacon area (Snavely, 1980) is an average recharge rate of 1,000,000 gpd per square mile, or about 21 inches annually. R.E. Wright

Associates (1982), in their report on the Upper Delaware River Basin, estimates that recharge to local multi-textured sand and gravel deposits during a year of normal precipitation is about 790,000 gpd to 985,000 gpd per square mile or about 16.5 to 20.5 inches. Because the unconsolidated material deposits (including unconfined sand and gravel and multi-textured sand and gravel deposits) within the study area have nearby surface-water bodies which would additionally recharge the aquifer under pumping conditions, a recharge rate of 1,000,000 gpd per square mile was used in the water-budget analyses.

The approximate recharge to the metamorphic bedrock units is estimated to be 350,000 gpd per square mile or 7 inches per year during periods of normal precipitation (Mazzafero, et. al., 1979). The recharge to the bedrock aquifers that is actually available for groundwater supply may be greater than the amount contributed by precipitation in the watershed area where permeable sand and gravel deposits overlie bedrock and are presumed to induce some recharge from the sand and gravel materials. The volume of the indirect recharge is not measurable without extensive studies, but it would increase non-linearly as withdrawals increase.

A water-budget analysis has been conducted to determine if there is sufficient groundwater recharge to the study area to replenish groundwater withdrawals from existing and additional wells on the well field parcel. The area of the direct watershed to the well field parcel has been determined (figure 5) and an appropriate recharge rate for the site applied.

Groundwater availability at a site is not restricted only to recharge from precipitation falling directly on the well field parcel. Groundwater flowing toward and beneath the site which can be accessed by wells on the property without adversely impacting other users is considered available. Consequently, the area which supports the water supply extends beyond the well field property boundary to include the natural recharge area contributing water to the study parcel.

A conservative recharge area limited to the mapped boundary of the sand and gravel aquifer with the northern boundary terminated at the property boundary. The recharge from precipitation which falls directly on the surface of the aquifer is estimated to be about 185,570 gpd, assuming a 21-inch annual recharge rate. The recharge to the sand and gravel aquifer does include additional recharge from upland areas, and more importantly, from the Mianus River overlying the aquifer. Average groundwater recharge from base flow from the upland area to the sand and gravel aquifer in the basin shown is about 474,050 gpd, assuming a

7-inch annual recharge rate. Therefore, the total recharge to the sand and gravel is estimated to be about 659,620 gpd.

It should be noted that water-budget analyses are useful in estimating available groundwater resources. However, the drilling and testing of proposed supply wells would need to be completed to determine the availability of groundwater from the aquifer source and any significant impacts to neighboring water supplies.

Recharge to the bedrock aquifer in the basin shown is about 539,000 gpd, assuming a 7-inch annual recharge rate.

Drought Considerations

Because groundwater supplies are recharged by precipitation, the recharge rate is directly dependent upon the precipitation rate. During periods of drought, the recharge rate and resulting groundwater availability diminishes. In the driest year in 30, defined as an extreme drought with a 3.3-percent probability of recurrence, about 36.0 inches of precipitation will fall in the study area. This is about 71 percent of the average annual precipitation of 50.45 inches per year. If recharge declines at the same rate as precipitation, the maximum recharge during a period of extreme drought would be 60 to 70 percent of average recharge. Recharge to the sand and gravel would be reduced to about 395,772 to 461,734 gpd during extreme drought conditions. Similarly, recharge to the bedrock aquifer would be reduced to 323,400 to 377,300 gpd. This amount is significantly greater than the combined average water demands for both the District and Brynwood which is about 217,985 gpd.

YIELD POTENTIAL OF SAND AND GRAVEL AQUIFERS

An evaluation of the yield potential of the undeveloped sand and gravel aquifer located on the northern portion of the well field parcel is provided below. This evaluation was conducted to designated areas with good potential for future development of high-yield sand and gravel production wells on the study parcel.

The data, although limited, indicates a prolific sand and gravel aquifer exists along portions of the Mianus River, north of the existing production wells. It is likely additional high-yielding wells can be developed in the outwash sand and gravel deposits along the river corridor where the aquifer has adequate thickness and has good hydraulic connection to the river.

Limited data is available regarding an aerial extent, thickness and suitability to develop high-yield wells from the mapped sand and gravel aquifer north of the well field parcel. The only published report (Geraghty & Miller, Inc., 1978) on the sand and gravel aquifer mapped on the study parcel indicates the aquifer broadens north of the pond along the river corridor. Field observations indicate significant glacial scouring on the study parcel in the valley setting which may have resulted in deep buried valley settings filled with glacial deposits, possibly extending 50 to 100 feet in thickness. The preliminary data appear favorable that high-yielding sand and gravel production well(s) 100 – 300 gpm could likely be developed in this area of the study parcel (figure 2). A preliminary drilling exploration program would have to be conducted to determine if the aquifer material is suitable for the development of a high-yielding well.

YIELD POTENTIAL OF BEDROCK AQUIFERS

The bedrock aquifer that underlies the entire study region is the principal source of groundwater in areas where sand and gravel aquifers are not available for development of water supply. The bedrock aquifers in the study region consist of metamorphic rock types.

Bedrock wells drilled at favorable well sites on the study parcel would likely yield between 25 and 150 gpm. Wells completed in the OCi unit would likely yield in the higher range of the estimate due to enlargement of fractures, joints and bedding planes in the formation by solution activity; and in areas the bedrock unit can induce recharge from overlying saturated sand and gravel deposits.

Fracture-Trace Analysis

One of the techniques employed in evaluating the potential for developing high-yield water wells from the bedrock aquifers in the study region is a fracture-trace analysis (figure 6). Fracture-trace maps include the delineation of faults, fracture-trace joint systems, old river and stream courses and major unconformities. These features frequently are indications of fractured or weathered zones within the bedrock and their identification is a useful tool in selecting favorable well sites for bedrock wells. The recommended locations for bedrock test wells were chosen utilizing the fracture-trace analysis conducted by LBG (figure 6).

Fracture zones can sometimes be located by inspecting geologic and topographic maps and by studying stereographic aerial photographs of the study area. The surface expressions of bedrock fractures often appear on aerial photographs as linear features (less than one-mile long) and lineaments which are significant linear traces longer than one mile. Many streams, valleys and topographic depressions tend to follow the faults, fracture zones and similar geologic features. In addition, changes in vegetative densities and configurations of natural ponds and lakes serve to aid in fracture mapping.

Higher-yielding bedrock wells would likely be developed on more significant lineaments in the region and most likely represent possible fractures or fault zones in bedrock units. However, linear traces less than one mile are also useful to target locations for high-yielding bedrock locations. Higher yields are generally found at the intersection of two or more fracture-trace patterns. Recommended bedrock test well locations utilizing the fracture-trace analysis method were checked in the field to confirm that the perceived fracture traces are natural and not the result of manmade artifacts.

The fracture-trace map was interpreted with additional layers of topography; bedrock geology, including faults and geologic contacts; sand and gravel deposits; and wetlands to identify favorable locations to target high-yielding bedrock wells. The favorable locations were identified in areas with one or more of the following features:

- fault zones;
- intersection of fault zones and lineations, or intersection of two or more lineations;
- unconformities;
- bedrock overlain by permeable sand gravel and/or saturated sand and gravel aquifer material;
- bedrock overlain by large wetland areas;
- locations in valley plains; and
- in proximity to streams, ponds, lakes and/or drainage systems.

Locations which exhibit more than one of the above features are considered to be the most promising locations for drilling high-yielding bedrock wells. The most favorable location to target the development of high-yielding bedrock wells are along the Mianus River corridor on the study parcel.

Exploration for water from bedrock sources is an inexact science in which not all test wells can be expected to produce enough water for public use.

GROUNDWATER EXPLORATION

The potential yield of favorable well sites can only be determined by drilling at the proposed sites. The review of possible permits (i.e., wetland permit) required to drill a particular location should be considered, in addition to obtaining clearance from underground utilities. The New York State Department of Health (NYSDOH) requires a minimum 100-foot radius of ownership and a 200-foot radius of sanitary control from a proposed public supply well which is afforded from all proposed well sites. The following summarizes the more common groundwater exploration methods for development of sand gravel wells; and bedrock wells for private and public water-supply sources.

Sand and Gravel Aquifer

The most common method of groundwater exploration on a favorable parcel underlain by a sand and gravel aquifer is to drill test borings. The purpose of the test borings is to locate the best sites for test production wells. During the boring program, formation samples are collected and 2.5-inch diameter stainless-steel observation wells are installed in selected test boring sites. The 2.5-inch diameter observation wells are utilized to obtain additional data, including pumping test data, aquifer parameters and preliminary water quality for the aquifer.

The formation samples collected during drilling are utilized to identify the best aquifer material and sieve analyses are conducted to determine the optimal size for the screen openings in a production well. When the best well site has been selected, a large-diameter test production well is drilled. After construction and development of the well is complete, a 72-hour pumping test is conducted to determine the sustainable yield and potential for impact to nearby wells, if any. Groundwater samples are collected near the end of the test. The data collected during the test is used to support an application for a NYSDEC public water supply permit.

Bedrock Aquifer

The yield of a bedrock aquifer can be determined only by drilling a test well and conducting a pumping test. For bedrock test well at the wells field, LBG recommends that an 8-inch diameter casing be installed and a 6-inch diameter test hole be drilled into the bedrock. The diameter of the well casing installed would typically be larger (8 inches) in bedrock units expected to yield greater than 75 gpm to accommodate a larger pump. The casing (minimum of 100 feet) should be installed and grouted into competent rock. The test well(s) should be drilled to a minimum depth of 450 feet, if a suitable yield is not encountered at a shallower depth. A hydrogeologist should analyze the water-production data obtained to 450 feet and decide whether or not to continue drilling beyond that depth.

Test wells should be drilled by the air-rotary method, which is relatively fast and efficient in the type of rock found in the region. Installation of a 8-inch diameter casing and drilling a 6-inch diameter test well to 450 feet can usually be accomplished in three to four days. A hydrogeologist should provide partial supervision to examine the drill cuttings as they are flushed from the borehole and would also determine the depths at which water enters the hole by observing the flow during drilling. Knowledge of the depths of the water-bearing fractures is essential information for interpreting pumping test data and in determining the depth at which to set the permanent pump. If a significant amount of water is developed during drilling, the borehole can be reamed to 8-inch diameter to accommodate a larger pump, if an 8-inch diameter casing was installed.

A 72-hour pumping test would be required to be conducted on successful test wells. If nearby domestic wells are located within the area of the test well, an offsite well monitoring program will likely be required. The existing supply wells for the District would also be monitored during any testing event. If two or more wells are to be tested, a simultaneous pumping test may be conducted to save costs and to simulate multiple-well pumping conditions. The pumping test should include water-level recovery measurements periodically on both the pumping and offsite monitoring wells for a minimum of 72 hours following shut down of the test.

Prior to shut down, water samples should be collected for analysis of all constituents listed in the New York State Sanitary Code, Part 5, Subpart 5-1, as well as for radon gas and microscopic particulate analysis, if required. The data collected during the test would support an application for a public water supply permit from the NYSDEC.

WATER QUALITY

Water quality is an important consideration in the development of a groundwater supply because some treatment options dramatically increase the development costs. The water quality of the region's sand and gravel aquifer along the Mianus River corridor is generally good to excellent and typically requires no treatment with the exception of chlorination for disinfection. The water quality of the regional bedrock aquifers is also generally good and also typically requires no treatment with the exception of chlorination.

Both the sand and gravel and bedrock aquifers would be required to be studied in accordance with the NYSDOH guidelines regarding groundwater sources under the direct influence of surface water ("Surface Water Treatment Rule"). Guidelines to assess the potential for influence require supplemental monitoring of surface-water features and additional water-quality sampling of the wells. In the event the wells are determined to be at high risk of surface water influence, water filtration and UV disinfection would be required. To reduce the risk of the wells being under the influence of surface water, proposed sand and gravel and bedrock well locations should be set back 200 feet from the Mianus River and the bedrock wells should be constructed with a minimum of 100 feet of casing.

Well Field Infrastructure

The existing water-supply system for the District consists of four water-supply wells (Well 2, Well 3, Well 4, and Well 5); an existing 10,000-gallon chlorine contact tank; 600,000-gallon atmospheric storage tank and distribution system. In addition, a back-up generator is located onsite that was sized to support the operation of the pumping and treatment equipment. The 10,000-gallon chlorine contact tank is located at the well field and the 600,000-gallon atmospheric storage tank is located approximately 5,500 feet northwest of the well field along

Evergreen Row in Armonk. Since Wells 2, 3 and 5 cannot be operated at the same time because they interfere with each other, the water-supply system is configured to operate Wells 2 and 4 (operating simultaneously) or Well 5 (or Well 3). In the event of extreme demand, the system is also configured to allow both Wells 4 and 5 to operate. This combination of Wells 4 and 5 would result in a maximum well field capacity of 470 gpm.

