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April 19, 2019

Mr. Michael Antonellis, Planning Director
Lancaster Community Development and Planning
701 Main Street, Suite 4
Lancaster, MA 01523

Re: Peer Review Letter – Goodridge Brook Estates

Dear Mr. Antonellis:

As requested by the Lancaster Department of Community Development and Planning, Comprehensive Environmental Inc. (CEI) has conducted a technical review of the Environmental Analysis provided for the proposed Goodridge Brook Estates development. CEI has based the review on the following documents:

- Environmental Analysis for Goodridge Brook Estates, Lancaster, MA (Goddard Consulting, March 22, 2019)
- Supplement to Environmental Analysis for Goodridge Brook Estates, Lancaster, MA (Goddard Consulting, April 11, 2019)
- Review letter from Massachusetts Division of Fisheries and Wildlife (Adam Katzua, Coldwater Fisheries Project Leader, February 26, 2019)
- Wetlands and Stormwater Review for Sterling Road 40B Project, Lancaster (Patrick C. Garner Company, Inc., March 27, 2019)
- Site Development Plan of Land "Goodridge Brook Estates" (GLM Engineering Consultants, Inc. Revision Date: February 19, 2019)

In addition to review of the documents listed above, CEI conducted a site visit on April 16, 2019 to observe site conditions as related to review of the Environmental Analysis. Findings based on our document review and site visit are provided below.

1. Existing Important Wildlife Habitats

1.1 Vernal Pool Habitat

In the Supplement to Environmental Analysis dated April 11, 2019, Goddard Consulting (GC) states, "*There were no suitable conditions observed within any of the onsite wetlands that could support the breeding by vernal pool indicator species*."

CEI's field observations on April 16, 2019 documented that the property is used as breeding habitat by obligate vernal pool species.

The Massachusetts Division of Fisheries and Wildlife - Natural Heritage and Endangered Species Program (NHESP) provides Guidelines for the Certification of Vernal Pool Habitat which are designed to ensure consistency between the NHESP certification criteria and the biological and physical criteria of vernal pool habitat in the Massachusetts Wetlands Protection Act (WPA) regulations (310 CMR 10.04, 10.57(1)(a)(3), 10.57(1)(b)(4), and 10.58(1)). As stated in these Guidelines, wildlife that use vernal pools are generally divided into two groups:

- **Obligate Species**: vertebrate and invertebrate species that require vernal pools for all or a portion of their life cycle and are unable to successfully complete their life cycle without vernal pools. Obligate species serve as direct indicators of vernal pool habitat because they require at least two months of flooded conditions and the absence of established, reproducing fish populations. When breeding evidence of obligate species is documented, it is not necessary to prove there is no established fish population.
- **Facultative Species**: vertebrate and invertebrate species that frequently use vernal pools for all or a portion of their life cycle, but are able to successfully complete their life cycle in other types of wetlands.

During CEI's site visit on April 16, 2019, CEI documented 10 spotted salamander (*Ambystoma maculatum*) egg masses within the wetland/intermitted stream complex on the property. Spotted salamander is listed by the NHESP as one of five obligate vernal pool species. To avoid disturbance of each egg mass, 5 representative photos were taken of the egg masses, as required for documentation to NHESP. These photos are provided below, with the nearest wetland flag noted for location reference.

Photo 1: Three spotted salamander egg masses observed within the intermittent stream/wetland complex. Nearest wetland flag: GLM 18-54

Photo 2: Close-up of one of the three spotted salamander egg masses near wetland flag GLM 18-54.

