

The data featured next further breaks down the Town of Shandaken's acreage by land use category as presented in the Environmental Impact Statement for the Watershed Regulations.

Land Use	Acres	Percentage (rounded to nearest whole percent)
Agriculture	0	0%
Low Density Residential (<10 acres)	2,602	3%
Low Density Residential (10 acres +)	8,519	11%
High Density Residential	160	0%
Commercial	995	1%
Government/Institutions	318	0%
Industrial/Manufacturing	33	0%
Vacant Land	6,92	28%
Open Space	58,050	2%

### Current Projects and Existing Reports

Any future wastewater project would ideally consider other anticipated community infrastructure improvements early in the planning phases. Should a wastewater project take place it is suggested that discussions begin taking place with the Ulster County Highway Department, NYSDOT in regards to the potential construction activities and minimizing impacts that construction could have on future transportation infrastructure plans.

### Existing Wastewater Problems and Needs

According to the Catlike Watershed Corporation Septic Rehabilitation Program, six individual septic system was on record as having problems (Parcels: 5.13-1-23, 5.13-1-37.2, 5.13-2-47, 5.13-2-53, 5.13-3-10, 5.13-3-7). Developing feasible, realistic, and cost effective wastewater alternatives for this community may be difficult due for several reasons. There are a limited number of users within the Preliminary Service Area. Many of the dwellings have either been constructed in close proximity to each other. Some of these units may be impacted by construction constraints and NYS Route 28 runs through the middle of the Preliminary Service area. Lastly, there appeared to be very few suitable locations where treatment activities could take place.

A preliminary review of the existing conditions and environmental constraints within the Preliminary Service Area indicates there may be wastewater issues. Problems may exist due to the fact that many of the Hamlet properties are

located either within 100 feet of a watercourse, or where slopes exceed 15%. There may also be difficulties in identifying suitable subsurface treatment sites due to existing flood plains, particularly in the areas on the southern side of NYS Route 28 (see **Figure 6.C Floodplain Mapping (FEMA)**). Lots with these types of constraints are inadequate for the proper functioning or replacement of septic systems and would not be permissible as new development sites under current regulations.

Conversations with community leaders indicate an interest in pursuing a wastewater project, however, they have also suggested that locally funding such a project would be problematic. If funding were not available from other sources it is unlikely that a wastewater project would be implemented. The community has also indicated that a future interest in extending the potential service area in an easterly direction along NYS Route 28. Such an extension may be more feasible as considered to be Phase Two project (see Figure 6.d Conceptual Layout Plan for further details on this area).

### **Preliminary Service Area and Flow**

A site visit was performed to define a potential service area for the Hamlet of Shandaken and to estimate a wastewater flow for the area. The information for this task was collected by NYCDEP prior to the Watershed Memorandum of Agreement and provided to NYSEFC. The preliminary service area defined by NYSEFC nearly matches the community's initial service study area provided to NYSEFC by NYCDEP.

The preliminary service area found in Figure 6.A Preliminary Service Area shows those parcels which might be serviced by a wastewater collection, treatment, and disposal system. This figure also shows those lots which may be constrained due to small lot size (<15,000 sf), proximity to waterways (100 ft buffer), and topography (Slopes >15%). The preliminary service area shown in this figure is a starting point which the locality may consider in further defining those lots it wishes to serve with a system. This preliminary service area does not consider a proposed growth scheme for the hamlet, rather it addresses the existing wastewater needs.

During the site visit, a structure count was conducted along with identification of any major construction constraints. An estimated wastewater flow was developed for the hamlet using the structure count (number and type of structures in service area), an average of 2.6 individuals per household, and a wastewater generation rate of 100 gpd per capita (consistent with 10 State Standards). Thus an estimated average daily wastewater flow for the Hamlet of Shandaken generated was 26,000 gpd (see Table 6.1 Wastewater Flow Estimate). This estimate does not take into account peak flows.

Based on the 1990 census the average household size in the Catskill Watershed counties of Greene, Delaware, and Ulster was 2.6. The average household size in the United States was 3.37 in 1950 and has been declining ever since. If average household size in the coming decades returned to 1950 levels due to economics and cultural trends, a substantial flow increase could result.

### **Possible Effluent Discharge Points**

Shandaken is in the Ashokan Reservoir watershed. A new surface discharge is regulated per Section 18-36(b) of the NYC Watershed Regulations.

### **Treatment Options for Shandaken**

The level of effort and site data available for this study is not intended to conform with engineering reports or facility plans as required by NYCDEP for New Infrastructure Communities 1-7, nor does this work approach the work and documentation of data that would be derived from a consultant. A more in-depth planning study may result in treatment options and estimated construction costs which may differ considerably from what is presented below.

### **Individual Septic System Treatment Option With a Management Component**

To evaluate sewage disposal options for the Hamlet of Shandaken, the first step was to determine the properties that may not be suitable for individual septic systems using tax maps and NYCDEP GIS information. These properties were tabulated based on their size or other site constraints (proximity to streams, wetlands, steep slopes, or property line setback) per Watershed regulations. Site investigations revealed evidence of bedrock or surface boulders within the hamlet area which may indicate a problem constructing septic systems per existing regulations. The majority of lots seem to have sufficient space for individual septic systems. Areas for concern may be the steeper grades to the north side of NYS Route 28 ( see **Figure 6.B Topography**) and a 100 foot setback from the Esopus Creek on the southern side of NYS Route 28, and tributaries leading to the Esopus. These areas may have difficulties limiting the construction of new septic systems which could conform to the 75a standards of NYS Department of Health.

In the mid-1990's preliminary information identified 18 of 79 lots which appear to be unable to meet the required 100 foot setback from streams for new systems as required by NYSDOH regulations. Fifty-two lots were too small to site leach fields with required separations (from wells, lots lines, etc.) required by NYSDOH regulations. Finally, the soil suitability for individual septic systems in this community is generally rated "severe", meaning that the depth to groundwater or percolation rates may limit septic system placement.



The locations where individual septic systems may be feasible are scattered through out the hamlet area and can be seen in Figure 6.D Conceptual Layout Plan. There may be as many as 58 lots with the potential for septic systems. One location which may impose difficulties on placement of individual septic systems due to drainage patterns and steeper grades is in the area of East and West High Street's. This area may offer the potential for a cluster system. The only way to determine the maximum extent of individual septic system suitability for the Shandaken hamlet would be to conduct a sanitary survey with soil evaluations for every lot in the Hamlet.

For this community, a likely first goal in planning and implementing a wastewater disposal system would be to investigate the feasibility of low cost appropriate technologies such as septic systems and cluster treatment systems.

### **Cluster Systems Treatment Option**

During the site visit, potential disposal areas for cluster or community-wide systems were identified as meriting investigation (see **Figure 6.D Conceptual Layout Plan**). This identification was made primarily on a visual examination of the land, assumed percent slope of the land, and proximity to the potential service area. These areas included two areas below the East and West High Streets (sites appear to have insufficient land area), two areas to southeasterly side of NYS Route 28 (sites appear limited potential for a small cluster system), between NYS Route 28 and the Esopus Creek (site appears to offer the most potential), and a site to the northeasterly part of the hamlet (site is geographically distanced from the Preliminary Service Area). A review of the county soils information reveals that each of these sites may have the potential for being developed into wastewater disposal sites pending further field investigations. Investigations into the potential for floodplain impacts will also have to occur should the area to the southerly side of NYS Route 28 become a realistic potential.

A potential community-wide sewer and cluster system alternative layout is shown on **Figure 6.D Conceptual Layout Plan**. This alternative also includes serving rough 33 or so units individually onsite with septic systems under a wastewater management program. It also shows a potential Cluster system, treatment, and dispersal system for approximately 38 units. The description and relative merits of conventional sewer systems versus small diameter gravity sewer systems is discussed in Chapter 2 of this report. Sewage pump station(s) may be required due to the terrain constraints, however, in the areas of East and West High Streets there may be the potential for a gravity collection system. Site constraints may also dictate a need to consider that the sewer system be placed in rear lots for some locations, such as the south side of the main street area. This may



result in a more efficient, economical sewer layout that will accommodate existing plumbing configurations.

To determine the wastewater disposal area requirements and estimate costs for this study, the assumed percolation rate is 60 minutes per inch, this value is the slowest percolation rate suitable for conventional subsurface absorption systems. This results in the most conservative approach (largest system) to sizing and estimating costs for the systems. For Site A, the required area including the 100 percent reserve area requirement is 1-2 acre range. Buffer zones would add acreage to this number. **Appendix 6.1**, entitled "**Wastewater Disposal System Sizing**" contains a summary of the disposal system sizing for each of the hamlets.

### **Sewers and Wastewater Treatment Option**

The Hamlet of Shandaken is in the Ashokan Reservoir watershed. A new surface water discharge to the Esopus Creek is regulated per Section 18-36 of the NYC Watershed Regulations. A WWTP can be described as a facility which treats sewage which requires a permit under Titles 7 or 8 of Article 17 as described in Chapter 2 of the report. Unit operations or processes may include preliminary treatment, flow equalization, primary settling, biological treatment, chemical treatment, secondary settling filtration, aeration, disinfection, and sludge processing.

### **Summary of Options**

For the Hamlet of Shandaken, the following collection sewer and treatment option was investigated:

- Community Cluster System (38 users) treatment at Sites A, and + / - 33 Individual Septic Systems.

### **Construction Cost Estimates**

Construction limitations were also taken into consideration in this review. The presence of state highways (NYS 28) running through the hamlet increases the cost of sewer pipe crossings of area roads. Evidence of bedrock and surface boulders may also indicate impacts on construction costs due to collection system construction and burial, and the potential for design and construction constraints due to potential flooding impacts from the Esopus River.

### **Alternative Cost Summary**

The summary of project costs for the treatment options analyzed is presented in **Table 6.2**, entitled "**Project Cost Summary.**" **Table 6.3**, entitled "**Construction Cost Estimate**" provides more detail regarding sewer system construction costs

and wastewater disposal system construction costs for the likely alternatives for the community. The alternative cost estimate identified was for a Community Cluster System with Conventional Sewers for 38 units at Sites A combined with Individual Septic Systems for the remaining + / - 33 units. The capital cost of the Community Cluster System is estimated to be \$962,129 and the Individual Septic Systems are estimated to cost \$330,000 (Based upon an estimated cost of \$10,000 per system). The Total Estimated Project Cost, including an estimated Non-Construction Cost of \$235,239, (approximately 25% of the Capital Cost) is \$1,176,196. (see note 3 of Table 6.2 for further related cost estimation details).

The estimated annual operation and maintenance cost for the components of this wastewater disposal system is presented in Table 6.4, entitled "**Annual Operation & Maintenance Cost Estimate.**" If additional individual septic systems in various locations of the hamlet become part of the solution, the above listed costs may be reduced, but probably not significantly. Based on an annual Operation and Maintenance cost of \$15,930 (from **Table 6.4**), the annual operation and maintenance cost per user or service connection is estimated to be \$224.

### **Further Study**

A detailed site investigation, which is beyond the scope of this study, will determine which option is most feasible. Also beyond the scope of this study, the annual operation and maintenance cost for each alternate option needs to be further developed and incorporated into a present worth analysis for selection of the most cost effective alternative based on project construction costs, annual operation and maintenance costs, and any recurring capital costs over a 20 year period.

**TABLES**



**TABLE 6.1**  
**WASTEWATER FLOW ESTIMATE**  
Hamlet of Shandaken

Facility Type	No. of units (note 1)	Flow Calculation Basis	Average Household Size (note 2)	Flow (gpd) (note 3)	Source (note 4)	Total Flow (gpd)
<b>RESIDENTIAL</b>						
Single Family Homes	63	equivalent residential	2.6	100	Ten State Standards - chap. 10, sect. 11.243	16,380
Two Family Homes	2	equivalent residential	2.6	100	Ten State Standards - chap. 10, sect. 11.243	520
Six Family Home	6	equivalent residential	2	100	Ten State Standards - chap. 10, sect. 11.243	1,200
<b>COMMERCIAL/INSTITUTIONAL</b>						
Carpenters Shop	1		n/a	100	Ten State Standards - chap. 10, sect. 11.243	260
Motel	1	7 units	n/a	100	NYSDEC - Motels	700
Fire Department	1	1 toilet	n/a	400	NYSDEC - Service Station	400
Gas Station	1	1 toilet	n/a	400	NYSDEC - Service Station	400
Church	1	50 seats	n/a	3	NYSDEC - Churches	150
Tackle Shop	1		n/a	100	Ten State Standards - chap. 10, sect. 11.243	260
Auto shop	1		n/a	100	Ten State Standards - chap. 10, sect. 11.243	260
County Highway Department	2		n/a	100	Ten State Standards - chap. 10, sect. 11.243	520
Lumber Mill	2		n/a	100	Ten State Standards - chap. 10, sect. 11.243	520
Post Office	1		n/a	100	Ten State Standards - chap. 10, sect. 11.243	260
Meat Cutters Shop	2		n/a	100	Ten State Standards - chap. 10, sect. 11.243	520
Gas Station	1	1 toilet	n/a	400	NYSDEC - Service Station	400
<b>OTHER</b>						
Vacant Structure	0		2.6	100	Ten State Standards	0
<b>Total Units (Equivalent Residential)</b>	<b>86</b>				<b>Subtotal</b>	<b>22,750</b>
					10 % increase due to new residential or commercial development	25,025
					<b>Total Estimated Flow (rounded)</b>	<b>26,000</b>
					This flow estimation is 0.72 of the MOA flow (36,000)	

Notes:

1. The number of units is based on equivalent residential units.
2. The average household size (population) was calculated by averaging the 1990 census population for each of the hamlet towns and determined to be 2.6.
3. gpd is gallons per day
4. Ten State Standards & NYSDEC - see Chapter 1 Acronyms and References.