The submersible pumps in the water-supply wells activate and deactivate based on the water level in the 10,000-gallon chlorine contact tank. Treated water is pumped from the 10,000-gallon chlorine contact tank into the distribution system utilizing two 30 HP transfer pumps. The transfer pumps operate based on the pressure measured at the effluent transmission pipe from the 600,000-gallon atmospheric storage tank. The current water-supply system is configured to allow the operation of only one transfer pump at any particular time because the existing water main cannot accommodate the increased flow from two transfer pumps.

The estimated average daily demand, determined on a monthly basis, from the District ranges from between 100,321 gpd during low demand periods to 264,346 gpd during high demand periods. These demands translate into a pumping rate of 70 to 184 gpm, assuming continuous 24-hour operation. Peak daily demands, determined on a monthly basis, ranged between 144,840 gpd (101 gpm) to 364,832 gpd (253 gpm). As previously indicated, the maximum well field capacity is 470 gpm (Well 4 and Well 5). Each transfer pump has the capability to pump approximately 235 gpm at the maximum system pressure of 145 psi (335 feet of water).

Water treatment consists of the injection of a sodium hypochlorite solution for disinfection of the water supply. The disinfection system is designed to provide a minimum of 4-log virus inactivation in accordance with the United States Environmental Protection Agency (USEPA) Ground Water Rule (GWR).

The proposed Brynwood development projects a peak daily water demand of 103,910 gpd. If connected to the water-supply system for the District, the peak daily demand would increase to about 468,742 (325 gpm). To meet the increased demand, a new water-supply well(s) will be required. In order to incorporate a new water-supply well into the water-supply system for the District, a raw water transmission main will need to be extended from the proposed water-supply well to the existing treatment building. A sodium hypochlorite solution would be injected and the water conveyed to the 10,000-gallon chlorine contact tank. With the addition of a new water-supply well, the 10,000-gallon chlorine contact tank would need to be upgraded to remain compliant with the USEPA GWR. The 10 State Standards requires that the water-supply system include at least two pumps and with any pump out of service, the remaining pump or pumps shall be capable of providing the maximum pumping demand from the system. Therefore, at a minimum, a third transfer pump would need to be incorporated to meet the peak demand. Other upgrades that would be needed include the replacement of the water main/distribution system to allow for greater capacity to flow through the piping system. The controls for the transfer pumps would also need to be reconfigured to allow for the operation of multiple transfer pumps and the back-up generator would need to be evaluated to determine if it can support the increased power demand from the new pumps.

CONCLUSIONS

1. Both the sand and gravel and bedrock aquifers along the Mianus River corridor have significant potential to develop high-yielding well(s) on the Town's well field parcel. The valley setting along the river corridor north of the existing well field is relatively unexplored and large supplies adequate for municipal needs can likely be obtained from the sand and gravel deposits and underlying bedrock units. The key hydrogeologic features on the well field parcel are the Mianus River and the valley setting underlain by a significant regional sand and gravel aquifer. The Inwood Marble unit which underlies the valley setting also has significant potential to develop high-yield bedrock wells.

2. A conservative recharge area limited to the mapped boundary of the sand and gravel aquifer with the northern boundary terminated at the property boundary. The recharge from direct precipitation which falls directly on the surface of the aquifer is estimated to be about 185,570 gpd, assuming a 21-inch annual recharge rate. The recharge to the sand and gravel aquifer does include additional recharge from upland areas, and most importantly, from the Mianus River overlying the aquifer. Average groundwater recharge from base flow from the upland area to the sand and gravel aquifer in the basin is about 474,050 gpd, assuming a 7-inch annual recharge rate. Therefore, the total recharge to the sand and gravel is estimated to be about 659,620 gpd.

Recharge to the bedrock aquifer in the basin shown is about 539,000 gpd, assuming a 7-inch annual recharge rate.

Because groundwater supplies are recharged by precipitation, the recharge rate is directly dependent upon the precipitation rate. During periods of drought, the recharge rate and resulting groundwater availability diminishes. In the driest year in 30, defined as an extreme drought with a 3.3-percent probability of recurrence, about 36.0 inches of precipitation will fall in the study area. This is about 71 percent of the average annual precipitation of 50.45 inches per year. If recharge declines at the same rate as precipitation, the maximum recharge during a period of extreme drought would be 60 to 70 percent of average recharge. Recharge to the sand and gravel would be reduced to about 395,772 to 461,734 gpd during extreme drought conditions. Similarly, recharge to the bedrock aquifer would be reduced to 323,400 to 377,300 gpd. This amount is significantly greater than the combined average water demands for both the District and Brynwood which is about 317,985 gpd.

It should be noted that water-budget analyses are useful in estimating available groundwater resources. However, the drilling and testing of the proposed supply wells would ultimately indicate the availability of groundwater from an aquifer source and any significant impacts to neighboring water supplies.

3. The preliminary data appear favorable that high-yielding sand and gravel production well(s) 100 – 300 gpm could likely be developed in this area of the study parcel (figure 2). An initial drilling exploration program will have to be conducted to determine if the aquifer material is suitable for the development of a high-yielding well.

4. Bedrock wells drilled at favorable well sites on the well field parcel would likely yield between 25 and 150 gpm. Wells completed in the Inwood Marble unit in this bedrock unit would likely yield in the higher range (50 to 150 gpm) of the estimate due to enlargement of fractures, joints and bedding planes in the formation by solution activity; and in areas the bedrock unit can induce recharge from overlying saturated sand and gravel deposits.

5. One of the techniques employed in evaluating the potential for developing high-yield water wells from the bedrock aquifers in the study region is fracture-trace analysis. The fracture-trace maps include the delineation of faults, fracture-trace joint systems, old river and stream courses and major unconformities. These features frequently are indications of fractured or weathered zones within the bedrock and their identification is a useful tool in selecting favorable sites for bedrock wells. The locations for proposed bedrock test wells were chosen utilizing the fracture-trace analysis conducted by LBG and focus on drilling the Inwood Marble in an area that the unit is overlain by saturated sand and gravel.

6. Water quality is an important consideration in the development of groundwater considering some treatment options dramatically increase the development costs of a proposed water supply. The water quality of the region’s sand and gravel aquifer along the Mianus River corridor is generally good to excellent and typically requires no treatment with the exception of chlorination for disinfection. The water quality of the region’s bedrock aquifers are also generally good and also typically requires no treatment with exception of chlorination.

7. Both the sand and gravel and bedrock aquifers would be required to be studied in accordance with NYSDOH guidelines regarding groundwater sources under the direct influence of surface water (“Surface Water Treatment Rule”). Guidelines to assess the potential for influence require supplemental monitoring of surface-water features and additional water-quality sampling of the wells. In the event the wells are determined to be under the influence of surface water, water filtration and UV disinfection will be required. To reduce the risk likelihood the wells would be under the influence of surface water, proposed sand and gravel and bedrock well locations should be set back 200 feet from the Mianus River and the bedrock wells should be constructed with a minimum of 100 feet of casing.

8. The proposed Brynwood development projects a peak daily water demand of 103,910 gpd. If connected to the water-supply system for the District, the total peak daily demand for the Water District would increase to about 468,742 (325 gpm). To meet the increased demand, the development of a new water-supply well(s) will be required. In order to incorporate a new water-supply well into the water-supply system for the District, a raw water

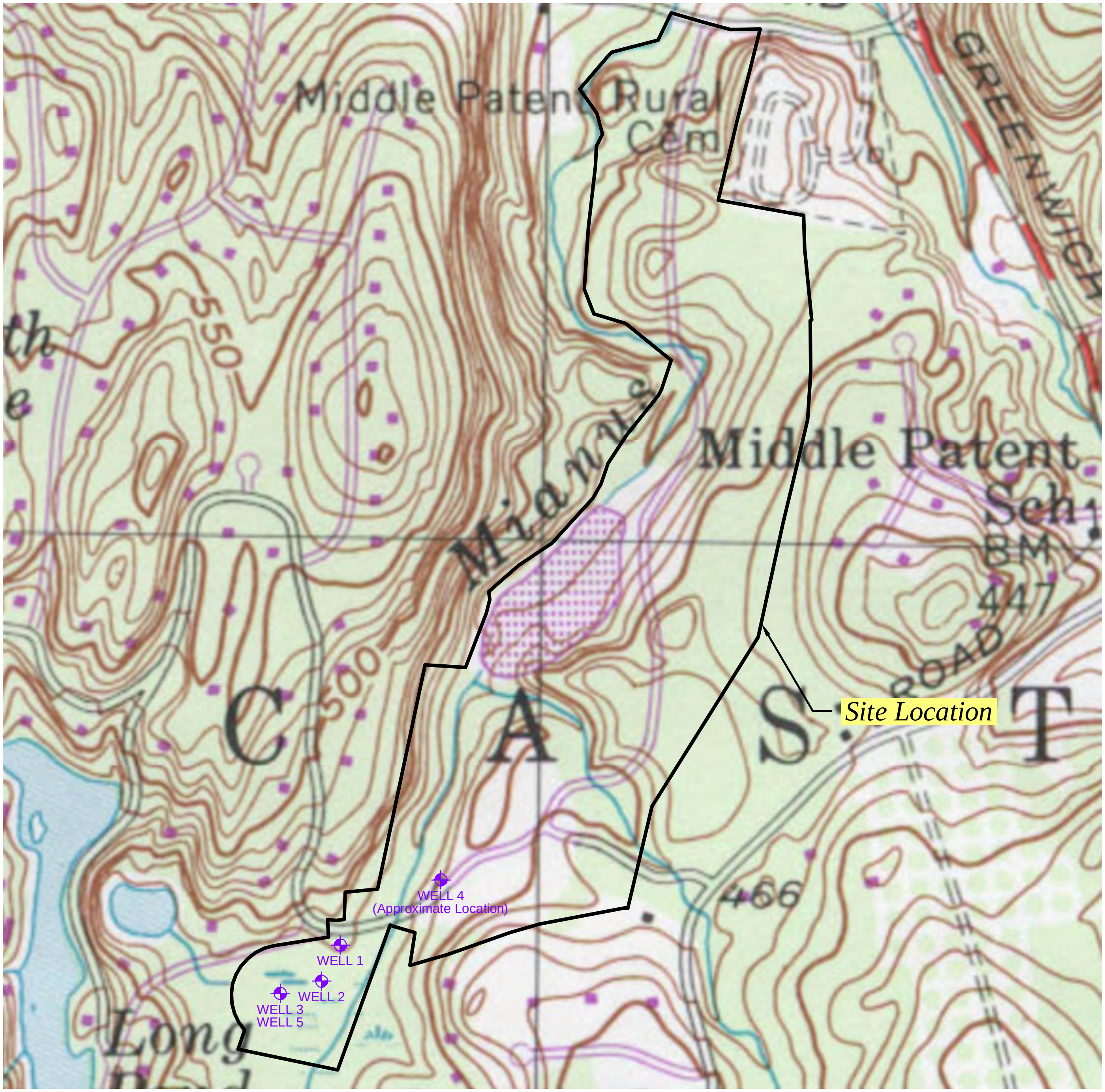
transmission main will need to be extended from the proposed water-supply well to the existing treatment building. A sodium hypochlorite solution would be injected and the water conveyed to the 10,000-gallon chlorine contact tank. With the addition of a new water-supply well, the 10,000-gallon chlorine contact tank would need to be upgraded to remain compliant with the USEPA GWR. The 10 State Standards requires that the water-supply system included at least two pumps and with any pump out of service, the remaining pump or pumps shall be capable of providing the maximum pumping demand from the system. Therefore, at a minimum, a third transfer pump would need to be incorporated to meet the peak demand. Other upgrades that would be needed include the replacement of the water main/distribution system to allow for greater capacity to flow through the piping system. The controls for the transfer pumps would also need to be reconfigured to allow for the operation of multiple transfer pumps and the back-up generator would need to be evaluated to determine if it can support the increased power demand from the new pumps.

LEGGETTE, BRASHEARS & GRAHAM, INC.

Thomas P. Cusack, CPG
Senior Vice President

cmm
March 15, 2013
H:\Brynwood\2013\Districut No. 2 Study.docx

FIGURES

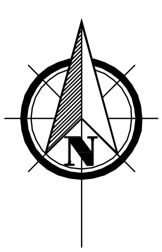


SOURCE: USGS TOPOGRAPHIC QUADRANGLE MOUNT KISCO, NEW YORK (1998).

