LEE COUNTY MPO
METROPOLITAN PLANNING ORGANIZATION

Fort Myers Beach Lighting Report

Lee County Metropolitan Planning Organization (MPO)
815 Nicholas Parkway East
P.O. Box 150045
Cape Coral, FL 33915-0045
(239) 330-2239

TEAM Engineering, LLC
1915 Pine Bluff Avenue
Orlando, FL 32806
david.greene@cpwgengineering.com
(813) 361-2644

FMB Lighting Report Outline

1. **Introduction**
    a. Describe the study area
    b. Talk about turtle impacts
    c. Provide overall site area map
    d. Mention crashes, hurricanes, etc

2. **Project Purpose and Goals**
    a. Purpose statement
        i. Something like make travel safer for residents and visitors
    b. Goals
        i. Mobility
        ii. Environment
        iii. Reduce impacts
        iv. Etc

3. **Existing Conditions**
    a. Roadway
        i. Describe roadway characteristics
    b. Multimodal
        i. Describe existence of bike/ped and transit facilities
    c. Land Use
        i. Major developments and redevelopments
    d. Crash Analysis
            i. Summarize crash data by mode, characteristics (day/night, etc), severity
    e. Lighting
        i. Existing system
            1. Types of lights, locations, characteristics
            2. Ownership, maintenance responsibilities
        ii. Lighting analysis
            1. Data collection
        2. Dark spots
    f. Other plans and initiatives
        i. FMB Streetscape
        ii. Estero Blvd reconstruction

4. **Lighting Analysis**
    a. Introduction
    b. Lighting needs
    c. Sea Turtle Compatibility
    d. Dark Skies Criteria
    e. Light System Alternatives
        i. Existing Lighting System
        ii. Options for Improvements

        1. Supplement
        2. Replace Whole System
        3. Town owned
    iii. Recommendations
        1. Leased from FPL
        2. Types of fixtures/lights
        3. Combo that uses different ones at different times of year (like Archibald)
    iv. Summary of where, what, types, ownership, and costs (cap and o/m)

5. **Potential Funding Sources**
    a. Local funds
    b. State and Federal funds
    c. Safety funds
        i. Describe benefit/cost analysis and potential justification for safety funding

6. **Implementation Action Plan**
    a. Detailed plan of implementation
    b. Next steps

1. Introduction

The Town of Fort Myers Beach is situated on a barrier island to the west of Ft. Myers, FL. The Town has a resident population of approximately 7,100, and hosts approximately 1.8 million visitors per year. As with most West Coast towns, tourism has become a year-round event, meaning the Town's effective population fluctuates greatly, and the quantity of tourists outnumbers local population. The large number of tourists generates significant pedestrian activity. Much of this activity occurs after dark.

The Town's beaches also draw aquatic visitors. Fort Myers Beach is an active turtle nesting area, and plays host each summer to large populations of endangered sea turtles. Turtle-friendly lighting is a key issue along Estero Boulevard so as not to disorient hatchling turtles as they migrate back to the Gulf upon emergence.

Because it lies on a barrier island, the Town's roadway network is limited. Estero Boulevard is the main transportation facility, and runs in a north-south direction. To the north, Estero Boulevard becomes San Carlos Boulevard, and connects to Fort Myers.

As the economy has rebounded, and tourism has picked back up, the Town of Fort Myers Beach has experienced increasing traffic congestion, increasing bicyclists and pedestrians, and increasing conflicts and crashes where travel modes conflict.

In September, 2017, Hurricane Irma hit near Fort Myers Beach as a Category 4 hurricane, damaging much of its infrastructure. Along Estero Boulevard, much of the lighting system was damaged by this storm.

The study area is identified in Figure 1.

2. Project Purpose and Goals

The purpose of this study is evaluate lighting conditions along Estero Boulevard and how those conditions affect safety in the corridor. Specifically, this report will provide the background information, analysis, and justification to support lighting improvements in the study corridor.

The Goals of this study, consistent with the purpose, are:

- Evaluate lighting levels to determine their adequacy, and develop a remediation plan if needed
- Develop cost estimates for any recommended improvements
- Identify causes of bicycle and pedestrian crashes
- Develop mitigation strategies for these crashes
-

3. Existing Conditions

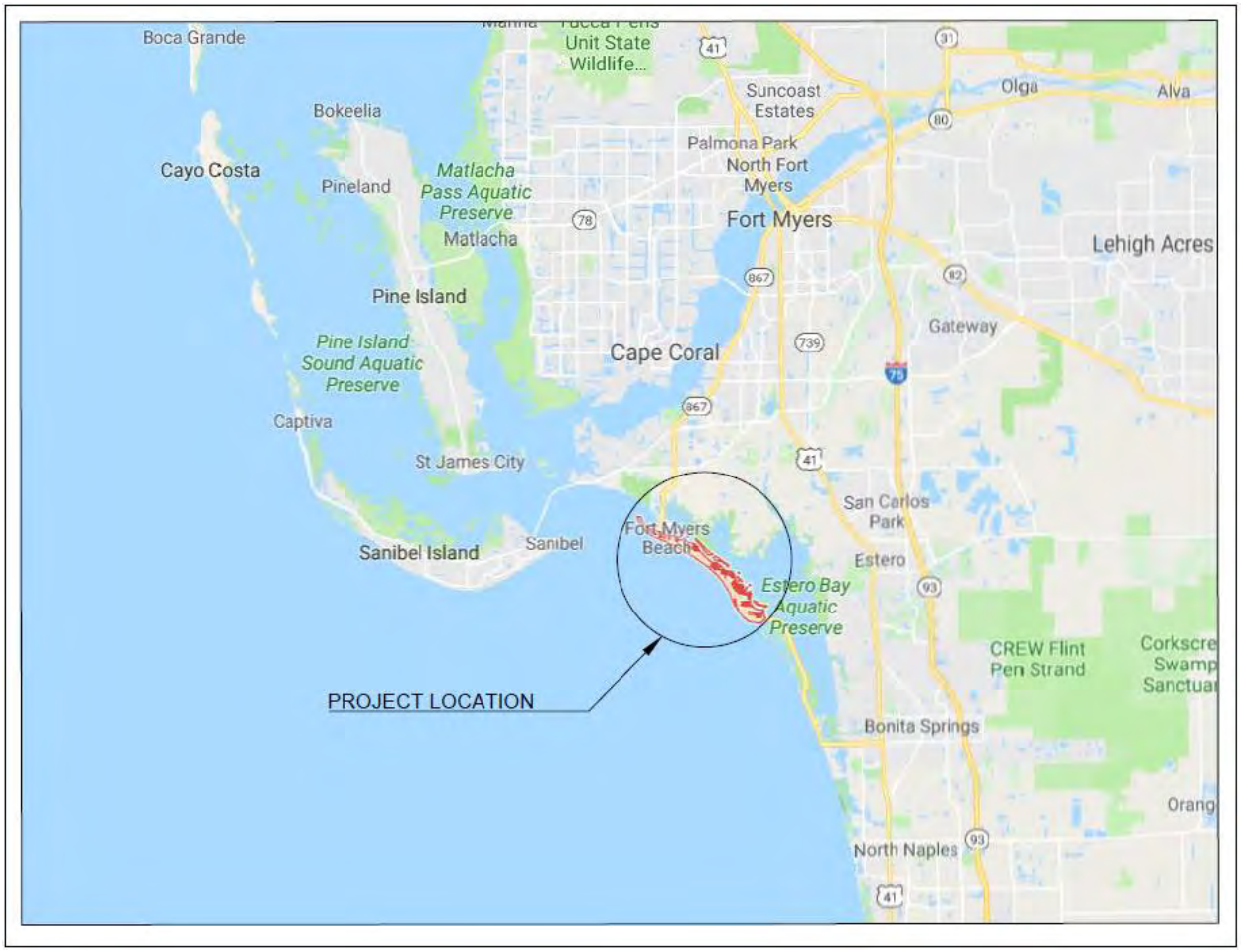
To develop an analysis baseline, existing conditions along the corridor were analyzed. To provide as much context as possible, several factors were analyzed, including:

- Roadway conditions
- Multimodal facilities
- Land uses
- Crash data
- Lighting conditions, and

- Ongoing plans and initiatives

The following sections provide a summary of the existing conditions.

Figure 1
Project Location Map



3.1 Roadway Conditions

As shown in Figure 1, Estero Boulevard is the principal travel corridor through Fort Myers Beach. Estero Boulevard enters Fort Myers Beach via the San Carlos Bridge. This bridge carries San Carlos Boulevard from Fort Myers over the Intracoastal Waterway onto the island.

North Estero Boulevard north of Times Square received a complete makeover after the renovation to its right of way in 2011. The roadway south of San Carlos Boulevard and within the study limits, is a county road. It is a two lane arterial with a posted speed limit of 35 mph. The roadway is characterized by frequent driveway access points and crossovers, with significant side friction. The reFresh Fort Myers Beach Master Plan includes plans to reconstruct Estero Boulevard south of Times Square to the Big Carlos Pass Bridge. Roadway, utility, pedestrian safety and bicycle improvements were identified within six one mile segments. Segment One from Crescent Street to Lovers Lane has been completed. Segment Two from Lovers Lane to Strandview Drive is currently under construction.

3.1. Multimodal Facilities

Historically, sidewalks and paved shoulders have been provided along Estero Boulevard. However, these facilities are being improved as part of the project described in Section 3.6.

LeeTran provides a Fort Myers Beach Shuttle along the island that provides circulation along Fort Myers Beach. The Shuttle also provides connections off the island to Fort Myers and to Bonita Springs. Figure 2 illustrates the existing LeeTran routes. The Trolley typically operates on one hour headways.

The Fort Myers Beach Tram is a new service recently instituted by LeeTran to provide circulation on the island itself. This service travels up and down the island to provide more frequent service than is provided by the Trolley.

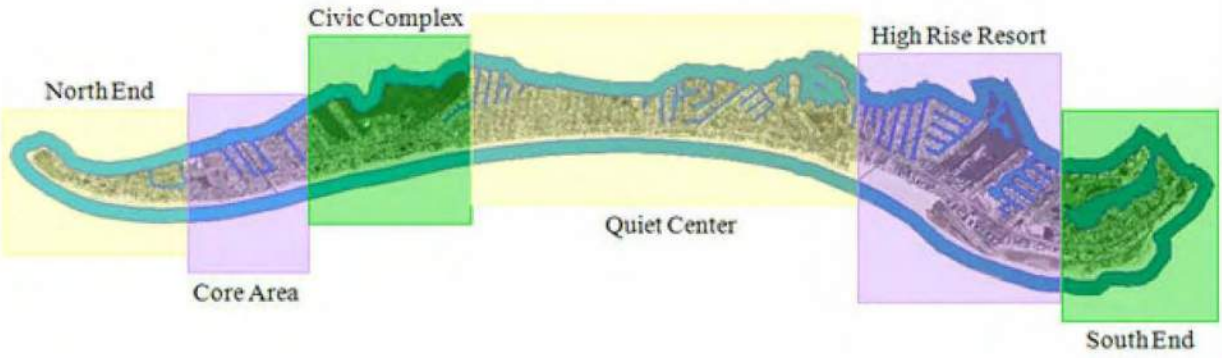
3.2. Land Use Summary

Land uses along Fort Myers Beach includes a variety of retail and residential uses. The Estero Boulevard project has divided the island into 6 segments, as shown in Figure 3. They are generally summarized as follows:

- North end – comprised of residential and resort areas, and generally quieter than other high turnover areas.
- Core Area – consists of the Times Square commercial area, as well as other numerous stand alone commercial uses. Mixed residential uses are also present.
- Civic Complex – is where the Town government offices, as well as nature parks, preserves, elementary school, and other public uses. This area also has residential and resort uses.
- The Quiet Center – is characterized principally by single family residential uses.
- High Rise Resort area – is characterized by high rise condos and resorts along the Gulf side, with single family and other residential uses on the east side.
- South End area – is characterized by a broad mix of uses, including beachfront resorts, commercial, beach, and single family uses.

Figure 2
LeeTran Shuttle Service Map

Figure 3
Fort Myers Beach Character Areas



3.3. Crash Analysis

Crash data along Estero Boulevard were analyzed to identify crash frequency, location, severity, and potential mitigation strategies. Since Estero Boulevard is being improved by Lee County, this analysis focused on bicycle and pedestrian crashes, and particularly evaluated the potential effects of lighting conditions on the crash history.

Crash data were obtained from the Signal 4 crash database. Data were collected for the years 2013-2017. Table 1 presents an overall summary of crash data by year.

Review of Table 1 indicates that a significant portion, nearly 25%, of all crashes occur during nighttime. Approximately 10% of the bicycle crashes, and nearly half of the pedestrian crashes occur at night.

Based on these crash analyses, there appears to be a strong indication that lighting may be a contributing factor to a significant number of overall crashes, and pedestrian crashes in particular.

3.4. Lighting conditions

Existing lighting along Estero Boulevard was evaluated to determine adequacy of the existing system. The following sections provide more detail on this analysis.

3.4.1. Existing Lighting Conditions

CPWG Engineering, Inc. performed an existing street lighting conditions assessment of the main traffic corridor in Fort Myers Beach, Florida, Estero Boulevard. The goal is to conduct a study to evaluate lighting conditions along Estero Boulevard from Estrellita Drive to Old San Carlos Boulevard, a corridor of just over 6 miles. The town of Fort Myers Beach is undertaking strategic planning to enhance the pedestrian safety on this corridor; the length is illuminated by approximately 143 light fixtures. Field measurements were conducted along the corridor during the Spring of 2018. All light measurements were conducted on clear nights. The analysis was conducted after the peak spring break period.

For the measurements, a TES-1339R Data Logger Light Meter Pro was utilized to sample field data. The meter was newly calibrated, with resolution to .001 foot-candle. Multiple field visits were required to acquire all the data. Sampling locations were identified for projected concentration of usage, and existing lighting, with specific intent to quantify the light levels leading into heavy usage areas, as well as identify projected travel times between differing illumination levels.

The method of reviewing the existing light levels is the illumination method, as defined by the Illumination Engineering Society of North America (IESNA). This is a measurement of the light density falling on a surface, independent of light source, or the surface itself. The IESNA has developed a Standard for recommended level of illumination for classified roadways, walkways, and parking areas, identifying minimal foot-candle levels for these travel ways. The Standard outlines recommended minimum levels, as well as emphasizes the need to maintain illumination uniformity over the roadways.

The FDOT Manual for Minimum Standards for Streets and Highways, commonly known as the Greenbook follows the IESNA Standard, outlining light levels recommended in order to avoid vision problems due to varying illumination from the street lights. The Greenbook Standard outlines recommended minimum levels, as well as emphasizes the need to maintain illumination uniformity over the roadways.

Table 6-1, Level of Illumination, Roadway and Walkway Classification, of the FDOT Guidelines provide illumination criteria by facility type and area type. Estero Boulevard is classified as a minor arterial' and

the Road Surface classification being R3; which is an asphalt road surface with dark aggregates. From the north end of the island to Loves Lane, the land uses are categorized as Intermediate. From Loves Lane south to the end of the project, the land uses are categorized as residential.

Under these classifications, the Average Maintained Illuminance should be a minimum of 1.0 foot-candles for the Intermediate classification areas north of Bay Road, and 0.7 foot-candles for residential areas south of Bay Road. The Illuminance Uniformity ratio (maximum to minimum) should be 4:1 in both sections. A foot-candle is a non-SI unit of illuminance or light intensity and it can be defined as the amount of illumination the inside surface of a one-foot-radius sphere would be receiving if there were a uniform point source of one candela in the exact center of the sphere.

The data collected is reported in Table 2. Table 2 summarizes light level samples in foot-candles, distance between sample points, and estimated travel times. Travel times are in reference to distance travelled and rate of travel based on the posted speed limits. The intent is to reinforce that drastically differing light intensity affects the eye's ability to receive data. Close samples in excess of max/min ration are common along this corridor.

A map of the locations where readings were taken is provided in Appendix 2 in Green.

Review of Table 2 indicates that the minimum levels drop significantly below the minimum recommendation of 1.0 and .7 foot-candles, in the respective areas, below the minimum recommended foot-candle threshold, as well as in excess of the maximum to minimum ratio. Based upon this analysis, the light level along a majority of the corridor is below the minimum recommended.

3.5. Ongoing plans and initiatives

There are a few ongoing initiatives that could significantly affect the need for lighting plans along the corridor, as described in the following sections.

3.5.1. Estero Boulevard Reconstruction

Lee County, in cooperation with the Town of Fort Myers Beach, is in the process of improving Estero Boulevard along the entire length of the island. An Estero Boulevard Master Plan was completed in 2014 that developed concepts for each section of the corridor. Significant public outreach was included as part of this plan, with the Town and the county developing the final options.

As shown in Figure 2, the County has divided Estero Boulevard into 6 distinct segments. The proposed cross sections vary, as shown in Figure 4.

As shown, each typical section along the corridor includes improved bicycle, pedestrian, and trolley facilities along the corridor. However, lighting upgrades are not a significant component of the project.

This project is being built from north to south, one section at a time. Work is underway along much of the corridor, with the southern two sections not yet begun.

3.5.2. Town of Fort Myers Beach Bicycle and Pedestrian Master Plan

In 2017, the Town completed a Bicycle and Pedestrian Master Plan. This Plan reviewed the current and proposed networks, and developed plans for improvements to those networks through an interactive public engagement program. The Plan recommend further development of the bicycle and pedestrian

trails along Estero Boulevard, and provided for connections from Estero Boulevard to the residential areas, shopping and commercial districts, and beach and recreation areas along the island.

3.5.3. TPI-FMB Redevelopment Project

A company called TPI has recently assembled major portions of the northern area of the Town into one large land holding. This land has recently received approval to begin development. At buildout, the project will change the character of the northern end of the Town by redevelopment of outdated and underutilized properties into a cohesive community redevelopment featuring resorts, retail, and other uses. As part of this project, significant bicycle and pedestrian traffic is expected to be generated. The project will provide for connections to the Town's multimodal network.

Table 1
Crash Data Summary by Year

Year	Motorized Vehicles			Bicycles			Pedestrians			Total Crashes	Fatalities
	Day	Night	Lighting not reported	Day	Night	Lighting not reported	Day	Night	Lighting not reported		
2013	74	3	10	1	0	1	0	0	0	89	0
2014	89	30	12	6	1	0	1	1	0	140	0
2015	121	40	6	16	0	0	4	2	0	189	0
2016	70	33	0	9	1	0	6	2	0	121	0
2017	78	32	0	6	1	0	1	6	0	124	1
TOTALS	**432**	**138**	**28**	**38**	**3**	**1**	**12**	**11**	**0**	**663**	**1**

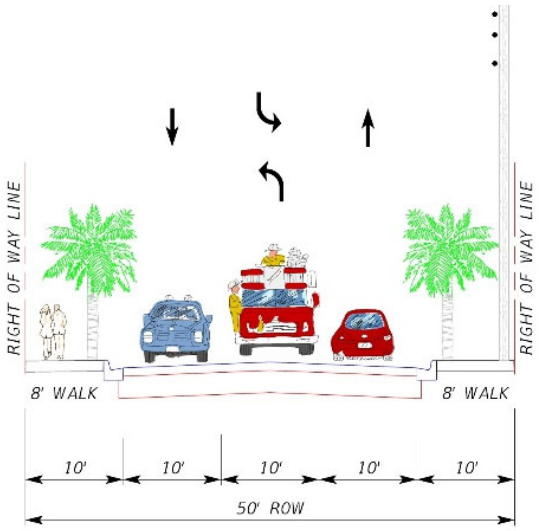
Table 2
Existing Light Levels

Reading Number	Footcandle Reading	Offset Distance	Time to Travel	Reading Number	Footcandle Reading	Offset Distance	Time to Travel
1	0.385	0	0	41	0.85	124.488	0:02
2	0.592	196.384	0:04	42	0.004	327.56	0:06
3	0.629	174.9	0:03	43	0	327.864	0:06
4	3.513	68.096	0:01	44	0.0012	397.784	0:08
5	0.251	189.696	0:04	45	0.0035	850.592	0:17
6	0.342	451.592	0:09	46	0.013	260.832	0:05
7	0.047	407.664	0:08	47	0.312	163.096	0:03
8	1.934	32.376	0:01	48	0.036	270.408	0:05
9	0.29	545.376	0:11	49	0.005	208.24	0:04
10	1.54	205.2	0:04	50	3.681	167.2	0:03
11	0.404	241.832	0:05	51	0.0075	208.848	0:04
12	1.727	197.6	0:04	52	3.573	170.088	0:03
13	0.26	139.992	0:03	53	0	218.424	0:04
14	4.532	66.88	0:01	54	1.049	197.752	0:04
15	0.094	295.944	0:06	55	0.5481	317.528	0:06
16	0.907	348.536	0:07	56	3.846	344.128	0:07
17	0.128	347.472	0:07	57	0.25	82.84	0:02
18	0.46	122.208	0:02	58	3.845	354.008	0:07
19	0.337	182.856	0:04	59	0.238	302.328	0:06
20	3.024	156.712	0:03	60	3.999	354.16	0:07
21	0.049	254.144	0:05	61	0.064	285.76	0:06
22	0.134	106.096	0:02	62	0.489	199.424	0:04
23	1.177	178.296	0:03	63	0	232.712	0:05
24	0.013	251.408	0:05	64	1.277	335.16	0:07
25	0.013	155.952	0:03	65	0.0017	177.688	0:03
26	3.253	354.008	0:07	66	4.029	314.336	0:06
27	0.17	200.792	0:04	67	0.025	590.672	0:12
28	1.547	154.28	0:03	68	0.586	169.024	0:03
29	0.035	122.968	0:02	69	0.026	191.824	0:04
30	0.011	118.56	0:02	70	1.873	195.624	0:04
31	0.853	475.76	0:09	71	3.264	388.512	0:08
32	0.091	241.376	0:05	72	0.03	282.264	0:06
33	2.792	186.808	0:04	73	1.78	103.056	0:02
34	0.165	333.64	0:06	74	0.221	429.4	0:08
35	0.031	300.808	0:06	75	0.037	269.344	0:05
36	1.753	386.384	0:08	76	3.307	251.104	0:05
37	0.059	553.888	0:11	77	0.082	232.256	0:04
38	3.399	262.504	0:05	78	2.106	186.96	0:04
39	1.067	324.368	0:06	79	0.013	163.4	0:03
40	0.035	112.632	0:02	80	0.011	1132.4	0:22

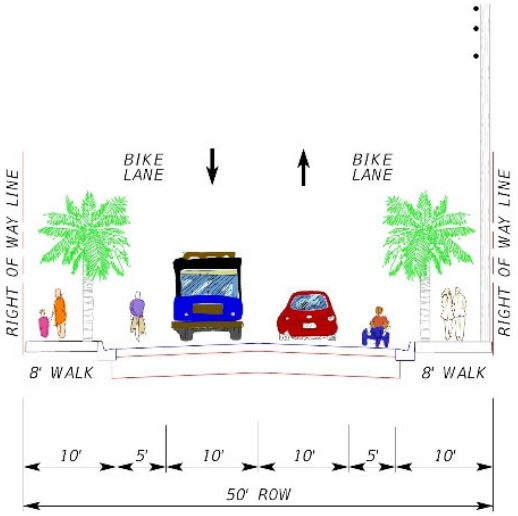
Table 2 (Continued)
Existing Light Levels

