



STATE OF TENNESSEE  
**DEPARTMENT OF ENVIRONMENT AND CONSERVATION**

Division of Solid Waste Management  
William R. Snodgrass Tennessee Tower  
312 Rosa L. Parks Avenue, 14<sup>th</sup> Floor  
Nashville, Tennessee 37243

November 9, 2023

Porchia Hernandez  
Denali Water Solutions  
3308 Bernice Avenue  
Russellville, AR 72802

**CERTIFIED MAIL**  
**#7021 0950 0001 7916 4518**  
**RETURN RECEIPT REQUESTED**

**RE: Permit-By-Rule for a Solid Waste Land Application Facility and Beneficial Use Proposal  
Determination – Denali Water Solutions, Womack – LND020000102**

Dear Ms. Hernandez:

The Tennessee Department of Environment and Conservation (TDEC), Division of Solid Waste Management (DSWM) has reviewed your Permit-By-Rule and Beneficial Use request received June 16, 2023 and revised October 10, 2023. The application requested multiple waste streams for land application and beneficial use, including food residuals and dissolved air flotation (DAF) residuals.

This letter will serve as official notice that DSWM has approved your Permit-By-Rule notification for the referenced 264 acres (identified as DW-2 field site) located in Bedford County along Steward Road, Shelbyville, TN 37160 (latitude 35.4875, longitude – 86.516667) for land application of food processing residuals. This facility shall be deemed to have a Permit-By-Rule for food processing residuals, provided the criteria of Rule 0400-11-01-.02(2)(b)6 of Tennessee's Solid Waste Processing and Disposal Regulations are met, including the permit conditions as submitted with your application. The registration number for this facility is LND020000102.

Rule 0400-11-01-.01(2) prohibits DAF residuals from being part of a Land Application Permit-By-Rule approval; however, this letter will serve as official notice that DSWM has determined that per Rule 0400-11-01-.02(1)(b)3(xxi), the proposed use of the DAF residuals in your proposal constitutes a beneficial use of solid waste when used in the manner proposed.

With the issuance of this Permit-By-Rule, there is an annual maintenance fee required, pursuant to Tennessee Rule 0400-11-01-.07(3), for this land application site. The annual fee is \$100.00. You will receive an annual maintenance fee invoice in August 2024 from TDEC Division of Fiscal Services that will indicate Denali Water Solutions owes \$100.00.

If you have any questions concerning this letter or decision, please contact Steven Wintheiser at [Steven.Wintheiser@tn.gov](mailto:Steven.Wintheiser@tn.gov) or 931-449-9028.

Sincerely,

A handwritten signature in black ink, appearing to read "Lisa A. Hughey".

Lisa A. Hughey, CHMM  
Director

cc: Steven Wintheiser, DSWM, Columbia Environmental Field Office  
[Records.SWM@tn.gov](mailto:Records.SWM@tn.gov)



3308 Bernice Avenue  
Russellville, Arkansas 72802  
479-498-0500

August 7, 2023

Tennessee Department of Environment and Conservation  
Division of Solid Waste  
Columbia Environmental Field Office  
1421 Hampshire Pike  
Columbia, Tennessee 38401

**RE: Notice of Technical Deficiency Response**  
**Womack Farm PBR Application**

Dear Mr. Wintheiser,

Denali has revised the permit application. Please review the following notes:

1. County corrected in application.
2. Denali will not be land applying on this farm December through March, due to the rainy season. Denali states in our management plan that we will not land apply when the soil is saturated or when precipitation is immanent. To minimize runoff potential, material is subsurface injected into the soil. Buffer zones will be clearly marked in the fields as to further prevent any chance of run off from weather activity.
3. Denali conducted a site assessment with the landowner to determine if sink holes were present. Two sinkholes were discovered on the property and buffered on the updated maps presented in the revised application.
4. A depth to water table has been added to the application. During the months of April through November the depth to water table is at least 4 feet. December through March, the fields will not be utilized for land application to avoid any potential runoff.
5. In the original submittal, 2022 products and analyticals were listed. This list used codes from the Denali operation system. The revised application has the updated 2023 list of sources and their respective products and should be more concise.
6. See 5.
7. See 5.
8. See 5.
9. The original samples were not properly collected for fecal testing, as it was not mandatory at the time. Therefore the analytical value provided is inaccurate and does not represent the sample. Denali has since agreed with TDEC on fecal testing kill plants annually. Those results are included in the updated permit application.



3308 Bernice Avenue  
Russellville, Arkansas 72802  
479-498-0500

10. Denali has updated the surface water monitoring plan.
11. The revised application explains that buffer zones will be marked on site with orange flags during land application.

Please contact me with any questions (479) 312-2094 or [porchia.hernandez@denaliwater.com](mailto:porchia.hernandez@denaliwater.com).

Sincerely,

A handwritten signature in black ink that reads "Porchia Hernandez".

Porchia Hernandez

Environmental Manager

Denali Water Solutions



# **Management Plan for the Land Application of Organic Residuals**

## **Permit Application**

Bedford **County, Tennessee**

June 7, 2023

Updated July 25, 2023

**Plan Prepared By:**

Porchia Hernandez  
3308 Bernice Ave  
Russellville, AR 72802

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- Appendix C: Residual Analytical Data
- Appendix D: Soil Survey Maps & Soil Analyticals
- Appendix E: Sampling Plan
- Appendix F: Additional Information

## 1.0 EXECUTIVE SUMMARY

Denali operates land application of food processing residuals for beneficial use fertilizer operations in Tennessee. Food processing residuals includes wastewater residuals from various food & vegetable processing plants, animal processing plants, and animal food processing plants. The general types of wastewater residuals generated from these facilities include, but are not limited to, processing wash-down rinse water, DAF skimmings, waste activated sludge, wastewater lagoon sludge, and restaurant wastewater residuals. Wastewater residuals will be land applied for beneficial use to farm fields and pastures. This plan addresses the requirements and conditions for the proper beneficial-use land application of residuals in Bedford County, Tennessee.

### PROPOSED FACILITY AND SITE LOCATION

The proposed farm site is located in Bedford county, approximately 35.4875, -86.516667. The property is owned by David Womack. Duck River is the closest stream located on the site. The fields are currently being used to grow row crops.

Aerial and site topographic maps are located in **Appendix B**.

### OPERATION SUMMARY

Land application for beneficial use is an economical, agriculturally accepted, and practical means of managing organic wastewater residuals.

In the case of liquid organic wastewater residuals, the material will be loaded at the generating facility and hauled directly to the land application sites via sealed tanker trucks. Tanker trucks will be leak-proof and always maintained in sanitary conditions. Once the material arrives at a land application site, it may be land applied directly from the truck or temporarily placed in a mobile frac tank. Residuals placed in mobile frac tanks will be removed and land applied with a tractor and buggy. Depending upon the generating source type and specific material characteristics, the residuals may be either injected with a tractor and buggy equipped with plows and sub-soil injectors, or surface applied.

In the case of dewatered residuals, the material will be collected at the generating facility and hauled via open top container trucks to the land application sites. The material will be offloaded at the application site into a spreader buggy for surface application. The material may then be disked in depending on the material characteristics and field conditions.

## 2.0 PERFORMANCE STANDARDS

### MINIMIZATION OF PROPAGATION, HARBORAGE, OR ATTRACTION OF DISEASE VECTORS

Residuals are land applied and spread evenly across the farm site. These liquid-based residuals quickly dry and soak into the soil to release the beneficial organic based nutrients. The land application at the agronomic rate for the crop being grown at the farm site will effectively recover the food-based residuals as a nutrient to feed soil microbes and allow for the breakdown of organic matter in the residuals and provide crop available nutrients that can be taken up by the roots of the crop.

## MINIMIZATION OF POTENTIAL FOR SOLID WASTE RELEASES TO THE ENVIRONMENT

Land application at the appropriate agronomic rate using a sub-soil injection method or immediate incorporation of the residuals will minimize the potential for the residual material to be released from the field site. The buffer setbacks for the field discussed in this application will also work as a preventative measure.

## MINIMIZATION OF POTENTIAL HARM TO PUBLIC

The land application at the field site is conducted on private property. The general public are not allowed at the field site, and the landowner will post no trespassing signs on the farm site to prevent public access.

## 3.0 DESIGN STANDARDS

### ONSITE STORAGE

There is to be no permanent storage at the proposed land application site therefore no financial assurance is needed.

### FLOODPLAIN

A proportion of the site is located in a flood plain. To prevent washout, material is subsurface injected into the soil. During times of wet weather when there could be the possibility of flooding, the land application activity is not conducted. Additionally, Denali will not land apply on these fields from December to March, when the water table is <200 in.

A FEMA flood hazard map is presented in **Appendix B**.

### WETLANDS

The proposed site is not located in a wetland area.

A soil survey map is presented in **Appendix D**.

### KARST TOPOGRAPHY

Two sinkholes were verified during a site inspection. These sites have been buffered out of our maps and will not be used during land application. A USGS sink hole map is presented in **Appendix B**.

### APPLICATION BOUNDARIES

Land application will not take place:

- a. 500 feet from a dwelling;
- b. 500 feet from any domestic water supply well;
- c. 100 feet from a stream;
- d. 1000 feet from a public water supply well;
- e. 20 feet from a public roadway;
- f. On a slope exceeding 8 percent (except for slopes where incorporation is practiced, in which case the maximum acceptable slope for land application is 12 percent);
- g. In an area having a minimum depth of less than 3 feet to the seasonal high water table;

- h. In areas with karst features such as caves and open sinkholes, land application will not be permitted within 200 feet and will have a vegetative buffer zone;
- i. To soils that are saturated, frozen, or covered with snow during rain or when precipitation is imminent, meaning a substantial natural occurrence of precipitation that could cause significant damage to property or threaten human life in the near future.

Flags will be placed along the boundaries of buffers in the field.

Aerial maps of the proposed site and associated fields with boundaries noted are presented in **Appendix B**.

## **RESIDUAL CHARACTERIZATION**

Food processing residuals are primarily organic solids or semi-solid residues produced by wastewater treatment processes at food processing plants, animal processing plants, and animal food processing plants. DENALI provides a valuable and essential service to these processing facilities by removing accumulated organic wastewater residuals from their plants and onsite wastewater treatment facilities. Although volumes may vary depending upon the facility type and specific processing activities, these residuals must often be removed on a daily basis to allow continuous, efficient processing plant and wastewater treatment operations.

Wastewater residuals may also accumulate in lagoons and holding ponds at industrial wastewater treatment facilities, referred to as Digested Lagoon Residuals. They must be removed from time to time in order for these facilities to maintain design capacity and treatment requirements. Wastewater residuals are a rich source of valuable plant available nutrients required for plant growth and provide valuable soil conditioning properties when land applied properly.

DAF skimmings are a common product of wastewater pretreatment systems which employ flocculates and dissolved air to remove the solids from wastewater. Flocculated solids float to the surface where they are skimmed off and collected. DAF skimmings from poultry and other food processing facilities contain valuable plant-available nutrients and have very low metals concentrations. Skimmings from different sources vary slightly in nutrient concentration and solids content.

Restaurant wastewater residuals are solids and rinse water collected in the grease trap interceptor from commercial food preparation kitchens. The food processing facilities produce dairy products, juice drinks, swine, and poultry products for direct human consumption. The mixture is of vegetable oils, animal fats, water and semi-solid material that collects in the grease traps which are situated in the wastewater outflow lines. Its composition is typically about 90% water, 5% oil and grease, and 5% organic solids. This material is collected by a third party and goes through a secondary separation, the solids, including oils and greases, are collected by the third party for further refining and the water fraction is collected by Denali for land application.

Generally, these materials do not contain hazardous waste or are a significant source of heavy metals. Since the facilities generating the wastes are food processing facilities, all chemicals and materials used in the processing are required to be "food grade". Denali, with the assistance of facility management, determine no hazardous waste constituents are present in prohibited quantities based on generator knowledge. Material samples are tested for plant nutrients, percent solids, and other parameters of concern based on generator knowledge.

Analytical results for residuals are presented in Appendix C.

## 4.0 OPERATIONAL STANDARDS

The food processing material is to be land applied for beneficial use as fertilizer. The land application site is utilized for producing seasonal crops that are typically used as animal feeds. Representative samples of the residuals from each source to be land applied will be analyzed and the results will be expressed in mg/kg (dry basis), or in mg/l (wet basis) as specified by the permit. Nutrient loading rate tabulations will be calculated based on the nitrogen uptake rate for the crops being grown. Typically, nutrient loading rates are based on the Plant Available Nitrogen (PAN) uptake of the cover crop. Application rates are based off the PAN value calculated in the loading rate tabulation. At the proposed application rates neither the nutrient uptake rates for the crop nor the hydraulic loading rates will be exceeded during land application of the field site. The total metals applied are forecasted based on the proposed application rate for the life of the land application site.

Loading Rate Tabulations for each source are located in **Appendix C**.

## 5.0 RECORD KEEPING AND REPORTING

Prior to application, the appropriate volume to be applied to each field area will be determined based upon the nutrient content of the material, the nutrient requirements of the crop to be grown following application, and the acreage to which material is to be applied. At the land application site, daily field logs will be maintained which document the application dates, time, volume, crop to be grown, and field number. Annually, a report will be generated which includes the information from the daily field logs, the total volume applied in gallons per acre, the total nutrients and metals applied in pounds per acre, laboratory analyses of the land applied wastewater residuals, and soil analyses. This information will be submitted to TDEC, the generating facility, and to the landowner.

Denali's sampling plan regarding soil, waste material, and surface water is presented in **Appendix E**.

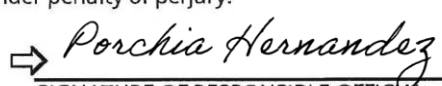
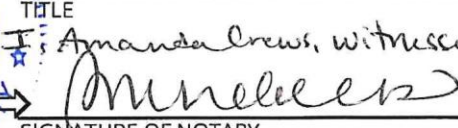
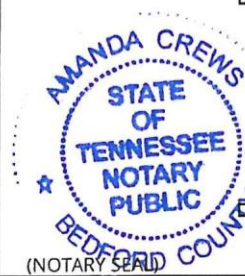
**Appendix A  
Land Use  
Agreements**





STATE OF TENNESSEE  
DEPARTMENT OF ENVIRONMENT AND CONSERVATION  
DIVISION OF SOLID WASTE MANAGEMENT  
WILLIAM R. SNODGRASS TENNESSEE TOWER  
312 ROSA L. PARKS AVENUE, 14TH FLOOR  
NASHVILLE, TN 37243

**SOLID WASTE PERMIT BY RULE NOTIFICATION**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                      |                                                 |                                                                                   |                                                            |                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------|-------------------------|
| <b>1. TYPE OF PERMIT- BY- RULE REQUESTED</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                      |                                                 |                                                                                   | <b>ID# TDEC USE ONLY</b>                                   |                         |
| <input type="checkbox"/> COMPOST FACILITY                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <input checked="" type="checkbox"/> LAND APPLICATION | <input type="checkbox"/> TIRE STORAGE FACILITY  |                                                                                   |                                                            |                         |
| <input type="checkbox"/> CONVENIENCE CENTER                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <input type="checkbox"/> PROCESSING FACILITY         | <input type="checkbox"/> TRANSFER STATION       |                                                                                   |                                                            |                         |
| <b>2. FACILITY INFORMATION</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                      |                                                 |                                                                                   | <b>FACILITY LOCATION COUNTY</b>                            |                         |
| FULL LEGAL NAME OF FACILITY<br><b>Denali Water Solutions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                      |                                                 |                                                                                   | <b>Bedford</b>                                             |                         |
| PHYSICAL LOCATION OR ADDRESS OF FACILITY<br><b>Steward Road</b>                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                      |                                                 |                                                                                   | <b>LATITUDE (DECIMAL DEGREES)</b><br>35.4875               |                         |
| CITY<br><b>Shelbville</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                      |                                                 |                                                                                   | <b>LONGITUDE (DECIMAL DEGREES)</b><br>-86.516667           |                         |
| STATE<br><b>TN</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                      |                                                 |                                                                                   |                                                            |                         |
| ZIP<br><b>37160</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                      |                                                 |                                                                                   |                                                            |                         |
| FACILITY MAILING ADDRESS<br><b>3308 Bernice Ave</b>                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                      |                                                 |                                                                                   | FACILITY EMAIL<br><b>porchia.hernandez@denaliwater.com</b> |                         |
| CITY<br><b>Russellville</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                      |                                                 |                                                                                   | AR 72802                                                   |                         |
| FACILITY MANAGER OR SITE OPERATOR<br><b>Fentress Bryan</b>                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                      | PHONE (WITH AREA CODE)<br><b>(479) 699-0032</b> | AFFILIATION OF SITE OPERATOR (IF DIFFERENT FROM PERMITTEE)<br><b>Area Manager</b> |                                                            |                         |
| <b>3. APPLICANT (PERMITTEE)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                      |                                                 |                                                                                   |                                                            |                         |
| APPLICANT NAME<br><b>Porchia Hernandez</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                      | PHONE (WITH AREA CODE)<br><b>(479) 312-2094</b> | EMAIL<br><b>porchia.hernandez@denaliwater.com</b>                                 |                                                            |                         |
| RESPONSIBLE OFFICIAL / TITLE<br><b>Environmental Manager</b>                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                      | PHONE (WITH AREA CODE)<br><b>(479) 312-2094</b> | EMAIL<br><b>porchia.hernandez@denaliwater.com</b>                                 |                                                            |                         |
| RESPONSIBLE OFFICIAL MAILING ADDRESS<br><b>3308 Bernice Ave</b>                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                      | CITY<br><b>Russellville</b>                     | STATE<br><b>AR</b>                                                                | ZIP<br><b>72082</b>                                        |                         |
| LANDOWNER NAME<br><b>DAVID WOMACK</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                          | LANDOWNER MAILING ADDRESS<br><b>260 WOMACK RD</b>    |                                                 | CITY<br><b>SHELBYVILLE</b>                                                        | STATE<br><b>TN</b>                                         | ZIP                     |
| <div><div></div><div>LANDOWNER SIGNATURE</div></div> <div><div></div><div>LANDOWNER SIGNATURE</div></div> <div><div></div><div>LANDOWNER SIGNATURE</div></div> <div><div></div><div>DATE</div></div>                                                                                                                                                                                                         |                                                      |                                                 |                                                                                   |                                                            |                         |
| <b>4. WASTE HANDLING</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                      |                                                 |                                                                                   |                                                            |                         |
| DESCRIPTION OF ACTIVITIES AND WASTES HANDLED OR PROCESSED<br><b>Land application of food processing residuals for beneficial use as a fertilizer material.</b>                                                                                                                                                                                                                                                                                                                                 |                                                      |                                                 | AMOUNT OF WASTE HANDLED, PROCESSED OR STORED<br><b>600.00</b>                     |                                                            |                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                      |                                                 | WEIGHT<br>TONS / DAY                                                              | VOLUME<br>YARDS / DAY                                      | STORAGE MAX<br>CU YARDS |
| <b>5. CERTIFICATION REQUIRED</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                      |                                                 |                                                                                   |                                                            |                         |
| I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision. The submitted information is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury. |                                                      |                                                 |                                                                                   |                                                            |                         |
| <div></div> <div>SIGNATURE OF RESPONSIBLE OFFICIAL</div>                                                                                                                                                                                                                                                                                                                                                    |                                                      |                                                 | <b>Porchia Hernandez</b><br>PRINTED NAME                                          |                                                            |                         |
| <b>Environmental Mgr</b><br>TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                      |                                                 | <b>6/15/2023</b><br>DATE                                                          |                                                            |                         |
| <div></div> <div>SIGNATURE OF NOTARY</div>                                                                                                                                                                                                                                                                                                                                                                  |                                                      |                                                 | <b>9-3-2024</b><br>DATE COMMISSION EXPIRES                                        |                                                            |                         |
| <div></div> <div>(NOTARY SEAL)</div>                                                                                                                                                                                                                                                                                                                                                                         |                                                      |                                                 |                                                                                   |                                                            |                         |

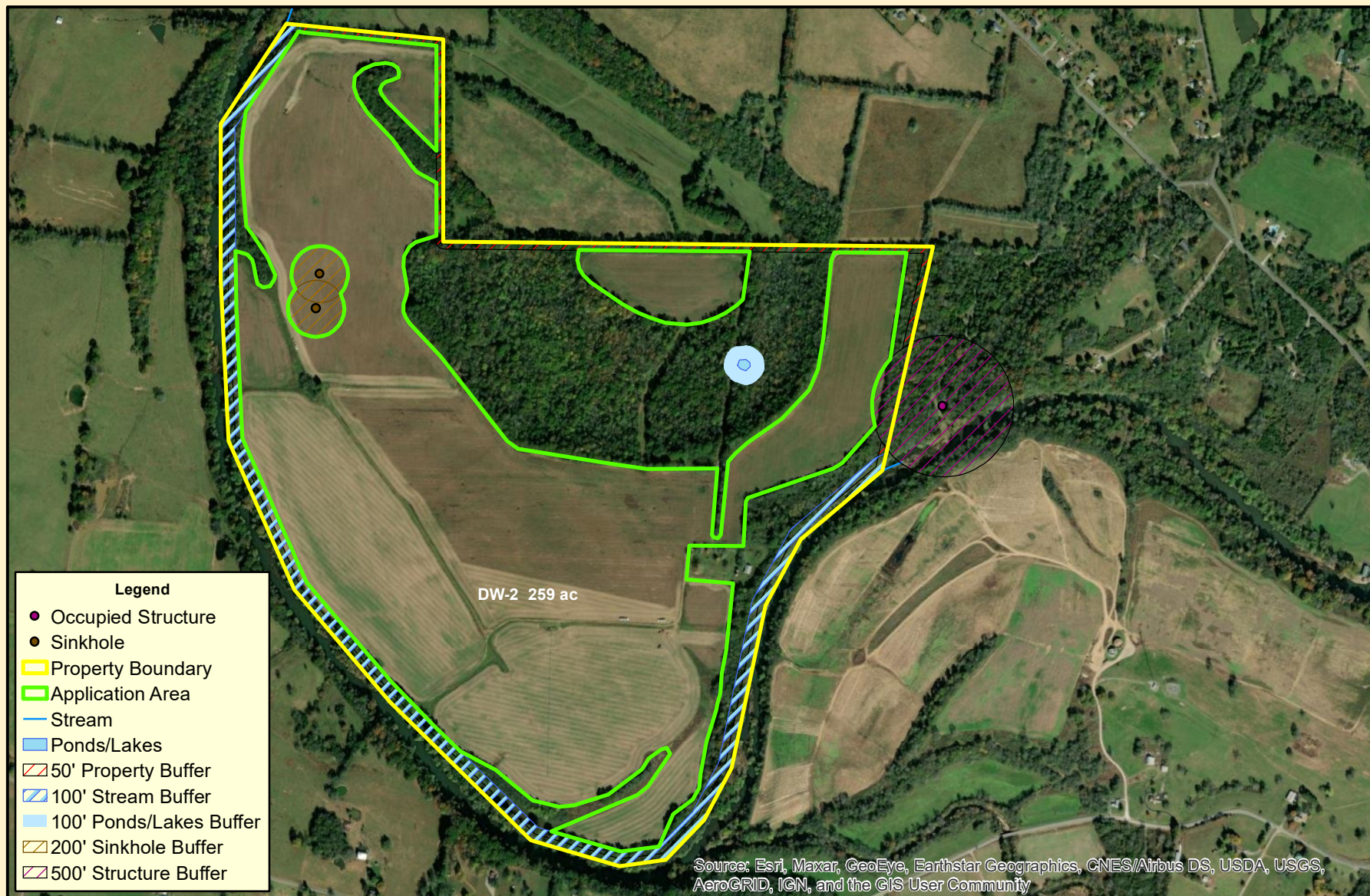
**Appendix B  
Land Application Site  
Information**



Denali Water Solutions

Bedford County Land List

| <u>Field ID</u> | <u>Owner</u> | <u>Latitude</u> | <u>Longitude</u> | <u>Acrege</u> | <u>Nearest Stream</u> | <u>Distance to Stream</u> |
|-----------------|--------------|-----------------|------------------|---------------|-----------------------|---------------------------|
| DW-2            | David Womack | 35°29'15"N      | 86°31'00"W       | 264           | Duck River            | 100'                      |

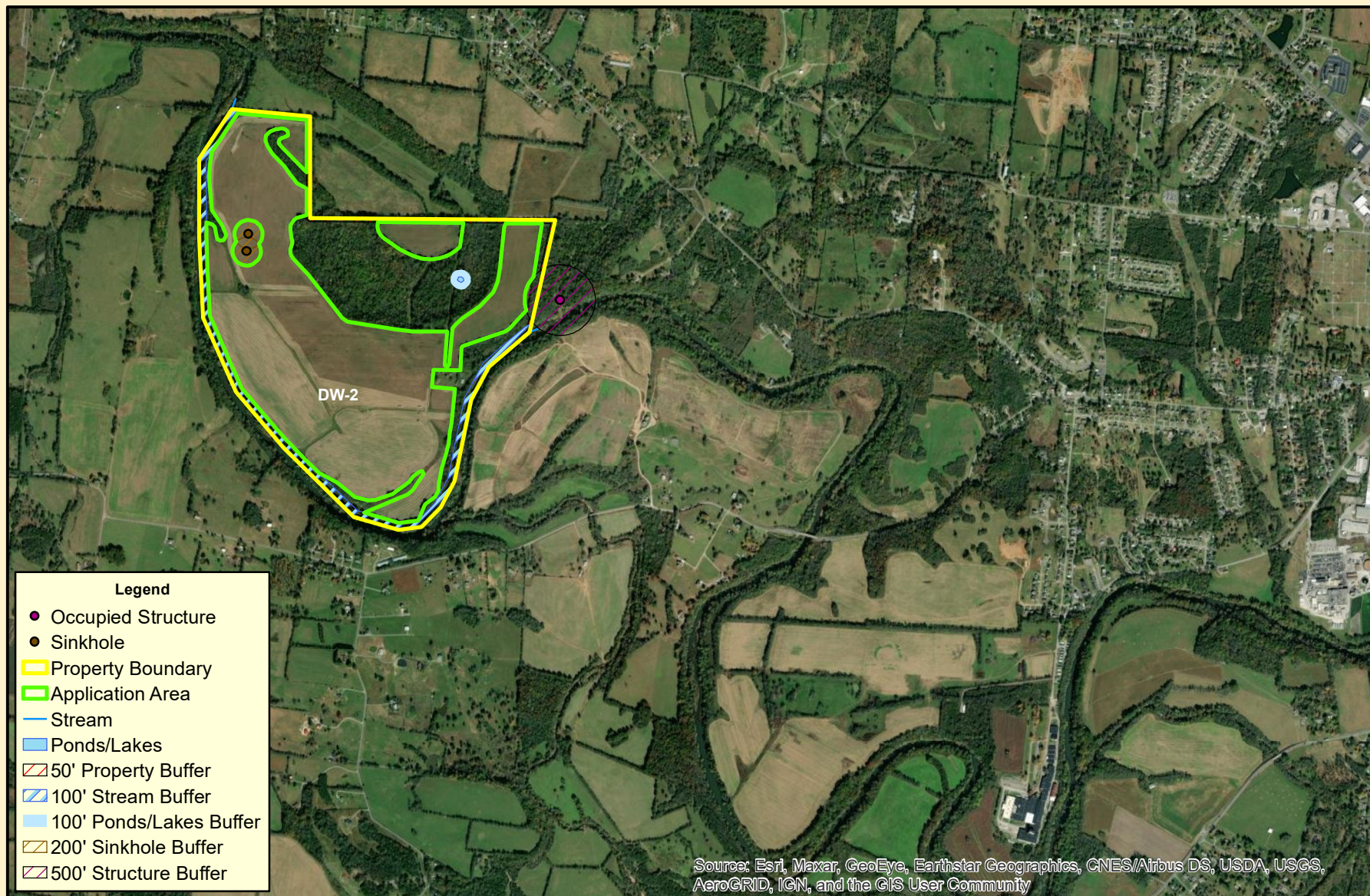


**DENALI**

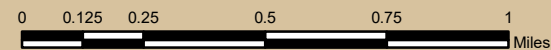
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David Womack  
Bedford County, Tennessee



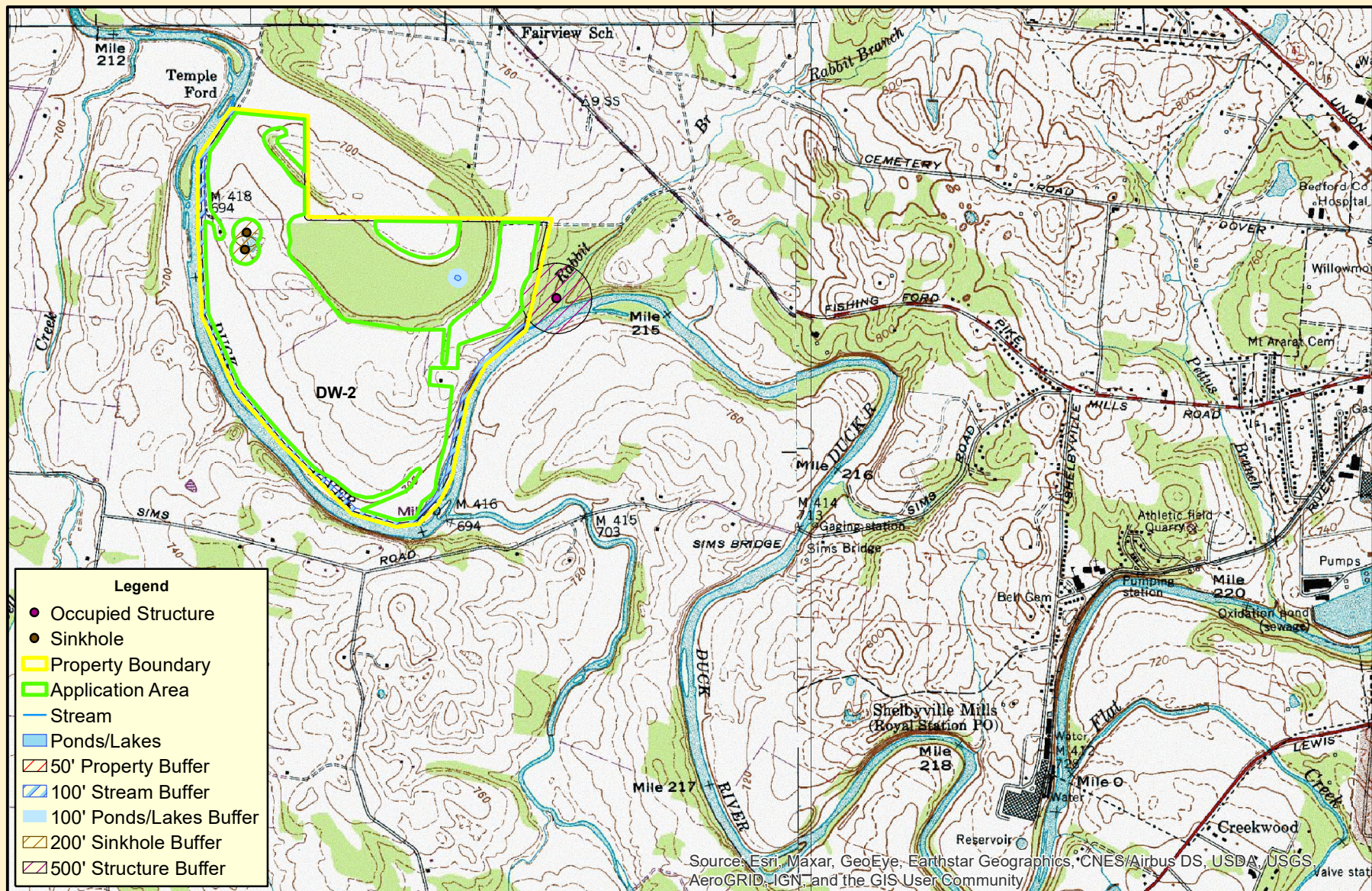


# DENALI

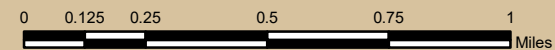


David Womack  
Bedford County, Tennessee



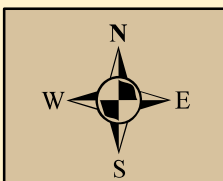
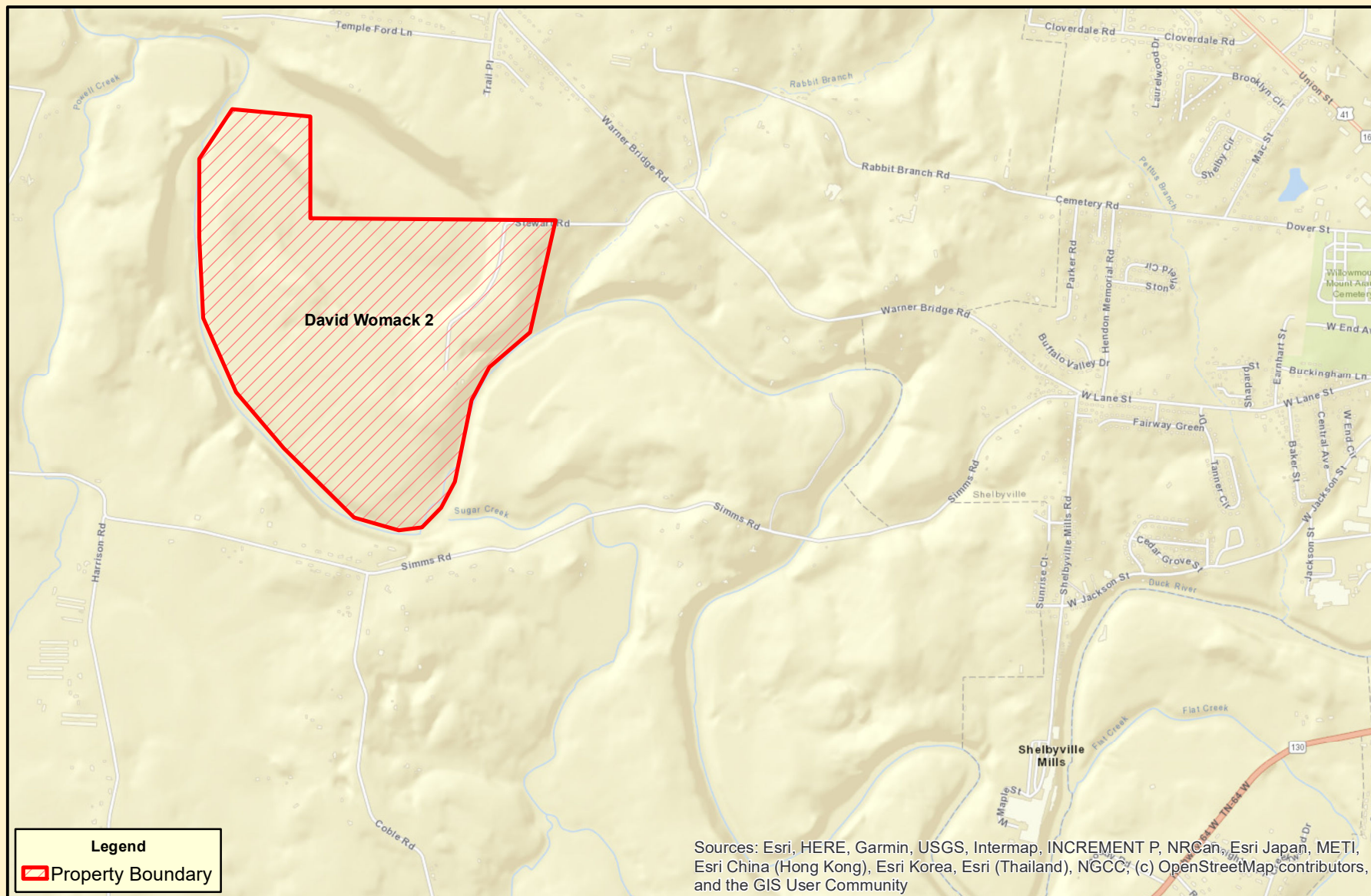


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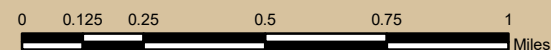


David Womack  
Bedford County, Tennessee

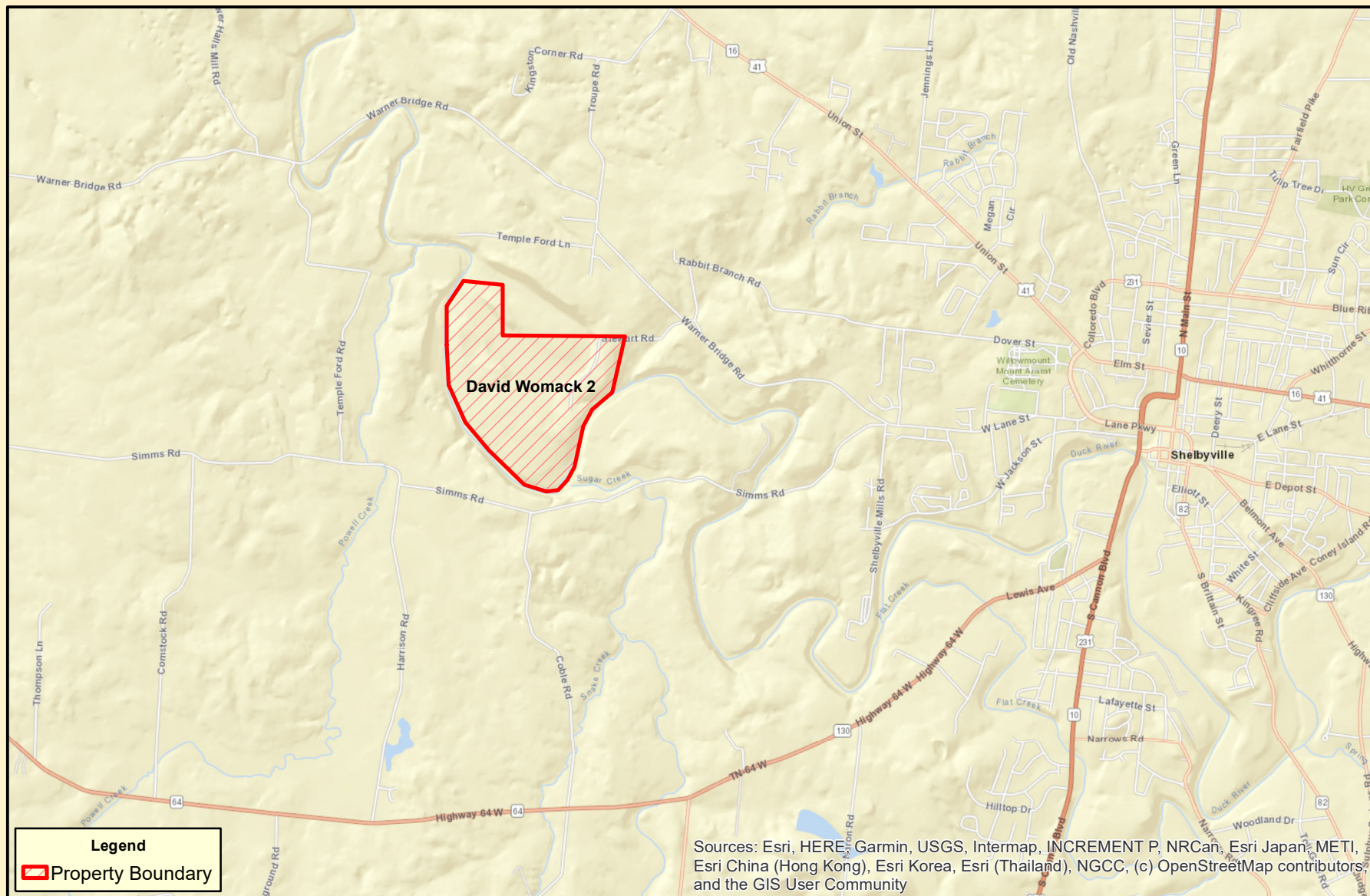




# DENALI



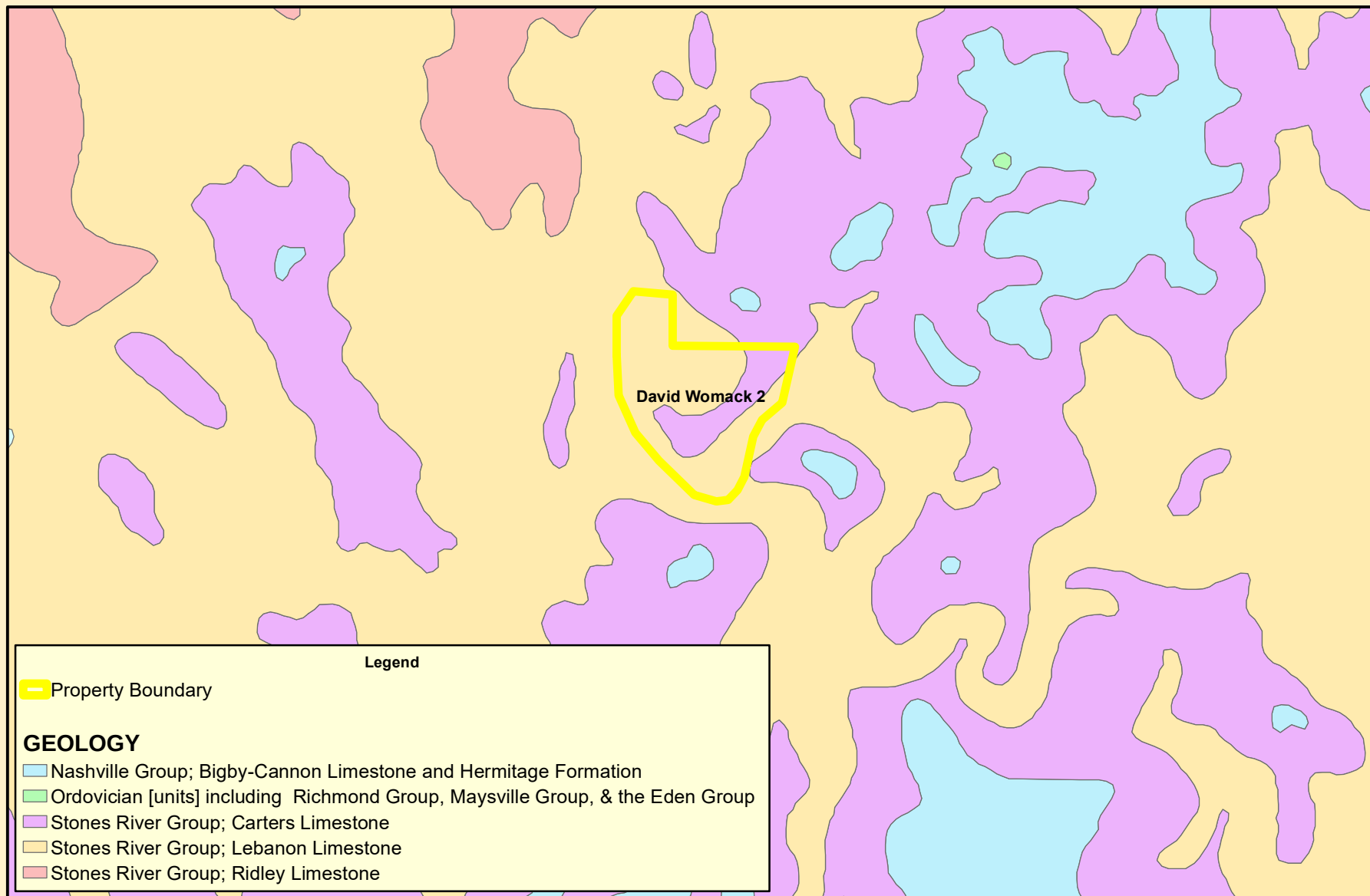
David Womack  
Bedford County, Tennessee



**DENALI**



David Womack  
Bedford County, Tennessee

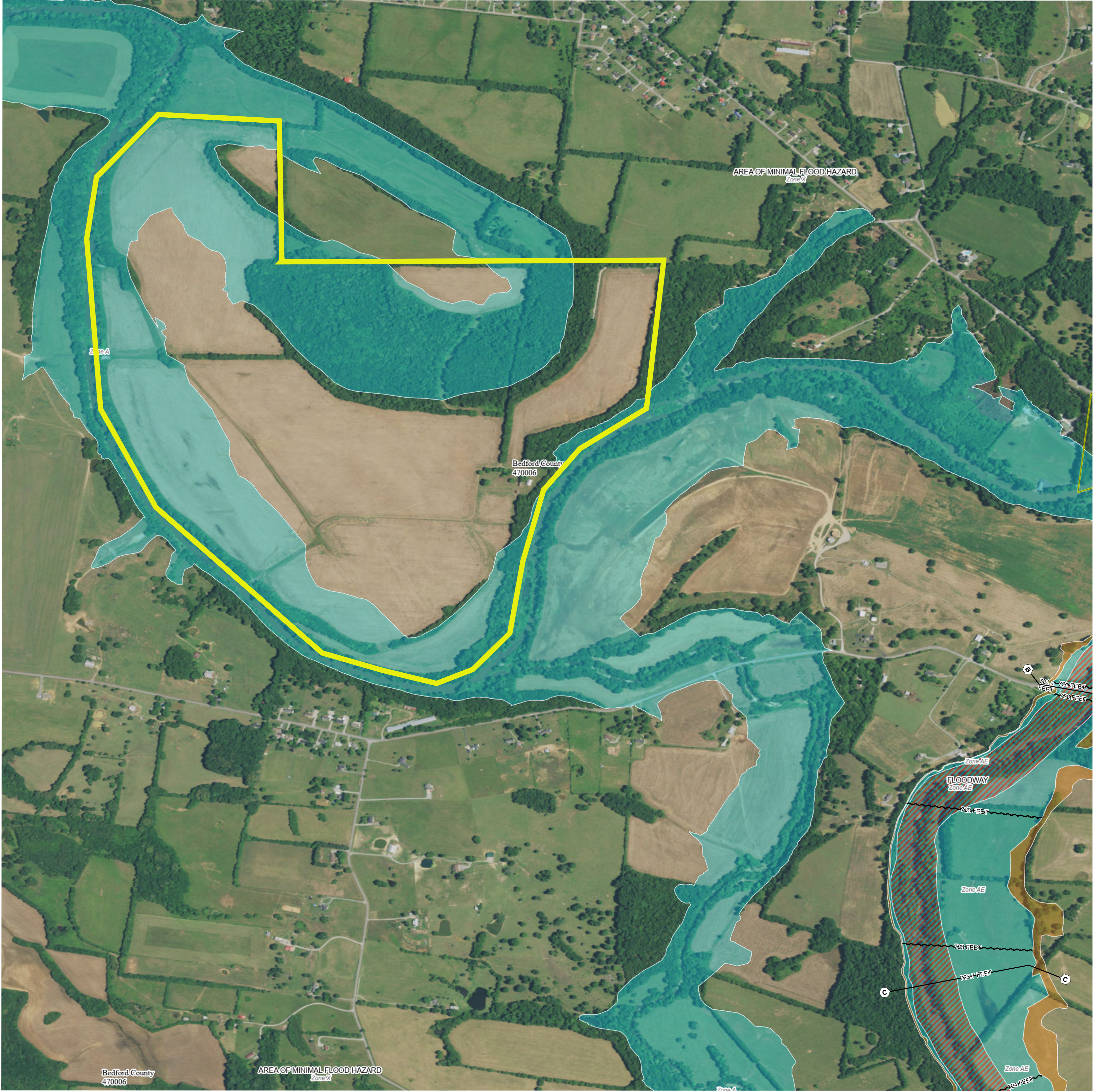


**DENALI**



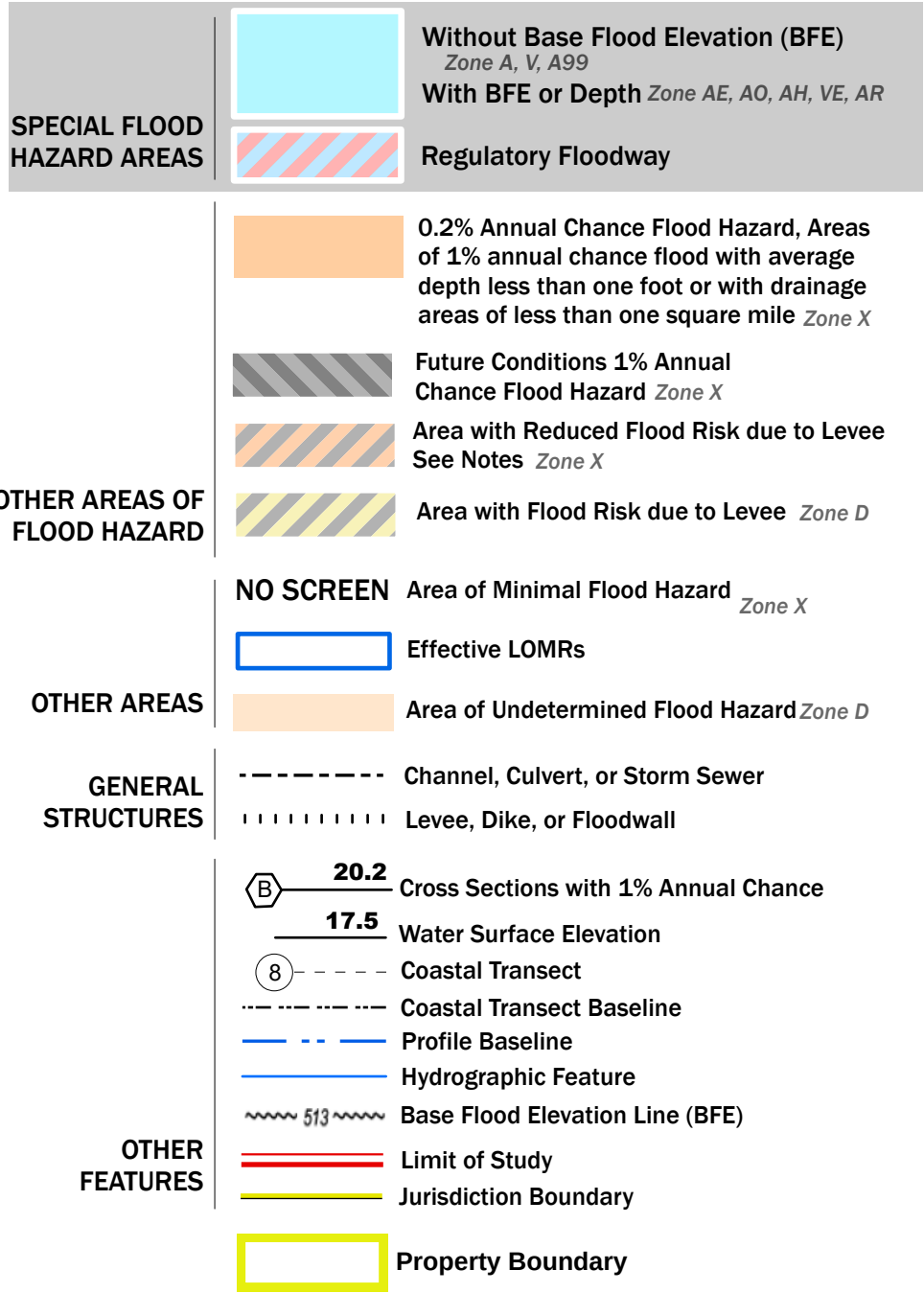
David Womack  
Bedford County, Tennessee





FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR DRAFT FIRM PANEL LAYOUT



NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-6627) or visit the FEMA Flood Map Service Center website at <https://msc.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to the Flood Insurance Study Report for this jurisdiction.

