

**Recommendations for Variance for Significant Use of Water for
Dust Control for Horse Corrals and Animal Exercising Arenas,
Methods of Calculation, and Supporting Data Requirements**

WUES-DWR-2021-10

**A Report to the State Water Resources Control Board
Prepared Pursuant to California Water Code
Section 10609.14**

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California Department of Water Resources
Water Use Efficiency Branch

Note: This report is part of the package of reports developed by the California Department of Water Resources to meet the requirements of Senate Bill 606 and Assembly Bill 1668 of 2018 for urban water use efficiency.

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Abbreviations and Acronyms

2018 Legislation	2018 Legislation on Water Conservation and Drought Planning (Senate Bill 606 [Hertzberg] and Assembly Bill 1668 [Friedman], as amended)
CCR	California Code of Regulations
CII	commercial, industrial, and institutional
CII-DIMWUS	Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard
CIMIS	California Irrigation Management Information System
DIM	dedicated irrigation meter
DWR	California Department of Water Resources
GIS	geographic information system
IRWUS	Indoor Residential Water Use Efficiency Standard
LAM	landscape area measurement
OR_LAM	Outdoor Residential Landscape Area Measurement
ORWUS	Outdoor Residential Water Use Efficiency Standard
Recommendation Package	Urban Water Use Efficiency Recommendation Package
SB	Senate Bill
SLA	Special Landscape Area
State	State of California
State Water Board	State Water Resources Control Board
UWUO	urban water use objective
UWUO_SB	urban water use objective without any variances
WC	California Water Code
WLS	Water Loss Standard

Executive Summary

The California State Legislature passed the 2018 Legislation on Water Conservation and Drought Planning (Senate Bill 606 [Hertzberg] and Assembly Bill 1668 [Friedman], as amended; hereinafter referred to as the “2018 Legislation”), which included provisions for advancing urban water use efficiency through developing and implementing various water use efficiency standards, variances, and performance measures. This report provides the purpose and details of review and development, and the recommendations for a variance for “significant use of water for soil compaction and dust control,” consistent with the directives under California Water Code (WC) Section 10609.14.

WC Section 10609.14 directs the California Department of Water Resources (DWR), in coordination with the State Water Resources Control Board (State Water Board), to conduct necessary studies to recommend appropriate variances for unique uses of water that could have a material effect on an urban retail water supplier’s urban water use objective (UWUO). A variance for “significant use of water for soil compaction and dust control” is one of the eight potential variances identified in the legislation. For each variance, the recommendations include a threshold of significance and guidelines and methodologies for calculating efficient water use allowable under the variance.

DWR conducted topic-specific research and investigations to answer three critical questions prior to developing recommendations for a variance for significant use of water for soil compaction and dust control:

1. Is this water use outside of the scope of the UWUO? In other words, is this water for non-urban use or part of the commercial, industrial, and institutional (CII) water uses other than irrigating landscape with dedicated irrigation meters? If so, the water use is either not subject to the provisions of urban water use efficiency in the 2018 Legislation or excluded from the UWUO and, thus, there is no need for a variance.
2. Is this water use unique within the context of the UWUO? If no, it is not eligible. If yes, the water use is potentially eligible for a variance, and the following two questions need to be answered “yes” to be determined eligible:
 - a. Is this water use shared by only some urban retail water suppliers or needed in unusual circumstances, but not commonly used enough to be included in one of the standards?
 - b. Is this water use excluded from all urban water use efficiency standards and other variances?

3. Could this unique water use have a material effect on the UWUO of some urban retail water suppliers? If so, the water use is warranted for variance development.

After confirming the above in collaboration with stakeholders and the State Water Board, DWR proceeded with variance development with a clarified scope, whereby significant use of water for soil compaction and dust control can be appropriately estimated and incorporated in an urban retail water supplier's UWUO.

Consistent with the legislative directive, DWR used a public process involving a diverse group of stakeholders in the review and development of the variance for significant use of water for soil compaction and dust control. The Water Use Studies Working Group and the Standards, Methods, and Performance Measures Working Group that DWR established to assist in implementing the 2018 Legislation were the primary stakeholders involved in the variance development process. Additional stakeholders included State of California agencies, cities, counties, urban retail water suppliers, environmental organizations, and other interested parties. Working group members and stakeholders were provided with many opportunities to comment on and inform the appropriateness of recommending a variance for significant use of water for soil compaction and dust control. Additionally, they were able to comment on, and inform the development and refinements for, the applicable scope, specifications, and methodologies for estimating the efficient water use volume for such a purpose. The resource requirements for administering the variance and associated supporting data requirements, accessibility, and quality were considered in the evaluation.

Through investigation of available data and stakeholder input, DWR concluded that "significant use of water for soil compaction and dust control" would not clearly reflect potential unique uses under this variance. Water use for soil compaction is mainly for construction activities on a commercial scale, which should be covered under CII water use and, hence, excluded from the UWUO. Moreover, horse corrals and animal exercising arenas, as well as other non-vegetated exercising and riding areas in residential parcels, may require significant water use to control the large amount of dust they may create. As such, to cover all potential unique uses of water for dust control in residential parcels, the variance was refined to "significant use of water for dust control for horse corrals and animal exercising arenas."

Furthermore, DWR concluded that establishing a variance to accommodate efficient water use for "significant use of water for dust control for horse corrals and animal exercising arenas" within residential parcels is appropriate, as that water use is unique, excluded from other standards and variances, and can have a material effect on an urban retail water supplier's UWUO. In this recommended variance, only water use for dust control in residential parcels is covered; water use for soil compaction and dust control for CII purposes, even for short-term use, is covered under other standards or is not part of the UWUO compliance determination. Implementation considerations,

including the need for technical assistance, are also included with the recommendations.

The recommendations for a variance for significant use of water for dust control for horse corrals and animal exercising arenas is part of the *Recommendations for Urban Water Use Efficiency Standards, Variances, Performance Measures, and Annual Water Use Reporting* (WUES-DWR-2021-01A). The recommendations were prepared per requirements of the 2018 Legislation and are to be transmitted to the State Water Board for adoption.

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1.0 Introduction

Senate Bill (SB) 606 (Hertzberg) and Assembly Bill 1668 (Friedman) of 2018, as amended (hereinafter referred to as the “2018 Legislation”), established a new foundation for long-term improvements in water conservation and drought planning to adapt to climate change and the resulting longer and more intense droughts in the State of California (State). These two bills provide expanded and new authorities and requirements to enable permanent changes and actions for those purposes, thereby improving the State’s water future for generations to come. Details of these provisions are summarized in *Making Water Conservation a California Way of Life: Primer of 2018 Legislation on Water Conservation and Drought Planning, Senate Bill 606 (Hertzberg) and Assembly Bill 1668 (Friedman)* (DWR and State Water Board, 2018).

1.1 New Approach to Urban Water Use Efficiency

Among other things, the 2018 Legislation contains provisions for advancing urban water use efficiency through developing and implementing various water use efficiency standards, variances, and performance measures per California Water Code (WC) Section 10609. The new water conservation framework is different than SB X7-7, which was established in 2009. The focus of SB X7-7 was to reduce statewide urban water use by 20 percent in 2020 compared to baseline calculated in 2010. The 2018 Legislation requires a bottom-up estimate from urban retail water suppliers of the urban water use objective (UWUO) based on the aggregated efficient water use volume by considering four urban water use efficiency standards and appropriate variances. The four standards are:

- Indoor Residential Water Use Efficiency Standard (IRWUS).
- Outdoor Residential Water Use Efficiency Standard (ORWUS).
- Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard (CII-DIMWUS).
- Water Loss Standard (WLS).

Commercial, industrial, and institutional (CII) water use not associated with dedicated irrigation meters (DIM) (or equivalent technologies) for outdoor irrigation of landscape areas is excluded from the UWUO.

Each of the procedural requirements to formalize these four standards for implementation is different. The 2018 Legislation includes a default progressively reduced IRWUS (WC Section 10609.4(a)). In November 2021, in collaboration with the

State Water Resources Control Board (State Water Board), the California Department of Water Resources (DWR) submitted the joint recommendations for IRWUS to the California State Legislature for further consideration per WC Section 10609.4(b). Separately, the State Water Board is currently conducting a rulemaking process to adopt the proposed WLS, which was originally authorized by SB 555 of 2015. For ORWUS and CII-DIMWUS, the 2018 Legislation requires DWR, in coordination with the State Water Board, to conduct necessary studies and investigations and develop recommendations to the State Water Board by October 1, 2021 (WC Sections 10609.6 and 10609.8).

Another major difference between the SB X7-7 requirements and those of the 2018 Legislation is that the anticipated outcome was measured on a statewide level per SB X7-7 and on an individual urban retail water supplier level per the 2018 Legislation. Recognizing the diversity of water use to support local economic, social, and environmental needs and varying climate conditions in the State, the 2018 Legislation requires DWR, in coordination with the State Water Board, to conduct necessary studies and investigations. It also requires DWR to develop recommendations for adoption by the State Water Board by October 1, 2021, for appropriate variances for unique uses that can have a material effect on an urban retail water supplier's UWUO and the corresponding thresholds of significance (WC Section 10609.14). In this context, DWR interpreted that a material effect means that this unique water use, although used in an efficient manner, could unfairly jeopardize an urban retail water supplier's ability to meet the UWUO when not explicitly addressed and calculated separately from the volume based on the four water use efficiency standards.