Reading Number	Footcandle Reading	Offset Distance	Time to Travel	Reading Number	Footcandle Reading	Offset Distance	Time to Travel
81	2.59	269.344	0:05	101	0.012	760	0:15
82	0.005	267.824	0:05	102	0.892	554.952	0:11
83	0.014	265.392	0:05	103	2.81	213.256	0:04
84	0.0025	667.432	0:13	104	4.312	542.64	0:11
85	1.004	882.816	0:17	105	0.601	288.344	0:06
86	0.012	288.648	0:06	106	0.001	446.728	0:09
87	4.58	1011.408	0:20	107	0.066	935.864	0:18
88	0.005	215.08	0:04	108	0.0109	834.936	0:16
89	0.036	909.264	0:18	109	3.221	233.928	0:05
90	0.0371	252.624	0:05	110	0.101	2804.704	0:55
91	0.081	302.48	0:06	111	0.003	478.2	0:09
92	2.53	739.632	0:14	112	3.214	1752.56	0:34
93	0.114	422.256	0:08	113	0.0431	2001.5	0:39
94	0.018	224.504	0:04	114	3.421	1452.1	0:28
95	0.075	887.984	0:17	115	0.891	375.288	0:07
96	0.012	625.968	0:12	116	0.1012	1790.2	0:35
97	1.949	175.104	0:03	117	4.112	854.2	0:17
98	0.069	568.328	0:11				
99	0.107	951.064	0:19				
100	0.027	788.728	0:15				

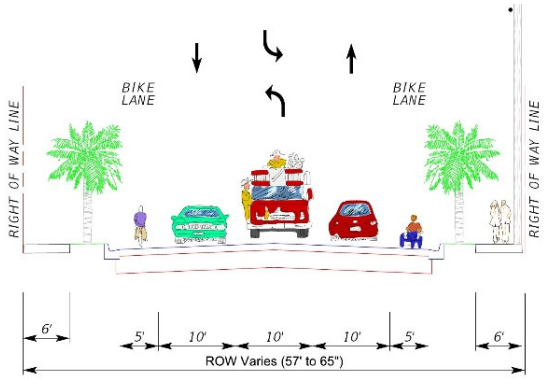
Figure 4
Estero Boulevard Typical Sections



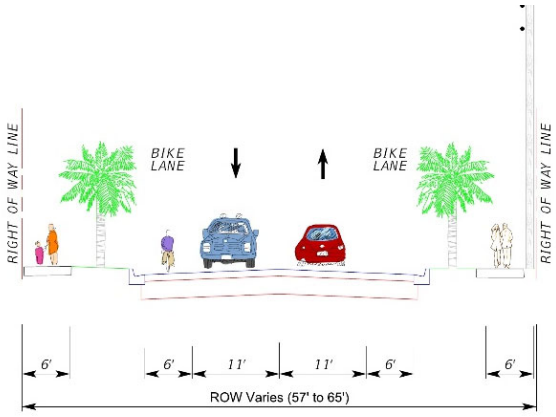
CORE/CIVIC AREA
3 LANE OPTION



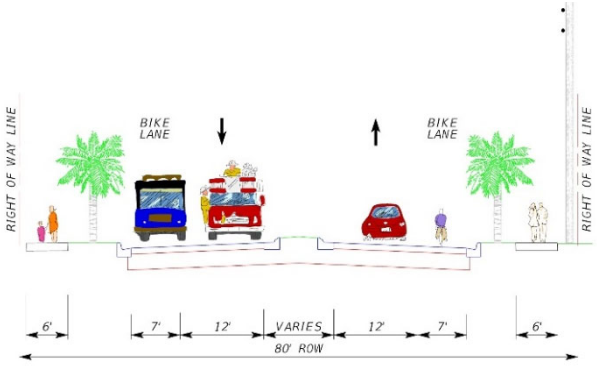
CORE/CIVIC AREA
2 LANE OPTION



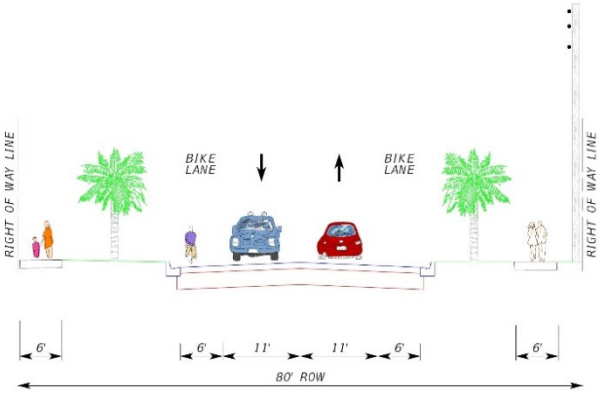
QUIET AREA



QUIET AREA



HIGH RISE
AREA



SOUTH END
AREA

4. Lighting Analysis

Based upon the existing conditions analysis presented in Section 3, the corridor has been analyzed to determine the need for lighting, and options to provide that lighting. This analysis is summarized below.

4.1. Lighting Need

The existing lighting along Estero Boulevard has been identified as deficient according to Florida Greenbook roadway lighting standards. It is deficient in terms of variability – moving quickly between better lit and low lighting areas – as well as total lighting output. Many of the existing street lights have light sources and reflectors that are visible to drivers, which creates a hot-spot of light intensity that creates eye confusion, causes squinting, and yields adverse effects to the driver.

The significant number of night time crashes further supports the need for more effective roadway lighting in the corridor.

This section summarizes potential lighting types, general capital costs, and general maintenance costs to be considered.

4.2. Sea Turtle Compatibility

Ft Myers Beach is an active sea turtle nesting area. As such, caution must be used in the development of lighting alternatives so as not to interfere with nesting and hatchlings returning to the Gulf upon birth. No light source should be visible, so that turtles are not confused as to the direction they should travel when nesting and returning to the water.

CPWG Engineering, Inc. reviewed related documentation for minimizing impact on Sea Turtles through the nesting season. The State of Florida Fish and Wildlife Commission (FWC) has generated extensive documentation on solutions to decrease light pollution affecting Sea Turtles, especially during nesting season. The Town has prepared Ordinances to supplement the FWC, assisting the Town staff to protect nesting sea turtles.

The Ordinance references Turtle Nesting Habitat, which is not defined. It is recommended that a broad definition of this habitat be included, that covers any public or private lands, accessible directly from the water's edge, to the first legal man-made development.

Field survey work performed along the length of this project revealed no fewer than 22 lights that are in place to illuminate Estero Boulevard are negatively impacting turtle nesting habitat, with direct visibility of the source. This can cause disorientation, confusion, and lead to mortality. The 22 lights are very specifically installed to illuminate Estero Boulevard, and this does not include side street lighting, parking lot lighting, or privately owned lighting. These lights are in direct conflict with existing Town Ordinances.

For purposes of the development of a lighting plan for Estero Boulevard, care will be taken to ensure that lights are turtle friendly, and will not encourage turtle confusion.

4.3. Dark Skies Criteria

The Town of Fort Myers Beach ordinances also reference compliance with the International Dark Skies Association (IDSA) guidelines to reduce light pollution. These guidelines provide recommendations related to the reduction of light pollution, known commonly as photo-pollution.

The definition of light pollution, is the excessive, misdirected or invasive use of artificial outdoor lighting. Mismanaged lighting alters the color and contrast of the nighttime sky, eclipses natural starlight, and disrupts circadian rhythms (the 24-hour processes of most living organisms), which affects the environment, energy resources, wildlife, and humans. The threat of light pollution continues to grow as the demand for artificial light increases each year.

While the conclusion of the light study indicates the need for more artificial street lighting, as well as the replacement of existing street lighting, these recommendations can actually reduce the existing light pollution by the use of full cut-off light fixtures, normalizing to a single color (temperature) of light, and will also eliminate existing violations of the Turtle Light visibility on turtle nesting habitat.

Full cut-off fixtures is a lighting industry term meaning the luminous intensity (visible light source or reflector) at or above an angle of 90° above nadir is zero, and the luminous intensity (in candelas) at or above a vertical angle of 80° above nadir does not numerically exceed 10% of the of the lamp or lamps in the luminaire. Essentially, no light escapes above the line parallel to the horizon, and the majority of light is directed downward.

IDSA guidelines has added benefits for driver safety, as this will eliminate visible hot-spots (glare) for car drivers that create vision impairment. Reducing the glare gives drivers greater ability to see in dark conditions, and eases eye confusion.

4.4. Lighting Alternatives

The existing lighting along the corridor is inconsistent in its type and placement, which leads to some of the lighting variation present along the corridor. The existing lighting structures are primarily cobra-head style fixtures, with varying types of light sources.

High Pressure Sodium, Metal Halide, and LED lighting were all observed, each with a differing color spectrum, as well as older fixture types where the light source and reflectors can be seen. This creates definitive glare and discomfort to the eye, and create a delay in human eye adjustment to varying levels of light, and even temporarily hinder the eye's Dark Adaption. Dark Adaption is a natural phenomenon in the eye where lower levels of light cause the eye to amend to utilize data from Rod cells, and disregard Cone cells data. This manifests as ability to only discriminate between shades of black and white. Disruption to dark adaptation refers to how the eye recovers its sensitivity in the dark, following exposure to bright lights.

These are not the only findings. Artificial light color is defined in terms of temperature. Color Temperature (CT) is a measure of the spectral content of the light source, the lower the CT, in the neighborhood of 2400-3000 degrees Kelvin are more of a yellow and red color, where light sources with a higher CT, in the neighborhood of 4000K-5000K are blue, or white. These colors are due to the wavelength of the light perceived by the human eye. The higher the CT, the shorter the wavelength of the light. Blue light scatters more in the human eye than the longer wavelengths of yellow and red, and

sufficient levels can damage the retina. This can cause problems seeing clearly for safe driving or walking at night, commonly perceived as glare from the light source.

Option 1 – Supplemental FPL lighting - To provide adequate lighting, supplemental lighting should be added to existing FPL fixtures to provide uniform light levels compliant with the FDOT Greenbook, and to minimize the maximum light level to minimum light level ratio. A conservative estimate number of additional fixtures along this corridor to attempt to reach Greenbook Standards is 80 fixtures. . Proposed additional fixtures are identified on Attachment 2 in red, to reach uniform light levels throughout the corridor. All supplemental lighting should standardize to full-cut-off, low glare, standard CT fixture. This would not eliminate the different CT lighting, or the higher glare fixtures, however, the overall illumination increase should improve driver/pedestrian safety.

Option 2 - Complete lighting replacement. This would involve complete street lighting system replacement, standardizing on full cut-off, low glare, adjustable cant LED light fixture, to create the safest driving condition, eliminate infractions to Town Ordinances for Turtle lighting, and improve driver/pedestrian safety. Proposed street lighting change out allows consistent spacing to be installed. The recommended light fixture proposed by FPL, is an industry leading low-glare CREE RSW equivalent light output low-wattage street light, mounted on 6' extension on existing utility wooden poles. Along project 6+ mile corridor, this fixture recommended spacing is 120 linear foot maximum spacing, yielding approximately 260 total fixtures (currently 143 fixtures serve the project area), or an increase of about 120 fixtures. The scope recommended is to determine a logical starting point, and consistently illuminate the corridor.

Option 3 – Town Owned Street Lighting. The Town could purchase and install Town owned lighting throughout this corridor, which would give the Town the ability to standardize the lighting in terms of CT, with full cut-off, glare reduced fixtures. This would also allow for better light distribution, and minimizing the hot-spots and create uniform lighting distribution and better maximum to minimum ratios along the corridor. A drawback from this option is the Town would be responsible for all the maintenance of their own fixtures, however newer LED technology has a projected 10 year life span with no interruption in service, unless acted on be external forces, like a high-wind event. Monthly fees associated with Town owned street lighting would be reduced on the order of 80 percent, but first cost are quite high.

Cost estimates for varying solutions are evaluated in several alternatives were considered. Capital and maintenance costs vary between the alternatives, as summarized below.

4.4.1. Option 1 – Adding Supplemental Lighting. The lighting is on a lease/use basis, owned and maintained by FPL. Standard tariffs dictate the cost per month, included as Attachment 1. OL-1 Outdoor Lighting, SL-1 Street Lighting, as well as PL-1 Premium Lighting. Monthly fees are based primarily on energy consumption, and fixture type, and range from $9 to $20 per fixture. Additional light is recommended as indicated above. Projected costs are broken into (2) categories, First Costs, and Monthly Fees:

First cost - $14/fixture, Monthly Fee - $10/month
Total – 81 x $14 = $1150 Additional Cost/month $810/month

4.4.2. Option 2 – Complete Replacement. This plan is based on the PL-1 Premium Lighting Tariff. This plan is centered on reduction of Carbon Dioxide generation, a federally incentivized strategic plan to reduce energy consumption by replacing antiquated devices with more efficient models. This plan reduces first cost for replacement fixtures, and reduces the monthly usage and operational costs. This plan would require extensive work with electrical utility, utilizing their fixtures, and existing utility poles, with a few supplemental poles where required. Initiating a starting point just south of the intersection Fifth Street and Estero Boulevard, where Estero Boulevard runs parallel to the beach, and extending to south end of Fort Myers Beach, this proposed method would include systemic replacement of all street lighting fixtures along this path, totaling 113, and supplementing additional fixtures on existing poles, with a few added poles, totaling 87. The first cost for this method would be minimal, with only cost of installing conduit to FPL specified locations, and the addition of 4 poles. The change of costs for this area changing from 113 lights to 200 lights. FPL currently charges the City $10/month according to the existing tariff for energy consumption, and the proposed tariff will cost $8.86 per fixture (inclusive of fixture costs, maintenance, and energy consumption), projections indicate an overall increase in current total FPL monthly street lighting costs from $1130, to $1772, or an increase of approximately $600 per month for this section of Estero Boulevard. FPL has performed a preliminary review of the Town total street lighting, and noted that a Town wide change of existing fixtures to energy efficient LED fixtures with equivalent light output would reduce the current monthly expenditure on street lighting from $4036 to $3450. Combining this Town-wide change out and adding new lighting along the project corridor would result in new monthly projection increase of less than 2 percent. Based on this information, CPWG strongly recommends the Town to engage talks with FPL for Energy Reduction Based LED Street Lighting Conversion.

All information for Option 2 is based on new PL-1 Tariff, a new tariff plan recently rolled out by FPL. This option required a new photometric design, performed for the specified project length, by FPL lighting department. This lighting photometric design is included in Attachment 3, and yielded a final additional lighting fixture quantity. The light levels, fixture locations and elevations are included. We have extrapolated the totals to include addition of 4 new poles, and a total fixture increase of 87 to reach specified light levels.

4.4.3. Option 3 – Town Owned Lighting. This option would reduce the monthly charges by FPL by approximately 80 percent, but comes with a first cost of approximately $400/fixture. The Town could install standard CT, low glare fixtures where they proposed, and create uniform light distribution. The Town would have to create a continuing service contract with a licensed electrical contractor, as well as a colocation agreement with FPL. The Town would be solely responsible for all maintenance of new fixtures. Complete corridor replacement would be projected at:

First cost - $400/fixture,	Monthly Fee - $3.00/month
Total – 140 x $400 = $56,000	140 x $3 = $420 – a savings of approx. $1700/month

4.5. Conceptual Lighting Plan

To comply with Town ordinances, adequately provide for roadway lighting, and to provide the most cost efficient solution to the Town, CPWG recommends Option 2. This costs is weighed with the actual life safety improvements along the corridor, and meeting Town Ordinances related to lighting. This option developed a preliminary lighting plan standardizing light spacing to the manufacturer's recommended distance for optimum lighting performance, maintained light levels, and minimizing maximum to minimum ration for light intensity. The plans are provided in Attachment 3 to this report, identifying the fixture locations, elevations, and lighting density, with the design standard for:

- Lighting type – CREE RSW equivalent wattage LED fixture
- Lighting spacing – for 41-50 Watt fixture, maximum spacing is 120'
- Special considerations – mounted on existing utility poles, spacing based on availability
- Annual Maintenance is included in the monthly cost of fixture

With the provided plan implemented, lighting along the corridor will be improved increasing pedestrian safety, turtle nesting will not be disturbed, and night time crashes may be reduced.

4.6. Lighting Justification Analysis

A Lighting Justification Report was prepared in accordance with Chapter 14 of the Florida Manual on Uniform Traffic Studies (MUTS).

The analysis is a two-step process. Step 1 provides a lighting warrant analysis consistent with criteria developed by the Transportation Association of Canada (TAC) Guide for the Design of Roadway Lighting. If lighting is determined to be warranted, then a Net Present Value (NPV) analysis is performed consistent with the guidelines provided in the MUTS. The NPV analysis evaluates savings related to crashes based upon providing highway lighting, compared with the cost to implement the lighting. If the savings is greater than the cost, then Lighting Justification Criteria are satisfied.

The TAC Guide provides a warranting system based on data for four key criteria:

- Geometric conditions
- Operational conditions
- Environmental conditions, and
- Crash conditions

Multiple items in each criteria are evaluated, and each item is assigned a scoring criterion and a weighting factor. The scores for all areas are summed, and a score greater than 60 is deemed to meet lighting warrants per the TAC Guidelines. The Estero Boulevard corridor scored 72, meaning that roadway lighting is warranted, and that NPV calculations should be conducted to determine justification.

The NPV was conducted utilizing analysis criteria provided for in the MUTS. Since the corridor has lighting in some sections, the base non-lighted No-Build condition is estimated based upon Highway Safety Manual (HSM) crash predictive analysis. The lighted Build Condition also utilizes HSM predictive analysis, but also incorporates existing crash experience.

Based upon the analysis conducted, roadway lighting in the corridor also meets Justification Criteria.

A stand-alone Lighting Justification Report is provided in Attachment 4.

5. Potential Funding Sources

To implement the lighting plan, there are two main sources of funding that could be made available: local funds and state/federal funds.

5.1. Local Funds

Local funds consist of those funds provided by the Town of Fort Myers Beach of by Lee County. Typically, these funds would be sourced from existing general revenues. Possible local sources could include:

- development impact fees related to the redevelopment activities along the Beach
- general funds
- tourist development taxes

Each of these sources will be more fully evaluated as part of next steps.]

5.2. State and Federal Funds

The most likely source of state or federal funding would be Federal Safety Funds. To qualify for these funds, the proposed project must meet the criteria outlined in the Florida Manual on Uniform Traffic Studies (MUTS). The MUTS provides a procedure to estimate the reduction in crashes expected, and then to compare this reduction to the costs of the system to develop a benefit-cost (BC) ratio for the proposed project. If the BC ratio is greater than 1.0, then the project could qualify. As discussed previously, the BC ration for this corridor exceeds 1, and the lighting is justified.

6. Next Steps

The non-existence of consistent lighting levels, with minimal maximum to minimum ratios, the varied color of the light sources, the light source visibilities all create impediments to traffic and pedestrian safety. Each can contribute to visual impairment while driving. Recommendations are as follows:

Primarily, a systemic lighting system replacement (removal of all fixtures of different sources, standardizing to only one source, and light spectrum, different sources include Metal Halide, High Pressure Sodium, and Light Emitting Diode (LED), and replacement with FP&L new CREE RSW LED lighting fixture that is both low wattage, and has leading glare reduction technology. This fixture also has internal adjustments to cant the angle of the fixture, which will eliminate light overflow in unwanted directions, such as towards turtle nesting habitats. This eliminates the requirement of shielding on lamps which reduce the light output and require a penetration of the housing of the fixture which can damage the life expectancy, as well as reduces the need to have FPL turn off street lights in turtle nesting season.

Removal and replacement of all fixtures, standardizing to a minimum full cut-off, and standardizing to a single Color Temperature will yield best results. This eliminates glare, and will have a definitive improvement on turtle nesting habitats.

ATTACHMENT 1

STREET LIGHTING

RATE SCHEDULE: SL-1

AVAILABLE:

In all territory served.

APPLICATION:

For lighting streets and roadways, whether public or private, which are thoroughfares for normal flow of vehicular traffic. Lighting for other applications such as: municipally and privately-owned parking lots; parks and recreational areas; or any other area not expressly defined above, is not permitted under this schedule except for lighting in such an application that was already under this schedule prior to July 9, 1992. Lamp replacement and energy-only service is available to existing customer facilities taking service under this rate prior to January 1, 2017.

TYPE OF INSTALLATION:

FPL-owned fixtures normally will be mounted on poles of FPL's existing distribution system and served from overhead wires. On request of the Customer, FPL will provide special poles or underground wires at the charges specified below. Customer-owned systems will be of a standard type and design, permitting service and lamp replacement at no abnormal cost to FPL.

SERVICE:

Service includes lamp renewals, patrol, energy from dusk each day until dawn the following day and maintenance of FPL-owned Street Lighting Systems.

LIMITATION OF SERVICE:

For Mercury Vapor, Fluorescent and Incandescent luminaires, no additions or changes in specified lumen output on existing installations will be permitted under this schedule after October 4, 1981 except where such additional lights are required in order to match existing installations.

Stand-by or resale service is not permitted hereunder.

CUSTOMER CONTRIBUTIONS:

A Contribution-in-Aid-of-Construction (CIAC) will be required for:

a) the differential cost between employing rapid construction techniques in trenching, backfilling and pole installation work where no obstructions exist, and the added cost to overcome obstructions such as sprinkler systems, paved surfaces (such as sidewalks, curbs, gutters, and roadways), landscaping, sodding and other obstructions encountered along the Street Light System installation route, including repair and replacement. If the Customer elects to perform work such as trenching and restoration, they will be reimbursed by FPL with a credit (not to exceed the total CIAC cost) for the value of this work as determined by FPL;

b) the installation cost of any new overhead distribution facilities and/or the cost of alterations to existing distribution facilities which are required in order to serve the Street Lighting System less four (4) times the additional annual non-fuel energy revenue generated by the installation or alteration of the Street Lighting System, plus where underground facilities are installed, the differential installation cost between underground and overhead distribution facilities.

These costs shall be paid by the Customer prior to the initiation of any construction work by FPL. The Customer shall also pay any additional costs associated with design modifications requested after the original estimate has been made.

(Continued on Sheet No. 8.716)

(Continued from Sheet No. 8.715)

REMOVAL OF FACILITIES:

If Street Lighting facilities are removed either by Customer request or termination or breach of the agreement, the Customer shall pay FPL an amount equal to the original installed cost of the removed facilities less any salvage value and any depreciation (based on current depreciation rates as approved by the Florida Public Service Commission) plus removal cost.

MONTHLY RATE:

Luminaire Type		Lamp Size Initial Lumens/Watts		kWh/Mo. Estimate	Charge for FPL-Owned Unit ($) Fixtures	Maintenance	Energy Non-Fuel **	Total ***	Charge for Customer-Owned Unit $) **** Relamping/ Energy Energy	Energy Only
High Pressure Sodium Vapor		6,300	70	29	$3.96	$1.89	$0.85	$6.70	$2.75	$0.85
"	"	9,500	100	41	$4.03	$1.90	$1.20	$7.13	$3.11	$1.20
"	"	16,000	150	60	$4.15	$1.93	$1.76	$7.84	$3.70	$1.76
"	"	22,000	200	88	$6.29	$2.45	$2.58	$11.32	$5.01	$2.58
"	"	50,000	400	168	$6.35	$2.46	$4.92	$13.73	$7.36	$4.92
"	" *	27,500	250	116	$6.69	$2.67	$3.40	$12.76	$6.04	$3.40
"	" *	140,000	1,000	411	$10.07	$4.78	$12.04	$26.89	$16.86	$12.04
Mercury Vapor *		6,000	140	62	$3.13	$1.70	$1.82	$6.65	$3.53	$1.82
"	" *	8,600	175	77	$3.18	$1.70	$2.26	$7.14	$3.97	$2.26
"	" *	11,500	250	104	$5.30	$2.44	$3.05	$10.79	$5.50	$3.05
"	" *	21,500	400	160	$5.27	$2.40	$4.69	$12.36	$7.10	$4.69

* These units are closed to new FPL installations.
** The non-fuel energy charge is 2.929 ¢ per kWh.
*** Bills rendered based on "Total" charge. Unbundling of charges is not permitted.
**** New customer-owned facilities are closed to this rate effective January 1, 2017.

