Biohabitats
The Stables Building
2081 Clipper Park Road
Baltimore, MD 21211
410.554.0156
www.biohabitats.com

MEMORANDUM

Date: June 12th, 2019

To: Ms. Cecilia Lane
Watershed Protection Division
Department of Energy and Environment
Government of the District of Columbia
1200 First Street NE 5th Floor
Washington DC

From: Bryan Arvai, Biohabitats, Inc.

RE: Amidon Park
Subject: Soil De-Compaction Recommendation

INTRODUCTION/SUMMARY

Soils in green spaces with heavy pedestrian and/or vehicle traffic, such as ball fields and overflow parking areas, can become deeply compacted over time. This compaction of green spaces results in reduced rainwater absorption and infiltration capacities and reduced health of surrounding vegetation (e.g. grass, shrubs, trees, etc.). As defined in the DOEE Stormwater Management Guidebook (July 2013)[1], these areas are considered "compacted cover" and assumes "these lands will generate 25 percent stormwater runoff for a design rain event." Typical aeration practices (core aeration) can reduce compaction and improve the hydraulic characteristics of the topsoil, but only penetrate a few inches and do not address compaction of soil layers that can develop at greater depths (typically within upper 24 inches) below the surface. This results in a de-compaction practice that has a greater influence on shallow root systems of grasses and does not significantly reduce the overall runoff from a green space.

Amidon Park located along G Street, SW between 4th Street and 6th Street SW falls into this category of a compacted cover green space that sees consistent use as a permitted athletic field and contributes significant runoff from the site. During the design phase of the project, Biohabitats has taken field measurements of Amidon Park to understand the soil profile characteristics and existing compaction at the site that may be reducing the soil's infiltration and retention capacities. These efforts, described below, indicate that compaction starting within the upper 6 inches of the soil surface appears to be the primary hindrance to increased soil infiltration and water retention.

Based on the site field measurements, Biohabitats recommends de-compacting the soil down to a minimum depth of 10 inches utilizing a process known as "subsoiling." While a range of equipment and processes are included within the category of "subsoiling," Biohabitats recommends utilizing a rotary de-compactor, such as the Imants Shockwave or Redexim Verti-Quake, to provide de-compaction while minimizing the surface disturbance and allowing the field to be playable immediately following the application, if needed. Biohabitats also recommends that for the best long-term results, the first de-compaction of the field should occur when the ground has thoroughly dried, and for the field to remain unused up to a week after de-compaction. Based on park programing, the first application of de-compaction will be conducted in June 2019 utilizing a rotary de-compactor with 10-inch blades.

[1] Center for Watershed Protection (prepared for DDOE Watershed Protection Division). "Stormwater Management Guidebook." 19. July. 2013. https://doee.dc.gov/swguidebook.

EXISTING SITE CONDITIONS/SOILS

Web soil survey

Biohabitats utilized the United States Department of Agriculture's (USDA) Natural Resources Conservation Service's (NRCS) Web Soil Survey (WSS) to perform a preliminary desktop analysis of the existing on-site soils. A full printout of the Web Soil Survey map and legend has been attached to this memorandum. The WSS mapping indicates the soils within the field are Udorthents, Loamy soils. Udorthents, loamy is typically characterized by a soil profile with a 0-2-inch loam surface layer above of a gravelly loam layer (up to 72 inches deep). Depths to a restrictive layer are typically greater than 80 inches deep with depths to the water table between 40 and 72 inches.

Soil Borings

Biohabitats performed four soil borings using a hand auger on March 28, 2019, to determine the general existing soil profile, conditions, and presence/absence of a restrictive layer. The soil borings were taken throughout the park in an effort to characterize the soil conditions under various levels of use based primarily on condition of surface vegetation (Photos 1-8). No soil borings were taken within the baseball diamond. Based on the urban setting and the soil survey, it is anticipated that, at a minimum, the upper 12 inches of park soil is fill material. In general, the soil profiles observed were characteristic of udorthent soil series with evidence of anthropogenic influences – broken brick and asphalt pieces – even though the profiles didn't exactly match the soil survey's map unit profile description. Soil profiles #1 and #2 taken to the north and south of the unvegetated playing field center, respectively, were similar in appearance and texture. Both have sandy loam to loam textured topsoil down to 6-12 inches below the ground surface underlain by loam to clay-loam textured subsoil extended below 12 inches. Soil profile #3 was taken within the unvegetated playing field center that had no topsoil and had a dried, cracked soil surface. The profile was homogenous in color and texture down to 9 inches when there was auger refusal, most likely due to buried brick or asphalt piece which was present throughout the entire profile. Sample #4 taken within left field south of the other soil profiles appears to have experienced the least amount of foot traffic. The soil profile in this location had a loam to sandy loam textured topsoil extend down to 6 inches, a second horizon or layer of similar texture but with less organic matter from 6-20 inches, and a third horizon with a loam to clay loam texture below 20 inches. Pieces of brick and asphalt were also observed in soil profile #4. Roots of varying sizes were present in soil profiles #1, #2, and #4 and extended down to a depth of 12 inches. However, from 6-12 inches the size and amount of roots present decreased, most likely a combination of vegetative species and existing compaction.

