

May 15, 2021

Julia Magliozzo  
Director of Operations  
Ecogy Energy  
315 Flatbush Avenue #393  
Brooklyn, NY 11217

**Re: Arcadia Farm, Yorktown, NY  
Tree Inventory Evaluation and Results – Revised Project Layout**

Dear Julia:

As requested, Paul Cowie + Associates (PC+A) inventoried and evaluated the condition of existing trees at 1300 Baptist Church Road on several days between March 27 and April 5, 2021.

On May 6, 2021, PC+A returned to the site to inventory additional trees and revise the original inventory (dated April 7, 2021) to reflect a proposed new layout for the project.

The goals of this study were to:

1. Identify, measure, and evaluate the current health and structural condition of existing 'Protected Trees' within the designated tree removal areas;
2. Calculate carbon storage and sequestration benefits provided by these inventoried trees;
3. Compile a list of tree species suitable and recommended for mitigation plantings based on a review of current species performance, existing site conditions, Town preferences, and other relevant factors.

The data collected and the recommendations made for each inventoried tree are presented in the attached spreadsheet. The following is an explanation of the data parameters included and an overview of our general finding and recommendations.

### ***Tree Included***

This tree inventory and evaluation was limited to trees within and approximately 10-feet beyond the proposed tree removal area, as indicated with a blue line on the attached site plan. Tree stumps, standing dead tree trunks less than 15-feet in height, shrubs, vines, and other vegetation within these areas were not inventoried and evaluated. No other trees in any other portions of the property, or on adjacent properties, were inventoried and evaluated.

Within the designated tree removal areas, trees were included based on whether they met the definition of a 'Protected Tree,' as per Chapter 270 of the Yorktown Town Code, *Trees*. Specifically, trees rooted on the subject private property were included if they possessed at least one stem measuring at least 8.0-inches in diameter (DBH). 'Street Trees' (defined by Town Code as trees with their base at least 50-percent within the public right-of-way) were included regardless of size.

A temporary aluminum tag hand-embossed with the corresponding tree ID number (#1 - #197) was attached to each of the

trees inventoried. The approximate location of each tree is indicated on the attached site plan. Trees #1 through #110 were inventoried, measured, and evaluated in March and April 2021. Trees #160 through #197 were added on May 6, 2021. Gaps in the Tree ID sequence are a result of previously inventoried trees being dropped from this revised inventory because they were more than 10-feet outside the revised project limit.

A total of 87 standing trees are included in this revised tree inventory.

### ***Tree Species + Exotic Invasive Status***

Each tree is identified in the attached data table by both its regionally accepted common name and its botanical name.

The invasive status of each species is indicated based on species index information published by the Lower Hudson Partnership for Regional Invasive Species Management and accessed via <https://www.lhprism.org/species-information> on February 26, 2021. Within the current proposed project limit, there are no tree species that are designated as invasive per the aforementioned source.

### ***Tree Size + Age Classification***

The diameter of each inventoried tree was measured with a diameter tape to the nearest one-tenth inch at a point 4.5-feet above ground level (DBH), or at the height indicated when branching or abnormal swellings at 4.5-feet would produce an inaccurate measurement.

In the case of multiple-stem trees, the diameter of each stem was measured and recorded, and the root sum squared of the stems ( $RSS = \sqrt{D1^2 + D2^2 + D3^2 \dots}$ ) was calculated to provide a single-stem equivalence for the purpose of determining critical root zone radii.

Total tree height, crown height, and crown width were measured using a Leica Disto D810 Touch laser distance meter.

- Total tree height was measured to the nearest whole foot from the ground to the highest main body foliage.
- Crown height was measured from the ground to the bottom of main body foliage at the outer edge of the crown and/or lowest scaffold branch (whichever came first); individual low hanging small branches were excluded.
- Crown spread was measured at the widest point of the main body drip line; individual extended small branches were excluded. For asymmetrical crowns, the crown was either measured 1) by averaging two perpendicular crown diameters or 2) by averaging four crown radii at right angles relative to each other, multiplying by 2, and adding the diameter in feet. Measurements were rounded to the nearest whole foot.

The age class of each individually inventoried tree was recorded based on apparent age relative to the normal life expectancy of the species. Age was classified as 'Young' if the tree had exhausted up to 20% of the species' typical life expectancy, 'Mature' if it had exhausted 20% to 80% of the species' life expectancy, or 'Over-Mature' if it had exhausted more than 80% of the species' life expectancy.