Charges for other FPL-owned facilities:

Wood pole used only for the street lighting system	$5.01
Concrete pole used only for the street lighting system	$6.85
Fiberglass pole used only for the street lighting system	$8.11
Steel pole used only for the street lighting system *	$6.85
Underground conductors not under paving	3.876 ¢ per foot
Underground conductors under paving	9.470 ¢ per foot

The Underground conductors under paving charge will not apply where a CIAC is paid pursuant to section "a)" under "Customer Contributions." The Underground conductors not under paving charge will apply in these situations.

(Continued on Sheet No. 8.717)

(Continued from Sheet No. 8.716)

On Customer-owned Street Lighting Systems, where Customer contracts to relamp at no cost to FPL, the Monthly Rate for non-fuel energy shall be 2.929 ¢ per kWh of estimated usage of each unit plus adjustments. On Street Lighting Systems, where the Customer elects to install Customer-owned monitoring systems, the Monthly Rate for non-fuel energy shall be 2.929 ¢ per kWh of estimated usage of each monitoring unit plus adjustments. The minimum monthly kWh per monitoring device will be 1 kilowatt-hour per month, and the maximum monthly kWh per monitoring device will be 5 kilowatt-hours per month.

During the initial installation period:
Facilities in service for 15 days or less will not be billed;
Facilities in service for 16 days or more will be billed for a full month.

WILLFUL DAMAGE:

Upon the **second** occurrence of willful damage to any FPL-owned facilities, the Customer will be responsible for the cost incurred for repair or replacement. If the lighting fixture is damaged, based on prior written instructions from the Customer, FPL will:

a) Replace the fixture with a shielded cutoff cobrahead. The Customer shall pay $280.00 for the shield plus all associated costs. However, if the Customer chooses to have the shield installed after the first occurrence, the Customer shall only pay the $280.00 cost of the shield; or

b) Replace with a like unshielded fixture. For this, and each subsequent occurrence, the Customer shall pay the costs specified under "Removal of Facilities"; or

c) Terminate service to the fixture.

Option selection shall be made by the Customer in writing and apply to all fixtures which FPL has installed on the Customer's behalf. Selection changes may be made by the Customer at any time and will become effective ninety (90) days after written notice is received.

Conservation Charge	See Sheet No. 8.030.1
Capacity Payment Charge	See Sheet No. 8.030.1
Environmental Charge	See Sheet No. 8.030.1
Fuel Charge	See Sheet No. 8.030.1
Storm Charge	See Sheet No. 8.040
Franchise Fee	See Sheet No. 8.031
Tax Clause	See Sheet No. 8.032

SPECIAL CONDITIONS:

Customers whose lights are turned off during sea turtle nesting season will receive a credit equal to the fuel charges associated with the fixtures that are turned off.

TERM OF SERVICE:

Initial term of ten (10) years with automatic, successive five (5) year extensions unless terminated in writing by either FPL or the Customer at least ninety (90) days prior to the current term's expiration.

RULES AND REGULATIONS:

Service under this schedule is subject to orders of governmental bodies having jurisdiction and to the currently effective "General Rules and Regulations for Electric Service" on file with the Florida Public Service Commission. In case of conflict between any provision of this schedule and said "General Rules and Regulations for Electric Service", the provision of this schedule shall apply.

OUTDOOR LIGHTING

RATE SCHEDULE OL-1

AVAILABLE:

In all territory served.

APPLICATION:

For year-round outdoor security lighting of yards, walkways and other areas. Lights to be served hereunder shall be at locations which are easily and economically accessible to Company vehicles and personnel for construction and maintenance.

It is intended that Company-owned security lights will be installed on existing Company-owned electric facilities, or short extension thereto, in areas where a street lighting system is not provided or is not sufficient to cover the security lighting needs of a particular individual or location. Where more extensive security lighting is required, such as for large parking lots or other commercial areas, the Customer will provide the fixtures, supports and connecting wiring; the Company will connect to the Customer's system and provide the services indicated below.

SERVICE:

Service includes lamp renewals, energy from approximately dusk each day until approximately dawn the following day, and maintenance of Company-owned facilities. The Company will replace all burned-out lamps and will maintain its facilities during regular daytime working hours as soon as practicable following notification by the Customer that such work is necessary. The Company shall be permitted to enter the Customer's premises at all reasonable times for the purpose of inspecting, maintaining, installing and removing any or all of its equipment and facilities.

The Company, while exercising reasonable diligence at all times to furnish service hereunder, does not guarantee continuous lighting and will not be liable for damages for any interruption, deficiency or failure of service, and reserves the right to interrupt service at any time for necessary repairs to lines or equipment.

LIMITATION OF SERVICE:

This schedule is not available for service normally supplied on the Company's standard street lighting schedules. Company-owned facilities will be installed only on Company-owned poles. Customer-owned facilities will be installed only on Customer-owned poles. Overhead conductors will not be installed in any area designated as an underground distribution area, or any area, premises or location served from an underground source. Customer must have an active house or premise account associated with this service. Stand-by or resale service not permitted hereunder.

MONTHLY RATE:

Luminaire Type		Lamp Size Initial Lumens/Watts		KWH/Mo. Estimate	Charge for Company-Owned Unit ($) Fixtures	Maintenance	Energy Non-Fuel **	Total	Charge for Customer-Owned Unit ($) Relamping/ Energy	Energy Only
High Pressure Sodium Vapor		6,300	70	29	$5.14	$1.94	$0.91	$7.99	$2.80	$0.91
"	"	9,500	100	41	$5.25	$1.94	$1.28	$8.47	$3.17	$1.28
"	"	16,000	150	60	$5.43	$1.97	$1.88	$9.28	$3.80	$1.88
"	"	22,000	200	88	$7.90	$2.53	$2.75	$13.18	$5.22	$2.75
"	"	50,000	400	168	$8.42	$2.49	$5.25	$16.16	$7.68	$5.25
"	" *	12,000	150	60	$5.43	$1.97	$1.88	$9.28	$4.07	$1.88
Mercury Vapor *		6,000	140	62	$3.95	$1.74	$1.94	$7.63	$3.64	$1.94
"	" *	8,600	175	77	$3.97	$1.74	$2.41	$8.12	$4.11	$2.41
"	" *	21,500	400	160	$6.50	$2.44	$5.00	$13.94	$7.38	$5.00

* These units are closed to new Company installations.

** The non-fuel energy charge is 3.126¢ per kWh.

(Continued on Sheet No. 8.726)

(Continued from Sheet No. 8.725)

Charges for other Company-owned facilities:

Wood pole and span of conductors:	$11.32
Concrete pole and span of conductors:	$15.30
Fiberglass pole and span of conductors:	$17.98
Steel pole used only for the street lighting system *	$15.30
Underground conductors (excluding trenching)	$0.086 per foot
Down-guy, Anchor and Protector	$10.29

For Customer-owned outdoor lights, where the Customer contracts to relamp at no cost to FPL, the monthly rate for non-fuel energy shall be $3.126¢ per kWh of estimated usage of each unit plus adjustments.

Conservation Charge	See Sheet No. 8.030.1
Capacity Payment Clause	See Sheet No. 8.030.1
Environmental Charge	See Sheet No. 8.030.1
Fuel Charge	See Sheet No. 8.030.1
Storm Charge	See Sheet No. 8.040
Franchise Fee	See Sheet No. 8.031
Tax Clause	See Sheet No. 8.032

TERM OF SERVICE:

Not less than one year. In the event the Company installs any facilities for which there is an added monthly charge, the Term of Service shall be for not less than three years.

If the Customer terminates service before the expiration of the initial term of the agreement, the Company may require reimbursement for the total expenditures made to provide such service, plus the cost of removal of the facilities installed less the salvage value thereof, and less credit for all monthly payments made for Company-owned facilities.

WILLFUL DAMAGE:

In the event of willful damage to these facilities, FPL will provide the initial repair of each installed item at its expense. Upon the second occurrence of willful damage, and subsequent occurrence to these FPL-owned facilities, the Customer will be responsible for the cost for repair or replacement.

RULES AND REGULATIONS:

Service under this schedule is subject to orders of governmental bodies having jurisdiction and to the currently effective "General Rules and Regulations for Electric Service" on file with the Florida Public Service Commission. In case of conflict between any provision of this schedule and said "General Rules and Regulations for Electric Service", the provision of this schedule shall apply.

COMPANY-OWNED FACILITIES:

Company-owned luminaires normally will be mounted on Company's existing distribution poles and served from existing overhead wires. The Company will provide one span of secondary conductor from existing secondary facilities to a Company-owned light at the Company's expense. When requested by the Customer, and at the option of the Company, additional spans of wire or additional poles or underground conductors may be installed by the Company upon agreement by the Customer to use the facilities for a minimum of three years and pay each month the charges specified under MONTHLY RATE.

MONTHLY RATE

The Customer will make a lump sum payment for the cost of changes in the height of existing poles or the installation of additional poles in the Company's distribution lines or the cost of any other facilities required for the installation of lights to be served hereunder.

(Continued on Sheet No. 8.727)

(Continued from Sheet No. 8.726)

At the Customer request, the Company will upgrade to a higher level of illumination without a service charge when the changes are consistent with good engineering practices. The Customer will pay the Company the net costs incurred in making other lamp size changes. In all cases where luminaries are replaced, the Customer will sign a new service agreement. Billing on the rate for the new luminaire or lamp size will begin as of the next regular billing date. A luminaire may be relocated at the Customer's request upon payment by the Customer of the costs of removal and reinstallation.

The Company will not be required to install equipment at any location where the service may be objectionable to others. If it is found after installation that the light is objectionable, the Company may terminate the service.

When the Company relocates or removes its facilities to comply with governmental requirements, or for any other reason, either the Company or the Customer shall have the right, upon written notice, to discontinue service hereunder without obligation or liability.

SPECIAL CONDITIONS:

Customers whose lights are turned off during sea turtle nesting season will receive a credit equal to the fuel charges associated with the fixtures that are turned off.

CUSTOMER-OWNED FACILITIES:

Customer-owned luminaires and other facilities will be of a type and design specified by the Company to permit servicing and lamp replacement at no abnormal cost. The Customer will provide all poles, fixtures, initial lamps and controls, and circuits up to the point of connection to the Company's supply lines, and an adequate support for the Company-owned service conductors.

The Company will provide an overhead service drop from its existing secondary conductors to the point of service designated by the Company for Customer-owned lights. Underground service conductors will be installed in lieu of the overhead conductors at the Customer's request, and upon payment by the Customer of the installed cost of the underground conductors after allowance for the cost of equivalent overhead service conductors and any trenching and backfilling provided by the Customer.

DEFINITIONS:

A "Luminaire," as defined by the Illuminating Engineering Society, is a complete lighting unit consisting of a lamp (bulb), together with parts designed to distribute the light, to position and protect the lamp, and connect the lamp to the power supply.

A "Conventional" luminaire is supported by a bracket that is mounted on the side of an ordinary wood pole or an ornamental pole. This is the only type of luminaire offered where service is to be supplied from overhead conductors, although this luminaire may also be used when service is supplied from underground conductors.

A "Contemporary" luminaire is of modern design and is mounted on top of an ornamental pole. Underground conductors are required.

A "Traditional" luminaire resembles an Early American carriage lantern and is mounted on top of a pole. It requires an ornamental pole and underground conductors to a source of supply.

An "Ornamental" pole is one made of concrete or fiberglass.

PREMIUM LIGHTING

RATE SCHEDULE: PL-1

AVAILABLE:

In all territory served.

APPLICATION:

FPL-owned lighting facilities not available under rate schedule SL-1 and OL-1. To any Customer for the sole purpose of lighting streets, roadways and common areas, other than individual residential locations. This includes but is not limited to parking lots, homeowners association common areas, or parks.

SERVICE:

Service will be unmetered and will include lighting installation, lamp replacement and facilities maintenance for FPL-owned lighting systems. It will also include energy from dusk each day until dawn the following day.

The Company, while exercising reasonable diligence at all times to furnish service hereunder, does not guarantee continuous lighting and will not be liable for damages for any interruption, deficiency or failure of service, and reserves the right to interrupt service at any time for necessary repairs to lines or equipment.

LIMITATION OF SERVICE:

Installation shall be made only when, in the judgement of the Company, the location and the type of the facilities are, and will continue to be, easily and economically accessible to the Company equipment and personnel for both construction and maintenance.

Stand-by, non-firm, or resale service is not permitted hereunder.

TERM OF SERVICE:

The term of service is (20) twenty years. At the end of the term of service, the Customer may elect to execute a new agreement based on the current estimated replacement costs. The Company will retain ownership of these facilities.

FACILITIES PAYMENT OPTION:

The Customer will pay for the facilities in a lump sum in advance of construction. The amount will be the Company's total work order cost for these facilities times the Present Value Revenue Requirement (PVRR) multiplier of 1.1961. Monthly Maintenance and Energy charges will apply for the term of service.

FACILITIES SELECTION:

Facilities selection shall be made by the Customer in writing by executing the Company's Premium Lighting Agreement.

(Continued on Sheet No. 8.721)

(Continued from Sheet No. 8.720)

MONTHLY RATE :

Facilities:

Paid in full:	Monthly rate is zero, for Customer's who have executed a Premium Lighting Agreement before March 1, 2010:
10 years payment option:	1.364% of total work order cost.
20 years payment option:	0.926% of total work order cost.

Maintenance: FPL's estimated costs of maintaining lighting facilities.

Billing: FPL reserves the right to assess a charge for the recovery of any dedicated billing system developed solely for this rate.

Energy: KWH Consumption for fixtures shall be estimated using the following formula:

$$KWH = \frac{\text{Unit Wattage (usage)} \times 353.3 \text{ hours per month}}{1000}$$

Non-Fuel Energy	2.929 ¢/kWh
Conservation Charge	See Sheet No. 8.030.1
Capacity Payment Charge	See Sheet No. 8.030.1
Environmental Charge	See Sheet No. 8.030.1
Fuel Charge	See Sheet No. 8.030.1
Storm Charge	See Sheet No. 8.040
Franchise Fee	See Sheet No. 8.031
Tax Clause	See Sheet No. 8.032

During the initial installation period:
Facilities in service for 15 days or less will not be billed;
Facilities in service for 16 days or more will be billed for a full month.

MINIMUM MONTHLY BILL:

The minimum monthly bill shall be the applicable Facilities Maintenance and Billing charges.

(Continued on Sheet No. 8.722)

(Continued from Sheet No. 8.721)

EARLY TERMINATION:

If the Customer no longer wishes to receive service under this schedule, the Customer may terminate the Premium Lighting Agreement by giving at least (90) ninety days advance written notice to the Company. Upon early termination of service, the Customer shall pay an amount computed by applying the following Termination Factors to the installed cost of the facilities, based on the year in which the Agreement was terminated. These Termination Factors will not apply to Customers who elected to pay for the facilities in a lump sum in lieu of a monthly payment.

FPL may also charge the Customer for the cost to the utility for removing the facilities.

Ten (10) Years Payment Option	Termination Factor	Twenty (20) Years Payment Option	Termination Factor
1	1.1961	1	1.1961
2	1.0324	2	1.0850
3	0.9489	3	1.0582
4	0.8590	4	1.0293
5	0.7621	5	0.9982
6	0.6576	6	0.9646
7	0.5450	7	0.9285
8	0.4237	8	0.8895
9	0.2929	9	0.8475
10	0.1519	10	0.8023
>10	0.0000	11	0.7535
		12	0.7009
		13	0.6443
		14	0.5832
		15	0.5174
		16	0.4465
		17	0.3700
		18	0.2876
		19	0.1988
		20	0.1031
		>20	0.0000

WILLFUL DAMAGE:

In the event of willful damage to these facilities, FPL will provide the initial repair of each installed item at its expense. Upon the second occurrence of willful damage, and subsequent occurrence to these FPL-owned facilities, the Customer will be responsible for the cost for repair or replacement.

RULES AND REGULATIONS:

Service under this schedule is subject to orders of governmental bodies having jurisdiction and to the currently effective "General Rules and Regulations for Electric Service" on file with the Florida Public Service Commission. In case of conflict between any provision of this schedule and said "General Rules and Regulations for Electric Service", the provision of this schedule shall apply.

INDEX OF RATE SCHEDULES

RATE SCHEDULE	DESCRIPTION	SHEET NO.
BA	Billing Adjustments	8.030
SC	Storm Charge	8.040
GS-1	General Service - Non Demand (0-20 kW)	8.101
GST-1	General Service - Non Demand - Time of Use (0-20 kW)	8.103
GSD-1	General Service Demand (21-499 kW)	8.105
GSDT-1	General Service Demand - Time of Use (21-499 kW)	8.107
GSL	General Service Load Management Program	8.109
NSMR	Non-Standard Meter Rider	8.120
GSCU-1	General Service Constant Usage	8.122
RS-1	Residential Service	8.201
RTR-1	Residential Time of Use Rider	8.203
CU	Common Use Facilities Rider	8.211
RLP	Residential Load Control Program	8.217
GSLD-1	General Service Large Demand (500-1999 kW)	8.310
GSLDT-1	General Service Large Demand - Time of Use (500-1999 kW)	8.320
CS-1	Curtailable Service (500-1999 kW)	8.330
CST-1	Curtailable Service -Time of Use (500-1999 kW)	8.340
GSLD-2	General Service Large Demand (2000 kW +)	8.412
GSLDT-2	General Service Large Demand - Time of Use (2000 kW +)	8.420
HLFT	High Load Factor – Time of Use	8.425
CS-2	Curtailable Service (2000 kW +)	8.432
CST-2	Curtailable Service -Time of Use (2000 kW +)	8.440
CST-3	Curtailable Service -Time of Use (69 kV or above)	8.542
CS-3	Curtailable Service (69 kV or above)	8.545
GSLD-3	General Service Large Demand (69 kV or above)	8.551
GSLDT-3	General Service Large Demand - Time of Use (69 kV or above)	8.552
OS-2	Sports Field Service	8.602
MET	Metropolitan Transit Service	8.610
CILC-1	Commercial/Industrial Load Control Program (Closed Schedule)	8.650
CDR	Commercial/Industrial Demand Reduction Rider	8.680
SL-1	Street Lighting	8.715
SL-1M	Street Lighting Metered Service	8.718
PL-1	Premium Lighting	8.720
OL-1	Outdoor Lighting	8.725
SL-2	Traffic Signal Service	8.730
SL-2M	Traffic Signal Metered Service	8.731
LT-1	LED Lighting Pilot	8.735
RL-1	Recreational Lighting	8.743
SST-1	Standby and Supplemental Service	8.750
ISST-1	Interruptible Standby and Supplemental Service	8.760
EDR	Economic Development Rider	8.800
DSMAR	Demand Side Management Adjustment Rider	8.810
TR	Transformation Rider	8.820
SDTR	Seasonal Demand – Time of Use Rider	8.830
EFEDR	Existing Facility Economic Development Rider	8.900
CISR	Commercial/Industrial Service Rider	8.910
VSP	Voluntary Solar Partnership Pilot Program	8.930

BILLING ADJUSTMENTS

The following charges are applied to the Monthly Rate of each rate schedule as indicated and are calculated in accordance with the formula specified by the Florida Public Service Commission.

RATE SCHEDULE	FUEL ¢/kWh Levelized	FUEL ¢/kWh On-Peak	FUEL ¢/kWh Off-Peak	CONSERVATION ¢/kWh	CONSERVATION $/kW	CAPACITY ¢/kWh	CAPACITY $/kW	ENVIRON-MENTAL ¢/kWh
RS-1, RS-1 w/RTR-1 1st 1,000 kWh	2.293			0.153		0.234		0.122
RS-1, RS-1 w/ RTR-1 all addn kWh	3.293			0.153		0.234		0.122
RS-1 w/RTR-1 All kWh		0.445	(0.184)	0.153		0.234		0.122
GS-1	2.631			0.145		0.220		0.115
GST-1		3.076	2.447	0.145		0.220		0.115
GSD-1, GSD-1 w/SDTR (Jan – May)(Oct – Dec)	2.631				0.48		0.70	0.105
GSD-1 w/SDTR (Jun-Sept)		3.821	2.481		0.48		0.70	0.105
GSDT-1, HLFT-1 GSDT-1w/SDTR (Jan – May)(Oct – Dec)		3.076	2.447		0.48		0.70	0.105
GSDT-1 w/SDTR (Jun-Sept)		3.821	2.481		0.48		0.70	0.105
GSLD-1, CS-1, GSLD-1w/SDTR (Jan – May)(Oct – Dec)	2.630				0.57		0.84	0.101
GSLD-1 w/SDTR (Jun-Sept)		3.819	2.480		0.57		0.84	0.101
GSLDT-1, CST-1, HLFT-2, GSLDT-1 w/SDTR (Jan–May & Oct–Dec)		3.074	2.446		0.57		0.84	0.101
GSLDT-1 w/SDTR (Jun-Sept)		3.819	2.480		0.57		0.84	0.101
GSLD-2, CS-2, GSLD-2 w/SDTR (Jan – May)(Oct – Dec)	2.616				0.56		0.78	0.089
GSLD-2 w/SDTR (Jun-Sept)		3.800	2.468		0.56		0.78	0.089
GSLDT-2, CST-2, HLFT-3 , GSLDT-2 w/SDTR (Jan – May)(Oct – Dec)		3.060	2.434		0.56		0.78	0.089
GSLDT-2 w/SDTR (Jun-Sept)		3.800	2.468		0.56		0.78	0.089
GSLD-3, CS-3	2.564				0.57		0.79	0.090
GSLDT-3, CST-3		2.998	2.385		0.57		0.79	0.090

NOTE: The Billing Adjustments for additional Rate Schedules are found on Sheet No. 8.030.1

(Continued from Sheet No. 8.030)

BILLING ADJUSTMENTS (Continued)

RATE SCHEDULE	FUEL ¢/kWh	¢/kWh	¢/kWh	CONSERVATION ¢/kWh	$/kW		CAPACITY ¢/kWh	$/kW		ENVIRON-MENTAL ¢/kWh
	Levelized	On-Peak	Off-Peak							
OS-2	2.616			0.082			0.098			0.067
MET	2.616				0.60			0.88		0.099
CILC-1(G)		3.076	2.447		0.63			0.89		0.090
CILC-1(D)		3.058	2.433		0.63			0.89		0.090
CILC-1(T)		2.998	2.385		0.61			0.86		0.085
SL-1,OL-1, RL-1, PL-1/SL-1M, LT-1	2.548			0.042			0.018			0.027
SL-2, GSCU-1/SL-2M	2.631			0.111			0.153			0.085
					RDD	DDC		RDD	DDC	
SST-1(T)		2.998	2.385		0.07	0.03		0.10	0.05	0.080
SST-1(D1)		3.076	2.447		0.07	0.03		0.11	0.05	0.098
SST-1(D2)		3.074	2.446		0.07	0.03		0.11	0.05	0.098
SST-1(D3)		3.060	2.434		0.07	0.03		0.11	0.05	0.098
ISST-1(D)		3.058	2.433		0.07	0.03		0.11	0.05	0.098
ISST-1(T)		2.998	2.385		0.07	0.03		0.10	0.05	0.080

RESERVED FOR FUTURE USE

(Continued from Sheet No. 8.030.2)

FUEL COST AND PURCHASE POWER RECOVERY CLAUSE (FUEL):

The monthly charge of each rate schedule shall be rounded to the nearest .001¢ per kilowatt-hour of sales to reflect the recovery of costs of fossil and nuclear fuels and purchased power (excluding capacity payments) for each kilowatt-hour delivered, including other adjustments. Fuel Costs and Purchased Power Recovery Factors are normally calculated annually, for the billing period of January through December and are adjusted to incorporate changes in costs from one period to the next.