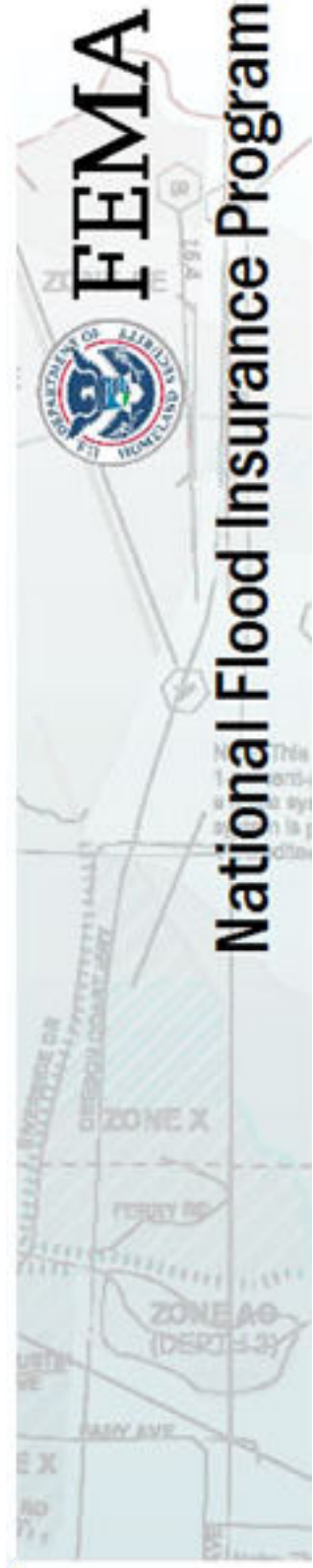
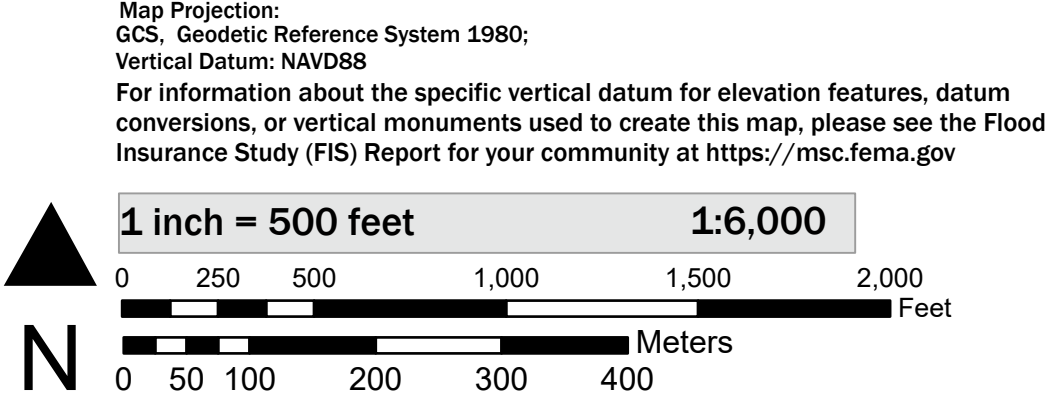
To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Basemap information shown on this FIRM was provided in digital format by the United States Geological Survey (USGS). The basemap shown is the USGS National Map: Orthoimagery. Last refreshed October, 2020.

This map was exported from FEMA's National Flood Hazard Layer (NFHL) on **5/31/2023 12:25 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time. For additional information, please see the Flood Hazard Mapping Updates Overview Fact Sheet at <https://www.fema.gov/media-library/assets/documents/118418>

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards. This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date.

SCALE



NATIONAL FLOOD INSURANCE PROGRAM  
FLOOD INSURANCE RATE MAP

PANEL 282 OF 375

|                     |        |       |
|---------------------|--------|-------|
| Panel Contains:     |        |       |
| COMMUNITY           | NUMBER | PANEL |
| CITY OF SHELBYVILLE | 470008 | 0282  |
| BEDFORD COUNTY      | 470006 | 0282  |



**Appendix C**  
**Residual Analytical Data**

Updated July 25, 2023  
2023 Material List and Analytics  
Requested Fecal Results

**Materials to be Land Applied**

| <b>Facility Name</b>                 | <b>Residual Type</b>                    | <b>Processed Material</b>          |
|--------------------------------------|-----------------------------------------|------------------------------------|
| Agrana Fruit US Inc                  | DAF - Food Processing                   | Fruit                              |
| Bio-Vac                              | Restaurant Wastewater                   | Restaurant Rinse Water             |
| Byrons Authentic BBQ - Rich Products | DAF - Food Processing                   | Bakery Goods                       |
| Custom Foods                         | DAF - Food Processing                   | Soup                               |
| DarPro Solutions                     | DAF - Animal Processing                 | Poultry                            |
| Equity Group - Cagle's Food          | DAF - Animal Processing                 | Poultry                            |
| Flowers Bakery                       | DAF - Food Processing                   | Bakery Goods                       |
| General Mills                        | DAF - Food Processing                   | Milk                               |
| Heritage Farms Dairy                 | DAF - Food Processing                   | Milk                               |
| Liquid Environmental Solutions       | Restaurant Wastewater                   | Restaurant Rinse Water             |
| Marzetti Horse Cave                  | DAF - Food Processing (Cake & Sludge)   | Dressing                           |
| Sonocco Kerry - Mizkan Americas      | DAF - Food Processing                   | Mustard                            |
| M&M Mars Northstar Recycling         | DAF - Food Processing                   | Candy                              |
| Perdue Farms                         | DAF - Animal Processing (Cake & Sludge) | Poultry                            |
| Pilgrims Pride                       | DAF - Animal Processing                 | Poultry                            |
| Rich Products #1 - Morristown        | DAF - Food Processing                   | Bakery Goods                       |
| Rich Products #2 - Morristown        | DAF - Food Processing                   | Bakery Goods                       |
| Rich Products - Murfreesboro         | DAF - Food Processing                   | Bakery Goods                       |
| Supreme Oil                          | DAF - Food Processing                   | Bakery Goods                       |
| Tyson Shelbyville, TN                | Digested Lagoon Residuals               | Poultry, Digested Sludge Residuals |
| Tyson Goodletsville, TN              | DAF - Animal Processing                 | Pork, Poultry                      |
| Tyson Robard, KY                     | DAF - Animal Processing (Sludge)        | Poultry                            |
| Campos Food - Gold Creek             | DAF - Animal Processing                 | Poultry                            |



# Loading Rate Tabulation

Environmental



Facility: Agrana Fruit US Inc - Centerville, TN

Analysis Date: 5/2/2023

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 23-123-0218

Internal ID: 7073

PAN:  $20\% \times (\text{TKN} - \text{Ammonia}) + 100\% \times \text{Ammonia} + \text{NO}_3 + \text{NO}_2$

| Parameter         | Concentration (mg/kg) |          | Limits     |
|-------------------|-----------------------|----------|------------|
|                   | dry                   | wet      |            |
| PAN               | 2089.00               | 288.2820 |            |
| Ammonia           | 725.00                | 100.0500 |            |
| TKN               | 6820.00               | 941.1600 |            |
| Nitrates/Nitrites | 145.00                | 20.0100  |            |
| Organic N         | 6095.00               | 841.1100 |            |
| Arsenic           | 3.62                  | 0.4996   | 75 mg/kg   |
| Cadmium           | 0.73                  | 0.1001   | 85 mg/kg   |
| Chromium          | 1.81                  | 0.2498   | 3000 mg/kg |
| Copper            | 5.69                  | 0.7852   | 4300 mg/kg |
| Lead              | 2.17                  | 0.2995   | 840 mg/kg  |
| Mercury           | 1.32                  | 0.1822   | 57 mg/kg   |
| Molybdenum        | 1.81                  | 0.2498   | 75 mg/kg   |
| Nickel            | 1.81                  | 0.2498   | 420 mg/kg  |
| Phosphorus        | 1980.00               | 273.2400 |            |
| Potassium         | 3350.00               | 462.3000 |            |
| Selenium          | 3.62                  | 0.4996   | 100 mg/kg  |
| Zinc              | 11.40                 | 1.5732   | 7500 mg/kg |
| Iron              |                       |          |            |
| Sodium            | 2410.00               | 332.5800 |            |
| Barium            |                       |          |            |
| Silver            |                       |          |            |
| Calcium           | 3240.00               | 447.1200 |            |
| Magnesium         | 338.00                | 46.6440  |            |
| Manganese         | 30.60                 | 4.2228   |            |
| Chloride          | 1200.00               | 165.6000 |            |
| Sulfur            | 1780.00               | 245.6400 |            |
| Oil & Grease      |                       | 2        |            |
| BOD               |                       |          |            |
| pcb               |                       |          |            |
| Fecal Coliform    |                       |          |            |
| TCLP              |                       |          |            |
| ph                | 3.00                  |          |            |
| % solidsS         | 13.80                 |          |            |
| % Vol Solids      | 96.40                 |          |            |
| % Moisture        | 86.20                 |          |            |
| lbs/gallon        | 7.50                  |          |            |
| dry tons/load     | 3.11                  |          |            |

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 12.9727

Phospate (P2O5): 28.1600

Potash (K2O): 24.9600

SP:

Max. Allowable App Rate at:

| Crop            | PAN | App Rate |
|-----------------|-----|----------|
| Corn            | 150 | 69,231   |
| Bermuda Pasture | 240 | 110,769  |
| Soybeans        | 60  | 27,692   |
| Wheat           | 75  | 34,615   |

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/17/2023  
Received : 05/03/2023

Report Number : **23-123-0218**

## REPORT OF ANALYSIS

Lab No : **86948**

Sample ID : **Agrana Fruit US Inc, Centerville, TN (AGRFRUI)**

Matrix: **Solids**

Sampled: **5/2/2023 8:00**

| Test                              | Results        | Units       | MQL    | DF | Date / Time Analyzed | By  | Analytical Method |
|-----------------------------------|----------------|-------------|--------|----|----------------------|-----|-------------------|
| Organic Matter                    | <b>97.1</b>    | %           | 0.100  | 1  | 05/16/23 11:00       | VVP | ASTM D2974        |
| Neutralizing Value (%CCE)         | <b>2.1</b>     | %           | 0.1    | 1  | 05/07/23 11:45       | DXT | AOAC 955.01       |
| Moisture                          | <b>86.2</b>    | %           |        | 1  | 05/09/23 16:45       | JLS | SW-DRYWT          |
| Ammonia Nitrogen                  | <725           | mg/Kg - dry | 725    | 1  | 05/09/23 13:00       | JPJ | 4500NH3C-2011     |
| Biochemical Oxygen Demand (5-day) | <b>1060000</b> | mg/Kg - dry | 435000 | 1  | 05/04/23 08:15       | JJZ | 5210B-2016        |
| Chloride                          | <b>1200</b>    | mg/Kg - dry | 290    | 10 | 05/09/23 21:13       | SRJ | 9056A             |
| Conductivity                      | <b>667</b>     | µS/cm       |        | 1  | 05/12/23 15:57       | CMF | 2510B-2011        |
| Nitrate (NO3-N)                   | <72.5          | mg/Kg - dry | 72.5   | 10 | 05/09/23 21:13       | SRJ | 9056A             |
| Nitrite (NO2-N)                   | <72.5          | mg/Kg - dry | 72.5   | 10 | 05/09/23 21:13       | SRJ | 9056A             |
| Nitrate+Nitrite-N                 | <72.5          | mg/Kg - dry | 72.5   | 10 | 05/09/23 21:13       |     | 9056A             |
| HEM: Oil and Grease               | <b>21400</b>   | mg/Kg - dry | 1830   | 1  | 05/10/23 12:09       | SMS | SW-9071B          |
| pH                                | <b>3.0</b>     | s.u.        |        | 1  | 05/11/23 15:30       | CNB | 9045D             |
| Total Solids                      | <b>13.8</b>    | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Volatile Solids             | <b>96.4</b>    | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Kjeldahl Nitrogen           | <b>6820</b>    | mg/Kg - dry | 1640   | 1  | 05/05/23 13:16       | ANH | 4500NORGD-2011    |
| Phosphorus                        | <b>1980</b>    | mg/Kg - dry | 36.2   | 1  | 05/06/23 04:12       | BKN | 6010D             |
| Arsenic                           | <3.62          | mg/Kg - dry | 3.62   | 1  | 05/06/23 04:12       | BKN | 6010D             |
| Boron                             | <18.1          | mg/Kg - dry | 18.1   | 1  | 05/06/23 04:12       | BKN | 6010D             |
| Cadmium                           | <0.725         | mg/Kg - dry | 0.725  | 1  | 05/06/23 04:12       | BKN | 6010D             |
| Calcium                           | <b>3240</b>    | mg/Kg - dry | 362    | 1  | 05/06/23 04:12       | BKN | 6010D             |
| Chromium                          | <1.81          | mg/Kg - dry | 1.81   | 1  | 05/06/23 04:12       | BKN | 6010D             |
| Copper                            | <b>5.69</b>    | mg/Kg - dry | 3.62   | 1  | 05/06/23 04:12       | BKN | 6010D             |
| Lead                              | <2.17          | mg/Kg - dry | 2.17   | 1  | 05/06/23 04:12       | BKN | 6010D             |

### Qualifiers/ Definitions

DF

Dilution Factor

MQL

Method Quantitation Limit



20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/17/2023  
Received : 05/03/2023

Report Number : **23-123-0218**

## REPORT OF ANALYSIS

Lab No : **86948**

Matrix: **Solids**

Sample ID : **Agrana Fruit US Inc, Centerville, TN (AGRFRUI)**

Sampled: **5/2/2023 8:00**

| Test       | Results     | Units       | MQL  | DF | Date / Time Analyzed | By  | Analytical Method |
|------------|-------------|-------------|------|----|----------------------|-----|-------------------|
| Magnesium  | <b>338</b>  | mg/Kg - dry | 36.2 | 1  | 05/06/23 04:12       | BKN | 6010D             |
| Manganese  | <b>30.6</b> | mg/Kg - dry | 3.62 | 1  | 05/06/23 04:12       | BKN | 6010D             |
| Mercury    | <1.32       | mg/Kg - dry | 1.32 | 1  | 05/10/23 12:24       | FDS | 7471A             |
| Molybdenum | <1.81       | mg/Kg - dry | 1.81 | 1  | 05/06/23 04:12       | BKN | 6010D             |
| Nickel     | <1.81       | mg/Kg - dry | 1.81 | 1  | 05/06/23 04:12       | BKN | 6010D             |
| Potassium  | <b>3350</b> | mg/Kg - dry | 72.5 | 1  | 05/06/23 04:12       | BKN | 6010D             |
| Selenium   | <3.62       | mg/Kg - dry | 3.62 | 1  | 05/06/23 04:12       | BKN | 6010D             |
| Sodium     | <b>2410</b> | mg/Kg - dry | 181  | 1  | 05/06/23 04:12       | BKN | 6010D             |
| Zinc       | <b>11.4</b> | mg/Kg - dry | 9.06 | 1  | 05/06/23 04:12       | BKN | 6010D             |
| Sulfur     | <b>1780</b> | mg/Kg - dry | 72.5 | 1  | 05/06/23 04:12       | BKN | 6010D             |

### Qualifiers/ Definitions

DF

Dilution Factor

MQL

Method Quantitation Limit

# Loading Rate Tabulation

Environmental



Facility: Bio-Vac - Fayetteville, TN

Analysis Date: 6/22/2023

Analysis Note:

**Product:** Land Apply Only !

**State:** TN

**Application Type:** Subsurface

**AIC Control #** 192-2925-1

**Internal ID:** 7210

**PAN:** 20% × (TKN - Ammonia) + 100% × Ammonia + NO3 + NO2

| Parameter         | Concentration (mg/kg) |           | Limits     |
|-------------------|-----------------------|-----------|------------|
|                   | dry                   | wet       |            |
| PAN               | 7324.40               | 1611.3680 |            |
| Ammonia           | 4900.00               | 1078.0000 |            |
| TKN               | 17000.00              | 3740.0000 |            |
| Nitrates/Nitrites | 4.40                  | 0.9680    |            |
| Organic N         | 12100.00              | 2662.0000 |            |
| Arsenic           | 5.00                  | 1.1000    | 75 mg/kg   |
| Cadmium           | 0.40                  | 0.0880    | 85 mg/kg   |
| Chromium          | 3.60                  | 0.7920    | 3000 mg/kg |
| Copper            | 18.00                 | 3.9600    | 4300 mg/kg |
| Lead              | 4.00                  | 0.8800    | 840 mg/kg  |
| Mercury           | 0.10                  | 0.0213    | 57 mg/kg   |
| Molybdenum        | 1.00                  | 0.2200    | 75 mg/kg   |
| Nickel            | 2.80                  | 0.6160    | 420 mg/kg  |
| Phosphorus        | 2700.00               | 594.0000  |            |
| Potassium         | 1000.00               | 220.0000  |            |
| Selenium          | 7.00                  | 1.5400    | 100 mg/kg  |
| Zinc              | 50.00                 | 11.0000   | 7500 mg/kg |
| Iron              |                       |           |            |
| Sodium            | 5500.00               | 1210.0000 |            |
| Barium            |                       |           |            |
| Silver            |                       |           |            |
| Calcium           | 5000.00               | 1100.0000 |            |
| Magnesium         | 520.00                | 114.4000  |            |
| Manganese         | 16.00                 | 3.5200    |            |
| Chloride          | 2200.00               | 484.0000  |            |
| Sulfur            |                       |           |            |
| Oil & Grease      |                       |           |            |
| BOD               |                       |           |            |
| pcb               |                       |           |            |
| Fecal Coliform    |                       |           |            |
| TCLP              |                       |           |            |
| ph                | 5.20                  |           |            |
| % solidsS         | 22.00                 |           |            |
| % Vol Solids      | 95.00                 |           |            |
| % Moisture        | 78.00                 |           |            |
| lbs/gallon        | 7.50                  |           |            |
| dry tons/load     | 4.95                  |           |            |

Pounds per 6000 gallon(s) load:

**Plant-available nitrogen:** 72.5116

**Phospate (P2O5):** 61.2100

**Potash (K2O):** 11.8800

**SP:**

**Max. Allowable App Rate at:**

| <u>Crop</u>     | <u>PAN</u> | <u>App Rate</u> |
|-----------------|------------|-----------------|
| Corn            | 150        | 12,329          |
| Bermuda Pasture | 240        | 19,726          |
| Soybeans        | 60         | 4,932           |
| Wheat           | 75         | 6,164           |



# Client Sample Results

Client: Denali Water Solutions  
Project/Site: Bio-Vac, Fayetteville, TN

Job ID: 192-2925-1

Client Sample ID: BIOVAC

Date Collected: 06/22/23 15:30

Date Received: 06/23/23 10:38

Lab Sample ID: 192-2925-1

Matrix: Solid

## Method: LA 29B SAR - Sodium Adsorption Ratio

| Analyte                 | Result | Qualifier | RL  | Unit | D | Prepared | Analyzed       | Dil Fac |
|-------------------------|--------|-----------|-----|------|---|----------|----------------|---------|
| Sodium Adsorption Ratio | 20     |           | 1.0 | NONE |   |          | 07/05/23 12:30 | 1       |

## Method: SW846 6010D - Metals (ICP)

| Analyte    | Result | Qualifier | RL   | Unit  | D | Prepared       | Analyzed       | Dil Fac |
|------------|--------|-----------|------|-------|---|----------------|----------------|---------|
| Cadmium    | <0.40  |           | 0.40 | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:22 | 1       |
| Sodium     | 5500   |           | 100  | mg/Kg | ✱ | 06/26/23 10:27 | 07/03/23 15:13 | 1       |
| Potassium  | 1000   |           | 100  | mg/Kg | ✱ | 06/26/23 10:27 | 07/03/23 15:13 | 1       |
| Calcium    | 5000   |           | 100  | mg/Kg | ✱ | 06/26/23 10:27 | 07/05/23 11:55 | 10      |
| Molybdenum | <1.0   |           | 1.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:22 | 1       |
| Sulfur     | 3600   |           | 100  | mg/Kg | ✱ | 06/26/23 10:27 | 07/03/23 15:10 | 10      |
| Nickel     | 2.8    |           | 1.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:22 | 1       |
| Magnesium  | 520    |           | 50   | mg/Kg | ✱ | 06/26/23 10:27 | 07/03/23 18:53 | 10      |
| Arsenic    | <5.0   |           | 5.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:22 | 1       |
| Copper     | 18     |           | 1.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:22 | 1       |
| Boron      | <10    |           | 10   | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:22 | 1       |
| Lead       | <4.0   |           | 4.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:22 | 1       |
| Phosphorus | 2700   |           | 100  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:18 | 10      |
| Zinc       | 50     |           | 1.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:22 | 1       |
| Selenium   | <7.0   |           | 7.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:22 | 1       |
| Manganese  | 16     |           | 0.20 | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:22 | 1       |
| Chromium   | 3.6    |           | 1.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:22 | 1       |

## Method: SW846 7471B - Mercury (CVAA)

| Analyte | Result | Qualifier | RL    | Unit  | D | Prepared       | Analyzed       | Dil Fac |
|---------|--------|-----------|-------|-------|---|----------------|----------------|---------|
| Mercury | <0.097 |           | 0.097 | mg/Kg | ✱ | 07/03/23 09:34 | 07/03/23 15:05 | 1       |

## General Chemistry

| Analyte                                           | Result | Qualifier | RL    | Unit     | D | Prepared | Analyzed       | Dil Fac |
|---------------------------------------------------|--------|-----------|-------|----------|---|----------|----------------|---------|
| Total Volatile Solids (SM 2540G-2015)             | 95     |           | 0.010 | % by Wt  |   |          | 07/07/23 15:41 | 1       |
| pH (SW846 9045D)                                  | 5.2    | HF        | 0.05  | SU       |   |          | 06/23/23 13:13 | 1       |
| Electrical Conductivity (1:1 Ratio) (SW846 9050A) | 6500   |           | 2.0   | umhos/cm |   |          | 06/27/23 14:32 | 1       |
| Limestone Equivalency (AOAC 955.01)               | 4.9    |           | 0.20  | % by Wt  |   |          | 06/30/23 14:59 | 1       |
| HEM (Oil & Grease) (ARDPCE AR OG_TPH)             | 150000 |           | 240   | mg/Kg    |   |          | 06/28/23 18:14 | 1       |
| Percent Moisture (SM Moisture - 2540)             | 78     |           | 0.010 | %        |   |          | 06/27/23 12:10 | 1       |
| Total Solids (SM Moisture - 2540)                 | 22     |           | 0.010 | %        |   |          | 06/27/23 12:10 | 1       |

Client Sample ID: BIOVAC

Date Collected: 06/22/23 15:30

Date Received: 06/23/23 10:38

Lab Sample ID: 192-2925-1

Matrix: Solid

Percent Solids: 22.0

## Method: SW846 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

| Analyte  | Result | Qualifier | RL   | Unit  | D | Prepared       | Analyzed       | Dil Fac |
|----------|--------|-----------|------|-------|---|----------------|----------------|---------|
| PCB-1016 | <0.45  |           | 0.45 | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 15:23 | 1       |
| PCB-1221 | <0.45  |           | 0.45 | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 15:23 | 1       |
| PCB-1232 | <0.45  |           | 0.45 | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 15:23 | 1       |
| PCB-1242 | <0.45  |           | 0.45 | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 15:23 | 1       |
| PCB-1248 | <0.45  |           | 0.45 | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 15:23 | 1       |

Eurofins Arkansas

# Client Sample Results

Client: Denali Water Solutions  
Project/Site: Bio-Vac, Fayetteville, TN

Job ID: 192-2925-1

**Client Sample ID: BIOVAC**

**Date Collected: 06/22/23 15:30**

**Date Received: 06/23/23 10:38**

**Lab Sample ID: 192-2925-1**

**Matrix: Solid**

**Percent Solids: 22.0**

## Method: SW846 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

| Analyte                       | Result    | Qualifier | RL       | Unit  | D | Prepared       | Analyzed       | Dil Fac |
|-------------------------------|-----------|-----------|----------|-------|---|----------------|----------------|---------|
| PCB-1254                      | <0.45     |           | 0.45     | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 15:23 | 1       |
| PCB-1260                      | <0.45     |           | 0.45     | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 15:23 | 1       |
| Surrogate                     | %Recovery | Qualifier | Limits   |       |   | Prepared       | Analyzed       | Dil Fac |
| Tetrachloro-m-xylene          | 89        |           | 47 - 115 |       |   | 06/30/23 14:13 | 07/06/23 15:23 | 1       |
| DCB Decachlorobiphenyl (Surr) | 85        |           | 52 - 122 |       |   | 06/30/23 14:13 | 07/06/23 15:23 | 1       |

## Method: SW846 9056A - Anions, Ion Chromatography

| Analyte      | Result | Qualifier | RL  | Unit  | D | Prepared | Analyzed       | Dil Fac |
|--------------|--------|-----------|-----|-------|---|----------|----------------|---------|
| Chloride     | 2200   |           | 89  | mg/Kg | ✱ |          | 06/27/23 10:58 | 10      |
| Nitrate as N | <2.2   |           | 2.2 | mg/Kg | ✱ |          | 06/24/23 02:09 | 1       |
| Nitrite as N | <2.2   |           | 2.2 | mg/Kg | ✱ |          | 06/24/23 02:09 | 1       |

## General Chemistry

| Analyte                                      | Result   | Qualifier | RL   | Unit  | D | Prepared       | Analyzed       | Dil Fac |
|----------------------------------------------|----------|-----------|------|-------|---|----------------|----------------|---------|
| Ammonia (as N) (SM 4500 NH3 G-2011)          | 4900     |           | 440  | mg/Kg | ✱ | 06/23/23 14:33 | 06/27/23 09:33 | 5       |
| Total Kjeldahl Nitrogen (SM 4500 NorgC-2011) | 17000    |           | 5100 | mg/Kg | ✱ | 06/23/23 16:30 | 06/29/23 09:58 | 25.71   |
| Biochemical Oxygen Demand (SM 5210 B-2016)   | 350000 B |           | 26   | mg/Kg | ✱ |                | 06/23/23 14:14 | 95.5    |



# Loading Rate Tabulation

Environmental



Facility: Byrons Authentic BBQ - Gallatin, TN

Analysis Date: 6/22/2023

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 192-2923-1

Internal ID: 7208

PAN: 20% × (TKN - Ammonia) + 100% × Ammonia + NO3 + NO2

| Parameter         | Concentration (mg/kg) |          | Limits     |
|-------------------|-----------------------|----------|------------|
|                   | dry                   | wet      |            |
| PAN               | 19448.00              | 388.9600 |            |
| Ammonia           | 12000.00              | 240.0000 |            |
| TKN               | 49000.00              | 980.0000 |            |
| Nitrates/Nitrites | 48.00                 | 0.9600   |            |
| Organic N         | 37000.00              | 740.0000 |            |
| Arsenic           | 13.00                 | 0.2600   | 75 mg/kg   |
| Cadmium           | 0.40                  | 0.0080   | 85 mg/kg   |
| Chromium          | 4.60                  | 0.0920   | 3000 mg/kg |
| Copper            | 29.00                 | 0.5800   | 4300 mg/kg |
| Lead              | 4.00                  | 0.0800   | 840 mg/kg  |
| Mercury           | 0.10                  | 0.0020   | 57 mg/kg   |
| Molybdenum        | 1.00                  | 0.0200   | 75 mg/kg   |
| Nickel            | 3.70                  | 0.0740   | 420 mg/kg  |
| Phosphorus        | 18000.00              | 360.0000 |            |
| Potassium         | 8100.00               | 162.0000 |            |
| Selenium          | 7.00                  | 0.1400   | 100 mg/kg  |
| Zinc              | 110.00                | 2.2000   | 7500 mg/kg |
| Iron              |                       |          |            |
| Sodium            | 49000.00              | 980.0000 |            |
| Barium            |                       |          |            |
| Silver            |                       |          |            |
| Calcium           | 6500.00               | 130.0000 |            |
| Magnesium         | 1200.00               | 24.0000  |            |
| Manganese         | 17.00                 | 0.3400   |            |
| Chloride          | 39000.00              | 780.0000 |            |
| Sulfur            |                       |          |            |
| Oil & Grease      |                       | 0        |            |
| BOD               |                       |          |            |
| pcb               |                       |          |            |
| Fecal Coliform    |                       |          |            |
| TCLP              |                       |          |            |
| ph                | 7.10                  |          |            |
| % solidsS         | 2.00                  |          |            |
| % Vol Solids      | 65.00                 |          |            |
| % Moisture        | 98.00                 |          |            |
| lbs/gallon        | 7.50                  |          |            |
| dry tons/load     | 0.45                  |          |            |

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 17.5032

Phospate (P2O5): 37.1000

Potash (K2O): 8.7500

SP:

Max. Allowable App Rate at:

| Crop            | PAN | App Rate |
|-----------------|-----|----------|
| Corn            | 150 | 50,000   |
| Bermuda Pasture | 240 | 80,000   |
| Soybeans        | 60  | 20,000   |
| Wheat           | 75  | 25,000   |

# Client Sample Results

Client: Denali Water Solutions  
Project/Site: Byrons Authentic BBQ, Gallatin, TN

Job ID: 192-2923-1

Client Sample ID: BYRBARB

Lab Sample ID: 192-2923-1

Date Collected: 06/22/23 16:00

Matrix: Solid

Date Received: 06/23/23 10:38

## Method: LA 29B SAR - Sodium Adsorption Ratio

| Analyte                 | Result | Qualifier | RL  | Unit | D | Prepared | Analyzed       | Dil Fac |
|-------------------------|--------|-----------|-----|------|---|----------|----------------|---------|
| Sodium Adsorption Ratio | 150    |           | 1.0 | NONE |   |          | 07/05/23 12:30 | 1       |

## Method: SW846 6010D - Metals (ICP)

| Analyte    | Result | Qualifier | RL   | Unit  | D | Prepared       | Analyzed       | Dil Fac |
|------------|--------|-----------|------|-------|---|----------------|----------------|---------|
| Cadmium    | <0.40  |           | 0.40 | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:53 | 1       |
| Sodium     | 49000  |           | 1000 | mg/Kg | ✱ | 06/26/23 10:27 | 07/03/23 15:24 | 10      |
| Potassium  | 8100   |           | 1000 | mg/Kg | ✱ | 06/26/23 10:27 | 07/03/23 15:24 | 10      |
| Calcium    | 6500   |           | 100  | mg/Kg | ✱ | 06/26/23 10:27 | 07/05/23 11:29 | 10      |
| Molybdenum | <1.0   |           | 1.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:53 | 1       |
| Sulfur     | 2500   |           | 100  | mg/Kg | ✱ | 06/26/23 10:27 | 07/03/23 15:24 | 10      |
| Nickel     | 3.7    |           | 1.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:53 | 1       |
| Magnesium  | 1200   |           | 50   | mg/Kg | ✱ | 06/26/23 10:27 | 07/03/23 19:10 | 10      |
| Arsenic    | 13     |           | 5.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:53 | 1       |
| Copper     | 29     |           | 1.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:53 | 1       |
| Boron      | <10    |           | 10   | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:53 | 1       |
| Lead       | <4.0   |           | 4.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:53 | 1       |
| Phosphorus | 18000  |           | 1000 | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:45 | 100     |
| Zinc       | 110    |           | 10   | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:49 | 10      |
| Selenium   | <7.0   |           | 7.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:53 | 1       |
| Manganese  | 17     |           | 0.20 | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:53 | 1       |
| Chromium   | 4.6    |           | 1.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:53 | 1       |

## Method: SW846 7471B - Mercury (CVAA)

| Analyte | Result | Qualifier | RL   | Unit  | D | Prepared       | Analyzed       | Dil Fac |
|---------|--------|-----------|------|-------|---|----------------|----------------|---------|
| Mercury | <0.10  |           | 0.10 | mg/Kg | ✱ | 07/03/23 09:34 | 07/03/23 15:04 | 1       |

## General Chemistry

| Analyte                                           | Result | Qualifier | RL    | Unit     | D | Prepared | Analyzed       | Dil Fac |
|---------------------------------------------------|--------|-----------|-------|----------|---|----------|----------------|---------|
| Total Volatile Solids (SM 2540G-2015)             | 65     |           | 0.010 | % by Wt  |   |          | 07/07/23 15:41 | 1       |
| pH (SW846 9045D)                                  | 7.1    | HF        | 0.05  | SU       |   |          | 06/23/23 13:13 | 1       |
| Electrical Conductivity (1:1 Ratio) (SW846 9050A) | 7100   |           | 2.0   | umhos/cm |   |          | 06/27/23 14:32 | 1       |
| Limestone Equivalency (AOAC 955.01)               | 3.6    |           | 0.20  | % by Wt  |   |          | 06/30/23 14:59 | 1       |
| HEM (Oil & Grease) (ARDPCE AR OG_TPH)             | 3600   |           | 240   | mg/Kg    |   |          | 06/23/23 14:53 | 1       |
| Percent Moisture (SM Moisture - 2540)             | 98     |           | 0.010 | %        |   |          | 06/27/23 12:10 | 1       |
| Total Solids (SM Moisture - 2540)                 | 2.0    |           | 0.010 | %        |   |          | 06/27/23 12:10 | 1       |

Client Sample ID: BYRBARB

Lab Sample ID: 192-2923-1

Date Collected: 06/22/23 16:00

Matrix: Solid

Date Received: 06/23/23 10:38

Percent Solids: 2.0

## Method: SW846 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

| Analyte  | Result | Qualifier | RL  | Unit  | D | Prepared       | Analyzed       | Dil Fac |
|----------|--------|-----------|-----|-------|---|----------------|----------------|---------|
| PCB-1016 | <4.9   |           | 4.9 | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 14:55 | 1       |
| PCB-1221 | <4.9   |           | 4.9 | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 14:55 | 1       |
| PCB-1232 | <4.9   |           | 4.9 | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 14:55 | 1       |
| PCB-1242 | <4.9   |           | 4.9 | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 14:55 | 1       |
| PCB-1248 | <4.9   |           | 4.9 | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 14:55 | 1       |

Eurofins Arkansas



# Client Sample Results

Client: Denali Water Solutions  
Project/Site: Byrons Authentic BBQ, Gallatin, TN

Job ID: 192-2923-1

**Client Sample ID: BYRBARB**

**Lab Sample ID: 192-2923-1**

Date Collected: 06/22/23 16:00

Matrix: Solid

Date Received: 06/23/23 10:38

Percent Solids: 2.0

## Method: SW846 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

| Analyte                       | Result    | Qualifier | RL       | Unit  | D | Prepared       | Analyzed       | Dil Fac |
|-------------------------------|-----------|-----------|----------|-------|---|----------------|----------------|---------|
| PCB-1254                      | <4.9      |           | 4.9      | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 14:55 | 1       |
| PCB-1260                      | <4.9      |           | 4.9      | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 14:55 | 1       |
| Surrogate                     | %Recovery | Qualifier | Limits   |       |   | Prepared       | Analyzed       | Dil Fac |
| Tetrachloro-m-xylene          | 79        |           | 47 - 115 |       |   | 06/30/23 14:13 | 07/06/23 14:55 | 1       |
| DCB Decachlorobiphenyl (Surr) | 90        |           | 52 - 122 |       |   | 06/30/23 14:13 | 07/06/23 14:55 | 1       |

## Method: SW846 9056A - Anions, Ion Chromatography

| Analyte      | Result | Qualifier | RL  | Unit  | D | Prepared | Analyzed       | Dil Fac |
|--------------|--------|-----------|-----|-------|---|----------|----------------|---------|
| Chloride     | 39000  |           | 960 | mg/Kg | ✱ |          | 06/27/23 10:16 | 10      |
| Nitrate as N | <24    |           | 24  | mg/Kg | ✱ |          | 06/23/23 22:00 | 1       |
| Nitrite as N | <24    |           | 24  | mg/Kg | ✱ |          | 06/23/23 22:00 | 1       |

## General Chemistry

| Analyte                                      | Result  | Qualifier | RL   | Unit  | D | Prepared       | Analyzed       | Dil Fac |
|----------------------------------------------|---------|-----------|------|-------|---|----------------|----------------|---------|
| Ammonia (as N) (SM 4500 NH3 G-2011)          | 12000   |           | 2300 | mg/Kg | ✱ | 06/23/23 14:33 | 06/27/23 09:31 | 5       |
| Total Kjeldahl Nitrogen (SM 4500 NorgC-2011) | 49000   |           | 6200 | mg/Kg | ✱ | 06/23/23 16:30 | 06/29/23 09:23 | 5       |
| Biochemical Oxygen Demand (SM 5210 B-2016)   | 1000000 | B         | 230  | mg/Kg | ✱ |                | 06/23/23 14:08 | 96.4    |

# Loading Rate Tabulation

Environmental



Facility: Custom Foods of America - Knoxville, TN

Analysis Date: 5/2/2023

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 23-123-0219

Internal ID: 7072

PAN: 20% × (TKN - Ammonia) + 100% × Ammonia + NO3 + NO2

| Parameter         | Concentration (mg/kg) |           | Limits     |
|-------------------|-----------------------|-----------|------------|
|                   | dry                   | wet       |            |
| PAN               | 6790.00               | 571.0390  |            |
| Ammonia           | 1190.00               | 100.0790  |            |
| TKN               | 28000.00              | 2354.8000 |            |
| Nitrates/Nitrites | 238.00                | 20.0158   |            |
| Organic N         | 26810.00              | 2254.7210 |            |
| Arsenic           | 5.95                  | 0.5004    | 75 mg/kg   |
| Cadmium           | 1.19                  | 0.1001    | 85 mg/kg   |
| Chromium          | 3.48                  | 0.2927    | 3000 mg/kg |
| Copper            | 18.20                 | 1.5306    | 4300 mg/kg |
| Lead              | 3.57                  | 0.3002    | 840 mg/kg  |
| Mercury           | 2.24                  | 0.1884    | 57 mg/kg   |
| Molybdenum        | 2.98                  | 0.2506    | 75 mg/kg   |
| Nickel            | 2.98                  | 0.2506    | 420 mg/kg  |
| Phosphorus        | 8010.00               | 673.6410  |            |
| Potassium         | 1300.00               | 109.3300  |            |
| Selenium          | 5.95                  | 0.5004    | 100 mg/kg  |
| Zinc              | 72.10                 | 6.0636    | 7500 mg/kg |
| Iron              |                       |           |            |
| Sodium            | 2850.00               | 239.6850  |            |
| Barium            |                       |           |            |
| Silver            |                       |           |            |
| Calcium           | 3650.00               | 306.9650  |            |
| Magnesium         | 417.00                | 35.0697   |            |
| Manganese         | 8.89                  | 0.7476    |            |
| Chloride          | 2870.00               | 241.3670  |            |
| Sulfur            | 2420.00               | 203.5220  |            |
| Oil & Grease      |                       | 0         |            |
| BOD               |                       |           |            |
| pcb               |                       |           |            |
| Fecal Coliform    |                       |           |            |
| TCLP              |                       |           |            |
| ph                | 3.10                  |           |            |
| % solidsS         | 8.41                  |           |            |
| % Vol Solids      | 93.60                 |           |            |
| % Moisture        | 91.60                 |           |            |
| lbs/gallon        | 7.50                  |           |            |
| dry tons/load     | 1.89                  |           |            |

