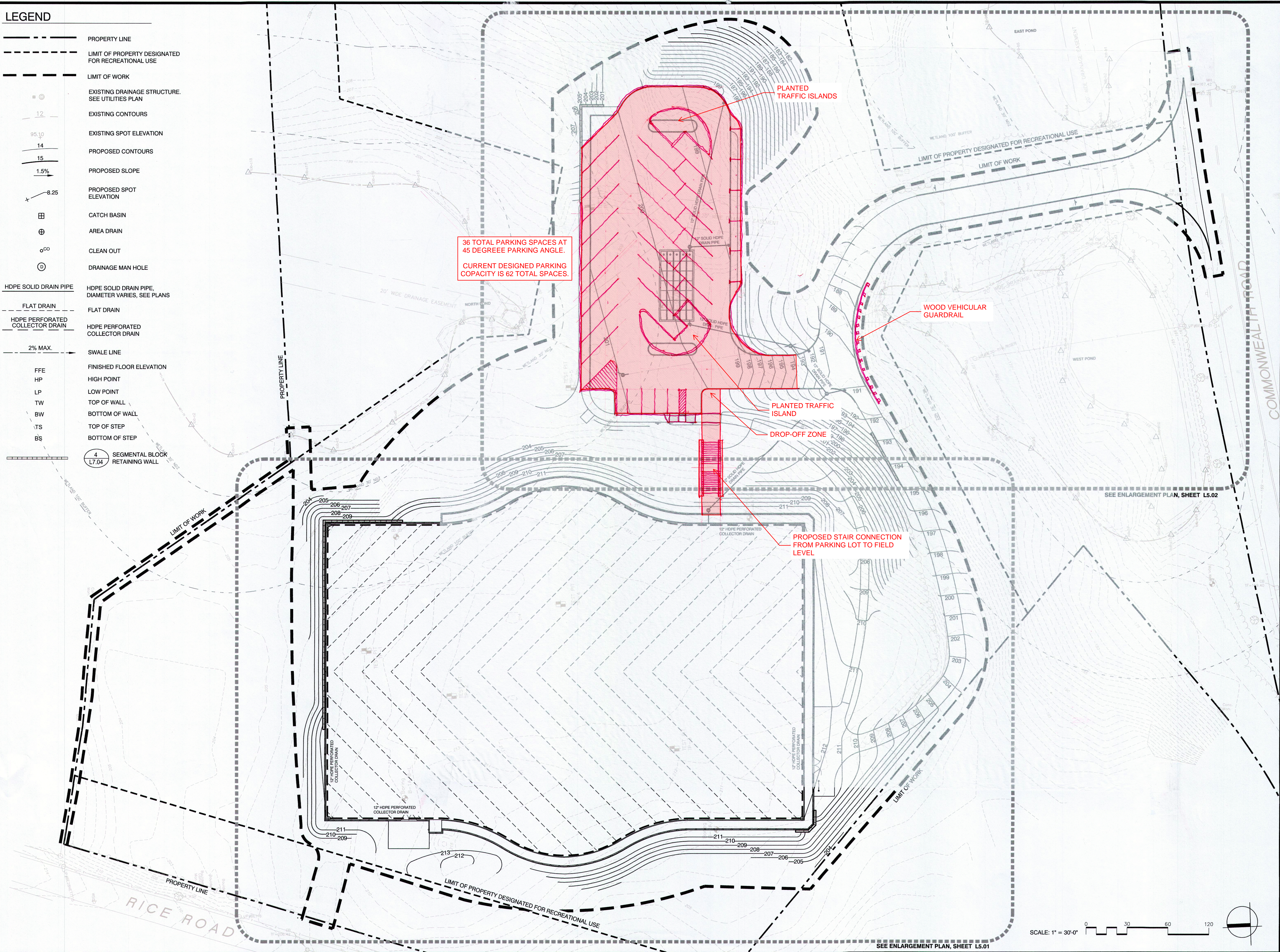


## LEGEND

- |                                 |  |
|---------------------------------|--|
|                                 | PROPERTY LINE  |
| -----                           | LIMIT OF PROPERTY DESIGNATED FOR RECREATIONAL USE    |
| -----                           | LIMIT OF WORK  |
| ⊞ ⊙                             | EXISTING DRAINAGE STRUCTURE.<br>SEE UTILITIES PLAN   |
| 12                              | EXISTING CONTOURS                                    |
| 95.10                           | EXISTING SPOT ELEVATION                              |
| 14                              | PROPOSED CONTOURS                                    |
| 15                              | PROPOSED SLOPE                                       |
| 1.5%                            | PROPOSED SPOT ELEVATION                              |
| 8.25                            | CATCH BASIN  |
| ⊞                               | AREA DRAIN   |
| ⊕                               | CLEAN OUT  |
| o <sup>CO</sup>                 | DRAINAGE MAN HOLE                                    |
| ⊙                               |  |
| HDPE SOLID DRAIN PIPE           | HDPE SOLID DRAIN PIPE.<br>DIAMETER VARIES, SEE PLANS |
| FLAT DRAIN                      | FLAT DRAIN   |
| HDPE PERFORATED COLLECTOR DRAIN | HDPE PERFORATED COLLECTOR DRAIN                      |
| 2% MAX.                         | SWALE LINE   |
| FFE                             | FINISHED FLOOR ELEVATION                             |
| HP                              | HIGH POINT   |
| LP                              | LOW POINT  |
| TW                              | TOP OF WALL  |
| BW                              | BOTTOM OF WALL                                       |
| TS                              | TOP OF STEP  |
| BS                              | BOTTOM OF STEP                                       |
| 4                               | SEGMENTAL BLOCK RETAINING WALL                       |



## IMPROVEMENTS TO LOKER CONSERVATION AND RECREATION AREA



410 COMMONWEALTH RD,  
WAYLAND, MA 01778

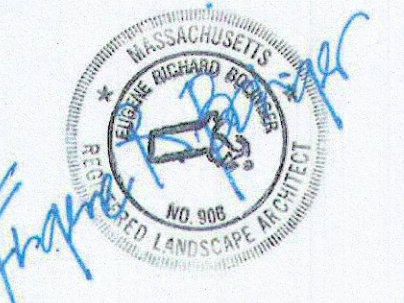
Weston & Sampson<sup>SM</sup>

85 Devonshire Street,  
3rd Floor, Boston, MA 02109  
617.412.4480 800.SAMPSON  
[www.westonandsampson.com](http://www.westonandsampson.com)

Consultants:

[illegible]

Seal:



Issued For:

BIDDING DOCUMENTS

Scale: AS SHOWN

Date: JANUARY 18, 2019

Drawn By: CCC, DYF

Reviewed By: BMK

Approved By: **ERB**

W&amp;S Project No: 2180076

W&amp;S File No:

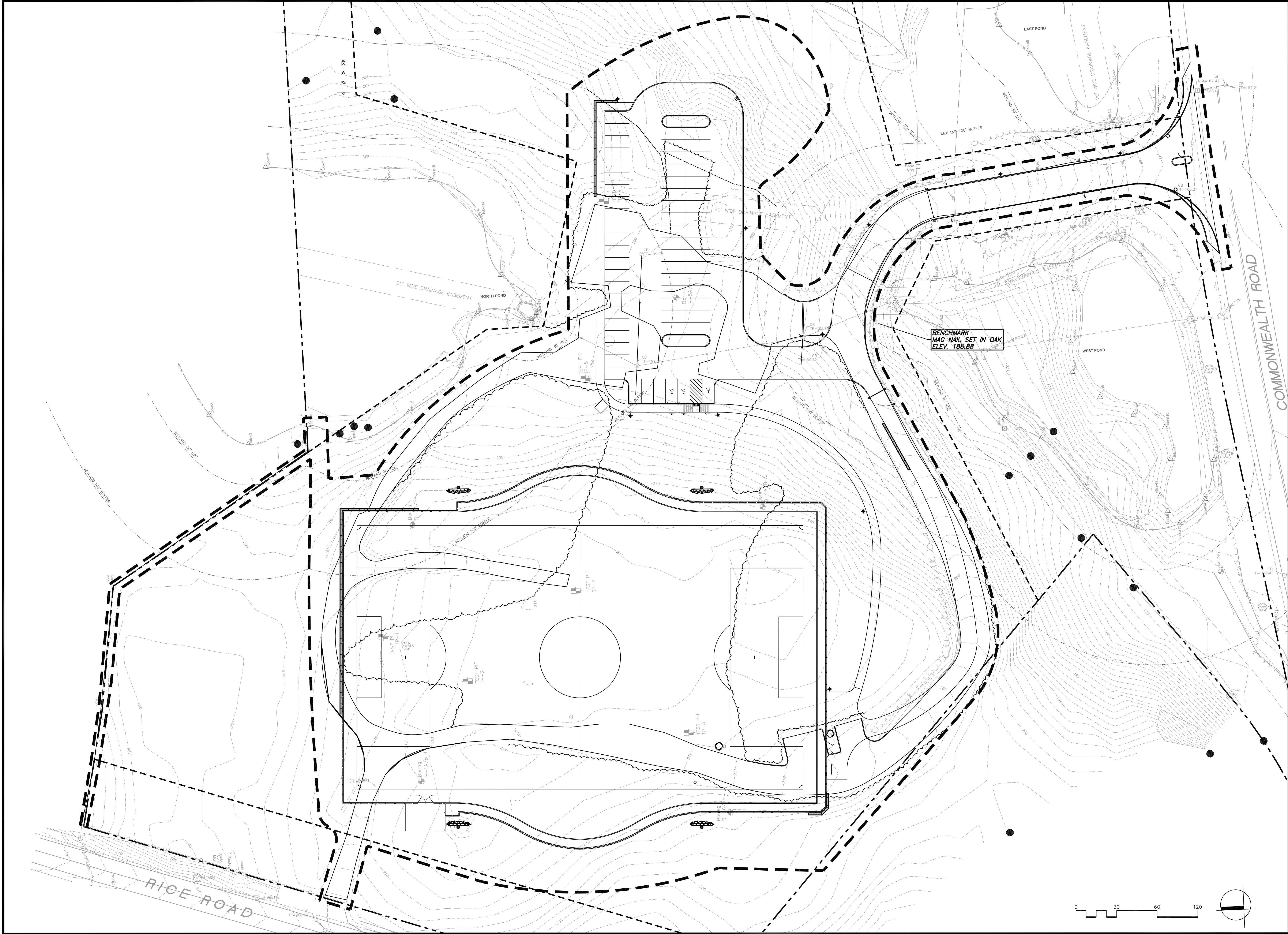
Drawing Title:

OVERALL GRADING,  
DRAINAGE & UTILITY  
PLANS

Sheet Number:


**L5.00**





Project:

IMPROVEMENTS TO  
LOKER CONSERVATION  
AND RECREATION AREA



410 COMMONWEALTH RD,  
WAYLAND, MA 01778

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85 Devonshire Street,  
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Consultants:

Revisions:

No.	Date	Description

Seal:



Issued For:

BIDDING DOCUMENTS

Scale: AS SHOWN

Date: JANUARY 18, 2019

Drawn By: CCC, DYF

Reviewed By: BMK

Approved By: ERB

W&S Project No: 2180076

W&S File No:

Drawing Title:

OVERALL SITE PLAN  
OVERLAY

Sheet Number:

L3.00



# Loker Soccer Field

Wayland,MA

## Lighting System

Pole / Fixture Summary						
Pole ID	Pole Height	Mtg Height	Fixture Qty	Luminaire Type		Circuit
S1-S4	70'	70'	6	TLC-LED-1150		6.90 kW
4			24			27.60 kW

Circuit Summary			
Circuit	Description	Load	Fixture Qty
A	Soccer	27.6 kW	24

Fixture Type Summary							
Type	Source	Wattage	Lumens	L90	L80	L70	Quantity
TLC-LED-1150	LED 5700K - 75 CRI	1150W	121,000	>81,000	>81,000	>81,000	24

## Light Level Summary

Calculation Grid Summary								
Grid Name	Calculation Metric	Illumination					Circuits	Fixture Qty
		Ave	Min	Max	Max/Min	Ave/Min		
Property Line	Horizontal	0.01	0	0.46	0.00		A	24
Property Line	Max Candela (by Fixture)	330	0	15109	0.00		A	24
Property Line	Max Vertical Illuminance Metric	0.02	0	0.95	0.00		A	24
Soccer	Horizontal Illuminance	36.6	23	45	1.99	1.59	A	24
Zero Grid	Horizontal	0.04	0	3	0.00		A	24
Zero Grid	Max Candela (by Fixture)	1111	0	72360	0.00		A	24
Zero Grid	Max Vert Illuminance (by Light Bank)	0.06	0	4	0.00		A	24

## From Hometown to Professional



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EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
4	S1-S4	70'	-4'	66'	TLC-LED-1150	6	6	0
4	TOTALS					24	24	0

Loker Soccer Field  
Wayland,MA

GRID SUMMARY	
Name:	Soccer
Size:	330' x 195'
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

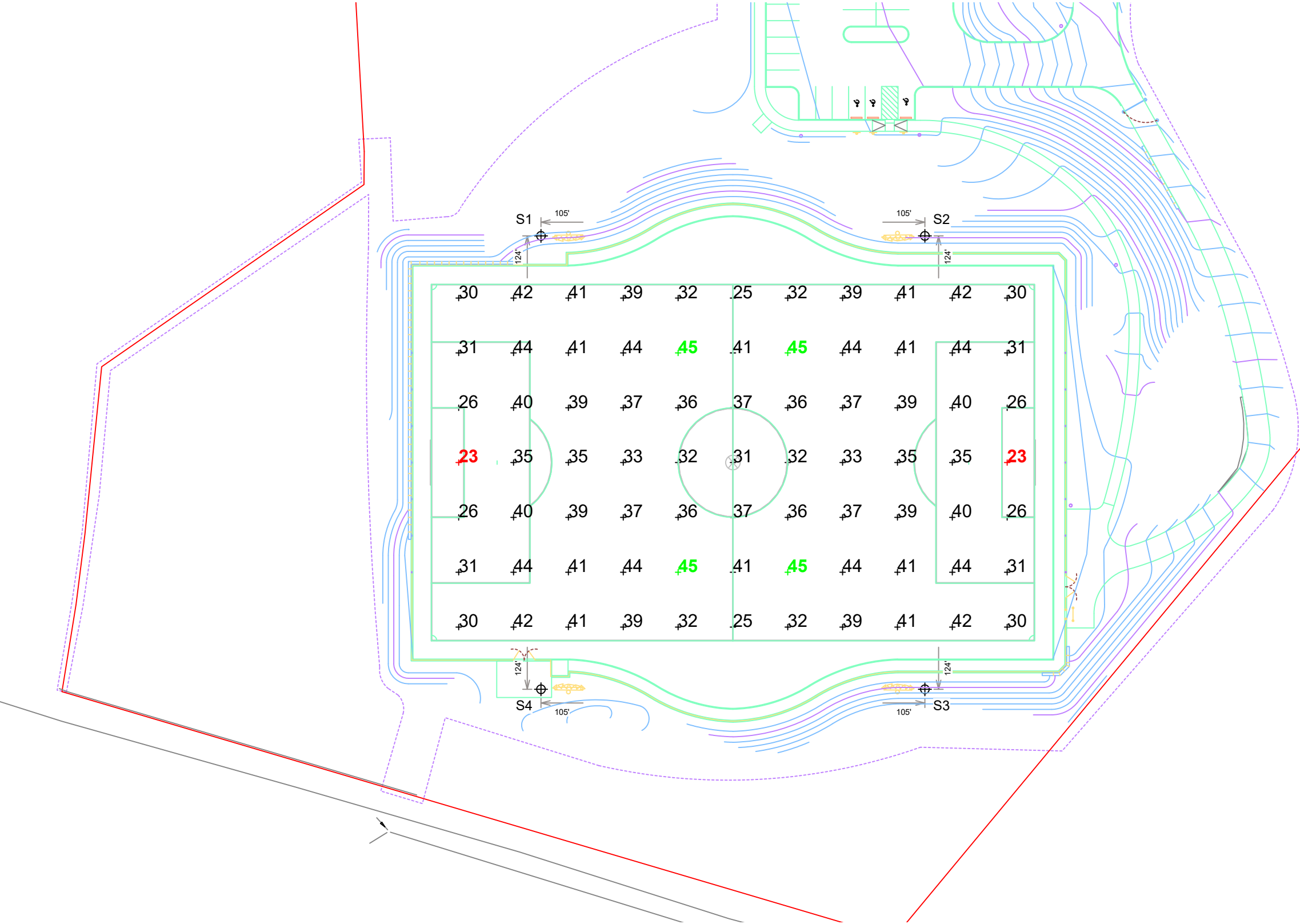
ILLUMINATION SUMMARY			
MAINTAINED HORIZONTAL FOOTCANDLES			
	Entire Grid		
<b>Guaranteed Average:</b>	<b>30</b>		
Scan Average:	36.64		
Maximum:	45		
Minimum:	23		
Avg / Min:	1.61		
<b>Guaranteed Max / Min:</b>	<b>2.5</b>		
Max / Min:	1.99		
UG (adjacent pts):	1.67		
CU:	0.88		
No. of Points:	77		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	121,000 lumens		
<b>No. of Luminaires:</b>	<b>24</b>		
Total Load:	27.6 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-1150	>81,000	>81,000	>81,000
Reported per TM-21-11. See luminaire datasheet for details.			

**Guaranteed Performance:** The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.95 dirt depreciation factor.

**Field Measurements:** Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

**Electrical System Requirements:** Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

**Installation Requirements:** Results assume ± 3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.



Pole location(s) ⚓ dimensions are relative to 0,0 reference point(s) ⊗



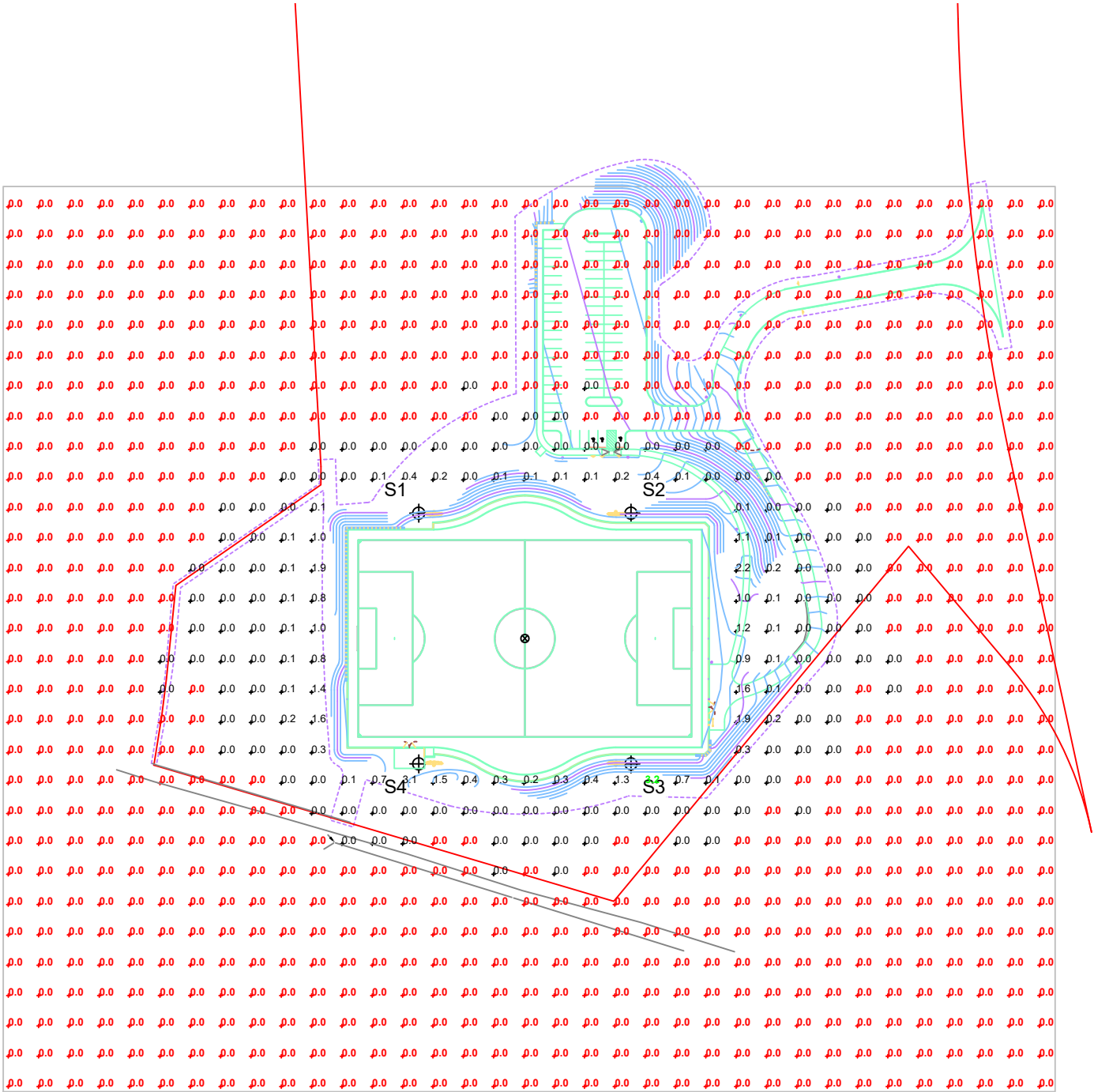
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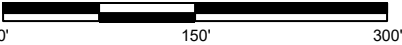
ILLUMINATION SUMMARY



EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
4	S1-S4	70'	-4'	66'	TLC-LED-1150	6	6	0
4	TOTALS					24	24	0



SCALE IN FEET 1 : 150



ENGINEERED DESIGN By: Markie Roake • File #191248AR1 • 21-Jan-19

## Loker Soccer Field

Wayland,MA

GRID SUMMARY	
Name:	Zero Grid
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

ILLUMINATION SUMMARY			
MAINTAINED HORIZONTAL FOOTCANDLES			
	Entire Grid		
Scan Average:	0.04		
Maximum:	3		
Minimum:	0		
Avg / Min:	-		
Max / Min:	-		
UG (adjacent pts):	2391.19		
CU:	0.01		
No. of Points:	933		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	121,000 lumens		
No. of Luminaires:	24		
Total Load:	27.6 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-1150	>81,000	>81,000	>81,000
Reported per TM-21-11. See luminaire datasheet for details.			

**Guaranteed Performance:** The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.95 dirt depreciation factor.

**Field Measurements:** Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

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**Installation Requirements:** Results assume  $\pm$  3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.



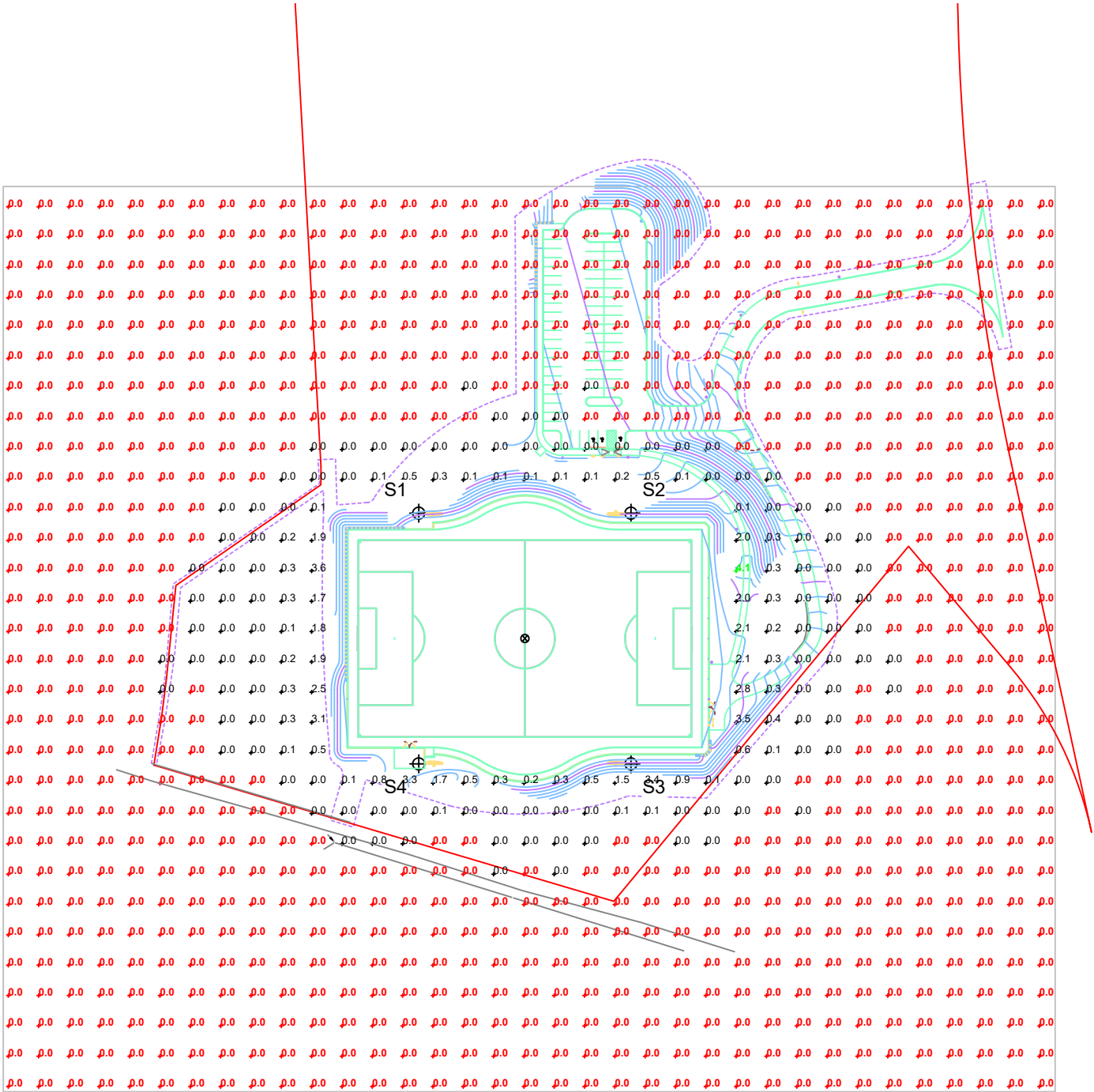
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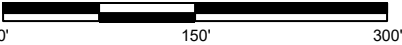
## ILLUMINATION SUMMARY



EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
4	S1-S4	70'	-4'	66'	TLC-LED-1150	6	6	0
4	TOTALS					24	24	0



SCALE IN FEET 1 : 150



ENGINEERED DESIGN By: Markie Roake • File #191248AR1 • 21-Jan-19

## Loker Soccer Field

Wayland,MA

GRID SUMMARY	
Name:	Zero Grid
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

ILLUMINATION SUMMARY				
MAINTAINED MAX VERTICAL FOOTCANDLES				
		Entire Grid		
Scan Average:	0.06			
Maximum:	4			
Minimum:	0			
Avg / Min:	-			
Max / Min:	-			
UG (adjacent pts):	1928.78			
CU:	0.01			
No. of Points:	933			
LUMINAIRE INFORMATION				
Color / CRI:	5700K - 75 CRI			
Luminaire Output:	121,000 lumens			
No. of Luminaires:	24			
Total Load:	27.6 kW			
Lumen Maintenance				
Luminaire Type	L90 hrs	L80 hrs	L70 hrs	
TLC-LED-1150	>81,000	>81,000	>81,000	
Reported per TM-21-11. See luminaire datasheet for details.				

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**Field Measurements:** Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

**Electrical System Requirements:** Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

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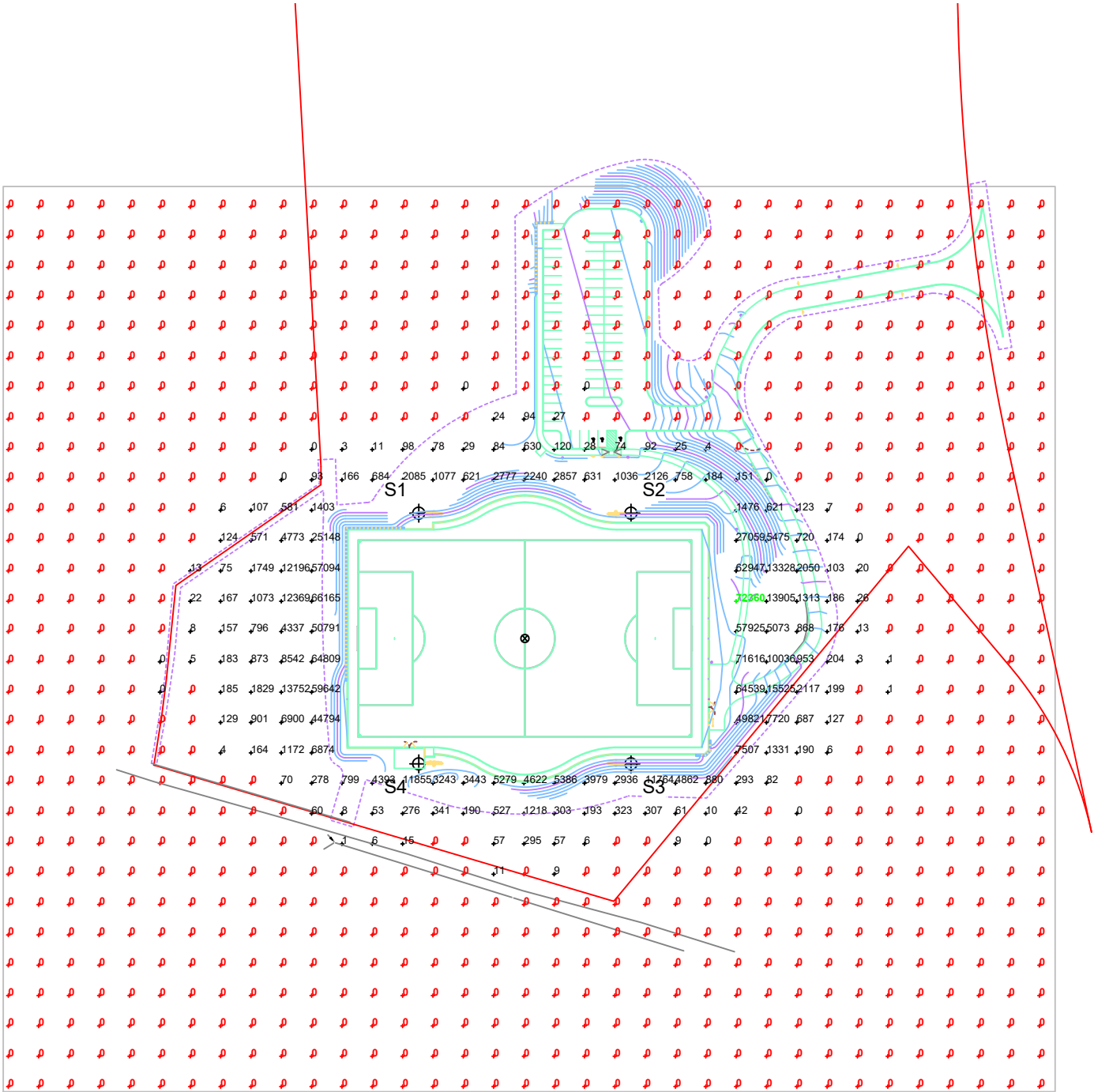
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## ILLUMINATION SUMMARY



EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
4	S1-S4	70'	-4'	66'	TLC-LED-1150	6	6	0
4	TOTALS					24	24	0



## Loker Soccer Field

Wayland,MA

GRID SUMMARY	
Name:	Zero Grid
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

ILLUMINATION SUMMARY			
MAINTAINED CANDELA (PER FIXTURE)			
	Entire Grid		
Scan Average:	1110.90		
Maximum:	72360		
Minimum:	0		
Avg / Min:	-		
Max / Min:	-		
UG (adjacent pts):	6264.35		
CU:	0.01		
No. of Points:	933		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	121,000 lumens		
No. of Luminaires:	24		
Total Load:	27.6 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-1150	>81,000	>81,000	>81,000
Reported per TM-21-11. See luminaire datasheet for details.			

