VOLUME II OF IV

ENGINEER'S REVIEW REPORT

THE NEW SEWAGE TREATMENT INFRASTRUCTURE PROGRAM

FOR THE

HAMLET OF PHOENICIA

TOWN OF SHANDAKEN
ULSTER COUNTY, NEW YORK

New York City Watershed Memorandum of Agreement (MOA)
Identified Community No. 6

October 2011

Catskill Watershed Corporation

Prepared By:

Lamont Engineers
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Scope of Work

Lamont Engineers
ENGINEERS • PLANNERS • FACILITY OPERATIONS
Dedicated to Service...Committed to Excellence

June 28, 2010

Mr. Nate Hendricks
Environmental Engineering Specialist
Catskill Watershed Corporation
PO Box 569
Margaretville, NY 12455

RE: Engineering Review Phase Services
Hamlet of Phoenicia New Sewage Treatment Infrastructure Program (NIP)
Town of Shandaken

Dear Mr. Hendricks:

I enclose the scope of work, manpower and cost estimates for the Review Phase engineering and legal services for the Hamlet of Phoenicia New Sewage Treatment Infrastructure Program (NIP) in the Town of Shandaken.

The task of restarting the Phoenicia NIP in the face of its history so far is a little daunting. A great deal of work was done on the project ($1.1M of design and project development work plus $600,000 for the NIP Study Phase), resulting in a final design which consists of installing large diameter gravity sewers and a Sequencing Batch Reactor (SBR) wastewater treatment plant (WWTP). However, that proposal was not acceptable to the property owners in the proposed district, reportedly because of concerns over installation of laterals and costs to the commercial properties.

The purpose of the Review Phase is to examine the feasibility, technical work, cost, planning, and implementation issues for the Hamlet of Phoenicia NIP. Utilizing all the work completed previously and exploring new alternatives that may not have been considered before, including a Septic Maintenance District(s) (SMD), a Community Septic System(s), and a Membrane Bioreactor (MBR) WWTP, Lamont Engineers will recommend a project that includes the cost of all work needed to complete the Pre-Construction and Construction Phases for the Hamlet of Phoenicia NIP within the remaining block grant amount. This project will also need to alleviate the community's concerns and ultimately be acceptable to the community.

Lamont Engineers will begin the Review Phase by performing an in-depth evaluation of all the work that has been done to date. This includes all the work performed by the Town of Shandaken's previous engineers, Laberge Engineering and Consulting Group, LTD, Delaware Engineering, and Rennia Engineering, consisting of, but not limited to the Task 1 through 6 reports, the Facility Plan, final design plans, and specifications that were issued for bidding and all supporting design information, low bidder bid forms, SPDES permit, the Final Environmental Impact Statement and SEQRA findings, cultural resource reports, soil boring reports, easements, Sewer Use Law, operation and maintenance budget, and associated commercial fees. Lamont Engineers will then investigate possible cost savings alternatives. These alternatives will include evaluating the feasibility of providing an SMD(s) and/or Community Septic System(s) for all or a portion of the proposed Sewer District, evaluating the existing collection system design for

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technical and cost adequacy and efficiency, determining if redesigning the system could reduce costs, identifying any areas of the collection system that could be eliminated, and evaluating the feasibility and cost of a Membrane Bioreactor (MBR) wastewater treatment plant. Additionally, Lamont Engineers will review the wetlands option study and make comments and recommendations. Wherever possible, information and data from the previous work will be used.

Payment for the assistance of the previous engineering firms in finding, copying, and providing any needed documentation, as well as any other agreed-upon value engineering work or any other task, will be pursuant to direct agreement and payment between CWC and the other engineering firms. Payment for such tasks will not be the responsibility of Lamont Engineers nor has Lamont Engineers carried any subcontract fee amounts in its budget for these services.

In order to determine the feasibility of a SMD and/or a Community Septic System, a Septic Limitations Map will be developed for the Proposed Sewer District. This map will help identify areas that have suitable soils, large enough lots, and are not otherwise overly encumbered by the flood plain or 100' off set from streams, and therefore may be suitable for subsurface treatment.

As a basis for Septic Limitations Mapping, GIS mapping will be provided by the Ulster County Planning Department. This mapping will include the MOA designated Hamlet Area, NYCDEP approved Service Area, Agricultural Districts, Aquifers, 100-year flood plain, watercourses, roads, stormwater facilities, National Wetland Inventory information, tax map information, land use, and USGS information. The area covered by the GIS mapping will be larger than the Proposed Sewer District to provide mapped information for attempting to identify sites for wastewater treatment systems.

Topographic mapping with 1' contour intervals will be obtained from the Town or its previous engineers. It is assumed that the topographic mapping already flown, developed and used in the previous work is adequate, that it covers a large enough area for this study and that no additional aerial photos or new topographic mapping will be necessary.

If areas are identified as potentially viable for an SMD or Community Septic System, field work will need to be completed to further verify the suitability for subsurface treatment.

Based on a cursory review of the Hamlet of Phoenicia soils, flood plain and lot sizes, it is assumed that there may be up to one (1) Community Septic System site and one (1) area where an SMD is feasible. The field work for a Community Septic System includes performing a groundwater mounding test and analysis, deep test pits and percolation tests on each site. The field work for an SMD includes deep test pits and percolation tests scattered throughout the area where the SMD would be located or on isolated properties if areas of SMD are not identified. Location of the deep test pits, percolation tests and ground water mounding test work will be performed. A local contractor will be subcontracted by Lamont Engineers to dig the deep test pits.

A groundwater mounding test is performed on relatively fast soils in an attempt to prove that even at flow rates 2 to 4 times faster than the maximum day and peak hour sewage flow rates anticipated for the community, no groundwater mound will form and that, therefore, groundwater modeling will not be necessary. A 20 to 30 foot trench is excavated and fitted with crushed stone

and perforated pipe. An array of groundwater monitoring wells is installed around the trench. Water is pumped into the perforated pipe in the trench at the accelerated rate identified above for one to three days. The pumping rate is throttled if and only if the trench and perforated pipe back up. For the duration of the test, the groundwater levels in the monitoring wells are recorded. When steady state is reached, pumping continues for 24 hours. After pumping, the groundwater level monitoring continues until the original groundwater level is reached.

A groundwater mounding computer model may be required for slower soils. This work is more extensive than the groundwater mounding test and would be done by a groundwater hydrogeologist. This work is not included in this proposed scope. At this time, we do not anticipate the need for a mounding model on this project.

It is assumed that an adequate number of soil borings have been performed in and around the Hamlet of Phoenicia as part of the work previously done on the project. If any additional soil borings are needed they will be performed during the Pre-Construction Phase. Therefore soil borings are not included in this scope of work.

After the review of the previous work, the desktop analysis of the community (including review of the GIS mapping, Septic Limitations Map, etc.), and field testing, Lamont Engineers will provide both capital cost estimates and operation and maintenance costs estimates for the viable options within the remaining block grant amount. After exploration of the options, Lamont Engineers, in conjunction with CWC and NYCDEP, will recommend a detailed plan that prioritizes the areas to be served, including a rationale for deletion of areas of the Proposed Sewer District, if any, and identifies all the remaining work required to complete the project, such as redesign work, easement acquisition work, District Formation work, SEQRA compliance work, etc. Up to three (3) meetings will be held with NYCDEP to ensure that the proposed option(s) are approvable by NYCDEP .

All of this will be thoroughly detailed in the Engineer's Review Report. A detailed Scope of Work: Steps to the Engineer's Review Report is provided in Attachment A to this letter.

Good communication and participation with the Hamlet of Phoenicia is key to the success of this project. Informational meetings will be held periodically throughout the Review Phase work. Lamont Engineers has budgeted for up to four (4) informational meetings. Preparation for these meeting will be intense. That preparation will include rehearsals of the presentations with NYCDEP, CWC, Lamont Engineers and its project attorney.

Lamont Engineers will also develop initial, periodically updated and complete project schedules; continuously pursue good coordination, communications, quality control, quality assurance, and value engineering with the project team. Lamont Engineers and its project attorney will meet with CWC on a monthly basis. Extremely important to the overall success of the project is early, continuous and thorough coordination with the CWC, NYCDEP, permitting and approval agencies, the Town, County, the project attorneys and all other involved agencies. This includes development and distribution of telephone call notes, emails, correspondence, meeting notes, memos, etc., as well as continuous review of staff work and subcontractor work for quality control. The structure of the project management is through a strong project manager system in which all project activity is undertaken at the direction and with the input and knowledge of the project managers, Henry Lamont, P.E. and Julie Barown, P.E.

Also enclosed with this letter is Attachment B – Manpower and Cost Estimate: Staff Hours Breakdown, Attachment C – Project Team Organizational Chart, Attachment D – Project Experience showing our extensive experience on wastewater projects, and Attachment E – Draft Project Management Plan which details the manner in which we will manage the project to ensure its success.

The not-to-exceed contract amount for the above listed and attached services is $298,148.

If you have any questions or comments, please do not hesitate to call me.

Very truly yours,

Henry Lamont

Henry Lamont, P.E.
Principal Engineer
Lamont Engineers

Enclosures:

Attachment A – Scope of Work: Steps to the Engineer's Review Report
Attachment B – Manpower and Cost Estimate: Staff Hours Breakdown
Attachment C - Project Team Organizational Chart and Team Résumés
Attachment D - Project Experience
Attachment E – Draft Project Management Plan

cc: Alan Rosa, Executive Director, Catskill Watershed Corporation
Timothy Cox, Corporate Counsel, Catskill Watershed Corporation
Julie Barown, P.E., Lamont Engineers
Michael Harrington, P.E., Lamont Engineers

ATTACHMENT A

Scope of Work:
Steps to the Engineer's Review Report

Scope of Work: Steps to the Engineer's Review Report

2010050 CWMP Engineering Scope of Work for Town of Shandaken, Hamlet of Phoenicia

Section 1 Overview of Hamlet and Review of Previous Work

1. Obtain census data.
2. Obtain and scan comprehensive plan, land use plans, zoning and subdivision regulations.
3. Review previously completed reports, SEQRA documentation, easements, correspondence, permits, soil boring reports, preliminary engineering and design reports, bidding plans and specifications.
4. Estimate cost to complete existing project.

Section 2 Delineate Planning Area

5. Obtain aerial orthographic photo.
6. Review aerial orthographic photo and delineate Planning Area. This should be based on the current Proposed Sewer District and should include other populated areas adjacent to the Proposed Sewer District that can be justified due to possible water quality concerns and/or could possibly used as subsurface treatment sites.
7. Either obtain data to create and create or contract with Ulster County planning department to create the following GIS maps overlaid on the Planning Area:
   a. Land Uses
   b. Ag Districts
   c. FEMA flood maps and 100' offsets from streams
   d. MOA Hamlet Area, NYSEFC Service Area
   e. Aquifer map
   f. Existing utilities map (stormwater facilities locations, water distribution systems and districts, underground gas lines, etc.)
   g. NWI map
   h. Tax map
   i. DOT corridor map
   j. USDA NRCS soils map
   k. Water courses, roads, and other significant features
8. Review GIS mapping.
9. Obtain existing topographic mapping (assumed to be supplied from Town of Shandaken, Hamlet of Phoenicia; possibly additional mapping will be necessary, depending on review of GIS and topographic mapping, but this is not anticipated and is not included in the Scope of Work).

Section 3 Identify, Assess and Plan for Wastewater Needs

10. Obtain USDA NRCS soil survey.
11. Obtain from the county the most up to date tax roll and property line data. Review existing topographic mapping to verify property boundaries are still the same. If not, modify topographic map to represent the most current tax mapping.
12. Review existing list of properties within the Proposed Sewer District. Verify listing and update property information including addresses, tax map info, etc.
13. Obtain flood maps.
14. Identify soil types within the Proposed Sewer District.
    a. Review types of soils
    b. Determine suitability for leach fields (septic systems) by reviewing perc rates and soil descriptions in the 24" zone
    c. Determine areas of high groundwater/bedrock
15. Determine minimum lot size for on-site septic systems with and without 100% reserve area based on:
    a. Perc rates from USGS Soils information. After determining the slowest perc rate for the each soil type, determine the application rate based on DEC Standards. Then use the next slowest application rate from the DEC tables.
    b. Any setbacks required by local zoning
    c. Setbacks required by DEC Standards.
    d. Average number of bedrooms per household – review census data for the Town
16. On topographic map, create Septic Limitations Map for the Proposed Sewer District. Show 100' offset from watercourses, 100 year flood boundary, areas of slope over 15%, lots of insufficient size for subsurface treatment, USGS soils delineation with shading for soils not suitable for subsurface treatment.
17. Perform windshield survey.
18. Based on windshield survey and previous engineering data, identify each property in the Proposed Sewer District and categorize, Residential Single Family (RSF), Residential Two Family (RTF), Residential Apartments (RA) (3 EDU's or more), Commercial (C), Commercial w/ Apartment(s) (CA), Institutional (I), Institutional w/ Apartment(s) (IA), Municipal (M).
19. Determine from field visit any stormwater problems.

Section 4 Delineate Proposed Wastewater Service Area

20. Analyze and summarize all gathered data, maps, MOA Designated Hamlet Area, Proposed Service Area, etc. to determine any other Supplemental Service Areas and identify sub-areas of the Proposed Service Area
21. Create map and list w/ tax map info for the Proposed Service Area and Sub-Service Areas.

Section 5 Determine Wastewater Flows for Service Area

22. Determine wastewater flow for Proposed Service Area and Sub-Service Areas.
    a. 300 gpd per EDU for Residential properties
    b. Determine flows from commercials based on windshield survey information in conjunction with existing commercial data from previous engineering reports.
    c. Add 10%
23. Compare to previous flow estimates as well as MOA Flow.

Section 6 Proposed Hydraulic and Organic Loading

24. Calculate Loadings for Proposed Service Area and Sub-Service Areas.

Section 7 Identification and Review of Wastewater Management Options

25. Review Wastewater Management options.
    a. Septic Maintenance District (s) (SMD)
    b. Sewer District - Community Septic or Clusters
    c. Combination SMD(s) & Sewer District/Community Septic or Clusters
    d. Sewer District - WWTP
26. Discuss potential wastewater management options for Proposed Service Areas and Sub-Service Areas (start with SMD and proceed towards WWTP as options are ruled out).
    a. Consider SMD, analyze data from Chapter 3 (Septic Limitations Map), identify number and percent of properties capable of maintaining own on-site, up-to-standard septic system with and without the 100% reserve area and determine if SMD is acceptable wastewater solution. If an SMD appears to be technically feasible for the Hamlet or a sub-area of the Hamlet, proceed to testing of a few sample sites through access letters.
    b. If SMD is not an acceptable solution for a particular Sub-Service Area, look at a Community Septic Systems. Try to find a suitable site or sites large enough to accommodate a community septic system((s) based on a desktop study. If one is found, move on to testing of the site(s) through access letters. If one cannot be found, move on to a WWTP.
        1. Prepare site selection criteria for a Community Septic System.
            A. Stage I – Identify Potential Sites
            B.. Stage II – Desktop Investigation
            C. Stage III – Send out to access/willingness to sell letters to property owners of potential sites (include right to do property survey)

        2. Perform Stages I & II. If a potentially suitable site is found proceed with Stage III.

Section 8 Review of Potentially Practical Options; Screening and Selection of Potentially Suitable Sites

27. If SMD is an acceptable wastewater solution for a Sub-Service Area, obtain access letters and perform site testing.
28. If there are Cluster and/or Community Septic Sites identified and willing seller letters are returned, perform site testing per the Site Selection Criteria, Stage IV – Field Work Protocol and perform testing.
29. Determine preferred subsurface wastewater treatment site based on results of testing.
30. Review of WWTP site purchased and review of optimal sites

Section 9 Wastewater System Alternatives and Discussion

31. Schematic design of wastewater solution options for the Hamlet
    a. Schematic Design of SMD (if applicable); and
    b. Collection System (where not an SMD)
        1. Review design of Large Diameter Collection System
            A. Review design and efficiency of existing Large Diameter Gravity Sewer design and suggest where money can be saved
            B. Suggest areas for deletion or to be installed through a Deduct Alternate process
        2. Discuss feasibility of changing Large Diameter Gravity System to Small Diameter Gravity Sewer
    c. Schematic design of Community Septic or WWTP (where not an SMD)
        1. Community Septic System
            A. Conventional Community Septic System
            B. Sand Filter to Absorption Bed System
        2. Wastewater Treatment Plant (if not an SMD or Community Septic)
            A. Review design and efficiency of existing SBR Plant and suggest areas where money could be saved, if any.
            B. MBR Plant

Section 10 Evaluate Options

32. Analyze Capital Costs and O&M budget for each option.
33. Estimate residential and commercial O&M costs and user fees for each option.

Section 11 Recommendations and Conclusions

34. Summarize draft report, identify selected option and explain why that option was chosen.
35. Identify permits and approvals still to be obtained or permits and approvals that will need to be modified.
36. Identify additional SEQRA work and revisions, if necessary, and estimate costs.
37. Identify District Formation work to be completed.
38. Identify easements to be obtained.
39. Identify property to be obtained (if any).
40. Timeframe to complete
41. Submit draft report to CWC for review and approval.
42. Address CWC comments.
43. Submit final report to NYCDEP for approval.
44. Address NYCDEP comments.

Exhibit B

Participants List

List of Participants / Hamlet of Phoenicia NIP
Shandaken (T) / Ulster (C)
Catskill Watershed Corporation
New Sewage Treatment Infrastructure Program (NIP)

I. Catskill Watershed Corporation

4th Tuesday CWC Board Meeting – 15 day right to object

1. Alan Rosa, Executive Director
   Office Cell: (607) 287-3786
   Home: (845) 586-3983
   Personal Cell: (845) 399-9885
   alrosa@cwconline.org
2. Nate Hendricks, Environmental Engineering Specialist
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   nhendricks@cwconline.org

3. Timothy Cox, Corporate Counsel
   timothycox@cwconline.org

4. Mike Triolo, Economic Development Director
   triolo@cwconline.org

5. Jim Martin, Finance Director
   PO Box 569
   Main Street
   Margaretville, New York 12455
   Phone: (845) 586-1400
   Fax: (845) 586-1401
   e-mail: invest@cwconline.org

   a. Property Appraiser
      Richard Arvidson
      Empire State Appraisers
      16 Hudson Street
      Kinderhook, NY 12106

II. Town of Shandaken

Fed Id #: 14-6002443

Town Meeting Hall
Route 28
PO Box 134
Allaben, NY 12480
Phone: (845) 688-5004
Fax: (845) 688-2041
Website: www.shandaken.us

Board Meetings:
1st Monday of month at 7:00 pm

Planning Board
Charles Fraiser
Maureen Millar
John Horn
JoAnne Kalb
Joan Munster
Marie Stutman, Planning Secretary

PO Box 134
Allaben, New York 12480
Phone: (845) 688-5008
Fax: (845) 688-2041
Email: planning@shandaken.us

Officials:

1. Hon. Robert A. Stanley, Supervisor — Office Hours: 7:30-3:30 M-F
PO Box 134
Allaben, New York 12480
Phone: (845) 688-7165 or (845) 688-7169
Fax: (845) 688-2041
E-Mail: shandakensupervisor@yahoo.com

Patti Heinz, Secretary/Bookkeeper
E-Mail: pheinz@shandaken.us

Diane O'Donnell, Secretary/Bookkeeper

2. Laurilyn J. Frasier, Town Clerk /Tax Collector — Mon - Fri 9:00 am – 3:30 pm
PO Box 67
Allaben, New York 12480
Phone: (845) 688-5004
Fax: (845) 688-2041
E-Mail: shandakenclerk@yahoo.com
Ginger Byron, Deputy Town Clerk
Brenda VanLeuvan, Deputy Town Clerk (they have 2)

3. Councilpersons
a. Jack Jordan, Councilperson
Email: councilmanjordan@shandaken.us

b. Timothy Malloy, Councilperson
Email: councilmanmalloy@shandaken.us

c. Vincent Bernstein, Councilperson
Email: councilmanbernstein@shandaken.us

d. Doris L. Bartlett, Councilperson
Email: councilmanbernstein@shandaken.us

4. Planning Board
   a. Charles Fraiser, Planning Board Chairperson
   b. Maureen Millar
   c. John Horn
   d. JoAnne Kalb
   e. Joan Munster
   f. Marie Stutman, Planning Secretary
   Email: planning@shandaken.us

5. Eric Hofmeister, Superintendent of Highways — Hours: 8:00-4:00 M-F
   PO Box 134
   Allaben, New York 12480
   Phone: (845) 688-5004
   Fax: (845) 688-2041
   Email: shandakensupervisor@yahoo.com

6. Town Building Inspector
   Gina Reilly — Hours: 8:30 – 3:30 M-F
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   Allaben, New York 12480
   Phone: (845) 688-5008
   Fax: (845) 688-2041
   Email: zeoshandaken@yahoo.com

7. Heidi Clark, Chair
   Assessor — Mon – Fri 10:00 – 3:30 M-F
   Phone: (845) 688-5004
   Fax: (845) 688-2041
   Email: clerk@shandaken.us

8. Town Attorney
   Paul Kellar, Attorney
   14 Pearl Street – PO Box 3536
   Kingston, New York 12401
   (845) 331-8900

III. Ulster County
   1. Ulster County Health Department
      300 Flatbush Avenue
      Kingston, New York 12401-2740
      Phone: (845) 340-3150
      a. Dean N. Palen, PE, MBA

Public Health Director
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(845) 340-3011

b. Allan M. Dumas, III, PE
Director of Environmental Sanitation
Phone: (845) 340-3035

c. Shelly Mertens, P.E.
Senior Public Health Engineer
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d. Joel R. Miranti, P.E.
Assistant Public Health Engineer
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Email: jmir@co.ulster.ny.us

2. Ulster County GIS/Informational Services
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(845) 340-3004

3. Ulster County Planning Department
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Website: www.co.ulster.ny.us/planning
E-mail: Planning@co.ulster.ny.us
a. Roxanne Pecora, Chairperson, Planning Board
b. Richard A. Gerentine, Chairperson, Transportation Council
c. Dennis Doyle, Director

4. Ulster County Public Works Administration
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Kingston, New York 12401-2810
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5. Environmental Management Council
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Stone Ridge, New York 12484
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(845) 658-8090 (H)
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E-mail: rfrits@aol.com

6. Ulster County Development Corporation
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5 Development Court
Kingston, New York 12401-1949
Phone: (845) 338-8840
Fax: (845) 338-0409
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7. Cornell Cooperative Extension, Ulster County
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E-mail: ulster@cornell.edu

8. Real Property Tax Services
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Kingston, New York 12402-1800
Phone: (845) 340-3490
Fax: (845) 340-3499

9. Soil & Water Conservation District, Ulster County
Leonard Tantillo, Chairman of the Board
Gary Capella, Executive Director
Times Square Office Park
652 Route 299, Suite 103
Highland, New York 12528
Phone: (845) 883-7162, Ext. 5
Fax: (845) 883-7184

10. County Legislators – District No. 3

Peter G. Kraft (D-I)
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IV. Engineers / Attorney

1. Lamont Engineers, P.C.
548 Main Street - PO Box 610
Cobleskill, New York 12043
Phone: (518) 234-4028
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b. Michael D. Harrington, P.E., Principal Engineer Reviewer
c. Julie Barown, P.E., Project Manager/Project Engineer
(518) 281-9651 (cell)
d. David Page, Assistant Project Engineer I, data collection WWTP review, cost estimates
e. Jeffrey M. Laban, Project Manager I, collection system design review
f. Maureen K. Seymour, Sr. Engineering Technician I, drafting
g. Glen Simpson, Engineering Technician, data collection
h. Debi Christman, Computer Technician II, report preparation, copying and distribution

2. Young, Sommer ... LLC
Attorneys at Law
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Fax: (518) 438-9914

a. Kevin M. Young, Attorney, ext. 225, (518) 441-9767 (car); (518) 459-0609 (home)
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b. Betsy Wykes
bwykes.8d882@youngsommer.com

V. Regulatory, Approval and Permitting Agencies

1. NYCDEP - New York City Department of Environmental Protection
Bureau of Water Supply, Quality & Protection
71 Smith Avenue
Kingston, New York 12401
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Fax: (845) 338-1371
Internet Address: http://www.nyc.gov/dep

a. Tom Stalter, Project Manager, West of Hudson Comm. Plng.
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Michael Meyer
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Jon R. Hairabedian , Assoc. Proj. Mgr.I (Kingston)
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d. Mike Giuliano
Regional Land Supervisor
New York City Department of Environmental Protection Land Management Office
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e. Judy Lapiner
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(914) 742-2040 (fax)
jlapiner@dep.nyc.gov

Pat Lambert
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f. Terry Potter or Paul Lenz
Permission to enter DEP lands for Surveying
(845) 340-7555

g. Det. Eric R. Johnson
NYCDEP Police
WOH Detective Bureau
(607) 363-9107
(607) 363-9009 (fax)
ejohnson@dep.nyc.gov

2. NYSDEC- New York State Department of Environmental Conservation
www.dec.state.ny.us

NYSDEC Region 3
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New Paltz, New York 12561-1696
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a. Rich Baldwin
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b. Thomas Rudolph, P.E.
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c. Wayne Elliot
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d. Margaret Duke
Permit Administrator and Assistance
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e. Alex Ciesluk

f. Armand DeAngelis
Boiceville Review Engineer
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h. Joseph Brilling
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i. Scott Ballard
Environmental Analyst I, Division of Environmental Permits
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3. NYSDOH
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4. NYSDOT
Highway Maintenance
Region 8 – Ulster County
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Poughkeepsie, NY 12603

Keith Savoury – Resident Engineer
Tom Storey – Asst Resident Engineer
David Corrigan or William C. LaRose – Permit Engineer
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NYSDOT Record Plans
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Fax: (845) 431-5889

5. United States Army Corps of Engineers
P.O. Box 209
Troy, NY 12182

VI. Utilities

1. Central Hudson Gas & Electric
Mark Mulpeter
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2. Verizon
Earl Martin

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Page: (845) 382-7086

Mike Jankowski, Outside Plant Engineer
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VII. Newspapers

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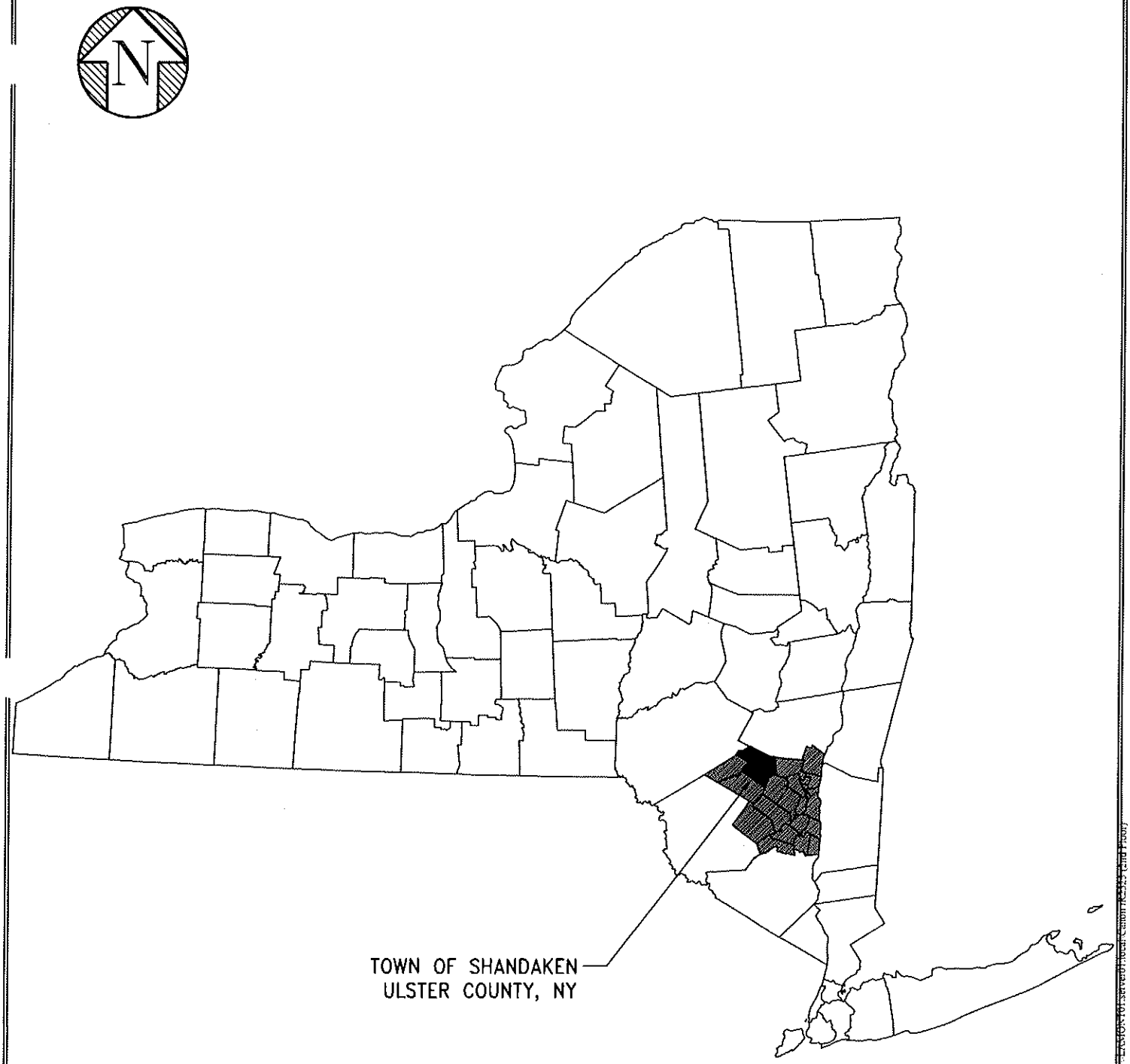
(845) 331-5000
Newsroom fax: (845) 331-3557
Advertising fax: (845) 338-0672
publisher@freemanonline.com

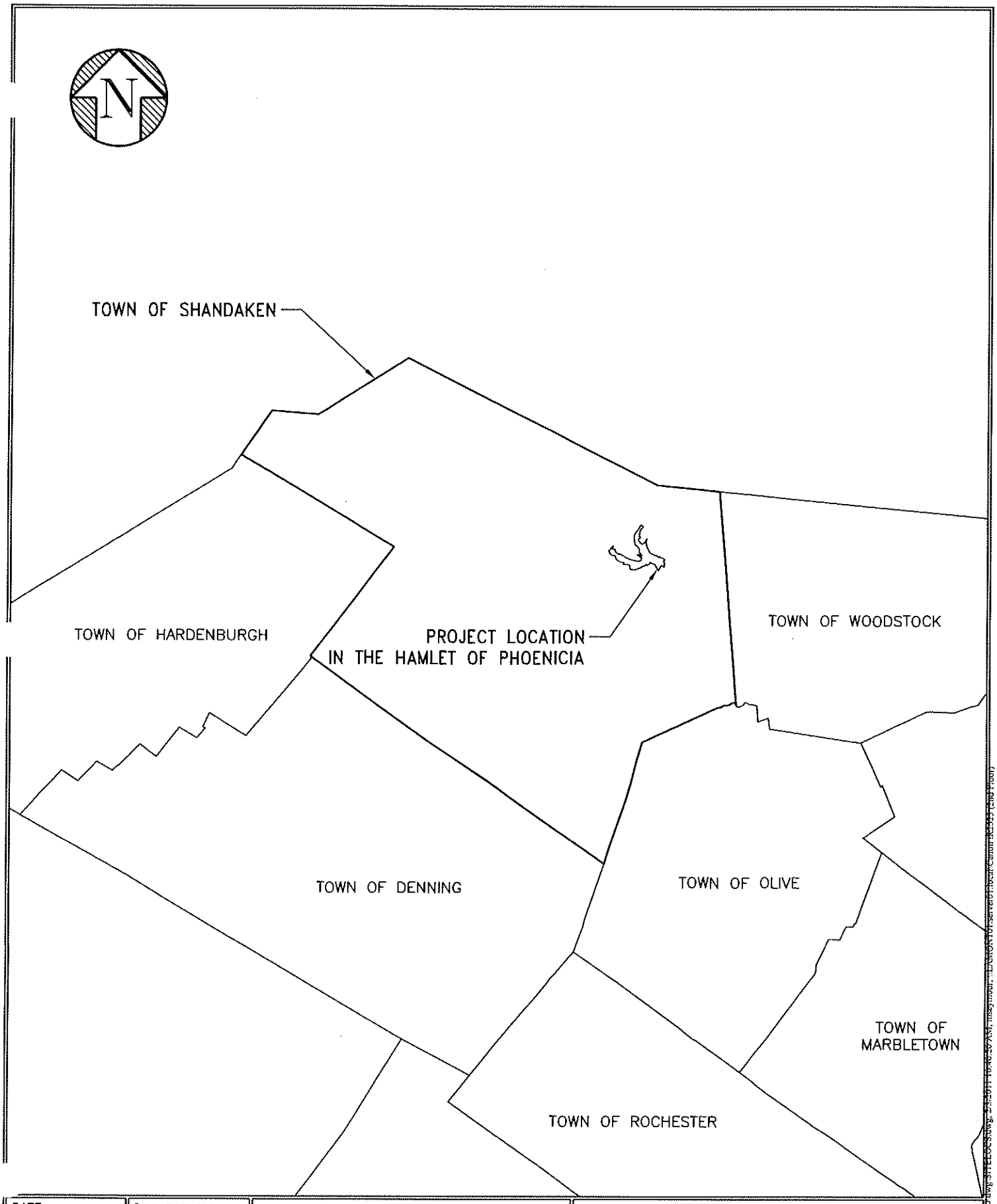
R:\Participant Lists\Phoenicia

Exhibit 1.1.A

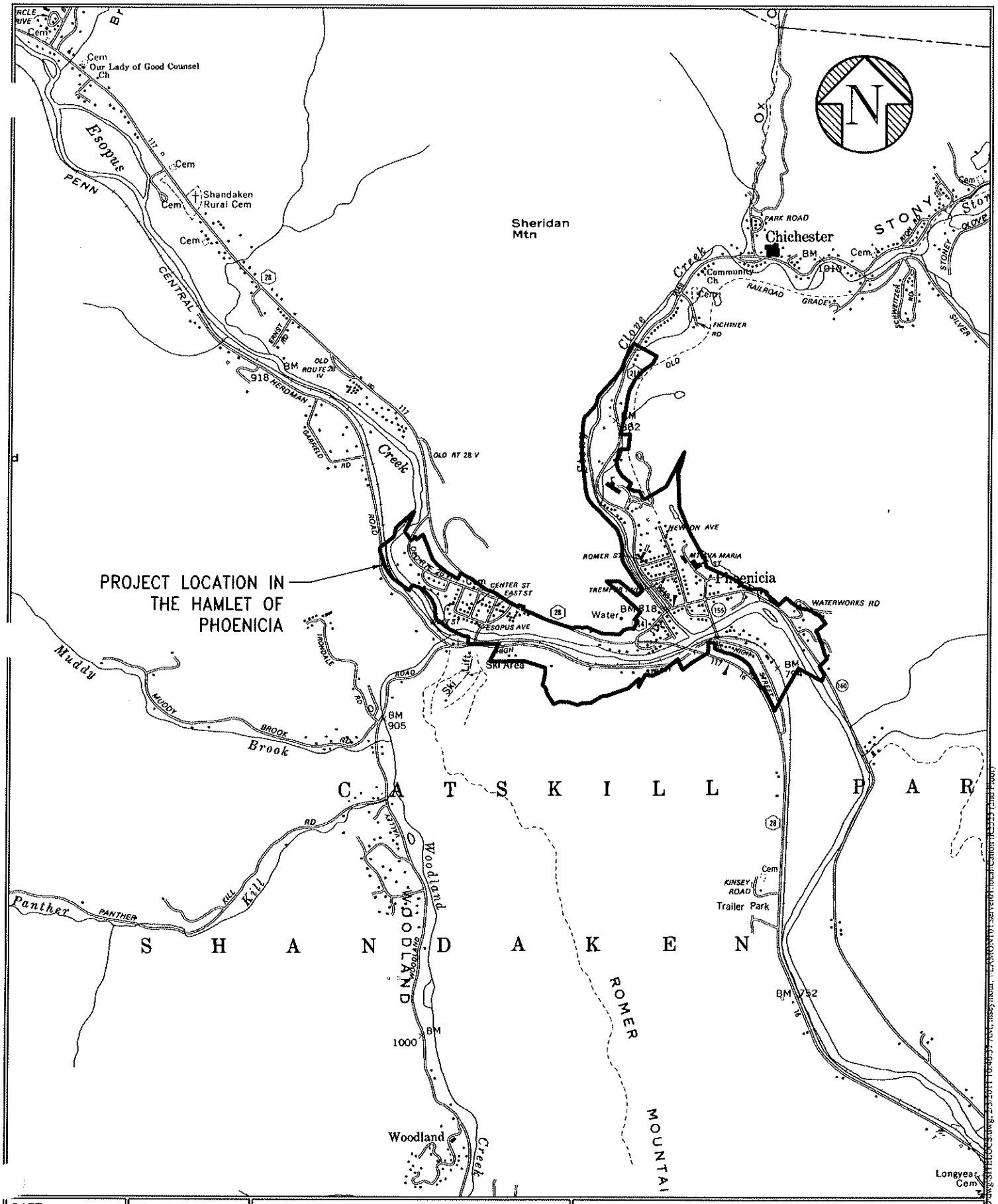
Location Maps



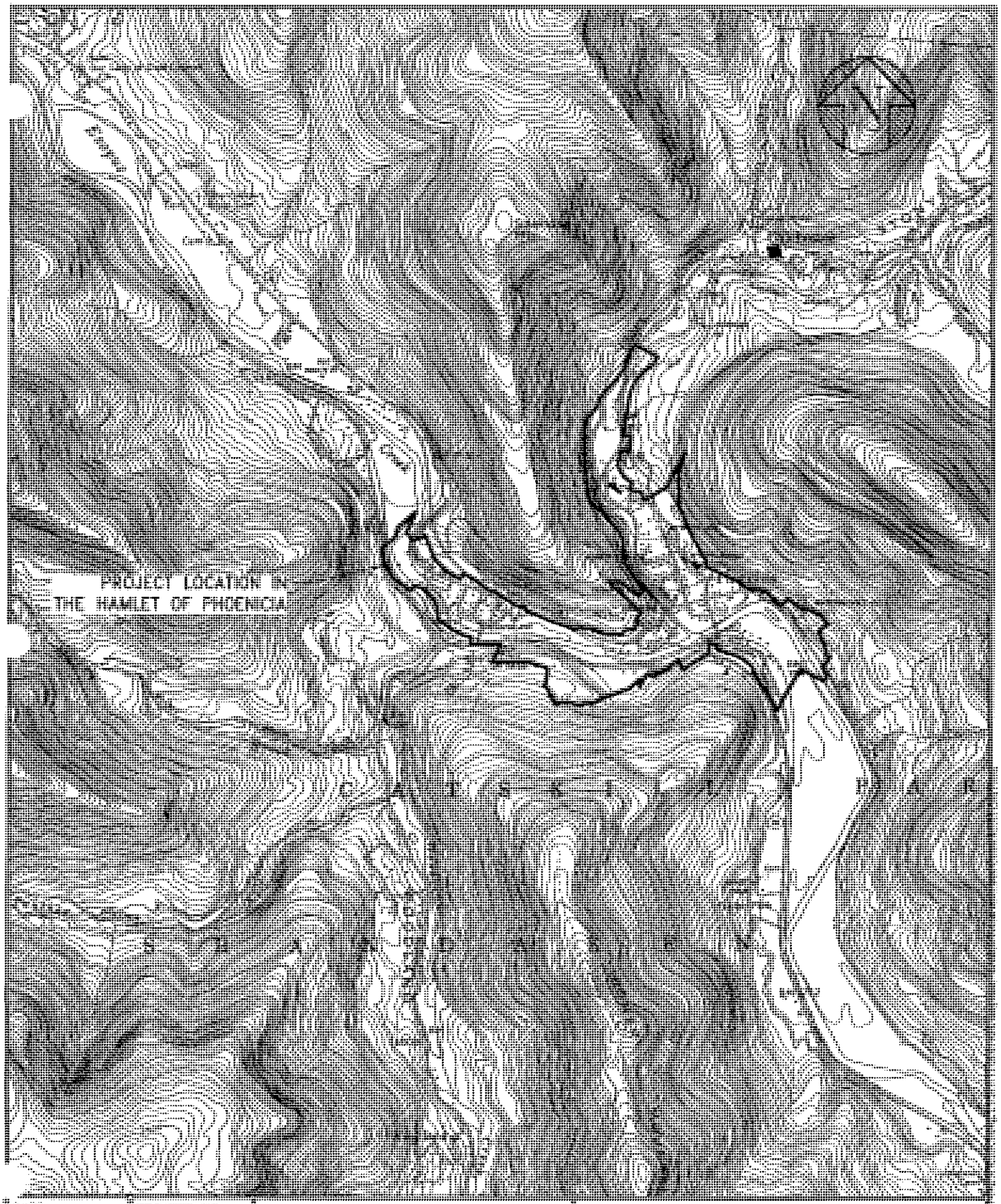
DATE	PROJECT NO.	PHOENICIA LOCATION MAP EXHIBIT 1.1.A	Lamont Engineers ENGINEERS · PLANNERS · FACILITY OPERATIONS
02/01/11	2010050		
SCALE	DRAWN		
NONE	MKS	ULSTER COUNTY NEW YORK STATE	



DATE 02/01/11	PROJECT NO. 2010050	PHOENICIA LOCATION MAP EXHIBIT 1.1.A	Lamont Engineers ENGINEERS · PLANNERS · FACILITY OPERATIONS
SCALE 1"=20,000'	DRAWN MKS	ULSTER COUNTY NEW YORK STATE	



DATE	PROJECT NO.	PHOENICIA LOCATION MAP EXHIBIT 1.1.A	Lamont Engineers ENGINEERS · PLANNERS · FACILITY OPERATIONS
02/01/11	2010050		
SCALE	DRAWN		
1"=2,500'	MKS	ULSTER COUNTY NEW YORK STATE	



DATE 03/01/11	PROJECT NO. 20-003	PHOENICIA LOCATION MAP EXHIBIT 1.1.A	Lamont Engineers ENGINEERS · PLANNERS · FACILITY OPERATORS
SCALE 1"=2,000'	DRAWN MKS	ULSTER COUNTY NEW YORK STATE	

Exhibit 1.2.A

2000 U.S. Census Information for the
Hamlet of Phoenicia Census Designated Place and Town of Shandaken

U.S. Census Bureau
American FactFinder

FACT SHEET

Phoenicia CDP, New York

View a Fact Sheet for a **race, ethnic, or ancestry group**

Census 2000 Demographic Profile Highlights:

General Characteristics - show more >>	Number	Percent	U.S.		
Total population	381			map	brief
Male	178	46.7	49.1%	map	brief
Female	203	53.3	50.9%	map	brief
Median age (years)	45.8	(X)	35.3	map	brief
Under 5 years	13	3.4	6.8%	map	
18 years and over	312	81.9	74.3%		
65 years and over	88	23.1	12.4%	map	brief
One race	371	97.4	97.6%		
White	366	96.1	75.1%	map	brief
Black or African American	1	0.3	12.3%	map	brief
American Indian and Alaska Native	2	0.5	0.9%	map	brief
Asian	1	0.3	3.6%	map	brief
Native Hawaiian and Other Pacific Islander	1	0.3	0.1%	map	brief
Some other race	0	0.0	5.5%	map	
Two or more races	10	2.6	2.4%	map	brief
Hispanic or Latino (of any race)	10	2.6	12.5%	map	brief
Household population	381	100.0	97.2%	map	brief
Group quarters population	0	0.0	2.8%	map	
Average household size	1.96	(X)	2.59	map	brief
Average family size	2.88	(X)	3.14	map	
Total housing units	246			map	
Occupied housing units	194	78.9	91.0%		brief
Owner-occupied housing units	102	52.6	66.2%	map	
Renter-occupied housing units	92	47.4	33.8%	map	brief
Vacant housing units	52	21.1	9.0%	map	

Social Characteristics - show more >>	Number	Percent	U.S.		
Population 25 years and over	282				
High school graduate or higher	219	77.7	80.4%	map	brief
Bachelor's degree or higher	88	31.2	24.4%	map	
Civilian veterans (civilian population 18 years and over)	47	15.5	12.7%	map	brief
Disability status (population 5 years and over)	122	31.3	19.3%	map	brief
Foreign born	34	8.5	11.1%	map	brief
Male, Now married, except separated (population 15 years and over)	87	59.2	56.7%		brief
Female, Now married, except separated (population 15 years and over)	61	34.7	52.1%		brief
Speak a language other than English at home (population 5 years and over)	20	5.1	17.9%	map	brief

Economic Characteristics - show more >>	Number	Percent	U.S.		
In labor force (population 16 years and over)	171	55.5	63.9%		brief
Mean travel time to work in minutes (workers 16 years and over)	20.9	(X)	25.5	map	brief
Median household income in 1999 (dollars)	22,159	(X)	41,994	map	
Median family income in 1999 (dollars)	28,000	(X)	50,046	map	
Per capita income in 1999 (dollars)	15,408	(X)	21,587	map	
Families below poverty level	5	5.7	9.2%	map	brief

Individuals below poverty level	54	13.9	12.4%	map	
Housing Characteristics - show more >>	**Number**	**Percent**	**U.S.**		
Single-family owner-occupied homes	93				brief
Median value (dollars)	93,400	(X)	119,600	map	brief
Median of selected monthly owner costs	(X)	(X)			brief
With a mortgage (dollars)	1,053	(X)	1,088	map	
Not mortgaged (dollars)	304	(X)	295		

(X) Not applicable.

