

SITE SELECTION AND EVALUATION REPORT FOR PROPOSED LAND APPLICATION SYSTEM

**RWDC Industries, LLC
Athens, Georgia**

January 2020

PREPARED BY

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1.0 INTRODUCTION

RWDC Industries, LLC is evaluating the feasibility for a Land Application System (LAS) that will provide treatment of "recovery water" from a biopolymer production facility in Athens, Clarke County, Georgia. Total flow is initially projected to be approximately 30,000 gallons per day (GPD) at startup. The vast majority of the flow is intended to be reused within the facility following treatment by dissolved air flotation (DAF) and polishing within a constructed wetland recycling system. The volume of material discharged to the LAS may be as high as 200,000 GPD, but after the entire water recovery system is installed and operational the discharge to LAS will average approximately 50,000 to 75,000 GPD on a more consistent long-term basis. Projected flow volume will be further refined during the design phase of the project. There will be no domestic waste or hazardous constituents included in these streams to LAS, and solids may be utilized as a soil amendment.

The proposed site is a 132-acre parcel located off of Voyles Road (Figure 1). Undeveloped areas of the site are being considered for use with the wetland recycling system and land application spray fields.

Nutter & Associates, Inc. has prepared this Site Selection and Evaluation Report (SSER) in general accordance with Table 2.1-2 of the Georgia Environmental Protection Division (EPD) *Guidelines for Slow-Rate Land Treatment of Wastewater (Revised, 2010)* for the area considered for the LAS.

The objective of the project is to permit a land application system that will provide treatment of recovery water from the biopolymer production facility. The information provided in this evaluation report is submitted to obtain concurrence from EPD to proceed with a detailed site investigation and preparation of a Design Development Report for the project.

2.0 SITE DESCRIPTION

The proposed site is in Clarke County, within the Winder Slope District of the Southern Piedmont Section of the Piedmont physiographic province (Clarke and Zisa, 1976). This area is characterized by the headwater tributaries of the major streams draining to the Atlantic Ocean. The stream valleys are broad and shallow with gentle side slopes separated by broad, rounded divides. The location of Clarke County and the general vicinity of the RWDC site are presented in Figure 1. The following sections describe general features of the proposed site, including land use, topography, and drainage/surface water features.

2.1 Proposed LAS Site

The proposed LAS site (Site) is located northeast of the City of Athens at 110 Voyles Road (Figure 1). The Site is accessed directly from Voyles Road. The Site is owned by RWDC Industries, LLC and was formerly a Invista/Dupont facility. The associated infrastructure is currently being renovated for use as biopolymer production facility. The undeveloped portions of the 132-acre site are vegetated with mixed pine/hardwood forested land and maintained grass. A large impoundment utilized as a recreational pond is in the eastern portion of the site. A former LAS operated by Dupont is located southeast of the RWDC facility, which is no longer in operation. Portions of the former LAS site may be utilized for land treatment or for siting the wetland recycling system.

The site pond is an impoundment of an unnamed tributary to the East Fork of Trail Creek. Trail Creek ultimately flows to the North Oconee River. Another unnamed tributary bisects the western boundary of the site and joins East Fork just south of the impoundment. The western portions of the site are characterized by gentle slopes ranging from 2 to 15 percent with steeper slopes near the stream channels and draws. The eastern portion of the site is flatter and includes areas around the existing facility that have been graded to nearly level. Elevations at the site range from 813 feet North American Vertical Datum (NAVD88) along the ridge tops to 728 feet in the floodplain along the tributaries to East Fork. Figure 2 presents a portion of the USGS Athens East, GA 7.5-minute topographic map showing the site topography and surface hydrologic features. Figure 3 presents FEMA flood zone mapping.

2.2 Threatened or Endangered Species

Review of the US Fish and Wildlife Service (USFWS) "Initial Project Scoping (IPaC)" identified no federally listed threatened, endangered, or candidate species that may occur near the Site. No critical habitats were identified within the project area.