ENERGY CONSERVATION COST RECOVERY CLAUSE (CONSERVATION):

The monthly charge of each rate schedule shall be rounded to the nearest .001¢ per kilowatt-hour of sales to reflect the recovery of conservation related expenditures by the Company. The Company shall record both projected and actual expenses and revenues associated with the implementation of the Company's Energy Conservation Plan as authorized by the Commission. The procedure for the review, approval, recovery and recording of such costs and revenues is set forth in Commission Rule 25-17.015, F.A.C. Energy Conservation Cost Recovery Factors are normally developed annually, for the billing period of January through December and are adjusted to incorporate changes in costs from one period to the next.

For non-demand rate schedules, the Energy Conservation Cost Recovery Charge shall be applied to the customer's total kWh. For Demand rate schedules (other than those listed below), the Energy Conservation Cost Recovery Charge shall be applied to the customer's billing demand as specified by the rate schedule. For Rate Schedule CILC-1, the Energy Conservation Cost Recovery Charge shall be applied to the customer's On-Peak demand. For Rate Schedules SST-1 and ISST-1, the Conservation Reservation Demand Charge (RDC) and Daily Demand Charge (DDC) shall be applied to the On-Peak Standby Demand and the Contract Standby Demand as described in sections (2) and (3) of Demand Charge for each rate schedule.

CAPACITY PAYMENT RECOVERY CLAUSE (CAPACITY):

The monthly charge of each rate schedule shall be rounded to the nearest .001¢ per kilowatt-hour of sales or $.01 per kilowatt of demand to reflect the recovery of capacity costs of purchased power, including other adjustments. Capacity Payment Recovery Factors are normally calculated annually, for the billing period of January through December and are adjusted to incorporate changes in costs from one period to the next.

For non-demand rate schedules, the Capacity Payment Charge shall be applied to the customer's total kWh. For Demand rate schedules (other than those listed below), the Capacity Payment Charge shall be applied to the customer's billing demand as specified by the rate schedule. For Rate Schedule CILC-1, the Capacity Payment Charge shall be applied to the customer's On-peak demand. For Rate Schedules SST-1 and ISST-1, the Capacity Reservation Demand Charge (RDC) and Daily Demand Charge (DDC) shall be applied to the On-Peak Standby Demand and the Contract Standby Demand as described in sections (2) and (3) of Demand Charge for each rate schedule.

ENVIRONMENTAL COST RECOVERY CLAUSE (ENVIRONMENTAL):

The monthly charge of each rate schedule shall be rounded to the nearest .001¢ per kilowatt-hour of sales to reflect the recovery of environmental compliance costs as approved by the Florida Public Service Commission. The Environmental Cost Recovery Factor is normally calculated annually, for the billing period of January through December and are adjusted to incorporate changes in costs from one period to the next.

FRANCHISE FEE CLAUSE:

The Monthly Rate of each rate schedule is increased by the specified percentage factor for each franchise area as set forth in the Franchise Fee Factors which are incorporated by reference as part of this clause and as filed with the Florida Public Service Commission. This percentage factor shall be applied after other appropriate adjustments.

(Continued on Sheet No. 8.032)

ATTACHMENT 2

TEAM
ENGINEERING

EXISTING LIGHTING
AND SAMPLE LOCATION
FORT MYERS BEACH

TEAM
ENGINEERING

EXISTING LIGHTING
AND SAMPLE LOCATION
FORT MYERS BEACH

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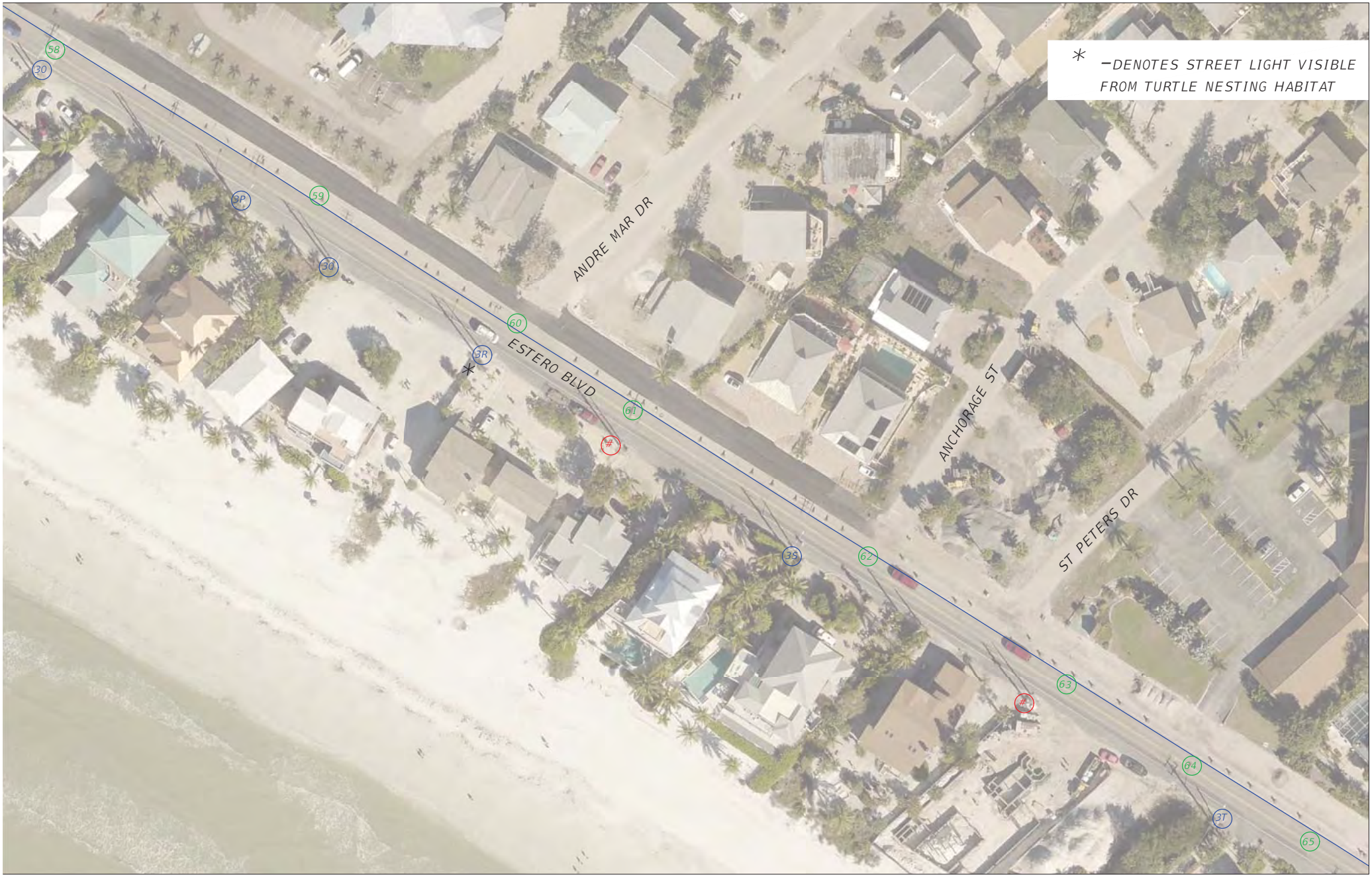
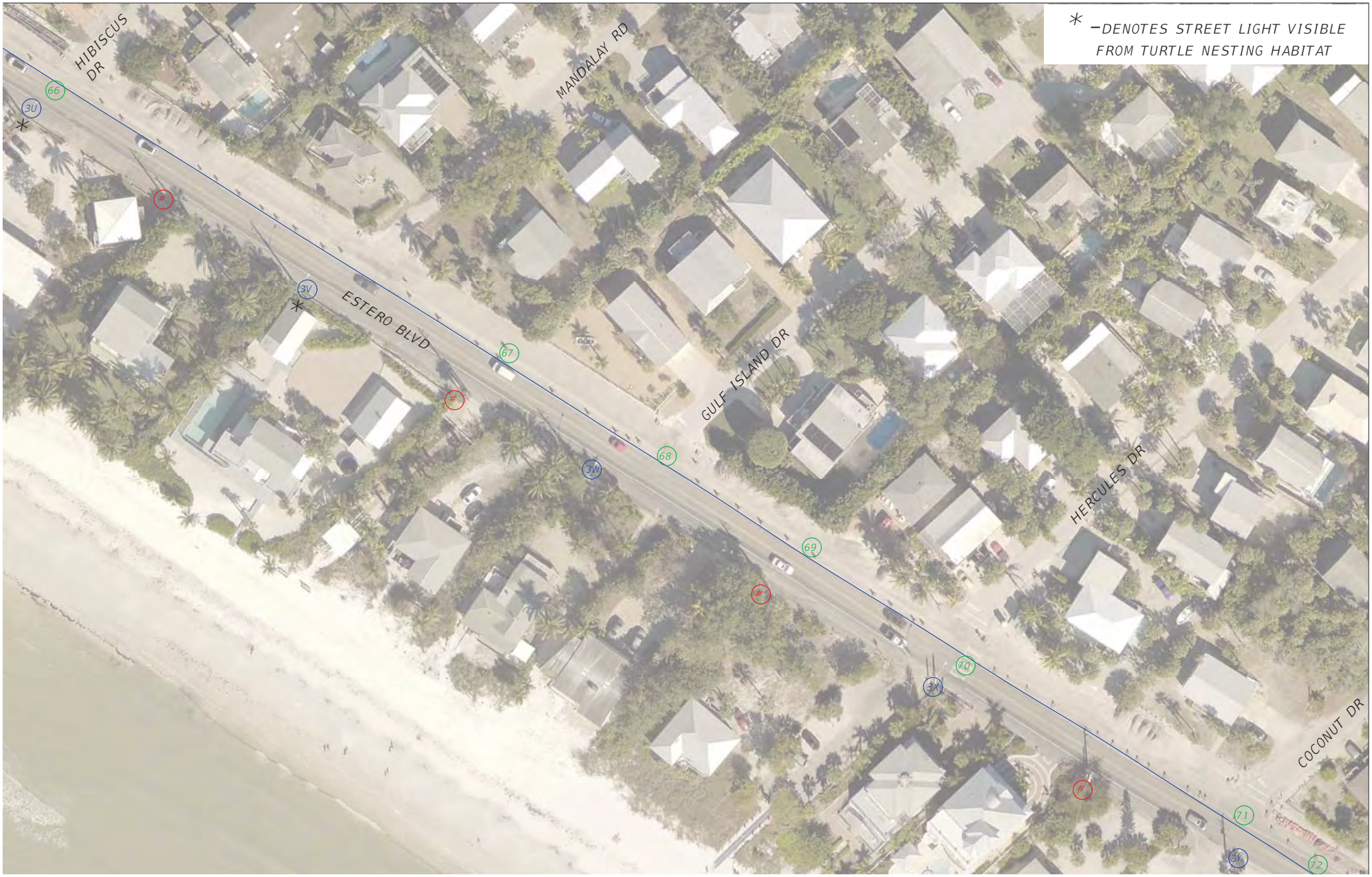
EXISTING LIGHTING
AND SAMPLE LOCATION
FORT MYERS BEACH



TEAM
ENGINEERING

EXISTING LIGHTING
AND SAMPLE LOCATION
FORT MYERS BEACH



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EXISTING LIGHTING
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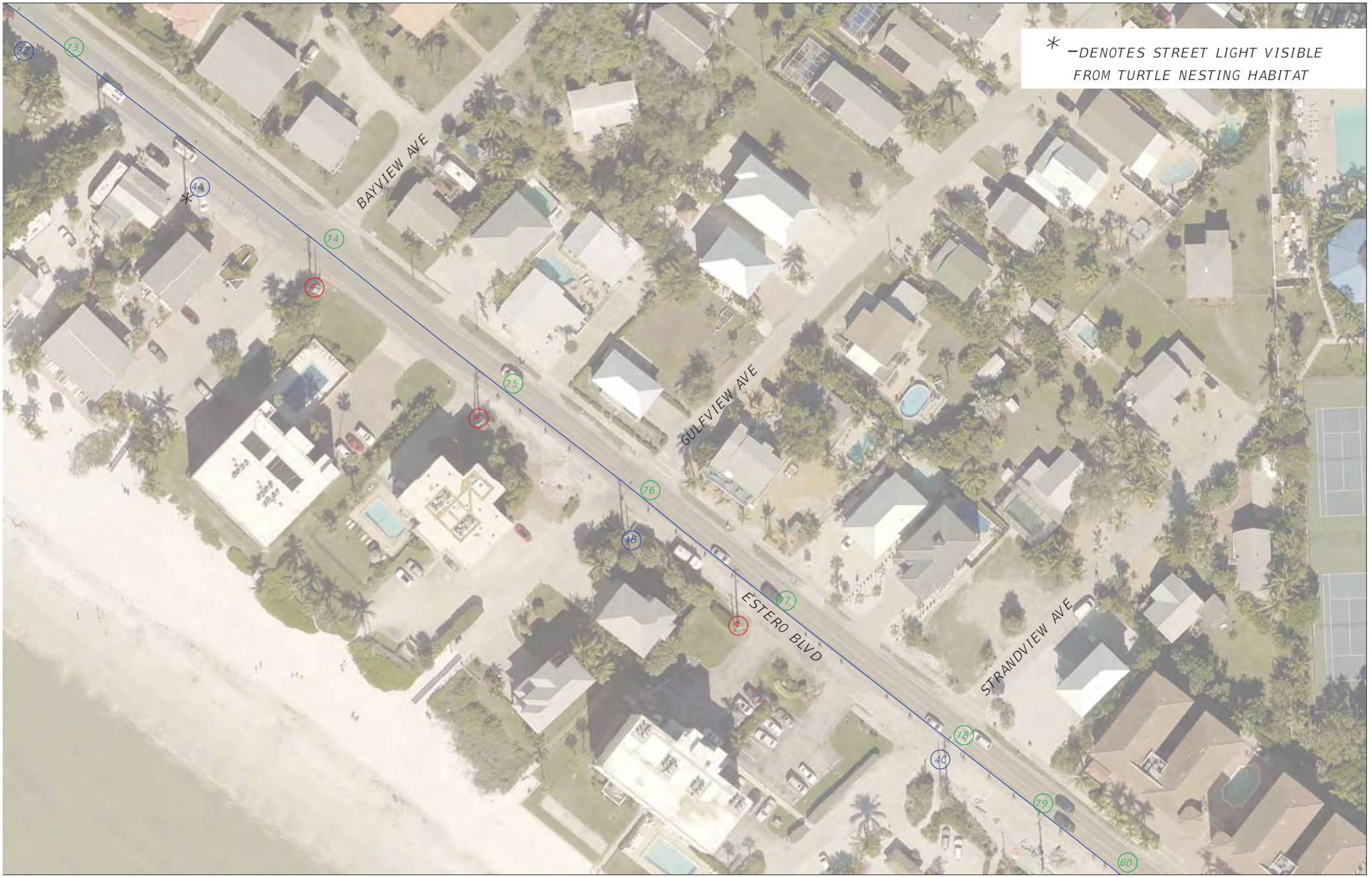

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EXISTING LIGHTING
AND SAMPLE LOCATION
FORT MYERS BEACH

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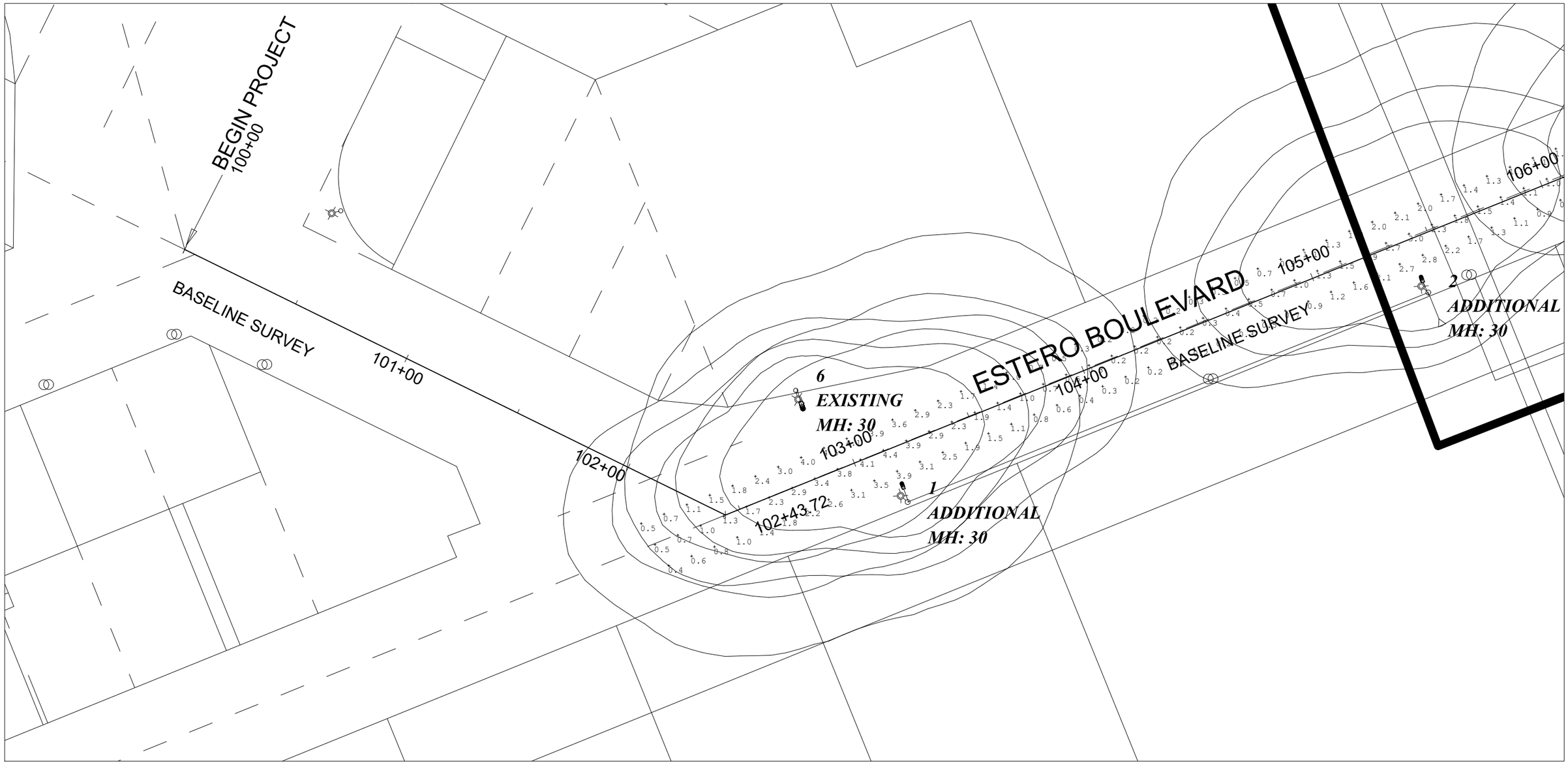
TEAM
ENGINEERING

EXISTING LIGHTING
AND SAMPLE LOCATION
FORT MYERS BEACH

6M

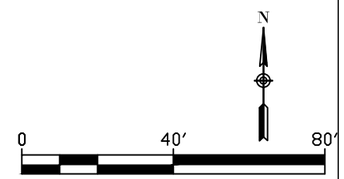
ATTACHMENT 3



Calculation Summary								
Label	**CalcType**	**Description**	**Units**	**Avg**	**Max**	**Min**	**Avg/Min**	**Max/Min**
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule									
Symbol	**Qty**	**Label**	**Arrangement**	**LLF**	**Description**	**Lum. Lumens**	**Arm**	**Lum. Watts**	**Total Watts**
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

New disclaimer:
This architectural lighting submittal is provided only for informational purposes and to help this customer or end-user (as applicable) understand how various sections of linear fixtures connect to each other and how they mount to the ceiling. This lighting submittal is strictly based on the information provided to Acuity Brands, and is provided without warranty as to accuracy, completeness, reliability or otherwise. If the information (including but not limited to floor-plans, reflected ceiling plans, electrical plans and specifications) provided to Acuity Brands is incomplete or not current (i.e., newer versions exist), the accuracy of proposed design may e adversely affected. Once this lighting submittal is received by the customer or end-user (as applicable), it is the obligation of the customer or end-user (as applicable) to consult with a professional engineering advisor to determine whether the proposed design meets the applicable project requirements for lighting system performance, code compliance, safety, suitability and effectiveness for use in a particular application. in no event will Acuity Brands be responsible for any loss resulting from any use of any information contained in this lighting submittal.



