

STATE OF UTAH
DIVISION OF WATER QUALITY
DEPARTMENT OF ENVIRONMENTAL QUALITY
PO BOX 144870
SALT LAKE CITY, UTAH 84114-4870

GROUND WATER DISCHARGE PERMIT
Permit No. UGW310001

In compliance with the provisions of the Utah Water Quality Act, Title 19, Chapter 5, Utah Code, the Act,

Morgan Ranches Dairy
PO Box 188, 81 North 100 East
Circleville, Utah 84723

hereafter, referred to as the Permittee, is granted a Ground Water Discharge Permit for the operation of dairy facilities in Piute County approximately 0.5 miles east of Circleville. The dairy is located in Section 30, T30S, R3W, Salt Lake Base and Meridian. The wastewater lagoons are located in the southwest quadrant of the dairy.

This Ground Water Discharge Permit amends and supersedes all other Ground Water Discharge Permits previously issued for this facility.

The permit is based on representations made by the Permittee and other information contained in the administrative record. It is the responsibility of the Permittee to read and understand all provisions of this permit.

The facilities described herein shall be operated in accordance with conditions set forth in the permit and the Utah Administrative Rules for Ground Water Quality Protection (R317-6).

This permit shall become effective on **May 25**, 2026.

This permit and authorization to operate shall expire at midnight **May 24**, 2031.

Candice A. Hasenyager, P.E.
Director
Utah Division of Water Quality

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Appendix A – Construction Permits

Appendix B – Comprehensive Nutrient Management Plan

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PART I. SPECIFIC CONDITIONS

A. GROUND WATER CLASSIFICATION

Ground water class as defined in Utah Administrative Code (Utah Admin. Code) R317-6-6(4) is determined through background ground water monitoring at each of the monitoring wells associated with the permitted features. Ground water beneath the Primary Lagoon and the Irrigation Ponds is classified as Class IA- Pristine Ground Water with a total dissolved solids (TDS) concentration less than 500 mg/L.

Ground water beneath the newly installed Secondary Lagoon is assumed to be Class IA – Pristine Ground Water but will be confirmed through background ground water monitoring as required by Part I.F.5.e.

B. BACKGROUND GROUND WATER QUALITY

Background ground water quality information is presented in Table 1. Background is defined as the mean analyte concentration at each monitoring well during the accelerated background monitoring period. For any new wells installed during the permit term, a formal determination of background ground water quality will be made after the completion of accelerated background monitoring as required by Part I.F.5.e.

TABLE 1: Background Ground Water Quality

Monitoring Well ID	Gradient Location	Nitrate / Nitrite	Ammonia	Bicarbonate	Chloride	TDS
MW-1 (Yellow House Well)	Up-gradient	2.65	<0.1	399	11.54	447
MW-2 (West Well)	Downgradient	2.74	<0.1	408	10.98	471
MW-3 (East Well)	Downgradient	2.93	<0.1	409	11.63	461
MW-4 (New Pond Well)	Downgradient	TBD	TBD	TBD	TBD	TBD
MW-5 (New Pond East Well)	Downgradient	TBD	TBD	TBD	TBD	TBD
MW-6 (Heifer Flat Well)	Up-gradient	TBD	TBD	TBD	TBD	TBD

All parameters are presented in mg/L.

TBD – To be determined following the background monitoring period.

C. GROUND WATER PROTECTION LEVELS

1. Protection Levels for Class IA – Pristine Ground Water

Ground water protection levels are presented in Table 2. The protection levels are based on the results of the accelerated background monitoring requirements as specified in R317-6-6(4) and Permit Part I.F.5.e. For Class IA – Pristine Ground Water, the protection levels are determined based on the following criteria:

- a. The protection level for total dissolved solids (TDS) is the greater of 1.25 times the mean background concentration or the mean background concentration plus two standard deviations.
- b. For contaminants that are detected in background concentrations, the protection level is the greater of 1.25 times the mean background concentration, the mean background concentration plus two standard deviations, or 0.25 times the ground water quality standard for each analyte.

- c. For contaminants that are not detected in background concentrations, the protection level is the greater of 0.1 times the water quality standard or the laboratory limit of detection.
- d. In no case will a pollutant be allowed to exceed the ground water quality standards as listed in R317-6-6(2) unless otherwise specified by the Director.

2. Protection Levels for New Monitoring Wells

For new monitoring wells constructed during the term of the permit that have not completed the background monitoring requirements described in Permit Part I.F.5.e, the protection level for total nitrate/nitrite shall be 0.25 times the ground water quality standard, and the protection level for TDS shall be the maximum value for Class IA Pristine Ground Water. The Permittee shall operate the facility such that the ground water protection levels which have been developed for this permit are not exceeded at the designated compliance monitoring points. Only waste from the dairy operations may be stored in the permitted facilities. R317-6-6(2) also contains ground water quality standards for contaminants such as metals, pesticides and volatile organic compounds. Accordingly, the Permittee must not discharge these or any other contaminants in quantities which could impair beneficial uses of the ground water.

TABLE 2: Ground Water Protection Levels

Monitoring Well ID	Gradient Location	Nitrate / Nitrite	Chloride	TDS
MW-1 (Yellow House Well)	Up-gradient	2.65	11.54	447
MW-2 (West Well)	Downgradient	2.74	10.98	471
MW-3 (East Well)	Downgradient	2.93	11.63	461
MW-4 (New Pond Well)	Downgradient	2.5 ^a	TBD	500 ^b
MW-5 (New Pond East Well)	Downgradient	2.5 ^a	TBD	500 ^b
MW-6 (Heifer Flat Well)	Up-gradient	2.5 ^a	TBD	500 ^b

All parameters are presented in mg/L.

TBD – To be determined. Protection levels will be determined once the background sampling period has been completed.

^a The protection level for new monitoring wells for total nitrate/nitrite is 0.25 times the groundwater quality standard. Exceedances of these protection levels will not be enforced until the background sampling period has been completed.

^b The protection level for new monitoring wells for TDS is the maximum concentration for Class IA Pristine Ground Water. Exceedances of these protection levels will not be enforced until the background sampling period has been completed.

D. PERMITTED FACILITIES

A site diagram showing the locations of all permitted facilities and associated monitoring wells is included in the Statement of Basis.

1. Authorized Facilities

The following facilities are authorized to store dairy wastewater under this Ground Water Discharge Permit in accordance with Utah Admin. Code R317-6-6(6.1).

- a. *The Primary Lagoon* (also identified as the “*New Pond*”) has a capacity of 40.2-acre feet and was constructed in 2019 with a single layer 60-mil high-density polyethylene (HDPE) flexible membrane liner (FML).
- b. *The Secondary Lagoon* (also identified as the “*East Pond*”) has a capacity of 45.8-acre feet and was constructed in 2025 with a single layer 60-mil HDPE FML.

2. Facilities Permitted by Rule

The following facilities are authorized under Permit by Rule in accordance with Utah Admin. Code R317-6-6(6.2)(5). These facilities are only authorized to store clean irrigation water. Dairy wastewater storage is no longer authorized in these facilities, and such usage shall constitute non-compliance with this permit.

- a. *The Old Irrigation Pond* is an unlined lagoon that was historically used to store dairy wastewater prior to the construction of the current permitted lagoons.
- b. *The Irrigation Pond* is a lagoon that was historically used to store dairy wastewater prior to the construction of the current permitted lagoons. The lagoon is equipped with a single-layer synthetic liner; however, the liner is damaged and does not meet the performance standards of this Permit.

E. BEST AVAILABLE TECHNOLOGY AND PERFORMANCE STANDARD

1. Best Available Technology

The administration of this permit is founded on the use of best available technology (BAT), in accordance with the requirements of Utah Admin. Code R317-6-6(1.3). Construction standards for the lagoons covered by this Permit are detailed in the Construction Permits contained in Appendix A.

2. Performance Standard for Best Available Technology

Compliance with the requirements for use of BAT will be demonstrated by construction, maintenance, and operation of the lagoon systems according to the Construction Permits. BAT compliance will also be demonstrated by maintaining a performing seepage rate at any point on the liner. Performance of the construction technology will be evaluated for compliance by the monitoring required in Part I.E of this Permit. The in-situ hydraulic conductivity of the lagoon liners will be verified with the approved construction quality assurance/quality control (QA/QC) plans outlined in the Construction Permits.

- a. *Liner* - The Permittee must maintain the liner integrity of all lagoons covered under this Permit. Deterioration of materials or any other situation, which prevents the liners from functioning according to the approved design, shall constitute non-compliance with this Permit. The formation of tears, bulges, or whales in a liner are indications of potential leaks. If these are observed, the liner must be repaired in an expeditious manner.
- b. *Land Application* - Land application of wastewater is planned as a routine method of wastewater disposal. Liquid waste and sludge from the permitted lagoons may be land-applied at the appropriate agronomic rate and in accordance with the approved *Comprehensive Nutrient Management Plan* included in Appendix B. The Permittee

must keep records of applied wastes and soils at application sites, the type of crops grown, the application rate calculations, and the dates, times and rates of each application for all application sites, in order to demonstrate compliance with agronomic rate requirements. Waste shall not be land applied to frozen or saturated ground or in situations that could result in surface runoff.

3. Closure Plan

At least 180 days prior to the closure of any lagoon or lagoon system, the Permittee shall submit to the Director a site-specific closure plan for disposition of the liquids, solids, and liner material of the lagoon(s) to be closed. The liner material will be tested according to an approved testing plan to determine an appropriate means of disposal that will not lead to ground water contamination. The monitoring wells will continue to be sampled for a post closure monitoring period as determined by the Director.

F. COMPLIANCE MONITORING REQUIREMENTS

The permittee is required to monitor ground water quality according to the provisions below which are based on compounds which may be discharged to ground water from the permitted facilities.

1. Compliance Monitoring Wells

The network of monitoring wells shall provide the ability to detect contamination in the uppermost ground water. Under the provisions of this permit, ground water contamination in the shallow aquifer could be a reason for the Permittee to take remedial action before ground water quality standards are exceeded and deeper aquifers are affected. The Director may require the Permittee to drill additional wells if the groundwater flow direction as demonstrated by available water level data is different than expected.

- a. *Location of Monitoring Wells* - The Permittee shall install a monitoring well system to establish the ground water gradient underlying each permitted lagoon system and to monitor ground water quality in both the up-gradient and down-gradient wells. The Permittee shall be required to drill additional monitoring wells if the ground water flow directions are different than expected and the existing monitoring wells do not accurately capture potential impacts of lagoon seepage. Information about any new wells installed for the lagoon systems covered under this permit shall be submitted to the Director and include:

- 1) Well identification;
- 2) Latitude and Longitude relative to the North American Datum of 1983 (NAD83);
- 3) Top-of-casing elevation, and
- 4) The associated well construction log.

- b. *Repair and Replacement of Monitoring Wells* – If a monitoring well becomes damaged, yields insufficient water for sampling, or is otherwise no longer suitable for its intended monitoring purpose, or if a previously observed hydraulic gradient between two monitoring wells becomes reversed, the Permittee shall notify the Director in writing within five (5) days of becoming aware of the condition. Within thirty (30) days of notification, the Permittee shall submit a plan and proposed timeline to the Director for either redevelopment of the compromised well or the installation of a replacement monitoring well

- c. *Future Modification of Monitoring Well Network* - If at any time the Director determines the monitoring well network to be inadequate due to a change in gradient or for any other reason, the Permittee shall submit within 30 days of receipt of notification a plan and compliance schedule to modify the monitoring well network.

2. Monitoring Period

The Permittee shall adhere to the monitoring schedule and associated monitoring report deadlines detailed in Part I.H.1 for the term of the permit.

3. Monitoring Requirements

The Permittee shall comply with the requirements outlined in Utah Admin. Code R317-6, the monitoring procedures outlined in Part I.F.5 of this Permit, and the procedures outlined in the Division approved *Sampling and Analysis Plan* (Appendix C).

4. Protection Levels

- a. *Application* - The monitoring requirements outlined below apply to all up-gradient and down-gradient wells. The protection levels have been calculated in accordance with the Ground Water Quality Protection Regulations (Utah Admin. Code R317-6-4) using background water quality data.
- b. *Exceedance in Down-gradient Well* – If the protection levels for this Permit are exceeded in any down-gradient well, the Permittee shall comply with the procedures outlined in Part I.F of this Permit.
- c. *Exceedance in Up-gradient Well* - If the protection levels for this permit are exceeded in any up-gradient well, the permittee shall report the exceedance in the next semi-annual monitoring report. In addition to reporting the up-gradient exceedance, the Permittee shall evaluate whether a reversal of the local hydraulic gradient has occurred and whether the exceedance was caused by the or by another source. If it is determined that a reversal of hydraulic conductivity has occurred, and the well is no longer hydraulically up-gradient, the well shall be considered out-of-compliance and subject to the conditions specified in Part I.G.2 of this Permit.
- d. *Exceedance in Newly Installed Monitoring Wells* – If the protection levels for this Permit are exceeded in any up-gradient or down-gradient monitoring well which has not completed the background monitoring requirements outlined in Permit Part I.F.5.e, the Permittee shall report the exceedance(s) in the next required Semi-annual Ground Water Quality Monitoring Report, however, the Division will not take enforcement action until the background monitoring period has been completed, unless deemed necessary by the Director.

5. Monitoring Procedures

- a. *Frequency* - Compliance ground water monitoring shall be conducted by the permittee on a semi-annual basis in accordance with the monitoring schedule specified in Part I.H.2 of this Permit.
- b. *Depth to Ground Water and Groundwater Elevation* - Depth to ground water shall be measured to the nearest 0.01 foot, below the reference point at the top of the well casing. For each monitoring well, the Permittee shall submit a report to the Division accompanied by a surveyor's report indicating the elevation in feet above mean sea level to the nearest 0.01 foot of the reference point at the top of the well casing from which all ground water depths are measured. Ground water elevations shall be

measured semi-annually at all active monitoring wells. Ground water elevations shall be calculated by subtracting the depth to ground water measurement from the elevation of the reference point at the top of the well casing and reported in feet above mean sea level to the nearest 0.01 foot. Ground water elevation calculations for each semi-annual ground water sampling event shall be submitted with the Semi-annual Ground Water Quality Monitoring Report.

- c. *Laboratory Approval* - All water analyses shall be performed by a laboratory certified by the State of Utah Department of Health in accordance with the approved Sampling and Analysis Plan and the provisions of Utah Admin. Code R317-6-6.12.
- d. *Semi-Annual Compliance Monitoring* – The following parameters shall be monitored semi-annually in all up-gradient and down-gradient monitoring wells covered under this Permit.
 - 1) Field Parameters: temperature, specific conductance, pH, and ground water elevation.
 - 2) Laboratory Parameters: Total Nitrate + Nitrite (as N), Ammonia, Bicarbonate, Chloride, and Total Dissolved Solids (TDS).
- e. *Background Ground Water Quality Monitoring* - Background ground water quality concentrations shall be calculated for all up-gradient and down-gradient monitoring wells for the purpose of establishing ground water protection levels. If any additional up-gradient or down-gradient monitoring wells are installed, the Permittee shall collect ground water samples from each of the newly installed wells on an accelerated quarterly schedule, at equal time intervals, until at least eight (8) sampling events have been completed. The samples shall be analyzed for the parameters listed above in Part I.F.5.d. Sample collection, handling, and analysis shall be conducted in accordance with the most recently revised and approved version of the *Sampling and Analysis Plan*. The results accompanied by any supporting raw data shall be submitted to the Division with the next Semi-annual Ground Water Quality Monitoring Report according to Part I.H of this Permit.

G. NON-COMPLIANCE STATUS

1. Probable Non-compliance Status:

The Permittee shall evaluate the results of each ground water sampling event for all compliance monitoring wells to determine any exceedance(s) of the ground water protection levels established for this Permit. Upon determination that a ground water protection level has been exceeded at any compliance monitoring well, the Permittee shall:

- a. Notify the Director of the exceedance in writing within 30 days of the receipt of the sample results.
- b. Immediately resample the well(s) that exceeded the protection levels.

2. Out-of-Compliance Status – Confirmed Exceedance of Ground Water Protection Levels

- a. For parameters with established protection levels, out-of-compliance shall be defined as two consecutive samples exceeding both the protection level and the background mean concentration plus two standard deviations. An out-of-compliance status for bicarbonate or chloride exceedances occurs only when their respective TDS protection levels are also exceeded.

b. Notification and Accelerated Monitoring

Upon determination by the Permittee or the Director, in accordance with Utah Admin. Code R317-6-6.17, that an out-of-compliance status exists, the Permittee shall:

- 1) Verbally notify the Director of the out-of-compliance within 24 hours and provide written notice within 5 days of the detection of the out-of-compliance status.
- 2) Immediately implement an accelerated schedule of monthly ground water monitoring for all out-of-compliance wells. Accelerated monitoring shall continue for at least two months, until the facility is brought into compliance, or as otherwise determined by the Director. The results of the accelerated monthly sampling shall be included in the semi-annual ground water monitoring report.
- 3) The Permittee shall verbally report any noncompliance, which may endanger public health or the environment, as soon as possible, but no later than 24 hours from the time the Permittee first became aware of the circumstances. The report shall be made to the Utah Department of Environmental Quality 24-hour number, (801) 536-4123.

c. Source and Contamination Assessment Study Plan

Within 30 days of the verbal notice to the Director (Part I. G.2.b.1), the Permittee shall submit a *Source and Contamination Assessment Study Plan* and compliance schedule for:

- 1) Assessment of the source or cause of the contamination, and determination of steps necessary to correct the source, if the contamination is caused by facilities or activities for which the permittee is responsible.
- 2) Assessment of the extent of ground water contamination and any potential dispersion.
- 3) Evaluation of potential remedial actions to restore and maintain ground water quality, and ensure that the ground water standards will not be exceeded at the down-gradient compliance monitoring wells.

Once the Director approves the *Source and Contamination Assessment Study Plan*, and the plan has been implemented, the Permittee shall submit a *Source and Contamination Assessment Report* to the Director for review and approval.

3. Out-of-Compliance Status – Failure to Maintain Best Available Technology

If BAT monitoring indicates a violation of any of the construction or performance standards outlined in Part I.D of this Permit, the Permittee shall submit to the Director a notification and description of the violation in accordance with Part II.I of this Permit.

a. Failure to Maintain Best Available Technology Required by Permit

A facility will be determined to be in an out-of-compliance status if best available technology has failed or cannot be maintained according to the provisions required by this Permit, unless:

- 1) The Permittee has notified the Division according to Part I.G.2.b, and
- 2) The failure was not intentional or was not caused by the Permittee's negligence, either in action or failure to act, and
- 3) The Permittee has taken adequate remedial measures in a timely manner or has developed an approvable remedial action plan and implementation schedule for restoration of best available control technology, an equivalent control technology, or closure of the facility (implementation of an equivalent technology will require permit modification and reissuance), and
- 4) The Permittee has demonstrated that any discharge of a pollutant from the facility is not in violation of the provisions of Utah Admin. Code 19-5-107.