As a supporting recommendation, the 2018 Legislation requires DWR to develop accompanying guidelines and methodologies for calculating the UWUO (WC Section 10609.16) and provide the recommendation to the State Water Board for adoption, along with DWR's recommendations on ORWUS, CII-DIMWUS, and appropriate variances by June 30, 2022 (WC Section 10609.2). The 2018 Legislation further requires DWR and the State Water Board to solicit broad public participation throughout the development and adoption processes (WC Section 10609(b)(3)).

1.2 Appropriate Variances

Per the 2018 Legislation, appropriate variances **may include, but are not limited to**, the following eight identified in WC Section 10609.14(b):

1. Significant use of evaporative coolers.
2. Significant populations of horses and other livestock.
3. Significant fluctuations in seasonal populations.

4. Significant landscaped areas irrigated with recycled water having high levels of total dissolved solids.
5. Significant use of water for soil compaction and dust control.
6. Significant use of water to supplement ponds and lakes to sustain wildlife.
7. Significant use of water to irrigate vegetation for fire protection.
8. Significant use of water for commercial or noncommercial agricultural use.

The eight identified potential variances were subject to further review to affirm the unique use and the likelihood of a material effect on an urban retail water supplier's UWUO before DWR engaged in additional efforts in variance development. Through stakeholder engagement, additional potential variances could also be identified. Additional potential variances may emerge in the future due to changes in water use to meet economic, social, and environmental needs.

When a recommended variance is adopted by the State Water Board, the variance becomes available to urban retail water suppliers. However, before a variance can be included in an urban retail water supplier's UWUO, the urban retail water supplier is required to request, with supporting data, and receive approval from the State Water Board (WC Section 10609.14(d)). This procedural requirement is urban retail water supplier-specific and variance-specific. The State Water Board is required to post on its website a list of approved variances, the specific variances approved for each urban retail water supplier, and the data requirement supporting the approval of each variance for individual urban retail water suppliers (WC Section 10609.14(e)).

Refinements to the California Water Code List

Based on research and stakeholder input, DWR recognized that development of a variance for "significant use of water for soil compaction and dust control" would not clearly reflect potential unique uses under this variance. Water use for soil compaction and dust control for CII purposes is either covered under other water use efficiency standards or not part of the UWUO compliance determination. Water use for dust control for horse corrals and animal exercising arenas within residential parcels is excluded from water use efficiency standards and other variances; however, this water use may be included in the UWUO and could warrant a variance, if there is a material effect on an urban retail water supplier's UWUO. As such, DWR refined the focus of this variance and renamed it to "significant use of water for dust control for horse corrals and animal exercising arenas."

1.3 Purpose of the Report

Per legislative requirements, DWR conducted studies and investigations to determine if the legislatively identified potential variances and others suggested by stakeholders should be developed and recommended for adoption. This report is one of the variance-specific reports that focuses on the potential variance for significant use of water for dust control for horse corrals and animal exercising arenas, a refined focus from “significant use of water for soil compaction and dust control” identified in the legislation.

Water Use for Dust Control for Horse Corrals and Animal Exercising Arenas

Horse corrals and animal exercising arenas, including other non-vegetated exercising and riding areas, can create dust when used for equestrian activities. Local ordinances and regulations require proper dust control in residential areas; otherwise, a fine could be levied if a complaint is made. In residential areas, water is primarily used to control dust in horse corrals and animal exercising arenas by using automated sprinklers, a water truck or tank, or a spigot and hose. Regulating dust is also important for horse health. Watering a corral or arena in a residential area can use large amounts of water, impacting an urban retail water supplier’s UWUO. Therefore, a properly defined scope and calculation methodology for this water use is critically important for the assessment of efficient water use relative to this variance.

Relationship to California Department of Water Resources’ Urban Water Use Efficiency Recommendation Package

DWR has completed a significant body of work to meet the requirements of the 2018 Legislation and provide recommendations on different topics to the State Water Board for adoption. To streamline document development and recognize the inherent interrelationship among different topics and the need for overall consistency, DWR organized the various reports in an Urban Water Use Efficiency Recommendation Package (Recommendation Package) that allows mutual referencing and incorporates content by reference. All reports in this Recommendation Package are given a serial number in the form of “WUES-DWR-2021-xx.” For each report, Appendix A includes the list of documents within the Recommendation Package that are incorporated by reference.

Specifically, this report, *Recommendations for Variance for Significant Use of Water for Dust Control for Horse Corrals and Animal Exercising Arenas, Methods of Calculation, and Supporting Data Requirements* (WUES-DWR-2021-10), provides the detailed documentation for the review and subsequent variance development for specifications, guidelines, and methodologies for the potential variance for significant use of water for dust control for horse corrals and animal exercising arenas. The recommendations for this variance were summarized in the report, *Summary of Recommendations for Variances* (WUES-DWR-2021-04), and the corresponding guidelines and

methodologies for calculating efficient water use for this variance were summarized in *Recommendations for Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B). The additional context, variance development process and approach, evaluation of options, and stakeholder input included in this document are incorporated by reference. Key terms and their definitions used in this report, along with abbreviations and acronyms, are included in *Urban Water Use Efficiency Recommendation Package: Glossary and Abbreviations and Acronyms* (WUES-DWR-2021-21).

Effects on Existing Law and Regulations

DWR developed this variance per legislative directive. The resulting variance, when adopted, does not set, rescind, or modify existing or future requirements or quantity limitations for water use for dust control for horse corrals and animal exercising arenas. Therefore, this variance will only be applicable where use of water for these functions is allowed per regulations and requirements.

1.4 Report Organization

This report is organized into six sections:

- **Section 1 – Introduction** provides the background and purpose of this document.
- **Section 2 – Scope Definition** provides the process and rationales used in confirming the scope for this potential variance that reflects unique water use with potential material effects on an urban retail water supplier's UWUO.
- **Section 3 – Approach to Variance Design** describes the technical approach and stakeholder engagement that DWR conducted to support the variance development. Options for different coverages and methods for calculating efficient water use for this variance are discussed and evaluated for technical feasibility, reasonableness, and ability to be implemented.
- **Section 4 – Recommendations** provides DWR's recommendations on this variance, including the specifications, guidelines, and methodologies for calculating efficient water use for this variance and the supporting data and information requirements.
- **Section 5 – Glossary** provides a list of key terms and their definitions used in this document.
- **Section 6 – References** provides a list of references used in this document.

This report includes two appendices:

- **Appendix A** provides the list of documents in DWR's Recommendation Package that are incorporated by reference.
- **Appendix B** provides a template for calculating the efficient water use for dust control for horse corrals and animal exercising arenas. This template is provided for illustrative purposes and is subject to revision after the State Water Board's adoption.

2.0 Scope Definition

In accordance with the legislative directive, DWR conducted studies and investigations to develop the information necessary to determine if a variance for significant use of water for dust control for horse corrals and animal exercising arenas was needed and, if so, to support any recommendation made to the State Water Board on the guidelines and methodologies pertaining to the calculation of an urban retail water supplier's UWUO.

The goals of these studies and investigations were to achieve the following:

- Confirm whether significant use of water for dust control for horse corrals and animal exercising arenas is a unique use that could have a material effect on the UWUO of urban retail water suppliers.
- Inform the recommendations for variance specifications, including the threshold of significance.
- Provide the basis for developing guidelines and methodologies for urban retail water suppliers to use in calculating the aggregated efficient water use allowable under this variance.

The first study goal provided a clarified scope for variance development, which was to be accomplished by addressing the remaining two study goals. The process and findings for scope definition are provided in Section 2. Section 3 contains additional variance development and option evaluation to inform the recommendations in Section 4.

2.1 Interpretation of Horse Corrals and Animal Exercising Arenas Nexus

The legislative directive emphasizes the use of water for soil compaction and dust control. Water used for soil compaction is mainly for specific construction activities if conditions warrant and is, therefore, typically categorized under CII water use. Water is used for dust control purposes throughout the State for both commercial and private applications, and there are many circumstances for which dust control is required, as discussed below.

Construction sites are subject to regulatory requirements for dust control; sometimes, for convenience, using nearby residential meters are allowed by local agencies, although it may create confusion in water use accounting under the new regulatory framework established by the 2018 Legislation. In commercial operations, water is used for dust control in facilities such as commercial horse boarding or show facilities,

commercial horse arenas, and horse racetracks. Additionally, owners of vacant lots are required to control dust when it becomes a nuisance (e.g., when a complaint is made).

Air quality management districts and air quality control districts each have dust control regulations that typically focus on construction or other CII uses (versus residential uses, unless a complaint is received). There also may be other local ordinances, regulations, and laws applicable to the use of water for dust control.

In addition to the above examples, based on stakeholder input, DWR also considered water use for soil stabilization, such as vegetation irrigation for adequate stabilization of hillsides in the process of variance development.

In certain areas of the State, water is used for dust control for horse corrals, animal exercising arenas, paddocks, and other non-vegetated exercising and riding areas (hereafter referred to as “horse corrals and animal exercising arenas”). Residential dust control is primarily associated with control of dust in horse corrals and animal exercising arenas; and these corrals and arenas are more prevalent in rural residential areas than urban areas. Horse corrals and animal exercising arenas can create a variable amount of dust in a residential area and, as such, are watered for several reasons. First, watering the corral surface benefits the horse’s health (Fabian Wheeler and Zajackowski, 2016). Second, providing surface moisture up to 3 inches in depth can result in better air quality for the horse and rider. Third, surface moisture provides a safer and more suitable ground for the horse to move over (i.e., a wet surface offers more traction than a dry surface). Fourth, because horses can create dust when exercised, a dust complaint in a nearby parcel in a residential area may result in a fine issued to the owner of the horse corral or animal exercising arena; application of water reduces the dust generated.

