

Town of Groton Resource Protection and Site Capacity

March 4, 2009

Kendig Keast Collaborative

Mac Birch



KENDIG KEAST
COLLABORATIVE

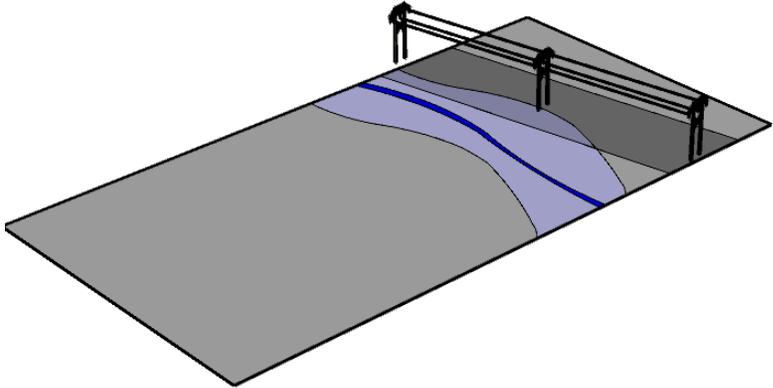
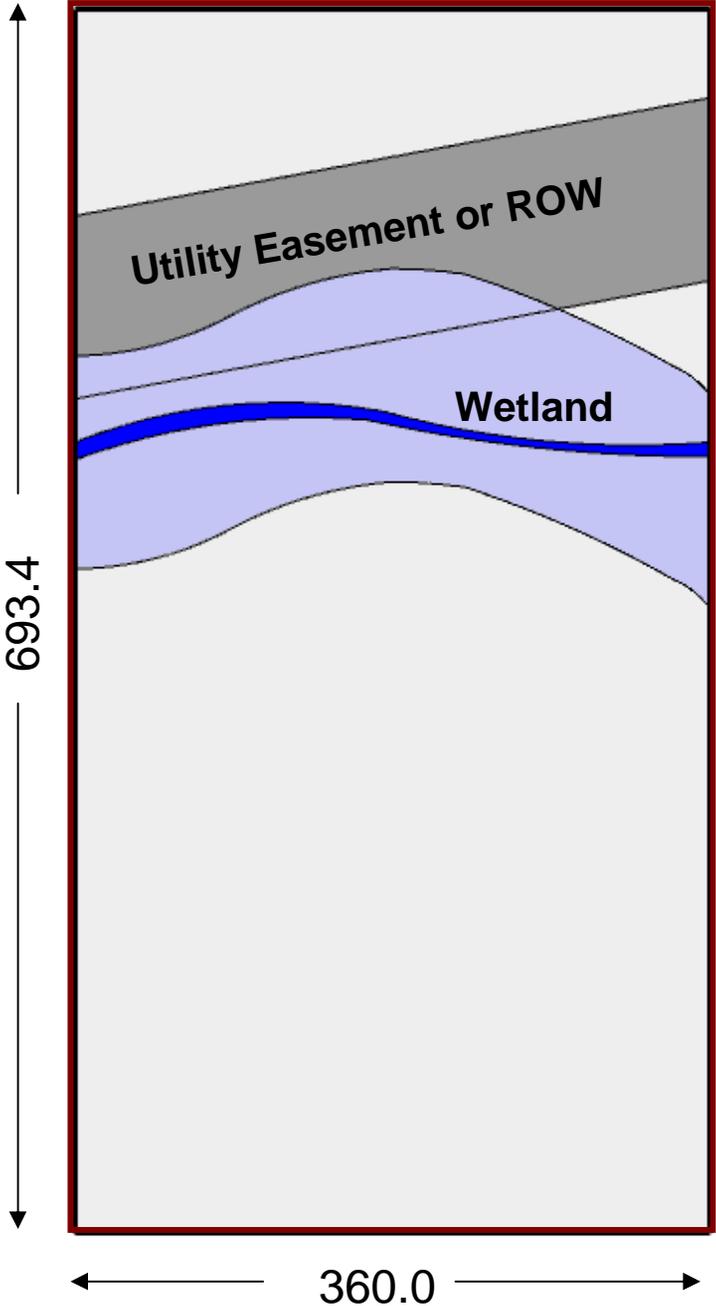
Resource Protection and Site Capacity

Objectives:

- Discuss methods of determining of site capacity and unit yield
- Determine a uniform procedure to calculate site capacity
- Begin to establish consensus on resource protection levels
- Find the true meaning of ~~life~~ “Buildable Areas”

Total Site Area

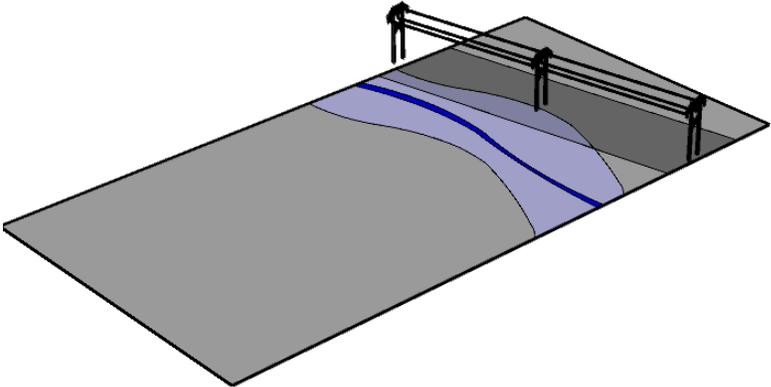
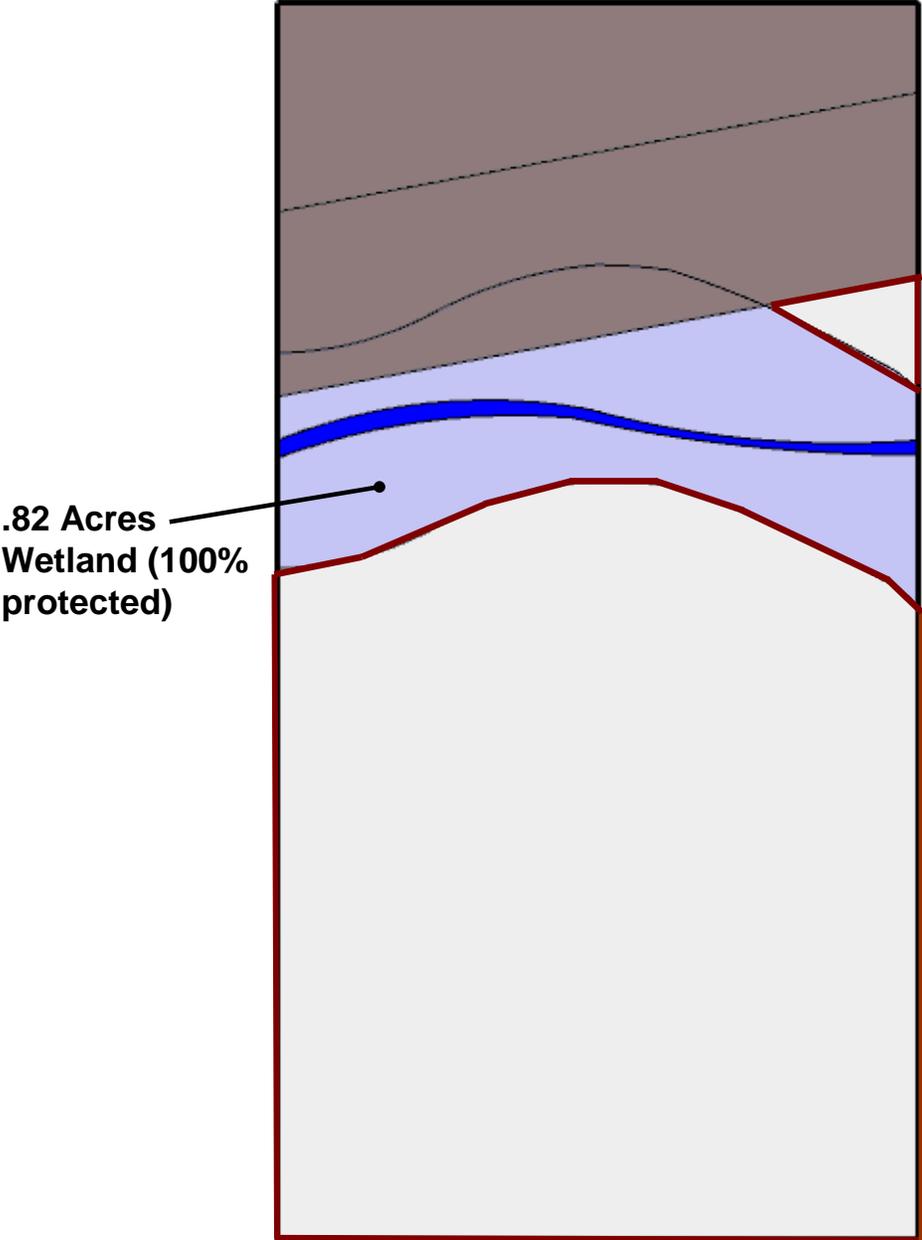
Based on Property Dimensions



$$693.4 \times 360.0 / 43,560 = \underline{\underline{5.73 \text{ Acres}}}$$

Buildable Area

Total Site Area Minus Protected Area

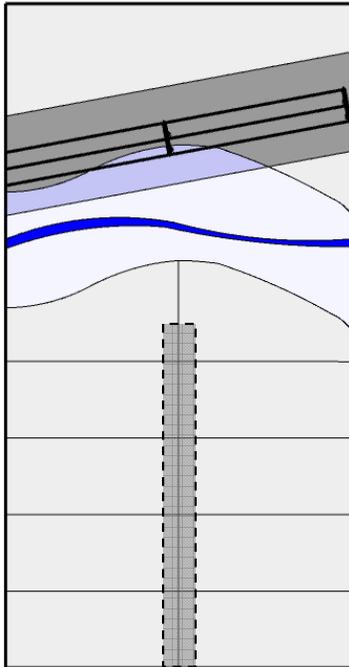


5.73 ac.	Total Site Area
<u>-0.82 ac.</u>	Resource Protected Areas
4.91 Acres	Buildable Area

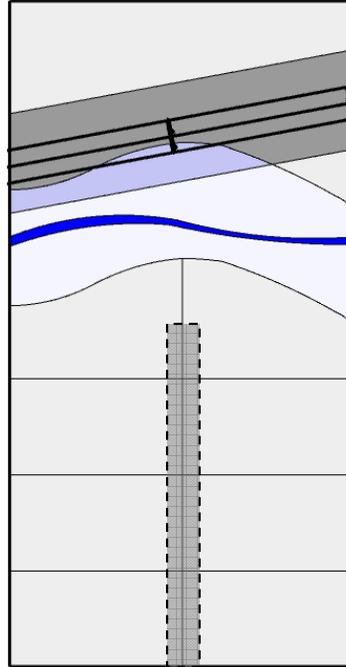
Theoretical Site Yields

District	Min. Lot Size (sq. ft.)	Gross Density (Lots/Acre)	Yield on 5.73 ac. Total Site	Yield on 4.91 ac. Buildable Area
RU-80	80,000	0.54	3	2
RU-40	40,000	1.09	6	5
RU-20	20,000	2.18	12	10
RS-20	20,000	2.18	12	10
RS-12	12,000	3.63	20	17
RS-8	8,000	5.45	31	26
R-20	20,000	2.18	12	10
R-12	12,000	3.63	20	17

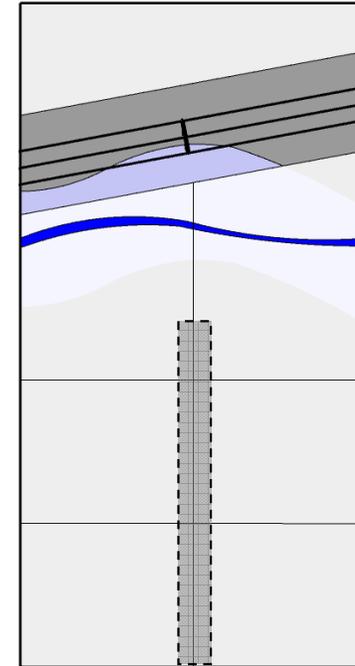
Conceptual Site Layouts



R-12, RS-12: 10 Lots



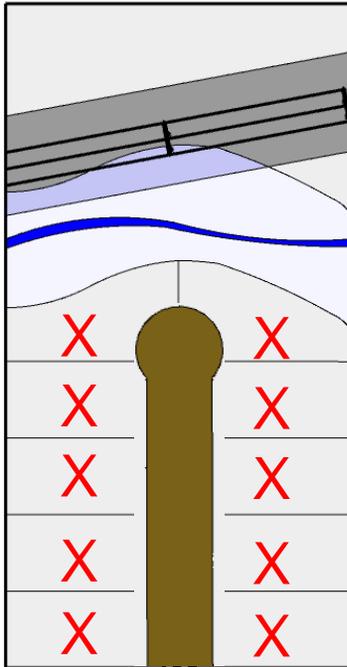
R-20, RS-20, RU-20:
8 Lots



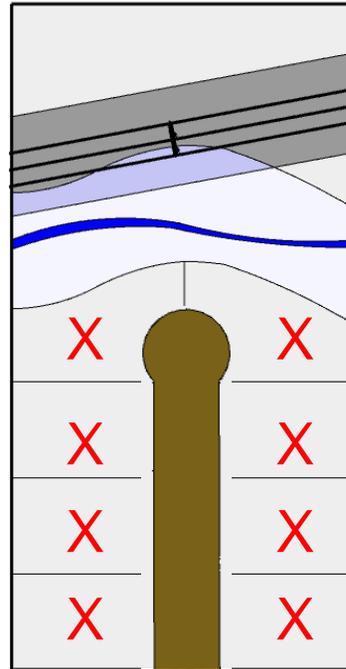
RU-40:
6 Lots (with wetland areas included)
4 Lots (with wetlands areas avoided)

