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Supplemental Report

Herpetological Survey and Vernal Pool Analysis with Conservation Planning Recommendations and Strategies

"The Preserve"

Old Saybrook, Westbrook, and Essex, Connecticut

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This report details supplemental field work and data analysis conducted at The Preserve during the spring and summer of 2005. This supplemental report must be used in tandem with my earlier report Herpetological Survey and Vernal Pool Analysis with Conservation Planning Recommendations and Strategies "The Preserve" Old Saybrook, Westbrook, and Essex, Connecticut October 26, 2004 in order to gain a full understanding of the vernal pool resources and conservation issues at The Preserve. During early May 2005, seven days were spent in the field with a team of 3-4 people to gather baseline data on size, vegetation, chemistry, and productivity of the 38 vernal pools at The Preserve. Another four days were spent in the field by a team of two people to gather data on the pools' water levels during the summertime drought (last week of June, 2005).

These supplemental data and analysis respond to requests by the Town's consultants to re-visit the vernal pools on site and to augment the 2002 data set on pool productivity, as well as to provide additional data on size, hydroperiod, and baseline hydrological parameters. In addition, certain conditions of approval placed on the project by the Old Saybrook Planning Commission necessitated that I recalculate the conserved and non-conserved pools. Foremost, the condition that Ingham Hill Road be used as an access point for The Preserve altered our ability to conserve two vernal pools that lie alongside the existing low intensity roadway.

All these supplemental data are included in the Appendices to this report. Table 3 details the dimensions and depth of the pools during the high water period in early May 2005. Table 4 provides spotted salamander egg mass counts for all the pools in 2005, and contrasts those with the data from 2002. Spotted salamander egg masses are considered to be the most reliable indicators of pool productivity (see discussion). Table 5 contains the water chemistry data for all 38 pools collected in May 2005. Accompanying Table 5 is a letter dated 31 August 2005 from Sam Haydock of BL Companies summarizing these data. These data include not only pH, conductivity, and dissolved oxygen, but also data on nutrient loading and heavy metal concentrations. Table 6 reports on the condition of the pools during the summertime drought in late June.

In summary, the field work conducted at The Preserve in 2005 resulted in:

detection of seven additional vernal pools on the site, bringing the total number of pools on the site to 38.

collection of productivity data on all 38 of these pools, using total number of spotted salamander egg masses as a measure of production

collection of baseline water quality data including pH, conductivity, dissolved oxygen, and various pollutants (including heavy metals) at all 38 pools

collection of size, depth, and other descriptive data on all 38 of these pools

additional new locations on the site for wetland dependent amphibians and reptiles, including several new locations for the State-listed special concern species, eastern ribbon snake. These new locations are reflected on updated species distribution maps included with this supplemental report.

New Vernal Pools

As part of the ongoing study of The Preserve, including the Bokum Road parcel, I conducted additional field work to determine whether the initial field work conducted at The Preserve in 2002 may have overlooked vernal pools. My work did discover several small pools that had been overlooked in 2002, but also detected a series of cryptic vernal pools and associated wetlands on the Bokum Road parcel. This is not surprising considering the amount of wetland habitat present on the landscape. There is also some professional judgment to be exercised in some of the larger wetland complexes that determines where one cryptic vernal pool ends and another begins. Overall, it is my professional opinion, that at this point in the field investigation all the critical vernal pool resources at The Preserve have been documented, mapped, and analyzed.

The following additional vernal pools are:

Pool 32: A small cryptic pool formed in a larger wetland complex at a woods road crossing that contained only twelve spotted salamander egg masses. This pool is located in Wetland 18 between Pools 7 and 8.

Pool 33: This is an elongate wetland system that parallels the west side of the RR tracks, opposite the Bokum Road parcel. It contains all three vernal pool obligate species, wood frogs, spotted salamanders, and marbled salamanders, and also abuts the power line right of way which contains the largest population of ribbon snakes on the site. The ribbon snake population occurring under the power line right of way was discussed in my previous report.

Pool 34: This is a large, beaver-created deep wetland impoundment that serves as breeding habitat for a variety of wetland-dependent amphibians and reptiles including a vernal pool species (spotted salamanders). A vernal pool facultative species (spotted turtle) was also present in this wetland.

Pool 35: This is a large pool located between the outflow of Pequot Swamp Pond and Pool 12, lying within Wetland 19. It contains breeding populations of wood frogs, spotted salamanders, and marbled salamanders, but despite its size its productivity is not great (84 spotted salamander egg masses).

Pool 36: This is a very small pool with two spotted salamander egg masses and a marbled salamander (last year's young) found under log nearby. It is located in Wetland 20, northwest of the northern end of Pequot Swamp Pond.

Pool 37: Located on the Bokum Road parcel, this is a low productivity pool, with two spotted salamander egg masses and five wood frog masses.

Pool 38: Located as a satellite pool to Pool 18, this contained large numbers of larval marbled salamanders, as well as more than thirty spotted salamander egg masses, and more than nine wood frog egg masses.

Productivity Data

Measuring the production values of vernal pools was one of goals of this year's field work. The most readily countable evidence of production is spotted salamander egg masses. They are readily countable, and unlike wood frog eggs, show use of a pool that transcends more than a decade. Wood frogs rapidly colonize wetlands, and because of their short generation time, three years, rapidly disappear from a wetland. Therefore, while their occurrence in a wetland/pool is important, it is not as robust a measure of sustained use as the spotted salamander. Marbled salamander production, while requiring the same time span and stability as the spotted salamander, is much harder to measure. Counting marbled salamander egg masses would require destruction/excavation of the dry pool bottom, and would compromise the marbled salamander eggs as brooding females tend to abandon the egg masses when they are disturbed. Counting the number of marbled salamander larvae in a pool is also an unreliable measure. For example, 100 larvae could be the product of one or two egg masses with high survivorship, or the product of 30-40 egg masses with low survivorship.

Table Four details the productivity of the 38 pools and contrasts those data with a more limited data set from 2002. One can note however, that those pools with high production in 2002 were also among the top producers in 2005, which is consistent with my premise that spotted salamander production remains fairly consistent over a decade if not more. By plotting the total production against the 18 vernal pools that are to be conserved in the proposed development, one notes that although 47% of the pools on The Preserve are being conserved using the standards set forth in Calhoun and Klemens (2002) that plan conserves 76% of the biological productivity of the vernal pools on site. This reflects development decisions that have been carefully made to respect those pools that are the source pools for the amphibian diversity and biomass at The Preserve.

Baseline Water Chemistry

The baseline data for the pools were remarkably consistent in the lack of pollutants. The other parameters such as dissolved oxygen and conductivity showed more variance. This may be a result of time of sampling and water temperature, as well as size of the pool. Table 5 and the accompanying letter from Sam Haydock provides a summary of those data. Vernal Pool 31 has some elevated levels of sodium chloride, and Vernal Pool 8 had some detectable amounts of copper and lead.

Late June 2005 Pool Levels

At the request of the Town's consultants, we examined the standing water levels and larval survivorship in the vernal pools in late June as we were experiencing drought conditions which have persisted throughout the summer. Although the data in Table 6 show a drawdown and drying of many of the vernal pools at The Preserve, they indicate conditions in a single year. The fact that many of these pools have large numbers of spotted salamander egg masses indicates that there are a sufficient number of years where salamanders survive within these pools through metamorphosis, thereby maintaining the population. It is not uncommon for the production of a vernal pool to fail for several years in a row. This is why the measure of production and success of pools is based upon spotted salamanders. The presence of spotted salamander eggs indicates at minimum the pool functions effectively one in every ten years, though in all likelihood successful reproduction occurs more frequently than once a decade. One should bear in mind that planning for vernal pool conservation is a long term proposition, not an exercise that is based upon a single year's data.

Additional Species Data

During the 2005 field season additional locations were found for various wetland-dependent amphibians and reptiles at The Preserve. These data have been incorporated into the revised maps appended to this report. New breeding locations were documented for all three vernal pool obligate amphibians. The most significant change was the number of confirmed breeding pools for marbled salamanders. Marbled salamanders are confirmed as breeding in 29 of the 38 vernal pools at The Preserve: Pools 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14 ,15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 30, 31, 33, 35, and 38. This shows a remarkably uniform distribution of this species across The Preserve. This is likely attributable to the interconnected nature of many of the cryptic vernal pools lying within wetland systems with some weak to moderate flow within the systems. It is the headwaters nature of this area that maintains these systems, and allows successful reproduction through development in pools that contain very shallow water.

Additional sites for two lined salamanders, four-toed salamanders redback salamanders, red-spotted newts, American toads, spring peepers, bull frogs, green frogs, pickerel frogs, wood frogs, painted turtles, spotted turtles, water snakes, and ribbon snakes. The additional ribbon snake locations were in Pequot Swamp Pond and in Vernal Pools 12 and 23. All these new data points have been incorporated into the updated species distribution maps appended to this report.

Vernal Pool Conservation Plan

In my previous report, I identified 15 conserved vernal pools out of 31 vernal pools at The Preserve. Therefore the previous plan conserved 48% of the pools on site, and all of the twelve high priority pools, two intermediate priority pools, and one low priority pool.

The revised plan conserves 18 out of 38 vernal pools, or 47% of the vernal pools at The Preserve. The current plan was unable to conserve all the high priority pools identified in my earlier report. Pools 16 and 31 were lost as a direct result of the Planning Commission's approval that required the opening of Ingham Hill Road to full traffic use. This resulted in additional loss of the vernal pool envelope because of road improvements as well as the separation (loss of) critical upland habitat by the presence of a high capacity roadway. The existing development in the critical upland habitat of Pool 25 already renders that vernal pool non-conforming with the standards of Calhoun and Klemens (2002). The current plan conserves three of the six intermediate priority pools, and five lower priority pools including several on the Bokum Road parcel. Conserved and non-conserved pools are presented in Tables 1 and 2 respectively. All maps appended to this report have been revised to not only include new pools and new species occurrences, but to reflect the conservation plan outlined in Tables 1 and 2.

The current plan conserves all sites for State-listed Special Concern Species (ribbon snake and box turtle) except that the single box turtle located at Vernal Pool 31 may be taken by the creation of a high traffic roadway (Ingham Hill Road access), which was a condition of approval by the Planning Commission.

The current plan also conserves more than 76% of the vernal pool productivity on site, using spotted salamander egg mass counts as the most reliable measure of production, all pools with 200 or more egg masses (except Vernal Pool 16 previously discussed) are conserved in accordance with the standards set forth in Calhoun and Klemens (2002) [a copy of this publication is appended to this report]. This results in a 24% loss of vernal pool productivity in the current plan. It has been the goal of the vernal pool studies to sort pools by productivity and unique species, with the outcome to maximize ecological protection of the site as part of the development process. Through this rigorous, scientifically-informed design process, although 53% of the vernal pools on site are being lost, these pools have been selected in a manner that reduces the overall vernal pool

biomass of the site by only 24%, while protecting all sites where there are State-listed Special Concern reptiles (except Vernal Pool 31 previously discussed), and multiple populations of all the wetland-dependent amphibians and reptiles at The Preserve.

Vernal Pool Disturbance Analysis

TABLE 1 CONSERVED VERNAL POOLS (N=18)

Pool #1

Area of Vernal Pool	***Total Area***	***Existing Condition***		***Post Construction***				***Total***	***Percent Disturbance***	***Maximum Disturbance Threshold***	***Delta***
		Disturbance		Golf		Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	2.64	0	0	0	0	0	0	0	0.00%	0%	0%
Critical Terrestrial Habitat 100'-750'	46.35	0	0	0	0	1.3	3.07	4.37	9.43%	25%	16%

Pool #2

Area of Vernal Pool	***Total Area***	***Existing Condition***		***Post Construction***				***Total***	***Percent Disturbance***	***Maximum Disturbance Threshold***	***Delta***
		Disturbance		Golf		Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	1.34	0	0	0	0	0	0	0	0.00%	0%	0%
Critical Terrestrial Habitat 100'-750'	39.53	0	0	0.03	0.13	2.11	4.98	7.25	18.34%	25%	7%

Pool #6

Area of Vernal Pool	Total Area	Existing Condition		Post Construction				Total	Percent Disturbance	Maximum Disturbance Threshold	Delta
		Disturbance		Golf		Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	3.25	0	0	0	0	0	0	0	0.00%	0%	0%
Critical Terrestrial Habitat 100'-750'	52.19	0.02	0.12	0	0	1.43	4.59	6.16	11.80%	25%	13%

Pool #7

Area of Vernal Pool	Total Area	Existing Condition		Post Construction				Total	Percent Disturbance	Maximum Disturbance Threshold	Delta
		Disturbance		Golf		Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	4.9	0	0	0	0	0	0	0	0.00%	0%	0%
Critical Terrestrial Habitat 100'-750'	56.91	0	0	0.35	3.82	1.81	4.94	10.92	19.19%	25%	6%

Pool #8

Area of Vernal Pool	***Total Area***	***Existing Condition*** Disturbance		***Post Construction***				***Total***	***Percent Disturbance***	***Maximum Disturbance Threshold***	***Delta***
		Impervious	Pervious	Impervious	Golf Pervious	Housing/ Roadway Impervious	Pervious				
Vernal Pool Envelope 0'-100'	1.35	0	0	0	0	0	0	0	0.00%	0%	0%
Critical Terrestrial Habitat 100'-750'	40.88	0	0	0.5	8.61	0.07	0.19	9.37	22.92%	25%	2%

Pool #9

Area of Vernal Pool	***Total Area***	***Existing Condition*** Disturbance		***Post Construction***				***Total***	***Percent Disturbance***	***Maximum Disturbance Threshold***	***Delta***
		Impervious	Pervious	Impervious	Golf Pervious	Housing/ Roadway Impervious	Pervious				
Vernal Pool Envelope 0'-100'	2.49	0	0	0	0	0	0	0	0.00%	0%	0%
Critical Terrestrial Habitat 100'-750'	47.79	0	0	0.73	7.86	0	0	8.59	17.97%	25%	7%

Pool #10

Area of Vernal Pool	Total Area	Existing Condition		Post Construction				Total	Percent Disturbance	Maximum Disturbance Threshold	Delta
		Disturbance		Golf		Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	2.58	0	0	0	0	0	0	0	0.00%	0%	0%
Critical Terrestrial Habitat 100'-750'	44	0	0	0.53	4.8	0	0	5.33	12.11%	25%	13%

Pool #11

Area of Vernal Pool	Total Area	Existing Condition		Post Construction				Total	Percent Disturbance	Maximum Disturbance Threshold	Delta
		Disturbance		Golf		Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	1.59	0	0	0	0	0	0	0	0.00%	0%	0%
Critical Terrestrial	42.05	0.004	0	0.47	3.88	0	0	4.354	10.35%	25%	15%

Pool #12

Area of Vernal Pool	Total Area	Existing Condition		Post Construction				Total	Percent Disturbance	Maximum Disturbance Threshold	Delta
		Disturbance			Golf	Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	3.96	0	0	0	0	0	0	0	0.00%	0%	0%
Critical Terrestrial Habitat 100'-750'	53.77	0	0	0.9	11.33	0	0	12.23	22.75%	25%	2%

Note: Critical Terrestrial Habitat disturbance due to proposed golf course area

Pool #13

Area of Vernal Pool	Total Area	Existing Condition		Post Construction				Total	Percent Disturbance	Maximum Disturbance Threshold	Delta
		Disturbance			Golf	Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	1.3	0	0	0	0	0	0	0	0.00%	0%	0%
Critical Terrestrial Habitat 100'-750'	36.74	0	0	0.49	7.4	0	0	7.89	21.48%	25%	4%

Pool #15

Area of Vernal Pool	Total Area	Existing Condition		Post Construction				Total	Percent Disturbance	Maximum Disturbance Threshold	Delta
		Disturbance		Golf		Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	2.53	0	0	0	0	0	0	0	0.00%	0%	0%
Critical Terrestrial Habitat 100'-750'	50.46	0.09	1.77	0	0	0	0	1.86	3.69%	25%	21%

Pool #17

Area of Vernal Pool	Total Area	Existing Condition		Post Construction				Total	Percent Disturbance	Maximum Disturbance Threshold	Delta
		Disturbance		Golf		Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	2.45	0	0	0	0	0	0	0	0.00%	0%	0%
Critical Terrestrial Habitat 100'-750'	50.13	1.92	3.97	0.06	0.46	0	0	6.41	12.79%	25%	12%

Pool #18

Area of Vernal Pool	Total Area (Acre)	Existing Condition		Post Construction				Total	Percent Disturbance	Maximum Disturbance Threshold	Delta
		Disturbance		Golf		Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	3.03	0	0	0	0	0	0	0	0.00%	0%	0%
Critical Terrestrial Habitat 100'-750'	50.52	0	0	0.23	3.44	0.73	1.61	6.01	11.90%	25%	13%

Pool #20

Area of Vernal Pool	Total Area	Existing Condition		Post Construction				Total	Percent Disturbance	Maximum Disturbance Threshold	Delta
		Disturbance		Golf		Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	2.04	0	0	0	0	0	0	0	0.00%	0%	0%
Critical Terrestrial Habitat 100'-750'	45.87	0	0	0	0	1.95	4.57	6.52	14.21%	25%	11%

Pool #28

Area of Vernal Pool	Total Area	Existing Condition		Post Construction				Total	Percent Disturbance	Maximum Disturbance Threshold	Delta
		Disturbance		Golf		Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	1.09	0	0	0	0	0	0	0	0.00%	0%	0%
Critical Terrestrial Habitat 100'-750'	34.76	0	0	0.17	0.86	1.91	5.3	8.24	23.71%	25%	1%

Pool #29

Area of Vernal Pool	Total Area	Existing Condition		Post Construction				Total	Percent Disturbance	Maximum Disturbance Threshold	Delta
		Disturbance		Golf		Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	1.33	0	0	0	0	0	0	0	0.00%	0%	0%
Critical Terrestrial Habitat 100'-750'	35.51	0.14	0.91	0	0	0.77	2.88	4.7	13.24%	25%	12%

Pool #32

Area of Vernal Pool	Total Area	Existing Condition Disturbance		Post Construction Golf		Post Construction Housing/ Roadway		Total	Percent Disturbance	Maximum Disturbance Threshold	Delta
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	1.35	0	0	0	0	0	0	0	0.00%	0%	0%
Critical Terrestrial Habitat 100'-750'	35.34	0	0	0.23	3.71	0	0.1	4.04	11.43%	25%	14%

Pool #38

Area of Vernal Pool	Total Area (.	Existing Condition Disturbance		Post Construction Golf		Post Construction Housing/ Roadway		Total	Percent Disturbance	Maximum rbance Threshold	Delta
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	0.89	0	0	0	0	0	0	0	0.00%	0%	0%
Critical Terrestrial Habitat 100'-750'	39.96	0	0	0	0	0	0	0	0.00%	25%	25%

Vernal Pool Disturbance Analysis

TABLE 2 NON-CONSERVED VERNAL POOLS (N=20)

Pool #3

Area of Vernal Pool	*Total Area*	*Existing Condition*		*Post Construction*				*Total*	*Percent Disturbance*	*Maximum Disturbance Threshold*	*Delta*
		Disturbance		Golf		Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	2.51	0	0	0.04	0.31	0	0	0.35	13.94%	0%	-14%
Critical Terrestrial Habitat 100'-750'	41.44	0	0	0.74	8.4	0.47	0.75	10.36	25.00%	25%	0%

Note: Vernal Pool Envelope disturbance due to proposed golf course cart path and clearing

Pool #4

Area of Vernal Pool	*Total Area*	*Existing Condition*		*Post Construction*				*Total*	*Percent Disturbance*	*Maximum Disturbance Threshold*	*Delta*
		Disturbance		Golf		Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	1.13	0	0	0.03	0	0	0	0.03	2.65%	0%	-3%
Critical Terrestrial Habitat 100'-750'	36.93	0	0	0.78	10.96	0	0	11.74	31.79%	25%	-7%