Topsoil Test Results

A composite soil sample was taken of the topsoil at the soil profile #1, #2, and #4 locations to determine the overall existing topsoil conditions, in particular soil pH and organic matter. Soil from soil profile #3 wasn't included since there was no topsoil present. The soil pH was 5.6, slightly lower than the preferred soil pH 6-8 for turf grass. The organic matter was 3.4% which is within the typical 3-5% range from in most native topsoils. The soil texture was sandy loam which correlates with hand texturing done during the soil boring field assessment.

Compaction Testing

Biohabitats also assessed the surface and subsurface hardness or compaction of the existing soils on March 28, 2019. Compaction testing of existing soils was performed with a soil penetrometer. The soil penetrometer measures compaction of the soil by the force required for the instrument to penetrate through the soil layers, mimicking the force required for roots to penetrate the soil. Testing by the United States Department of Agriculture's Agricultural Research Service (USDA-ARS) indicates that root penetration within soils decreases linearly with increasing soil compaction rates up to 300 pounds per square inch (PSI). Almost no roots penetrate into soils exceeding 300 PSI[2]. Biohabitats measured compaction at twenty-five locations in a grid pattern to ensure the entire park including in and around the baseball diamond was assessed. The depth and measured field penetration resistance in PSI was recorded at each location to determine the depth at which compaction begins and ends. At a majority of the locations, the penetrometer was stopped, most likely by buried brick or asphalt pieces. Therefore, the bottom of the compaction layer was not able to be well defined.

In the vicinity of the unvegetated playing field center, compaction began at a depth of 3-7 inches. This was similar to a location within the baseball diamond which was compacted starting at 3 inches. In the remainder of the park,

2 Duiker, Sjoerd W., "Agronomy Facts 63: Diagnosing Soil Compaction Using a Penetrometer (Soil Compaction Tester)." Penn State University. 2002

compaction started at 6-9 inches and at three locations the compaction was recorded as ending at approximately 20 inches. It was noted that the left field of the baseball field had less bare areas, more surface vegetation, and areas of no compaction and compaction starting at deeper depths in comparison to the rest of the park.

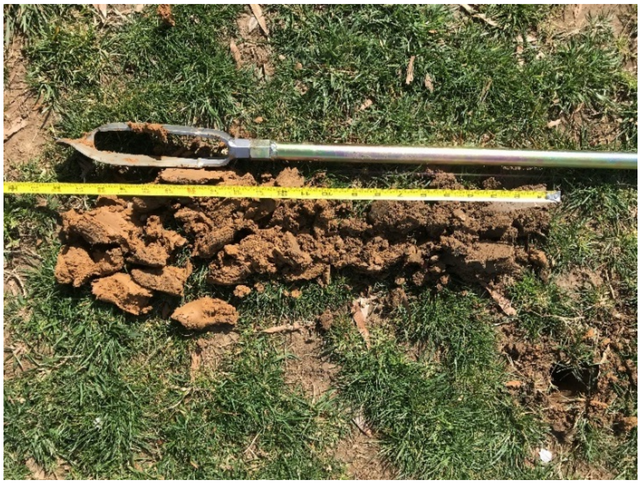


Photo 1: Soil profile #1 to east side of green space center between Morrow Drive and Kennedy Place.

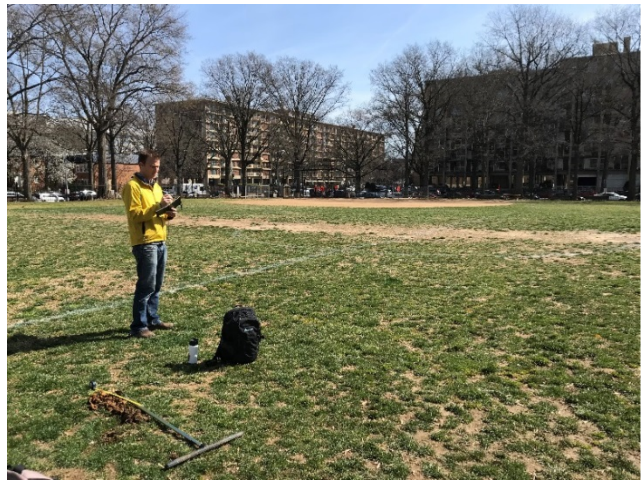


Photo 2: Location of soil profile #1 within Amidon Park.

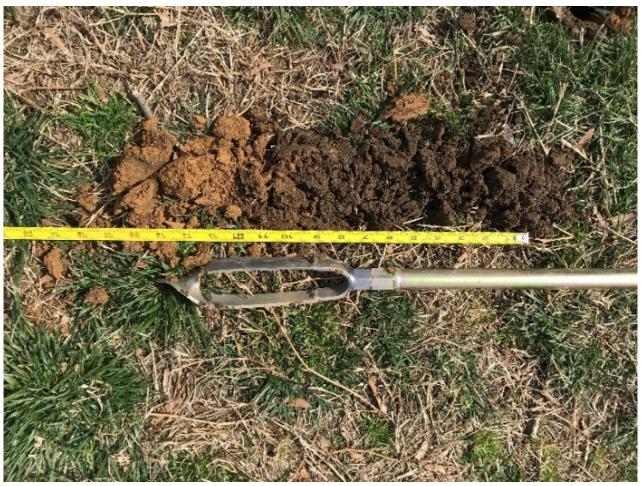


Photo 3: Soil profile #2 to east side of green space center between Morrow Drive and Kennedy Place.