Actual yields will vary with lot configuration and minimum width requirements

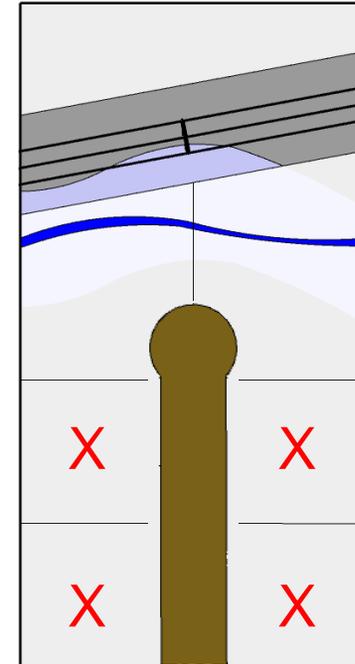
Conceptual Site Layouts



R-12, RS-12: 10 Lots



R-20, RS-20, RU-20:
8 Lots



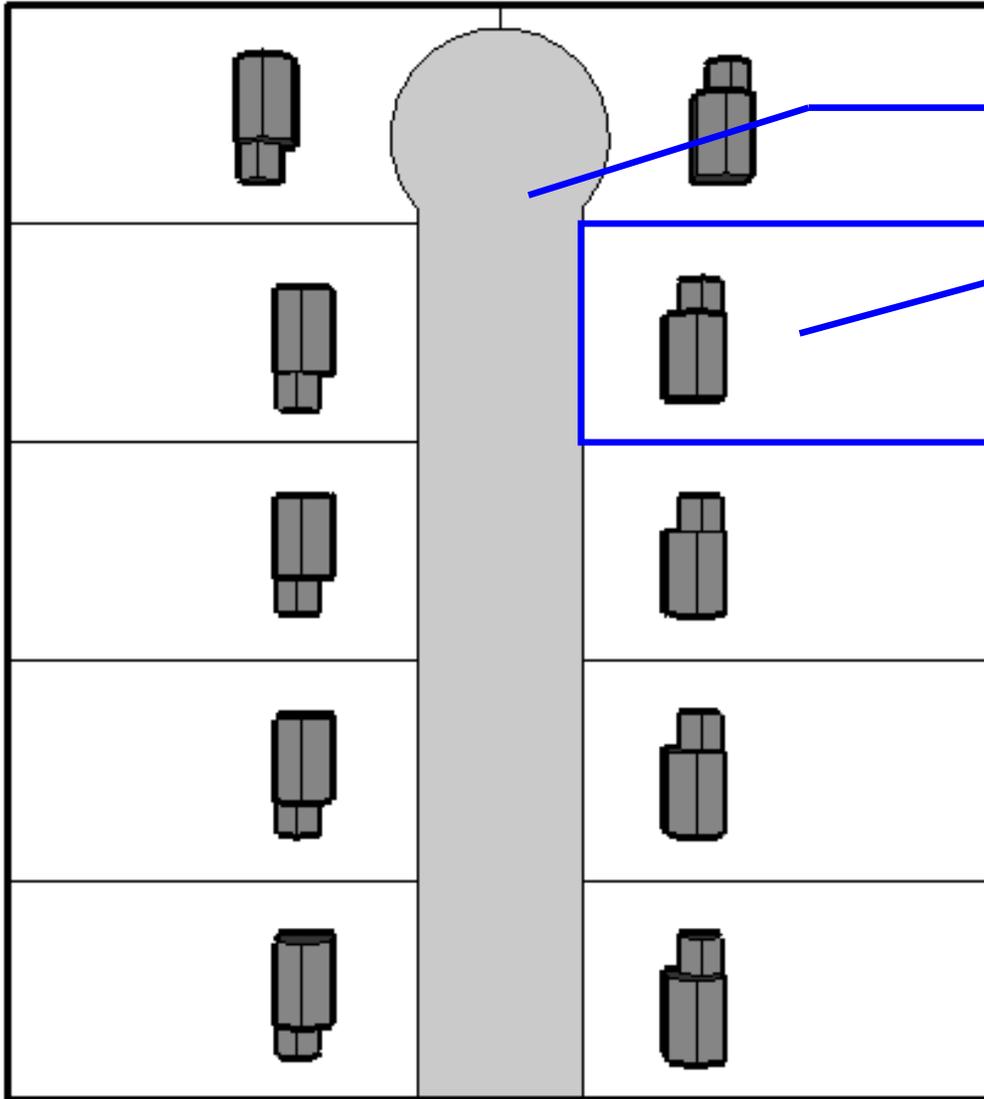
RU-40:
6 Lots (with wetland areas included)
4 Lots (with wetland areas avoided)

Actual yields will vary with lot configuration and minimum width requirements

In most cases, public street ROW must be taken into consideration

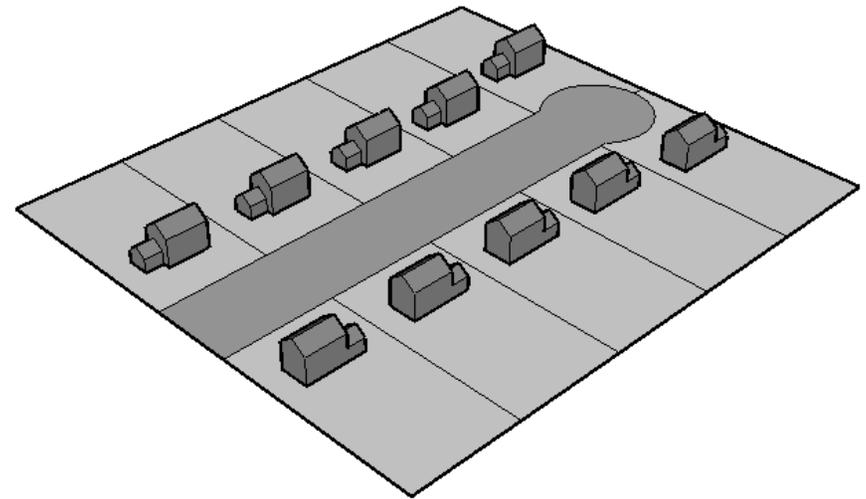
“Net” Density

Adjusts for required street right-of-way



60' street ROW with cul-de-sac (24,000 sq. ft.)

Each lot: 12,000 sq. ft. (80' x 150')

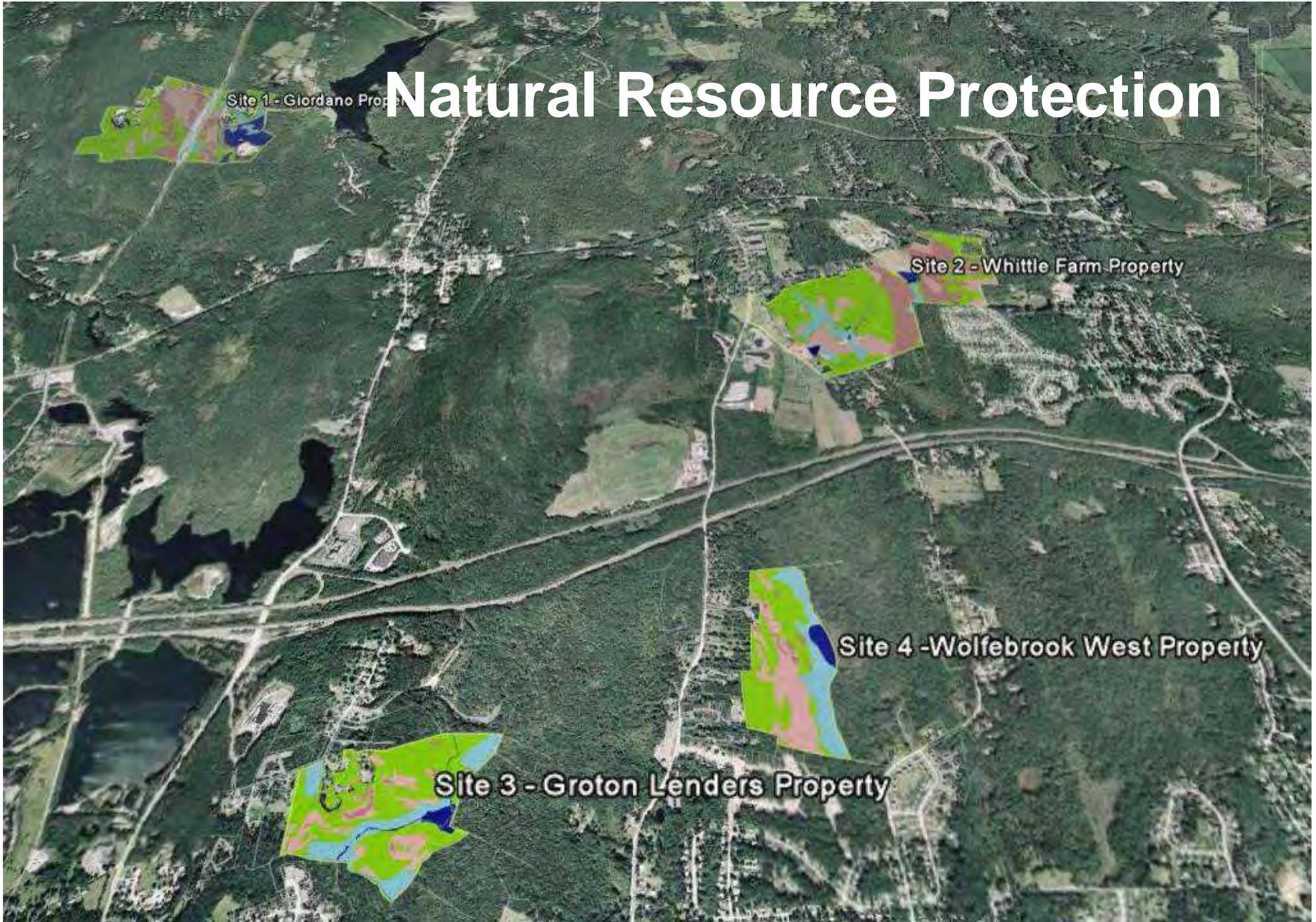


Practical Site Yields

Based on Net Density and Buildable Site Area

District	Min. Lot Size (sq. ft.)	Gross Density (Lots/Acre)	Net Density (Lots/Acre)	Yield on 4.91 ac. Net Buildable Site
RU-80	80,000	0.54	0.51	4
RU-40	40,000	1.09	0.98	4
RU-20	20,000	2.18	1.89	9
RS-20	20,000	2.18	1.89	9
RS-12	12,000	3.63	3.03	14
RS-8	8,000	5.45	4.44	21
R-20	20,000	2.18	1.89	9
R-12	12,000	3.63	3.03	14

Natural Resource Protection



Site 1 - Giordano Property

Site 2 - Whittle Farm Property

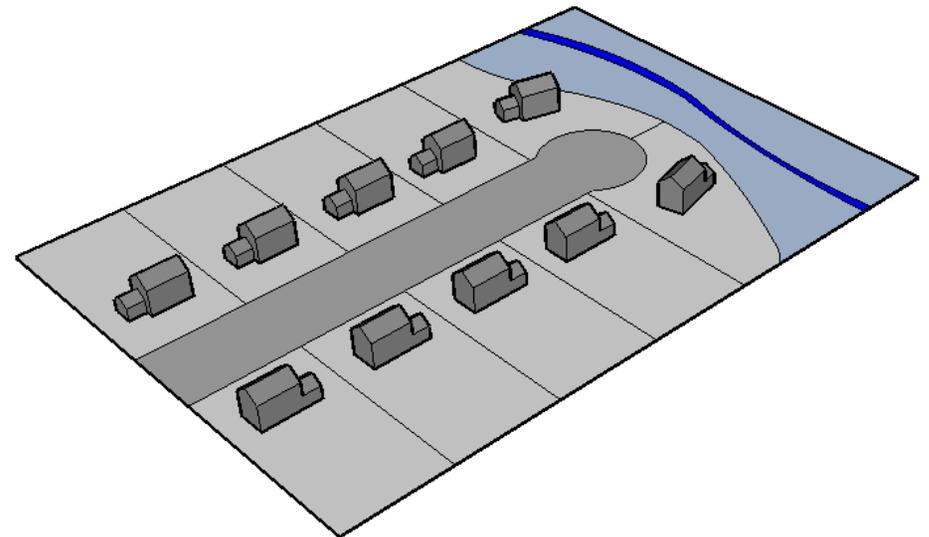
Site 4 - Wolfebrook West Property

Site 3 - Groton Lenders Property

Protected Resources

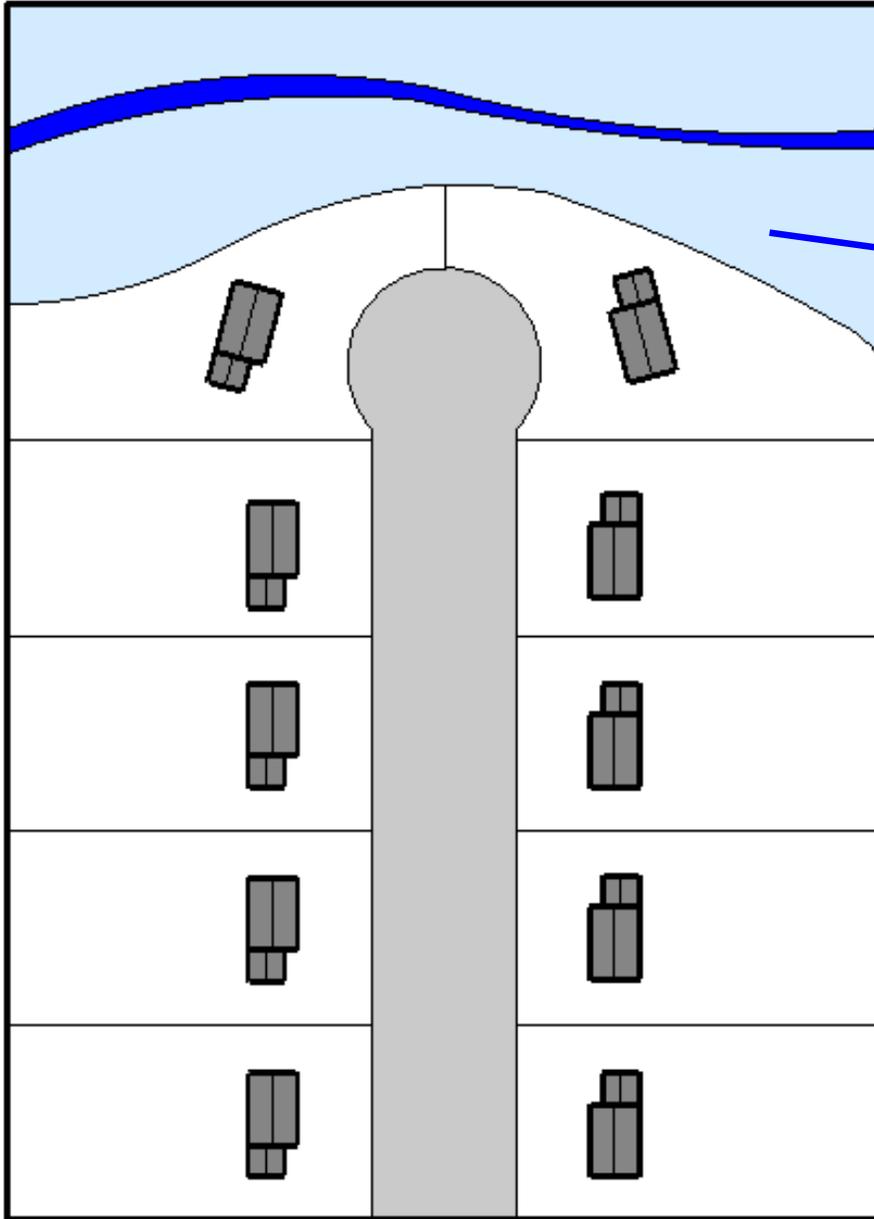
Counts as Open Space

36,000 sq. ft. of floodplain/water.
100% protected. Counts as open space.



Total Size: 144,000 sq. ft. (3.31 acres)

Net Density: 10 units ÷ 3.31 acres = 3.025 DU/ac.



