



Lighting Evaluation and Report

Field of Dreams Baseball Complex Dripping Springs ,TX

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Lighting Evaluation and Report

Purpose

The purpose of this report is to evaluate the performance of the lighting installation at the Field of Dreams Sport Complex at 7398 Creek Road in Dripping Springs, Texas. The evaluation consists of review of fixture types and quantities, pole placement, aiming angles and light levels being produced in field of play and areas beyond the field of play.

Documents provided

- Field layout with light fixtures located
- CAD file of Lighting layout.
- Light Fixture Quotation dated 9/5/12 from Terrence Sports Lighting Inc.

General Information

Field Layouts

Field #9 is a 300' field. Fields 1-8 are all 200' fields and are in two clusters of four fields.

Light Pole Placement

Field #9 has light poles located along the 1st and 3rd baselines and in the outfield.

Field #1-#8 has light poles placed along the common space between the field clusters and along common baselines between the fields. There are no poles in the outfield of these 8 fields.

Basic Lighting System Installation

The lighting system consists of pole mounted sport floodlight fixtures in groups of 3, 4 or 5 lights per pole on 60' wooden poles.

The light fixtures used are 1500Watt GE Power Spot Sport Lighting Fixtures with NEMA 6 reflectors. NEMA 6 reflectors have a beam pattern of 100 to 130 degree and are considered to be "wide beam" units. The light fixtures do not have glare control shields.

The lighting system was installed in Feb/March of 2013. The installation was performed without any formal engineered design documents. There are no light level calculations or fixture aiming angle documents for the installation.

Lighting System Operation

Lights are reported by nearby residents to be used 3 to 4 nights per week from dusk till 10:30PM. With this as a usage basis, the installed lights have operated approximately 600 hours. The lamp life of 20,000 hours total would yield approximately 90% of their rated light output currently.

Field Lighting Survey

A site visit was conducted during the day to take photos and confirmed the layout documents that were provided.

A site visit at night was conducted on 3/3/14 to take light level measurements. A Minolta T10A light meter was used. The light meter was last calibrated when purchased two years ago. The light meter was held at 36" above grade for light level recording. One staff member held the meter, while another recorded the measurements.

It was determined by field to field light level sampling that that lights levels within fields 1-8 were basically consistent. Based on this, only one field's light levels were recorded. Light levels were taken in the infield and outfield area. These recorded light levels are found on the plan contained in the back of this report. Additional light levels were taken outside the field on the adjacent Troppy property.

A sample of Field #9's lighting levels beyond the playing field produced minimal levels beyond the field of play. This is due to the use of light poles in the outfield.

Lighting Standards and Recommendations

Baseball field lighting recommendations can be found in Illumination Engineering Manual (IES) manual RP-6-01 Class III (some spectators) and 2013 Little League Lighting Standards.

Both sources recommend the infield lighting levels be 50 foot-candles with uniformity of 2:1 and outfield lighting should be 30 foot-candles with uniformity of 2.5:1.

Fixture aiming angles should not exceed 25 degrees from horizontal.

Light pole placement is provided in both standards, but Little League Lighting Standards show recommended pole locations for 200'-300'fields.

Lighting control to address light trespass, over-illumination, glare, clutter, and sky glow are lighting system requirements that are not specifically defined in the two standards referenced. However, it is stated that careful consideration should be given to this issue during the design of the lighting system. Methods to control these issues are a

combination of pole height/placement, fixture reflector beam selection, fixture aiming angles and use of glare control shields.

General Light levels (For Reference)

Condition	Illumination	
	(ftcd)	(lux)
Sunlight	10,000	107,527
Full Daylight	1,000	10,752
Overcast Day	100	1,075
Very Dark Day	10	107
Twilight	1	10.8
Deep Twilight	.1	1.08
Full Moon	.01	.108
Quarter Moon	.001	.0108
Starlight	.0001	.0011
Overcast Night	.00001	.0001

Lighting Survey Results

Recorded Light Levels (Fields 1-8) (Illumination Engineering Manual (IES) manual RP-6-01)

Infield Light Levels -62 Foot-candles (average) Min. to Max. 1.5:1 (70 fc to 50 fc)

Outfield Levels- 23 Foot-candles (average) Min. to Max. 5:1 (50 fc to 10 fc)

Fixture Aiming Angles

Exact fixture aiming angles cannot be confirmed, but it appears that the angles are slightly higher than the recommended 25 degree from horizontal.