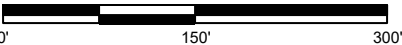
**Guaranteed Performance:** The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.95 dirt depreciation factor.

**Field Measurements:** Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

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**Installation Requirements:** Results assume  $\pm$  3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.

SCALE IN FEET 1 : 150



Pole location(s)  $\oplus$  dimensions are relative to 0,0 reference point(s)  $\otimes$



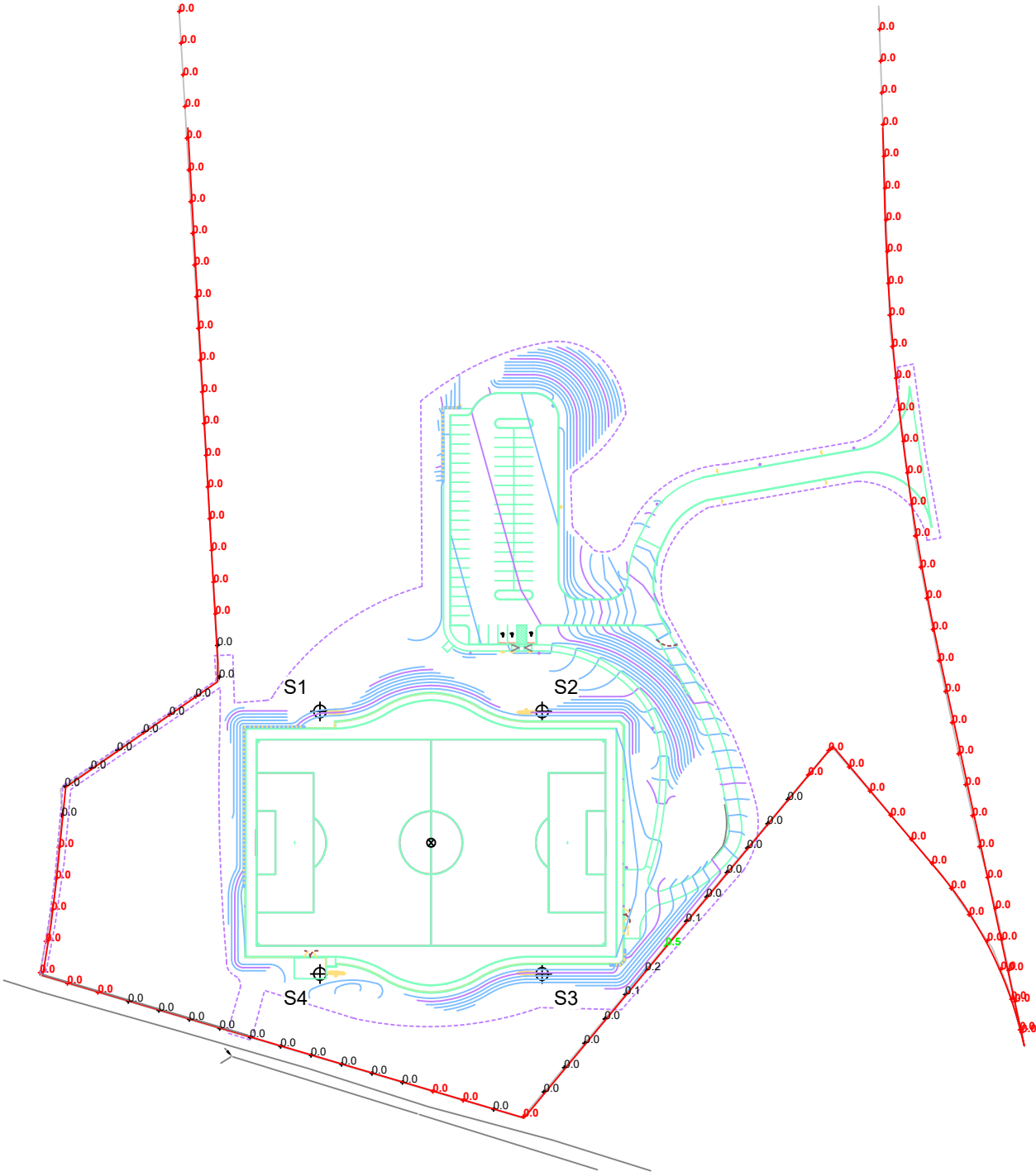
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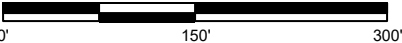
## ILLUMINATION SUMMARY



EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
4	S1-S4	70'	-4'	66'	TLC-LED-1150	6	6	0
4	TOTALS					24	24	0



SCALE IN FEET 1 : 150



## Loker Soccer Field

Wayland,MA

GRID SUMMARY	
Name:	Property Line
Spacing:	30.0'
Height:	3.0' above grade

ILLUMINATION SUMMARY			
MAINTAINED HORIZONTAL FOOTCANDLES			
	Entire Grid		
Scan Average:	0.0085		
Maximum:	0.46		
Minimum:	0.00		
No. of Points:	109		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	121,000 lumens		
No. of Luminaires:	24		
Total Load:	27.6 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-1150	>81,000	>81,000	>81,000
Reported per TM-21-11. See luminaire datasheet for details.			

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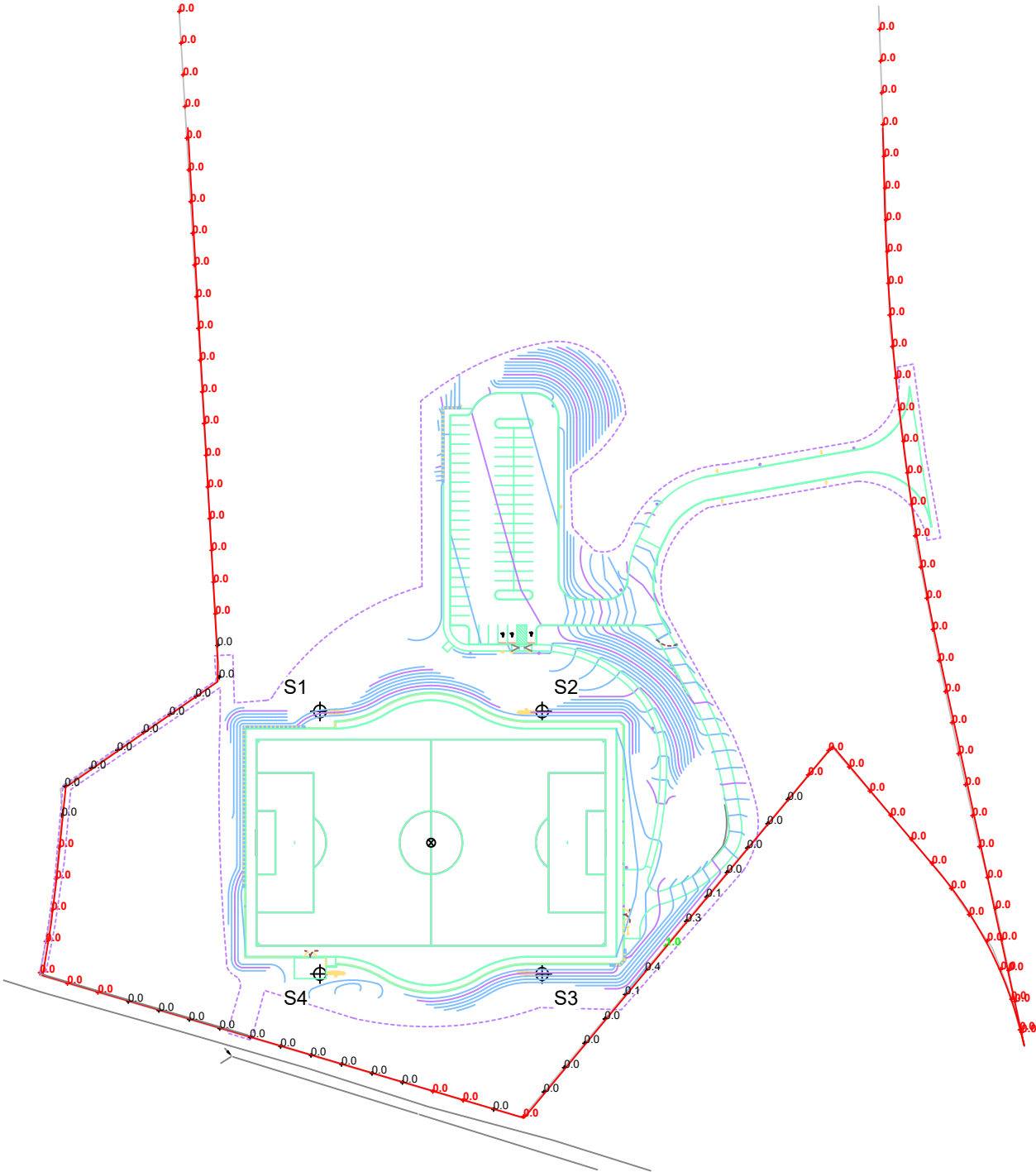


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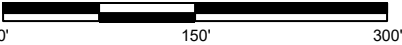
## ILLUMINATION SUMMARY



EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
4	S1-S4	70'	-4'	66'	TLC-LED-1150	6	6	0
4	TOTALS					24	24	0



SCALE IN FEET 1 : 150



## Loker Soccer Field

Wayland,MA

GRID SUMMARY	
Name:	Property Line
Spacing:	30.0'
Height:	3.0' above grade

ILLUMINATION SUMMARY			
MAINTAINED MAX VERTICAL FOOTCANDLES			
	Entire Grid		
Scan Average:	0.0172		
Maximum:	0.95		
Minimum:	0.00		
No. of Points:	109		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	121,000 lumens		
No. of Luminaires:	24		
Total Load:	27.6 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-1150	>81,000	>81,000	>81,000
Reported per TM-21-11. See luminaire datasheet for details.			

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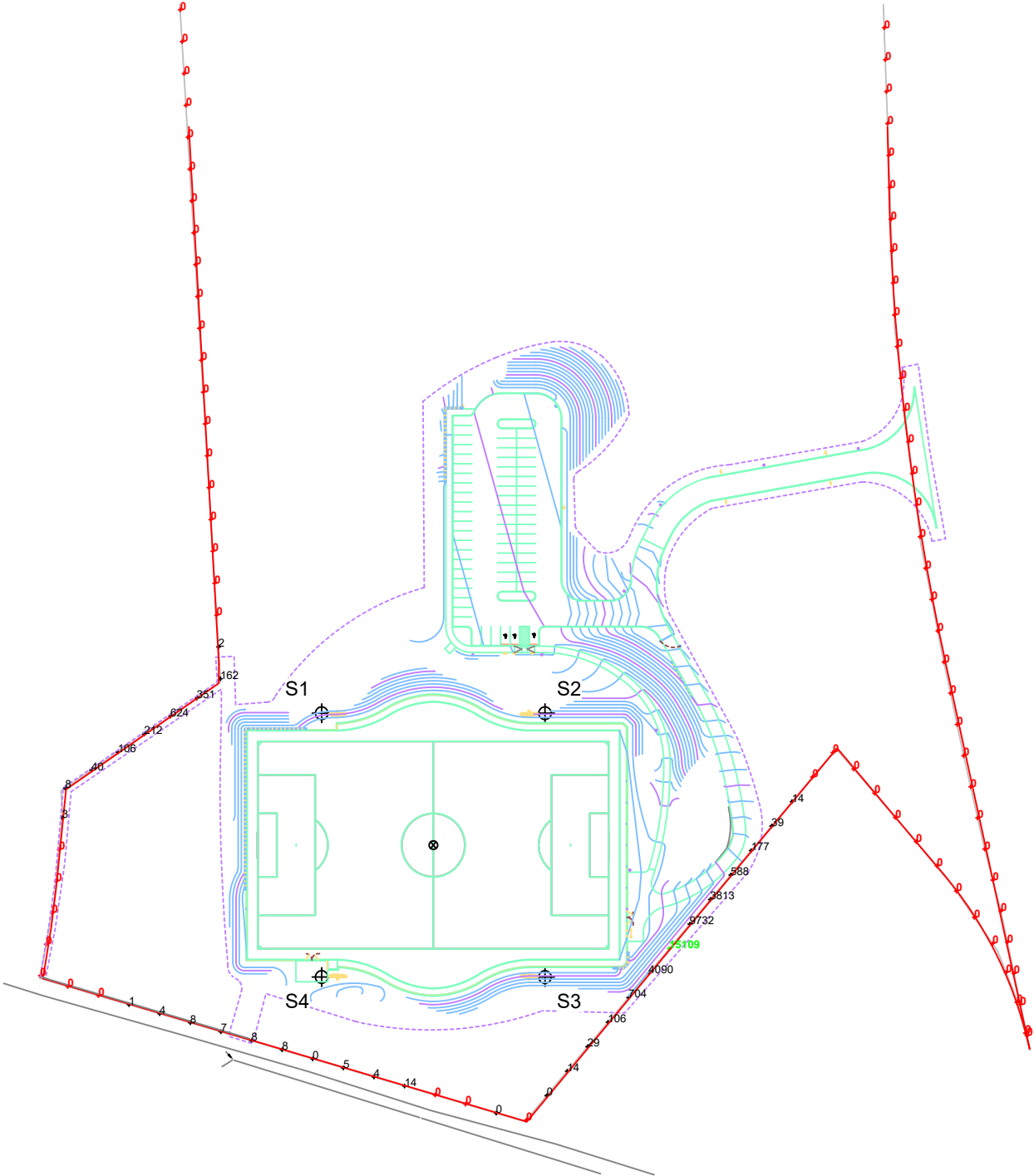


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## ILLUMINATION SUMMARY



EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
4	S1-S4	70'	-4'	66'	TLC-LED-1150	6	6	0
4	TOTALS					24	24	0



## Loker Soccer Field

Wayland,MA

GRID SUMMARY	
Name:	Property Line
Spacing:	30.0'
Height:	3.0' above grade

ILLUMINATION SUMMARY			
MAINTAINED CANDELA (PER FIXTURE)			
	Entire Grid		
Scan Average:	330.0715		
Maximum:	15108.77		
Minimum:	0.00		
No. of Points:	109		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	121,000 lumens		
No. of Luminaires:	24		
Total Load:	27.6 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-1150	>81,000	>81,000	>81,000
Reported per TM-21-11. See luminaire datasheet for details.			

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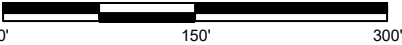


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## ILLUMINATION SUMMARY

SCALE IN FEET 1 : 150



Pole location(s) ⚓ dimensions are relative to 0,0 reference point(s) ⊗



Loker Soccer Field  
Wayland,MA

EQUIPMENT LAYOUT

**INCLUDES:**

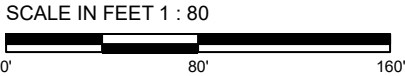
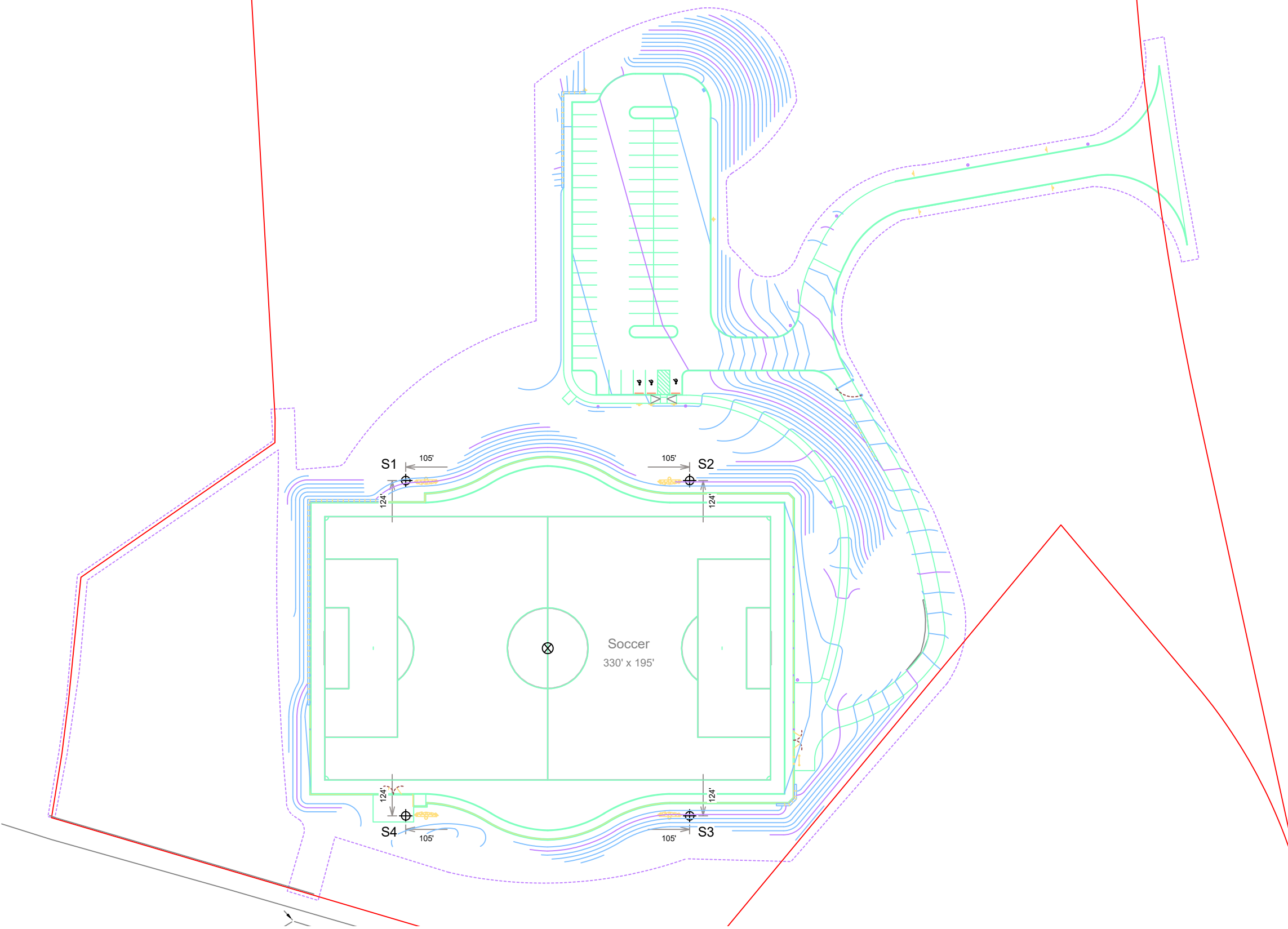
- Soccer

**Electrical System Requirements:** Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

**Installation Requirements:** Results assume ± 3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.

EQUIPMENT LIST FOR AREAS SHOWN						
Pole				Luminaires		
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE
4	S1-S4	70'	-4'	66'	TLC-LED-1150	6
4	TOTALS					24

SINGLE LUMINAIRE AMPERAGE DRAW CHART								
Ballast Specifications (.90 min power factor)		Line Amperage Per Luminaire (max draw)						
Single Phase Voltage	208 (60)	220 (60)	240 (60)	277 (60)	347 (60)	380 (60)	480 (60)	
TLC-LED-1150	6.8	6.5	5.9	5.1	4.1	3.7	3.0	



Pole location(s) ⚓ dimensions are relative to 0,0 reference point(s) ⊗



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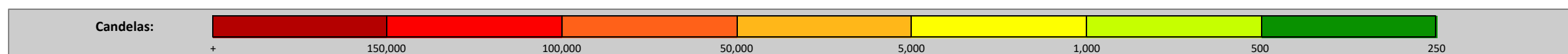
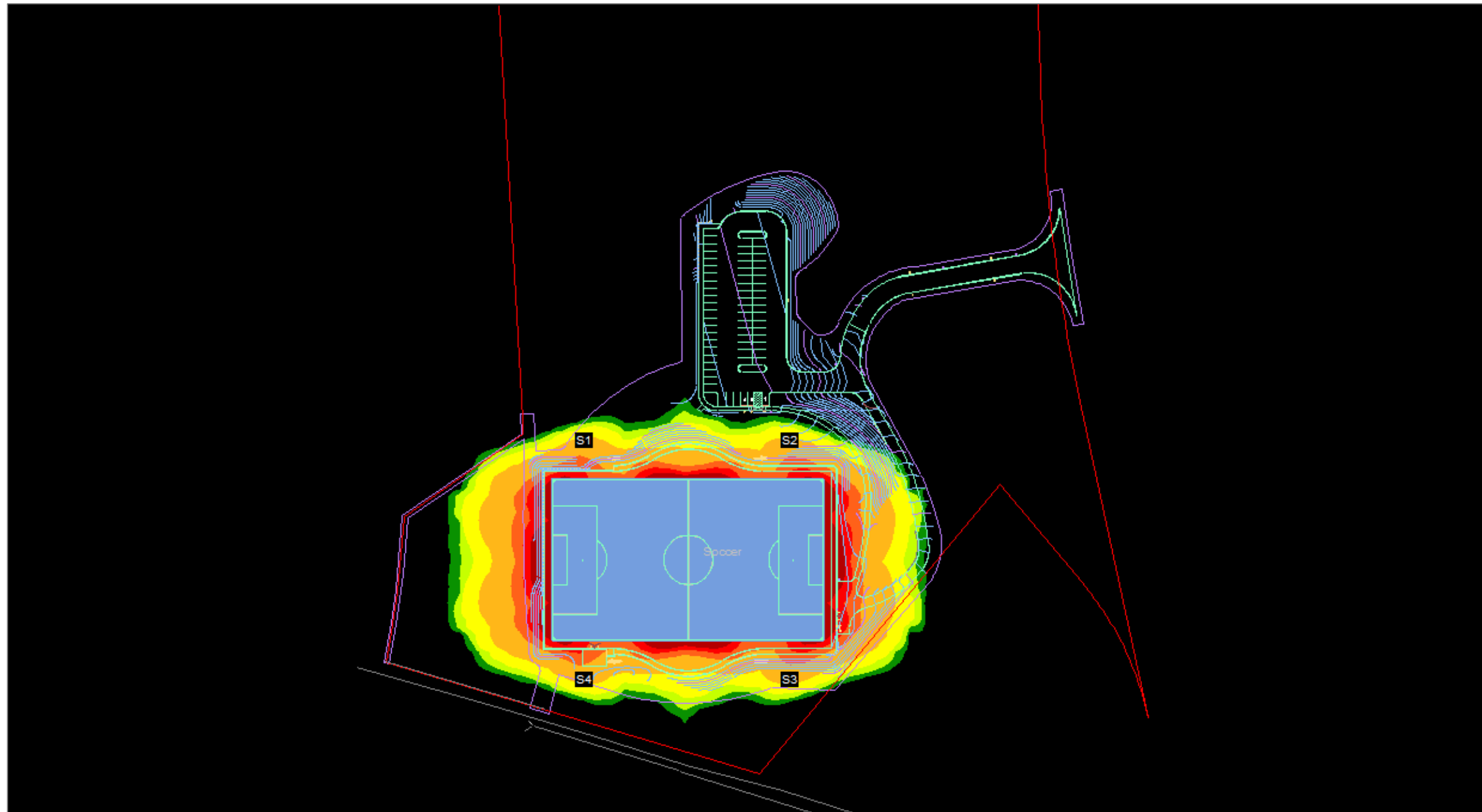
## Wayland, MA

## Summary

A well-designed lighting system controls light to provide maximum useful on-field illumination with minimal destructive off-site glare.

## Candela Levels

**Minimal to No Glare: 500 or less candela**  
Equivalent to 100W incandescent light bulb.



**ENGINEERED DESIGN** By: Markie Roake • File #191248AR1 • 21-Jan-19





Consulting  
Engineers  
and Scientists

January 15, 2019

Project 941.01189

Mr. Sarkis Sarkisian, Town Planner  
Town of Wayland  
41 Cochituate Road  
Wayland, Massachusetts 01778

RE: Environmental Conditions  
Former Dow Chemical Facility  
412 Commonwealth Road  
Wayland, Massachusetts

Dear Mr. Sarkisian:

As requested, Ransom Consulting, Inc. (Ransom) has prepared this letter for Town of Wayland regarding the environmental conditions of the above-referenced property (the Site). Ransom understands that the Town plans to re-develop a portion of the Site with an athletic field and associated parking lot.

Between 1994 and 2000 and under the supervision of the Massachusetts Department of Environmental Protection (MassDEP), Ransom worked with The Dow Chemical Company (Dow) during the performance of preliminary and comprehensive response actions, as defined by the Massachusetts Contingency Plan (MCP) at the Site. The response actions were focused on several potential/suspected areas of contamination at the Site, including two on-site septic systems, a "former burn area", former "shallow disposal/glass disposal area", dredge spoils piles, and two fuel oil underground storage tanks (USTs). Dow also undertook additional voluntary response actions at the Site in response to public comments and a request from the Board of Selectmen; these actions include sampling of environmental media at other portions of the Site as requested by the public. Finally, in 1999, Dow undertook a voluntary facility closure project which included the demolition of the on-site buildings, the closure of the two septic systems, the removal of approximately 13,000 tons of sediments associated with two dredge spoils piles and the restoration of the Site. In March 2000, a Class A-2 Response Action Outcome (RAO) Statement, concluding that a Permanent Solution had been achieved at the Site, was submitted to the MassDEP.

Based on the response actions completed at the Site and the regulatory status of the Site, Ransom does not anticipate that the Site's past use will be an impediment to the proposed redevelopment plan.

If you have any questions regarding this letter, please contact me at (978) 465-1822.

Sincerely,

Timothy J. Snay, LSP, LEP  
Principal, Vice President/Senior Scientist

TJS:ts

**12 Kent Way, Suite 100, Byfield, Massachusetts 01922-1221, Tel (978) 465-1822, Fax (978) 465-2986**  
400 Commercial Street, Suite 404, Portland, Maine 04101, Tel (207) 772-2891  
Pease International Tradeport, 112 Corporate Drive, Portsmouth, New Hampshire 03801, Tel (603) 436-1490  
60 Valley Street, Building F, Suite 106, Providence, Rhode Island 02909, Tel (401) 433-2160  
2127 Hamilton Avenue, Hamilton, New Jersey 08619, Tel (609) 584-0090

[www.ransomenv.com](http://www.ransomenv.com)



## *M E M O R A N D U M*

**TO:** Brandon Kunkel, Sr. Landscaped Architect, Weston & Sampson

**FROM:** Daron Kurkjian P.E., Project Manager - EGE, Weston & Sampson  
Sean Healey, LSP, Team Leader - EGE, Weston & Sampson

**DATE:** April 4, 2018

**SUBJECT:** Proposed Recreation Field – Loker Conservation and Recreation Area  
Focused Environmental Records Review & Soil Assessment

We understand that that Town of Wayland is considering redevelopment of portions of the of the Loker Conservation Area in Wayland, Massachusetts (the Site) for recreational purposes. Pursuant to your request, we have performed an environmental records review and soil assessment of areas planned for redevelopment. A summary of our review and subsequent soil assessment is provided below.

### **Environmental Records Review:**

The Site planned for redevelopment is a portion of the Loker Conservation and Recreation area in the Town of Wayland. The area of the Site was previously occupied by a Dow Chemical testing facility which operated at the Site between 1964 and 1988. The Dow Chemical facility was demolished in 1999 to 2000.

The area planned for redevelopment is defined in previous environmental reports as 16-acres of the 32-acre former Dow Chemical property. Several former buildings were previously located on-Site including a main office building and laboratory building, a cooling tower building, a solvent storage shed, a garage and a small shed. The proposed area for athletic field redevelopment is limited to the area of the main office building on the western portion of the Site. Dow's research included testing relative to:

- Inorganic and organo-metallic chemistry related to the synthesis of ceramics and catalyst;
- Organic chemistry/biochemistry related to enzymes and epoxies;
- Synthesis of agricultural and pharmaceutical compounds; and
- Catalyst research related to hydrogen production.

The Site is listed with the Massachusetts Department of Environmental Protection (MassDEP) under Release Tracking Number (RNT) 3-3866. This RTN is associated with environmental investigations conducted at the Site between 1987 and 1994 by Ransom Environmental on behalf of Dow Chemical. In 1993, the Site became a MassDEP Public Involvement Plan (PIP) Site following receipt of a citizen petition. The investigations identified known and suspected areas of subsurface disposal and contamination including:

- 1) An upper septic system area, located north of the former laboratory building;



- 2) A former shallow disposal/glass disposal area, located in the vicinity of the former solvent storage shed and former cooling tower building;
- 3) A former burn area, consisting of the burn bucket and concrete pad incineration areas; and
- 4) A former underground storage tank (UST) and lower septic system area, located near the southeast corner of the laboratory building.

Of these four areas, the upper septic system area is the only area that is proposed to be disturbed by the proposed athletic field construction. The remaining three areas of historic environmental concern are not planned to be disturbed during the proposed athletic field construction.

Remedial actions were performed at the Site in 2000 and included:

- Removal of surface soils from a former fire training area;
- Removal of two dredge spoil piles; and
- UST removal.

None of the above remediation areas are in the areas planned to be disturbed by the proposed athletic field construction.

In 2000, Ransom submitted a Class A-2 Response Action Outcome (RAO) Statement for RTN 3-3866 in support of regulatory closure. The RAO applies to four discrete locations identified above. The RAO is supported by a Method 3 risk characterization for each of the four areas. The RAO and Method 3 concluded that there is No Significant Risk to human health or the environment from residual contaminants at the Site. Weston & Sampson has reviewed the Method 3 risk characterization and based on the data presented the conclusions of the risk characterization appear reasonable.

Additional Site closure activities were also conducted in 2000 and included the abatement of asbestos containing material within the building, and demolition of building and structures on the Site. According to previous reports, the Upper and Lower Septic tanks were removed. The Upper Septic system distribution system status is unknown and appears to remain in place. No distribution system was listed to be associated with the Lower septic tank.

In response to a request from the Wayland Board of Health, in 2000 the Massachusetts Department of Public Health's Bureau of Environmental Health Assessment reviewed cancer incidence and potential exposure from the Site. This assessment focused on residents that live in the area of the Site. No statistically significant increased incidence of cancer was found.

