Wastewater Facilities Planning Report
Phase II Planning Area

DRAFT

Town of Tolland WPCA
Tolland, CT

February 15, 2011

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146 Hartford Road
Manchester, CT 06040

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Town of Tolland WPCA
TABLE OF CONTENTS

SECTION **PAGE**

TABLE OF CONTENTS

SECTION **PAGE**

TABLE OF CONTENTS

SECTION **PAGE**

TABLE OF CONTENTS

SECTION **PAGE**

TABLE OF CONTENTS

SECTION **PAGE**

TABLE OF CONTENTS

TABLES **FOLLOWING PAGE**

TABLE OF CONTENTS

TABLES **FOLLOWING PAGE**

FIGURES **FOLLOWING PAGE**

TABLE OF CONTENTS

FIGURES **FOLLOWING PAGE**

TABLE OF CONTENTS

ES. EXECUTIVE SUMMARY

Since 1975, the Town of Tolland has been under a consent order issued by the Connecticut Department of Environmental Protection (CTDEP). The consent order requires the Town to develop a town-wide sewage facilities plan to: identify failing on-site wastewater renovation systems (OWRS) [formerly referred to as on-site wastewater disposal systems], address potential wastewater management neighborhood problem areas, and describe alternative methods for correction and elimination of pollution problems to protect the waters of the State.

In 2004, the comprehensive wastewater management plan was segmented into two phases, primarily to expeditiously address desirable development in the Route 195 Gateway Zone, provide a long term solution to an on-site wastewater renovation system at the Tolland Middle School in need of substantial repairs, and to accommodate wastewater handling at the proposed (and subsequently built) new High School. Phase I, depicted on Figure ES-1, includes areas from Routes 30 and 74 in the western portions of Tolland, stretching east along Old Post Road to the commercially zoned Route 195 corridor to the proposed high school site on Old Cathole Road.

For this report in 2011, the remaining parcels located outside of the Phase I area were evaluated collectively as the Phase II study area. This report is considered the comprehensive wastewater facilities plan for the Phase II area, and also is considered to incorporate the previous recommendations from the 2004 Phase I report. Water quality needs relating to environmental issues are considered in the Phase II areas of Tolland in the report described herein.

The Phase I and Phase II reports will together collectively serve as a road map for the long-term wastewater management needs of the entire Town over a 20-year planning horizon. This wastewater facilities plan has been prepared pursuant to CGS Chapter 103 Section 7-246(b).

It is hereby recommended in this report that the Town of Tolland considers the following:

- Adopt and implement a formal On-Site Wastewater Management Program. See Sections A and B of the Executive Summary describing the process used to categorize the Neighborhood Areas into the various Tiers.
- Parcels (Tier I, II, III, & IV) with on-site wastewater renovation systems should be continuously monitored as part of the day-to-day record keeping by the local health agent.
- Tiers II, III, & IV Neighborhoods should be targeted for additional monitoring by the Eastern Highland Health District and the Tolland WPCA. This monitoring could include analysis of septic system repair records, periodic rotating walkover investigations during high groundwater, die tracer testing, infrared thermography, water quality monitoring, and periodic evaluation of the collected data as necessary.
- Tier III and IV neighborhoods areas should have annual, spring walkovers to observe site conditions during high groundwater to monitor the neighborhoods for indications of existing and worsening septic systems. If conditions worsen, or are such that reasonable mitigative actions by property owners to correct deficient septic systems cannot be taken; these areas should be recommended as a project area for public sewers.
- Tier IV neighborhood areas should be subject to surface water and groundwater sampling and testing program. The program will consist of quarterly sampling from 5% of the total number of potable drinking water wells and 3 samples from each surface water body within each Tier IV neighborhood area. Previously repaired septic

TO WILLIE CIRCLE
PHASE II STUDY AREA

Shenipsit Lake

SHENIPSIT LAKE ROAD
CRYSTAL LAKE ROAD
OLD STAFFORD ROAD
ROUTE 74
ROUTE 30
OLD POST ROAD
RHODES ROAD
OLD CATHOLE ROAD
METCALF ROAD
GEHRING ROAD
COOSE LANE
ROUTE 195
84

Parker Memorial School
Tolland Middle School
Tolland High School
Birch Grove Primary School
Town Hall
Old Post Road Pump Station
Gateway Zone Pump Station
Industrial Park Pump Station

Parcel Deletion per Owner's Request
Parcel Addition
Parcel Subdivision
Parcel Removed PA-490 Designation
Parcel Addition

Paulk Hill Brook
Cupping Meadow Brook
Tolland Marsh Pond

RUSSELL DRIVE AREA
PARTRIDGE LANE AREA
ANTHONY ROAD AREA

Town of Vernon

Parcel
Water
Stream

Buildings
Field Location
Approximate Location

Town Boundary
Phase 1 Planning Area
Phase 2 Target Study Area
Recommended Sewer Service District
Non-Sewered Area *(On-Site Wastewater Disposal)*

Pump Stations
PS Existing
PS Proposed

Grinder Pumps
Simplex
Duplex

Existing Sewer Pipes
Gravity
Force Main
Low Pressure

Proposed Sewer Pipes
Gravity
Force Main
Low Pressure

TOWN OF TOLLAND
WATER POLLUTION CONTROL AUTHORITY
WASTEWATER FACILITIES PLAN

Figure ES-1

RECOMMENDED WASTEWATER MANAGEMENT PLAN

MAY 2004
UPDATED AUGUST 17, 2010 & FEBRUARY 14, 2011

N W E S

0 0.25 0.5 1 Miles

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systems, as reported by EHHD, will be monitored to evaluate the effectiveness of current design criteria.

- A yearly summary of septic repair records, pump outs, and variances to the public health code should be produced for the Tolland WPCA by EHHD (and/or Contractor as needed).
- Petition the CT DEP to lift the outstanding Consent Order in the Shenipsit Lake watershed area.
- The Town should expedite the completion of a septic system pump out ordinance to minimize the need for extensive public sewering and threats to public health and the environment.
- The WPCA should continue and broaden its public education program, to enlist the efforts of the citizens of the Town to minimize the risk of pollution. Neighborhood meetings to discuss relevant issues should be considered.

The Wastewater Management Plan has been based upon several criteria:

- Limitations set by the Vernon Intermunicipal Wastewater Disposal Agreement.
- Ability to maintain continued individual on-site wastewater management solutions in neighborhood areas.
- Utilization of existing base mapping, GIS data, Town staff experience, public knowledge, and published regulations.
- Participation by the public through Questionnaire Responses and public meetings.
- Consistency with State policies including Conservation & Development.
- Compatibility with the future land use planning goals of Tolland.
- Need for hard in-situ data from a coordinated monitoring and testing program.

The proposed Sewer Service District modifications with Tiers I, II, III, & IV are recommended after review of the intermunicipal agreement, the physical makeup (soils, wetlands, floodplains, topography) of the area, State policies, historical conditions resulting from operating and monitoring on-site septic systems, and multiple meetings with the Town of Tolland agencies and staff.

A. IDENTIFICATION OF WASTEWATER MANAGEMENT NEEDS

Data was collected during the wastewater facilities planning process and reviewed in-depth for each neighborhood area. The information was evaluated in terms of the affect upon On-site Wastewater Renovation Systems (OWRSs, or Septic Systems). The gathered data was analyzed to determine areas with wastewater disposal needs beyond conventional septic systems. An existing town-wide Geographic Information System (GIS) was utilized to present the various layers of information overlain on a parcel by parcel basis to show general trending throughout the town.

Various types of data were collected including:

- Surficial Soils
- Soil Suitability
- Groundwater Quality
- Topographic Mapping
- Areas of Steep Slopes
- Land Use Data

- Surface Water Quality
- Aquifer Protection Area Boundaries
- CT OPM Conservation and Development Plan and Locational Guide Map
- Lot Sizes
- Questionnaire Results
- Town Sanitarian's Local Knowledge
- Water Distribution Systems Mapping
- Historical Septic Repair Data
- Tolland Zoning Map
- Tolland Future Plan of Development
- Targeted Walkover Investigations
- Other Data Sources

B. WASTEWATER MANAGEMENT NEEDS PRIORITY MATRIX

Information about the neighborhood areas in Phase II was presented for discussion and planning concurrence. A priority ranking system was assigned, illustrating various environmental needs irrespective of economic considerations. The Priority Matrix category weighting scheme was presented to and reviewed by the Town Engineer, WPCA staff, and local health district staff. Town staff offered feedback about the scores assigned to individual neighborhood areas for various categories. The weighted scores for each neighborhood area were based on numerous factors affecting proper operations of on-site wastewater renovation systems in each neighborhood.

The factors used in the Wastewater Disposal Needs Priority Matrix include:

- Lots Less than ¾ Acre
- Aquifer Protection Area Located Within Tolland
- Poorly Draining Surficial Materials
- Poor Soil Suitability
- Area Served by Private or Community Wells
- Septic System Repairs
- Sanitarian Observations
- Slopes Greater Than 30°
- Questionnaire Results
- Walkover Results
- Proximity to Existing Public Sewers

The Wastewater Management Needs Priority matrix is presented as Table ES–1. It was determined that areas which scored in excess of 50% of the total number of priority points were considered to be significantly constrained to the extent that continued on-site wastewater management would need annual water sampling to be sustainable for the long term operations. Neighborhood areas with a score between 43 and 50% should be targeted with annual walkovers for continuous monitoring of the wastewater renovation systems. Areas scoring between 20 and 41% of the priority points were considered to be areas where increased monitoring to verify performance of the on-site systems is warranted, primarily due to site constraints. Areas garnering less and 20% of the priority points were considered to have minor impediments to long-term on-site wastewater renovation.

C. RECOMMENDED WASTEWATER MANAGEMENT PLAN

To manage wastewater disposal throughout the 20-year planning horizon, a Wastewater Management Plan was developed as presented in Figure ES-2. The plan recommends a tiered monitoring program to collect high quality data about septic system performance to prevent degradation of subsurface wastewater renovation systems. Based on the 20-year planning horizon of this Facilities Report, Phase II sewer extensions were evaluated in Appendix E but are not proposed herein.

Table ES-1: Wastewater Management Needs Priority Matrix

Data Source	A	B	C	D	E	F	G	H	I	J	K	L	M	
Legend ■ More than 60% □ From 30% to 60% " " Less than 30% **Location**	**Lots Less than ¾ Acre**	**Aquifer Protection Area Located Within Tolland**	**Poorly Draining Surficial Materials**	**Poor Soil Suitability**	**Area Served by Private or Community Wells**	**Septic System Repairs**	**Sanitarian Observations**	**Slopes Greater Than 30 °**	**Questionnaire Results**	**Walkover Results**	**Proximity to Existing Public Sewers**	**Total Priority Points**	**Percent of Maximum Priority Points**	
Priority Weight	*4*	*2*	*1*	*5*	*2*	*3*	*3*	*2*	*4*	*5*	*2*	*33.0*		
Willie Circle Area	■		■	□	■	■	■			■		20.5	62%	TIER IV AREAS
Apple Road Area	□		■	■	■	□	■		□	□		19.0	58%	
Anthony Road Area	□		□	□		□	■		■		■	15.5	47%	TIER III AREAS
Lakeview Heights Area	■		□	■	■			■			□	14.5	44%	
Russell Drive Area	□	■	□		■		■	■	□		□	14.5	44%	
Laurel Ridge Road Area	■		□	□	■	□	■					13.5	41%	TIER II AREAS
Meadowood Road Area			□		■	■	■			■		13.5	41%	
Dunn Hill Road Area	□		□	□		□		■	□		■	12.5	38%	
Partridge Lane Area	□	□	□		■	□	■		□			12.0	36%	
Reed Road Area	□	■	□		■	□	■				□	12.0	36%	
Center Road Area			■	□	■		■				■	10.5	32%	
Dockerel Road Area			□	■	■							7.5	23%	
Patricia Drive Area		□	□	□	■						□	7.0	21%	
Skungamaug Road Area	■	■										6.0	18%	TIER I AREAS
Curtis Drive Area	□	□			■							5.0	15%	
Hurlbut Road Area			■		■	□						4.5	14%	
Cedar Swamp Road Area	□				■							4.0	12%	
Charter Road Area	□	■										4.0	12%	
High Ridge Drive Area			□		■			□				3.5	11%	

A) Lots less than 3/4 of an acre based on GIS analysis.

B) Tolland Aquifer Protection Area provided by Town.

C) Based on USGS Surficial Materials GIS Data Layer for Till (□) and Thick Till (■).

D) Based on USDA NRCS Soil Potential Ratings; Septic Tank Absorption Fields for Single Family Residences (Connecticut) for March 2004.

E) Public water consumption records from CT Water, • Birmingham Utilities, and CT DPH Water Service Area GIS mapping for Community Water Supplies. Parcels without public drinking water records assumed have private drinking water wells.

F) List of Septic System Repairs compiled by Eastern Highland Health District records of septic system modifications. Less than 10% ( ), 10% to 15% (□), 15% or more (■).

G) Recommended by the Eastern Highland Health District representative assigned to Tolland.

H) Slope analysis performed in GIS using Town of Tolland AutoCAD aerial survey contour data. Land area: less than 10% ( ), 10% to 15% (□), 15% or more (■).

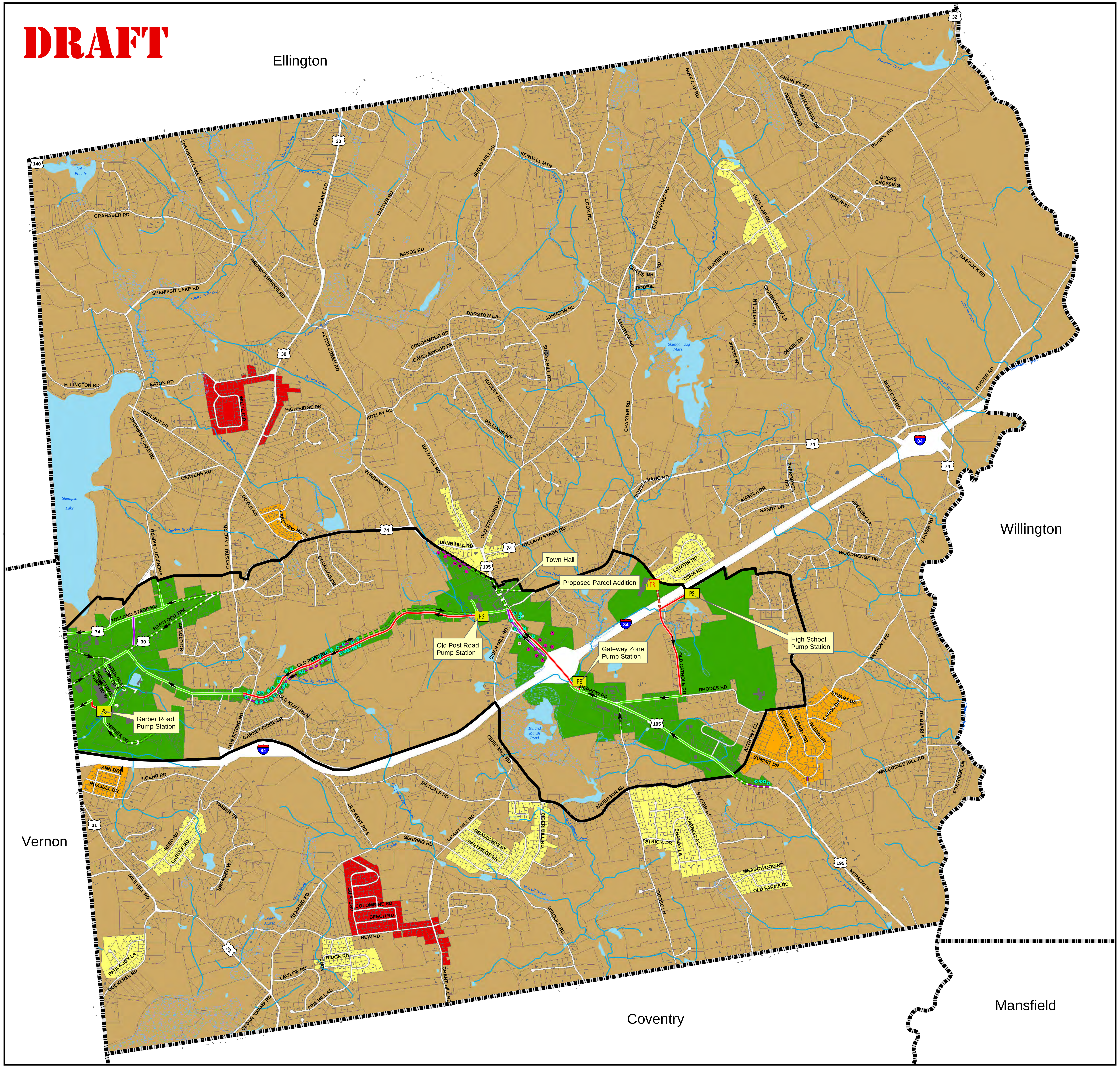
I) Results returned to Fuss & O'Neill and entered into database as of April 2nd, 2008, based on self reporting observations of seasonal problems with WW disposal systems.

J) Walkovers performed April 10th, 2008 to April 18th, 2008

K) Approximate distance to sewers. Locations within 3,000 feet are coded ■. Locations from 3,000 to 6,000 are coded □ .

L) Priority Points assigned based on the summation of (number of ■ × Priority Weight × 1.0) and (number of □ × Priority Weight × 0.5) for each category.

M) Percent calculated as the total number of Neighborhood Priority Points divided by the theoretical highest possible priority point score (33.0).



RECOMMENDED WASTEWATER MANAGEMENT PLAN

TOLLAND WASTEWATER FACILITIES PLAN
PHASE 2

Wastewater Management Areas

- Sewer Service District
- Tier I On-Site WW Management Area
- Tier II On-Site WW Management Area
- Tier III On-Site WW Management Area
- Tier IV On-Site WW Management Area

Tier I Neighborhood Areas
Tier I neighborhood areas generally appear to have adequately functioning on-site wastewater renovation systems. There is no anecdotal knowledge from Town staff or representatives from the Health District that problems exist in these areas. A cursory review of the available data sets compiled during this analysis did not identify any significant impediments to proper wastewater treatment. As part of a rigorous on-site wastewater management program, Tier I neighborhood areas or parcels not included in the Priority Matrix areas should still be watched for signs of septic system malfunctions in the future to protect public health and the environment.

Tier II Neighborhood Areas
Tier II areas have been identified in the Wastewater Management Needs Priority Point Matrix as having some characteristics which may impair on-site wastewater absorption systems. These areas should be monitored by representatives of the Eastern Highland Health District and the Tolland WPCA. This monitoring could include analysis of septic system repair records, public education, periodic rotating walkover investigations during high groundwater, die tracer testing, infrared thermography, water quality monitoring, and periodic evaluation of the collected data as necessary. If the additional monitoring identifies conditions where the neighborhood area does not have adequately functioning wastewater disposal systems, a remediation plan will need to be implemented.

Tier III Neighborhood Areas
Tier III neighborhood areas were identified with multiple problematic conditions which indicate impaired wastewater renovation systems. These areas should have annual, spring walkovers to observe site conditions during high groundwater for signs of malfunctioning on-site wastewater renovation systems. Monitoring should also include analysis of septic system repair records, public education, die tracer testing, infrared thermography, water quality monitoring, and periodic evaluation of the collected data as necessary. If conditions worsen, or are such that reasonable mitigative actions by property owners to correct deficient septic systems cannot be taken; these areas should be recommended for escalation to the Tier IV category. These areas should also be included in the monitoring program established for Tier I and II areas.

Tier IV Neighborhood Areas
Tier IV neighborhood areas were identified as having numerous conditions potentially impairing proper operation of on-oite wastewater renovation systems which require close oversight. The Eastern Highland Health District and the Tolland WPCA would quarterly sample and test the groundwater and surface water of neighborhoods in this category. These areas should also be included in the monitoring program established for Tier I, II, and III areas.

Sewer Infrastructure

Existing	Proposed
Gravity	Gravity
Force Main	Force Main
Low Pressure	Low Pressure
Existing Pump Stations	Proposed Pump Stations
Duplex Grinder Pump	Simplex Grinder Pump
	Duplex Grinder Pump

Notes:
1) Town of Tolland parcel base dated 2004 with supplemental additions to 2007.
2) 2004 Building dataset provided by Town of Tolland.
3) Dataset of town boundaries and hydrography downloaded from the CT DEP GIS website Fall 2005.
4). Tolland Sewer Service District from Phase 1 WW Facilities Plan Dated 2004.

0 0.5 1 2 3
Miles

FIGURE ES-2

FEBRUARY 2011

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1. RECOMMENDED TIER I AREAS

Tier I neighborhood areas, defined as locations with Priority Points from 0.0 to 6.0, generally appear to have adequately functioning on-site wastewater renovation systems. There is no anecdotal knowledge from Town staff or representatives from the Health District that problems exist in these areas. A cursory review of the available data sets compiled during this analysis did not identify any significant impediments to proper wastewater treatment. As part of a rigorous on-site wastewater management program, Tier I neighborhood areas or parcels not included in the Priority Matrix areas should still be monitored for signs of septic system malfunctions in the future to protect public health and the environment.

2. RECOMMENDED TIER II AREAS

Tier II areas, with Priority Points from 6.5 to 13.5, have been identified in the Wastewater Management Needs Priority Point Matrix as having some characteristics which may impair on-site wastewater absorption systems. These areas should be monitored by representatives of the Eastern Highland Health District and the Tolland WPCA. As needed, this monitoring could include analysis of septic system repair records, public education, and periodic evaluation of the collected data as necessary. If the additional monitoring identifies conditions where the neighborhood area does not have adequately functioning wastewater disposal systems, a remediation plan will need to be implemented.

2.a. LAUREL RIDGE ROAD AREA

There have been 4 septic system repairs over the past ten years in the Laurel Ridge Road Area. 21 of 55 Septic System Questionnaire Responses were returned for the Laurel Ridge Road Neighborhood and they found the age of septic systems was between 2 and 43 years old with an average age of 20 years. 1 property owner reported seasonal wastewater disposal system problems, while 76% stated never having any trouble. Of the responses, 1 parcel indicated 1 problem with their septic system. 33% of the responses indicated that public sewers were needed in the neighborhood and 48% chose not to answer. Approximately 19% reported having experienced flooding or surface drainage problems on their property. Approximately 33% reported making repairs to their septic system (14% replaced their septic tank and 14% replaced leaching fields).

2.b. MEADOWOOD ROAD AREA

There have been 11 septic system repairs over the past ten years in the Meadowood Road Area. The walkover site investigation program revealed 1 lot with a suspected septic system failure, 3 lots with damp soil which will require a follow-up investigation during wet conditions, and 1 lot with a homeowner who denied the inspector access.

18 of 42 Septic System Questionnaire Responses were returned for the Meadowood Road Neighborhood and they found the age of septic systems was between 5 and 47 years old with an average age of 25 years. 1 property owners reported seasonal wastewater disposal system problems, while 83% stated never having any trouble. Of the responses, 1 parcel indicated multiple problems with the system. 22% of the responses indicated that public sewers were needed in the neighborhood and 61% chose not to answer. Approximately 33% reported having experienced flooding or surface drainage problems on their property. Approximately 39% reported making repairs to their septic system (39% replaced their septic tank and 22% added to leaching field).

2.c. DUNN HILL ROAD AREA

There have been 9 septic system repairs over the past ten years in the Dunn Hill Road Area.

25 of 62 Septic System Questionnaire Responses were returned for the Dunn Hill Road Neighborhood and they found the age of septic systems was between 1 and 46 years old with an average age of 23 years. 4 property owners reported seasonal wastewater disposal system problems, while 64% stated never having any trouble. Of the responses, 2 indicated 1 problem with their septic system and 2 parcels indicated multiple problems with the system. 32% of the responses indicated that public sewers were needed in the neighborhood and 44% chose not to answer. Approximately 44% reported having experienced flooding or surface drainage problems on their property. Approximately 28% reported making repairs to their septic system (24% replaced their septic tank and 20% replaced leaching fields).

2.d. PARTRIDGE LANE AREA

There have been 15 septic system repairs over the past ten years in the Partridge Lane Area. The walkover site investigation program revealed 1 lot with a suspected septic system failure, 1 lot with damp soil which will require a follow-up investigation during wet conditions, and 12 lots which appear to have properly operating subsurface sewage absorption systems.

48 of 142 Septic System Questionnaire Responses were returned for the Partridge Lane Neighborhood and they found the age of septic systems was between 1 and 57 years old with an average age of 26 years. 7 property owners reported seasonal wastewater disposal system problems, while 71% stated never having any trouble. Of the responses, 5 indicated 1 problem with their septic system and 2 indicated multiple problems with the system. 31% of the responses indicated that public sewers were needed in the neighborhood and 50% chose not to answer. Approximately 31% reported having experienced flooding or surface drainage problems on their property. Approximately 23% reported making repairs to their septic system (21% replaced their septic tank and 21% replaced leaching fields).

2.e. REED ROAD AREA

There have been 7 septic system repairs over the past ten years in the Reed Road Area. The walkover site investigation program revealed 1 lot with a suspected septic system failure and 5 lots which appear to have properly operating subsurface sewage absorption systems.

28 of 54 Septic System Questionnaire Responses were returned for the Reed Road Neighborhood and they found the age of septic systems was between 4 and 60 years old with an average age of 27 years. 2 property owners reported seasonal wastewater disposal system problems, while 71% stated never having any trouble. Both responses indicated 1 problem with their septic system. 25% of the responses indicated that public sewers were needed in the neighborhood and 57% chose not to answer. Approximately 32% reported having experienced flooding or surface drainage problems on their property. Approximately 36% reported making repairs to their septic system (21% replaced their septic tank and 11% replaced leaching fields).

2.f. CENTER ROAD AREA

There have been 4 septic system repairs over the past ten years in the Center Road Area. The walkover site investigation program evaluated 6 lots that appear to have properly operating subsurface sewage absorption systems.

25 of 46 Septic System Questionnaire Responses were returned for the Center Road Neighborhood and they found the age of septic systems was between 3 and 36 years old with an average age of 27 years. 3 property owners reported seasonal wastewater disposal system problems, while 84% stated never having any trouble. Of the responses, 3 indicated 1 problem with their septic system and no responses indicated multiple problems with the system. 20% of the responses indicated that public sewers were needed in the neighborhood and 52% chose not to answer. Approximately 28% reported having experienced flooding or surface drainage problems on their property. Approximately 16% reported making repairs to their septic system (28% added to the leaching field and 20% replaced leaching fields).

2.g. DOCKEREL ROAD AREA

10 of 30 Septic System Questionnaire Responses were returned for the Dockerel Road Neighborhood and they found the age of septic systems was between 5 and 40 years old with an average age of 17 years. None of the property owners reported seasonal wastewater disposal system problems. 10% of the responses indicated that public sewers were needed in the neighborhood and 90% chose not to answer. Approximately 10% reported having experienced flooding or surface drainage problems on their property. Approximately 0% reported making repairs to their septic system, but 30% added to the leaching field.

2.h. PATRICIA DRIVE AREA

There have been 9 septic system repairs over the past ten years in the Patricia Drive Area. The walkover site investigation program revealed 1 lot with a suspected failing septic system and 7 lots that appear to have properly operating subsurface sewage absorption systems.

41 of 110 Septic System Questionnaire Responses were returned for the Patricia Drive Neighborhood and they found the age of septic systems was between 2 and 43 years old with an average age of 26 years. 1 property owner reported 1 seasonal wastewater disposal system problem, while 88% stated never having any trouble. 17% of the responses indicated that public sewers were needed in the neighborhood and 59% chose not to answer. Approximately 5% reported having experienced flooding or surface drainage problems on their property. Approximately 17% reported making repairs to their septic system. 12% replaced leaching fields, 7% replaced their septic tank, and 7% replaced leaching fields.

3. RECOMMENDED TIER III AREAS

The neighborhood areas with Priority Points between 14.0 and 16.0 were identified as category Tier III with multiple problematic conditions which indicate impaired wastewater renovation systems. These areas should have annual, spring walkovers to observe site conditions during high groundwater for signs of malfunctioning on-site wastewater renovation systems. As necessary, monitoring may also include analysis of septic system repair records, public education, and periodic evaluation of the collected data as necessary.

If conditions worsen, or are such that reasonable mitigative actions by property owners to correct deficient septic systems cannot be taken; these areas should be recommended for escalation to the Tier IV category. These areas should also be included in the monitoring program established for Tier I and II areas: Anthony Road Neighborhood, Lakeview Heights Neighborhood, and Russell Drive Neighborhood.

3.a. ANTHONY ROAD NEIGHBORHOOD

A majority of the Septic System Questionnaire results show indications of malfunctioning septic systems. The close proximity to existing sewers along the Gateway Corridor counts as additional priority points because preference is given to problem areas with more readily available solutions. The Anthony Road neighborhood generally has 30% to 60% parcels less than ¾ of an acre. The surficial material of Anthony Road is mostly till which generally is not well drained. The NRCS soil suitability to support on-site wastewater renovation systems appears to be split between low and medium potential. Within the past 10 years, a reasonably high proportion of the septic systems have been repaired according to the local health district records.

If necessary, extending public sewers from Route 195 (Merrow Road) would be the most cost effective constructed solution for the Anthony Road Neighborhood, since existing gravity sewers have been constructed along Merrow Road to the intersection with Anthony Road. Out of nine potential sites for community septic systems, none were suitable for a large community septic system. The terrain was generally too hilly and steep for a large community system. Some of the potential sites reviewed through published literature were characterized by unusual lot dimensions or close proximity to watercourses.

3.b. LAKEVIEW HEIGHTS NEIGHBORHOOD

The Lakeview Heights Area generally has parcels less than ¾ of an acre. The neighborhood soils are mostly categorized low potential to support on-site wastewater renovation systems based on the NRCS soil suitability rating system for Connecticut. The potable water for each parcel is provided by individual private wells. The topography of the neighborhood has areas of steep slopes which limit the available land for septic system repairs. The surficial material is till which generally is not well draining. Although not adjacent to existing sewers, this area is approximately ¾ of a mile away (preference is given to problem areas with more readily available solutions).

Potential community septic system sites have been identified surrounding the Lakeview Heights neighborhood. The Tolland Volunteer Fire Station parcel appears to have the most favorable conditions for siting a community system. A second feasible alternative involves extending a low pressure sewer to a future proposed gravity sewer at Willie Circle (which would then pump the flow to Tolland Stage Road). Both alternatives have approximately the same order of magnitude opinion of cost, but the sewer extension is recommended as a better value for the Town if constructed in concert with (or subsequent to) public sewers to Willie Circle, based on projected operation and maintenance costs.

3.c. RUSSELL DRIVE NEIGHBORHOOD

The area generally has 30% to 60% parcels less than ¾ of an acre. The area is located within an aquifer protection area. The topography of the neighborhood has areas of steep slopes which further limits the availability for septic system repairs. The potable water for each parcel is provided by individual private wells. The surficial material is till which generally is not well drained. The questionnaire results returned by the homeowners indicate that between 30% and 60% answered questions indicating the potential for improperly operating septic systems. Walkover investigations uncovered 1 out of 4 lots with damp soils which should be reviewed again during the next high groundwater season. The soil suitability, rated by the NRCS, for septic system was rated as low potential.

If public sewers become necessary, one alternative could be a force main crossing I-84 and the second alternative comprised of a force main alignment to Route 31 at the border of the neighboring town of Vernon. For a community septic system, potential site #1 just to the west of the area abutting the Vernon town line appears to be suitable, though it is privately owned. It is located at the low point of the northern end on a large parcel with adequate nitrogen dilution and bacteria travel time. The remaining three sites reviewed through published literature appear to be unsuitable based on the preliminary analysis. From a conceptual planning level cost comparison, a force main to a future sewer extension by the Town of Vernon on Route 31 appears to be more economical than the other alternatives, but it is contingent upon a construction of a planned sewer extension in Vernon with which to connect.

4. RECOMMENDED TIER IV AREAS

Tier IV neighborhood areas (from 19.0 to 33.0 Priority Points) were identified as having numerous conditions potentially impairing proper operation of on-site wastewater renovation systems which require close oversight. The Eastern Highland Health District and the Tolland WPCA (or an agent thereof) would quarterly sample and test the groundwater and surface water of neighborhoods in this category for sanitary sewage related contaminants.

These Tier IV neighborhood areas should also have annual, spring walkovers to observe site conditions during high groundwater. As necessary, additional monitoring may include analysis of septic system repair records especially to determine the effectiveness of the latest designs, die tracer testing, infrared thermography, water quality monitoring, and periodic evaluation of the collected data. These areas should also be included in the monitoring program established for Tier I, II, and III areas.

If these Tier IV neighborhood areas have water test results that indicate on-site septic systems are performing correctly and not adversely affecting the environment or public health after 3 years of quarterly testing, the Tier IV neighborhood area(s) will be re-categorized as a Tier III area.

4.a. WILLIE CIRCLE NEIGHBORHOOD

Generally, the area has parcels less than ¾ of an acre. Walkover site investigations in this neighborhood uncovered signs of improperly operating septic systems. The neighborhood is located in poorly draining thick till surficial material. The parcels in this area are served by three community wells which will be monitored to determine if groundwater is contaminated with poorly treated septic system effluent. Sanitarian records of septic system repairs show many lots with documented septic system repairs during the past 10 years. The NRCS soil suitability to support on-site wastewater renovation systems classifies the areas as somewhat restrictive.

If required, a public sewer extending south along Route 30 to Tolland Stage Road would utilize a transmission sewer force main pipe and be constructed in the roadway, minimizing woodland clearing. A less favorable alternative would involve constructing a new community wastewater renovation (community septic) system. The most suitable site for a community septic system would be located in a preserved open space woodland area, of which portions would require permanent clearing.

4.b. APPLE ROAD NEIGHBORHOOD

The NRCS soil suitability to support on-site wastewater renovation systems varies, but a significant area is shown as low potential. It is located in poorly draining thick till surficial material. The potable water for each parcel is provided by individual private wells. The area generally has 30% to

60% parcels less than ¾ of an acre. One-third of the walkover sites in the Apple Road Area had signs of wastewater disposal problems. The questionnaire results returned by the homeowners indicate that between 30% and 60% answered questions indicating the potential for improperly operating septic systems. The list of septic system repairs compiled by EHHD reported 10% to 15% repairs.

In case a constructed solution is deemed necessary, the Apple Road Neighborhood Area evaluation included a potential community septic system. A conceptual feasibility analysis evaluated a community sewer collection system flowing by gravity to a large septic tank at potential site #1. The large leaching field would be built in an agricultural field surrounded by an old stone wall. Extending public sewers to this neighborhood was not recommended due to the substantial distances the infrastructure would need to traverse to connect to the nearest available sewer. Other sites surrounding the neighborhood were investigated, but construction costs increased the further south or west from the low point the potential community septic system parcel was located, since a pump station and force main piping would be needed. A cursory desktop analysis of potential site #1 indicates high soil suitability for septic systems, ample nitrogen dilution area, and adequate bacterial travel time.

D. WASTEWATER FLOW ESTIMATES

Table ES-3 reserves future wastewater flow for Tier III and IV neighborhood areas if future public sewer extensions are deemed warranted by the WPCA due to the results of the monitoring and/or sampling program. The average daily total wastewater flow capacity available to Tolland through the Vernon–Tolland Intermunicipal Agreement is 400,000 gpd. Based on the 20-year planning horizon of this Facilities Report and because no Phase II sewer extensions are proposed herein, the Town of Tolland appears to have sufficient wastewater capacity for the future.

Table ES-3: Town-wide Public Sewers Wastewater Flow Apportionment

Source		Estimated Future Wastewater Flow
Phase I Wastewater Flows		300,000 gpd
Phase I Infiltration & Inflow		10,000 gpd
Phase I Land Use Infilling		24,000 gpd
Phase II Willie Circle Neighborhood	Tier IV Area	18,000 gpd
Phase II Anthony Road Neighborhood	Tier III Area	31,000 gpd
Phase II Lakeview Heights Neighborhood	Tier III Area	7,000 gpd
Phase II Russell Drive Neighborhood	Tier III Area	9,000 gpd
Phase II Infiltration & Inflow	Tiers III & IV	10,000 gpd
Total Estimated Future Wastewater Flow		409,000 gpd

It should be noted that although the volume of wastewater appears to be greater than the intermunicipal agreement by 9,000 gpd, the wastewater flow apportionment has been conservatively estimated based upon build-out flows from future sewered parcels that may not be realized.

Currently, the wastewater flows from the Phase I planning area are recorded to be much less than the 334,000 gpd apportioned flow for the area. Over the planning horizon of this report, Tolland's wastewater discharge to Vernon should continue to be monitored through their contract operations firm. As the flows approach the 400,000 gpd threshold, a build-out analysis should be prepared to identify remaining potential sources of wastewater generation. If it appears that the Tolland will reach the 400,000 gpd threshold, the WPCA should inquire about purchasing additional capacity from the Town of Vernon. The Town of Vernon, once dismissive of the notion, may reportedly consider modifying the Town of Tolland's allocated volume.

E. IMPLEMENTATION PLAN

Table ES-4 presents a schedule to implement the Wastewater Management Facilities Plan in the Town of Tolland.

Table ES-4: Implementation Schedule

Action Item	Tentative Schedule
Accommodate Infilling Development in Existing Phase 1 Sewered Areas	Ongoing
Rigorous On-Site Wastewater Management Plan	Ongoing
Pump-Out Ordinance and Public Awareness Program	In Development
Extend Sanitary Sewers along Route 195 from Goose Lane to Anthony Road	Completed
Update Administrative Procedures	2011-2013
Monitor Tier IV Areas – Determine Groundwater Monitoring Locations	Spring 2012
Monitor Tier IV Areas – Surface & Ground Water Testing	2012-2015
Monitor Tier IV Area – Willie Circle Neighborhood	2015-2030*
Monitor Tier IV Area – Apple Road Neighborhood	2020-2030*
Monitor Tier III Area – Anthony Road Neighborhood	2011-2030*
Monitor Tier III Area – Lakeview Heights Neighborhood	2011-2030*
Monitor Tier III Area – Russell Drive Neighborhood	2011-2030*

* Tolland WPCA and EHHD to review repairs in these areas annually to monitor chronic wastewater issues.

A number of actions will be taken to implement an effective long-term on-site wastewater management program. These steps don't guarantee that sewers won't be needed at some point in the future, especially if the input from the monitoring actions indicates that septic systems aren't sufficient to protect public health and the environment. Public petitions in areas identified as Tier II, III, and IV should be considered by the WPCA as well, when determining project implementation schedules.

F. RIGOROUS ON-SITE WASTEWATER MANAGEMENT PROGRAM

The Town of Tolland shall target larger on-site wastewater management areas, through adoption of the wastewater management plan proposed herein. The WPCA should also establish procedures which will avoid potential future problems with on-site sewage disposal. This includes enforcing the new zoning regulations which limit new development to maximum densities with further reductions for steep slopes and wetlands. The WPCA shall vigorously enforce the technical standards for subsurface disposal systems for new development and conversions of systems presently in use. The On-Site Wastewater Management Program is intended to be dynamic and may be altered to meet changing needs.

Recommendations include:

- Records of wastewater-related data should be added to the existing town-wide GIS system. Data would include walkover results, septage pump outs, reported problems, variances and solutions, as well as additional information on the septic systems as desired over time. This would require a more comprehensive, spatial database record-keeping system to be implemented for use by the Eastern Highland Health Department (EHHD).
- As part of a Townwide Pump Out Ordinance, the Town should adopt a standard pump–out form and require haulers to complete the form at each pump-out event. EHHD would log the form into a database for subsequent analysis and annual reporting to the WPCA A sample form is provided in Appendix D.
- Monitor septic system performance by reviewing pump-out records of septage haulers serving the Town. Pump-out reports should be submitted by haulers discharging to the various Water Pollution Control Facilities as well as those using other disposal means.
- Regular, annual walkovers of parcels in Tier III classified areas should be considered in the wastewater management areas where multiple indications of wastewater treatment deficiencies appear to exist.
- Periodic, random, periodic walkovers of Tier II parcels on a rotating basis during periods of high groundwater or significant precipitation events should be considered in neighborhood concern areas by EHHD to identify potential community pollution problems. Increased septic pumping data may be an indicator of challenging site characteristics in certain neighborhoods. Suspected failures should be referred to the Health District, which should work with the property owner to investigate the problem and repair the septic system.
- Groundwater and surface water samples may be taken to uncover indications of possible pollution (bacterial and nutrients) from improperly functioning subsurface renovation systems. Samples should be collected in late spring-early summer and late summer from various locations, such as the Shenipsit Lake, aquifers, etc..
- Periodic evaluation of the data that has been collected is important in determining what this information means relative to wastewater management. A designated staff member could maintain a series of GIS maps and help the WPCA and EHHD staff discerns trends over time for on-site wastewater renovation system performance. The WPCA should solicit an annual report from the EHHD of the number of variances granted, types of repairs, and location.
- A public awareness campaign to inform the users of subsurface renovation systems of proper maintenance procedures and symptoms of potentially failing systems should be conducted on a continuous basis. Targeted mailings and newspaper articles which explain proper operation and maintenance of subsurface disposal systems have been helpful to other municipalities in this effort.

G. FINANCING PLAN

Design and construction of improvements in conformance with the recommended plan would likely be primarily financed through betterment (benefit) assessments. The town should seek and apply for funding through a combination of grants and loans from the CT DEP's Clean Water

Fund (CWF) small community set-aside program, STEAP grants, and other Special Acts monies as available.

H. CONNECTICUT ENVIRONMENTAL POLICY ACT CONSISTENCY

In summary, the recommendations proposed in this wastewater management plan are consistent with town-wide and statewide goals, and comply with the Connecticut Environmental Policy Act. CEPA consistency includes a coordinated review of the Wastewater Facilities Planning Report among the state agencies, including DEP and the Office of Policy and Management. The statewide Conservation and Development Plan (C&D Plan) was consulted to determine the recommended type of wastewater management and potential development desired. Data was collected to depict the general boundaries of species identified through the Natural Diversity Database (NDDB). The majority of the areas identified as sensitive habitats were located along the major water bodies and marshlands in Town.

The recommended wastewater management plan will have no temporary or long-term environmental impacts to the environment. This Facilities Plan recommends continued monitoring and data collection of neighborhood areas to continue to assess the long term operation of on-site wastewater renovation systems. Potential impacts due to constructed solutions are not anticipated because repair of on-site septic systems would be the responsibility of individual homeowners. Neighborhood Area constructed projects are not proposed during the 20-year planning horizon of this document, unless surface and ground water sampling and testing indicate a constructed solution is warranted.

I. INTRODUCTION

A. BACKGROUND

The Connecticut Department of Environmental Protection (CT DEP) issued a Consent Order to the Town of Tolland on September 29, 1975 requiring the town to comply with the following:

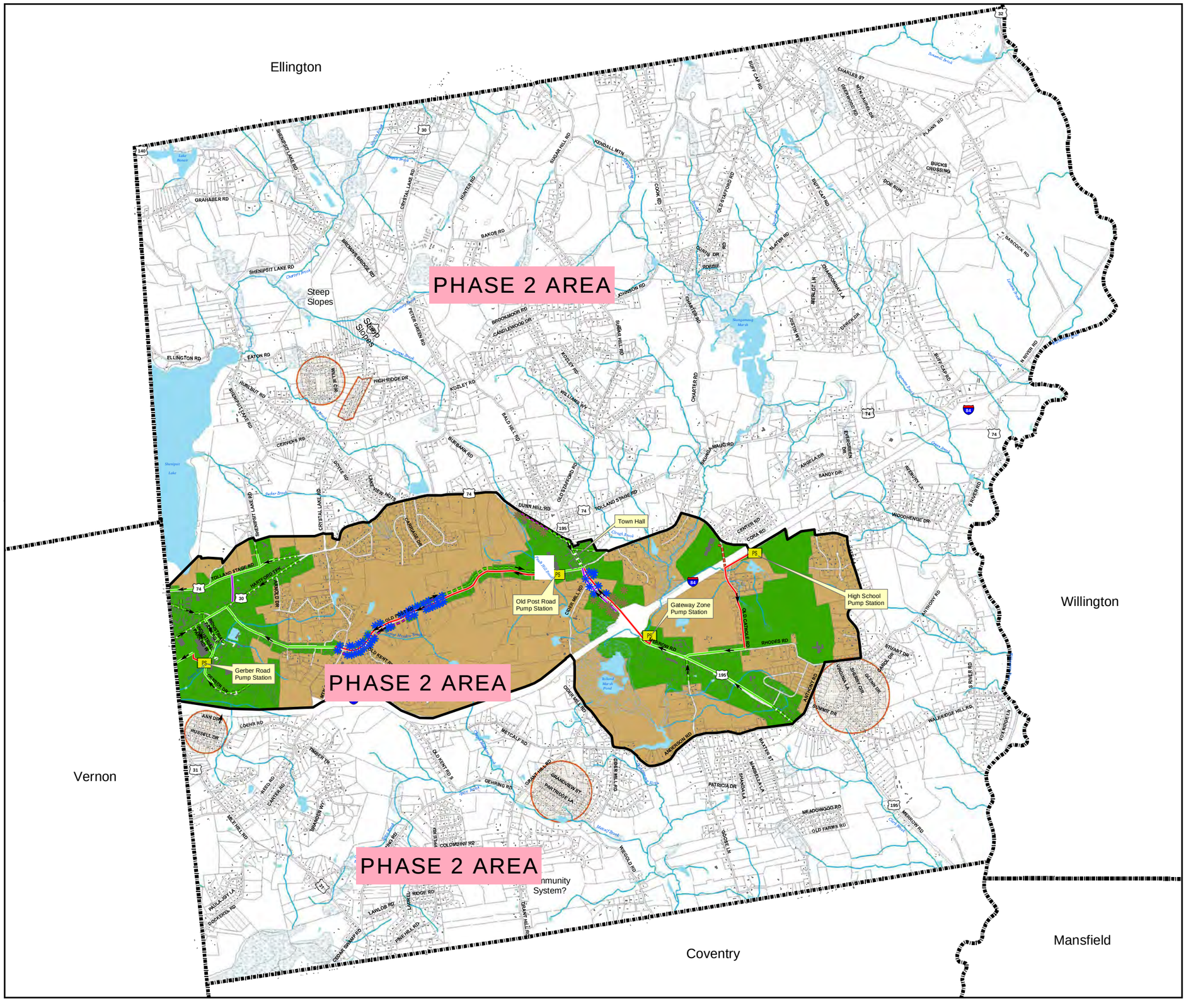
- Develop a town-wide sewage facilities plan addressing failing subsurface sewage disposal systems and potential problem areas
- Describe alternative methods for correction and elimination of pollution problems giving due regard to adjacent communities within common watersheds
- Construct any facilities as may be required

The Town of Tolland has produced three reports since the late 1970's to satisfy the first two objectives of the Order. These reports are dated 1979, 1987, and 1998. For various reasons these reports either were not submitted to DEP or were not accepted by DEP. Most recently, the Phase I report was submitted to CTDEP by Fuss & O'Neill in April 2004. The current study has augmented the studies for Phase I and also incorporates pertinent information from the earlier studies.

B. PLANNING STUDY AREA

The Town of Tolland is roughly square in shape and contains approximately 25,000 acres of land within its municipal borders. The town is located just east of the central Connecticut Valley, at the beginning of the region known as the Eastern Highlands. Tolland is bounded by the Willimantic River and Willington on the east, by Coventry on the south, by Vernon and Ellington on the west and by Ellington to the north.

The planning study area consists of two phases. The two-phased approach was selected to complete wastewater planning in the central corridor of town, which is experiencing development pressure, and to assure that such development is in conformity with state environmental and development policies. The first phase consists of the central corridor extending eastward from the Vernon town line along Route 30 and Route 74 to Route 195, and then south to include the commercial area commonly referred to as the "Gateway Zone", and eastward to the vicinity of the existing and proposed high school parcels. Phase I and Phase II planning areas are presented in Figure I-1. The planning area of the second phase of the study will be the remainder of the incorporated area of the Town of Tolland.



OVERVIEW MAP

TOLLAND WASTEWATER FACILITIES PLAN
PHASE 2

- Phase 1 Planning Area
- Study Area Identified for Phase 2

Wastewater Management Areas

- Sewer Service District
- On-Site WW Management Area

Existing Sewer Pipes

- Gravity
- Force Main
- Low Pressure

Proposed Sewer Pipes

- Gravity
- Force Main
- Low Pressure

Grinder Pumps

- Simplex
- Duplex

Pump Stations

- Existing
- Proposed

Notes:
1) Town of Tolland parcel base dated 2004 with supplemental additions to 2007.
2) 2004 Building dataset provided by Town of Tolland.
3) Dataset of town boundaries and hydrography downloaded from the CT DEP GIS website Fall 2005.
4). Tolland Sewer Service District from Phase 1 WW Facilities Plan Dated 2004.

0 0.5 1 2
Miles

FIGURE I-1

FEBRUARY 2011

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II. REVIEW OF PREVIOUS REPORTS AND DATA

Four wastewater investigations have been initiated since 1979. The Town of Tolland's draft *Sewer Facilities Plan* report, *Facility Plan for Wastewater Management*, *Facility Plan for Pollution Abatement Program* by the Town of Tolland, and *Wastewater Facilities Planning Report – Phase I Planning Area* by Fuss & O'Neill were reviewed, and utilized for background information regarding the Phase II study where possible. Summaries of the previous reports, presented in reverse chronology, are as follows;

A. WASTEWATER FACILITIES PLANNING REPORT – PHASE I PLANNING AREA (2004)

To meet the goals of the Town Plan of Development, the comprehensive wastewater management plan was split into two phases. The Phase I study area examined the Gateway Zone (on Merrow Road), Old Post Road, and the Commercial/Industrial Zone in western Tolland on Route 30.

Recommendations from the study included:

- Revise the Sewer Service District (SSD) boundaries as presented herein to address the identified wastewater disposal needs as well as the economic development goals of the Town
- Construct extensions of public sewers within the SSD
    - Gateway Sewer (Old Post Road to Rhodes Road, including Gateway Pump Station)
    - High School Sewer Extension (Rhodes Road & Old Cathole Road to both high school sites, including two pump stations)
    - Sewer Extensions to South (Route 195 & Goose Lane)
    - Sewer Extensions to North (Tolland Green & Route 74)
    - Old Hartford Tpk. (Route 30) & Route 74
- Adopt and implement a formal On-site Wastewater Management Program to maintain use of septic systems for areas outside of the recommended SSD
- Pump Station upgrades at Old Post Road and Industrial Park Pump Station

Based on March 2004 dollars, the range of total budgetary planning level opinion of capital costs for Phase I wastewater improvements was approximately $9,500,000 dollars. Sanitary sewers have since been expanded to serve the Gateway area and new High School, including two new pump stations, force mains, low pressure and gravity sewers at a cost of approximately $6.3 million dollars. A gravity sewer extension has also been extended south along Route 195.

B. DRAFT SEWER FACILITIES PLAN (1999)

This report states that the majority of more than 4,000 homes and businesses in Tolland were served by individual on-site disposal systems. Data presented indicated that many permitted activities (over 1,000) related to the repair and improvement of on-site septic systems occurred from 1974 to 1999. Nine primary areas of concern were identified and are presented in Figure II-1 (prepared by the Town of Tolland Development Group). Four of the nine areas are located in or adjacent to the Phase I planning area. Carriage Drive is within Phase I, Russell Road, Partridge

TO WILLIE CIRCLE
PHASE II STUDY AREA

Shenipsit Lake

SHENIPSIT LAKE ROAD

CRYSTAL LAKE ROAD

OLD STAFFORD ROAD

Parker Memorial School

Parcel Deletion per Owner's Request

Parcel Addition

ROUTE 74

Tolland Middle School

Tolland High School

Parcel Removed PA-490 Designation

OLD CATHOLE ROAD

Birch Grove Primary School

RHODES ROAD

Parcel Addition

ROUTE 195

Town Hall

Old Post Road Pump Station

OLD POST ROAD

Parcel Subdivision

ROUTE 30

Gateway Zone Pump Station

Industrial Park Pump Station

METCALF ROAD

GEHRING ROAD

GOOSE LANE

RUSSELL DRIVE AREA

PARTRIDGE LANE AREA

ANTHONY ROAD AREA

Town of Vernon

84

PS

Parcel
Water
Stream

Buildings
Field Location
Approximate Location

Town Boundary
Phase 1 Planning Area
Phase 2 Target Study Area
Recommended Sewer Service District
Non-Sewered Area *(On-Site Wastewater Disposal)*

Pump Stations
PS Existing
PS Proposed

Grinder Pumps
Simplex
Duplex

Existing Sewer Pipes
Gravity
Force Main
Low Pressure

Proposed Sewer Pipes
Gravity
Force Main
Low Pressure

J:\DWG\P2002\507\A20\GIS\MXD\RECOMMENDED PLAN.MXD

TOWN OF TOLLAND
WATER POLLUTION CONTROL AUTHORITY
WASTEWATER FACILITIES PLAN

Figure II-1

RECOMMENDED WASTEWATER MANAGEMENT PLAN

MAY 2004
UPDATED AUGUST 17, 2010 & FEBRUARY 14, 2011

N W E S

0 0.25 0.5 1 Miles

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Lane, and Anthony Road areas are adjacent to the boundary of Phase I planning area. Repairs in these areas did not represent a challenge to the installation of replacement leaching fields or tanks. Most of repairs in those areas, except Partridge Lane, reportedly were completed without variances to the health code provisions.

C. FACILITY PLAN FOR WASTEWATER MANAGEMENT (1987)

The 1987 facility plan investigated problems associated with on-site wastewater disposal. The plan also investigated alternative methods of wastewater disposal for areas of Town that could no longer support on-site septic systems. The report indicated that the entire Town of Tolland had experienced sporadic problems with on-site disposal. However, thirteen primary areas of concern were identified. Of these Carriage Drive and Alta Vista Avenue are two areas that are located in the Phase I planning area. Off-site alternative solutions were recommended for several areas, directing the wastewater to the Vernon system, including Carriage Drive area.

D. FACILITY PLAN FOR POLLUTION ABATEMENT PROGRAM (1979)

The Facility Plan for Pollution Abatement Program and the addendum conducted by Purcell Associates in 1979 was not available and could not be reviewed as part of this study.

E. INTERMUNICIPAL AGREEMENT

The original Tolland-Vernon Intermunicipal Agreement, executed on April 6, 1989, stated that Tolland's ultimate average daily flow into the Vernon sewage system shall not exceed 1.0 million gallons per day (MGD). It was also stated that Tolland is allowed an average daily flow of 400,000 gallons per day (gpd) until future upgrades are constructed at the Vernon Water Pollution Control Facility. The maximum allowable peak hourly flow rate shall not exceed four times the 0.40 MGD limitation.

The town of Tolland is presently responsible for paying the costs to Vernon based on the entire 400,000 gpd apportioned flow, regardless of its actual contribution. The ultimate average daily flow was anticipated to be divided between the Route 74 connection at 0.25 MGD and the Route 30 connection at 0.75 MGD. A copy of the Tolland/Vernon intermunicipal agreement is attached in the Appendix.

Since the issuance of the Phase I Facilities Plan, the Town of Vernon has verbally expressed interest in exploring modifications to the intermunicipal agreement to increase the amount of flow allocated to the Town of Tolland. Serious negotiations have not taken place to date.

III. EXISTING CONDITIONS

Data, maps, reports, records, files and other information relevant to wastewater disposal within the planning area were collected from sources including:

- Tolland Engineering Department
- Connecticut Water Company
- Tolland Tax Assessor's Department
- Tolland Planning and Zoning Department
- Tolland Water Pollution Control Authority
- Connecticut Department of Environmental Protection (DEP)
- Federal Emergency Management Agency (FEMA)
- Connecticut Office of Policy and Management (CT OPM)
- United Stated Department of Agriculture (USDA)
- Connecticut Water Company (CT Water Company)
- Birmingham Utilities (now owned by CT Water Company)

Figure III-1 shows the planning area as outlined by the existing Sewer Service Area (SSA). The results of the data investigation phase of the planning study are presented below.

A. EXISTING SEWER SERVICE AREA (SSA)

Figure III-1 shows the existing sewer service area in the Phase I Planning Area. The Phase II areas shown on Figure III-1 are not part of the existing SSA.

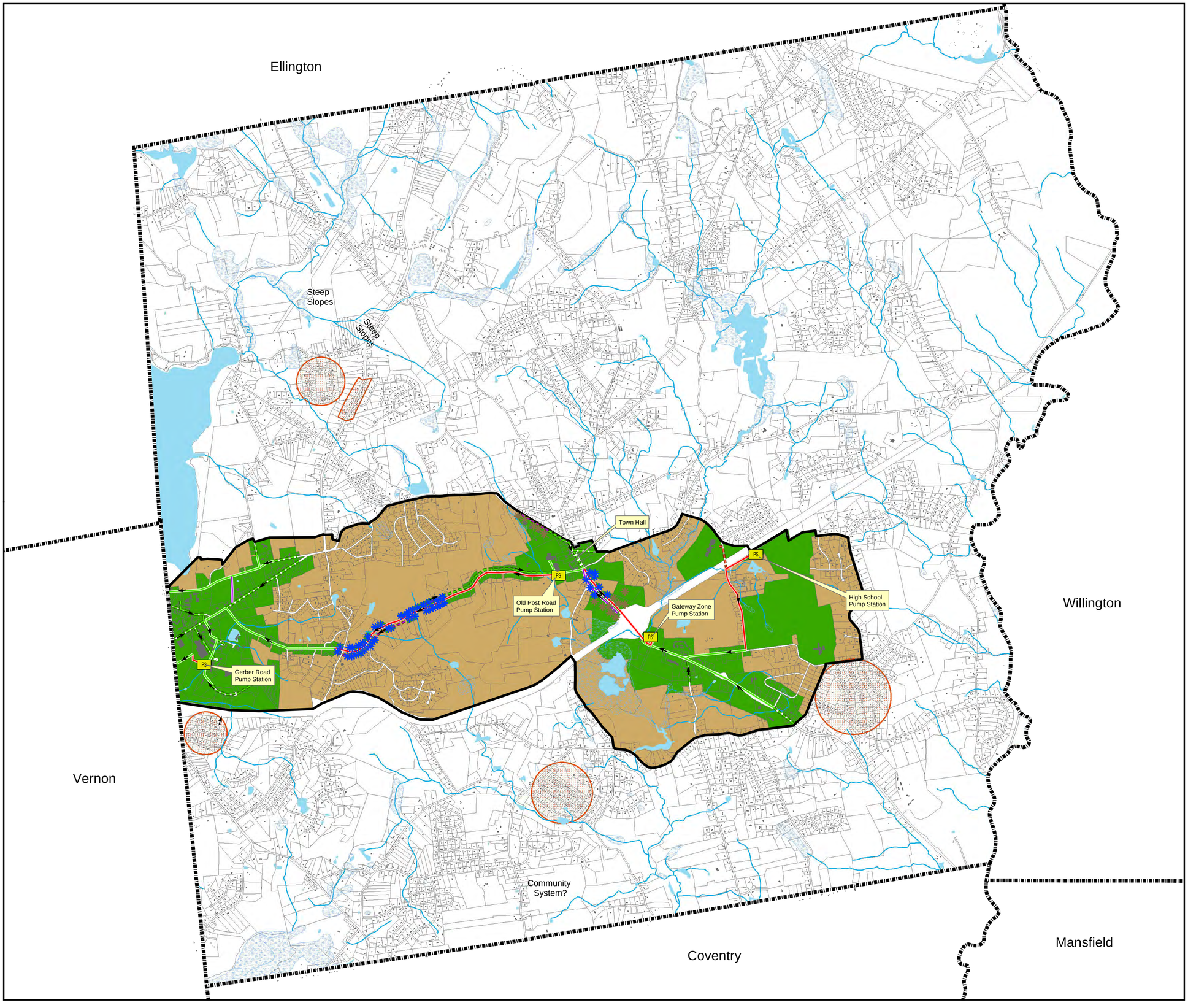
B. EXISTING SEWERED AREA

None of the Phase II areas are currently sewered.

C. SANITARY SEWER COLLECTION SYSTEM

Public sewer systems are utilized for collecting wastewater and transporting it to a treatment/disposal facility. The treatment/disposal facility can be an advanced waste water treatment facility or a local, neighborhood facility such as a community leaching field with or without advanced wastewater treatment. The Tolland wastewater collection system is composed of a large network of gravity sewers, force mains and pump stations. Through Intermunicipal Agreements with the surrounding towns, the wastewater from Tolland's sanitary sewer collection system administratively flows to and is treated by the Vernon Water Pollution Control Facility.

- **Gravity Sewers:** The gravity collection system carries wastewater to several low points and utilizes pump stations and force mains to lift the wastewater to the next high point, from which the wastewater once again flows under the influence of gravity until it reaches its ultimate discharge point at the Town's border. A typical gravity sewer is shown in Figure III-2.



OVERVIEW MAP

TOLLAND WASTEWATER FACILITIES PLAN
PHASE 2

Phase 1 Planning Area

Study Area Identified for Phase 2

Wastewater Management Areas

Sewer Service District

On-Site WW Management Area

Existing Sewer Pipes

Gravity

Force Main

Low Pressure

Proposed Sewer Pipes

Gravity

Force Main

Low Pressure

Grinder Pumps

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Duplex

Pump Stations

PS Existing

PS Proposed

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4). Tolland Sewer Service District from Phase 1 WW Facilities Plan Dated 2004.

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Miles

FIGURE III-1

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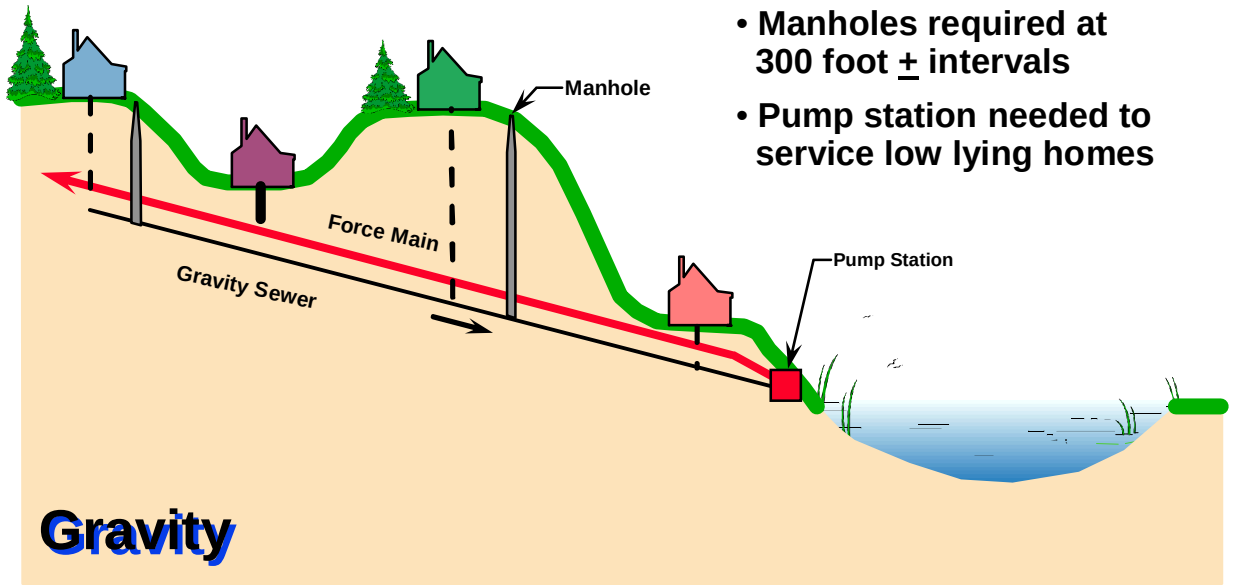
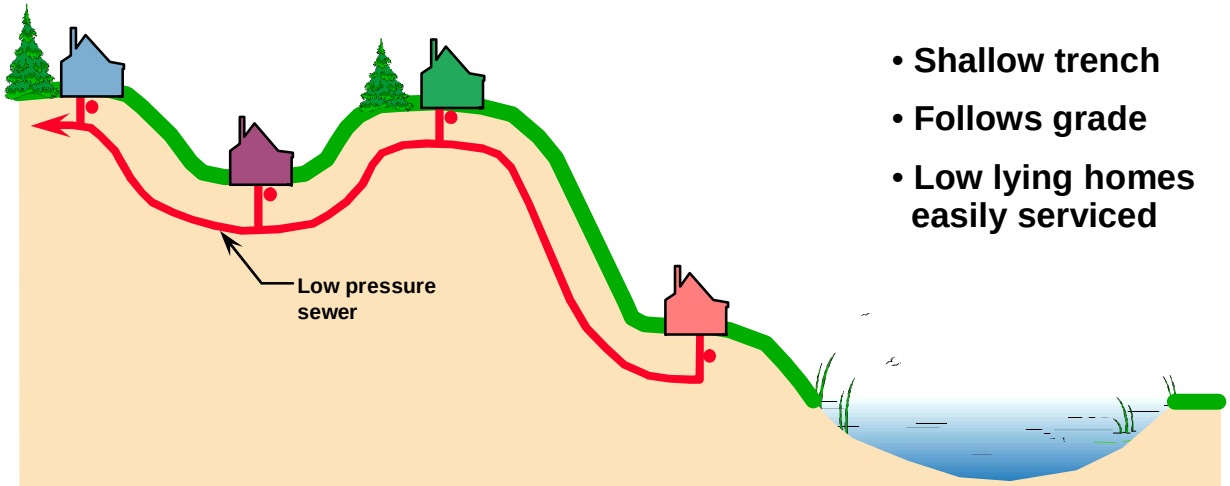
Common Sewer Collection Systems

Figure III-2



- Deep trench
- Manhole required at 300 foot ± intervals
- Pump station needed to service low lying homes

Gravity



- Shallow trench
- Follows grade
- Low lying homes easily serviced

Low Pressure

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- **Force Mains:** Force mains are sewers designed to receive the wastewater discharged from a pumping station and to convey it under pressure to the point of discharge (gravity sewer manhole, storage tank, or treatment plant). The velocity in a force main should be adequate to prevent solids from settling out of the wastewater. At design average flow, velocities in excess of 3 feet per second are recommended by TR-16 "Guides for the Design of Wastewater Treatment Works". Force mains are typically designed with a minimum pipe diameter of 4-inches. Automatic air relief/vacuum valves are generally installed at relative high points in the force main and air relief valves are located at relative low points in the pressure network. A typical force main system is shown in Figure III-2.
- **Pump Stations:** The function of a pump station is to lift wastewater from a low point to a higher point of discharge. Wastewater pump stations are designed to handle the projected peak hourly wastewater flows of its tributary sewer collection system (sewershed). Pump stations must have provisions for servicing, removal, and replacement of equipment. Wet wells are required in pump stations to store the wastewater before it is pumped. To protect the pumps from clogging, devices commonly used within the wet well include bar racks, screens and motorized grinders or shredders.

None of the Phase II areas are currently sewered.

D. CONVENTIONAL SEPTIC SYSTEMS

Continued use of individual septic systems generally is the most cost effective alternative for handling wastewater renovation needs from a particular area, providing physical conditions allow for use of these systems. Conventional septic systems have the benefits of recharging the groundwater with treated wastewater, and in some cases encourage some level of water conservation. Conventional septic systems also tend to limit the intensity of use of the land on which they are located when compared to other means of wastewater renovation.

A conventional septic system is defined, for the purposes of this report, to be a septic tank and leaching trenches (filled with crushed stone) or leaching galleries. The entire system is installed below ground. The septic tank removes most of the solids in the wastewater through settling and removes much of the grease in the wastewater through flotation. Wastewater flows out of the septic tank by gravity through a subsurface piping network into the leaching trenches and eventually the effluent is discharged into the soil. The size requirement of the leaching area is dependent upon the projected wastewater flow and permeability of the soil.

Raw sewage from a residential dwelling varies in the amount and types of biological oxygen demand (BOD), total suspended solids (TSS), and total nitrogen, depending on the living habits of the occupants. Garbage disposals increase the BOD and TSS and are not recommended for on-site systems for that reason. Low flow fixtures and appliances actually increase the wastewater constituent concentrations (strength) because less water dilutes the same amount of nutrients. Pharmaceuticals have increasingly also been the topic of study for on-site systems with groundwater discharges. For example, an elderly widow utilizing low flow fixtures and on consistent medications can generate a different type and quantity of wastewater than a young family of four with pre-1980 fixtures and a garbage grinder. Table III-1 below approximates the concentration of constituents in domestic raw sewage.

Table III-1: Domestic Raw Sewage Constituents		
BOD5	200 mg/L	Rotorua District Council and Environment Bay of Plenty, New Zealand (May 2005 – January 2006)
TSS	300 mg/L	
Total Nitrogen	65 mg/L	
Fecal Coliform	± 2,000,000 col/100 mL	Massachusetts Alternative Septic System Test Center 1999

Septic tanks provide primary treatment of wastewater by settling out the heavy solids and trapping floatables such as oils, fats, and grease (scum). Bacteria that thrive under conditions without oxygen (anaerobic) treat the wastewater in the liquid of the septic tank by converting ammonia to nitrites. On a limited basis, nitrates are also consumed and converted to nitrogen gas in an anaerobic environment (particularly if another carbon source is introduced). An effluent filter screens out the large suspended particles to prevent them from leaving the tank. Table III-2 shows the general effectiveness of a septic tank to remove raw sewage constituents.

Table III-2: Conventional Septic Tank Effluent Constituants		
BOD5	154 mg/L (23% Removal)	Roger Shafer, "Use of Recirculating Textile Filter followed by a Polishing Sand Filter for On-site Wastewater Treatment in Colorado's Fractured Bedrock Environment," presented at the Fractured-Rock Aquifers 2002 Conference, March 13-15, Denver, Colorado
TSS	96 mg/L (68% Removal)	
Nitrogen	38 mg/L (42% Removal)	
Fecal Coliform	± 2,000,000 col/100 mL	Massachusetts Alternative Septic System Test Center 1999

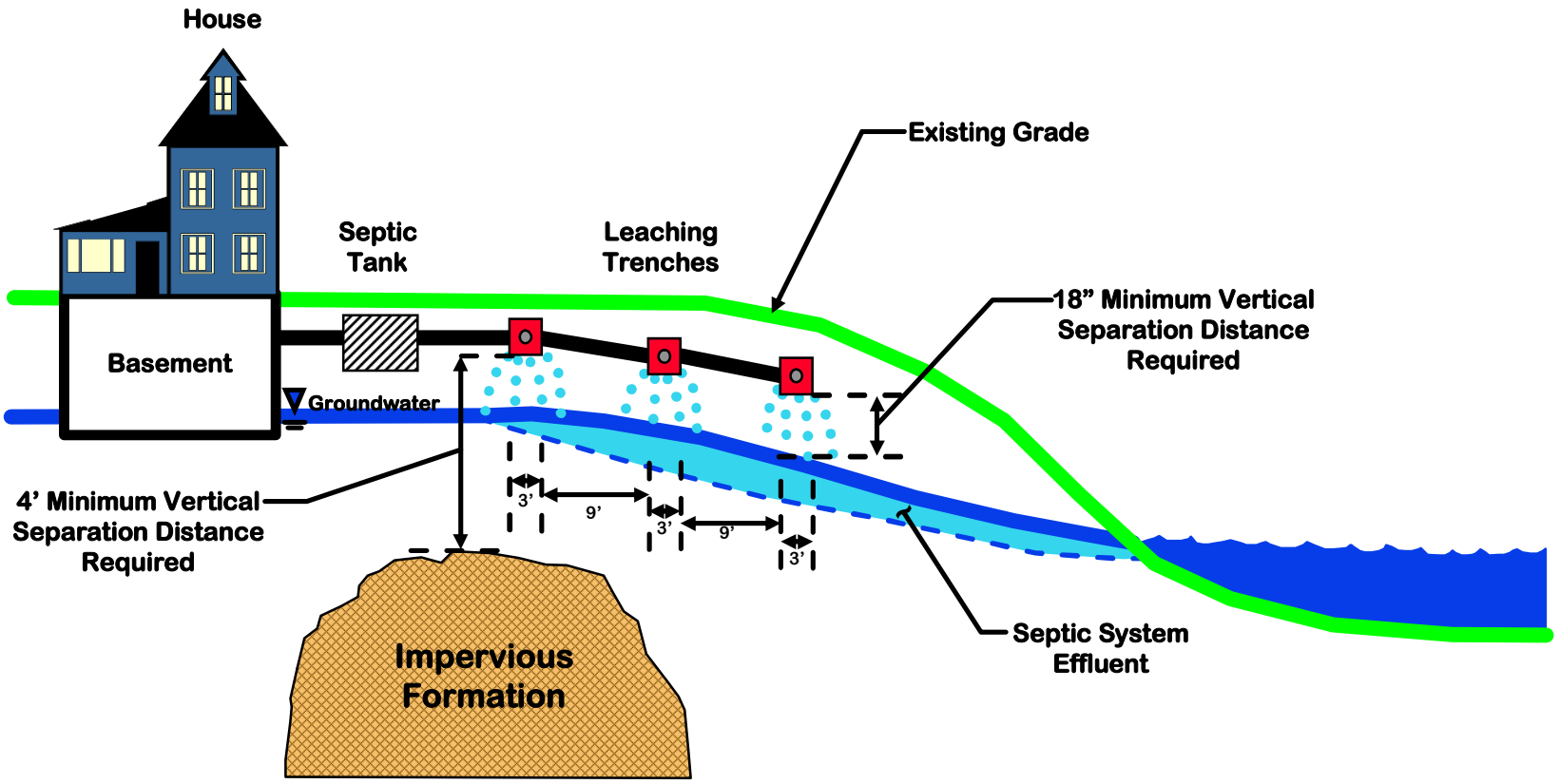
Aerobic wastewater treatment occurs in the soil beneath the leaching field. The soil medium supports biological growth. A "biomat" is formed at the point where the septic tank effluent enters the soil. The biomat is the essential element of the treatment systems and is very effective in removing organic material and pathogens from wastewater. Proper maintenance by periodic septic tank pumping and care in controlling what is discharged to these systems is essential for long term management of these systems. Figure III-3 shows a typical septic system design.

1. CHALLENGES WITH CONVENTIONAL SEPTIC SYSTEMS

There are a number of site conditions under which a conventional septic system may not be able to perform as desired, such as:

- **High density areas containing many houses on small lots.** In these situations, there may be inadequate room to construct a leaching system or to repair a leaching system that has sufficient leaching area for the estimated flow. Commonly, they may fail to meet the minimum leaching area requirements, separation distance from drinking water wells or other setback requirements (Figures III-4 and III-5). This may result in contamination of shallow drinking water wells and the migration of plumes across property lines.
- **Areas with a seasonal high groundwater table.** Proper wastewater treatment requires that an adequate aerobic zone be maintained in the soil below the leaching field. If the groundwater table is at or near the bottom of the leaching field, the aerobic treatment zone is reduced or eliminated. In these cases, there is inadequate treatment of the wastewater.

Standard Septic System Cross-Section



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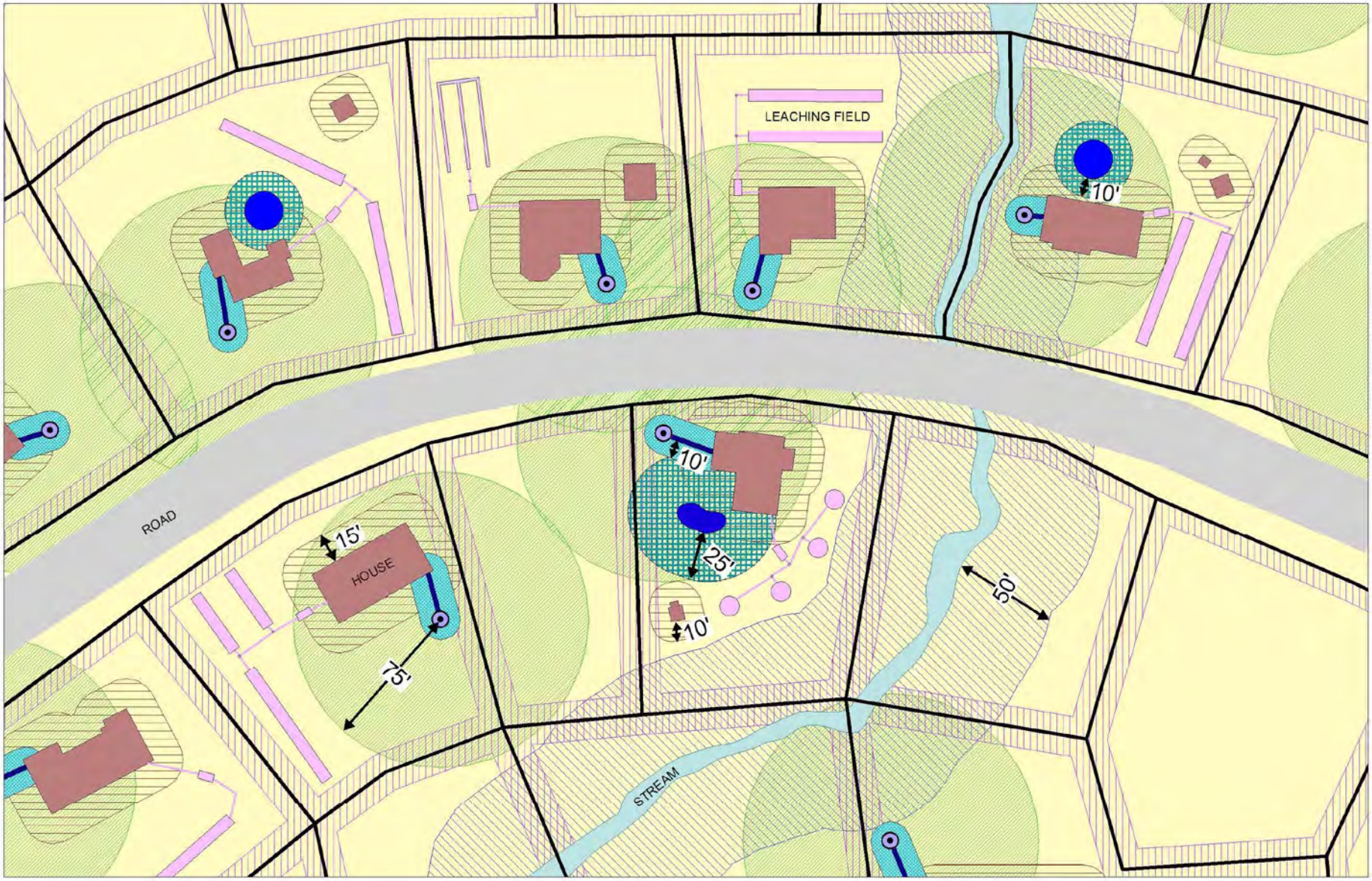

Open Watercourse
Road
Building
Property Line
Subsurface Sewage Disposal System
Private Well
Water Pipe
Pool

10' Property Line Buffer
50' Open Watercourse Buffer
15' Occupied Building Buffer
10' Accessory Building Buffer
25' Below Ground Swimming Pool Buffer
10' Above Ground Swimming Pool Buffer
75' Well Buffer
10' Water Pipe Buffer

Connecticut Department of Public Health

Typical Onsite Septic System Layouts with Minimum Separation Distances for Lots Served by Private Wells

50 0 50 100 Feet

N W E S

Figure III-4

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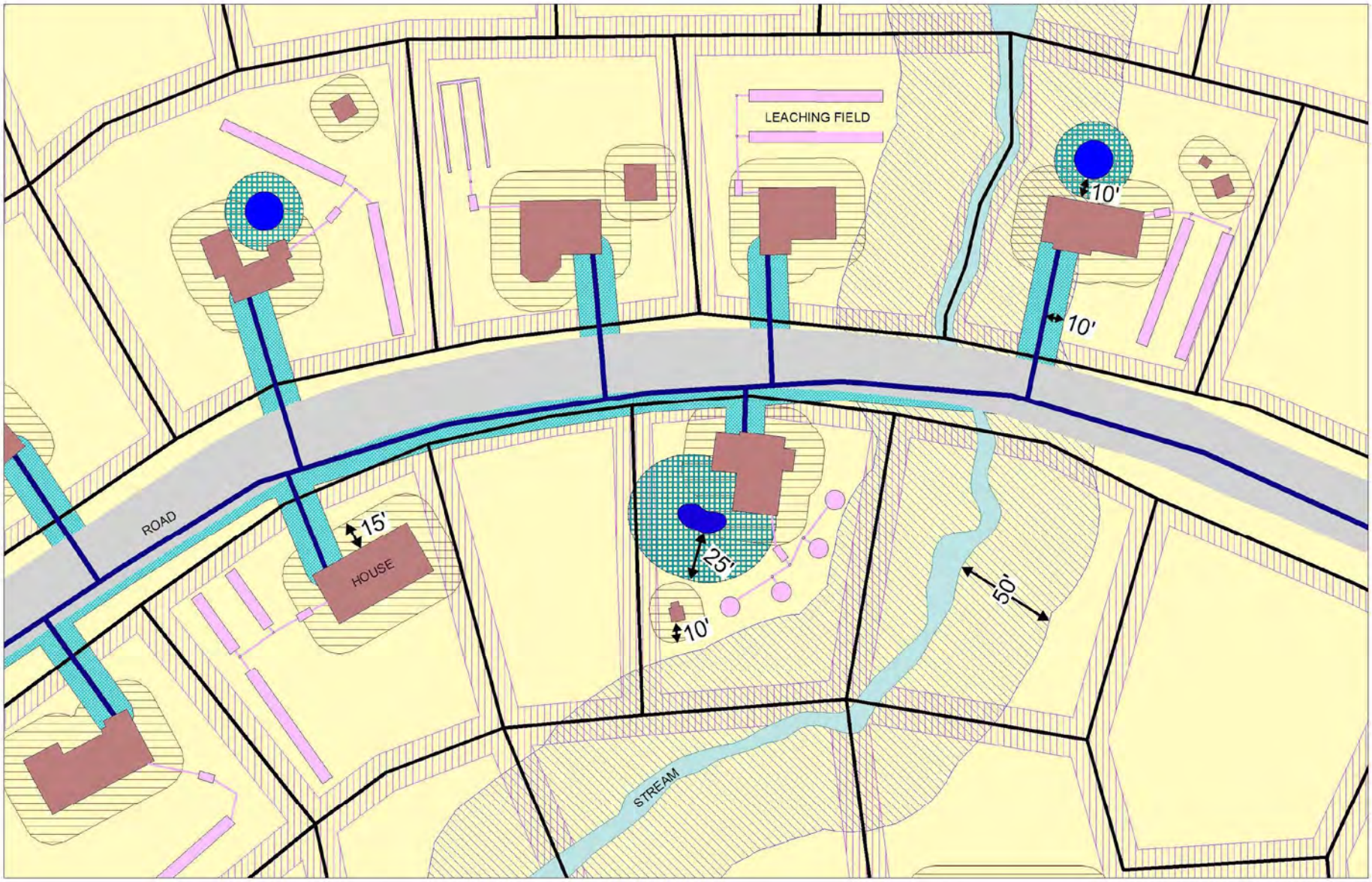
G:\PAD\acmunway\Template\Figure\DPH_SSDS_Setbacks\typical.apr, Private Wells


LEACHING FIELD
10'
10'
ROAD
15'
HOUSE
25'
10'
50'
STREAM
Open Watercourse
Road
Building
Property Line
Subsurface Sewage Disposal System
Water Pipe
Pool
10' Property Line Buffer
50' Open Watercourse Buffer
15' Occupied Building Buffer
10' Accessory Building Buffer
25' Below Ground Swimming Pool Buffer
10' Above Ground Swimming Pool Buffer
10' Water Pipe Buffer
Connecticut Department of Public Health
Typical Onsite Septic System Layouts with Minimum Separation Distances for Lots Served by Public Water
50 0 50 100 Feet
N
W
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S
Figure III-5
FUSS & O'NEILL
Disciplines to Deliver
G:\PAD\admin\wa\Template\Figure\DPH_SSOS_Setbackstypical.apr, Public Water

- **Areas with relatively impermeable soils.** Where there is ledge or very tight (i.e., non-porous) soils, the ability of the leaching field to accommodate the wastewater is severely diminished. This lack of hydraulic conductivity often results in system failure and surface breakout of sewage. It also may cause wastewater within the plumbing system to back up into the home.

- **Areas close to surface water bodies.** Rivers, embankments, ponds, streams and other surface waters may be impacted by partially or inadequately treated wastewater from nearby leaching systems. Bacterial contamination of the water may result. It is also a common occurrence to have nutrient contamination of these water bodies. In these instances, it is possible that nutrients such as nitrogen and phosphorous are not removed sufficiently from the wastewater plume before it reaches the surface water.

- **Areas with extremely permeable soils such as coarse grained sand and gravel**. When these conditions exist, the wastewater moves through the soil too rapidly, without receiving effective treatment. Where other conditions such as high density housing or shallow groundwater exist, degradation of ground and surface waters can be accelerated, even when the leaching system meets other code requirements. Groundwater adversely affected by septic systems may not be a suitable drinking water source if shallow drinking water wells are present in the vicinity of these septic systems.

- **Other older systems.** In areas where houses were built several decades ago, the septic systems were typically installed to significantly less stringent standards than required by today's codes. The leaching fields and septic tanks are often undersized or incomplete.

- **Discharge of harmful substances**. Discharge of substances which inhibit the biological processes may cause incomplete wastewater renovation. Some potential culprits of this phenomena is the illegal sodium-rich discharge of backwash from water softeners or oils, paints, and solvents.

2. DESIGN AND INSTALLATION OF NEW ISDS

New on-site systems should be designed by professionals familiar with regulations regarding subsurface renovation systems and should take into account soil conditions, groundwater elevations and area requirements for the particular lot involved. To this end, the State has compiled requirements to further facilitate proper subsurface disposal. Critical review of designs submitted to the Eastern Highland Health District and Town staff for approval is very important to ensure that the new systems will meet the needs for sewage renovation for the long term.

Septic system adequacy should also be addressed when subdivision applications are reviewed and when additions to buildings and conversions in use (e.g. residential to commercial) are made.

Proper installation of approved septic systems is also critical to long term operation. Field inspections of these installations in progress by the Health District representative or other qualified staff are essential for this reason. In addition, record information should be gathered during construction and filed with EHHD, the Tolland GIS steward and WPCA to facilitate locating parts of the system if modifications are required in the future.

E. COMMUNITY SUBSURFACE SEWAGE ABSORPTION SYSTEMS

In locations where individual lot sizes are not adequate to support conventional septic systems, community sewage absorption systems (CSAS) may be an acceptable alternative. CSAS generally

consist of a septic tank for the removal of solids, and a leaching field (typically with some type of gallery surrounded by crushed stone) installed to allow the septic tank effluent to seep into the existing soil. The purpose of the gallery is to maximize the effective leaching area provided by the trench and to provide storage so that if a high volume of wastewater enters the CSAS in a short period of time then the water will have a chance to slowly seep into the ground without backing up the system.

A CSAS site would require deep deposits of well-drained soils and sufficient depths to groundwater and bedrock. The parcel would need to be large in area to provide the necessary nitrogen dilution to meet drinking water standards at the property line, otherwise pretreatment of the wastewater would be required prior to discharge. Unless a town-owned parcel suitable for subsurface disposal systems is available, this alternative will also require land acquisition or an easement in perpetuity. Refer to Figure III-6.

F. TOWN ZONING REGULATIONS

Zoning regulates land use, including the size, shape and permitted uses of lots and structures to promote public safety, health and general welfare. It dictates where people live and work, the size of houses, and the location of stores. Zoning can preserve natural features, promote infill development and mixed-use development, and provide public community spaces.

Zoning will rarely be the only sensible growth tool a community uses, but can help reach land-use goals when combined with effective planning. Overly restrictive zoning can lead to many problems, from enforcement problems to a stagnant development climate and economic decline. Likewise, areas zoned for significantly more development than currently existing can lead to congestion, overcrowding, and over-stressed infrastructure.

Tolland's current zoning designations were adopted under the authority of Chapter 124 of the General Statutes of the State of Connecticut, as amended. These regulations were adopted for a number of reasons including promoting public safety, health and general welfare; assuring adequate light, air and privacy; preventing overcrowding of the land and avoiding unwarranted concentration of population; lessening congestion in streets; facilitating suitable transportation, public utilities, resources and recreational facilities; conserving the value of buildings and property; encouraging the most appropriate use of the land throughout the Town with reasonable consideration for the existing or planned character of the area and guiding the Town to conform with its Comprehensive Plan of Development.

There are eight different zoning designations as listed in Table III-3. Boundaries dividing land within the town are established by the Planning and Zoning Commission and are shown graphically on Figure III-7. Table III-4 outlines the minimum lot size and maximum building coverage for each zoning designation.

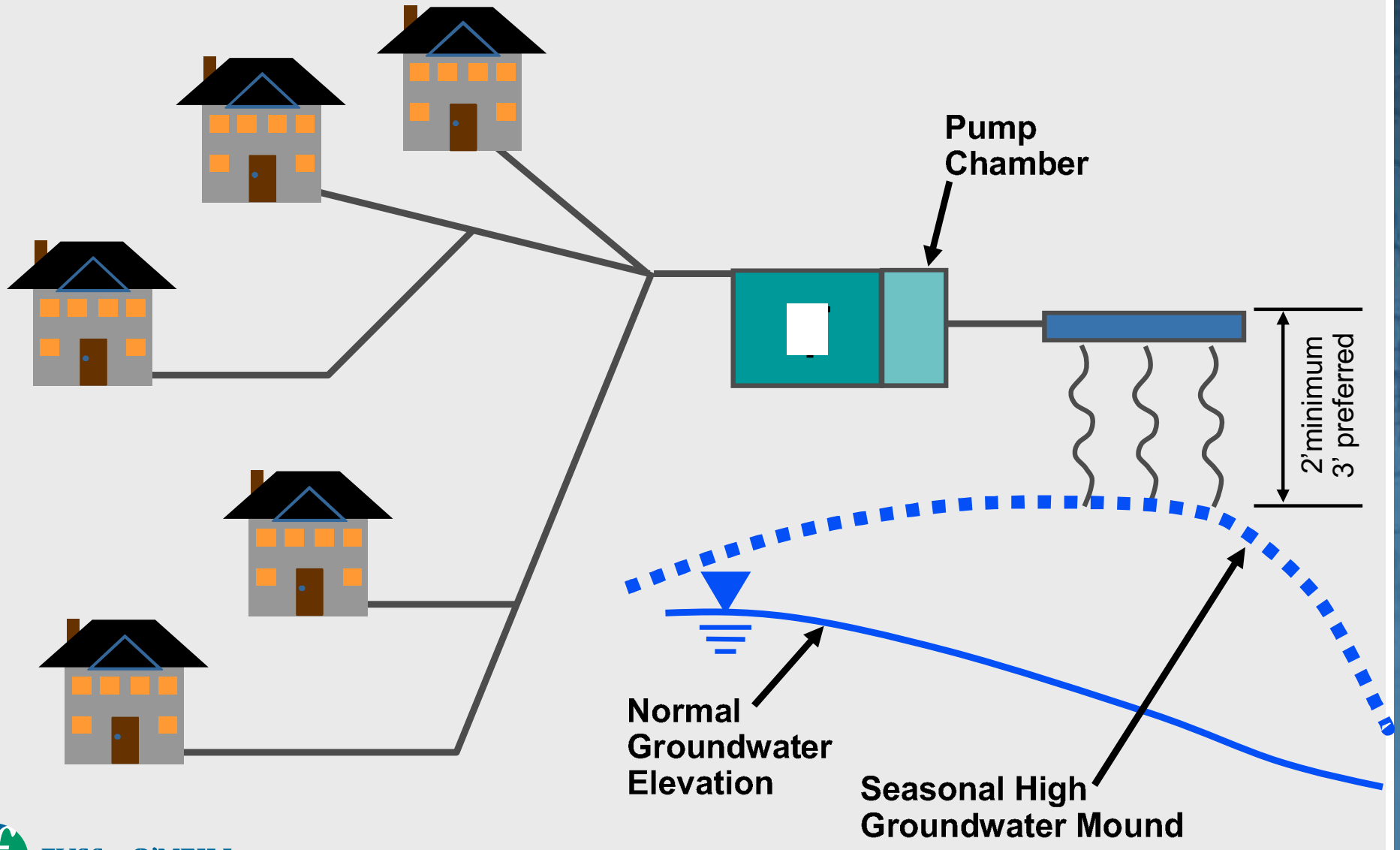
Table III-3: Zoning Requirements

Zoning Designation	
Residential Design Districts	RDD
Village Center Zone	VCZ
Neighborhood Commercial Zone	NCZ
Commercial/Industrial Zone	CIZ
Gateway Design District	GDD
Tolland Business Park Zone	TBP
Floodplain/Stream Belt Zone	FPSB
Aquifer Protection Overlay Zone	APO

The Residential Design Districts encourages flexibility of site design and housing construction (single family, multi-family, village clusters, & affordable housing) to protect the natural semi-rural character of the Town. It promotes preservation and growth of agriculture, as well as preservation of wetlands while minimizing stormwater runoff. The RDD zone offers greater protection in the Natural Resource

Wastewater Systems – Community

Figure III-6



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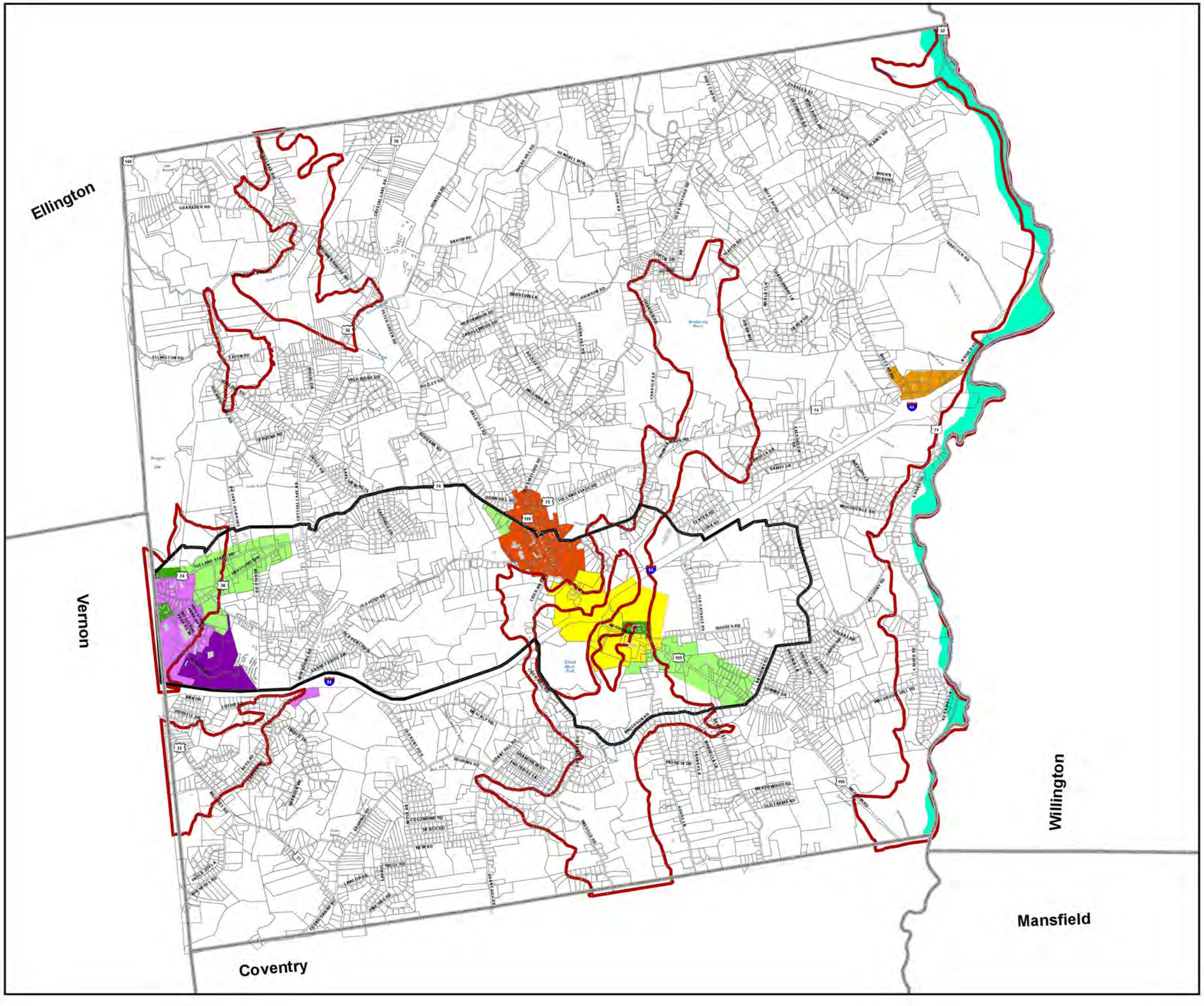

Town Zoning Map

TOLLAND WASTEWATER FACILITIES PLAN
PHASE 2

- Phase 1 WW Planning Area
- Tolland Aquifer Protection Areas

Zoning

- Residential
- Residential Designated District
- Neighborhood Commercial Zone
- Gateway Designated District
- Village Center Zone
- Tolland Business Park
- Commercial/Industrial Zone A
- Commercial/Industrial Zone B
- Flood Plain/Stream Belt

Notes:
1) Town of Tolland Zoning map as of December 18, 2007.
2) Town of Tolland parcel base dated 2004 with supplemental additions to 2007.
3) 2004 building dataset provided by Town of Tolland.
4) Dataset of Town boundaries downloaded from the CT DEP GIS website Fall 2005.