4. Additional Notification

In the event of out-of-compliance status due to either an exceedance of ground water protection levels or a failure of Best Available Technology, the permittee shall notify the Central Utah District Health Department within 24 hours or the first working day following a spill.

5. Contingency Plan for Exceedance of Protection Levels

If, after reviewing the ground water monitoring data, the *Source and Contamination Assessment Report*, and other relevant information, the Director determines that use of any lagoon or waste handling system has caused an exceedance of ground water protection levels at any compliance monitoring point, the Permittee shall submit a proposed *Contamination Investigation Plan*, which addresses the items outlined in Utah Admin. Code R317-6-6.15.D(1), to the Division within 30 calendar days of the Director's determination and notification.

Once the Director approves the *Contamination Investigation Plan*, and the plan has been executed, the Permittee shall submit a *Contamination Investigation Report* to the Director for review and approval. The *Contamination Investigation Report* shall meet the requirements outlined in Utah Admin. Code R317-6-6.15.D(1).

After reviewing the results of the *Contamination Investigation Report*, the Director may require the Permittee to develop a *Corrective Action Plan* to remediate the contamination in compliance with Utah Admin. Code R317-6-6.15.D(2). Actions taken under the plan may include (but are not limited to) repairing or reconstructing the lagoon liner as needed, constructing temporary holding ponds lined with FMLs to contain liquid waste, and installing wells for the purpose of extracting the contaminated ground water. Contaminated ground water may be stored in a permitted lagoon or land applied according to the approved *Comprehensive Nutrient Management Plan*.

6. Contingency Plan for Failure of Best Available Technology

In the event of BAT failure of the liquid waste lagoon, the contents of the failing lagoon shall be transferred to the remaining functional lagoon via a pump. Alternatively, if it is not feasible to pump the contents to the remaining functional lagoon, the contents of the failing lagoon may be land applied according to the approved *Comprehensive Nutrient Management Plan*.

H. REPORTING REQUIREMENTS

1. Semi-Annual Ground Water Monitoring Schedule

Monitoring required in Part I.F.5 (above) shall be reported according to the Compliance Monitoring & Reporting Schedule below in Table 3, unless modified by the Director.

TABLE 3: Semi-Annual Compliance Monitoring & Reporting Schedule

Monitoring Period	Report Due Date
January 1 – June 30	August 1
July 1 – December 31	February 1

2. Ground Water Quality Sampling Report

Regular semi-annual monitoring reports shall include the following:

- a. Field data sheets, or copies thereof, including the field parameters required in Part I.F.5.d, above, or as listed in the most recently approved *Sampling and Analysis Plan*; well name/number, date and time, names of sampling crew, depth to ground water, type of sampling pump or bailer, volume of water purged before sampling, and any pertinent comments related to sampling conditions.
- b. Results of ground water analysis, including date sampled, date received and the results of analysis for each parameter, including value or concentration; units of measurement; method detection limit for the examination; analytical method and the date of analysis. The analytical methods and the method detection limits for every parameter specified in Part I.F.5.d must conform to those in the approved *Sampling and Analysis Plan*.
- c. Land application information required to be reported under the approved *Comprehensive Nutrient Management Plan*.

3. Accelerated Background Monitoring Report

Following the completion of the accelerated background ground water quality monitoring period outlined in Part I.F.5.e the Permittee shall submit an Accelerated Background Monitoring Report with the next Semi-annual Ground Water Sampling Report. The report shall include the following statistical calculations presented in spreadsheet format for each parameter in Table 2 for each new compliance monitoring well:

- 1) Non-detect values converted to the detection limit times 0.25, and
- 2) Mean concentration, and
- 3) Standard deviation, and
- 4) Mean concentration plus 2 standard deviations, and
- 5) Mean concentration of all parameters times 1.25, and
- 6) Ground water quality standard times 0.25.

Following Division review and approval of the Report, the protection levels for new wells included in Table 2 will be adjusted if necessary to comply with Utah Admin. Code R317-6-6(4).

4. Potentiometric Surface Map

A potentiometric surface map utilizing the most recent ground water elevations from all monitoring wells shall be submitted to the Division with the Permit Renewal Application at

least 180 days prior to the Permit expiration date. The potentiometric surface map shall indicate the estimated ground water flow direction and the hydraulic gradient.

5. Noncompliance or Probable Noncompliance

Reporting requirements for noncompliance or probable noncompliance status shall be according to the provisions of Part I.G.

6. Electronic Filing Requirements - In addition to submitting the hard copy data above, the Permittee shall submit the required ground water monitoring data in an electronic format specified by the Director.

I. COMPLIANCE SCHEDULE

1. **Retrofitting Evaluation of Up-gradient Monitoring Wells.**

The up-gradient monitoring wells for the Primary Lagoon and the Secondary Lagoon are equipped with fixed well heads and pumps that do not allow the Permittee to collect the depth to water measurements required by Part I.F.5.b or to complete the potentiometric surface map required by Part I.H.3.

- a. **Within 90 calendar days** of the date of this Permit renewal, the Permittee shall submit a plan and compliance schedule to the Director to evaluate the deficient up-gradient monitoring wells to determine if they can be modified to meet the requirements of this Permit or if additional monitoring wells must be installed.

PART II MONITORING, RECORDING AND REPORTING REQUIREMENTS

A. REPRESENTATIVE SAMPLING

Samples taken in compliance with the monitoring requirements established under Part I shall be representative of the monitored activity.

B. ANALYTICAL PROCEDURES

Water sample analysis must be conducted according to test procedures specified under Utah Admin. Code R317-6-6.3.L, unless other test procedures have been specified in this permit.

C. PENALTIES FOR TAMPERING

The Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

D. REPORTING OF MONITORING RESULTS

Monitoring results obtained during each reporting period specified in the permit, shall be submitted to the Director, Utah Division of Water Quality at the following address no later than the 15th day of the month following the completed reporting period:

State of Utah
Division of Water Quality
P.O. Box 144870
Salt Lake City, Utah 84114-4870
Attention: Ground Water Protection Section

E. COMPLIANCE SCHEDULES

Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any Compliance Schedule of this permit shall be submitted no later than 14 days following each schedule date.

F. ADDITIONAL MONITORING BY THE PERMITTEE

If the Permittee monitors any pollutant more frequently than required by this permit, using approved test procedures as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted. Such increased frequency shall also be indicated.

G. RECORDS CONTENTS

Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements;
2. The individual(s) who performed the sampling or measurements;
3. The date(s) and time(s) analyses were performed;
4. The individual(s) who performed the analyses;
5. The analytical techniques or methods used; and,
6. The results of such analyses.

H. RETENTION OF RECORDS

The Permittee shall retain records of all monitoring information, including all calibration and maintenance records and copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application. This period may be extended at the request of the

Director at any time.

I. TWENTY-FOUR HOUR NOTICE OF NONCOMPLIANCE REPORTING

1. The Permittee shall verbally report any noncompliance which may endanger public health or the environment as soon as possible, but no later than 24 hours from the time the Permittee first became aware of the circumstances. The report shall be made to the Utah Department of Environmental Quality 24-hour number, (801) 536-4123.
2. A written submission shall also be provided to the Director within five days of the time that the Permittee becomes aware of the circumstances. The written submission shall contain:
 - a. A description of the noncompliance and its cause;
 - b. The period of noncompliance, including exact dates and times;
 - c. The estimated time noncompliance is expected to continue if it has not been corrected; and,
 - d. Steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.
3. Reports shall be submitted to the addresses in Part II.D, Reporting of Monitoring Results.

J. OTHER NONCOMPLIANCE REPORTING

Instances of noncompliance not required to be reported within 24 hours shall be reported at the time that monitoring reports for Part II.D are submitted.

K. INSPECTION AND ENTRY

The Permittee shall allow the Director, or an authorized representative, to:

1. Enter upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of the permit;
2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and,
4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location

PART III COMPLIANCE RESPONSIBILITIES

A. DUTY TO COMPLY

The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. The Permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

B. PENALTIES FOR VIOLATIONS OF PERMIT CONDITIONS

The Act provides that any person who violates a permit condition implementing provisions of the Act is subject to a civil penalty not to exceed \$10,000 per day of such violation. Any person who willfully or negligently violates permit conditions is subject to a fine not exceeding \$25,000 per day of violation. Any person convicted under Section 19-5-115(2) of the Act a second time shall be punished by a fine not exceeding \$50,000 per day. Nothing in this permit shall be construed to relieve the Permittee of the civil or criminal penalties for noncompliance.

C. NEED TO HALT OR REDUCE ACTIVITY NOT A DEFENSE

It shall not be a defense for a Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. DUTY TO MITIGATE

The Permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. PROPER OPERATION AND MAINTENANCE

The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by the Permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

PART IV GENERAL REQUIREMENTS

A. PLANNED CHANGES

The Permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required when the alteration or addition could significantly change the nature of the facility or increase the quantity of pollutants discharged.

B. ANTICIPATED NONCOMPLIANCE

The Permittee shall give advance notice of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

C. PERMIT ACTIONS

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

D. DUTY TO REAPPLY

If the Permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the Permittee must apply for and obtain a permit renewal or extension. The application should be submitted at least 180 days before the expiration date of this permit.

E. DUTY TO PROVIDE INFORMATION

The Permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The Permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

F. OTHER INFORMATION

When the Permittee becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in a permit application or any report to the Director, it shall promptly submit such facts or information.

G. SIGNATORY REQUIREMENTS

All applications, reports or information submitted to the Director shall be signed and certified.

1. All permit applications shall be signed as follows:

- a. For a corporation: by a responsible corporate officer;
- b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively.
- c. For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official.

2. All reports required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

- a. The authorization is made in writing by a person described above and submitted to the Director, and,

- b. The authorization specified either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)
 3. Changes to Authorization. If an authorization under Part IV.G.2 is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Part IV.G.2 must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative.
 4. Certification. Any person signing a document under this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted 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 for knowing violations."
- H. PENALTIES FOR FALSIFICATION OF REPORTS

The Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than six months per violation, or by both.
- I. AVAILABILITY OF REPORTS

Except for data determined to be confidential by the Permittee, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Director. As required by the Act, permit applications, permits, effluent data, and ground water quality data shall not be considered confidential.
- J. PROPERTY RIGHTS

The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.
- K. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.
- L. TRANSFERS

This permit may be automatically transferred to a new Permittee if:

1. The current Permittee notifies the Director at least 30 days in advance of the proposed transfer date;
2. The notice includes a written agreement between the existing and new Permittee containing a specific date for transfer of permit responsibility, coverage, and liability between them; and,
3. The Director does not notify the existing Permittee and the proposed new Permittee of his or her intent to modify, or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph 2 above.

M. STATE LAWS

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the Permittee from any responsibilities, liabilities, penalties established pursuant to any applicable state law or regulation under authority preserved by Section 19-5-117 of the Act.

N. REOPENER PROVISION

This permit may be reopened and modified (following proper administrative procedures) to include the appropriate limitations and compliance schedule, if necessary, if one or more of the following events occur:

1. If new ground water standards are adopted by the Board, the permit may be reopened and modified to extend the terms of the permit or to include pollutants covered by new standards. The Permittee may apply for a variance under the conditions outlined in R317-6-6.4.D.
2. If alternative compliance mechanisms are required.
3. If subsequent ground water monitoring data reveals the background water quality values in Part I Table 1 are not accurate.

Appendix A1



State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of Environmental Quality

Alan Matheson
Executive Director

DIVISION OF WATER QUALITY
Erica Brown Gaddis, PhD
Director

FILE COPY

October 5, 2018

McKay Morgan
Morgan Ranches
1150 East 470 South
Circleville, Utah 84723

Subject: Construction Permit for Additional Dairy Waste Pond

Dear Mr. Morgan:

On September 20, 2018, the Division of Water Quality (DWQ) received the engineering plans and specifications for Additional Dairy Waste Pond prepared by the USDA-NRCS and stamped by Bronson Smart, PE USDA-NRCS State Conservation Engineer, Utah.

DWQ has identified one minor revision to the plans. In Section 8, Seam Testing, Nondestructive Seam Testing it indicates the pressure test of the air channel will be performed at 25 to 30 psi with the test failing with a pressure loss of 4 psi. To be consistent with previous Construction Permits we require that the pressure be a minimum of 30 psi with a pressure loss of 3 psi. This has been communicated to the NRCS Engineers.

The following is a summary of the proposed major construction projects:

- Construction of an Additional Dairy Waste Pond

The plans and specifications, as submitted, comply with *the Utah Water Quality Rules, (R317, Utah Administrative Code)*. A **Construction Permit** is hereby issued as constituted by this letter, subject to the following conditions:

1. *Any revisions or modifications to the approved plans and specifications must be submitted to DWQ for review and approval, before construction or implementation thereof. Please submit any changes for review and approval directly to Woodrow Campbell, P.E., of the DWQ Ground Water Protection Section.*

2. *A written operations and maintenance manual, containing a description of the functioning of the facilities, an outline of routine maintenance procedures, and all checklists and maintenance logs needed for proper operation of the system, must be submitted and approved before the final inspection and operation of the system.*
3. *The approved facilities must not be placed in service unless DWQ has conducted a final inspection, reviewed and approved the As-Built Construction Certification Report, and provided written authorization to place the constructed facilities in service.*

The plans and specifications for this project have been stamped and signed by a Professional Engineer currently licensed to practice in the state of Utah. The construction design, inspection supervision, and written construction certification of all work associated with this Construction Permit must be performed by a Professional Engineer licensed to practice in the state of Utah.

This Construction Permit will expire one year from the date of its issuance, as evidenced by the date of this letter, unless substantial progress is made in constructing the approved facilities or the plans and specifications have been resubmitted and the construction permit is reissued. This permit does not relieve you, in any way, of your obligations to comply with other applicable local requirements. You may contact Nathan Selin, Central Utah Public Health Department or John Chartier, DEQ District Engineer for further assistance regarding local matters.

Because of the inherent hazard potential at lagoons and ponds, warning signs should be posted at these facilities to state the dangers of drowning and asphyxiation. Safety ropes running down the pond side slopes, and fastened to posts at the top of the dikes should be available to allow anyone trapped in the ponds to escape.

Please contact Mr. Campbell at the beginning of construction to allow periodic inspections to be scheduled.

Upon completion of the project, a final inspection and approval of the As-Built Construction Certification Report is required before the approval to operate the completed facilities can be issued. Please remain in contact with Mr. Campbell to schedule the final inspection. The Construction Certification Report with final as-built drawings must include test results for the following construction quality assurance and quality control (CQA/QC) elements:

Soil Subgrade

- Proctor Curves,
- Soil Classification,
- Field Compaction Testing, and
- Subgrade Acceptance Certification.

Flexible Membrane Liner

- Panel Placement Log,
- Trial Seam Test Log,
- Seaming Record,
- Seam Test Record,
- Repair Log,
- As-Built Drawing,
- Manufactures Certification including QA/QC Testing of the Rolls, and
- Professional Engineer Certification.

If we can be of further assistance, please contact Mr. Woodrow Campbell at wwcampbell@utah.gov or (801) 536-4353.

Sincerely,



Kim Shelley
Acting Director

EBG/WWC/DJH:lg

cc: Nathan Selin, Central Utah Public Health Department (via email w/o attachment)
John Chartier, DEQ District Engineer (via email w/o attachment)
Jason Robinson, Jason.L.Robinson@ut.usda.gov (via email w/o attachment)

DWQ-2018-010944

Appendix A2



State of Utah

SPENCER J. COX
Governor

DEIDRE HENDERSON
Lieutenant Governor

Department of Environmental Quality

Tim Davis
Executive Director

DIVISION OF WATER QUALITY
John K. Mackey, P.E.
Director

October 17, 2025

VIA EMAIL
READ RECEIPT REQUESTED

Morgan Ranches LLC
C/O Marty and McKay Morgan, Owners
PO Box 188
Circleville, UT 84723

**Subject: Construction Permit for a Waste Water Pond and Pipeline
Morgan Ranches LLC – Ground Water Discharge Permit UGW310001**

Dear Mr. Morgan:

On September 29, 2025, the Division of Water Quality ("Division") received the engineering plans for the waste water pond and pipeline from David Schick, United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). The drawings were stamped by Anders P. Fillerup, P.E., a Utah Certified Professional Engineer. The submittal did not contain the Construction Specifications. The Construction Specifications included with this Construction Permit come from a similar NRCS project at another dairy. Woodrow Campbell, P.E., of the Division, approved the use of these construction specifications.

The following is a summary of the proposed major construction projects:

- Waste Water Pond – The Waste Water Pond will be lined with either a High-Density Polyethylene (HDPE) or Linear Low-Density Polyethylene (LLDPE) liner and the thickness will be 60 millimeters.
- Pipeline – A 42-inch dual wall HDPE pipe will be installed to carry the waste water 1,551 feet to the new pond.

The following are conditions for testing the liner in the new pond.

- HDPE or LLDPE Liner - Nondestructive seam testing, air pressure test requirement – The pressure in the air channel shall be a minimum of 30 pounds per square inch (psi) with a loss of pressure of less than or equal to 3 psi after 5 minutes of monitoring. The NRCS Construction Specifications

indicate that the pressure in the air channel shall be a minimum of 25-30 psi with a loss of pressure of less than or equal to 4 psi after 5 minutes of monitoring. The more restrictive requirement must be followed.

We have completed our review of the plans and specifications and find they comply with the *Utah Water Quality Rules* (Utah Admin. Code R317). On this basis, a **Construction Permit** is hereby issued as constituted by this letter, subject to the following conditions:

1. Any revisions or modifications to the approved plans and specifications must be submitted to the Division for review and approval before construction or implementation. Please submit any changes for review and approval directly to Woodrow Campbell, P.E., of the Groundwater Protection Section.
2. A written operations and maintenance manual containing a description of the functioning of the facilities, an outline of routine maintenance procedures, and all checklists and maintenance logs needed for proper operation of the system, must be submitted and approved before the final inspection and operation of the system.
3. The approved facilities must not be placed in service unless the Division has conducted a final inspection, reviewed and approved the As-Built Construction Certification Report, and provided written authorization to place the constructed facilities in service.
4. Construction activities that disturb one acre or more are required to obtain coverage under the Utah Pollutant Discharge Elimination System (UPDES) Storm Water General Permit for Construction Activities. The permit requires the development of a Storm Water Pollution Prevention Plan (SWPPP) to be implemented and updated from the commencement of any soil disturbing activities at the site until the final stabilization of the project. For more information or to obtain permit coverage online, please go to the following website URL: <https://deq.utah.gov/water-quality/general-construction-storm-water-updes-permits>

The plans and specifications for this project have been stamped and signed by a Professional Engineer currently licensed to practice in the state of Utah. The construction design, inspection supervision, and written construction certification of all work associated with this Construction Permit must be performed by a Professional Engineer licensed to practice in the state of Utah.

This Construction Permit will expire one year from the date of issuance unless substantial progress is made in constructing the approved facilities or the plans and specifications have been resubmitted, and the construction permit is reissued. This permit does not relieve you, in any way, of your obligations to comply with other applicable local requirements. You may contact Eric Larsen, with the Central Utah Public Health Department at (385) 505-5558 or John Chartier, DEQ District Engineer, at (435) 559-1969 for further assistance regarding local matters.

