



# COLORADO

Department of Public Health & Environment

Dedicated to protecting and improving the health and environment of the people of Colorado

## Guidance for Completing Nitrogen Agronomic Rate Analysis for Reclaimed Water Users and Treater

May 23, 2017

This document will be revised based on new information; specifically the nitrogen requirements values provided in Part IV. It is recommended that this document be accessed from the Water Quality Control Division’s web page to ensure that the most recent version is being used:

<https://www.colorado.gov/pacific/cdphe/wq-reclaimed-water-reuse-permits>

### Purpose

The Colorado Reclaimed Water Control Regulation 84 requires that Treater of reclaimed water provide in their Letter of Intent an analysis that demonstrates that reclaimed water used for irrigation will be applied at or below agronomic rates (Part 84.6(A)(4)). The agronomic rate is the rate of application of reclaimed water and associated nutrients necessary to satisfy the nutritional and watering requirements of the vegetation at a site, while strictly minimizing the amount of nutrients that run off to surface waters or which pass below the root zone of the plants. In addition, the regulation requires that Users of reclaimed water include in the User Plans to Comply information on practices to minimize the amount of applied water and associated pollutants that pass through the root zone of the plants to be irrigated (Part 84.9(A)(4)).

This guidance addresses the division’s recommended methodology to meet both requirements through inclusion of an agronomic rate analysis for nitrogen in a User Plans to Comply, the Treater’s submittal of that User Plan to Comply to the division, and the division’s amendment of the Letter of Intent to incorporate this information. Note that the Treater is responsible for reviewing the information to ensure it is accurate and to comply with the requirement of the Colorado Reclaimed Water Control Regulation, Part 84.6(A)(4), to implement a process to oversee the use of reclaimed water by users to ensure, to the maximum extent practicable, that Users and maintain compliance with the regulation.

Ultimate responsibility for ensuring agronomic uptake of nutrients and irrigation water is the responsibility of the User and the Treater.

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## I. How to Use this Document

This guidance is intended to be used in developing new, or when updating current, User Plans to Comply. The division is not requiring that current User Plans to Comply that contain an accurate agronomic rate analysis be revised to match the recommended methods and documentation in this document. For example, many User Plans to Comply already utilize the method for sites with 90% turf grass in the division's Water Quality Policy 21, Guidelines for the Determination of Agronomic Rate for Application of Reclaimed Water under Regulation 84. This method is the same as the one provided in Simplified Method 1 in this guidance. It is not necessary for a User Plan to Comply that has already been developed using Policy 21 to be updated to conform to the documentation required for Simplified Method 1. However, this guidance does provide a useful tool for reviewing current User Plans to Comply to ensure that the agronomic rate analysis has been completed correctly. For example, if a User Plan to Comply for a site with less than 90% turf grass has utilized the method in Policy 21 incorrectly, this guidance can be used to correct that plan and bring the use site back into compliance with the regulatory requirements by selecting a recommended method for which the site does qualify.

Prior to proceeding to the guidance on performing and documenting the required agronomic rate analysis, Users and Treateres should review Part II of this document regarding the actual application of reclaimed water in a manner that meets the agronomic rate requirements of the regulation.

Part III of this document provides the guidance on the division's recommended methodology to complete and document the agronomic rate analysis. For many sites, this can be done by using one of the Simplified Methods in Part III.A. Sites with conditions that do not fall under one of the simplified methods can either follow the guidance for performing a Calculated Method in Part III.B or can do a Site-Specific Methods as discussed in Part III.C.

- Simplified Method 1 (Part III.A.1): Sites with 90% or greater turf grass (based on Water Quality Policy 21)
- Simplified Method 2 (Part III.A.2): Sites with 100% drip irrigation.
- Simplified Method 3 (Part III.A.3): Sites with a combination of turf grass and 100% drip irrigated non-turf grass.
- Calculated Method (Part III.B): Sites where a two-step calculation method is used to demonstrate that the annual nitrogen loading is less than the agronomic need and sites with less than 90% turf grass for which all other areas utilize drip irrigation.
- Site-Specific Methods (Part III.C): Sites utilizing an alternative method.

