



## Bear Creek Community Charter School at Ten Mile Run

### High Efficiency LED Lighting White Paper

Bear Creek Community Charter School's commitment to environmental stewardship is evident throughout the design of the new Bear Creek Community Charter School at Ten Mile Run. One example is the installation of high efficiency LED lighting throughout the interior of the school as well as exterior lighting across the new school campus. There will be 1,154 light fixtures installed in the new school, and 989 of those light fixtures will be high efficiency LED lighting fixtures. LED lighting provides numerous benefits, including long-term cost savings. As a fiduciary of public funds, it is important to ensure the new facility operates as efficiently as possible.

The light-emitting diode (LED) is one of today's most energy-efficient and rapidly-developing lighting technologies. Quality LED light bulbs last longer, are more durable, and offer comparable or better light quality than other types of lighting.

#### Why Use LED Lighting?

- Long Life: Long life time stands out as the number one benefit of LED lights. LED bulbs and diodes have an outstanding operational life time expectation of up to 100,000 hours. This is 11 years of continuous operation, or 22 years of 50% operation. If you leave on the LED fixture for 8 hours per day it would take around 20 years before you'd have to replace the LED bulb. LED bulbs don't really burn out and stop working like a standard light, moreover the lighting diodes emit lower output levels over a very long period of time and become less bright. Because the long life span of LED lights, there is less maintenance work - think of all the time saved in replacing light bulbs.
- Energy Efficiency: Today's most efficient way of illumination and lighting, with an estimated energy efficiency of 80% when compared to traditional lighting and conventional light bulbs. This means that about 80% of the electrical energy is converted to light, while 20% is lost and converted into other forms of energy such as heat. With traditional incandescent light bulbs who operate at 20% energy efficiency only, a 80% of the electricity is lost as heat. Imagine the following scenario: If you use traditional lighting and have an electricity bill of \$ 100, then \$80 of that money has been used to heat the room, not to light it! Using LED illumination with 80% efficiency, the electricity costs would be around \$ 20 and you'd have saved around \$ 80.
- Low-Voltage: A low-voltage power supply is sufficient for LED illumination. This makes it easy to use LED lighting also in outdoor settings, by connecting an external solar-energy source and is a big advantage when it comes to using LED technology in remote or rural areas.

- Ecologically Friendly: LED lights are free of toxic chemicals. Most conventional fluorescent lighting bulbs contain a variety of materials such as mercury, that are dangerous for the environment. LED lights contain no toxic materials and are 100% recyclable, and will help you to reduce your carbon footprint by up to a third. The long operational life time span mentioned above means also that one LED light bulb can save material and production of 25 incandescent light bulbs. A big step towards a greener future!
- Durable Quality: LEDs are extremely durable and built with sturdy components that are highly rugged and can withstand even the roughest conditions. Because LED lights are resistant to shock, vibrations and external impacts, they make great outdoor lighting systems for rough conditions and exposure to weather, wind, rain or even external vandalism, traffic related public exposure and construction or manufacturing sites.
- Zero UV Emissions: LED illumination produces little infrared light and close to no UV emissions. Because of this, LED lighting is highly suitable not only for goods and materials that are sensitive to heat due to the benefit of little radiated heat emission, but also for illumination of UV sensitive objects or materials such as in museums, art galleries, archeological sites etc.
- Design Flexibility: LEDs can be combined in any shape to produce highly efficient illumination. Individual LEDs can be dimmed, resulting in a dynamic control of light, color and distribution. Well-designed LED illumination systems can achieve fantastic lighting effects, not only for the eye but also for the mood and the mind. LED mood illumination is already being used in airplanes, classrooms and many more locations and we can expect to see a lot more LED mood illumination in our daily lives within the next few years.
- Operational in Extremely Cold or Hot Temperatures: LED are ideal for operation under cold and low outdoor temperature settings. For fluorescent lamps, low temperatures may affect operation and present a challenge, but LED illumination operates well also in cold settings, such as for outdoor winter settings, freezer rooms etc.
- Light Dispersement: LED is designed to focus its light and can be directed to a specific location without the use of an external reflector, achieving a higher application efficiency than conventional lighting. Well-designed LED illumination systems are able to deliver light more efficiently to the desired location.
- Instant Lighting & Frequent Switching: LED lights brighten up immediately and when powered on, which has great advantages for infrastructure projects such as traffic and signal lights. Also, LED lights can be switched off and on frequently and without affecting the LED's lifetime or light emission. In contrast, traditional lighting may take several seconds to reach full brightness, and frequent on/off switching does drastically reduce operational life expectancy.