Initial conversations with stakeholders indicated that significant use of water for dust control for horse corrals and animal exercising arenas could have a material effect on an urban retail water supplier’s UWUO. Therefore, it is reasonable to consider a variance to address this water use on residential parcels.

2.2 Process for Scope Refinement

In the context of the 2018 Legislation, the four water use efficiency standards cover types of water use commonly shared by most, if not all, urban retail water suppliers. The variances are effectively the less common uses that may be important for only some urban retail water suppliers due to geographic location, local climate, and other local conditions. In concept, the scopes of standards and those of variances are mutually exclusive. However, local water use, facility connection, and account management can be complex due to years of development and implementation of practices without the structure suggested in the 2018 Legislation. Therefore, DWR needed to examine different scenarios associated with water use for dust control for horse corrals and

animal exercising arenas against three questions in sequence prior to developing variance recommendations:

1. Is this water use out of the scope of the UWUO? In other words, is this water for non-urban use or part of the CII water uses other than irrigating landscape with DIMs? If so, the water use is either not subject to the provisions of urban water use efficiency in the 2018 Legislation or excluded from the UWUO and, thus, there is no need for a variance.
2. Is this water use unique in the context of the UWUO? If no, it is not eligible. If yes, the water use is potentially eligible for a variance, and the following two questions need to be answered “yes” to be determined eligible:
 - a. Is this water use shared by only some urban retail water suppliers or needed in unusual circumstances but not commonly used enough to be included in one of the standards?
 - b. Is this water use excluded from all urban water use efficiency standards and other variances?
3. Could this unique water use have a material effect on the UWUO of some urban retail water suppliers? If so, the water use is warranted for variance development.

The following summarizes the results of the above process of elimination for clarifying the scope of the variance.

Unique Use

The unique use for variance consideration was established by addressing the first two questions listed above.

In April 2021, DWR conducted a survey regarding potential concerns over significant use of water for dust control for horse corrals and animal exercising arenas. The survey was completed by 68 urban retail water suppliers in the State. About 28 percent of the participants mentioned that use of water for dust control for horse corrals could be significant to their utilities. However, with the exception of one urban retail water supplier in the Sacramento River region, the others believed the effect would be less than 5 percent of their total water use. The results of this survey suggested that this water use could be considered as a variance due to its use by only some urban retail water suppliers.

DWR examined multiple scenarios in determining the status of a unique water use, as summarized below. Note that the conditions described below illustrate the filtering process for variance applicability. In practice, an urban retail water supplier would need to assess its actual conditions for variance applicability.

- Conditions that are categorically excluded for variance considerations due to the water use not being part of the UWUO.
 - Water use for commercial operations purposes is considered under CII water use not subject to UWUO calculation and reporting. Commercial operations could include horse corrals and animal exercising arenas not on residential parcels, other commercial animal operations, or dust control or soil stabilization/compaction related to construction activities.
 - In certain situations where an urban retail water supplier allows CII water use from an unused residential meter for various reasons (e.g., safety), the urban retail water supplier should temporarily reclassify the meter as CII so that the associated water use is properly categorized and excluded from its UWUO, but subject to CII water use performance measures. The practice is fully under the control of an urban retail water supplier and, therefore, the use is not considered a variance.
- Conditions that are within the scope of UWUO, but categorically excluded from variance considerations because it is covered by standards or other variances.
 - Bioengineered slopes for soil stabilization require water for vegetation. In many cases, the source of water could be recycled water. Any water use for soil stabilization to maintain vegetation on bioengineered slopes should be covered under CII-DIMWUS as a Special Landscape Area (SLA), and, therefore, excluded in this variance consideration (see *Recommendations for Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard* [WUES-DWR-2021-03]).
 - Bioengineered slopes located on residential parcels are covered under ORWUS and/or CII-DIMWUS water use, and are excluded in this variance consideration (see *Recommendations for Outdoor Residential Water Use Efficiency Standard* [WUES-DWR-2021-02] and *Recommendations for Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard* [WUES-DWR-2021-03]).
 - An owner of a vacant lot is required to control dust when it becomes a nuisance (e.g., when a complaint is made). Direct water application is a method used to combat dust on vacant lots; however, it is not the only method for regulating dust and should be discouraged in favor of other methods, including planting native species, or using mulch or other stabilizing materials. Water use for vacant lot dust control is redirected to ORWUS for residential applications based on its residential meter use or CII water use for nonresidential applications per the discretion of the corresponding urban retail

water supplier, and it is excluded in this variance consideration (see *Recommendations for Outdoor Residential Water Use Efficiency Standard* [WUES-DWR-2021-02]).

- Conditions where water use is within the scope of UWUO.
 - Water use for horse corrals and animal exercising arenas is excluded from ORWUS. ORWUS includes only residential outdoor landscape irrigation (see *Recommendations for Outdoor Residential Water Use Efficiency Standard* [WUES-DWR-2021-02]). Therefore, the water use is potentially allowable under a variance.

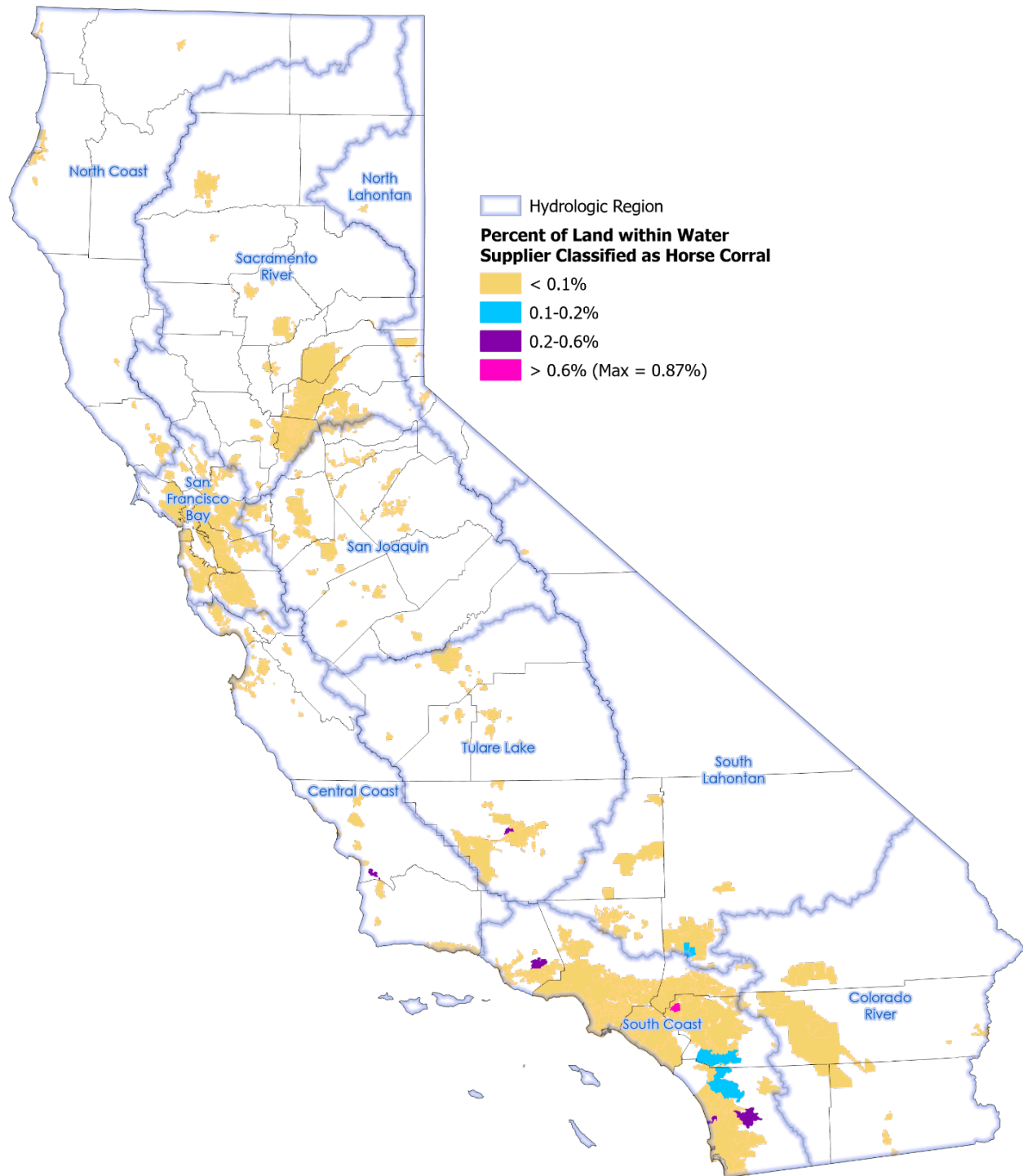
Analysis of DWR’s 2018 Outdoor Residential Landscape Area Measurement (OR_LAM) data identified more than 1,700 acres of horse corrals and animal exercising arenas (see *Technical Report: Outdoor Residential Landscape Area Measurement* [WUES-DWR-2021-02.T1]). Although these corrals and arenas are present in all hydrologic regions throughout the State (Table 2-1 and Figure 2-1), the largest concentrations are in southern California: Riverside County (490 acres), San Diego County (392 acres), and San Bernardino County (129 acres). As previously noted, horse corrals and animal exercising arenas are more prevalent in rural areas than urban areas.