Guidance for determining the nitrogen requirements for vegetation can be found in Part IV, including division accepted values for some of the more common plants used for landscaping in Colorado. This document also addresses, in Part V, when the agronomic rate analysis in the User Plan to Comply must be revised, and when these revisions are considered "significant" and must be submitted to the division for amendment of the Treater's Letter of Intent.

## II. Applying Reclaimed Water at an Agronomic Rate

This document is focused on the required agronomic rate analysis for nitrogen, but Treaters and Users are also responsible for designing, operating, and maintaining reclaimed water irrigation systems that prevents exceedance of the agronomic rate and the resulting potential for discharge of other pollutants. It is generally assumed that this requirement will be met by applying irrigation water at the agronomic rate for nitrogen, not adding unnecessary fertilizer, and not applying more water than the plants need. The ultimate responsibility for ensuring agronomic uptake of nutrients and irrigation water is the responsibility of the authorized parties.

### A. Fertilizer Application

The division is not requiring the agronomic rate analysis include calculations or documentations associated with additional nitrogen contributions from fertilizer. However, the addition of any fertilizers at the site will decrease the capacity of the vegetation to remove nitrogen from the reclaimed water and therefore decrease the agronomic need from the numbers discussed in this document. If fertilizers will be used at the site, the combined nitrogen contribution from the fertilizer and the reclaimed water application must not exceed the overall nitrogen agronomic need of the vegetation. To meet this requirement, Users must be aware of the difference between the nitrogen loading and the nitrogen agronomic need, and ensure that fertilizer is not applied in excess of the calculated nitrogen agronomic need. In many cases, especially for established vegetation, additional fertilizer application will not be necessary for reclaimed water irrigation sites. Treaters should share nutrient data with Users to help with this process.

### B. Operating and Maintaining the Irrigation System

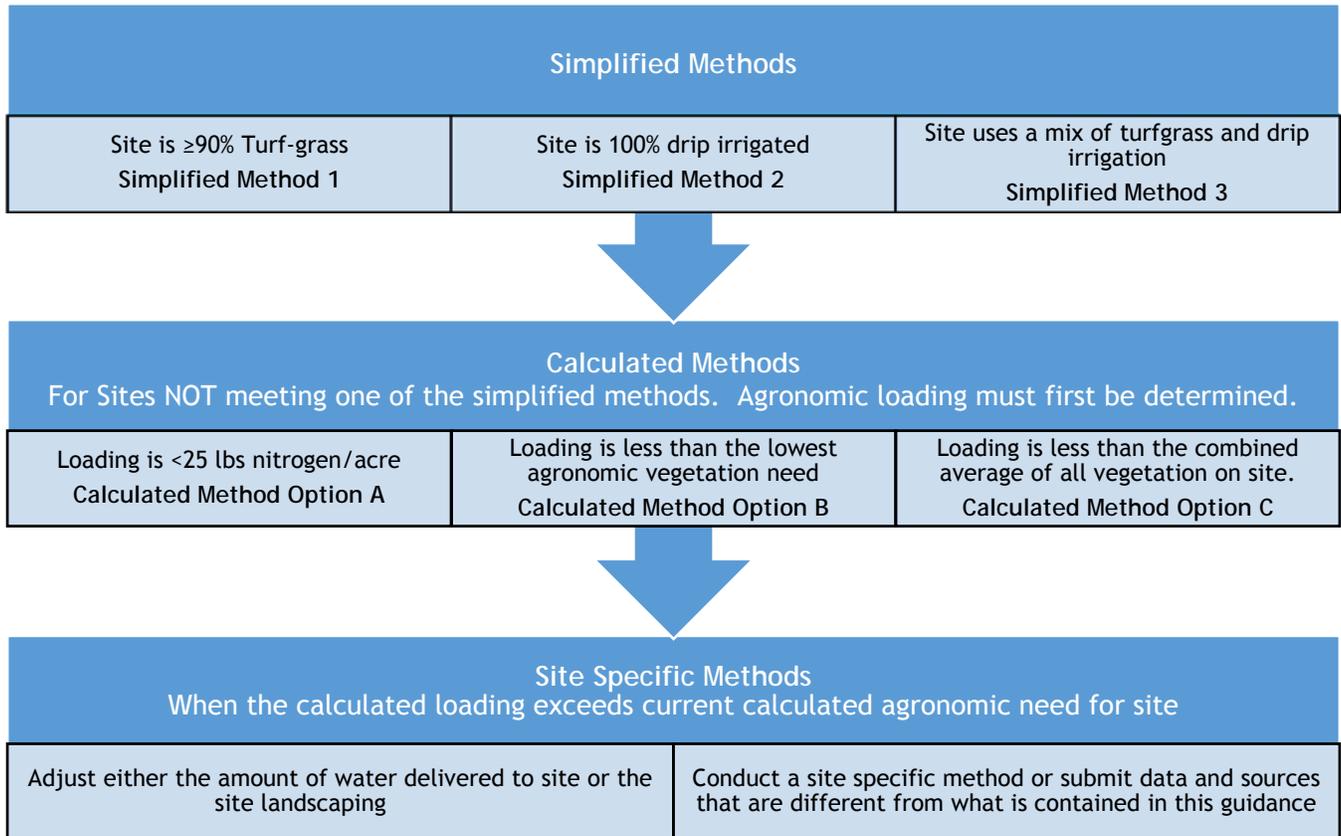
To comply with Regulation 84, a User must irrigate at an agronomic rate, and strictly minimize ponding or runoff. Irrigation systems and landscaping must be operated, inspected, and maintained in order to not irrigate in excess of vegetation needs, as this would be a discharge to groundwater outside the authority of Regulation 84. The operation must take into account that the actual application rate is appropriate for the specific vegetation being irrigated. For example, a two acre site might have an overall site-wide nitrogen need of 84 lbs/acre/year. However, if half of that site is landscaped with plants that only need 25 lbs/acre/year of nitrogen, the irrigation system will likely need to be designed and operated to apply less water, and therefore nitrogen, to that portions of the site with a lower agronomic need.

