

Valhalla at Brandywine Project
Wallace Township, Chester County

Bog Turtle (*Clemmys muhlenbergii*) Phase II
Survey and Phase III Trapping Effort Report



Prepared By



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August 2007

**VALHALLA AT BRANDYWINE PROJECT
WALLACE TOWNSHIP
CHESTER COUNTY**

**BOG TURTLE (*Clemmys muhlenbergii*) PHASE II
SURVEY AND PHASE III TRAPPING EFFORT REPORT**

PREPARED FOR

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R07-0269:001

EXECUTIVE SUMMARY

Skelly and Loy, Inc. has prepared this Phase II Bog Turtle (*Clemmys muhlenbergii*) Species Survey Report as part of the engineering and environmental studies associated with the Valhalla at Brandywine property in Wallace Township, Chester County, Pennsylvania. The proposed project entails the development of an approximately 320-acre tract for use as a golf course, spa, and residential community. Conceptual engineering and planning are currently being evaluated for the proposed project. A project location map is included in Appendix I.

Chester County is located within the extant range of the northern population of the bog turtle (*Clemmys muhlenbergii*). The bog turtle is a small, semiaquatic turtle which is listed as federally threatened under the Federal Endangered Species Act and state endangered under the Pennsylvania Fish and Boat Code. Jurisdiction over the species under the Federal Endangered Species Act rests with the United States Fish and Wildlife Service (USFWS). Jurisdiction over the species under the Pennsylvania Fish and Boat Code rests with the Pennsylvania Fish and Boat Commission (PFBC).

The proposed development tract is bisected laterally by Marshall Road. It is bordered on the east by Conestoga Road. Existing land cover/land use throughout the project area consists of mature deciduous forest, scrub-shrub successional habitat, and riparian corridor. The project is located within a transitional section of urban development and rural agricultural land use within northern Chester County. Surface water resources associated with the project area are located within the drainage basin of The East Branch of the Brandywine Creek, a High Quality (HQ) - Trout Stock Fishes (TSF) and Migratory Fishes (MF) designated stream.

In response to the potential for interaction with the species by the proposed project, Skelly and Loy conducted a Phase I species habitat assessment on April 6, 2007, to determine the presence/absence of conditions suitable for species support. Wetland/watercourse habitats within the property boundaries of the Valhalla at Brandywine tract were extensive, as was indicated by a wetland delineation performed by Mr. Steve Wheeler of Wheeler Environmental Services. Visual observations suggested that some habitat conditions within this large wetland complex were consistent with the characteristics of potential species habitat.

The potential for impacts to the bog turtle is typically evaluated within 300 feet of a proposed project through the identification of all areas that will be permanently or temporarily affected by any and all project features including buildings, roads, staging areas, utility lines, outfall and intake



structures, wells, stormwater retention or detention basins, parking lots, driveways, lawns, etc. The hydrological effects of some projects have the potential to extend beyond the direct footprint of the project due to the effects that impervious surfaces or groundwater pumping may have on the hydrology of nearby groundwater-dependent wetlands. Avoidance of direct and indirect effects refers to no disturbance to or encroachment into wetlands or connecting stream corridors through filling, ditching, or draining for any project-associated features or activities. Adverse effects may also be anticipated to occur when lot lines include portions of the wetlands, when an adequate upland buffer is not retained around the wetlands, or when roads, stormwater basins, impervious surfaces, or wells may affect the hydrology of the wetlands. No direct impacts to the wetland complex are proposed by the Earth Companies land development project design.

Phase II species surveys were conducted in the Designated Survey Area (DSA) during the period between May 2 and June 14, 2007, within potentially suitable habitat components of the wetland complex to validate the presence or probable absence of the species. The overall wetland acreage was 32 acres; however, the DSA was determined to include 10 acres. A map containing the wetland boundaries, photograph locations, and the DSA is located in Appendix II.

Instead of the required four surveys, the wetlands within the property was surveyed on six occasions at the request of the client. The Phase II species surveys were conducted according to the protocol of the *USFWS Guidelines for Bog Turtle Surveys, April 2006*. In addition, a supplemental trapping effort was undertaken within core habitat areas of the wetland complex. Given the vegetative and groundwater hydrology characteristics of this wetland complex, an array of 80 traps was deployed throughout the core habitat area during the period between May 17 and June 7, 2007. This trapping period was chosen to coincide with the activity period of the species, thus increasing the likelihood of species capture. The trapping efforts were conducted in accordance with the *Draft USFWS Bog Turtle Trapping Survey Protocol (2007)*. The trapping procedures functioned to augment the Phase II species survey efforts. The Phase II survey and supplemental trapping effort were completed under authorization granted by the PFBC Scientific Collector's Permit 2007 No. 001, Type III (R).