In the above analysis, the unique use of water for horse corrals and animal exercising arenas within residential parcels in certain areas of the State was confirmed. Therefore, it was reasonable for DWR to proceed with the evaluation of the potential for a material effect on an urban retail water supplier’s UWUO.

Table 2-1 Estimated Acreage of Horse Corrals and Animal Exercising Arenas by Hydrologic Region

Hydrologic Region	Estimated Acreage (acres)
Central Coast	81
Colorado River	58
North Coast	5
North Lahontan	8
Sacramento River	265
San Francisco Bay	47
San Joaquin	18
South Coast	1,110
South Lahontan	85
Tulare Lake	51

Source: DWR OR_LAM dataset 2018, horse corral land mask data



Source: DWR OR_LAM dataset 2018, horse corral land mask data

Figure 2-1 Percent of Land Classified as Horse Corrals and Animal Exercising Arenas in Urban Retail Water Suppliers' Service Areas

Potential for a Material Effect

Based on the above analysis of potential water use for soil compaction and dust control, DWR concluded that water use for dust control on residential properties is primarily associated with control of dust on horse corrals and animal exercising arenas. As noted above, dust reduction benefits a horse's health, results in better air quality for the horse and rider and provides a more suitable surface for the exercising horse (Fabian Wheeler and Zajaczkowski, 2016).

Various methods of watering horse corrals and animal exercising arenas can result in sizable amounts of water use. The more commonly used methods for applying water include:

- Automated sprinklers.
- Water truck or tank.
- Spigot and hose.

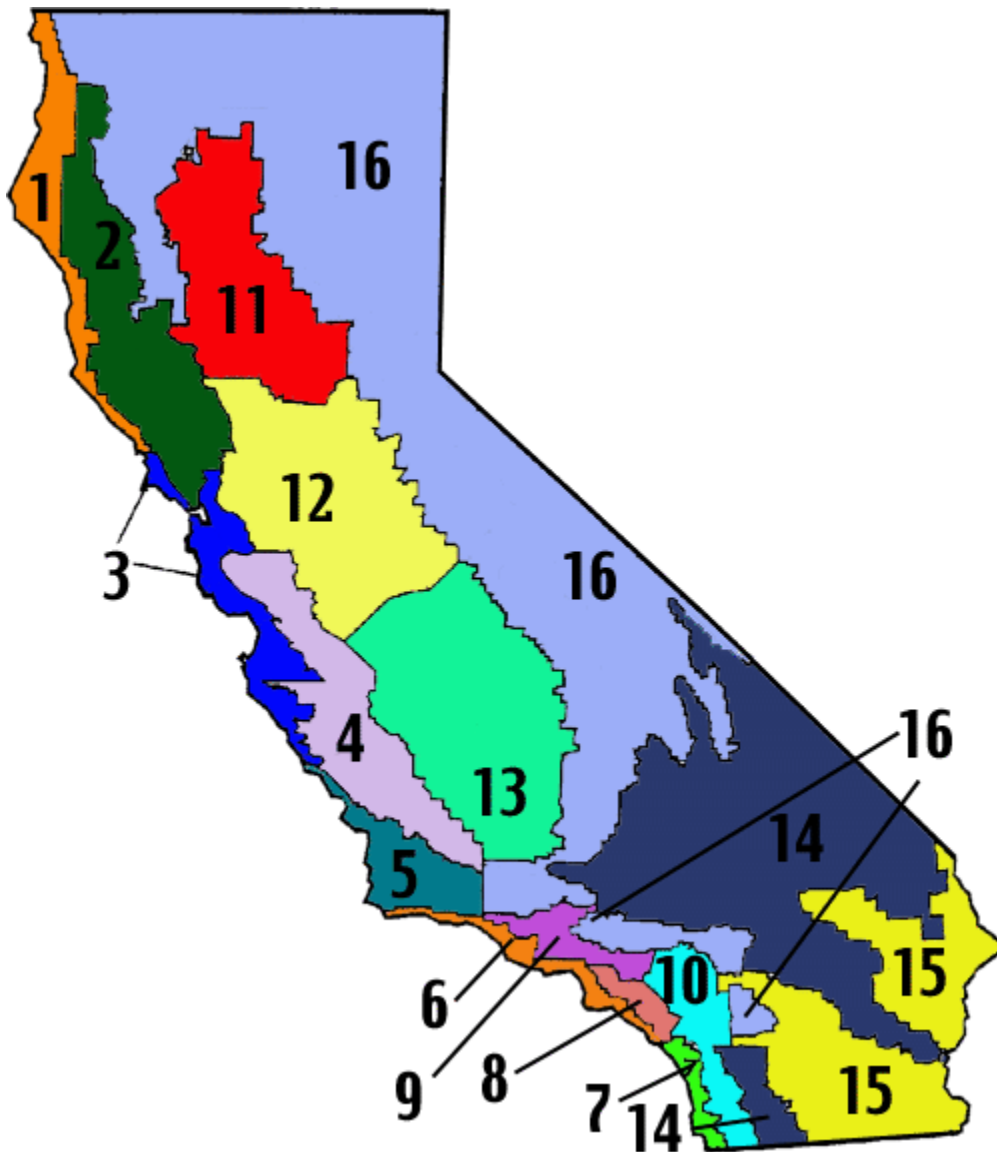
Other methods for dust control are more expensive and more common in commercial operations, including (Premier Equestrian, 2016):

- Underground irrigation with water.
- Pumping system for local reuse with water.
- Foam footings (non-water based).
- Dust suppression treatment (non-water based).

Some urban retail water suppliers have considerable service area acreage for horse corrals and animal exercising arenas. To reduce dust and ensure the function and performance of the corrals and arenas, moisture to a depth of up to 3 inches should be provided. To reach that depth, application of 0.25 inches of water two to five days per week is recommended (Fabian Wheeler and Zajaczkowski, 2016; BigSprinkler, Personal Communication, 2021; Premier Equestrian, 2016). Although the minimum recommended water depth to use on corrals and arenas is 0.10 inches for dust control, with the State's warm air temperatures and high evapotranspiration rates, application of 0.10 inches of water dries too quickly and is not as effective as 0.25 inches (Fabian Wheeler and Zajaczkowski, 2016; BigSprinkler, Personal Communication, 2021; Premier Equestrian, 2016).

As shown in Figure 2-1, above, many of these horse corrals and animal exercising arenas are located in areas that typically have both low humidity and low precipitation. As such, these climate conditions influence the amount of water needed for dust control. The California Climate Zones, defined by the California Building Standards Code,

California Code of Regulations (CCR), Title 24, were developed to advise energy-conscious design decisions. The Climate Zones were created using basic climate conditions, design day data, climate design priorities, Title 24 requirements, climate description, and heating and cooling degree days. Sixteen Climate Zones are identified throughout the State and are shown in Figure 2-2 (Pacific Energy Center, 2006).



Source: Pacific Energy Center, 2006

Figure 2-2 California Climate Zones as Defined in California Building Standards Code, California Code of Regulations, Title 24

Based on the DWR OR_LAM data, there are more than 1,700 acres of horse corrals and animal exercising arenas on residential parcels statewide. As shown in Figure 2-1 (above), these corrals and arenas are not equally distributed through the State; rather, they are concentrated in certain urban retail water suppliers' service areas. Although

there are potential limitations related to the best available data, DWR confirmed that there are reasons to believe that water use for horse corrals and animal exercising arenas could have a material effect on the UWUO for some urban retail water suppliers and, therefore, a variance is warranted.

2.3 Clarified Scope for Variance Development

Based on the above analysis, DWR has established that significant use of water for dust control for horse corrals and animal exercising arenas (including other non-vegetated exercising and riding areas) within residential parcels is a unique use and may have a material effect on an urban retail water supplier's UWUO under certain conditions and as allowed per current regulations and requirements.

As described previously, several types of water use are not allowed in this variance. Water use for commercial operations purposes is considered under CII water use. Water use for soil stabilization to maintain vegetation on bioengineered slopes is covered under CII-DIMWUS as an SLA, and bioengineered slopes located on residential parcels are covered under ORWUS and/or CII water use. Dust control on vacant lots is redirected to ORWUS for residential applications or CII water use for nonresidential applications.

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3.0 Approach to Variance Design

DWR's approach to variance design was an iterative process in collaboration with stakeholders and the State Water Board to assist DWR in refining options and associated specifications and data needs. Taking into consideration findings from the studies, research, and input and feedback from the collaborative process, DWR formulated the recommendations.

3.1 Stakeholder Process

Consistent with the legislative directive, DWR used a public process involving diverse stakeholders in the review and development of the variance for significant use of water for dust control for horse corrals and animal exercising arenas. The stakeholder process was part of the larger engagement process to implement the provisions of urban water use efficiency in the 2018 Legislation (see *Stakeholder Outreach Summary for Developing Urban Water Use Efficiency Standards, Variances and Performance Measures* [WUES-DWR-2021-20]). More focused stakeholder engagements specifically for variances started in November 2020, with periodic meetings and workshops held through early 2022.

DWR established two working groups to assist with implementing the 2018 Legislation, and these groups formed the base of the stakeholder involvement process that included State agencies, cities, counties, urban retail water suppliers, environmental organizations, professionals, and other stakeholders and interested parties. The Water Use Studies Working Group was established in July 2019 to inform DWR in developing water use studies for setting up standards, variances, and performance measures. Concurrently, the Standards, Methods, and Performance Measures Working Group was also established to provide input to DWR on developing the structure and specifications of water use efficiency standards, variances, methodologies, and performance measures. However, due to the close relationship between research and variance design, members of both working groups were invited to participate in the same stakeholder meetings and workshops. DWR opened working group meetings and workshops to the public to allow for broader participation in and input from other stakeholders, interested parties, and individuals.