### C. Agronomic Rate Analysis for Phosphorus and Water

The recommended methods in this guidance only address the required agronomic rate analysis for nitrogen. This guidance does not include calculations for phosphorus or water. At this time, the division is not requiring all Letters of Intent and User Plans to Comply to include documentation of an agronomic rate analysis for constituents other than nitrogen.

**III. Performing and Documenting the Nitrogen Agronomic Rate Analysis**

The following guidance provides information on the qualifications, approach, and required information to document the nitrogen agronomic rate analysis. It is recommended that it first be reviewed if a site meets one of the Simplified Methods in Part III.A., and only using one of the Calculated Methods in Part III.B if necessary. The Site-Specific Methods as discussed in Part III.C. provides additional information for sites that do not qualify for any of these previously outlined methods, or if the preparer prefers not follow one of those division recommended methods.



**A. Simplified Nitrogen Agronomic Rate Analysis for Qualified Sites**

Sites that meet the conditions for one of the three simplified methods provided below do not need to perform calculations. Instead, the User Plan to Comply just needs to include the information identified below for the method used.

**1) Simplified Method 1: 90% or more turf grass**

Application to sites that are predominantly turf grass, as set forth in the division’s Water Quality Policy 21, Guidelines for the Determination of Agronomic Rate for Application of Reclaimed Water under Regulation 84.

Common examples: Parks and golf courses where irrigated landscaping is almost solely comprised of lawn areas with traditional turf grasses, such as bluegrass.

Qualifications: If 90% or more of the irrigated land at the site is turf grass, use an annual nitrogen agronomic need of 174 pounds per acre, per Water Quality Policy 21. To use this value, the

vegetation must be the traditional landscaping grass that has a high nitrogen requirement, such as blue or ryegrass. This value will not be applicable to most native and xeriscaping turf-forming grasses, including buffalo grass and fescues. These grasses have a much lower nitrogen requirement than 174 pounds per acre and one of the other methods discussed in this document must be used.