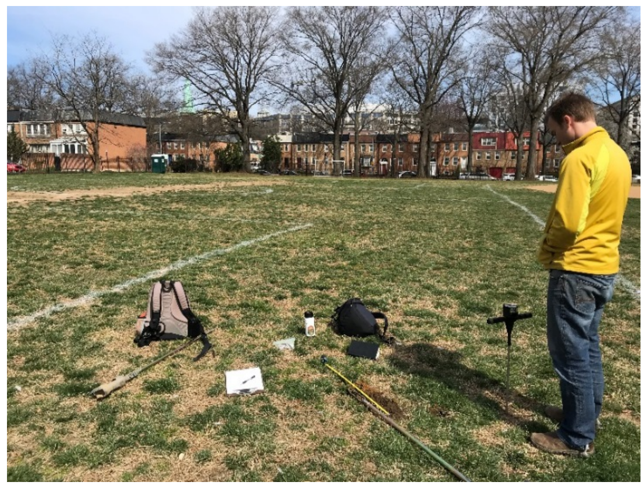


Photo 4: Location of soil profile #2 within Amidon Park.

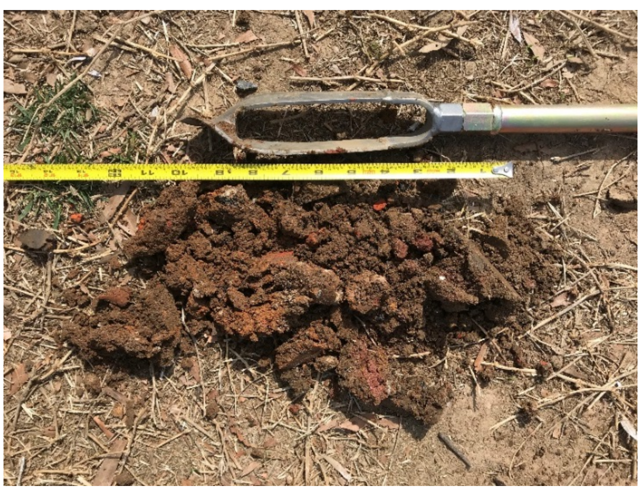


Photo 5: Soil profile #3 to east side of green space center between Morrow Drive and Kennedy Place.

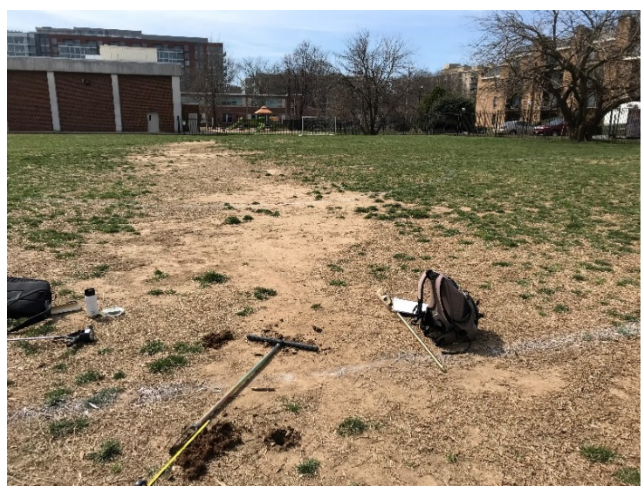


Photo 6: Location of soil profile #3 within Amidon Park.

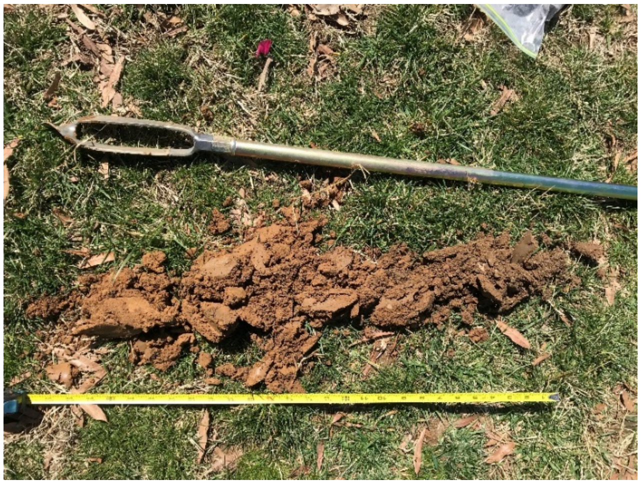


Photo 7: Soil profile #4 to east side of green space center between Morrow Drive and Kennedy Place.