Protected Resources for this Analysis

Resource	Protection Level
Water Bodies and Watercourses	100% (120% in the WRPD)
Wetlands and Floodplains	100%
Steep Slopes 25% +	100 % (in all areas)
Moderate Slopes 15% to 24.9%	100% (Only in the Sewer Avoidance Area)
Woodlands	10% (20% in RU districts)

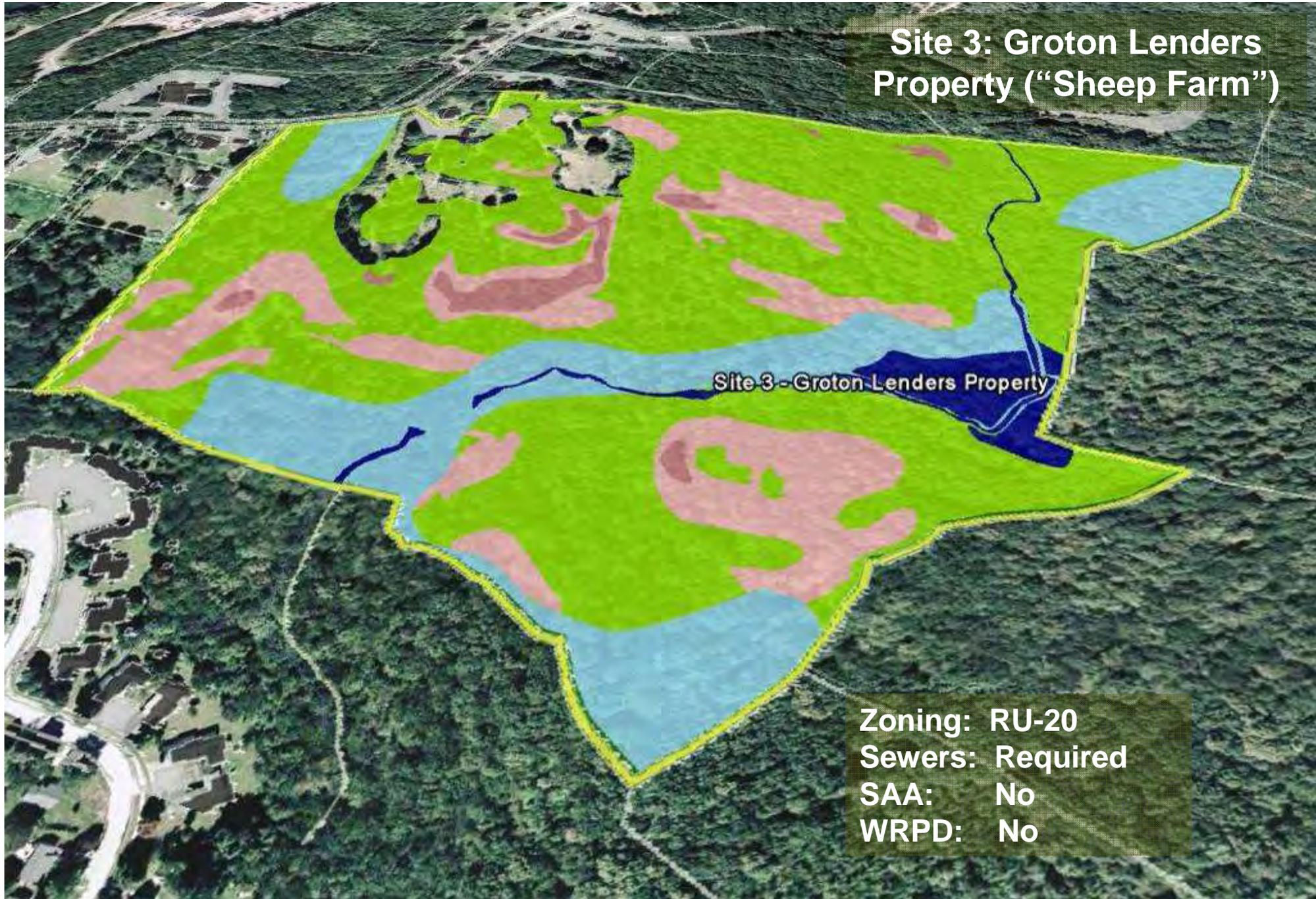
Areas Analyzed

	Property	Size	District	In SAA*	In WRPD
	1. Giordano	200.92	RU-40	Yes	Yes
	2. Whittle Farm	196.68	RU-40	Yes	No**
	3. Groton Lenders LLC	64.01	RU-20	No	No
	4. Wolfebrook West	57.40	RS-20	No	No

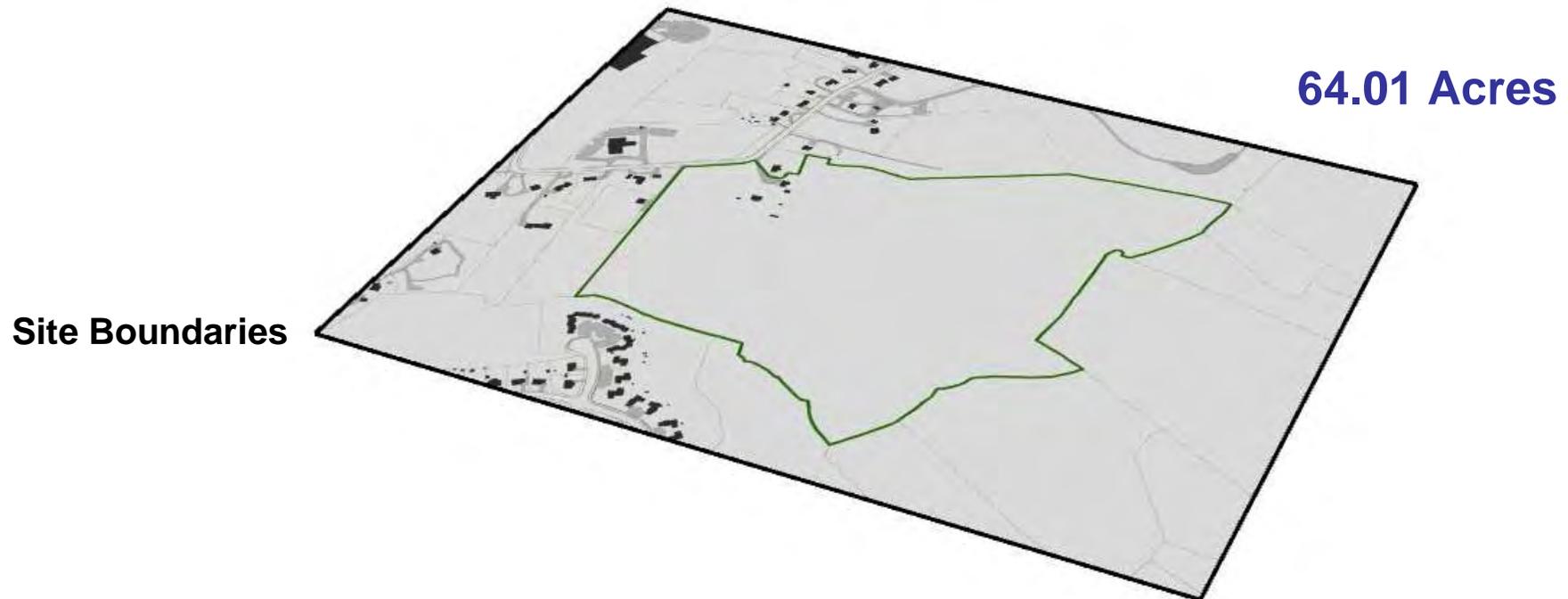
* Sewer Avoidance Area

** East part of site is in the WRPD, but analysis was conducted as non-WRPD to simplify the calculation example.

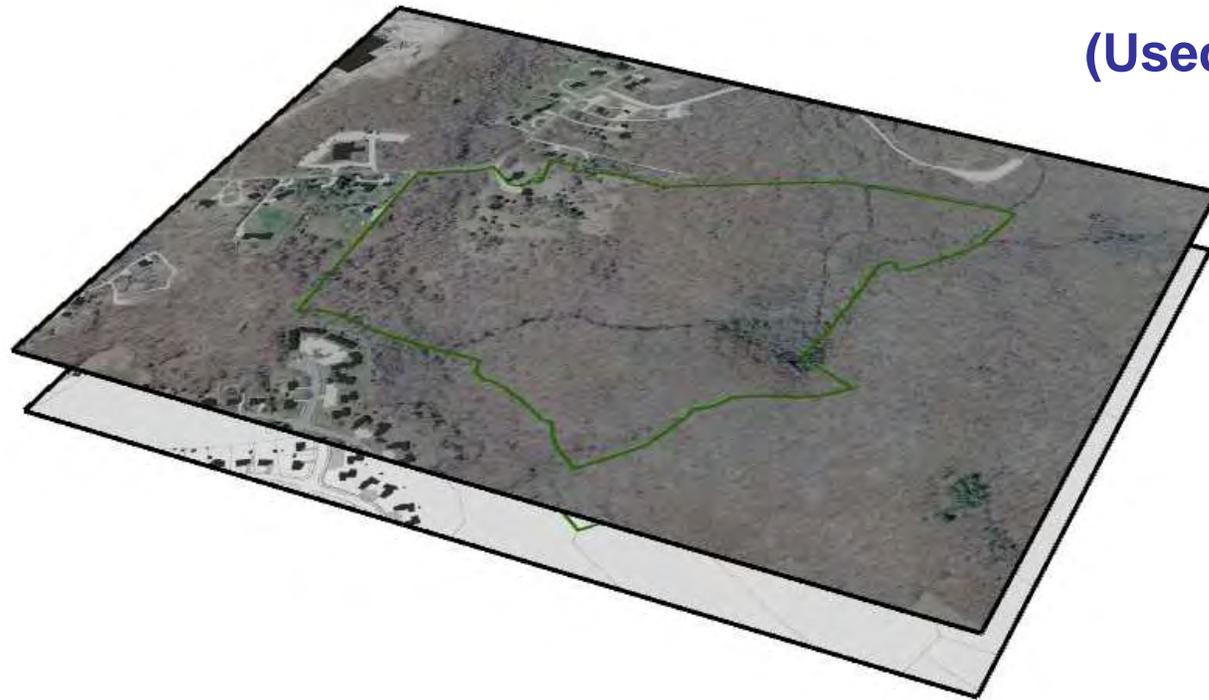
Example of Resource Overlays



Application of Overlays



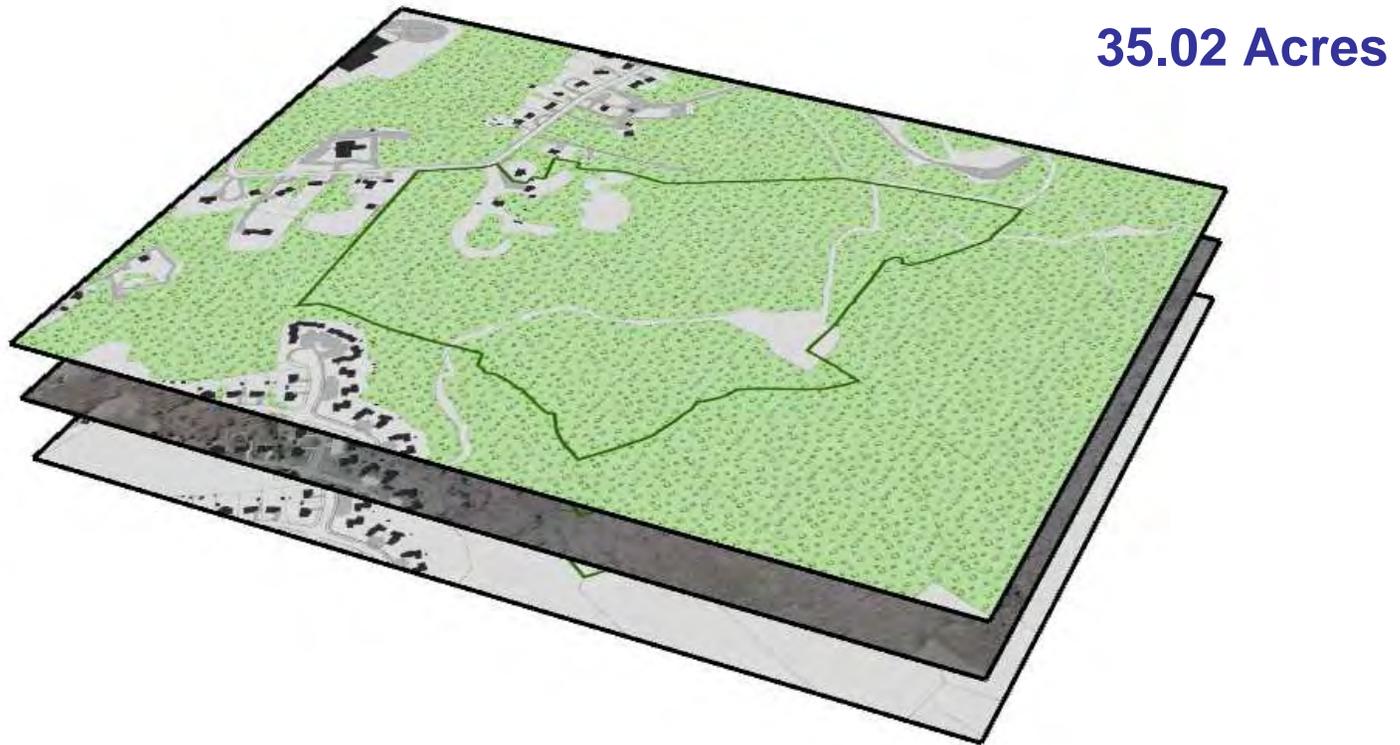
Application of Overlays



(Used for Analysis)

**Orthophoto
Site Boundaries**

Application of Overlays

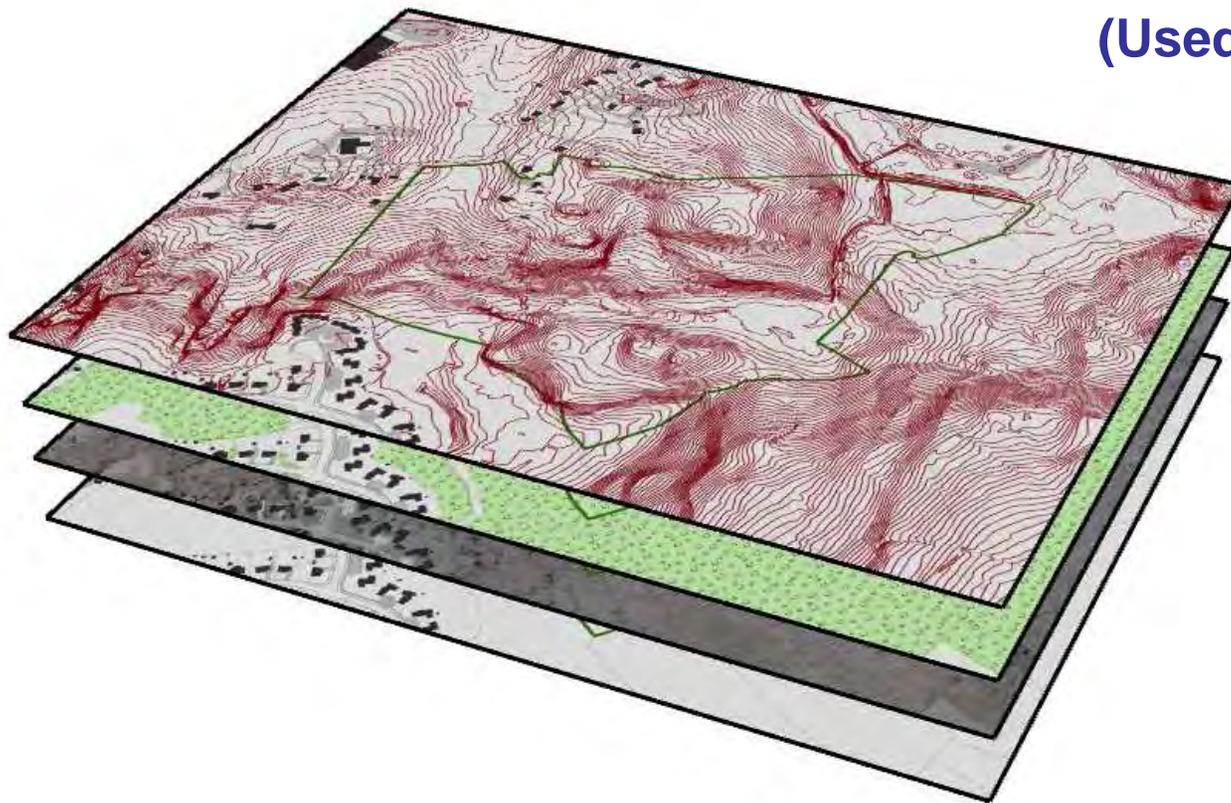


Woodlands
Orthophoto
Site Boundaries

Application of Overlays

(Used for Analysis)