Working group members and other participants had ample opportunities to learn about the variance design process and provide feedback on the appropriateness of this specific variance being developed and the scope, specifications, and methodologies for estimating efficient water use. They provided input on variance implementation, such as resource needs (staff), supporting data requirements, and accessibility considerations.

DWR also conducted and responded to requests for additional meetings and public outreach and engagement activities with both individuals and groups of stakeholders to

learn from their experiences, understand their specific concerns, and receive other feedback. In addition to accessing available literature and reports for this variance, DWR also consulted with animal husbandry experts and stakeholders (Rancho California Water District and San Juan Water District) to gain insight into existing practices or experiences related to dust control for horse corrals and animal exercising arenas.

3.2 Considerations for Variance Design

As stated in Section 2.3, the clarified scope for the variance for significant use of water for dust control for horse corrals and animal exercising arenas is limited to residential parcels and as allowed per current regulations and requirements. This water use is excluded from ORWUS. DWR proceeded with variance development after confirming this clarified scope with stakeholders and working group members.

In variance design, DWR needed to determine what would constitute water use efficiency for water use for horse corrals and animal exercising arenas, the level of estimated water use that could be considered to have a material effect on an urban retail water supplier's UWUO (i.e., significance threshold), and how to calculate the aggregated water use under the variance with credible data and supporting information. Based on the research and stakeholder input, DWR considered the following factors.

- The variance focuses on significant water use for dust control on horse corrals and animal exercising arenas on residential parcels.
- If exclusion criteria in ORWUS change, the variance criteria may also change.
- The efficient water use volume calculation uses a constant amount of applied water, but the frequency of irrigation may change. There are no adjustments for soil type (i.e., corral surface type) or other factors, because the corrals will likely be modified or improved in some ways to serve their intended functions.
- DWR considered the effects of local climate on water use for dust control for horse corrals and animal exercising arenas based on the California Climate Zones (as defined by California Building Standards Code, CCR, Title 24) and maximum average monthly air temperatures. DWR recognized that an urban retail water supplier's service area may span more than one Climate Zone.
- DWR recognized that the majority of urban retail water suppliers could face challenges in calculating water used for this purpose, since the amount of water used for dust control in a residential setting is currently not reported.
- DWR recognized that specific data are needed for the calculation of water use for this variance. Many urban retail water suppliers expressed concerns over the

potential burden and costs to pursue a variance in addition to compliance with many other requirements under the provisions of urban water use efficiency in the 2018 Legislation. Therefore, DWR considered the following to be reasonable:

- The methodology for calculating aggregated water use under this variance should, to the extent reasonable, stay consistent with existing water use efficiency laws and regulations or build on existing methodologies used by urban retail water suppliers in SB X7-7 compliance.
- The data and information required to support a variance need to be credible, reasonably accessible to urban retail water suppliers or reasonably obtainable by urban retail water suppliers, or separately provided by DWR to the extent possible.
- Necessary technical assistance from DWR related to implementation should be incorporated into the variance development process.

Allowable Watering Days

In accordance with WC and State goals for efficient water use, DWR determined allowable watering days for horse corrals and animal exercising arenas.

Research conducted by Fabian Wheeler and Zajaczkowski (2016) and Premier Equestrian (2016) recommended that horse corrals and animal exercising arenas be watered two to four days per week. Temperature ranges in which to water were not specified, but the research indicated the need to irrigate more in areas experiencing warmer temperatures than cooler areas, as warmer areas have higher evaporation rates.

Based on this information, DWR used the California Climate Zones (as defined by California Building Standards Code, CCR, Title 24) to estimate the State's climate conditions. Using the Pacific Energy Center's Guide to California Climate Zones (Pacific Energy Center, 2006), the maximum average monthly air temperature in each of the 16 Climate Zones was determined (see Table 3-1). Those maximum average air temperatures were then used to categorize each Climate Zone into one of three groupings that represented the recommended number of watering days (Pacific Energy Center, 2006). As presented in Table 3-2, Climate Zones were grouped according to maximum average air temperatures ranging from 50 to 69 degrees Fahrenheit, 70 to 79 degrees Fahrenheit, and 80 to 99 degrees Fahrenheit. The recommended number of watering days per week (watering frequency) for dust control for horse corrals and animal exercising arenas are shown in Table 3-3 and are grouped by Climate Zone.

Table 3-1 Maximum Average Air Temperature in Each California Climate Zone

California Climate Zone	Maximum Average Air Temperature (degrees Fahrenheit) ¹
1	58
2	68
3	65
4	69
5	63
6	70
7	57
8	73
9	74
10	78
11	82
12	78
13	80
14	85
15	92
16	76

Note:

¹ Maximum average air temperature by Climate Zone was determined using Pacific Energy Center's Guide to California Climate Zones (Pacific Energy Center, 2006).

Table 3-2 California Climate Zones Grouped by Maximum Average Air Temperature

California Climate Zones	Maximum Average Air Temperature Range (Degrees Fahrenheit)
1 through 5, 7	50 to 69
6, 8 through 10, 12, 16	70 to 79
11, 13 through 15	80 to 99

Source: Pacific Energy Center, 2006

Table 3-3 Recommended Watering Frequency for Corrals and Arenas in California Climate Zones

California Climate Zones	Watering Frequency
1 through 5, 7	2 days per week
6, 8 through 10, 12, 16	3 days per week
11, 13 through 15	4 days per week

Source: Pacific Energy Center, 2006; Premier Equestrian 2016

3.3 Variance Options

In developing variance options, DWR took into consideration the allowable frequency for watering horse corrals and animal exercising arenas and the potential to adjust for climate conditions and hydrologic data. DWR developed three options for calculation of

efficient water use under this variance and discussed all options with stakeholders in a working group meeting on June 10, 2021. The purposes of designing different options were to explore pros and cons for different settings and solicit input from stakeholders regarding their corresponding reasonableness and ability to implement those options. Based on the resulting findings and insights, DWR then developed the recommendations (Section 4).

Common Methodologies for Options

Regardless of the approach to calculating water use under this variance, and based on the considerations discussed in Section 3.2, the following methodologies were common to all three options:

- **Equation for Estimating Variance Efficient Water Use Volume:**

Variance Efficient Water Use Volume (gallons) = *corral area* (square feet) x *number of allowable watering days per year* x 0.021 (feet of water per watering day) x 7.48 (gallons per cubic foot)

- **Application Depth of Water.** To reduce dust and provide moisture for up to 3 inches of depth of corral surface, the application of 0.25 inches of water is recommended. The equation requires that the unit be converted from inches to feet to arrive at acre-feet per year. Although the minimum recommended water depth to use on corrals for dust control is 0.10 inches, the State's warm air temperatures and high evapotranspiration rates mean that amount will dry too quickly and will not be as effective as 0.25 inches.
- **Qualifying Acreage.** The horse corral and animal exercising arena acreage within residential parcels is aggregated across an urban retail water supplier's service area. This acreage will need to be determined by the urban retail water supplier using the DWR OR_LAM data or alternative data.
- **Threshold of Significance.** The threshold of significance was set at 5 percent of the total aggregated efficient water use volume based on the four standards.

Options for Calculating Efficient Water Use

The three options developed by DWR and discussed with stakeholders included:

- **Option 1 – Constant Value for Allowable Watering Frequency.** Option 1 assumed a single watering frequency of three days per week throughout the year (52 weeks) for a total of 156 days per year. To minimize potential over-watering and to account for varying corral and arena surface materials, DWR set this statewide frequency at the lower end of the recommended water application frequency range of two to four days per week (BigSprinkler, Personal Communication, 2021).
- **Option 2 – Variable Value for Allowable Watering Frequency Based on California Climate Zones.** In Option 2, the watering frequency was variable and based on the California Climate Zone(s) (as defined by California Building Standards Code, CCR, Title 24) in which an urban retail water supplier was located. These Climate Zones reflected the local climate and the maximum allowable watering frequency, as presented in Table 3-3, above. Determining the Number of Allowable Watering Days per Year assumed weekly watering frequency throughout the year (52 weeks). If an urban retail water supplier's service area spanned two or more Climate Zones, it would need to calculate the horse corral and animal exercising arena acreage for each climate zone, determine the Variable Efficient Water Use Volume for each climate zone, and add them together to get a total for all Climate Zones.
- **Option 3 – Variable Value for Allowable Watering Frequency Based on California Climate Zones and Local Precipitation Data.** In Option 3, the watering frequency was variable and based on both the California Climate Zone(s) (as defined by California Building Standards Code, CCR, Title 24) in which an urban retail water supplier was located as well as local precipitation data.

The Number of Allowable Watering Days per Year used a running total of irrigation days per week and was calculated for the year using daily precipitation data and the service area Climate Zone as follows:

- If no precipitation fell during a week or rainfall amounts were not greater than 0.10 inches, then the number of days the horse corrals and animal exercising arenas would be watered that week was based on the Climate Zone location.
- If daily precipitation was greater than 0.10 inches, the corrals and arenas would not be watered for the next two days, due to the rainfall irrigating those areas.