NO.	DATE	REVISION

TEAM ENGINEERING

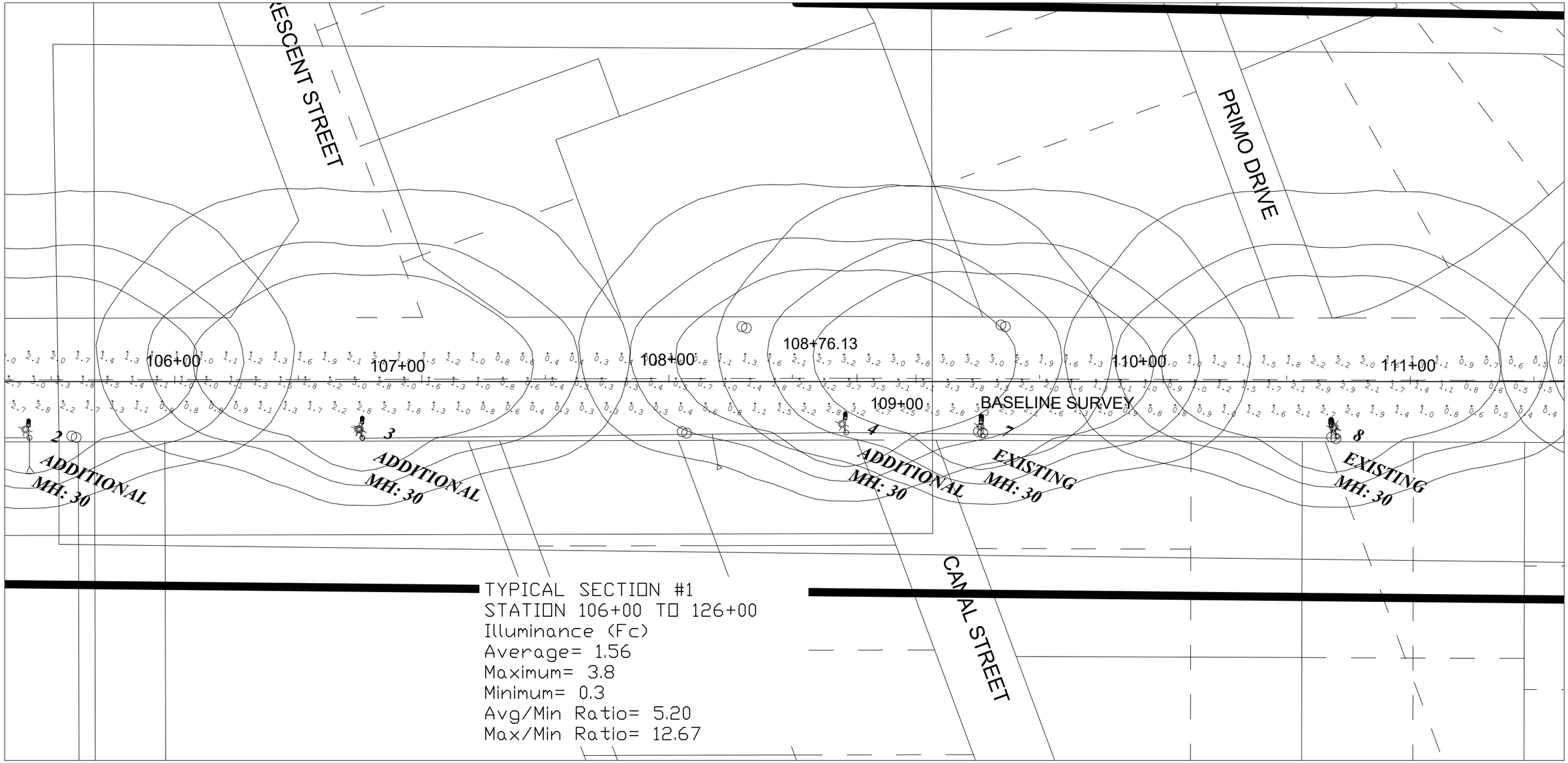
PHOTOMETRIC STUDY
FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:

DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
100+00.00 TO 105+31.16

SHEET NUMBER
1
1 OF 54



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Label	**CalcType**	**Description**	**Units**	**Avg**	**Max**	**Min**	**Avg/Min**	**Max/Min**
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
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Luminaire Schedule									
Symbol	**Qty**	**Label**	**Arrangement**	**LLF**	**Description**	**Lum. Lumens**	**Arm**	**Lum. Watts**	**Total Watts**
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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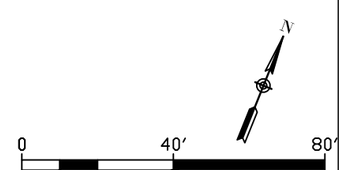


NO.	DATE	REVISION

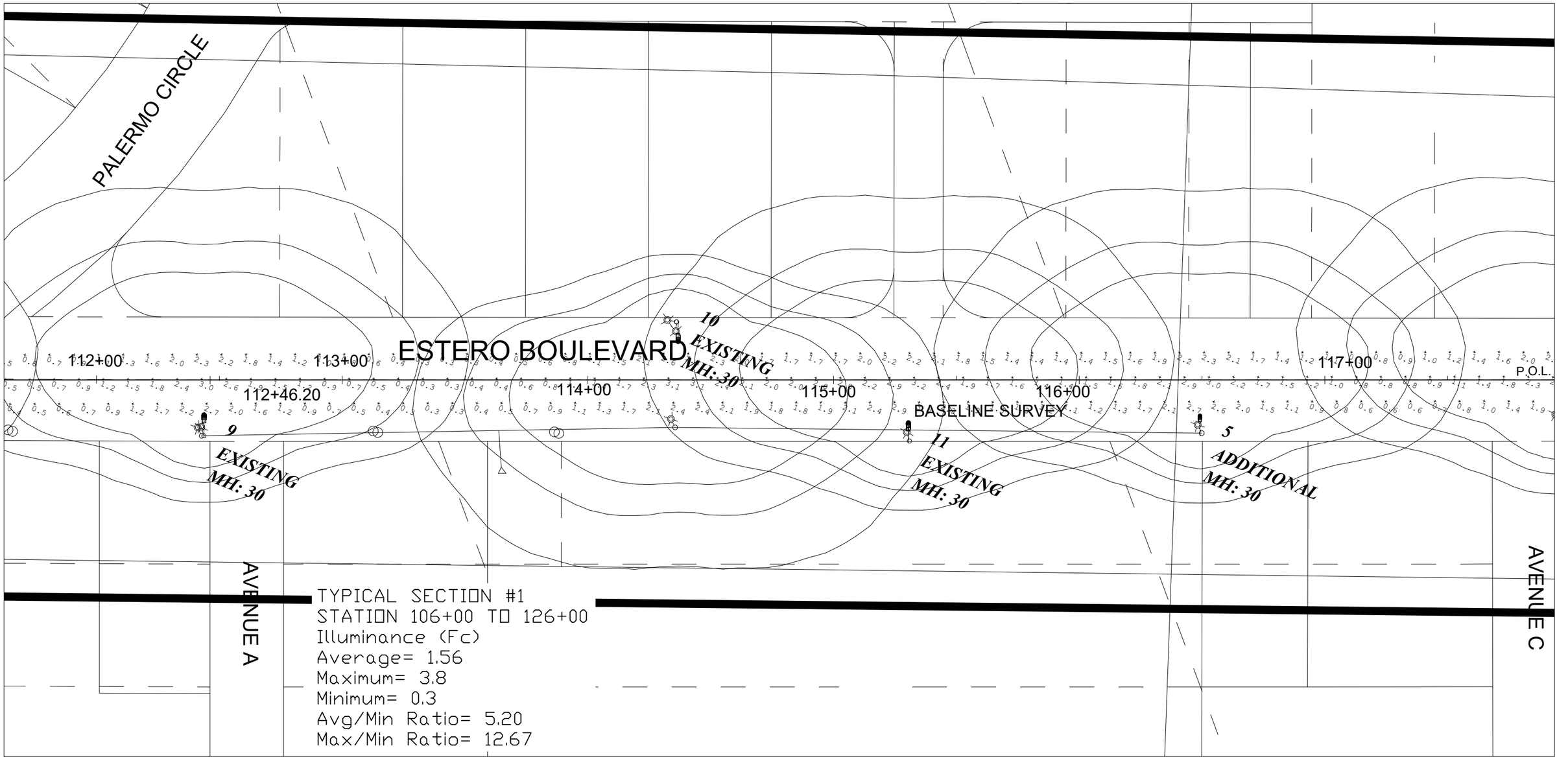
TEAM ENGINEERING

PHOTOMETRIC STUDY
FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
105+31.16 TO 111+62.33

SHEET NUMBER
2
2 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
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Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
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	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
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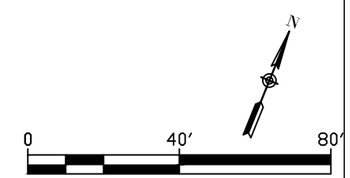


NO.	DATE	REVISION

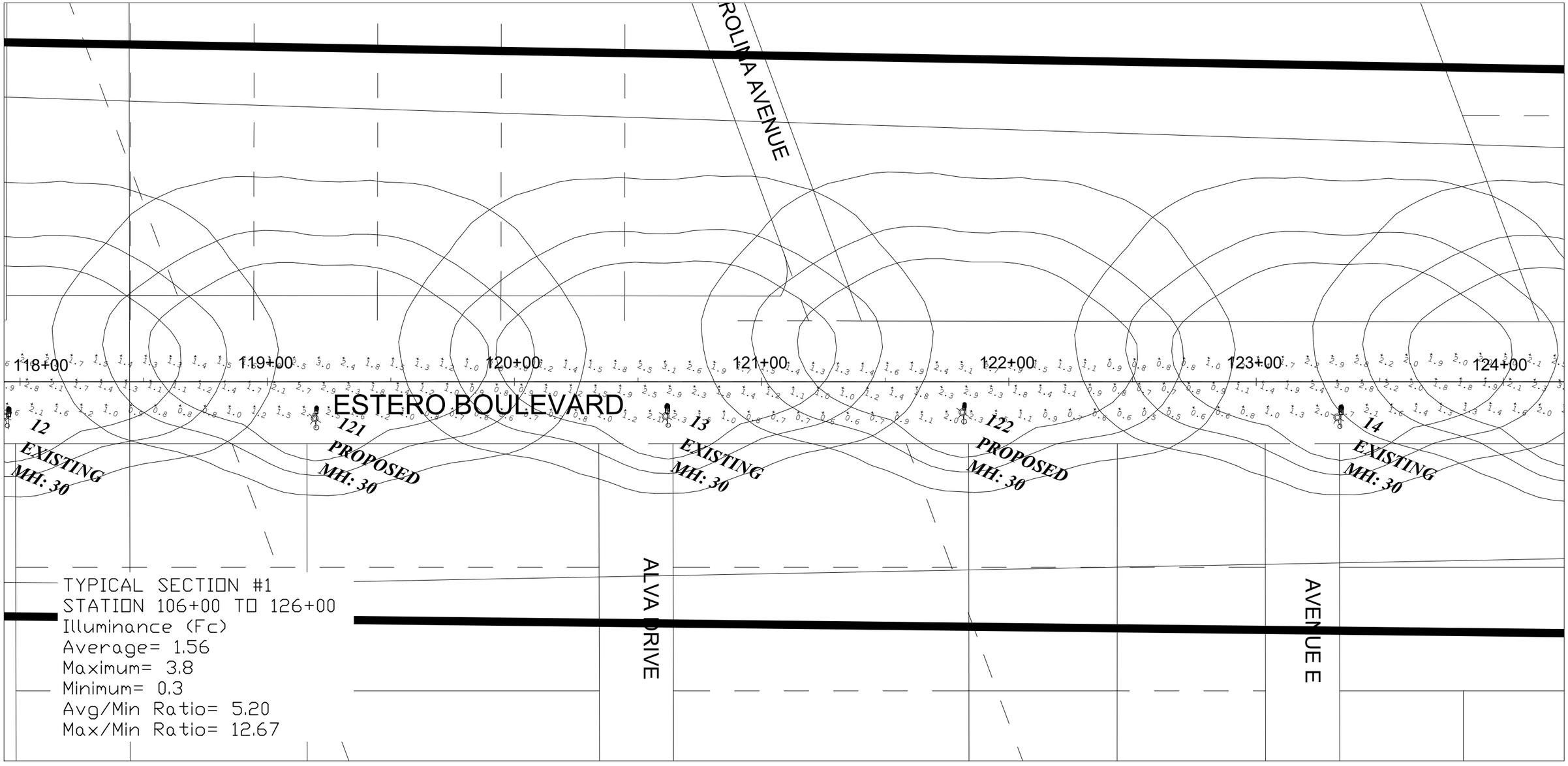
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 10/1/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
111+62.33 TO 117+93.49

SHEET NUMBER
3
3 OF 54



Calculation Summary								
Label	**CalcType**	**Description**	**Units**	**Avg**	**Max**	**Min**	**Avg/Min**	**Max/Min**
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule									
Symbol	**Qty**	**Label**	**Arrangement**	**LLF**	**Description**	**Lum. Lumens**	**Arm**	**Lum. Watts**	**Total Watts**
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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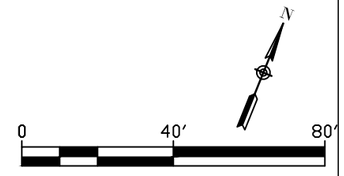


NO.	DATE	REVISION

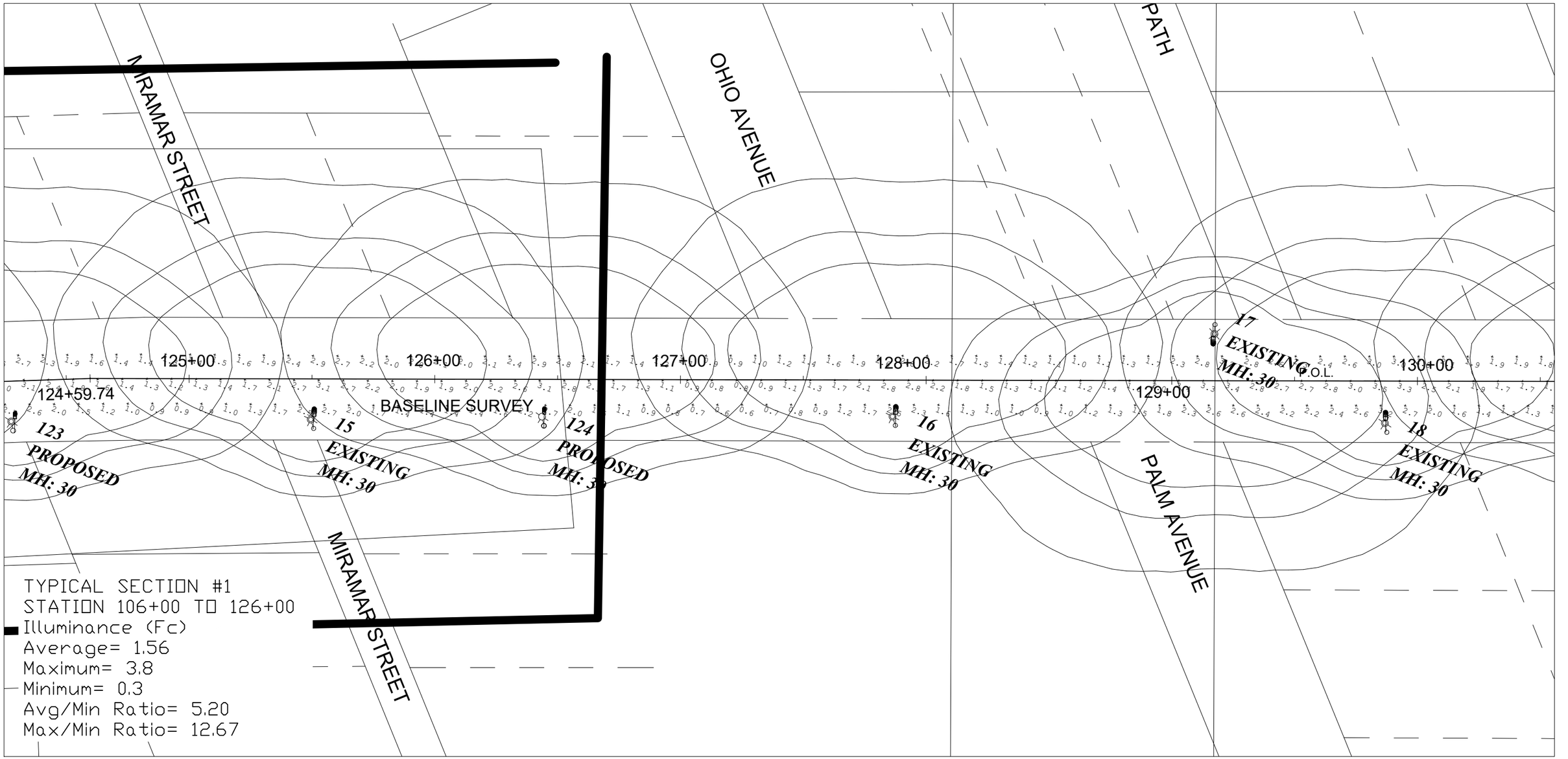
TEAM ENGINEERING

PHOTOMETRIC STUDY
FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
117+93.49 TO 124+24.65

SHEET NUMBER
4
4 OF 54



Calculation Summary								
Label	**CalcType**	**Description**	**Units**	**Avg**	**Max**	**Min**	**Avg/Min**	**Max/Min**
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule									
Symbol	**Qty**	**Label**	**Arrangement**	**LLF**	**Description**	**Lum. Lumens**	**Arm**	**Lum. Watts**	**Total Watts**
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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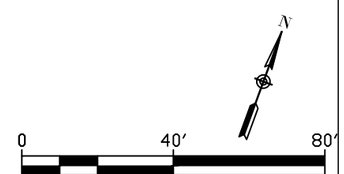


NO.	DATE	REVISION

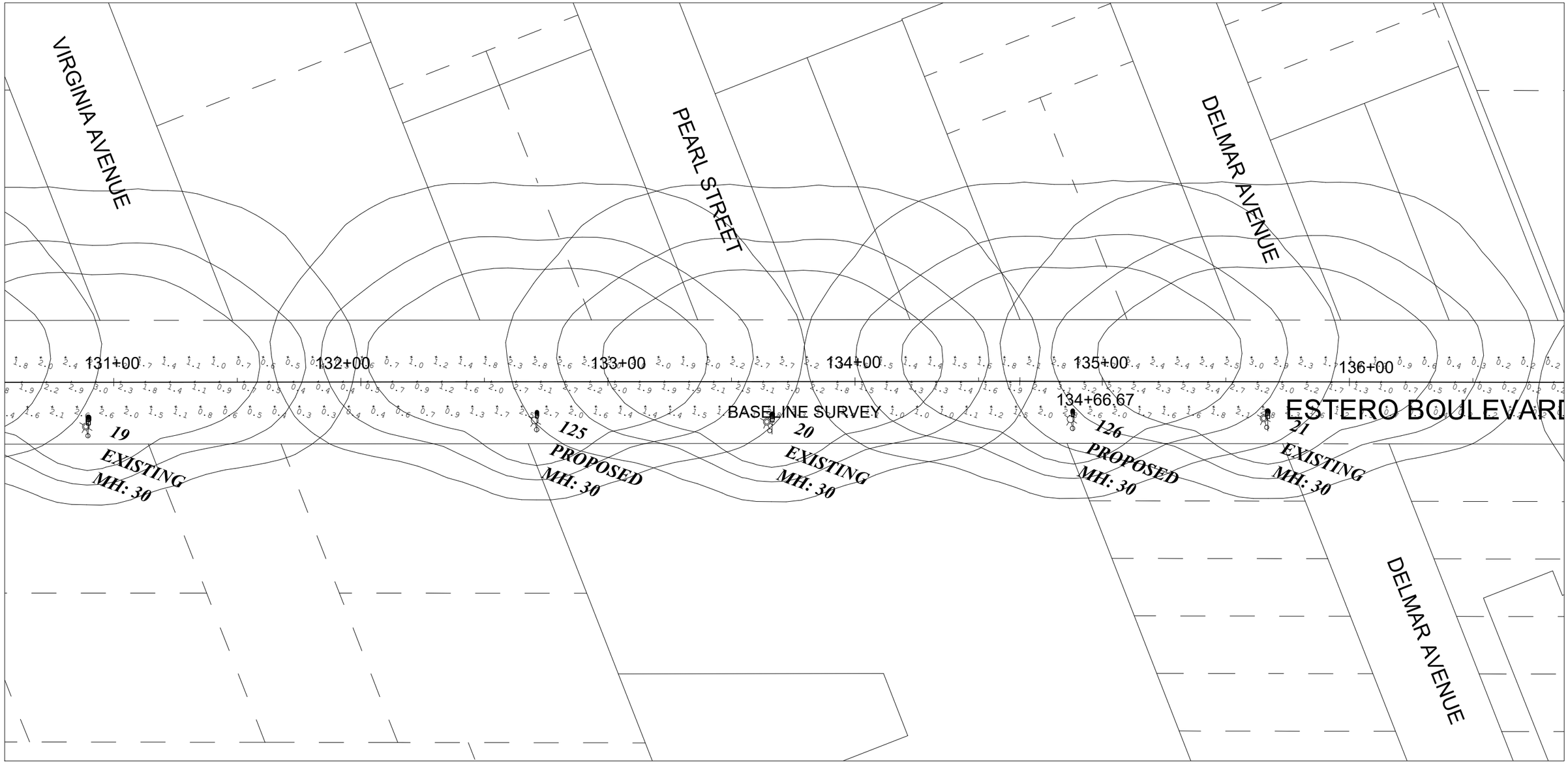
TEAM ENGINEERING

PHOTOMETRIC STUDY
FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
124+24.65 TO 130+55.82

SHEET NUMBER
5
5 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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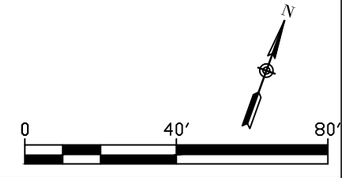


NO.	DATE	REVISION

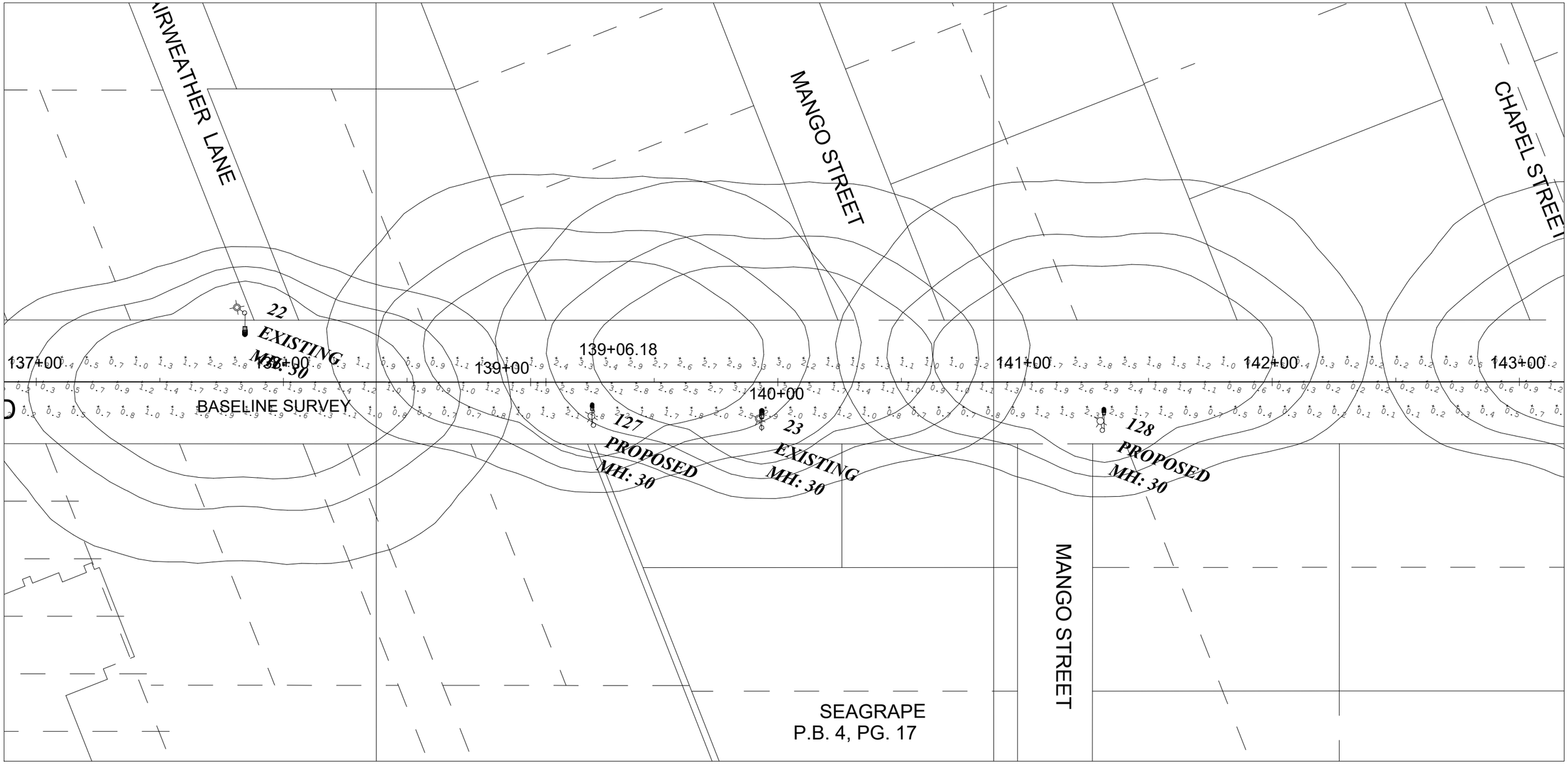
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
130+55.82 TO 136+86.98