### ***Critical Root Zone (CRZ)***

Critical root zone radius (CRZ) is the ground area around a tree which, if fully protected from soil compaction, grade changes, excavation, and other soil and root-damaging impacts, will ensure that tree health and structural integrity will not be compromised by construction activity. This information is provided to assist designers in locating grading, pavement, underground utilities, and other proposed improvements in a manner that minimizes impacts to any trees that may be retained.

### ***Tree Condition***

The condition of each inventoried tree was systematically evaluated and rated with consideration given to both the health and vigor and the structural integrity of the root system, primary stems, scaffold branching, small branches and twigs, and foliage.

A rating of 'Good', 'Fair', or 'Poor' was assigned separately to the health and vigor as well as to the structure and form of each inventoried tree. An 'Overall Condition' rating was then assigned, as follows:

- *Good*: The tree had no more than one or two minor health disorders and/or structural defects and was growing with normal vigor;
- *Fair*: The tree had 2 – 4 minor, or one major, health disorders and/or structural defects, and/or was growing with below-normal vigor or other limitations.
- *Poor*: The tree had several minor, or two or more major, health disorders and/or structural defects, and/or was declining in vigor.
- *Dead*: 75% or more of the crown was dead and any remaining live portions were deteriorating in health.

For the purpose of carbon benefits modeling, health and vigor ratings were converted to corresponding percentages (i.e. Good = 75% - 100%, Fair = 50% - 75%, Poor = 25% - 50%, Dead/Dying = 0% - 25%) and percent crown dieback and percent missing crown were recorded.

Please note that inspection of the inventoried trees was limited to visual observations from the ground and did not include climbing, aerial inspections, subsurface exploration, wood strength testing, or other advanced diagnostic techniques, which may be necessary to fully identify and evaluate the severity of certain health disorders and structural defects. Therefore, certain health disorders and/or structural defects may have not been noted or their extent may not have been fully determined.

### ***Observations***

The 'Disorders + Defects, Comments, Additional Recommendations' column contains various comments regarding the nature and severity of disorders and defects noted, particularly where they resulted in reduced condition ratings and/or recommendations for tree removal.

Additionally, this column contains additional treatment recommendations not included in the subsequent recommendation columns.

### ***Maintenance Recommendations***

It is PC+A's understanding that all existing trees within the designated areas are proposed for removal. Nevertheless, where appropriate, recommendations for pruning to remove dead, dying, damaged, and/or diseased limbs, pruning to improve branch architecture, cabling to reduce the risk of failure at certain branch defects, or other treatments were made based on conditions observed at the time each tree was evaluated.

This information is provided to further characterize the trees' current condition and provide guidance in the event that decisions are made to preserve any of the trees.

Terminology for various pruning types (e.g. 'Clean Crown', 'Raise Crown', 'Reduce Crown', 'Structural prune', etc.) correspond to ANSI A300 *American National Standard for Tree Care Operations*.

Each recommendation was prioritized based on the severity of potential safety risks first (e.g. large dead trees versus small dead trees, trees containing large dead limbs versus small dead branches, etc.) and addressing tree health and appearance

second. The priority of each recommendation was ranked as High ('H'), Medium ('M'), or Low ('L'). These recommendations should be implemented in order of decreasing priority.

**Tree Removal Recommendations**

Definitive recommendations for tree removal were made for trees that were dead, had substantial dieback and/or limited remaining life expectancy, or possessed severe, irreparable structural defects that pose potential safety risks.

It is PC+A's opinion that those trees for which a specific removal recommendation was made should be removed whether or not the project proceeds. Further, it is PC+A's interpretation that those trees satisfy the 'Permit Not Required' exemptions provided in Section 270-5 of the Yorktown Town Code.

At this time, twenty-eight trees are recommended for removal due to death, severely deteriorated and irreparable health or structural condition, or limited remaining life expectancy. Seventeen of the trees recommended for removal are white ash (*Fraxinus americana*) trees with severe emerald ash borer infestation. Many of these ash trees are dead or near dead and the remainder will almost certainly succumb within the next year or two.

**Tree Inventory Summary**

Count of Protected Trees by Lower Hudson PRISM invasive status and current condition (Viable Trees = trees to be removed for design reasons only; Non-Viable Trees = trees requiring removal regardless of the design because they are dead, dying, diseased, or in an otherwise deteriorated and irreparable health or structural condition and, therefore, exempt from permit requirements).

