



Advancing Tree Equity in Providence, Rhode Island
Project Design Document – Year 4

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INSTRUCTIONS

Project Operators must complete and submit this Project Design Document (PDD) to request credits after the third anniversary of the Credit Commencement Date. City Forest Credits then reviews this PDD as part of the validation process along with all other required project documents. An approved third-party verifier then does an independent check of all documents and compliance with the Protocol, known as verification. An updated PDD will need to be submitted for future verification at Year 6 and After Year 25.

Project Operators should enter data and supporting attachments starting on page 3 under Project Overview where you find “[Enter text here]” as thoroughly as possible and provide numbered attachments for maps and other documentation (ex: 1 – Regional Map). Keep all instructions in the document.

Below is a list of documents that are needed to complete a successful Year 4 Project Design Document:

For the Single Tree Planting Design:

- Carbon Quantification Year 4 Credit tool
- Tree Sampling Data
- Geocoded photos
- Project geospatial data, if there have been changes (KML file or shapefile)

For the Cluster Planting Design

- Project Area imaging from any telemetry, imaging, or remote sensing service
- i-Tree Canopy report
- i-Tree Canopy source data
- Project geospatial data, if there have been changes (KML file or shapefile)
- Carbon Quantification Year 4 Credit tool

For the Area Reforestation Planting Design (previously Canopy Design):

- Either:
 - Project Area imaging from any telemetry, imaging, or remote sensing service
 - i-Tree Canopy report
 - i-Tree Canopy source data
- Or:
 - Tree plot sampling data
- Project geospatial data, if there have been changes (KML file or shapefile)
- Carbon Quantification Year 4 Credit tool
- Summary of approach to quantifying the local CO₂ index

PROJECT OVERVIEW

Project Name: Advancing Tree Equity in Providence, Rhode Island

Project Number: 22

Project Type: Planting Project (under City Forest Credits Planting Protocol - version 9, February 7, 2021)

Project Start Date: November 10, 2021

Project Location: Providence, Rhode Island

Project Operator Name: American Forests

Project Operator Contact Information: Tanner Haid, Senior Director of Urban Forestry Field Delivery, 202-601-1976, thaid@americanforests.org

PROJECT AND PLANTING DESIGN UPDATES

Include information on changes to the project including tree survival, ownership, or other relevant updates.

Between April 2020 and November 2021, the Providence Neighborhood Planting Program (PNPP) planted 1,120 trees across the city of Providence, Rhode Island. Trees were planted using the single tree planting design and quantification method including: 1,039 trees planted along the city right-of-way (sidewalks, lawn strips, medians, etc.) and 81 trees planted on other city owned and managed properties (schools, fire stations, parks, etc.).

There have been no changes in land ownership on this project area site.

Most trees have not been replaced since the initial planting.

CARBON QUANTIFICATION DOCUMENTATION (Section 12 and Appendix B)

Describe and summarize the planting design, sampling, and appropriate quantification/measurement method for the project – Single Tree, Clustered, or Area Reforestation. Include the project's climate zone and method of data collection. Outline the estimated total number of credits to be issued to the project over 25 years as well as the amount to be issued upon successful validation and verification in Year 4. Attach the quantification tool and appropriate sampling tool.

List of quantification Tools by planting method (CFC to provide guidance and resources):

- 1) *Single Tree - single tree quantification tool*
- 2) *Clustered - cluster quantification tool*
- 3) *Area Reforestation - quantification with CO₂ calculated per acre*

To ensure performance of the credits, Project Operators must commit to the following at Year 4, with additional requirements at Year 6 and after Year 25 based on the appropriate quantification method.

- 1) *Single Tree*
 - a. *Year 4: Project Operators must generate a random sample of project tree sites using the Single Tree Quantification Tool. Project Operators must visit those sampled tree sites and*

collect data on whether the sample contains a live tree, standing dead tree, or no tree. Provide geocoded photos or imaging of a minimum sample of 20% of the trees. The tracking file includes a column where each tree is assigned a unique serial number to help with tracking each coordinate and tree picture or image.

- i. Based on this data, the number and species of project trees is adjusted and a new CO₂ projected amount by after Year 25 is generated.*

2) Clustered

- a. Year 4: Project Operators provide images of the Project Area from any telemetry, imaging, remote sensing, i-Tree Canopy, or UAV service, such as Google Earth and estimate the area in tree canopy cover (acres). Imaging from Google Earth with leaf-on may be used. Project Operators will calculate the percent of canopy cover from the Google Earth imaging. Projects can use i-Tree Canopy and point sampling to calculate canopy cover. Using i-Tree Canopy, continue adding points until the standard error of the estimate for both the tree and non-tree cover is less than 5%. i-Tree Canopy will supply you with the standard errors. If tree canopy cover is determined using another approach, such as image classification, a short description of the approach should be provided, as well as the QA/QC measures that were used. A tree cover classification accuracy assessment should be conducted, as with randomly placed points, and the percentage tree cover classification accuracy reported.*
 - i. If the canopy coverage equals or exceeds 2.8% (400 trees per acre with an average canopy area of 3.14 square feet per tree (2-foot diameter of canopy) is 2.8% of an acre), then the credits projected in the Clustered Quantification Tool may be issued. If canopy coverage is below 2.8%, then the number of credits issued is reduced by the same percentage as the canopy coverage falls below 2.8%.*

3) Area Reforestation (formerly Canopy planting design)

- a. Year 4: Project Operators must either conduct a physical tree count using plots or use imaging to determine canopy coverage at Year 4.*
 - i. If the canopy coverage equals or exceeds 2.8% (400 trees per acre with an average canopy area of 3.14 square feet per tree (2-foot diameter of canopy) is 2.8% of an acre), then the credits projected in the Quantification Tool may be issued. If canopy coverage is below 2.8%, then the number of credits issued is reduced by the same percentage as the canopy coverage falls below 2.8%.*

Overview

Between April 2020 and November 2021, the Providence Neighborhood Planting Program (PNPP) Planted 1,120 trees across the city of Providence, Rhode Island. Trees were planted using the single tree planting design and quantification method including: 1,039 trees planted along the city right-of-way (sidewalks, lawn strips, medians, etc.) and 81 trees planted on other city owned and managed properties (schools, fire stations, parks, etc.). The Project Operator used the Single Tree quantification method.

Data Collection

American Forests and local implementing partner Providence Neighborhood Planting Program staff collected data on the 89 tree random sample spanning the “Advancing Tree Equity in Providence, Rhode Island” project area, as provided by City Forest Credits. The status of each tree was documented, along with a geotagged photo. After sampling was completed, the project has a current mortality status of 6 vacant/dead trees.

Significant mortality (>20%) did not occur and no significant changes were made to the Project Area since the initial planting.

Attachments: Providence 2021 Single Tree Year 4 Credit Tool

Carbon Quantification

Total number of trees planted	1,120
Project area (acres), if applicable	N/A
Total number of trees per acre, if applicable	N/A
Credits attributed to the project (tCO ₂ e)	1,022
Credits after mortality deduction (20% or insert observed mortality, if greater)	818
Contribution to Registry Reversal Pool Account (5%) (tCO ₂ e)	41
Total credits to be issued to the Project Operator (tCO₂e)	777
Total credits requested to be issued at Year 4	311

GHG Assertion:

Project Operator asserts that the Project results in GHG emissions mitigation of 777 tons CO₂e over the 25-year Project Duration. Project Operator asserts that, per Protocol guidelines, 40% of the Project GHG emissions mitigation is issued at Year 4, or 311 tons CO₂e.

The updated Projected CO₂ stored and credit issuance over 26 years is outlined below:

Single Tree Plantings	Projection at Initial Crediting	Updated Projection at Year 4
Total credits issued at Initial Crediting (10% CO ₂ (t))	78	78
Total credits to be issued at Year 4 (40% CO ₂ (t))	311	311
Total credits to be issued at Year 6 (30% CO ₂ (t))	233	233
Total credits to be issued at Year 26 (20% CO ₂ (t))	155	155
Total credits to be issued (tCO₂e)	777	777

Attachment: Providence 2021 Single Tree Year 4 Credit Tool

CO-BENEFITS QUANTIFICATION DOCUMENTATION (Section 12 and Appendix A)

Summarize co-benefit quantification and provide supporting documentation. If necessary, update the CFC-provided Co-Benefits Quantification spreadsheet to calculate updated rainfall interception, reduction of certain air compounds, and energy savings.

Ecosystem Services	Resource Units	Value
Rainfall Interception (m3/yr)	7,142.36	\$15,094.51
Air Quality (t/yr)	0.4764	\$5,715.86
Cooling – Electricity (kWh/yr)	93,201.26	\$13,057.50
Heating – Natural Gas (kBtu/yr)	3,467,234.39	\$48,493.53
Grand Total (\$/yr)	N/A	\$82,361.39

Attachment: Providence 2021 Single Tree Year 4 Credit Tool

ADDITIONAL INFORMATION

Include additional information on changes to monitoring and reporting plans since the Initial Credit Planting Design Document was submitted.

American Forests is the Project Operator, whereas Providence Neighborhood Planting Program (PNPP) is the local implementing partner that plants, maintains, and inventories the trees planted. There have been no changes to monitoring and reporting plans since the Initial Credit Planting Design Document was submitted.

SIGNATURE

Signed on August 15th in 2025, by Tanner Haid, Senior Director of Urban Forestry Field Delivery, for American Forests.

Tanner Haid

Signature

Tanner Haid

Printed Name

304-886-2665

Phone

thaid@americanforests.org

Email

ATTACHMENTS

For the Single Tree Planting Design:

- 1 - Carbon Quantification Year 4 Credit tool
- 2 - Tree Sampling Data
- 3 - Geocoded photos
- 4 - Project geospatial data (KML file or shapefile)

For the Cluster Planting Design

- 1 - Project Area imaging from any telemetry, imaging, or remote sensing service
- 2 - i-Tree Canopy report
- 3 - i-Tree Canopy source data
- 4 - Project geospatial data (KML file or shapefile)
- 5 - Carbon Quantification Year 4 Credit tool

For the Area Reforestation Planting Design (previously Canopy Design):

- Either:
 - 1 - Project Area imaging from any telemetry, imaging, or remote sensing service
 - 2 - i-Tree Canopy report
 - 3 - i-Tree Canopy source data
- Or:
 - 1 - Tree plot sampling data
 - 2 - Project geospatial data (KML file or shapefile)
 - 3 - Carbon Quantification Year 4 Credit tool
 - 4 - Summary of approach to quantifying the local CO₂ index

This copy assigned to INSERT ORGANIZATION NAME. Proprietary and confidential

Directions

Create a data sheet with the same fields seen in the example below.

At the time of data collection soon after planting, record the following information:

-Date of data collection.

-Names of the crew that collected that data.

At the time of data collection soon after planting record the following information:

-Date planted

-Tree Id#, the unique number that coincides with each tree that was planted. If a replacement tree is planted in it, therefore what was originally tree #1 is now tree #2.

-Site Id#, a unique number assigned to each spot a tree is planted at.

-Species name (botanical name)

-Latitude and Longitude (or x and y coordinates) of where each tree is located.

-Image#1, the unique number for the first image of this site.

-Image#2, the unique number for the second image of this site taken at 90 degrees from the first.

To request Forward Credits, draw a random sample and record these additional information:

-If the tree is alive, record if it is the original one planted (original) or a replacement.

-Record if the tree is dead (standing) or missing (vacant site).

-Date removed, the date when the tree was removed.

-Date replaced, the date when the replacement tree was planted.

-Notes, information concerning tree status, health, etc.

During subsequent field sampling sessions you may find it helpful to take a census of the trees.

Example Data Collection Table

Data Collection Dates:

When Planted	Address	Street
2021 - Fall	40	Commodore St
2021 - Fall	47	Callan St
2021 - Fall	182	Thurbers Ave
2021 - Fall	662	Atwells Ave
2021 - Fall	42	Tuxedo Ave
2021 - Fall	62-68	Dike St
2021 - Fall	103	Dike St

2021 - Fall	239	Cranston St
2021 - Fall	301	Cranston St
2020 - Spring	66	Commodore St
2021 - Fall	301	Cranston St
2020 - Spring	76	Commodore St
2020 - Spring	525	Charles St
2020 - Spring	85	Bowdoin St
2020 - Spring	15	Joslin St
2020 - Spring	285	Washington Ave
2020 - Spring	255-263	Warrington Ave
2020 - Spring	292	Vermont Ave
2020 - Spring	292	Vermont Ave
2020 - Spring	30	Central St
2020 - Spring	30	Central St
2020 - Spring	30	Central St
2020 - Spring	60	Central St
2020 - Spring	22	Carter St
2020 - Spring		Roger Williams Park - opp Temple to Music
2020 - Fall	10	Carleton St.
2020 - Fall	440	River Ave
2020 - Fall	25	Parkway Ave
2020 - Spring	125	George St
2020 - Fall	5	Santiago St
2020 - Fall	90	Reservoir Ave
2020 - Spring	338	Angell St
2020 - Fall	220	Power St
2020 - Fall	347	Williams St
2020 - Fall	291	Union Ave
2020 - Fall	191	Webster Ave
2020 - Fall	80	Plenty St
2020 - Fall	220	Elmwood Ave
2020 - Fall	243	Elmwood Ave
2020 - Fall	52	Whitmarsh St
2020 - Fall	15	Gallatin St
2020 - Fall	50	Carolina Ave
2020 - Spring	479	Douglas Ave
2020 - Fall	1358	Eddy St
2020 - Fall	542	Potters Ave
2021 - Spring	65	Trenton St
2021 - Spring	55	Gano St
2021 - Spring	55	Gano St
2021 - Spring	55	Gano St
2021 - Spring	55	Gano St
2021 - Spring	120	Wayland Ave
2020 - Spring	466	Admiral Street
2021 - Spring	27	East Manning St
2021 - Spring	45	Larch St

2021 - Spring	95	Keene Street
2021 - Spring	366	Thayer Street
2021 - Spring	110	Lloyd Ave
2021 - Spring	108	Suffolk St
2021 - Spring	172	Webster Ave
2021 - Spring	11	Pilgrim St
2021 - Spring	11	Pilgrim St
2021 - Spring	1199	Eddy St
2021 - Spring	1305	Eddy St
2021 - Spring	1	Louisa St
2020 - Spring	57	Sharon St
2020 - Spring	41	Grosvenor Ave
2021 - Spring	184	Benefit St
2021 - Spring	223	Ivy St
2021 - Spring	lawn strip	S. Water St
2020 - Spring	30	Elmhurst Ave
2021 - Spring	674	Prairie Ave
2021 - Spring	60	Fosdyke St
2021 - Spring	110	Lauriston St
2021 - Spring	1271	N. Main St
2021 - Fall	131	Lancaster St
2020 - Spring	22	Arbor Dr
2020 - Spring	26	Arbor Dr
2021 - Fall	15	Woodbine St
2021 - Fall	13	Edgemere Ave
2021 - Fall	152	Indiana Ave
2021 - Fall	236	Ohio Ave
2021 - Fall	15	Melrose St.
2021 - Fall	142	Stanwood St
2021 - Fall	18	Tobey St.
2020 - Spring	111	Arbor Dr
2021 - Fall	234	Roger Williams Ave
2021 - Fall	203	Rutherglen Ave
2021 - Fall	948	Branch Avenue
2021 - Fall	948	Branch Avenue

Confidential CFC information. Do not forward to third parties without CFC permission.

Information:
Information on each tree:
ated at the site. When each tree has just been planted, and there are not any dead or missing trees, the tree is now tree #4. If tree #4 is the next one at the project that gets replaced, that new tree will then be tree #5.
ated. These data are used to accurately locate the site for remeasurement.
0 degrees to the first.
nal data on each tree site sampled.
placement (replace#1, replace#2).
Copy of your original data sheets along for reference when attempting to locate each tree.

			Crew:
Concatenated / Full Address	Side	Site Order #	Lat
40 Commodore St, Providence, RI	S	1	41.8468
47 Callan St, Providence, RI	F	1	41.84450317
182 Thurbers Ave, Providence, RI	Y	Y	41.79973406
662 Atwells Ave, Providence, RI	S	1	41.8246175
42 Tuxedo Ave, Providence, RI	S	1	41.823017
62-68 Dike St, Providence, RI	F	1	41.81585232
103 Dike St, Providence, RI	F	8	41.8160828

239 Cranston St, Providence, RI	F	3	41.81405585
301 Cranston St, Providence, RI	F	1	41.813083
66 Commodore St, Providence, RI	F	1	41.84760126
301 Cranston St, Providence, RI	F	5	41.813083
76 Commodore St, Providence, RI	S	1	41.84783271
525 Charles St, Providence, RI	F	1	41.849342
85 Bowdoin St, Providence, RI	F	1	41.822262
15 Joslin St, Providence, RI	F	1	41.82443396
285 Washington Ave, Providence, RI	F	3	41.78747095
255-263 Warrington Ave, Providence, RI	F	1	41.8239891
292 Vermont Ave, Providence, RI	F	1	41.78789876
292 Vermont Ave, Providence, RI	F	3	41.78789876
30 Central St, Providence, RI	F	6	41.81446045
30 Central St, Providence, RI	F	5	41.81446045
30 Central St, Providence, RI	F	2	41.81446045
60 Central St, Providence, RI	F	3	41.81376876
22 Carter St, Providence, RI	Side (on Bucklin)	2	41.799865
Roger Williams Park - opp Temple to Music, Providence, RI	In park	Y	41.781216
10 Carleton St., Providence, RI	F	2	41.832524
440 River Ave, Providence, RI	F	1	41.83985569
25 Parkway Ave, Providence, RI	S	1	41.83398494
125 George St, Providence, RI	F	1	41.82556295
5 Santiago St, Providence, RI	F	2	41.7892889
90 Reservoir Ave, Providence, RI	S	1	41.793821
338 Angell St, Providence, RI	F	3	41.82889888
220 Power St, Providence, RI	F	2	41.823934
347 Williams St, Providence, RI	F	1	41.823029
291 Union Ave, Providence, RI	F	1	41.80718
191 Webster Ave, Providence, RI	S	4	41.810205
80 Plenty St, Providence, RI	F	1	41.80713585
220 Elmwood Ave, Providence, RI	S	6	41.8069905
243 Elmwood Ave, Providence, RI	F	1	41.80617664
52 Whitmarsh St, Providence, RI	F	1	41.80594268
15 Gallatin St, Providence, RI	F		41.79711538
50 Carolina Ave, Providence, RI	F	1	41.791905
479 Douglas Ave, Providence, RI	S	3	41.843546
1358 Eddy St, Providence, RI	S	1	41.788269
542 Potters Ave, Providence, RI	F	3	41.80160244
65 Trenton St, Providence, RI	F	1	41.82097585
55 Gano St , Providence, RI	F	4	41.82025347
55 Gano St , Providence, RI	F	5	41.82025347
55 Gano St , Providence, RI	F	9	41.82025347
55 Gano St , Providence, RI	F (behind path)	12	41.82025347
120 Wayland Ave, Providence, RI	F	2	41.827233
466 Admiral Street, Providence, RI	S	2	41.846558
27 East Manning St, Providence, RI	S	1	41.8269696
45 Larch St, Providence, RI	F	1	41.842397

95 Keene Street, Providence, RI	F	1	41.83209218
366 Thayer Street, Providence, RI	S	3	41.83247414
110 Lloyd Ave , Providence, RI	F	1	41.83150527
108 Suffolk St, Providence, RI	F	1	41.84265
172 Webster Ave, Providence, RI	F	1	41.81090733
11 Pilgrim St, Providence, RI	F	1	41.80749458
11 Pilgrim St, Providence, RI	F	3	41.80749458
1199 Eddy St, Providence, RI	F	2	41.792694
1305 Eddy St, Providence, RI	S	1	41.7897005
1 Louisa St, Providence, RI	S	1	41.802583
57 Sharon St, Providence, RI	F	1	41.83682863
41 Grosvenor Ave, Providence, RI	F	1	41.83356889
184 Benefit St, Providence, RI	F	1	41.8276023
223 Ivy St, Providence, RI	F	1	41.84596829
lawn strip S. Water St, Providence, RI	F		41.819789
30 Elmhurst Ave, Providence, RI	F	1	41.840446
674 Prairie Ave, Providence, RI	Front	2	41.79549291
60 Fosdyke St, Providence, RI	F		41.84622401
110 Lauriston St, Providence, RI	F	2	41.84826598
1271 N. Main St, Providence, RI	side	1	41.854939
131 Lancaster St, Providence, RI	F	1	41.84576371
22 Arbor Dr, Providence, RI	F	1	41.838465
26 Arbor Dr, Providence, RI	F	1	41.838344
15 Woodbine St, Providence, RI	F	1	41.845468
13 Edgemere Ave, Providence, RI	F	2	41.825493
152 Indiana Ave, Providence, RI	S	1	41.79040308
236 Ohio Ave, Providence, RI	S	2	41.7892786
15 Melrose St., Providence, RI	F	4	41.7991407
142 Stanwood St, Providence, RI	F	1	41.80205901
18 Tobey St., Providence, RI	F	2	41.820061
111 Arbor Dr, Providence, RI	F	1	41.83752659
234 Roger Williams Ave, Providence, RI	F	1	41.78880476
203 Rutherglen Ave, Providence, RI	F	1	41.78730938
948 Branch Avenue, Providence, RI	F	1	41.85490935
948 Branch Avenue, Providence, RI	F	2	41.85490935

tree id#s will all be the same as the site#s. As trees get replaced, the list of tree id#s will increase. In the

Long	Orig Species	CFC Site ID #	CFC Tree ID # (Orig Tree)	
-71.417829	Armstrong Maple	S1019	T1019	
-71.45186301	Kentucky Coffeetr	S1042	T1042	
-71.40641016	Valley Forge Elm	S1057	T1057	
-71.43887844	Spectrum Honeylo	S1068	T1068	
-71.438842	Tree Lilac	S1071	T1071	
-71.44272253	Armstrong Maple	S1074	T1074	
-71.44341287	Village Green Zeln	S1087	T1087	

-71.42753124	Valley Forge elm	S1093	T1093	
-71.42884	Kentucky coffeetr	S1097	T1097	
-71.41800839	Minnesota strain	S110	T110	
-71.42884	Prairie expedition	S1101	T1101	
-71.41806557	Armstrong maple	S111	T111	
-71.41982	Hedge Maple	S135	T135	
-71.442924	Donald Wyman Cr	S142	T142	
-71.44671162	Hedge Maple	S144	T144	
-71.39986524	October Glory Ma	S154	T154	
-71.4128343	Legend Linden	S157	T157	
-71.40013251	Japanese Tree Lila	S162	T162	
-71.40013251	Merlot redbud	S163	T163	
-71.42189907	Glenleven linden	S194	T194	
-71.42189907	Glenleven linden	S195	T195	
-71.42189907	Princeton Elm	S198	T198	
-71.42269771	Triumph Elm	S200	T200	
-71.428052	Kwanzan	S223	T223	
-71.416461	Ohio buckeye 'Aut	S237	T237	
-71.447827	River Birch	S252	T252	
-71.44048051	Swamp white oak	S263	T263	
-71.43722788	Ginkgo	S266	T266	
-71.39873407	American Linden '	S31	T31	link
-71.42411696	Pin Oak	S328	T328	
-71.426656	Baumann horsech	S335	T335	
-71.3941125	Corinthian linden	S35	T35	
-71.391781	Village Green Zelk	S354	T354	
-71.390749	London plane	S371	T371	
-71.446991	Schubert cherry	S390	T390	
-71.449504	London Planetree	S392	T392	
-71.42211066	Nannyberry	S419	T419	
-71.4247705	Spring snow craba	S421	T421	
-71.4251177	Kentucky Coffeetr	S425	T425	
-71.42206818	Japanese Snowbe	S429	T429	
-71.4141035	London Planetree	S436	T436	
-71.394573	Minnesota Strain	S446	T446	
-71.427694	Boulevard Linden	S45	T45	
-71.402489	Patriot Elm	S453	T453	
-71.42729111	Armstrong Maple	S483	T483	
-71.39043397	Schubert Cherry	S510	T510	
-71.38966358	Wireless Zelkova	S518	T518	
-71.38966358	Minnesota Strain	S519	T519	
-71.38966358	Thornless Hawtho	S523	T523	
-71.38966358	Pin Oak	S526	T526	
-71.388691	Sargent Cherry	S527	T527	
-71.432022	Boulevard Linden	S54	T54	
-71.39256131	Spring Snow craba	S540	T540	
-71.400848	Minnesota Strain	S562	T562	

-71.40176299	American hornbea	S574	T574	
-71.40130214	American Linden '	S577	T577	
-71.40266435	Black Oak	S579	T579	
-71.423802	River birch	S621	T621	
-71.449358	American Hornbe	S657	T657	
-71.41164587	Corinthian Linden	S711	T711	
-71.41164587	Harvest Gold Lind	S713	T713	
-71.403913	Greenspire Linder	S728	T728	
-71.40287169	Japanese tree lilac	S738	T738	
-71.409429	Ginkgo	S739	T739	
-71.44130327	Minn. Strain Redb	S74	T74	
-71.43942317	Greenspire Linder	S75	T75	
-71.4078092	Ft McNair horsech	S758	T758	
-71.39852647	Wireless Zelkova	S761	T761	
-71.40345	American elm 'Val	S774	T774	
-71.43742	Corinthian Linden	S79	T79	
-71.41038064	Tulip Tree	S807	T807	
-71.39258483	Japanese tree lilac	S827	T827	
-71.39352404	Sargent cherry	S831	T831	
-71.399921	Littleleaf linden	S832	T832	
-71.40061505	American Linden	S873	T873	
-71.437182	American linden 'L	S88	T88	
-71.437308	Minnesota strain	S89	T89	
-71.404838	Donald Wyman Cr	S892	T892	
-71.457752	Sargent Cherry 'Ra	S908	T908	
-71.39621253	Greenspire Linder	S919	T919	
-71.39909512	Ginkgo 'Princeton	S923	T923	
-71.42340886	Silver Linden	S929	T929	
-71.42407721	Autumnalis Cherry	S950	T950	
-71.435582	London Planetree	S956	T956	
-71.4371628	Ginkgo 'Magyar'	S97	T97	
-71.42832026	Tulip Tree	S980	T980	
-71.42990852	Japanese Snowbe	S981	T981	
-71.43732735	Japanese tree lilac	S991	T991	
-71.43732735	Shingle Oak	S992	T992	

example below, site# 1 has a

[illegible]

Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Vacant	N/A		Fall 2022	
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Dead	N/A			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
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Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Replaceme	T1121	Spring 202	Fall 2022
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			

Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Vacant	N/A			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Vacant	N/A		Winter 202	N/A
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
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Link	TRUE	TRUE	Link	Standing	Original			
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Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Vacant	N/A			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Standing	Original			
Link	TRUE	TRUE	Link	Dead	N/A			

vacant	4
standing	83
dead	2

Current Species (If Replaced/ Dif)	Updated Lat	Updated Long	Notes
	41.79923	-71.4089	This is a

Purple			Correct
			Tree
			Not a
			how to
	41.82533	-71.4024	125
			Had been
Japanese			(Fall 2022

			From
			River
			Poor
			Multiple
Honeylocu			Not a

The Single Tree Initial Credit Tool for the Northeast Climate Zone

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The analyst can use this method to forecast the amount of CO₂ (in metric tonnes, t) estimate the estimated CO₂ storage can be issued at three points in time – 10% within one year after p program-wide pool to insure against catastrophic loss of trees. At the end of the project, in ye issued.

Project Operators will follow the Steps listed below to obtain an initial forecast. Basic tree pla a user wishes to seek Credits at one of the first points in time after planting, they will use this Users will submit this spreadsheet to the Registry with other documentation so the Registry c points in time.

Steps

- 1) Plant project trees and collect the following data on each planted tree using the data collection (longitude). We use the term “site” instead of “tree” because some planted trees may no longer b
- 2) Compile data on the numbers of trees planted by species to fill in the Planting List (Table 1).
- 3) Enter data on the anticipated mortality rate (% of planted sites without trees in 25 years) into r
- 4) Credits will be automatically calculated in Table 6, incorporating tree losses and the 5% buffer
- 5) Table 4 automatically infers the amount of CO₂ stored after 25 years from the sample to the p
- 6) For planning purposes only, users can enter a low and high price of CO₂ (\$ per t) in Table 5. Ta stored.
- 7) Table 7 automatically provides estimates of co-benefits for live trees after 25 years in Resourc

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d to be stored by live project trees after 25 years for crediting. Credits based on planting, 40% after year 3, and 30% after year 5, minus 5% that will go into a year 25, Operators will receive credits for all CO2 stored, minus Credits already

nting data on all trees planted needs to be collected at the time of planting. When tool to calculate credit amounts and to supply verification data to the Registry. can verify the planting. Sampled data will be used to obtain Credits at subsequent

n table included in this workbook: species, site id#, tree id# and location (latitude and be present in the sites where they were planted.
ow 6 on the Credits sheet.
pool deduction.
population of live trees.
ble 6 incorporates error estimates of ±15% to calculate low and high amounts of CO ₂
ce Units (e.g., kWh) per year and \$ per year.

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Directions

1) In Table 1 record the number of sites planted for each tree species.

2) If species are not listed, add them to the bottom of Table 1.

Table 1. Planting List

Scientific Name	Common Name
<i>Castanea pumila</i>	Alleghany chinkapin
<i>Tilia americana</i>	American basswood
<i>Fagus grandifolia</i>	American beech
<i>Castanea dentata</i>	American chestnut
<i>Ulmus americana</i>	American elm
<i>Ilex opaca</i>	American holly
<i>Carpinus caroliniana</i>	American hornbeam
<i>Sorbus americana</i>	American mountain ash
<i>Prunus americana</i>	American plum
<i>Platanus occidentalis</i>	American sycamore
<i>Prunus maackii</i>	Amur chokecherry
<i>Phellodendron amurense</i>	Amur corktree
<i>Maackia amurensis</i>	Amur maackia
<i>Acer ginnala</i>	Amur maple
<i>Malus species</i>	Apple
<i>Pyrus calleryana</i> 'Aristocrat'	Aristocrat callery pear
<i>Crataegus mollis</i> 'scheele'	Arnold hawthorn
<i>Fraxinus species</i>	Ash
<i>Chamaecyparis thyoides</i>	Atlantic white cedar
<i>Cedrus atlantica</i>	Atlas cedar
<i>Casuarina equisetifolia</i>	Australian pine
<i>Pinus nigra</i>	Austrian pine
<i>Elaeagnus umbellata</i>	Autumn olive
<i>Taxodium distichum</i>	Baldcypress
<i>Abies balsamea</i>	Balsam fir
<i>Populus balsamifera</i>	Balsam poplar
<i>Tilia species</i>	Basswood
<i>Broadleaf Deciduous Large Other</i>	BDL OTHER
<i>Broadleaf Deciduous Medium Other</i>	BDM OTHER
<i>Broadleaf Deciduous Small Other</i>	BDS OTHER
<i>Fagus species</i>	Beech
<i>Broadleaf Evergreen Large Other</i>	BEL OTHER
<i>Broadleaf Evergreen Medium Other</i>	BEM OTHER
<i>Broadleaf Evergreen Small Other</i>	BES OTHER
<i>Tilia platyphyllos</i>	Bigleaf linden
<i>Populus grandidentata</i>	Bigtooth aspen

<i>Betula species</i>	Birch
<i>Carya cordiformis</i>	Bitternut hickory
<i>Fraxinus nigra</i>	Black ash
<i>Betula lenta</i>	Black birch
<i>Prunus serotina</i>	Black cherry
<i>Populus balsamifera ssp. trichocarpa</i>	Black cottonwood
<i>Carya texana</i>	Black hickory
<i>Robinia pseudoacacia</i>	Black locust
<i>Quercus velutina</i>	Black oak
<i>Populus nigra</i>	Black oak
<i>Picea mariana</i>	Black spruce
<i>Nyssa sylvatica</i>	Black tupelo
<i>Juglans nigra</i>	Black walnut
<i>Salix nigra</i>	Black willow
<i>Quercus marilandica</i>	Blackjack oak
<i>Picea pungens 'glauca'</i>	Blue spruce
<i>Quercus austrina</i>	Bluff oak
<i>Pinus contorta var. bolanderi</i>	Bolander beach pine
<i>Acer negundo</i>	Boxelder
<i>Quercus macrocarpa</i>	Bur oak
<i>Juglans cinerea</i>	Butternut
<i>Sabal palmetto</i>	Cabbage palmetto
<i>Pyrus calleryana</i>	Callery pear
<i>Phoenix canariensis</i>	Canary Island date palm
<i>Fraxinus caroliniana</i>	Carolina ash
<i>Prunus caroliniana</i>	Carolina laurelcherry
<i>Conifer Evergreen Large Other</i>	CEL OTHER
<i>Conifer Evergreen Medium Other</i>	CEM OTHER
<i>Conifer Evergreen Small Other</i>	CES OTHER
<i>Prunus cerasifera</i>	Cherry plum
<i>Quercus prinus</i>	Chestnut oak
<i>Castanea mollissima</i>	Chinese chestnut
<i>Ulmus parvifolia</i>	Chinese elm
<i>Ulmus parvifolia evergreen</i>	Chinese elm evergreen
<i>Magnolia denudata</i>	Chinese magnolia
<i>Magnolia x soulangiana</i>	Chinese magnolia; Saucer magnolia
<i>Quercus muehlenbergii</i>	Chinkapin oak
<i>Citrus species</i>	Citrus
<i>Sequoia sempervirens</i>	Coast redwood
<i>Crataegus crus-galli</i>	Cockspur hawthorn
<i>Acer platanoides 'columnare'</i>	Columnare maple
<i>Prunus virginiana</i>	Common chokecherry
<i>Ptelea trifoliata</i>	Common hoptree
<i>Pyrus communis</i>	Common pear
<i>Diospyros virginiana</i>	Common persimmon
<i>Salix matsudana</i>	Corkscrew willow

<i>Cornus mas</i>	Cornelian cherry
<i>Populus species</i>	Cottonwood
<i>Malus 'harvest gold'</i>	Crabapple harvest gold
<i>Malus 'Indian summer'</i>	Crabapple Indian summer
<i>Acer platanoides 'Crimson king'</i>	Crimson king maple
<i>Ilex cassine</i>	Dahoon
<i>Metasequoia glyptostroboides</i>	Dawn redwood
<i>Cedrus deodara</i>	Deodar cedar
<i>Cornus species</i>	Dogwood
<i>Pseudotsuga menziesii</i>	Douglas fir
<i>Amelanchier arborea</i>	Downy serviceberry
<i>Populus deltoides</i>	Eastern cottonwood
<i>Tsuga canadensis</i>	Eastern hemlock
<i>Ostrya virginiana</i>	Eastern hophornbeam
<i>Juniperus virginiana</i>	Eastern red cedar
<i>Cercis canadensis</i>	Eastern redbud
<i>Amelanchier canadensis</i>	Eastern service berry
<i>Pinus strobus</i>	Eastern white pine
<i>Elm</i>	Elm
<i>Ulmus procera</i>	English elm
<i>Quercus robur</i>	English oak
<i>Juglans regia</i>	English walnut
<i>Fagus sylvatica</i>	European beech
<i>Carpinus betulus</i>	European hornbeam
<i>Larix decidua</i>	European larch
<i>Sorbus aucuparia</i>	European mountain ash
<i>Betula pendula</i>	European white birch
<i>Quercus palustris fastigiata</i>	Fastigate pin oak
<i>Ginkgo biloba, female</i>	Female ginkgo
<i>Abies species</i>	Fir
<i>Koelreuteria elegans</i>	Flamegold
<i>Cornus florida</i>	Flowering dogwood
<i>Prunus triloba</i>	Flowering plum
<i>Ginkgo biloba</i>	Ginkgo
<i>Koelreuteria paniculata</i>	Goldenrain tree
<i>Betula populifolia</i>	Gray birch
<i>Populus x canescens</i>	Gray poplar
<i>Fraxinus pennsylvanica</i>	Green ash
<i>Crataegus viridis</i>	Green hawthorn
<i>Acer saccharum 'green mountain'</i>	Green mountain sugar maple
<i>Tilia cordata 'greenspire'</i>	Greenspire littleleaf linden
<i>Eucommia ulmoides</i>	Hardy rubber tree
<i>Crataegus species</i>	Hawthorn
<i>Corylus species</i>	Hazelnut
<i>Acer campestre</i>	Hedge maple
<i>Carya species</i>	Hickory
<i>Prunus subhirtella</i>	Higan cherry

<i>Ilex species</i>	Holly
<i>Gleditsia triacanthos</i>	Honeylocust
<i>Aesculus hippocastanum</i>	Horsechestnut
<i>Pinus banksiana</i>	Jack pine
<i>Pinus thunbergiana</i>	Japanese black pine
<i>Carpinus japonica</i>	Japanese hornbeam
<i>Acer palmatum</i>	Japanese maple
<i>Sophora japonica</i>	Japanese pagoda tree
<i>Cryptomeria japonica</i>	Japanese red cedar
<i>Styrax japonicus</i>	Japanese snowbell
<i>Syringa reticulata</i>	Japanese tree lilac
<i>Zelkova serrata</i>	Japanese zelkova
<i>Butia capitata</i>	Jelly palm
<i>Cercidiphyllum japonicum</i>	Katsura tree
<i>Gymnocladus dioicus</i>	Kentucky coffeetree
<i>Cornus kousa</i>	Kousa dogwood
<i>Prunus serrulata</i>	Kwanzan cherry
<i>x Cupressocyparis leylandii</i>	Leyland cypress
<i>Tilia cordata</i>	Littleleaf linden
<i>Quercus virginiana</i>	Live oak
<i>Pinus taeda</i>	Loblolly pine
<i>Populus nigra 'italica'</i>	Lombardy poplar
<i>Platanus hybrida</i>	London planetree
<i>Magnolia species</i>	Magnolia
<i>Abies holophylla</i>	Manchurian fir
<i>Acer species</i>	Maple
<i>Albizia julibrissin</i>	Mimosa
<i>Carya alba</i>	Mockernut hickory
<i>Araucaria araucana</i>	Monkeypuzzle tree
<i>Araucaria excelsa</i>	Norfolk island pine
<i>Catalpa speciosa</i>	Northern catalpa
<i>Celtis occidentalis</i>	Northern hackberry
<i>Quercus ellipsoidalis</i>	Northern pin oak
<i>Quercus rubra</i>	Northern red oak
<i>Thuja occidentalis</i>	Northern white cedar
<i>Acer platanoides</i>	Norway maple
<i>Picea abies</i>	Norway spruce
<i>Quercus species</i>	Oak
<i>Acer rubrum 'October glory'</i>	October glory red maple
<i>Quercus lyrata</i>	Overcup oak
<i>Betula papyrifera</i>	Paper birch
<i>Broussonetia papyrifera</i>	Paper mulberry
<i>Malus pumila</i>	Paradise apple
<i>Asimina triloba</i>	Pawpaw
<i>Prunus persica</i>	Peach
<i>Carya glabra</i>	Pignut hickory

<i>Prunus pensylvanica</i>	Pin cherry
<i>Quercus palustris</i>	Pin oak
<i>Pinus species</i>	Pine
<i>Pinus rigida</i>	Pitch pine
<i>Prunus species</i>	Plum
<i>Pinus serotina</i>	Pond pine
<i>Quercus stellata</i>	Post oak
<i>Prestoea species</i>	Prestoea
<i>Ligustrum species</i>	Privet
<i>Prunus x cistena</i>	Purpleleaf sand cherry
<i>Populus tremuloides</i>	Quaking aspen
<i>Aesculus x carnea</i>	Red horsechestnut
<i>Acer rubrum</i>	Red maple
<i>Morus rubra</i>	Red mulberry
<i>Betula nigra</i>	River birch
<i>Ulmus thomasii</i>	Rock elm
<i>Hibiscus syriacus</i>	Rose-of-sharon
<i>Paulownia tomentosa</i>	Royal paulownia
<i>Elaeagnus angustifolia</i>	Russian olive
<i>Pinus clausa</i>	Sand pine
<i>Prunus sargentii</i>	Sargent cherry
<i>Sassafras albidum</i>	Sassafras
<i>Quercus acutissima</i>	Sawtooth oak
<i>Acer rubrum 'armstrong'</i>	Scarlet maple
<i>Quercus coccinea</i>	Scarlet oak
<i>Acer platanoides 'schwedleri'</i>	Schwedleri Norway maple
<i>Pinus sylvestris</i>	Scotch pine
<i>Ulmus serotina</i>	September elm
<i>Amelanchier species</i>	Serviceberry
<i>Carya ovata</i>	Shagbark hickory
<i>Quercus imbricaria</i>	Shingle oak
<i>Pinus echinata</i>	Shortleaf pine
<i>Prunus virginiana 'Shubert'</i>	Shubert chokecherry
<i>Quercus shumardii</i>	Shumard oak
<i>Ulmus pumila</i>	Siberian elm
<i>Tilia tomentosa</i>	Silver linden
<i>Acer saccharinum</i>	Silver maple
<i>Ulmus rubra</i>	Slippery elm
<i>Rhus glabra</i>	Smooth sumac
<i>Ulmus carpinifolia 'hollandica'</i>	Smoothleaf elm
<i>Morella cerifera</i>	Southern bayberry
<i>Catalpa bignonioides</i>	Southern catalpa
<i>Magnolia grandiflora</i>	Southern magnolia
<i>Quercus falcata</i>	Southern red oak
<i>Picea species</i>	Spruce
<i>Pinus glabra</i>	Spruce pine
<i>Rhus hirta</i>	Staghorn sumac

<i>Magnolia stellata</i>	Star magnolia
<i>Acer pensylvanicum</i>	Striped maple
<i>Acer saccharum</i>	Sugar maple
<i>Fraxinus pennsylvanica 'summit'</i>	Summit green ash
<i>Quercus bicolor</i>	Swamp white oak
<i>Prunus avium</i>	Sweet cherry
<i>Liquidambar styraciflua</i>	Sweetgum
<i>Acer pseudoplatanus</i>	Sycamore maple
<i>Ailanthus altissima</i>	Tree of heaven
<i>Acer buergerianum</i>	Trident maple
<i>Liriodendron tulipifera</i>	Tulip tree
<i>Corylus colurna</i>	Turkish hazelnut
<i>Halesia diptera</i>	Two-wing silverbell
<i>Crataegus phaenopyrum</i>	Washington hawthorn
<i>Quercus nigra</i>	Water oak
<i>Betula pendula gracilis</i>	Weeping birch
<i>Salix x sepulcralis Simonkai</i>	Weeping willow
<i>Fraxinus americana</i>	White ash
<i>Abies concolor</i>	White fir
<i>Morus alba</i>	White mulberry
<i>Quercus alba</i>	White oak
<i>Populus alba</i>	White poplar
<i>Picea glauca</i>	White spruce
<i>Salix species</i>	Willow
<i>Quercus phellos</i>	Willow oak
<i>Ulmus alata</i>	Winged elm
<i>Hamamelis virginiana</i>	Witch hazel
<i>Betula alleghaniensis</i>	Yellow birch
<i>Aesculus octandra</i>	Yellow buckeye
<i>Cladrastis kentukea</i>	Yellowwood
<i>Taxus species</i>	Yew
<i>Prunus yedoensis</i>	Yoshino flowering cherry
<i>Zelkova species</i>	Zelkova
<i>Acer tataricum</i>	Tatar maple
<i>Acer x freemanii</i>	Freeman maple
<i>Aesculus glabra</i>	Ohio buckeye
<i>Aesculus hippocastanum</i>	horsechestnut
<i>Aesculus x 'Autumn Splendor'</i>	
<i>Amelanchier laevis</i>	Serviceberry
<i>Cercidiphyllum japonicum</i>	katsuratree
<i>Crataegus crusgalli inermis</i>	hawthorn
<i>Malus 'Donald Wyman'</i>	crabapple
<i>Malus 'Purple Prince'</i>	crabapple
<i>Malus 'Royal raindrops'</i>	crabapple
<i>Malus 'Spring Snow'</i>	crabapple
<i>Malus 'Velvet Pillar'</i>	crabapple
<i>Parrotia persica</i>	persian ironwood

<i>Platanus x acerifolia</i>	London planetree
<i>Prunus species</i>	First Blush
<i>Pyrus x 'Javelin'</i>	pear
<i>Quercus acustissima</i>	sawtooth oak
<i>Tilia cordata x mongolica</i>	harvest gold linden
<i>Ulmus 'Accolade'</i>	elm
<i>Ulmus davidiana var. japonica</i>	elm
<i>Ulmus 'Patriot'</i>	elm
<i>Ulmus x 'Triumph'</i>	elm
<i>Viburnum lentago</i>	

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Tree-Type Abbreviation	No. Sites Planted
BDS	
BDL	61
BDL	
BDL	
BDL	61
BES	3
BDM	7
BDS	
BDS	
BDL	
BDS	
BDM	
BDM	
BDS	8
BDS	
BDS	25
BDS	
BDL	
CEM	
CEM	
CEL	
CEL	
BES	
BDL	3
CEL	
BDL	
BDL	
BDL	
BDM	
BDS	
BDL	
BEL	
BEM	
BES	
BDL	
BDL	

Table 2. Summary of Planting Sites

Tree-Type	Tree-Type Abbreviation
Brdlf Decid Large (>50 ft)	BDL
Brdlf Decid Med (30-50 ft)	BDM
Brdlf Decid Small (<30 ft)	BDS
Brdlf Evgrn Large (>50 ft)	BEL
Brdlf Evgrn Med (30-50 ft)	BEM
Brdlf Evgrn Small (<30 ft)	BES
Conif Evgrn Large (>50 ft)	CEL
Conif Evgrn Med (30-50 ft)	CEM
Conif Evgrn Small (<30 ft)	CES
Total Sites Planted	

BDM	
BDL	
BDL	
BDL	
BDL	
BDL	
BDL	
BDL	
BDL	7
BDL	
CEL	
BDM	
BDL	
BDM	
BDL	
CEL	5
BDL	
CES	
BDM	
BDL	11
BDL	
PEM	
BDS	
PEL	
BDL	
BES	
CEL	
CEM	
CES	
BDS	
BDL	
BDM	
BDL	
BEL	
BDS	
BDS	
BDL	
BES	
CEL	
BDS	
BDL	
BDS	
BDS	
BDS	
BDM	
BDM	

BDS	
BDL	
BDS	
BDS	
BDL	
BES	
BDL	
CEL	
BDS	
CEL	
BDS	
BDL	
CEM	
BDM	
CEM	
BDS	51
BDS	
CEL	
BDL	
BDL	
BDL	
BDL	
BDL	
BDM	
BDL	
BDS	
BDM	
BDL	26
BDL	
CEL	
BDS	
BDS	
BDS	
BDL	37
BDS	
BDM	1
BDL	
BDL	
BDS	
BDL	
BDM	63
BDL	
BDS	
BDS	
BDM	12
BDL	
BDS	12

BES	
BDL	36
BDL	
CEM	
CEL	
BDM	
BDS	
BDM	
CEL	
BDM	19
BDS	60
BDL	80
PES	
BDM	
BDL	21
BDS	
BDS	34
CEL	
BDM	
BDL	
CEL	
BDL	
BDL	
BEM	
CEL	
BDM	
BDS	
BDL	
CEL	
CEL	
BDM	
BDL	12
BDL	
BDL	4
CEM	
BDL	
CEL	
BDL	
BDM	51
BDL	
BDL	
BDM	
BDS	
BDS	
BDS	
BDL	

BDS	
BDL	
CEL	
CEL	
BDS	
CEL	
BDL	
PES	
BES	
BDS	
BDL	
BDM	7
BDM	
BDM	
BDL	16
CEL	
BDS	
BDM	
BDS	
CEM	
BDS	31
BDM	
BDL	
BDM	
BDL	2
BDL	
CEL	
BDL	
BDS	
BDL	
BDL	8
CEL	
BDS	20
BDL	
BDL	
BDL	12
BDL	
BDM	
BDS	
BDL	
BES	
BDM	
BEM	
BDL	
CEL	
CEL	
BDS	

BDS	
BDS	
BDL	11
BDL	
BDL	16
BDM	
BDL	4
BDL	
BDL	
BDS	
BDL	23
BDL	1
BDS	
BDS	
BDL	
BDM	
BDM	
BDL	
CEL	
BDM	
BDL	1
BDL	
CEL	
BDM	
BDL	
BDM	
BDS	
BDL	
BDL	1
BDM	
CES	
BDS	
BDL	
BDS	9
BDL	28
BDL	1
BDL	12
BDS	1
BDS	17
BDM	3
BDS	10
BDS	18
BDS	5
BDS	10
BDS	19
BDS	2
BDS	1

BDL	61
BDS	9
BDS	5
BDL	2
BDM	11
BDL	5
BDM	5
BDL	11
BDL	5
BDS	7

No. Sites Planted
579
179
354
0
0
3
5
0
0
1120

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Directions

Using the information you provide and background data, the tool calculates the amount of Credits (% loss) is applied to account for anticipated tree losses (Cell D6). A 5% buffer pool deduction is applied to determine credits issued after planting (Initial Crediting). A different tool is used for credit of data on tree status in the sample sites.

Mortality Deduction (%):	20%
Observed Mortality (%) at Year 4	= (COUNTA(Table1[Status]) - COUNTIF(Ta

Table 3. Credits are based on 10%, 40%, and 30% at Years 1, 3, and 5 after planting, respectively, anticipated tree losses and the 5% buffer pool deduction.

	No. Sites Planted	No. Live Trees	Mortality Deduction (%)	25-yr CO ₂ stored (kg/tree)
BDL	579	463	0.20	1,288.64
BDM	179	143	0.20	551.09
BDS	354	283	0.20	485.99
BEL	0	0	0.20	0.00
BEM	0	0	0.20	0.00
BES	3	2	0.20	525.79
CEL	5	4	0.20	777.69
CEM	0	0	0.20	0.00
CES	0	0	0.20	0.00
	1120	896	0.20	3,629.2

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that could be issued at years 1 (10%), 3 (40%), and 5 (30%) after planting. A mortality deductions applied that will go into a program-wide pool to insure against catastrophic loss of trees. This tool is issuance in Years 4 and 6. The tool in those years requires calculation of a sample and collection

able1[Status],"Alive"))/COUNTA(Table1[Status])

, of the projected CO₂ stored by live trees 25-years after planting. These values account for

	10%	40%	30%	20%
Tot. 25-yr CO ₂ stored w/ losses and 5% deduction (t)	10% CO ₂ (t)	40% CO ₂ (t)	30% CO ₂ (t)	20% CO ₂ (t)
567.1	56.71	226.82	170.12	113.41
75.0	7.50	29.99	22.49	14.99
130.8	13.08	52.30	39.23	26.15
0.0	0.00	0.00	0.00	0.00
0.0	0.00	0.00	0.00	0.00
1.2	0.12	0.48	0.36	0.24
3.0	0.30	1.18	0.89	0.59
0.0	0.00	0.00	0.00	0.00
0.0	0.00	0.00	0.00	0.00
776.9	77.69	310.77	233.08	155.39

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In Table 4 the tool infers the amount of CO₂ stored after 25 years from the sample to account for anticipated tree losses and the 5% buffer pool deduction.

Table 4. Grand Total CO₂ Stored after 25 years (all live trees, includes tree losses and buffer)

Tree-Type	No. Sites Planted	Mortality Deduction (%)	Total Live Trees After Mortality
Brdlf Decid Large (>50 ft)	579	0.20	463
Brdlf Decid Med (30-50 ft)	179	0.20	143
Brdlf Decid Small (<30 ft)	354	0.20	283
Brdlf Evgrn Large (>50 ft)	0	0.20	0
Brdlf Evgrn Med (30-50 ft)	0	0.20	0
Brdlf Evgrn Small (<30 ft)	3	0.20	2
Conif Evgrn Large (>50 ft)	5	0.20	4
Conif Evgrn Med (30-50 ft)	0	0.20	0
Conif Evgrn Small (<30 ft)	0	0.20	0
	1120		896

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o the population of live trees. Values in column H

er pool deduction)

25-yr CO ₂ stored (kg/tree)	CO ₂ Tot. - No Deductions (t)	Grand Total CO ₂ w/ Deductions (t)
1,288.64	746.1	567.1
551.09	98.6	75.0
485.99	172.0	130.8
0.00	0.0	0.0
0.00	0.0	0.0
525.79	1.6	1.2
777.69	3.9	3.0
0.00	0.0	0.0
0.00	0.0	0.0
3629	1,022.3	776.9

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Using the information you provide and background data, the tool provides estimates of co-years in Resource Units per year and \$ per year.

Table 7. Co-Benefits per year after 25 years (all live trees, includes tree losses)

Ecosystem Services	Resource Units Totals	Resource Unit/site	Total \$
Rainfall Interception (m3/yr)	7,142.36	6.38	\$15,094.51
Air Quality (t/yr)			
O3	0.2422	0.0002	\$2,451.02
NOx	0.1025	0.0001	\$1,037.36
PM10	0.1177	0.0001	\$2,156.04
Net VOCs	0.0140	0.0000	\$71.44
Air Quality Total	0.4764	0.0004	\$5,715.86
Energy (kWh/yr & kBtu/yr)			
Cooling - Electricity	93,201.26	83.22	\$13,057.50
Heating - Natural Gas	3,467,234.39	3,095.74	\$48,493.53
Energy Total (\$/yr)			\$61,551.02
Grand Total (\$/yr)			\$82,361.39

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-benefits after 25

\$/site
\$13.477
\$2.188
\$0.926
\$1.925
\$0.064
\$5.10
\$11.66
\$43.30
\$54.96
\$73.54