Source: U.S. Census Bureau, Summary File 1 (SF 1) and Summary File 3 (SF 3)

The letters PDF or symbol indicate a document is in the Portable Document Format (PDF). To view the file you will need the Adobe® Acrobat® Reader, which is available for free from the Adobe web site.

U.S. Census Bureau
American FactFinder

FACT SHEET

Phoenicia CDP, New York

2005-2009 American Community Survey 5-Year Estimates - what's this?
Data Profile Highlights:

Note: The following links are to data from the American Community Survey and the Population Estimates Program.

NOTE: Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties.

Social Characteristics - show more >>	Estimate	Percent	U.S.	Margin of Error
Average household size	1.75	(X)	2.60	+/-0.48
Average family size	2.87	(X)	3.19	+/-0.66
Population 25 years and over	310			+/-130
High school graduate or higher	(X)	79.4	84.6%	(X)
Bachelor's degree or higher	(X)	27.1	27.5%	(X)
Civilian veterans (civilian population 18 years and over)	17	4.9	10.1%	+/-19
With a Disability	(X)	(X)	(X)	(X)
Foreign born	36	9.9	12.4%	+/-38
Male, Now married, except separated (population 15 years and over)	73	52.5	52.3%	+/-59
Female, Now married, except separated (population 15 years and over)	55	26.7	48.4%	+/-41
Speak a language other than English at home (population 5 years and over)	57	16.1	19.6%	+/-45
Household population	363			+/-144
Group quarters population	(X)	(X)	(X)	(X)

Economic Characteristics - show more >>	Estimate	Percent	U.S.	Margin of Error
In labor force (population 16 years and over)	243	70.4	65.0%	+/-127
Mean travel time to work in minutes (workers 16 years and over)	20.1	(X)	25.2	+/-8.9
Median household income (in 2009 inflation-adjusted dollars)	31,324	(X)	51,425	+/-46,559
Median family income (in 2009 inflation-adjusted dollars)	62,841	(X)	62,363	+/-43,556
Per capita income (in 2009 inflation-adjusted dollars)	29,144	(X)	27,041	+/-8,228
Families below poverty level	(X)	0.0	9.9%	+/-41.5
Individuals below poverty level	(X)	10.5	13.5%	+/-12.1

Housing Characteristics - show more >>	Estimate	Percent	U.S.	Margin of Error
Total housing units	289			+/-95
Occupied housing units	208	72.0	88.2%	+/-84
Owner-occupied housing units	83	39.9	66.9%	+/-46
Renter-occupied housing units	125	60.1	33.1%	+/-81
Vacant housing units	81	28.0	11.8%	+/-60
Owner-occupied homes	83			+/-46
Median value (dollars)	288,400	(X)	185,400	+/-178,060
Median of selected monthly owner costs				
With a mortgage (dollars)	1,384	(X)	1,486	+/-300
Not mortgaged (dollars)	814	(X)	419	+/-71

ACS Demographic Estimates - show more >>	Estimate	Percent	U.S.	Margin of Error
Total population	363			+/-144
Male	157	43.3	49.3%	+/-82
Female	206	56.7	50.7%	+/-99
Median age (years)	53.5	(X)	36.5	+/-10.9
Under 5 years	9	2.5	6.9%	+/-14
18 years and over	345	95.0	75.4%	+/-145
65 years and over	93	25.6	12.6%	+/-67
One race	363	100.0	97.8%	+/-144
White	363	100.0	74.5%	+/-144
Black or African American	0	0.0	12.4%	+/-123
American Indian and Alaska Native	0	0.0	0.8%	+/-123
Asian	0	0.0	4.4%	+/-123
Native Hawaiian and Other Pacific Islander	0	0.0	0.1%	+/-123
Some other race	0	0.0	5.6%	+/-123
Two or more races	0	0.0	2.2%	+/-123
Hispanic or Latino (of any race)	0	0.0	15.1%	+/-123

Source: U.S. Census Bureau, 2005-2009 American Community Survey

Explanation of Symbols:
'****' - The median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.
'*****' - The estimate is controlled. A statistical test for sampling variability is not appropriate.
'N' - Data for this geographic area cannot be displayed because the number of sample cases is too small.
'(X)' - The value is not applicable or not available.

The letters PDF or symbol indicate a document is in the Portable Document Format (PDF). To view the file you will need the Adobe® Acrobat® Reader, which is available for free from the Adobe web site.

QT-H1. **General Housing Characteristics: 2000**
Data Set: Census 2000 Summary File 1 (SF 1) 100-Percent Data
Geographic Area: **Phoenicia CDP, New York**

NOTE: For information on confidentiality protection, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf1u.htm.

Subject	Number	Percent
OCCUPANCY STATUS		
Total housing units	**246**	**100.0**
Occupied housing units	194	78.9
Vacant housing units	52	21.1
TENURE		
Occupied housing units	**194**	**100.0**
Owner-occupied housing units	102	52.6
Renter-occupied housing units	92	47.4
VACANCY STATUS		
Vacant housing units	**52**	**100.0**
For rent	5	9.6
For sale only	2	3.8
Rented or sold, not occupied	1	1.9
For seasonal, recreational, or occasional use	26	50.0
For migratory workers	0	0.0
Other vacant	18	34.6
RACE OF HOUSEHOLDER		
Occupied housing units	**194**	**100.0**
One race	190	97.9
White	186	95.9
Black or African American	0	0.0
American Indian and Alaska Native	2	1.0
Asian	1	0.5
Native Hawaiian and Other Pacific Islander	1	0.5
Some other race	0	0.0
Two or more races	4	2.1
HISPANIC OR LATINO HOUSEHOLDER AND RACE OF HOUSEHOLDER		
Occupied housing units	**194**	**100.0**
Hispanic or Latino (of any race)	2	1.0
Not Hispanic or Latino	192	99.0
White alone	184	94.8
AGE OF HOUSEHOLDER		
Occupied housing units	**194**	**100.0**
15 to 24 years	3	1.5
25 to 34 years	20	10.3
35 to 44 years	32	16.5
45 to 54 years	52	26.8
55 to 64 years	20	10.3
65 years and over	67	34.5
65 to 74 years	32	16.5
75 to 84 years	22	11.3
85 years and over	13	6.7

(X) Not applicable.
Source: U.S. Census Bureau, Census 2000 Summary File 1, Matrices H3, H4, H5, H6, H7, and H16.

U.S. Census Bureau
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QT-H7. **Year Structure Built and Year Householder Moved Into Unit: 2000**
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data
Geographic Area: **Phoenicia CDP, New York**

NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.

Subject	Number	Percent
TENURE BY YEAR STRUCTURE BUILT		
Owner-occupied housing units	**121**	**100.0**
Built 1999 to March 2000	0	0.0
Built 1995 to 1998	5	4.1
Built 1990 to 1994	0	0.0
Built 1980 to 1989	7	5.8
Built 1970 to 1979	0	0.0
Built 1960 to 1969	0	0.0
Built 1950 to 1959	13	10.7
Built 1940 to 1949	13	10.7
Built 1939 or earlier	83	68.6
Median	1940-	(X)
Renter-occupied housing units	**79**	**100.0**
Built 1999 to March 2000	0	0.0
Built 1995 to 1998	0	0.0
Built 1990 to 1994	6	7.6
Built 1980 to 1989	18	22.8
Built 1970 to 1979	0	0.0
Built 1960 to 1969	0	0.0
Built 1950 to 1959	16	20.3
Built 1940 to 1949	4	5.1
Built 1939 or earlier	35	44.3
Median	1950	(X)
TENURE BY YEAR HOUSEHOLDER MOVED INTO UNIT		
Owner-occupied housing units	**121**	**100.0**
Moved in 1999 to March 2000	13	10.7
Moved in 1995 to 1998	11	9.1
Moved in 1990 to 1994	7	5.8
Moved in 1980 to 1989	48	39.7
Moved in 1970 to 1979	13	10.7
Moved in 1969 or earlier	29	24.0
Median	1984	(X)
Renter-occupied housing units	**79**	**100.0**
Moved in 1999 to March 2000	29	36.7
Moved in 1995 to 1998	16	20.3
Moved in 1990 to 1994	16	20.3
Moved in 1980 to 1989	12	15.2
Moved in 1970 to 1979	0	0.0
Moved in 1969 or earlier	6	7.6
Median	1996	(X)

(X) Not applicable.
Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrices H36, H37, H38, and H39.

Older than 1939
$\frac{83+35}{121+79} \times 100 = 59\%$

Newer than 1990
$\frac{7+0+5+0+18+6+0+0}{121+79} \times 100 = 18\%$

118

U.S. Census Bureau
American FactFinder

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QT-H8. **Rooms, Bedrooms, and House Heating Fuel: 2000**
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data
Geographic Area: **Phoenicia CDP, New York**

NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.

Subject	Number	Percent
TENURE BY ROOMS		
Owner-occupied housing units	**121**	**100.0**
1 room	0	0.0
2 rooms	0	0.0
3 rooms	7	5.8
4 rooms	8	6.6
5 rooms	12	9.9
6 rooms	56	46.3
7 or more rooms	38	31.4
Median	6.1	(X)
Renter-occupied housing units	**79**	**100.0**
1 room	0	0.0
2 rooms	23	29.1
3 rooms	18	22.8
4 rooms	24	30.4
5 rooms	6	7.6
6 rooms	4	5.1
7 or more rooms	4	5.1
Median	3.4	(X)
TENURE BY BEDROOMS		
Owner-occupied housing units	**121**	**100.0**
No bedroom	0	0.0
1 bedroom	0	0.0
2 bedrooms	39	32.2
3 bedrooms	60	49.6
4 bedrooms	15	12.4
5 or more bedrooms	7	5.8
Renter-occupied housing units	**79**	**100.0**
No bedroom	6	7.6
1 bedroom	35	44.3
2 bedrooms	30	38.0
3 bedrooms	8	10.1
4 bedrooms	0	0.0
5 or more bedrooms	0	0.0
HOUSE HEATING FUEL		
Occupied housing units	**200**	**100.0**
Utility gas	0	0.0
Bottled, tank, or LP gas	0	0.0
Electricity	28	14.0
Fuel oil, kerosene, etc	136	68.0
Coal or coke	0	0.0
Wood	36	18.0
Solar energy	0	0.0
Other fuel	0	0.0
No fuel used	0	0.0

(X) Not applicable.
Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrices H26, H27, H40, and H42.

4 or more Bedrooms

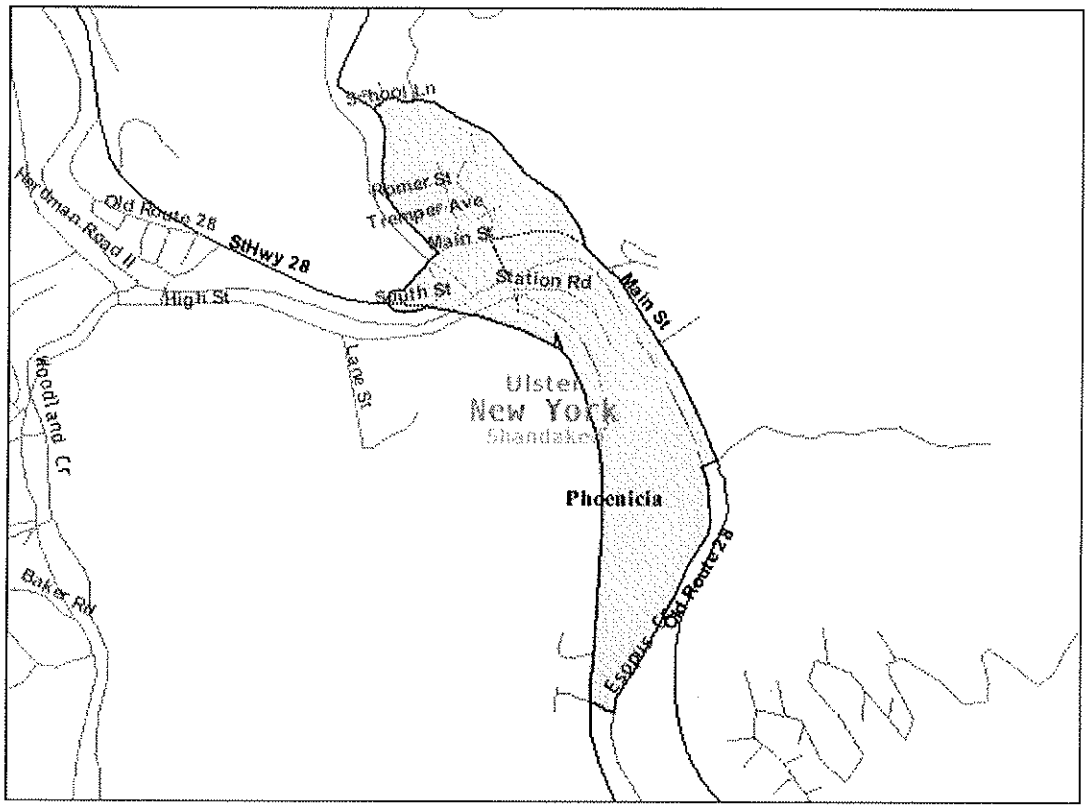
$\frac{15+7+0+0}{121+79} \times 100$

$\approx 11\%$

Phoenicia CDP, New York

Boundaries
- State
- '00 County
- '00 Co Sub
- '00 Subbarrio
- '00 Place
- '00 Place
- '00 Con City
- '00 Urban Area
- '00 Urban Area

Features
- Major Road
- Street
- Stream/Waterbody
- Stream/Waterbody



2.8 miles across

Close

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FACT SHEET

Shandaken town, Ulster County, New York

View a Fact Sheet for a **race, ethnic, or ancestry group**

Census 2000 Demographic Profile Highlights:

General Characteristics - show more >>	Number	Percent	U.S.		
Total population	3,235			map	brief
Male	1,604	49.6	49.1%	map	brief
Female	1,631	50.4	50.9%	map	brief
Median age (years)	45.0	(X)	35.3	map	brief
Under 5 years	160	4.9	6.8%	map	
18 years and over	2,580	79.8	74.3%		
65 years and over	564	17.4	12.4%	map	brief
One race	3,174	98.1	97.6%		
White	3,062	94.7	75.1%	map	brief
Black or African American	39	1.2	12.3%	map	brief
American Indian and Alaska Native	13	0.4	0.9%	map	brief
Asian	38	1.2	3.6%	map	brief
Native Hawaiian and Other Pacific Islander	4	0.1	0.1%	map	brief
Some other race	18	0.6	5.5%	map	
Two or more races	61	1.9	2.4%	map	brief
Hispanic or Latino (of any race)	99	3.1	12.5%	map	brief
Household population	3,179	98.3	97.2%	map	brief
Group quarters population	56	1.7	2.8%	map	
Average household size	2.17	(X)	2.59	map	brief
Average family size	2.82	(X)	3.14	map	
Total housing units	2,666			map	
Occupied housing units	1,463	54.9	91.0%		brief
Owner-occupied housing units	1,055	72.1	66.2%	map	
Renter-occupied housing units	408	27.9	33.8%	map	brief
Vacant housing units	1,203	45.1	9.0%	map	

Social Characteristics - show more >>	Number	Percent	U.S.		
Population 25 years and over	2,420				
High school graduate or higher	2,037	84.2	80.4%	map	brief
Bachelor's degree or higher	644	26.6	24.4%	map	
Civilian veterans (civilian population 18 years and over)	388	14.8	12.7%	map	brief
Disability status (population 5 years and over)	722	23.0	19.3%	map	brief
Foreign born	384	11.6	11.1%	map	brief
Male, Now married, except separated (population 15 years and over)	748	55.6	56.7%		brief
Female, Now married, except separated (population 15 years and over)	652	46.8	52.1%		brief
Speak a language other than English at home (population 5 years and over)	343	10.9	17.9%	map	brief

Economic Characteristics - show more >>	Number	Percent	U.S.		
In labor force (population 16 years and over)	1,672	61.7	63.9%		brief
Mean travel time to work in minutes (workers 16 years and over)	31.9	(X)	25.5	map	brief
Median household income in 1999 (dollars)	31,566	(X)	41,994	map	
Median family income in 1999 (dollars)	40,927	(X)	50,046	map	
Per capita income in 1999 (dollars)	21,121	(X)	21,587	map	
Families below poverty level	65	7.4	9.2%	map	brief

Individuals below poverty level	405	12.3	12.4%	map	
Housing Characteristics - show more >>	**Number**	**Percent**	**U.S.**		
Single-family owner-occupied homes	795				brief
Median value (dollars)	91,200	(X)	119,600	map	brief
Median of selected monthly owner costs	(X)	(X)			brief
With a mortgage (dollars)	977	(X)	1,088	map	
Not mortgaged (dollars)	368	(X)	295		

(X) Not applicable.

Source: U.S. Census Bureau, Summary File 1 (SF 1) and Summary File 3 (SF 3)

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FACT SHEET

Shandaken town, Ulster County, New York

2005-2009 American Community Survey 5-Year Estimates - what's this?
Data Profile Highlights:

Note: The following links are to data from the American Community Survey and the Population Estimates Program.

NOTE: Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties.

Social Characteristics - show more >>	Estimate	Percent	U.S.	Margin of Error
Average household size	2.00	(X)	2.60	+/-0.16
Average family size	2.66	(X)	3.19	+/-0.19
Population 25 years and over	2,447			+/-214
High school graduate or higher	(X)	88.6	84.6%	(X)
Bachelor's degree or higher	(X)	27.0	27.5%	(X)
Civilian veterans (civilian population 18 years and over)	264	9.9	10.1%	+/-78
With a Disability	(X)	(X)	(X)	(X)
Foreign born	275	8.7	12.4%	+/-122
Male, Now married, except separated (population 15 years and over)	700	44.8	52.3%	+/-108
Female, Now married, except separated (population 15 years and over)	631	48.0	48.4%	+/-97
Speak a language other than English at home (population 5 years and over)	337	11.0	19.6%	+/-138
Household population	3,052			+/-219
Group quarters population	(X)	(X)	(X)	(X)

Economic Characteristics - show more >>	Estimate	Percent	U.S.	Margin of Error
In labor force (population 16 years and over)	1,768	61.9	65.0%	+/-196
Mean travel time to work in minutes (workers 16 years and over)	33.0	(X)	25.2	+/-4.9
Median household income (in 2009 inflation-adjusted dollars)	38,220	(X)	51,425	+/-8,863
Median family income (in 2009 inflation-adjusted dollars)	50,644	(X)	62,363	+/-11,064
Per capita income (in 2009 inflation-adjusted dollars)	27,819	(X)	27,041	+/-3,517
Families below poverty level	(X)	9.6	9.9%	+/-6.4
Individuals below poverty level	(X)	14.5	13.5%	+/-6.1

Housing Characteristics - show more >>	Estimate	Percent	U.S.	Margin of Error
Total housing units	2,656			+/-187
Occupied housing units	1,529	57.6	88.2%	+/-131
Owner-occupied housing units	1,068	69.8	66.9%	+/-128
Renter-occupied housing units	461	30.2	33.1%	+/-124
Vacant housing units	1,127	42.4	11.8%	+/-178
Owner-occupied homes	1,068			+/-128
Median value (dollars)	224,000	(X)	185,400	+/-14,741
Median of selected monthly owner costs				
With a mortgage (dollars)	1,471	(X)	1,486	+/-244
Not mortgaged (dollars)	537	(X)	419	+/-86

ACS Demographic Estimates - show more >>	Estimate	Percent	U.S.	Margin of Error
Total population	3,159			+/-213
Male	1,716	54.3	49.3%	+/-211
Female	1,443	45.7	50.7%	+/-151
Median age (years)	47.9	(X)	36.5	+/-4.5
Under 5 years	88	2.8	6.9%	+/-56
18 years and over	2,678	84.8	75.4%	+/-199
65 years and over	706	22.3	12.6%	+/-140
One race	3,159	100.0	97.8%	+/-213
White	3,082	97.6	74.5%	+/-219
Black or African American	22	0.7	12.4%	+/-24
American Indian and Alaska Native	0	0.0	0.8%	+/-123
Asian	55	1.7	4.4%	+/-77
Native Hawaiian and Other Pacific Islander	0	0.0	0.1%	+/-123
Some other race	0	0.0	5.6%	+/-123
Two or more races	0	0.0	2.2%	+/-123
Hispanic or Latino (of any race)	161	5.1	15.1%	+/-83

Source: U.S. Census Bureau, 2005-2009 American Community Survey

Explanation of Symbols:
'****' - The median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.
'******' - The estimate is controlled. A statistical test for sampling variability is not appropriate.
'N' - Data for this geographic area cannot be displayed because the number of sample cases is too small.
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QT-H1. **General Housing Characteristics: 2000**
Data Set: Census 2000 Summary File 1 (SF 1) 100-Percent Data
Geographic Area: **Shandaken town, Ulster County, New York**

NOTE: For information on confidentiality protection, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf1u.htm.

Subject	Number	Percent
OCCUPANCY STATUS		
Total housing units	**2,666**	**100.0**
Occupied housing units	1,463	54.9
Vacant housing units	1,203	45.1
TENURE		
Occupied housing units	**1,463**	**100.0**
Owner-occupied housing units	1,055	72.1
Renter-occupied housing units	408	27.9
VACANCY STATUS		
Vacant housing units	**1,203**	**100.0**
For rent	79	6.6
For sale only	53	4.4
Rented or sold, not occupied	27	2.2
For seasonal, recreational, or occasional use	786	65.3
For migratory workers	2	0.2
Other vacant	256	21.3
RACE OF HOUSEHOLDER		
Occupied housing units	**1,463**	**100.0**
One race	1,440	98.4
White	1,393	95.2
Black or African American	12	0.8
American Indian and Alaska Native	11	0.8
Asian	17	1.2
Native Hawaiian and Other Pacific Islander	2	0.1
Some other race	5	0.3
Two or more races	23	1.6
HISPANIC OR LATINO HOUSEHOLDER AND RACE OF HOUSEHOLDER		
Occupied housing units	**1,463**	**100.0**
Hispanic or Latino (of any race)	31	2.1
Not Hispanic or Latino	1,432	97.9
White alone	1,368	93.5
AGE OF HOUSEHOLDER		
Occupied housing units	**1,463**	**100.0**
15 to 24 years	31	2.1
25 to 34 years	148	10.1
35 to 44 years	252	17.2
45 to 54 years	391	26.7
55 to 64 years	238	16.3
65 years and over	403	27.5
65 to 74 years	224	15.3
75 to 84 years	133	9.1
85 years and over	46	3.1

(X) Not applicable.
Source: U.S. Census Bureau, Census 2000 Summary File 1, Matrices H3, H4, H5, H6, H7, and H16.

U.S. Census Bureau
American FactFinder

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QT-H7. **Year Structure Built and Year Householder Moved Into Unit: 2000**
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data
Geographic Area: **Shandaken town, Ulster County, New York**

NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.

Subject	Number	Percent
TENURE BY YEAR STRUCTURE BUILT		
Owner-occupied housing units	**1,059**	**100.0**
Built 1999 to March 2000	0	0.0
Built 1995 to 1998	22	2.1
Built 1990 to 1994	39	3.7
Built 1980 to 1989	131	12.4
Built 1970 to 1979	111	10.5
Built 1960 to 1969	105	9.9
Built 1950 to 1959	96	9.1
Built 1940 to 1949	96	9.1
Built 1939 or earlier	459	43.3
Median	1947	(X)
Renter-occupied housing units	**401**	**100.0**
Built 1999 to March 2000	0	0.0
Built 1995 to 1998	10	2.5
Built 1990 to 1994	34	8.5
Built 1980 to 1989	55	13.7
Built 1970 to 1979	36	9.0
Built 1960 to 1969	35	8.7
Built 1950 to 1959	69	17.2
Built 1940 to 1949	27	6.7
Built 1939 or earlier	135	33.7
Median	1956	(X)
TENURE BY YEAR HOUSEHOLDER MOVED INTO UNIT		
Owner-occupied housing units	**1,059**	**100.0**
Moved in 1999 to March 2000	63	5.9
Moved in 1995 to 1998	172	16.2
Moved in 1990 to 1994	197	18.6
Moved in 1980 to 1989	358	33.8
Moved in 1970 to 1979	141	13.3
Moved in 1969 or earlier	128	12.1
Median	1987	(X)
Renter-occupied housing units	**401**	**100.0**
Moved in 1999 to March 2000	133	33.2
Moved in 1995 to 1998	129	32.2
Moved in 1990 to 1994	79	19.7
Moved in 1980 to 1989	48	12.0
Moved in 1970 to 1979	0	0.0
Moved in 1969 or earlier	12	3.0
Median	1997	(X)

(X) Not applicable.
Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrices H36, H37, H38, and H39.

Older than 1939

$$\left(\frac{459+135}{1059+401}\right)\times 100 \approx 41\%$$

Newer than 1980

$$\left(\frac{131+39+22+0+56+34+10+0}{1059+401}\right)\times 100 \approx 20\%$$

QT-H8. **Rooms, Bedrooms, and House Heating Fuel: 2000**
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data
Geographic Area: **Shandaken town, Ulster County, New York**

NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.

Subject	Number	Percent
TENURE BY ROOMS		
Owner-occupied housing units	**1,059**	**100.0**
1 room	0	0.0
2 rooms	21	2.0
3 rooms	60	5.7
4 rooms	234	22.1
5 rooms	163	15.4
6 rooms	246	23.2
7 or more rooms	335	31.6
Median	5.7	(X)
Renter-occupied housing units	**401**	**100.0**
1 room	6	1.5
2 rooms	111	27.7
3 rooms	47	11.7
4 rooms	71	17.7
5 rooms	80	20.0
6 rooms	54	13.5
7 or more rooms	32	8.0
Median	4.0	(X)
TENURE BY BEDROOMS		
Owner-occupied housing units	**1,059**	**100.0**
No bedroom	0	0.0
1 bedroom	77	7.3
2 bedrooms	391	36.9
3 bedrooms	374	35.3
4 bedrooms	130	12.3
5 or more bedrooms	87	8.2
Renter-occupied housing units	**401**	**100.0**
No bedroom	12	3.0
1 bedroom	134	33.4
2 bedrooms	124	30.9
3 bedrooms	109	27.2
4 bedrooms	22	5.5
5 or more bedrooms	0	0.0
HOUSE HEATING FUEL		
Occupied housing units	**1,460**	**100.0**
Utility gas	6	0.4
Bottled, tank, or LP gas	279	19.1
Electricity	147	10.1
Fuel oil, kerosene, etc	843	57.7
Coal or coke	6	0.4
Wood	174	11.9
Solar energy	0	0.0
Other fuel	5	0.3
No fuel used	0	0.0

(X) Not applicable.
Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrices H26, H27, H40, and H42.

4 or more Bedrooms

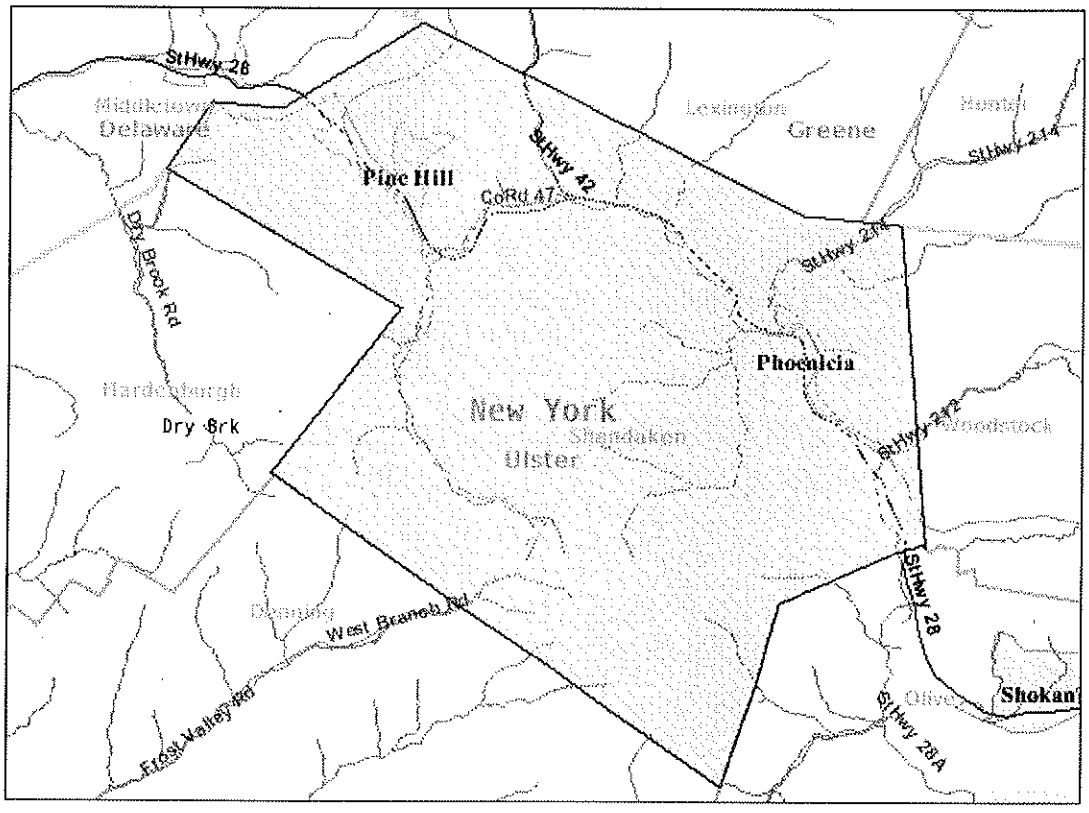
$\frac{130+87+22}{1059+401} \times 100$

$\approx 16\%$

Shandaken town, Ulster County, New York

Boundaries
- State
- '00 County
- '00 Co Sub
- '00 Subbarrio
- '00 Place
- '00 Place
- '00 Con City
- '00 Urban Area
- '00 Urban Area

Features
- Major Road
- Street
- Stream/Waterbody
- Stream/Waterbody



20 miles across

Close

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FACT SHEET

New York

View a Fact Sheet for a race, ethnic, or ancestry group

Census 2000 Demographic Profile Highlights:

General Characteristics - show more >>	Number	Percent	U.S.		
Total population	18,976,457			map	brief
Male	9,146,748	48.2	49.1%	map	brief
Female	9,829,709	51.8	50.9%	map	brief
Median age (years)	35.9	(X)	35.3	map	brief
Under 5 years	1,239,417	6.5	6.8%	map	
18 years and over	14,286,350	75.3	74.3%		
65 years and over	2,448,352	12.9	12.4%	map	brief
One race	18,386,275	96.9	97.6%		
White	12,893,689	67.9	75.1%	map	brief
Black or African American	3,014,385	15.9	12.3%	map	brief
American Indian and Alaska Native	82,461	0.4	0.9%	map	brief
Asian	1,044,976	5.5	3.6%	map	brief
Native Hawaiian and Other Pacific Islander	8,818	0.0	0.1%	map	brief
Some other race	1,341,946	7.1	5.5%	map	
Two or more races	590,182	3.1	2.4%	map	brief
Hispanic or Latino (of any race)	2,867,583	15.1	12.5%	map	brief
Household population	18,395,996	96.9	97.2%	map	brief
Group quarters population	580,461	3.1	2.8%	map	
Average household size	2.61	(X)	2.59	map	brief
Average family size	3.22	(X)	3.14	map	
Total housing units	7,679,307			map	
Occupied housing units	7,056,860	91.9	91.0%		brief
Owner-occupied housing units	3,739,166	53.0	66.2%	map	
Renter-occupied housing units	3,317,694	47.0	33.8%	map	brief
Vacant housing units	622,447	8.1	9.0%	map	

Social Characteristics - show more >>	Number	Percent	U.S.		
Population 25 years and over	12,542,536				
High school graduate or higher	9,916,212	79.1	80.4%	map	brief
Bachelor's degree or higher	3,433,212	27.4	24.4%	map	
Civilian veterans (civilian population 18 years and over)	1,361,164	9.5	12.7%	map	brief
Disability status (population 5 years and over)	3,606,147	20.6	19.3%	map	brief
Foreign born	3,868,133	20.4	11.1%	map	brief
Male, Now married, except separated (population 15 years and over)	3,798,834	53.3	56.7%		brief
Female, Now married, except separated (population 15 years and over)	3,737,007	47.1	52.1%		brief
Speak a language other than English at home (population 5 years and over)	4,962,921	28.0	17.9%	map	brief

Economic Characteristics - show more >>	Number	Percent	U.S.		
In labor force (population 16 years and over)	9,046,805	61.1	63.9%		brief
Mean travel time to work in minutes (workers 16 years and over)	31.7	(X)	25.5	map	brief
Median household income in 1999 (dollars)	43,393	(X)	41,994	map	
Median family income in 1999 (dollars)	51,691	(X)	50,046	map	
Per capita income in 1999 (dollars)	23,389	(X)	21,587	map	
Families below poverty level	535,935	11.5	9.2%	map	brief

Individuals below poverty level	2,692,202	14.6	12.4%	map	
Housing Characteristics - show more >>	**Number**	**Percent**	**U.S.**		
Single-family owner-occupied homes	2,689,728				brief
Median value (dollars)	148,700	(X)	119,600	map	brief
Median of selected monthly owner costs	(X)	(X)			brief
With a mortgage (dollars)	1,357	(X)	1,088	map	
Not mortgaged (dollars)	457	(X)	295		

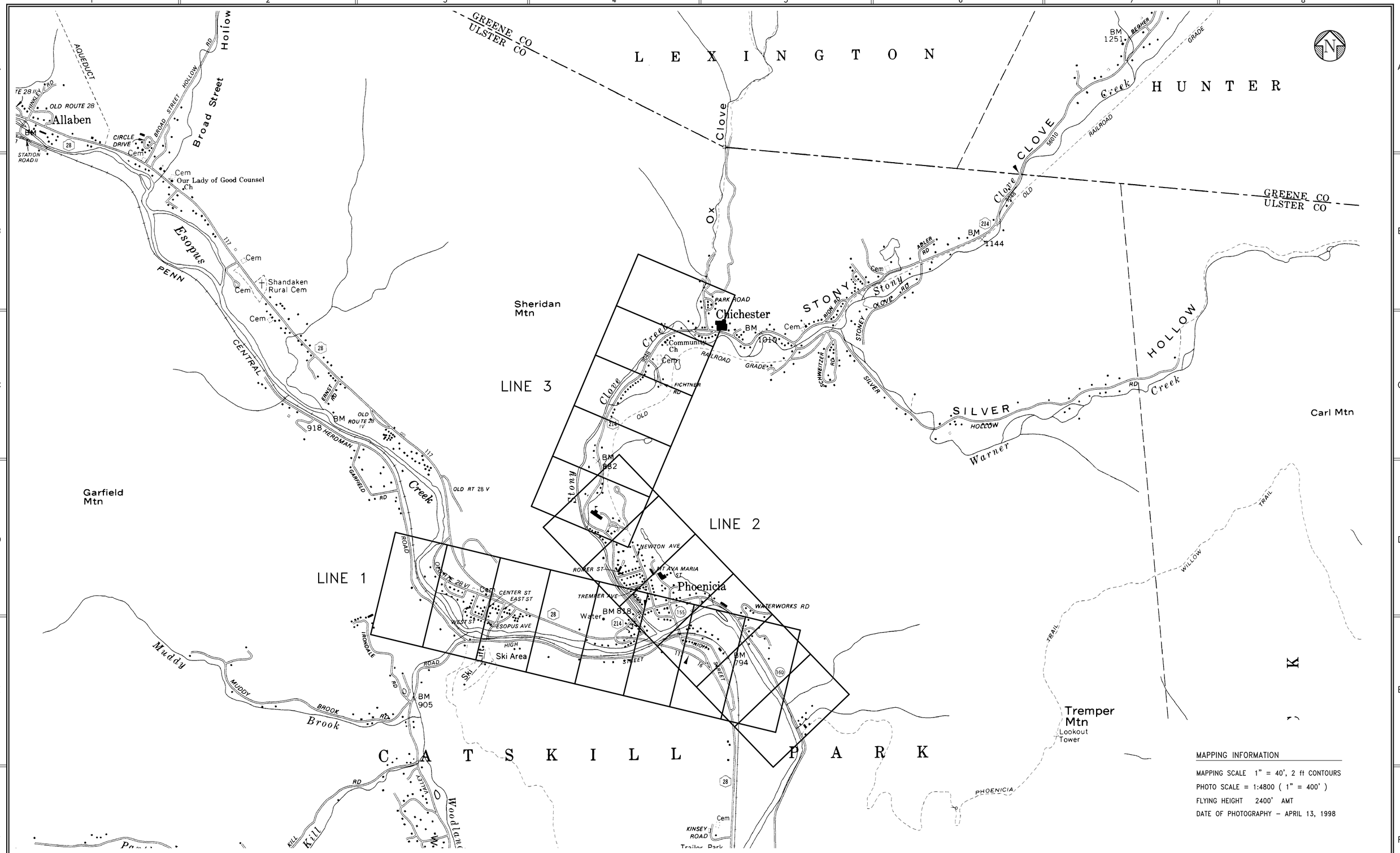
(X) Not applicable.

Source: U.S. Census Bureau, Summary File 1 (SF 1) and Summary File 3 (SF 3)

The letters PDF or symbol indicate a document is in the Portable Document Format (PDF). To view the file you will need the Adobe® Acrobat® Reader, which is available for **free** from the Adobe web site.

Exhibit 2.A

Limit of Aerial Photography Map



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ISSUE	REV.	LOCATION	DATE	AP'D	REMARKS

ISSUE	REV.	LOCATION	DATE	AP'D	REMARKS

SCALE	1"=1,000'
DRAWN	MKS
DATE	2/04/11
DESIGNED	JRB
CHECKED	HL

PHOENICIA SEWER DISTRICT
NYCDEP NEW SEWAGE TREATMENT
INFRASTRUCTURE PROGRAM
ULSTER COUNTY NEW YORK STATE

LIMIT OF AERIAL PHOTOGRAPHY MAP

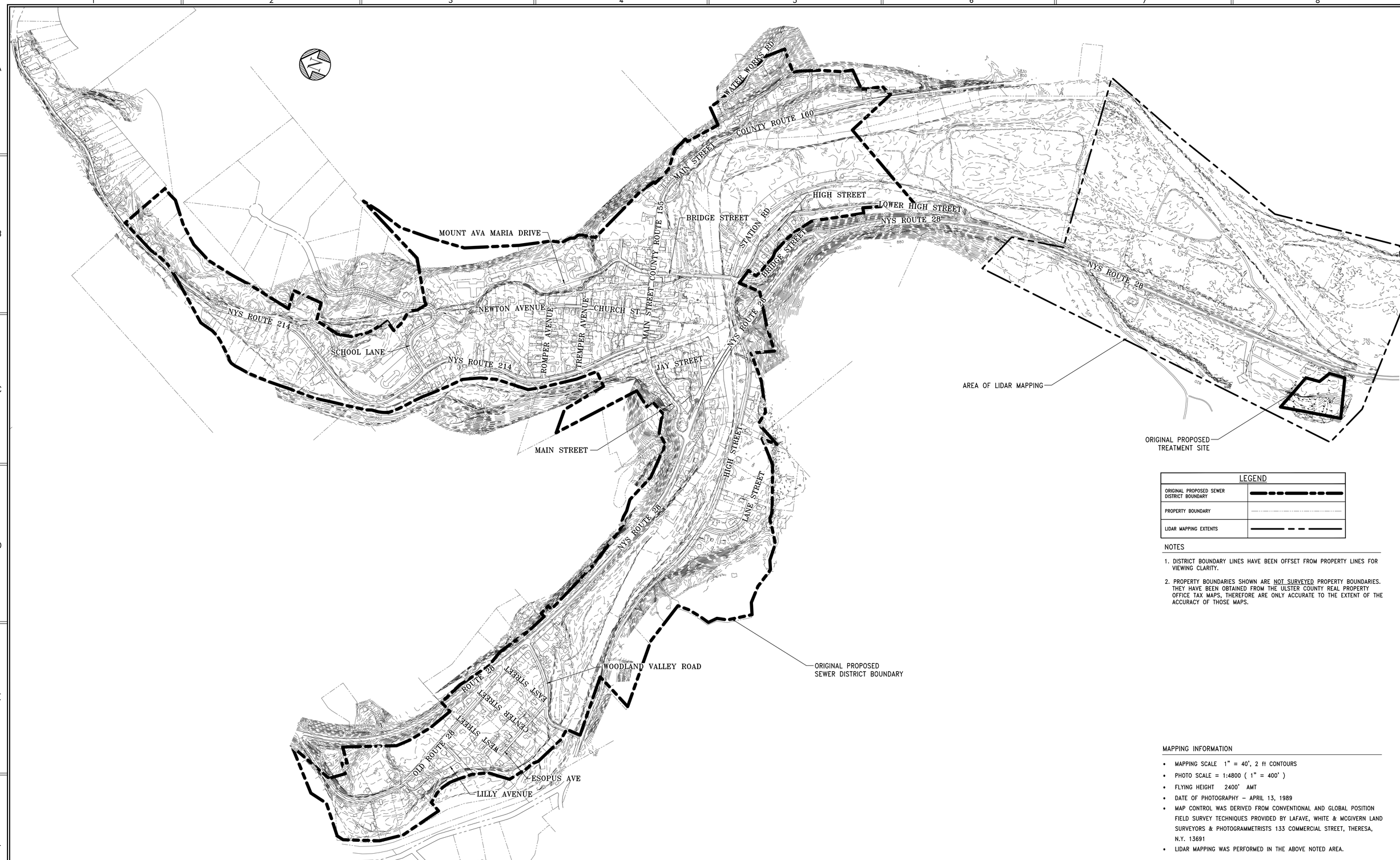
EXHIBIT 2.A

Lamont Engineers
ENGINEERS · PLANNERS · FACILITY OPERATIONS
548 MAIN ST., COBLESKILL, N.Y. 12043 (518) 234-4028

PROJECT NO.	FILE NAME	SHEET NO.
2010050	2.A_AERIAL PHOTO	EX. 2.A

Exhibit 2.B

Topographic Map



LEGEND	
ORIGINAL PROPOSED SEWER DISTRICT BOUNDARY	
PROPERTY BOUNDARY	
LIDAR MAPPING EXTENTS	

NOTES

1. DISTRICT BOUNDARY LINES HAVE BEEN OFFSET FROM PROPERTY LINES FOR VIEWING CLARITY.
2. PROPERTY BOUNDARIES SHOWN ARE NOT SURVEYED PROPERTY BOUNDARIES. THEY HAVE BEEN OBTAINED FROM THE ULSTER COUNTY REAL PROPERTY OFFICE TAX MAPS, THEREFORE ARE ONLY ACCURATE TO THE EXTENT OF THE ACCURACY OF THOSE MAPS.

MAPPING INFORMATION

- MAPPING SCALE 1" = 40', 2 ft CONTOURS
- PHOTO SCALE = 1:4800 (1" = 400')
- FLYING HEIGHT 2400' AMT
- DATE OF PHOTOGRAPHY – APRIL 13, 1989
- MAP CONTROL WAS DERIVED FROM CONVENTIONAL AND GLOBAL POSITION FIELD SURVEY TECHNIQUES PROVIDED BY LAFAVE, WHITE & MCGIVERN LAND SURVEYORS & PHOTOGRAMMETRISTS 133 COMMERCIAL STREET, THERESA, N.Y. 13691
- LIDAR MAPPING WAS PERFORMED IN THE ABOVE NOTED AREA.