Weston & Sampson focused our review within the areas associated with potential Site redevelopment. Based on our preliminary review of the RAO and Method 3 risk characterization (March 2000) and the Facility Closure Report (April 2000), we identified the following concerns:

- Site risk assessment and risk characterization applied only to the four discrete areas of the Site identified above. Of these four areas, the upper septic system area is the sole area proposed to be disturbed by the athletic field construction. There was limited historic soil or groundwater data in the areas planned for redevelopment as recreational fields.

The risk characterization did not evaluate a park or recreation field visitor. It did evaluate residential use in three of the four areas, which may be protective of park or recreations field visitors; however, there is no residential use evaluation in certain areas planned for



redevelopment. The residential use evaluation is a conservative exposure pathway. In 2004, the Town of Wayland added deed restrictions to the Site limiting future uses to conservation and/or recreation. Therefore, no residential redevelopment is allowed on the Site.



**Soil Assessment:**

To assess soil conditions in the area of proposed redevelopment, Weston & Sampson collected soil samples from five (5) soil borings, six (6) test pits, and seven (7) surface soil sample locations. Soil assessment was focused on areas of proposed cut and fill and areas where soils are planned to be excavated and relocated on-Site. Soil sample locations were also placed in area where future field users and spectators will congregate. Results of the soil assessment are detailed below:

**Soil Borings:**

On March 12, 2018, Weston & Sampson directed the advancement of five (5) soil borings at the Site. See Figure 1 for approximate soil boring locations.

Soil samples were collected at continuous intervals within the borings. Soils encountered generally consisted of brown silty sands with trace gravel. Refusal indicating shallow bedrock ranged from approximately 5 to 8 feet below ground surface (bgs). No odors or staining were observed in soil samples collected from the borings. Soil samples were field screened with a photo-ionization detector (PID) meter to evaluate potential volatile constituents. The PID readings were low and the highest reading was 4.6 parts per million by volume (ppmv).

Weston & Sampson collected and submitted soil samples for off-Site laboratory analysis. Five (5) soil samples (one from each boring) were submitted for volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), Resource Conservation and Recovery Act (RCRA) 8 metals plus cobalt and/or pesticides and herbicide analysis.

**Test Pits and Surface Soil Sampling:**

On March 21, 2018, Weston & Sampson directed the advancement of six (6) test pits at the Site. Soil samples were collected from at least two depth intervals from each test pit. Weston & Sampson also collected seven (7) surface soil samples at the Site. Surface soil samples were hand dug and collected to a depth of 12 inches below grade. See Figure 1 for test pit and surface soil sample locations.

The soil samples were field screened with a PID and no evidence of contamination was observed. The highest PID reading from test pits and surface soil samples was 1.5 ppmv.

In the locations of test pits TP-1 and TP-2, remnants of the Upper Septic system including approximately six-inch diameter clay pipe were observed. A concrete wall was also identified at the Upper Septic system location.

Five (5) soil samples from the test pits and three (3) soil surface soil samples were submitted for off-Site laboratory for varying analysis including VOCs, semi-volatile organic compounds (SVOCs), PAHs, RCRA 8 metals plus cobalt and/or pesticides and herbicide analysis. Two test pit soil samples from within or below the Upper Septic distribution system were submitted for SVOCs instead of PAH analysis. SVOC analysis includes PAH and provides a wider range of analytes than PAH analysis. As historical records indicated testing waste was discharged to the Upper Septic system, this wider range of SVOC analytes was selected for these two test pit locations (TP-1 and TP-2).

**Soil Analytical Results:**

The soil assessment included investigation within a total of 18 locations at the Site, with 13 soil samples submitted for off-Site laboratory analysis. These sample locations were limited to areas of proposed soil disturbance or congregating areas of users or spectators. See Table 1 and Table 2 for a summary of



soil analytical results. As shown in the tables, there were no analytes detected in excess of MassDEP Massachusetts Contingency Plan (MCP) reportable concentrations (RCs).

In conclusion, our historical records review and subsurface assessment has found no evidence of residual contamination at the Site. Analyzed soil samples exhibited analyte concentration below RCs. These analytes included VOCs, SVOCs and/or PAHs, RCRA 8 metals plus cobalt and/or pesticides and herbicide analysis. Weston & Sampson's soil assessment of Site areas to be disturbed as part of potential redevelopment do not change the findings of the 2000 Method 3 risk characterization report. Specifically, the 2000 RAO closure report conclusion remains unchanged that "the Site also poses no significant risk of harm to the safety, the environment, and public welfare." Based on these results, no further environmental testing is required or recommended for this pre-design phase of this project.

*Remaining Septic System and Foundation:*

The area planned for a multi-purpose athletic field is on top of the former Upper Septic field and includes much of the former building footprint. While the Upper Septic system tank was reportedly removed, we observed evidence that the septic system distribution system and a concrete wall remain below grade. We recommend that the Weston & Sampson structural engineering and/or geotechnical team review these subsurface structures and their potential impact to the proposed athletic field construction.



### LIMITATIONS:

Based on the multi-acre Site footprint, it is possible that areas of contamination may be outside of analyzed areas. In addition, the area of east of the parking location was not assessed as part of our soil assessment. This area included a historic fire training that may have used per- and poly-fluorinated alkylated substances (PFAS), a class of emerging contaminants has been associated with fire training areas. Based on the proposed construction away from fire training areas, assessment of PFAS was not included in this assessment.

This memo was prepared for the use of the Town of Wayland, exclusively. The findings provided by Weston & Sampson in this report are based solely on the information reported in this document. Future investigations, and/or information that was not available to Weston & Sampson at the time of the investigation, may result in a modification of the findings stated in this memo.

Should additional information become available concerning this Site or neighboring properties that could directly impact the Site in the future that information should be made available to Weston & Sampson for review so that, if necessary, conclusions presented in this report may be modified. The conclusions of this report are based on conditions observed by Weston & Sampson personnel at the time of the investigation, information provided by the Town of Wayland and samples collected and analyzed on the dates shown or stated in this report. This memo has been prepared in accordance with generally accepted engineering and geological practices. No other warranty, express or implied, is made.



## ADDITIONAL BACK-UP FROM HISTORIC REPORTS:

Excerpt from March 2000 RAO Report:

Sampling results for each exposure area are summarized in Appendix A. Soil in the Upper Septic System Area is impacted by low concentrations of volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs). Soil in the Former Burn Area is impacted by residual concentrations of polynuclear aromatic hydrocarbons (PAHs). Soil in the Former Shallow Disposal Area is impacted by low concentrations of SVOCs including PAHs. Soil in the Former UST Area contains very low concentrations of petroleum hydrocarbons. Ground water in the area downgradient of the Former Shallow Disposal Area has been impacted by low concentrations of VOCs, including chlorinated compounds. Pond sediments are impacted by low concentrations of VOCs, SVOCs, PAHs, polychlorinated dibenzodioxins (PCDDs), and polychlorinated dibenzofurans (PCDFs). Surface water from the ponds contains trace concentrations of bis(2-ethylhexyl)phthalate (an SVOC) and low concentrations of metals.

Excerpt from April 2000 Closure Report, related to backfill:

## 3.5 Restoration Activities

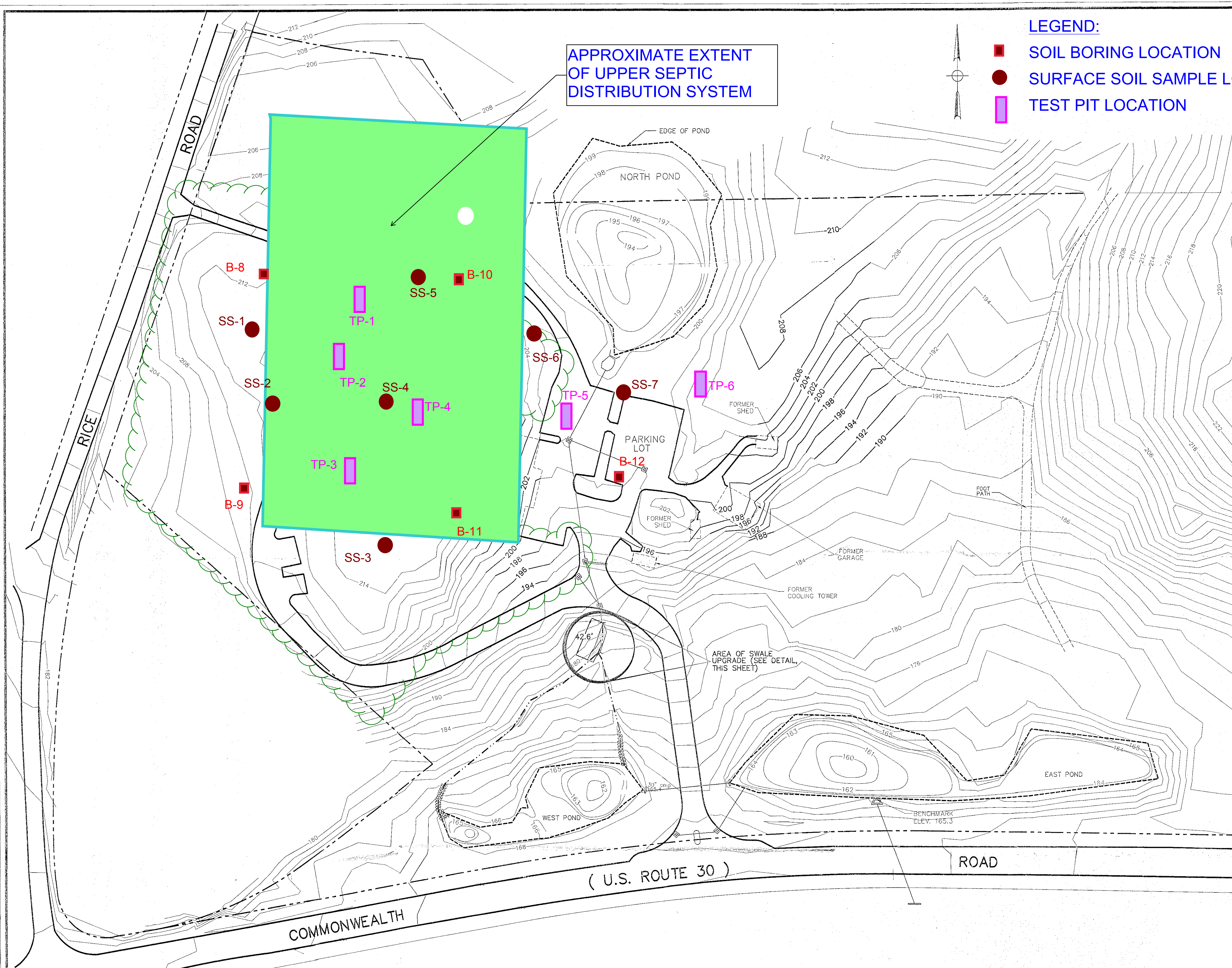
Following removal the Site buildings, excavation of the two septic systems and sump, and elimination of the two Dredge Spoils Piles as part of the RAM, the Site was restored. An elevation survey was conducted to determine the approximate volume of material required to return all impacted areas to original grade. The baseline survey was compared to a February 1994 site plan provided by the Town of Wayland Assessor's office which depicts the original topography of the area. Approximately 3,500 yards of a loam backfill was used to grade the area formerly occupied by the Site buildings and septic system areas and approximately 12 yards of loam was used to grade the Dredge Soil Piles area. Prior to delivering backfill material, two composite samples of the backfill material were collected and submitted under chain-of-custody to Alpha and analyzed for the following parameters:

1. VOCs with an extended library search;
2. SVOCs with an extended library search; and
3. Toxicity Characteristic Leaching Procedure (TCLP) Metals.

No contaminants were detected above the method detection limits in either of the samples sent for analysis. Copies of the laboratory chemical analysis data sheets are provided in Appendix H.

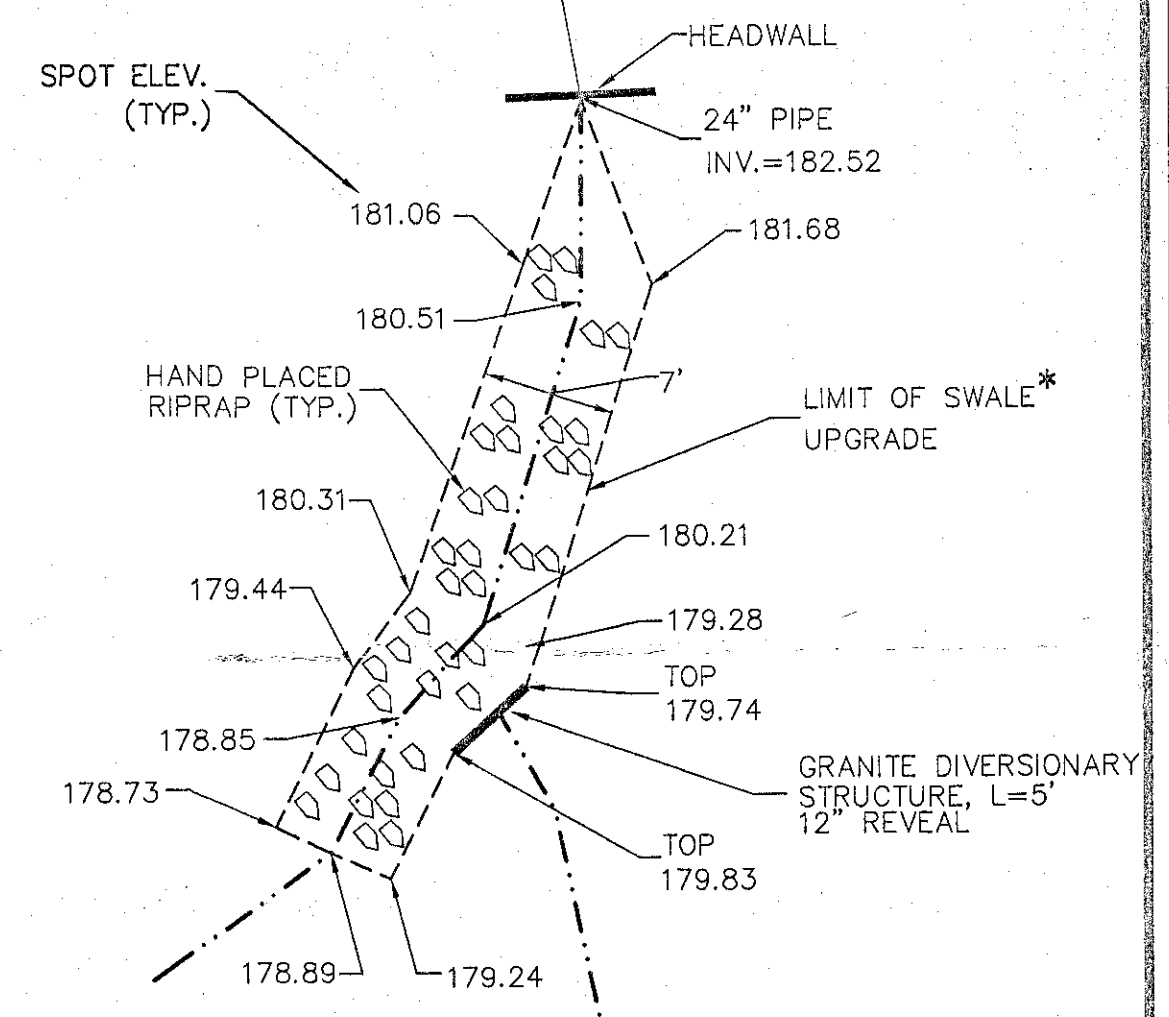
Weston & Sampson estimated 12 to 24 inches of backfill are present at the Site.



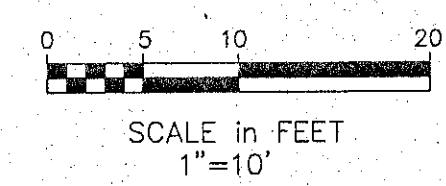


APPROXIMATE EXTENT OF UPPER SEPTIC DISTRIBUTION SYSTEM

- LEGEND:**
- SOIL BORING LOCATION
  - SURFACE SOIL SAMPLE LOCATION
  - ▭ TEST PIT LOCATION



\* LIMIT OF SWALE UPGRADE IS NOT INDICATIVE OF TOP OF BANK.

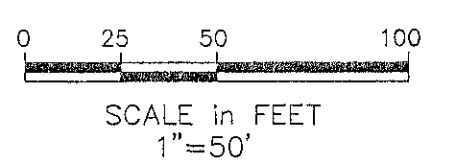


SWALE UPGRADE DETAIL

- NOTES:**
1. BASE MAP AND TOPOGRAPHY PREPARED BY ENVIRONMENTAL SCIENCES AND SERVICES (ESS).
  2. TOPOGRAPHICAL AND SWALE UPGRADE AS-BUILT SURVEY PERFORMED BY RANSOM ENVIRONMENTAL CONSULTANTS, INC. ON APRIL 7, 2000.
  3. PROPERTY LINE INFORMATION OBTAINED FROM ESS BASE MAP. RANSOM ENVIRONMENTAL CONSULTANTS, INC. NOT RESPONSIBLE FOR INACCURATE PROPERTY LINE INFORMATION OR BUILDING LOCATIONS.
  4. EXISTING UNDERGROUND UTILITIES OBTAINED FROM MAP ENTITLED, "POND ENHANCEMENTS/GRADING PLAN", PREPARED BY ANDERSON-NICHOLS & CO., INC., DATED JULY 21, 1992.

- LEGEND:**
- PROPERTY LINE
  - 220— EXIST. ELEVATION CONTOUR LINE
  - 190— CONTOUR LINE AT AREA OF NEW GRADING
  - - - DRAINAGE SWALE
  - - - EDGE OF EXISTING POND
  - ▨ EXISTING RIP RAP

- NOTES:**
1. SITE SKETCH OVERLAIN ON RANSOM 2000 AS BUILT PLAN.
  2. ALL LOCATIONS ARE APPROXIMATE AND FOR GRAPHICAL PURPOSES ONLY.
  3. FIELD SAMPLING PERFORMED BY WESTON & SAMPON IN MARCH 2018.

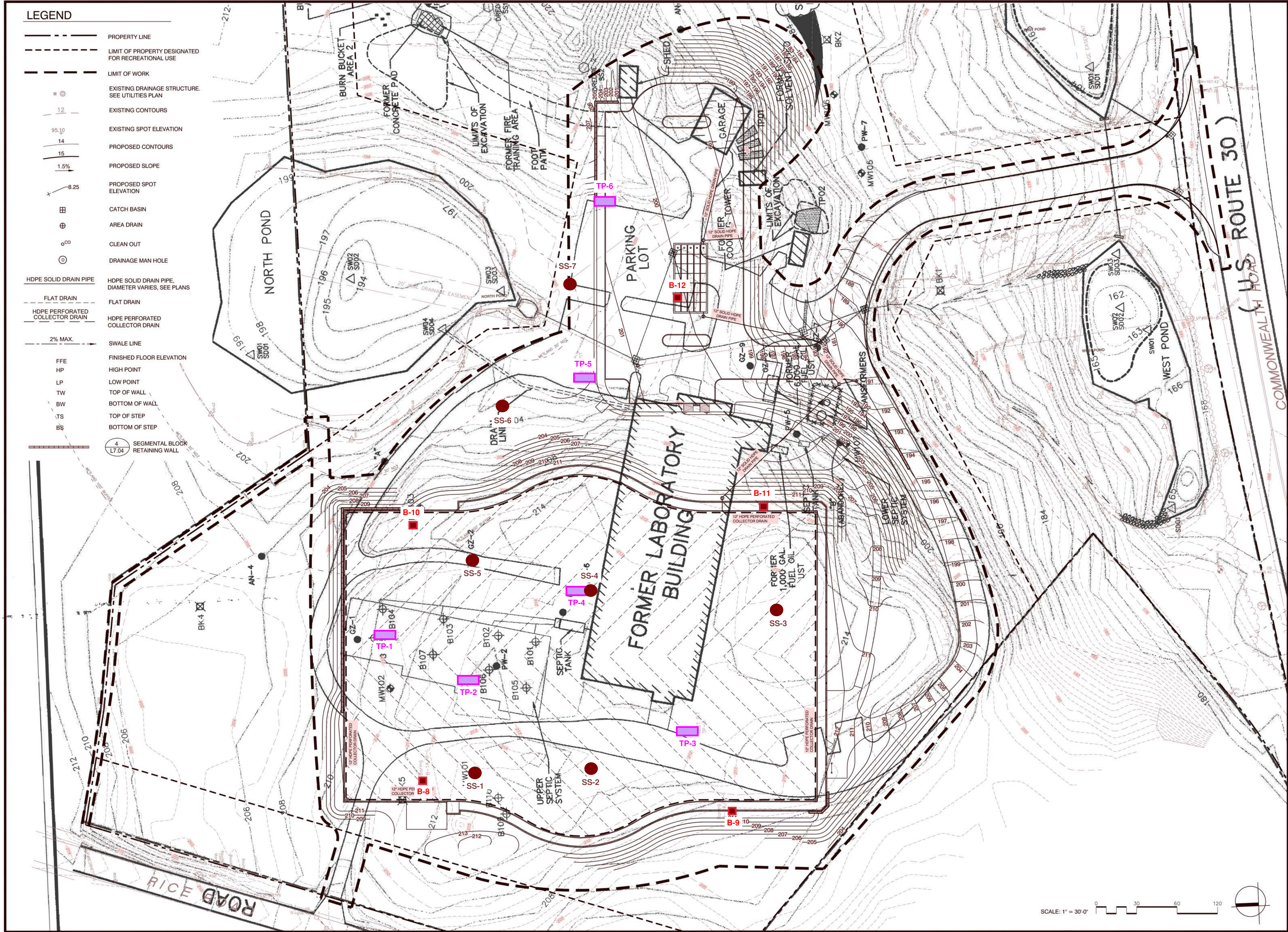


**FIGURE 1: SITE SKETCH  
LOKER CONSERVATION AND  
RECREATION AREA**

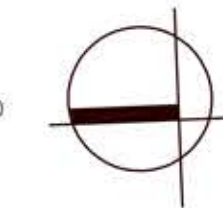


LEGEND

- PROPERTY LINE  
--- LIMIT OF PROPERTY DESIGNATED FOR RECREATIONAL USE  
--- LIMIT OF WORK  
● EXISTING DRAINAGE STRUCTURE. SEE UTILITIES PLAN  
12 EXISTING CONTOURS  
95.10 EXISTING SPOT ELEVATION  
14 PROPOSED CONTOURS  
15 PROPOSED SLOPE  
1.5% PROPOSED SLOPE  
8.25 PROPOSED SPOT ELEVATION  
田 CATCH BASIN  
⊕ AREA DRAIN  
○ CLEAN OUT  
○ DRAINAGE MAN HOLE  
HDPE SOLID DRAIN PIPE HDPE SOLID DRAIN PIPE. DIAMETER VARIES, SEE PLANS  
FLAT DRAIN FLAT DRAIN  
HDPE PERFORATED COLLECTOR DRAIN HDPE PERFORATED COLLECTOR DRAIN  
2% MAX. SWALE LINE  
FFE FINISHED FLOOR ELEVATION  
HP HIGH POINT  
LP LOW POINT  
TW TOP OF WALL  
BW BOTTOM OF WALL  
TS TOP OF STEP  
BS BOTTOM OF STEP  
4 L7.04 SEGMENTAL BLOCK RETAINING WALL



SCALE: 1" = 30'-0"



Project:

IMPROVEMENTS TO  
LOKER CONSERVATION  
AND RECREATION AREA



410 COMMONWEALTH RD,  
WAYLAND, MA 01778

Weston & Sampson

85 Devonshire Street,  
3rd Floor, Boston, MA 02109  
617.412.4480 800.SAMPSON  
www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description

Scale:

Issued For:

BIDDING DOCUMENTS

Scale:

AS SHOWN

Date:

JANUARY 18, 2019

Drawn By:

CCC, DYF

Reviewed By:

BMK

Approved By:

ERB

W&S Project No: 2180076

W&S File No:

Drawing Title:

TESTING OVERLAY

Sheet Number:

L5.00



GRADING, DRAINAGE & UTILITIES LEGEND:

- LIMIT OF WORK
- PROPERTY LINE
- ⑩ EXISTING DRAINAGE STRUCTURE  
SEE UTILITIES PLAN
- 12 EXISTING CONTOURS
- 95.10 EXISTING SPOT ELEVATION
- 14 PROPOSED CONTOURS
- 15 PROPOSED SLOPE
- 8.25 PROPOSED SPOT ELEVATION
- ☒ CATCH BASIN
- ⊕ AREA DRAIN
- <sup>CO</sup> CLEAN OUT
- Ⓢ DRAINAGE MAN HOLE
- Ⓢ SEWER MAN HOLE
- HDPE PERF. DRAIN PIPE  
HDPE PERFORATED DRAIN PIPE, DIAMETER VARIES
- HDPE SOLID DRAIN PIPE, DIAMETER VARIES
- 2% MAX. SWALE LINE
- GRADE BREAK
- FFE FINISHED FLOOR ELEVATION
- HP HIGH POINT
- LP LOW POINT
- TW TOP OF WALL
- BW BOTTOM OF WALL
- TS TOP OF STEP
- BS BOTTOM OF STEP

STORAGE BUILDING BY OTHERS - N.I.C.  
REFER TO CONTRACT IFB #19-1032  
LIMIT OF WORK

SEE ENTRY PLAZA ENLARGEMENT PLAN, SHEET L5.03

CONCESSION/ TICKET BUILDING  
BY OTHERS - N.I.C. REFER TO  
CONTRACT IFB #19-1032

4" INV=126.92

1" CW & 4" WASTE,  
COORDINATE FINAL  
TIE-IN LOCATION  
WITH BUILDING  
MANUFACTURER  
PROVIDE  
CLEANOUTS ON  
MAIN BUILDING  
SEWER AT EACH  
BUILDING AND AT  
100' MIN. SPACING

4" PVC SEWER @ 1.0% SLOPE

4" WASTE COORDINATE  
LOCATION WITH BUILDING  
MANUFACTURER. PROVIDE  
CLEAN OUT ON MAIN  
BUILDING SEWER

CONNECT NEW  
BUILDING SEWER TO  
EXISTING M.H.  
INV. IN=123.97  
INV. OUT (EX)= 121.87

65 LF. OF 4" PVC SEWER @ 1.0%

RESTROOM BUILDING BY  
OTHERS - N.I.C. REFER TO  
CONTRACT IFB #19-1032

BUILDING MANUFACTURER TO PROVIDE  
AND INSTALL NEW 2" BLACK FLOW  
PREVENTOR AND WATER METER. WATER  
METER AND BFP TO BE COORDINATED  
WITH LOCAL UTILITY

25'-0" CLEARANCE BETWEEN  
TRACK AND SOFTBALL FIELD

REINFORCED TURF EMERGENCY  
VEHICLE AND PEDESTRIAN ACCESS

SEE SYNTHETIC TURF FIELD ENLARGEMENT PLAN, SHEET L5.04

QUICK COUPLER HOSE  
CONNECTION, VALVE,  
AND BOX (2 TOTAL)

ZONE 1 WELL HEAD BUFFER

SOFTBALL FIELD BLEACHER  
AREA LOCATED AT LIMITS OF  
ZONE 1 WELL HEAD BUFFER

SCALE: 1" = 30'-0"

Project:

IMPROVEMENTS TO  
WAYLAND HIGH SCHOOL  
ATHLETIC FACILITIES



264 OLD CONNECTICUT  
PATH, WAYLAND, MA 01778

Weston & Sampson

85 Devonshire Street,  
3rd Floor, Boston, MA 02109  
617.412.4480 800.SAMPSON  
www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description



Issued For:

BIDDING DOCUMENTS

Scale: AS SHOWN

Date: JANUARY 18, 2019

Drawn By: CCC, DYF

Reviewed By: BMK

Approved By: ERB

W&S Project No: 2180076

W&S File No:

Drawing Title:

GRADING, DRAINAGE,  
AND UTILITIES PLAN

Sheet Number:

L5.01









# GENESIS VERTICAL LIFT

## ENCLOSURE AND SHAFTWAY MODELS



The Garaventa Genesis is a vertical platform lift which provides access into or within commercial or residential buildings. It travels inside a complete, self-contained enclosure, as shown, or can be located in a shaftway constructed by others. Our unique, anodized aluminum design is strong, durable and attractive.





02.24.2016

*Eric Q. Hall*



DRAWINGS HAVE BEEN REVIEWED AND FOUND THAT THEY ARE: (CHECK/SELECT ONE)

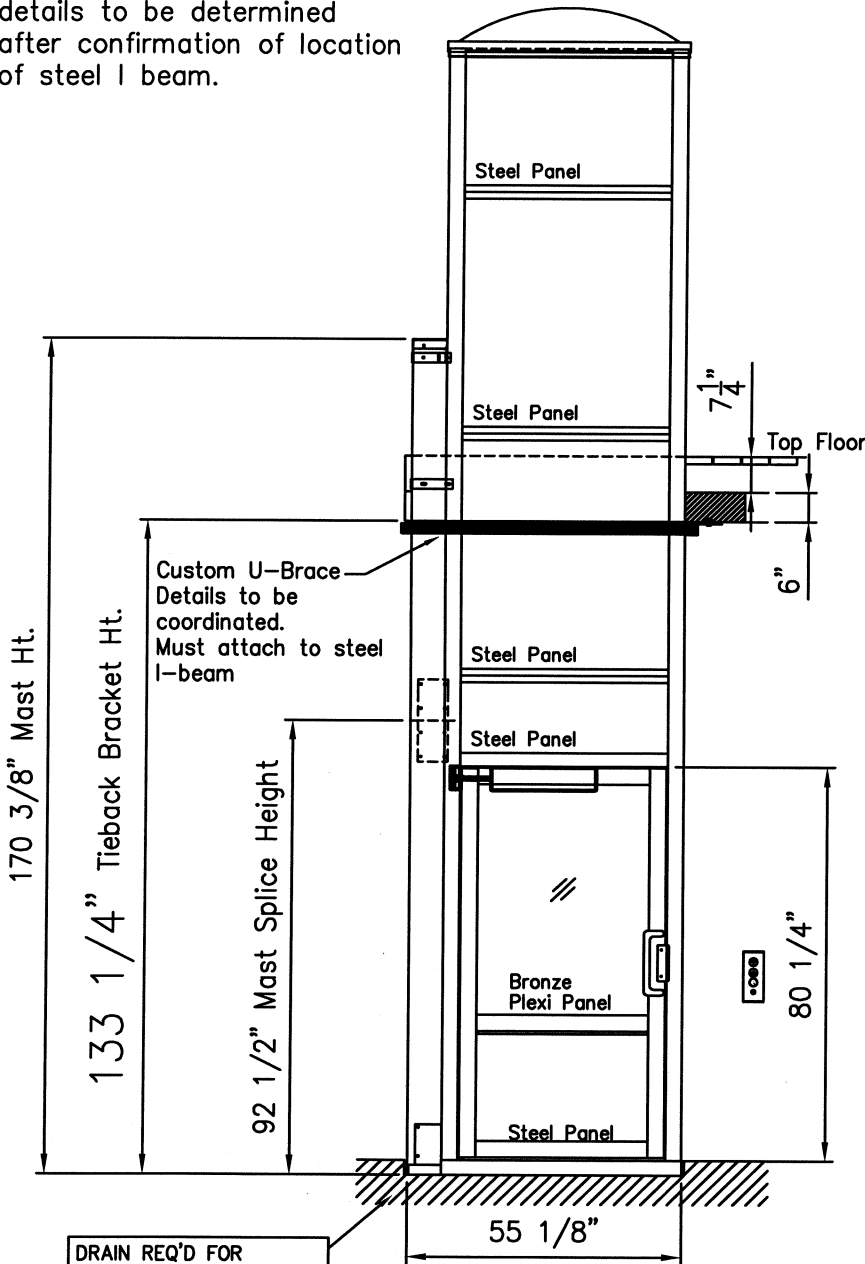
- ☐ ACCEPTED AS DRAWN, - NO CHANGES.  
☐ ACCEPTED AS NOTED. PLEASE MAKE LISTED CHANGES. NO RESUBMITTAL NECESSARY.  
☐ NOT ACCEPTED. PLEASE REVISE AS NOTED AND RE-SUBMIT DRAWINGS FOR APPROVAL.

