



TOWN OF PINCHER CREEK SPECIAL COUNCIL MEETING AGENDA
Wednesday, August 16, 2023 at 1:00 p.m.
[Zoom](#)

1. **Call to Order**
2. **Agenda Approval**
3. **New Business**
 - 3.1 **Golf Course Water Usage**
4. **Closed Session Discussion**
 - 4.1 **Personnel - FOIP s. 24**
5. **Adjournment**

THE NEXT REGULAR COUNCIL MEETING IS SCHEDULED for Monday, August 28, 2023 at 6:00 pm.

From: [Cao](#)
To: [Kristie Green](#)
Subject: FW: Re: Golf Course Water Usage
Date: Tuesday, August 15, 2023 1:55:02 PM
Attachments: [image001.png](#)
[image002.png](#)

Hi Kristie,

Please see Don's email below, please add this to the Special Council meeting for tomorrow. All the information in all the emails below needs to be packed up and sent out to Council **today**. Don will speak to this item listed as "Golf Course Water Usage". This item will be in the Open Meeting.

Please can you organize the Waiver for Signature for Council Members to sign.

Thanks,
Angie



Angie Lucas MEdes., RPP, MCIP
CAO

email: cao@pinchercreek.ca

phone: (403) 627-3156

Town of Pincher Creek, 962 St. John Ave (Box 159) Pincher Creek, AB
T0K1W0

www.pinchercreek.ca

From: [REDACTED]
Sent: Tuesday, August 15, 2023 1:29 PM
To: Cao <cao@pinchercreek.ca>
Subject: Fwd: Re: Golf Course Water Usage

Hi Angie

Attached is a request from the Pincher Creek Golf Club with background information to water with sprinkler system 3 days per week. Please distribute to council members today.

I am requesting that this item be added to the Special Council Agenda of August 16 2023. Please supply a Waiver for signature of Council Members as this request is within a 24 hour time period before the Special Meeting

Thank you

Mayor Don Anderberg

Sent from my Samsung Galaxy smartphone.

----- Original message -----

From: Todd Goodreau <[REDACTED]>
Date: 2023-08-11 10:38 AM (GMT-07:00)
To: Charles Clymer <[REDACTED]>, DAnderberg@pinchercreek.ca
Subject: Re: Golf Course Water Usage

Good day Mayor Anderberg,

I want to thank you again for working with us at the golf course on solutions during the water restrictions. Your knowledge and collaboration have been very helpful.

As described in detail below by golf course irrigation expert Reg Down- Pacific Irrigation Consultants, using sprinkler heads to irrigate a golf course actually uses less water than watering by hand with hoses.

As discussed with Charles Clymer, we can have Reg Down come in and present to the Town of Pincher Creek and Council on golf course irrigation, but time is not on our side as our greens and tees are showing the impact of not being properly irrigated using sprinkler heads.

We are asking that the golf course be allowed an additional two days per week to water our greens and tee boxes only, which would be done at night. This would be in addition to the one day a week we are already allowed to water. Our plan is to apply enough water to maintain healthy greens and tee boxes, which our current system is already designed to do. Some hand watering may still be required, but this revised schedule will reduce it.

We are hoping this can be expedited through the appropriate channels and we can start on the revised schedule early next week.

Thanks again and we look forward to your reply.

Todd Goodreau
President Pincher Creek Golf Club Society

On Thu, Aug 10, 2023 at 9:09 PM Charles Clymer <[REDACTED]> wrote:

Charles Clymer
Sent from my iPhone

Begin forwarded message:

From: Reg Down <regjdown@gmail.com>
Date: August 10, 2023 at 7:00:05 PM MDT
To: Charles Clymer <[REDACTED]>

Subject: Re: Golf Course Water Usage

Hello Charles,

Yes, watering greens with a hose is terribly inefficient because there is now way of measuring how much water is getting to the plant. The sprinklers apply the water evenly across the green surface with greater efficiency in a short period of time (i.e. 15 or 20 minutes per day) compared to hose watering.

You will use less water using the sprinkler heads to irrigate the greens.

Golf greens are built as "perched water tables" meaning that the sand and gravel in the subgrade soil is designed to hold / retain water for the roots of the plant. If too much water is applied, the unused water drains out. If too little water is applied, the water may not be getting to the deep plant roots, and be lost to evaporation (what we refer to as evapotranspiration).

<https://www.usga.org/content/usga/home-page/course-care/green-section-record/59/14/the-perched-water-table-and-leaching-greens.html>

Reg

On Thu, Aug 10, 2023 at 5:42 PM Charles Clymer <[REDACTED]> wrote:

Hi Reg,

Have had 2 meetings with the mayor of our town and the question he asks is If we are watering 10 greens with 1/2" hose at 50psi for about 1 1/2 hrs per green per day are we wasting water by not using the sprinklers, and are we achieving the water penetration we need to keep the grass roots alive?