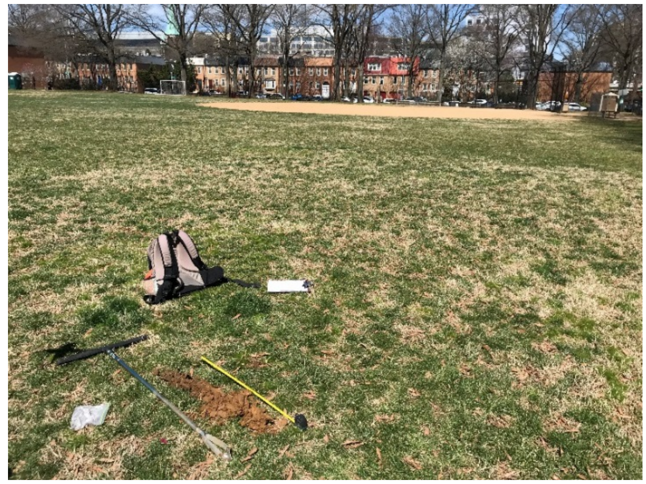


Photo 8: Location of soil profile #4 within Amidon Park.

SOIL DE-COMPACTION - METHODS

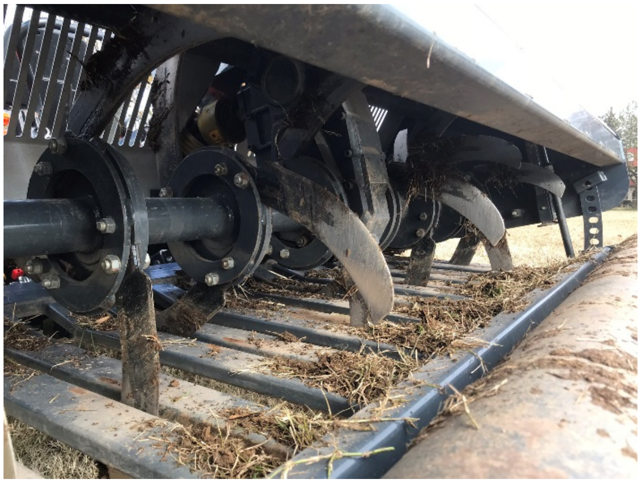
Rotary de-compactor

A rotary de-compactor, such as the Imants Shockwave or Redexim Verti-Quake, is a subset of subsoiling equipment that includes a series of blades attached to a central rotor shaft (See Photo 9 below). Blades are typically 10-15 inches long. As the shaft rotates, the blades enter the soil vertically on a staggered pattern and sequence, cutting the soil to the full blade length. Due to the width of the blades, the soil is pushed laterally, creating cracks and fissures within the soil. As adjacent blades enter the soil, the soil is pushed in the opposite direction, further cracking the soil. The continued cutting/pushing of the soil by the blades creates a wave action within the soil, creating a consistent de-compaction to the full working depth, without excessive damage to the surface.

The shafts of rotary de-compactors are connected into the drivetrain of the attached tractor which drives the cutting of the soil. This minimizes the need to pull the device behind the tractor as done in static subsoiling equipment, reducing the horsepower required and subsequent ruts and slippage that can occur with heavier equipment.

The lateral de-compaction and smaller equipment required of the rotary de-compactor minimizes the surface disturbance. A roller typically attached to the back of the equipment ensures a smooth final surface. Athletic fields can typically be played on immediately following de-compaction by a rotary de-compactor. However, keeping the fields out of operation for additional time (24 hours – 7 days) can increase the long-term benefits of de-compaction by providing the grass roots time to grow into fractured soil.

The saturation of the soil layer during de-compaction can affect the quality of de-compaction, resealing of cuts, and the impact from the pulling equipment on the surface. Soils should be mostly dry and friable to allow for maximum fracturing of soils. Using a rotary de-compactor during wet conditions will also allow cuts to reseal quickly and minimize the long-term benefits of the de-compaction. However, due to equipment size needed and the cutting process of the equipment, rotary de-compaction will not result in the excessive surface disturbance, clumping, and rutting that may be seen in static shank subsoilers when used in wet conditions. Ideal dry conditions typically fall within late summer to early fall.



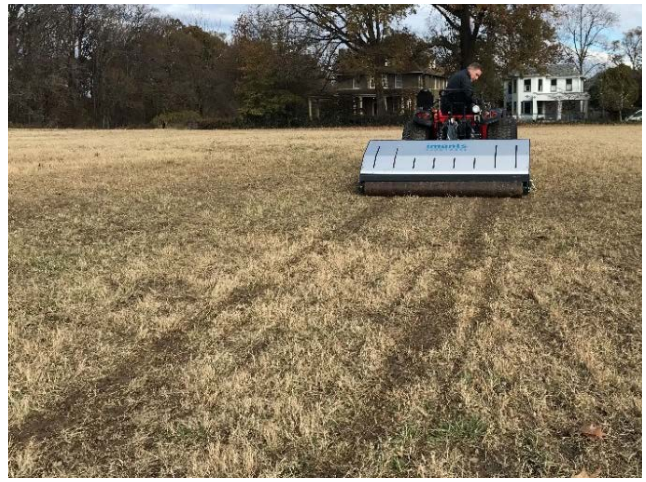


Photo 9: Rotary shaft and blades of rotary de-compactor

Photo 10: tracks left after rotary de-compaction

SOIL AMMENDMENTS

The addition of soil amendments during the de-compaction process will enhance soil infiltration and soil health thus improving vegetation survivability and increasing soil resistance to future compaction. The following soil amendments are the recommended for Amidon Park:

<u>Compost</u>
The addition of compost enhances the performance of the soils to infiltrate and absorb rainfall by improving the health and structure of the soil, therefore increasing the resistance to future compaction. During de-compaction in building the soil structure and maintaining de-compaction throughout the year, a ¼-inch surface topdressing of compost can be applied before or after subsoiling with a rotary de-compactor. By applying prior to subsoiling, some compost will be incorporated into the soil during the de-compaction process. Biohabitats recommends compost be well decomposed and weed free organic matter derived from leaf and/or yard trimmings.