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 25.6968

Phospate (P2O5): 69.4200

Potash (K2O): 5.9000

SP:

Max. Allowable App Rate at:

| Crop            | PAN | App Rate |
|-----------------|-----|----------|
| Corn            | 150 | 34,615   |
| Bermuda Pasture | 240 | 55,385   |
| Soybeans        | 60  | 13,846   |
| Wheat           | 75  | 17,308   |



20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/17/2023  
Received : 05/03/2023

Report Number : **23-123-0219**

**REPORT OF ANALYSIS**

Lab No : **86950**

Matrix: **Solids**

Sample ID : **Custom Foods, Knoxville, TN (CUSFOOD)**

Sampled: **5/2/2023 8:45**

| Test                              | Results       | Units       | MQL    | DF | Date / Time Analyzed | By  | Analytical Method |
|-----------------------------------|---------------|-------------|--------|----|----------------------|-----|-------------------|
| Organic Matter                    | <b>94.4</b>   | %           | 0.100  | 1  | 05/16/23 11:00       | VVP | ASTM D2974        |
| Neutralizing Value (%CCE)         | <b>2.9</b>    | %           | 0.1    | 1  | 05/07/23 11:45       | DXT | AOAC 955.01       |
| Moisture                          | <b>91.6</b>   | %           |        | 1  | 05/09/23 16:45       | JLS | SW-DRYWT          |
| Ammonia Nitrogen                  | <1190         | mg/Kg - dry | 1190   | 1  | 05/09/23 13:00       | JPJ | 4500NH3C-2011     |
| Biochemical Oxygen Demand (5-day) | <b>857000</b> | mg/Kg - dry | 357000 | 1  | 05/04/23 08:15       | JJZ | 5210B-2016        |
| Chloride                          | <b>2870</b>   | mg/Kg - dry | 476    | 10 | 05/09/23 21:39       | SRJ | 9056A             |
| Conductivity                      | <b>501</b>    | µS/cm       |        | 1  | 05/12/23 15:57       | CMF | 2510B-2011        |
| Nitrate (NO3-N)                   | <119          | mg/Kg - dry | 119    | 10 | 05/09/23 21:39       | SRJ | 9056A             |
| Nitrite (NO2-N)                   | <119          | mg/Kg - dry | 119    | 10 | 05/09/23 21:39       | SRJ | 9056A             |
| Nitrate+Nitrite-N                 | <119          | mg/Kg - dry | 119    | 10 | 05/09/23 21:39       |     | 9056A             |
| HEM: Oil and Grease               | <3460         | mg/Kg - dry | 3460   | 1  | 05/10/23 12:09       | SMS | SW-9071B          |
| pH                                | <b>3.1</b>    | s.u.        |        | 1  | 05/11/23 15:30       | CNB | 9045D             |
| Total Solids                      | <b>8.41</b>   | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Volatile Solids             | <b>93.6</b>   | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Kjeldahl Nitrogen           | <b>28000</b>  | mg/Kg - dry | 1940   | 1  | 05/05/23 13:17       | ANH | 4500NORGD-2011    |
| Phosphorus                        | <b>8010</b>   | mg/Kg - dry | 59.5   | 1  | 05/06/23 04:17       | BKN | 6010D             |
| Arsenic                           | <5.95         | mg/Kg - dry | 5.95   | 1  | 05/06/23 04:17       | BKN | 6010D             |
| Boron                             | <29.8         | mg/Kg - dry | 29.8   | 1  | 05/06/23 04:17       | BKN | 6010D             |
| Cadmium                           | <1.19         | mg/Kg - dry | 1.19   | 1  | 05/06/23 04:17       | BKN | 6010D             |
| Calcium                           | <b>3650</b>   | mg/Kg - dry | 595    | 1  | 05/06/23 04:17       | BKN | 6010D             |
| Chromium                          | <b>3.48</b>   | mg/Kg - dry | 2.98   | 1  | 05/06/23 04:17       | BKN | 6010D             |
| Copper                            | <b>18.2</b>   | mg/Kg - dry | 5.95   | 1  | 05/06/23 04:17       | BKN | 6010D             |
| Lead                              | <3.57         | mg/Kg - dry | 3.57   | 1  | 05/06/23 04:17       | BKN | 6010D             |

**Qualifiers/  
Definitions**

DF

Dilution Factor

MQL

Method Quantitation Limit

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/17/2023  
Received : 05/03/2023

Report Number : **23-123-0219**

## REPORT OF ANALYSIS

Lab No : **86950**

Matrix: **Solids**

Sample ID : **Custom Foods, Knoxville, TN (CUSFOOD)**

Sampled: **5/2/2023 8:45**

| Test       | Results     | Units       | MQL  | DF | Date / Time Analyzed | By  | Analytical Method |
|------------|-------------|-------------|------|----|----------------------|-----|-------------------|
| Magnesium  | <b>417</b>  | mg/Kg - dry | 59.5 | 1  | 05/06/23 04:17       | BKN | 6010D             |
| Manganese  | <b>8.89</b> | mg/Kg - dry | 5.95 | 1  | 05/06/23 04:17       | BKN | 6010D             |
| Mercury    | <2.24       | mg/Kg - dry | 2.24 | 1  | 05/10/23 12:25       | FDS | 7471A             |
| Molybdenum | <2.98       | mg/Kg - dry | 2.98 | 1  | 05/06/23 04:17       | BKN | 6010D             |
| Nickel     | <2.98       | mg/Kg - dry | 2.98 | 1  | 05/06/23 04:17       | BKN | 6010D             |
| Potassium  | <b>1300</b> | mg/Kg - dry | 119  | 1  | 05/06/23 04:17       | BKN | 6010D             |
| Selenium   | <5.95       | mg/Kg - dry | 5.95 | 1  | 05/06/23 04:17       | BKN | 6010D             |
| Sodium     | <b>2850</b> | mg/Kg - dry | 298  | 1  | 05/06/23 04:17       | BKN | 6010D             |
| Zinc       | <b>72.1</b> | mg/Kg - dry | 14.9 | 1  | 05/06/23 04:17       | BKN | 6010D             |
| Sulfur     | <b>2420</b> | mg/Kg - dry | 119  | 1  | 05/06/23 04:17       | BKN | 6010D             |

### Qualifiers/ Definitions

DF

Dilution Factor

MQL

Method Quantitation Limit

# Loading Rate Tabulation

Environmental



Facility: DarPro Solutions - Russellville, KY

Analysis Date: 5/2/2023

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 23-123-0240

Internal ID: 7070

PAN:  $20\% \times (\text{TKN} - \text{Ammonia}) + 100\% \times \text{Ammonia} + \text{NO}_3 + \text{NO}_2$

| Parameter         | Concentration (mg/kg) |           | Limits     |
|-------------------|-----------------------|-----------|------------|
|                   | dry                   | wet       |            |
| PAN               | 19080.00              | 711.6840  |            |
| Ammonia           | 15200.00              | 566.9600  |            |
| TKN               | 31900.00              | 1189.8700 |            |
| Nitrates/Nitrites | 540.00                | 20.1420   |            |
| Organic N         | 16700.00              | 622.9100  |            |
| Arsenic           | 13.50                 | 0.5036    | 75 mg/kg   |
| Cadmium           | 2.70                  | 0.1007    | 85 mg/kg   |
| Chromium          | 21.60                 | 0.8057    | 3000 mg/kg |
| Copper            | 71.10                 | 2.6520    | 4300 mg/kg |
| Lead              | 8.11                  | 0.3025    | 840 mg/kg  |
| Mercury           | 4.70                  | 0.1753    | 57 mg/kg   |
| Molybdenum        | 9.89                  | 0.3689    | 75 mg/kg   |
| Nickel            | 28.60                 | 1.0668    | 420 mg/kg  |
| Phosphorus        | 8890.00               | 331.5970  |            |
| Potassium         | 4920.00               | 183.5160  |            |
| Selenium          | 13.50                 | 0.5036    | 100 mg/kg  |
| Zinc              | 289.00                | 10.7797   | 7500 mg/kg |
| Iron              |                       |           |            |
| Sodium            | 39700.00              | 1480.8100 |            |
| Barium            |                       |           |            |
| Silver            |                       |           |            |
| Calcium           | 26600.00              | 992.1800  |            |
| Magnesium         | 6300.00               | 234.9900  |            |
| Manganese         | 122.00                | 4.5506    |            |
| Chloride          | 5540.00               | 206.6420  |            |
| Sulfur            | 19500.00              | 727.3500  |            |
| Oil & Grease      |                       | 44        |            |
| BOD               |                       |           |            |
| pcb               |                       |           |            |
| Fecal Coliform    |                       |           |            |
| TCLP              |                       |           |            |
| ph                | 7.60                  |           |            |
| % solids          | 3.73                  |           |            |
| % Vol Solids      | 82.00                 |           |            |
| % Moisture        | 96.30                 |           |            |
| lbs/gallon        | 7.50                  |           |            |
| dry tons/load     | 0.84                  |           |            |

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 32.0258

Phosphate (P2O5): 34.1700

Potash (K2O): 9.9100

SP:

Max. Allowable App Rate at:

| Crop            | PAN | App Rate |
|-----------------|-----|----------|
| Corn            | 150 | 28,125   |
| Bermuda Pasture | 240 | 45,000   |
| Soybeans        | 60  | 11,250   |
| Wheat           | 75  | 14,063   |



20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/17/2023  
Received : 05/03/2023

Report Number : **23-123-0240**

**REPORT OF ANALYSIS**

Lab No : **86951**

Sample ID : **DarPro Solutions, Russellville, KY (DARPRUS)**

Matrix: **Solids**

Sampled: **5/2/2023 9:00**

| Test                              | Results       | Units       | MQL    | DF | Date / Time Analyzed | By  | Analytical Method |
|-----------------------------------|---------------|-------------|--------|----|----------------------|-----|-------------------|
| Organic Matter                    | <b>65.3</b>   | %           | 0.100  | 1  | 05/16/23 11:00       | VVP | ASTM D2974        |
| Neutralizing Value (%CCE)         | <b>5.6</b>    | %           | 0.1    | 1  | 05/08/23 16:45       | DXT | AOAC 955.01       |
| Moisture                          | <b>96.3</b>   | %           |        | 1  | 05/09/23 16:45       | JLS | SW-DRYWT          |
| Ammonia Nitrogen                  | <b>15200</b>  | mg/Kg - dry | 2700   | 1  | 05/09/23 13:00       | JPJ | 4500NH3C-2011     |
| Biochemical Oxygen Demand (5-day) | <b>641000</b> | mg/Kg - dry | 162000 | 1  | 05/04/23 08:15       | JJZ | 5210B-2016        |
| Chloride                          | <b>5540</b>   | mg/Kg - dry | 1080   | 10 | 05/09/23 22:05       | SRJ | 9056A             |
| Conductivity                      | <b>1150</b>   | µS/cm       |        | 1  | 05/12/23 15:57       | CMF | 2510B-2011        |
| Nitrate (NO3-N)                   | <270          | mg/Kg - dry | 270    | 10 | 05/09/23 22:05       | SRJ | 9056A             |
| Nitrite (NO2-N)                   | <270          | mg/Kg - dry | 270    | 10 | 05/09/23 22:05       | SRJ | 9056A             |
| Nitrate+Nitrite-N                 | <270          | mg/Kg - dry | 270    | 10 | 05/09/23 22:05       |     | 9056A             |
| HEM: Oil and Grease               | <b>443000</b> | mg/Kg - dry | 8050   | 1  | 05/10/23 12:09       | SMS | SW-9071B          |
| pH                                | <b>7.6</b>    | s.u.        |        | 1  | 05/11/23 15:30       | CNB | 9045D             |
| Total Solids                      | <b>3.73</b>   | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Volatile Solids             | <b>82.0</b>   | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Kjeldahl Nitrogen           | <b>31900</b>  | mg/Kg - dry | 5000   | 1  | 05/05/23 13:18       | ANH | 4500NORGD-2011    |
| Phosphorus                        | <b>8890</b>   | mg/Kg - dry | 135    | 1  | 05/06/23 04:23       | BKN | 6010D             |
| Arsenic                           | <13.5         | mg/Kg - dry | 13.5   | 1  | 05/06/23 04:23       | BKN | 6010D             |
| Boron                             | <67.6         | mg/Kg - dry | 67.6   | 1  | 05/06/23 04:23       | BKN | 6010D             |
| Cadmium                           | <2.70         | mg/Kg - dry | 2.70   | 1  | 05/06/23 04:23       | BKN | 6010D             |
| Calcium                           | <b>26600</b>  | mg/Kg - dry | 1350   | 1  | 05/06/23 04:23       | BKN | 6010D             |
| Chromium                          | <b>21.6</b>   | mg/Kg - dry | 6.76   | 1  | 05/06/23 04:23       | BKN | 6010D             |
| Copper                            | <b>71.1</b>   | mg/Kg - dry | 13.5   | 1  | 05/06/23 04:23       | BKN | 6010D             |
| Lead                              | <8.11         | mg/Kg - dry | 8.11   | 1  | 05/06/23 04:23       | BKN | 6010D             |

**Qualifiers/  
Definitions**

DF

Dilution Factor

MQL

Method Quantitation Limit

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/17/2023  
Received : 05/03/2023

Report Number : **23-123-0240**

## REPORT OF ANALYSIS

Lab No : **86951**

Matrix: **Solids**

Sample ID : **DarPro Solutions, Russellville, KY (DARPRUS)**

Sampled: **5/2/2023 9:00**

| Test       | Results      | Units       | MQL  | DF | Date / Time Analyzed | By  | Analytical Method |
|------------|--------------|-------------|------|----|----------------------|-----|-------------------|
| Magnesium  | <b>6300</b>  | mg/Kg - dry | 135  | 1  | 05/06/23 04:23       | BKN | 6010D             |
| Manganese  | <b>122</b>   | mg/Kg - dry | 13.5 | 1  | 05/06/23 04:23       | BKN | 6010D             |
| Mercury    | <4.70        | mg/Kg - dry | 4.70 | 1  | 05/10/23 12:27       | FDS | 7471A             |
| Molybdenum | <b>9.89</b>  | mg/Kg - dry | 6.76 | 1  | 05/06/23 04:23       | BKN | 6010D             |
| Nickel     | <b>28.6</b>  | mg/Kg - dry | 6.76 | 1  | 05/06/23 04:23       | BKN | 6010D             |
| Potassium  | <b>4920</b>  | mg/Kg - dry | 270  | 1  | 05/06/23 04:23       | BKN | 6010D             |
| Selenium   | <13.5        | mg/Kg - dry | 13.5 | 1  | 05/06/23 04:23       | BKN | 6010D             |
| Sodium     | <b>39700</b> | mg/Kg - dry | 676  | 1  | 05/06/23 04:23       | BKN | 6010D             |
| Zinc       | <b>289</b>   | mg/Kg - dry | 33.8 | 1  | 05/06/23 04:23       | BKN | 6010D             |
| Sulfur     | <b>19500</b> | mg/Kg - dry | 270  | 1  | 05/06/23 04:23       | BKN | 6010D             |

### Qualifiers/ Definitions

DF

Dilution Factor

MQL

Method Quantitation Limit

# Loading Rate Tabulation

Environmental



Facility: Equity Group - Franklin, KY

Analysis Date: 5/2/2023

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 23-123-0253

Internal ID: 7086

PAN:  $20\% \times (\text{TKN} - \text{Ammonia}) + 100\% \times \text{Ammonia} + \text{NO}_3 + \text{NO}_2$

| Parameter         | Concentration (mg/kg) |           | Limits     |
|-------------------|-----------------------|-----------|------------|
|                   | dry                   | wet       |            |
| PAN               | 14562.00              | 1980.4320 |            |
| Ammonia           | 6040.00               | 821.4400  |            |
| TKN               | 41300.00              | 5616.8000 |            |
| Nitrates/Nitrites | 1470.00               | 199.9200  |            |
| Organic N         | 35260.00              | 4795.3600 |            |
| Arsenic           | 3.68                  | 0.5005    | 75 mg/kg   |
| Cadmium           | 0.74                  | 0.1000    | 85 mg/kg   |
| Chromium          | 9.19                  | 1.2498    | 3000 mg/kg |
| Copper            | 15.60                 | 2.1216    | 4300 mg/kg |
| Lead              | 2.21                  | 0.3006    | 840 mg/kg  |
| Mercury           | 1.25                  | 0.1700    | 57 mg/kg   |
| Molybdenum        | 1.84                  | 0.2502    | 75 mg/kg   |
| Nickel            | 2.38                  | 0.3237    | 420 mg/kg  |
| Phosphorus        | 5190.00               | 705.8400  |            |
| Potassium         | 713.00                | 96.9680   |            |
| Selenium          | 3.68                  | 0.5005    | 100 mg/kg  |
| Zinc              | 62.60                 | 8.5136    | 7500 mg/kg |
| Iron              |                       |           |            |
| Sodium            | 897.00                | 121.9920  |            |
| Barium            |                       |           |            |
| Silver            |                       |           |            |
| Calcium           | 1650.00               | 224.4000  |            |
| Magnesium         | 332.00                | 45.1520   |            |
| Manganese         | 24.60                 | 3.3456    |            |
| Chloride          | 2940.00               | 399.8400  |            |
| Sulfur            | 3600.00               | 489.6000  |            |
| Oil & Grease      |                       | 0         |            |
| BOD               |                       |           |            |
| pcb               |                       |           |            |
| Fecal Coliform    |                       |           |            |
| TCLP              |                       |           |            |
| ph                | 6.10                  |           |            |
| % solidsS         | 13.60                 |           |            |
| % Vol Solids      | 96.40                 |           |            |
| % Moisture        | 86.40                 |           |            |
| lbs/gallon        | 7.50                  |           |            |
| dry tons/load     | 3.06                  |           |            |

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 89.1194

Phospate (P2O5): 72.7400

Potash (K2O): 5.2400

SP:

Max. Allowable App Rate at:

| Crop            | PAN | App Rate |
|-----------------|-----|----------|
| Corn            | 150 | 10,112   |
| Bermuda Pasture | 240 | 16,180   |
| Soybeans        | 60  | 4,045    |
| Wheat           | 75  | 5,056    |



20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/19/2023  
Received : 05/03/2023

Report Number : **23-123-0253**

**REPORT OF ANALYSIS**

Lab No : **86989**

Sample ID : **Equity Group, Franklin, KY (EQUALBA)**

Matrix: **Solids**

Sampled: **5/2/2023 9:30**

| Test                              | Results        | Units       | MQL    | DF  | Date / Time Analyzed | By  | Analytical Method |
|-----------------------------------|----------------|-------------|--------|-----|----------------------|-----|-------------------|
| Organic Matter                    | <b>95.5</b>    | %           | 0.100  | 1   | 05/16/23 11:00       | VVP | ASTM D2974        |
| Neutralizing Value (%CCE)         | <b>3.4</b>     | %           | 0.1    | 1   | 05/11/23 14:53       | DXT | AOAC 955.01       |
| Moisture                          | <b>86.4</b>    | %           |        | 1   | 05/09/23 16:45       | JLS | SW-DRYWT          |
| Ammonia Nitrogen                  | <b>6040</b>    | mg/Kg - dry | 735    | 1   | 05/09/23 14:45       | JPJ | 4500NH3C-2011     |
| Biochemical Oxygen Demand (5-day) | <b>1290000</b> | mg/Kg - dry | 221000 | 1   | 05/04/23 08:15       | JJZ | 5210B-2016        |
| Chloride                          | <2940          | mg/Kg - dry | 2940   | 100 | 05/10/23 21:09       | SRJ | 9056A             |
| Conductivity                      | <b>1210</b>    | µS/cm       |        | 1   | 05/12/23 15:50       | CMF | 2510B-2011        |
| Nitrate (NO3-N)                   | <735           | mg/Kg - dry | 735    | 100 | 05/10/23 21:09       | SRJ | 9056A             |
| Nitrite (NO2-N)                   | <735           | mg/Kg - dry | 735    | 100 | 05/10/23 21:09       | SRJ | 9056A             |
| Nitrate+Nitrite-N                 | <735           | mg/Kg - dry | 735    | 100 | 05/10/23 21:09       |     | 9056A             |
| HEM: Oil and Grease               | <2070          | mg/Kg - dry | 2070   | 1   | 05/15/23 08:15       | DRD | SW-9071B          |
| pH                                | <b>6.1</b>     | s.u.        |        | 1   | 05/11/23 15:30       | CNB | 9045D             |
| Total Solids                      | <b>13.6</b>    | %           | 0.010  | 1   | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Volatile Solids             | <b>96.4</b>    | %           | 0.010  | 1   | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Kjeldahl Nitrogen           | <b>41300</b>   | mg/Kg - dry | 1880   | 1   | 05/08/23 16:15       | ANH | 4500NORGD-2011    |
| Phosphorus                        | <b>5190</b>    | mg/Kg - dry | 36.8   | 1   | 05/11/23 07:17       | BKN | 6010D             |
| Arsenic                           | <3.68          | mg/Kg - dry | 3.68   | 1   | 05/11/23 07:17       | BKN | 6010D             |
| Boron                             | <18.4          | mg/Kg - dry | 18.4   | 1   | 05/11/23 07:17       | BKN | 6010D             |
| Cadmium                           | <0.735         | mg/Kg - dry | 0.735  | 1   | 05/11/23 07:17       | BKN | 6010D             |
| Calcium                           | <b>1650</b>    | mg/Kg - dry | 368    | 1   | 05/11/23 07:17       | BKN | 6010D             |
| Chromium                          | <b>9.19</b>    | mg/Kg - dry | 1.84   | 1   | 05/11/23 07:17       | BKN | 6010D             |
| Copper                            | <b>15.6</b>    | mg/Kg - dry | 3.68   | 1   | 05/11/23 07:17       | BKN | 6010D             |
| Lead                              | <2.21          | mg/Kg - dry | 2.21   | 1   | 05/11/23 07:17       | BKN | 6010D             |

**Qualifiers/  
Definitions**

DF

Dilution Factor

MQL

Method Quantitation Limit

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/19/2023  
Received : 05/03/2023

Report Number : **23-123-0253**

## REPORT OF ANALYSIS

Lab No : **86989**

Matrix: **Solids**

Sample ID : **Equity Group, Franklin, KY (EQUALBA)**

Sampled: **5/2/2023 9:30**

| Test       | Results     | Units       | MQL  | DF | Date / Time Analyzed | By  | Analytical Method |
|------------|-------------|-------------|------|----|----------------------|-----|-------------------|
| Magnesium  | <b>332</b>  | mg/Kg - dry | 36.8 | 1  | 05/11/23 07:17       | BKN | 6010D             |
| Manganese  | <b>24.6</b> | mg/Kg - dry | 3.68 | 1  | 05/11/23 07:17       | BKN | 6010D             |
| Mercury    | <1.25       | mg/Kg - dry | 1.25 | 1  | 05/10/23 13:00       | FDS | 7471A             |
| Molybdenum | <1.84       | mg/Kg - dry | 1.84 | 1  | 05/11/23 07:17       | BKN | 6010D             |
| Nickel     | <b>2.38</b> | mg/Kg - dry | 1.84 | 1  | 05/11/23 07:17       | BKN | 6010D             |
| Potassium  | <b>713</b>  | mg/Kg - dry | 73.5 | 1  | 05/11/23 07:17       | BKN | 6010D             |
| Selenium   | <3.68       | mg/Kg - dry | 3.68 | 1  | 05/11/23 07:17       | BKN | 6010D             |
| Sodium     | <b>897</b>  | mg/Kg - dry | 184  | 1  | 05/11/23 07:17       | BKN | 6010D             |
| Zinc       | <b>62.6</b> | mg/Kg - dry | 9.19 | 1  | 05/11/23 07:17       | BKN | 6010D             |
| Sulfur     | <b>3600</b> | mg/Kg - dry | 73.5 | 1  | 05/11/23 07:17       | BKN | 6010D             |

### Qualifiers/ Definitions

DF

Dilution Factor

MQL

Method Quantitation Limit

Microbiology by Method EPA 1681

| Analyte                   | Result<br>MPN/g | <u>Qualifier</u> | Dilution | Analysis<br>date / time | <u>Batch</u>              |
|---------------------------|-----------------|------------------|----------|-------------------------|---------------------------|
| Fecal Coliform            | <920            |                  | 1        | 09/16/2023 12:21        | <a href="#">WG2132976</a> |
| Fecal Coliform -Geom.Mean | <1050           |                  | 1        | 09/16/2023 12:21        | <a href="#">WG2132976</a> |

Sample Narrative:

L1655899-01 WG2132976: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Microbiology by Method EPA 1681

| Analyte        | Result | Qualifier | Dilution | Analysis<br>date / time | Batch                     |
|----------------|--------|-----------|----------|-------------------------|---------------------------|
| Fecal Coliform | <1020  |           | 1        | 09/16/2023 12:21        | <a href="#">WG2132976</a> |

Sample Narrative:

L1655899-02 WG2132976: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Microbiology by Method EPA 1681

| Analyte        | Result | Qualifier | Dilution | Analysis<br>date / time | Batch                     |
|----------------|--------|-----------|----------|-------------------------|---------------------------|
| Fecal Coliform | <909   |           | 1        | 09/16/2023 12:21        | <a href="#">WG2132976</a> |

Sample Narrative:

L1655899-03 WG2132976: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Microbiology by Method EPA 1681

| Analyte        | Result | Qualifier | Dilution | Analysis<br>date / time | Batch                     |
|----------------|--------|-----------|----------|-------------------------|---------------------------|
| Fecal Coliform | 2240   |           | 1        | 09/16/2023 12:21        | <a href="#">WG2132976</a> |

Sample Narrative:

L1655899-04 WG2132976: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Microbiology by Method EPA 1681

| Analyte        | Result | Qualifier | Dilution | Analysis<br>date / time | Batch                     |
|----------------|--------|-----------|----------|-------------------------|---------------------------|
| Fecal Coliform | <870   |           | 1        | 09/16/2023 12:21        | <a href="#">WG2132976</a> |

Sample Narrative:

L1655899-05 WG2132976: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Microbiology by Method EPA 1681

| Analyte        | Result | Qualifier | Dilution | Analysis<br>date / time | Batch                     |
|----------------|--------|-----------|----------|-------------------------|---------------------------|
| Fecal Coliform | <956   |           | 1        | 09/16/2023 12:21        | <a href="#">WG2132976</a> |

Sample Narrative:

L1655899-06 WG2132976: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Microbiology by Method EPA 1681

| Analyte        | Result | Qualifier | Dilution | Analysis<br>date / time | Batch                     |
|----------------|--------|-----------|----------|-------------------------|---------------------------|
| Fecal Coliform | <887   |           | 1        | 09/16/2023 12:21        | <a href="#">WG2132976</a> |

Sample Narrative:

L1655899-07 WG2132976: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

# Loading Rate Tabulation

Environmental



Facility: Flowers Bakery - Crossville, TN

Analysis Date: 5/5/2023

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 23-125-0187

Internal ID: 7088

PAN:  $20\% \times (\text{TKN} - \text{Ammonia}) + 100\% \times \text{Ammonia} + \text{NO}_3 + \text{NO}_2$

| Parameter         | Concentration (mg/kg) |           | Limits     |
|-------------------|-----------------------|-----------|------------|
|                   | dry                   | wet       |            |
| PAN               | 16176.00              | 404.4000  |            |
| Ammonia           | 5720.00               | 143.0000  |            |
| TKN               | 54000.00              | 1350.0000 |            |
| Nitrates/Nitrites | 800.00                | 20.0000   |            |
| Organic N         | 48280.00              | 1207.0000 |            |
| Arsenic           | 20.00                 | 0.5000    | 75 mg/kg   |
| Cadmium           | 4.00                  | 0.1000    | 85 mg/kg   |
| Chromium          | 12.00                 | 0.3000    | 3000 mg/kg |
| Copper            | 41.20                 | 1.0300    | 4300 mg/kg |
| Lead              | 12.00                 | 0.3000    | 840 mg/kg  |
| Mercury           | 7.40                  | 0.1850    | 57 mg/kg   |
| Molybdenum        | 10.00                 | 0.2500    | 75 mg/kg   |
| Nickel            | 21.90                 | 0.5475    | 420 mg/kg  |
| Phosphorus        | 5280.00               | 132.0000  |            |
| Potassium         | 2190.00               | 54.7500   |            |
| Selenium          | 20.00                 | 0.5000    | 100 mg/kg  |
| Zinc              | 168.00                | 4.2000    | 7500 mg/kg |
| Iron              |                       |           |            |
| Sodium            | 4040.00               | 101.0000  |            |
| Barium            |                       |           |            |
| Silver            |                       |           |            |
| Calcium           | 2590.00               | 64.7500   |            |
| Magnesium         | 644.00                | 16.1000   |            |
| Manganese         | 27.30                 | 0.6825    |            |
| Chloride          | 2350.00               | 58.7500   |            |
| Sulfur            | 2880.00               | 72.0000   |            |
| Oil & Grease      |                       | 21        |            |
| BOD               |                       |           |            |
| pcb               |                       |           |            |
| Fecal Coliform    |                       |           |            |
| TCLP              |                       |           |            |
| ph                | 3.70                  |           |            |
| % solids          | 2.50                  |           |            |
| % Vol Solids      | 93.60                 |           |            |
| % Moisture        | 97.50                 |           |            |
| lbs/gallon        | 7.50                  |           |            |
| dry tons/load     | 0.56                  |           |            |

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 18.1980

Phosphate (P2O5): 13.6000

Potash (K2O): 2.9600

SP:

Max. Allowable App Rate at:

| Crop            | PAN | App Rate |
|-----------------|-----|----------|
| Corn            | 150 | 50,000   |
| Bermuda Pasture | 240 | 80,000   |
| Soybeans        | 60  | 20,000   |
| Wheat           | 75  | 25,000   |



20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information : TN2 - FLOCROS

Report Date : 05/19/2023  
Received : 05/05/2023

Report Number : **23-125-0187**

**REPORT OF ANALYSIS**

Lab No : **90472**

Matrix: **Solids**

Sample ID : **Flowers Bakery, Crossville, TN (FLOCROS)**

Sampled: **5/5/2023 9:00**

| Test                              | Results       | Units       | MQL    | DF | Date / Time Analyzed | By  | Analytical Method |
|-----------------------------------|---------------|-------------|--------|----|----------------------|-----|-------------------|
| Organic Matter                    | <b>84.2</b>   | %           | 0.100  | 1  | 05/17/23 11:00       | VVP | ASTM D2974        |
| Neutralizing Value (%CCE)         | <b>2.7</b>    | %           | 0.1    | 1  | 05/16/23 11:15       | DXT | AOAC 955.01       |
| Moisture                          | <b>97.5</b>   | %           | 0.010  | 1  | 05/17/23 16:50       | JLS | SW-DRYWT          |
| Ammonia Nitrogen                  | <b>5720</b>   | mg/Kg - dry | 4000   | 1  | 05/11/23 06:00       | JPJ | 4500NH3C-2011     |
| Biochemical Oxygen Demand (5-day) | <b>440000</b> | mg/Kg - dry | 240000 | 1  | 05/08/23 13:45       | JJZ | 5210B-2016        |
| Chloride                          | <b>2350</b>   | mg/Kg - dry | 1600   | 10 | 05/11/23 23:12       | SRJ | 9056A             |
| Conductivity                      | <b>229</b>    | µS/cm       |        | 1  | 05/16/23 15:52       | CMF | 2510B-2011        |
| Nitrate (NO3-N)                   | <400          | mg/Kg - dry | 400    | 10 | 05/11/23 23:12       | SRJ | 9056A             |
| Nitrite (NO2-N)                   | <400          | mg/Kg - dry | 400    | 10 | 05/11/23 23:12       | SRJ | 9056A             |
| Nitrate+Nitrite-N                 | <400          | mg/Kg - dry | 400    | 10 | 05/11/23 23:12       |     | 9056A             |
| HEM: Oil and Grease               | <b>208000</b> | mg/Kg - dry | 10900  | 1  | 05/16/23 16:16       | DRD | SW-9071B          |
| pH                                | <b>3.7</b>    | s.u.        |        | 1  | 05/16/23 13:45       | CNB | 9045D             |
| Total Solids                      | <b>2.50</b>   | %           | 0.010  | 1  | 05/17/23 16:50       | JLS | 2540G-2011        |
| Total Volatile Solids             | <b>93.6</b>   | %           | 0.010  | 1  | 05/17/23 16:50       | JLS | 2540G-2011        |
| Total Kjeldahl Nitrogen           | <b>54000</b>  | mg/Kg - dry | 14000  | 1  | 05/09/23 12:30       | ANH | 4500NORGD-2011    |
| Phosphorus                        | <b>5280</b>   | mg/Kg - dry | 200    | 1  | 05/11/23 07:43       | BKN | 6010D             |
| Arsenic                           | <20.0         | mg/Kg - dry | 20.0   | 1  | 05/11/23 07:43       | BKN | 6010D             |
| Boron                             | <100          | mg/Kg - dry | 100    | 1  | 05/11/23 07:43       | BKN | 6010D             |
| Cadmium                           | <4.00         | mg/Kg - dry | 4.00   | 1  | 05/11/23 07:43       | BKN | 6010D             |
| Calcium                           | <b>2590</b>   | mg/Kg - dry | 2000   | 1  | 05/11/23 07:43       | BKN | 6010D             |
| Chromium                          | <b>12.0</b>   | mg/Kg - dry | 10.0   | 1  | 05/11/23 07:43       | BKN | 6010D             |
| Copper                            | <b>41.2</b>   | mg/Kg - dry | 20.0   | 1  | 05/11/23 07:43       | BKN | 6010D             |
| Lead                              | <12.0         | mg/Kg - dry | 12.0   | 1  | 05/11/23 07:43       | BKN | 6010D             |

**Qualifiers/  
Definitions**

\*  
I

Outside QC Limit  
Recovery out of range

DF  
MQL

Dilution Factor  
Method Quantitation Limit

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information : TN2 - FLOCROS

Report Date : 05/19/2023  
Received : 05/05/2023

Report Number : **23-125-0187**

## REPORT OF ANALYSIS

Lab No : **90472**

Matrix: **Solids**

Sample ID : **Flowers Bakery, Crossville, TN (FLOCROS)**

Sampled: **5/5/2023 9:00**

| Test       | Results     | Units       | MQL  | DF | Date / Time Analyzed | By  | Analytical Method |
|------------|-------------|-------------|------|----|----------------------|-----|-------------------|
| Magnesium  | <b>644</b>  | mg/Kg - dry | 200  | 1  | 05/11/23 07:43       | BKN | 6010D             |
| Manganese  | <b>27.3</b> | mg/Kg - dry | 20.0 | 1  | 05/11/23 07:43       | BKN | 6010D             |
| Mercury    | <7.40       | mg/Kg - dry | 7.40 | 1  | 05/15/23 12:57       | FDS | 7471A             |
| Molybdenum | <10.0       | mg/Kg - dry | 10.0 | 1  | 05/11/23 07:43       | BKN | 6010D             |
| Nickel     | <b>21.9</b> | mg/Kg - dry | 10.0 | 1  | 05/11/23 07:43       | BKN | 6010D             |
| Potassium  | <b>2190</b> | mg/Kg - dry | 400  | 1  | 05/13/23 00:52       | TJS | 6010D             |
| Selenium   | <20.0       | mg/Kg - dry | 20.0 | 1  | 05/11/23 07:43       | BKN | 6010D             |
| Sodium     | <b>4040</b> | mg/Kg - dry | 1000 | 1  | 05/11/23 07:43       | BKN | 6010D             |
| Zinc       | <b>168</b>  | mg/Kg - dry | 50.0 | 1  | 05/11/23 07:43       | BKN | 6010D             |
| Sulfur     | <b>2880</b> | mg/Kg - dry | 400  | 1  | 05/11/23 07:43       | BKN | 6010D             |

### Qualifiers/ Definitions

\* Outside QC Limit  
I Recovery out of range

DF Dilution Factor  
MQL Method Quantitation Limit

# Loading Rate Tabulation

Environmental



Facility: General Mills - Murfreesboro, TN

Analysis Date: 5/2/2023

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 23-123-0241

Internal ID: 7071

PAN:  $20\% \times (\text{TKN} - \text{Ammonia}) + 100\% \times \text{Ammonia} + \text{NO}_3 + \text{NO}_2$

| Parameter         | Concentration (mg/kg) |           | Limits     |
|-------------------|-----------------------|-----------|------------|
|                   | dry                   | wet       |            |
| PAN               | 27032.00              | 1043.4352 |            |
| Ammonia           | 5150.00               | 198.7900  |            |
| TKN               | 112000.00             | 4323.2000 |            |
| Nitrates/Nitrites | 512.00                | 19.7632   |            |
| Organic N         | 106850.00             | 4124.4100 |            |
| Arsenic           | 12.80                 | 0.4941    | 75 mg/kg   |
| Cadmium           | 2.56                  | 0.0988    | 85 mg/kg   |
| Chromium          | 68.20                 | 2.6325    | 3000 mg/kg |
| Copper            | 145.00                | 5.5970    | 4300 mg/kg |
| Lead              | 7.69                  | 0.2968    | 840 mg/kg  |
| Mercury           | 4.18                  | 0.1613    | 57 mg/kg   |
| Molybdenum        | 27.20                 | 1.0499    | 75 mg/kg   |
| Nickel            | 45.40                 | 1.7524    | 420 mg/kg  |
| Phosphorus        | 34600.00              | 1335.5600 |            |
| Potassium         | 6670.00               | 257.4620  |            |
| Selenium          | 12.80                 | 0.4941    | 100 mg/kg  |
| Zinc              | 1010.00               | 38.9860   | 7500 mg/kg |
| Iron              |                       |           |            |
| Sodium            | 8620.00               | 332.7320  |            |
| Barium            |                       |           |            |
| Silver            |                       |           |            |
| Calcium           | 47700.00              | 1841.2200 |            |
| Magnesium         | 2970.00               | 114.6420  |            |
| Manganese         | 328.00                | 12.6608   |            |
| Chloride          | 5790.00               | 223.4940  |            |
| Sulfur            | 48500.00              | 1872.1000 |            |
| Oil & Grease      |                       | 1         |            |
| BOD               |                       |           |            |
| pcb               |                       |           |            |
| Fecal Coliform    |                       |           |            |
| TCLP              |                       |           |            |
| ph                | 7.30                  |           |            |
| % solidsS         | 3.86                  |           |            |
| % Vol Solids      | 81.70                 |           |            |
| % Moisture        | 96.10                 |           |            |
| lbs/gallon        | 7.50                  |           |            |
| dry tons/load     | 0.87                  |           |            |

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 46.9546

Phospate (P2O5): 137.6300

Potash (K2O): 13.9000

SP:

Max. Allowable App Rate at:

| Crop            | PAN | App Rate |
|-----------------|-----|----------|
| Corn            | 150 | 19,149   |
| Bermuda Pasture | 240 | 30,638   |
| Soybeans        | 60  | 7,660    |
| Wheat           | 75  | 9,574    |

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/17/2023

Received : 05/03/2023

Report Number : **23-123-0241**

**REPORT OF ANALYSIS**

Lab No : **86952**

Matrix: **Solids**

Sample ID : **General Mills, Murfreesboro, TN (GENMILL)**

Sampled: **5/2/2023 9:45**

| Test                              | Results       | Units       | MQL    | DF | Date / Time Analyzed | By  | Analytical Method |
|-----------------------------------|---------------|-------------|--------|----|----------------------|-----|-------------------|
| Organic Matter                    | <b>77.9</b>   | %           | 0.100  | 1  | 05/16/23 11:00       | VVP | ASTM D2974        |
| Neutralizing Value (%CCE)         | <b>5.0</b>    | %           | 0.1    | 1  | 05/08/23 16:45       | DXT | AOAC 955.01       |
| Moisture                          | <b>96.1</b>   | %           |        | 1  | 05/09/23 16:45       | JLS | SW-DRYWT          |
| Ammonia Nitrogen                  | <b>5150</b>   | mg/Kg - dry | 2560   | 1  | 05/09/23 13:00       | JPJ | 4500NH3C-2011     |
| Biochemical Oxygen Demand (5-day) | <154000       | mg/Kg - dry | 154000 | 1  | 05/04/23 08:15       | JJZ | 5210B-2016        |
| Chloride                          | <b>5790</b>   | mg/Kg - dry | 1030   | 10 | 05/09/23 22:31       | SRJ | 9056A             |
| Conductivity                      | <b>486</b>    | µS/cm       |        | 1  | 05/12/23 16:04       | CMF | 2510B-2011        |
| Nitrate (NO3-N)                   | <256          | mg/Kg - dry | 256    | 10 | 05/09/23 22:31       | SRJ | 9056A             |
| Nitrite (NO2-N)                   | <256          | mg/Kg - dry | 256    | 10 | 05/09/23 22:31       | SRJ | 9056A             |
| Nitrate+Nitrite-N                 | <256          | mg/Kg - dry | 256    | 10 | 05/09/23 22:31       |     | 9056A             |
| HEM: Oil and Grease               | <b>14400</b>  | mg/Kg - dry | 7210   | 1  | 05/10/23 12:09       | SMS | SW-9071B          |
| pH                                | <b>7.3</b>    | s.u.        |        | 1  | 05/11/23 15:30       | CNB | 9045D             |
| Total Solids                      | <b>3.86</b>   | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Volatile Solids             | <b>81.7</b>   | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Kjeldahl Nitrogen           | <b>112000</b> | mg/Kg - dry | 4900   | 1  | 05/05/23 13:19       | ANH | 4500NORGD-2011    |
| Phosphorus                        | <b>34600</b>  | mg/Kg - dry | 128    | 1  | 05/06/23 04:28       | BKN | 6010D             |
| Arsenic                           | <12.8         | mg/Kg - dry | 12.8   | 1  | 05/06/23 04:28       | BKN | 6010D             |
| Boron                             | <64.1         | mg/Kg - dry | 64.1   | 1  | 05/06/23 04:28       | BKN | 6010D             |
| Cadmium                           | <2.56         | mg/Kg - dry | 2.56   | 1  | 05/06/23 04:28       | BKN | 6010D             |
| Calcium                           | <b>47700</b>  | mg/Kg - dry | 1280   | 1  | 05/06/23 04:28       | BKN | 6010D             |
| Chromium                          | <b>68.2</b>   | mg/Kg - dry | 6.41   | 1  | 05/06/23 04:28       | BKN | 6010D             |
| Copper                            | <b>145</b>    | mg/Kg - dry | 12.8   | 1  | 05/06/23 04:28       | BKN | 6010D             |
| Lead                              | <7.69         | mg/Kg - dry | 7.69   | 1  | 05/06/23 04:28       | BKN | 6010D             |

**Qualifiers/  
Definitions**

DF

Dilution Factor

MQL

Method Quantitation Limit



20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/17/2023  
Received : 05/03/2023

Report Number : **23-123-0241**

**REPORT OF ANALYSIS**

Lab No : **86952**

Matrix: **Solids**

Sample ID : **General Mills, Murfreesboro, TN (GENMILL)**

Sampled: **5/2/2023 9:45**

| Test       | Results      | Units       | MQL  | DF | Date / Time Analyzed | By  | Analytical Method |
|------------|--------------|-------------|------|----|----------------------|-----|-------------------|
| Magnesium  | <b>2970</b>  | mg/Kg - dry | 128  | 1  | 05/06/23 04:28       | BKN | 6010D             |
| Manganese  | <b>328</b>   | mg/Kg - dry | 12.8 | 1  | 05/06/23 04:28       | BKN | 6010D             |
| Mercury    | <4.18        | mg/Kg - dry | 4.18 | 1  | 05/10/23 12:28       | FDS | 7471A             |
| Molybdenum | <b>27.2</b>  | mg/Kg - dry | 6.41 | 1  | 05/06/23 04:28       | BKN | 6010D             |
| Nickel     | <b>45.4</b>  | mg/Kg - dry | 6.41 | 1  | 05/06/23 04:28       | BKN | 6010D             |
| Potassium  | <b>6670</b>  | mg/Kg - dry | 256  | 1  | 05/06/23 04:28       | BKN | 6010D             |
| Selenium   | <12.8        | mg/Kg - dry | 12.8 | 1  | 05/06/23 04:28       | BKN | 6010D             |
| Sodium     | <b>8620</b>  | mg/Kg - dry | 641  | 1  | 05/06/23 04:28       | BKN | 6010D             |
| Zinc       | <b>1010</b>  | mg/Kg - dry | 32.1 | 1  | 05/06/23 04:28       | BKN | 6010D             |
| Sulfur     | <b>48500</b> | mg/Kg - dry | 256  | 1  | 05/06/23 04:28       | BKN | 6010D             |