**Required Documentation:** If the site meets the qualifications above, then this simplified method can be used to demonstrate compliance where the annual nitrogen loading is lower than 174 lbs/acre. All currently authorized Treateders in Colorado have already provided information to demonstrate that, given the nitrogen concentrations in their reclaimed water, the loading will not exceed this amount. Therefore, the User Plan to Comply only has to include basic information to state this approach is being used. Include all of the following documentation in the User Plan to Comply, which will be submitted to the division by the Treater:

- i) A statement that Simplified Method 1 is being used for the required analysis.
- ii) A statement that 90% or more of the irrigated land at the site is turf grass.
- iii) A list of the varieties of turf grass present at the site that are included in the 90% or greater turf grass area.

2) Simplified Method 2: 100% drip irrigation

A drip irrigation system slowly applies the reclaimed water in a way that, with proper operation, limits the amount of delivered water to closely match the needs of the individual plants. The division assumes that properly managed drip irrigation will result in agronomic rates not being exceeded. A separate analysis/calculation is not needed for drip irrigation to demonstrate that water will be applied at the agronomic rate, since it is expected that this analysis will be a fundamental part of the proper design and operation of the system.

**Common examples:** Commercial, municipal, and multi-family properties where all irrigated landscaping uses drip irrigation; such as flower beds, trees located in sidewalk cutouts, and xeriscaping.

**Qualifications:** Sites where all reclaimed water irrigation occurs by drip irrigation do not need to provide agronomic calculations.

**Required Documentation:** Include all of the following documentation in the User Plan Comply, which will be submitted to the division by the Treater and also act as an amendment to the Letter of Intent:

- i) A statement that Simplified Method 2 is being used for the required analysis.
- ii) A statement that all irrigation at the site will be applied through drip irrigation calibrated to meet the agronomic need of the plants present.

3) Simplified Method 3: Combination of turf and 100% drip irrigated non-turf grass

This method is applicable to site with less than 90% turf grass, but where all non-turf grass areas use drip irrigation. For sites with drip irrigation and traditional irrigation of non-turf grass, refer to the discussion in Part III.B, below, under the header “Accounting for drip irrigation when using the Calculated Method.”

**Common examples:** Parks, commercial, municipal, and multi-family properties were irrigated landscaping includes both lawn areas with traditional turf grasses as well as flower beds and other landscaped areas provided with separate irrigation zones using drip irrigation.

**Qualifications:** To use this method, all irrigation must be either of turf grass or must use drip

irrigation. The turf grass portion of the site must meet the same qualification as in Simplified Method 1 (Part III.A.1), and the Drip Irrigation system portion of the site must meet the same qualification as Simplified Method 2 (Part III.A.2).

**Required Documentation:** Include the following documentation in the User Plan to Comply, which will also be submitted to the division by the Treater as an amendment to the Letter of Intent:

- i) A statement that Simplified Method 3 is being used for the required analysis.
- ii) A statement that all irrigated land at the site is either turf grass or uses drip irrigation.
- iii) A list of the varieties of turf grass present at the site.
- iv) A statement that all irrigation at the site of non-turf grass vegetation will be applied through drip irrigation calibrated to meet the agronomic need of the plants present.

- B. **Calculated Method:** Recommended Method for Nitrogen Agronomic Rate Analysis Calculations  
All sites that do not qualify for one of the Simplified Methods (Part III.A) must provide additional information on the analysis conducted. This section provides guidance on the division's recommended method and the required documentation. Alternatively, if the User or Treater chooses not to use this method, or the method does not demonstrate that the application will be at agronomic rate, a Site-Specific Method (Part III.C) must be used.

#### **Accounting for drip irrigation when using the Calculated Method**

As discussed for Simplified Method 2 (Part III.A.3), above, the division assumes that properly managed drip irrigation will result in agronomic rates not being exceeded. Therefore, there is an option to exclude drip irrigated areas from the analysis. In many cases this will not be necessary and therefore the division recommends first reviewing the Calculated Methods and simply including the drip irrigated area in the recommended calculations (i.e., not attempting to separate out these drip irrigated areas).