Topo Contours
Woodlands
Orthophoto
Site Boundaries

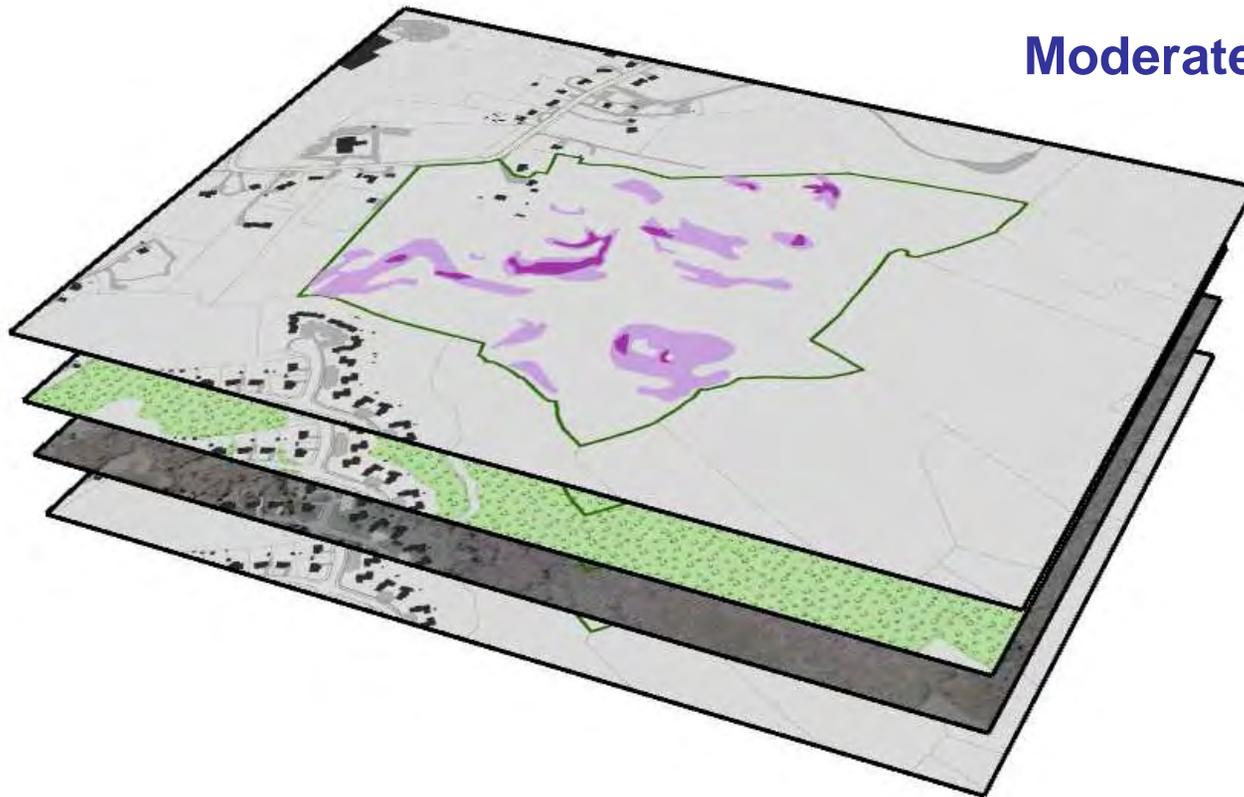


Application of Overlays

Steep: 1.27 Acres

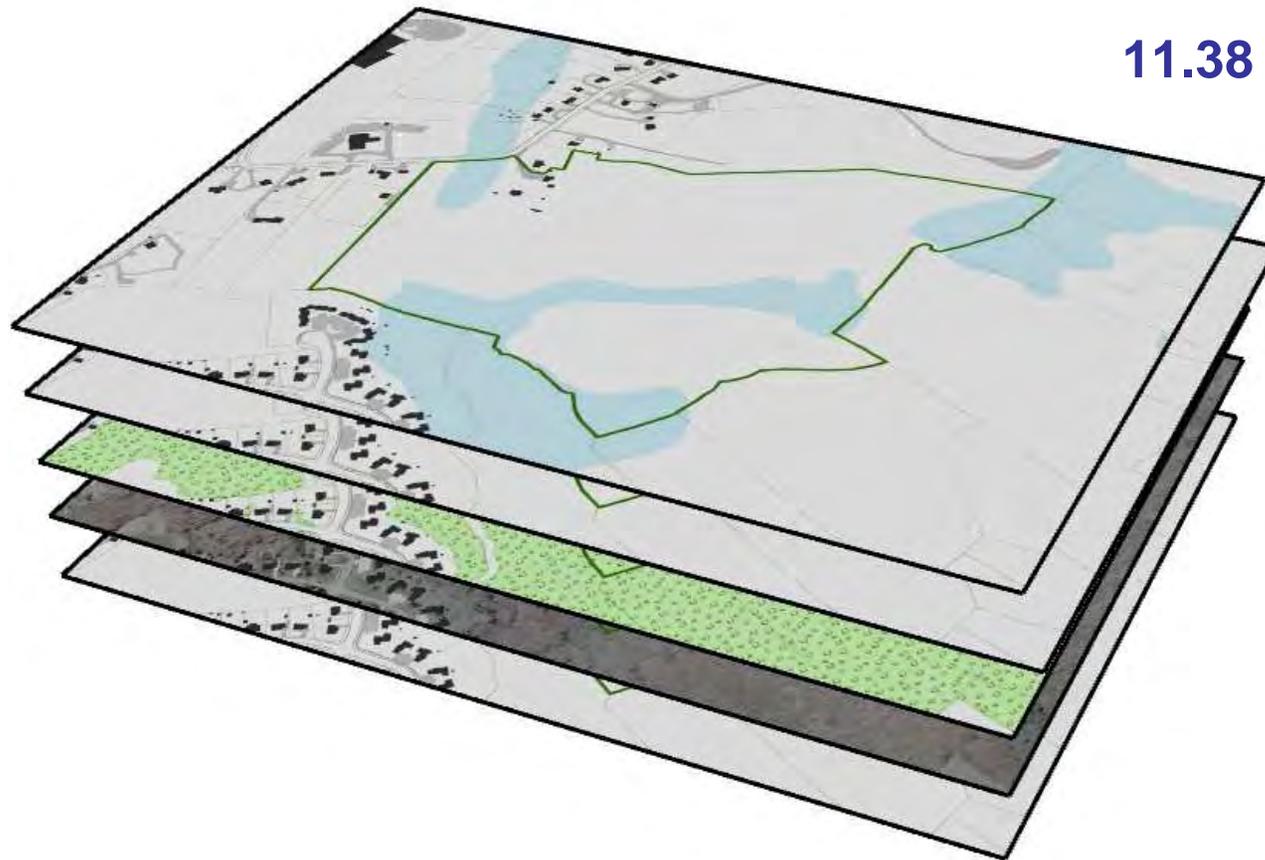
Moderate: 8.57 Acres

Slopes
Woodlands
Orthophoto
Site Boundaries



Application of Overlays

Wetlands
Slopes
Woodlands
Orthophoto
Site Boundaries



11.38 Acres

Application of Overlays

2.07 Acres

Waterbodies

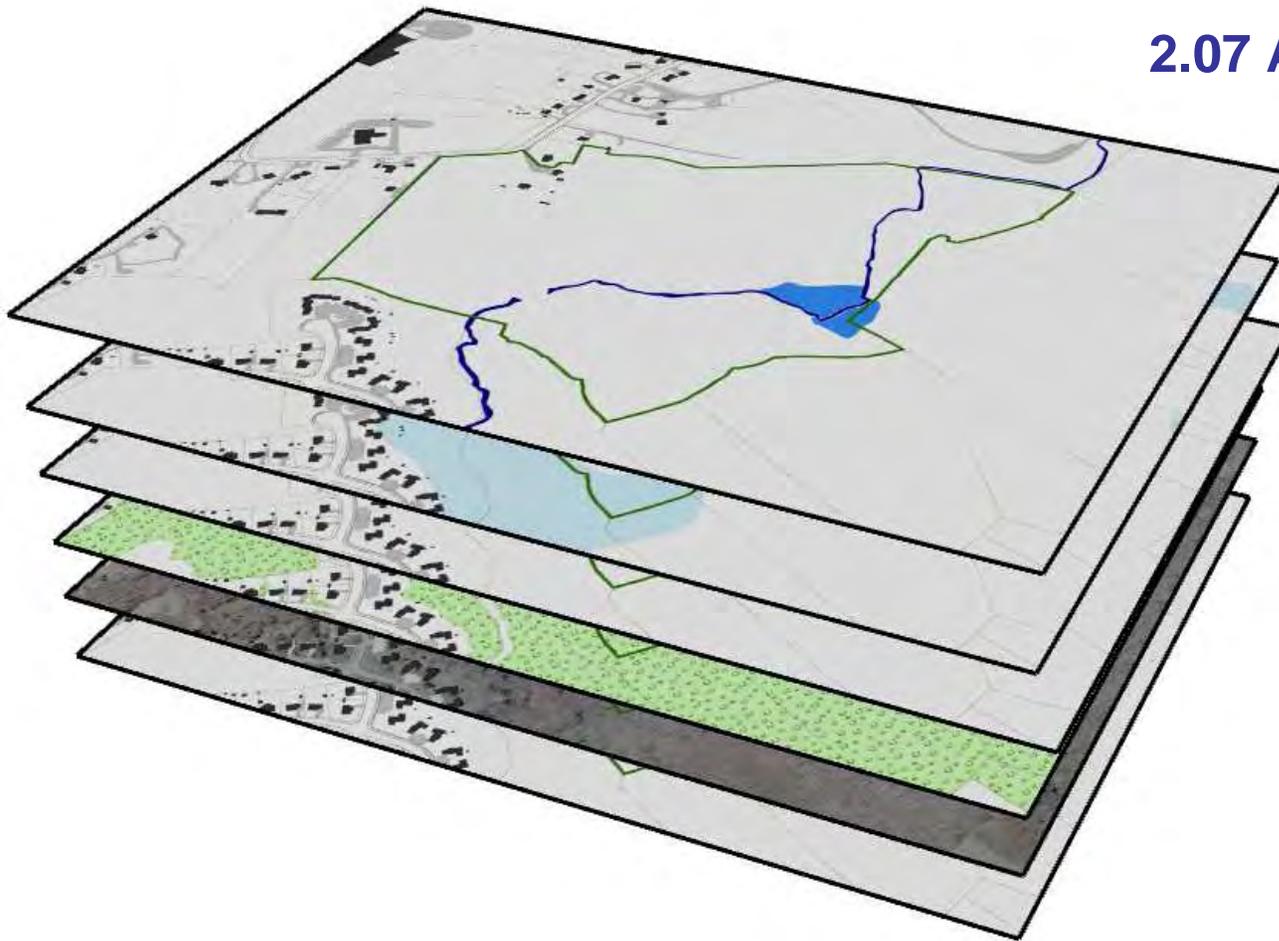
Wetlands

Slopes

Woodlands

Orthophoto

Site Boundaries



Application of Overlays

Composite

Waterbodies

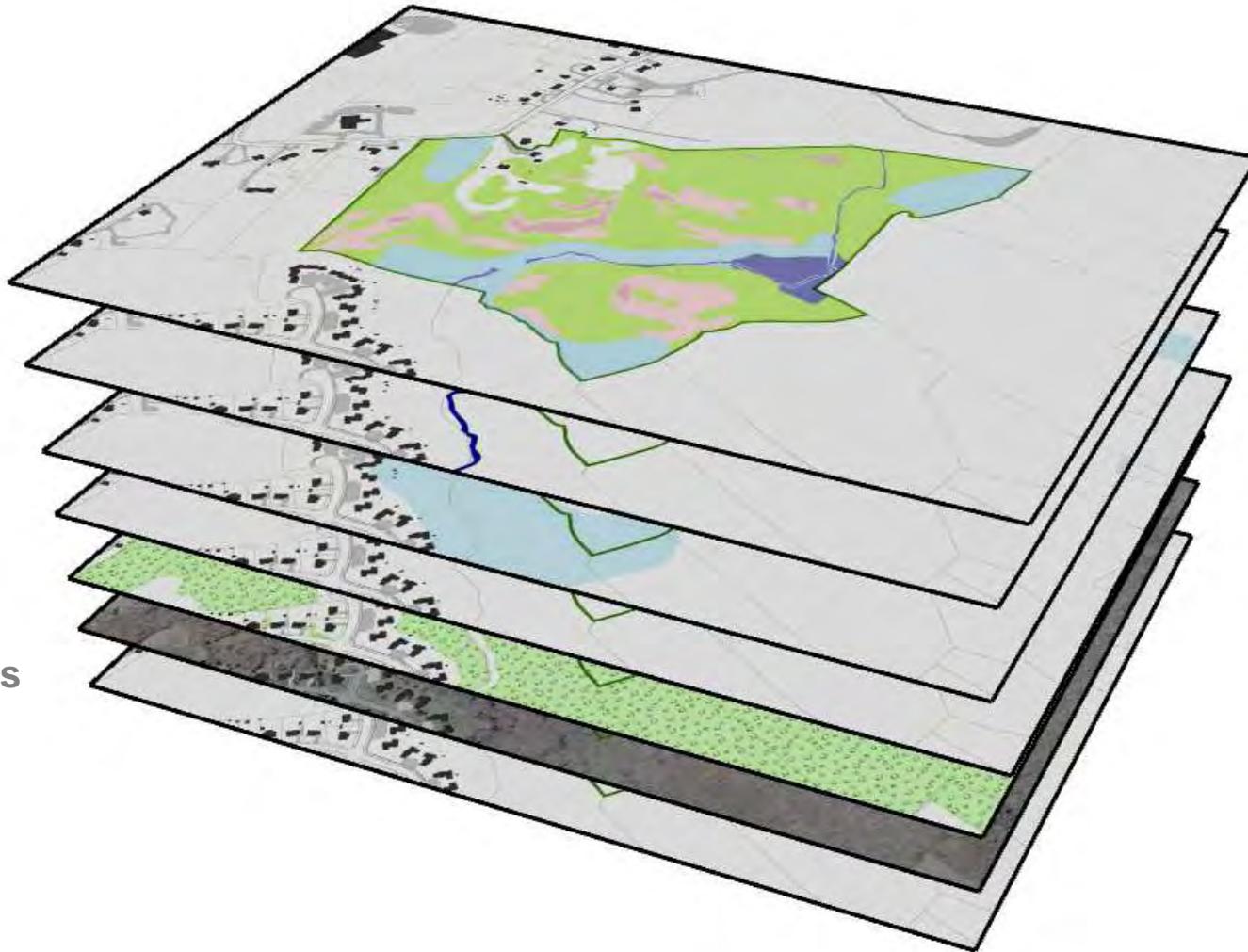
Wetlands

Slopes

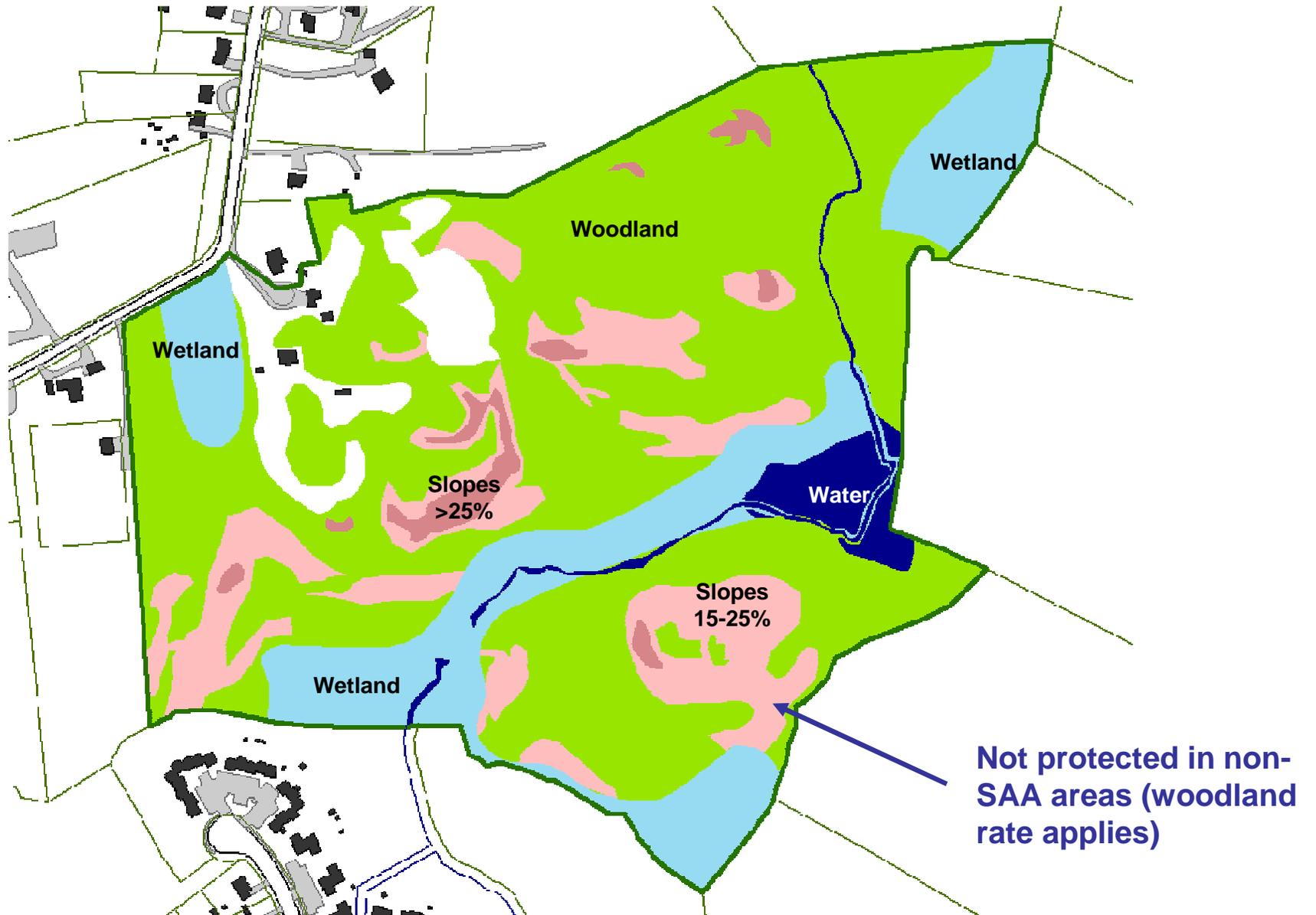
Woodlands