2.3 Cultural and Historic Resources

The National Register of Historic Places website was consulted to determine the presence of cultural resources within the project area. No resources were identified within the site vicinity. In addition, the USGS topographic quadrangle shows no cemeteries within the Site.

3.0 SITE SOIL CHARACTERISTICS

Based on the Soil Conservation Service (SCS) Soil Survey of Clarke and Oconee Counties (Robertson, 1968), the soil series mapped within the Site are Appling, Cecil, Colfax, Chewacla, Davidson, Madison, and Pacolet. A rock outcrop and a water feature are also mapped. Figure 4 presents the NRCS soils map for the site. Due to topographic location and seasonal high-water table, Colfax and Chewacla series soils are not suitable for wastewater irrigation and are excluded from consideration. Physical characteristics of the suitable soil series significant to wastewater treatment as reported by the USDA-NRCS Soil Survey are presented in Table 1. A brief description of the suitable soils mapped on the site follows.

3.1 Suitable Soils

3.1.1 Appling Series

The Appling series consists of very deep, well drained, moderately permeable soils. They are formed in material weathered from felsic igneous and metamorphic rocks. Appling soils are found in the uplands on ridges and hillsides. Slopes range from 0 to 25 percent. The surface horizon is generally brown with a sandy loam to loamy sand texture to 6 inches. The subsurface horizon to 60 inches is yellowish-red to brown with a clay loam to clay texture. Below 60 inches, a reddish yellow loamy saprolite extends to a depth greater than 60 inches. The depth of bedrock is greater than 60 inches. The depth of the seasonal high-water table is greater than 60 inches.

3.1.2 Cecil Series

Cecil series consists of deep, well drained, moderately permeable soils. They are formed in material weathered from granite, gneiss, and schist. Cecil soils are found in the uplands on broad plateaus, ridgetops, and hillsides. Slopes range from 2 to 10 percent. The surface horizon is generally dark yellowish-brown with a sandy loam texture to 7 inches. The subsurface horizon to 50 inches is yellowish-red to red with a clay loam to clay texture. Below 50 inches, a reddish loamy saprolite extends to a depth of 60 inches. The depth of bedrock is greater than 60 inches. The depth of the seasonal high-water table is greater than 60 inches.

3.1.3 Davidson Series

The Davidson series consists of very deep, well drained, moderately permeable soils. They are formed in material weathered from dark colored rocks. Davidson soils are found on gently sloping to moderately steep uplands in the Piedmont. Slopes range from 2 to 25 percent. The surface horizon is generally dark reddish-brown with a loam texture to 7 inches. The subsurface horizon to 72 inches is dark red with a clay texture. The depth of bedrock is greater than 72 inches. The depth of the seasonal high-water table is greater than 60 inches.

3.1.4 Madison Series

Madison series consists of deep, well drained, moderately permeable soils. They are formed in material weathered from felsic metamorphic or igneous rocks high in mica content. Madison soils are found on gently sloping to steep uplands. Slopes are mostly between 4 and 15 percent but range from 2 to 60 percent. The surface horizon is generally yellowish brown to strong brown with a sandy loam texture to 6 inches. The subsurface horizon to 35 inches is red with a clay texture. Below 35 inches, a yellowish red loamy saprolite extends to a depth of 72 inches. The depth to bedrock is greater than 60 inches. The depth of the seasonal high-water table is greater than 60 inches.

3.1.5 Pacolet Series

Pacolet series consists of deep, well drained, moderately permeable soils. They are formed in material weathered from granite, gneiss, and mica schist. Pacolet soils are found on moderately long or short hillsides that are mainly adjacent to drainage ways. Slopes range from 10 to 25 percent. The surface horizon is generally brown with a sandy loam texture to 5 inches. The subsurface horizon to 30 inches is red with a clay loam texture. Below 30 inches, a brownish-yellow sandy loam saprolite extends to a depth of 60 inches. The depth to bedrock is greater than 60 inches. The depth of the seasonal high-water table is greater than 60 inches.