SIGNED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

Note: Custom U-Brace details to be determined after confirmation of location of steel I beam.

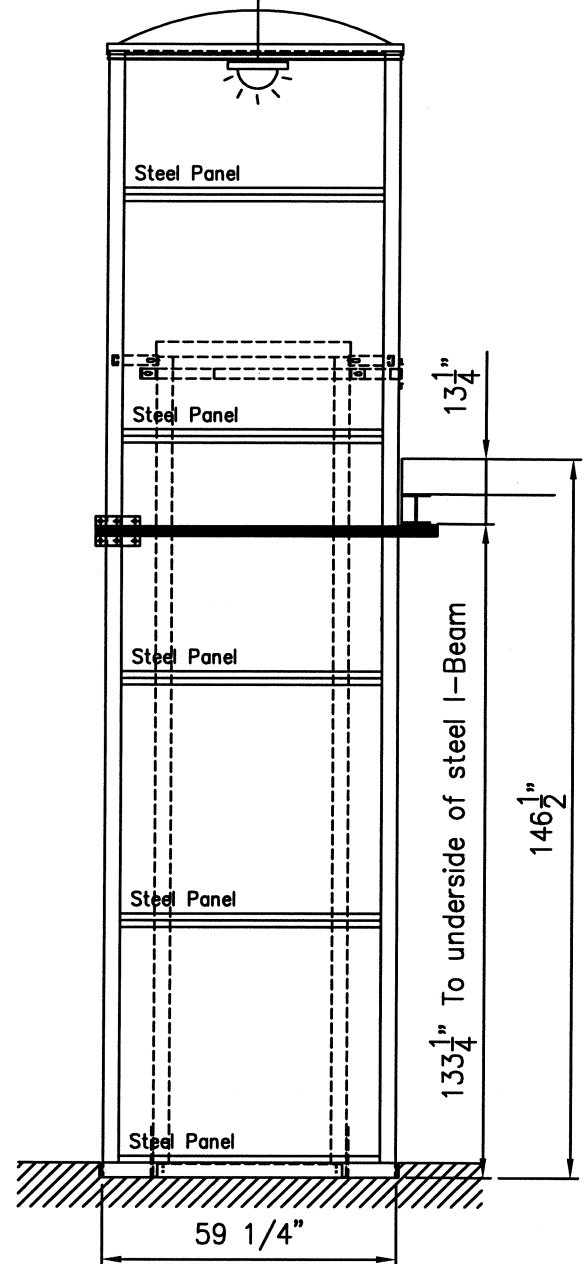
NOTE: COORDINATE WITH ELECTRICAL CONTRACTOR

Shaft/landing lighting circuit by others. Independent of lift electric with a minimum of 5 FTC or 54 LUX ambient required within shaft and on platform at each landing.



DRAIN REQ'D FOR APPLICATIONS WHERE WATER MAY ENTER PIT AREA (BY OTHERS)

LOWER LANDING VIEW



FRONT SIDE VIEW

A-1	CHG MEZZ BRACE TO CUSTOM U-BRACE, ADDED GEN NOTES 1/8/16 KM			
A	INITIAL RELEASE	UNITS: INCHES	12/23/15	JK
REV.	SCALE: 1:40	TOLERANCES: DIMENSIONAL $\pm 1/32$ ANGULAR $\pm 0.5^\circ$	PROJECTION:	DATE DRN.BY CHK.BY



735 E INDUSTRIAL PARK DR.  
 SUITE C  
 MANCHESTER, NH 03109  
 PH: ++1 603 669 6553  
 FAX: ++1 603 669 0078  
<http://www.garaventlift.com>

SERIES 3 GENESIS ENCLOSURE ASSEMBLY  
 DANVERS HIGH SCHOOL  
 60 CABOT ROAD  
 DANVERS MA 09123  
 GARAVENTA LIFT (NH)

PAGE 1 OF 8

67700-AD-A

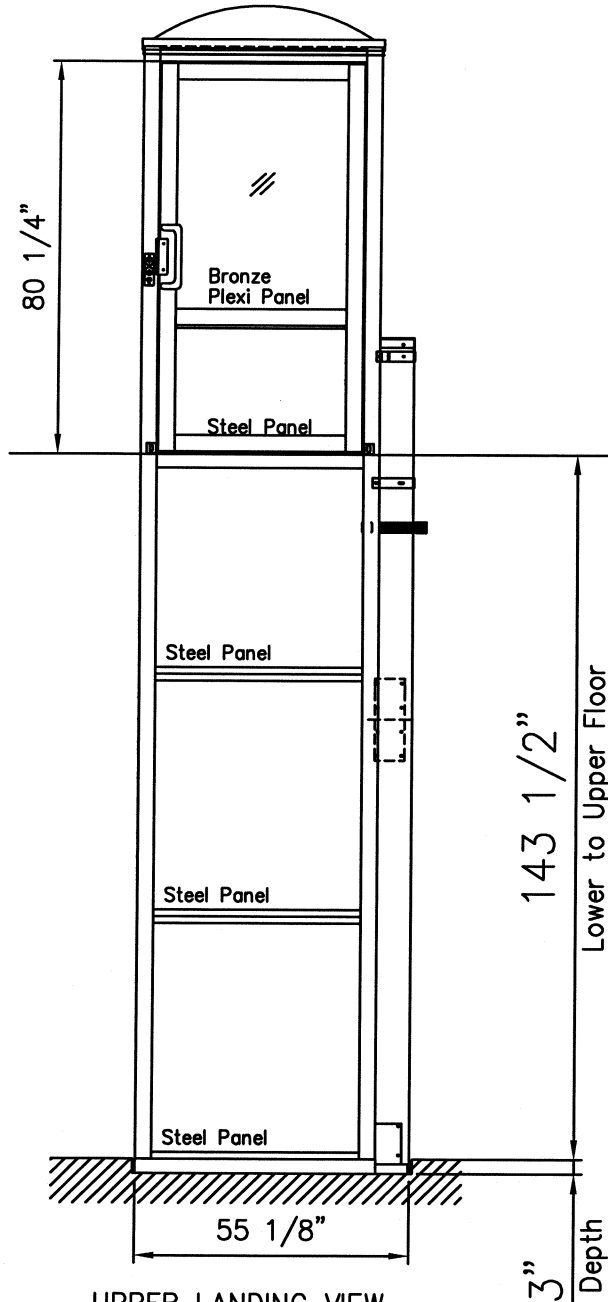


Finish floor to finish floor dimension must be accurate to w/in  $\pm 1/4"$  for custom enclosure fabrication.  
Check one of the boxes below, make corrections as required.

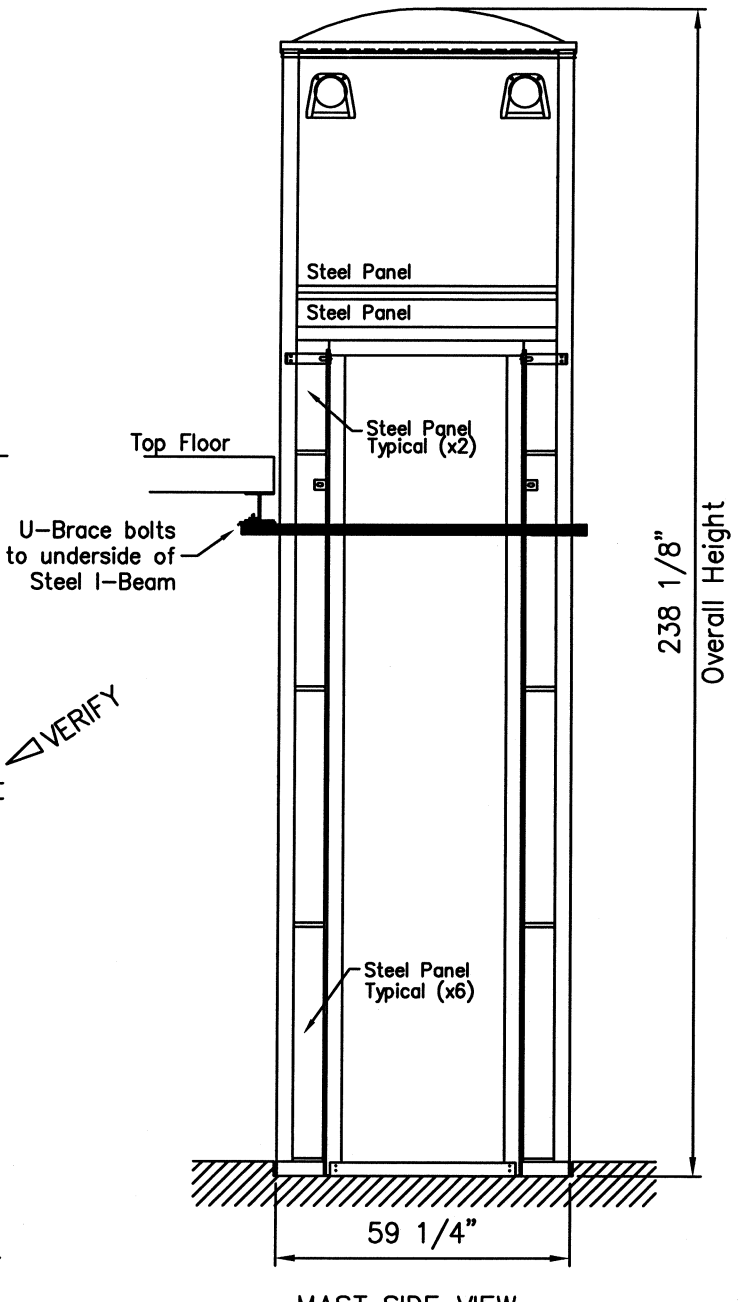
- ☐ THE ACTUAL FINISH FLOOR ELEVATION IS DIFFERENT FROM THE DIMENSION LISTED ON DRAWINGS FOR LOWER FLOOR TO UPPER LEVEL FINISH FLOOR AND HAS BEEN CORRECTED.
- ☐ THE FINISH FLOOR ELEVATION FOR LOWER FLOOR TO UPPER LEVEL FINISH FLOOR AS SHOWN OF THE DRAWING IS CORRECT (W/IN  $\pm 1/4"$ )

LIFT HEIGHT  
H1=146 1/2"

(H1=Lower to Upper Floor+Pit Depth)



UPPER LANDING VIEW



MAST SIDE VIEW

A-1	CHG MEZZ BRACE TO CUSTOM U-BRACE, ADDED	GEN NOTES	1/8/16	KM				
A	INITIAL RELEASE				UNITS: INCHES	12/23/15	JK	
REV.	SCALE: 1: 40	TOLERANCES: DIMENSIONAL $\pm 1/32$	ANGULAR $\pm 0.5^\circ$	PROJECTION:		DATE	DRN.BY	CHK.BY



735 E INDUSTRIAL PARK DR.  
SUITE C  
MANCHESTER, NH 03109  
PH: ++1 603 669 6553  
FAX: ++1 603 669 0078  
<http://www.garaventalift.com>

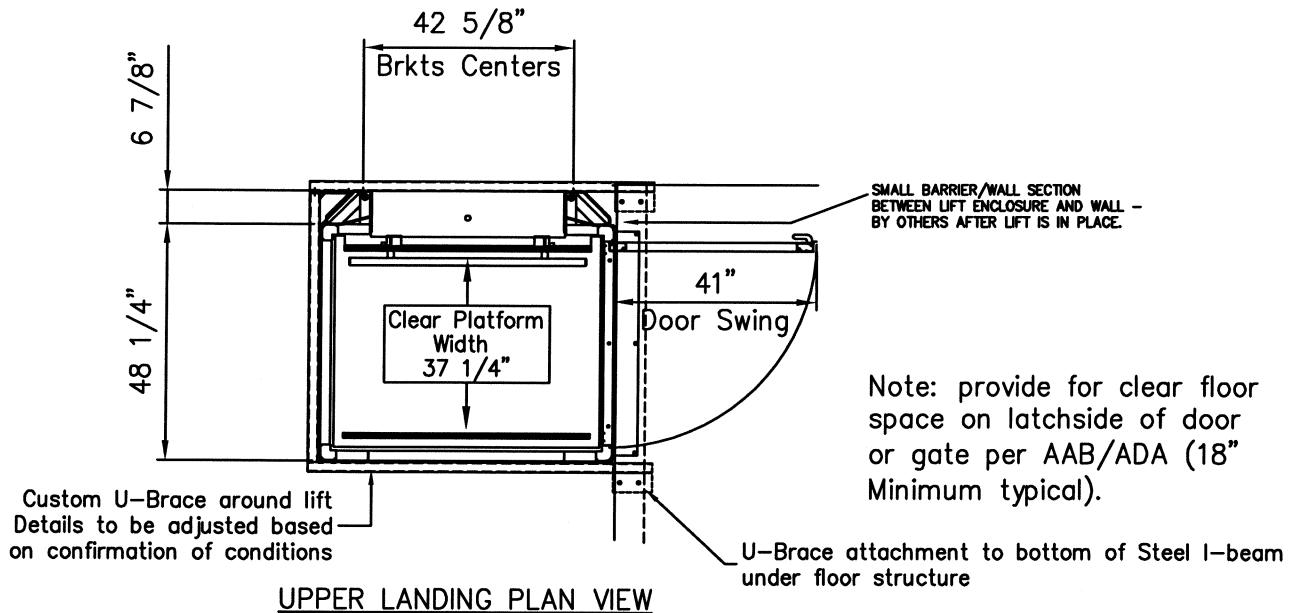
SERIES 3 GENESIS ENCLOSURE ASSEMBLY  
DANVERS HIGH SCHOOL  
60 CABOT ROAD  
DANVERS MA 09123  
GARAVENTA LIFT (NH)

PAGE 2 OF 8

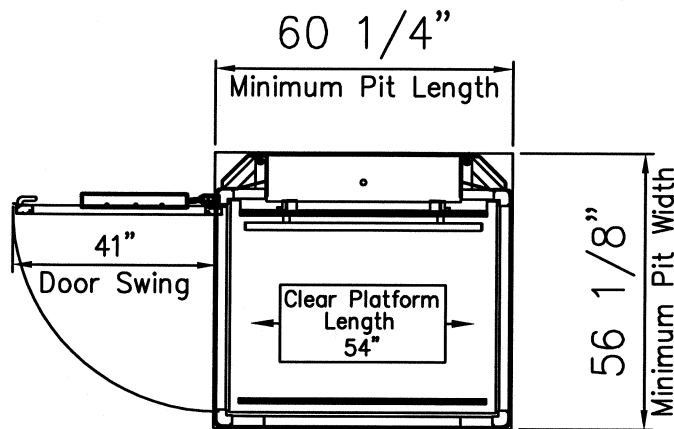
67700-AD-A



SECURE LIFT MAST TO BUILDING  
STRUCTURE AT TIE-BACK LOCATION.  
STRUCTURE / BLOCKING BY OTHERS  
TO MEET LOADS LISTED ON LOADING DIAGRAM.



**DEDICATED CIRCUIT SUPPLIED BY OTHERS:**  
120 VAC / 1 PHASE - 60 Hz.  
Conduit and devices to suit local codes and  
a recommended 15 amp. dedicated circuit.



Wall Mount Call Station(s)  
(Position & Installation by Others)

A-1	CHG MEZZ BRACE TO CUSTOM U-BRACE, ADDED GEN NOTES	1/8/16	KM	KM
A	INITIAL RELEASE	UNITS: INCHES	12/23/15	JK
REV.	SCALE: 1: 40	TOLERANCES: DIMENSIONAL $\pm 1/32$ ANGULAR $\pm 0.5^\circ$	PROJECTION:	DATE DRN.BY CHK.BY



735 E INDUSTRIAL PARK DR.  
SUITE C  
MANCHESTER, NH 03109  
PH: ++1 603 669 6553  
FAX: ++1 603 669 0078  
<http://www.garaventlift.com>

**SERIES 3 GENESIS ENCLOSURE ASSEMBLY**  
DANVERS HIGH SCHOOL  
60 CABOT ROAD  
DANVERS MA 09123  
GARAVENTA LIFT (NH)

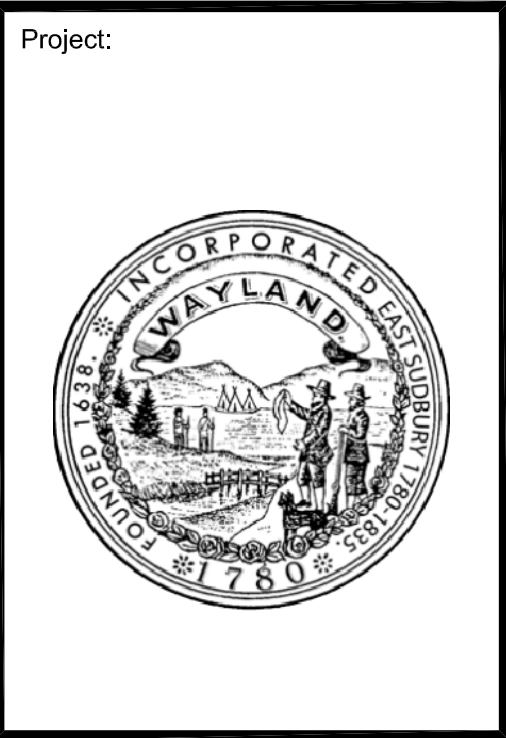
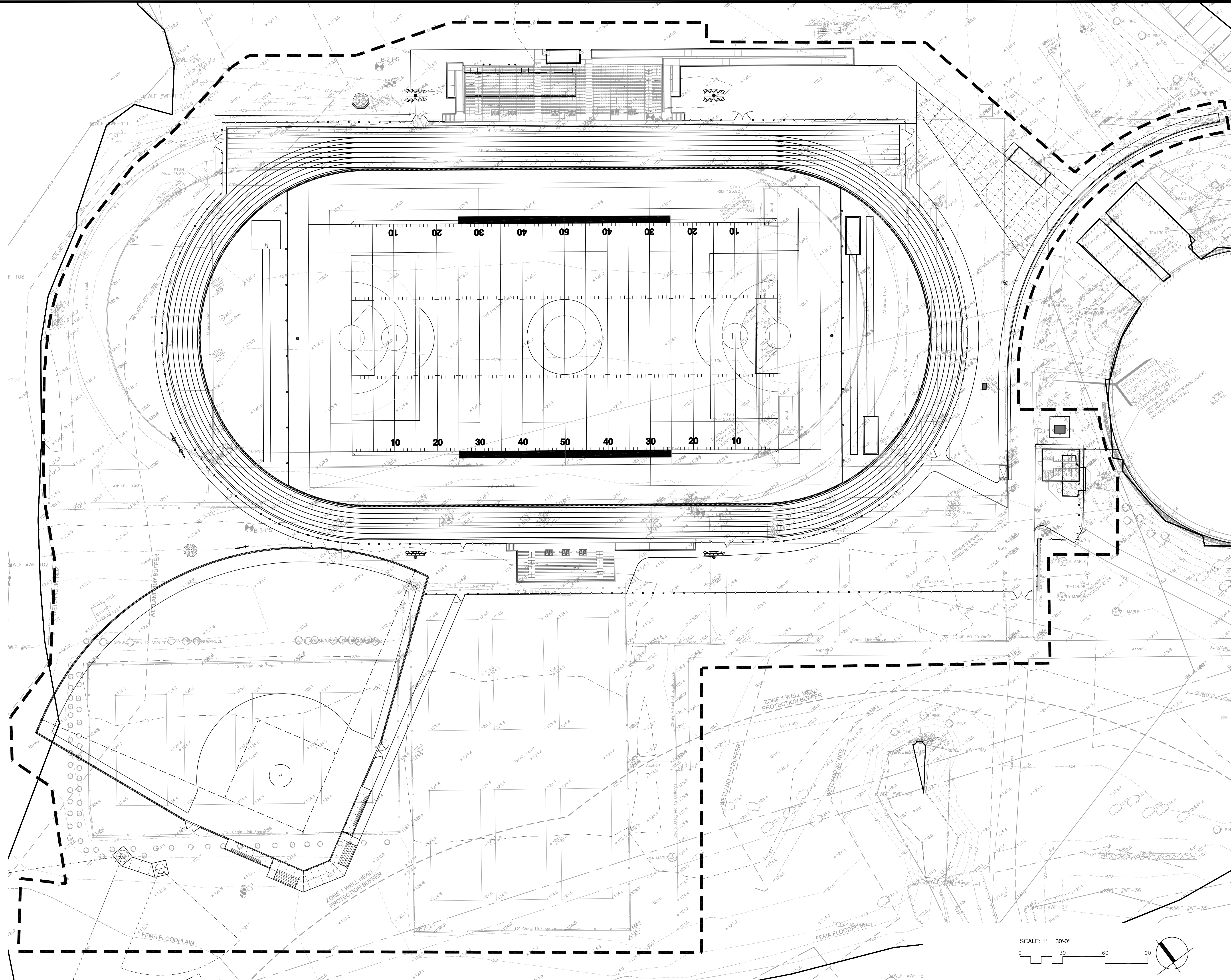
PAGE 3 OF 8

67700-AD-A









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Consultants:

Revisions:		
No.	Date	Description

Issued For:

Scale:

Date: JANUARY 18, 2019

Drawn By:

Reviewed By:

Approved By:

W&S Project No:

W&S File No:

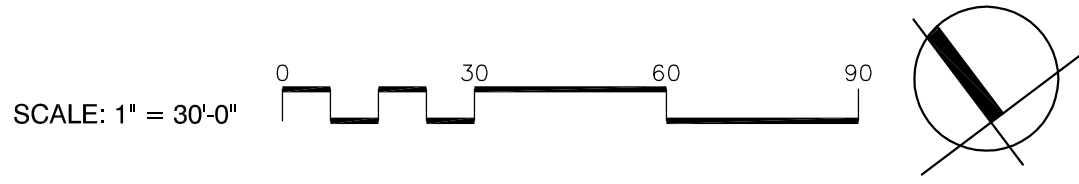
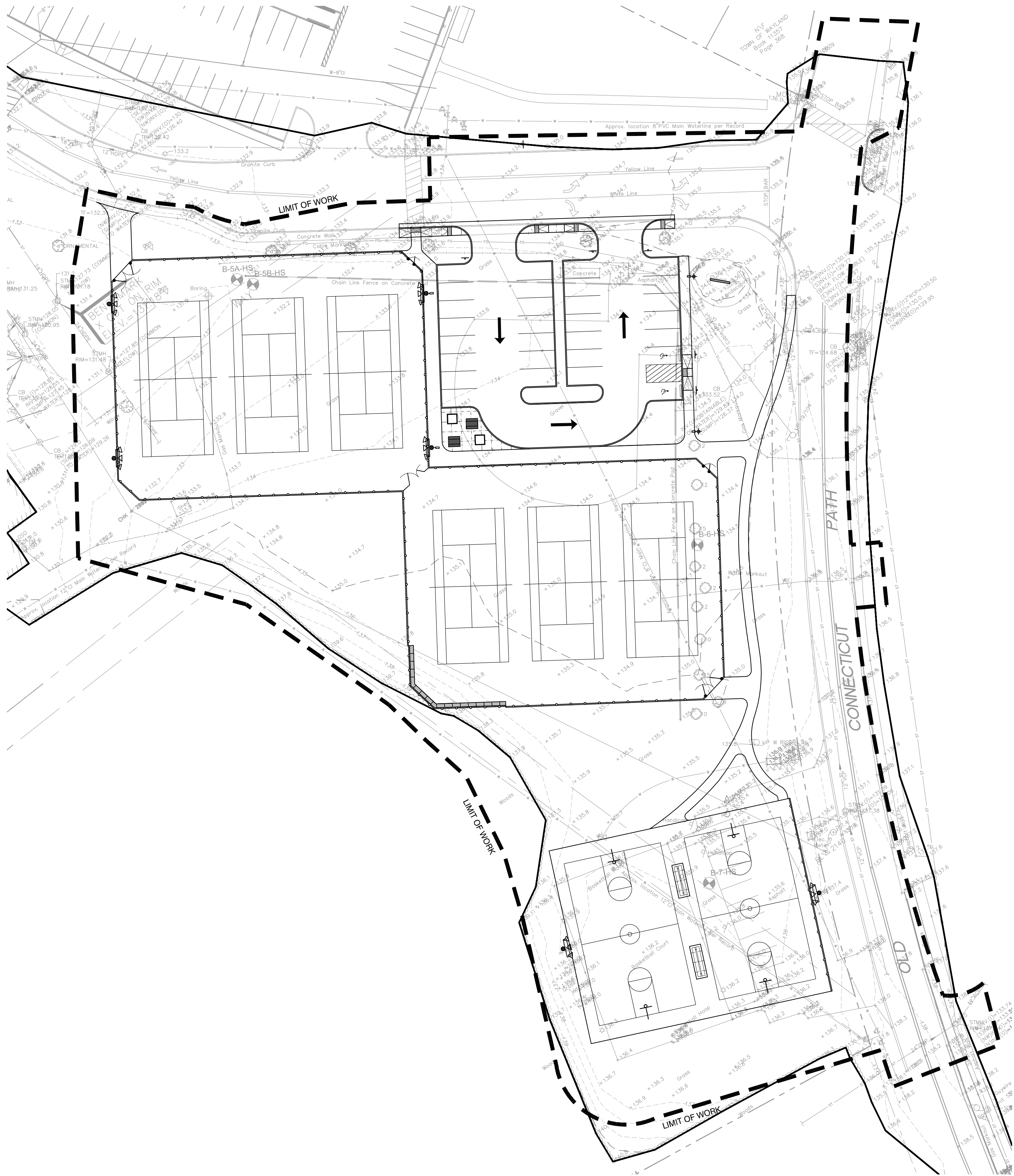
Drawing Title:

SITE PLAN OVERLAY

Sheet Number:

L3.01





Project:



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Revisions:

No.	Date	Description

Issued For:

Scale:

Date: JANUARY 18, 2019

Drawn By:

Reviewed By:

Approved By:

W&S Project No:

W&S File No:

Drawing Title:

SITE PLAN OVERLAY

Sheet Number:

L3.04



Wayland High School Multi Fields

Wayland,MA

Lighting System

Pole / Fixture Summary						
Pole ID	Pole Height	Mtg Height	Fixture Qty	Luminaire Type	Load	Circuit
BA1-BA2	40'	40'	4	TLC-LED-600	2.32 kW	G
F1-F2	80'	15'	2	TLC-BT-575	1.15 kW	A
		80'	10	TLC-LED-1150	11.50 kW	A
		80'	2	TLC-LED-1150	2.30 kW	B
		70'	1	TLC-LED-600	0.58 kW	C
F3-F4	80'	15'	2	TLC-BT-575	1.15 kW	A
		80'	11	TLC-LED-1150	12.65 kW	A
		80'	2	TLC-LED-1150	2.30 kW	B
		80'	7	TLC-LED-1150	8.05 kW	H
		70'	1	TLC-LED-600	0.58 kW	D
T1, T4	50'	50'	2	TLC-LED-1150	2.30 kW	E
T2-T3	50'	40'	1	CREE OSQ	0.13 kW	F
		50'	2	TLC-LED-1150	2.30 kW	E
10			94		94.62 kW	

Circuit Summary			
Circuit	Description	Load	Fixture Qty
A	Football	52.9 kW	50
B	Track	9.2 kW	8
C	Home	1.16 kW	2
D	Visitor	1.16 kW	2
E	Tennis	9.2 kW	8
F	Parking Lot	0.26 kW	2
G	Basketball	4.64 kW	8
H	Practice	16.1 kW	14

Fixture Type Summary							
Type	Source	Wattage	Lumens	L90	L80	L70	Quantity
TLC-LED-600	LED 5700K - 75 CRI	580W	65,600	>81,000	>81,000	>81,000	12
CREE OSQ	LED 5700K - 70 CRI	130W	17,000	--	--	--	1
TLC-LED-1150	LED 5700K - 75 CRI	1150W	121,000	>81,000	>81,000	>81,000	72
TLC-BT-575	LED 5700K - 75 CRI	575W	52,000	>81,000	>81,000	>81,000	8

Light Level Summary

Calculation Grid Summary								
Grid Name	Calculation Metric	Illumination					Circuits	Fixture Qty
		Ave	Min	Max	Max/Min	Ave/Min		
Basketball 1	Horizontal Illuminance	39.9	27.6	53.9	1.95	1.45	G	8
Basketball 2	Horizontal Illuminance	40.2	27.7	54	1.95	1.45	G	8
Football	Horizontal Illuminance	50.5	40.1	57.1	1.42	1.26	A	50
Home	Horizontal Illuminance	16.6	15	18	1.20	1.11	C	2
Parking	Horizontal Illuminance	0.36	0	1.80	319.29		F	2
Practice	Horizontal Illuminance	23.2	9.60	35.3	3.68	2.42	H	14
Soccer	Horizontal Illuminance	50	39.5	58.3	1.47	1.27	A	50
Tennis	Horizontal Illuminance	53.4	41	69.9	1.70	1.30	E	8
Track	Horizontal Illuminance	8.40	3.50	22	6.28	2.40	B	8
Visitor	Horizontal Illuminance	15.6	12.2	17.3	1.42	1.28	D	2
Zero Grid 1	Horizontal	1.06	0	37.2	0.00		A,B,C,D,E,F,G,H	94
Zero Grid 1	Max Candela (by Fixture)	37867	0	499003	0.00		A,B,C,D,E,F,G,H	94
Zero Grid 1	Max Vert Illuminance (by Light Bank)	2.01	0	59.6	0.00		A,B,C,D,E,F,G,H	94
Zero Grid 2	Horizontal	0.07	0	18.7	0.00		A,B,C,D,E,F,G,H	94
Zero Grid 2	Max Candela (by Fixture)	2733	0	192168	0.00		A,B,C,D,E,F,G,H	94
Zero Grid 2	Max Vert Illuminance (by Light Bank)	0.17	0	30.4	0.00		A,B,C,D,E,F,G,H	94