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FIGURE III-7
JULY 2007

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Table III-4: Tolland Residential Zones and Development Options

	RDD Zone Traditional Development See Sec. 170-37 L for No. of lots allowed	RDD Zone Flexibility for Open Space Preservation Required lot dimensions may be reduced proportional to increase in Open Space See Sec. 170-38 for dimension reductions	VCZ	Multi-Family Special Permit	Elderly Special Permit
Min. Parcel Size				10 Acres	10 Acres
Min. Lot Size	2 Ac. / 87120 sqft.	No less than 40,000 sqft.	1 Acre		
Min. Buildable Area	19,000 sqft.	19,000 sqft.	19,000 sqft.		
Min. Lot Frontage	200'	No less than 125'	150'	125'	125'
Max. Building Coverage	15%	15%	20%	15%	15%
Setbacks:	Principal structures			See Site Perimeter Setbacks	
Front yards: From Collector & Arterial Rds. From other roads	 60' 40'	 60' No less than 30'	 40" 40'		
Side Yard	25'	No less than 20'	15'		
Rear Yard Dwelling/accessory buildings	50'/25'	No less than 25'	50'/25'		
Rear lots allowed	Yes	Yes, but lot dimension reductions do not apply	NO	N/A	N/A
Min. Lot size	5 Acres	5 acres			
Min. Buildable Area	19,000 sq. ft.	19,000 sqft.			
Max. Bldg. Coverage:	15%	15%			
Setbacks: Front Yard	100'	100'			
Side & Rear Yards	50'	50'			
Max. Building Height	35' (40' at ridge)			35'	35'
Min Open Space	20%	>20% increased open space dedication may reduce required lot dimensions	20%	20% of parcel	20% of parcel
Max # of dwelling units per Acre of Developable area				6BR on septic systems 8BR on sewer	10 BR on septic systems 12 BR on sewer
Site perimeter setbacks				100' adjoining a residential zone 50' adjoining a non-residental zone	
Maximum number of dwellings per building	1/ lot - with 1 accessory apartment			12/ building	40/ building

Table Source: Town of Tolland Zoning Regulations (Rev. November 1, 2007)

& Wildlife Protection areas of Town and maintains the maximum amount of land area for open space (including parks, recreation, and trails). The minimum lot size for traditional development in RDD zones is 87,120 sq. ft. The maximum building coverage is 15% of the land with a minimum of 20% open space required. To increase open space on a site, the minimum lot size may be reduced to 40,000 sq. ft. in proportion to an increase in open space.

The Village Center Zone promotes the traditional New England Village atmosphere of the existing residential, municipal, cultural, and religious uses within the village green area. The regulations specify a minimum lot size of 1 Acre with a minimum building size of 19,000 sq. ft.

Smaller scale, less intense commercial/office uses are encouraged in the Neighborhood Commercial Zone which serves as a transition to residential areas. Permitted site plan uses have a gross floor area of 20,000 sq. ft. or less for retail stores, banks, offices, day-care, schools, public, use, clubs, art centers, places of worship, bed-and breakfasts, and agricultural uses. Special permit sues are allowed for site plans with a GFA greater than 20,000 sq. ft. (arcades, bazaars, kennels, motor vehicle sales/repairs/rentals, gas stations, medical facilities, printing, sporting, restaurants, theaters, utilities, car washes, roadside stands, or mixed use). The minimum lot size is one acre with maximum lot coverage of 50% (all structures and impervious surfaces). The minimum building floor area is 1,000 sq. ft. with no individual retail business exceeding 32,000 sq. ft.

Larger scale, more intense commercial and light-industrial uses are sought for areas zoned Commercial/Industrial (A or B). The minimum lot size is one acre with maximum lot coverage of 60%. This area can be used for R&D labs, office, manufacturing, warehousing, printing, art/music centers, transportation facilities, retail stores, banks, clubs, gas stations, recreation facilities, restaurants, Laundromats, car washes, distribution centers, trade schools, self storage facilities, and day cares.

The purpose of the Gateway Design District is to create an attractive entrance to Tolland while encouraging coordinated commercial/office development with high design standards at the interchange gateway entrances to the community. The goal is to promote compact commercial development having scale and form consistent with the natural landforms of the site and the character of the Town. Development on GDD zoned sites, with the exclusion of additions less than 10% of the gross floor area, require special permits. These buildings are required to follow multiple architectural design guidelines for aesthetics. The minimum lot size is 1 acre with maximum lot coverage of 50% With four concurring votes from the Zoning Commission, the lot coverage may be increased to 65% or (under unique circumstances) 75%-80%. The maximum size of an individual retail business may not exceed 52,000 sq. ft. (60,000 sq. ft. with Commission approval).

The Tolland Business Park zoned parcels provides an area for light industry, offices, and other flexible site development. The minimum lot size is 2 acres with a minimum building size of 5,000 sq. ft. and maximum impervious lot coverage of 50%. The permitted site plan uses include R&D labs, offices, manufacturing, warehouses, printing, medical labs, and utilities. The principal uses under special permit are: contractor storage, communication studios, machinery repairs, and indoor athletic facilities.

The Floodplain/Stream Belt Zone protects the Willimantic River floodplain limits to reduce the danger to public and property health, safety, and welfare by severely limiting the construction or alternation of land in flood prone areas to compatible uses (farm stands, agriculture, parking lots, etc).

The Aquifer Protection Overlay Zone was established to preserve the quality and quantity of Tolland's groundwater resources. The regulations of development activities in these areas were created to reduce the potential for groundwater contamination of a public drinking water aquifer.

G. FUTURE LAND USE PLAN

Planning is the process by which a community determines how it desires to shape its development in the future. Comprehensive plans address the strengths, weaknesses, opportunities, and threats to a community. The results are prepared as a statement of objectives for future growth. Goals and a broad outline of how to achieve those goals are included. The goals of the future master plan are implemented by restricting land use in conjunction with zoning regulations.

Town planning staff were consulted to verify consistency with the Town's planning objectives. Figure III-8 shows the Future Land Use from Tolland's existing June 1999 plan. The Town has begun updating the Future Land Use Plan with an anticipated completion date in 2009-2010.

H. RECOMMENDED CONSERVATION & DEVELOPMENT POLICIES PLAN AND LOCATIONAL GUIDE MAP FOR CONNECTICUT, 2004-2009

The "Conservation and Development Policies Plan for Connecticut" (C&D Plan) is a statement of the State's growth, resource management, and public investment policies. The Plan provides a policy and planning framework for the administrative and programmatic actions and capital and operational investment decisions of state government, which influence the future growth and development of the state. The plan, prepared by the Office of Policy and Management, designates land use characteristics and presents goals and policies for each category.

The Locational Guide Map provides a geographical interpretation of the state's conservation and development policies. It is a compilation of the best available digital, standardized, statewide data for each policy's criteria definition.

There are seven conservation and development categories relevant to Tolland's current Sewer Service Area. In general, the 20-year Recommended Wastewater Disposal Plan must be consistent with the C&D Plans' Locational Guide Map in order to be approved by the CT DEP and for any projects recommended therein to be eligible for most state funding programs. Recent legislation has authorized state agencies to recoup or rescind state funding for non-conforming Town construction projects which were constructed utilizing state grants, retroactive until 1991.

The Town Planner petitioned the state's Office of Policy and Management (CTOPM) in January and February 2004 to amend their C&D Plan prior to its release through the public hearing process, to correspond with town-wide development goals. CTOPM incorporated many of the requested changes, mostly due to mapping accuracy errors and development out of their purview (service to schools). However, no modifications were made to the two vacant parcels north of Route 74 west of Shenipsit Lake Road which are bifurcated in the current town-wide plan of development, with the streetward portion of the lots included within the Neighborhood Commercial Zone.

The major categories, from the C&D Plan, found in Tolland are presented in Figure III-9, and are described as follows:

- **Growth Areas:** Growth Areas provide the opportunity for staged urban expansion generally in conformance with municipal or regional development plans. These lands

Future Land Use Plan

TOLLAND WASTEWATER FACILITIES PLAN
PHASE 2

Notes:
1) Land Use mapping dated June 1999; provided by Town of Tolland

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FIGURE III-8

JULY 2008

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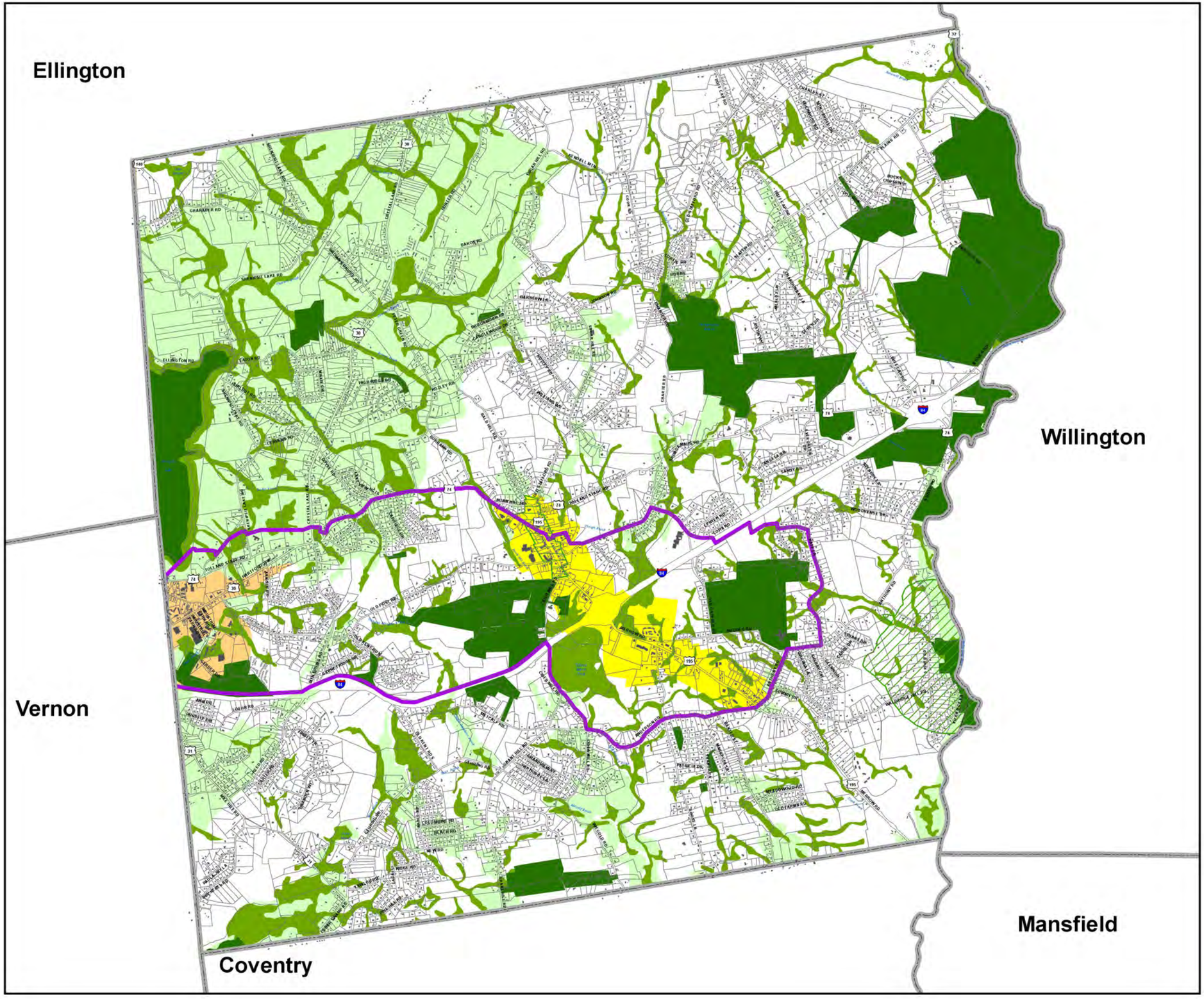

2004-2009 CT OPM Plan of Conservation and Development

TOLLAND WASTEWATER FACILITIES PLAN
PHASE 2

Phase 1 WW Planning Area

Development Policies

- Regional Centers
- Neighborhood Conservation Areas
- Growth Areas
- Rural Community Centers
- Conservation Areas
- Preservation Areas
- Existing Preserved Open Space
- Rural Lands
- Level A/B Aquifer Protection Areas
- Historic Districts

Notes:
1) Connecticut Office of Policy Management mapping showing the Locational Guide Map for the 2004-2009 Conservation and Development Policies Plan for Connecticut downloaded October 2005 from the OPM website.
2) Parcel layer based on 2004 updates with supplemental additions to 2007.

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FIGURE III-9
JULY 2008

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Disciplines to Deliver

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reflect moderately developed areas with vacant, developable lands, existing or planned water or sewer services, and the potential for future mixed use and intensive development of area wide significance.

- **Rural Community Centers:** Rural Community Centers reflect existing mixed use areas or places that may be suitable for future clustering of the more intensive housing, shopping, employment, and public service needs of municipalities outside of urban development areas. Rural Community Centers are areas where small-scale community systems of water supply, waste disposal, and public services are appropriate but large-scale public service systems should be avoided.
- **Rural Lands:** Rural Lands are those areas falling outside any other Guide Map Category. Structural development forms and intensities which exceed on-site carrying capacity for water supply and sewage disposal are discouraged.
- **Existing Preserved Open Space:** The Existing Preserved Open Space designation represents areas in the state with the highest priority for conservation and permanent use as open space. The area should be kept in permanent continuation as public or quasi-public open space, and discouragement of sale and structural development of such areas, except as may be consistent with the open space functions served.
- **Preservation Areas:** Preservation Areas advocate the protection of significant resource, heritage, and recreation of statewide significance. For these areas, the priority is to avoid support of structural development except as directly consistent with the preservation values.
- **Conservation Areas:** Conservation Areas advocate the long-term public benefit, the lands contributing to the state's need for food, fiber, water and other resources, open space, recreation, and environmental quality and ensure that changes in the use are compatible with the identified conservation values.
- **Level A/B Aquifer Protection Areas:** Level A/B Aquifer Protection Areas advocate protection of the water resources of the state. In areas of high density development, the extension of public sewers may reduce the risk of degradation of aquifer water quality. In undeveloped areas, increased density of development due to extension of public sewers is discouraged.
- **Historic Districts:** Historic Areas include Local Historic Districts, as defined in state statute, as well as National Register Historic Districts Development in these areas must be in accordance with any guidelines or standards established for the district.

I. OPEN SPACE CONSERVATION

Open space and institutional land areas provide a mechanism to preserve critical land and natural resources. Areas in their natural state protect valuable ecological functions and unique natural features. Open space provides passive outdoor recreational opportunities. Disturbance of land through development creates erosion, increased storm water run-off and exponentially increases pollution in lakes, rivers, streams, and aquifers.

Certain land uses incur municipal services that can lead to an overall net loss to the Town's operating budget. Passive conservation and preserved open space generally do not require municipal oversight. Acquisition of public or non-profit open space reduces future Town losses

from increased expenditures per unit built. Open space and other protected areas are presented in Figure III-9.

J. NATURAL DIVERSITY DATABASE

The Natural Diversity Database (NDDB) is a central repository for information on the biology, population status and threats to the elements of natural diversity in the state of Connecticut. Information from biologic inventories of the state's species and habitats has been collected by the Connecticut Geological and Natural History Survey. Additional information received from universities, biologists, naturalists and conservation groups continuously update the existing database. The database currently contains information on the status of more than 1,000 species of plants and animals which includes the Endangered, Threatened or Special Concern species listed in Connecticut.

The NDDB was consulted to determine whether further investigation with regard to endangered species in the Sewer Service Area is required for future sewer expansion projects. This mapping, depicted in Figures III-10 identifies potential areas for further investigation.

The area surrounding Shenipsit Lake is the largest area for concern in the Phase II study with respect to NDDB. Other areas include the water course north of Angela Drive, the tributary stream by the intersection of Slater and Charter Roads, and another area located between Old Stafford Road and Charter Road. In northwestern Tolland along the Willimantic River, an area is designated south of North River Road. An area in southwestern Tolland located west of Cedar Swamp Road by the Coventry and Vernon town lines was also identified.

K. AQUIFER PROTECTION ZONES

The Town of Tolland Aquifer Protection mapping was reviewed to determine the location of aquifer protection zones. The purpose of aquifer protection regulations is to preserve the quality and quantity of the Town's groundwater resources. To reduce the potential groundwater contamination, further investigation with regard to activities within aquifer protection zones is required if wastewater collection facilities are constructed within those areas. The Aquifer Protection Map is depicted in Figure III-11. Extension of public sewers within Aquifer Protection zones may prevent further degradation of groundwater in those areas by reducing the discharge from on-site wastewater facilities.

A large aquifer protection area is located along the eastern extents of Tolland's town line border with Willington on the Willimantic River. A second aquifer protection area is located in the central portion of the Town surrounding the Skungamaug Marsh, reaching south across the Tolland Marsh and following the Skungamaug River to the Coventry town line. Two aquifer protection areas can be found adjacent to Shenipsit Lake in western area of Town, as well as one area in northern Tolland by Brown Bridge Road. An aquifer protection area extends from Vernon across Mile Hill Road to I-84 in the southwest.

L. SURFICIAL SOILS

There is no predominant surficial soil deposit within the Phase II area as shown in Figure III-12. The majority of surficial materials in the Phase II area are composed of Till or Thick Till. The areas that are not identified as till were a match with Tolland's Aquifer Protection Areas. These surficial materials generally include the presence of Sand + Gravel and tend to have a higher permeability and hydraulic capacity than till.

Ellington

Willington

Vernon

Coventry

Mansfield

CT DEP NATURAL DIVERSITY DATABASE

TOLLAND WW FACILITIES PLAN
PHASE 2

NDDB Preliminary Mapping

Phase 1 WW Planning Area

Notes:
1) NDDB mapping downloaded from the DEP web site May 2007.
2) Town of Tolland parcel base dated 2004 with supplemental additions to 2007.
3) 2004 building data set provided by Town of Tolland.
4) Water streams and bodies data layer downloaded from the DEP web site.

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FIGURE III-10
JULY 2008

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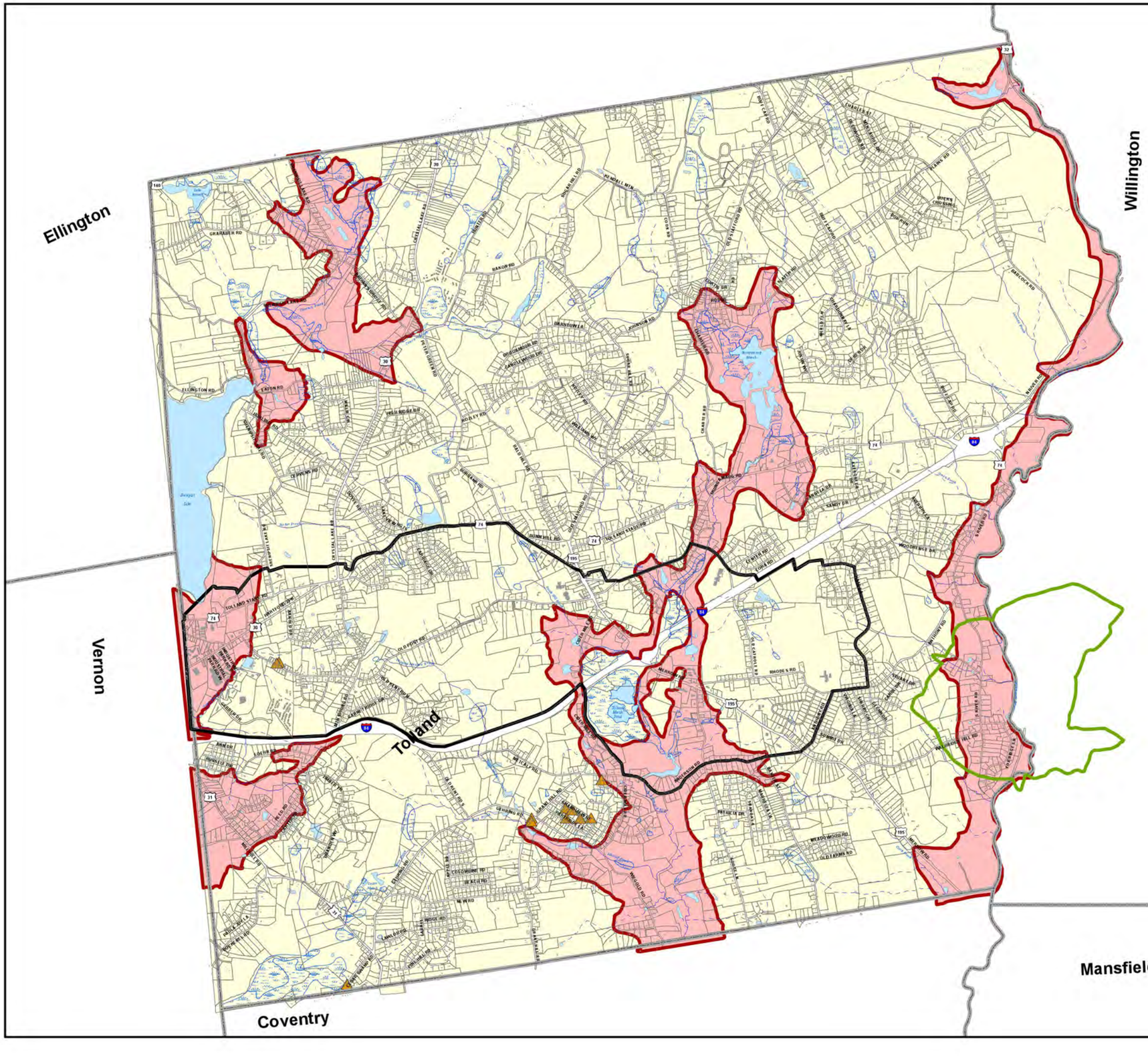

Aquifer Protection Areas

TOLLAND WASTEWATER FACILITIES PLAN
PHASE 2

- Preliminary DEP Aquifer Protection Area
- Parcels
- Phase 1 Planning Area
- Aquifer Protection Area Wells
- Streams/Rivers
- Intermittent Water

Water

- Ponds/Lakes
- Marsh on USGS Quad Sheet
- Tolland Aquifer Protection Areas

Notes:
1) Town of Tolland parcel base dated 2004 with supplemental additions to 2007.
2) 2004 building dataset provided by Town of Tolland.
3) Data set of town boundaries, aquifer protection areas, and water course/bodies downloaded from the CT DEP GIS website Fall 2005.

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FIGURE III-11
JULY 2008

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Ellington

Willington

Vernon

Mansfield

Coventry

Surficial Materials

TOLLAND WASTEWATER FACILITIES PLAN
PHASE 2

Phase 1 WW Study Area

Water

- Ponds/Lakes
- Marsh on USGS Quad Sheet

Surficial Materials

- Alluv / Fines
- Till, Sand+Gravel, Boulders
- Alluv / Sand + Gravel
- Alluv / Sand + Gravel / Sand / Fines
- Gravel
- Sand
- Sand + Gravel
- Sand + Gravel / Fines
- Sand + Gravel / Sand
- Sand / Fines
- Sand / Sand + Gravel
- Swamp
- Talus
- Thick Till
- Till

Notes:
1) Town of Tolland parcel base dated 2004, with supplemental additions to 2007.
2) Dataset of town boundaries, and water features downloaded from the CT DEP GIS website Fall 2005.
3) USGS Surficial Materials dated prior to 1992. Surficial material units describe textures of unconsolidated glacial and post-glacial materials including gravel, sand, fines, till, alluvium, and swamp deposits.

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FIGURE III-12
JULY 2008

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Three prominent swamp areas are shown on Figure III-12: Cedar Swamp, Skungamaug Marsh, and Tolland Marsh Pond. A large Sand + Gravel area is located northwest of Shenipsit Lake. A deposit of Sand + Gravel /Fines is located south, adjacent to Shenipsit Lake with Sand + Gravel extending south across I-84 towards Route 31. Deposits of Sand + Gravel, Sand + Gravel/Fines, and Alluv/Sand + Gravel can be found along the Willimantic River. Along the Skungamaug River in the central portion of Tolland, varying soil deposits of Sand, Sand + Gravel, and small amounts of Alluv/Sand + Gravel.

M. DRAINAGE BASIN AREAS

A drainage basin is the topographic region from which a stream receives runoff, through-flow, and groundwater flow. Drainage basins are divided from each other by topographic barriers. Drainage basins are arbitrarily defined based on available topographic information. The number, size, and shape of drainage basins found in an area vary with the scale of examination. The regional and subregional basins are labeled on Figure III-13. Generally, the elevated areas tend to drain in a north to south orientation.

Approximately two-thirds of the Town (central to eastern) is located in the Willimantic Regional Drainage Basin. This area is sub-divided into Hop River, Skungamaug River, Willimantic River, and Edison Brook. The western side of Town falls within the Hockanum Regional Drainage Basin which is divided into three sub-basins, Charters Brook, Hockanum River, and Tankerhossen River. A relatively small area located by Lake Bonair is part of the Scantic Regional Basin, connected by Broad Brook.

N. POPULATION PROJECTIONS

Population projections are an important part of the planning process. The sizing of the wastewater disposal facilities and available public sewer collection system capacity depends on the number of wastewater contributors. The US Census American Factfinder counted 13,146 people living in 4,665 households (98.9% occupied) in Tolland in the year 2000. There was an average population density of 2.83 people per household.

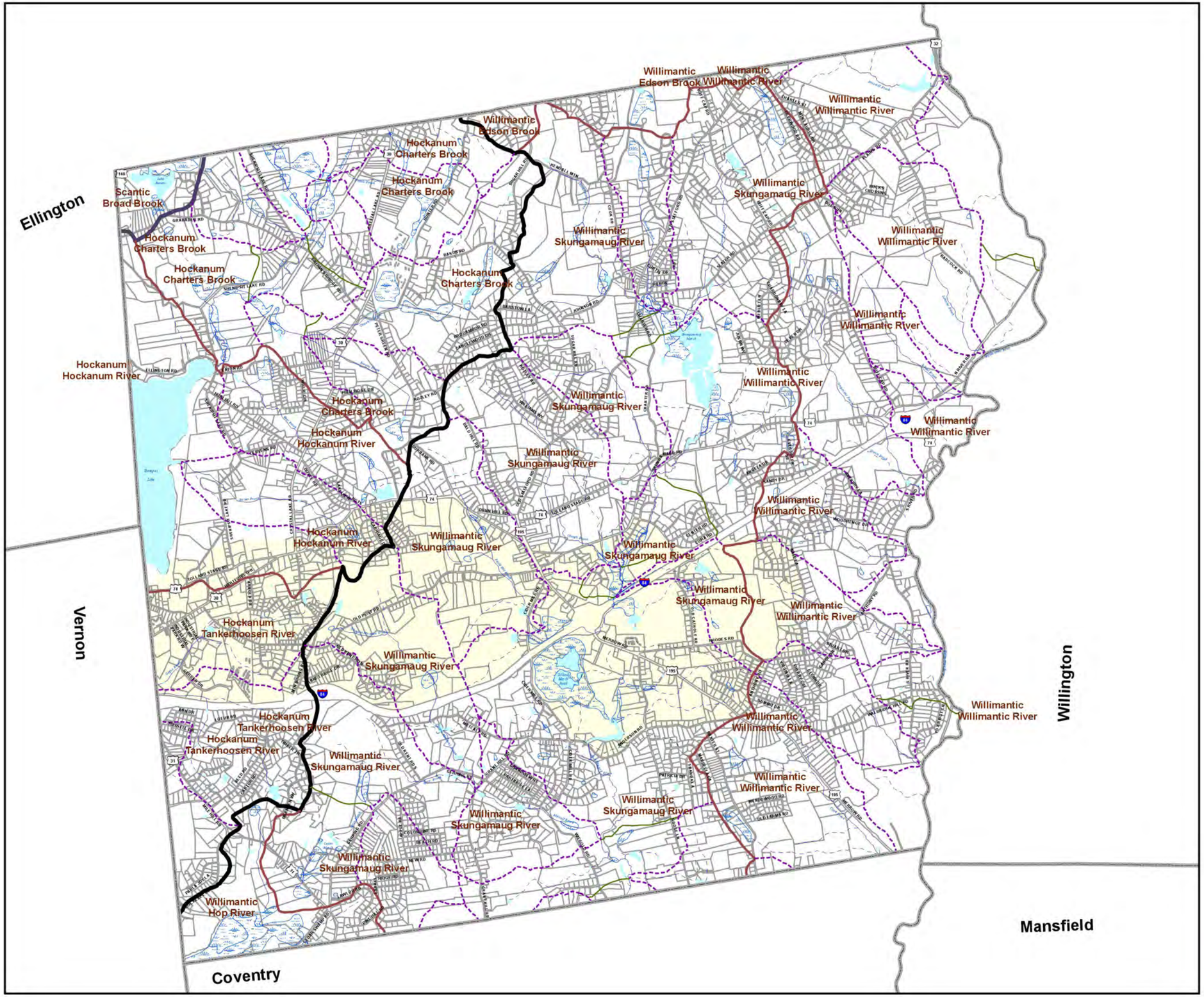
Population projections for Tolland were provided by two sources: 1) data by the Connecticut State Office of Policy and Management (CTOPM), and 2) historical growth trends in town provided by the Town of Tolland Development Group, with extrapolation of these growth trends to the future. These sources of information were evaluated and compared to determine the most accurate population projections.

The Office of Policy and Management (OPM) provides population estimates at 5-year intervals, projecting to the year 2020. OPM projected population for year 2000 to be 11,600; however, the actual 2000 census recorded population was 13,146. OPM estimated that the 2020 population in Tolland will reach 12,880. Based on the OPM estimates, the population in Tolland will increase an average of 0.5% every year. Using the same rate of increase, it is estimated that the population in the year 2024 will be 13,151.

In comparison to OPM's projections for growth, these historical and projected growth rates are deemed as more representative of town wide population growth. Therefore, the projections for growth in town use the annual growth rate factor of 1.1% as listed above. Extrapolated population projections for Tolland are presented in Table III-5.

Drainage Basin Map

TOLLAND WASTEWATER FACILITIES PLAN
PHASE 2



Basin Boundaries

- Major
- Regional
- Subregional
- Local
- Stream Reach
- Lake Impoundment
- Streams/Rivers
- Intermittent Water
- Ponds/Lakes
- Marsh on USGS Quad Sheet
- Phase 1 WW Study Area

Regional Basin Label
Subregional Basin Label

Notes:
1) Town of Tolland parcel base dated 2004 with supplemental additions to 2007.
2) Dataset of town boundaries, water course/bodies, and drainage basins downloaded from the CT DEP GIS website Fall 2005.

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FIGURE III-13
JULY 2008

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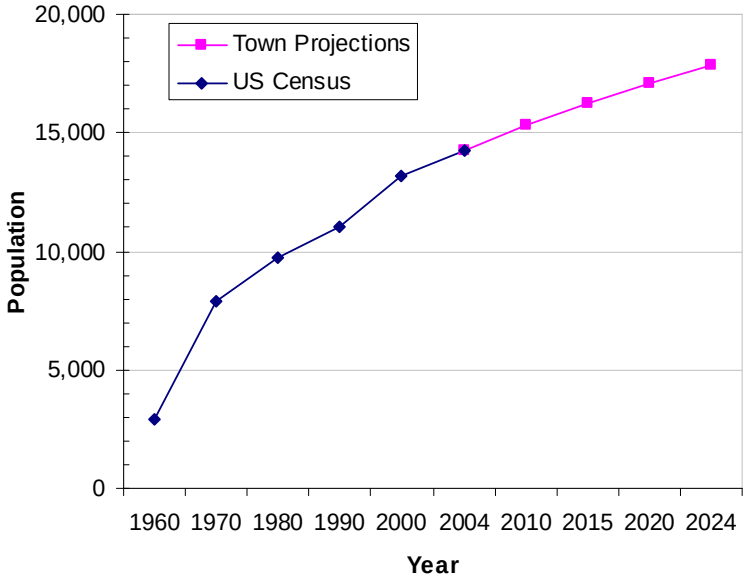
Based on historical growth rate information from the Town of Tolland Planning Office, and discussions with the Town Director of Planning and Community Development, the OPM population projection was deemed low and unrealistic.

Table III-5: Town of Tolland Population Projections



YEAR	TOLLAND POPULATION
1960	2,950 [a]
1970	7,857 [a]
1980	9,694 [a]
1990	11,001 [a]
2000	13,146 [a]
2004	14,272 [a]
2010	15,342 [b]
2015	16,232 [b]
2020	17,125 [b]
2024	17,838 [b]

[a] U.S. Census data; [b] Projected Values

More realistic population projections for the next 20 years were estimated in conjunction with the Town Planner's estimate of 63 new dwellings per year and 2.83 people per unit (for the Phase I Wastewater Planning Area). Actual historical and Town projected population growth values are shown in Table III-6, as follows:

Table III-6: Tolland Population Growth Rates

PERIOD	Source	PERIOD GROWTH RATE	ANNUAL GROWTH RATE
1650 – 1960	US Census	78%	7.8%
1960 – 1970	US Census	166%	16.6%
1970 – 1980	US Census	23%	2.3%
1980 – 1990	US Census	13%	1.3%
1990 – 2000	US Census	19%	1.9%
2000 – 2004	US Census	9%	2.9%
2004 – 2010	Estimate	7%	1.1%
2010 – 2020	Estimate	11%	1.1%
2020 – 2024	Estimate	4%	1.1%

This equals an additional projected 3,565 people that will be added to the town's population by the year 2024.

O. SOIL SUITABILITY FOR SEPTIC DISPOSAL FIELDS

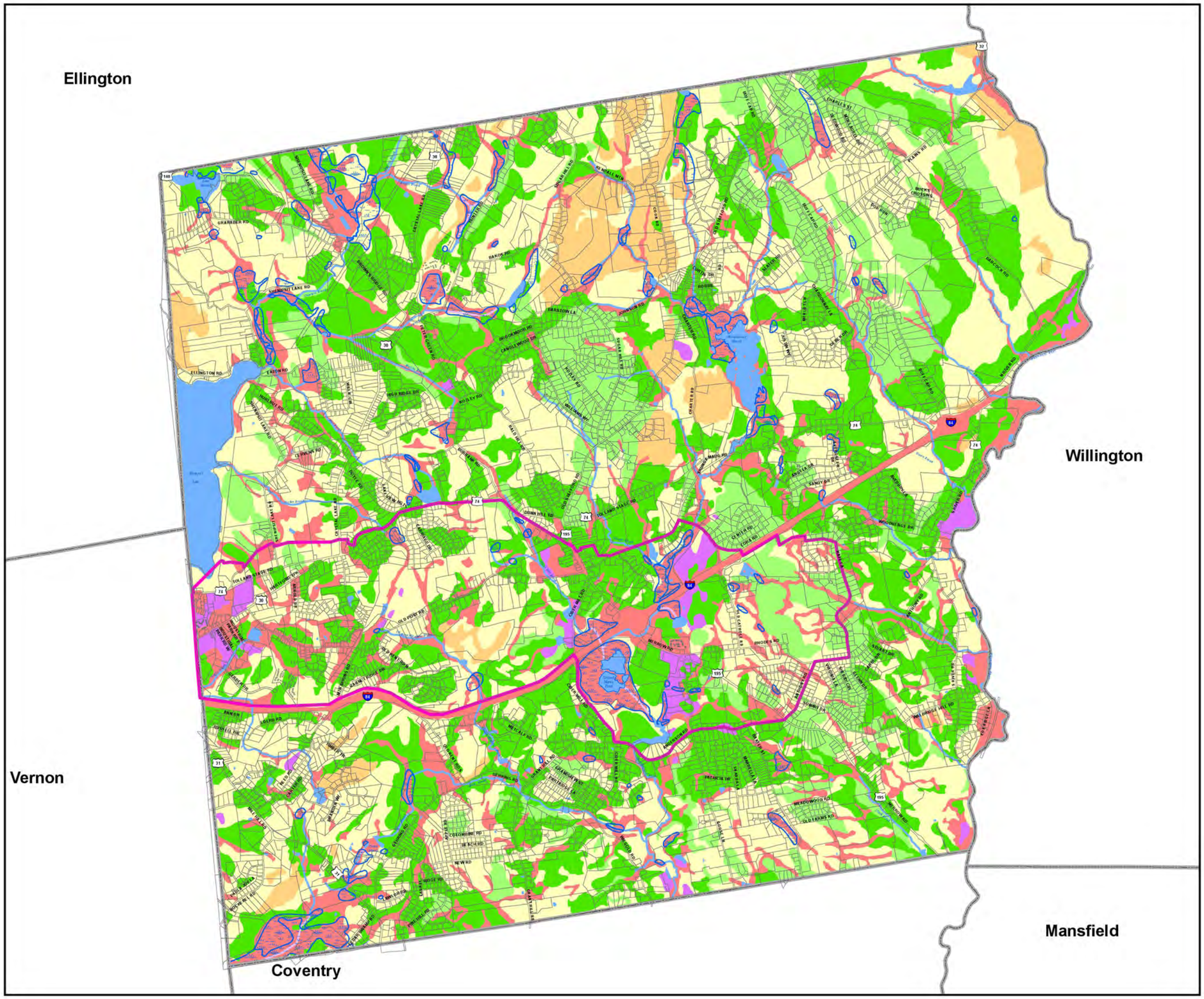
A detailed inventory of soils was taken from the July 2005 United States Department of Agriculture (USDA) Soil Survey of Tolland County. The soils of Tolland County were originally mapped by the USDA Soil Conservation Service (SCS). The USDA Natural Resources Conservation Service (NRCS) revised the original mapping. The modern soil survey unifies the eight separate county soil legends into a single statewide legend, incorporates current soil taxonomy and standards, addresses land use changes and urbanization, and is compiled onto planimetric orthophoto base mapping. The minimum delineation size of the soil regions was three acres.

The soil survey report interpretations for septic tank absorption fields were updated in March 2004. The interpretations rate potential suitability of use rather than the avoidance of problems. The ratings help determine the relative suitability of soils for septic tank absorption fields and were developed for planning purposes only.

The performance standard identifies the capabilities of a base septic system and addresses soil and landscape characteristics. A base septic system is assumed to be for a single family, 3-bedroom home on a 1-acre lot with a private well, or a ½-acre lot with public water supply. The system has a 1,000-gallon septic tank and a 375 to 750 square foot absorption field. The base system is also one that is installed in a soil common to the area having the best combination of properties for absorption fields. The system works, meets state health code regulations, and is easy to install. The soil characteristics at the site has a slope less than 15%, soil percolation rate between 6 and 60 in/hr, water table more than 36 inches deep, bedrock greater than 72 inches deep, soils that do not flood or very rarely flood, and depth to restricted layer is more than 36 inches below the soil surface.

The NRCS evaluated each soil classification for septic tank absorption fields and designated six categories based on soil potential ratings and associated cost factors. The potential ratings are described below and refer to Figure III-14.

- **High Potential -** These soils have the best combination of characteristics or may have limitations that can be easily overcome using standard installation practices. The cost factor is 1.0× to 2.0×.
- **Medium Potential -** These soils have significant limitations that are generally overcome using commonly applied designs. The cost factor ranges from 2.0× to 2.5×.
- **Low Potential -** These soils have limitations that require extensive design and site preparation to overcome. The cost factor ranges from 2.5× to 3.0×.
- **Very Low Potential -** These soils have to overcome severe soil limitations that require extensive design and site preparation. A permit for absorption field installation may not be issued unless the naturally occurring soils meet the minimal requirements outlined in the state health code. It is unlikely these soils can be improved sufficiently to meet state health code regulations. The cost factor ranges from 4.25× to 6.0×.
- **Extremely Low Potential -** These soils have severe limitations that are extremely difficult to overcome. A permit for absorption field installation may not be issued unless the naturally occurring soils meet the minimal requirements outlined in the state health code. It is unlikely these soils can be improved sufficiently to meet state health code regulations.



Soil Suitability for Septic System Disposal Systems

TOLLAND WASTEWATER FACILITIES PLAN
PHASE 2

Phase 1 WW Planning Area

Parcels

Soil Potential To Support SSDSs

- Extremely Low Potential
- Very Low Potential
- Low Potential
- Medium Potential
- High Potential
- Not Rated

Notes:
1) Parcel layer based on 2004 updates with supplemental additions to 2007.
2) Dataset of town boundaries, and water features downloaded from the CT DEP GIS web site Fall 2005.
3) Soil data layer provided the USDA Natural Resources Conservation Service.
4) Soil Suitabilty based on USDA Soil Conservation Service 2004 draft soil coverage and USDA NRCS Soil Potential Ratings; Septic Tank Absorption Fields for Single Family Residences (Connecticut) for March 2004.

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FIGURE III-14
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- **Not Rated -** Areas labeled Not Rated have characteristics that show extreme variability from one location to another. The work needed to overcome adverse soil properties cannot be estimated.

Source: "Soil Potential Ratings: Septic Tank Absorption Fields for Single Family Residences (Connecticut)" published March 2004 by the USDA NRCS.

The SCS soils maps are not a substitute for on-site investigations to determine the site-specific soils information for use in septic system design. However, they are an excellent source of information for wastewater disposal planning purposes. The local sanitarian or public health department should be consulted to verify soil suitability for septic disposal if possible. For this study, the regional health district was relied upon heavily for input on actual soil suitabilities.

Some soils such as Agawam fine sandy loam, the Charlton fine sandy loam and Hinckley gravelly sandy loam have been identified as the most suitable for on-site septic systems within the planning area. Generally, these soils are well drained sandy or silty loams with moderate to rapid permeability. Gloucester stony sandy loam and Sutton stony fine sandy are examples of moderately suitable soil for septic systems in this report.

The soil suitability to support subsurface sewage disposal systems in the Phase II Area generally rate from the middle to upper end of the scale (poor to high). The areas rated as Extremely Low Potential and Very Low Potential are relatively sparse, scattered throughout the Phase II area along stream banks and wetlands. Discussion of soil suitability to support on-site wastewater renovation within particular neighborhoods will be discussed in more detail within following sections of this report.

P. HYDRIC SOILS

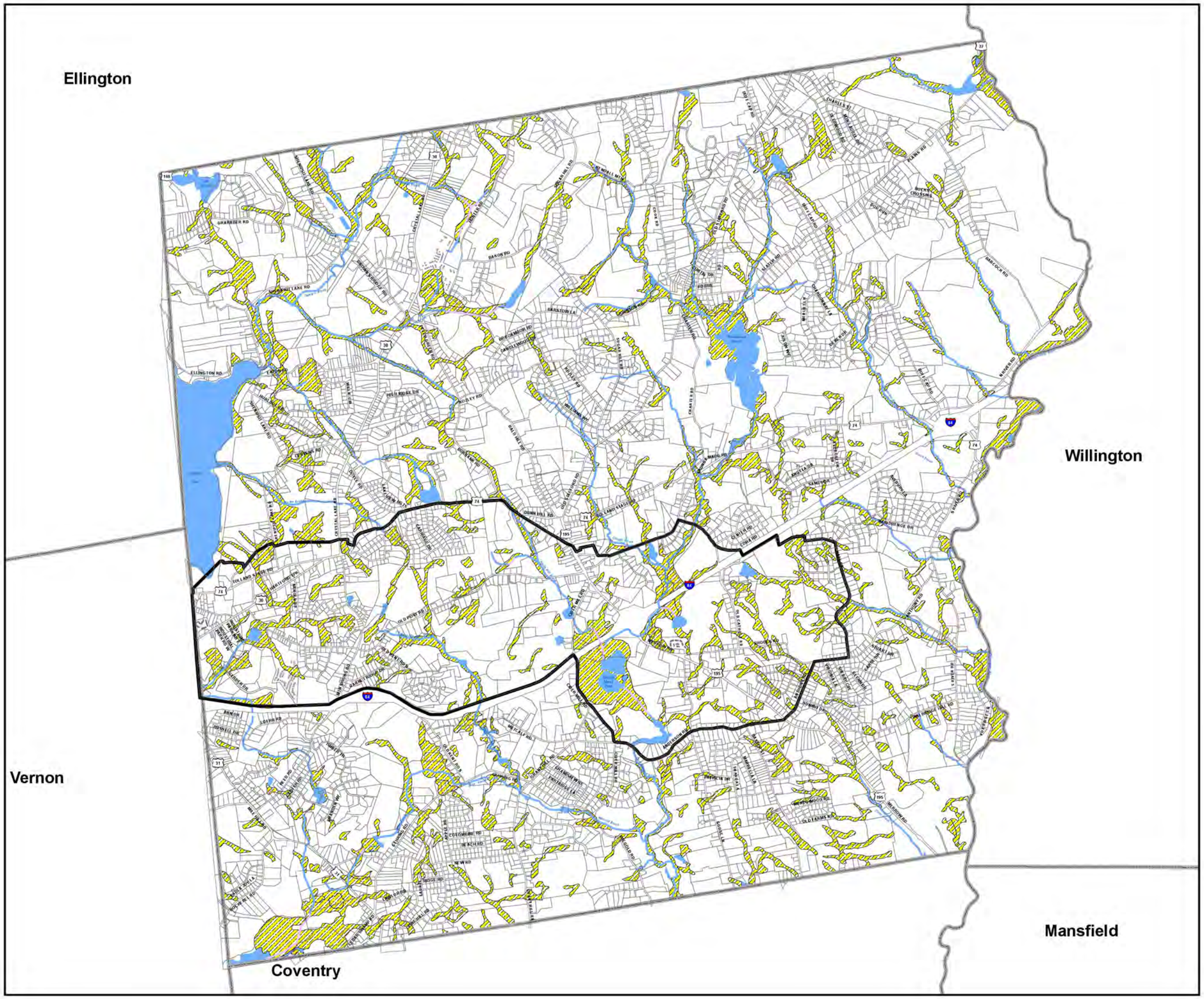
Hydric soils are defined soils that form under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part. The concept of hydric soils includes soils developed under sufficiently wet conditions to support the growth and regeneration of hydrophytic vegetation. Soils that are sufficiently wet because of artificial measures are included in the concept of hydric soils. Also, soils in which the hydrology has been artificially modified are hydric if the soil, in an unaltered state, was hydric. Some series, designated as hydric, have phases that are not hydric depending on water table, flooding, and ponding characteristics. Hydric soils (shown on Figure III-15) are restrictive to the appropriate level of subsurface wastewater treatment and disposal.

The hydric soils appear to be relatively evenly distributed throughout the Town of Tolland. The soils are concentrated in low lying areas around streams, ponds, and depressions that tend to collect surface water. Some of the areas shown as Extremely Low Potential and Very Low Potential Suitability for SSDS are hydric soils. Cedar Swamp, Skungamaug Marsh, and Tolland Marsh Pond are also composed of hydric soils.

Q. FLOODPLAINS

Floodplains are low-lying areas that form along the banks of streams and rivers. During times of heavy flow, water spills over and floods the land. This may occur in early spring when snow melts or during times of unusually large rainfall events.

The commonly accepted standard for delineating the extent of floodplains is by using mapping delineating a 100-year flood event. A 100-year flood is commonly used because it is considered a



Hydric Soils

TOLLAND WASTEWATER FACILITIES PLAN
PHASE 2

- Hydric Soils
- Water
- Phase 1 WW Planning Area
- Parcels

Notes:
1) Parcel layer based on 2004 updates with supplemental additions to 2007.
2) Dataset of town boundaries, and water features downloaded from the CT DEP GIS web site Fall 2005.
3) Soil data layer provided the USDA Natural Resources Conservation Service.

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FIGURE III-15
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large flooding event with a one percent chance of occurring any given year. The Federal Emergency Management Agency (FEMA) created mapping to show the extents of the flood plains for the major watercourses within the United States.

FEMA studied the Willimantic River area with detailed methods because priority was given to known flood hazard areas and areas of projected development and proposed construction at the time of the study. Areas having low development potential and minimal flood hazards identified at the beginning of the FEMA study were studied using approximate methods. Charters Brook, Martins Brook, the Skungamaug River, Gages Brook, Spice Brook, Brooks Brook, Grover Brook, Cemetery Brook, and Chapins Meadow Brook were studied with approximate methods.

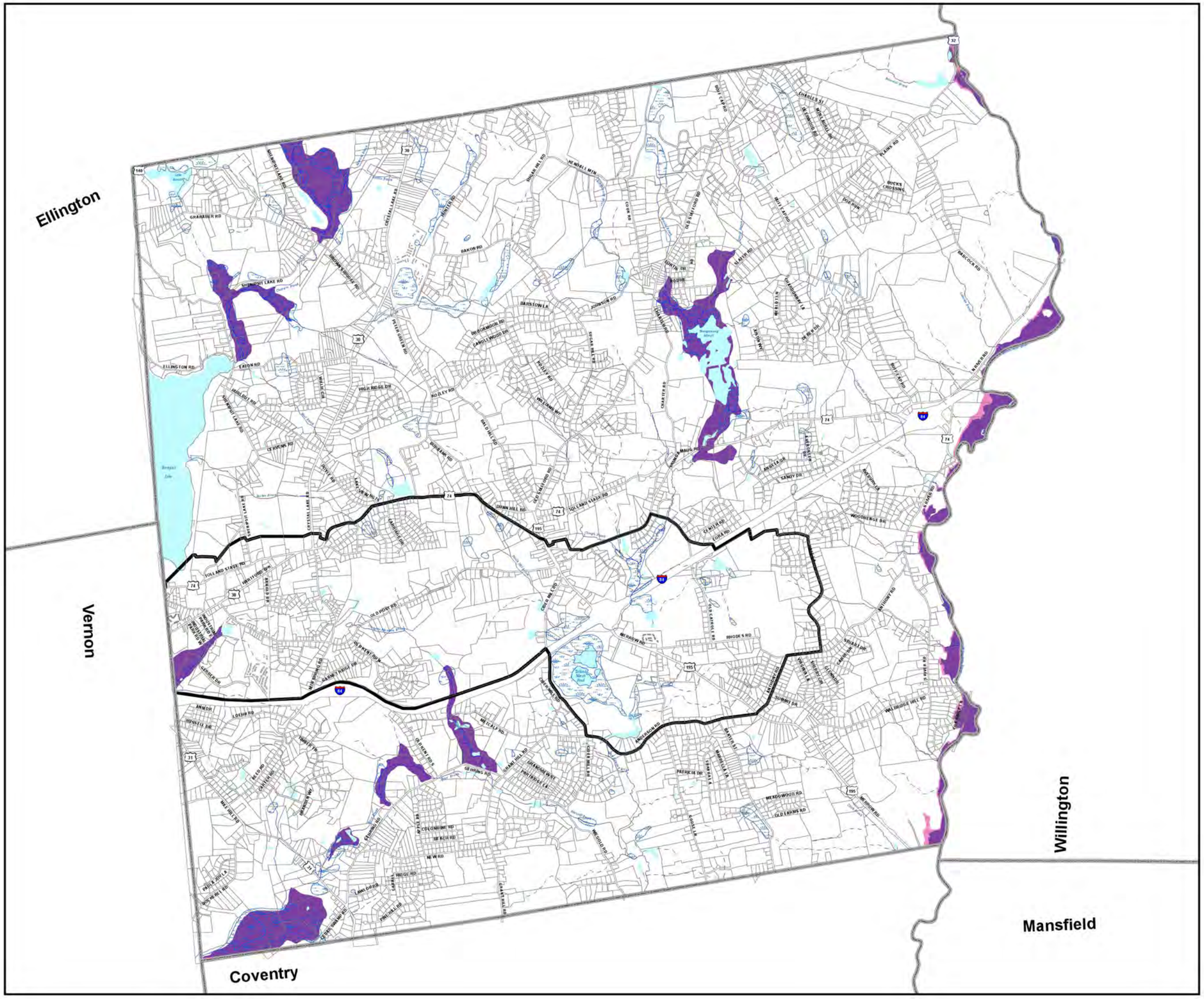
Wastewater facilities within the 100-year floodplain must be flood-proofed. Two examples of flood-proofed facilities include an elevated platform for electrical components or watertight bulkheads at major structures. Subsurface sewage disposal systems should not be built in flood plains. Figure III-16 shows the flood zone areas within Tolland using FEMA mapping.

A large floodplain exists along the Willimantic River and Skungamaug Marsh. A 100 Year Flood Zone is located surrounding wetlands at the intersection of Martins and Grants Brooks. North of Eaton Road has a floodplain associated with wetlands and Charters Brook. Floodplains in southwestern Tolland include Spice Brook, Cedar Swamp, and Chapins Meadow Brook.

R. PUBLIC WATER SYSTEMS

In Connecticut, any system that pipes water for human consumption with at least 15 service connections or regularly serves at least 25 individuals 60 or more days out of the year is considered by the Department of Public Health to be a Public Water System. A system that serves water 60 or more days a year is considered to regularly serve water. Water systems can either be publicly or privately owned. Public water systems are subdivided by regulation into two major categories: community and non-community water systems. The division is based on the type of consumer served and the frequency the consumer uses the water (Source: CT Department of Public Health website).

Tolland is presently served by three private water companies: the Tolland Water Company, Connecticut Water Company (CWC) and Birmingham Water Company. The Birmingham Water Company was recently purchased by CWC in 2007. Tolland Water Company is managed by Birmingham Water Company and now operates administratively under CWC. Each water company is regulated by numerous state and federal regulations with respect to water quality and water resources. The state Department of Public Utility Control (DPUC) authorizes water rates and quality of service. Figure III-17 shows the location of the water companies' distribution areas. Table III-7 summarizes each of the three water company's service areas and number of customers served in Tolland. The meter readings provided by the three public water utilities were from the years 2006 and 2007.



FEMA Flood Zones

TOLLAND WASTEWATER FACILITIES PLAN
PHASE 2

FEMA Flood Zones

- 100 Year Flood Zone
- 500 Year Flood Zone
- Floodway in Zone AE
- Phase 1 WW Planning Area

Water

- Ponds/Lakes
- Marsh on USGS Quad Sheet
- Streams/Rivers
- Intermittent Water

Notes:
1) Town of Tolland parcel base dated 2004 with supplemental additions to 2007.
2) Dataset of town boundaries, water course/bodies, and FEMA floodplains, downloaded from the CT DEP GIS website Fall 2005.

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FIGURE III-16
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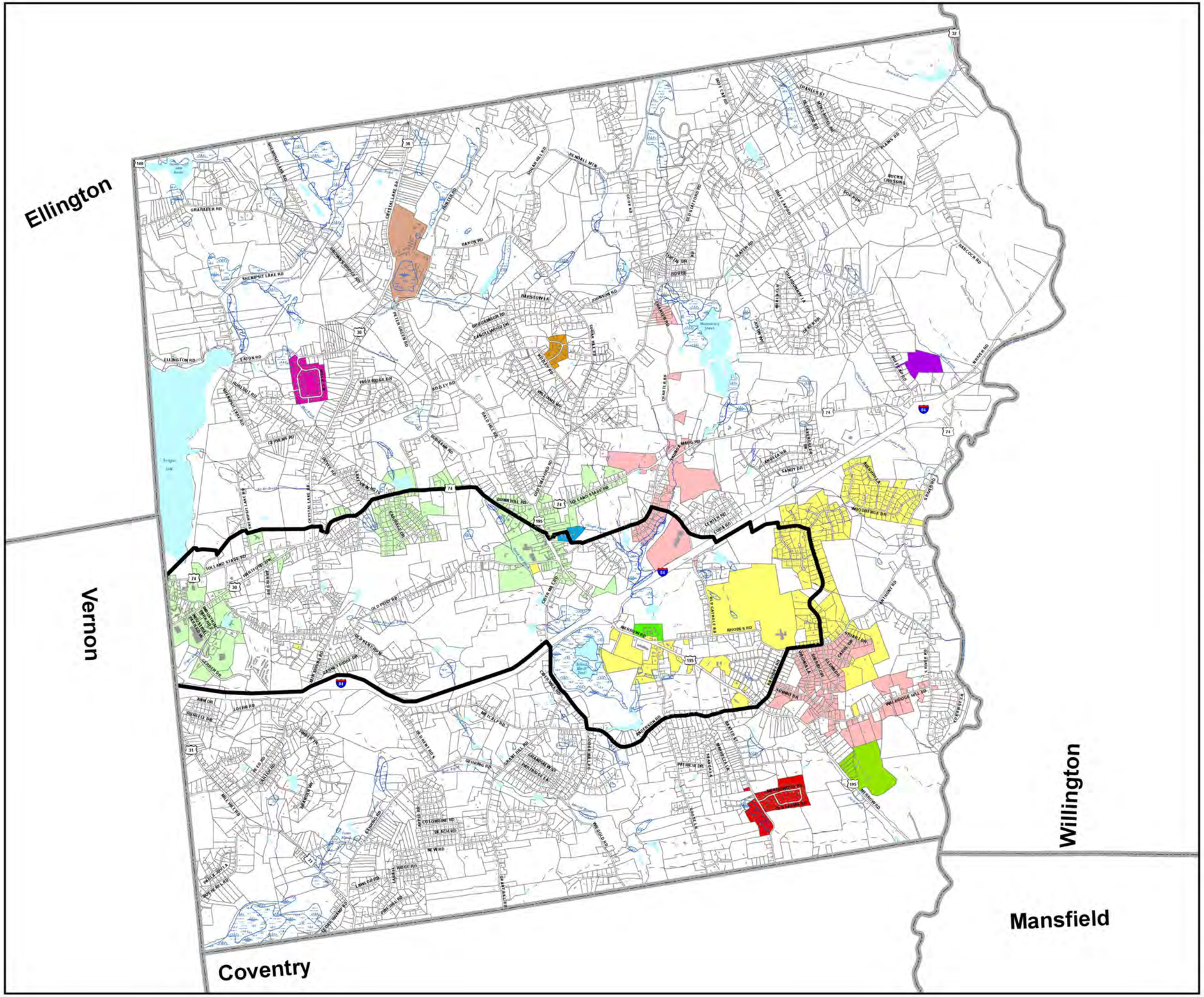

Potable Water Source

TOLLAND WASTEWATER FACILITIES PLAN
PHASE 2

Phase 1 WW Planning Area

Parcels

Public Water Systems

Tolland Water Company

Birmingham Water Company

Connecticut Water

Community Water Systems

Baxter Farms Community Water Association

Eastview-Kozley Water Association

Village at Crystal Springs

Norwegian Woods Apartments

Stone Pond Condominiums

Tolland Elderly Housing

Ivy Woods Apartments

Woodland Summit Community Water Assn

Notes:
1) Town of Tolland parcel base dated 2004, with supplemental additions to 2007.
2) 2004 building data set provided by Town of Tolland.
3) Data set of town boundaries downloaded from the CT DEP GIS website.
4) Parcels served by Public Water mapped from water 2006 & 2007 water consumption records.

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FIGURE III-17
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Table III-7: Summary of Drinking Water Supply in Tolland

Potable Water Source	Approximate Number of Parcels Served		Approximate Usage per Year (gpd)	
	Phase I Study Area	Phase II Study Area	Phase I Study Area	Phase II Study Area
Tolland Water Company	17	199	10,500	35,000
Connecticut Water Company	192	68	35,500	20,400
Birmingham Water Company	89	161	85,200	39,600
Stone Pond Condominiums	1	0	ND	0
Tolland Elderly Housing	1	3	0	1,500
Baxter Farms Community Water Assn	0	50	0	8,300
Eastview - Kozley Water Assn	0	20	0	3,600
Ivy Woods Apartments	0	1	0	ND
Norwegian Woods Apartments	0	10	0	ND
Village at Crystal Springs	0	67	0	2,500
Woodland Summit Comm Water Assn	0	53	0	8,767
Private Well	830	3,550	160,000	682,000

*Estimated number of persons per customer records.
ND – Water System Operator did not respond to Health Department's request for water usage data

S. WATER QUALITY CLASSIFICATIONS

The Water Quality Standards (WQS) are part of Connecticut's Clean Water program. The DEP provides the standards as part of a set of statutory and regulatory requirements to protect public health and the environment. The DEP Bureau of Water Management established and adopted surface and groundwater classifications. Certain limitations dictated by water quality classifications restrict use of surface and groundwater resources for wastewater discharge. Figure III-18 shows the groundwater quality for the SSA in Tolland. Figure III-19 shows the surface water quality.

Observations based on the groundwater quality classifications mapped in Figure III-18 are as follows:

The groundwater quality for most of the Phase II area is GA with several well radius areas with a groundwater quality rating of GAA. The northwest quadrant of Tolland has a groundwater rating of GAA, GAAs. The groundwater may be impaired GA, GAA at both the intersection of Old Stafford Road and Charter Road and at the intersection of Old Post Road and Merrow Road.

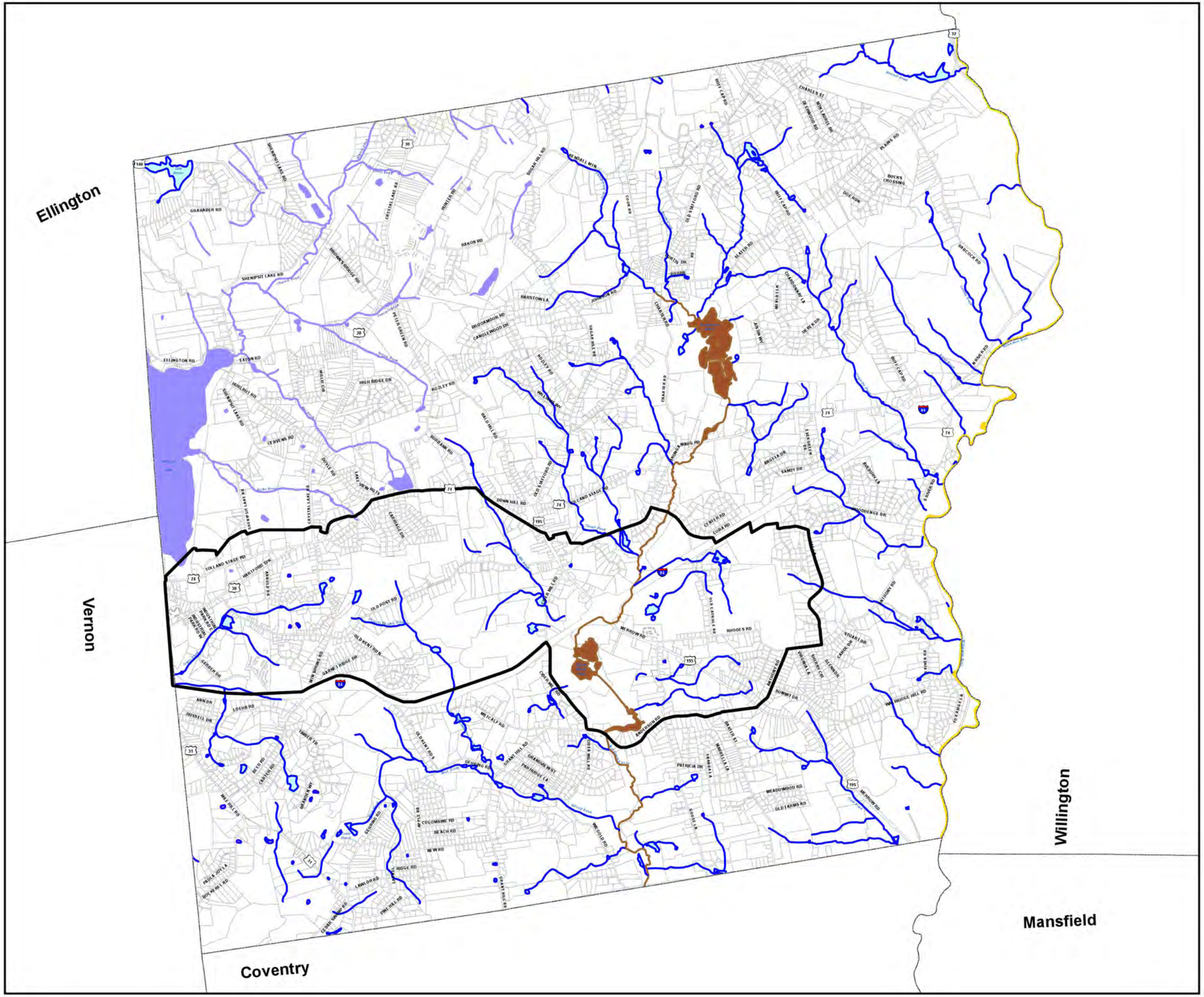
The surface water quality map shows AA-classified water courses surrounding and flowing into Shenipsit Lake. The majority of remaining surface water in Town is classified A. The Skungamaug River, Tolland Marsh Pond, and Skungamaug Marsh are classified as B with a goal of becoming either A or AA. The Willimantic River has a surface water classification of B.

According to Connecticut Water Quality Standards, discharges to surface waters shall be limited as follows:

- **Class AA, A and SA surface waters:** Discharges may be permitted from public or private drinking water treatment systems, dredging activity and dredge material dewatering operations, including the discharge of dredged or fill material and clean water discharges. In Class AA surface waters such discharges shall be subject to the

Surface Water Quality Map

TOLLAND WASTEWATER FACILITIES PLAN
PHASE 2



Phase 1 WW Planning Area

Surface Water Quality

- A
- AA
- B
- B/A, B/AA
- A
- AA
- B
- B/A, B/AA

Notes:
1) Town of Tolland parcel base dated 2004, with supplemental additions to 2007.
2) Dataset of town boundaries and surface water quality designation downloaded from the CT DEP GIS website Fall 2005.

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FIGURE III-18
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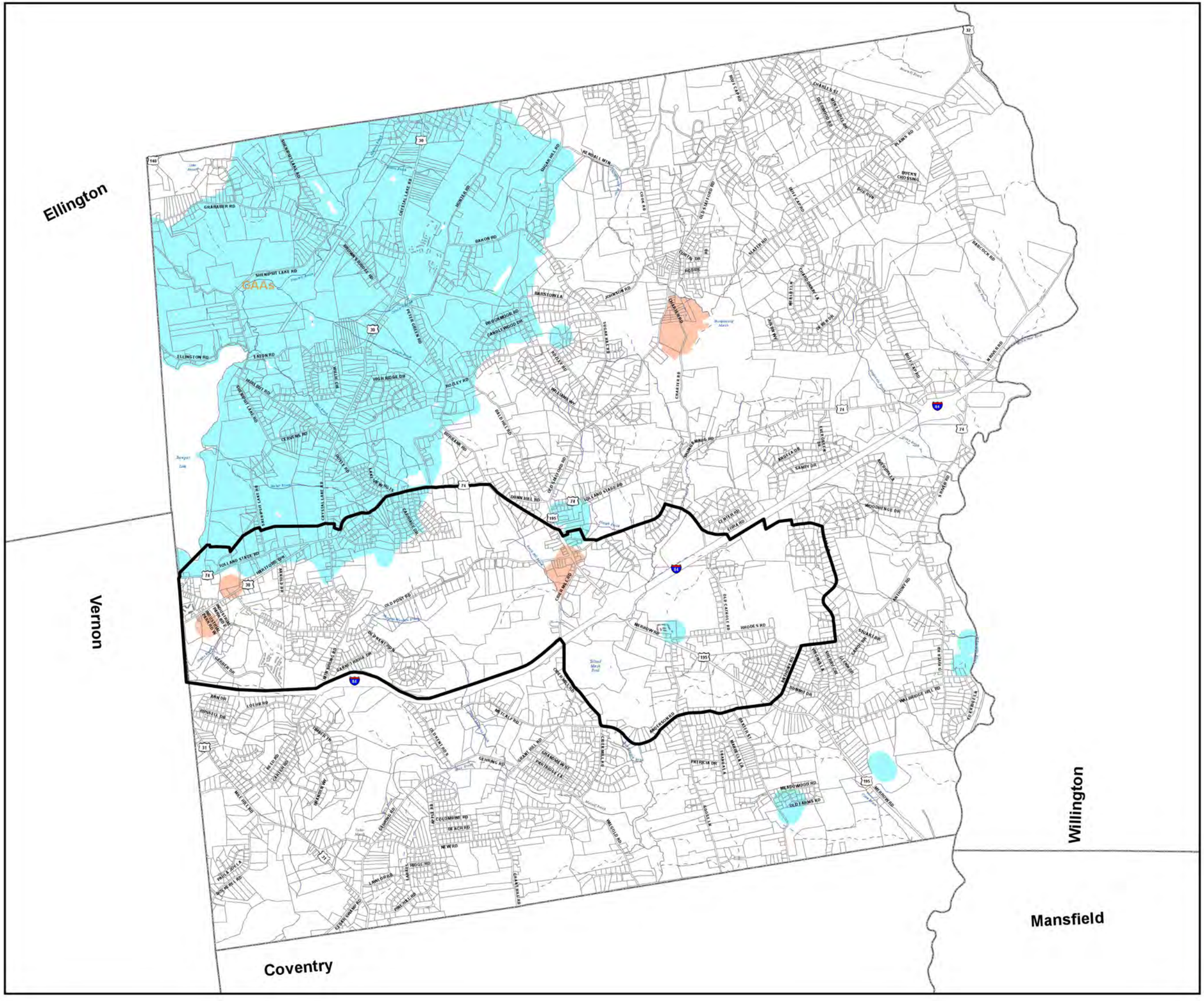
Groundwater Quality Map

TOLLAND WASTEWATER FACILITIES PLAN
PHASE 2



- Phase 1 WW Planning Area
- Streams/Rivers
- Intermittent Water
- GA
- GAA, GAAs
- GB (none)
- GC
- GA, GAA May be impaired

Notes:
1) Town of Tolland parcel base dated 2004, with supplemental additions to 2007.
2) Dataset of town boundaries, water course, and Groundwater Quality designation downloaded from the CT DEP GIS website Fall 2005.

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FIGURE III-19
JULY 2008

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approval of the Commissioner of Health Services. Other discharges to surface waters with a Classification of SA, A, or AA may be authorized provided such discharge will be of short duration and is necessary to remediate surface water or groundwater pollution.

- **Class B and SB surface waters:** Discharges may be permitted for those allowed in Class AA, A and SA surface waters, cooling water discharges, discharges from municipal and industrial wastewater treatment systems and other discharges.
- **Class C/B, D/B, SC/SB or SD/SB surface waters:** Designations shall not be a reason for authorizing a new discharge that would prevent the attainment of Class B or Class SB designated uses and quality criteria.
- **Class B/AA, B/A, C/A, SB/SA, or SC/SA surface water:** Designations shall not be a reason for authorizing a new discharge that would prevent the attainment of Class AA, A or SA Water Quality Criteria.

Class	Table III-8: Inland Surface Water Designated Usage
AA	Existing or proposed drinking water supplies; habitat for fish and other aquatic life and wildlife; recreation; and water supply for industry and agriculture. Not suitable to receive wastewater discharges.
B/AA **C/AA**	May not be meeting Class AA Criteria or designated uses. The water quality goal is achievement of Class AA Criteria and attainment of Class AA designated uses.
A	Habitat for fish and other aquatic life and wildlife; potential drinking water supplies; recreation; navigation; and water supply for industry and agriculture. Not suitable to receive wastewater discharges.
B/A **C/A**	May not be meeting Criteria or one or more designated uses. The water quality goal is achievement of Class A Criteria and attainment of Class A designated uses.
B	Habitat for fish and other aquatic life and wildlife; recreation; navigation; and industrial and agricultural water supply. Suitable to receive major and minor discharges from municipal and industrial wastewater treatment systems.
C/B **D/B**	Due to point or non-point sources of pollution, certain Criteria or one or more designated uses assigned to Class B waters may not currently be met. The water quality goal is achievement of Class B Criteria and attainment of Class B designated uses.

Class	Table III-8: Inland Surface Water Designated Usage
C	Class C water quality results from conditions that are usually correctable through implementation of established water quality management programs to control point and non-point sources. Present water quality conditions frequently preclude the attainment of one or more designated uses for Class B waters or one or more Criteria for Class B waters are not being consistently achieved. Class C waters may be suitable for certain fish and wildlife habitat, certain recreational activities, industrial use and navigation. Class C waters may have good aesthetic value. Examples of conditions that warrant a Class C designation include: combined sewer overflows, urban runoff, inadequate municipal or industrial wastewater treatment, and community-wide septic system failures.
C/B **C/A** **C/AA**	Presently not meeting Criteria or not supporting one or more assigned designated uses due to pollution. The goal for such waters may be Class AA, A or Class B.
D	Class D water quality results from conditions that are not readily correctable through implementation of established water quality management programs to control point and non-point sources. Present water quality conditions persistently preclude the attainment of one or more designated uses for Class B waters or one or more Criteria for Class B waters are not being achieved for prolonged periods. Class D waters may be suitable for bathing or other recreational purposes, certain fish and wildlife habitat, industrial uses and navigation. Class D waters may have good aesthetic value. Examples of conditions which warrant a Class D designation include chemical contamination of bottom sediments, contamination of fish or shellfish with toxic compounds, and pollution caused by out-of-state sources.
D/B **D/A**	D/B, D/A - Presently not meeting Criteria or not supporting one or more assigned designated uses due to severe pollution or presence of certain persistent contaminants in the sediments which may bioaccumulate in the food chain. The goal for such waters may be Class A or Class B.

Class	Table III-9: Groundwater Designated Usage
GAA	Groundwater used or which may be used for public supplies of water suitable for drinking without treatment; groundwater in the area that contributes to a public drinking water supply well; and groundwater in areas that have been designated as a future water supply in an individual water utility supply plan or in the Area wide. Suitable for individual domestic septic systems.
GAA_S	Groundwater that is tributary to a public water supply reservoir.
GA	Groundwater within the area of existing private water supply wells or an area with the potential to provide water to public or private water supply wells. The DEP presumes that groundwater in such an area is, at a minimum, suitable for drinking or other domestic uses without treatment. Suitable to receive septic system discharge and septage of human or animal origin.
GB	Groundwater within a historically highly urbanized area or an area of intense industrial activity and where public water supply service is available. Such groundwater may not be suitable for human consumption without treatment due to waste discharges, spills or leaks of chemicals or land use impacts. Suitable to receive septic system discharge and septage of human or animal origin.
GC	Groundwater to which the DEP Commissioner has authorized leachate discharge. The permittee performed necessary hydrogeologic studies, secured legal rights to affected groundwater, and complied with other requirements of Connecticut's Water Quality Standards and any other applicable law. Groundwater classified as GC is not suitable for development of public supplies of potable water. Suitable to receive DEP approved leachate discharges.

IV. INVESTIGATION OF WASTEWATER MANAGEMENT

Nineteen areas throughout the Phase II Study Area were targeted for more detailed examination of the performance of existing on-site wastewater renovation systems. This examination was based on the Town Sanitarian's past experiences in Tolland, the septic system repair history, small lot sizes, questionnaire results, and a walkover program. The extent of each area is shown on Figure IV-1. Each neighborhood area was arbitrarily assigned names based on well-known local roads.

A. SANITARIAN RECOMMENDATIONS

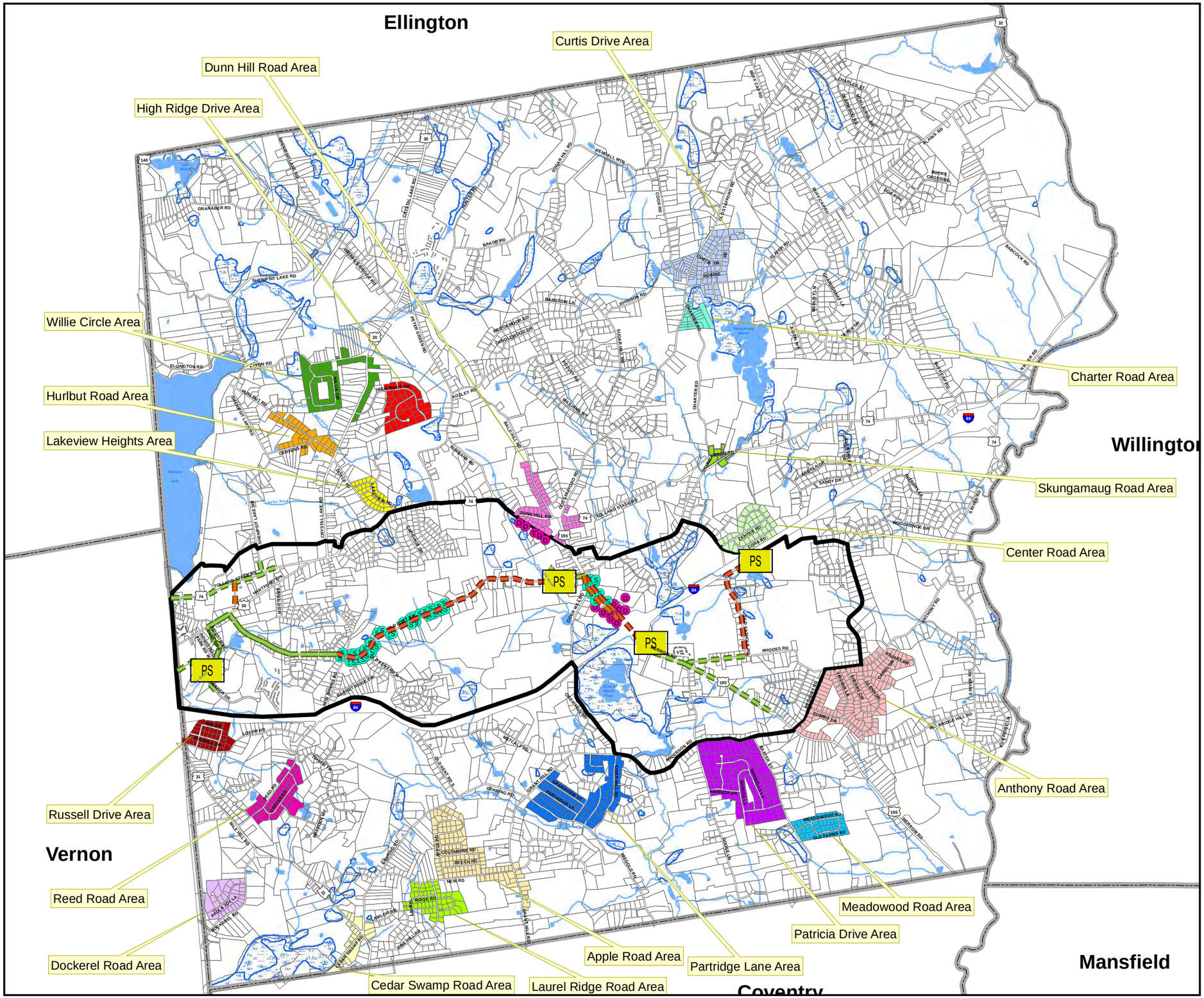
Firsthand, local knowledge of septic system performance is often more accurate and reliable than published information. On-site wastewater renovation performance information was solicited from the Town Sanitarian who reports to Eastern Highland Health District. Figure IV-2 shows the suspect areas where septic system problems appear to be most prevalent per the Sanitarian. The areas identified on this map are based on the sanitarians anecdotal past experiences (septic tank pump-outs, homeowner conversations, variances granted, site visits, etc.). The highlighted areas are where septic repairs have been challenging due to less desirable soil conditions such as high groundwater, slow percolation, shallow depth to restrictive layers, etc. for on-site sewage renovation systems. Input from the Health District Sanitarian is particularly valuable, since they observe actual soil characteristics and septic system effectiveness during wastewater facility installations and repairs.

The sanitarian-identified areas were the basis for the geographical extent of some of the neighborhood areas that were targeted for further examination. The names of the nine areas identified by the Town Sanitarian as being suspect areas for continued on-site wastewater renovation through conventional septic systems are listed below:

- Anthony Road Area
- Apple Road Area
- Center Road Area
- Laurel Ridge Road Area
- Meadowood Road Area
- Partridge Lane Area
- Reed Road Area
- Russell Drive Area
- Willie Circle Area

The Eastern Highland Health District also tabulated variances recorded in their public health records for three of the targeted neighborhood areas (as of September 2008). A variance is granted when permitting repairs to a septic system requires a deviation from one or more Public Health Code Regulations for the design and construction of a septic system. When a system is permitted with a variance, it is understood that the system may be not have an indefinite life span and may need to be repaired again at some point in the future. Variances to the public health code may be indicative of potential pollution of the waters of the State. More information about the septic system repairs and granted variances are on file at the EHHD office.

- Within the Anthony Road Area, along Anthony Road, Virginia Lane, and Summit Drive; 93+ houses exist with approximately 73 septic system repairs. There were 9 repaired septic systems requiring one variance and 4 repaired septic systems requiring multiple variances.
- The Apple Road Area includes Apple Road, Holly Lane, Dogwood Road, Elm Road, Columbine Road, and Beech Road. Out of a total of 98 houses, there were 21 septic system repairs recorded, two of which required a single variance and 1 of the repairs required multiple variances.



Neighborhood Areas

TOLLAND WASTEWATER FACILITIES PLAN
PHASE 2

Phase 1 Wastewater Planning Area

Existing Sewers

- Gravity
- Force Main
- Low Pressure
- PS — Existing Pump Stations

Grinder Pumps

- S — Simplex
- D — Duplex

Neighborhood Areas

- Anthony Rd
- Apple Rd
- Cedar Swamp Rd
- Center Rd
- Charter Rd
- Curtis Dr
- Dockerel Rd
- Dunn Hill Rd
- High Ridge Dr
- Hurlbut Rd
- Lakeview Hghts
- Laurel Ridge Rd
- Meadowood Rd
- Partridge Ln
- Patricia Dr
- Reed Rd
- Russell Dr
- Skungamaug Rd
- Willie Cir

Notes:
1) Parcel layer based on 2004 updates with supplemental additions to 2007.
2) Dataset of town boundaries, and water features downloaded from the CT DEP GIS web site Fall 2005.

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FIGURE IV-1

FEBRUARY 2011

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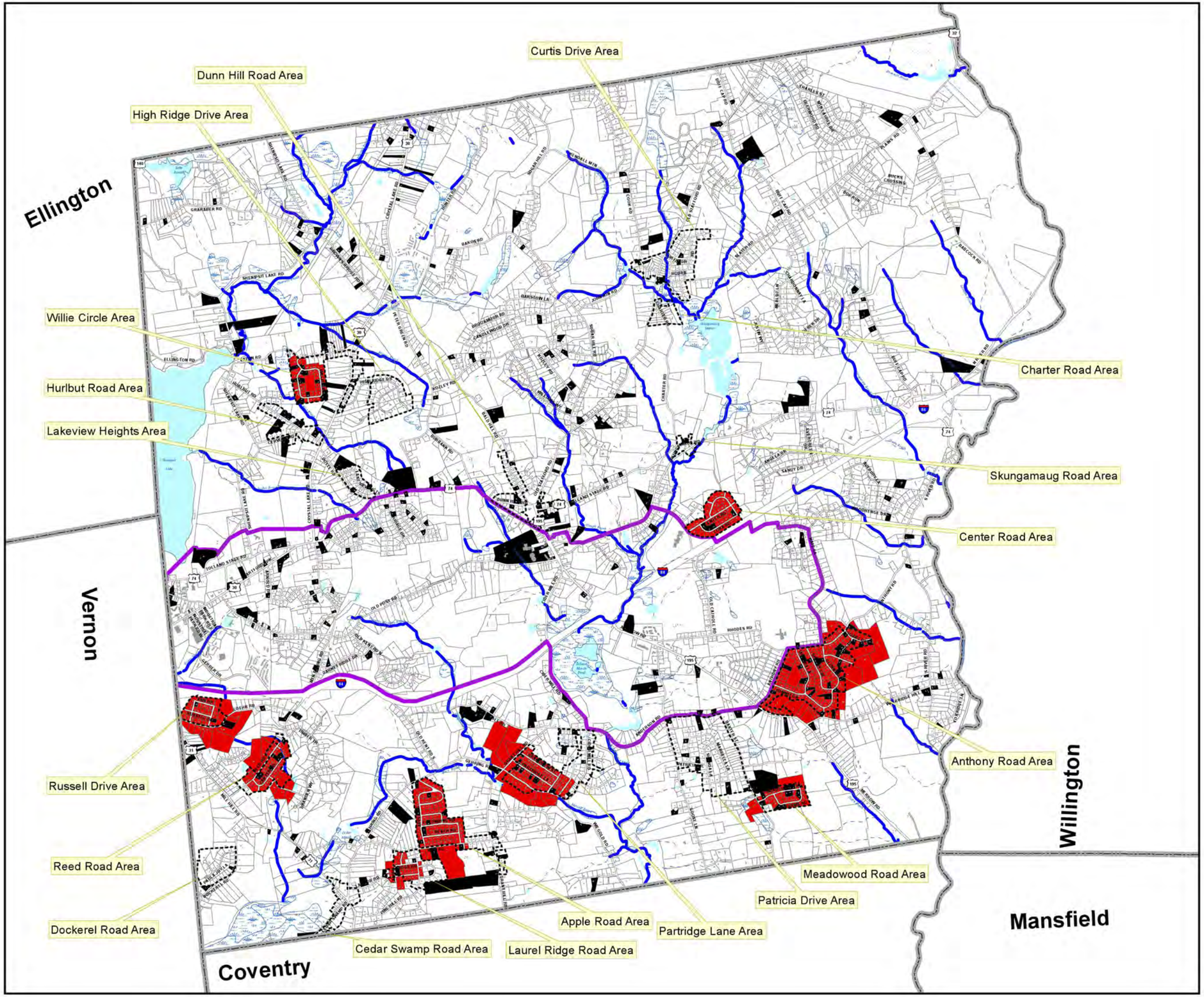

ON-SITE WASTEWATER RENOVATION NEIGHBORHOODS WITH SUSPECTED CHRONIC SYSTEM PROBLEMS

TOLLAND WASTEWATER FACILITIES PLAN
PHASE 2

- Town Sanitarian On-Site WW Suspect Areas
- Parcels with Septic System Repair
- Parcel
- Phase 1 WW Planning Area
- Neighborhoods Areas

Notes:
1) Town of Tolland parcel base dated 2004, with supplemental additions to 2007.
2) 2004 building data set provided by Town of Tolland.
3) Data set of town boundaries downloaded from the CT DEP GIS website.
4) Areas with suspect on-site wastewater system operations provided by Town Sanitarian.
5) List of Septic System Repairs compiled by Eastern Highland Health District records of septic system modifications.

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FIGURE IV-2
JULY 2008

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- 48 houses are located within Willie Circle Area, and 24 septic system repairs were reported. 8 of the reported repairs required one variance and 3 of the repairs required multiple variances. This is indicative of poor septic suitability and lack of available property setbacks in the area.

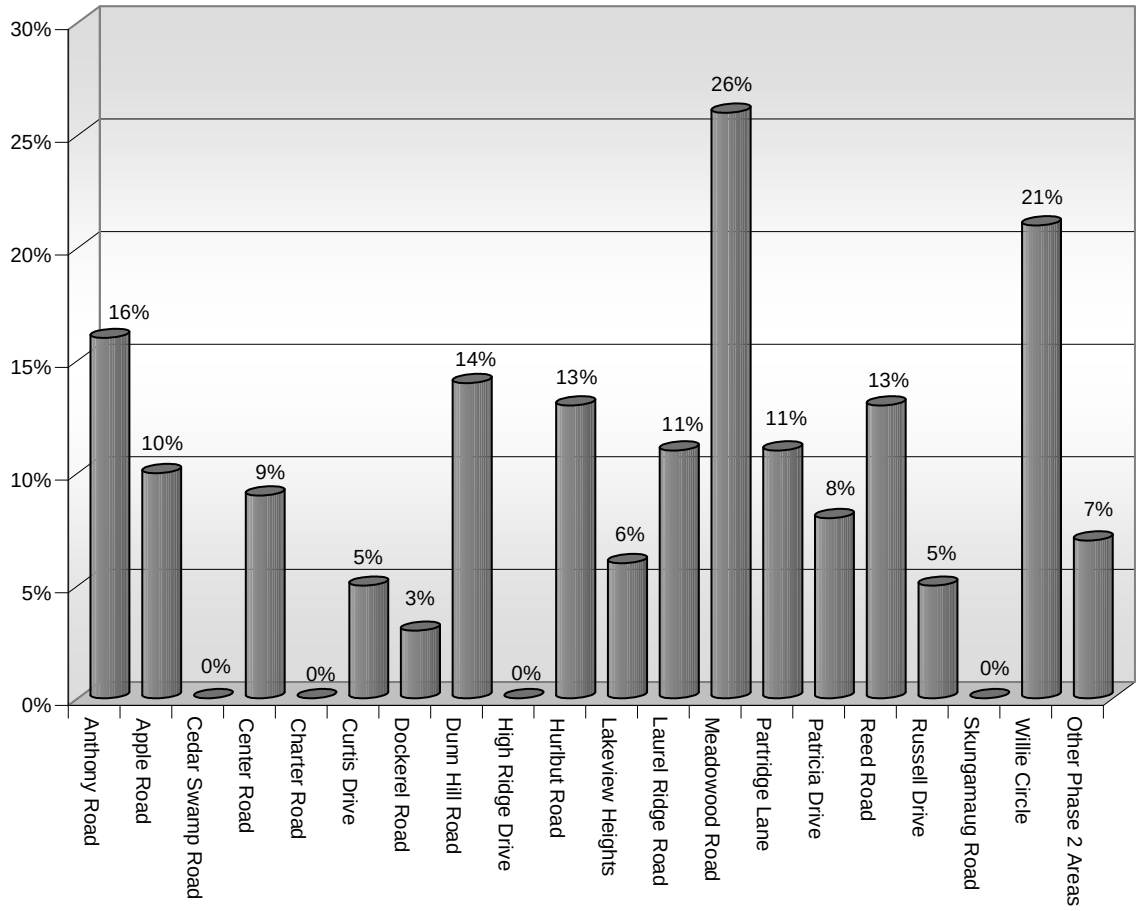
B. SEPTIC SYSTEM REPAIRS

Septic repair/failure information from 1997 to 2007 was reviewed and plotted in Figure IV-2. The septic system repairs are approximately evenly distributed throughout Tolland. There are a couple of "hot spots" within Meadowood Road and Skungamaug Road neighborhood areas where a clustering of recent repairs was noted. There are six additional neighborhood areas (shown in Figure IV-3 on the next page) with at least 10% of the parcels having septic system repairs within the past 10 years.