The bog turtle survey efforts were concentrated throughout the wetland areas with components of suitable habitat for the species. The areas of emphasis throughout the DSA included components of emergent vegetation with mucky soils and persistent groundwater interaction. The amount of effort expended per survey event was consistent with the maximum required effort of the *USFWS Guidelines for Bog Turtle Surveys, April 2006*.



Habitat conditions are suitable for the support of the species within components of the wetland complex; however, no bog turtles were located during the 2007 survey efforts. Therefore, based on these survey results, the species is probably absent from the wetland complex area. It should be noted that the wetland habitat was intensively surveyed during the investigations.

Other species of herptofauna were observed during the context of the bog turtle surveys. These species included the American toad, green frog, pickerel frog, wood frog, snapping turtle, garter snake, northern water snake, wood turtle, spotted turtle, snapping turtle, box turtle, and two-lined salamander.

INTRODUCTION

The Valhalla at Brandywine project in Wallace Township, Chester County, Pennsylvania, consists of the development of an approximately 320-acre tract for use as a golf course, spa, and residential community. Conceptual engineering and planning are currently being evaluated for the proposed land development project.

The proposed development tract is bisected laterally by Marshall Road. It is bordered on the east by Conestoga Road. A small unnamed tributary in the northern portion of the property flows to the East Branch of the Brandywine Creek, a High Quality (HQ), - Trout Stock Fisheries (TSF) and Migratory Fishes (MF) designated stream. The East Branch of the Brandywine is located adjacent to the western property border.

The project consists of 2 parcels of land. One parcel, to the north of Marshall Road, will be used for the construction of the golf course, clubhouse, and spa facility. The northern portion of the property is approximately 260 acres. Existing land cover/land use throughout the northern portion of the property consists of an existing farmstead, stream corridor, and secondary successional and mature forests. Some of the northern portion of the property was used as dairy farm during the first half of the 1900's, however, this ceased at least 50 years ago.

The other parcel, to the south of Marshall Road, will be used as a residential area. The southern portion of the property is approximately 60 acres and consists of an abandoned quarry. The property is covered with a mixture of disturbed land, secondary successional fields, scrub/shrub, and secondary successional forests. Other than two pond, this portion of the property does not contain wetlands.

The bog turtle is a small, semiaquatic turtle which is listed as federally threatened under the Federal Endangered Species Act and state endangered under the Pennsylvania Fish and Boat Code. Jurisdiction over the species under the Federal Endangered Species Act rests with the USFWS. Jurisdiction over the species under the Pennsylvania Fish and Boat Code rests with the PFBC. Chester County is located within the extant range of the northern population of the species.

The species typically inhabits emergent wetland in meadows and pastures with a persistent source of groundwater springs and seeps which induce the development of thick, organic, mucky soil conditions. Potential habitat for the species is typically recognized by the presence of three criteria: suitable hydrology, suitable soil conditions, and suitable vegetative characteristics. Suitable hydrology, soils, and vegetation are necessary to provide critical wintering sites for hibernation (soft muck, peat, burrows, root systems, of woody vegetation) and nesting habitats (open areas with tussock-forming vegetation) for this species. It is important to note that one or more of these criteria may be absent from portions of a wetland supporting bog turtles. The bog turtle can inhabit disturbed, low-quality wetland complexes, often with semi-closed canopies. The species is also known to be transient in forested habitat that is associated with springs and small streams leading to more open marshes. If suitable criteria are present, the entire wetland habitat is considered to be potential bog turtle habitat, regardless of the extent of the wetland or property boundaries.

Wetland/watercourse habitats within the property boundaries of the Valhalla at Brandywine property as determined by Wheeler Environmental, were limited to the area north of Marshall Road. The only wetlands south of Marshall Road consisted of two large palustrine open water (POW) ponds. These ponds were the result of the former land use as a quarry. The wetland complex north of Marshall Road appeared to be supported by various hydrologic sources including persistent groundwater regimes and surface water from steep slopes in the northern and eastern portion of the property.

In response to the potential for interaction with the species by the proposed project, Skelly and Loy conducted a Phase I species habitat assessment on November 2, 2006, to determine the presence/absence of conditions suitable for species support. Visual observations during the Phase I habitat assessment suggested that habitat conditions within portions of the wetland complex were consistent with the characteristics of potential species habitat.