Note: Vernal Pool Envelope disturbance due to proposed golf course cart path

Critical Terrestrial Habitat disturbance due to golf course area

Pool #5

Area of Vernal Pool	Total Area	Existing Condition		Post Construction				Total	Percent Disturbance	Maximum Disturbance Threshold	Delta
		Disturbance			Golf	Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	1.4	0	0	0	0	0.14	0.19	0.33	23.57%	0%	-24%
Critical Terrestrial Habitat 100'-750'	43.14	0	0	0.26	1.6	1.22	2.7	5.78	13.40%	25%	12%

Note: Vernal Pool Envelope disturbance due to proposed bridge site #2

Pool #14

Area of Vernal Pool	Total Area	Existing Condition		Post Construction				Total	Percent Disturbance	Maximum Disturbance Threshold	Delta
		Disturbance			Golf	Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	1.96	0.15	0.24	0	0	0	0	0.39	19.90%	0%	-20%
Critical Terrestrial Habitat 100'-750'	46.21	3.05	19.88	0	0	0	0	22.93	49.62%	25%	-25%

Note: Vernal Pool Envelope and Critical Terrestrial Habitat disturbance due to existing disturbance

Pool #16

Area of Vernal Pool	Total Area	Existing Condition		Post Construction				Total	Percent Disturbance	Maximum Disturbance Threshold	Delta
		Disturbance		Golf		Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	2.24	0.14	0.14	0	0	0.07	0.64	0.99	44.20%	0%	-44%
Critical Terrestrial Habitat 100'-750'	48.83	2.51	4.5	0	0	0.92	18.78	26.71	54.70%	25%	-30%

Note: Vernal Pool Envelope disturbance due to proposed Ingham Hill Road improvements

Vernal Pool Envelope disturbance and loss of critical upland habitat due to increased level of traffic on Ingham Hill Road conditioned by Old Saybrook Planning Commission

Pool #19

Area of Vernal Pool	Total Area	Existing Condition		Post Construction				Total	Percent Disturbance	Maximum Disturbance Threshold	Delta
		Disturbance		Golf		Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	1.97	0	0	0.03	0.08	0	0	0.11	5.58%	0%	-6%
Critical Terrestrial Habitat 100'-750'	47.8	0	0	0.3	8.26	5.32	18	31.88	66.69%	25%	-42%

Note: Vernal Pool Envelope disturbance due to proposed golf course cart path and clearing

Pool #21

Area of Vernal Pool	Total Area	Existing Condition		Post Construction				Total	Percent Disturbance	Maximum Disturbance Threshold	Delta
		Disturbance		Golf		Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	1.99	0	0	0.04	0.94	0	0	0.98	49.25%	0%	-49%
Critical Terrestrial Habitat 100'-750'	45.91	0.23	0.54	0.92	23.13	0	0	24.82	54.06%	25%	-29%

Note: Vernal Pool Envelope disturbance due to proposed golf course cart path and clearing

Pool #22

Area of Vernal Pool	Total Area	Existing Condition		Post Construction				Total	Percent Disturbance	Maximum Disturbance Threshold	Delta
		Disturbance		Golf		Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	0.75	0	0	0	0.19	0	0	0.19	25.33%	0%	-25%
Critical Terrestrial Habitat 100'-750'	37.11	0	0	0.95	20.6	0.04	0.37	21.96	59.18%	25%	-34%

Note: Vernal Pool Envelope disturbance due to proposed golf course area

Pool #23

Area of Vernal Pool	Total Area	Existing Condition		Post Construction				Total	Percent Disturbance	Maximum Disturbance Threshold	Delta
		Disturbance			Golf	Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	2.24	0	0	0.04	0.78	0	0	0.82	36.61%	0%	-37%
Critical Terrestrial Habitat 100'-750'	47.6	0.56	2.1	0.84	2.93	0	0	6.43	13.51%	25%	11%

Note: Vernal Pool Envelope disturbance due to proposed golf course area

Pool #24

Area of Vernal Pool	Total Area	Existing Condition		Post Construction				Total	Percent Disturbance	Maximum Disturbance Threshold	Delta
		Disturbance			Golf	Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	2.28	0	0	0	0	0.11	0.09	0.2	8.77%	0%	-9%
Critical Terrestrial Habitat 100'-750'	45.39	0	0	0.25	1.5	4.42	7.22	13.39	29.50%	25%	-4%

Note: Vernal Pool Envelope disturbance due to proposed roadway

Pool #25

Area of Vernal Pool	***Total Area***	***Existing Condition***		***Post Construction***				***Total***	***Percent Disturbance***	***Maximum Disturbance Threshold***	***Delta***
		Disturbance			Golf	Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	1.91	0	0	0	0	0	0	0	0.00%	0%	0%
Critical Terrestrial Habitat 100'-750'	47.39	3.78	12.6	0.34	7.53	0	0	24.25	51.17%	25%	-26%

Pool #26

Area of Vernal Pool	***Total Area***	***Existing Condition***		***Post Construction***				***Total***	***Percent Disturbance***	***Maximum Disturbance Threshold***	***Delta***
		Disturbance			Golf	Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	1.59	0	0	0	0	0	0.07	0.07	4.40%	0%	-4%
Critical Terrestrial Habitat 100'-750'	44.44	0	0	0.13	2.16	4.8	2.7	9.79	22.03%	25%	3%

Note: Vernal Pool Envelope disturbance due to proposed roadway drainage

Pool #27

Area of Vernal Pool	***Total Area***	***Existing Condition*** Disturbance		***Post Construction*** Golf		Housing/ Roadway		***Total***	***Percent Disturbance***	***Maximum Disturbance Threshold***	***Delta***
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	1.06	0	0	0	0	0.13	0.93	1.06	100.00%	0%	-100%
Critical Terrestrial Habitat 100'-750'	41.25	0	0	1.97	12.25	15.49	11.54	41.25	100.00%	25%	-75%

Note: Vernal Pool located within proposed central village area

Pool #30

Area of Vernal Pool	***Total Area***	***Existing Condition*** Disturbance		***Post Construction*** Golf		Housing/ Roadway		***Total***	***Percent Disturbance***	***Maximum Disturbance Threshold***	***Delta***
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	2.32	0	0	0	0	0	0	0	0.00%	0%	0%
Critical Terrestrial Habitat 100'-750'	48.13	0.14	0.65	0	0	4.31	10.28	15.38	31.96%	25%	-7%

Pool #31

Area of Vernal Pool	Total Area	Existing Condition		Post Construction				Total	Percent Disturbance	Maximum Disturbance Threshold	Delta
		Disturbance			Golf	Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	2.45	0.12	0.3	0	0	0.14	0.51	1.07	43.67%	0%	-44%
Critical Terrestrial Habitat 100'-750'	50.98	2.77	9.13	0.02	2.32	1.77	13.39	29.4	57.67%	25%	-33%

Note: Vernal Pool Envelope disturbance due to proposed Ingham Hill Road improvements

Vernal Pool Envelope disturbance and loss of critical upland habitat due to increased level of traffic on Ingham Hill Road conditioned by Old Saybrook Planning Commission

Pool #33

Area of Vernal Pool	Total Area	Existing Condition		Post Construction				Total	Percent Disturbance	Maximum Disturbance Threshold	Delta
		Disturbance			Golf	Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	5.23	0	0	0	0	0	0	0	0.00%	0%	0%
Critical Terrestrial Habitat 100'-750'	67.9	0	0	0	0	4.87	17.08	21.95	32.33%	25%	-7%

Pool #34

Area of Vernal Pool	***Total Area***	***Existing Condition***		***Post Construction***				***Total***	***Percent Disturbance***	***Maximum Disturbance Threshold***	***Delta***
		Disturbance			Golf	Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	2.19	0	0	0	0	0	0	0	0.00%	0%	0%
Critical Terrestrial Habitat 100'-750'	48.54	11.42	0	0	0	1.66	1.34	14.42	29.71%	25%	-5%

Pool #35

Area of Vernal Pool	***Total Area***	***Existing Condition***		***Post Construction***				***Total***	***Percent Disturbance***	***Maximum Disturbance Threshold***	***Delta***
		Disturbance			Golf	Housing/ Roadway					
		Impervious	Pervious	Impervious	Pervious	Impervious	Pervious				
Vernal Pool Envelope 0'-100'	2.45	0	0	0	0	0	0	0	0.00%	0%	0%
Critical Terrestrial Habitat 100'-750'	47.75	0	0	0.85	12.95	0	0	13.8	28.90%	25%	-4%

Pool #36

Area of Vernal Pool	***Total Area***	***Existing Condition*** Disturbance		***Post Construction***				***Total***	***Percent Disturbance***	***Maximum Disturbance Threshold***	***Delta***
		Impervious	Pervious	Impervious	Golf Pervious	Housing/ Roadway Impervious	Pervious				
Vernal Pool Envelope 0'-100'	1.58	0	0	0.04	0	0	0	0.04	2.53%	0%	-3%
Critical Terrestrial Habitat 100'-750'	37.45	0	0	0.38	5.35	2.9	6.18	14.81	39.55%	25%	-15%

Note: Vernal Pool Envelope disturbance due to proposed golf course cart path

Pool #37

Area of Vernal Pool	***Total Area***	***Existing Condition*** Disturbance		***Post Construction***				***Total***	***Percent Disturbance***	***Maximum Disturbance Threshold***	***Delta***
		Impervious	Pervious	Impervious	Golf Pervious	Housing/ Roadway Impervious	Pervious				
Vernal Pool Envelope 0'-100'	1.79	0	0	0	0	0.25	0.25	0.5	27.93%	0%	-28%
Critical Terrestrial Habitat 100'-750'	43.57	0.62	4.77	0	0	1	2.46	8.85	20.31%	25%	5%

Note: Vernal Pool Envelope disturbance due to proposed roadway

TABLE 3

VERNAL POOL DIMENSIONS

Pool No.	Length (feet)	Width (feet)	Depth (inches)	Date
1	229	99	12	5/10/2005
2	91	35	15	5/10/2005
3	61	40	9	5/10/2005
4	30	29	12	5/12/2005
5	36	27	24	5/10/2005
6	235	230	17	5/12/2005
7A	470	64	24	5/9/2005
7B	466	64	9	5/9/2005
8	272	79	9	5/9/2005
9	279	135	10	5/11/2005
10	140	121	33	5/11/2005
11	121	88	23	5/11/2005
12	614	90	9	5/10/2005
13	81	59	10	5/10/2005
14	117	77	24	5/12/2005
15	225	105	32+	5/12/2005
16	195	103	31	5/11/2005
17	256	117	32	5/13/2005
18	412	73	12	5/13/2005
19	154	55	5	5/11/2005

Pool No.	Length (feet)	Width (feet)	Depth (inches)	Date
20	167	83	34	5/13/2005
21	215	95	12	5/11/2005
22	54	21	15	5/11/2005
23A	240	101	6	5/11/2005
23B	10	9	29	5/11/2005
24	183	72	36	5/12/2005
25	190	109	18	5/10/2005
26	64	57	21	5/11/2005
27	125	52	34+	5/9-13/2005
28	153	55	19.5	5/9/2005
29	30	20	17	5/9/2005
30	200	38	16	5/9/2005
31	73	39	10	5/11/2005
32	49	39	9	5/9/2005
33	831	54	9	5/9/2005
34	n/a	n/a	36+	5/10/2005
35	195	73	7	5/10/2005
36	42	22	10	5/12/2005
37	61	25	5	5/13/2005
38	70	30	10	5/13/2005

TABLE 4

Vernal Pool Productivity

Productivity 2002
A. maculatum

Vernal Pool #	*Egg Mass*	
18	1200	*
20	500	*
10	355	*
7	342	
1	330	
17	289	*
16	230	
15	205	
12	152	
25	139	
19	131	
8	129	
6	110	
23	103	
11	77	
9	70	
5	70	
22	31	
14	29	
29	25	
3	22	
21	20	
28	19	
13	19	
24	7	
4	2	
2	0	
26	N/D	
27	N/D	
30	N/D	
31	ID in 2003	
32	ID in 2005	
33	ID in 2005	
34	ID in 2005	
35	ID in 2005	
36	ID in 2005	
37	ID in 2005	
38	ID in 2005	
Total	**4606**	

Productivity 2005
A. maculatum

Vernal Pool #	*Egg Mass*	
18	1242	
20	937	
7	462	
10	409	*
1	379	
15	353	
12	334	
17	235	*
16	233	
9	211	
25	184	
8	164	*
26	159	
11	135	
33	134	
19	126	
21	106	
6	93	
5	86	
35	84	
13	83	
23	73	
30	73	
27	63	*
34	58	
28	49	
3	47	
22	43	
29	30	
14	24	
31	16	
24	13	
32	12	
36	11	
4	10	
38	9	*
2	7	
37	2	*
Total	**6689**	

*Note: * = Undercounted due to water turbidity or tannin*

TABLE 6

Vernal Pool Wetland Levels Late June 2005

POOL #	DEPTH (Inches)	LARVAL ACTIVITY NOTED		Date Surveyed	NOTES
		R. sylvatica	*A. maculatum*		
1	10			6/25	ponded throughout
2	0			6/25	NSW, NSSS
3	4		Observed	6/29	Ponded in 3 east only; 3 west is NSS and SSS
4	0			6/29	NSW, NSSS
5	10	Observed		6/25	Ponding in roadbed, pool area measured previously is dry
6	0			6/25	NSW, SSS
7	12	observed	Observed	6/25	
8	3	Observed	Observed	6/29	
9	0			6/29	NSW, SSS
10	13		Observed	6/29	
11	0			6/29	NSW, NSSS
12	0			6/29	NSW, SSS
13	0			6/29	NSW, NSSS
14	0			6/27	NSW, NSSS
15	0			6/27	NSW, SSS
16	14			6/25	
17	11			6/27	
18	10	Observed	Observed	6/29	
19	3		Observed	6/25	
20	12	Observed	Observed	6/27	
21	0			6/25	NSW, SSS
22	0			6/25	NSW, SSS
23SH	4	Observed	Observed	6/25	Springhead located on west side of VP 23
23	0			6/25	NSW, SSS
24	0			6/25	NSW, NSSS
25	0			6/27	NSW, NSSS
26	0			6/25	NSW, SSS
27	0			6/25	NSW, NSSS
28	0			6/28	NSW, NSSS
29	1			6/27	
30	0			6/27	NSW, NSSS
31	0			6/27	NSW, NSSS
32	0			6/29	NSW, NSSS
33	0			6/27	NSW, NSSS
34	-	-	-	-	Didn't check beaverpond, assumed still well ponded
35	0			6/29	NSW, SSS
36	0			6/25	NSW, NSSS
37	0			6/27	NSW, NSSS
38	0			6/29	NSW, NSSS

TABLE 6 NOTES

1. maximum water depth was recorded
2. no Ambystoma opacum larvae observed in any pools
3. NSW – no standing water
4. SSS – water table was at or near the soil surface
5. NSSS – water table was not at or near the soil surface
6. r [illegible]val activity was observed unless noted
7. S[illegible]ow pools which potentially dried and recharged were dip-netted to verify presence/absence of larvae (rain occurred on 6/28)

Vernal Pool Analysis

TABLE 5 Vernal Pool Water Chemistry Analysis

Pool No.	Temperature (° Celcius)	Specific Conductivity (uS)	Dissolved Oxygen (mg/L)	Salinity (ppt)	pH	Nitrate-N (mg/L)	Nitrite-N (mg/L)	Chrloride (mg/L)	Total Dissolved Solids (mg/L)	Turbidity (NTU)	Total Phosphorous (mg/L)
1	17.2	50.6	0.30	0.0	5.9	ND	ND	2.8	75	1.23	0.03
2	12.2	36.5	1.67	0.0	4.7	ND	ND	2.4	67	ND	0.03
3	13.4	52.4	0.49	0.0	5.5	ND	ND	3.1	52	5.24	0.02
4	17.2	38.0	3.01	0.0	5.2	ND	ND	3.5	52	0.89	0.01
5	12.3	53.9	2.01	0.0	6	0.1	0.006	4	32	1.72	0.01
6	17.0	36.2	0.33	0.0	5	ND	0.01	4.2	68	1.96	0.01
7A	14.9	35.6	0.36	0.0	5.7	0.1	ND	3.5	28	6.74	0.05
7B	15.4	36.6	0.81	0.0	5.7	0.2	0.007	3.3	32	1.54	ND
8	12.1	45.5	3.39	0.0	5.5	0.1	ND	3.6	3	95.7	0.19
9	13.6	56.6	1.28	0.0	5.8	ND	ND	3.2	100	1.09	0.07
10	14.8	37.8	0.78 (bottom) 3.3 (in column)	0.0	5.5	ND	0.007	3.9	115	2.53	0.02
11	15.6	40.3	2.70	0.0	5.4	ND	0.006	3.8	108	0.79	0.04
12	14.8	38.3	1.43	0.0	5.5	ND	0.004	3.4	98	0.48	0.01
13	17.0	43.3	0.13	0.0	4.6	ND	0.008	3.4	122	0.82	0.01
14	16.8	39.2	0.28	0.0	5.7	0.2	ND	3.5	70	0.83	0.05
15	18.2	41.4	0.97	0.0	5	ND	0.01	4	23	1.18	0.02
16	12.4	84.0	2.80	NA	5.8	ND	ND	16.9	102	0.57	0.03
17	14.7	68.4	1.13	0.0	6	0.4	0.01	9.3	88	2.27	0.02
18	13.3	71.3	3.00	0.0	6.3	0.2	ND	4.6	70	19	0.04
19	18.4	50.5	2.94	0.0	6.2	ND	ND	3.4	122	0.84	0.01
20	12.6	37.5	1.28	0.0	4.8	0.4	0.009	4.9	75	0.85	0.02
21	17.1 (edge) 19.6 (center)	35.9	0.12 (edge) 0.92 (center)	0.0	5.2	ND	ND	4.1	170	0.79	0.01
22	16.8	39.9	1.25	0.0	5.2	ND	ND	3.3	148	0.67	0.02
23A	18.8	44.1	4.21	0.0	5.8	ND	0.004	3.5	90	3.24	0.02
23B	14.2	40.4	2.15	0.0	5.3	ND	ND	3.3	135	0.42	ND
24	18.7	33.1	1.39	0.0	5.1	ND	0.013	4.1	63	1.27	0.03
25	18.2	35.3	4.01	NA	4.6	0.1	0.002	3.4	102	0.67	ND
26	16.8	47.9	0.55	0.0	5.7	ND	ND	3.7	102	1.13	0.18
27	16.8	40.6	0.94	0.0	4.9	ND	ND	4.0	117	0.92	0.05
28	11.6	45.4	1.34	0.0	5.2	ND	ND	3.4	35	0.54	0.01
29	20.0	20.8	1.03	NA	5.6	0.1	0.002	ND	148	0.78	0.03
30	20.2	39.0	1.38	NA	4.5	0.1	0.003	3.4	100	0.84	0.22
31	12.4	123.2	3.52	0.1	6.4	0.1	ND	22.3	132	0.77	0.06
32	13.8	45.5	3.39	0.0	6.2	ND	0.006	3.5	48	0.68	0.13
33	18.4	47.8	2.76	NA	4.8	0.1	0.002	3.2	88	0.44	ND
34	21.7	34.3	4.01	NA	6.6	0.2	0.002	6.2	102	0.57	ND
35	14.4	34.0	0.86	0.0	4.9	ND	ND	4.4	72	16.4	0.03
36	14.8	39.9	0.03	0.0	5.5	ND	ND	3.4	28	0.74	ND
37	8.8	39.7	0.80	0.0	4.5	0.1	0.006	4.3	62	1.13	ND
38	11.6	58.5	2.58	0.0	6.2	0.3	ND	5.3	80	1.35	0.01