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ISSUE	REV.	LOCATION	DATE	AP'D	REMARKS

ISSUE	REV.	LOCATION	DATE	AP'D	REMARKS

SCALE	1"=400'
DRAWN	MKS
DATE	7/29/11
DESIGNED	JRB
CHECKED	HL

PHOENICIA SEWER DISTRICT
NYCDEP NEW SEWAGE TREATMENT
INFRASTRUCTURE PROGRAM
ULSTER COUNTY NEW YORK STATE

TOPOGRAPHIC MAP

EXHIBIT 2.B

Lamont Engineers
ENGINEERS • PLANNERS • FACILITY OPERATIONS
548 MAIN ST., COBLESKILL, N.Y. 12043 (518) 234-4028

PROJECT NO.	FILE NAME	SHEET NO.
2010050	EX. 2.b_TOPO MAP	EXHIBIT 2.b

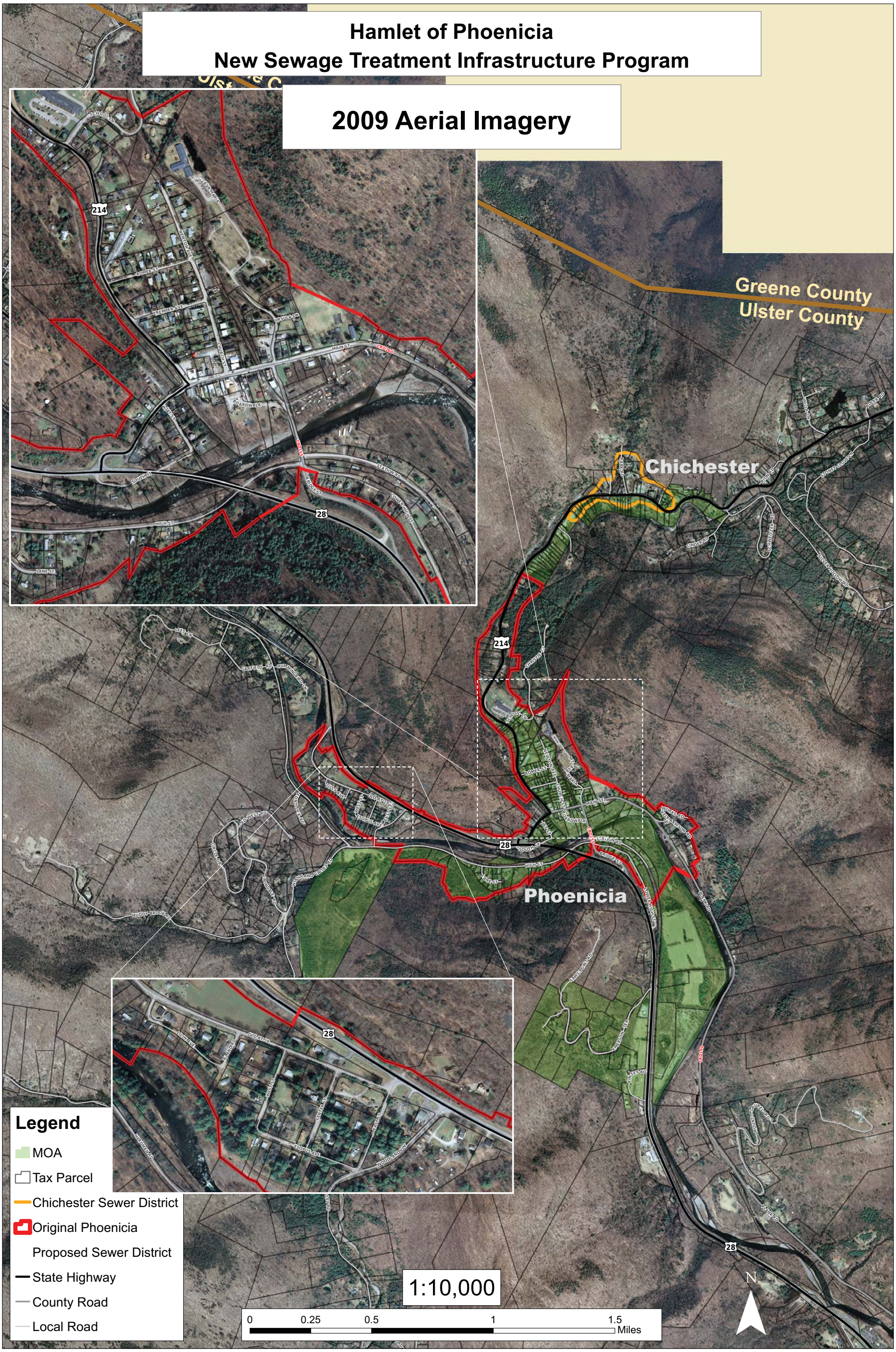
Exhibit 2.C

GIS Information Mapping

NOTE: The GIS Maps for this Exhibit have been reduced for this report and are not drawn to the scale indicated. Refer to the graphic scale for measuring distances.

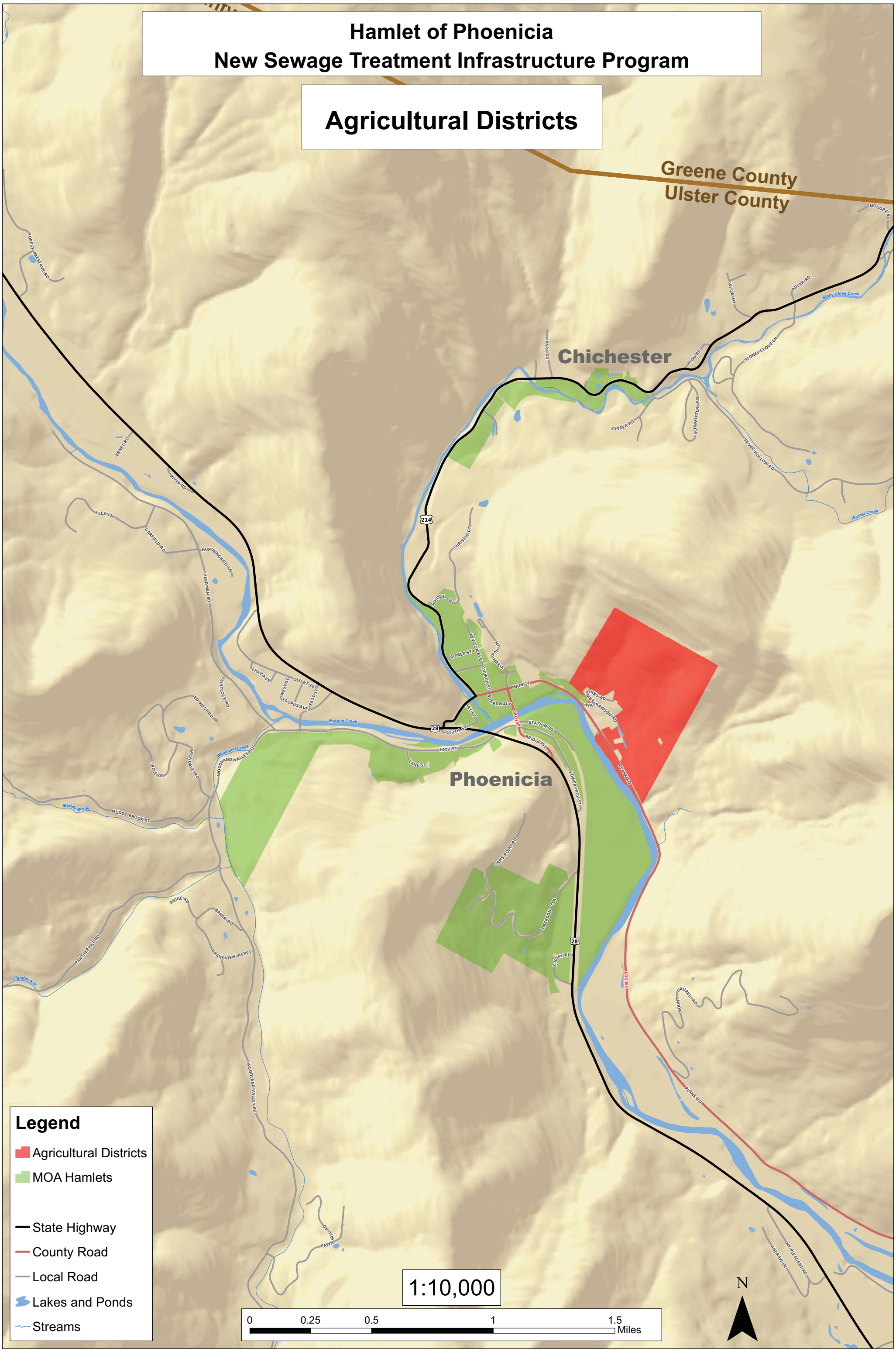
Hamlet of Phoenicia
New Sewage Treatment Infrastructure Program

2009 Aerial Imagery



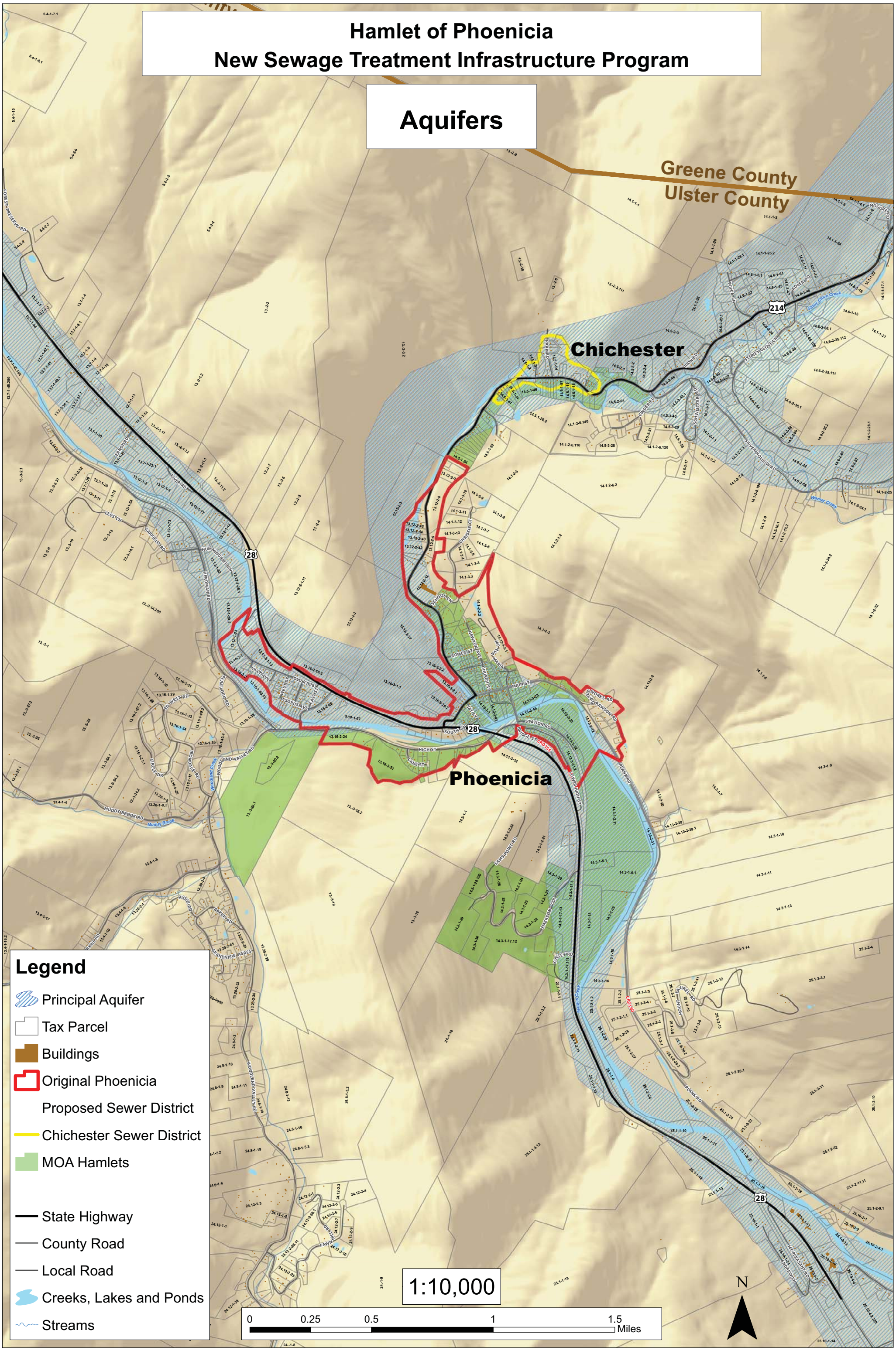
Hamlet of Phoenicia
New Sewage Treatment Infrastructure Program

Agricultural Districts



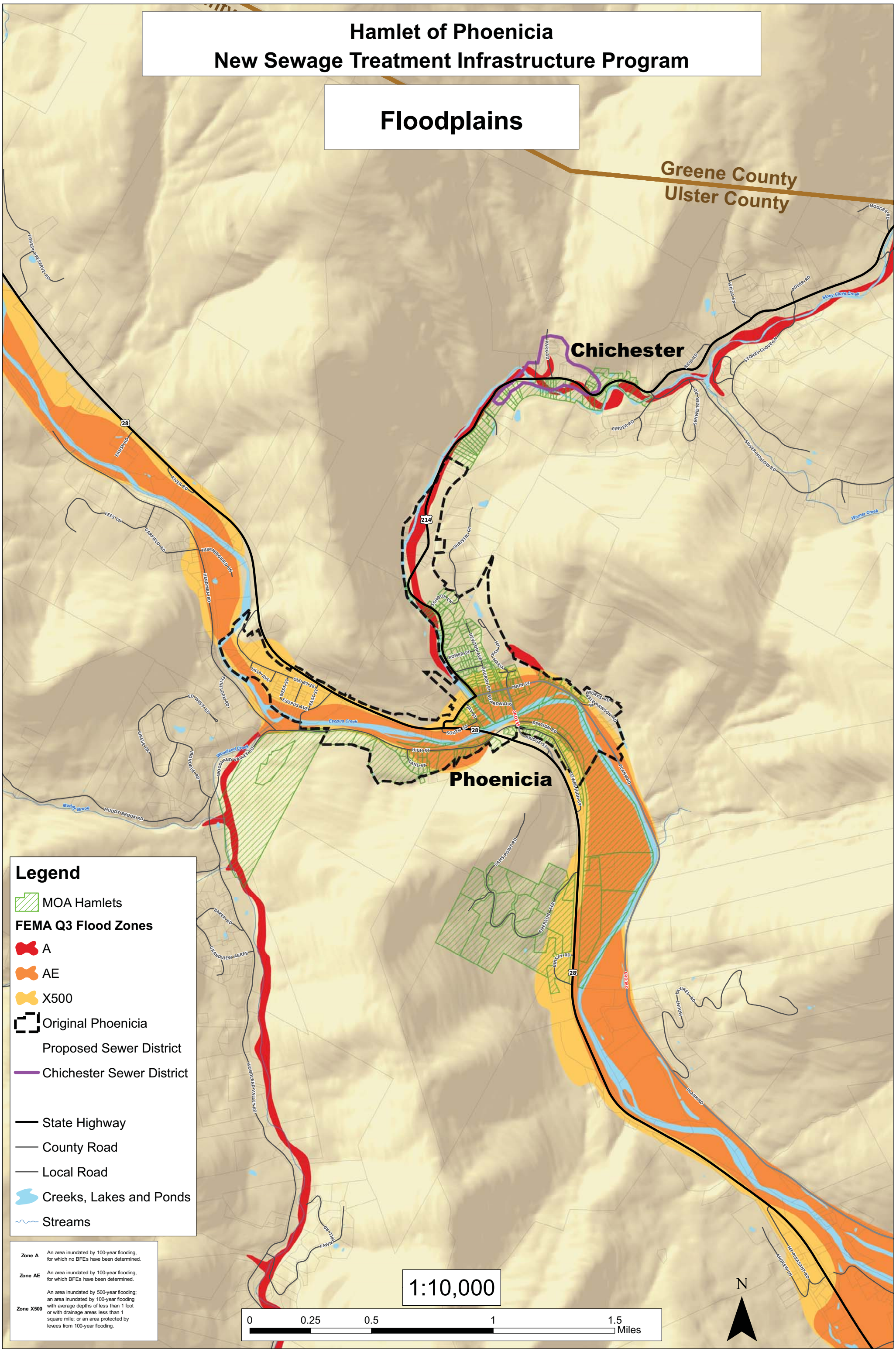
Hamlet of Phoenicia
New Sewage Treatment Infrastructure Program

Aquifers



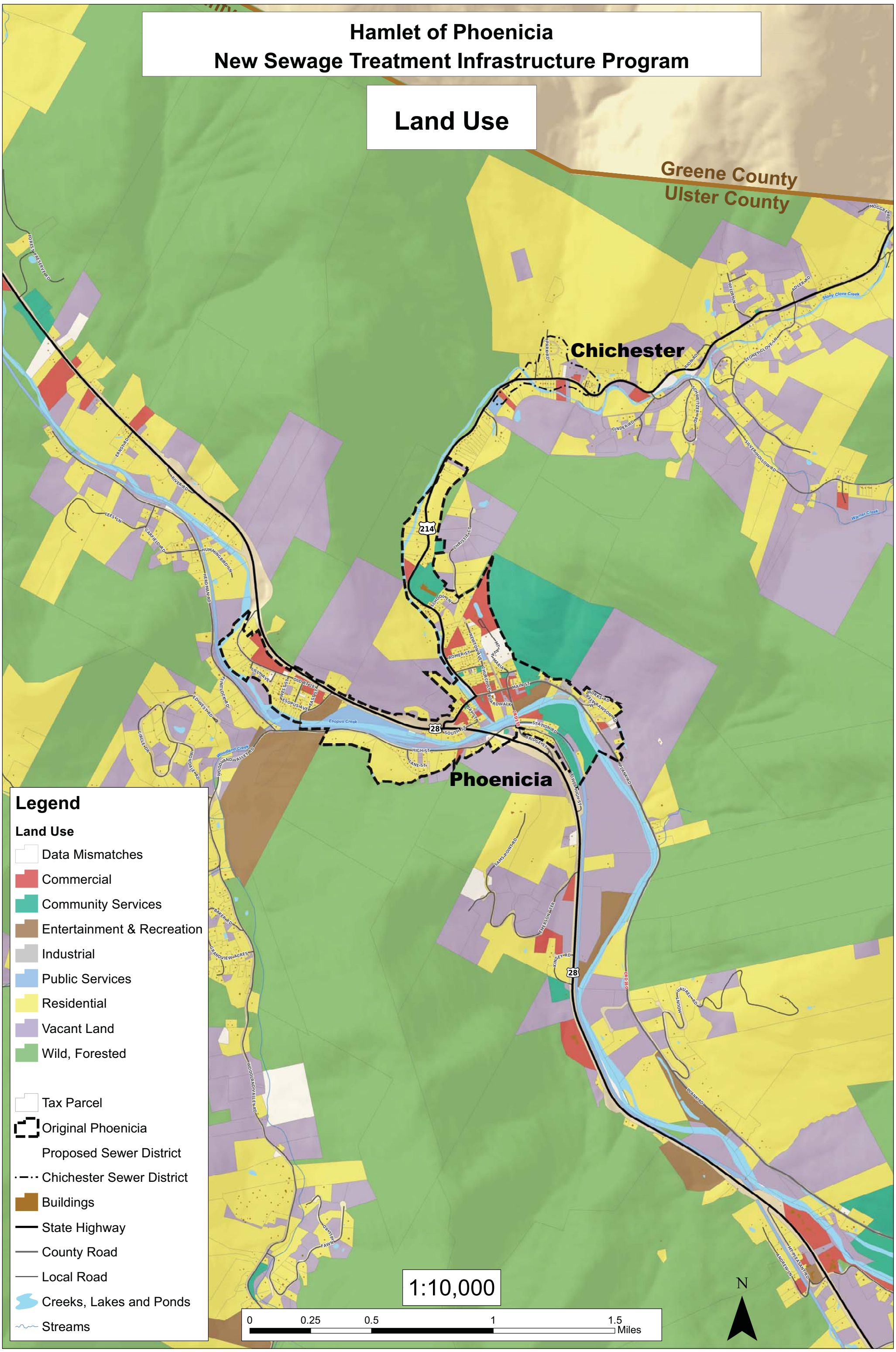
Hamlet of Phoenicia
New Sewage Treatment Infrastructure Program

Floodplains



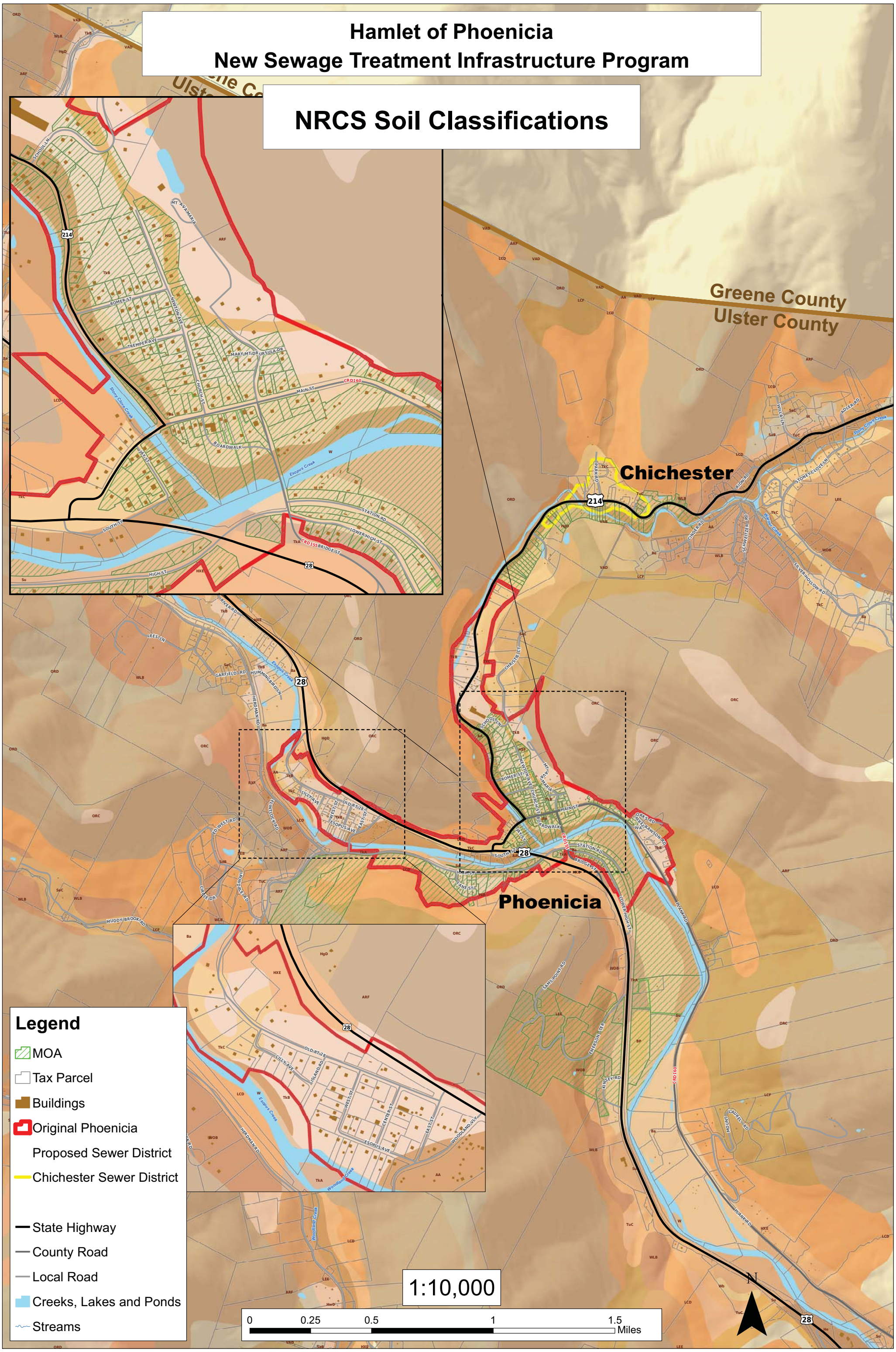
Hamlet of Phoenicia
New Sewage Treatment Infrastructure Program

Land Use



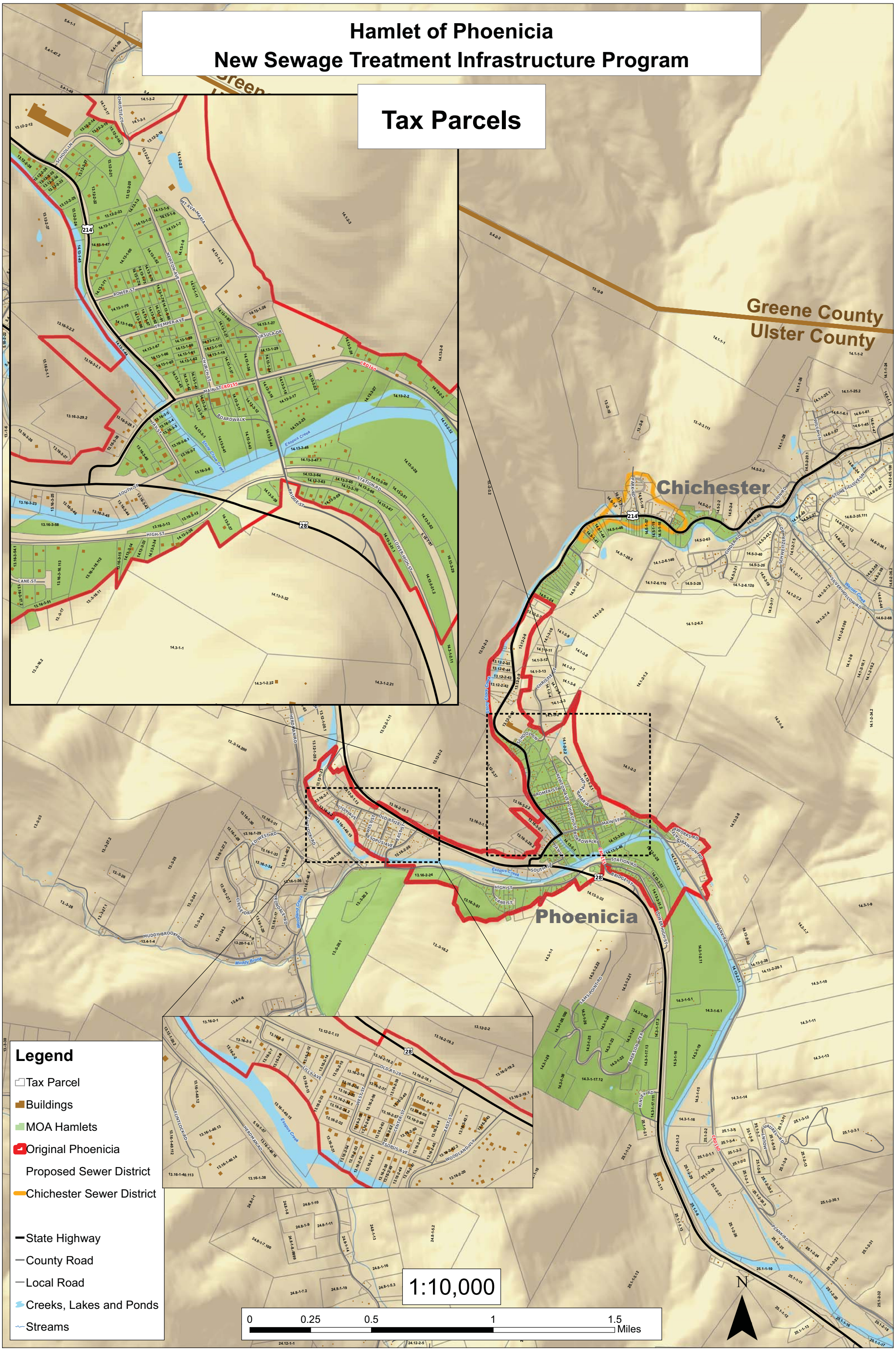
Hamlet of Phoenicia
New Sewage Treatment Infrastructure Program

NRCS Soil Classifications



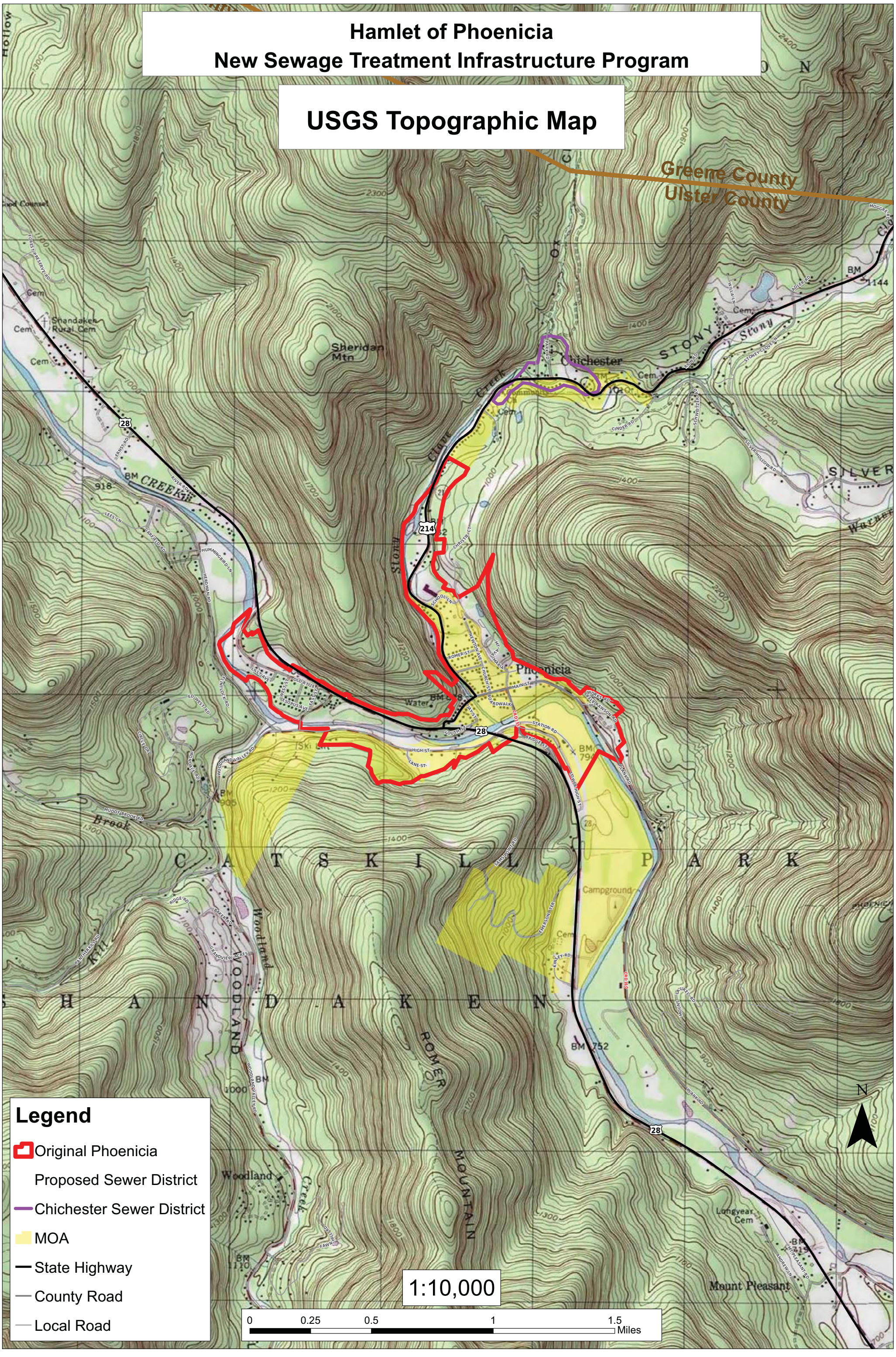
Hamlet of Phoenicia
New Sewage Treatment Infrastructure Program

Tax Parcels



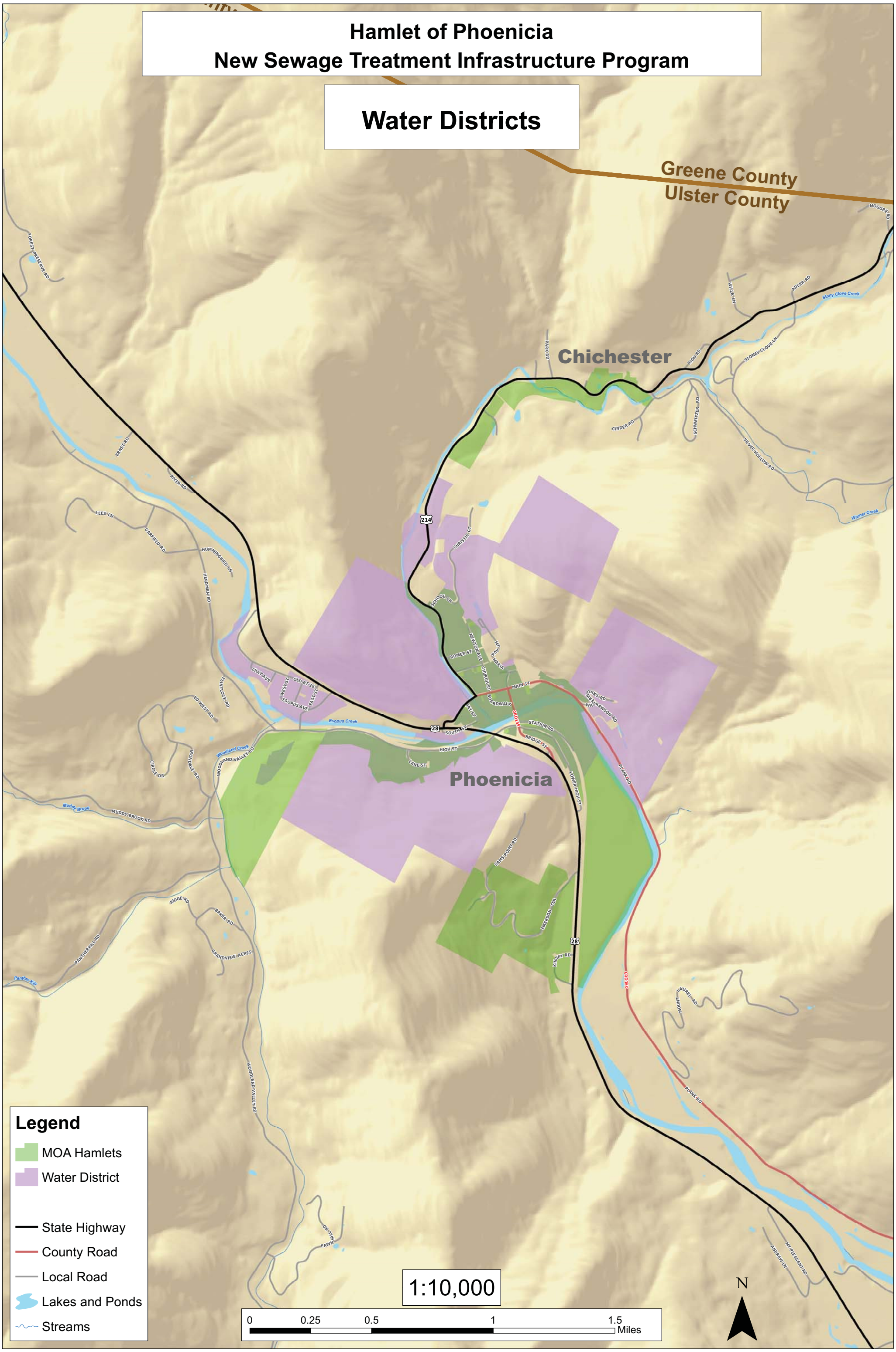
Hamlet of Phoenicia
New Sewage Treatment Infrastructure Program

USGS Topographic Map



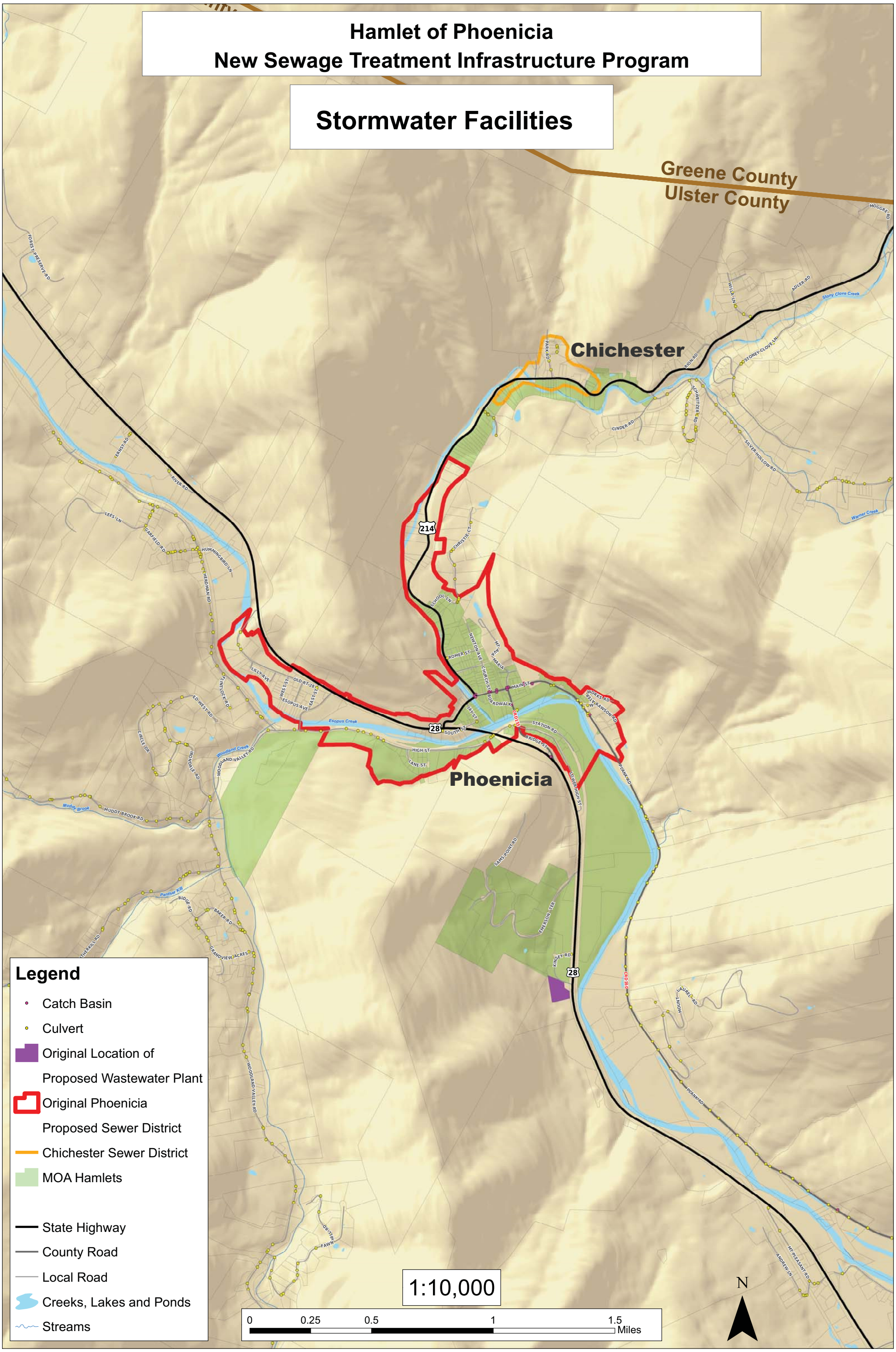
Hamlet of Phoenicia
New Sewage Treatment Infrastructure Program

Water Districts



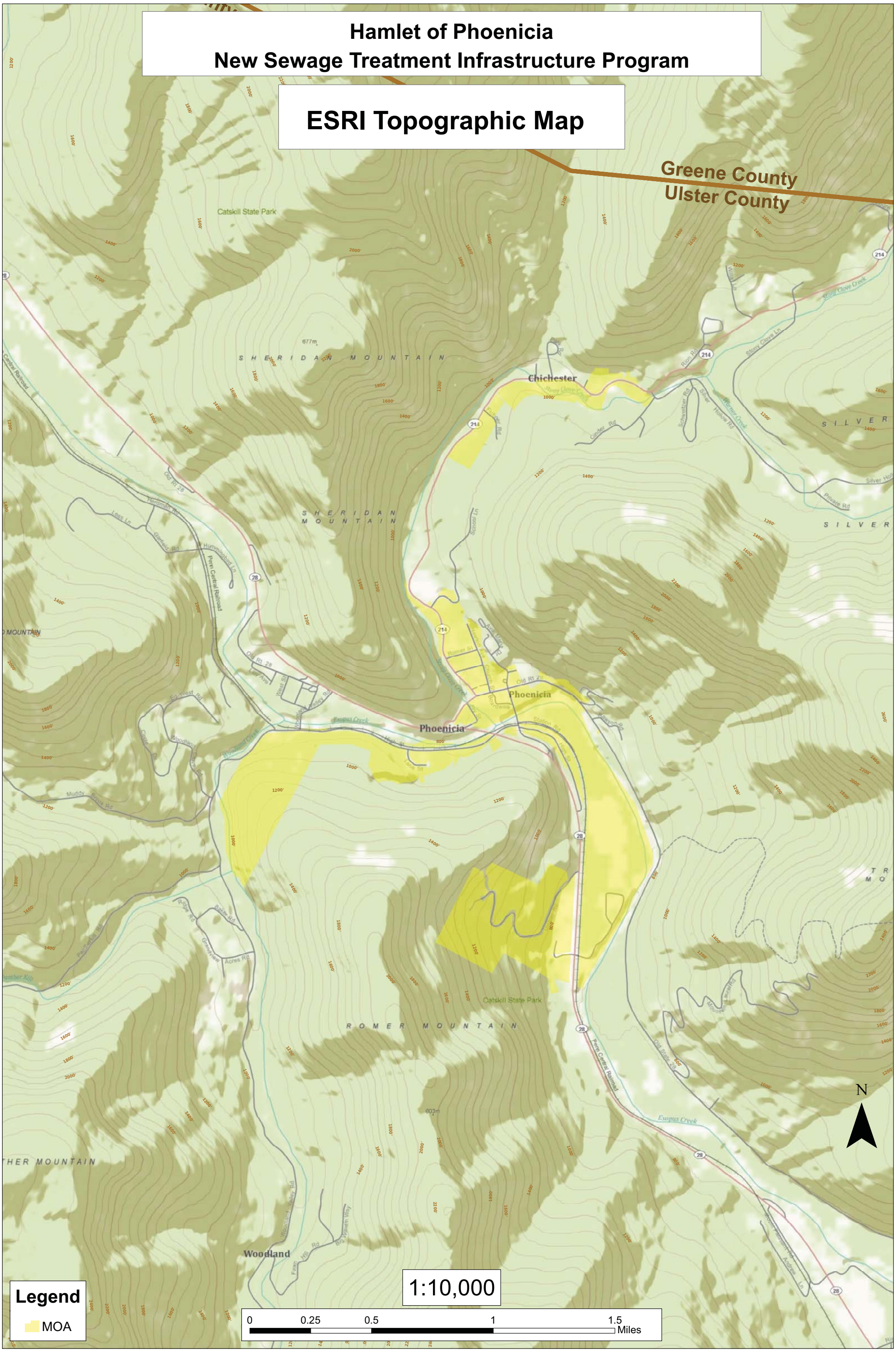
Hamlet of Phoenicia
New Sewage Treatment Infrastructure Program

Stormwater Facilities



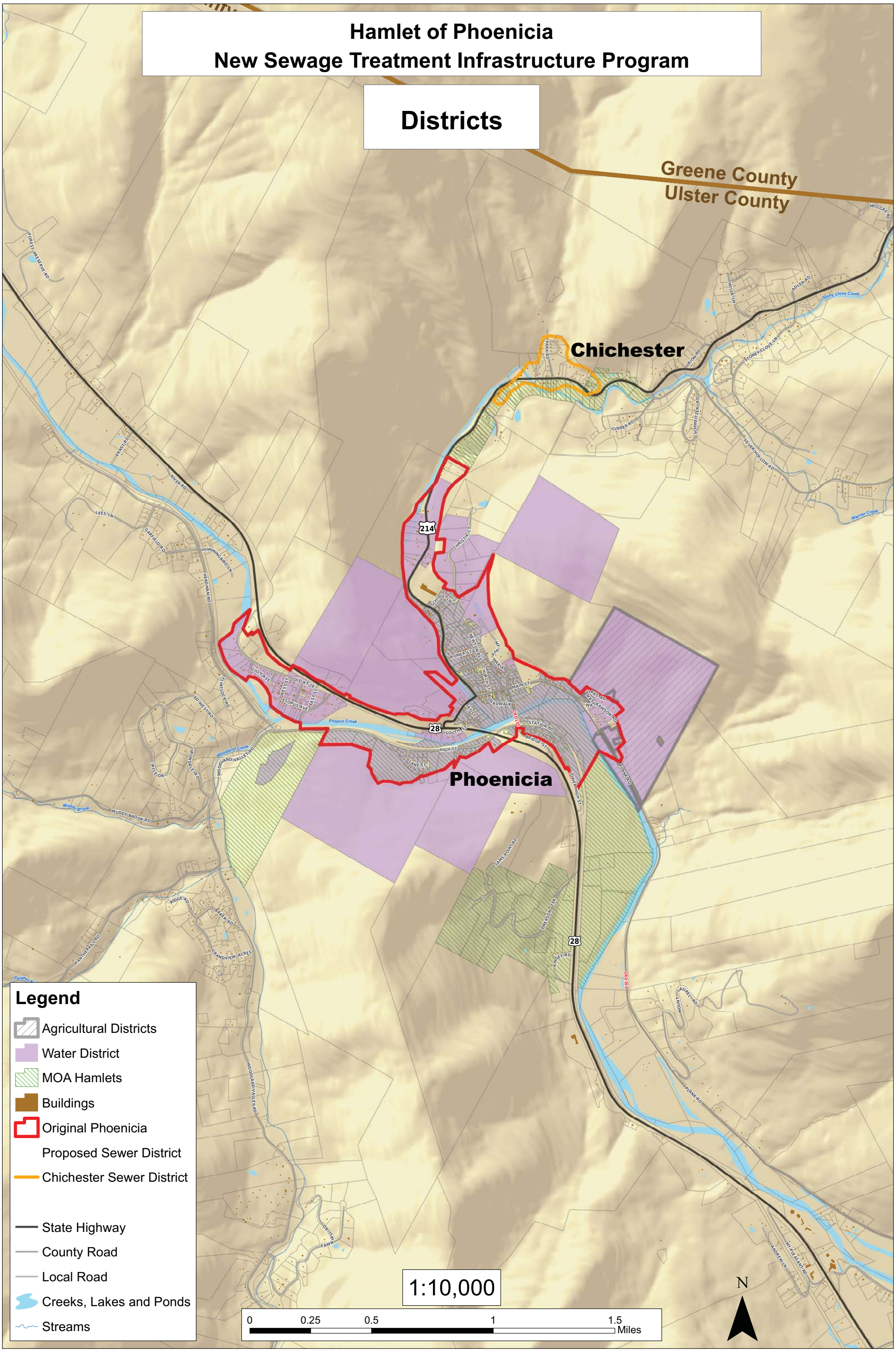
Hamlet of Phoenicia
New Sewage Treatment Infrastructure Program