PHASE II SPECIES SURVEY DETAILS

The potential for impacts to the bog turtle is typically evaluated within 300 feet of a proposed project through the identification of all areas that will be permanently or temporarily affected by any and all project features, including buildings, roads, staging areas, utility lines, outfall and intake structures, wells, stormwater retention or detention basins, parking lots, driveways, lawns, etc. The hydrological effects of some projects have the potential to extend beyond the direct footprint of the project due to the effects that impervious surfaces or groundwater pumping may have on the hydrology of nearby groundwater-dependent wetlands. Avoidance of direct and indirect effects refers to no disturbance to or encroachment into wetlands or connecting stream corridors through filling, ditching, or draining for any project-associated features or activities. Adverse effects may also be anticipated to occur when lot lines include portions of the wetlands; when an adequate upland buffer is not retained around the wetlands; or when roads, stormwater basins, impervious surfaces, or wells may affect the hydrology of the wetlands. If proposed project activities cannot be avoided within 300 feet of potential bog turtle habitat, then a formal Phase II Species Survey to determine the presence or probable absence of the species in the wetlands may be required by the USFWS and PFBC.

In recognition of potential species habitat within the proposed project limits, Phase II species surveys were conducted on the wetland complex to validate the presence or probable absence of the species in this location. The Phase II surveys were conducted according to the protocol of the *USFWS Guidelines for Bog Turtle Surveys, April 2006*. The Phase II surveys were completed under authorization granted by the PFBC Scientific Collector's Permit 2007 No. 001, Type III (R).

Six surveys of the wetland complex area were conducted during the period between April 30 and May 21, 2007. Surveys were conducted under the direction of USFWS- and PFBC-recognized bog turtle surveyors, Ms. Teresa Amitrone, Mr. Ben Berra, and Mr. Andy Brookens. Five of the six surveys were conducted during the month of May (May 2, 9, 17, 24, and 31). One survey was conducted on June 7. The surveys were conducted during appropriate weather conditions as specified by the USFWS Bog Turtle Survey Guidelines.

Phase II species surveys were conducted within the DSA of the wetland complex. The DSA is defined by the survey guidelines to be those areas of the wetlands that meet the soils, hydrology, and vegetation criteria for potential bog turtle habitat. These areas may occur within the



emergent, scrub-shrub, or forested parts of the wetlands. The designated survey area within the wetland complex included the mosaic habitat components of emergent vegetation with mucky soils and groundwater interaction. Species survey techniques included random opportunistic visual scanning, transect scanning, probing, and muddling through the soil substrate. Representative photographs of the surveyed potential habitat areas are located in Appendix III and are numbered 1 through 15.

WETLAND	HABITAT CHARACTERIZATION	APPROXIMATE WETLAND SIZE (ACRES)	DESIGNATED SURVEY AREA (ACRES)
Wetland Complex	<p>The wetland complex is located adjacent to the east bank of the East Branch of the Brandywine Creek. Hydrology to this wetland complex appears to be provided by persistent groundwater regimes and surface water from the surrounding wooded slopes.</p> <p>A channel located in the northern portion of the site contributes to the hydrology of the regime; however, it becomes less defined and provides overland waterflow to the lower portion of the system.</p> <p>Characteristic vegetation in this habitat which was evident during the field investigation consisted of reed canary grass, soft rush, sedge species, tearthumb, watercress, skunk cabbage, and red maple. Soil conditions within the complex consist primarily of a mucky substrate 2 to 36 inches in depth. Based on these observations, the complex can be characterized as a large persistent habitat with mosaics of shallow groundwater and mucky soil conditions, considered to habitat. A small-scale oxbow stream is located in the western portion of the site. Overall, the wetlands within the site are dynamic; during rain events, the channels within the wetland are flooded due to a man-made berm associated with a rail line in the southern portion of the wetland complex. Water flow is greatly increased during this time and the channels become flooded, encroaching over the banks.</p> <p>Palustrine Emergent 05% - Scrub Shrub 05% - Palustrine Forest: 90%</p>	32	10



TABLE 1
VALHALLA AT BRANDYWINE PROJECT
PHASE II BOG TURTLE SPECIES SURVEY DETAILS
WETLAND COMPLEX HABITAT AREA
TOTAL DESIGNATED SURVEY AREA: 10 ACRES