3.2 Site Reconnaissance

In September 2019, Nutter & Associates, Inc. conducted a preliminary site evaluation to confirm the published soil mapping and to assess suitability for land treatment at the Site. Representative portions of the site were traversed and the topography and general landscape characteristics were observed. Five (5) hand auger borings were advanced across the site to capture different landscape positions (Figure 5). Soil profile descriptions are included in Appendix A. The vast majority of the site consists of Cecil and Pacolet series soils, which are suitable for land treatment.

Soils in the leveled area southeast of the facility were graded (see soil boring B4). The surface horizon and clay subsoil horizon were removed sometime in the past. The remaining soil profile is consistent with saprolitic horizons observed deeper in Cecil and Pacolet series soils.

Cecil and Pacolet series soils are considered suitable for land application of recovery water from the RWDC facility. Based on the site evaluation and Geographic Information Systems (GIS) analysis, approximately 40 acres are projected to be suitable for land treatment (Figure 5). This projected suitable area consists of the suitable soil series remaining after observing setbacks required for habitable structures, property boundaries, streams, and other unsuitable landscape positions.

4.0 CONCLUSION AND RECOMMENDATIONS

Based on the available published data, preliminary site reconnaissance, and experience with other land application systems that have similar landscapes and soil characteristics, the site is suitable for land treatment of recovery water. The portions of the site suitable for treatment include ridgetops and side slopes. The unsuitable areas occur along the drainage features, surface water bodies, and property boundaries. Based on the site evaluation, the soil series suitable for land treatment include Cecil and Pacolet.

Of the 132 acres, approximately 40 acres are considered suitable for land treatment. This suitable area consists of the suitable soil series excluding setbacks.

Nutter & Associates, Inc. requests EPD concurrence that the sites are suitable for the proposed land application system and permission to precede with preparation of a Design Development Report for the project.

5.0 REFERENCES

Clark, W.Z., Jr. and A.C. Zisa. 1976. Physiographic Map of Georgia, Georgia Department of Natural Resources, Atlanta, Georgia.

Robertson, Stanley M. 1968. Soil Survey of Clarke and Oconee Counties, Georgia. US Department of Agriculture Soil Conservation Service. US Government Printing Office, Washington, D.C.

TABLE

Table 1. Physical characteristics of suitable soil series as reported in the Soil Survey of Clarke and Oconee Counties.

| Soil Series | Erosion Hazard | Drainage | Seasonal High Water Table | Depth to Bedrock | Horizon Depth | Permeability |
|-------------|----------------|-----------------|---------------------------|------------------|---------------|--------------|
| | | | inches | | | Inches/hour |
| Cecil | Moderate | WD ¹ | >72 | >60 | 0-8 | 2.0-6.3 |
| | | | | | 8-14 | 0.63-2.0 |
| | | | | | 14-46 | 0.63-2.0 |
| | | | | | 46-52 | 0.63-2.0 |
| Pacolet | Moderate | WD ¹ | >72 | 72 | 0-5 | 2.0-6.3 |
| | | | | | 5-12 | 0.63-2.0 |
| | | | | | 12-26 | 0.63-2.0 |
| | | | | | 26-50 | 0.63-2.0 |