**TABLE 6.2 (Sheet 1 of 2)**  
**PROJECT COST SUMMARY**  
**Hamlet of Shandaken**

CONSTRUCTION COSTS (In January, 1999 dollars)	Total Costs
Individual Sewage Treatment Systems	
flow = 16,000 gpd	
No. = 33 @ \$10,000 per each (see note 1)	\$330,000
Cluster System Treatment with Conventional Sewer System	
Site A system, 38 services, 10000 gpd design flow	
Sewer construction cost (See Table 6.3, Sheet 1 of 4)	\$460,554
Wastewater disposal system construction cost (See Table 6.3, Sheet 2 of 4)	\$171,575
Sub-total	\$632,129
Site B system,    services,    gpd design flow	
Sewer construction cost	\$0
Wastewater disposal system construction cost	\$0
Sub-total	\$0
Total System Cost	\$962,129
Cluster System Treatment with Small Diameter Gravity Sewer (SDGS)	
Site A system, 38 services, 10,000 gpd design flow	
Sewer construction cost (See Table 6.3, Sheet 3 of 4)	\$455,882
Wastewater disposal system construction cost (See Table 6.3, Sheet 4 of 4)	\$155,075
Sub-total	\$610,957
Site B system,    services,    gpd design flow	
Sewer construction cost	\$0
Wastewater disposal system construction cost	\$0
Sub-total	\$0
Total System Cost	\$940,957
COMMUNITY-WIDE SEPTIC SYSTEM (A & B COMBINED, TREATMENT AT SITE A)	
1. with conventional sewer system,    services,    gpd flow	
Sewer construction cost	\$0
Wastewater disposal system construction cost	\$0
	\$0
2. with small diameter gravity system,    services,    gpd flow	
Sewer construction cost	\$0
Wastewater disposal system construction cost	\$0
	\$0
II. PROJECT COSTS	
Construction cost of least cost alternate (see note 2)	\$940,957
Non-construction costs including engineering (planning, hydrological/soils investigations, design, construction), land/easement acquisition, fiscal services, legal services, administration costs, permits    (approx. 25% of construction)	\$235,239
Total Estimated Project Cost (See note 3)	\$1,176,196

**TABLE 6.2 (Sheet 2 of 2)**

Notes for Table 6.2:

- 1 Individual Septic Systems average cost per site of \$10,000 is derived from the Catskill Watershed Corporation database on replacement or repairs to 666 individual septic systems through December 1998. There were 479 new or replacement individual septic systems including conventional design, modified conventional design, or alternative design systems. The average cost of the 479 new or replacement was \$7,556 with 243 conventional designs averaging just under \$4,000; 56 modified conventional designs averaging under \$10,000; and 180 alternative designs averaging just under \$12,000.
- 2 A more detailed study may result in a different alternate selected as the least cost alternate. Lacking detailed soils analysis, subsurface borings, disposal site analysis with hydrological/soils investigations, vertical and horizontal control survey, and detailed cost estimating with vendor quotes the above cost estimates may be considered to be accurate to plus or minus 25 percent.



**TABLE 6.3 (Sheet 1 of 4)****CONSTRUCTION COST ESTIMATE****CLUSTER SYSTEM TREATMENT WITH CONVENTIONAL SEWER SYSTEM****Site A Sewer Construction Cost****Hamlet of Shandaken**

Item No.	Description	Quantity	Unit	Unit Price	Total Price
2	8" sewer - PVC SDR35, 0-8' depth - B	4,142	LF	\$33	\$136,686
3	4" or 6" sewer laterals - PVC SDR35 - C	1900	LF	\$27	\$95,000
4	Manholes, 4' dia., - 8' depth, w/cover/frame	16	Ea.	\$1,500	\$24,000
5	Rock excavation - D	210	CY	\$40	\$8,400
6	Highway boring, rock, complete	\$50	LF	\$300	\$15,000
7	Stream crossing, environmental protection	\$0	Ea.	\$4,500	\$0
8	Road restoration, subbase and pavement	1315	LF	\$16	\$21,040
9	DOT ROW work, extra conditions - E	\$0	LF	\$32	\$0
10	Pump Station, complete with electrical	\$1	Ea.	\$60,000	\$60,000
11	2" or 4" Force Main, DIP or PVC SDR 26	\$100	LF	\$17	\$1,700
12	Grinder pump w/ sump & electrical	\$2	Ea.	\$6,000	\$12,000
	Sub-total without items 1 & 13				\$373,826
1	Mobilization, insurance, clearing/grubbing - A		LS	6%	\$22,430
13	Landscape/restoration - F		LS	6%	\$22,430
	Estimated Cost				\$418,686
	Construction Contingencies, 10%				\$41,868
	Total Estimated Construction Cost, 1999\$				\$460,554

A - equals 6 % of sub total costs

B - includes excavation, bedding, pipe installation, wyes/tees, backfill, testing,

C - laterals, average L = 50 feet to within 5 feet of foundation

D - low rock estimate, CY= trench L x 0.05 x 1CY/ft.; high rock estimate, CY= trench L x 0.25 x 1

E - LF = road L affected x \$32/LF including sidewalks restoration, DOT inspection, etc.

F - equals 6 % of sub-total costs

**TABLE 6.3 (Sheet 2 of 4)****CONSTRUCTION COST ESTIMATE****CLUSTER SYSTEM TREATMENT WITH CONVENTIONAL SEWER SYSTEM****Site A Wastewater Disposal System Construction Cost****Hamlet of Shandaken**

Item No	Description	Quantity	Unit	Unit Price	Total Price
1	Septic tank, 12,000 gal size, concrete, in place cost per 1000 gal. = \$1250				\$15,000
2A	Dosing tank with alternating siphons tank size = 25% design flow & cost = \$1.50/gal. plus \$1000		Ea.		\$4,750
2B	Pump station, if required for dosing field cost = \$50,000			\$50,000.00	not needed
3	4"PVC gravity dosing line to field or 4" pres. PVC (dual lines in common trench)	200		\$12.00	\$2,400
4	Absorption field site clearing, grubbing, grading 66,500 SF area	66500	SF	\$0.20	\$13,300
5	Fencing enclosure, woven wire, 800'/1acre to 1700'/4acre	1050		\$10.00	\$10,500
6	Access road, 12' wide gravel		LS		\$10,000
	Sub-total				\$55,950
7	Absorption field quantities per 1000 feet of trench (=2000 SF of absorption trench & 6000 SF of area)				
7a)	trench excavation, 1000 LF = 148, say 150 CY		LF	\$1.00	\$1,000
7b)	crushed stone, 74 CY, say 75 CY		CY	\$20.00	\$1,500
7c)	4" PVC perf. or 2" pres. PVC perf. pipe, set to grade		LF	\$4.00	\$4,000
7d)	PVC solid wall pipe within absorption field area (approx. 100 feet of 4" gravity or 3" pres. PVC pipe)		LF	\$4.00	\$400
7e)	distribution box, concrete with speed levelers (not required with pressure system)		Ea.	\$300.00	\$300
7f)	permeable geotextile, 2000 SF		SF	\$0.25	\$500
7g)	backfill soil, 74 CY, say 75 CY		CY	\$3.00	\$225
7h)	monitoring well or absorption field corner markers		LS	\$250.00	\$250
7i)	valving with valve box, typical per 1000' of trench		Ea.	\$250.00	\$250
7j)	grading & seeding, 6000 SF		SF	\$0.10	\$600
	Sub-total for 1000' of Absorption Trench				\$9,025
8	Absorption field cost for this site equals 66500SF/6000SF(\$9025)				\$100,027
	Estimated Cost				\$155,977
	Construction Contingencies, 10%				\$15,598
	Total Estimated Construction Cost, 1999\$				\$171,575

Design basis: 10000 gpd design flow with a percolation rate of 60 min/inch will need  
66,500 SF of area.

**TABLE 6.3 (Sheet 3 of 4)****CONSTRUCTION COST ESTIMATE****CLUSTER SYSTEM TREATMENT WITH SMALL DIAMETER GRAVITY SYSTEM****Site A Sewer Construction Cost****Hamlet of Shandaken**

Item No.	Description	Quantity	Unit	Unit Price	Total Price
2	4" sewer - PVC SDR35, 0-6' depth - B	4142	LF	\$27	\$111,834
3	2" or 4" sewer laterals - PVC SDR35 - C	1520	LF	\$24	\$36,480
4	Septic Tanks, concrete, 1000 gal. installed	38	Ea.	\$1,500	\$57,000
5	Septic Tanks, concrete, 2000 gal. installed	0	Ea.	\$2,000	\$0
6	Manholes, 4' dia., - 4' depth, w/cover/frame	5	Ea.	\$1,200	\$6,000
7	Cleanouts, 4"	10	Ea.	\$250	\$2,500
8	Rock excavation - D	80	CY	\$40	\$3,200
9	Highway boring, rock, complete	50	LF	\$300	\$15,000
10	Stream crossing, environmental protection	0	Ea.	\$4,500	\$0
11	Road restoration, subbase and pavement	1315	LF	\$16	\$21,040
12	DOT ROW work, extra conditions - E	1540	LF	\$32	\$49,280
13	Pump Station, complete with electrical	1	Ea.	\$55,000	\$55,000
14	2" or 4" Force Main, DIP or PVC SDR 26	100	LF	\$17	\$1,700
15	Effluent pump w/ sump & electrical	2	Ea.	\$5,500	\$11,000
	Sub-total without items 1 & 16				\$370,034
1	Mobilization, insurance, clearing/grubbing - A		LS	6%	\$22,202
16	Landscape/restoration - F		LS	6%	\$22,202
	Estimated Cost				\$414,438
	Construction Contingencies, 10%				\$41,444
	Total Estimated Construction Cost, 1999\$				\$455,882

A - equals 6 % of sub total costs

B - includes excavation, bedding, pipe installation, wyes/tees, backfill, testing,

C - laterals, average L = 40 feet to septic tank connection including cleanout

D - low rock estimate, CY= trench L x 0.02 x 1CY/ft.; high rock estimate, CY= trench L x 0.10 x 1

E - LF = road L affected x \$32/LF including sidewalks restoration, DOT inspection, etc.

F - equals 6 % of sub-total costs



**TABLE 6.3 (Sheet 4 of 4)**

**CONSTRUCTION COST ESTIMATE**

**CLUSTER SYSTEM TREATMENT WITH SMALL DIAMETER GRAVITY SYSTEM**

**Site A Wastewater Disposal System Construction Cost**

**Hamlet of Shandaken**

Item No	Description	Quantity	Unit	Unit Price	Total Price
1	Septic tank, concrete, in place cost per 1000 gal. = \$1250				
2A	Dosing tank with alternating siphons tank size = 25% design flow & cost = \$1.50/gal. plus \$1000		Ea.		\$4,750
2B	Pump station, if required for dosing field cost = \$50,000			\$50,000.00	not needed
3	4"PVC gravity dosing line to field or 4" pres. PVC (dual lines in common trench)	200		\$12.00	\$2,400
4	Absorption field site clearing, grubbing, grading 66,500 SF area	66500	SF	\$0.20	\$13,300
5	Fencing enclosure, woven wire, 800'/1acre to 1700'/4acre	1050		\$10.00	\$10,500
6	Access road, 12' wide gravel		LS		\$10,000
	Sub-total				\$40,950
7	Absorption field quantities per 1000 feet of trench (=2000 SF of absorption trench & 6000 SF of area)				
	7a) trench excavation, 1000 LF = 148, say 150 CY		LF	\$1.00	\$1,000
	7b) crushed stone, 74 CY, say 75 CY		CY	\$20.00	\$1,500
	7c) 4" PVC perf. or 2" pres. PVC perf. pipe, set to grade		LF	\$4.00	\$4,000
	7d) PVC solid wall pipe within absorption field area (approx. 100 feet of 4" gravity or 3" pres. PVC pipe)		LF	\$4.00	\$400
	7e) distribution box, concrete with speed levelers (not required with pressure system)		Ea.	\$300.00	\$300
	7f) permeable geotextile, 2000 SF		SF	\$0.25	\$500
	7g) backfill soil, 74 CY, say 75 CY		CY	\$3.00	\$225
	7h) monitoring well or absorption field corner markers		LS	\$250.00	\$250
	7i) valving with valve box, typical per 1000' of trench		Ea.	\$250.00	\$250
	7j) grading & seeding, 6000 SF		SF	\$0.10	\$600
	Sub-total for 1000' of Absorption Trench				\$9,025
8	Absorption field cost for this site equals 66500SF/6000SF(\$9025)				\$100,027
	Estimated Cost				\$140,977
	Construction Contingencies, 10%				\$14,098
	Total Estimated Construction Cost, 1999\$				\$155,075

Design basis: 10,000 gpd design flow with a percolation rate of 60 min/inch will need 66,500 SF of area.