DATE OF SURVEY	SURVEYORS	SURVEY CONDITIONS	SURVEY EFFORT	HERPTILES ENCOUNTERED (TABLE 2)
05/02/07	E. Bruggeman K. Thompson T. Amitrone* A. Nevin A. Brookens*	Start: Ambient Temperature: 65.1°F Ambient. Humidity: 60% Avg. Wind Speed: 2.0 mph Soil/Water Temperature: 51.8°F Cloud Cover: 10% Finish: Ambient Temperature: 84.0°F Ambient. Humidity: 35% Avg. Wind Speed: 1.5 mph Cloud Cover: 10%	08:30 - 17:30 (45) person-hours of effort)	Numerous Green Frogs American Toad Snapping Turtle (Dead) Box Turtle Numerous Pickerel Frogs (2) Garter Snakes Unknown Salamander
05/07/07	A. Brookens* B. Berra* T. Amitrone* A. Nevin L. Singer R. Leiberher J. O'Herron A. Dunay K. Starner G. Orris K. Thompson B. Orwan	Start: Ambient Temperature: 69.4°F Ambient. Humidity: 58% Avg. Wind Speed: 0.5 mph Soil/Water Temperature: 54.0°F Cloud Cover: 0% Finish: Ambient Temperature: 83.0°F Ambient. Humidity: 78% Avg. Wind Speed: 0.5 mph Cloud Cover: 25%	09:30 - 15:00 (66 person-hours of effort)	Numerous Green Frogs Numerous Pickerel Frogs Painted Turtle - juvenile
05/17/07	T. Amitrone* B. Berra* J. O'Herron R. Leiberher K. Starner G. Orris K. Thompson L. Collum L. Singer A. Nevin A. Dunay R. Sheidy E. Bruggeman	Start: Ambient Temperature: 78.0°F Ambient. Humidity: 28% Avg. Wind Speed: 0.9 mph Soil/Water Temperature: 53.0°F Cloud Cover: 0% Finish: Ambient Temperature: 80°F Ambient. Humidity: 30% Avg. Wind Speed: 0.5 mph Cloud Cover: 0 (Bog turtle trap deployment)	09:30 - 15:30 (78 man-hours of effort)	Numerous Green Frogs (2) Snapping Turtles Wood Turtle Spotted Turtle



**TABLE 1
(CONTINUED)**

DATE OF SURVEY	SURVEYORS	SURVEY CONDITIONS	SURVEY EFFORT	HERPTILES ENCOUNTERED (TABLE 2)
05/24/07	T. Amitrone* B. Berra* K. Thompson A. Nevin J. O'Herron B. Orwan L. Collum E. Bruggeman A. Dunay G. Orris	Start: Ambient Temperature: 72.0°F Ambient. Humidity: 39% Avg. Wind Speed: 0.5 mph Soil/Water Temperature: 55°F Cloud Cover: 0% Finish: Ambient Temperature: 74.0°F Ambient. Humidity: 45% Avg. Wind Speed: 0 mph Cloud Cover: 0%	8:15 - 15:30 (62.5 person-hours of effort)	Numerous Pickerel Frogs Numerous Green Frogs Spotted Turtle Wood Frog
05/31/07	T. Amitrone* K. Thompson R. Leiberher S. Stees J. O'Herron B. Orwan G. Orris E. Bruggeman L. Collum A. Dunay	Start: Ambient Temperature: 75.0°F Ambient. Humidity: 45% Avg. Wind Speed: 0 mph Soil/Water Temperature: 55°F Cloud Cover: 0% Finish: Ambient Temperature: 79.0°F Ambient. Humidity: 45% Avg. Wind Speed: 0 mph Cloud Cover: 0%	08:00 - 14:30 (65 person-hours of effort)	Wood Turtle American Toad Numerous Green Frogs (3) Wood Frogs Snapping Turtle Numerous Pickerel Frogs
06/07/07	T. Amitrone* J. O'Herron E. Bruggeman K. Thompson A. Dunay B. Orwan K. Starner L. Collum L. Singer	Start: Ambient Temperature: 74.0°F Ambient. Humidity: 38% Avg. Wind Speed: 0 mph Soil/Water Temperature: 55°F Cloud Cover: 0% Finish: Ambient Temperature: 80.0°F Ambient. Humidity: 45% Avg. Wind Speed: 0 mph Cloud Cover: 0% (Bog Turtle Trap Removal)	08:15 - 15:45 (67.5 person-hours of effort)	Numerous Green Frogs Numerous Pickerel Frogs Wood Frog Snapping Turtle American Toad

*Indicates the name of a USFWS/PFBC-recognized bog turtle surveyor.

SUPPLEMENTAL SPECIES TRAPPING SURVEY DETAILS

Given the vegetative and groundwater hydrology characteristics of this wetland complex, an array of 80 traps was deployed throughout the best habitat section of the emergent habitat during the period between May 17 and June 7, 2007. This trapping period was chosen to coincide



with a very active biological period of the species, thus increasing the likelihood of species capture. The trapping effort functioned to augment the Phase II species survey efforts.