INVASIVE STATUS	VIABLE TREES TO BE REMOVED	NON-VIABLE TREES REQUIRING REMOVAL DUE TO CONDITION	TOTAL
Invasive	0	0	0
Non-Invasive	59	28	87
<b>TOTAL</b>	<b>59</b>	<b>28</b>	<b>87</b>

**Carbon Benefits Estimation via iTree Eco**

The Eco module of the iTree software suite was used to calculate current carbon storage and annual sequestration rates for the inventoried trees. Relevant reports produced by the iTree Eco model are attached.

iTree was developed and is under active review and constant improvement by a consortium of industry organizations and experts led by the U.S. Forest Service. It is widely considered to be the current state of the art and is the most widely used tool for calculating the level and value of a variety of ecosystem services that trees provide in urban and rural settings.

iTree Eco requires specific inputs to run its models. PC+A used the following data derived from the measurements described above to run the carbon models:

- Weather: 2016 weather and pollution data from the Westchester County Airport weather station in White Plains, NY.
- Species
- DBH: Diameter at breast height (4.5-feet above the ground), or the single-stem equivalent for multi-stem trees.
- Total Tree Height
- Crown Height
- Crown Width
- Crown Condition
- Crown Dieback / Missing Crown

Please do not hesitate to contact me if you have any questions or require any additional information.

Sincerely,

**PAUL COWIE AND ASSOCIATES**



Paul F. Cowie  
*President*

PFC:pc  
Encl.



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Croton-on-Hudson, NY 10520  
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Developer



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718-304-0945  
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Construction Contact: Jim Donnelly  
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Project Manager: Julia Magliozzo  
Projectmanagement@ecogyenergy.com

Page Size: 24" x 36"

Power Clerk Project #:

PROPERTY INFORMATION

SBL: 47.11-1-4

Block Group: 1

Lot: 4

Lot Area: 11.67 Acres

Latitude: 41°15'34.3"N

Longitude: 73°49'24.5"W

Array 1 Azimuth: 205°

Panel Tilt: 20°

PE Stamps/ Signatures

Rev	Date	Description	Initial
00	4/1/21	Design	MT






























Legend

- Solar Panel
- FD Setbacks & Pathways
- Gas Line
- D/C Home Run
- A/C Home Run
- Light Shade
- Heavy Shade
- Obstruction (Vent Pipe)
- Building Outline
- Solar Inverter Electrical Equipment

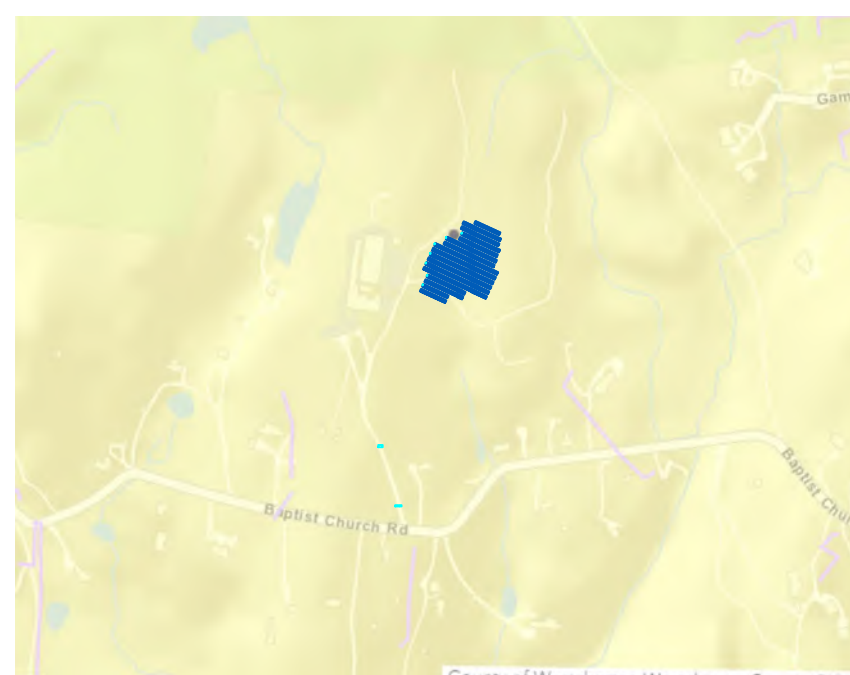
SCOPE OF WORK

- Installation of:
- (2232) Solar Modules 445W (49,662 sqft)
- (8) SolarEdge 100kW 480V Inverters
- (1) 52IT 800A Solar AC Combiner Panel
- (1) 89L 800A AC Disconnect Switch