¹WD = well drained

FIGURES

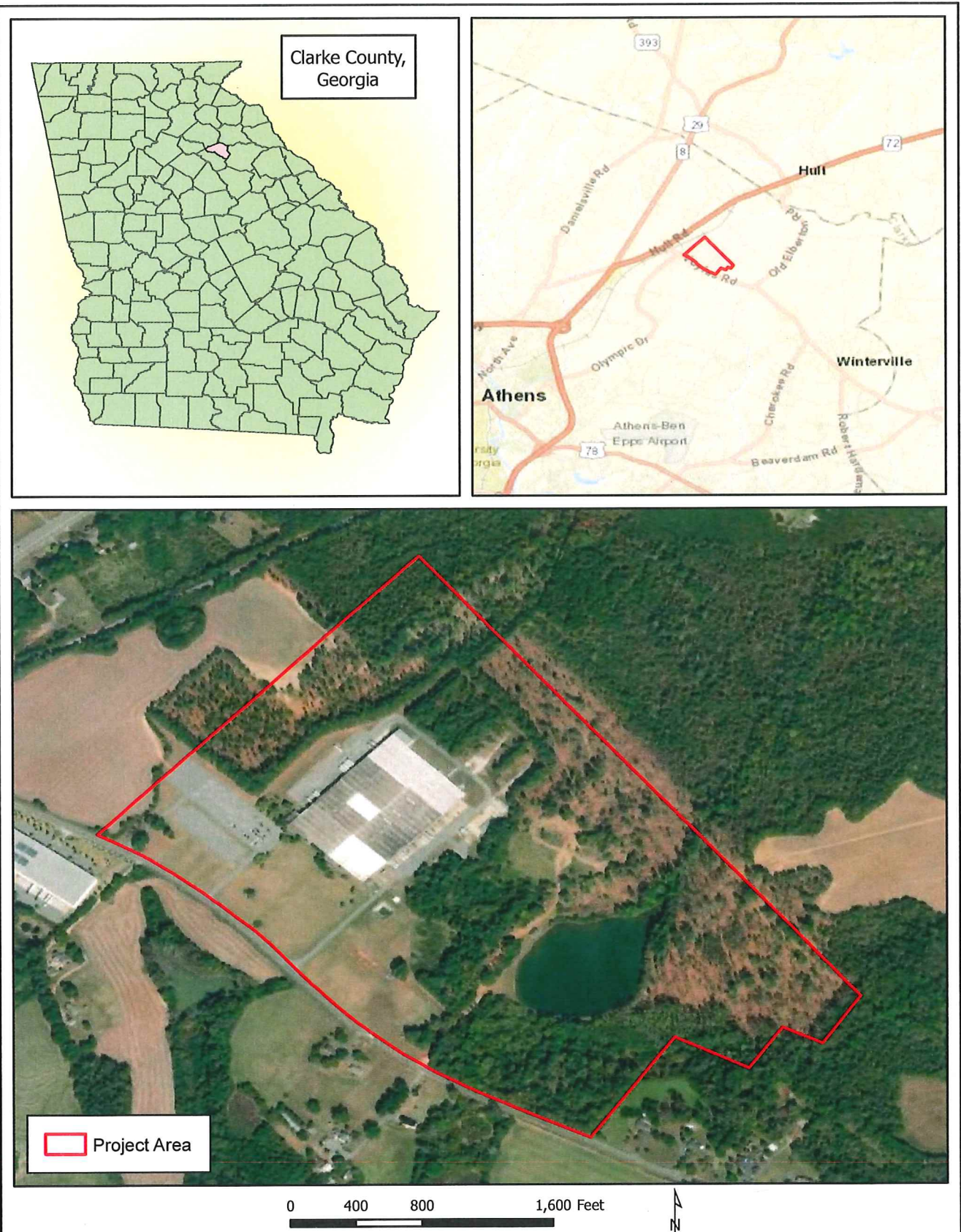