ENGINEERED DESIGN By: Markie Roake • File #126964D • 12-Sep-18

From Hometown to Professional



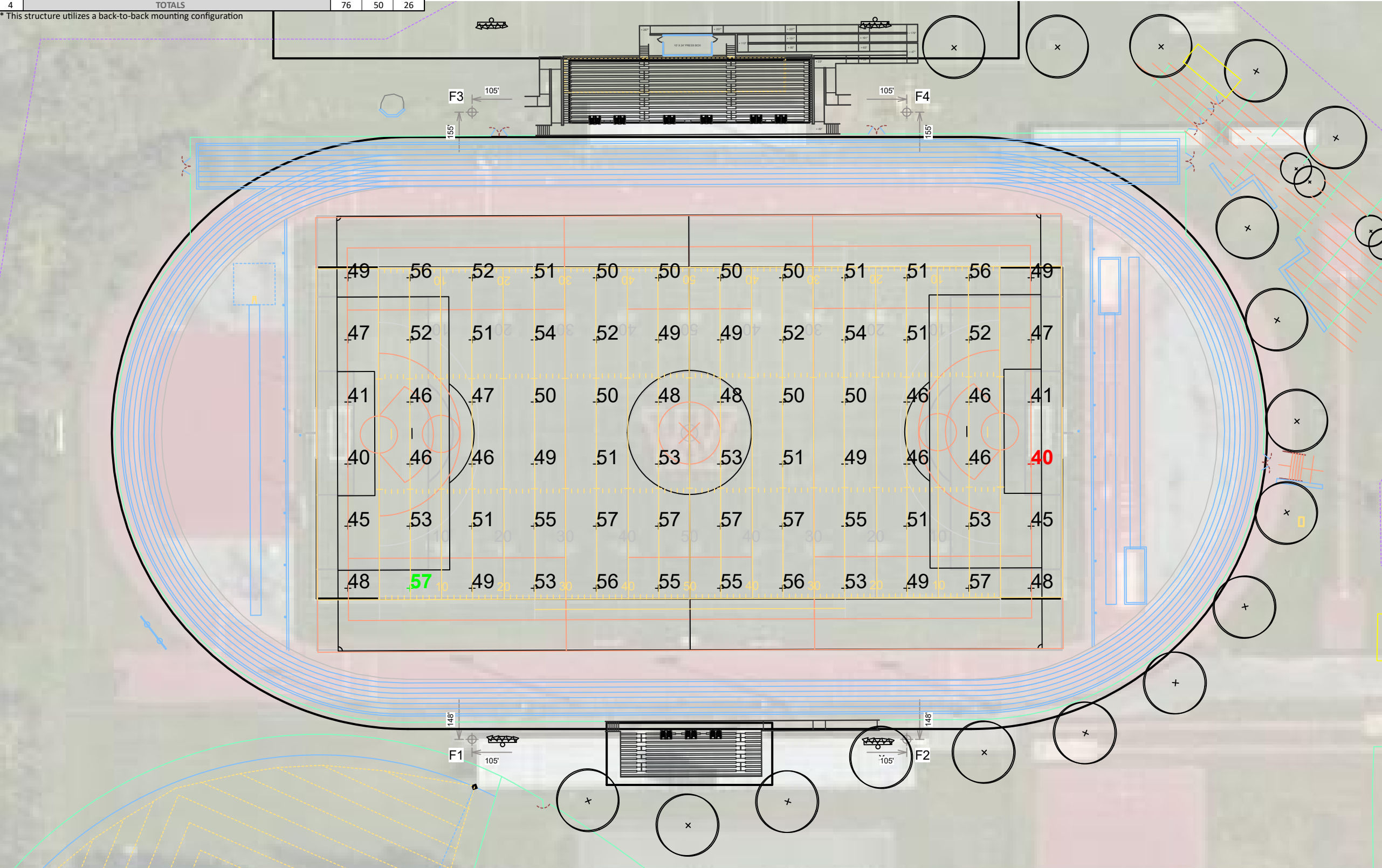
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EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
2	F1-F2	80'	-	15'	TLC-BT-575	2	2	0
				70'	TLC-LED-600	1	0	1
				80'	TLC-LED-1150	12	10	2
2	F3-F4	80'	-	15'	TLC-BT-575	2	2	0
				70'	TLC-LED-600	1	0	1
				80'	TLC-LED-1150	13/7*	11	9
4	TOTALS					76	50	26

\* This structure utilizes a back-to-back mounting configuration



# Wayland High School Multi Fields

Wayland, MA

GRID SUMMARY	
Name:	Football
Size:	360' x 160'
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

ILLUMINATION SUMMARY			
MAINTAINED HORIZONTAL FOOTCANDLES			
	Entire Grid		
<b>Guaranteed Average:</b>	<b>50</b>		
Scan Average:	50.45		
Maximum:	57.1		
Minimum:	40.1		
Avg / Min:	1.26		
<b>Guaranteed Max / Min:</b>	<b>2</b>		
Max / Min:	1.42		
UG (adjacent pts):	1.19		
CU:	0.60		
No. of Points:	72		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	121,000 / 52,000 lumens		
<b>No. of Luminaires:</b>	<b>50</b>		
Total Load:	52.9 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-1150	>81,000	>81,000	>81,000
TLC-BT-575	>81,000	>81,000	>81,000
Reported per TM-21-11. See luminaire datasheet for details.			

**Guaranteed Performance:** The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.95 dirt depreciation factor.

**Field Measurements:** Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

**Electrical System Requirements:** Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

**Installation Requirements:** Results assume  $\pm$  3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.

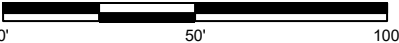


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## ILLUMINATION SUMMARY

SCALE IN FEET 1 : 50

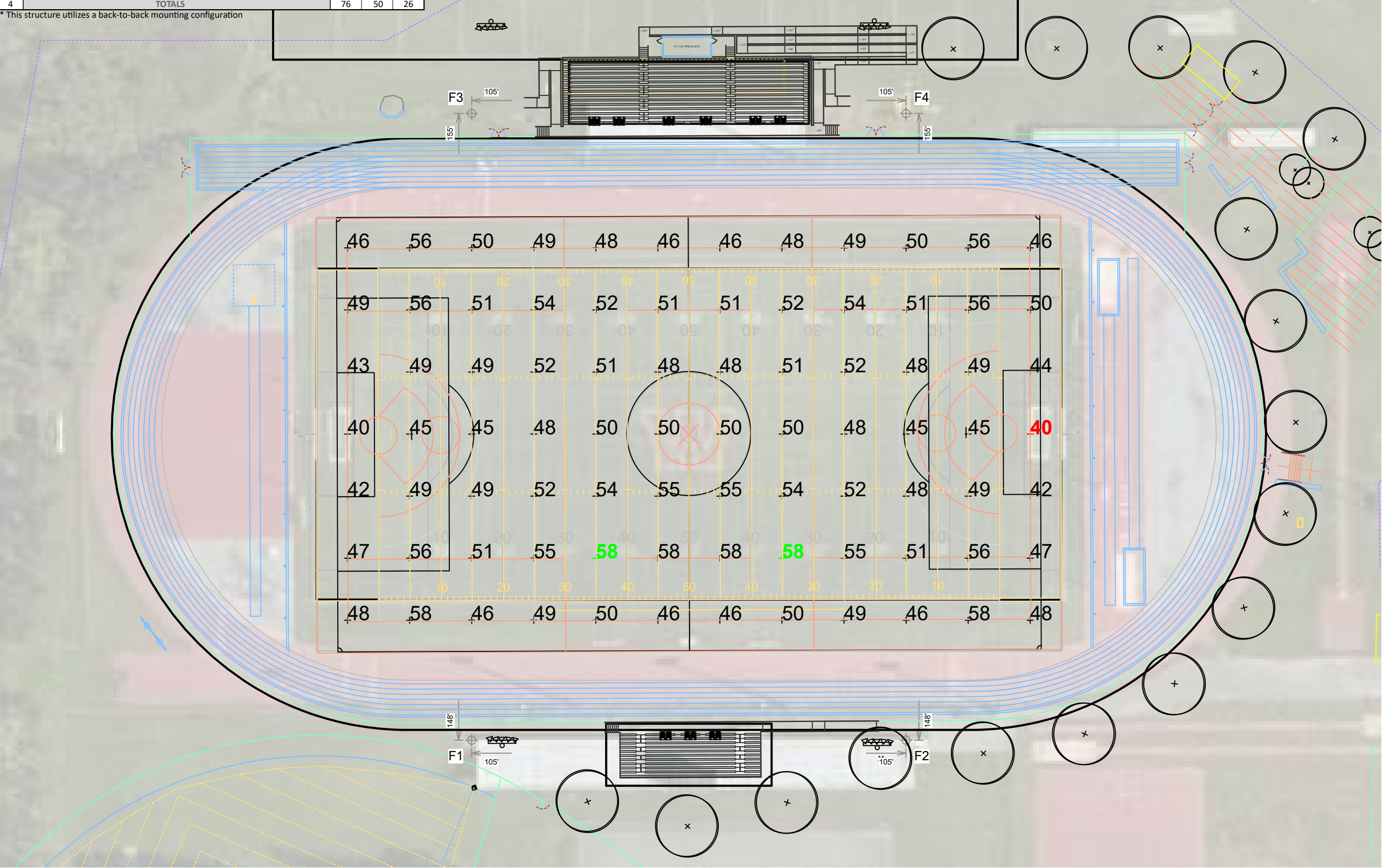


Pole location(s) ⚓ dimensions are relative to 0,0 reference point(s) ⊗



EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
2	F1-F2	80'	-	15'	TLC-BT-575	2	2	0
				70'	TLC-LED-600	1	0	1
				80'	TLC-LED-1150	12	10	2
2	F3-F4	80'	-	15'	TLC-BT-575	2	2	0
				70'	TLC-LED-600	1	0	1
				80'	TLC-LED-1150	13/7*	11	9
4	TOTALS					76	50	26

\* This structure utilizes a back-to-back mounting configuration



Wayland High School Multi Fields  
Wayland, MA

GRID SUMMARY	
Name:	Soccer
Size:	360' x 210'
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

ILLUMINATION SUMMARY			
MAINTAINED HORIZONTAL FOOTCANDLES			
	Entire Grid		
<b>Guaranteed Average:</b>	<b>50</b>		
Scan Average:	50.04		
Maximum:	58.3		
Minimum:	39.5		
Avg / Min:	1.27		
<b>Guaranteed Max / Min:</b>	<b>2</b>		
Max / Min:	1.47		
UG (adjacent pts):	1.26		
CU:	0.69		
No. of Points:	84		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	121,000 / 52,000 lumens		
<b>No. of Luminaires:</b>	<b>50</b>		
Total Load:	52.9 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-1150	>81,000	>81,000	>81,000
TLC-BT-575	>81,000	>81,000	>81,000
Reported per TM-21-11. See luminaire datasheet for details.			

**Guaranteed Performance:** The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.95 dirt depreciation factor.

**Field Measurements:** Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

**Electrical System Requirements:** Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

**Installation Requirements:** Results assume  $\pm$  3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.



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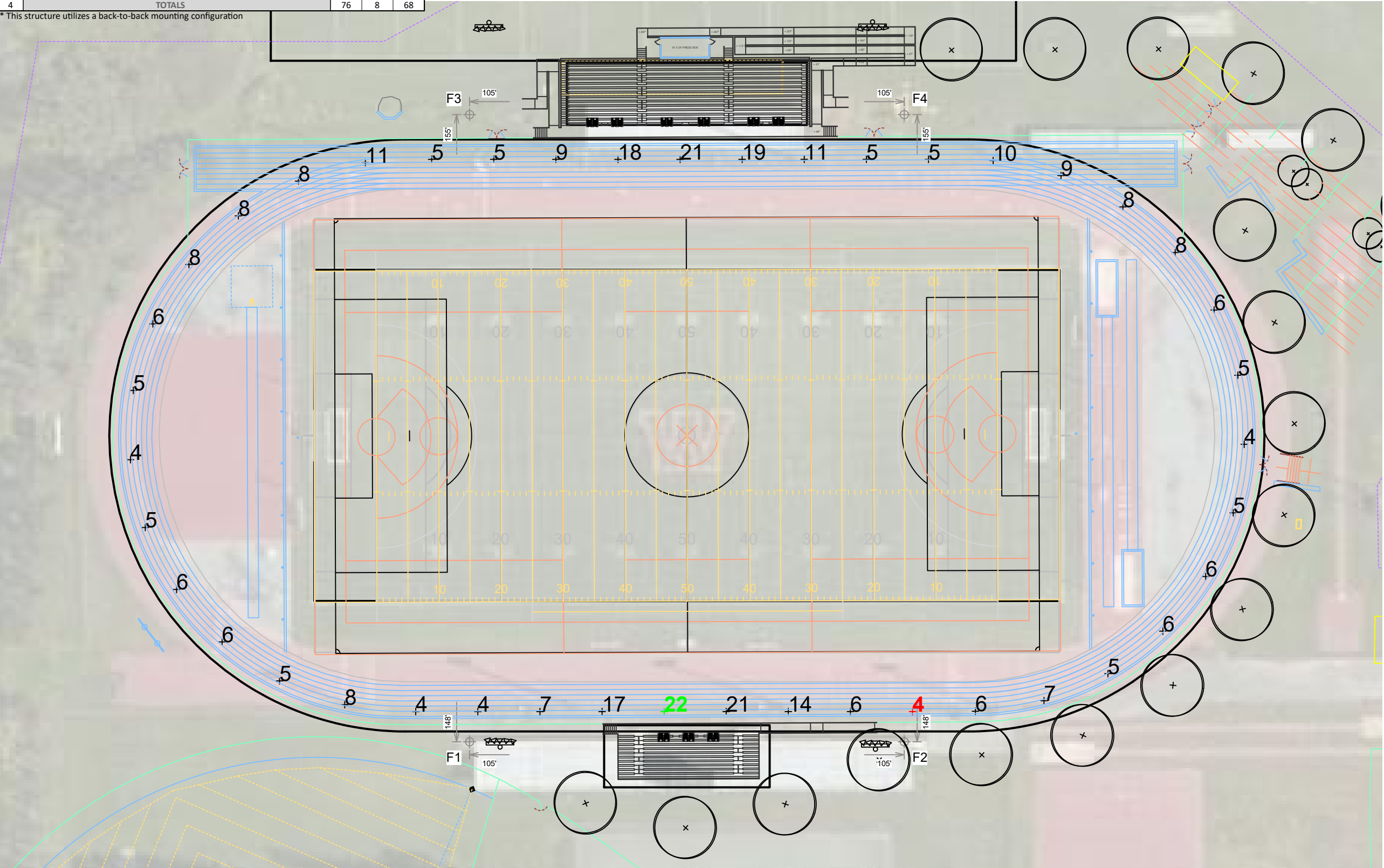
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ILLUMINATION SUMMARY



EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
2	F1-F2	80'	-	15'	TLC-BT-575	2	0	2
				70'	TLC-LED-600	1	0	1
				80'	TLC-LED-1150	12	2	10
2	F3-F4	80'	-	15'	TLC-BT-575	2	0	2
				70'	TLC-LED-600	1	0	1
				80'	TLC-LED-1150	13/7*	2	18
4	TOTALS					76	8	68

\* This structure utilizes a back-to-back mounting configuration



Wayland High School Multi Fields  
Wayland, MA

GRID SUMMARY	
Name:	Track
Size:	Irregular
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

ILLUMINATION SUMMARY			
MAINTAINED HORIZONTAL FOOTCANDLES			
	Entire Grid		
Scan Average:	8.40		
Maximum:	22.0		
Minimum:	3.5		
Avg / Min:	2.40		
Max / Min:	6.28		
UG (adjacent pts):	0.00		
CU:	0.33		
No. of Points:	43		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	121,000 lumens		
No. of Luminaires:	8		
Total Load:	9.2 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-1150	>81,000	>81,000	>81,000
Reported per TM-21-11. See luminaire datasheet for details.			

**Guaranteed Performance:** The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.95 dirt depreciation factor.

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**Installation Requirements:** Results assume ± 3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.

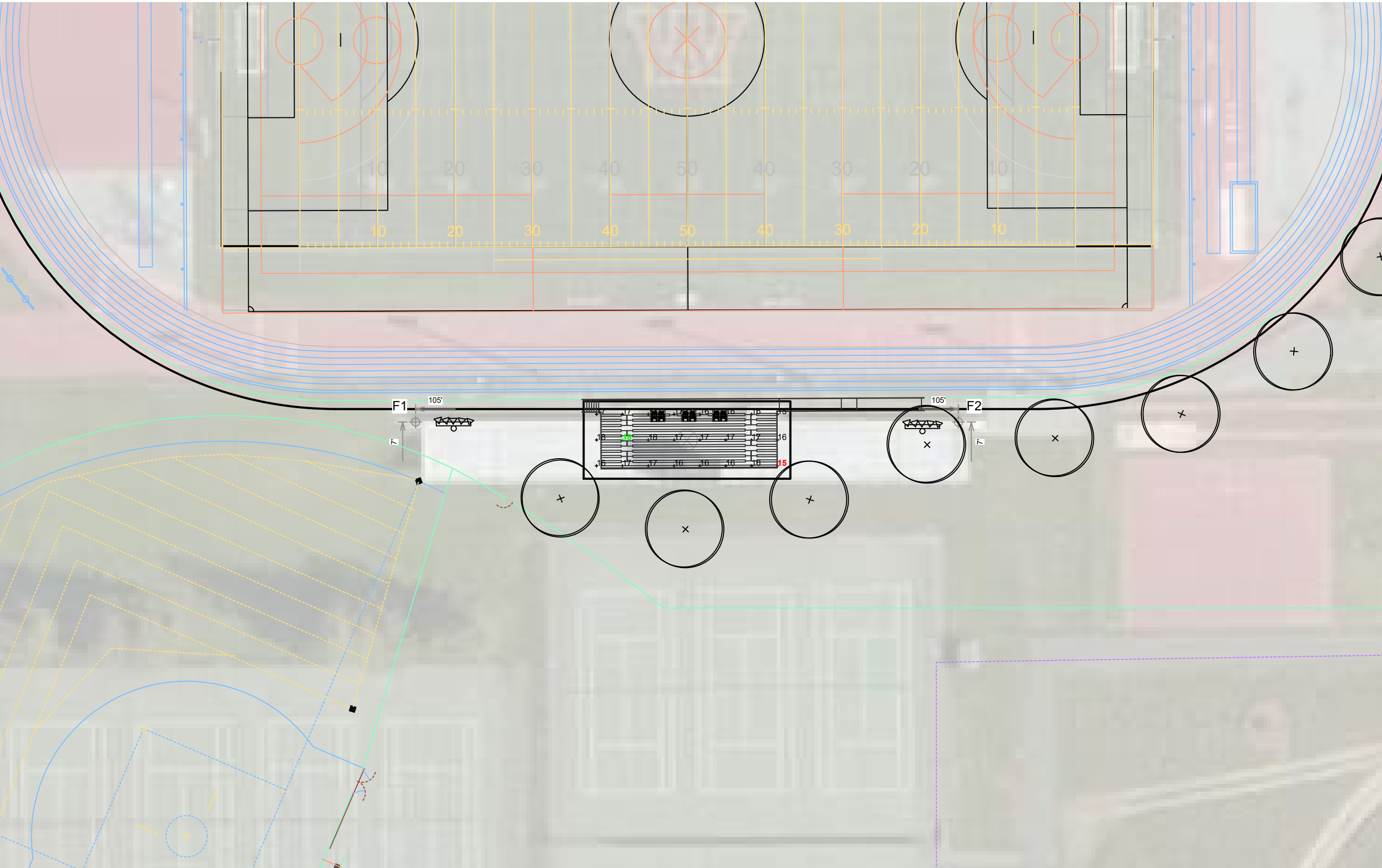


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ILLUMINATION SUMMARY



EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
2	F1-F2	80'	-	15'	TLC-BT-575	2	0	2
				70'	TLC-LED-600	1	1	0
				80'	TLC-LED-1150	12	0	12
2	TOTALS				30	2	28	



## Wayland High School Multi Fields

Wayland, MA

GRID SUMMARY	
Name:	Home
Size:	80' x 30'
Spacing:	10.0' x 10.0'
Height:	3.0' above grade

ILLUMINATION SUMMARY			
MAINTAINED HORIZONTAL FOOTCANDLES			
	Entire Grid		
Scan Average:	16.61		
Maximum:	18.0		
Minimum:	15.0		
Avg / Min:	1.11		
Max / Min:	1.20		
UG (adjacent pts):	1.09		
CU:	0.28		
No. of Points:	24		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	65,600 lumens		
No. of Luminaires:	2		
Total Load:	1.16 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-600	>81,000	>81,000	>81,000
Reported per TM-21-11. See luminaire datasheet for details.			

**Guaranteed Performance:** The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.95 dirt depreciation factor.

**Field Measurements:** Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

**Electrical System Requirements:** Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

**Installation Requirements:** Results assume  $\pm 3\%$  nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.



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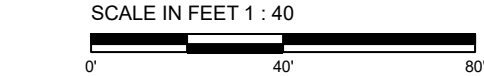
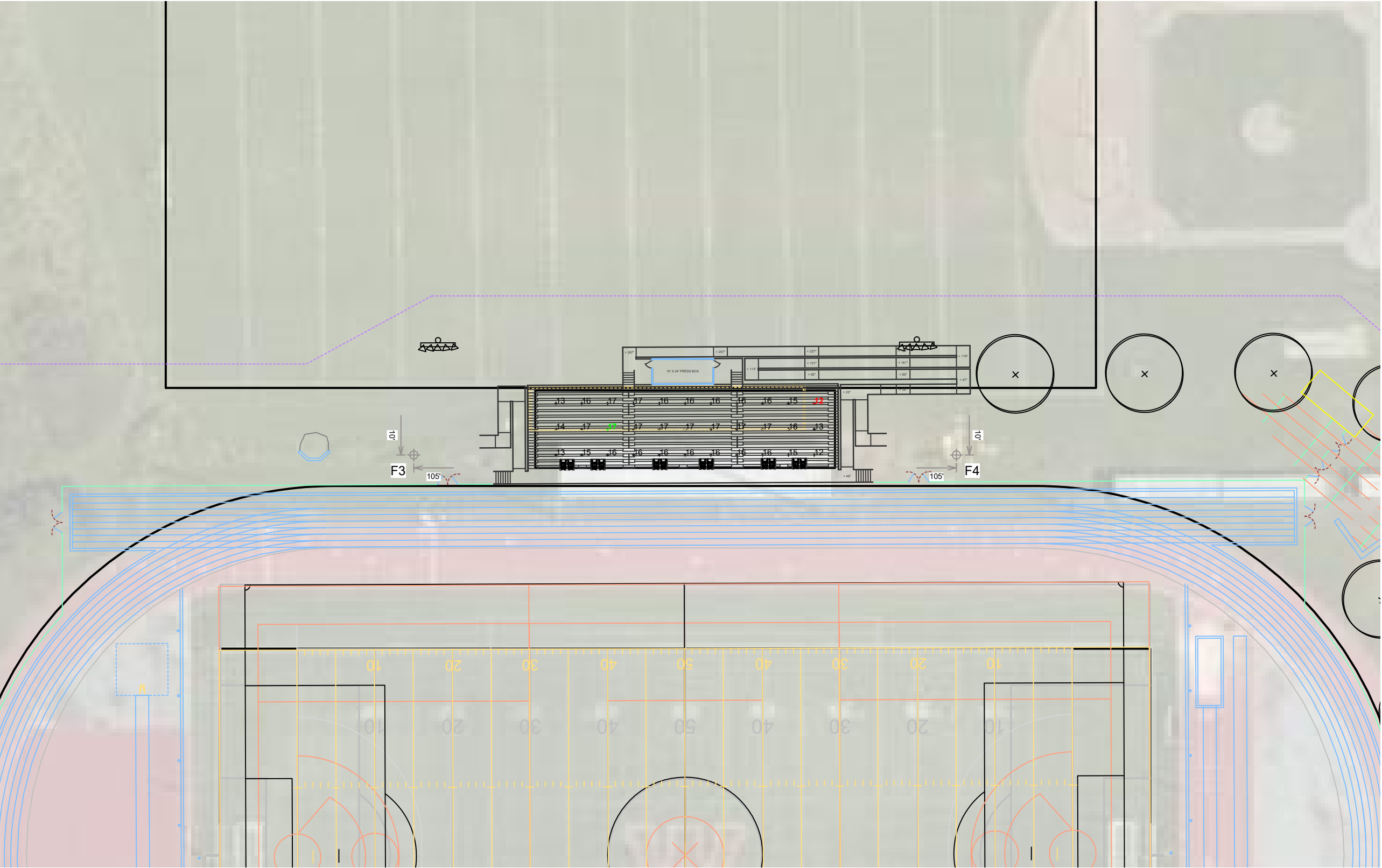
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## ILLUMINATION SUMMARY



EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
2	F3-F4	80'	-	15'	TLC-BT-575	2	0	2
				70'	TLC-LED-600	1	1	0
				80'	TLC-LED-1150	13/7*	0	20
2	TOTALS				46	2	44	

\* This structure utilizes a back-to-back mounting configuration



Pole location(s) ⚓ dimensions are relative to 0,0 reference point(s) ⊗

# Wayland High School Multi Fields

Wayland, MA

GRID SUMMARY	
Name:	Visitor
Size:	116' x 30'
Spacing:	10.0' x 10.0'
Height:	3.0' above grade

ILLUMINATION SUMMARY			
MAINTAINED HORIZONTAL FOOTCANDLES			
	Entire Grid		
Scan Average:	15.64		
Maximum:	17.3		
Minimum:	12.2		
Avg / Min:	1.28		
Max / Min:	1.42		
UG (adjacent pts):	1.25		
CU:	0.36		
No. of Points:	33		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	65,600 lumens		
No. of Luminaires:	2		
Total Load:	1.16 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-600	>81,000	>81,000	>81,000
Reported per TM-21-11. See luminaire datasheet for details.			

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**Field Measurements:** Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

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**Installation Requirements:** Results assume ± 3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.



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## ILLUMINATION SUMMARY



EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
2	F3-F4	80'	-	15'	TLC-BT-575	2	0	2
				70'	TLC-LED-600	1	0	1
				80'	TLC-LED-1150	13/7*	7	13
2	TOTALS					46	14	32

\* This structure utilizes a back-to-back mounting configuration



Wayland High School Multi Fields  
Wayland,MA

GRID SUMMARY	
Name:	Practice
Size:	360' x 160'
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

ILLUMINATION SUMMARY			
MAINTAINED HORIZONTAL FOOTCANDLES			
	Entire Grid		
Scan Average:	23.21		
Maximum:	35.3		
Minimum:	9.6		
Avg / Min:	2.42		
Max / Min:	3.68		
UG (adjacent pts):	2.23		
CU:	0.74		
No. of Points:	60		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	121,000 lumens		
No. of Luminaires:	14		
Total Load:	16.1 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-1150	>81,000	>81,000	>81,000
Reported per TM-21-11. See luminaire datasheet for details.			

**Guaranteed Performance:** The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.95 dirt depreciation factor.

**Field Measurements:** Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

**Electrical System Requirements:** Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

**Installation Requirements:** Results assume ± 3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.



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ILLUMINATION SUMMARY



EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
2	T1, T4	50'	-	50'	TLC-LED-1150	2	2	0
2	T2-T3	50'	-	40'	CREE OSQ	1	0	1
				50'	TLC-LED-1150	2	2	0
4	TOTALS					10	8	2

Wayland High School Multi Fields  
Wayland,MA

GRID SUMMARY	
Name:	Tennis
Size:	3 Court - 12' Spacing
Spacing:	20.0' x 20.0'
Height:	3.0' above grade

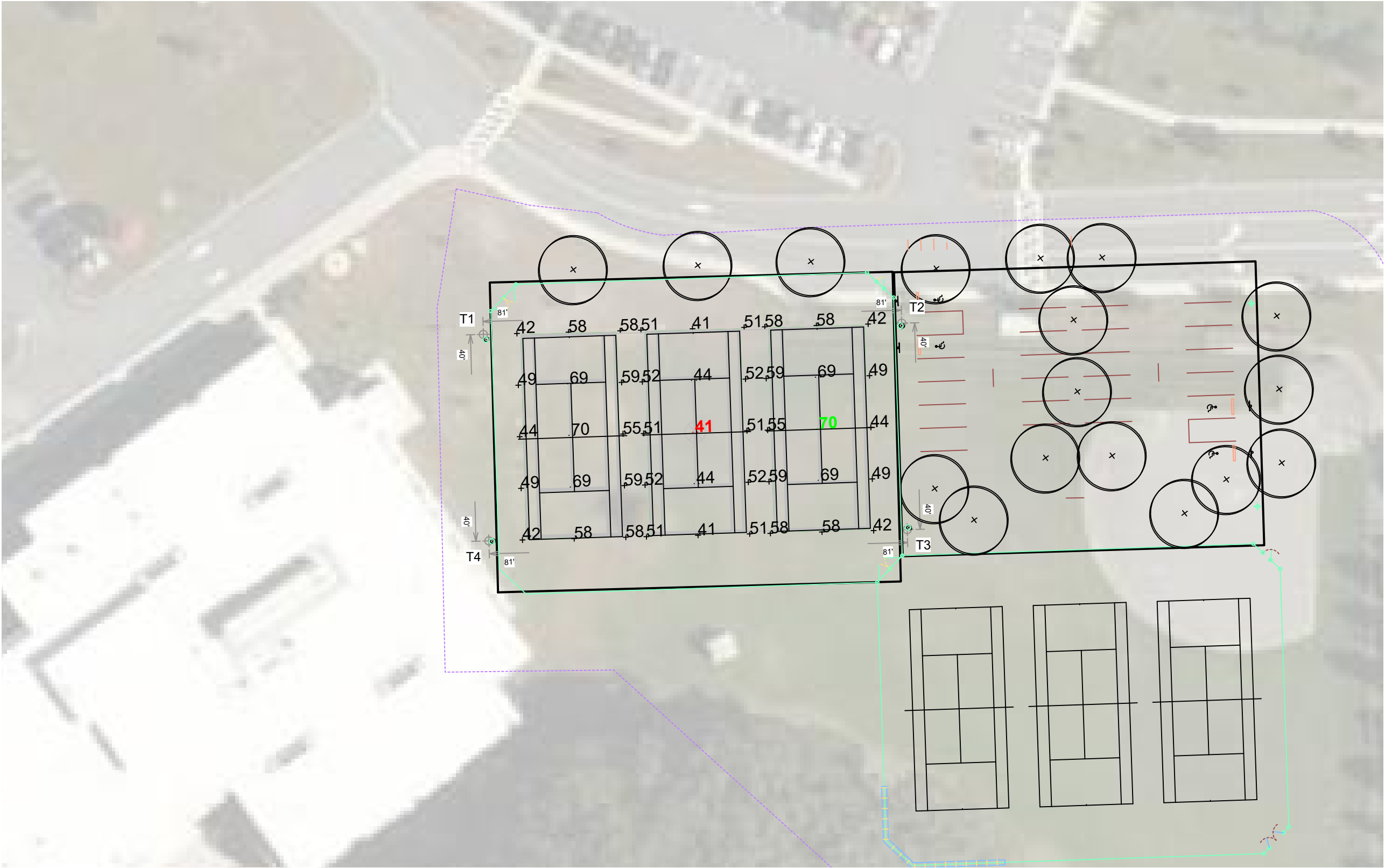
ILLUMINATION SUMMARY			
MAINTAINED HORIZONTAL FOOTCANDLES			
	Entire Grid		
<b>Guaranteed Average:</b>	<b>50</b>		
Scan Average:	53.41		
Maximum:	69.9		
Minimum:	41.0		
Avg / Min:	1.30		
<b>Guaranteed Max / Min:</b>	<b>2</b>		
Max / Min:	1.70		
UG (adjacent pts):	0.00		
CU:	0.97		
No. of Points:	45		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	121,000 lumens		
<b>No. of Luminaires:</b>	<b>8</b>		
Total Load:	9.2 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-1150	>81,000	>81,000	>81,000
Reported per TM-21-11. See luminaire datasheet for details.			