Please contact Mr. Campbell at the beginning of construction to allow periodic inspections to be scheduled. Upon completion of the project, a final inspection and approval of the As-Built Construction Certification Report is required before the approval to operate the completed facilities can be issued. Please remain in contact with Mr. Campbell to schedule the final inspection. The Construction Certification Report must be stamped by a P.E., include final as-built drawings, and include test results for the following construction quality assurance and quality control (CQA/QC) elements:

Soil Subgrade

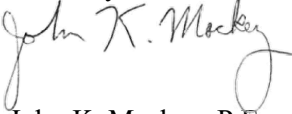
- Proctor Curves;
- Soil Classification;
- Field Compaction Testing, and
- Subgrade Acceptance Certification.

Flexible Membrane Liner

- Panel Placement Log;
- Trial Seam Test Log;
- Seaming Record;
- Seam Test Record;
- Repair Log;
- As-Built Drawing;
- Manufactures' Certification including QA/QC Testing of the Rolls, and
- Professional Engineer Certification.

If we can be of further assistance, please contact Mr. Woodrow Campbell at (801) 536-4353 or wwcampbell@utah.gov.

Sincerely,



John K. Mackey, P.E.
Director

WWC/DLB/LLW/JKM/cl

Attachments: Morgan Dairy 2025 Pond Plan Drawings (DWQ-2025-007841)
NRCS Construction Specifications (DWQ-2025-007840)

Cc: Via Email
Marty and McKay Morgan, Morgan Ranches LLC
David Schick, NRCS
Brent Campbell, NRCS
Anders P. Fillerup, NRCS
John Chartier, P.E., DEQ District Engineer
Eric Larsen, Central Utah Public Health
Jeff Kolmel, DWQ

Appendix B



Comprehensive Nutrient Management Plan (CNMP) (Version 3, 8/17/2016 Format)

The Comprehensive Nutrient Management Plan (CNMP) is an important part of the conservation management system (CMS) for your Animal Feeding Operation (AFO). This CNMP documents the planning decisions and operation and maintenance information for the AFO.

Farm/Facility: Morgan Ranches LLC
c/o McKay Morgan
P.O. box 188
Circleville, UT 84723
(435)616-5036

Owner/Operator: McKay Morgan

Plan Period: Jun 2022 - May 2027

Certified Comprehensive Nutrient Management Plan (CNMP) Planner

As a Certified Comprehensive Nutrient Management Plan (CNMP) Planner, I certify that I have reviewed the *Comprehensive Nutrient Management Plan* and that the elements of the document are technically compatible, reasonable and can be implemented.

Signature: _____ Date: _____
Name: Hannah Freeze
Title: Certified CNMP Planner

Conservation District (Optional)

As a Conservation District employee, I have reviewed the *Comprehensive Nutrient Management Plan* and concur that the plan meets the District's conservation goals.

Signature: _____ Date: _____
Name: _____
Title: _____

Owner/Operator

As the owner/operator of this CNMP, I, as the decision maker, have been involved in the planning process and agree that the items/practices listed in each element of the CNMP are needed. I understand that I am responsible for keeping all necessary records associated with implementation of this CNMP. It is my intention to implement/accomplish this CNMP in a timely manner as described in the plan.

Signature: _____ Date: _____
Name: McKay Morgan

Table of Contents

Section 1. Farmstead (Production Area)

- 1.1. Maps of Farmstead, Existing and Planned Conservation Practices
- 1.2. Farmstead Conservation Practices – Record of Decisions
- 1.3. Farmstead Conservation Practices – Implementation Requirements
- 1.4. Animal Inventory
- 1.5. Manure Storage Information
- 1.6. Planned Manure Exports
- 1.7. Planned Manure Imports
- 1.8. Planned Internal Transfers of Manure
- 1.9. Brief Description of or Additional Information about Animal Feeding Operation (Optional)

Section 2. Crop and Pasture (Land Treatment)

- 2.1. Maps of Fields, Soils, Application Setbacks, Existing and Planned Crop and Pasture Conservation Practices
- 2.2. Crop and Pasture Conservation Practices – Record of Decisions
- 2.3. Crop and Pasture Conservation Practices – Implementation Requirements
- 2.4. Predicted Soil Erosion

Section 3. Nutrient Management Plan (590)

- 3.1. Nitrogen and Phosphorus Risk Analyses Results
- 3.2. Manure Application Setback Distances
- 3.3. Soil Test Result Data
- 3.4. Manure Nutrient Analyses
- 3.5. Planned Crops and Fertilizer Recommendations
- 3.6. Planned Nutrient Applications
- 3.7. Field Nutrient Balance
- 3.8. Manure Inventory Annual Summary (Optional)
- 3.9. Fertilizer Material Annual Summary (Optional)
- 3.10. Plan Nutrient Balance

Section 1. Farmstead (Production Area)

1.1. Maps of Existing and Planned Farmstead Conservation Practices

PND DRAFT



File Name:
Morgan
Ranches

Assisted By:
Hannah Freeze
Nutrient
Management
Specialist



Piute CD

Comprehensive Nutrient Management Plan
Morgan Ranches

Piute County, UT

Drawn By: Hannah Freeze 5/26/2022

Sheet 1 of 2



File Name:
Morgan
Ranches

Assisted By:
Hannah Freeze
Nutrient
Management
Specialist



Piute CD

Comprehensive Nutrient Management Plan
Morgan Ranches

Piute County, UT

Drawn By: Hannah Freeze 5/26/2022

Sheet 2 of 2

1.2. Farmstead Conservation Practices -- Record of Decisions

Spring 2021: Morgan's submitted an application for AgVIP. They were selected for funding in Sept. 2021.

January 26, 2022: A site visit was conducted on Morgan's dairy to go through the AgVIP site visit checklist and see the operation. All fields were assessed. Morgan's had copies of soil tests for fields around the dairy. During the site visit, it was determined that an additional farm, Double M, owned in part by McKay Morgan would be included in the CNMP. Compost from the dairy is applied to the Double M as well.

1.3. Farmstead Conservation Practices – Implementation Requirements

There are no conservation practice implementation requirements for Morgan Ranches to be in compliance with all State and Federal water quality regulations.

PND DRAFT

1.4. Animal Inventory

Animal Group	Type or Production Phase	Number of Animals ^a	Average Weight (lbs)	Confinement Period	Manure Collected (%) ^b	Manure Storage
Jerseys	Dairy (Lact)	1,700	1,200	Jan Early - Dec Late	100	Pond
Holsteins	Dairy (Lact)	1,500	1,400	Jan Early - Dec Late	100	Pond
Dry Cows	Dairy (Dry)	584	1,300	Jan Early - Dec Early	25	Compost Yard
Babies	Beef (Yearling)	662	300	Jan Early - Dec Late	25	Dry Lots
60-200 Days Old	Beef (Feeder)	1,480	650	Jan Early - Dec Late	25	Dry Lots
7-74 mo Old	Heifer	2,611	1,100	Jan Early - Dec Late	45	Compost Yard

a. The average number of animals present in the production facility at any one time.

b. If manure collected is less than 100%, this indicates that the animals spend a portion of the day outside of the production facility or the production facility is unoccupied one or more times during the confinement period.

1.5. Manure Storage Information

Storage ID	Type of Storage	Pumpable or Spreadable Capacity	Annual Manure Collected	Maximum Days of Storage
Reception Pit 1	Uncovered watertight structure	179,520 gal	0 gal	
Reception Pit 2	Uncovered watertight structure	178,024 gal	0 gal	
Pond	Uncovered watertight structure	22,293,692 gal	14,507,000 gal	561
Compost Yard	Open lot	23,176 tons	22,876 tons	370
Dry Lots	Open lot	14,573 tons	3,348 tons	1,589

1.6. Planned Manure Exports

Month-Year	Manure Source	Amount	Receiving Operation	Location
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(None)

1.7. Planned Manure Imports

Month-Year	Manure's Animal Type	Amount	Originating Operation	Location
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(None)

1.8. Planned Internal Transfers of Manure

Month-Year	Manure Source	Amount	Manure Destination
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(None)

1.9. Brief Description of or Additional Information about Animal Feeding Operation (Optional)

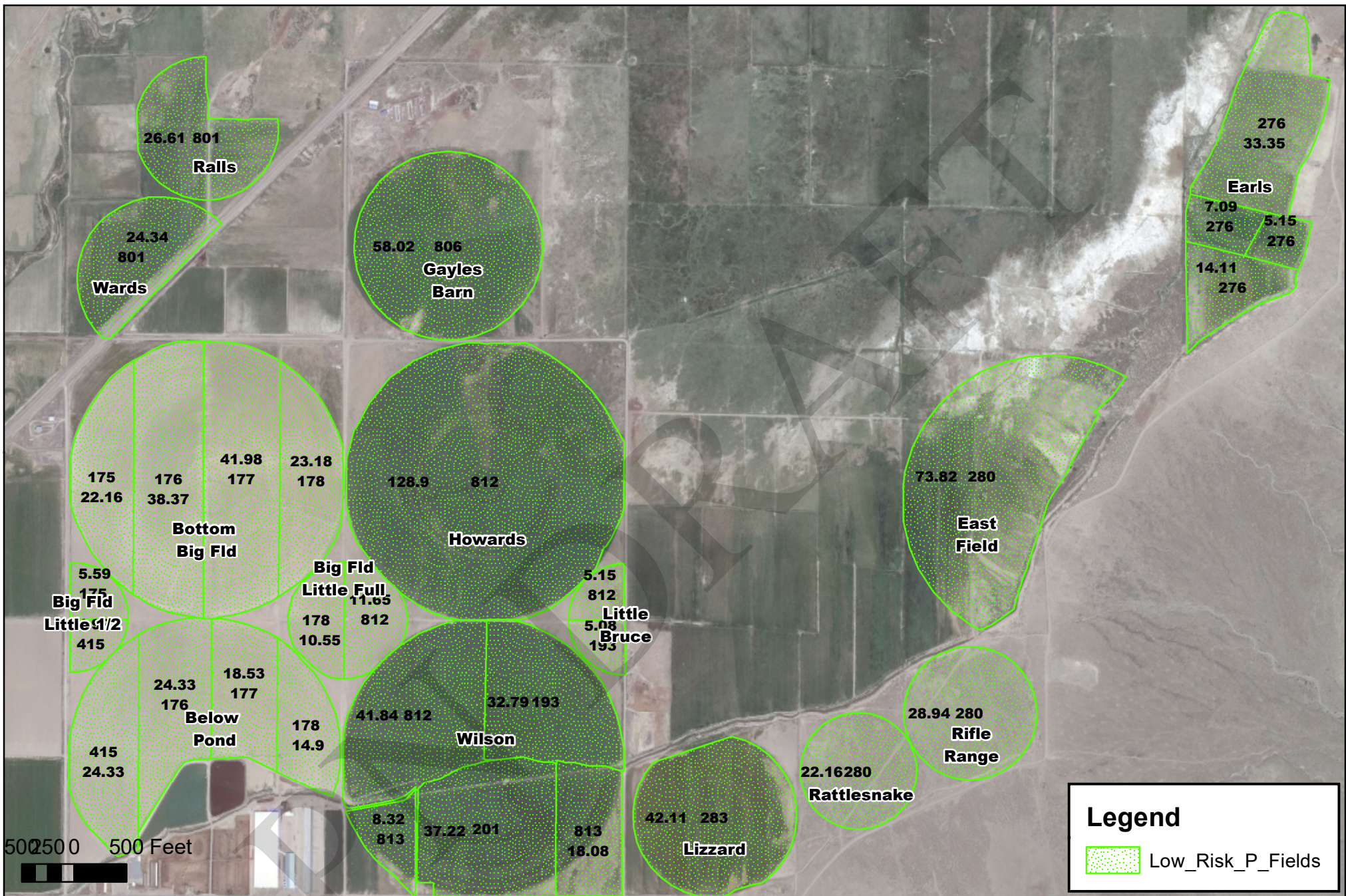
Morgan Ranches is a family-owned operation operated by the Morgan family. Approximately 3,200 milk cows are housed on the facility, half Jerseys, half Holsteins. Cows are milked twice per day on a carousel milker. Young stock are also housed on the dairy in dry lots totaling an average of 5,337 animals from baby calves up to springer heifers. Milk cows are housed in covered barns. Free stalls are bedded with mattresses topped with compost. Compost is added to the free stall beds weekly and fluffed daily. Manure from the facility is scraped into a reception pit and run through a separator. Solids are hauled to the compost lot south and west of the dairy. Liquids are pumped into the manure pond where they can be land applied to crop fields through center pivots.

2,792 acres are included under this CNMP. Alfalfa is grown on all acres. After about 2 years, alfalfa crops are interseeded with small grains to thicken the stands. Grain is interseeded yearly for about 4 years. Other small grains such as winter wheat and sorghum are included in the crop rotation.

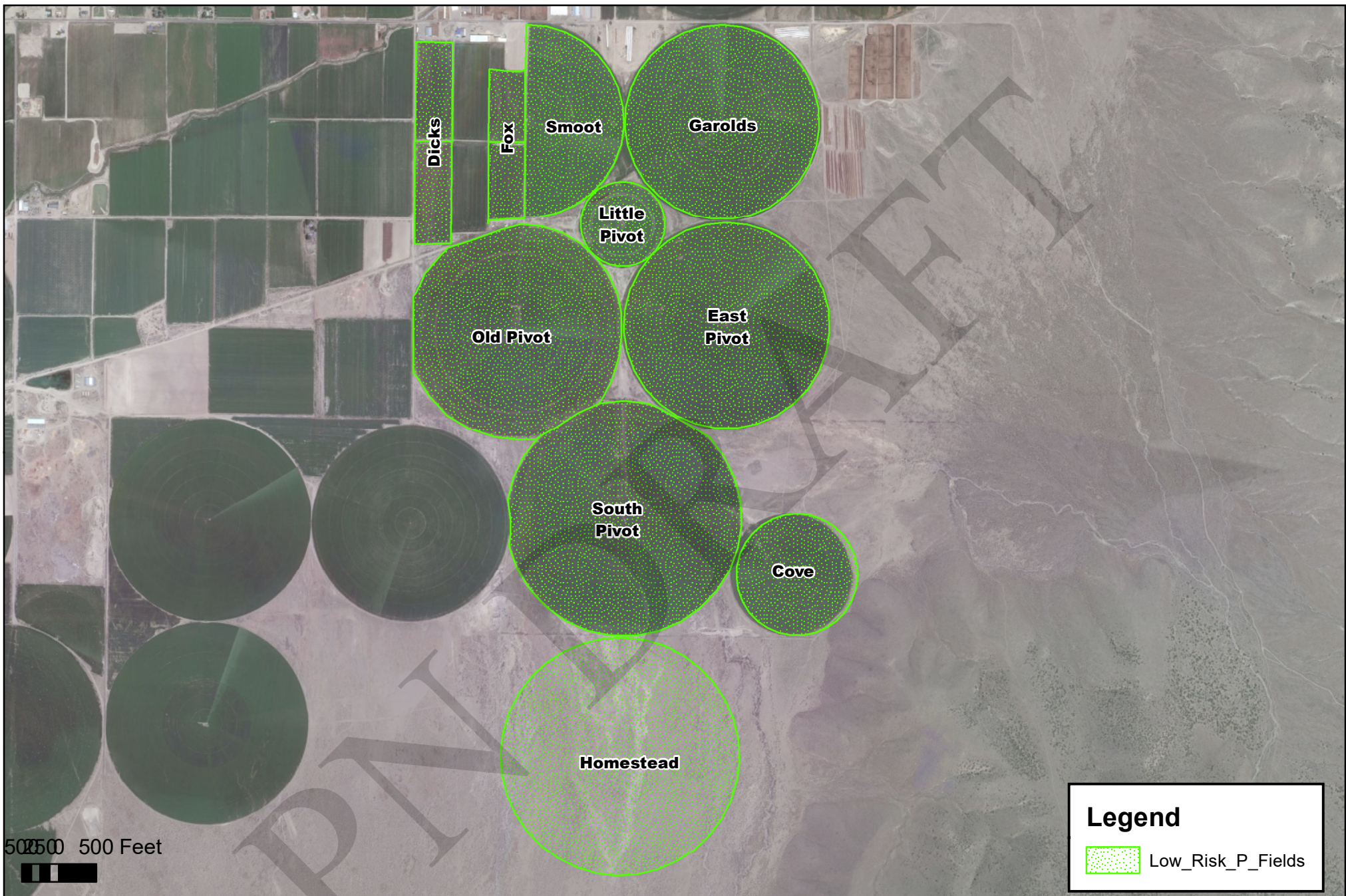
Section 2. Crop and Pasture (Land Treatment)

2.1. Maps of Fields, Soils, Application Setbacks, Existing and Planned Crop and Pasture Conservation Practices

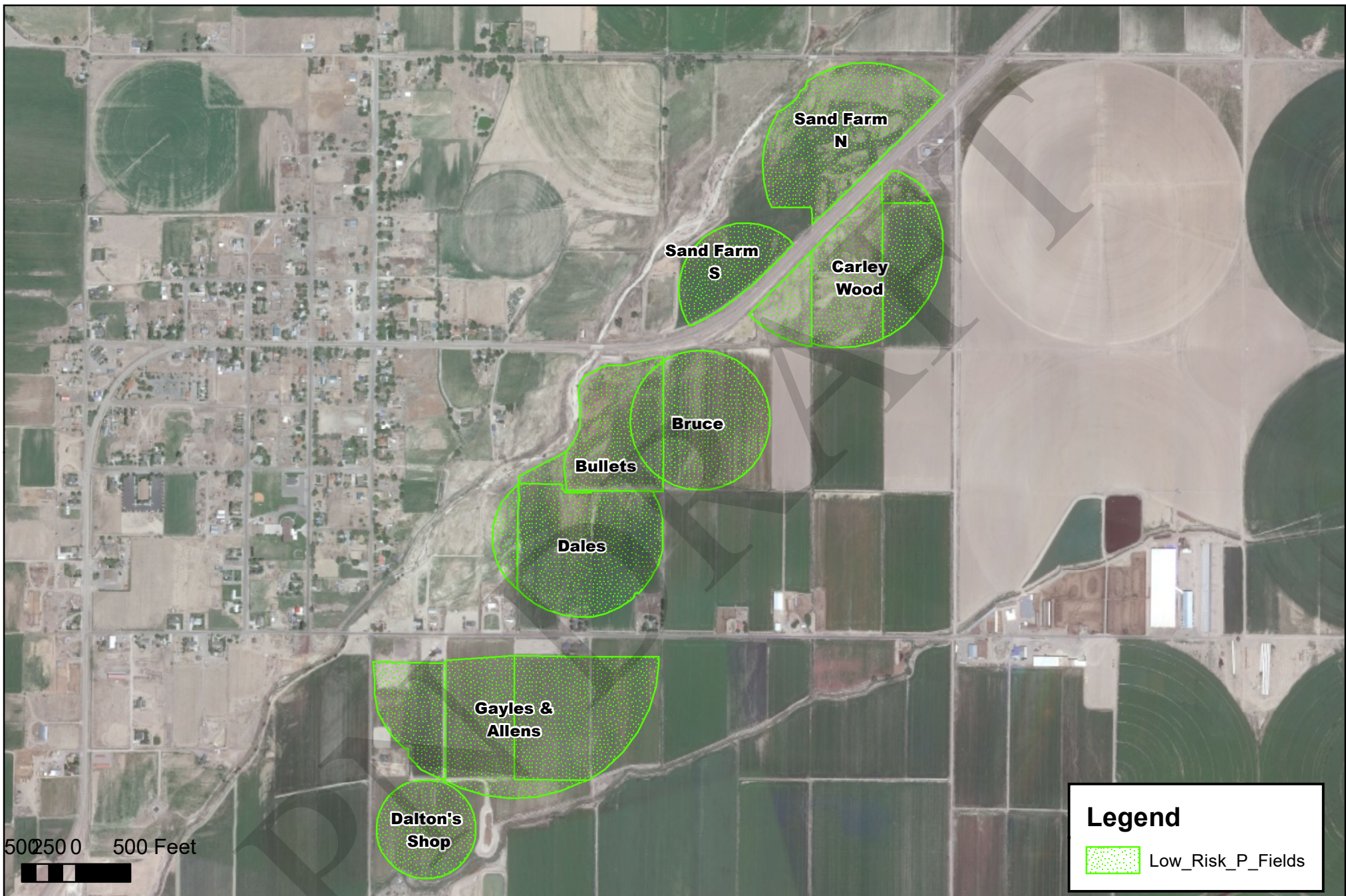
PND DRAFT



File Name: Morgan Ranches	Assisted By: Hannah Freeze Nutrient Management Specialist	N Comprehensive Nutrient Management Plan Morgan Ranches Piute CD	Drawn By: Hannah Freeze 5/26/2022 Sheet 1 of 4
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File Name: Morgan Ranches	Assisted By: Hannah Freeze Nutrient Management Specialist	Comprehensive Nutrient Management Plan Morgan Ranches Piute County, UT	Drawn By: Hannah Freeze 5/26/2022
			Sheet 2 of 4