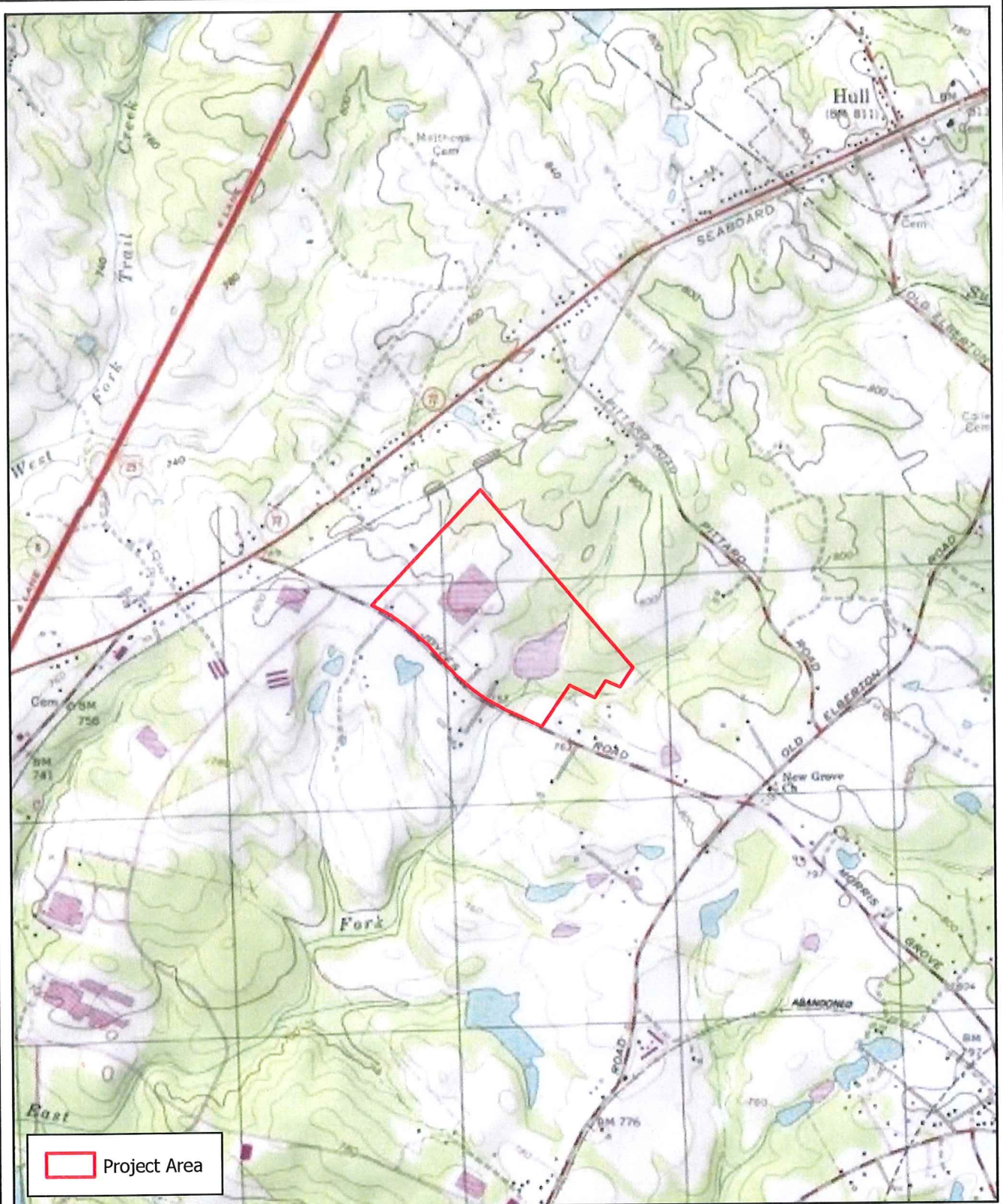