ESRI Topographic Map



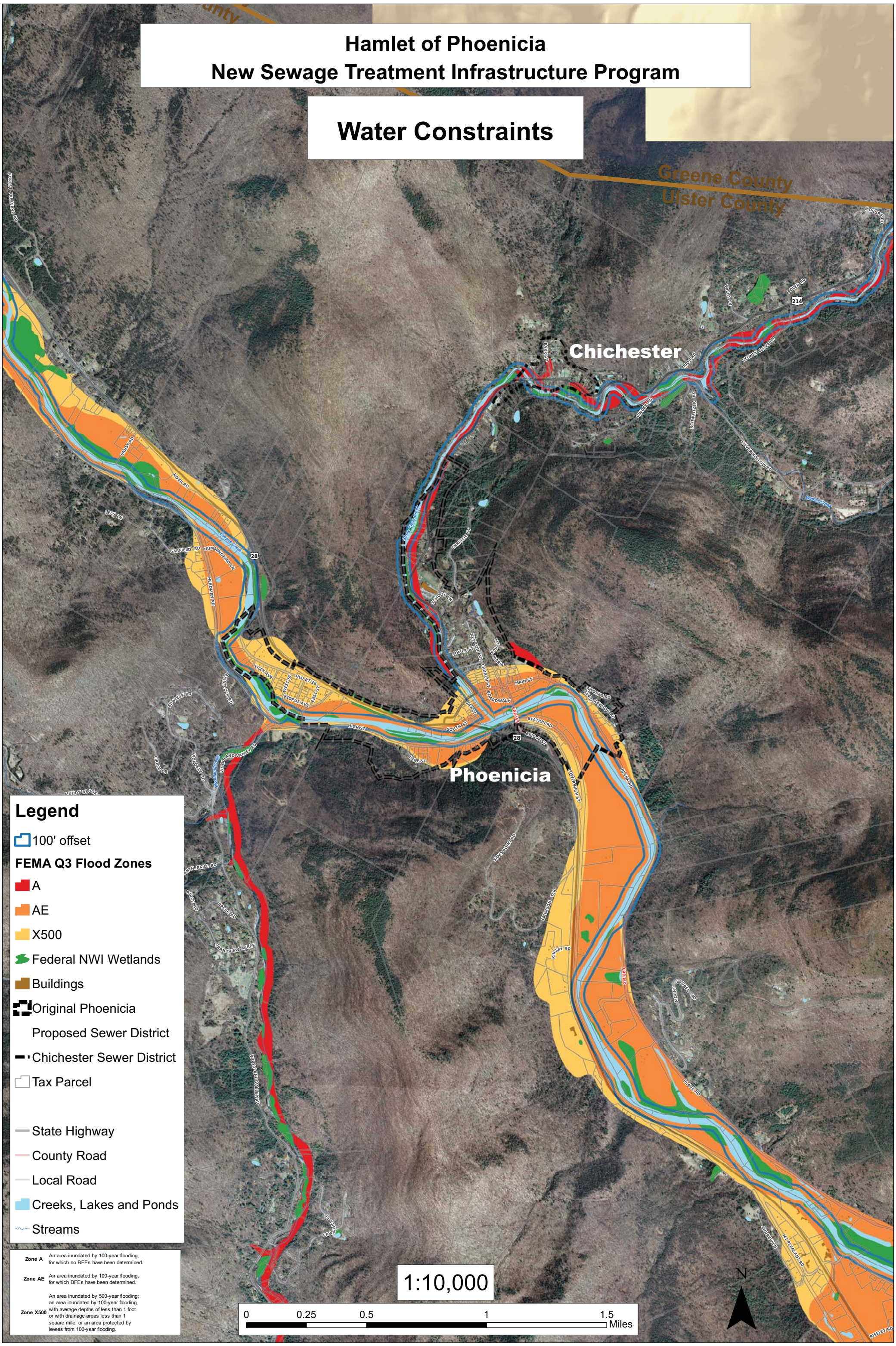
Hamlet of Phoenicia
New Sewage Treatment Infrastructure Program

Districts



Hamlet of Phoenicia
New Sewage Treatment Infrastructure Program

Water Constraints



Hamlet of Phoenicia
New Sewage Treatment Infrastructure Program

Water Constraints

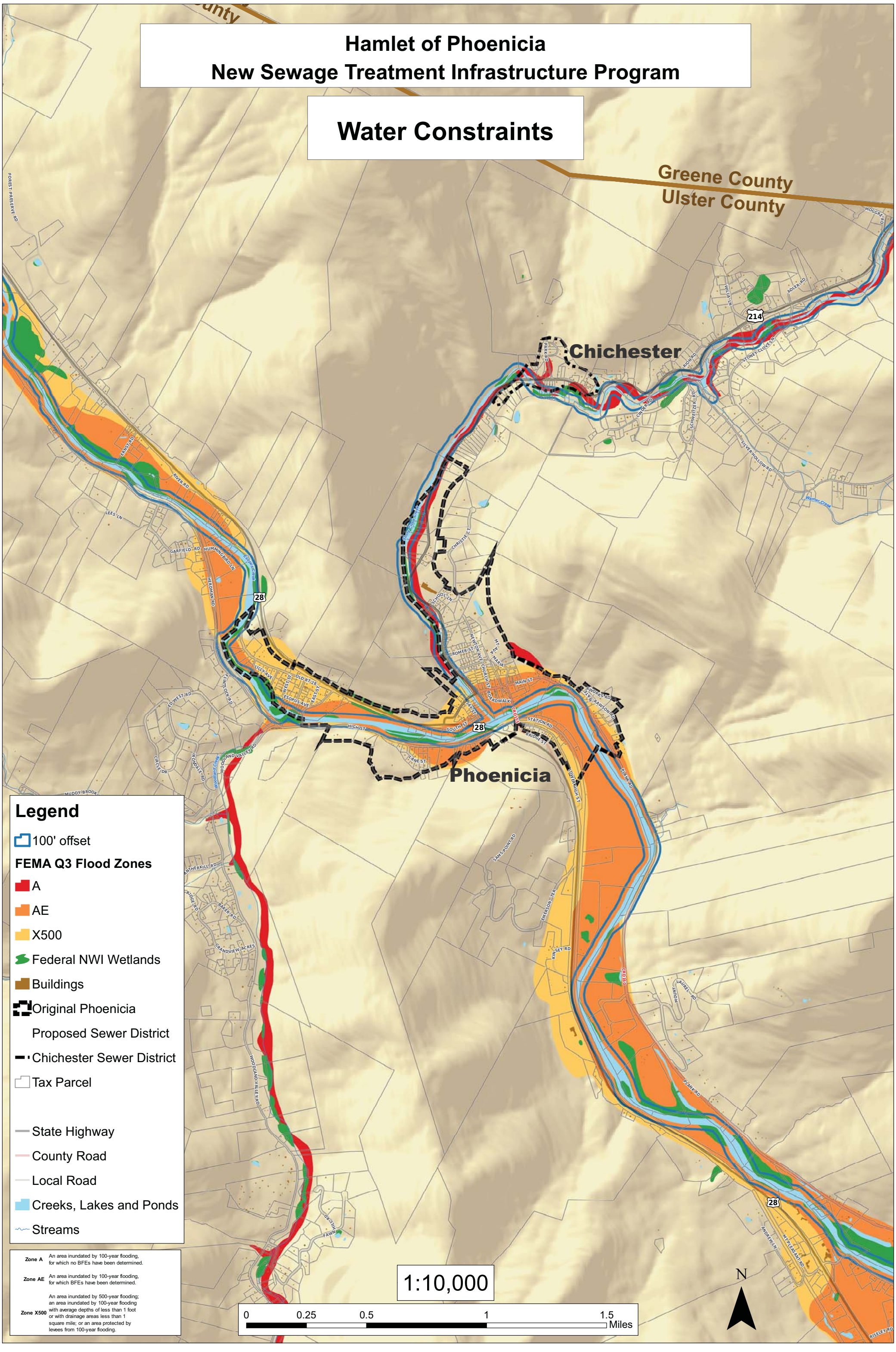


Exhibit 3.1.a.A

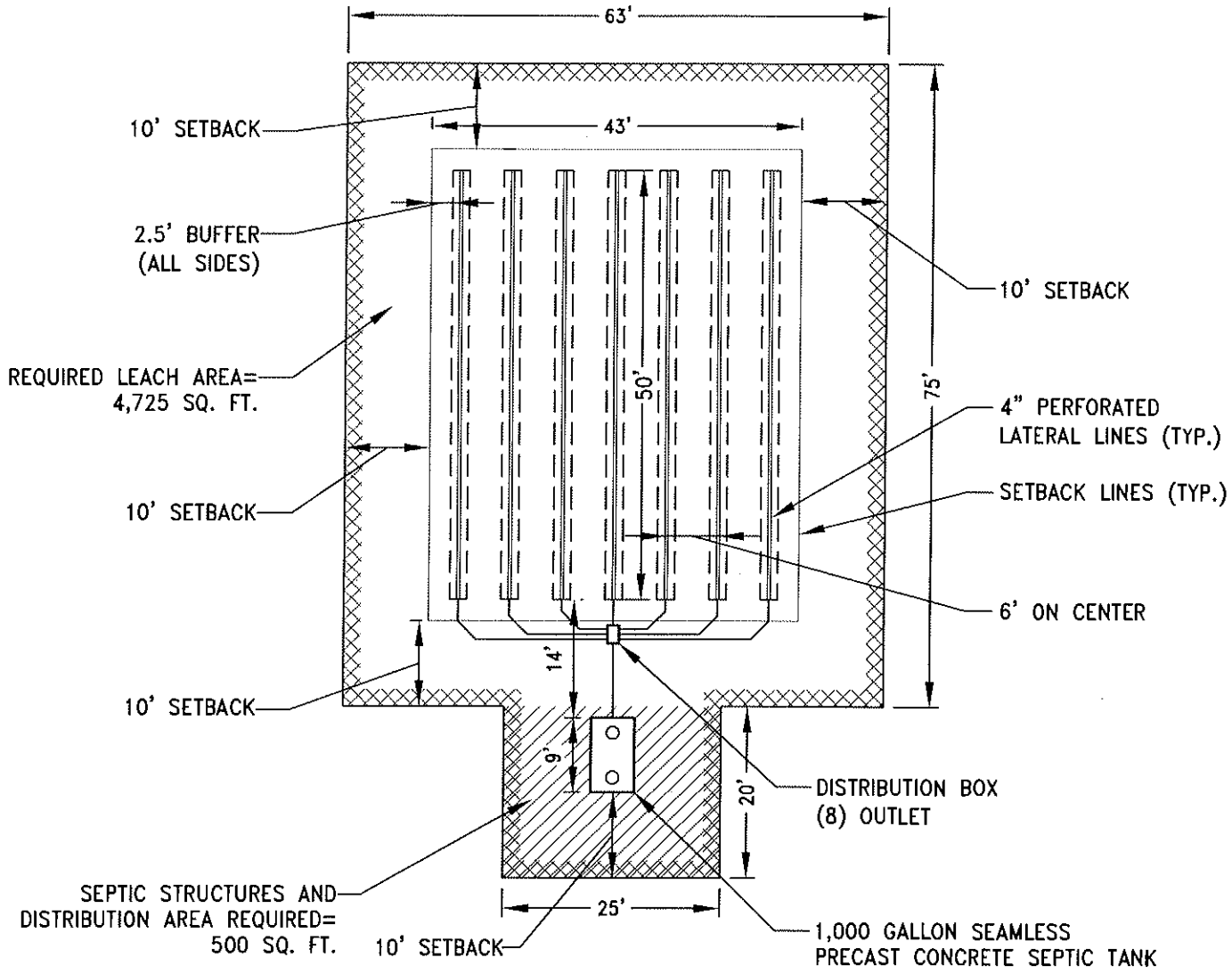
Sample Conventional Septic System Layout and Design
(0.6 gal/day/sf)

Typical Conventional Septic System Design - 0.6 gpd/sf Application Rate			
Notes			
1	flow rate	400	(GFD)Gallons per day
2	Application rate	0.6	GFD per Sq. Ft.
	trench width	2	Feet
	lateral length	50	Feet
	lateral spacing	6	Feet on center
	setback	10	Feet minimum
	area required for structures	500	Sq. Ft. (constant)
	basal area	2.5	Feet
	flow rate / appl rate	667	Treatment Area
	treatment area / trench width	333	Lineal feet of pipe
	Feet of pipe / lateral length	7	# of laterals
	# of laterals Lateral spacing	43	Treatment area width
	required leach field area with setbacks and basal area	4,725	Sq. Ft. Leach area
	Leach area x 2	9,450	100% reserve
	Leach area w/reserve + structures area	9,950	Area required with septic structures and distribution lines
	Req'd area rounded up	10,000	Total conventional septic system area required

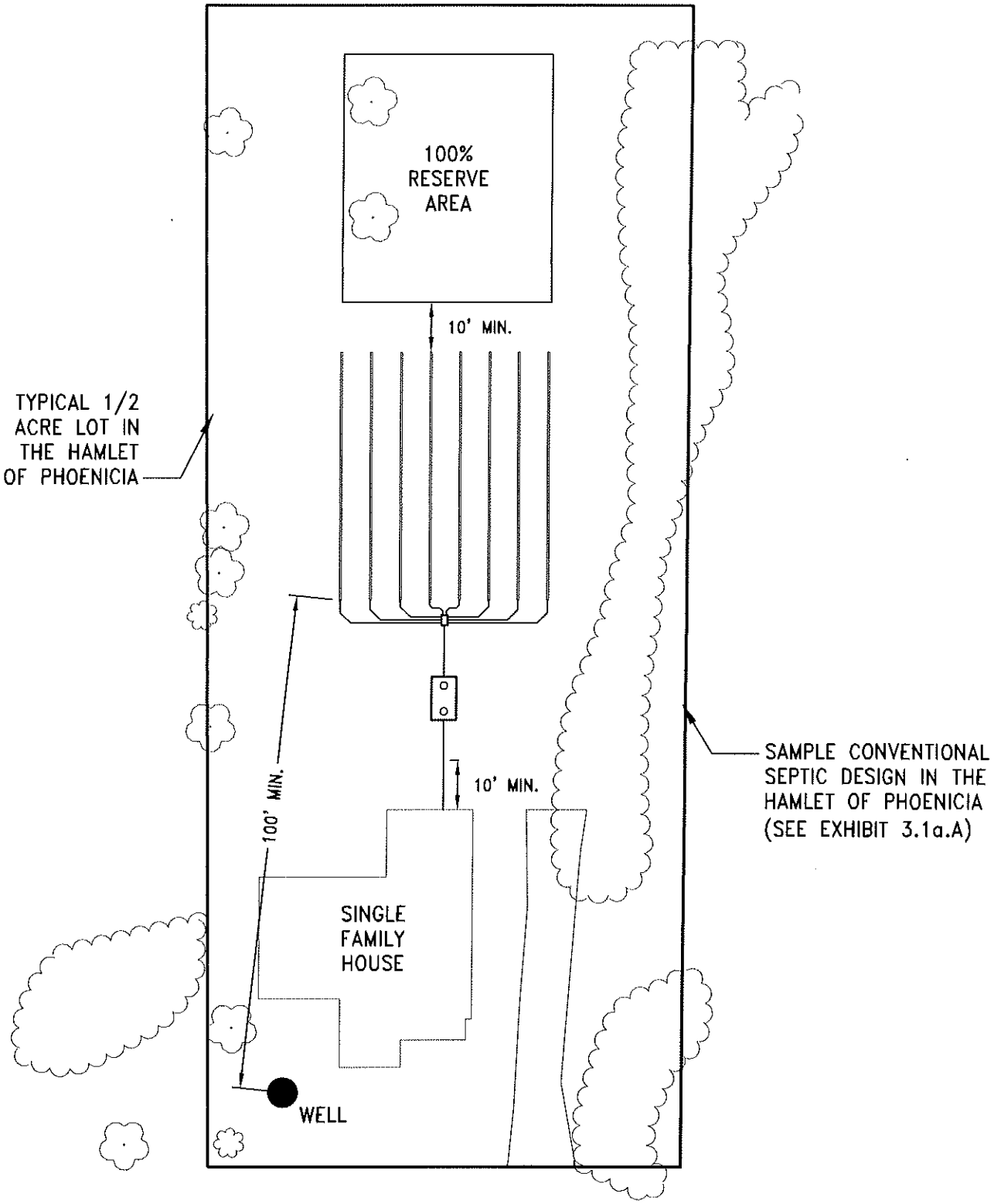
1 Based on "NYSDEC Design Standards for Wastewater Treatment Works, 1988" for a 3 bedroom home

2 Based on soil permeability and percolation rate

DESIGN CRITERIA	
FLOW RATE	400 GALLONS PER DAY
APPLICATION RATE	0.60 GALLONS PER DAY PER SQUARE FOOT



DATE	PROJECT NO.	SAMPLE CONVENTIONAL SEPTIC SYSTEM DESIGN HAMLET OF PHOENICIA EXHIBIT 3.1a.A	Lamont Engineers ENGINEERS · PLANNERS · FACILITY OPERATIONS
2/8/11	2010050		
SCALE 1"=20'	DRAWN MKS		



DATE	PROJECT NO.	SAMPLE CONVENTIONAL SEPTIC SYSTEM DESIGN HAMLET OF PHOENICIA EXHIBIT 3.1a.A	Lamont Engineers ENGINEERS · PLANNERS · FACILITY OPERATIONS
2/8/11	2010050		
SCALE 1"=30'	DRAWN MKS		

K:\APPS\DSK\PROJ\2010050\dwg\EXHIBIT 3.1a.A_SAM_SEPTIC.dwg, 2/8/2011 12:19:52 PM, mseymour, \\LAMONT01\server01\local\Canon IR2525 (2nd Floor)

Exhibit 3.1.a.B

Septic Limitation Map

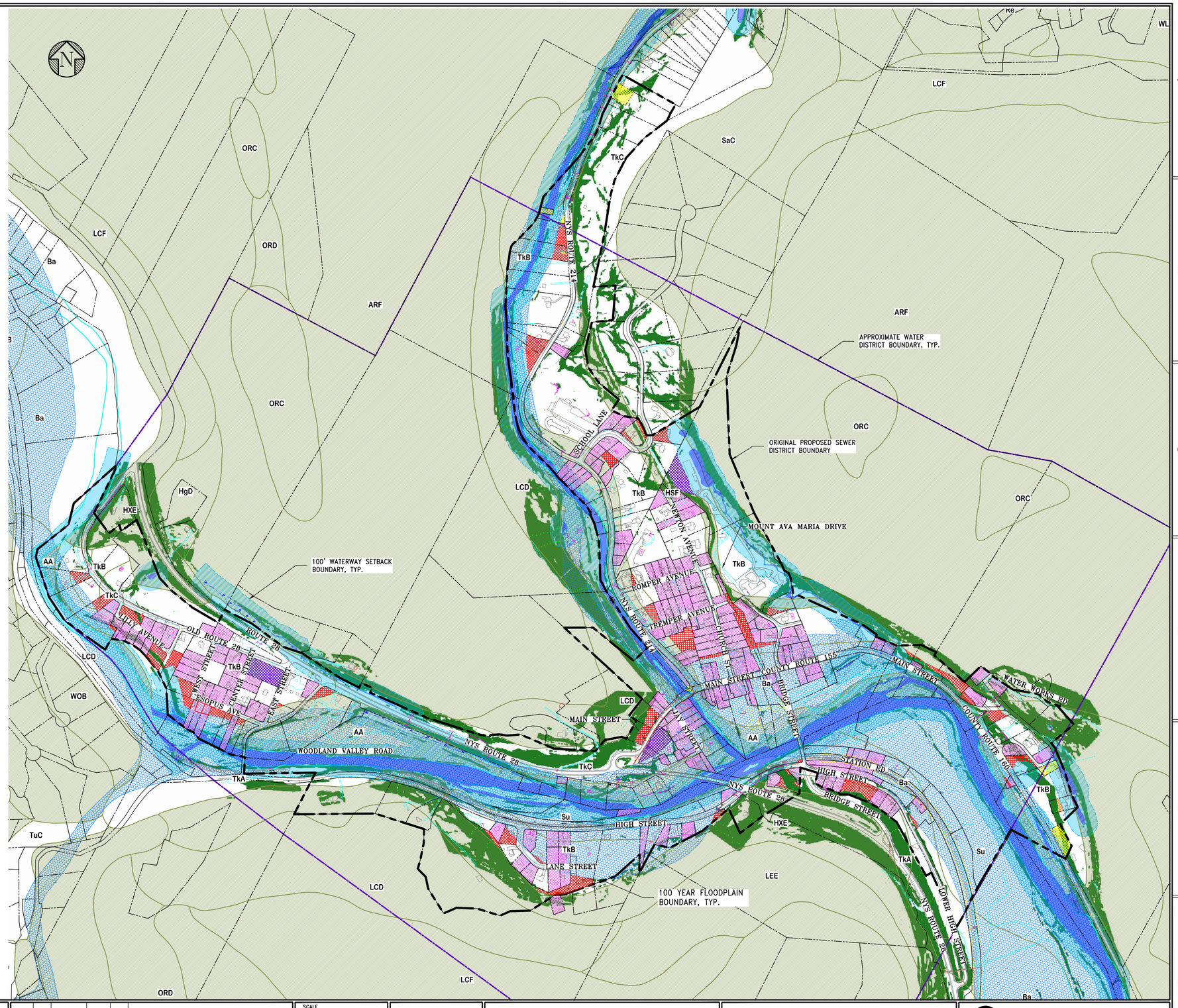
LEGEND

GRADES ≥ 15% SLOPES	
UNSUITABLE SOILS	
PARCELS UNDER 18,000 SF WITH TUNKHANNOCK, BARBOUR OR SUNCOOK SOILS WITH WATER SERVICE	
PARCELS WITH USABLE AREA* UNDER 18,000 SF WITH TUNKHANNOCK, BARBOUR OR SUNCOOK SOILS WITH WATER SERVICE	
PARCELS UNDER 23,000 SF WITH TUNKHANNOCK, BARBOUR OR SUNCOOK SOILS WITH OUT WATER SERVICE	
PARCELS WITH USABLE AREA* UNDER 23,000 SF WITH TUNKHANNOCK, BARBOUR OR SUNCOOK SOILS WITH OUT WATER SERVICE	
PARCELS WITH USABLE AREA UNDER REQUIRED LOT SIZE BASED ON USAGE	
WATERWAYS	
100' BUFFER FROM WATERWAYS	
FEMA AREAS OF 100 YEAR FLOOD, BASE FLOOD ELEVATIONS AND FLOOD HAZARDS NOT DETERMINED	

*USABLE AREA IS THE AREA OF THE PARCEL NOT ELIMINATED BY STEEP SLOPES, WATERWAY BUFFERS, UNSUITABLE SOILS AND THE 100 YEAR FLOOD PLAIN

LEGEND

= ORIGINAL PROPOSED SEWER DISTRICT BOUNDARY
= WATER DISTRICT BOUNDARY
= 100' WATER SETBACK BOUNDARY
= 100 YEAR FLOOD BOUNDARY
= REAL PROPERTY TAX MAP PROPERTY LINES



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ISSUE	REV.	LOCATION	DATE	AP'D	REMARKS

ISSUE	REV.	LOCATION	DATE	AP'D	REMARKS

SCALE	1"=400'
DRAWN	MKS
DATE	1/05/11
DESIGNED	JRB
CHECKED	HL

PHOENICIA SEWER DISTRICT
NYCDEP NEW SEWAGE TREATMENT
INFRASTRUCTURE PROGRAM
ULSTER COUNTY NEW YORK STATE

SEPTIC LIMITATION MAP

EXHIBIT 3.1.a.B

Lamont Engineers
ENGINEERS • PLANNERS • FACILITY OPERATIONS
548 MAIN ST., COBLESKILL, N.Y. 12043 (518) 234-4028

PROJECT NO.	FILE NAME	SHEET NO.
2010050	SEPTIC LIMITATION MAP	EXHIBIT 3.1.a.B

Exhibit 3.1.b.A

Flood Insurance Study

KEY TO MAP

100-Year Flood Boundary

100-Year Flood Boundary

FLOODWAY FRINGE — FLOODWAY

100-Year Flood Boundary

100-Year Flood Boundary

Approximate 100-Year Flood Boundary

Cross Section Line — A — A

Elevation Reference Mark — RM7 ×

River Mile — • M1.5

NOTES TO USER

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

This map was prepared to facilitate flood plain management activities only; it may not show all special flood hazard areas in the community or all planimetric features outside of the flood plain. Refer to the latest official Flood Insurance Rate Map for any additional areas of special flood hazard.

Floodway widths in some areas may be too narrow to show to scale. Refer to Floodway Data Table where floodway width is shown at 1/20 inch.

For adjoining map panels, see separately printed Index to Map Panels.

APPROXIMATE SCALE

500 0 500 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FLOODWAY

FLOOD BOUNDARY AND FLOODWAY MAP

TOWN OF
SHANDAKEN,
NEW YORK
ULSTER COUNTY

PANEL 39 OF 45
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
360864 0039

EFFECTIVE DATE:
JANUARY 17, 1985

Federal Emergency Management Agency

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION IN FT. (NGVD)[1]	DESCRIPTION OF LOCATION
RM 1	1069.59	USC&GS standard disk, stamped J 47 1934, set in top of concrete post approximately 1.6 miles west along CONRAIL tracks from the station at Shandaken approximately 0.3 mile east of milepost K 34 along State Route 28 projecting approximately 1 foot above ground.

[1] National Geodetic Vertical Datum of 1929

KEY TO MAP

100-Year Flood Boundary
500-Year Flood Boundary
FLOODWAY FRINGE — FLOODWAY
100-Year Flood Boundary
500-Year Flood Boundary
Approximate 100-Year Flood Boundary
Cross Section Line — A — A
Elevation Reference Mark — RM7 ×
River Mile — • M1.5

NOTES TO USER

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

This map was prepared to facilitate flood plain management activities only; it may not show all special flood hazard areas in the community or all planimetric features outside of the flood plain. Refer to the latest official Flood Insurance Rate Map for any additional areas of special flood hazard.

Floodway widths in some areas may be too narrow to show to scale. Refer to Floodway Data Table where floodway width is shown at 1/20 inch.

For adjoining map panels, see annotated printed Index for Map Panels.

APPROXIMATE SCALE
500 0 500 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FLOODWAY

FLOOD BOUNDARY AND FLOODWAY MAP

TOWN OF
SHANDAKEN,
NEW YORK
ULSTER COUNTY

PANEL 17 OF 45
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
360864 0017

EFFECTIVE DATE:
JANUARY 17, 1985

Federal Emergency Management Agency

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION IN FT. (NGVD)[1]	DESCRIPTION OF LOCATION
RM 3	917.78	USC&GS standard disk, stamped G 47 1934, set in top of a large rock outcrop approximately 1.8 miles east along CONRAIL tracks from the Shandaken railroad station, approximately 14 rails west of milepost K 30 about 4 rails east of bridge 35 approximately 9 yards south of south rail and 4.5 feet above ground.

[1] National Geodetic Vertical Datum of 1929

KEY TO MAP

60-Year Flood Boundary
100-Year Flood Boundary
FLOODWAY FRINGE
60-Year Flood Boundary
100-Year Flood Boundary
FLOODWAY
approximate 100-Year Flood Boundary
cross Section Line
Elevation Reference Mark — RM7
river Mile — • M1.5

NOTES TO USER

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

This map was prepared to facilitate flood plain management activities only; it may not show all special flood hazard areas in the community or all planimetric features outside of the flood plain. Refer to the latest official Flood Insurance Rate Map for any additional areas of special flood hazard.

Floodway widths in some areas may be too narrow to show to scale. Refer to Floodway Data Table where floodway width is shown at 1/29 inch.

For adjoining map panels, see separately printed Index to Map Panels.

APPROXIMATE SCALE
500 0 500 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FLOODWAY

FLOOD BOUNDARY AND FLOODWAY MAP

TOWN OF
SHANDAKEN,
NEW YORK
ULSTER COUNTY

PANEL 23 OF 45
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
360864 0023

EFFECTIVE DATE:
JANUARY 17, 1985

Federal Emergency Management Agency

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION IN FT. (NGVD)[1]	DESCRIPTION OF LOCATION
RM 4	793.62	USC&GS standard disk stamped F 47 1934 along CONRAIL tracks approximately 10 rails south of Phoenicia railroad station midway between station and section house on east side of tract 14 feet west of west rail of west track set in the top of concrete post

[1] National Geodetic Vertical Datum of 1929

KEY TO MAP

100-Year Flood Boundary
100-Year Flood Boundary
FLOODWAY FRINGE — FLOODWAY
100-Year Flood Boundary
500-Year Flood Boundary
Approximate 100-Year Flood Boundary
Cross Section Line — A — A
Elevation Reference Mark — RM7
River Mile — • M1.5

NOTES TO USER

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

This map was prepared to facilitate flood-plain management activities only. It may not show all special flood hazard areas in the community or all planimetric features outside of the flood plain. Refer to the latest official Flood Insurance Rate Map for any additional areas of special flood hazard.

Floodway widths in some areas may be too narrow to show to scale. Refer to Floodway Data Table where floodway width is shown at 1/20 inch.

For adjoining map panels, see separately printed Index to Map Panels.

APPROXIMATE SCALE
500 0 500 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FLOODWAY
FLOOD BOUNDARY AND FLOODWAY MAP

TOWN OF
SHANDAKEN,
NEW YORK
ULSTER COUNTY

PANEL 24 OF 45
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
360864 0024

EFFECTIVE DATE:
JANUARY 17, 1985

Federal Emergency Management Agency

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION IN FT. (NGVD)[1]	DESCRIPTION OF LOCATION
RM 2	996.52	USC&GS standard disk, stamped H 47 1934, set in top of a large outcropping boulder along CONRAIL tracks approximately 12 yards south of a semaphore, about 2.5 yards south of south rail of main track and set about 6 inches higher than top of rail.

[1] National Geodetic Vertical Datum of 1929

KEY TO MAP

100-Year Flood Boundary
500-Year Flood Boundary
FLOODWAY FRINGE
FLOODWAY
100-Year Flood Boundary
500-Year Flood Boundary
Approximate 100-Year Flood Boundary
Cross Section Line — A — A
Elevation Reference Mark — RM7
River Mile — • M1.5

NOTES TO USER

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

This map was prepared to facilitate flood plain management activities only; it may not show all special flood hazard areas in the community or all obstructive features outside of the flood plain. Refer to the latest official Flood Insurance Rate Map for any additional areas of special flood hazard.

Floodway widths in some areas may be too narrow to show to scale. Refer to Floodway Data Table where floodway width is shown at 1/20 inch.

For adjoining map panels, see separately printed Index to Map Panels.

APPROXIMATE SCALE
500 500 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FLOODWAY

FLOOD BOUNDARY AND FLOODWAY MAP

TOWN OF
SHANDAKEN,
NEW YORK
ULSTER COUNTY

PANEL 21 OF 45
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
360864 0021

EFFECTIVE DATE:
JANUARY 17, 1985

Federal Emergency Management Agency

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION IN FT. (NGVD)[1]	DESCRIPTION OF LOCATION
RM 5	751.92	USC&GS standard disk stamped Q 279 1942 approximately 1.3 miles south along CONRAIL tracks from Phoenicia railroad station approximately 4 rails south of pole 10. 23.4 feet east of centerline of State Route 28; 16.2 feet west of west rail of track set in top of concrete post.

[1] National Geodetic Vertical Datum of 1929

KEY TO MAP

100-Year Flood Boundary
100-Year Flood Boundary
FLOODWAY FRINGE — FLOODWAY
100-Year Flood Boundary
100-Year Flood Boundary
Approximate 100-Year Flood Boundary
Cross Section Line — A — A
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NOTES TO USER

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Floodway widths in some areas may be too narrow to show to scale. Refer to Floodway Data Table where floodway width is shown at 1/20 inch.

For adjoining map panels, see separately printed Index to Map Panels.

APPROXIMATE SCALE
500 — 500 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FLOODWAY

FLOOD BOUNDARY AND FLOODWAY MAP

TOWN OF
SHANDAKEN,
NEW YORK
ULSTER COUNTY

PANEL 37 OF 45
(SEE MAP INDEX FOR PANELS NOT PRINTED)

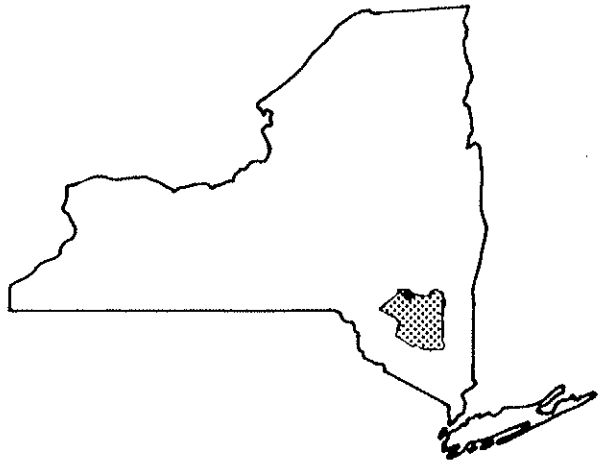
COMMUNITY-PANEL NUMBER
360864 0037

EFFECTIVE DATE:
JANUARY 17, 1985

Federal Emergency Management Agency

FLOOD INSURANCE STUDY

TOWN OF SHANDAKEN, NEW YORK
ULSTER COUNTY



REVISED:
FEBRUARY 17, 1989

Federal Emergency Management Agency

COMMUNITY NUMBER-360864

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance study purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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PUBLISHED SEPARATELY:

Flood Insurance Rate Map Index
Flood Insurance Rate Map

FLOOD INSURANCE STUDY
TOWN OF SHANDAKEN, NEW YORK

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Town of Shandaken, Ulster County, New York, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert Shandaken to the regular program of flood insurance by the Federal Emergency Management Agency (FEMA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

This Flood Insurance Study was prepared by compiling pertinent information for the flood hazard areas in the Town of Shandaken from existing technical and/or scientific data originally prepared by others for purposes other than the National Flood Insurance Program (NFIP). This existing data was reviewed by FEMA prior to its use in the development of this Flood Insurance Study to ensure compliance with NFIP accuracy requirements.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these federally-supported studies are based. These criteria take precedence over the minimum federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 44 CFR, 60.3. In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgments

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by the New York District of the U. S. Army Corps of Engineers (COE) during the Report on Technical Services for Esopus Creek. The report was completed in November 1982.

This study represents a revision of the original Flood Insurance Study due to the dissolution of the Village of Pine Hill, and incorporates additional approximate flooding from Giggle Hollow, Alton Creek, and Birch Creek. This revised analysis was completed in March 1988.

1.3 Coordination

On February 8, 1984, the results of the original study were reviewed at a final Consultation and Coordination Officer's (CCO) meeting attended by representatives of FEMA and the Town of Shandaken.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Town of Shandaken, Ulster County, New York. The area of study is shown on the Vicinity Map (Figure 1).

Esopus Creek was studied by detailed methods from the downstream corporate limits to a point just above State Route 28. The areas studied by detailed methods were selected based upon the extent and validity of available existing hydrologic and hydraulic data.

Woodland Creek, Stony Clove Creek, Beaver Kill, Birch Creek, the Neversink River, Giggle Hollow, Alton Creek, Birch Creek, various unnamed streams, and the remaining portion of Esopus Creek were studied by approximate methods. Approximate methods of analysis were used to study all remaining areas having a potential flood hazard that did not have available scientific or technical data.

2.2 Community Description

The Town of Shandaken is located in the northern portion of Ulster County in southeastern New York. It is bordered by the Town of Woodstock to the east, the Towns of Denning and Olive to the south, the Town of Hardenburgh to the west, the Town of Middleburgh to the west and north, and the Towns of Hunter and Lexington to the north.

The population of Shandaken was 2,912 in 1980 (Reference 1). The residents of the area are primarily employed in the recreation and tourist industries throughout the year.

The drainage area of Esopus Creek at the downstream corporate limits of Shandaken is approximately 170 square miles. The flood plain of the creek is located in a mountain valley and consists primarily of residential development, commercial development, and vacant wooded land. The topography of the watershed is steep, with tributaries originating in small mountain valleys. State Route 28 follows the river valley for the length of the study area.

The climate of the area features substantial precipitation, with cold, snowy winters, and short, cool summers. The annual precipitation averages 46 inches in the valleys and up to 60 inches in the mountains, and is evenly distributed throughout the year.

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF SHANDAKEN, NY

(ULSTER CO.)

APPROXIMATE SCALE

4 0 4 8 12 MILES

VICINITY MAP

The average annual temperature is approximately 45 degrees Fahrenheit (^{o}F), with a minimum temperature in January averaging 14°F and a maximum July temperature averaging 80°F (Reference 2).

2.3 Principal Flood Problems

Esopus Creek has a long history of flooding upstream of Ashokan Reservoir. The most recent flood occurred on March 21-22, 1980, with a recurrence interval of approximately 22 years. Flood damage was estimated at six million dollars. A flood flow of approximately the same magnitude as the March 1980 flood affected Esopus Creek on March 30, 1951 (Reference 3). According to local residents and newspaper accounts, the flood apparently was associated with a dam which broke on Birch Creek.

3.0 ENGINEERING METHODS

For the flooding source studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one-percent chance of annual occurrence) in any 50-year period is about 40 percent (four in ten) and, for any 90-year period, the risk increases to about 60 percent (six in ten). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for the flooding source studied in detail affecting the community.

The New York State Department of Environmental Conservation developed a model of the Esopus Creek basin using the COE HEC-1 computer program (Reference 4). The model was modified by the New York District of the COE to reflect the flood of March 21-22, 1980, at the Coldbrook gaging station. Hypothetical storms with recurrence intervals of 10, 50, 100, and 500 years were then

developed using Technical Memorandum HYDRO-35 and Technical Paper 40 (References 5 and 6). By computing the 10-, 50-, and 100-year floods on the model and adjusting the constant loss rate of rainfall to a reasonable value, peak discharges were produced at Coldbrook in close agreement with the peak discharge-frequency relations based on a 49-year record of flood peaks observed at Coldbrook. However, no agreement between the hypothetical 500-year flood and the peak discharge versus frequency curve based on observed flood peaks was possible.

Peak discharges were required at Coldbrook and four points upstream to the Village of Shandaken for the 10-, 50-, 100-, and 500-year hypothetical floods and the flood of March 21-22, 1980. The procedure used to define these discharges is as follows. Peak discharges at Coldbrook for the 10-, 50-, and 100-year floods were computed by the COE HEC-1 computer model using the hypothetical storms (Reference 4). The 500-year peak discharge at Coldbrook was taken from the peak discharge-frequency curve based on observed floods. These discharges were plotted, and the curve was adjusted for partial duration and then used as the peak discharge-frequency relation for Coldbrook.

For the four points upstream of Coldbrook, the 10-, 50-, and 100-year peak discharges computed by the HEC-1 model from the hypothetical storms were plotted, and curves were drawn. The curves were extended to a 500-year recurrence interval by making them parallel to the curve for Coldbrook. They were alao adjusted for partial duration.

A summary of drainage area-peak discharge relationships for Esopus Creek is ahown is Table 1, "Summary of Discharges." Table 1 is based on the partial duration curves for Coldbrook and the four points upstream for the 10-, 50-, 100-, and 500-year floods, and the flood of March 21-22, 1980.

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs)			
		10-YEAR	50-YEAR	100-YEAR	500-YEAR
ESOPUS CREEK					
At the downstream corporate limits	169.7	36,000	72,000	92,599	165,000
At the confluence of Beaver Kill	132.7	30,000	60,000	74,619	142,000
At the confluence of Woodland Creek	84.2	20,000	39,600	48,801	89,500
At the confluence of Broad Street Hollow Creek	59.4	16,000	30,500	37,529	67,000

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the source studied were carried out to provide estimates of the elevationa of floods of the selected recurrence intervals.

Cross sections were field surveyed to provide data for the backwater analyses. All bridges and culverts were field surveyed to obtain elevation data and structural geometry.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 2).

Water-surface elevations of floods of the selected recurrence intervals were computed using the COE HEC-2 step-backwater computer program (Reference 7). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. Starting water-surface elevations for Esopus Creek were calculated by the slope/ area method.

Roughness coefficients (Manning's "n") used in the hydraulic computations were estimated by field inspection and engineering judgment. The coefficients were then verified by the HEC-2 computer program by reproducing the gage height at the Coldbrook gaging station for the March 21-22, 1980, flood. The channel "n" value for Esopus Creek was 0.030, and the overbank "n" value was 0.100.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages State and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study produces maps designed to assist communities in developing flood plain management measures.

4.1 Flood Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as

the base flood for flood plain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For the stream studied in detail, the 100- and 500-year flood plain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps (Reference 8).

For all streams studied by spproximate methods the boundary of the 100-year flood was delineated using the original Flood Insurance Studies for the Town of Shandaken and the Village of Pine Hill (References 9 and 10).

The 100- and 500-year flood plain boundaries are shown on the Flood Boundary and Floodway Map (Exhibit 2). In cases where the 100- and 500-year flood plain boundaries are close together, only the 100-year flood plain boundary has been shown. Small areas within the flood plain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on flood plains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of flood plain manage-ment. Under this concept, the area of the 100-year flood plain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent flood plain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodway in this study is presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodway presented in this study was computed on the basis of equal conveyance reduction from each side of the flood plain. The results of these computations are tabulated at selected cross sections for the stream segments for which a floodway was computed (Table 2).

As shown on the Flood Boundary and Floodway Map (Exhibit 2), the floodway boundaries were computed at cross sections. Between cross sections, the boundaries were interpolated. In cases where the floodway and 100-year flood plain boundaries are either close together or collinear, only the floodway boundary has been shown.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Esopus Creek								
A	75	254	7,478	12.4	662.3	662.3	663.2	0.9
B	1,675	642	9,232	10.0	665.3	665.3	666.0	0.7
C	3,335	307	4,844	19.1	674.5	674.5	674.6	0.1
D	5,165	472	6,733	13.8	682.8	682.8	683.5	0.7
E	6,850	527	11,593	8.0	689.7	689.7	690.0	0.3
F	8,740	330	4,883	19.0	692.3	692.3	692.6	0.3
G	9,350	586	10,081	9.2	702.2	702.2	703.0	0.8
H	9,940	342	7,118	13.0	702.3	702.3	703.0	0.7
I	10,860	227	5,315	17.4	703.7	703.7	704.4	0.7
J	12,615	582	7,913	9.4	708.2	708.2	708.9	0.7
K	14,180	298	3,703	20.1	713.4	713.4	713.9	0.5
L	16,260	261	3,960	18.8	723.7	723.7	724.6	0.9
M	18,200	563	5,440	13.7	737.5	737.5	737.5	0.0
N	19,800	609	10,236	7.3	744.1	744.1	744.5	0.4
O	22,150	284	4,612	16.2	762.2	762.2	762.3	0.1
P	24,245	641	9,447	7.9	773.3	773.3	774.2	0.9
Q	26,920	365	4,582	16.3	788.8	788.8	788.8	0.0
R	29,500	409	5,522	13.5	803.0	803.0	803.8	0.8
S	30,800	508	8,028	9.3	817.4	817.4	818.3	0.9
T	31,475	385	6,862	10.9	826.2	826.2	827.1	0.9
U	33,300	267	3,978	18.8	836.3	836.3	837.3	1.0
V	35,060	180	3,122	23.9	852.9	852.9	853.3	0.4
W	35,650	422	7,342	10.2	864.0	864.0	864.8	0.8

[1]Feet from corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF SHANDAKEN, NY
(ULSTER CO.)