NA - Not Analyzed
ND- Non Detect

TABLE 5 Vernal Pool Water Chemistry Analysis

Pool No.	Arsenic (mg/L)	Silver (mg/L)	Beryllium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Lead (mg/l)	Mercury (mg/L)	Nickel (mg/L)	Selenium (mg/L)	Antimony (mg/L)	Thallium (mg/L)	Zinc (mg/L)
1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
7A	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
7B	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8	ND	ND	ND	ND	ND	0.02	0.016	ND	ND	ND	ND	ND	ND
9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
19	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
21	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
22	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
23A	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
23B	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
24	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
26	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
27	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
28	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
29	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
31	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
32	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
33	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
34	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
35	ND	ND	ND	ND	ND	0.01	ND	ND	ND	ND	ND	ND	ND
36	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
37	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
38	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NA - Not Analyzed
ND- Non Detect

OBSERVATIONS LEGEND

- SPOTTED SALAMANDER BREEDING POOL
- SPOTTED SALAMANDER TERRESTRIAL
- MARBLED SALAMANDER BREEDING POOL
- MARBLED SALAMANDER TERRESTRIAL
- DUSKY SALAMANDER
- 2 LINED SALAMANDER
- 4 TOED SALAMANDER
- REDBACK SALAMANDER
- RED SPOTTED NEWT BREEDING POOL
- RED SPOTTED NEWT TERRESTRIAL
- AMERICAN TOAD
- SPRING PEEPER
- GRAY TREEFROG
- BULLFROG
- GREEN FROG
- PICKEREL FROG
- WOOD FROG BREEDING POOL
- WOOD FROG TERRESTRIAL
- SNAPPING TURTLE
- PAINTED TURTLE
- SPOTTED TURTLE
- BOX TURTLE
- WORM SNAKE
- BLACK RACER SNAKE
- RINGNECK SNAKE
- BLACK RAT SNAKE
- WATER SNAKE
- RIBBON SNAKE
- GARTER SNAKE
- CONSERVED VERNAL POOLS
- NON-CONSERVED VERNAL POOLS

ESSEX
WESTBROOK
153
CONNECTICUT ROUTE
WESTBROOK TOWN LINE
ESSEX
SAYBROOK
EASEMENT
BOKUM ROAD
CONNECTICUT VALLEY RAILROAD (VALLEY BRANCH)
PEQUOT
SWAMP
POND
HOUSE
HOLLOW ROAD
PEPPERIDGE TRAIL
DEER RUN
LEADA WOODS ROAD
WILD APPLE LANE
PHEASANT HILL ROAD
FOX HILL ROAD
BARLEY NECK WAY

GRAPHIC SCALE
400 200 0 400
SCALE IN FEET

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THE PRESERVE
OLD SAYBROOK, WESTBROOK, ESSEX
MIDDLESEX COUNTY, CONNECTICUT

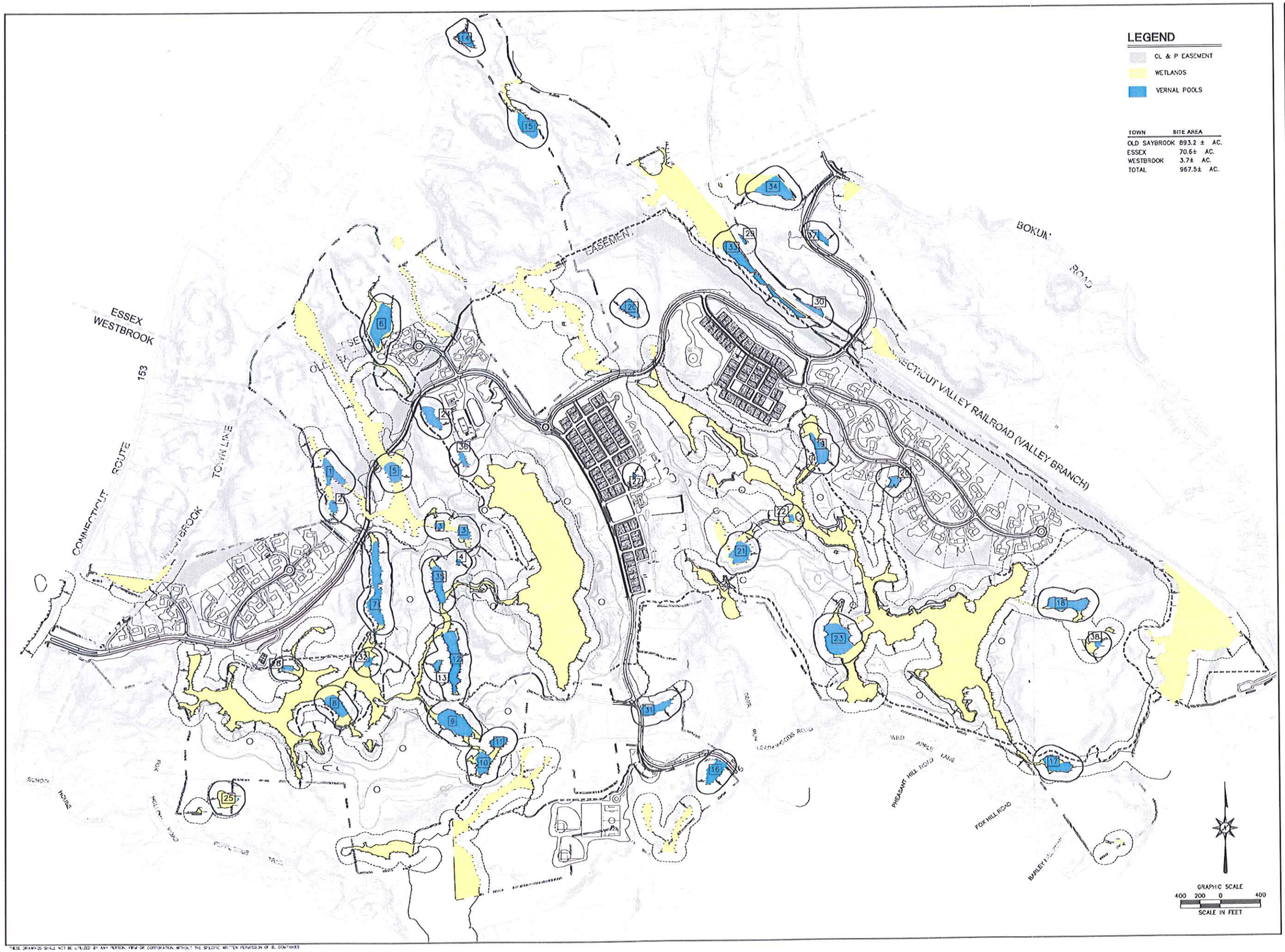
REVISIONS		
No.	Date	
1	6/9/05	SUPPLEMENTAL FIELD WORK
2	8/23/05	SUPPLEMENTAL FIELD WORK

Designed	-
Drawn	K.T.
Checked	
Approved	
Scale	1"=400'
Project No.	01C955-F
Date	XX/XX/XX
CAD File	AMC95500

Title
OVERALL
AMPHIBIAN AND REPTILE
OBSERVATIONS

Sheet No.
DISTRIBUTION
MAP 1
REVISED

xref (s): 800950A, XYC95001, XYC95002, XYC95003



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Rye, NY 10580

THE PRESERVE

OLD SAYBROOK, WESTBROOK, ESSEX
MIDDLESEX COUNTY, CONNECTICUT

REVISIONS		
No.	Date	Desc.
1	6/9/05	SUPPLEMENTAL FIELD WORK
2	8/23/05	SUPPLEMENTAL FIELD WORK

Designed	-
Drawn	K.T.
Checked	
Approved	
Scale	1" = 400'
Project No.	01C955-F
Date	XX/XX/XX
CAD File	AMC9553a

File

VERNAL POOL INVENTORY

Sheet No.

DISTRIBUTION MAP 2a

REVISED

Xref (s): 80295004

Sep 12, 2005 3:21pm gmeuser P:\JOBS\01c955-F\Dwg\Viewfile\AMC9553a.dwg
Layout: 11x17 OVERALL

TOWN	SITE AREA
OLD SAYBROOK	893.2 ± AC.
ESSEX	70.6± AC.
WESTBROOK	3.7± AC.
TOTAL	967.5± AC.

LEGEND

- CL & P EASEMENT
- WETLANDS
- 100 FT. WETLAND BUFFER
- CONSERVED VERNAL POOLS
- NON-CONSERVED VERNAL POOLS
- 750 FT. VERNAL POOL BUFFER (HIGH PRIORITY)

OBSERVATIONS LEGEND:
PRIORITY CONSERVATION SPECIES

CONNECTICUT LISTED SPECIAL CONCERN SPECIES

- BOX TURTLE
- RIBBON SNAKE

VERNAL POOL OBLIGATE SPECIES

- SPOTTED SALAMANDER BREEDING POOL
- SPOTTED SALAMANDER TERRESTRIAL
- MARBLED SALAMANDER BREEDING POOL
- MARBLED SALAMANDER TERRESTRIAL
- WOOD FROG BREEDING POOL
- WOOD FROG TERRESTRIAL

VERNAL POOL FACULTATIVE SPECIES

- FOUR TOED SALAMANDER
- RED SPOTTED NEWT BREEDING POOL
- RED SPOTTED NEWT TERRESTRIAL
- GRAY TREEFROG
- SPOTTED TURTLE

ESSEX
WESTBROOK
153
CONNECTICUT ROUTE
TOWN LINE
ESSEX
SAYBROOK
PEQUOT
SWA
POND
CL & P EASEMENT
BOKUM ROAD
CONNECTICUT VALLEY RAILROAD (VALLEY BRANCH)
DEEP RUN
CEDARWOODS ROAD
WILD APPLE LANE
PHEASANT HILL ROAD
FOX HILL ROAD
BARLEY HILL ROAD
SCHOOL HOUSE
FOX HOLLOW ROAD
PERRYCROFT

GRAPHIC SCALE
400 200 0 400
SCALE IN FEET

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REVISIONS No.	Date	Desc.
1	6/9/05	SUPPLEMENTAL FIELD WORK
2	8/23/05	SUPPLEMENTAL FIELD WORK

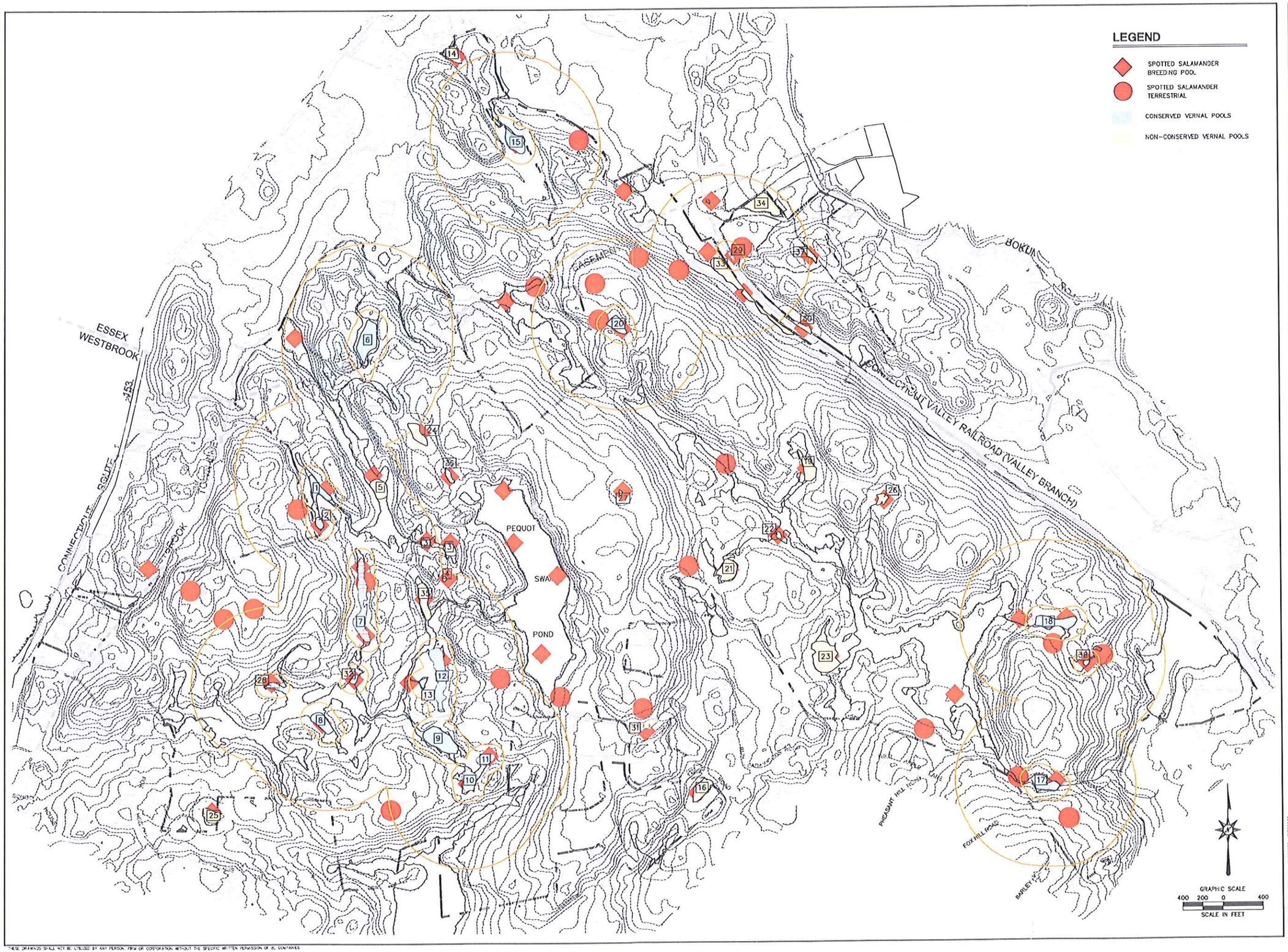
Designed	X.X.X.
Drawn	K.T.
Checked	
Approved	
Scale	1"=400'
Project No.	01C955-F
Date	XX/XX/XX
CAD File	AMC9552b

Title
VERNAL POOL CONSERVATION PLAN WITH PRIORITY CONSERVATION SPECIES

Sheet No.

DISTRIBUTION MAP 2b
REVISED

Xref (s): 8C0955A



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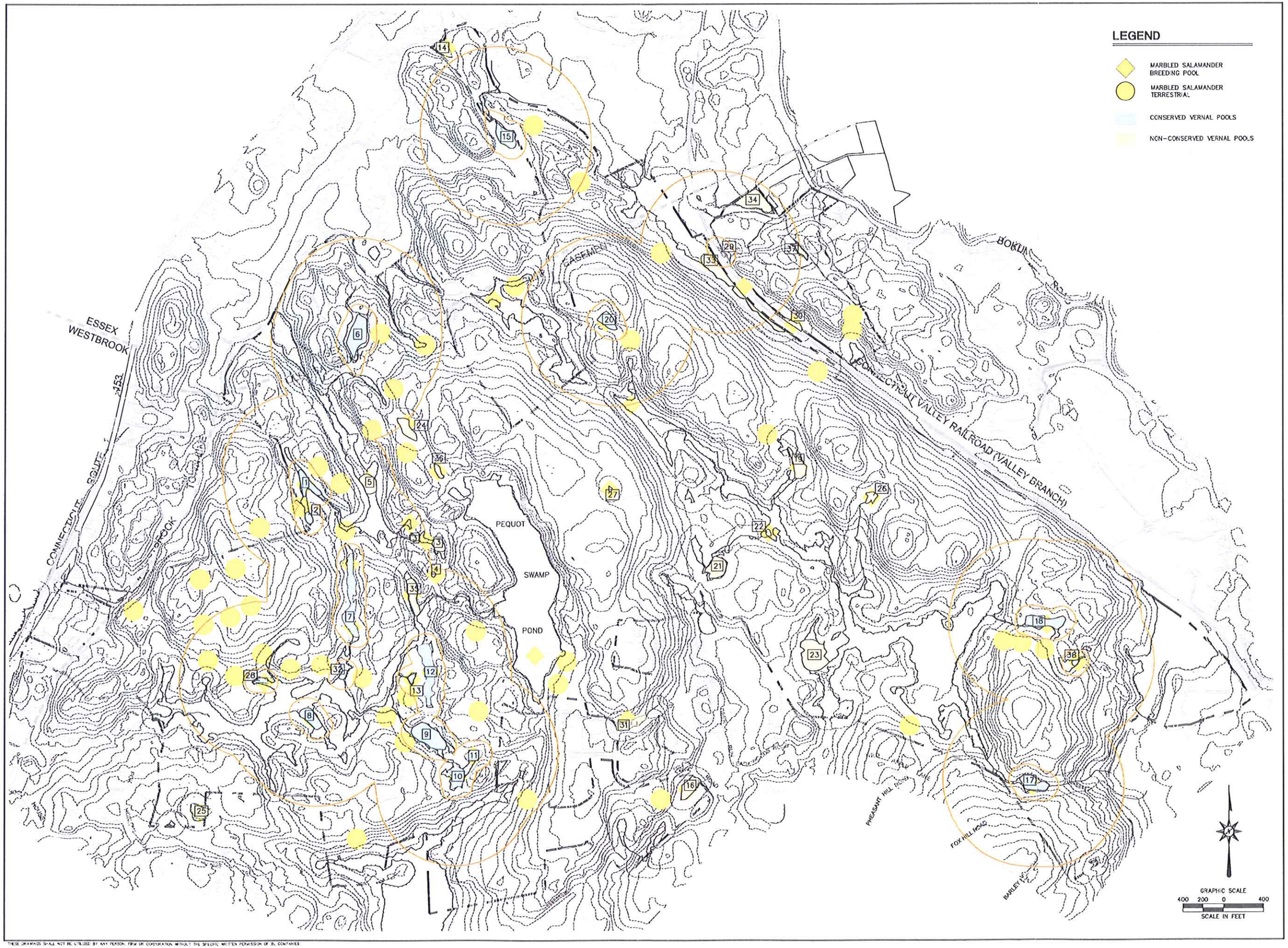
No.	Revisions Date	Desc.
1	6/9/05	SUPPLEMENTAL FIELD WORK
2	8/23/05	SUPPLEMENTAL FIELD WORK

Designed	-
Drawn	K.T.
Checked	
Approved	
Scale	1"=400'
Project No.	01C955-F
Date	xx/xx/xx
CAD File	AMC95506

Title
AMPHIBIAN AND REPTILE OBSERVATIONS

Sheet No.
DISTRIBUTION MAP 3
REVISED

Xref (s): BOUNDARY, XYZ95001, XYZ95002, XYZ95003



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REVISIONS		
No.	Date	Desc.
1	6/9/05	SUPPLEMENTAL FIELD WORK
2	8/23/05	SUPPLEMENTAL FIELD WORK

