

# Levels of Design

**(LEED, High Efficiency, Utilizing Reuse & Rainwater)**

*“Are all irrigation systems created equal? For that matter are they designed with efficiency in mind? What about maintenance issues?”*

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## The Scenario

I have created a leading edge landscape concept for an upcoming project. However, I know the plant material that I have selected will require supplemental watering to get them through the harsh weather days ahead during the establishment period. What am I to do?



Have you heard about irrigation systems? Oh, you mean those things that get buried and come on automatically and get the landscape wet? Yea. But I hear they are lots of trouble and don't work well, especially those drip irrigation ones.

Sound familiar? For the past 18 years I have heard this kind of talk over and over again till I am blue in the face from holding back my comments. It's time to clear the air. I have just completed presenting at two large green industry conventions – one in Minnesota and another in Toronto. Your right – most people just don't get it! The questions that I am asked and the comments that I am told bring me back to the days of old when I did not no the difference – or that their even was a difference. Boy – was I wrong! I have spent the past 17 years reading about irrigation and the massive array of parts produced all over the world that can come together to create a “SYSTEM.” I emphasize system here because that is what it is. A professionally design irrigation system (CID) utilizing the correct and most efficient parts to meet the sites unique watering needs, installed by pre-qualified contractors (CIC), maintained by certified irrigation technicians (CIT) with the entire process overseen by a qualified experience irrigation consultant (ASIC) – is like a hot red Ferrari, pushed to the limit on a European Autobahn. This is what life is all about!

## Reality Bites

Oh, this is not your experience with irrigation on your past projects? Why? Did you follow the process? Oh, you thought irrigation systems were just something thrown together by someone claiming to be a qualified contractor, sorry, a qualified irrigation contractor? And those pipes still sticking out of the ground, they really don't go with your landscape dream do they? But, they threw in the car wash and the sidewalk and driveway washing that occurs daily for free. What a bargain.



Ok, I will lay off the typical problems that are plaguing the irrigation trade, now and in the future. Unless we work together to put an end to water wasting inferiorly designed, installed and maintained so called irrigation systems – the problems will persist.

There are three things going for irrigation right now that I pray will change the way irrigation is looked at, treated at the concept table, talked about by those that design landscape projects – plants that do not need water do not exist – as far as I am aware of. So, we need irrigation systems – correct? What we do not need is JUNK! Low Bid gets junk. Design/Build most times gets junk. If the process required to have a professionally conceptualized efficient irrigation system designed, installed and maintained is not adhered to you get what? JUNK! This brings confusion and mistrust from those who wish to do the right thing but do not know where to turn.

The three things working to straighten out the irrigation industry are: The Irrigation Association (IA) educational offerings, The EPA's new initiative creating WaterSense (like Energy Star) to promote WaterSense recognized designers, contractors and water auditors who have stepped up to the plate to receive certification and many more educational opportunities being offered by Rain Bird, Toro, Hunter, Irrigorteck, Cal Poly Pomona, and people like myself that are saying – enough is enough.

### Levels of Irrigation

Once upon a time there was only irrigation or no irrigation systems. You either had water or you didn't. This picture shows an aqueduct in Turkey which carries water from the hills to the house and fields. Our current levels of irrigation equipment are light years ahead of this technology. The problem we are having is that the trade is for most part not versed in the latest available technology. The water efficient parts are there – the knowledge to create the most practical efficient site specific systems for most players is missing. Time is on our side and the next generation will be much better stewards of this finite natural resource – or they will not have it to use in the first place.



With the introduction of LEED – Leadership in Energy and Environmental Design, new classifications for irrigation appeared. LEED is defined as:

*“The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ is the nationally accepted benchmark for the design, construction, and operation of high performance green buildings. LEED gives building owners and operators the tools they need to have an immediate and measurable impact on their buildings’ performance. LEED promotes a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality.” USGBC*

The new classifications for water efficiency credits noted in LEED documents, or for that matter sites with well thought out water efficient irrigation systems are:

- ◆ Traditional (conventional),
- ◆ High Efficiency,
- ◆ LEED, which includes rainwater or recycled site water harvesting systems.

The goal is to get sites off of potable water systems – city supplied water. This water is becoming to valuable and scarce in areas to be used for anything but human consumption. Besides, plants do not like chlorinated water and do far better using what Mother Nature provides.