**Qualifiers/  
Definitions**

DF

Dilution Factor

MQL

Method Quantitation Limit

# Loading Rate Tabulation

Environmental



Facility: Heritage Farms Dairy - Murfreesboro, TN

Analysis Date: 5/2/2023

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 23-123-0242

Internal ID: 7080

PAN:  $20\% \times (\text{TKN} - \text{Ammonia}) + 100\% \times \text{Ammonia} + \text{NO}_3 + \text{NO}_2$

| Parameter         | Concentration (mg/kg) |           | Limits     |
|-------------------|-----------------------|-----------|------------|
|                   | dry                   | wet       |            |
| PAN               | 22980.00              | 471.0900  |            |
| Ammonia           | 6350.00               | 130.1750  |            |
| TKN               | 84500.00              | 1732.2500 |            |
| Nitrates/Nitrites | 1000.00               | 20.5000   |            |
| Organic N         | 78150.00              | 1602.0750 |            |
| Arsenic           | 25.00                 | 0.5125    | 75 mg/kg   |
| Cadmium           | 5.00                  | 0.1025    | 85 mg/kg   |
| Chromium          | 12.50                 | 0.2563    | 3000 mg/kg |
| Copper            | 25.00                 | 0.5125    | 4300 mg/kg |
| Lead              | 15.00                 | 0.3075    | 840 mg/kg  |
| Mercury           | 9.40                  | 0.1927    | 57 mg/kg   |
| Molybdenum        | 12.50                 | 0.2563    | 75 mg/kg   |
| Nickel            | 12.50                 | 0.2563    | 420 mg/kg  |
| Phosphorus        | 19900.00              | 407.9500  |            |
| Potassium         | 10500.00              | 215.2500  |            |
| Selenium          | 25.00                 | 0.5125    | 100 mg/kg  |
| Zinc              | 71.00                 | 1.4555    | 7500 mg/kg |
| Iron              |                       |           |            |
| Sodium            | 19400.00              | 397.7000  |            |
| Barium            |                       |           |            |
| Silver            |                       |           |            |
| Calcium           | 18500.00              | 379.2500  |            |
| Magnesium         | 3160.00               | 64.7800   |            |
| Manganese         | 35.20                 | 0.7216    |            |
| Chloride          | 4220.00               | 86.5100   |            |
| Sulfur            | 12500.00              | 256.2500  |            |
| Oil & Grease      |                       | 1         |            |
| BOD               |                       |           |            |
| pcb               |                       |           |            |
| Fecal Coliform    |                       |           |            |
| TCLP              |                       |           |            |
| ph                | 7.20                  |           |            |
| % solids          | 2.05                  |           |            |
| % Vol Solids      | 86.50                 |           |            |
| % Moisture        | 98.00                 |           |            |
| lbs/gallon        | 7.50                  |           |            |
| dry tons/load     | 0.46                  |           |            |

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 21.1991

Phosphate (P2O5): 42.0400

Potash (K2O): 11.6200

SP:

Max. Allowable App Rate at:

| Crop            | PAN | App Rate |
|-----------------|-----|----------|
| Corn            | 150 | 42,857   |
| Bermuda Pasture | 240 | 68,571   |
| Soybeans        | 60  | 17,143   |
| Wheat           | 75  | 21,429   |

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/17/2023  
Received : 05/03/2023

Report Number : **23-123-0242**

**REPORT OF ANALYSIS**

Lab No : **86956**

Matrix: **Solids**

Sample ID : **Heritage Farms Dairy, Murfreesboro, TN (HERFARM)**

Sampled: **5/2/2023 10:15**

| Test                              | Results      | Units       | MQL    | DF | Date / Time Analyzed | By  | Analytical Method |
|-----------------------------------|--------------|-------------|--------|----|----------------------|-----|-------------------|
| Organic Matter                    | <b>85.9</b>  | %           | 0.100  | 1  | 05/16/23 11:00       | VVP | ASTM D2974        |
| Neutralizing Value (%CCE)         | <b>3.5</b>   | %           | 0.1    | 1  | 05/08/23 16:45       | DXT | AOAC 955.01       |
| Moisture                          | <b>98.0</b>  | %           |        | 1  | 05/09/23 16:45       | JLS | SW-DRYWT          |
| Ammonia Nitrogen                  | <b>6350</b>  | mg/Kg - dry | 5000   | 1  | 05/09/23 13:00       | JPJ | 4500NH3C-2011     |
| Biochemical Oxygen Demand (5-day) | <300000      | mg/Kg - dry | 300000 | 1  | 05/04/23 08:15       | JJZ | 5210B-2016        |
| Chloride                          | <b>4220</b>  | mg/Kg - dry | 2000   | 10 | 05/09/23 22:57       | SRJ | 9056A             |
| Conductivity                      | <b>354</b>   | µS/cm       |        | 1  | 05/12/23 16:04       | CMF | 2510B-2011        |
| Nitrate (NO3-N)                   | <500         | mg/Kg - dry | 500    | 10 | 05/09/23 22:57       | SRJ | 9056A             |
| Nitrite (NO2-N)                   | <500         | mg/Kg - dry | 500    | 10 | 05/09/23 22:57       | SRJ | 9056A             |
| Nitrate+Nitrite-N                 | <500         | mg/Kg - dry | 500    | 10 | 05/09/23 22:57       |     | 9056A             |
| HEM: Oil and Grease               | <14000       | mg/Kg - dry | 14000  | 1  | 05/10/23 12:09       | SMS | SW-9071B          |
| pH                                | <b>7.2</b>   | s.u.        |        | 1  | 05/11/23 15:30       | CNB | 9045D             |
| Total Solids                      | <b>2.05</b>  | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Volatile Solids             | <b>86.5</b>  | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Kjeldahl Nitrogen           | <b>84500</b> | mg/Kg - dry | 10200  | 1  | 05/05/23 13:20       | ANH | 4500NORGD-2011    |
| Phosphorus                        | <b>19900</b> | mg/Kg - dry | 250    | 1  | 05/06/23 04:33       | BKN | 6010D             |
| Arsenic                           | <25.0        | mg/Kg - dry | 25.0   | 1  | 05/06/23 04:33       | BKN | 6010D             |
| Boron                             | <125         | mg/Kg - dry | 125    | 1  | 05/06/23 04:33       | BKN | 6010D             |
| Cadmium                           | <5.00        | mg/Kg - dry | 5.00   | 1  | 05/06/23 04:33       | BKN | 6010D             |
| Calcium                           | <b>18500</b> | mg/Kg - dry | 2500   | 1  | 05/06/23 04:33       | BKN | 6010D             |
| Chromium                          | <12.5        | mg/Kg - dry | 12.5   | 1  | 05/06/23 04:33       | BKN | 6010D             |
| Copper                            | <25.0        | mg/Kg - dry | 25.0   | 1  | 05/06/23 04:33       | BKN | 6010D             |
| Lead                              | <15.0        | mg/Kg - dry | 15.0   | 1  | 05/06/23 04:33       | BKN | 6010D             |

**Qualifiers/  
Definitions**

DF

Dilution Factor

MQL

Method Quantitation Limit

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/17/2023  
Received : 05/03/2023

Report Number : **23-123-0242**

## REPORT OF ANALYSIS

Lab No : **86956**

Matrix: **Solids**

Sample ID : **Heritage Farms Dairy, Murfreesboro, TN (HERFARM)**

Sampled: **5/2/2023 10:15**

| Test       | Results      | Units       | MQL  | DF | Date / Time Analyzed | By  | Analytical Method |
|------------|--------------|-------------|------|----|----------------------|-----|-------------------|
| Magnesium  | <b>3160</b>  | mg/Kg - dry | 250  | 1  | 05/06/23 04:33       | BKN | 6010D             |
| Manganese  | <b>35.2</b>  | mg/Kg - dry | 25.0 | 1  | 05/06/23 04:33       | BKN | 6010D             |
| Mercury    | <9.40        | mg/Kg - dry | 9.40 | 1  | 05/10/23 12:30       | FDS | 7471A             |
| Molybdenum | <12.5        | mg/Kg - dry | 12.5 | 1  | 05/06/23 04:33       | BKN | 6010D             |
| Nickel     | <12.5        | mg/Kg - dry | 12.5 | 1  | 05/06/23 04:33       | BKN | 6010D             |
| Potassium  | <b>10500</b> | mg/Kg - dry | 500  | 1  | 05/06/23 04:33       | BKN | 6010D             |
| Selenium   | <25.0        | mg/Kg - dry | 25.0 | 1  | 05/06/23 04:33       | BKN | 6010D             |
| Sodium     | <b>19400</b> | mg/Kg - dry | 1250 | 1  | 05/06/23 04:33       | BKN | 6010D             |
| Zinc       | <b>71.0</b>  | mg/Kg - dry | 62.5 | 1  | 05/06/23 04:33       | BKN | 6010D             |
| Sulfur     | <b>12500</b> | mg/Kg - dry | 500  | 1  | 05/06/23 04:33       | BKN | 6010D             |

### Qualifiers/ Definitions

DF

Dilution Factor

MQL

Method Quantitation Limit



# Loading Rate Tabulation

Environmental



Facility: Liquid Environmental Solutions - Nashville, TN

Analysis Date: 6/22/2023

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 192-2922-1

Internal ID: 7209

PAN:  $20\% \times (\text{TKN} - \text{Ammonia}) + 100\% \times \text{Ammonia} + \text{NO}_3 + \text{NO}_2$

| Parameter         | Concentration (mg/kg) |           | Limits     |
|-------------------|-----------------------|-----------|------------|
|                   | dry                   | wet       |            |
| PAN               | 6170.40               | 586.1880  |            |
| Ammonia           | 2700.00               | 256.5000  |            |
| TKN               | 20000.00              | 1900.0000 |            |
| Nitrates/Nitrites | 10.40                 | 0.9880    |            |
| Organic N         | 17300.00              | 1643.5000 |            |
| Arsenic           | 5.00                  | 0.4750    | 75 mg/kg   |
| Cadmium           | 0.40                  | 0.0380    | 85 mg/kg   |
| Chromium          | 4.20                  | 0.3990    | 3000 mg/kg |
| Copper            | 46.00                 | 4.3700    | 4300 mg/kg |
| Lead              | 4.00                  | 0.3800    | 840 mg/kg  |
| Mercury           | 0.10                  | 0.0093    | 57 mg/kg   |
| Molybdenum        | 1.00                  | 0.0950    | 75 mg/kg   |
| Nickel            | 2.80                  | 0.2660    | 420 mg/kg  |
| Phosphorus        | 900.00                | 85.5000   |            |
| Potassium         | 640.00                | 60.8000   |            |
| Selenium          | 7.00                  | 0.6650    | 100 mg/kg  |
| Zinc              | 49.00                 | 4.6550    | 7500 mg/kg |
| Iron              |                       |           |            |
| Sodium            | 1000.00               | 95.0000   |            |
| Barium            |                       |           |            |
| Silver            |                       |           |            |
| Calcium           | 1300.00               | 123.5000  |            |
| Magnesium         | 180.00                | 17.1000   |            |
| Manganese         | 5.20                  | 0.4940    |            |
| Chloride          | 960.00                | 91.2000   |            |
| Sulfur            |                       |           |            |
| Oil & Grease      |                       | 6         |            |
| BOD               |                       |           |            |
| pcb               |                       |           |            |
| Fecal Coliform    |                       |           |            |
| TCLP              |                       |           |            |
| ph                | 4.40                  |           |            |
| % solidsS         | 9.50                  |           |            |
| % Vol Solids      | 97.00                 |           |            |
| % Moisture        | 90.00                 |           |            |
| lbs/gallon        | 7.50                  |           |            |
| dry tons/load     | 2.14                  |           |            |

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 26.3785

Phospate (P2O5): 8.8100

Potash (K2O): 3.2800

SP:

Max. Allowable App Rate at:

| Crop            | PAN | App Rate |
|-----------------|-----|----------|
| Corn            | 150 | 34,615   |
| Bermuda Pasture | 240 | 55,385   |
| Soybeans        | 60  | 13,846   |
| Wheat           | 75  | 17,308   |

# Client Sample Results

Client: Denali Water Solutions

Job ID: 192-2922-1

Project/Site: Liquid Environmental Solutions, Nashville, TN

Client Sample ID: LIQENTN

Lab Sample ID: 192-2922-1

Date Collected: 06/22/23 15:30

Matrix: Solid

Date Received: 06/23/23 10:38

## Method: LA 29B SAR - Sodium Adsorption Ratio

| Analyte                 | Result | Qualifier | RL  | Unit | D | Prepared | Analyzed       | Dil Fac |
|-------------------------|--------|-----------|-----|------|---|----------|----------------|---------|
| Sodium Adsorption Ratio | 7.0    |           | 1.0 | NONE |   |          | 07/05/23 12:30 | 1       |

## Method: SW846 6010D - Metals (ICP)

| Analyte    | Result | Qualifier | RL   | Unit  | D | Prepared       | Analyzed       | Dil Fac |
|------------|--------|-----------|------|-------|---|----------------|----------------|---------|
| Cadmium    | <0.40  |           | 0.40 | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 11:57 | 1       |
| Sodium     | 1000   |           | 100  | mg/Kg | ✱ | 06/26/23 10:27 | 07/03/23 15:03 | 1       |
| Potassium  | 640    |           | 100  | mg/Kg | ✱ | 06/26/23 10:27 | 07/03/23 15:03 | 1       |
| Calcium    | 1300   |           | 100  | mg/Kg | ✱ | 06/26/23 10:27 | 07/05/23 11:52 | 10      |
| Molybdenum | <1.0   |           | 1.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 11:57 | 1       |
| Sulfur     | 2200   |           | 100  | mg/Kg | ✱ | 06/26/23 10:27 | 07/03/23 14:59 | 10      |
| Nickel     | 2.8    |           | 1.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 11:57 | 1       |
| Magnesium  | 180    |           | 5.0  | mg/Kg | ✱ | 06/26/23 10:27 | 07/03/23 18:46 | 1       |
| Arsenic    | <5.0   |           | 5.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 11:57 | 1       |
| Copper     | 46     |           | 1.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 11:57 | 1       |
| Boron      | <10    |           | 10   | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 11:57 | 1       |
| Lead       | <4.0   |           | 4.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 11:57 | 1       |
| Phosphorus | 900    |           | 10   | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 11:57 | 1       |
| Zinc       | 49     |           | 1.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 11:57 | 1       |
| Selenium   | <7.0   |           | 7.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 11:57 | 1       |
| Manganese  | 5.2    |           | 0.20 | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 11:57 | 1       |
| Chromium   | 4.2    |           | 1.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 11:57 | 1       |

## Method: SW846 7471B - Mercury (CVAA)

| Analyte | Result | Qualifier | RL    | Unit  | D | Prepared       | Analyzed       | Dil Fac |
|---------|--------|-----------|-------|-------|---|----------------|----------------|---------|
| Mercury | <0.098 |           | 0.098 | mg/Kg | ✱ | 07/03/23 09:34 | 07/03/23 15:02 | 1       |

## General Chemistry

| Analyte                                           | Result | Qualifier | RL    | Unit     | D | Prepared | Analyzed       | Dil Fac |
|---------------------------------------------------|--------|-----------|-------|----------|---|----------|----------------|---------|
| Total Volatile Solids (SM 2540G-2015)             | 97     |           | 0.010 | % by Wt  |   |          | 07/07/23 15:41 | 1       |
| pH (SW846 9045D)                                  | 4.4    | HF        | 0.05  | SU       |   |          | 06/23/23 13:13 | 1       |
| Electrical Conductivity (1:1 Ratio) (SW846 9050A) | 2500   |           | 2.0   | umhos/cm |   |          | 06/27/23 14:32 | 1       |
| Limestone Equivalency (AOAC 955.01)               | 0.28   |           | 0.20  | % by Wt  |   |          | 06/30/23 14:59 | 1       |
| HEM (Oil & Grease) (ARDPCE AR OG_TPH)             | 55000  |           | 220   | mg/Kg    |   |          | 06/23/23 14:53 | 1       |
| Percent Moisture (SM Moisture - 2540)             | 90     |           | 0.010 | %        |   |          | 06/27/23 12:10 | 1       |
| Total Solids (SM Moisture - 2540)                 | 9.5    |           | 0.010 | %        |   |          | 06/27/23 12:10 | 1       |

Client Sample ID: LIQENTN

Lab Sample ID: 192-2922-1

Date Collected: 06/22/23 15:30

Matrix: Solid

Date Received: 06/23/23 10:38

Percent Solids: 9.5

## Method: SW846 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

| Analyte  | Result | Qualifier | RL  | Unit  | D | Prepared       | Analyzed       | Dil Fac |
|----------|--------|-----------|-----|-------|---|----------------|----------------|---------|
| PCB-1016 | <1.0   |           | 1.0 | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 14:27 | 1       |
| PCB-1221 | <1.0   |           | 1.0 | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 14:27 | 1       |
| PCB-1232 | <1.0   |           | 1.0 | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 14:27 | 1       |
| PCB-1242 | <1.0   |           | 1.0 | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 14:27 | 1       |
| PCB-1248 | <1.0   |           | 1.0 | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 14:27 | 1       |

Eurofins Arkansas

# Client Sample Results

Client: Denali Water Solutions

Job ID: 192-2922-1

Project/Site: Liquid Environmental Solutions, Nashville, TN

**Client Sample ID: LIQENTN**

**Lab Sample ID: 192-2922-1**

Date Collected: 06/22/23 15:30

Matrix: Solid

Date Received: 06/23/23 10:38

Percent Solids: 9.5

## Method: SW846 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

| Analyte                       | Result    | Qualifier | RL       | Unit  | D | Prepared       | Analyzed       | Dil Fac |
|-------------------------------|-----------|-----------|----------|-------|---|----------------|----------------|---------|
| PCB-1254                      | <1.0      |           | 1.0      | mg/Kg | ☼ | 06/30/23 14:13 | 07/06/23 14:27 | 1       |
| PCB-1260                      | <1.0      |           | 1.0      | mg/Kg | ☼ | 06/30/23 14:13 | 07/06/23 14:27 | 1       |
| Surrogate                     | %Recovery | Qualifier | Limits   |       |   | Prepared       | Analyzed       | Dil Fac |
| Tetrachloro-m-xylene          | 102       |           | 47 - 115 |       |   | 06/30/23 14:13 | 07/06/23 14:27 | 1       |
| DCB Decachlorobiphenyl (Surr) | 100       |           | 52 - 122 |       |   | 06/30/23 14:13 | 07/06/23 14:27 | 1       |

## Method: SW846 9056A - Anions, Ion Chromatography

| Analyte      | Result | Qualifier | RL  | Unit  | D | Prepared | Analyzed       | Dil Fac |
|--------------|--------|-----------|-----|-------|---|----------|----------------|---------|
| Chloride     | 960    |           | 21  | mg/Kg | ☼ |          | 06/24/23 01:49 | 1       |
| Nitrate as N | <5.2   |           | 5.2 | mg/Kg | ☼ |          | 06/24/23 01:49 | 1       |
| Nitrite as N | <5.2   |           | 5.2 | mg/Kg | ☼ |          | 06/24/23 01:49 | 1       |

## General Chemistry

| Analyte                                      | Result   | Qualifier | RL   | Unit  | D | Prepared       | Analyzed       | Dil Fac |
|----------------------------------------------|----------|-----------|------|-------|---|----------------|----------------|---------|
| Ammonia (as N) (SM 4500 NH3 G-2011)          | 2700     |           | 190  | mg/Kg | ☼ | 06/23/23 14:33 | 06/27/23 09:29 | 1       |
| Total Kjeldahl Nitrogen (SM 4500 NorgC-2011) | 20000    |           | 2500 | mg/Kg | ☼ | 06/23/23 16:30 | 06/29/23 09:21 | 5       |
| Biochemical Oxygen Demand (SM 5210 B-2016)   | 790000 B |           | 140  | mg/Kg | ☼ |                | 06/23/23 14:00 | 98      |

# Loading Rate Tabulation

Environmental



Facility: Marzetti Horse Cave Pre-Treatment Facility - Columbus, OH

Analysis Date: 5/2/2023

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 23-123-0243

Internal ID: 7089

PAN: 20% × (TKN - Ammonia) + 100% × Ammonia + NO3 + NO2

| Parameter         | Concentration (mg/kg) |           | Limits     |
|-------------------|-----------------------|-----------|------------|
|                   | dry                   | wet       |            |
| PAN               | 4710.00               | 682.9500  |            |
| Ammonia           | 690.00                | 100.0500  |            |
| TKN               | 20100.00              | 2914.5000 |            |
| Nitrates/Nitrites | 138.00                | 20.0100   |            |
| Organic N         | 19410.00              | 2814.4500 |            |
| Arsenic           | 3.45                  | 0.5003    | 75 mg/kg   |
| Cadmium           | 0.69                  | 0.1001    | 85 mg/kg   |
| Chromium          | 3.70                  | 0.5365    | 3000 mg/kg |
| Copper            | 35.40                 | 5.1330    | 4300 mg/kg |
| Lead              | 2.07                  | 0.3002    | 840 mg/kg  |
| Mercury           | 1.13                  | 0.1639    | 57 mg/kg   |
| Molybdenum        | 1.72                  | 0.2494    | 75 mg/kg   |
| Nickel            | 5.90                  | 0.8555    | 420 mg/kg  |
| Phosphorus        | 7860.00               | 1139.7000 |            |
| Potassium         | 2810.00               | 407.4500  |            |
| Selenium          | 3.45                  | 0.5003    | 100 mg/kg  |
| Zinc              | 26.70                 | 3.8715    | 7500 mg/kg |
| Iron              |                       |           |            |
| Sodium            | 1460.00               | 211.7000  |            |
| Barium            |                       |           |            |
| Silver            |                       |           |            |
| Calcium           | 1580.00               | 229.1000  |            |
| Magnesium         | 556.00                | 80.6200   |            |
| Manganese         | 13.30                 | 1.9285    |            |
| Chloride          | 1620.00               | 234.9000  |            |
| Sulfur            | 2370.00               | 343.6500  |            |
| Oil & Grease      |                       | 0         |            |
| BOD               |                       |           |            |
| pcb               |                       |           |            |
| Fecal Coliform    |                       |           |            |
| TCLP              |                       |           |            |
| ph                | 3.90                  |           |            |
| % solidsS         | 14.50                 |           |            |
| % Vol Solids      | 95.30                 |           |            |
| % Moisture        | 85.50                 |           |            |
| lbs/gallon        | 7.50                  |           |            |
| dry tons/load     | 3.26                  |           |            |

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 30.7328

Phospate (P2O5): 117.4500

Potash (K2O): 22.0000

SP:

Max. Allowable App Rate at:

| Crop            | PAN | App Rate |
|-----------------|-----|----------|
| Corn            | 150 | 29,032   |
| Bermuda Pasture | 240 | 46,452   |
| Soybeans        | 60  | 11,613   |
| Wheat           | 75  | 14,516   |

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/17/2023  
Received : 05/03/2023

Report Number : **23-123-0243**

**REPORT OF ANALYSIS**

Lab No : **86957**

Matrix: **Solids**

Sample ID : **Marzetti Horse Cave Pre-Treatment Facility, Columbus, OH (MARZETT)**

Sampled: **5/2/2023 11:00**

| Test                              | Results        | Units       | MQL    | DF | Date / Time Analyzed | By  | Analytical Method |
|-----------------------------------|----------------|-------------|--------|----|----------------------|-----|-------------------|
| Organic Matter                    | <b>94.5</b>    | %           | 0.100  | 1  | 05/16/23 11:00       | VVP | ASTM D2974        |
| Neutralizing Value (%CCE)         | <b>6.5</b>     | %           | 0.1    | 1  | 05/08/23 16:45       | DXT | AOAC 955.01       |
| Moisture                          | <b>85.5</b>    | %           |        | 1  | 05/09/23 16:45       | JLS | SW-DRYWT          |
| Ammonia Nitrogen                  | <690           | mg/Kg - dry | 690    | 1  | 05/09/23 13:00       | JPJ | 4500NH3C-2011     |
| Biochemical Oxygen Demand (5-day) | <b>1740000</b> | mg/Kg - dry | 414000 | 1  | 05/04/23 08:15       | JJZ | 5210B-2016        |
| Chloride                          | <b>1620</b>    | mg/Kg - dry | 276    | 10 | 05/09/23 23:48       | SRJ | 9056A             |
| Conductivity                      | <b>487</b>     | µS/cm       |        | 1  | 05/12/23 16:04       | CMF | 2510B-2011        |
| Nitrate (NO3-N)                   | <69.0          | mg/Kg - dry | 69.0   | 10 | 05/09/23 23:48       | SRJ | 9056A             |
| Nitrite (NO2-N)                   | <69.0          | mg/Kg - dry | 69.0   | 10 | 05/09/23 23:48       | SRJ | 9056A             |
| Nitrate+Nitrite-N                 | <69.0          | mg/Kg - dry | 69.0   | 10 | 05/09/23 23:48       |     | 9056A             |
| HEM: Oil and Grease               | <1750          | mg/Kg - dry | 1750   | 1  | 05/10/23 12:09       | SMS | SW-9071B          |
| pH                                | <b>3.9</b>     | s.u.        |        | 1  | 05/11/23 15:30       | CNB | 9045D             |
| Total Solids                      | <b>14.5</b>    | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Volatile Solids             | <b>95.3</b>    | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Kjeldahl Nitrogen           | <b>20100</b>   | mg/Kg - dry | 1010   | 1  | 05/05/23 13:21       | ANH | 4500NORGD-2011    |
| Phosphorus                        | <b>7860</b>    | mg/Kg - dry | 34.5   | 1  | 05/06/23 04:38       | BKN | 6010D             |
| Arsenic                           | <3.45          | mg/Kg - dry | 3.45   | 1  | 05/06/23 04:38       | BKN | 6010D             |
| Boron                             | <17.2          | mg/Kg - dry | 17.2   | 1  | 05/06/23 04:38       | BKN | 6010D             |
| Cadmium                           | <0.690         | mg/Kg - dry | 0.690  | 1  | 05/06/23 04:38       | BKN | 6010D             |
| Calcium                           | <b>1580</b>    | mg/Kg - dry | 345    | 1  | 05/06/23 04:38       | BKN | 6010D             |
| Chromium                          | <b>3.70</b>    | mg/Kg - dry | 1.72   | 1  | 05/06/23 04:38       | BKN | 6010D             |
| Copper                            | <b>35.4</b>    | mg/Kg - dry | 3.45   | 1  | 05/06/23 04:38       | BKN | 6010D             |
| Lead                              | <2.07          | mg/Kg - dry | 2.07   | 1  | 05/06/23 04:38       | BKN | 6010D             |

**Qualifiers/  
Definitions**

DF Dilution Factor

MQL Method Quantitation Limit



20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/17/2023  
Received : 05/03/2023

Report Number : **23-123-0243**

## REPORT OF ANALYSIS

Lab No : **86957**

Matrix: **Solids**

Sample ID : **Marzetti Horse Cave Pre-Treatment Facility, Columbus, OH (MARZETT)**

Sampled: **5/2/2023 11:00**

| Test       | Results     | Units       | MQL  | DF | Date / Time Analyzed | By  | Analytical Method |
|------------|-------------|-------------|------|----|----------------------|-----|-------------------|
| Magnesium  | <b>556</b>  | mg/Kg - dry | 34.5 | 1  | 05/06/23 04:38       | BKN | 6010D             |
| Manganese  | <b>13.3</b> | mg/Kg - dry | 3.45 | 1  | 05/06/23 04:38       | BKN | 6010D             |
| Mercury    | <1.13       | mg/Kg - dry | 1.13 | 1  | 05/10/23 12:43       | FDS | 7471A             |
| Molybdenum | <1.72       | mg/Kg - dry | 1.72 | 1  | 05/06/23 04:38       | BKN | 6010D             |
| Nickel     | <b>5.90</b> | mg/Kg - dry | 1.72 | 1  | 05/06/23 04:38       | BKN | 6010D             |
| Potassium  | <b>2810</b> | mg/Kg - dry | 69.0 | 1  | 05/06/23 04:38       | BKN | 6010D             |
| Selenium   | <3.45       | mg/Kg - dry | 3.45 | 1  | 05/06/23 04:38       | BKN | 6010D             |
| Sodium     | <b>1460</b> | mg/Kg - dry | 172  | 1  | 05/06/23 04:38       | BKN | 6010D             |
| Zinc       | <b>26.7</b> | mg/Kg - dry | 8.62 | 1  | 05/06/23 04:38       | BKN | 6010D             |
| Sulfur     | <b>2370</b> | mg/Kg - dry | 69.0 | 1  | 05/06/23 04:38       | BKN | 6010D             |

### Qualifiers/ Definitions

DF

Dilution Factor

MQL

Method Quantitation Limit

# Loading Rate Tabulation

Environmental



Facility: Sonoco Kerry - Mizkan Americas - Crossville, TN

Analysis Date: 5/2/2023

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 23-123-0244

Internal ID: 7079

PAN:  $20\% \times (\text{TKN} - \text{Ammonia}) + 100\% \times \text{Ammonia} + \text{NO}_3 + \text{NO}_2$

| Parameter         | Concentration (mg/kg) |           | Limits     |
|-------------------|-----------------------|-----------|------------|
|                   | dry                   | wet       |            |
| PAN               | 15730.00              | 235.9500  |            |
| Ammonia           | 6670.00               | 100.0500  |            |
| TKN               | 45300.00              | 679.5000  |            |
| Nitrates/Nitrites | 1334.00               | 20.0100   |            |
| Organic N         | 38630.00              | 579.4500  |            |
| Arsenic           | 33.30                 | 0.4995    | 75 mg/kg   |
| Cadmium           | 6.67                  | 0.1001    | 85 mg/kg   |
| Chromium          | 16.70                 | 0.2505    | 3000 mg/kg |
| Copper            | 48.90                 | 0.7335    | 4300 mg/kg |
| Lead              | 20.00                 | 0.3000    | 840 mg/kg  |
| Mercury           | 11.30                 | 0.1695    | 57 mg/kg   |
| Molybdenum        | 16.70                 | 0.2505    | 75 mg/kg   |
| Nickel            | 16.70                 | 0.2505    | 420 mg/kg  |
| Phosphorus        | 8800.00               | 132.0000  |            |
| Potassium         | 5870.00               | 88.0500   |            |
| Selenium          | 33.30                 | 0.4995    | 100 mg/kg  |
| Zinc              | 350.00                | 5.2500    | 7500 mg/kg |
| Iron              |                       |           |            |
| Sodium            | 140000.00             | 2100.0000 |            |
| Barium            |                       |           |            |
| Silver            |                       |           |            |
| Calcium           | 7400.00               | 111.0000  |            |
| Magnesium         | 1140.00               | 17.1000   |            |
| Manganese         | 33.30                 | 0.4995    |            |
| Chloride          | 2790.00               | 41.8500   |            |
| Sulfur            | 2750.00               | 41.2500   |            |
| Oil & Grease      |                       | 2         |            |
| BOD               |                       |           |            |
| pcb               |                       |           |            |
| Fecal Coliform    |                       |           |            |
| TCLP              |                       |           |            |
| ph                | 7.40                  |           |            |
| % solidsS         | 1.50                  |           |            |
| % Vol Solids      | 66.60                 |           |            |
| % Moisture        | 98.50                 |           |            |
| lbs/gallon        | 7.50                  |           |            |
| dry tons/load     | 0.34                  |           |            |

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 10.6178

Phospate (P2O5): 13.6000

Potash (K2O): 4.7500

SP:

Max. Allowable App Rate at:

| Crop            | PAN | App Rate |
|-----------------|-----|----------|
| Corn            | 150 | 81,818   |
| Bermuda Pasture | 240 | 130,909  |
| Soybeans        | 60  | 32,727   |
| Wheat           | 75  | 40,909   |

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/17/2023

Received : 05/03/2023

Report Number : **23-123-0244**

**REPORT OF ANALYSIS**

Lab No : **86958**

Matrix: **Solids**

Sample ID : **Sonoco Kerry - Mizkan Americas, Crossville, TN (SONCROS)**

Sampled: **5/2/2023 11:30**

| Test                              | Results       | Units       | MQL    | DF | Date / Time Analyzed | By  | Analytical Method |
|-----------------------------------|---------------|-------------|--------|----|----------------------|-----|-------------------|
| Organic Matter                    | <b>60.5</b>   | %           | 0.100  | 1  | 05/16/23 11:00       | VVP | ASTM D2974        |
| Neutralizing Value (%CCE)         | <b>4.6</b>    | %           | 0.1    | 1  | 05/08/23 16:45       | DXT | AOAC 955.01       |
| Moisture                          | <b>98.5</b>   | %           |        | 1  | 05/09/23 16:45       | JLS | SW-DRYWT          |
| Ammonia Nitrogen                  | <6670         | mg/Kg - dry | 6670   | 1  | 05/09/23 13:00       | JPJ | 4500NH3C-2011     |
| Biochemical Oxygen Demand (5-day) | <b>459000</b> | mg/Kg - dry | 160000 | 1  | 05/04/23 08:15       | JJZ | 5210B-2016        |
| Chloride                          | <b>2790</b>   | mg/Kg - dry | 2670   | 10 | 05/10/23 00:14       | SRJ | 9056A             |
| Conductivity                      | <b>967</b>    | µS/cm       |        | 1  | 05/12/23 16:04       | CMF | 2510B-2011        |
| Nitrate (NO3-N)                   | <667          | mg/Kg - dry | 667    | 10 | 05/10/23 00:14       | SRJ | 9056A             |
| Nitrite (NO2-N)                   | <667          | mg/Kg - dry | 667    | 10 | 05/10/23 00:14       | SRJ | 9056A             |
| Nitrate+Nitrite-N                 | <667          | mg/Kg - dry | 667    | 10 | 05/10/23 00:14       |     | 9056A             |
| HEM: Oil and Grease               | <17700        | mg/Kg - dry | 17700  | 1  | 05/12/23 10:28       | SMS | SW-9071B          |
| pH                                | <b>7.4</b>    | s.u.        |        | 1  | 05/11/23 15:30       | CNB | 9045D             |
| Total Solids                      | <b>1.50</b>   | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Volatile Solids             | <b>66.6</b>   | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Kjeldahl Nitrogen           | <b>45300</b>  | mg/Kg - dry | 13900  | 1  | 05/08/23 16:01       | ANH | 4500NORGD-2011    |
| Phosphorus                        | <b>8800</b>   | mg/Kg - dry | 333    | 1  | 05/06/23 04:44       | BKN | 6010D             |
| Arsenic                           | <33.3         | mg/Kg - dry | 33.3   | 1  | 05/06/23 04:44       | BKN | 6010D             |
| Boron                             | <167          | mg/Kg - dry | 167    | 1  | 05/06/23 04:44       | BKN | 6010D             |
| Cadmium                           | <6.67         | mg/Kg - dry | 6.67   | 1  | 05/06/23 04:44       | BKN | 6010D             |
| Calcium                           | <b>7400</b>   | mg/Kg - dry | 3330   | 1  | 05/06/23 04:44       | BKN | 6010D             |
| Chromium                          | <16.7         | mg/Kg - dry | 16.7   | 1  | 05/06/23 04:44       | BKN | 6010D             |
| Copper                            | <b>48.9</b>   | mg/Kg - dry | 33.3   | 1  | 05/06/23 04:44       | BKN | 6010D             |
| Lead                              | <20.0         | mg/Kg - dry | 20.0   | 1  | 05/06/23 04:44       | BKN | 6010D             |

**Qualifiers/  
Definitions**

DF

Dilution Factor

MQL

Method Quantitation Limit

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/17/2023  
Received : 05/03/2023

Report Number : **23-123-0244**

## REPORT OF ANALYSIS

Lab No : **86958**

Matrix: **Solids**

Sample ID : **Sonoco Kerry - Mizkan Americas, Crossville, TN (SONCROS)**

Sampled: **5/2/2023 11:30**

| Test       | Results       | Units       | MQL  | DF | Date / Time Analyzed | By  | Analytical Method |
|------------|---------------|-------------|------|----|----------------------|-----|-------------------|
| Magnesium  | <b>1140</b>   | mg/Kg - dry | 333  | 1  | 05/06/23 04:44       | BKN | 6010D             |
| Manganese  | <33.3         | mg/Kg - dry | 33.3 | 1  | 05/06/23 04:44       | BKN | 6010D             |
| Mercury    | <11.3         | mg/Kg - dry | 11.3 | 1  | 05/10/23 12:44       | FDS | 7471A             |
| Molybdenum | <16.7         | mg/Kg - dry | 16.7 | 1  | 05/06/23 04:44       | BKN | 6010D             |
| Nickel     | <16.7         | mg/Kg - dry | 16.7 | 1  | 05/06/23 04:44       | BKN | 6010D             |
| Potassium  | <b>5870</b>   | mg/Kg - dry | 667  | 1  | 05/06/23 04:44       | BKN | 6010D             |
| Selenium   | <33.3         | mg/Kg - dry | 33.3 | 1  | 05/06/23 04:44       | BKN | 6010D             |
| Sodium     | <b>140000</b> | mg/Kg - dry | 1670 | 1  | 05/06/23 04:44       | BKN | 6010D             |
| Zinc       | <b>350</b>    | mg/Kg - dry | 83.3 | 1  | 05/06/23 04:44       | BKN | 6010D             |
| Sulfur     | <b>2750</b>   | mg/Kg - dry | 667  | 1  | 05/06/23 04:44       | BKN | 6010D             |

### Qualifiers/ Definitions

DF

Dilution Factor

MQL

Method Quantitation Limit

# Loading Rate Tabulation

Environmental



Facility: M&M Mars  
Analysis Date: 1/18/2023  
Analysis Note:

Product: Sludge  
State: TN  
Application Type: Subsurface  
PAN:  $20\% \times (\text{TKN} - \text{Ammonia}) + 100\% \times \text{Ammonia} + \text{NO}_3 + \text{NO}_2$

AIC Control # 2301L42-007  
Internal ID: 6836

| Parameter         | Concentration (mg/kg) |          | Limits     |
|-------------------|-----------------------|----------|------------|
|                   | dry                   | wet      |            |
| PAN               | 6745.00               | 207.7460 |            |
| Ammonia           | 1100.00               | 33.8800  |            |
| TKN               | 29300.00              | 902.4400 |            |
| Nitrates/Nitrites | 5.00                  | 0.1540   |            |
| Organic N         | 28200.00              | 868.5600 |            |
| Arsenic           | 8.10                  | 0.2495   | 75 mg/kg   |
| Cadmium           | 8.10                  | 0.2495   | 85 mg/kg   |
| Chromium          |                       |          | 3000 mg/kg |
| Copper            | 315.00                | 9.7020   | 4300 mg/kg |
| Lead              | 16.20                 | 0.4990   | 840 mg/kg  |
| Mercury           | 2.82                  | 0.0869   | 57 mg/kg   |
| Molybdenum        | 16.20                 | 0.4990   | 75 mg/kg   |
| Nickel            | 16.20                 | 0.4990   | 420 mg/kg  |
| Phosphorus        | 3910.00               | 120.4280 |            |
| Potassium         | 324.00                | 9.9792   |            |
| Selenium          | 11.30                 | 0.3480   | 100 mg/kg  |
| Zinc              | 327.00                | 10.0716  | 7500 mg/kg |
| Iron              |                       |          |            |
| Barium            |                       |          |            |
| Silver            |                       |          |            |
| Calcium           |                       |          |            |
| Magnesium         |                       |          |            |
| Manganese         |                       |          |            |
| Chloride          |                       |          |            |
| Sulfur            |                       |          |            |
| Oil & Grease      |                       |          |            |
| BOD               |                       |          |            |
| pcb               |                       |          |            |
| Fecal Coliform    |                       |          |            |
| TCLP              |                       |          |            |
| ph                | 5.63                  |          |            |
| % solids          | 3.08                  |          |            |
| % Vol Solids      | 84.50                 |          |            |
| % Moisture        | 96.90                 |          |            |
| lbs/gallon        | 8.34                  |          |            |
| dry tons/load     | 0.77                  |          |            |

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 10.3956

Phospate (P2O5): 13.8000

Potash (K2O): 0.6000

SP:

Max. Allowable App Rate at:

| Crop            | PAN | App Rate |
|-----------------|-----|----------|
| Corn            | 150 | 90,000   |
| Bermuda Pasture | 240 | 144,000  |
| Soybeans        | 60  | 36,000   |
| Wheat           | 75  | 45,000   |



**Client:** Denali Water Solutions  
**Project Name:** GA-4 Samples  
**Lab ID:** 2301L42-007

**Client Sample ID:** M&M Mars  
**Collection Date:** 1/18/2023 2:30:00 PM  
**Matrix:** Sludge

| Analyses                                                  | Result | Reporting Limit | Qual | Units               | BatchID | Dilution Factor | Date Analyzed    | Analyst |
|-----------------------------------------------------------|--------|-----------------|------|---------------------|---------|-----------------|------------------|---------|
| <b>Total, Volatile, and Fixed Residue by SM2540G-2015</b> |        |                 |      | <b>(SM2540G)</b>    |         |                 |                  |         |
| % Total Solids                                            | 3.08   | 0.00100         |      | wt%                 | 349958  | 1               | 01/23/2023 17:27 | LS      |
| % Volatile Solids                                         | 84.5   | 0.00100         |      | wt%                 | 349958  | 1               | 01/23/2023 17:27 | LS      |
| <b>Total Phosphorus, soils E365.1</b>                     |        |                 |      | <b>(E365.1)</b>     |         |                 |                  |         |
| Phosphorus, Total (As P)                                  | 3910   | 332             |      | mg/Kg-dry           | 349810  | 1               | 01/23/2023 11:26 | MS      |
| <b>TOTAL MERCURY SW7471B</b>                              |        |                 |      | <b>(SW7471B)</b>    |         |                 |                  |         |
| Mercury                                                   | BRL    | 2.82            |      | mg/Kg-dry           | 349901  | 1               | 01/23/2023 18:05 | GR      |
| <b>Nitrogen, total Kjeldahl (TKN) Extractable E351.2M</b> |        |                 |      | <b>(E351.2 MOD)</b> |         |                 |                  |         |
| Nitrogen, total Kjeldahl(TKN)Extractable                  | 29300  | 1640            |      | mg/Kg-dry           | 349802  | 1               | 01/25/2023 12:10 | JO      |
| <b>NITROGEN, TOTAL E351.2M+E353.2M</b>                    |        |                 |      |                     |         |                 |                  |         |
| Nitrogen, Total                                           | 905    | 50.0            |      | mg/Kg-dry           | R507239 | 1               | 01/26/2023 00:00 | JO      |
| <b>Nitrogen, Nitrate (as N) Ext. E353.2 MOD</b>           |        |                 |      |                     |         |                 |                  |         |
| Nitrogen, Nitrate (as N) Extractable                      | BRL    | 5.00            |      | mg/Kg-dry           | R506861 | 1               | 01/23/2023 00:00 | AA      |
| <b>Nitrogen, Ammonia (as N) Extractable E350.1 MOD</b>    |        |                 |      | <b>(E350.1)</b>     |         |                 |                  |         |
| Nitrogen, Ammonia (As N) Extractable                      | 1100   | 318             |      | mg/Kg-dry           | 349767  | 1               | 01/27/2023 15:17 | TL      |
| <b>Laboratory Hydrogen Ion (pH) SW9045D</b>               |        |                 |      | <b>(SW9045D)</b>    |         |                 |                  |         |
| pH                                                        | 5.63   | 0.01            | H    | pH Units            | 350104  | 1               | 01/25/2023 14:24 | AH      |
| Sample Temperature degrees C                              | 21.4   | 0.10            | H    | pH Units            | 350104  | 1               | 01/25/2023 14:24 | AH      |
| <b>METALS, TOTAL SW6010D</b>                              |        |                 |      | <b>(SW3050B)</b>    |         |                 |                  |         |
| Arsenic                                                   | BRL    | 8.10            |      | mg/Kg-dry           | 349778  | 1               | 01/26/2023 14:38 | EO      |
| Cadmium                                                   | BRL    | 8.10            |      | mg/Kg-dry           | 349778  | 1               | 01/26/2023 14:38 | EO      |
| Copper                                                    | 315    | 8.10            |      | mg/Kg-dry           | 349778  | 1               | 01/26/2023 14:38 | EO      |
| Lead                                                      | BRL    | 16.2            |      | mg/Kg-dry           | 349778  | 1               | 01/26/2023 14:38 | EO      |
| Molybdenum                                                | BRL    | 16.2            |      | mg/Kg-dry           | 349778  | 1               | 01/26/2023 14:38 | EO      |
| Nickel                                                    | BRL    | 16.2            |      | mg/Kg-dry           | 349778  | 1               | 01/26/2023 14:38 | EO      |
| Potassium                                                 | BRL    | 324             |      | mg/Kg-dry           | 349778  | 1               | 01/26/2023 14:38 | EO      |
| Selenium                                                  | BRL    | 11.3            |      | mg/Kg-dry           | 349778  | 1               | 01/26/2023 14:38 | EO      |
| Zinc                                                      | 327    | 16.2            |      | mg/Kg-dry           | 349778  | 1               | 01/26/2023 14:38 | EO      |
| <b>PERCENT MOISTURE D2216</b>                             |        |                 |      |                     |         |                 |                  |         |
| Percent Moisture                                          | 96.9   | 0               |      | wt%                 | R506898 | 1               | 01/23/2023 17:27 | LS      |

