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MEMORANDUM

TO: JAY FOSTER

FROM: TRIPP DAVIS

CC:

DATE: JUNE 4, 2016

PROJECT: MEGUNTICOOK GC

RE: IRRIGATION WATER

URGENT * FOR REVIEW PLEASE COMMENT PLEASE REPLY FOR YOUR USE

Jay,

As we discussed recently, I have had occasion to write about the value of minimizing use of irrigation water, while addressing the functional need of irrigation water in maintaining reasonable turf grass quality. Here are some specific factors as they relate to Megunticook.

Minimizing Irrigation Water Use

The subject of minimizing irrigation water use is particularly relevant to golf courses with wide reaching and automatic irrigation systems, where overwatering, over reliance on the automated control of the irrigation system, and watering too much overall area, has too often been the norm. The golf industry as a whole has moved in the direction of changing these practices to minimize the use of irrigation water in the following ways:

- Reducing Overwatering
 - Overwatering has historically been caused by two things.
 - A desire for golf courses to be “artificially” green, so that water is liberally applied with the primary goal of color.
 - Inability to water one area in need adequately without overwatering an area that does not need it. When irrigation head spacing is too wide, it is hard to have specific enough control to water only where and when needed.
 - What is being done to reduce overwatering
 - A move towards accepting a different shade of green – must be accepted by golfers.
 - A move to build irrigation systems with more heads with tighter spacing so that only areas in need are watered when it is necessary.
 - A move to use to hand water more often when there is a large enough maintenance staff to manage such. Hand watering allows for more specific application of water, but it is only feasible when there is a maintenance staff large enough to manage this and still manage reasonable turf quality and turf health.
 - The value of less water use on maintenance and playing quality
 - Less chemicals to combat disease and weeds
 - Firmer playing surfaces that tend to make a course more playable, while enhancing the strategic quality of a golf course by making angles more important – firmer surfaces mean players have to play angles instead of relying on a higher ball flight causing a ball to stop where it lands.
- Reducing Reliance of Automated Control
 - Too often, use of irrigation water has been managed through programs in the irrigation control system without enough attention being paid to soil moisture. Automated systems are being combined with a knowledge of soil moisture to tailor automation so that the default is to water just enough, with more water only being applied as needed.
- Reduce the Total Area of Irrigation Coverage
 - Going to the use of native grasses and plant material, and/or grasses and plant material that do not require irrigation water after being established, is being done to reduce the overall area being watered, primarily in largely out of play areas, while sometimes such areas are used to enhance the visual and strategic character of a golf course.

The above does not really relate to Megunticook because minimization of irrigation water has been the norm at Megunticook for over 100 years, to the point it has made it a challenge to maintain a reasonable level of quality in the turf grasses on the course. Over the years, this has had positive impacts as well.

- It has led to the turf grasses on the course adapting, to some extent, to surviving without a reasonable amount of water. It has created a stronger turf grass for the

site, but mere survival is not going to produce a reasonable level of quality relative to how the golf course plays. With stronger turf grasses that are more adapted to the site, they want need much more in the functional use of water to provide a better playing quality.

- A lack of automation in the irrigation “system” at Megunticook has led to a culture at the Club that at first has given the maintenance staff a better understanding of applying water where and when needed, even if it has made it hard to water all that is needed, when it is needed. It is safe to say that even if some greater level of automation were added to the irrigation “system” at Megunticook, it will not lead to overwatering. And secondly, it has conditioned the Membership to accept a lighter shade of green in the grasses.
- Minimal water use as at Megunticook has led to the use of native grasses and/grasses that are drought tolerant in areas that are largely out of play, or in areas where such will enhance the visual and strategic character of the course. While I know that some players may not like such grasses getting too thick, do realize that the use of these types of grasses is vital to reducing the area that needs to be watered.

Functional Need of Irrigation Water

The fact is that golf is played over surfaces composed of grasses that are not typically indigenous, or naturally occurring, to the site the course is located. And, the maintenance of these grass surfaces, to a reasonable level of quality, is important to the playing enjoyment of a golf course. Reasonable level of quality of quality should be defined as consistent density in the turf grass, capable of being mown at a variety of consistent heights, to allow shots to be played with a reasonable measure of consistency so that skill in the playing of the game is aptly rewarded.

The single most important substance in the maintenance of grasses used on a golf course is water. Without water, used when and where it is needed, maintaining a reasonable level of quality with the turf grasses used on a golf course is not possible. These are the things that any golf course needs to functionally make use of irrigation water in the pursuit of a reasonable level of quality in the turf grasses.

- Consistent Water Source Capable of Adequately Watering the Area to be Maintained
 - This is simply calculating the area (square footage) of the course where turf grasses are going to be maintained and calculating the maximum daily need for applying water to the areas where turf grasses are going to be maintained. If there is a need to store water than there needs to be a calculation done to determine backup for maximum daily use for a given number of days – typically a minimum of five days.
 - In some cases, the amount of water available will impact how much area can be maintained, or impact the level of quality of maintenance to certain areas given water resources at any given point in time. For instance, there may be only enough water to maintain greens in drought conditions, or it

may be just greens and tees, and so on. Optimally, there is enough water to maintain all turf grass areas in some way, so there has to be a balance between water source, or amount of water available, and the total area of turf grasses to be maintained by type of turf grass.

- Reliable and Capable Distribution System throughout the Area to be Maintained
 - In order to be able to maintain turf grasses to a reasonable level of quality, there needs to be a way to reliably distribute water to each of these areas, found in piping to irrigation heads that cover all such areas. You can pull hose and either hand water or use temporary above ground heads, but if you don't have a large enough Maintenance Staff to support this, overall quality of conditions will suffer, no fault of the Maintenance Staff.
- Adequate Water Pressure
 - To be able to water where and when needed, noting that it is typical for many areas of the course to need water at the same time, it is important to have enough water pressure throughout the distribution system to allow for watering more than one area at a time – often times more two or three areas at a time. Turf grass won't care that there is not enough pressure to water where and when needed.
- Automation or a Large Enough Staff to Mangle Hand Watering
 - To be able to water where and when needed, again noting that it is typical for many areas of the course to need water at the same time, it is vital to either have enough automation, or a large enough staff, to be able to water multiple areas at the same time.

With a golf course that does not have some measure of an irrigation system with a good water source, a reliable distribution system, adequate water pressure, and automation or a large enough Maintenance Staff, turf grass quality will suffer at times, sometimes to the point the course is not very enjoyable to play, while at times the result can be the death of turf grasses.

In the time I have assisted Megunticook, I found that there are a lot of interesting things that can be done to improve the playing enjoyment of the course, with the first and most important thing being developing a more reliable way to consistently apply irrigation water. I would recommend updating a plan from local professionals to install a true irrigation system and provide a way to reliably supply that system with water. I would note that any such plan to install a true irrigation system should be done with any potential changes to the golf course in mind so that all areas are adequately watered, and there is an understanding of what changes may require irrigation to be moved or redone – such as in building a new tee, which will need irrigation, or in rebuilding a green, where it is often necessary to redo the irrigation. While it would be optimal to add tees or rebuild greens as a true irrigation system is installed, it is more important to get the irrigation system installed if funds won't allow for all to be done at the same time.