The trapping efforts were conducted in accordance with *Draft USFWS Bog Turtle Trapping Survey Protocol (2007)*. The supplemental trapping effort was completed under authorization granted by the PFBC Scientific Collector's Permit 2007 No. 001, Type III (R).

To increase the likelihood of capturing herpetofauna, the placement of traps within the wetland complex were typically associated with one of the following habitat features:

- shallow surface water rivulets and travel corridors among hummocky vegetation with corridor links to an unnamed tributary to the East Branch of the Brandywine Creek and oxbow water channels;
- transitional areas on the edge of sedge/reed canary/cattail microhabitats which conveyed hydrology through the wetland; and
- core emergent habitat components.

In addition to the USFWS trapping protocol, techniques utilized were consistent with the methodologies referenced in *Field Techniques for Bog Turtle Research in North Carolina (2002)*. The constructed traps were consistent with the Ken Fahey "small mammal trap" design widely used throughout the southern range by species researchers. Each trap location was recorded on a project map. The bog turtle trap location map is found in Appendix IV. When placed, the traps were partially or fully covered with vegetation to provide shade for reducing the likelihood that a trapped turtle would suffer from heat stress. Traps were placed along rivulets and travel corridors in one to two inches of water or wet mud. Each trap was checked once per 24-hour period between May 17 and June 7, 2007, by Ms. Amitrone, Mr. Ryan Leiberher, and/or Ms. Kelly Thompson.

Table 2 summarizes the results of the supplemental trapping efforts conducted within the wetland habitat complex.

TABLE 2
VALHALLA AT BRANDYWINE PROJECT
SUPPLEMENTAL BOG TURTLE SPECIES TRAPPING SUMMARY
MAY 17 - JUNE 7, 2007

TRAP NUMBER	TOTAL SPECIES CAPTURES
21	2 Green Frogs
22	0
23	0
24	0
25	0
26	0
27	0
28	Green Frogs
29	0
30	0
31	0
32	0
33	0
34	0
35	Two Field Mice
36	0
37	Juvenile Snapping Turtle
38	Juvenile Snapping Turtle
39	0
40	0
41	0
42	0
43	0
44	0



**TABLE 2
(CONTINUED)**

TRAP NUMBER	TOTAL SPECIES CAPTURES
45	0
46	0
47	0
48	0
49	0
50	0
51	Green Frog
52	Juvenile Opossum
53	0
54	0
55	0
56	0
57	0
58	0
59	Spotted Turtle
60	0
61	0
62	Green Frog
63	0
64	0
65	0
66	0
67	0
68	0
69	0



**TABLE 2
(CONTINUED)**

TRAP NUMBER	TOTAL SPECIES CAPTURES
70	0
71	0
72	0
73	0
74	0
75	Spotted Turtle
76	0
77	Spotted Turtle
78	0
79	Two Juvenile Snapping Turtles
80	Juvenile Snapping Turtle
81	0
82	0
83	0
84	0
85	0
86	0
87	0
88	0
89	0
90	0
91	0
92	0
93	Spotted Turtle
94	0



**TABLE 2
(CONTINUED)**

TRAP NUMBER	TOTAL SPECIES CAPTURES
95	0
96	0
97	0
98	0
99	0
100	0

The trapping effort within the wetland complex extended for a total of 21 days and encompassed approximately 504 trap-hours/trap. The total trap-hours expended during the effort for the project were 40,320 hours. Wildlife species captured during the trapping effort included snapping turtles, green frogs, spotted turtles, one opossum, and two field mice. No bog turtle individuals were collected during the trapping effort.

SURVEY RESULTS

Phase II species survey efforts for the presence of the bog turtle were conducted in the wetlands associated with the proposed Valhalla at Brandywine Project during the 2007 species survey period. The bog turtle survey efforts were undertaken throughout wetland areas with components of suitable habitat for the species. The designated survey area within the wetland complex included the mosaic habitat components of emergent vegetation with mucky soils and groundwater interaction. The amount of effort expended per survey event was consistent with the maximum required effort of the *USFWS Guidelines for Bog Turtle Surveys, April 2006*.

A supplemental trapping effort was also undertaken within the emergent core habitat area of the wetland complex. Given the characteristics of this habitat, an array of 80 traps was deployed throughout the best habitat sections of the wetland complex during the period between May 17 and June 7, 2007. No bog turtle individuals were collected during the trapping effort.