**Qualifiers:**

- \* Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value

- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- F Analyzed in the lab which is a deviation from the method
- < Less than Result value
- J Estimated value detected below Reporting Limit

# Loading Rate Tabulation

Environmental - Dewatering



Facility: Perdue Farms - Monterey, TN

Analysis Date: 3/31/2022

Analysis Note:

**Product:** Cake  
**State:** TN  
**Application Type:** Subsurface  
**PAN:** 20% × (TKN - Ammonia) + 100% × Ammonia + NO3 + NO2

AIC Control #: 22-075-0161

Internal ID: 5375

| Parameter         | Concentration (mg/kg) |                              | Limits     |
|-------------------|-----------------------|------------------------------|------------|
|                   | dry                   | lbs/ton                      |            |
| PAN               | 18994.17              | 37.9883                      |            |
| Ammonia           | 5210.00               | 10.4200                      |            |
| TKN               | 74100.00              | 148.2000                     |            |
| Nitrates/Nitrites | 6.17                  | 0.9995                       |            |
| Organic N         | 68890.00              | 137.7800                     |            |
| Arsenic           | 3.09                  | 0.0062                       | 75 mg/kg   |
| Cadmium           | 0.62                  | 0.0012                       | 85 mg/kg   |
| Chromium          | 4.82                  | 0.0096                       | 3000 mg/kg |
| Copper            | 10.30                 | 0.0206                       | 4300 mg/kg |
| Lead              | 1.85                  | 0.0037                       | 840 mg/kg  |
| Mercury           | 0.09                  | 0.0002                       | 57 mg/kg   |
| Molybdenum        | 2.48                  | 0.0050                       | 75 mg/kg   |
| Nickel            | 3.65                  | 0.0073                       | 420 mg/kg  |
| Phosphorus        | 10500.00              | 21.0000                      |            |
| Potassium         | 2190.00               | 4.3800                       |            |
| Selenium          | 3.09                  | 0.0062                       | 100 mg/kg  |
| Zinc              | 162.00                | 0.3240                       | 7500 mg/kg |
| Iron              |                       |                              |            |
| Sodium            | 1000.00               | 2.0000                       |            |
| Barium            |                       |                              |            |
| Silver            |                       |                              |            |
| Calcium           | 2090.00               | 4.1800                       |            |
| Magnesium         | 1170.00               | 2.3400                       |            |
| Manganese         | 8.83                  | 0.0177                       |            |
| Chloride          | 617.00                | 1.2340                       |            |
| Sulfur            | 6670.00               | 13.3400                      |            |
| Oil & Grease      | 1                     |                              |            |
| BOD               |                       |                              |            |
| pcb               |                       |                              |            |
| Fecal Coliform    |                       |                              |            |
| TCLP              |                       |                              |            |
| ph                | 5.60                  |                              |            |
| % solidsS         | 16.20                 |                              |            |
| % Vol Solids      | 96.00                 |                              |            |
| % Moisture        | 83.80                 |                              |            |
| Density           | 7.50 lbs/gallon       | 1,515.00 lbs/yd <sup>3</sup> |            |

**Tons per load at  
1 ton/load**

**Dry tons/load:** 0.16

**Plant-available nitrogen:** 6.1540

**Phospate (P2O5):** 7.7900

**Potash (K2O):** 0.8400

**Max. Allowable App Rate at:**

| <u>Crop</u>     | <u>PAN</u> | <u>App Rate</u> |
|-----------------|------------|-----------------|
| Corn            | 150        | 150,000         |
| Bermuda Pasture | 240        | 240,000         |
| Soybeans        | 60         | 60,000          |
| Wheat           | 75         | 75,000          |

11675

Denali Water Solutions  
Ms. Vanya Colburn  
P.O. Box 3036  
Russellville, AR 72802

Project TN2

Information : PERMONT- Cake

Report Date : 03/31/2022  
Received : 03/16/2022

Report Number : **22-075-0161**

**REPORT OF ANALYSIS**

Lab No : **91720**

Matrix: **Solids**

Sample ID : **Perdue Farms, Monterey, TN (PERMONT- Cake)**

Sampled: **3/16/2022 13:08**

| Test                              | Results        | Units       | MQL    | DF | Date / Time Analyzed | By  | Analytical Method |
|-----------------------------------|----------------|-------------|--------|----|----------------------|-----|-------------------|
| Carbon, Total                     | <b>57.3</b>    | %           | 0.10   | 1  | 03/23/22 14:09       | JCG | LECO              |
| Calcium (saturated paste)         | <b>0.481</b>   | meq/L       | 0.005  | 1  | 03/22/22 15:15       | JCG | Saturate Paste    |
| Magnesium (saturated paste)       | <b>0.382</b>   | meq/L       | 0.008  | 1  | 03/22/22 15:15       | JCG | Saturate Paste    |
| Sodium (saturated paste)          | <b>0.203</b>   | meq/L       | 0.004  | 1  | 03/22/22 15:15       | JCG | Saturate Paste    |
| Sodium Absorption Ratio           | <b>0.309</b>   |             |        | 1  | 03/22/22 15:15       | JCG | Saturate Paste    |
| Soluble Salts                     | <b>0.19</b>    | dS/m        | 0.01   | 1  | 03/22/22 09:00       | JVP | Soluble Salts     |
| Fecal Coliform                    | <b>37700 H</b> | MPN/g - dry | 11100  | 1  | 03/18/22 10:12       | SBA | 9221E-2011        |
| Loss on Ignition                  | <b>84.1</b>    | %           |        | 1  | 03/23/22 11:00       | VVP | AOAC 2.7.06       |
| Neutralizing Value (%CCE)         | <b>7.4</b>     | %           | 0.1    | 1  | 03/24/22 00:00       | DXT | AOAC 955.01       |
| Moisture                          | <b>83.8</b>    | %           |        | 1  | 03/18/22 16:02       | FMM | SW-DRYWT          |
| Ash                               | <b>0.646</b>   | %           | 0.010  | 1  | 03/18/22 16:02       | FMM | 2540G-2011        |
| Ammonia Nitrogen                  | <b>5210</b>    | mg/Kg - dry | 617    | 1  | 03/23/22 13:07       | JPJ | 4500NH3C-2011     |
| Biochemical Oxygen Demand (5-day) | <b>431000</b>  | mg/Kg - dry | 123000 | 1  | 03/17/22 09:50       | RDP | 5210B-2016        |
| Chloride                          | <b>617</b>     | mg/Kg - dry | 24.7   | 1  | 03/19/22 01:02       | JCA | 9056A             |
| Nitrate (NO3-N)                   | <6.17          | mg/Kg - dry | 6.17   | 1  | 03/19/22 01:02       | JCA | 9056A             |
| Nitrite (NO2-N)                   | <6.17          | mg/Kg - dry | 6.17   | 1  | 03/19/22 01:02       | JCA | 9056A             |
| Nitrate+Nitrite-N                 | <6.17          | mg/Kg - dry | 6.17   | 1  | 03/19/22 01:02       |     | 9056A             |
| HEM: Oil and Grease               | <b>7590</b>    | mg/Kg - dry | 889    | 1  | 03/22/22 09:07       | MEJ | SW-9071B          |
| pH                                | <b>5.6</b>     | s.u.        |        | 1  | 03/23/22 15:45       | DRS | 9045D             |
| Total Solids                      | <b>16.2</b>    | %           | 0.010  | 1  | 03/18/22 16:02       | FMM | 2540G-2011        |
| Total Volatile Solids             | <b>96.0</b>    | %           | 0.010  | 1  | 03/18/22 16:02       | FMM | 2540G-2011        |
| Total Kjeldahl Nitrogen           | <b>74100</b>   | mg/Kg - dry | 14100  | 10 | 03/22/22 16:29       | CLP | 4500NORGD-2011    |
| Phosphorus                        | <b>10500</b>   | mg/Kg - dry | 30.9   | 1  | 03/24/22 06:09       | JTR | 6010D             |

**Qualifiers/  
Definitions**

DF Dilution Factor  
MQL Method Quantitation Limit

H Beyond holding time

11675

Denali Water Solutions  
Ms. Vanya Colburn  
P.O. Box 3036  
Russellville, AR 72802

Project TN2

Information : PERMONT- Cake

Report Date : 03/31/2022  
Received : 03/16/2022

Report Number : **22-075-0161**

**REPORT OF ANALYSIS**

Lab No : **91720**

Sample ID : **Perdue Farms, Monterey, TN (PERMONT- Cake)**

Matrix: **Solids**

Sampled: **3/16/2022 13:08**

| Test       | Results     | Units       | MQL    | DF | Date / Time Analyzed | By  | Analytical Method |
|------------|-------------|-------------|--------|----|----------------------|-----|-------------------|
| Arsenic    | <3.09       | mg/Kg - dry | 3.09   | 1  | 03/24/22 06:09       | JTR | 6010D             |
| Boron      | <15.4       | mg/Kg - dry | 15.4   | 1  | 03/24/22 06:09       | JTR | 6010D             |
| Cadmium    | <0.617      | mg/Kg - dry | 0.617  | 1  | 03/24/22 06:09       | JTR | 6010D             |
| Calcium    | <b>2090</b> | mg/Kg - dry | 309    | 1  | 03/24/22 06:09       | JTR | 6010D             |
| Chromium   | <b>4.82</b> | mg/Kg - dry | 1.54   | 1  | 03/24/22 06:09       | EAL | 6010D             |
| Copper     | <b>10.3</b> | mg/Kg - dry | 3.09   | 1  | 03/24/22 06:09       | JTR | 6010D             |
| Lead       | <1.85       | mg/Kg - dry | 1.85   | 1  | 03/24/22 06:09       | JTR | 6010D             |
| Magnesium  | <b>1170</b> | mg/Kg - dry | 30.9   | 1  | 03/24/22 06:09       | JTR | 6010D             |
| Manganese  | <b>8.83</b> | mg/Kg - dry | 3.09   | 1  | 03/29/22 06:09       | TJS | 6010D             |
| Mercury    | <0.0920     | mg/Kg - dry | 0.0920 | 1  | 03/21/22 16:29       | ZMT | 7471A             |
| Molybdenum | <b>2.48</b> | mg/Kg - dry | 1.54   | 1  | 03/24/22 06:09       | JTR | 6010D             |
| Nickel     | <b>3.65</b> | mg/Kg - dry | 1.54   | 1  | 03/24/22 06:09       | JTR | 6010D             |
| Potassium  | <b>2190</b> | mg/Kg - dry | 61.7   | 1  | 03/24/22 06:09       | JTR | 6010D             |
| Selenium   | <3.09       | mg/Kg - dry | 3.09   | 1  | 03/24/22 06:09       | JTR | 6010D             |
| Sodium     | <b>1000</b> | mg/Kg - dry | 154    | 1  | 03/24/22 06:09       | JTR | 6010D             |
| Zinc       | <b>162</b>  | mg/Kg - dry | 7.72   | 1  | 03/24/22 06:09       | JTR | 6010D             |
| Sulfur     | <b>6670</b> | mg/Kg - dry | 61.7   | 1  | 03/24/22 06:09       | JTR | 6010D             |

**Qualifiers/  
Definitions**

DF Dilution Factor  
MQL Method Quantitation Limit

H Beyond holding time

# Loading Rate Tabulation

Environmental



Facility: Perdue Farms - Monterey, TN

Analysis Date: 5/2/2023

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 23-123-0245

Internal ID: 7078

PAN:  $20\% \times (\text{TKN} - \text{Ammonia}) + 100\% \times \text{Ammonia} + \text{NO}_3 + \text{NO}_2$

| Parameter         | Concentration (mg/kg) |           | Limits     |
|-------------------|-----------------------|-----------|------------|
|                   | dry                   | wet       |            |
| PAN               | 13188.40              | 1529.8544 |            |
| Ammonia           | 3220.00               | 373.5200  |            |
| TKN               | 52200.00              | 6055.2000 |            |
| Nitrates/Nitrites | 172.40                | 19.9984   |            |
| Organic N         | 48980.00              | 5681.6800 |            |
| Arsenic           | 4.31                  | 0.5000    | 75 mg/kg   |
| Cadmium           | 0.86                  | 0.1000    | 85 mg/kg   |
| Chromium          | 23.30                 | 2.7028    | 3000 mg/kg |
| Copper            | 31.10                 | 3.6076    | 4300 mg/kg |
| Lead              | 2.59                  | 0.3004    | 840 mg/kg  |
| Mercury           | 1.56                  | 0.1810    | 57 mg/kg   |
| Molybdenum        | 2.16                  | 0.2506    | 75 mg/kg   |
| Nickel            | 7.27                  | 0.8433    | 420 mg/kg  |
| Phosphorus        | 8470.00               | 982.5200  |            |
| Potassium         | 1160.00               | 134.5600  |            |
| Selenium          | 4.31                  | 0.5000    | 100 mg/kg  |
| Zinc              | 140.00                | 16.2400   | 7500 mg/kg |
| Iron              |                       |           |            |
| Sodium            | 1260.00               | 146.1600  |            |
| Barium            |                       |           |            |
| Silver            |                       |           |            |
| Calcium           | 6260.00               | 726.1600  |            |
| Magnesium         | 713.00                | 82.7080   |            |
| Manganese         | 52.80                 | 6.1248    |            |
| Chloride          | 1320.00               | 153.1200  |            |
| Sulfur            | 4790.00               | 555.6400  |            |
| Oil & Grease      |                       | 11        |            |
| BOD               |                       |           |            |
| pcb               |                       |           |            |
| Fecal Coliform    |                       |           |            |
| TCLP              |                       |           |            |
| ph                | 6.20                  |           |            |
| % solidsS         | 11.60                 |           |            |
| % Vol Solids      | 94.30                 |           |            |
| % Moisture        | 88.40                 |           |            |
| lbs/gallon        | 7.50                  |           |            |
| dry tons/load     | 2.61                  |           |            |

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 68.8434

Phospate (P2O5): 101.2500

Potash (K2O): 7.2700

SP:

Max. Allowable App Rate at:

| Crop            | PAN | App Rate |
|-----------------|-----|----------|
| Corn            | 150 | 13,043   |
| Bermuda Pasture | 240 | 20,870   |
| Soybeans        | 60  | 5,217    |
| Wheat           | 75  | 6,522    |



20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/17/2023  
Received : 05/03/2023

Report Number : **23-123-0245**

**REPORT OF ANALYSIS**

Lab No : **86959**

Matrix: **Solids**

Sample ID : **Perdue Farms, Monterey, TN (PERMONT-Sludge)**

Sampled: **5/2/2023 12:00**

| Test                              | Results        | Units       | MQL    | DF | Date / Time Analyzed | By  | Analytical Method |
|-----------------------------------|----------------|-------------|--------|----|----------------------|-----|-------------------|
| Organic Matter                    | <b>94.6</b>    | %           | 0.100  | 1  | 05/16/23 11:00       | VVP | ASTM D2974        |
| Neutralizing Value (%CCE)         | <b>8.9</b>     | %           | 0.1    | 1  | 05/08/23 16:45       | DXT | AOAC 955.01       |
| Moisture                          | <b>88.4</b>    | %           |        | 1  | 05/09/23 16:45       | JLS | SW-DRYWT          |
| Ammonia Nitrogen                  | <b>3220</b>    | mg/Kg - dry | 862    | 1  | 05/09/23 14:45       | JPJ | 4500NH3C-2011     |
| Biochemical Oxygen Demand (5-day) | <b>1030000</b> | mg/Kg - dry | 517000 | 1  | 05/04/23 08:15       | JJZ | 5210B-2016        |
| Chloride                          | <b>1320</b>    | mg/Kg - dry | 345    | 10 | 05/10/23 16:51       | SRJ | 9056A             |
| Conductivity                      | <b>1460</b>    | µS/cm       |        | 1  | 05/12/23 15:50       | CMF | 2510B-2011        |
| Nitrate (NO3-N)                   | <86.2          | mg/Kg - dry | 86.2   | 10 | 05/10/23 16:51       | SRJ | 9056A             |
| Nitrite (NO2-N)                   | <86.2          | mg/Kg - dry | 86.2   | 10 | 05/10/23 16:51       | SRJ | 9056A             |
| Nitrate+Nitrite-N                 | <86.2          | mg/Kg - dry | 86.2   | 10 | 05/10/23 16:51       |     | 9056A             |
| HEM: Oil and Grease               | <b>110000</b>  | mg/Kg - dry | 2190   | 1  | 05/12/23 10:28       | SMS | SW-9071B          |
| pH                                | <b>6.2</b>     | s.u.        |        | 1  | 05/11/23 15:30       | CNB | 9045D             |
| Total Solids                      | <b>11.6</b>    | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Volatile Solids             | <b>94.3</b>    | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Kjeldahl Nitrogen           | <b>52200</b>   | mg/Kg - dry | 1920   | 1  | 05/08/23 16:04       | ANH | 4500NORGD-2011    |
| Phosphorus                        | <b>8470</b>    | mg/Kg - dry | 43.1   | 1  | 05/06/23 04:49       | BKN | 6010D             |
| Arsenic                           | <4.31          | mg/Kg - dry | 4.31   | 1  | 05/06/23 04:49       | BKN | 6010D             |
| Boron                             | <21.6          | mg/Kg - dry | 21.6   | 1  | 05/06/23 04:49       | BKN | 6010D             |
| Cadmium                           | <0.862         | mg/Kg - dry | 0.862  | 1  | 05/06/23 04:49       | BKN | 6010D             |
| Calcium                           | <b>6260</b>    | mg/Kg - dry | 431    | 1  | 05/06/23 04:49       | BKN | 6010D             |
| Chromium                          | <b>23.3</b>    | mg/Kg - dry | 2.16   | 1  | 05/06/23 04:49       | BKN | 6010D             |
| Copper                            | <b>31.1</b>    | mg/Kg - dry | 4.31   | 1  | 05/06/23 04:49       | BKN | 6010D             |
| Lead                              | <2.59          | mg/Kg - dry | 2.59   | 1  | 05/06/23 04:49       | BKN | 6010D             |

**Qualifiers/  
Definitions**

DF

Dilution Factor

MQL

Method Quantitation Limit

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/17/2023  
Received : 05/03/2023

Report Number : **23-123-0245**

## REPORT OF ANALYSIS

Lab No : **86959**

Matrix: **Solids**

Sample ID : **Perdue Farms, Monterey, TN (PERMONT-Sludge)**

Sampled: **5/2/2023 12:00**

| Test       | Results     | Units       | MQL  | DF | Date / Time Analyzed | By  | Analytical Method |
|------------|-------------|-------------|------|----|----------------------|-----|-------------------|
| Magnesium  | <b>713</b>  | mg/Kg - dry | 43.1 | 1  | 05/06/23 04:49       | BKN | 6010D             |
| Manganese  | <b>52.8</b> | mg/Kg - dry | 4.31 | 1  | 05/06/23 04:49       | BKN | 6010D             |
| Mercury    | <1.56       | mg/Kg - dry | 1.56 | 1  | 05/10/23 12:45       | FDS | 7471A             |
| Molybdenum | <2.16       | mg/Kg - dry | 2.16 | 1  | 05/06/23 04:49       | BKN | 6010D             |
| Nickel     | <b>7.27</b> | mg/Kg - dry | 2.16 | 1  | 05/06/23 04:49       | BKN | 6010D             |
| Potassium  | <b>1160</b> | mg/Kg - dry | 86.2 | 1  | 05/06/23 04:49       | BKN | 6010D             |
| Selenium   | <4.31       | mg/Kg - dry | 4.31 | 1  | 05/06/23 04:49       | BKN | 6010D             |
| Sodium     | <b>1260</b> | mg/Kg - dry | 216  | 1  | 05/06/23 04:49       | BKN | 6010D             |
| Zinc       | <b>140</b>  | mg/Kg - dry | 10.8 | 1  | 05/06/23 04:49       | BKN | 6010D             |
| Sulfur     | <b>4790</b> | mg/Kg - dry | 86.2 | 1  | 05/06/23 04:49       | BKN | 6010D             |

### Qualifiers/ Definitions

DF

Dilution Factor

MQL

Method Quantitation Limit

# Loading Rate Tabulation

Environmental



Facility: Pilgrim's Pride Debone - Chattanooga, TN

Analysis Date: 5/2/2023

Analysis Note:

Product: Land App - SPN/E

State: TN

Application Type: Subsurface

AIC Control # 23-123-0246

Internal ID: 7077

PAN: 20% × (TKN - Ammonia) + 100% × Ammonia + NO3 + NO2

| Parameter         | Concentration (mg/kg) |           | Limits     |
|-------------------|-----------------------|-----------|------------|
|                   | dry                   | wet       |            |
| PAN               | 26996.00              | 1133.8320 |            |
| Ammonia           | 10700.00              | 449.4000  |            |
| TKN               | 89800.00              | 3771.6000 |            |
| Nitrates/Nitrites | 476.00                | 19.9920   |            |
| Organic N         | 79100.00              | 3322.2000 |            |
| Arsenic           | 11.90                 | 0.4998    | 75 mg/kg   |
| Cadmium           | 2.38                  | 0.1000    | 85 mg/kg   |
| Chromium          | 58.60                 | 2.4612    | 3000 mg/kg |
| Copper            | 21.10                 | 0.8862    | 4300 mg/kg |
| Lead              | 7.14                  | 0.2999    | 840 mg/kg  |
| Mercury           | 4.52                  | 0.1898    | 57 mg/kg   |
| Molybdenum        | 5.95                  | 0.2499    | 75 mg/kg   |
| Nickel            | 23.40                 | 0.9828    | 420 mg/kg  |
| Phosphorus        | 3620.00               | 152.0400  |            |
| Potassium         | 1310.00               | 55.0200   |            |
| Selenium          | 11.90                 | 0.4998    | 100 mg/kg  |
| Zinc              | 462.00                | 19.4040   | 7500 mg/kg |
| Iron              |                       |           |            |
| Sodium            | 170.00                | 7.1400    |            |
| Barium            |                       |           |            |
| Silver            |                       |           |            |
| Calcium           | 3260.00               | 136.9200  |            |
| Magnesium         | 488.00                | 20.4960   |            |
| Manganese         | 13.30                 | 0.5586    |            |
| Chloride          | 1550.00               | 65.1000   |            |
| Sulfur            | 10400.00              | 436.8000  |            |
| Oil & Grease      |                       | 11        |            |
| BOD               |                       |           |            |
| pcb               |                       |           |            |
| Fecal Coliform    |                       |           |            |
| TCLP              |                       |           |            |
| ph                | 5.70                  |           |            |
| % solidsS         | 4.20                  |           |            |
| % Vol Solids      | 98.10                 |           |            |
| % Moisture        | 95.80                 |           |            |
| lbs/gallon        | 7.50                  |           |            |
| dry tons/load     | 0.95                  |           |            |

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 51.0224

Phospate (P2O5): 15.6700

Potash (K2O): 2.9700

SP:

Max. Allowable App Rate at:

| Crop            | PAN | App Rate |
|-----------------|-----|----------|
| Corn            | 150 | 17,647   |
| Bermuda Pasture | 240 | 28,235   |
| Soybeans        | 60  | 7,059    |
| Wheat           | 75  | 8,824    |

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/17/2023  
Received : 05/03/2023

Report Number : **23-123-0246**

**REPORT OF ANALYSIS**

Lab No : **86960**

Matrix: **Solids**

Sample ID : **Pilgrims Pride Debone, Chattanooga, TN (PILDBON)**

Sampled: **5/2/2023 12:30**

| Test                              | Results        | Units       | MQL    | DF | Date / Time Analyzed | By  | Analytical Method |
|-----------------------------------|----------------|-------------|--------|----|----------------------|-----|-------------------|
| Organic Matter                    | <b>92.9</b>    | %           | 0.100  | 1  | 05/16/23 11:00       | VVP | ASTM D2974        |
| Neutralizing Value (%CCE)         | <b>6.3</b>     | %           | 0.1    | 1  | 05/08/23 16:45       | DXT | AOAC 955.01       |
| Moisture                          | <b>95.8</b>    | %           |        | 1  | 05/09/23 16:45       | JLS | SW-DRYWT          |
| Ammonia Nitrogen                  | <b>10700</b>   | mg/Kg - dry | 2380   | 1  | 05/09/23 14:45       | JPJ | 4500NH3C-2011     |
| Biochemical Oxygen Demand (5-day) | <b>1170000</b> | mg/Kg - dry | 286000 | 1  | 05/04/23 08:15       | JJZ | 5210B-2016        |
| Chloride                          | <b>1550</b>    | mg/Kg - dry | 952    | 10 | 05/10/23 17:43       | SRJ | 9056A             |
| Conductivity                      | <b>1240</b>    | µS/cm       |        | 1  | 05/12/23 15:50       | CMF | 2510B-2011        |
| Nitrate (NO3-N)                   | <238           | mg/Kg - dry | 238    | 10 | 05/10/23 17:43       | SRJ | 9056A             |
| Nitrite (NO2-N)                   | <238           | mg/Kg - dry | 238    | 10 | 05/10/23 17:43       | SRJ | 9056A             |
| Nitrate+Nitrite-N                 | <238           | mg/Kg - dry | 238    | 10 | 05/10/23 17:43       |     | 9056A             |
| HEM: Oil and Grease               | <b>106000</b>  | mg/Kg - dry | 6330   | 1  | 05/12/23 10:28       | SMS | SW-9071B          |
| pH                                | <b>5.7</b>     | s.u.        |        | 1  | 05/11/23 15:30       | CNB | 9045D             |
| Total Solids                      | <b>4.20</b>    | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Volatile Solids             | <b>98.1</b>    | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Kjeldahl Nitrogen           | <b>89800</b>   | mg/Kg - dry | 4810   | 1  | 05/08/23 16:06       | ANH | 4500NORGD-2011    |
| Phosphorus                        | <b>3620</b>    | mg/Kg - dry | 119    | 1  | 05/06/23 04:54       | BKN | 6010D             |
| Arsenic                           | <11.9          | mg/Kg - dry | 11.9   | 1  | 05/06/23 04:54       | BKN | 6010D             |
| Boron                             | <59.5          | mg/Kg - dry | 59.5   | 1  | 05/06/23 04:54       | BKN | 6010D             |
| Cadmium                           | <2.38          | mg/Kg - dry | 2.38   | 1  | 05/06/23 04:54       | BKN | 6010D             |
| Calcium                           | <b>3260</b>    | mg/Kg - dry | 1190   | 1  | 05/06/23 04:54       | BKN | 6010D             |
| Chromium                          | <b>58.6</b>    | mg/Kg - dry | 5.95   | 1  | 05/06/23 04:54       | BKN | 6010D             |
| Copper                            | <b>21.1</b>    | mg/Kg - dry | 11.9   | 1  | 05/06/23 04:54       | BKN | 6010D             |
| Lead                              | <7.14          | mg/Kg - dry | 7.14   | 1  | 05/06/23 04:54       | BKN | 6010D             |

**Qualifiers/  
Definitions**

DF

Dilution Factor

MQL

Method Quantitation Limit

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/17/2023  
Received : 05/03/2023

Report Number : **23-123-0246**

## REPORT OF ANALYSIS

Lab No : **86960**

Matrix: **Solids**

Sample ID : **Pilgrims Pride Debone, Chattanooga, TN (PILDBON)**

Sampled: **5/2/2023 12:30**

| Test       | Results      | Units       | MQL  | DF | Date / Time Analyzed | By  | Analytical Method |
|------------|--------------|-------------|------|----|----------------------|-----|-------------------|
| Magnesium  | <b>488</b>   | mg/Kg - dry | 119  | 1  | 05/06/23 04:54       | BKN | 6010D             |
| Manganese  | <b>13.3</b>  | mg/Kg - dry | 11.9 | 1  | 05/06/23 04:54       | BKN | 6010D             |
| Mercury    | <4.52        | mg/Kg - dry | 4.52 | 1  | 05/10/23 12:47       | FDS | 7471A             |
| Molybdenum | <5.95        | mg/Kg - dry | 5.95 | 1  | 05/06/23 04:54       | BKN | 6010D             |
| Nickel     | <b>23.4</b>  | mg/Kg - dry | 5.95 | 1  | 05/06/23 04:54       | BKN | 6010D             |
| Potassium  | <b>1310</b>  | mg/Kg - dry | 238  | 1  | 05/06/23 04:54       | BKN | 6010D             |
| Selenium   | <11.9        | mg/Kg - dry | 11.9 | 1  | 05/06/23 04:54       | BKN | 6010D             |
| Sodium     | <b>1700</b>  | mg/Kg - dry | 595  | 1  | 05/06/23 04:54       | BKN | 6010D             |
| Zinc       | <b>462</b>   | mg/Kg - dry | 29.8 | 1  | 05/06/23 04:54       | BKN | 6010D             |
| Sulfur     | <b>10400</b> | mg/Kg - dry | 238  | 1  | 05/06/23 04:54       | BKN | 6010D             |

### Qualifiers/ Definitions

DF

Dilution Factor

MQL

Method Quantitation Limit

Microbiology by Method EPA 1681

| Analyte                   | Result | Qualifier | Dilution | Analysis         | Batch                     |
|---------------------------|--------|-----------|----------|------------------|---------------------------|
|                           | MPN/g  |           |          | date / time      |                           |
| Fecal Coliform            | <3960  |           | 1        | 09/20/2023 16:54 | <a href="#">WG2136031</a> |
| Fecal Coliform -Geom.Mean | <4370  |           | 1        | 09/21/2023 12:47 | <a href="#">WG2136031</a> |

Sample Narrative:

L1657526-01 WG2136031: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Microbiology by Method EPA 1681

| Analyte        | Result | Qualifier | Dilution | Analysis<br>date / time | Batch                     |
|----------------|--------|-----------|----------|-------------------------|---------------------------|
| Fecal Coliform | <6460  |           | 1        | 09/20/2023 16:54        | <a href="#">WG2136031</a> |

Sample Narrative:

L1657526-02 WG2136031: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Microbiology by Method EPA 1681

| Analyte        | Result | Qualifier | Dilution | Analysis         | Batch                     |
|----------------|--------|-----------|----------|------------------|---------------------------|
|                | MPN/g  |           |          | date / time      |                           |
| Fecal Coliform | <3210  |           | 1        | 09/20/2023 16:54 | <a href="#">WG2136031</a> |

Sample Narrative:

L1657526-03 WG2136031: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Microbiology by Method EPA 1681

| Analyte        | Result | Qualifier | Dilution | Analysis<br>date / time | Batch                     |
|----------------|--------|-----------|----------|-------------------------|---------------------------|
| Fecal Coliform | <5620  |           | 1        | 09/20/2023 16:54        | <a href="#">WG2136031</a> |

Sample Narrative:

L1657526-04 WG2136031: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Microbiology by Method EPA 1681

| Analyte        | Result | Qualifier | Dilution | Analysis<br>date / time | Batch                     |
|----------------|--------|-----------|----------|-------------------------|---------------------------|
| Fecal Coliform | <3490  |           | 1        | 09/20/2023 16:54        | <a href="#">WG2136031</a> |

Sample Narrative:

L1657526-05 WG2136031: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Microbiology by Method EPA 1681

| Analyte        | Result | Qualifier | Dilution | Analysis<br>date / time | Batch                     |
|----------------|--------|-----------|----------|-------------------------|---------------------------|
| Fecal Coliform | <4050  |           | 1        | 09/20/2023 16:54        | <a href="#">WG2136031</a> |

Sample Narrative:

L1657526-06 WG2136031: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Microbiology by Method EPA 1681

| Analyte        | Result | Qualifier | Dilution | Analysis<br>date / time | Batch                     |
|----------------|--------|-----------|----------|-------------------------|---------------------------|
| Fecal Coliform | <4650  |           | 1        | 09/20/2023 16:54        | <a href="#">WG2136031</a> |

Sample Narrative:

L1657526-07 WG2136031: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



# Loading Rate Tabulation

Environmental



Facility: Rich Products Corporation Plant #1 - Morristown, TN

Analysis Date: 5/2/2023

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 23-123-0247

Internal ID: 7076

PAN:  $20\% \times (\text{TKN} - \text{Ammonia}) + 100\% \times \text{Ammonia} + \text{NO}_3 + \text{NO}_2$

| Parameter         | Concentration (mg/kg) |           | Limits     |
|-------------------|-----------------------|-----------|------------|
|                   | dry                   | wet       |            |
| PAN               | 9660.00               | 406.6860  |            |
| Ammonia           | 2380.00               | 100.1980  |            |
| TKN               | 36400.00              | 1532.4400 |            |
| Nitrates/Nitrites | 476.00                | 20.0396   |            |
| Organic N         | 34020.00              | 1432.2420 |            |
| Arsenic           | 11.90                 | 0.5010    | 75 mg/kg   |
| Cadmium           | 2.38                  | 0.1002    | 85 mg/kg   |
| Chromium          | 10.40                 | 0.4378    | 3000 mg/kg |
| Copper            | 31.70                 | 1.3346    | 4300 mg/kg |
| Lead              | 7.14                  | 0.3006    | 840 mg/kg  |
| Mercury           | 4.33                  | 0.1823    | 57 mg/kg   |
| Molybdenum        | 5.95                  | 0.2505    | 75 mg/kg   |
| Nickel            | 5.95                  | 0.2505    | 420 mg/kg  |
| Phosphorus        | 4810.00               | 202.5010  |            |
| Potassium         | 1410.00               | 59.3610   |            |
| Selenium          | 11.90                 | 0.5010    | 100 mg/kg  |
| Zinc              | 52.40                 | 2.2060    | 7500 mg/kg |
| Iron              |                       |           |            |
| Sodium            | 9380.00               | 394.8980  |            |
| Barium            |                       |           |            |
| Silver            |                       |           |            |
| Calcium           | 5450.00               | 229.4450  |            |
| Magnesium         | 626.00                | 26.3546   |            |
| Manganese         | 15.30                 | 0.6441    |            |
| Chloride          | 2370.00               | 99.7770   |            |
| Sulfur            | 2290.00               | 96.4090   |            |
| Oil & Grease      |                       | 15        |            |
| BOD               |                       |           |            |
| pcb               |                       |           |            |
| Fecal Coliform    |                       |           |            |
| TCLP              |                       |           |            |
| ph                | 4.50                  |           |            |
| % solids          | 4.21                  |           |            |
| % Vol Solids      | 99.30                 |           |            |
| % Moisture        | 95.80                 |           |            |
| lbs/gallon        | 7.50                  |           |            |
| dry tons/load     | 0.95                  |           |            |

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 18.3009

Phosphate (P2O5): 20.8700

Potash (K2O): 3.2100

SP:

Max. Allowable App Rate at:

| Crop            | PAN | App Rate |
|-----------------|-----|----------|
| Corn            | 150 | 50,000   |
| Bermuda Pasture | 240 | 80,000   |
| Soybeans        | 60  | 20,000   |
| Wheat           | 75  | 25,000   |

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/17/2023

Received : 05/03/2023

Report Number : **23-123-0247**

**REPORT OF ANALYSIS**

Lab No : **86962**

Matrix: **Solids**

Sample ID : **Rich Products Corporation Plant #1, Morristown, TN (RICMOR1)**

Sampled: **5/2/2023 13:00**

| Test                              | Results        | Units       | MQL    | DF | Date / Time Analyzed | By  | Analytical Method |
|-----------------------------------|----------------|-------------|--------|----|----------------------|-----|-------------------|
| Organic Matter                    | <b>92.0</b>    | %           | 0.100  | 1  | 05/16/23 11:00       | VVP | ASTM D2974        |
| Neutralizing Value (%CCE)         | <b>4.2</b>     | %           | 0.1    | 1  | 05/08/23 16:45       | DXT | AOAC 955.01       |
| Moisture                          | <b>95.8</b>    | %           |        | 1  | 05/09/23 16:45       | JLS | SW-DRYWT          |
| Ammonia Nitrogen                  | <2380          | mg/Kg - dry | 2380   | 1  | 05/09/23 14:45       | JPJ | 4500NH3C-2011     |
| Biochemical Oxygen Demand (5-day) | <b>1190000</b> | mg/Kg - dry | 286000 | 1  | 05/04/23 08:15       | JJZ | 5210B-2016        |
| Chloride                          | <b>2370</b>    | mg/Kg - dry | 952    | 10 | 05/10/23 18:09       | SRJ | 9056A             |
| Conductivity                      | <b>492</b>     | µS/cm       |        | 1  | 05/12/23 15:50       | CMF | 2510B-2011        |
| Nitrate (NO3-N)                   | <238           | mg/Kg - dry | 238    | 10 | 05/10/23 18:09       | SRJ | 9056A             |
| Nitrite (NO2-N)                   | <238           | mg/Kg - dry | 238    | 10 | 05/10/23 18:09       | SRJ | 9056A             |
| Nitrate+Nitrite-N                 | <238           | mg/Kg - dry | 238    | 10 | 05/10/23 18:09       |     | 9056A             |
| HEM: Oil and Grease               | <b>152000</b>  | mg/Kg - dry | 6710   | 1  | 05/12/23 10:28       | SMS | SW-9071B          |
| pH                                | <b>4.5</b>     | s.u.        |        | 1  | 05/11/23 15:30       | CNB | 9045D             |
| Total Solids                      | <b>4.21</b>    | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Volatile Solids             | <b>99.3</b>    | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Kjeldahl Nitrogen           | <b>36400</b>   | mg/Kg - dry | 5120   | 1  | 05/08/23 16:07       | ANH | 4500NORGD-2011    |
| Phosphorus                        | <b>4810</b>    | mg/Kg - dry | 119    | 1  | 05/09/23 22:41       | BKN | 6010D             |
| Arsenic                           | <11.9          | mg/Kg - dry | 11.9   | 1  | 05/09/23 22:41       | BKN | 6010D             |
| Boron                             | <59.5          | mg/Kg - dry | 59.5   | 1  | 05/09/23 22:41       | BKN | 6010D             |
| Cadmium                           | <2.38          | mg/Kg - dry | 2.38   | 1  | 05/09/23 22:41       | BKN | 6010D             |
| Calcium                           | <b>5450</b>    | mg/Kg - dry | 1190   | 1  | 05/09/23 22:41       | BKN | 6010D             |
| Chromium                          | <b>10.4</b>    | mg/Kg - dry | 5.95   | 1  | 05/09/23 22:41       | BKN | 6010D             |
| Copper                            | <b>31.7</b>    | mg/Kg - dry | 11.9   | 1  | 05/09/23 22:41       | BKN | 6010D             |
| Lead                              | <7.14          | mg/Kg - dry | 7.14   | 1  | 05/09/23 22:41       | BKN | 6010D             |

**Qualifiers/  
Definitions**

DF Dilution Factor

MQL

Method Quantitation Limit

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/17/2023  
Received : 05/03/2023

Report Number : **23-123-0247**

## REPORT OF ANALYSIS

Lab No : **86962**

Matrix: **Solids**

Sample ID : **Rich Products Corporation Plant #1, Morristown, TN (RICMOR1)**

Sampled: **5/2/2023 13:00**

| Test       | Results     | Units       | MQL  | DF | Date / Time Analyzed | By  | Analytical Method |
|------------|-------------|-------------|------|----|----------------------|-----|-------------------|
| Magnesium  | <b>626</b>  | mg/Kg - dry | 119  | 1  | 05/09/23 22:41       | BKN | 6010D             |
| Manganese  | <b>15.3</b> | mg/Kg - dry | 11.9 | 1  | 05/09/23 22:41       | BKN | 6010D             |
| Mercury    | <4.33       | mg/Kg - dry | 4.33 | 1  | 05/10/23 12:48       | FDS | 7471A             |
| Molybdenum | <5.95       | mg/Kg - dry | 5.95 | 1  | 05/09/23 22:41       | BKN | 6010D             |
| Nickel     | <5.95       | mg/Kg - dry | 5.95 | 1  | 05/09/23 22:41       | BKN | 6010D             |
| Potassium  | <b>1410</b> | mg/Kg - dry | 238  | 1  | 05/09/23 22:41       | BKN | 6010D             |
| Selenium   | <11.9       | mg/Kg - dry | 11.9 | 1  | 05/09/23 22:41       | BKN | 6010D             |
| Sodium     | <b>9380</b> | mg/Kg - dry | 595  | 1  | 05/09/23 22:41       | BKN | 6010D             |
| Zinc       | <b>52.4</b> | mg/Kg - dry | 29.8 | 1  | 05/10/23 11:07       | TJS | 6010D             |
| Sulfur     | <b>2290</b> | mg/Kg - dry | 238  | 1  | 05/09/23 22:41       | BKN | 6010D             |

### Qualifiers/ Definitions

DF

Dilution Factor

MQL

Method Quantitation Limit

# Loading Rate Tabulation

Environmental



Facility: Rich Products Corporation Plant #2 - Morristown, TN

Analysis Date: 5/2/2023

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 23-123-0248

Internal ID: 7075

PAN:  $20\% \times (\text{TKN} - \text{Ammonia}) + 100\% \times \text{Ammonia} + \text{NO}_3 + \text{NO}_2$

| Parameter         | Concentration (mg/kg) |           | Limits     |
|-------------------|-----------------------|-----------|------------|
|                   | dry                   | wet       |            |
| PAN               | 13598.00              | 440.5752  |            |
| Ammonia           | 4340.00               | 140.6160  |            |
| TKN               | 47500.00              | 1539.0000 |            |
| Nitrates/Nitrites | 626.00                | 20.2824   |            |
| Organic N         | 43160.00              | 1398.3840 |            |
| Arsenic           | 15.60                 | 0.5054    | 75 mg/kg   |
| Cadmium           | 3.13                  | 0.1014    | 85 mg/kg   |
| Chromium          | 18.20                 | 0.5897    | 3000 mg/kg |
| Copper            | 53.80                 | 1.7431    | 4300 mg/kg |
| Lead              | 9.38                  | 0.3039    | 840 mg/kg  |
| Mercury           | 6.00                  | 0.1944    | 57 mg/kg   |
| Molybdenum        | 9.06                  | 0.2935    | 75 mg/kg   |
| Nickel            | 8.91                  | 0.2887    | 420 mg/kg  |
| Phosphorus        | 8940.00               | 289.6560  |            |
| Potassium         | 2260.00               | 73.2240   |            |
| Selenium          | 15.60                 | 0.5054    | 100 mg/kg  |
| Zinc              | 104.00                | 3.3696    | 7500 mg/kg |
| Iron              |                       |           |            |
| Sodium            | 2510.00               | 81.3240   |            |
| Barium            |                       |           |            |
| Silver            |                       |           |            |
| Calcium           | 5660.00               | 183.3840  |            |
| Magnesium         | 1060.00               | 34.3440   |            |
| Manganese         | 21.80                 | 0.7063    |            |
| Chloride          | 1810.00               | 58.6440   |            |
| Sulfur            | 4810.00               | 155.8440  |            |
| Oil & Grease      |                       | 1         |            |
| BOD               |                       |           |            |
| pcb               |                       |           |            |
| Fecal Coliform    |                       |           |            |
| TCLP              |                       |           |            |
| ph                | 4.40                  |           |            |
| % solidsS         | 3.24                  |           |            |
| % Vol Solids      | 95.80                 |           |            |
| % Moisture        | 96.80                 |           |            |
| lbs/gallon        | 7.50                  |           |            |
| dry tons/load     | 0.73                  |           |            |

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 19.8259

Phospate (P2O5): 29.8500

Potash (K2O): 3.9500

SP:

Max. Allowable App Rate at:

| Crop            | PAN | App Rate |
|-----------------|-----|----------|
| Corn            | 150 | 45,000   |
| Bermuda Pasture | 240 | 72,000   |
| Soybeans        | 60  | 18,000   |
| Wheat           | 75  | 22,500   |

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/17/2023  
Received : 05/03/2023