LEGEND

PROPERTY BOUNDARY

WELL 1 — EXISTING WATER SUPPLY WELL



QUADRANGLE LOCATION

0 — 600

SCALE IN FEET

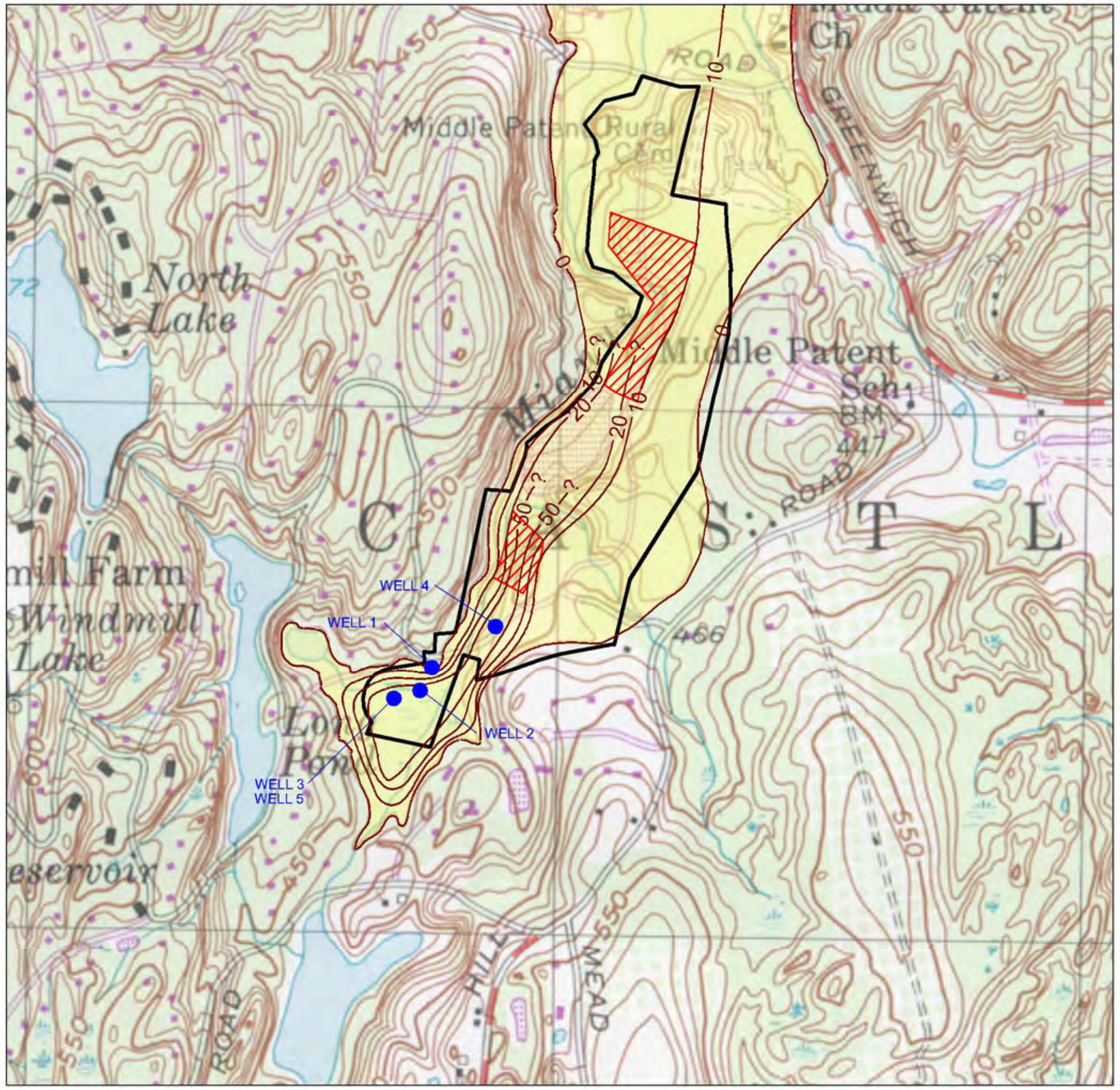
TOWN OF NORTH CASTLE
WATER DISTRICT No. 2 WELL FIELD
(T) NORTH CASTLE, NEW YORK

SITE LOCATION MAP OF
NORTH CASTLE WATER DISTRICT No. 2 PROPERTY

DATE	REVISED

PREPARED BY: LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Groundwater and Environmental Engineering Services
4 Research Drive
Suite 301
Shelton, Connecticut 06484
(203) 929-8555

DRAWN:	MRV	CHECKED:	TPC	DATE:	03/15/13	FIGURE:	1



LEGEND

PROPERTY BOUNDARY

WELL 1 — WATER DISTRICT No.2 PRODUCTION WELL LOCATION

STRATIFIED DRIFT AREA (dashed where approximate)

10 — STRATIFIED DRIFT THICKNESS CONTOUR

TARGET AREA TO EXPLORE THE DEVELOPMENT OF HIGH YIELD SAND AND GRAVEL WELLS

SOURCE:
MODIFIED FROM 208 AREAWIDE WASTE MANAGEMENT PLAN, NORTHERN WESTCHESTER COUNTY, NEW YORK, GERAGHTY & MILLER, 1977.

QUADRANGLE LOCATION

0 1000
SCALE IN FEET

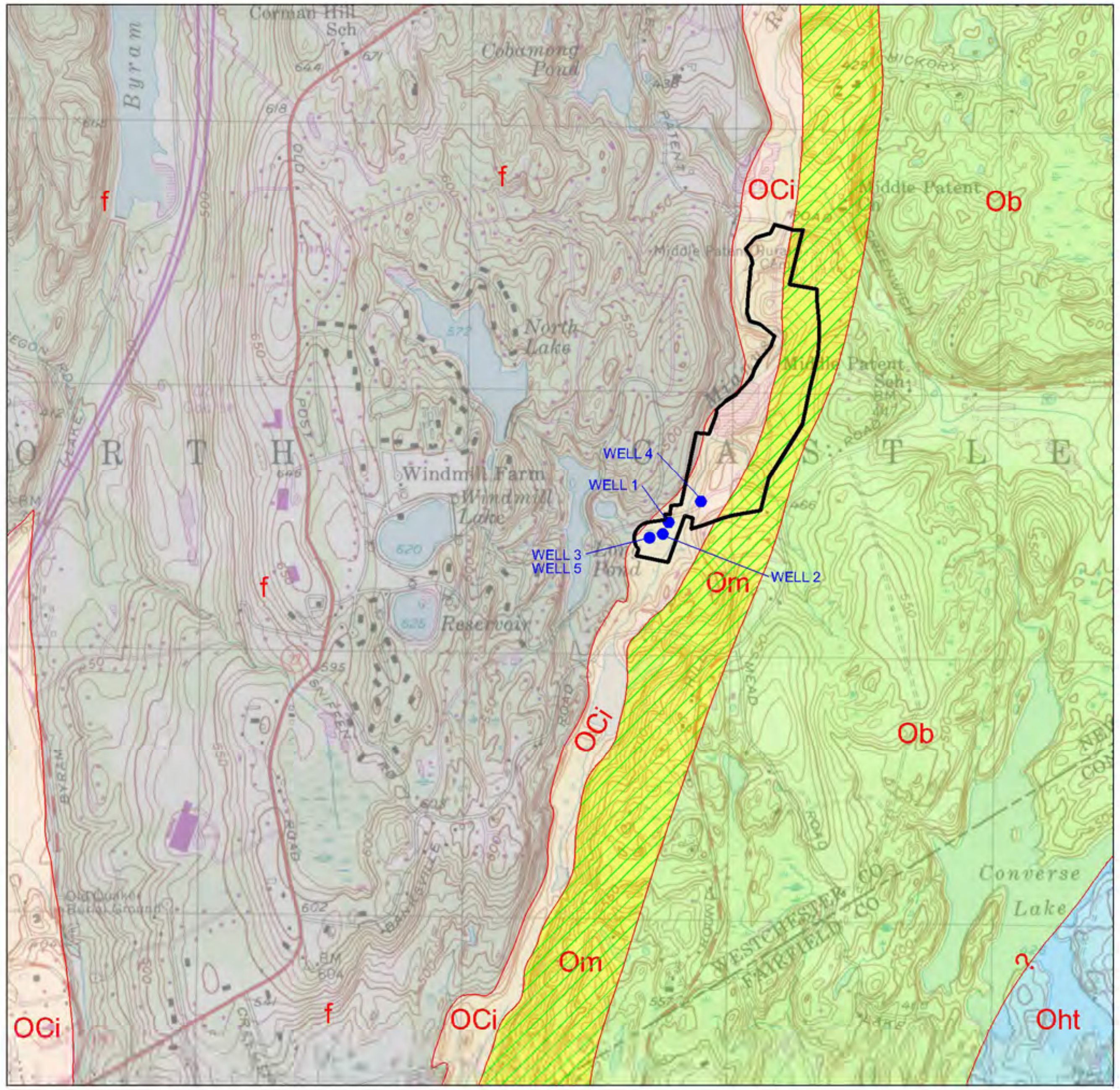
TOWN OF NORTH CASTLE
WATER DISTRICT No. 2 WELL FIELD
(T) NORTH CASTLE, NEW YORK

WATER DISTRICT No. 2 STRATIFIED DRIFT AREA

DATE	REVISED

PREPARED BY: LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Groundwater and Environmental Engineering Services
4 Research Drive
Suite 301
Shelton, Connecticut 06484
(203) 929-8555

DRAWN: MRV | CHECKED: TPC | DATE: 03/15/13 | FIGURE: 2



QUADRANGLE LOCATION

0 2000
SCALE IN FEET

LEGEND

- Property Boundary
- f — Fordham Gneiss, undivided - garnet-biotite-quartz-plagioclase gneiss and amphibolite
- OCi — Inwood Marble - dolomite marble, calcschist, granulite, and quartzite, overlain by calcite marble
- Om — Manhattan Formation, undivided - peltite schists, and amphibolite
- Ob — Bedford Gneiss - biotite-quartz-plagioclase gneiss and interlayered amphibolite
- WELL 1 — Water District No. 2 Production Well Location

Sources: Geologic Map of New York, Lower Hudson Street, New York State Museum and Science Service, 1970.
208 Areawide Waste Management Plan, Northern Westchester County, New York, Geraghty & Miller, 1977.