SHEET NUMBER
6
6 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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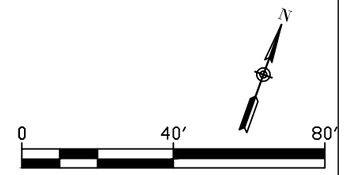


NO.	DATE	REVISION

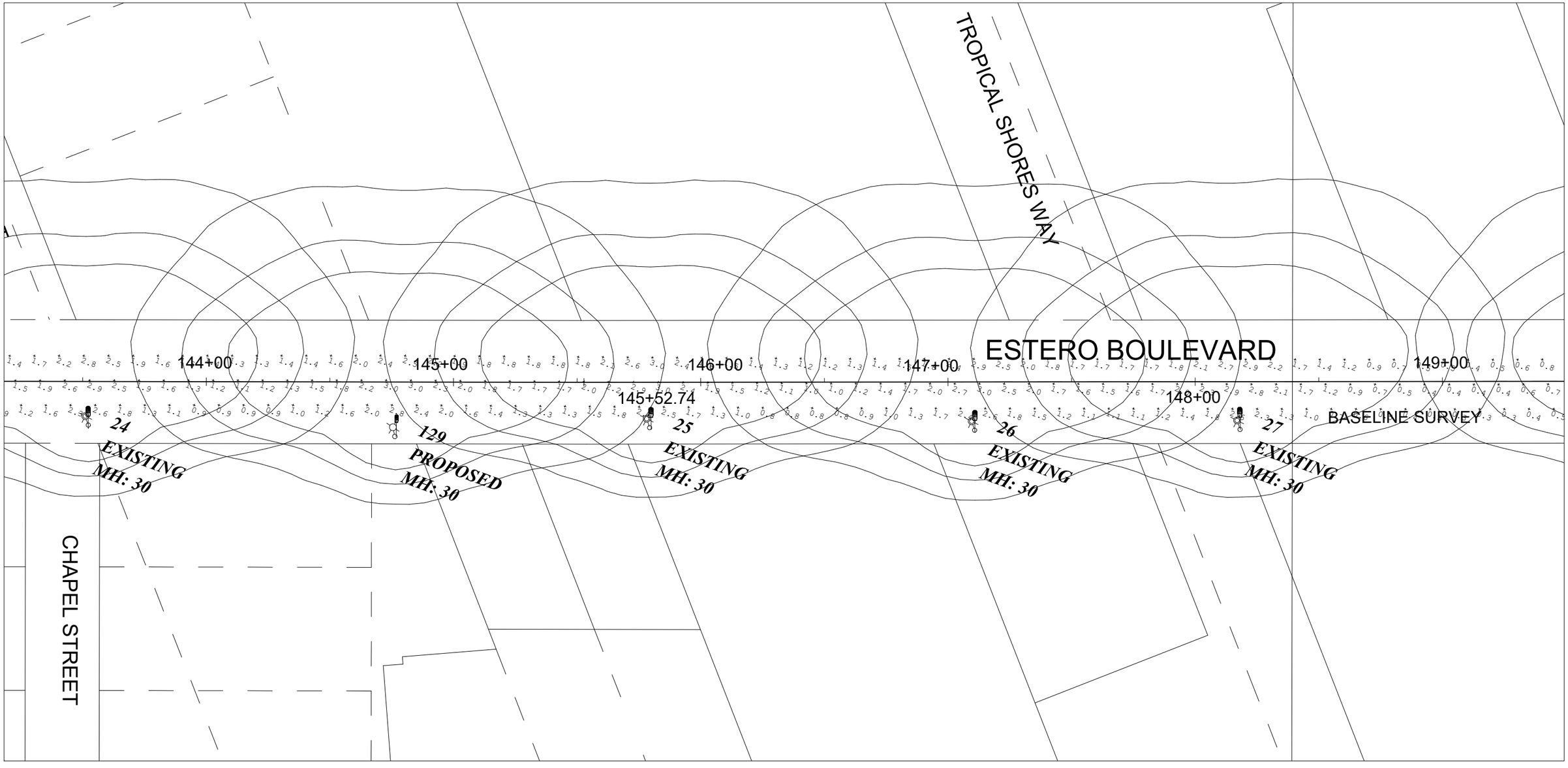
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
136+86.98 TO 143+18.15

SHEET NUMBER
7
7 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
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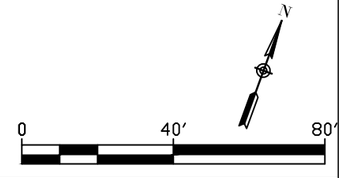


NO.	DATE	REVISION

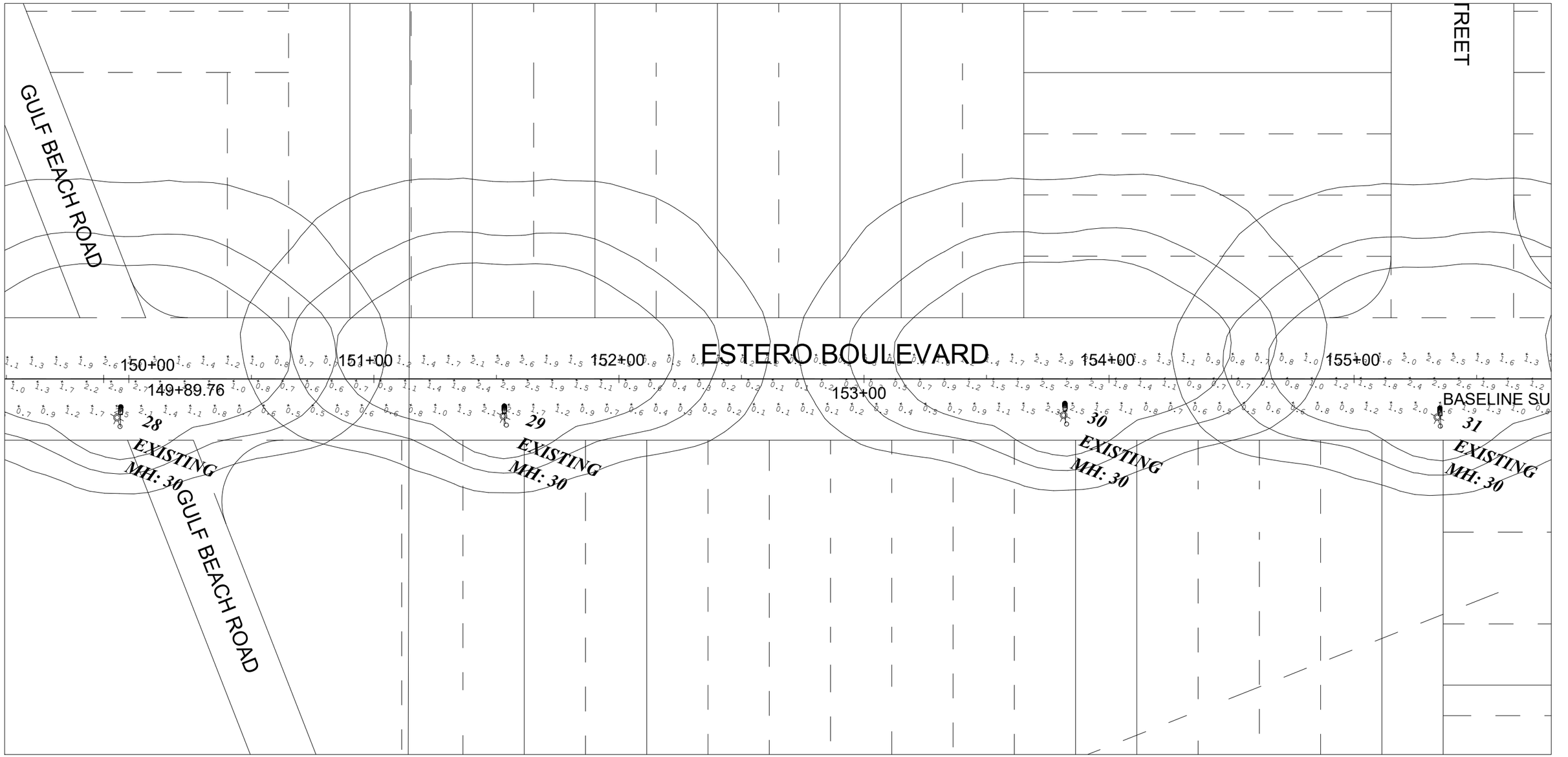
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
143+18.15 TO 149+49.31

SHEET NUMBER
8
8 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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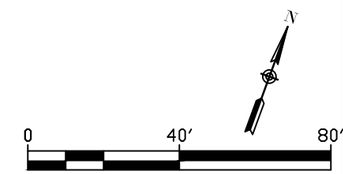


NO.	DATE	REVISION

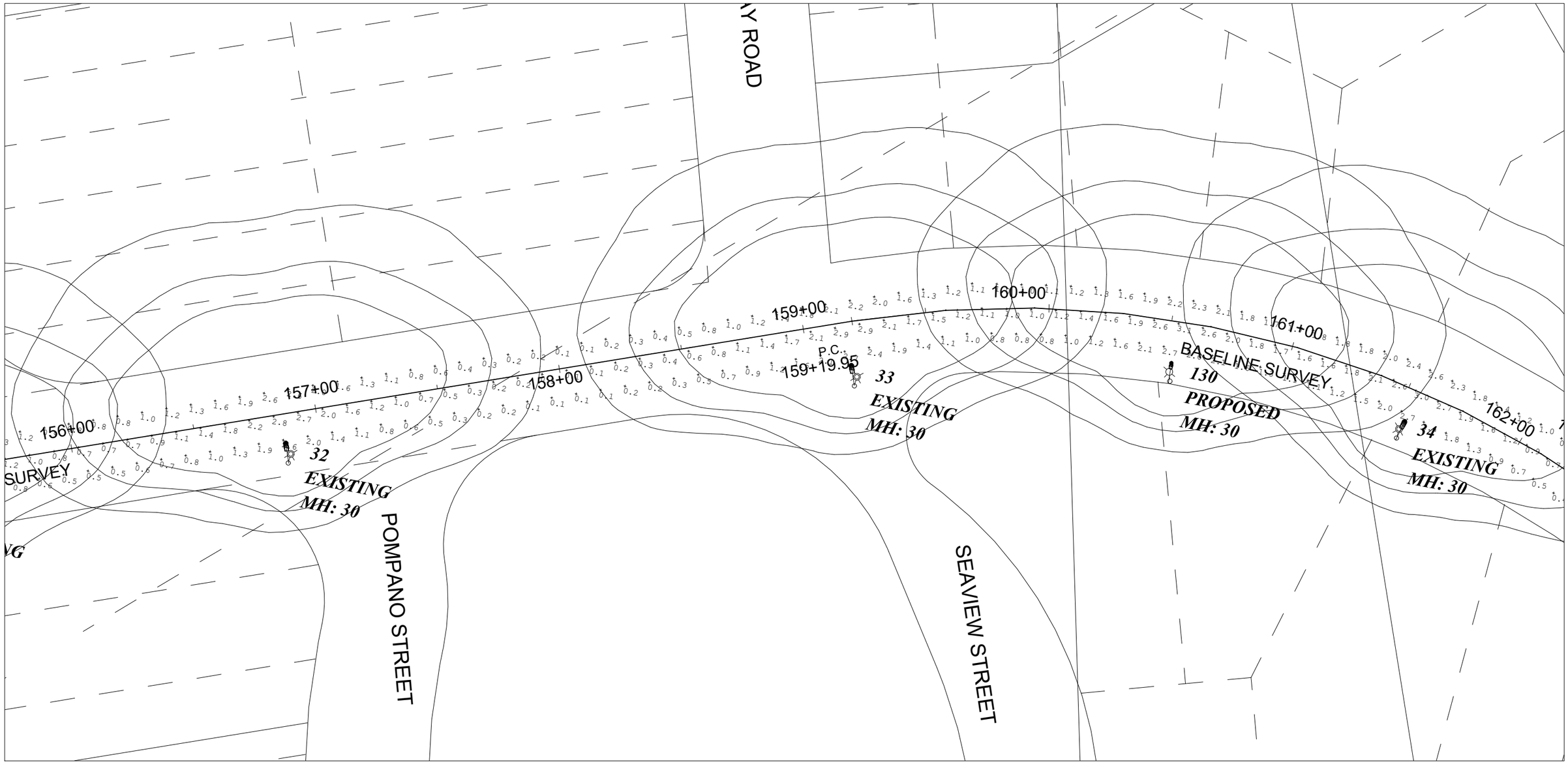
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
149+49.31 TO 155+80.47

SHEET NUMBER
9
9 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
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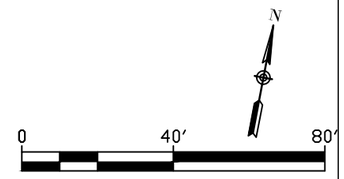


NO.	DATE	REVISION

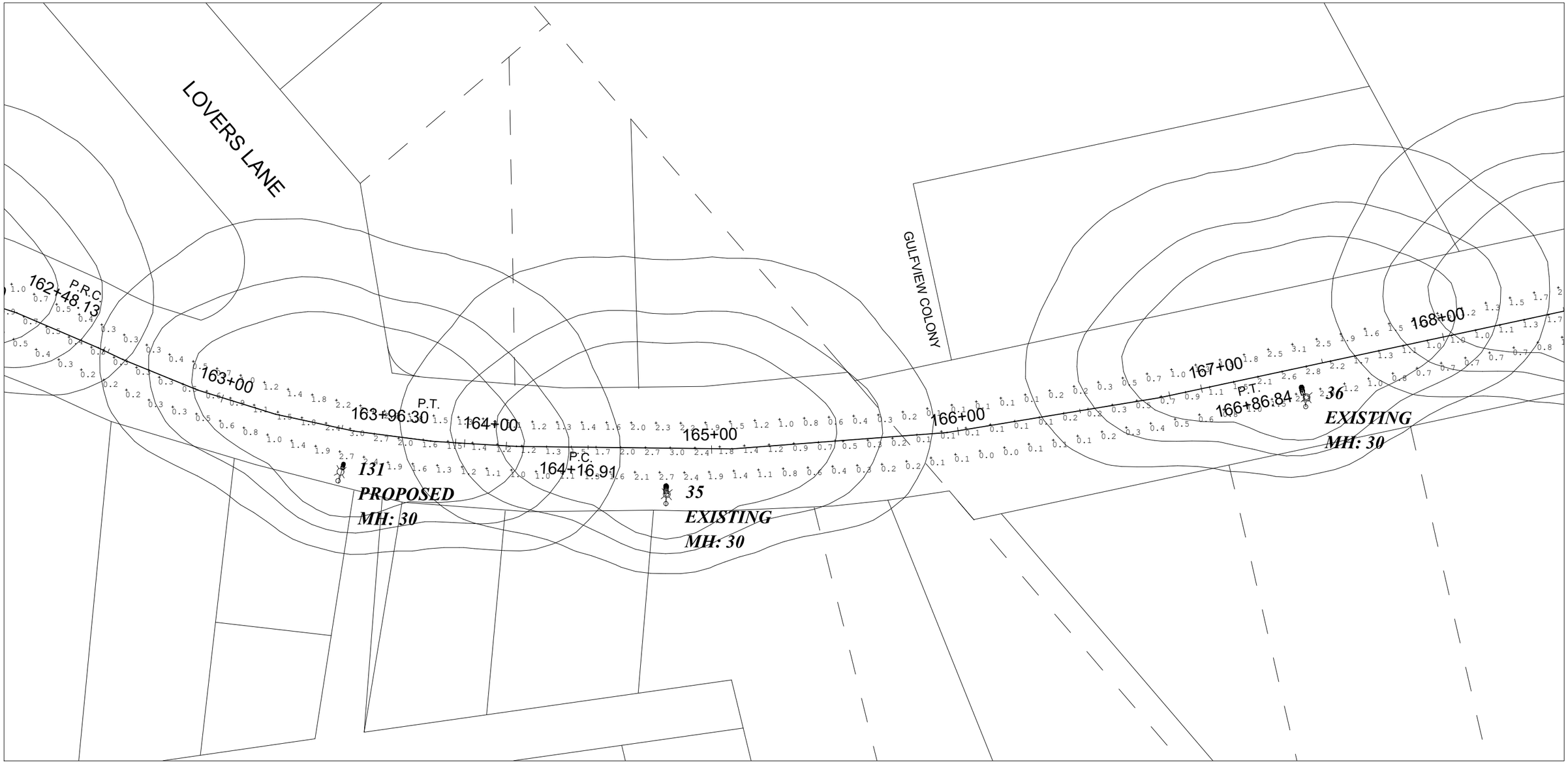
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
155+80.47 TO 162+11.64

SHEET NUMBER
10
10 OF 54



Calculation Summary								
Label	**CalcType**	**Description**	**Units**	**Avg**	**Max**	**Min**	**Avg/Min**	**Max/Min**
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
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Luminaire Schedule									
Symbol	**Qty**	**Label**	**Arrangement**	**LLF**	**Description**	**Lum. Lumens**	**Arm**	**Lum. Watts**	**Total Watts**
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
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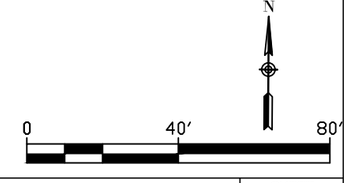

NO.	DATE	REVISION

TEAM ENGINEERING

PHOTOMETRIC STUDY
FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
162+11.64 TO 168+42.80

SHEET NUMBER
11
11 OF 54

Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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N

0 40′ 80′

NO.	DATE	REVISION

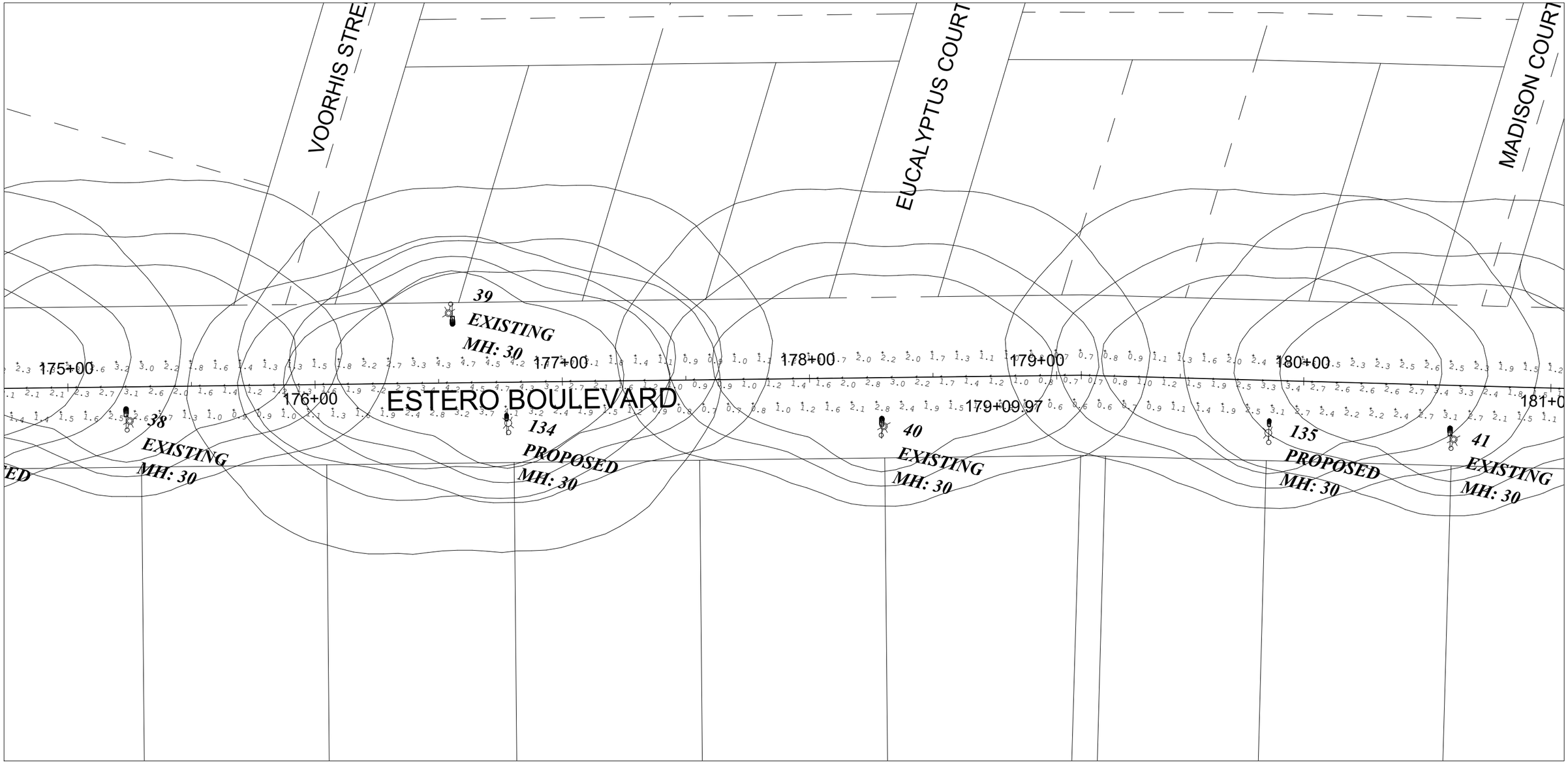
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
168+42.80 TO 174+73.96

SHEET NUMBER
12
12 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
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	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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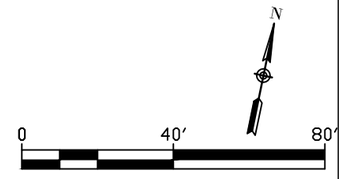