FLOODWAY DATA

ESOPUS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Esopus Creek (continued)								
X	36,075	315	4,837	10.1	866.2	866.2	866.9	0.7
Y	37,810	226	3,064	15.9	878.7	878.7	878.7	0.0
Z	39,537	310	3,448	14.2	889.6	889.6	890.5	0.9
AA	41,313	188	2,439	20.0	905.5	905.5	905.5	0.0
AB	43,763	298	3,577	13.6	920.8	920.8	920.8	0.0
AC	45,350	394	3,625	13.5	929.7	929.7	929.7	0.0
AD	47,637	570	7,520	6.5	936.5	936.5	937.2	0.7
AE	49,387	1,310	4,699	10.4	950.8	950.8	951.1	0.3
AF	51,463	472	3,347	11.2	966.1	966.1	966.1	0.0
AG	53,113	359	3,165	11.9	977.7	977.7	977.9	0.2
AH	54,460	339	2,670	14.1	992.1	992.1	992.1	0.0
AI	55,350	267	2,704	13.9	998.6	998.6	998.6	0.0
AJ	56,750	220	2,522	14.9	1,010.8	1,010.8	1,011.5	0.7
AK	57,875	536	7,499	5.0	1,027.2	1,027.2	1,027.9	0.7
AL	59,275	517	3,817	9.8	1,029.3	1,029.3	1,030.2	0.9
AM	60,075	461	3,766	10.0	1,035.7	1,035.7	1,036.3	0.6
AN	62,063	218	2,670	14.1	1,055.4	1,055.4	1,055.4	0.0
AO	62,700	341	5,020	7.5	1,062.9	1,062.9	1,063.5	0.6

[1]Feet from corporate limits

TABLE 2

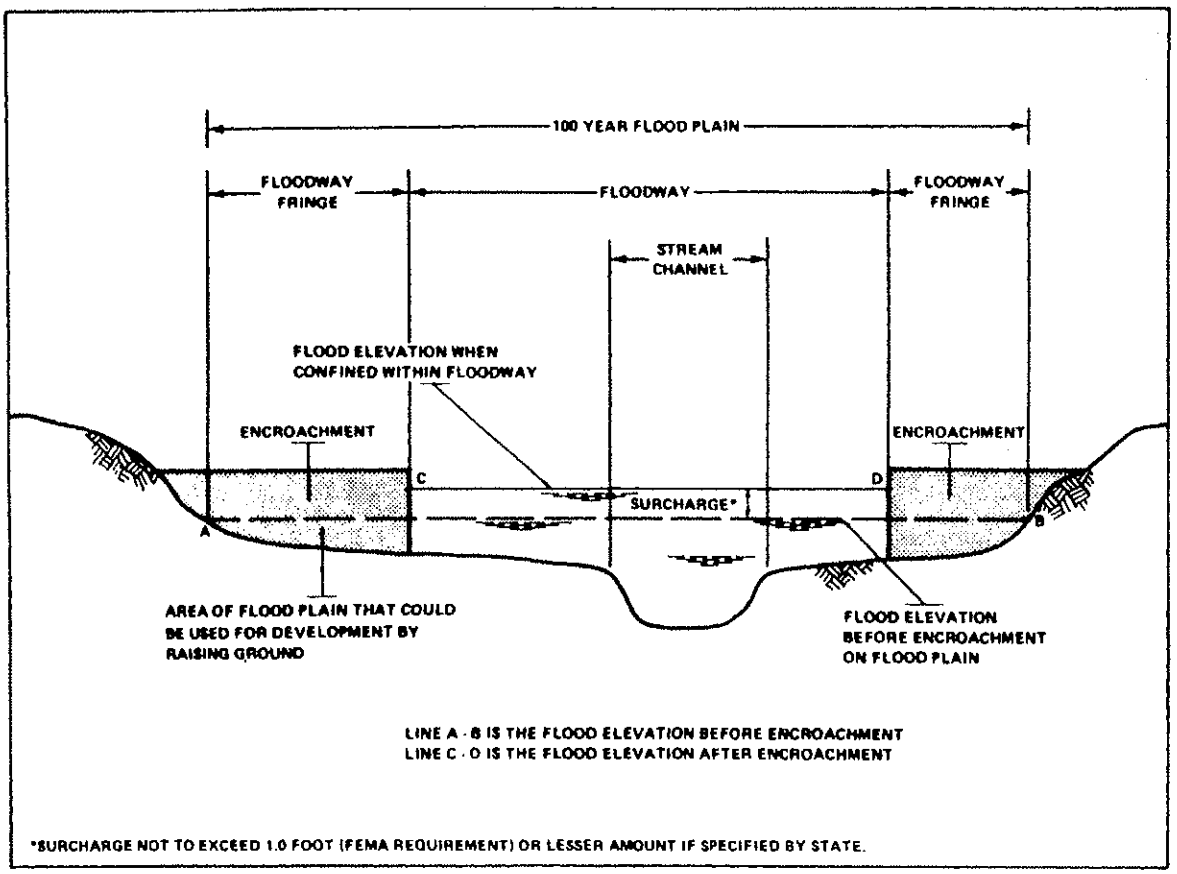
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF SHANDAKEN, NY
(ULSTER CO.)

FLOODWAY DATA

ESOPUS CREEK

The area between the floodway and 100-year flood plain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain developments are shown in Figure 2.



FLOODWAY SCHEMATIC Figure 2

The floodway in this report is recommended to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

5.0 INSURANCE APPLICATION

To establish actuarial insurance rates, data from the engineering study must be transformed into flood insurance criteria. This process includes

the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for the flooding source studied in detail in the Town of Shandaken.

5.1 Reach Determinations

Reaches are defined as sections of flood plain that have relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference may not have a variation greater than that indicated in the following tabulation for more than 20 percent of the reach:

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The locations of the reaches determined for the flooding source of the Town of Shandaken are shown on the Flood Profiles (Exhibit 1) and summarized in Table 3.

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is used to establish relationships between depth and frequency of flooding in any reach. This relationship is then used with depth-damage relationships for various classes of structures to establish actuarial insurance rate tables.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations rounded to the nearest one-half foot, multiplied by 10, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year flood water-surface elevations is greater than 10.0 feet, it is rounded to the nearest whole foot.

5.3 Flood Insurance Zones

Flood insurance zones and zone numbers are assigned based on the type of flood hazard and the FHF, respectively. A unique zone number is associated with each possible FHF, and varies from 1 for a FHF of 005 to a maximum of 30 for a FHF of 200 or greater.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Esopus Creek							
Reach 1	39	-16.4	-4.5	+10.2	160	A26	Varies
Reach 2	37,39	-10.9	-3.0	+9.7	110	A21	Varies
Reach 3	37	-5.8	-1.8	+6.6	060	A12	Varies
Reach 4	23,24, 37	-7.0	-2.0	+7.3	070	A14	Varies
Reach 5	21,23	-6.3	-1.8	+6.8	065	A13	Varies
Reach 6	21	-4.0	-1.0	+3.8	040	A8	Varies
Reach 7	17,21	-5.5	-1.4	+4.9	055	A11	Varies

[1]Flood Insurance Rate Map Panel
[2]Weighted Average
[3]Rounded to the nearest foot - see map

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF SHANDAKEN, NY
(ULSTER CO.)

FLOOD INSURANCE ZONE DATA

ESOPUS CREEK

Zone A:	Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations shown or FHFs determined.
Zones A8, A11, A12, A13, A14, A21, and A26:	Special Flood Hazard Areas inundated by the 100-year flood; with base flood elevations shown, and zones subdivided according to FHFs.
Zone B:	Areas between the Special Flood Hazard Areas and the limits of the 500-year flood; areas that are protected from the 100- or 500-year floods by dike, levee, or other water control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding; not subdivided.

Flood elevation differences, FHFs, flood insurance zones, and base flood elevations for the flooding source studied in detail in the community are shown in Table 3.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Town of Shandaken is, for insurance purposes, the principal result of the Flood Insurance Study. This map contains the official delineation of flood insurance zones and base flood elevations. Base flood elevation lines show the locations of the expected whole-foot water-surface elevation of the base (100-year) flood. The base flood elevations and zone numbers are used by insurance agents, in conjunction with structure elevations and characteristics, to assign actuarial insurance rates to structures and contents insured under the National Flood Insurance Program.

6.0 OTHER STUDIES

This Flood Insurance Study was prepared by compiling existing hydrologic and hydraulic technical and scientific data prepared by other organizations originally for purposes other than the NFIP. The data was identified as the best available at the time of compilation of this Flood Insurance Study and should depict the general conditions of the flooding sources with relative accuracy. FEMA performed a cursory review and accepted the data as valid for purposes of this Flood Insurance Study and the NFIP. However, if better information is known to exist or has been developed since the date of this report, the information should be immediately forwarded to the Natural and Technological Hazards Division,

Federal Emergency Management Agency (Regional Director, Region II Office, 26 Federal Plaza, Room 1351, New York, New York 10278) for consideration for revision of this study.

The Flood Insurance Study for the Town of Hunter has been prepared (Reference 11). The results of this study are in exact agreement with the results of that study.

The Flood Insurance Study for the Town of Olive is currently being prepared (Reference 12). The results of that study will be in exact agreement with the results of this study.

Due to its more up-to-date nature, this study supersedes the original Flood Insurance Study for the Town of Shandaken (Reference 9).

7.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, Federal Emergency Management Agency, Regional Director, Region II Office, 26 Federal Plaza, Room 1351, New York, New York 10278.

8.0 BIBLIOGRAPHY AND REFERENCES

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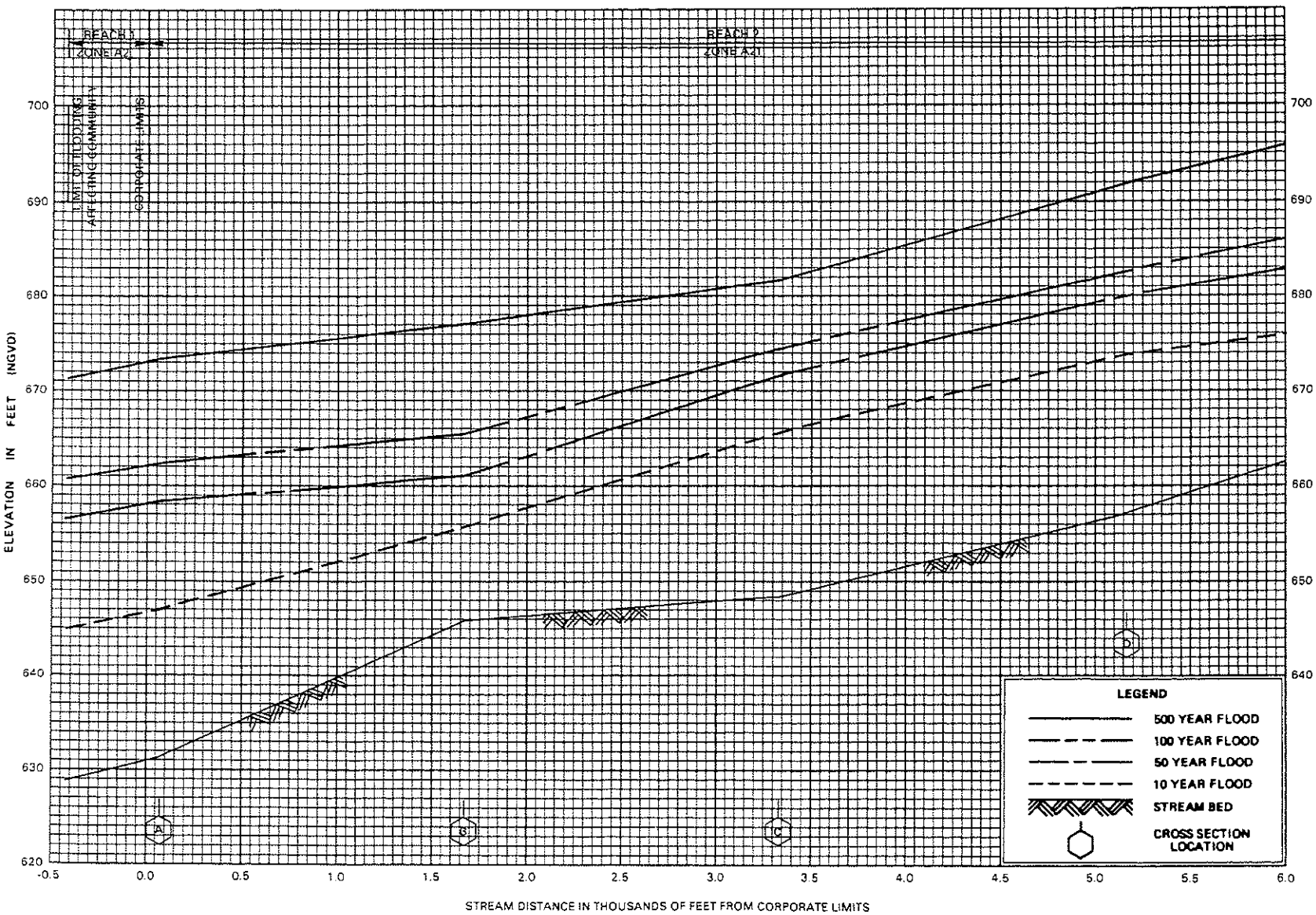
11. Federal Emergency Management Agency, Flood Insurance Study, Town of Hunter, Greene County, New York, Washington, D. C., February 3, 1983.

12. Federal Emergency Management Agency, Flood Insurance Study, Town of Olive, Ulster County, New York (Unpublished).

Chow, Ven Te, Open-Channel Hydraulics, New York, McGraw-Hill, 1959.

U. S. Department of Transportation, Federal Highway Administration, Design for Open-Channel Flow, Washington, D. C., 1973.



FLOOD PROFILES

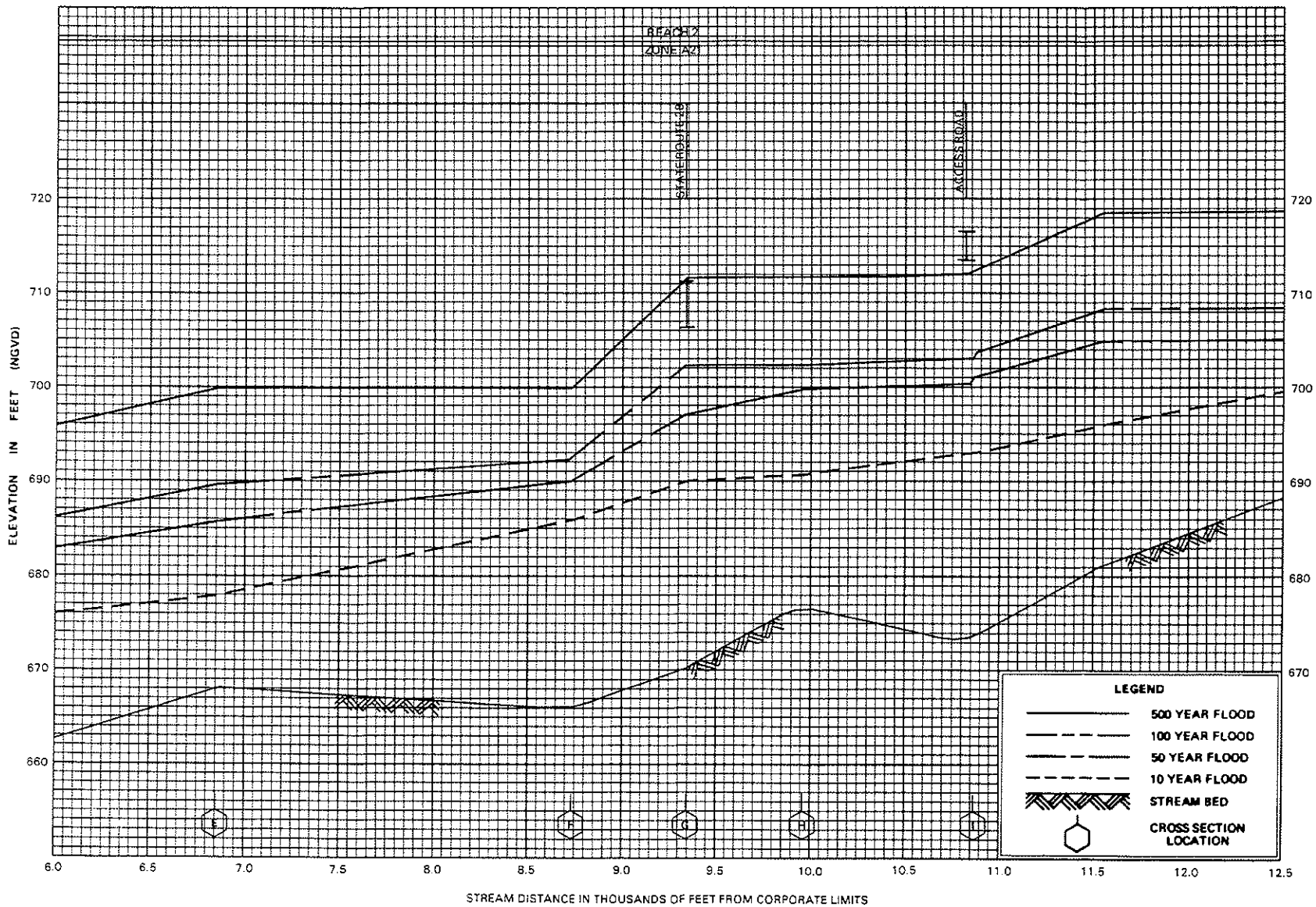
ESOPUS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF SHANDAKEN, NY

(ULSTER CO.)

01P



FLOOD PROFILES

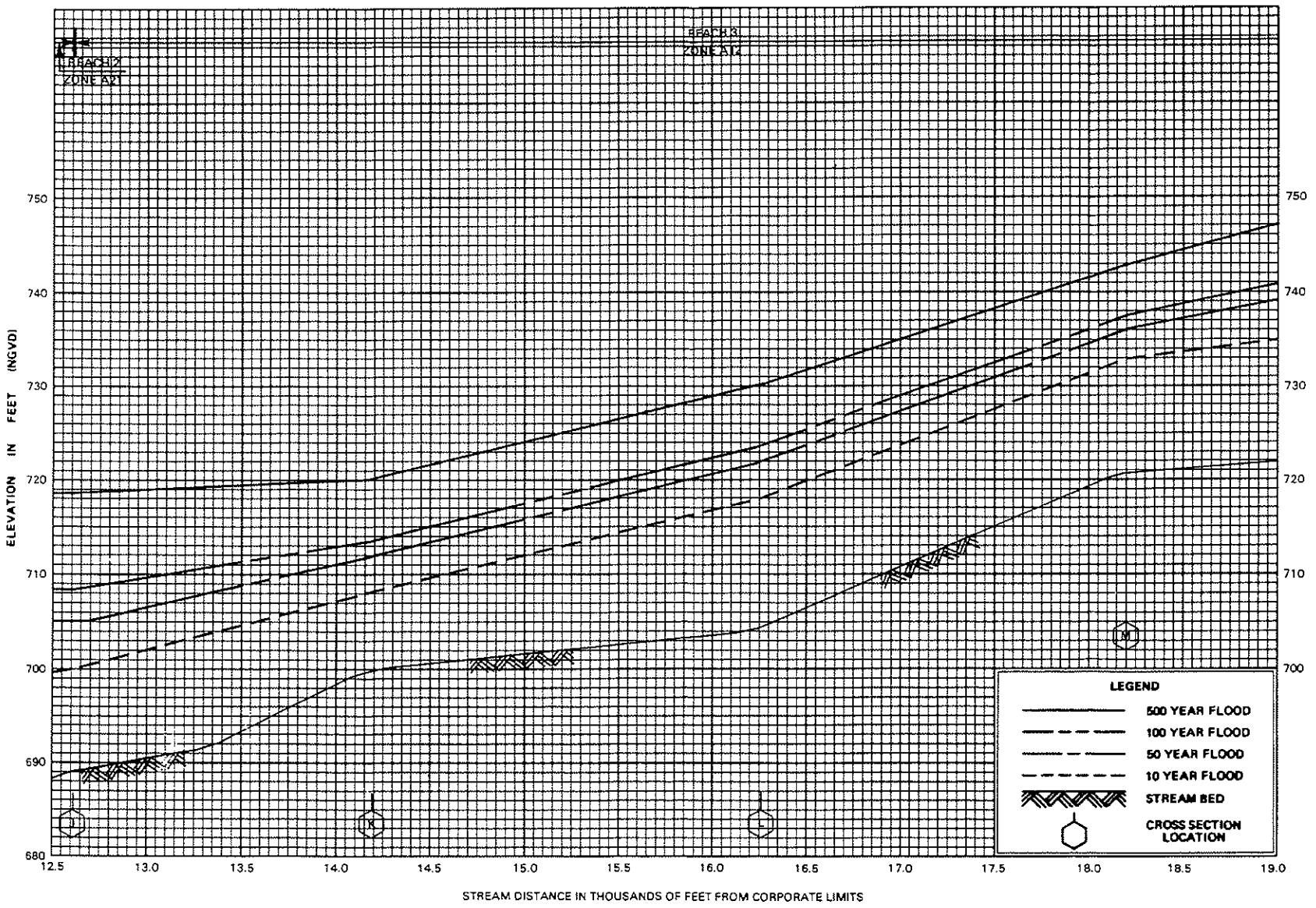
ESOPUS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF SHANDAKEN, NY

(ULSTER CO.)

02P



FLOOD PROFILES

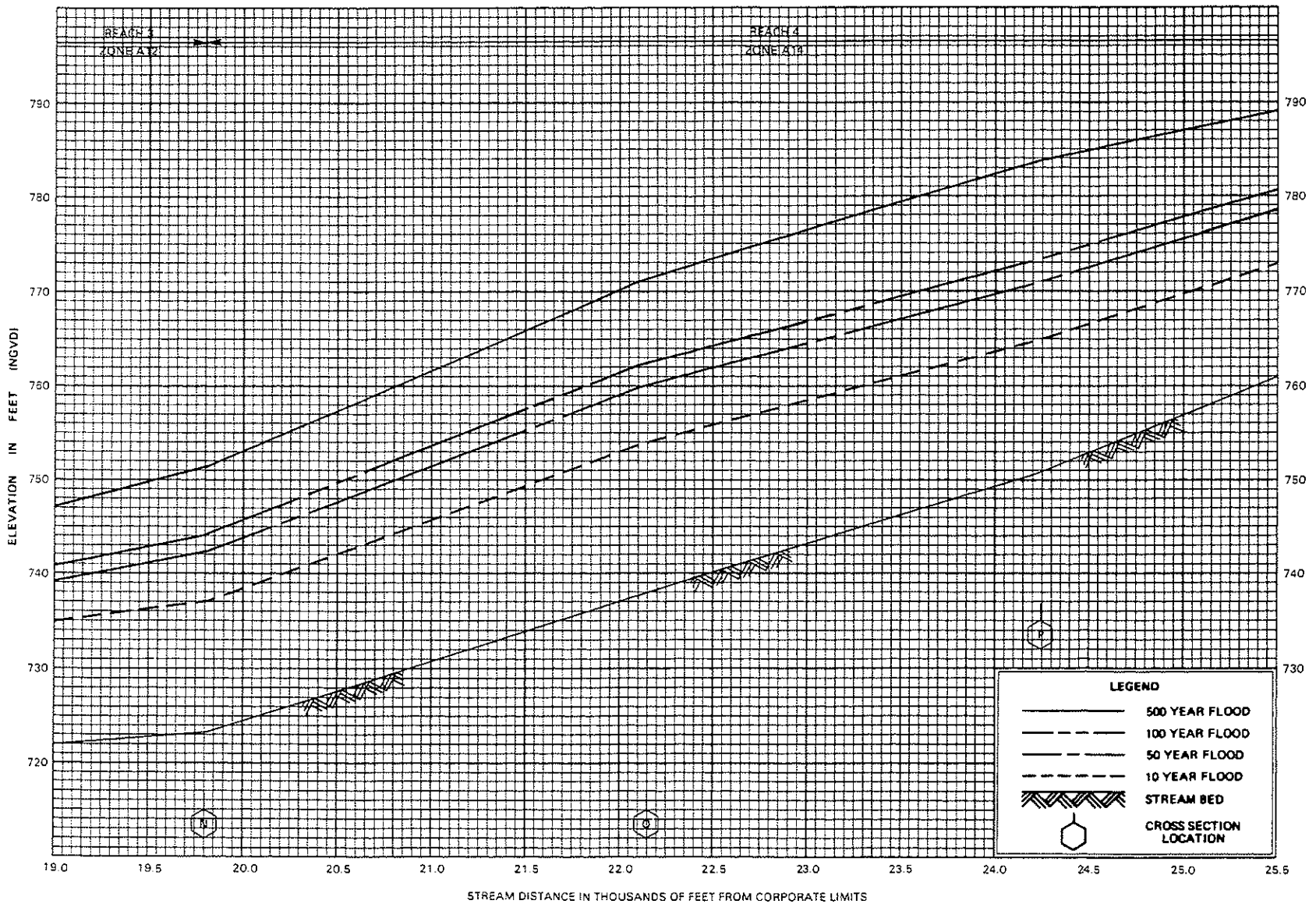
ESOPUS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF SHANDAKEN, NY

(ULSTER CO.)

03P



FLOOD PROFILES

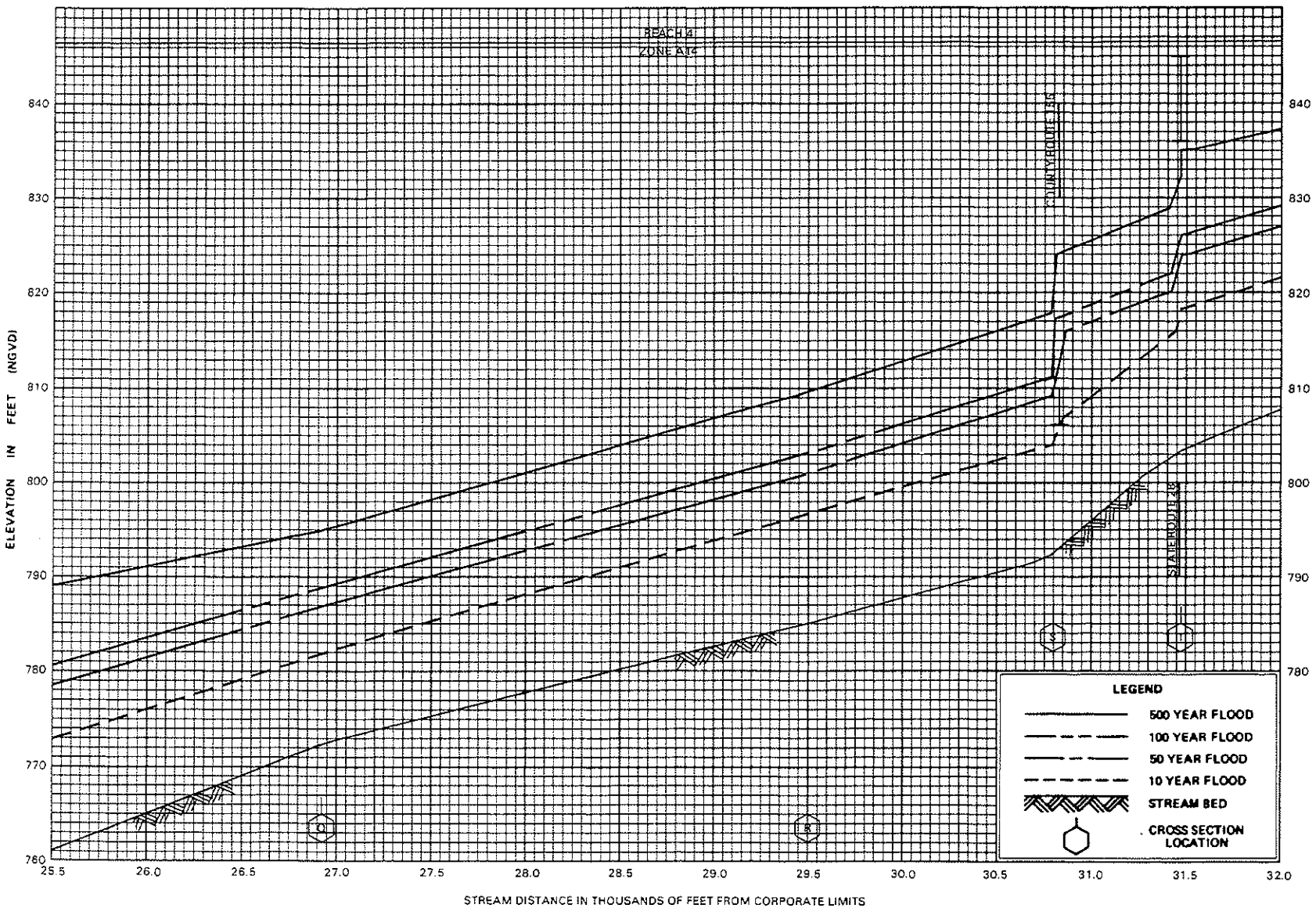
ESOPUS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF SHANDAKEN, NY

(ULSTER CO.)

04P



FLOOD PROFILES

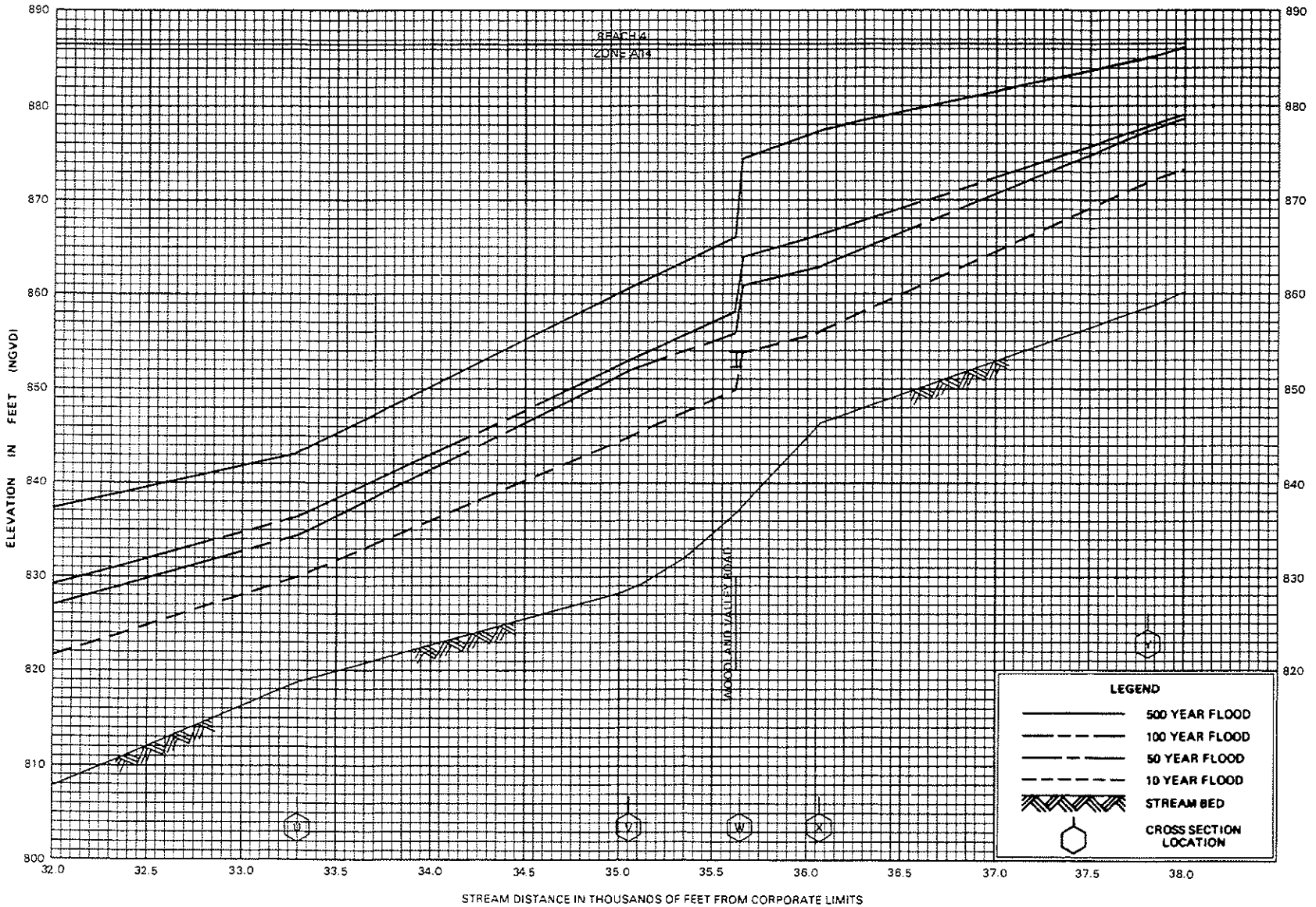
ESOPUS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF SHANDAKEN, NY

(ULSTER CO.)

05P



FLOOD PROFILES

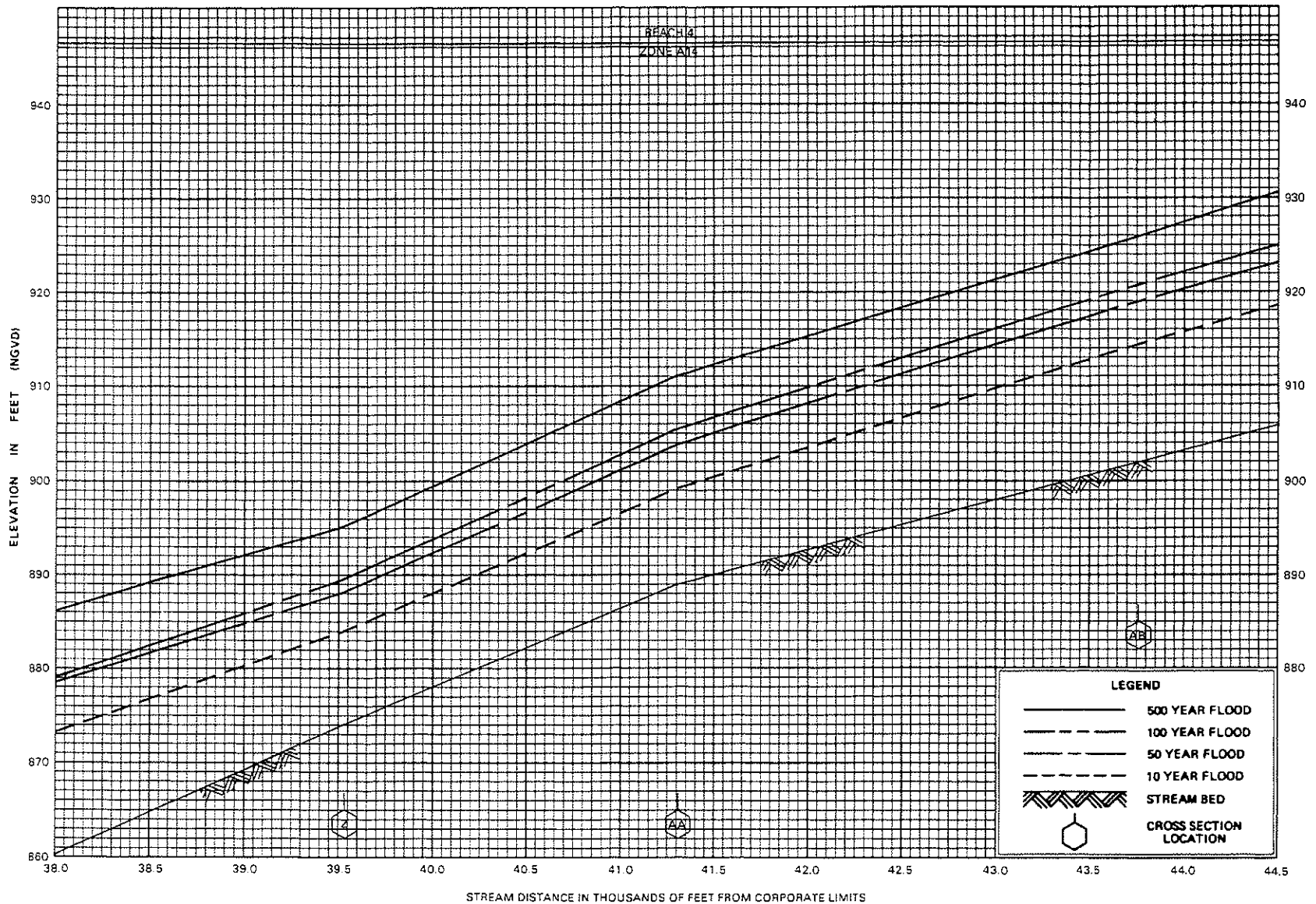
ESOPUS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF SHANDAKEN, NY

(ULSTER CO.)

06P



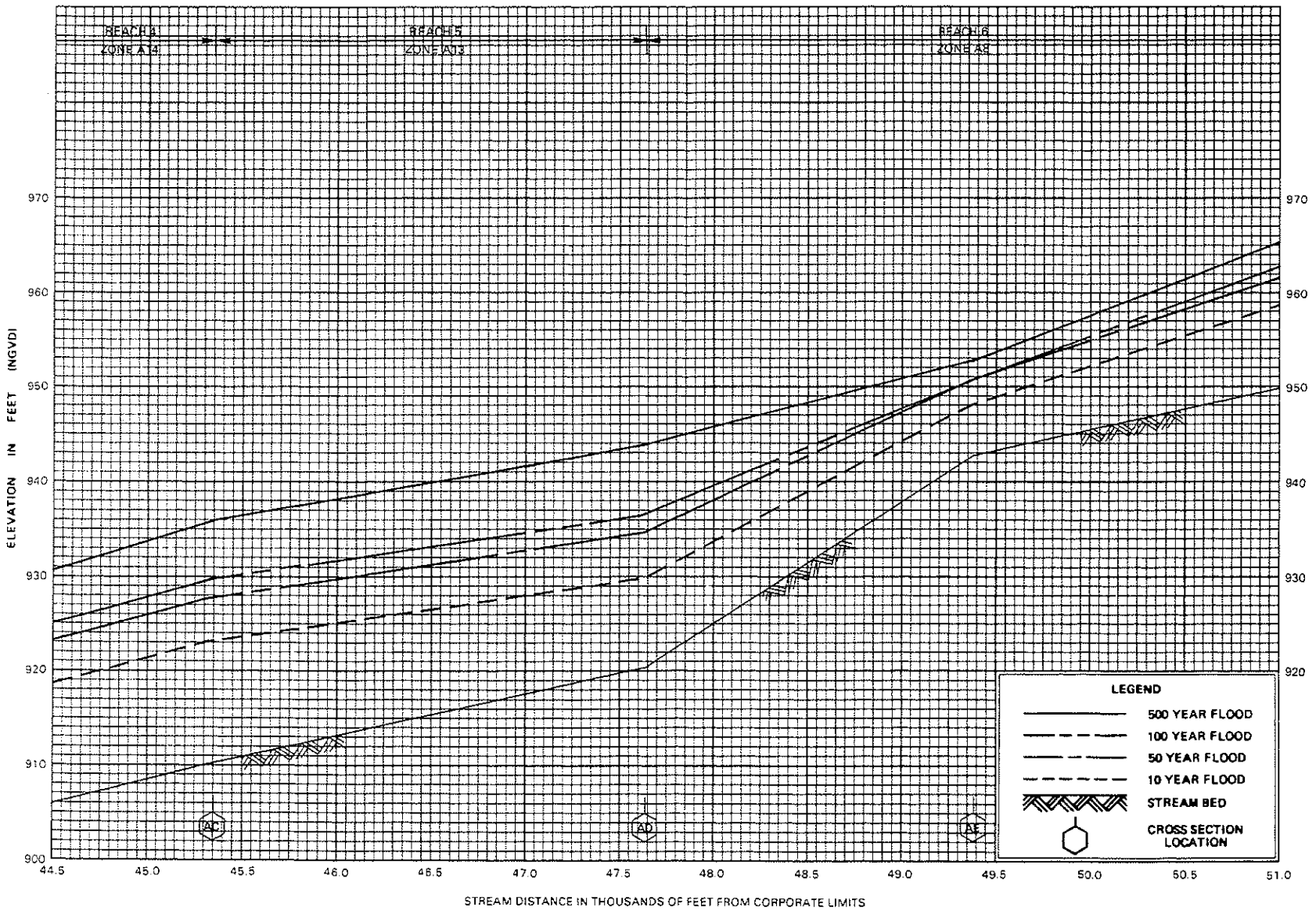
FLOOD PROFILES

ESOPUS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF SHANDAKEN, NY
(ULSTER CO.)

07P



FLOOD PROFILES

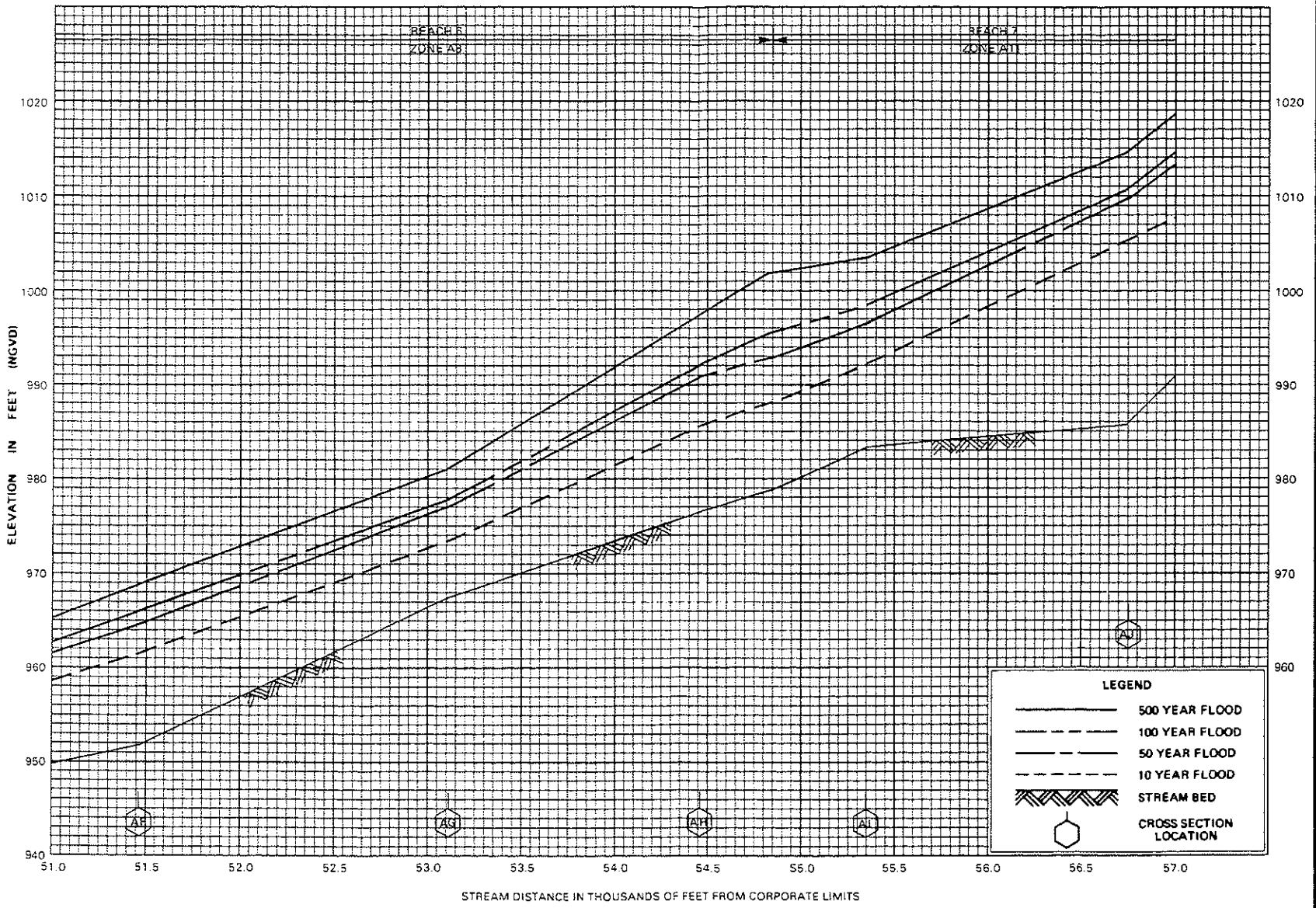
ESOPUS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF SHANDAKEN, NY

(ULSTER CO.)

08P



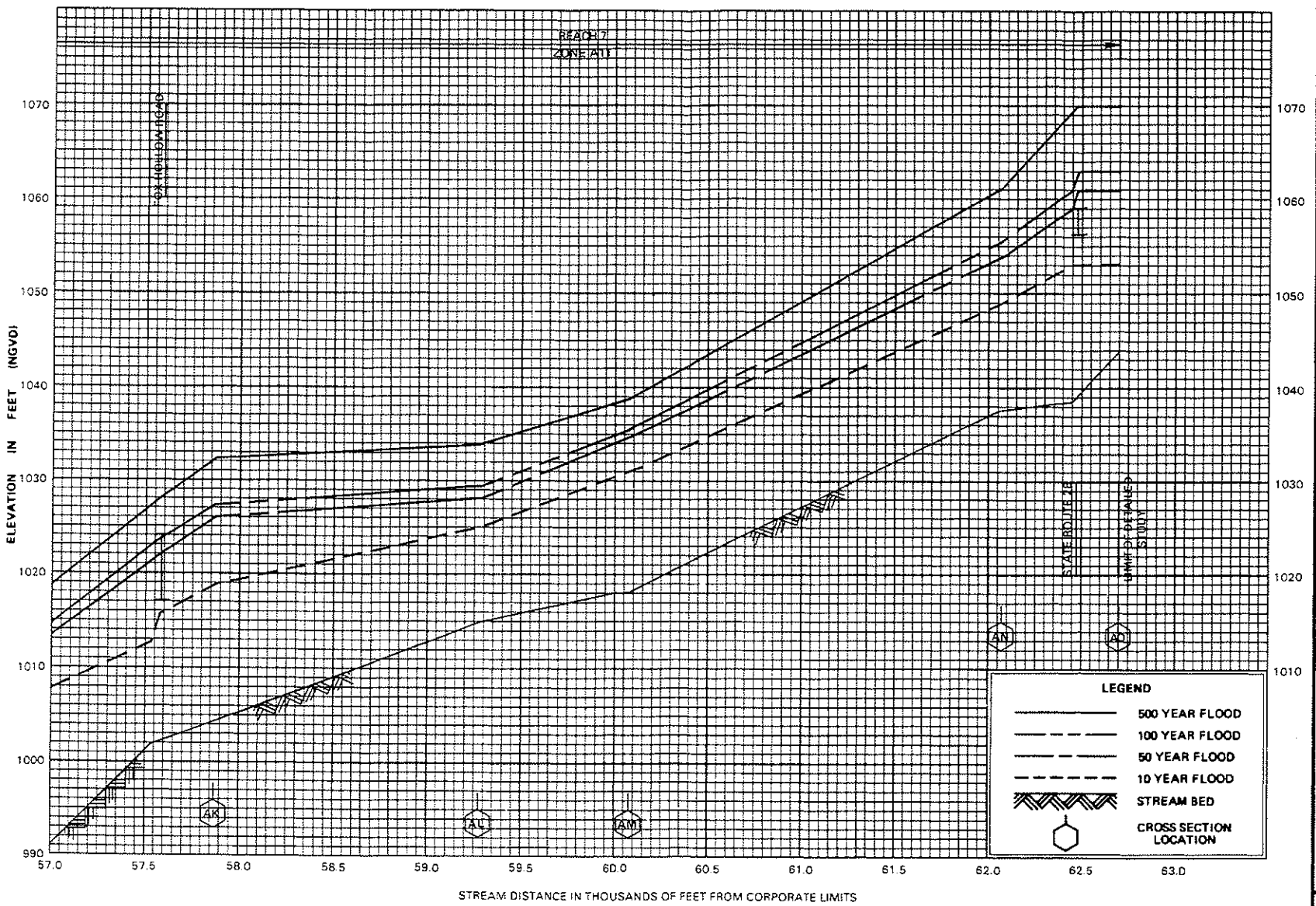
FLOOD PROFILES

ESOPUS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF SHANDAKEN, NY
(ULSTER CO.)