File Name:
Morgan
Ranches

Assisted By:
Hannah Freeze
Nutrient
Management
Specialist



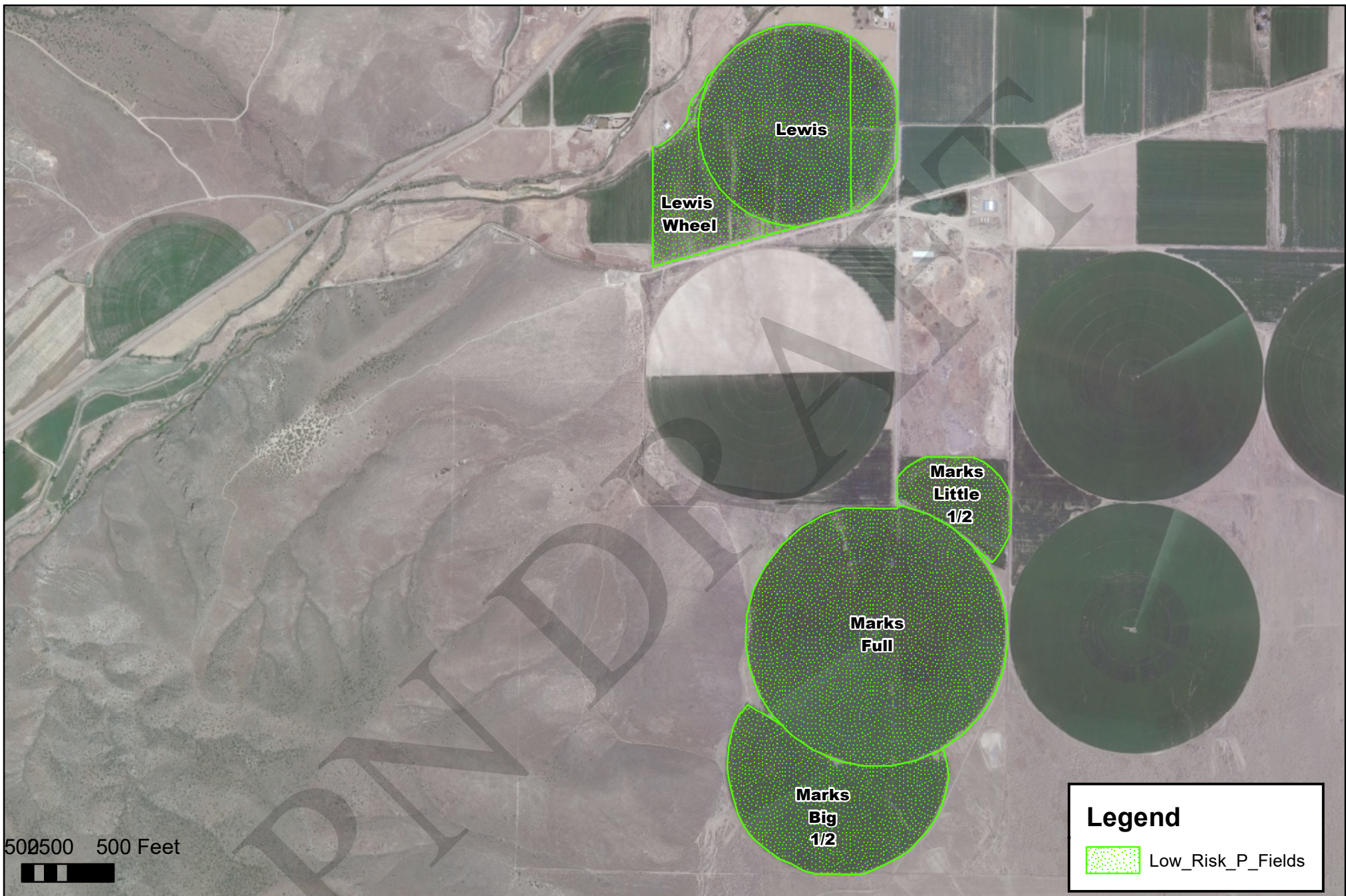
Piute CD

Comprehensive Nutrient Management Plan **Morgan Ranches**

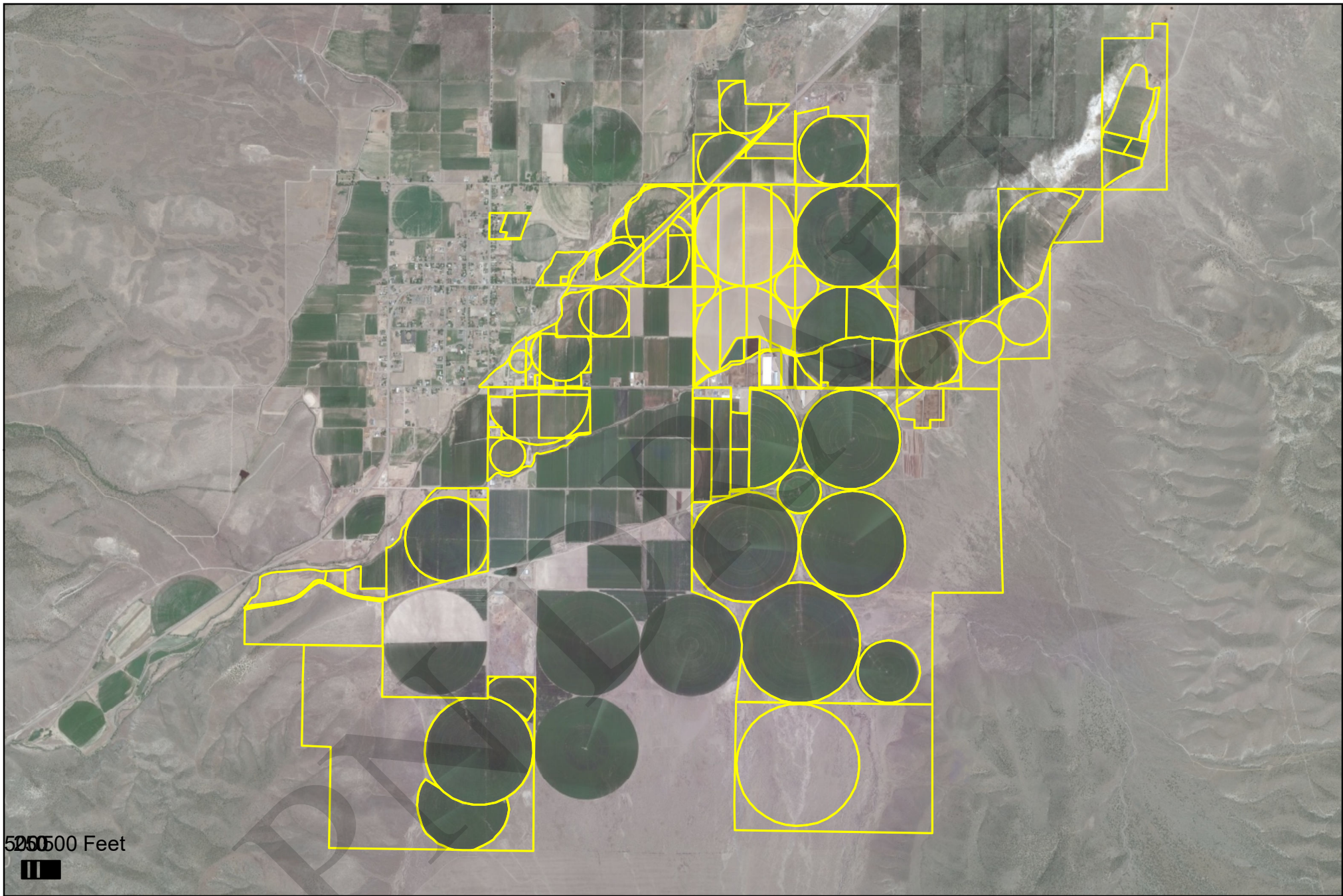
Piute County, UT

Drawn By: Hannah Freeze 5/26/2022

Sheet 3 of 4



File Name: Morgan Ranches	Assisted By: Hannah Freeze Nutrient Management Specialist	Piute CD Comprehensive Nutrient Management Plan Morgan Ranches Piute County, UT	Drawn By: Hannah Freeze 5/26/2022 Sheet 4 of 4
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File Name:
Morgan
Ranches

Assisted By:
Hannah Freeze
Nutrient
Management
Specialist



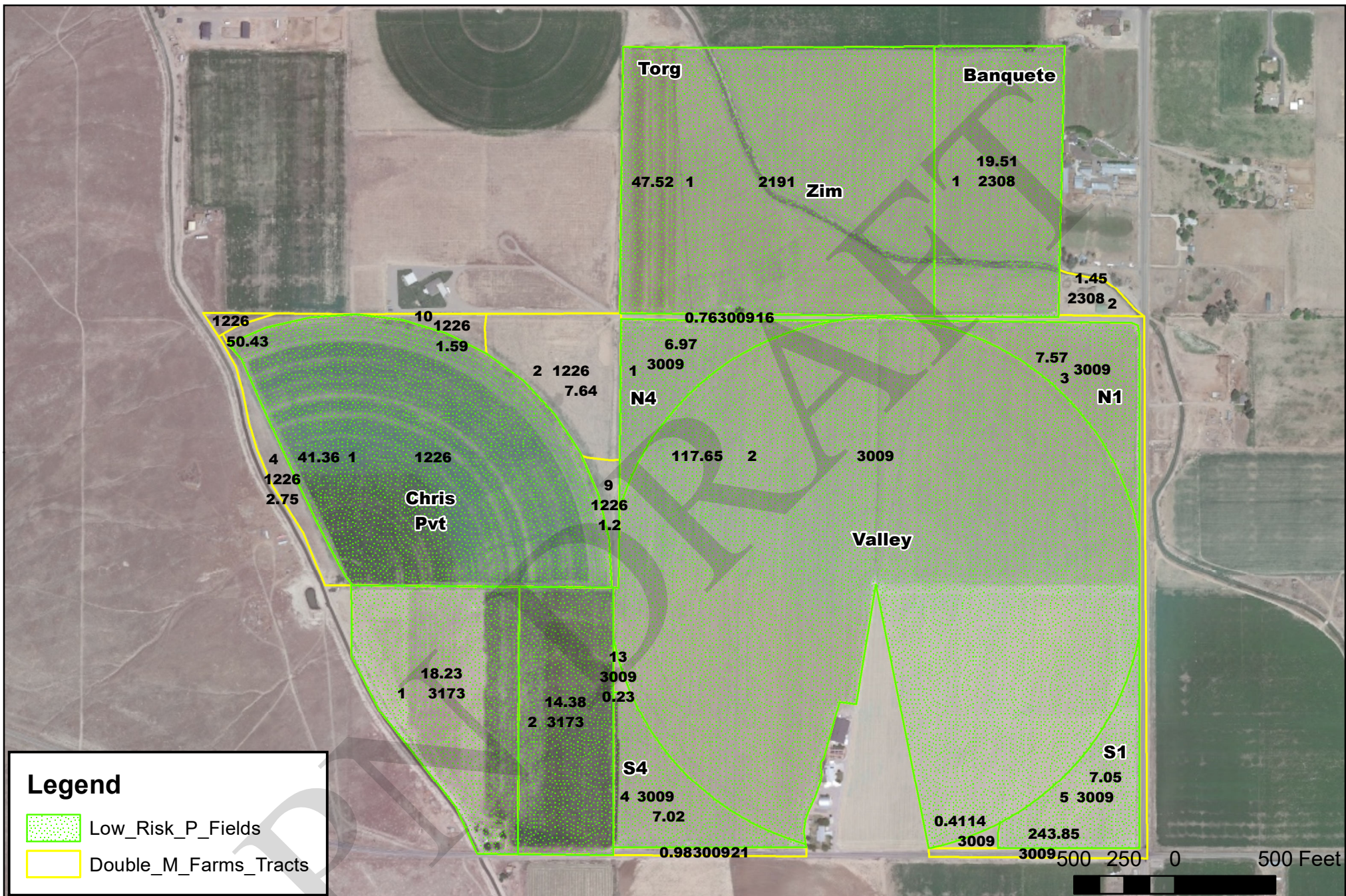
Piute CD

Comprehensive Nutrient Management Plan
Morgan Ranches

Piute County, UT

Drawn By: Hannah Freeze 5/26/2022

Sheet 1 of 1



2.2. Crop and Pasture Conservation Practices -- Record of Decisions

All crop fields receiving manure annually are sprinkler irrigated. Sprinkler irrigated fields ensure maximum irrigation efficiency with little to no field runoff especially during large weather events.

PND DRAFT

2.3. Crop and Pasture Conservation Practices – Implementation Requirements

Cover crops for nutrient management and sediment control may be implemented into current crop rotations. Crops can reduce nutrient needs through nitrogen fixation, nutrient cycling / capture and prevention of loss by leaching and erosion. Preference will be to cover crop mixes that include diverse species including plants with various rooting structures including fibrous and tap roots. Legumes may be included to fix nitrogen for the preceding crops these could include vetches, clovers, or peas. Scavenger-type cover crops may be utilized to capture nutrients following cash crops and converting them into organic forms to prevent leaching during fall / spring and releasing nutrients to the following crop for example root plants such as radish and turnips or fast-growing annual grasses such as annual ryegrass. Cover crops should be selected that are compatible with cash crops grown, and the season they will be planted. Methods for cover crop establishment can include broadcasting, direct seeding, Interseeding into cash crop, other methods as needed. Seeding rates should reflect goals of the cover crop and planting methods to ensure proper plant populations. Contact your local conservation district or NRCS office for assistance in creating a cover crops mix.

No additional crop conservation practices are required in order for Morgan Ranches to be in compliance with all State and Federal water quality regulations.

2.4. Predicted Soil Erosion

Average water, wind, irrigation, gully and ephemeral erosion estimates

Field	Predominant Soil Type	T Factor (t/ac/yr)	Slope (%)	Water (t/ac/yr)	Wind (t/ac/yr)	Irrigation Erosion Controlled (y/n)	Gully Erosion Controlled (y/n)	Ephemeral Erosion Controlled (y/n)	Total (t/ac/yr)
Marks big half	40 (Crestline FSL)	5	3.0						
Marks full pvt	40 (Crestline FSL)	5	3.0						
Marks Little hf	40 (Crestline FSL)	5	3.0						
Lewis Wheel In	171 (Monroe L)	5	1.0						
Lewis Pivot	171 (Monroe L)	5	1.0						
Dalton Shop	171 (Monroe L)	5	1.0						
Gayles & Allens	171 (Monroe L)	5	1.0						
Dales	103 (Anco L)	2	0.5						
Bullets	103 (Anco L)	2	0.5						
Bruce	103 (Anco L)	2	0.5						
Sand Farm South	PjA (Nevadanile L)	5	1.0						
Sand Farm North	PjA (Nevadanile L)	5	1.0						
Carly Wood	171 (Monroe L)	5	1.0						
Wards	SmW (Benstot SIL)	5	1.0						
Ralls	SmW (Benstot SIL)	5	1.0						
Gayles Barn pvt	SmW (Benstot SIL)	5	1.0						
Bottom Big Fld	171 (Monroe L)	5	1.0						
Howards	171 (Monroe L)	5	1.0						
Big fld lttl hf	171 (Monroe L)	5	1.0						
Big fld ltt ful	171 (Monroe L)	5	1.0						
Below Pond	UhA (Circlevally FSL)	5	1.5						
Wilson	UhA (Circlevally FSL)	5	1.5						
Little Bruce	171 (Monroe L)	5	1.0						
Lizzard	UkC (Mosida L)	5	1.0						
Rattlesnake	UkC (Mosida L)	5	1.0						
Rifle Range	UkC (Mosida L)	5	1.0						
East Field	UkC (Mosida L)	5	1.0						

Field	Predominant Soil Type	T Factor (t/ac/yr)	Slope (%)	Water (t/ac/yr)	Wind (t/ac/yr)	Irrigation Erosion Controlled (y/n)	Gully Erosion Controlled (y/n)	Ephemeral Erosion Controlled (y/n)	Total (t/ac/yr)
Earl's	UkC (Mosida L)	5	1.0						
Dick's	UhA (Circlevally FSL)	5	1.5						
Fox	UhA (Circlevally FSL)	5	1.5						
Smoot	UhA (Circlevally FSL)	5	1.5						
Gerald's	UhA (Circlevally FSL)	5	1.5						
Little Pivot	UhA (Circlevally FSL)	5	1.5						
Old Pivot	UkC (Mosida L)	5	1.0						
East Pivot	107 (Annabella CB-SL)	5	12.5						
South Pivot	UkC (Mosida L)	5	1.0						
Homestead	40 (Crestline FSL)	5	3.0						
Cove	40 (Crestline FSL)	5	3.0						
Chris Pivot	128 (Escalante GR-SL)	4	3.5						
Valley Pivot	130 (Escalante SL)	4	3.0						
Zim	128 (Escalante GR-SL)	4	3.5						
N4 Pivot	130 (Escalante SL)	4	3.0						
N1 Pivot	130 (Escalante SL)	4	3.0						
S4 Pivot	130 (Escalante SL)	4	3.0						
S1 Pivot	130 (Escalante SL)	4	3.0						