**Guaranteed Performance:** The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.95 dirt depreciation factor.

**Field Measurements:** Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

**Electrical System Requirements:** Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

**Installation Requirements:** Results assume ± 3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.





EQUIPMENT LIST FOR AREAS SHOWN							
Pole				Luminaires			
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID
2	T2-T3	50'	-	40'	CREE OSQ	1	1
				50'	TLC-LED-1150	2	0
2	TOTALS					6	2

Wayland High School Multi Fields  
Wayland,MA

GRID SUMMARY	
Name:	Parking
Size:	140' x 110'
Spacing:	10.0' x 10.0'
Height:	3.0' above grade

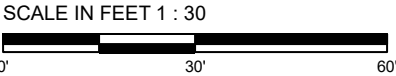
ILLUMINATION SUMMARY			
MAINTAINED HORIZONTAL FOOTCANDLES			
	Entire Grid		
<b>Scan Average:</b>	<b>0.36</b>		
Maximum:	1.8		
Minimum:	0.0		
Avg / Min:	65.79		
<b>Max / Min:</b>	<b>319.29</b>		
UG (adjacent pts):	2.03		
CU:	0.18		
No. of Points:	168		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 70 CRI		
Luminaire Output:	17,000 lumens		
<b>No. of Luminaires:</b>	<b>2</b>		
Total Load:	0.26 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
CREE OSQ	--	--	--
Reported per TM-21-11. See luminaire datasheet for details.			

**Guaranteed Performance:** The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.95 dirt depreciation factor.

**Field Measurements:** Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

**Electrical System Requirements:** Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

**Installation Requirements:** Results assume ± 3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.



Pole location(s) ⚓ dimensions are relative to 0,0 reference point(s) ⊗



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EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
2	BA1, BA2	40'	-	40'	TLC-LED-600	4	4	0
2	TOTALS					8	8	0

## Wayland High School Multi Fields

Wayland,MA

GRID SUMMARY	
Name:	Basketball 1
Size:	85' x 50'
Spacing:	10.0' x 10.0'
Height:	3.0' above grade

ILLUMINATION SUMMARY			
MAINTAINED HORIZONTAL FOOTCANDLES			
	Entire Grid		
<b>Guaranteed Average:</b>	<b>30</b>		
Scan Average:	39.91		
Maximum:	53.9		
Minimum:	27.6		
Avg / Min:	1.45		
<b>Guaranteed Max / Min:</b>	<b>2.5</b>		
Max / Min:	1.95		
UG (adjacent pts):	1.42		
CU:	0.31		
No. of Points:	40		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	65,600 lumens		
<b>No. of Luminaires:</b>	<b>8</b>		
Total Load:	4.64 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-600	>81,000	>81,000	>81,000
Reported per TM-21-11. See luminaire datasheet for details.			

**Guaranteed Performance:** The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.95 dirt depreciation factor.

**Field Measurements:** Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

**Electrical System Requirements:** Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

**Installation Requirements:** Results assume ± 3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.



SCALE IN FEET 1 : 30

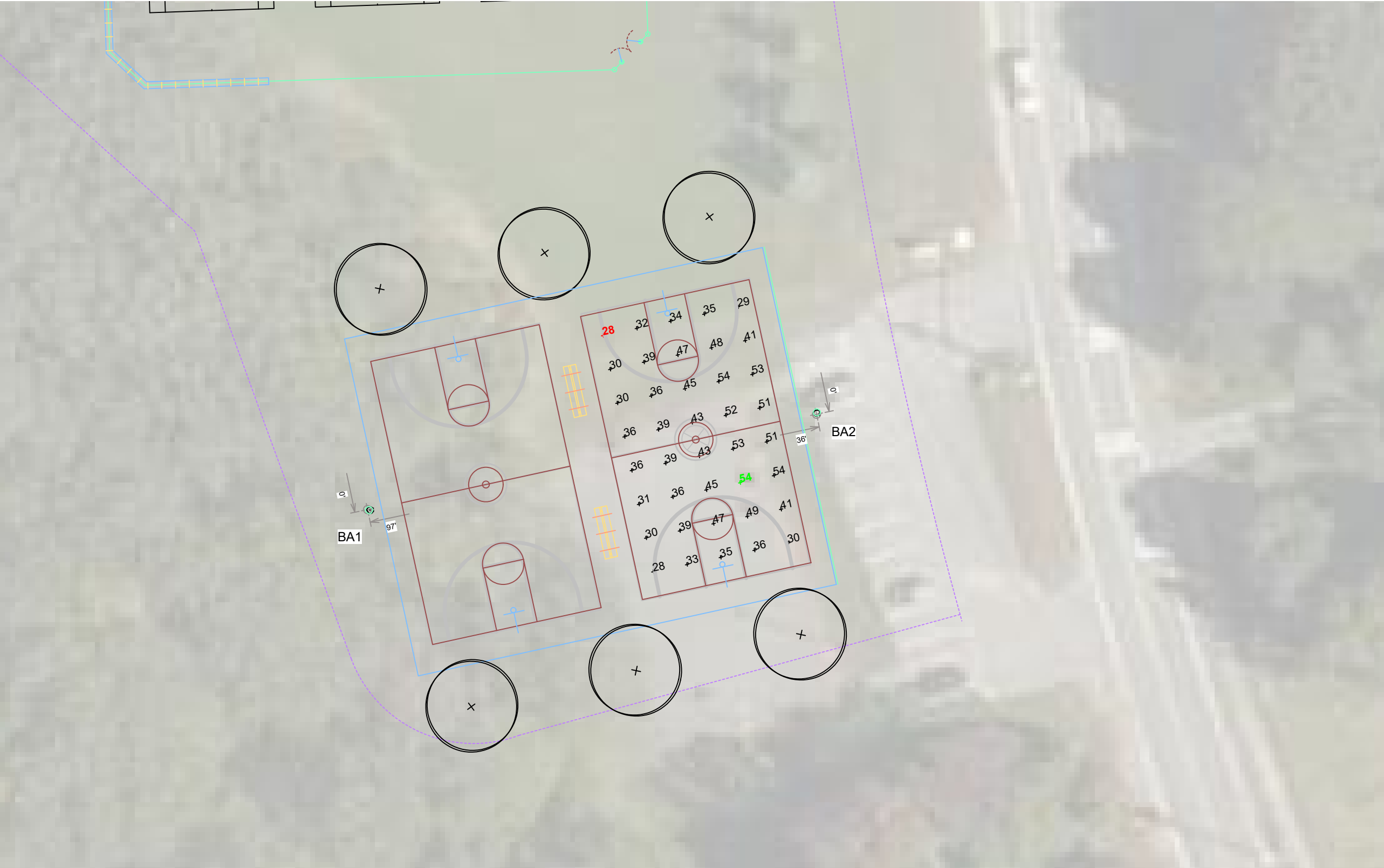
0' 30' 60'

Pole location(s) ⚓ dimensions are relative to 0,0 reference point(s) ⊗





EQUIPMENT LIST FOR AREAS SHOWN							
Pole				Luminaires			
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID
2	BA1, BA2	40'	-	40'	TLC-LED-600	4	4
2	TOTALS					8	8



## Wayland High School Multi Fields

Wayland,MA

GRID SUMMARY	
Name:	Basketball 2
Size:	85' x 50'
Spacing:	10.0' x 10.0'
Height:	3.0' above grade

ILLUMINATION SUMMARY			
MAINTAINED HORIZONTAL FOOTCANDLES			
	Entire Grid		
Guaranteed Average:	30		
Scan Average:	40.23		
Maximum:	54.0		
Minimum:	27.7		
Avg / Min:	1.45		
Guaranteed Max / Min:	2.5		
Max / Min:	1.95		
UG (adjacent pts):	1.40		
CU:	0.31		
No. of Points:	40		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	65,600 lumens		
No. of Luminaires:	8		
Total Load:	4.64 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-600	>81,000	>81,000	>81,000
Reported per TM-21-11. See luminaire datasheet for details.			

**Guaranteed Performance:** The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.95 dirt depreciation factor.

**Field Measurements:** Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

**Electrical System Requirements:** Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

**Installation Requirements:** Results assume  $\pm 3\%$  nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.



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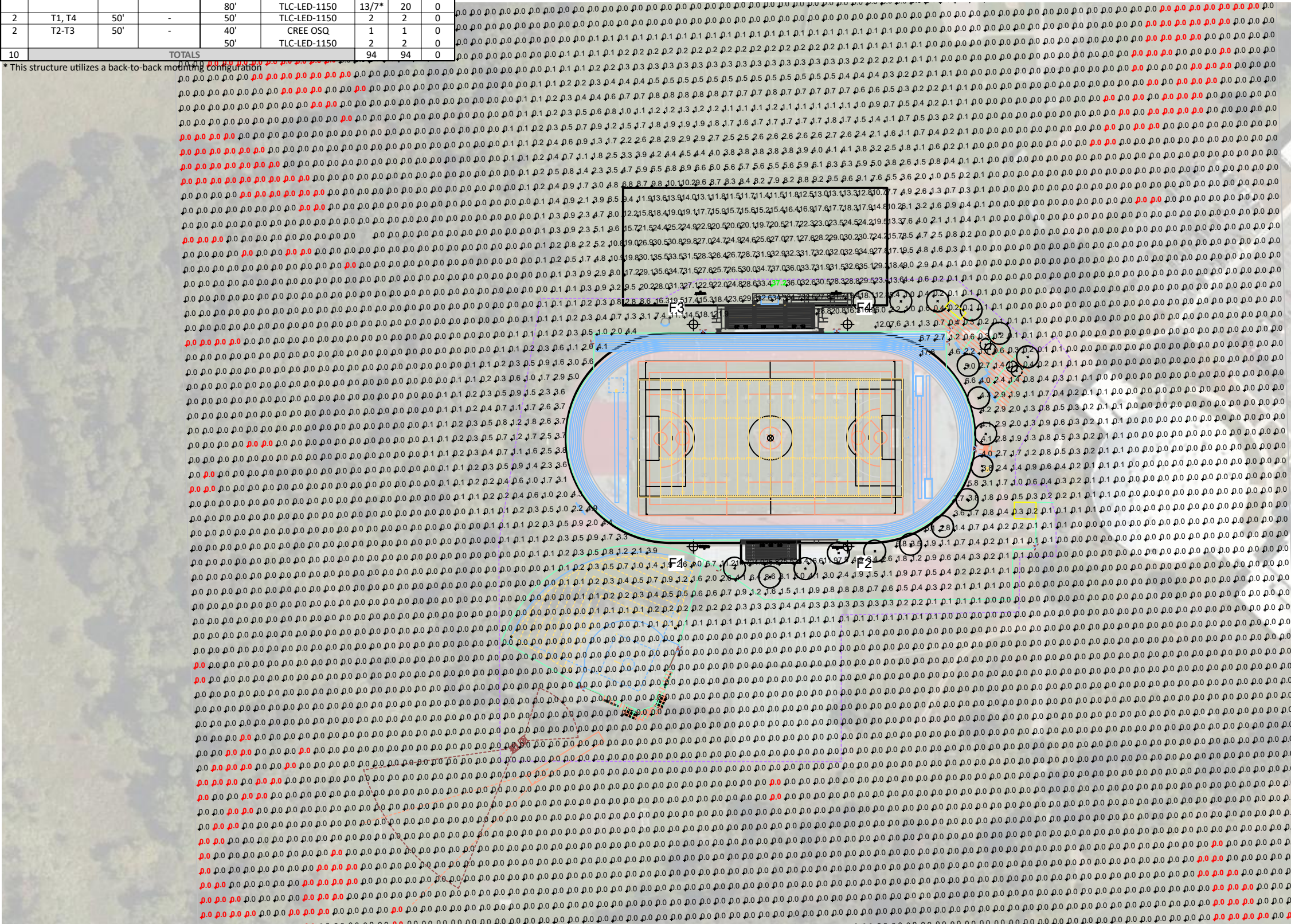
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## ILLUMINATION SUMMARY



EQUIPMENT LIST FOR AREAS SHOWN							
Pole			Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID
2	BA1, BA2	40'	-	40'	TLC-LED-600	4	4
2	F1-F2	80'	-	15'	TLC-BT-575	2	2
				70'	TLC-LED-600	1	1
				80'	TLC-LED-1150	12	12
2	F3-F4	80'	-	15'	TLC-BT-575	2	2
				70'	TLC-LED-600	1	1
				80'	TLC-LED-1150	13/7*	20
2	T1, T4	50'	-	50'	TLC-LED-1150	2	2
2	T2-T3	50'	-	40'	CREE OSQ	1	1
				50'	TLC-LED-1150	2	2
10	TOTALS					94	94

\* This structure utilizes a back-to-back mounting configuration



## Wayland High School Multi Fields

Wayland,MA

GRID SUMMARY	
Name:	Zero Grid 1
Spacing:	20.0' x 20.0'
Height:	3.0' above grade

ILLUMINATION SUMMARY

MAINTAINED HORIZONTAL FOOTCANDLES

	Entire Grid
Scan Average:	1.06
Maximum:	37.2
Minimum:	0.0
Avg / Min:	-
Max / Min:	-
UG (adjacent pts):	129.45
CU:	0.20
No. of Points:	4778

LUMINAIRE INFORMATION

Color / CRI:	5700K - 75 CRI / 5700K - 70 CRI / 5700K - 75 CRI / 5700K - 70 CRI
Luminaire Output:	65,600 / 17,000 / 121,000 / 52,000 lumens
No. of Luminaires:	94
Total Load:	94.62 kW

Lumen Maintenance

Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-600	>81,000	>81,000	>81,000
CREE OSQ	--	--	--
TLC-LED-1150	>81,000	>81,000	>81,000
TLC-BT-575	>81,000	>81,000	>81,000

Reported per TM-21-11. See luminaire datasheet for details.

**Guaranteed Performance:** The ILLUMINATION described

above is guaranteed per your Musco

Warranty document and includes a 0.95

dirty depreciation factor.

**Field Measurements:** Individual field measurements may vary from

computer-calculated predictions and should be taken

in accordance with IESNA RP-6-15.

**Electrical System Requirements:** Refer to Amperage

Draw Chart and/or the "Musco Control System Summary"

for electrical sizing.

**Installation Requirements:** Results assume ± 3%

nominal voltage at line side of the driver and structures

located within 3 feet (1m) of design locations.



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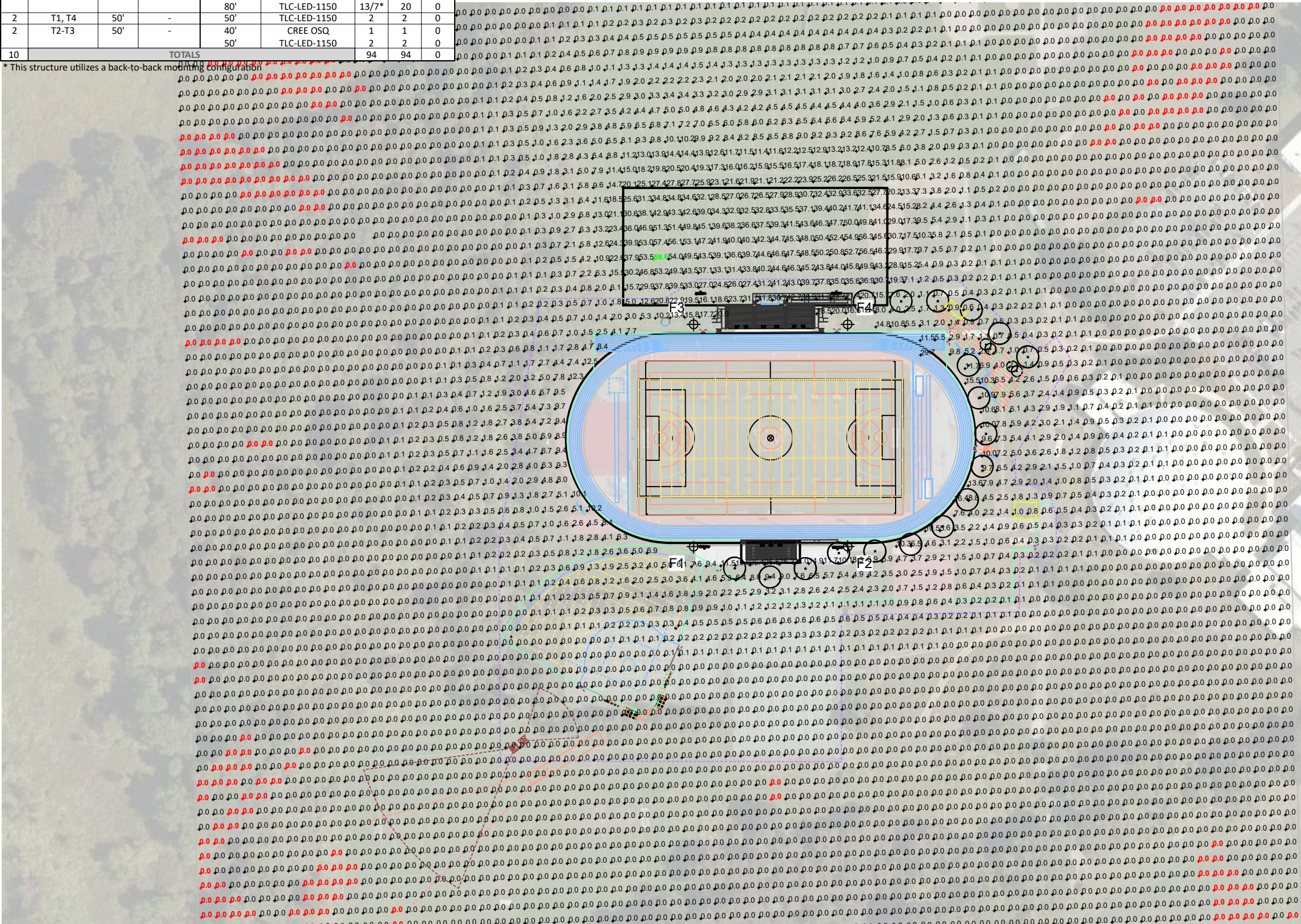
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## ILLUMINATION SUMMARY



EQUIPMENT LIST FOR AREAS SHOWN							
Pole				Luminaires			
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID
2	BA1, BA2	40'	-	40'	TLC-LED-600	4	4
2	F1-F2	80'	-	15'	TLC-BT-575	2	2
				70'	TLC-LED-600	1	1
				80'	TLC-LED-1150	12	12
2	F3-F4	80'	-	15'	TLC-BT-575	2	2
				70'	TLC-LED-600	1	1
				80'	TLC-LED-1150	13/**	20
2	T1, T4	50'	-	50'	TLC-LED-1150	2	2
2	T2-T3	50'	-	40'	CREE OSQ	1	1
				50'	TLC-LED-1150	2	2
10	TOTALS					94	94

\*This structure utilizes a back-to-back mounting configuration



## Wayland High School Multi Fields

Wayland,MA

GRID SUMMARY	
Name:	Zero Grid 1
Spacing:	20.0' x 20.0'
Height:	3.0' above grade

ILLUMINATION SUMMARY			
MAINTAINED MAX VERTICAL FOOTCANDLES			
	Entire Grid		
Scan Average:	2.01		
Maximum:	59.6		
Minimum:	0.0		
Avg / Min:	-		
Max / Min:	-		
UG (adjacent pts):	124.55		
CU:	0.20		
No. of Points:	4778		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI / 5700K - 70 CRI / 5700K - 75 CRI / 5700K - 70 CRI		
Luminaire Output:	65,600 / 17,000 / 121,000 / 52,000 lumens		
No. of Luminaires:	94		
Total Load:	94.62 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-600	>81,000	>81,000	>81,000
CREE OSQ	--	--	--
TLC-LED-1150	>81,000	>81,000	>81,000
TLC-BT-575	>81,000	>81,000	>81,000
Reported per TM-21-11. See luminaire datasheet for details.			

**Guaranteed Performance:** The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.95 dirt depreciation factor.

**Field Measurements:** Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

**Electrical System Requirements:** Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

**Installation Requirements:** Results assume  $\pm$  3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.



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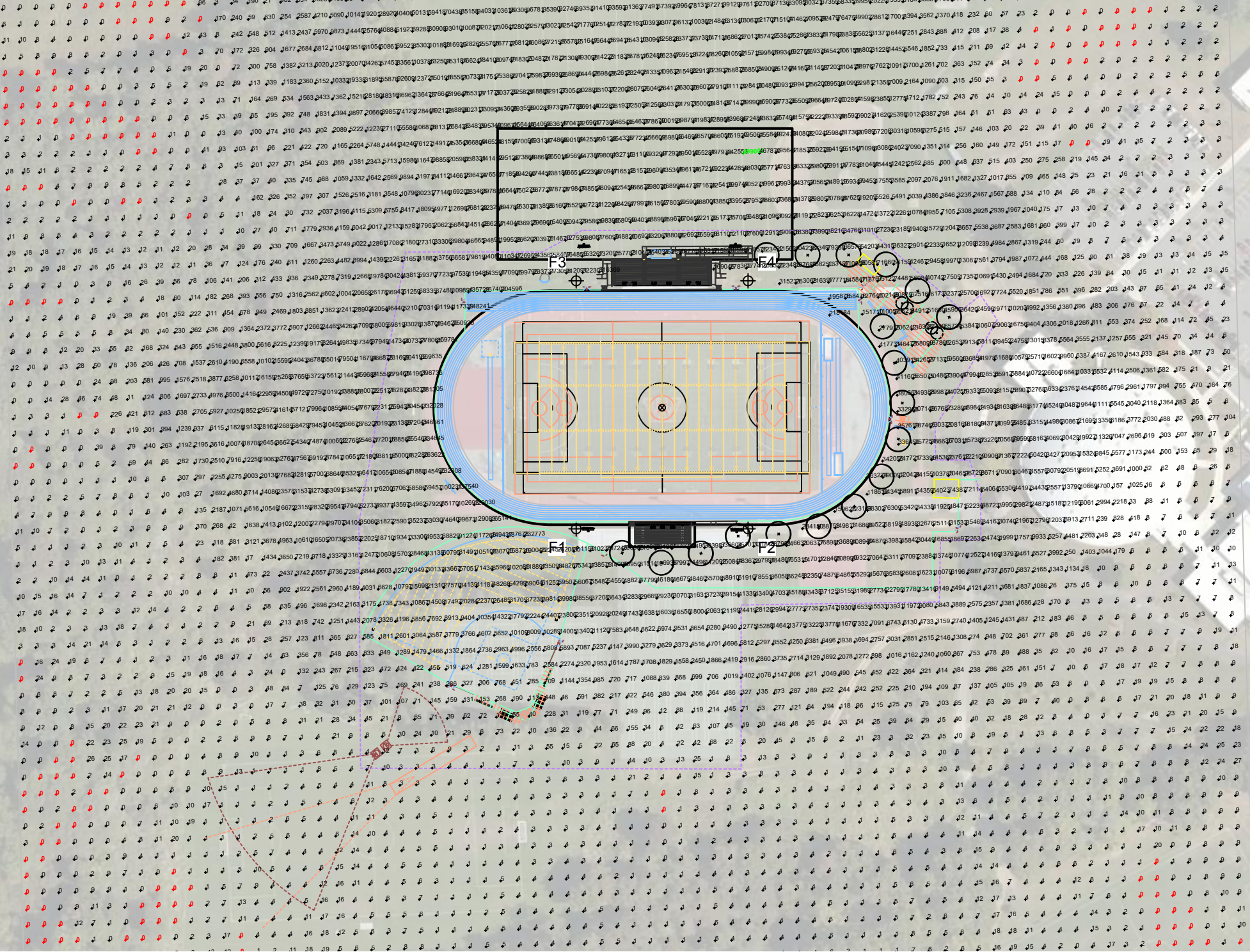
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## ILLUMINATION SUMMARY

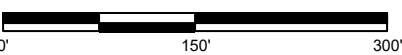


EQUIPMENT LIST FOR AREAS SHOWN							
Pole			Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID
2	BA1, BA2	40'	-	40'	TLC-LED-600	4	4
2	F1-F2	80'	-	15'	TLC-BT-575	2	2
				70'	TLC-LED-600	1	1
				80'	TLC-LED-1150	12	12
2	F3-F4	80'	-	15'	TLC-BT-575	2	2
				70'	TLC-LED-600	1	1
				80'	TLC-LED-1150	13/7*	20
2	T1, T4	50'	-	50'	TLC-LED-1150	2	2
2	T2-T3	50'	-	40'	CREE OSQ	1	1
				50'	TLC-LED-1150	2	2
10	TOTALS					94	94

\* This structure utilizes a back-to-back mounting configuration



SCALE IN FEET 1 : 150



Pole location(s) ⚓ dimensions are relative to 0,0 reference point(s) ⊗

## Wayland High School Multi Fields

Wayland,MA

### GRID SUMMARY

Name: Zero Grid 1  
Spacing: 20.0' x 20.0'  
Height: 3.0' above grade

### ILLUMINATION SUMMARY

MAINTAINED CANDELA (PER FIXTURE)

Entire Grid

Scan Average: 37867.11

Maximum: 499003.1

Minimum: 0.0

Avg / Min: -

Max / Min: -

UG (adjacent pts): 101970.69

CU: 0.20

No. of Points: 4778

### LUMINAIRE INFORMATION

Color / CRI: 5700K - 75 CRI / 5700K - 70 CRI / 5700K - 75 CRI / 5

Luminaire Output: 65,600 / 17,000 / 121,000 / 52,000 lumens

No. of Luminaires: 94

Total Load: 94.62 kW

Lumen Maintenance

Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-600	>81,000	>81,000	>81,000
CREE OSQ	--	--	--
TLC-LED-1150	>81,000	>81,000	>81,000
TLC-BT-575	>81,000	>81,000	>81,000

Reported per TM-21-11. See luminaire datasheet for details.

**Guaranteed Performance:** The ILLUMINATION described

above is guaranteed per your Musco

Warranty document and includes a 0.95

dirt depreciation factor.

**Field Measurements:** Individual field measurements may vary from

computer-calculated predictions and should be taken

in accordance with IESNA RP-6-15.

**Electrical System Requirements:** Refer to Amperage

Draw Chart and/or the "Musco Control System Summary"

for electrical sizing.

**Installation Requirements:** Results assume ± 3%

nominal voltage at line side of the driver and structures

located within 3 feet (1m) of design locations.



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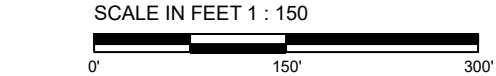
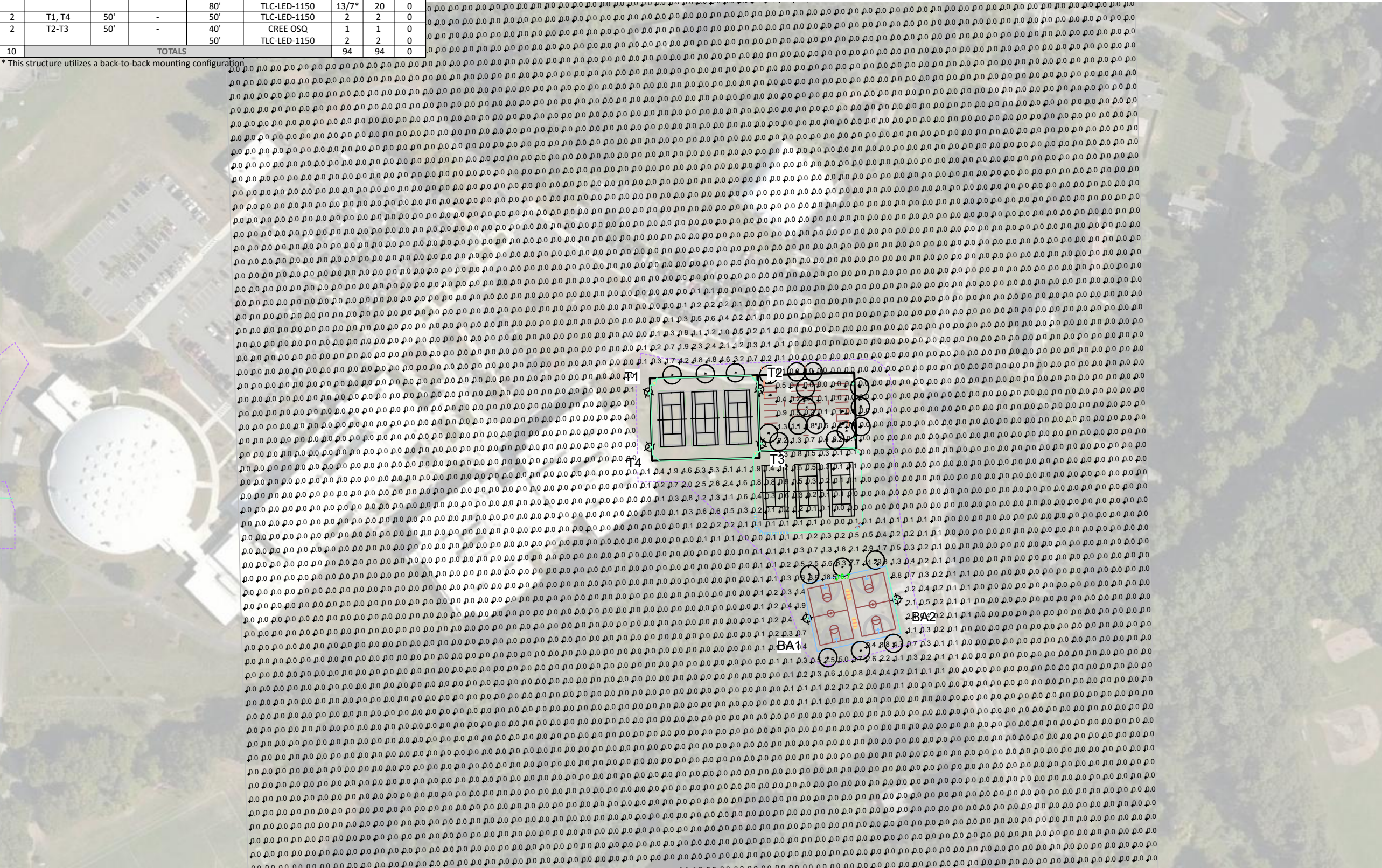
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### ILLUMINATION SUMMARY



EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
2	BA1, BA2	40'	-	40'	TLC-LED-600	4	4	0
2	F1-F2	80'	-	15'	TLC-BT-575	2	2	0
				70'	TLC-LED-600	1	1	0
				80'	TLC-LED-1150	12	12	0
2	F3-F4	80'	-	15'	TLC-BT-575	2	2	0
				70'	TLC-LED-600	1	1	0
				80'	TLC-LED-1150	13/7*	20	0
2	T1, T4	50'	-	50'	TLC-LED-1150	2	2	0
2	T2-T3	50'	-	40'	CREE OSQ	1	1	0
				50'	TLC-LED-1150	2	2	0
10	TOTALS					94	94	0

\* This structure utilizes a back-to-back mounting configuration



ENGINEERED DESIGN By: Markie Roake • File #126964D • 12-Sep-18

## Wayland High School Multi Fields

Wayland,MA

GRID SUMMARY	
Name:	Zero Grid 2
Spacing:	20.0' x 20.0'
Height:	3.0' above grade

ILLUMINATION SUMMARY

MAINTAINED HORIZONTAL FOOTCANDLES

	Entire Grid
Scan Average:	0.07
Maximum:	18.7
Minimum:	0.0
Avg / Min:	-
Max / Min:	-
UG (adjacent pts):	35.59
CU:	0.01
No. of Points:	4382

LUMINAIRE INFORMATION

Color / CRI:	5700K - 75 CRI / 5700K - 70 CRI / 5700K - 75 CRI / 5700K - 70 CRI		
Luminaire Output:	65,600 / 17,000 / 121,000 / 52,000 lumens		
No. of Luminaires:	94		
Total Load:	94.62 kW		

Lumen Maintenance

Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-600	>81,000	>81,000	>81,000
CREE OSQ	--	--	--
TLC-LED-1150	>81,000	>81,000	>81,000
TLC-BT-575	>81,000	>81,000	>81,000

Reported per TM-21-11. See luminaire datasheet for details.