Designed	-
Drawn	K.T.
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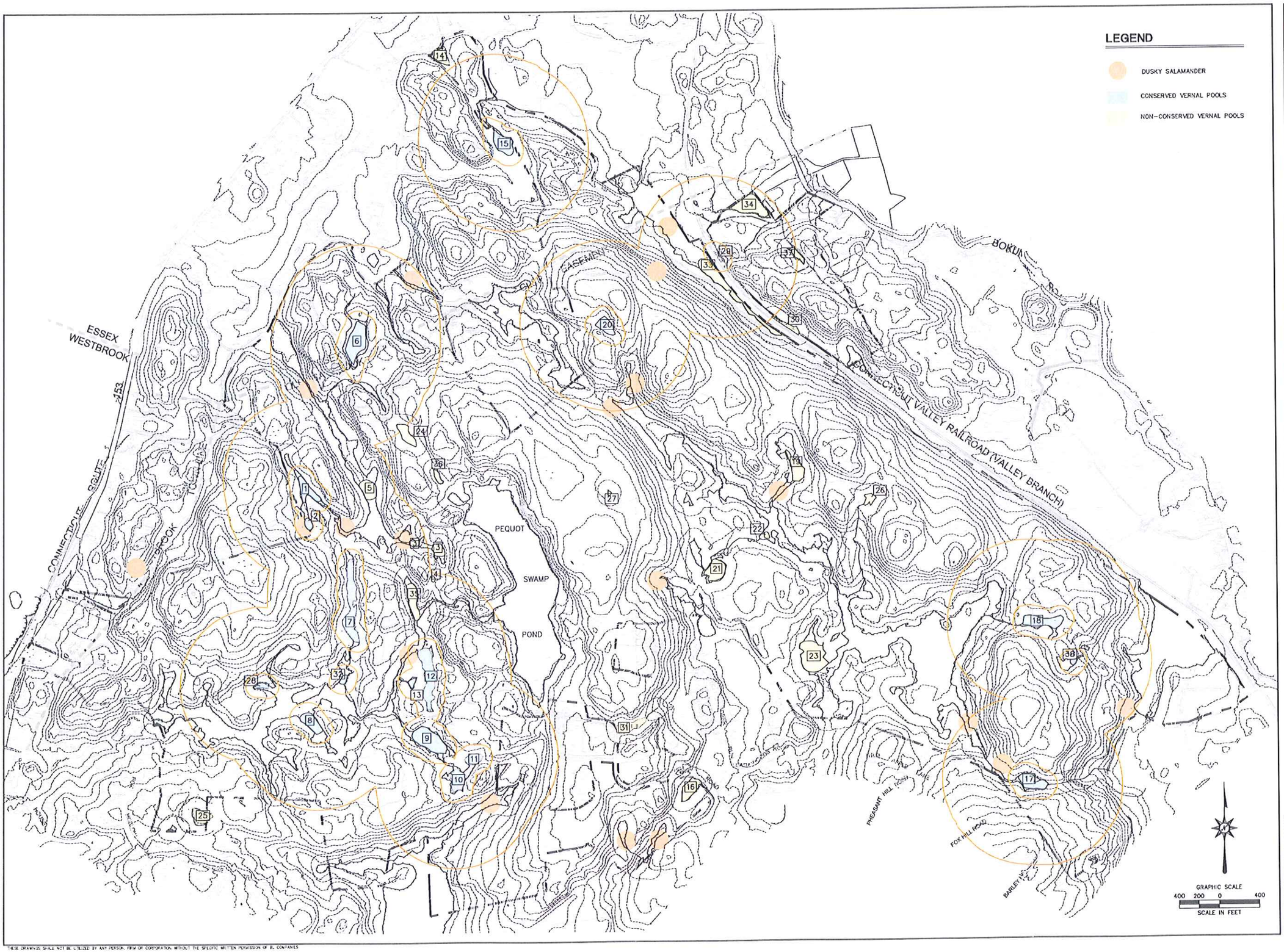
Approved	
Scale	1"= 400'
Project No.	010955-F
Date	XX/XX/XX
CAD File	AMC95505

Title
AMPHIBIAN AND REPTILE OBSERVATIONS

Sheet No.
DISTRIBUTION MAP 4
REVISED



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No.	REVISIONS Date	Desc.
1	6/7/05	SUPPLEMENTAL FIELD WORK
2	9/23/05	SUPPLEMENTAL FIELD WORK

Designed	-
Drawn	K.T.
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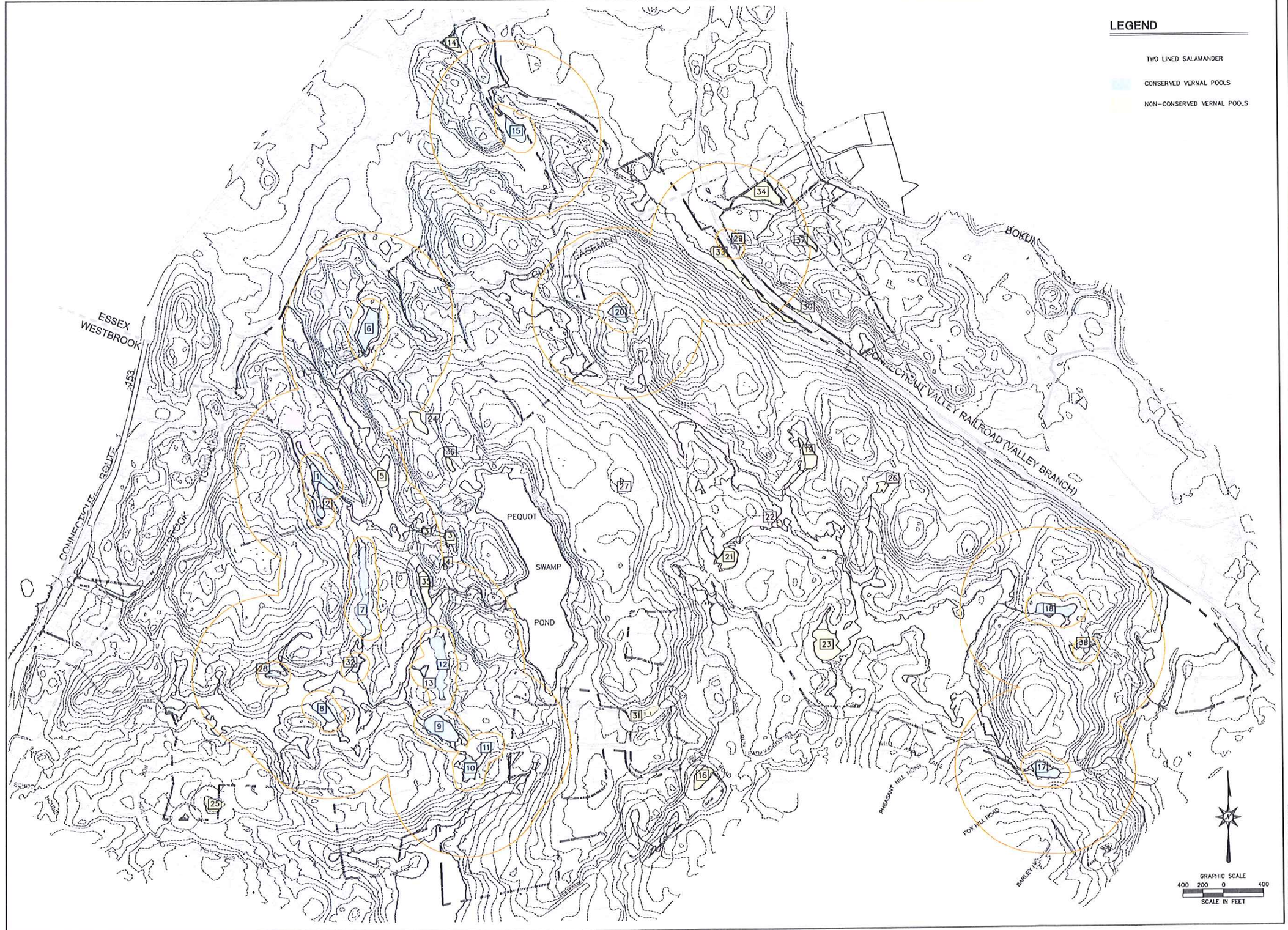
Scale	1"=400'
Project No.	01C955-F
Date	XX/XX/XX
CAD File	AMC95505

Title
AMPHIBIAN AND REPTILE OBSERVATIONS

Sheet No.
DISTRIBUTION MAP 5
REVISED

Ref: (x) 80260504, XY053501, XY053502, XY053503



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2 8/23/05 SUPPLEMENTAL FIELD WORK

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Drawn K.T.
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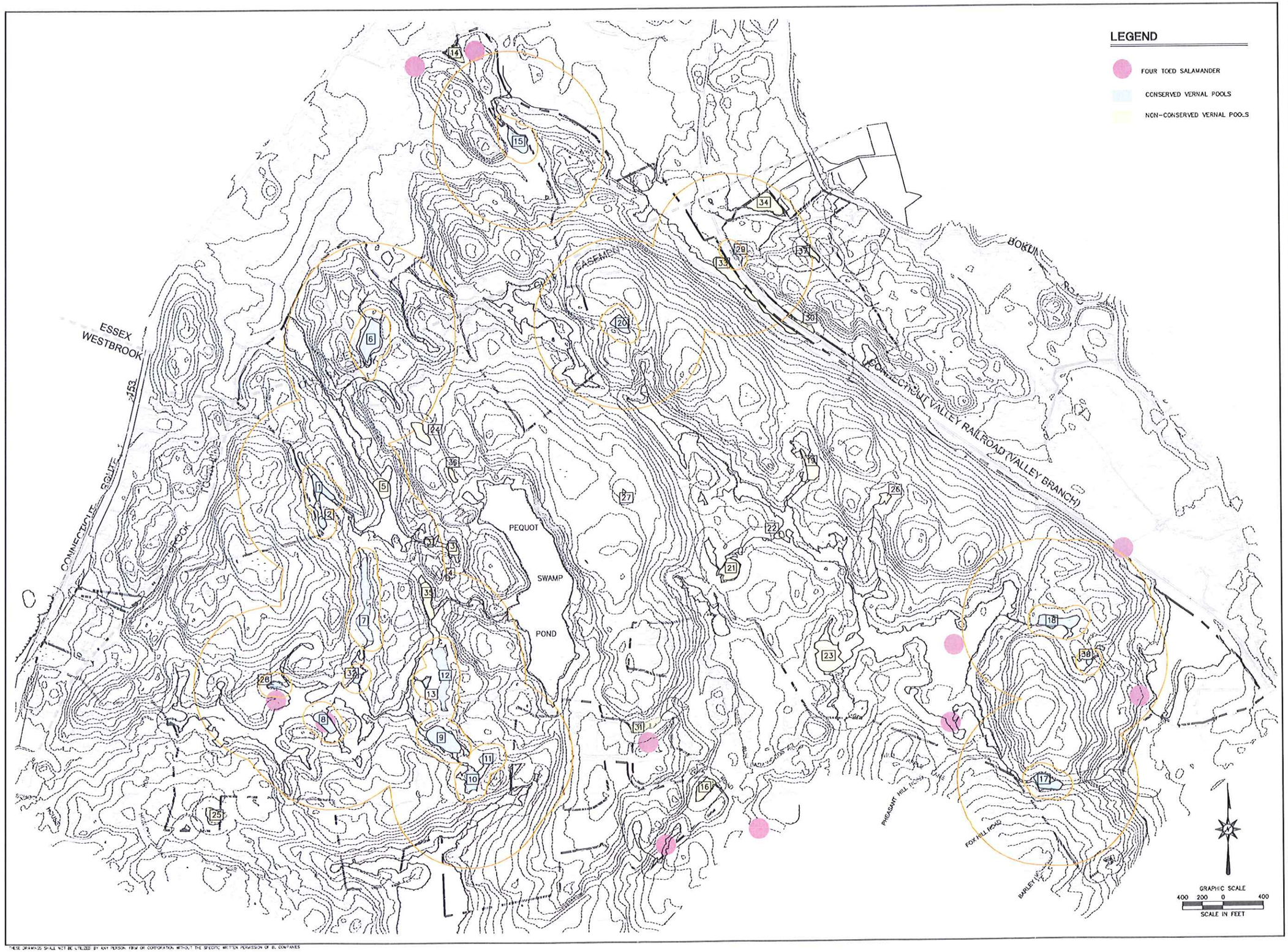
Scale 1"=400'
Project No. 01C955-F
Date XX/XX/XX
CAD File AMC95505

Title
AMPHIBIAN AND REPTILE OBSERVATIONS

Sheet No.
DISTRIBUTION MAP 6
REVISED

Xref (s): 80025504, XY025501, XY025502, XY025503



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2	8/23/05	SUPPLEMENTAL FIELD WORK

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Drawn	K.T.
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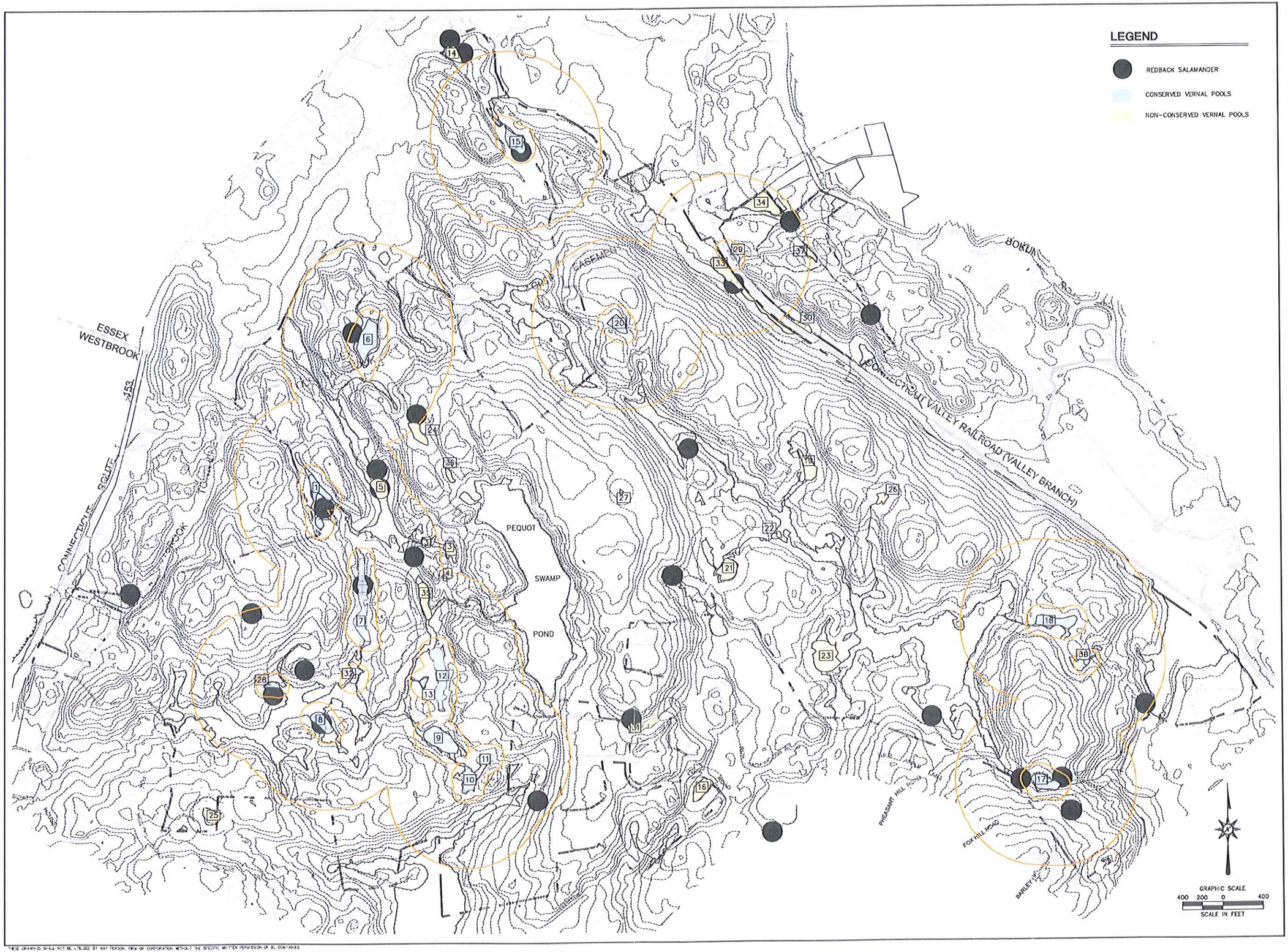
Date	XX/XX/XX
CAD File	AMC95505

Title
AMPHIBIAN AND REPTILE OBSERVATIONS

Sheet No.
DISTRIBUTION MAP 7
REVISED

Xref: c:\...\80095504, XY05501, XY05502, XY05503



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2	8/23/20	SUPPLEMENTAL FIELD WORK

Designed	-
Drawn	K.T.
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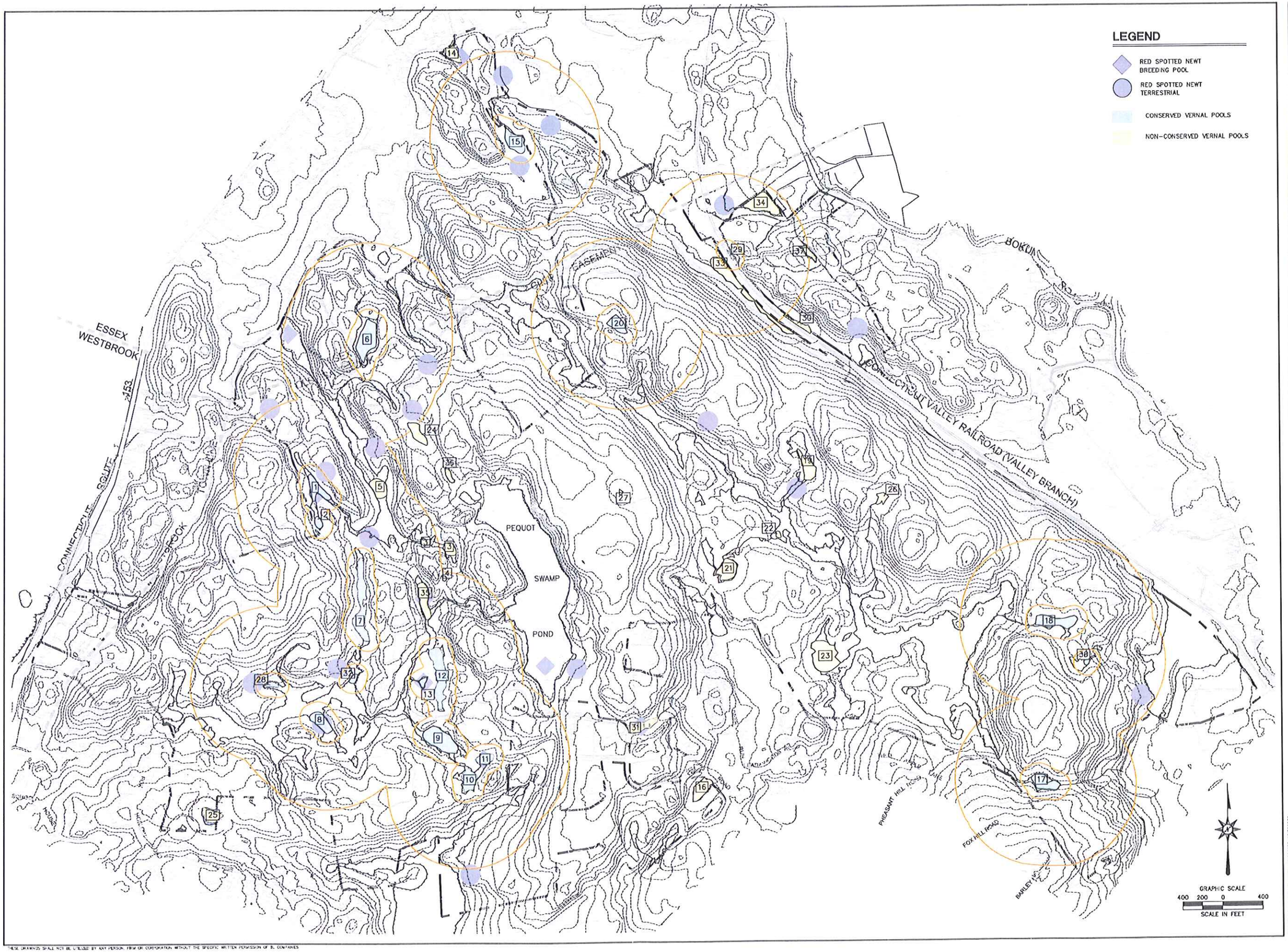
Scale	1"=400'
Project No.	01C955-F
Date	xx/xx/xx
CAD File	AMC95506

Title
AMPHIBIAN AND REPTILE OBSERVATIONS

Sheet No.
DISTRIBUTION MAP 8
REVISED

Xref: (x) 8005506A, XYZ5501, XYZ5502, XYZ5503



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2	8/23/05	SUPPLEMENTAL FIELD WORK