**TABLE 6.4 (Sheet 1 of 2)****ANNUAL OPERATION & MAINTENANCE COST ESTIMATE****LOWEST COST ALTERNATE1****Hamlet of Shandaken**

	Annual Cost \$
A. Individual Sewage Treatment Systems	
No. = 33	
Annual cost @ \$100/yr. per each	\$3,300
B. Collection system O & M	
0.80 mile @ \$1500/yr/mile pipe (excluding laterals)	\$1,200
effluent pumps, 2 @ \$50/yr.	\$100
C. Pump stations O & M, 1 each, 6,400 gpd capacity	
labor @ 2 hr/week @ \$25/hr. including benefits	\$2,600
contract expenses	\$250
electric power	\$500
less credit if SDGS system	(\$670)
D. Subsurface Disposal System O & M, 10,000 gpd	
labor @ 3 hr./week @ \$25/hr.	\$3,900
Septage hauling, 12,000 gallons @ \$0.10/gallon	\$1,200
E. Administration and management expenses of Sewer District	
71 users (connections) @ \$50/account	\$3,550
Total Estimated Annual Operation & Maintenance	\$15,930

Footnote 1. Individual Sewage Treatment Systems plus Cluster System with Small Diameter Gravity Sewers.

Footnote 2. This cost represents 1 system pump out. It may only be necessary pump once every three years.

**TABLE 6.4 (Sheet 2 of 2)**  
**ANNUAL OPERATION & MAINTENANCE COST ESTIMATE**  
**LOWEST COST ALTERNATIVE**  
Hamlet of Shandaken

**Collection Sewers**

Estimate sewer line maintenance at \$1500/yr/mile of pipe including appurtenances. Annual O & M is assumed to be approximately equal for gravity, pressure, vacuum, and SDGS systems.

**Pump Stations** O & M labor @ 5hr/week for flows over 25,000 gpd and 2 hr/week for flows under 25,000 gpd. Use labor cost including benefits of \$25/hr.

Add contract expenses for electrical and pump repairs, etc. say \$500/yr over 25,000 gpd and \$250/yr under 25,000 gpd

Add electric power expenses say \$1000/yr over 25,000 gpd and \$500/yr. under 25,000 gpd

For SDGS system pump stations O & M expense is estimated to be 80 % of O & M for conventional design pump station due to 1) pumping a liquid waste devoid of large solids, 2) less grease and other nuisance floatables in wet well, 3) use of more energy efficient pumps, and 4) shallow depth wetwells due to SDGS design.

**Grinder pumps** @ \$60/unit/yr. to include annual service calls (3 to 5 % of units per year, 10-15 year major overhaul of each unit (replace seals, bearings, motor, etc), other service requirements such as electrical failures, grease build-up, clogging of pumps or pump air lock, preventive maintenance check annually, and electric power consumption (\$10-12 per year).

**Effluent Pumps** @ \$50/unit/yr - similar to grinder pump O & M except effluent pump units are smaller, less expensive, and generally require less energy.

**Individual Septic Systems** @ \$100 or more per unit per year to include Wastewater Management District (WWMD) inspections, septage disposal every 3 to 7 years, maintenance/repairs (typical system may require this major work every 10 to 25 years), administration and management expenses of WWMD. Annual system inspection work would include septic tank (uncover and inspect, measure depth of scum and sludge), distribution box/device (uncover and inspect), and leach field for evidence of pending or overt hydraulic failure. For systems with pump stations check semi-annually for pump and back-up alarm function. Use these inspections to educate system users reviewing appropriate water use practices.

**Subsurface Disposal - Cluster or Community-wide System** O & M labor @ 5hr/week for flows over 15,000 gpd and 3hr/week for flows under 15,000 gpd. Duties include checking system using a checklist, resting alternate absorption beds, grass cutting, etc.

**Administrative and Management Expense of Sewer District or WWMD**

Estimate \$50 per account per year. Services to include supervision of staff, record keeping, accounting, billing, filling reports, etc.



***FIGURES***

Figure 6.B  
Topography

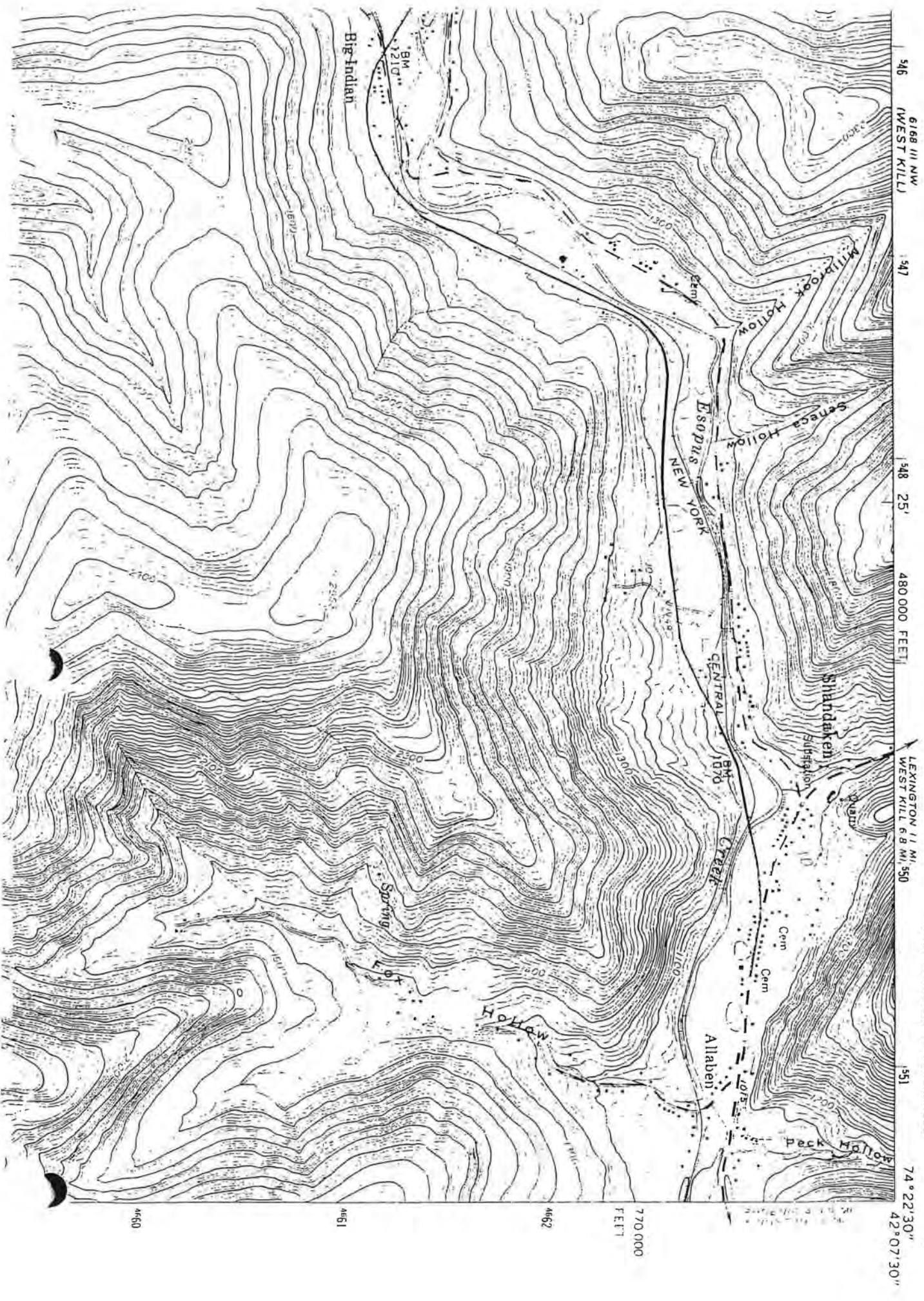




FIGURE 6.Aa

Lots with  
Potential  
Construction  
Constraints



(Lots may be within 100' buffer of  
waterways, Slopes >15%,  
and lot size less than 15,000sqft)

# New Sewage Treatment Infrastructure Program

## Strategic Wastewater Planning Study

Town of Shandaken  
Hamlet of Shandaken  
Ulster County

The following diagram was  
prepared by NYSEFC using  
NYCDEP GIS Data. This information  
is for discussion purposes only  
and makes no representation of  
accuracy

Prepared for:  
Town of Shandaken  
NYCDEP  
Prepared By:  
ASM NYSEFC  
Date:  
5/31/00