However, if the Calculated Method does not demonstrate that the agronomic rate is met when the drip irrigated portion of the site is included in the calculations, the drip irrigated areas may be excluded from the analysis by doing the following:

**Calculated Method Step 1:** When completing Step 1, the maximum expected annual volume of reclaimed water used for drip irrigation can be estimated and that volume excluded from the calculations.

**Calculated Method Step 2:** For Step 2, **Option C** (Part III.B(2)((iii))) must be used. When completing Option C, the land area and vegetation that receives the drip irrigation is excluded from the calculations. This is done that same way that non-irrigated area is excluded in the example provided in that part.

**Required Documentation:** The following information must be included in the Required Documentation, in addition to the information identified for Option C (Required Documentation items (a) through (f)).

- g) A statement that drip irrigated areas are being excluded
- h) The maximum expected annual volume of reclaimed water used for drip irrigation that was excluded from Step 1
- i) A statement of the total surface area (in square feet or acres) that will be drip irrigated that was excluded from Step 2.

There are two steps in completing the Calculated Method. Step 1 (subsection (1), below) is to calculate the nitrogen loading (how much nitrogen will be applied). Step 2 (subsection (2), below) is to calculate the nitrogen agronomic need of the vegetation present (how much nitrogen the vegetation requires). If the nitrogen loading in Step 1 is less than the nitrogen agronomic need in Step 2, then the application is expected to be below the agronomic rate.

1) Step 1: Annual Nitrogen Loading

Calculate the amount of nitrogen loading delivered to irrigated area of the site in a year.

$$\text{Annual Nitrogen Loading (lbs/acre)} = \frac{(\text{Total volume of reclaimed water in million gallons per year}) \times (\text{Average Annual TIN in mg/L}) \times 8.34}{(\text{Total area irrigated with reclaimed water})}$$

Total volume of reclaimed water in million gallons per year: use the maximum expected annual volume of reclaimed water used for irrigation

Average Annual TIN= the maximum expected concentration of total inorganic nitrogen (TIN) in the provided reclaimed water.

EXAMPLE: A 4 acre site receives 1,000,000 gallons of water per year that has 20 mg/L of TIN.  
Annual Nitrogen Loading = [1 million gallons X 20 mg/L X 8.34] ÷ (4 acres) =41.7 lbs/acre

In the above equation the multiplier of 8.34 is for conversion of units.

$$\frac{3.785 \text{ liters/gallon} * 1,000,000 \text{ gallons /million gallons}}{453592 \text{ milligrams/lb}}$$

1) Step 2: Annual Nitrogen Agronomic Need

There are three different options (A, B, or C) provided in this guidance for determining the nitrogen agronomic need of the irrigated area of the site. If none of these methods demonstrate that the loading is less than the need, then a Site-Specific Method (Part III.C) must be completed for the site.

i) Option A: Sites with annual nitrogen agronomic loading of 25 pounds per acre or less

Qualifications: If the annual nitrogen loading calculated in Step 1 is less than or equal to 25 lbs per acre, use a very conservative annual nitrogen agronomic need of 25 pounds per acre for the entire site. (Most landscape plants will uptake at least this much nitrogen. Please see Part IV.)

ii) Required Documentation: Include the following documentation in the User Plan Comply, which will be submitted to the division by the Treater and also act as an amendment to the Letter of Intent:

- a) A statement that the Calculated Method - Option A is being used for the required analysis.
- b) The loading calculations from Step 1 demonstrating an annual nitrogen loading of less than 25 lbs per acre
- c) A statement that the conservative agronomic rate of 25 pounds per acre was used for all vegetation types at the site.

iii) Option B: Site-wide nitrogen agronomic need based on lowest vegetation value

Qualification: If the annual nitrogen loading per acre calculated in Step 1 is less than the lowest annual nitrogen agronomic need per acre for a vegetation type present at the site, then the annual nitrogen agronomic for that vegetation type can be used for the entire site

To use this method, look up the nitrogen agronomic need for all of the vegetation types present and identify the lowest agronomic need. This value will be used for the entire site. See Part IV for guidance on determining nitrogen requirements for various vegetation types.