Permits to make repairs to septic systems in the Town of Tolland, have been recorded by the Eastern Highland Health District. The records were reviewed by the Town Sanitarian and Town Engineer to distinguish between septic tank, leaching system, and other types of repairs. The repair records were linked to the GIS parcel mapping of the Town by address. "*Septic Tank Repair Only*" repairs were not included in the figure because a tank repair is not necessarily a good indication that the geography, soil types, lot density and terrain impairs subsurface wastewater treatment.

It is noted that repairs solely are not an indication of on-site wastewater problems. However, identification of on-site problematic areas from Town staff and Sanitarian records can target additional research and indicate areas of poorly performing on-site systems requiring a constructable solution.

Figure IV-3: Percent of Parcels with Septic System Repairs (1997-2007)

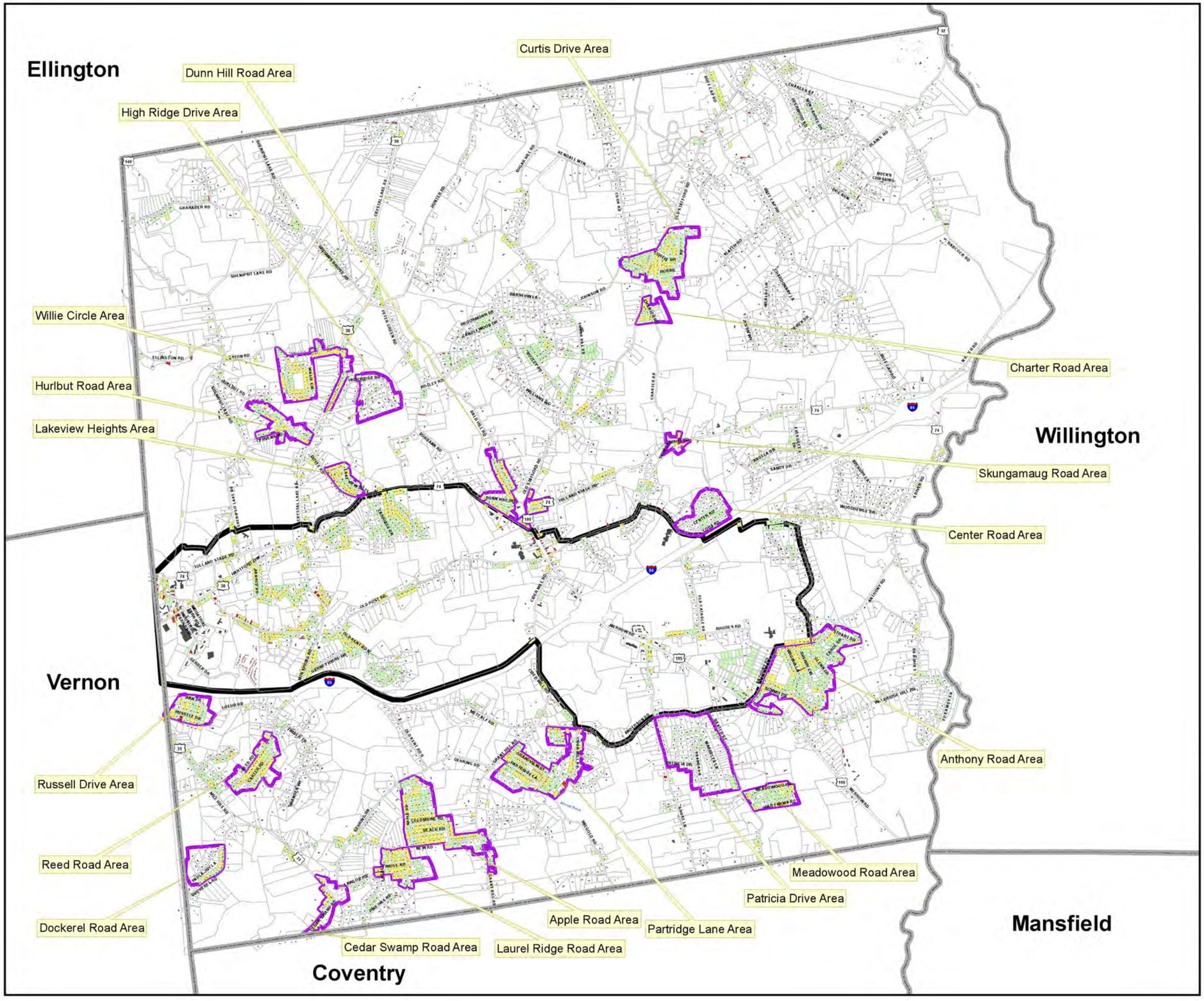


C. LOTS LESS THAN ¾ ACRE

Parcels with small lot areas are clustered together in neighborhood developments which are scattered throughout Tolland as shown on the Figure IV-4 map. The Skungamaug Road area appears to have a high proportion of lots less than 1/3 of an acre based on the bar graphs in Figure IV-5 but this may be amplified because there are only 12 lots in this neighborhood area.

More than 50% of the parcels are smaller than ¾ of an acre in the neighborhood areas of:

- Dunn Hill Road
- Lakeview Heights
- Laurel Ridge Road
- Partridge Lane
- Reed Road
- Skungamaug Road
- Willie Circle



Small Lot Sizes

TOLLAND WASTEWATER FACILITIES PLAN
PHASE 2

Phase 1 Area

Neighborhood Areas

Parcels

Small Lot Sizes

Less than 1/3 Acre

1/3 Acre to 1/2 Acre

1/2 Acre to 3/4 Acre

3/4 Acre to 1 Acre

Greater Than 1 Acre

Notes:
1) Town of Tolland parcel base dated 2004 with supplemental additions to 2007.
3) 2004 building dataset provided by Town of Tolland.
4) Dataset of Town boundaries downloaded from the CT DEP GIS website Fall 2005.

0 0.5 1

Miles

N W E S

FIGURE IV-4
JULY 2008

FUSS & O'NEILL
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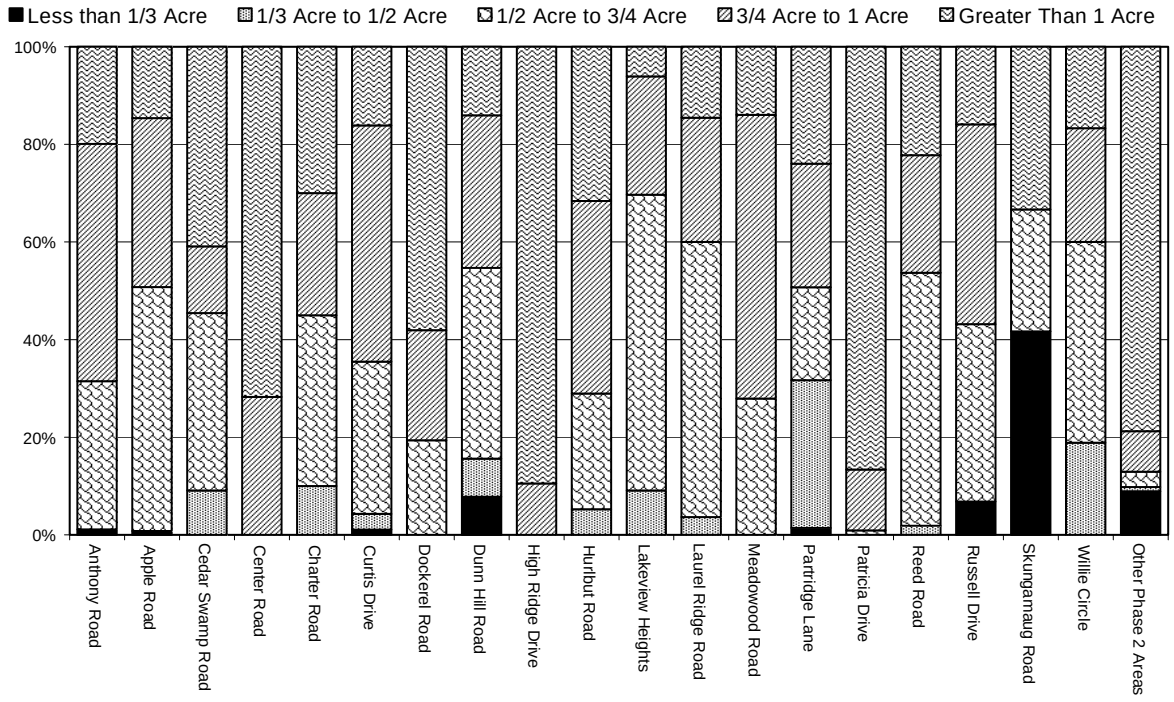
The neighborhood areas with larger lot sizes (greater than ¾ of an acre) include:

- Anthony Road
- Curtis Drive
- Center Road
- Charter Road
- Dockerel Road
- High Ridge Drive
- Hurlbut Road
- Meadowood Road
- Patricia Drive
- Russell Drive
- Non-Neighborhood Phase II Areas

Figure IV-5: Neighborhood Area Lot Size by Total Percentage



D. QUESTIONNAIRE RESULTS

A two page questionnaire was compiled, containing questions to allow the property owners to assess wastewater disposal and septic system performance throughout the Phase II Study Area. This public participation component of the Wastewater Facilities Planning solicited input from the community. The questionnaire was mailed to developed lots (4,876 total) in the Phase II area with mailing addresses provided by the Tolland Tax Assessor. 1,836 responses were received as of the June 13th, 2008 cutoff deadline with an impressive response rate of 38 percent

The responses were coded into a Microsoft Access database and summarized with database queries. Data reports for each neighborhood area were created, as well as overview response statistics. The total response rate for each question may not sum to 100% because individual respondents sometimes chose not to answer every question. The data was also linked to the Town's parcel base mapping by address. The questionnaire results summarized by neighborhood are included in Appendix B.

Write-in responses were summarily reviewed for duplicates and re-coded to one of the check boxes if appropriate. For example, some respondents did not check boxes regarding what septic system repair was made but instead chose to write-in "replaced septic tank and leaching field." At least one written-in response had to be re-coded for less than 5% of the returned questionnaire forms.

1. PHASE II STUDY AREA

The following Questionnaire Responses were summarized based on the entire Phase II Study Area.

Figure IV-6: Septic System Pumping

"Approximately how often do you get your septic tank pumped?"

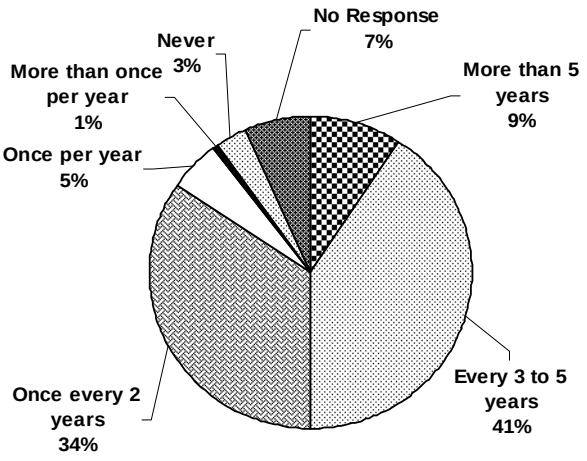
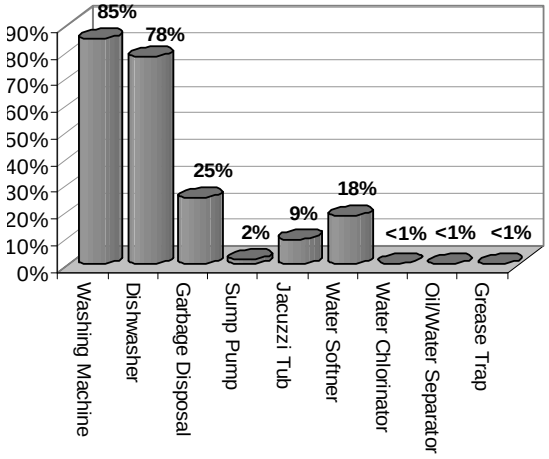


Figure IV-7: Wastewater Sources

"Are any of the following connected to your wastewater disposal system



The majority of Tolland property owners (41%) pump their septic tank every 3 to 5 years. The second highest response shows 34% pumping their septic system once every 2 years. Numerous publications recommend pumping septic tanks every 2 to 3 years to prevent excessive sludge and scum buildup in a domestic septic tank. Homeowners who pump once per year or more (5%) may pump when the system starts to backup into the house, but may also be pumping a properly operating system for other reasons. A few reasons for more frequent pumping include: high wastewater generation at the property (group homes and businesses), improper education about maintaining a septic system, or making it easier to keep track of the maintenance schedule when pumped annually.

85% of the respondents have washing machines and 78% have dishwashers connected to their septic systems. A washing machine tends to generate large slugs of flow which consume a significant portion of the systems overall capacity. By contrast, automatic dishwashers tend to conserve and reuse water compared to cleaning dishes by hand. Use of a garbage disposal tends to load the septic system with heavy amounts of finely ground solid particles. This often requires a more rigorous tank pumping schedule than the typically recommended 2 to 3 years. Septic tanks properly sized for Jacuzzi tubs are not cause for concern. Jacuzzi tubs retrofitted into existing homes can be cause for concern because a typically sized septic system would be undersized for the large flows generated every time a full Jacuzzi tub empties. The large slug of flow has the potential to stir up the settled solids in the septic tank and cause carry over of the solids into the leaching field. Solids in the leaching fields gradually clog the soil pores, reduce the soils ability to treat and disperse the septic tank effluent, which may eventually cause the entire system to fail.

Furthermore, chemicals in the spa water can kill the system bacteria, causing inadequate renovation of the wastewater.

Figure IV-8: Low-flow Appliances

"Do you have any of the following low-flow appliances?"

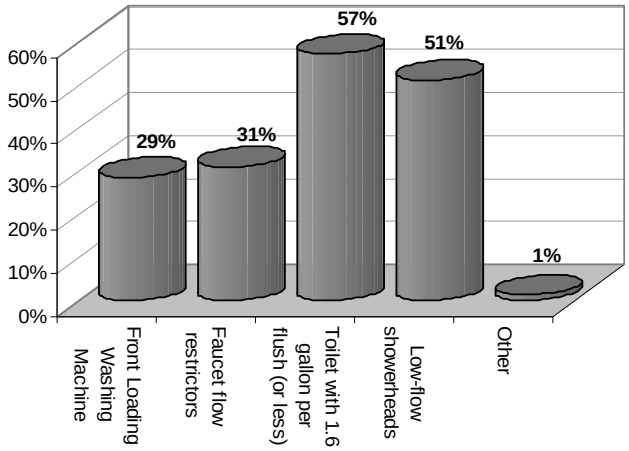
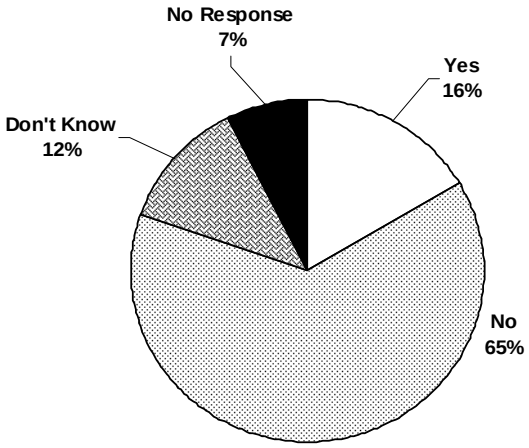


Figure IV-9: System Repairs

"Has your wastewater disposal system ever been repaired?"



Low flow fixtures and appliances reduce wastewater volumes, thereby potentially extending the life of subsurface absorption systems by increasing the detention time in the septic tank. Theoretically, less solids would carry-over into the dispersal fields and slow the rate at which the soil interface is gradually clogged with solids particles. Currently 28% of households have front loading washing machines, which use significantly less water than a top loading version. Instead of filling the entire wash barrel with water, only the bottom fraction fills with water. Traditional older-style toilets typically use 5 to 7 gallons per flush, but a 1994 federal law required low-flow toilets with 1.6 gallons per flush. Based on the EPA On-site Wastewater Treatment Systems Manual, a toilet is used 5.05 times per day per person on average. The use of low flow toilets can therefore add up to significant water savings (17 to 27 gpd per person).

Approximately 16% of the homeowners made repairs to their wastewater renovation systems in Tolland. Another 12% are not sure which is possible for new homeowners or residents who have others maintain their property. 65% of questionnaire responses responded that there has not been a repair at their property. Some owners may have chosen not to respond to this question for fear of disclosing unrecorded septic system repairs to the Town, even though records are kept on file. 19% of the respondents provided an inconclusive answer (12% who don't know and 7% who didn't respond). If say, 3% of the inconclusive responses are actually from repaired septic systems, that would bring the total percent of lots in the Phase II Study with repaired septic systems to roughly 19%. When asked what might be the approximate cost to replace a septic system disposal field, the average answer was about $13,700. The homeowners who had to replace their leaching fields reported costing as much as $45,000 with the median at approximately $12,500.

Figure IV-10: Multiple Repairs
"Has more than one repair been made?"

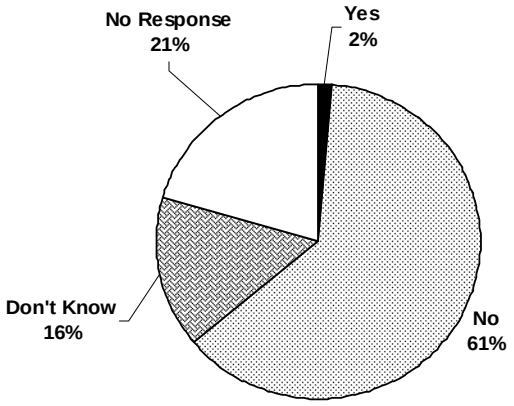
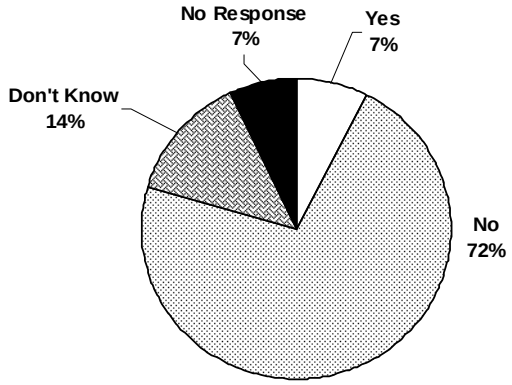


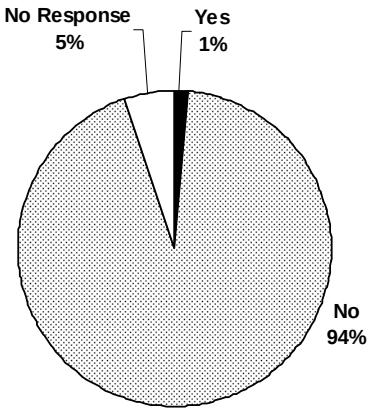
Figure IV-11: Gray Water System
"Do you have a separate leaching field or dry well for "gray water" (sinks, showers, washing machine)?"



Of the repairs made, only 2% of the respondents reported making more than one repair to their system. Nearly 21% of respondents (relatively significant number) chose not to answer this question. The remaining percentage who self-reported that they didn't know if more than one repair was made to their system may have not been aware of the historic events at their property prior to their ownership.

Nearly 72% of the returned questionnaires stated that no separate gray water system is utilized. Gray water systems are designed to handle flows from sinks, showers, water softeners and washing machines. The wastewater discharges from toilets and garbage disposals have high solids and nutrient loadings which require a higher level of treatment than gray water. A gray water system reduces the total wastewater flow volume to the septic tank and leaching fields. Gray water systems in CT require the use of a septic tank upstream of the dispersal component.

Figure IV-12:
Potential Water Contamination
"Are you aware of any local wells or springs that may have been adversely affected by septic system flow?"



The chart to the left shows that the overwhelming majority of respondents were not aware of any local wells or springs that may have been impacted negatively by septic system effluent. This is not surprising, because lab testing is often required to make this determination. Elevated Nitrogen, Phosphorous, or Coliform are generally not detectable by taste alone.

Figure IV-13: Defer Homeowner Costs

"Should fixed income households be allowed to defer paying taxes and fees to fix wastewater disposal problems, until selling their property?"

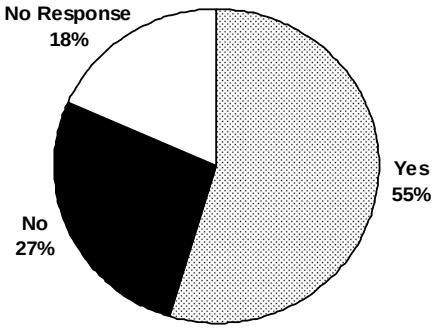
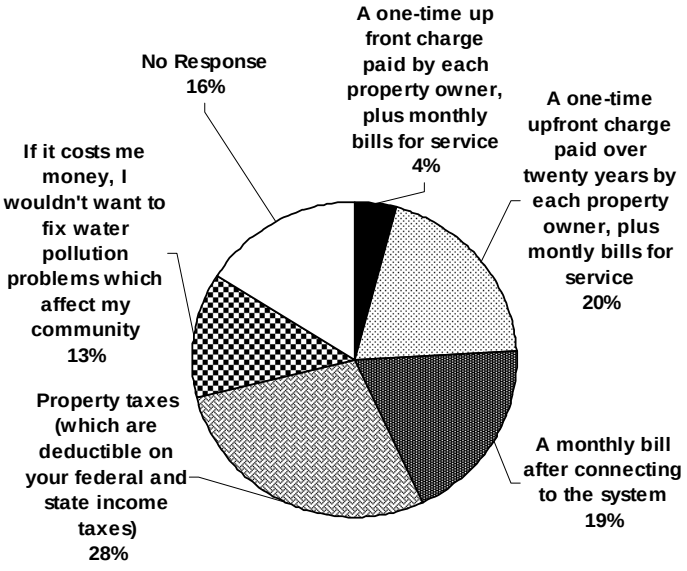


Figure IV-14: Payment Preference

"If the Town needs to expend money to fix wastewater disposal problems in a neighborhood, the Town aggressively pursues grants to pay for the capital improvements. However, if a public sewering option is needed, and the grants are not available or insufficient to pay for the needed capital improvements, how would you prefer the Town to pay for the capital improvements?"



The public was asked two questions regarding how to pay for community wastewater treatment alternatives if deemed necessary to protect the groundwater and public health. 55% of the responses felt that fixed income households (i.e. social security benefits) should be allowed to defer tax payments and fees until selling their property for fixing wastewater disposal problems. 27% didn't think a deferral should be allowed and 18% didn't answer the question.

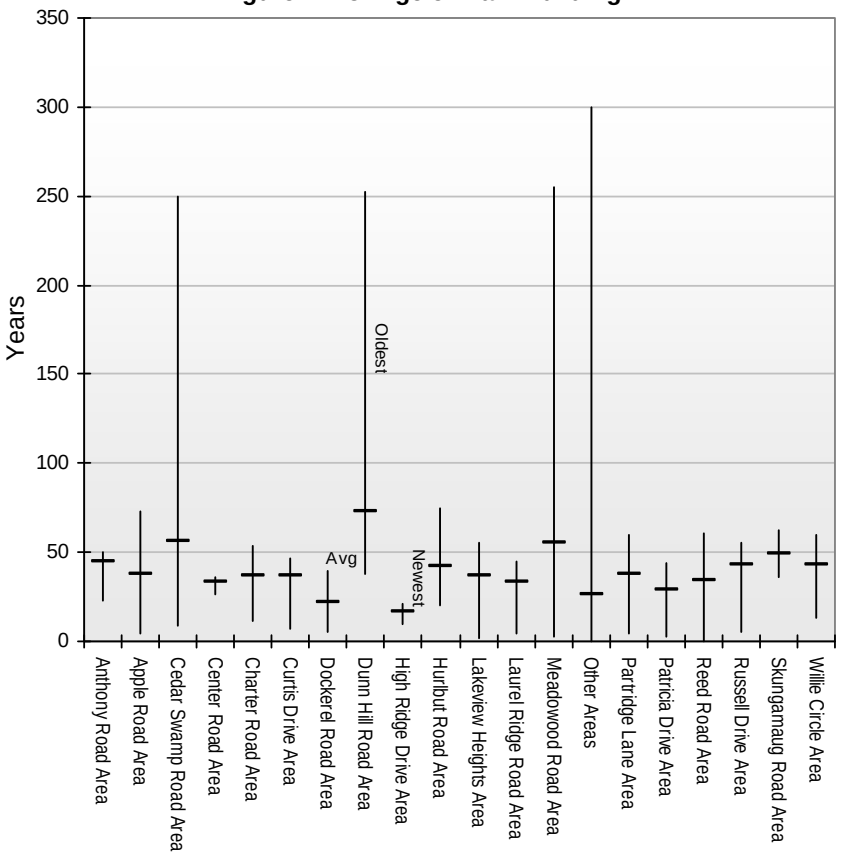
The second question asking what method the Town should pursue to pay for capital improvements of wastewater renovation projects generated a greatly divided response. The option to pay through property taxes was the most favorable at 28%. It is interesting to note that many questionnaires were returned with hand written comments conveying displeasure about the high property taxes in Town. The second most popular method (20%) for paying for public wastewater treatment projects is through a one-time upfront charge paid over twenty years by each property owner, plus monthly bills for service. Residents also equally favored (19%) a monthly bill after connecting to the system. 13% of the Phase II area questionnaire responses stated that if it costs money, they wouldn't want to fix water pollution problems which affect their community.

2. NEIGHBORHOOD AREAS

The questionnaire responses were matched to the GIS parcel mapping by address. The results were tabulated by neighborhood area. Select questions evaluating the wastewater renovation systems in each neighborhood were presented graphically. The results are discussed below.

Approximately 93% of the responses were from the owner of the property. The neighborhoods with the oldest buildings are Cedar Swamp Road, Dunn Hill Road, and Meadowood Road neighborhood areas with an average building age more than 50 years old. Ten additional neighborhood areas have houses with an average age between 37 and 50 years old. Dockerel Road and High Ridge Drive Area generally have the newest construction (less than 25 years old).

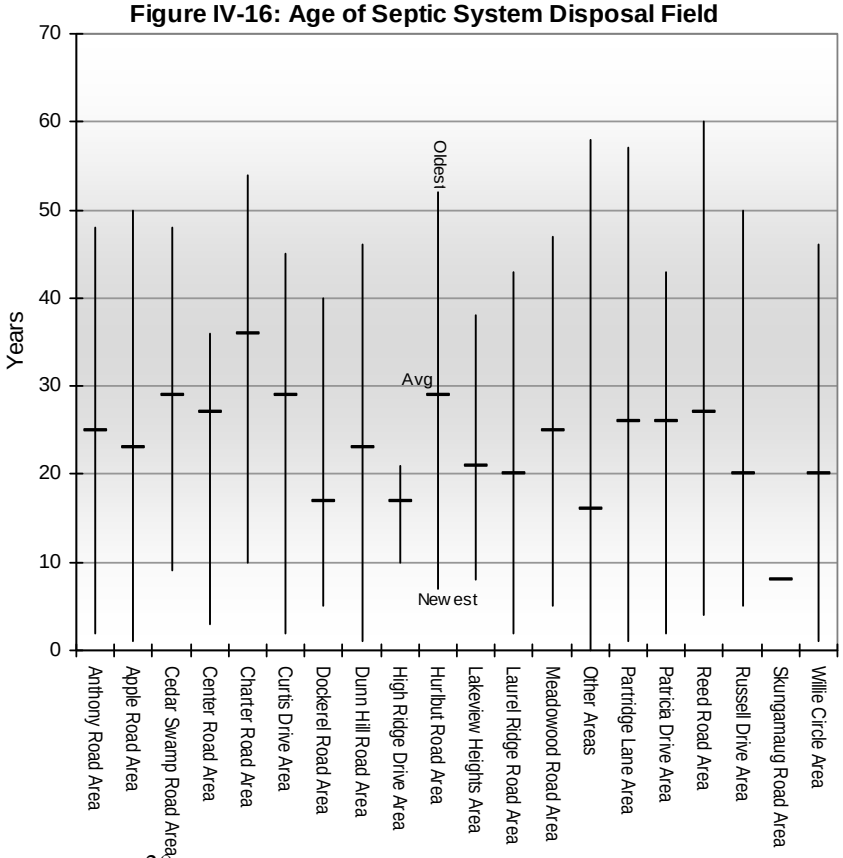
Figure IV-15: Age of Main Building



The septic systems appear to have been installed within the last 60 years in Tolland, according to the responding homeowner responses. The average age of septic system disposal fields is approximately 23 years old. The septic systems in the Charter Road area are reportedly 36 years on average matching the average age of the houses in the neighborhood and are generally oldest throughout the Town.

Cedar Swamp Road, Charter Road Area, High Ridge Drive Area, Hurlbut Road, and Lakeview Heights neighborhood area have absorption fields that are at least 7 years old.

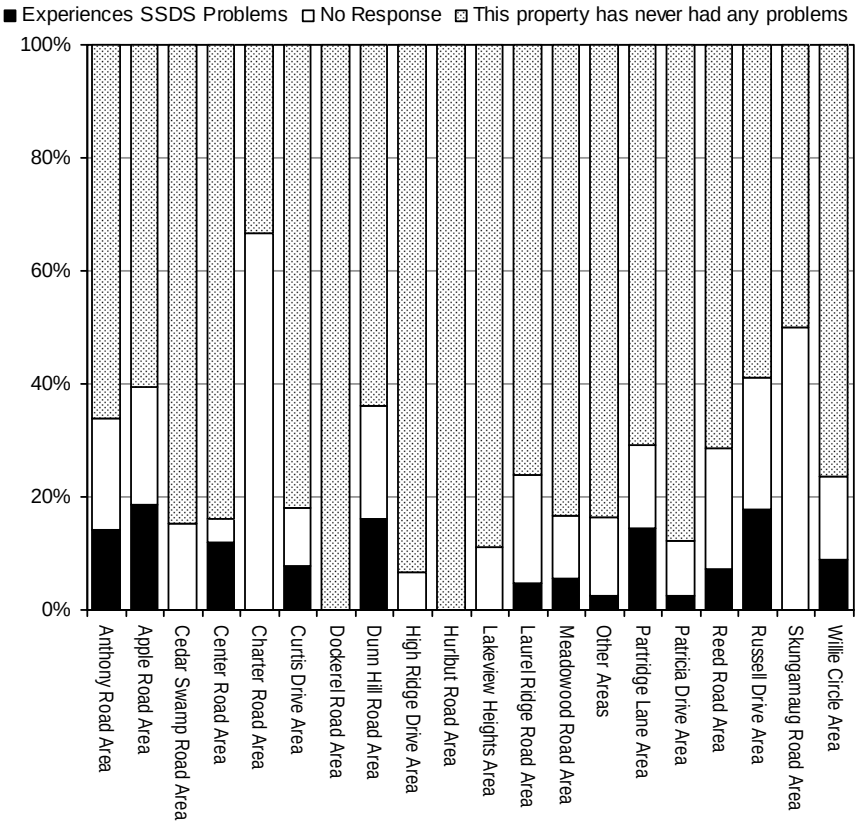
Figure IV-16: Age of Septic System Disposal Field



Less than 20 percent of the homeowners reported wastewater disposal system problems. These could be classified as muddy disposal fields, slowly draining or backs up, flows onto ground surface, odors, or other. Anthony Road, Apple Road, Dunn Hill Road, and Russell Drive Area have the highest reported number of problems. Cedar Swamp Road, Charter Road, Dockerel Road, High Ridge Drive, Hurlbut Road, Lakeview Heights, and Skungamaug Road Areas did not report any wastewater disposal system problems.

Figure IV-17: Wastewater Disposal Problems

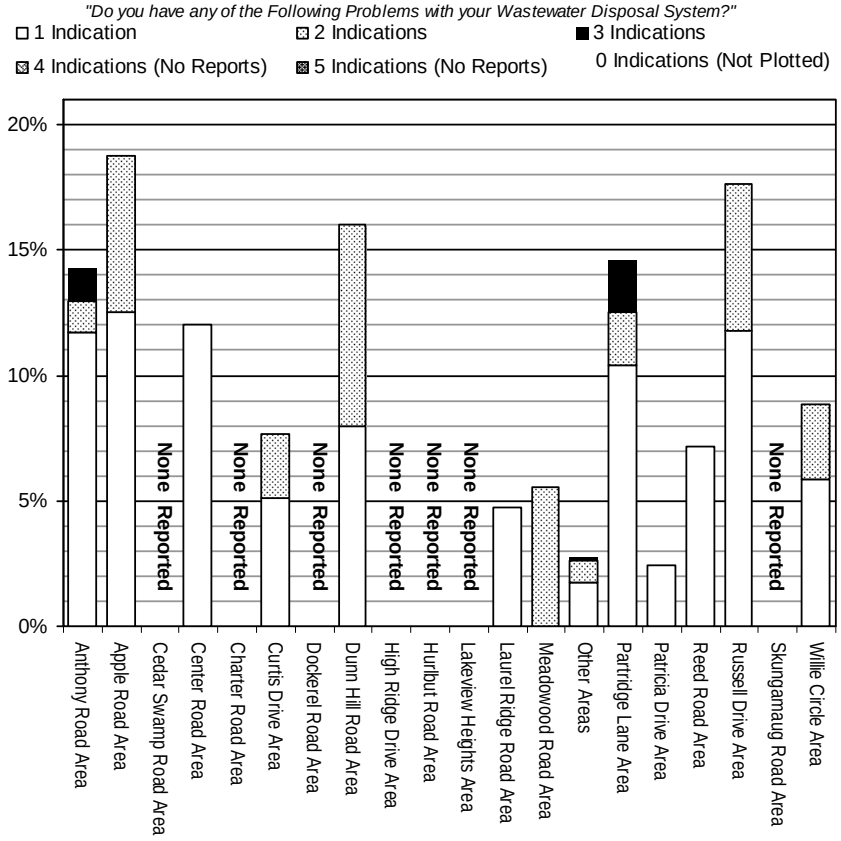
"Do you have any wastewater disposal system problems?"



This graph shows the breakdown of reported seasonal problems. Parcels with more than 1 type of septic system problem are more likely to be malfunctioning. Both the Anthony Road and Partridge Lane neighborhoods have parcels with up to 3 different types of wastewater absorption field problems. Apple Road, Dunn Hill Road, and Russell Drive neighborhoods had a few homeowners report 2 different types of problems.

Figure IV-18: Number of Unique Problems

"Do you have any of the Following Problems with your Wastewater Disposal System?"



Approximately 50% of the questionnaire participants responded they are more concerned than not about installed septic systems adverse affect on water quality in their area. This ratio of responses expressing concern generally doesn't vary by neighborhood. However, Cedar Swamp Road, Dockerel Road, and Hurlbut Road neighborhood areas do not appear to be concerned with polluted surface or groundwater in their area caused by septic systems.

The neighborhoods with residents who think a public sewer is needed are shown in Table IV-1 below. 22% of property owners who returned questionnaires chose not to answer this question. Residents in 8 of the 20 areas responded that public sewers may be needed in their neighborhood based on the Yes/No polling results.

Figure IV-19: Groundwater Concern

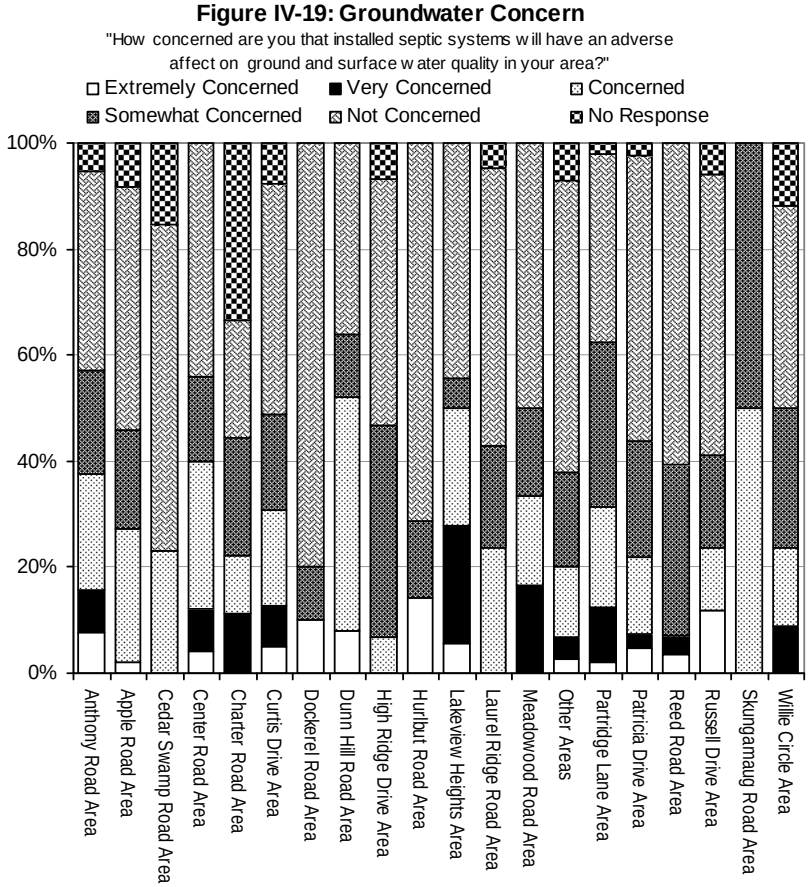


Figure IV-20 Public Sewer Need

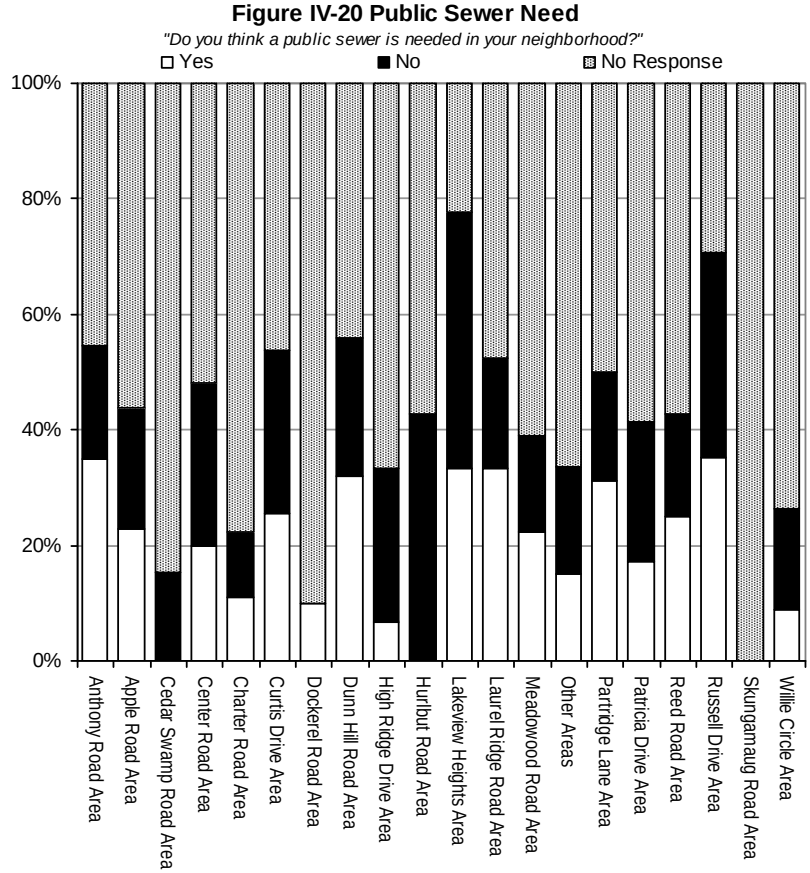


Table IV-1: Public Sewer Need

Neighborhood Area	Yes	No
Anthony Road	27	15
Apple Road	11	10
Cedar Swamp Road	0	2
Center Road	5	7
Charter Road	1	1
Curtis Drive	10	11
Dockerel Road	1	0
Dunn Hill Road	8	6
High Ridge Drive	1	4
Hurlbut Road	0	3
Lakeview Heights	6	8
Laurel Ridge Road	7	4
Meadowood Road	4	3
Other	201	249
Partridge Lane	15	9
Patricia Drive	7	10
Reed Road	7	5
Russell Drive	6	6
Skungamaug Road	0	0
Willie Circle	3	6

The consensus of the residents of the Phase II area tend not to think that investigating the effects of septic systems on water quality in neighborhood areas is worthwhile. This is in contrast to the response asking if a public sewer is needed in local neighborhoods. Residents in the neighborhood areas of Anthony Road, Center Road, Dunn Hill Road, Laurel Ridge Road, Partridge Lane, and Skungamaug Road are in favor of investigating the effect of septic systems on the area's water quality. The remaining 14 neighborhoods do not think a study would be meaningful.

Figure IV-21: Investigate Septic System Effects

"In your opinion, is it worthwhile to investigate the effect of septic systems on surface and groundwater quality in your area?"

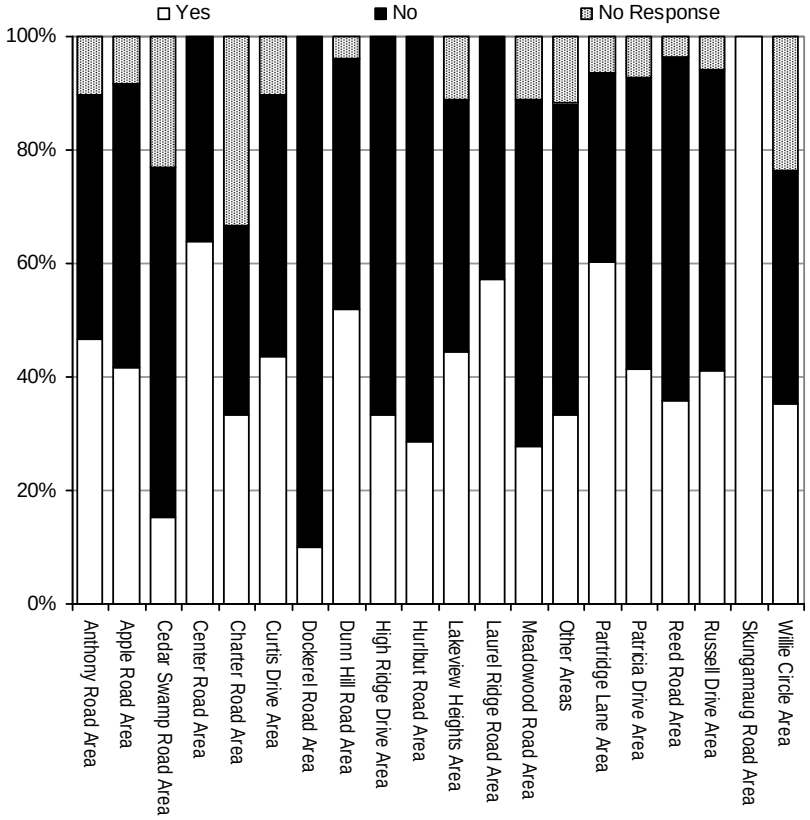
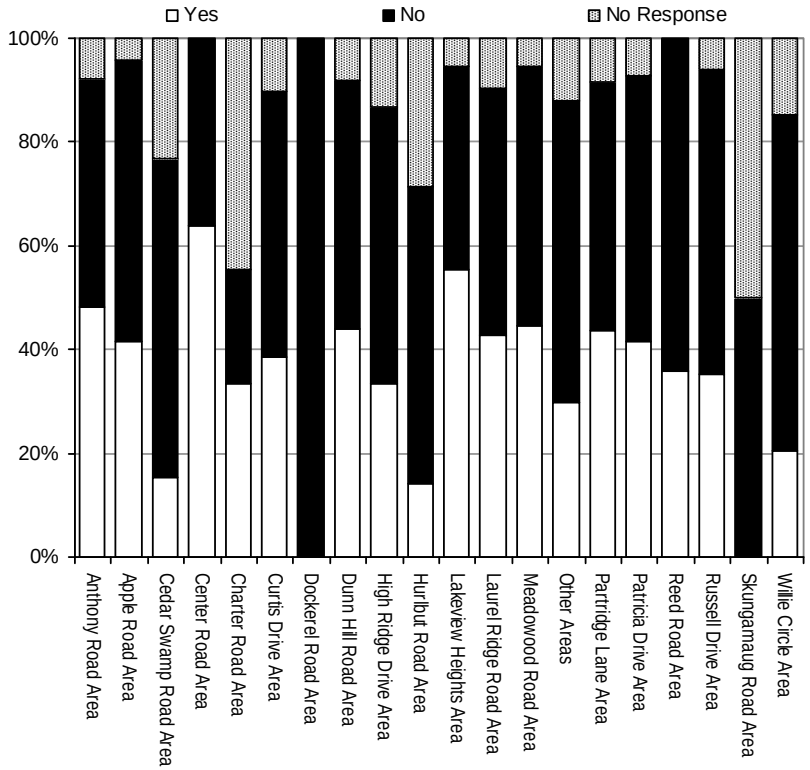


Figure IV-22: Investigate Alternatives

"In your opinion, is it worthwhile to investigate methods other than individual on-site septic systems for collecting and treating wastewater produced in your area?"



The Anthony Road Area, Center Road Area, Charter Road Area, and Lakeview Heights Area are the only neighborhoods in favor of investigating methods other than individual on-site septic systems for collecting and treating wastewater in the respective areas. These results conflict with the perceived need for a public sewer shown in Table IV-1 because 7 of the neighborhood areas changed from thinking public sewers are needed to indicate *off-site* wastewater disposal is not a useful subject to study. 2 neighborhood areas swapped viewpoints in the opposite direction. The conflicting results might be due to the confusing verbose wording of this question. Results from the questionnaires were input into the Needs Matrix and weighted to quantify their relative importance for continued on-site wastewater renovation in each area.

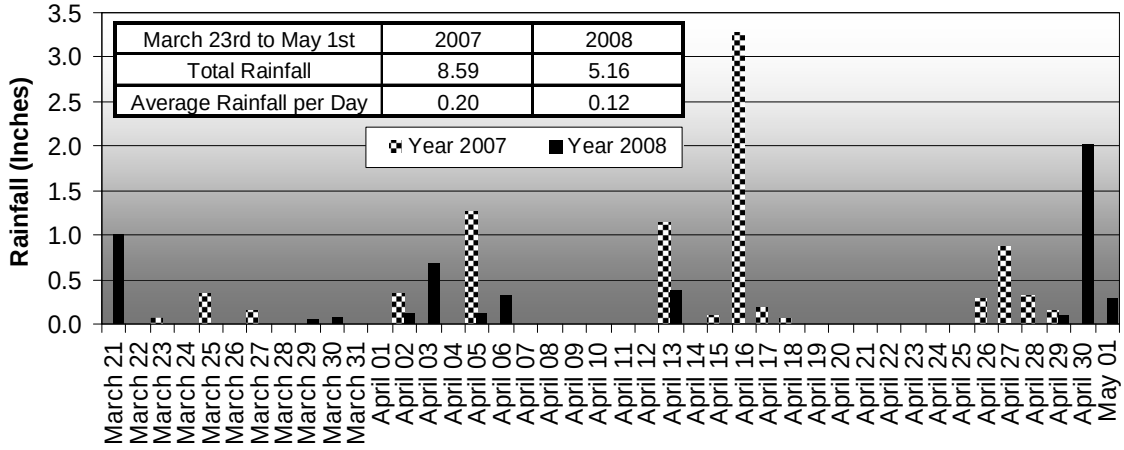
E. WALKOVER INSPECTION PROGRAM

Observations were recorded for walkover evaluations of 120 parcels during the spring wet season (April 10th to 18th, 2008). Completed Walkover Forms for each of the selected parcels may be found in Appendix C of this report.

Lots were chosen at random based on suspicions raised from the Questionnaire Results of the surrounding parcels in each neighborhood. The number of walkovers assigned to each neighborhood was generally set based on the size of each area. Neighborhood areas with Questionnaire Results indicating the neighborhood has minimal or no problems were skipped. Available resources budgeted for this project were allocated based on the perceived SSDS functionality within each neighborhood. The Tolland Town Engineer reviewed the walkover program's target parcels prior to execution.

Walkovers are generally seasonal as they detect most problems when performed during the wet period in the spring. Unfortunately, the 2008 wet season received approximately half as much rainfall as 2007. Figure IV-23 below, compares the spring rainfall of 2007 and 2008. The most significant rainfall of 2.0 inches occurred after the walkover investigations were completed on April 30th. The error-corrected surface weather data was downloaded from the NOAA National Climatic Data Center web site.

Figure IV-23: Historic Precipitation Data from the Storrs, CT Weather Station



Field personnel look for symptoms of subsurface treatment system failures. A failing system typically has blatant effluent break out, grey-water surface discharge, effluent discharges to

storm sewers or surface waters. More subtle telltale signs indicating the system may be malfunctioning include: odors of sewage in the vicinities of the septic tank or leaching field, wet areas that should otherwise not be wet, and areas where lush green grass appears to be growing above leaching fields.

The on-site wastewater treatment systems for 80% of the lots appear OK. The apparent location of 12% of the treatment systems had moist, damp, or mossy ground which would require a follow-up visit during high groundwater. 8 parcels had highly saturated soil areas adjacent to the septic system field. 1 site was observed with effluent breaking out and running down a hillside. Table IV-2 summarizes the walkover results for each neighborhood area in the Phase II study area.

Table IV-2: Walkover Results

Neighborhood Area	Number of Parcels Investigated	Denied Entry	Appears OK	Requires Follow-up Visit	Suspected Failure	Apparent Failure
Anthony Road	17	1	15	2	1	0
Apple Road	12	0	8	3	0	1
Cedar Swamp Road	0	0	0	0	0	0
Center Road	6	0	6	0	0	0
Charter Road	0	0	0	0	0	0
Curtis Drive	10	0	9	1	0	0
Dockerel Road	2	0	2	0	0	0
Dunn Hill Road	5	0	5	0	0	0
High Ridge Drive	0	0	0	0	0	0
Hurlbut Road	2	0	2	0	0	0
Lakeview Heights	4	0	3	1	0	0
Laurel Ridge Road	8	0	8	0	0	0
Meadowood Road	5	1	0	3	1	0
Partridge Lane	14	0	12	1	1	0
Patricia Drive	8	0	7	0	1	0
Reed Road	6	0	5	0	1	0
Russell Drive	6	0	6	0	0	0
Skungamaug Road	0	0	0	0	0	0
Willie Circle	6	0	0	3	3	0
Other Areas	9	0	7	2	0	0
Total	**120**	**2**	**96**	**16**	**8**	**1**

F. WASTEWATER FLOW ESTIMATION

The wastewater flow for each neighborhood was estimated based on future conditions assuming build-out of vacant lots. These flow rates are used for planning purposes. If a neighborhood area is identified as having poorly functioning septic systems and the mitigation plan recommends extending public sewers, the flow rates would be used to reserve unused capacity from the Vernon

intermunicipal agreement. The neighborhood flows could also be used when sizing infrastructure such as pipes, pump stations, community septic systems, etc. Table IV-3 shows the estimated future wastewater flow generated within each Neighborhood Area. Note that the values shown in the table below do not include additional inflow or infiltration caused by a hypothetical extension of public sewers to any of the neighborhood areas.

Wastewater flows were assigned to parcels served with public water by using 100 percent of their quarterly water consumption from Birmingham Utilities, Connecticut Water, and Tolland Water. Other lots were apportioned flow based on community well flow meter data. Developed residential parcels with individual private wells were assigned wastewater flow based on Tolland's WPCA Regulations establishing 1 EDU = 192 gallons per day. Typically, lots with individual private well have lower water pressure and therefore use less water. Vacant, developable residential parcels in each neighborhood area were apportioned future flow based on a single family residential dwelling. No commercial development was anticipated in any of the neighborhood areas.

The average wastewater flow for a residential parcel was calculated as 200 gpd per EDU. The calculation is from 2006 and 2007 town-wide water meter billing records of single family dwellings served by public water. The calculation assumes 95% of water consumption is discharged as wastewater.

The average EDU flow rate was reported in the Phase I Wastewater Planning Study as 192 gpd (per EDU). This number was calculated based on public water consumption records of Phase I parcels from 2002 and 2003 water billing data provided by Connecticut Water and Tolland Water Company.

The total future estimated wastewater flow from the investigated neighborhood areas is 246,000 gpd. Anthony Road, which is served by the Tolland Water Company, has the largest number of parcels and also the largest flows of any neighborhood area. Partridge Lane, Apple Road, Patricia Drive, Willie Circle and Curtis Drive also have flows of 18,000 gpd or greater.

Table IV-3: Future Wastewater Flow Estimation by Neighborhood Area

Neighborhood Area	# of Lots	Future Wastewater Flows (gpd)	Neighborhood Area	# of Lots	Future Wastewater Flows (gpd)
Anthony Road	181	31,000	Lakeview Heights	33	7,000
Apple Road	130	25,000	Laurel Ridge Road	55	11,000
Cedar Swamp Road	22	5,000	Skungamaug Road	12	3,000
Center Road	46	9,000	Meadowood Road	43	9,000
Charter Road	20	4,000	Partridge Lane	142	29,000
Curtis Drive	93	18,000	Patricia Drive	112	22,000
Dockerel Road	31	6,000	Reed Road	54	11,000
Dunn Hill Road	64	13,000	Russell Drive	44	9,000
High Ridge Drive	38	8,000	Willie Circle	90	18,000
Hurlbut Road	38	8,000			

NOTE: Future Wastewater flows based on water consumption records or 192 gpd per single family home for lots with wells. Vacant parcels are assumed as future single family homes. Municipal land assumed to remain open space.

G. HEALTH CODE SETBACK DISTANCES

Six lots were reviewed for their continued ability to support on-site wastewater renovation systems. The lots were chosen from the following neighborhood areas: Anthony Road, Apple Road, Lakeview Heights, Russell Drive, and Willie Circle. Lots were selected based on a review of the planimetric features shown on the mid 1990 aerial CAD mapping. Questionnaire responses and walkover results were also referenced when selecting representative lots for this evaluation.

The Connecticut Department of Public Health "Regulations and Technical Standards for Subsurface Sewage Disposal Systems" are the current *best practice* design standards for designing and constructing wastewater renovation systems less than 5,000 gallons in Connecticut. The Director of the Eastern Highland Health Department stated at public Workshop #1 (for this facilities plan) that the DPH standards are conservative, and, if properly followed, a modern septic system should properly function indefinitely whereas a septic system installed prior to 1980 has a finite lifetime because the long term acceptance rate of the soil was not considered prior to that date. When a variance is approved to allow a repair to an existing system, the system is assumed to be designed to a level lower than the DPH standards and will need to be repaired or replaced again at the end of a finite lifespan.

Separation distances were applied to the six representative lots to reveal the available land suitable for construction of a subsurface sewage absorption system. See Table IV-4. It was assumed that the lots do not have surface/groundwater drains (curtain, footing, catch basins), utility service trenches, or potable water/irrigation lines. The locations of individual drinking water wells and/or public water service piping were assumed.

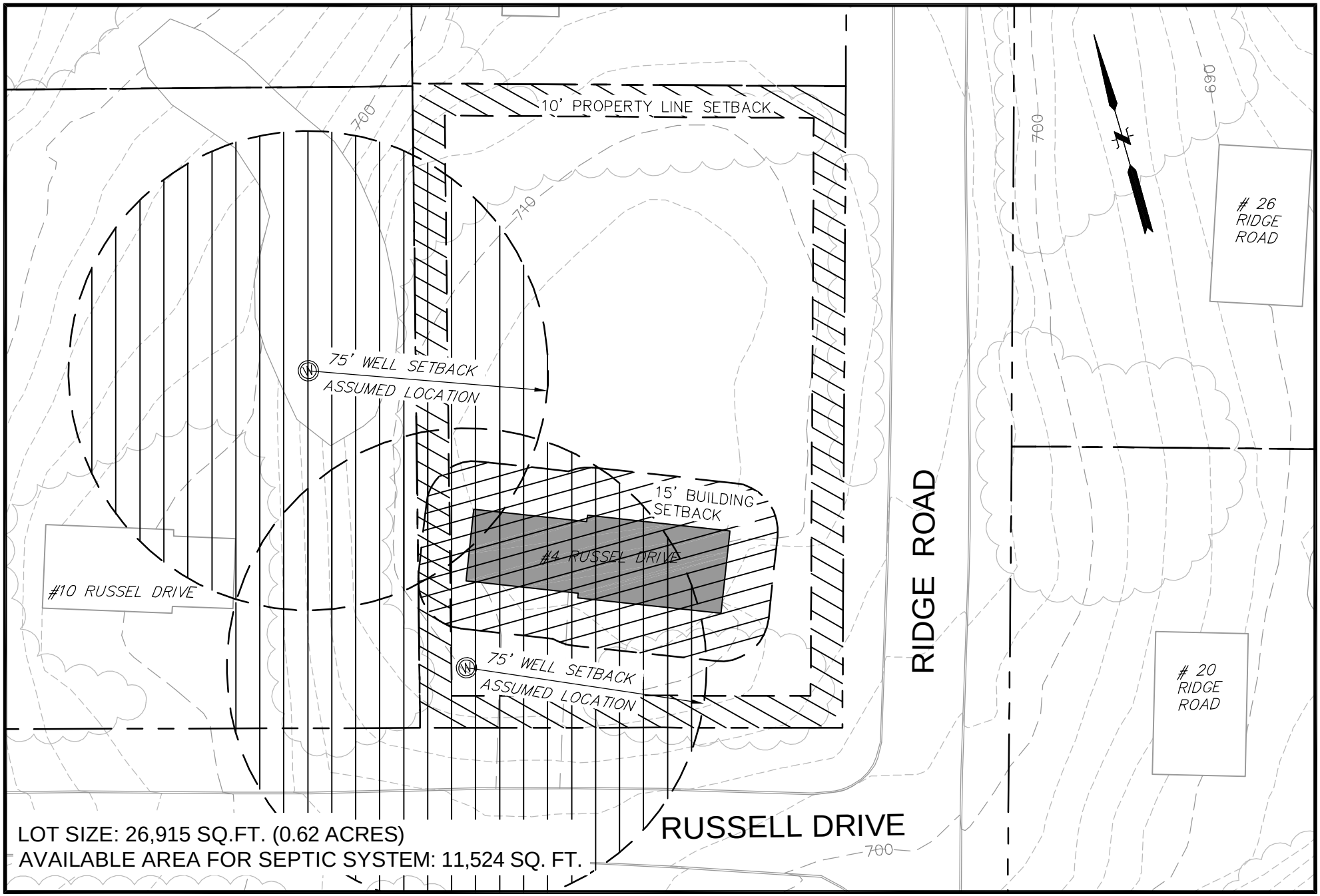
Table IV-4:

CT Health Code Separation Distances From Subsurface Sewage Systems

• 75 feet to well under 10 gpm • 150 feet to well from 10 to 50 gpm • 200 feet to well over 50 gpm • 15 feet to human habitation on adjacent property • 15 feet to building served • 10 feet to accessory structure • 50 feet to open watercourse • 100 feet to public water supply reservoir • 25 feet to surface or groundwater drain constructed of solid pipe • 25 feet to groundwater drains and storm water infiltration or retention/detention system located up-gradient, or on the side of system	• 50 feet to groundwater drains and storm water infiltration or retention/detention system located down-gradient. Note; Piping backfilled with free draining material can constitute a drain • 10 feet to top of embankment • 10 feet to property line • 10 feet to potable water and/or irrigation lines which flow under pressure • 25 feet to below ground swimming pool • 10 feet to above ground swimming pool • 5 feet to utility service trench • 10 feet to water treatment wastewater disposal system

Each of the lots was assumed to be utilized as a single family residence with three bedrooms at a design flow of 450 gpd (150 gpd per bedroom) based on the Public Health Code Regulations. Wastewater disposal trenches were sized at 900 square feet of required effective leaching area, conservatively assuming a percolation rate between 30.1 and 45.0 minutes for the percolation test water level to drop one inch. Assuming 2 rows of Infiltrator Sidewinder (high capacity) trenches with a center to center spacing of 7 feet, a typical leaching field layout would require a 9.8 ft x 115 ft footprint. The total square footage required would be 1,130 square feet (hypothetically). Actual size would vary at a site depending on soil conditions, leaching field type, and site layout. An equally sized reserve area would be needed for repairs (spaced 7 feet from the old system), bringing the estimated total size of the system to 2,741 square feet.

Figures IV-24 thru IV-29 map the available area for septic systems for lots in various neighborhood areas throughout the Phase II area of Tolland. Parcel records and GIS were used to determine lots with public water vs. private wells. Water mains and individual well locations were assumed. Table IV-5 summarizes the available area for on-site septic system repairs.



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Date: Thu, Jul 10, 2008 - 7:08 PM User: MattJ

UCS: WORLD | MS VIEW: STP-3-#4 | LMAN: | CTB: F&O Standard (Half).ctb

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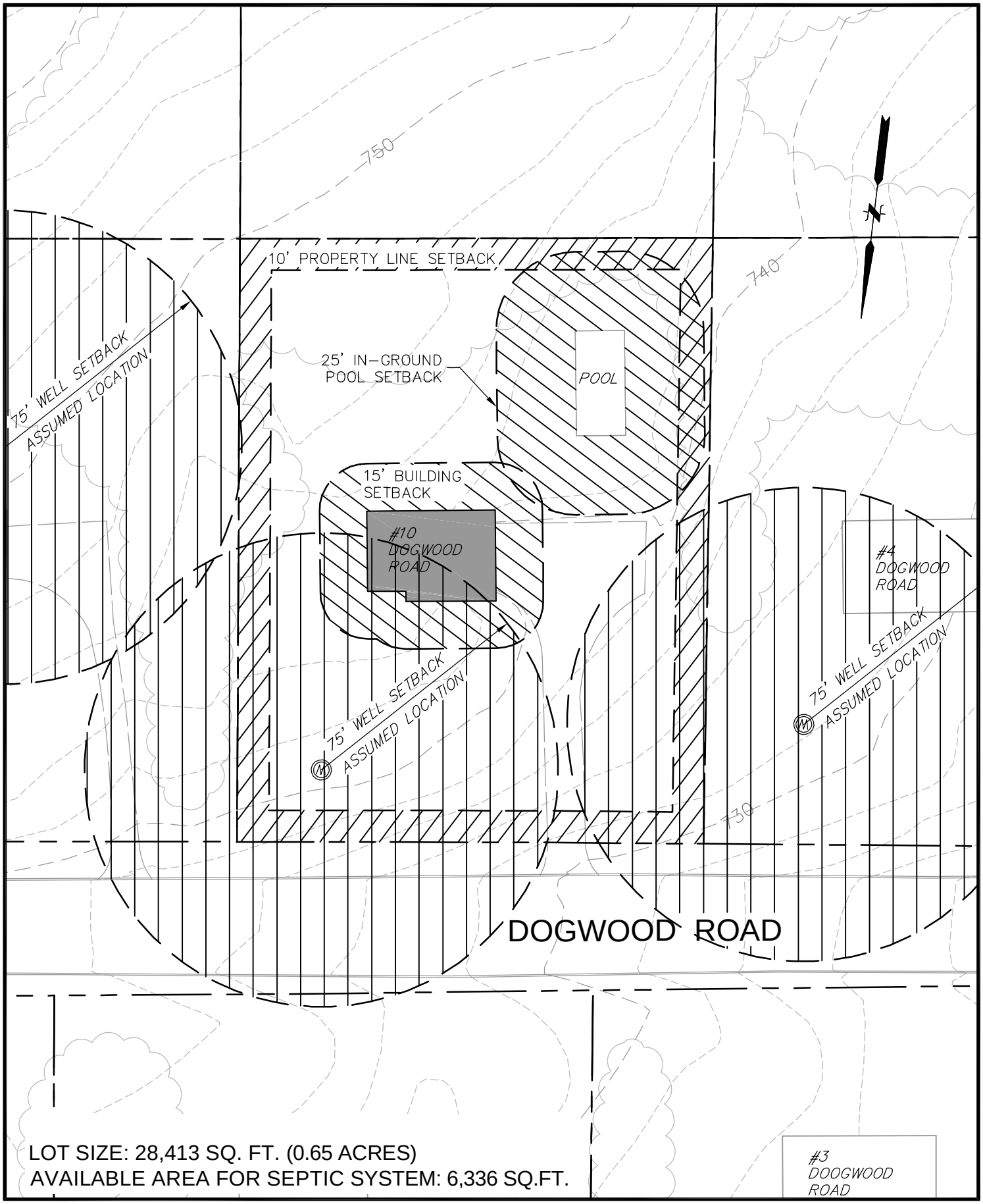
TOWN OF TOLLAND
#4 RUSSELL DRIVE
AVAILABLE AREA FOR SEPTIC SYSTEM
WASTEWATER FACILITIES PLANNING STUDY - PHASE 2
TOLLAND CONNECTICUT

PROJ. No.: 2002507.A40
DATE: JULY 2008

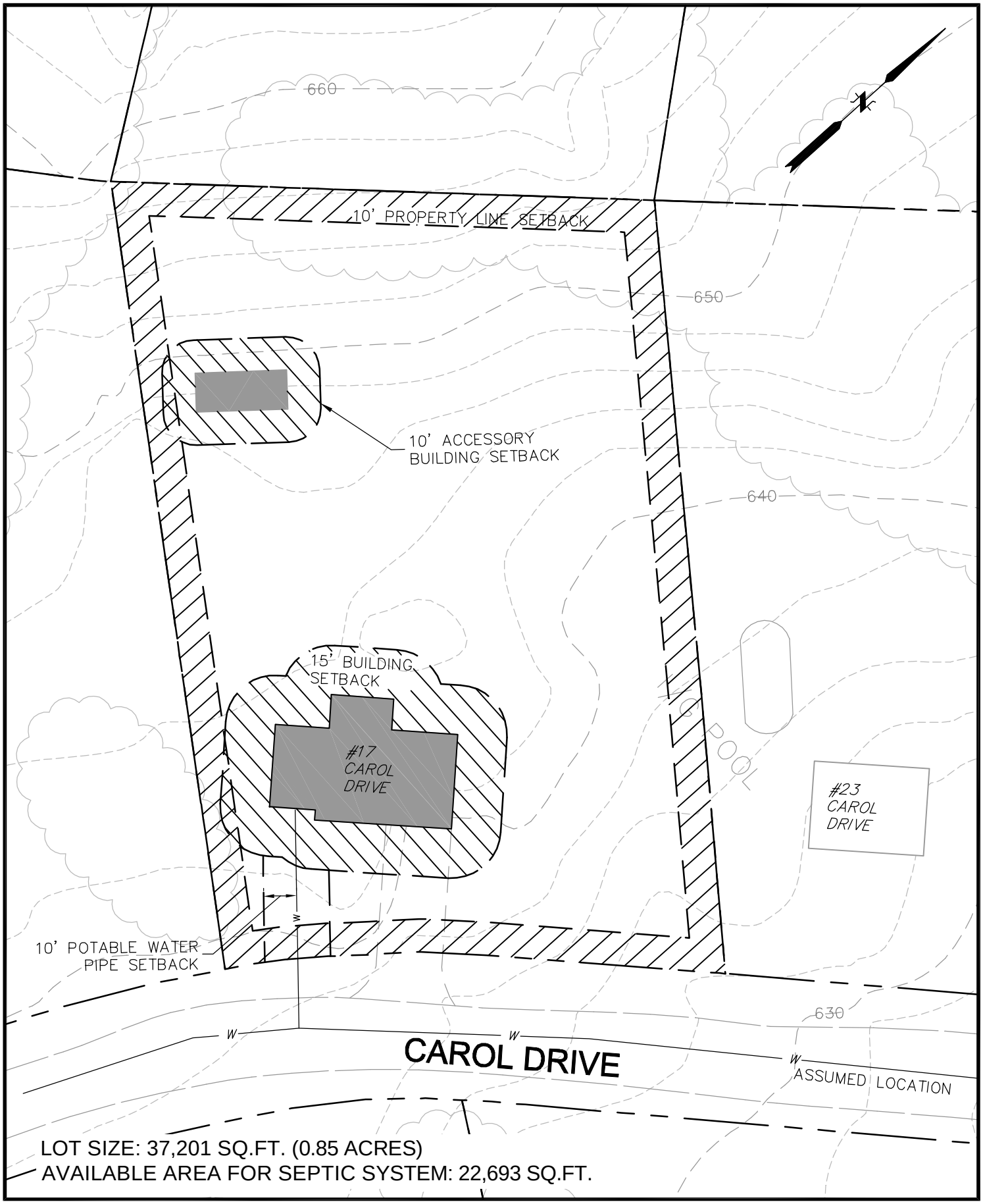
FIG IV-24



SCALE: HORZ.: 1" = 40' VERT.: DATUM: HORZ.: VERT.: 0 20 40 GRAPHIC SCALE	WWW.FandO.COM FUSS & O'NEILL *Disciplines to Deliver* 146 HARTFORD RD MANCHESTER, CT 06040 860.646.2469	TOWN OF TOLLAND #10 DOGWOOD ROAD AVAILABLE AREA FOR SEPTIC SYSTEM WASTEWATER FACILITIES PLANNING STUDY - PHASE 2 TOLLAND CONNECTICUT

PROJ. No.: 2002507.A40
DATE: JULY 2008

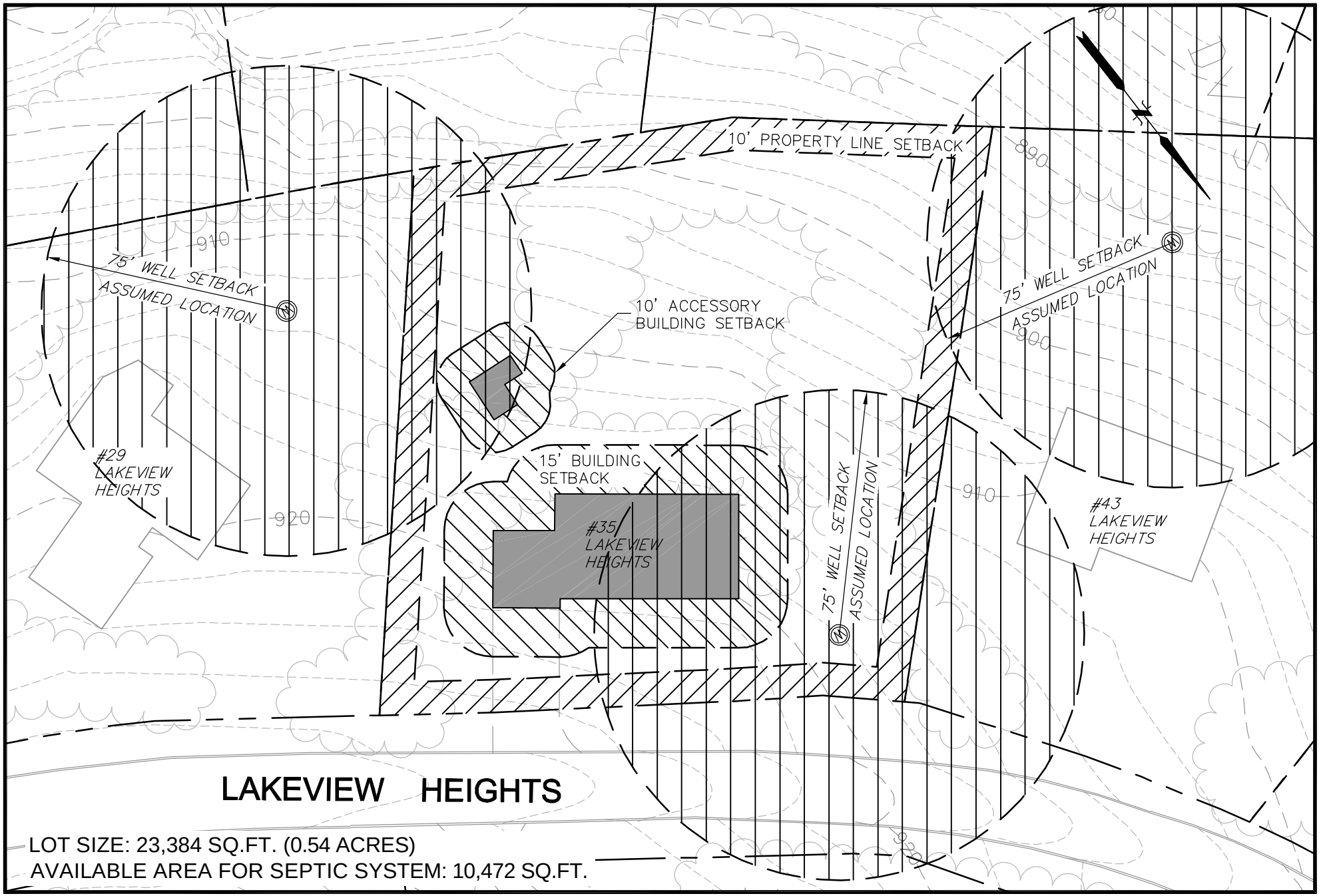
FIG IV-25



SCALE: HORZ.: 1" = 40' VERT.: DATUM: HORZ.: VERT.: 0 20 40 GRAPHIC SCALE	WWW.FandO.COM FUSS & O'NEILL *Disciplines to Deliver* 146 HARTFORD RD MANCHESTER, CT 06040 860.646.2469	TOWN OF TOLLAND #17 CAROL DRIVE AVAILABLE AREA FOR SEPTIC SYSTEM WASTEWATER FACILITIES PLANNING STUDY - PHASE 2 TOLLAND SEPTIC SYSTEM AVAILABLE AREA

PROJ. No.: 2002507.A40
DATE: JULY 2008

FIG IV-26



LAKEVIEW HEIGHTS

LOT SIZE: 23,384 SQ.FT. (0.54 ACRES)
AVAILABLE AREA FOR SEPTIC SYSTEM: 10,472 SQ.FT.

SCALE:
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GRAPHIC SCALE

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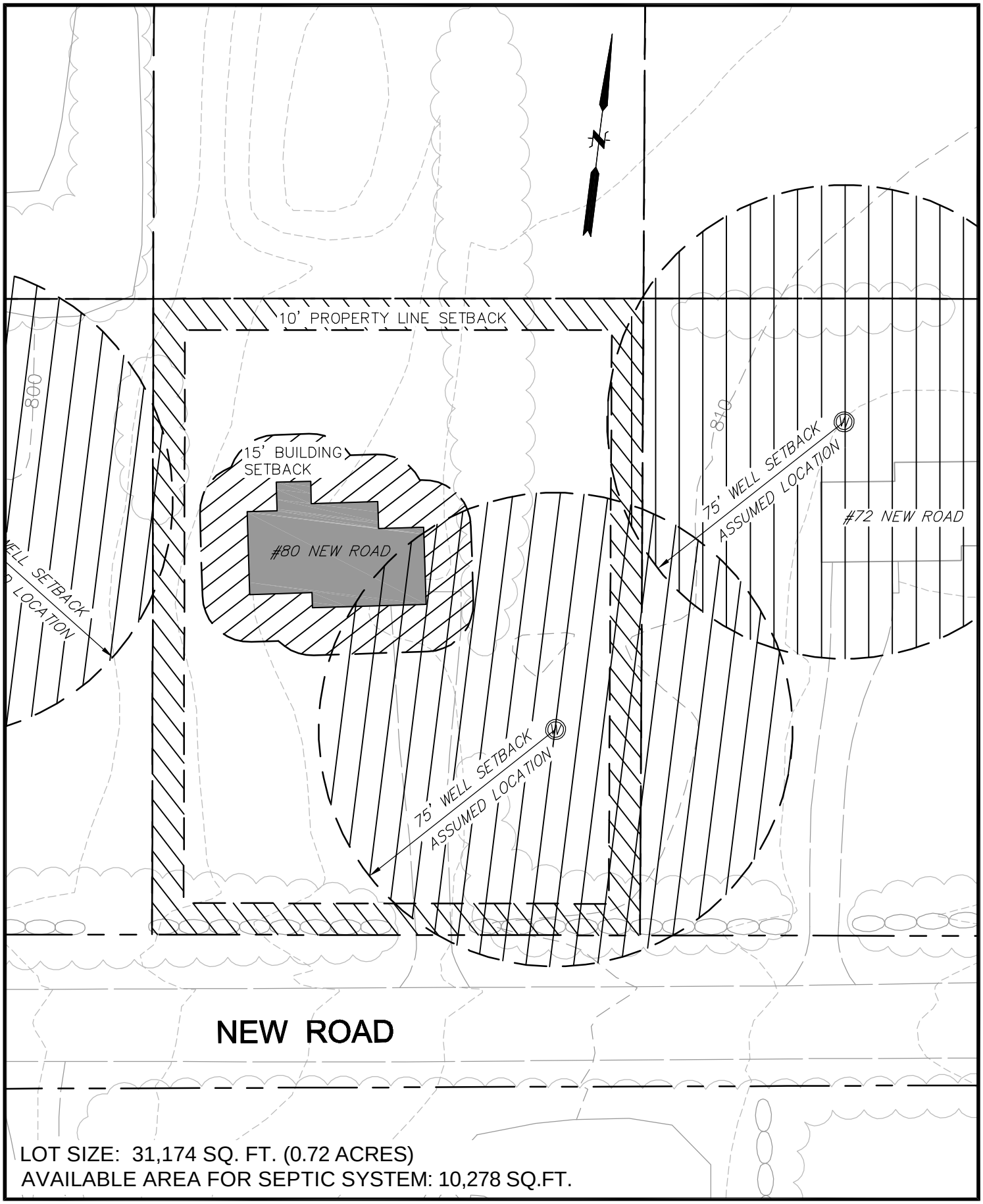
TOWN OF TOLLAND
35 LAKEVIEW HEIGHTS
AVAILABLE AREA FOR SEPTIC SYSTEM
WASTEWATER FACILITIES PLANNING STUDY - PHASE 2
TOLLAND CONNECTICUT

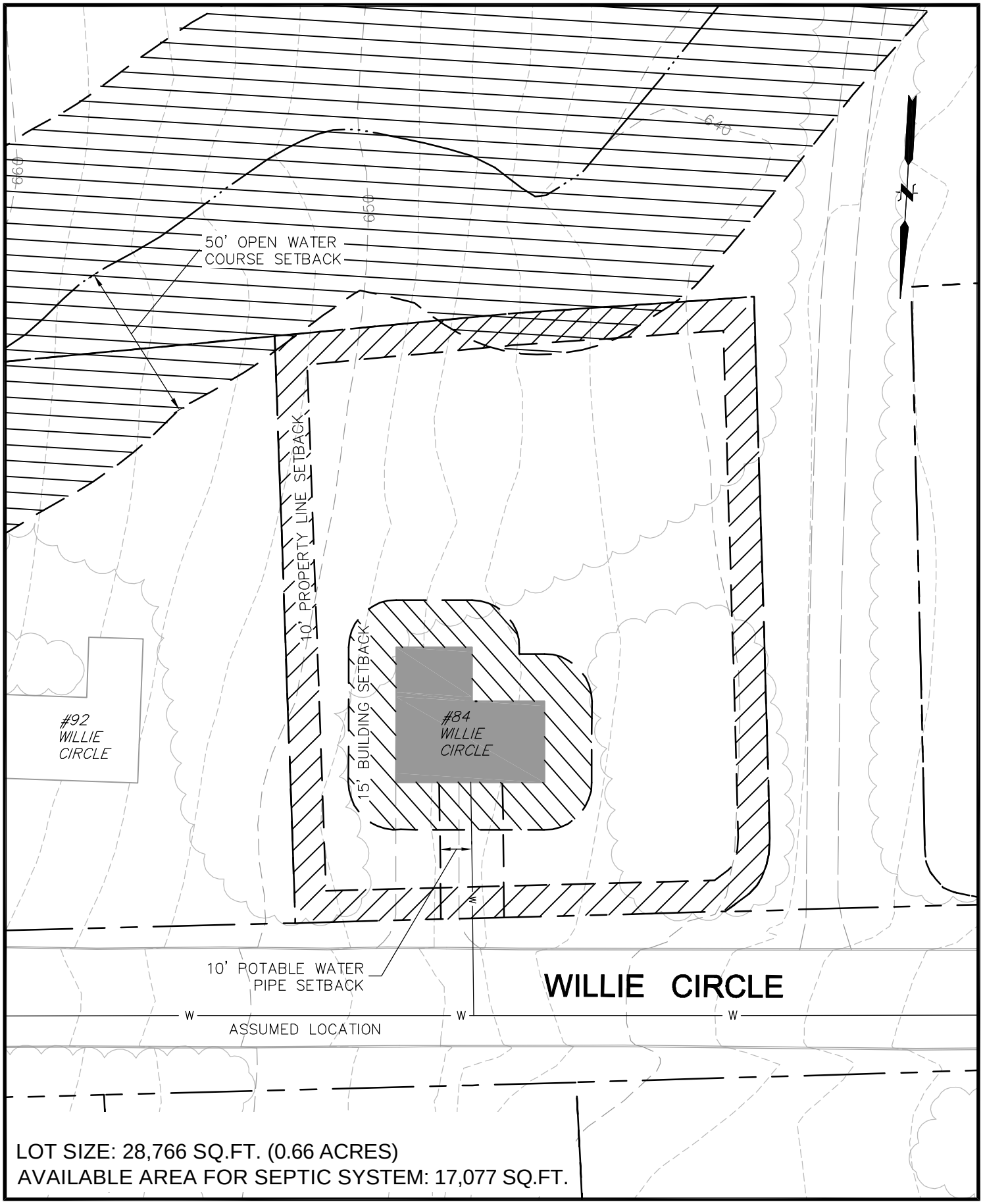
PROJ. No.: 2002507.A40
DATE: JULY 2008

FIG IV-27



LOT SIZE: 31,174 SQ. FT. (0.72 ACRES)
AVAILABLE AREA FOR SEPTIC SYSTEM: 10,278 SQ.FT.

SCALE: HORZ.: 1" = 40' VERT.: DATUM: HORZ.: VERT.: 0 20 40 GRAPHIC SCALE	WWW.FandO.COM FUSS & O'NEILL *Disciplines to Deliver* 146 HARTFORD RD MANCHESTER, CT 06040 860.646.2469	TOWN OF TOLLAND #80 NEW ROAD AVAILABLE AREA FOR SEPTIC SYSTEM WASTEWATER FACILITIES PLANNING STUDY - PHASE 2 TOLLAND CONNECTICUT	PROJ. No.: 2002507.A40 DATE: JULY 2008 FIG IV-28



SCALE: HORZ.: 1" = 40' VERT.: DATUM: HORZ.: VERT.: 0 20 40 GRAPHIC SCALE	WWW.FandO.COM FUSS & O'NEILL *Disciplines to Deliver* 146 HARTFORD RD MANCHESTER, CT 06040 860.646.2469	TOWN OF TOLLAND #84 WILLIE CIRCLE AVAILABLE AREA FOR SEPTIC SYSTEM WASTEWATER FACILITIES PLANNING STUDY - PHASE 2 TOLLAND CONNECTICUT	PROJ. No.: 2002507.A40 DATE: JULY 2008 FIG IV-29

Table IV-5: Available Area for Septic Systems

Location	Lot Size (Sq. Ft.)	Available Area (Sq. Ft.)
#4 Russell Drive	26,915	11,524
#10 Dogwood Road	28,413	6,336
#17 Carol Drive	37,201	22,693
#35 Lakeview Heights	23,384	10,472
#80 Willie Circle	31,174	10,278
#84 Willie Circle	28,766	17,077
Available area for subsurface sewage absorption systems based on CT DPH regulations. Assumes well/water service location.		

Based on this analysis, the six lots reviewed have more than the 2,741 square feet required for a septic system and reserve area based on Connecticut Department of Health Regulations and Technical Standards for Residential Septic Systems. Although the lots do not appear to need a constructed wastewater renovation solution based on this analysis, depth to high groundwater and restrictive soil layer were not considered. In addition, many of the wastewater disposal fields are 20 years or older, and may be approaching then end of their useful design life due to soil pore plugging caused by carryover of suspended solids, scum, and/or sludge from older single compartment septic tanks.

V. EXAMINATION OF NEIGHBORHOOD AREAS

The data collected in prior sections was reviewed in-depth for each neighborhood area. The information was evaluated in terms of on-site waste water treatment systems. The analysis concludes with recommendations for future wastewater treatment methods. The analysis is presented below alphabetically by neighborhood area.

A. ANTHONY ROAD AREA

The Anthony Road Area consists of 181 parcels, located in the southwestern region of Tolland. 2 lots are less than ⅓ of an acre, 55 lots are between ½ and ¾ of an acre, 88 lots are between ¾ and 1 acre, and 36 lots are more than 1 acre. Lot sizes greater than ½ an acre are generally large enough to support on-site wastewater disposal system based on the setback requirements in the 2008 Department of Public Health Septic System Regulations. This neighborhood area is immediately adjacent to proposed sewers which will terminate at the intersection of Merrow Road and Anthony Road (part of the Phase I WW Facilities Plan). The estimated wastewater generated for this neighborhood is 31,000 gpd.

The area is not located within FEMA 100-year floodplains. The neighborhood lies in the Willimantic regional drainage basin and is part of the Willimantic River subregional drainage basin (with 3 southwest parcels being part of the Skungamaug River subregional basin). The groundwater quality classification is GA, which means the DEP presumes that groundwater in such an area is suitable for drinking or other domestic uses without treatment, but is also suitable to receive septic system discharge. There is no surface water within the Anthony Road neighborhood area although several Class A unnamed intermittent streams which flow either east or west, surround the area. This inland surface water classification means the water courses have been identified by the DEP as habitat for aquatic life/wildlife, recreation benefits, and potential use as a water supply but is not suitable to receive wastewater [surface] discharges. DEP mapping shows an aquifer protection area immediately west to protect the Tolland South River Road well field.

Hydric soils typically remain waterlogged for a majority of the year and tend to indicate the presence of local wetlands. A finger crosses Anthony Road from the west and terminates in the backyard of a house on Virginia Lane, north of the water tower. There are also hydric soils in the backyard of one house on Summit drive on the south side of the road and a nominal amount along the north boundary of the neighborhood area and on Stuart Drive in the backyards of the lots. Wastewater renovation systems cannot be built in hydric soils because 1) wetland areas are heavily regulated, and 2) the soil does not have sufficient unsaturated depth to renovate the septic system effluent before it mixes with the groundwater. A 0.25 mile vain of hydric soil exists in the center of the Anthony Road Neighborhood.

The soil suitability for on-site wastewater renovation systems of the western portion of the neighborhood is rated low by the USDA NRCS. The middle of the Anthony Road neighborhood is rated as medium potential, and the eastern portion is rated as high potential to support on-site wastewater systems. The southwest stub was rated as medium potential. The hydric soils described above were rated as extremely low potential.

The surficial material in this area is till, as shown in spatial data produced by the USGS.

The majority of parcels in the neighborhood area have water service provided by the Tolland Water Company. In the northwest corner, 10 parcels are Birmingham Water Company customers.

According to the May 18, 2007 Natural Diversity Database spatial information maintained by the DEP, no threatened or endangered species have been identified for this area.

Both the Tolland Zoning and future land use plan designate this area as single family residential. The Connecticut Office of Policy and Management Conservation and Development Plan Locational Guide map specifies this area is mostly rural lands with a few fingers of preservation area located on lots already developed with residential dwellings (based on the USDA hydric soil data).

There have been 28 septic system repairs over the past ten years in the Anthony Road Area. The walkover site investigation program revealed 1 lot with a suspected septic system failure, 1 lot with a homeowner who denied the inspector access, and 15 lots that appear to have properly operating subsurface sewage absorption systems.

77 of 179 Septic System Questionnaire Responses were returned for the Anthony Road Neighborhood and they found the age of septic systems was between 2 and 48 years old with an average age of 25 years. 11 property owners reported seasonal waste water disposal system problems, while 66% stated never having any trouble. Of the responses, 9 indicated 1 problem with their septic system and 2 indicated multiple problems with the system. 35% of the responses indicated that public sewers were needed in the neighborhood and 45% chose not to answer. Approximately 45% reported having experienced flooding or surface drainage problems on their property. Approximately 66% reported making repairs to their septic system (58% replaced their septic tank and 45% replaced leaching fields).

B. APPLE ROAD AREA

The Apple Road Area consists of 130 parcels, located in the south central region of Tolland. 1 lot is less than ⅓ of an acre, 65 lots are between ½ and ¾ acre, 45 lots are between ¾ and 1 acre, and 19 lots are more than 1 acre. Lot sizes greater than ½ an acre are generally large enough to support on-site wastewater disposal system based on the setback requirements in the 2008 Department of Public Health Septic System Regulations. The closest feasible existing public sewers to this neighborhood are approximately 2.5 miles by traveling north along Old Kent Road South, under Interstate 84, to the gravity sewer at the intersection of Mountain Spring Road and Old Post Road (part of the Phase I WW Facilities Plan). The estimated wastewater generated for this neighborhood is 25,000 gpd.

The area is not located in FEMA floodplains. The neighborhood lies in the Willimantic regional drainage basin and is part of the Skungamaug River subregional drainage basin. The groundwater quality classification is GA, which means the DEP presumes that groundwater in such an area is suitable for drinking or other domestic uses without treatment, but is also suitable to receive septic system discharge. There is no surface water within the Apple Road neighborhood area although Spice Brook (Class A inland surface water) is located north of Gehring Road. This inland surface water classification means the water courses have been identified by the DEP as habitat for aquatic life/wildlife, recreation benefits, and potential use as a water supply but is not suitable to receive wastewater [surface] discharges. There are no Tolland or DEP aquifer protection areas nearby.

Hydric soils typically remain waterlogged for a majority of the year and tend to indicate the presence of local wetlands. Hydric soils appear to cross over the footprints of buildings at 4 lots in the north end of the Apple Road area. There are also 2 parcels in the northwest corner with hydric soils on the lot. Along the west boundary of the neighborhood area, hydric soil has minimal impact on the backyards of multiple lots. Wastewater renovation systems cannot be built

in hydric soils because 1) wetland areas are heavily regulated, and 2) the soil does not have sufficient unsaturated depth to renovate the septic system effluent before it mixes with the groundwater.

The soil suitability for on-site wastewater renovation systems of the southwest area of the neighborhood is rated as high potential by the USDA NRCS. North of Columbine Road, the soil is rated medium potential with most of the remaining area rated as low potential for on-site wastewater renovation systems. Some areas in the north have extremely low potential which were designated previously as hydric soils.

The surficial material in the central portions of this area are thick till deposits with outer lying areas composing primarily of till, as shown in spatial data produced by the USGS.

The parcels in this neighborhood area have potable water provided through individual private wells. Private wells for single family residences have a required separation distance from subsurface sewage absorption systems of 75 feet which may significantly reduce the available area for making repairs to septic system leaching fields.

According to the May 18, 2007 Natural Diversity Database spatial information maintained by the DEP, no threatened or endangered species have been identified for this area.

Both the Tolland Zoning and future land use plan designate this area as single family residential. The Connecticut Office of Policy and Management Conservation and Development Plan Locational Guide map shows the central area of the neighborhood being a conservation area, as well as the northwest and southeast corners. The remaining areas are designated rural lands. In the northwest corner of the neighborhood area, a finger of hydric soil has been classified as preservation area. Irrespective of the C&D classification, a residential dwelling appears to be built on nearly every parcel in this neighborhood area.

There have been 13 septic system repairs over the past ten years in the Apple Road Area. The walkover site investigation program revealed 1 lot with an apparent septic system failure, 3 lots with damp soil which require a follow-up investigation during wet conditions and 8 lots that appear to have properly operating subsurface sewage absorption systems.

48 of 130 Septic System Questionnaire Responses were returned for the Apple Road Neighborhood and they found the age of septic systems was between 1 and 50 years old with an average age of 23 years. 9 property owners reported seasonal wastewater disposal system problems, while 60% stated never having any trouble. Of the responses, 6 indicated 1 problem with their septic system and 3 indicated multiple problems with the system. 23% of the responses indicated that public sewers were needed in the neighborhood and 56% chose not to answer. Approximately 33% reported having experienced flooding or surface drainage problems on their property. Approximately 27% reported making repairs to their septic system (21% replaced their septic tank and 23% replaced leaching fields).

C. CEDAR SWAMP ROAD AREA

The Cedar Swamp Road Area consists of 22 parcels, located in the southwest corner of Tolland on the Town line with Coventry. 2 lots are between ⅓ and ½ acres, 8 lots are between ½ and ¾ acre, 3 lots are between ¾ and 1 acre, and 9 lots are more than 1 acre. Lot sizes greater than ½ an acre are generally large enough to support on-site wastewater disposal system based on the setback requirements in the 2008 Department of Public Health Septic System Regulations. The closest feasible existing public sewers to this neighborhood are approximately 2.5 miles by traveling north

along Mile Hill Road (Route 30), under the Interstate 84 overpass, and into the existing gravity sewer system in Vernon. The estimated wastewater generated for this neighborhood is 5,000 gpd.

The area is not located in FEMA floodplains. The neighborhood lies in the Willimantic regional drainage basin. The northern parcels are part of the Skungamaug River subregional drainage basin and the southern parcels lie in the Hop River subregional drainage basin. The groundwater quality classification is GA, which means the DEP presumes that groundwater in such an area is suitable for drinking or other domestic uses without treatment, but is also suitable to receive septic system discharge. There is an unnamed Class A intermittent stream that flows from Lawlor Road across Cedar Swamp Road into Cedar Swamp. This inland surface water classification means the water courses have been identified by the DEP as habitat for aquatic life/wildlife, recreation benefits, and potential use as a water supply but is not suitable to receive wastewater [surface] discharges. There are no Tolland or DEP aquifer protection areas nearby.