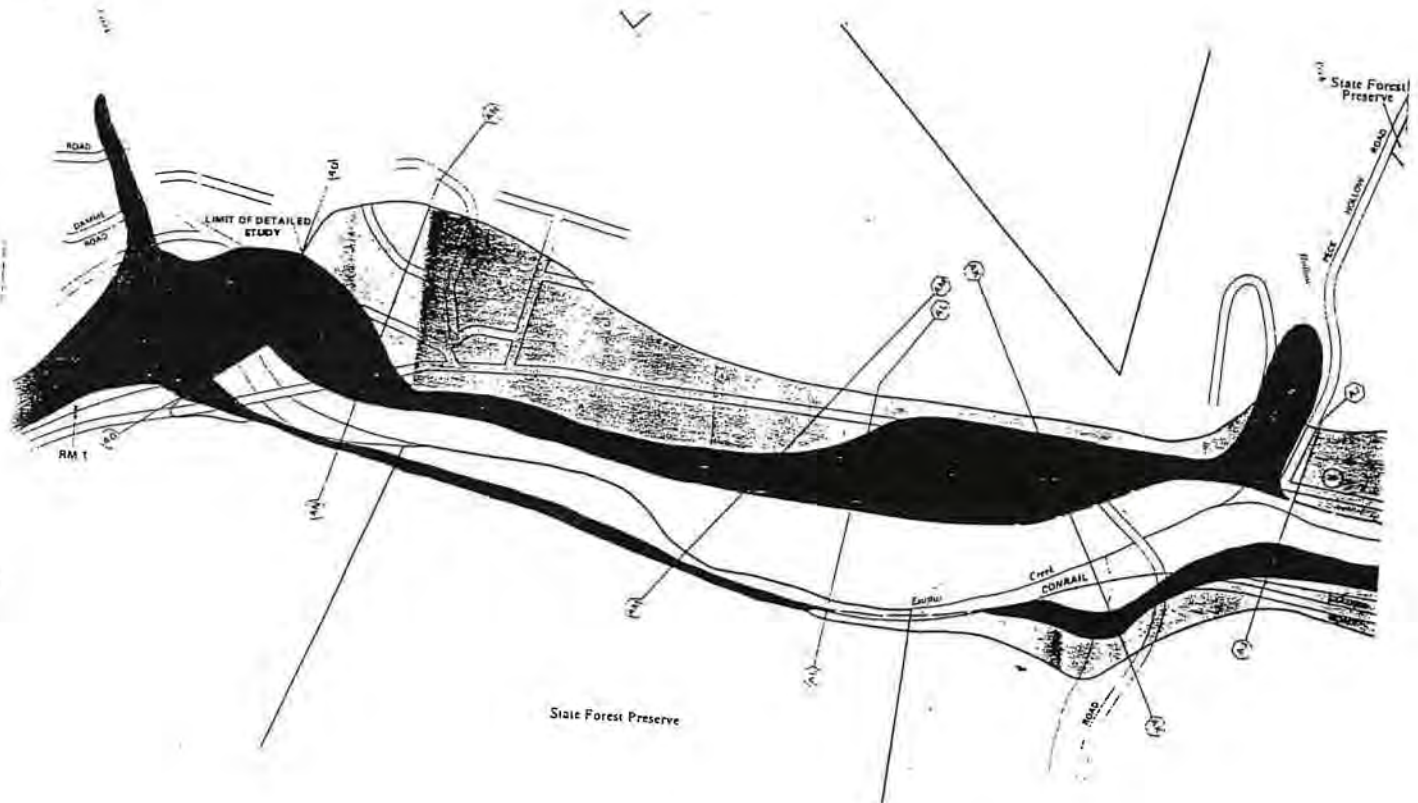


Not to Scale





FIGURE 6.C  
FLOODPLAIN MAPPING (FEMA)  
HAMLET OF SHANDAKEN  
TOWN OF SHANDAKEN





# FIGURE 6.D Conceptual Layout Plan

## New Sewage Treatment Infrastructure Program

## Strategic Wastewater Planning Study

- Individual Septic System
- Clean Out
- Small Diameter Gravity Sewer
- Manhole

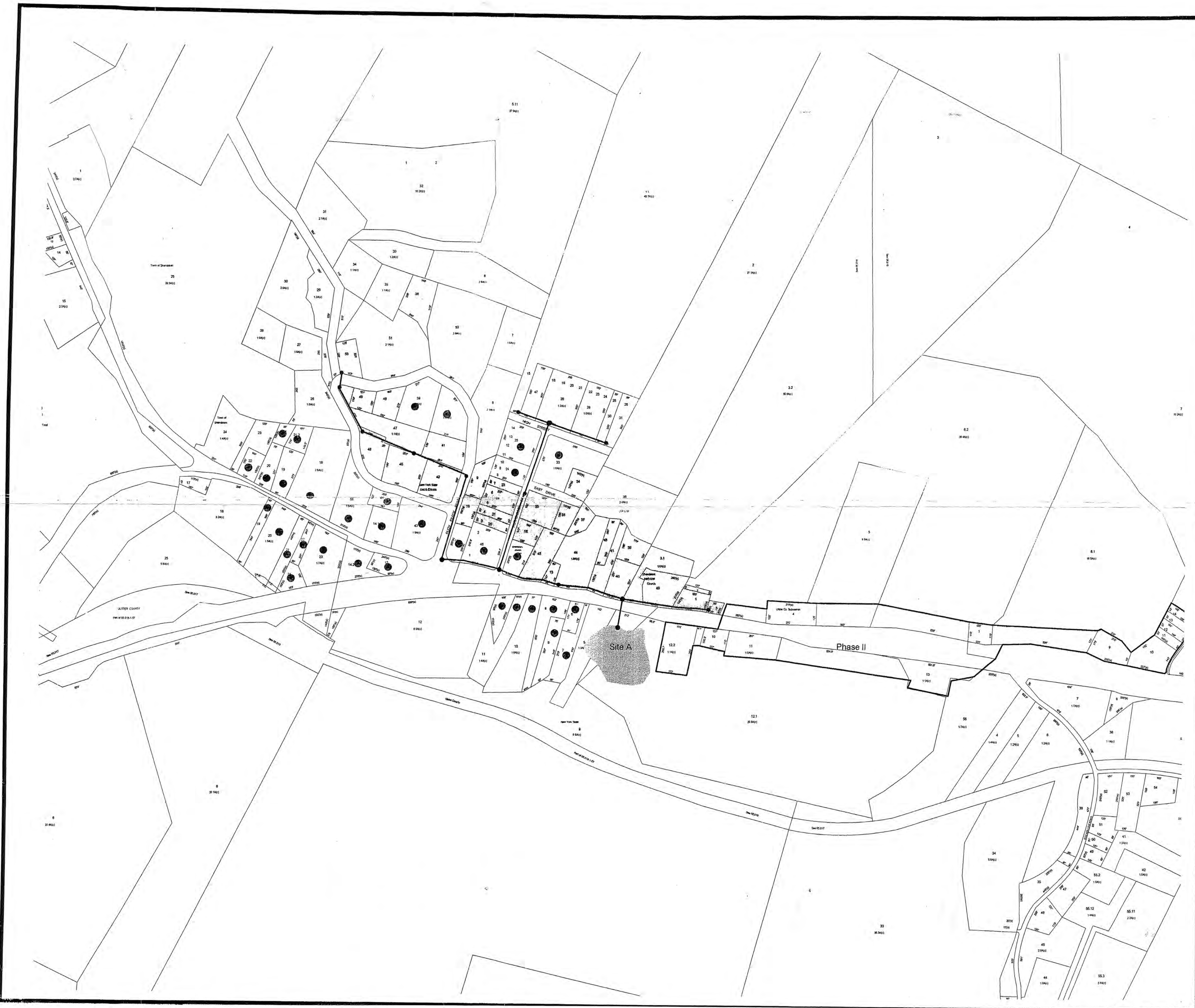
Town of Shandaken  
Hamlet of Shandaken  
Ulster County

The following diagram was prepared by NYSEFC using NYCDEP GIS Data. This information is for discussion purposes only and makes no representation of accuracy

Prepared for:  
Town of Shandaken  
NYCDEP  
Prepared By:  
ASM NYSEFC  
Date:  
5/30/00



Not to Scale



**APPENDICES**



**APPENDIX 6.1 (Sheet 1 of 2)**  
**WASTEWATER DISPOSAL SYSTEM SIZING**

No.	Community Name	Hamlet Design Flow (gpd)	On-Site System Flows (gpd)	Cluster System Flow		Site A-Area Required (SF)			Site B-Area Required (SF)			WWTP Capacity
				Site A (gpd)	Site B (gpd)	Absorption Trench System for Perc Rates of min/in.:	Absorption Trench System for Perc Rates of min/in.:	Absorption Trench System for Perc Rates of min/in.:	Absorption Trench System for Perc Rates of min/in.:			
8	Bloomville	28,000	0	24,300	3,700	121,500	145,400	161,750	18,200	21,800	24,400	Not
			Approximate no. of properties:			with 100% Reserve Area			with 100% Reserve Area			Allowed
9	Boiceville	45,000	8,000	1,600	0	243,000	290,800	323,500	36,400	43,600	48,800	
	see note 2		Approximate no. of properties:			with 100% Reserve Area						35,400
			28	6	0	15,200	18,400	20,600				note 2
10	Hamden	20,000	3,400	16,600		82,700	99,300	110,800				Not
			Approximate no. of properties:			with 100% Reserve Area						Allowed
			13	46		165,400	198,600	221,200				
11	DeLancey	17,000	15,250	1,000	750	4,920	5,900	6,608	3,648	4,408	4,920	Not
	see note 1		Approximate no. of properties:			with 100% Reserve Area			with 100% Reserve Area			Allowed
			50	4	3	9,840	11,800	13,200	7,300	8,820	9,840	
12	Bovina Center	23,000	0	22,000	1,000	109,900	131,600	146,700	4,900	5,900	6,600	Not
	see note 1		Approximate no. of properties:			with 100% Reserve Area			with 100% Reserve Area			Allowed
			0	66	3	219,800	263,200	293,400				
13	Ashland	28,000	900	14,500	12,600	72,400	86,700	96,600	62,700	75,500	83,900	28,000
			Approximate no. of properties:			with 100% Reserve Area			with 100% Reserve Area			
			3	46	40	144,800	173,400	193,200	125,400	151,000	167,800	
15	Trout Creek	16,000	500	4,600	10,900	22,700	27,200	30,400	54,200	65,000	72,450	Not
			Approximate no. of properties:			with 100% Reserve Area			with 100% Reserve Area			Allowed
			2	14	33	45,400	54,400	60,800	108,400	130,000	144,900	
16	Lexington	20,000	2,400	12,000	5,600	59,700	71,800	79,850	27,800	33,400	37,150	
			Approximate no. of properties:			with 100% Reserve Area			with 100% Reserve Area			
			9	29	19	119,400	143,600	159,700	55,600	66,800	74,300	

**APPENDIX 6.1 (Sheet 2 of 2)**  
**WASTEWATER DISPOSAL SYSTEM SIZING**

No.	Community Name	Hamlet Design Flow (gpd)	On-Site System Flows (gpd)	Cluster System Flow		Site A-Area Required (SF)			Site B-Area Required (SF)			WWTP Capacity (gpd)
				Site A (gpd)	Site B (gpd)	Absorption Trench System for Perc Rates of min/in.:			Absorption Trench System for Perc Rates of min/in.:			
						30	45	60	30	45	60	
17	S.Kortright	17,000	0	17,000	0	84,700	101,700	113,300				Not Allowed
			Approximate no. of properties:			with 100% Reserve Area						
				38	0	169,400	203,400	226,600				
18	Shandaken	26,000	19,600	6,400		31,800	38,200	42,500				26,000
			Approximate no. of properties			with 100% Reserve Area						
			58	19		63,600	76,400	85,000				
19	W. Conesville	9,000	0	9,000		44,775	53,650	59,800				
			Approximate no. of properties			with 100% Reserve Area						
			0	30		89,550	170,300	119,600				
20	Claryville	29,000										
			Approximate no. of properties			with 100% Reserve Area			with 100% Reserve Area			
21	Halcottsville	17,000	3,100	3,700	10,200	18,200	21,800	24,400	50,750	60,800	67,800	16,000
			Approximate no. of properties			with 100% Reserve Area			with 100% Reserve Area			
			10	12	33	36,400	43,600	48,800	101,500	121,600	135,600	
22	New Kingston	9,000	1,750	7,250		36,000	43,300	48,100				Not Allowed
			Approximate no. of properties:			with 100% Reserve Area						
			7	23		72,000	86,600	96,200				Allowed

Note 1: If cluster system serves 3 or less homes the design flow will be based on the number of bedrooms. For cluster systems serving 4 or more properties, the design flow is based on actual flow estimate. This table based on estimated flows.

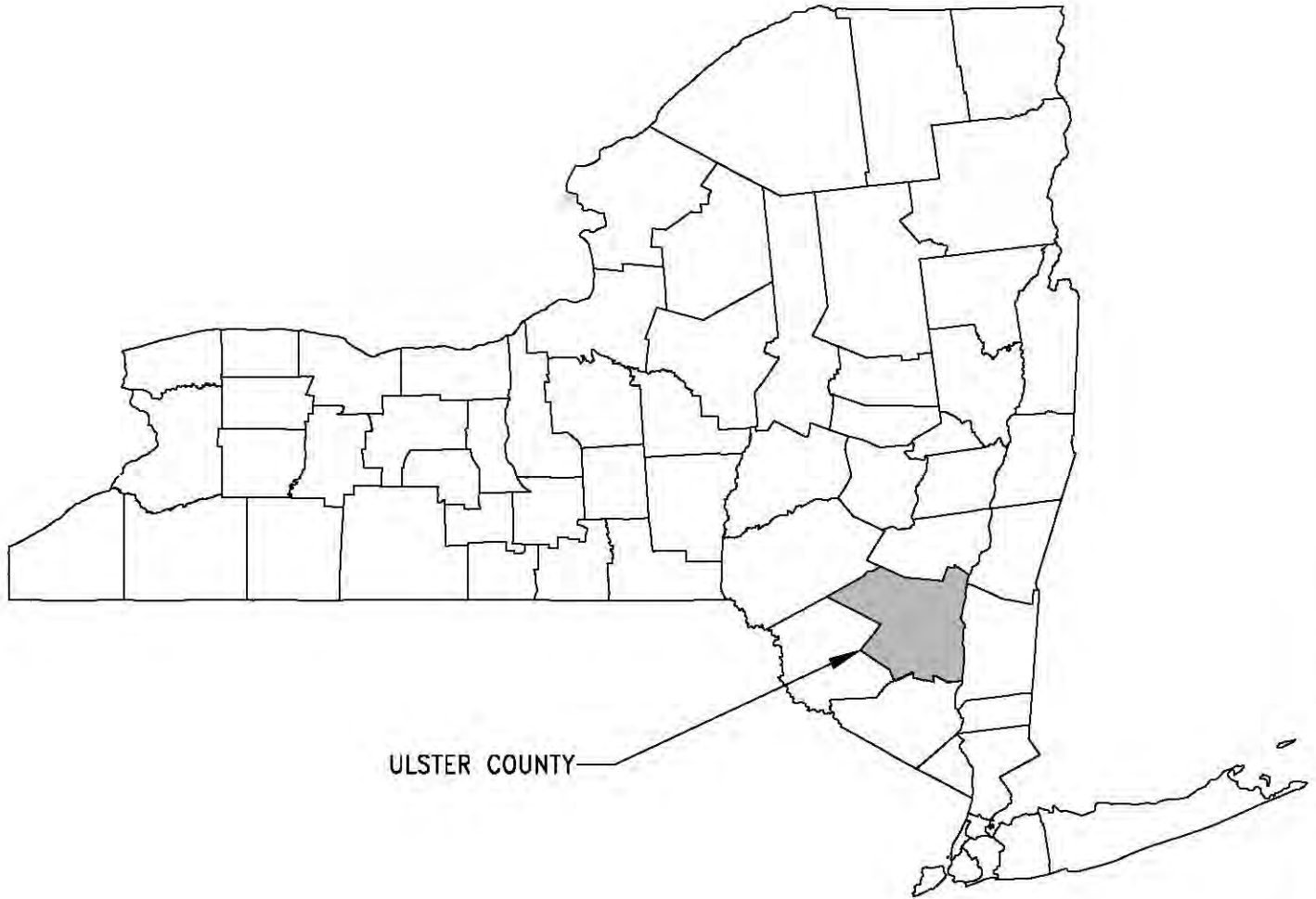
Note 2: WWTP to serve hamlet less Beechford Dr. area. Design flow = 35,400, and with Onteora Central School = 62,400 gpd.