<u>Biochar</u>
Biochar is high-carbon, fine-grained, and highly porous charcoal generated from a wide range of carbon sources, including byproducts from wood and agricultural industries (e.g. coconut fibers) and animal manure. The addition of biochar to soils can improve soil moisture retention and structure, increasing the soils resistance to future compaction. Biochar can be added as a surface topdressing after de-compacting with a rotary subsoiler or incorporated into the soil during de-compaction with a rotary subsoiler (grain size dependent).

Selection of a suitable biochar should consider the original source of carbon as many biochar products can act as nutrient and or chemical loads to systems, rather than as temporary nutrient binders. For instance, biochar generated from chicken manure is high in nutrients that will leach into runoff while biochar generated from coconut byproducts are typically free of nutrients when placed and absorb and temporarily bind nutrients for plant uptake. Biohabitats recommends biochar be a horticultural charcoal with the follow parameters: a pH of 7.0 or less, greater than or equal to 60% total mass of organic carbon content, and a fine to coarse grain-size similar to sand and/or small gravels. Biohabitats recommends using Cool Terra® Organic or an approved equivalent. If using Cool Terra® Organic, the recommended biochar application rates for new lawn/turf grass is 18-70 lbs (~0.5-2 cubic feet) per 1000 sq. ft. to soil prior to seeding. It is important to note, application rates for biochar can vary wildly between sources/feedstocks from 1 cubic yard per acre to more than 20 cubic yards per acre. Therefore, it is important to adjust the biochar application as needed per manufacturer's instructions and/or the biochar's parameters.

RECOMMENDATIONS

As noted in the introduction and attached Figure, Biohabitats recommends de-compacting approximately 0.68 acres of Amidon Park encompassing the outfield of the baseball field and excluding areas within the existing tree driplines and the baseball infield. It is recommended that Amidon Park be de-compacted utilizing a rotary de-compactor, such as the Imants Shockwave or Redexim Verti-Quake, to provide de-compaction of the top 10 inches of soil. This will minimize the surface disturbance and allow the field to be playable immediately following de-compaction. Biohabitats also recommends adding compost and biochar as soil amendments to approximately 0.50 acres of the western half of the field during de-compaction to enhance soil health and turf establishment in this area. For the best long-term results, de-compaction of Amidon Park should occur when the ground has thoroughly dried and for the field to remain unused for up to a week after de-compaction. Currently, de-compaction is proposed for June 2019 based on park programing.

The follow sequence of de-compaction, soil amendments and turf grass seeding are recommended:

1. Mow park prior to proposed work.

Steps 2-4 shall be completed on the 0.50 acres noted on the attached Proposed Conditions Plan

2. Spread biochar evenly over soil surface. Biochar shall be a horticultural charcoal with a pH of 7.0 or less, greater than or equal to 60% total mass of organic carbon content, and a fine to coarse grain-size similar to sand and/or small gravels. Apply biochar at an application rate of 18-70 lbs (~0.5-2 cubic feet) per 1000 sq. ft.
3. Spread turf grass seed mix evenly over biochar. Apply turf grass seed at a rate as specified by seed supplier.
4. Spread a ¼-inch surface topdressing of compost evenly over turf grass seed and biochar. Compost shall be well decomposed and weed free organic matter derived from leaf and/or yard trimmings.

Step 5 shall be completed on the full 0.68 acres noted on the attached Proposed Conditions Plan