TOWN OF NORTH CASTLE
WATER DISTRICT No. 2 WELL FIELD
(T) NORTH CASTLE, NEW YORK

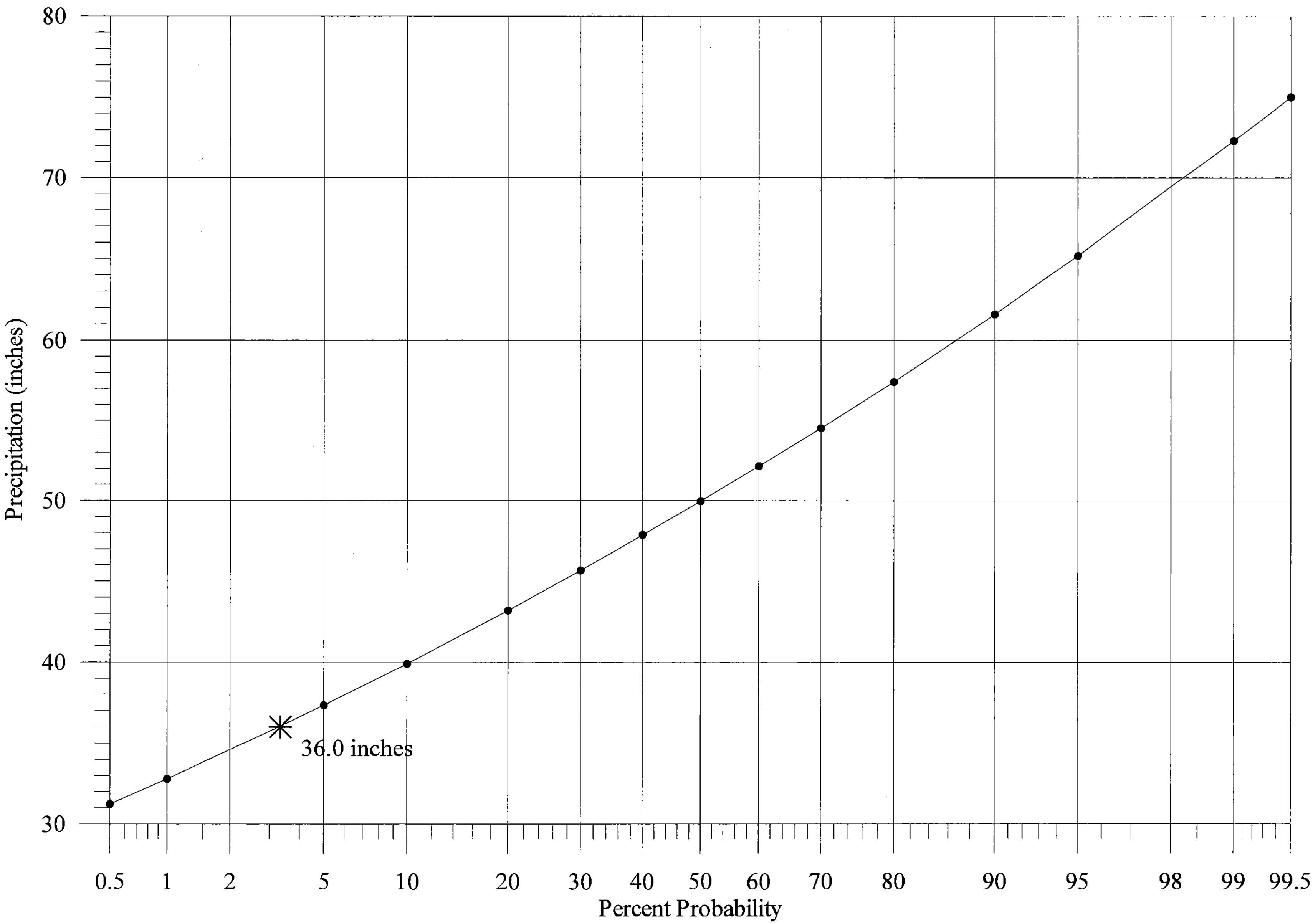
WATER DISTRICT No. 2 BEDROCK GEOLOGY

DATE	REVISED	PREPARED BY:
		LEGGETTE, BRASHEARS & GRAHAM, INC. Professional Groundwater and Environmental Engineering Services 4 Research Drive Suite 301 Shelton, Connecticut 06484 (203) 929-8555

DRAWN: MRV | CHECKED: TPC | DATE: 03/15/13 | FIGURE: 3

TOWN OF NORTH CASTLE
WATER DISTRICT No. 2 WELL FIELD PARCEL
(T) NORTH CASTLE, NEW YORK

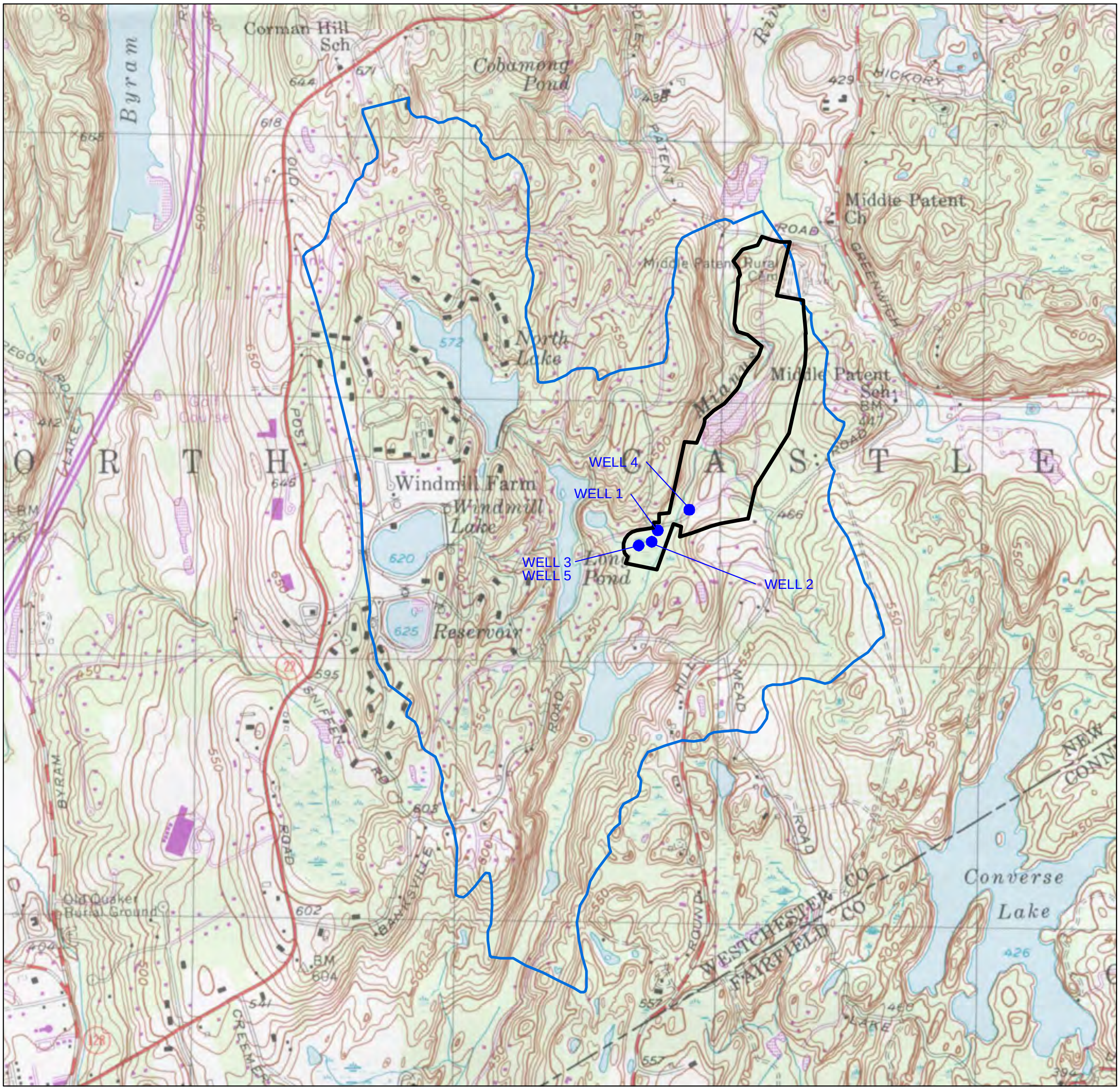
Precipitation Percent Probability Graph for Westchester County AP (1971-2000)



K:\Jobs\Brynwood\DEIS\Water District #2\Figure 4 precip prob.grf

LEGGETTE, BRASHEARS & GRAHAM, INC.

FIGURE 4



SOURCE: USGS TOPOGRAPHIC QUADRANGLE MOUNT KISCO, NEW YORK (1998).

LEGEND

PROPERTY BOUNDARY

WELL 1 — WATER DISTRICT No. 2 PRODUCTION WELL LOCATION

WATERSHED BOUNDARY

N

QUADRANGLE LOCATION

0 600

SCALE IN FEET

TOWN OF NORTH CASTLE
WATER DISTRICT No. 2 WELL FIELD
(T) NORTH CASTLE, NEW YORK

WATERSHED MAP

DATE	REVISED

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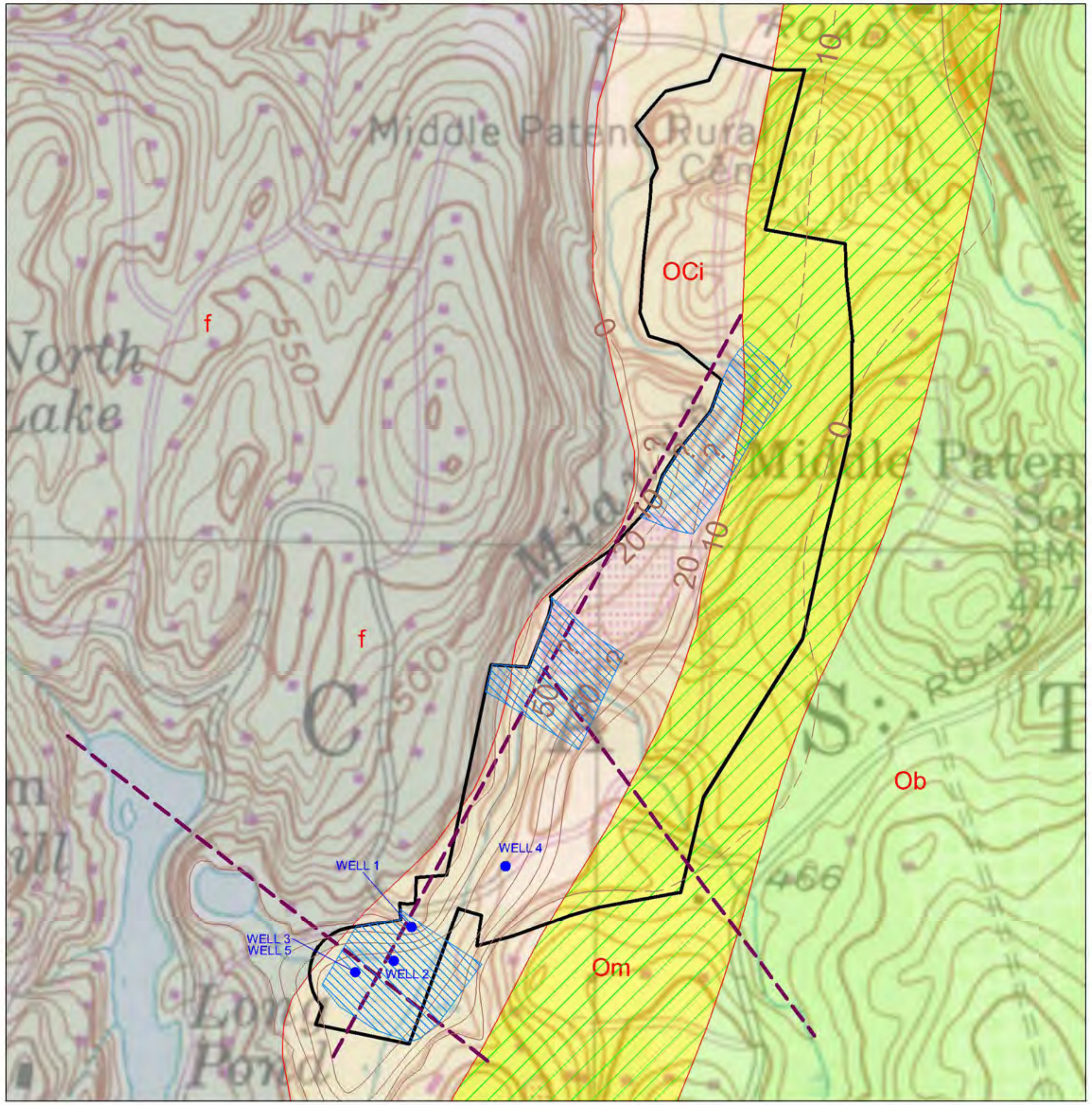
DRAWN:	MRV	CHECKED:	TPC	DATE:	03/15/13	FIGURE:	5



LEGEND

- Property Boundary
- f — Fordham Gneiss, undivided - garnet-biotite-quartz-plagioclase gneiss and amphilbolite
- OCi — Inwood Marble - dolomite marble, calcschist, granulite, and quartzite, overlain by calcite marble
- Om — Manhattan Formation, undivided - peltite schists, and amphilbolite
- Ob — Bedford Gneiss - biotite-quartz-plagioclase gneiss and interlayered amphilbolite
- WELL 1 — Water District No. 2 Production Well Location
- Fracture Trace
- Primary Target Area to Develop High Yield Bedrock Well
- 10 — Stratified Drift Thickness Contour

Sources: Geologic Map of New York, Lower Hudson Street, New York State Museum and Science Service, 1970.
208 Areawide Waste Management Plan, Northern Westchester County, New York, Geraghty & Miller, 1977.