**EXAMPLE:** A site is two acres. It consists of vegetation with the following agronomic needs:

Blue turf grass: 174 lbs/acre

Buffalo grass: 88 lbs/acre

Brome grass: 40 lbs/acre

Ignore non-irrigated areas (0.25 acres sidewalks and playgrounds). The lowest agronomic need for brome grass (40 lbs/acre), so therefore that agronomic need is used for the entire 1.75 acres of irrigated area.

Site Annual Agronomic Need = 40 lbs/acre

If the nitrogen loading for the site calculated in Step 1 is less than 40 lbs/acre then this option can be used.

**Required Documentation:** Include the following documentation in the User Plan Comply, which will be submitted to the division by the Treater and also act as an amendment to the Letter of Intent:

- a) A statement that Calculated Method - Option B is being used for the required analysis.
- b) The loading calculations from Step 1, including the total nitrogen loading.
- c) A list of the vegetation types present at the site, the nitrogen requirement in lbs/acre for each type, and the source of the values provided (see Part IV, below).
- d) A statement that a conservative site-wide nitrogen agronomic need was used based on the lowest annual nitrogen requirements for all vegetation types.

iv) Option C: Aggregated nitrogen agronomic need

If neither of the more conservative options, Option A or Option B, will demonstrate compliance with the agronomic rate, an analysis can be completed that separates the site into different areas.

**Qualification:** Take the vegetated area and separate out into individual vegetation types. Identify the nitrogen agronomic need for vegetation type in each area. See Part IV for guidance of determining nitrogen requirements for various vegetation types. The site-wide nitrogen agronomic need is then calculated by determining the total pounds of annual nitrogen used by all areas and dividing this number by the total irrigated acreage. If the annual nitrogen loading calculated in Step 1 is less than the site-wide annual nitrogen agronomic need, then the User can use this method to demonstrate compliance.

It is not necessary for each area to have a single type of vegetation. A user can combine multiple vegetation types in an area and use the lowest agronomic need value of a vegetation present for that area, using the approach in Option B, or use a conservative value for the area of 25 lbs per acre using the approach in Option A.

**EXAMPLE:** A site is two acres. There are 0.25 acres of non-irrigated land consisting of sidewalks and playgrounds that is ignored in the calculations. The remaining 1.75 acres of irrigated area consists of 1 acre blue turf grass, 0.25 acres buffalo grass, and 0.5 acres assorted flower beds and shrubs.

First the agronomic need that will be used for the vegetation types is determined:

Blue turf grass: 174 lbs/acre (based on Table 1 in Part IV)

Buffalo grass: 88 lbs/acre (based on Table 1 in Part IV)

Assorted flower beds and shrubs: 25 lbs/acre (using a conservative value based on Option B approach)

The annual agronomic need is then calculated for each area:

Area 1: 1 acre turf grass X 174 lbs/acre = 174 lbs

Area 2: 0.25 acres buffalo grass X 88 lbs/acre = 22 lbs

Area 3: 0.5 acres assorted flower beds and shrubs X 25 lbs/acre = 12.5 lbs

The site-wide annual nitrogen agronomic need is then calculated by adding the need for each area and dividing by the total irrigated area:

$$\begin{aligned}\text{Site Annual Agronomic Need} &= (174 \text{ lbs} + 88 \text{ lbs} + 12.5 \text{ lbs}) \div 1.75 \text{ total irrigate acres} \\ &= 119 \text{ lbs/acre}\end{aligned}$$

If the nitrogen loading for the site calculated in Step 1 is less than 119 lbs/acre, then this option can be used.

**Required Documentation:** Include the following documentation in the User Plan Comply, which will be submitted to the division by the Treater and also act as an amendment to the Letter of Intent:

- a) A statement that Calculated Method - Option C is being used for the required analysis.
- b) The loading calculations from Step 1, including the total nitrogen loading.
- c) A list of the vegetation types present, the nitrogen agronomic need in lbs/acre for each type, and the source of the nitrogen agronomic need values used (see Part IV, below).
- d) The acres for each vegetation type.
- e) The agronomic need calculation completed in accordance with this Option C, including the annual nitrogen need.
- f) A statement that the annual site-wide nitrogen load documented in (b) is less than the annual site-wide nitrogen need documented in (e).