**Guaranteed Performance:** The ILLUMINATION described

above is guaranteed per your Musco

Warranty document and includes a 0.95

dirt depreciation factor.

**Field Measurements:** Individual field measurements may vary from

computer-calculated predictions and should be taken

in accordance with IESNA RP-6-15.

**Electrical System Requirements:** Refer to Amperage

Draw Chart and/or the "Musco Control System Summary"

for electrical sizing.

**Installation Requirements:** Results assume ± 3%

nominal voltage at line side of the driver and structures

located within 3 feet (1m) of design locations.



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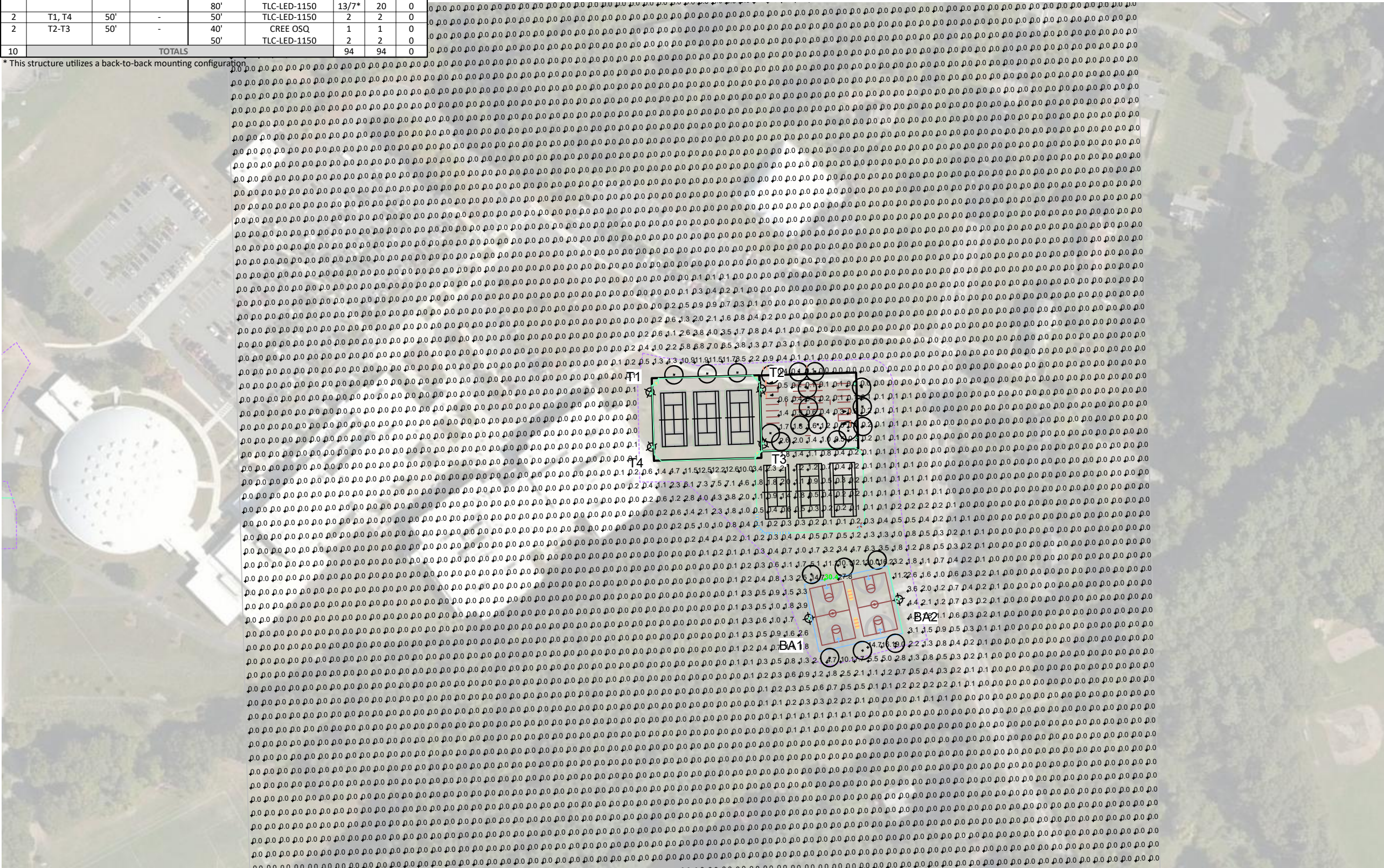
## ILLUMINATION SUMMARY

Pole location(s) ⚡ dimensions are relative to 0,0 reference point(s) ⊗



EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
2	BA1, BA2	40'	-	40'	TLC-LED-600	4	4	0
2	F1-F2	80'	-	15'	TLC-BT-575	2	2	0
				70'	TLC-LED-600	1	1	0
				80'	TLC-LED-1150	12	12	0
				15'	TLC-BT-575	2	2	0
2	F3-F4	80'	-	70'	TLC-LED-600	1	1	0
				80'	TLC-LED-1150	13/7*	20	0
				50'	TLC-LED-1150	2	2	0
				2	T1, T4	50'	-	50'
2	T2-T3	50'	-	40'	CREE OSQ	1	1	0
				50'	TLC-LED-1150	2	2	0
10	TOTALS					94	94	0

\* This structure utilizes a back-to-back mounting configuration



## Wayland High School Multi Fields

Wayland,MA

GRID SUMMARY	
Name:	Zero Grid 2
Spacing:	20.0' x 20.0'
Height:	3.0' above grade

ILLUMINATION SUMMARY			
MAINTAINED MAX VERTICAL FOOTCANDLES			
	Entire Grid		
Scan Average:	0.17		
Maximum:	30.4		
Minimum:	0.0		
Avg / Min:	-		
Max / Min:	-		
UG (adjacent pts):	26.72		
CU:	0.01		
No. of Points:	4382		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI / 5700K - 70 CRI / 5700K - 75 CRI / 5700K - 70 CRI		
Luminaire Output:	65,600 / 17,000 / 121,000 / 52,000 lumens		
No. of Luminaires:	94		
Total Load:	94.62 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-600	>81,000	>81,000	>81,000
CREE OSQ	--	--	--
TLC-LED-1150	>81,000	>81,000	>81,000
TLC-BT-575	>81,000	>81,000	>81,000
Reported per TM-21-11. See luminaire datasheet for details.			

**Guaranteed Performance:** The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.95 dirt depreciation factor.

**Field Measurements:** Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

**Electrical System Requirements:** Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

**Installation Requirements:** Results assume ± 3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.



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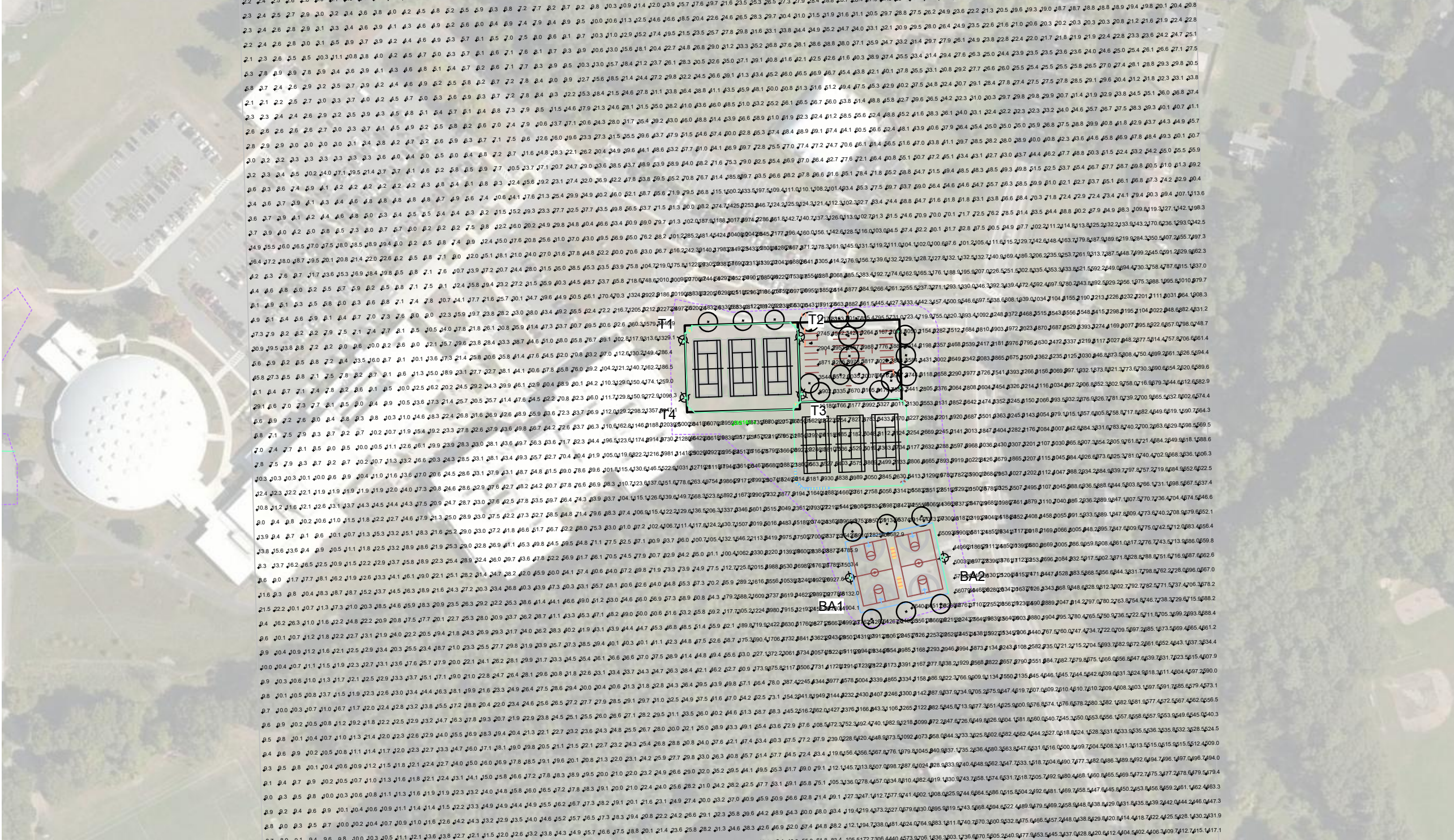
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## ILLUMINATION SUMMARY



EQUIPMENT LIST FOR AREAS SHOWN						
Pole			Luminaires			
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE
2	BA1, BA2	40'	-	40'	TLC-LED-600	4
2	F1-F2	80'	-	15'	TLC-BT-575	2
				70'	TLC-LED-600	1
				80'	TLC-LED-1150	12
2	F3-F4	80'	-	15'	TLC-BT-575	2
				70'	TLC-LED-600	1
				80'	TLC-LED-1150	13/**
2	T1, T4	50'	-	50'	TLC-LED-1150	2
2	T2-T3	50'	-	40'	CREE OSQ	1
				50'	TLC-LED-1150	2
10	TOTALS					94

\* This structure utilizes a back-to-back mounting configuration



## Wayland High School Multi Fields

Wayland,MA

GRID SUMMARY	
<b>Name:</b>	<b>Zero Grid 2</b>
Spacing:	20.0' x 20.0'
Height:	3.0' above grade

ILLUMINATION SUMMARY			
MAINTAINED CANDELA (PER FIXTURE)			
	Entire Grid		
<b>Scan Average:</b>	<b>2733.31</b>		
Maximum:	192168.4		
Minimum:	0.0		
Avg / Min:	-		
<b>Max / Min:</b>	<b>-</b>		
UG (adjacent pts):	63.88		
CU:	0.01		
No. of Points:	4382		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI / 5700K - 70 CRI / 5700K - 75 CRI / 5700K - 70 CRI		
Luminaire Output:	65,600 / 17,000 / 121,000 / 52,000 lumens		
<b>No. of Luminaires:</b>	<b>94</b>		
Total Load:	94.62 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-600	>81,000	>81,000	>81,000
CREE OSQ	--	--	--
TLC-LED-1150	>81,000	>81,000	>81,000
TLC-BT-575	>81,000	>81,000	>81,000
Reported per TM-21-11. See luminaire datasheet for details.			

**Guaranteed Performance:** The ILLUMINATION described

above is guaranteed per your Musco

Warranty document and includes a 0.95

dirt depreciation factor.

**Field Measurements:** Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

**Electrical System Requirements:** Refer to Amperage

Draw Chart and/or the "Musco Control System Summary"

for electrical sizing.

**Installation Requirements:** Results assume ± 3%

nominal voltage at line side of the driver and structures

located within 3 feet (1m) of design locations.

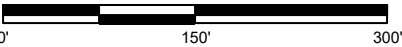


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## ILLUMINATION SUMMARY

SCALE IN FEET 1 : 150



Pole location(s) ⚓ dimensions are relative to 0,0 reference point(s) ⓧ

ENGINEERED DESIGN By: Markie Roake • File #126964D • 12-Sep-18



Wayland High School Multi Fields  
Wayland,MA

EQUIPMENT LAYOUT

INCLUDES:

- Basketball 1
- Basketball 2
- Football
- Home
- Parking
- Practice
- Soccer
- Tennis
- Track
- Visitor

**Electrical System Requirements:** Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

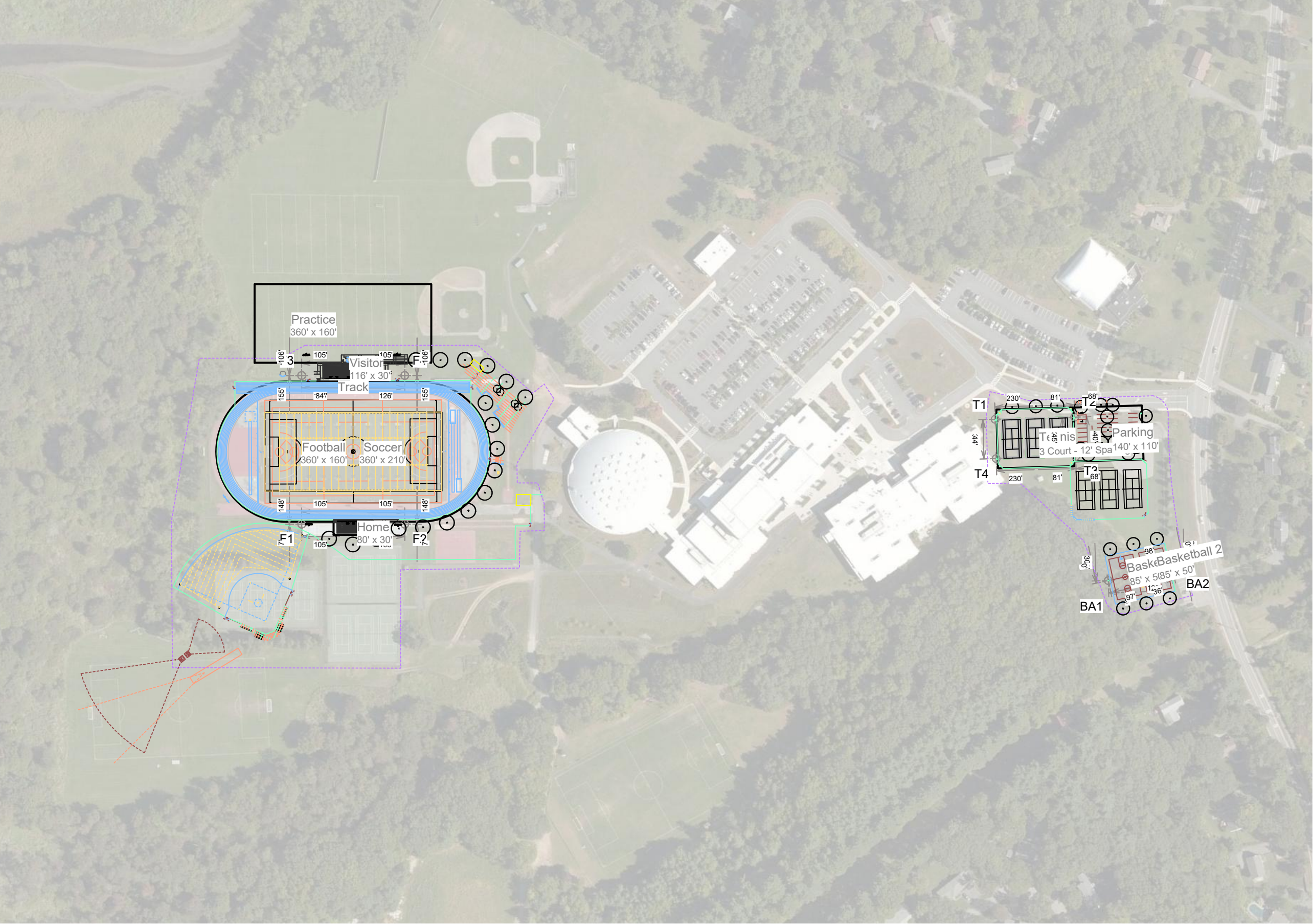
**Installation Requirements:** Results assume ± 3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.

EQUIPMENT LIST FOR AREAS SHOWN

Pole				Luminaires		
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE
2	BA1, BA2	40'	-	40'	TLC-LED-600	4
2	F1-F2	80'	-	15'	TLC-BT-575	2
				70'	TLC-LED-600	1
				80'	TLC-LED-1150	12
2	F3-F4	80'	-	15'	TLC-BT-575	2
				70'	TLC-LED-600	1
				80'	TLC-LED-1150	13/7*
2	T1, T4	50'	-	50'	TLC-LED-1150	2
2	T2-T3	50'	-	40'	CREE OSQ	1
				50'	TLC-LED-1150	2
10	TOTALS					94

\* This structure utilizes a back-to-back mounting configuration

SINGLE LUMINAIRE AMPERAGE DRAW CHART							
Ballast Specifications (.90 min power factor)		Line Amperage Per Luminaire (max draw)					
Single Phase Voltage		208 (60)	220 (60)	240 (60)	277 (60)	347 (60)	480 (60)
TLC-LED-600		3.4	3.2	3.0	2.6	2.0	1.9
Cree OSQ		-	-	-	-	-	-
TLC-LED-1150		6.8	6.5	5.9	5.1	4.1	3.7
TLC-BT-575		3.2	3.0	2.8	2.4	1.9	1.4



SCALE IN FEET 1 : 200



Pole location(s) ⚡ dimensions are relative to 0,0 reference point(s) ⊗



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Wayland High School Multi Fields  
Wayland,MA

GLARE IMPACT

Summary

Map indicates the maximum candela an observer would see when facing the brightest light source from any direction.

A well-designed lighting system controls light to provide maximum useful on-field illumination with minimal destructive off-site glare.

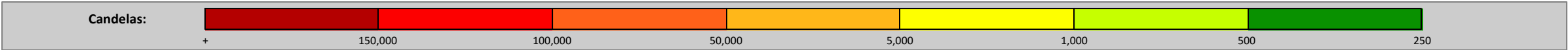
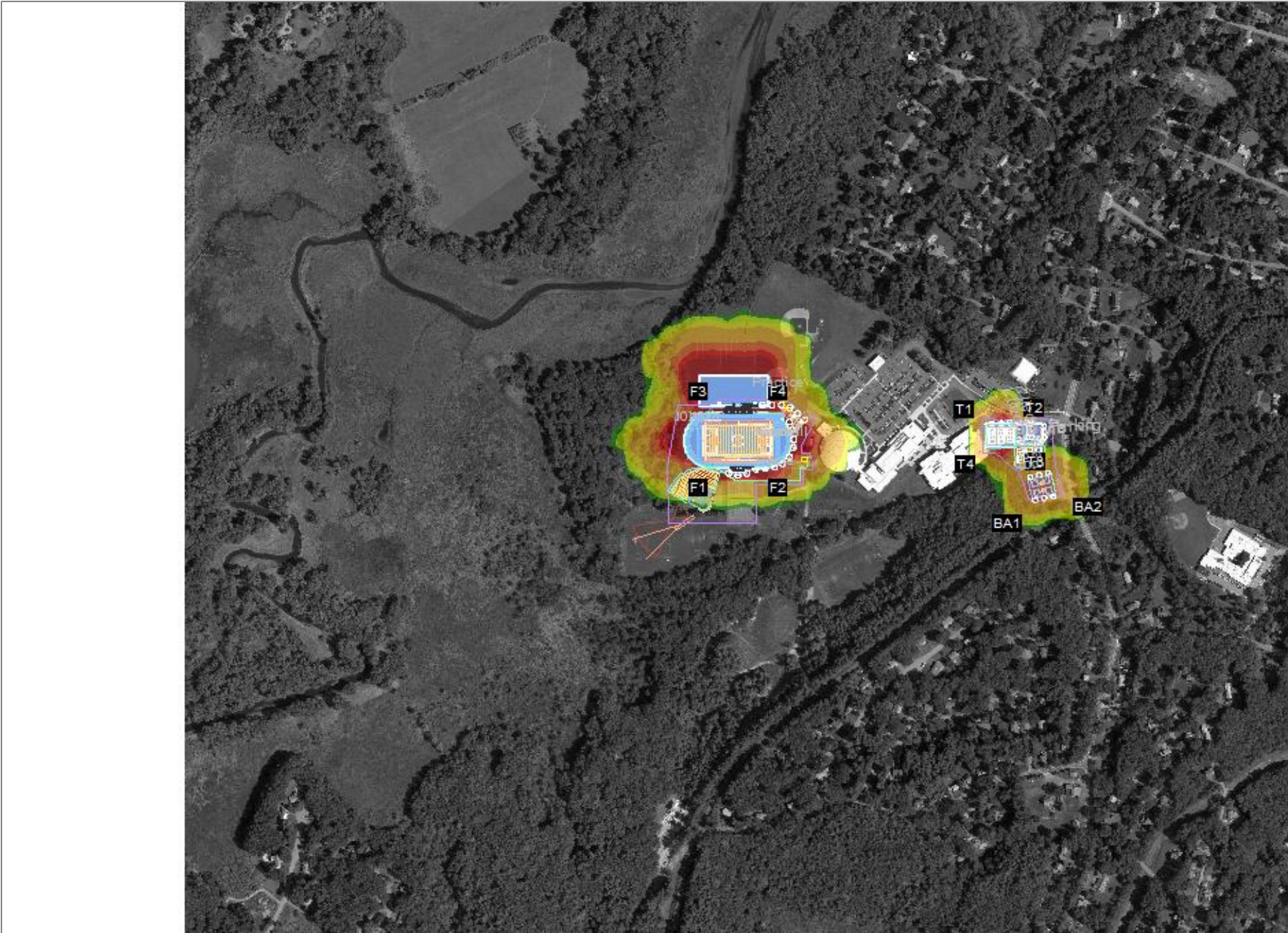
GLARE

Candela Levels

**High Glare: 150,000 or more candela**  
Should only occur on or very near the lit area where the light source is in direct view. Care must be taken to minimize high glare zones.

**Significant Glare: 25,000 to 75,000 candela**  
Equivalent to high beam headlights of a car.

**Minimal to No Glare: 500 or less candela**  
Equivalent to 100W incandescent light bulb.



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# STC Guidelines for Maintenance



## of Infilled Synthetic Turf Sports Fields

Published January 2013



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# Introduction

## Purpose

With thousands of sports field installations throughout North America, the Synthetic Turf Council is pleased that so many field owners have enjoyed the appearance, performance, playability and longevity benefits that a synthetic turf surface can provide. In order to maximize the investment and benefits of a synthetic turf surface, maintenance is essential. These voluntary guidelines provide owners with objective maintenance guidance to augment, and not replace, the maintenance requirements and procedures of the company or companies providing the warranty for the field and the installation.

## Objectives

There are four key areas that drive the need for objective synthetic turf maintenance guidelines:

- **Maximize the appearance and longevity of your synthetic turf**—Improperly maintained fields will degrade faster and compromise playing conditions.
- **Ensure maximum performance and playability**—The *STC Guidelines for Synthetic Turf Performance*, available at [www.syntheticturfCouncil.org](http://www.syntheticturfCouncil.org), states, “proper maintenance is essential for the performance and quality of any synthetic turf system.” Through a combination of regular maintenance and performance testing, it is possible to track the synthetic sports field’s performance and anticipate the end of its useful life.
- **Address field usage topics and special circumstances**—Factors such as age, hours of use, type of usage, climate, contamination and other situations impact the performance of the synthetic turf.
- **Meet your field’s warranty requirements**—While a maintenance regimen can support the requirements of a warranty, the details of a maintenance plan should be carefully reviewed with the field builder to assure that it complies with and does not void any provisions of the warranty.

**Field builder**—For purposes of this document, a field builder is defined as the company having primary responsibility for installing the synthetic turf sports field, either directly or indirectly through a subcontractor or distributor, and providing the overall warranty for the installation and the field materials.

## Scope

While there are numerous types and uses of synthetic turf, this document focuses on infilled synthetic turf systems designed for sports fields. This document addresses the following topics for a field owner:

- Suggested approach to maintenance
- Routine maintenance
- Comprehensive maintenance
- Field rejuvenation
- Special circumstances
- Usage considerations



# Approach to Maintenance

As stated in the Introduction, a solid maintenance program is essential to achieving the appearance, performance, playability and longevity benefits of synthetic turf. A field owner should take the following approach towards maintenance:

## Prior to Purchase

### Communication

- Understand that no synthetic turf system is “maintenance free”.
- Obtain the field builder’s warranty and maintenance guidelines. Ask questions to understand the implications and requirements of each throughout the useful life of the synthetic turf.
- Discuss the anticipated usage of your field with your field builder. Obtain a maintenance plan that is designed for your field and its planned usage.

### Purchase/Design Considerations

- Include in your purchase specific maintenance equipment, extra infill and repair materials (extra synthetic turf, seaming tape and glue).
- For synthetic turf fields with an irrigation system, consult an irrigation specialist to ensure that the system will not cause the field to become over-saturated when irrigated. Only potable water should be used for irrigation.
- Design and locate the field to avoid contamination from adjacent areas.
  - ⇒ Ensure player walkways to the field are clean, and install a brush mat at the entrance to the field. Where necessary, cross over covers can be used for player entry onto the field.
  - ⇒ Consider installing paved areas around the field to prevent contamination from nearby vegetation, spectators, maintenance vehicle tires, etc.
  - ⇒ If possible, locate the field away from sources of airborne pollutants, flood plains, and other problematic situations.
  - ⇒ Ensure that all surrounding surface water is directed away from the field.

### Establish Responsibility

- Understand who will perform the ongoing maintenance, including repairs and infill replacement, and its cost throughout the useful life of the field. The maintenance can be performed by the field owner with its own equipment and personnel, or outsourced to either a qualified maintenance firm or the field builder. If a third-party maintenance firm is to be engaged, make sure it is pre-approved by the field builder and it agrees to maintain your desired performance criteria. The STC maintains on its website, [www.syntheticurfCouncil.org](http://www.syntheticurfCouncil.org), an *Online Buyer’s Guide and Member Directory* that includes a



listing of STC Certified and other maintenance service providers.

- The field builder should confirm in writing before any maintenance work is performed on the field that the ongoing maintenance program, service provider, and maintenance equipment are acceptable, comply with and will not void any warranty provisions.

### **Accepting Your New Field**

- **Training**—Field owner personnel should be trained on the synthetic turf warranty, the field builder's maintenance guidelines and these STC Maintenance Guidelines. Training should include information about the specific components and materials of the installed system, the proper use of the synthetic turf maintenance equipment you will be operating, and the steps to ensure that optimal benefits are obtained while satisfying warranty requirements.
- **Expectation**—After a period of several months of initial use of the field and rainfall, the infill material will settle into the synthetic turf. During this period, more frequent brushing may be advised by your field builder. Once settling occurs, check the infill depth for consistency around the field and to ensure it is within the field builder's guidelines.
- **Testing**—Conduct any on-site field testing by a recognized third-party lab that may have been specified during the purchase or bid process to determine if the field meets desired performance criteria, e.g., those highlighted in the *STC Guidelines for Synthetic Turf Performance*. This will help benchmark the performance characteristics of the field when it is new against test results taken throughout its useful life.

### **Protecting Your Field**

- Establish signage and local rules for the use of the field to avoid field contamination and damage.
- If the field is in a flood plain, cover it when the threat of flooding exists with a specialized tarp designed to limit silt and debris from contaminating the field surface.
- Encourage coaches and players to rotate activities to different sections of the field to prevent high wear areas.
- Provide trash and litter containers on site and make sure there are enough containers to eliminate overflow.
- Route field access traffic in such a way as to minimize the tracking of mud and dirt onto the field.
- Set up drinks for players during practice breaks off of the field, if possible.
- Do not perform any maintenance or other activity that may invalidate the warranty.
- Report any field damage to the field builder immediately. Damages need to be immediately repaired to avoid an escalating problem.
- Plan to perform the maintenance recommended by your field builder. In terms of time, you should budget one hour of inspection and maintenance for every 10 hours of playing time.