QUADRANGLE LOCATION

0 600
SCALE IN FEET

TOWN OF NORTH CASTLE
WATER DISTRICT No. 2 WELL FIELD
(T) NORTH CASTLE, NEW YORK

FRACTURE TRACE MAP

DATE	REVISED

PREPARED BY: LEGGETTE, BRASHEARS & GRAHAM, INC.
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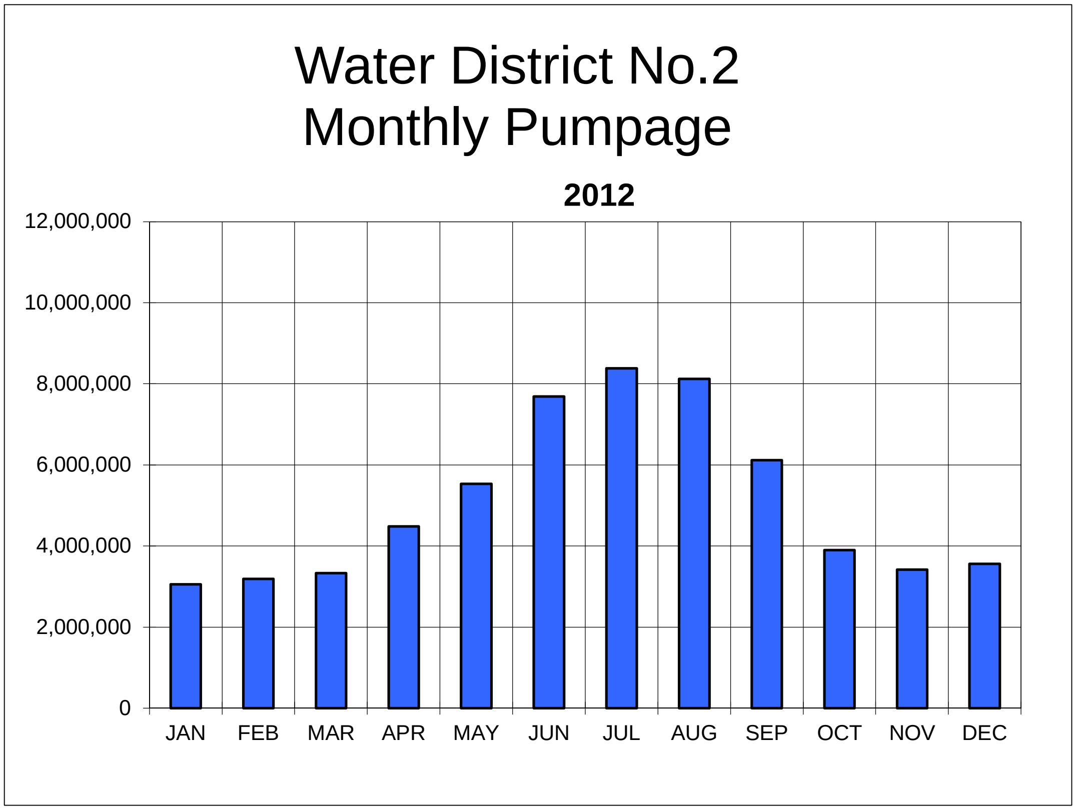
(203) 929-8555

DRAWN:	MRV	CHECKED:	TPC	DATE:	03/15/13	FIGURE:	6

APPENDIX I

2012

JAN	3,051,840
FEB	3,188,033
MAR	3,329,479
APR	4,481,544
MAY	5,532,026
JUN	7,688,774
JUL	8,379,640
AUG	8,120,340
SEP	6,114,124
OCT	3,901,756
NOV	3,417,488
DEC	3,562,320
TOTAL	60,767,364



NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report

For Systems that Treat with Chlorine and/or Ultraviolet Radiation

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
North Castle Water Dist. 2	February 2012	3/5/2012	☐ Surface ☑ Ground ☐ GWUDI
Public Water System ID	**County**	**Town, Village, or City**	☐ Purchase with subsequent chlorination
NY 5903446	Westchester	Town of North Castle	☐ Purchase w/out subsequent chlorination

DATE	Source(s) in Use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Ultraviolet Radiation / Other Treatments: Dist Sys. Free mg/l	UV Unit Active (Yes/No)	Intensity Meter >70%	
1		119,353			20	1.2	0.6			
2		92,645			16	1.2	0.6			
3		74,855			16	1.2	0.6			
4		101,733			20	1.3	0.6			
5		103,934			20	1.2	0.6			
6		97,253			20	1.3	0.7			
7		107,147			20	1.1	0.6			
8		94,822			20	1.1	0.6			
9		106,160			20	1.1	0.6			
10		73,974			16	1.1	0.6			
11		95,524			16	1.2	0.6			
12		108,129			20	1.2	0.6			
13		270,446			56	1.1	0.5			
14		145,980			32	1.4	0.6			
15		123,949			24	1.2	0.6			
16		88,035			16	1.1	0.6			
17		73,830			16	1.2	0.6			
18		116,200			20	1.3	0.6			
19		71,988			12	1.2	0.5			
20		143,702			28	1.2	0.5			
21		108,274			24	1.2	0.5			
22		125,095			24	1.4	0.6			
23		95,622			20	1.2	0.5			
24		98,966			20	1.1	0.5			
25		98,177			20	1.2	0.5			
26		118,822			24	1.1	0.5			
27		97,385			20	1.1	0.5			
28		116,883			24	1.2	0.5			
29		119,150			24	1.2	0.5			
Total		3,188,033		0	628		16.4	0	0	
AVG.		109,932		#DIV/0!	21.65517241	1.193103448	0.565517241			

Chlorine Mix Ratio = 7.9 Gallons quarts/gallons of **12.5** % chlorine added to 50 gallons of water in crock

Date UV quartz sleeve last cleaned ______ Dat UV Lamp Replaced ______ Alarm Activation (yes or no)if "yes" date of activation ______

Reported by: Sal Misiti Title: Assistant Superintendent NYS DOH Operator Certification Number: **NY0032969**

Signature: ______ Date: **3/5/2012** Operator Grade Level **IIB**

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2.Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Coman Hill School	2/2/2012	1	☐ Yes ☑ No	☐ Yes ☑ No	0.7
40 Long Pond Road	2/15/2012	1	☐ Yes ☑ No	☐ Yes ☑ No	0.3
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	

Population Served: **1200**

Number of microbiological monitoring samples required: **2**

Number of microbiological monitoring samples taken: **2**

Did an M&R violation occur? ☐ Yes ☑ No

If "Yes," check reason (s) below:

____ Actual number of samples is fewer than required.

____ Did not collect/analyze repeat sample.

____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur? ☐ Yes ☑ No

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): ____________________

Name of NYSDOH Certified Laboratory: ____________________

Did any MCL violation occur? If so, please describe: ____________________

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain.

Comments: ____________________

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report

For Systems that Treat with Chlorine and/or Ultraviolet Radiation

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
North Castle Water Dist. 2	March 2012	4/2/2012	☐ Surface ☑ Ground ☐ GWUDI
Public Water System ID	**County**	**Town, Village, or City**	☐ Purchase with subsequent chlorination
NY 5903446	Westchester	Town of North Castle	☐ Purchase w/out subsequent chlorination

DATE	Source(s) in Use	Treated water volume (1,000 gallons/day)	Chlorination – Gaseous: Cylinder weight (lbs.)	Chlorination – Gaseous: Chlorine used per day (lbs.)	Chlorination – Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Ultraviolet Radiation / Other Treatments: Dist Sys. Free mg/l	UV Unit Active (Yes/No)	Intensity Meter >70%	
1		92,334			20	1.1	0.5			
2		101,798			20	1.1	0.5			
3		100,493			20	1.1	0.5			
4		117,253			20	1.2	0.5			
5		125,500			24	1.2	0.5			
6		77,736			20	1.2	0.5			
7		106,748			20	1.2	0.5			
8		103,115			20	1.2	0.5			
9		95,891			20	1.2	0.5			
10		84,537			20	1.1	0.5			
11		120,177			20	1.1	0.5			
12		102,997			20	1.2	0.5			
13		113,509			24	1.2	0.6			
14		99,437			20	1.2	0.5			
15		106,992			20	1.3	0.6			
16		126,958			28	1.3	0.5			
17		90,288			20	1.3	0.5			
18		136,037			28	1.4	0.6			
19		104,152			20	1.4	0.5			
20		109,261			20	1.4	0.6			
21		106,653			24	1.4	0.5			
22		126,473			24	1.3	0.5			
23		110,416			20	1.5	0.6			
24		135,224			48	1.5	0.6			
25		20,500			4	1	0.5			
26		184,618			40	1	0.5			
27		121,507			32	1	0.5			
28		118,951			32	1	0.5			
29		91,864			28	1	0.5			
30		121,281			24	1.1	0.6			
31		76,779			20	1.3	0.6			
Total		3,329,479		0	720		16.3	0	0	
AVG.		107,403		#DIV/0!	23.22580645	1.209677419	0.525806452			

Chlorine Mix Ratio = 7.9 Gallons quarts/gallons of 12.5 % chlorine added to 50 gallons of water in crock

Date UV quartz sleeve last cleaned ______ Dat UV Lamp Replaced ______ Alarm Activation (yes or no)if "yes" date of activation ______

Reported by: Sal Misiti Title: Assistant Superintendent NYS DOH Operator Certification Number: NY0032969

Signature: ______ Date: 4/2/2012 Operator Grade Level IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2.Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Coman Hill School	3/6/2012	1	☐ Yes ☑ No	☐ Yes ☑ No	0.5
12 Spruce Hill Rd	3/15/2012	1	☐ Yes ☑ No	☐ Yes ☑ No	0.4
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	

Population Served: 1200

Number of microbiological monitoring samples required: 2

Number of microbiological monitoring samples taken: 2

Did an M&R violation occur? ☐ Yes ☑ No

If "Yes," check reason (s) below:

____ Actual number of samples is fewer than required.
____ Did not collect/analyze repeat sample.
____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur? ☐ Yes ☑ No

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): ____________________

Name of NYSDOH Certified Laboratory: ____________________

Did any MCL violation occur? If so, please describe: ____________________

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain.

Comments: ____________________

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report

For Systems that Treat with Chlorine and/or Ultraviolet Radiation

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
North Castle Water Dist. 2	April 2012	5/2/2012	☐ Surface ☑ Ground ☐ GWUDI
Public Water System ID	**County**	**Town, Village, or City**	☐ Purchase with subsequent chlorination
NY 5903446	Westchester	Town of North Castle	☐ Purchase w/out subsequent chlorination

			Chlorination					Ultraviolet Radiation / Other Treatments		
			Gaseous		Liquid					
DATE	Source(s) in Use	Treated water volume (1,000 gallons/day)	Cylinder weight (lbs.)	Chlorine used per day (lbs.)	Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Dist Sys. Free mg/l	UV Unit Active (Yes/No)	Intensity Meter >70%	
1		106,624			24	1.4	0.6			
2		94,115			20	1.4	0.5			
3		94,808			24	1.5	0.6			
4		112,871			24	1.5	0.6			
5		93,160			24	1.7	0.6			
6		119,015			28	1.6	0.6			
7		91,143			24	1.7	0.6			
8		119,431			28	1.7	0.6			
9		118,982			28	1.8	0.6			
10		81,502			20	1.6	0.6			
11		114,401			24	1.5	0.5			
12		127,387			28	1.5	0.6			
13		113,725			24	1.4	0.5			
14		149,858			32	1.2	0.5			
15		143,691			32	1.2	0.5			
16		186,968			60	1.2	0.5			
17		179,958			40	1.1	0.5			
18		205,567			44	1.7	0.6			
19		185,079			40	1.4	0.6			
20		169,808			36	1.3	0.6			
21		177,609			40	1.3	0.5			
22		158,703			32	1.1	0.4			
23		132,066			24	1.4	0.6			
24		175,986			28	1.3	0.6			
25		214,937			40	1.1	0.6			
26		169,866			24	1.3	0.6			
27		211,736			36	1.2	0.6			
28		206,438			32	1.2	0.6			
29		216,745			32	1.2	0.6			
30		209,365			44	1.1	0.5			
Total		4,481,544		0	936		16.9	0	0	
AVG.		149,385		#DIV/0!	31.2	1.386666667	0.563333333			

Chlorine Mix Ratio = 7.9 Gallons quarts/gallons of **12.5** % chlorine added to 50 gallons of water in crock

Date UV quartz sleeve last cleaned ______ Dat UV Lamp Replaced ______ Alarm Activation (yes or no)if "yes" date of activation ______

Reported by: Sal Misiti Title: Assistant Superintendent NYS DOH Operator Certification Number: **NY0032969**

Signature: ______ Date: **5/2/2012** Operator Grade Level **IIB**

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2.Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Coman Hill School	4/3/2012	**1**	☐ Yes ☑ No	☐ Yes ☑ No	0.6
12 Spruce Hill Road	4/16/2012	**1**	☐ Yes ☑ No	☐ Yes ☑ No	0.6
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	

Population Served: **1200**

Number of microbiological monitoring samples required: **2**

Number of microbiological monitoring samples taken: **2**

Did an M&R violation occur? ☐ Yes ☑ No

If "Yes," check reason (s) below:

____ Actual number of samples is fewer than required.

____ Did not collect/analyze repeat sample.

____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur? ☐ Yes ☑ No

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): ____________________

Name of NYSDOH Certified Laboratory: ____________________

Did any MCL violation occur? If so, please describe: ____________________

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain.

