

August 3, 2020



Mr. George Barrett, Chair  
Wareham Planning Board  
c/o Mr. Kenneth Buckland, Town Planner  
54 Marion Road  
Wareham, Massachusetts 02571

Via: FedEx (two copies) and Email to: [kbuckland@wareham.ma.us](mailto:kbuckland@wareham.ma.us)  
[sraposo@wareham.ma.us](mailto:sraposo@wareham.ma.us)

Reference: Supplemental Information  
Applications for Site Plan Review  
27 Charge Pond Road, 140 & 150 Tihonet Road PV+ES Projects  
Wareham, Massachusetts  
B+T Project No. 1833.109 and 1833.112

Dear Planning Board Members:

On behalf of the Applicant, Borrego Solar Systems, Inc. (BSSI), Beals and Thomas, Inc. (B+T) respectfully submits the enclosed supplemental information to address feedback received during the July 13, 2020 hearing regarding the above-referenced projects. Specifically, the following information is provided to address comments to date:

-  The limit of clearing for 140 and 150 Tihonet has been increased to 150 feet from Tihonet Road. Updated Site Context exhibits for these projects are attached. In addition to providing the requested additional screening, this revision also results in an overall decrease in tree clearing by just under 15 acres (10.2 acres less clearing at the 150 Tihonet site and 4.3 acres less clearing at the 140 Tihonet site).
-  A forestry evaluation has been undertaken at each site to estimate market value of the timber on the sites. BSSI is committing to taking no economic benefit from the tree clearing associated with the projects and will provide the resulting \$80,075 (see enclosed report for breakdown by project) to the Town of Wareham prior to the commencement of construction activities for its use in undertaking its preferred mitigation project(s). In addition to this mitigation commitment, BSSI is discussing tax agreements with the Wareham Town Administrator and Assessor that will commit the projects to approximately \$588,000 in payments in the first year of operation (increasing at 2.5% per year) and approximately \$14.1 million dollars over the twenty year project terms.

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■ The projects will result in the greenhouse gas equivalencies below<sup>1</sup>. Cumulatively, the projects will produce approximately 69 MWh (megawatt hours) of renewable energy per year over the term of the project. A few key equivalencies are provided below and the full reports have been attached hereto. The MWhs produced are equivalent to:

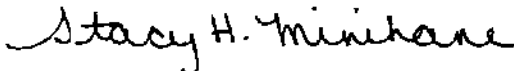
- Greenhouse gas emissions for 10,547 passenger vehicles driven in a year
- CO2 emissions from 8,266 homes' electricity use for one year
- Carbon sequestered by 63,758 acres (a ratio of ~ 369:1 when compared to proposed clearing) of US forest in one year

We note that the Conservation Administrator is in the process of reviewing the wetland resource area delineation at these sites, and that associated changes to the wetland lines may result in design revisions. Additionally, we acknowledge receipt of Mr. Rowley's peer review letter dated July 28, 2020 regarding the 27 Charge Pond Road site and will be preparing responses/revisions as appropriate. Therefore, we anticipate providing the Town with a full revised plan set and responses to comments at a future date. However, in the interim, we hope that the Board finds the enclosed information helpful and responsive.

Please do not hesitate to contact us should you have any questions, and we look forward to continuing the discussion of these projects at the August 10, 2020 hearings.

Very truly yours,

BEALS AND THOMAS, INC.



Stacy H. Minihane, PWS  
Senior Associate

Enclosures: Updated Site Context exhibits for 140 and 150 Tihonet Road PV+ES Projects  
Site Context exhibit for 27 Charge Pond Road PV+ES Project (unchanged from original submission)  
Forestry Evaluations  
Greenhouse Gas Equivalencies information

cc: Wareham Conservation Commission (via email)  
Borrego Solar Systems, Inc. (via Box upload)  
A.D. Makepeace Company, James Kane (1 copy via US Mail and email)

SHM/1833109LT001

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<sup>1</sup> United States Environmental Protection Agency; (2020, July 31); Greenhouse Gas Equivalencies Calculator; Retrieved from: <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

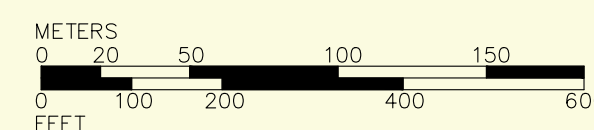
# 140 TIHONET PV+ES PROJECT (aka 0 and 169 Tihonet Road)

Wareham, Massachusetts

Note: This exhibit intended for illustrative purposes; refer to final plans.



**BEALS + THOMAS**  
Civil Engineers + Landscape Architects +  
Land Surveyors + Planners +  
Environmental Specialists



B+T Drawing No. 1833112P604B-001 Date: 07/30/2020

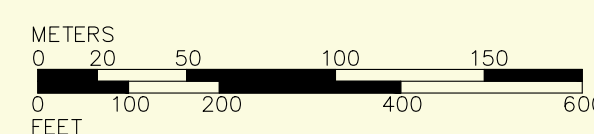
**SITE CONTEXT**  
APPLICANT: BORREGO SOLAR SYSTEMS, INC.

# 150 TIHONET PV+ES PROJECT (aka 0 and 169 Tihonet Road)

Wareham, Massachusetts



**BEALS + THOMAS**  
Civil Engineers + Landscape Architects +  
Land Surveyors + Planners +  
Environmental Specialists



B+T Drawing No. 1833112P605B-001 Date: 07/30/2020

**SITE CONTEXT**

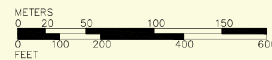
APPLICANT: BORREGO SOLAR SYSTEMS, INC.

# 27 CHARGE POND ROAD PV+ES PROJECT (aka 67 Tihonet Road)

Warham, Massachusetts



**BEALS + THOMAS**  
Civil Engineers + Landscape Architects +  
Land Surveyors + Planners +  
Environmental Specialists



B+T Drawing No. 1833109P606A-001 Date: 05/26/2020

**SITE CONTEXT**  
APPLICANT: BORREGO SOLAR SYSTEMS, INC.

**Jeffrey D. Golay** Massachusetts Licensed Forester #399

2300 Main Poland Road, Williamsburg, MA 01096 • (978) 317-3707 • jeffreygolay@gmail.com

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On Saturday July 25<sup>th</sup> a site visit was performed to evaluate the conditions of a 42.1-acre section of forestland on the westerly side of Charge Pond Road in the town of Wareham, MA. The study area is shown as the shaded area on the attached plan.

The overstory of the site is composed of primarily white pine, nearly pure in some areas, or occurring with associated black oak, white oak, red oak and pitch pine. Understory regeneration is present at high density in most areas and is composed of white pine, white oak and red maple. Lowbush blueberry and poison ivy are also present at high density in many areas. Invasive greenbrier, knotweed and bittersweet were observed onsite. Forest health and vigor are generally fair, many standing dead and downed trees were observed. Timber quality is generally fair among all species.

Plot data was taken using a 10 basal area factor cruz-all and tree measurements were taken using a Biltmore scale stick. Plot data was processed using US Forest Service NED-3 software and timber values were derived from UMass Cooperative Extension Southern New England Stumpage Reports for 2019-2020 and adjusted based on site conditions. The following timber values were used: white pine \$90/MBF, pitch pine \$60/MBF, white oak \$150/MBF, black oak \$100/MBF, firewood \$10/cord, pulpwood \$1/ton.

Forestland Statistics:

Mean DBH: 10"

Basal area: 140 Sq. Ft. / Ac.

Firewood volume: 130 Cords

Pulpwood volume: 500 Tons

Sawtimber volume: 420 MBF Total

-White pine – 168 MBF

-Pitch pine – 20 MBF

-White oak – 8 MBF

-Black oak – 20 MBF

Firewood value: \$1,300

Pulpwood value: \$500

Sawtimber value: \$19,520

Total estimated standing timber value: \$21,320

Sincerely,



Jeffrey D. Golay  
MA Licensed Forester #399

7/31/2020

Date







**Jeffrey D. Golay** Massachusetts Licensed Forester #399

2300 Main Poland Road, Williamsburg, MA 01096 • (978) 317-3707 • jeffreygolay@gmail.com

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On Saturday July 25<sup>th</sup> a site visit was performed to evaluate the conditions of a 66.61-acre section of forestland on the easterly side of Tihonet Road in the town of Wareham, MA. The study area is shown as the hatched area on the attached plan.

The overstory is composed of primarily pitch pine and white pine with associated white oak, black oak and red maple. Understory regeneration is present at medium to high density throughout much of the site and is composed of white pine, red maple and mixed oaks. Lowbush blueberry occurs at high density in many areas. Invasive species were not observed in most areas; however, greenbrier was observed in the southern portion of the property adjacent to the high-tension line easement. Forest health and vigor are generally fair to good. Timber quality is generally fair to good among white pines and poor to fair among pitch pines and hardwoods.

Plot data was taken using a 10 basal area factor cruz-all and tree measurements were taken using a Biltmore scale stick. Plot data was processed using US Forest Service NED-3 software and timber values were derived from UMass Cooperative Extension Southern New England Stumpage Reports for 2019-2020 and adjusted based on site conditions. The following timber values were used: white pine \$90/MBF, pitch pine \$60/MBF, white oak \$150/MBF, firewood \$10/cord, pulpwood \$1/ton.

Forestland Statistics:

Mean DBH: 9"

Basal area: 160 Sq. Ft. / Ac.

Firewood volume: 68 Cords

Pulpwood volume: 1400 Tons

Sawtimber volume: 268.5 MBF Total

-White pine – 110 MBF

-Pitch pine – 150 MBF

-White oak – 8.5 MBF

Firewood value: \$680

Pulpwood value: \$1,400

Sawtimber value: \$20,175

Total estimated standing timber value: \$22,255

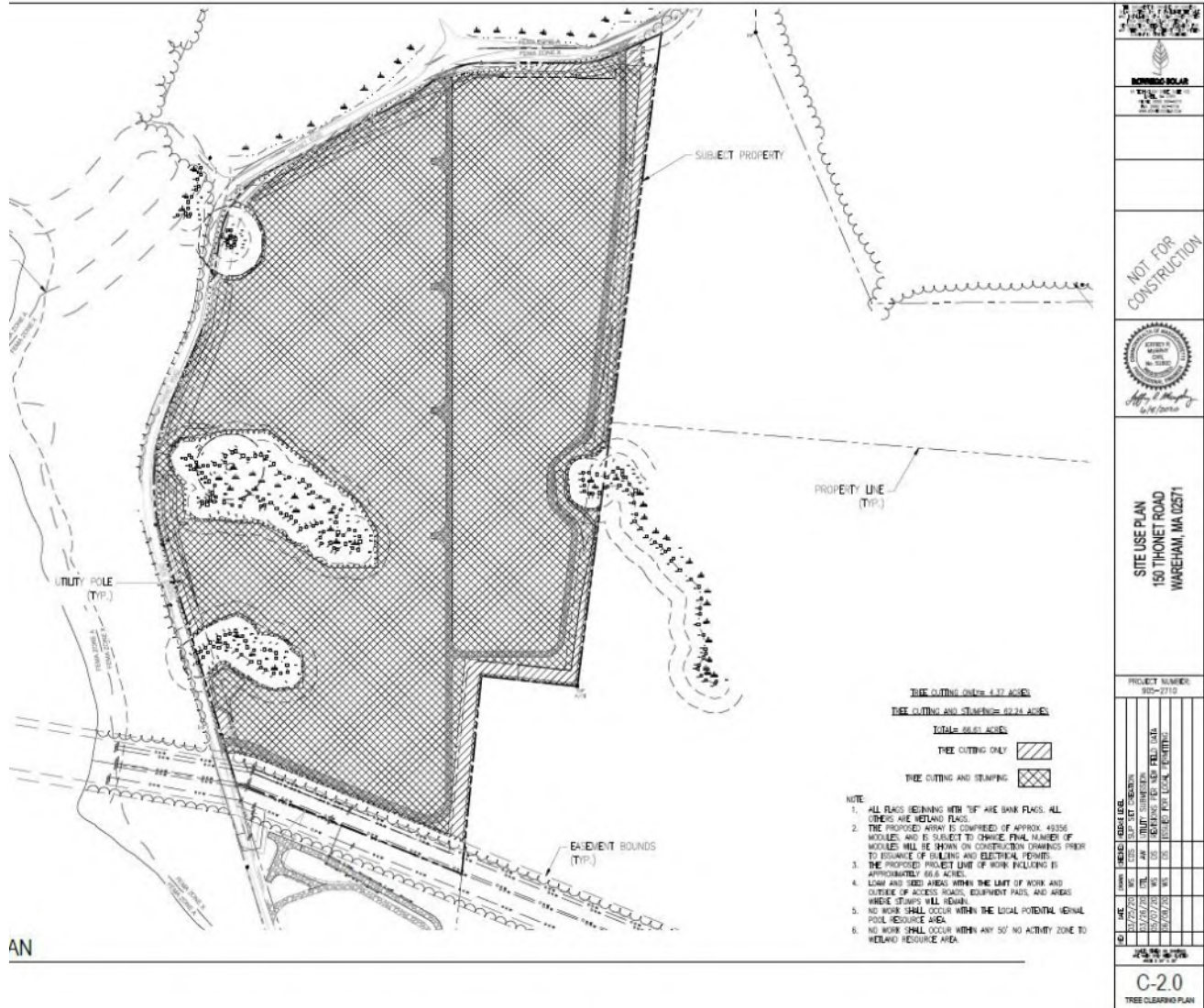
Sincerely,



Jeffrey D. Golay  
MA Licensed Forester #399

7/31/2020

Date





**Jeffrey D. Golay** Massachusetts Licensed Forester #399

2300 Main Poland Road, Williamsburg, MA 01096 • (978) 317-3707 • jeffreygolay@gmail.com

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On Saturday July 25<sup>th</sup> a site visit was performed to evaluate the conditions of a 74.1-acre section of forestland on the easterly side of Tihonet Road in the town of Wareham, MA. The study area is shown as the hatched area on the attached plan.

The overstory of this site is composed of primarily white pine a large component of pitch pine and lesser components of red maple, sassafras, white oak and black oak. Understory regeneration is present at varying density and is composed of white pine, sassafras, mixed oaks and red maple. Fern species and low bush blueberries are common throughout the site. Forest health and vigor are generally fair to good. Timber quality is generally fair among all species.

Plot data was taken using a 10 basal area factor cruz-all and tree measurements were taken using a Biltmore scale stick. Plot data was processed using US Forest Service NED-3 software and timber values were derived from UMass Cooperative Extension Southern New England Stumpage Reports for 2019-2020 and adjusted based on site conditions. The following timber values were used: white pine \$90/MBF, pitch pine \$60/MBF, firewood \$10/cord, pulpwood \$1/ton.

Forestland Statistics:

Mean DBH: 12"

Basal area: 172 Sq. Ft. / Ac.

Firewood volume: 140 Cords

Pulpwood volume: 1500 Tons

Sawtimber volume: 420 MBF Total

-White pine – 280 MBF

-Pitch pine – 140 MBF

Firewood value: \$1,400

Pulpwood value: \$1,500

Sawtimber value: \$33,600

Total estimated standing timber value: \$36,500

Sincerely,



Jeffrey D. Golay  
MA Licensed Forester #399

7/31/2020

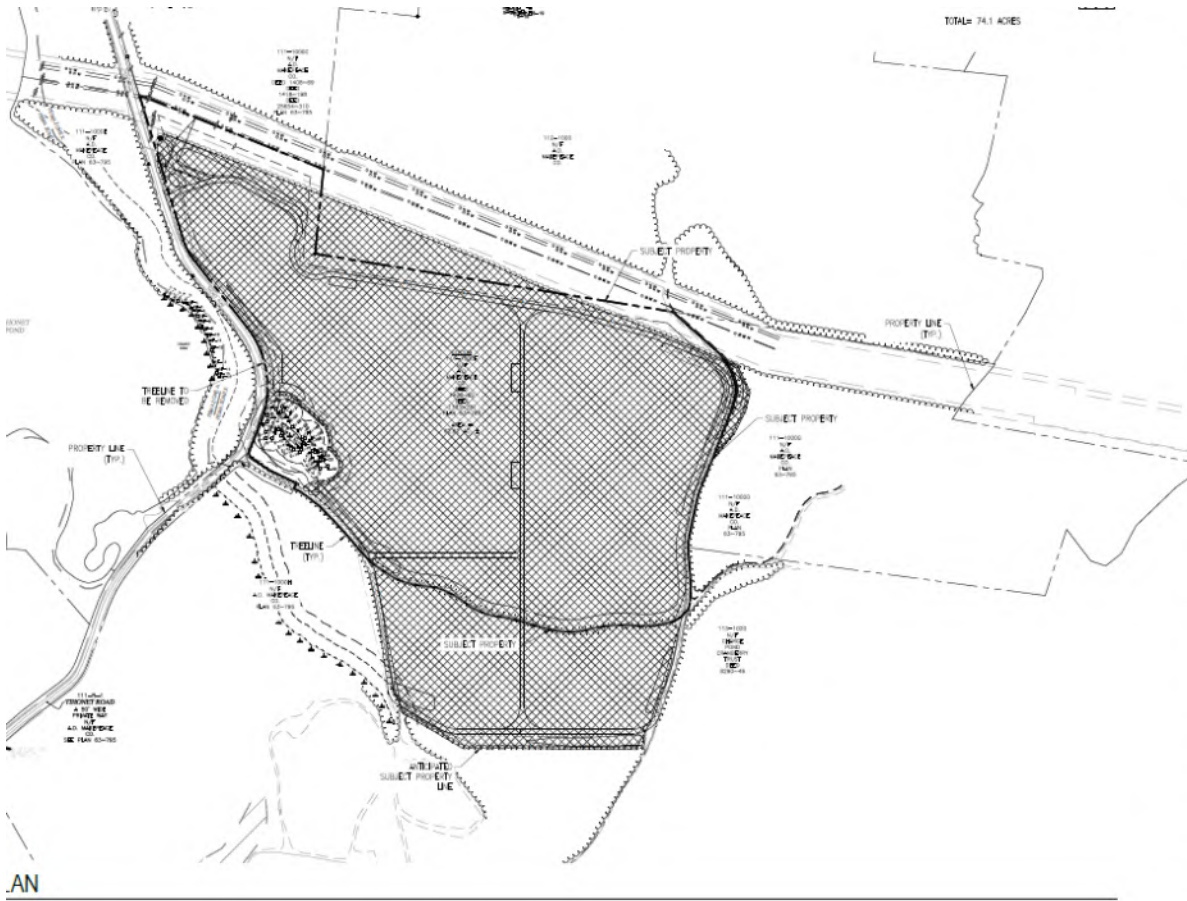
Date

Page 1 of 2

**Jeffrey D. Golay** Massachusetts Licensed Forester #399

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NOT FOR  
CONSTRUCTION



SITE USE PLAN  
140 THORNT ROAD  
WAREHAM, MA 02571

PROJECT NUMBER:  
905-2708

NO.	DATE	REVISION	BY	DATE	REVISION	BY	DATE	REVISION
1	02/07/20	ISSUE FOR PERMIT	JAK	02/07/20	ISSUE FOR PERMIT	JAK	02/07/20	ISSUE FOR PERMIT
2	02/07/20	ISSUE FOR PERMIT	JAK	02/07/20	ISSUE FOR PERMIT	JAK	02/07/20	ISSUE FOR PERMIT
3	02/07/20	ISSUE FOR PERMIT	JAK	02/07/20	ISSUE FOR PERMIT	JAK	02/07/20	ISSUE FOR PERMIT
4	02/07/20	ISSUE FOR PERMIT	JAK	02/07/20	ISSUE FOR PERMIT	JAK	02/07/20	ISSUE FOR PERMIT
5	02/07/20	ISSUE FOR PERMIT	JAK	02/07/20	ISSUE FOR PERMIT	JAK	02/07/20	ISSUE FOR PERMIT
6	02/07/20	ISSUE FOR PERMIT	JAK	02/07/20	ISSUE FOR PERMIT	JAK	02/07/20	ISSUE FOR PERMIT
7	02/07/20	ISSUE FOR PERMIT	JAK	02/07/20	ISSUE FOR PERMIT	JAK	02/07/20	ISSUE FOR PERMIT
8	02/07/20	ISSUE FOR PERMIT	JAK	02/07/20	ISSUE FOR PERMIT	JAK	02/07/20	ISSUE FOR PERMIT
9	02/07/20	ISSUE FOR PERMIT	JAK	02/07/20	ISSUE FOR PERMIT	JAK	02/07/20	ISSUE FOR PERMIT
10	02/07/20	ISSUE FOR PERMIT	JAK	02/07/20	ISSUE FOR PERMIT	JAK	02/07/20	ISSUE FOR PERMIT

C-2.0  
TREE CLEARING PLAN





**Equivalency Results** [How are they calculated?](#)




The sum of the greenhouse gas emissions you entered above is of Carbon Dioxide Equivalent. This is equivalent to:




48,821 Metric Tons




**Greenhouse gas emissions from**


<p><span>i</span> <b>10,547</b></p>  <p>Passenger vehicles driven for one year</p>	<p><span>i</span> <b>121,144,199</b></p>  <p>Miles driven by an average passenger vehicle</p>
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**CO<sub>2</sub> emissions from**

<p><span>i</span> <b>5,493,542</b></p>  <p>gallons of gasoline consumed</p>	<p><span>i</span> <b>4,795,787</b></p>  <p>gallons of diesel consumed</p>	<p><span>i</span> <b>53,794,168</b></p>  <p>Pounds of coal burned</p>
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<p><span>i</span> <b>646</b></p>  <p>tanker trucks' worth of gasoline</p>	<p><span>i</span> <b>5,634</b></p>  <p>homes' energy use for one year</p>	<p><span>i</span> <b>8,266</b></p>  <p>homes' electricity use for one year</p>
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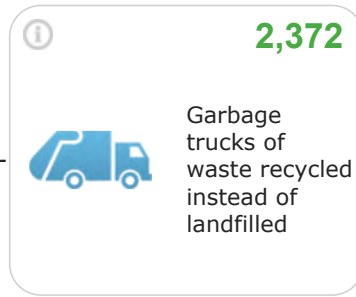
<p><span>i</span> <b>268</b></p>  <p>railcars' worth of coal burned</p>	<p><span>i</span> <b>113,031</b></p>  <p>barrels of oil consumed</p>	<p><span>i</span> <b>1,995,793</b></p>  <p>propane cylinders used for home barbeques</p>
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<p><span>i</span> <b>0.013</b></p>  <p>coal-fired power plants in one year</p>	<p><span>i</span> <b>6,226,264,90</b></p>  <p>number of smartphones charged</p>
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## Greenhouse gas emissions avoided by



-or-



-or-



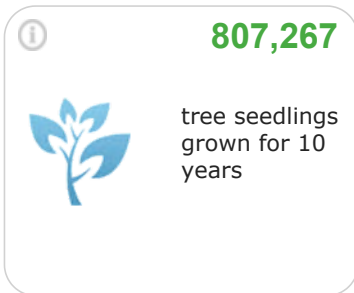
-or-



-or-



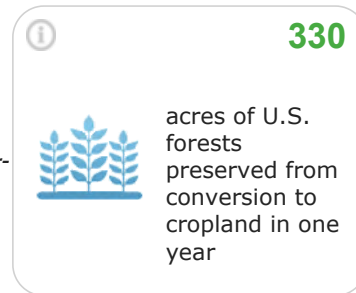
## Carbon sequestered by



-or-



-or-









**Equivalency Results** [How are they calculated?](#)




The sum of the greenhouse gas emissions you entered above is of Carbon Dioxide Equivalent. This is equivalent to:



11,489 Metric Tons




**Greenhouse gas emissions from**

<p><span style="float: right; color: green; font-weight: bold;">2,482</span></p> <p> Passenger vehicles driven for one year</p>	<p><span style="float: right; color: green; font-weight: bold;">28,509,677</span></p> <p> Miles driven by an average passenger vehicle</p>
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**CO<sub>2</sub> emissions from**

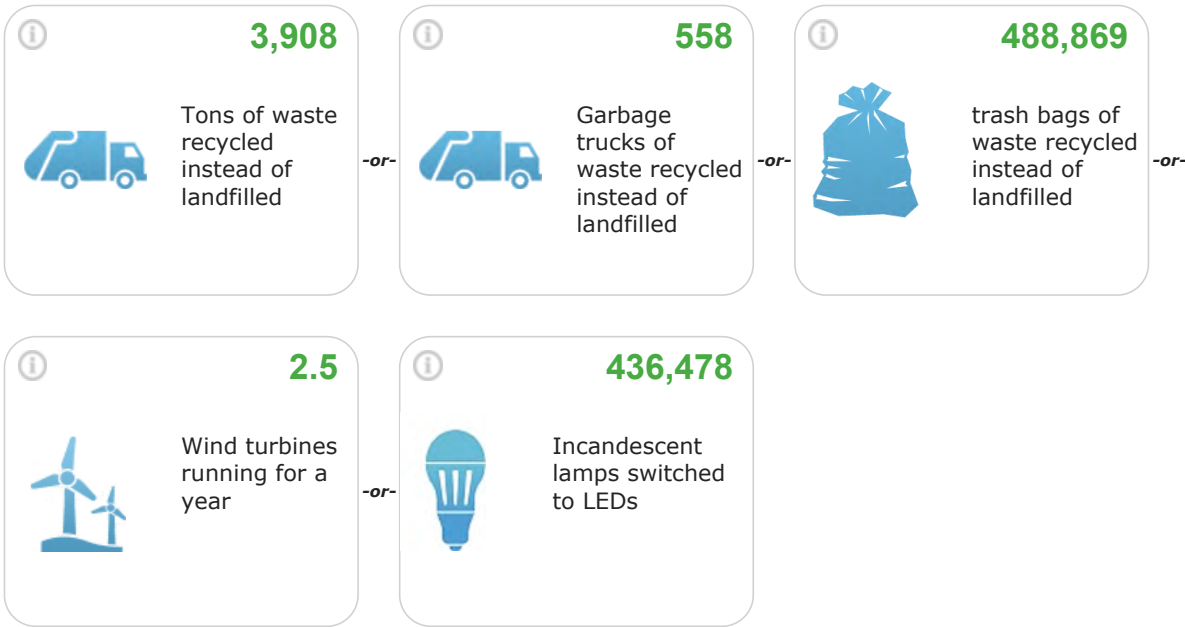
<p><span style="float: right; color: green; font-weight: bold;">1,292,832</span></p> <p> gallons of gasoline consumed</p>	<p><span style="float: right; color: green; font-weight: bold;">1,128,625</span></p> <p> gallons of diesel consumed</p>	<p><span style="float: right; color: green; font-weight: bold;">12,659,743</span></p> <p> Pounds of coal burned</p>
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<p><span style="float: right; color: green; font-weight: bold;">152</span></p> <p> tanker trucks' worth of gasoline</p>	<p><span style="float: right; color: green; font-weight: bold;">1,326</span></p> <p> homes' energy use for one year</p>	<p><span style="float: right; color: green; font-weight: bold;">1,945</span></p> <p> homes' electricity use for one year</p>
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<p><span style="float: right; color: green; font-weight: bold;">63.2</span></p> <p> railcars' worth of coal burned</p>	<p><span style="float: right; color: green; font-weight: bold;">26,600</span></p> <p> barrels of oil consumed</p>	<p><span style="float: right; color: green; font-weight: bold;">469,683</span></p> <p> propane cylinders used for home barbeques</p>
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<p><span style="float: right; color: green; font-weight: bold;">0.003</span></p> <p> coal-fired power plants in one year</p>	<p><span style="float: right; color: green; font-weight: bold;">1,465,268,71</span></p> <p> number of smartphones charged</p>
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## Greenhouse gas emissions avoided by



## Carbon sequestered by







**Equivalency Results** [How are they calculated?](#)




The sum of the greenhouse gas emissions you entered above is of Carbon Dioxide Equivalent. This is equivalent to:




18,595 Metric Tons




**Greenhouse gas emissions from**

<p><span>i</span> <b>4,017</b></p>  <p>Passenger vehicles driven for one year</p>	<p><span>i</span> <b>46,141,816</b></p>  <p>Miles driven by an average passenger vehicle</p>
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**CO<sub>2</sub> emissions from**

<p><span>i</span> <b>2,092,399</b></p>  <p>gallons of gasoline consumed</p>	<p><span>i</span> <b>1,826,636</b></p>  <p>gallons of diesel consumed</p>	<p><span>i</span> <b>20,489,306</b></p>  <p>Pounds of coal burned</p>
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<p><span>i</span> <b>246</b></p>  <p>tanker trucks' worth of gasoline</p>	<p><span>i</span> <b>2,146</b></p>  <p>homes' energy use for one year</p>	<p><span>i</span> <b>3,148</b></p>  <p>homes' electricity use for one year</p>
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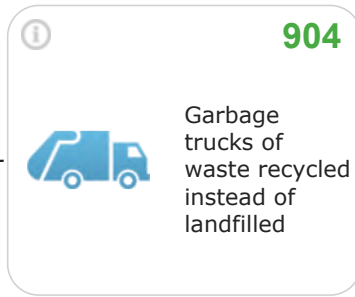
<p><span>i</span> <b>102</b></p>  <p>railcars' worth of coal burned</p>	<p><span>i</span> <b>43,052</b></p>  <p>barrels of oil consumed</p>	<p><span>i</span> <b>760,164</b></p>  <p>propane cylinders used for home barbeques</p>
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<p><span>i</span> <b>0.005</b></p>  <p>coal-fired power plants in one year</p>	<p><span>i</span> <b>2,371,481,05</b></p>  <p>number of smartphones charged</p>
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## Greenhouse gas emissions avoided by



-or-



-or-



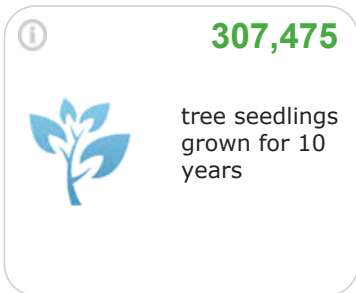
-or-



-or-



## Carbon sequestered by



-or-



-or-







**Equivalency Results** [How are they calculated?](#)




The sum of the greenhouse gas emissions you entered above is of Carbon Dioxide Equivalent. This is equivalent to:




18,737 Metric Tons




**Greenhouse gas emissions from**

<p><span>i</span> <b>4,048</b></p>  <p>Passenger vehicles driven for one year</p>	<p><span>i</span> <b>46,492,705</b></p>  <p>Miles driven by an average passenger vehicle</p>
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**CO<sub>2</sub> emissions from**

<p><span>i</span> <b>2,108,311</b></p>  <p>gallons of gasoline consumed</p>	<p><span>i</span> <b>1,840,527</b></p>  <p>gallons of diesel consumed</p>	<p><span>i</span> <b>20,645,119</b></p>  <p>Pounds of coal burned</p>
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<p><span>i</span> <b>248</b></p>  <p>tanker trucks' worth of gasoline</p>	<p><span>i</span> <b>2,162</b></p>  <p>homes' energy use for one year</p>	<p><span>i</span> <b>3,172</b></p>  <p>homes' electricity use for one year</p>
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<p><span>i</span> <b>103</b></p>  <p>railcars' worth of coal burned</p>	<p><span>i</span> <b>43,379</b></p>  <p>barrels of oil consumed</p>	<p><span>i</span> <b>765,945</b></p>  <p>propane cylinders used for home barbeques</p>
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<p><span>i</span> <b>0.005</b></p>  <p>coal-fired power plants in one year</p>	<p><span>i</span> <b>2,389,515,13</b></p>  <p>number of smartphones charged</p>
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## Greenhouse gas emissions avoided by

 **6,373**

 Tons of waste recycled instead of landfilled

-or-

 **910**

 Garbage trucks of waste recycled instead of landfilled


-or-

 **797,233**

 trash bags of waste recycled instead of landfilled

-or-

 **4**


 Wind turbines running for a year


-or-

 **711,794**

 Incandescent lamps switched to LEDs

## Carbon sequestered by

 **309,813**

 tree seedlings grown for 10 years

-or-

 **24,469**

 acres of U.S. forests in one year

-or-

 **127**

 acres of U.S. forests preserved from conversion to cropland in one year