Orthophoto

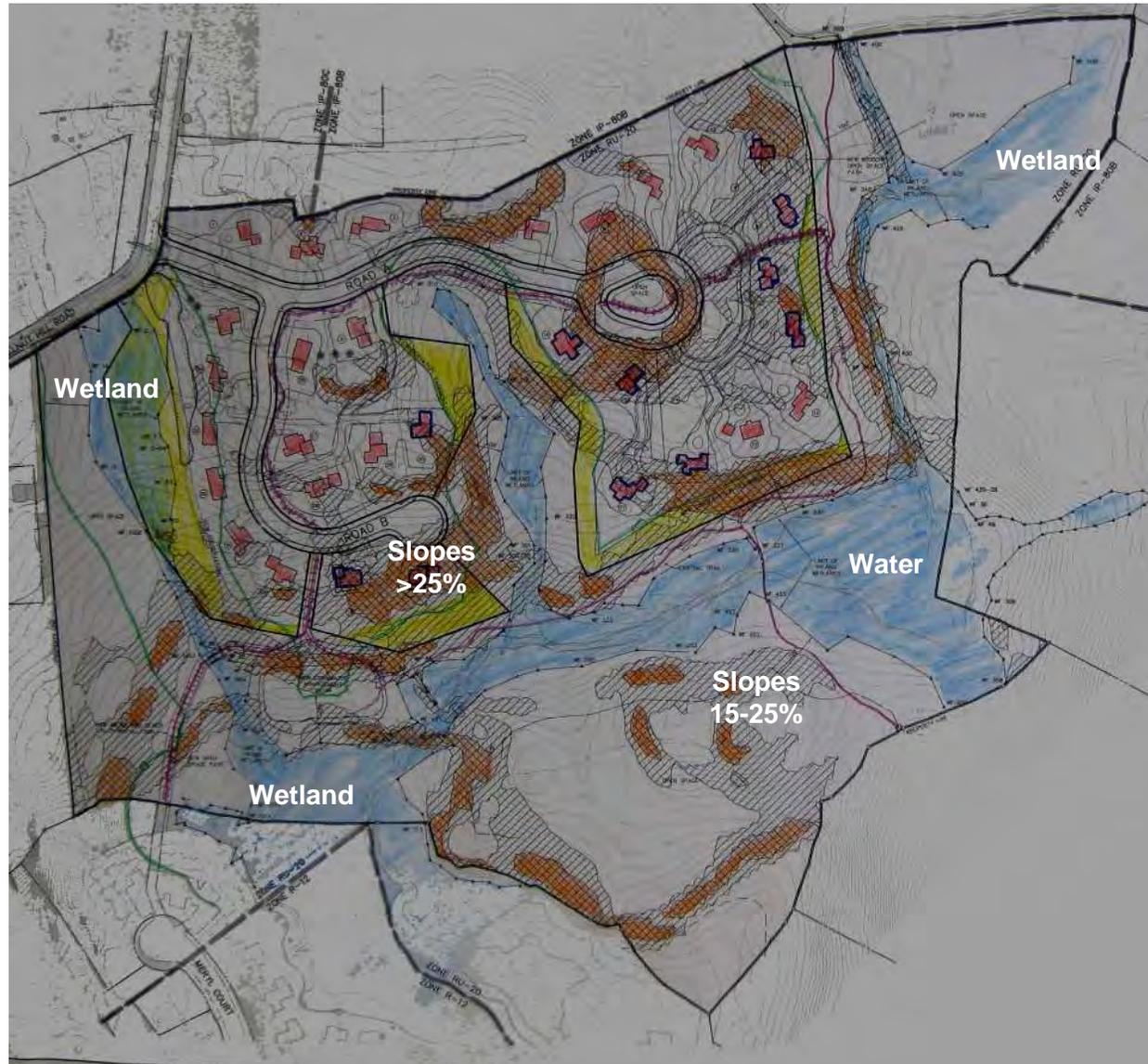
Site Boundaries



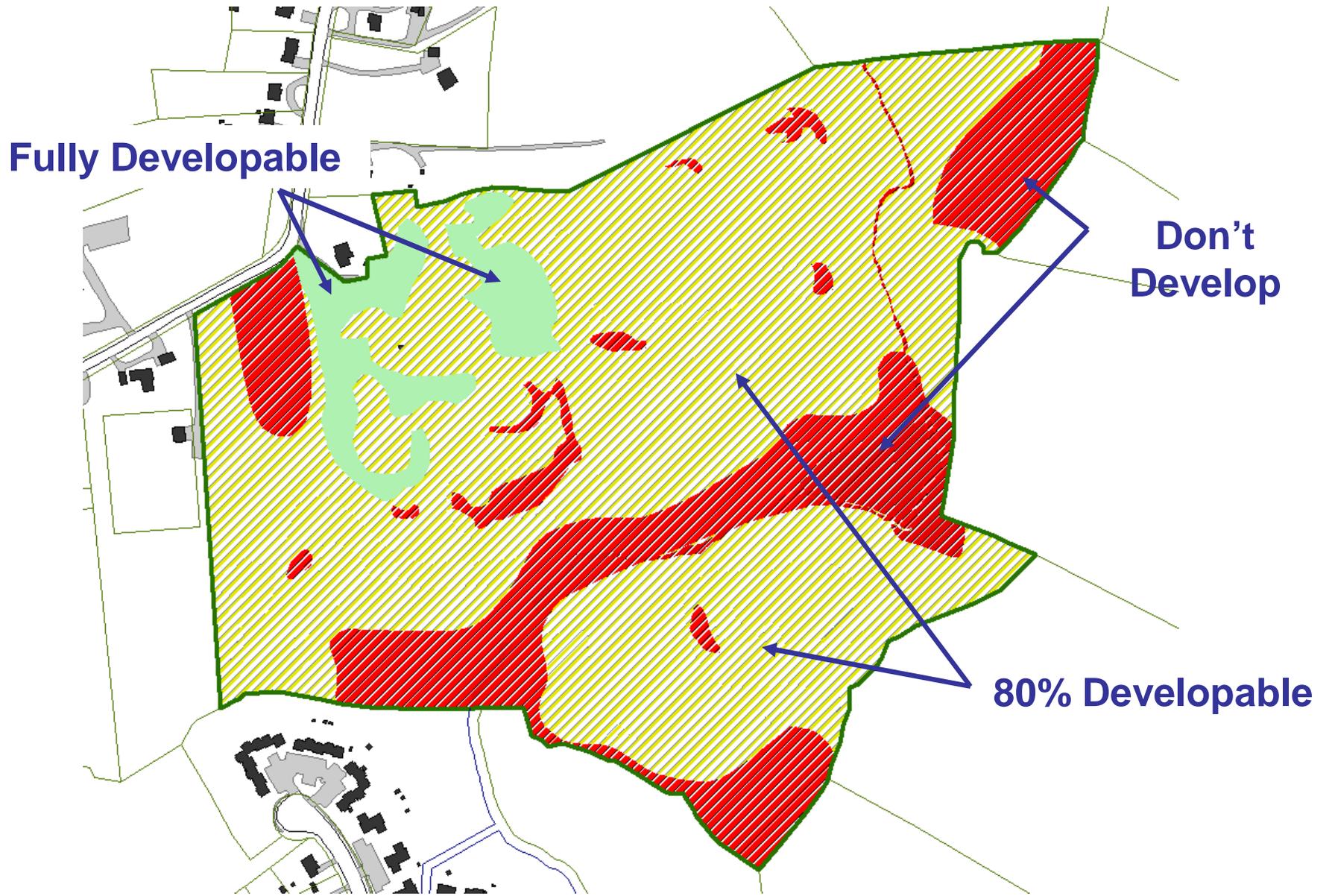
Application of Overlays



Actual Analysis

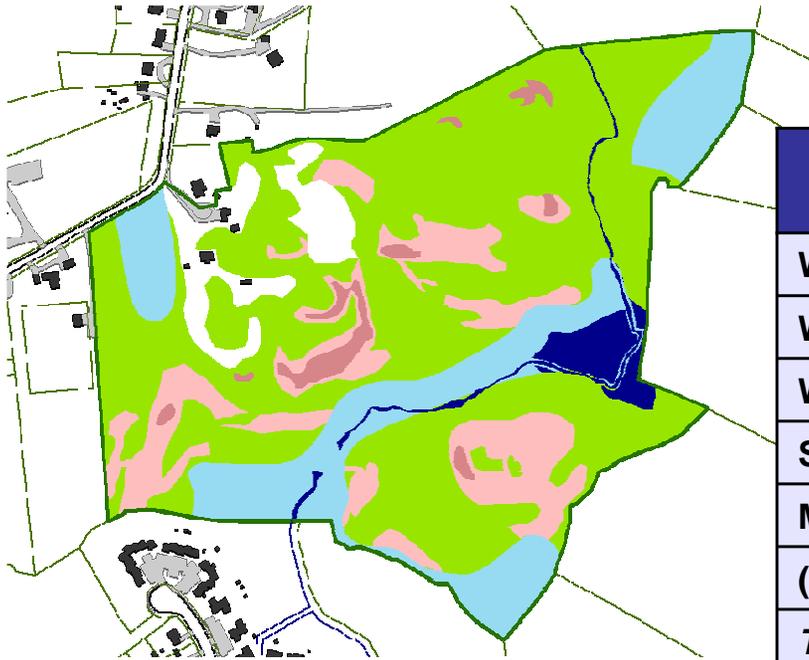


Developable Areas



Resource and Site Capacity Calculations

Groton Lenders Property



Resource Category	Acres on Site	Protection Level	Protected Acres
Waterbodies	2.07	100%	2.07
Wetlands	11.38	100%	11.38
Woodlands	35.02	20%	7.00
Steep Slopes 25% +	1.27	100%	1.27
Moderate Slopes 15-24.9%	8.57	0%	0
(No Resources)	5.70	0%	0
Total Site Area	64.01		21.72

RU-20 District

Gross Density: 1.89 lots/acre

Net Density: 2.03 lots/acre

Site Yield:

64.01 Total Acres

- 21.72 Protected Acres

42.29 Buildable Area x 1.89 = **79.93 Lots**

Calculation Spreadsheet Example Area 3

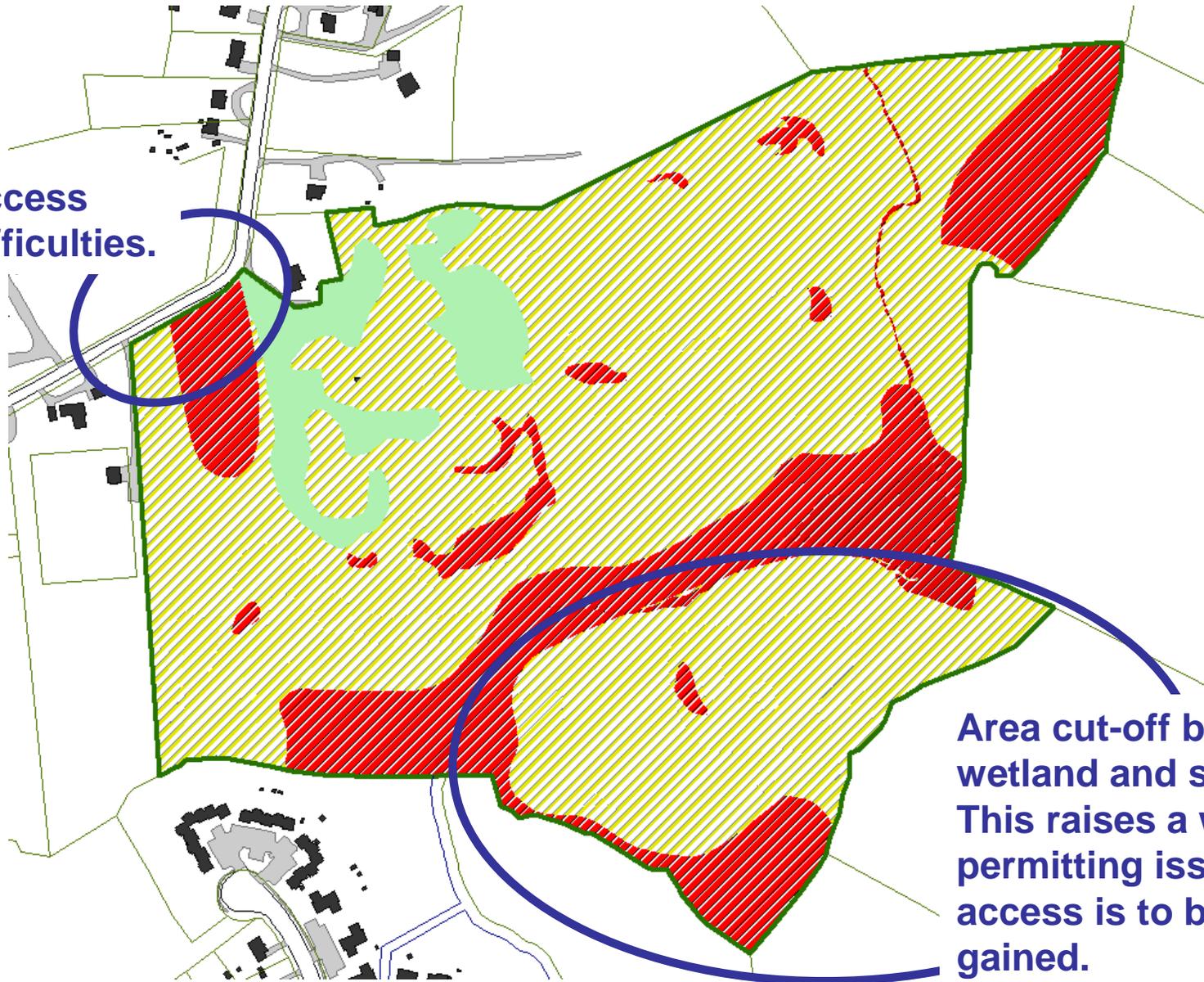
(Based on RS-20 District, Non-SAA, Non-WRPD Requirements)

Total Site Area			64.01	Acres
- Waterbodies			2.07	Acres
= Base Site Area			61.94	Acres
 Protected Resources				
Waterbodies (in the WRPD)	0.00	0	0.00	
Floodplain	0.00	1	0.00	
Wetlands	11.38	1	11.38	
Woodlands	35.00	0.2	7.00	
Steep Slopes Greater than 25%	1.27	1	1.27	
Moderate Slopes 15-24.9%	8.57	0	0.00	
Mod. Slopes 15-24.9% (in the SAA)	0.00	1	0.00	
- Total	56.22		19.65	Acres
 Buildable Land				
			42.29	Acres
x Net Density (based on Zoning District)			1.89	DU/Ac.
= Number of Permitted Units			79	Dus

Practical Site-Specific Difficulties

Groton Lenders Property

Access difficulties.

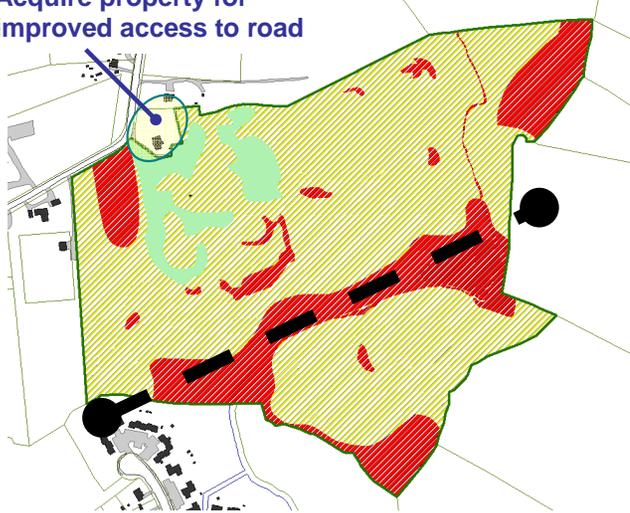


Area cut-off by wetland and stream. This raises a wetland permitting issue if access is to be gained.

Possible Remedies

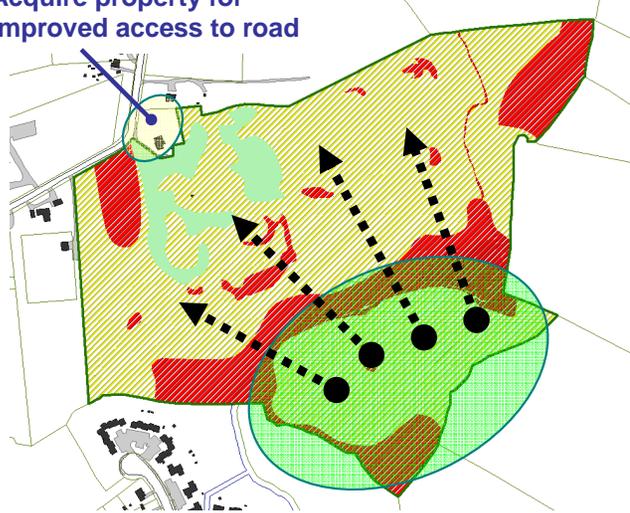
Groton Lenders Property

Acquire property for improved access to road



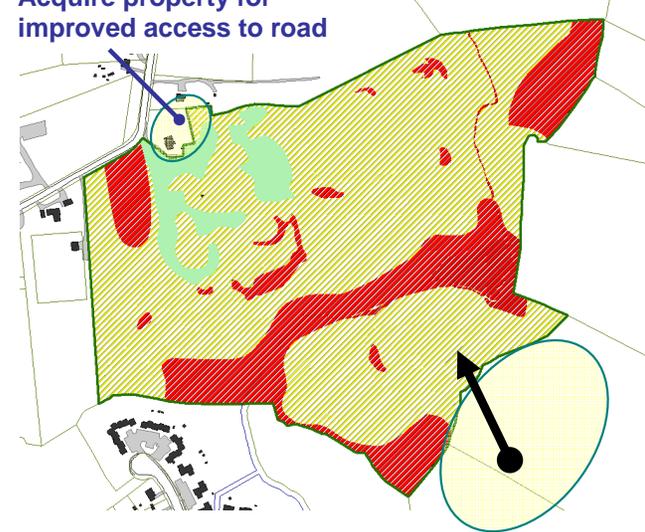
Detach inaccessible portion of site. Wait for possible future developer to come in from other side

Acquire property for improved access to road



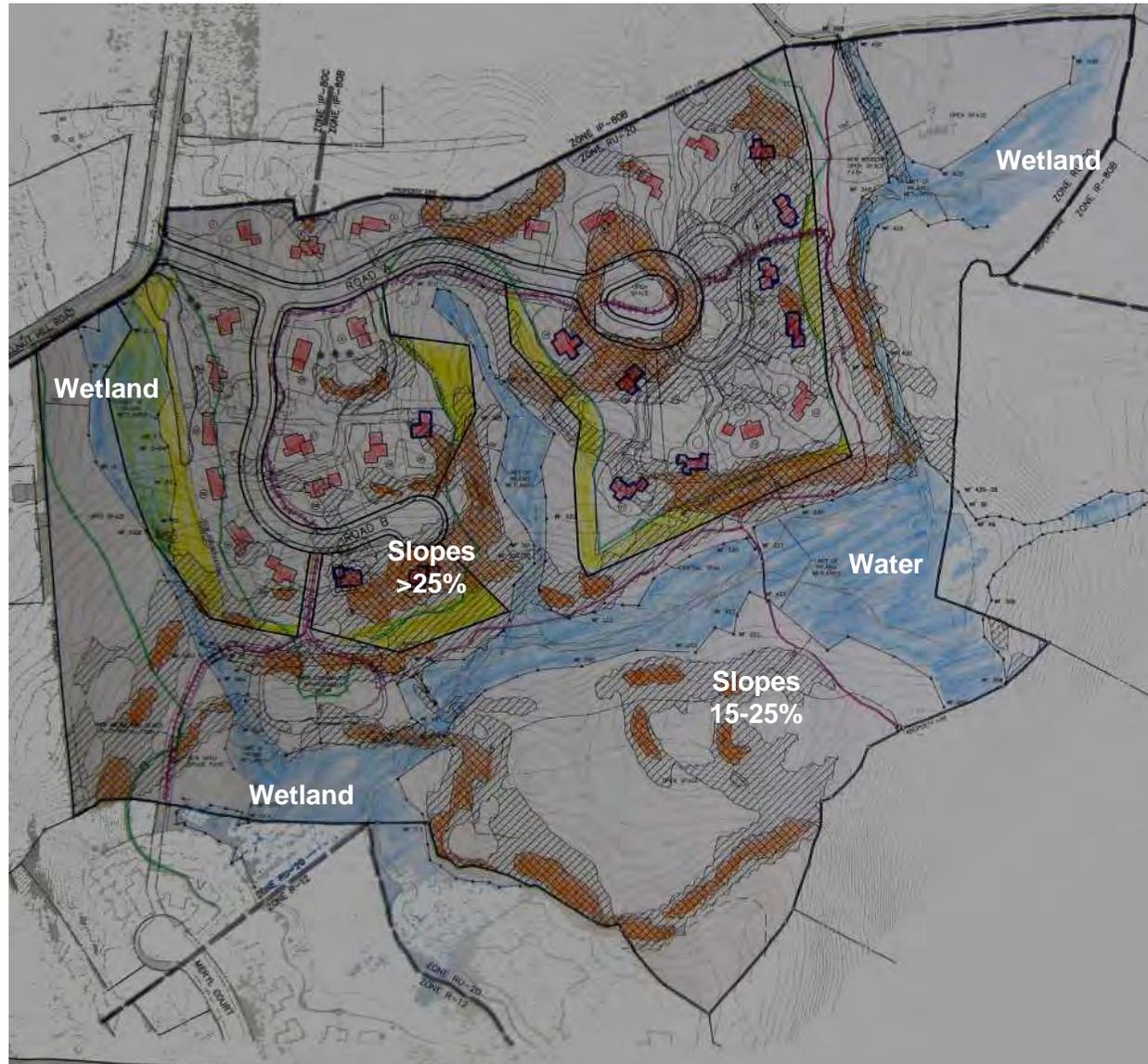
Leave detached land as permanent open space. Develop at a higher intensity or cluster on north side.

Acquire property for improved access to road



Acquire land for separate access from south.