Hydric soils typically remain waterlogged for a majority of the year and tend to indicate the presence of local wetlands. Houses appear to be built on the hydric soil which crosses Route 30 in the north. Along Cedar Swamp Road, houses appear to be built on either side of a finger of hydric soil extending from the swamp, south across the road and out of the neighborhood area. The southwestern most lot in the study area appears to be completely covered with hydric soil. Wastewater renovation systems cannot be built in hydric soils because 1) wetland areas are heavily regulated, and 2) the soil does not have sufficient unsaturated depth to renovate the septic system effluent before it mixes with the groundwater.

The soil suitability for on-site wastewater renovation systems of the southwest area of the neighborhood is rated as high potential by the USDA NRCS. The Cedar Swamp neighborhood area appears to have greatly varying soils with soil suitability potential classified high, low, and extremely low that generally do not form large contiguous areas. The soil irregularity within such a small area implies that a properly operating septic system at one parcel should not be used to infer neighboring lots also function correctly.

The surficial material is mostly sand and gravel with 3 parcels west of Route 31 situated on till. A small area of alluv/sand+gravel is located east of the swamp, as shown in spatial data produced by the USGS.

The parcels in this neighborhood area have potable water provided through individual private wells. Private wells for single family residences have a required separation distance from subsurface sewage absorption systems of 75 feet which may significantly reduce the available area for making repairs to septic system leaching fields.

According to the May 18, 2007 Natural Diversity Database spatial information maintained by the DEP, approximately ⅔ of the area (on the west side) have been identified as being a potential habitat for threatened and endangered species, apparently due to the close proximity to Cedar Swamp.

Both the Tolland Zoning and future land use plan designate this area as single family residential. The Connecticut Office of Policy and Management Conservation and Development Plan Locational Guide map shows 3 parcels as rural land east of Gehring Road with the remaining area designated as conservation area. The three areas of hydric soils (two cross streets and one in the southwest corner) are designated as preservation areas. Irrespective of the C&D classification, a residential dwelling appears to be built on nearly every parcel in this neighborhood area.

There have been no septic system repairs over the past ten years in the Cedar Swamp Road Area. None of the lots in the Cedar Swamp neighborhood were included as part of the walkover site investigation program based on results from questionnaire responses.

13 of 21 Septic System Questionnaire Responses were returned for the Cedar Swamp Road Neighborhood and they found the age of septic systems was between 9 and 48 years old with an average age of 29 years. No property owners reported seasonal wastewater disposal system problems, while 85% stated never having any trouble. None of the responses indicated that public sewers were needed in the neighborhood and 85% chose not to answer. Approximately 15% reported having experienced flooding or surface drainage problems on their property. Approximately 23% reported making repairs to their septic system (23% replaced their septic tank and 15% replaced the septic tank baffle).

D. CENTER ROAD AREA

The Center Road Area consists of 46 parcels, located adjacent to Interstate 84, north of the new high school, close to the center of town. 13 lots are between ¾ and 1 acre and 33 lots are more than 1 acre. Lot sizes greater than ½ an acre are generally large enough to support on-site wastewater disposal system based on the setback requirements in the 2008 Department of Public Health Septic System Regulations. Public sewers are less than 0.25 miles away at the new high school pump station (part of the Phase I WW Facilities Plan), but any wastewater would have to travel a total of 6.3 miles west to the Vernon town line. The estimated wastewater generated for this neighborhood is 9,000 gpd.

The area is not located in FEMA floodplains. The neighborhood lies in the Willimantic regional drainage basin and Skungamaug River subregional drainage basin. The groundwater quality classification is GA, which means the DEP presumes that groundwater in such an area is suitable for drinking or other domestic uses without treatment, but is also suitable to receive septic system discharge. There is an unnamed Class A pond located approximately 0.2 miles northeast which flows north into Kalis Brook. This inland surface water classification means the water courses have been identified by the DEP as habitat for aquatic life/wildlife, recreation benefits, and potential use as a water supply but is not suitable to receive wastewater [surface] discharges. There are no Tolland or DEP aquifer protection areas nearby.

The NRCS mapping indicates that there are no hydric soils in the Center Road Neighborhood Area. Hydric soils typically remain waterlogged for a majority of the year and tend to indicate the presence of local wetlands. The soil suitability for on-site wastewater renovation systems of the entire area is medium potential.

The surficial material is split between two thick till deposits with a 250-foot wide narrow section of till, as shown in spatial data produced by the USGS.

The parcels in this neighborhood area have potable water provided through individual private wells. Private wells for single family residences have a required separation distance from subsurface sewage absorption systems of 75 feet which may significantly reduce the available area for making repairs to septic system leaching fields.

According to the May 18, 2007 Natural Diversity Database spatial information maintained by the DEP, none of the neighborhood area has been identified as being a potential habitat for threatened and endangered species.

Both the Tolland Zoning and future land use plan designate this area as single family residential. The Connecticut Office of Policy and Management Conservation and Development Plan Locational Guide map shows it as rural land.

There have been 4 septic system repairs over the past ten years in the Center Road Area. The walkover site investigation program evaluated 6 lots that appear to have properly operating subsurface sewage absorption systems.

25 of 46 Septic System Questionnaire Responses were returned for the Center Road Neighborhood and they found the age of septic systems was between 3 and 36 years old with an average age of 27 years. 3 property owners reported seasonal wastewater disposal system problems, while 84% stated never having any trouble. Of the responses, 3 indicated 1 problem with their septic system and no responses indicated multiple problems with the system. 20% of the responses indicated that public sewers were needed in the neighborhood and 52% chose not to answer. Approximately 28% reported having experienced flooding or surface drainage problems on their property. Approximately 16% reported making repairs to their septic system (28% added to the leaching field and 20% replaced leaching fields).

E. CHARTER ROAD AREA

The Charter Road Area consists of 20 parcels, located northwest of the Skungamaug Marsh on Old Stafford Road in the north central region of Tolland. 2 lots are between ⅓ and ½ of an acre, 7 lots are between ½ and ¾ of an acre, 5 lots are between ¾ and 1 acre, and 6 lots are more than 1 acre in size. Lot sizes greater than ½ an acre are generally large enough to support on-site wastewater disposal system based on the setback requirements in the 2008 Department of Public Health Septic System Regulations. This neighborhood area is located approximately 1.98 miles north of the existing sanitary sewers on Route 195 by Old Post Road (part of the Phase I WW Facilities Plan). The estimated wastewater generated for this neighborhood is 4,000 gpd, which includes wastewater flow for single family dwellings built on the vacant lots in the future.

The rear of two parcels on Charter Road and Town land is located in 100-year FEMA floodplains. The neighborhood lies in the Willimantic regional drainage basin and is part of the Skungamaug River subregional drainage basin. The groundwater quality classification is GA-Impaired, which means the DEP recognizes that the groundwater may not be meeting set criteria or cannot be used for one or more designated uses. The DEP water quality goal for this impairment is achievement of Class A Criteria and attainment of Class A designated uses. Class A designation presumes that groundwater in such an area is suitable for drinking or other domestic uses without treatment, but is also suitable to receive septic system discharge. An unnamed pond is located at the beginning of an unnamed intermittent stream (both Class A) which flows north along rear property lines into Skungamaug River. Just north of the neighborhood area and upstream from the unnamed intermittent tributary stream, impaired B/A classified Skungamaug River flows west. The source of contamination is shown to occur on DEP mapping where the river crosses Old Stafford Road. Class A water courses indicate that the water courses have been identified by the DEP as habitat for aquatic life/wildlife, recreation benefits, and potential use as a water supply but are not suitable to receive wastewater [surface] discharges. As with the groundwater classification system, a water course does not meet set criteria or cannot be used for one or more designated uses when it is impaired.

Hydric soils typically remain waterlogged for a majority of the year and tend to indicate the presence of local wetlands. Hydric soils intersect the rear of several parcels along the northern

boundary of the Charter Road neighborhood area. Wastewater renovation systems cannot be built in hydric soils because 1) wetland areas are heavily regulated, and 2) the soil does not have sufficient unsaturated depth to renovate the septic system effluent before it mixes with the groundwater.

The soil suitability for on-site wastewater renovation systems of the western portion of the neighborhood is rated low by the USDA NRCS. The majority of the neighborhood area is rated as high potential to support on-site wastewater renovation systems with medium potential soils along the western edge. The hydric soils along the rear of the northern parcels are rated as extremely low potential.

The surficial material in this area is divided between till in the southwest, sand + gravel in the north and south east, and swamp area in the northwest, as shown in spatial data produced by the USGS.

Water service to the parcels in this area is provided by Tolland Water Company.

According to the May 18, 2007 Natural Diversity Database spatial information maintained by the DEP, threatened or endangered species have been identified around the Skungamaug Marsh with the area of influence extending west of Charter Road to include approximately half of the parcels in the neighborhood area.

Both the Tolland Zoning and future land use plan designate this area as single family residential. The Zoning also designates the area as an Aquifer Protection Area which imposes additional restrictions and requirements on the single family lots to protect the sand + gravel aquifer. The Connecticut Office of Policy and Management Conservation and Development Plan Locational Guide map specifies this area is rural land that abuts preserved open space. Hydric soils in the backyards of 3 northern lots are preservation area. The land locked parcel to the east has conservation area to the north. It should be noted that the C&D boundary needs to be rectified to match the parcel lines in this area.

There have been no septic system repairs over the past ten years in the Charter Road Area. None of the lots in the Cedar Swamp neighborhood were included as part of the walkover site investigation program based on results from questionnaire responses.

9 of 20 Septic System Questionnaire Responses were returned for the Charter Road Neighborhood and they found the age of septic systems was between 10 and 54 years old with an average age of 36 years. No property owners reported seasonal wastewater disposal system problems, while 33% stated never having any trouble. 11% of the responses indicated that public sewers were needed in the neighborhood and 78% chose not to answer. Approximately 22% reported having experienced flooding or surface drainage problems on their property. 0% reported making repairs to their septic system, but 22% reported adding to the leaching field.

F. CURTIS DRIVE AREA

The Curtis Drive Area consists of 93 parcels, located northwest of the Skungamaug Marsh Along Old Stamford Road in north central Tolland. 1 lot is less than ⅓ of an acre, 3 lots are between ⅓ and ½ of an acre, 29 lots are between ½ and ¾ of an acre, 45 lots are between ¾ and 1 acre, and 15 lots are more than 1 acre. Lot sizes greater than ½ an acre are generally large enough to support on-site wastewater disposal system based on the setback requirements in the 2008 Department of Public Health Septic System Regulations. This neighborhood area is located approximately 2.3 miles north of the existing sanitary sewers on Route 195 by Old Post Road (part of the Phase I WW Facilities Plan). The estimated wastewater generated for this neighborhood is

18,000 gpd, which includes wastewater flow for single family dwellings built on the vacant lots in the future.

Five buildings are located in the 100 year FEMA flood zone and portions of four other parcels contain 100 year FEMA flood Zones. The entire neighborhood lies in the Willimantic regional drainage basin and is part of the Skungamaug River subregional drainage basin. The groundwater quality classification is GA, which means the DEP presumes that groundwater in such an area is suitable for drinking or other domestic uses without treatment, but is also suitable to receive septic system discharge.

An unnamed intermittent stream, which connects to Grover Brook, crosses 2 parcels in the northeast corner. Brooks Brook flows from the North to the South through the center of the area. An unnamed intermittent stream located between the backyards of houses on Robbie Road and Slater Road flows west into Brooks Brook. West of the area, Class A inland surface water including Brooks Pond and Skungamaug River flow southwest into Skungamaug Marsh (located southeast of the area). At the intersection with Old Stafford Road, the Skungamaug River inland surface water classification changes to impaired B/A. Class A water courses indicate that the water courses have been identified by the DEP as habitat for aquatic life/wildlife, recreation benefits, and potential use as a water supply but are not suitable to receive wastewater [surface] discharges. When a water course is impaired, it does not meet set criteria or cannot be used for one or more designated uses. Approximately ⅓ of the Curtis Drive Area (southern lots) are within the Tolland Aquifer Protection Area. There are no DEP aquifer protection areas nearby.

Hydric soils typically remain waterlogged for a majority of the year and tend to indicate the presence of local wetlands. There are minor areas of hydric soil located in the rear of developed lots in the northwest and northeast corners. Hydric soil may also be found between the abutting backyards of lots along Brooks Brook. Parcels on Pinegrove drive also have hydric soils in their backyards. Wastewater renovation systems cannot be built in hydric soils because 1) wetland areas are heavily regulated, and 2) the soil does not have sufficient unsaturated depth to renovate the septic system effluent before it mixes with the groundwater.

The soil suitability for on-site wastewater renovation systems of the western portion of the neighborhood is rated low by the USDA NRCS. The central and southern areas have high potential to support on-site wastewater systems. The west and northeast corner are classified as low potential. There are also extremely low potential areas along Brooks Brook, and found where the hydric soil is situated behind the southern lots on Pinegrove Drive.

The surficial material in this area is Till in the northern region and Sand + Gravel in the south, as shown in spatial data produced by the USGS.

Potable water for the parcels in the neighborhood is provided by individual private wells.

According to the May 18, 2007 Natural Diversity Database spatial information maintained by the DEP, three southernmost parcels are within proximity to threatened or endangered species living in the adjacent swamp.

Both the Tolland Zoning and future land use plan designate this area as single family residential. The Zoning also designates the southern third of the area as an Aquifer Protection Area which imposes additional restrictions and requirements on the single family lots to protect the sand + gravel aquifer. The Connecticut Office of Policy and Management Conservation and Development Plan Locational Guide map specifies this area has conservation areas for developed

residential lots in the central area, preservation areas through the areas with hydric soils, and rural lands for the remaining parcels.

There have been 5 septic system repairs over the past ten years in the Curtis Drive Area. The walkover site investigation program revealed 1 lot with damp soil which will require a follow-up investigation during wet conditions and 9 lots that appear to have properly operating subsurface sewage absorption systems.

39 of 92 Septic System Questionnaire Responses were returned for the Curtis Drive Neighborhood and they found the age of septic systems was between 2 and 45 years old with an average age of 29 years. 3 property owners reported seasonal wastewater disposal system problems, while 82% stated never having any trouble. Of the responses, 2 indicated 1 problem with their septic system and 1 parcel indicated multiple problems with the system. 26% of the responses indicated that public sewers were needed in the neighborhood and 46% chose not to answer. Approximately 21% reported having experienced flooding or surface drainage problems on their property. Approximately 28% reported making repairs to their septic system (18% replaced their septic tank and 8% replaced leaching fields).

G. DOCKEREL ROAD AREA

The Dockerel Road Area consists of 31 parcels located in the southwest corner of Tolland. 6 lots are between ½ and ¾ of an acre, 7 lots are between ¾ and 1 acre and 18 lots are more than 1 acre. Lot sizes greater than ½ an acre are generally large enough to support on-site wastewater disposal system based on the setback requirements in the 2008 Department of Public Health Septic System Regulations. Public sewers are approximately 1.2 miles to the future Bolton Lakes low pressure force main, and 1.7 miles to the Vernon gravity sewer system north of Interstate 84 Exit 67 on Route 31. The estimated wastewater generated for this neighborhood is 6,000 gpd, which includes wastewater flow for single family dwellings built on the vacant lots in the future.

The area is not located in FEMA floodplains. The neighborhood lies in the Hockanum regional drainage basin and Tankerhoosen River subregional drainage basin. The groundwater quality classification is GA, which means the DEP presumes that groundwater in such an area is suitable for drinking or other domestic uses without treatment, but is also suitable to receive septic system discharge. The start of Barrows Brook (Class A water body) is located on the west edge of the neighborhood boundary. This inland surface water classification means the water courses have been identified by the DEP as habitat for aquatic life/wildlife, recreation benefits, and potential use as a water supply but is not suitable to receive wastewater [surface] discharges. There are no Tolland or DEP aquifer protection areas nearby.

Hydric soils typically remain waterlogged for a majority of the year and tend to indicate the presence of local wetlands. The NRCS mapping indicates that there are 2 fingers of hydric soils from the west in the backyard of developed parcels. Wastewater renovation systems cannot be built in hydric soils because 1) wetland areas are heavily regulated, and 2) the soil does not have sufficient unsaturated depth to renovate the septic system effluent before it mixes with the groundwater.

The soil suitability for on-site wastewater renovation systems of the entire area is generally low potential with the central region of high potential and 2 small hydric soil pockets on the west of extremely low potential to support on-site wastewater systems. There is also 1 pocket in the northwest corner of the neighborhood area classified as high potential.

The surficial material is till, as shown in spatial data produced by the USGS.

The parcels in this neighborhood area have potable water provided through individual private wells. Private wells for single family residences have a required separation distance from subsurface sewage absorption systems of 75 feet which may significantly reduce the available area for making repairs to septic system leaching fields.

According to the May 18, 2007 Natural Diversity Database spatial information maintained by the DEP, none of the neighborhood area has been identified as being a potential habitat for threatened and endangered species.

Both the Tolland Zoning and future land use plan designate this area as single family residential. The Connecticut Office of Policy and Management Conservation and Development Plan Locational Guide map shows it as rural land.

There has been 1 septic system repair over the past ten years in the Dockerel Road Area. The walkover site investigation program evaluated 2 lots which both appear to have properly operating subsurface sewage absorption systems.

10 of 30 Septic System Questionnaire Responses were returned for the Dockerel Road Neighborhood and they found the age of septic systems was between 5 and 40 years old with an average age of 17 years. None of the property owners reported seasonal wastewater disposal system problems. 10% of the responses indicated that public sewers were needed in the neighborhood and 90% chose not to answer. Approximately 10% reported having experienced flooding or surface drainage problems on their property. Approximately 0% reported making repairs to their septic system, but 30% added to the leaching field.

H. DUNN HILL ROAD AREA

The Dunn Hill Road Area consists of 64 parcels located in the central part of Tolland at the intersection of Route 74 and Route 195. 5 lots are less than ⅓ of an acre, 4lots are between ⅓ and ½ of an acre, 25 lots are between ½ and ¾ of an acre, 20 lots are between ¾ and 1 acre and 9 lots are more than 1 acre. Lot sizes greater than ½ an acre are generally large enough to support on-site wastewater disposal system based on the setback requirements in the 2008 Department of Public Health Septic System Regulations. Public sewers are adjacent to the Dunn Hill Road Area because gravity sewers are already planned to extend north from Old Post Road along Route 195 to the Phase I Planning Area boundary. The estimated wastewater generated for this neighborhood is 13,000 gpd, which includes wastewater flow for single family dwellings built on the vacant lots in the future.

The area is not located in FEMA floodplains. The neighborhood lies in the Willimantic regional drainage basin and Skungamaug River subregional drainage basin. The groundwater quality classification is GA, which means the DEP presumes that groundwater in such an area is suitable for drinking or other domestic uses without treatment, but is also suitable to receive septic system discharge. The Class A inland surface water, Palulk Hill Brook, is located west of the Dunn Hill Road neighborhood area and Clough Brook (also Class A) is located east of the area. This inland surface water classification means the water courses have been identified by the DEP as habitat for aquatic life/wildlife, recreation benefits, and potential use as a water supply but is not suitable to receive wastewater [surface] discharges. There are no Tolland or DEP aquifer protection areas nearby.

The NRCS mapping indicates that there are no hydric soils within this neighborhood area. Hydric soils typically remain waterlogged for a majority of the year and tend to indicate the presence of

local wetlands. The soil suitability for on-site wastewater renovation systems shows low potential for the western parcels on Dunn Hill Road. Parcels on Bald Hill Road are high potential, but the 4 northern parcels are classified as low potential. On the east side of the neighborhood area, parcels on Torry and Old Stafford Road are medium potential.

The surficial material is till, as shown in spatial data produced by the USGS.

The parcels in this neighborhood area have potable water provided through individual private wells. Private wells for single family residences have a required separation distance from subsurface sewage absorption systems of 75 feet which may significantly reduce the available area for making repairs to septic system leaching fields.

According to the May 18, 2007 Natural Diversity Database spatial information maintained by the DEP, none of the neighborhood area has been identified as being a potential habitat for threatened and endangered species.

The Tolland Zoning and future land use plans shows the south western region designated as Village Center with the remaining parcels located as single family residential. The Connecticut Office of Policy and Management Conservation and Development Plan Locational Guide map shows the western developed parcels as conservation areas. Southwest along Dunn Hill Road, the land is categorized as rural.

There have been 9 septic system repairs over the past ten years in the Dunn Hill Road Area. The walkover site investigation program evaluated 5 lots which appear to have properly operating subsurface sewage absorption systems.

25 of 62 Septic System Questionnaire Responses were returned for the Dunn Hill Road Neighborhood and they found the age of septic systems was between 1 and 46 years old with an average age of 23 years. 4 property owners reported seasonal wastewater disposal system problems, while 64% stated never having any trouble. Of the responses, 2 indicated 1 problem with their septic system and 2 parcels indicated multiple problems with the system. 32% of the responses indicated that public sewers were needed in the neighborhood and 44% chose not to answer. Approximately 44% reported having experienced flooding or surface drainage problems on their property. Approximately 28% reported making repairs to their septic system (24% replaced their septic tank and 20% replaced leaching fields).

I. HIGH RIDGE DRIVE AREA

The High Ridge Drive Area consists of 38 parcels located in Western Tolland, north of Route 74 and east or Route 30. 4 lots are between ¾ and 1 acre and 34 lots are more than 1 acre. Lot sizes greater than ½ an acre are generally large enough to support on-site wastewater disposal system based on the setback requirements in the 2008 Department of Public Health Septic System Regulations. This neighborhood area is located approximately 1.6 miles east of existing gravity sewers on Route 74. The estimated wastewater generated for this neighborhood is 8,000 gpd.

The area is not located in FEMA floodplains. The neighborhood lies in the Hockanum regional drainage basin and is part of the Charters Brook subregional drainage basin. 5 parcels in the southwest are part of the Hockanum River subregional drainage basin. The groundwater quality classification is GAAs, which means it is a tributary to a public water supply reservoir. Groundwater for a public water supply reservoir used or which may be used for public supplies of water suitable for drinking without treatment and groundwater in the area that contributes to a

public drinking water supply well is suitable for individual domestic septic systems according to the DEP.

The inland surface water classification of Browns Brook which is located northwest of the neighborhood area is rated Class AA. It starts at an unnamed Class AA Pond. Southeast of the High Ridge Drive Area is West Brook. Both brooks eventually discharge into the Shenipsit Lake Reservoir. AA inland surface water classification is used for existing or proposed drinking water supplies, habitat for fish and other aquatic life and wildlife, recreation, and water supply for industry and agriculture. It is not suitable to receive wastewater [surface] discharges. The area is not part of the Tolland or DEP Aquifer Protection Area, most likely because of the distance to the reservoir.

Hydric soils typically remain waterlogged for a majority of the year and tend to indicate the presence of local wetlands. In the southeast corner, 2 parcels have a small area of hydric soils. Wastewater renovation systems cannot be built in hydric soils because 1) wetland areas are heavily regulated, and 2) the soil does not have sufficient unsaturated depth to renovate the septic system effluent before it mixes with the groundwater.

The soil suitability for on-site wastewater renovation systems of the western portion of the neighborhood is rated low by the USDA NRCS. Northern parcels are in high potential soils. 2 parcels in the southeast corner are rated extremely low due to the presence of hydric soils, and the backyard of the other southernmost parcels is rated high. The remaining soil areas are rated as low potential to on-site wastewater renovation systems.

The surficial material in this area is till, as shown in spatial data produced by the USGS.

Potable water for the parcels in the neighborhood is provided by individual private wells. Private wells for single family residences have a required separation distance from subsurface sewage absorption systems of 75 feet which may significantly reduce the available area for making repairs to septic system leaching fields.

None of the neighborhood area has been identified as being a potential habitat for threatened and endangered species based on the DEP Natural Diversity Database spatial information dated May 18, 2007.

Both the Tolland Zoning and future land use plan designate this area as single family residential. The Connecticut Office of Policy and Management Conservation and Development Plan Locational Guide map specifies this area is a conservation area developed with residential dwellings. There is preserved open space to the northeast and hydric soils (wetlands) in the rear of two southwest houses.

There have been no septic system repairs over the past ten years in the High Ridge Drive Area. None of the lots in this neighborhood were included as part of the walkover site investigation program based on results based on the favorable responses for septic system performance submitted in questionnaire responses.

15 of 38 Septic System Questionnaire Responses were returned for the High Ridge Drive Neighborhood and they found the age of septic systems was between 10 and 21 years old with an average age of 17 years. No property owners reported seasonal wastewater disposal system problems, while 93% stated never having any trouble. 7% of the responses indicated that public sewers were needed in the neighborhood and 67% chose not to answer. Approximately 20% reported having experienced flooding or surface drainage problems on their property.

Approximately 0% reported making repairs to their septic system, although 33% added to leaching field.

J. HURLBUT ROAD AREA

The Hurlbut Road Area consists of 38 parcels located in western Tolland between Shenipsit Lake and Route 30. 2 lots are between ⅓ and ½ of an acre, 9 lots are between ½ and ¾ of an acre, 15 lots are between ¾ and 1 acre and 12 lots are more than 1 acre. Lot sizes greater than ½ an acre are generally large enough to support on-site wastewater disposal system based on the setback requirements in the 2008 Department of Public Health Septic System Regulations. The closest public sewers are located on Route 74 by Shenipsit Lake Road. The estimated wastewater generated for this neighborhood is 8,000 gpd, which includes wastewater flow for single family dwellings built on the vacant lots in the future.

The area is not located in FEMA floodplains. The neighborhood lies in the Hockanum regional drainage basin and Hockanum River subregional drainage basin. The groundwater quality classification is GAAs, which means it is a tributary to a public water supply reservoir. Groundwater for a public water supply reservoir used or which may be used for public supplies of water suitable for drinking without treatment and groundwater in the area that contributes to a public drinking water supply well is suitable for individual domestic septic systems according to the DEP.

There are 2 small unnamed ponds southwest of the area that are not connected to any watercourses. West Brook flows from the southeast to the northwest and is rated as Class AA because it discharges into Shenipsit Lake. AA inland surface water classification is used for existing or proposed drinking water supplies, habitat for fish and other aquatic life and wildlife, recreation, and water supply for industry and agriculture. It is not suitable to receive wastewater [surface] discharges. The area is not part of the Tolland or DEP Aquifer Protection Area, most likely because of the distance to the reservoir. The area is immediately southeast of the Shenipsit Lake watershed.

Hydric soils typically remain waterlogged for a majority of the year and tend to indicate the presence of local wetlands. The NRCS mapping indicates that two houses on Hurlbut Road have hydric soils that cross the street. At the intersection of Route 30 and Hurlbut Road, 2 different properties also have hydric soil in the backyard. Wastewater renovation systems cannot be built in hydric soils because 1) wetland areas are heavily regulated, and 2) the soil does not have sufficient unsaturated depth to renovate the septic system effluent before it mixes with the groundwater.

The soil suitability ranking, created by the USDA NRCS, for on-site wastewater renovation systems shows mostly high potential along Hurlbut Road. East on Cervens Road, the soil suitability changes to medium and then to low potential. The limits of the hydric soils described above are rated as extremely low potential to support subsurface sewage soil absorption systems.

The surficial material is thick till with underlying surficial geology in the southwest and southeast regions of the neighborhood area classified as till, as shown in spatial data produced by the USGS.

The parcels in this neighborhood area have potable water provided through individual private wells. Private wells for single family residences have a required separation distance from subsurface sewage absorption systems of 75 feet which may significantly reduce the available area for making repairs to septic system leaching fields.

According to the May 18, 2007 Natural Diversity Database spatial information maintained by the DEP, none of the neighborhood area has been identified as being a potential habitat for threatened and endangered species.

The Tolland Zoning and future land use plans shows the south western region designated as Village Center with the remaining parcels located as single family residential. The Connecticut Office of Policy and Management Conservation and Development Plan Locational Guide map shows conservation areas throughout most of the Hurlbut Road Area. There are two areas of hydric soils classified as preservation areas with one crossing the middle of the neighborhood and the second along the east boundary in the backyard. All but 3 lots in the Hurlbut Road area are developed with residential dwellings.

There have been 5 septic system repairs over the past ten years in the Hurlbut Road Area. The walkover site investigation program evaluated 2 lots which both appear to have properly operating subsurface sewage absorption systems.

7 of 38 Septic System Questionnaire Responses were returned for the Hurlbut Road Neighborhood and they found the age of septic systems was between 7 and 52 years old with an average age of 29 years. None of the property owners reported seasonal wastewater disposal system problems. None of the responses indicated that public sewers were needed in the neighborhood and 57% chose not to answer. Approximately 29% reported having experienced flooding or surface drainage problems on their property. Approximately 14% reported making repairs to their septic system (14% replaced their septic tank and 43% added to the leaching field).

K. LAKEVIEW HEIGHTS AREA

The Lakeview Heights Area consists of 33 parcels located in the southwest corner of Tolland. 3 lots between ⅓ and ½ of an acre, 20 lots are between ½ and ¾ of an acre, 8 lots are between ¾ and 1 acre and 2 lots are more than 1 acre. Lot sizes greater than ½ an acre are generally large enough to support on-site wastewater disposal system based on the setback requirements in the 2008 Department of Public Health Septic System Regulations. Public sewers are approximately ¾ of a mile to the Route 74 gravity sewer system in the Phase I Wastewater Planning Area. The estimated wastewater generated for this neighborhood is 7,000 gpd.

The area is not located in FEMA floodplains. The neighborhood lies in the Hockanum regional drainage basin and Hockanum River subregional drainage basin. The groundwater quality classification is GAAs, which means it is a tributary to a public water supply reservoir. Groundwater for a public water supply reservoir used or which may be used for public supplies of water suitable for drinking without treatment and groundwater in the area that contributes to a public drinking water supply well is suitable for individual domestic septic systems according to the DEP.

Poehnerts Pond is located approximately 0.16 miles east and Sucker Brook is located 0.12 miles west. Both are Inland Surface Water Bodies classified AA and both eventually discharge into Shenipsit Lake. AA inland surface water classification is used for existing or proposed drinking water supplies, habitat for fish and other aquatic life and wildlife, recreation, and water supply for industry and agriculture. It is not suitable to receive wastewater [surface] discharges. The area is not part of the Tolland or DEP Aquifer Protection Area, most likely because of the distance to the reservoir.

The NRCS mapping does not show any indications of hydric soil in the Lakeview Heights Neighborhood Area. Hydric soils typically remain waterlogged for a majority of the year and tend to indicate the presence of local wetlands. The soil suitability for on-site wastewater renovation systems of the northwest corner is rated high potential, with the remaining area rated low potential to support on-site wastewater systems.

The surficial material is till, as shown in spatial data produced by the USGS.

The parcels in this neighborhood area have potable water provided through individual private wells. Private wells for single family residences have a required separation distance from subsurface sewage absorption systems of 75 feet which may significantly reduce the available area for making repairs to septic system leaching fields.

According to the May 18, 2007 Natural Diversity Database spatial information maintained by the DEP, none of the neighborhood area has been identified as being a potential habitat for threatened and endangered species.

Both the Tolland Zoning and future land use plan designate this area as single family residential. The Connecticut Office of Policy and Management Conservation and Development Plan Locational Guide map shows each of the lots in the neighborhood area as a conservation area even though each parcel is developed with a single family residence.

There have been 2 septic system repairs over the past ten years in the Lakeview Heights Area. The walkover site investigation program evaluated 3 lots that appear to have properly operating subsurface sewage absorption systems and 1 lot with damp soil which will require a follow-up investigation during wet conditions.

18 of 33 Septic System Questionnaire Responses were returned for the Lakeview Heights Neighborhood and they found the age of septic systems was between 8 and 38 years old with an average age of 21 years. No property owners reported seasonal wastewater disposal system problems, while 89% stated never having any trouble. 33% of the responses indicated that public sewers were needed in the neighborhood and 22% chose not to answer. Approximately 11% reported having experienced flooding or surface drainage problems on their property. Approximately 33% reported making repairs to their septic system (11% replaced their septic tank and 17% added to leaching fields).

L. LAUREL RIDGE ROAD AREA

The Laurel Ridge Road Area consists of 64 parcels located in southern Tolland, southeast of Gehring Road and north of the Coventry Town Line. 2 lots are between ⅓ and ½ of an acre, 31 lots are between ½ and ¾ of an acre, 14 lots are between ¾ and 1 acre and 8 lots are more than 1 acre. Lot sizes greater than ½ an acre are generally large enough to support on-site wastewater disposal system based on the setback requirements in the 2008 Department of Public Health Septic System Regulations. Existing public sewers are not located nearby. It is approximately 3 miles to the gravity sewers at the intersection of Old Post Road and Mountain Spring Road. The future Bolton Lakes low pressure force main is located approximately 2.7 miles away (but will have limited hydraulic capacity). The estimated wastewater generated for this neighborhood is 11,000 gpd, which includes wastewater flow for single family dwellings built on the vacant lots in the future.

The area is not located in FEMA floodplains. The neighborhood lies in the Willimantic regional drainage basin and Skungamaug River subregional drainage basin. The groundwater quality

classification is GA, which means the DEP presumes that groundwater in such an area is suitable for drinking or other domestic uses without treatment, but is also suitable to receive septic system discharge. The Class A unnamed intermittent stream crosses the cul-de-sac on Laurel Ridge Road flowing north to Spice Brook. This inland surface water classification means the water courses have been identified by the DEP as habitat for aquatic life/wildlife, recreation benefits, and potential use as a water supply but is not suitable to receive wastewater [surface] discharges. There are no Tolland or DEP aquifer protection areas nearby.

Hydric soils typically remain waterlogged for a majority of the year and tend to indicate the presence of local wetlands. The NRCS mapping indicates that there are hydric soils on the east side covering most of 2 parcels developed with residential dwellings. There are also 3 connected fingers in the northwest backyards of properties (1 of the houses appears to be built in the hydric soils). Wastewater renovation systems cannot be built in hydric soils because 1) wetland areas are heavily regulated, and 2) the soil does not have sufficient unsaturated depth to renovate the septic system effluent before it mixes with the groundwater.

The soil suitability for on-site wastewater renovation systems shows high potential from the northwest to the southeast with a few areas of extremely low potential where the hydric soils are located. The remaining ½ is low potential with extremely low potential in backyards of lots on the eastern border. The southern 3 parcels are rated as medium potential to support on-site wastewater renovation systems.

The surficial material is till, as shown in spatial data produced by the USGS.

The parcels in this neighborhood area have potable water provided through individual private wells. Private wells for single family residences have a required separation distance from subsurface sewage absorption systems of 75 feet which may significantly reduce the available area for making repairs to septic system leaching fields.

According to the May 18, 2007 Natural Diversity Database spatial information maintained by the DEP, none of the neighborhood area has been identified as being a potential habitat for threatened and endangered species.

The Tolland Zoning and future land use plans shows the south western region designated as Village Center with the remaining parcels located as single family residential. The Connecticut Office of Policy and Management Conservation and Development Plan Locational Guide map shows the neighborhood area as rural lands with hydric soils classified as preservation areas.

There have been 4 septic system repairs over the past ten years in the Laurel Ridge Road Area. The walkover site investigation program evaluated 8 lots which appear to have properly operating subsurface sewage absorption systems.

21 of 55 Septic System Questionnaire Responses were returned for the Laurel Ridge Road Neighborhood and they found the age of septic systems was between 2 and 43 years old with an average age of 20 years. 1 property owner reported seasonal wastewater disposal system problems, while 76% stated never having any trouble. Of the responses, 1 parcel indicated 1 problem with their septic system. 33 % of the responses indicated that public sewers were needed in the neighborhood and 48% chose not to answer. Approximately 19% reported having experienced flooding or surface drainage problems on their property. Approximately 33% reported making repairs to their septic system (14% replaced their septic tank and 14% replaced leaching fields).

M. MEADOWOOD ROAD AREA

The Meadowood Road Area consists of 43 parcels located between Route 195 and Baxter Street in southwestern Tolland. 12 lots are between ½ and ¾ of an acre, 25 lots are between ¾ and 1 acre and 6 lots are more than 1 acre. Lot sizes greater than ½ an acre are generally large enough to support on-site wastewater disposal system based on the setback requirements in the 2008 Department of Public Health Septic System Regulations. Public sewers are planned along Merrow Road to the intersection with Anthony Road. The distance from the Meadowood Road Area, north along Baxter Road, and east on Anderson Road for a hypothetical sewer connection to the Phase I Wastewater Planning Area would be approximately 1 mile. The estimated wastewater generated for this neighborhood is 9,000 gpd, which includes wastewater flow for single family dwellings built on the vacant lots in the future.

The area is not located in FEMA floodplains. The neighborhood lies in the Willimantic regional drainage basin and Willimantic River subregional drainage basin. The groundwater quality classification is GAA due to three community wells. The DEP GAA classification is for groundwater which is or may be used for public supplies of water suitable for drinking without treatment, area that contributes to a public drinking water supply well, and groundwater in areas that have been designated as a future water supply in an individual water utility supply plan or in the area wide. Individual domestic septic systems may be located on GAA classified land. There is no surface water within the neighborhood area. Clark Brook is located 0.27 miles to the east with 2 Class A intermittent tributary streams to the north and south of the area. This inland surface water classification means the water courses have been identified by the DEP as habitat for aquatic life/wildlife, recreation benefits, and potential use as a water supply but is not suitable to receive wastewater [surface] discharges. There are no Tolland or DEP aquifer protection areas nearby.

Hydric soils typically remain waterlogged for a majority of the year and tend to indicate the presence of local wetlands. Along the north edge of the neighborhood area boundary, hydric soils appear to be located in the backyard of 7 lots on Meadowood Road. In the southeast corner, 2 lots also appear to have areas of hydric soils. Wastewater renovation systems cannot be built in hydric soils because 1) wetland areas are heavily regulated, and 2) the soil does not have sufficient unsaturated depth to renovate the septic system effluent before it mixes with the groundwater.

The soil suitability for on-site wastewater renovation systems generally shows the Meadowood Road Area classified as medium potential with low potential in the west and northwest areas. The extents of hydric soils are rated extremely low potentials to support on-site wastewater renovation systems.

The surficial material is mostly till with some western parcels located in a thick till deposit, as shown in spatial data produced by the USGS.

The parcels in this neighborhood area have potable water provided through the Woodland Summit Community Water Association by three community water system wells located within the neighborhood's GAA classified land. The separation distance between sub surface sewage absorption systems and wells pumping between 10 and 50 gallons per minute is 150 feet based on the Public Health Code. This distance may significantly reduce the available area for making repairs to septic system leaching fields, but the parcels adjacent to these wells appear to have adequate size to make on-site septic system repairs and still meet applicable Health Code requirements.

According to the May 18, 2007 Natural Diversity Database spatial information maintained by the DEP, none of the neighborhood area has been identified as being a potential habitat for threatened and endangered species.

The Tolland Zoning and future land use plans shows the south western region designated as Village Center with the remaining parcels located as single family residential. The Connecticut Office of Policy and Management Conservation and Development Plan Locational Guide map shows the west region of the neighborhood area as conservation area with all but 1 parcel developed with residential dwellings. The eastern portion of the neighborhood is shown as rural lands. The backyards of 6 parcels to the north and 2 parcels in the southeast are classified as preservation areas due to the presence of hydric soils.

There have been 11 septic system repairs over the past ten years in the Meadowood Road Area. The walkover site investigation program revealed 1 lot with a suspected septic system failure, 3 lots with damp soil which will require a follow-up investigation during wet conditions, and 1 lot with a homeowner who denied the inspector access.

18 of 42 Septic System Questionnaire Responses were returned for the Meadowood Road Neighborhood and they found the age of septic systems was between 5 and 47 years old with an average age of 25 years. 1 property owners reported seasonal wastewater disposal system problems, while 83% stated never having any trouble. Of the responses, 1 parcel indicated multiple problems with the system. 22% of the responses indicated that public sewers were needed in the neighborhood and 61% chose not to answer. Approximately 33% reported having experienced flooding or surface drainage problems on their property. Approximately 39% reported making repairs to their septic system (39% replaced their septic tank and 22% added to leaching field).

N. PARTRIDGE LANE AREA

The Partridge Lane Area consists of 142 parcels in the southwest quadrant of Tolland between Grant Hill and Cider Mill Road. 2 lots are less than ⅓ of an acre, 43 lots are between ⅓ and ½ of an acre, 27 lots are between ½ and ¾ of an acre, 36 lots are between ¾ and 1 acre and 34 lots are more than 1 acre. Lot sizes greater than ½ an acre are generally large enough to support on-site wastewater disposal system based on the setback requirements in the 2008 Department of Public Health Septic System Regulations. This neighborhood area is located approximately 1.2 miles east of existing gravity sewers on Route 195 by following Anderson Road to Goose Lane. The estimated wastewater generated for this neighborhood is 29,000 gpd.

The area is not located in FEMA floodplains. The neighborhood lies in the Willimantic regional drainage basin and is part of the Skungamaug River subregional drainage basin. The groundwater quality classification is GA, which means the DEP presumes that groundwater in such an area is suitable for drinking or other domestic uses without treatment, but is also suitable to receive septic system discharge. An unnamed pond south of Partridge Lane, classified A, connects to Metcalf Brook. A second intermittent unnamed stream (with inland surface water classification of A) flows from Elgin Road east into Skungamaug River. This inland surface water classification means the water courses have been identified by the DEP as habitat for aquatic life/wildlife, recreation benefits, and potential use as a water supply but is not suitable to receive wastewater surface discharges. The eastern fifth of the neighborhood area is part of the Tolland aquifer protection area along Cider Mill Road. There are no DEP aquifer protection areas nearby.

Hydric soils typically remain waterlogged for a majority of the year and tend to indicate the presence of local wetlands. There is 1 finger of hydric soil that fills most of the backyard of 2 lots on Elgin Road and fully covers 1 lot on Weigold Road. In the southeast, a tip of hydric soils covers the majority of one developed lot plus 2 other undeveloped land locked parcels. A small portion of the backyard of a third developed lot also contains hydric soils. Wastewater renovation systems cannot be built in hydric soils because 1) wetland areas are heavily regulated, and 2) the soil does not have sufficient unsaturated depth to renovate the septic system effluent before it mixes with the groundwater.

The soil suitability for on-site wastewater renovation systems of the northwest corner of the neighborhood area is rated medium potential, as well as the west and central areas. The northwest corner and south area of Partridge Lane Area has high soil potential to support on-site wastewater renovation systems. 1 small finger and 1 tip of hydric soil in the area (described previously) are rated extremely low potential.

The surficial material in this area is mostly till with a thick till deposit in the northwest corner. 5 parcels in the northeast corner have a mix of till, sand + gravel, & boulder surficial material. These cursory observations are based on spatial data produced by the USGS.

Potable water for the parcels in the neighborhood is provided by individual private wells. Private wells for single family residences have a required separation distance from subsurface sewage absorption systems of 75 feet which may significantly reduce the available area for making repairs to septic system leaching fields.

None of the neighborhood area has been identified as being a potential habitat for threatened and endangered species based on the DEP Natural Diversity Database spatial information dated May 18, 2007.

Both the Tolland Zoning and future land use plan designate this area as single family residential. A portion of the area is also part of the Tolland aquifer protection area. Zoning regulations in an Aquifer Protection Area imposes additional restrictions and requirements to protect the aquifer. The Connecticut Office of Policy and Management Conservation and Development Plan Locational Guide map specifies the southwestern parcels are designated as rural lands and the northeastern parcels are conservation areas. 3 developed parcels with hydric soils are classified as preservation areas.

There have been 15 septic system repairs over the past ten years in the Partridge Lane Area. The walkover site investigation program revealed 1 lot with a suspected septic system failure, 1 lot with damp soil which will require a follow-up investigation during wet conditions, and 12 lots which appear to have properly operating subsurface sewage absorption systems.

48 of 142 Septic System Questionnaire Responses were returned for the Partridge Lane Neighborhood and they found the age of septic systems was between 1 and 57 years old with an average age of 26 years. 7 property owners reported seasonal wastewater disposal system problems, while 71% stated never having any trouble. Of the responses, 5 indicated 1 problem with their septic system and 2 indicated multiple problems with the system. 31% of the responses indicated that public sewers were needed in the neighborhood and 50% chose not to answer. Approximately 31% reported having experienced flooding or surface drainage problems on their property. Approximately 23% reported making repairs to their septic system (21% replaced their septic tank and 21% replaced leaching fields).

O. PATRICIA DRIVE AREA

The Patricia Drive Area consists of 112 parcels in the southwest quadrant of Tolland between Goose Lane, Baxter Street, and Anderson Road. 1 lot is between ½ and ¾ of an acre, 14 lots are between ¾ and 1 acre, and 97 lots are more than 1 acre. Lot sizes greater than ½ an acre are generally large enough to support on-site wastewater disposal system based on the setback requirements in the 2008 Department of Public Health Septic System Regulations. This neighborhood area is located approximately ⅓ of a mile to future planned sewers at the intersection Route 195 and Anthony Road (part of the Phase I WW Facilities Plan). The estimated wastewater generated for this neighborhood is 22,000 gpd, which includes wastewater flow for single family dwellings built on the vacant lots in the future.

The area is not located in FEMA floodplains. The entire neighborhood lies in the Willimantic regional drainage basin. The north and west areas are part of the Skungamaug River subregional drainage basin while the southeast region is part of the Willimantic River subregional drainage basin. The groundwater quality classification is GA, which means the DEP presumes that groundwater in such an area is suitable for drinking or other domestic uses without treatment, but is also suitable to receive septic system discharge. There are no surface water streams/bodies within the Patricia Drive neighborhood are but a Class A unnamed pond connecting to the Skungamaug River through an unnamed intermittent stream is located outside of the boundary south of Patricia Drive. Class A water courses indicate that the water courses have been identified by the DEP as habitat for aquatic life/wildlife, recreation benefits, and potential use as a water supply but are not suitable to receive wastewater [surface] discharges. Parcels along Anderson Road are inside Tolland Aquifer Protection Area. There are no DEP aquifer protection areas nearby.

Hydric soils typically remain waterlogged for a majority of the year and tend to indicate the presence of local wetlands. There are hydric soils in the front yards of parcels on Baxter Street in the northwest corner of the neighborhood area. On the east side of the area, hydric soils cross Patricia Drive from a vacant lot on to 2 built lots. In the southwest region, there is 1 lot with a small tip of hydric soils in the backyard. Wastewater renovation systems cannot be built in hydric soils because 1) wetland areas are heavily regulated, and 2) the soil does not have sufficient unsaturated depth to renovate the septic system effluent before it mixes with the groundwater.

The soil suitability for on-site wastewater renovation systems is mostly high potential with scattered areas of lower ratings. There are 2 areas of hydric soils assigned a rating of extremely low potential. The backyards of 4 parcels in the north could not be rated due to the variability of the soil. On both sides of Lee Lane, 5 parcels are rated low potential to support on-site wastewater absorption systems.

The surficial material in this area is mostly till with a sand + gravel deposit in the northeast and some thick till in the southeast corner, as shown in spatial data produced by the USGS.

Generally, the parcels in the neighborhood are supplied potable water through individual private wells. One parcel in the southwest corner of the neighborhood area on Baxter Street appears to be connected to the Baxter Farms Community Water Supply based on available water service area mapping.

According to the May 18, 2007 Natural Diversity Database spatial information maintained by the DEP, none of the neighborhood area has been identified as being a potential habitat for threatened and endangered species.

Both the Tolland Zoning and future land use plan designate this area as single family residential. The Zoning map also imposes additional restrictions and requirements on parcels in the north that are within the Tolland Aquifer Protection Area.

The Connecticut Office of Policy and Management Conservation and Development Plan Locational Guide map generally classify the land as rural with two preserved open space parcels surrounded by residential homes. There is a finger hydric soils in the northeast corner classified as preservation area and 13 parcels in the southeast developed with residential dwellings that are classified as a conservation area.

There have been 9 septic system repairs over the past ten years in the Patricia Drive Area. The walkover site investigation program revealed 1 lot with a suspected failing septic system and 7 lots that appear to have properly operating subsurface sewage absorption systems.

41 of 110 Septic System Questionnaire Responses were returned for the Patricia Drive Neighborhood and they found the age of septic systems was between 2 and 43 years old with an average age of 26 years. 1 property owner reported 1 seasonal wastewater disposal system problem, while 88% stated never having any trouble. 17% of the responses indicated that public sewers were needed in the neighborhood and 59% chose not to answer. Approximately 5% reported having experienced flooding or surface drainage problems on their property. Approximately 17% reported making repairs to their septic system. 12% replaced leaching fields, 7% replaced their septic tank, and 7% replaced leaching fields.

P. REED ROAD AREA

The Reed Road Area consists of 54 parcels and is located in the southwest corner of Tolland off of Mile Hill Road. 1 lot is between ⅓ and ½ acre, 28 lots are between ½ and ¾ acre, 13 lots are between ¾ and 1 acre, and 12 lots are more than 1 acre. Lot sizes greater than ½ an acre are generally large enough to support on-site wastewater disposal system based on the setback requirements in the 2008 Department of Public Health Septic System Regulations. The closest feasible existing public sewers to this neighborhood are approximately 1 mile northwest along Mountain Spring Road, over Interstate 84 to the high point on Old Post Road. The estimated wastewater generated for this neighborhood is 11,000 gpd, which includes wastewater flow for single family dwellings built on the vacant lots in the future.

The area is not located in FEMA floodplains. The neighborhood lies in the Hockanum regional drainage basin and Tankerhoosen River subregional drainage basin. The groundwater quality classification is GA, which means the DEP presumes that groundwater in such an area is suitable for drinking or other domestic uses without treatment, but is also suitable to receive septic system discharge. An unnamed Class A inland surface water stream flows from Reed Road Dam north past Carter and Reed Road, and into a tributary of Gages Brook. This inland surface water classification means the water courses have been identified by the DEP as habitat for aquatic life/wildlife, recreation benefits, and potential use as a water supply but is not suitable to receive wastewater [surface] discharges. The northwest portion of the Reed Road Neighborhood area is approximately split along the rear property line between Reed and Carter Road by part of the Tolland aquifer protection area. There are no DEP aquifer protection areas nearby.

Hydric soils typically remain waterlogged for a majority of the year and tend to indicate the presence of local wetlands. A bone shaped finger of hydric soils covers large portions of 8 parcels located in the southwest region of the area. A second area of hydric soils is located in the backyard of 3 houses on the west side of Carter Road. Wastewater renovation systems cannot be built in

hydric soils because 1) wetland areas are heavily regulated, and 2) the soil does not have sufficient unsaturated depth to renovate the septic system effluent before it mixes with the groundwater.

The soil suitability for on-site wastewater renovation systems in the Reed Road neighborhood area is generally rated as low potential. Along a southwest to central zone of soil the classification is high potential with an adjacent area of hydric soil rated as extremely low potential.

The surficial material is mostly till with a deposit of sand + gravel to the northwest, as shown in spatial data produced by the USGS.

The parcels in this neighborhood area have potable water provided through individual private wells. Private wells for single family residences have a required separation distance from subsurface sewage absorption systems of 75 feet which may significantly reduce the available area for making repairs to septic system leaching fields.

None of the neighborhood area has been identified as being a potential habitat for threatened and endangered species based on the DEP Natural Diversity Database spatial information dated May 18, 2007.

Both the Tolland Zoning and future land use plan designate this area as single family residential. A portion of the area is also part of the Tolland aquifer protection area. Zoning regulations in an Aquifer Protection Area imposes additional restrictions and requirements to protect the aquifer. The Connecticut Office of Policy and Management Conservation and Development Plan Locational Guide map shows 15 developed residential parcels along Reed Road in a conservation area with the remaining neighborhood area classified as rural lands.

There have been 7 septic system repairs over the past ten years in the Reed Road Area. The walkover site investigation program revealed 1 lot with a suspected septic system failure and 5 lots which appear to have properly operating subsurface sewage absorption systems.

28 of 54 Septic System Questionnaire Responses were returned for the Reed Road Neighborhood and they found the age of septic systems was between 4 and 60 years old with an average age of 27 years. 2 property owners reported seasonal wastewater disposal system problems, while 71% stated never having any trouble. Both responses indicated 1 problem with their septic system. 25% of the responses indicated that public sewers were needed in the neighborhood and 57% chose not to answer. Approximately 32% reported having experienced flooding or surface drainage problems on their property. Approximately 36% reported making repairs to their septic system (21% replaced their septic tank and 11% replaced leaching fields).

Q. RUSSELL DRIVE AREA

The Russell Drive Area consists of 44 parcels located south of Interstate 84 on the Vernon Town line. 3 lots are less than ⅓ of an acre, 16 lots are between ½ and ¾ of an acre, 18 lots are between ¾ and 1 acre and 7 lots are more than 1 acre. Lot sizes greater than ½ an acre are generally large enough to support on-site wastewater disposal system based on the setback requirements in the 2008 Department of Public Health Septic System Regulations. Public sewers are less than 0.25 miles away if a hypothetical force main was constructed under Interstate 84 to the existing gravity sewer on Gerber Drive. Extending sewers north along Route 31 to Vernon's sewer collection system has an approximate distance of 0.5 miles. The estimated wastewater generated for this neighborhood is 9,000 gpd, which includes wastewater flow for single family dwellings built on the vacant lots in the future.

The area is not located in FEMA floodplains. The neighborhood lies in the Hockanum regional drainage basin and Tankerhoosen River subregional drainage basin. The groundwater quality classification is GA, which means the DEP presumes that groundwater in such an area is suitable for drinking or other domestic uses without treatment, but is also suitable to receive septic system discharge. An unnamed brook, classified by the DEP as a Class A inland surface water stream, flows through Gage's Pond into Gages Brook. This inland surface water classification means the water courses have been identified by the DEP as habitat for aquatic life/wildlife, recreation benefits, and potential use as a water supply but is not suitable to receive wastewater [surface] discharges. There is one lot within the Tolland Aquifer Protection Area. There are no DEP aquifer protection areas nearby.

The NRCS mapping does not shown any indications of hydric soil in the Russell Drive Neighborhood Area. Hydric soils typically remain waterlogged for a majority of the year and tend to indicate the presence of local wetlands. The soil suitability for on-site wastewater renovation systems of the northwest corner is rated high potential, with the remaining area rated low potential to support on-site wastewater systems.

The soil suitability for on-site wastewater renovation systems generally shows high soil potential to support on-site wastewater renovation systems in the northwest and low potential in the southeast.

The surficial material is mostly till with the western parcels in a sandy gravel deposit, as shown in spatial data produced by the USGS.

Potable water for the parcels in the neighborhood is provided by individual private wells. Private wells for single family residences have a required separation distance from subsurface sewage absorption systems of 75 feet which may significantly reduce the available area for making repairs to septic system leaching fields.

According to the May 18, 2007 Natural Diversity Database spatial information maintained by the DEP, none of the neighborhood area has been identified as being a potential habitat for threatened and endangered species.

Both the Tolland Zoning and future land use plan designate this area as single family residential. The Zoning Map also designates 1 parcel within the Aquifer Protection Area which imposes additional restrictions and requirements on the single family lots to protect local aquifers. The Connecticut Office of Policy and Management Conservation and Development Plan Locational Guide map classifies the Russell Drive neighborhood area as rural lands with a few parcels developed with residential dwellings designated as conservation area.

There have been 2 septic system repairs over the past ten years in the Russell Drive Area. The walkover site investigation program revealed 6 lots which appear to have properly operating subsurface sewage absorption systems.

17 of 44 Septic System Questionnaire Responses were returned for the Russell Drive Neighborhood and they found the age of septic systems was between 5 and 50 years old with an average age of 20 years. 3 property owners reported seasonal wastewater disposal system problems, while 59% stated never having any trouble. Of the responses, 2 indicated 1 problem with their septic system and 1 parcel indicated multiple problems with the system. 35% of the responses indicated that public sewers were needed in the neighborhood and 29% chose not to answer. Approximately 24% reported having experienced flooding or surface drainage problems on their property. Approximately 35% reported making repairs to their septic system (29% replaced their septic tank and 12% replaced leaching fields).

R. SKUNGAMAUG ROAD AREA

The Skungamaug Road Area consists of 12 parcels located in the central region of Town, south of the Skungamaug Marsh. 5 lots are less than ⅓ of an acre, 3 lots are between ½ and ¾ of an acre, and 4 lots are more than 1 acre. Lot sizes greater than ½ an acre are generally large enough to support on-site wastewater disposal system based on the setback requirements in the 2008 Department of Public Health Septic System Regulations. Public sewers are approximately 1.25 miles to the Route 195 gravity sewer system at the intersection of Old Post Road in the Phase I Wastewater Planning Area. The estimated wastewater generated for this neighborhood is 3,000 gpd, which includes wastewater flow for single family dwellings built on the vacant lots in the future.

100 year FEMA floodplains are located on 2 properties (1 is vacant) along the eastern corner of the neighborhood area. The Skungamaug Road neighborhood area lies in the Willimantic regional drainage basin and Skungamaug River subregional drainage basin. The groundwater quality classification is GA, which means the DEP presumes that groundwater in such an area is suitable for drinking or other domestic uses without treatment, but is also suitable to receive septic system discharge.

Skungamaug River flows along the southern edge of the neighborhood boundary and is mapped in the FEMA floodplain. It is classified as impaired B with a goal of attaining classification A. The source of contamination is shown to occur on DEP mapping where the river crosses Old Stafford Road. An impaired water course does not meet set criteria or cannot be used for one or more designated uses when it is impaired. Class A inland surface water is classified by the DEP as habitat for aquatic life/wildlife, recreation benefits, and potential use as a water supply but are not suitable to receive wastewater [surface] discharges.

West of the neighborhood boundary, Class A Charter Brook flows south and discharges into Skungamaug River. This inland surface water classification means the water courses have been identified by the DEP as habitat for aquatic life/wildlife, recreation benefits, and potential use as a water supply but is not suitable to receive wastewater [surface] discharges.

The rear or 2 parcels are shown as being in the Tolland aquifer protection area. There are no DEP aquifer protection areas nearby.

The NRCS mapping designates hydric soils along the southern edge of one parcel along the Skungamaug River (in the backyard). Hydric soils typically remain waterlogged for a majority of the year and tend to indicate the presence of local wetlands. The soil suitability for on-site wastewater renovation systems is rated low potential to support on-site wastewater systems throughout the neighborhood area.

The surficial material is sand, as shown in spatial data produced by the USGS.

The parcels in this neighborhood area have potable water supplied through either individual private wells or the Tolland Water Company. Private wells for single family residences have a required separation distance from subsurface sewage absorption systems of 75 feet which may significantly reduce the available area for making repairs to septic system leaching fields. If a lot with a private well has a well setback distance which restricted septic system repairs, a connection to the public water supply may potentially free more land area for absorption field space.

According to the May 18, 2007 Natural Diversity Database spatial information maintained by the DEP, none of the neighborhood area has been identified as being a potential habitat for threatened and endangered species.

Both the Tolland Zoning and future land use plan designate this area as single family residential. The Connecticut Office of Policy and Management Conservation and Development Plan Locational Guide map shows the northwest parcel as approximately 50% conservation and 3 southeast parcels as conservation areas. The hydric soils in the backyard of the developed parcel to the south are classified as a preservation area and the remaining Skungamaug Road area is assigned a classification of rural land.

There has been 1 septic system repair over the past ten years in the Skungamaug Road neighborhood area. None of the lots in this neighborhood were included as part of the walkover site investigation program based on results based on the favorable responses for septic system performance submitted in questionnaire responses.

2 of 11 Septic System Questionnaire Responses were returned for the Skungamaug Road Neighborhood. Only one of the lots reported the age of the septic system at 8 years old. No property owners reported seasonal wastewater disposal system problems, while 50% stated never having any trouble. The responses chose not to answer the question asking if public sewers were needed. None reported having experienced flooding or surface drainage problems on their property. Approximately 50% reported making repairs to their septic system (50% replaced leaching fields).

S. WILLIE CIRCLE AREA

The Willie Circle Area consists of 90 parcels, located in the northwest quadrant of Tolland between Shenipsit Lake and Route 30. 17 lots are between ⅓ and ½ of an acre, 37 are between ½ and ¾ acre, 21 lots are between ¾ and 1 acre, and 15 lots are more than 1 acre. Lot sizes greater than ½ an acre are generally large enough to support on-site wastewater disposal system based on the setback requirements in the 2008 Department of Public Health Septic System Regulations. The closest feasible existing public sewers to this neighborhood are approximately 1.2 miles south along Crystal Lake Road to planned gravity sewers on Route 74 (part of the Phase I WW Facilities Plan). The estimated wastewater generated for this neighborhood is 18,000 gpd.

The area is not located in FEMA floodplains. The neighborhood lies in the Hockanum regional drainage basin and is part of the Charters Brook subregional drainage basin in the northeast and Hockanum River subregional drainage basin in the southwest. The groundwater quality classification is GAAs, which means it is a tributary to a public water supply reservoir. Groundwater for a public water supply reservoir used or which may be used for public supplies of water suitable for drinking without treatment and groundwater in the area that contributes to a public drinking water supply well is suitable for individual domestic septic systems according to the DEP.

Class AA West Brook flows southeast starting at Poehnerts Pond northwest to Shenipsit Lake, passing through the southeast corner of the Willie Circle Area. Browns Brook flows west under Route 30 into Cemetery Brook and passes within 300 feet of the neighborhood area. It is also rated as a class AA inland surface water stream and discharges into the Shenipsit Lake reservoir. AA inland surface water classification is used for existing or proposed drinking water supplies, habitat for fish and other aquatic life and wildlife, recreation, and water supply for industry and agriculture. It is not suitable to receive wastewater [surface] discharges. The area is not part of the Tolland or DEP Aquifer Protection Area, most likely because of the distance to the reservoir.

Hydric soils typically remain waterlogged for a majority of the year and tend to indicate the presence of local wetlands. Along the western boundary of the Willie Circle neighborhood area,

hydric soils are shown in the backyard of several parcels. Wastewater renovation systems cannot be built in hydric soils because 1) wetland areas are heavily regulated, and 2) the soil does not have sufficient unsaturated depth to renovate the septic system effluent before it mixes with the groundwater.

The soil suitability for on-site wastewater renovation systems for the Route 30 parcels are low potential, except the northwest corner where the lots are rated high potential. Part of Eaton and Willie Circle are rated low potential to support on-site wastewater renovation systems. The northwest area has soils classified as medium potential with an area of high potential in the west and center of Willie Circle. The backyards of the northeast parcels abut extremely low potential hydric soils.

The surficial material of the neighborhood area is mostly thick till with till deposits located along Route 30, as shown in spatial data produced by the USGS.

The parcels on Willie Circle are served by the Woodland Summit Community Water Association with 3 community wells located in the open space surrounded by the parcels. The separation distance between subsurface sewage absorption systems and wells pumping between 10 and 50 gallons per minute is 150 feet based on the Public Health Code. This distance may significantly reduce the available area for making repairs to septic system leaching fields. Two of the wells are sited such that the septic system must be situated in the front yard of four parcels, greatly limiting the available parcel area for future septic system repairs. The lots on Eaton Road and Route 30 have potable water provided through individual private wells. Private wells for single family residences have a required separation distance from subsurface sewage absorption systems of 75 feet which may significantly reduce the available area for making repairs to septic system leaching fields.

According to the May 18, 2007 Natural Diversity Database spatial information maintained by the DEP, no threatened or endangered species have been identified for this area.

Both the Tolland Zoning and Future Land Use Plan designate this area as single family residential. The Connecticut Office of Policy and Management Conservation and Development Plan Locational Guide map shows the Willie Circle neighborhood area as a conservation area with preservation area on the west side behind the houses along the hydric soils. Irrespective of the C&D classification, a residential dwelling appears to be built on nearly every parcel in this neighborhood area.

There have been 17 septic system repairs over the past ten years in the Willie Circle Area. The walkover site investigation program revealed 3 lots with damp soil which require a follow-up investigation during wet conditions and 3 lots with suspected subsurface sewage absorption system failures.

34 of 90 Septic System Questionnaire Responses were returned for the Willie Circle Neighborhood and they found the age of septic systems was between 1 and 46 years old with an average age of 20 years. 3 property owners reported seasonal wastewater disposal system problems, while 76% stated never having any trouble. Of the responses, 2 indicated 1 problem with their septic system and 1 indicated multiple problems with the system. 9% of the responses indicated that public sewers were needed in the neighborhood and 74% chose not to answer. Approximately 26% reported having experienced flooding or surface drainage problems on their property. Approximately 32% reported making repairs to their septic system (35% replaced their septic tank and 24% replaced leaching fields).

VI. WASTEWATER MANAGEMENT NEEDS PRIORITY MATRIX

A priority ranking system was assigned, illustrating various environmental needs irrespective of economic considerations. The Priority Matrix category weighting scheme was presented to and reviewed by the Town Engineer, WPCA staff, Town Planning and local health district staff. Town staff also offered feedback about the scores assigned to individual neighborhood areas for various categories. The weighted scores for each neighborhood area are based on numerous factors affecting proper operations of on-site wastewater renovation systems in each neighborhood.

The factors used in the Wastewater Disposal Needs Priority Matrix include:

- Lots Less than ¾ Acre
- Aquifer Protection Area Located Within Tolland
- Poorly Draining Surficial Materials
- Poor Soil Suitability
- Area Served by Private or Community Wells
- Septic System Repairs
- Sanitarian Observations
- Slopes Greater Than 30°
- Questionnaire Results
- Walkover Results
- Proximity to Existing Public Sewers

The relative importance for evaluating the alternate wastewater disposal needs of each category was represented with a weighting scheme from 1 to 5(low to high). Scores of high (■), medium (□), or low ( ) were assigned to each category for every neighborhood area based on the judgment criteria of the category. Values of 1, ½, and 0 were assigned respectively to scores of high, medium, and low. To find the weighted score for the category, the weighting scheme value was multiplied by the score's value for the category. The weighted scores for each neighborhood area were added together to determine the total number of priority points. The Wastewater Management Needs Priority Matrix is shown as Table VI-1, located on the following page.

Table VI-1: Wastewater Management Needs Priority Matrix

Data Source	A	B	C	D	E	F	G	H	I	J	K	L	M	
Legend ■ More than 60% □ From 30% to 60% " " Less than 30% Location	Lots Less than ¾ Acre	Aquifer Protection Area Located Within Tolland	Poorly Draining Surficial Materials	Poor Soil Suitability	Area Served by Private or Community Wells	Septic System Repairs	Sanitarian Observations	Slopes Greater Than 30 °	Questionnaire Results	Walkover Results	Proximity to Existing Public Sewers	Total Priority Points	Percent of Maximum Priority Points	
Priority Weight	*4*	*2*	*1*	*5*	*2*	*3*	*3*	*2*	*4*	*5*	*2*	*33.0*		
Willie Circle Area	■		■	□	■	■	■			■		20.5	62%	TIER IV AREAS
Apple Road Area	□		■	■	■	□	■		□	□		19.0	58%	
Anthony Road Area	□		□	□		□	■		■		■	15.5	47%	TIER III AREAS
Lakeview Heights Area	■		□	■	■			■			□	14.5	44%	
Russell Drive Area	□	■	□		■		■	■	□		□	14.5	44%	
Laurel Ridge Road Area	■		□	□	■	□	■					13.5	41%	
Meadowood Road Area			□		■	■	■			■		13.5	41%	
Dunn Hill Road Area	□		□	□		□		■	□		■	12.5	38%	
Partridge Lane Area	□	□	□		■	□	■		□			12.0	36%	TIER II AREAS
Reed Road Area	□	■	□		■	□	■				□	12.0	36%	
Center Road Area			■	□	■		■				■	10.5	32%	
Dockerel Road Area			□	■	■							7.5	23%	
Patricia Drive Area		□	□	□	■						□	7.0	21%	
Skungamaug Road Area	■	■										6.0	18%	
Curtis Drive Area	□	□			■							5.0	15%	
Hurlbut Road Area			■		■	□						4.5	14%	TIER I AREAS
Cedar Swamp Road Area	□				■							4.0	12%	
Charter Road Area	⊓	■										4.0	12%	
High Ridge Drive Area			□		■			□				3.5	11%	

A) Lots less than 3/4 of an acre based on GIS analysis.

B) Tolland Aquifer Protection Area provided by Town.

C) Based on USGS Surficial Materials GIS Data Layer for Till (□) and Thick Till (■).

D) Based on USDA NRCS Soil Potential Ratings; Septic Tank Absorption Fields for Single Family Residences (Connecticut) for March 2004.

E) Public water consumption records from CT Water, • Birmingham Utilities, and CT DPH Water Service Area GIS mapping for Community Water Supplies. Parcels without public drinking water records assumed have private drinking water wells.

F) List of Septic System Repairs compiled by Eastern Highland Health District records of septic system modifications. Less than 10% (), 10% to 15% (□), 15% or more (■).

G) Recommended by the Eastern Highland Health District representative assigned to Tolland.

H) Slope analysis performed in GIS using Town of Tolland AutoCAD aerial survey contour data. Land area: less than 10% (), 10% to 15% (□), 15% or more (■).

I) Results returned to Fuss & O'Neill and entered into database as of April 2nd, 2008, based on self reporting observations of seasonal problems with WW disposal systems.

J) Walkovers performed April 10th, 2008 to April 18th, 2008

K) Approximate distance to sewers. Locations within 3,000 feet are coded ■. Locations from 3,000 to 6,000 are coded □ .

L) Priority Points assigned based on the summation of (number of ■ × Priority Weight × 1.0) and (number of □ × Priority Weight × 0.5) for each category.

M) Percent calculated as the total number of Neighborhood Priority Points divided by the theoretical highest possible priority point score (33.0).

A. PRIORITY MATRIX ACTION THRESHOLD

After extensive review of numerous pieces of data and ranking of the neighborhood areas using the Wastewater Management Needs Priority Matrix, 5 neighborhoods scored within the Tier III and IV monitoring categories based on the total number of priority points. These areas are:

- Willie Circle Area 20.5/33.0 Priority Points 62%
- Apple Road Area 19.0/33.0 Priority Points 58%
- Anthony Road Area 15.5/33.0 Priority Points 47%
- Lakeview Heights Area 14.5/33.0 Priority Points 44%
- Russell Drive Area 14.5/33.0 Priority Points 44%

Neighborhoods have been identified based on multiple weighted criteria with each indicating potential impediments for proper on-site wastewater renovation systems. Many of these neighborhood areas have also been continuously identified in past Facilities Planning Reports as areas requiring further monitoring. Limiting factors for long-term continued conventional on-site wastewater management in each neighborhood area are listed in the Needs Priority Matrix.

Even though these neighborhood areas are rated poorly, the blanket statement that every parcel within the neighborhood has horribly malfunctioning septic systems is not true. On a planning level, the collective groups of lots are not adequately treating wastewater before releasing the effluent into the environment but a detailed lot by lot analysis of every square foot of property is not feasible.

This study identifies areas where there is a high incidence of septic system problems. The Tolland WPCA assumes that if residents had problems with their systems in the past, their repairs will make the septic system code compliant due to recent technological innovations in wastewater renovation systems and will tend not to experience similar problems in the future. Also, problems that are corrected would not require further repairs within the 20-year planning horizon of this report. Septic systems designed to the current Public Health Code regulations are designed for perpetual life span without problems. However, the average age of septic systems in these neighborhoods are more than 30 years old as reported on the public participation questionnaire responses, so some repairs to make the septic systems code compliant are anticipated.

A rating of 44% or higher signifies that these areas generally have numerous conditions that may contribute to poorly functioning septic systems **OR** conditions that make septic system repairs difficult and costly. The categories also identify areas that may generally be challenging to properly design and construct on-site wastewater system repairs without extensive site preparation or Public Health Code variances.

An area scoring 44% or higher has multiple conditions which each may marginally reduce wastewater treatment ability and the combined cascading affect of numerous marginal impairments creates a large combined negative set of conditions. For example: an area with a poor NRCS septic system suitability rating does not necessarily require extensive monitoring and groundwater testing, but if it also has a large number of septic system repairs within the past 10 years, and signs of improperly functioning septic systems are uncovered during walkover inspections of randomly

chose lots; the combined data builds a much stronger case that there are generally conditions throughout the area investigated that prevent septic systems from working correctly.

Implementing wastewater management plans to the areas with the highest needs (# of priority points) will often have larger, more immediate benefits to protect the environment and public health because the area is assumed to have more deficiencies.

Neighborhood areas listed on the Wastewater Management Needs Priority Matrix in Tier I and II areas do show some indications of potential wastewater disposal problems but the severity of problems is generally less than areas listed with the highest number of points. These areas should still be included in an ongoing monitoring program by the Tolland WPCA and EHHD.

B. ACTION AREAS (CONSTRUCTION PROJECTS)

Based on the Tolland WPCA evaluation, none of the neighborhood areas have sufficient priority points to be considered as action areas that require constructed solutions such as public sewer extensions or a community wastewater renovation system. Instead, the WPCA would establish an on-going in-situ monitoring and/or testing program to collect additional data to prove actual long-term wastewater renovation capabilities of the Tier III and IV neighborhood areas.

C. NON-ACTION AREAS

The on-site wastewater soil absorption systems in non-action neighborhood areas score less than the maximum priority points from the Wastewater Management Needs Priority Matrix. Both the neighborhood areas from the Priority Matrix and unsewered parcels not assigned to a neighborhood area in Non-Action areas are categorized under a four tier monitoring system. These areas should continue to be monitored and remain as on-site wastewater management areas.

1. TIER I MONITORING AREAS (0 TO 6.0 PRIORITY POINTS)

Parcels with on-site septic systems shall be part of the Tier I Monitoring Area if they are not classified under other Tier criteria and have not already connected to sanitary sewers within Tolland's Sewer Service District. Tier I parcels shall remain classified as Tier I unless day-to-day monitoring activities indicate potential individual or neighborhood wastewater treatment/dispersal problems. The Tolland WPCA board would be the authority which could reclassify parcel designations.

2. TIER II MONITORING AREAS (6.5 TO 13.5 PRIORITY POINTS)

Parcels within the Tier II Monitoring Areas with 6.5 to 13.5 priority points have been identified with signs of potentially problematic on-site soil absorption systems. The WPCA would have the ability to reclassify parcels based on analysis of monitoring results as warranted.

3. TIER III MONITORING AREAS (14.0 TO 16.0 PRIORITY POINTS)

3.a. RUSSELL DRIVE AREA (14.5 PRIORITY POINTS)

The Russell Drive area is tied with Lakeview Heights for 14.5 out of 33 total priority points. The area generally has 30% to 60% parcels less than ¾ of an acre. The area is located within an aquifer protection area. The topography of the neighborhood has areas of steep slopes which further limits the availability for septic system repairs. The potable water for each parcel is provided by individual private wells.

The surficial material is till which generally is not well drained. The questionnaire results returned by the home owners indicate that between 30% and 60% answered questions indicating the potential for improperly operating septic systems. Walkover investigations uncovered 1 out of 4 lots with damp soils which should be reviewed again during the next high groundwater season. The soil suitability, rated by the NRCS, for septic system was rated as low potential.

3.b. LAKEVIEW HEIGHTS AREA (14.5 PRIORITY POINTS)

This neighborhood area scored 44% and is tied with the number of priority points for the Russell Drive Area. The evaluation categories that match the neighborhood area attributes by more than 60% were assigned a score of high (■). The Lakeview Heights Area generally has parcels less than ¾ of an acre. The neighborhood soils are mostly categorized low potential to support on-site wastewater renovation systems based on the NRCS soil suitability rating system for Connecticut. The potable water for each parcel is provided by individual private wells. The topography of the neighborhood has areas of steep slopes which limit the available land for septic system repairs.

Categories in the Wastewater Management Needs Matrix assigned medium (□) scores also contribute to the overall state of the neighborhood. The surficial material is till which generally is not well draining. Although not adjacent to existing sewers, this area is approximately ¾ of a mile away (preference is given to problem areas with more readily available solutions).

3.c. ANTHONY ROAD AREA (15.5 PRIORITY POINTS)

The Anthony Road Area scored 15.5 out of 33 total priority points (47%). A score of high (■) was assigned to the categories with the most critical impediments to properly operating on-site wastewater renovation systems. A majority of the Septic System Questionnaire results show indications of malfunctioning septic systems. The close proximity to existing sewers along the Gateway Corridor counts as additional priority points because preference is given to problem areas with more readily available solutions.

Medium (□) ratings were assigned where the matrix category had less apparent impact in the neighborhood area. The Anthony Road neighborhood generally has 30% to 60% parcels less than ¾ of an acre. The surficial material of Anthony Road is mostly till which generally is not well drained. The NRCS soil suitability to support on-site wastewater renovation systems appears to be split between low and medium potential. Within the past 10 years, a reasonably high proportion of the septic systems have been repaired according to the local health district records.

4. TIER IV MONITORING AREAS (16.5 TO 33.0 PRIORITY POINTS)

4.a. APPLE ROAD AREA (19.0 PRIORITY POINTS)

Out of 33 total priority points, the Apple Road Area scored 19.0 points. The categories scored of high (■) contributed most to the total number of priority points. The NRCS soil suitability to support on-site wastewater renovation systems varies, but a significant area is shown as low potential. It is located in poorly draining thick till surficial material. The potable water for each parcel is provided by individual private wells.

Other categories scored medium (□) are also important when considering the wastewater management needs of the neighborhood. The area generally has 30% to 60% parcels less than ¾ of an acre. One-third of the walkover sites in the Apple Road Area had either tell-tale signs of improperly operating septic systems or subtle indications of wastewater disposal problems (which would require additional follow-up). The questionnaire results returned by the homeowners

indicate that between 30% and 60% answered questions indicating the potential for improperly operating septic systems. The list of septic system repairs compiled by EHHD reported 10% to 15% repairs.

4.b. WILLIE CIRCLE AREA (20.5 PRIORITY POINTS)

This neighborhood area scored 62% of the maximum priority points. The categories with higher scores contributed significantly to the total number of priority points. Generally, the area has parcels less than ¾ of an acre. Walkover site investigations in this neighborhood uncovered lots with signs of improperly operating septic systems. The neighborhood is located in poorly draining thick till surficial material. The parcels in this area are served by three community wells which will be monitored to determine if groundwater is contaminated with poorly treated septic system effluent. Sanitarian records of septic system repairs show many lots with documented septic system repairs during the past 10 years.

Additional criteria contribute to the overall score of the area although posing a less significant threat. The NRCS soil suitability to support on-site wastewater renovation systems classifies the areas as somewhat restrictive.

VII. RECOMMENDED WASTEWATER MANAGEMENT PLAN

The Tolland Wastewater Management Plan is presented as Figure VII-1. The plan recommends classifying the neighborhood areas based on the total priority points scored in the Wastewater Management Needs Priority Matrix. The areas identified as having contributing factors potentially impairing on-site wastewater renovation systems were categorized into a four tier system for continued monitoring, testing, and analysis. Each classification tier has progressively higher levels of monitoring and oversight.

Many homeowners typically do not proactively inspect their on-site systems or make repairs because of the perceived cost implications. Instead, their septic systems sometimes operate in an impaired manner. The Town oversight of the neighborhood areas should minimize further septic system performance degradation due to lack of homeowner O&M. The WPCA believes that this approach will best protect the homeowners from costly constructed solutions and prevent aging septic systems from needing increasingly costly repairs. With the ongoing oversight by the Town, no constructed solutions will be required in Tolland's Phase II study area, unless surface and ground water sampling and testing indicates a constructed solution is warranted.

The Tolland WPCA will collect data to characterize the long term wastewater renovation performance of septic systems based on the category requirements described below. A yearly summary report of septic system repair records, pump outs, and variances to the public health code should be produced for the Tolland WPCA by EHHD (and/or Contractors as needed).

A. TIER I NEIGHBORHOOD AREAS

Tier I neighborhood areas are defined as locations with Priority Points from 0.0 to 6.0. These areas generally appear to have adequately functioning on-site wastewater renovation systems. This category includes parcels within the Phase II area that were not part of any defined neighborhood area in the Priority Matrix. There is no anecdotal knowledge from Town staff or representatives from the Health District that problems exist in these areas. A cursory review of the available data sets compiled during this analysis did not identify any significant impediments to proper wastewater treatment.

As part of a rigorous on-site wastewater management program, Tier I neighborhood areas or parcels not included in the Priority Matrix areas should still be watched for signs of septic system malfunctions in the future to protect public health and the environment.

B. TIER II NEIGHBORHOOD AREAS

Tier II neighborhood areas are defined as locations with Priority Points between 6.5 and 13.5. Tier II areas have been identified in the Wastewater Management Needs Priority Point Matrix as having some characteristics which may impair on-site wastewater absorption systems.

These areas should be monitored by representatives of the Eastern Highland Health District and the Tolland WPCA. As needed, this monitoring could include analysis of septic system repair records and periodic evaluation of the collected data as necessary. These areas should also be included in the monitoring program established for Tier I areas.

If the additional monitoring identifies conditions where the neighborhood area does not have adequately functioning wastewater disposal systems, a remediation plan will need to be implemented.

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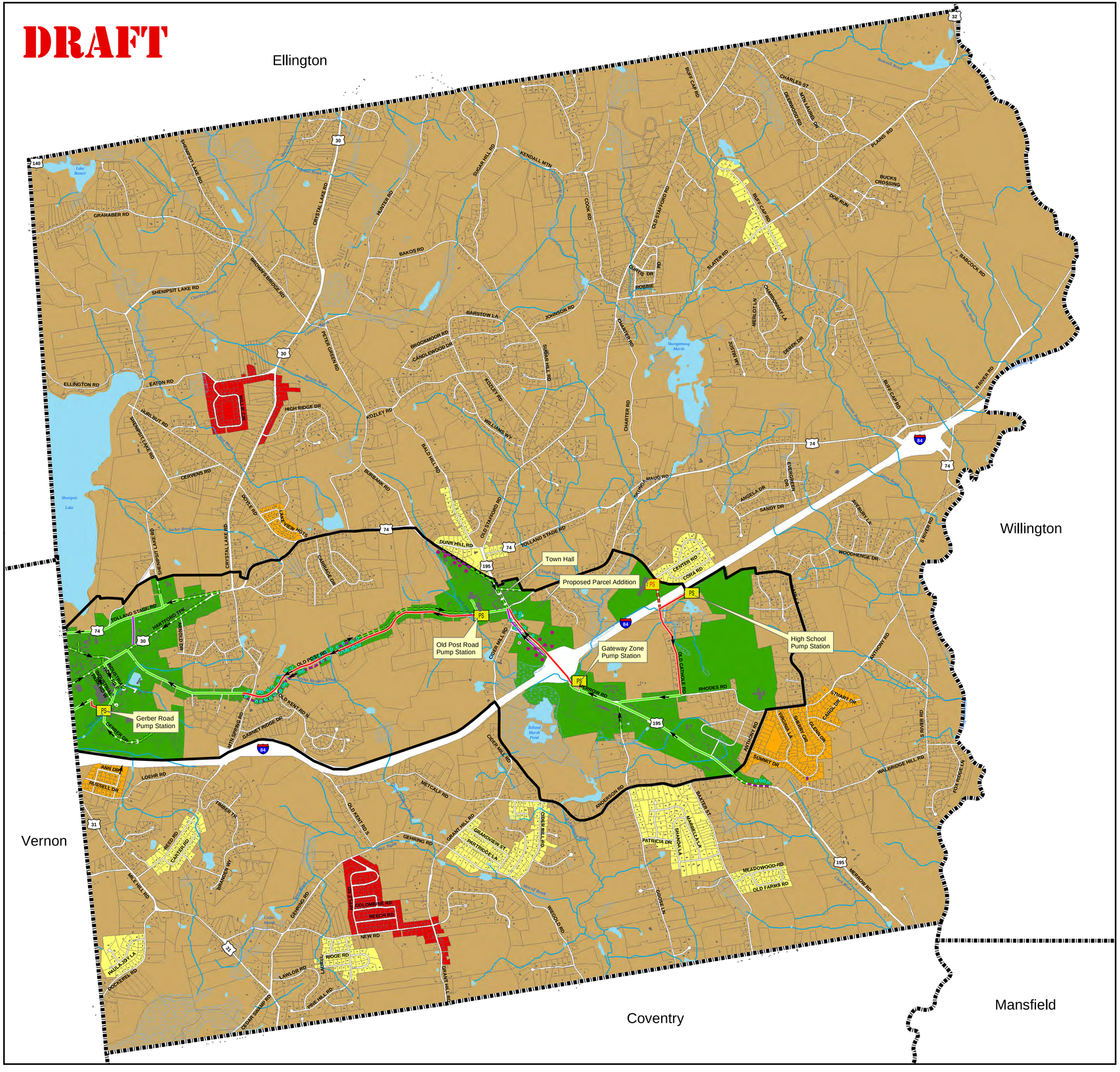
RECOMMENDED WASTEWATER MANAGEMENT PLAN

TOLLAND WASTEWATER FACILITIES PLAN
PHASE 2



Wastewater Management Areas

- Sewer Service District
- Tier I On-Site WW Management Area
- Tier II On-Site WW Management Area
- Tier III On-Site WW Management Area
- Tier IV On-Site WW Management Area

Tier I Neighborhood Areas

Tier I neighborhood areas generally appear to have adequately functioning on-site wastewater renovation systems. There is no anecdotal knowledge from Town staff or representatives from the Health District that problems exist in these areas. A cursory review of the available data sets compiled during this analysis did not identify any significant impediments to proper wastewater treatment. As part of a rigorous on-site wastewater management program, Tier I neighborhood areas or parcels not included in the Priority Matrix areas should still be watched for signs of septic system malfunctions in the future to protect public health and the environment.

Tier II Neighborhood Areas

Tier II areas have been identified in the Wastewater Management Needs Priority Point Matrix as having some characteristics which may impair on-site wastewater absorption systems. These areas should be monitored by representatives of the Eastern Highland Health District and the Tolland WPCA. This monitoring could include analysis of septic system repair records, public education, periodic rotating walkover investigations during high groundwater, die tracer testing, infrared thermography, water quality monitoring, and periodic evaluation of the collected data as necessary. If the additional monitoring identifies conditions where the neighborhood area does not have adequately functioning wastewater disposal systems, a remediation plan will need to be implemented.

Tier III Neighborhood Areas

Tier III neighborhood areas were identified with multiple problematic conditions which indicate impaired wastewater renovation systems. These areas should have annual, spring walkovers to observe site conditions during high groundwater for signs of malfunctioning on-site wastewater renovation systems. Monitoring should also include analysis of septic system repair records, public education, die tracer testing, infrared thermography, water quality monitoring, and periodic evaluation of the collected data as necessary. If conditions worsen, or are such that reasonable mitigative actions by property owners to correct deficient septic systems cannot be taken; these areas should be recommended for escalation to the Tier IV category. These areas should also be included in the monitoring program established for Tier I and II areas.

Tier IV Neighborhood Areas

Tier IV neighborhood areas were identified as having numerous conditions potentially impairing proper operation of on-oite wastewater renovation systems which require close oversight. The Eastern Highland Health District and the Tolland WPCA would quarterly sample and test the groundwater and surface water of neighborhoods in this category. These areas should also be included in the monitoring program established for Tier I, II, and III areas.

Sewer Infrastructure

Existing	Proposed
Gravity	Gravity
Force Main	Force Main
Low Pressure	Low Pressure
Existing Pump Stations	Proposed Pump Stations
Duplex Grinder Pump	Simplex Grinder Pump
	Duplex Grinder Pump

Notes:
1) Town of Tolland parcel base dated 2004 with supplemental additions to 2007.
2) 2004 Building dataset provided by Town of Tolland.
3) Dataset of town boundaries and hydrography downloaded from the CT DEP GIS website Fall 2005.
4). Tolland Sewer Service District from Phase 1 WW Facilities Plan Dated 2004.

0 0.5 1 2 3
Miles

FIGURE VII-1

FEBRUARY 2011

N W E S

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Disciplines to Deliver

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C. TIER III NEIGHBORHOOD AREAS

Tier III neighborhood areas are defined as locations with Priority Points from 14.0 to 16.0 with multiple problematic conditions which indicate impaired wastewater renovation systems. These areas should have annual, spring walkovers to observe site conditions during high groundwater for signs of malfunctioning on-site wastewater renovation systems. As necessary, monitoring may also include analysis of septic system repair records and periodic evaluation of the collected data as necessary.

If conditions worsen, or are such that reasonable mitigative actions by property owners to correct deficient septic systems cannot be taken; these areas should be recommended as escalation to the Tier IV category. These areas should also be included in the monitoring program established for Tier I and II areas.

D. TIER IV NEIGHBORHOOD AREAS

Tier IV neighborhood areas are defined as locations with Priority Points from 19.0 to 33.0 identified as having numerous conditions potentially impairing proper operation of on-site wastewater renovation systems which require close oversight. The Eastern Highland Health District and the Tolland WPCA (or an agent thereof) would sample and test the groundwater and surface water of neighborhoods in this category. Monitoring of Tier IV neighborhoods identified in the Wastewater Management Needs Priority Matrix should be highest priority.

The surface water and groundwater sampling and testing program will consist of quarterly sampling. Samples will be selected based on their proximity to areas of environmental and/or human health concern. Water samples should be collected from various locations as depicted on Figure VII-2 and VII-3. The sampling should continue for the duration of this facilities planning horizon and for as long as the Tier IV neighborhood areas remain on-site wastewater management areas.

Groundwater samples should be taken from 5% of the total number potable drinking water wells in each Tier IV neighborhood area. At each surface water body within or adjacent to each neighborhood area, 3 samples should be collected and tested. Previously repaired septic systems, as reported by EHHD, will be monitored to evaluate the effectiveness of current design criteria. The location of the water sampling should be randomized during each sampling event.

The samples should be analyzed at a State Department of Public Health certified laboratory for sanitary sewage related contaminants which may include the constituents listed below:

- Total Nitrogen
- Total Kjeldahl Nitrogen
- Ammonia
- Nitrite
- pH
- Chloride
- Total Dissolved Solids
- Total Phosphorus
- Escherichia Coli Bacteria
- Enterococcus Bacteria

The results of the water testing will be compared to the applicable State and Federal surface and ground water quality standards.

Analytical results should be compiled by sample site and carefully reviewed to discern trends over time as well as to observe any particularly high results which may indicate development of a pollution problem. Interpretation of data gathered through this program should be coordinated with the Tolland WPCA and EHHD (or their agent) to provide as broad a picture as possible of the quality of the drinking and groundwater in Tier IV neighborhood areas.