Section 3. Nutrient Management Plan (590)

3.1. Nitrogen and Phosphorus Risk Analyses

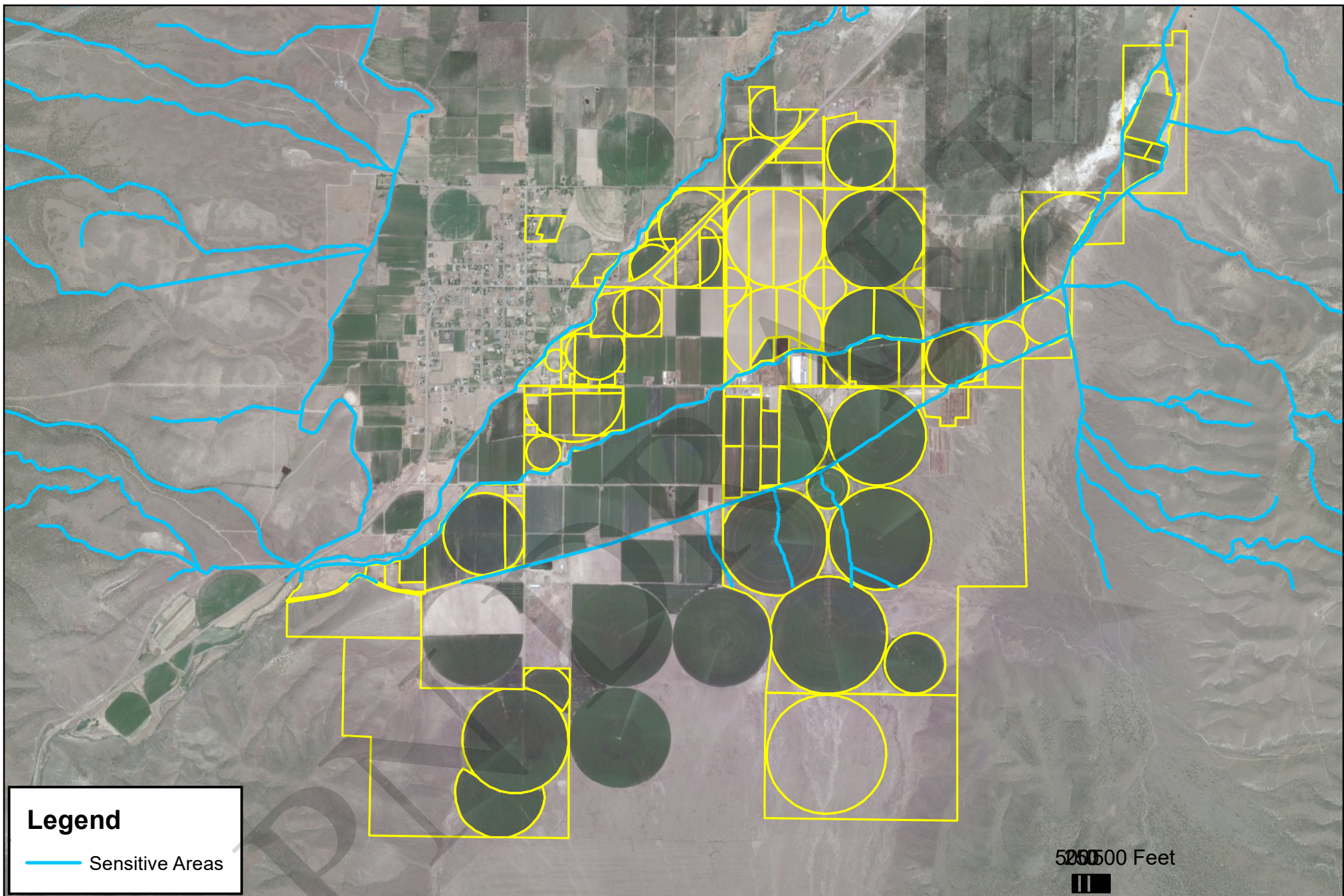
Utah Phosphorus Index

Field	Crop Year	Winter Application Total	Non-Winter Application Total	P Index w/o P Apps	P Index w/ P Apps	P Loss Risk
Marks big half	2022	18.0	13.0	12.5	13.0	Very low
Marks full pvt	2022	18.0	13.0	12.5	13.0	Very low
Marks Little hf	2022	18.0	13.0	12.5	13.0	Very low
Lewis Wheel In	2022	19.5	14.5	14.0	14.5	Very low
Lewis Pivot	2022	18.0	13.0	12.5	13.0	Very low
Dalton Shop	2022	19.5	14.5	14.0	14.5	Very low
Gayles & Allens	2022	19.5	14.5	14.0	14.5	Very low
Dales	2022	33.0	28.0	27.5	28.0	Low
Bullets	2022	33.0	28.0	27.5	28.0	Low
Bruce	2022	31.5	26.5	26.0	26.5	Low
Sand Farm South	2022	21.0	16.0	15.5	16.0	Low
Sand Farm North	2022	21.0	16.0	15.5	16.0	Low
Carly Wood	2022	18.0	13.0	12.5	13.0	Very low
Wards	2022	24.0	19.0	18.5	19.0	Low
Ralls	2022	22.5	17.5	17.0	17.5	Low
Gayles Barn pvt	2022	22.5	17.5	17.0	17.5	Low
Bottom Big Fld	2022	18.0	13.0	12.5	13.0	Very low
Howards	2022	18.0	13.0	12.5	13.0	Very low
Big fld lttl hf	2022	18.0	13.0	12.5	13.0	Very low
Big fld ltt ful	2022	18.0	13.0	12.5	13.0	Very low
Below Pond	2022	22.5	17.5	17.0	17.5	Low
Wilson	2022	18.0	13.0	12.5	13.0	Very low
Little Bruce	2022	18.0	13.0	12.5	13.0	Very low

Field	Crop Year	Winter Application Total	Non-Winter Application Total	P Index w/o P Apps	P Index w/ P Apps	P Loss Risk
Lizzard	2022	22.5	17.5	17.0	17.5	Low
Rattlesnake	2022	22.5	17.5	17.0	17.5	Low
Rifle Range	2022	22.5	17.5	17.0	17.5	Low
East Field	2022	22.5	17.5	17.0	17.5	Low
Earl's	2022	22.5	17.5	17.0	17.5	Low
Dick's	2022	18.0	13.0	12.5	13.0	Very low
Fox	2022	18.0	13.0	12.5	13.0	Very low
Smoot	2022	18.0	13.0	12.5	13.0	Very low
Gerald's	2022	18.0	13.0	12.5	13.0	Very low
Little Pivot	2022	19.5	14.5	14.0	14.5	Very low
Old Pivot	2022	21.0	16.0	15.5	16.0	Low
East Pivot	2022	24.0	19.0	18.5	19.0	Low
South Pivot	2022	21.0	16.0	15.5	16.0	Low
Homestead	2022	18.0	13.0	12.5	13.0	Very low
Cove	2022	18.0	13.0	12.5	13.0	Very low
Chris Pivot	2022	23.0	19.0	18.5	19.0	Low
Valley Pivot	2022	18.5	14.5	14.0	14.5	Very low
Zim	2022	26.0	22.0	21.5	22.0	Low
N4 Pivot	2022	18.5	14.5	14.0	14.5	Very low
N1 Pivot	2022	23.0	19.0	18.5	19.0	Low
S4 Pivot	2022	18.5	14.5	14.0	14.5	Very low
S1 Pivot	2022	18.5	14.5	14.0	14.5	Very low

3.2. Manure Application Setback Distances

Manure application setbacks will be implemented according to the USDA-NRCS standard of 33' along roads, irrigation structures, and sensitive areas.



Legend

— Sensitive Areas

52500 Feet



File Name:

Double
M Farms

Assisted By:

Hannah Freeze
Nutrient
Management
Specialist



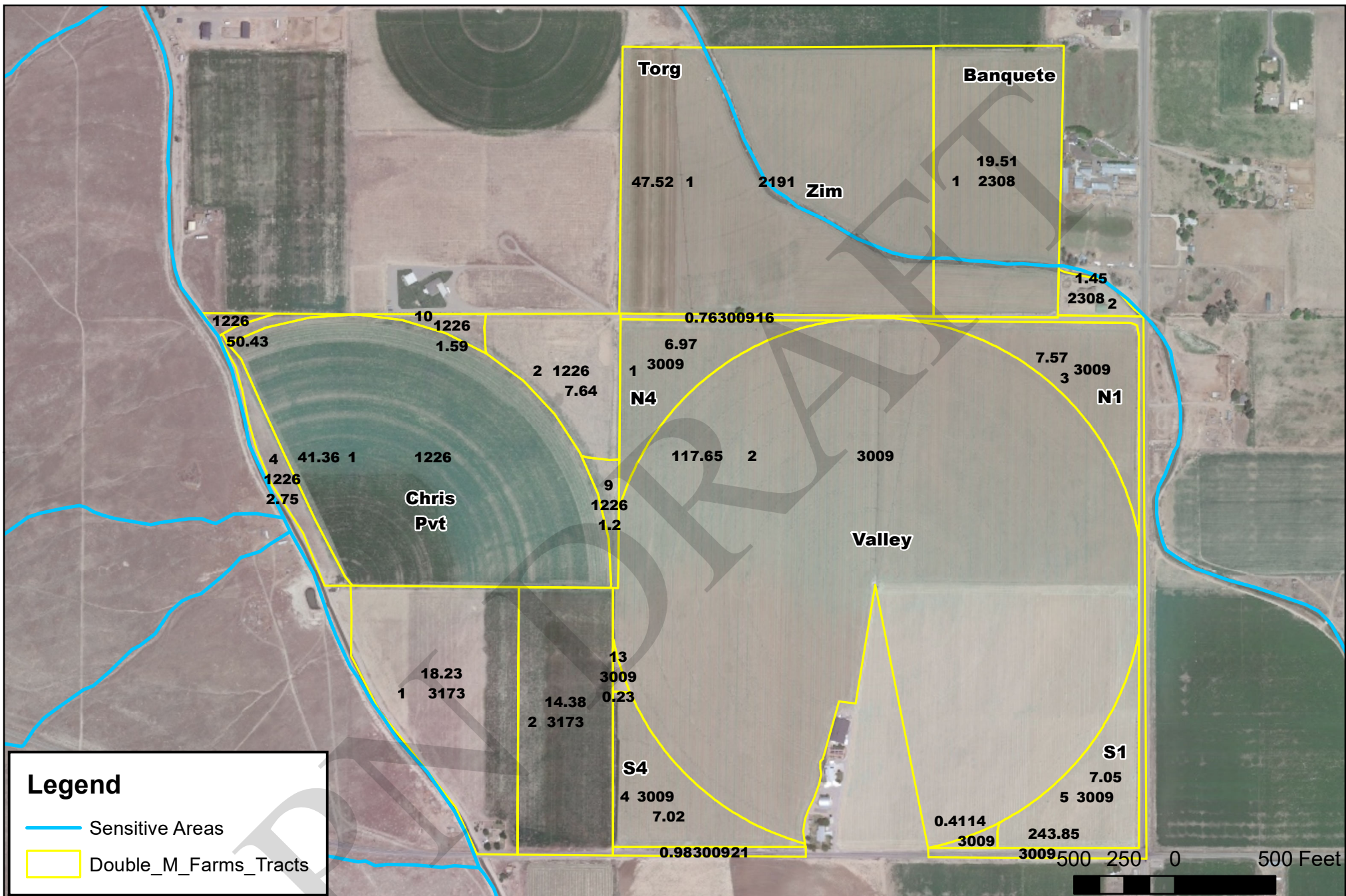
Piute CD

Comprehensive Nutrient Management Plan Double M Farms

Piute County, UT

Drawn By: Hannah Freeze 5/26/2022

Sheet 1 of 1

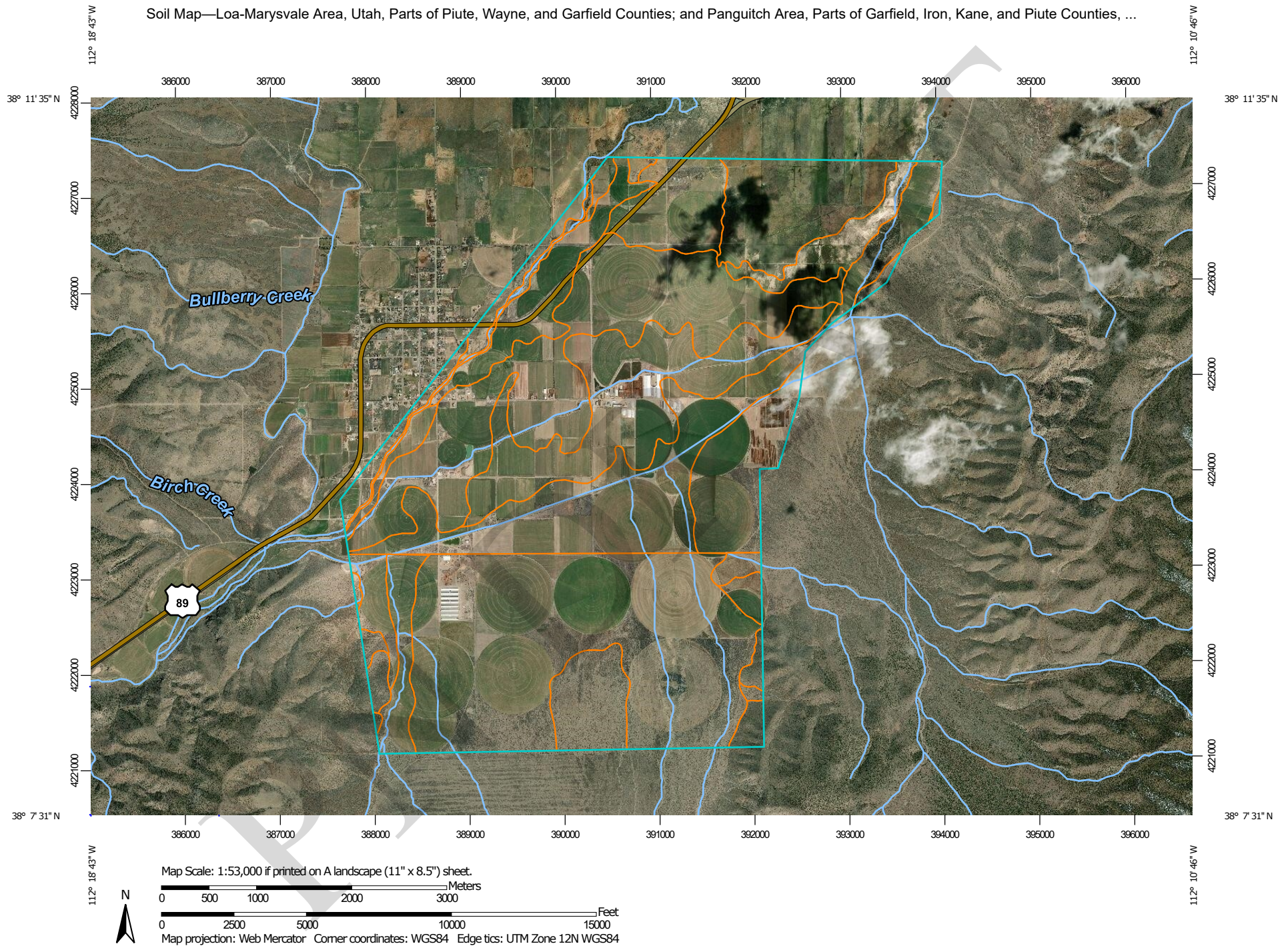


3.3. Soil Test Data

Field	Test Year	OM (%)	P Test Used	P	K	Mg	Ca	Na	Units	Soil pH	Buffer pH	CEC (meq/100g)	NO ₃ -N (ppm)	EC (mmhos/cm)
Marks big half	2021	1.9	Olsen	17	524	5	11	1	ppm	8.2		18.3	5.0	0.80
Marks full pvt	2021	1.9	Olsen	12	450	6	12	1	lbs/ac	8.0		20.0	6.0	1.00
Marks Little hf	2021	1.5	Olsen	30	413	5	12	1	ppm	8.0		19.6	19.0	1.10
Lewis Wheel In	2021	2.5	Olsen	14	478	6	13	1	ppm	8.1		21.9	8.0	1.20
Lewis Pivot	2021	2.5	Olsen	14	478	6	13	1	ppm	8.1		21.9	8.0	1.20
Dalton Shop	2021	3.2	Olsen	22	575	6	13	1	ppm	8.0		22.5	13.0	1.30
Gayles & Allens	2021	2.2	Olsen	14	429	6	12	1	lbs/ac	8.1		20.0	14.0	1.20
Dales	2021	2.7	Olsen	14	386	6	13	1	ppm	8.1		20.5	10.0	1.20
Bullets									ppm					
Bruce	2021	2.4	Olsen	14	275	6	13	1	ppm	8.1		20.9	7.0	1.10
Sand Farm South	2021	2.1	Olsen	18	399	5	11	1	ppm	8.1		18.2	7.0	1.00
Sand Farm North	2021	2.1	Olsen	18	399	5	11	1	ppm	8.1		18.2	7.0	1.00
Carly Wood	2021	2.7	Olsen	15	403	7	14	1	ppm	8.1		22.5	8.0	1.30
Wards	2021	2.5	Olsen	14	527	6	13	1	ppm	8.0		21.6	9.0	1.10
Ralls	2021	2.5	Olsen	12	508	6	12	1	ppm	8.2		20.2	8.0	1.10
Gayles Barn pvt	2021	3.2	Olsen	38	1,004	10	15	2	ppm	8.1		30.2	11.0	2.90
Bottom Big Fld	2021	2.4	Olsen	28	511	6	12	1	ppm	8.3		21.1	9.0	1.00
Howards	2021	2.4	Olsen	32	883	6	11	1	ppm	8.1		21.9	11.0	1.70
Big fld Ittl hf	2021	2.1	Olsen	38	736	5	12	1	ppm	8.2		20.9	16.0	1.60
Big fld Itt ful	2021	2.1	Olsen	38	736	5	12	1	ppm	8.2		20.9	16.0	1.60
Below Pond									ppm					
Wilson	2021	2.6	Olsen	42	794	7	12	1	ppm	8.0		22.0	12.0	1.20
Little Bruce	2021	2.4	Olsen	14	275	6	13	1	ppm	8.1		20.9	7.0	1.10
Lizzard	2021	2.3	Olsen	18	594	5	12	1	ppm	8.1		19.5	4.0	1.00
Rattlesnake	2021	1.6	Olsen	28	1,182	4	10	1	lbs/ac	8.4		18.3	5.0	0.80
Rifle Range	2021	1.7	Olsen	20	826	5	12	1	ppm	8.3		19.8	5.0	0.90
East Field	2021	2.4	Olsen	25	1,051	6	12	1	ppm	8.4		21.6	8.0	1.20
Earl's	2021	2.8	Olsen	26	811	6	12	1	ppm	8.3		22.0	7.0	1.00
Dick's									ppm					

Field	Test Year	OM (%)	P Test Used	P	K	Mg	Ca	Na	Units	Soil pH	Buffer pH	CEC (meq/100g)	NO ₃ -N (ppm)	EC (mmhos/cm)
Fox									ppm					
Smoot	2021	2.4	Olsen	39	728	7	12	1	ppm	8.1		22.5	36.0	2.30
Gerald's	2021	2.2	Olsen	38	903	5	11	1	ppm	8.2		19.5	8.0	1.00
Little Pivot	2021	2.5	Olsen	39	646	6	12	1	ppm	8.0		21.1	7.0	1.10
Old Pivot	2021	2.1	Olsen	30	634	5	13	1	ppm	7.9		21.1	22.0	1.50
East Pivot	2021	1.8	Olsen	30	1,027	4	9	1	ppm	8.3		17.0	8.0	1.00
South Pivot									ppm					
Homestead	2021	1.5	Olsen	20	691	4	10	1	ppm	7.8		17.0	8.0	0.80
Cove	2021	1.9	Olsen	22	712	4	15	1	ppm	7.9		22.2	8.0	1.00
Chris Pivot									ppm					
Valley Pivot									ppm					
Zim									ppm					
N4 Pivot									ppm					
N1 Pivot									ppm					
S4 Pivot									ppm					
S1 Pivot									ppm					

Soil Map—Loa-Marysville Area, Utah, Parts of Piute, Wayne, and Garfield Counties; and Panguitch Area, Parts of Garfield, Iron, Kane, and Piute Counties, ...