Report Number : **23-123-0248**

**REPORT OF ANALYSIS**

Lab No : **86964**

Matrix: **Solids**

Sample ID : **Rich Products Corporation Plant #2, Morristown, TN (RICMOR2)**

Sampled: **5/2/2023 13:15**

| Test                              | Results        | Units       | MQL    | DF | Date / Time Analyzed | By  | Analytical Method |
|-----------------------------------|----------------|-------------|--------|----|----------------------|-----|-------------------|
| Organic Matter                    | <b>91.3</b>    | %           | 0.100  | 1  | 05/16/23 11:00       | VVP | ASTM D2974        |
| Neutralizing Value (%CCE)         | <b>3.6</b>     | %           | 0.1    | 1  | 05/08/23 16:45       | DXT | AOAC 955.01       |
| Moisture                          | <b>96.8</b>    | %           |        | 1  | 05/09/23 16:45       | JLS | SW-DRYWT          |
| Ammonia Nitrogen                  | <b>4340</b>    | mg/Kg - dry | 3130   | 1  | 05/09/23 14:45       | JPJ | 4500NH3C-2011     |
| Biochemical Oxygen Demand (5-day) | <b>1410000</b> | mg/Kg - dry | 375000 | 1  | 05/04/23 08:15       | JJZ | 5210B-2016        |
| Chloride                          | <b>1810</b>    | mg/Kg - dry | 1250   | 10 | 05/10/23 18:34       | SRJ | 9056A             |
| Conductivity                      | <b>502</b>     | µS/cm       |        | 1  | 05/12/23 16:04       | CMF | 2510B-2011        |
| Nitrate (NO3-N)                   | <313           | mg/Kg - dry | 313    | 10 | 05/10/23 18:34       | SRJ | 9056A             |
| Nitrite (NO2-N)                   | <313           | mg/Kg - dry | 313    | 10 | 05/10/23 18:34       | SRJ | 9056A             |
| Nitrate+Nitrite-N                 | <313           | mg/Kg - dry | 313    | 10 | 05/10/23 18:34       |     | 9056A             |
| HEM: Oil and Grease               | <8780          | mg/Kg - dry | 8780   | 1  | 05/12/23 10:28       | SMS | SW-9071B          |
| pH                                | <b>4.4</b>     | s.u.        |        | 1  | 05/11/23 15:30       | CNB | 9045D             |
| Total Solids                      | <b>3.24</b>    | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Volatile Solids             | <b>95.8</b>    | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Kjeldahl Nitrogen           | <b>47500</b>   | mg/Kg - dry | 6780   | 1  | 05/08/23 16:08       | ANH | 4500NORGD-2011    |
| Phosphorus                        | <b>8940</b>    | mg/Kg - dry | 156    | 1  | 05/09/23 22:46       | BKN | 6010D             |
| Arsenic                           | <15.6          | mg/Kg - dry | 15.6   | 1  | 05/09/23 22:46       | BKN | 6010D             |
| Boron                             | <78.1          | mg/Kg - dry | 78.1   | 1  | 05/09/23 22:46       | BKN | 6010D             |
| Cadmium                           | <3.13          | mg/Kg - dry | 3.13   | 1  | 05/09/23 22:46       | BKN | 6010D             |
| Calcium                           | <b>5660</b>    | mg/Kg - dry | 1560   | 1  | 05/09/23 22:46       | BKN | 6010D             |
| Chromium                          | <b>18.2</b>    | mg/Kg - dry | 7.81   | 1  | 05/09/23 22:46       | BKN | 6010D             |
| Copper                            | <b>53.8</b>    | mg/Kg - dry | 15.6   | 1  | 05/09/23 22:46       | BKN | 6010D             |
| Lead                              | <9.38          | mg/Kg - dry | 9.38   | 1  | 05/09/23 22:46       | BKN | 6010D             |

**Qualifiers/  
Definitions**

DF

Dilution Factor

MQL

Method Quantitation Limit

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/17/2023  
Received : 05/03/2023

Report Number : **23-123-0248**

## REPORT OF ANALYSIS

Lab No : **86964**

Matrix: **Solids**

Sample ID : **Rich Products Corporation Plant #2, Morristown, TN (RICMOR2)**

Sampled: **5/2/2023 13:15**

| Test       | Results     | Units       | MQL  | DF | Date / Time Analyzed | By  | Analytical Method |
|------------|-------------|-------------|------|----|----------------------|-----|-------------------|
| Magnesium  | <b>1060</b> | mg/Kg - dry | 156  | 1  | 05/09/23 22:46       | BKN | 6010D             |
| Manganese  | <b>21.8</b> | mg/Kg - dry | 15.6 | 1  | 05/09/23 22:46       | BKN | 6010D             |
| Mercury    | <6.00       | mg/Kg - dry | 6.00 | 1  | 05/10/23 12:52       | FDS | 7471A             |
| Molybdenum | <b>9.06</b> | mg/Kg - dry | 7.81 | 1  | 05/09/23 22:46       | BKN | 6010D             |
| Nickel     | <b>8.91</b> | mg/Kg - dry | 7.81 | 1  | 05/09/23 22:46       | BKN | 6010D             |
| Potassium  | <b>2260</b> | mg/Kg - dry | 313  | 1  | 05/09/23 22:46       | BKN | 6010D             |
| Selenium   | <15.6       | mg/Kg - dry | 15.6 | 1  | 05/09/23 22:46       | BKN | 6010D             |
| Sodium     | <b>2510</b> | mg/Kg - dry | 781  | 1  | 05/09/23 22:46       | BKN | 6010D             |
| Zinc       | <b>104</b>  | mg/Kg - dry | 39.1 | 1  | 05/10/23 11:12       | TJS | 6010D             |
| Sulfur     | <b>4810</b> | mg/Kg - dry | 313  | 1  | 05/09/23 22:46       | BKN | 6010D             |

### Qualifiers/ Definitions

DF

Dilution Factor

MQL

Method Quantitation Limit



# Loading Rate Tabulation

Environmental



Facility: Rich Products Corporation - Murfreesboro, TN

Analysis Date: 5/2/2023

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 21-123-0249

Internal ID: 7074

PAN:  $20\% \times (\text{TKN} - \text{Ammonia}) + 100\% \times \text{Ammonia} + \text{NO}_3 + \text{NO}_2$

| Parameter         | Concentration (mg/kg) |           | Limits     |
|-------------------|-----------------------|-----------|------------|
|                   | dry                   | wet       |            |
| PAN               | 2853.00               | 556.3350  |            |
| Ammonia           | 513.00                | 100.0350  |            |
| TKN               | 11700.00              | 2281.5000 |            |
| Nitrates/Nitrites | 102.60                | 20.0070   |            |
| Organic N         | 11187.00              | 2181.4650 |            |
| Arsenic           | 2.56                  | 0.4992    | 75 mg/kg   |
| Cadmium           | 0.51                  | 0.1000    | 85 mg/kg   |
| Chromium          | 1.93                  | 0.3764    | 3000 mg/kg |
| Copper            | 23.70                 | 4.6215    | 4300 mg/kg |
| Lead              | 3.07                  | 0.5987    | 840 mg/kg  |
| Mercury           | 0.89                  | 0.1730    | 57 mg/kg   |
| Molybdenum        | 1.28                  | 0.2496    | 75 mg/kg   |
| Nickel            | 1.28                  | 0.2496    | 420 mg/kg  |
| Phosphorus        | 1220.00               | 237.9000  |            |
| Potassium         | 460.00                | 89.7000   |            |
| Selenium          | 2.56                  | 0.4992    | 100 mg/kg  |
| Zinc              | 161.00                | 31.3950   | 7500 mg/kg |
| Iron              |                       |           |            |
| Sodium            | 518.00                | 101.0100  |            |
| Barium            |                       |           |            |
| Silver            |                       |           |            |
| Calcium           | 851.00                | 165.9450  |            |
| Magnesium         | 175.00                | 34.1250   |            |
| Manganese         | 6.05                  | 1.1798    |            |
| Chloride          | 471.00                | 91.8450   |            |
| Sulfur            | 938.00                | 182.9100  |            |
| Oil & Grease      |                       | 0         |            |
| BOD               |                       |           |            |
| pcb               |                       |           |            |
| Fecal Coliform    |                       |           |            |
| TCLP              |                       |           |            |
| ph                | 3.00                  |           |            |
| % solids          | 19.50                 |           |            |
| % Vol Solids      | 98.40                 |           |            |
| % Moisture        | 80.50                 |           |            |
| lbs/gallon        | 7.50                  |           |            |
| dry tons/load     | 4.39                  |           |            |

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 25.0351

Phosphate (P2O5): 24.5200

Potash (K2O): 4.8400

SP:

Max. Allowable App Rate at:

| Crop            | PAN | App Rate |
|-----------------|-----|----------|
| Corn            | 150 | 36,000   |
| Bermuda Pasture | 240 | 57,600   |
| Soybeans        | 60  | 14,400   |
| Wheat           | 75  | 18,000   |

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/17/2023  
Received : 05/03/2023

Report Number : **23-123-0249**

**REPORT OF ANALYSIS**

Lab No : **86966**

Matrix: **Solids**

Sample ID : **Rich Products Corporation, Murfreesboro, TN (RICPROD)**

Sampled: **5/2/2023 13:45**

| Test                              | Results        | Units       | MQL    | DF | Date / Time Analyzed | By  | Analytical Method |
|-----------------------------------|----------------|-------------|--------|----|----------------------|-----|-------------------|
| Organic Matter                    | <b>99.1</b>    | %           | 0.100  | 1  | 05/16/23 11:00       | VVP | ASTM D2974        |
| Neutralizing Value (%CCE)         | <b>5.4</b>     | %           | 0.1    | 1  | 05/08/23 16:45       | DXT | AOAC 955.01       |
| Moisture                          | <b>80.5</b>    | %           |        | 1  | 05/09/23 16:45       | JLS | SW-DRYWT          |
| Ammonia Nitrogen                  | <513           | mg/Kg - dry | 513    | 1  | 05/09/23 14:45       | JPJ | 4500NH3C-2011     |
| Biochemical Oxygen Demand (5-day) | <b>1050000</b> | mg/Kg - dry | 513000 | 1  | 05/04/23 08:15       | JJZ | 5210B-2016        |
| Chloride                          | <b>471</b>     | mg/Kg - dry | 205    | 10 | 05/10/23 19:00       | SRJ | 9056A             |
| Conductivity                      | <b>409</b>     | µS/cm       |        | 1  | 05/12/23 15:50       | CMF | 2510B-2011        |
| Nitrate (NO3-N)                   | <51.3          | mg/Kg - dry | 51.3   | 10 | 05/10/23 19:00       | SRJ | 9056A             |
| Nitrite (NO2-N)                   | <51.3          | mg/Kg - dry | 51.3   | 10 | 05/10/23 19:00       | SRJ | 9056A             |
| Nitrate+Nitrite-N                 | <51.3          | mg/Kg - dry | 51.3   | 10 | 05/10/23 19:00       |     | 9056A             |
| HEM: Oil and Grease               | <1500          | mg/Kg - dry | 1500   | 1  | 05/12/23 10:28       | SMS | SW-9071B          |
| pH                                | <b>3.0</b>     | s.u.        |        | 1  | 05/11/23 15:30       | CNB | 9045D             |
| Total Solids                      | <b>19.5</b>    | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Volatile Solids             | <b>98.4</b>    | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Kjeldahl Nitrogen           | <b>11700</b>   | mg/Kg - dry | 974    | 1  | 05/08/23 16:09       | ANH | 4500NORGD-2011    |
| Phosphorus                        | <b>1220</b>    | mg/Kg - dry | 25.6   | 1  | 05/09/23 22:51       | BKN | 6010D             |
| Arsenic                           | <2.56          | mg/Kg - dry | 2.56   | 1  | 05/09/23 22:51       | BKN | 6010D             |
| Boron                             | <12.8          | mg/Kg - dry | 12.8   | 1  | 05/09/23 22:51       | BKN | 6010D             |
| Cadmium                           | <0.513         | mg/Kg - dry | 0.513  | 1  | 05/09/23 22:51       | BKN | 6010D             |
| Calcium                           | <b>851</b>     | mg/Kg - dry | 256    | 1  | 05/09/23 22:51       | BKN | 6010D             |
| Chromium                          | <b>1.93</b>    | mg/Kg - dry | 1.28   | 1  | 05/09/23 22:51       | BKN | 6010D             |
| Copper                            | <b>23.7</b>    | mg/Kg - dry | 2.56   | 1  | 05/09/23 22:51       | BKN | 6010D             |
| Lead                              | <b>3.07</b>    | mg/Kg - dry | 1.54   | 1  | 05/09/23 22:51       | BKN | 6010D             |

**Qualifiers/  
Definitions**

DF

Dilution Factor

MQL

Method Quantitation Limit

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/17/2023  
Received : 05/03/2023

Report Number : **23-123-0249**

## REPORT OF ANALYSIS

Lab No : **86966**

Matrix: **Solids**

Sample ID : **Rich Products Corporation, Murfreesboro, TN (RICPROD)**

Sampled: **5/2/2023 13:45**

| Test       | Results     | Units       | MQL   | DF | Date / Time Analyzed | By  | Analytical Method |
|------------|-------------|-------------|-------|----|----------------------|-----|-------------------|
| Magnesium  | <b>175</b>  | mg/Kg - dry | 25.6  | 1  | 05/09/23 22:51       | BKN | 6010D             |
| Manganese  | <b>6.05</b> | mg/Kg - dry | 2.56  | 1  | 05/09/23 22:51       | BKN | 6010D             |
| Mercury    | <0.887      | mg/Kg - dry | 0.887 | 1  | 05/10/23 12:54       | FDS | 7471A             |
| Molybdenum | <1.28       | mg/Kg - dry | 1.28  | 1  | 05/09/23 22:51       | BKN | 6010D             |
| Nickel     | <1.28       | mg/Kg - dry | 1.28  | 1  | 05/09/23 22:51       | BKN | 6010D             |
| Potassium  | <b>460</b>  | mg/Kg - dry | 51.3  | 1  | 05/09/23 22:51       | BKN | 6010D             |
| Selenium   | <2.56       | mg/Kg - dry | 2.56  | 1  | 05/09/23 22:51       | BKN | 6010D             |
| Sodium     | <b>518</b>  | mg/Kg - dry | 128   | 1  | 05/09/23 22:51       | BKN | 6010D             |
| Zinc       | <b>161</b>  | mg/Kg - dry | 6.41  | 1  | 05/09/23 22:51       | BKN | 6010D             |
| Sulfur     | <b>938</b>  | mg/Kg - dry | 51.3  | 1  | 05/09/23 22:51       | BKN | 6010D             |

### Qualifiers/ Definitions

DF

Dilution Factor

MQL

Method Quantitation Limit

# Loading Rate Tabulation

Environmental



Facility: Supreme Oil - Nashville, TN

Analysis Date: 5/5/2023

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 23-125-0186

Internal ID: 7087

PAN: 20% × (TKN - Ammonia) + 100% × Ammonia + NO3 + NO2

| Parameter         | Concentration (mg/kg) |           | Limits     |
|-------------------|-----------------------|-----------|------------|
|                   | dry                   | wet       |            |
| PAN               | 2090.00               | 259.1600  |            |
| Ammonia           | 806.00                | 99.9440   |            |
| TKN               | 6420.00               | 796.0800  |            |
| Nitrates/Nitrites | 161.20                | 19.9888   |            |
| Organic N         | 5614.00               | 696.1360  |            |
| Arsenic           | 4.03                  | 0.4997    | 75 mg/kg   |
| Cadmium           | 0.81                  | 0.0999    | 85 mg/kg   |
| Chromium          | 2.02                  | 0.2505    | 3000 mg/kg |
| Copper            | 10.60                 | 1.3144    | 4300 mg/kg |
| Lead              | 9.03                  | 1.1197    | 840 mg/kg  |
| Mercury           | 1.48                  | 0.1835    | 57 mg/kg   |
| Molybdenum        | 2.02                  | 0.2505    | 75 mg/kg   |
| Nickel            | 2.02                  | 0.2505    | 420 mg/kg  |
| Phosphorus        | 1310.00               | 162.4400  |            |
| Potassium         | 4070.00               | 504.6800  |            |
| Selenium          | 4.03                  | 0.4997    | 100 mg/kg  |
| Zinc              | 62.00                 | 7.6880    | 7500 mg/kg |
| Iron              |                       |           |            |
| Sodium            | 32500.00              | 4030.0000 |            |
| Barium            |                       |           |            |
| Silver            |                       |           |            |
| Calcium           | 1150.00               | 142.6000  |            |
| Magnesium         | 483.00                | 59.8920   |            |
| Manganese         | 4.03                  | 0.4997    |            |
| Chloride          | 46100.00              | 5716.4000 |            |
| Sulfur            | 1650.00               | 204.6000  |            |
| Oil & Grease      |                       | 36        |            |
| BOD               |                       |           |            |
| pcb               |                       |           |            |
| Fecal Coliform    |                       |           |            |
| TCLP              |                       |           |            |
| ph                | 3.10                  |           |            |
| % solidsS         | 12.40                 |           |            |
| % Vol Solids      | 91.10                 |           |            |
| % Moisture        | 87.60                 |           |            |
| lbs/gallon        | 7.50                  |           |            |
| dry tons/load     | 2.79                  |           |            |

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 11.6622

Phospate (P2O5): 16.7400

Potash (K2O): 27.2500

SP:

Max. Allowable App Rate at:

| Crop            | PAN | App Rate |
|-----------------|-----|----------|
| Corn            | 150 | 75,000   |
| Bermuda Pasture | 240 | 120,000  |
| Soybeans        | 60  | 30,000   |
| Wheat           | 75  | 37,500   |

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle, AR 72834

Project Sludge/Biosolids Testing  
Information : TN2 - SUPOILN

Report Date : 05/19/2023  
Received : 05/05/2023

Report Number : **23-125-0186**

**REPORT OF ANALYSIS**

Lab No : **90471**

Matrix: **Solids**

Sample ID : **Supreme Oil, Nashville, TN (SUPOILN)**

Sampled: **5/5/2023 8:00**

| Test                              | Results       | Units       | MQL    | DF | Date / Time Analyzed | By  | Analytical Method |
|-----------------------------------|---------------|-------------|--------|----|----------------------|-----|-------------------|
| Organic Matter                    | <b>89.4</b>   | %           | 0.100  | 1  | 05/17/23 11:00       | VVP | ASTM D2974        |
| Neutralizing Value (%CCE)         | <b>2.8</b>    | %           | 0.1    | 1  | 05/16/23 11:15       | DXT | AOAC 955.01       |
| Moisture                          | <b>87.6</b>   | %           |        | 1  | 05/15/23 16:20       | JLS | SW-DRYWT          |
| Ammonia Nitrogen                  | <806          | mg/Kg - dry | 806    | 1  | 05/11/23 06:00       | JPJ | 4500NH3C-2011     |
| Biochemical Oxygen Demand (5-day) | <b>984000</b> | mg/Kg - dry | 484000 | 1  | 05/08/23 13:45       | JJZ | 5210B-2016        |
| Chloride                          | <b>46100</b>  | mg/Kg - dry | 323    | 10 | 05/11/23 22:20       | SRJ | 9056A             |
| Conductivity                      | <b>2470</b>   | µS/cm       |        | 1  | 05/16/23 15:52       | CMF | 2510B-2011        |
| Nitrate (NO3-N)                   | <80.6         | mg/Kg - dry | 80.6   | 10 | 05/11/23 22:20       | SRJ | 9056A             |
| Nitrite (NO2-N)                   | <80.6         | mg/Kg - dry | 80.6   | 10 | 05/11/23 22:20       | SRJ | 9056A             |
| Nitrate+Nitrite-N                 | <80.6         | mg/Kg - dry | 80.6   | 10 | 05/11/23 22:20       |     | 9056A             |
| HEM: Oil and Grease               | <b>356000</b> | mg/Kg - dry | 2030   | 1  | 05/16/23 16:16       | DRD | SW-9071B          |
| pH                                | <b>3.1</b>    | s.u.        |        | 1  | 05/16/23 13:45       | CNB | 9045D             |
| Total Solids                      | <b>12.4</b>   | %           | 0.010  | 1  | 05/15/23 16:20       | JLS | 2540G-2011        |
| Total Volatile Solids             | <b>91.1</b>   | %           | 0.010  | 1  | 05/15/23 16:20       | JLS | 2540G-2011        |
| Total Kjeldahl Nitrogen           | <b>6420</b>   | mg/Kg - dry | 1610   | 1  | 05/09/23 12:29       | ANH | 4500NORGD-2011    |
| Phosphorus                        | <b>1310</b>   | mg/Kg - dry | 40.3   | 1  | 05/12/23 02:56       | BKN | 6010D             |
| Arsenic                           | <4.03         | mg/Kg - dry | 4.03   | 1  | 05/12/23 02:56       | BKN | 6010D             |
| Boron                             | <20.2         | mg/Kg - dry | 20.2   | 1  | 05/12/23 02:56       | BKN | 6010D             |
| Cadmium                           | <0.806        | mg/Kg - dry | 0.806  | 1  | 05/12/23 02:56       | BKN | 6010D             |
| Calcium                           | <b>1150</b>   | mg/Kg - dry | 403    | 1  | 05/12/23 02:56       | BKN | 6010D             |
| Chromium                          | <2.02         | mg/Kg - dry | 2.02   | 1  | 05/12/23 02:56       | BKN | 6010D             |
| Copper                            | <b>10.6</b>   | mg/Kg - dry | 4.03   | 1  | 05/12/23 02:56       | BKN | 6010D             |
| Lead                              | <b>9.03</b>   | mg/Kg - dry | 2.42   | 1  | 05/12/23 02:56       | BKN | 6010D             |

**Qualifiers/  
Definitions**

DF

Dilution Factor

MQL

Method Quantitation Limit

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle, AR 72834

Project Sludge/Biosolids Testing

Information : TN2 - SUPOILN

Report Date : 05/19/2023  
Received : 05/05/2023

Report Number : **23-125-0186**

**REPORT OF ANALYSIS**

Lab No : **90471**

Sample ID : **Supreme Oil, Nashville, TN (SUPOILN)**

Matrix: **Solids**

Sampled: **5/5/2023 8:00**

| Test       | Results      | Units       | MQL  | DF | Date / Time Analyzed | By  | Analytical Method |
|------------|--------------|-------------|------|----|----------------------|-----|-------------------|
| Magnesium  | <b>483</b>   | mg/Kg - dry | 40.3 | 1  | 05/12/23 02:56       | BKN | 6010D             |
| Manganese  | <4.03        | mg/Kg - dry | 4.03 | 1  | 05/12/23 02:56       | BKN | 6010D             |
| Mercury    | <1.48        | mg/Kg - dry | 1.48 | 1  | 05/15/23 12:47       | FDS | 7471A             |
| Molybdenum | <2.02        | mg/Kg - dry | 2.02 | 1  | 05/12/23 02:56       | BKN | 6010D             |
| Nickel     | <2.02        | mg/Kg - dry | 2.02 | 1  | 05/12/23 02:56       | BKN | 6010D             |
| Potassium  | <b>4070</b>  | mg/Kg - dry | 80.6 | 1  | 05/13/23 00:46       | TJS | 6010D             |
| Selenium   | <4.03        | mg/Kg - dry | 4.03 | 1  | 05/12/23 02:56       | BKN | 6010D             |
| Sodium     | <b>32500</b> | mg/Kg - dry | 202  | 1  | 05/12/23 02:56       | BKN | 6010D             |
| Zinc       | <b>62.0</b>  | mg/Kg - dry | 10.1 | 1  | 05/12/23 02:56       | BKN | 6010D             |
| Sulfur     | <b>1650</b>  | mg/Kg - dry | 80.6 | 1  | 05/12/23 02:56       | BKN | 6010D             |

**Qualifiers/  
Definitions**

DF

Dilution Factor

MQL

Method Quantitation Limit

# Loading Rate Tabulation

Environmental



Facility: Tyson - Shelbyville, TN

Analysis Date: 5/2/2023

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 23-123-0252

Internal ID: 7085

PAN: 20% × (TKN - Ammonia) + 100% × Ammonia + NO3 + NO2

| Parameter         | Concentration (mg/kg) |           | Limits     |
|-------------------|-----------------------|-----------|------------|
|                   | dry                   | wet       |            |
| PAN               | 61492.00              | 1199.0940 |            |
| Ammonia           | 49800.00              | 971.1000  |            |
| TKN               | 103000.00             | 2008.5000 |            |
| Nitrates/Nitrites | 1052.00               | 20.5140   |            |
| Organic N         | 53200.00              | 1037.4000 |            |
| Arsenic           | 26.30                 | 0.5129    | 75 mg/kg   |
| Cadmium           | 5.26                  | 0.1026    | 85 mg/kg   |
| Chromium          | 13.20                 | 0.2574    | 3000 mg/kg |
| Copper            | 30.50                 | 0.5948    | 4300 mg/kg |
| Lead              | 15.80                 | 0.3081    | 840 mg/kg  |
| Mercury           | 9.11                  | 0.1776    | 57 mg/kg   |
| Molybdenum        | 13.20                 | 0.2574    | 75 mg/kg   |
| Nickel            | 13.20                 | 0.2574    | 420 mg/kg  |
| Phosphorus        | 22000.00              | 429.0000  |            |
| Potassium         | 14300.00              | 278.8500  |            |
| Selenium          | 26.30                 | 0.5129    | 100 mg/kg  |
| Zinc              | 127.00                | 2.4765    | 7500 mg/kg |
| Iron              |                       |           |            |
| Sodium            | 4940.00               | 96.3300   |            |
| Barium            |                       |           |            |
| Silver            |                       |           |            |
| Calcium           | 3070.00               | 59.8650   |            |
| Magnesium         | 3010.00               | 58.6950   |            |
| Manganese         | 26.30                 | 0.5129    |            |
| Chloride          | 2330.00               | 45.4350   |            |
| Sulfur            | 5100.00               | 99.4500   |            |
| Oil & Grease      |                       | 27        |            |
| BOD               |                       |           |            |
| pcb               |                       |           |            |
| Fecal Coliform    |                       |           |            |
| TCLP              |                       |           |            |
| ph                | 7.10                  |           |            |
| % solidsS         | 1.95                  |           |            |
| % Vol Solids      | 100.00                |           |            |
| % Moisture        | 98.10                 |           |            |
| lbs/gallon        | 7.50                  |           |            |
| dry tons/load     | 0.44                  |           |            |

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 53.9592

Phospate (P2O5): 44.2100

Potash (K2O): 15.0600

SP:

Max. Allowable App Rate at:

| Crop            | PAN | App Rate |
|-----------------|-----|----------|
| Corn            | 150 | 16,667   |
| Bermuda Pasture | 240 | 26,667   |
| Soybeans        | 60  | 6,667    |
| Wheat           | 75  | 8,333    |



20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/19/2023

Received : 05/03/2023

Report Number : **23-123-0252**

**REPORT OF ANALYSIS**

Lab No : **86988**

Matrix: **Solids**

Sample ID : **Tyson, Shelbyville, TN (TYSHELB)**

Sampled: **5/2/2023 15:30**

| Test                              | Results        | Units       | MQL    | DF | Date / Time Analyzed | By  | Analytical Method |
|-----------------------------------|----------------|-------------|--------|----|----------------------|-----|-------------------|
| Organic Matter                    | <b>81.0</b>    | %           | 0.100  | 1  | 05/16/23 11:00       | VVP | ASTM D2974        |
| Neutralizing Value (%CCE)         | <b>3.2</b>     | %           | 0.1    | 1  | 05/08/23 16:45       | DXT | AOAC 955.01       |
| Moisture                          | <b>98.1</b>    | %           |        | 1  | 05/09/23 17:15       | JLS | SW-DRYWT          |
| Ammonia Nitrogen                  | <b>49800</b>   | mg/Kg - dry | 5260   | 1  | 05/09/23 14:45       | JPJ | 4500NH3C-2011     |
| Biochemical Oxygen Demand (5-day) | <b>1760000</b> | mg/Kg - dry | 632000 | 1  | 05/04/23 08:15       | JJZ | 5210B-2016        |
| Chloride                          | <b>2330</b>    | mg/Kg - dry | 2110   | 10 | 05/10/23 20:44       | SRJ | 9056A             |
| Conductivity                      | <b>1480</b>    | µS/cm       |        | 1  | 05/12/23 15:50       | CMF | 2510B-2011        |
| Nitrate (NO3-N)                   | <526           | mg/Kg - dry | 526    | 10 | 05/10/23 20:44       | SRJ | 9056A             |
| Nitrite (NO2-N)                   | <526           | mg/Kg - dry | 526    | 10 | 05/10/23 20:44       | SRJ | 9056A             |
| Nitrate+Nitrite-N                 | <526           | mg/Kg - dry | 526    | 10 | 05/10/23 20:44       |     | 9056A             |
| HEM: Oil and Grease               | <b>270000</b>  | mg/Kg - dry | 14000  | 1  | 05/15/23 08:15       | DRD | SW-9071B          |
| pH                                | <b>7.1</b>     | s.u.        |        | 1  | 05/11/23 15:30       | CNB | 9045D             |
| Total Solids                      | <b>1.95</b>    | %           | 0.010  | 1  | 05/09/23 17:15       | JLS | 2540G-2011        |
| Total Volatile Solids             | <b>100</b>     | %           | 0.010  | 1  | 05/09/23 17:15       | JLS | 2540G-2011        |
| Total Kjeldahl Nitrogen           | <b>103000</b>  | mg/Kg - dry | 13600  | 1  | 05/08/23 16:14       | ANH | 4500NORGD-2011    |
| Phosphorus                        | <b>22000</b>   | mg/Kg - dry | 263    | 1  | 05/11/23 07:12       | BKN | 6010D             |
| Arsenic                           | <26.3          | mg/Kg - dry | 26.3   | 1  | 05/11/23 07:12       | BKN | 6010D             |
| Boron                             | <132           | mg/Kg - dry | 132    | 1  | 05/11/23 07:12       | BKN | 6010D             |
| Cadmium                           | <5.26          | mg/Kg - dry | 5.26   | 1  | 05/11/23 07:12       | BKN | 6010D             |
| Calcium                           | <b>3070</b>    | mg/Kg - dry | 2630   | 1  | 05/11/23 07:12       | BKN | 6010D             |
| Chromium                          | <13.2          | mg/Kg - dry | 13.2   | 1  | 05/11/23 07:12       | BKN | 6010D             |
| Copper                            | <b>30.5</b>    | mg/Kg - dry | 26.3   | 1  | 05/11/23 07:12       | BKN | 6010D             |
| Lead                              | <15.8          | mg/Kg - dry | 15.8   | 1  | 05/11/23 07:12       | BKN | 6010D             |

**Qualifiers/  
Definitions**

DF Dilution Factor

MQL

Method Quantitation Limit

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/19/2023  
Received : 05/03/2023

Report Number : **23-123-0252**

## REPORT OF ANALYSIS

Lab No : **86988**

Sample ID : **Tyson, Shelbyville, TN (TYSHELB)**

Matrix: **Solids**

Sampled: **5/2/2023 15:30**

| Test       | Results      | Units       | MQL  | DF | Date / Time Analyzed | By  | Analytical Method |
|------------|--------------|-------------|------|----|----------------------|-----|-------------------|
| Magnesium  | <b>3010</b>  | mg/Kg - dry | 263  | 1  | 05/11/23 07:12       | BKN | 6010D             |
| Manganese  | <26.3        | mg/Kg - dry | 26.3 | 1  | 05/11/23 07:12       | BKN | 6010D             |
| Mercury    | <9.11        | mg/Kg - dry | 9.11 | 1  | 05/10/23 12:58       | FDS | 7471A             |
| Molybdenum | <13.2        | mg/Kg - dry | 13.2 | 1  | 05/11/23 07:12       | BKN | 6010D             |
| Nickel     | <13.2        | mg/Kg - dry | 13.2 | 1  | 05/11/23 07:12       | BKN | 6010D             |
| Potassium  | <b>14300</b> | mg/Kg - dry | 526  | 1  | 05/11/23 07:12       | BKN | 6010D             |
| Selenium   | <26.3        | mg/Kg - dry | 26.3 | 1  | 05/11/23 07:12       | BKN | 6010D             |
| Sodium     | <b>4940</b>  | mg/Kg - dry | 1320 | 1  | 05/11/23 07:12       | BKN | 6010D             |
| Zinc       | <b>127</b>   | mg/Kg - dry | 65.8 | 1  | 05/11/23 07:12       | BKN | 6010D             |
| Sulfur     | <b>5100</b>  | mg/Kg - dry | 526  | 1  | 05/11/23 07:12       | BKN | 6010D             |

### Qualifiers/ Definitions

DF

Dilution Factor

MQL

Method Quantitation Limit

Microbiology by Method EPA 1681

| Analyte                   | Result<br>MPN/g | <u>Qualifier</u> | Dilution | Analysis<br>date / time | <u>Batch</u>              |
|---------------------------|-----------------|------------------|----------|-------------------------|---------------------------|
| Fecal Coliform            | <1520           |                  | 1        | 09/15/2023 13:59        | <a href="#">WG2132396</a> |
| Fecal Coliform -Geom.Mean | <1530           |                  | 1        | 09/15/2023 13:59        | <a href="#">WG2132396</a> |

Sample Narrative:

L1655593-01 WG2132396: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Microbiology by Method EPA 1681

| Analyte        | Result | Qualifier | Dilution | Analysis<br>date / time | Batch                     |
|----------------|--------|-----------|----------|-------------------------|---------------------------|
| Fecal Coliform | <1540  |           | 1        | 09/15/2023 13:59        | <a href="#">WG2132396</a> |

Sample Narrative:

L1655593-02 WG2132396: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Microbiology by Method EPA 1681

| Analyte        | Result | Qualifier | Dilution | Analysis<br>date / time | Batch                     |
|----------------|--------|-----------|----------|-------------------------|---------------------------|
| Fecal Coliform | <1530  |           | 1        | 09/15/2023 13:59        | <a href="#">WG2132396</a> |

Sample Narrative:

L1655593-03 WG2132396: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Microbiology by Method EPA 1681

| Analyte        | Result | Qualifier | Dilution | Analysis date / time | Batch                     |
|----------------|--------|-----------|----------|----------------------|---------------------------|
| Fecal Coliform | <1620  |           | 1        | 09/15/2023 13:59     | <a href="#">WG2132396</a> |

Sample Narrative:

L1655593-04 WG2132396: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Microbiology by Method EPA 1681

| Analyte        | Result | Qualifier | Dilution | Analysis<br>date / time | Batch                     |
|----------------|--------|-----------|----------|-------------------------|---------------------------|
| Fecal Coliform | <1500  |           | 1        | 09/15/2023 13:59        | <a href="#">WG2132396</a> |

Sample Narrative:

L1655593-05 WG2132396: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Microbiology by Method EPA 1681

| Analyte        | Result | Qualifier | Dilution | Analysis<br>date / time | Batch                     |
|----------------|--------|-----------|----------|-------------------------|---------------------------|
| Fecal Coliform | <1520  |           | 1        | 09/15/2023 13:59        | <a href="#">WG2132396</a> |

Sample Narrative:

L1655593-06 WG2132396: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Microbiology by Method EPA 1681

| Analyte        | Result | Qualifier | Dilution | Analysis<br>date / time | Batch                     |
|----------------|--------|-----------|----------|-------------------------|---------------------------|
| Fecal Coliform | <1510  |           | 1        | 09/15/2023 13:59        | <a href="#">WG2132396</a> |

Sample Narrative:

L1655593-07 WG2132396: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

# Loading Rate Tabulation

Environmental



Facility: Tyson (IBP) - Goodlettsville, TN

Analysis Date: 5/2/2023

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 23-123-0250

Internal ID: 7083

PAN:  $20\% \times (\text{TKN} - \text{Ammonia}) + 100\% \times \text{Ammonia} + \text{NO}_3 + \text{NO}_2$

| Parameter         | Concentration (mg/kg) |           | Limits     |
|-------------------|-----------------------|-----------|------------|
|                   | dry                   | wet       |            |
| PAN               | 7818.20               | 1164.9118 |            |
| Ammonia           | 2480.00               | 369.5200  |            |
| TKN               | 28500.00              | 4246.5000 |            |
| Nitrates/Nitrites | 134.20                | 19.9958   |            |
| Organic N         | 26020.00              | 3876.9800 |            |
| Arsenic           | 3.36                  | 0.5006    | 75 mg/kg   |
| Cadmium           | 0.67                  | 0.1000    | 85 mg/kg   |
| Chromium          | 26.00                 | 3.8740    | 3000 mg/kg |
| Copper            | 11.10                 | 1.6539    | 4300 mg/kg |
| Lead              | 2.01                  | 0.2995    | 840 mg/kg  |
| Mercury           | 1.11                  | 0.1654    | 57 mg/kg   |
| Molybdenum        | 1.68                  | 0.2503    | 75 mg/kg   |
| Nickel            | 9.19                  | 1.3693    | 420 mg/kg  |
| Phosphorus        | 2380.00               | 354.6200  |            |
| Potassium         | 1600.00               | 238.4000  |            |
| Selenium          | 3.36                  | 0.5006    | 100 mg/kg  |
| Zinc              | 87.20                 | 12.9928   | 7500 mg/kg |
| Iron              |                       |           |            |
| Sodium            | 395.00                | 58.8550   |            |
| Barium            |                       |           |            |
| Silver            |                       |           |            |
| Calcium           | 7790.00               | 1160.7100 |            |
| Magnesium         | 223.00                | 33.2270   |            |
| Manganese         | 6.68                  | 0.9953    |            |
| Chloride          | 523.00                | 77.9270   |            |
| Sulfur            | 2700.00               | 402.3000  |            |
| Oil & Grease      |                       | 44        |            |
| BOD               |                       |           |            |
| pcb               |                       |           |            |
| Fecal Coliform    |                       |           |            |
| TCLP              |                       |           |            |
| ph                | 5.40                  |           |            |
| % solids          | 14.90                 |           |            |
| % Vol Solids      | 98.90                 |           |            |
| % Moisture        | 85.10                 |           |            |
| lbs/gallon        | 7.50                  |           |            |
| dry tons/load     | 3.35                  |           |            |

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 52.4210

Phosphate (P2O5): 36.5400

Potash (K2O): 12.8700

SP:

Max. Allowable App Rate at:

| Crop            | PAN | App Rate |
|-----------------|-----|----------|
| Corn            | 150 | 17,308   |
| Bermuda Pasture | 240 | 27,692   |
| Soybeans        | 60  | 6,923    |
| Wheat           | 75  | 8,654    |

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/19/2023  
Received : 05/03/2023

Report Number : **23-123-0250**

**REPORT OF ANALYSIS**

Lab No : **86986**

Matrix: **Solids**

Sample ID : **Tyson (IBP), Goodlettsville, TN (TYPGOOD)**

Sampled: **5/2/2023 14:15**

| Test                              | Results       | Units       | MQL    | DF | Date / Time Analyzed | By  | Analytical Method |
|-----------------------------------|---------------|-------------|--------|----|----------------------|-----|-------------------|
| Organic Matter                    | <b>95.7</b>   | %           | 0.100  | 1  | 05/16/23 11:00       | VVP | ASTM D2974        |
| Neutralizing Value (%CCE)         | <b>3.4</b>    | %           | 0.1    | 1  | 05/11/23 14:53       | DXT | AOAC 955.01       |
| Moisture                          | <b>85.1</b>   | %           |        | 1  | 05/09/23 16:45       | JLS | SW-DRYWT          |
| Ammonia Nitrogen                  | <b>2480</b>   | mg/Kg - dry | 671    | 1  | 05/09/23 14:45       | JPJ | 4500NH3C-2011     |
| Biochemical Oxygen Demand (5-day) | <b>532000</b> | mg/Kg - dry | 183000 | 1  | 05/04/23 08:15       | JJZ | 5210B-2016        |
| Chloride                          | <b>523</b>    | mg/Kg - dry | 268    | 10 | 05/10/23 19:26       | SRJ | 9056A             |
| Conductivity                      | <b>1410</b>   | µS/cm       |        | 1  | 05/12/23 15:50       | CMF | 2510B-2011        |
| Nitrate (NO3-N)                   | <67.1         | mg/Kg - dry | 67.1   | 10 | 05/10/23 19:26       | SRJ | 9056A             |
| Nitrite (NO2-N)                   | <67.1         | mg/Kg - dry | 67.1   | 10 | 05/10/23 19:26       | SRJ | 9056A             |
| Nitrate+Nitrite-N                 | <67.1         | mg/Kg - dry | 67.1   | 10 | 05/10/23 19:26       |     | 9056A             |
| HEM: Oil and Grease               | <b>442000</b> | mg/Kg - dry | 2000   | 1  | 05/15/23 08:15       | DRD | SW-9071B          |
| pH                                | <b>5.4</b>    | s.u.        |        | 1  | 05/11/23 15:30       | CNB | 9045D             |
| Total Solids                      | <b>14.9</b>   | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Volatile Solids             | <b>98.9</b>   | %           | 0.010  | 1  | 05/09/23 16:45       | JLS | 2540G-2011        |
| Total Kjeldahl Nitrogen           | <b>28500</b>  | mg/Kg - dry | 1450   | 1  | 05/08/23 16:10       | ANH | 4500NORGD-2011    |
| Phosphorus                        | <b>2380</b>   | mg/Kg - dry | 33.6   | 1  | 05/11/23 07:02       | BKN | 6010D             |
| Arsenic                           | <3.36         | mg/Kg - dry | 3.36   | 1  | 05/11/23 07:02       | BKN | 6010D             |
| Boron                             | <16.8         | mg/Kg - dry | 16.8   | 1  | 05/11/23 07:02       | BKN | 6010D             |
| Cadmium                           | <0.671        | mg/Kg - dry | 0.671  | 1  | 05/11/23 07:02       | BKN | 6010D             |
| Calcium                           | <b>7790</b>   | mg/Kg - dry | 336    | 1  | 05/11/23 07:02       | BKN | 6010D             |
| Chromium                          | <b>26.0</b>   | mg/Kg - dry | 1.68   | 1  | 05/11/23 07:02       | BKN | 6010D             |
| Copper                            | <b>11.1</b>   | mg/Kg - dry | 3.36   | 1  | 05/11/23 07:02       | BKN | 6010D             |
| Lead                              | <2.01         | mg/Kg - dry | 2.01   | 1  | 05/11/23 07:02       | BKN | 6010D             |

**Qualifiers/  
Definitions**

DF

Dilution Factor

MQL

Method Quantitation Limit

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/19/2023  
Received : 05/03/2023

Report Number : **23-123-0250**

## REPORT OF ANALYSIS

Lab No : **86986**

Matrix: **Solids**

Sample ID : **Tyson (IBP), Goodlettsville, TN (TYPGOOD)**

Sampled: **5/2/2023 14:15**

| Test       | Results     | Units       | MQL  | DF | Date / Time Analyzed | By  | Analytical Method |
|------------|-------------|-------------|------|----|----------------------|-----|-------------------|
| Magnesium  | <b>223</b>  | mg/Kg - dry | 33.6 | 1  | 05/11/23 07:02       | BKN | 6010D             |
| Manganese  | <b>6.68</b> | mg/Kg - dry | 3.36 | 1  | 05/11/23 07:02       | BKN | 6010D             |
| Mercury    | <1.11       | mg/Kg - dry | 1.11 | 1  | 05/10/23 12:55       | FDS | 7471A             |
| Molybdenum | <1.68       | mg/Kg - dry | 1.68 | 1  | 05/11/23 07:02       | BKN | 6010D             |
| Nickel     | <b>9.19</b> | mg/Kg - dry | 1.68 | 1  | 05/11/23 07:02       | BKN | 6010D             |
| Potassium  | <b>1600</b> | mg/Kg - dry | 67.1 | 1  | 05/11/23 07:02       | BKN | 6010D             |
| Selenium   | <3.36       | mg/Kg - dry | 3.36 | 1  | 05/11/23 07:02       | BKN | 6010D             |
| Sodium     | <b>395</b>  | mg/Kg - dry | 168  | 1  | 05/11/23 07:02       | BKN | 6010D             |
| Zinc       | <b>87.2</b> | mg/Kg - dry | 8.39 | 1  | 05/11/23 07:02       | BKN | 6010D             |
| Sulfur     | <b>2700</b> | mg/Kg - dry | 67.1 | 1  | 05/11/23 07:02       | BKN | 6010D             |

### Qualifiers/ Definitions

DF

Dilution Factor

MQL

Method Quantitation Limit

# Loading Rate Tabulation

Environmental



Facility: Tyson - Robards, KY

Analysis Date: 5/2/2023

Analysis Note:

Product: Sludge

State: TN

Application Type: Subsurface

AIC Control # 23-123-0251

Internal ID: 7084

PAN:  $20\% \times (\text{TKN} - \text{Ammonia}) + 100\% \times \text{Ammonia} + \text{NO}_3 + \text{NO}_2$

| Parameter         | Concentration (mg/kg) |           | Limits     |
|-------------------|-----------------------|-----------|------------|
|                   | dry                   | wet       |            |
| PAN               | 15782.40              | 2367.3600 |            |
| Ammonia           | 7870.00               | 1180.5000 |            |
| TKN               | 47400.00              | 7110.0000 |            |
| Nitrates/Nitrites | 6.40                  | 0.9600    |            |
| Organic N         | 39530.00              | 5929.5000 |            |
| Arsenic           | 3.33                  | 0.4995    | 75 mg/kg   |
| Cadmium           | 0.67                  | 0.1001    | 85 mg/kg   |
| Chromium          | 27.40                 | 4.1100    | 3000 mg/kg |
| Copper            | 62.80                 | 9.4200    | 4300 mg/kg |
| Lead              | 2.00                  | 0.3000    | 840 mg/kg  |
| Mercury           | 1.28                  | 0.1920    | 57 mg/kg   |
| Molybdenum        | 1.67                  | 0.2505    | 75 mg/kg   |
| Nickel            | 15.30                 | 2.2950    | 420 mg/kg  |
| Phosphorus        | 5970.00               | 895.5000  |            |
| Potassium         | 993.00                | 148.9500  |            |
| Selenium          | 3.33                  | 0.4995    | 100 mg/kg  |
| Zinc              | 181.00                | 27.1500   | 7500 mg/kg |
| Iron              |                       |           |            |
| Sodium            | 1100.00               | 165.0000  |            |
| Barium            |                       |           |            |
| Silver            |                       |           |            |
| Calcium           | 11100.00              | 1665.0000 |            |
| Magnesium         | 563.00                | 84.4500   |            |
| Manganese         | 33.30                 | 4.9950    |            |
| Chloride          | 2670.00               | 400.5000  |            |
| Sulfur            | 8670.00               | 1300.5000 |            |
| Oil & Grease      |                       | 0         |            |
| BOD               |                       |           |            |
| pcb               |                       |           |            |
| Fecal Coliform    |                       |           |            |
| TCLP              |                       |           |            |
| ph                | 6.30                  |           |            |
| % solidsS         | 15.00                 |           |            |
| % Vol Solids      | 96.10                 |           |            |
| % Moisture        | 85.00                 |           |            |
| lbs/gallon        | 7.50                  |           |            |
| dry tons/load     | 3.38                  |           |            |