Could you please give me your thoughts.

Best regards,

Charles

Charles Clymer

Sent from my iPhone

On Aug 8, 2023, at 5:24 PM, Reg Down <regdown@gmail.com> wrote:

Hello Charles,

As requested, please see the following information regarding standard water requirements for golf courses in southern

Alberta.

Weekly water usage requirements

Water usage / application rate requirements for golf courses in southern Alberta are different for specific areas of the golf course due to grass type and subgrade type. These estimates are based on zero natural rainfall received. Also, wind (as is the case in Pincher Creek) is a major factor in terms of evaporation loss.

Greens require a minimum of 2.0" of water per week
Tees require a minimum of 1-1/2" " of water per week
Fairways require a minimum of 1" of water per week.

It should be noted that for cities and towns in southern Alberta 1" of precipitation / sprinkler watering is the norm for residential / commercial landscape watering. The reason that the water requirements are higher for golf course applications is due to the shorter height of cut for turfgrass applications and golf traffic (which stresses the plant), and the fact that greens are built on sand based subgrades requiring higher water usage.

Green Complex Irrigation

The irrigation system at Pincher Creek has the ability to apply .50" (1/2") of effective water per hour. If a green requires 2.0" per week of irrigation, that means that the irrigation sprinklers need to run for 4 hours (240 minutes) per week. (240 minutes per week divided by 7 days per week = 34 minutes per day).

Each green will have 4 sprinkler heads with an average of 50 US GPM (gallons per minute) of water each. So if those 4 sprinklers operate at 50 US GPM each (200 US GPM for 4 sprinklers) for 240 minutes per week, the weekly water (effective) usage will be **48,000 US Gallons per week** (based on zero natural rainfall). Multiply that by 9 greens and the total weekly water requirement is 432,000 US Gallons per week (48,000 gallons per week x 9 greens = **432,000 US Gallons per week) for 9 greens.**

Tee Complex Irrigation

Based on a minimum water requirement of (1-1/2" of water per week) for each set of tees, that means that the irrigation sprinklers need to run for 3 hours (180 minutes) per week. (180 minutes per week divided by 7 days per week = 25 minutes per day). So if those

sprinklers operate at 50 US GPM each, 4 sprinkler heads for 180 minutes per week, the weekly water (effective) usage will be **36,000 US Gallons per week** (based on zero natural rainfall) or **324,000 US Gallons per week for nine holes.**

Fairway Irrigation

In the case of Pincher Creek, you are probably watering approximately 40 acres of fairways. Based on an average precipitation rate requirement of 1" per week (same as cities and towns in southern Alberta) that means you will require 40 acre inches (which translates to 27,000 US Gallons of water per acre, or **1,080,000 US Gallons of water for 40 acres**) per week based on zero natural rainfall.

Typically in times of water rationing, the fairway irrigation is the first area to be cut back.

For southern Alberta, based on average climate for the region, golf courses may require up to 20 weeks of irrigation per year - based on worst case limited natural rainfall.

April - 1 week
May - 3 weeks
June - 4 weeks
July - 4 weeks
August - 4 weeks
September - 3 weeks
October - 1 weeks

Total Worst Case - 20 weeks.

Based on 20 weeks of irrigation per year,
- Greens will require (432,000 US Gallons per week x 20 weeks) = 8,640,000 US Gallons Year
- Tees will require (360,000 US Gallons per week x 20 weeks) = 7,200,000 US Gallons Year
- Fairways will require 1,080,000 US Gallons per week x 20 weeks = 21,600,000 US Gallons Year

Total estimated water usage will be approximately 37,440,000 US Gallons per year. Please note that this amount can be reduced if the number of weeks / days of irrigation is less than 20 weeks.

Daily Water Usage for Comparison

In terms of daily water usage, it depends on what the current pumping system at Pincher Creek is capable of producing in terms of gallons per minute. Typically a nine hole golf course will have a pump system capable of producing 500 US GPM.

A properly irrigated nine hole golf course (based on the above estimates) will require approximately 250,000 US Gallons per day to maintain adequate turf quality.

If the pumping system is capable of producing 500 US GPM, and the pipe size is adequate in terms of delivering the water at that rate, then the daily water requirement can be achieved by running that pump for 8.0 hours per day (night). (500 US GPM x 60 minutes x 8 hours = 240,000 US Gallons per day).

However, if you are restricted to only watering for a maximum of 4 hours a day, you can only achieve 50% of the plants / turfs water requirements.

To ensure that the water you have is being utilized efficiently, sprinkler irrigation should always be operated at night when the wind is lowest. Watering with hoses is the least efficient method of watering because you can't measure how much water is being applied, and too much pressure is lost delivering water through the hoses.