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.

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: Loa-Marysville Area, Utah, Parts of Piute, Wayne, and Garfield Counties

Survey Area Data: Version 5, Sep 7, 2021

Soil Survey Area: Panguitch Area, Parts of Garfield, Iron, Kane, and Piute Counties, Utah

Survey Area Data: Version 15, Sep 7, 2021

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Mar 15, 2013—Nov 2, 2017

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

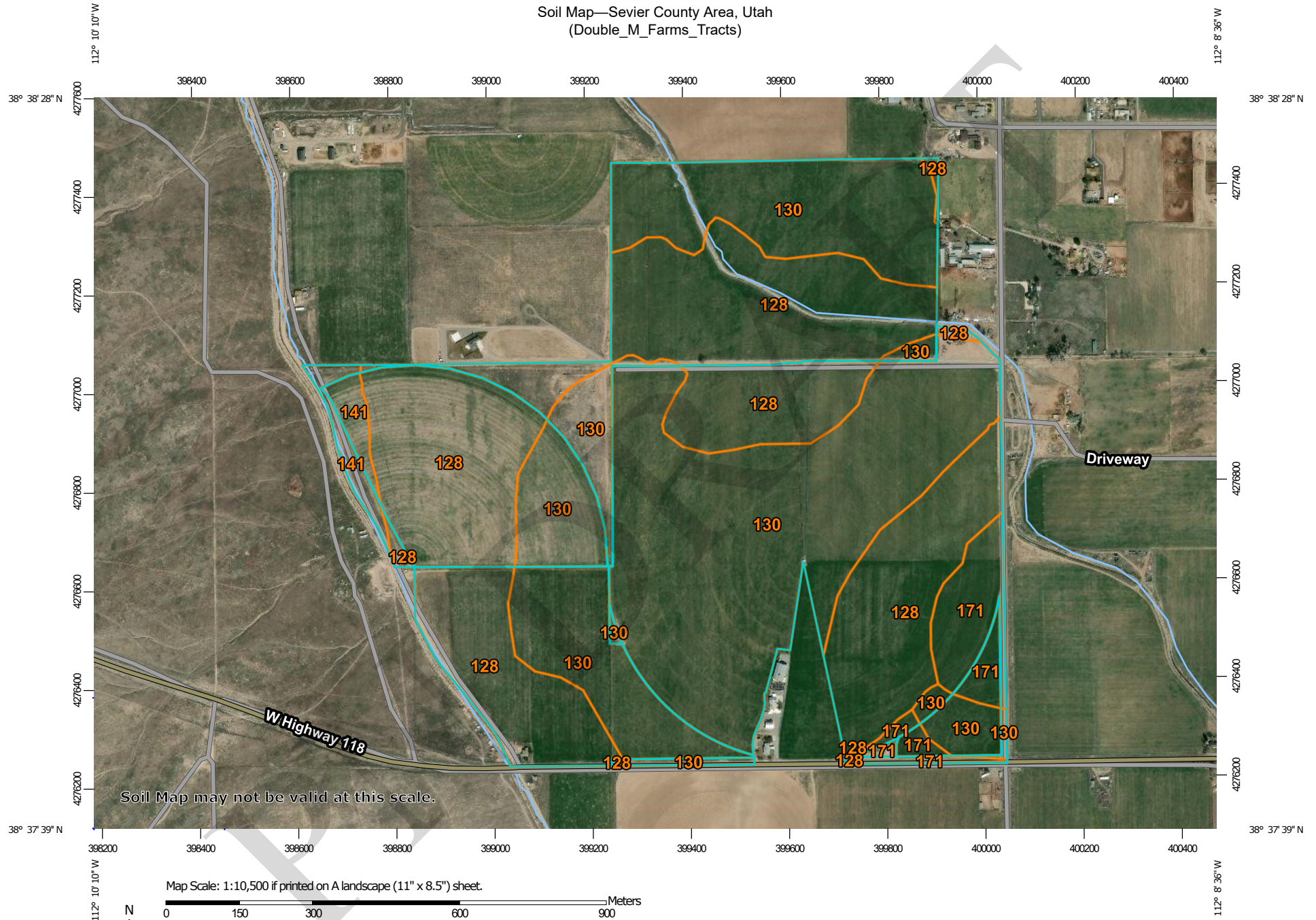
Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
103	Anco-Green River-Poganeab complex, 0 to 4 percent slopes	41.4	0.7%
104	Anco-Griver complex, 0 to 2 percent slopes	158.1	2.5%
107	Annabella cobbly sandy loam, 5 to 20 percent slopes	318.8	5.1%
133	Glenwood fine sandy loam, 0 to 2 percent slopes	110.9	1.8%
140	Hiko Peak very cobbly sandy loam, 5 to 30 percent slopes, extremely bouldery	3.8	0.1%
171	Monroe loam, 0 to 2 percent slopes	1,033.1	16.5%
PhA	Scipio mucky peat, 0 to 2 percent slopes	387.2	6.2%
PjA	Nevadanile-Green River complex, 0 to 2 percent slopes	296.0	4.7%
SmW	Benstot silt loam, 0 to 2 percent slopes	259.8	4.2%
UhA	Circlevalley fine sandy loam, 0 to 3 percent slopes	670.5	10.7%
UkC	Mosida loam, 0 to 2 percent slopes	822.8	13.2%
Subtotals for Soil Survey Area		4,102.5	65.6%
Totals for Area of Interest		6,252.9	100.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
18	Broncho very gravelly sandy loam, 2 to 5 percent slopes	226.9	3.6%
20	Bruman gravelly loam, 2 to 10 percent slopes	16.6	0.3%
23	Bruman very cobbly loam, 5 to 30 percent slopes	35.3	0.6%
24	Bruman very cobbly loam, 30 to 50 percent slopes	56.5	0.9%
40	Crestline fine sandy loam, 2 to 4 percent slopes	1,560.3	25.0%
65	Henrieville sandy loam, 2 to 5 percent slopes	80.2	1.3%
72	Jodero loam, 1 to 2 percent slopes	135.8	2.2%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
148	Tridell cobbly loam, 4 to 25 percent slopes	38.6	0.6%
Subtotals for Soil Survey Area		2,150.2	34.4%
Totals for Area of Interest		6,252.9	100.0%

Soil Map—Sevier County Area, Utah
(Double_M_Farms_Tracts)



Map Scale: 1:10,500 if printed on A landscape (11" x 8.5") sheet.

0 150 300 600 900 Meters
0 500 1000 2000 3000 Feet
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

5/26/2022
Page 1 of 3

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: Sevier County Area, Utah

Survey Area Data: Version 11, Sep 7, 2021

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

Date(s) aerial images were photographed: Dec 31, 2009—Nov 2, 2017

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

Map Unit Legend

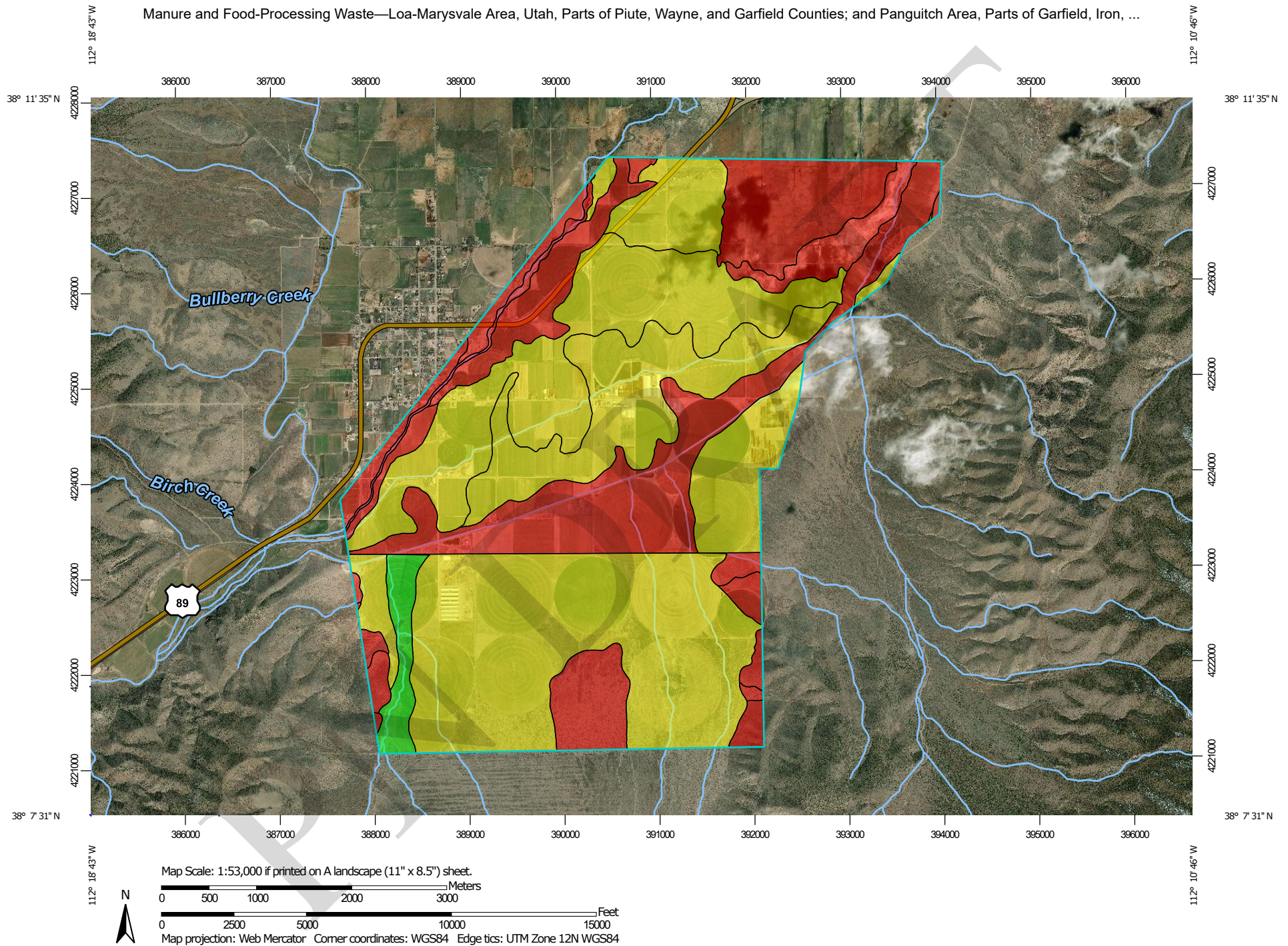
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
128	Escalante gravelly sandy loam, gravelly substratum, 2 to 5 percent slopes	133.1	43.1%
130	Escalante sandy loam, gravelly substratum, 2 to 4 percent slopes	156.1	50.6%
141	Hiko Peak, south-Annabella complex, 5 to 30 percent slopes	5.5	1.8%
171	Monroe loam, 0 to 2 percent slopes	14.0	4.5%
Totals for Area of Interest		308.7	100.0%

3.4. Manure Nutrient Analyses

Manure Source	Dry Matter (%)	Total N	NH ₄ -N	Total P ₂ O ₅	Total K ₂ O	Avail. P ₂ O ₅	Avail. K ₂ O	Units	Analysis Source and Date
Reception Pit 1								lbs/1000 gal	MMP Estimate
Reception Pit 2								lbs/1000 gal	MMP Estimate
Pond		31.4	6.3	59.0	102.0	47.2	86.7	lbs/1000 gal	MMP Estimate
Compost Yard		1.0	1.0	1.4	66.0	1.1	56.1	lbs/ton	MMP Estimate
Dry Lots		6.7	2.4	7.6	9.4	6.1	8.0	lbs/ton	MMP Estimate

a. Entered analysis may be the average of several individual analyses.

b. Utah assumes that 80% of manure phosphorus and 85% of manure potassium is crop available. First-year per-acre nitrogen availability for individual manure applications is given in the Planned Nutrient Applications table. For more information about nitrogen availability in Utah, see Manure Estimated Nutrient Content spreadsheet, version 3.0e2.



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Background

 Aerial Photography

Soils

Soil Rating Polygons

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Soil Rating Lines

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Soil Rating Points

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Water Features

 Streams and Canals

Transportation

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

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: Loa-Marysville Area, Utah, Parts of Piute, Wayne, and Garfield Counties

Survey Area Data: Version 5, Sep 7, 2021

Soil Survey Area: Panguitch Area, Parts of Garfield, Iron, Kane, and Piute Counties, Utah

Survey Area Data: Version 15, Sep 7, 2021

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Mar 15, 2013—Nov 2, 2017

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

Manure and Food-Processing Waste

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
103	Anco-Green River-Poganeab complex, 0 to 4 percent slopes	Very limited	Anco (35%)	Slow water movement (1.00)	41.4	0.7%
				Salinity (1.00)		
				Sodium content (1.00)		
				Droughty (1.00)		
				Depth to saturated zone (0.86)		
			Poganeab (25%)	Depth to saturated zone (1.00)		
				Slow water movement (1.00)		
				Sodium content (0.82)		
				Flooding (0.60)		
				Salinity (0.50)		
			Provo (3%)	Filtering capacity (1.00)		
				Depth to saturated zone (1.00)		
				Flooding (1.00)		
				Droughty (0.95)		
				Leaching (0.90)		
104	Anco-Griver complex, 0 to 2 percent slopes	Very limited	Anco, strongly saline (45%)	Slow water movement (1.00)	158.1	2.5%
				Salinity (1.00)		
				Sodium content (1.00)		
				Droughty (1.00)		
				Depth to saturated zone (0.86)		
			Poganeab, saline (10%)	Depth to saturated zone (1.00)		

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Slow water movement (1.00)		
				Sodium content (0.82)		
				Flooding (0.60)		
				Salinity (0.50)		
107	Annabella cobbly sandy loam, 5 to 20 percent slopes	Somewhat limited	Annabella (85%)	Droughty (0.86)	318.8	5.1%
				Slope (0.84)		
				Flooding (0.60)		
				Leaching (0.45)		
				No filtering capacity limitation (0.00)		
			Medburn (7%)	Leaching (0.45)		
133	Glenwood fine sandy loam, 0 to 2 percent slopes	Very limited	Glenwood (90%)	Filtering capacity (1.00)	110.9	1.8%
				Droughty (0.91)		
				Leaching (0.45)		
			Escalante (5%)	Filtering capacity (1.00)		
			Wrango (3%)	Filtering capacity (1.00)		
				Droughty (0.93)		
				Leaching (0.45)		
				Sodium content (0.02)		
140	Hiko Peak very cobbly sandy loam, 5 to 30 percent slopes, extremely bouldery	Very limited	Hiko Peak, extremely stony (85%)	Large stones (1.00)	3.8	0.1%
				Slope (1.00)		
				Droughty (0.99)		
				Cobble content (0.98)		
				Leaching (0.45)		
			Annabella (8%)	Slope (1.00)		
				Droughty (0.90)		
				Cobble content (0.68)		
				Leaching (0.45)		
			Pibler (5%)	Slow water movement (1.00)		

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Depth to cemented pan (1.00)		
				Droughty (1.00)		
				Slope (1.00)		
				Runoff (0.40)		
			Tosser (2%)	Filtering capacity (1.00)		
				Droughty (1.00)		
				Slope (1.00)		
				Leaching (0.45)		
				Sodium content (0.18)		
171	Monroe loam, 0 to 2 percent slopes	Somewhat limited	Monroe (90%)	No filtering capacity limitation (0.00)	1,033.1	16.5%
			Annabella (3%)	Droughty (0.90)		
				Cobble content (0.68)		
				Leaching (0.45)		
PhA	Scipio mucky peat, 0 to 2 percent slopes	Very limited	Scipio (90%)	Depth to saturated zone (1.00)	387.2	6.2%
				Flooding (0.60)		
				Leaching (0.50)		
				Too acid (0.50)		
				Slow water movement (0.30)		
			Poganeab (6%)	Depth to saturated zone (1.00)		
				Slow water movement (1.00)		
				Sodium content (0.82)		
				Flooding (0.60)		
				Salinity (0.50)		
			Kirkham (3%)	Sodium content (1.00)		
				Slow water movement (1.00)		

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Depth to saturated zone (0.86)		
				Runoff (0.40)		
PjA	Nevadanile-Green River complex, 0 to 2 percent slopes	Very limited	Nevadanile (60%)	Filtering capacity (1.00)	296.0	4.7%
			Glenwood (5%)	Filtering capacity (1.00)		
				Droughty (0.76)		
				Leaching (0.45)		
SmW	Benstot silt loam, 0 to 2 percent slopes	Somewhat limited	Benstot (90%)	Slow water movement (0.30)	259.8	4.2%
				Salinity (0.00)		
				No filtering capacity limitation (0.00)		
			Griver, strongly saline (10%)	Depth to saturated zone (0.86)		
				Salinity (0.78)		
				Sodium content (0.59)		
				Too acid (0.37)		
UhA	Circlevalley fine sandy loam, 0 to 3 percent slopes	Somewhat limited	Circlevalley (95%)	No filtering capacity limitation (0.00)	670.5	10.7%
UkC	Mosida loam, 0 to 2 percent slopes	Very limited	Mosida (90%)	Filtering capacity (1.00)	822.8	13.2%
				Slow water movement (0.30)		
			Wrango (5%)	Filtering capacity (1.00)		
				Droughty (0.93)		
				Leaching (0.45)		
				Sodium content (0.02)		
Subtotals for Soil Survey Area					4,102.5	65.6%
Totals for Area of Interest					6,252.9	100.0%

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
18	Broncho very gravelly sandy loam, 2 to 5 percent slopes	Very limited	Broncho (85%)	Filtering capacity (1.00)	226.9	3.6%
				Droughty (0.62)		
				Cobble content (0.50)		
				Leaching (0.45)		
20	Bruman gravelly loam, 2 to 10 percent slopes	Very limited	Bruman (90%)	Filtering capacity (1.00)	16.6	0.3%
				Droughty (0.68)		
23	Bruman very cobbly loam, 5 to 30 percent slopes	Very limited	Bruman (90%)	Filtering capacity (1.00)	35.3	0.6%
				Cobble content (1.00)		
				Slope (1.00)		
				Droughty (0.81)		
24	Bruman very cobbly loam, 30 to 50 percent slopes	Very limited	Bruman (85%)	Slope (1.00)	56.5	0.9%
				Filtering capacity (1.00)		
				Cobble content (1.00)		
				Droughty (0.81)		
40	Crestline fine sandy loam, 2 to 4 percent slopes	Somewhat limited	Crestline (90%)	Leaching (0.45)	1,560.3	25.0%
65	Henrieville sandy loam, 2 to 5 percent slopes	Somewhat limited	Henrieville (85%)	Leaching (0.45)	80.2	1.3%
72	Jodero loam, 1 to 2 percent slopes	Not limited	Jodero (82%)		135.8	2.2%
148	Tridell cobbly loam, 4 to 25 percent slopes	Very limited	Tridell (85%)	Filtering capacity (1.00)	38.6	0.6%
				Slope (1.00)		
				Cobble content (0.50)		
				Sodium content (0.08)		
				Droughty (0.04)		
Subtotals for Soil Survey Area					2,150.2	34.4%
Totals for Area of Interest					6,252.9	100.0%

Rating	Acres in AOI	Percent of AOI
Somewhat limited	3,922.7	62.7%

Rating	Acres in AOI	Percent of AOI
Very limited	2,194.2	35.1%
Not limited	135.8	2.2%
Totals for Area of Interest	6,252.9	100.0%

Description

The application of manure and food-processing waste not only disposes of waste material but also can improve crop production by increasing the supply of nutrients in the soils where the material is applied. Manure is the excrement of livestock and poultry, and food-processing waste is damaged fruit and vegetables and the peelings, stems, leaves, pits, and soil particles removed in food preparation. The manure and food-processing waste are solid, slurry, or liquid. Their nitrogen content varies. A high content of nitrogen limits the application rate. Toxic or otherwise dangerous wastes, such as those mixed with the lye used in food processing, are not considered in the ratings.