Note 3: Last Updated 9/23/99

Exhibit 1.1.A

Location Maps





DATE  
10/23/12

PROJECT NO.  
2014044

SCALE  
NONE

DRAWN  
MKS

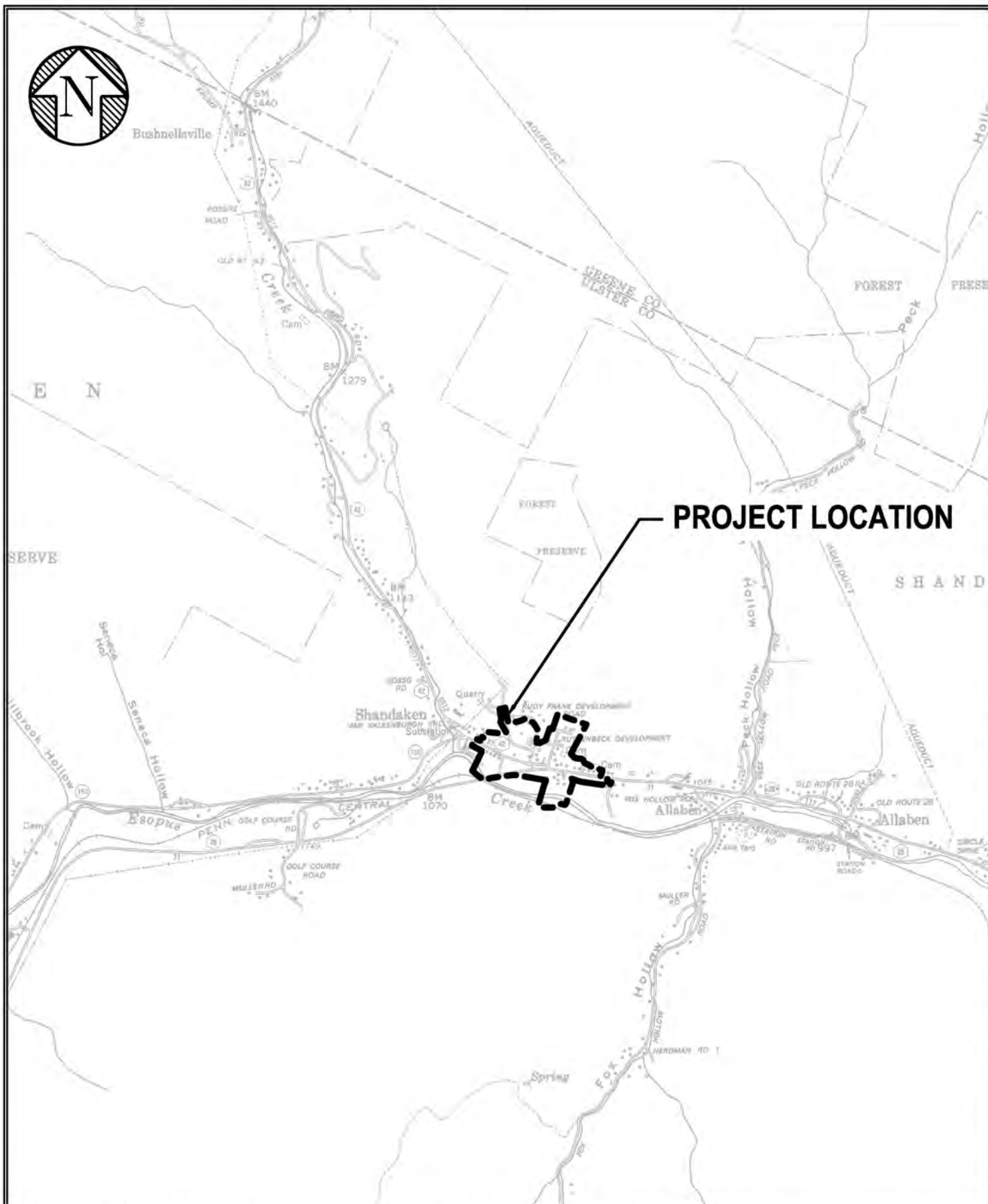
SHANDAKEN  
LOCATION MAP  
EXHIBIT 1.1.A

ULSTER COUNTY

NEW YORK STATE



**Lamont Engineers**  
ENGINEERS • PLANNERS • FACILITY OPERATIONS



DATE  
10/23/12

PROJECT NO.  
2014044

SCALE  
1"=2,500'

DRAWN  
MKS

SHANDAKEN  
LOCATION MAP  
EXHIBIT 1.1.A

ULSTER COUNTY

NEW YORK STATE



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Exhibit 1.2.A

2010 U.S. Census Information Town of Shandaken

# 2010 Population Finder

## 2010 Demographic Profile

NY - Shandaken town

### Population

Total Population	3,085
------------------	-------

### Housing Status ( in housing units unless noted )

Total	2,776
Occupied	1,505
Owner-occupied	1,083
Population in owner-occupied ( number of individuals )	2,199
Renter-occupied	422
Population in renter-occupied ( number of individuals )	842
Households with individuals under 18	292
Vacant	1,271
Vacant: for rent	88
Vacant: for sale	47

### Population by Sex/Age

Male	1,552
Female	1,533
Under 18	487
18 & over	2,598
20 - 24	124
25 - 34	245
35 - 49	614
50 - 64	943
65 & over	608

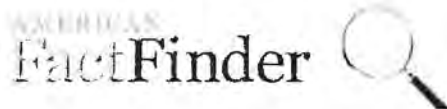
### Population by Ethnicity

Hispanic or Latino	153
Non Hispanic or Latino	2,932

### Population by Race

White	2,866
African American	28
Asian	48
American Indian and Alaska Native	14
Native Hawaiian and Pacific Islander	0
Other	54
Identified by two or more	75

Source: U.S. Census Bureau | Application Support Division (ASD) | [asd.internet.staff@census.gov](mailto:asd.internet.staff@census.gov) | Last  
Revised: Tuesday, 13-Mar-2012 17:36:53 EDT



QT-H1

General Housing Characteristics: 2010

2010 Census Summary File 1

NOTE: For information on confidentiality protection, nonsampling error, and definitions, see <http://www.census.gov/prod/cen2010/doc/sf1.pdf>.

Geography: Shandaken town, Ulster County, New York

Subject	Number	Percent
<b>OCCUPANCY STATUS</b>		
Total housing units	2,776	100.0
Occupied housing units	1,505	54.2
Vacant housing units	1,271	45.8
<b>TENURE</b>		
Occupied housing units	1,505	100.0
Owner occupied	1,083	72.0
Owned with a mortgage or loan	591	39.3
Owned free and clear	492	32.7
Renter occupied	422	28.0
<b>VACANCY STATUS</b>		
Vacant housing units	1,271	100.0
For rent	88	6.9
Rented, not occupied	9	0.7
For sale only	47	3.7
Sold, not occupied	16	1.3
For seasonal, recreational, or occasional use	980	77.1
For migratory workers	0	0.0
Other vacant	131	10.3
<b>TENURE BY HISPANIC OR LATINO ORIGIN OF HOUSEHOLDER BY RACE OF HOUSEHOLDER</b>		
Occupied housing units	1,505	100.0
Owner-occupied housing units	1,083	72.0
Not Hispanic or Latino householder	1,056	70.2
White alone householder	1,019	67.7
Black or African American alone householder	9	0.6
American Indian and Alaska Native alone householder	4	0.3
Asian alone householder	10	0.7
Native Hawaiian and Other Pacific Islander alone householder	0	0.0
Some Other Race alone householder	2	0.1
Two or More Races householder	12	0.8
Hispanic or Latino householder	27	1.8
White alone householder	22	1.5
Black or African American alone householder	0	0.0
American Indian and Alaska Native alone householder	1	0.1
Asian alone householder	0	0.0
Native Hawaiian and Other Pacific Islander alone householder	0	0.0
Some Other Race alone householder	3	0.2
Two or More Races householder	1	0.1
Renter-occupied housing units	422	28.0
Not Hispanic or Latino householder	405	26.9
White alone householder	386	25.6
Black or African American alone householder	7	0.5

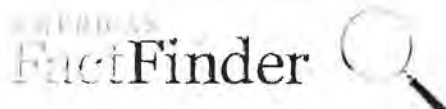


Subject	Number	Percent
American Indian and Alaska Native alone householder	1	0.1
Asian alone householder	4	0.3
Native Hawaiian and Other Pacific Islander alone householder	0	0.0
Some Other Race alone householder	2	0.1
Two or More Races householder	5	0.3
Hispanic or Latino householder	17	1.1
White alone householder	6	0.4
Black or African American alone householder	0	0.0
American Indian and Alaska Native alone householder	1	0.1
Asian alone householder	0	0.0
Native Hawaiian and Other Pacific Islander alone householder	0	0.0
Some Other Race alone householder	8	0.5
Two or More Races householder	2	0.1

X Not applicable.

Source: U.S. Census Bureau, 2010 Census.

Summary File 1, Tables H3, H4, H5, and HCT1.



DP03

## SELECTED ECONOMIC CHARACTERISTICS

2006-2010 American Community Survey 5-Year Estimates

Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Data and Documentation section.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, for 2010, the 2010 Census provides the official counts of the population and housing units for the nation, states, counties, cities and towns. For 2006 to 2009, the Population Estimates Program provides intercensal estimates of the population for the nation, states, and counties.

Subject	Shandaken town, Ulster County, New York			
	Estimate	Estimate Margin of Error	Percent	Percent Margin of Error
EMPLOYMENT STATUS				
Population 16 years and over	2,790	+/-252	2,790	(X)
In labor force	1,709	+/-213	61.3%	+/-6.5
Civilian labor force	1,709	+/-213	61.3%	+/-6.5
Employed	1,554	+/-190	55.7%	+/-6.6
Unemployed	155	+/-89	5.6%	+/-3.0
Armed Forces	0	+/-123	0.0%	+/-1.2
Not in labor force	1,081	+/-223	38.7%	+/-6.5
Civilian labor force	1,709	+/-213	1,709	(X)
Percent Unemployed	(X)	(X)	9.1%	+/-4.8
Females 16 years and over	1,251	+/-128	1,251	(X)
In labor force	731	+/-133	58.4%	+/-8.8
Civilian labor force	731	+/-133	58.4%	+/-8.8
Employed	663	+/-121	53.0%	+/-8.5
Own children under 6 years	112	+/-65	112	(X)
All parents in family in labor force	81	+/-53	72.3%	+/-28.1
Own children 6 to 17 years	292	+/-76	292	(X)
All parents in family in labor force	134	+/-69	45.9%	+/-21.0
COMMUTING TO WORK				
Workers 16 years and over	1,511	+/-188	1,511	(X)
Car, truck, or van -- drove alone	1,130	+/-196	74.8%	+/-7.7
Car, truck, or van -- carpooled	106	+/-51	7.0%	+/-3.4
Public transportation (excluding taxicab)	25	+/-25	1.7%	+/-1.6
Walked	49	+/-31	3.2%	+/-2.1
Other means	10	+/-15	0.7%	+/-1.0
Worked at home	191	+/-93	12.6%	+/-6.0
Mean travel time to work (minutes)	32.4	+/-6.4	(X)	(X)
OCCUPATION				
Civilian employed population 16 years and over	1,554	+/-190	1,554	(X)
Management, business, science, and arts occupations	547	+/-134	35.2%	+/-7.5
Service occupations	298	+/-84	19.2%	+/-5.0
Sales and office occupations	330	+/-111	21.2%	+/-6.5
Natural resources, construction, and maintenance occupations	227	+/-88	14.6%	+/-5.4