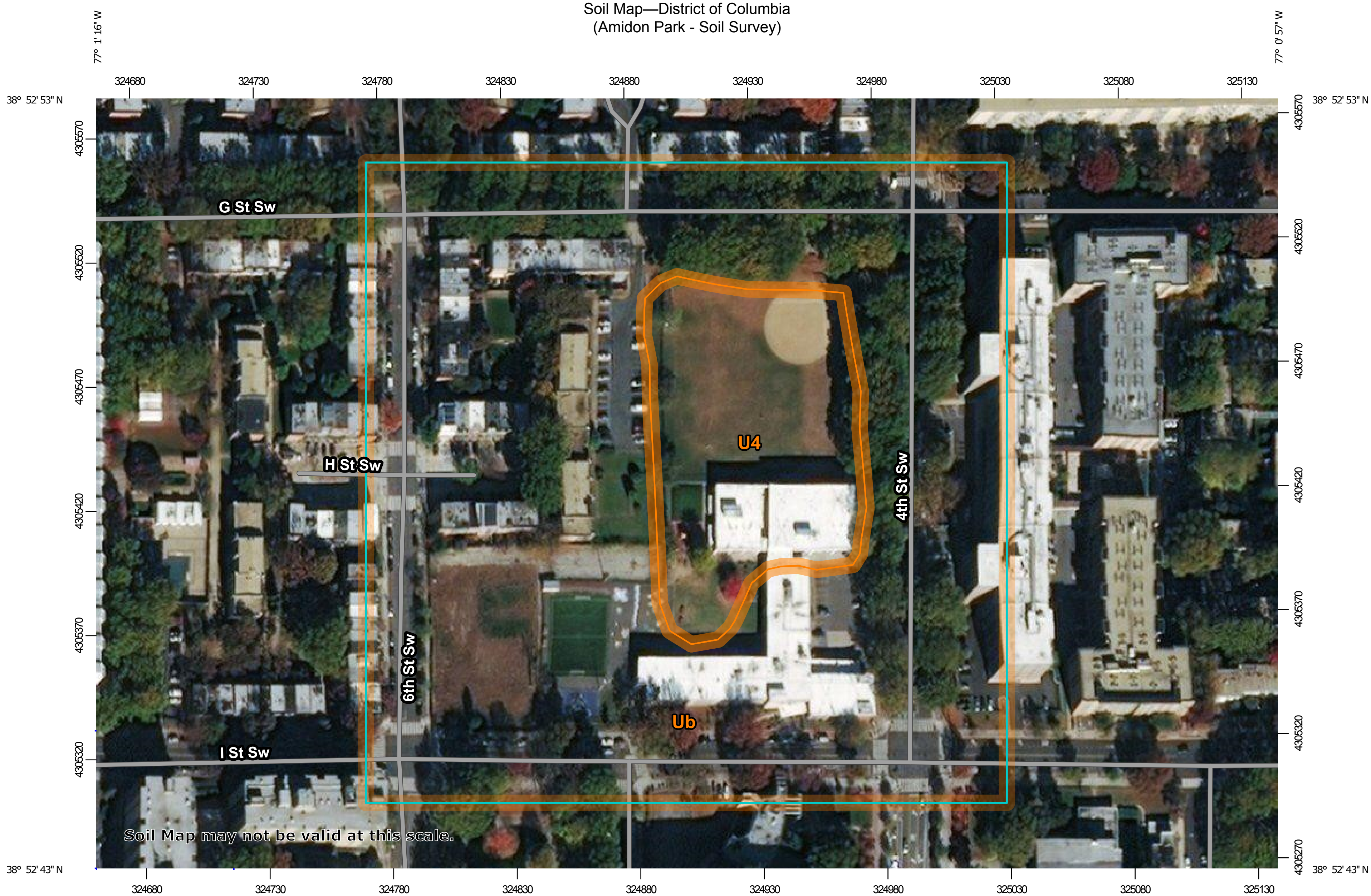
5. Run the rotary de-compactor over the approximately 0.68-acre site (excluding the existing tree driplines and baseball infield) in two directions perpendicular to each pass (i.e. north-south and then east-west).

6. Water the project area as needed until turf grass is established.

While the use of rotary de-compactor will provide improved soil compaction rates, it is anticipated continuous applications will be needed to maintain the desired compaction level of the park fields, typically on the order of once every 1-3 years, depending on use and structure of the existing soils. Biohabitats recommends that DPR continue to monitor the field compaction in the first five years following de-compaction to develop the required recurrence interval for subsoiling. Inclusion of soil amendments during de-compaction can provide improved soil structure and should reduce the recurrence interval required for the site.

Attachment 1: Amidon Park USGS Web Soil Survey map

Soil Map—District of Columbia
(Amidon Park - Soil Survey)



Map Scale: 1:2,190 if printed on A landscape (11" x 8.5") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: District of Columbia
Survey Area Data: Version 12, Sep 10, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 3, 2015—Feb 22, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
U4	Udorthents, loamy	2.6	15.5%
Ub	Urban land	14.0	84.5%
Totals for Area of Interest		**16.6**	**100.0%**

Map Unit Description

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named, soils that are similar to the named components, and some minor components that differ in use and management from the major soils.

Most of the soils similar to the major components have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Some minor components, however, have properties and behavior characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description

District of Columbia

U4—Udorthents, loamy

Map Unit Setting

National map unit symbol: 49wh
Elevation: 0 to 300 feet

Mean annual precipitation: 42 to 48 inches
Mean annual air temperature: 52 to 58 degrees F
Frost-free period: 175 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, loamy, and similar soils: 90 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Loamy

Setting

Landform: Broad interstream divides
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Fluviomarine deposits

Typical profile

AC - 0 to 2 inches: loam
C - 2 to 72 inches: gravelly loam

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.01 to 19.98 in/hr)
Depth to water table: About 40 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Ub—Urban land

Map Unit Setting

National map unit symbol: 49wq
Frost-free period: 175 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 10 inches to
Runoff class: Very high