The ratings are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the waste is applied, and the method by which the waste is applied. The properties that affect absorption include saturated hydraulic conductivity (Ksat), depth to a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, and available water capacity. The properties that affect plant growth and microbial activity include reaction, the sodium adsorption ratio, salinity, and bulk density. The wind erodibility group, soil erosion factor K, and slope are considered in estimating the likelihood that wind erosion or water erosion will transport the waste material from the application site. Stones, cobbles, a water table, ponding, and flooding can hinder the application of waste. Permanently frozen soils are unsuitable for waste treatment.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect agricultural waste management. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

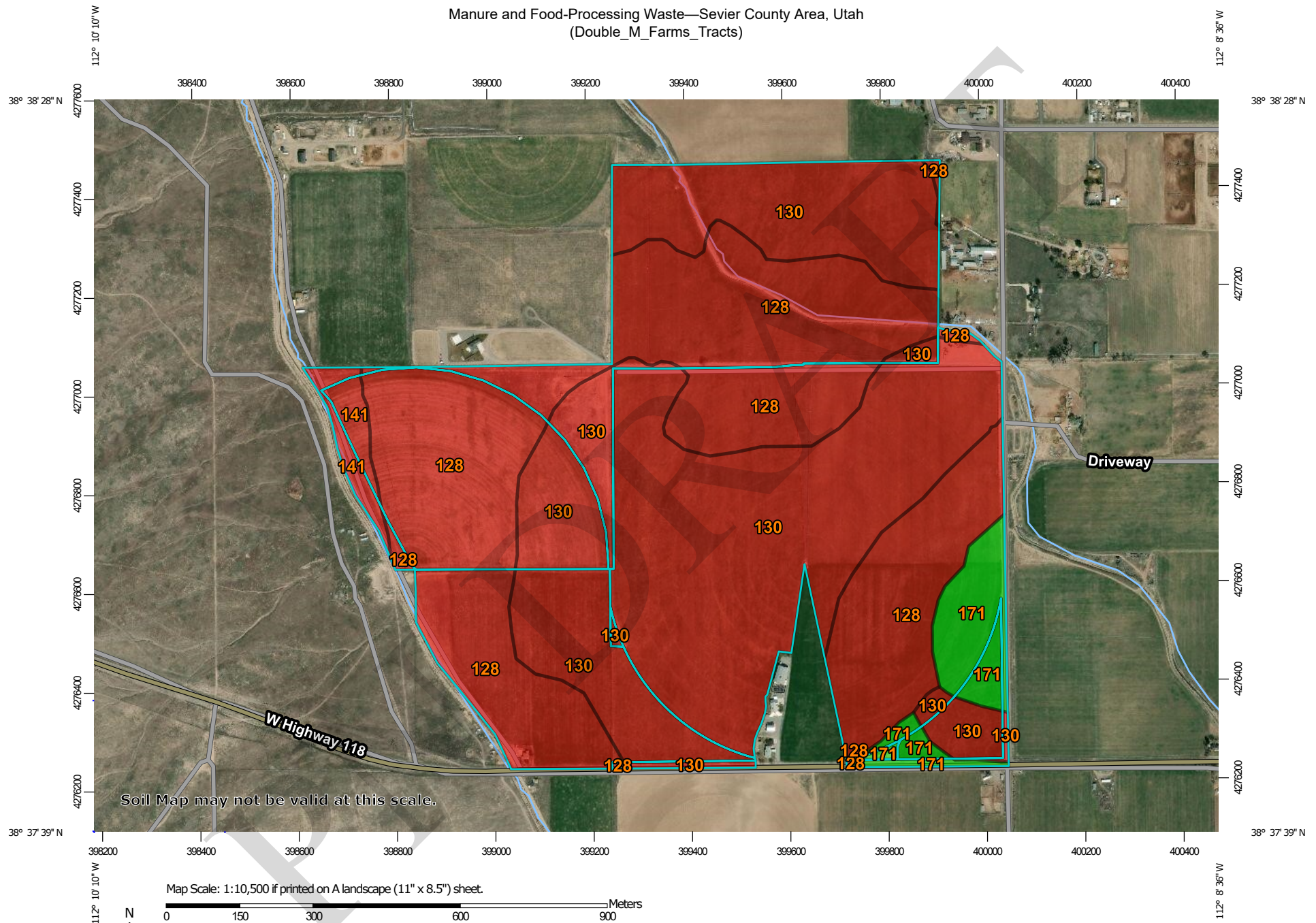
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Manure and Food-Processing Waste—Sevier County Area, Utah
(Double_M_Farms_Tracts)



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

5/26/2022
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MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Background

 Aerial Photography

Soils

Soil Rating Polygons

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Soil Rating Lines

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Soil Rating Points

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Water Features

 Streams and Canals

Transportation

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

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: Sevier County Area, Utah

Survey Area Data: Version 11, Sep 7, 2021

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

Date(s) aerial images were photographed: Dec 31, 2009—Nov 2, 2017

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

Manure and Food-Processing Waste

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
128	Escalante gravelly sandy loam, gravelly substratum, 2 to 5 percent slopes	Very limited	Escalante, gravelly substratum (90%)	Filtering capacity (1.00)	133.1	43.1%
			Hiko Peak (6%)	Large stones (1.00)		
				Droughty (0.95)		
			Hoye (4%)	Filtering capacity (1.00)		
				Droughty (0.21)		
				Sodium content (0.01)		
130	Escalante sandy loam, gravelly substratum, 2 to 4 percent slopes	Very limited	Escalante, gravelly substratum (90%)	Filtering capacity (1.00)	156.1	50.6%
			Wrango (4%)	Filtering capacity (1.00)		
				Droughty (0.93)		
				Sodium content (0.02)		
			Hiko Peak (3%)	Large stones (1.00)		
				Droughty (0.95)		
141	Hiko Peak, south-Annabella complex, 5 to 30 percent slopes	Very limited	Hiko Peak, south (65%)	Slope (1.00)	5.5	1.8%
				Large stones (1.00)		
				Droughty (0.95)		
			Escalante (10%)	Filtering capacity (1.00)		
171	Monroe loam, 0 to 2 percent slopes	Not limited	Monroe (90%)		14.0	4.5%
Totals for Area of Interest					308.7	100.0%

Rating	Acres in AOI	Percent of AOI
Very limited	294.7	95.5%
Not limited	14.0	4.5%
Totals for Area of Interest	308.7	100.0%

Description

The application of manure and food-processing waste not only disposes of waste material but also can improve crop production by increasing the supply of nutrients in the soils where the material is applied. Manure is the excrement of livestock and poultry, and food-processing waste is damaged fruit and vegetables and the peelings, stems, leaves, pits, and soil particles removed in food preparation. The manure and food-processing waste are solid, slurry, or liquid. Their nitrogen content varies. A high content of nitrogen limits the application rate. Toxic or otherwise dangerous wastes, such as those mixed with the lye used in food processing, are not considered in the ratings.

The ratings are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the waste is applied, and the method by which the waste is applied. The properties that affect absorption include saturated hydraulic conductivity (Ksat), depth to a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, and available water capacity. The properties that affect plant growth and microbial activity include reaction, the sodium adsorption ratio, salinity, and bulk density. The wind erodibility group, soil erosion factor K, and slope are considered in estimating the likelihood that wind erosion or water erosion will transport the waste material from the application site. Stones, cobbles, a water table, ponding, and flooding can hinder the application of waste. Permanently frozen soils are unsuitable for waste treatment.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect agricultural waste management. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

3.5. Planned Crops and Fertilizer Recommendations

Field	Crop Year	Planned Crop	Yield Goal (per ac)	N Rec (lbs/ac)	P ₂ O ₅ Rec (lbs/ac)	K ₂ O Rec (lbs/ac)	N Removed (lbs/ac)	P ₂ O ₅ Removed (lbs/ac)	K ₂ O Removed (lbs/ac)	Custom Fert. Rec. Source
Marks big half	2022	Alfalfa	6.0 tons	0	0	0	340	80	360	
Marks full pvt	2022	Alfalfa	6.0 tons	0	175	0	340	80	360	
Marks Little hf	2022	Alfalfa	6.0 tons	0	0	0	340	80	360	
Lewis Wheel In	2022	Alfalfa	6.0 tons	0	75	0	340	80	360	
Lewis Pivot	2022	Alfalfa	6.0 tons	0	75	0	340	80	360	
Dalton Shop	2022	Grass-legume (50-50)	8.0 tons	75	0	0	320	103	470	
Gayles & Allens	2022	Grass-legume (50-50)	8.0 tons	75	90	0	320	103	470	
Dales	2022	Grass-legume (50-50)	8.0 tons	75	25	0	320	103	470	
Bullets	2022	Grass-legume (50-50)	8.0 tons	75			320	103	470	
Bruce	2022	Grass-legume (50-50)	8.0 tons	75	25	0	320	103	470	
Sand Farm South	2022	Grass-legume (50-50)	8.0 tons	75	0	0	320	103	470	
Sand Farm North	2022	Grass-legume (50-50)	8.0 tons	75	0	0	320	103	470	
Carly Wood	2022	Grass-legume (50-50)	8.0 tons	75	25	0	320	103	470	
Wards	2022	Grass-legume (50-50)	8.0 tons	75	25	0	320	103	470	
Ralls	2022	Grass-legume (50-50)	8.0 tons	75	25	0	320	103	470	
Gayles Barn pvt	2022	Alfalfa	6.0 tons	0	0	0	340	80	360	
Bottom Big Fld	2022	Alfalfa	6.0 tons	0	0	0	340	80	360	
Howards	2022	Alfalfa	6.0 tons	0	0	0	340	80	360	
Big fld lttl hf	2022	Alfalfa	6.0 tons	0	0	0	340	80	360	
Big fld ltt ful	2022	Alfalfa	6.0 tons	0	0	0	340	80	360	
Below Pond	2022	Alfalfa	6.0 tons	0			340	80	360	
Wilson	2022	Alfalfa	6.0 tons	0	0	0	340	80	360	
Little Bruce	2022	Alfalfa	6.0 tons	0	75	0	340	80	360	
Lizzard	2022	Alfalfa	6.0 tons	0	0	0	340	80	360	
Rattlesnake	2022	Grass (100%)	8.0 tons	175	25	0	320	103	470	
Rifle Range	2022	Grass (100%)	8.0 tons	175	0	0	320	103	470	
East Field	2022	Grass (100%)	8.0 tons	175	0	0	320	103	470	

Field	Crop Year	Planned Crop	Yield Goal (per ac)	N Rec (lbs/ac)	P ₂ O ₅ Rec (lbs/ac)	K ₂ O Rec (lbs/ac)	N Removed (lbs/ac)	P ₂ O ₅ Removed (lbs/ac)	K ₂ O Removed (lbs/ac)	Custom Fert. Rec. Source
Earl's	2022	Grass (100%)	8.0 tons	175	0	0	320	103	470	
Dick's	2022	Grass (100%)	8.0 tons	175			320	103	470	
Fox	2022	Grass (100%)	8.0 tons	175			320	103	470	
Smoot	2022	Grass (100%)	8.0 tons	175	0	0	320	103	470	
Gerald's	2022	Grass (100%)	8.0 tons	175	0	0	320	103	470	
Little Pivot	2022	Grass (100%)	8.0 tons	175	0	0	320	103	470	
Old Pivot	2022	Grass-legume (50-50)	8.0 tons	75	0	0	320	103	470	
East Pivot	2022	Grass-legume (50-50)	8.0 tons	75	0	0	320	103	470	
South Pivot	2022	Grass-legume (50-50)	8.0 tons	75			320	103	470	
Homestead	2022	Grass-legume (50-50)	8.0 tons	75	0	0	320	103	470	
Cove	2022	Grass-legume (50-50)	8.0 tons	75	0	0	320	103	470	
Chris Pivot	2022	Grass-legume (50-50)	8.0 tons	75			320	103	470	
Valley Pivot	2022	Grass-legume (50-50)	8.0 tons	75			320	103	470	
Zim	2022	Alfalfa	6.0 tons	0			340	80	360	
N4 Pivot	2022	Alfalfa	6.0 tons	0			340	80	360	
N1 Pivot	2022	Alfalfa	6.0 tons	0			340	80	360	
S4 Pivot	2022	Alfalfa	6.0 tons	0			340	80	360	
S1 Pivot	2022	Alfalfa	6.0 tons	0			340	80	360	

a. Unharvested cover crop or first crop in double-crop system.

b. Custom fertilizer recommendation.

3.7. Field Nutrient Balance (Manure-spreadable Area)

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ^a			Nutrients Applied ^b			Balance After Recs ^c			Balance After Removal ^d	
					N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
2022	Marks big half	63.0	Alfalfa	6	0	0	0	0	0	0	0	0	0	-80	-360
2022	Marks full pvt	144.7	Alfalfa	6	0	175	0	0	0	0	0	-175	0	-80	-360
2022	Marks Little hf	20.7	Alfalfa	6	0	0	0	0	0	0	0	0	0	-80	-360
2022	Lewis Wheel In	26.3	Alfalfa	6	0	75	0	0	0	0	0	-75	0	-80	-360
2022	Lewis Pivot	87.2	Alfalfa	6	0	75	0	0	0	0	0	-75	0	-80	-360
2022	Dalton Shop	15.0	Grass-legume (50-50)	8	75	0	0	0	0	0	-75	0	0	-103	-470
2022	Gayles & Allens	61.9	Grass-legume (50-50)	8	75	90	0	0	0	0	-75	-90	0	-103	-470
2022	Dales	35.7	Grass-legume (50-50)	8	75	25	0	0	0	0	-75	-25	0	-103	-470
2022	Bullets	16.4	Grass-legume (50-50)	8	75			0	0	0	-75			-103	-470
2022	Bruce	29.5	Grass-legume (50-50)	8	75	25	0	0	0	0	-75	-25	0	-103	-470
2022	Sand Farm South	13.0	Grass-legume (50-50)	8	75	0	0	0	0	0	-75	0	0	-103	-470
2022	Sand Farm North	32.3	Grass-legume (50-50)	8	75	0	0	0	0	0	-75	0	0	-103	-470
2022	Carly Wood	39.0	Grass-legume (50-50)	8	75	25	0	0	0	0	-75	-25	0	-103	-470
2022	Wards	24.3	Grass-legume (50-50)	8	75	25	0	0	0	0	-75	-25	0	-103	-470
2022	Ralls	26.6	Grass-legume (50-50)	8	75	25	0	0	0	0	-75	-25	0	-103	-470
2022	Gayles Barn pvt	58.0	Alfalfa	6	0	0	0	0	0	0	0	0	0	-80	-360
2022	Bottom Big Fld	125.7	Alfalfa	6	0	0	0	0	0	0	0	0	0	-80	-360
2022	Howards	128.9	Alfalfa	6	0	0	0	0	0	0	0	0	0	-80	-360
2022	Big fld lttl hf	10.5	Alfalfa	6	0	0	0	0	0	0	0	0	0	-80	-360
2022	Big fld ltt ful	22.2	Alfalfa	6	0	0	0	0	0	0	0	0	0	-80	-360
2022	Below Pond	82.1	Alfalfa	6	0			0	0	0	0			-80	-360
2022	Wilson	138.3	Alfalfa	6	0	0	0	0	0	0	0	0	0	-80	-360
2022	Little Bruce	10.2	Alfalfa	6	0	75	0	0	0	0	0	-75	0	-80	-360
2022	Lizzard	42.1	Alfalfa	6	0	0	0	0	0	0	0	0	0	-80	-360
2022	Rattlesnake	22.1	Grass (100%)	8	175	25	0	0	0	0	-175	-25	0	-103	-470
2022	Rifle Range	28.9	Grass (100%)	8	175	0	0	0	0	0	-175	0	0	-103	-470
2022	East Field	73.8	Grass (100%)	8	175	0	0	0	0	0	-175	0	0	-103	-470
2022	Earl's	59.6	Grass (100%)	8	175	0	0	0	0	0	-175	0	0	-103	-470
2022	Dick's	30.6	Grass (100%)	8	175			0	0	0	-175			-103	-470

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ^a			Nutrients Applied ^b			Balance After Recs ^c			Balance After Removal ^d	
					N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
2022	Fox	22.3	Grass (100%)	8	175			0	0	0	-175			-103	-470
2022	Smoot	61.9	Grass (100%)	8	175	0	0	0	0	0	-175	0	0	-103	-470
2022	Gerald's	122.1	Grass (100%)	8	175	0	0	0	0	0	-175	0	0	-103	-470
2022	Little Pivot	23.0	Grass (100%)	8	175	0	0	0	0	0	-175	0	0	-103	-470
2022	Old Pivot	146.9	Grass-legume (50-50)	8	75	0	0	0	0	0	-75	0	0	-103	-470
2022	East Pivot	136.6	Grass-legume (50-50)	8	75	0	0	0	0	0	-75	0	0	-103	-470
2022	South Pivot	177.2	Grass-legume (50-50)	8	75			0	0	0	-75			-103	-470
2022	Homestead	183.8	Grass-legume (50-50)	8	75	0	0	0	0	0	-75	0	0	-103	-470
2022	Cove	96.7	Grass-legume (50-50)	8	75	0	0	0	0	0	-75	0	0	-103	-470
2022	Chris Pivot	41.4	Grass-legume (50-50)	8	75			0	0	0	-75			-103	-470
2022	Valley Pivot	117.7	Grass-legume (50-50)	8	75			0	0	0	-75			-103	-470
2022	Zim	67.0	Alfalfa	6	0			0	0	0	0			-80	-360
2022	N4 Pivot	6.9	Alfalfa	6	0			0	0	0	0			-80	-360
2022	N1 Pivot	7.6	Alfalfa	6	0			0	0	0	0			-80	-360
2022	S4 Pivot	7.0	Alfalfa	6	0			0	0	0	0			-80	-360
2022	S1 Pivot	7.1	Alfalfa	6	0			0	0	0	0			-80	-360

Field Nutrient Balance (Non-manure-spreadable Area)

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ^a			Nutrients Applied ^b			Balance After Recs ^c			Balance After Removal ^d	
					N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac	N lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac	P ₂ O ₅ lbs/ac	K ₂ O lbs/ac
		ac		per ac											

^a Fertilizer Recs are the crop fertilizer recommendations. The N rec accounts for any N credit from previous legume crop.