Designed	-
Drawn	K.T.
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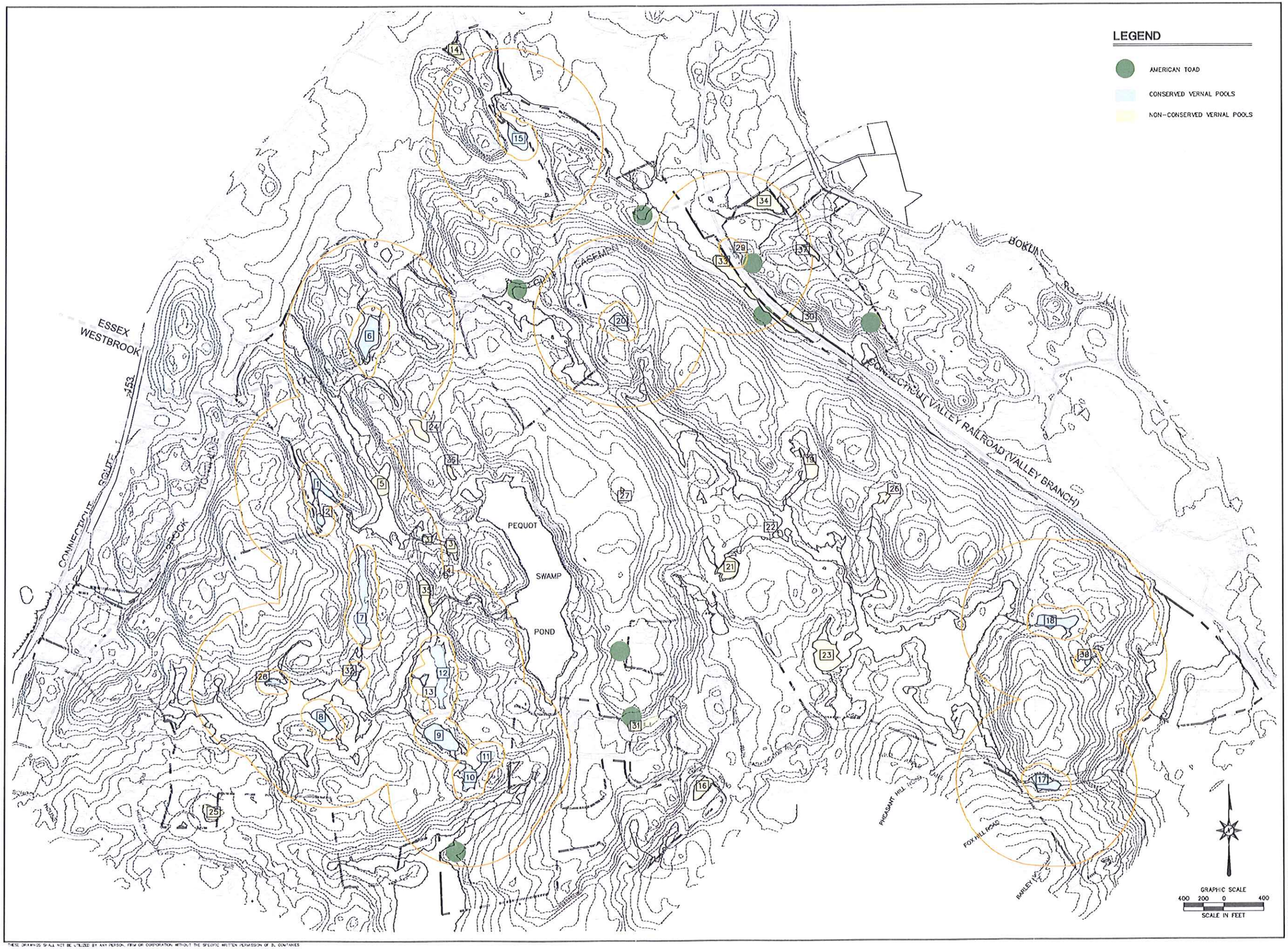
Scale	1"=400'
Project No.	010955-F
Date	XX/XX/XX
CAD File	AMC95506

Title
AMPHIBIAN AND REPTILE OBSERVATIONS

Sheet No.
DISTRIBUTION MAP 9
REVISED

Xref (s): 800500A, XYZ05501, XYZ05502, XYZ05503



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1	6/9/05	SUPPLEMENTAL FIELD WORK
2	8/22/05	SUPPLEMENTAL FIELD WORK

Designed	-
Drawn	K.T.
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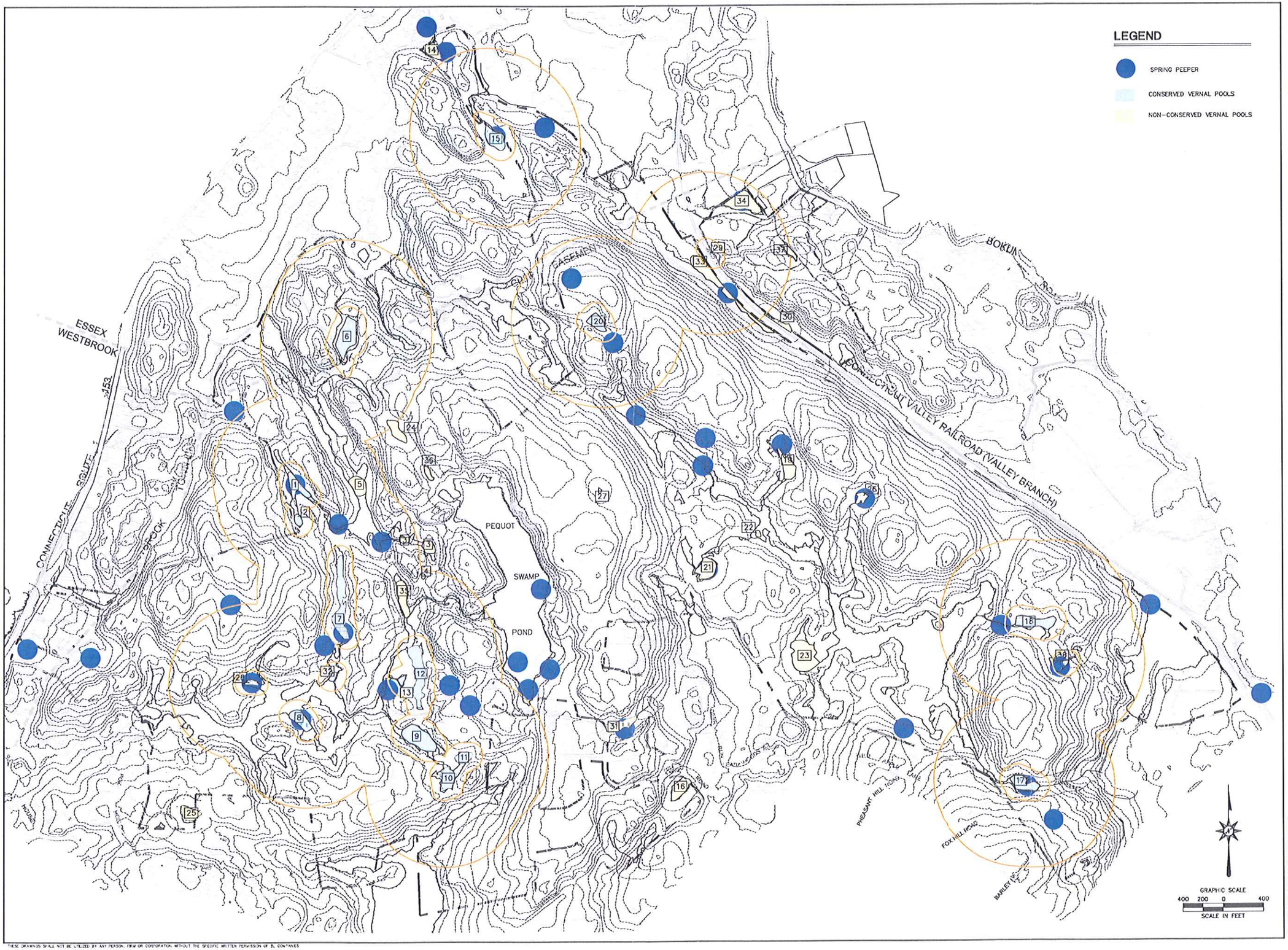
Approved	
Scale	1"=400'
Project No.	01C955-F
Date	XX/XX/XX
CAD File	AMC95506

Title
AMPHIBIAN AND REPTILE OBSERVATIONS

Sheet No.
DISTRIBUTION MAP 10
REVISED

Xref (s): B0095504, XY095501, XY095502, XY095503



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REVISIONS		
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1	6/9/05	SUPPLEMENTAL FIELD WORK
2	6/23/05	SUPPLEMENTAL FIELD WORK

Designed	-
Drawn	K.T.
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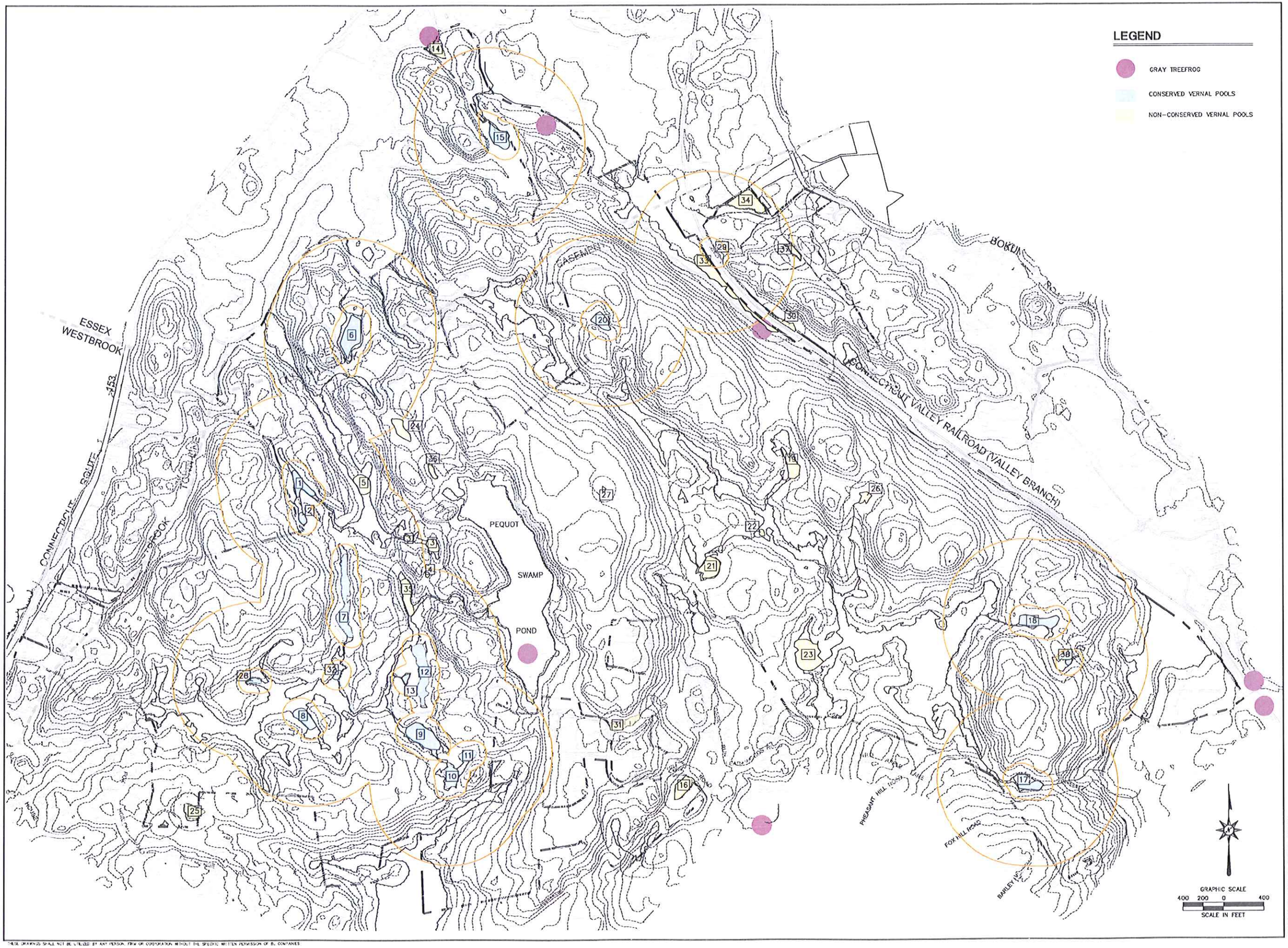
Approved	
Scale	1"=400'
Project No.	01C955-F
Date	XX/XX/XX
CAD File	AMC95506

Title
AMPHIBIAN AND REPTILE OBSERVATIONS

Sheet No.
DISTRIBUTION MAP 11
REVISED

Xref (s): 80C955A, XYZ5501, XYZ5502, XYZ5503



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REVISIONS		
No.	Date	Desc.
1	6/9/05	SUPPLEMENTAL FIELD WORK
2	8/23/05	SUPPLEMENTAL FIELD WORK

Designed	-
Drawn	K.T.
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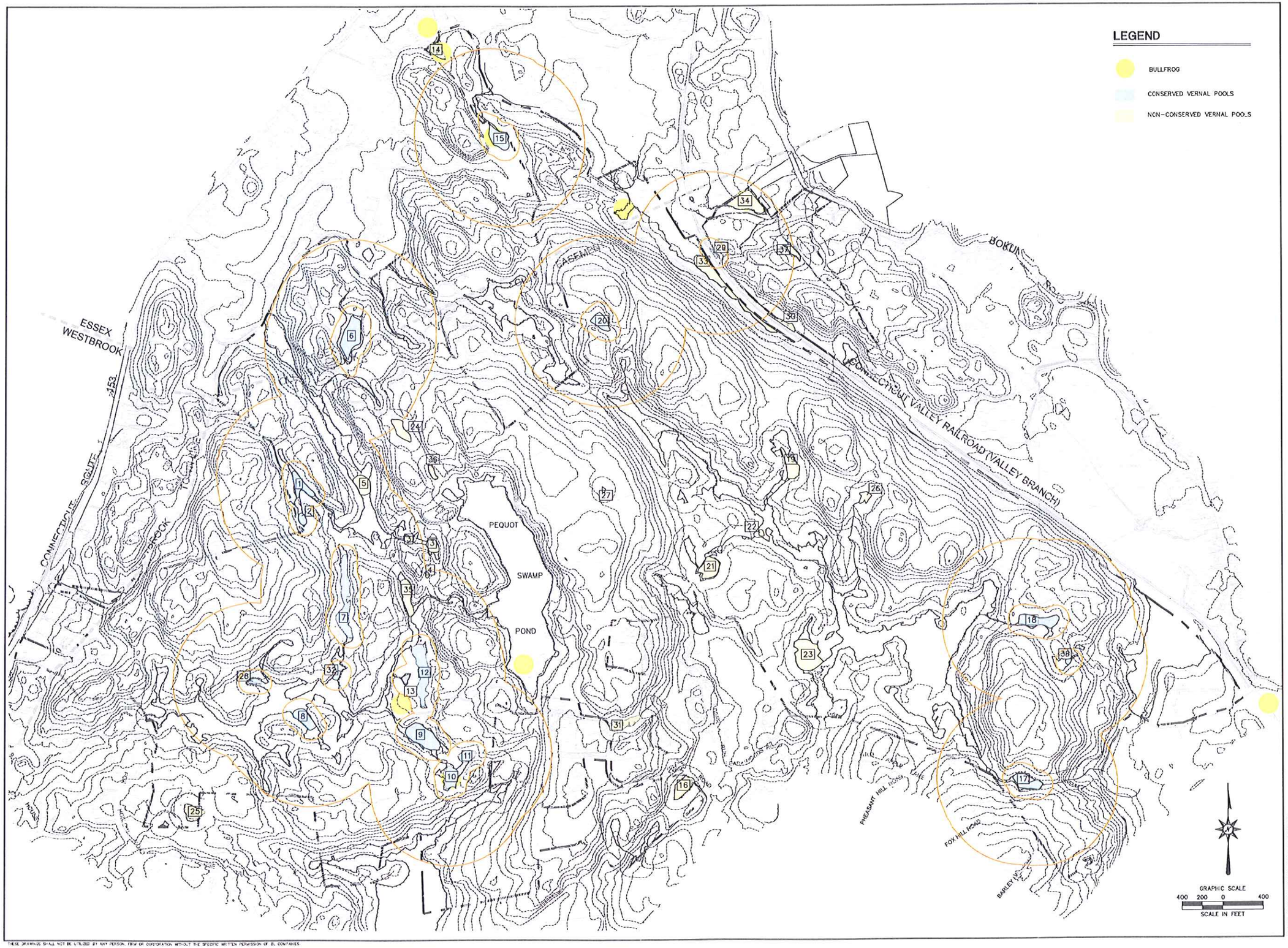
Scale	1"=400'
Project No.	01C955-F
Date	XX/XX/XX
CAD File	AMC95504

Title
AMPHIBIAN AND REPTILE OBSERVATIONS

Sheet No.
DISTRIBUTION MAP 12
REVISED

Xref (s): BC05504, XYZ5001, XYZ5002, XYZ5003



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2	8/23/05	SUPPLEMENTAL FIELD WORK

Designed	-
Drawn	K.T.
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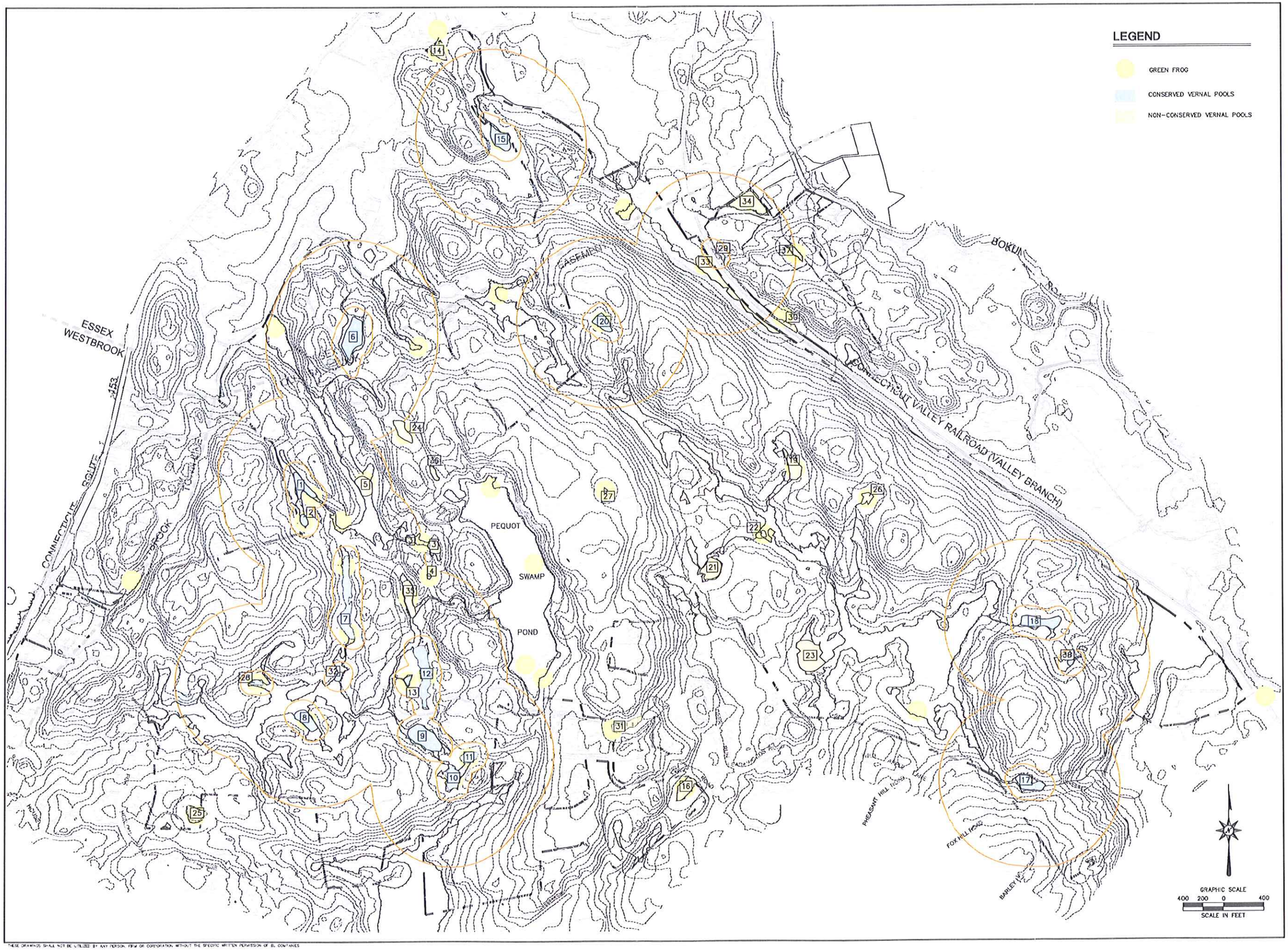
Approved	
Scale	1"=400'
Project No.	01C855-F
Date	XX/XX/XX
CAD File	AMC95504