09P



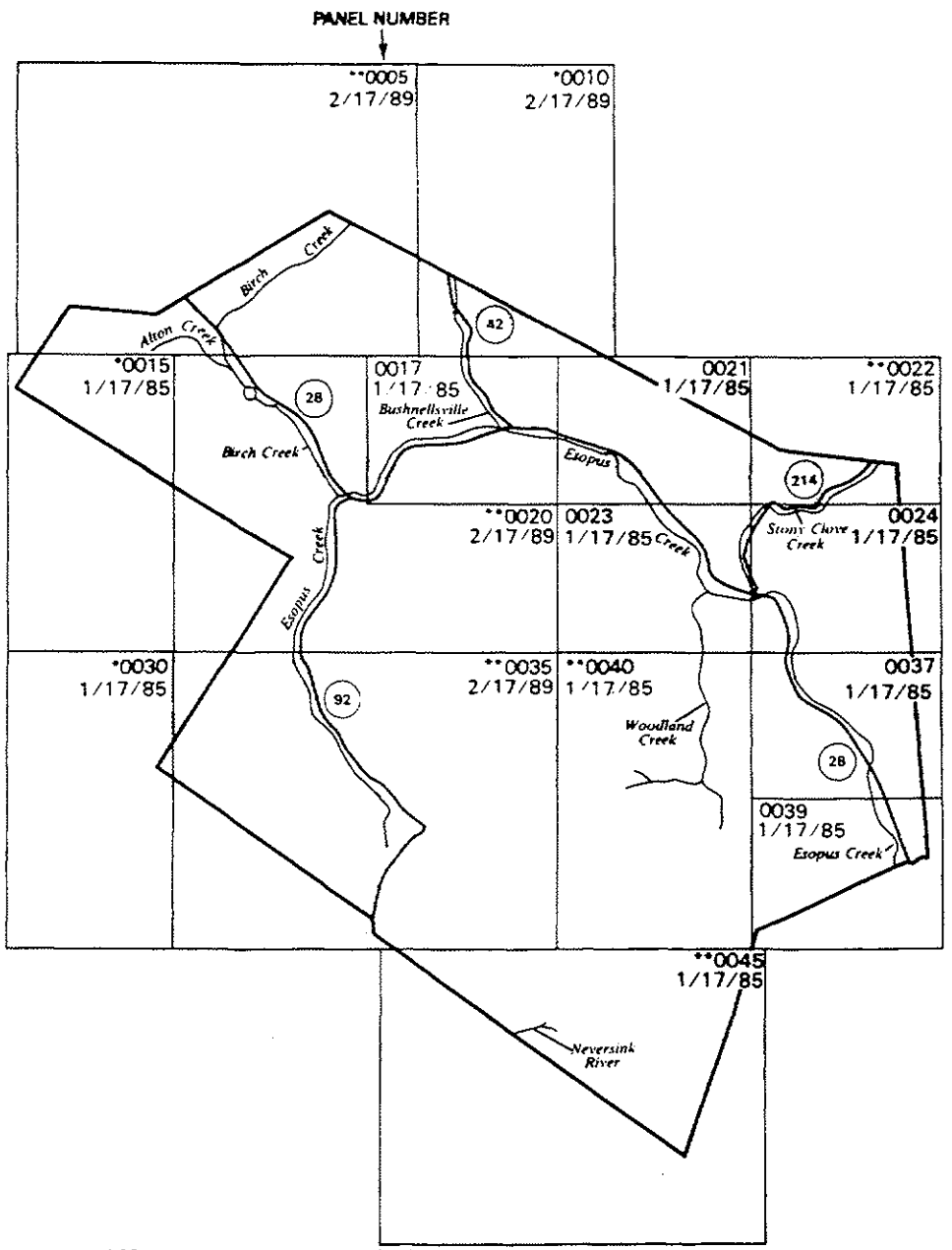
FLOOD PROFILES

ESOPUS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF SHANDAKEN, NY
(ULSTER CO.)

10P



*PANEL NOT PRINTED-AREA OUTSIDE FLOOD BOUNDARIES
** PANEL NOT PRINTED-NO FLOODWAY DELINEATED; FOR FLOOD BOUNDARIES, SEE CORRESPONDING FLOOD INSURANCE RATE MAP PANEL PUBLISHED SEPARATELY

NATIONAL FLOOD INSURANCE PROGRAM

FLOODWAY
FLOOD BOUNDARY AND FLOODWAY MAP

TOWN OF
SHANDAKEN,
NEW YORK
ULSTER COUNTY

MAP INDEX

PANELS PRINTED: 17, 21, 23, 24, 37, 39

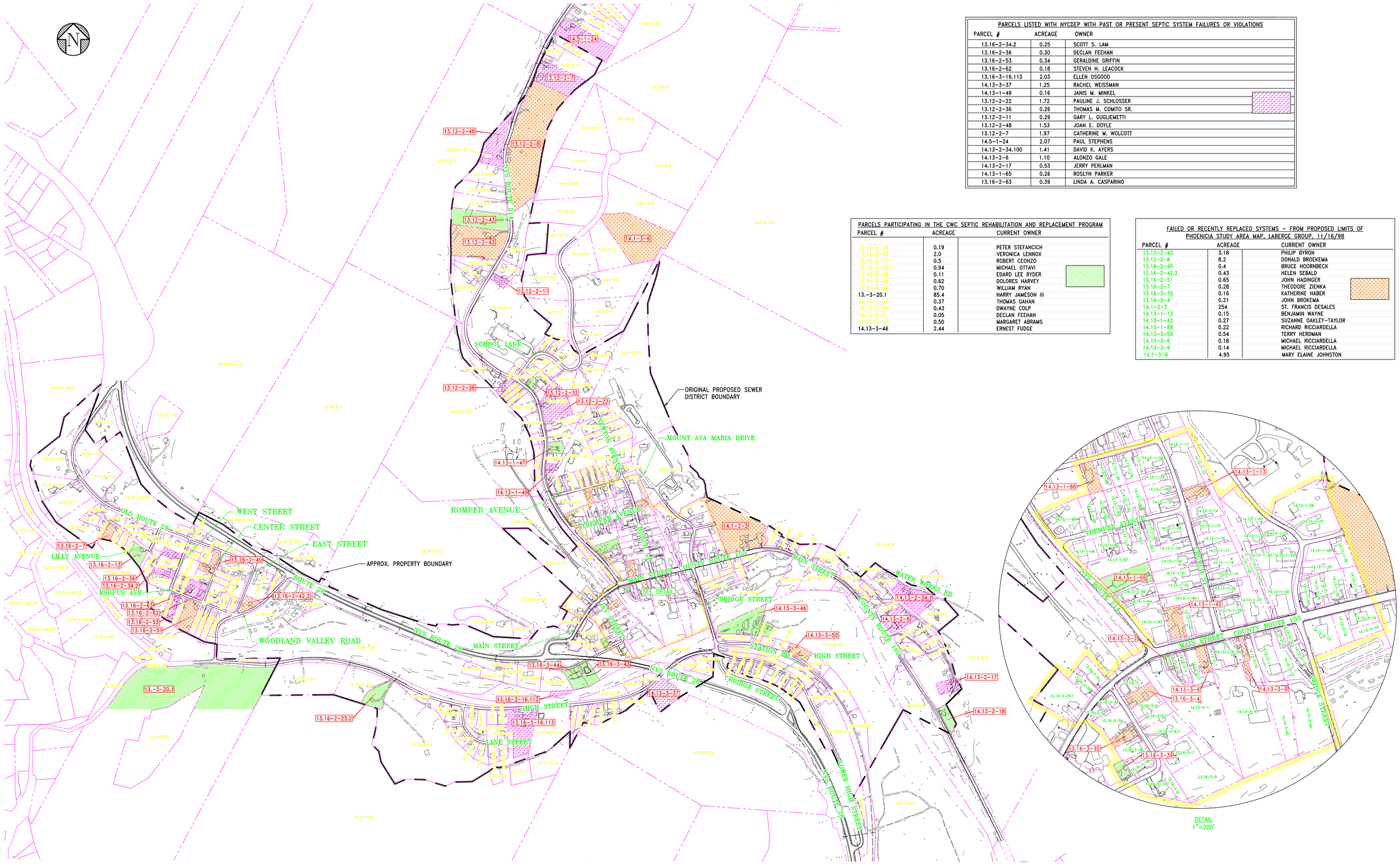
COMMUNITY-PANEL NUMBERS
360864 0001-0045

MAP REVISED:
FEBRUARY 17, 1989

Federal Emergency Management Agency

Exhibit 3.2.a.A

Septic Failures Map



PARCELS LISTED WITH NYCDEP WITH PAST OR PRESENT SEPTIC SYSTEM FAILURES OR VIOLATIONS

PARCEL #	ACREAGE	OWNER
13.16-2-34.2	0.25	SCOTT S. LAM
13.16-2-36	0.30	DECLAN FEEHAN
13.16-2-53	0.34	GERALDINE GRIFFIN
13.16-2-62	0.18	STEVEN H. LEACOCK
13.16-3-16.113	2.03	ELLEN OSGOOD
14.13-3-37	1.25	RACHEL WEISSMAN
14.13-1-49	0.16	JANIS M. MINKEL
13.12-2-22	1.72	PAULINE J. SCHLOSSER
13.12-2-36	0.26	THOMAS M. COMITO SR.
13.12-2-11	0.29	GARY L. GUGLIEMETTI
13.12-2-48	1.53	JOAN E. DOYLE
13.12-2-7	1.97	CATHERINE M. WOLCOTT
14.5-1-24	2.07	PAUL STEPHENS
14.13-2-34.100	1.41	DAVID K. AYERS
14.13-2-6	1.10	ALONZO GALE
14.13-2-17	0.53	JERRY PERLMAN
14.13-1-65	0.26	ROSLYN PARKER
13.16-2-63	0.39	LINDA A. CASPARINO

PARCELS PARTICIPATING IN THE CWC SEPTIC REHABILITATION AND REPLACEMENT PROGRAM

PARCEL #	ACREAGE	CURRENT OWNER
13.12-2-32	0.19	PETER STEFANCICH
13.12-2-43	2.0	VERONICA LENNOX
13.16-2-13	0.5	ROBERT CEONZO
13.16-2-23.2	0.94	MICHAEL OTTAVI
13.16-3-39	0.11	EDARD LEE RYDER
13.16-3-43	0.62	DOLORES HARVEY
13.16-3-44	0.70	WILLIAM RYAN
13.-3-20.1	85.4	HARRY JAMESON III
14.13-1-47	0.37	THOMAS GAHAN
14.13-1-66	0.43	DWAYNE COLP
14.13-3-2	0.05	DECLAN FEEHAN
14.13-2-18	0.50	MARGARET ABRAMS
14.13-3-46	2.44	ERNEST FUDGE

FAILED OR RECENTLY REPLACED SYSTEMS – FROM PROPOSED LIMITS OF PHOENICIA STUDY AREA MAP, LABERGE GROUP, 11/16/98

PARCEL #	ACREAGE	CURRENT OWNER
13.12-2-42	3.18	PHILIP BYRON
13.12-2-8	8.2	DONALD BROEKEMA
13.16-2-40	0.4	BRUCE HOORNBECK
13.16-2-42.2	0.43	HELEN SEBALD
13.16-2-51	0.65	JOHN HADINGER
13.16-2-7	0.28	THEODORE ZIENKA
13.16-3-35	0.16	KATHERINE HABER
13.16-3-4	0.21	JOHN BROKEMA
14.1-2-3	254	ST. FRANCIS DESALES
14.13-1-13	0.15	BENJAMIN WAYNE
14.13-1-42	0.27	SUZANNE OAKLEY-TAYLOR
14.13-1-88	0.22	RICHARD RICCIARDELLA
14.13-3-50	0.54	TERRY HERDMAN
14.13-3-6	0.18	MICHAEL RICCIARDELLA
14.13-3-9	0.14	MICHAEL RICCIARDELLA
14.1-3-6	4.95	MARY ELAINE JOHNSTON

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ISSUE	REV.	LOCATION	DATE	AP'D	REMARKS

ISSUE	REV.	LOCATION	DATE	AP'D	REMARKS

SCALE	1"=400'
DRAWN	MKS
DATE	2/08/11
DESIGNED	JRB
CHECKED	HL

PHOENICIA SEWER DISTRICT
NYCDEP NEW SEWAGE TREATMENT
INFRASTRUCTURE PROGRAM
ULSTER COUNTY NEW YORK STATE

SEPTIC FAILURES MAP

EXHIBIT 3.2.a.A

Lamont Engineers
ENGINEERS • PLANNERS • FACILITY OPERATIONS
548 MAIN ST., COBLESKILL, N.Y. 12043 (518) 234-4028

PROJECT NO.	FILE NAME	SHEET NO.
2010050	3.2.a.A_SEPT FAIL	EX. 3.2.a.A

Exhibit 3.2.b.A

Soils Mapping and Soils Descriptions

Map Scale: 1:12,300 if printed on D size (22" x 34") sheet.

Meters
0 50 100 200 300

Feet
0 300 600 1,200 1,800

N

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

Oceans

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

MAP INFORMATION

Map Scale: 1:12,300 if printed on D size (22" × 34") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

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: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Date(s) aerial images were photographed: 8/13/2006; 8/22/2006

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.

Map Unit Legend

Ulster County, New York (NY111)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
AA	Alluvial land	295.7	3.0%
ARF	Arnot-Oquaga-Rock outcrop complex, very steep	4,448.2	44.6%
Ba	Barbour loam	378.8	3.8%
BP	Borrow pit	17.5	0.2%
He	Haven loam	53.9	0.5%
HgD	Hoosic gravelly loam, 15 to 25 percent slopes	43.5	0.4%
HSF	Hoosic soils, very steep	31.9	0.3%
HwD	Hudson and Schoharie soils, 15 to 25 percent slopes	115.5	1.2%
HXE	Hudson and Schoharie soils, steep	229.3	2.3%
LCD	Lackawanna and Swartswood very bouldery soils, moderately steep	743.2	7.5%
LCF	Lackawanna and Swartswood very bouldery soils, very steep	540.1	5.4%
LEE	Lackawanna and Swartswood extremely bouldery soils, steep	697.8	7.0%
OdB	Odessa silt loam, 3 to 8 percent slopes	14.4	0.1%
ORC	Oquaga-Arnot-Rock outcrop complex, sloping	230.1	2.3%
ORD	Oquaga-Arnot-Rock outcrop complex, moderately steep	530.7	5.3%
Re	Red Hook gravelly silt loam	8.5	0.1%
RXF	Rock outcrop-Arnot complex, very steep	148.0	1.5%
SaB	Schoharie silt loam, 3 to 8 percent slopes	42.1	0.4%
SaC	Schoharie silt loam, 8 to 15 percent slopes	198.9	2.0%
SdB	Scriba and Morris soils, 0 to 8 percent slopes	6.8	0.1%
SEB	Scriba and Morris very bouldery soils, gently sloping	5.0	0.0%
Su	Suncook loamy fine sand	161.1	1.6%
TkA	Tunkhannock gravelly loam, 0 to 3 percent slopes	100.3	1.0%
TkB	Tunkhannock gravelly loam, 3 to 8 percent slopes	158.1	1.6%
TkC	Tunkhannock gravelly loam, rolling	172.9	1.7%
TuB	Tunkhannock gravelly loam, clayey substratum, 3 to 8 percent slopes	6.2	0.1%
TuC	Tunkhannock gravelly loam, clayey substratum, 8 to 15 percent slopes	55.1	0.6%
VAB	Valois very bouldery soils, gently sloping	23.7	0.2%
VAD	Valois very bouldery soils, moderately steep	32.7	0.3%

Ulster County, New York (NY111)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
W	Water	104.2	1.0%
Wb	Wayland silt loam	4.3	0.0%
WLB	Wellsboro and Wurtsboro very bouldery soils, gently sloping	306.1	3.1%
WOB	Wellsboro and Wurtsboro extremely bouldery soils, gently sloping	63.0	0.6%
Totals for Area of Interest		**9,967.5**	**100.0%**

Phoenicia NIP
Perc & Permeability of Various Soil Types

Soil Name and Map Symbol	Depth (In)	Range of Permeability (µm/sec)		Range of Percolation* Rate (min./In)		Application Rate (gpd/sf)
AA (Alluvial Land)	0 to 5	1.4	141	302	3	Not suitable
	5 to 70	**0.42**	**141**	**1008**	**3**	**Not suitable**
Ba (Barbour)	0 to 6	4	14	106	30	0.2
	6 to 28	**14**	**42**	**30**	**10**	**0.6**
	28 to 60	42	141	10	3	0.9
SaC (Schoharie)	0 to 10	1.4	4	302	106	Not suitable
	10 to 36	**0.42**	**1.4**	**1008**	**302**	**Not suitable**
	36 - 50	0.42	1.4	1008	302	Not suitable
Su (Suncook)	0 to 3	42	141	10	3	0.9
	3 to 27	42	141	10	3	0.9
	27 to 36	**42**	**141**	**10**	**3**	**0.9**
	36 to 53	42	141	10	3	0.9
TkA, TkB, TkC (Tunkhannock)	0 to 7	14	42	30	10	0.6
	7 to 23	14	42	30	10	0.6
	23 to 30	**14**	**42**	**30**	**10**	**0.6**
	30 to 80	14	141	30	3	0.6
TuC (Tunkhannock)	0 to 7	14	42	30	10	0.6
	7 to 23	14	42	30	10	0.6
	23 to 30	**14**	**42**	**30**	**10**	**0.6**
	30 to 40	14	141	30	3	0.6
	40 to 80	0.01	0.4	42330	1058	Not suitable
WLB, WOB (Wellsboro and Wurtsboro)	0 to 9	4	14	106	30	0.2
	9 to16	4	14	106	30	0.2
	16 to 21	0.42	1.4	1008	302	Not suitable
	21 to 60	**0.42**	**1.4**	**1008**	**302**	**Not suitable**

*µm/sec $(hr/423.3min)^{-1}$ = min/inch

Component Legend

This report presents general information about the map units and map unit components in the selected area. It shows map unit symbols and names and the components in each map unit. It also shows the percent of the components in the map units, the kind of component, and the slope range of each component.

Report—Component Legend

Component Legend– Ulster County, New York						
Map unit symbol and name	Pct. of map unit	Component name	Component kind	Pct. slope		
				Low	RV	High
AA—Alluvial land						
	45	Fluvaquents	Taxon above family	0	2	3
	35	Udifluvents	Taxon above family	0	3	5
ARF—Arnot-Oquaga-Rock outcrop complex, very steep						
	40	Arnot	Series	35	53	70
	30	Oquaga	Series	35	48	60
	20	Rock outcrop	Miscellaneous area	35	48	60
Ba—Barbour loam						
	85	Barbour	Series	0	1	2
BP—Borrow pit						
	80	Borrow pit	Miscellaneous area	0	4	8
He—Haven loam						
	80	Haven	Series	0	2	3
HgD—Hoosic gravelly loam, 15 to 25 percent slopes						
	80	Hoosic	Series	15	20	25
HSF—Hoosic soils, very steep						
	80	Hoosic	Series	25	40	55
HwD—Hudson and Schoharie soils, 15 to 25 percent slopes						
	40	Hudson	Series	15	20	25
	35	Schoharie	Series	15	20	25
HXE—Hudson and Schoharie soils, steep						
	40	Hudson	Series	25	40	55
	35	Schoharie	Series	25	40	55

Component Legend– Ulster County, New York						
Map unit symbol and name	Pct. of map unit	Component name	Component kind	Pct. slope		
				Low	RV	High
LCD—Lackawanna and Swartswood very bouldery soils, moderately steep						
	40	Lackawanna	Series	15	20	25
	40	Swartswood	Series	15	20	25
LCF—Lackawanna and Swartswood very bouldery soils, very steep						
	40	Lackawanna	Series	35	43	50
	40	Swartswood	Series	35	43	50
LEE—Lackawanna and Swartswood extremely bouldery soils, steep						
	40	Lackawanna	Series	15	25	35
	35	Swartswood	Series	15	25	35
OdB—Odessa silt loam, 3 to 8 percent slopes						
	80	Odessa	Series	3	4	8
ORC—Oquaga-Arnot-Rock outcrop complex, sloping						
	35	Oquaga	Series	8	12	15
	30	Arnot	Series	8	12	15
	15	Rock outcrop	Miscellaneous area	8	12	15
ORD—Oquaga-Arnot-Rock outcrop complex, moderately steep						
	35	Oquaga	Series	15	25	35
	30	Arnot	Series	15	25	35
	15	Rock outcrop	Miscellaneous area	15	25	35
Re—Red Hook gravelly silt loam						
	80	Red hook	Series	0	2	3
RXF—Rock outcrop-Arnot complex, very steep						
	55	Rock outcrop	Miscellaneous area	35	53	70
	30	Arnot	Series	35	53	70
SaB—Schoharie silt loam, 3 to 8 percent slopes						
	80	Schoharie	Series	3	4	8
SaC—Schoharie silt loam, 8 to 15 percent slopes						
	80	Schoharie	Series	8	12	15

Component Legend– Ulster County, New York						
Map unit symbol and name	Pct. of map unit	Component name	Component kind	Pct. slope		
				Low	RV	High
SdB—Scriba and Morris soils, 0 to 8 percent slopes						
	40	Scriba	Series	0	4	8
	40	Morris	Series	0	4	8
SEB—Scriba and Morris very bouldery soils, gently sloping						
	40	Scriba	Series	0	5	10
	40	Morris	Series	0	5	10
Su—Suncook loamy fine sand						
	80	Suncook	Series	0	2	3
TkA—Tunkhannock gravelly loam, 0 to 3 percent slopes						
	80	Tunkhannock	Series	0	2	3
TkB—Tunkhannock gravelly loam, 3 to 8 percent slopes						
	80	Tunkhannock	Series	3	6	8
TkC—Tunkhannock gravelly loam, rolling						
	80	Tunkhannock	Series	5	11	16
TuB—Tunkhannock gravelly loam, clayey substratum, 3 to 8 percent slopes						
	80	Tunkhannock, clayey substratum	Taxadjunct	3	6	8
TuC—Tunkhannock gravelly loam, clayey substratum, 8 to 15 percent slopes						
	80	Tunkhannock, clayey substratum	Taxadjunct	8	12	15
VAB—Valois very bouldery soils, gently sloping						
	80	Valois	Series	3	6	8
VAD—Valois very bouldery soils, moderately steep						
	75	Valois	Series	15	20	25
W—Water						
	100	Water	Miscellaneous area			
Wb—Wayland silt loam						
	80	Wayland	Series	0	1	1
WLB—Wellsboro and Wurtsboro very bouldery soils, gently sloping						
	40	Wellsboro	Series	3	9	15
	40	Wurtsboro	Series	3	9	15

Component Legend– Ulster County, New York						
Map unit symbol and name	Pct. of map unit	Component name	Component kind	Pct. slope		
				Low	RV	High
WOB—Wellsboro and Wurtsboro extremely bouldery soils, gently sloping						
	40	Wellsboro	Series	3	9	15
	40	Wurtsboro	Series	3	9	15

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Report—Engineering Properties

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash.

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
AA—Alluvial land												
Fluvaquents	0-5	*Gravelly silt loam	CL, GM, ML, SM	A-1, A-2, A-4	0	0-10	60-100	55-100	30-100	10-90	15-25	NP-15
	5-70	*Gravelly silt loam, Very gravelly sand, silty clay loam	GC, ML, SC-SM, CL	A-4, A-1, A-2, A-6	0	0-15	35-100	30-100	15-100	5-90	15-30	NP-20
Udifluvents	0-4	*Gravelly loam	ML, SC, CL, GM	A-4, A-1, A-2	0	0-10	60-80	55-75	30-75	10-65	15-25	NP-20
	4-70	*Gravelly sandy loam, Very gravelly sand, loam	GC, CL, SM, ML	A-2, A-4, A-6, A-1	0	0-15	35-100	30-100	15-100	5-90	15-30	NP-20

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
ARF—Arnot-Oquaga-Rock outcrop complex, very steep												
Arnot	0-1	*Moderately decomposed plant material	PT	A-8	0	0	100	100	—	—	—	NP
	1-4	*Channery silt loam	ML, SM, GM	A-2, A-4, A-5	0	5-10	60-85	55-80	45-80	30-70	35-45	1-9
	4-18	*Very channery silt loam, Very channery loam	GM	A-2, A-4, A-1	0	10-25	30-60	25-55	20-55	15-50	20-35	1-9
	18-22	*Unweathered bedrock	—	—	0	0	—	—	—	—	—	—
Oquaga	0-3	*Moderately decomposed plant material	PT	A-8	0	0	100	100	—	—	—	NP
	3-8	*Channery silt loam	ML, SM, GM	A-4, A-5, A-2	0	5-20	60-85	40-70	35-70	25-65	35-45	2-7
	8-28	*Very channery loam, Very channery silt loam, channery loam	SM, GC-GM, GM, ML	A-4, A-1, A-2	0	10-25	35-70	25-60	20-60	15-55	20-30	2-7
	28-35	*Very gravelly loam, Very channery silt loam	ML, SM, GC-GM, GM	A-1, A-2, A-4	0	10-25	35-70	25-60	20-60	15-55	20-30	2-7
	35-39	*Unweathered bedrock	—	—	0	0	—	—	—	—	—	—
Rock outcrop	0-60	*Unweathered bedrock	—	—	0	0	—	—	—	—	—	—

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
Ba—Barbour loam												
Barbour	0-6	*Loam	SM, CL-ML, ML, SC-SM	A-4, A-2	0	0	80-100	75-100	50-95	30-90	15-25	2-7
	6-28	*Gravelly loam, Silt loam, gravelly fine sandy loam	SM, CL-ML, ML, SC-SM	A-2, A-4, A-1	0	0	60-100	55-95	30-95	15-85	15-25	2-7
	28-60	*Very gravelly sand, Sandy loam, gravelly loamy fine sand, fine sandy loam	SM, SP, GM, GW	A-1, A-2, A-3, A-4	0	0-5	35-95	30-95	20-80	2-40	0-20	NP-3
BP—Borrow pit												
Borrow pit	—	—	—	—	—	—	—	—	—	—	—	—
He—Haven loam												
Haven	0-11	*Loam	SM, ML	A-4	0	0	80-100	75-100	65-100	40-90	15-25	NP-4
	11-25	*Loam, Gravelly silt loam, very fine sandy loam	ML, SM	A-2, A-4	0	0	60-100	55-95	40-95	20-85	15-25	NP-4
	25-60	*Gravelly sand, Stratified sand to gravel	SM, SP, SW, GP	A-2, A-3, A-1	0	0-20	30-90	25-85	10-60	1-25	10-15	NP

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
HgD—Hoosic gravelly loam, 15 to 25 percent slopes												
Hoosic	0-8	*Gravelly loam	GM, ML, SM	A-1, A-2, A-4, A-5	0	5-10	55-80	50-70	30-70	15-60	30-45	2-10
	8-14	*Gravelly loam, Very gravelly fine sandy loam	GC-GM, GM, SM, SP-SM	A-1, A-2, A-4	0	5-10	40-75	35-65	20-60	10-45	20-30	2-8
	14-30	*Very gravelly loamy sand, Very gravelly sandy loam	GW, GP-GM, GM, SM	A-1	0	10-15	30-65	25-50	15-40	2-20	0-10	NP-1
	30-80	*Stratified extremely gravelly sand, Stratified very gravelly loamy sand, stratified extremely gravelly loamy sand	GM, SM, GW, GP-GM	A-1	0	10-15	30-65	25-50	15-40	2-20	0-10	NP

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
HSF—Hoosic soils, very steep												
Hoosic	0-8	*Gravelly sandy loam	GM, ML, SM	A-5, A-1, A-2, A-4	0	5-10	55-80	50-70	30-70	15-60	30-45	2-10
	8-14	*Gravelly loam, Very gravelly fine sandy loam	SM, SP-SM, GC-GM, GM	A-4, A-1, A-2	0	5-10	40-75	35-65	20-60	10-45	20-30	2-8
	14-30	*Very gravelly loamy sand, Very gravelly sandy loam	GM, SM, GW, GP-GM	A-1	0	10-15	30-65	25-50	15-40	2-20	0-10	NP-1
	30-80	*Stratified extremely gravelly sand, Stratified very gravelly loamy sand, stratified extremely gravelly loamy sand	SM, GW, GP-GM, GM	A-1	0	10-15	30-65	25-50	15-40	2-20	0-10	NP

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
HwD—Hudson and Schoharie soils, 15 to 25 percent slopes												
Hudson	0-7	*Silt loam	OL, CL, CL-ML, ML	A-4, A-6, A-7	0	0	95-100	95-100	85-100	65-95	25-48	5-19
	7-25	*Silty clay loam, Silty clay	CH, CL	A-6, A-7	0	0	95-100	90-100	80-100	80-100	35-65	15-35
	25-38	*Silty clay, Silty clay loam	CH, CL	A-7, A-6	0	0	95-100	90-100	80-100	80-100	35-65	15-35
	38-60	*Stratified silty clay to silt loam, Silt loam, clay	CH, CL	A-6, A-7	0	0	95-100	90-100	80-100	60-100	35-65	15-35
Schoharie	0-10	*Silt loam	CL, ML	A-6, A-7	0	0	100	95-100	80-100	65-95	35-50	10-25
	10-36	*Silty clay, Clay, silty clay loam	CL	A-6	0	0	100	95-100	90-100	80-100	25-40	10-25
	36-50	*Stratified silty clay to silty clay loam, Clay, silty clay	CL, CL-ML	A-4, A-6	0	0	100	95-100	90-100	80-100	20-35	6-20

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
HXE—Hudson and Schoharie soils, steep												
Hudson	0-7	*Silty clay loam	ML, OL, CL, CL-ML	A-7, A-4, A-6	0	0	95-100	95-100	85-100	65-95	25-48	5-19
	7-25	*Silty clay loam, Silty clay	CH, CL	A-6, A-7	0	0	95-100	90-100	80-100	80-100	35-65	15-35
	25-38	*Silty clay, Silty clay loam	CL, CH	A-6, A-7	0	0	95-100	90-100	80-100	80-100	35-65	15-35
	38-60	*Stratified silty clay to silt loam, Silt loam, clay	CH, CL	A-7, A-6	0	0	95-100	90-100	80-100	60-100	35-65	15-35
Schoharie	0-10	*Silt loam	ML, CL	A-7, A-6	0	0	100	95-100	80-100	65-95	35-50	10-25
	10-36	*Silty clay, Clay, silty clay loam	CL	A-6	0	0	100	95-100	90-100	80-100	25-40	10-25
	36-50	*Stratified silty clay to silty clay loam, Clay, silty clay	CL, CL-ML	A-4, A-6	0	0	100	95-100	90-100	80-100	20-35	6-20

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
LCD—Lackawanna and Swartswood very bouldery soils, moderately steep												
Lackawanna	0-2	*Moderately decomposed plant material	PT	A-8	0	0	100	100	—	—	—	—
	2-5	*Flaggy silt loam	ML, SM, CL, GM	A-2, A-4	0-5	0-20	65-92	50-75	40-70	30-60	15-35	1-14
	5-17	*Gravelly silt loam, Gravelly loam, flaggy silt loam	CL, GM, ML, SC	A-2, A-4, A-6	0	0-20	65-92	50-75	40-70	30-60	20-35	1-14
	17-49	*Gravelly loam, Channery silt loam, channery sandy loam	SC-SM, CL, GM, ML	A-4, A-6, A-2	0	0-20	65-85	50-70	30-70	15-55	15-35	1-12
	49-80	*Gravelly loam, Channery silt loam, channery sandy loam	CL, GM, ML, SC-SM	A-2, A-4, A-6	0	0-20	65-85	50-70	30-70	15-55	15-35	1-12
Swartswood	0-7	*Gravelly fine sandy loam	ML, SM	A-2, A-4, A-1	0-5	3-15	60-90	50-85	30-80	15-65	15-25	NP-6
	7-29	*Gravelly sandy loam, Channery loam, channery sandy loam	GM, ML, SM	A-4, A-1, A-2	0	0-25	60-90	50-90	30-85	15-65	15-25	NP-6
	29-60	*Very gravelly sandy loam, Very flaggy fine sandy loam, very channery loam	GW-GM, ML, SM, GM	A-4, A-1, A-2	0	5-25	50-80	35-80	20-70	10-60	15-20	NP-6

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
LCF—Lackawanna and Swartswood very bouldery soils, very steep												
Lackawanna	0-2	*Moderately decomposed plant material	PT	A-8	0	0	100	100	—	—	—	—
	2-5	*Flaggy silt loam	CL, GM, ML, SM	A-2, A-4	0-5	0-20	65-92	50-75	40-70	30-60	15-35	1-14
	5-17	*Gravelly silt loam, Gravelly loam, flaggy silt loam	ML, SC, CL, GM	A-2, A-4, A-6	0	0-20	65-92	50-75	40-70	30-60	20-35	1-14
	17-49	*Gravelly loam, Channery silt loam, channery sandy loam	ML, SC-SM, CL, GM	A-2, A-4, A-6	0	0-20	65-85	50-70	30-70	15-55	15-35	1-12
	49-80	*Gravelly loam, Channery silt loam, channery sandy loam	ML, SC-SM, CL, GM	A-4, A-6, A-2	0	0-20	65-85	50-70	30-70	15-55	15-35	1-12
Swartswood	0-7	*Gravelly fine sandy loam	ML, SM	A-1, A-2, A-4	0-5	3-15	60-90	50-85	30-80	15-65	15-25	NP-6
	7-29	*Gravelly sandy loam, Channery loam, channery sandy loam	ML, SM, GM	A-4, A-1, A-2	0	0-25	60-90	50-90	30-85	15-65	15-25	NP-6
	29-60	*Very gravelly sandy loam, Very flaggy fine sandy loam, very channery loam	SM, GM, GW-GM, ML	A-1, A-2, A-4	0	5-25	50-80	35-80	20-70	10-60	15-20	NP-6

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
LEE—Lackawanna and Swartswood extremely bouldery soils, steep												
Lackawanna	0-2	*Moderately decomposed plant material	PT	A-8	0	0	100	100	—	—	—	—
	2-5	*Flaggy silt loam	CL, GM, ML, SM	A-4, A-2	0-5	0-20	65-92	50-75	40-70	30-60	15-35	1-14
	5-17	*Gravelly silt loam, Gravelly loam, channery silt loam	SC, CL, GM, ML	A-6, A-2, A-4	0	0-20	65-92	50-75	40-70	30-60	20-35	1-14
	17-49	*Gravelly loam, Channery silt loam, channery sandy loam	CL, GM, ML, SC-SM	A-2, A-4, A-6	0	0-20	65-85	50-70	30-70	15-55	15-35	1-12
	49-80	*Gravelly loam, Channery silt loam, channery sandy loam	GM, ML, SC-SM, CL	A-2, A-4, A-6	0	0-20	65-85	50-70	30-70	15-55	15-35	1-12
Swartswood	0-7	*Gravelly fine sandy loam	ML, SM	A-1, A-2, A-4	0-5	3-15	60-90	50-85	30-80	15-65	15-25	NP-6
	7-29	*Gravelly sandy loam, Channery loam, channery sandy loam	ML, SM, GM	A-2, A-4, A-1	0	0-25	60-90	50-90	30-85	15-65	15-25	NP-6
	29-60	*Very gravelly sandy loam, Very flaggy fine sandy loam, very channery loam	GM, GW-GM, ML, SM	A-1, A-2, A-4	0	5-25	50-80	35-80	20-70	10-60	15-20	NP-6

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
OdB—Odessa silt loam, 3 to 8 percent slopes												
Odessa	0-8	*Silt loam	CL, ML	A-6, A-7	0	0	100	95-100	80-100	65-95	35-50	12-20
	8-12	*Silty clay loam, Silt loam	CH, CL	A-6, A-7	0	0	100	95-100	90-100	80-100	35-60	20-35
	12-34	*Silty clay, Silty clay loam	CH, CL	A-6, A-7	0	0	100	95-100	90-100	80-100	35-60	20-35
	34-50	*Stratified silty clay to silty clay loam, Clay, silty clay loam	CH, CL	A-7, A-6	0	0	100	95-100	90-100	80-100	35-60	20-35

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
ORC—Oquaga-Arnot-Rock outcrop complex, sloping												
Oquaga	0-3	*Moderately decomposed plant material	PT	A-8	0	0	100	100	—	—	—	NP
	3-8	*Channery silt loam	SM, GM, ML	A-5, A-2, A-4	0	5-20	50-85	40-70	35-70	25-65	35-45	2-7
	8-28	*Very channery loam, Very channery silt loam, channery loam	GC-GM, GM, ML, SM	A-4, A-1, A-2	0	10-25	35-70	25-60	20-60	15-55	20-30	2-7
	28-35	*Very gravelly loam, Very channery silt loam	GM, ML, SM, GC-GM	A-4, A-1, A-2	0	10-25	35-70	25-60	20-60	15-55	20-30	2-7
	35-39	*Unweathered bedrock	—	—	0	0	—	—	—	—	—	—
Arnot	0-1	*Moderately decomposed plant material	PT	A-8	0	0	100	100	—	—	—	NP
	1-4	*Channery silt loam	GM, ML, SM	A-4, A-5, A-2	0	5-10	60-85	55-80	45-80	30-70	35-45	1-9
	4-18	*Very channery silt loam, Very channery loam	GM	A-4, A-1, A-2	0	10-25	30-60	25-55	20-55	15-50	20-35	1-9
	18-22	*Unweathered bedrock	—	—	0	0	—	—	—	—	—	—
Rock outcrop	0-60	*Unweathered bedrock	—	—	0	0	—	—	—	—	—	—

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
ORD—Oquaga-Arnot-Rock outcrop complex, moderately steep												
Oquaga	0-3	*Moderately decomposed plant material	PT	A-8	0	0	100	100	—	—	—	NP
	3-8	*Channery silt loam	SM, GM, ML	A-4, A-5, A-2	0	5-20	50-85	40-70	35-70	25-65	35-45	2-7
	8-28	*Very channery loam, Very channery silt loam, channery loam	SM, GC-GM, GM, ML	A-2, A-4, A-1	0	10-25	35-70	25-60	20-60	15-55	20-30	2-7
	28-35	*Very gravelly loam, Very channery silt loam	GC-GM, GM, ML, SM	A-2, A-4, A-1	0	10-25	35-70	25-60	20-60	15-55	20-30	2-7
	35-39	*Unweathered bedrock	—	—	0	0	—	—	—	—	—	—
Arnot	0-1	*Moderately decomposed plant material	PT	A-8	0	0	100	100	—	—	—	NP
	1-4	*Channery silt loam	SM, GM, ML	A-4, A-5, A-2	0	5-10	60-85	55-80	45-80	30-70	35-45	1-9
	4-18	*Very channery silt loam, Very channery loam	GM	A-1, A-2, A-4	0	10-25	30-60	25-55	20-55	15-50	20-35	1-9
	18-22	*Unweathered bedrock	—	—	0	0	—	—	—	—	—	—
Rock outcrop	0-60	*Unweathered bedrock	—	—	0	0	—	—	—	—	—	—

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
Re—Red Hook gravelly silt loam												
Red hook	0-8	*Gravelly silt loam	ML, SM, CL-ML, GC	A-4, A-6, A-2	0	0-5	60-80	55-75	40-75	25-65	15-30	1-15
	8-14	*Gravelly silt loam, Loam, very gravelly sandy loam	GC, ML, SC-SM, SM	A-2, A-4, A-6, A-1	0	0-5	30-90	25-85	15-80	10-70	15-30	1-15
	14-30	*Gravelly loam, Silt loam, very gravelly sandy loam	GC, ML, SC-SM, SM	A-4, A-6, A-1, A-2	0	0-5	30-90	25-85	15-80	10-70	15-30	1-15
	30-50	*Very gravelly sandy loam, Very gravelly loam, gravelly silt loam, very gravelly loamy sand	GM, ML, GC, SM	A-6, A-1, A-2, A-4	0	5-10	30-80	25-75	15-75	10-70	15-30	1-15
RXF—Rock outcrop-Arnot complex, very steep												
Rock outcrop	0-60	*Unweathered bedrock	—	—	0	0	—	—	—	—	—	—
Arnot	0-1	*Moderately decomposed plant material	PT	A-8	0	0	100	100	—	—	—	NP
	1-4	*Channery silt loam	GM, ML, SM	A-5, A-2, A-4	0	5-10	60-85	55-80	45-80	30-70	35-45	1-9
	4-18	*Very channery silt loam, Very channery loam	GM	A-1, A-2, A-4	0	10-25	30-60	25-55	20-55	15-50	20-35	1-9
	18-22	*Unweathered bedrock	—	—	0	0	—	—	—	—	—	—

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
SaB—Schoharie silt loam, 3 to 8 percent slopes												
Schoharie	0-10	*Silt loam	CL, ML	A-6, A-7	0	0	100	95-100	80-100	65-95	35-50	10-25
	10-36	*Silty clay, Clay, silty clay loam	CL	A-6	0	0	100	95-100	90-100	80-100	25-40	10-25
	36-50	*Stratified silty clay to silty clay loam, Clay, silty clay	CL, CL-ML	A-4, A-6	0	0	100	95-100	90-100	80-100	20-35	6-20
SaC—Schoharie silt loam, 8 to 15 percent slopes												
Schoharie	0-10	*Silt loam	ML, CL	A-6, A-7	0	0	100	95-100	80-100	65-95	35-50	10-25
	10-36	*Silty clay, Clay, silty clay loam	CL	A-6	0	0	100	95-100	90-100	80-100	25-40	10-25
	36-50	*Stratified silty clay to silty clay loam, Clay, silty clay	CL, CL-ML	A-4, A-6	0	0	100	95-100	90-100	80-100	20-35	6-20

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
SdB—Scriba and Morris soils, 0 to 8 percent slopes												
Morris	0-6	*Flaggy silt loam	ML, SM, CL-ML, GM	A-2, A-4	0	3-20	60-95	55-85	40-80	30-70	20-30	1-10
	6-13	*Flaggy silt loam, Gravelly loam, channery silt loam	ML, SM, CL-ML, GM	A-2, A-4	0	0-20	60-95	45-80	40-80	25-75	15-25	NP-9
	13-65	*Gravelly loam, Channery silt loam, very channery silty clay loam	ML, SM, CL-ML, GM	A-4, A-2	0	0-20	60-95	45-80	40-80	25-75	15-25	NP-9
	65-80	*Gravelly loam, Very channery silt loam	SM, CL-ML, GM, ML	A-4, A-2	0	0-20	60-95	45-80	40-80	25-75	15-25	NP-9
Scriba	0-9	*Gravelly fine sandy loam	GM, ML, SM, CL-ML	A-1, A-2, A-4	0	0-5	55-80	50-75	40-75	20-70	15-20	NP-5
	9-13	*Gravelly fine sandy loam, Gravelly silt loam	GM, ML, SM, CL-ML	A-1, A-2, A-4	0	0-5	35-75	30-70	20-65	15-60	15-20	NP-5
	13-50	*Gravelly fine sandy loam, Very gravelly sandy loam, gravelly silt loam	GM, ML, SM, CL-ML	A-1, A-2, A-4	0	0-5	35-75	30-70	20-65	15-60	15-20	NP-5
	50-65	*Gravelly fine sandy loam, Very gravelly sandy loam, gravelly silt loam	SM, CL-ML, GM, ML	A-2, A-4, A-1	0	5-10	35-75	30-70	20-65	15-60	15-20	NP-5

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
SEB—Scriba and Morris very bouldery soils, gently sloping												
Morris	0-6	*Flaggy silt loam	GM, ML, SM, CL-ML	A-2, A-4	0-5	3-20	60-95	55-85	40-80	30-70	20-30	1-10
	6-13	*Flaggy silt loam, Gravelly loam, channery silt loam	SM, CL-ML, GM, ML	A-2, A-4	0	0-20	60-95	45-80	40-80	25-75	15-25	NP-9
	13-65	*Gravelly loam, Channery silt loam, very channery silty clay loam	ML, SM, CL-ML, GM	A-2, A-4	0	0-20	60-95	45-80	40-80	25-75	15-25	NP-9
	65-80	*Gravelly loam, Very channery silt loam	ML, SM, CL-ML, GM	A-2, A-4	0	0-20	60-95	45-80	40-80	25-75	15-25	NP-9
Scriba	0-9	*Gravelly fine sandy loam	SM, CL-ML, GM, ML	A-1, A-2, A-4	0-5	5-10	55-80	50-75	40-75	20-70	15-20	NP-5
	9-13	*Gravelly fine sandy loam, Gravelly silt loam	ML, SM, CL-ML, GM	A-1, A-2, A-4	0	0-5	35-75	30-70	20-65	15-60	15-20	NP-5
	13-50	*Gravelly fine sandy loam, Very gravelly sandy loam, gravelly silt loam	SM, CL-ML, GM, ML	A-4, A-1, A-2	0	0-5	35-75	30-70	20-65	15-60	15-20	NP-5
	50-65	*Gravelly fine sandy loam, Very gravelly sandy loam, gravelly silt loam	ML, SM, CL-ML, GM	A-2, A-4, A-1	0	5-10	35-75	30-70	20-65	15-60	15-20	NP-5