^b Nutrients Applied are the nutrients expected to be available to the crop from that year's manure applications plus nutrients from that year's commercial fertilizer applications and nitrates from irrigation water. With a double-crop year, the total nutrients applied for both crops and the year's balances are listed on the second crop's line.

^c For N, Nutrients Applied minus Fertilizer Recs for indicated crop year. Also includes amount of residual N expected to become available that year from prior years' manure applications. For P₂O₅ and K₂O, Nutrients Applied minus Fertilizer Recs *through* the indicated crop year, with positive balances carried forward to subsequent years. Negative values indicate a potential need to apply additional nutrients.

^d Nutrients Applied minus amount removed by harvested portion of crop through the indicated year. Positive balances are carried forward to subsequent years.

^e Custom fertilizer recommendation.

^f Legume crop is assumed to utilize some or all of the supplied N.

^g Includes residual N expected to become available that year from prior years' manure applications.

3.8. Manure Inventory Annual Summary (Optional)

Manure Source	Plan Period	On Hand at Start of Period	Total Generated	Total Imported	Total Transferred In	Total Applied	Total Exported	Total Transferred Out	On Hand at End of Period	Units
Reception Pit 1	Jun '22 - May '23	0	0	0	0	0	0	0	0	gal
Reception Pit 2	Jun '22 - May '23	0	0	0	0	0	0	0	0	gal
Pond	Jun '22 - May '23	0	14,507,000	0	0	9,416,233	0	0	5,090,767	gal
Compost Yard	Jun '22 - May '23	0	22,876	0	0	15,208	0	0	7,668	tons
Dry Lots	Jun '22 - May '23	0	3,348	0	0	0	0	0	3,348	tons
All Sources (liquid)	Jun '22 - May '23	0	14,507,000	0	0	9,416,233	0	0	5,090,767	gal
All Sources (solid)	Jun '22 - May '23	0	26,224	0	0	15,208	0	0	11,016	tons

3.10. Plan Nutrient Balance (Manure-spreadable Area)

	N (lbs)	P ₂ O ₅ (lbs)	K ₂ O (lbs)
Total Manure Nutrients on Hand at Start of Plan ^a	0	0	0
Total Manure Nutrients Collected ^b	500,827	913,384	3,021,001
Total Manure Nutrients Imported ^c	0	0	0
Total Manure Nutrients Exported ^d	0	0	0
Total Manure Nutrients Gained/Lost in Transfer ^e	0	0	0
Total Manure Nutrients on Hand at End of Plan ^f	189,950	336,535	1,056,818
Total Manure Nutrients Applied ^g	310,986	576,794	960,478
Available Manure Nutrients Applied (Utilized by plan's crops) ^h	0	0	0
Available Manure Nutrients Applied (Not utilized by plan's crops) ⁱ	140,360	461,559	816,250
Commercial Fertilizer Nutrients Applied (Utilized by plan's crops) ^j	0	0	0
Commercial Fertilizer Nutrients Applied (Not utilized by plan's crops) ^k	0	0	0
Available Nutrients Applied (Manure and fertilizer; utilized by plan's crops) ^l	0	0	0
Nutrient Utilization Potential ^m	818,694	266,939	1,150,014
Nutrient Balance of Spreadable Acres ^{n p}	-818,694	-266,939	-1,150,014
Average Nutrient Balance per Spreadable Acre per Year ^{o p}	-304	-99	-427

a. Total manure nutrients present in storage at the beginning of the plan.

b. Total manure nutrients collected on the farm.

c. Total manure nutrients imported onto the farm.

d. Total manure nutrients exported from the farm to an external operation.

e. Net change in total manure nutrients due to transfers between storage units with differing analyses.

f. Total manure nutrients present in storage at the end of plan.

g. Total nutrients present in land-applied manure. These values do not account for losses due to rate, timing, and method of application.

h. Manure nutrients applied and available to crops in the plan. These values are based on the total manure nutrients applied after accounting for nutrient losses due to rate, timing, and method of application. Nutrients which will not be utilized by crops in the plan are excluded from these values.

i. Manure nutrients applied that will be utilized by crops outside the plan. This usually results from Fall nutrient applications at the end of the plan intended for crops in subsequent years.

j. Nutrients applied as commercial fertilizers and nitrates contained in irrigation water. Nutrients that will not be utilized by crops in the plan are excluded from these values.

k. Nutrients applied as commercial fertilizer which will be utilized by crops outside the plan.

l. Sum of available manure nutrients applied and commercial fertilizer nutrients applied.

m. Nutrient utilization potential of crops grown. For N the value is based on the N recommendation for non-legume crops and N uptake or other state-imposed limit for N application rates for legumes. P₂O₅ and K₂O values are based on fertilizer recommendations or crop removal (whichever is greater).

n. Available nutrients applied minus crop nutrient utilization potential. Negative values indicate additional nutrient utilization potential and positive values indicate over-application.

o. Average per acre-year nutrient balance. Values are calculated by dividing nutrient balance of spreadable acres by the number of spreadable acres in the plan and by the length of the plan in years. Negative values indicate additional nutrient utilization potential and positive values indicate over-application.

p. Non-trivial, positive values for N indicate that the plan was not properly developed. Negative values for N indicate additional nutrient utilization potential which may or may not be intentional. For example, plans that include legume crops often will not utilize the full N utilization potential for legume crops if manure can be applied to non-legume crops that require N for optimum yield. Positive values for P₂O₅ and/or K₂O do not necessarily indicate that the plan was developed improperly. For example, producers may be allowed to apply N-based application rates of manure to fields with low soil test P values or fields with a low potential P-loss risk based on the risk assessment tool used by the state. Negative values for P₂O₅ and K₂O indicate that planned applications to some fields are less than crop removal rates or fertilizer recommendations.

Plan Nutrient Balance (Non-manure-spreadable Area)

	N (lbs)	P ₂ O ₅ (lbs)	K ₂ O (lbs)
--	------------	--	---------------------------

	N (lbs)	P ₂ O ₅ (lbs)	K ₂ O (lbs)
Commercial Fertilizer Nutrients Applied ^a	0	0	0
Nutrient Utilization Potential ^b	0	2	0
Nutrient Balance of Non-spreadable Acres ^{c e}	0	-2	0
Average Nutrient Balance per Non-spreadable Acre per Year ^{d e}	0	-200	0

a. Nutrients applied as commercial fertilizers and nitrates contained in irrigation water.

b. Nutrient utilization potential of crops grown based on crop fertilizer recommendations.

c. Commercial fertilizer nutrients applied minus crop nutrient utilization potential. Negative values indicate additional nutrient utilization potential and positive values indicate over-application.

d. Average per acre-year nutrient balance. Values are calculated by dividing nutrient balance of non-spreadable acres by number of non-spreadable acres in plan and by the length of the plan in years. Negative values indicate additional nutrient utilization potential and positive values indicate over-application.

e. Non-trivial, positive values for N indicate that the plan was not properly developed. Negative values for N indicate additional nutrient utilization potential which may or may not be intentional. Positive values for P₂O₅ and/or K₂O do not necessarily indicate that the plan was developed improperly. For example, multiple year applications may have been planned during the final plan year(s) and these nutrients will not be utilized by crops in the current plan. Negative values for P₂O₅ and K₂O indicate that applications to some fields may have been delayed to allow the producer to apply the nutrients in accordance with their fertilization schedule.

Appendix C

Morgan Ranches, LLC

Sampling and Analysis Plan

Written March 2026

1. Compliance Monitoring Period - Monitoring shall continue for the duration of the permit term. Monitoring wells will be sampled on a semi-annual basis.
2. Water Level Measurement - In association with each well sampling event, water level measurements shall be obtained in each monitoring well prior to the removal of any water from the well casing. Measurements shall be taken with a YJingrui water level meter and shall be performed from the top of the well casing and recorded to the nearest 0.01 foot of each monitoring well.
3. Purging and Sampling of Well - The procedure is as follows:
 - a. Calculations are made by first determining the length of the water column by subtracting the depth to water from the total depth of the well. Once this value is known, the volume shall then be calculated using the formula for the volume of a cylinder: $\text{Volume (ft}^3\text{)} = \pi \times r^2 \times h$. The radius is then found by dividing the casing diameter (in inches) by two and then converting it to feet by dividing by 12. After calculating the volume in cubic feet, it shall be converted to gallons by multiplying by 7.48 gallons per cubic foot. Alternatively, the volume of water in a well casing can be estimated using published reference tables that provide the number of gallons per foot for standard casing diameters (see example 1).
 - b. Three times (3X) the casing volume is calculated.
 - c. We will remove three times the casing volume of water from the well. Geo Tech pump is the pump that will be used. Other pump options are being considered.
 - d. The appropriate sample bottles (supplied by SUU laboratory) are labeled with sample location, date, and time sampled. (See example 2 for Field Data Sheet that shall be filled out while sampling).
 - e. Latex gloves shall be used during sampling, and gloves shall be changed between sampling locations.
 - f. Field measurements are taken: temperature, specific conductance, and pH. Measurements shall be taken with the Oakton waterproof pocket tester several times while purging to verify that the water has reached a stable set of values during sampling. The water Quality meter shall be calibrated for pH and conductivity prior to use each day per the manufacturer's instructions.

- g. Samples are taken without contamination. Equipment shall be sanitized between each sampling by using a detergent wash and clean water rinse. If using the same pump, the hoses shall be changed between wells.
 - h. Samples are immediately placed on ice and transported to the Southern Utah University Laboratory on the same day they are collected.
 - i. The Chain of Custody form is completed for each sampling event. The form accompanies the samples to the laboratory, where it is signed upon receipt.
 - j. Laboratory analysis requested: (as per Permit Part 1.E.4.f.2)
 - Nitrate + Nitrite
 - Ammonia
 - Bicarbonate
 - Chloride
 - Total Dissolved Solids
4. Laboratory Approval - All water quality analyses must be conducted by a laboratory certified by the State of Utah to perform these analyses. Currently, water sample analyses are performed by the Southern Utah University Laboratory.
5. Analysis for nitrogen species shall be conducted at the same laboratory. Results of the treatment pond wastewater performance monitoring accompanied by any supporting raw data shall be submitted to the Division of Water Quality with the next Ground Water Quality Monitoring Report.
6. A Groundwater Monitoring Report shall be submitted to the Division of Water Quality in compliance with the schedule outlined in the permit (part 1.G). The Ground Water Monitoring Report shall include copies of the data tables, field log sheets, and the laboratory analytical report.

Example 1

geotech

Water Measure Tables

WEIGHT OF WATER

Cubic Feet of Water	= 62.428 pounds
Gallon	= 8.345 pounds
1 Ounce of Water	= 28.35 grams
Liter	= 2.205 pounds 1,000 grams
Cubic Meter	= 2204.5 pounds
1 ppm	= 1 lb. per million lbs.
1 ppm	= 8.34 lbs. per million gallons of water
1 ppm	= 1 milligram per liter of water

WATER VOLUME EQUIVALENTS

1 Quart	= 2 pints (pt) .946 ml
1 Gallon	= 4 quarts (qt) 3.785 liters (l) 3.785 liters 231 cubic inches
1 Liter	= 1000 milliliters (ml) .2642 gallons (gal) 61 cubic inches
1 Quart	= 946 ml
1 Cubic Foot	= 1728 cubic inches 7.48 gallons 28.317 liters
1 Cubic Yard	= 202 gallons
1 Cubic Meter	= 1000 liters 264.2 gallons

WELL CASING VOLUME PER FOOT OF DEPTH

Diameter Of Casing Or Hole (in.)	Gallons Per Foot Of Depth
1	0.041
1.5	0.092
2	0.163
2.5	0.255
3	0.367
4	0.653
4.5	0.826
5	1.020
5.5	1.234
6	1.469
7	2.000
8	2.611
9	3.305
10	4.080
11	4.937
12	5.875
14	8.000
16	10.44
18	13.22
20	16.32
22	19.75
24	23.50
26	27.58
28	32.00
30	36.72
32	41.78
34	47.16
36	52.88

PRESSURE

(Height x .434 lbs.)

100 psi	= 7.03 kg/cm ² 6.9 bars 689 kPa
1 bar	= 100 kPa 14.5 psi
1 gpm	= 378 liters/mm
10 cfm	= 283 liters/mm

VOLUME OF ANNULUS

(Cubic Feet/Linear Feet)

Gallons Per Linear Feet	Hole Dia. (inches)	2	4	6	8	10	12	14	16	20	24	30
0.16	2											
0.65	4	0.07	0.00									
1.02	5	0.11	0.05									
1.47	6	0.17	0.11	0.00								
2.00	7	0.25	0.18	0.07								
2.61	8	0.33	0.26	0.15	0.00							
3.30	9	0.42	0.35	0.25	0.09							
4.08	10	0.52	0.46	0.35	0.20	0.00						
5.87	12	0.76	0.70	0.59	0.44	0.24	0.00					
8.00	14	1.05	0.98	0.87	0.72	0.52	0.28	0.00				
10.44	16	1.37	1.31	1.20	1.05	0.85	0.61	0.33	0.00			
13.22	18	1.75	1.68	1.57	1.42	1.22	0.98	0.70	0.37			
16.32	20	2.16	2.09	1.99	1.83	1.64	1.40	1.11	0.79	0.00		
23.49	24	3.12	3.05	2.95	2.79	2.60	2.36	2.07	1.75	0.96	0.00	
36.73	30	4.89	4.82	4.71	4.56	4.36	4.12	3.84	3.51	2.73	1.77	0.00
52.88	36	7.05	6.98	6.87	6.72	6.52	6.28	6.00	5.67	4.89	3.93	2.16

Field Data Sheet

(Morgan Ranches, LLC)

Name: _____

Time: _____

Sampling Crew: 1. _____ 2. _____ 3. _____

Well No.	Depth to GW	Pump Type	Casing Volume	Purged Volume	Temp	S.C.	pH
					1. 2. 3	1. 2. 3.	1. 2. 3.
					1. 2. 3	1. 2. 3	1. 2. 3
					1. 2. 3	1. 2. 3	1. 2. 3
					1. 2. 3	1. 2. 3	1. 2. 3
					1. 2. 3	1. 2. 3	1. 2. 3
					1. 2. 3	1. 2. 3	1. 2. 3

Use Standard Operating Procedures for:

- Water Level Measurements
- pH, Conductivity, Temp
- Ground Water Purging

Laboratory Name: Southern Utah University Water Lab

TAT: ____ 24 hr ____ 2 day ____ 3 day ____ 5 day ____ Std

Documentation:

- Container labels
- Chain of Custody Record

Notes:

Example 3

Morgan Ranches Dairy - Permit UGW310001

Groundwater Sample Results

Yellow House - Upgradient Well

Sample Date	N+N	Nitrate	Nitrite	NH3	Bicarbonate	Chloride	TDS	pH	Temp	Spec. Cond.
5/19/2022	0.391	NA	NA	<0.5	130	<10	100	9.41	68.9 F	
1/29/2023	2.380	NA	NA	<0.5	424	>5	495	7.41	64.6 F	
11/12/2025	3.61	NA	NA	<0.5	NA	7.4	470.0	7.51	67.3 F	

Protection Levels

Mean + 2SD	7.40					20.31	583			
	6.71					20.3	533			

East Well

Sample Date	N+N	Nitrate	Nitrite	NH3	Bicarbonate	Chloride	TDS	pH	Temp	Spec. Cond.
5/19/2022	4.76	NA	NA	<0.5	389.00	12.60	410.00	7.05	66 F	
1/29/2023	0.72	NA	NA	<0.5	373.00	11.80	415.00	7.14	63 F	
11/12/2025	6.1	NA	NA	<0.5	NA	9.8	470	7.23	67 F	

Protection Levels

Mean + 2SD	7.40					20.31	583			
	6.71					20.3	533			

West Well

Sample Date	N+N	Nitrate	Nitrite	NH3	Bicarbonate	Chloride	TDS	pH	Temp	Spec. Cond.
5/19/2022	1.05	NA	NA	<0.5	459	14.2	430.0	6.81	67.5 F	
1/29/2023	0.55	NA	NA	<0.5	421	7.8	450.0	7.21	63.5 F	
11/12/2025	1.08	NA	NA	<0.5	NA	14.1	510	6.98	68 F	

Protection Levels

Mean + 2SD	7.40					20.31	583			
	6.71					20.3	533			

New Pond Well

Sample Date	N+N	Nitrate	Nitrite	NH3	Bicarbonate	Chloride	TDS	pH	Temp	Spec. Cond.
5/19/2022	3.6	NA	NA	<0.5	227.0	16.8	215.0	7.3	69.4 F	
1/29/2023	0.9	NA	NA	<0.5	170.0	16.8	255.0	7.4	62.6 F	
11/12/2025	3.13	NA	NA	<0.5	NA	20.0	285	7.36	67 F	

Protection Levels

Mean + 2SD	7.40					20.31	583			
	6.71					20.3	533			

Heifer Flat Well - Upgradient Well

Sample Date	N+N	Nitrate	Nitrite	NH3	Bicarbonate	Chloride	TDS	pH	Temp	Spec. Cond.
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Protection Levels

Mean + 2SD	7.40					20.31	583			
	6.71					20.3	533			

New Pond East Well

Sample Date	N+N	Nitrate	Nitrite	NH3	Bicarbonate	Chloride	TDS	pH	Temp	Spec. Cond.
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Protection Levels

Mean + 2SD	7.40					20.31	583			
	6.71					20.3	533			