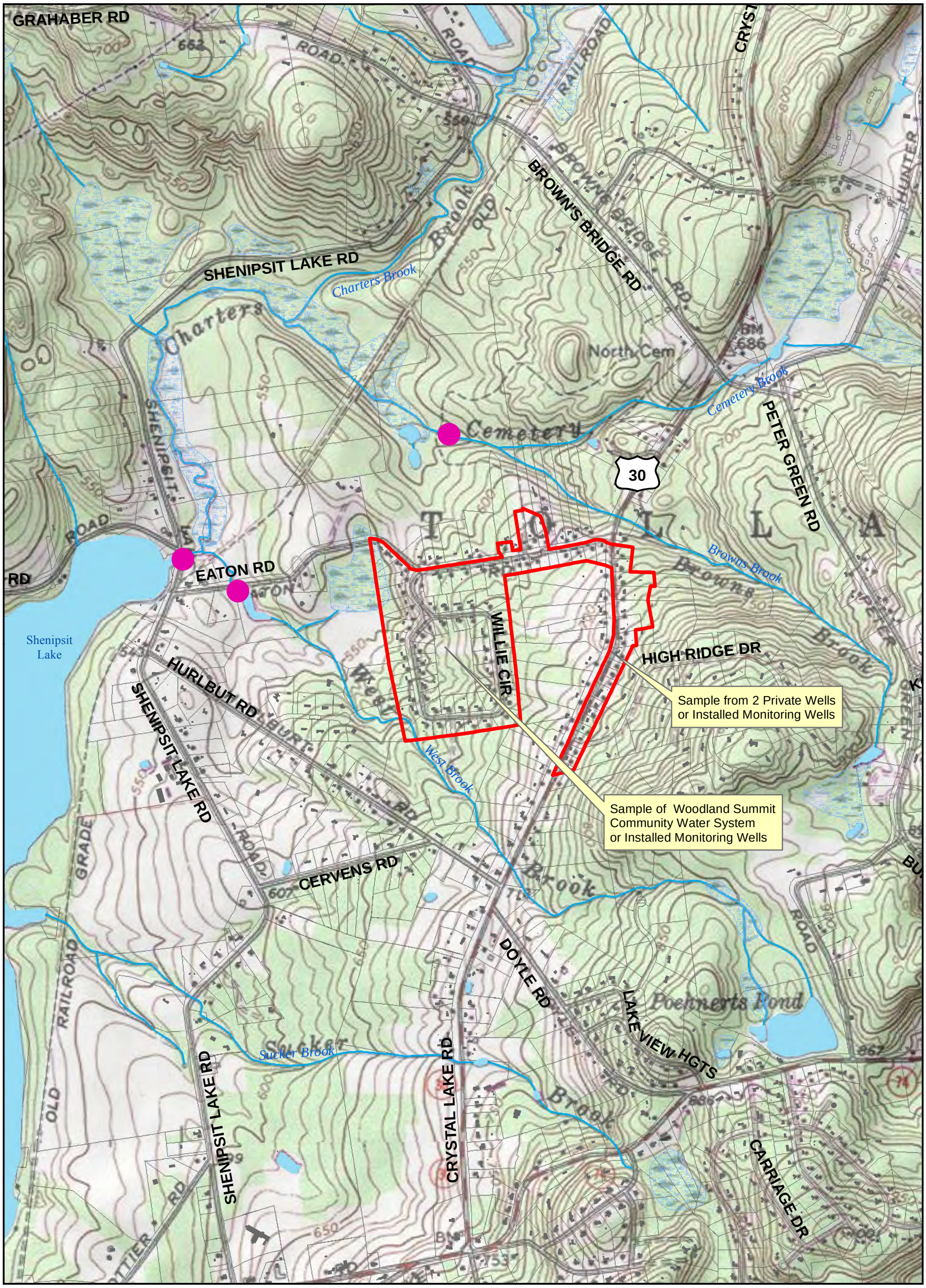

FIGURE VII-2 FEBRUARY 2011

Surface Water Sampling Location

SURFACE AND GROUND WATER SAMPLING LOCATIONS
WILLIE CIRCLE NEIGHBORHOOD AREA
TOLLAND WASTEWATER FACILITIES PLAN
PHASE 2

0 1,000 2,000 3,000 Feet

N W E S

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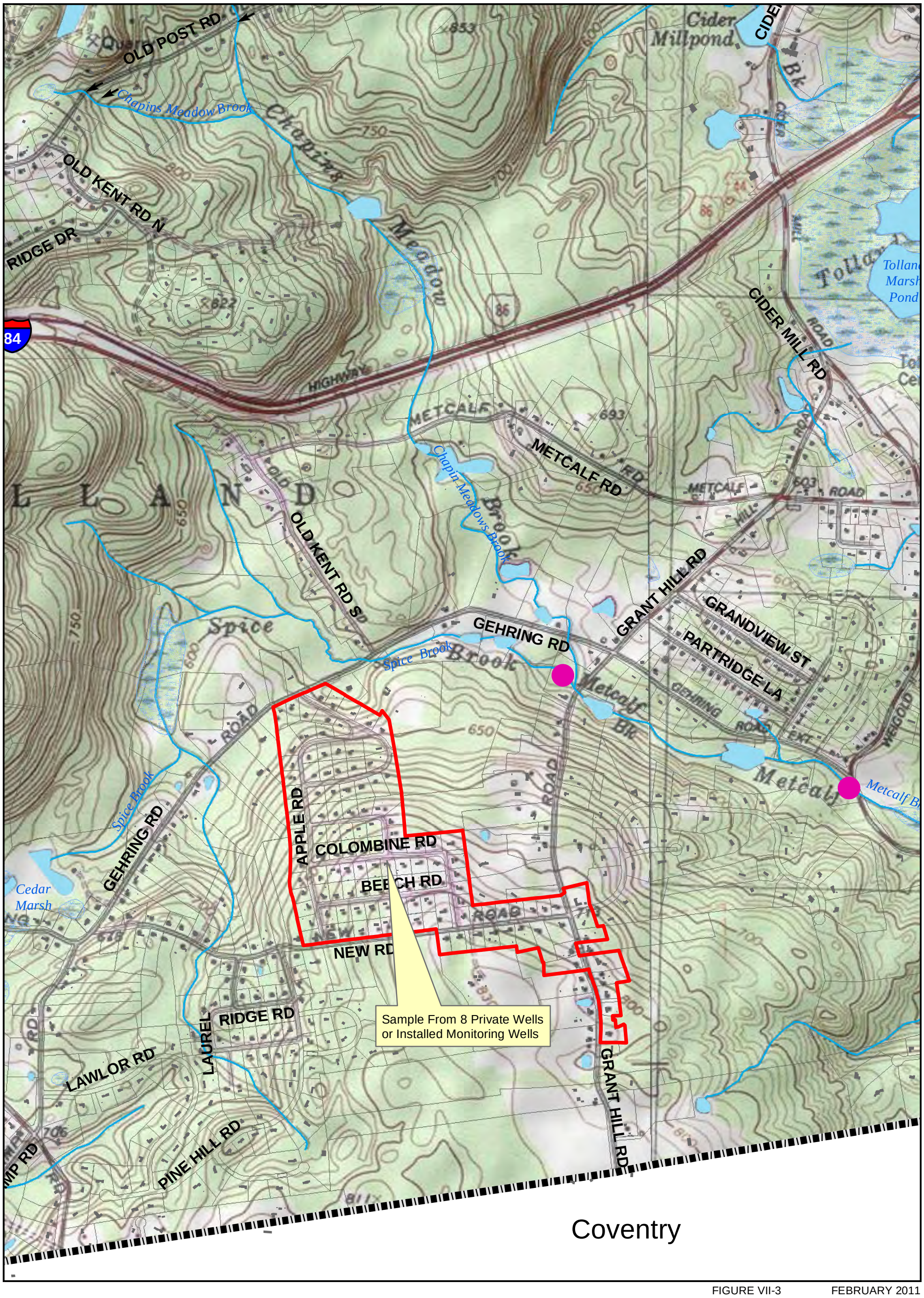

FIGURE VII-3 FEBRUARY 2011

Surface Water Sampling Location

SURFACE AND GROUND WATER SAMPLING LOCATIONS
APPLE ROAD NEIGHBORHOOD AREA
TOLLAND WASTEWATER FACILITIES PLAN
PHASE 2

0 1,000 2,000 3,000 Feet

N W E S

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Disciplines to Deliver

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The surface and groundwater sampling and testing program may provide indications of possible pollution (bacterial and nutrients) from improperly functioning subsurface disposal systems in the general area, though not definitively at a single location. Additional investigation of suspected point sources of pollution could be recommended based upon trending of monitoring results.

These Tier IV neighborhood areas should also have annual, spring walkovers to observe site conditions during high groundwater. As necessary, additional monitoring may include analysis of septic system repair records, die tracer testing, infrared thermography, water quality monitoring, and periodic evaluation of the collected data.

After collection of sufficient data from a sampling and testing program, the Tolland WPCA should have results indicating the wastewater renovation performance in these areas. If insufficiently treated wastewater releases are documented, clear indications of worsening conditions are observed, and/or potential hazards to public health or the environment are found; corrective action will be required. Reasonable mitigative actions may include septic system repairs by individual property owners to correct deficient septic systems, a community septic system, or recommendation for a public sewer project. If these neighborhood areas have water test results that indicate on-site septic systems are performing correctly and not adversely affecting the environment or public health after 3 years of quarterly testing, the Tier IV neighborhood area(s) will be re-categorized as a Tier III area. These areas should also be included in the monitoring program established for Tier I, II, and III areas.

E. FUTURE WASTEWATER FLOW ALLOCATION

Table VII-1 reserves future wastewater flow for Tier III and IV neighborhood areas if future public sewer extensions are deemed warranted by the WPCA due to the results of the monitoring and sampling program. The average daily total wastewater flow capacity available to Tolland through the Vernon–Tolland Intermunicipal Agreement is 400,000 gpd. Based on the 20-year planning horizon of this Facilities Report and because no Phase II sewer extensions are proposed herein, the Town of Tolland appears to have sufficient wastewater capacity for the future.

Table VII-1: Town-wide Public Sewers Wastewater Flow Apportionment

Source		Estimated Future Wastewater Flow
Phase I Wastewater Flows		300,000 gpd
Phase I Infiltration & Inflow		10,000 gpd
Phase I Land Use Infilling		24,000 gpd
Phase II Willie Circle Neighborhood	Tier IV Area	18,000 gpd
Phase II Anthony Road Neighborhood	Tier III Area	31,000 gpd
Phase II Lakeview Heights Neighborhood	Tier III Area	7,000 gpd
Phase II Russell Drive Neighborhood	Tier III Area	9,000 gpd
Phase II Infiltration & Inflow		10,000 gpd
Total Estimated Future Wastewater Flow		409,000 gpd

The combined wastewater flow from the Town-wide Wastewater Management Plan will utilize 409,000 gpd capacity of the Agreement, and is conservatively projected to exceed the volumetric amount slightly upon connection of the recommended areas for public sewers. Although the volume of sewage appears to be greater than the intermunicipal agreement by 9,000 gpd, the wastewater flow apportionment has been a conservative estimate of the build-out flows of future sewered parcels that may not be realized.

Currently, the wastewater flows from the Phase I planning area appear to be much less than the 334,000 gpd apportioned flow for the area. If sewer extensions are constructed and flows approach the 400,000 gpd threshold, a build-out analysis should be prepared to identify the remaining potential sources of wastewater generation. If it appears that the Tolland will reach the 400,000 gpd threshold, the WPCA should inquire about purchasing additional capacity from the Town of Vernon.

VIII. RIGOROUS ON-SITE WASTEWATER MANAGEMENT PROGRAM

The Town of Tolland should target larger on-site wastewater management areas, through adoption of the wastewater management plan proposed herein. The WPCA should also establish procedures which will avoid potential future problems with on-site sewage disposal. These include:

- Enforcing the new zoning regulations which limit new development to maximum densities with further reductions for steep slopes and wetlands.
- Ensure vigorous enforcement of technical standards for subsurface disposal systems for new development and conversions of systems presently in use.

The On-Site Wastewater Management Program is intended to be dynamic and may be altered to meet changing needs. It is important to note that the measures recommended herein for on-site wastewater management do not guarantee that public sewers will not be required in the future. The programs outlined in this document are meant to improve the effectiveness of the on-site wastewater disposal systems. Public sewers may still be the proper solution should the output from future wastewater studies indicate that existing septic systems are unable to be sufficiently replaced or repaired (with traditional or alternative wastewater treatment technologies) to protect the public health and environment.

The WPCA, along with the appropriate regulatory authorities, should also encourage the enforcement of the On-Site Wastewater Management Program for existing and proposed subsurface disposal systems. The program includes the following items:

- Promote the proper operation of on-site disposal systems through public education.
- Monitor on-site systems and their possible effects on surface and ground waters, paying particular attention to areas above level A/B aquifers.
- Identify poorly-functioning systems and implement an effective on-site repair.

An important aspect to proper wastewater management that is often unrecognized is monitoring of individual subsurface disposal systems. This must be carried out in order to detect problems with systems over time.

Many problems associated with septic systems are the result of outdated designs or improper maintenance practices. Water purification system backwashes have also recently been identified as potential retardant to proper performance of conventional septic systems. An on-site wastewater management program could provide more local control over approval, operations, and maintenance practices for septic systems.

Proposed ordinances for sewer avoidance programs or wastewater management districts must be sent to the Connecticut Department of Public Health (DPH) for review. Management programs must include re-issuance of permits to discharge (at least every 5 years) and septic tank pump-out permitting. Monthly exception reporting to the DPH will also be required.

A number of actions can be taken to implement a long-term on-site wastewater management program. These steps don't guarantee that sewers won't be needed at some point in future time, especially if the input from the monitoring actions shows that septic systems aren't sufficient to protect public health and the environment.

A. PUBLIC EDUCATION

The first element of the program is education of the townspeople. A public awareness campaign to inform the users of subsurface disposal systems of proper maintenance procedures and symptoms of potentially failing systems should be conducted on a continuous basis. Targeted mailings and newspaper articles which explain proper operation and maintenance of subsurface disposal systems have been helpful in this effort. The WPCA should continue and broaden its public education program, to enlist the efforts of the citizens of the Town to minimize the risk of pollution. Neighborhood meetings to discuss relevant issues should be considered.

B. EXAMINE ON-SITE SYSTEMS

Not every property owner who has an individual septic system appears to be proactively inspecting and repairing them as the systems age (based on questionnaire responses and walkover results). A rigorous inspection, monitoring, and notification process needs to be implemented to keep track of the on-site subsurface wastewater renovation systems in Town.

1. ESTABLISH DATABASE

Once installed, subsurface disposal systems must be managed properly to ensure efficient operation. A first step would be to add to the existing computer GIS database using existing property data from the Town. Records of wastewater-related data can then be easily organized and manipulated for analysis. Data would include walkover results, septage pump outs, reported problems and solutions, as well as additional information on the septic systems as desired over time. This would require a more comprehensive, spatial database record-keeping system to be implemented for use by the Eastern Highland Health Department (EHHD).

2. CONTINUOUS MONITORING

A second important aspect to proper management is monitoring of individual subsurface disposal systems. This must be carried out in order to detect problems with systems over time. Monitoring should be a joint effort by the homeowner, the septic tank pumpers, the staff of the Sanitarian and the Town. Whenever problems are discovered, they should be reported to the Sanitarian and proper repairs should be designed, reviewed and constructed as soon as possible. These repairs should follow the same criteria for the design and construction of new subsurface systems as much as possible to insure that repairs will be adequate for some time in the future.

Administrative forms from the DPH are included in Appendix D for use by the Town of Tolland when implementing their on-site wastewater management program.

3. PUMP OUT PROGRAM

Another means to monitor septic system performance is to carefully review pump-out records of septage haulers serving the Town. Pump-out reports should be submitted by haulers discharging to the various Water Pollution Control Facilities as well as those using other disposal means. This would require a new permit or record-keeping spatial database-driven system (implemented by the EHHD) for septage pump-outs from Tolland. It is recommended that the Town of Tolland use the standard pump–out form (attached in Appendix D), and require haulers to complete the form at each pump-out event. Copies of the completed form would then be forwarded to Eastern Highlands Health District staff for logging into the database and subsequent follow-up, should such action be necessary (if additional staffing and monetary resources become available). During

pump-out, inspections of the system by EHHD personnel would minimize the need for extensive public sewering and threats to public health and the environment through a better understanding of septic system performance. A nominal administration fee (say $25) to support the program should be included.

The pump-out data would be recorded in the EHHD's database, which could be attached to the town-wide GIS. This would allow detection of a high frequency of pump-outs at a given septic system. Though frequent pump-outs are often an indication of deteriorating system performance, it may also be indicative of improper operation, or other causes requiring further investigation. It is recommended that EHHD staff evaluate the data to determine whether operational changes such as disconnecting the sump pump, controlling grease, or abandoning/limiting the use of the garbage disposal will elongate the useful life of a septic system. See Figure VIII-1 showing the recommended five year pump-out plan.

If area-wide trends of high frequency pump-outs are recognized, other means of performance detection should be implemented to determine the effectiveness of the systems in the area.

The Town should consider adopting a mandatory pumping program that requires septic tanks be pumped every five years, at a minimum. Commercial systems could have a shorter required pumping frequency. The purpose of this regulation would be to prevent overloading of solids in the septic tanks with subsequent carryover into, and clogging of the leaching field. The database system will provide tracking of pumping frequency and allow the Town to issue reminders to residents who are approaching the five year limit, and also to follow-up with enforcement actions for those over the limit. Property owners would receive notifications by mail and penalties for failure to comply.

The town should expedite the completion of septic system pump out ordinance to minimize the need for extensive public sewering and threats to public health and the environment.

4. WALKOVER INVESTIGATIONS

Another element to include in effective management of on-site systems is actually walking through the areas. During these walkovers, the staff will be looking for symptoms of subsurface disposal system failures such as odors of sewage in the vicinity of the septic tank or leaching field, wet areas that should otherwise not be wet, and areas where lush green grass is growing above leaching fields. Walkovers are generally seasonal as they detect most problems when performed during the wet period in the spring.

The On-Site Wastewater Management Plan should include walkovers of developed properties. Higher priority should be given to Tier III and IV neighborhood areas with regular, annual walkovers where multiple indications of wastewater treatment deficiencies appear to exist. Random, periodic walkovers of Tier II parcels should be conducted on a rotating basis during periods of high groundwater or significant precipitation events. Suspect failures should be referred to the Health District, which should work with the property owner to investigate the problem and repair the septic system.

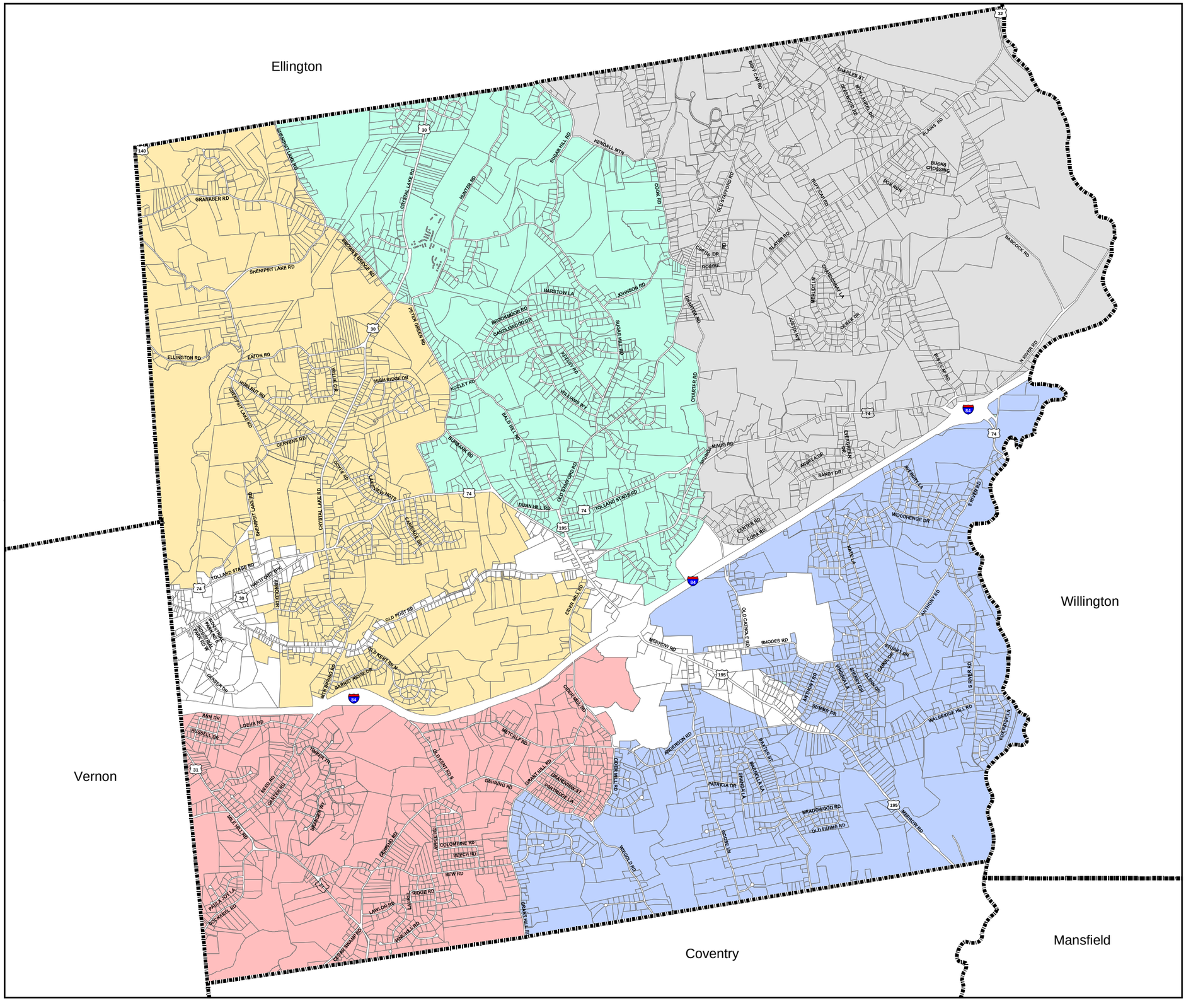
Additional technical and clerical staff may be needed to accomplish this goal.

5. DIE TRACER TESTING

Suspected problems can be followed up by dye tracer testing of the system to help determine whether there is, in fact, a problem that requires attention. While the presence of dye in a nearby

5 YEAR ON-SITE SEPTIC SYSTEM PUMP OUT PLAN

TOLLAND WASTEWATER FACILITIES PLAN
PHASE 2



Sewer Service District

- Year 1 (1,307 Parcels)
- Year 2 (1,259 Parcels)
- Year 3 (1,176 Parcels)
- Year 4 (1,240 Parcels)
- Year 5 (1,254 Parcels)

Notes:
1) Town of Tolland parcel base dated 2004 with supplemental additions to 2007.
2) 2004 Building dataset provided by Town of Tolland.
3) Dataset of town boundaries and hydrography downloaded from the CT DEP GIS website Fall 2005.
4). Tolland Sewer Service District from Phase 1 WW Facilities Plan Dated 2004.

0 0.5 1 2

Miles

FIGURE VIII-1

FEBRUARY 2011

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surface water source is generally considered an effective indicator of a problem, the absence of dye does not positively rule out a septic problem. Dye tests have historically been known to have limitations in certain fine grained, low permeability soils and may not be a guarantee that the septic system is *not* in failure

6. INFRARED THERMOGRAPHY

This is an emerging remote sensing technology which can be used to detect failing septic systems and illicit discharges. The temperature difference between sewage discharges and the surrounding environment release varying amounts of infrared wavelengths. An aerial infrared thermography unit would take photos of neighborhood areas for desktop GIS analysis. A GIS Analyst would review the infrared data to locate suspected discharges. Field crews could then inspect the identified sites to confirm the presence of a failing septic system. Typically, late fall, winter, and early spring are the best times to conduct this type of evaluation because the surrounding environment has a significantly lower temperature than wastewater effluent. This method provides significant cost savings because walkover investigations target specific parcels identified as suspect areas based on current remote sensing equipment instead of an engineering analysis of static data sets.

7. WATER QUALITY MONITORING

A major goal of this monitoring program is to identify subsurface disposal problems before they become public health or environmental pollution concerns and to implement on-site solutions before installation of sewers becomes the only viable solution. Sampling efforts would provide a database which the Toll and WPCA can use for long-term planning purposes (i.e. follow-up investigations, special scrutiny, consideration of sewer extensions, and utilization of alternate sewage disposal methods).

The surface and groundwater sampling and testing program may provide indications of possible pollution (bacterial and nutrients) from improperly functioning subsurface disposal systems in the general area, though not definitively at a single location. Additional investigation of suspected point sources of pollution could be recommended based upon trending of monitoring results.

The samples should be analyzed at a State Department of Public Health certified laboratory for sanitary sewage related contaminants which may include the constituents listed below:

- Total Nitrogen
- Total Kjeldahl Nitrogen
- Ammonia
- Nitrite
- pH
- Chloride
- Total Dissolved Solids
- Total Phosphorus
- Escherichia Coli Bacteria
- Enterococcus Bacteria

The results of the water testing will be compared to the applicable State and Federal surface and ground water quality standards.

Analytical results should be compiled by sample site and carefully reviewed to discern trends over time as well as to observe any particularly high results which may indicate development of a pollution problem. Interpretation of data gathered through this program should be coordinated with the Tolland WPCA and EHHD to provide as broad a picture as possible of the quality of the drinking and groundwater in Tier IV neighborhood areas.

8. EVALUATION OF FINDINGS

Periodic evaluation of the data that has been collected is important in determining what this information means relative to wastewater management effectiveness. An annual review of the data with a written summary of the results is suggested to be completed by EHHD and transmitted to Tolland WPCA for review. The review process should address questions such as:

- Where are septic systems failing (if anywhere)?
- Is water quality being impacted by subsurface disposal?
- Are there any failures in public water supply watersheds (which warrant particular concern)?
- Can the failures be effectively repaired on-site, and will repairs alleviate water quality impacts?
- Are there areas where alternatives to on-site septic systems appear necessary?
- Are there any modifications that should be made to the On-Site Wastewater Management Program that would improve its effectiveness (e.g. move or add water sampling locations)?

A designated staff member could maintain a series of GIS maps: septic system failures and repairs, high frequency septage pump-outs; and walkover results (e.g. obvious failures, suspected failures). This data, plotted on map(s), will help the WPCA and EHHD staff discern trends over time in septic system performance and help set (or revise) priorities for the On-site Wastewater Management Program. The Tolland WPCA should solicit an annual report from the EHHD of the number of variances granted, types of repairs, and location.

C. IMPROVING TREATMENT PERFORMANCE OF SSAS

1. WASTEWATER VOLUME REDUCTION

By reducing flows, inadequately sized systems can be brought into compliance and can be made to operate more efficiently. Wastewater flows can be reduced through the use of low-flow plumbing fixtures, non-discharging toilets and other methods. Public education is also key in informing a community about ways to reduce wastewater generation and discharge. These alternatives should be considered as part of an overall approach to reducing the volume of wastewater discharged in areas with significant site limitations.

2. REPAIRING SUBSURFACE SEWAGE ABSORPTION SYSTEMS

The common mode of failure of a septic system is clogging of the leaching field and a reduction in the infiltrative capacity of the soil. Often, this is the result of excessive solids carryover from the septic tank; however permeability of the native soils in which the system was constructed plays a key role; age is also a factor. A mature biomat is a very effective filter. Solids that pass through the septic tank are trapped in the filter, and, over time, can clog a leaching field. Many older systems were constructed to standards that were far less demanding than current regulations, resulting in insufficient septic tank storage/operating volume. The Tolland WPCA strongly encourages SSAS repairs to incorporate the technological advances made to on-site system in recent times to improve treatment capacity on challenging sites.

Commonly used leaching systems include conventional leaching trenches (using crushed stone and perforated pipe), leaching beds, and shallow or deep leaching chambers. Other technologies are being implemented more frequently for challenging system repairs. These include improved leaching chambers such as the Infiltrator and Contactors/Rechargers. Additional advancements in leaching field design include the Eljen "In-Drain", shallow, pressure-dosed leaching trenches, mounded systems and various other technologies designed to reduce the footprint of the leaching area and maximize surface area for wastewater treatment.

In areas of shallow bedrock or shallow groundwater or excessively drained soils, a mounded system can be constructed by placing suitable soil fill on top of the ground and then installing the leaching trenches in the fill. Constructing the leaching trenches in the fill creates a vertical separation between the bottom of the leaching trench and the high bedrock or groundwater level. This vertical separation provides a zone in the soil where aerobic bacteria can sufficiently treat the septic tank effluent. The leaching field must have a large enough area to allow the effluent to enter the underlying native soil which is generally less permeable than the fill placed to create the mounded system.

A mounded system can be considerably more expensive than a conventional repair, depending on the amount of fill required. In most situations a pump is required to lift the effluent up to the raised leaching field. Pumping wastewater into the leaching trenches adds both a capital cost for the pump and an operational cost for electricity.

Often, septic system failures are repaired on-site. The success of a repair depends largely on the physical characteristics of the property, such as area of the lot, depth to groundwater, soil permeability, slope of the land surface, depth to bedrock and distance to drinking water wells, as well as the quality of the design and construction methods followed. When septic systems are repaired or replaced on-site, they are upgraded to current design standards, if possible. In some cases where lot size is limited, repairs are made which do not meet the applicable Connecticut Public Health Code requirements. Variances (or exceptions) are sometimes necessary for required separating distances between septic systems and drinking water wells, buildings, or property lines. These variances are typically issued through the Town Sanitarian or local Health District.

Where adequate, suitable land is not available for proper septic system repairs on-site, a property owner could meet the wastewater disposal needs by purchasing a vacant lot of suitable size and physical characteristics for installation of a remote leaching field. A vacant lot is seldom available adjacent to the subject property, particularly in densely populated areas. In addition, distance between the house and the new leaching field has an impact on the cost effectiveness of such an alternative. Pumping of septic tank effluent is often required for this type of a system repair. It is uncommon that the proper conditions exist for this method of wastewater management to be considered. On-site failures should be considered for connection to the public sewers on a case by case basis to determine if public sewers are nearby and if on-site solutions to meet the public health code without variances are feasible. Where repairs are not feasible on-site, alternative solutions should be developed and implemented in collaboration with the Tolland WPCA and EHHD.

3. INDIVIDUAL ADVANCED TREATMENT UNITS

Engineered septic systems may sometimes also contain a secondary treatment process for isolated properties with challenging site conditions. Located downstream from the septic tank, a pretreatment system would treat the wastewater under aerobic conditions before discharging the effluent into a soil absorption system. These systems can provide an additional level of treatment

beyond that attained in a septic system, and as a result, the required area of the leaching field that follows the treatment unit can be downsized. These systems have historically not been commonly used in Connecticut, but are increasingly becoming more accepted. The CTDPH must review applications for their residential use on a case-by-case basis when flows are less than 5,000 gallons per day.

Advanced treatment systems use colonies of aerobic microbes that consume the BOD and TSS. Nitrogen is gasified in a chemical process relying on both anaerobic and aerobic microbes. Pathogens die off or become inactivated because they cannot survive aerobic conditions. The secondary treatment systems are designed to promote the best conditions possible to grow and sustain the aerobic microbes that treat the wastewater.

Many of the advanced treatment systems work by using some type of a proprietary media which sustain large colonies of bacteria and microorganisms similar to a biomat within the treatment vessel. The media typically has a large surface area which provides many nooks and crannies where microbes can attach and thrive. A high surface area allows for a very dense population of microbes in a small treatment system footprint. The large concentration of colonies enables higher wastewater treatment capacity in a smaller footprint. The biological film self-regulates for variations in hydraulic and organic loading plus environmental variations in temperature, pH, and process inhibitors. If the colonies of microbes collapse (system abandoned, chemical cleaner poison, mass die-off), the systems are able to rejuvenate themselves 1 to 3 months after the stressor is removed from the system.

By contrast, very large soil absorption fields would be needed to match the surface area of the treatment media to provide enough area to grow a comparably sized biomat. The advanced treatment systems use the same basic principals to treat the effluent as a conventional soil absorption system, but under more controlled conditions. For lots of limited size, high groundwater, ledge, or separation distance requirements; construction of a conventional soil absorption system may be restricted. Advanced treatment systems have been constructed within 2 feet of basement walls, 5 feet from property lines, 50 feet from lakes, and 30 to 40 feet from wells in other parts of the northeast.

The difference between the advanced treatment technologies is the type of media used and how the wastewater is applied to the media. Although these systems significantly reduce BOD, TSS, total nitrogen, and pathogens, the effluent is still not potable. Adequate vertical separation between the bottom of the disposal fields and the seasonal high groundwater table, as well as a minimum 21-day travel time to sensitive receptors are still required in most installations.

Significant reduction in the total nitrogen of the wastewater effluent can be accomplished by recirculating the discharge from the advanced treatment unit back to the front of the septic tank. The aerobic microbes in the advanced treatment unit nitrify the wastewater by converting the ammonia to nitrates. When the nitrates are recirculated to the septic tank, anaerobic microbes convert the nitrates to nitrogen gas by using the abundant supply of carbon settling in the tank in a biological chemical process called denitrification. The nitrogen gas escapes to the atmosphere, reducing the total nitrogen of the wastewater. This process tends to remove less nitrogen during the winter months because the denitrifying bacteria are highly dependent on temperature. Nitrogen reduction can exceed 60% but is highly dependant on the wastewater strength, temperature, pH, alkalinity, and oxygen supply.

Many advanced treatment systems are equipped with control panels with audible and visual alarms plus controllers for their systems. Remote telemetry can be added for off-site monitoring of the

system from a central office. If remote telemetry is required, the control panel should be required to send a daily signal to the central office that no alarms have been reported and the unit is online. Some homeowners purposely disconnect the system power causing the advanced treatment system to stop working. Diagnosing systems that have been deactivated by homeowners between inspection visits is otherwise difficult to discover.

Although ATU system manufacturers test results with significant wastewater constituent reduction (BOD5, TSS, total nitrogen), the tests used in their reports are generally under controlled conditions. The wastewater used for the testing is a composite sample from a waste water treatment plant side-stream of a large sewershed. The wastewater has been diluted with inflow and infiltration, commercial wastewater flows, and diluted raw sewage from numerous residences to produce a raw sewage composite that does not significantly vary in constituents during testing. The wastewater generation from a typical single family residence varies considerable over the course of time due to changes of the occupants (age, cultural, economical, quantity, vacations, etc). These changes affect the type of raw wastewater generated by the house which will also affect the concentration of influent and effluent constituents. Although the advanced treatment systems have reported results of achieving nutrient removal concentrations less than 15 mg/l, long term operations with concentration rates of 20 mg/l should be expected.

The EPA certified ATUs significantly reduce the biological oxygen demand, total suspended solids, total nitrogen, and pathogens in the wastewater. A comparison of the technologies is presented in Table VIII-1.

Table VIII-1: Technology Comparison Matrix

Comparison Matrix	Orenco AdvanTex	Waterloo Biofilter	AquaPoint BioClere	RetroFAST MicroFAST	Bord Na Móna PuraFlo
BOD Removal	90%	95%	93%	91%	98%
TSS Removal	84%	95%	90%	84%	89%
Total Nitrogen Removal	80%	62%	57%	51%	61%
Pathogen Removal	99%	99%	99%	98%	99%
Monthly Energy Usage (kW)	23	40.3	130.2	65.1	6.7
Monthly Energy Cost	$3.45	$6.05	$19.53	$9.77	$1.01
Equipment & Installation Costs	$10k – $12k	$12k – $14k	$9k – $11k	$9k	$13k – $15k

Energy usage costs based on $0.15 per kilowatt-hour

The advanced treatment units have associated operating costs because they require electricity and periodic inspections. Some systems are intermittent dosing while others are fully submerged with constant aeration. The systems use the energy to move the wastewater through the system and oxygenate the aerobic microbes. Some of the technologies can be installed above grade and the effluent can flow by gravity to the soil absorption system.

The conceptual level opinion of cost (Table VIII-2) for a new septic tank, advanced treatment system, UV disinfection, pressure dosing system, and mounded leaching field ranges from $21,500 to $27,500. This assumes major site work is not needed to create a suitable area for installation (no retaining walls, drainage improvements, etc.).

Table VIII-2: Advanced Treatment Unit	
1,500 gallon Septic Tank	$2,000
Advanced Treatment System	$9,000 to $15,000
UV Disinfection System	$1,500
Dosing Pump Chamber	$1,000
Mounded Soil Absorption System	$8,000
Conceptual Level Opinion of Cost Estimate	**$21,500 to $27,500**

The opinions of cost presented represent a Conceptual Level Opinion of Cost. These opinions of costs are based on year 2008 dollars, and should be considered accurate to minus fifteen or plus thirty percent. Since Fuss & O'Neill has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor(s)' methods of determining prices, or over competitive bidding or market conditions, Fuss & O'Neill's opinion of probable Total Project Costs and Construction Cost are made on the basis of Fuss & O'Neill's experience and qualifications and represent Fuss & O'Neill's best judgment as an experienced and qualified professional engineer, familiar with the construction industry; but Fuss & O'Neill cannot and does not guarantee that proposals, bids or actual Total Project or Construction Costs will not vary from opinions of probable cost prepared by Fuss & O'Neill. If prior to the bidding or negotiating Phase the Owner wishes greater assurance as to Total Project or Construction Costs, the Owner shall employ an independent cost estimator.

UV disinfection is used for small lots serviced by private wells and inadequate separation distances to the subsurface disposal system. Generally, there is scale-of-economics cost savings by hiring a single contractor to perform work on multiple lots managed under one project.

Maintenance contracts for inspections, system tune-ups, sludge-judge test of the septic tank, measure the amperage of the pumps (and/or fans), and required effluent testing range from $400 to $800 annual. This cost is typical for the advanced wastewater treatment systems in this report. The number of site visits and effluent sampling requirements are dictated by the health district.

The advanced treatment units were compared based on a 20-year life cycle cost as shown in Table VIII-3. The difference in rounded, annualized total life cycle cost between the various vendors is a comparable $200 per year. An interest rate of 4% was set assuming homeowners will have access to government subsidized loans to pay for individual site improvements. Life cycle costs do not include engineering costs, regulatory costs or contingency.

Table VIII-3: Life Cycle Costs of Advanced Treatment Units					
Order of Magnitude Opinion of Cost Estimation *$$ per Dwelling*	Orenco AdvanTex	Waterloo Biofilter	AquaPoint BioClere	RetroFAST MicroFAST	Bord Na Móna PuraFlo
One Time Capital Costs (Annualized)					
New 1,500 Septic Tank	$147	$147	$147	$147	$147
ATU Capital Cost	$809	$957	$736	$662	$1,030
UV Disinfection	$110	$110	$110	$110	$110
Dosing Pump	$74	N/A	$74	$74	N/A
Mounded Soil Absorption System	$589	$589	$589	$589	$589
Recurring Costs (Annualized)					
Service Contract	$600	$600	$600	$600	$600
Septic Tank Pumping	$100	$100	$100	$100	$100
Advanced Treatment Unit Energy Usage	$41	$73	$234	$118	$12
UV Disinfection Energy Usage	$40	$40	$40	$40	$40
UV Lamp Replacement	$75	$75	$75	$75	$75
Dosing Pump Energy Usage	$14	$14	$14	$14	$14
Total Life Cycle Cost (Annualized, Rounded)	**$2,600**	**$2,700**	**$2,700**	**$2,500**	**$2,700**

Advanced secondary treatment systems appear to be a viable alternative. The systems are able to significantly reduce the septic tank effluent by removing BOD5, TSS, total nitrogen, and pathogens. Pathogens can be further removed with a UV disinfection system. The amount of energy used strongly depends on the amount of effluent recirculation, use of air blowers in the treatment process, and the overall design of the system.

Benefits include a higher treatment level than a traditional septic tank, water resources protection where septic systems are failing, an alternative for sites unsuitable for septic systems, an extension of a drainfield's life span, and reduction of ammonia discharged to receiving waters. Many aerobic treatment systems tend to be driven by a lack of room to construct conventional septic systems.

The largest drawback of Advanced Treatment Units is the higher expense to operate than a conventional septic system because electricity is required. When the electricity goes out, many of the systems are designed to allow the wastewater to pass through to the leaching field via gravity. Other systems rely solely on pumps which may cause the wastewater to backup if the power is lost for long periods of time. Each of the systems have mechanical parts such as pumps, blowers, spray nozzles, air diffusers, and valves that eventually fail and must be replaced. ATUs require more frequent and a higher level of routine maintenance than traditional septic systems to make sure the systems function properly. These systems also have the potential to become upset due to sudden drastic changes in wastewater effluent loading/concentration which potentially negatively affects the treatment capability.

ATUs typically $5,000 to $12,000 more expensive than a system composed of a conventional septic tank and leaching field, plus the operational costs of a mechanical system can amount to approximately $600 annually. The operational and maintenance requirements of these systems are quite sophisticated in comparison to an ISDS; therefore, the DEP has indicated that if individual

innovative treatment systems are used to solve an area-wide wastewater disposal problem, the Town becomes responsible for managing the maintenance of these systems.

D. PROPER DESIGN AND INSTALLATION OF SUBSURFACE DISPOSAL SYSTEMS

An important element of this plan is that new subsurface sewage renovation systems be designed and constructed properly. New on-site systems should be designed by professionals familiar with regulations regarding subsurface renovation systems and should take into account soil conditions, groundwater elevations and area requirements for the particular lot involved. To this end, the State has compiled requirements to further facilitate proper subsurface wastewater renovation. Critical review of designs submitted to the Sanitarian and Town staff for approval is very important in ensuring that the new systems will meet the needs for sewage renovation for the long term.

Septic system adequacy should also be addressed when subdivision applications are reviewed and when additions to buildings and conversions in use (e.g. residential to commercial) are made.

Proper installation of approved septic systems is also critical to long term operation. Field inspections of these installations in progress by the Sanitarian or other qualified staff are essential for this reason. It is essential that record information is gathered during construction and filed both in hard copy and as part of a GIS deployment to facilitate locating parts of the septic system if modifications are needed in the future.

E. EXTENSION OF THE PUBLIC WATER SUPPLY

A benefit of extending the public water supply is that the elimination of private drinking water wells could relax the separation requirement to siting replacement subsurface renovation systems on small lots.

The extension of the public water supply system may cost approximately $120 per linear foot of distribution pipe installed, plus any water supply source improvements (e.g. new collection wells, pumping facilities, etc.). An expenditure of this considerable amount of money for a water supply system can help solve on-site wastewater disposal problems that are related to setback requirements, but only if a suitable public water source is located nearby.

F. WASTEWATER HOLDING TANKS

In rare instances, where a parcel has a limited amount of space available for the replacement of a leaching system, the sanitarian may require a holding tank. This typically occurs when the sanitarian believes the proposed system would not function properly. Unlike subsurface disposal systems, where wastewater is discharged into the ground and only the solids that are retained by the septic tank and are pumped out every few years, the entire contents of the holding tank are pumped by septage haulers since no wastewater enters the ground. This pumping usually occurs on a fairly frequent basis.

Low water-use plumbing fixtures are, of course, essential to minimize this volume of wastewater. A reasonably large tank should be provided in order to minimize the pumping frequency; for instance a 3,000 gallon tank may be suitable for a three bedroom residence. A level indicator should be installed in the tank so that the owner can arrange for tank pump out when the tank is approximately two-thirds full in order to provide some reserve storage volume. State regulatory

agencies have also indicated that metering of water use to homes with holding tanks should be provided.

The cost of a holding tank with level indicators, installation of low-flow plumbing fixtures, and a water meter is estimated to be in the $5,000 to $6,000 range for a single family residence. An additional annual cost for using a holding tank includes the cost for pumping out and disposing of the contents of the tank. An average size household using a very effective water conservation program would pay approximately $4,000 to $5,000 annually for hauling and disposal costs. The DEP has recommended in the past that, because of these high operational costs, the Town should pay for wastewater hauling and disposal to minimize the potential significant economic impact to the homeowner. Some of these holding tanks are designed to accept black water only (toilets) while the gray water (non-toilet sources) is discharged to a small leaching field. Based on the annual O&M costs, holding tanks are seldom recommended as a viable wastewater disposal method.

IX. IMPLEMENTATION OF WASTEWATER MANAGEMENT PLAN

Implementing a master plan for the entire Town serves as a "road map" for the next 20 years in directing improvements to the wastewater management practices of Tolland. The Wastewater Management Plan will be used as a guide when making future improvements to the Town's existing public sewer system (shown as Figure IX-1). It classifies parcels with sewer access available (includes parcels currently with public sewer service and those within close proximity to connect to existing sewers) and parcels targeted for Tier I, II, III, and IV monitored on-site solutions. Public petitions in areas identified as Tier II, III, or IV should be considered by the Tolland WPCA as well, when determining project implementation schedules. Note that the entire Phase II Study area has been classified as one of the monitoring and/or testing Tiers with no proposed constructed solutions over the 20-year planning horizon, unless surface and ground water sampling and testing indicates a constructed solution is warranted.

The implementation of any neighborhood mitigation action should generally be prioritized based on the number of priority points within the Wastewater Disposal Needs Priority Matrix, but also be at the sole discretion of the WPCA and Engineering Department. The Priority Matrix was created with the best intent of serving the Town's needs, but it is recognized that special circumstances may be considered by the WPCA and Engineering Department when prioritizing capital improvements. Wastewater management projects should be coordinated with other Town facilities (i.e. roadway improvements or other Public Works projects) in the vicinity to limit disruption and minimize costs, if possible.

A. BOUNDARY RECTIFICATION AND PARCEL DELETIONS

The existence of bifurcated parcels (i.e., the SSA boundary divides various parcels) opens the WPCA to potential litigation by property owners who want to connect facilities outside of the SSA into public sewers, based on the argument that the connection point is within the SSA. Bifurcated parcels in many Connecticut municipalities have caused disputes between Towns, developers and local property owners. Removal of bifurcated parcels by completely adding or removing the parcel alleviates this type of confrontation.

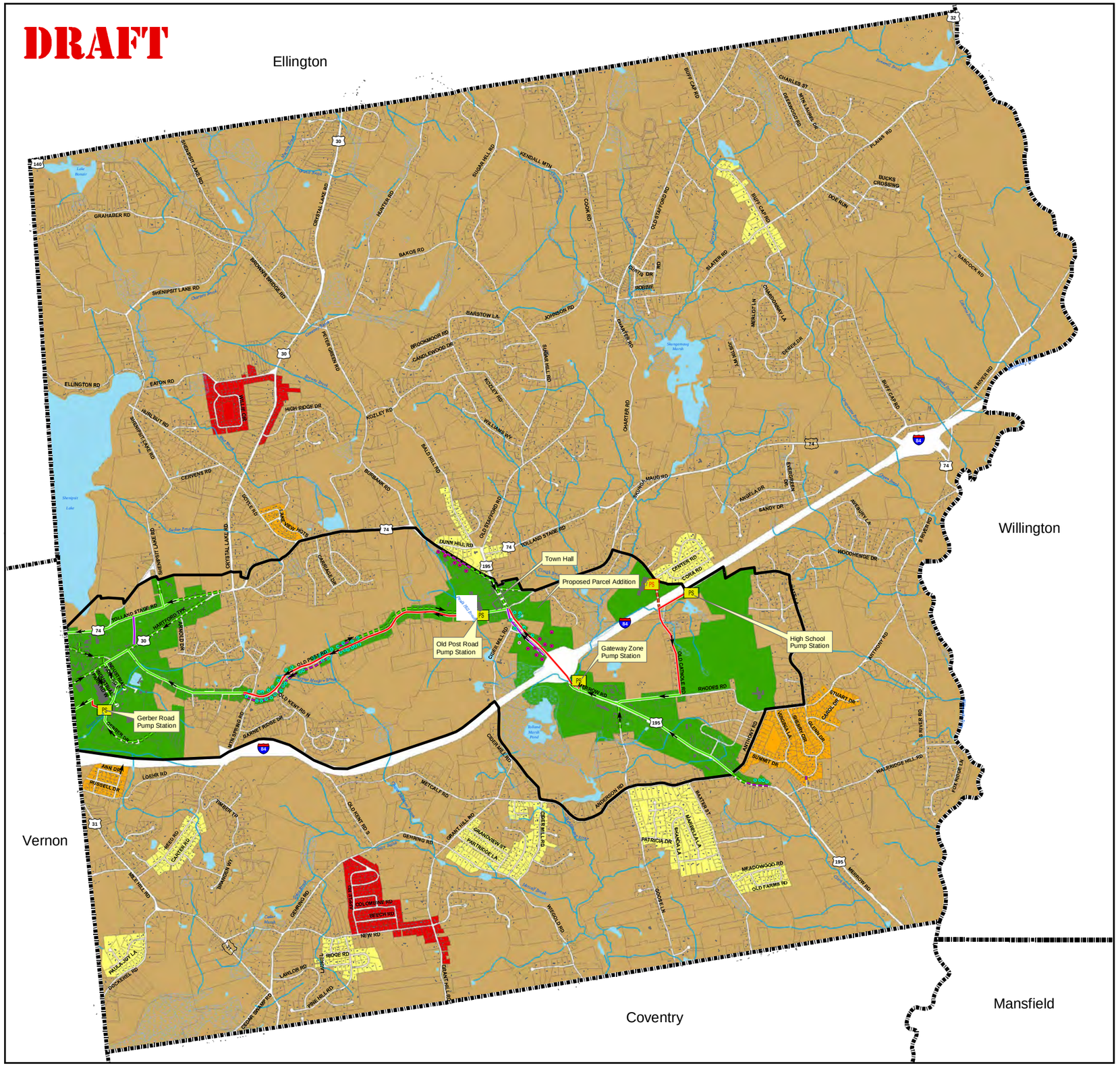
With the adoption of GIS, the Town's parcel base is continuously updated. If bifurcated parcels are allowed, strong policy must be included in the Sewer Ordinances describing the allowed actions under this specific situation. Bifurcation of Phase II parcels is not recommended herein.

Removing parcels from the SSA reduces the commitment the town has made to provide public sewers, and enforces the town-wide "Smart Growth" goals. Parcels can be removed from areas of town where failing septic systems previously have been identified, properly repaired to meet the public health code, and now operate correctly. One example is extension of public water, allowing the removal of private wells (and the associated well setback distance), thereby increasing lot area for installation of additional leaching fields. Parcels can also be removed from areas of Town where future development is discouraged and existing on-site wastewater disposal systems function properly.

The first step in the plan is to complete and adopt this Wastewater Management Study in accordance with town and Connecticut Department of Environmental Protection (DEP) requirements. The draft report will be submitted to DEP in February of 2009.

Upon completion of the wastewater management study report, the Town of Tolland should submit the proposed sewer extensions and community septic system concepts to the Planning and

DRAFT



RECOMMENDED WASTEWATER MANAGEMENT PLAN

TOLLAND WASTEWATER FACILITIES PLAN
PHASE 2

Wastewater Management Areas

- Sewer Service District
- Tier I On-Site WW Management Area
- Tier II On-Site WW Management Area
- Tier III On-Site WW Management Area
- Tier IV On-Site WW Management Area

Tier I Neighborhood Areas

Tier I neighborhood areas generally appear to have adequately functioning on-site wastewater renovation systems. There is no anecdotal knowledge from Town staff or representatives from the Health District that problems exist in these areas. A cursory review of the available data sets compiled during this analysis did not identify any significant impediments to proper wastewater treatment. As part of a rigorous on-site wastewater management program, Tier I neighborhood areas or parcels not included in the Priority Matrix areas should still be watched for signs of septic system malfunctions in the future to protect public health and the environment.

Tier II Neighborhood Areas

Tier II areas have been identified in the Wastewater Management Needs Priority Point Matrix as having some characteristics which may impair on-site wastewater absorption systems. These areas should be monitored by representatives of the Eastern Highland Health District and the Tolland WPCA. This monitoring could include analysis of septic system repair records, public education, periodic rotating walkover investigations during high groundwater, die tracer testing, infrared thermography, water quality monitoring, and periodic evaluation of the collected data as necessary. If the additional monitoring identifies conditions where the neighborhood area does not have adequately functioning wastewater disposal systems, a remediation plan will need to be implemented.

Tier III Neighborhood Areas

Tier III neighborhood areas were identified with multiple problematic conditions which indicate impaired wastewater renovation systems. These areas should have annual, spring walkovers to observe site conditions during high groundwater for signs of malfunctioning on-site wastewater renovation systems. Monitoring should also include analysis of septic system repair records, public education, die tracer testing, infrared thermography, water quality monitoring, and periodic evaluation of the collected data as necessary. If conditions worsen, or are such that reasonable mitigative actions by property owners to correct deficient septic systems cannot be taken; these areas should be recommended for escalation to the Tier IV category. These areas should also be included in the monitoring program established for Tier I and II areas.

Tier IV Neighborhood Areas

Tier IV neighborhood areas were identified as having numerous conditions potentially impairing proper operation of on-oite wastewater renovation systems which require close oversight. The Eastern Highland Health District and the Tolland WPCA would quarterly sample and test the groundwater and surface water of neighborhoods in this category. These areas should also be included in the monitoring program established for Tier I, II, and III areas.

Sewer Infrastructure

Existing	Proposed
Gravity	Gravity
Force Main	Force Main
Low Pressure	Low Pressure
Existing Pump Stations	Proposed Pump Stations
Duplex Grinder Pump	Simplex Grinder Pump
	Duplex Grinder Pump

Notes:
1) Town of Tolland parcel base dated 2004 with supplemental additions to 2007.
2) 2004 Building dataset provided by Town of Tolland.
3) Dataset of town boundaries and hydrography downloaded from the CT DEP GIS website Fall 2005.
4). Tolland Sewer Service District from Phase 1 WW Facilities Plan Dated 2004.

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Miles

FIGURE IX-1

FEBRUARY 2011

N W E S

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Zoning Commission (P&Z). P&Z would perform a review of the Phase II plan and issue a report in accordance with Section 8-24 of the Connecticut General Statutes.

The P&Z report will address the effect of the existing zoning regulations on development within the sewer service area after sewers are installed. If lots that existed prior to the zoning regulations do not have to meet current zoning requirements, the Town of Tolland may want to consult a land-use attorney that could advise the town on how to manage development after the sewer system is installed.

B. SCHEDULE

The recommended plan should be coordinated to construct improvements in concert with roadway improvements or other public works projects in the vicinity, in addition to the priorities defined in the Needs Matrix. A proposed implementation schedule is presented in Table IX-1.

Table IX-1: Implementation Schedule

Action Item	Tentative Schedule
Accommodate Infilling Development in Existing Phase 1 Sewered Areas	Ongoing
Rigorous On-Site Wastewater Management Plan	Ongoing
Pump-Out Ordinance and Public Awareness Program	In Development
Extend Sanitary Sewers along Route 195 from Goose Lane to Anthony Road	Completed
Update Administrative Procedures	2011-2013
Monitor Tier IV Areas – Determine Groundwater Monitoring Locations	Spring 2012
Monitor Tier IV Areas – Surface & Ground Water Testing	2012-2015
Monitor Tier IV Area – Willie Circle Neighborhood	2015-2030*
Monitor Tier IV Area – Apple Road Neighborhood	2020-2030*
Monitor Tier III Area – Anthony Road Neighborhood	2011-2030*
Monitor Tier III Area – Lakeview Heights Neighborhood	2011-2030*
Monitor Tier III Area – Russell Drive Neighborhood	2011-2030*

* Tolland WPCA and EHHD to review repairs in these areas annually to monitor chronic wastewater issues.

Spending of town tax monies will need to be approved by the Tolland Town Council. If the Town of Tolland decides that it is worthwhile to do an income survey in the project area, the survey could be done while engineering design of the project is occurring.

C. REGULATING LAND USE

An important element of any wastewater management plan is control of land use in areas outside of the designated sewer service area. Development should only be allowed to the extent that the

soils and other local conditions can support properly designed on-site wastewater renovation systems. Continued coordination with the WPCA, the Health District staff, and Planning and Zoning officials is critically important to avoid possible future subsurface disposal problems.

The proposed wastewater management monitoring and/or groundwater testing are targeted for neighborhoods which are already built-out as residential communities.

Although not targeted for future public sewers, adding Tier III or IV areas to the sewer service district is unlikely to change the characteristics of the neighborhood. Where sewer extensions may be required in the future, the transmission piping shall be constructed to prevent parcels outside of the sewer service district from being able to connect.

1. CEPA CONSISTENCY

The Connecticut Environmental Policy Act (CEPA) provides a framework for policy and planning for administrative/programmatic actions and capital/operational investment decisions of state government. These regulations (1) address human resource needs and development, (2) balance economic growth with environmental protection and resource conservation concerns, and (3) coordinates the functional planning activities of state agencies to accomplish long-term effectiveness and economies in the expenditure of public funds.

CEPA requires state agencies to undertake a comprehensive evaluation of any application action that might significantly affect the environment. The sponsoring agency has to assess the consistency of its proposed action with the C&D plan. The Office of Policy and Management then makes a determination whether the evaluation satisfies CEPA requirements. The policies are also spatially located on a Locational Guide Map for interpretation with respect to each area's potential to fulfill and balance the conservation and development priorities of the State.

There are no constructed solutions presented in the 20-year time frame for the Phase II Wastewater Facilities Plan, unless surface and ground water sampling and testing indicates a constructed solution is warranted.

X. ENVIRONMENTAL IMPACT OF RECOMMENDED PLAN

The recommended wastewater management plan will have no temporary or long-term environmental impacts to the environment. This Facilities Plan recommends continued monitoring and data collection of neighborhood areas to continue to assess the long term operation of on-site wastewater renovation systems. Potential impacts due to constructed solutions are not anticipated because repair of on-site septic systems would be the responsibility of individual homeowners. Neighborhood Area constructed projects are not proposed during the planning horizon of this document, unless surface and ground water sampling and testing indicate a constructed solution is warranted.

Sections A and B below provide an overview look at environmental impacts for general sewer extension projects that have the potential to cause impacts if not properly mitigated. The environmental impacts are broken down into two categories: (1) temporary impacts associated with construction of the wastewater renovation improvements and (2) long-term impacts.

A. TEMPORARY IMPACTS

Installation of neighborhood-wide wastewater management solutions will have a series of construction related impacts to the areas being served. Public sewers, for example, are installed in roadways to reduce the need for easements and disruption of wooded and wetland areas outside of the commonly traveled ways. The expected temporary impacts of neighborhood area public sewer extensions and community septic systems are described below.

1. NOISE CONTROL

During the course of sewer installation, noise will be generated by the heavy equipment used to install the sewers. This noise is unavoidable, but is of only a temporary nature and is restricted to certain hours of the day. The Town can limit the construction to certain hours each day in the project specifications if desired. The ConnDOT restricts work hours on state roadways to off-peak traffic times.

2. DUST CONTROL

A certain amount of dust will be generated by the sewer installation. Dust control through the use of water and/or calcium chloride will be practiced wherever necessary. Dust generation impacts will be minimized to the extent practicable.

3. EROSION AND SEDIMENTATION CONTROL

As with any significant construction project, there exists a potential for soil erosion with sediment washed away into surface water. Appropriate erosion and sediment control measures, such as hay bales and silt fences, must be used wherever necessary to prevent the dispersion of sediments into wetlands and water courses. Water pumped during trench dewatering operations must be discharged into sediment traps or dewatering bags. Disturbed vegetated areas need to be loamed, seeded, and mulched as soon as possible after the installation of sewers to re-establish the vegetation cover and prevent erosion. The use of silt sacks in catch basins drainage system is also recommended to reduce the amount of sediment discharged into water courses.

4. TRAFFIC

One of the most noticeable impacts of the sewer construction will be the disruption of traffic on state and local roads. Maintenance of reasonable access to the homes along the sewer route for local residents and emergency vehicles must be maintained. Good communications with residents will be important, as will maintenance of driveways adjacent to the sewer construction.

5. UTILITIES

The temporary disruption of utilities is another potential impact of sewer construction. Careful design of the sewer system can avoid conflicts. Test pits can be dug prior to trench excavation where existing utility depth and/or locations are unknown. Record research by contacting the utility companies serving the Town is integral to the design process of any new sewers.

6. IMPACT ON HABITAT OF NDDB SPECIES

Coordination with the DEP wildlife division would be needed to identify any endangered species/species of concern and develop mitigation measures to minimize the impact to those species.

B. LONG-TERM IMPACTS

1. WATER QUALITY

The water quality of the surface and ground water in Tolland will be monitored as part of this Facilities Plan. Neighborhood areas identified as being most likely to contribute to water quality impairment due to on-site wastewater disposal will be watched closely.

The long term impacts on water quality from wastewater management construction projects (such as public sewers or community septic systems) would be a positive one: the elimination of subsurface disposal systems potentially discharging untreated or poorly treated sewage into surface waters or groundwater.

2. FLOODPLAINS

According to information obtained from the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program Maps, portions of the existing Sewer Service Area are within the 100 & 500 year flood zones. Collection system infrastructure built in these areas should be avoided.

3. ODORS AND AIR QUALITY

The potential for odors exist at various points in a public sewer system exist if the sewage is allowed to become anaerobic. In order to prevent odor problems, an odor control system consisting of an aerated wet well should be provided for each pump station. Control space and provisions for additional odor control measures are recommended for future installation (should the need arise). Existing odor control systems should be evaluated and upgraded as needed to minimize odors generated from the existing sewer system. Pressure sewers are closed pipes with limited exposure of sewage to the atmosphere may require special odor control provisions.

4. NOISE CONTROL

Grinder pumps installed in rural community center area operate very quietly and are not expected to cause disturbance to the residents. Pump stations are expected to cause little disturbance due to noise. The emergency generator operators at pump stations occasionally run a brief power cycle to test the status of the generator. Emergency generators can be located inside a building adjacent to the pump station wet well to further reduce noise. To minimize generator noise pollution, a noise reducing enclosure around the motor and acoustical noise louver may be considered.

5. TRAFFIC CONGESTION

There will be no appreciable long-term traffic impacts due to continued monitoring of the on-site wastewater disposal systems in the Phase II area.

Since the neighborhood areas examined are already nearly completely built out, future sewer extensions or community septic systems also would not appear to increase traffic.

6. SOCIO-ECONOMIC IMPACTS

The proposed Phase II plan is not anticipated to alter the area's socio-economic make-up.

7. GROWTH POTENTIAL

Growth is not anticipated as a result of the proposed Phase II plan.

8. PROPERTY VALUES

Property values will not increase as a result of implementation of the recommended plan in this Facilities Report because constructed solutions are not proposed, unless surface and ground water sampling and testing indicates a constructed solution is warranted.

If public sewers were constructed in a neighborhood area, the property values typically increase as result. The ability to connect to sewers makes the property more valuable because the risk of an on-site wastewater absorption system failing in the near term or distant future is eliminated. Public sewers also remove a major restriction on the potential uses of the property such as increasing the available area to construct additions to the building, installation of a pool, drilling a new groundwater well, etc.

C. MITIGATING MEASURES

This Phase II Planning report does not propose any constructed solutions which would impact the environment of the neighborhood areas.

Mitigating measures that can be used to reduce the environmental impacts seen as the result of public sewer extensions and/or community wastewater renovation systems could include:

- Application for and approval of wetland and stream crossings with applicable agencies.
- Installation of sedimentation and erosion control measures along proposed sewer extension routes during the construction phase and at pump station-sites
- Restoration of wetland and stream areas affected by construction
- Odor control equipment installation at pump station sites

- Protection of Natural Diversity Database (NDDB) habitat

D. LAND TAKING AND EASEMENTS

No land taking or easements will be required for the Recommend Wastewater Management Plan of the Phase II area.

Some taking of land is typically required for proposed pump stations and community septic systems. When a construction project requires such actions, the specific site conditions must be individually evaluated. Owners of the properties served by grinder pumps would be required to enter into legal agreements with the WPCA, allowing the Town access to the pump chamber and the control panel (which would be mounted on the exterior of the building served). Individual access easements would not be required for property owners with grinder pump agreements.

XI. FINANCING

The state and federal agencies listed below should be contacted to determine if funding (or partial funding) in the form of grants and/or loans would be available for implementation of this Facilities Plan. Grant/loan disbursements to Towns are generally based on the ranking that the project receives from the agency relative to other projects, typically on a needs basis. Financing may be possible with a combination of state Clean Water Fund grants and loans, betterment assessments, available Small Town Economic Assistance Program (STEAP) grants and general taxation funds from the Town of Tolland.

The exact dollar amounts available in grants and loans for each project from the various agencies are generally not determined until a viable project is submitted to the agency and reviewed for funding eligibility. Interest rates vary depending upon the prevailing rates at the time the loan is granted. Agency loan interest rates are typically lower than free market rates. Annual disbursements from the agencies vary from year to year based on the monies available to the agencies and the number of Towns that have applied for funding in a particular year.

Funding from the State of Connecticut through the Small Town Economic Assistance Program (STEAP) grants for planning, design, and construction is a possible funding source to assist in financing improvements that has been utilized by the Town of Tolland in the past.

Properties to benefit from collection system improvements and expansions are tentatively identified to provide the funding structure for the sewer system work. The cost of the recommended improvements could be paid for through a combination of grants, loans, sewer betterment assessments (paid by the owners that will receive sewer service), developer's contributions, and, perhaps, general taxation funds, or a combination of these options.

A. CONNECTICUT DEP CLEAN WATER FUND

The potential funding available from DEP consists of a 25% grant toward eligible costs and a 2% interest rate (annual percentage rate) loan for the remaining costs. The State of Connecticut construction grants program is administered through the Department of Environmental Protection's Clean Water Fund (CWF). The grant program has historically been underfunded by the State of Connecticut, but recent water quality concerns have led to a replenishment of state funding for the Clean Water Fund Program. The DEP maintains a Small Communities Set-Aside program within the larger Priority List program to aid communities with wastewater issues that may be of a smaller magnitude than those of the larger cities. CTDEP is required to fund a minimum of one Small Communities project annually. The Clean Water Fund Program, and it's associated Small Communities Set-Aside program, has strict guidelines that must be met for eligibility.

Proposed public sewer projects are generally eligible for funding from the Clean Water Fund, where allocation of funds is determined through a Priority List program, which includes the projects in the state except those in the Small Communities Set-Aside program. Projects on the Priority List are ranked by DEP through established criteria. Typically, in any given year, there is a significant shortfall between requested funding and funding available for the projects on the Priority List. Therefore, some projects may not get funding from the Priority List program for several years.

B. CONNECTICUT DEP COLLECTION SYSTEM FUND

The CT DEP has established a loan-only program called the Collection System Fund. This dedicated fund finances collection system projects that do not score adequate priority points to be funded under the basic grant/loan CWF. Loans are issued currently for 20 years at 2% interest, with annual payments due beginning the year after the construction improvements are complete. Eligible projects compete based on priority points, and interest rates are subject to change.

C. USDA RURAL DEVELOPMENT

Rural Development [formerly the Farmer's Home Administration], is part of the U.S. Department of Agriculture. It offers a program called the Rural Utilities Service for Water and Waste Disposal Programs which provides loans and grants to areas with fewer than 10,000 residents that fall below a minimum threshold per capita income. Recipients must be public entities including municipalities, counties, special purpose districts, Indian tribes, and non-profit corporations. Grants may cover a maximum of 75% of eligible facility development costs. Loan guarantees are made up to 90% of any eligible project cost.

Rural Development's loans and grants are administered based on a project's ranking as determined by the agency (mainly based on median household income) and the availability of funds. Rural Development grants can be as high as 45% of the eligible project costs for a project in a moderate-income area or 75% of the eligible costs in a low-income area.

Because Tolland's population of year 2005 according to the latest decennial U.S. Census was 13,146 people, it would generally not be eligible for funding. However, Rural Development sometimes will fund a project in a particular area within a Town, although the town population is over 10,000. The applicant must show that the population of the project area is less than 10,000, and provide specific reasons why the area should be considered for funding separately from the rest of the Town.

The median annual household income levels must be no more than $43,148 to be classified as a moderate-income area (80% of statewide median household income) and $26,968 to be classified as a low-income area (50% of statewide median household income). Based on the American Community Survey for the 2000 census, Tolland's median household income was $77, 398, exceeding the USDA threshold value. The local USDA agent should be contacted to verify program prerequisites have not been changed, when seeking funding for future construction projects. On occasion, a particular section of a more affluent town falls below the income threshold. Use of GIS to identify these areas can help formulate a case for obtaining Rural Development funding.

D. CONNECTICUT STEAP GRANTS

Small towns in Connecticut are eligible for block grant monies from the Small Town Economic Assistance Program (STEAP). This is a program administered through the Connecticut Office of Policy Management and STEAP monies for sewer projects administered through CTDEP, subject to their regulations. The program is targeted for assistance to towns with a variety of requested infrastructure improvements, and is not solely relegated to wastewater improvements. Sewer programs are, however, a qualifying use of these monies. Localities may receive up to $500,000 per year if (1) their population is under 30,000, (2) they are not designated as a distressed municipality or a public investment community, and (3) the State Plan of Conservation and Development does not show them as having an urban center.

E. SPECIAL LEGISLATIVE ACTS

Specific project financing may be available through a Special Act of the legislature. There currently is a fund available to be used for miscellaneous water pollution control projects throughout the state. Local legislators can petition to the Governor's office for a portion of the money. The Governor's office then decides which projects receive the monies and the eligible amounts.

F. SEWER BETTERMENT ASSESSMENTS

Sewer betterment assessments are often levied to the owners of property along a sewer route. Betterment assessments often pay for the majority of the project's cost. However, under Connecticut State Law the property owner's assessment cannot be more than the increase in the value of his/her property due to the sewer service. Betterment assessments are often used to finance the sewer user's portion of the DEP wastewater loans. There are several methods that may be used by the Town to make these assessments. Several of these methods are described below.

1. THE FRONTAGE ASSESSMENT

A common assessment method is the Frontage Assessment in which the Town makes an assessment at a uniform rate per front foot of property served. The disadvantage commonly associated with this method is that a property owner having a greater frontage than the neighboring properties would pay a higher assessment though his benefit may be no greater than neighbor's property.

2. AREA ASSESSMENT

Another widely used assessment method is based on the area of the parcels to be served by sewers. The Town determines a cost per acre by dividing the entire project cost by the acreage of land to be served by the facilities. The Town would then assess the property owners based on the acreage of the property multiplied by the unit cost per acre. One disadvantage to this method is the potential for inequitable cost apportioned for larger parcels which may not be subdivided. Calculation of the total acreage may also be questioned based on buildable area versus total parcel area. Subtraction for wetland areas is often included in the calculation, but is somewhat subjective.

3. AVERAGE UNIT COST ASSESSMENT (FOR NEW CONNECTIONS ONLY)

Each new property owner to the sewer network would pay the average local share of the user's cost in the initial phase of the sewer construction. Property owners already connected to public sewers would not be assessed for improvements. Particular construction difficulties in various parts of the system would be apportioned equally to all users. This method more fairly allocates cost to a user on the basis of benefits received. All or a portion of the assessment to an undeveloped property could be deferred until that property is developed.

4. AVERAGE UNIT COST ASSESSMENT (FOR ALL CONNECTIONS)

This assessment method is the same as the previous method, except the wastewater facilities construction cost is apportioned equally to sewer users. This method will meet some resistance from existing property owners already connected to sewers. A variation would consist of establishing two different assessment values, one for users connected to sewers and another for properties to be sewered. This method would recognize that existing users benefit from the project, but to an extent less than those in the newly added service area.

5. BASED ON ASSESSED VALUATION

Each property's sewer assessment could be determined by that property's valuation relative to the total of all valuations in the Sewer Service Area. An assessment based on the increase in property value would require the services of an appraisal firm that would calculate the increased property value that each business/industrial parcel would derive from having sewer service provided to it. This increased value would be the betterment assessment that the property owner would be charged. The assessment policy based on property values would collect more money from undeveloped land in the business/industrial zones, as the property values will increase even though there is no wastewater being produced on these parcels.

6. WASTEWATER FLOW BASED ASSESSMENT

Under an assessment policy based on wastewater flow, a business would be charged based on the amount of flow it is expected to discharge. If a business is expected to use twice the amount of water as a single-family house, then the business would be charged twice what the homeowner pays.

Tolland currently follows this method. The costs described below are as of July 1, 2004 and shall be adjusted January 1st of each year by the Engineering News Record Construction Cost Index (ENRCCI).

- Single family residential properties are assessed $8,000.
- Multifamily residential properties are assessed $6,000 per residential unit.
- Commercial/industrial properties are assessed $10,000 per assessable acre based on an estimated average flow of 345 gallons per day per assessable acre.
- Municipal properties within the Gateway Design District area are assessed $10,000 per assessessable acre based on an estimated average flow of 345 gallons per day per assessable acre.
- Municipal properties outside the Gateway Design District and other nonprofits are assessed based on $8,000 per EDU.
- Municipal properties designated as open space are deferred assessment until a change in use is proposed.
- Land designated as PA490, as defined under Section 12-107b(c) of the Connecticut general Statutes, are deferred assessments until such time as the land is no longer designated as PA490.
- Other than the previously designated categories shall be assessed on a project-by-project basis given due regard to the above described assessments and other pertinent factors as determined by the WPCA.

G. GENERAL TAXATION

In many cases, projects are funded from general taxation. This is often necessary to prevent the sewer betterment assessments from exceeding the increase in property value due to new sewer service. This method recognizes the benefit of the sewer project (e.g., environmental improvements and economic benefits) to the community as a whole. In addition, it spreads the

costs over a larger population, reducing the cost on a unit basis. By moving a portion of the costs to the general taxation, the users may realize end-of-year income tax benefits for these payments when payments are deductible for the individual homeowners, as opposed to including the costs as sewer user fees (which do not have the same advantage).

H. BUILDING CONNECTION CHARGE

"A connection charge, referenced in CSG 7-255, may be levied at the time of connection with the sewer and is generally in addition to the benefit assessment. Connection charges take basically two forms. The first, which exists while the debt for the sewer system is still active, generally covers the municipal cost of processing a permit to connect, including the inspection of the connection. The second, which usually occurs after the capital debt for the sewer has been paid off, covers both the permit processing costs and a lump-sum payment in lieu of a benefit assessment to compensate the Town for future capacity improvements (both in Tolland and the surrounding communities to which Tolland discharges). In the latter case, the funds collected in lieu of a benefit assessment are available for use for any capital costs within the existing or proposed municipal sewerage system.

The ability to use funds collected as benefit assessments or connection charges is restricted by CGS 7-267. This statute requires that funds collected for the sewerage system must be kept separate from other municipal funds and may not be transferred or used for anything but the costs associated with the sewerage system. This means that, regardless of the other fiscal needs of the community, money that has been collected for the operation, maintenance, or debt retirement of the sewerage system cannot be transferred or reallocated to other municipal accounts."

Source: Methods of Capital Cost Recovery on Water Pollution Control Projects: A summary and Analysis of the 1995 Sewer Benefit Assessment Survey by Dennis Greci of the Connecticut Department of Environmental Protection Bureau of Water Management.

In Tolland, a connection charge is set either of two ways:

(1) For properties connecting to public sewers which discharge to Vernon (prior to Tolland's full payment of its share of Vernon's sewerage system) shall pay a charge consisting of:

- The charge imposed by the intermunicipal agreement dated April 6, 1989, as adjusted by the ENRCCI every January 1st for inflation.
- The property connection shall also pay an administrative fee of $100 or as set annually by the WPCA.

(2) For properties developed after the Town's payment in full of the costs of any part of the sewage system, a charge consisting of:

- The charge imposed by the intermunicipal agreement dated April 6, 1989, as adjusted by the ENRCCI every January 1st for inflation.
- The property connection shall also pay an administrative fee of $100 or as set annually by the WPCA.
- Additional charges (adjusted January 1st of each year to the ENRCCI) calculated as:
    - Single family residence: $8,000 per residential unit
    - Multifamily residential: $6,000 per residential unit

- Commercial/industrial properties: $10,000 per assessable acre
- Municipal designated Gateway Design District: $10,000 per assessable acre
- Other municipal/nonprofits: $8,000 per EDU.

I. OPERATION AND MAINTENANCE FEES

For projects which receive state funds under the Construction Grants Program, regulations require that the costs for operation and maintenance of these facilities be allocated to and paid for by sewer system users. A user charge system should distribute the cost of operation and maintenance of sewage collection and treatment works to each user or user class in proportion to the user's contribution to total wastewater loading of the treatment works. Factors such as strength, volume, cost of Operation and Maintenance (O&M) at the WPCF where the wastewater is discharged, and delivery flow rate characteristics must be considered. These factors must be included as the basis for the user's contribution to ensure a proportional distribution of operation and maintenance cost to each user. For residential users, this is commonly reduced to a unit cost for simplicity of administration.

Most municipalities apportion the cost of operation and maintenance of the facilities to the users on the basis of the equivalent residential unit (single family) system already in use. The majority of sewer users would typically discharge wastewater of normal domestic strength. This method of apportionment meets state and federal regulations and provides the most equitable and simple arrangement. User fees for commercial and industrial properties would be equated on flow rates as they relate to flow contribution from a typical residential unit, and surcharges could be put in place for higher strength wastewaters. An interactive computer spreadsheet program to evaluate the impact of various user charges to maintain Tolland's infrastructure and to contribute to the surrounding communities with wastewater treatment facilities should be created to help assist the WPCA set budgets and assign fees to recoup the cost.

J. ANNUAL COSTS

Many factors will affect the annual costs borne by sewer users, including the actual number of hookups, quantities of wastewater flows generated, usage fees, equipment maintenance and utility fees. The use of general taxation to levy costs for non-users to pay for a portion of wastewater improvements is often considered, and would be based on the mil rate for the chosen system. To estimate the cost for non-users, multiply the property valuation in thousands of dollars by the mil rate increase of the improvements.

K. COST OF SEPTIC SYSTEM REHABILITATION

It is interesting to compare the costs for the proposed sewerage program with the costs that would be incurred to repair an individual failed subsurface disposal system. Costs for innovative and alternative individual septic system repairs, on the lots where repairs are difficult, typically range from $20,000 to $40,000 (with even higher costs possible) depending on the amount of fill required, spatial concerns, technology required and pumping requirements. Repairs to septic systems would likely be paid via a home improvement loan, which at 6 percent interest and five-year term would cost $4,700 to $9,500 annually for the capital cost range above. These costs would typically be significantly greater than the annual cost of new sewers. Furthermore, such repairs/replacements would not be elgible for DEP funding though DPH or EPA monies may be obtained.

XII. APPENDICES

APPENDIX A: INTERMUNICIPAL AGREEMENT

TOWN OF TOLLAND

TOLLAND/VERNON INTERMUNICIPAL AGREEMENT

Agreement made and concluded this, the 6th day of April .1989, and between the Town of Tolland, a municipal corporation organized and isting under the laws of the State of Connecticut, hereinafter called olland", acting through its Water Pollution Control Authority, and the wn of Vernon, a municipal corporation organized under the laws of the ate of Connecticut, hereinafter called "Vernon", acting through its ter Pollution Control Authority, duly authorized, and both acting rsuant to Chapter 103 of the Connecticut General Statutes, as amended.

WITNESSETH

WHEREAS, Vernon has constructed and operates a sewerage system; and

WHEREAS, Tolland desires to enter into an agreement with Vernon for wage and septage treatment, and to share the costs thereof with Vernon;

WHEREAS, Vernon will agree, under certain conditions, to receive nitary sewage, septage, and industrial waste from Tolland at the Vernon wage Treatment Plant; and

WHEREAS, Vernon is endeavoring to establish and/or acquire the essary facilities for land disposal of sludge and/or ash generated by wage and septage treated at the Vernon Sewage Treatment Plant, to the ent this search is in Tolland, the Town of Tolland will cooperate in s endeavor.

NOW, THEREFORE, the parties hereto for the consideration hereinafter es, agree as follows:

Suspended Solids (Abbreviated SS): Shall mean solids that either float on the surface of, or are in suspension in water, or sewage, or wastewater, or other liquids and which are removable by laboratory filtering, expressed in milligrams per liter by weight (or pounds per day.)

Combined Sewer: Shall mean a drain or sewer receiving stormwater runoff, in addition to sanitary sewage and/or industrial wastes.

Wastewaters: Shall mean the combined sanitary sewage, industrial wastes, and normal infiltration.

Average Daily Flow: Shall mean the total annual flow as measured at a metering station, divided by a number of days in the year.

Peak Hourly Flow Rate: Shall mean the maximum rate of sewage flow occurring over any one hour duration, expressed in million gallons per day. Such rate has been established by accepted engineering guidelines.

Operating and Maintenance Costs: The costs for operation and maintenance of any sewerage facility, including but not limited to, direct costs of labor, materials, chemicals, power, fuel, equipment replacement, administration, and other expenses directly attributable to proper operation and maintenance.

Capital Cost: Capital cost shall mean the net local cost after Federal and State Aid of constructing any facilities, or any modification to an existing facility. Capital costs shall include but not necessarily be limited to, administrative and construction costs, engineering and legal fees, interest charges, costs of acquiring land and easements, and legal and surveying costs associated with acquiring land and easements.

icle B. Waste Water Characteristics:

Tolland will not connect any combined sewer into Vernon's sewer system and will not discharge into the sewer system of Vernon any drainage, sewer substances or wastes containing such characteristics and/or volume determined to be excessive by the State of Connecticut Department of Environmental Protection and/or the Town of Vernon, or wastewaters which are not amenable to treatment or reduction by the sewage treatment processes employed, or, which are amenable to treatment only to such a degree that the Sewage Treatment Plant cannot meet the effluent discharge requirements of a State and/or Federal agency having jurisdiction over the discharge of wastewaters. The Town of Tolland shall adopt within six months of the effective date of this intermunicipal agreement, a sewer use regulation approved by the Connecticut Department of Environmental Protection. Such regulation shall include sections similar in scope and intent to the Vernon Sewer Use Regulations Section III (General Requirements for Disposal of Community Wastes) and Section IV (Wastes Which May and Wastes Which Shall Be Discharged Into Public Sewers and Drains) which provide for the quality of wastewater to be discharged. In addition, such regulation shall include other appropriate administrative requirements which provide for the physical integrity of the sewer system. Until such time as Tolland adopts such regulations, it shall use and apply the Vernon Sewer Use Regulations.

Tolland's ultimate average daily flow into the Vernon Sewerage System shall not exceed 1.0 MGD and the peak hourly flow rate shall not exceed 3.8 times the 1.0 MGD limitation. The ultimate average daily flow is anticipated to be divided between the Route 74 connection at 0.25 MGD and the Route 30 connection at 0.75 MGD.

Revised to 50/50 "SPRING" 1992

All facilities, including sewers and pumping stations constructed by Tolland, in Tolland, will be constructed, operated and maintained in accordance with current Federal and State engineering guidelines and professional engineering practices and applicable sewer use regulations in effect for the Town of Tolland pursuant to paragraph 2 of Article B of this agreement. Facilities currently in place shall, whenever feasible, be upgraded as necessary to meet such standards. For the purpose of establishing total flow from Tolland, sewage flow shall be estimated by acceptable engineering practices utilizing an accounting of individual connections in Tolland. The Town of Vernon shall have the option of requiring flow meters if it is determined by testing with a temporary flow meter that inflow/infiltration is excessive and not in line with flow figures presented using alternate engineering methods. If required by Vernon, Tolland shall install and maintain flow meters at major points of interconnection between Tolland and Vernon. Tolland may elect at its sole discretion to install and maintain flow meters at any or all major points of interconnection between Tolland and Vernon. Tolland shall provide to Vernon a quarterly accounting of all connections to the sewer. Exceeding flow values, as defined in Article B.3 and 4 will result in a re-evaluation of Tolland's contribution to capital costs (refer to Article E).

If other than domestic sanitary sewage discharged in Tolland is to be conveyed to the Vernon STP, then reasonable sampling and laboratory analysis of said wastewater including the location and frequency of sampling and analysis shall be accomplished at the discretion of Vernon. Total costs of said analysis will be borne by Tolland for laboratory analysis which cannot be performed at the Vernon STP.

ticle E. Allocation and Payments of Capital Costs

Sewage Treatment Plant - Existing Plant

a. Tolland agrees to pay Vernon a share of the total capital costs, plus accrued interest at the applicable bond rates, for the Vernon STP constructed under U. S. Environmental Protection Agency, Project No. C090180-01 in proportion to the ratio of the average daily Tolland flow of 0.40 MGD to the STP average daily flow of 6.42 MGD. Tolland is entitled to a maximum loading at the STP equal to 1000 pounds per day BOD and 1170 pounds per day total suspended solids in accordance with Sewer Use Regulations No. 1. Tolland's share of the STP capital costs shall be calculated by multiplying its ratio of 0.40 to 6.42 times the net local STP capital costs, as defined in Article A.16. This total capital cost share, less $58,000.00 previously received from Tolland, may be paid to Vernon on or before July 15, 1989. If a one-time payment is not elected by Tolland, then Tolland may make payment to Vernon as annual debt service payment for the principal and semi-annual payment for interest due in accordance with Vernon's payment schedule for the remaining bond life provided Tolland reimburses its share of all previous annual debt service paid for by Vernon on or before July 15, 1989. Payments shall be due upon receipt of invoice. If payments are not made within one month of such due date, the payment shall be deemed delinquent and subject to an interest penalty of 1 1/2% per month from the due date. The interest penalty is subject to change to conform with current public acts, general statutes and Vernon ordinances. Any payments shall be subject to further adjustment upon completion of an audit for EPA Project C090180-01.

plant. Payment shall be due upon receipt of invoice. If payments are not made within one month of such due date, the payment shall be deemed delinquent and subject to an interest penalty of 1 1/2% per month from the due date. The interest penalty is subject to change to conform with current public acts, general statutes and Vernon ordinances.

Collection System

a. For new and replacement sewers constructed by Vernon which carry wastes both from Tolland and Vernon, capital costs will be apportioned in accordance with the ratio of peak hourly flows of each town, except as provided in subparagraph 3.b. hereof:

b. Exceptions to subparagraph 3.a:

1.) For any sewer in Vernon which carries Tolland sewage and which becomes overloaded due to additional flow originating in Tolland, then Tolland shall assume the total costs of installing the new sewer.

2.) For any sewer in Vernon which carries Tolland sewage and which becomes overloaded due to additional flow originating in Vernon, then Vernon shall assume the total costs of installing the new sewer. In either case, if the sewer is defective and in need of replacement, the cost for the new sewer shall be apportioned in accordance with the ratio peak hourly flows of each town.

c. Any capital costs incurred by sewer infiltration/inflow reduction projects within the Vernon system which directly or indirectly enhance capacity in sewer lines conveying Tolland flows, shall be shared by Tolland in accordance with the applicable ratio of peak hourly flows, as determined prior to infiltration/inflow reduction. Such projects may include storm drain connection

ticle F. Allocation of Operating and Maintenance Costs

Tolland shall collect user charges from its users. Tolland agrees to pay user charges to Vernon in accordance with Vernon's User Charges Schedule which is utilized to invoice its users within the geographical limits of Vernon. A notice of proposed user rate charges shall be given to Tolland prior to public hearings.

For any maintenance work performed in Tolland by Vernon on Tolland sewer lines, all costs will be borne by Tolland. If required in the future, Tolland shall assume full responsibility for costs of maintaining and operating any and all metering systems which serve to meter on the Tolland sewage flows. Tolland shall have the right of inspection of all joint facilities at reasonable times.

The Town of Vernon shall establish an escrow account for the receipt of connection (outlet charges) for each new connection within Vernon and Tolland which is tributary to the Rockville trunk sewer service area made after the execution of this agreement. The connection charges which are to be deposited into the escrow account shall be $400 per residential connection and $500 per 1,500 square feet of industrial/commercial property connected to the sewer. These rates shall be increased on an annual basis (January 1 of each year) based upon the increase in the Engineering News Record Construction Cost Index. The reference date for comparison shall be the month of the date of this agreement. Notwithstanding the above, either town may elect to establish townwide connection charges in excess of the rates identified above as those rates have been established solely for the purpose of determining the amount to be deposited into the escrow account.

The parties hereto agree that any dispute arising between Vernon and Tolland to the interpretation of the Agreement shall be first mediated in a manner acceptable to both parties. However, both parties retain the right to proceed to judicial action at any time when either party determines mediation to be unsatisfactory in reaching a resolution to the dispute.

ticle J. Audit

Vernon agrees to keep books and records of all expenditures and disbursements concerning any facility covered by this Agreement in accordance with good accounting practices and shall also render to Tolland, at least annually, a financial statement setting forth a summary of such receipts and disbursements.

Vernon also agrees that all of its books, records, accounts, statements and any other memoranda concerning the construction, maintenance and operation of any facility covered by this Agreement and the records of costs thereof, shall be subject to inspection and audit by Tolland at all reasonable times.

ticle K. Infiltration and Inflow Reduction

For sanitary sewers in Tolland, Tolland hereby agrees to conduct an Infiltration/Inflow Program to minimize infiltration and inflow into the Tolland sanitary sewer system, when it has been determined that Tolland's flow exceeds those defined in Article B. Tolland further agrees to pay the cost of analyses and studies of its own sewer system.

THE TOWN OF TOLLAND

TEST: Elaine H. Bugbee

Town Clerk

BY: John B. Harkins
John B. Harkins, Town Manager

DATE: April 6. 1989

TEST: Elaine H. Bugbee

Town Clerk

TOLLAND WATER POLLUTION CONTROL AUTHORITY

BY: Stewart R. Joslin
Stewart Joslin, Chairman
Tolland Town Council

DATE: April 6, 1989

THE TOWN OF VERNON

TEST: Henry F. Bettis
Henry F. Bettis

Town Clerk of
Vernon

BY: Stephen C. Marcham
Stephen C. Marcham, Mayor

DATE: 4-6-89

VERNON WATER POLLUTION CONTROL AUTHORITY

TEST: Henry F. Bettis
Henry F. Bettis

Town Clerk of
Vernon

BY: Thomas DiDio
Thomas Didio, Chairman, W.P.C.A.

DATE: 4/6/89

APPENDIX B: QUESTIONNAIRE RESPONSES

TOWN OF TOLLAND

DRAFT

Septic System Questionnaire Results

Tolland Wastewater Facilities Plan – Phase 2

June 13th, 2008

Questionnaire Statistics

4,876 Sent

1,836 Returned (38%)

1,836 Inputted (38%)

FUSS & O'NEILL

Disciplines to Deliver

Anthony Road Area

Questionnaires Sent:	179
Questionnaires Returned by Property Owner:	77
Percent of Questionnaires Returned:	43.0%

Are you the owner of this property? 96% Yes 0% No

Are you currently or plan to retire in the next 10 years? 57% Yes 34% No

How long have you owned or lived at this location? 26.9 years

Age of main building: 51.2 years

Number of bedrooms: 2.9

Number of permanent residents: 2.2

Number of seasonal residents: 0.9

Length of seasonal resident stay: 51.7 days

How many seasonal residents plan to become permanent residents?

62% None _____ (People) in _____ (Years)

Property Use

96% Single family residential
0% Multi-family (Number of Units: _____)
0% Condominium/Apartment
3% Vacant
3% Other: Responses Vary

Septic System Location

6% Front yard
82% Backyard
4% Other: Responses Vary
5% Left of Main Building
6% Right of Main Building

What type of wastewater disposal system do you have?

95% Septic Tank/Leaching Field
0% Cesspool
1% Pressure Distribution
0% Surface Discharge
0% Don't Know
0% Other: Responses Vary

Do you share the wastewater disposal system with another entity (i.e. multi-tenant building, neighbor)?

0% Yes, who: Responses Vary 94% No

How old is your septic system disposal (leaching) field? 21% Don't know 24.7 (Years)

Are any of the following connected to your wastewater disposal system?

79% Washing Machine
66% Dishwasher
34% Garbage Disposal
3% Sump Pump
1% Jacuzzi Tub
0% Water Softener
0% Water Chlorinator
0% Oil/Water Separator
0% Grease Trap

Approximately how often do you get your septic tank pumped?

10% More than 5 years
43% Every 3 to 5 years
32% Once every 2 years
9% Once per year
1% More than once per year
1% Never

Do you have a separate leaching field or dry well for "gray water" (sinks, showers, washing machine) 17% Yes 69% No 12% Don't Know

How much would you guess it might cost to replace a septic system disposal (leaching) field?

$13,127

35% I paid for a repair before
31% I've never paid for a repair

Do you have any of the following problems with your wastewater disposal system?

66% This property has never had any problems

	Spring	Summer	Fall	Winter
Disposal field is muddy	9%	0%	4%	3%
Drains slowly or backs up	1%	0%	0%	1%
Flows onto ground surface	1%	1%	1%	1%
Odors	3%	3%	0%	0%
Other (Describe)	3%	1%	1%	1%

Does the problem seem to be linked to a specific event (washing clothes, heavy rains, visitors, etc)?

_____

Responses Vary

Has your wastewater disposal system ever been repaired?

66% Yes 12% No 18% Don't Know

Has more than one repair been made?

6% Yes 53% No 34% Don't Know

When was the repair made? _____ (MONTH/YEAR)

What was done? (Check all that apply)

58% Replace septic tank
45% Replace leaching field
8% Replace septic tank baffle
9% Other: Responses Vary
4% Add to leaching field
5% Not Applicable

What was the approximate repair cost? $8,555

SURVEY CONTINUES ON BACK

Are you aware of other wastewater disposal problems in your neighborhood 21% Ye 70% No

What type of water supply do you have?

0% Unknown Water Supply
12% Private Well: 0% Dug Well 14% Drilled Well
32% Community Well
45% Public Water Company: Responses Vary

If so, have you had your well water tested?

23% Yes
30% No Reason: Responses Vary

Do you have any of the following low-flow appliances?

25% Front Loading Washing Machine
39% Faucet flow restrictors
61% Toilet with 1.6 gallon per flush (or less)
53% Low-flow showerheads
1% Other: Responses Vary

Do you have these soil is at your property?

12% Sand 23% Clay 12% Till 12% Other: Responses Vary

At your property, what is the approximate depth of groundwater?

86% Don't Know 15 feet

Have you ever experienced flooding or surface drainage problems on your property?

45% Yes 42% No 8% Don't Know

Are you aware of any local wells or springs that may have been adversely affected by septic system flow? 4% Yes 95% No

Even if no obvious problems exist, are you concerned that your septic system is not properly treating the wastewater which passes through it? 17% Yes 79% No

How concerned are you that installed septic systems will have an adverse affect on ground and surface water quality in your area?

8% Extremely Concerned
8% Very Concerned
22% Concerned
19% Somewhat concerned
38% Not concerned

In your opinion, is it worthwhile to investigate the effect of septic systems on surface and groundwater quality in your area 47% Yes 43% No

In your opinion, is it worthwhile to investigate methods other than individual on-site septic systems for collecting and treating wastewater produced in your area? 48% Yes 44% No

Do you think a public sewer is needed in your neighborhood? 35% Yes 52% No

What areas of interest led you to fill out this survey?

83% Property Owner
19% Environmental Interest
0% Neighborhood Association
3% Technical Interest
10% Other: Responses Vary

Should fixed income households be allowed to defer paying taxes and fees to fix wastewater disposal problems, until selling their property?

73% Yes 13% No

PLEASE COMPLETE BOTH SIDES OF SURVEY

If the Town needs to expend money to fix wastewater disposal problems in a neighborhood, the Town aggressively pursues grants to pay for the capital improvements. However, if a public sewering option is needed, and the grants are not available or insufficient to pay for the needed capital improvements, how would you prefer the Town to pay for the capital improvements?

6% A one-time upfront charge paid by each property owner, plus monthly bills for service
22% A one-time upfront charge paid over twenty years by each property owner, plus monthly bills for service
19% A monthly bill after connecting to the system
31% Property taxes (which are deductible on your federal and state income taxes)
18% If it costs me money, I wouldn't want to fix water pollution problems which affect my community

Comments:

Responses Vary

Anthony Road Area

Apple Road Area

Questionnaires Sent:	130
Questionnaires Returned by Property Owner:	48
Percent of Questionnaires Returned:	36.9%

Are you the owner of this property? 94% Yes 0% No

Are you currently or plan to retire in the next 10 years? 60% Yes 38% No

How long have you owned or lived at this location? 24.5 years

Age of main building: 37.7 years

Number of bedrooms: 3.4

Number of permanent residents: 2.5

Number of seasonal residents: 1.2

Length of seasonal resident stay: 75.0 days

How many seasonal residents plan to become permanent residents?

67% None _____ (People) in _____ (Years)

Property Use

96% Single family residential
0% Multi-family (Number of Units: _____)
0% Condominium/Apartment
0% Vacant
0% Other: Responses Vary

Septic System Location

10% Front yard
81% Backyard
2% Other: Responses Vary
10% Left of Main Building
6% Right of Main Building

What type of wastewater disposal system do you have?

100% Septic Tank/Leaching Field
0% Cesspool
0% Pressure Distribution
0% Surface Discharge
0% Don't Know
0% Other: Responses Vary

Do you share the wastewater disposal system with another entity (i.e. multi-tenant building, neighbor)?