- Ensure a maintenance and activity log is maintained. This is often required by the warranty. It is important that each and every maintenance operation, no matter how minor, be recorded in the log. Please ask your field builder for a form, but in general, the following information should be logged:
  - ⇒ Type of Activity during week
  - ⇒ Estimated number of hours used during week
  - ⇒ Average number of participants per hour
  - ⇒ Type of maintenance activity performed
  - ⇒ Remarks/Notes
  - ⇒ Signature of maintenance supervisor



## Routine Maintenance—Ongoing

The basic components of effective, routine maintenance are to:

- Conduct inspections and perform minor repairs to avoid playing hazards.
- Keep the playing surface clean and free of debris and contaminants.
- Check and maintain proper infill levels to provide a consistent surface.
- Brush the surface to preserve appearance, keep grass fibers upright, and maintain even infill levels, making sure to use only approved bristles that will not overly abrade the fibers.
- Maintain a maintenance and activity log.

### Conduct Inspections and Perform Minor Repairs

A maintenance person should walk the field daily and conduct more detailed inspections according to your field builder's recommended schedule. To avoid permanent damage to your synthetic turf or safety hazards, check regularly for and address such critical items as foreign debris, low infill levels, open seams, etc.

- Pay special attention to the most heavily used areas, such as midfield, goal mouths, corner kick areas, etc. Add new infill or redistribute migrated infill, where necessary, to the recommended depth.
- Look for foreign debris or contamination.
- Check seams and joints where panels or any field markings are joined together. Open joints can create a tripping hazard and should be immediately repaired. An open joint of 12 inches in length or less may not be an indication of seam failure—discuss with your field builder in advance for self-repair techniques and if self-repairs are recommended. Note that open joints of greater than 12 inches in length should be reported to and reviewed with your field builder.
- Note any deteriorating grass fiber or infill conditions, visual or excess wear concerns, drainage concerns, performance concerns, etc. and report them to your field builder.

### Keep the Playing Surface Clean

- Remove all waste items on a regular basis. Sweepers can assist in this process. Every loose foreign object, no matter how small, can damage your field by abrading the grass fibers and/or contaminating the infill.
- Remove airborne contaminants, such as leaves and other debris. If allowed to remain on the surface for any length of time, they will migrate into the system, inhibiting drainage and causing infill compaction. Consider covering the field with pre-approved tarp when it is not in use.
- Remove organic material, including animal waste, as soon as possible to impede the growth of algae, weed or moss growth. Leafy trees should not be located next to a field, if possible. Brushing will help



deter organic growth, as will the use of approved fungicides and anti-bacterial treatments.

- Don't allow food, sodas, chewing gum, sunflower seeds, chewing tobacco, smoking, etc. on the field.
- Do not use cleaning chemicals containing alcohol or acetone solvents. Chemicals should not be used without consulting with your field builder. Take care to avoid spilling any petroleum-based liquids including fuel onto the surface.

## Maintain Proper Infill Levels

The proper amount of infill is vital to the performance of the field. Infill also protects the grass fibers from damage, and helps keep them upright. Ask your field builder for the recommended infill levels. Be aware that:

- High use areas are prone to greater infill displacement.
- Brushing, drag mats, and proper rakes can help redistribute infill evenly.
- Infill may accumulate at the edges of a field. If so, clean the material prior to brushing back into the main field.
- Replacement infill should meet the field builder's specifications.
- Using an infill depth gauge or a nail and tape measure on a grid pattern is the preferred way to measure infill depth and consistency.

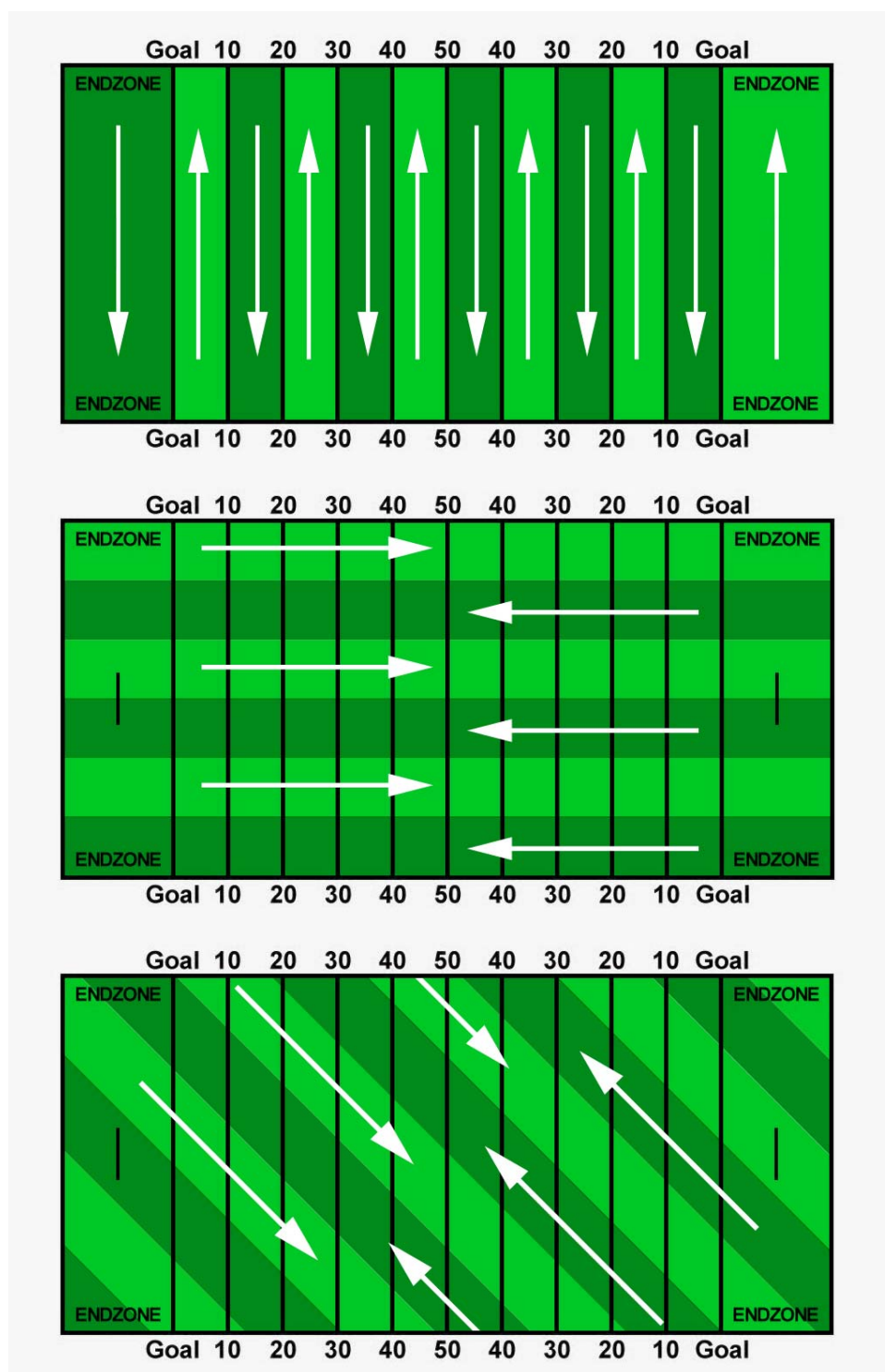
## Groom the Surface

Regular brushing is an important function that must not be overlooked or neglected. Brushing helps to maintain uniform infill levels, keep the grass fibers upright, remove debris, and improve the field appearance. Conversely, the flattening of grass fibers can create a possible acceleration of wear as well as reduced field performance. While grooming, inspect the field for unsafe conditions.

- **Equipment**—Use a static brush for general infill leveling and to stand up the grass fibers. A mechanical sweeper or other specialty synthetic turf cleaning equipment should be used to remove surface debris. Do not use maintenance equipment before receiving proper use and safety training. Use only equipment and vehicles that are approved by the field builder. Use only synthetic fiber bristles of recommended stiffness. Do not use metal or wire bristles. Do not use 6-wheel vehicles.
- **Method**—Using an average all-purpose vehicle, brushing a standard sized multi-purpose field takes about an hour. The vehicle speed should be low and sharp turns must be avoided. It is most effective to brush the surface when it is dry. The high-wear areas will require additional attention as these zones will obviously have the most disrupted infill and pile flattening due to the intensity of play.
- **Direction**—The surface should be brushed in a number of directions, alternating the direction in consecutive activities, but generally in the direction of the individual panels to avoid crossing over the main seams. On different days, start at different locations so as to alternate the brushing direction for each panel (see graphic on next page).



- **Brush Height Setting**—The optimum brush height setting will depend on the model and type of equipment. Do not set the brush so low that it digs into the turf pile or backing. Too low a setting can damage the turf, the seams and disturb the infill.
- **Frequencies**—Ask your field builder for the recommended grooming frequency. In general, the frequency will be related to the intensity of use; however, excessive brushing can cause fiber damage which over time will compromise the field's performance characteristics and longevity.





# Comprehensive Maintenance—Semi-Annual to Annual

## Situations Requiring Comprehensive Maintenance

Over a period of time, the following situations may arise which will require the need for more comprehensive maintenance:

- Grass fibers become significantly bent, creased and flat.
- The playing surface becomes hard and compacted. While common to infilled systems, this impacts the players and also can create drainage issues.
- Dirt, debris and metal accumulate on or within the system despite routine maintenance.
- Seams become loose or panels shift creating a safety hazard.
- Infill levels become uneven, particularly in high wear areas, such as in front of soccer goals. This will impact player biomechanics and surface consistency, and will provide inadequate support of the grass fibers.

When these situations or other concerns arise, contact the field builder and/or a third-party maintenance contractor approved by the field builder.

## Comprehensive Maintenance Options

Comprehensive maintenance generally includes the use of specialty maintenance equipment by trained maintenance professionals. Depending upon the situation, the following actions may be performed:

- **Professional field inspection and corrective action**—Assess the field surface, especially heavy wear areas, identify weak or loose seams and inlays, and repair the damage. Sport performance testing may also be desirable.
- **Decompaction of infill**—Infill decompaction is important for improving shock absorption and synthetic turf drainage. Use only equipment specially designed to decompact and create loft in infilled synthetic turf systems.
- **Redistribution and leveling of the infill**—Measure infill depth on a grid pattern, and add and level infill as needed to return the surface to the field builder's specifications.
- **Deep Cleaning**—Use special equipment that combines mechanical brushing, suction, and an infill return system to remove surface debris and embedded contaminants.
- **Metal removal**—Use a magnet attached to your maintenance equipment to remove ferrous metal objects from the field.
- **Weed and pest treatment**—Treat with herbicides or pesticides, as required.
- **Partial removal and reinstallation of infill material**—Remove the infill, as necessary, to get rid of embedded foreign matter that has contaminated the infill system, relieve grass fibers that may be trapped in the infill, or improve drainage.



## Field Rejuvenation—As Needed Maintenance

As fields mature, the accumulation of unwanted or foreign contaminants is inevitable, especially deep within the infill layer. Events, such as flooding or dust storms, may introduce extreme levels of contamination. This may cause surface hardening and water permeability issues, and compromise field performance.

When a field begins to show signs of deep compaction, such as *g*-max readings that exceed desired levels or significant drainage issues, full field rejuvenation may be desired. These maintenance services are performed using specialized field rejuvenation equipment and personnel and may include:

- Removal of the vast majority of dirty and contaminated infill;
- Untangling matted and compacted fibers;
- A combination of re-installation of new infill and/or the cleaning of the original infill;
- Removal of dust, debris and application of a disinfectant to treat for bacteria, if the original infill will be processed and cleaned.

## Special Circumstances—As Needed Maintenance

While not intended as a complete list, the Synthetic Turf Council wishes to provide guidance on certain special circumstances which may require solutions on an “as needed” basis.

### Field Markings

- Temporary paints can be used if formulated specifically for *synthetic* turf. Ideally, paint should be applied only to the turf fibers, and not into the infill; although this will not be possible if infill levels are too high. Remove and reapply paint after a maximum of four applications to avoid hard-to-remove build-up.
- Service companies with specialized equipment are available that can paint and remove lines, logos, end zones, graphics, etc.
- Permanent lines, logos, etc. can age differently than the playing field turf. They may harden or shrink at different rates that will affect *g*-max. Special grooming or other techniques may be required.

### Heavy Rain

- If significant ponding occurs after heavy rainfall, it may be an indication of a variety of factors, such as clogged or damaged underground drain pipes or discharge outlets, base unevenness, debris in the infill, or infill surface tension. For infill surface tension, a field builder-approved surfactant or laundry fabric softener can be used to break the surface tension allowing the turf to drain.
- After heavy rainfall, it is advisable to check the infill levels in case of migration with the field slope.



## Snow and Ice

Generally snow and ice should be left to melt and drain off the system without assistance. At times, however, it is necessary to remove snow or ice to make the field playable for a scheduled event. The working principle for removing snow is to do so as near to game time as possible. This reduces the likelihood of new snow build-up and will reduce the risk of ice from cold winds whipping across a damp, newly cleared surface. Because ice and wet snow removal is particularly difficult, it is important that you take measures to prevent the build-up of ice and wet snow. Use only pneumatic tires on equipment used for the removal of snow and ice. If a snow plow is used, make sure the blade is guarded with PVC pipe and corner elbows or rubber tips, and the height is adjusted to leave ¼-½" inch of snow on the surface. This is to avoid surface damage. The remaining snow should be left to melt in the sunlight as brushing the remaining snow may also remove the infill. Avoid using a tarp on the field during freezing weather. Tarps, unless vinyl or poly-coated, can freeze to the surface, and will be very difficult to remove.

In some cases it may be necessary to use a weighted lawn roller over the field to break up ice. The broken ice can then be swept off the field. Generally, if the sun is out and the ice or frost is not excessive, it tends to melt rapidly, especially when players are on the field.

## Lightning

Lightning strikes, although rare, can happen. Metal spikes should not be used on the field to reduce the chance of lightning strikes. If your field is struck by lightning, damages beneath the surface are typically greater than the damage to the surface.

## Static Electricity

Surfactants like liquid laundry fabric softeners can reduce static electricity.

## Stain Removal

Most stains can be removed easily with a solution of hot, but not boiling, water and a field builder's approved household detergent. Brush the stain with a stiff bristle brush, scrub the area with soap and water, rinse with clean water, and pat dry.

## Equipment Leaks or Spills

- Prevent leaks or spills by checking equipment and its components thoroughly before use on turf; do not fill fuels, oils, fluids while equipment is on the field. Wipe any excess grease from any/all fittings. Petroleum-based spills can damage the synthetic turf.
- **Hydraulic fluid**—Use only the newer biodegradable fluids, if available for your equipment—don't use petroleum-based fluids. Check with the equipment manufacturer to verify the biodegradable fluid is compatible with the equipment and its warranty. If a leak occurs when using petroleum-based fluids it is important to minimize the damage by stopping and capturing as much fluid as possible. If it gets on the turf, use spill leak towels to soak up the majority of the fluid. Vacuum out the infill in



the affected area, use a solution of household dishwashing liquid and water to break down and clean any remaining fluid from the turf. Once the turf is clean, you will need to install new infill.

- **Motor oil**—See above.
- **Gasoline and diesel**—Don't fill equipment while it is on the turf. Do not overfill. Newer equipment has an overflow tube that drains directly under the equipment and onto the ground. Use a catch pan while filling to prevent accidental spillage.
- **Grease**—Use grease sparingly and wipe any excess off of all fittings, bearings, chains, etc.

## Removal of Certain Foreign Objects and Contaminants

- **Chewing gum** can best be removed by using either ice or an aerosol to freeze the gum, which can then be chipped or broken off the turf fibers. If gum has been smeared across fibers, peanut butter will soften and breakdown the gum so that it can be wiped off.
- **Sunflower seeds, peanut shells, pistachio shells**, etc. should be removed as soon as possible by using a hand held or back pack blower. To minimize or eliminate the movement of infill, do not point nozzle directly into the turf. Use minimal throttle to decrease the volume of air.
- **Metal objects** should be picked up by a magnet that is attached to grooming and brushing equipment.
- **Moss, mold, or algae** may appear in underutilized areas of the synthetic turf, particularly if it is in shade and damp. Specialty products are available to treat these organisms and fungi—consult your field builder. If moss, mold, or algae are allowed to harvest and spread, the field may need to be rejuvenated (see *Field Rejuvenation*).
- **Weeds** are easily removed by hand if the infestation has not become too excessive. Treatments are also available.



# Synthetic Turf Usage Considerations

It is very important for a field owner to understand that certain activities, usage and other circumstances may impact the field quality, wear and tear, appearance, warranty and performance of a synthetic turf field. If any doubt exists, the field builder should be consulted. The following are some of the suggested considerations for the field owner:

- **Make sure in advance** any maintenance equipment, personnel, techniques, repairs and materials comply with the field builder's specifications and warranty.
- **Verify** that the design, synthetic turf system and maintenance specifications will result in the desired performance outcomes prior to selecting your provider. The *STC Guidelines for Synthetic Turf Performance* are available by visiting [www.syntheticturfCouncil.org](http://www.syntheticturfCouncil.org). The STC also maintains a list of STC Certified consultants, manufacturers, field builders, testing labs, and service providers on its website.
- **Monitor the performance** of your field throughout its useful life with periodic field testing and frequent inspections.
- The following **may damage** the synthetic turf: accidents, vandalism, spiked shoes, animals, wire brushes, fires, fireworks, floods, chemical reactions, acts of God, the use of dry cleaning fluids or improper cleaning methods, high pressure sprays exceeding 500 psi, storage of heavy materials on the field, non-approved infill materials, and non-approved artificial lights.
- **Certain activities** may damage the synthetic turf such as bicycle traffic, track and field events, golf activities, concerts, etc. Special events and activities should be reviewed with the field builder before the event occurs to ensure that damage is not done. You should also consider consulting with a company that sells field protection.
- The **quality of the sub-base** will directly affect the appearance and performance of the synthetic turf system. Select a base contractor only after carefully checking synthetic turf experience and capabilities. Significant importance should be assigned to grade, stone quality, drainage, etc. If the base is compromised, then the surface will be compromised.
- **Footwear**—Suitable footwear should always be used. Metal spikes should be prohibited and cleats are preferred. Flat-soled rubber shoes greatly intensify the wear and tear on the synthetic turf.
- **Use patterns**—It is very important to spread the field use to various locations on the field to prevent uneven or accelerated wear in certain areas.
- **Vehicles**
  - ⇒ Do not park vehicles on the field, especially in the heat of the day, or leave vehicles on a wet or hot field for long periods of time.
  - ⇒ Engine exhausts should not be faced down toward the playing field, and a hot muffler or exhaust pipe should not touch the surface.



- ⇒ Use lighter vehicles with LGP (Low Ground Pressure) tires with round edges to prevent rutting. Do not use cleated or traction tires.
- ⇒ Heavy vehicles (over 300 pounds) should have a maximum tire pressure of 35 psi.
- ⇒ Make wide, not sharp, turfs, and only when the vehicle is in motion. All vehicles should move at slow speeds. Avoid abrupt and sudden braking, as well as sudden acceleration or spinning of the wheels, especially on wet surfaces. Consult the equipment manufacturer to learn load limits.
- ⇒ All vehicles must be checked before use on the field to determine if they are leaking oil or gas. If so, they should be repaired before entry onto the field.

- **Concentrated heavy use protection**

- ⇒ Stage or other set-ups for special events or activities, such as graduations, are normal. Proper field protection of the synthetic turf must be provided to prevent damaging it. Use plywood, interlocking plastic panels or similar weight distributing materials under all chairs and tables—consult the field builder or a field protection company. Use field protection that does not have a dimensional profile, e.g., corrugation, because the profile will transfer onto the turf and require heavy grooming to remove. It is imperative that no anchoring spikes, posts or footing be driven into the turf. Once the field protection is removed, the area should be groomed and swept with a magnet to remove any misplaced or dropped nails, screws, etc.
- ⇒ Helicopter landings may be necessary to remove an injured player, for example; the rotor wash will likely cause infill to be displaced. As soon as possible evaluate the area and groom or brush as needed.
- ⇒ Protect the synthetic turf as needed with approved tarps when nearby renovations, e.g., running track recoats or installations, cleaning or painting of bleachers, construction or repairs to lighting, renovations of adjacent natural turf fields, etc., may cause harm to the synthetic turf. Contact the field builder for a protection recommendation. Improper plastic protection will cause heat damage.
- ⇒ Prevent heavy equipment from accessing the field or, if necessary, cover the field with appropriate protection to distribute the weight of the equipment.

## Disclaimer

Due to the unique situation of each synthetic turf installation, other considerations may arise that are not addressed by these guidelines. Such considerations should not be ignored or minimized, but should be addressed by your field builder or industry specialists. This document does not in any way, imply, suggest or guarantee that a warranty, environmental, or performance issue could not arise if these guidelines are followed. These voluntary guidelines are not standards, and are not to be used as the basis for warranty or other claims.



The Synthetic Turf Council and its members invite you to visit  
[www.SyntheticTurfCouncil.org](http://www.SyntheticTurfCouncil.org) for additional information.

We hope you enjoy your field!



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Online Buyer's Guide and Member Directory  
[www.stc.officialbuyersguide.net](http://www.stc.officialbuyersguide.net)

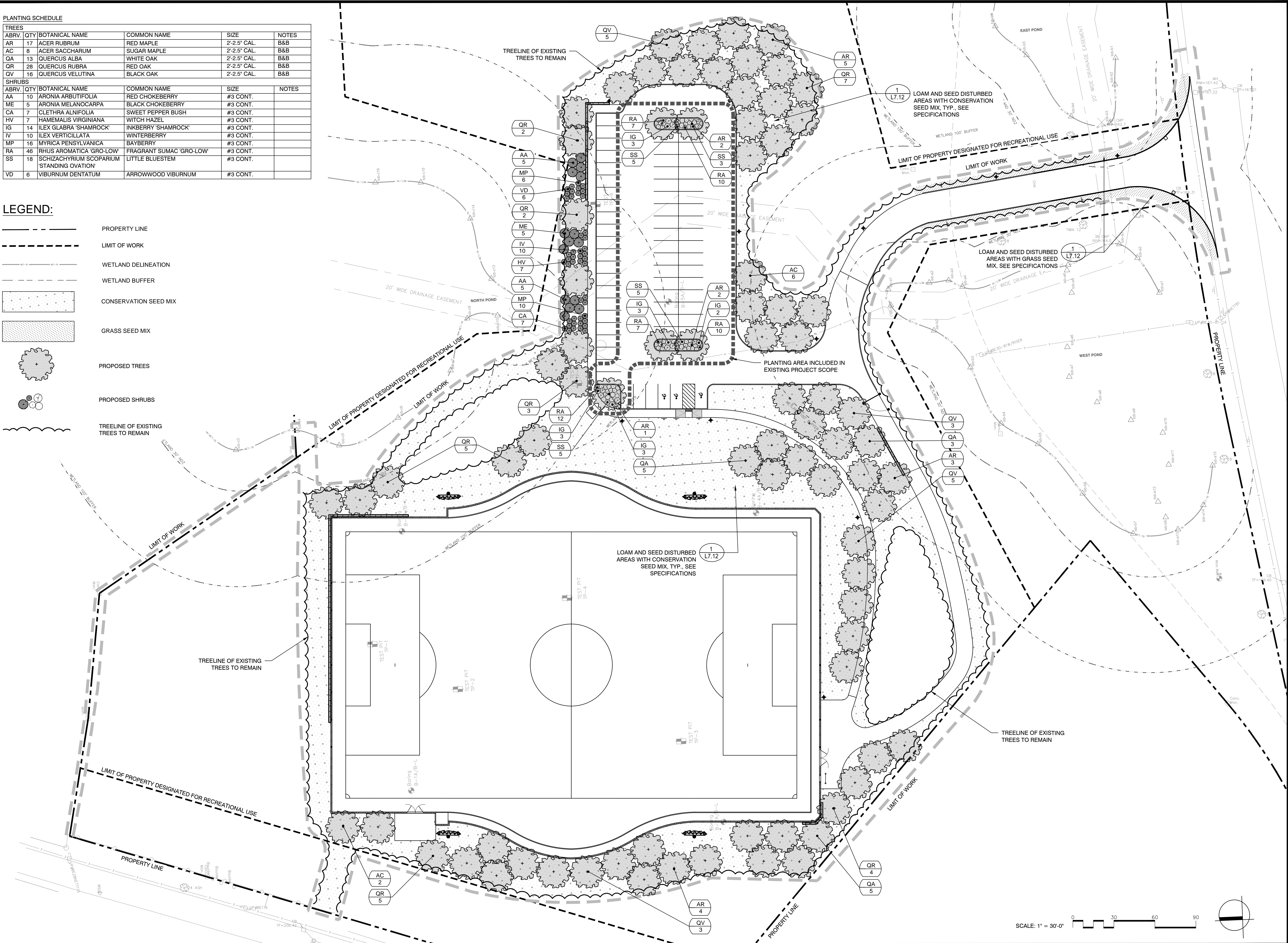


PLANTING SCHEDULE

TREES				
ABRV.	QTY	BOTANICAL NAME	COMMON NAME	SIZE
AR	17	ACER RUBRUM	RED MAPLE	2'-2.5" CAL.
AC	8	ACER SACCHARUM	SUGAR MAPLE	2'-2.5" CAL.
QA	13	QUERCUS ALBA	WHITE OAK	2'-2.5" CAL.
QR	28	QUERCUS RUBRA	RED OAK	2'-2.5" CAL.
QV	16	QUERCUS VELUTINA	BLACK OAK	2'-2.5" CAL.
SHRUBS				
ABRV.	QTY	BOTANICAL NAME	COMMON NAME	SIZE
AA	10	ARONIA ARBUTIFOLIA	RED CHOKEBERRY	#3 CONT.
ME	5	ARONIA MELANOCARPA	BLACK CHOKEBERRY	#3 CONT.
CA	7	CLETHRA ALNIFOLIA	SWEET PEPPER BUSH	#3 CONT.
HV	7	HAMMELIS VIRGINIANA	WITCH HAZEL	#3 CONT.
IG	14	ILEX GLABRA 'SHAMROCK'	INKBERRY 'SHAMROCK'	#3 CONT.
IV	10	ILEX VERTICILLATA	WINTERBERRY	#3 CONT.
MP	16	MYRICA PENNSYLVANICA	BAYBERRY	#3 CONT.
RA	46	RHUS AROMATICA 'GRO-LOW'	FRAGRANT SUMAC 'GRO-LOW'	#3 CONT.
SS	18	SCHIZACHYRIUM SCOPARIUM 'STANDING OVATION'	LITTLE BLUESTEM	#3 CONT.
VD	6	VIBURNUM DENTATUM	ARROWWOOD VIBURNUM	#3 CONT.


LEGEND:

- PROPERTY LINE
- LIMIT OF WORK
- WETLAND DELINEATION
- WETLAND BUFFER
- CONSERVATION SEED MIX
- GRASS SEED MIX
- PROPOSED TREES
- PROPOSED SHRUBS
- TREELINE OF EXISTING TREES TO REMAIN



Project:

IMPROVEMENTS TO  
LOKER CONSERVATION  
AND RECREATION AREA



410 COMMONWEALTH RD.  
WAYLAND, MA 01778

Weston & Sampson

85 Devonshire Street,  
3rd Floor, Boston, MA 02109  
617.412.4480 800.SAMPSON  
www.westonandsampson.com

Consultants:


Revisions:		
No.	Date	Description

Seal:

Issued For:

BIDDING DOCUMENTS

Scale: AS SHOWN

Date: NOVEMBER 26, 2018

Drawn By: CCC, DYF

Reviewed By: BMK

Approved By: ERB

W&S Project No: 2180076

W&S File No:

Drawing Title:

OPTION 5  
TREE REPLACEMENT  
STRATEGY

Sheet Number:



**Typical Weekday during the Spring**

Sample Monday

March 15 to June 30

Time Period	Group	Trips (Drop Off)	Trips (Cars Parked at Site)
9:00am-10:30am	Womens Bootcamp	24	25
1:00pm-2:00pm	Intro Teeball	12	13
4:00pm-5:00pm	U-12 Boys Soccer	24	10
5:30pm-7:00pm	Girls Lacrosse	24	10
7:15pm-8:45pm	Men's Adult Soccer	30	30

**Typical Weekend during the Spring**

Sample Saturday

March 15 to June 30

Time Period	Group	Trips (Drop Off)	Trips (Cars Parked at Site)
8:00am-9:30am	Youth Soccer 9v9 (2)	45	45
9:30am-11:00am	Youth Soccer 9v9 (2)	45	45
11:00am-12:30pm	Youth Soccer 11v11	36	45
12:30pm-2:30pm	Youth Lacrosse	45	45
2:30pm-4:30pm	Youth Lacrosse	45	45
4:30pm-5:30pm	Youth Soccer 11v11	45	45
5:30pm-7:00pm	Girls Lacrosse	36	36
7:15pm-8:45pm	Men's Adult Soccer	30	30
8:45pm-10:00pm	Adult Football	50	55

**Typical Weekday during the Summer**

Sample Wednesday

July 1 to Aug 24

Time Period	Group	Trips (Drop Off)	Trips (Cars Parked at Site)
8:00am-4:00pm	Sports Camp	50	8
4:00pm-6:00pm	Lessons	12	10
6:30pm-8:00pm	Adult Womens Soccer	30	30
8:00pm-10:00pm	Adult Lacrosse	30	30

**Typical Weekend during the Summer**

Sample Sunday

July 1 to Aug 24

Time Period	Group	Trips (Drop Off)	Trips (Cars Parked at Site)
8:00am-9:30am	Club Soccer	16	10
9:30am-11:00am	Club Soccer	16	10
11:00am-12:30pm	Youth Soccer	45	45
12:30pm-2:30pm	Youth Lacrosse	45	45
2:30pm-4:30pm	Captains Practices	20	16

**Typical Weekday during the Fall**

Sample Tuesday

Aug 24 to Nov 15

Time Period	Group	Trips (Drop Off)	Trips (Cars Parked at Site)
9:00am-10:30am	Womens Bootcamp	24	25



1:00pm-2:00pm	Pre-K Soccer	12	13
4:00pm-5:00pm	U-12 Boys Soccer	30	6
5:30pm-7:00pm	Youth Flag Football	16	12
7:15pm-8:45pm	Men's Adult Soccer	36	40

### Typical Weekend during the Fall

Sample Sunday

Aug 24 to Nov 15

Time Period	Group	Trips (Drop Off)	Trips (Cars Parked at Site)
8:00am-9:30am	Adult Soccer 11v11	30	30
9:30am-11:00am	Adult Soccer 11v11	30	40
11:00am-2:00pm	Youth Football	45	50
2:00pm-4:30pm	Youth Football	45	50
4:30pm-5:30pm	Youth Soccer	45	45
5:30pm-7:00pm	Youth Soccer	36	36
7:15pm-8:45pm	Men's Adult Soccer	30	30
8:45pm-10:00pm	Adult Frisbee	18	18