Title
AMPHIBIAN AND REPTILE OBSERVATIONS

Sheet No.
DISTRIBUTION MAP 13
REVISED



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1 6/9/20 SUPPLEMENTAL FIELD WORK
2 8/23/20 SUPPLEMENTAL FIELD WORK

Designed	-
Drawn	K.T.
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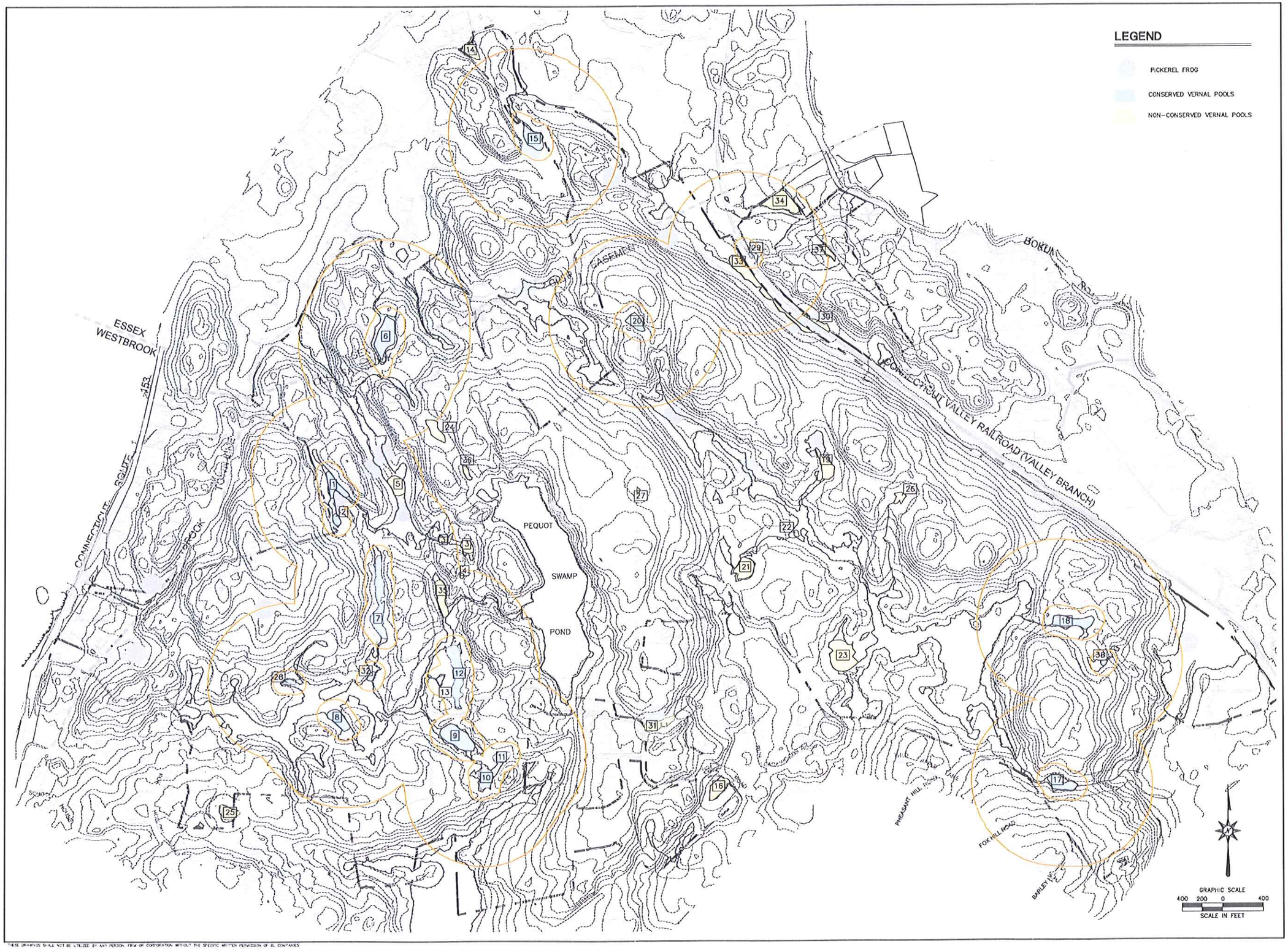
Scale	1"=400'
Project No.	01C955-F
Date	XX/XX/XX
CAD File	AMC95504

Title
AMPHIBIAN AND REPTILE OBSERVATIONS

Sheet No.
DISTRIBUTION MAP 14
REVISED

Xref (s): 80095504, XY95501, XY95502, XY95503



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1	6/9/05	SUPPLEMENTAL FIELD WORK
2	8/23/05	SUPPLEMENTAL FIELD WORK

Designed	-
Drawn	K.T.
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Scale	1"=400'
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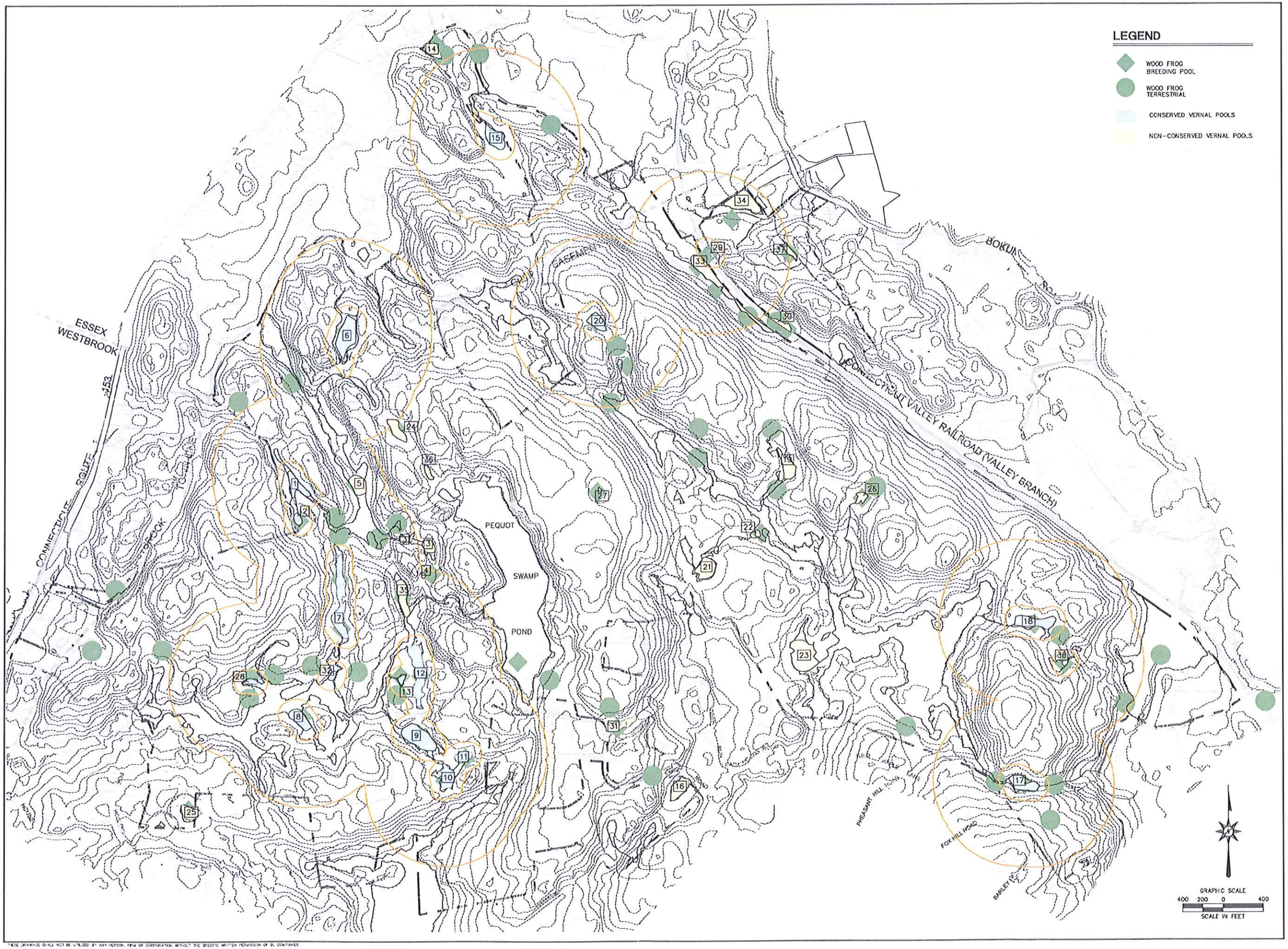
Date	XX/XX/XX
CAD File	AMC95504

Title
AMPHIBIAN AND REPTILE OBSERVATIONS

Sheet No.
DISTRIBUTION MAP 15
REVISED



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CAD File	AM095504

Title
AMPHIBIAN HABITAT

Sheet No.
DISTRIBUTION MAP 16
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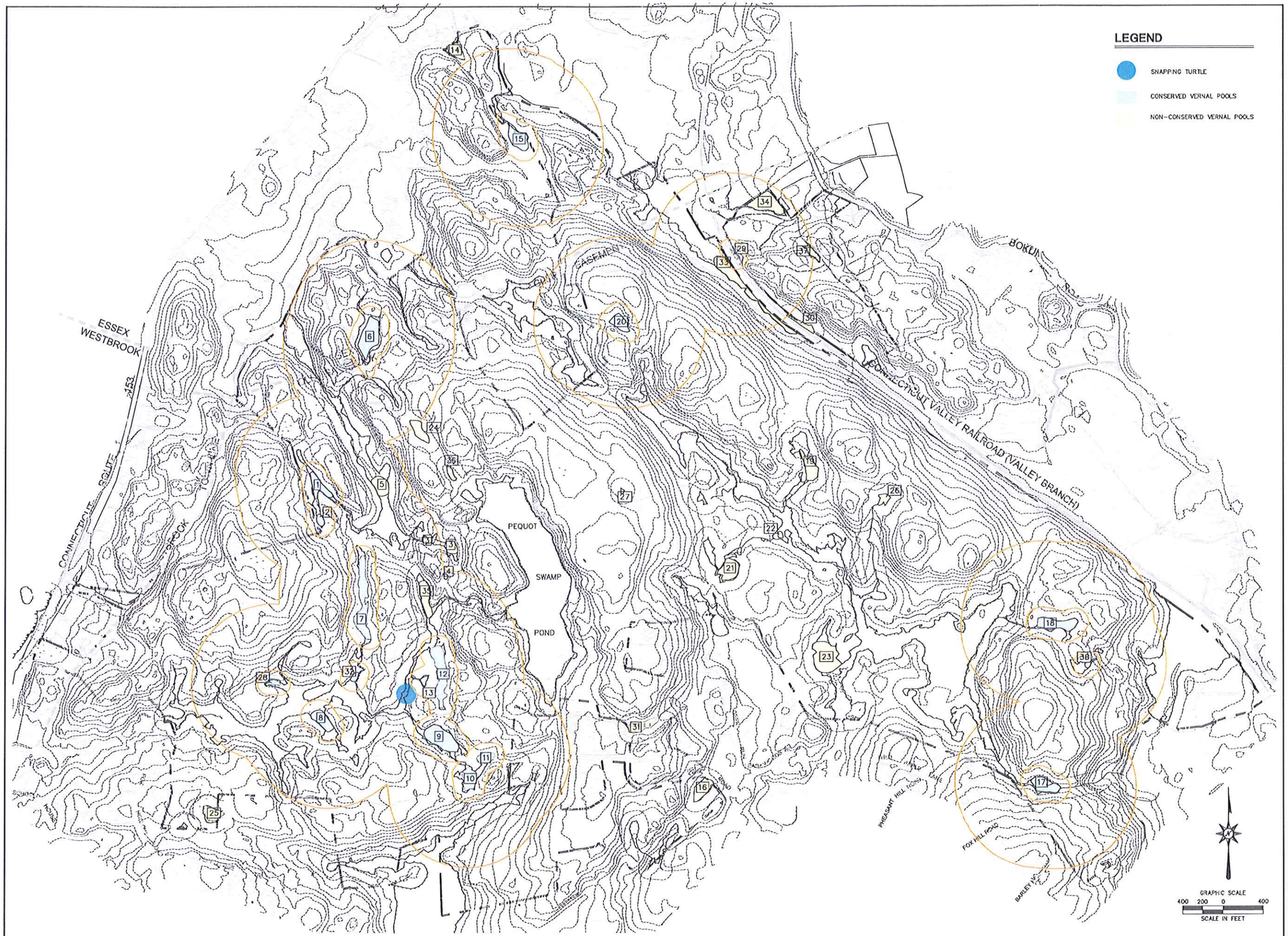

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THE PRESERVE
OLD SAYBROOK, WESTBROOK, ESSEX
MIDDLESEX COUNTY, CONNECTICUT

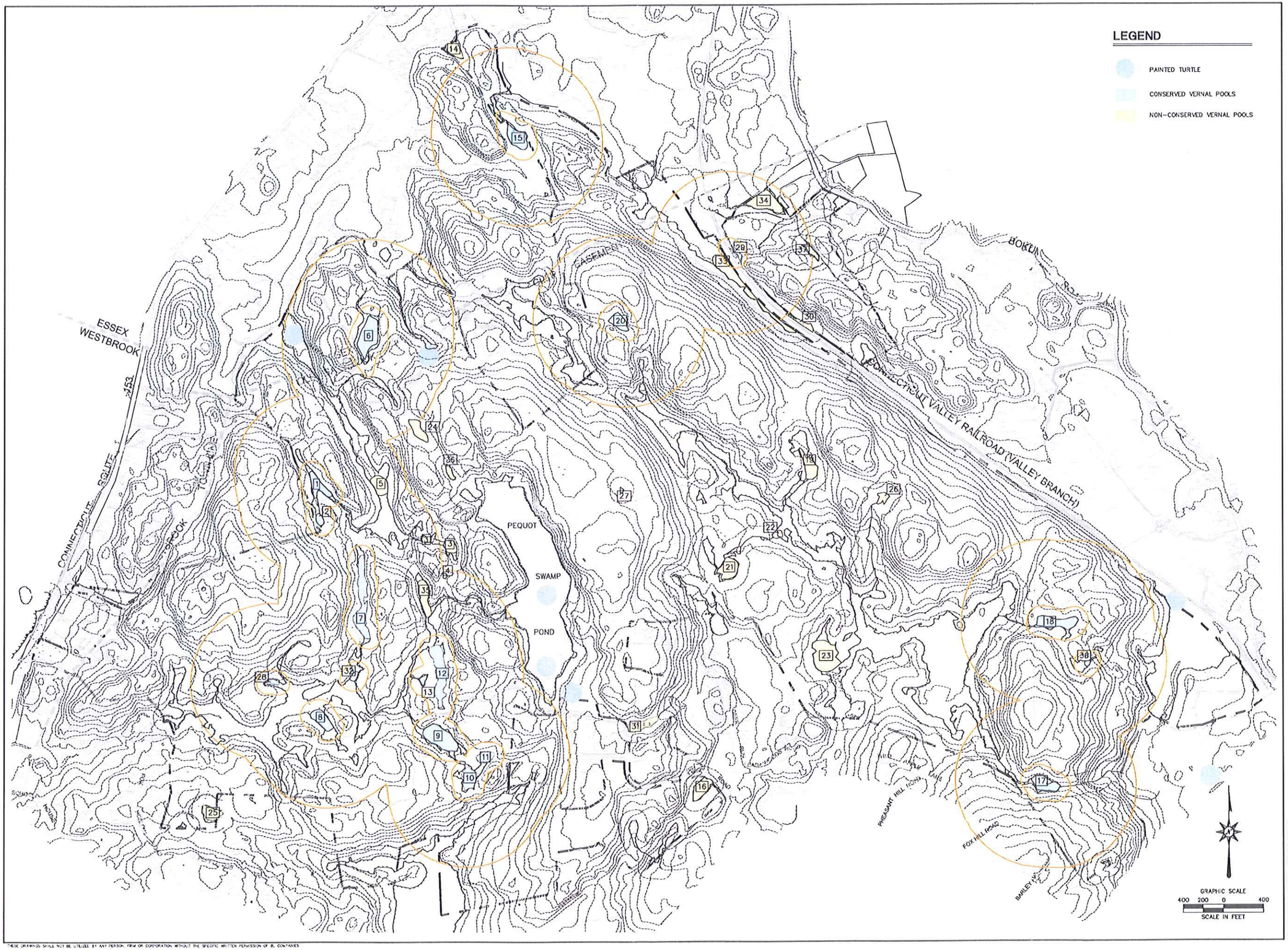
REVISIONS		
No.	Date	Desc.
1	6/9/05	SUPPLEMENTAL FIELD WORK
2	8/23/05	SUPPLEMENTAL FIELD WORK

Designed	-
Drawn	K.T.
Checked	
Approved	
Scale	1"=400'
Project No.	01C955-F
Date	XX/XX/XX
CAD File	AMC95501

Title
AMPHIBIAN AND REPTILE OBSERVATIONS

Sheet No.
DISTRIBUTION MAP 17
REVISED

Xref: C:\0_BLCOMPANIES_PROJECTS_XYZ\95501_XYZ\95501_XYZ\95503



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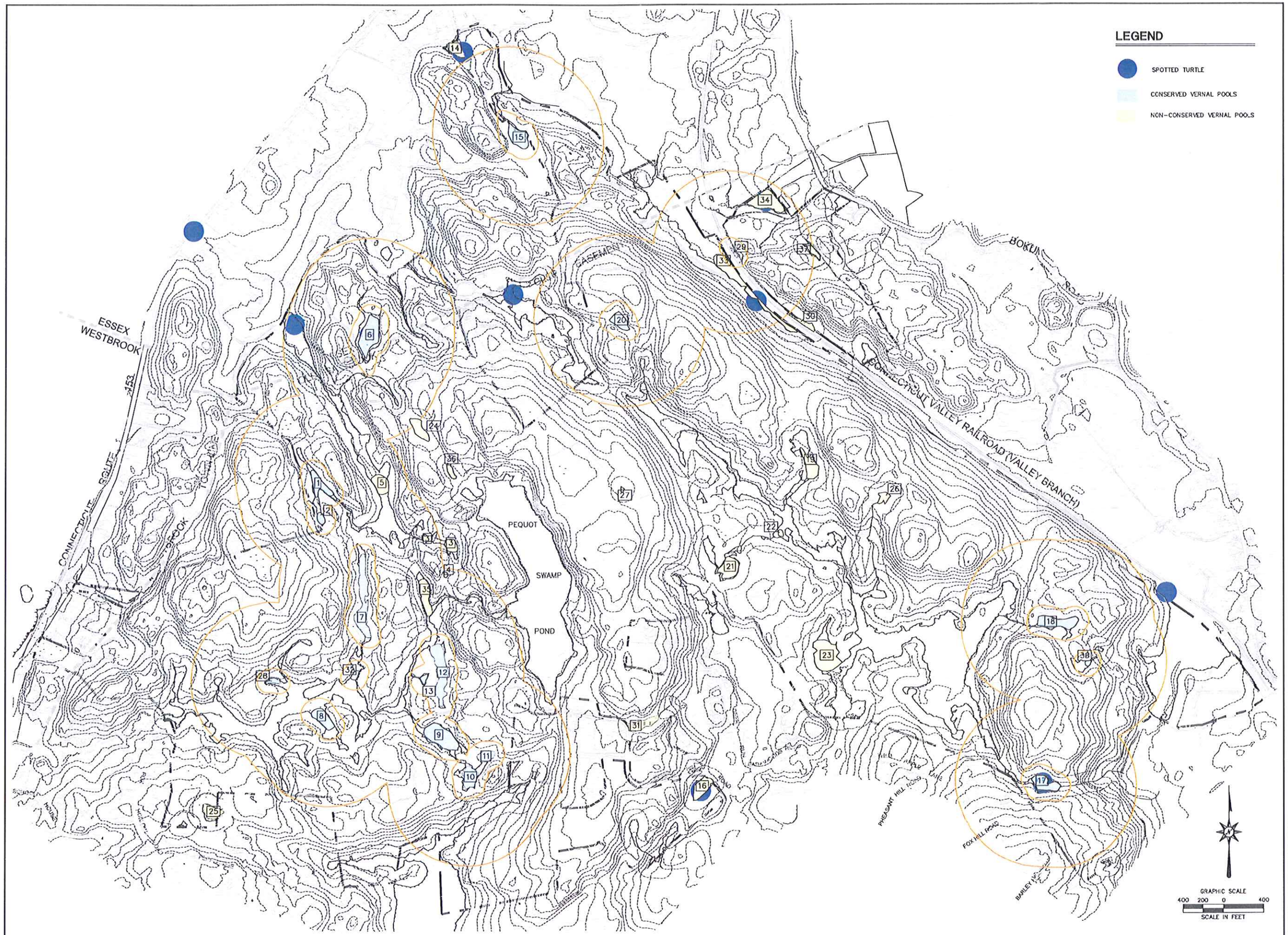
REVISIONS No.	Date	Desc.
1	6/9/03	SUPPLEMENTAL FIELD WORK
2	8/22/03	SUPPLEMENTAL FIELD WORK