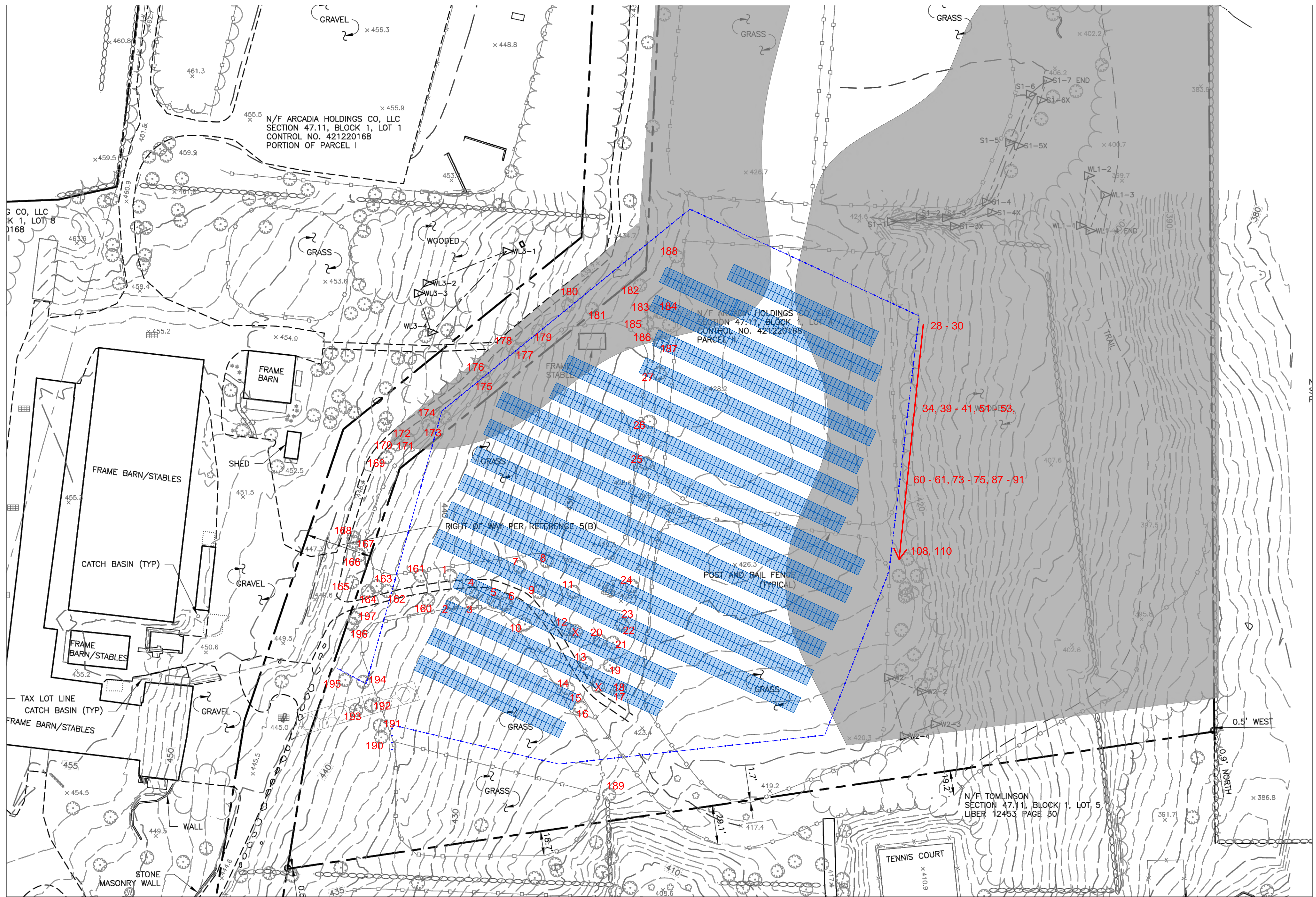
2 TAX MAP  
A-000  
Scale: NTS



3 UTILITY CAPACITY MAP  
A-000  
Scale: NTS



SCALE: 1"=10'-0" (IN FEET)  
0 5 10 20



T1.0.7

1300 Baptist Church Rd  
Yorktown Hts. NY  
10598

Owner: Arcadia Holding Co., LLC

Solar Modules:  
(2232) 445W Solar Modules

Solar Inverters:  
(8) SolarEdge 100kW 3p 480V Inv's

Solar System DC Size: 993.24kW

Solar System AC Size: 800kW

Interconnection Type:  
Community Solar

SITE PLAN  
OVERVIEW

Scale: See Scales | Page 2 of 2

A-001.01













## Carbon Storage of Trees by Species

Location: Yorktown Heights, Westchester, New York, United States of America

Project: Arcadia Farm Revised, Series: Arcadia, Year: 2021

Generated: 5/15/2021



Species	Carbon Storage (ton)	Carbon Storage (%)	CO <sub>2</sub> Equivalent (ton)
Red maple	36.7	48.4%	134.7
Black birch	0.4	0.5%	1.5
Shagbark hickory	8.2	10.7%	29.9
White ash	5.8	7.6%	21.3
Black walnut	3.3	4.3%	12.0
Tulip tree	1.8	2.4%	6.7
Black cherry	1.3	1.7%	4.6
White oak	3.3	4.4%	12.2
Northern red oak	2.8	3.6%	10.1
Black oak	12.4	16.4%	45.5
<b>Total</b>	<b>75.9</b>	<b>100%</b>	<b>278.5</b>

Due to limits of available models, i-Tree Eco will limit carbon storage to a maximum of 7,500 kg (16,534.7 lbs) and not estimate additional storage for any tree beyond a diameter of 254 cm (100 in). Whichever limit results in lower carbon storage is used.

## Annual Carbon Sequestration of Trees by Species

Location: Yorktown Heights, Westchester, New York, United States of America

Project: Arcadia Farm Revised, Series: Arcadia, Year: 2021

Generated: 5/15/2021



<b>Species</b>	<b>Gross Carbon Sequestration (ton/yr)</b>	<b>CO<sub>2</sub> Equivalent (ton/yr)</b>