Adjacent Property

Light levels in the adjacent Troppy property were in excess of .25 foot-candle in most areas. Access to extended area property was not available, but it is estimated that measureable light levels of .1 foot-candles extended for several hundred feet beyond the Troppy property.

Evaluation

Light Pole/Fixture Placements

The location of poles for 200' radius fields #1-8 does agree with the layout provided in the Little League Lighting Standards (see recommended lighting diagrams –page 12). However, the notes related to this diagram point out taller light poles may be needed for glare control. In addition, IES RP-6-01 states “careful consideration should be given how a planned lighting layout may impact surrounding spaces”.

The lack of outfield light poles require that all field lighting be directed from poles being placed along the 1st and 3rd field baselines with fixtures being aimed at high angles into the outfield. The higher aiming angles combined with “wide angle” fixture reflectors is causing uneven field lighting, and unwanted glare and spill light to the surrounding properties, as shown in the below photo.



Light Levels

Comparing the recommended light levels and minimum to maximum limitations, the infield lighting exceeds recommended levels and the outfield levels are less than the recommended levels. The lower outfield light levels coupled with excessive min. to max. ratios make the outfield lighting non compliant with recommended levels.

Field Comparisons

Daytime visit of several area youth baseball complexes were conducted to compare the Field of Dreams layout of poles and number of fixtures per pole aiming angles. The following photos compare the lighting layout of the Field of Dreams to the Oak Hill Baseball Complex. It should be noted that the Oakhill Complex uses fewer lights per pole, employs the use of outfield poles, allowing for lower aiming angles. The use of outfield poles was prevalent in area youth baseball complexes visited.

Field of Dreams Photographs (1-8)



View from Field # 8



Typical Light Pole with 4 fixtures on each side



View between Fields 1-8

Oakhill Baseball Complex Photographs



200' radius Field Infield Lighting



200' radius Field Infield Lighting



200' Radius Field Outfield Lighting

Conclusion

The Field of Dreams lighting installation appears to have the quantity of light fixtures to comply with lighting standards and recommendations. However, light pole locations combined with the number of light fixtures per pole, are producing field light levels that do not meet the standards outlined in Illumination Engineering Manual (IES) manual RP-6-01 Class III (some spectators) and 2013 Little League Lighting Standards. More importantly, lack of light poles in the outfield is clearly causing unwanted spill light into the adjacent properties and light trespass and glare that can be seen for up to a mile away from the fields.

The basic location of poles for 200' radius Fields #1-8 does agree with the layout provided in the Little League Lighting Standards (see recommended lighting diagrams – page 12). However, the notes related to this diagram point out “taller poles may need to be needed for glare control”. In addition, IES RP-6-01 states “careful consideration should be given to how any lighting layout could impact surrounding spaces”.

Based on our evaluation, proper consideration was not given in the Field of Dreams lighting system installation to prevent unacceptable spill light, light trespass, and glare to the surrounding properties.

Recommendations

The current lighting system should be modified to improve the light levels on the field and reduce the light trespass and glare being imposed on adjacent properties. Potential lighting modifications are outlined below. It is recommended that the lighting options be modeled by a lighting designer to determine the effectiveness of the potential modifications.

Option #1

Increase pole height, adjust fixture aiming angles, and provide glare control shields as necessary to redirect light to field of play and reduce spill light and unwanted glare. A complete lighting study would be needed to confirm that this option would meet the recommend standards.

Option #2 (recommended)

Increase the number of poles by placing two outfield poles on each field (#1-8). Reallocate the number of light fixtures per pole, change aiming angles, and provide glare shields at the perimeter fixtures to provide better overall field lighting to field of play and reduce spill light and unwanted glare.