Actual Analysis



Resource Overlay

Site 1: Giordano Property

Site 1 - Giordano Property

Zoning: RU-40
Sewers: None
SAA: Yes
WRPD: Yes



Resource Areas

Giordano Property



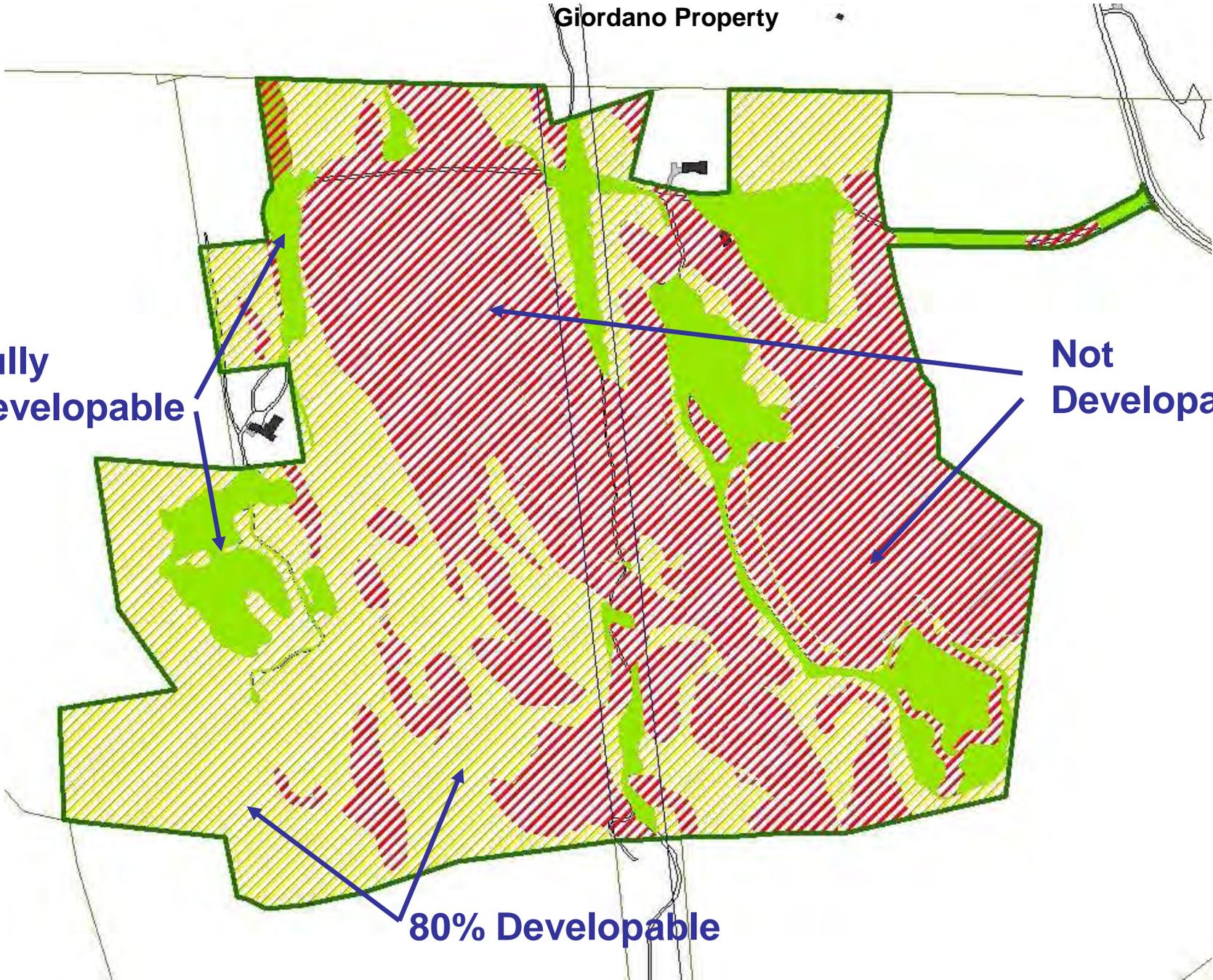
Developable Areas

Giordano Property

Fully
Developable

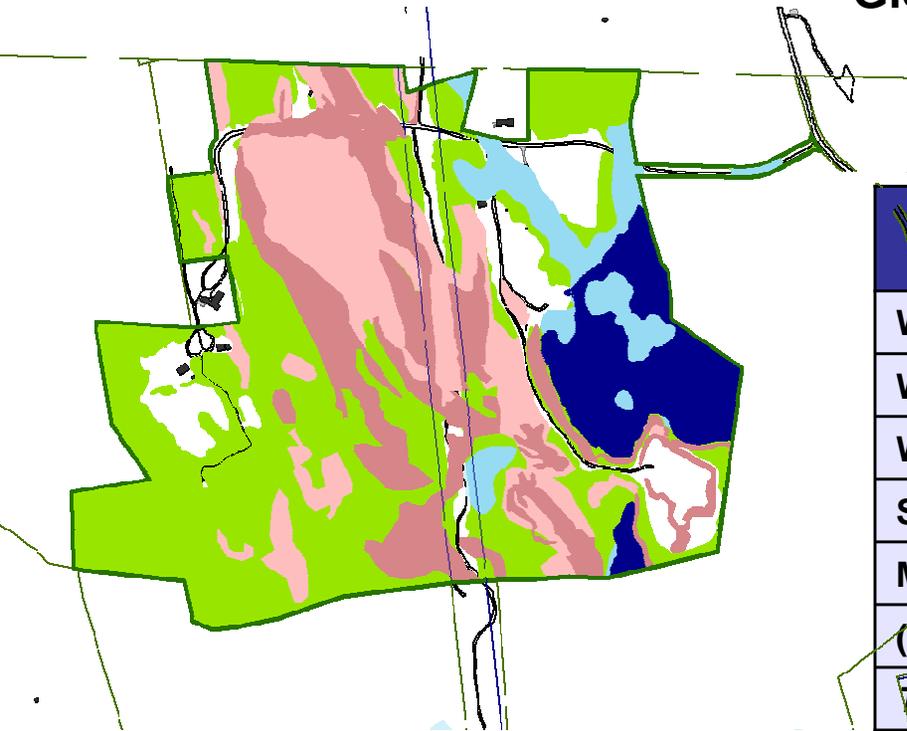
Not
Developable

80% Developable



Resource and Site Capacity Calculations

Giordano Property



Resource Category	Acres on Site	Protection Level	Protected Acres
Waterbodies	17.99	120%	21.59
Wetlands	12.04	100%	12.04
Woodlands	76.69	20%	15.34
Steep Slopes 25% +	34.50	100%	34.50
Moderate Slopes 15-24.9%	32.84	100%	32.84
(No Resources)	26.86	0%	0
Total Site Area	200.92		116.31

RU-40 District

Gross Density: 1.09 lots/acre

Net Density: 0.98 lots/acre

Site Yield:

200.92 Total Acres

- 116.31 Protected Acres

94.61 Buildable Area x 0.98 = **82.92 Lots**

Practical Site-Specific Difficulties

Giordano Property



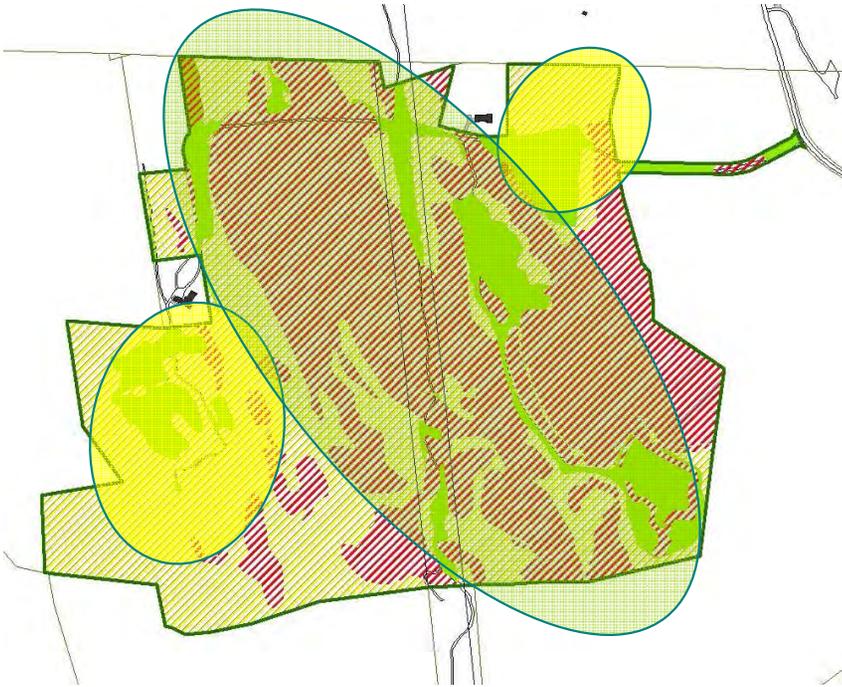
Access difficulties

Pond excavation

Utility Easement

Possible Remedies

Giordano Property

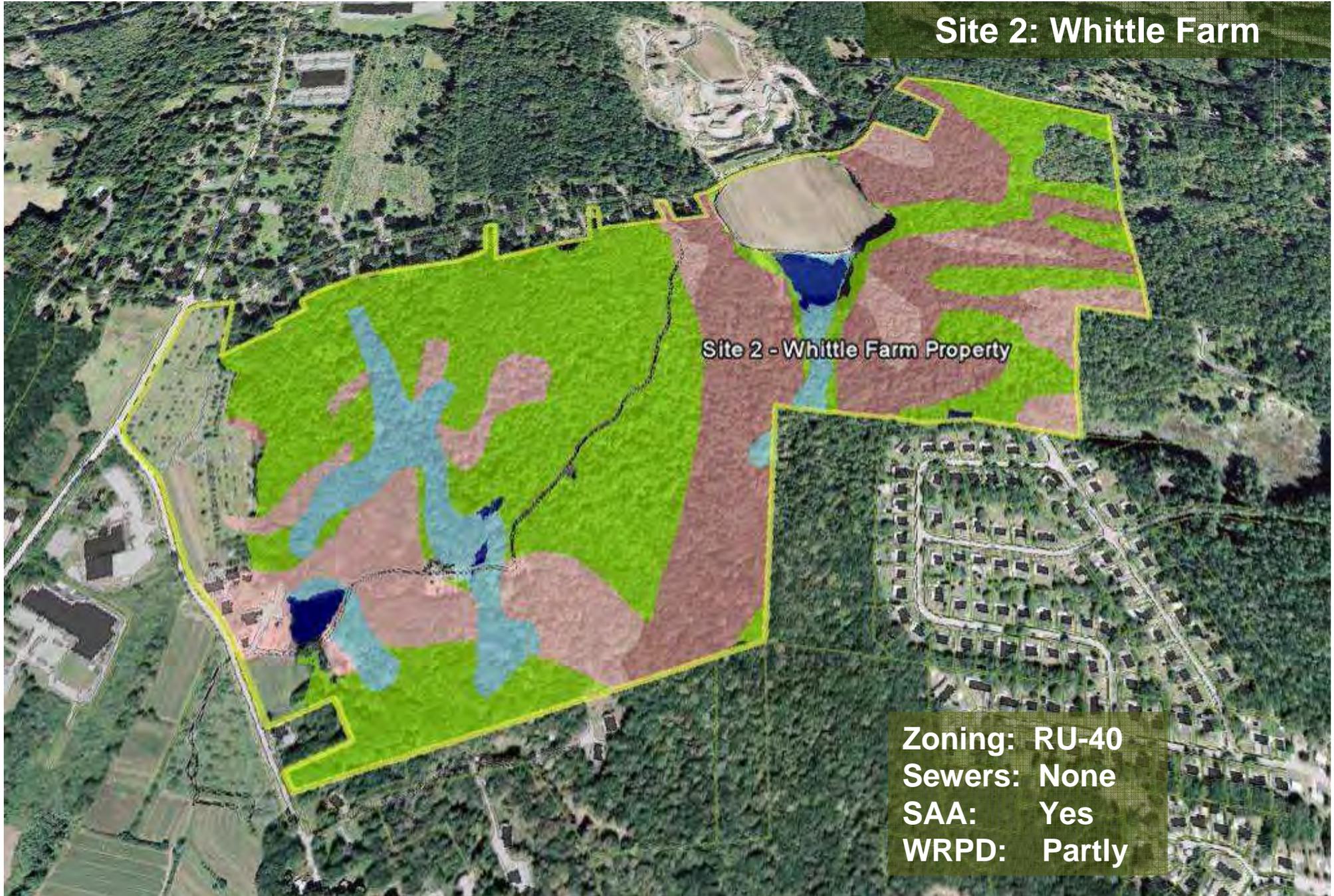


**Extreme clustering in non-constrained areas.
Permanently protect remaining areas through conservation easement or donation.**



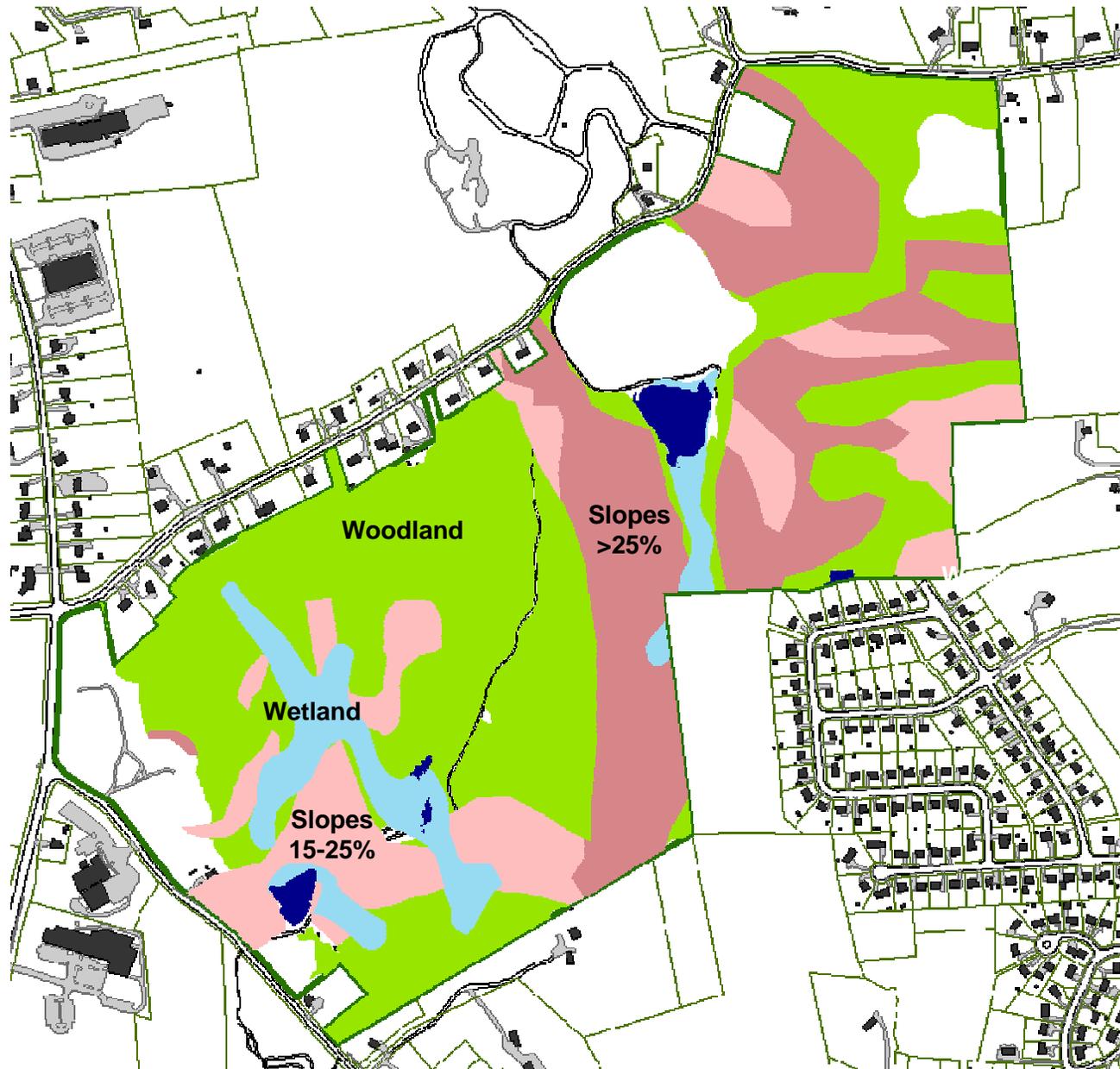
**Change regulations to permit multifamily units with package waste treatment plant.
Donate/preserve open space**

Resource Overlay



Resource Areas

Whittle Farm Property



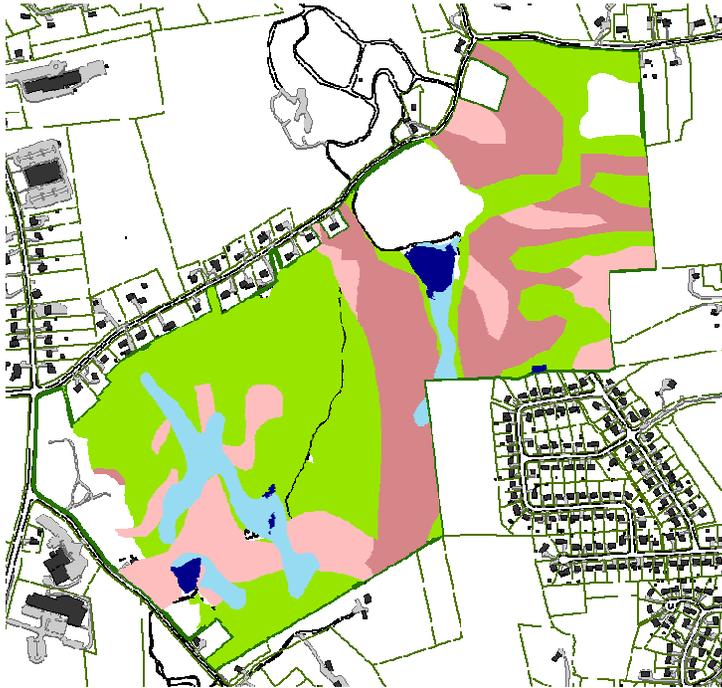
Developable Areas

Whittle Farm Property



Resource and Site Capacity Calculations

Whittle Farms Property



Resource Category	Acres on Site	Protection Level	Protected Acres
Waterbodies	2.75	100%	2.75
Wetlands	12.79	100%	12.79
Woodlands	81.14	20%	16.23
Steep Slopes 25% +	44.25	100%	44.25
Moderate Slopes 15-24.9%	28.52	100%	28.52
(No Resources)	27.23	0%	0
Total Site Area	196.68		104.54