Pounds per 6000 gallon(s) load:

Plant-available nitrogen: 106.5312

Phospate (P2O5): 92.2800

Potash (K2O): 8.0400

SP:

Max. Allowable App Rate at:

| Crop            | PAN | App Rate |
|-----------------|-----|----------|
| Corn            | 150 | 8,411    |
| Bermuda Pasture | 240 | 13,458   |
| Soybeans        | 60  | 3,364    |
| Wheat           | 75  | 4,206    |

20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/19/2023  
Received : 05/03/2023

Report Number : **23-123-0251**

## REPORT OF ANALYSIS

Lab No : **86987**

Sample ID : **Tyson, Robards, KY (TYROBAR)**

Matrix: **Solids**

Sampled: **5/2/2023 14:45**

| Test                              | Results        | Units       | MQL    | DF  | Date / Time Analyzed | By  | Analytical Method |
|-----------------------------------|----------------|-------------|--------|-----|----------------------|-----|-------------------|
| Organic Matter                    | <b>97.3</b>    | %           | 0.100  | 1   | 05/16/23 11:00       | VVP | ASTM D2974        |
| Neutralizing Value (%CCE)         | <b>9.7</b>     | %           | 0.1    | 1   | 05/11/23 14:53       | DXT | AOAC 955.01       |
| Moisture                          | <b>85.0</b>    | %           |        | 1   | 05/09/23 17:15       | JLS | SW-DRYWT          |
| Ammonia Nitrogen                  | <b>7870</b>    | mg/Kg - dry | 667    | 1   | 05/09/23 14:45       | JPJ | 4500NH3C-2011     |
| Biochemical Oxygen Demand (5-day) | <b>1080000</b> | mg/Kg - dry | 400000 | 1   | 05/04/23 08:15       | JJZ | 5210B-2016        |
| Chloride                          | <2670          | mg/Kg - dry | 2670   | 100 | 05/10/23 20:18       | SRJ | 9056A             |
| Conductivity                      | <b>3600</b>    | µS/cm       |        | 1   | 05/12/23 15:50       | CMF | 2510B-2011        |
| Nitrate (NO3-N)                   | <667           | mg/Kg - dry | 667    | 100 | 05/10/23 20:18       | SRJ | 9056A             |
| Nitrite (NO2-N)                   | <667           | mg/Kg - dry | 667    | 100 | 05/10/23 20:18       | SRJ | 9056A             |
| Nitrate+Nitrite-N                 | <667           | mg/Kg - dry | 667    | 100 | 05/10/23 20:18       |     | 9056A             |
| HEM: Oil and Grease               | <b>4380</b>    | mg/Kg - dry | 1870   | 1   | 05/15/23 08:15       | DRD | SW-9071B          |
| pH                                | <b>6.3</b>     | s.u.        |        | 1   | 05/11/23 15:30       | CNB | 9045D             |
| Total Solids                      | <b>15.0</b>    | %           | 0.010  | 1   | 05/09/23 17:15       | JLS | 2540G-2011        |
| Total Volatile Solids             | <b>96.1</b>    | %           | 0.010  | 1   | 05/09/23 17:15       | JLS | 2540G-2011        |
| Total Kjeldahl Nitrogen           | <b>47400</b>   | mg/Kg - dry | 1630   | 1   | 05/08/23 16:11       | ANH | 4500NORGD-2011    |
| Phosphorus                        | <b>5970</b>    | mg/Kg - dry | 33.3   | 1   | 05/11/23 07:07       | BKN | 6010D             |
| Arsenic                           | <3.33          | mg/Kg - dry | 3.33   | 1   | 05/11/23 07:07       | BKN | 6010D             |
| Boron                             | <16.7          | mg/Kg - dry | 16.7   | 1   | 05/11/23 07:07       | BKN | 6010D             |
| Cadmium                           | <0.667         | mg/Kg - dry | 0.667  | 1   | 05/11/23 07:07       | BKN | 6010D             |
| Calcium                           | <b>11100</b>   | mg/Kg - dry | 333    | 1   | 05/11/23 07:07       | BKN | 6010D             |
| Chromium                          | <b>27.4</b>    | mg/Kg - dry | 1.67   | 1   | 05/11/23 07:07       | BKN | 6010D             |
| Copper                            | <b>62.8</b>    | mg/Kg - dry | 3.33   | 1   | 05/11/23 07:07       | BKN | 6010D             |
| Lead                              | <2.00          | mg/Kg - dry | 2.00   | 1   | 05/11/23 07:07       | BKN | 6010D             |

### Qualifiers/ Definitions

DF

Dilution Factor

MQL

Method Quantitation Limit



20513

Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle , AR 72834

Project Sludge/Biosolids Testing

Information :

Report Date : 05/19/2023  
Received : 05/03/2023

Report Number : **23-123-0251**

## REPORT OF ANALYSIS

Lab No : **86987**

Matrix: **Solids**

Sample ID : **Tyson, Robards, KY (TYROBAR)**

Sampled: **5/2/2023 14:45**

| Test       | Results     | Units       | MQL  | DF | Date / Time Analyzed | By  | Analytical Method |
|------------|-------------|-------------|------|----|----------------------|-----|-------------------|
| Magnesium  | <b>563</b>  | mg/Kg - dry | 33.3 | 1  | 05/11/23 07:07       | BKN | 6010D             |
| Manganese  | <b>33.3</b> | mg/Kg - dry | 3.33 | 1  | 05/11/23 07:07       | BKN | 6010D             |
| Mercury    | <1.28       | mg/Kg - dry | 1.28 | 1  | 05/10/23 12:57       | FDS | 7471A             |
| Molybdenum | <1.67       | mg/Kg - dry | 1.67 | 1  | 05/11/23 07:07       | BKN | 6010D             |
| Nickel     | <b>15.3</b> | mg/Kg - dry | 1.67 | 1  | 05/11/23 07:07       | BKN | 6010D             |
| Potassium  | <b>993</b>  | mg/Kg - dry | 66.7 | 1  | 05/11/23 07:07       | BKN | 6010D             |
| Selenium   | <3.33       | mg/Kg - dry | 3.33 | 1  | 05/11/23 07:07       | BKN | 6010D             |
| Sodium     | <b>1100</b> | mg/Kg - dry | 167  | 1  | 05/11/23 07:07       | BKN | 6010D             |
| Zinc       | <b>181</b>  | mg/Kg - dry | 8.33 | 1  | 05/11/23 07:07       | BKN | 6010D             |
| Sulfur     | <b>8670</b> | mg/Kg - dry | 66.7 | 1  | 05/11/23 07:07       | BKN | 6010D             |

### Qualifiers/ Definitions

DF

Dilution Factor

MQL

Method Quantitation Limit

Microbiology by Method EPA 1681

| Analyte                   | Result<br>MPN/g | <u>Qualifier</u> | Dilution | Analysis<br>date / time | <u>Batch</u>              |
|---------------------------|-----------------|------------------|----------|-------------------------|---------------------------|
| Fecal Coliform            | <1030           |                  | 1        | 09/14/2023 13:40        | <a href="#">WG2131538</a> |
| Fecal Coliform -Geom.Mean | <2480           |                  | 1        | 09/14/2023 13:40        | <a href="#">WG2131538</a> |

Sample Narrative:

L1655098-01 WG2131538: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Microbiology by Method EPA 1681

| Analyte        | Result | Qualifier | Dilution | Analysis<br>date / time | Batch                     |
|----------------|--------|-----------|----------|-------------------------|---------------------------|
| Fecal Coliform | <1040  |           | 1        | 09/14/2023 13:40        | <a href="#">WG2131538</a> |

Sample Narrative:

L1655098-02 WG2131538: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Microbiology by Method EPA 1681

| Analyte        | Result | Qualifier | Dilution | Analysis<br>date / time | Batch                     |
|----------------|--------|-----------|----------|-------------------------|---------------------------|
| Fecal Coliform | <1060  |           | 1        | 09/14/2023 13:40        | <a href="#">WG2131538</a> |

Sample Narrative:

L1655098-03 WG2131538: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Microbiology by Method EPA 1681

| Analyte        | Result | Qualifier | Dilution | Analysis<br>date / time | Batch                     |
|----------------|--------|-----------|----------|-------------------------|---------------------------|
| Fecal Coliform | <1080  |           | 1        | 09/14/2023 13:40        | <a href="#">WG2131538</a> |

Sample Narrative:

L1655098-04 WG2131538: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Microbiology by Method EPA 1681

| Analyte        | Result | Qualifier | Dilution | Analysis<br>date / time | Batch                     |
|----------------|--------|-----------|----------|-------------------------|---------------------------|
| Fecal Coliform | 437000 |           | 1        | 09/14/2023 13:40        | <a href="#">WG2131538</a> |

Sample Narrative:

L1655098-05 WG2131538: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Microbiology by Method EPA 1681

| Analyte        | Result | Qualifier | Dilution | Analysis<br>date / time | Batch                     |
|----------------|--------|-----------|----------|-------------------------|---------------------------|
| Fecal Coliform | 1090   |           | 1        | 09/14/2023 13:40        | <a href="#">WG2131538</a> |

Sample Narrative:

L1655098-06 WG2131538: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Microbiology by Method EPA 1681

| Analyte        | Result | Qualifier | Dilution | Analysis<br>date / time | Batch                     |
|----------------|--------|-----------|----------|-------------------------|---------------------------|
| Fecal Coliform | <998   |           | 1        | 09/14/2023 13:40        | <a href="#">WG2131538</a> |

Sample Narrative:

L1655098-07 WG2131538: Results reported on a dry weight basis

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Company Name/Address:

Denali Water Solutions Inc.

3308 Bernice Avenue  
Russellville, AR 72802

Billing Information:

Accounts Payable  
3308 Bernice Ave.  
Russellville, AR 72802Pres  
Chk

Analysis / Container / Preservative

Chain of Custody Page \_\_\_\_ of \_\_\_\_



MT JULIET, TN

12065 Lebanon Rd Mount Juliet, TN 37122  
Submitting a sample via this chain of custody  
constitutes acknowledgment and acceptance of the  
Pace Terms and Conditions found at:  
<https://info.pacelabs.com/hubfs/pas-standard-terms.pdf>

A051

Acctnum: DENWATRAR

Template: T237640

Prelogin: P1023775

PM: 923 - Reagan Johnson

PB:

Shipped Via: FedEx Ground

Remarks Sample # (lab only)

Report to:

Danny Burns

Email To:

gabe.timby@denaliwater.com;danny.burns@de

Project Description:

TN2- Tyson Robards

City/State

Collected:

Please Circle:

PT MT CT ET

Phone: 479-518-1554

Client Project #

Lab Project #

Collected by (print):

Site/Facility ID #

P.O. #

Collected by (signature):

Rush? (Lab MUST Be Notified)

☐ Same Day ☐ Five Day  
☐ Next Day ☐ 5 Day (Rad Only)  
☐ Two Day ☐ 10 Day (Rad Only)  
☐ Three Day

Quote #

Date Results Needed

Immediately

Packed on Ice N ☐ Y ☐No.  
of  
Cntrs

Sample ID

Comp/Grab

Matrix \*

Depth

Date

Time

TN2- Tyson Robards

Grab

SS

9-12-23

4pm

7

X

\* Matrix:

SS - Soil AIR - Air F - Filter  
 GW - Groundwater B - Bioassay  
 WW - WasteWater  
 DW - Drinking Water  
 OT - Other Sludge

Remarks:

Samples returned via:

☐ UPS ☐ FedEx ☐ Courier

Tracking #

Relinquished by : (Signature)

Date:

Time:

Received by: (Signature)

Trip Blank Received: Yes ☒ No ☐HCL / MeOH  
TBR

Relinquished by : (Signature)

Date:

Time:

Received by: (Signature)

Temp: DRAG Bottles Received: 9

1.2 to 1.2

Relinquished by : (Signature)

Date:

Time:

Received for lab by: (Signature)

Date:

Time:

Hold:

Condition:  
NCF / OK

Sample Receipt Checklist

COC Seal Present/Intact: ☐ NP ☒ Y ☐ N  
 COC Signed/Accurate: ☒ Y ☐ N  
 Bottles arrive intact: ☒ Y ☐ N  
 Correct bottles used: ☒ Y ☐ N  
 Sufficient volume sent: ☒ Y ☐ N  
 If Applicable  
 VOA Zero Headspace: ☐ Y ☐ N  
 Preservation Correct/Checked: ☐ Y ☐ N  
 RAD Screen <0.5 mR/hr: ☒ Y ☐ N

If preservation required by Login: Date/Time

# Loading Rate Tabulation

Environmental



Facility: Gold Creek - Caryville, TN

Analysis Date: 6/22/2023

Analysis Note:

**Product:** DAF  
**State:** TN  
**Application Type:** Subsurface  
**PAN:** 20% × (TKN - Ammonia) + 100% × Ammonia + NO3 + NO2

**AIC Control #** 192-2920-1

**Internal ID:** 7207

| Parameter         | Concentration (mg/kg) |           | Limits     |
|-------------------|-----------------------|-----------|------------|
|                   | dry                   | wet       |            |
| PAN               | 24460.00              | 415.8200  |            |
| Ammonia           | 13000.00              | 221.0000  |            |
| TKN               | 70000.00              | 1190.0000 |            |
| Nitrates/Nitrites | 60.00                 | 1.0200    |            |
| Organic N         | 57000.00              | 969.0000  |            |
| Arsenic           | 10.00                 | 0.1700    | 75 mg/kg   |
| Cadmium           | 0.40                  | 0.0068    | 85 mg/kg   |
| Chromium          | 4.60                  | 0.0782    | 3000 mg/kg |
| Copper            | 37.00                 | 0.6290    | 4300 mg/kg |
| Lead              | 4.00                  | 0.0680    | 840 mg/kg  |
| Mercury           | 0.10                  | 0.0017    | 57 mg/kg   |
| Molybdenum        | 1.00                  | 0.0170    | 75 mg/kg   |
| Nickel            | 4.50                  | 0.0765    | 420 mg/kg  |
| Phosphorus        | 15000.00              | 255.0000  |            |
| Potassium         | 5100.00               | 86.7000   |            |
| Selenium          | 7.00                  | 0.1190    | 100 mg/kg  |
| Zinc              | 130.00                | 2.2100    | 7500 mg/kg |
| Iron              |                       |           |            |
| Sodium            | 29000.00              | 493.0000  |            |
| Barium            |                       |           |            |
| Silver            |                       |           |            |
| Calcium           | 20000.00              | 340.0000  |            |
| Magnesium         | 2100.00               | 35.7000   |            |
| Manganese         | 27.00                 | 0.4590    |            |
| Chloride          | 27000.00              | 459.0000  |            |
| Sulfur            |                       |           |            |
| Oil & Grease      |                       | 0         |            |
| BOD               |                       |           |            |
| pcb               |                       |           |            |
| Fecal Coliform    |                       |           |            |
| TCLP              |                       |           |            |
| ph                | 6.90                  |           |            |
| % solidsS         | 1.70                  |           |            |
| % Vol Solids      | 94.00                 |           |            |
| % Moisture        | 98.00                 |           |            |
| lbs/gallon        | 7.50                  |           |            |
| dry tons/load     | 0.38                  |           |            |

Pounds per 6000 gallon(s) load:

**Plant-available nitrogen:** 18.7119

**Phospate (P2O5):** 26.2800

**Potash (K2O):** 4.6800

**SP:**

**Max. Allowable App Rate at:**

| <u>Crop</u>     | <u>PAN</u> | <u>App Rate</u> |
|-----------------|------------|-----------------|
| Corn            | 150        | 47,368          |
| Bermuda Pasture | 240        | 75,789          |
| Soybeans        | 60         | 18,947          |
| Wheat           | 75         | 23,684          |

# Client Sample Results

Client: Denali Water Solutions  
Project/Site: Gold Creek, Caryville, TN

Job ID: 192-2920-1

Client Sample ID: GOLCREE

Date Collected: 06/22/23 16:00

Date Received: 06/23/23 10:38

Lab Sample ID: 192-2920-1

Matrix: Solid

## Method: LA 29B SAR - Sodium Adsorption Ratio

| Analyte                 | Result | Qualifier | RL  | Unit | D | Prepared | Analyzed       | Dil Fac |
|-------------------------|--------|-----------|-----|------|---|----------|----------------|---------|
| Sodium Adsorption Ratio | 52     |           | 1.0 | NONE |   |          | 07/05/23 12:30 | 1       |

## Method: SW846 6010D - Metals (ICP)

| Analyte    | Result | Qualifier | RL   | Unit  | D | Prepared       | Analyzed       | Dil Fac |
|------------|--------|-----------|------|-------|---|----------------|----------------|---------|
| Cadmium    | <0.40  |           | 0.40 | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:38 | 1       |
| Sodium     | 29000  |           | 1000 | mg/Kg | ✱ | 06/26/23 10:27 | 07/03/23 15:20 | 10      |
| Potassium  | 5100   |           | 1000 | mg/Kg | ✱ | 06/26/23 10:27 | 07/03/23 15:20 | 10      |
| Calcium    | 20000  |           | 1000 | mg/Kg | ✱ | 06/26/23 10:27 | 07/05/23 11:26 | 100     |
| Molybdenum | <1.0   |           | 1.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:38 | 1       |
| Sulfur     | 8800   |           | 100  | mg/Kg | ✱ | 06/26/23 10:27 | 07/03/23 15:20 | 10      |
| Nickel     | 4.5    |           | 1.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:38 | 1       |
| Magnesium  | 2100   |           | 50   | mg/Kg | ✱ | 06/26/23 10:27 | 07/03/23 19:06 | 10      |
| Arsenic    | 10     |           | 5.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:38 | 1       |
| Copper     | 37     |           | 1.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:38 | 1       |
| Boron      | 11     |           | 10   | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:38 | 1       |
| Lead       | <4.0   |           | 4.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:38 | 1       |
| Phosphorus | 15000  |           | 100  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:34 | 10      |
| Zinc       | 130    |           | 10   | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:34 | 10      |
| Selenium   | <7.0   |           | 7.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:38 | 1       |
| Manganese  | 27     |           | 2.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:34 | 10      |
| Chromium   | 4.6    |           | 1.0  | mg/Kg | ✱ | 06/26/23 10:27 | 06/30/23 12:38 | 1       |

## Method: SW846 7471B - Mercury (CVAA)

| Analyte | Result | Qualifier | RL   | Unit  | D | Prepared       | Analyzed       | Dil Fac |
|---------|--------|-----------|------|-------|---|----------------|----------------|---------|
| Mercury | <0.10  |           | 0.10 | mg/Kg | ✱ | 07/03/23 09:34 | 07/03/23 15:00 | 1       |

## General Chemistry

| Analyte                                           | Result | Qualifier | RL    | Unit     | D | Prepared | Analyzed       | Dil Fac |
|---------------------------------------------------|--------|-----------|-------|----------|---|----------|----------------|---------|
| Total Volatile Solids (SM 2540G-2015)             | 94     |           | 0.010 | % by Wt  |   |          | 06/27/23 12:50 | 1       |
| pH (SW846 9045D)                                  | 6.9    | HF        | 0.05  | SU       |   |          | 06/23/23 13:13 | 1       |
| Electrical Conductivity (1:1 Ratio) (SW846 9050A) | 4800   |           | 2.0   | umhos/cm |   |          | 06/27/23 14:32 | 1       |
| Limestone Equivalency (AOAC 955.01)               | 9.1    |           | 0.20  | % by Wt  |   |          | 06/30/23 14:59 | 1       |
| HEM (Oil & Grease) (ARDPCE AR OG_TPH)             | 970    |           | 240   | mg/Kg    |   |          | 06/23/23 14:53 | 1       |
| Percent Moisture (SM Moisture - 2540)             | 98     |           | 0.010 | %        |   |          | 06/27/23 12:10 | 1       |
| Total Solids (SM Moisture - 2540)                 | 1.7    |           | 0.010 | %        |   |          | 06/27/23 12:10 | 1       |

Client Sample ID: GOLCREE

Date Collected: 06/22/23 16:00

Date Received: 06/23/23 10:38

Lab Sample ID: 192-2920-1

Matrix: Solid

Percent Solids: 1.7

## Method: SW846 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

| Analyte  | Result | Qualifier | RL  | Unit  | D | Prepared       | Analyzed       | Dil Fac |
|----------|--------|-----------|-----|-------|---|----------------|----------------|---------|
| PCB-1016 | <5.8   |           | 5.8 | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 13:32 | 1       |
| PCB-1221 | <5.8   |           | 5.8 | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 13:32 | 1       |
| PCB-1232 | <5.8   |           | 5.8 | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 13:32 | 1       |
| PCB-1242 | <5.8   |           | 5.8 | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 13:32 | 1       |
| PCB-1248 | <5.8   |           | 5.8 | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 13:32 | 1       |

Eurofins Arkansas

# Client Sample Results

Client: Denali Water Solutions  
Project/Site: Gold Creek, Caryville, TN

Job ID: 192-2920-1

**Client Sample ID: GOLCREE**

**Lab Sample ID: 192-2920-1**

Date Collected: 06/22/23 16:00

Matrix: Solid

Date Received: 06/23/23 10:38

Percent Solids: 1.7

## Method: SW846 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

| Analyte                       | Result    | Qualifier | RL       | Unit  | D | Prepared       | Analyzed       | Dil Fac |
|-------------------------------|-----------|-----------|----------|-------|---|----------------|----------------|---------|
| PCB-1254                      | <5.8      |           | 5.8      | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 13:32 | 1       |
| PCB-1260                      | <5.8      |           | 5.8      | mg/Kg | ✱ | 06/30/23 14:13 | 07/06/23 13:32 | 1       |
| Surrogate                     | %Recovery | Qualifier | Limits   |       |   | Prepared       | Analyzed       | Dil Fac |
| Tetrachloro-m-xylene          | 82        |           | 47 - 115 |       |   | 06/30/23 14:13 | 07/06/23 13:32 | 1       |
| DCB Decachlorobiphenyl (Surr) | 102       |           | 52 - 122 |       |   | 06/30/23 14:13 | 07/06/23 13:32 | 1       |

## Method: SW846 9056A - Anions, Ion Chromatography

| Analyte      | Result | Qualifier | RL  | Unit  | D | Prepared | Analyzed       | Dil Fac |
|--------------|--------|-----------|-----|-------|---|----------|----------------|---------|
| Chloride     | 27000  |           | 120 | mg/Kg | ✱ |          | 06/24/23 00:26 | 1       |
| Nitrate as N | <30    |           | 30  | mg/Kg | ✱ |          | 06/24/23 00:26 | 1       |
| Nitrite as N | <30    |           | 30  | mg/Kg | ✱ |          | 06/24/23 00:26 | 1       |

## General Chemistry

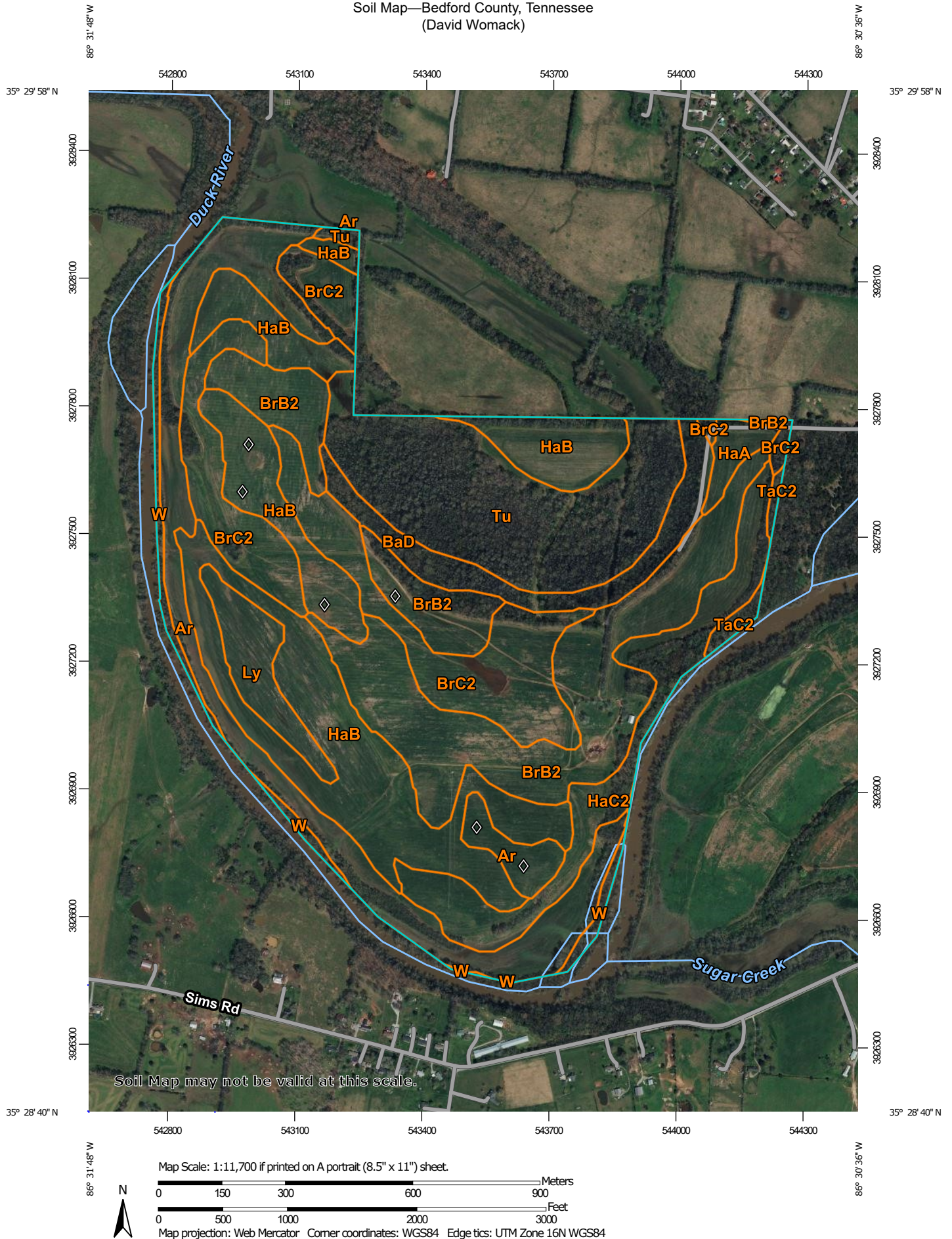
| Analyte                                      | Result   | Qualifier | RL    | Unit  | D | Prepared       | Analyzed       | Dil Fac |
|----------------------------------------------|----------|-----------|-------|-------|---|----------------|----------------|---------|
| Ammonia (as N) (SM 4500 NH3 G-2011)          | 13000    |           | 3000  | mg/Kg | ✱ | 06/23/23 14:33 | 06/27/23 09:22 | 5       |
| Total Kjeldahl Nitrogen (SM 4500 NorgC-2011) | 70000    |           | 39000 | mg/Kg | ✱ | 06/23/23 16:30 | 06/29/23 09:51 | 25.71   |
| Biochemical Oxygen Demand (SM 5210 B-2016)   | 260000 B |           | 180   | mg/Kg | ✱ |                | 06/23/23 13:51 | 96.3    |

**Appendix D**  
**Soil Survey Maps and Soil**  
**Analyticals**

Edited July 25, 2023  
Depth to Water Table Map



Soil Map—Bedford County, Tennessee  
(David Womack)



## 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 1:24,000.

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: Bedford County, Tennessee

Survey Area Data: Version 19, Sep 15, 2022

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

Date(s) aerial images were photographed: Mar 20, 2021—Apr 20, 2021

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 |
|------------------------------------|----------------------------------------------------------------|--------------|----------------|
| Ar                                 | Arrington silt loam, 0 to 2 percent slopes, frequently flooded | 53.2         | 13.4%          |
| BaD                                | Barfield-Rock outcrop complex, 5 to 20 percent slopes          | 17.4         | 4.4%           |
| BrB2                               | Braxton silt loam, 2 to 5 percent slopes, eroded               | 76.0         | 19.1%          |
| BrC2                               | Braxton silt loam, 5 to 12 percent slopes, eroded              | 54.9         | 13.8%          |
| HaA                                | Harpeth silt loam, 0 to 2 percent slopes                       | 4.2          | 1.0%           |
| HaB                                | Harpeth silt loam, 2 to 5 percent slopes                       | 85.8         | 21.6%          |
| HaC2                               | Harpeth silt loam, 5 to 12 percent slopes, eroded              | 28.9         | 7.3%           |
| Ly                                 | Lynnville silt loam, frequently flooded                        | 11.4         | 2.9%           |
| TaC2                               | Talbott silt loam, 5 to 12 percent slopes, eroded              | 2.5          | 0.6%           |
| Tu                                 | Tupelo silt loam, 0 to 2 percent slopes, occasionally flooded  | 56.7         | 14.2%          |
| W                                  | Water                                                          | 7.0          | 1.7%           |
| <b>Totals for Area of Interest</b> |                                                                | <b>398.0</b> | <b>100.0%</b>  |



## 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

### Bedford County, Tennessee

#### Ar—Arrington silt loam, 0 to 2 percent slopes, frequently flooded

##### Map Unit Setting

*National map unit symbol:* 2td33

*Elevation:* 500 to 850 feet  
*Mean annual precipitation:* 48 to 58 inches  
*Mean annual air temperature:* 57 to 61 degrees F  
*Frost-free period:* 190 to 230 days  
*Farmland classification:* Prime farmland if protected from flooding or not frequently flooded during the growing season

**Map Unit Composition**

*Arrington and similar soils:* 90 percent  
*Minor components:* 10 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Arrington****Setting**

*Landform:* Flood plains  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Silty alluvium derived from limestone and siltstone

**Typical profile**

*Ap - 0 to 26 inches:* silt loam  
*Bw - 26 to 50 inches:* silt loam  
*C - 50 to 79 inches:* silt loam

**Properties and qualities**

*Slope:* 0 to 2 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Runoff class:* Low  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.60 to 2.00 in/hr)  
*Depth to water table:* About 49 to 59 inches  
*Frequency of flooding:* NoneFrequent  
*Frequency of ponding:* None  
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Available water supply, 0 to 60 inches:* Very high (about 12.5 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 3w  
*Land capability classification (nonirrigated):* 3w  
*Hydrologic Soil Group:* B  
*Ecological site:* F123XY005TN - Floodplains  
*Hydric soil rating:* No

**Minor Components****Egam**

*Percent of map unit:* 4 percent

*Landform:* Flood plains  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

**Armour**

*Percent of map unit:* 2 percent  
*Landform:* Stream terraces  
*Landform position (two-dimensional):* Footslope, toeslope  
*Landform position (three-dimensional):* Base slope, tread  
*Down-slope shape:* Concave, convex  
*Across-slope shape:* Linear, convex  
*Hydric soil rating:* No

**Lindell**

*Percent of map unit:* 2 percent  
*Landform:* Flood plains  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

**Ocana**

*Percent of map unit:* 2 percent  
*Landform:* Flood plains  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

**BaD—Barfield-Rock outcrop complex, 5 to 20 percent slopes****Map Unit Setting**

*National map unit symbol:* 2v596  
*Elevation:* 390 to 1,210 feet  
*Mean annual precipitation:* 48 to 58 inches  
*Mean annual air temperature:* 57 to 61 degrees F  
*Frost-free period:* 190 to 230 days  
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Barfield and similar soils:* 50 percent  
*Rock outcrop:* 35 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

## Description of Barfield

### Setting

*Landform:* Hillslopes

*Landform position (two-dimensional):* Footslope

*Landform position (three-dimensional):* Base slope

*Down-slope shape:* Concave

*Across-slope shape:* Linear

*Parent material:* Clayey residuum weathered from phosphatic limestone

### Typical profile

*A - 0 to 6 inches:* silty clay loam

*Bw - 6 to 12 inches:* clay

*C - 12 to 18 inches:* channery clay

*R - 18 to 28 inches:* bedrock

### Properties and qualities

*Slope:* 5 to 20 percent

*Depth to restrictive feature:* 8 to 20 inches to lithic bedrock

*Drainage class:* Well drained

*Runoff class:* Very high

*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

*Available water supply, 0 to 60 inches:* Very low (about 2.0 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 6s

*Hydrologic Soil Group:* D

*Ecological site:* F123XY003TN - Limestone Glades And Dry Woodlands

*Hydric soil rating:* No

## Description of Rock Outcrop

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 8s

## Minor Components

### Ashwood

*Percent of map unit:* 5 percent

*Landform:* Hillslopes

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Side slope

*Down-slope shape:* Linear

*Across-slope shape:* Linear  
*Hydric soil rating:* No

**Mimosa**

*Percent of map unit:* 5 percent  
*Landform:* Escarpments  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Concave  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

**Gladdice**

*Percent of map unit:* 5 percent  
*Landform:* Escarpments  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Concave  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

**BrB2—Braxton silt loam, 2 to 5 percent slopes, eroded****Map Unit Setting**

*National map unit symbol:* krv7  
*Elevation:* 900 to 1,200 feet  
*Mean annual precipitation:* 48 to 55 inches  
*Mean annual air temperature:* 48 to 71 degrees F  
*Frost-free period:* 190 to 205 days  
*Farmland classification:* All areas are prime farmland

**Map Unit Composition**

*Braxton and similar soils:* 100 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Braxton****Setting**

*Landform:* Hillslopes  
*Landform position (three-dimensional):* Side slope  
*Parent material:* Clayey alluvium and/or residuum weathered from limestone

**Typical profile**

*H1 - 0 to 7 inches:* silt loam  
*H2 - 7 to 60 inches:* clay

**Properties and qualities**

*Slope:* 2 to 5 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.60 to 2.00 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* High (about 9.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2e  
*Hydrologic Soil Group:* B  
*Ecological site:* F123XY001TN - Limestone Uplands  
*Hydric soil rating:* No

**BrC2—Braxton silt loam, 5 to 12 percent slopes, eroded****Map Unit Setting**

*National map unit symbol:* krw8  
*Elevation:* 900 to 1,200 feet  
*Mean annual precipitation:* 48 to 55 inches  
*Mean annual air temperature:* 48 to 71 degrees F  
*Frost-free period:* 190 to 205 days  
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Braxton and similar soils:* 100 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Braxton****Setting**

*Landform:* Hillslopes  
*Landform position (three-dimensional):* Side slope  
*Parent material:* Clayey alluvium and/or residuum weathered from limestone

**Typical profile**

*H1 - 0 to 7 inches:* silt loam  
*H2 - 7 to 60 inches:* clay

**Properties and qualities**

*Slope:* 5 to 12 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.60 to 2.00 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* High (about 9.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 3e

*Hydrologic Soil Group:* B

*Ecological site:* F123XY001TN - Limestone Uplands

*Hydric soil rating:* No

**HaA—Harpeth silt loam, 0 to 2 percent slopes****Map Unit Setting**

*National map unit symbol:* krvp

*Elevation:* 700 to 1,300 feet

*Mean annual precipitation:* 48 inches

*Mean annual air temperature:* 48 to 71 degrees F

*Frost-free period:* 190 to 205 days

*Farmland classification:* All areas are prime farmland

**Map Unit Composition**

*Harpeth and similar soils:* 100 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Harpeth****Setting**

*Landform:* Stream terraces

*Landform position (three-dimensional):* Tread

*Parent material:* Loess or loamy alluvium over clayey residuum weathered from limestone

**Typical profile**

*H1 - 0 to 8 inches:* silt loam

*H2 - 8 to 40 inches:* silty clay loam

*H3 - 40 to 60 inches:* clay

**Properties and qualities**

*Slope:* 0 to 2 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Well drained

*Capacity of the most limiting layer to transmit water*

*(Ksat):* Moderately high to high (0.60 to 2.00 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water supply, 0 to 60 inches:* High (about 10.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 1

*Hydrologic Soil Group:* B

*Ecological site:* F123XY004TN - Deep Loamy Terraces And Depressions



*Hydric soil rating:* No

## **HaB—Harpeth silt loam, 2 to 5 percent slopes**

### **Map Unit Setting**

*National map unit symbol:* krvq

*Elevation:* 700 to 1,300 feet

*Mean annual precipitation:* 48 inches

*Mean annual air temperature:* 48 to 71 degrees F

*Frost-free period:* 190 to 205 days

*Farmland classification:* All areas are prime farmland

### **Map Unit Composition**

*Harpeth and similar soils:* 100 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Harpeth**

#### **Setting**

*Landform:* Stream terraces

*Landform position (three-dimensional):* Tread

*Parent material:* Loess or loamy alluvium over clayey residuum weathered from limestone

#### **Typical profile**

*H1 - 0 to 8 inches:* silt loam

*H2 - 8 to 40 inches:* silty clay loam

*H3 - 40 to 60 inches:* clay

#### **Properties and qualities**

*Slope:* 2 to 5 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Well drained

*Capacity of the most limiting layer to transmit water*

*(Ksat):* Moderately high to high (0.60 to 2.00 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water supply, 0 to 60 inches:* High (about 10.3 inches)

#### **Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 2e

*Hydrologic Soil Group:* B

*Ecological site:* F123XY004TN - Deep Loamy Terraces And Depressions

*Hydric soil rating:* No

## HaC2—Harpeth silt loam, 5 to 12 percent slopes, eroded

### Map Unit Setting

*National map unit symbol:* krvr  
*Elevation:* 700 to 1,300 feet  
*Mean annual precipitation:* 48 inches  
*Mean annual air temperature:* 48 to 71 degrees F  
*Frost-free period:* 190 to 205 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Harpeth and similar soils:* 100 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Harpeth

#### Setting

*Landform:* Stream terraces  
*Landform position (three-dimensional):* Tread  
*Parent material:* Loess or loamy alluvium over clayey residuum weathered from limestone

#### Typical profile

*H1 - 0 to 6 inches:* silt loam  
*H2 - 6 to 40 inches:* silty clay loam  
*H3 - 40 to 60 inches:* clay

#### Properties and qualities

*Slope:* 5 to 12 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.60 to 2.00 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* High (about 10.3 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 3e  
*Hydrologic Soil Group:* B  
*Ecological site:* F123XY004TN - Deep Loamy Terraces And Depressions  
*Hydric soil rating:* No

## Ly—Lynnville silt loam, frequently flooded

### Map Unit Setting

*National map unit symbol:* krvy

*Elevation:* 500 to 900 feet  
*Mean annual precipitation:* 46 to 54 inches  
*Mean annual air temperature:* 48 to 71 degrees F  
*Frost-free period:* 190 to 220 days  
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Lynnville and similar soils:* 92 percent  
*Minor components:* 8 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Lynnville****Setting**

*Landform:* Flood plains  
*Landform position (three-dimensional):* Tread  
*Parent material:* Loamy alluvium derived from limestone

**Typical profile**

*H1 - 0 to 18 inches:* silt loam  
*H2 - 18 to 60 inches:* silt loam

**Properties and qualities**

*Slope:* 0 to 2 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Moderately well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.60 to 2.00 in/hr)  
*Depth to water table:* About 24 to 36 inches  
*Frequency of flooding:* NoneFrequent  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* High (about 10.6 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 3w  
*Hydrologic Soil Group:* C  
*Ecological site:* F123XY005TN - Floodplains  
*Hydric soil rating:* No

**Minor Components****Melvin**

*Percent of map unit:* 8 percent  
*Landform:* Depressions  
*Hydric soil rating:* Yes

**TaC2—Talbott silt loam, 5 to 12 percent slopes, eroded****Map Unit Setting**

*National map unit symbol:* krwj  
*Elevation:* 460 to 1,400 feet

*Mean annual precipitation:* 45 to 55 inches  
*Mean annual air temperature:* 48 to 71 degrees F  
*Frost-free period:* 190 to 205 days  
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Talbott and similar soils:* 100 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Talbott****Setting**

*Landform:* Hillslopes  
*Landform position (three-dimensional):* Side slope  
*Parent material:* Clayey residuum weathered from limestone

**Typical profile**

*H1 - 0 to 4 inches:* silt loam  
*H2 - 4 to 34 inches:* clay  
*R - 34 to 44 inches:* bedrock

**Properties and qualities**

*Slope:* 5 to 12 percent  
*Depth to restrictive feature:* 20 to 40 inches to lithic bedrock  
*Drainage class:* Well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* Low (about 4.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 4e  
*Hydrologic Soil Group:* C  
*Ecological site:* F123XY001TN - Limestone Uplands  
*Hydric soil rating:* No

**Tu—Tupelo silt loam, 0 to 2 percent slopes, occasionally flooded****Map Unit Setting**

*National map unit symbol:* 2v5cr  
*Elevation:* 460 to 890 feet  
*Mean annual precipitation:* 47 to 52 inches  
*Mean annual air temperature:* 57 to 61 degrees F  
*Frost-free period:* 180 to 205 days  
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Tupelo and similar soils:* 90 percent

*Minor components: 10 percent*  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Tupelo**

#### **Setting**

*Landform:* Stream terraces  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Concave  
*Parent material:* Clayey alluvium derived from limestone

#### **Typical profile**

*Ap - 0 to 8 inches:* silt loam  
*Bt1 - 8 to 15 inches:* silty clay loam  
*Bt2 - 15 to 65 inches:* clay  
*R - 65 to 79 inches:* bedrock

#### **Properties and qualities**

*Slope:* 0 to 2 percent  
*Depth to restrictive feature:* 59 to 79 inches to lithic bedrock  
*Drainage class:* Somewhat poorly drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)  
*Depth to water table:* About 12 to 24 inches  
*Frequency of flooding:* NoneOccasional  
*Frequency of ponding:* None  
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Available water supply, 0 to 60 inches:* High (about 9.1 inches)

#### **Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 3w  
*Hydrologic Soil Group:* C/D  
*Ecological site:* F123XY002TN - Limestone Flats  
*Hydric soil rating:* No

### **Minor Components**

#### **Nesbitt**

*Percent of map unit:* 5 percent  
*Landform:* Flats  
*Landform position (three-dimensional):* Talf  
*Down-slope shape:* Linear  
*Across-slope shape:* Concave  
*Hydric soil rating:* No

#### **Dowellton**

*Percent of map unit:* 5 percent  
*Landform:* Stream terraces  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Concave

*Across-slope shape:* Concave  
*Hydric soil rating:* Yes

## **W—Water**

### **Map Unit Setting**

*National map unit symbol:* krwn  
*Mean annual air temperature:* 48 to 71 degrees F  
*Farmland classification:* Not prime farmland

### **Map Unit Composition**

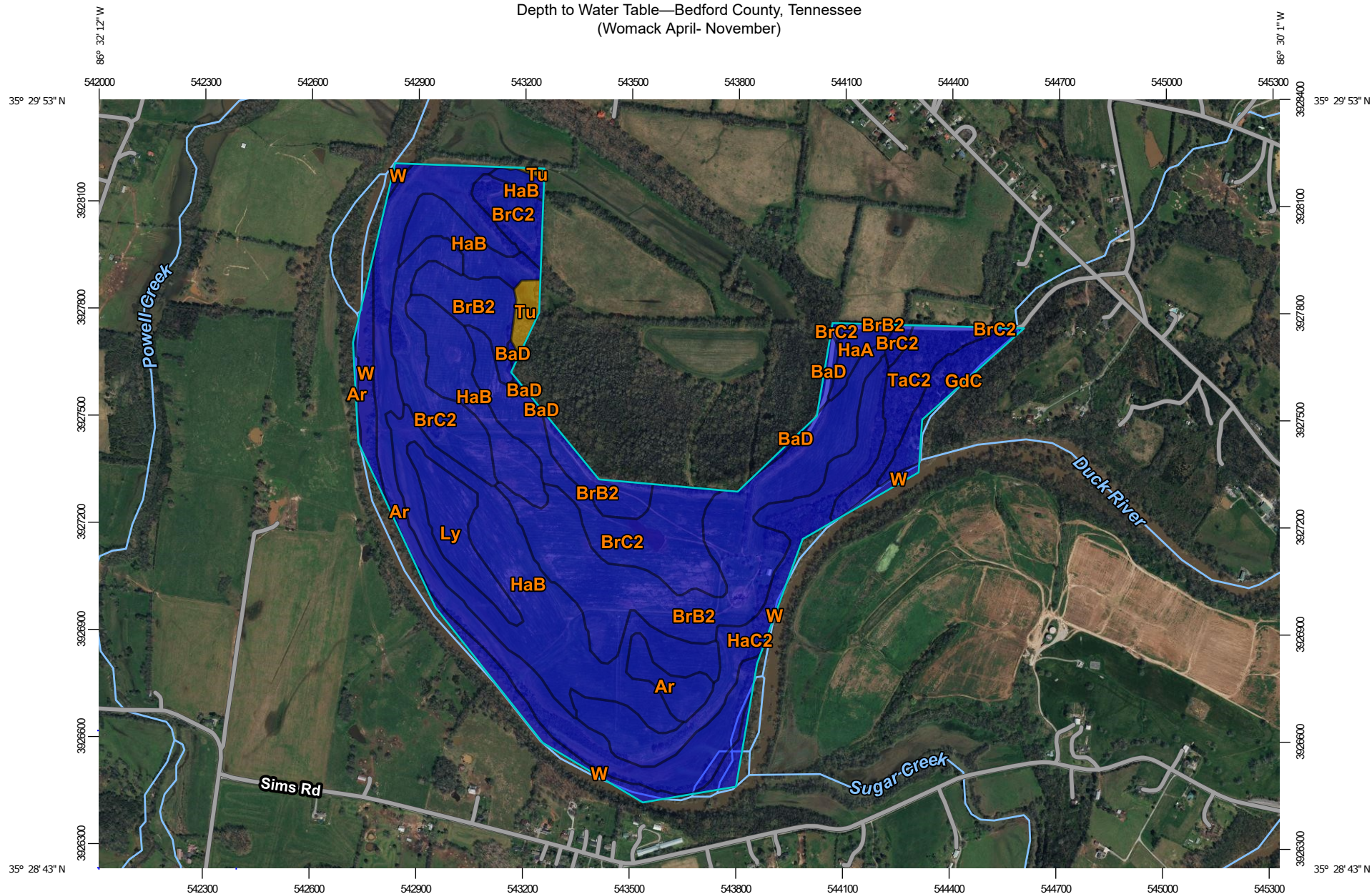
*Water:* 100 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

## **Data Source Information**

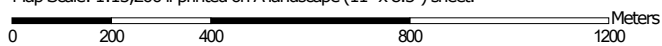
Soil Survey Area: Bedford County, Tennessee  
Survey Area Data: Version 19, Sep 15, 2022



Depth to Water Table—Bedford County, Tennessee  
(Womack April- November)



Map Scale: 1:15,200 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84



Natural Resources  
Conservation Service

Web Soil Survey  
National Cooperative Soil Survey

7/25/2023  
Page 1 of 4

Depth to Water Table—Bedford County, Tennessee  
(Womack April- November)

## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

#### Soil Rating Polygons

-  0 - 25
-  25 - 50
-  50 - 100
-  100 - 150
-  150 - 200
-  > 200
-  Not rated or not available

#### Soil Rating Lines

-  0 - 25
-  25 - 50
-  50 - 100
-  100 - 150
-  150 - 200
-  > 200
-  Not rated or not available

#### Soil Rating Points

-  0 - 25
-  25 - 50
-  50 - 100
-  100 - 150
-  150 - 200
-  > 200

 Not rated or not available

### 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 1:24,000.

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: Bedford County, Tennessee

Survey Area Data: Version 19, Sep 15, 2022

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

Date(s) aerial images were photographed: Mar 20, 2021—Apr 20, 2021

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.