Subject	Shandaken town, Ulster County, New York			
	Estimate	Estimate Margin of Error	Percent	Percent Margin of Error
Production, transportation, and material moving occupations	152	+/-69	9.8%	+/-4.3
INDUSTRY				
Civilian employed population 16 years and over	1,554	+/-190	1,554	(X)
Agriculture, forestry, fishing and hunting, and mining	40	+/-47	2.6%	+/-3.0
Construction	217	+/-86	14.0%	+/-5.3
Manufacturing	165	+/-73	10.6%	+/-4.5
Wholesale trade	40	+/-31	2.6%	+/-2.1
Retail trade	92	+/-51	5.9%	+/-3.1
Transportation and warehousing, and utilities	64	+/-47	4.1%	+/-2.9
Information	24	+/-25	1.5%	+/-1.6
Finance and insurance, and real estate and rental and leasing	132	+/-60	8.5%	+/-3.5
Professional, scientific, and management, and administrative and waste management services	123	+/-66	7.9%	+/-3.9
Educational services, and health care and social assistance	305	+/-102	19.6%	+/-6.6
Arts, entertainment, and recreation, and accommodation and food services	222	+/-90	14.3%	+/-5.5
Other services, except public administration	55	+/-53	3.5%	+/-3.5
Public administration	75	+/-64	4.8%	+/-4.1
CLASS OF WORKER				
Civilian employed population 16 years and over	1,554	+/-190	1,554	(X)
Private wage and salary workers	959	+/-143	61.7%	+/-7.5
Government workers	261	+/-102	16.8%	+/-6.3
Self-employed in own not incorporated business workers	325	+/-122	20.9%	+/-6.6
Unpaid family workers	9	+/-15	0.6%	+/-0.9
INCOME AND BENEFITS (IN 2010 INFLATION-ADJUSTED DOLLARS)				
Total households	1,520	+/-151	1,520	(X)
Less than \$10,000	121	+/-67	8.0%	+/-4.4
\$10,000 to \$14,999	209	+/-88	13.8%	+/-5.3
\$15,000 to \$24,999	166	+/-65	10.9%	+/-4.2
\$25,000 to \$34,999	154	+/-75	10.1%	+/-4.8
\$35,000 to \$49,999	198	+/-67	13.0%	+/-4.4
\$50,000 to \$74,999	279	+/-113	18.4%	+/-6.8
\$75,000 to \$99,999	160	+/-76	10.5%	+/-5.0
\$100,000 to \$149,999	168	+/-75	11.1%	+/-5.0
\$150,000 to \$199,999	9	+/-15	0.6%	+/-1.0
\$200,000 or more	56	+/-35	3.7%	+/-2.3
Median household income (dollars)	43,349	+/-9,196	(X)	(X)
Mean household income (dollars)	60,331	+/-10,177	(X)	(X)
With earnings	1,098	+/-141	72.2%	+/-6.4
Mean earnings (dollars)	56,241	+/-10,399	(X)	(X)
With Social Security	560	+/-134	36.8%	+/-7.5
Mean Social Security income (dollars)	15,749	+/-1,955	(X)	(X)
With retirement income	385	+/-117	25.3%	+/-7.1
Mean retirement income (dollars)	32,513	+/-24,923	(X)	(X)
With Supplemental Security Income	117	+/-74	7.7%	+/-4.8
Mean Supplemental Security Income (dollars)	8,096	+/-1,680	(X)	(X)
With cash public assistance income	9	+/-12	0.6%	+/-0.8
Mean cash public assistance income (dollars)	522	+/-27	(X)	(X)
With Food Stamp/SNAP benefits in the past 12 months	151	+/-70	9.9%	+/-4.6
Families	837	+/-132	837	(X)
Less than \$10,000	21	+/-24	2.5%	+/-3.0
\$10,000 to \$14,999	57	+/-45	6.8%	+/-5.1
\$15,000 to \$24,999	113	+/-54	13.5%	+/-6.3
\$25,000 to \$34,999	72	+/-50	8.6%	+/-5.7
\$35,000 to \$49,999	128	+/-58	15.3%	+/-6.6
\$50,000 to \$74,999	206	+/-93	24.6%	+/-9.7



Subject	Shandaken town, Ulster County, New York			
	Estimate	Estimate Margin of Error	Percent	Percent Margin of Error
\$75,000 to \$99,999	88	+/-52	10.5%	+/-6.1
\$100,000 to \$149,999	109	+/-55	13.0%	+/-6.6
\$150,000 to \$199,999	0	+/-123	0.0%	+/-4.1
\$200,000 or more	43	+/-32	5.1%	+/-3.7
Median family income (dollars)	52,604	+/-9,026	(X)	(X)
Mean family income (dollars)	72,392	+/-15,446	(X)	(X)
Per capita income (dollars)	29,768	+/-5,095	(X)	(X)
Nonfamily households	683	+/-133	683	(X)
Median nonfamily income (dollars)	27,371	+/-10,767	(X)	(X)
Mean nonfamily income (dollars)	42,605	+/-10,644	(X)	(X)
Median earnings for workers (dollars)	27,634	+/-5,805	(X)	(X)
Median earnings for male full-time, year-round workers (dollars)	43,917	+/-9,224	(X)	(X)
Median earnings for female full-time, year-round workers (dollars)	32,763	+/-10,573	(X)	(X)
HEALTH INSURANCE COVERAGE				
Civilian noninstitutionalized population	(X)	(X)	(X)	(X)
With health insurance coverage	(X)	(X)	(X)	(X)
With private health insurance	(X)	(X)	(X)	(X)
With public coverage	(X)	(X)	(X)	(X)
No health insurance coverage	(X)	(X)	(X)	(X)
Civilian noninstitutionalized population under 18 years	(X)	(X)	(X)	(X)
No health insurance coverage	(X)	(X)	(X)	(X)
Civilian noninstitutionalized population 18 to 64 years	(X)	(X)	(X)	(X)
In labor force:	(X)	(X)	(X)	(X)
Employed:	(X)	(X)	(X)	(X)
With health insurance coverage	(X)	(X)	(X)	(X)
With private health insurance	(X)	(X)	(X)	(X)
With public coverage	(X)	(X)	(X)	(X)
No health insurance coverage	(X)	(X)	(X)	(X)
Unemployed:	(X)	(X)	(X)	(X)
With health insurance coverage	(X)	(X)	(X)	(X)
With private health insurance	(X)	(X)	(X)	(X)
With public coverage	(X)	(X)	(X)	(X)
No health insurance coverage	(X)	(X)	(X)	(X)
Not in labor force:	(X)	(X)	(X)	(X)
With health insurance coverage	(X)	(X)	(X)	(X)
With private health insurance	(X)	(X)	(X)	(X)
With public coverage	(X)	(X)	(X)	(X)
No health insurance coverage	(X)	(X)	(X)	(X)
PERCENTAGE OF FAMILIES AND PEOPLE WHOSE INCOME IN THE PAST 12 MONTHS IS BELOW THE POVERTY LEVEL				
All families	(X)	(X)	12.2%	+/-7.4
With related children under 18 years	(X)	(X)	37.8%	+/-17.0
With related children under 5 years only	(X)	(X)	58.7%	+/-36.3
Married couple families	(X)	(X)	3.6%	+/-5.5
With related children under 18 years	(X)	(X)	12.5%	+/-17.8
With related children under 5 years only	(X)	(X)	48.0%	+/-47.8
Families with female householder, no husband present	(X)	(X)	64.8%	+/-30.5
With related children under 18 years	(X)	(X)	100.0%	+/-45.4
With related children under 5 years only	(X)	(X)	100.0%	+/-85.4
All people	(X)	(X)	16.4%	+/-6.7
Under 18 years	(X)	(X)	28.5%	+/-13.5
Related children under 18 years	(X)	(X)	28.5%	+/-13.5
Related children under 5 years	(X)	(X)	42.9%	+/-30.2
Related children 5 to 17 years	(X)	(X)	22.9%	+/-13.4
18 years and over	(X)	(X)	14.6%	+/-6.3
18 to 64 years	(X)	(X)	18.5%	+/-7.5

Subject	Shandaken town, Ulster County, New York			
	Estimate	Estimate Margin of Error	Percent	Percent Margin of Error
65 years and over	(X)	(X)	3.3%	+/-4.1
People in families	(X)	(X)	11.8%	+/-7.2
Unrelated individuals 15 years and over	(X)	(X)	26.2%	+/-12.8

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see Accuracy of the Data). The effect of nonsampling error is not represented in these tables.

There were changes in the edit between 2009 and 2010 regarding Supplemental Security Income (SSI) and Social Security. The changes in the edit loosened restrictions on disability requirements for receipt of SSI resulting in an increase in the total number of SSI recipients in the American Community Survey. The changes also loosened restrictions on possible reported monthly amounts in Social Security income resulting in higher Social Security aggregate amounts. These results more closely match administrative counts compiled by the Social Security Administration.

Workers include members of the Armed Forces and civilians who were at work last week.

Industry codes are 4-digit codes and are based on the North American Industry Classification System 2007. The Industry categories adhere to the guidelines issued in Clarification Memorandum No. 2, "NAICS Alternate Aggregation Structure for Use By U.S. Statistical Agencies," issued by the Office of Management and Budget.

Occupation codes are 4-digit codes and are based on the Standard Occupational Classification (SOC) 2010. The 2010 Census occupation codes were updated in accordance with the 2010 revision of the SOC. To allow for the creation of 2006-2010 and 2008-2010 tables, occupation data in the multiyear files (2006-2010 and 2008-2010) were recoded to 2010 Census occupation codes. We recommend using caution when comparing data coded using 2010 Census occupation codes with data coded using previous Census occupation codes. For more information on the Census occupation code changes, please visit our website at <http://www.census.gov/hhes/www/oiindex/>.

While the 2006-2010 American Community Survey (ACS) data generally reflect the December 2009 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.

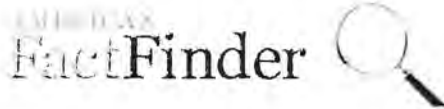
Estimates of urban and rural population, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2000 data. Boundaries for urban areas have not been updated since Census 2000. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Source: U.S. Census Bureau, 2006-2010 American Community Survey

#### Explanation of Symbols:

1. An '\*\*\*' entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate.
2. An '-' entry in the estimate column indicates that either no sample observations or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution.
3. An '-' following a median estimate means the median falls in the lowest interval of an open-ended distribution.
4. An '+' following a median estimate means the median falls in the upper interval of an open-ended distribution.
5. An '\*\*\*\*' entry in the margin of error column indicates that the median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.
6. An '\*\*\*\*\*' entry in the margin of error column indicates that the estimate is controlled. A statistical test for sampling variability is not appropriate.
7. An 'N' entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small.
8. An '(X)' means that the estimate is not applicable or not available.





DP04

## SELECTED HOUSING CHARACTERISTICS

2006-2010 American Community Survey 5-Year Estimates

Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Data and Documentation section.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, for 2010, the 2010 Census provides the official counts of the population and housing units for the nation, states, counties, cities and towns. For 2006 to 2009, the Population Estimates Program provides intercensal estimates of the population for the nation, states, and counties.

Subject	Shandaken town, Ulster County, New York			
	Estimate	Estimate Margin of Error	Percent	Percent Margin of Error
<b>HOUSING OCCUPANCY</b>				
Total housing units	2,654	+/-166	2,654	(X)
Occupied housing units	1,520	+/-151	57.3%	+/-4.8
Vacant housing units	1,134	+/-152	42.7%	+/-4.8
Homeowner vacancy rate	5.5	+/-4.7	(X)	(X)
Rental vacancy rate	3.3	+/-4.9	(X)	(X)
<b>UNITS IN STRUCTURE</b>				
Total housing units	2,654	+/-166	2,654	(X)
1-unit, detached	2,136	+/-195	80.5%	+/-4.8
1-unit, attached	9	+/-15	0.3%	+/-0.6
2 units	65	+/-68	2.4%	+/-2.6
3 or 4 units	98	+/-68	3.7%	+/-2.5
5 to 9 units	69	+/-47	2.6%	+/-1.7
10 to 19 units	13	+/-20	0.5%	+/-0.7
20 or more units	48	+/-58	1.8%	+/-2.2
Mobile home	216	+/-86	8.1%	+/-3.2
Boat, RV, van, etc.	0	+/-123	0.0%	+/-1.3
<b>YEAR STRUCTURE BUILT</b>				
Total housing units	2,654	+/-166	2,654	(X)
Built 2005 or later	40	+/-45	1.5%	+/-1.7
Built 2000 to 2004	21	+/-24	0.8%	+/-0.9
Built 1990 to 1999	101	+/-66	3.8%	+/-2.5
Built 1980 to 1989	365	+/-114	13.8%	+/-4.4
Built 1970 to 1979	338	+/-112	12.7%	+/-4.0
Built 1960 to 1969	179	+/-87	6.7%	+/-3.3
Built 1950 to 1959	425	+/-164	16.0%	+/-6.0
Built 1940 to 1949	138	+/-82	5.2%	+/-3.1
Built 1939 or earlier	1,047	+/-190	39.4%	+/-6.5
<b>ROOMS</b>				
Total housing units	2,654	+/-166	2,654	(X)
1 room	76	+/-47	2.9%	+/-1.8
2 rooms	158	+/-85	6.0%	+/-3.1
3 rooms	362	+/-142	13.6%	+/-5.3
4 rooms	496	+/-130	18.7%	+/-4.7
5 rooms	461	+/-120	17.4%	+/-4.7