0% Yes, who: Responses Vary 100% No

How old is your septic system disposal (leaching) field? 25% Don't know 23.1 (Years)

Are any of the following connected to your wastewater disposal system?

85% Washing Machine
85% Dishwasher
29% Garbage Disposal
4% Sump Pump
0% Jacuzzi Tub
38% Water Softener
2% Water Chlorinator
0% Oil/Water Separator
0% Grease Trap

Approximately how often do you get your septic tank pumped?

4% More than 5 years
31% Every 3 to 5 years
48% Once every 2 years
15% Once per year
2% More than once per year
0% Never

Do you have a separate leaching field or dry well for "gray water" (sinks, showers, washing machine) 4% Yes 85% No 8% Don't Know

How much would you guess it might cost to replace a septic system disposal (leaching) field? $12,946

25% I paid for a repair before
56% I've never paid for a repair

Do you have any of the following problems with your wastewater disposal system?

60% This property has never had any problems

	Spring	Summer	Fall	Winter
Disposal field is muddy	8%	0%	0%	0%
Drains slowly or backs up	6%	0%	2%	0%
Flows onto ground surface	4%	0%	0%	0%
Odors	4%	4%	4%	2%
Other (Describe)	0%	0%	0%	0%

Does the problem seem to be linked to a specific event (washing clothes, heavy rains, visitors, etc)?

_____

Responses Vary

Has your wastewater disposal system ever been repaired?

27% Yes 56% No 13% Don't Know

Has more than one repair been made?

4% Yes 63% No 17% Don't Know

When was the repair made? _____ (MONTH/YEAR)

What was done? (Check all that apply)

21% Replace septic tank
23% Replace leaching field
2% Replace septic tank baffle
2% Other: Responses Vary
13% Add to leaching field
13% Not Applicable

What was the approximate repair cost? $10,338

SURVEY CONTINUES ON BACK

Are you aware of other wastewater disposal problems in your neighborhood 31% Ye 44% No

What type of water supply do you have?

0% Unknown Water Supply
65% Private Well: 0% Dug Well 69% Drilled Well
0% Community Well
0% Public Water Company: Responses Vary

If so, have you had your well water tested?

65% Yes
27% No Reason: Responses Vary

Do you have any of the following low-flow appliances?

33% Front Loading Washing Machine
35% Faucet flow restrictors
69% Toilet with 1.6 gallon per flush (or less)
50% Low-flow showerheads
0% Other: Responses Vary

Do you have these soil is at your property?

21% Sand 17% Clay 4% Till 6% Other: Responses Vary

At your property, what is the approximate depth of groundwater?

92% Don't Know 38 feet

Have you ever experienced flooding or surface drainage problems on your property?

33% Yes 65% No 2% Don't Know

Are you aware of any local wells or springs that may have been adversely affected by septic system flow? 4% Yes 90% No

Even if no obvious problems exist, are you concerned that your septic system is not properly treating the wastewater which passes through it? 8% Yes 88% No

How concerned are you that installed septic systems will have an adverse affect on ground and surface water quality in your area?

2% Extremely Concerned
0% Very Concerned
25% Concerned
19% Somewhat concerned
46% Not concerned

In your opinion, is it worthwhile to investigate the effect of septic systems on surface and groundwater quality in your area 42% Yes 50% No

In your opinion, is it worthwhile to investigate methods other than individual on-site septic systems for collecting and treating wastewater produced in your area? 42% Yes 54% No

Do you think a public sewer is needed in your neighborhood? 23% Yes 73% No

What areas of interest led you to fill out this survey?

83% Property Owner
21% Environmental Interest
0% Neighborhood Association
0% Technical Interest
8% Other: Responses Vary

Should fixed income households be allowed to defer paying taxes and fees to fix wastewater disposal problems, until selling their property?

63% Yes 25% No

PLEASE COMPLETE BOTH SIDES OF SURVEY

If the Town needs to expend money to fix wastewater disposal problems in a neighborhood, the Town aggressively pursues grants to pay for the capital improvements. However, if a public sewering option is needed, and the grants are not available or insufficient to pay for the needed capital improvements, how would you prefer the Town to pay for the capital improvements?

0% A one-time upfront charge paid by each property owner, plus monthly bills for service
15% A one-time upfront charge paid over twenty years by each property owner, plus monthly bills for service
27% A monthly bill after connecting to the system
23% Property taxes (which are deductible on your federal and state income taxes)
13% If it costs me money, I wouldn't want to fix water pollution problems which affect my community

Comments:

Responses Vary

Apple Road Area

Cedar Swamp Road Area

Questionnaires Sent:	21
Questionnaires Returned by Property Owner:	13
Percent of Questionnaires Returned:	61.9%

Are you the owner of this property? 100% Yes 0% No

Are you currently or plan to retire in the next 10 years? 62% Yes 15% No

How long have you owned or lived at this location? 30.8 years

Age of main building: 56.2 years

Number of bedrooms: 2.8

Number of permanent residents: 2.1

Number of seasonal residents: 2.5

Length of seasonal resident stay: 185.0 days

How many seasonal residents plan to become permanent residents?

85% None _____ (People) in _____ (Years)

Property Use

85% Single family residential
0% Multi-family (Number of Units: _____)
0% Condominium/Apartment
8% Vacant
8% Other: Responses Vary

Septic System Location

38% Front yard
46% Backyard
0% Other: Responses Vary
0% Left of Main Building
8% Right of Main Building

What type of wastewater disposal system do you have?

92% Septic Tank/Leaching Field
0% Cesspool
0% Pressure Distribution
0% Surface Discharge
0% Don't Know
0% Other: Responses Vary

Do you share the wastewater disposal system with another entity (i.e. multi-tenant building, neighbor)?

0% Yes, who: Responses Vary 92% No

How old is your septic system disposal (leaching) field? 8% Don't know 29.3 (Years)

Are any of the following connected to your wastewater disposal system?

62% Washing Machine
62% Dishwasher
8% Garbage Disposal
0% Sump Pump
0% Jacuzzi Tub
31% Water Softener
0% Water Chlorinator
0% Oil/Water Separator
0% Grease Trap

Approximately how often do you get your septic tank pumped?

8% More than 5 years
31% Every 3 to 5 years
54% Once every 2 years
0% Once per year
0% More than once per year
0% Never

Do you have a separate leaching field or dry well for "gray water" (sinks, showers, washing machine) 31% Yes 54% No 8% Don't Know

How much would you guess it might cost to replace a septic system disposal (leaching) field?

$10,000

0% I paid for a repair before
31% I've never paid for a repair

Do you have any of the following problems with your wastewater disposal system?

85% This property has never had any problems

	Spring	Summer	Fall	Winter
Disposal field is muddy	0%	0%	0%	0%
Drains slowly or backs up	0%	0%	0%	0%
Flows onto ground surface	0%	0%	0%	0%
Odors	0%	0%	0%	0%
Other (Describe)	0%	0%	0%	0%

Does the problem seem to be linked to a specific event (washing clothes, heavy rains, visitors, etc)?

_____

Responses Vary

Has your wastewater disposal system ever been repaired?

23% Yes 54% No 8% Don't Know

Has more than one repair been made?

0% Yes 54% No 8% Don't Know

When was the repair made? _____ (MONTH/YEAR)

What was done? (Check all that apply)

23% Replace septic tank
0% Replace leaching field
15% Replace septic tank baffle
15% Other: Responses Vary
8% Add to leaching field
8% Not Applicable

What was the approximate repair cost? $2,000

SURVEY CONTINUES ON BACK

Are you aware of other wastewater disposal problems in your neighborhood 0% Ye 69% No

What type of water supply do you have?

0% Unknown Water Supply
46% Private Well: 8% Dug Well 54% Drilled Well
0% Community Well
0% Public Water Company: Responses Vary

If so, have you had your well water tested?

69% Yes
8% No Reason: Responses Vary

Do you have any of the following low-flow appliances?

23% Front Loading Washing Machine
23% Faucet flow restrictors
69% Toilet with 1.6 gallon per flush (or less)
62% Low-flow showerheads
0% Other: Responses Vary

Do you have these soil is at your property?

23% Sand 23% Clay 8% Till 0% Other: Responses Vary

At your property, what is the approximate depth of groundwater?

62% Don't Know 31 feet

Have you ever experienced flooding or surface drainage problems on your property?

15% Yes 69% No 0% Don't Know

Are you aware of any local wells or springs that may have been adversely affected by septic system flow? 8% Yes 85% No

Even if no obvious problems exist, are you concerned that your septic system is not properly treating the wastewater which passes through it? 8% Yes 85% No

How concerned are you that installed septic systems will have an adverse affect on ground and surface water quality in your area?

0% Extremely Concerned
0% Very Concerned
23% Concerned
0% Somewhat concerned
62% Not concerned

In your opinion, is it worthwhile to investigate the effect of septic systems on surface and groundwater quality in your area 15% Yes 62% No

In your opinion, is it worthwhile to investigate methods other than individual on-site septic systems for collecting and treating wastewater produced in your area? 15% Yes 62% No

Do you think a public sewer is needed in your neighborhood? 0% Yes 69% No

What areas of interest led you to fill out this survey?

62% Property Owner
15% Environmental Interest
0% Neighborhood Association
0% Technical Interest
8% Other: Responses Vary

Should fixed income households be allowed to defer paying taxes and fees to fix wastewater disposal problems, until selling their property?

54% Yes 15% No

PLEASE COMPLETE BOTH SIDES OF SURVEY

If the Town needs to expend money to fix wastewater disposal problems in a neighborhood, the Town aggressively pursues grants to pay for the capital improvements. However, if a public sewering option is needed, and the grants are not available or insufficient to pay for the needed capital improvements, how would you prefer the Town to pay for the capital improvements?

0% A one-time upfront charge paid by each property owner, plus monthly bills for service
23% A one-time upfront charge paid over twenty years by each property owner, plus monthly bills for service
15% A monthly bill after connecting to the system
8% Property taxes (which are deductible on your federal and state income taxes)
23% If it costs me money, I wouldn't want to fix water pollution problems which affect my community

Comments:

Responses Vary

Cedar Swamp Road Area

Center Road Area

Questionnaires Sent:	46
Questionnaires Returned by Property Owner:	25
Percent of Questionnaires Returned:	54.3%

Are you the owner of this property? 96% Yes 0% No

Are you currently or plan to retire in the next 10 years? 48% Yes 44% No

How long have you owned or lived at this location? 17.8 years

Age of main building: 33.0 years

Number of bedrooms: 3.8

Number of permanent residents: 2.8

Number of seasonal residents: 1.6

Length of seasonal resident stay: 38.6 days

How many seasonal residents plan to become permanent residents?

76% None 2.0 (People) in 5.0 (Years)

Property Use

100% Single family residential
0% Multi-family (Number of Units: _____)
0% Condominium/Apartment
0% Vacant
0% Other: Responses Vary

Septic System Location

4% Front yard 16% Left of Main Building
60% Backyard 20% Right of Main Building
0% Other: Responses Vary

What type of wastewater disposal system do you have?

100% Septic Tank/Leaching Field
0% Cesspool
0% Pressure Distribution
0% Surface Discharge
0% Don't Know
0% Other: Responses Vary

Do you share the wastewater disposal system with another entity (i.e. multi-tenant building, neighbor)?

0% Yes, who: Responses Vary 96% No

How old is your septic system disposal (leaching) field? 8% Don't know 27.4 (Years)

Are any of the following connected to your wastewater disposal system?

100% Washing Machine
100% Dishwasher
92% Garbage Disposal
0% Sump Pump
0% Jacuzzi Tub
12% Water Softener
0% Water Chlorinator
0% Oil/Water Separator
0% Grease Trap

Approximately how often do you get your septic tank pumped?

4% More than 5 years
52% Every 3 to 5 years
24% Once every 2 years
16% Once per year
0% More than once per year
0% Never

Do you have a separate leaching field or dry well for "gray water" (sinks, showers, washing machine) 4% Yes 80% No 12% Don't Know

How much would you guess it might cost to replace a septic system disposal (leaching) field?

$15,633

4% I paid for a repair before
76% I've never paid for a repair

Do you have any of the following problems with your wastewater disposal system?

84% This property has never had any problems

	Spring	Summer	Fall	Winter
Disposal field is muddy	0%	0%	0%	0%
Drains slowly or backs up	0%	0%	0%	0%
Flows onto ground surface	0%	0%	0%	0%
Odors	0%	4%	4%	8%
Other (Describe)	0%	0%	0%	0%

Does the problem seem to be linked to a specific event (washing clothes, heavy rains, visitors, etc)?

Responses Vary

Has your wastewater disposal system ever been repaired?

16% Yes 44% No 40% Don't Know

Has more than one repair been made?

4% Yes 48% No 40% Don't Know

When was the repair made? _____ (MONTH/YEAR)

What was done? (Check all that apply)

8% Replace septic tank
20% Replace leaching field
8% Replace septic tank baffle
0% Other: Responses Vary
28% Add to leaching field
0% Not Applicable

What was the approximate repair cost? $14,250

SURVEY CONTINUES ON BACK

Are you aware of other wastewater disposal problems in your neighborhood 16% Ye 64% No

What type of water supply do you have?

0% Unknown Water Supply
72% Private Well: 0% Dug Well 68% Drilled Well
0% Community Well
0% Public Water Company: Responses Vary

If so, have you had your well water tested?

52% Yes
44% No Reason: Responses Vary

Do you have any of the following low-flow appliances?

28% Front Loading Washing Machine
24% Faucet flow restrictors
48% Toilet with 1.6 gallon per flush (or less)
60% Low-flow showerheads
0% Other: Responses Vary

Do you have these soil is at your property?

36% Sand 28% Clay 0% Till 4% Other: Responses Vary

At your property, what is the approximate depth of groundwater?

88% Don't Know 91 feet

Have you ever experienced flooding or surface drainage problems on your property?

28% Yes 64% No 8% Don't Know

Are you aware of any local wells or springs that may have been adversely affected by septic system flow? 4% Yes 96% No

Even if no obvious problems exist, are you concerned that your septic system is not properly treating the wastewater which passes through it? 20% Yes 76% No

How concerned are you that installed septic systems will have an adverse affect on ground and surface water quality in your area?

4% Extremely Concerned
8% Very Concerned
28% Concerned
16% Somewhat concerned
44% Not concerned

In your opinion, is it worthwhile to investigate the effect of septic systems on surface and groundwater quality in your area 64% Yes 36% No

In your opinion, is it worthwhile to investigate methods other than individual on-site septic systems for collecting and treating wastewater produced in your area? 64% Yes 36% No

Do you think a public sewer is needed in your neighborhood? 20% Yes 72% No

What areas of interest led you to fill out this survey?

88% Property Owner
28% Environmental Interest
0% Neighborhood Association
8% Technical Interest
8% Other: Responses Vary

Should fixed income households be allowed to defer paying taxes and fees to fix wastewater disposal problems, until selling their property?

72% Yes 20% No

PLEASE COMPLETE BOTH SIDES OF SURVEY

If the Town needs to expend money to fix wastewater disposal problems in a neighborhood, the Town aggressively pursues grants to pay for the capital improvements. However, if a public sewering option is needed, and the grants are not available or insufficient to pay for the needed capital improvements, how would you prefer the Town to pay for the capital improvements?

0% A one-time upfront charge paid by each property owner, plus monthly bills for service
36% A one-time upfront charge paid over twenty years by each property owner, plus monthly bills for service
20% A monthly bill after connecting to the system
36% Property taxes (which are deductible on your federal and state income taxes)
12% If it costs me money, I wouldn't want to fix water pollution problems which affect my community

Comments:

Responses Vary

Center Road Area

Charter Road Area

Questionnaires Sent:	20
Questionnaires Returned by Property Owner:	9
Percent of Questionnaires Returned:	45.0%

Are you the owner of this property? 56% Yes 0% No

Are you currently or plan to retire in the next 10 years? 44% Yes 22% No

How long have you owned or lived at this location? 24.8 years

Age of main building: 37.3 years

Number of bedrooms: 3.2

Number of permanent residents: 1.5

Number of seasonal residents: 0.0

Length of seasonal resident stay: _____ days

How many seasonal residents plan to become permanent residents?

44% None _____ (People) in _____ (Years)

Property Use

67% Single family residential
0% Multi-family (Number of Units: _____)
0% Condominium/Apartment
33% Vacant
0% Other: Responses Vary

Septic System Location

11% Front yard
56% Backyard
0% Other: Responses Vary
0% Left of Main Building
11% Right of Main Building

What type of wastewater disposal system do you have?

67% Septic Tank/Leaching Field
0% Cesspool
0% Pressure Distribution
0% Surface Discharge
0% Don't Know
0% Other: Responses Vary

Do you share the wastewater disposal system with another entity (i.e. multi-tenant building, neighbor)?

0% Yes, who: Responses Vary 67% No

How old is your septic system disposal (leaching) field? 11% Don't know 35.8 (Years)

Are any of the following connected to your wastewater disposal system?

44% Washing Machine
44% Dishwasher
0% Garbage Disposal
0% Sump Pump
0% Jacuzzi Tub
0% Water Softener
0% Water Chlorinator
0% Oil/Water Separator
0% Grease Trap

Approximately how often do you get your septic tank pumped?

22% More than 5 years
33% Every 3 to 5 years
11% Once every 2 years
0% Once per year
0% More than once per year
0% Never

Do you have a separate leaching field or dry well for "gray water" (sinks, showers, washing machine) 0% Yes 22% No 44% Don't Know

How much would you guess it might cost to replace a septic system disposal (leaching) field?

_____

0% I paid for a repair before
56% I've never paid for a repair

Do you have any of the following problems with your wastewater disposal system?

33% This property has never had any problems

	Spring	Summer	Fall	Winter
Disposal field is muddy	0%	0%	0%	0%
Drains slowly or backs up	0%	0%	0%	0%
Flows onto ground surface	0%	0%	0%	0%
Odors	0%	0%	0%	0%
Other (Describe)	0%	0%	0%	0%

Does the problem seem to be linked to a specific event (washing clothes, heavy rains, visitors, etc)?

_____

Responses Vary

_____

Has your wastewater disposal system ever been repaired?

0% Yes 56% No 11% Don't Know

Has more than one repair been made?

0% Yes 56% No 11% Don't Know

When was the repair made? _____ (MONTH/YEAR)

What was done? (Check all that apply)

0% Replace septic tank
0% Replace leaching field
0% Replace septic tank baffle
0% Other: Responses Vary
22% Add to leaching field
0% Not Applicable

What was the approximate repair cost? _____

SURVEY CONTINUES ON BACK

Are you aware of other wastewater disposal problems in your neighborhood 0% Ye 56% No

What type of water supply do you have?

0% Unknown Water Supply
0% Private Well: 0% Dug Well 0% Drilled Well
11% Community Well
67% Public Water Company: Responses Vary

If so, have you had your well water tested?

11% Yes
0% No Reason: Responses Vary

Do you have any of the following low-flow appliances?

0% Front Loading Washing Machine
22% Faucet flow restrictors
44% Toilet with 1.6 gallon per flush (or less)
33% Low-flow showerheads
11% Other: Responses Vary

Do you have these soil is at your property?

22% Sand 11% Clay 22% Till 0% Other: Responses Vary

At your property, what is the approximate depth of groundwater?

67% Don't Know _____ feet

Have you ever experienced flooding or surface drainage problems on your property?

22% Yes 44% No 0% Don't Know

Are you aware of any local wells or springs that may have been adversely affected by septic system flow? 0% Yes 67% No

Even if no obvious problems exist, are you concerned that your septic system is not properly treating the wastewater which passes through it? 0% Yes 56% No

How concerned are you that installed septic systems will have an adverse affect on ground and surface water quality in your area?

0% Extremely Concerned
11% Very Concerned
11% Concerned
22% Somewhat concerned
22% Not concerned

In your opinion, is it worthwhile to investigate the effect of septic systems on surface and groundwater quality in your area 33% Yes 33% No

In your opinion, is it worthwhile to investigate methods other than individual on-site septic systems for collecting and treating wastewater produced in your area? 33% Yes 22% No

Do you think a public sewer is needed in your neighborhood? 11% Yes 22% No

What areas of interest led you to fill out this survey?

56% Property Owner
11% Environmental Interest
0% Neighborhood Association
0% Technical Interest
0% Other: Responses Vary

Should fixed income households be allowed to defer paying taxes and fees to fix wastewater disposal problems, until selling their property?

33% Yes 11% No

PLEASE COMPLETE BOTH SIDES OF SURVEY

If the Town needs to expend money to fix wastewater disposal problems in a neighborhood, the Town aggressively pursues grants to pay for the capital improvements. However, if a public sewering option is needed, and the grants are not available or insufficient to pay for the needed capital improvements, how would you prefer the Town to pay for the capital improvements?

11% A one-time upfront charge paid by each property owner, plus monthly bills for service
0% A one-time upfront charge paid over twenty years by each property owner, plus monthly bills for service
11% A monthly bill after connecting to the system
33% Property taxes (which are deductible on your federal and state income taxes)
0% If it costs me money, I wouldn't want to fix water pollution problems which affect my community

Comments:

_____

Responses Vary

_____

_____

_____

_____

_____

Charter Road Area

Curtis Drive Area

Questionnaires Sent:	92
Questionnaires Returned by Property Owner:	39
Percent of Questionnaires Returned:	42.4%

Are you the owner of this property? 95% Yes 0% No

Are you currently or plan to retire in the next 10 years? 41% Yes 56% No

How long have you owned or lived at this location? 18.3 years

Age of main building: 36.6 years

Number of bedrooms: 3.1

Number of permanent residents: 2.5

Number of seasonal residents: 0.3

Length of seasonal resident stay: 14.0 days

How many seasonal residents plan to become permanent residents?

56% None _____ (People) in _____ (Years)

Property Use

100% Single family residential
0% Multi-family (Number of Units: _____)
0% Condominium/Apartment
0% Vacant
0% Other: Responses Vary

Septic System Location

5% Front yard
82% Backyard
0% Other: Responses Vary
5% Left of Main Building
8% Right of Main Building

What type of wastewater disposal system do you have?

100% Septic Tank/Leaching Field
0% Cesspool
0% Pressure Distribution
0% Surface Discharge
0% Don't Know
0% Other: Responses Vary

Do you share the wastewater disposal system with another entity (i.e. multi-tenant building, neighbor)?

0% Yes, who: Responses Vary 97% No

How old is your septic system disposal (leaching) field? 28% Don't know 28.8 (Years)

Are any of the following connected to your wastewater disposal system?

97% Washing Machine
79% Dishwasher
33% Garbage Disposal
3% Sump Pump
3% Jacuzzi Tub
21% Water Softener
3% Water Chlorinator
0% Oil/Water Separator
0% Grease Trap

Approximately how often do you get your septic tank pumped?

3% More than 5 years
41% Every 3 to 5 years
54% Once every 2 years
3% Once per year
0% More than once per year
0% Never

Do you have a separate leaching field or dry well for "gray water" (sinks, showers, washing machine) 5% Yes 74% No 21% Don't Know

How much would you guess it might cost to replace a septic system disposal (leaching) field?

$13,133

8% I paid for a repair before
59% I've never paid for a repair

Do you have any of the following problems with your wastewater disposal system?

82% This property has never had any problems

	Spring	Summer	Fall	Winter
Disposal field is muddy	3%	0%	0%	0%
Drains slowly or backs up	8%	3%	3%	3%
Flows onto ground surface	0%	0%	0%	0%
Odors	0%	0%	0%	0%
Other (Describe)	0%	0%	0%	0%

Does the problem seem to be linked to a specific event (washing clothes, heavy rains, visitors, etc)?

Responses Vary

Has your wastewater disposal system ever been repaired?

28% Yes 46% No 23% Don't Know

Has more than one repair been made?

3% Yes 41% No 33% Don't Know

When was the repair made? _____ (MONTH/YEAR)

What was done? (Check all that apply)

18% Replace septic tank
8% Replace leaching field
8% Replace septic tank baffle
5% Other: Responses Vary
8% Add to leaching field
8% Not Applicable

What was the approximate repair cost? $1,410

SURVEY CONTINUES ON BACK

Are you aware of other wastewater disposal problems in your neighborhood 3% Ye 82% No

What type of water supply do you have?

0% Unknown Water Supply
74% Private Well: 0% Dug Well 62% Drilled Well
0% Community Well
0% Public Water Company: Responses Vary

If so, have you had your well water tested?

72% Yes
23% No Reason: Responses Vary

Do you have any of the following low-flow appliances?

21% Front Loading Washing Machine
38% Faucet flow restrictors
54% Toilet with 1.6 gallon per flush (or less)
49% Low-flow showerheads
0% Other: Responses Vary

Do you have these soil is at your property?

51% Sand 8% Clay 3% Till 3% Other: Responses Vary

At your property, what is the approximate depth of groundwater?

62% Don't Know 122 feet

Have you ever experienced flooding or surface drainage problems on your property?

21% Yes 72% No 3% Don't Know

Are you aware of any local wells or springs that may have been adversely affected by septic system flow? 0% Yes 97% No

Even if no obvious problems exist, are you concerned that your septic system is not properly treating the wastewater which passes through it? 13% Yes 85% No

How concerned are you that installed septic systems will have an adverse affect on ground and surface water quality in your area?

5% Extremely Concerned
8% Very Concerned
18% Concerned
18% Somewhat concerned
44% Not concerned

In your opinion, is it worthwhile to investigate the effect of septic systems on surface and groundwater quality in your area 44% Yes 46% No

In your opinion, is it worthwhile to investigate methods other than individual on-site septic systems for collecting and treating wastewater produced in your area? 38% Yes 51% No

Do you think a public sewer is needed in your neighborhood? 26% Yes 64% No

What areas of interest led you to fill out this survey?

90% Property Owner
28% Environmental Interest
0% Neighborhood Association
5% Technical Interest
5% Other: Responses Vary

Should fixed income households be allowed to defer paying taxes and fees to fix wastewater disposal problems, until selling their property?

46% Yes 31% No

PLEASE COMPLETE BOTH SIDES OF SURVEY

If the Town needs to expend money to fix wastewater disposal problems in a neighborhood, the Town aggressively pursues grants to pay for the capital improvements. However, if a public sewering option is needed, and the grants are not available or insufficient to pay for the needed capital improvements, how would you prefer the Town to pay for the capital improvements?

3% A one-time upfront charge paid by each property owner, plus monthly bills for service
36% A one-time upfront charge paid over twenty years by each property owner, plus monthly bills for service
18% A monthly bill after connecting to the system
33% Property taxes (which are deductible on your federal and state income taxes)
13% If it costs me money, I wouldn't want to fix water pollution problems which affect my community

Comments:

Responses Vary

Curtis Drive Area

Dockerel Road Area

Questionnaires Sent:	30
Questionnaires Returned by Property Owner:	10
Percent of Questionnaires Returned:	33.3%

Are you the owner of this property? 90% Yes 0% No

Are you currently or plan to retire in the next 10 years? 40% Yes 60% No

How long have you owned or lived at this location? 13.0 years

Age of main building: 21.5 years

Number of bedrooms: 3.3

Number of permanent residents: 2.9

Number of seasonal residents: 4.0

Length of seasonal resident stay: 180.0 days

How many seasonal residents plan to become permanent residents?

70% None _____ (People) in _____ (Years)

Property Use

100% Single family residential
0% Multi-family (Number of Units: _____)
0% Condominium/Apartment
0% Vacant
0% Other: Responses Vary

Septic System Location

40% Front yard
50% Backyard
0% Other: Responses Vary
10% Left of Main Building
0% Right of Main Building

What type of wastewater disposal system do you have?

100% Septic Tank/Leaching Field
0% Cesspool
0% Pressure Distribution
0% Surface Discharge
0% Don't Know
0% Other: Responses Vary

Do you share the wastewater disposal system with another entity (i.e. multi-tenant building, neighbor)?

0% Yes, who: Responses Vary 100% No

How old is your septic system disposal (leaching) field? 30% Don't know 17.0 (Years)

Are any of the following connected to your wastewater disposal system?

90% Washing Machine
80% Dishwasher
20% Garbage Disposal
0% Sump Pump
20% Jacuzzi Tub
20% Water Softener
0% Water Chlorinator
0% Oil/Water Separator
0% Grease Trap

Approximately how often do you get your septic tank pumped?

20% More than 5 years
30% Every 3 to 5 years
50% Once every 2 years
0% Once per year
0% More than once per year
0% Never

Do you have a separate leaching field or dry well for "gray water" (sinks, showers, washing machine) 0% Yes 80% No 20% Don't Know

How much would you guess it might cost to replace a septic system disposal (leaching) field?

$11,667

0% I paid for a repair before
80% I've never paid for a repair

Do you have any of the following problems with your wastewater disposal system?

100% This property has never had any problems

	Spring	Summer	Fall	Winter
Disposal field is muddy	0%	0%	0%	0%
Drains slowly or backs up	0%	0%	0%	0%
Flows onto ground surface	0%	0%	0%	0%
Odors	0%	0%	0%	0%
Other (Describe)	0%	0%	0%	0%

Does the problem seem to be linked to a specific event (washing clothes, heavy rains, visitors, etc)?

_____

Responses Vary

Has your wastewater disposal system ever been repaired?

0% Yes 90% No 10% Don't Know

Has more than one repair been made?

0% Yes 60% No 10% Don't Know

When was the repair made? _____ (MONTH/YEAR)

What was done? (Check all that apply)

0% Replace septic tank
0% Replace leaching field
0% Replace septic tank baffle
0% Other: Responses Vary
30% Add to leaching field
0% Not Applicable

What was the approximate repair cost? _____

SURVEY CONTINUES ON BACK

Are you aware of other wastewater disposal problems in your neighborhood 0% Yes 100% No

What type of water supply do you have?

0% Unknown Water Supply
70% Private Well: 0% Dug Well 80% Drilled Well
0% Community Well
0% Public Water Company: Responses Vary

If so, have you had your well water tested?

90% Yes
10% No Reason: Responses Vary

Do you have any of the following low-flow appliances?

30% Front Loading Washing Machine
60% Faucet flow restrictors
60% Toilet with 1.6 gallon per flush (or less)
60% Low-flow showerheads
0% Other: Responses Vary

Do you have these soil is at your property?

40% Sand 10% Clay 10% Till 20% Other: Responses Vary

At your property, what is the approximate depth of groundwater?

80% Don't Know 193 feet

Have you ever experienced flooding or surface drainage problems on your property?

10% Yes 90% No 0% Don't Know

Are you aware of any local wells or springs that may have been adversely affected by septic system flow? 0% Yes 100% No

Even if no obvious problems exist, are you concerned that your septic system is not properly treating the wastewater which passes through it? 0% Yes 100% No

How concerned are you that installed septic systems will have an adverse affect on ground and surface water quality in your area?

10% Extremely Concerned
0% Very Concerned
0% Concerned
10% Somewhat concerned
80% Not concerned

In your opinion, is it worthwhile to investigate the effect of septic systems on surface and groundwater quality in your area 10% Yes 90% No

In your opinion, is it worthwhile to investigate methods other than individual on-site septic systems for collecting and treating wastewater produced in your area? 0% Yes 100% No

Do you think a public sewer is needed in your neighborhood? 10% Yes 90% No

What areas of interest led you to fill out this survey?

90% Property Owner
0% Environmental Interest
0% Neighborhood Association
0% Technical Interest
0% Other: Responses Vary

Should fixed income households be allowed to defer paying taxes and fees to fix wastewater disposal problems, until selling their property?

80% Yes 10% No

PLEASE COMPLETE BOTH SIDES OF SURVEY

If the Town needs to expend money to fix wastewater disposal problems in a neighborhood, the Town aggressively pursues grants to pay for the capital improvements. However, if a public sewering option is needed, and the grants are not available or insufficient to pay for the needed capital improvements, how would you prefer the Town to pay for the capital improvements?

0% A one-time upfront charge paid by each property owner, plus monthly bills for service
20% A one-time upfront charge paid over twenty years by each property owner, plus monthly bills for service
20% A monthly bill after connecting to the system
40% Property taxes (which are deductible on your federal and state income taxes)
10% If it costs me money, I wouldn't want to fix water pollution problems which affect my community

Comments:

Responses Vary

Dockerel Road Area

Dunn Hill Road Area

Questionnaires Sent:	62
Questionnaires Returned by Property Owner:	25
Percent of Questionnaires Returned:	40.3%

Are you the owner of this property? 96% Yes 0% No

Are you currently or plan to retire in the next 10 years? 40% Yes 56% No

How long have you owned or lived at this location? 18.2 years

Age of main building: 72.6 years

Number of bedrooms: 3.6

Number of permanent residents: 3.6

Number of seasonal residents: 0.0

Length of seasonal resident stay: _____ days

How many seasonal residents plan to become permanent residents?

64% None _____ (People) in _____ (Years)

Property Use

100% Single family residential
0% Multi-family (Number of Units: _____)
0% Condominium/Apartment
0% Vacant
0% Other: Responses Vary

Septic System Location

12% Front yard
68% Backyard
0% Other: Responses Vary
16% Left of Main Building
8% Right of Main Building

What type of wastewater disposal system do you have?

96% Septic Tank/Leaching Field
0% Cesspool
0% Pressure Distribution
0% Surface Discharge
4% Don't Know
0% Other: Responses Vary

Do you share the wastewater disposal system with another entity (i.e. multi-tenant building, neighbor)?

0% Yes, who: Responses Vary 96% No

How old is your septic system disposal (leaching) field? 36% Don't know 22.9 (Years)

Are any of the following connected to your wastewater disposal system?

88% Washing Machine
80% Dishwasher
24% Garbage Disposal
0% Sump Pump
0% Jacuzzi Tub
0% Water Softener
0% Water Chlorinator
0% Oil/Water Separator
0% Grease Trap

Approximately how often do you get your septic tank pumped?

12% More than 5 years
36% Every 3 to 5 years
40% Once every 2 years
8% Once per year
0% More than once per year
0% Never

Do you have a separate leaching field or dry well for "gray water" (sinks, showers, washing machine) 12% Yes 72% No 20% Don't Know

How much would you guess it might cost to replace a septic system disposal (leaching) field?

$15,000

20% I paid for a repair before
48% I've never paid for a repair

Do you have any of the following problems with your wastewater disposal system?

64% This property has never had any problems

	Spring	Summer	Fall	Winter
Disposal field is muddy	0%	0%	0%	0%
Drains slowly or backs up	4%	0%	0%	4%
Flows onto ground surface	8%	0%	0%	4%
Odors	12%	0%	0%	4%
Other (Describe)	0%	0%	0%	0%

Does the problem seem to be linked to a specific event (washing clothes, heavy rains, visitors, etc)?

_____

Responses Vary

Has your wastewater disposal system ever been repaired?

28% Yes 48% No 20% Don't Know

Has more than one repair been made?

0% Yes 60% No 28% Don't Know

When was the repair made? _____ (MONTH/YEAR)

What was done? (Check all that apply)

24% Replace septic tank
20% Replace leaching field
12% Replace septic tank baffle
4% Other: Responses Vary
12% Add to leaching field
8% Not Applicable

What was the approximate repair cost? $11,018

SURVEY CONTINUES ON BACK

Are you aware of other wastewater disposal problems in your neighborhood 24% Ye 56% No

What type of water supply do you have?

0% Unknown Water Supply
40% Private Well: 0% Dug Well 28% Drilled Well
0% Community Well
48% Public Water Company: Responses Vary

If so, have you had your well water tested?

40% Yes
36% No Reason: Responses Vary

Do you have any of the following low-flow appliances?

8% Front Loading Washing Machine
36% Faucet flow restrictors
68% Toilet with 1.6 gallon per flush (or less)
56% Low-flow showerheads
0% Other: Responses Vary

Do you have these soil is at your property?

20% Sand 28% Clay 20% Till 12% Other: Responses Vary

At your property, what is the approximate depth of groundwater?

84% Don't Know 7 feet

Have you ever experienced flooding or surface drainage problems on your property?

44% Yes 52% No 0% Don't Know

Are you aware of any local wells or springs that may have been adversely affected by septic system flow? 4% Yes 84% No

Even if no obvious problems exist, are you concerned that your septic system is not properly treating the wastewater which passes through it? 16% Yes 76% No

How concerned are you that installed septic systems will have an adverse affect on ground and surface water quality in your area?

8% Extremely Concerned
0% Very Concerned
44% Concerned
8% Somewhat concerned
36% Not concerned

In your opinion, is it worthwhile to investigate the effect of septic systems on surface and groundwater quality in your area 52% Yes 44% No

In your opinion, is it worthwhile to investigate methods other than individual on-site septic systems for collecting and treating wastewater produced in your area? 44% Yes 48% No

Do you think a public sewer is needed in your neighborhood? 32% Yes 64% No

What areas of interest led you to fill out this survey?

88% Property Owner
20% Environmental Interest
4% Neighborhood Association
8% Technical Interest
4% Other: Responses Vary

Should fixed income households be allowed to defer paying taxes and fees to fix wastewater disposal problems, until selling their property?

72% Yes 16% No

PLEASE COMPLETE BOTH SIDES OF SURVEY

If the Town needs to expend money to fix wastewater disposal problems in a neighborhood, the Town aggressively pursues grants to pay for the capital improvements. However, if a public sewering option is needed, and the grants are not available or insufficient to pay for the needed capital improvements, how would you prefer the Town to pay for the capital improvements?

0% A one-time upfront charge paid by each property owner, plus monthly bills for service
16% A one-time upfront charge paid over twenty years by each property owner, plus monthly bills for service
12% A monthly bill after connecting to the system
36% Property taxes (which are deductible on your federal and state income taxes)
12% If it costs me money, I wouldn't want to fix water pollution problems which affect my community

Comments:

Responses Vary

Dunn Hill Road Area

High Ridge Drive Area

Questionnaires Sent:	38
Questionnaires Returned by Property Owner:	15
Percent of Questionnaires Returned:	39.5%

Are you the owner of this property? 93% Yes 0% No

Are you currently or plan to retire in the next 10 years? 33% Yes 53% No

How long have you owned or lived at this location? 13.5 years

Age of main building: 17.0 years

Number of bedrooms: 3.9

Number of permanent residents: 3.1

Number of seasonal residents: 0.3

Length of seasonal resident stay: 100.0 days

How many seasonal residents plan to become permanent residents?

73% None _____ (People) in _____ (Years)

Property Use

100% Single family residential
0% Multi-family (Number of Units: _____)
0% Condominium/Apartment
0% Vacant
0% Other: Responses Vary

Septic System Location

60% Front yard
20% Backyard
0% Other: Responses Vary
7% Left of Main Building
13% Right of Main Building

What type of wastewater disposal system do you have?

100% Septic Tank/Leaching Field
0% Cesspool
0% Pressure Distribution
0% Surface Discharge
0% Don't Know
0% Other: Responses Vary

Do you share the wastewater disposal system with another entity (i.e. multi-tenant building, neighbor)?

0% Yes, who: Responses Vary 100% No

How old is your septic system disposal (leaching) field? 0% Don't know 17.0 (Years)

Are any of the following connected to your wastewater disposal system?

87% Washing Machine
80% Dishwasher
33% Garbage Disposal
0% Sump Pump
20% Jacuzzi Tub
20% Water Softener
0% Water Chlorinator
0% Oil/Water Separator
0% Grease Trap

Approximately how often do you get your septic tank pumped?

0% More than 5 years
67% Every 3 to 5 years
27% Once every 2 years
7% Once per year
0% More than once per year
0% Never

Do you have a separate leaching field or dry well for "gray water" (sinks, showers, washing machine) 0% Yes 87% No 13% Don't Know

How much would you guess it might cost to replace a septic system disposal (leaching) field?

$6,400

0% I paid for a repair before
73% I've never paid for a repair

Do you have any of the following problems with your wastewater disposal system?

93% This property has never had any problems

	Spring	Summer	Fall	Winter
Disposal field is muddy	0%	0%	0%	0%
Drains slowly or backs up	0%	0%	0%	0%
Flows onto ground surface	0%	0%	0%	0%
Odors	0%	0%	0%	0%
Other (Describe)	0%	0%	0%	0%

Does the problem seem to be linked to a specific event (washing clothes, heavy rains, visitors, etc)?

_____

Responses Vary

Has your wastewater disposal system ever been repaired?

0% Yes 80% No 20% Don't Know

Has more than one repair been made?

0% Yes 67% No 20% Don't Know

When was the repair made? _____ (MONTH/YEAR)

What was done? (Check all that apply)

0% Replace septic tank
0% Replace leaching field
0% Replace septic tank baffle
0% Other: Responses Vary
33% Add to leaching field
0% Not Applicable

What was the approximate repair cost? _____

SURVEY CONTINUES ON BACK

Are you aware of other wastewater disposal problems in your neighborhood 0% Ye 87% No

What type of water supply do you have?

0% Unknown Water Supply
60% Private Well: 0% Dug Well 60% Drilled Well
0% Community Well
0% Public Water Company: Responses Vary

If so, have you had your well water tested?

67% Yes
33% No Reason: Responses Vary

Do you have any of the following low-flow appliances?

27% Front Loading Washing Machine
47% Faucet flow restrictors
73% Toilet with 1.6 gallon per flush (or less)
53% Low-flow showerheads
0% Other: Responses Vary

Do you have these soil is at your property?

40% Sand 13% Clay 7% Till 13% Other: Responses Vary

At your property, what is the approximate depth of groundwater?

67% Don't Know 192 feet

Have you ever experienced flooding or surface drainage problems on your property?

20% Yes 73% No 7% Don't Know

Are you aware of any local wells or springs that may have been adversely affected by septic system flow? 0% Yes 100% No

Even if no obvious problems exist, are you concerned that your septic system is not properly treating the wastewater which passes through it? 7% Yes 93% No

How concerned are you that installed septic systems will have an adverse affect on ground and surface water quality in your area?

0% Extremely Concerned
0% Very Concerned
7% Concerned
40% Somewhat concerned
47% Not concerned

In your opinion, is it worthwhile to investigate the effect of septic systems on surface and groundwater quality in your area 33% Yes 67% No

In your opinion, is it worthwhile to investigate methods other than individual on-site septic systems for collecting and treating wastewater produced in your area? 33% Yes 53% No

Do you think a public sewer is needed in your neighborhood? 7% Yes 87% No

What areas of interest led you to fill out this survey?

80% Property Owner
27% Environmental Interest
0% Neighborhood Association
7% Technical Interest
13% Other: Responses Vary

Should fixed income households be allowed to defer paying taxes and fees to fix wastewater disposal problems, until selling their property?

40% Yes 40% No

PLEASE COMPLETE BOTH SIDES OF SURVEY

If the Town needs to expend money to fix wastewater disposal problems in a neighborhood, the Town aggressively pursues grants to pay for the capital improvements. However, if a public sewering option is needed, and the grants are not available or insufficient to pay for the needed capital improvements, how would you prefer the Town to pay for the capital improvements?

7% A one-time upfront charge paid by each property owner, plus monthly bills for service
27% A one-time upfront charge paid over twenty years by each property owner, plus monthly bills for service
33% A monthly bill after connecting to the system
40% Property taxes (which are deductible on your federal and state income taxes)
0% If it costs me money, I wouldn't want to fix water pollution problems which affect my community

Comments:

Responses Vary

High Ridge Drive Area

Hurlbut Road Area

Questionnaires Sent:	38
Questionnaires Returned by Property Owner:	7
Percent of Questionnaires Returned:	18.4%

Are you the owner of this property? 100% Yes 0% No

Are you currently or plan to retire in the next 10 years? 71% Yes 29% No

How long have you owned or lived at this location? 32.7 years

Age of main building: 41.7 years

Number of bedrooms: 3.0

Number of permanent residents: 2.4

Number of seasonal residents: 1.0

Length of seasonal resident stay: 90.0 days

How many seasonal residents plan to become permanent residents?

100% None _____ (People) in _____ (Years)

Property Use

100% Single family residential
0% Multi-family (Number of Units: _____)
0% Condominium/Apartment
0% Vacant
0% Other: Responses Vary

Septic System Location

0% Front yard
86% Backyard
0% Other: Responses Vary
14% Left of Main Building
14% Right of Main Building

What type of wastewater disposal system do you have?

100% Septic Tank/Leaching Field
0% Cesspool
0% Pressure Distribution
0% Surface Discharge
0% Don't Know
0% Other: Responses Vary

Do you share the wastewater disposal system with another entity (i.e. multi-tenant building, neighbor)?

0% Yes, who: Responses Vary 100% No

How old is your septic system disposal (leaching) field? 14% Don't know 29.3 (Years)

Are any of the following connected to your wastewater disposal system?

100% Washing Machine
71% Dishwasher
29% Garbage Disposal
0% Sump Pump
0% Jacuzzi Tub
14% Water Softener
0% Water Chlorinator
0% Oil/Water Separator
0% Grease Trap

Approximately how often do you get your septic tank pumped?

14% More than 5 years
43% Every 3 to 5 years
43% Once every 2 years
0% Once per year
0% More than once per year
0% Never

Do you have a separate leaching field or dry well for "gray water" (sinks, showers, washing machine) 14% Yes 86% No 0% Don't Know

How much would you guess it might cost to replace a septic system disposal (leaching) field?

$10,000

14% I paid for a repair before
86% I've never paid for a repair

Do you have any of the following problems with your wastewater disposal system?

100% This property has never had any problems

	Spring	Summer	Fall	Winter
Disposal field is muddy	0%	0%	0%	0%
Drains slowly or backs up	0%	0%	0%	0%
Flows onto ground surface	0%	0%	0%	0%
Odors	0%	0%	0%	0%
Other (Describe)	0%	0%	0%	0%

Does the problem seem to be linked to a specific event (washing clothes, heavy rains, visitors, etc)?

_____

Responses Vary

Has your wastewater disposal system ever been repaired?

14% Yes 86% No 0% Don't Know

Has more than one repair been made?

0% Yes 57% No 0% Don't Know

When was the repair made? _____ (MONTH/YEAR)

What was done? (Check all that apply)

14% Replace septic tank
14% Replace leaching field
14% Replace septic tank baffle
14% Other: Responses Vary
43% Add to leaching field
0% Not Applicable

What was the approximate repair cost? $15,000

SURVEY CONTINUES ON BACK

Are you aware of other wastewater disposal problems in your neighborhood 14% Ye 86% No

What type of water supply do you have?

0% Unknown Water Supply
43% Private Well: 0% Dug Well 86% Drilled Well
0% Community Well
0% Public Water Company: Responses Vary

If so, have you had your well water tested?

57% Yes
43% No Reason: Responses Vary

Do you have any of the following low-flow appliances?

71% Front Loading Washing Machine
43% Faucet flow restrictors
43% Toilet with 1.6 gallon per flush (or less)
57% Low-flow showerheads
14% Other: Responses Vary

Do you have these soil is at your property?

29% Sand 29% Clay 14% Till 43% Other: Responses Vary

At your property, what is the approximate depth of groundwater?

86% Don't Know 6 feet

Have you ever experienced flooding or surface drainage problems on your property?

29% Yes 71% No 0% Don't Know

Are you aware of any local wells or springs that may have been adversely affected by septic system flow? 0% Yes 86% No

Even if no obvious problems exist, are you concerned that your septic system is not properly treating the wastewater which passes through it? 0% Yes 100% No

How concerned are you that installed septic systems will have an adverse affect on ground and surface water quality in your area?

14% Extremely Concerned
0% Very Concerned
0% Concerned
14% Somewhat concerned
71% Not concerned

In your opinion, is it worthwhile to investigate the effect of septic systems on surface and groundwater quality in your area 29% Yes 71% No

In your opinion, is it worthwhile to investigate methods other than individual on-site septic systems for collecting and treating wastewater produced in your area? 14% Yes 57% No

Do you think a public sewer is needed in your neighborhood? 0% Yes 86% No

What areas of interest led you to fill out this survey?

71% Property Owner
43% Environmental Interest
0% Neighborhood Association
14% Technical Interest
29% Other: Responses Vary

Should fixed income households be allowed to defer paying taxes and fees to fix wastewater disposal problems, until selling their property?

57% Yes 14% No

PLEASE COMPLETE BOTH SIDES OF SURVEY

If the Town needs to expend money to fix wastewater disposal problems in a neighborhood, the Town aggressively pursues grants to pay for the capital improvements. However, if a public sewering option is needed, and the grants are not available or insufficient to pay for the needed capital improvements, how would you prefer the Town to pay for the capital improvements?

14% A one-time upfront charge paid by each property owner, plus monthly bills for service
14% A one-time upfront charge paid over twenty years by each property owner, plus monthly bills for service
0% A monthly bill after connecting to the system
29% Property taxes (which are deductible on your federal and state income taxes)
29% If it costs me money, I wouldn't want to fix water pollution problems which affect my community

Comments:

Responses Vary

Hurlbut Road Area

Lakeview Heights Area

Questionnaires Sent:	33
Questionnaires Returned by Property Owner:	18
Percent of Questionnaires Returned:	54.5%

Are you the owner of this property? 89% Yes 0% No

Are you currently or plan to retire in the next 10 years? 67% Yes 28% No

How long have you owned or lived at this location? 18.7 years

Age of main building: 37.0 years

Number of bedrooms: 3.1

Number of permanent residents: 2.1

Number of seasonal residents: 0.0

Length of seasonal resident stay: _____ days

How many seasonal residents plan to become permanent residents?

50% None _____ (People) in _____ (Years)

Property Use

94% Single family residential
0% Multi-family (Number of Units: _____)
0% Condominium/Apartment
0% Vacant
0% Other: Responses Vary

Septic System Location

28% Front yard
67% Backyard
0% Other: Responses Vary
6% Left of Main Building
6% Right of Main Building

What type of wastewater disposal system do you have?

100% Septic Tank/Leaching Field
0% Cesspool
0% Pressure Distribution
0% Surface Discharge
0% Don't Know
0% Other: Responses Vary

Do you share the wastewater disposal system with another entity (i.e. multi-tenant building, neighbor)?

0% Yes, who: Responses Vary 100% No

How old is your septic system disposal (leaching) field? 44% Don't know 20.8 (Years)

Are any of the following connected to your wastewater disposal system?

83% Washing Machine
89% Dishwasher
22% Garbage Disposal
11% Sump Pump
0% Jacuzzi Tub
17% Water Softener
0% Water Chlorinator
0% Oil/Water Separator
0% Grease Trap

Approximately how often do you get your septic tank pumped?

6% More than 5 years
39% Every 3 to 5 years
39% Once every 2 years
11% Once per year
0% More than once per year
6% Never

Do you have a separate leaching field or dry well for "gray water" (sinks, showers, washing machine) 17% Yes 61% No 17% Don't Know

How much would you guess it might cost to replace a septic system disposal (leaching) field?

$11,750

11% I paid for a repair before
61% I've never paid for a repair

Do you have any of the following problems with your wastewater disposal system?

89% This property has never had any problems

	Spring	Summer	Fall	Winter
Disposal field is muddy	0%	0%	0%	0%
Drains slowly or backs up	0%	0%	0%	0%
Flows onto ground surface	0%	0%	0%	0%
Odors	0%	0%	0%	0%
Other (Describe)	0%	0%	0%	0%

Does the problem seem to be linked to a specific event (washing clothes, heavy rains, visitors, etc)?

_____

Responses Vary

Has your wastewater disposal system ever been repaired?

33% Yes 39% No 28% Don't Know

Has more than one repair been made?

0% Yes 61% No 28% Don't Know

When was the repair made? _____ (MONTH/YEAR)

What was done? (Check all that apply)

11% Replace septic tank
6% Replace leaching field
6% Replace septic tank baffle
0% Other: Responses Vary
17% Add to leaching field
17% Not Applicable

What was the approximate repair cost? $0,900

SURVEY CONTINUES ON BACK

Are you aware of other wastewater disposal problems in your neighborhood 17% Ye 72% No

What type of water supply do you have?

0% Unknown Water Supply
50% Private Well: 0% Dug Well 72% Drilled Well
0% Community Well
0% Public Water Company: Responses Vary

If so, have you had your well water tested?

67% Yes
28% No Reason: Responses Vary

Do you have any of the following low-flow appliances?

17% Front Loading Washing Machine
39% Faucet flow restrictors
67% Toilet with 1.6 gallon per flush (or less)
72% Low-flow showerheads
0% Other: Responses Vary

Do you have these soil is at your property?

11% Sand 6% Clay 0% Till 11% Other: Responses Vary

At your property, what is the approximate depth of groundwater?

50% Don't Know 150 feet

Have you ever experienced flooding or surface drainage problems on your property?

11% Yes 89% No 0% Don't Know

Are you aware of any local wells or springs that may have been adversely affected by septic system flow? 0% Yes 100% No

Even if no obvious problems exist, are you concerned that your septic system is not properly treating the wastewater which passes through it? 6% Yes 94% No

How concerned are you that installed septic systems will have an adverse affect on ground and surface water quality in your area?

6% Extremely Concerned
22% Very Concerned
22% Concerned
6% Somewhat concerned
44% Not concerned

In your opinion, is it worthwhile to investigate the effect of septic systems on surface and groundwater quality in your area 44% Yes 44% No

In your opinion, is it worthwhile to investigate methods other than individual on-site septic systems for collecting and treating wastewater produced in your area? 56% Yes 39% No

Do you think a public sewer is needed in your neighborhood? 33% Yes 56% No

What areas of interest led you to fill out this survey?

83% Property Owner
44% Environmental Interest
0% Neighborhood Association
0% Technical Interest
11% Other: Responses Vary

Should fixed income households be allowed to defer paying taxes and fees to fix wastewater disposal problems, until selling their property?

61% Yes 22% No

PLEASE COMPLETE BOTH SIDES OF SURVEY

If the Town needs to expend money to fix wastewater disposal problems in a neighborhood, the Town aggressively pursues grants to pay for the capital improvements. However, if a public sewering option is needed, and the grants are not available or insufficient to pay for the needed capital improvements, how would you prefer the Town to pay for the capital improvements?

0% A one-time upfront charge paid by each property owner, plus monthly bills for service
17% A one-time upfront charge paid over twenty years by each property owner, plus monthly bills for service
28% A monthly bill after connecting to the system
28% Property taxes (which are deductible on your federal and state income taxes)
11% If it costs me money, I wouldn't want to fix water pollution problems which affect my community

Comments:

Responses Vary

Lakeview Heights Area

Laurel Ridge Road Area

Questionnaires Sent:	55
Questionnaires Returned by Property Owner:	21
Percent of Questionnaires Returned:	38.2%

Are you the owner of this property? 95% Yes 0% No

Are you currently or plan to retire in the next 10 years? 48% Yes 43% No

How long have you owned or lived at this location? 16.4 years

Age of main building: 33.2 years

Number of bedrooms: 3.1

Number of permanent residents: 3.0

Number of seasonal residents: 1.0

Length of seasonal resident stay: 107.5 days

How many seasonal residents plan to become permanent residents?

67% None _____ (People) in _____ (Years)

Property Use

100% Single family residential
0% Multi-family (Number of Units: _____)
0% Condominium/Apartment
0% Vacant
0% Other: Responses Vary

Septic System Location

33% Front yard
48% Backyard
10% Other: Responses Vary
10% Left of Main Building
24% Right of Main Building

What type of wastewater disposal system do you have?

90% Septic Tank/Leaching Field
0% Cesspool
5% Pressure Distribution
0% Surface Discharge
0% Don't Know
0% Other: Responses Vary

Do you share the wastewater disposal system with another entity (i.e. multi-tenant building, neighbor)?

0% Yes, who: Responses Vary 90% No

How old is your septic system disposal (leaching) field? 38% Don't know 20.1 (Years)

Are any of the following connected to your wastewater disposal system?

95% Washing Machine
90% Dishwasher
24% Garbage Disposal
5% Sump Pump
0% Jacuzzi Tub
33% Water Softener
0% Water Chlorinator
0% Oil/Water Separator
0% Grease Trap

Approximately how often do you get your septic tank pumped?

5% More than 5 years
52% Every 3 to 5 years
33% Once every 2 years
0% Once per year
0% More than once per year
10% Never

Do you have a separate leaching field or dry well for "gray water" (sinks, showers, washing machine) 10% Yes 76% No 10% Don't Know

How much would you guess it might cost to replace a septic system disposal (leaching) field?

$11,600

10% I paid for a repair before
57% I've never paid for a repair

Do you have any of the following problems with your wastewater disposal system?

76% This property has never had any problems

	Spring	Summer	Fall	Winter
Disposal field is muddy	0%	0%	0%	0%
Drains slowly or backs up	0%	0%	0%	0%
Flows onto ground surface	0%	0%	0%	0%
Odors	0%	0%	0%	5%
Other (Describe)	0%	0%	0%	0%

Does the problem seem to be linked to a specific event (washing clothes, heavy rains, visitors, etc)?

_____

Responses Vary

Has your wastewater disposal system ever been repaired?

33% Yes 33% No 29% Don't Know

Has more than one repair been made?

0% Yes 52% No 29% Don't Know

When was the repair made? _____ (MONTH/YEAR)

What was done? (Check all that apply)

14% Replace septic tank
14% Replace leaching field
10% Replace septic tank baffle
5% Other: Responses Vary
10% Add to leaching field
5% Not Applicable

What was the approximate repair cost? $7,000

SURVEY CONTINUES ON BACK

Are you aware of other wastewater disposal problems in your neighborhood 0% Ye 86% No

What type of water supply do you have?

5% Unknown Water Supply
67% Private Well: 5% Dug Well 43% Drilled Well
0% Community Well
0% Public Water Company: Responses Vary

If so, have you had your well water tested?

71% Yes
29% No Reason: Responses Vary

Do you have any of the following low-flow appliances?

48% Front Loading Washing Machine
43% Faucet flow restrictors
52% Toilet with 1.6 gallon per flush (or less)
62% Low-flow showerheads
0% Other: Responses Vary

Do you have these soil is at your property?

29% Sand 33% Clay 5% Till 5% Other: Responses Vary

At your property, what is the approximate depth of groundwater?

86% Don't Know 85 feet

Have you ever experienced flooding or surface drainage problems on your property?

19% Yes 62% No 19% Don't Know

Are you aware of any local wells or springs that may have been adversely affected by septic system flow? 0% Yes 95% No

Even if no obvious problems exist, are you concerned that your septic system is not properly treating the wastewater which passes through it? 19% Yes 81% No

How concerned are you that installed septic systems will have an adverse affect on ground and surface water quality in your area?

0% Extremely Concerned
0% Very Concerned
24% Concerned
19% Somewhat concerned
52% Not concerned

In your opinion, is it worthwhile to investigate the effect of septic systems on surface and groundwater quality in your area 57% Yes 43% No

In your opinion, is it worthwhile to investigate methods other than individual on-site septic systems for collecting and treating wastewater produced in your area? 43% Yes 48% No

Do you think a public sewer is needed in your neighborhood? 33% Yes 52% No

What areas of interest led you to fill out this survey?

90% Property Owner
19% Environmental Interest
0% Neighborhood Association
5% Technical Interest
10% Other: Responses Vary

Should fixed income households be allowed to defer paying taxes and fees to fix wastewater disposal problems, until selling their property?

62% Yes 19% No

PLEASE COMPLETE BOTH SIDES OF SURVEY

If the Town needs to expend money to fix wastewater disposal problems in a neighborhood, the Town aggressively pursues grants to pay for the capital improvements. However, if a public sewering option is needed, and the grants are not available or insufficient to pay for the needed capital improvements, how would you prefer the Town to pay for the capital improvements?

0% A one-time upfront charge paid by each property owner, plus monthly bills for service
14% A one-time upfront charge paid over twenty years by each property owner, plus monthly bills for service
29% A monthly bill after connecting to the system
24% Property taxes (which are deductible on your federal and state income taxes)
14% If it costs me money, I wouldn't want to fix water pollution problems which affect my community

Comments:

Responses Vary

Laurel Ridge Road Area

Meadowood Road Area

Questionnaires Sent:	42
Questionnaires Returned by Property Owner:	18
Percent of Questionnaires Returned:	42.9%

Are you the owner of this property? 89% Yes 6% No

Are you currently or plan to retire in the next 10 years? 78% Yes 22% No

How long have you owned or lived at this location? 31.2 years

Age of main building: 55.3 years

Number of bedrooms: 3.0

Number of permanent residents: 2.1

Number of seasonal residents: 0.8

Length of seasonal resident stay: 365.0 days

How many seasonal residents plan to become permanent residents?

94% None _____ (People) in _____ (Years)

Property Use

100% Single family residential
0% Multi-family (Number of Units: _____)
0% Condominium/Apartment
0% Vacant
0% Other: Responses Vary

Septic System Location

0% Front yard
56% Backyard
0% Other: Responses Vary
28% Left of Main Building
17% Right of Main Building

What type of wastewater disposal system do you have?

94% Septic Tank/Leaching Field
6% Cesspool
0% Pressure Distribution
0% Surface Discharge
0% Don't Know
0% Other: Responses Vary

Do you share the wastewater disposal system with another entity (i.e. multi-tenant building, neighbor)?

0% Yes, who: Responses Vary 100% No

How old is your septic system disposal (leaching) field? 17% Don't know 24.8 (Years)

Are any of the following connected to your wastewater disposal system?

67% Washing Machine
56% Dishwasher
6% Garbage Disposal
6% Sump Pump
0% Jacuzzi Tub
0% Water Softener
0% Water Chlorinator
0% Oil/Water Separator
0% Grease Trap

Approximately how often do you get your septic tank pumped?

28% More than 5 years
22% Every 3 to 5 years
28% Once every 2 years
6% Once per year
0% More than once per year
11% Never

Do you have a separate leaching field or dry well for "gray water" (sinks, showers, washing machine) 33% Yes 50% No 6% Don't Know

How much would you guess it might cost to replace a septic system disposal (leaching) field?

$12,846

28% I paid for a repair before
17% I've never paid for a repair

Do you have any of the following problems with your wastewater disposal system?

83% This property has never had any problems

	Spring	Summer	Fall	Winter
Disposal field is muddy	6%	0%	0%	6%
Drains slowly or backs up	0%	0%	0%	0%
Flows onto ground surface	0%	0%	0%	0%
Odors	6%	0%	0%	6%
Other (Describe)	0%	0%	0%	0%

Does the problem seem to be linked to a specific event (washing clothes, heavy rains, visitors, etc)?

_____

Responses Vary

Has your wastewater disposal system ever been repaired?

39% Yes 56% No 6% Don't Know

Has more than one repair been made?

11% Yes 78% No 11% Don't Know

When was the repair made? _____ (MONTH/YEAR)

What was done? (Check all that apply)

39% Replace septic tank
17% Replace leaching field
11% Replace septic tank baffle
11% Other: Responses Vary
22% Add to leaching field
0% Not Applicable

What was the approximate repair cost? $3,500

SURVEY CONTINUES ON BACK

Are you aware of other wastewater disposal problems in your neighborhood 11% Ye 83% No

What type of water supply do you have?

0% Unknown Water Supply
0% Private Well: 0% Dug Well 6% Drilled Well
94% Community Well
0% Public Water Company: Responses Vary

If so, have you had your well water tested?

83% Yes
0% No Reason: Responses Vary

Do you have any of the following low-flow appliances?

28% Front Loading Washing Machine
33% Faucet flow restrictors
50% Toilet with 1.6 gallon per flush (or less)
83% Low-flow showerheads
0% Other: Responses Vary

Do you have these soil is at your property?

17% Sand 11% Clay 11% Till 0% Other: Responses Vary

At your property, what is the approximate depth of groundwater?

83% Don't Know 4 feet

Have you ever experienced flooding or surface drainage problems on your property?

33% Yes 61% No 6% Don't Know

Are you aware of any local wells or springs that may have been adversely affected by septic system flow? 11% Yes 89% No

Even if no obvious problems exist, are you concerned that your septic system is not properly treating the wastewater which passes through it? 0% Yes 100% No

How concerned are you that installed septic systems will have an adverse affect on ground and surface water quality in your area?

0% Extremely Concerned
17% Very Concerned
17% Concerned
17% Somewhat concerned
50% Not concerned

In your opinion, is it worthwhile to investigate the effect of septic systems on surface and groundwater quality in your area 28% Yes 61% No

In your opinion, is it worthwhile to investigate methods other than individual on-site septic systems for collecting and treating wastewater produced in your area? 44% Yes 50% No

Do you think a public sewer is needed in your neighborhood? 22% Yes 72% No

What areas of interest led you to fill out this survey?

61% Property Owner
17% Environmental Interest
11% Neighborhood Association
6% Technical Interest
22% Other: Responses Vary

Should fixed income households be allowed to defer paying taxes and fees to fix wastewater disposal problems, until selling their property?

61% Yes 28% No

PLEASE COMPLETE BOTH SIDES OF SURVEY

If the Town needs to expend money to fix wastewater disposal problems in a neighborhood, the Town aggressively pursues grants to pay for the capital improvements. However, if a public sewering option is needed, and the grants are not available or insufficient to pay for the needed capital improvements, how would you prefer the Town to pay for the capital improvements?

0% A one-time upfront charge paid by each property owner, plus monthly bills for service
11% A one-time upfront charge paid over twenty years by each property owner, plus monthly bills for service
28% A monthly bill after connecting to the system
39% Property taxes (which are deductible on your federal and state income taxes)
11% If it costs me money, I wouldn't want to fix water pollution problems which affect my community

Comments:

Responses Vary

Meadowood Road Area

Miscellaneous Areas

Questionnaires Sent:	3640
Questionnaires Returned by Property Owner:	1341
Percent of Questionnaires Returned:	36.8%

Are you the owner of this property? 92% Yes 1% No

Are you currently or plan to retire in the next 10 years? 42% Yes 51% No

How long have you owned or lived at this location? 15.7 years

Age of main building: 26.4 years

Number of bedrooms: 3.4

Number of permanent residents: 3.0

Number of seasonal residents: 1.9

Length of seasonal resident stay: 97.3 days

How many seasonal residents plan to become permanent residents?

64% None 2.3 (People) in 4.3 (Years)

Property Use

92% Single family residential
0% Multi-family (Number of Units: 44.3)
1% Condominium/Apartment
4% Vacant
3% Other: Responses Vary

Septic System Location

21% Front yard
52% Backyard
3% Other: Responses Vary
11% Left of Main Building
11% Right of Main Building

What type of wastewater disposal system do you have?

92% Septic Tank/Leaching Field
0% Cesspool
0% Pressure Distribution
0% Surface Discharge
1% Don't Know
1% Other: Responses Vary

Do you share the wastewater disposal system with another entity (i.e. multi-tenant building, neighbor)?

1% Yes, who: Responses Vary 91% No

How old is your septic system disposal (leaching) field? 11% Don't know 16.3 (Years)

Are any of the following connected to your wastewater disposal system?

85% Washing Machine
79% Dishwasher
24% Garbage Disposal
1% Sump Pump
12% Jacuzzi Tub
19% Water Softener
0% Water Chlorinator
0% Oil/Water Separator
0% Grease Trap

Approximately how often do you get your septic tank pumped?

9% More than 5 years
41% Every 3 to 5 years
33% Once every 2 years
4% Once per year
1% More than once per year
4% Never

Do you have a separate leaching field or dry well for "gray water" (sinks, showers, washing machine) 6% Yes 73% No 13% Don't Know

How much would you guess it might cost to replace a septic system disposal (leaching) field?

$13,857

7% I paid for a repair before
63% I've never paid for a repair

Do you have any of the following problems with your wastewater disposal system?

84% This property has never had any problems

	Spring	Summer	Fall	Winter
Disposal field is muddy	1%	0%	0%	0%
Drains slowly or backs up	0%	0%	0%	0%
Flows onto ground surface	1%	0%	0%	0%
Odors	1%	1%	0%	1%
Other (Describe)	0%	0%	0%	0%

Does the problem seem to be linked to a specific event (washing clothes, heavy rains, visitors, etc)?

Responses Vary

Has your wastewater disposal system ever been repaired?

11% Yes 71% No 10% Don't Know

Has more than one repair been made?

1% Yes 65% No 12% Don't Know

When was the repair made? _____ (MONTH/YEAR)

What was done? (Check all that apply)

6% Replace septic tank
7% Replace leaching field
3% Replace septic tank baffle
2% Other: Responses Vary
18% Add to leaching field
3% Not Applicable

What was the approximate repair cost? $8,494

SURVEY CONTINUES ON BACK

Are you aware of other wastewater disposal problems in your neighborhood 4% Ye 81% No

What type of water supply do you have?

0% Unknown Water Supply
52% Private Well: 3% Dug Well 62% Drilled Well
3% Community Well
6% Public Water Company: Responses Vary

If so, have you had your well water tested?

66% Yes
19% No Reason: Responses Vary

Do you have any of the following low-flow appliances?

30% Front Loading Washing Machine
30% Faucet flow restrictors
56% Toilet with 1.6 gallon per flush (or less)
50% Low-flow showerheads
1% Other: Responses Vary

Do you have these soil is at your property?

26% Sand 21% Clay 12% Till 11% Other: Responses Vary

At your property, what is the approximate depth of groundwater?

74% Don't Know 150 feet

Have you ever experienced flooding or surface drainage problems on your property?

18% Yes 72% No 3% Don't Know

Are you aware of any local wells or springs that may have been adversely affected by septic system flow? 1% Yes 93% No

Even if no obvious problems exist, are you concerned that your septic system is not properly treating the wastewater which passes through it? 7% Yes 85% No

How concerned are you that installed septic systems will have an adverse affect on ground and surface water quality in your area?

2% Extremely Concerned
4% Very Concerned
13% Concerned
18% Somewhat concerned
55% Not concerned

In your opinion, is it worthwhile to investigate the effect of septic systems on surface and groundwater quality in your area 33% Yes 55% No

In your opinion, is it worthwhile to investigate methods other than individual on-site septic systems for collecting and treating wastewater produced in your area? 30% Yes 58% No

Do you think a public sewer is needed in your neighborhood? 15% Yes 72% No

What areas of interest led you to fill out this survey?

79% Property Owner
19% Environmental Interest
1% Neighborhood Association
3% Technical Interest
12% Other: Responses Vary

Should fixed income households be allowed to defer paying taxes and fees to fix wastewater disposal problems, until selling their property?

52% Yes 29% No

PLEASE COMPLETE BOTH SIDES OF SURVEY

If the Town needs to expend money to fix wastewater disposal problems in a neighborhood, the Town aggressively pursues grants to pay for the capital improvements. However, if a public sewering option is needed, and the grants are not available or insufficient to pay for the needed capital improvements, how would you prefer the Town to pay for the capital improvements?

5% A one-time upfront charge paid by each property owner, plus monthly bills for service
20% A one-time upfront charge paid over twenty years by each property owner, plus monthly bills for service
18% A monthly bill after connecting to the system
27% Property taxes (which are deductible on your federal and state income taxes)
13% If it costs me money, I wouldn't want to fix water pollution problems which affect my community

Comments:

Responses Vary

Miscellaneous Areas

Partridge Lane Area

Questionnaires Sent:	142
Questionnaires Returned by Property Owner:	48
Percent of Questionnaires Returned:	33.8%

Are you the owner of this property? 92% Yes 0% No

Are you currently or plan to retire in the next 10 years? 50% Yes 50% No

How long have you owned or lived at this location? 18.7 years

Age of main building: 38.5 years

Number of bedrooms: 3.0

Number of permanent residents: 2.8

Number of seasonal residents: 9.4

Length of seasonal resident stay: 211.7 days

How many seasonal residents plan to become permanent residents?

67% None _____ (People) in _____ (Years)

Property Use

98% Single family residential
0% Multi-family (Number of Units: _____)
0% Condominium/Apartment
2% Vacant
2% Other: Responses Vary

Septic System Location

19% Front yard
63% Backyard
0% Other: Responses Vary
8% Left of Main Building
10% Right of Main Building

What type of wastewater disposal system do you have?

98% Septic Tank/Leaching Field
0% Cesspool
0% Pressure Distribution
0% Surface Discharge
2% Don't Know
0% Other: Responses Vary

Do you share the wastewater disposal system with another entity (i.e. multi-tenant building, neighbor)?

0% Yes, who: Responses Vary 98% No

How old is your septic system disposal (leaching) field? 25% Don't know 25.6 (Years)

Are any of the following connected to your wastewater disposal system?

83% Washing Machine
60% Dishwasher
13% Garbage Disposal
4% Sump Pump
6% Jacuzzi Tub
27% Water Softener
0% Water Chlorinator
0% Oil/Water Separator
0% Grease Trap

Approximately how often do you get your septic tank pumped?

10% More than 5 years
38% Every 3 to 5 years
38% Once every 2 years
10% Once per year
0% More than once per year
2% Never

Do you have a separate leaching field or dry well for "gray water" (sinks, showers, washing machine) 19% Yes 65% No 21% Don't Know

How much would you guess it might cost to replace a septic system disposal (leaching) field?

$13,481

19% I paid for a repair before
60% I've never paid for a repair

Do you have any of the following problems with your wastewater disposal system?

71% This property has never had any problems

	Spring	Summer	Fall	Winter
Disposal field is muddy	8%	0%	2%	4%
Drains slowly or backs up	4%	0%	2%	4%
Flows onto ground surface	2%	0%	0%	0%
Odors	2%	0%	0%	2%
Other (Describe)	2%	0%	0%	2%

Does the problem seem to be linked to a specific event (washing clothes, heavy rains, visitors, etc)?

_____

Responses Vary

Has your wastewater disposal system ever been repaired?

23% Yes 54% No 23% Don't Know

Has more than one repair been made?

6% Yes 58% No 27% Don't Know

When was the repair made? _____ (MONTH/YEAR)

What was done? (Check all that apply)

21% Replace septic tank
21% Replace leaching field
6% Replace septic tank baffle
6% Other: Responses Vary
10% Add to leaching field
6% Not Applicable

What was the approximate repair cost? $14,200

SURVEY CONTINUES ON BACK

Are you aware of other wastewater disposal problems in your neighborhood 13% Ye 79% No

What type of water supply do you have?

0% Unknown Water Supply
63% Private Well: 6% Dug Well 69% Drilled Well
0% Community Well
0% Public Water Company: Responses Vary

If so, have you had your well water tested?

73% Yes
23% No Reason: Responses Vary

Do you have any of the following low-flow appliances?

21% Front Loading Washing Machine
19% Faucet flow restrictors
56% Toilet with 1.6 gallon per flush (or less)
40% Low-flow showerheads
0% Other: Responses Vary

Do you have these soil is at your property?

21% Sand 21% Clay 19% Till 13% Other: Responses Vary

At your property, what is the approximate depth of groundwater?

73% Don't Know 131 feet

Have you ever experienced flooding or surface drainage problems on your property?

31% Yes 63% No 2% Don't Know

Are you aware of any local wells or springs that may have been adversely affected by septic system flow? 0% Yes 100% No

Even if no obvious problems exist, are you concerned that your septic system is not properly treating the wastewater which passes through it? 19% Yes 79% No

How concerned are you that installed septic systems will have an adverse affect on ground and surface water quality in your area?

2% Extremely Concerned
10% Very Concerned
19% Concerned
31% Somewhat concerned
35% Not concerned

In your opinion, is it worthwhile to investigate the effect of septic systems on surface and groundwater quality in your area 60% Yes 33% No

In your opinion, is it worthwhile to investigate methods other than individual on-site septic systems for collecting and treating wastewater produced in your area? 44% Yes 48% No

Do you think a public sewer is needed in your neighborhood? 31% Yes 58% No

What areas of interest led you to fill out this survey?

83% Property Owner
19% Environmental Interest
0% Neighborhood Association
0% Technical Interest
10% Other: Responses Vary

Should fixed income households be allowed to defer paying taxes and fees to fix wastewater disposal problems, until selling their property?

60% Yes 23% No

PLEASE COMPLETE BOTH SIDES OF SURVEY

If the Town needs to expend money to fix wastewater disposal problems in a neighborhood, the Town aggressively pursues grants to pay for the capital improvements. However, if a public sewering option is needed, and the grants are not available or insufficient to pay for the needed capital improvements, how would you prefer the Town to pay for the capital improvements?

2% A one-time upfront charge paid by each property owner, plus monthly bills for service
21% A one-time upfront charge paid over twenty years by each property owner, plus monthly bills for service
23% A monthly bill after connecting to the system
27% Property taxes (which are deductible on your federal and state income taxes)
6% If it costs me money, I wouldn't want to fix water pollution problems which affect my community

Comments:

Responses Vary

Partridge Lane Area

Patricia Drive Area

Questionnaires Sent:	110
Questionnaires Returned by Property Owner:	41
Percent of Questionnaires Returned:	37.3%

Are you the owner of this property? 100% Yes 0% No

Are you currently or plan to retire in the next 10 years? 59% Yes 41% No

How long have you owned or lived at this location? 20.4 years

Age of main building: 28.9 years

Number of bedrooms: 3.3

Number of permanent residents: 2.4

Number of seasonal residents: 0.6

Length of seasonal resident stay: 50.0 days

How many seasonal residents plan to become permanent residents?

63% None _____ (People) in _____ (Years)

Property Use

95% Single family residential
0% Multi-family (Number of Units: _____)
0% Condominium/Apartment
0% Vacant
0% Other: Responses Vary

Septic System Location

29% Front yard
63% Backyard
0% Other: Responses Vary
10% Left of Main Building
0% Right of Main Building

What type of wastewater disposal system do you have?

93% Septic Tank/Leaching Field
0% Cesspool
0% Pressure Distribution
0% Surface Discharge
0% Don't Know
0% Other: Responses Vary

Do you share the wastewater disposal system with another entity (i.e. multi-tenant building, neighbor)?

0% Yes, who: Responses Vary 93% No

How old is your septic system disposal (leaching) field? 22% Don't know 26.2 (Years)

Are any of the following connected to your wastewater disposal system?

88% Washing Machine
83% Dishwasher
24% Garbage Disposal
2% Sump Pump
5% Jacuzzi Tub
17% Water Softener
0% Water Chlorinator
0% Oil/Water Separator
0% Grease Trap

Approximately how often do you get your septic tank pumped?

7% More than 5 years
37% Every 3 to 5 years
41% Once every 2 years
10% Once per year
0% More than once per year
0% Never

Do you have a separate leaching field or dry well for "gray water" (sinks, showers, washing machine) 5% Yes 68% No 22% Don't Know

How much would you guess it might cost to replace a septic system disposal (leaching) field?

$15,023

5% I paid for a repair before
56% I've never paid for a repair

Do you have any of the following problems with your wastewater disposal system?

88% This property has never had any problems

	Spring	Summer	Fall	Winter
Disposal field is muddy	2%	0%	0%	0%
Drains slowly or backs up	0%	0%	0%	0%
Flows onto ground surface	0%	0%	0%	0%
Odors	0%	0%	0%	0%
Other (Describe)	0%	0%	0%	0%

Does the problem seem to be linked to a specific event (washing clothes, heavy rains, visitors, etc)?

_____

Responses Vary

Has your wastewater disposal system ever been repaired?

17% Yes 59% No 20% Don't Know

Has more than one repair been made?

2% Yes 46% No 34% Don't Know

When was the repair made? _____ (MONTH/YEAR)

What was done? (Check all that apply)

7% Replace septic tank
7% Replace leaching field
5% Replace septic tank baffle
2% Other: Responses Vary
12% Add to leaching field
5% Not Applicable

What was the approximate repair cost? $5,225

SURVEY CONTINUES ON BACK

Are you aware of other wastewater disposal problems in your neighborhood 0% Ye 90% No

What type of water supply do you have?

0% Unknown Water Supply
59% Private Well: 0% Dug Well 63% Drilled Well
0% Community Well
2% Public Water Company: Responses Vary

If so, have you had your well water tested?

66% Yes
29% No Reason: Responses Vary

Do you have any of the following low-flow appliances?

27% Front Loading Washing Machine
41% Faucet flow restrictors
54% Toilet with 1.6 gallon per flush (or less)
54% Low-flow showerheads
2% Other: Responses Vary

Do you have these soil is at your property?

27% Sand 22% Clay 2% Till 5% Other: Responses Vary

At your property, what is the approximate depth of groundwater?

78% Don't Know 152 feet

Have you ever experienced flooding or surface drainage problems on your property?

5% Yes 88% No 7% Don't Know

Are you aware of any local wells or springs that may have been adversely affected by septic system flow? 2% Yes 98% No

Even if no obvious problems exist, are you concerned that your septic system is not properly treating the wastewater which passes through it? 15% Yes 80% No

How concerned are you that installed septic systems will have an adverse affect on ground and surface water quality in your area?

5% Extremely Concerned
2% Very Concerned
15% Concerned
22% Somewhat concerned
54% Not concerned

In your opinion, is it worthwhile to investigate the effect of septic systems on surface and groundwater quality in your area 41% Yes 51% No

In your opinion, is it worthwhile to investigate methods other than individual on-site septic systems for collecting and treating wastewater produced in your area? 41% Yes 51% No

Do you think a public sewer is needed in your neighborhood? 17% Yes 73% No

What areas of interest led you to fill out this survey?

85% Property Owner
24% Environmental Interest
0% Neighborhood Association
15% Technical Interest
5% Other: Responses Vary

Should fixed income households be allowed to defer paying taxes and fees to fix wastewater disposal problems, until selling their property?

63% Yes 24% No

PLEASE COMPLETE BOTH SIDES OF SURVEY

If the Town needs to expend money to fix wastewater disposal problems in a neighborhood, the Town aggressively pursues grants to pay for the capital improvements. However, if a public sewering option is needed, and the grants are not available or insufficient to pay for the needed capital improvements, how would you prefer the Town to pay for the capital improvements?

0% A one-time upfront charge paid by each property owner, plus monthly bills for service
22% A one-time upfront charge paid over twenty years by each property owner, plus monthly bills for service
17% A monthly bill after connecting to the system
39% Property taxes (which are deductible on your federal and state income taxes)
2% If it costs me money, I wouldn't want to fix water pollution problems which affect my community

Comments:

Responses Vary

Patricia Drive Area

Reed Road Area

Questionnaires Sent:	54
Questionnaires Returned by Property Owner:	28
Percent of Questionnaires Returned:	51.9%

Are you the owner of this property? 93% Yes 0% No

Are you currently or plan to retire in the next 10 years? 43% Yes 50% No

How long have you owned or lived at this location? 15.6 years

Age of main building: 33.7 years

Number of bedrooms: 2.9

Number of permanent residents: 2.8

Number of seasonal residents: 1.0

Length of seasonal resident stay: 30.0 days

How many seasonal residents plan to become permanent residents?

57% None _____ (People) in _____ (Years)

Property Use

93% Single family residential
0% Multi-family (Number of Units: _____)
0% Condominium/Apartment
0% Vacant
4% Other: Responses Vary

Septic System Location

14% Front yard
61% Backyard
0% Other: Responses Vary
4% Left of Main Building
14% Right of Main Building

What type of wastewater disposal system do you have?

93% Septic Tank/Leaching Field
0% Cesspool
0% Pressure Distribution
0% Surface Discharge
0% Don't Know
0% Other: Responses Vary

Do you share the wastewater disposal system with another entity (i.e. multi-tenant building, neighbor)?

0% Yes, who: Responses Vary 100% No

How old is your septic system disposal (leaching) field? 29% Don't know 26.8 (Years)

Are any of the following connected to your wastewater disposal system?

86% Washing Machine
82% Dishwasher
21% Garbage Disposal
4% Sump Pump
0% Jacuzzi Tub
18% Water Softener
4% Water Chlorinator
0% Oil/Water Separator
0% Grease Trap

Approximately how often do you get your septic tank pumped?

7% More than 5 years
25% Every 3 to 5 years
39% Once every 2 years
14% Once per year
4% More than once per year
0% Never

Do you have a separate leaching field or dry well for "gray water" (sinks, showers, washing machine) 11% Yes 68% No 14% Don't Know

How much would you guess it might cost to replace a septic system disposal (leaching) field?

$16,531

7% I paid for a repair before
68% I've never paid for a repair

Do you have any of the following problems with your wastewater disposal system?

71% This property has never had any problems

	Spring	Summer	Fall	Winter
Disposal field is muddy	7%	0%	0%	0%
Drains slowly or backs up	0%	0%	0%	0%
Flows onto ground surface	0%	0%	0%	0%
Odors	0%	0%	0%	0%
Other (Describe)	0%	0%	0%	0%

Does the problem seem to be linked to a specific event (washing clothes, heavy rains, visitors, etc)?

_____

Responses Vary

Has your wastewater disposal system ever been repaired?

36% Yes 36% No 21% Don't Know

Has more than one repair been made?

0% Yes 57% No 21% Don't Know

When was the repair made? _____ (MONTH/YEAR)

What was done? (Check all that apply)

21% Replace septic tank
11% Replace leaching field
0% Replace septic tank baffle
0% Other: Responses Vary
4% Add to leaching field
4% Not Applicable

What was the approximate repair cost? $6,614

SURVEY CONTINUES ON BACK

Are you aware of other wastewater disposal problems in your neighborhood 4% Ye 86% No

What type of water supply do you have?

0% Unknown Water Supply
61% Private Well: 0% Dug Well 68% Drilled Well
0% Community Well
0% Public Water Company: Responses Vary

If so, have you had your well water tested?

68% Yes
21% No Reason: Responses Vary

Do you have any of the following low-flow appliances?

32% Front Loading Washing Machine
32% Faucet flow restrictors
61% Toilet with 1.6 gallon per flush (or less)
61% Low-flow showerheads
4% Other: Responses Vary

Do you have these soil is at your property?

39% Sand 11% Clay 11% Till 7% Other: Responses Vary

At your property, what is the approximate depth of groundwater?

68% Don't Know 211 feet

Have you ever experienced flooding or surface drainage problems on your property?

32% Yes 64% No 0% Don't Know

Are you aware of any local wells or springs that may have been adversely affected by septic system flow? 0% Yes 100% No

Even if no obvious problems exist, are you concerned that your septic system is not properly treating the wastewater which passes through it? 4% Yes 93% No

How concerned are you that installed septic systems will have an adverse affect on ground and surface water quality in your area?

4% Extremely Concerned
4% Very Concerned
0% Concerned
32% Somewhat concerned
61% Not concerned

In your opinion, is it worthwhile to investigate the effect of septic systems on surface and groundwater quality in your area 36% Yes 61% No

In your opinion, is it worthwhile to investigate methods other than individual on-site septic systems for collecting and treating wastewater produced in your area? 36% Yes 64% No

Do you think a public sewer is needed in your neighborhood? 25% Yes 71% No

What areas of interest led you to fill out this survey?

82% Property Owner
18% Environmental Interest
0% Neighborhood Association
7% Technical Interest
14% Other: Responses Vary

Should fixed income households be allowed to defer paying taxes and fees to fix wastewater disposal problems, until selling their property?

64% Yes 29% No

PLEASE COMPLETE BOTH SIDES OF SURVEY

If the Town needs to expend money to fix wastewater disposal problems in a neighborhood, the Town aggressively pursues grants to pay for the capital improvements. However, if a public sewering option is needed, and the grants are not available or insufficient to pay for the needed capital improvements, how would you prefer the Town to pay for the capital improvements?

4% A one-time upfront charge paid by each property owner, plus monthly bills for service
7% A one-time upfront charge paid over twenty years by each property owner, plus monthly bills for service
29% A monthly bill after connecting to the system
43% Property taxes (which are deductible on your federal and state income taxes)
7% If it costs me money, I wouldn't want to fix water pollution problems which affect my community

Comments:

Responses Vary

Reed Road Area

Russell Drive Area

Questionnaires Sent:	44
Questionnaires Returned by Property Owner:	17
Percent of Questionnaires Returned:	38.6%

Are you the owner of this property? 94% Yes 0% No

Are you currently or plan to retire in the next 10 years? 47% Yes 41% No

How long have you owned or lived at this location? 19.9 years

Age of main building: 43.3 years

Number of bedrooms: 2.8

Number of permanent residents: 2.4

Number of seasonal residents: 13.9

Length of seasonal resident stay: 61.0 days

How many seasonal residents plan to become permanent residents?

88% None _____ (People) in _____ (Years)

Property Use

82% Single family residential
0% Multi-family (Number of Units: _____)
0% Condominium/Apartment
0% Vacant
6% Other: Responses Vary

Septic System Location

6% Front yard
82% Backyard
0% Other: Responses Vary
12% Left of Main Building
6% Right of Main Building

What type of wastewater disposal system do you have?

94% Septic Tank/Leaching Field
0% Cesspool
0% Pressure Distribution
0% Surface Discharge
0% Don't Know
0% Other: Responses Vary

Do you share the wastewater disposal system with another entity (i.e. multi-tenant building, neighbor)?

0% Yes, who: Responses Vary 100% No

How old is your septic system disposal (leaching) field? 35% Don't know 20.4 (Years)

Are any of the following connected to your wastewater disposal system?

71% Washing Machine
71% Dishwasher
6% Garbage Disposal
0% Sump Pump
6% Jacuzzi Tub
35% Water Softener
6% Water Chlorinator
6% Oil/Water Separator
0% Grease Trap

Approximately how often do you get your septic tank pumped?

6% More than 5 years
53% Every 3 to 5 years
29% Once every 2 years
6% Once per year
0% More than once per year
0% Never

Do you have a separate leaching field or dry well for "gray water" (sinks, showers, washing machine) 29% Yes 65% No 0% Don't Know

How much would you guess it might cost to replace a septic system disposal (leaching) field?

$12,000

12% I paid for a repair before
59% I've never paid for a repair

Do you have any of the following problems with your wastewater disposal system?

59% This property has never had any problems

	Spring	Summer	Fall	Winter
Disposal field is muddy	12%	0%	6%	6%
Drains slowly or backs up	0%	0%	6%	6%
Flows onto ground surface	0%	0%	0%	0%
Odors	6%	6%	6%	6%
Other (Describe)	0%	0%	0%	0%

Does the problem seem to be linked to a specific event (washing clothes, heavy rains, visitors, etc)?

_____

Responses Vary

Has your wastewater disposal system ever been repaired?

35% Yes 35% No 24% Don't Know

Has more than one repair been made?

0% Yes 65% No 29% Don't Know

When was the repair made? _____ (MONTH/YEAR)

What was done? (Check all that apply)

29% Replace septic tank
12% Replace leaching field
6% Replace septic tank baffle
0% Other: Responses Vary
6% Add to leaching field
6% Not Applicable

What was the approximate repair cost? $16,000

SURVEY CONTINUES ON BACK

Are you aware of other wastewater disposal problems in your neighborhood 0% Ye 94% No

What type of water supply do you have?

0% Unknown Water Supply
53% Private Well: 0% Dug Well 76% Drilled Well
0% Community Well
0% Public Water Company: Responses Vary

If so, have you had your well water tested?

71% Yes
18% No Reason: Responses Vary

Do you have any of the following low-flow appliances?

18% Front Loading Washing Machine
18% Faucet flow restrictors
59% Toilet with 1.6 gallon per flush (or less)
59% Low-flow showerheads
0% Other: Responses Vary

Do you have these soil is at your property?

18% Sand 12% Clay 6% Till 6% Other: Responses Vary

At your property, what is the approximate depth of groundwater?

88% Don't Know _____ feet

Have you ever experienced flooding or surface drainage problems on your property?

24% Yes 71% No 0% Don't Know

Are you aware of any local wells or springs that may have been adversely affected by septic system flow? 0% Yes 94% No

Even if no obvious problems exist, are you concerned that your septic system is not properly treating the wastewater which passes through it? 12% Yes 76% No

How concerned are you that installed septic systems will have an adverse affect on ground and surface water quality in your area?

12% Extremely Concerned
0% Very Concerned
12% Concerned
18% Somewhat concerned
53% Not concerned

In your opinion, is it worthwhile to investigate the effect of septic systems on surface and groundwater quality in your area 41% Yes 53% No

In your opinion, is it worthwhile to investigate methods other than individual on-site septic systems for collecting and treating wastewater produced in your area? 35% Yes 59% No

Do you think a public sewer is needed in your neighborhood? 35% Yes 59% No

What areas of interest led you to fill out this survey?

94% Property Owner
35% Environmental Interest
0% Neighborhood Association
0% Technical Interest
0% Other: Responses Vary

Should fixed income households be allowed to defer paying taxes and fees to fix wastewater disposal problems, until selling their property?

59% Yes 29% No

PLEASE COMPLETE BOTH SIDES OF SURVEY

If the Town needs to expend money to fix wastewater disposal problems in a neighborhood, the Town aggressively pursues grants to pay for the capital improvements. However, if a public sewering option is needed, and the grants are not available or insufficient to pay for the needed capital improvements, how would you prefer the Town to pay for the capital improvements?

0% A one-time upfront charge paid by each property owner, plus monthly bills for service
18% A one-time upfront charge paid over twenty years by each property owner, plus monthly bills for service
24% A monthly bill after connecting to the system
29% Property taxes (which are deductible on your federal and state income taxes)
12% If it costs me money, I wouldn't want to fix water pollution problems which affect my community

Comments:

_____

Responses Vary

_____

_____

_____

_____

_____

Russell Drive Area

Skungamaug Road Area

Questionnaires Sent:	11
Questionnaires Returned by Property Owner:	2
Percent of Questionnaires Returned:	18.2%

Are you the owner of this property? 100% Yes 0% No

Are you currently or plan to retire in the next 10 years? 50% Yes 50% No

How long have you owned or lived at this location? 26.0 years

Age of main building: 49.0 years

Number of bedrooms: 2.5

Number of permanent residents: 3.0

Number of seasonal residents: 0.0

Length of seasonal resident stay: 0.0 days

How many seasonal residents plan to become permanent residents?

100% None _____ (People) in _____ (Years)

Property Use

100% Single family residential
0% Multi-family (Number of Units: _____)
0% Condominium/Apartment
0% Vacant
0% Other: Responses Vary

Septic System Location

50% Front yard 50% Left of Main Building
0% Backyard 0% Right of Main Building
0% Other: Responses Vary

What type of wastewater disposal system do you have?

100% Septic Tank/Leaching Field
0% Cesspool
0% Pressure Distribution
0% Surface Discharge
0% Don't Know
0% Other: Responses Vary

Do you share the wastewater disposal system with another entity (i.e. multi-tenant building, neighbor)?