Habitat conditions are suitable for the support of the species; however, no bog turtles were located within the identified wetland habitat during the 2007 survey efforts. Therefore, based on



these survey results, the species is most likely absent from the wetland complex. It should be noted that the wetland habitat was intensively surveyed during the investigations.

Numerous herpetofauna (Table 3) were observed during the context of the bog turtle surveys including the green frog, pickerel frog, spotted turtle, wood turtle, snapping turtle, box turtle, garter snake, wood frog, and northern two-line salamander. Representative photographs of the encountered herpetofauna are numbered 16 through 22 and are located in Appendix IV.

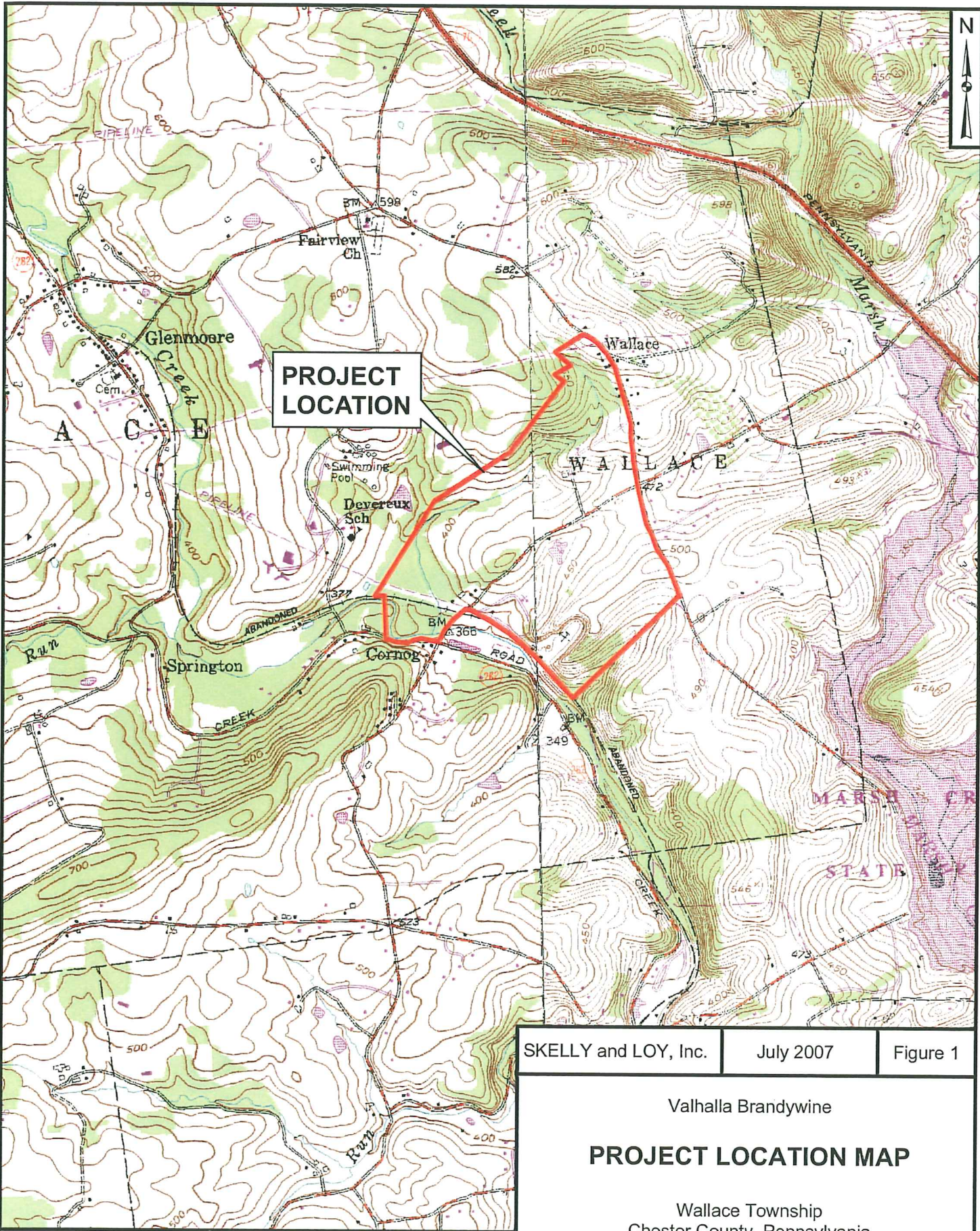
**TABLE 3
COMMON AND SCIENTIFIC NAMES OF HERPETOFAUNA OBSERVED
AT THE VALHALLA AT BRANDYWINE PROJECT
PHASE II BOG TURTLE SPECIES SURVEY**