Red maple	0.40	1.46
Black birch	0.01	0.02
Shagbark hickory	0.04	0.16
White ash	0.03	0.09
Black walnut	0.06	0.23
Tulip tree	0.01	0.05
Black cherry	0.01	0.04
White oak	0.03	0.11
Northern red oak	0.02	0.09
Black oak	0.12	0.44
<b>Total</b>	<b>0.73</b>	<b>2.70</b>

Invasive Species + Non-Viable Trees Omitted

## Carbon Storage of Trees by Species

Location: Yorktown Heights, Westchester, New York, United States of America

Project: Arcadia Farm Revised No Removals, Series: Arcadia Farm, Year: 2021

Generated: 5/15/2021



<b>Species</b>	<b>Carbon Storage (ton)</b>	<b>Carbon Storage (%)</b>	<b>CO<sub>2</sub> Equivalent (ton)</b>
Red maple	30.7	54.7%	112.5
Black birch	0.4	0.7%	1.5
Shagbark hickory	5.4	9.7%	19.9
Black walnut	3.3	5.8%	12.0
White oak	3.3	5.9%	12.2
Northern red oak	2.8	4.9%	10.1
Black oak	10.2	18.3%	37.6
<b>Total</b>	<b>56.1</b>	<b>100%</b>	<b>205.6</b>

Due to limits of available models, i-Tree Eco will limit carbon storage to a maximum of 7,500 kg (16,534.7 lbs) and not estimate additional storage for any tree beyond a diameter of 254 cm (100 in). Whichever limit results in lower carbon storage is used.

Invasive Species + Non-Viable Trees Omitted

## Annual Carbon Sequestration of Trees by Species

Location: Yorktown Heights, Westchester, New York, United States of America

Project: Arcadia Farm Revised No Removals, Series: Arcadia Farm, Year: 2021

Generated: 5/15/2021



<b>Species</b>	<b>Gross Carbon Sequestration (ton/yr)</b>	<b>CO<sub>2</sub> Equivalent (ton/yr)</b>
Red maple	0.34	1.24
Black birch	0.01	0.02
Shagbark hickory	0.03	0.12
Black walnut	0.06	0.23
White oak	0.03	0.11
Northern red oak	0.02	0.09
Black oak	0.10	0.37
<b>Total</b>	<b>0.60</b>	<b>2.18</b>