0% Yes, who: Responses Vary 100% No

How old is your septic system disposal (leaching) field? 50% Don't know 8.0 (Years)

Are any of the following connected to your wastewater disposal system?

100% Washing Machine
100% Dishwasher
0% Garbage Disposal
0% Sump Pump
0% Jacuzzi Tub
0% Water Softener
0% Water Chlorinator
0% Oil/Water Separator
0% Grease Trap

Approximately how often do you get your septic tank pumped?

0% More than 5 years
50% Every 3 to 5 years
50% Once every 2 years
0% Once per year
0% More than once per year
0% Never

Do you have a separate leaching field or dry well for "gray water" (sinks, showers, washing machine) 0% Yes 100% No 0% Don't Know

How much would you guess it might cost to replace a septic system disposal (leaching) field?

$5,000

50% I paid for a repair before
50% I've never paid for a repair

Do you have any of the following problems with your wastewater disposal system?

50% This property has never had any problems

	Spring	Summer	Fall	Winter
Disposal field is muddy	0%	0%	0%	0%
Drains slowly or backs up	0%	0%	0%	0%
Flows onto ground surface	0%	0%	0%	0%
Odors	0%	0%	0%	0%
Other (Describe)	0%	0%	0%	0%

Does the problem seem to be linked to a specific event (washing clothes, heavy rains, visitors, etc)?

_____

Responses Vary

Has your wastewater disposal system ever been repaired?

50% Yes 50% No 0% Don't Know

Has more than one repair been made?

0% Yes 100% No 0% Don't Know

When was the repair made? _____ (MONTH/YEAR)

What was done? (Check all that apply)

0% Replace septic tank
50% Replace leaching field
0% Replace septic tank baffle
0% Other: Responses Vary
0% Add to leaching field
0% Not Applicable

What was the approximate repair cost? $5,000

SURVEY CONTINUES ON BACK

Are you aware of other wastewater disposal problems in your neighborhood 0% Ye 50% No

What type of water supply do you have?

0% Unknown Water Supply
100% Private Well: 0% Dug Well 50% Drilled Well
0% Community Well
0% Public Water Company: Responses Vary

If so, have you had your well water tested?

100% Yes
0% No Reason: Responses Vary

Do you have any of the following low-flow appliances?

50% Front Loading Washing Machine
100% Faucet flow restrictors
100% Toilet with 1.6 gallon per flush (or less)
100% Low-flow showerheads
0% Other: Responses Vary

Do you have these soil is at your property?

100% Sand 0% Clay 50% Till 0% Other: Responses Vary

At your property, what is the approximate depth of groundwater?

50% Don't Know 125 feet

Have you ever experienced flooding or surface drainage problems on your property?

0% Yes 50% No 50% Don't Know

Are you aware of any local wells or springs that may have been adversely affected by septic system flow? 0% Yes 100% No

Even if no obvious problems exist, are you concerned that your septic system is not properly treating the wastewater which passes through it? 0% Yes 100% No

How concerned are you that installed septic systems will have an adverse affect on ground and surface water quality in your area?

0% Extremely Concerned
0% Very Concerned
50% Concerned
50% Somewhat concerned
0% Not concerned

In your opinion, is it worthwhile to investigate the effect of septic systems on surface and groundwater quality in your area 100% Yes 0% No

In your opinion, is it worthwhile to investigate methods other than individual on-site septic systems for collecting and treating wastewater produced in your area? 0% Yes 50% No

Do you think a public sewer is needed in your neighborhood? 0% Yes 100% No

What areas of interest led you to fill out this survey?

50% Property Owner
0% Environmental Interest
0% Neighborhood Association
0% Technical Interest
50% Other: Responses Vary

Should fixed income households be allowed to defer paying taxes and fees to fix wastewater disposal problems, until selling their property?

100% Yes 0% No

PLEASE COMPLETE BOTH SIDES OF SURVEY

If the Town needs to expend money to fix wastewater disposal problems in a neighborhood, the Town aggressively pursues grants to pay for the capital improvements. However, if a public sewering option is needed, and the grants are not available or insufficient to pay for the needed capital improvements, how would you prefer the Town to pay for the capital improvements?

0% A one-time upfront charge paid by each property owner, plus monthly bills for service
0% A one-time upfront charge paid over twenty years by each property owner, plus monthly bills for service
0% A monthly bill after connecting to the system
50% Property taxes (which are deductible on your federal and state income taxes)
0% If it costs me money, I wouldn't want to fix water pollution problems which affect my community

Comments:

Responses Vary

Skungamaug Road Area

Willie Circle Area

Questionnaires Sent:	90
Questionnaires Returned by Property Owner:	34
Percent of Questionnaires Returned:	37.8%

Are you the owner of this property? 97% Yes 0% No

Are you currently or plan to retire in the next 10 years? 41% Yes 56% No

How long have you owned or lived at this location? 21.3 years

Age of main building: 42.7 years

Number of bedrooms: 2.9

Number of permanent residents: 2.6

Number of seasonal residents: 0.0

Length of seasonal resident stay: 0.0 days

How many seasonal residents plan to become permanent residents?

68% None _____ (People) in _____ (Years)

Property Use

100% Single family residential
0% Multi-family (Number of Units: _____)
0% Condominium/Apartment
0% Vacant
0% Other: Responses Vary

Septic System Location

29% Front yard
53% Backyard
6% Other: Responses Vary
9% Left of Main Building
6% Right of Main Building

What type of wastewater disposal system do you have?

100% Septic Tank/Leaching Field
0% Cesspool
0% Pressure Distribution
0% Surface Discharge
0% Don't Know
0% Other: Responses Vary

Do you share the wastewater disposal system with another entity (i.e. multi-tenant building, neighbor)?

0% Yes, who: Responses Vary 100% No

How old is your septic system disposal (leaching) field? 35% Don't know 20.4 (Years)

Are any of the following connected to your wastewater disposal system?

76% Washing Machine
68% Dishwasher
12% Garbage Disposal
3% Sump Pump
0% Jacuzzi Tub
6% Water Softener
0% Water Chlorinator
0% Oil/Water Separator
0% Grease Trap

Approximately how often do you get your septic tank pumped?

9% More than 5 years
47% Every 3 to 5 years
32% Once every 2 years
9% Once per year
0% More than once per year
0% Never

Do you have a separate leaching field or dry well for "gray water" (sinks, showers, washing machine) 15% Yes 65% No 15% Don't Know

How much would you guess it might cost to replace a septic system disposal (leaching) field?

$12,429

21% I paid for a repair before
41% I've never paid for a repair

Do you have any of the following problems with your wastewater disposal system?

76% This property has never had any problems

	Spring	Summer	Fall	Winter
Disposal field is muddy	6%	0%	3%	0%
Drains slowly or backs up	6%	0%	0%	0%
Flows onto ground surface	0%	0%	0%	0%
Odors	0%	0%	0%	0%
Other (Describe)	0%	0%	0%	0%

Does the problem seem to be linked to a specific event (washing clothes, heavy rains, visitors, etc)?

_____

Responses Vary

Has your wastewater disposal system ever been repaired?

32% Yes 47% No 12% Don't Know

Has more than one repair been made?

0% Yes 41% No 26% Don't Know

When was the repair made? _____ (MONTH/YEAR)

What was done? (Check all that apply)

35% Replace septic tank
24% Replace leaching field
6% Replace septic tank baffle
6% Other: Responses Vary
9% Add to leaching field
3% Not Applicable

What was the approximate repair cost? $8,883

SURVEY CONTINUES ON BACK

Are you aware of other wastewater disposal problems in your neighborhood 6% Ye 82% No

What type of water supply do you have?

0% Unknown Water Supply
24% Private Well: 3% Dug Well 38% Drilled Well
47% Community Well
0% Public Water Company: Responses Vary

If so, have you had your well water tested?

65% Yes
18% No Reason: Responses Vary

Do you have any of the following low-flow appliances?

12% Front Loading Washing Machine
18% Faucet flow restrictors
62% Toilet with 1.6 gallon per flush (or less)
50% Low-flow showerheads
0% Other: Responses Vary

Do you have these soil is at your property?

32% Sand 15% Clay 3% Till 12% Other: Responses Vary

At your property, what is the approximate depth of groundwater?

88% Don't Know 3 feet

Have you ever experienced flooding or surface drainage problems on your property?

26% Yes 59% No 9% Don't Know

Are you aware of any local wells or springs that may have been adversely affected by septic system flow? 0% Yes 88% No

Even if no obvious problems exist, are you concerned that your septic system is not properly treating the wastewater which passes through it? 3% Yes 85% No

How concerned are you that installed septic systems will have an adverse affect on ground and surface water quality in your area?

0% Extremely Concerned
9% Very Concerned
15% Concerned
26% Somewhat concerned
38% Not concerned

In your opinion, is it worthwhile to investigate the effect of septic systems on surface and groundwater quality in your area 35% Yes 41% No

In your opinion, is it worthwhile to investigate methods other than individual on-site septic systems for collecting and treating wastewater produced in your area? 21% Yes 65% No

Do you think a public sewer is needed in your neighborhood? 9% Yes 79% No

What areas of interest led you to fill out this survey?

82% Property Owner
18% Environmental Interest
0% Neighborhood Association
0% Technical Interest
6% Other: Responses Vary

Should fixed income households be allowed to defer paying taxes and fees to fix wastewater disposal problems, until selling their property?

56% Yes 18% No

PLEASE COMPLETE BOTH SIDES OF SURVEY

If the Town needs to expend money to fix wastewater disposal problems in a neighborhood, the Town aggressively pursues grants to pay for the capital improvements. However, if a public sewering option is needed, and the grants are not available or insufficient to pay for the needed capital improvements, how would you prefer the Town to pay for the capital improvements?

0% A one-time upfront charge paid by each property owner, plus monthly bills for service
12% A one-time upfront charge paid over twenty years by each property owner, plus monthly bills for service
3% A monthly bill after connecting to the system
26% Property taxes (which are deductible on your federal and state income taxes)
29% If it costs me money, I wouldn't want to fix water pollution problems which affect my community

Comments:

Responses Vary

Willie Circle Area

Entire Phase 2 Area

Questionnaires Sent:	4877
Questionnaires Returned by Property Owner:	1836
Percent of Questionnaires Returned:	37.6%

Are you the owner of this property? 93% Yes 0% No

Are you currently or plan to retire in the next 10 years? 45% Yes 49% No

How long have you owned or lived at this location? 17.2 years

Age of main building: 30.4 years

Number of bedrooms: 3.3

Number of permanent residents: 2.8

Number of seasonal residents: 2.2

Length of seasonal resident stay: 95.1 days

How many seasonal residents plan to become permanent residents?

65% None 2.2 (People) in 4.5 (Years)

Property Use

93% Single family residential
0% Multi-family (Number of Units: 44.3)
1% Condominium/Apartment
3% Vacant
3% Other: Responses Vary

Septic System Location

20% Front yard
56% Backyard
2% Other: Responses Vary
10% Left of Main Building
11% Right of Main Building

What type of wastewater disposal system do you have?

93% Septic Tank/Leaching Field
0% Cesspool
0% Pressure Distribution
0% Surface Discharge
0% Don't Know
1% Other: Responses Vary

Do you share the wastewater disposal system with another entity (i.e. multi-tenant building, neighbor)?

1% Yes, who: Responses Vary 92% No

How old is your septic system disposal (leaching) field? 15% Don't know 18.3 (Years)

Are any of the following connected to your wastewater disposal system?

85% Washing Machine
78% Dishwasher
25% Garbage Disposal
2% Sump Pump
9% Jacuzzi Tub
18% Water Softener
0% Water Chlorinator
0% Oil/Water Separator
0% Grease Trap

Approximately how often do you get your septic tank pumped?

9% More than 5 years
41% Every 3 to 5 years
34% Once every 2 years
5% Once per year
1% More than once per year
3% Never

Do you have a separate leaching field or dry well for "gray water" (sinks, showers, washing machine) 7% Yes 72% No 14% Don't Know

How much would you guess it might cost to replace a septic system disposal (leaching) field?

$13,708

9% I paid for a repair before
60% I've never paid for a repair

Do you have any of the following problems with your wastewater disposal system?

81% This property has never had any problems

	Spring	Summer	Fall	Winter
Disposal field is muddy	2%	0%	0%	0%
Drains slowly or backs up	1%	0%	0%	1%
Flows onto ground surface	1%	0%	0%	0%
Odors	1%	1%	1%	1%
Other (Describe)	0%	0%	0%	0%

Does the problem seem to be linked to a specific event (washing clothes, heavy rains, visitors, etc)?

Responses Vary

Has your wastewater disposal system ever been repaired?

16% Yes 64% No 12% Don't Know

Has more than one repair been made?

2% Yes 62% No 16% Don't Know

When was the repair made? _____ (MONTH/YEAR)

What was done? (Check all that apply)

11% Replace septic tank
10% Replace leaching field
4% Replace septic tank baffle
2% Other: Responses Vary
16% Add to leaching field
3% Not Applicable

What was the approximate repair cost? $8,620

SURVEY CONTINUES ON BACK

Are you aware of other wastewater disposal problems in your neighborhood 6% Ye 79% No

What type of water supply do you have?

0% Unknown Water Supply
51% Private Well: 2% Dug Well 59% Drilled Well
6% Community Well
7% Public Water Company: Responses Vary

If so, have you had your well water tested?

64% Yes
21% No Reason: Responses Vary

Do you have any of the following low-flow appliances?

29% Front Loading Washing Machine
31% Faucet flow restrictors
57% Toilet with 1.6 gallon per flush (or less)
51% Low-flow showerheads
1% Other: Responses Vary

Do you have these soil is at your property?

26% Sand 20% Clay 11% Till 10% Other: Responses Vary

At your property, what is the approximate depth of groundwater?

75% Don't Know 141 feet

Have you ever experienced flooding or surface drainage problems on your property?

21% Yes 70% No 3% Don't Know

Are you aware of any local wells or springs that may have been adversely affected by septic system flow? 1% Yes 93% No

Even if no obvious problems exist, are you concerned that your septic system is not properly treating the wastewater which passes through it? 8% Yes 84% No

How concerned are you that installed septic systems will have an adverse affect on ground and surface water quality in your area?

3% Extremely Concerned
5% Very Concerned
15% Concerned
19% Somewhat concerned
52% Not concerned

In your opinion, is it worthwhile to investigate the effect of septic systems on surface and groundwater quality in your area 36% Yes 53% No

In your opinion, is it worthwhile to investigate methods other than individual on-site septic systems for collecting and treating wastewater produced in your area? 33% Yes 56% No

Do you think a public sewer is needed in your neighborhood? 17% Yes 71% No

What areas of interest led you to fill out this survey?

80% Property Owner
19% Environmental Interest
1% Neighborhood Association
4% Technical Interest
11% Other: Responses Vary

Should fixed income households be allowed to defer paying taxes and fees to fix wastewater disposal problems, until selling their property?

55% Yes 27% No

PLEASE COMPLETE BOTH SIDES OF SURVEY

If the Town needs to expend money to fix wastewater disposal problems in a neighborhood, the Town aggressively pursues grants to pay for the capital improvements. However, if a public sewering option is needed, and the grants are not available or insufficient to pay for the needed capital improvements, how would you prefer the Town to pay for the capital improvements?

4% A one-time upfront charge paid by each property owner, plus monthly bills for service
20% A one-time upfront charge paid over twenty years by each property owner, plus monthly bills for service
19% A monthly bill after connecting to the system
28% Property taxes (which are deductible on your federal and state income taxes)
13% If it costs me money, I wouldn't want to fix water pollution problems which affect my community

Comments:

Responses Vary

Entire Phase 2 Area

APPENDIX C: WORKSHOP MEETING MINUTES

TOWN OF TOLLAND

WATER POLLUTION CONTROL AUTHORITY
MINUTES OF JUNE 3, 2008
SEWER FACILITIES PLAN WORKSHOP

Members Present: Jennifer Zmijewski, Chair
John Konrad, alternate
Bruce Allen (arrived 8:00p.m.)

Members Absent: Todd Penney, Vice Chair
Karen Tehan
Andy Netro

Others Present: Dave Smith, Director of Public Works
Kurt Mailman and Matthew Jermine of Fuss & O'Neill
Jason Hofmann, The Water Planet Company
Rob Miller, Eastern Highlands Health District
Board and Commission Members
Public

Jennifer Zmijewski called the meeting to order at 7:07p.m in Council chambers, describing the reason for the Workshop, to explain to various Board and Commission members and other interested parties about the WPCA's Facilities Plan to date. She said the Town entered into a consent order with the Department of Environmental Protection (DEP) in the early 1990s and they are working toward getting a final plan approved. The Plan has been broken out into two phases. Phase I, which encompasses the commercial areas in Town, has been approved. Phase II is the residential portion, and Fuss & O'Neill has been working with them to put it together. She then introduced Kurt Mailman of Fuss & O'Neill.

Kurt Mailman said they collected a variety of data about wastewater management in Tolland from different sources, and they hope to use those present as a sounding board to get an idea if they are on the right track with their developing plan. He provided a handout, Workshop #1 Agenda. He said some of the goals of Phase II include addressing existing environmental concerns, augmenting the Phase I Plan and looking at the 20-year planning horizon as proscribed by DEP. He reviewed several maps and data that resulted in a weighted response Needs Matrix used to quantify if on-site wastewater renovation is suitable in various neighborhood areas.

Referring to the matrix provided, Kurt Mailman said that Tolland has, for the most part, some good sized lots which allow plenty of room for septic and wells, and that the smaller acreage lots of about 1/3 of an acre were mostly sewered in Phase I. He added that most smaller lots in the ½ to ¾ acre size can receive code compliant repairs to septic systems if the soils are good. He did qualify that there are sometimes discrepancies betweenold published county soil data and Natural Resources Conservation Service (NRCS) on-line GIS spatial data, but that in using data for the Needs Matrix, they went with the assumption that web-based data is most current.

Kurt Mailman discussed the aquifer protection areas in town. Looking at the DEP web site, he said that there is only one aquifer area; however, from the Phase I study, they found Tolland has

more than one aquifer protection area. Dave Smith clarified that the additional areas are part of a zoning designation used by the PZC and that an aquifer protection area carries extra prohibitions and protections such as different ratings for bedrooms per acre. Because of this, Kurt Mailman said they would need to rate Tolland's aquifer protection areas in the Needs Matrix.

A questionnaire was sent out in April to all residences in the Phase II area, and Kurt Mailman said they had a good return rate of about 37 percent. The questionnaire asked residents about issues with odor problems, breakouts, seasonal problems, the age of their septic systems, soil types, history of repairs and a variety of other questions, including whether they have garbage disposals or water conditioning equipment in their homes. Kurt Mailman said the responses gave them a good cross section of the town and they used the responses to charter where people reported problems, recording "hits" if the same types of problems were reported occurring in a particular neighborhood. Clusters of homes with multiple "hits" were used as the basis for a walkover program, whereby 120 properties were selected for physical walkovers to look for evidence of ponding, septic tank breakout, or wet or soggy soils. While they did miss the high groundwater period in March, they did find some ponding and soggy soil areas despite it being a relatively dry month in April.

Rob Miller asked if they considered that residents will not want to report their property as problematic by either not responding or giving false information on the surveys. For that reason, he said weighting the self-reporting column on the matrix with a 4 might be a little high. Matthew Jermine of Fuss & O'Neill said one way they addressed this issue was to schedule a walkover on properties next door to someone who reported problems. Richard Knight, PZC Chair, noted that in the 120 walkovers, only four neighborhoods were found to have problems. Rob Miller noted that when repairs are made to septic systems, variances to setbacks can be granted.

Running through all the data sources, Kurt Mailman said the Willie Circle area had the highest priority points. He also noted that part of the flow capacity form the Phase I plan was reserved for some residential areas that might have problems. He added that Tolland has a limited capacity discharge of 400,000 GPD so that any sewer issues must be kept in the framework of Tolland's limitation. Dave Smith said that the Phase I allocated area left about 80,000 GPD for the remainder of the town. The phased plan, he said, was a compromise with DEP because the Town had an imminent need through economic development to add sewers to the Route 195 corridor area.

Kurt Mailman said in the matrix, any areas that reportedly met 50 percent or more of the criteria, they deemed as areas to look at further. This equates to 17 priority points or more. For these areas, they felt they would need to look at other solutions rather than continued on-site wastewater management.

Kurt Mailman said another factor and major element to the plan is whether it meets the goals of the statewide Conservation and Development Plan. He said public sewers are not encouraged in preserved open space and conservation areas, and they would have to prove an environmental need for sewers at the same time they do not promote development in these areas. He said the State's overall goal is to encourage development in inner cities and to prevent sprawl. Richard Knight asked if these priority neighborhoods fall in conservation areas. Kurt Mailman said the Willie Circle area is in a conservation area, and Apple Road is partially in a conservation area. Additionally, Anthony Road is in a rural area. MaryAnn Delaney Tuttle asked if sewering could

be justified in some conservation neighborhoods if the area is already developed but failing in on-site wastewater management. Kurt Mailman said they could, but they would need to do a petition letter to ask for the area to be redesignated. He said the Director of Planning and Community Development can use this information to ask for a change in the designation. He said if the OPM rejects the basis for the request, then DEP cannot approve the WW Facilities Planning Report. Kurt Mailman further said that if the request is not approved, they can still go forward with recommendations to sewer but they will lose out on State monies to build the facilities. He provided the example that in Phase I, they successfully petitioned to change Rhodes Road to allow sewering by showing the existing issues with small lots and a definitive need to tie in the high school required going down Rhodes Road. Despite their rural designation, previously developed properties on Rhodes Road were allowed to tie in. (Vacant properties were excluded from the sewer service district.)

MaryAnn Delaney Tuttle asked if they could pencil in individual lots for sewering in an effort to isolate areas to solve problems but not further develop areas where sewering is not needed. Kurt Mailman said they could, that the analysis of the petition for C&D Plan changes is done on a lot by lot basis. He said their goal, however, for this evening is to see if they can achieve consensus that they need to find solutions for the areas that came in meeting 50 percent or more of the criteria. Their goal, he said, is to serve the areas that have an environmental need.

Mr. Knight asked if their goal is to solve water pollution control issues or to meet the criteria to get the consent decree lifted so they don't lose out on State grants. Jennifer Zmijewski said they cannot solve water pollution control areas in Town without getting their master plan approved and the DEP will want them to implement their approved plan at some point. Mr. Knight also asked if any of these priority areas are in a straight line with each other where they might get a sort of two-for-one resolution. MaryAnn Delaney Tuttle noted that the Hurlburt and Willie Circle areas are fairly close together. Kurt Mailman said looking at that issue would be a next step item, but that for now this Workshop is to get a feel for if they are on board targeting the correct areas. Richard Knight asked if there is a target date for the plan. Kurt Mailman said the schedule looks at having the draft report ready to be submitted in August to the DEP to solicit their comments and then amend as necessary.

Jason Hofmann of The Water Planet asked if they run pipe for the Russell, Willie, Anthony, and Lakeview areas, how close are they to putting them near the gallonage limitation set by Vernon, as well as ten years down the road. Kurt Mailman showed a future wastewater flow apportionment chart which indicated they would be under the 80,000 gallon threshold but close to it. He added that in twenty years out, they may be able to negotiate with Vernon for more gallonage. Jennifer Zmijewski said, however, that they don't expect to bump up against the 400,000 GPD limit even in twenty years. Dave Smith also noted that the hardware installed for the sewers was done in anticipation of the [400,000 gpd] larger flows.

Richard Knight asked if they might be able to do a community septic system for the Apple Road area. Kurt Mailman said there is a large area, but it would be a loft goal. Fuss & O'Neill plans to do a desktop analysis of a potential community wastewater treatment site in one of the priority areas to get a feel for the things they might be able to do.

Going back to the Needs Matrix, Rob Miller said with regard to soils suitability that the only way to get better data is to do an actual site analysis. He said this is what their sanitarian does. For that reason, he questioned why the Sanitarian's Recommendations (column H) was rated with

only 3 points, but the Poor Soil Suitability (column D) from NRCS was rated higher with 5 points. He said he would expect the sanitarian's recommendations to be more accurate. Dave Smith said the problem was that the sanitarian's information was not anything they could reproduce and put in a package and therefore becomes very precise anecdotal evidence. Rob Miller said the sanitarian's recommendations are based on experience and the parameters she looks at are the same as NRCS, except that the NRCS data a larger townwide scale. With that in mind, he asked if it would be worthwhile to quantify data from her files. Dave Smith said there might be some budget constraints involved. He also pointed out that the past three draft plans have all flagged these same clusters, so the information tracks true across the categories.

Richard Knight said matrixes sometimes lead the reader to accept a predetermined conclusion. He questioned why the walkover results would appear on the matrix. Kurt Mailman said the walkovers are a field-verified corroboration of a physical wastewater problem. Jennifer Zmijewski said physical evidence should carry heavy weight. Mr. Knight said he was concerned that using a different approach, they could easily come up with a different set of neighborhoods to target. John Konrad said at the end of the day the results of this matrix were unsurprising to him, that they corroborated what he saw as areas with wastewater management problems. He also asked if the only solution is to put in a high pressure line and pumping stations in the problem areas. Kurt Mailman said there are some other solutions that they would need to consider. Dave Smith cautioned that they should not word any areas as having a pollution problem that is extremely detrimental as that is not nearly the case, but rather they are problem areas. John Konrad asked if putting in dry wells in some of these areas for separate graywater treatment would be helpful. Jennifer Zmijewski said multiple dry wells is not a practical solution to the problem. She added that it is unlikely that they will be able to find alternate sites in some of these areas to support a community system.

Jennifer Zmijewski explained what a community wastewater treatment system is. She said that taking all the homes in a given area and tying them all together into one large wastewater absorption system requires a DEP permit, which has more stringent regulations than local health department rules. She said one DEP requirement relates to nitrogen and the need to use alternative treatment technology to remove nitrogen. She said because the State dictates that you cannot put alternative treatment systems in watershed areas, finding a site to handle a lot of flow near Willie Circle will be difficult. Additionally, the WPCA would be responsible to maintain the community wastewater because it is a public sewer system. Rob Miller added that a modern WPCA Developers agreement would require bonding for a privately owned community's wastewater treatment system.

The question was asked if it was feasible to expect homeowners to individually repair their septic systems. Jennifer Zmijewski said whatever public wastewater renovation solutions are determined, the homeowners will bear the cost typically through benefit analyses. She said a community solution is determined on an economy of scale. Rob Miller said that some septic site repairs cannot comply with today's regulations and so many of those repairs require variances and will have a finite life. He said you cannot continue to make repairs with variances without some risk to public health. Dave Smith said if a septic system requires refreshing of fields once every forty years, that is basically a lifetime for a homeowner. He said that one reality is that not every home in a problem area has a problem and the difficultly will be in telling these people that they have to come up with a large sum of money to pay for sewering. Jennifer Zmijewski added that another reality will be based on discussions with DEP and how hard they will push.

Richard Knight said that the public policy notion has been that they should only build homes where the land will sustain them without the introduction of artificial means, such as sewers. He said if they are going to accept the notion of replacing septic systems with sewers then they should make it loud and clear that public policy is changing.

Dave Smith said that they should take a look at how many repairs were done in a given problem area that required variances from neighbors wells or which required variances in general. He said they could look at the street files for Willie Circle, Apple Road and other high priority areas, and that it would not be that hard. Rob Miller said that in his experience he expects they will find a lot of variances granted in the Willie Circle area.

Rob Miller volunteered a summer student intern who he said could look at the number and types of variances for the Willie Circle area as a start, and other areas if staff are available.

John Konrad said he suspects one issue at the public hearing will be people pointing to one neighbor who they believe abuses their wastewater system. Jennifer Zmijewski said in her experience she has found people will often adjust their lifestyle to live within the limitations of the wastewater system, such as not doing laundry at home. Dave Smith said a selling point for community systems is that they will give people more utility of their properties, so they no longer have to do things such as going to the laundromat.

Kurt Mailman said the next steps will be to solicit more information from the Health Department and do some more evaluations to look at alternatives for the neighborhoods at t he top of the needs matrix. From there they will develop and finalize a recommended plan, look at the most cost effective solutions, revise maps to include Phase I and II, and put together an opinion cost for improvements. This will help them to put together a road map for the next twenty years.

In response to a question from Richard Knight about the definition of an on-site wastewater management plan, Kurt Mailman said that some municipalities put together pump out plans that require residents to pump out their septics by a particular date. They sometimes create a program of septic system testing and walkover investigations to identify continuing concern areas and set thresholds. He added that some communities do outreach programs and create brochures that educate people on the best ways to maintain a septic system, protect the groundwater, and to tell them that garbage disposals and septic systems are not the best marriage for instance.

John Durand, a Sugar Hill Road resident, said he had received the survey and from comments from other residents, there was this undercurrent belief that the Town was planning to sewer the entire Town. He said he came to the meeting out of concern that they, the WPCA and Town, were opening the door to widespread public sewer connections and from the discussions tonight, he was pleased to see that this is not the plan.

Kurt Mailman said there will be a public hearing where they will show their revised wastewater management plan to solicit comments from the public and finalize the draft report, which will then be submitted to the DEP and finalized based on their comments.

Respectfully submitted,

Annie Gentile
Clerk

Workshop #1 Agenda
Tolland Wastewater Facilities Planning Report
Phase II Planning Area
Town Hall, 7:00 PM
June 3rd, 2008

1.0 Introductions

2.0 Background

- 2.1 Phased Program to Facilitate Economic Development
- 2.2 Phase I Report Submitted April 2004

3.0 Wastewater Phase II Facilities Planning Goals
- 3.1 Address Environmental Concerns
- 3.2 Long Term 20 Year Planning Horizon
- 3.3 Conservation and Development Consistency

4.0 Goals for Workshop
- 4.1 Solicit feedback on Draft Wastewater Management Plan
- 4.2 Consensus on Development Probabilities
- 4.3 Confirmation of Wastewater Renovation Needs Matrix
- 4.4 Agree on Methodology to Provide Wastewater Renovation in Areas
- 4.5 Review Draft Plan with Local and Statewide Planning Goals

5.0 Completed to Date
- 5.1 Compiled Existing GIS Mapping
- 5.2 Plotted Health District Septic System Repair Data
- 5.3 Incorporated Town Sanitarian's Areas of Concern
- 5.4 Defined Extents of Neighborhood Areas of Concern
- 5.5 Apportioned Wastewater Flow based on Water Use Records
- 5.6 Conducted Phase II Questionnaire Program
- 5.7 Evaluated Wastewater Questionnaire Survey Responses
- 5.8 Implemented Walkover Inspection Program
- 5.9 Created Draft Evaluation Matrix

6.0 Determine Wastewater Needs
- 6.1 Spatial Analysis & Correlation of all Data Sources
  - 6.1.1 Existing GIS Mapping
    - 6.1.1.1 Location of Existing Sewer Collection System
    - 6.1.1.2 Tolland Zoning Designations
    - 6.1.1.3 Tolland Future Land Use Plan
    - 6.1.1.4 Soil Suitability
    - 6.1.1.5 Aquifer Protection Areas
    - 6.1.1.6 Surficial Materials
    - 6.1.1.7 Water System Locations
    - 6.1.1.8 Small Lot Sizes

- 6.1.2 Health District Septic System Repair Data
- 6.1.3 Town Sanitarian Areas of Concern
- 6.1.4 Defined Extents of Neighborhood Areas of Concern
- 6.1.5 Wastewater Flow Apportionment
- 6.1.6 Walkover Inspection Program
- 6.1.7 Wastewater Questionnaire Survey

7.0 Draft Wastewater Management Plan Recommendations
- 7.1 Extend Public Sewers (Gravity vs. Low Pressure)
  - 7.1.1 Anthony Road – North to Old Cathole Road
  - 7.1.2 Willie Circle – South along Crystal Lake Rd
  - 7.1.3 Lake View Heights – North along Doyle Road to Crystal Lake Road
  - 7.1.4 Russell Drive Area– North under I-84 (micro tunneling/pipe jacking) or public sewer/force main into Vernon
- 7.2 Community Treatment System
  - 7.2.1 Apple Road Area – Southeast of New Rd and Grant Hill Rd Intersection
- 7.3 Consideration of Decentralized Wastewater Disposal Options
- 7.4 On-Site Wastewater Management Areas
  - 7.4.1 Remaining Areas
  - 7.4.2 Continued Onsite Wastewater Renovation System Monitoring Program

8.0 Next Steps
- 8.1 Alternatives Summary (Technical Memo)
  - 8.1.1 Describe Alternatives for Wastewater Renovation
  - 8.1.2 Conceptual Layouts of Recommended Improvements
- 8.2 Develop Recommended Plan
  - 8.2.1 Overall Feasibility
  - 8.2.2 Economic Analysis
  - 8.2.3 Implementation Considerations
  - 8.2.4 Revise Tolland SSA map
  - 8.2.5 Collection System Layout/Subsurface Treatment Site layout
  - 8.2.6 Opinion of Cost
  - 8.2.7 Preparation of On-Site Wastewater Management Plan
  - 8.2.8 List of Permits Needed
  - 8.2.9 Compatibility with Town Zoning and Future Plan of Development
  - 8.2.10 Compatibility with State Conservation and Development Plan
  - 8.2.11 Environmental Impacts of Recommended Plan
- 8.3 Issue Draft Wastewater Facilities Plan Report
- 8.4 Public Hearing on Draft Report
- 8.5 Finalize Report

PLANNING & ZONING COMMISSION
TOLLAND, CONNECTICUT
REGULAR MEETING MINUTES OF NOVEMBER 24, 2008

MEMBERS PRESENT:	Richard Knight, Chair
Gael	Stapleton, Secretary
	Michael Cardin, Regular
Sue	Errickson, Regular
Marilee	Beebe-Kostrun, Alternate
MEMBERS ABSENT:	Roseann Gottier, Vice Chair
Jack	Scavone, Alternate
OTHERS PRESENT:	Linda Farmer, Director of Planning & Community Development
Dave	Smith, Town Engineer
Heidi	Samokar, Planimetrics
	Kurt Mailman, Senior Project Manager, Fuss & O'Neill
Jennifer	Zmijewski, WPCA Chair
Rob	Miller, Health Director, Eastern Highlands Health District
John	Konrad, WPCA Alternate
	Public

1. Call to Order. Richard Knight, Chair, called the meeting to order at 7:00p.m. in Council Chambers.

2. Public Comment: None.

3. Public Hearing(s): None.

4. Action on Public Hearing(s): None

5. Other Agenda Items

   5.1 Sewer Facilities Plan – Phase II – Discussion with WPCA, Fuss & O'Neill, Planimetrics and the Eastern Highlands Health District Health Director on proposed plan and potential land use impact. Richard Knight described the three cornerstones of the Plan of Conservation and Development (POCD) update, saying that any new development should be environmentally sustainable on site, fiscally viable, and should fall within the framework of maintaining the look and feel of the town's character. He said that Planimetrics is assisting the PZC in developing the POCD. He said extensive sewering would have a large impact on the town.

Jennifer Zmijewski, Chair of the WPCA, said their Authority is not looking at extending sewers to promote development. Rather they are looking at areas of concern in town where continued on-site wastewater management may not be possible. Kurt Mailman, Senior Project Manager with Fuss & O'Neill, the consultant hired by the town to help with the phased project provided a Powerpoint presentation. He said his firm started the phased project in 2004 with Phase II starting about a year ago in October. He walked through the process of how they quantified various areas in town on their ability to sustain on-site septic systems. Providing some background, he said Tolland has been under a consent order from the Department of Environmental Protection since 1975 to have an approved wastewater management plan. In 1993, the DEP put the Town under a consent order prohibiting sewer connections in the Shenipsit Lake watershed area.

Mr. Mailman said Phase I consisted of the Industrial Park, Old Post Road, the Gateway zone and the schools. This phase was fast-tracked to accommodate development in the Gateway zone. Phase II is the remaining areas of town not covered in Phase I. Mr. Mailman said they used various evaluation criteria including existing base mapping, GIS data, site by site evaluations, self-reporting public participation on the effectiveness of individual resident's systems, and 120 physical walkovers of parcels in town. They looked at the compatibility of these evaluations with development plans as well as with the intermunicipal agreement Tolland has with the Town of Vernon. They also relied on the knowledge of the town sanitarian.

From this information, Mr. Mailman said they created a priority point matrix rating the ability in various areas to sustain on-site septic systems. They delineated five project areas, a Tier II area which would be areas that would require continued monitoring, and Tier I areas, which were not identified as potentially problematic. He said much of the town does not need improvements beyond possibly increased monitoring by the WPCA and the EHHD. Mr. Mailman said they recommend that all Tier I and Tier II areas be monitored by the EHHD and participate in a town-wide pump out program every five years to help preserve the longevity of their systems.

The five project areas are the Anthony Road area, the Apple Road area, Lakeview Heights area, Russell Drive and Willie Circle areas. All would involve public sewer extensions with the exception of Apple Road, for which they recommend a community solution. Mr. Mailman added that any review of the plan must have CEPA consistency. It was noted that many of these areas of concern are areas with small lots. Mr. Mailman said that it is challenging to make septic repairs on small lots that will meet public health code requirements due to spatial limitations. Ms. Stapleton asked what the main issue is in the Lakeview Heights area. Mr. Mailman said it is ledge.

Mr. Mailman said the five projects, if completed, would not cause Tolland to exceed the allowable gallons per day usage that is determined in their

intermunicipal agreement. Mr. Knight asked if any of these project areas can have a solution on site, particularly if they have public water. Mr. Mailman said Anthony Road already has a public water system, but there are still problems there. He said their recommendation is that these areas are unlikely to be able to sustain themselves for the next twenty years. Mr. Mailman provided costs opinions for the five projects, which were estimated to be between $19.3 million and $41 million in present day dollars. He said there is no imminent public health risk that requires immediate construction. However, if these projects are put on a recommended plan, then they would be eligible for state funding in some cases if the opportunity arose. Ms. Errickson asked if there was any urgency to completing the project in the Willie Circle area due to its proximity to Shenipsit Lake. Mr. Mailman said the area does fall in the watershed. Ms. Zmijewski said this factor adds limitations to their options for a solution.

Mr. Mailman said the next steps in the process are to hold a public hearing, submit their plan to the DEP and finalize the plan with the DEP, which can take some time. He said they can then solicit the DEP to lift their consent order. Ms. Errickson asked if they were under any obligation to notify individual homeowners in the areas of concern about the public hearing. Ms. Zmijewski said they are not required to do more than place an ad for a public hearing; however, they plan to put an ad in the Tolland Monthly and put information up on the town website as well to try to reach as many people as possible. Ms. Beebe-Kostrun asked if the plan will affect the town's bond rating. Dave Smith, Town Engineer said it will not affect the bond rating, but because grant to loan ratios are based on needed capacity, their ratio is low right now.

Mr. Knight asked if some septic problems are caused by a poor system of management by individual homeowners. He asked if there were specific land characteristics that they might need to take another look at. He asked if the town could figure out how many homes presently exist on 1 acre or less of land and if they could be put on a density map. Ms. Zmijewski cautioned that there are many factors that influence whether a system is sustainable on site besides lot size, such as individual maintenance, soil types, depth to groundwater, and depth to ledge. Mr. Mailman said they took more of an umbrella approach when defining areas of concern. Ms. Beebe-Kostrun said that although a system may fail on a smaller sized lot, an engineered system can always be done. Ms. Zmijewski said that it is easier to do this on undeveloped small parcels than it is on parcels with an existing house and system. Rob Miller, Health Director with EHHD said that systems designed and constructed before the early 1980's have a finite life, whereas newer systems have permanent long-term solutions.

Heidi Samokar of Planimetrics said the WPCA is solely responsible for the sewer service map, and they determine where sewers are and where they can and cannot go. She said any future land use decisions will require a close look at this. She said it sounds like there is common ground between everyone about avoidance areas and the need to monitor and educate the public about proper

maintenance. She said she also spoke to the wastewater administrator in Vernon and has learned there is excess capacity but that several communities share that access. Therefore, it will be important to be aware of the gallons per day numbers they may be allowed when planning any future development. Ms. Farmer asked if they will need to reconcile their planning initiatives when they start looking at opportunities for increased density. Ms. Zmijewski said there may need to be some tradeoffs but that they should remember that the flow rates that were given were conservative. Mr. Mailman said he recalled they had gotten some early estimates on required flow rates when they worked on Phase I and that data might still be available.

Mr. Cardin asked if the town is presently informed when a resident has their septic system pumped. Mr. Smith said that information is not mandatory to be provided. He said Skips Septic generally informs the town, but other pumpers do not. Ms. Stapleton asked how they plan to address homeowners who install water softeners that discharge to their septics. Mr. Miller said he does not know. He said the DEP is the agency with the authority to enforce statute but they are not set up to handle discharges in residential settings. He said he has tried getting local installation information from water softener installers, but has not had any luck. He said if a homeowner asks the health district, they advise them of the law, but they don't regulate what is done in individual homes. He added that they advise homeowners of their options—to either not treat their water, to install a system that does not discharge to their septic, or to install a septic that is solely dedicated to this type of discharge.

Ms. Farmer confirmed with Ms. Zmijewski that the PZC could provide comments to the WPCA to be made part of the public hearing. Mr. Knight asked that Mr. Mailman provide a copy of his presentation to Ms. Farmer to be made part of the evening's record.

Mr. Knight seated Ms. Beebe-Kostrun for Ms. Gottier

5.2 P&Z App. #786 – TOMLEN, LLC – Commission to determine under Section 170-126 C. of the Zoning Regulations, appropriate notice for pending Zoning Regulation revision Public Hearing. Ms. Farmer said the public hearing for this application is set for January 12, 2009. She said the applicant requested a zoning regulation revision to allow 20 percent of the units in active adult communities to not be restricted to persons 55 of age or older only. She said it is not a requirement to notify everyone within 500' of Belvedere Ridge and the other active adult community in town, Crystal Springs, unless they deem it appropriate. Ms. Errickson said she feels individual notifications should be sent to property owners within 500' at both Belvedere Ridge and Crystal Springs.

Errickson/Cardin motion to notify all property owners within 500' of Belvedere Ridge and to notify Steve Amedy of the public hearing as a courtesy. Mr. Knight said there are about another 7,000 people in town and he feels the courtesy

notification is the public hearing notice in the newspaper. A vote was taken on the motion. Mr. Cardin, Ms. Errickson, and Ms. Beebe-Kostrun voted in favor. Mr. Knight and Ms. Stapleton were opposed. Motion passed.

5.3 8-24 Referral – Discussion and report to Town Council concerning Quit Claiming the abandoned portion of Bald Hill Road to abutters. Mr. Knight said they did not receive any advance notice about this referral and so they should not feel they need to make any referral this evening. Ms. Farmer provided some background saying that the opinion of the town attorney in 1974, Harold Garrity, was that the extended portion of Bald Hill Road if owned by the town had been abandoned as a road. She said a proposal is before the Town Council to quit claim the portion of Bald Hill Road from the center out to clean up some technicalities. Mr. Smith said there are about a dozen properties that have frontage there. He said by quit claiming this portion of the road, the town would have no responsibility to upgrade it.

Ms. Stapleton said she believes there is preserved land there and asked if quit claiming it would have any affect on residents' use of the land. Ms. Farmer said she would not expect there to be any. Ms. Stapleton asked if public access would still be allowed to the land. Mr. Smith clarified that there is no town open space in the discussion area. He said this is beyond Kozley Road. Mr. Cardin concurred that the land in that area is all privately owned. Mr. Knight asked if the town attorney, Rick Conti has issued any statement. Ms. Farmer said they have not received anything in writing, but that she assumes they will receive something before the Town Council takes any formal action.

Marilee Clark of 24 Hitching Post Road in Glastonbury spoke as attorney for Monique Paladoro, who is contracted to purchase the property at 11 White Road on December 1st. Ms. Clark said the opinion from 1975 was that the portion of the road has been abandoned and that there is all trees and brush in this area now. She said Attorney Conti forwarded her the opinion of the town's former attorney saying that he agreed with the opinion. Ms. Paladoro added that the landowners on White Road have been paying tax on that strip of land for years.

Errickson/Cardin motion to provide a positive referral to the Town Council to quit claim the abandoned portion of Bald Hill Road Extension to abutters on White Road, pending a formal affirmation by the Town attorney. Motion unanimously approved.

5.4 Road Acceptances – Consider recommending acceptance of the following roads to the Town Council: Fieldstone Commons and Zoey Road. Mr. Knight asked Ms. Farmer to explain the Fieldstone Commons road. Ms. Farmer said this is a 920' cul-de-sac. He asked if this road would be limited to the 1100' cul-de-sac length, and if that would prevent access to the developable land in back. Ms. Farmer said it would be limited to 1100' but that they don't need to extend that road, as they could put in an access drive. Ms. Errickson asked why they have to

approve it as a town road. Ms. Farmer said they would need to because the subdivision was approved as a town road already. Mr. Cardin asked what would happen theoretically if they did not approve the roads. Mr. Smith said the homeowners on these roads could sue them because they purchased homes that were supposed to have legal lot frontage on a town road. He said when people live on a road they get all the town services such as school bus service, snow plowing and rubbish pickup. Ms. Farmer noted that the conservation easement markers were installed at Zoey Place. She added that the town does not currently promote private roads in town, and that if the roads are approved by the end of the year, then those roads get added to their current inventory which adds to their availability for State aid.

Errickson/Beebe-Kostrun motion to recommend acceptance to the Town Council of both Fieldstone Commons and Zoey Place as town roads. Motion unanimously approved.

6. Approval of Minutes – Approve minutes of November 10, 2008 Regular Meeting and November 17, 2008 Special Meeting. Cardin/Errickson motion to approve the minutes of the November 10 Regular meeting. Ms. Errickson said that the minutes should include reference on Page 2 in the last paragraph of the Public Comment section that she had suggested Mr. Marchese locate his business office on the discussed property in order to satisfy the regulations. She also noted that the spelling of Mr. Marchese's name was incorrect. It should be "Marchese" rather than "Marquis" as presented in the minutes. Cardin/Errickson motion to approve the minutes as amended. Mr. Cardin, Ms. Errickson, Ms. Stapleton, and Mr. Knight voted to approve. Ms. Beebe-Kostrun abstained. Motion passed.

   Cardin/Errickson motion to approve the minutes of the November 17, 2008 Special Meeting. Mr. Cardin, Ms. Errickson, Ms. Stapleton, and Mr. Knight voted to approve. Ms. Beebe-Kostrun abstained. Motion passed.

7. Town Staff Comments

   Announcements –

   - Infrastructure Meeting – Monday, December 15, 2008 at 7:00p.m. in Council Chambers.
   - Open House – Two Alternative Concepts for Traffic Improvements on the Tolland Green – Tuesday, December 2, 2008 at 7:00pm in Council Chambers. Ms. Farmer indicated that the two concepts will include a discussion about a roundabout at the junction of Old Stafford Road and Route 74 and a tee intersection in the center of the Green.

8. Reading of Correspondence: None.

9. Communications and Petitions from Commission Members: Ms. Errickson provided a report on CRCOG. She said David Fink from the CT Partnership for Strong Communities gave a presentation on the Home Connecticut program. He said they are pushing this program because the State is losing a good number of their 25 to 34 year olds due to a lack of affordable housing. The State is also losing teachers, police officers, mechanics and municipal workers. Funds from the plan have already been sent to 16 towns. Ms. Errickson said the median home price in Connecticut is $275,000 and rental properties in the state are full. The school age population is dropping drastically as predicted. She also said a CCM workshop on agriculture will be held in Somers on December 10. There was a Capitol Region Roundtable discussion on September 11 on the environment, character, and economy of the region. She said the next discussion will be on January 8, 2009. Ms. Errickson also said the regional POCD is being tweaked as State regulations have changed for the region.

   Ms. Farmer provided a handout from the DEP on the Development of a Water Pollution Control Plan and a Sewer Service Area Map.

   Mr. Knight said he met with two gentlemen from OPM who looked at the areas identified for possible higher density development for affordable housing pertaining to the Home CT grant the town has applied for.

10. Public Participation: None.

11. Adjournment. The meeting was adjourned at 9:00p.m.

Respectfully submitted,

Annie Gentile
Clerk

FUSS & O'NEILL

MEMORANDUM

TO: Project File

FROM: Matthew Jermine, PE

DATE: February 13, 2009

RE: Response to February 3, 2009 Public Hearing Comments

Chris Perkins of 11 Clarke Road: "found inconsistencies in how the WPCA and its consultant applied the matrix criteria. He said some scores are skewed which could easily change which neighborhoods fall out in the top five."

The matrix scores were reviewed and adjusted. A copy of the revised matrix is attached. Note: a few areas moved from Tier II to Tier I areas.

- Overall, all of the neighborhood scores were inflated equally. A few areas moved up or down a spot on the priority list but the top five neighborhood areas remained at the top of the list in the same ranked order.
- The category for Lots less than 3/4 of an acre was based on a spreadsheet that incorrectly counted parcels 0 to 1 acre (instead of 0 to 3/4 acre). This has been fixed.
- Septic system repairs were originally based on an visual estimate of the number of septic system repairs plotted on a map. The field was recalculated based on a quantitative GIS analysis where # of lots in each neighborhood were counted and compared to the total number of lots in the neighborhood.
    - The rating for this category was modified because more 10% repairs or higher within the past 10 years is considered significant
    - A "full box" for this category signifies repairs greater than 20%
    - An "empty box" for this category signifies repairs between 10% and 20%
    - "No box" for this category signifies less than 10% of repairs
- The field Slopes greater than 30 degrees was originally based on a visual estimate of a color map plot showing slopes greater than 30 degrees. The field was recalculated based on a quantitative GIS analysis which calculated the land area more than and less than 30 degrees, divided to produce the percentage of land area in each neighborhood area greater than 30 degrees.
    - A "full box" for this category is based on 15% or more land area with slopes over 30 degrees.
    - An "empty box" for this category is based on 10% to 15% of the land area with slopes over 30 degrees.
    - "No box" for this category signifies less than 10% of the land area with slopes greater than 30 degrees.

- Questionnaire results were re-calculated based on the neighborhood summary results for self reporting observations of seasonal problems with their wastewater disposal systems. Self reporting septic system repairs are no longer counted because they would already be included under column G of the Matrix Septic System Repairs.

- The Neighborhood Areas Proximity to Existing Public Sewers was revised.

    - A "full box" for this category is based on a distance less than 3,000 ft. Previously the value was less than 2,500 ft.

    - An "empty box" for this category is based on a distance between 3,000 ft and 6,000 ft. Previously the range was 2,500 to 5,000 ft

    - "No box" for this category signifies a connection distance greater than 6,000 ft.

Rick Bozzone of 9 Elm Road: What was the Apple Road Area data from the Town Sanitarian?

# of houses = 94
# of repairs = 21
# of repairs (1 Variance) = 2
# of repairs (2 Variances) = 1

Patrick Doyle of 8 Lakeview Drive Ext: Questioned whether every house in town received the questionnaire

The public meeting was advertised on the Town's web site and in the local newspaper.

Phone calls to non-responding questionnaire recipients was not included in the project scope of this planning study.

Yellow fill indicates responses received & coded by Fuss & O'Neill on Lakeview Heights road.

Street_	Street_Address	Name
0	LAKEVIEW HEIGHTS	KUNZLI WERNER O JR TRUSTEE (8 Lakeview Heights)
15	LAKEVIEW HEIGHTS	VINCI SCOTT
22	LAKEVIEW HEIGHTS	SYPHERS NEIL N & ELIZABETH A
23	LAKEVIEW HEIGHTS	KIRITSIS THEO D & JANICE M
29	LAKEVIEW HEIGHTS	KLEIN CHARLES A & CAROL T
30	LAKEVIEW HEIGHTS	LAHMAN NANCY D
34	LAKEVIEW HEIGHTS	KUNZLI WERNER O JR
35	LAKEVIEW HEIGHTS	GOEGHEGAN ROBERT F & JANET L
38	LAKEVIEW HEIGHTS	DEGIACOMO GREGG & MARGO ANN M
43	LAKEVIEW HEIGHTS	LEVY KENNETH P TRUST &
47	LAKEVIEW HEIGHTS	GALLO RALPH P &
48	LAKEVIEW HEIGHTS	Malcolm Matthews
52	LAKEVIEW HEIGHTS	VINES DOUGLAS C
53	LAKEVIEW HEIGHTS	DAMBROUCKAS FRANCES (3200 NA1A Unit 909 Ft Pierce, FL)
56	LAKEVIEW HEIGHTS	KAVANAGH PAUL E JR &
63	LAKEVIEW HEIGHTS	DAMBROUCKAS FRANCES (3200 NA1A Unit 909 Ft Pierce, FL)
64	LAKEVIEW HEIGHTS	CLARK MARK F & MILLER LUCY D
68	LAKEVIEW HEIGHTS	CONFORTO MICHAEL F & JOANNE
72	LAKEVIEW HEIGHTS	LEMIRE PHYLLIS A
75	LAKEVIEW HEIGHTS	BERNARD ANDREW D & ELIZABETH A
78	LAKEVIEW HEIGHTS	GREEN MICHAEL J
8	LAKEVIEW HEIGHTS	KUNZLI WERNER O
81	LAKEVIEW HEIGHTS	FOLEY RENA B & JOHN F
84	LAKEVIEW HEIGHTS	ZIEMER MANFRED & GERDA G
60	Doyle Road	MARTINECK WARREN J & PATRICIA A
66	Doyle Road	HYJEK KATHLEEN M

Rich Bray of 9 Columbine Road: He said he moved his leaching field on his property to accommodate putting in a pool, but it was listed as a repair to his system whish is not correct. He said it his is an example of why the quality control for recording repairs and the vetting of neighborhoods needs to be more accurate. He also questioned the matrix again, saying the numbers can be skewed to move one neighborhood in or out of the top five.

The septic system repair data is only one component of the priority matrix. The repair data is reasonably accurate for the planning scale of this effort and the staff requirements to look through every parcel file within the phase 2 area would require significant time to complete a detailed file search. This was considered at the onset of the study.

The Priority Weight was agreed upon by the WPCA before the ranking of each neighborhood was completed.

Steve Rousk of 16 Dogwood Road: Running a sewer pipe in the Apple Road area rather than building a community solution might be less expensive when you figure in maintenance costs on the facility, and suggested running the numbers again.

- A 5.75 mile sewer force main to Coventry is approximately $5.75 million more expensive than a community system to construct plus additional legal/admin/contract fees to negotiate an intermunicipal agreement. The Town of Coventry has reportedly allocated the capacity at its treatment facility to connect properties within its boundaries.

- A sewer force main to the top of Old Post Road is approximately $800,000 more expensive because physical constraints make it difficult to find a direct route across the highway.

Susan Bieren of 21 Corinne Drive: expects that many homeowners have had their systems replaced with newer technology that are smaller, more efficient, and kinder to the environment.

- Most of the current design practices for a typical residential septic system would have a larger foot print than a system designed in the 1960's (as is the case for her neighborhood). The old methodology was to remove the sludge/scum in a tank, and then get the liquid into the ground. Today, the systems are designed to also treat the liquid by controlling the liquid-soil interface and separation distance to groundwater. In many cases, this might actually increase the size of the system.

- State of the art technology including advanced pretreatment units has not been fully embraced by the DPH for residential use, YET. The regulatory framework is in place but the details of who inspects/tests/monitors/repairs the systems is still not finalized. The cost of these AT systems often exceeds the cost of public sewers.

Bob Pinto of 32 Ann Drive: Look at brining public drinking water down from Vernon. Having public water and a septic system has both benefits and drawbacks.

- Generally households with public water use more water than if they had private wells. Using more water may stress the systems more.

- Without well setbacks, a larger portion of the lot can be utilized for leaching fields, BUT homeowners generally would lose the land area where their existing, failed leaching system is located. Also, not all of the land within a well buffer zone can be used to construct leaching fields due to steep slopes, wetlands, bedrock, etc.

- Some failed systems are not repaired because homeowners don't notice or do not want to pay the large cost for new leaching fields.

Rich Bozzone of 9 Elm Road: Why some streets in the Apple Road area are included in the neighborhood project area, while others are not.

The lots that were included in the Apple Road Area generally have parcel sizes less than 1 acre.

APPENDIX D: ON-SITE WW DISPOSAL SYSTEM FORMS

TOWN OF TOLLAND

FOR OFFICE USE ONLY
Map_____ Lot _____ ID No._____

RECORD OF SEPTIC TANK CLEANING

PROPERTY INFORMATION

Date of Pumpout: _____ Town: _____

Street Address: _____ Owner Name: _____

Residential Multifamily Commercial Municipal

PUMPER INFORMATION

Company Name: _____ Driver Name: _____

PUMPOUT INFORMATION

Reason for Pumpout: Routine
Repair
Property Transfer
Filter Clogged

Structures Serviced: Tank
Dry Well
Cesspool
Grease Trap

Tank Level Before Pumpout: High
Low
Normal

Estimated Tank Size: _____Gal.

Gallons Pumped: _____

Outlet Baffle: OK
Needs Repair

Outlet Filter: Yes
No
Cleaned

Inlet Baffle: OK
Needs Repair

Riser Needed? Yes No

Observations: Effluent Runback Surface Breakout Plumbing Backup
Other: _____

SHOW APPROXIMATE LOCATION OF ALL STRUCTURES PUMPED. GIVE SWING TIE MEASUREMENTS FROM BUILDING CORNERS OR TWO PERMANENT IDENTIFIABLE POINTS. LABEL FRONT OF BUILDING AND SHOW LOCATION OF CLOSEST STREET OR ROADWAY.

DISCLAIMER: This document is a record that the septic tank was pumped on this date, and of the pumper's observations on this date, but is not an official inspection report on the subsurface sewage disposal system serving the premises.

PLEASE RETURN THIS FORM WITHIN 30 DAYS TO THE HEALTH DEPARTMENT IN THE TOWN WHERE THIS PROPERTY IS LOCATED

Form #4 Technical Standards for Subsurface Sewage Disposal Systems

PERMIT TO DISCHARGE

Approval is hereby given to _____, in accordance with Public
(Property Owner)
Health Code Section 19-13-B103e (h) to discharge to a subsurface sewage disposal system located at

_____
(Street Address)
in the town of _____, CT that will receive domestic sewage from a:

Residential building containing _____bedrooms. Single family (Y/N):____.
Restaurant containing _____seats.
Commercial/Office building providing _____square feet.
Other structure as described: _____.

Permitted Volume / Design Flow =_____ gallons per day. Note: The design flow must be limited accordingly for any repaired system that has an undersized leaching system or where the naturally occurring soil has limited hydraulic capacity based on MLSS non-compliance.

In order to provide a sufficient factor of safety it is recommended that the average daily discharge not exceed 2/3 of the design flow or_____ gallons per day.

Operation and Maintenance: The septic tank shall be inspected regularly and cleaned as needed but not less frequently than every five years. The septic tank has an effluent filter (Y/N)_____. Effluent filters require periodic cleaning. Failure to clean the filter could result in a backup of sewage into the building or effluent breakout. Restaurants serviced by external grease interceptor tank(s) require quarterly inspections and cleaning as necessary. Tank pump-outs tracked by local health department (Y/N)_____. If yes, stipulate pump-out requirements: _____.

Special Requirements and Restrictions: 1. Wastewater from water treatment systems cannot discharge to the subsurface sewage disposal system. 2. Signs of system malfunction or failure should be addressed.

_____

_____

Exceptions (Repairs Only):_____

_____

_____

_____

File Information: Construction Permit No. _____. Approved as-built on file (Y/N)_____.

Date of Final Inspection: _____Inspected By:_____

Permit Issuance: Issued by: _____Title: _____
(Director of Health or Registered Sanitarian)

Signature: _____Date:_____

Permit expiration date (5 years from issuance date):_____

CONNECTICUT RECOMMENDED MINIMUM EXISTING SEPTIC SYSTEM INSPECTION REPORT

DATE: _____

---

(1) **PROPERTY ADDRESS:** _____ **TOWN:** _____.
Type of Dwelling or Use: _____.

(2) **CLIENT INFORMATION:**
Client's Name: _____ Phone #: _____.
Mailing Address: _____.
Town : _____ State: _____ ZIP: _____.

(3) **INSPECTOR INFORMATION:**
Inspector's Name: _____.
Company: _____ Phone #: _____.
Mailing Address: _____.
Town: _____ State: _____ ZIP: _____.

DISCLAIMER:

THIS INSPECTION REPORT INDICATES THE PRESENT CONDITION OF THE PRIVATE ON-SITE SUBSURFACE SEWAGE DISPOSAL SYSTEM BASED ON RECOMMENDED INSPECTION PROCEDURES OUTLINED IN THIS REPORT. THE RESULTS OF THIS INSPECTION DOES NOT GUARANTEE OR WARRANTY FUTURE PERFORMANCE. THE INSPECTION REPORT EXCLUDES AND DOES NOT INTEND TO COVER COMPONENTS THAT ARE INACCESSIBLE (BY REASONABLE HAND DIGGING) OR ARE OTHERWISE NOT OBSERVABLE.

---

(4) **RESULTS AND RECOMMENDATIONS** **(Check applicable items):**

a. _____ System functioned properly at time of inspection

b. _____ System functioning but is not sized per current standards, no upgrade required

c. _____ System operating at capacity under current usage levels

d. _____ Plumbing leaks or wastewater routing problems in home

e. _____ Need for component replacement due to structural damage

f. _____ Further investigation of leaching system with machine digging is recommended

g. _____ Evidence of prior high liquid levels in system components

h. _____ Sewage overflow observed, repair required under permit of local health department

i. _____ Soil testing recommended to determine expansion/repair area

COMMENTS AND RECOMMENDATIONS FOR ABOVE CHECKED ITEMS ON NEXT PAGE

COMMENTS_____

_____
_____
_____
_____
_____
_____
_____

RECOMMENDATIONS_____

_____
_____
_____
_____
_____
_____
_____

NOTE: The recipient of this report should discuss any deficiencies found by this inspection with the Inspector.

INSPECTION PROCEDURES

(5) RECORDS AND DATA: (OBTAIN AS MUCH AS PRACTICAL PRIOR TO THE ACTUAL INSPECTION)

This information may be obtained through numerous sources, some of which is provided voluntarily, such as, through the property owner. The inspector assumes no responsibility for the accuracy of information provided in this manner.

Attach copies of all available records and indicate the source of such records.

RECORDS (INDICATE NUMBER OF EACH)

Permit Applications: New System: _____ Date: _____ Source: _____.
Repair/Alter: _____ Date: _____ Source: _____.

Permits to Construct: New System: _____ Date: _____ Source: _____.
Repair/Alter: _____ Date: _____ Source: _____.

Permits to Discharge: New System: _____ Date: _____ Source: _____.
Repair/Alter: _____ Date: _____ Source: _____.

NOTE: Lack of records or data on file does not necessarily indicate that the existing subsurface sewage disposal system is non-compliant with installation standards.

MAINTENANCE RECORDS
Last Two Septage Pumpout Dates: _____, _____ Source _____.
Copies of Pumpout Reports: Available? _____ (Y/N) Source _____.

LOCATION DRAWING – (AS-BUILT)
Is a Location Drawing Available? _____ (Y/N) Source _____.

INSPECTION REPORT

(6) GENERAL INFORMATION

Age of System: Tank: _____ Years Leaching Fields: _____ Years
Number of People Occupying Dwelling: Currently _____ Anticipated _____.
If currently unoccupied, how long has it been vacant? _____.
Number of Bedrooms: _____.
Water Supply to Building: _____Well; _____ Comm. Well; _____ Public water supply

(7) WASTEWATER ROUTING

One Tank/One System _____ . Two or more tanks/One System _____
Separate Gray and Black Water Systems _____ .
Does more than one sewer line leave the foundation _____ (Y/N) (indicating possible two separate systems?)
Is there an in-home ejector pump? _____ (Y/N)
Water treatment system present? _____ (Y/N) If Yes, does backwash discharge to septic system? _____ (Y/N) If Yes, recommend alternative.
Is there a garbage disposal present? _____ (Y/N) If Yes, recommend cleaning tank more often.
Is there a sump pump present? _____ (Y/N) If Yes, where discharged? _____

Does the washing machine discharge to septic tank? _____ (Y/N) If No, DYE TEST may be necessary. If discharge is to a separate drywell or separate leaching system, is it functional? _____ (Y/N) If No, corrective action would be required.
Is there any indication that sewage bypasses the septic system? _____ (Y/N) If Yes, DYE TEST may be necessary.

NOTE: IF DYE TEST IS NECESSARY PERFORM IT PRIOR TO PUMPING TANK

(8) SEPTIC TANK EVALUATION

TYPE OF SEPTIC TANK: ____ Cesspool _____ Single Compartment
____Two Compartment _____ Multiple Tanks

CLEANOUT OF TANK ACCESSIBLE? _____ (Y/N) At what depth below grade? _____*
*If greater than 12" a riser to within 12" is required by Public Health Code.

TANK CONSTRUCTION: _____Concrete _____Plastic _____Fiberglass
_____Metal ____Other:_____.

VOLUME OF TANK: _____ Gallons

TANK COMPONENTS:	PRESENT (Y/N)	TYPE COMP.	CONDITION (GOOD,FAIR,POOR)
General Tank		_____	_____
Inlet Sewer Line		_____	_____
Inlet Baffle	_____	_____	_____
Outlet Baffle	_____	_____	_____
Effluent Filter	_____	_____	_____
Compartment Wall	_____	_____	_____

Has there been any indication of previous higher than normal levels of septage in the tank? _____(Y/N)
What is actual distance between liquid level in tank and tank ceiling? _____ inches

If septic tank was pumped, did sewage flow back into the tank from the leaching fields? _____ (Y/N)
(this may indicate either, the system is flooded or, there is blockage occurring in the distribution system)

What was the amount of solid build-up in the tank at the time of inspection:
_____ Excessive _____ Normal _____ Light

Is system served by a pump and pump chamber? _____ (Y/N)
If yes, give details: _____.
_____.
Pump in working order, with alarm, manhole to grade? _____.
_____.

(9) LEACHING SYSTEM EVALUATION

TYPE OF SYSTEM: _____ Trenches _____Galleries _____ Pits
_____ Bed _____ Other, Type? _____

LEACHING AREA REQUIRED PER CURRENT STANDARDS (if perc. test info. is avail.):_____ S.F.

EFFECTIVE LEACHING AREA PROVIDED (if as-built drawing is available) _____S.F.

Distance between septic tank/leaching fields and potable water wells: _____ FEET*
* INDICATE LOCATIONS AND DISTANCES ON DIAGRAM ON PAGE 5

Are there any structures or impermeable surfaces located over or near the leaching area? _____ (Y/N)
Describe: _____
_____

Were one or more of the following signs of system malfunction present?

____ SEPTIC ODORS
____ PONDING OR SEWAGE BREAKOUTS
____ LUSH GREEN GRASS OVER PARTS OF SYSTEM
____ ILLEGAL DISCHARGE

Does surface water, roof drains, or sump pump runoff drain onto the leaching area _____ (Y/N)

Were distribution boxes exposed? ____ (Y/N) What was found? _____
_____

Was the leaching system probed? _____ (Y/N) What were results? _____
_____
_____

Were there any leaching galleries or pits opened to observe present or past effluent levels? _____(Y/N)
What was found? _____
_____
_____

INSPECTION REPORT

Was a more in-depth investigation of leaching system conducted? _____ (Y/N) What were results?

_____

_____

_____

_____

Is there an expansion/repair area available? _____ Likely _____ Not Likely _____ Unknown

Were there any conditions observed which could limit a repair? (wetlands, ledge outcrops, streams, etc.)

_____

_____

_____

(10) DIAGRAM OF S. TANK AND LEACHING SYSTEM LOCATION (ties from permanent structures):

_____ _____

INSPECTOR'S NAME (printed or typed) **INSPECTOR'S SIGNATURE**

PROFESSION:_____ **LIC.NO.**_____ **DATE:** _____

This form has been developed by the Connecticut Environmental Health Association with assistance from the State Department of Public Health, Local Sanitarians, Licensed Installers, CT Sewage Disposal Association, CT Association of Realtors and the Home Inspection Industry

APPENDIX E: EVALUATION OF CONSTRUCTED SOLUTIONS

TOWN OF TOLLAND

Alternative sewage disposal methods were examined for the Neighborhood Areas scoring highest on the Wastewater Management Needs Priority Matrix. The constructed solutions were not compared versus continued operations, maintenance, and repair of existing individual on-site septic systems. The Recommended Wastewater Management Plan does not include any of these constructed solutions.

For both extension of public sewers and construction of a community septic system, the neighborhood sewer collection system is a significant cost because the parcels are not spaced closely together. Construction of a neighborhood sewer collection system generally has a high cost per property owner ($2k to $5k per EDU per year for 20 years based on year 2008) based on the conceptual level opinions of costs.

The maps of 6 representative neighborhood parcels with the Public Health Code Setback distances plotted tend to show that most of the lots should have adequate area to site a septic system. The Eastern Highland Health Department provided only a limited number of instances where a few septic system repairs required variances based on a brief record search of Willie Circle. Although adequate horizontal land area may exist to site a septic system, the poor soils and shallow depth to a restrictive soil layer has the potential to restrict on-site wastewater renovation much more than the Department of Public Health setback distances. Designing on-site wastewater disposal systems in poor soils and shallow restrictive layers are generally more difficult engineering problems to solve because the conditions are generally found throughout the entire lot on small parcels.

Of the possible alternatives, repairs to the individual on-site wastewater renovation systems anecdotally appear to be another possible alternative, even if the repairs appear to be relatively expensive to the homeowner (i.e. mounded system). It may be less expensive if homeowners are required by the Town to make on-site repairs to their septic systems, than it would be to construct a sewer collection system with one of the wastewater renovation options. This is based on historical repair costs for residential septic systems compared to the cost per EDU of the low cost wastewater management alternative. Still, the cost of a detailed inspection of every septic system in Town plus mandating and inspecting repairs also carries significant expense which would be difficult to determine and outside the scope of this planning document.

The remainder of this section compares the costs between community septic systems and public sewer extensions for neighborhoods with impaired wastewater renovation systems.

Any of the following alternatives anticipates supplemental funding from outside the neighborhood area to make the project costs tolerable to the neighborhood residents (such as a DEP Clean Water Fund 25% Grant). Total costs of constructed solutions are summarized in Table AE-2. DEP Clean Water Fund monies available to subsidize the project cost are not included in Table AE-2.

Table AE-2: Order of Magnitude Opinion of Cost for Selected Alternatives

Neighborhood Area	Description	Order of Magnitude Opinion of Cost (-30% to +50% Rounded)
Willie Circle	Sewer Extension	$3,950,000 TO $8,470,000
Apple Road	Community Septic System (Site #1)	$7,210,000 TO $15,440,000
Anthony Road	Sewer Extension	$5,570,000 TO $11,920,000
Lakeview Heights	Sewer Extension*	$1,020,000 TO $2,170,000
Russell Drive	Sewer Extension (To Vernon)	$1,530,000 TO $3,280,000
Total		$19,300,000 TO $41,000,000

* Recommended if constructed in conjunction with or subsequent to Willie Circle Sewer

Costs in 2008 Dollars

Extending sewers to Willie Circle is more favorable than constructing a new community septic system. A sewer extension from Route 30 is $860,000 less expensive than a community septic system. The most suitable site for a community septic system is located in a preserved open space woodland area, of which portions would be permanently cleared. A public sewer extension south along Route 30 to Tolland Stage Road would have a transmission sewer force main pipe. The public sewer extension alternative would be built in the roadway minimizing woodland clearing.

Potential community septic system site #1 in the Apple Road neighborhood has the lowest conceptual opinion of cost ($7.21 to $15.44 million) of the community septic system potential sites. The entire community sewer collection system would flow by gravity to potential site #1. The large leaching field would be built in an agricultural field surrounded by an old stone wall. Extending public sewers to this neighborhood was deemed not feasible due to the substantial distances. Other sites surrounding the neighborhood were investigated but construction costs increased the further south or west from the low point the potential community septic system parcel was located because a pump station and force main piping are needed. The desktop analysis of potential site #1 reveals high soil suitability for septic systems, ample nitrogen dilution area, and adequate bacteria travel time.

Extending public sewers from Route 195 (Merrow Road) is the most feasible alternative for the Anthony Road Neighborhood. Existing gravity sewers are already planned along Merrow Road to the intersection with Anthony Road. Out of nine potential sites for community septic systems, none were suitable for a large community septic system. The terrain was generally too hilly and steep for a large community system. Some of the potential sites had unusual partial dimensions or they were in close proximity to water courses.

Potential community septic system sites were found surrounding the Lakeview Heights neighborhood. The Tolland Volunteer Fire Station parcel appears to have the most favorable conditions for a community system. The second feasible alternative involves extending a low pressure sewer to a future proposed gravity sewer at Willie Circle (which then pumps the flow to Tolland Stage Road). Both alternatives have approximately the same conceptual opinion of cost, but the sewer extension may be a better value for the Town. Instead of operating both a pump station and a community septic system, the Town would only operate one infrastructure facility.

Two alternatives were looked at to extend public sewers for the Russell Drive Neighborhood. One alternative had a force main crossing I-84 and the second alternative had a force main alignment to Route 31 in Vernon. For a community septic system, potential site #1 appears to be suitable. It is located at the low point of the northern end on a large parcel with adequate nitrogen

dilution and bacteria travel time. The remaining 3 potential sites appear to be unsuitable based on the preliminary analysis. From a conceptual planning level cost comparison, a sewer collection system with a force main to future proposed sewers on Route 31 in Vernon appears to be a more suitable alternative than a community septic system.

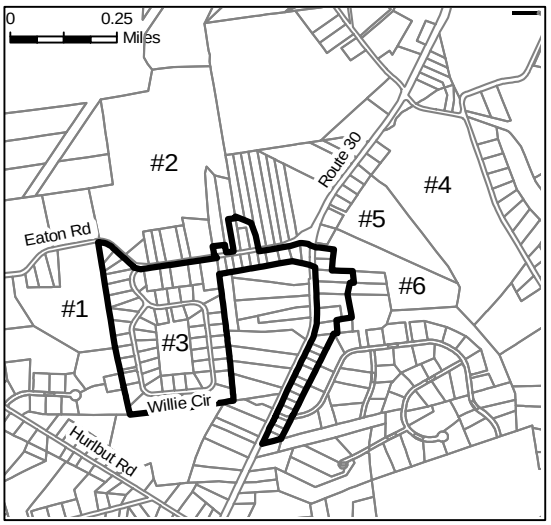
A. WILLIE CIRCLE AREA (20.5 PRIORITY POINTS)

The Willie Circle Area scored the highest number of priority points in Tolland. The expected wastewater flow from this neighborhood area is approximately 18,000 gpd, excluding future infiltration and inflow.

The most suitable location for a community septic system is site #2 (shown in Figure AE-2) based on topography, soil suitability, and available land area. The area is currently woodlands and designated as a preserved open space by the CT OPM which may increase the regulatory hurdles for construction of a wastewater disposal system.

An alternative to the community septic system is extension of public sewers south to Route 74. The sewer alignment would pass parcels designated for continued on-site wastewater management and connection to public sewers would be prohibited by constructing a force main transmission line.

Figure AE-2:
Willie Circle Neighborhood Area Map



This area is within the Shenipsit Lake reservoir watershed which precludes the use of any advanced treatment technologies for wastewater renovation because sewage treatment systems cannot be permitted within protected lands based on State Regulations.

1. ON-SITE WASTEWATER MANAGEMENT

The Willie Circle Neighborhood Area currently falls under the classification of an on-site wastewater management district. The large number of priority points scored with the Wastewater Management Needs Priority Matrix indicates that an alternative method to manage wastewater generated by this neighborhood area is required based on the category scoring.

2. COMMUNITY SEPTIC SYSTEM

2.a. POTENTIAL SITE #1

The feasibility of a community septic system at this location is marginal, based on the following cursory analysis. This 24 acre, privately owned parcel to the west of Willie Circle contains approximately 9 acres of wetlands along the road frontage of Eaton Road, intermittent streams bisecting the open field to the south, and West Brook along the edge of the western property line. Aerial photography shows the wetlands to be undisturbed woodlands. The NRCS soil suitability of the central and northern portions of the parcel (with shallow slopes) are rated extremely low potential. The 9% sloping soil at the southern tip is rated low potential with approximately 1.5

acres of available area for a community septic system. The southern area of the parcel is a cleared field which may potentially be used to grow crops.

Construction of a community septic system in the low potential 9% sloping soil has potential for breakout at the foot of the slope where the soil type changes and the NRCS classification is extremely low potential. Detailed engineering analysis will be required to determine if the 21-day bacteria travel time is met before the wastewater effluent breaks-out at the toe of the slope before entering the wetlands. Obtaining the 21-day bacteria travel time may be challenging based on the available distance from the community system's location and the hydraulic gradient. Nitrogen dilution of the wastewater effluent appears to be a major limiting factor at the site which may potentially limit the available system capacity to the rainwater dilution tributary area.

The wetland area is shown as a Preservation Area and the southern tip is a Conservation Area on the State OPM Conservation and Development Locational Guide Map.

2.b. POTENTIAL SITE #2

This 64.5 acre woodland parcel north of Eaton Road can be divided into two halves and evaluated separately. The parcel is owned by the Town of Tolland. North of Cemetery Brook, the site has a very highly suited area for a community septic system. Along the roadway, the site topography and planimetrics are undesirable.

The aerial photography does not show much of this area due to dense evergreen vegetation. Along frontage with Eaton Road, the land shows surging terrain which descends into Cemetery Brook. The soil located along the southern part of the parcel is rated as medium potential to support a SSAS. This site does not have adequate nitrogen dilution area or distance to the brook to meet the bacteria travel time requirements.

The northern half of potential site #2 does appear adequate for a septic system. The land slopes 6% from an elevation of about 610 in the southwest to elevation 545. The NRCS soil suitability classification is high potential to support subsurface sewage absorption systems. Approximately 21.2 acres are available to develop a community system. The available land area should be more than sufficient for nitrogen dilution requirements and 21-day bacteria travel time distances for the wastewater flow generated by the Willie Circle Neighborhood. See Figure AE-3.

The State C&D Plan classifies the entire parcel as preserved Open Space. Construction of a community septic system on this land would require the woodland habitat to be cleared within the limits of the absorption fields. After construction, the area would have to be maintained as an open field to prevent bushes and trees from putting roots down and damaging the community septic system. There has recently been precedence in Connecticut where community septic systems have been constructed in parcels designated as preserved open space (Eastbury and Mansfield, CT).

2.c. POTENTIAL SITE #3

The 6.6 acres of open space infield of Willie Circle (owned by the Woodland Summit Community Association) does not meet the necessary requirements for a community wastewater system. Although the site is flat, with no streams, and favorable NRCS soil potential, other restrictions exist. Construction of a community septic system would require the woodlands to be permanently cleared away. The setback distances of three community drinking water wells would further reduce the available area for a large subsurface sewage absorption system. Due to the long and narrow

GRAVITY SEWER

FORCE MAIN

COMMUNITY
SEPTIC SYSTEM
#2

GRAVITY SEWER

CERVENS ROAD

ROUTE 30

WILLIE CIRCLE

EATON ROAD

CRYSTAL LAKE ROAD

HIGH RIDGE DRIVE

BENNETT DRIVE

AUSTIN

LEGEND

- NEIGHBORHOOD AREA
- PROPOSED GRAVITY SEWER
- EXISTING GRAVITY SEWER
- PROPOSED LOW PRESSURE SEWER
- PROPOSED FORCE MAIN
- PROPOSED PUMP STATION
- PROPOSED GRINDER STATION

No.	DATE	DESCRIPTION	BY
1.			

REVISIONS

PROJ. MANAGER:
CHIEF DESIGNER:
REVIEWED BY: DATE

SOURCE:

PLANIMETRIC DATA PROVIDED BY TOWN OF TOLLAND.

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TOWN OF TOLLAND
POTENTIAL COMMUNITY SEPTIC SYSTEM #2
WILLIE CIRCLE AREA CONCEPTUAL ALIGNMENT
WASTEWATER FACILITIES PLANNING STUDY - PHASE 2
TOLLAND CONNECTICUT

PROJ. No.: 2002507.A40
DATE: JULY 2008

FIG AE-3

dimensions of the site, nitrogen dilution and bacteria travel time requirements could not be met. Sufficient travel time does not exist between the proposed absorption fields and the large wells.

2.d. POTENTIAL SITE #4

Further northwest along Route 30, a large 60 acre parcel is rated high potential for on-site wastewater systems by the USDA NRCS. The privately owned site is developed with a single family residence and a cell phone tower and is mostly woodlands. The parcel has undulating topography with slopes of 10% or more making it difficult to locate a potential community septic system. The site drains to the north into Cemetery Brook. The State OPM C&D plan designates the parcel as a conservation area. The area would require significant earth moving to flatten an area for a large subsurface sewage absorption field and is therefore not readily suitable for a community wastewater renovation system.

2.e. POTENTIAL SITES #5 AND #6

Two large privately owned triangular parcels are located northeast of the Willie Circle Neighborhood. Neither of these parcels are suitable for a community septic system based largely on the topography. Each is approximately 17½ acres with separate single family houses. Each house is located in the center of the property. Ridge lines north and south of the property drain into Brown's Brook located at the low point along the shared property line. The NRCS soil suitability classifies the parcels as low potential to support on-site wastewater absorption fields.

The northern parcel has a plateau about ¾ of an acre in size but the topography tends to indicate there might be unpredictable ledge based on two acute peaks in the contours. The shape of the contours presents a second concern. If wastewater effluent discharges from the soil absorption field, the surface contours indicate that the effluent would concentrate into the central ravine and potentially breakout of the soil as it flows towards the single family dwelling into Brown's Brook. If the effluent didn't breakout onto the ground surface, it could still overload the soil's hydraulic capacity limiting renovation of the wastewater.

The southern parcel does not have a suitably flat, well draining area to locate a community septic system large enough for the Willie Circle Neighborhood. The mostly wooded parcels would have to be cleared to install a community septic system. The C&D Locational Guide classifies these parcels as conservation area with the hydric soils immediately surrounding Brown's Brook classified as a Preservation Area.

3. EXTENSION OF PUBLIC SEWERS

Public sewers can be extended from Route 74 (Tolland Stage Road) to Willie Circle. Figures AE-4 and AE-5 shows a conceptual plan for this alternative.

Gravity sewers would provide sewer connections to Willie Circle. A second gravity line would extend from ⅓ of a mile north of Doyle Road along Crystal Lake Road, West on Eaton Road, to the low point on Willie Circle. A pump station would be located at the low point just south of the intersection of Willie Circle and Eaton Road. The pump station would discharge the raw sewage into a 13,300 foot force main constructed east on Eaton Road, south along Crystal Lake Road (Route 30), and west along Tolland Stage Road. The force main would connect to public sewers at the intersection of Tolland Stage Road and Shenipsit Lake Road.

The long force main would prevent other parcels from connecting into the sewer system and prevent undeveloped lots along the transmission sewer from becoming developable. Many of the

GRAVITY SEWER

FORCE MAIN

MATCH LINE SEE FIG. AE-12

GRAVITY SEWER

FORCE MAIN

CERVENS ROAD

ROUTE 30

WILLIE CIRCLE

EATON ROAD

HIGH RIDGE DRIVE

CRYSTAL LAKE ROAD

BENNETT DRIVE

AUSTIN

BROWN

PS

LEGEND

- NEIGHBORHOOD AREA
- PROPOSED GRAVITY SEWER
- EXISTING GRAVITY SEWER
- PROPOSED LOW PRESSURE SEWER
- PROPOSED FORCE MAIN
- PROPOSED PUMP STATION
- PROPOSED GRINDER STATION

No.	DATE	DESCRIPTION	BY
1.			

REVISIONS

PROJ. MANAGER:
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REVIEWED BY: DATE

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TOWN OF TOLLAND
EXTENSION OF PUBLIC SEWERS
WILLIE CIRCLE AREA CONCEPTUAL ALIGNMENT
WASTEWATER FACILITIES PLANNING STUDY - PHASE 2
TOLLAND CONNECTICUT

PROJ. No.: 2002507.A40
DATE: JULY 2008

FIG AE-4

MATCH LINE SEE FIG.AE-13

SHENIPSIT LAKE

EXISTING GRAVITY SEWER

EXISTING LOW PRESSURE SEWER

EXISTING GRAVITY SEWER

FORCE MAIN DISCHARGE

FORCE MAIN

FORCE MAIN

SHENIPSIT LAKE ROAD

CRYSTAL LAKE ROAD (ROUTE 30)

TOLLAND STAGE ROAD (ROUTE 74)

OLD HARTFORD TURNPIKE

SAND HILL ROAD

GOTTIER ROAD

ARNOLD DRIVE

MOUNTAIN SPRING ROAD

CRESTWOOD ROAD

TOLLAMEDE DRIVE

HARRIET DRIVE

VALLEY VIEW DRIVE

ELIZABETH LANE

ANDREW WAY

OLD POST RD

AVENUE

LEGEND

- NEIGHBORHOOD AREA
- PROPOSED GRAVITY SEWER
- EXISTING GRAVITY SEWER
- PROPOSED LOW PRESSURE SEWER
- PROPOSED FORCE MAIN
- PROPOSED PUMP STATION (PS)
- PROPOSED GRINDER STATION (GP)

No.	DATE	DESCRIPTION	BY
1.			

REVISIONS

PROJ. MANAGER:
CHIEF DESIGNER:
REVIEWED BY: DATE

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PROJ. No.: 2002507.A40
DATE: JULY 2008

FIG AE-5

parcels along the force main route are within OPM C&D Conservation Areas, and development of these lots due to the presence of sewer should be prevented. This is especially of concern for large lots on Route 74. Connection of individual parcels to force main transmission lines are technically difficult, and can be defensibly prohibited by the Tolland WPCA.

4. CONCEPTUAL OPINION OF COST

A Conceptual Level Opinion of Cost for two wastewater management alternatives in the Willie Circle area was prepared. Both alternatives have similar unit quantities for construction of 9,800 feet of gravity sanitary sewer collection piping, 3,900 square yards of Town road pavement repair, and pump station. The town pavement repair, gravity sewer piping, and pump station are significant costs which would be incurred with any alternative. Conceptual Level Opinion of Costs for either extending public sewers or construction of a community septic system are shown in Tables AE-3 and AE-4.

Extension of public sewers has a conceptual level opinion of cost between $3.95 and $8.47 million dollars. This is based on the assumption that much of the long force main to Route 74 can be built in the grass shoulder of the State roadways to significantly reduce the cost of full lane width pavement overlays. Much of the force main route appears to have adequate shoulder for off-road construction according to recent color aerial photos.

Construction of a community septic system at Potential Site #2 has a conceptual level opinion of cost between $4.81 and $10.29 million dollars. The cost of the community septic system is based on a rule-of-thumb $100 per gallon unit cost based on professional experience. Developing a community septic system on other potential sites would likely increase the opinion of cost because the sites are less favorable or located further from the proposed Willie Circle pump station.

The typical cost per EDU (Equivalent Dwelling Unit) for construction is shown in Table AE-5. A 25% DEP Clean Water Fund Grant could reduce the project cost if awarded by the State. The cost per EDU to construct a Community Septic System at Site #2 is approximately $7,000 to $15,000 per EDU more expensive than constructing public sewers. If public sewers were extended to Willie Circle and Lakeview Heights at the same time, the difference in construction cost would be much less because the force main cost would be shared among a large total number of EDUs.

ORDER OF MAGNITUDE OPINION OF COST

FUSS & O'NEILL
Disciplines to Deliver

Table AE-3

PROJECT: Tolland WW Fac Plan - Phase 2
LOCATION: Willie Circle Neighborhood
DESCRIPTION: Gravity collector sewers to a pump stations. Force main to gravity sewer on Route 74.

DATE 06/26/06
ESTIMATOR: MMJ
CHECKED BY: KAM
PROJECT NO.: 2002.507.A40

Since Fuss & O'Neill has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor(s)' methods of determining prices, or over competitive bidding or market conditions, Fuss & O'Neill's opinion of probable Total Project Costs and Construction Cost are made on the basis of Fuss & O'Neill's experience and qualifications and represent Fuss & O'Neill's best judgment as an experienced and qualified professional engineer, familiar with the construction industry; but Fuss & O'Neill cannot and does not guarantee that proposals, bids or actual Total Project or Construction Costs will not vary from opinions of probable cost prepared by Fuss & O'Neill. If prior to the bidding or negotiating Phase the Owner wishes greater assurance as to Total Project or Construction Costs, the Owner shall employ an independent cost estimator.

ITEM DESCRIPTION	UNITS	NUM. OF UNITS	COST PER UNIT	TOTAL COST
Gravity Sewer	FT	9,800	$210	$2,058,000
Low Pressure Sewer	FT	0	$90	$0
Force Main	FT	13,300	$110	$1,463,000
Submersible Small to Medium Sized Pump Station	EA	1	$400,000	$400,000
Pavement Repair (Town Road)	SY	3,900	$90	$351,000
Pavement Repair (State Road)	TON	840	$65	$54,600
Grinder Pumps	EA	0	$8,000	$0
Easements	SY	0	$6	$0
Construction Under I-84 Highway	LS	0	$500,000	$0
Community Subsurface Wastewater Renovation System	GPD	0	$100	$0
Land Acquisition	ACRE	0.23	$50,000	$11,500
TOTAL CONSTRUCTION COST				$4,340,000
ENGINEERING/LEGAL/ADMINISTRATIVE (30%)				$1,302,000
SUBTOTAL				**$5,642,000**
TOTAL COST (-30% TO +50% ROUNDED)				**$3,950,000 TO $8,470,000**

Notes:
Based on 2008 dollars. Subsurface investigation has not been performed therefore bedrock removal quantities are indeterminate. Excessive dewatering not included. Costs include mobilization, bonds, mobilization, maintenance and protection of traffic.

ORDER OF MAGNITUDE OPINION OF COST

FUSS & O'NEILL
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Table AE-4

PROJECT:	Tolland WW Fac Plan - Phase 2	DATE	06/26/06
LOCATION:	Willie Circle Neighborhood	ESTIMATOR:	MMJ
DESCRIPTION:	Gravity collector sewers to a pump station. Force main to a community septic system (Potential Site #2)	CHECKED BY:	KAM
		PROJECT NO.:	2002.507.A40

Since Fuss & O'Neill has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor(s)' methods of determining prices, or over competitive bidding or market conditions, Fuss & O'Neill's opinion of probable Total Project Costs and Construction Cost are made on the basis of Fuss & O'Neill's experience and qualifications and represent Fuss & O'Neill's best judgment as an experienced and qualified professional engineer, familiar with the construction industry; but Fuss & O'Neill cannot and does not guarantee that proposals, bids or actual Total Project or Construction Costs will not vary from opinions of probable cost prepared by Fuss & O'Neill. If prior to the bidding or negotiating Phase the Owner wishes greater assurance as to Total Project or Construction Costs, the Owner shall employ an independent cost estimator.

ITEM DESCRIPTION	UNITS	NUM. OF UNITS	COST PER UNIT	TOTAL COST
Gravity Sewer	FT	9,800	$210	$2,058,000
Low Pressure Sewer	FT	0	$90	$0
Force Main	FT	2,500	$110	$275,000
Pump Station	EA	1	$400,000	$400,000
Pavement Repair (Town Road)	SY	3,900	$90	$351,000
Pavement Repair (State Road)	TON	0	$65	$0
Grinder Pumps	EA	0	$8,000	$0
Easements	SY	0	$6	$0
Construction Under I-84 Highway	LS	0	$500,000	$0
Community Subsurface Wastewater Renovation System	GPD	18,000	$100	$1,800,000
Land Acquisition (Already Owned by Town)	ACRE	0.23	$50,000	$11,500
TOTAL CONSTRUCTION COST				$4,900,000
ENGINEERING/LEGAL/ADMINISTRATIVE (40%)				$1,960,000
SUBTOTAL				**$6,860,000**
TOTAL COST (-30% TO +50% ROUNDED)				**$4,810,000 TO $10,290,000**

Notes:
Based on 2008 dollars. Subsurface investigation has not been performed therefore bedrock removal quantities are indeterminate. Excessive dewatering not included. Costs include mobilization, bonds, mobilization, maintenance and protection of traffic.

Table AE-5: Construction Cost per Parcel (Willie Circle)

	Extend Public Sewers		Community Septic System (Site #2)	
	-30% to +50%		-30% to +50%	
Conceptual Level Opinion of Cost	$3,950,000	$8,470,000	$4,810,000	$10,290,000
25% DEP Clean Water Fund Grant	$987,500	$2,117,500	$1,202,500	$2,572,500
Subsidized Construction Cost (Rounded)	$2,960,000	$6,350,000	$3,610,000	$7,720,000
Number of EDUs	90	90	90	90
Total Construction Cost per EDU	$33,000	$71,000	$40,000	$86,000

2008 Dollars

The annual Construction and O&M costs per EDU are shown in Table AE-6, based on the subsidized construction costs. The extension of public sewers has a 20 year annual cost per parcel of $233 to $450 per month. This exceeds the community septic system alternative at potential site #2, with a monthly cost from $266 to $525.

Table AE-6: Annual Cost Comparison by Parcel (Willie Circle)

	Extend Public Sewers		Community Septic System (Site #2)	
	-30% to +50%		-30% to +50%	
Annualized Construction Cost per Parcel (Rounded) (20 year loan with 3% interest)	$2,200	$4,800	$2,700	$5,800
Estimated Annual O&M Cost per EDU	$587	$587	$450	$450
Annual Cost per EDU (Rounded)	$2,800	$5,400	$3,200	$6,300

2008 Dollars

Subsurface investigation has not been performed; therefore soil characteristics and bedrock removal quantities are indeterminate. Excessive dewatering is not included. Costs include mobilization, bonds, maintenance and protection of traffic. The opinions of cost presented represent a Conceptual Level Opinion of Cost. These opinions of costs are based on year 2008 dollars, and should be considered accurate to minus thirty or plus fifty percent.