COMMON NAME	SCIENTIFIC NAME
Green Frog	<i>Rana clamitans melanota</i>
Pickerel Frog	<i>Rana palustris</i>
Wood Frog	<i>Rana sylvatica</i>
Eastern Box Turtle	<i>Terrapene carolina</i>
Wood Turtle	<i>Clemmys insculpta</i>
Snapping Turtle	<i>Chelydra serpentina serpentina</i>
Spotted Turtle	<i>Clemmys guttata</i>
Garter Snake	<i>Thamnophis sirtalis sirtalis</i>
Northern Two-line Salamander	<i>Eurycea bislineata</i>
American Toad	<i>Bufo americana</i>



APPENDICES

**APPENDIX I -
PROJECT LOCATION MAP**



**PROJECT
LOCATION**

SKELLY and LOY, Inc.	July 2007	Figure 1
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Valhalla Brandywine PROJECT LOCATION MAP Wallace Township Chester County, Pennsylvania	
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Source: U.S.G.S. 7.5' Quadrangles - Wagontown and Downingtown - Pennsylvania

Job No: R07-0269	Scale: 1" = 2000'
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**APPENDIX II -
BOG TURTLE PHASE II DESIGNATED SURVEY AREA
AND WETLAND DELINEATION MAP**

**APPENDIX III -
REPRESENTATIVE PHOTOGRAPHS**



Photograph 1. The wetlands in the northern portion of the Valhalla at Brandywine complex.



Photograph 2. The wetlands in the northern portion of the Valhalla at Brandywine complex.



Photograph 3. The wetlands in the northern portion of the Valhalla at Brandywine complex.



Photograph 4. The wetlands in the central portion of the Valhalla at Brandywine complex.



Photograph 5. The unnamed tributary to the East Branch of the Brandywine; headwaters in the northern portion of the site.



Photograph 6. The wetlands located in the central portion of the Valhalla at Brandywine complex.



Photograph 7. The wetlands in the southern portion of the Valhalla at Brandywine complex.



Photograph 8. The wetlands in the southern portion of the Valhalla at Brandywine complex.



Photograph 9. The wetlands in the southern portion of the Valhalla at Brandywine complex.



Photograph 10. The unnamed tributary to the East Branch of the Brandywine in the southern portion of the site.



Photograph 11. An oxbow tributary located in the southern portion of the Valhalla at Brandywine complex.



Photograph 12. The unnamed tributary to the East Branch of the Brandywine Creek.



Photograph 13. The habitat in the southern portion of the Valhalla at Brandywine complex.



Photograph 14. The habitat in the southern portion of the Valhalla at Brandywine complex.



Photograph 15. The habitat in the southern portion of the Valhalla at Brandywine complex.



Photograph 16. A spotted turtle trapped at the Valhalla at Brandywine complex.



Photograph 17. A box turtle located during the Phase II bog turtle survey at the Valhalla at Brandywine complex.



Photograph 18. An American toad located during a Phase II bog turtle survey at the Valhalla at Brandywine complex.



Photograph 19. A juvenile snapping turtle found inside a trap during the Phase III survey at the Valhalla at Brandywine complex.



Photograph 20. An eastern box turtle found during the Phase II bog turtle survey at the Valhalla at Brandywine complex.