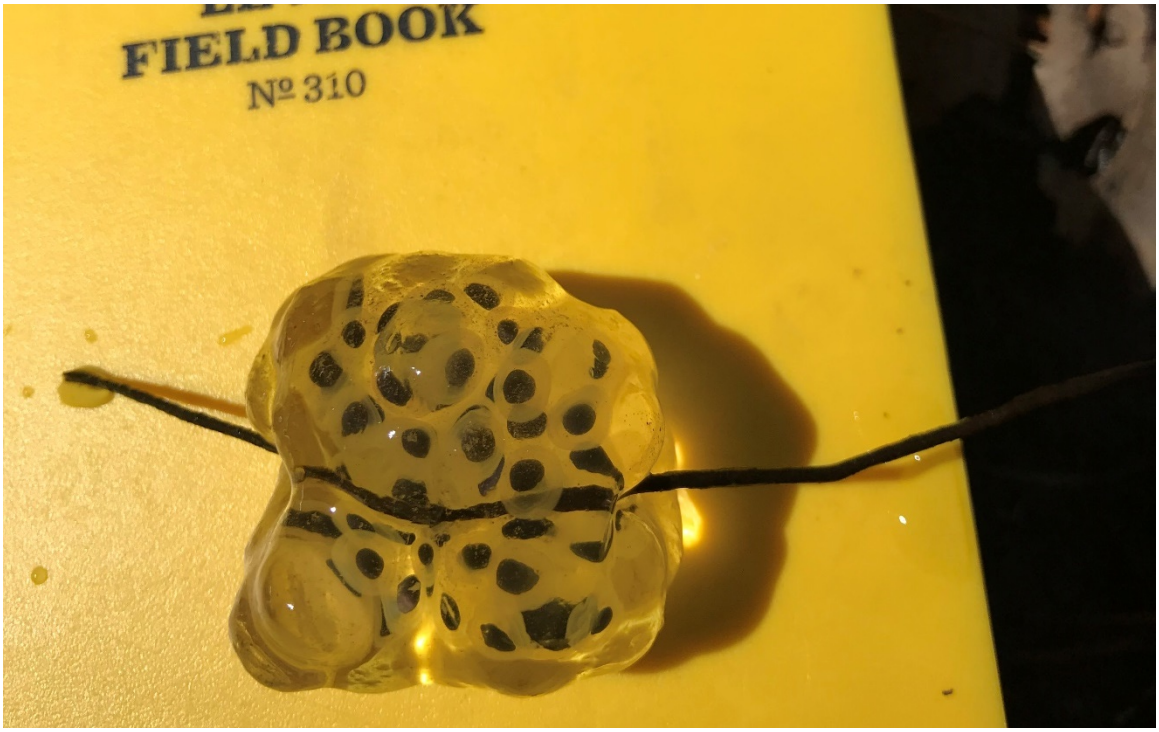

Photo 3: Spotted salamander egg mass observed near wetland flag GLM 18-56.

Photo 4: Spotted salamander egg mass observed near wetland flag 18-60, to the north.

Photo 5: Spotted salamander egg mass observed near wetland flag 18-60, to the south.

Photo 6 and 7: Typical conditions in the stream/wetland complex in the vicinity of the spotted salamander egg mass observations.

NHESP specifies the following criteria for vernal pool certification by use of the Obligate Species Method:

- **Biological Criteria:** NHESP lists five obligate vernal pool species, including spotted salamander. NHESP includes a variety of breeding evidence which is accepted, including a total of 5 egg masses from obligate species (any combination, regardless of species). The biological criteria is satisfied by the spotted salamander egg masses documented on 4/16/2019.
- **Physical Criteria:** In addition to meeting biological criteria, a site must have physical evidence of a "*pool with no permanently flowing outlet*". The physical evidence accepted includes photos or video of "*the entire pool holding water including any inlets or outlets (e.g., any streams, culverts, etc.)*". At the time of CEI's site visit, the stream/wetland complex was flowing in a generally southerly direction. On the day prior to CEI's site visit, the rainfall total for the area was 1.85 inches. Based on CEI's observations on 4/16/2019, the physical criteria of a "*pool with no permanently flowing outlet*" could not be confirmed.

  As stated in the Supplement to Environmental Analysis, the watershed area for the stream system is below the 0.5 square mile criteria used for a presumption of perennial flow per the WPA at 310 CMR(2)(a)1.a. Given the presumed intermittent flow classification of the stream, the vernal pool physical criteria specified above could potentially be satisfied with additional field documentation at a time when the seasonal/intermittent flow status can be documented with photos or video as required by NHESP. Based on CEI's discussion with NHESP staff (Michael Jones, State Herpetologist), the site is considered "potentially certifiable" pending additional field data collection for physical criteria.

2. Endangered Species

In the Supplemental Environmental Analysis, GC states, "*No endangered species were observed during the vernal pool surveys on 4/2 and 4/9. The site does not contain suitable breeding habitat for any State-listed amphibians*".

CEI did not observe any state- or federally-listed rare species during the site visit on 4/16/2019. In addition to field observations, which cannot conclusively confirm that such species are not present on site, CEI conducted a literature review of state-listed species that have been previously documented within Lancaster. Table 1 on the following page provides a listing of these species and CEI's assessment of the potential for presence on the site. CEI believes that most of these species are unlikely to be found on site, and that three state-listed turtle species (wood turtle, Blanding's turtle, and eastern box turtle) could potentially use the site as habitat.