Figure 1. Site vicinity and location of the proposed RWDC Industries LAS site, Athens, Clarke County, Georgia.



Data Source: USGS topographic quadrangles

0 1,000 2,000 4,000 Feet



Figure 2. USGS topographic map of the proposed RWDC Industries LAS site, Athens, Clarke County, Georgia.



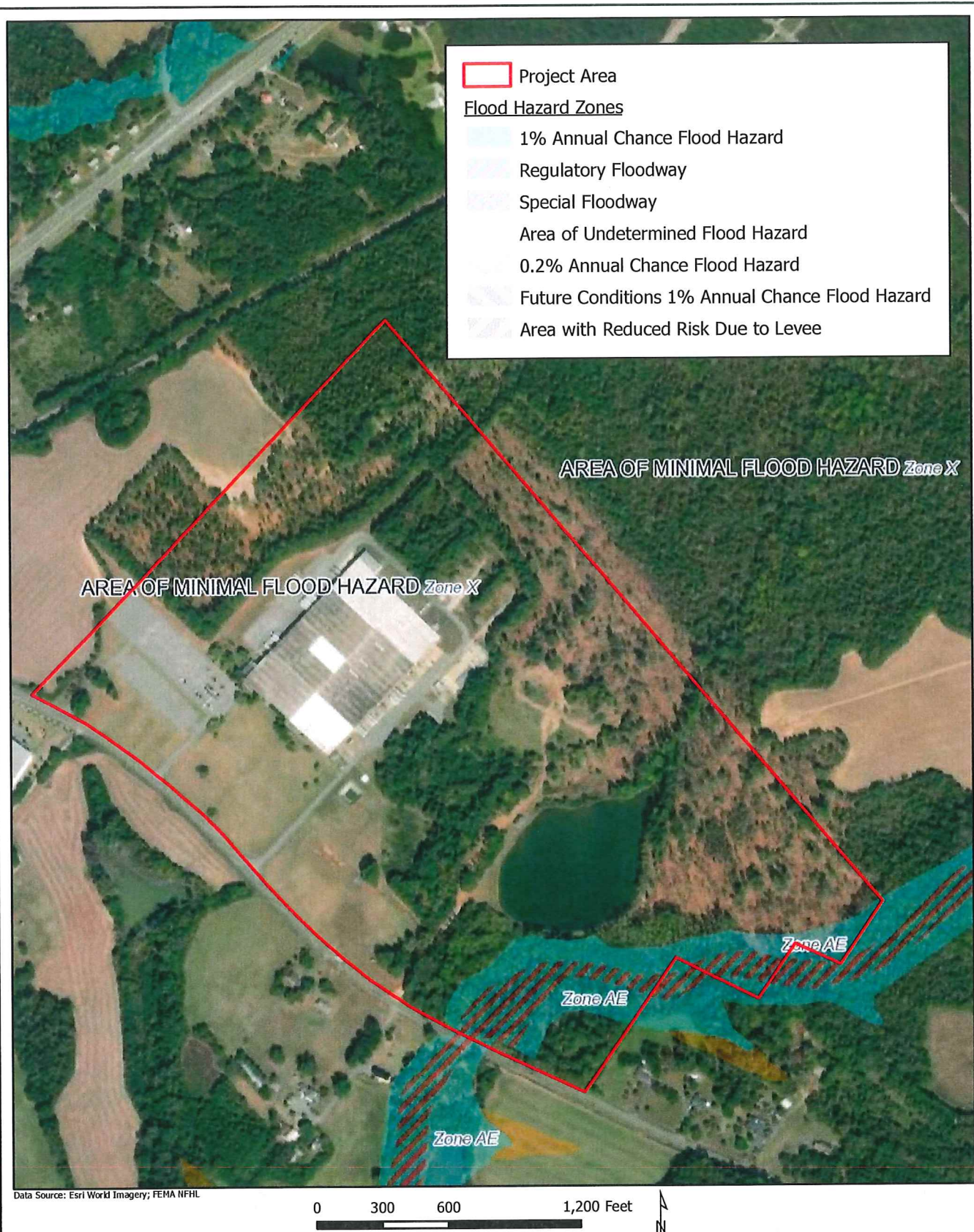


Figure 3. FEMA flood hazard zones map of the proposed RWDC Industries LAS site, Athens, Clarke County, Georgia.