It should be noted for the alternatives evaluated; Since Fuss & O'Neill has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor(s)' methods of determining prices, or over competitive bidding or market conditions, Fuss & O'Neill's opinion of probable Total Project Costs and Construction Cost are made on the basis of Fuss & O'Neill's experience and qualifications and represent Fuss & O'Neill's best judgment as an experienced and qualified professional engineer, familiar with the construction industry;

but Fuss & O'Neill cannot and does not guarantee that proposals, bids or actual Total Project or Construction Costs will not vary from opinions of probable cost prepared by Fuss & O'Neill. If prior to the bidding or negotiating Phase the Owner wishes greater assurance as to Total Project or Construction Costs, the Owner shall employ an independent cost estimator.

5. ALTERNATIVE EVALUATION

A cursory review of 6 potential sites for a community septic system found 1 suitable site, 2 marginal sites, and 3 unsuitable sites. Potential site #2 appears to have the most favorable characteristics for an on-site wastewater renovation system of the alternatives reviewed. Site conditions favorable for wastewater renovation systems include: high NRCS soil potential, flat and even terrain, large land mass, upstream watershed area, distance to environmentally sensitive receptor, and existing site usage. The community septic system would be sized for the neighborhood area only and not be sized for future capacity from parcels outside the Willie Circle Neighborhood, to satisfy OPM development concerns. There might be concerns about constructing a large community septic system in a water supply aquifer protection area which would have to be addressed during implementation.

Extension of public sewers to the Willie Circle neighborhood area from Route 74 is an alternative to a community septic system. A proposed neighborhood sewer collection system would discharge into a pump station. The pump station would pump the wastewater effluent through a transmission pipe long force main to existing Town gravity sewers on Route 74. The transmission pipe would mean unsewered parcels along the force main route would be unable to connect which would help limit development in the C&D map rural and conservation areas. Extension of public sewers would have a smaller environmental impact to the area because open space woodlands would not be cleared to construct a large community septic system.

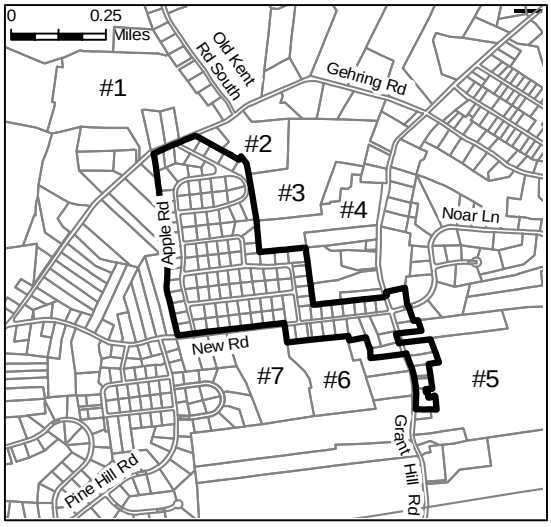
The major implementation considerations include homeowner's resistance due to the project cost and homeowners who recently repaired their septic system who then would not want to support a neighborhood wastewater management project.

Both the extension of public sewers and construction of a community septic system have very high construction costs per EDU, as shown in Table AE-5. At this conceptual level opinion of cost, both alternatives have an approximately equal cost. The alternative to extend public sewer is slightly favored because it has a smaller environmental footprint than constructing a community septic system in the preserved open space woodland area of potential site #2.

B. APPLE ROAD AREA (19.05 PRIORITY POINTS)

The Apple Road Neighborhood obtained 58% of the total priority points in the Wastewater Needs Priority Matrix. The total wastewater flows to the 130 neighborhood parcel is approximately 25,000 gpd. Public sewers are not located within a feasible distance to this neighborhood area. There are several larger parcels surrounding the neighborhood area. Most of the potential sites identified in this report for a community septic system are capable of supporting a system, although some sites have more favorable characteristics than others.

Figure AE-6:
Apple Road Neighborhood Area Map



The most suitable location for a community septic system is site #1 (shown in Figure AE-6) based on topography, soil suitability, and available land area. This area is better than site #7 because it requires minimal or possibly no pumping from the Apple Road gravity sewer collection system to the community system location compared to the more significant pumping requirements of site #7.

The area is currently a partially cleared agricultural field surrounded by a stone wall with rows of young trees. The current agricultural use is not compatible with a subsurface sewage renovation system which may be one potential issue to overcome. The State C&D designates the area as a Conservation Area, which is compatible with locating a community septic system to mitigate poorly functioning neighborhood septic systems.

1. ON-SITE WASTEWATER MANAGEMENT

Wastewater disposal in the Apple Road Neighborhood Area is by individual on-site septic systems. The considerable amount of priority points assigned using the Priority Matrix signifies that this neighborhood area requires an alternative method to manage wastewater generation.

2. COMMUNITY SEPTIC SYSTEM

2.a. POTENTIAL SITE #1

Although most of this 50 acre parcel is covered with marshlands, there is a 4.5 acre overgrown field in the southwest corner surrounded by a stone wall that appears promising. This area has a NRCS soil suitability rating of high potential to support on-site wastewater disposal. The slope of the field is about 11% draining towards the marshland further north on the parcel. The slope is larger than the recommended 10% slope, so additional site engineering may be required for a large community septic system. There appears to be a sufficient nitrogen dilution area and adequate distance to meet the bacteria travel time requirements before the wastewater effluent enters the adjacent marshland. The OPM C&D Locational Guide Map classifies the area as a conservation area.

A cursory review of the topography indicates that it may be possible to convey wastewater from the Apple Road Area to the proposed community system with a gravity sewer. The low point of the Apple Road Neighborhood is located in the northwest corner of the neighborhood boundary and potential site #1 is located downhill from the neighborhood low point. This option will significantly reduce the O&M requirements by potentially eliminating a large pump station. Pressure dosing through the absorption fields may still be needed, however.

The current use of the area does not appear to be compatible with a community septic system. The planting of rows of young trees would have to be cleared for construction and after installation the area would have to be regularly mowed to prevent plants from setting deep roots. Trees and bushes growing over soil absorption fields can damage or destroy the systems through numerous ways. See Figure AE-7.

A detailed desktop analysis of potential site #1 was performed based on 25,000 gpd and an assumed soil permeability rate of 15 ft/day. The long term acceptance rate of the soil to accept wastewater effluent without clogged soil pores is .66 gallons per square foot per day (based on the assume permeability rate, BOD5, and Suspended Solids). The total length of leaching fields required (assuming 6 sq ft per foot) is 6,338 linear feet. A leaching field 6' wide with low-pressure perforated distribution pipes and trenches spaced 9' on center would require a 54,300 square foot (1.25 acre) footprint. Additional hydraulic capacity from the side wall interface between the soil and the disposal trench were not included in this analysis (to be conservative). Assuming 3 feet of vertical travel distance plus 106 feet of horizontal travel distance would be sufficient to satisfy the 21-day bacteria travel time requirement at 15 ft/day permeability. Phosphorus absorption in the soil does not appear to be a concern.

Nitrogen dilution calculations would require a 16 acre rainfall tributary area to dilute the septic system nitrogen to be less than 10 mg/l at the sampling point. An area larger than 16 acres is desirable to provide an additional safety factor (i.e. droughts, excess nitrogen, etc). Based on contours from the Town's aerial mapping, approximately 20 acres of dilution area surround the proposed community septic system. The 10mg/l is the State DPH limit for drinking water supplies. The system would discharge 5.6 lbs of nitrogen into the environment from sewage daily. This is reduced because 60% is removed in either the septic tank or by bacteria in the soil's biomat. 10.6 grams of nitrogen are created per person per day with 2.54 people per dwelling and 130 dwellings. Supporting data was gathered from the Tolland GIS parcel base, US Census, and US EPA.

2.b. POTENTIAL SITE #2

This location is a 14.1 acre lot with a single family dwelling with several large animal corrals. The NRCS rates the soil as low potential to support septic system. The property has a gradual slope from the south to the north. It does not appear to have any brooks, marsh, or ponds on the property. Sufficient land mass exists for both nitrogen dilution and 21 day bacteria travel time. The OPM C&D plan designates the parcel as rural lands which must be protected from future development.

A community system on this area would be larger than a similar system in soils rated high potential by the NRCS. Wastewater would have to be pumped from the northwest corner of the Apple Road Neighborhood Area with a pump station. The use of the potential location as an animal corral is a compatible use with a subsurface wastewater renovation system.

COMMUNITY
SEPTIC SYSTEM
POTENTIAL SITE #1

GRAVITY SEWER
(TYP.)

PROPOSED OFF
SITE EASEMENT

SOURCE:

PLANIMETRIC DATA PROVIDED BY TOWN OF TOLLAND.

FOR CONCEPT PLANNING ONLY

LEGEND

- NEIGHBORHOOD AREA
- PROPOSED GRAVITY SEWER
- EXISTING GRAVITY SEWER
- PROPOSED LOW PRESSURE SEWER
- PROPOSED FORCE MAIN
- PROPOSED PUMP STATION
- PROPOSED GRINDER STATION

SCALE:	
HORZ.:	1" = 450'
VERT.:	
DATUM:	
HORZ.:	
VERT.:	

0 225 450
GRAPHIC SCALE

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TOWN OF TOLLAND

COMMUNITY SEPTIC SYSTEM POTENTIAL SITE #1
APPLE ROAD AREA CONCEPTUAL ALIGNMENT

WASTEWATER FACILITIES PLANNING STUDY - PHASE 2

TOLLAND CONNECTICUT

PROJ. No.:	2002507.A40
DATE:	JULY 2008

FIG AE-7

2.c. POTENTIAL SITE #3

The topography of this 34.6 acre, wooded, privately owned parcel can be used to split it into two regions. The eastern region has steep 21% slopes with variable terrain and several intermittent streams splitting the area into narrow unusable strips.

The western region is generally a well graded (8% slope) terrain from the south to the north. The orientation would allow a community system constructed on the land to have significant travel time to the property line and a sizeable nitrogen dilution area. The soil suitability of the site is low potential and would require large, spread out absorption fields to overcome the soil hydraulic capacity restrictions. Much of this area is shown as rural lands on the Connecticut Conservation and Development Plan, bisected by a large area of Preservation Area (from hydric soils).

2.d. POTENTIAL SITE #4

The single family residence sits on an 18.7 acre parcel with a tennis court, pool, barn, and horse corals. A community septic system could be built on the west half of the lot in area currently covered with woodlands which is located approximately 700 feet from the residence. The area of the septic system slopes from the north to the south at 11%. The larger slope would require additional engineering effort and possible construction cost to ensure the effluent does not travel through the soil too quickly. The width between property lines from uphill to downhill of the proposed community septic system location is approximately 460 feet which means the available area for nitrogen dilution and bacteria travel time requirements may be marginal at best. The C&D plan show the parcel divided between three classifications, with the proposed location of the community system located in rural lands. The soil suitability is rated as low potential for the area under consideration, based on the NRCS mapping and classification methodology. Based on the 11% slopes and short travel distance to the property line, this site would be unsuitable for a large community septic system to serve the Apple Road Neighborhood.

2.e. POTENTIAL SITE #5

The Joshua Conservation & Historic Trust owns 83.8 acres of vacant land at 373 Grant Hill Road. Much of the land has steep slopes of 15% or more with variable hilly terrain. A 4.4 acre area located in the center of the lot is the most suitable area for a community septic system. The NRCS classifies the soil at this location as high potential to support subsurface sewage disposal. The State Conservation and Development currently designates the potential site for the septic system as rural lands although the southern half of the parcel is designated as preserved open space. This is likely a mapping error, and the whole parcel could be considered preserved open space. The mission of Joshua Trust is to preserve the natural habitat of the land, which conflicts with construction activities. Obtaining rights from Joshua Trust, to construct a community septic system, would be difficult because a community septic system would require some of the woodlands to be permanently cleared. There is abundant nitrogen dilution area and 21-day bacteria travel time distances. Although this site meets the prerequisite engineering characteristics for a community wastewater renovation system, the land use by the owner conflicts with construction of a large septic system. This site is unsuitable for a community septic system because of the conflicting use.

2.f. POTENTIAL SITE #6

The 21 acre orchard has a single family residence and auxiliary structures. Even though there is sufficient land area for a community septic system, the construction activities would destroy the

orchard surrounding the proposed community wastewater renovation system. The OPM development policy for this land is generally rural lands. The NRCS soil suitability to support septic system disposal systems is medium potential. The land has negligible slope where the community septic system would be built.

Nitrogen dilution and bacteria travel time do not appear to be a major concern at this site based on the dimensions and size of the lot.

Although the site characteristics are favorable for a community septic system, the distance from the neighborhood gravity sewer low point and the current land use discount the appeal of this alternative. A large pump station and long force main would be required to convey the wastewater from the northwestern corner of the Apple Road Neighborhood Area to this potential site at significant cost.

2.g. POTENTIAL SITE #7

The mostly wooded 25.6 acre site has a single family residence along New Road with a barn and a couple of agricultural fields. The lot slopes at 5% from the west to the east with at least 8 acres of available land for a community septic system. A stream and some wetlands are located along the west, east, and south property lines but do not extend into the property. The NRCS soil suitability for much of the parcel is rated low potential to support septic systems with extremely low potential hydric soils along the side and rear property line. The OPM Conservation and Development plan classifies the northeast corner of the lot as conservation area with the central area as rural lands. The hydric soil is classified as a preservation area.

The nitrogen dilution area and 21-day bacteria travel time distance do not appear to be a problem for a community septic system based on the dimensions of this property. The soils at this site are less favorable then neighboring potential site #6, but the lot is largely under-utilized and no conflicting uses exist. Like the neighboring lot, a large pump station at the opposite end of the Apple Road Neighborhood area would have to pump the sewage through a long force main to this site, at considerable cost. This site has the potential for a community septic system based on this basic analysis if potential sites closer to the low point of the neighborhood gravity sewer collection system cannot be used. Refer to Figure AE-8.

3. EXTENSION OF PUBLIC SEWERS

The closest existing public sewers to the Apple Road Neighborhood are approximately 2.5 miles by traveling north along Old Kent Road South, under Interstate 84, to the gravity sewer at the intersection of Mountain Spring Road and Old Post Road (part of the Phase I WW Facilities Plan). It is not feasible to consider evaluating this alternative because the cost would be prohibitive and OPM Conservation and Development approval as part of the DEP sewer extension permit approval process would be very difficult to obtain.

The distance to extend public sewers from either Vernon or Coventry were also measured and deemed to be further away and more technically difficult to seek approval than a sewer extension from Tolland's existing wastewater infrastructure.

4. CONCEPTUAL OPINION OF COST

Table AE-7 and AE-8 presents Conceptual Level Opinion of Costs for two different community septic system alternatives for the Apple Road Neighborhood. The difference between the two alternatives is the lack of a pump station for potential site #1 and a long force main to site #7.

GRAVITY SEWER (TYP.)

FORCE MAIN

PROPOSED OFF SITE EASEMENT

COMMUNITY SEPTIC SYSTEM POTENTIAL SITE #7

SOURCE:

PLANIMETRIC DATA PROVIDED BY TOWN OF TOLLAND.

FOR CONCEPT PLANNING ONLY

LEGEND

- NEIGHBORHOOD AREA
- PROPOSED GRAVITY SEWER
- EXISTING GRAVITY SEWER
- PROPOSED LOW PRESSURE SEWER
- PROPOSED FORCE MAIN
- PROPOSED PUMP STATION
- PROPOSED GRINDER STATION

SCALE:
HORZ.: 1" = 450'
VERT.:
DATUM:
HORZ.:
VERT.:
0 225 450
GRAPHIC SCALE

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TOWN OF TOLLAND

COMMUNITY SEPTIC SYSTEM POTENTIAL SITE #7
APPLE ROAD AREA CONCEPTUAL ALIGNMENT

WASTEWATER FACILITIES PLANNING STUDY - PHASE 2

TOLLAND CONNECTICUT

PROJ. No.: 2002507.A40
DATE: JULY 2008

FIG AE-8

ORDER OF MAGNITUDE OPINION OF COST

FUSS & O'NEILL
Disciplines to Deliver

Table AE-7

PROJECT: Tolland WW Fac Plan - Phase 2	DATE 06/26/06
LOCATION: Apple Road Neighborhood	ESTIMATOR: MMJ
DESCRIPTION: Gravity sewer to pump station to Community Septic System (Potential Site #1)	CHECKED BY: KAM
	PROJECT NO.: 2002.507.A40

Since Fuss & O'Neill has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor(s)' methods of determining prices, or over competitive bidding or market conditions, Fuss & O'Neill's opinion of probable Total Project Costs and Construction Cost are made on the basis of Fuss & O'Neill's experience and qualifications and represent Fuss & O'Neill's best judgment as an experienced and qualified professional engineer, familiar with the construction industry; but Fuss & O'Neill cannot and does not guarantee that proposals, bids or actual Total Project or Construction Costs will not vary from opinions of probable cost prepared by Fuss & O'Neill. If prior to the bidding or negotiating Phase the Owner wishes greater assurance as to Total Project or Construction Costs, the Owner shall employ an independent cost estimator.

ITEM DESCRIPTION	UNITS	NUM. OF UNITS	COST PER UNIT	TOTAL COST
Gravity Sewer	FT	18,100	$210	$3,801,000
Low Pressure Sewer	FT	0	$90	$0
Force Main	FT	0	$110	$0
Pump Station	EA	0	$400,000	$0
Pavement Repair (Town Road)	SY	8,000	$90	$720,000
Pavement Repair (State Road)	TON	0	$65	$0
Grinder Pumps	EA	0	$8,000	$0
Easements	SY	6,300	$6	$37,800
Construction Under I-84 Highway	LS	0	$500,000	$0
Community Subsurface Wastewater Renovation System	GPD	25,000	$100	$2,500,000
Land Acquisition	ACRE	5.75	$50,000	$287,500
TOTAL CONSTRUCTION COST				$7,350,000
ENGINEERING/LEGAL/ADMINISTRATIVE (40%)				$2,940,000
SUBTOTAL				**$10,290,000**
TOTAL COST (-30% TO +50% ROUNDED)				**$7,210,000 TO $15,440,000**

Notes:
Based on 2008 dollars. Subsurface investigation has not been performed therefore bedrock removal quantities are indeterminate. Excessive dewatering not included. Costs include mobilization, bonds, mobilization, maintenance and protection of traffic.

ORDER OF MAGNITUDE OPINION OF COST

FUSS & O'NEILL
Disciplines to Deliver

Table AE-8

PROJECT:	Tolland WW Fac Plan - Phase 2	DATE	06/26/06
LOCATION:	Apple Road Neighborhood	ESTIMATOR:	MMJ
DESCRIPTION:	Gravity sewer to Pump Station to Community Septic System (Potential Site #7)	CHECKED BY:	KAM
		PROJECT NO.:	2002.507.A40

Since Fuss & O'Neill has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor(s)' methods of determining prices, or over competitive bidding or market conditions, Fuss & O'Neill's opinion of probable Total Project Costs and Construction Cost are made on the basis of Fuss & O'Neill's experience and qualifications and represent Fuss & O'Neill's best judgment as an experienced and qualified professional engineer, familiar with the construction industry; but Fuss & O'Neill cannot and does not guarantee that proposals, bids or actual Total Project or Construction Costs will not vary from opinions of probable cost prepared by Fuss & O'Neill. If prior to the bidding or negotiating Phase the Owner wishes greater assurance as to Total Project or Construction Costs, the Owner shall employ an independent cost estimator.

ITEM DESCRIPTION	UNITS	NUM. OF UNITS	COST PER UNIT	TOTAL COST
Gravity Sewer	FT	16,300	$210	$3,423,000
Low Pressure Sewer	FT	0	$90	$0
Force Main	FT	5,300	$110	$583,000
Pump Station	EA	1	$400,000	$400,000
Pavement Repair (Town Road)	SY	7,500	$90	$675,000
Pavement Repair (State Road)	TON	0	$65	$0
Grinder Pumps	EA	0	$8,000	$0
Easements	SY	6,300	$6	$37,800
Construction Under I-84 Highway	LS	0	$500,000	$0
Community Subsurface Wastewater Renovation System	GPD	25,000	$100	$2,500,000
Land Acquisition	ACRE	9.35	$50,000	$467,500
TOTAL CONSTRUCTION COST				$8,090,000
ENGINEERING/LEGAL/ADMINISTRATIVE (40%)				$3,236,000
SUBTOTAL				**$11,326,000**
TOTAL COST (-30% TO +50% ROUNDED)				**$7,930,000 TO $16,990,000**

Notes:
Based on 2008 dollars. Subsurface investigation has not been performed therefore bedrock removal quantities are indeterminate. Excessive dewatering not included. Costs include mobilization, bonds, mobilization, maintenance and protection of traffic.

Both alternatives have similar unit quantities for construction of 16,300 feet of gravity sanitary sewer collection piping, 7,500 square yards of Town road pavement repair, and 6,300 square yards of sewer easement for the off-road sewer alignment.

A community septic system at potential site #1 has a conceptual level opinion of cost between $7.21 and $15.44 million dollars. The site is located near the low point of the neighborhood sewer collection system and a pump station does not appear to be required. For both alternatives, the cost of the community septic system is based on a rule-of-thumb $100 per gallon unit cost based on professional experience.

Construction of a community septic system at Potential Site #7 has a conceptual level opinion of cost between $7.93 and $16.99 million dollars. This alternative is more costly because a pump station and force main are required to pump the wastewater effluent to the opposite end of the neighborhood.

The typical cost per EDU for construction is shown in Table AE-9. The community septic system at site #1 appears to be $4,000 to $7,000 (per EDU) less expensive than a community septic system at potential site #7, when a 25% DEP Clean Water Fund Grant is used to reduce the conceptual level opinion of cost for the project.

Table AE-9: Construction Cost per Parcel (Apple Road)

	Community Septic System (Site #1)		Community Septic System (Site #7)	
	-30% to +50%		*-30% to +50%*	
Conceptual Level Opinion of Cost	$7,210,000	$15,440,000	$7,930,000	$16,990,000
25% DEP Clean Water Fund Grant	$1,802,500	$3,860,000	$1,982,500	$4,247,500
Subsidized Construction Cost (Rounded)	$5,410,000	$11,580,000	$5,950,000	$12,740,000
Number of EDUs	130	130	130	130
Total Construction Cost per EDU	$42,000	$89,000	$46,000	$98,000

2008 Dollars

The annual Construction and O&M costs per parcel are shown in Table AE-10. The construction of a community sewer collection system and subsurface sewage renovation system has an estimated 20 year annual cost per EDU between $3,400 and $6,600, based on the subsidized construction costs. This is more than the community septic system alternative at potential site #7, with a yearly cost ranging from $3,600 to $7,100.

Table AE-10: Annual Cost Comparison by Parcel (Apple Road)

	Community Septic System (Site #1)		Community Septic System (Site #7)	
	-30% to +50%		-30% to +50%	
Annualized Construction Cost per Parcel (Rounded) (20 year loan with 3% interest)	$2,800	$6,000	$3,100	$6,600
Estimated Annual O&M Cost per EDU	$587	$587	$450	$450
Annual Cost per EDU (Rounded)	$3,400	$6,600	$3,600	$7,100

2008 Dollars

Subsurface investigation has not been performed therefore soil characteristics and bedrock removal quantities are indeterminate. Excessive dewatering is not included. Costs include mobilization, bonds, maintenance and protection of traffic. The opinions of cost presented represent a Conceptual Level Opinion of Cost. These opinions of costs are based on year 2008 dollars, and should be considered accurate to minus thirty or plus fifty percent.

Since Fuss & O'Neill has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor(s)' methods of determining prices, or over competitive bidding or market conditions, Fuss & O'Neill's opinion of probable Total Project Costs and Construction Cost are made on the basis of Fuss & O'Neill's experience and qualifications and represent Fuss & O'Neill's best judgment as an experienced and qualified professional engineer, familiar with the construction industry; but Fuss & O'Neill cannot and does not guarantee that proposals, bids or actual Total Project or Construction Costs will not vary from opinions of probable cost prepared by Fuss & O'Neill. If prior to the bidding or negotiating Phase the Owner wishes greater assurance as to Total Project or Construction Costs, the Owner shall employ an independent cost estimator.

5. ALTERNATIVE EVALUATION

Of the locations looked at, potential site #1 was the most favorable location. Seven potential sites were evaluated for a community septic system for the Apple Road neighborhood. Five of the sites fulfill the preliminary screening requirements evaluated for a large subsurface sewage absorption system. A community septic system would be sized for the parcels inside the Apple Road Neighborhood area only and not be sized with an appreciable amount of future capacity, to satisfy OPM development concerns.

Potential site #1 was located downhill from the Apple Road neighborhood area, which means a large, expensive pump station is not needed. This site also minimizes the transmission pipe from the sewer collection system to the leaching fields. Based on a desktop analysis of the site, there appears to be sufficient bacteria travel time to the brook (with k=10 ft/day) and an adequate nitrogen dilution area.

As a comparison to potential site #1, a large parcel suitable for a community septic system located at the south end of the neighborhood area was examined. Potential site #7 has a large area of open land for a community septic system. This site also drains downhill into hydric soils and a stream. This alternative is more expensive because a pump station and force main are needed to pump the wastewater uphill across the neighborhood area from the low point in the north.

The analysis of a public sewer extension for this area is not a feasible alternative. Public sewers are located a fair distance away with a force main length of 2.5 miles. Conceptual planning and costing were not performed for this alternative.

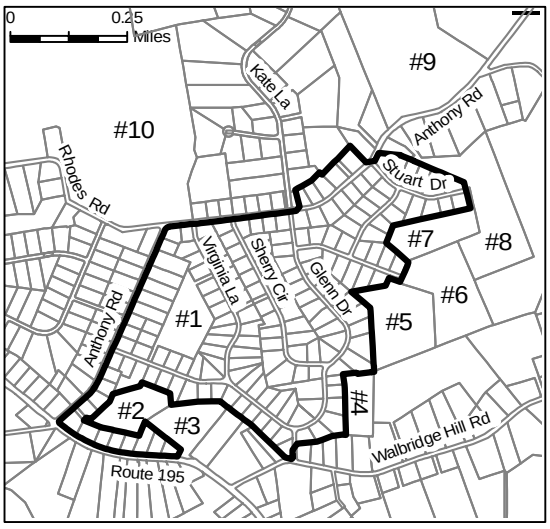
Homeowner's resistance due to the project cost and homeowners who recently repaired their septic system who then would not want to support a neighborhood wastewater management project should be addressed through a public outreach campaign during implementation of any neighborhood wastewater management solution.

Potential site #1 has the lowest conceptual opinion of cost of the alternatives. The land appears capable of supporting a community septic system. The area is not preserved open space. A community septic system at site #1 is the leading choice of the alternatives examined.

C. ANTHONY ROAD AREA (15.5 PRIORITY POINTS)

The Anthony Road Neighborhood Area is ranked third on the Wastewater Management Needs Priority Matrix. The 181 parcels generate an estimated 31,000 gpd of wastewater flow. Infiltration and Inflow would further increase the neighborhood flow. Figure AE-9 shows a map of the neighborhood area.

Figure AE-9:
Anthony Road Neighborhood Area Map



The potential sites that were briefly evaluated for a community septic system were found to be unsuitable based on surficial characteristics. Extension of public sewers does appear to be an especially viable alternative because gravity sewers from the Phase I Wastewater Facilities Plan are already planned to be constructed to the intersection of Route 195 and Anthony Road.

Although potable water is provided to this area through community groundwater wells owned and operated by Tolland water, the aquifer protection area around the wells is not a concern with the evaluation of the community septic system alternatives. The public drinking water wells are located 1.3 miles east along the west bank of the Willimantic River.

1. ON-SITE WASTEWATER MANAGEMENT

This area currently falls under the category of an on-site wastewater management district. The on-site wastewater renovation systems at this site no longer appear to operate reliably based on the large number of priority points scored with the Wastewater Management Needs Priority Matrix. Alternates to on-site wastewater management will be examined for the Anthony Road Area below.

2. COMMUNITY SEPTIC SYSTEM

There are many parcels surrounding the Anthony Road Neighborhood area with suitable gross land mass to support a community septic system. Analysis of the parcels reveals that none of the lots appear suitable for a community septic system based on soil ratings, topography, and planimetric characteristics.

Many of the large lots have extremely steep 15% slopes with undulating topography that does not provide for a large smooth surface to site a community system. There are numerous intermittent brooks shown in aerial photography and AutoCAD drawings (not shown in the DEP hydrography data) that weave through many of the parcels considered for community septic systems.

2.a. POTENTIAL SITE #1

This site is a large 9.1 acre, open area surrounding by houses on Anthony Road, Virginia Lane and Summit Drive. At the center of the lot is a large water storage tank for the Tolland Water Company drinking water system. Based on the topography, there appears to be 2 rock outcrops south of the access road to the water tower. An area south of the access road appears to be the most suitable location for a community septic system. A stream along the north excludes much of this area from consideration. The land gently slopes at 2% to the east for approximately 200 feet and then the slope increases to 5% near the southeast property line.

The soil suitability for on-site wastewater disposal is low potential according to the USDA NRCS and the parcel is designated rural land by the CT OPM Conservation and Development Plan. The nitrogen dilution area does not seem to cover enough land area to reduce a community wastewater system's effluent discharge to less than 10 mg/l. The distance to the property line varies between 50 and 100 feet, meaning that the 21 day bacteria travel time requirements could not be met at this site. This site is unsuitable for a community septic system based on inadequate nitrogen dilution area and insufficient distance to the property line.

2.b. POTENTIAL SITE #2

In terms of the overall sanitary sewer alignment for the area, this site is located in a very favorable location near the termination point of the gravity sewers for the entire neighborhood. The lot measures 7.7 acres in size. A single family house is developed in the south-central zone of the lot. The southern ⅓ of the lot is designated conservation area and the northern ⅔ is rural area according to the Locational Guide Map from OPM. The NRCS soil potential for on-site wastewater disposal is medium potential. There are no water courses on the lot.

Although the size, C&D classification, and soil potential are favorable for a community system, additional DEP design criteria limit what can be built for absorption systems greater than 5,000 gpd. The lot is situated on the peak of a hill with a relatively small area (in any direction) to contribute towards nitrogen dilution. Several rows of leaching fields located on this parcel would inevitably be less than 150 feet to a property line which would not provide enough bacteria travel time.

2.c. POTENTIAL SITE #3

The site is approximately 7.7 acres in size with a medium soil potential to support on-site septic systems. The southern portion of the lot along Merrow Road is developed with a multi-story house and large detached barn, but the land use is designated as commercial. The Plan of Conservation and Development classifies this property as rural lands with a preservation area along hydric soils located in a gully through the center. Although there are several flat plateaus along the north and south sides of the gully, the low and high points are separated by steep topography, which poses several design challenges. The natural topography would also make waste water discharges into the soil tend to converge into a narrow gully stretching along the center of the property from northwest to southeast, to a low point discharging directly into an intermittent stream.

2.d. POTENTIAL SITE #4

The single family residence is located in the center of the lot with a long driveway extending towards Virginia Lane in the northwest. The property is 6 acres in size and approximately 310 feet in width. The land slopes downhill across the narrow side of the property at 9%. A drainage swale is located along the north side of the driveway. The OPM C&D designated use for this parcel is rural lands. The NRCS soil potential for on-site subsurface wastewater disposal systems is high potential. The narrow width of the property combined with the direction of the sloping terrain does not make it possible to obtain proper nitrogen dilution or meet the 21-day travel time requirements. This site is inadequate for a community septic system.

2.e. POTENTIAL SITE #5

With slopes of 12% from the west down to the east into Newcomb Brook, this 14.8 acre lot has a somewhat steep slope. The northern half of the parcel is crossed by three brooks (including Newcomb Brook). The southern half of the parcel has the potential for a community septic system if the 1.16 acre area can be sufficiently enlarged (by cutting into the hillside) to support a 31,000 gpd community septic system. The downhill soil would also have to be tested for adequate hydraulic capacity.

The NRCS soil potential for an on-site septic system for the area of the property where the community septic system could be located is low rated low. The OPM C&D map shows the lot as rural lands. Sufficient nitrogen dilution area exists for the large waste water flows of the neighborhood. The bacteria travel time requirements appear to be marginal on this site because the community system would be built within 130 feet of the property line where the land also has steep slopes. Based on characteristics evaluated, this site appears to be marginally unsuitable to support a community septic system.

2.f. POTENTIAL SITE #6

This 15.6 acre site consists almost entirely of 16% or more steeply sloping land with a single family residence built along the north property line. The NRCS soil suitability for on-site wastewater disposal varies from extremely low, to low, to high potential. The State Conservation and Development map shows this site as rural lands with an Aquifer Protection Area located along the east property line. Due to the steep slopes, the majority of this site is unsuitable for a large community subsurface sewage renovation system.

A 1.18 acre flat meadow is located at the southern tip of the parcel. The meadow has an enormous nitrogen dilution area uphill from the remaining +/- 14 acres of the property. It is not an acceptable location for a large community septic system because it is adjacent to the property line and an intermittent stream (no 21-day bacteria travel time).

2.g. POTENTIAL SITE #7

There is approximately 1.9 acres of suitably sloped (4%), even ground located in the backyard of the single family, 8.9 acre site. The NRCS soil suitability classifies this parcel as low potential to support a subsurface absorption field, with a thumb of high potential soil to the north. The area is classified as rural lands on the C&D map.

Based on the orientation of the land, there appears to be more than enough land is for nitrogen dilution requirements. Meeting the DEP travel time requirement from the discharge point of the

leaching fields to the unnamed intermittent stream located along the west property line does not seem possible.

2.h. POTENTIAL SITE #8

A single family residence is built near the center of 21.5 acre potential site #8. Both the north and southern regions of the site have very steep topography with 27% slopes. A 1.6 acre plateau exists midway down a steep embankment in the southern part of the parcel. The CT OPM mapping designates this area as rural lands. The 1.6 acre plateau is located within an aquifer protection area. The southern half of the parcel is highly suitable soil for on-site wastewater disposal, according to the USDA NRCS.

There would be a copious uphill land area to provide nitrogen dilution. The 1.6 acre area is fairly remote and difficult to reach with a force main pipe. The 21-day bacteria travel time requirement does not look possible because the community septic system would be located 170 feet uphill from the property line at a very steep 17% slope. The steep slope will greatly increases the speed of the wastewater effluent through the soil, and reduce the travel time to the property line.

2.i. POTENTIAL SITE #9

Various streams and wetlands are located along varying terrain of the southern half of potential site #9. The northern half of this 85 acre parcel was not evaluated due to the distance from Anthony Road. The NRCS soil suitability of the southern land is rated high potential for septic systems on either side of the extremely low potential hydric soil extents. Sufficient contiguous, evenly sloped land does not exist to site a large community system. Constructing several smaller waste water absorption fields would not be possible because the 21-day bacteria travel time to adjacent water courses and wetlands could not be achieved.

3. EXTENSION OF PUBLIC SEWERS

Approximately ⅓ of the neighborhood area tends to naturally drain northwest towards Anthony Road. The remaining drains to either of two low points in the southeast and northeast corners of the neighborhood. The sewer collection system through the Anthony Road neighborhood would need 3.3 miles of gravity sewer, 1,500 feet of low pressure sewers, and 4/5ths of a mile of force main. Two pump stations and 11 grinder pumps would be used to overcome the topography of the neighborhood. The majority of parcels will be served by gravity sewers with the potential to eliminate grinder pumps if deep sewers are deemed cost effective during a preliminary design value engineering process. The wastewater flow from the entire neighborhood area would discharge into planned future gravity sewers at the intersection of Anthony Road and Route 195 as anticipated in Tolland's Phase I Facilities Report. This alternative is shown on Figure AE-10.

4. CONCEPTUAL OPINION OF COST

The extension of public sewers to the Anthony Road Neighborhood would cost from $5.57 to $11.92 million dollars according to the Conceptual Level Opinion of Costs shown in Table AE-11. No alternatives to construct a community wastewater disposal system were evaluated because none of the sites surrounding the Anthony Road Neighborhood were deemed suitable.

The cost estimate includes 17,400 feet of gravity and 1,500 feet of low pressure collector sewers throughout the neighborhood. There would be two pump stations and 11 grinder pumps for this alternative. Another significant cost is 9,900 square yards of Town Road Pavement Repair (5 feet wide) at $891,000 and 740 tons of State Road Pavement Overlay at an estimated cost of $48,100.

RHODES ROAD

(PAPER SUBDIVISION – NOT DEVELOPED – NO EXISTING ROADS)

FORCE MAIN DISCHARGE

GRAVITY SEWER

PLANNED FUTURE GRAVITY SEWER

GRAVITY SEWER

LOW PRESSURE SEWER

GRAVITY SEWER

FORCE MAIN

LOW PRESSURE SEWER

FORCE MAIN DISCHARGE

FORCE MAIN

GRAVITY SEWER

KIM CIRCLE

KATE LANE

ANTHONY ROAD

STERRY CIRCLE

VIRGINIA LANE

GLENN DRIVE

CORINNE DRIVE

CAROL DRIVE

STUART DRIVE

SUMMIT DRIVE

SHERRY CIRCLE

RANDY ROAD

MERROW ROAD (ROUTE 195)

BAXTER STREET

DENSE WOODS

NEWCOMB BROOK

PS

GP

LEGEND

- NEIGHBORHOOD AREA
- PROPOSED GRAVITY SEWER
- EXISTING GRAVITY SEWER
- PROPOSED LOW PRESSURE SEWER
- PROPOSED FORCE MAIN
- PROPOSED PUMP STATION
- PROPOSED GRINDER STATION

No.	DATE	DESCRIPTION	BY
1.			

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PROJ. MANAGER:
CHIEF DESIGNER:
REVIEWED BY: DATE

SOURCE:

PLANIMETRIC DATA PROVIDED BY TOWN OF TOLLAND.

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TOWN OF TOLLAND
EXTENSION OF PUBLIC SEWERS
ANTHONY ROAD AREA CONCEPTUAL ALIGNMENT
WASTEWATER FACILITIES PLANNING STUDY - PHASE 2
TOLLAND CONNECTICUT

PROJ. No.: 2002507.A40
DATE: JULY 2008

FIG AE-10

ORDER OF MAGNITUDE OPINION OF COST

FUSS & O'NEILL
Disciplines to Deliver

Table AE-11

PROJECT:	Tolland WW Fac Plan - Phase 2
LOCATION:	Anthony Road Neighborhood
DESCRIPTION:	Gravity and low pressure sewer to two pump stations. Force main to gravity sewer on Merrow Road.

DATE	06/26/06
ESTIMATOR:	MMJ
CHECKED BY:	KAM
PROJECT NO.:	2002.507.A40

Since Fuss & O'Neill has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor(s)' methods of determining prices, or over competitive bidding or market conditions, Fuss & O'Neill's opinion of probable Total Project Costs and Construction Cost are made on the basis of Fuss & O'Neill's experience and qualifications and represent Fuss & O'Neill's best judgment as an experienced and qualified professional engineer, familiar with the construction industry; but Fuss & O'Neill cannot and does not guarantee that proposals, bids or actual Total Project or Construction Costs will not vary from opinions of probable cost prepared by Fuss & O'Neill. If prior to the bidding or negotiating Phase the Owner wishes greater assurance as to Total Project or Construction Costs, the Owner shall employ an independent cost estimator.

ITEM DESCRIPTION	UNITS	NUM. OF UNITS	COST PER UNIT	TOTAL COST
Gravity Sewer	FT	17,400	$210	$3,654,000
Low Pressure Sewer	FT	1,500	$90	$135,000
Force Main	FT	4,300	$110	$473,000
Pump Station	EA	2	$400,000	$800,000
Pavement Repair (Town Road)	SY	9,900	$90	$891,000
Pavement Repair (State Road)	TON	740	$65	$48,100
Grinder Pumps	EA	11	$8,000	$88,000
Easements	SY	0	$6	$0
Construction Under I-84 Highway	LS	0	$500,000	$0
Community Subsurface Wastewater Renovation System	GPD	0	$100	$0
Land Acquisition	ACRE	0.40	$50,000	$20,000
TOTAL CONSTRUCTION COST				$6,110,000
ENGINEERING/LEGAL/ADMINISTRATIVE (30%)				$1,833,000
SUBTOTAL				**$7,943,000**
TOTAL COST (-30% TO +50% ROUNDED)				**$5,570,000 TO $11,920,000**

Notes:
Based on 2008 dollars. Subsurface investigation has not been performed therefore bedrock removal quantities are indeterminate. Excessive dewatering not included. Costs include mobilization, bonds, mobilization, maintenance and protection of traffic.

The State Road Pavement cost can be reduced if the sewer can be moved out of the roadway and into the grass right-of-way.

The typical cost per EDU for construction shown in Table AE-12 is between $23,000 and $49,000 (including a 25% grant from the DEP Clean Water Fund).

Table AE-12:
Construction Cost per Parcel (Anthony Road)

	Extend Public Sewers	
	-30%	*to +50%*
Conceptual Level Opinion of Cost	$5,570,000	$11,920,000
25% DEP Clean Water Fund Grant	$1,392,500	$2,980,000
Subsidized Construction Cost (Rounded)	$4,180,000	$8,940,000
Number of EDUs	181	181
Total Construction Cost per EDU	$23,000	$49,000

2008 Dollars

The annual Construction and O&M costs per EDU are shown in Table AE-13. The extension of public sewers has a 20 year annual cost per parcel of approximately $175 to $325 per month.

Table AE-13: Annual Cost Comparison by Parcel (Anthony Road)

	Extend Public Sewers	
	-30%	*to +50%*
Annualized Construction Cost per Parcel (Rounded) (20 year loan with 3% interest)	$1,500	$3,300
Estimated Annual O&M Cost per EDU	$587	$587
Annual Cost per EDU (Rounded)	$2,100	$3,900

2008 Dollars

Subsurface investigation has not been performed therefore soil characteristics and bedrock removal quantities are indeterminate. Excessive dewatering is not included. Costs include mobilization, bonds, maintenance and protection of traffic. The opinions of cost presented represent a Conceptual Level Opinion of Cost. These opinions of costs are based on year 2008 dollars, and should be considered accurate to minus thirty or plus fifty percent.

Since Fuss & O'Neill has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor(s)' methods of determining prices, or over competitive bidding or market conditions, Fuss &

O'Neill's opinion of probable Total Project Costs and Construction Cost are made on the basis of Fuss & O'Neill's experience and qualifications and represent Fuss & O'Neill's best judgment as an experienced and qualified professional engineer, familiar with the construction industry; but Fuss & O'Neill cannot and does not guarantee that proposals, bids or actual Total Project or Construction Costs will not vary from opinions of probable cost prepared by Fuss & O'Neill. If prior to the bidding or negotiating Phase the Owner wishes greater assurance as to Total Project or Construction Costs, the Owner shall employ an independent cost estimator.

5. ALTERNATIVE EVALUATION

Nine potential sites for community septic systems were reviewed. None of the sites were suitable for a large community septic system. Generally the terrain was extremely hilly and steep with wetlands and ravines in the low-lying areas. Constructing a community septic system on any of the lots would require significant engineering effort during design process and a substantial amount of earthwork to make one of the sites suitable. As a benefit, extension of public sewers would have a smaller environmental impact to the area because woodlands would not be cleared to construct a large community septic system.

Extending public sewers from Route 195 (Merrow Road) is the most feasible alternative. Existing gravity sewers are already planned along Merrow Road to the intersection with Anthony Road. The neighborhood tends to drain into three low points. The conceptual design of the collection sewer for the opinion of cost assumed the discharge point for the wastewater in the neighborhood is at the southwest low point at the intersection of Anthony and Merrow Road. The downstream pump stations (Gateway Zone and Old Post Road) were planned based on the anticipated flow from the Anthony Road neighborhood. Capacity upgrades at the Gerber Road Pump Station have already been recommended in the Tolland Phase I WW Facilities Planning Report.

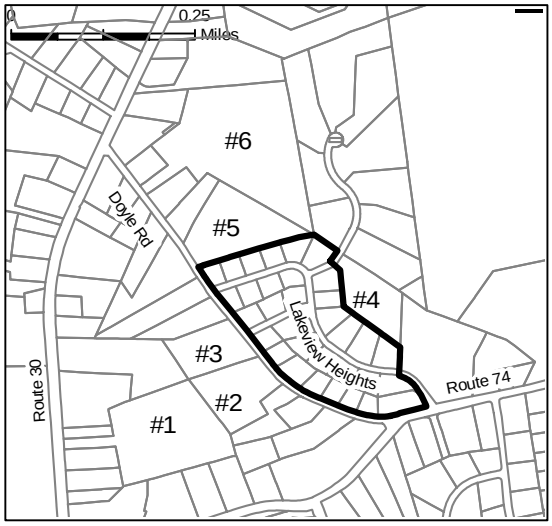
Homeowner's resistance due to the project cost and homeowners who recently repaired their septic system who then would not want to support a neighborhood wastewater management project should be addressed through a public outreach campaign during implementation of any neighborhood wastewater management solution.

The State OPM might have concerns about development of the large parcels surrounding the neighborhood area if public sewers are extended. The parcels to the north were evaluated for community septic systems and appear to be undevelopable along Anthony Road. The parcels to the east do appear marginally developable, but at significant cost to the property owner. To prevent the undeveloped large eastern parcels from trying to connect to public sewers in the future, the areas will be excluded from the sewer service district. In addition to Tolland's stringent SSD regulations, the pump station proposed for the eastern half of the Anthony Road Neighborhood could be sized to meet the wastewater needs of the planned sewershed only with marginal additional capacity for future sewer connections.

D. LAKEVIEW HEIGHTS AREA (14.5 PRIORITY POINTS)

14.5 out of 33 priority points were assigned to the Lakeview Heights Neighborhood Area in the Wastewater Needs Priority Matrix. Wastewater flow apportionment for this neighborhood was estimated to be 7,000 gpd for the 33 parcels. Public sewers are located on Route 74 (Tolland Stage Road) approximately ¾ of a mile to the southwest. There are potential economics of scale by extending sewers to both Lakeview Heights and Willie Circle at the same time which would allow the two neighborhood areas to share sewer infrastructure.

Figure AE-11:
Lakeview Heights Neighborhood Area Map



In addition to public sewers, there are a few sites suitable for a community septic system. One of the sites is also owned by the Town of Tolland. A portion of the site has a volunteer fire station built on it. Figure AE-11 shows potential site #1 located about 1/5 of a mile west of the Lakeview Heights Area. The area has highly rated soils, little slope, with adequate land area for nitrogen dilution and bacteria travel time.

This area is within the Shenipsit Lake reservoir watershed which precludes the use of any advanced treatment technologies for wastewater renovation because sewage treatment systems cannot by permitted within protected lands based on State Regulations.

1. ON-SITE WASTEWATER MANAGEMENT

This area is currently categorized as an on-site wastewater management district. Each property has individual on-site septic systems. The neighborhood was identified in the Wastewater Management Needs Priority Matrix because it exceeded the action limit with more than 50% of the total number of priority points. This suggests that on-site wastewater management is no longer suitable to adequately handle the wastewater generated by the Lakeview Heights Neighborhood Area.

2. COMMUNITY SEPTIC SYSTEM

2.a. POTENTIAL SITE #1

This 11.5 acre site is owned by the Town of Tolland and is the location of the Volunteer Fire House on 64 Crystal Lake Road. The portion of the parcel east of Sucker Brook is not suitable for a community septic system due to the presence of small ravines. This also suggests that the area may be swampy, teaming with brook channels weaving through the area and is shown on mapping as having hydric soil and being labeled a preservation area on the C&D plan.

The property area west of Sucker Brook is classified as a conservation area on the C&D map and has a suitable 2 acre plot of land located north of the volunteer fire station. This area appears to be set aside for a future building but would be well suited for a small community septic system. A 7,000 gpd community septic system appears to be small enough for this footprint with sufficient

nitrogen dilution area and 21-day bacteria travel time. The topography of site is level, sloping slightly toward the northern property line. The NRCS soil suitability is rated high potential to support an on-site wastewater disposal system. The surface/groundwater from this part of the site eventually flows over the adjacent parcel into Sucker Brook.

A cross-country easement would be required to cross 47 Doyle Road with a transmission sewer. The wetlands located at the rear of potential site #1 would have to be crossed adding to the construction cost but alternative methods such as directional drilling could possibly be employed. According to the State C&D plan, this area is designated as a conservation area. See Figure AE-12.

2.b. POTENTIAL SITE #2

47 Doyle Road is a single family residential house with a large agricultural field in the backyard. The property is 4.9 acres. The topography slopes uniformly down to the wetlands on the west at 13%. This slope is higher than the maximum recommended slope to construct a septic system disposal field, which would add construction costs to re-grade the area. There are no water courses on the property. The NRCS soil suitability is rate high potential to support an on-site wastewater disposal system. Sufficient area exists for nitrogen dilution and 21-day travel time. The CT OPM Land Use classification of the area is a conservation area. This area is somewhat suitable for a community septic system, but the terrain slope is slightly larger than the recommended maximum. Other sites surrounding the neighborhood area might prove to be a better alternative.

2.c. POTENTIAL SITE #3

The large open field behind the house at 55 Doyle Road appears to be a tree farm. The lot is 9.3 acres. Siteing of a community wastewater treatment plant would conflict with the current use. This site has a moderately steep 13% homogeneous slope. The area is shown as a conservation area on the C&D Locational Guide Map. The NRCS soil potential to support an on-site wastewater disposal system is rated high potential. There are no water courses on the property, but the rear of the lot abuts a wetland area. There appears to be adequate nitrogen dilution area and bacterial travel time distance.

2.d. POTENTIAL SITE #4

This parcel is 4 acres in size and appears to have a ridgeline running approximately northwest to southeast across the middle of the parcel. The parcel is shaped like a long, narrow diamond with half of the drainage area flowing either southwest or northeast. Multiple residences located downhill of the site would likely be sensitive to any changes in the groundwater table caused by a large uphill wastewater absorption system. The soil suitability of the parcel is low potential. The area is designated as a conservation area on the State C&D map. There are no streams on the parcel. It appears difficult to obtain the necessary nitrogen dilution and 21-day bacteria travel time to site a community septic system based on the characteristics of the property. This site is not suitable for a community septic system.

2.e. POTENTIAL SITE #5

The 6.9 acre parcel north of Lakeview Heights is privately owned by a single family. The topographic description of the lot is classified in the Tolland parcel base as "Clear, Ledge" which raises the possibility that the site may not be adequate for a community septic system. The majority of the parcel is cleared for several agricultural-type buildings and the fields appear to be fenced in as multiple animal corrals according to aerial photos. The land slopes at 11% from the

MATCH LINE SEE FIG AE-4

WILLIE CIRCLE
PUMP STATION FORCE MAIN

LOW PRESSURE
SEWER

LOW
PRESSURE
SEWER

LAKEVIEW HEIGHTS
SEPTIC SYSTEM
POTENTIAL SITE #1

MATCH LINE SEE FIG AE-5

HURLBUTT ROAD
CERVENS ROAD
ROUTE 30
SHENIPSIT LAKE ROAD
CRYSTAL LAKE ROAD
DRIVE
ROAD
LAKEVIEW HEIGHTS
PETER GREEN ROAD
TOLLAND STAGE ROAD
CARRIAGE DRIVE
DENSE WOODS
SUCKER BROOK
PODHNERTS POND

LEGEND

- NEIGHBORHOOD AREA
- PROPOSED GRAVITY SEWER
- EXISTING GRAVITY SEWER
- PROPOSED LOW PRESSURE SEWER
- PROPOSED FORCE MAIN
- PROPOSED PUMP STATION
- PROPOSED GRINDER STATION

CTB: LMAN: MS VIEW: UCS:

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TOWN OF TOLLAND
COMMUNITY SEPTIC SYSTEM POTENTIAL SITE #1
LAKEVIEW HEIGHTS AREA CONCEPTUAL ALIGNMENT
WASTEWATER FACILITIES PLANNING STUDY - PHASE 2
TOLLAND CONNECTICUT

PROJ. No.: 2002507.A40
DATE: JULY 2008

FIG AE-12

southeast down to the northwest. Most of the cleared area has a high soil suitability to support on-site wastewater systems according to the USDA NRCS. The OPM classification of the land is a conservation area. There do not appear to be any watercourses on the property. The site appears to have sufficient nitrogen dilution area and 21-day bacteria travel time. This site appears to be moderately suitable for a community septic system if subsurface investigations reveal adequate hydraulic capacity in the soil and lack of shallow ledge.

2.f. POTENTIAL SITE #6

The property north of Lakeview Heights is privately owned by a single family. The total lot size is 17.8 acres. The undeveloped area available for a community septic system has a slope of 9%. The area slopes downhill to West Brook which bisects the parcel. The 2004 aerial photo appears to show several small gullies perpendicular to West Brook. These make the site less desirable because of the potential of septic effluent entering West Brook before the 21 day travel time is achieved. The NRCS soil suitability of the area is low potential to support on-site wastewater disposal. The OPM Development Policies for the parcel is conservation area, except around West Brook where the hydric soils are classified as a preservation area. This lot is generally unsuitable for a community wastewater disposal system because of West Brook and the lack of the 21-day travel time.

3. EXTENSION OF PUBLIC SEWERS

The Lakeview Heights neighborhood would be sewered with approximately 4,700 feet of low pressure sewer and 31 grinder pumps due to the undulating topography, as shown on Figure AE-13. Taking advantage of a public sewer extension to Willie Circle, the low pressure sewer system of Lakeview Heights could be extended approximately 2,600 feet north to the gravity sewer termination manhole on Crystal Lake Road. The wastewater would flow via a low pressure sewer from Lakeview Heights up to the Willie Circle Neighborhood pump station, and then be pumped south through a force main to gravity sewers on Tolland Stage Road. This alternative may increase the O&M costs of the proposed pump station at Willie Circle but would typically be less expensive than the O&M of a community septic system. If both neighborhoods were sewered at the same time, an economics of scale benefit could be realized to evenly divide the cost of paying for the long transmission force main to Route 74.

To prevent development of several large parcels along Route 31 and Route 74, the force main transmission pipe will prevent the parcels from connecting into sewers in the future. This should satisfy the State C&D requirements to discourage growth along the sewer route in conservation and rural areas.

4. CONCEPTUAL OPINION OF COST

Conceptual Level Opinion of Costs for the two alternatives is relatively similar with approximate project costs ranging from $1.02 to $3.07 million (-30% to +50%). Table AE-14 and AE-15 shows the breakdown of costs for extension of public sewers from Willie Circle to Lakeview Heights and a community septic system at potential site #1.

The public sewer extension from Willie Circle to Lakeview Heights assumes much of the low pressure sewer along Route 31 would be built in the grass shoulder. The total cost of this alternative range from $1.02 to $2.17 million. The 6,600 feet of low pressure includes the transmission pipe north along Route 31 to the Willie Circle gravity sewer.

MATCH LINE SEE FIG AE-4

CONNECT LOW PRESSURE SEWER TO WILLIE CIRCLE GRAVITY SEWER

LOW PRESSURE SEWER

LOW PRESSURE SEWER

MATCH LINE SEE FIG AE-5

LEGEND

- NEIGHBORHOOD AREA
- PROPOSED GRAVITY SEWER
- EXISTING GRAVITY SEWER
- PROPOSED LOW PRESSURE SEWER
- PROPOSED FORCE MAIN
- PS PROPOSED PUMP STATION
- GP PROPOSED GRINDER STATION

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TOWN OF TOLLAND
EXTENSION OF PUBLIC SEWERS
LAKEVIEW HEIGHTS AREA CONCEPTUAL ALIGNMENT
WASTEWATER FACILITIES PLANNING STUDY - PHASE 2
TOLLAND CONNECTICUT

PROJ. No.: 2002507.A40
DATE: JULY 2008

FIG AE-13

ORDER OF MAGNITUDE OPINION OF COST

FUSS & O'NEILL
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Table AE-14

PROJECT:	Tolland WW Fac Plan - Phase 2
LOCATION:	Lakeview Heights Neighborhood
DESCRIPTION:	Low pressure sewer to Community Septic System (potential site #1)

DATE	06/26/06
ESTIMATOR:	MMJ
CHECKED BY:	KAM
PROJECT NO.:	2002.507.A40

Since Fuss & O'Neill has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor(s)' methods of determining prices, or over competitive bidding or market conditions, Fuss & O'Neill's opinion of probable Total Project Costs and Construction Cost are made on the basis of Fuss & O'Neill's experience and qualifications and represent Fuss & O'Neill's best judgment as an experienced and qualified professional engineer, familiar with the construction industry; but Fuss & O'Neill cannot and does not guarantee that proposals, bids or actual Total Project or Construction Costs will not vary from opinions of probable cost prepared by Fuss & O'Neill. If prior to the bidding or negotiating Phase the Owner wishes greater assurance as to Total Project or Construction Costs, the Owner shall employ an independent cost estimator.

ITEM DESCRIPTION	UNITS	NUM. OF UNITS	COST PER UNIT	TOTAL COST
Gravity Sewer	FT	0	$210	$0
Low Pressure Sewer	FT	4,700	$90	$423,000
Force Main	FT	0	$110	$0
Pump Station	EA	0	$400,000	$0
Pavement Repair (Town Road)	SY	2,100	$90	$189,000
Pavement Repair (State Road)	TON	0	$65	$0
Grinder Pumps	EA	31	$8,000	$248,000
Easements	SY	900	$6	$5,400
Construction Under I-84 Highway	LS	0	$500,000	$0
Community Subsurface Wastewater Renovation System	GPD	7,000	$100	$700,000
Land Acquisition (Town Already Owns Site)	ACRE	0.00	$50,000	$0
TOTAL CONSTRUCTION COST				$1,570,000
ENGINEERING/LEGAL/ADMINISTRATIVE (30%)				$471,000
SUBTOTAL				**$2,041,000**
TOTAL COST (-30% TO +50% ROUNDED)				**$1,430,000 TO $3,070,000**

Notes:
Based on 2008 dollars. Subsurface investigation has not been performed therefore bedrock removal quantities are indeterminate. Excessive dewatering not included. Costs include mobilization, bonds, mobilization, maintenance and protection of traffic.

ORDER OF MAGNITUDE OPINION OF COST

FUSS & O'NEILL
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Table AE-15

PROJECT: Tolland WW Fac Plan - Phase 2
LOCATION: Lakeview Heights Neighborhood
DESCRIPTION: Low pressure sewer to Willie Circle Neighborhood gravity sewer.

DATE 06/26/06
ESTIMATOR: MMJ
CHECKED BY: KAM
PROJECT NO.: 2002.507.A40

Since Fuss & O'Neill has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor(s)' methods of determining prices, or over competitive bidding or market conditions, Fuss & O'Neill's opinion of probable Total Project Costs and Construction Cost are made on the basis of Fuss & O'Neill's experience and qualifications and represent Fuss & O'Neill's best judgment as an experienced and qualified professional engineer, familiar with the construction industry; but Fuss & O'Neill cannot and does not guarantee that proposals, bids or actual Total Project or Construction Costs will not vary from opinions of probable cost prepared by Fuss & O'Neill. If prior to the bidding or negotiating Phase the Owner wishes greater assurance as to Total Project or Construction Costs, the Owner shall employ an independent cost estimator.

ITEM DESCRIPTION	UNITS	NUM. OF UNITS	COST PER UNIT	TOTAL COST
Gravity Sewer	FT	0	$210	$0
Low Pressure Sewer	FT	6,600	$90	$594,000
Force Main	FT	0	$110	$0
Pump Station	EA	0	$400,000	$0
Pavement Repair (Town Road)	SY	2,800	$90	$252,000
Pavement Repair (State Road)	TON	170	$65	$11,050
Grinder Pumps	EA	31	$8,000	$248,000
Easements	SY	0	$6	$0
Construction Under I-84 Highway	LS	0	$500,000	$0
Community Subsurface Wastewater Renovation System	GPD	0	$100	$0
Land Acquisition	ACRE	0.00	$50,000	$0
TOTAL CONSTRUCTION COST				$1,110,000
ENGINEERING/LEGAL/ADMINISTRATIVE (30%)				$333,000
SUBTOTAL				**$1,443,000**
TOTAL COST (-30% TO +50% ROUNDED)				**$1,020,000 TO $2,170,000**

Notes:
Based on 2008 dollars. Subsurface investigation has not been performed therefore bedrock removal quantities are indeterminate. Excessive dewatering not included. Costs include mobilization, bonds, mobilization, maintenance and protection of traffic.

A community septic system at potential site #1 has a conceptual level opinion of cost between $1.43 and $3.07 million dollars. This includes 900 square yards for a 15 foot wide easement and a 7,000 gpd community septic system on Town land. The cost of the community septic system is based on a rule-of-thumb $100 per gallon unit cost based on professional experience. There is no construction cost because the sewers will not be built on State roadways.

The typical cost per EDU for construction is shown in Table AE-16, based on subsidized construction costs using Clean Water Funds. Extending public sewers from Willie Circle is approximately $9,000 to $21,000 less expensive per EDU than the community septic system alternative at potential site #1.

Table AE-16: Construction Cost per Parcel (Lakeview Heights)

	Extend Public Sewers		Community Septic System (Site #1)	
	-30%	*to +50%*	*-30%*	*to +50%*
Conceptual Level Opinion of Cost	$1,020,000	$2,170,000	$1,430,000	$3,070,000
25% DEP Clean Water Fund Grant	$255,000	$542,500	$357,500	$767,500
Subsidized Construction Cost (Rounded)	$770,000	$1,630,000	$1,070,000	$2,300,000
Number of EDUs	33	33	33	33
Total Construction Cost per EDU	$23,000	$49,000	$32,000	$70,000

2008 Dollars

The annual Construction and O&M costs per EDU are shown in Table AE-17. The extension of public sewers has a 20 year annual cost per parcel of $600 to $1,300 less than the Community Septic System Alternative.

Table AE-17: Annual Cost Comparison by Parcel (Lakeview Heights)

	Extend Public Sewers		Community Septic System (Site #1)	
	-30%	*to +50%*	*-30%*	*to +50%*
Annualized Construction Cost per Parcel (Rounded) (20 year loan with 3% interest)	$1,500	$3,300	$2,200	$4,700
Estimated Annual O&M Cost per EDU	$587	$587	$450	$450
Annual Cost per EDU (Rounded)	$2,100	$3,900	$2,700	$5,200

2008 Dollars

Subsurface investigation has not been performed therefore soil characteristics and bedrock removal quantities are indeterminate. Excessive dewatering is not included. Costs include mobilization, bonds, maintenance and protection of traffic. The opinions of cost presented

represent a Conceptual Level Opinion of Cost. These opinions of costs are based on year 2008 dollars, and should be considered accurate to minus thirty or plus fifty percent.

Since Fuss & O'Neill has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor(s)' methods of determining prices, or over competitive bidding or market conditions, Fuss & O'Neill's opinion of probable Total Project Costs and Construction Cost are made on the basis of Fuss & O'Neill's experience and qualifications and represent Fuss & O'Neill's best judgment as an experienced and qualified professional engineer, familiar with the construction industry; but Fuss & O'Neill cannot and does not guarantee that proposals, bids or actual Total Project or Construction Costs will not vary from opinions of probable cost prepared by Fuss & O'Neill. If prior to the bidding or negotiating Phase the Owner wishes greater assurance as to Total Project or Construction Costs, the Owner shall employ an independent cost estimator.

5. ALTERNATIVE EVALUATION

Potential community septic system sites were found surrounding the Lakeview Heights neighborhood. Four of the six lots appear suitable for a community subsurface sewage renovation system. The site which appears to have the most favorable conditions is potential site #1. The parcel is owned by the Town of Tolland and partially utilized for a volunteer fire station. It is located a close distance to Lakeview Heights and has suitable soil for leaching fields. Many of the other sites are also favorable but the acquisition cost would likely make them more expensive alternatives.

The community septic system would be sized for the neighborhood area only and not be sized for future capacity from parcels outside the Lakeview Heights Neighborhood, to satisfy OPM development concerns. There might be concerns about constructing a large community septic system in a water supply aquifer protection area which would have to be addressed during implementation.

Public sewers could also be extended to this neighborhood, instead of a community septic system. Based on the assumption that public sewer would be extended to Willie Circle, a low pressure sewer from Lakeview Heights could be extended north along Route 31 to the Willie Circle gravity sewer collection system. The State OPM is expected to be concerned about future development along the low pressure sewer transmission line on Route 31. The area is already built-out based on the residential zoning designation. Additional Town regulations to prohibit sewer connections to the low pressure sewer transmission pipe would also prevent future connections outside the SSD. The low pressure sewer transmission pipe could be hydraulically sized for the capacity of the Lakeview Heights neighborhood area, with nominal additional capacity for parcels outside of the sewer service district; to discourage future development.

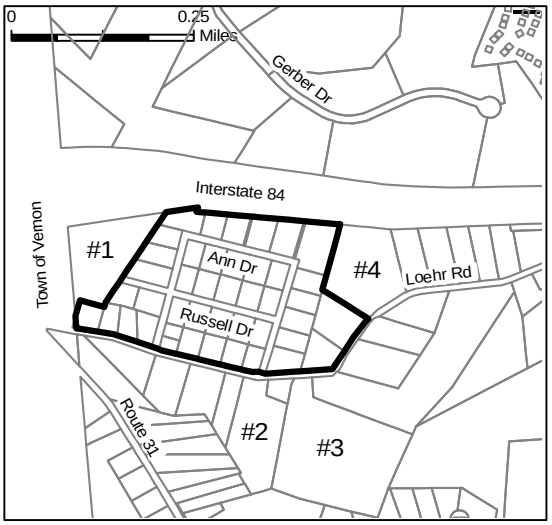
Homeowner's resistance due to the project cost and homeowners who recently repaired their septic system who then would not want to support a neighborhood wastewater management project should be addressed through a public outreach campaign during implementation of any neighborhood wastewater management solution.

The extension of public sewers is slightly less expensive than a community septic system at potential site #1. At this conceptual level opinion of cost planning, both alternatives should be considered equivalent on a cost basis. Extension of public sewer is seen as a slightly better alternative because the Town would not have to operate and maintain the community septic system. Instead, it is assumed that they would have to operate a pump station at Willie Circle. O&M on one facility typically is less expensive than O&M on two independent, disparate facilities.

E. RUSSELL DRIVE AREA (14.5 PRIORITY POINTS)

The Russell Drive Neighborhood Area has only a few parcels with enough land mass to support a subsurface community wastewater renovation system. The modest flows from the area of 9,000 gpd, excluding infiltration and inflow, are generally compatible with the smaller lot sizes of the potential sites that were investigated.

Figure AE-14:
Russell Drive Neighborhood Area Map



Of the four areas evaluated, potential site #1 (shown on Figure A E-14) appears to offer the most beneficial characteristics to support a subsurface community wastewater renovation system.

Two alternatives were also evaluated to extend public sewers to the neighborhood area. A force main constructed under Interstate 84 to Gerber Drive is one possibility. A second alternative is a force main west to Route 31 to future proposed sanitary sewers to be constructed by Vernon. Both sewer alternatives have logistical challenges that would need to be explored before proceeding with either option.

1. ON-SITE WASTEWATER MANAGEMENT

This area currently is served by individual privately owned and maintained septic systems and is not part of the Town's Sewer Service District. The priority point score from the Wastewater Management Needs Priority Matrix identified the Russell Drive Neighborhood Area as having on-site wastewater disposal challenges. This can be corroborated by examining the rating categories of the matrix such as "Town Sanitarian Observations." The existing on-site wastewater management challenges of this neighborhood may require an alternative approach.

2. COMMUNITY SEPTIC SYSTEM

2.a. POTENTIAL SITE #1

Northwest of the Russell Drive Area, a 6.6 acre land locked, woodland lot located south of Interstate 84 has soil rated as high potential suitability for septic systems by the NRCS. The topography has a uniform 10% downhill slope towards the Vernon town line. The OPM land use classification of the lot is a conservation area. There appears to be adequate nitrogen dilution and 21-day bacteria travel time before the wastewater effluent reaches the western property line. Potential site #1 would be expensive to acquire because it is part of a lot extending into Vernon with road frontage to the Route 31 commercial area by the I-84 exit.

2.b. POTENTIAL SITE #2

The front 230 feet of the parcel has high potential soil to support a septic system according to the NRCS, however it is developed with a single family residence with no room for a community septic system. The larger, undeveloped portion of the parcel is located in the rear but is rated as low potential for septic systems. The total lot size is 5.9 acres. The parcel is long (810 feet) and

narrow (375 feet), with a stream bisecting most of the available open space behind the house. The slope of the terrain is approximately 7%. The OPM C&D map classifies the lot as a conservation area.

It does not appear possible to design a community system for this lot based on the overall site orientation. Providing adequate separation distance between the effluent discharge and the stream would be difficult. The nitrogen dilution area is not large enough and the 21-day bacteria travel time could not be achieved for a large subsurface wastewater renovation system. See Figure AE-15.

2.c. POTENTIAL SITE #3

This 6.8 acre parcel is not suitable for a community septic system. Very steep topography of 27% is not conducive to wastewater absorption fields. Constructability on steep slopes is limited and the travel time through the soil is fast due to the steep hydraulic grade line. The soil suitability is rated poor on this parcel. The OPM C&D land classification is conservation area.

A stream bisects the parcel making it difficult to obtain the necessary distance to meet the 21-day travel time requirement. The nitrogen dilution of the effluent would be limited to the tributary area of half of the parcel due to the bisecting stream. The lot is not suitable for a community subsurface wastewater renovation system because of the steep slopes, difficulty achieving 21-day bacteria travel time, and limited nitrogen dilution area.

2.d. POTENTIAL SITE #4

Although this property has a large footprint (14.9 acres), the available area to site a community wastewater system is extremely limited. The topography of the majority of the parcel is extremely mountainous terrain (25%). A stream runs along the western and northern property lines. The NRCS soil suitability is rated as low potential to support on-site wastewater disposal systems. The OPM C&D plan shows the lot as rural lands.

A small flat area exists between the northern stream and the base of the mountainous terrain, but adequate hydric soil capacity and bacteria travel time to the stream might not exist due to the amount of rainwater descending the side of the mountain.

3. EXTENSION OF PUBLIC SEWERS

The neighborhood falls on a ridge line approximately located along Russell Drive. The northern parcels tend to drain to the northwest while the southern parcels drain to the south. 2,400 feet of gravity sewers would be extended along Russell Drive, Ann Drive, the north half of Clark Road, and the north half of Ridge Road. 2,100 feet of low pressure sewers would extend along Loeher Road, and the southern portions of Ridge Road and Clark Road. Low pressure sewer would be utilized instead of a second gravity sewer and second pump station to mitigate costs. During design development for this neighborhood, a more detailed analysis should be conducted comparing grinder pumps to a second pump station. The sewers would discharge into a proposed pump station located in the northwest corner of the neighborhood area on a developed, privately owned single family residential parcel.

3.a. FORCE MAIN UNDER INTERSTATE 84

One alternative to connect to public sewers is by extension of a 1,700 foot force main, north from the proposed pump station, under Interstate 84, and into existing gravity sewers on Gerber Drive

No.	DATE	DESCRIPTION	BY
1.			

REVISIONS

PROJ. MANAGER:	
CHIEF DESIGNER:	
REVIEWED BY:	DATE

SOURCE:

PLANIMETRIC DATA PROVIDED BY TOWN OF TOLLAND.

FOR CONCEPT PLANNING ONLY

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TOWN OF TOLLAND

COMMUNITY SEPTIC SYSTEM POTENTIAL SITE #1

RUSSELL DRIVE AREA CONCEPTUAL ALIGNMENT

WASTEWATER FACILITIES PLANNING STUDY - PHASE 2

TOLLAND CONNECTICUT

PROJ. No.: 2002507.A40

DATE: JULY 2008

FIG AE-15

(as shown on Figure AE-16). Crossing I-84 would be performed using directional drilling or micro-tunneling to minimize disruptions on the highway. Refer to Figure AE-17.

3.b. FORCE MAIN NORTH ALONG ROUTE 31

A second alternative would extend south a 1,950 foot force main from the proposed pump station location to Loehr Road, and west to Route 31 to a future proposed sanitary sewer constructed in Vernon by others.

4. CONCEPTUAL OPINION OF COST

Conceptual Level Opinions of Cost were prepared for one community septic system and two force main alignments to existing public sewers. The sewer extension to Route 31 in Vernon has potential cost sharing/savings because the Town of Vernon has long term plans to extend sewers in that area. The sewer extension constructed under I-84 to Gerber Drive was the mid-priced alternative. The community septic system at potential site #1 appears to be the most expensive alternative because the proposed site for the community septic system is part of a commercial district abutting Route 31. For the alternatives, the basic neighborhood sewer collection system has approximately 2,400 feet of gravity pipe, 2,100 feet of low pressure sewer, and 13 grinder pumps.

Extension of public sewers under I-84 with a connection into Gerber Drive has a Conceptual Level Opinion of Cost between $1,950,000 and $4,180,000, as shown in Table AE-18. There is a significant cost to construct the force main under the highway without disrupting traffic.

A sewer extension west along Loehr Road to Route 31 in Vernon is anticipated to be inexpensive because of long-term plans to extend sewers along Route 31 in Vernon. This would reduce the total force main length from approximately 4,400 feet to 1,700 feet. The Conceptual Level Opinion of Cost for this alternative was estimated between $1,530,000 and $3,280,000. Refer to Table AE-19 for a breakdown of the unit costs.

The community septic system has cost benefits because an expensive pump station is not needed. Potential Site #1 is located in the low spot of the neighborhood which allows the gravity sewers to discharge directly into the community system. Furthermore, the entire community septic system would be located on a site that slopes downhill to the west, which may make it possible to distribute wastewater effluent to the trenches without pressure dosing. Table AE-20 estimates the Conceptual Level Opinion of Cost to be between $2.89 and $6.18 million dollars. This cost range includes land acquisition of 6.6 acres and a 9,000 gpd community septic system.

The typical cost per EDU (Equivalent Dwelling Unit) for construction is shown in Table AE-21. The cost per EDU to construct a Community Septic System at Site #1 is approximately $23,000 to $49,000 per EDU more expensive than extending public sewers to Vernon. The conceptual level opinion of cost was reduced by an anticipated DEP 25% grant from the Clean Water Fund.

No.	DATE	DESCRIPTION	BY
1.			

REVISIONS

PROJ. MANAGER:
CHIEF DESIGNER:
REVIEWED BY: DATE

SOURCE:
PLANIMETRIC DATA PROVIDED BY TOWN OF TOLLAND.

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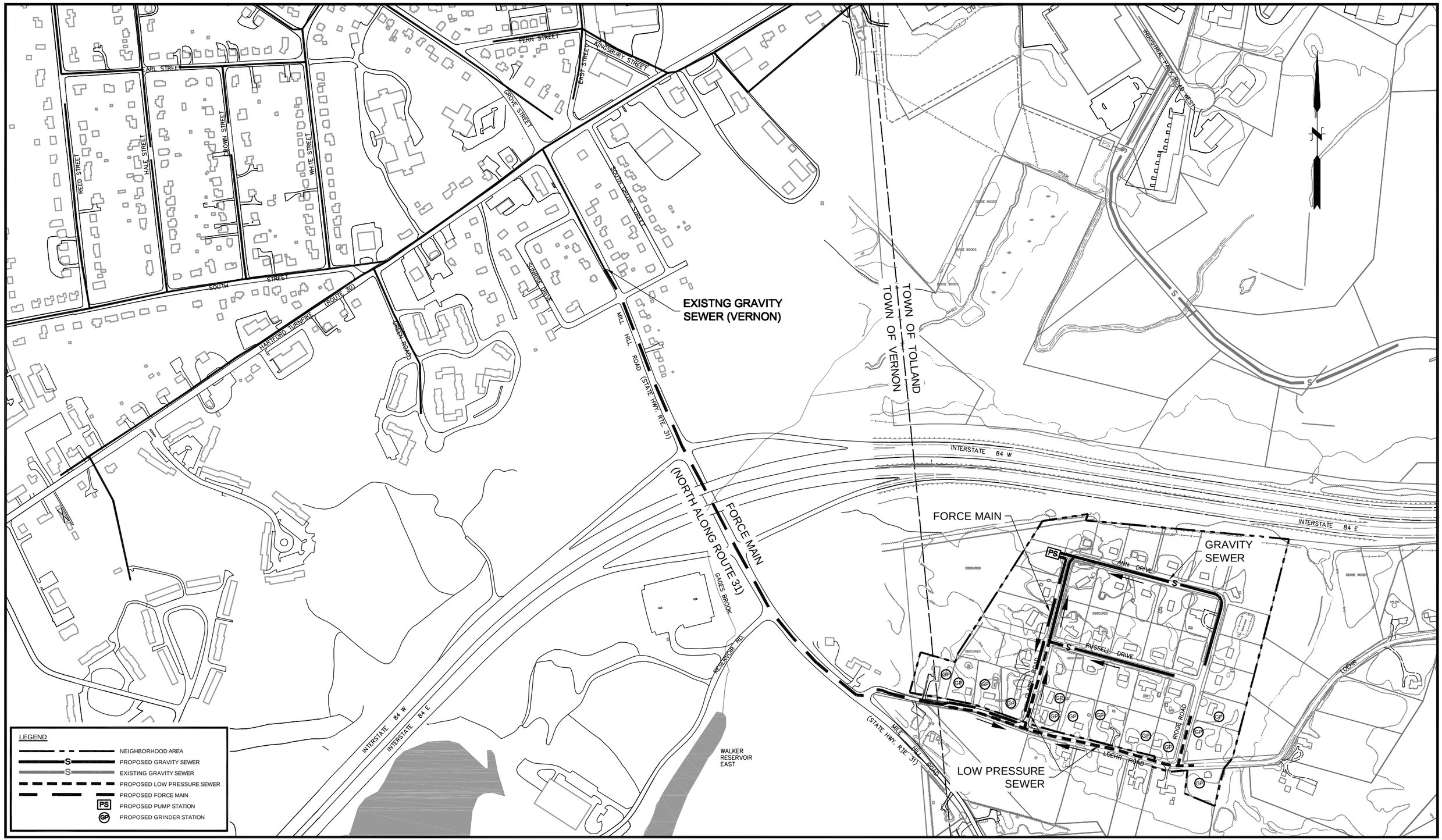
TOWN OF TOLLAND
EXTENSION OF PUBLIC SEWERS UNDER I-84
RUSSELL DRIVE AREA CONCEPTUAL ALIGNMENT
WASTEWATER FACILITIES PLANNING STUDY - PHASE 2
TOLLAND CONNECTICUT

PROJ. No.: 2002507.A40
DATE: JULY 2008

FIG AE-16



No.	DATE	DESCRIPTION	BY
1.			

REVISIONS

PROJ. MANAGER:	
CHIEF DESIGNER:	
REVIEWED BY:	DATE

SOURCE:

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TOWN OF TOLLAND
EXTENSION OF PUBLIC SEWERS ON ROUTE 31
RUSSELL DRIVE AREA CONCEPTUAL ALIGNMENT
WASTEWATER FACILITIES PLANNING STUDY - PHASE 2

TOLLAND CONNECTICUT

PROJ. No.: 2002507.A40
DATE: JULY 2008

FIG AE-17

ORDER OF MAGNITUDE OPINION OF COST

FUSS & O'NEILL
Disciplines to Deliver

Table AE-18

PROJECT:	Tolland WW Fac Plan - Phase 2	DATE	06/26/06
LOCATION:	Russell Drive Neighborhood	ESTIMATOR:	MMJ
DESCRIPTION:	Force Main under I-84: Gravity and low pressure sewer to pump station. Force main across I-84 to existing Gerber Drive gravity sewer	CHECKED BY:	KAM
		PROJECT NO.:	2002.507.A40

Since Fuss & O'Neill has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor(s)' methods of determining prices, or over competitive bidding or market conditions, Fuss & O'Neill's opinion of probable Total Project Costs and Construction Cost are made on the basis of Fuss & O'Neill's experience and qualifications and represent Fuss & O'Neill's best judgment as an experienced and qualified professional engineer, familiar with the construction industry; but Fuss & O'Neill cannot and does not guarantee that proposals, bids or actual Total Project or Construction Costs will not vary from opinions of probable cost prepared by Fuss & O'Neill. If prior to the bidding or negotiating Phase the Owner wishes greater assurance as to Total Project or Construction Costs, the Owner shall employ an independent cost estimator.

ITEM DESCRIPTION	UNITS	NUM. OF UNITS	COST PER UNIT	TOTAL COST
Gravity Sewer	FT	2,400	$210	$504,000
Low Pressure Sewer	FT	2,100	$90	$189,000
Force Main	FT	1,700	$110	$187,000
Pump Station	EA	1	$400,000	$400,000
Pavement Repair (Town Road)	SY	2,500	$90	$225,000
Pavement Repair (State Road)	TON	0	$65	$0
Grinder Pumps	EA	13	$8,000	$104,000
Easements	SY	2,700	$6	$16,200
Construction Under I-84 Highway	LS	1	$500,000	$500,000
Community Subsurface Wastewater Renovation System	GPD	0	$100	$0
Land Acquisition	ACRE	0.15	$50,000	$7,500
TOTAL CONSTRUCTION COST				$2,140,000
ENGINEERING/LEGAL/ADMINISTRATIVE (30%)				$642,000
SUBTOTAL				**$2,782,000**
TOTAL COST (-30% TO +50% ROUNDED)				**$1,950,000 TO $4,180,000**

Notes:
Based on 2008 dollars. Subsurface investigation has not been performed therefore bedrock removal quantities are indeterminate. Excessive dewatering not included. Costs include mobilization, bonds, mobilization, maintenance and protection of traffic.

ORDER OF MAGNITUDE OPINION OF COST

FUSS & O'NEILL
Disciplines to Deliver

Table AE-19

PROJECT:	Tolland WW Fac Plan - Phase 2	DATE	06/26/06
LOCATION:	Russell Drive Neighborhood	ESTIMATOR:	MMJ
DESCRIPTION:	ALTERNATIVE 2: Gravity and low pressure sewer to pump station. Force main along Route 30 to Vernon gravity sewer	CHECKED BY:	KAM
		PROJECT NO.:	2002.507.A40

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ITEM DESCRIPTION	UNITS	NUM. OF UNITS	COST PER UNIT	TOTAL COST
Gravity Sewer	FT	2,400	$210	$504,000
Low Pressure Sewer	FT	2,100	$90	$189,000
Force Main	FT	4,400	$110	$484,000
Pump Station	EA	1	$400,000	$400,000
Pavement Repair (Town Road)	SY	2,700	$90	$243,000
Pavement Repair (State Road)	TON	480	$65	$31,200
Grinder Pumps	EA	13	$8,000	$104,000
Easements	SY	0	$6	$0
Construction Under I-84 Highway	LS	0	$500,000	$0
Community Subsurface Wastewater Renovation System	GPD	0	$100	$0
Land Acquisition	ACRE	0.15	$50,000	$7,500
TOTAL CONSTRUCTION COST				$1,970,000
ENGINEERING/LEGAL/ADMINISTRATIVE (30%)				$591,000
SUBTOTAL				**$2,561,000**
TOTAL COST (-30% TO +50% ROUNDED)				**$1,800,000 TO $3,850,000**

Notes:
Based on 2008 dollars. Subsurface investigation has not been performed therefore bedrock removal quantities are indeterminate. Excessive dewatering not included. Costs include mobilization, bonds, mobilization, maintenance and protection of traffic.

ORDER OF MAGNITUDE OPINION OF COST

FUSS & O'NEILL
Disciplines to Deliver

Table AE-20

PROJECT:	Tolland WW Fac Plan - Phase 2
LOCATION:	Russell Drive Neighborhood
DESCRIPTION:	Gravity and low pressure sewer to Community Septic System (potential site #1)

DATE	06/26/06
ESTIMATOR:	MMJ
CHECKED BY:	KAM
PROJECT NO.:	2002.507.A40

Since Fuss & O'Neill has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor(s)' methods of determining prices, or over competitive bidding or market conditions, Fuss & O'Neill's opinion of probable Total Project Costs and Construction Cost are made on the basis of Fuss & O'Neill's experience and qualifications and represent Fuss & O'Neill's best judgment as an experienced and qualified professional engineer, familiar with the construction industry; but Fuss & O'Neill cannot and does not guarantee that proposals, bids or actual Total Project or Construction Costs will not vary from opinions of probable cost prepared by Fuss & O'Neill. If prior to the bidding or negotiating Phase the Owner wishes greater assurance as to Total Project or Construction Costs, the Owner shall employ an independent cost estimator.

ITEM DESCRIPTION	UNITS	NUM. OF UNITS	COST PER UNIT	TOTAL COST
Gravity Sewer	FT	2,400	$210	$504,000
Low Pressure Sewer	FT	2,100	$90	$189,000
Force Main	FT	0	$110	$0
Pump Station	EA	0	$400,000	$0
Pavement Repair (Town Road)	SY	2,700	$90	$243,000
Pavement Repair (State Road)	TON	0	$65	$0
Grinder Pumps	EA	13	$8,000	$104,000
Easements	SY	400	$6	$2,400
Construction Under I-84 Highway	LS	0	$500,000	$0
Community Subsurface Wastewater Renovation System	GPD	9,000	$100	$900,000
Land Acquisition (At Premium Cost)	ACRE	6.62	$150,000	$993,000
TOTAL CONSTRUCTION COST				$2,940,000
ENGINEERING/LEGAL/ADMINISTRATIVE (40%)				$1,176,000
SUBTOTAL				**$4,116,000**
TOTAL COST (-30% TO +50% ROUNDED)				**$2,890,000 TO $6,180,000**

Notes:
Based on 2008 dollars. Subsurface investigation has not been performed therefore bedrock removal quantities are indeterminate. Excessive dewatering not included. Costs include mobilization, bonds, mobilization, maintenance and protection of traffic.

Table AE-21: Construction Cost per Parcel (Russell Drive)

	Extend Public Sewers				Community Septic System (Site #1)	
	Gerber Drive (Tolland)		*To Vernon*			
	-30%	*to +50%*	*-30%*	*to +50%*	*-30%*	*to +50%*
Conceptual Level Opinion of Cost	$1,950,000	$4,180,000	$1,530,000	$3,280,000	$2,890,000	$6,180,000
25% DEP Clean Water Fund Grant	$487,500	$1,045,000	$382,500	$820,000	$722,500	$1,545,000
Subsidized Construction Cost (Rounded)	$1,460,000	$3,140,000	$1,150,000	$2,460,000	$2,170,000	$4,640,000
Number of EDUs	44	44	44	44	44	44
Total Construction Cost per EDU	$33,000	$71,000	$26,000	$56,000	$49,000	$105,000

2008 Dollars

The annual Construction and O&M costs per EDU are shown in Table AE-22. The construction and O&M of a public sewer system to Vernon has an estimated 20 year annual cost per EDU of $2,300 to $4,400 (including the Clean Water Fund Grant).

Table AE-22: Annual Cost Comparison by Parcel (Russell Drive)

	Extend Public Sewers				Community Septic System (Site #1)	
	Gerber Drive (Tolland)		*To Vernon*			
	-30%	*to +50%*	*-30%*	*to +50%*	*-30%*	*to +50%*
Annualized Construction Cost per Parcel (Rounded) (20 year loan with 3% interest)	$2,200	$4,800	$1,700	$3,800	$3,300	$7,100
Estimated Annual O&M Cost per EDU	$587	$587	$587	$587	$450	$450
Annual Cost per EDU (Rounded)	$2,800	$5,400	$2,300	$4,400	$3,800	$7,600

2008 Dollars

Subsurface investigation has not been performed therefore soil characteristics and bedrock removal quantities are indeterminate. Excessive dewatering is not included. Costs include mobilization, bonds, maintenance and protection of traffic. The opinions of cost presented represent a Conceptual Level Opinion of Cost. These opinions of costs are based on year 2008 dollars, and should be considered accurate to minus thirty or plus fifty percent.

Since Fuss & O'Neill has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor(s)' methods of determining prices, or over competitive bidding or market conditions, Fuss & O'Neill's opinion of probable Total Project Costs and Construction Cost are made on the basis of Fuss & O'Neill's experience and qualifications and represent Fuss & O'Neill's best judgment as an experienced and qualified professional engineer, familiar with the construction industry; but Fuss & O'Neill cannot and does not guarantee that proposals, bids or actual Total Project or Construction Costs will not vary from opinions of probable cost prepared by Fuss & O'Neill. If prior to the bidding or negotiating Phase the Owner wishes greater assurance as to Total Project or Construction Costs, the Owner shall employ an independent cost estimator.

5. ALTERNATIVE EVALUATION

Potential site #1 is suitable for a community septic system for the Russell Drive Neighborhood. It is located at the low point of the northern end on a large parcel with adequate nitrogen dilution and bacteria travel time. The remaining 3 potential sites appear to be unsuitable based on the preliminary analysis. Of the alternatives evaluated, a community septic system at potential site #1 appears to be the least expensive option.

Two alternatives to extend public sewers were also evaluated. The cost for each alternative is equivalent at this conceptual opinion of cost planning stage. The alternative to cross under I-84 faces regulatory hurdles permitting a utility crossing under the highway. A force main north along Route 31 also faces a DOT Encroachment Permit Review but the distance traversed is much longer.

Homeowner's resistance due to the project cost and homeowners who recently repaired their septic system who then would not want to support a neighborhood wastewater management project should be addressed through a public outreach campaign during implementation of any neighborhood wastewater management solution.

A community septic system will not require a lengthy design review by the State DOT. Both the community septic system and sewer extension under I-84 will impact the wooded area in the northwest corner of the neighborhood. The community septic system could gain support by turning the cleared land over the leaching trenches into a community park. The largest concern the CT OPM might have with any of these alternatives is the sewer availability to large underdeveloped lots surrounding the Russell Drive Neighborhood. Limiting the size of the pump station (for a public sewer extension) or limiting the capacity of the community septic system would limit the neighborhood sewer system availability to accept lots in the future. The Town also should firmly enforce the sewer service district boundaries and limit parcels designated for on-site wastewater disposal from connecting to public sewers.

6. ECONOMIC ANALYSIS

Table AE-23 below summarizes the Order of Magnitude Opinion of Cost for the main alternatives of each neighborhood area. DEP Clean Water Fund monies available to subsidize the project cost are not shown in Table AE-23 below.

Table AE-23: Order of Magnitude Opinion of Cost

Neighborhood Area	Description	Order of Magnitude Opinion of Cost (-30% to +50% Rounded)
Willie Circle	Sewer Extension	$3,950,000 TO $8,470,000
	Community Septic System (Site #2)	$4,810,000 TO $10,290,000
Apple Road	Community Septic System (Site #1)	$7,210,000 TO $15,440,000
	Community Septic System (Site #7)	$7,930,000 TO $16,990,000
Anthony Road	Sewer Extension	$5,570,000 TO $11,920,000
Lakeview Heights	Sewer Extension*	$1,020,000 TO $2,170,000
	Community Septic System (Site #1)	$1,430,000 TO $3,070,000
Russell Drive	Sewer Extension (To Vernon)	$1,530,000 TO $3,280,000
	Sewer Extension (To Gerber Drive)	$1,950,000 TO $4,180,000
	Community Septic System (Site #1)	$2,890,000 TO $6,180,000

* Recommended if constructed in conjunction with or subsequent to Willie Circle Sewer

Costs in 2008 Dollars

An economic analysis of the alternatives compares the construction cost per EDU of the alternatives (shown in Table AE-25). The opinions of cost per EDU are relatively comparable. Neighborhoods with more EDUs have a large number of properties to distribute the cost of the wastewater management alternative, but the size of the area to be served generally also increases which increases the infrastructure needs and tends to raise the project capital cost. These opinions of cost may be defrayed by State, Local, and Federal grants as available. For example, the values may be 25% lower if the projects are awarded funding by the Clean Water Fund Grant (shown in Table AE-25).

Table AE-24:
Order of Magnitude Opinion of Cost Economic Analysis

Neighborhood Area	Description	EDUs	Construction Cost per EDU (-30% to +50% Rounded)
Willie Circle	Sewer Extension	90	$44,000 TO $94,000
	Community Septic System (Site #2)	90	$53,000 TO $114,000
Apple Road	Community Septic System (Site #1)	130	$55,000 TO $119,000
	Community Septic System (Site #7)	130	$61,000 TO $131,000
Anthony Road	Sewer Extension	181	$31,000 TO $66,000
Lakeview Heights	Sewer Extension	33	$31,000 TO $66,000
	Community Septic System (Site #1)	33	$43,000 TO $93,000
Russell Drive	Sewer Extension (To Vernon)	44	$35,000 TO $75,000
	Sewer Extension (To Gerber Drive)	44	$44,000 TO $95,000
	Community Septic System (Site #1)	44	$66,000 TO $140,000

Costs in 2008 Dollars

Table A4-25: Order of Magnitude Opinion of Cost Economic Analysis with DEP Clean Water Fund 25% Grant

Neighborhood Area	Description	EDUs	Construction Cost per EDU (-30% to +50% Rounded)
Willie Circle	Sewer Extension	90	$33,000 TO $71,000
	Community Septic System (Site #2)	90	$40,000 TO $86,000
Apple Road	Community Septic System (Site #1)	130	$42,000 TO $89,000
	Community Septic System (Site #7)	130	$46,000 TO $98,000
Anthony Road	Sewer Extension	181	$23,000 TO $49,000
Lakeview Heights	Sewer Extension	33	$23,000 TO $49,000
	Community Septic System (Site #1)	33	$32,000 TO $70,000
Russell Drive	Sewer Extension (To Vernon)	44	$26,000 TO $56,000
	Sewer Extension (To Gerber Drive)	44	$33,000 TO $71,000
	Community Septic System (Site #1)	44	$49,000 TO $105,000

Costs in 2008 Dollars