## Depth to Water Table

| Map unit symbol                    | Map unit name                                                            | Rating (centimeters) | Acres in AOI | Percent of AOI |
|------------------------------------|--------------------------------------------------------------------------|----------------------|--------------|----------------|
| Ar                                 | Arrington silt loam, 0 to 2 percent slopes, frequently flooded           | >200                 | 52.2         | 15.3%          |
| BaD                                | Barfield-Rock outcrop complex, 5 to 20 percent slopes                    | >200                 | 2.2          | 0.6%           |
| BrB2                               | Braxton silt loam, 2 to 5 percent slopes, eroded                         | >200                 | 72.2         | 21.2%          |
| BrC2                               | Braxton silt loam, 5 to 12 percent slopes, eroded                        | >200                 | 54.3         | 16.0%          |
| GdC                                | Gladeville-Rock outcrop complex, 2 to 15 percent slopes, extremely stony | >200                 | 8.3          | 2.4%           |
| HaA                                | Harpeth silt loam, 0 to 2 percent slopes                                 | >200                 | 4.0          | 1.2%           |
| HaB                                | Harpeth silt loam, 2 to 5 percent slopes                                 | >200                 | 74.6         | 22.0%          |
| HaC2                               | Harpeth silt loam, 5 to 12 percent slopes, eroded                        | >200                 | 29.0         | 8.5%           |
| Ly                                 | Lynnville silt loam, frequently flooded                                  | >200                 | 11.4         | 3.4%           |
| TaC2                               | Talbott silt loam, 5 to 12 percent slopes, eroded                        | >200                 | 12.5         | 3.7%           |
| Tu                                 | Tupelo silt loam, 0 to 2 percent slopes, occasionally flooded            | 38                   | 3.2          | 0.9%           |
| W                                  | Water                                                                    | >200                 | 16.2         | 4.8%           |
| <b>Totals for Area of Interest</b> |                                                                          |                      | <b>340.0</b> | <b>100.0%</b>  |

## Description

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

## Rating Options

*Units of Measure:* centimeters

*Aggregation Method:* Dominant Component

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Lower

*Interpret Nulls as Zero:* No

*Beginning Month:* April

*Ending Month:* November

## SOIL ANALYSIS

Client :  
Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle AR 72834

Grower :  
TN2- David Womack

Report No: 23-138-0930  
Cust No: 20513  
Date Printed: 05/19/2023  
Date Received : 05/18/2023  
PO:  
Page : 1 of 5

Lab No: 08005

Field: DW-2

Sample ID: DW-2-1

| Test                | Method | Results      | SOIL TEST RATINGS |     |        |         |           | Calculated Cation Exchange Capacity |
|---------------------|--------|--------------|-------------------|-----|--------|---------|-----------|-------------------------------------|
|                     |        |              | Very Low          | Low | Medium | Optimum | Very High |                                     |
| Soil pH             | 1:1    | 6.8          |                   |     |        |         |           | 8.6 meq/100g                        |
| Buffer pH           |        |              |                   |     |        |         |           | %Saturation                         |
| Phosphorus (P)      | M3     | 15 mg/kg     |                   |     |        |         |           | %sat meq                            |
| Potassium (K)       | M3     | 63 mg/kg     |                   |     |        |         |           | K 1.9 0.2                           |
| Calcium (Ca)        | M3     | 1368 mg/kg   |                   |     |        |         |           | Ca 79.5 6.8                         |
| Magnesium (Mg)      | M3     | 149 mg/kg    |                   |     |        |         |           | Mg 14.4 1.2                         |
| Sulfur (S)          |        |              |                   |     |        |         |           | H 3.5 0.3                           |
| Boron (B)           |        |              |                   |     |        |         |           | Na 0.7 0.1                          |
| Copper (Cu)         | M3     | 0.9 mg/kg    |                   |     |        |         |           | K/Mg Ratio: 0.13                    |
| Iron (Fe)           |        |              |                   |     |        |         |           | Ca/Mg Ratio: 5.52                   |
| Manganese (Mn)      |        |              |                   |     |        |         |           |                                     |
| Zinc (Zn)           |        |              |                   |     |        |         |           |                                     |
| Sodium (Na)         | M3     | 13 mg/kg     |                   |     |        |         |           |                                     |
| Soluble Salts       | SS1:2  | 0.08 dS/m    |                   |     |        |         |           |                                     |
| Organic Matter      | LOI    | 2.8%         |                   |     |        |         |           |                                     |
| Estimated N Release |        | 100 lbs/acre |                   |     |        |         |           |                                     |
| Nitrate Nitrogen    | NO3N   | 25 mg/kg     |                   |     |        |         |           |                                     |
|                     |        |              |                   |     |        |         |           |                                     |
|                     |        |              |                   |     |        |         |           |                                     |
|                     |        |              |                   |     |        |         |           |                                     |

## SOIL FERTILITY GUIDELINES

Crop : Corn

Yield Goal : 150 bu/acre

Rec Units: LB/ACRE

| (lbs)  | LIME (tons) | N   | P <sub>2</sub> O <sub>5</sub> | K <sub>2</sub> O | Mg | S | B | Cu | Mn | Zn | Fe         |
|--------|-------------|-----|-------------------------------|------------------|----|---|---|----|----|----|------------|
| 0      | 0           | 133 | 94                            | 124              | 0  |   |   | 0  |    |    |            |
| Crop : |             |     |                               |                  |    |   |   |    |    |    | Rec Units: |
|        |             |     |                               |                  |    |   |   |    |    |    |            |

Comments :

### Corn

- Greater N efficiency for corn may be achieved by splitting the N application. Apply 1/4 to 1/3 of the N prior to or at planting and the remainder as sidedress when corn is 8-24 inches high.
- For early planted corn or no till corn, apply a starter fertilizer at least 2 inches from the seed at a rate of 10-20 lbs N/Acre and 30-60 lbs P<sub>2</sub>O<sub>5</sub>/Acre.

## SOIL ANALYSIS

Client :  
Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle AR 72834

Grower :  
TN2- David Womack

Report No: 23-138-0930  
Cust No: 20513  
Date Printed: 05/19/2023  
Date Received : 05/18/2023  
PO:  
Page : 2 of 5

Lab No: 08006

Field: DW-2

Sample ID: DW-2-2

| Test                | Method | Results      | SOIL TEST RATINGS |     |        |         |           | Calculated Cation Exchange Capacity |
|---------------------|--------|--------------|-------------------|-----|--------|---------|-----------|-------------------------------------|
|                     |        |              | Very Low          | Low | Medium | Optimum | Very High |                                     |
| Soil pH             | 1:1    | 6.2          |                   |     |        |         |           | 10.5 meq/100g                       |
| Buffer pH           |        |              |                   |     |        |         |           | %Saturation                         |
| Phosphorus (P)      | M3     | 15 mg/kg     |                   |     |        |         |           | %sat meq                            |
| Potassium (K)       | M3     | 101 mg/kg    |                   |     |        |         |           | K 2.5 0.3                           |
| Calcium (Ca)        | M3     | 1455 mg/kg   |                   |     |        |         |           | Ca 69.3 7.3                         |
| Magnesium (Mg)      | M3     | 189 mg/kg    |                   |     |        |         |           | Mg 15.0 1.6                         |
| Sulfur (S)          |        |              |                   |     |        |         |           | H 12.4 1.3                          |
| Boron (B)           |        |              |                   |     |        |         |           | Na 0.7 0.1                          |
| Copper (Cu)         | M3     | 0.8 mg/kg    |                   |     |        |         |           | K/Mg Ratio: 0.16                    |
| Iron (Fe)           |        |              |                   |     |        |         |           | Ca/Mg Ratio: 4.62                   |
| Manganese (Mn)      |        |              |                   |     |        |         |           |                                     |
| Zinc (Zn)           |        |              |                   |     |        |         |           |                                     |
| Sodium (Na)         | M3     | 16 mg/kg     |                   |     |        |         |           |                                     |
| Soluble Salts       | SS1:2  | 0.17 dS/m    |                   |     |        |         |           |                                     |
| Organic Matter      | LOI    | 3.2%         |                   |     |        |         |           |                                     |
| Estimated N Release |        | 108 lbs/acre |                   |     |        |         |           |                                     |
| Nitrate Nitrogen    | NO3N   | 26 mg/kg     |                   |     |        |         |           |                                     |
|                     |        |              |                   |     |        |         |           |                                     |
|                     |        |              |                   |     |        |         |           |                                     |
|                     |        |              |                   |     |        |         |           |                                     |

## SOIL FERTILITY GUIDELINES

Crop : Corn

Yield Goal : 150 bu/acre

Rec Units: LB/ACRE

| (lbs)  | LIME | (tons) | N   | P <sub>2</sub> O <sub>5</sub> | K <sub>2</sub> O | Mg | S | B | Cu  | Mn | Zn | Fe         |
|--------|------|--------|-----|-------------------------------|------------------|----|---|---|-----|----|----|------------|
| 0      |      | 0      | 131 | 94                            | 116              | 0  |   |   | 1.0 |    |    |            |
| Crop : |      |        |     |                               |                  |    |   |   |     |    |    | Rec Units: |
|        |      |        |     |                               |                  |    |   |   |     |    |    |            |

Comments :

### Corn

- Greater N efficiency for corn may be achieved by splitting the N application. Apply 1/4 to 1/3 of the N prior to or at planting and the remainder as sidedress when corn is 8-24 inches high.
- For early planted corn or no till corn, apply a starter fertilizer at least 2 inches from the seed at a rate of 10-20 lbs N/Acre and 30-60 lbs P<sub>2</sub>O<sub>5</sub>/Acre.



## SOIL ANALYSIS

|                                                                                                         |                               |                                                                                                                            |
|---------------------------------------------------------------------------------------------------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Client :<br>Denali Water Solutions<br>Ms. Vanya Colburn<br>15797 State Hwy 155 E<br>Dardanelle AR 72834 | Grower :<br>TN2- David Womack | Report No: 23-138-0930<br>Cust No: 20513<br>Date Printed: 05/19/2023<br>Date Received : 05/18/2023<br>PO:<br>Page : 3 of 5 |
|---------------------------------------------------------------------------------------------------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------|

Lab No: 08007

Field: DW-2

Sample ID: DW-2-3

| Test                | Method | Results      | SOIL TEST RATINGS |     |        |         |           | Calculated Cation<br>Exchange Capacity |
|---------------------|--------|--------------|-------------------|-----|--------|---------|-----------|----------------------------------------|
|                     |        |              | Very Low          | Low | Medium | Optimum | Very High |                                        |
| Soil pH             | 1:1    | 6.4          |                   |     |        |         |           | 12.0 meq/100g                          |
| Buffer pH           |        |              |                   |     |        |         |           | %Saturation                            |
| Phosphorus (P)      | M3     | 13 mg/kg     |                   |     |        |         |           | %sat meq                               |
| Potassium (K)       | M3     | 143 mg/kg    |                   |     |        |         |           | K 3.1 0.4                              |
| Calcium (Ca)        | M3     | 1698 mg/kg   |                   |     |        |         |           | Ca 70.8 8.5                            |
| Magnesium (Mg)      | M3     | 237 mg/kg    |                   |     |        |         |           | Mg 16.5 2.0                            |
| Sulfur (S)          |        |              |                   |     |        |         |           | H 9.2 1.1                              |
| Boron (B)           |        |              |                   |     |        |         |           | Na 0.5 0.1                             |
| Copper (Cu)         | M3     | 0.6 mg/kg    |                   |     |        |         |           | K/Mg Ratio: 0.18                       |
| Iron (Fe)           |        |              |                   |     |        |         |           | Ca/Mg Ratio: 4.29                      |
| Manganese (Mn)      |        |              |                   |     |        |         |           |                                        |
| Zinc (Zn)           |        |              |                   |     |        |         |           |                                        |
| Sodium (Na)         | M3     | 15 mg/kg     |                   |     |        |         |           |                                        |
| Soluble Salts       | SS1:2  | 0.35 dS/m    |                   |     |        |         |           |                                        |
| Organic Matter      | LOI    | 3.7%         |                   |     |        |         |           |                                        |
| Estimated N Release |        | 118 lbs/acre |                   |     |        |         |           |                                        |
| Nitrate Nitrogen    | NO3N   | 63 mg/kg     |                   |     |        |         |           |                                        |
|                     |        |              |                   |     |        |         |           |                                        |
|                     |        |              |                   |     |        |         |           |                                        |
|                     |        |              |                   |     |        |         |           |                                        |

## SOIL FERTILITY GUIDELINES

Crop : Corn

Yield Goal : 150 bu/acre

Rec Units: LB/ACRE

| (lbs)      | LIME | (tons) | N  | P <sub>2</sub> O <sub>5</sub> | K <sub>2</sub> O | Mg | S | B | Cu  | Mn | Zn | Fe |
|------------|------|--------|----|-------------------------------|------------------|----|---|---|-----|----|----|----|
| 0          |      | 0      | 57 | 98                            | 81               | 0  |   |   | 1.0 |    |    |    |
| Crop :     |      |        |    |                               |                  |    |   |   |     |    |    |    |
| Rec Units: |      |        |    |                               |                  |    |   |   |     |    |    |    |
|            |      |        |    |                               |                  |    |   |   |     |    |    |    |

Comments :

### Corn

- Greater N efficiency for corn may be achieved by splitting the N application. Apply 1/4 to 1/3 of the N prior to or at planting and the remainder as sidedress when corn is 8-24 inches high.
- For early planted corn or no till corn, apply a starter fertilizer at least 2 inches from the seed at a rate of 10-20 lbs N/Acre and 30-60 lbs P<sub>2</sub>O<sub>5</sub>/Acre.

## SOIL ANALYSIS

Client :  
Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle AR 72834

Grower :  
TN2- David Womack

Report No: 23-138-0930  
Cust No: 20513  
Date Printed: 05/19/2023  
Date Received : 05/18/2023  
PO:  
Page : 4 of 5

Lab No: 08008

Field: DW-2

Sample ID: DW-2-4

| Test                | Method | Results      | SOIL TEST RATINGS |     |        |         |           | Calculated Cation Exchange Capacity |
|---------------------|--------|--------------|-------------------|-----|--------|---------|-----------|-------------------------------------|
|                     |        |              | Very Low          | Low | Medium | Optimum | Very High |                                     |
| Soil pH             | 1:1    | 5.9          |                   |     |        |         |           | 9.4 meq/100g                        |
| Buffer pH           | SMP    | 6.77         |                   |     |        |         |           | %Saturation                         |
| Phosphorus (P)      | M3     | 30 mg/kg     |                   |     |        |         |           | %sat meq                            |
| Potassium (K)       | M3     | 195 mg/kg    |                   |     |        |         |           | K 5.3 0.5                           |
| Calcium (Ca)        | M3     | 1156 mg/kg   |                   |     |        |         |           | Ca 61.5 5.8                         |
| Magnesium (Mg)      | M3     | 180 mg/kg    |                   |     |        |         |           | Mg 16.0 1.5                         |
| Sulfur (S)          |        |              |                   |     |        |         |           | H 17.0 1.6                          |
| Boron (B)           |        |              |                   |     |        |         |           | Na 0.7 0.1                          |
| Copper (Cu)         | M3     | 1.3 mg/kg    |                   |     |        |         |           | K/Mg Ratio: 0.33                    |
| Iron (Fe)           |        |              |                   |     |        |         |           | Ca/Mg Ratio: 3.84                   |
| Manganese (Mn)      |        |              |                   |     |        |         |           |                                     |
| Zinc (Zn)           |        |              |                   |     |        |         |           |                                     |
| Sodium (Na)         | M3     | 15 mg/kg     |                   |     |        |         |           |                                     |
| Soluble Salts       | SS1:2  | 0.37 dS/m    |                   |     |        |         |           |                                     |
| Organic Matter      | LOI    | 4.2%         |                   |     |        |         |           |                                     |
| Estimated N Release |        | 128 lbs/acre |                   |     |        |         |           |                                     |
| Nitrate Nitrogen    | NO3N   | 60 mg/kg     |                   |     |        |         |           |                                     |
|                     |        |              |                   |     |        |         |           |                                     |
|                     |        |              |                   |     |        |         |           |                                     |
|                     |        |              |                   |     |        |         |           |                                     |

## SOIL FERTILITY GUIDELINES

Crop : Corn

Yield Goal : 150 bu/acre

Rec Units: LB/ACRE

| (lbs)      | LIME | (tons) | N  | P <sub>2</sub> O <sub>5</sub> | K <sub>2</sub> O | Mg | S | B | Cu | Mn | Zn | Fe |
|------------|------|--------|----|-------------------------------|------------------|----|---|---|----|----|----|----|
| 2000       |      | 1      | 63 | 69                            | 40               | 0  |   |   | 0  |    |    |    |
| Crop :     |      |        |    |                               |                  |    |   |   |    |    |    |    |
| Rec Units: |      |        |    |                               |                  |    |   |   |    |    |    |    |
|            |      |        |    |                               |                  |    |   |   |    |    |    |    |

Comments :

### Corn

Limestone application is targeted to bring soil pH to 6.0.

- Greater N efficiency for corn may be achieved by splitting the N application. Apply 1/4 to 1/3 of the N prior to or at planting and the remainder as sidedress when corn is 8-24 inches high.
- For early planted corn or no till corn, apply a starter fertilizer at least 2 inches from the seed at a rate of 10-20 lbs N/Acre and 30-60 lbs P<sub>2</sub>O<sub>5</sub>/Acre.

## SOIL ANALYSIS

Client :  
Denali Water Solutions  
Ms. Vanya Colburn  
15797 State Hwy 155 E  
Dardanelle AR 72834

Grower :  
TN2- David Womack

Report No: 23-138-0930  
Cust No: 20513  
Date Printed: 05/19/2023  
Date Received : 05/18/2023  
PO:  
Page : 5 of 5

Lab No: 08009

Field: DW-2

Sample ID: DW-2-5

| Test                | Method | Results      | SOIL TEST RATINGS |     |        |         |           | Calculated Cation<br>Exchange Capacity |
|---------------------|--------|--------------|-------------------|-----|--------|---------|-----------|----------------------------------------|
|                     |        |              | Very Low          | Low | Medium | Optimum | Very High |                                        |
| Soil pH             | 1:1    | 6.9          |                   |     |        |         |           | 7.9 meq/100g                           |
| Buffer pH           |        |              |                   |     |        |         |           | %Saturation                            |
| Phosphorus (P)      | M3     | 13 mg/kg     |                   |     |        |         |           | %sat meq                               |
| Potassium (K)       | M3     | 123 mg/kg    |                   |     |        |         |           | K 4.0 0.3                              |
| Calcium (Ca)        | M3     | 1177 mg/kg   |                   |     |        |         |           | Ca 74.5 5.9                            |
| Magnesium (Mg)      | M3     | 189 mg/kg    |                   |     |        |         |           | Mg 19.9 1.6                            |
| Sulfur (S)          |        |              |                   |     |        |         |           | H 1.3 0.1                              |
| Boron (B)           |        |              |                   |     |        |         |           | Na 0.8 0.1                             |
| Copper (Cu)         | M3     | 1.3 mg/kg    |                   |     |        |         |           | K/Mg Ratio: 0.20                       |
| Iron (Fe)           |        |              |                   |     |        |         |           | Ca/Mg Ratio: 3.74                      |
| Manganese (Mn)      |        |              |                   |     |        |         |           |                                        |
| Zinc (Zn)           |        |              |                   |     |        |         |           |                                        |
| Sodium (Na)         | M3     | 14 mg/kg     |                   |     |        |         |           |                                        |
| Soluble Salts       | SS1:2  | 0.16 dS/m    |                   |     |        |         |           |                                        |
| Organic Matter      | LOI    | 3.7%         |                   |     |        |         |           |                                        |
| Estimated N Release |        | 118 lbs/acre |                   |     |        |         |           |                                        |
| Nitrate Nitrogen    | NO3N   | 20 mg/kg     |                   |     |        |         |           |                                        |
|                     |        |              |                   |     |        |         |           |                                        |
|                     |        |              |                   |     |        |         |           |                                        |
|                     |        |              |                   |     |        |         |           |                                        |

## SOIL FERTILITY GUIDELINES

Crop : Corn

Yield Goal : 150 bu/acre

Rec Units: LB/ACRE

| (lbs)  | LIME | (tons) | N   | P <sub>2</sub> O <sub>5</sub> | K <sub>2</sub> O | Mg | S | B | Cu | Mn | Zn | Fe         |
|--------|------|--------|-----|-------------------------------|------------------|----|---|---|----|----|----|------------|
| 0      |      | 0      | 143 | 98                            | 80               | 0  |   |   | 0  |    |    |            |
| Crop : |      |        |     |                               |                  |    |   |   |    |    |    | Rec Units: |
|        |      |        |     |                               |                  |    |   |   |    |    |    |            |

Comments :

### Corn

- Greater N efficiency for corn may be achieved by splitting the N application. Apply 1/4 to 1/3 of the N prior to or at planting and the remainder as sidedress when corn is 8-24 inches high.
- For early planted corn or no till corn, apply a starter fertilizer at least 2 inches from the seed at a rate of 10-20 lbs N/Acre and 30-60 lbs P<sub>2</sub>O<sub>5</sub>/Acre.

20513

Denali Water Solutions  
Ms. Vanya Colburn  
P.O. Box 3036  
Russellville , AR 72811

Project TN2- David Womack  
Information :

Report Number : **23-138-0202**

**REPORT OF ANALYSIS**

Report Date : 05/31/2023

Received : 05/18/2023

Lab No : **95729**

Sample ID : **DW-2-1**

Matrix: **Solids**

Sampled:

| Test                        | Results      | Units | MQL   | DF | Date / Time Analyzed | By  | Analytical Method |
|-----------------------------|--------------|-------|-------|----|----------------------|-----|-------------------|
| Calcium (saturated paste)   | <b>3.77</b>  | meq/L | 0.005 | 1  | 05/31/23 15:13       | SWL | Saturate Paste    |
| Magnesium (saturated paste) | <b>1.17</b>  | meq/L | 0.008 | 1  | 05/31/23 15:13       | SWL | Saturate Paste    |
| Sodium (saturated paste)    | <b>0.207</b> | meq/L | 0.004 | 1  | 05/31/23 15:13       | SWL | Saturate Paste    |
| Sodium Absorption Ratio     | <b>0.132</b> |       |       | 1  | 05/31/23 15:13       | SWL | Saturate Paste    |
| Chromium, Hexavalent        | <0.516       | mg/Kg | 0.516 | 1  | 05/26/23 09:27       | ABB | 3060A 7196A       |
| Arsenic                     | <b>4.97</b>  | mg/Kg | 2.50  | 5  | 05/24/23 12:17       | BKN | 6010D             |
| Cadmium                     | <0.500       | mg/Kg | 0.500 | 5  | 05/24/23 12:17       | BKN | 6010D             |
| Copper                      | <b>7.93</b>  | mg/Kg | 2.50  | 5  | 05/24/23 12:17       | BKN | 6010D             |
| Lead                        | <b>15.2</b>  | mg/Kg | 1.50  | 5  | 05/24/23 12:17       | BKN | 6010D             |
| Mercury                     | <0.161       | mg/Kg | 0.161 | 1  | 05/24/23 13:47       | FDS | 7471A             |
| Nickel                      | <b>11.8</b>  | mg/Kg | 1.25  | 5  | 05/24/23 12:17       | BKN | 6010D             |
| Selenium                    | <2.50        | mg/Kg | 2.50  | 5  | 05/24/23 12:17       | BKN | 6010D             |
| Zinc                        | <b>37.1</b>  | mg/Kg | 6.25  | 5  | 05/24/23 12:17       | BKN | 6010D             |

**Qualifiers/  
Definitions**

DF Dilution Factor  
MQL Method Quantitation Limit

L Limit Exceeded



20513

Denali Water Solutions  
Ms. Vanya Colburn  
P.O. Box 3036  
Russellville , AR 72811

Project TN2- David Womack  
Information :

Report Number : **23-138-0202**

**REPORT OF ANALYSIS**

Report Date : 05/31/2023

Received : 05/18/2023

Lab No : **95730**

Sample ID : **DW-2-2**

Matrix: **Solids**

Sampled:

| Test                        | Results      | Units | MQL   | DF | Date / Time Analyzed | By  | Analytical Method |
|-----------------------------|--------------|-------|-------|----|----------------------|-----|-------------------|
| Calcium (saturated paste)   | <b>6.29</b>  | meq/L | 0.005 | 1  | 05/31/23 15:13       | SWL | Saturate Paste    |
| Magnesium (saturated paste) | <b>2.28</b>  | meq/L | 0.008 | 1  | 05/31/23 15:13       | SWL | Saturate Paste    |
| Sodium (saturated paste)    | <b>0.283</b> | meq/L | 0.004 | 1  | 05/31/23 15:13       | SWL | Saturate Paste    |
| Sodium Absorption Ratio     | <b>0.136</b> |       |       | 1  | 05/31/23 15:13       | SWL | Saturate Paste    |
| Chromium, Hexavalent        | <0.500       | mg/Kg | 0.500 | 1  | 05/26/23 09:27       | ABB | 3060A 7196A       |
| Arsenic                     | <b>6.98</b>  | mg/Kg | 0.500 | 1  | 05/24/23 03:36       | BKN | 6010D             |
| Cadmium                     | <b>0.378</b> | mg/Kg | 0.100 | 1  | 05/24/23 03:36       | BKN | 6010D             |
| Copper                      | <b>10.8</b>  | mg/Kg | 0.500 | 1  | 05/24/23 03:36       | BKN | 6010D             |
| Lead                        | <b>12.7</b>  | mg/Kg | 0.300 | 1  | 05/24/23 03:36       | BKN | 6010D             |
| Mercury                     | <0.167       | mg/Kg | 0.167 | 1  | 05/24/23 13:48       | FDS | 7471A             |
| Nickel                      | <b>11.8</b>  | mg/Kg | 0.250 | 1  | 05/24/23 03:36       | BKN | 6010D             |
| Selenium                    | <0.500       | mg/Kg | 0.500 | 1  | 05/24/23 03:36       | BKN | 6010D             |
| Zinc                        | <b>38.7</b>  | mg/Kg | 1.25  | 1  | 05/24/23 03:36       | BKN | 6010D             |

**Qualifiers/  
Definitions**

DF Dilution Factor  
MQL Method Quantitation Limit

L Limit Exceeded

20513

Denali Water Solutions  
Ms. Vanya Colburn  
P.O. Box 3036  
Russellville , AR 72811

Project TN2- David Womack  
Information :

Report Number : **23-138-0202**

**REPORT OF ANALYSIS**

Report Date : 05/31/2023

Received : 05/18/2023

Lab No : **95731**  
Sample ID : **DW-2-3**

Matrix: **Solids**  
Sampled:

| Test                        | Results      | Units | MQL   | DF | Date / Time Analyzed | By  | Analytical Method |
|-----------------------------|--------------|-------|-------|----|----------------------|-----|-------------------|
| Calcium (saturated paste)   | <b>13.7</b>  | meq/L | 0.005 | 1  | 05/31/23 15:13       | SWL | Saturate Paste    |
| Magnesium (saturated paste) | <b>4.48</b>  | meq/L | 0.008 | 1  | 05/31/23 15:13       | SWL | Saturate Paste    |
| Sodium (saturated paste)    | <b>0.390</b> | meq/L | 0.004 | 1  | 05/31/23 15:13       | SWL | Saturate Paste    |
| Sodium Absorption Ratio     | <b>0.129</b> |       |       | 1  | 05/31/23 15:13       | SWL | Saturate Paste    |
| Chromium, Hexavalent        | <0.500       | mg/Kg | 0.500 | 1  | 05/26/23 09:27       | ABB | 3060A 7196A       |
| Arsenic                     | <b>8.08</b>  | mg/Kg | 0.500 | 1  | 05/24/23 03:52       | BKN | 6010D             |
| Cadmium                     | <b>0.612</b> | mg/Kg | 0.100 | 1  | 05/24/23 03:52       | BKN | 6010D             |
| Copper                      | <b>13.0</b>  | mg/Kg | 0.500 | 1  | 05/24/23 03:52       | BKN | 6010D             |
| Lead                        | <b>12.5</b>  | mg/Kg | 0.300 | 1  | 05/24/23 03:52       | BKN | 6010D             |
| Mercury                     | <0.170       | mg/Kg | 0.170 | 1  | 05/24/23 13:50       | FDS | 7471A             |
| Nickel                      | <b>16.5</b>  | mg/Kg | 0.250 | 1  | 05/24/23 03:52       | BKN | 6010D             |
| Selenium                    | <0.500       | mg/Kg | 0.500 | 1  | 05/24/23 03:52       | BKN | 6010D             |
| Zinc                        | <b>47.6</b>  | mg/Kg | 1.25  | 1  | 05/24/23 03:52       | BKN | 6010D             |

**Qualifiers/  
Definitions**

DF Dilution Factor  
MQL Method Quantitation Limit

L Limit Exceeded

20513

Denali Water Solutions  
Ms. Vanya Colburn  
P.O. Box 3036  
Russellville , AR 72811

Project TN2- David Womack  
Information :

Report Number : **23-138-0202**

## REPORT OF ANALYSIS

Report Date : 05/31/2023

Received : 05/18/2023

Lab No : **95732**

Sample ID : **DW-2-4**

Matrix: **Solids**

Sampled:

| Test                        | Results      | Units | MQL   | DF | Date / Time Analyzed | By  | Analytical Method |
|-----------------------------|--------------|-------|-------|----|----------------------|-----|-------------------|
| Calcium (saturated paste)   | <b>9.70</b>  | meq/L | 0.005 | 1  | 05/31/23 15:13       | SWL | Saturate Paste    |
| Magnesium (saturated paste) | <b>4.15</b>  | meq/L | 0.008 | 1  | 05/31/23 15:13       | SWL | Saturate Paste    |
| Sodium (saturated paste)    | <b>0.296</b> | meq/L | 0.004 | 1  | 05/31/23 15:13       | SWL | Saturate Paste    |
| Sodium Absorption Ratio     | <b>0.112</b> |       |       | 1  | 05/31/23 15:13       | SWL | Saturate Paste    |
| Chromium, Hexavalent        | <0.512       | mg/Kg | 0.512 | 1  | 05/26/23 09:27       | ABB | 3060A 7196A       |
| Arsenic                     | <b>8.30</b>  | mg/Kg | 0.500 | 1  | 05/24/23 03:57       | BKN | 6010D             |
| Cadmium                     | <b>0.770</b> | mg/Kg | 0.100 | 1  | 05/24/23 03:57       | BKN | 6010D             |
| Copper                      | <b>10.8</b>  | mg/Kg | 0.500 | 1  | 05/24/23 03:57       | BKN | 6010D             |
| Lead                        | <b>12.5</b>  | mg/Kg | 0.300 | 1  | 05/24/23 03:57       | BKN | 6010D             |
| Mercury                     | <0.161       | mg/Kg | 0.161 | 1  | 05/24/23 13:51       | FDS | 7471A             |
| Nickel                      | <b>12.0</b>  | mg/Kg | 0.250 | 1  | 05/24/23 03:57       | BKN | 6010D             |
| Selenium                    | <0.500       | mg/Kg | 0.500 | 1  | 05/24/23 03:57       | BKN | 6010D             |
| Zinc                        | <b>80.5</b>  | mg/Kg | 1.25  | 1  | 05/24/23 03:57       | BKN | 6010D             |

### Qualifiers/ Definitions

DF Dilution Factor  
MQL Method Quantitation Limit

L Limit Exceeded

20513

Denali Water Solutions  
Ms. Vanya Colburn  
P.O. Box 3036  
Russellville , AR 72811

Project TN2- David Womack  
Information :

Report Number : **23-138-0202**

## REPORT OF ANALYSIS

Report Date : 05/31/2023

Received : 05/18/2023

Lab No : **95733**

Sample ID : **DW-2-5**

Matrix: **Solids**

Sampled:

| Test                        | Results      | Units | MQL   | DF | Date / Time Analyzed | By  | Analytical Method |
|-----------------------------|--------------|-------|-------|----|----------------------|-----|-------------------|
| Calcium (saturated paste)   | <b>5.14</b>  | meq/L | 0.005 | 1  | 05/31/23 15:13       | SWL | Saturate Paste    |
| Magnesium (saturated paste) | <b>1.88</b>  | meq/L | 0.008 | 1  | 05/31/23 15:13       | SWL | Saturate Paste    |
| Sodium (saturated paste)    | <b>0.270</b> | meq/L | 0.004 | 1  | 05/31/23 15:13       | SWL | Saturate Paste    |
| Sodium Absorption Ratio     | <b>0.144</b> |       |       | 1  | 05/31/23 15:13       | SWL | Saturate Paste    |
| Chromium, Hexavalent        | <0.506       | mg/Kg | 0.506 | 1  | 05/26/23 09:27       | ABB | 3060A 7196A       |
| Arsenic                     | <b>7.25</b>  | mg/Kg | 2.50  | 5  | 05/24/23 12:22       | BKN | 6010D             |
| Cadmium                     | <0.500       | mg/Kg | 0.500 | 5  | 05/24/23 12:22       | BKN | 6010D             |
| Copper                      | <b>9.95</b>  | mg/Kg | 2.50  | 5  | 05/24/23 12:22       | BKN | 6010D             |
| Lead                        | <b>18.8</b>  | mg/Kg | 1.50  | 5  | 05/24/23 12:22       | BKN | 6010D             |
| Mercury                     | <0.178       | mg/Kg | 0.178 | 1  | 05/24/23 13:52       | FDS | 7471A             |
| Nickel                      | <b>14.6</b>  | mg/Kg | 1.25  | 5  | 05/24/23 12:22       | BKN | 6010D             |
| Selenium                    | <2.50        | mg/Kg | 2.50  | 5  | 05/24/23 12:22       | BKN | 6010D             |
| Zinc                        | <b>47.2</b>  | mg/Kg | 6.25  | 5  | 05/24/23 12:22       | BKN | 6010D             |

### Qualifiers/ Definitions

DF Dilution Factor  
MQL Method Quantitation Limit

L Limit Exceeded

**Appendix E**  
**Sampling Plan**

Updated July 25, 2023  
Parameters Added  
Monitoring Locations Map

# DENALI



**Denali Sampling Plan**  
**Permit Application**  
**McMinn County**

## Material Sampling Plan:

Food processing residuals will be sampled annually for the parameters listed below.

- A. Total Solids
- B. pH
- C. Calcium Carbonate Equivalent
- D. Nutrients
  - a. Ammonia Nitrogen
  - b. Nitrate/Nitrite
  - c. Total Kjeldahl Nitrogen
  - d. Phosphorus
  - e. Potassium
  - f. Boron
  - g. Sulfur
  - h. Manganese
  - i. Molybdenum
- E. Soluble Salts
  - a. Total Soluble Salts
  - b. Calcium
  - c. Magnesium
  - d. Sodium
  - e. Chloride
- A. Pathogens
  - a. Fecal Coliform
    - Materials that have vector attraction or pathogenic potential shall be tested for fecal coliform as an indicator of the average pathogenic and viral density.
    - The geometric mean method of 7 samples will be used to determine if material is less than 2 million CFU/MPN on a dry weight basis.
- F. Designated Groundwater Parameters (Rule 1200-1-7)
  - a. Arsenic
  - b. Cadmium
  - c. Chromium
  - d. Cobalt
  - e. Copper
  - f. Lead
  - g. Mercury
  - h. Nickel
  - i. Selenium
  - j. Zinc

\*All other listed parameters are not known to be in food processing residuals. Food processing facilities have strict guidelines on food safety and cannot come in contact with the majority of chemicals listed in Rule 1200-1-7.
- H. Additional parameters
  - a. Oil and Grease
  - b. Sodium Absorption Ratio
  - c. Total Carbon (C:N can be calculated with TC and TKN)

**Soil Sampling Plan:**

Annually each field will be analyzed for the following parameters:

- A. pH
- B. Cation Exchange Capacity
- C. Nutrients
  - a. Nitrate-N
  - b. Phosphorus
  - c. Potassium
  - d. Estimated Nitrogen Release
- D. Salts
  - a. Soluble Salts
  - b. Calcium
  - c. Sodium
  - d. Magnesium
  - e. Sodium Absorption Ratio
- E. Other Parameters
  - a. Organic Matter

Lime and fertilizer recommendations will be given based on soil results and crop grown.

Every three years, each field will be analyzed for the additional parameters:

- A. Metals
  - a. Arsenic
  - b. Cadmium
  - c. Chromium
  - d. Cobalt
  - e. Copper
  - f. Lead
  - g. Mercury
  - h. Nickel
  - i. Selenium
  - j. Zinc

Representative sample(s) will be taken for each field listed in this permit to adequately characterize the soil and determine the appropriate application rate of materials.

**Soil Sampling Procedure:**

The top 4 inches of soil will be sampled as to best represent any effects from the addition of fertilizer material.



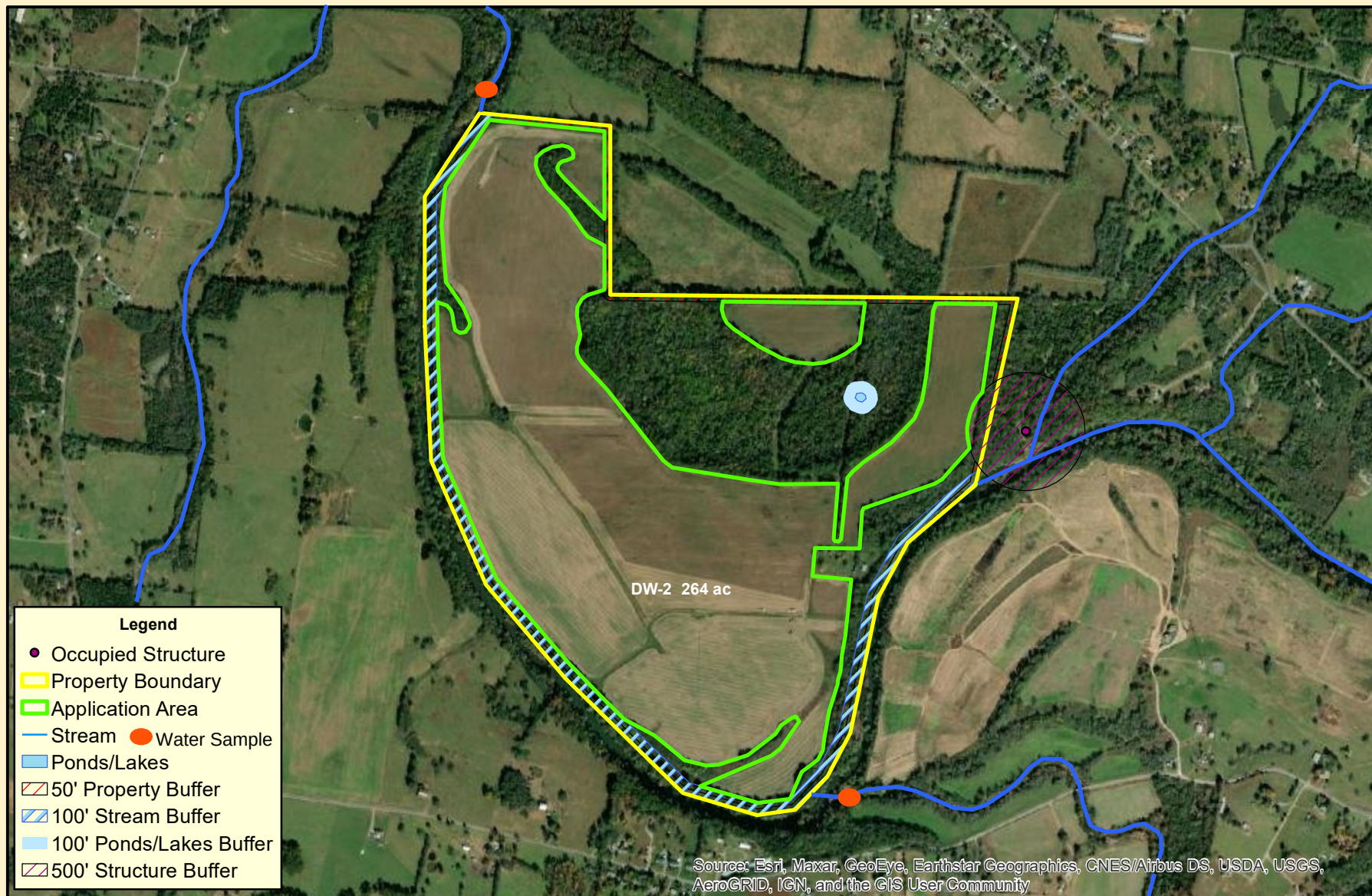
**Surface Water Sampling Plan:**

Denali will maintain the required 100 ft. land application buffer from streams and water ways. Surface water sampling will occur twice a year, spring and fall, during years that land application takes place. Surface waters will be sampled at upstream and downstream of release to determine impact of pollutants.

In the event surface water sampling is needed the following parameters will be sampled:

- A. Biological Oxygen Demand
- B. Dissolved Oxygen (DO)
- C. Chemical Oxygen Demand (COD)
- D. E-coli
- E. Temperature
- F. Dissolved Solids
- G. Total Suspended Solids
- H. Conductivity
- I. pH
- J. Turbidity
- K. Nutrients
  - Ammonia Nitrogen
  - Nitrate/Nitrite
  - Total Kjeldahl Nitrogen
  - Phosphorus

All results will be submitted with the annual report to TDEC and will be available to landowners and generators.



**DENALI**

0 400 800 1,600 2,400 3,200  
Feet

David Womack  
Bedford County, Tennessee