- For more than two days following the rainfall event, the maximum allowable watering frequency would be as presented in Table 3-3.
- The California Irrigation Management Information System (CIMIS) record of daily precipitation from the previous year would be used in determining the Number of Allowable Watering Days per Year.

As in Option 2, if an urban retail water supplier's service area spanned two or more Climate Zones, it would need to calculate the horse corral and animal exercising arena acreage for each Climate Zone, determine the Variable Efficient Water Use Volume for each Climate Zone, and add them together to get a total for all Climate Zones.

Stakeholder feedback was collected and considered by DWR. A summary table of the different options is provided in Table 3-4, which includes important characteristics of each option, including data requirements, data sources, and thresholds of significance.

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Table 3-4 Summary of the Three Options for Variance for Dust Control for Horse Corrals and Animal Exercising Arenas

Items	Option 1	Option 2	Option 3
Threshold of significance	More than 5 percent of the total aggregated efficient water use volume based on the four standards without variances.	More than 5 percent of the total aggregated efficient water use volume based on the four standards without variances.	More than 5 percent of the total aggregated efficient water use volume based on the four standards without variances.
Equation	$\text{Variance Efficient Water Use Volume (gallons)} = \text{corral area (square feet)} \times \text{number of allowable watering days per year} \times 0.021 \text{ (feet of water per watering day)} \times 7.48 \text{ (gallons per cubic foot)}$		
Type of equation	Static	Variable	Variable
Amount of applied water	<ul style="list-style-type: none"> 0.25 inches (or 0.021 feet, because the equation requires inches to be converted to feet to calculate acre-feet). <p><i>Source of amount of applied water: DWR</i></p>	<ul style="list-style-type: none"> 0.25 inches (or 0.021 feet, because the equation requires inches to be converted to feet to calculate acre-feet). <p><i>Source of amount of applied water: DWR</i></p>	<ul style="list-style-type: none"> 0.25 inches (or 0.021 feet, because the equation requires inches to be converted to feet to calculate acre-feet). <p><i>Source of amount of applied water: DWR</i></p>
Corral and arena acreage (square feet)	Based on urban retail water supplier's service area. <i>Source of acreage data: DWR OR_LAM dataset or from urban retail water supplier's alternative data</i>	Based on urban retail water supplier's service area. <i>Source of acreage data: DWR OR_LAM dataset or from urban retail water supplier's alternative data</i>	Based on urban retail water supplier's service area. <i>Source of acreage data: DWR OR_LAM dataset or from urban retail water supplier's alternative data</i>
Allowable corral and arena watering frequency	<p>Three days per week throughout the year (52 weeks) for a total of 156 days per year throughout the State.</p> <p><i>Source of watering frequency: DWR</i></p>	<p>Based on California Climate Zone* and throughout the year (52 weeks):</p> <ul style="list-style-type: none"> Climate Zones 1 through 5, 7: two days per week. Climate Zones 6, 8 through 10,12, 16: three days per week. Climate Zones 11, 13 through 15: four days per week. <p><i>Source of watering frequency: DWR</i></p>	<p>Based on California Climate Zone* and local precipitation data:</p> <ul style="list-style-type: none"> Running total of irrigation days per week. If no precipitation fell during a week or rainfall amounts were not greater than 0.10 inches, then the number of days the horse corrals and animal exercising arenas would be watered that week would be based on the Climate Zone location. If daily precipitation was greater than 0.10 inches, the corrals and arenas would not be watered for the next two days, due to the rainfall irrigating those areas. For more than two days following the rainfall event, the maximum allowable watering frequency would be by California Climate Zone: <ul style="list-style-type: none"> Climate Zones 1 through 5, 7: 2 days per week. Climate Zones 6, 8 through 10,12, 16: 3 days per week. Climate Zones 11, 13 through 15: 4 days per week. <p><i>Source of watering frequency: DWR</i> <i>Source of daily precipitation data: DWR-provided link to daily precipitation records from CIMIS or from urban retail water supplier's precipitation data</i></p>

Note:

* As defined by California Building Standards Code, California Code of Regulations, Title 24

Key:

CIMIS = California Irrigation Management Information System

DWR = California Department of Water Resources

OR_LAM = Outdoor Residential Landscape Area Measurement

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Working group members and stakeholders generally agreed with the variance construct. They also agreed that having all the information provided would be beneficial and make calculating the efficient water use volume easier.

Working group members and stakeholders agreed that Option 1 was a more conservative option and likely not an adequate method to address the entire State. They agreed with the amount of water used, but not the three days per week of watering across the entire State, as northern California versus southern California have very different climates.

Working group members and stakeholders agreed that Option 2 was more accurate than Option 1 and the most realistic option to address the entire State for determining the allowable Number of Allowable Watering Days per Year based on Climate Zones, especially with the wide range in climate conditions statewide. They also agreed with the Application Depth of Water amount.

Working group members and stakeholders agreed that Option 3 provided the most precise information. They agreed with the amount of water used and allowable Number Watering Days per Year based on Climate Zones. It was noted that most urban retail water suppliers would likely not apply for this variance if they needed to gather and evaluate precipitation data due to the time and resources needed. If data were provided, it would be easier for an urban retail water supplier to apply for the variance.

3.4 Summary of Findings

Based on research and input from working group members and stakeholders, DWR concluded that significant water use for horse corrals and animal exercising arenas should be recognized and provided through a variance. Three options were designed to estimate water use under this variance. It was agreed that calculation of the allowable watering frequency should be reflective of both the California Climate Zone in which an urban retail water supplier is located and local precipitation data.

If an urban retail water supplier's service area spanned two or more Climate Zones, it was initially considered that the urban retail water supplier would need to calculate the horse corral and animal exercising arena acreage for each Climate Zone, determine the Variable Efficient Water Use Volume for each Climate Zone, and add them together to get a total for all Climate Zones. Accounting for feedback from working group members and stakeholders regarding the level of effort associated with the use of precipitation data, it was agreed that using the single Climate Zone with the largest portion of the service area would be representative in the calculation for this variance.

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4.0 Recommendations

This section provides DWR’s recommendations for the variance for significant use of water for dust control for horse corrals and animal exercising arenas, including guidelines and methodologies, reporting requirements, and implementation considerations.

These recommendations and the resulting variance adopted by the State Water Board do not set, rescind, or modify existing or future requirements for dust control for horse corrals and animal exercising arenas or other purposes.

4.1 Summary of Recommendations

Based on the analysis and stakeholder input, DWR’s recommendations are included below. **This recommendation is contingent upon DWR’s recommended ORWUS and its adoption by the State Water Board.**

Recommendations for the Variance for Significant Use of Water for Dust Control for Horse Corrals and Animal Exercising Arenas

DWR recommends that a variance should be established for significant use of water for dust control for horse corrals and animal exercising arenas that are excluded from ORWUS. The recommended variance against ORWUS should have the specifications detailed in Section 4.2. The determination of aggregated efficient water use under the variance (Variance Efficient Water Use Volume), as part of an urban retail water supplier’s UWUO, should be subject to the guidelines and methodologies detailed in Section 4.3.

4.2 Specifications

DWR recommends that a variance be established for “significant use of water for dust control for horse corrals and animal exercising arenas” with the following specifications.

- This variance is limited to horse corrals and animal exercising arenas within residential parcels and as allowed per current regulations and requirements.
- The Variance Efficient Water Use Volume should be calculated based on daily precipitation data from the previous year and California Climate Zone (as defined by California Building Standards Code, CCR, Title 24).
 - If daily precipitation is greater than 0.10 inches, horse corrals and animal exercising arenas would not be watered for the next two days, due to the rainfall irrigating those areas.

- For more than two days following the rainfall event, the maximum allowable watering frequency for horse corrals and animal exercising arenas are reflective of California Climate Zones (as defined by California Building Standards Code, CCR, Title 24) as follows:
 - Climate Zones 1 through 5, 7: two days per week.
 - Climate Zones 6, 8 through 10, 12, 16: three days per week.
 - Climate Zones 11, 13 through 15: four days per week.
- When multiple Climate Zones exist within an urban retail water supplier's service area, the Climate Zone with the largest portion of the service area is considered representative for calculating the estimate of water use under this variance.
- Urban retail water suppliers must examine precipitation records, identify the rainfall events exceeding 0.10 inches in a day, then determine the number of allowable application days between rainfall events exceeding 0.10 inches per day.
- The Variance Efficient Water Use Volume should be greater than 5 percent of the sum of the aggregated estimates of efficient water uses based on the four established standards (i.e., IRWUS, ORWUS, CII-DIMWUS, and WLS [UWUO_SB]).
- The calculation of estimated water use under this variance should follow the guidelines and methodologies provided by DWR (see Section 4.3).

4.3 Guidelines and Methodologies

DWR recommends the following guidelines and methodologies for the variance for “significant use of water for dust control for horse corrals and animal exercising arenas.”

- An urban retail water supplier will be allowed to include the variance for significant use of water for dust control for horse corrals and animal exercising arenas in calculating its UWUO when all following conditions are satisfied.
 1. The use of this variance by the urban retail water supplier has been previously approved by the State Water Board. (Reminder: The State Water Board's approval is for using the variance, but not for the quantity of water use, which may vary every year.)
 2. The Variance Efficient Water Use Volume by is greater than 5 percent of the sum of the aggregated estimates of efficient water uses based on four

established standards, namely, IRWUS, ORWUS, CII-DIMWUS, and WLS (UWUO_SB).