Comments: ____________________

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report

For Systems that Treat with Chlorine and/or Ultraviolet Radiation

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
North Castle Water Dist. 2	May 2012	6/1/2012	☐ Surface ☑ Ground ☐ GWUDI
Public Water System ID	**County**	**Town, Village, or City**	☐ Purchase with subsequent chlorination
NY 5903446	Westchester	Town of North Castle	☐ Purchase w/out subsequent chlorination

DATE	Source(s) in Use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Dist Sys. Free mg/l	Ultraviolet Radiation / Other Treatments: UV Unit Active (Yes/No)	Intensity Meter >70%	
1		168,872			32	1.3	0.5			
2		109,007			20	1.1	0.5			
3		139,456			24	1.1	0.5			
4		156,970			28	1.1	0.5			
5		146,363			28	1	0.6			
6		188,225			36	1	0.5			
7		152,092			32	1	0.5			
8		170,473			36	1.2	0.5			
9		120,839			24	1.1	0.5			
10		182,907			36	1.1	0.5			
11		181,871			40	1.1	0.5			
12		190,503			40	1.1	0.5			
13		201,859			44	1.2	0.6			
14		158,286			32	1.2	0.5			
15		161,850			32	1	0.5			
16		131,022			28	1	0.5			
17		159,796			28	1	0.5			
18		187,956			36	1	0.5			
19		194,013			40	1	0.5			
20		231,704			56	1	0.5			
21		161,294			40	1.3	0.6			
22		186,464			36	1.2	0.6			
23		171,690			28	1.3	0.6			
24		199,034			40	1.2	0.5			
25		176,078			32	1.1	0.5			
26		202,550			40	1.2	0.5			
27		188,076			36	1.1	0.5			
28		233,758			44	1.1	0.5			
29		225,326			40	1.4	0.5			
30		217,942			40	1.1	0.5			
31		235,750			44	1.3	0.5			
Total		5,532,026		0	1092		16	0	0	
AVG.		178,452		#DIV/0!	35.22580645	1.125806452	0.516129032			

Chlorine Mix Ratio = 7.9 Gallons quarts/gallons of 12.5 % chlorine added to 50 gallons of water in crock

Date UV quartz sleeve last cleaned ______ Dat UV Lamp Replaced ______ Alarm Activation (yes or no)if "yes" date of activation ______

Reported by: Sal Misiti Title: Assistant Superintendent NYS DOH Operator Certification Number: NY0032969

Signature: ______ Date: 6/1/2012 Operator Grade Level IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2.Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Coman Hill School	5/2/2012	1	☐ Yes ☐ No	☐ Yes ☐ No	0.5
21 Thornewood Road	5/15/2012	1	☐ Yes ☐ No	☐ Yes ☐ No	0.5
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	

Population Served: **1200**

Number of microbiological monitoring samples required: **2**

Number of microbiological monitoring samples taken: **2**

Did an M&R violation occur? ☐ Yes ☐ No

If "Yes," check reason (s) below:

____ Actual number of samples is fewer than required.

____ Did not collect/analyze repeat sample.

____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur? ☐ Yes ☐ No

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): ____________________

Name of NYSDOH Certified Laboratory: ____________________

Did any MCL violation occur? If so, please describe: ____________________

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain.

Comments: ____________________

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report

For Systems that Treat with Chlorine and/or Ultraviolet Radiation

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
North Castle Water Dist. 2	June 2012	7/2/2012	☐ Surface ☑ Ground ☐ GWUDI
Public Water System ID	**County**	**Town, Village, or City**	☐ Purchase with subsequent chlorination
NY 5903446	Westchester	Town of North Castle	☐ Purchase w/out subsequent chlorination

			Chlorination				Ultraviolet Radiation / Other Treatments			
			Gaseous		Liquid					
DATE	Source(s) in Use	Treated water volume (1,000 gallons/day)	Cylinder weight (lbs.)	Chlorine used per day (lbs.)	Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Dist Sys. Free mg/l	UV Unit Active (Yes/No)	Intensity Meter >70%	
1		216,476			40	1	0.5			
2		202,880			36	1	0.5			
3		237,340			40	1	0.5			
4		183,800			32	1	0.6			
5		231,668			40	1	0.5			
6		209,850			40	1	0.5			
7		233,750			44	1	0.5			
8		252,662			48	1	0.5			
9		233,264			44	1.1	0.5			
10		230,232			48	1	0.5			
11		277,550			56	1.2	0.5			
12		255,450			48	1.3	0.5			
13		241,946			48	1.4	0.5			
14		177,176			32	1.2	0.5			
15		230,324			44	1.1	0.5			
16		259,042			52	1.2	0.5			
17		308,376			60	1.3	0.5			
18		347,686			68	1.2	0.5			
19		269,772			52	1	0.5			
20		344,134			68	1.8	0.5			
21		355,974			72	1	0.5			
22		135,154			28	1	0.5			
23		350,724			60	1.4	0.5			
24		340,164			56	1	0.5			
25		241,590			40	1.1	0.5			
26		206,550			40	1.1	0.5			
27		269,766			52	1.1	0.5			
28		264,604			56	1.4	0.5			
29		273,874			56	1.1	0.5			
30		306,996			60	1.2	0.5			
Total		7,688,774		0	1460		15.1	0	0	
AVG.		256,292		#DIV/0!	48.67	1.14	0.50			

Chlorine Mix Ratio = 7.9 Gallons quarts/gallons of **12.5** % chlorine added to 50 gallons of water in crock

Date UV quartz sleeve last cleaned ______ Dat UV Lamp Replaced ______ Alarm Activation (yes or no)if "yes" date of activation ______

Reported by: Sal Misiti Title: Assistant Superintendent NYS DOH Operator Certification Number: **NY0032969**

Signature: ______ Date: **7/2/2012** Operator Grade Level **IIB**

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2.Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Coman Hill School	6/6/2012	1	☐ Yes ☑ No	☐ Yes ☑ No	0.4
5 Oak Ridge Ct	6/19/2012	1	☐ Yes ☑ No	☐ Yes ☑ No	0.7
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	

Population Served: 1200

Number of microbiological monitoring samples required: 2

Number of microbiological monitoring samples taken: 2

Did an M&R violation occur? ☐ Yes ☑ No

If "Yes," check reason (s) below:

____ Actual number of samples is fewer than required.

____ Did not collect/analyze repeat sample.

____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur? ☐ Yes ☑ No

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): ____________________

Name of NYSDOH Certified Laboratory: ____________________

Did any MCL violation occur? If so, please describe: ____________________

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain.

Comments: ____________________

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report

For Systems that Treat with Chlorine and/or Ultraviolet Radiation

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
North Castle Water Dist. 2	July 2012	8/2/2012	☐ Surface ☑ Ground ☐ GWUDI
Public Water System ID	**County**	**Town, Village, or City**	☐ Purchase with subsequent chlorination
NY 5903446	Westchester	Town of North Castle	☐ Purchase w/out subsequent chlorination

DATE	Source(s) in Use	Treated water volume (1,000 gallons/day)	Chlorination – Gaseous: Cylinder weight (lbs.)	Chlorination – Gaseous: Chlorine used per day (lbs.)	Chlorination – Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Dist Sys. Free mg/l	UV Unit Active (Yes/No)	Intensity Meter >70%	
1		353,294			72	1	0.5			
2		353,922			72	1	0.5			
3		286,202			60	1.1	0.5			
4		283,604			64	1.3	0.5			
5		246,670			44	1.1	0.6			
6		295,618			60	1.1	0.5			
7		301,990			60	1	0.5			
8		303,594			60	1	0.5			
9		305,132			64	1	0.5			
10		327,678			68	1.1	0.5			
11		347,650			88	1	0.5			
12		291,358			60	1	0.5			
13		364,832			92	1.2	0.5			
14		310,522			72	1.1	0.5			
15		246,200			88	1.1	0.5			
16		201,898			88	1.7	0.6			
17		212,838			84	1.3	0.5			
18		308,774			112	1.2	0.5			
19		234,016			60	1.1	0.5			
20		230,186			56	1.2	0.5			
21		208,318			40	1.2	0.5			
22		286,528			52	1.5	0.5			
23		211,180			36	1.3	0.5			
24		296,988			44	1.2	0.5			
25		276,460			44	1.2	0.5			
26		204,500			36	1.1	0.5			
27		208,684			36	1.4	0.5			
28		181,568			32	1.3	0.5			
29		230,364			48	1.6	0.5			
30		229,488			44	1.7	0.6			
31		239,584			52	1.4	0.5			
Total		8,379,640		0	1888		15.8	0	0	
AVG.		270,311		#DIV/0!	60.90322581	1.209677419	0.509677419			

Chlorine Mix Ratio = 7.9 Gallons quarts/gallons of 12.5 % chlorine added to 50 gallons of water in crock

Date UV quartz sleeve last cleaned ______ Dat UV Lamp Replaced ______ Alarm Activation (yes or no)if "yes" date of activation ______

Reported by: Sal Misiti Title: Assistant Superintendent NYS DOH Operator Certification Number: NY0032969

Signature: ______ Date: 8/2/2012 Operator Grade Level IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2.Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Coman Hill School	7/3/2012	**1**	☐ Yes ☑ No	☐ Yes ☑ No	0.3
40 Long Pond Road	7/16/2012	**1**	☐ Yes ☑ No	☐ Yes ☑ No	0.7
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	

Population Served: **1200**

Number of microbiological monitoring samples required: **2**

Number of microbiological monitoring samples taken: **2**

Did an M&R violation occur? ☐ Yes ☑ No

If "Yes," check reason (s) below:

- ___ Actual number of samples is fewer than required.
- ___ Did not collect/analyze repeat sample.
- ___ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur? ☐ Yes ☑ No

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

- ___ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).
- ___ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).
- ___ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): ______________________

Name of NYSDOH Certified Laboratory: ______________________

Did any MCL violation occur? If so, please describe: ______________________

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain.

Comments: ______________________

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report

For Systems that Treat with Chlorine and/or Ultraviolet Radiation

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
North Castle Water Dist. 2	August 2012		☐ Surface ☑ Ground ☐ GWUDI
Public Water System ID	**County**	**Town, Village, or City**	☐ Purchase with subsequent chlorination
NY 5903446	Westchester	Town of North Castle	☐ Purchase w/out subsequent chlorination

DATE	Source(s) in Use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Dist Sys. Free mg/l	Ultraviolet Radiation / Other Treatments: UV Unit Active (Yes/No)	Intensity Meter >70%	
1		228,584			44	1.5	0.5			
2		223,968			44	1.3	0.5			
3		244,960			52	1.4	0.5			
4		303,056			60	1.3	0.6			
5		291,776			60	1.3	0.5			
6		188,544			32	1.2	0.5			
7		256,504			44	1.4	0.6			
8		298,884			56	1.1	0.5			
9		253,616			48	1.1	0.5			
10		254,056			48	1.3	0.5			
11		224,232			40	1.2	0.5			
12		249,520			44	1.4	0.6			
13		274,092			56	1.2	0.5			
14		250,748			48	1	0.5			
15		282,988			52	1.1	0.5			
16		249,932			48	1	0.5			
17		245,360			52	1	0.5			
18		214,488			48	1.1	0.5			
19		218,016			40	1	0.5			
20		260,616			44	1.1	0.5			
21		267,296			52	1.2	0.5			
22		284,440			56	1.1	0.5			
23		308,584			60	1.2	0.5			
24		303,332			60	1.1	0.5			
25		263,476			52	1.1	0.5			
26		308,188			56	1.1	0.5			
27		270,780			52	1.1	0.5			
28		271,628			48	1.3	0.5			
29		290,296			56	1.1	0.5			
30		239,572			48	1.1	0.4			
31		298,808			56	1.2	0.5			
Total		8,120,340		0	1556		15.7	0	0	
AVG.		261,946		#DIV/0!	50.19354839	1.180645161	0.506451613			

Chlorine Mix Ratio = 7.9 Gallons quarts/gallons of 12.5 % chlorine added to 50 gallons of water in crock

Date UV quartz sleeve last cleaned ______ Dat UV Lamp Replaced ______ Alarm Activation (yes or no)if "yes" date of activation ______

Reported by: Sal Misiti Title: Assistant Superintendent NYS DOH Operator Certification Number: NY0032969

Signature: ______ Date: 1/0/1900 Operator Grade Level IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2.Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Coman Hill School	8/1/2012	1	☐ Yes ☑ No	☐ Yes ☑ No	0.3
21 Thornewood Rd	8/13/2012	1	☐ Yes ☑ No	☐ Yes ☑ No	0.3
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	

Population Served: **1200**

Number of microbiological monitoring samples required: **2**

Number of microbiological monitoring samples taken: **2**

Did an M&R violation occur? ☐ Yes ☑ No

If "Yes," check reason (s) below:

____ Actual number of samples is fewer than required.

____ Did not collect/analyze repeat sample.

____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur? ☐ Yes ☑ No

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): ____________________

Name of NYSDOH Certified Laboratory: ____________________

Did any MCL violation occur? If so, please describe: ____________________

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain.