CEI reviewed the United States Geological Survey Gap Analysis Project (GAP) data for additional information on potential use of the site as habitat for the turtle species listed above. GAP has delineated species range and provides predicted distribution maps for more than 2,000 species that occur within the United States. The species distribution data was created by modeling the predicted habitat of each species, based on nationwide land cover data (USGS-GAP 2016) interpreted with a database of relationships between vegetation and species, along with other environmental data. GAP does not currently provide information on the predicted range for the eastern box turtle, and does not predict that the site is within the distribution range for Blanding's turtle. As shown in Figure 1, the project site is within the predicted species range for wood turtle. It should be noted that the GAP is a screening-level tool and

that additional species-specific field investigations would be required to provide further information about the use of the site by turtle species.

Figure 1: GAP analysis map showing that the proposed Goodridge Brook Estates site is within the predicted species range for wood turtle (orange shaded areas). Wood turtle is also predicted to have extensive areas of species range along the Goodridge Brook corridor to the west of the site.

Table 1: Lancaster Rare Species Observations[1] by MESA Status[2]

Taxonomic Group	Scientific Name	Common Name	MESA Status	Most Recent Observation	Summary of Typical Habitat / Comparison to Site Conditions	Potentially on Site?
Amphibian	*Ambystoma laterale*	Blue-spotted Salamander	SC	1997	Breeding habitat is primarily wetlands dominated by *Cephalanthus occidentalis* and other multi-stem shrubs. *Inconsistent with site conditions.*	unlikely
Bird	*Circus cyaneus*	Northern Harrier	T	1904	Wet meadows, grasslands, open fields. *Inconsistent with site conditions.*	unlikely
	Accipiter striatus	Sharp-shinned Hawk	SC	1909	Mixed woods and coniferous woods with spruce/pine, nearby open areas for hunting. *Possible, but over 100 years since last observation in Lancaster.*	unlikely
	Rallus elegans	King Rail	T	1999	Shallow waters, extensive wet meadows, cattail marshes. *Inconsistent with site conditions.*	unlikely
	Bartramia longicauda	Upland Sandpiper	E	1994	Open, grassy uplands, wet meadows, old fields, pasture. *Inconsistent with site conditions.*	unlikely
	Asio otus	Long-eared Owl	SC	1898	Dense coniferous/mixed forest close to fields/open areas suitable for foraging. *Possible, but over 100 years since last observation in Lancaster.*	unlikely
	Pooecetes gramineus	Vesper Sparrow	T	1993	Not considered a forest species. *Inconsistent with site conditions.*	unlikely
	Ammodramus savannarum	Grasshopper Sparrow	T	1999	Sandplain grasslands, hayfields, airfields, etc., characterized by bunch grasses. *Inconsistent with site conditions.*	unlikely
	Ammodramus henslowii	Henslow's Sparrow	E	1939	Open fields. *Inconsistent with site conditions.*	unlikely
Butterfly / Moth	*Speranza exonerata*	Pine Barrens Speranza	SC	1992	Pine barrens. *Inconsistent with site conditions.*	unlikely
	Lycia rachela	Twilight Moth	E	2002	Sandplain pitch pine-scrub oak barrens; other shrub wetlands on sandy soils. *Inconsistent with site conditions.*	unlikely
	Zanclognatha martha	Pine Barrens Zanclognatha	T	1994	Pine barrens; rocky summits and ridges. *Inconsistent with site conditions.*	unlikely
	Psectraglaea carnosa	Pink Sallow	SC	1993	Pitch pine-scrub oak barrens, heathlands on sandplains, acidic bogs and swamps. *Inconsistent with site conditions.*	unlikely
Mammal	*Sorex palustris*	Water Shrew	SC	1986	Seldom found more than a few yards from the banks of swift, rocky-bedded streams. *Inconsistent with site conditions.*	unlikely
Mussel	*Alasmidonta undulata*	Triangle Floater	SC	1997	Large rivers and lakes. *Inconsistent with site conditions.*	unlikely
Reptile	*Glyptemys insculpta*	Wood Turtle	SC	1998	Prefers riparian areas of mid-sized streams, including mixed and deciduous forests. *Possible use of site as non-wintering habitat.*	possible
	Emydoidea blandingi	Blanding's Turtle	T	2006	Summer habitat includes upland forests and field edges. *Possible use of site as non-wintering habitat.*	possible
	Terrapene carolina	Eastern Box Turtle	SC	1992	Includes dry and moist woodlands. *Possible use of site.*	possible
Vascular Plant	*Panicum philadelphicum*	Philadelphia Panic-grass	SC	1995	Open, full-sun on seasonally flooded sands, typically bordering streams, lakes, and wetlands. *Inconsistent with site conditions.*	unlikely
	Eragrostis frankii	Frank's Lovegrass	SC	1939	Sandy river banks and sandbars. *Inconsistent with site conditions.*	unlikely
	Platanthera flava var. herbiola	Pale Green Orchis	T	1944	Semi-shaded habitats in red maple/white ash floodplains. *Site not located within a floodplain; over 50 years since last Lancaster observation.*	unlikely
	Platanthera dilatata	Leafy White Orchis	T	1904	Sunny, wet areas. *Inconsistent with site conditions.*	unlikely
	Eleocharis ovata	Ovate Spike-sedge	E	1991	Sandy, freshwater margins of rivers, lakes, and ponds. *Inconsistent with site conditions.*	unlikely
	Cyperus houghtonii	Houghton's Flatsedge	E	1997	Shores of rivers and ponds, commonly associated with jack pine; rocky, open summits. *Inconsistent with site conditions.*	unlikely
	Carex typhina	Cat-tail Sedge	T	1999	Typically found in floodplain forests. *Site not located within a floodplain.*	unlikely
	Arceuthobium pusillum	Dwarf Mistletoe	SC	1924	Typical habitat is peatlands, peat bogs, spruce-fir-birch headwater swamps. *Inconsistent with site conditions.*	unlikely
	Petasites frigidus var. palmatus	Sweet Coltsfoot	E	1912	Forested swamps, calcareous fens. *Inconsistent with site conditions.*	unlikely
	Liatris scariosa var. novae-angliae	New England Blazing Star	SC	1908	Typical habitat is open, dry, low-nutrient sandy soils of grasslands, heathlands, barrens. *Inconsistent with site conditions.*	unlikely

