Turf Resources

Knowledge is of two kinds. We know a subject ourselves, or we know where we can find information on it.
Samuel Johnson (1709 - 1784)

Turfgrass Integrated Pest Management Handbook
Publication 816 - $20
Ontario Ministry of Agriculture and Food, Crop Technology Branch

This new turf publication has been designed as a field handbook and a study guide for IPM accreditation for the golf courses, lawn care and parks sectors. It contains basic information on IPM, IPM for diseases, insects and weeds that are found in turf in Ontario, IPM templates for golf courses, parks and lawn care, a turf disease identification key, a turf insect injury key and examples of pest monitoring sheets. This publication, along with Publication 384, *Recommendations for Turfgrass Management* and Publication 162, *Diseases and Insects of Turfgrass in Ontario* provide you with a complete reference package on turf IPM for Ontario.

To obtain copies visit your OMAF Resource Centre www.omaf.gov.on.ca or phone 1-877-424-1300.

Special Offer from the Guelph Turfgrass Institute
Turf IPM Reference Package containing the above 3 noted publications. Free shipping in Ontario (a $13 value). To order, phone 519-824-4120 x 52501 or email info@gti.uoguelph.ca.

Standard Guide for Maintaining Cool Season Turfgrasses on Athletic Fields
Guide F2060-00 $25 USD
American Society for Testing and Materials

This guide covers the minimum requirements for maintaining cool season turfgrasses used for natural surface athletic fields. Practices covered include mowing, fertilization, irrigation, core cultivation, overseeding, and pest management. For further information or to order visit www.astm.org.

Central Irrigation Control Systems – It's Time to Consider

GARY SUPP, CID, TURF CARE PRODUCTS CANADA

Water is an integral part of plant health care. For sports fields we need healthy turfgrass to make sure that it is firm yet resilient enough to withstand intensive athletic activities. To maintain that turf we need supplemental watering, as normal rainfall patterns do not always mesh with community activity schedules.

This additional watering can be provided by hand or hose travelers. But by far the most efficient precipitation pattern for an even distribution of water is that devised by nature in the form of rainfall. Our closest approximation to it is to design and install a uniform layout of water emitting devices either above or below soil level.

These "sprinklers" are controlled with a piping system. A series of valves allow us to introduce water into the pipe lines which are then directed over a landscaped area when and where we wish. This irrigation system makes it possible to be an efficient water manager as well as provide for plant life maintenance.

This dual stewardship has thankfully been assisted by technology. Safe low voltage electricity can turn a valve off or on. Timing mechanisms as simple as mechanical gear boxes or as sophisticated as today's personal computer allow us to sequentially activate these watering systems. Like all other applications of automation technologies, this has freed people to pursue other activities.

Efficient management of these systems still requires frequent adjustment. If enough rain falls there is no need for supplemental watering, so a timed landscape watering cycle needs to be halted for a period of time. If we are in the middle of a hot and dry summer or have a tournament schedule to meet, an increase in water replenishment may be required. If any cutting or aerifying equipment are needed to operate on the site, then the irrigation system must be scheduled to accommodate it.

Repair and replacement work is also a constant. Public interaction can sometimes lead to vandalism on park sites. As sprinkler systems age some of their components naturally stop performing.

This demand for irrigation system repairs and seasonal adjustments is more than possible to effectively manage for one site with just a single person dedicated to that purpose. As two, three, five or ten more sites are added for maintenance, there arises a need for assistance. This may be in the form of trained staff or hired professional contracting firms.

From here, a multi-site landscaper or parks manager also take on the task of financial analyst. What portion of a labour budget is allocated for irrigation work? How much money is to be spent on old or inadequate sprinkler system upgrade or repair? What are the parks' water usage bills like and are there directives to limit or reduce these expenditures without sacrificing park quality? Are present staff numbers to remain the same, be allowed to increase, or required to decrease over the next 3 to 10 years?

Then there is the role of emergency coordinator. As sometimes happens, a portion of the park may have flooded or eroded because a sprinkler line broke or a valve failed to close over night. Drought weather conditions may have dictated a need for water restrictions or outright bans for landscape watering purposes.

We can resolve all of these financial and emergency scenarios with regards to landscape watering through automated off-site monitoring and control irrigation systems. Central/satellite control systems allow one to view, record and manage irrigation water use over extended areas from a single location. Through developments achieved in the electronics and communications industries, alarms and fail safe shutoffs are triggered should water or hydro use occur beyond the range of normal consumptions.

These control packages greatly speed up repair response times. Irrigation component problems are pinpointed before reaching the site. Master water valves would have already shut the lines down, without losing thousands of liters