Subject	Shandaken town, Ulster County, New York			
	Estimate	Estimate Margin of Error	Percent	Percent Margin of Error
\$150,000 to \$199,999	130	+/-72	12.1%	+/-6.3
\$200,000 to \$299,999	314	+/-79	29.2%	+/-7.2
\$300,000 to \$499,999	256	+/-101	23.8%	+/-8.3
\$500,000 to \$999,999	37	+/-29	3.4%	+/-2.6
\$1,000,000 or more	22	+/-38	2.0%	+/-3.4
Median (dollars)	218,800	+/-17,595	(X)	(X)
MORTGAGE STATUS				
Owner-occupied units	1,076	+/-175	1,076	(X)
Housing units with a mortgage	548	+/-129	50.9%	+/-10.0
Housing units without a mortgage	528	+/-148	49.1%	+/-10.0
SELECTED MONTHLY OWNER COSTS (SMOC)				
Housing units with a mortgage	548	+/-129	548	(X)
Less than \$300	0	+/-123	0.0%	+/-6.2
\$300 to \$499	0	+/-123	0.0%	+/-6.2
\$500 to \$699	42	+/-31	7.7%	+/-5.3
\$700 to \$999	61	+/-38	11.1%	+/-7.1
\$1,000 to \$1,499	195	+/-87	35.6%	+/-11.8
\$1,500 to \$1,999	85	+/-47	15.5%	+/-8.3
\$2,000 or more	165	+/-76	30.1%	+/-11.4
Median (dollars)	1,428	+/-189	(X)	(X)
Housing units without a mortgage	528	+/-148	528	(X)
Less than \$100	0	+/-123	0.0%	+/-6.4
\$100 to \$199	0	+/-123	0.0%	+/-6.4
\$200 to \$299	48	+/-43	9.1%	+/-7.2
\$300 to \$399	162	+/-86	30.7%	+/-13.7
\$400 or more	318	+/-112	60.2%	+/-14.8
Median (dollars)	481	+/-112	(X)	(X)
SELECTED MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME (SMOCAP)				
Housing units with a mortgage (excluding units where SMOCAP cannot be computed)	534	+/-121	534	(X)
Less than 20.0 percent	156	+/-67	29.2%	+/-10.6
20.0 to 24.9 percent	61	+/-37	11.4%	+/-6.5
25.0 to 29.9 percent	111	+/-66	20.8%	+/-10.9
30.0 to 34.9 percent	54	+/-42	10.1%	+/-7.5
35.0 percent or more	152	+/-67	28.5%	+/-11.0
Not computed	14	+/-24	(X)	(X)
Housing unit without a mortgage (excluding units where SMOCAP cannot be computed)	528	+/-148	528	(X)
Less than 10.0 percent	201	+/-97	38.1%	+/-15.2
10.0 to 14.9 percent	54	+/-39	10.2%	+/-7.3
15.0 to 19.9 percent	93	+/-67	17.6%	+/-11.8
20.0 to 24.9 percent	39	+/-36	7.4%	+/-6.1
25.0 to 29.9 percent	40	+/-42	7.6%	+/-7.7
30.0 to 34.9 percent	33	+/-36	6.3%	+/-6.4
35.0 percent or more	68	+/-58	12.9%	+/-10.4
Not computed	0	+/-123	(X)	(X)
GROSS RENT				
Occupied units paying rent	346	+/-101	346	(X)
Less than \$200	41	+/-57	11.8%	+/-15.8
\$200 to \$299	12	+/-20	3.5%	+/-6.0
\$300 to \$499	14	+/-25	4.0%	+/-7.0
\$500 to \$749	95	+/-60	27.5%	+/-15.8
\$750 to \$999	129	+/-70	37.3%	+/-17.0
\$1,000 to \$1,499	55	+/-32	15.9%	+/-8.0
\$1,500 or more	0	+/-123	0.0%	+/-9.6
Median (dollars)	759	+/-114	(X)	(X)
No rent paid	98	+/-55	(X)	(X)
GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME (GRAPI)				

Subject	Shandaken town, Ulster County, New York			
	Estimate	Estimate Margin of Error	Percent	Percent Margin of Error
Occupied units paying rent (excluding units where GRAP cannot be computed)	346	+/-101	346	(X)
Less than 15.0 percent	33	+/-41	9.5%	+/-11.4
15.0 to 19.9 percent	34	+/-26	9.8%	+/-7.5
20.0 to 24.9 percent	68	+/-54	19.7%	+/-14.8
25.0 to 29.9 percent	13	+/-21	3.8%	+/-6.4
30.0 to 34.9 percent	16	+/-26	4.6%	+/-7.4
35.0 percent or more	182	+/-78	52.6%	+/-15.9
Not computed	98	+/-55	(X)	(X)

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see Accuracy of the Data). The effect of nonsampling error is not represented in these tables.

The median gross rent excludes no cash renters.

In prior years, the universe included all owner-occupied units with a mortgage. It is now restricted to include only those units where SMOCAPI is computed, that is, SMOCAPI and household income are valid values.

In prior years, the universe included all owner-occupied units without a mortgage. It is now restricted to include only those units where SMOCAPI is computed, that is, SMOCAPI and household income are valid values.

In prior years, the universe included all renter-occupied units. It is now restricted to include only those units where GRAP is computed, that is, gross rent and household income are valid values.

The 2009 and 2010 plumbing data for Puerto Rico will not be shown. Research indicates that the questions on plumbing facilities that were introduced in 2008 in the stateside American Community Survey and the 2008 Puerto Rico Community Survey may not have been appropriate for Puerto Rico.

While the 2006-2010 American Community Survey (ACS) data generally reflect the December 2009 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.

Estimates of urban and rural population, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2000 data. Boundaries for urban areas have not been updated since Census 2000. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Source: U.S. Census Bureau, 2006-2010 American Community Survey

#### Explanation of Symbols:

1. An '\*\*\*' entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate.
2. An 'L' entry in the estimate column indicates that either no sample observations or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution.
3. An 'L' following a median estimate means the median falls in the lowest interval of an open-ended distribution.
4. An 'U' following a median estimate means the median falls in the upper interval of an open-ended distribution.
5. An '\*\*\*' entry in the margin of error column indicates that the median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.
6. An '\*\*\*\*\*' entry in the margin of error column indicates that the estimate is controlled. A statistical test for sampling variability is not appropriate.
7. An 'N' entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small.
8. An '(X)' means that the estimate is not applicable or not available.

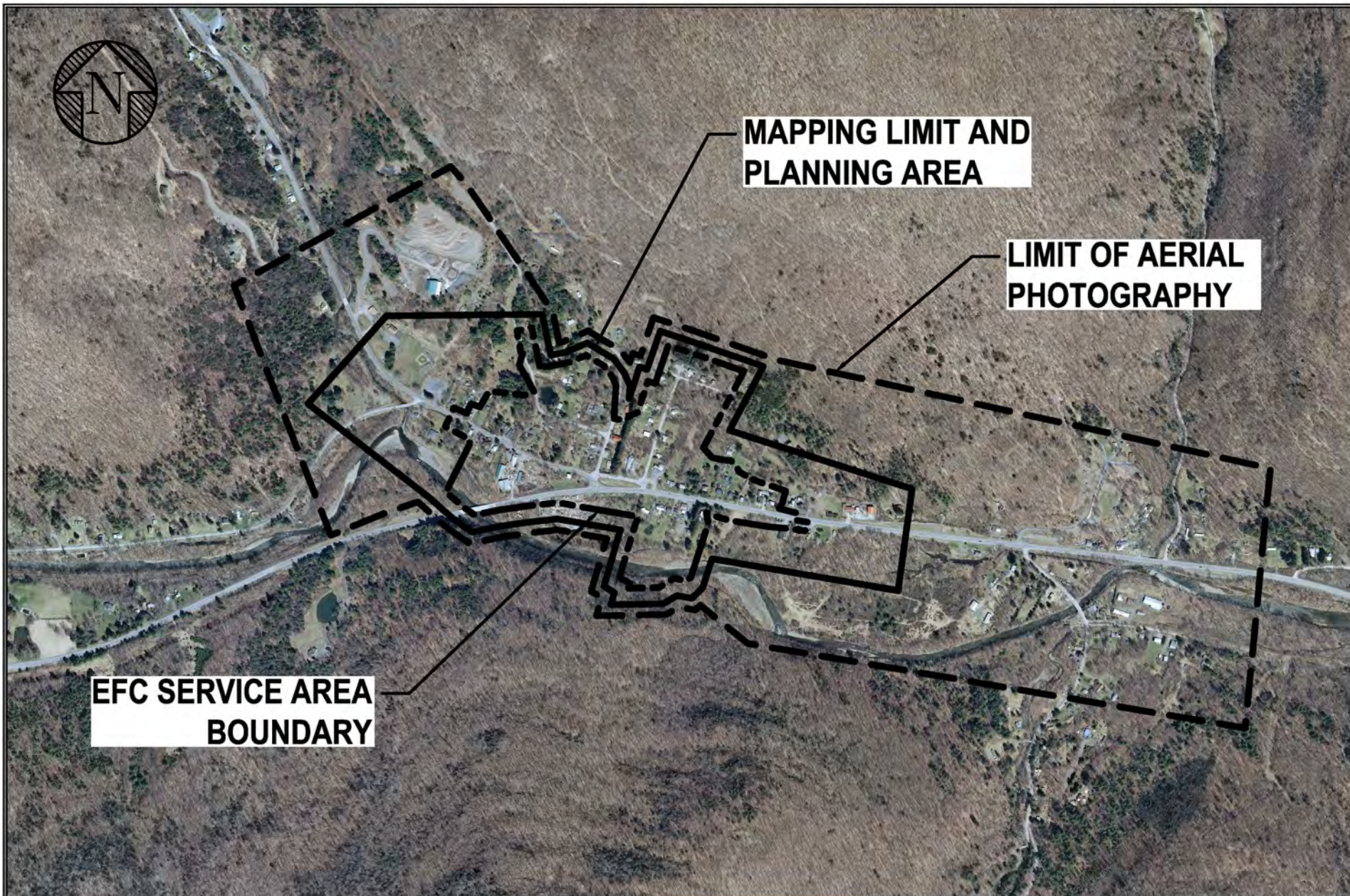
Exhibit 2.A

Aerial Photography and Mapping Limit










DATE 1/22/13	PROJECT NO. 2014044	SHANDAKEN AERIAL PHOTOGRAPHY AND MAPPING LIMIT ULSTER COUNTY NEW YORK STATE	 <b>Lamont Engineers</b> ENGINEERS • PLANNERS • FACILITY OPERATIONS
SCALE 1"=1,000'	DRAWN MKS		



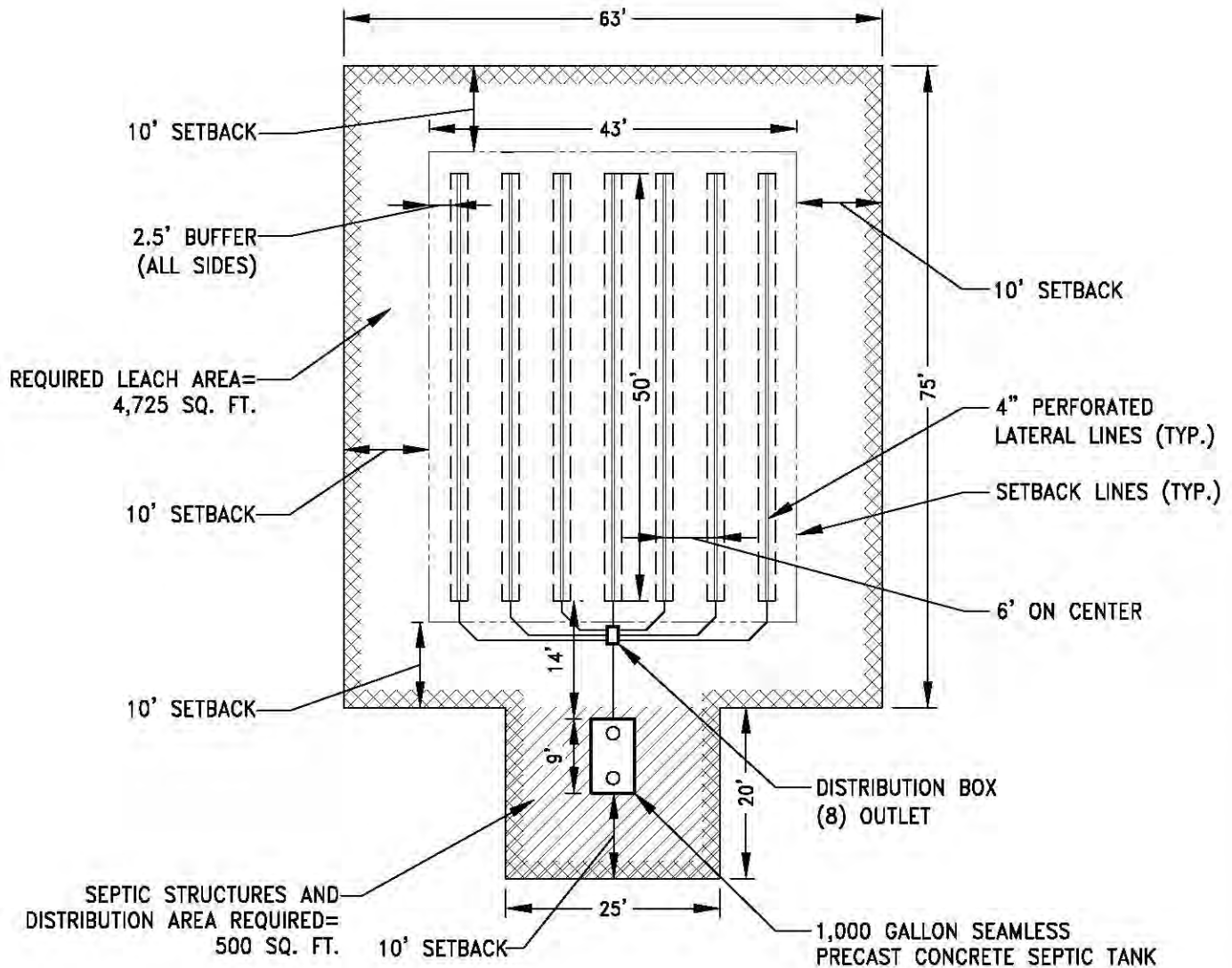
Exhibit 3.1.a.A

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  
5/4/13

PROJECT NO.  
2014044

SCALE  
1"=20'