NO.	DATE	REVISION

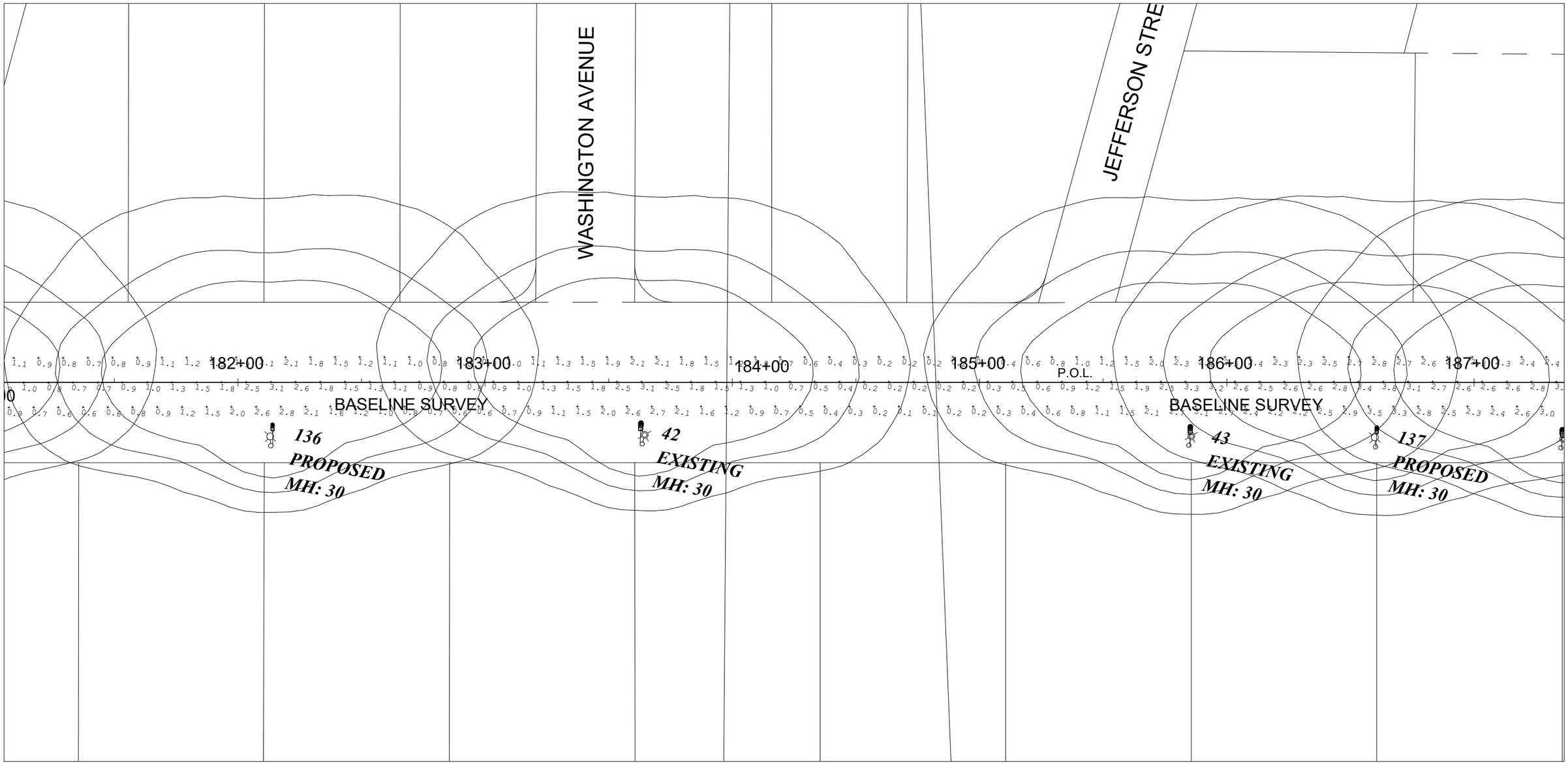
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
174+73.96 TO 181+05.13

SHEET NUMBER
13
13 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
—■	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
—■	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
—■	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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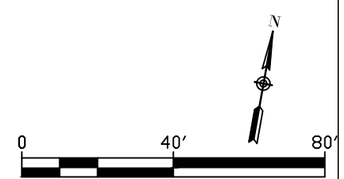


NO.	DATE	REVISION

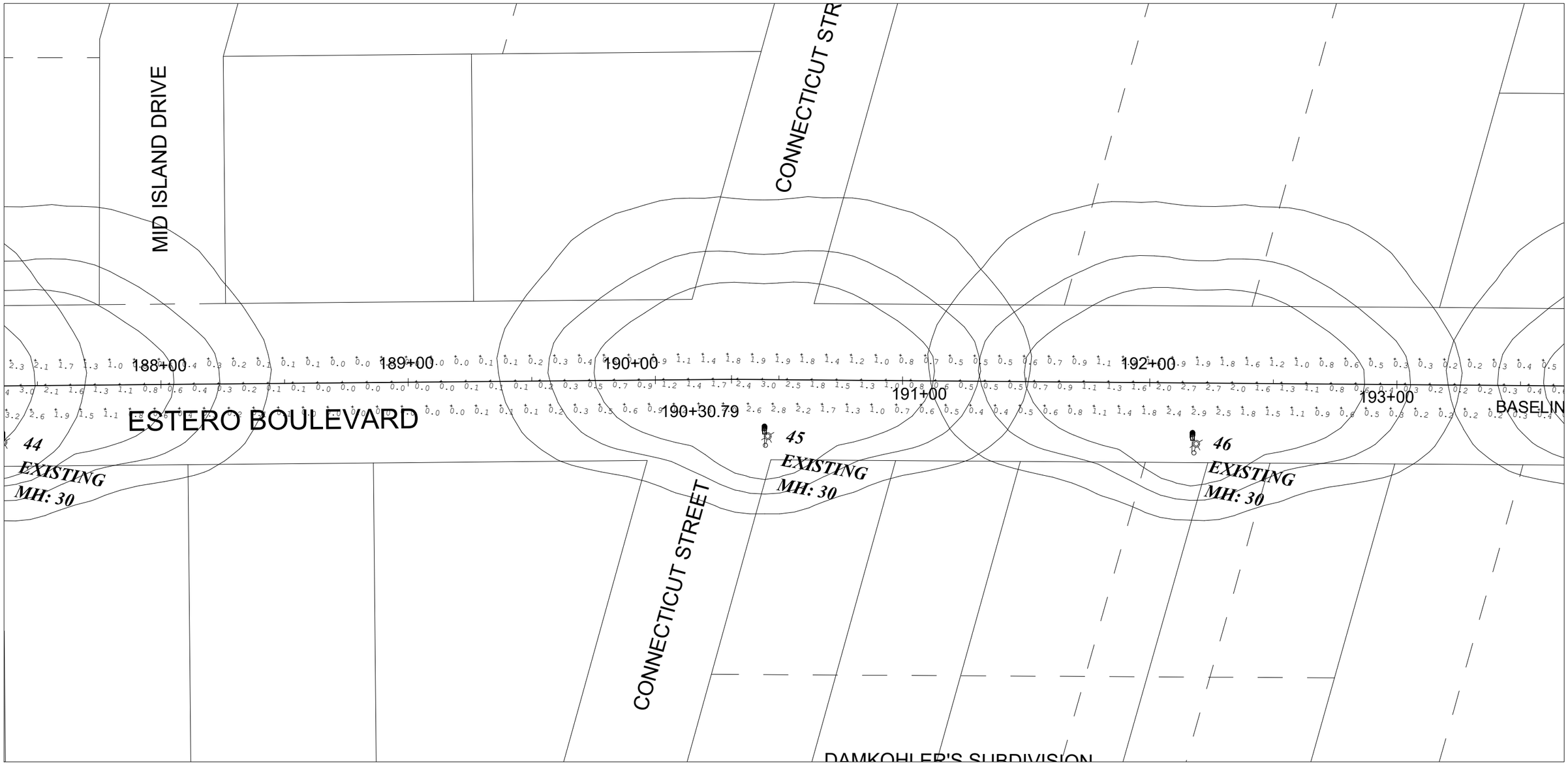
TEAM ENGINEERING

PHOTOMETRIC STUDY
FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
181+05.13 TO 187+36.29

SHEET NUMBER
14
14 OF 54



Calculation Summary								
Label	**CalcType**	**Description**	**Units**	**Avg**	**Max**	**Min**	**Avg/Min**	**Max/Min**
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule									
Symbol	**Qty**	**Label**	**Arrangement**	**LLF**	**Description**	**Lum. Lumens**	**Arm**	**Lum. Watts**	**Total Watts**
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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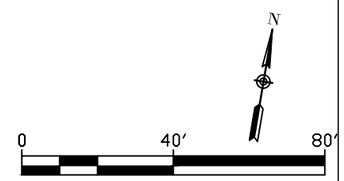


NO.	DATE	REVISION

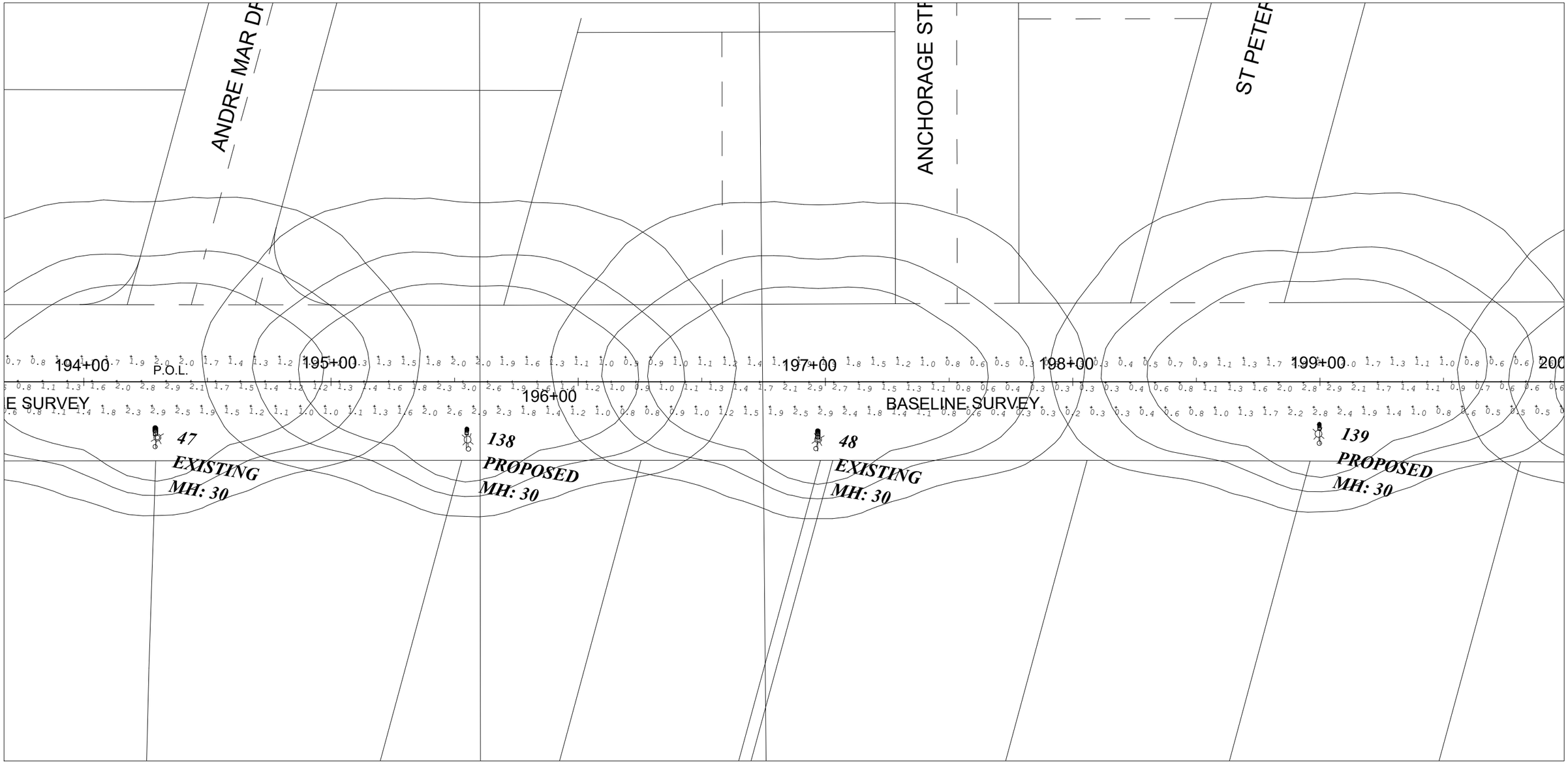
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
187+36.29 TO 193+67.46

SHEET NUMBER
15
15 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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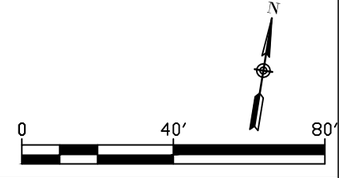


NO.	DATE	REVISION

TEAM ENGINEERING

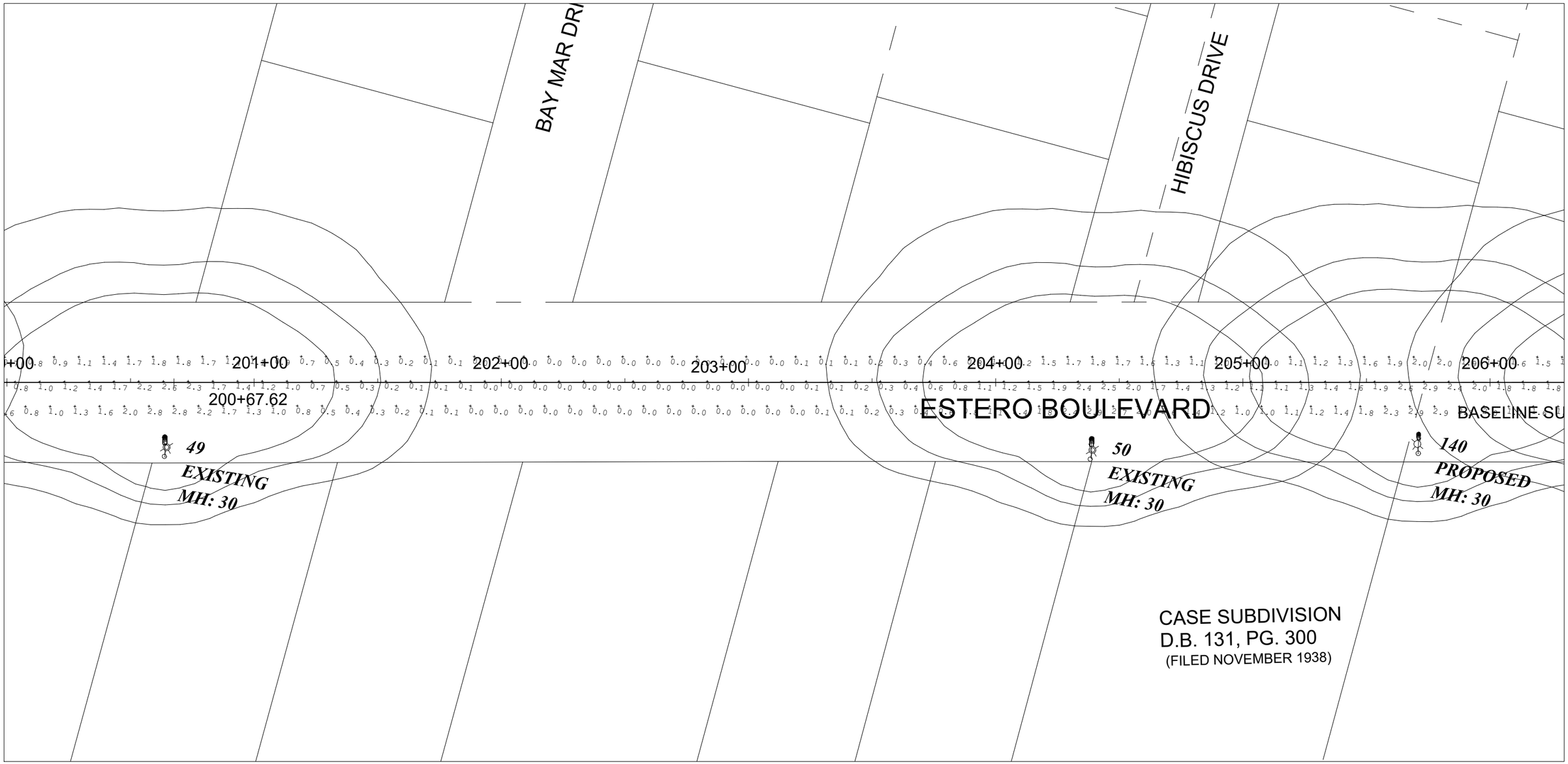
PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:

DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
193+67.46 TO 199+98.62

SHEET NUMBER
16
16 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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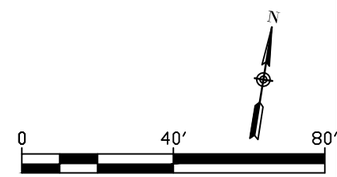


NO.	DATE	REVISION

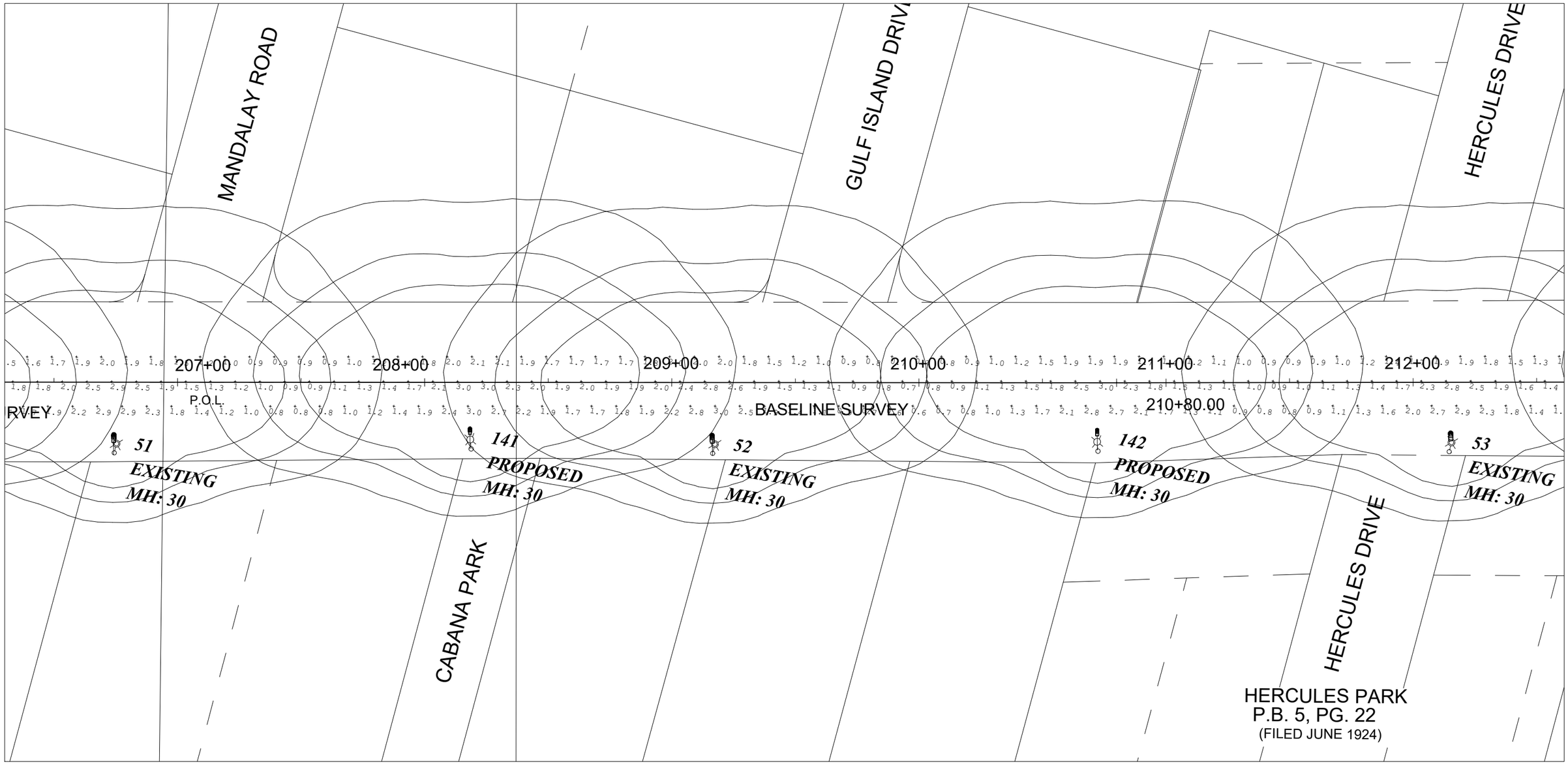
TEAM
ENGINEERING

PHOTOMETRIC STUDY
FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
199+98.62 TO 206+29.78

SHEET NUMBER
17
17 OF 54



Calculation Summary								
Label	**CalcType**	**Description**	**Units**	**Avg**	**Max**	**Min**	**Avg/Min**	**Max/Min**
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule									
Symbol	**Qty**	**Label**	**Arrangement**	**LLF**	**Description**	**Lum. Lumens**	**Arm**	**Lum. Watts**	**Total Watts**
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
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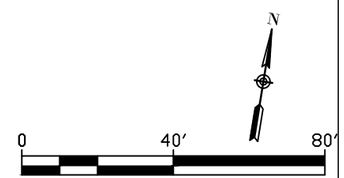


NO.	DATE	REVISION

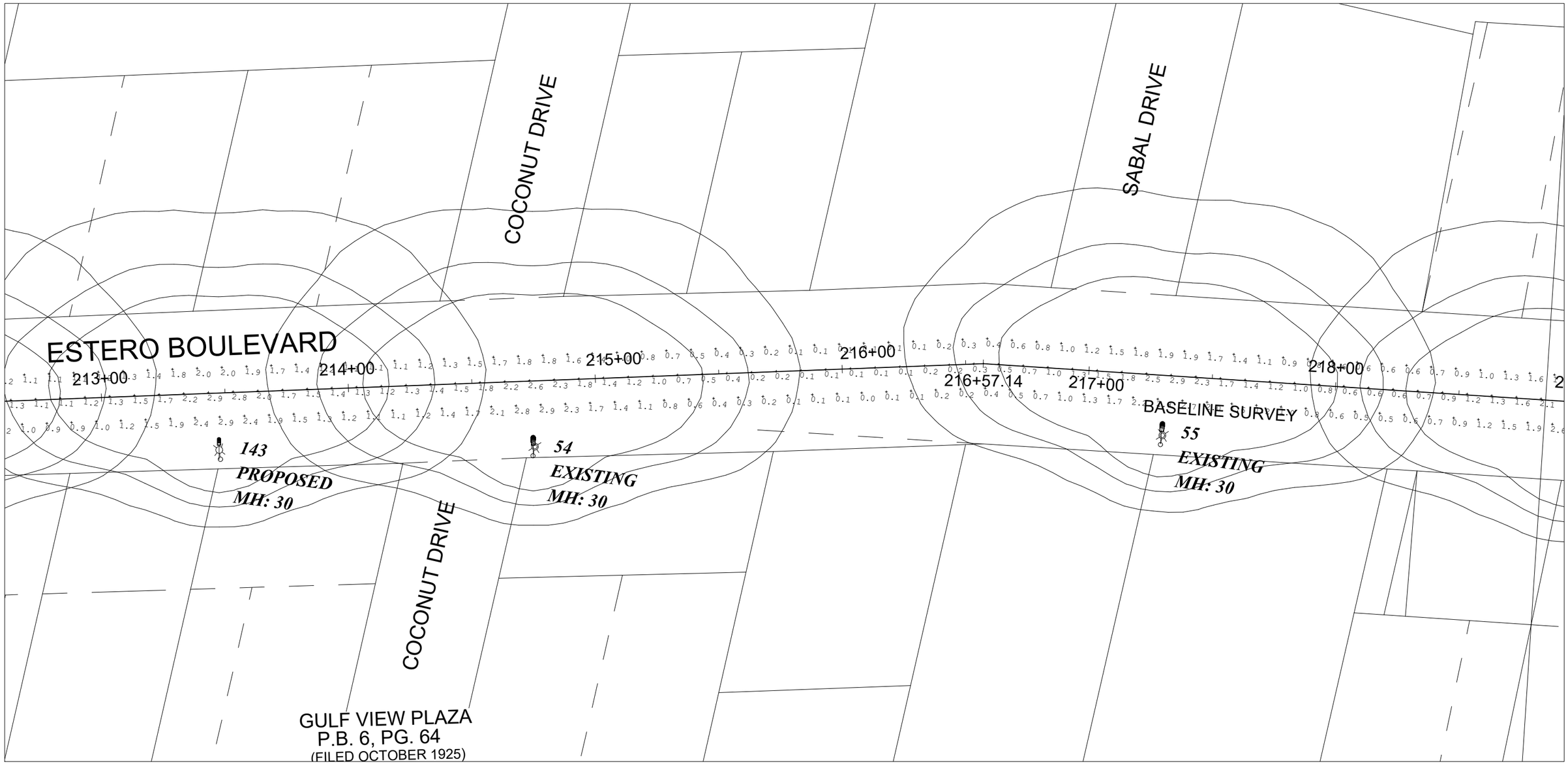
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
206+29.78 TO 212+60.95