### C. Site Specific Methods

If none of the Simplified Methods (Part III.A) nor the Calculated Method (Part III.B), above, show compliance with the agronomic rate requirements (i.e., that the nitrogen loading is less than the nitrogen agronomic need), then it may be possible to make relatively minor changes to a site to still qualify for one of these methods. For example, the site may reduce the amount of water applied, increase the reliance on drip irrigation, or adjust the vegetation type. However, a site not wishing to make changes, or for which one of those method still does not demonstrate compliance, will need to perform a site-specific analysis for division review.

Considerations for performing a site specific analysis, and/or making modifications to a site, include:

- 1) Consult a certified agronomist to design a landscape that he/she will verify meets the nitrogen uptake requirements of the site.

- 2) Adjust the anticipated volume delivered, which is used in the Calculated Method's loading calculation (Step 1), to more closely reflect the actual amount of water delivered to the site. A reduced volume of reclaimed water will decrease the nitrogen loading of the site. The amount of water that is actually delivered is often a maximum rather than an actual number. Past irrigation records or records of similar sites in similar areas could be helpful.
- 3) Explore changes to watering schedules and systems to ensure the most efficient delivery of water and lessen the amount of water and nutrients delivered. This could involve water-saving sprinkler heads, converting to drip irrigation, or installing weather control equipment.
- 4) For sites that have not yet established landscape vegetation, considering adding areas with either higher or more easily determined agronomic rates to increase nitrogen uptake for a site. For instance, buffalo grass, at 80 lbs/acre, which has a much higher nitrogen uptake than a default number of 25 lbs/acre for undetermined vegetation that may be used for sparsely vegetated areas.
- 5) For sites that have established landscape, consider reseeding disturbed or denuded areas with vegetation with higher agronomic requirements for nitrogen.

**Required Documentation:** The information documented will vary with the analysis method used and must be adequate for the division to be able to determine if the irrigation at the site will be below agronomic rates. At a minimum, the following documentation must be included in the User Plan Comply, which will be submitted to the division by the Treater and also act as an amendment to the Letter of Intent:

- i) A statement that a Site Specific Method is being used for the required analysis.
- ii) Information that identifies the irrigation method and the expected loading of nitrogen from reclaimed water.
- iii) Information that identifies the vegetation that will be present at the site
- iv) Information demonstrates that the nitrogen loading will not exceed the agronomic need of the vegetation present at the site.

**IV. Determining Nitrogen Requirements for Vegetation**

The division has compiled Table 1 of some of the more common plants used for landscaping. As further agronomic data is provided to the division by Treaters and Users, the division will add data to the Table 1: Nitrogen Agronomic Need for Common Vegetation Types, in Part IV.

Additional acceptable sources of agronomic rate information include:

- Information available from Colorado State University Extension or a similar academic agronomic program
- Information provided by seed provider or manufacturer on nutrient requirements.
- Information submitted by a certified agronomist

The division is recommending a conservative nitrogen requirement of 25 lbs/acre can be used as a default for any landscape vegetation. This number is the CSU Extension agronomic rate for Colorado native grasses<sup>1</sup>. Since native grasses grow without additional cultivation, the division is extrapolating that any vegetation in Colorado would require at least this much nitrogen to maintain growth. This number can be applied to any contiguous vegetation. This number cannot be used for irrigation that would occur on areas with no vegetation present, such as spray irrigation across an area with a rock garden with only a few specimen plants. These areas would require drip irrigation or similar approaches to ensure that irrigation was occurring only to the vegetated locations. In many cases, using this conservative value will be adequate to demonstrate compliance with the agronomic rate analysis requirements. However, the user may alternatively identify a source and provide a more specific agronomic rate for any vegetation not listed in Table 1.