- This condition should be verified by the urban retail water supplier every year before using the variance to calculate the UWUO.
- The Variance Efficient Water Use Volume should be calculated based on data applicable to the conditions of the previous year.
- DWR, in coordination with the State Water Board, may recommend revisions of the guidelines and methodologies in the future, as needed.
- Use of alternative data is allowed if the urban retail water supplier can provide evidence that the alternative data is equal to or superior to DWR-provided data or DWR-suggested referenced data. Refer to “*Use of Alternative Data*” in a later section.
- Urban retail water suppliers should provide all necessary data and information to support the use of this variance and associated calculated amount of estimated water use to be included in UWUO. The data and information should be made publicly available. Where applicable, DWR will specify validation and certification requirements for certain data use.

For general guidelines and methodologies for using variances for calculating the UWUO, refer to *Recommendations for Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B, Section 6.2).

Methodology for Estimating Variance Efficient Water Use Volume on Urban Retail Water Supplier Level

The recommendation for this variance allows for calculation of the Variance Efficient Water Use Volume for significant use of water for dust control for horse corrals and animal exercising arenas.

Appendix B provides a template for calculating the Variance Efficient Water Use Volume for significant use of water for dust control for horse corrals and animal exercising arenas. This template is provided for illustrative purposes and is subject to revision after the State Water Board’s adoption.

An urban retail water supplier with a significant water use that is in the scope of this variance must follow the required development steps to apply for the variance, provided it meets the requirements and threshold.

Data Needed for Calculation

- Amount of applied water (0.25 inches or 0.021 feet).

- Horse corral and animal exercising arena acreage in urban retail water supplier’s residential service area in square feet.
- Local daily precipitation data in inches.

Variance Efficient Water Use Volume

The Variance Efficient Water Use Volume for horse corrals and animal exercising arenas is to be estimated using the following equation:

$$\text{Variance Efficient Water Use Volume (gallons)} = \text{corral area (square feet)} \times \text{number of allowable watering days per year} \times 0.021 \text{ (feet of water per watering day)} \times 7.48 \text{ (gallons per cubic foot)}$$

Significance Test

The Variance Efficient Water Use Volume must be equal to or greater than the minimum volume established below.

$$\text{Minimum Variance Volume (gallons)} = 5\% \times \text{UWUO_SB}$$

Data Provided or Referenced by the California Department of Water Resources

- Total amount of horse corral and animal exercise arena acreage in the urban retail water supplier’s service area (from DWR OR_LAM dataset).
- Link to daily precipitation data (from CIMIS).
- An urban retail water supplier shall use the maximum allowable watering frequency for watering horse corrals and animal exercising arenas in California Climate Zones in Table 4-1 (values from Table 3-3).

Table 4-1 Maximum Allowable Watering Frequency for Horse Corrals and Animal Exercising Arenas by California Climate Zone

California Climate Zone	Watering Frequency
1 through 5, 7	Two days per week
6, 8 through 10, 12, 16	Three days per week
11, 13 through 15	Four days per week

Data Provided or Obtained by Urban Retail Water Supplier

- Calculated number of allowable watering days in the previous year.
- Obtained daily precipitation data from CIMIS (link provided by DWR).
- Alternatively, horse corral and animal exercising arena acreage calculated based on the urban retail water supplier’s geographic information system (GIS) data or

precipitation data, in accordance with the alternative data requirements described in the section below.

Summary of Guidelines and Methodologies to Calculate the Variance Efficient Water Use Volume

A summary of guidelines and methodologies to calculate the Variance Efficient Water Use Volume for a variance for dust control for horse corrals and animal exercising arenas on residential parcels is provided in Table 4-2.

Table 4-2 Summary of Guidelines and Methodologies for Calculation of the Variance Efficient Water Use Volume for Significant Use of Water for Dust Control for Horse Corrals and Animal Exercising Arenas

Guidelines and Methodologies	Calculation for 5 Percent Threshold Use
Data needed for calculation	<ul style="list-style-type: none"> • Amount of applied water (0.25 inches or 0.021 feet). • Horse corral and animal exercising arena acreage in square feet based on urban retail water supplier’s service area • Local daily precipitation data in inches.
Allowable corral and arena watering frequency	<p>Determine number of days per year horse corrals and animal exercising arenas are watered (irrigated) based on the following:</p> <ul style="list-style-type: none"> • Calculation of allowable irrigation days using records of days of precipitation. • If daily precipitation is greater than 0.10 inches, horse corrals and animal exercising arenas would not be watered for the next two days, due to the rainfall irrigating those areas. • For more than two days following the rainfall event, the maximum allowable watering frequency is as follows, based on California Climate Zones (as defined by California Building Standards Code, California Code of Regulations, Title 24): <ul style="list-style-type: none"> • Climate Zones 1 through 5, 7: 2 days per week. • Climate Zones 6, 8 through 10, 12, 16: 3 days per week. • Climate Zones 11, 13 through 15: 4 days per week.
Equation	<p>Variance Efficient Water Use Volume (gallons) = <i>corral area</i> (square feet) x <i>number of allowable watering days per year</i> x 0.021 (feet of water per watering day) x 7.48 (gallons per cubic foot)</p>

Table 4-2 Summary of Guidelines and Methodologies for Calculation of the Variance Efficient Water Use Volume for Significant Use of Water for Dust Control for Horse Corrals and Animal Exercising Arenas (contd.)

Guidelines and Methodologies	Calculation for 5 Percent Threshold Use
Sources of data	<p>Provided by DWR:</p> <ul style="list-style-type: none"> • Total horse corral and animal exercising arena acreage in an urban retail water supplier’s residential service area from DWR OR_LAM dataset. • Link to daily precipitation records from CIMIS. <p>To be obtained/developed by urban retail water supplier:</p> <ul style="list-style-type: none"> • Daily precipitation data from CIMIS or urban retail water supplier’s precipitation data, in accordance with the alternative data requirements. • Alternatively, horse corral and animal exercising arena acreage calculated based on urban retail water supplier’s GIS data, in accordance with the alternative data requirements.
Reporting requirements (provided to DWR by urban retail water supplier)	<ul style="list-style-type: none"> • Aggregate horse corral and animal exercising arena acreage in urban retail water supplier’s residential service area. • Precipitation records. • Climate Zone(s) in which the urban retail water supplier is located. • Calculated number of allowable irrigation days in previous year. • Associated documentation for all the supporting data and information. • Proof of compliance with all applicable existing laws and regulations.

Key:

CIMIS = California Irrigation Management Information System

DWR = California Department of Water Resources

GIS = geographic information system

Data Accuracy

The urban retail water supplier must report to DWR all the data and supporting documentation used to estimate water use. While DWR is supplying some of this information, it will need to be confirmed that it is correctly used in the calculation.

To ensure data accuracy, an urban retail water supplier must also provide a detailed description of the method(s) used to determine the number of watering (irrigation) days per year. An urban retail water supplier must include in its application:

- Description of the methodology and data used, including data sources and any locally applicable research and literature.
- Description of the data verification process.

- Credentials (such as licenses, certifications, education, training, or professional background of staff) for the entity/party that conducted the research or analysis and verification.
- Affidavit or certification of the data by a qualified urban retail water supplier staff member responsible for data quality.
 - Certification of the data by the entity/party that produced it if not produced by the urban retail water supplier's staff.
 - Referenced, published research reports do not require certification but must be cited.
- Documentation on surveys, map(s), satellite image(s), or other records, statistical sample results, and any other supporting data must be retained for the period the data is used in this process plus three years, and available upon request.

Use of Alternative Data

Alternative Residential Landscape Area Measurement Data

The use of alternative data for this variance should maintain consistency with ORWUS, as DWR-provided referenced data are from the same source: residential landscape area measurement (LAM). It is not adequate to accept one portion of the data but not the other. Urban retail water suppliers can use alternative horse corral and animal exercising arena acreage and qualifying irrigated agricultural land area acreage in the variance calculations. Areas can be measured by:

- **On-the-ground measurement** – This approach involves physical measurement of horse corrals/arenas or irrigated crop area and produces the most accurate result, but it is time consuming and resource intensive. It also involves coordinating with the residents for permission to access the property and conduct measurements.
- **Using remote sensing or GIS mapping methods** – The accuracy of results from remote sensing methods depends on qualifications of the entity that performs the analysis and quality of the remotely sensed or GIS data. If done correctly, this method can produce reasonably accurate results, but requires technical resources (GIS mapping systems).

If an urban retail water supplier chooses to use alternative data, it must receive approval from DWR and demonstrate that its data meets or exceeds the quality and accuracy of data provided by DWR. To request the use of alternative data or method to determine horse corral and animal exercising arena acreage, the urban retail water supplier must demonstrate that the alternative data or method meets or exceeds the quality and

accuracy of the data and method DWR provides or references by submitting a package containing the following:

1. Description of why the alternative data meets or exceeds the quality and accuracy of the DWR data or referenced data.
2. Description of the methodology and data used, including data sources and any locally applicable research and literature.
3. Include credentials (such as licenses, certifications, education, training, or professional background of staff) for the entity/party that conducted the measurements and verification.
4. Affidavit or certification of the alternative data by a qualified urban retail water supplier staff member responsible for data quality.
 - a. Certification of the alternative data by the entity/party that produced it if not produced by the urban retail water supplier's staff.
5. A public process is implemented that provides the public an opportunity to review the alternative data or methodology and understand the purpose of the request to use alternative data.
6. Submit a request signed by the General Manager of the urban retail water supplier to DWR.