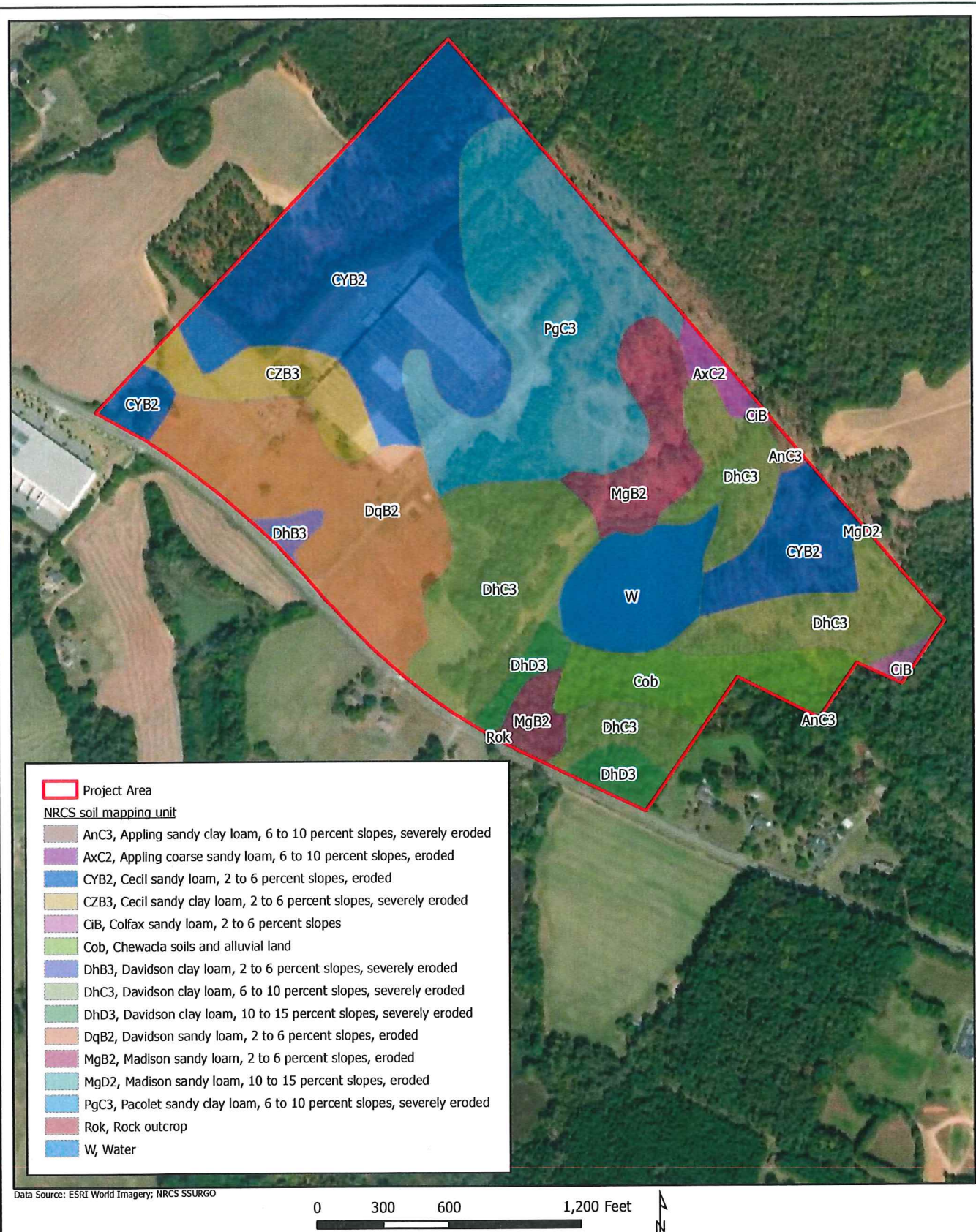


Figure 4. NRCS soil map of the proposed RWDC Industries LAS site, Athens, Clarke County, Georgia.



Figure 5. Projected suitable soil areas, RWDC Industries Athens Facility, Clarke County, Georgia.

APPENDIX A

GLOSSARY OF SOIL PROFILE DESCRIPTION SYMBOLS

TEXTURE

| | | |
|------------------------|------------------|-----------------|
| S - Sand | LS - Loamy Sand | SL - Sandy Loam |
| L - Loam | Sil - Silt Loam | Si - Silt |
| SiCl - Silty Clay Loam | SiC - Silty Clay | CL - Clay Loam |
| SCL - Sandy Clay Loam | SC - Sandy Clay | C - Clay |

| | | | |
|-----------------|---------------|----------------|--------------|
| BOUNDARY | Distinctness: | Ab - Abrupt | Cl - Clear |
| | | Gr - Gradual | Df - Diffuse |
| | Topography: | Sm - Smooth | Wy - Wavy |
| | | Ir - Irregular | Br - Broken |