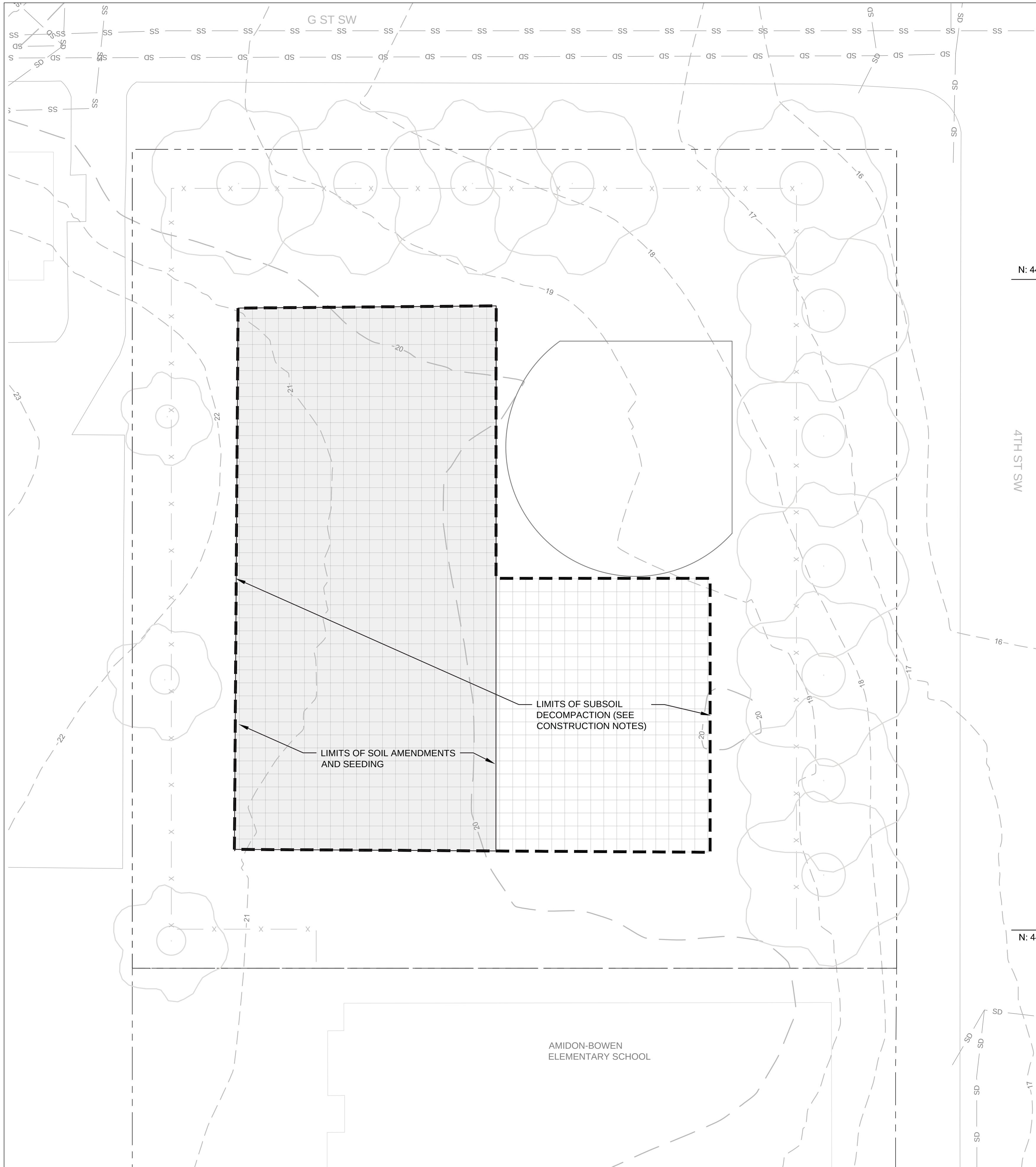
Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Data Source Information

Soil Survey Area: District of Columbia
Survey Area Data: Version 12, Sep 10, 2018

Attachment 2: Amidon Park Proposed Conditions Plan



CONSTRUCTION NOTES:

1. PRIOR TO SUBSOILING, CONTRACTOR SHALL BROADCAST THE FOLLOWING AMENDMENTS AND SEED IN THE ORDER NOTED:

ORDER	AMENDMENT	APPLICATION RATE
1ST	BIOCHAR	4 CY/AC
2ND	PERMANENT SEED	AS APPROVED BY DPR
3RD	COMPOST	30 CY/AC (APPROX DEPTH OF 0.25 INCHES)

2. CONTRACTOR TO SUBSOIL WITHIN LIMITS SHOWN USING A ROTARY, LINEAR SUBSOILER, SUCH AS A IMANTS SHOCKWAVE OR REDEXIM VERTI-QUAKE OR APPROVED EQUAL, TO A DEPTH OF 10 INCHES.