Designed	X.X.X.
Drawn	K.T.
Checked	
Approved	
Scale	1"=400'
Project No.	01C955-F
Date	XX/XX/XX
CAD File	AMC95501

Title
AMPHIBIAN AND REPTILE OBSERVATIONS

Sheet No.
DISTRIBUTION MAP 18
REVISED

Xref (s): BOUNDARY, XYTOPO01, XYTOPO02, XYTOPO03



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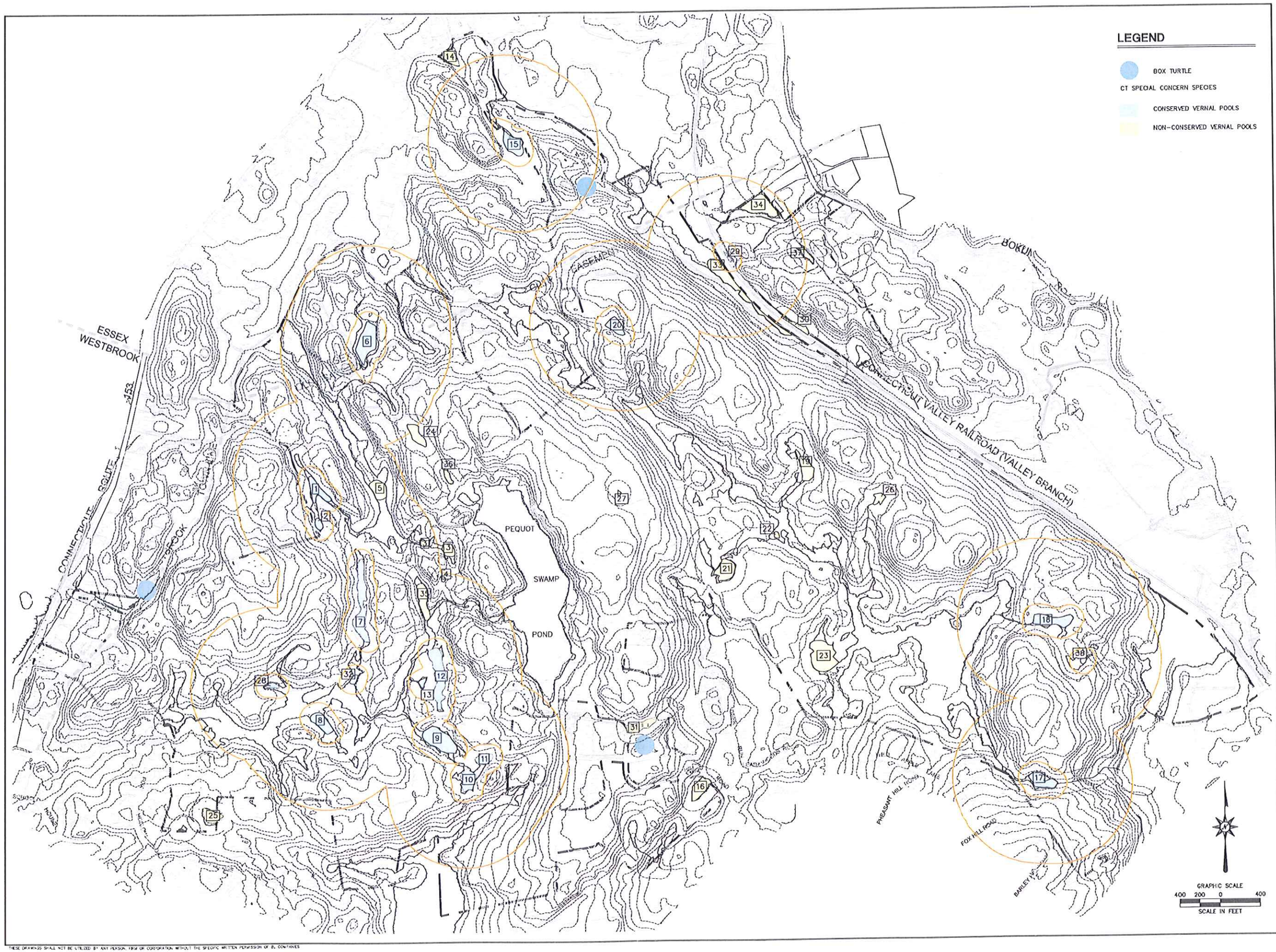
REVISIONS		
No.	Date	Desc.
1	6/9/05	SUPPLEMENTAL FIELD WORK
2	8/23/05	SUPPLEMENTAL FIELD WORK

Designed	-
Drawn	K.T.
Checked	
Approved	
Scale	1"=400'
Project No.	01C955-F
Date	XX/XX/XX
CAD File	AMC95501

Title
AMPHIBIAN AND REPTILE OBSERVATIONS

Sheet No.
DISTRIBUTION MAP 19
REVISED

Xref (s): BASE500A, XYZBASE01, XYZBASE02, XYZBASE03



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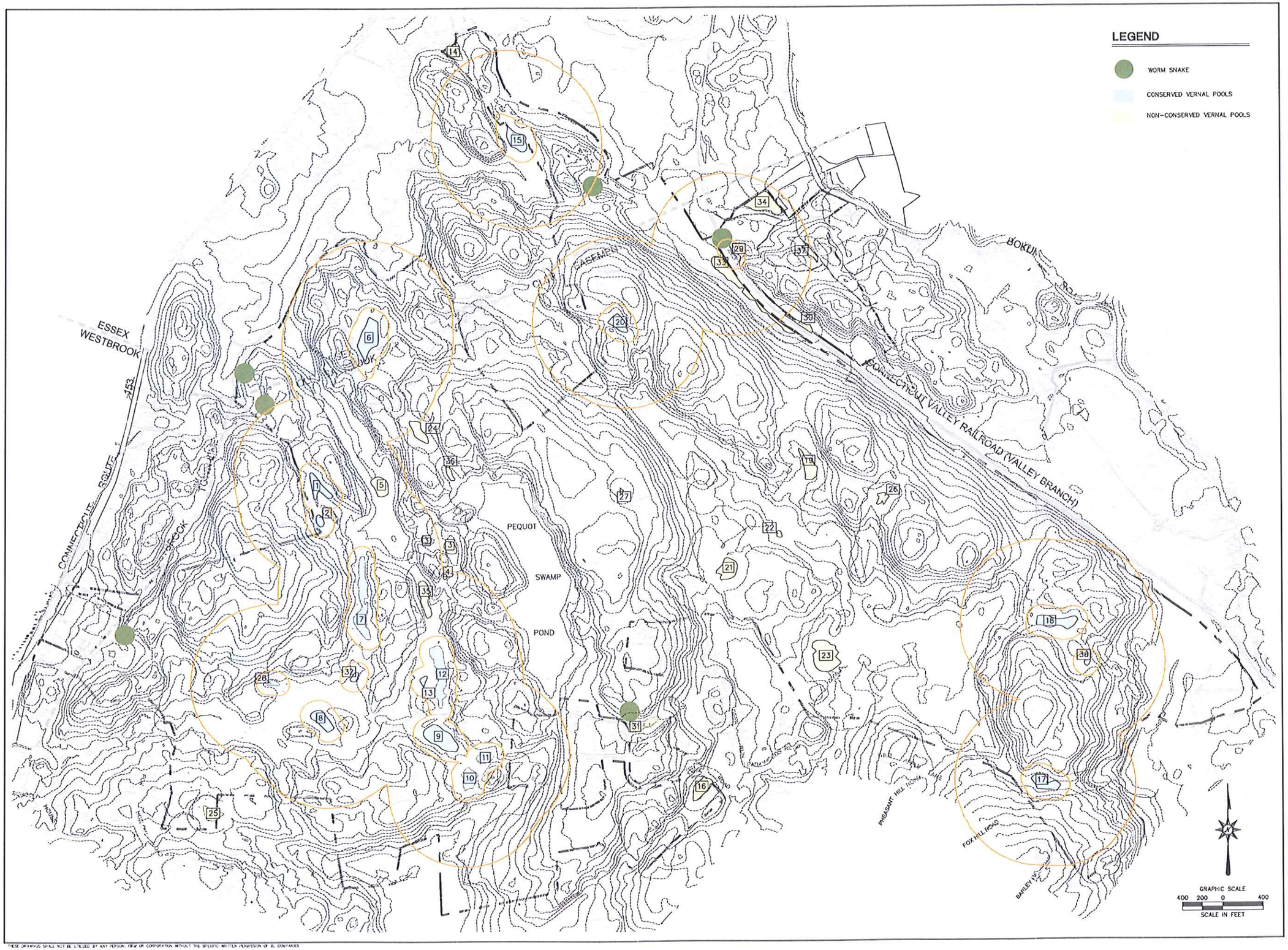
REVISIONS		
No.	Date	Desc.
1	6/9/05	SUPPLEMENTAL FIELD WORK
2	8/23/05	SUPPLEMENTAL FIELD WORK

Designed	-
Drawn	K.T.
Checked	
Approved	
Scale	1"= 400'
Project No.	010955-F
Date	xx/xx/xx
CAD File	AMC95501

Title
AMPHIBIAN AND REPTILE OBSERVATIONS

Sheet No.
DISTRIBUTION MAP 20
REVISED

Xref (s) 8000504, XYZ5501, XYZ5502, XYZ5503



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REVISIONS

No.	Date	Desc.
1	6/9/05	SUPPLEMENTAL FIELD WORK
2	8/23/05	SUPPLEMENTAL FIELD WORK

Designed	-
Drawn	K.T.
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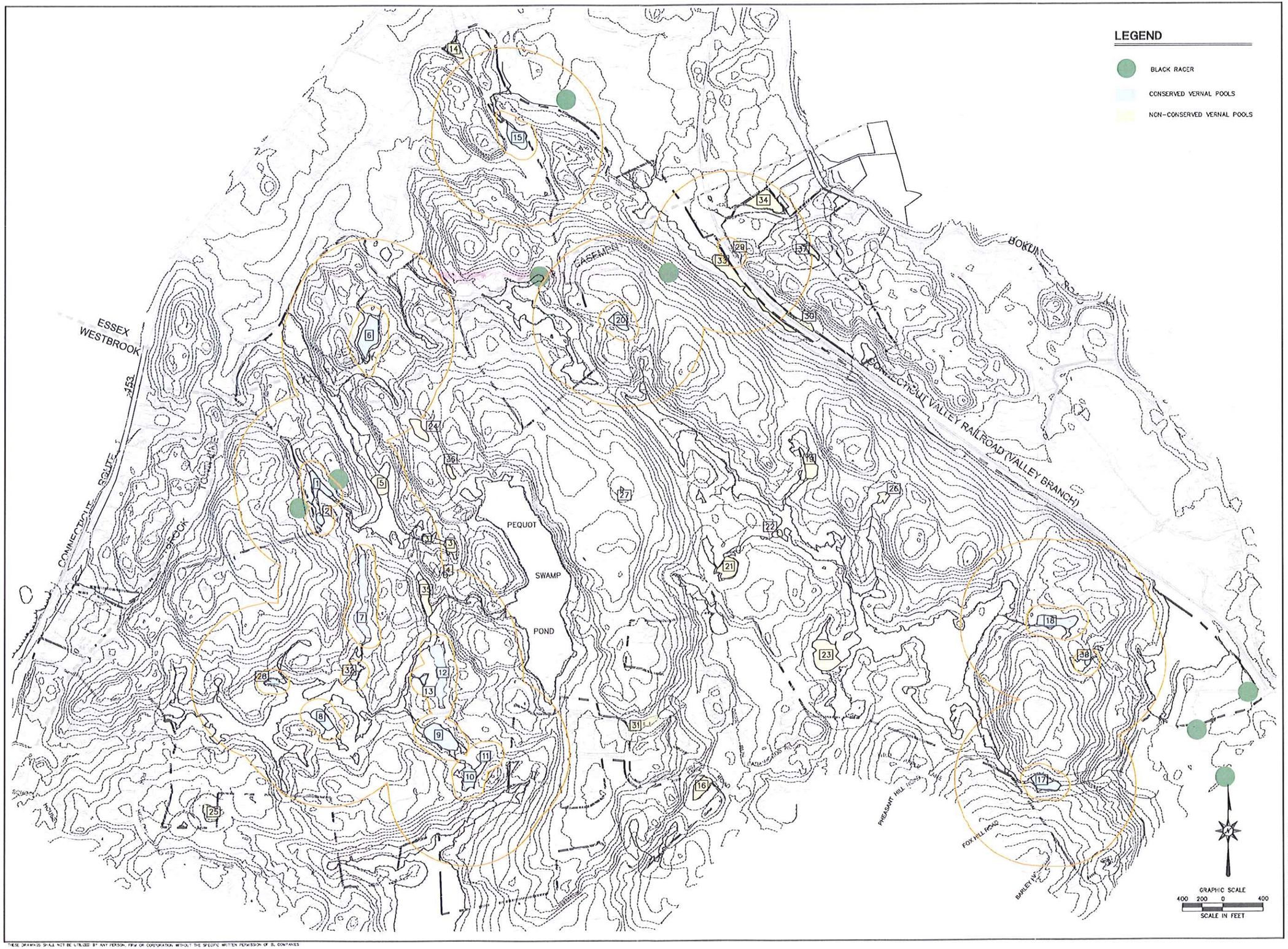
Approved	
Scale	1"=400'
Project No.	01C955-F
Date	XX/XX/XX
CAD File	AMC95502

Title
AMPHIBIAN AND REPTILE OBSERVATIONS

Sheet No.
DISTRIBUTION MAP 21
REVISED

Xref (s): 80095504, XY095501, XY095502, XY095503



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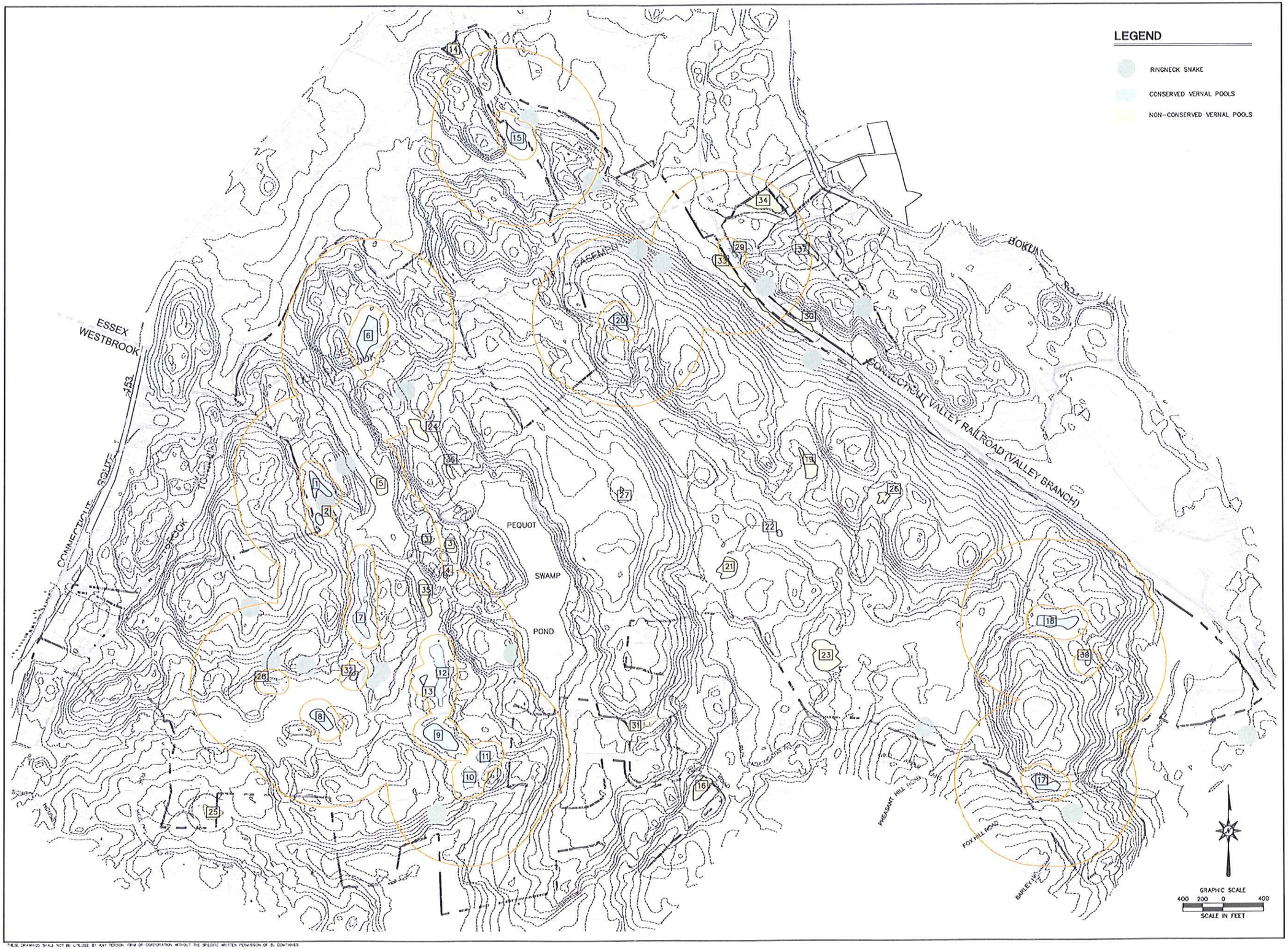
REVISIONS No.	Date	Desc.
1	6/9/05	SUPPLEMENTAL FIELD WORK
2	8/23/05	SUPPLEMENTAL FIELD WORK

Designed	-
Drawn	K.T.
Checked	
Approved	
Scale	1"=400'
Project No.	010955-F
Date	XX/XX/XX
CAD File	AM095503

Title
AMPHIBIAN AND REPTILE OBSERVATIONS

Sheet No.
DISTRIBUTION MAP 22
REVISED



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REVISIONS		
No.	Date	Desc.
1	6/9/05	SUPPLEMENTAL FIELD WORK
2	8/23/05	SUPPLEMENTAL FIELD WORK