RU-40 District

Gross Density: 1.09 lots/acre

Net Density: 0.98 lots/acre

Site Yield:

196.68 Total Acres

- 104.54 Protected Acres

92.14 Buildable Area x 0.98 = **90.29 Lots**

Practical Site-Specific Difficulties

Whittle Farm Property



Possible Remedies

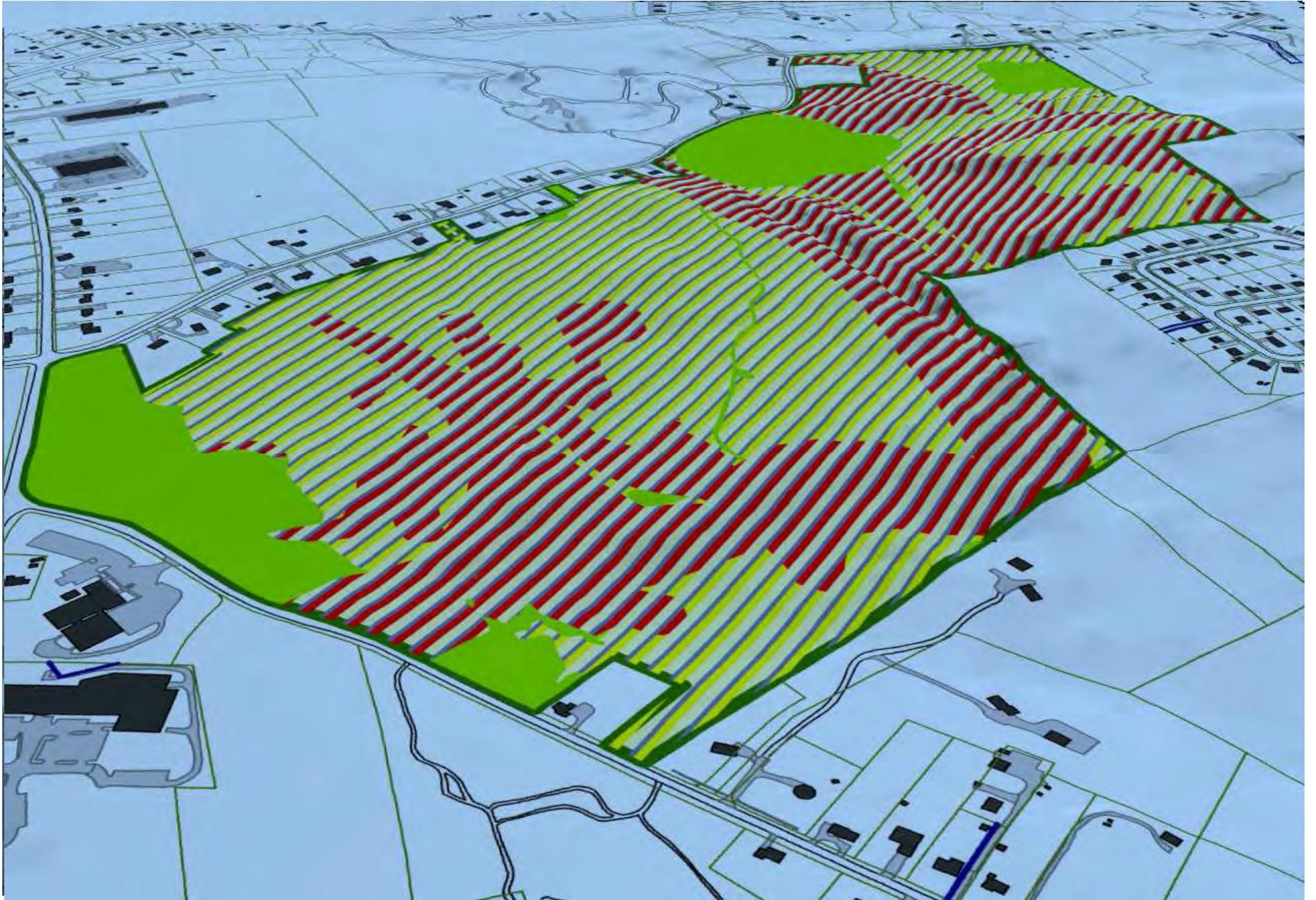
Whittle Farm Property



**Cluster in nodal areas.
Protect remaining areas as
permanent open space.**



**Mixed density residential with
multi-family near collector
street. Protect remaining
areas as permanent open
space.**

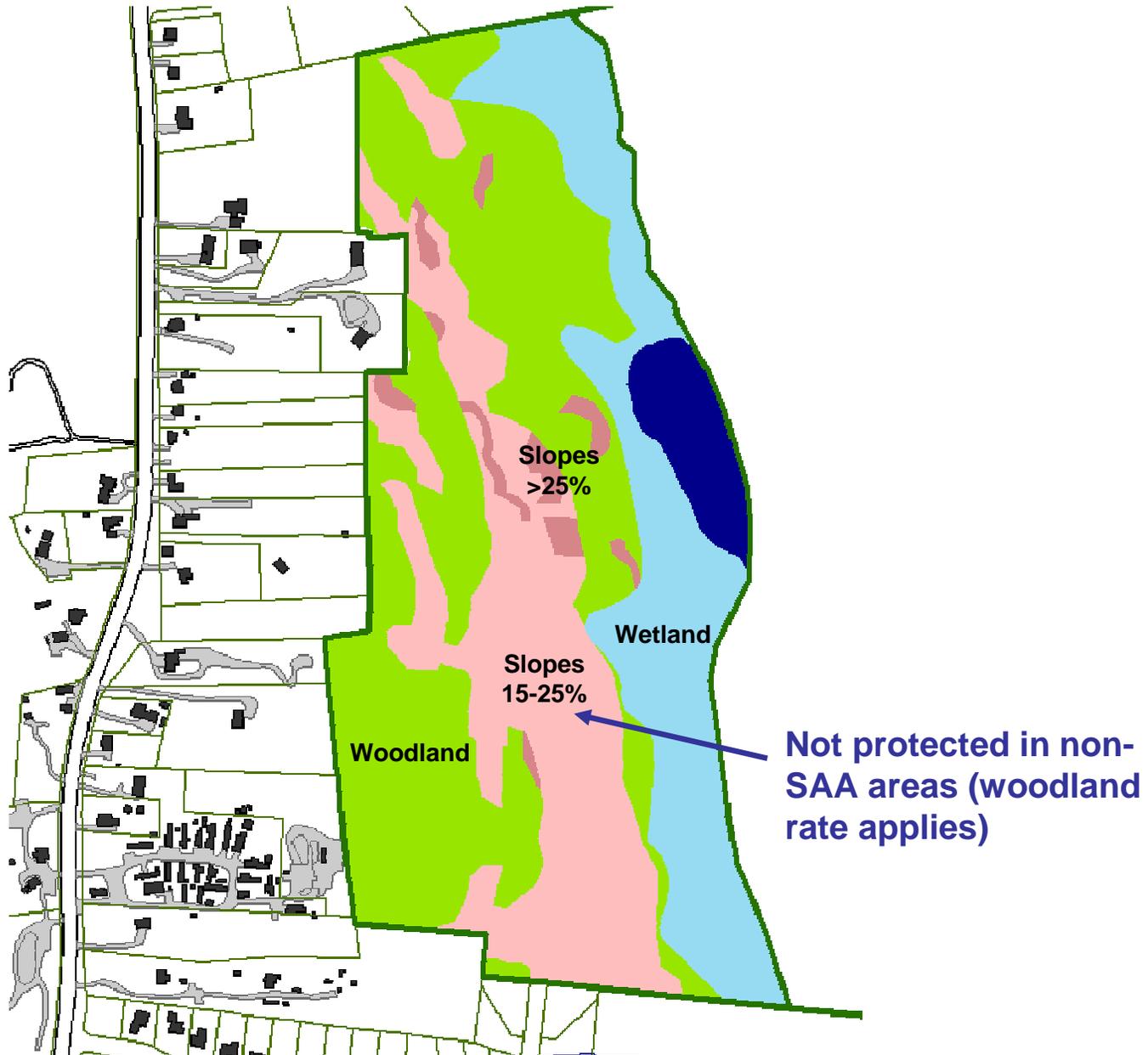


Resource Overlay



Resource Areas

Wolfebrook West Property



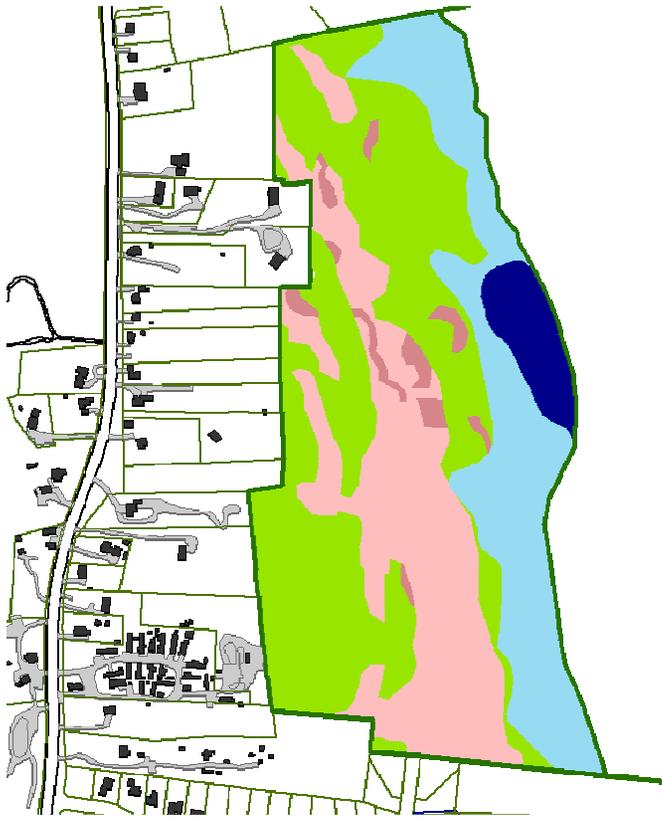
Developable Areas

Wolfebrook West Property



Resource and Site Capacity Calculations

Wolfebrook West Property



Resource Category	Acres on Site	Protection Level	Protected Acres
Waterbodies	2.63	100%	2.63
Wetlands	13.45	100%	13.45
Woodlands	23.89	10%	2.39
Steep Slopes 25% +	1.71	100%	1.71
Moderate Slopes 15-24.9%	15.68	10%*	1.57
(No Resources)	0.04	0%	0
Total Site Area	57.40		21.75

RS-20 District

Gross Density: 2.18 lots/acre

Net Density: 1.89 lots/acre

Site Yield:

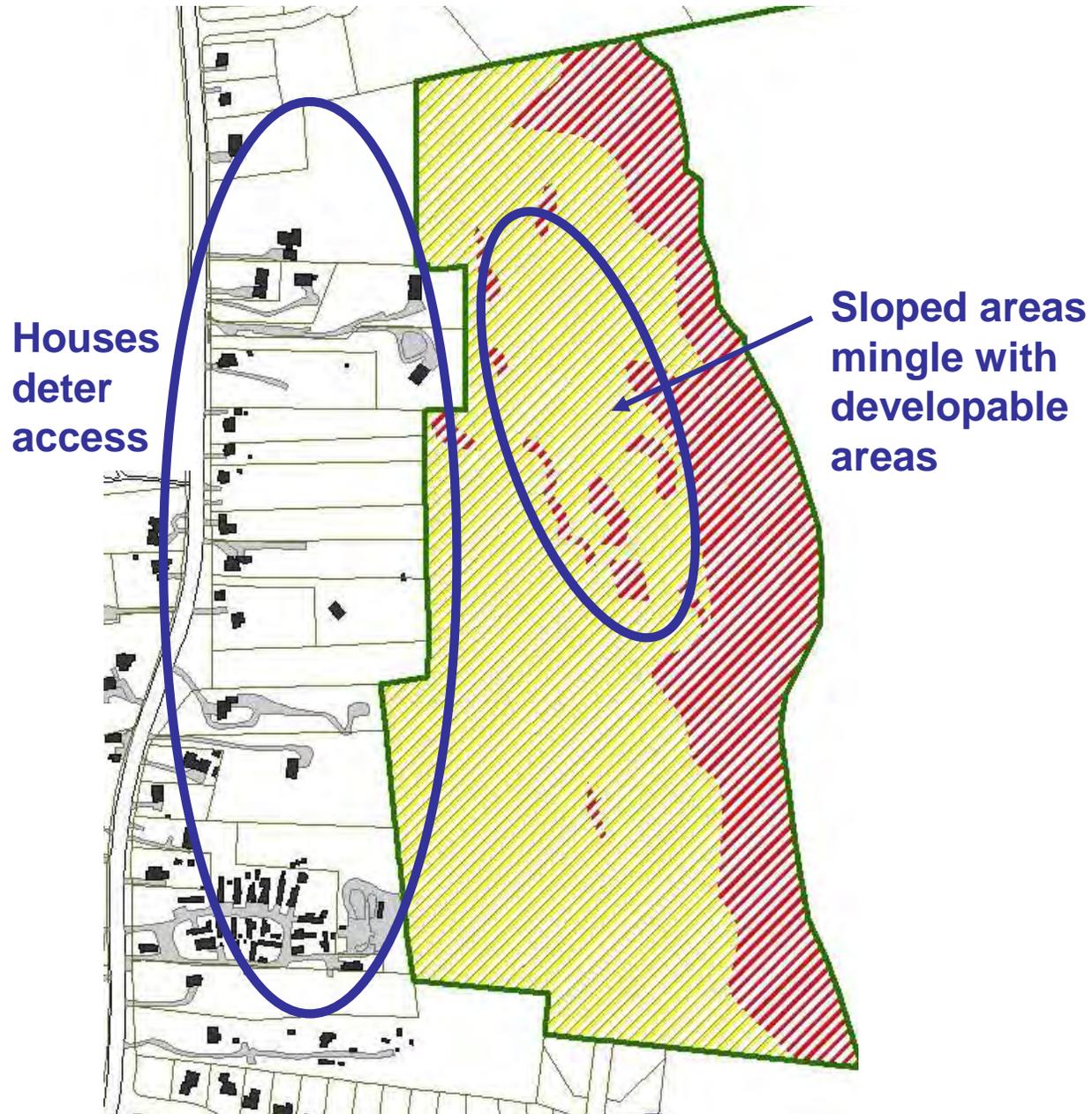
57.40 Total Acres

- 21.75 Protected Acres

35.65 Buildable Area x 1.89 = **67.38 Lots**

Practical Site-Specific Difficulties

Wolfebrook West Property



Possible Remedies

Wolfebrook West Property



**Cluster in nodal areas.
Protect remaining areas as
permanent open space.**

- 10 minute break
- Discussion
 - Which resources to protect?
 - What are the appropriate protection ratios?
 - Where should they be applied? All Districts?
 - What incentives might be provided to promote resource protection and land preservation?