MATERIAL SPECIFICATIONS

1. BIOCHAR
   - BIOCHAR: BIOCHAR IS FINE-GRAINED CHARCOAL MADE BY HEATING BIOMASS WITH LIMITED TO NO OXYGEN, A PROCESS CALLED PYROLYSIS. BIOCHAR SHALL BE FURNISHED FROM OFF-SITE AND SHALL BE FREE OF SOIL, STONE AND OTHER FOREIGN MATERIALS.
   - BIOCHAR SHALL MEET THE FOLLOWING PARAMETERS:

     (a) ORGANIC CARBON CONTENT: GREAT THAN OR EQUAL TO 60% OF TOTAL MASS

     (b) PH: 7.0 OR LESS

     (c) PARTICLE SIZE: SAND AND/OR SMALL GRAVEL

2. COMPOST
   - COMPOST SHALL BE DERIVED FROM PLANT MATERIAL AND PROVIDED BY A MEMBER OF THE U.S. COMPOSTING SEAL OF TESTING ASSURANCE (STA) PROGRAM. SEE WWW.COMPOSTINGCOUNCIL.ORG FOR A LIST OF LOCAL PROVIDERS.
   - ALTERNATIVE SPECIFICATIONS AND/OR CERTIFICATIONS, SUCH AS THOSE ADMINISTERED BY THE MARYLAND DEPARTMENT OF AGRICULTURE OR OTHER AGENCIES, MAY BE SUBSTITUTED, AS AUTHORIZED BY DDOE. IN ALL CASES, COMPOST MATERIAL MUST MEET STANDARDS FOR CHEMICAL CONTAMINATION AND PATHOGEN LIMITS PERTAINING TO SOURCE MATERIALS, AS WELL AS REASONABLE LIMITS ON PHOSPHORUS AND NITROGEN CONTENT TO AVOID EXCESSIVE LEACHING OF NUTRIENTS.
   - THE COMPOST SHALL BE THE RESULT OF THE BIOLOGICAL DEGRADATION AND TRANSFORMATION OF PLANT-DERIVED MATERIALS UNDER CONDITIONS THAT PROMOTE ANAEROBIC DECOMPOSITION. THE MATERIAL SHALL BE WELL COMPOSTED, FREE OF VIABLE WEED SEEDS, AND STABLE WITH REGARD TO OXYGEN CONSUMPTION AND CARBON DIOXIDE GENERATION. THE COMPOST SHALL HAVE A MOISTURE CONTENT THAT HAS NO VISIBLE FREE WATER OR DUST PRODUCED WHEN HANDLING THE MATERIAL. IT SHALL MEET THE FOLLOWING CRITERIA, AS REPORTED BY THE U.S. COMPOSTING COUNCIL STA COMPOST TECHNICAL DATA SHEET PROVIDED BY THE VENDOR:

     (a) 100 PERCENT OF THE MATERIAL MUST PASS THROUGH A HALF-INCH SCREEN

     (b) THE PH OF THE MATERIAL SHALL BE BETWEEN 6 AND 8

     (c) MANUFACTURED INERT MATERIAL (PLASTIC, CONCRETE, CERAMICS, METAL, ETC.) SHALL BE LESS THAN 1.0 PERCENT BY WEIGHT

     (d) THE ORGANIC MATTER CONTENT SHALL BE BETWEEN 35 AND 65 PERCENT

     (e) SOLUBLE SALT CONTENT SHALL BE LESS THAN 6.0 MMHOS/CM

     (f) MATURITY MUST BE GREATER THAN 80 PERCENT

     (g) STABILITY SHALL BE 7 OR LESS

     (h) CARBON/NITROGEN RATIO SHALL BE LESS THAN 25:1

     (i) TRACE METAL TEST RESULT = —PASS!

     (j) THE COMPOST MUST HAVE A DRY BULK DENSITY RANGING FROM 40 TO 50 LB/FT3

LEGEND

EXISTING
- MAJOR CONTOUR
- MINOR CONTOUR
- PROPERTY LINE
- SS SANITARY SEWER
- SD STORM DRAIN
- X FENCE
- TRAVERSE POINT
- TREE
- SD STORMDRAIN MANHOLE
- S SEWER MANHOLE

PROPOSED
- 425 MAJOR CONTOUR
- 424 MINOR CONTOUR
- LIMITS OF SUBSOIL DECOMPACTION
- LIMITS OF AMENDMENTS AND SEEDING

HORIZONTAL SCALE

0 20 40

CLIENT

DEPARTMENT OF ENERGY & ENVIRONMENT

CECILIA LANE
ENVIRONMENTAL ENGINEER
WATERSHED PROTECTION DIVISION
DEPARTMENT OF ENERGY AND ENVIRONMENT
GOVERNMENT OF THE DISTRICT OF COLUMBIA
1200 FIRST STREET, NE 5TH FLOOR
WASHINGTON, DC 20002
DESK: (202) 535-1961
WEB: DOEE.DC.GOV

DATE:	ISSUES / REVISIONS

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DC.gov

Biohabitats
The Stables Building 2081 Clipper Park Road
Baltimore, MD 21211 / ph: 410.554.0156
fx: 410.554.0168 / www.biohabitats.com
Restore the Earth & Inspire Ecological Stewardship

AMIDON PARK SOIL DE-COMPACTION

TITLE: PROPOSED CONDITIONS

PROJECT NO.: 18030.01 SCALE: 1:20_XREF

SEAL: BY: TB CHECK: BA

DWG. NO.:

SHEET NO.: 1 OF 1