Designed	-
Drawn	K.T.
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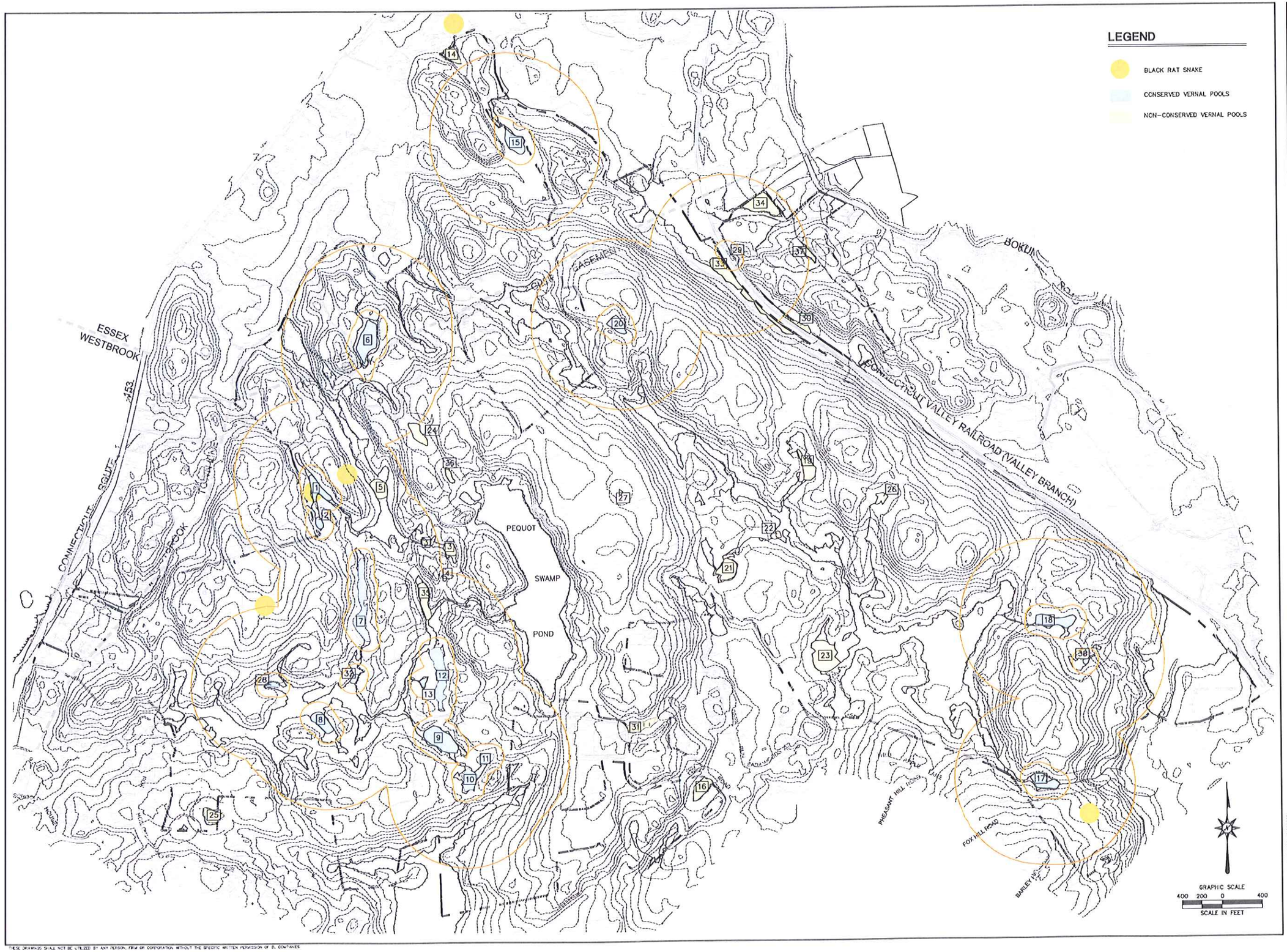
Approved	
Scale	1"=400'
Project No.	010955-F
Date	XX/XX/XX
CAD File	AMC95502

Title
AMPHIBIAN AND REPTILE OBSERVATIONS

Sheet No.
DISTRIBUTION MAP 23
REVISED

Xref G:\ 010955\04_XYD\5501, XYD\5502, XYD\5503



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REVISIONS
No. Date Desc.
1 6/9/05 SUPPLEMENTAL FIELD WORK
2 8/22/05 SUPPLEMENTAL FIELD WORK

Designed –
Drawn K.T.
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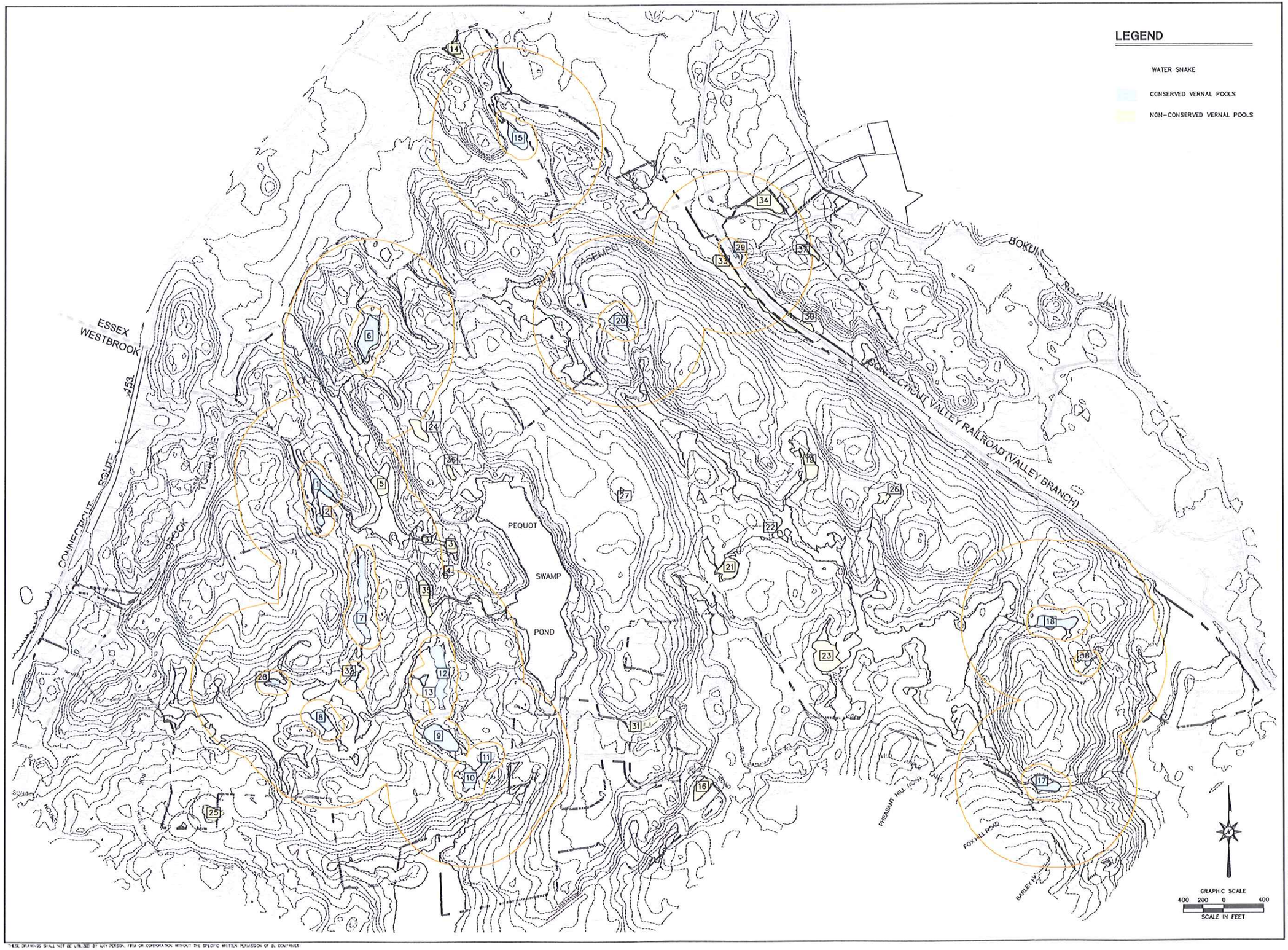
Approved
Scale 1" = 400'
Project No. 01C955-F
Date XX/XX/XX
CAD File AMC95503

Title
AMPHIBIAN AND REPTILE OBSERVATIONS

Sheet No.

DISTRIBUTION MAP 24
REVISED



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REVISIONS		
No.	Date	Desc.
1	6/9/05	SUPPLEMENTAL FIELD WORK
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Drawn	K.T.
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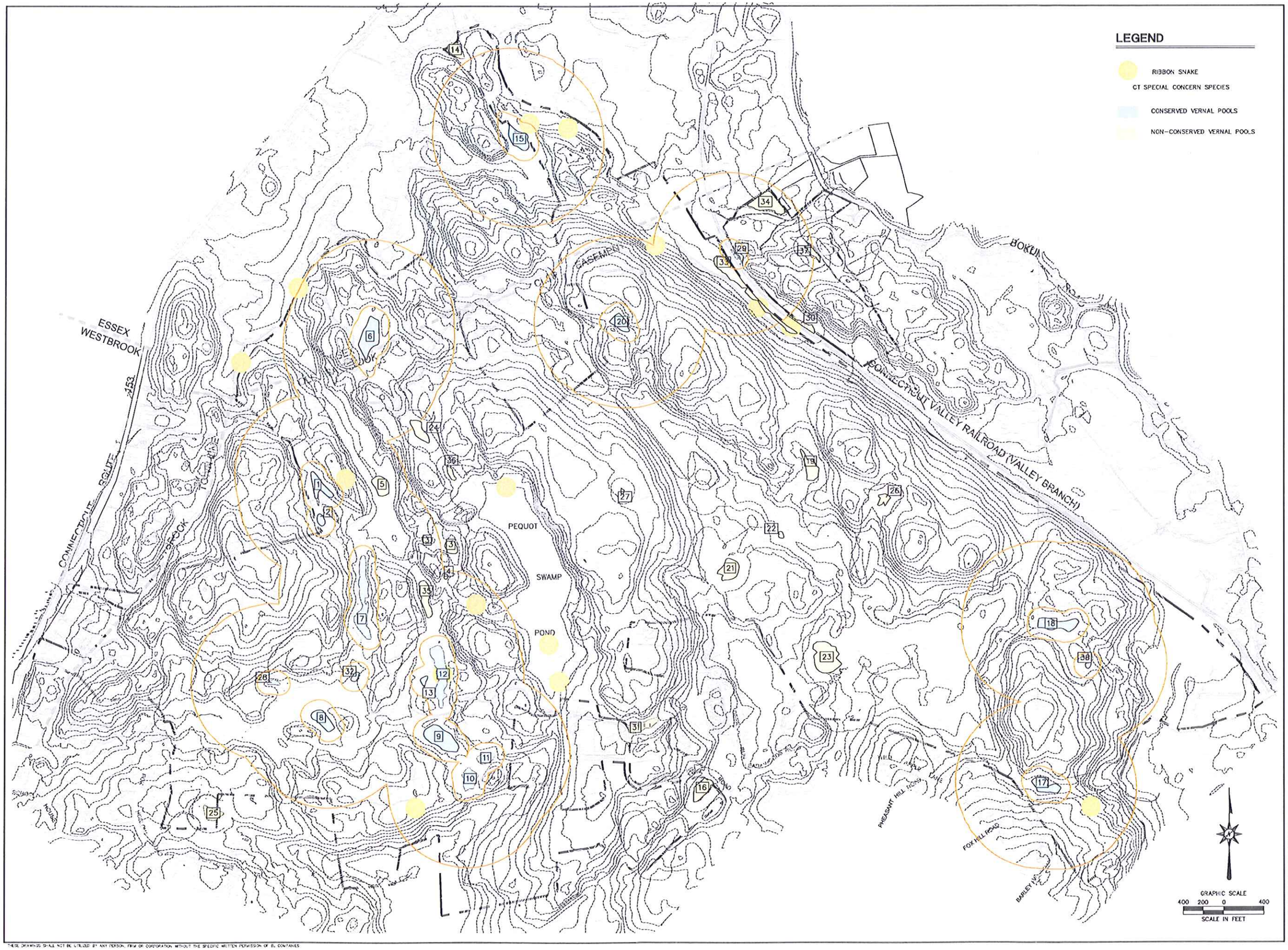
Approved	
Scale	1" = 400'
Project No.	01C955-F
Date	XX/XX/XX
CAD File	AMC95503

Title
AMPHIBIAN AND REPTILE OBSERVATIONS

Sheet No.
DISTRIBUTION MAP 25
REVISED

Xref: G:\01C955\A_XYZ\01C955_XYZ95503_XYZ95503_XYZ95503



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REVISIONS		
No.	Date	Desc.
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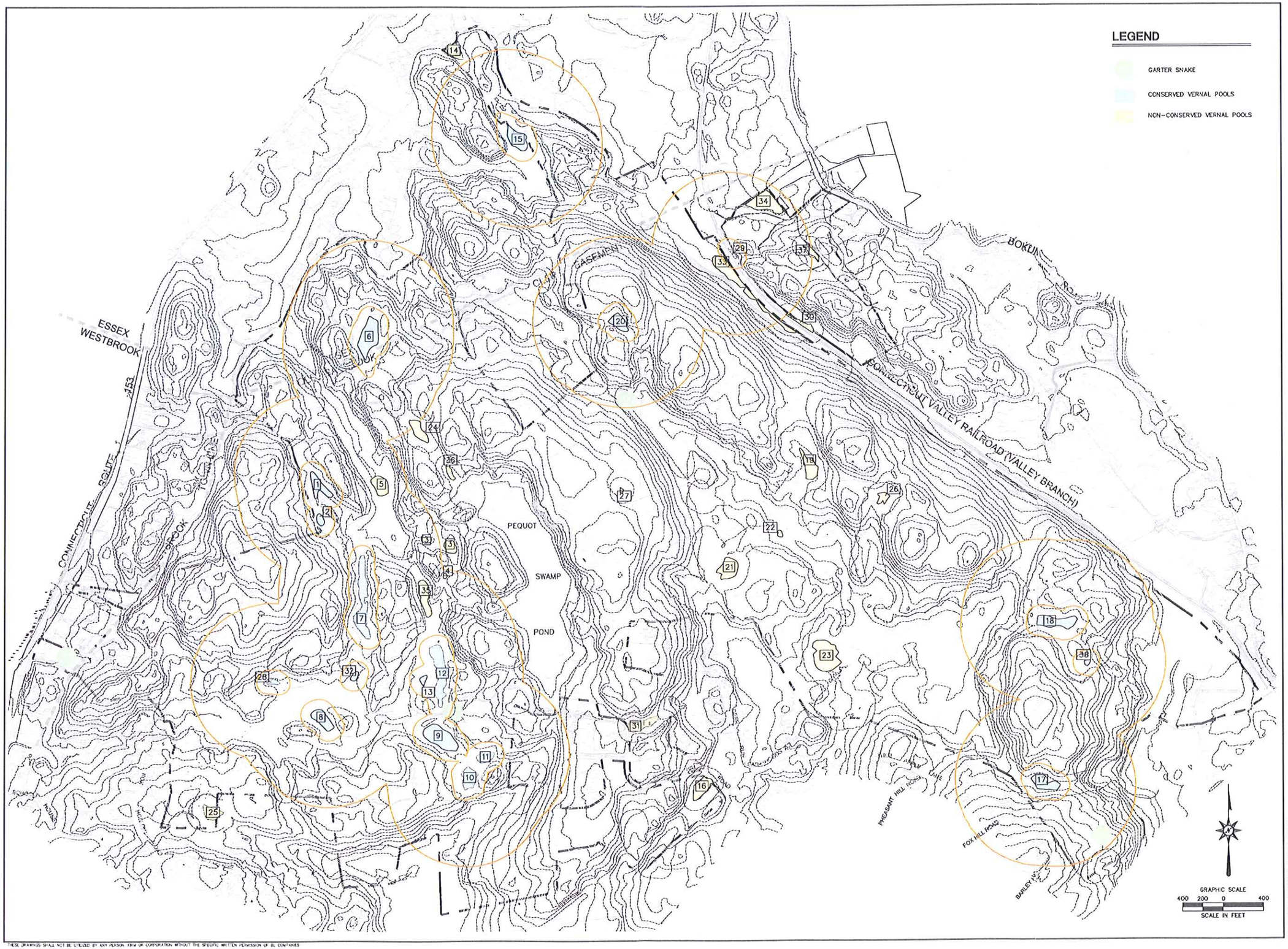
2	8/23/05	SUPPLEMENTAL FIELD WORK

Designed	-
Drawn	K.T.
Checked	
Approved	
Scale	1"=400'
Project No.	01C955-F
Date	XX/XX/XX
CAD File	AMC95502

Title
AMPHIBIAN AND REPTILE OBSERVATIONS

Sheet No.
DISTRIBUTION MAP 26
REVISED

J:\ref (c) 01C955\04_XYD\C502_XYD\C503_XYD\C503



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REVISIONS		
No.	Date	Desc.
1	6/9/05	SUPPLEMENTAL FIELD WORK
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Designed	X.X.X.
Drawn	K.T.
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Approved	
Scale	1" = 400'
Project No.	01C955-F
Date	XX/XX/XX
CAD File	AMC95502

Title
AMPHIBIAN AND REPTILE OBSERVATIONS

Sheet No.
DISTRIBUTION MAP 27
REVISED

TOWN	SITE AREA
OLD SAYBROOK	893.2 ± AC.
ESSEX	70.6± AC.
WESTBROOK	3.7± AC.
TOTAL	967.5± AC.

LEGEND

- CL & P EASEMENT
- WETLANDS
- 100 FT. WETLAND BUFFER
- CONSERVED VERNAL POOLS
- NON-CONSERVED VERNAL POOLS
- 750 FT. VERNAL POOL BUFFER (CONSERVED)

OBSERVATIONS LEGEND:
PRIORITY CONSERVATION SPECIES

CONNECTICUT LISTED SPECIAL CONCERN SPECIES

- BOX TURTLE
- RIBBON SNAKE

VERNAL POOL OBLIGATE SPECIES

- SPOTTED SALAMANDER BREEDING POOL
- SPOTTED SALAMANDER TERRESTRIAL
- MARBLED SALAMANDER BREEDING POOL
- MARBLED SALAMANDER TERRESTRIAL
- WOOD FROG BREEDING POOL
- WOOD FROG TERRESTRIAL

VERNAL POOL FACULTATIVE SPECIES

- FOUR TOED SALAMANDER
- RED SPOTTED NEWT BREEDING POOL
- RED SPOTTED NEWT TERRESTRIAL
- GRAY TREEFROG
- SPOTTED TURTLE

ESSEX
WESTBROOK
OLD SAYBROOK
EASEMENT
BOKUM ROAD
CONNECTICUT VALLEY RAILROAD (VALLEY BRANCH)
CONNECTICUT ROUTE 153
TOWN LINE
SCHOOL HOUSE
HOLLAND ROAD
PERRY ROAD
DEEP RUN
MEADOWOODS ROAD
RIVER ROAD
WILD APPLE LANE
PHEASANT HILL ROAD
FOX HILL ROAD
BARLEY NECK ROAD

GRAPHIC SCALE
400 200 0 400
SCALE IN FEET

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Drawn	K.T.
Checked	
Approved	
Scale	1"=400'
Project No.	01C955-F
Date	XX/XX/XX
CAD File	AMC95509

Title
ECOLOGICAL CONNECTIVITY
VERNAL POOL STEPPING STONES
INTO UPLAND HABITAT

Sheet No.

DISTRIBUTION MAP 28

REVISED

Sep 12, 2005 3:31pm K:\Design Fi\JOBS01\01c955-f\dwg\Wetlnd\AMC95509.dwg
Layout: 11x17 OVERALL