Comments: ____________________

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report

For Systems that Treat with Chlorine and/or Ultraviolet Radiation

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
North Castle Water Dist. 2	September 2012	10/1/2012	☐ Surface ☑ Ground ☐ GWUDI
Public Water System ID	**County**	**Town, Village, or City**	☐ Purchase with subsequent chlorination
NY 5903446	Westchester	Town of North Castle	☐ Purchase w/out subsequent chlorination

DATE	Source(s) in Use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Ultraviolet Radiation / Other Treatments: Dist Sys. Free mg/l	UV Unit Active (Yes/No)	Intensity Meter >70%	
1		313,924			60	1.2	0.5			
2		283,916			56	1.1	0.5			
3		311,380			60	1.2	0.5			
4		210,056			40	1.1	0.5			
5		171,736			36	1.1	0.5			
6		180,864			36	1.2	0.6			
7		219,132			44	1	0.5			
8		162,364			40	1	0.5			
9		193,904			40	1.7	0.6			
10		201,872			40	1.3	0.5			
11		220,808			40	1.1	0.5			
12		219,388			40	1	0.5			
13		219,996			40	1	0.5			
14		233,412			44	1	0.5			
15		248,906			48	1	0.6			
16		197,706			40	1	0.5			
17		88,900			28	1	0.5			
18		227,972			44	1	0.5			
19		164,836			32	1.1	0.4			
20		208,136			40	1.1	0.5			
21		210,456			40	1.3	0.5			
22		183,560			32	1.1	0.5			
23		226,212			40	1	0.5			
24		190,088			36	1.1	0.5			
25		217,372			44	1.1	0.5			
26		160,328			28	1.1	0.5			
27		183,000			32	1.3	0.5			
28		140,200			20	1.3	0.5			
29		154,300			20	1	0.5			
30		169,400			24	1	0.5			
Total		6,114,124		0	1164		15.2	0	0	
AVG.		203,804		#DIV/0!	38.8	1.117	0.507			

Chlorine Mix Ratio = 7.9 Gallons quarts/gallons of 12.5 % chlorine added to 50 gallons of water in crock

Date UV quartz sleeve last cleaned ______ Dat UV Lamp Replaced ______ Alarm Activation (yes or no)if "yes" date of activation ______

Reported by: Sal Misiti Title: Assistant Superintendent NYS DOH Operator Certification Number: NY0032969

Signature: ______ Date: 10/1/2012 Operator Grade Level IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2.Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Coman Hill School	9/5/2012	1	☐ Yes ☑ No	☐ Yes ☑ No	0.5
12 Spruce Hill Rd	9/18/2012	1	☐ Yes ☑ No	☐ Yes ☑ No	0.3
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	

Population Served: **1200**

Number of microbiological monitoring samples required: 2

Number of microbiological monitoring samples taken: 2

Did an M&R violation occur? ☐ Yes ☑ No

If "Yes," check reason (s) below:

- Actual number of samples is fewer than required.
- Did not collect/analyze repeat sample.
- Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur? ☐ Yes ☑ No

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

- For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).
- For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).
- The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): ______________________

Name of NYSDOH Certified Laboratory: ______________________

Did any MCL violation occur? If so, please describe: ______________________

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain.

Comments: ______________________

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report

For Systems that Treat with Chlorine and/or Ultraviolet Radiation

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
North Castle Water Dist. 2	October 2012	11/6/2012	☐ Surface ☑ Ground ☐ GWUDI
Public Water System ID	**County**	**Town, Village, or City**	☐ Purchase with subsequent chlorination
NY 5903446	Westchester	Town of North Castle	☐ Purchase w/out subsequent chlorination

DATE	Source(s) in Use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Dist Sys. Free mg/l	UV Unit Active (Yes/No)	Intensity Meter >70%	
1		170,744			24	1	0.5			
2		147,156			20	1	0.5			
3		134,150			16	1	0.5			
4		132,370			24	1	0.5			
5		108,040			20	1	0.5			
6		134,940			20	1	0.4			
7		121,508			24	1	0.5			
8		174,136			28	1	0.5			
9		141,384			24	1	0.5			
10		105,672			20	1.1	0.5			
11		158,984			24	1	0.5			
12		130,872			20	1	0.5			
13		140,812			32	1	0.5			
14		157,710			28	1	0.5			
15		119,322			20	1.2	0.5			
16		137,388			20	1	0.4			
17		151,324			20	1.4	0.5			
18		119,024			20	1	0.5			
19		76,028			16	1	0.5			
20		141,172			16	1	0.5			
21		161,928			20	1	0.4			
22		116,876			16	1	0.5			
23		117,360			32	1	0.5			
24		27,040			8	1.1	0.5			
25		191,200			40	1.1	0.5			
26		119,596			20	1	0.5			
27		126,940			24	1	0.5			
28		95,224			20	1	0.5			
29		82,030			20	1	0.5			
30		90,646			20	1.3	0.6			
31		70,180			16	1.4	0.6			
Total		3,901,756		0	672		15.4	0	0	
AVG.		125,863		#DIV/0!	21.68	1.051612903	0.50			

Chlorine Mix Ratio = 7.9 Gallons quarts/gallons of 12.5 % chlorine added to 50 gallons of water in crock

Date UV quartz sleeve last cleaned ______ Dat UV Lamp Replaced ______ Alarm Activation (yes or no)if "yes" date of activation ______

Reported by: Sal Misiti Title: Assistant Superintendent NYS DOH Operator Certification Number: NY0032969

Signature: ______ Date: 11/6/2012 Operator Grade Level IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2.Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Coman Hill School	10/2/2012	1	☐ Yes ☐ No	☐ Yes ☐ No	0.4
5 Oak Ridge Ct	10/16/2012	1	☐ Yes ☐ No	☐ Yes ☐ No	0.3
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	

Population Served: **1200**

Number of microbiological monitoring samples required: 2

Number of microbiological monitoring samples taken: 2

Did an M&R violation occur? ☐ Yes ☑ No

If "Yes," check reason (s) below:

Actual number of samples is fewer than required.

____ Did not collect/analyze repeat sample.

____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur? ☐ Yes ☑ No

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): ______________________

Name of NYSDOH Certified Laboratory: ______________________

Did any MCL violation occur? If so, please describe: ______________________

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain.

Comments: ______________________

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report

For Systems that Treat with Chlorine and/or Ultraviolet Radiation

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
North Castle Water Dist. 2	November 2012	12/3/2012	☐ Surface ☑ Ground ☐ GWUDI
Public Water System ID	**County**	**Town, Village, or City**	☐ Purchase with subsequent chlorination
NY 5903446	Westchester	Town of North Castle	☐ Purchase w/out subsequent chlorination

			Chlorination					Ultraviolet Radiation / Other Treatments		
			Gaseous		Liquid					
DATE	Source(s) in Use	Treated water volume (1,000 gallons/day)	Cylinder weight (lbs.)	Chlorine used per day (lbs.)	Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Dist Sys. Free mg/l	UV Unit Active (Yes/No)	Intensity Meter >70%	
1		71,268			20	1.5	0.5			
2		65,292			20	1.6	0.5			
3		67,348			20	1.6	0.6			
4		102,852			24	1.7	0.5			
5		78,952			20	1.7	0.5			
6		148,212			32	1.9	0.6			
7		92,236			20	1.5	0.6			
8		132,100			28	1.4	0.5			
9		85,312			20	1.2	0.5			
10		122,016			20	1.2	0.4			
11		163,068			28	1.1	0.5			
12		114,612			24	1	0.5			
13		115,172			20	1	0.5			
14		129,436			20	1	0.5			
15		120,640			28	1.1	0.5			
16		86,964			20	1.4	0.5			
17		131,832			32	1.4	0.5			
18		148,040			36	1.3	0.5			
19		122,720			28	1.5	0.5			
20		108,560			28	1.5	0.5			
21		103,796			24	1.3	0.5			
22		143,424			36	1.2	0.5			
23		132,840			32	1.2	0.5			
24		125,480			28	1.3	0.5			
25		137,320			32	1.2	0.5			
26		111,488			28	1.1	0.5			
27		129,256			28	1.3	0.5			
28		110,856			24	1	0.5			
29		117,148			28	1.1	0.5			
30		99,248			24	1.1	0.5			
Total		3,417,488		0	772		15.2	0	0	
AVG.		113,916		#DIV/0!	25.7	1.3	0.5			

Chlorine Mix Ratio = 7.9 Gallons quarts/gallons of **12.5** % chlorine added to 50 gallons of water in crock

Date UV quartz sleeve last cleaned ______ Dat UV Lamp Replaced ______ Alarm Activation (yes or no)if "yes" date of activation ______

Reported by: Sal Misiti Title: Assistant Superintendent NYS DOH Operator Certification Number: **NY0032969**

Signature: ______ Date: **12/3/2012** Operator Grade Level **IIB**

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2.Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Coman Hill School	11/5/2012	**1**	☐ Yes ☑ No	☐ Yes ☑ No	0.4
21 Thornewood Road	11/14/2012	**1**	☐ Yes ☑ No	☐ Yes ☑ No	0.4
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	

Population Served: **1200**

Number of microbiological monitoring samples required: **2**

Number of microbiological monitoring samples taken: **2**

Did an M&R violation occur? ☐ Yes ☑ No

If "Yes," check reason (s) below:

____ Actual number of samples is fewer than required.

____ Did not collect/analyze repeat sample.

____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur? ☐ Yes ☑ No

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): ____________________

Name of NYSDOH Certified Laboratory: ____________________

Did any MCL violation occur? If so, please describe: ____________________

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain.

Comments: ____________________

NEW YORK STATE DEPARTMENT OF HEALTH

Bureau of Water Supply Protection

Water Systems Operation Report

For Systems that Treat with Chlorine and/or Ultraviolet Radiation

Public Water System Name	Reporting Month/Year	Date Report Submitted	Source Water Type(s)
North Castle Water Dist. 2	December 2012	1/2/2013	☐ Surface ☑ Ground ☐ GWUDI
Public Water System ID	**County**	**Town, Village, or City**	☐ Purchase with subsequent chlorination
NY 5903446	Westchester	Town of North Castle	☐ Purchase w/out subsequent chlorination

DATE	Source(s) in Use	Treated water volume (1,000 gallons/day)	Chlorination: Gaseous: Cylinder weight (lbs.)	Chlorination: Gaseous: Chlorine used per day (lbs.)	Chlorination: Liquid: Hypochlorite added to crock (gallons or quarts)	Free chlorine residual at entry point (mg/l)	Ultraviolet Radiation / Other Treatments: Dist Sys. Free mg/l	UV Unit Active (Yes/No)	Intensity Meter >70%	
1		133,256			32	1	0.5			
2		110,764			28	1.1	0.5			
3		109,316			24	1.7	0.5			
4		125,524			32	1.2	0.5			
5		105,932			28	1.3	0.5			
6		108,560			28	1.2	0.5			
7		99,132			24	1.1	0.5			
8		111,580			28	1.1	0.5			
9		136,076			32	1.1	0.4			
10		124,368			32	1.1	0.5			
11		119,824			32	1.1	0.5			
12		122,012			32	1.1	0.5			
13		113,512			28	1.3	0.5			
14		82,508			20	1.2	0.5			
15		123,992			32	1.1	0.5			
16		151,160			40	1.1	0.5			
17		125,356			32	1.2	0.5			
18		112,680			28	1.4	0.6			
19		123,788			28	1.6	0.6			
20		111,688			20	1.2	0.5			
21		105,604			24	1.3	0.5			
22		105,988			28	1.1	0.5			
23		118,272			28	1	0.4			
24		120,164			24	1.2	0.4			
25		96,632			24	1.3	0.5			
26		118,828			28	1.4	0.5			
27		100,540			24	1.2	0.5			
28		73,188			20	1.1	0.5			
29		94,628			20	1	0.5			
30		156,808			32	1	0.5			
31		120,640			28	1.2	0.6			
Total		3,562,320		0	860		15.5	0	0	
AVG.		114,914		#DIV/0!	27.74193548	1.193548387	0.5			

Chlorine Mix Ratio = 7.9 Gallons quarts/gallons of 12.5 % chlorine added to 50 gallons of water in crock

Date UV quartz sleeve last cleaned ________ Dat UV Lamp Replaced ________ Alarm Activation (yes or no)if "yes" date of activation ________

Reported by: Sal Misiti Title: Assistant Superintendent NYS DOH Operator Certification Number: NY0032969

Signature: ________ Date: 1/2/2013 Operator Grade Level IIB

Microbiological Samples and Free Chlorine Residual

Sample Location	Date of Sample	Sample Type 1.Routine 2.Repeat	Total Coliform Positive	E.coli Positive	Free Chlorine Residual (mg/l)
Coman Hill School	12/3/2012	1	☐ Yes ☑ No	☐ Yes ☑ No	0.5
40 Long Pond Rd	12/18/2013	1	☐ Yes ☑ No	☐ Yes ☑ No	0.4
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	
			☐ Yes ☐ No	☐ Yes ☐ No	

Population Served: **1200**

Number of microbiological monitoring samples required: 2

Number of microbiological monitoring samples taken: 2

Did an M&R violation occur? ☐ Yes ☑ No

If "Yes," check reason (s) below:

____ Actual number of samples is fewer than required.

____ Did not collect/analyze repeat sample.

____ Did not collect/analyze for E. coli for positive total coliform from routine/repeat sample.

Did an MCL violation occur? ☐ Yes ☑ No

If "**Yes**," check reason(s) below (see also Part 5, Table 6 for additional information).