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
Su—Suncook loamy fine sand												
Suncook	0-3	*Loamy fine sand	SM	A-2	0	0	95-100	85-100	45-85	15-35	0-10	NP
	3-27	*Loamy fine sand, Loamy sand	SM, SP	A-2, A-3, A-1	0	0	90-100	70-100	20-85	0-35	0-10	NP
	27-36	*Stratified loamy fine sand to fine sand, Loamy sand	SM, SP	A-1, A-2, A-3	0	0	90-100	70-100	20-85	0-35	0-10	NP
	36-53	*Loamy fine sand, Sand	SP, SM	A-1, A-2, A-3	0	0	90-100	70-100	20-85	0-35	0-10	NP
TkA—Tunkhannock gravelly loam, 0 to 3 percent slopes												
Tunkhannock	0-7	*Gravelly loam	SM, GM, ML	A-2, A-4	0	0-20	60-95	55-90	45-70	30-55	15-25	NP-3
	7-23	*Gravelly loam, Cobbly silt loam, very gravelly sandy loam	SM, SP-SM, GM	A-1, A-2, A-4	0	0-35	40-80	25-75	20-60	10-45	15-25	NP-3
	23-30	*Very gravelly loam, Cobbly silt loam, very gravelly sandy loam	SP-SM, GM, SM	A-2, A-4, A-1	0	0-35	40-80	25-75	20-60	10-45	15-25	NP-3
	30-80	*Error, Gravelly sandy loam, very gravelly loamy sand	SP-SM, GW-GM, GM, GP-GM	A-3, A-1, A-2	0	3-25	30-80	25-70	15-55	5-15	15-20	NP-2

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
TkB—Tunkhannock gravelly loam, 3 to 8 percent slopes												
Tunkhannock	0-7	*Gravelly loam	GM, ML, SM	A-4, A-2	0	0-20	60-95	55-90	45-70	30-55	15-25	NP-3
	7-23	*Gravelly loam, Cobbly silt loam, very gravelly sandy loam	GM, SM, SP-SM	A-4, A-1, A-2	0	0-35	40-80	25-75	20-60	10-45	15-25	NP-3
	23-30	*Very gravelly loam, Cobbly silt loam, very gravelly sandy loam	GM, SM, SP-SM	A-4, A-1, A-2	0	0-35	40-80	25-75	20-60	10-45	15-25	NP-3
	30-80	*Error, Gravelly sandy loam, very gravelly loamy sand	GW-GM, GM, GP-GM, SP-SM	A-3, A-1, A-2	0	5-35	30-80	25-70	15-55	5-15	15-20	NP-2
TkC—Tunkhannock gravelly loam, rolling												
Tunkhannock	0-7	*Gravelly loam	ML, SM, GM	A-2, A-4	0	0-20	60-95	55-90	45-70	30-55	15-25	NP-3
	7-23	*Gravelly loam, Cobbly silt loam, very gravelly sandy loam	GM, SM, SP-SM	A-4, A-1, A-2	0	0-35	40-80	25-75	20-60	10-45	15-25	NP-3
	23-30	*Very gravelly loam, Cobbly silt loam, very gravelly sandy loam	SM, SP-SM, GM	A-1, A-2, A-4	0	0-35	40-80	25-75	20-60	10-45	15-25	NP-3
	30-80	*Error, Gravelly sandy loam, very gravelly loamy sand	GM, GP-GM, SP-SM, GW-GM	A-1, A-2, A-3	0	5-35	30-80	25-70	15-55	5-15	15-20	NP-2

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
TuB—Tunkhannock gravelly loam, clayey substratum, 3 to 8 percent slopes												
Tunkhannock, clayey substratum	0-7	*Gravelly loam	SM, GM, ML	A-2, A-4	0	0-20	60-95	55-90	45-70	30-55	15-25	NP-3
	7-23	*Gravelly loam, Cobbly silt loam, very gravelly sandy loam	GM, SM, SP-SM	A-4, A-1, A-2	0	0-35	40-80	25-75	20-60	10-45	15-25	NP-3
	23-30	*Very gravelly loam, Cobbly silt loam, very gravelly sandy loam	GM, SM, SP-SM	A-2, A-4, A-1	0	0-35	40-80	25-75	20-60	10-45	15-25	NP-3
	30-40	*Error, Very gravelly loamy sand, gravelly sandy loam	GP-GM, SP-SM, GW-GM, GM	A-3, A-1, A-2	0	5-35	30-80	25-70	15-55	5-15	15-20	NP-2
	40-80	*Silty clay, Silty clay loam	CL, CL-ML	A-4, A-6, A-7, A-5	0	0	100	100	95-100	90-95	25-55	5-25

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
TuC—Tunkhannock gravelly loam, clayey substratum, 8 to 15 percent slopes												
Tunkhannock, clayey substratum	0-7	*Gravelly loam	GM, ML, SM	A-4, A-2	0	0-20	60-95	55-90	45-70	30-55	15-25	NP-3
	7-23	*Gravelly loam, Cobbly silt loam, very gravelly sandy loam	GM, SM, SP-SM	A-2, A-4, A-1	0	0-35	40-80	25-75	20-60	10-45	15-25	NP-3
	23-30	*Very gravelly loam, Cobbly silt loam, very gravelly sandy loam	GM, SM, SP-SM	A-4, A-1, A-2	0	0-35	40-80	25-75	20-60	10-45	15-25	NP-3
	30-40	*Error, Very gravelly loamy sand, gravelly sandy loam	GM, GP-GM, SP-SM, GW-GM	A-1, A-2, A-3	0	5-35	30-80	25-70	15-55	5-15	15-20	NP-2
	40-80	*Silty clay, Silty clay loam	CL, CL-ML	A-6, A-5, A-7, A-4	0	0	100	100	95-100	90-95	25-55	5-25

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
VAB—Valois very bouldery soils, gently sloping												
Valois	0-2	*Moderately decomposed plant material	PT	A-8	0	0	100	100	—	—	—	NP
	2-13	*Gravelly loam	SM, GC-GM, GM, ML	A-4, A-1, A-2	0-5	0-10	55-80	50-75	35-75	20-70	20-40	1-12
	13-42	*Gravelly loam, Gravelly silt loam, gravelly sandy loam	GM, ML, SM, GC-GM	A-1, A-2, A-4	0-1	0-10	55-95	50-90	35-90	20-80	15-25	NP-5
	42-67	*Very gravelly sandy loam, Very gravelly loam, very gravelly fine sandy loam	GM, GW, GW-GM, GC-GM	A-1, A-2, A-4	0-1	0-15	20-60	15-55	10-50	4-40	15-25	NP-7

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
VAD—Valois very bouldery soils, moderately steep												
Valois	0-2	*Moderately decomposed plant material	PT	A-8	0	0	100	100	—	—	—	NP
	2-13	*Gravelly loam	SM, GC-GM, GM, ML	A-4, A-1, A-2	0-5	0-10	55-80	50-75	35-75	20-70	20-40	1-12
	13-42	*Gravelly loam, Gravelly silt loam, gravelly sandy loam	GC-GM, GM, ML, SM	A-1, A-2, A-4	0-1	0-10	55-95	50-90	35-90	20-80	15-25	NP-5
	42-67	*Very gravelly sandy loam, Very gravelly loam, very gravelly fine sandy loam	GC-GM, GM, GW, GW-GM	A-1, A-2, A-4	0-1	0-15	20-60	15-55	10-50	4-40	15-25	NP-7
W—Water												
Water	—	—	—	—	—	—	—	—	—	—	—	—
Wb—Wayland silt loam												
Wayland	0-5	*Silt loam	ML, OL	A-5, A-7	0	0	100	95-100	90-100	70-95	40-50	5-15
	5-24	*Silty clay loam, Silt loam	CL-ML, ML, CL	A-7, A-4, A-6	0	0	100	95-100	90-100	70-95	25-45	5-15
	24-60	*Silt loam, Fine sandy loam	CL-ML, GC, SC, CL	A-2, A-4	0	0	65-100	55-100	50-95	25-90	16-25	5-10

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
WLB—Wellsboro and Wurtsboro very bouldery soils, gently sloping												
Wellsboro	0-9	*Flaggy silt loam	CL-ML, ML, SM	A-2, A-4	0-5	3-10	70-100	65-100	60-95	30-90	15-35	NP-10
	9-16	*Flaggy silt loam, Channery silt loam, gravelly loam	GC-GM, ML, SM, CL-ML	A-2, A-4	0	0-15	70-100	60-100	55-95	30-70	15-30	NP-10
	16-21	*Gravelly loam, Channery sandy loam, gravelly silt loam	SC-SM, CL, GM, ML	A-2, A-4	0	0-20	55-90	45-90	35-80	25-60	15-30	NP-10
	21-60	*Gravelly loam, Channery sandy loam, gravelly silt loam	GM, ML, SC-SM, CL	A-2, A-4	0	0-20	55-90	45-90	35-80	25-60	15-30	NP-10
Wurtsboro	0-6	*Gravelly loam	GM, ML, SM	A-2, A-4	0-5	3-5	70-100	65-90	55-90	30-70	15-35	NP-6
	6-19	*Gravelly sandy loam, Fine sandy loam, channery loam	SM, GM	A-2, A-4	0	0-15	70-95	55-90	45-85	30-50	15-30	NP-6
	19-56	*Gravelly fine sandy loam, Very gravelly sandy loam, channery loam	SM, GM	A-1, A-2, A-4	0	0-20	50-95	35-90	30-80	20-50	15-25	NP-6

Engineering Properties– Ulster County, New York												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
WOB—Wellsboro and Wurtsboro extremely bouldery soils, gently sloping												
Wellsboro	0-9	*Flaggy silt loam	SM, CL-ML, ML	A-2, A-4	0-5	5-25	70-100	65-100	60-95	30-90	15-35	NP-10
	9-16	*Flaggy silt loam, Channery silt loam, gravelly loam	ML, SM, CL-ML, GC-GM	A-2, A-4	0	0-15	70-100	60-100	55-95	30-70	15-30	NP-10
	16-21	*Gravelly loam, Channery sandy loam, gravelly silt loam	CL, GM, ML, SC-SM	A-4, A-2	0	0-20	55-90	45-90	35-80	25-60	15-30	NP-10
	21-60	*Gravelly loam, Channery sandy loam, gravelly silt loam	ML, SC-SM, CL, GM	A-2, A-4	0	0-20	55-90	45-90	35-80	25-60	15-30	NP-10
Wurtsboro	0-6	*Gravelly loam	ML, SM, GM	A-4, A-2	0-5	15-25	70-100	65-90	55-90	30-70	15-35	NP-6
	6-19	*Gravelly sandy loam, Fine sandy loam, channery loam	GM, SM	A-2, A-4	0	0-15	70-95	55-90	45-85	30-50	15-30	NP-6
	19-56	*Gravelly fine sandy loam, Very gravelly sandy loam, channery loam	GM, SM	A-1, A-2, A-4	0	0-20	50-95	35-90	30-80	20-50	15-25	NP-6

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Map Unit Description

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description

Ulster County, New York

AA—Alluvial land

Map Unit Setting

Elevation: 100 to 3,000 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Fluvaquents and similar soils: 45 percent
Udifluvents and similar soils: 35 percent

Description of Fluvaquents

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Alluvium with highly variable texture

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.06 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 15 percent
Available water capacity: Moderate (about 6.1 inches)

Interpretive groups

Land capability (nonirrigated): 5w

Typical profile

0 to 5 inches: Gravelly silt loam
5 to 70 inches: Gravelly silt loam

Description of Udifluvents

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Alluvium with a wide range of texture

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.06 to 19.98 in/hr)
Depth to water table: About 24 to 72 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Low (about 5.9 inches)

Interpretive groups

Land capability (nonirrigated): 5w

Typical profile

0 to 4 inches: Gravelly loam
4 to 70 inches: Gravelly sandy loam

ARF—Arnot-Oquaga-Rock outcrop complex, very steep

Map Unit Setting

Elevation: 600 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Arnot and similar soils: 40 percent
Oquaga and similar soils: 30 percent
Rock outcrop: 20 percent

Description of Arnot

Setting

Landform: Hills, ridges, benches
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from acid sandstone, siltstone, and shale

Properties and qualities

Slope: 35 to 70 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.2 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 1 inches: Moderately decomposed plant material
1 to 4 inches: Channery silt loam
4 to 18 inches: Very channery silt loam
18 to 22 inches: Unweathered bedrock

Description of Oquaga

Setting

Landform: Hills, ridges, benches
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope

Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Channery loamy till with lithology dominated by reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 35 to 60 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.8 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 3 inches: Moderately decomposed plant material
3 to 8 inches: Channery silt loam
8 to 28 inches: Very channery loam
28 to 35 inches: Very gravelly loam
35 to 39 inches: Unweathered bedrock

Description of Rock Outcrop

Properties and qualities

Slope: 35 to 60 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 60 inches: Unweathered bedrock

Ba—Barbour loam

Map Unit Setting

Elevation: 250 to 1,500 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Barbour and similar soils: 85 percent

Description of Barbour

Setting

Landform: Flood plains

Landform position (two-dimensional): Summit
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy over sandy and gravelly alluvium derived mainly from areas of acid, reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water capacity: Moderate (about 6.0 inches)

Interpretive groups

Land capability (nonirrigated): 1

Typical profile

0 to 6 inches: Loam
6 to 28 inches: Gravelly loam
28 to 60 inches: Very gravelly sand

BP—Borrow pit

Map Unit Setting

Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Borrow pit: 80 percent

Description of Borrow Pit

Interpretive groups

Land capability (nonirrigated): 7s

He—Haven loam

Map Unit Setting

Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Haven and similar soils: 80 percent

Description of Haven

Setting

Landform: Outwash plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.3 inches)

Interpretive groups

Land capability (nonirrigated): 1

Typical profile

0 to 11 inches: Loam
11 to 25 inches: Loam
25 to 60 inches: Gravelly sand

HgD—Hoosic gravelly loam, 15 to 25 percent slopes

Map Unit Setting

Elevation: 100 to 1,100 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Hoosic and similar soils: 80 percent

Description of Hoosic

Setting

Landform: Deltas, outwash plains, terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy and gravelly glaciofluvial deposits

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.6 inches)

Interpretive groups
Land capability (nonirrigated): 4e

Typical profile
0 to 8 inches: Gravelly loam
8 to 14 inches: Gravelly loam
14 to 30 inches: Very gravelly loamy sand
30 to 80 inches: Stratified extremely gravelly sand

HSF—Hoosic soils, very steep

Map Unit Setting
Elevation: 100 to 1,100 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition
Hoosic and similar soils: 80 percent

Description of Hoosic

Setting
Landform: Deltas, outwash plains, terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy and gravelly glaciofluvial deposits

Properties and qualities
Slope: 25 to 55 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.6 inches)

Interpretive groups
Land capability (nonirrigated): 7e

Typical profile
0 to 8 inches: Gravelly sandy loam
8 to 14 inches: Gravelly loam

14 to 30 inches: Very gravelly loamy sand
30 to 80 inches: Stratified extremely gravelly sand

HwD—Hudson and Schoharie soils, 15 to 25 percent slopes

Map Unit Setting

Elevation: 300 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Hudson and similar soils: 40 percent
Schoharie and similar soils: 35 percent

Description of Hudson

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Riser
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Clayey and silty glaciolacustrine deposits

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Available water capacity: High (about 9.5 inches)

Interpretive groups

Land capability (nonirrigated): 4e

Typical profile

0 to 7 inches: Silt loam
7 to 25 inches: Silty clay loam
25 to 38 inches: Silty clay
38 to 60 inches: Stratified silty clay to silt loam

Description of Schoharie

Setting

Landform: Lake plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex

Parent material: Reddish clayey and silty glaciolacustrine deposits

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Moderate (about 7.6 inches)

Interpretive groups

Land capability (nonirrigated): 4e

Typical profile

0 to 10 inches: Silt loam
10 to 36 inches: Silty clay
36 to 50 inches: Stratified silty clay to silty clay loam

HXE—Hudson and Schoharie soils, steep

Map Unit Setting

Elevation: 300 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Hudson and similar soils: 40 percent
Schoharie and similar soils: 35 percent

Description of Hudson

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Riser
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Clayey and silty glaciolacustrine deposits

Properties and qualities

Slope: 25 to 55 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent

Available water capacity: High (about 9.5 inches)

Interpretive groups

Land capability (nonirrigated): 7e

Typical profile

0 to 7 inches: Silty clay loam
7 to 25 inches: Silty clay loam
25 to 38 inches: Silty clay
38 to 60 inches: Stratified silty clay to silt loam

Description of Schoharie

Setting

Landform: Lake plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Reddish clayey and silty glaciolacustrine deposits

Properties and qualities

Slope: 25 to 55 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Moderate (about 7.6 inches)

Interpretive groups

Land capability (nonirrigated): 7e

Typical profile

0 to 10 inches: Silt loam
10 to 36 inches: Silty clay
36 to 50 inches: Stratified silty clay to silty clay loam

LCD—Lackawanna and Swartswood very bouldery soils, moderately steep

Map Unit Setting

Elevation: 600 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Swartswood and similar soils: 40 percent
Lackawanna and similar soils: 40 percent

Description of Lackawanna

Setting

Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived from reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 17 to 36 inches to fragipan
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.4 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 2 inches: Moderately decomposed plant material
2 to 5 inches: Flaggy silt loam
5 to 17 inches: Gravelly silt loam
17 to 49 inches: Gravelly loam
49 to 80 inches: Gravelly loam

Description of Swartswood

Setting

Landform: Hills, till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from quartzite, conglomerate, and sandstone

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 36 inches to fragipan
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: About 19 to 35 inches
Frequency of flooding: None
Frequency of ponding: None

Available water capacity: Very low (about 2.9 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 7 inches: Gravelly fine sandy loam
7 to 29 inches: Gravelly sandy loam
29 to 60 inches: Very gravelly sandy loam

LCF—Lackawanna and Swartswood very bouldery soils, very steep

Map Unit Setting

Elevation: 600 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Swartswood and similar soils: 40 percent
Lackawanna and similar soils: 40 percent

Description of Lackawanna

Setting

Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived from reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 35 to 50 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 17 to 36 inches to fragipan
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.4 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 2 inches: Moderately decomposed plant material
2 to 5 inches: Flaggy silt loam
5 to 17 inches: Gravelly silt loam
17 to 49 inches: Gravelly loam

49 to 80 inches: Gravelly loam

Description of Swartswood

Setting

Landform: Hills, till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from quartzite, conglomerate, and sandstone

Properties and qualities

Slope: 35 to 50 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 36 inches to fragipan
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: About 19 to 35 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.9 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 7 inches: Gravelly fine sandy loam
7 to 29 inches: Gravelly sandy loam
29 to 60 inches: Very gravelly sandy loam

LEE—Lackawanna and Swartswood extremely bouldery soils, steep

Map Unit Setting

Elevation: 600 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Lackawanna and similar soils: 40 percent
Swartswood and similar soils: 35 percent

Description of Lackawanna

Setting

Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex

Parent material: Loamy till derived from reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 17 to 36 inches to fragipan
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.4 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 2 inches: Moderately decomposed plant material
2 to 5 inches: Flaggy silt loam
5 to 17 inches: Gravelly silt loam
17 to 49 inches: Gravelly loam
49 to 80 inches: Gravelly loam

Description of Swartswood

Setting

Landform: Hills, till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from quartzite, conglomerate, and sandstone

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 20 to 36 inches to fragipan
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: About 19 to 35 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.9 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 7 inches: Gravelly fine sandy loam
7 to 29 inches: Gravelly sandy loam
29 to 60 inches: Very gravelly sandy loam

OdB—Odessa silt loam, 3 to 8 percent slopes

Map Unit Setting

Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Odessa and similar soils: 80 percent

Description of Odessa

Setting

Landform: Lake plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Reddish clayey and silty glaciolacustrine deposits

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Moderate (about 7.1 inches)

Interpretive groups

Land capability (nonirrigated): 3w

Typical profile

0 to 8 inches: Silt loam
8 to 12 inches: Silty clay loam
12 to 34 inches: Silty clay
34 to 50 inches: Stratified silty clay to silty clay loam

ORC—Oquaga-Arnot-Rock outcrop complex, sloping

Map Unit Setting

Elevation: 600 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Oquaga and similar soils: 35 percent
Arnot and similar soils: 30 percent

Rock outcrop: 15 percent

Description of Oquaga

Setting

Landform: Hills, ridges, benches
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Channery loamy till with lithology dominated by reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.8 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 3 inches: Moderately decomposed plant material
3 to 8 inches: Channery silt loam
8 to 28 inches: Very channery loam
28 to 35 inches: Very gravelly loam
35 to 39 inches: Unweathered bedrock

Description of Arnot

Setting

Landform: Hills, ridges, benches
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from acid sandstone, siltstone, and shale

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.2 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 1 inches: Moderately decomposed plant material
1 to 4 inches: Channery silt loam
4 to 18 inches: Very channery silt loam
18 to 22 inches: Unweathered bedrock

Description of Rock Outcrop

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 60 inches: Unweathered bedrock

ORD—Oquaga-Arnot-Rock outcrop complex, moderately steep

Map Unit Setting

Elevation: 600 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Oquaga and similar soils: 35 percent
Arnot and similar soils: 30 percent
Rock outcrop: 15 percent

Description of Oquaga

Setting

Landform: Hills, ridges, benches
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Channery loamy till with lithology dominated by reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.8 inches)

Interpretive groups
Land capability (nonirrigated): 7s

Typical profile
0 to 3 inches: Moderately decomposed plant material
3 to 8 inches: Channery silt loam
8 to 28 inches: Very channery loam
28 to 35 inches: Very gravelly loam
35 to 39 inches: Unweathered bedrock

Description of Arnot

Setting
Landform: Hills, ridges, benches
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from acid sandstone, siltstone, and shale

Properties and qualities
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.2 inches)

Interpretive groups
Land capability (nonirrigated): 7s

Typical profile
0 to 1 inches: Moderately decomposed plant material
1 to 4 inches: Channery silt loam
4 to 18 inches: Very channery silt loam
18 to 22 inches: Unweathered bedrock

Description of Rock Outcrop

Properties and qualities
Slope: 15 to 35 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Interpretive groups
Land capability (nonirrigated): 7s

Typical profile

0 to 60 inches: Unweathered bedrock

Re—Red Hook gravelly silt loam

Map Unit Setting

Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Red hook and similar soils: 80 percent

Description of Red Hook

Setting

Landform: Valley trains, terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy glaciofluvial deposits

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water capacity: Low (about 4.9 inches)

Interpretive groups

Land capability (nonirrigated): 3w

Typical profile

0 to 8 inches: Gravelly silt loam
8 to 14 inches: Gravelly silt loam
14 to 30 inches: Gravelly loam
30 to 50 inches: Very gravelly sandy loam

RXF—Rock outcrop-Arnot complex, very steep

Map Unit Setting

Elevation: 1,000 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Rock outcrop: 55 percent
Arnot and similar soils: 30 percent

Description of Rock Outcrop

Properties and qualities

Slope: 35 to 70 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 60 inches: Unweathered bedrock

Description of Arnot

Setting

Landform: Hills, ridges, benches
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from acid sandstone, siltstone, and shale

Properties and qualities

Slope: 35 to 70 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.2 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 1 inches: Moderately decomposed plant material
1 to 4 inches: Channery silt loam
4 to 18 inches: Very channery silt loam
18 to 22 inches: Unweathered bedrock

SaB—Schoharie silt loam, 3 to 8 percent slopes

Map Unit Setting

Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F

Frost-free period: 110 to 200 days

Map Unit Composition

Schoharie and similar soils: 80 percent

Description of Schoharie

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Reddish clayey and silty glaciolacustrine deposits

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Moderate (about 7.6 inches)

Interpretive groups

Land capability (nonirrigated): 2e

Typical profile

0 to 10 inches: Silt loam
10 to 36 inches: Silty clay
36 to 50 inches: Stratified silty clay to silty clay loam

SaC—Schoharie silt loam, 8 to 15 percent slopes

Map Unit Setting

Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Schoharie and similar soils: 80 percent

Description of Schoharie

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Reddish clayey and silty glaciolacustrine deposits

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Moderate (about 7.6 inches)

Interpretive groups

Land capability (nonirrigated): 3e

Typical profile

0 to 10 inches: Silt loam
10 to 36 inches: Silty clay
36 to 50 inches: Stratified silty clay to silty clay loam

SdB—Scriba and Morris soils, 0 to 8 percent slopes

Map Unit Setting

Elevation: 600 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Morris and similar soils: 40 percent
Scriba and similar soils: 40 percent

Description of Scriba

Setting

Landform: Drumlins, till plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till dominated by sandstone, with lesser amounts of limestone and shale

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 12 to 18 inches to fragipan
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 17 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent

Available water capacity: Very low (about 1.2 inches)

Interpretive groups

Land capability (nonirrigated): 3w

Typical profile

0 to 9 inches: Gravelly fine sandy loam
9 to 13 inches: Gravelly fine sandy loam
13 to 50 inches: Gravelly fine sandy loam
50 to 65 inches: Gravelly fine sandy loam

Description of Morris

Setting

Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till derived from reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 12 to 22 inches to fragipan
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 1.3 inches)

Interpretive groups

Land capability (nonirrigated): 3w

Typical profile

0 to 6 inches: Flaggy silt loam
6 to 13 inches: Flaggy silt loam
13 to 65 inches: Gravelly loam
65 to 80 inches: Gravelly loam

SEB—Scriba and Morris very bouldery soils, gently sloping

Map Unit Setting

Elevation: 600 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Morris and similar soils: 40 percent
Scriba and similar soils: 40 percent

Description of Scriba

Setting

Landform: Drumlins, till plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till dominated by sandstone, with lesser amounts of limestone and shale

Properties and qualities

Slope: 0 to 10 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 12 to 18 inches to fragipan
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 17 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Very low (about 1.2 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 9 inches: Gravelly fine sandy loam
9 to 13 inches: Gravelly fine sandy loam
13 to 50 inches: Gravelly fine sandy loam
50 to 65 inches: Gravelly fine sandy loam

Description of Morris

Setting

Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till derived from reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 0 to 10 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 12 to 22 inches to fragipan
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None

Available water capacity: Very low (about 1.3 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 6 inches: Flaggy silt loam
6 to 13 inches: Flaggy silt loam
13 to 65 inches: Gravelly loam
65 to 80 inches: Gravelly loam

Su—Suncook loamy fine sand

Map Unit Setting

Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Suncook and similar soils: 80 percent

Description of Suncook

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy alluvium derived mainly from varying amounts of sandstone, conglomerate, granite, gneiss, and quartzite

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water capacity: Low (about 3.8 inches)

Interpretive groups

Land capability (nonirrigated): 3s

Typical profile

0 to 3 inches: Loamy fine sand
3 to 27 inches: Loamy fine sand
27 to 36 inches: Stratified loamy fine sand to fine sand
36 to 53 inches: Loamy fine sand

TkA—Tunkhannock gravelly loam, 0 to 3 percent slopes

Map Unit Setting

Elevation: 700 to 2,000 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Tunkhannock and similar soils: 80 percent

Description of Tunkhannock

Setting

Landform: Valley trains, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.6 inches)

Interpretive groups

Land capability (nonirrigated): 2s

Typical profile

0 to 7 inches: Gravelly loam
7 to 23 inches: Gravelly loam
23 to 30 inches: Very gravelly loam
30 to 80 inches: Error

TkB—Tunkhannock gravelly loam, 3 to 8 percent slopes

Map Unit Setting

Elevation: 700 to 2,000 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Tunkhannock and similar soils: 80 percent

Description of Tunkhannock

Setting

Landform: Valley trains, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.6 inches)

Interpretive groups

Land capability (nonirrigated): 2s

Typical profile

0 to 7 inches: Gravelly loam
7 to 23 inches: Gravelly loam
23 to 30 inches: Very gravelly loam
30 to 80 inches: Error

TkC—Tunkhannock gravelly loam, rolling

Map Unit Setting

Elevation: 700 to 2,000 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Tunkhannock and similar soils: 80 percent

Description of Tunkhannock

Setting

Landform: Valley trains, terraces
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread
Down-slope shape: Convex

Across-slope shape: Convex
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 5 to 16 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.6 inches)

Interpretive groups

Land capability (nonirrigated): 3e

Typical profile

0 to 7 inches: Gravelly loam
7 to 23 inches: Gravelly loam
23 to 30 inches: Very gravelly loam
30 to 80 inches: Error

TuB—Tunkhannock gravelly loam, clayey substratum, 3 to 8 percent slopes

Map Unit Setting

Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Tunkhannock, clayey substratum, and similar soils: 80 percent

Description of Tunkhannock, Clayey Substratum

Setting

Landform: Valley trains, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 40 to 72 inches to strongly contrasting textural stratification
Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 30 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Low (about 3.6 inches)

Interpretive groups
Land capability (nonirrigated): 2s

Typical profile
0 to 7 inches: Gravelly loam
7 to 23 inches: Gravelly loam
23 to 30 inches: Very gravelly loam
30 to 40 inches: Error
40 to 80 inches: Silty clay

TuC—Tunkhannock gravelly loam, clayey substratum, 8 to 15 percent slopes

Map Unit Setting
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition
Tunkhannock, clayey substratum, and similar soils: 80 percent

Description of Tunkhannock, Clayey Substratum

Setting
Landform: Valley trains, terraces
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from reddish sandstone, siltstone, and shale

Properties and qualities
Slope: 8 to 15 percent
Depth to restrictive feature: 40 to 72 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 30 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Low (about 3.6 inches)

Interpretive groups

Land capability (nonirrigated): 3e

Typical profile

0 to 7 inches: Gravelly loam
7 to 23 inches: Gravelly loam
23 to 30 inches: Very gravelly loam
30 to 40 inches: Error
40 to 80 inches: Silty clay

VAB—Valois very bouldery soils, gently sloping

Map Unit Setting

Elevation: 600 to 1,600 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Valois and similar soils: 80 percent

Description of Valois

Setting

Landform: Valley sides, lateral moraines, end moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from sandstone, siltstone, and shale

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Available water capacity: Moderate (about 6.2 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 2 inches: Moderately decomposed plant material
2 to 13 inches: Gravelly loam
13 to 42 inches: Gravelly loam
42 to 67 inches: Very gravelly sandy loam

VAD—Valois very bouldery soils, moderately steep

Map Unit Setting

Elevation: 600 to 1,600 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Valois and similar soils: 75 percent

Description of Valois

Setting

Landform: Valley sides, lateral moraines, end moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from sandstone, siltstone, and shale

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Available water capacity: Moderate (about 6.2 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 2 inches: Moderately decomposed plant material
2 to 13 inches: Gravelly loam
13 to 42 inches: Gravelly loam
42 to 67 inches: Very gravelly sandy loam

W—Water

Map Unit Setting

Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Water: 100 percent

Wb—Wayland silt loam

Map Unit Setting

Elevation: 200 to 1,500 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Wayland and similar soils: 80 percent

Description of Wayland

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Silty and clayey alluvium washed from uplands that contain some calcareous drift

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 1 percent
Available water capacity: High (about 9.4 inches)

Interpretive groups

Land capability (nonirrigated): 5w

Typical profile

0 to 5 inches: Silt loam
5 to 24 inches: Silty clay loam
24 to 60 inches: Silt loam

WLB—Wellsboro and Wurtsboro very bouldery soils, gently sloping

Map Unit Setting

Elevation: 1,100 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F

Frost-free period: 110 to 200 days

Map Unit Composition

Wurtsboro and similar soils: 40 percent
Wellsboro and similar soils: 40 percent

Description of Wellsboro

Setting

Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Loamy till derived mainly from reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 15 to 25 inches to fragipan
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 14 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.0 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 9 inches: Flaggy silt loam
9 to 16 inches: Flaggy silt loam
16 to 21 inches: Gravelly loam
21 to 60 inches: Gravelly loam

Description of Wurtsboro

Setting

Landform: Hills, till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Loamy till derived mainly from acid quartzite, conglomerate, and sandstone

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 17 to 28 inches to fragipan
Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 15 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.3 inches)

Interpretive groups
Land capability (nonirrigated): 6s

Typical profile
0 to 6 inches: Gravelly loam
6 to 19 inches: Gravelly sandy loam
19 to 56 inches: Gravelly fine sandy loam

WOB—Wellsboro and Wurtsboro extremely bouldery soils, gently sloping

Map Unit Setting
Elevation: 1,100 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition
Wurtsboro and similar soils: 40 percent
Wellsboro and similar soils: 40 percent

Description of Wellsboro

Setting
Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Loamy till derived mainly from reddish sandstone, siltstone, and shale

Properties and qualities
Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 15 to 25 inches to fragipan
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 14 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 1.9 inches)

Interpretive groups
Land capability (nonirrigated): 7s

Typical profile

0 to 9 inches: Flaggy silt loam
9 to 16 inches: Flaggy silt loam
16 to 21 inches: Gravelly loam
21 to 60 inches: Gravelly loam

Description of Wurtsboro

Setting

Landform: Hills, till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Loamy till derived mainly from acid quartzite, conglomerate, and sandstone

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 17 to 28 inches to fragipan
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 15 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.3 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 6 inches: Gravelly loam
6 to 19 inches: Gravelly sandy loam
19 to 56 inches: Gravelly fine sandy loam

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Map Unit Description (Brief, Generated)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

The Map Unit Description (Brief, Generated) report displays a generated description of the major soils that occur in a map unit. Descriptions of non-soil (miscellaneous areas) and minor map unit components are not included. This description is generated from the underlying soil attribute data.

Additional information about the map units described in this report is available in other Soil Data Mart reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the Soil Data Mart reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description (Brief, Generated)

Ulster County, New York

Map Unit: AA—Alluvial land

Component: Fluvaquents (45%)

The Fluvaquents component makes up 45 percent of the map unit. Slopes are 0 to 3 percent. This component is on flood plains. The parent material consists of alluvium with highly variable texture. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is frequently flooded. It is frequently ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, May, June, October, November, December. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 5w. This soil meets hydric criteria.

Component: Udifluvents (35%)

The Udifluvents component makes up 35 percent of the map unit. Slopes are 0 to 5 percent. This component is on flood plains. The parent material consists of alluvium with a wide range of texture. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is frequently flooded. It is not ponded. A seasonal zone of water saturation is at 48 inches during January, February, March, April, May, November, December. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 5w. This soil does not meet hydric criteria.

Map Unit: ARF—Arnot-Oquaga-Rock outcrop complex, very steep

Component: Arnot (40%)

The Arnot component makes up 40 percent of the map unit. Slopes are 35 to 70 percent. This component is on hills, ridges, benches. The parent material consists of loamy till derived mainly from acid sandstone, siltstone, and shale. Depth to a root restrictive layer, bedrock, lithic, is 10 to 20 inches. The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 50 percent. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria.

Component: Oquaga (30%)

The Oquaga component makes up 30 percent of the map unit. Slopes are 35 to 60 percent. This component is on hills, ridges, benches. The parent material consists of channery loamy till with lithology dominated by reddish sandstone, siltstone, and shale. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 50 percent. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria.

Component: Rock outcrop (20%)

Generated brief soil descriptions are created for major soil components. The Rock outcrop is a miscellaneous area.

Map Unit: Ba—Barbour loam

Component: Barbour (85%)

The Barbour component makes up 85 percent of the map unit. Slopes are 0 to 2 percent. This component is on flood plains. The parent material consists of loamy over sandy and gravelly alluvium derived mainly from areas of acid, reddish sandstone, siltstone, and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is occasionally flooded. It is not ponded. A seasonal zone of water saturation is at 54 inches during January, February, March, April. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 1. This soil does not meet hydric criteria.

Map Unit: BP—Borrow pit

Component: Borrow pit (80%)

Generated brief soil descriptions are created for major soil components. The Borrow pit is a miscellaneous area.

Map Unit: He—Haven loam

Component: Haven (80%)

The Haven component makes up 80 percent of the map unit. Slopes are 0 to 3 percent. This component is on outwash plains. The parent material consists of loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 1. This soil does not meet hydric criteria.

Map Unit: HgD—Hoosic gravelly loam, 15 to 25 percent slopes

Component: Hoosic (80%)

The Hoosic component makes up 80 percent of the map unit. Slopes are 15 to 25 percent. This component is on deltas, outwash plains, terraces. The parent material consists of sandy and gravelly glaciofluvial deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria.

Map Unit: HSF—Hoosic soils, very steep

Component: Hoosic (80%)

The Hoosic component makes up 80 percent of the map unit. Slopes are 25 to 55 percent. This component is on deltas, outwash plains, terraces. The parent material consists of sandy and gravelly glaciofluvial deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria.

Map Unit: HwD—Hudson and Schoharie soils, 15 to 25 percent slopes

Component: Hudson (40%)

The Hudson component makes up 40 percent of the map unit. Slopes are 15 to 25 percent. This component is on lake plains. The parent material consists of clayey and silty glaciolacustrine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 21 inches during January, February, March, April, November, December. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent.

Component: Schoharie (35%)

The Schoharie component makes up 35 percent of the map unit. Slopes are 15 to 25 percent. This component is on lake plains. The parent material consists of reddish clayey and silty glaciolacustrine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 27 inches during March, April. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 15 percent.

Map Unit: HXE—Hudson and Schoharie soils, steep

Component: Hudson (40%)

The Hudson component makes up 40 percent of the map unit. Slopes are 25 to 55 percent. This component is on lake plains. The parent material consists of clayey and silty glaciolacustrine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 21 inches during January, February, March, April, November, December. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent.

Component: Schoharie (35%)

The Schoharie component makes up 35 percent of the map unit. Slopes are 25 to 55 percent. This component is on lake plains. The parent material consists of reddish clayey and silty glaciolacustrine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 27 inches during March, April. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 15 percent.

Map Unit: LCD—Lackawanna and Swartswood very bouldery soils, moderately steep

Component: Lackawanna (40%)

The Lackawanna component makes up 40 percent of the map unit. Slopes are 15 to 25 percent. This component is on drumlinoid ridges, hills, till plains. The parent material consists of loamy till derived from reddish sandstone, siltstone, and shale. Depth to a root restrictive layer, fragipan, is 17 to 36 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 50 percent. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria.

Component: Swartswood (40%)

The Swartswood component makes up 40 percent of the map unit. Slopes are 15 to 25 percent. This component is on hills, till plains. The parent material consists of loamy till derived mainly from quartzite, conglomerate, and sandstone. Depth to a root restrictive layer, fragipan, is 20 to 36 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 24 inches during January, February, March, November, December. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria.

Map Unit: LCF—Lackawanna and Swartswood very bouldery soils, very steep

Component: Lackawanna (40%)

The Lackawanna component makes up 40 percent of the map unit. Slopes are 35 to 50 percent. This component is on drumlinoid ridges, hills, till plains. The parent material consists of loamy till derived from reddish sandstone, siltstone, and shale. Depth to a root restrictive layer, fragipan, is 17 to 36 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 50 percent. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria.

Component: Swartswood (40%)

The Swartswood component makes up 40 percent of the map unit. Slopes are 35 to 50 percent. This component is on hills, till plains. The parent material consists of loamy till derived mainly from quartzite, conglomerate, and sandstone. Depth to a root restrictive layer, fragipan, is 20 to 36 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 24 inches during January, February, March, November, December. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria.

Map Unit: LEE—Lackawanna and Swartswood extremely bouldery soils, steep

Component: Lackawanna (40%)

The Lackawanna component makes up 40 percent of the map unit. Slopes are 15 to 35 percent. This component is on drumlinoid ridges, hills, till plains. The parent material consists of loamy till derived from reddish sandstone, siltstone, and shale. Depth to a root restrictive layer, fragipan, is 17 to 36 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 50 percent. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria.

Component: Swartswood (35%)

The Swartswood component makes up 35 percent of the map unit. Slopes are 15 to 35 percent. This component is on hills, till plains. The parent material consists of loamy till derived mainly from quartzite, conglomerate, and sandstone. Depth to a root restrictive layer, fragipan, is 20 to 36 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 24 inches during January, February, March, November, December. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria.

Map Unit: OdB—Odessa silt loam, 3 to 8 percent slopes

Component: Odessa (80%)

The Odessa component makes up 80 percent of the map unit. Slopes are 3 to 8 percent. This component is on lake plains. The parent material consists of reddish clayey and silty glaciolacustrine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during January, February, March, April, May, December. Organic matter content in the surface horizon is about 6 percent. Nonirrigated land capability classification is 3w. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 15 percent.

Map Unit: ORC—Oquaga-Arnot-Rock outcrop complex, sloping

Component: Oquaga (35%)

The Oquaga component makes up 35 percent of the map unit. Slopes are 8 to 15 percent. This component is on hills, ridges, benches. The parent material consists of channery loamy till with lithology dominated by reddish sandstone, siltstone, and shale. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 50 percent. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria.

Component: Arnot (30%)

The Arnot component makes up 30 percent of the map unit. Slopes are 8 to 15 percent. This component is on hills, ridges, benches. The parent material consists of loamy till derived mainly from acid sandstone, siltstone, and shale. Depth to a root restrictive layer, bedrock, lithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 50 percent. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria.

Component: Rock outcrop (15%)

Generated brief soil descriptions are created for major soil components. The Rock outcrop is a miscellaneous area.

Map Unit: ORD—Oquaga-Arnot-Rock outcrop complex, moderately steep

Component: Oquaga (35%)

The Oquaga component makes up 35 percent of the map unit. Slopes are 15 to 35 percent. This component is on hills, ridges, benches. The parent material consists of channery loamy till with lithology dominated by reddish sandstone, siltstone, and shale. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 50 percent. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria.

Component: Arnot (30%)

The Arnot component makes up 30 percent of the map unit. Slopes are 15 to 35 percent. This component is on hills, ridges, benches. The parent material consists of loamy till derived mainly from acid sandstone, siltstone, and shale. Depth to a root restrictive layer, bedrock, lithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 50 percent. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria.

Component: Rock outcrop (15%)

Generated brief soil descriptions are created for major soil components. The Rock outcrop is a miscellaneous area.

Map Unit: Re—Red Hook gravelly silt loam

Component: Red Hook (80%)

The Red Hook component makes up 80 percent of the map unit. Slopes are 0 to 3 percent. This component is on valley trains, terraces. The parent material consists of loamy glaciofluvial deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during January, February, March, April, May, December. Organic matter content in the surface horizon is about 5 percent. Nonirrigated land capability classification is 3w. This soil does not meet hydric criteria.

Map Unit: RXF—Rock outcrop-Arnot complex, very steep

Component: Rock outcrop (55%)

Generated brief soil descriptions are created for major soil components. The Rock outcrop is a miscellaneous area.

Component: Arnot (30%)

The Arnot component makes up 30 percent of the map unit. Slopes are 35 to 70 percent. This component is on hills, ridges, benches. The parent material consists of loamy till derived mainly from acid sandstone, siltstone, and shale. Depth to a root restrictive layer, bedrock, lithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 50 percent. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria.

Map Unit: SaB—Schoharie silt loam, 3 to 8 percent slopes

Component: Schoharie (80%)

The Schoharie component makes up 80 percent of the map unit. Slopes are 3 to 8 percent. This component is on lake plains. The parent material consists of reddish clayey and silty glaciolacustrine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 27 inches during March, April. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 15 percent.

Map Unit: SaC—Schoharie silt loam, 8 to 15 percent slopes

Component: Schoharie (80%)

The Schoharie component makes up 80 percent of the map unit. Slopes are 8 to 15 percent. This component is on lake plains. The parent material consists of reddish clayey and silty glaciolacustrine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 27 inches during March, April. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 15 percent.

Map Unit: SdB—Scriba and Morris soils, 0 to 8 percent slopes

Component: Morris (40%)

The Morris component makes up 40 percent of the map unit. Slopes are 0 to 8 percent. This component is on drumlinoid ridges, hills, till plains. The parent material consists of loamy till derived from reddish sandstone, siltstone, and shale. Depth to a root restrictive layer, fragipan, is 12 to 22 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during January, February, March, November, December. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 3w. This soil does not meet hydric criteria.

Component: Scriba (40%)

The Scriba component makes up 40 percent of the map unit. Slopes are 0 to 8 percent. This component is on drumlins, till plains. The parent material consists of loamy till dominated by sandstone, with lesser amounts of limestone and shale. Depth to a root restrictive layer, fragipan, is 12 to 18 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 9 inches during January, February, March, April, May, November, December. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 3w. This soil does not meet hydric criteria.

Map Unit: SEB—Scriba and Morris very bouldery soils, gently sloping

Component: Morris (40%)

The Morris component makes up 40 percent of the map unit. Slopes are 0 to 10 percent. This component is on drumlinoid ridges, hills, till plains. The parent material consists of loamy till derived from reddish sandstone, siltstone, and shale. Depth to a root restrictive layer, fragipan, is 12 to 22 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during January, February, March, November, December. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria.