Notes:

1. Adapted from list obtained from Lancaster Conservation Commission website. Several species from the original list have been delisted by MESA and are not included in Table 1.
2. Massachusetts Endangered Species Act (MESA) Categories: SC=Special Concern; T=Threatened; E=Endangered

3. Intermittent Stream

CEI conducted a review of the intermittent stream watershed area using USGS StreamStats, and confirmed the watershed area is 0.13 square miles as stated in the Supplement to Environmental Analysis report. As stated above, this area is below the WPA threshold for a presumption of perennial flow. However, as noted in the review letter from Massachusetts Division of Fisheries and Wildlife (DFW), the stream does have features which justify additional field investigations to make a more detailed determination of flow conditions and the potential for the stream (or downstream portions of the stream) to support populations of wild brook trout. Conditions observed by CEI, as documented in Photos 8-9, included:

- a well-developed stream channel with defined bed and banks;
- streambed material ranging from silty/mucky to sandy to coarse gravel;
- bankfull width of the stream channel in its southerly downstream section varied from approximately four feet to six feet.

CEI agrees that the request by DFW to conduct additional field investigations in July/August is reasonable and supported by field observations.

Photo 6: Well-defined stream channel and banks observed in the southern (downstream) section of the stream. Bankfull width in the southern section of the stream typically ranged from approximately 4-6 feet.

Photo 7: Stream bed material ranged from upstream areas characterized by silt/muck to downstream areas with sandy and gravelly/rocky bottom. As shown in the photo, aquatic bed vegetation observed in the stream channel included bog moss (*Aulacomnium palustre*).

4. Other Observations

4.1 Natural Communities.

CEI staff traversed the site in north-south transects and made general observations regarding the natural community types found on the site. CEI concurs with the GC assessment of community types as presented in the Environmental Analysis report. Much of the mixed coniferous/hardwood forested site is dominated by successional white pine forest and also includes areas with oak-hickory forest assemblage. Areas in the southern and central potion of the site within and adjacent to wetlands have a higher abundance of red maple, ash, and other hardwood deciduous species. It is CEI's opinion that the natural community types observed on the site are quite common throughout Massachusetts. CEI has reviewed the NHESP *Classification of Natural Communities of Massachusetts* and does not believe that the observed site conditions meet the requirements for classification as an NHESP Exemplary Natural Community.

4.2 Wildlife

CEI did not make any significant direct wildlife observations during the site visit. Indirect observations included deer droppings and hoof prints, black bear scat, and coyote scat. CEI also observed a small frog jump from the streambank into the stream channel in the southern/central portion of the site, although it was not visible for long enough to allow for species identification. CEI's site visit did not include a bird inventory, although numerous birds were heard in song throughout the site.

CEI appreciates the opportunity to provide this peer review for the Town of Lancaster. Please contact me at (508) 281-5201 or rhartzel@ceiengineers.com if you have any questions about this report or would like to discuss the findings in greater detail.

Sincerely,

Robert Hartzel, CLM
Principal Scientist
Comprehensive Environmental, Inc.