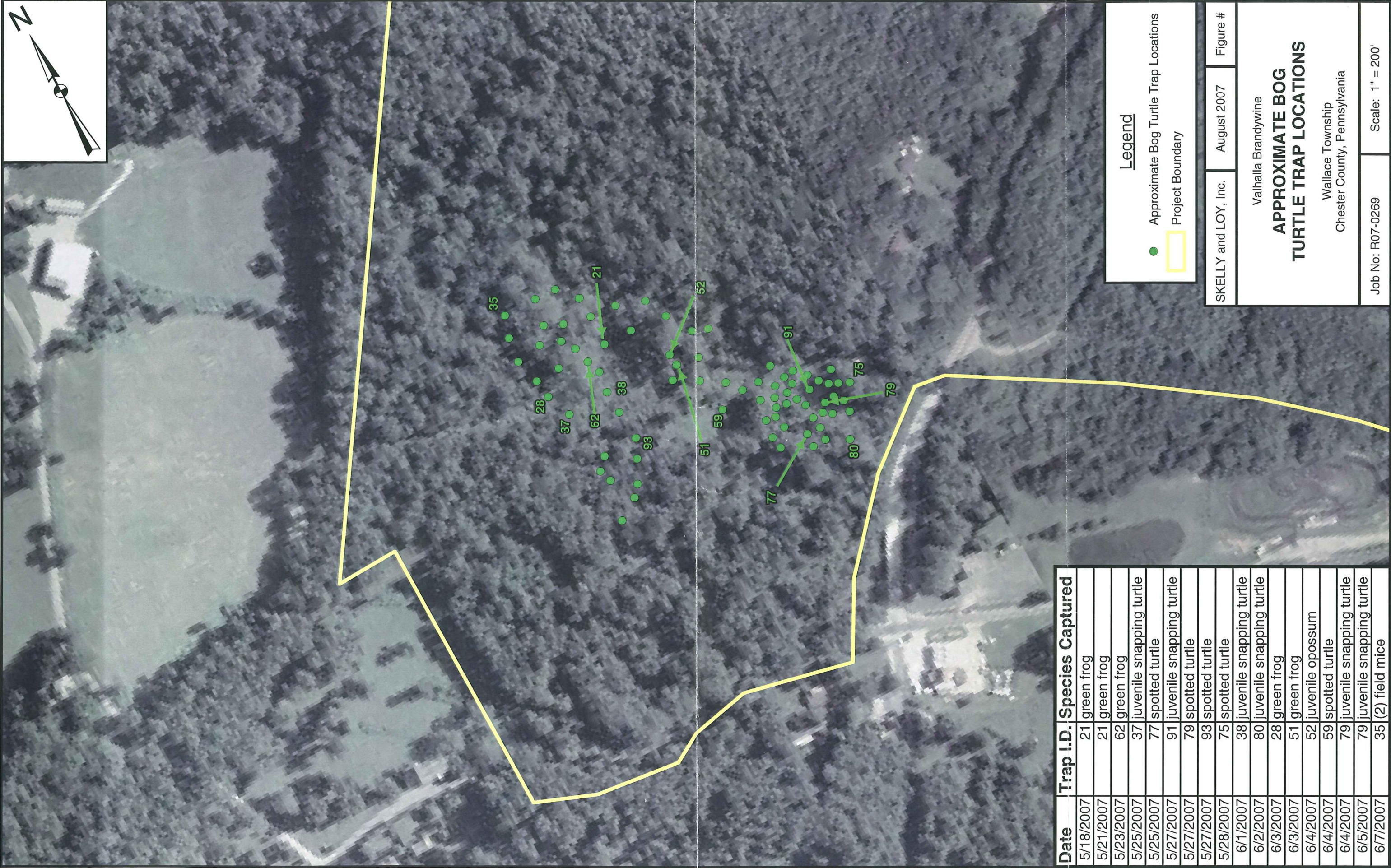
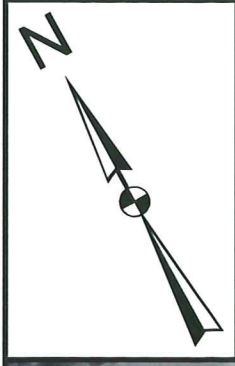


Photograph 21. A wood turtle located during the Phase II bog turtle survey at the Valhalla at Brandywine complex.



Photograph 22. A pickerel frog observed during the Phase II bog turtle survey at the Valhalla at Brandywine complex.

**APPENDIX IV -
APPROXIMATE BOG TURTLE TRAP LOCATIONS**



Date	Trap I.D.	Species Captured
5/18/2007	21	green frog
5/21/2007	21	green frog
5/23/2007	62	green frog
5/25/2007	37	juvenile snapping turtle
5/25/2007	77	spotted turtle
5/27/2007	91	juvenile snapping turtle
5/27/2007	79	spotted turtle
5/27/2007	93	spotted turtle
5/28/2007	75	spotted turtle
6/1/2007	38	juvenile snapping turtle
6/2/2007	80	juvenile snapping turtle
6/3/2007	28	green frog
6/3/2007	51	green frog
6/4/2007	52	juvenile opossum
6/4/2007	59	spotted turtle
6/4/2007	79	juvenile snapping turtle
6/5/2007	79	juvenile snapping turtle
6/7/2007	35	(2) field mice

Legend

- Approximate Bog Turtle Trap Locations
- Project Boundary

SKELLY and LOY, Inc. August 2007 Figure #

Valhalla Brandywine
**APPROXIMATE BOG
 TURTLE TRAP LOCATIONS**
 Wallace Township
 Chester County, Pennsylvania

Job No: R07-0269 Scale: 1" = 200'