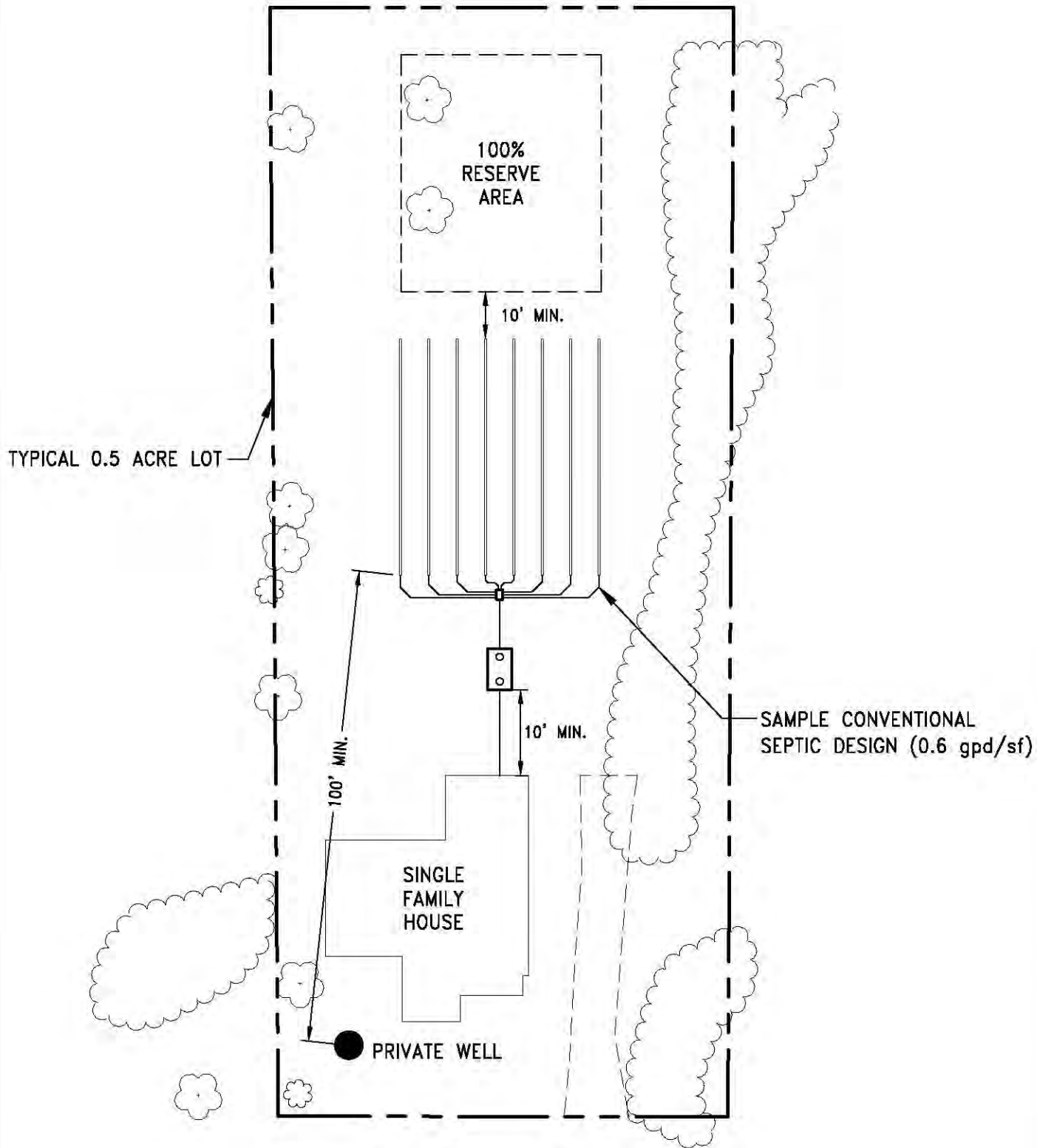
DRAWN  
JRB

HAMLET OF SHANDAKEN  
SAMPLE CONVENTIONAL SEPTIC  
SYSTEM DESIGN 0.6 GPD/SF  
EXHIBIT 3.1a.A



**Lamont Engineers**  
ENGINEERS • PLANNERS • FACILITY OPERATIONS





DATE  
5/4/13

PROJECT NO.  
2014044

SCALE  
1"=30'

DRAWN  
JRB

HAMLET OF SHANDAKEN  
TYPICAL LOT LAYOUT  
EXHIBIT 3.1a.A



**Lamont Engineers**  
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Exhibit 3.1.a.B

Septic Limitation Map







Exhibit 3.1.b.A

Flood Insurance Study Map



NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations (BFEs)** and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

**Coastal Base Flood Elevations** shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

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 National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 18. The **horizontal datum** was NAD 83, GR81980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov> or contact the National Geodetic Survey at the following address:

NGS Information Services  
NOAA/NNGS12  
National Geodetic Survey  
SSM/C-3, #9202  
1315 East-West Highway  
Silver Spring, Maryland 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov>.

**Base map** information shown on this FIRM was derived from digital orthophotography provided by the New York State Office of Cyber Security & Critical Infrastructure from photography dated April 2009.

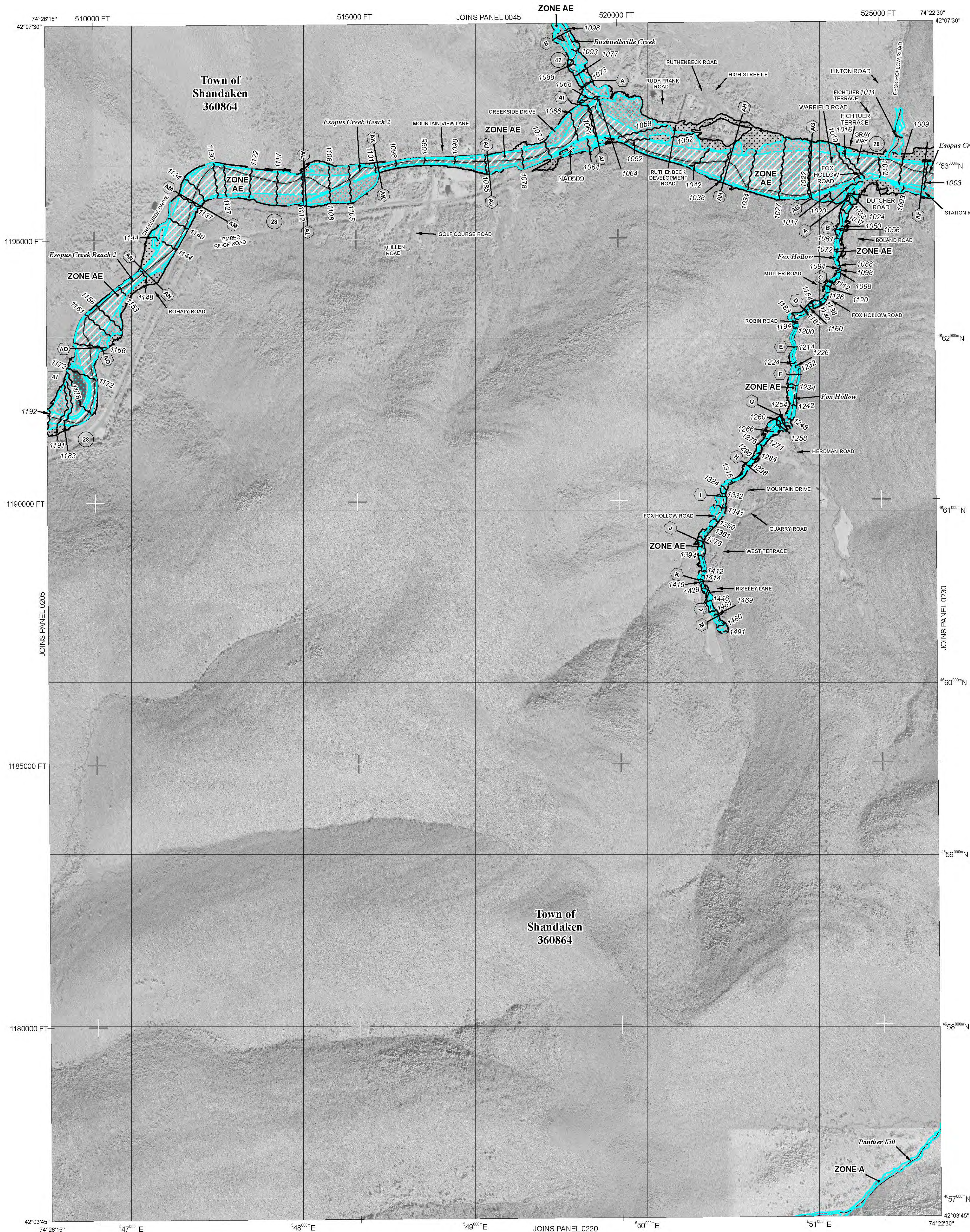
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

**Corporate limits** shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

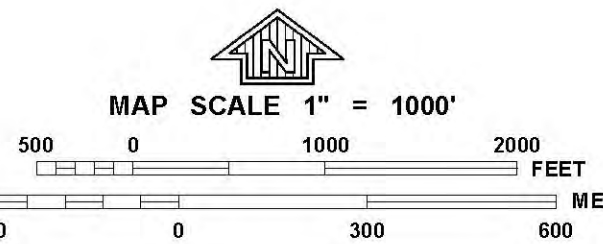
For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at <http://msc.firm.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have **questions about this map**, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange (FMIx) at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov/business/rfp>.



LEGEND

- SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD**
- The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.
- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently determined to be inadequate for protection from the 1% annual chance or greater flood.
- ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.
- FLOODWAY AREAS IN ZONE AE**
- The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.
- OTHER FLOOD AREAS**
- Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- OTHER AREAS**
- Areas determined to be outside the 0.2% annual chance floodplain.
- Areas in which flood hazards are undetermined, but possible.
- COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS**
- OTHERWISE PROTECTED AREAS (OPAs)**
- CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.
- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation line and value; elevation in feet\*
- Base Flood Elevation value where uniform within zone; elevation in feet\*
- \* Referenced to the North American Vertical Datum of 1988
- 87°07'45", 32°22'30"
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 1000-meter Universal Transverse Mercator grid values, zone 18N
- 5000-foot grid values: New York State Plane coordinate system, East zone (FPSZONE 3101), Transverse Mercator projection
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- River Mile
- MAP REPOSITORY
- Refer to listing of Map Repositories on Map Index
- EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
- EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
- For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.
- To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.



**NATIONAL FLOOD INSURANCE PROGRAM**

**PANEL 0210E**

**FIRM**

**FLOOD INSURANCE RATE MAP**

for ULSTER COUNTY, NEW YORK  
(ALL JURISDICTIONS)

**CONTAINS:**

**COMMUNITY** **NUMBER**

**SHANDAKEN, TOWN OF** **360864**

**REVISED PRELIMINARY**  
**NOVEMBER 20, 2014**

**PANEL 210 OF 910**  
**MAP SUFFIX: E**  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

**MAP NUMBER**  
**36111C0210E**

**EFFECTIVE DATE**

**Federal Emergency Management Agency**



Exhibit 3.2.a.A

Septic Failures Map