**TABLE 1: Nitrogen Agronomic Need for Common Vegetation Types**

Vegetation	Annual Nitrogen Agronomic Need (lbs/acre)	Source	Notes
Colorado Native Grasses	25		See discussion above regarding application for other vegetation types
Buffalo grass, Blue Grama, Bermudagrass	80	CSU Extension “Lawn Grass 7.202” by T. Koski and V. Skinner	
Tall or Fine Fescue	108	CSU Extension “Lawn Grass 7.202” by T. Koski and V. Skinner	
Turf Grass (e.g., bluegrass, ryegrass)	174	Water Quality Policy 21, Guidelines for the Determination of Agronomic Rate for Application of Reclaimed Water under Regulation 84.	To use this value, the vegetation must be the traditional landscaping grass that has a high nitrogen requirement, such as blue or ryegrass. This value will not be applicable to most native and xeriscaping turf-forming grasses, including buffalo grass and fescues.

If not provided, the agronomic need of grass seed mixtures can be determined similarly to determining the needs of the site, for instance using the 25 lb/acre default, or using an average based on the percentages of all seeds in the mix.

It is not necessary to use different agronomic need values for vegetation while it is being established. The division expects the agronomic need for establishing sod or other vegetation to be higher during the initial stages of landscaping. A notation in maintenance records or landscape plan should indicate how long the vegetation took to become fully established.

#### V. Revision to agronomic rate analyses

##### A. When does an Agronomic Rate Analysis need to be revised?

The User will need to update their agronomic rate analysis if there are changes to either the agronomic loading or agronomic need for the site. This could be due to changes in landscaping, watering procedures, or in the reclaimed water treatment. This update must be documented in the current version of the User Plan to Comply.

##### B. When does a revision to the agronomic rate analysis require a modification request be submitted to the division?

As discussed above, the User needs to document changes to agronomic rate analysis and maintain a User Plan to Comply that reflects current conditions to allow for proper operation, maintenance, and compliance evaluations. The Treater only needs to submit the changes to the division as a modification request for the Letter of Intent if one of the following conditions is met:

- 1) The method used to perform the nitrogen agronomic rate analysis has changed. This includes the following conditions for which the original analysis would no longer demonstrate compliance with the regulation and therefore the analysis must be revised using a different method
  - i) For sites using one of the Simplified Methods (Part III.A) : The site no longer meets the qualifications for the method used; or
  - ii) For sites using the Calculated Method (Part III.B): The loading from Step 1 becomes greater than, or equal to, the nitrogen agronomic need from Step 2.
- 2) For sites using the Calculated Method (Part III.B) :
  - i) The nitrogen loading from Step 1 has increased by more than 50%; or
  - ii) The nitrogen agronomic need for the site from Step 2 has decreased by more than 50%
- 3) The submittal is specifically required by the Water Quality Control Division, such as might occur at a site inspection.

Revisions to a User Plan to comply that meets these criteria require that the Treater submit a Modification Request for their Letter of Intent to the division. The Modification Request form can be found at [ColoradoWaterPermits.com](http://ColoradoWaterPermits.com).

Reclaimed water Users should inquire with the Treater regarding additional requirements for submittal and approval of changes to the User Plan to Comply. The Treater may have different requirements to submit information to the division.

## Appendix A: Glossary

Agronomic need -The minimum amount of nutrients required by vegetation to maintain healthy growth.

Agronomic rate -The amount of nutrients delivered to an irrigation site based on maximum water allocations for that site

Drip irrigation - Localized and minimized irrigation designed to target small areas of vegetation. This could either be sub-surface or above ground irrigation.

Letter of Intent-Application completed by reclaimed water Treater to outline control measures and practices that will ensure compliance with Regulation 84 during the treatment, distribution, and oversight of a reclaimed water program.

Treater - Entity responsible for treatment, distribution, and oversight of the use of reclaimed water

User-Entity in control of and using reclaimed water

User Plan to Comply- Documentation completed by User to outline control measures and practices that will ensure compliance with Regulation 84 while using reclaimed water. The User Plan to Comply is submitted to the Treater in order for the Treater to update their Letter of Intent