| | | | |
|------------------|--------|-----------------------|-------------------------|
| STRUCTURE | Grade: | 0 - Absent | 1 - Weak |
| | | 2 - Moderate | 3 - Strong |
| | Size: | vf - Very Fine | f - Fine |
| | | m - Medium | c - Coarse |
| | | vc - Very Coarse | |
| | Type: | sg - Single Grain | m - Massive |
| | | cr - Crumb (granular) | a - Angular |
| | | abk - Angular Blocky | sbk - Subangular Blocky |
| | | pl - Platy | cl - Columnar |
| | | pm - Prismatic | |

| | | | |
|--------------------|-------------|--------------------|-----------------|
| CONSISTENCY | When Moist: | VFR - Very Friable | FR - Friable |
| | | FM - Firm | VFM - Very Firm |
| | | LS - Loose | |

| | | | |
|--------------|---------|---------------------|------------------------|
| ROOTS | Number: | O - None | F - Few |
| | | C - Common | M - Many |
| | Size: | < 1 - less than 1mm | 1-2 - 1mm to 2mm |
| | | 2-5 - 2mm to 5mm | > 5 - greater than 5mm |

| | | | |
|----------------|-------------|--------------------|-------------------|
| MOTTLES | Number: | f - Few | c - Common |
| | | m - Many | |
| | Size: | < 5 - Fine (f) | 5-15 - Medium (m) |
| | | > 15 - Coarse (co) | |
| | Prominence: | F - Faint | D - Distinct |
| | | P - Prominent | |

LITHOCHROMOLGY

MCS - Multi-colored saprolite

| Project Number: 19-091 | | | | | | | | | | Date: 9-20-19 | | | |
|------------------------|-----------------|-----------------|--------------|---------|---------|-------------|-----|-----|----------------------|---------------|-----|---|--|
| Soil Scientist: SWD | | | | | | | | | | | | | |
| Boring/ Pit | Depth (inch) | Horizon Name | Matrix Color | | Texture | Consistence | | | Structure (inferred) | | | Mottles/ Redox Features | Notes ZSS,RH,LTAR,etc. |
| | | | Hue | Val/Crm | | Rpt | Stk | Pls | Grd | Sz | Typ | | |
| B1 | 0-3 | A | 10YR | 4/4 | SL | fr | | | 1 | m | gr | | |
| 6% | 3-10 | BA | 7.5YR | 4/6 | SL | fr | | | 1 | m | gr | | |
| | 10-48 | Bt1 | 2.5YR | 4/6 | C | fr | | | 2 | m | sbk | | |
| | 48-60 | Bt2 | 5YR | 4/6 | C | fr | | | 2 | m | sbk | C,F-M 10YR 6/4-6/2; 2.5YR 4/6; 10YR 5/6 | |
| B2 | 0-3 | Bt1 | 5YR | 4/6 | SL | fr | | | 1 | m | sbk | | |
| 10% | 3-48 | Bt2 | 2.5YR | 4/6 | C | fr | | | 2 | m | sbk | | |
| B3 | 0-30 | Bt | 2.5YR | 4/6 | C | fr | | | 2 | m | sbk | | |
| 5% | | | | | | | | | | | | avg ref 41 @ 30" | |
| B4 | 0-60 | C | MCS | | fS | fr | | | 0 | | | | |
| 0% | | | | | | | | | | | | | MCS = multi-colored saprolite TRUNCATED |
| B5 | 0-40 | Bt | 2.5YR | 4/6 | C | fr | | | 2 | m | sbk | | |
| 25% | 40-60 | BC | 2.5YR | 5/6 | SL | fr | | | 1 | m | sbk | | MICACEOUS |

1. *Pharmaceutical industry* – The pharmaceutical industry is the largest and most profitable of the three industries. It is a highly competitive industry with a high barrier to entry. The industry is characterized by a high level of research and development (R&D) spending, which is necessary to develop new drugs. The industry is also characterized by a high level of marketing spending, which is necessary to promote new drugs. The industry is a highly regulated industry, with a high level of government oversight.