Alternative Precipitation Data

To demonstrate that alternative precipitation data meets or exceeds the quality and accuracy of the data provided by DWR, the urban retail water supplier must submit a package containing the following:

1. Description of why the alternative data meets or exceeds the quality and accuracy of the DWR data.
2. Description of the methodology used to estimate daily precipitation including the source of data (e.g., whether it is from a weather station or other).
3. If precipitation is calculated using station data:
 - a. Description of the siting condition of the weather station.
 - b. List of precipitation sensors used.
 - c. Description of maintenance procedures and schedules.

- d. Description of the quality assurance and quality control procedures.
4. Certification of the alternative data by the entity that produced it.
5. A process to provide the public with an opportunity to review the alternative data and understand the purpose of the request to use alternative data.
6. Submit a request signed by the General Manager of the urban retail water supplier to DWR.

4.4 Implementation Considerations

A specific consideration to prepare for this variance application is that an urban retail water supplier must determine the aggregate horse corral and animal exercising arena acreage in its residential service area populations and the allowable irrigation days, using either data provided by DWR or its own data approved through the alternative data process.

4.5 Reporting Requirements

Official documentation to verify the accuracy of the data must be submitted with the package. All data used by an urban retail water supplier in its calculation(s), regardless of whether they were obtained by the urban retail water supplier or provided by DWR, must be reported with the variance application as listed below.

- Aggregate horse corral and animal exercising arena acreage in the urban retail water supplier's residential service area with associated documentation.
 - An urban retail water supplier must use either acreage from the DWR OR_LAM dataset (LAM corral land mask data, provided by DWR) or calculate acreage based on its own GIS data. If using its own GIS data, the urban retail water supplier must receive approval from DWR (as described in Section 4.3).
 - Acreage data does not need to be updated yearly, but should be verified with DWR every five years to confirm that the most recent data are used.
- Precipitation records with associated documentation.
 - An urban retail water supplier must use either daily precipitation data from CIMIS (link provided by DWR)² or provide its own daily precipitation data from a reliable source (e.g., National Weather Service or United States Geological Survey) in accordance with the Use of Alternative Data requirements. If using CIMIS data, the urban retail water supplier must reference the CIMIS station

² <https://cimis.water.ca.gov/>

or Spatial CIMIS location used. If using its own data, the urban retail water supplier must receive approval from DWR (as described in Section 4.3).

- Precipitation data must be updated every year.
- Climate Zone(s) in which the urban retail water supplier is located with associated documentation.
- Calculated number of allowable watering (irrigation) days in the previous year, along with calculations supporting the number of water days per year with associated documentation.
- Associated documentation for all the supporting data and information.
- Proof of compliance with existing regulations and requirements regarding use of water for these functions.
- All other related information as described in Section 4.4.

After the initial variance application, if an urban retail water supplier has a change in the aggregate acreage or uses alternative daily precipitation data, the urban retail water supplier will need to obtain DWR's approval to use this new information and submit it to the State Water Board as an amendment to its approved variance.

Documentation on individual surveys or other records, statistical sample results, and any other data supporting the populations and verification should be retained for the period the data are used in this process, plus three years.

5.0 Glossary

The following key terms are listed below for easy reference. Where applicable, existing definitions from statutes and regulations are provided.

animal exercising arena. An open space used for animal training, exercises, and activities. An exercise arena can also be referred to as a horse corral, paddock, or other non-vegetated exercise and riding areas (collectively, “corrals”).

bioengineered slope. A slope designed and constructed with live vegetation as an integral component of stability.

horse corral. An open space used for horse training exercises and activities. Horse corrals can also be referred to as animal exercise arenas, paddocks, or other non-vegetated exercise and riding areas (collectively referred to as, “corrals”).

hydrologic region. A geographical division of the State of California based on the local hydrologic basins. The California Department of Water Resources divides the State of California into 10 hydrologic regions that correspond to the State’s major water drainage basins: North Coast, North Lahontan, Sacramento River, San Francisco Bay, Central Coast, San Joaquin River, Tulare Lake, South Coast, South Lahontan, and Colorado River.

material effect. Having real importance or great consequences. In the context of California Department of Water Resources’ recommendations regarding the urban water use objective and variances, a material effect is an effect on the urban water use objective that could influence the compliance status of an urban retail water supplier.

threshold of significance. A minimum volume of unique water use in an urban retail water supplier’s service area that could have a material effect on that urban retail water supplier’s urban water use objective.

urban retail water supplier. A water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes, as defined in California Water Code Section 10608.12(t).

urban water use efficiency standards. The standards effective through California Water Code Section 10609.4 (indoor residential use) or adopted by the State Water Resources Control Board (outdoor residential, water loss, and commercial, industrial, and institutional outdoor irrigation of landscape areas with dedicated meters) pursuant to California Water Code Section 10609.2.

urban water use objective. An estimate of aggregate efficient water use for the previous year based on adopted water use efficiency standards and local service area characteristics for that year, as described in California Water Code Section 10609.20, as defined in California Water Code Section 10608.12(u).

water loss. The total of apparent loss and real loss (California Code of Regulations, Title 23, Section 638.1(a) and Section 638.1(k), respectively) in an urban retail water supplier's system. Apparent loss means loss due to unauthorized consumption and/or nonphysical (paper) loss attributed to inaccuracies associated with customer metering or systematic handling errors. Real loss means the physical water loss from the pressurized potable water system and the urban retail water supplier's potable water storage tanks, up to the point of customer consumption.

6.0 References

DWR and State Water Board (California Department of Water Resources and State Water Resources Control Board). 2018. Making Water Conservation a California Way of Life. Primer of 2018 Legislation on Water Conservation and Drought Planning Senate Bill 606 (Hertzberg) and Assembly Bill 1668 (Friedman). Accessed at: <https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Water-Use-And-Efficiency/Make-Water-Conservation-A-California-Way-of-Life/Files/PDFs/Final-WCL-Primer.pdf?la=en&hash=B442FD7A34349FA91DA5CDEFC47134EA38ABF209>

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Pacific Energy Center. 2006. The Pacific Energy Center's Guide to California Climate Zones and Bioclimatic Design. October. Accessed at: https://www.pge.com/includes/docs/pdfs/about/edusafety/training/pec/toolbox/arch/climate/california_climate_zones_01-16.pdf

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Appendix A – Urban Water Use Efficiency Recommendation Package Reports Incorporated by Reference

- DWR (California Department of Water Resources). September 2022.
Recommendations for Urban Water Use Efficiency Standards, Variances,
Performance Measures, and Annual Water Use Reporting. DWR Report Number:
WUES-DWR-2021-01A.
- DWR (California Department of Water Resources). September 2022.
Recommendations for Guidelines and Methodologies for Calculating Urban
Water Use Objective. DWR Report Number: WUES-DWR-2021-01B.
- DWR (California Department of Water Resources). September 2022.
Recommendations for Outdoor Residential Water Use Efficiency Standard. DWR
Report Number: WUES-DWR-2021-02.
- DWR (California Department of Water Resources). September 2022.
Recommendations for Commercial, Industrial, and Institutional Outdoor Irrigation
of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency
Standard. DWR Report Number: WUES-DWR-2021-03.
- DWR (California Department of Water Resources). September 2022. Technical Report:
Outdoor Residential Landscape Area Measurement. DWR Report Number:
WUES-DWR-2021-02.T1.
- DWR (California Department of Water Resources). September 2022. Summary of
Recommendations for Variances. DWR Report Number: WUES-DWR-2021-04.
- DWR (California Department of Water Resources). September 2022. Stakeholder
Outreach Summary for Developing Urban Water Use Efficiency Standards,
Variances, and Performance Measures. DWR Report Number: WUES-DWR-
2021-20.
- DWR (California Department of Water Resources). September 2022. Urban Water Use
Efficiency Recommendation Package: Glossary and Abbreviations and
Acronyms. DWR Report Number: WUES-DWR-2021-21.

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Appendix B – Template for Calculating the Efficient Water Use for Variance for Significant Use of Water for Dust Control for Horse Corrals and Animal Exercising Arenas

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Variance: Significant Use of Water for Dust Control and Animal Exercising Arenas

*Fill in the grey rows to determine: 1. water use under this variance, and 2. whether you (urban retail water supplier) are qualified to apply for this variance.

Equation Components
<p>Feet of water per watering day The amount of water applied to the horse corrals is a fixed value of 0.25 inches, or 0.021' because the calculation requires inches to be converted to feet in order to calculate acre-feet.</p>
<p>Corral Area The corral area needs to be obtained from DWR using their LAM data.</p>
<p>Climate Zones The climate zones can be found on the next tab by searching for the zip codes your water supply service area is in. If your service area is within more than one climate zone, the calculation needs to be done for each individual climate zone, and then added together for a total water use value. The number of days per week the corral is watered based on climate zone is: - Climate zones 1 through 5, 7 = 2 days/week - Climate zones 6, 8 through 10, 12, 16 = 3 days/week - Climate zones 11, 13 through 15 = 4 days/week</p>

Parameter	Value
feet of water per watering day (feet) (Calculated)	0.021
Corral Area (square foot)	
Climate Zone*	
Number of Allowable Watering Days per Year Following the Instruction Given Above	
Variance Efficient Water Use Volume (gallons) (Calculated)	0
What is your aggregated estimates of efficient water use based on four established standards?	
Are you qualified to apply for this variance? (Calculated)	NO

Variance Efficient Water Use Volume (gallons) = Corral Area (square feet) x Number of Allowable Watering Days per Year x 0.21 (feet of water per watering day) x 7.48 (gallons per cubic foot)

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