____ For systems collecting less than 40 samples per month: two or more of the samples (routine and /or repeat) are positive for total coliform (= total coliform MCL violation).

____ For systems collecting 40 or more samples per month: more than 5% of the samples (routine and/or repeat) are positive for total coliform (= total coliform MCL violation).

____ The original sample was E.coli positive and at least 1 repeat sample was positive for total coliform (= E.coli MCL violation).

Reminder: System must collect a minimum of five (5) routine microbiological monitoring samples during the month following a repeat sample collection.

As required by 5-1.72, "Operation of a Public Water System," a copy of this form shall be sent to your local health department by the 10th calendar day of the next reporting period.

Sample Collector(s): ____________________

Name of NYSDOH Certified Laboratory: ____________________

Did any MCL violation occur? If so, please describe: ____________________

Did an emergency or low pressure problem occur? Did source water bypass an existing treatment process in the system? If so, please explain.

Comments: ____________________

APPENDIX K

VHB Engineering, Surveying and Landscape Architecture, P.C. | Affiliated with Vanasse Hangen Brustlin, Inc.

Planning
Transportation
Land Development
Environmental

MEMORANDUM

TO: Megan Maciejowski

FROM: John Saccardi, Bonnie Von Ohlsen

DATE: June 5, 2012

RE: Byram Hills Student Generation Rates

1. Introduction

The purpose of this memorandum is to clarify some confusion regarding the school generation rates in North Castle (Byram Hills), including the general validity of the Rutgers University Center for Urban Policy Research (CUPR) factors.

As you know, our presentations for the proposed development at Brynwood referred to the Rutgers CUPR multipliers as the benchmark for estimates of school children generation for environmental impact statements in New York State. Although often criticized by community residents as under estimating the projected number of students, we have found this source is reasonably reliable in most instances. However, the data needs to be verified in response to local conditions and to a uniquely designed project, like Brynwood, that addresses an atypical market.

The basic ratios cited in our presentations have been:

Unit Type	Public School Student Generation Rate per Unit*
2 bedroom condominium flat	0.05
3 bedroom condominium duplex	0.28
5 bedroom single family home alternative	1.03

*Source: Rutgers CUPR. See Table 2 for details.

In the presentations, we noted that the Brynwood condominiums would have even fewer school age children than the Rutgers multipliers would indicate, based on the buyer profiles for this unique product, which are significantly different from a typical condominium developments covered by Rutgers. The total costs for the unit (purchase price, condo fees, taxes and required club membership) and the

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www.vhb.com

lack of amenities for families with children, would make these condominiums primarily an empty nester product and they would be marketed as such. Hence, a lower generation factor would be realistic and will be used along with the Rutgers CUPR generation factors in the DEIS.

The Rutgers ratios for condominiums were criticized at community meetings citing that they are significantly different from what has been realized locally. Reference was made to the actual number of school children that live at the Whippoorwill Ridge and Whippoorwill Hills developments, particularly in comparison to the estimates reportedly made at the time when these projects were originally proposed. It was stated that the applicants' documents projected very few students, in contrast to the numbers actually realized. In effect, this implied that DEIS numbers and multipliers cannot be trusted.

As a result, we did some independent research based on data obtained from the Town Planning Department and the School District.

2. Comparable Multifamily Condominiums in Armonk

There is nothing in Armonk that is comparable to what is being proposed at Brynwood, certainly not as a golf course condominium, not even a more typical condominium. Whippoorwill Hills, Whippoorwill Ridge and the Cider Mill are three HOA communities at the edge of the downtown area with large single family homes, duplex townhomes and just a few condominium units in multifamily buildings. The predominant type of home (e.g., single family) and the number of bedrooms (e.g., three, four and more) are key factors in the student generation ratios. With these characteristics, the projects would be expected to generate a sizable school age population.

Residents and local officials reported during our discussions that the number of students from these projects far exceeded the DEIS documents that were prepared in the mid-1980's. We FOILed the documents from the Planning Department archives. There were DEISs for Whippoorwill Ridge and Whippoorwill Hills; both had school children estimates. There was no DEIS for the Cider Mill in the file, presumably given the more modest size of the project. Therefore following data comparison focuses on Whippoorwill Ridge and Whippoorwill Hills.

At the time of the applications, both Whippoorwill projects called for townhouse developments. The following school children projections, based on Westchester County data and North Castle Town consultant data, were cited in the documents:

Whippoorwill Ridge: 96 units, 21 school children

Whippoorwill Hills: 323 units, 89 school children

Total both projects: 419 units, 110 students

At some point prior to construction, it appears that the projects were significantly changed to a mix of single family homes, duplexes and condominiums, with a combined total of approximately of 205 units; roughly half of the proposal from the 1980s. Specifically, Whippoorwill Hills went from 323 units to 150 units. Whippoorwill Ridge went from 96 to 55 units.

In order to obtain the actual number of students, we went to the School District, and received data on the number of students signed up for bus transportation. We also reviewed the PTSA student directory, which provides Byram Hills students by street address. Based on this data , the number of school age children actually realized in Whippoorwill Hills and Whippoorwill Ridge is 119 (excluding 19 students at the Cider Mill development for which there was no DEIS in the Town's archives). See Table 3 below.

Although it is interesting that the DEIS projections and the actual number of students are similar (119 realized in 2012 vs. 110 projected 30 years earlier), this does not help in the analysis of the generation ratios, since the projects were so dramatically changed from the initial planning to the actual construction. It does, however, explain what likely occurred in the past nearly three decades from when the projects were originally proposed.

In order to further consider the generation factors, we took a closer look at the number of units actually built at these projects, applied the Rutgers generation ratios, and then compared the results to the actual school district numbers provided by the district. This would be a better test of the general validity of the Rutgers ratios. For this comparison, we were also able to include the Cider Mill.

Based on field work, aerial photographs and sample unit information from Houlihan Lawrence, we assigned bedroom sizes to the estimated 115 single family homes, the 93 townhouses and the 24 condominium units. As indicated on the following tables, the Rutgers student generation ratios result in an estimate of 153 students for this housing mix, compared to the school district number of 136* students signed up for bus transportation. The estimated 153 students actually represent a 0.66 ratio compared to a ratio of 0.59 actually realized.

Table 1: Total Units/Estimated Distribution - 3 Projects

	Single Family Detached	**Attached Townhomes**	**Condo/Apts** (in two bldgs/8 units per bldg)	**Total**
Whippoorwill Hills	62	64	24	150
Whippoorwill Ridge	37	18	0	55
Cider Mill	<u>16</u>	<u>11</u>	<u>0</u>	<u>27</u>
totals	115	93	24	232

Source: Estimated based upon aerial photograph and field review

Table 2: Estimate of School-Age Children in Public Schools (Combined 3 Projects)

	Number of Units	CUPR Multiplier	Number of School-age Children in Public School
Single family detached/ 4 BR	115	0.87[1]	100
Townhomes/attached/3 BR Townhomes/attached/4 BR	61 32	0.28[2] 0.92[3]	17 30
Condos/Apt Bldg 1 BR 2 BR 3 BR	 6 15 3	 0.15[4] 0.15[5] 0.49[6]	 1 3 2
Total	**232 units**		**153 school-age children** *(136 signed up by BHSD)*

[1]**Rutgers University Residential Demographic Multipliers** (June 2006): New York, School age children in public schools, ownership units for Single Family Detached, costing more than $329,500 (4 bedrooms)
[2]**Rutgers University Residential Demographic Multipliers** (June 2006): New York, School age children in public schools, ownership units for Single-Family Attached housing, costing more than $269,500 (3 bedrooms)
[3]**Rutgers University Residential Demographic Multipliers** (June 2006): New York, School age children in public schools, ownership units for Single-Family Attached housing, costing more than $224,500 to $329,500 (4 bedrooms)
[4]**Rutgers University Residential Demographic Multipliers** (June 2006): New York, School age children in public schools, ownership units in buildings with 5+ units, all values (1 bedroom)
[5]**Rutgers University Residential Demographic Multipliers** (June 2006): New York, School age children in public schools, ownership units for Single-Family Attached housing, in buildings with 5+ units, costing between $135,00 to $329,500 (2 bedrooms)
[6]**Rutgers University Residential Demographic Multipliers** (June 2006): New York, School age children in public schools, ownership units in buildings with 5+ units, all values (3 bedrooms)

Thus, it appears that the Rutgers CUPR numbers are reasonably accurate in this case, as we expected from years of experience with this source.

3. Single Family Homes in the Byram Hills

The Rutgers CUPR student generation factors were also criticized for single family homes.

Given the quality and reputation of the Byram Hills schools, many residents indicated that the Rutgers ratios for the single family home alternative were low and that at least 2.0 students per housing unit could be expected. Although many households have pre-schoolers, recent high school graduates and private school students, 2.0 was repeatedly cited as a more realistic ratio. However, a 2.0 ratio does not necessarily coincide with overall demographic data from the school district and the US Census.

According to the Westchester-Putnam School Boards Association report, entitled "Facts and Figures, 2010", there were 2,810 students in the BHSD in 2009-2010, with a total district population of 12,800 persons. Based on the Census, the 2010 population of the Town includes 2.86 persons per home. Applying that factor, the 12,800 persons, at 2.86 persons per home (Source: Town website, Town Life –

Demographics), would yield about 4,476 housing units in the school district, with a resulting ratio of 0.63 students per dwelling unit (2,810 divided by 4,476).

We recognize that these gross numbers are not sufficiently accurate for DEIS purposes. As previously noted, in April we met with the school district officials (former Superintendent and new Superintendent) who supplied more detailed data. This included information from the transportation office on students signed up for bus transportation on seven projects in the Town, including four single family subdivisions; some of fairly recent construction. The student directory from the Byram Hills PTSA provided the number of students by street address. Although there are some unexplained differences in the pupil counts, the overall numbers provide very useful information on school children generation

Table 3 lists the approximate number of students and the estimated number of dwelling units, based on available data, aerial photographs, etc.

Table 3: Project-Specific Data

Development	Homes	Public School Age Pupils*	Ratio
Whippoorwill Ridge	150	82-103	0.68
Whippoorwill Hills	55	15-16	0.29
Cider Mill	27	11-17	1.36
Thomas Wright and Sands Mill	88	115-120	1.36
Leisure Farms	31	36-43	1.39
Windmill Farms	377	277-285	0.76

* Directory and bus transportation figures—higher number used for the ratio.

The total number of units in the seven developments is 728. The highest number of total students from school district sources is 579; this results in an overall ratio of 0.795 students per dwelling unit. This includes a variety of housing types which is similar to the gross factor for the census and BOCES. Again, more detailed information is needed for the DEIS.

With regard to all the locally derived data, the School District officials acknowledged the differences in the total number of students from the two sources, and concluded that the higher numbers should be used for conservative analyses. The district also cautioned that the directory could have missed a few students since it only includes PTSA member families. In response we counted the total number of students in the directory and compared it with the total for the school district, noting a discrepancy of 3%. As a result, if we increased the totals for the seven projects by 1.03, the result would be 596 students with an overall student generation ratio of 0.82.

For the four single family home developments in the table above, the ratio is 0.93 students per home (461 students in 496 homes). Excluding Windmill Farms, an older development, the ratio is 1.41 students per home (168 divided by 119).

4. Conclusions

Although the Rutgers CUPR school children generation factors are reasonably accurate for condominiums in North Castle, they do not reflect the golf course condominium units as proposed at Brynwood. To be conservative, the DEIS will run the school children generation analyses with both the Rutgers derived numbers and with a lower ratio that better reflects the nature of this housing product.

For the single family homes alternative, two sets of numbers will also be utilized; the Rutgers CJUPR student generation ratios, and the Byram Hills School District factors given to us by the district, for the newer subdivisions.