Component: Scriba (40%)

The Scriba component makes up 40 percent of the map unit. Slopes are 0 to 10 percent. This component is on drumlins, till plains. The parent material consists of loamy till dominated by sandstone, with lesser amounts of limestone and shale. Depth to a root restrictive layer, fragipan, is 12 to 18 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 9 inches during January, February, March, April, May, November, December. Organic matter content in the surface horizon is about 5 percent. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria.

Map Unit: Su—Suncook loamy fine sand

Component: Suncook (80%)

The Suncook component makes up 80 percent of the map unit. Slopes are 0 to 3 percent. This component is on flood plains. The parent material consists of sandy alluvium derived mainly from varying amounts of sandstone, conglomerate, granite, gneiss, and quartzite. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is occasionally flooded. It is not ponded. A seasonal zone of water saturation is at 54 inches during January, February, March, April. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 3s. This soil does not meet hydric criteria.

Map Unit: TkA—Tunkhannock gravelly loam, 0 to 3 percent slopes

Component: Tunkhannock (80%)

The Tunkhannock component makes up 80 percent of the map unit. Slopes are 0 to 3 percent. This component is on valley trains, terraces. The parent material consists of gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from reddish sandstone, siltstone, and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 2s. This soil does not meet hydric criteria.

Map Unit: TkB—Tunkhannock gravelly loam, 3 to 8 percent slopes

Component: Tunkhannock (80%)

The Tunkhannock component makes up 80 percent of the map unit. Slopes are 3 to 8 percent. This component is on valley trains, terraces. The parent material consists of gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from reddish sandstone, siltstone, and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 2s. This soil does not meet hydric criteria.

Map Unit: TkC—Tunkhannock gravelly loam, rolling

Component: Tunkhannock (80%)

The Tunkhannock component makes up 80 percent of the map unit. Slopes are 5 to 16 percent. This component is on valley trains, terraces. The parent material consists of gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from reddish sandstone, siltstone, and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria.

Map Unit: TuB—Tunkhannock gravelly loam, clayey substratum, 3 to 8 percent slopes

Component: Tunkhannock, clayey substratum (80%)

The Tunkhannock, clayey substratum component makes up 80 percent of the map unit. Slopes are 3 to 8 percent. This component is on valley trains, terraces. The parent material consists of gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from reddish sandstone, siltstone, and shale. Depth to a root restrictive layer, strongly contrasting textural stratification, is 40 to 72 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 36 inches during March, April. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 2s. This soil does not meet hydric criteria.

Map Unit: TuC—Tunkhannock gravelly loam, clayey substratum, 8 to 15 percent slopes

Component: Tunkhannock, clayey substratum (80%)

The Tunkhannock, clayey substratum component makes up 80 percent of the map unit. Slopes are 8 to 15 percent. This component is on valley trains, terraces. The parent material consists of gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from reddish sandstone, siltstone, and shale. Depth to a root restrictive layer, strongly contrasting textural stratification, is 40 to 72 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 36 inches during March, April. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria.

Map Unit: VAB—Valois very bouldery soils, gently sloping

Component: Valois (80%)

The Valois component makes up 80 percent of the map unit. Slopes are 3 to 8 percent. This component is on end moraines, valley sides, lateral moraines. The parent material consists of loamy till derived mainly from sandstone, siltstone, and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 50 percent. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria.

Map Unit: VAD—Valois very bouldery soils, moderately steep

Component: Valois (75%)

The Valois component makes up 75 percent of the map unit. Slopes are 15 to 25 percent. This component is on end moraines, valley sides, lateral moraines. The parent material consists of loamy till derived mainly from sandstone, siltstone, and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 50 percent. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria.

Map Unit: W—Water

Component: Water (100%)

Generated brief soil descriptions are created for major soil components. The Water is a miscellaneous area.

Map Unit: Wb—Wayland silt loam

Component: Wayland (80%)

The Wayland component makes up 80 percent of the map unit. Slopes are 0 to 1 percent. This component is on flood plains. The parent material consists of silty and clayey alluvium washed from uplands that contain some calcareous drift. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is low. This soil is frequently flooded. It is frequently ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, May, June, November, December. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 5w. This soil meets hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 1 percent.

Map Unit: WLB—Wellsboro and Wurtsboro very bouldery soils, gently sloping

Component: Wellsboro (40%)

The Wellsboro component makes up 40 percent of the map unit. Slopes are 3 to 15 percent. This component is on drumlinoid ridges, hills, till plains. The parent material consists of loamy till derived mainly from reddish sandstone, siltstone, and shale. Depth to a root restrictive layer, fragipan, is 15 to 25 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 16 inches during January, February, March, November, December. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria.

Component: Wurtsboro (40%)

The Wurtsboro component makes up 40 percent of the map unit. Slopes are 3 to 15 percent. This component is on hills, till plains. The parent material consists of loamy till derived mainly from acid quartzite, conglomerate, and sandstone. Depth to a root restrictive layer, fragipan, is 17 to 28 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 18 inches during January, February, March, November, December. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria.

Map Unit: WOB—Wellsboro and Wurtsboro extremely bouldery soils, gently sloping

Component: Wellsboro (40%)

The Wellsboro component makes up 40 percent of the map unit. Slopes are 3 to 15 percent. This component is on drumlinoid ridges, hills, till plains. The parent material consists of loamy till derived mainly from reddish sandstone, siltstone, and shale. Depth to a root restrictive layer, fragipan, is 15 to 25 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 16 inches during January, February, March, November, December. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria.

Component: Wurtsboro (40%)

The Wurtsboro component makes up 40 percent of the map unit. Slopes are 3 to 15 percent. This component is on hills, till plains. The parent material consists of loamy till derived mainly from acid quartzite, conglomerate, and sandstone. Depth to a root restrictive layer, fragipan, is 17 to 28 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 18 inches during January, February, March, November, December. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria.

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Map Unit Description

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Ulster County, New York

AA—Alluvial land

Map Unit Setting

Elevation: 100 to 3,000 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Fluvaquents and similar soils: 45 percent
Udifluvents and similar soils: 35 percent

Description of Fluvaquents

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Alluvium with highly variable texture

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.06 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 15 percent
Available water capacity: Moderate (about 6.1 inches)

Interpretive groups

Land capability (nonirrigated): 5w

Typical profile

0 to 5 inches: Gravelly silt loam
5 to 70 inches: Gravelly silt loam

Description of Udifluvents

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Alluvium with a wide range of texture

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.06 to 19.98 in/hr)
Depth to water table: About 24 to 72 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Low (about 5.9 inches)

Interpretive groups

Land capability (nonirrigated): 5w

Typical profile

0 to 4 inches: Gravelly loam
4 to 70 inches: Gravelly sandy loam

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

AA—Alluvial land

Map Unit Setting

Elevation: 100 to 3,000 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Fluvaquents and similar soils: 45 percent
Udifluvents and similar soils: 35 percent

Description of Fluvaquents

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Alluvium with highly variable texture

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.06 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 15 percent
Available water capacity: Moderate (about 6.1 inches)

Interpretive groups

Land capability (nonirrigated): 5w

Typical profile

0 to 5 inches: Gravelly silt loam
5 to 70 inches: Gravelly silt loam

Description of Udifluvents

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Alluvium with a wide range of texture

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.06 to 19.98 in/hr)
Depth to water table: About 24 to 72 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Low (about 5.9 inches)

Interpretive groups

Land capability (nonirrigated): 5w

Typical profile

0 to 4 inches: Gravelly loam
4 to 70 inches: Gravelly sandy loam

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

ARF—Arnot-Oquaga-Rock outcrop complex, very steep

Map Unit Setting

Elevation: 600 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Arnot and similar soils: 40 percent
Oquaga and similar soils: 30 percent
Rock outcrop: 20 percent

Description of Arnot

Setting

Landform: Hills, ridges, benches
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from acid sandstone, siltstone, and shale

Properties and qualities

Slope: 35 to 70 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.2 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 1 inches: Moderately decomposed plant material
1 to 4 inches: Channery silt loam
4 to 18 inches: Very channery silt loam
18 to 22 inches: Unweathered bedrock

Description of Oquaga

Setting

Landform: Hills, ridges, benches
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex

Parent material: Channery loamy till with lithology dominated by reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 35 to 60 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.8 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 3 inches: Moderately decomposed plant material
3 to 8 inches: Channery silt loam
8 to 28 inches: Very channery loam
28 to 35 inches: Very gravelly loam
35 to 39 inches: Unweathered bedrock

Description of Rock Outcrop

Properties and qualities

Slope: 35 to 60 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 60 inches: Unweathered bedrock

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

Ba—Barbour loam

Map Unit Setting

Elevation: 250 to 1,500 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Barbour and similar soils: 85 percent

Description of Barbour

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy over sandy and gravelly alluvium derived mainly from areas of acid, reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water capacity: Moderate (about 6.0 inches)

Interpretive groups

Land capability (nonirrigated): 1

Typical profile

0 to 6 inches: Loam
6 to 28 inches: Gravelly loam
28 to 60 inches: Very gravelly sand

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

BP—Borrow pit

Map Unit Setting

Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Borrow pit: 80 percent

Description of Borrow Pit

Interpretive groups

Land capability (nonirrigated): 7s

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

He—Haven loam

Map Unit Setting

Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Haven and similar soils: 80 percent

Description of Haven

Setting

Landform: Outwash plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.3 inches)

Interpretive groups

Land capability (nonirrigated): 1

Typical profile

0 to 11 inches: Loam
11 to 25 inches: Loam
25 to 60 inches: Gravelly sand

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

HgD—Hoosic gravelly loam, 15 to 25 percent slopes

Map Unit Setting

Elevation: 100 to 1,100 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Hoosic and similar soils: 80 percent

Description of Hoosic

Setting

Landform: Deltas, outwash plains, terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy and gravelly glaciofluvial deposits

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.6 inches)

Interpretive groups

Land capability (nonirrigated): 4e

Typical profile

0 to 8 inches: Gravelly loam
8 to 14 inches: Gravelly loam
14 to 30 inches: Very gravelly loamy sand
30 to 80 inches: Stratified extremely gravelly sand

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

HSF—Hoosic soils, very steep

Map Unit Setting

Elevation: 100 to 1,100 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Hoosic and similar soils: 80 percent

Description of Hoosic

Setting

Landform: Deltas, outwash plains, terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy and gravelly glaciofluvial deposits

Properties and qualities

Slope: 25 to 55 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.6 inches)

Interpretive groups

Land capability (nonirrigated): 7e

Typical profile

0 to 8 inches: Gravelly sandy loam
8 to 14 inches: Gravelly loam
14 to 30 inches: Very gravelly loamy sand
30 to 80 inches: Stratified extremely gravelly sand

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

HwD—Hudson and Schoharie soils, 15 to 25 percent slopes

Map Unit Setting

Elevation: 300 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Hudson and similar soils: 40 percent
Schoharie and similar soils: 35 percent

Description of Hudson

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Riser
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Clayey and silty glaciolacustrine deposits

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Available water capacity: High (about 9.5 inches)

Interpretive groups

Land capability (nonirrigated): 4e

Typical profile

0 to 7 inches: Silt loam
7 to 25 inches: Silty clay loam
25 to 38 inches: Silty clay
38 to 60 inches: Stratified silty clay to silt loam

Description of Schoharie

Setting

Landform: Lake plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Reddish clayey and silty glaciolacustrine deposits

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Moderate (about 7.6 inches)

Interpretive groups

Land capability (nonirrigated): 4e

Typical profile

0 to 10 inches: Silt loam
10 to 36 inches: Silty clay
36 to 50 inches: Stratified silty clay to silty clay loam

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

HXE—Hudson and Schoharie soils, steep

Map Unit Setting

Elevation: 300 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Hudson and similar soils: 40 percent
Schoharie and similar soils: 35 percent

Description of Hudson

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Riser
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Clayey and silty glaciolacustrine deposits

Properties and qualities

Slope: 25 to 55 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Available water capacity: High (about 9.5 inches)

Interpretive groups

Land capability (nonirrigated): 7e

Typical profile

0 to 7 inches: Silty clay loam
7 to 25 inches: Silty clay loam
25 to 38 inches: Silty clay
38 to 60 inches: Stratified silty clay to silt loam

Description of Schoharie

Setting

Landform: Lake plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Reddish clayey and silty glaciolacustrine deposits

Properties and qualities

Slope: 25 to 55 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Moderate (about 7.6 inches)

Interpretive groups

Land capability (nonirrigated): 7e

Typical profile

0 to 10 inches: Silt loam
10 to 36 inches: Silty clay
36 to 50 inches: Stratified silty clay to silty clay loam

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

LEE—Lackawanna and Swartswood extremely bouldery soils, steep

Map Unit Setting

Elevation: 600 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Lackawanna and similar soils: 40 percent
Swartswood and similar soils: 35 percent

Description of Lackawanna

Setting

Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived from reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 17 to 36 inches to fragipan
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.4 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 2 inches: Moderately decomposed plant material
2 to 5 inches: Flaggy silt loam
5 to 17 inches: Gravelly silt loam
17 to 49 inches: Gravelly loam
49 to 80 inches: Gravelly loam

Description of Swartswood

Setting

Landform: Hills, till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope

Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from quartzite, conglomerate, and sandstone

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 20 to 36 inches to fragipan
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: About 19 to 35 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.9 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 7 inches: Gravelly fine sandy loam
7 to 29 inches: Gravelly sandy loam
29 to 60 inches: Very gravelly sandy loam

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

LCD—Lackawanna and Swartswood very bouldery soils, moderately steep

Map Unit Setting

Elevation: 600 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Swartswood and similar soils: 40 percent
Lackawanna and similar soils: 40 percent

Description of Lackawanna

Setting

Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived from reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 17 to 36 inches to fragipan
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.4 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 2 inches: Moderately decomposed plant material
2 to 5 inches: Flaggy silt loam
5 to 17 inches: Gravelly silt loam
17 to 49 inches: Gravelly loam
49 to 80 inches: Gravelly loam

Description of Swartswood

Setting

Landform: Hills, till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope

Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from quartzite, conglomerate, and sandstone

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 36 inches to fragipan
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: About 19 to 35 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.9 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 7 inches: Gravelly fine sandy loam
7 to 29 inches: Gravelly sandy loam
29 to 60 inches: Very gravelly sandy loam

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

LCF—Lackawanna and Swartswood very bouldery soils, very steep

Map Unit Setting

Elevation: 600 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Swartswood and similar soils: 40 percent
Lackawanna and similar soils: 40 percent

Description of Lackawanna

Setting

Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived from reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 35 to 50 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 17 to 36 inches to fragipan
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.4 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 2 inches: Moderately decomposed plant material
2 to 5 inches: Flaggy silt loam
5 to 17 inches: Gravelly silt loam
17 to 49 inches: Gravelly loam
49 to 80 inches: Gravelly loam

Description of Swartswood

Setting

Landform: Hills, till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope

Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from quartzite, conglomerate, and sandstone

Properties and qualities

Slope: 35 to 50 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 36 inches to fragipan
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: About 19 to 35 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.9 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 7 inches: Gravelly fine sandy loam
7 to 29 inches: Gravelly sandy loam
29 to 60 inches: Very gravelly sandy loam

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

OdB—Odessa silt loam, 3 to 8 percent slopes

Map Unit Setting

Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Odessa and similar soils: 80 percent

Description of Odessa

Setting

Landform: Lake plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Reddish clayey and silty glaciolacustrine deposits

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Moderate (about 7.1 inches)

Interpretive groups

Land capability (nonirrigated): 3w

Typical profile

0 to 8 inches: Silt loam
8 to 12 inches: Silty clay loam
12 to 34 inches: Silty clay
34 to 50 inches: Stratified silty clay to silty clay loam

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

ORD—Oquaga-Arnot-Rock outcrop complex, moderately steep

Map Unit Setting

Elevation: 600 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Oquaga and similar soils: 35 percent
Arnot and similar soils: 30 percent
Rock outcrop: 15 percent

Description of Oquaga

Setting

Landform: Hills, ridges, benches
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Channery loamy till with lithology dominated by reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.8 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 3 inches: Moderately decomposed plant material
3 to 8 inches: Channery silt loam
8 to 28 inches: Very channery loam
28 to 35 inches: Very gravelly loam
35 to 39 inches: Unweathered bedrock

Description of Arnot

Setting

Landform: Hills, ridges, benches
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope

Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from acid sandstone, siltstone, and shale

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.2 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 1 inches: Moderately decomposed plant material
1 to 4 inches: Channery silt loam
4 to 18 inches: Very channery silt loam
18 to 22 inches: Unweathered bedrock

Description of Rock Outcrop

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 60 inches: Unweathered bedrock

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

ORC—Oquaga-Arnot-Rock outcrop complex, sloping

Map Unit Setting

Elevation: 600 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Oquaga and similar soils: 35 percent
Arnot and similar soils: 30 percent
Rock outcrop: 15 percent

Description of Oquaga

Setting

Landform: Hills, ridges, benches
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Channery loamy till with lithology dominated by reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.8 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 3 inches: Moderately decomposed plant material
3 to 8 inches: Channery silt loam
8 to 28 inches: Very channery loam
28 to 35 inches: Very gravelly loam
35 to 39 inches: Unweathered bedrock

Description of Arnot

Setting

Landform: Hills, ridges, benches
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex

Across-slope shape: Convex
Parent material: Loamy till derived mainly from acid sandstone, siltstone, and shale

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.2 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 1 inches: Moderately decomposed plant material
1 to 4 inches: Channery silt loam
4 to 18 inches: Very channery silt loam
18 to 22 inches: Unweathered bedrock

Description of Rock Outcrop

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 60 inches: Unweathered bedrock

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

Re—Red Hook gravelly silt loam

Map Unit Setting

Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Red hook and similar soils: 80 percent

Description of Red Hook

Setting

Landform: Valley trains, terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy glaciofluvial deposits

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water capacity: Low (about 4.9 inches)

Interpretive groups

Land capability (nonirrigated): 3w

Typical profile

0 to 8 inches: Gravelly silt loam
8 to 14 inches: Gravelly silt loam
14 to 30 inches: Gravelly loam
30 to 50 inches: Very gravelly sandy loam

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

RXF—Rock outcrop-Arnot complex, very steep

Map Unit Setting

Elevation: 1,000 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Rock outcrop: 55 percent
Arnot and similar soils: 30 percent

Description of Rock Outcrop

Properties and qualities

Slope: 35 to 70 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 60 inches: Unweathered bedrock

Description of Arnot

Setting

Landform: Hills, ridges, benches
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from acid sandstone, siltstone, and shale

Properties and qualities

Slope: 35 to 70 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.2 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 1 inches: Moderately decomposed plant material

1 to 4 inches: Channery silt loam
4 to 18 inches: Very channery silt loam
18 to 22 inches: Unweathered bedrock

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

SaB—Schoharie silt loam, 3 to 8 percent slopes

Map Unit Setting

Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Schoharie and similar soils: 80 percent

Description of Schoharie

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Reddish clayey and silty glaciolacustrine deposits

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Moderate (about 7.6 inches)

Interpretive groups

Land capability (nonirrigated): 2e

Typical profile

0 to 10 inches: Silt loam
10 to 36 inches: Silty clay
36 to 50 inches: Stratified silty clay to silty clay loam

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

SaC—Schoharie silt loam, 8 to 15 percent slopes

Map Unit Setting

Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Schoharie and similar soils: 80 percent

Description of Schoharie

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Reddish clayey and silty glaciolacustrine deposits

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Moderate (about 7.6 inches)

Interpretive groups

Land capability (nonirrigated): 3e

Typical profile

0 to 10 inches: Silt loam
10 to 36 inches: Silty clay
36 to 50 inches: Stratified silty clay to silty clay loam

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

SdB—Scriba and Morris soils, 0 to 8 percent slopes

Map Unit Setting

Elevation: 600 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Morris and similar soils: 40 percent
Scriba and similar soils: 40 percent

Description of Scriba

Setting

Landform: Drumlins, till plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till dominated by sandstone, with lesser amounts of limestone and shale

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 12 to 18 inches to fragipan
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 17 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Very low (about 1.2 inches)

Interpretive groups

Land capability (nonirrigated): 3w

Typical profile

0 to 9 inches: Gravelly fine sandy loam
9 to 13 inches: Gravelly fine sandy loam
13 to 50 inches: Gravelly fine sandy loam
50 to 65 inches: Gravelly fine sandy loam

Description of Morris

Setting

Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear

Parent material: Loamy till derived from reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 12 to 22 inches to fragipan
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 1.3 inches)

Interpretive groups

Land capability (nonirrigated): 3w

Typical profile

0 to 6 inches: Flaggy silt loam
6 to 13 inches: Flaggy silt loam
13 to 65 inches: Gravelly loam
65 to 80 inches: Gravelly loam

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

SEB—Scriba and Morris very bouldery soils, gently sloping

Map Unit Setting

Elevation: 600 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Morris and similar soils: 40 percent
Scriba and similar soils: 40 percent

Description of Scriba

Setting

Landform: Drumlins, till plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till dominated by sandstone, with lesser amounts of limestone and shale

Properties and qualities

Slope: 0 to 10 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 12 to 18 inches to fragipan
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 17 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Very low (about 1.2 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 9 inches: Gravelly fine sandy loam
9 to 13 inches: Gravelly fine sandy loam
13 to 50 inches: Gravelly fine sandy loam
50 to 65 inches: Gravelly fine sandy loam

Description of Morris

Setting

Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope
Down-slope shape: Concave

Across-slope shape: Linear
Parent material: Loamy till derived from reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 0 to 10 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 12 to 22 inches to fragipan
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 1.3 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 6 inches: Flaggy silt loam
6 to 13 inches: Flaggy silt loam
13 to 65 inches: Gravelly loam
65 to 80 inches: Gravelly loam

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

Su—Suncook loamy fine sand

Map Unit Setting

Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Suncook and similar soils: 80 percent

Description of Suncook

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy alluvium derived mainly from varying amounts of sandstone, conglomerate, granite, gneiss, and quartzite

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water capacity: Low (about 3.8 inches)

Interpretive groups

Land capability (nonirrigated): 3s

Typical profile

0 to 3 inches: Loamy fine sand
3 to 27 inches: Loamy fine sand
27 to 36 inches: Stratified loamy fine sand to fine sand
36 to 53 inches: Loamy fine sand

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

TkA—Tunkhannock gravelly loam, 0 to 3 percent slopes

Map Unit Setting

Elevation: 700 to 2,000 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Tunkhannock and similar soils: 80 percent

Description of Tunkhannock

Setting

Landform: Valley trains, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.6 inches)

Interpretive groups

Land capability (nonirrigated): 2s

Typical profile

0 to 7 inches: Gravelly loam
7 to 23 inches: Gravelly loam
23 to 30 inches: Very gravelly loam
30 to 80 inches: Error

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

TkB—Tunkhannock gravelly loam, 3 to 8 percent slopes

Map Unit Setting

Elevation: 700 to 2,000 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Tunkhannock and similar soils: 80 percent

Description of Tunkhannock

Setting

Landform: Valley trains, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.6 inches)

Interpretive groups

Land capability (nonirrigated): 2s

Typical profile

0 to 7 inches: Gravelly loam
7 to 23 inches: Gravelly loam
23 to 30 inches: Very gravelly loam
30 to 80 inches: Error

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

TuB—Tunkhannock gravelly loam, clayey substratum, 3 to 8 percent slopes

Map Unit Setting

Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Tunkhannock, clayey substratum, and similar soils: 80 percent

Description of Tunkhannock, Clayey Substratum

Setting

Landform: Valley trains, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 40 to 72 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 30 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Low (about 3.6 inches)

Interpretive groups

Land capability (nonirrigated): 2s

Typical profile

0 to 7 inches: Gravelly loam
7 to 23 inches: Gravelly loam
23 to 30 inches: Very gravelly loam
30 to 40 inches: Error
40 to 80 inches: Silty clay

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

TuC—Tunkhannock gravelly loam, clayey substratum, 8 to 15 percent slopes

Map Unit Setting

Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Tunkhannock, clayey substratum, and similar soils: 80 percent

Description of Tunkhannock, Clayey Substratum

Setting

Landform: Valley trains, terraces
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 40 to 72 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 30 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Low (about 3.6 inches)

Interpretive groups

Land capability (nonirrigated): 3e

Typical profile

0 to 7 inches: Gravelly loam
7 to 23 inches: Gravelly loam
23 to 30 inches: Very gravelly loam
30 to 40 inches: Error
40 to 80 inches: Silty clay

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

TkC—Tunkhannock gravelly loam, rolling

Map Unit Setting

Elevation: 700 to 2,000 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Tunkhannock and similar soils: 80 percent

Description of Tunkhannock

Setting

Landform: Valley trains, terraces
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 5 to 16 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.6 inches)

Interpretive groups

Land capability (nonirrigated): 3e

Typical profile

0 to 7 inches: Gravelly loam
7 to 23 inches: Gravelly loam
23 to 30 inches: Very gravelly loam
30 to 80 inches: Error

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

VAB—Valois very bouldery soils, gently sloping

Map Unit Setting

Elevation: 600 to 1,600 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Valois and similar soils: 80 percent

Description of Valois

Setting

Landform: Valley sides, lateral moraines, end moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from sandstone, siltstone, and shale

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Available water capacity: Moderate (about 6.2 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 2 inches: Moderately decomposed plant material
2 to 13 inches: Gravelly loam
13 to 42 inches: Gravelly loam
42 to 67 inches: Very gravelly sandy loam

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

VAD—Valois very bouldery soils, moderately steep

Map Unit Setting

Elevation: 600 to 1,600 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Valois and similar soils: 75 percent

Description of Valois

Setting

Landform: Valley sides, lateral moraines, end moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from sandstone, siltstone, and shale

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Available water capacity: Moderate (about 6.2 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 2 inches: Moderately decomposed plant material
2 to 13 inches: Gravelly loam
13 to 42 inches: Gravelly loam
42 to 67 inches: Very gravelly sandy loam

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

W—Water

Map Unit Setting

Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Water: 100 percent

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

Wb—Wayland silt loam

Map Unit Setting

Elevation: 200 to 1,500 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Wayland and similar soils: 80 percent

Description of Wayland

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Silty and clayey alluvium washed from uplands that contain some calcareous drift

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 1 percent
Available water capacity: High (about 9.4 inches)

Interpretive groups

Land capability (nonirrigated): 5w

Typical profile

0 to 5 inches: Silt loam
5 to 24 inches: Silty clay loam
24 to 60 inches: Silt loam

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

WOB—Wellsboro and Wurtsboro extremely bouldery soils, gently sloping

Map Unit Setting

Elevation: 1,100 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Wurtsboro and similar soils: 40 percent
Wellsboro and similar soils: 40 percent

Description of Wellsboro

Setting

Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Loamy till derived mainly from reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 15 to 25 inches to fragipan
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 14 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 1.9 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 9 inches: Flaggy silt loam
9 to 16 inches: Flaggy silt loam
16 to 21 inches: Gravelly loam
21 to 60 inches: Gravelly loam

Description of Wurtsboro

Setting

Landform: Hills, till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Concave

Across-slope shape: Convex
Parent material: Loamy till derived mainly from acid quartzite, conglomerate, and sandstone

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 17 to 28 inches to fragipan
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 15 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.3 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 6 inches: Gravelly loam
6 to 19 inches: Gravelly sandy loam
19 to 56 inches: Gravelly fine sandy loam

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Ulster County, New York

WLB—Wellsboro and Wurtsboro very bouldery soils, gently sloping

Map Unit Setting

Elevation: 1,100 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days

Map Unit Composition

Wurtsboro and similar soils: 40 percent
Wellsboro and similar soils: 40 percent

Description of Wellsboro

Setting

Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Loamy till derived mainly from reddish sandstone, siltstone, and shale

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 15 to 25 inches to fragipan
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 14 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.0 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 9 inches: Flaggy silt loam
9 to 16 inches: Flaggy silt loam
16 to 21 inches: Gravelly loam
21 to 60 inches: Gravelly loam

Description of Wurtsboro

Setting

Landform: Hills, till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Concave

Across-slope shape: Convex
Parent material: Loamy till derived mainly from acid quartzite, conglomerate, and sandstone

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 17 to 28 inches to fragipan
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 15 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.3 inches)

Interpretive groups

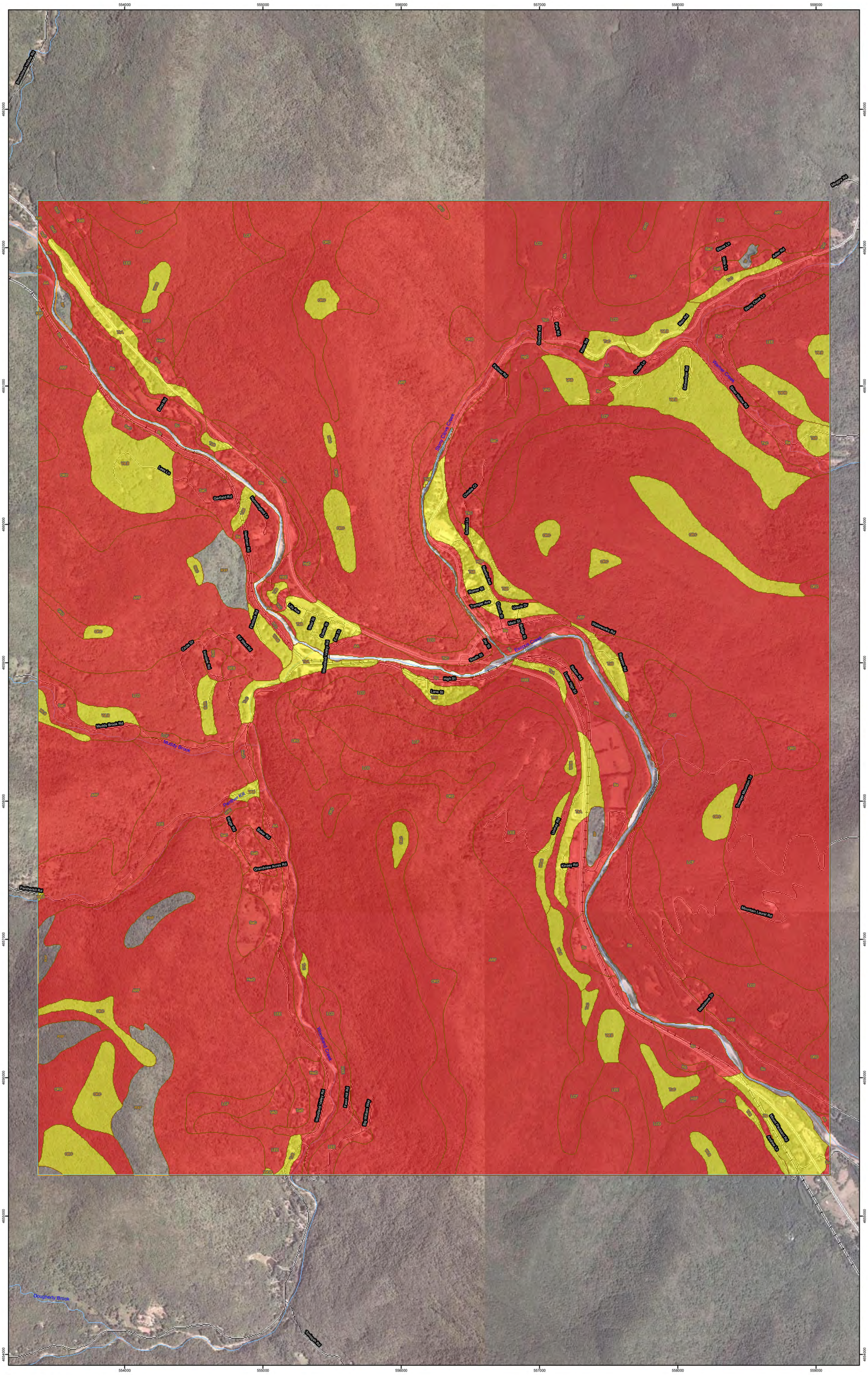
Land capability (nonirrigated): 6s

Typical profile

0 to 6 inches: Gravelly loam
6 to 19 inches: Gravelly sandy loam
19 to 56 inches: Gravelly fine sandy loam

Data Source Information

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010



Map Scale: 1:12,300 if printed on D size (22" x 34") sheet.

Meters: 0 50 100 200 300

Feet: 0 300 600 1,200 1,800

N

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Units

Soil Ratings

Very limited

Somewhat limited

Not limited

not rated or not available

Political Features

Cities

Water Features

Oceans

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

MAP INFORMATION

Map Scale: 1:12,300 if printed on D size (22" × 34") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

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: Ulster County, New York
Survey Area Data: Version 8, Feb 5, 2010

Date(s) aerial images were photographed: 8/13/2006; 8/22/2006

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.

Septic Tank Absorption Fields (NY)

Septic Tank Absorption Fields (NY)— Summary by Map Unit — Ulster County, New York						
Map unit symbol	**Map unit name**	**Rating**	**Component name (percent)**	**Rating reasons (numeric values)**	**Acres in AOI**	**Percent of AOI**
AA	Alluvial land	Very limited	Fluvaquents (45%)	Flooding (1.00)	295.7	3.0%
				Ponding (1.00)		
				Depth to saturated zone (1.00)		
				Restricted permeability (0.19)		
			Udifluvents (35%)	Flooding (1.00)		
				Filtering capacity (1.00)		
				Seepage (1.00)		
				Depth to saturated zone (0.33)		
ARF	Arnot-Oquaga-Rock outcrop complex, very steep	Very limited	Arnot (40%)	Depth to bedrock (1.00)	4,448.2	44.6%
				Slope (1.00)		
				Restricted permeability (0.31)		
			Oquaga (30%)	Slope (1.00)		
				Depth to bedrock (0.75)		
				Restricted permeability (0.31)		
Ba	Barbour loam	Very limited	Barbour (85%)	Flooding (1.00)	378.8	3.8%
				Seepage (0.90)		
				Depth to saturated zone (0.17)		
BP	Borrow pit	Not rated	Borrow pit (80%)		17.5	0.2%
He	Haven loam	Somewhat limited	Haven (80%)	Seepage (0.90)	53.9	0.5%
				Restricted permeability (0.31)		
HgD	Hoosic gravelly loam, 15 to 25 percent slopes	Very limited	Hoosic (80%)	Slope (1.00)	43.5	0.4%
				Seepage (1.00)		
				Filtering capacity (1.00)		
HSF	Hoosic soils, very steep	Very limited	Hoosic (80%)	Slope (1.00)	31.9	0.3%
				Seepage (1.00)		
				Filtering capacity (1.00)		

Septic Tank Absorption Fields (NY)— Summary by Map Unit — Ulster County, New York						
Map unit symbol	**Map unit name**	**Rating**	**Component name (percent)**	**Rating reasons (numeric values)**	**Acres in AOI**	**Percent of AOI**
HwD	Hudson and Schoharie soils, 15 to 25 percent slopes	Very limited	Hudson (40%)	Restricted permeability (1.00)	115.5	1.2%
				Slope (1.00)		
				Depth to saturated zone (0.80)		
			Schoharie (35%)	Restricted permeability (1.00)		
				Slope (1.00)		
				Depth to saturated zone (0.80)		
HXE	Hudson and Schoharie soils, steep	Very limited	Hudson (40%)	Restricted permeability (1.00)	229.3	2.3%
				Slope (1.00)		
				Depth to saturated zone (0.80)		
			Schoharie (35%)	Restricted permeability (1.00)		
				Slope (1.00)		
				Depth to saturated zone (0.80)		
LCD	Lackawanna and Swartswood very bouldery soils, moderately steep	Very limited	Lackawanna (40%)	Slope (1.00)	743.2	7.5%
				Depth to dense material (0.83)		
				Surface rock fragments (0.60)		
				Restricted permeability (0.31)		
			Swartswood (40%)	Slope (1.00)		
				Depth to saturated zone (0.78)		
				Depth to dense material (0.75)		
				Surface rock fragments (0.60)		
				Restricted permeability (0.31)		

Septic Tank Absorption Fields (NY)— Summary by Map Unit — Ulster County, New York						
Map unit symbol	**Map unit name**	**Rating**	**Component name (percent)**	**Rating reasons (numeric values)**	**Acres in AOI**	**Percent of AOI**
LCF	Lackawanna and Swartswood very bouldery soils, very steep	Very limited	Lackawanna (40%)	Slope (1.00)	540.1	5.4%
				Depth to dense material (0.83)		
				Surface rock fragments (0.60)		
				Restricted permeability (0.31)		
			Swartswood (40%)	Slope (1.00)		
				Depth to saturated zone (0.78)		
				Depth to dense material (0.75)		
				Surface rock fragments (0.60)		
				Restricted permeability (0.31)		
LEE	Lackawanna and Swartswood extremely bouldery soils, steep	Very limited	Lackawanna (40%)	Slope (1.00)	697.8	7.0%
				Depth to dense material (0.83)		
				Surface rock fragments (0.80)		
				Restricted permeability (0.31)		
			Swartswood (35%)	Slope (1.00)		
				Surface rock fragments (0.80)		
				Depth to saturated zone (0.78)		
				Depth to dense material (0.75)		
				Restricted permeability (0.31)		
OdB	Odessa silt loam, 3 to 8 percent slopes	Very limited	Odessa (80%)	Restricted permeability (1.00)	14.4	0.1%
				Depth to saturated zone (1.00)		
ORC	Oquaga-Arnot-Rock outcrop complex, sloping	Somewhat limited	Oquaga (35%)	Depth to bedrock (0.75)	230.1	2.3%
				Restricted permeability (0.31)		
				Slope (0.20)		

Septic Tank Absorption Fields (NY)— Summary by Map Unit — Ulster County, New York						
Map unit symbol	**Map unit name**	**Rating**	**Component name (percent)**	**Rating reasons (numeric values)**	**Acres in AOI**	**Percent of AOI**
ORD	Oquaga-Arnot-Rock outcrop complex, moderately steep	Very limited	Oquaga (35%)	Slope (1.00)	530.7	5.3%
				Depth to bedrock (0.75)		
				Restricted permeability (0.31)		
			Arnot (30%)	Depth to bedrock (1.00)		
				Slope (1.00)		
				Restricted permeability (0.31)		
Re	Red Hook gravelly silt loam	Very limited	Red Hook (80%)	Depth to saturated zone (1.00)	8.5	0.1%
				Restricted permeability (0.49)		
RXF	Rock outcrop-Arnot complex, very steep	Not rated	Rock outcrop (55%)		148.0	1.5%
SaB	Schoharie silt loam, 3 to 8 percent slopes	Very limited	Schoharie (80%)	Restricted permeability (1.00)	42.1	0.4%
				Depth to saturated zone (0.80)		
SaC	Schoharie silt loam, 8 to 15 percent slopes	Very limited	Schoharie (80%)	Restricted permeability (1.00)	198.9	2.0%
				Depth to saturated zone (0.80)		
				Slope (0.20)		
SdB	Scriba and Morris soils, 0 to 8 percent slopes	Very limited	Scriba (40%)	Restricted permeability (1.00)	6.8	0.1%
				Depth to saturated zone (1.00)		
				Depth to dense material (0.95)		
			Morris (40%)	Restricted permeability (1.00)		
				Depth to saturated zone (1.00)		
				Depth to dense material (0.95)		

Septic Tank Absorption Fields (NY)— Summary by Map Unit — Ulster County, New York						
Map unit symbol	**Map unit name**	**Rating**	**Component name (percent)**	**Rating reasons (numeric values)**	**Acres in AOI**	**Percent of AOI**
SEB	Scriba and Morris very bouldery soils, gently sloping	Very limited	Scriba (40%)	Restricted permeability (1.00)	5.0	0.0%
				Depth to saturated zone (1.00)		
				Depth to dense material (0.95)		
				Surface rock fragments (0.60)		
				Slope (0.06)		
			Morris (40%)	Restricted permeability (1.00)		
				Depth to saturated zone (1.00)		
				Depth to dense material (0.95)		
				Surface rock fragments (0.60)		
				Slope (0.06)		
Su	Suncook loamy fine sand	Very limited	Suncook (80%)	Flooding (1.00)	161.1	1.6%
				Filtering capacity (1.00)		
				Seepage (1.00)		
				Depth to saturated zone (0.17)		
TkA	Tunkhannock gravelly loam, 0 to 3 percent slopes	Somewhat limited	Tunkhannock (80%)	Seepage (0.90)	100.3	1.0%
TkB	Tunkhannock gravelly loam, 3 to 8 percent slopes	Somewhat limited	Tunkhannock (80%)	Seepage (0.90)	158.1	1.6%
TkC	Tunkhannock gravelly loam, rolling	Very limited	Tunkhannock (80%)	Slope (1.00)	172.9	1.7%
				Seepage (0.90)		
TuB	Tunkhannock gravelly loam, clayey substratum, 3 to 8 percent slopes	Somewhat limited	Tunkhannock, clayey substratum (80%)	Depth to saturated zone (0.25)	6.2	0.1%
				Depth to dense material (0.11)		
TuC	Tunkhannock gravelly loam, clayey substratum, 8 to 15 percent slopes	Somewhat limited	Tunkhannock, clayey substratum (80%)	Depth to saturated zone (0.25)	55.1	0.6%
				Slope (0.20)		
				Depth to dense material (0.11)		
VAB	Valois very bouldery soils, gently sloping	Somewhat limited	Valois (80%)	Restricted permeability (0.31)	23.7	0.2%
				Surface rock fragments (0.30)		

Septic Tank Absorption Fields (NY)— Summary by Map Unit — Ulster County, New York						
Map unit symbol	**Map unit name**	**Rating**	**Component name (percent)**	**Rating reasons (numeric values)**	**Acres in AOI**	**Percent of AOI**
VAD	Valois very bouldery soils, moderately steep	Very limited	Valois (75%)	Slope (1.00)	32.7	0.3%
				Restricted permeability (0.31)		
				Surface rock fragments (0.30)		
W	Water	Not rated	Water (100%)		104.2	1.0%
Wb	Wayland silt loam	Very limited	Wayland (80%)	Flooding (1.00)	4.3	0.0%
				Restricted permeability (1.00)		
				Ponding (1.00)		
				Depth to saturated zone (1.00)		
WLB	Wellsboro and Wurtsboro very bouldery soils, gently sloping	Somewhat limited	Wellsboro (40%)	Depth to saturated zone (0.89)	306.1	3.1%
				Depth to dense material (0.88)		
				Restricted permeability (0.85)		
				Surface rock fragments (0.60)		
				Slope (0.20)		
			Wurtsboro (40%)	Depth to saturated zone (0.88)		
				Depth to dense material (0.83)		
				Surface rock fragments (0.60)		
				Restricted permeability (0.31)		
				Slope (0.20)		

Septic Tank Absorption Fields (NY)— Summary by Map Unit — Ulster County, New York						
Map unit symbol	**Map unit name**	**Rating**	**Component name (percent)**	**Rating reasons (numeric values)**	**Acres in AOI**	**Percent of AOI**
WOB	Wellsboro and Wurtsboro extremely bouldery soils, gently sloping	Somewhat limited	Wellsboro (40%)	Depth to saturated zone (0.89)	63.0	0.6%
				Depth to dense material (0.88)		
				Restricted permeability (0.85)		
				Surface rock fragments (0.80)		
				Slope (0.20)		
			Wurtsboro (40%)	Depth to saturated zone (0.88)		
				Depth to dense material (0.83)		
				Surface rock fragments (0.80)		
				Restricted permeability (0.31)		
				Slope (0.20)		
Totals for Area of Interest					**9,967.5**	**100.0%**

Septic Tank Absorption Fields (NY)— Summary by Rating Value		
Rating	**Acres in AOI**	**Percent of AOI**
Very limited	8,701.3	87.3%
Somewhat limited	996.4	10.0%
Null or Not Rated	269.8	2.7%
Totals for Area of Interest	**9,967.5**	**100.0%**

Description

Septic tank absorption fields are subsurface systems of perforated pipe or similar devices that distribute effluent from a septic tank into the soil. New York State Department of Health regulations allow installation of septic system absorption fields of varying designs, depending upon the depth of suitable soil material above any limitation in the natural soil at a site (New York State Department of Health, 1990). Where necessary, imported fill material may be used to elevate absorption trenches to at least the minimum distance of 24 inches above limiting soil horizons. The depth ranges of suitable material and corresponding types of absorption systems allowed are as follows:

Less than 12 inches-no system allowed

12 to 24 inches-alternative raised trench

24 to 48 inches-conventional shallow trench

More than 48 inches-conventional system

The ratings in this interpretation are based on evaluation of the soil between depths of 12 and 48 inches. In addition, the bottom layer of the soil is evaluated for risk of seepage. This interpretation does not evaluate bedrock below the soil. The soil properties and site features considered are those that affect absorption of the effluent, construction and maintenance of the system, and public health.

The soil properties and qualities that affect the absorption and effective treatment of wastewater effluent are saturated hydraulic conductivity (Ksat), depth to a seasonal high water table, depth to bedrock, depth to dense material, and susceptibility to flooding. Stones and boulders and a shallow depth to bedrock or dense material interfere with installation. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas. In addition, the hazards of erosion and sedimentation increase as slope increases.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 2 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, ground water may be contaminated.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations

between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen, which is displayed on the report. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the Selected Soil Interpretations report with this interpretation included from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

The information in this interpretation is based on criteria developed specifically for soils in New York. The information is not site specific and does not eliminate the need for onsite investigation of the soils.

Reference:

New York State Department of Health. 1990. Appendix 75-A of Part 75, Section 201(1)(1) of New York Public Health Law. Nassau and Suffolk Counties have a waiver from this portion of New York State Department of Health regulations.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher