

May 29, 2020

Frey Farm Landfill

Stage 1 Visual Landscape Synthesis Plan

Annual Status Update

Manor Township, Lancaster County, Pennsylvania

Introduction

The Frey Farm Landfill (FFLF) is a Municipal Solid Waste (MSW) disposal facility operated by Lancaster County Solid Waste Management Authority (LCSWMA), located along River Road in Manor Township, Lancaster County, Pennsylvania.

Construction of the Frey Farm Landfill (FFLF) Visual Landscape Synthesis Plan (VLSP) Stage 1 began in 2019 and consisted of planting a combination of 158 native-species trees and shrubs, and natural succession seed mix over approximately 30.2 acres of final cap. Stage 1 was the only stage completed in 2019.

For a detailed map please see (Stage One Overview Exhibits).

The VLSP is designed to achieve the following core objectives:

1. Achieve an enhanced and more natural appearance that blends into the surrounding landscape, over time, of the Frey Farm Landfill (FFLF) from neighboring viewpoints by mitigating potential visual impacts associated with the FFVE and improving the long- term appearance of the FFLF when compared to the mowed vegetative cover that is traditionally used post-closure at landfills;
2. Achieve a sustainable vegetative ecosystem for the long-term success that also reduces the need for traditional maintenance activities to support vegetation (fertilization, lime application, mowing, etc.); and
3. Minimize interference from landscaping with ongoing landfilling operations, and promote the continued safe operation of the FFLF in compliance with PADEP regulations.

Summary of 2019 Implementation Activities

Initial implementation efforts began in the fall of 2019.

LCSWMA completed the field layout with its survey equipment, and plant material locations were marked with numbers that corresponded with the specific tree or shrub to be planted.

Crown Excavating was engaged by LCSWMA for topsoil installation and mulching of the planted trees. Tomlinson Bomberger, also a LCSWMA contractor, completed the planting of the mixture of native trees and shrubs in Stage 1.

The construction generally consisted of the following components for VLSP Stage 1:

- Installation of topsoil above final cover soils;
- Plant material installation; and
- Mulching

During the implementation efforts a representative of Kaufman Engineering, Inc. and / or the Arm Group, Inc. was onsite to oversee implementation efforts and complete CQA efforts and complete related documentation.

Each of the tree and shrub species utilized for FFLF VLSP Stage 1 were chosen based on desired habitat conditions. The following criteria were used for selection of these species (in no specific order of importance):

1. Known to thrive in poor soil conditions;
2. Drought tolerance;
3. Native to Pennsylvania;
4. Reasonable commercial availability from growers in the region;
5. Value to wildlife as cover and food source, with specific emphasis given to pollinator species to encourage bee and butterfly habitat;
6. Ability to blend into surrounding vegetation; and
7. Performed well at the landscape demonstration projects at other Pennsylvania landfills.

The trees and shrubs used in stage one are a mix of balled and burlapped, container-grown and bare root plant material. A mix of plant sizes were used, and caliper size and heights varied depending on species type. Calipers generally ranged between 0.25" C – 1.5" C (measured 6 inches above the root ball or ground surface), and height generally ranged between 3 feet and 10 feet. Plant material specifications conformed to the American Nursery Stock Standards issued by the American National Standards Institute (ANSI Z60.1).

Screened topsoil was imported from Kreider Mulch located in Washington Borough, PA, consisting of greater fines and a higher organic content, suitable for vegetative growth.

The mulch consisted of a natural triple cut mulch made from bark of the tree that has fine texture. Therefore, it breaks down at a faster rate to add supplemental organic matter to the soil, soil stabilization and weed suppression.

2019 Maintenance

2019 efforts were mainly related to proper implementation and little maintenance occurred in 2019. However, one important item of note was deer guards were placed on most deciduous trees due to initial buck damage (buck rubs) that were occurring not long after implementation. In addition, a few trees were staked as an additional protection against wind damage. It is expected that after a season or two of root development these stakes would be removed as the plant will likely be acclimated to the location.

The implementation effort went very well, and there were no issues with Stage 1 construction.

Monitoring

LCSWMA has initiated a bi-weekly monitoring of Stage 1 (see attached monitoring reports). LCSWMA will continue its practice to conduct inspections of the plantings after significant weather events such as large storms where wind gusts above 50 mph may have occurred. Action items will be taken on an as needed basis following the discovery or observation of a potential issue.

LCSWMA will continue onsite observations of the soil and plants. Past photographic records will continue to be used to monitor this aspect of the study. LCSWMA will also annually evaluate the degree of success of compost, fertilizers, mulch and any irrigation efforts that have been utilized. It is still early in the project history, however, we believe the soil and mulch used in the 2019 implementation efforts is performing very well. No fertilizers or irrigation efforts were used in 2019.

Survival rates as of the 5/13/2020 Kaufman Engineering, Inc. inspection were approximately 96.2%. The Stage 1 plant population wintered well during its first winter. New growth was observed on 96.2% of plant material and most plants showed signs of vigor and growth. It is not uncommon to see modest growth rates on newly planted trees and shrubs for the first two years. Plants typically are getting acclimated to their new location and spend most of their energy, during this time, developing root structure subsurface. We will continue to monitor these important aspects as they will aid in developing the best plant matrix for future stages.

There was no plant disease or insect damage in 2019. We did sustain a bit of deer damage, and we are attempting to mitigate future deer damage with the addition of deer guards around specific deciduous trees. Weed growth has been minimal to date but will increase as the existing mulch breaks down and weeds and grasses encroach.

In addition to the Kaufman Engineering, Inc. inspection on 5/13/2020 a separate walk through was conducted with the following attendees on the same date.

Attendees (5/13/2020):

Katie Sandoe, LCSWMA
Jeff Musser, LCSWMA
Dwight Yoder, Gibbel Kraybill & Hess
Brian Kaufman, Kaufman Engineering, Inc.

Proposed Modifications or Revisions to the Plan

Currently there are no plans to modify any portion of the plan. Overall the first stage is meeting performance expectations. We're still early in the process of monitoring and judging plant specific performance. For the most part all plants species are showing signs of health, vigor and new growth. There are a few plant specific exceptions, which were expected (Mainly deer damage).

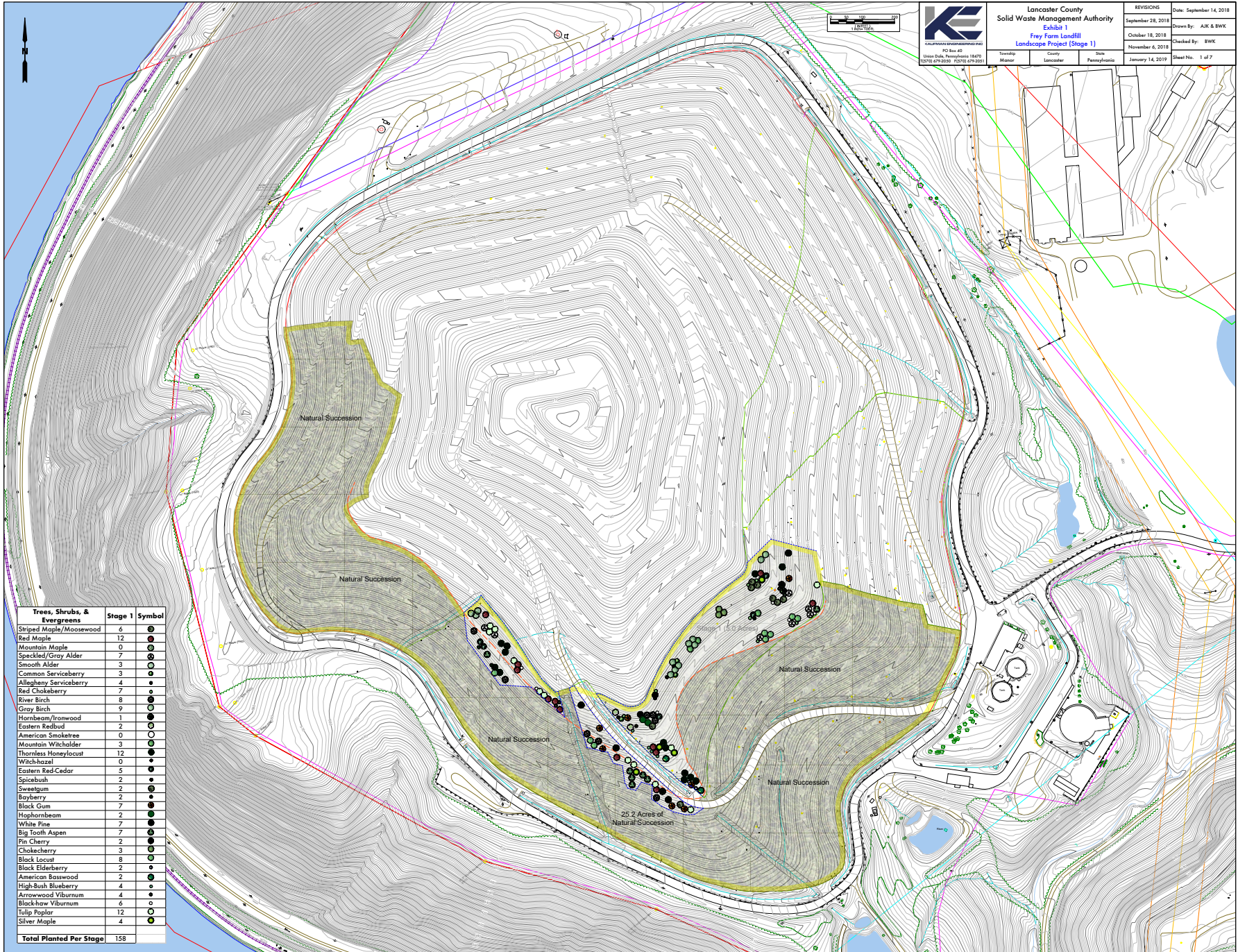
The natural succession area is doing quite well and has already softened the engineered appearance of the landfill (benching). The visual softening and textural diversity observed in 2019 and in 2020 should increase over time and continue to add a more natural appearance to the landfill slopes that blends into the surrounding landscape. No additional modifications or revisions are planned for the Stage 1 succession areas.

Planned 2020 Activities

Monitoring will be performed bi-weekly by (FFLF) staff and seasonally by Kaufman Engineering, Inc. or as needed. Six plants documented in the 5/13/2020 report will be replaced during 2020 as they currently are showing no signs of life (As of the 5/13/20 report) or have been heavily damaged by deer.

A determination will likely be made in the coming months if any portions of Stage 2 can be implemented in 2020. The Covid-19 pandemic unfortunately will not allow LCSWMA to unveil a definitive plan at this time. LCSWMA plans to communicate with PADEP as the situation unfolds.

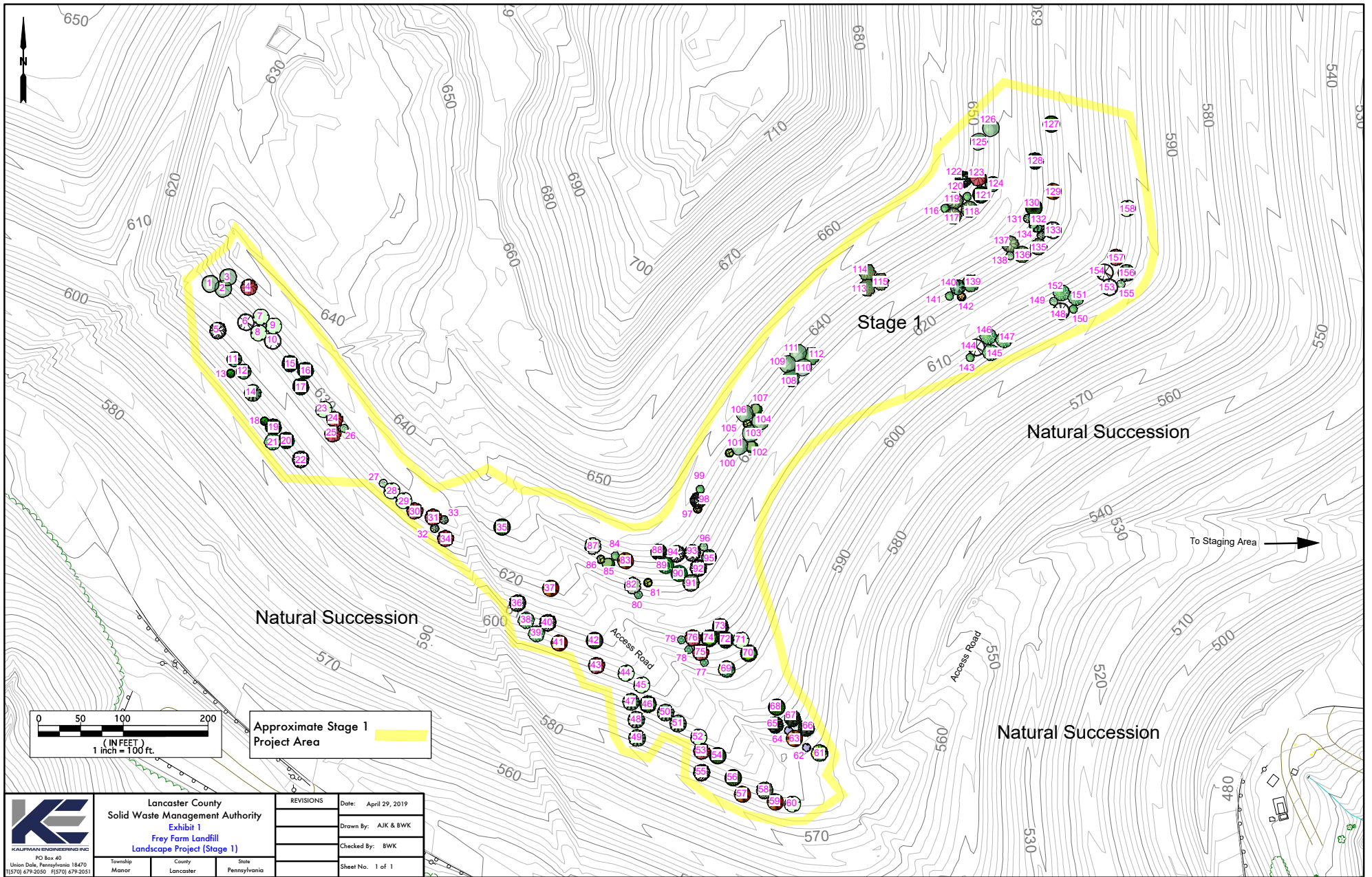
Stage One
Plant Locations and Photos




 KALPAMANN ENGINEERING 100 Box 60 Union Dale, Pennsylvania 16750 717-637-2030 F51731-676-2021	Lancaster County Solid Waste Management Authority Exhibit 1 Fry Farm Landfill Landscape Project (Stage 1)		REVISIONS Date: September 14, 2018 September 28, 2018 October 18, 2018 November 6, 2018 January 14, 2019	Drawn By: AJK & BWK Checked By: BWK Sheet No. 1 of 7
	Township	County	State	
	Mifflin	Lancaster	Pennsylvania	

Trees, Shrubs, & Evergreens	Stage 1	Symbol
Striped Maple/Moosewood	6	●
Red Maple	12	●
Mountain Maple	0	●
Speckled/Gray Alder	7	●
Smooth Alder	3	●
Common Serviceberry	3	●
Allegheny Serviceberry	4	●
Red Chokeberry	7	●
River Birch	8	●
Gray Birch	9	●
Hornbeam/Ironwood	1	●
Eastern Redbud	2	●
American Smoke-tree	0	○
Mountain Witchhazel	3	●
Thornless Honeylocust	12	●
Witchhazel	0	●
Eastern Red Cedar	5	●
Spicebush	2	●
Sweetgum	2	●
Bayberry	2	●
Black Gum	7	●
Hophornbeam	2	●
White Pine	7	●
Big Tooth Aspen	7	●
Pin Cherry	2	●
Chokecherry	3	●
Black Locust	8	●
Black Elderberry	2	●
American Basswood	2	●
High-Bush Blueberry	4	●
Arrowwood Viburnum	4	●
Blackhaw Viburnum	4	●
Tulip Poplar	12	●
Silver Maple	4	●
Total Planted Per Stage	158	

Stage One Overview Map



 KALIFMAN ENGINEERING INC PO Box 40 Union Dale, Pennsylvania 18470 (1570) 679-2050 (F1570) 679-2051	Lancaster County Solid Waste Management Authority Exhibit 1 Frey Farm Landfill Landscape Project (Stage 1)		REVISIONS _____ _____ _____	Date: April 29, 2019 Drawn By: AJK & BWK Checked By: BWK
	Township	County	State	Sheet No. 1 of 1
	Manor	Lancaster	Pennsylvania	

Stage One Overview - Plant Numbers

Number	Plants	Northing	Easting	Buck Rub Protection
1	Smooth Alder	228962.2	2331269.1	
2	Smooth Alder	228956.5	2331284.1	
3	Smooth Alder	228962.9	2331281.0	
4	Red Maple	228958.5	2331314.5	X
5	River Birch	228907.7	2331278.0	X
6	Speckled/Gray Alder	228917.6	2331311.0	
7	Tulip Poplar	228923.7	2331328.3	X
8	Tulip Poplar	228904.9	2331325.8	X
9	Tulip Poplar	228913.2	2331343.3	X
10	Speckled/Gray Alder	228895.8	2331342.4	X
11	Eastern Red-Cedar	228873.5	2331297.5	
12	Eastern Red-Cedar	228859.0	2331308.5	
13	Bayberry	228857.5	2331293.0	
14	Big Tooth Aspen	228834.9	2331318.9	X
15	Thornless Honeylocust	228869.3	2331362.5	
16	Thornless Honeylocust	228861.3	2331380.5	
17	Thornless Honeylocust	228842.3	2331375.0	
18	Bayberry	228801.6	2331332.6	
19	Thornless Honeylocust	228795.0	2331342.7	
20	Thornless Honeylocust	228779.3	2331357.9	
21	Black Locust	228777.4	2331342.4	
22	River Birch	228756.5	2331375.0	X
23	Tulip Poplar	228815.3	2331402.0	X
24	Red Maple	228803.4	2331415.0	X
25	Red Maple	228786.6	2331412.8	X
26	Black-haw Viburnum	228793.1	2331426.0	
27	Black-haw Viburnum	228728.6	2331472.0	
28	Tulip Poplar	228719.9	2331481.9	X
29	Tulip Poplar	228708.3	2331496.0	X
30	Red Maple	228696.4	2331509.0	X
31	Red Maple	228689.0	2331530.5	X
32	Arrowwood Viburnum	228675.9	2331532.0	
33	Arrowwood Viburnum	228685.9	2331543.0	
34	Red Maple	228664.0	2331545.0	X
35	White Pine	228677.5	2331611.0	
36	River Birch	228588.0	2331629.4	
37	Black Gum	228605.5	2331668.0	X
38	Black Locust	228567.9	2331639.9	X
39	Black Locust	228552.4	2331651.9	X
40	River Birch	228564.9	2331664.7	
41	Black Gum	228541.5	2331678.0	X

Number	Plants	Northing	Easting	Buck Rub Protection
42	White Pine	228544.5	2331719.5	
43	Red Maple	228515.0	2331722.0	X
44	Tulip Poplar	228506.0	2331756.4	X
45	Tulip Poplar	228492.0	2331774.8	X
46	Silver Maple	228469.5	2331782.0	X
47	Big Tooth Aspen	228472.5	2331762.5	X
48	Big Tooth Aspen	228451.5	2331768.5	
49	Big Tooth Aspen	228430.0	2331769.5	
50	Big Tooth Aspen	228460.0	2331803.0	
51	Big Tooth Aspen	228447.0	2331817.5	
52	Tulip Poplar	228431.0	2331841.5	X
53	Red Maple	228414.6	2331845.2	X
54	White Pine	228409.3	2331863.8	
55	River Birch	228389.3	2331845.1	
56	White Pine	228383.5	2331882.0	
57	Black Gum	228364.0	2331893.0	X
58	Sweetgum	228368.5	2331919.0	X
59	Black Gum	228355.1	2331931.5	X
60	Tulip Poplar	228352.5	2331951.5	X
61	American Basswood	228412.5	2331983.3	
62	Black Elderberry	228418.8	2331968.2	
63	Black Gum	228429.4	2331953.9	X
64	Black Elderberry	228438.6	2331947.1	
65	Thornless Honeylocust	228445.5	2331931.2	
66	Thornless Honeylocust	228441.9	2331967.6	
67	Thornless Honeylocust	228453.1	2331951.5	X
68	White Pine	228466.2	2331933.1	
69	American Basswood	228510.9	2331874.4	
70	Silver Maple	228529.3	2331900.2	
71	Tulip Poplar	228544.6	2331891.0	
72	Thornless Honeylocust	228545.3	2331873.0	X
73	Thornless Honeylocust	228560.8	2331867.0	X
74	Silver Maple	228546.9	2331853.9	X
75	Red Maple	228530.4	2331844.0	X
76	Red Maple	228547.4	2331835.0	X
77	High-Bush Blueberry	228518.7	2331848.2	
78	High-Bush Blueberry	228533.7	2331829.9	
79	High-Bush Blueberry	228545.2	2331821.4	
80	High-Bush Blueberry	228598.2	2331770.9	
81	Allegheny Serviceberry	228612.0	2331782.5	X
82	Eastern Redbud	228608.8	2331763.9	X

Number	Plants	Northing	Easting	Buck Rub Protection
83	Black Gum	228638.0	2331755.8	X
84	Red Chokeberry	228643.7	2331743.8	
85	Common Serviceberry	228634.0	2331736.0	
86	Allegheny Serviceberry	228639.3	2331727.1	
87	Eastern Redbud	228655.3	2331717.4	X
88	Pin Cherry	228647.8	2331794.9	X
89	Hophornbeam	228632.3	2331802.8	
90	Hophornbeam	228622.9	2331818.6	
91	Sweetgum	228611.9	2331832.6	X
92	River Birch	228629.2	2331841.3	X
93	River Birch	228646.8	2331834.3	X
94	River Birch	228645.8	2331815.8	X
95	Eastern Red-Cedar	228641.4	2331854.0	
96	Black-haw Viburnum	228654.1	2331847.5	
97	Spicebush	228698.6	2331840.4	
98	Pin Cherry	228708.5	2331841.0	
99	Red Chokeberry	228721.7	2331843.3	
100	Allegheny Serviceberry	228764.0	2331878.0	X
101	Gray Birch	228771.6	2331889.1	
102	Common Serviceberry	228771.4	2331904.0	
103	Gray Birch	228786.9	2331902.8	
104	Gray Birch	228800.5	2331913.7	
105	Allegheny Serviceberry	228798.3	2331899.0	X
106	Gray Birch	228810.4	2331895.4	
107	Common Serviceberry	228815.0	2331908.9	
108	Mountain Witchalder	228852.1	2331949.6	
109	Gray Birch	228868.4	2331945.6	
110	Gray Birch	228864.4	2331964.1	
111	Gray Birch	228881.4	2331958.1	
112	Mountain Witchalder	228878.1	2331973.1	
113	Chokecherry	228958.5	2332038.5	
114	Chokecherry	228975.7	2332039.2	
115	Chokecherry	228965.4	2332054.4	
116	Red Chokeberry	229051.2	2332130.3	
117	Striped Maple	229042.0	2332139.8	X
118	Striped Maple	229050.0	2332158.8	X
119	Striped Maple	229060.0	2332141.8	
120	Red Chokeberry	229065.2	2332156.3	
121	Silver Maple	229067.0	2332172.4	X
122	Thornless Honeylocust	229085.3	2332151.5	
123	Red Maple	229086.9	2332169.1	X

Number	Plants	Northing	Easting	Buck Rub Protection
124	Eastern Red-Cedar	229078.8	2332186.5	
125	Gray Birch	229129.0	2332170.0	X
126	Gray Birch	229145.0	2332184.0	X
127	White Pine	229150.0	2332255.0	
128	Thornless Honeylocust	229107.0	2332236.0	
129	Black Gum	229071.0	2332257.0	X
130	White Pine	229052.2	2332234.5	
131	Arrowwood Viburnum	229039.3	2332227.2	
132	Hornbeam	229032.5	2332238.7	
133	Speckled/Gray Alder	229025.5	2332257.0	
134	Arrowwood Viburnum	229019.5	2332243.2	
135	Striped Maple	229006.0	2332239.8	X
136	Striped Maple	228997.0	2332220.8	X
137	Striped Maple	229009.0	2332206.8	X
138	Black-haw Viburnum	228995.6	2332206.5	
139	Mountain Witchalder	228963.5	2332160.1	
140	Eastern Red-Cedar	228957.7	2332145.7	
141	Red Chokeberry	228948.5	2332135.5	
142	Spicebush	228947.2	2332149.7	
143	Red Chokeberry	228876.4	2332159.8	
144	Speckled/Gray Alder	228888.0	2332167.5	
145	Black Locust	228882.2	2332184.4	X
146	Black Locust	228901.2	2332181.4	X
147	Black Locust	228897.2	2332199.9	
148	Speckled/Gray Alder	228930.5	2332266.5	
149	Black-haw Viburnum	228942.1	2332257.9	
150	Red Chokeberry	228933.2	2332280.8	
151	Black Locust	228946.8	2332284.5	
152	Black Locust	228952.2	2332267.4	X
153	Speckled/Gray Alder	228958.6	2332323.2	
154	Speckled/Gray Alder	228976.0	2332318.0	
155	Black-haw Viburnum	228962.4	2332336.8	
156	Big Tooth Aspen	228975.4	2332343.2	
157	Red Maple	228993.7	2332331.0	X
158	Tulip Poplar	229051.0	2332344.0	X

Fall 2019



Photo 1 – Crown Excavating installed mounds of topsoil in the surveyed Phase 1 locations.



Photo 2 – Tomlinson Bomberger performing planting of the Phase 1 trees.
All trees were planted with hand tools and monitored for planting depth by ARM.

Fall 2019



Photo 3 – Day 1 planting observation progress picture.



Photo 4 – Day 2 planting observation progress picture.

Fall 2019



Photo 5 – Day 3 planting observation progress picture. The larger plant material was planted on Day 3.



Photo 6 – Crown Excavating completed mulching around planted trees.

Spring 2020



Photo 7 – A Black Gum tree. Mulch has faded becoming more natural. Note deer protection and tree identification stakes.

Spring 2020

Spring 2020



Photo 8– Frequently observed many birds utilizing new habitat.



Photo 9 – Natural Succession beginning to soften engineered appearance of landfill benching.