Typical Hardware Layout with Remote Transceiver

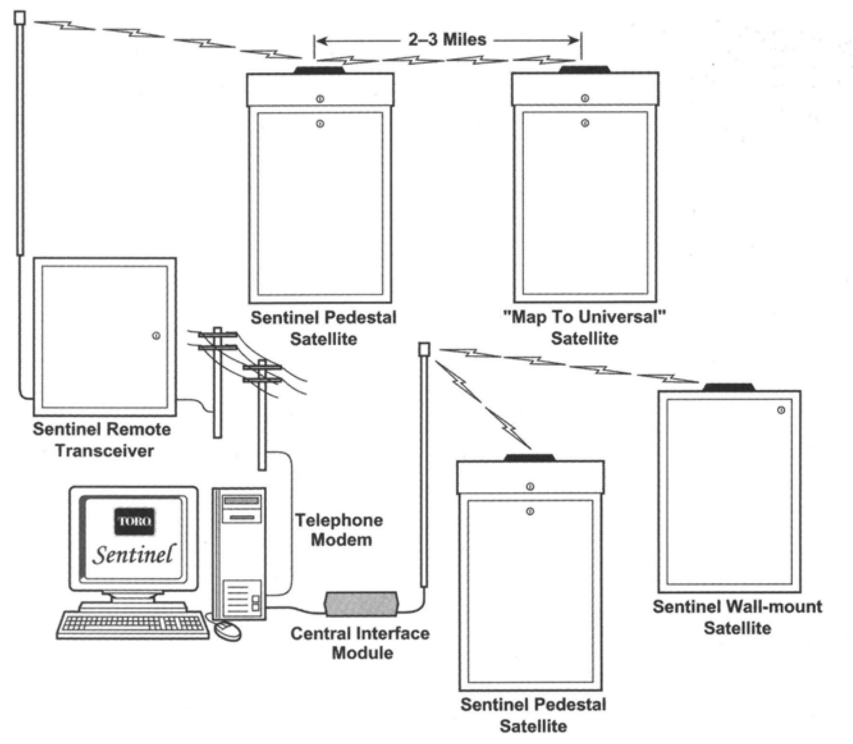

DIAGRAM AND PHOTOS COURTESY OF THE TORO COMPANY

of water to landscape runoff. Hand-held radios can then be used to turn valves on as required, eliminating the need for reaching into submerged valve box enclosures or directing additional staff to turn a timing switch device on and off.

Supplemental waterings are directed to occur based on complex programming parameters designed to step in only when nature skips a beat. Only as much water as is needed is released from the sprinkler zones to top off the soil reservoir to its optimum mix of oxygen and plant available water.

This type of control has actually been around for decades. While controlling devices have evolved, golf courses have been making full use of central control technology with great benefit for half a century. Superintendents have been able to adjust watering schedules for their entire golf course from within their offices instead of sending staff out to press buttons on satellite timing boxes placed over hundreds of acres of land.

Golf central irrigation control has advanced to the pace of the evolution of the personal computer. Digital time keeping alone has saved millions of gallons of water over the mechanical clocks of early generation controllers. The sophistication and degree of today's golf control systems now includes pump station monitoring and evapotranspiration based watering schedules.

One of the innovations of modern golf systems occurred over 20 years ago in the use of uhf frequency radio communication. This not just as a tool for valve actuation for repair functions, but as a means for a central computer to communicate scheduling information to its satellites without having to hard wire everything together. It was this advance in communication technology that made central irrigation control a viable option for non-contiguous sites such as college campuses and cities.

Piggy-backing the telecommunications industry, central control can now transmit and receive programming operations through telephone line or short range radio. Advancing radio technologies like the cellular telephone and the promise of satellite information relay systems are bringing to focus a new all-encompassing wireless network as the communication standard of the future.

The flexibility now inherent in central to satellite would be merely electronic soup without a complete and functioning database of every working sprinkler zone. Each valve operated group of sprinkler heads must be identified and detailed. Expected station flow rates based on manufacturer's published data are then compared to actual flow rates measured through flow meters. These water flow monitoring devices are inserted into each water service pipe line. From this analysis, service adjustments to some of the site irrigation components may be required to achieve optimum uniformity.

A master shutoff valve is also added to react to unexpected water usage. Flows during various stages of irrigation cycle operation are continually measured to ensure that all is operating when and how it should be. If not, an alarm is created while the piping system is shut down automatically. These alarms can even be qualified so that those incidents where water flows remain unstopped immediately page emergency service personnel. For public parks this can translate into a near elimination of unscheduled down time for athletic play due to water damaged landscape.

Best central control practices also require a series of environmental measuring sensors be introduced into the landscape. One or two weather stations should be set up in regional typifying areas. They would measure several atmospheric factors such as temperature, relative humidity, wind and solar radiation levels to arrive at an accurate assessment of evapotranspiration (ET) loss during the day. This ET figure is communicated generally once a day at a time when sprinklers are not in operation throughout the system to adjust daily watering schedules. This information is critical to ensure that only the exact water replenishment amount is released through the sprinkler system.

Rain sensors are used on each site to override scheduled irrigation cycles should a cloudburst occur between ET programming relays. More sophisticated rainfall units can even measure the amount of rainfall and relay that to a logged system data base for historical tracking – rainfall data– stored and recorded for report and review.

Soil moisture sensors retain final veto of sprinkling operations for each site. They are designed to respond to the water holding capacity different soil bases have when being used as subterranean plant water reservoirs. For example, sand based soils would allow for more frequent watering applications due to lower moisture retention capabilities.

With this level of hydraulic control and real time environmental tracking, irrigation systems become a best management process for the plant care regimen. Water consumption may be reduced by 30 to 50 percent annually from previous non-monitored sprinkler methods. Plant material may also be trained for drought tolerance through deep infrequent cyclings of supplemental water.

Central irrigation control systems can also interact with lock and lighting systems through the use of low voltage electric relays. Utilizing a dry contact switch methodology, the system can recognize whether hydro has operated and create alarms similar to those used for water applications.

Central irrigation system control has arrived in the 20th century ready for the 21st. It carries a price in dollars which might not appear fiscally possible given present budgets. It seems initially to be a lot to pay up front for what looks like something as simple as turning water valves off and on. Like all other digital technologies, however, as hardware/ software items adapt the latest circuitries unit, costs are coming down. Even at today's market prices for these systems, payback periods of two to five years are not unheard of.

Solid state circuitry continues to shrink all communication and information access into the palm of our hand. The irrigation industry is keeping pace.

The growing scope of a parks management workload that strives to meet higher community service standards demands the use of the best tools available. Water supply agencies demand conservative accountability for all water usage. It is indeed time to consider central irrigation control systems. ♦