Summary

- Greens will require 432,000 US Gallons per week.
- Tees will require 360,000 US Gallons per week.
- Fairways will require 1,080,000 US Gallons per week.

I'm not sure how the Town of Pincher Creek measures water requirements, so I have converted the above weekly water usage estimates as follows.

Greens 432,000 US Gallons per week / 1,635.2 M3 / 1.325 Acre Ft.
Tees 360,000 US Gallons per week / 1,362.7 M3 / 1.104 Acre Ft.
Fairways 1,080,000 US Gallons per week / 4,088.2 M3 / 3.314 Acre Ft.

For reference, Pacific Irrigation Consultants (my company) has been in business for over 27 years, and we have successfully designed more than 160 golf course irrigation systems. We have also

successfully applied for & secured over 40 golf course water licenses in Alberta and BC, which both have strict rules in terms of accurately estimating water usage for golf courses.

This is probably more information than you need, but explains how we arrive at water usage quantities for golf courses.

If you have any other questions or require any additional information, please let me know.

Reg Down
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Green Section Record

August 06, 2021

Volume 59, Issue 14

WEST REGIONAL UPDATE

The Perched Water Table and Leaching Greens

August 06, 2021

By Brian Whitlark, senior consulting agronomist, West Region



Portable sprinklers are an effective tool to apply enough water to leach salts from putting greens.

Lately I have fielded questions about irrigation strategies and drainage characteristics in putting greens built with sand over gravel and drainage and sand over native soil and drainage. This update provides an easy-to-read summary of the differences in these two construction models. Additionally, the perched water table concept and leaching versus deep watering is also discussed.

The perched water table: A sand over gravel system like the USGA green provides a reservoir of water for the turf to use and allows the profile to still drain well. Contrary to some belief, water continually flows from the sand through the gravel due to gravity and adhesion forces from the gravel – i.e., water flow does not entirely stop at this interface. In a sand over native soil profile, the water may not flow into the native soil depending on the native soil characteristics. If the subsoil has very poor water permeability, water will accumulate in the rootzone in between the drain lines and drainage therefore is less uniform than when using a sand over gravel design.

A coarse sand will have a shallower perched water table than a finer-textured sand. However, the coarser and rounder the gravel (less adhesive forces), the deeper the perched water table. If the depth of the sand is not greater than the height of the perched water table, the profile remains chronically wet. This situation is commonly observed in bunkers when using the durable liners with only 4-5 inches of sand. In low-lying areas such as near the front of greens, deepening the rootzone to 14-16 inches has proven useful to raise the sand depth well above the height of the perched water table. The deeper sand depth in low areas can be beneficial in a sand over gravel or sand over native soil construction method because it will decrease the tendency for these low areas to hold excess moisture.

Flushing salts versus deep watering: The “ideal” way to flush salts is to replace the water in the rootzone with irrigation water. When additional water is applied, the added weight of the water will help break the tension at the sand and gravel interface and expedite flow through the gravel. If the goal is to wet a 12-inch rootzone, a considerable amount of water must be added. Some superintendents will use portable, low-precipitation-rate sprinklers to optimize leaching events and avoid adding water to green surrounds and bunkers. You can calculate the amount of water needed to leach fairly easily. If you know the total porosity from a soil physical test, let’s say it is 45%, multiply 0.45 by the depth of the rootzone in inches. A fairly new green may have a 12-inch rootzone and at 45% porosity would need about 5.4 inches of water to leach the entire profile. For older courses, the rootzone is often 16-18 inches, but the porosity could be lower at maybe 40%. An 18-inch rootzone with 40% porosity would need about 7 inches of water to entirely leach the profile. If these calculations make your head hurt like mine does, then use a 4- to 5-inch guideline for a good leaching event and ideally you will apply this water slowly, over at least a 10-hour period (1/2 inch per hour).

Deep watering does not require the same amount of water as a leaching event. In a deep-water event, you are trying to fill the rootzone with water, not replace all the water in the rootzone. A 12-inch rootzone dried to 20% volumetric water content will still contain 2.4 inches of water (12 X 0.20). If the porosity of the rootzone is 40%, the green can hold about 5 inches of water, so in this case you would need to add about 2.6 inches of water to fill the rootzone. Again, it is not necessary to make these calculations – a good guideline is to apply

1 to 2.5 inches of water during a deep irrigation event. These events wet the profile and help to reestablish greater moisture consistency across the entire green.

There are many different putting green construction methods that can be managed to deliver good performance. While there are pros and cons of each method, I strongly encourage using science (soil physical testing and the advice of a trained laboratory professional or [USGA agronomists](#)) when selecting construction methods and advice on irrigation management. Please reach out if you have any questions on the water relations in different putting green construction mixtures and designs.

West Region Agronomists:

Brian Whitlark, senior consulting agronomist – bwhitlark@usga.org

Cory Isom, agronomist – cisom@usga.org

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