These are the new emerging words used to describe a certain type and efficiency level of the new breed of irrigation systems, currently being undertaken by a select few in Canada and the USA.

- ◆ **Traditional** also called conventional is an old school spray sprinkler and rotary sprinkler irrigation system. Controlled by an irrigation controller (timer) which when the time and day line up to indicate a watering occurrence has been programmed, sends an electrical current through a wire to a valve solenoid causing the valve to hydraulically open. The water flows through the lateral pipe line to the various sprinkler heads and as the line pressurizes sprinklers rise up to perform their duty – watering for however long the operator has set them to run. Spray sprinklers covering areas from 5’ to 15’ are used for smaller areas while rotors that move the stream of water throughout a preset pattern water form 16’ to 40’ or more for larger applications. These systems are usually measured in gallons per minute (GPM) of water.



- ◆ **High Efficiency** systems with city water sources utilize technology that has come from the agricultural side of irrigation. Netafim, a leading edge company from Israel is the technology responsible for greening the desert, drip by drip. These systems usually utilize what is commonly known as Drip irrigation. I like to call it Low Volume as there are numerous devices that utilize gallons per hour (GPH) watering rather than GPM. Sub-surface used for crop production is making itself known in landscape planters and small turf areas. Boulevard strips of grass typically around 4’ to 5’ wide are perfect for the use of sub-surface technology – if and when the system is designed and installed by professionals that know what they are doing. Soaker hose used for rows of hedges, soaking shrubs and other uses has been around for a long time. It works similar to your own skin that



allows moisture to come to the surface for cooling. Soaker hose works the same way where little drops of water are forced through the pipe causing the pipe to bleed water slowly but effectively. Drip emitters are devices placed on a distribution pipe that carries water to many devices. Each device is rated for a certain water discharge in GPH. They vary for .5 gph to 24 gph. The higher flow can place a small stream of water about 6’ into the air so the old saying that drip does not deliver very much water does not hold true. Inline drip emitters are extruded inside of a pipe typically 1/2” or 5/8<sup>th</sup>”.



The water is forced through a labyrinth which slows the flow to a drip and pressure regulates at the same time. This pipe is currently being installed in turf areas by those who are



adventurous and will slowly become the norm. Coated in root inhibitor the old saying that roots followed the water into the emitter and stopped the flow is now old school. Surface installed dripline spaced in a triangular layout with distance dictated by soil type is used to flood irrigate mass planted areas. Tree root watering systems utilizing micro-bubblers are available to deep root water

them while also providing air deep into the planter pit. Micro sprays are also used for mass planting areas to broadcast water over the entire planter bed.

- ◆ **LEED** would be based upon the High Efficiency model. Differences are where the water comes from. Rainwater harvesting has become a commonly used word around leaders in this field as well as recycled site water. LEED Credits are awarded as noted:
  - ◆ WE Credit 1.1: Use high efficiency irrigation technology, OR, use captured rain or recycled site water to reduce potable water consumption for irrigation by 50% over conventional means. (1 point)...

- ◆ WE Credit 1.2: Use only captured rain or recycled site water for an additional 50% reduction (100% total reduction) of potable water for site irrigation needs, OR, do not install permanent landscape irrigation systems. (1 point)...

Captured rain also known as Rainwater harvesting (pictured are Bushman Tanks) and the use of reuse site water require a knowledgeable consultant in this specialized field of irrigation –to get it right the first time. The mention of non-permanent irrigation to me sounds like agricultural fields where an irrigation system is laid out on the surface to satisfy the crops water requirements to produce the desired marketable results for that particular crop. I would view an irrigation laid on the surface for a period of up to 2 years or longer as an eye sore detracting from the overall vision and outcome of the project that so many landscape design teams spend countless hours creating. A more pleasing method is to design an irrigation system where stations (zones) can be shut off once the plant material has established itself –with the use of supplemental irrigation – delivered in a just in time methodology.



Credit:

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References/ Credits:

USGBC

<http://www.usgbc.org/DisplayPage.aspx?CategoryID=19>

Rain Bird Irrigation - Root watering system and drip emitter photos.

Bushman irrigation and water storage (rain harvesting tanks)