SHEET NUMBER
18
18 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
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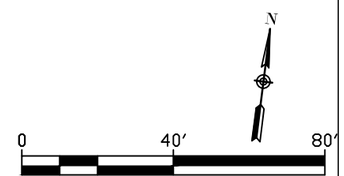


NO.	DATE	REVISION

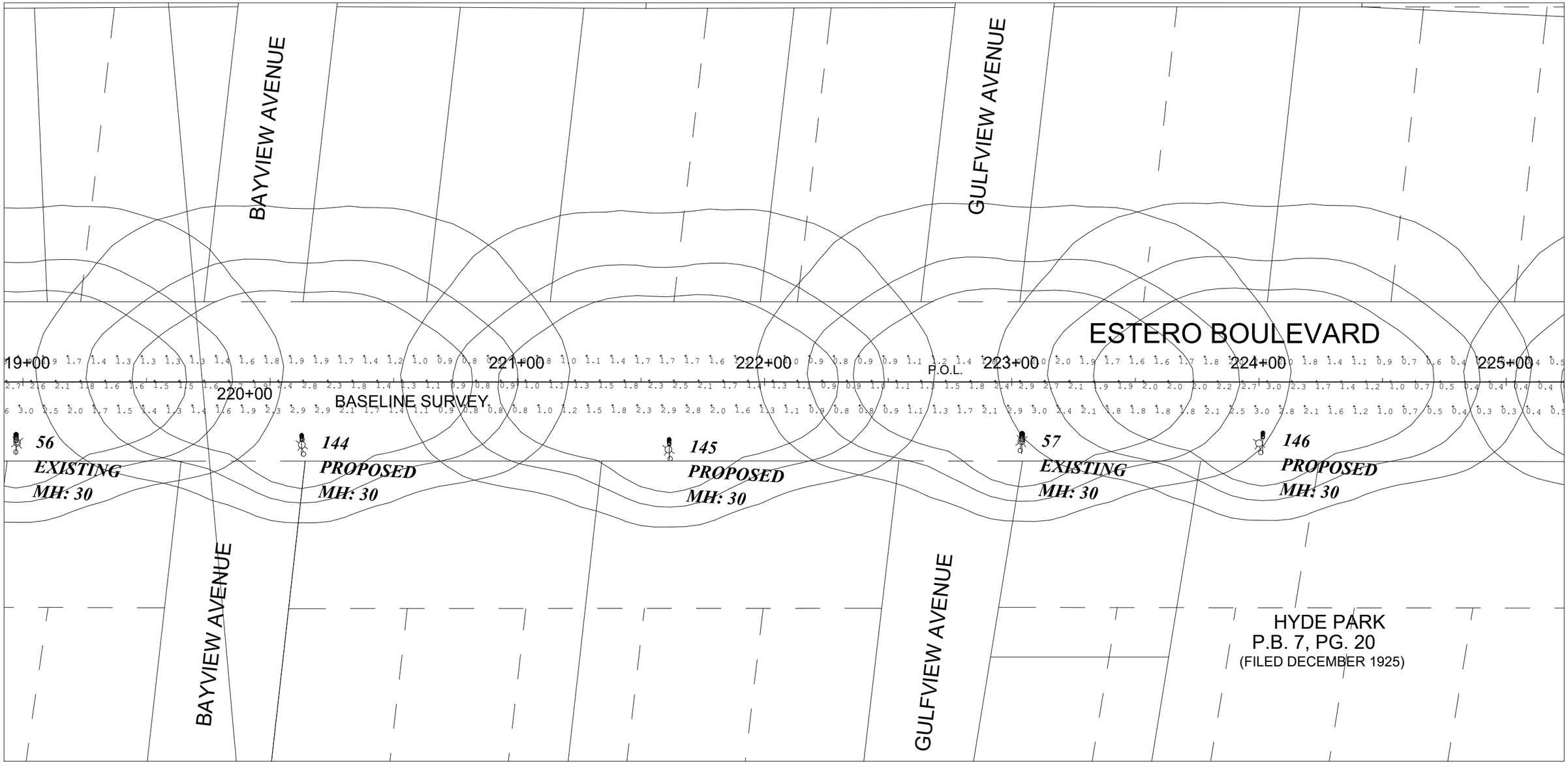
TEAM ENGINEERING

PHOTOMETRIC STUDY
FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
212+60.95 TO 218+92.11

SHEET NUMBER
19
19 OF 54



Calculation Summary								
Label	**CalcType**	**Description**	**Units**	**Avg**	**Max**	**Min**	**Avg/Min**	**Max/Min**
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule									
Symbol	**Qty**	**Label**	**Arrangement**	**LLF**	**Description**	**Lum. Lumens**	**Arm**	**Lum. Watts**	**Total Watts**
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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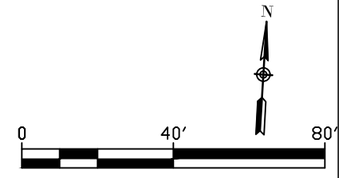


NO.	DATE	REVISION

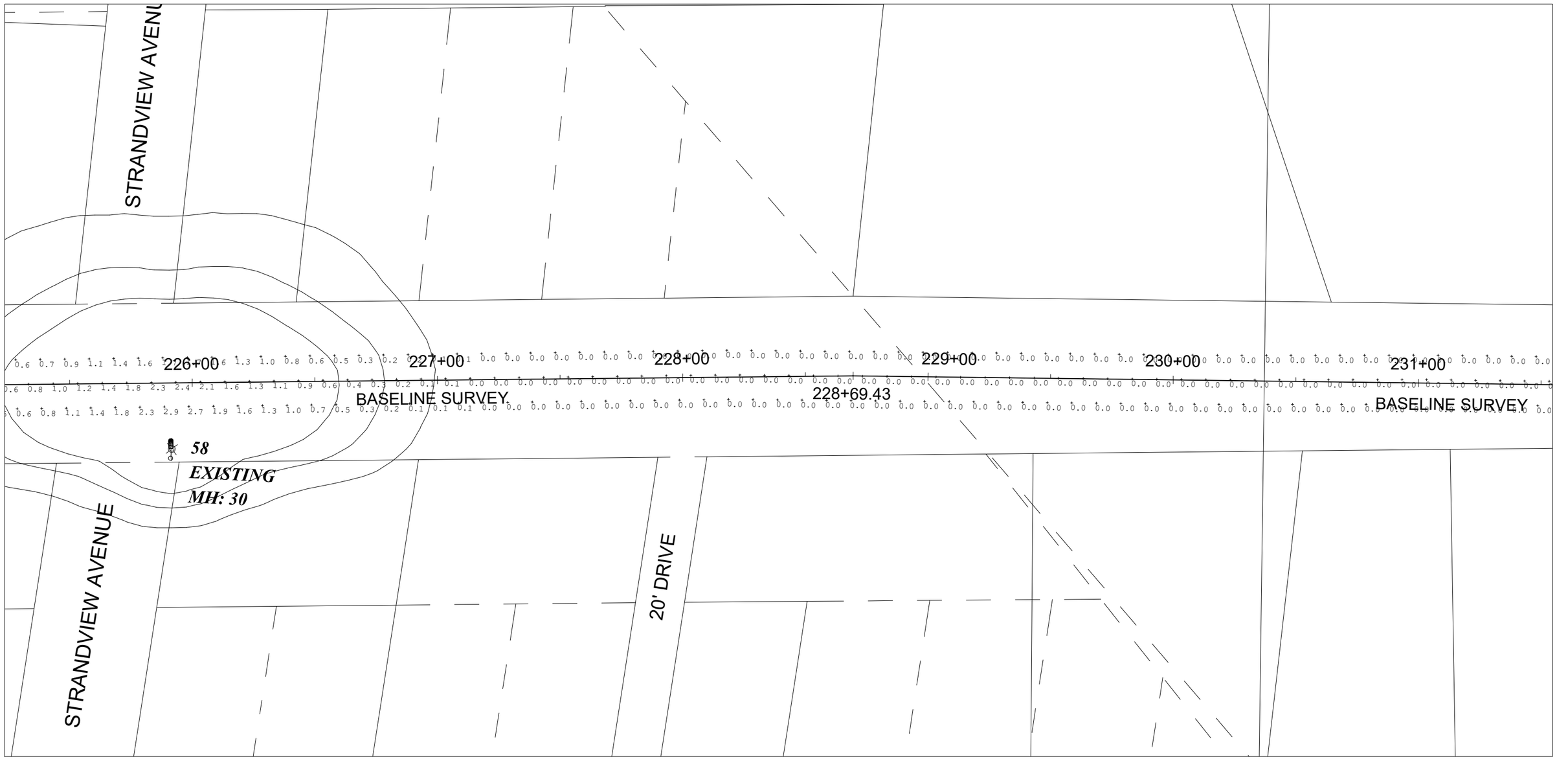
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
218+92.11 TO 225+23.27

SHEET NUMBER
20
20 OF 54



Calculation Summary								
Label	**CalcType**	**Description**	**Units**	**Avg**	**Max**	**Min**	**Avg/Min**	**Max/Min**
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule									
Symbol	**Qty**	**Label**	**Arrangement**	**LLF**	**Description**	**Lum. Lumens**	**Arm**	**Lum. Watts**	**Total Watts**
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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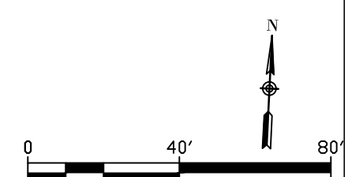


NO.	DATE	REVISION

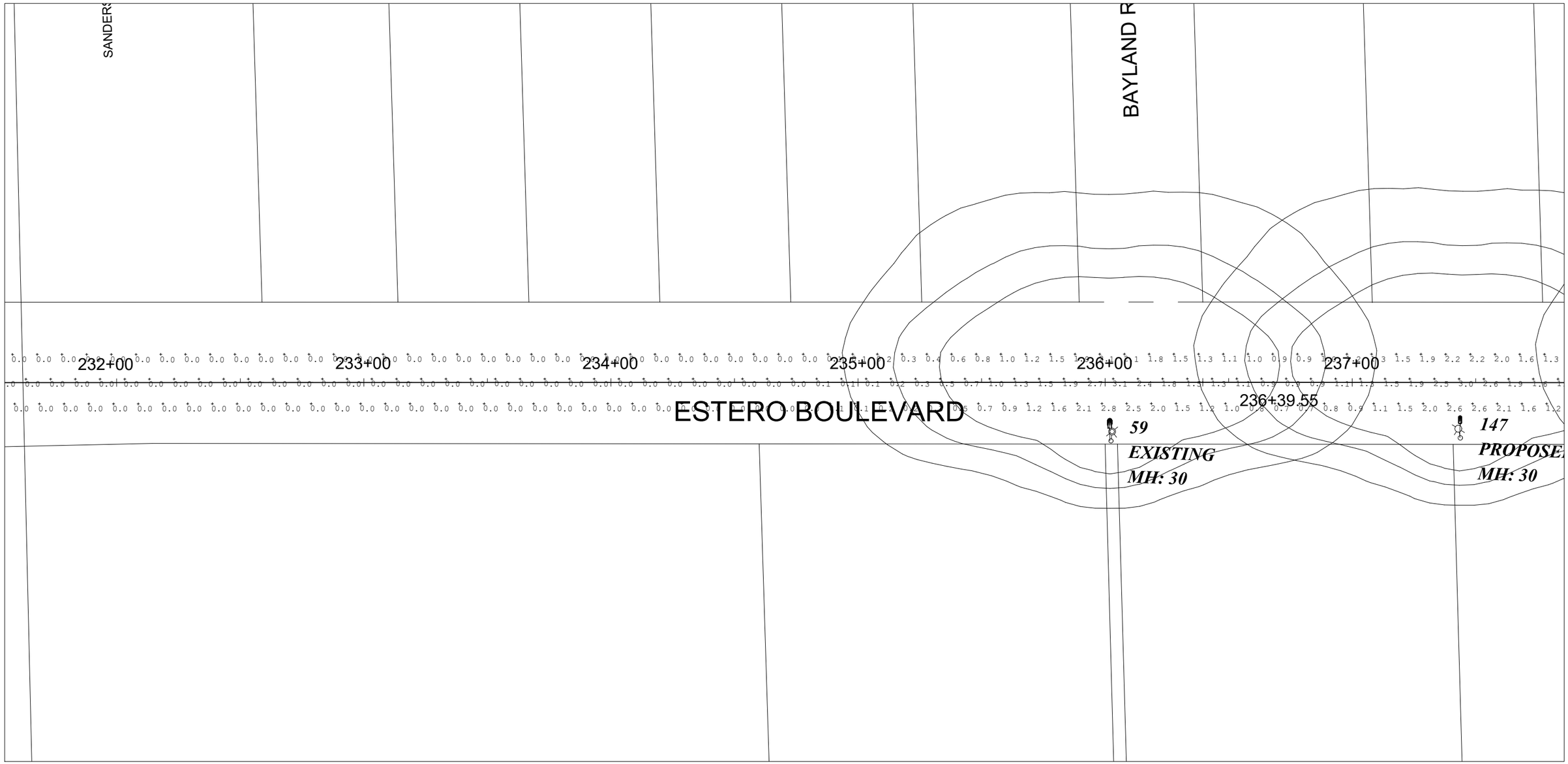
TEAM ENGINEERING

PHOTOMETRIC STUDY
FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
225+23.27 TO 231+54.44

SHEET NUMBER
21
21 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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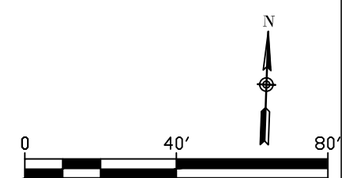


NO.	DATE	REVISION

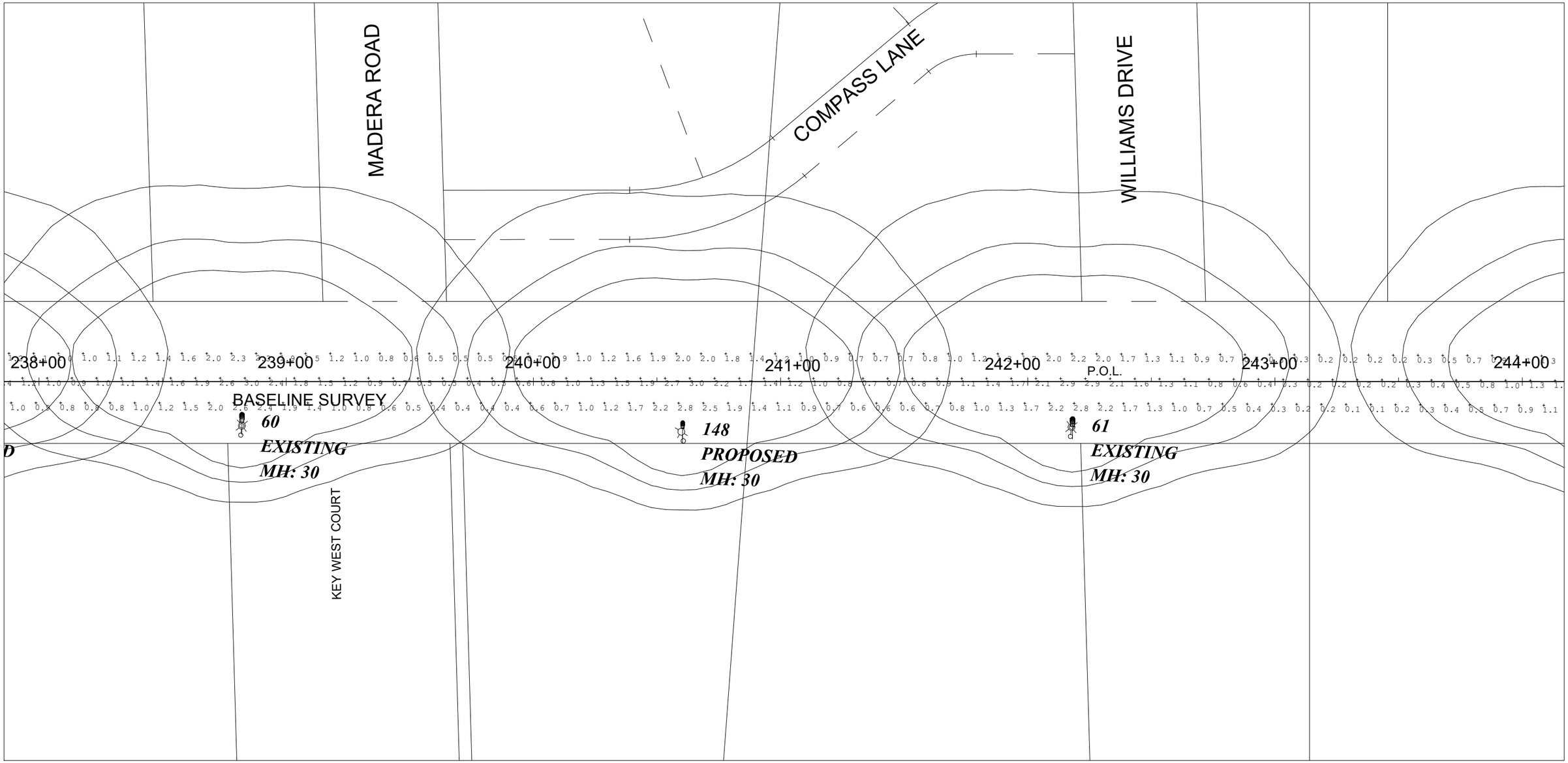
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
231+54.44 TO 237+85.60

SHEET NUMBER
22
22 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
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TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
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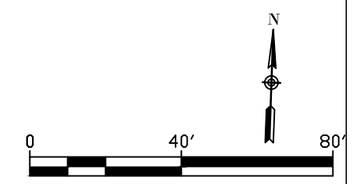


NO.	DATE	REVISION

TEAM
ENGINEERING

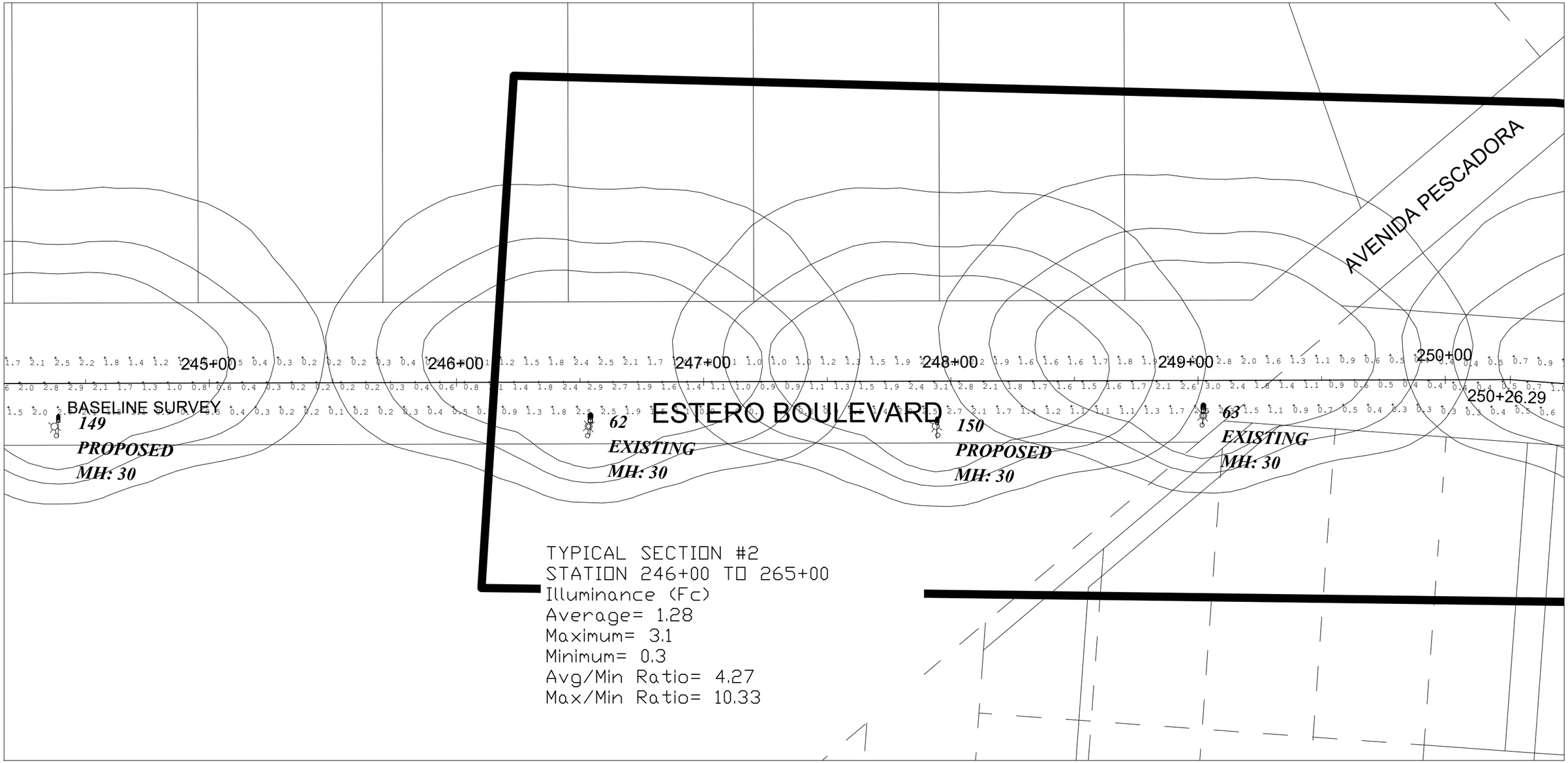
PHOTOMETRIC STUDY
FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:

DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
237+85.60 TO 244+16.77

SHEET NUMBER
23
23 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
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TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
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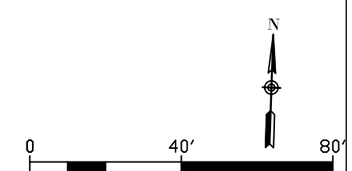


NO.	DATE	REVISION

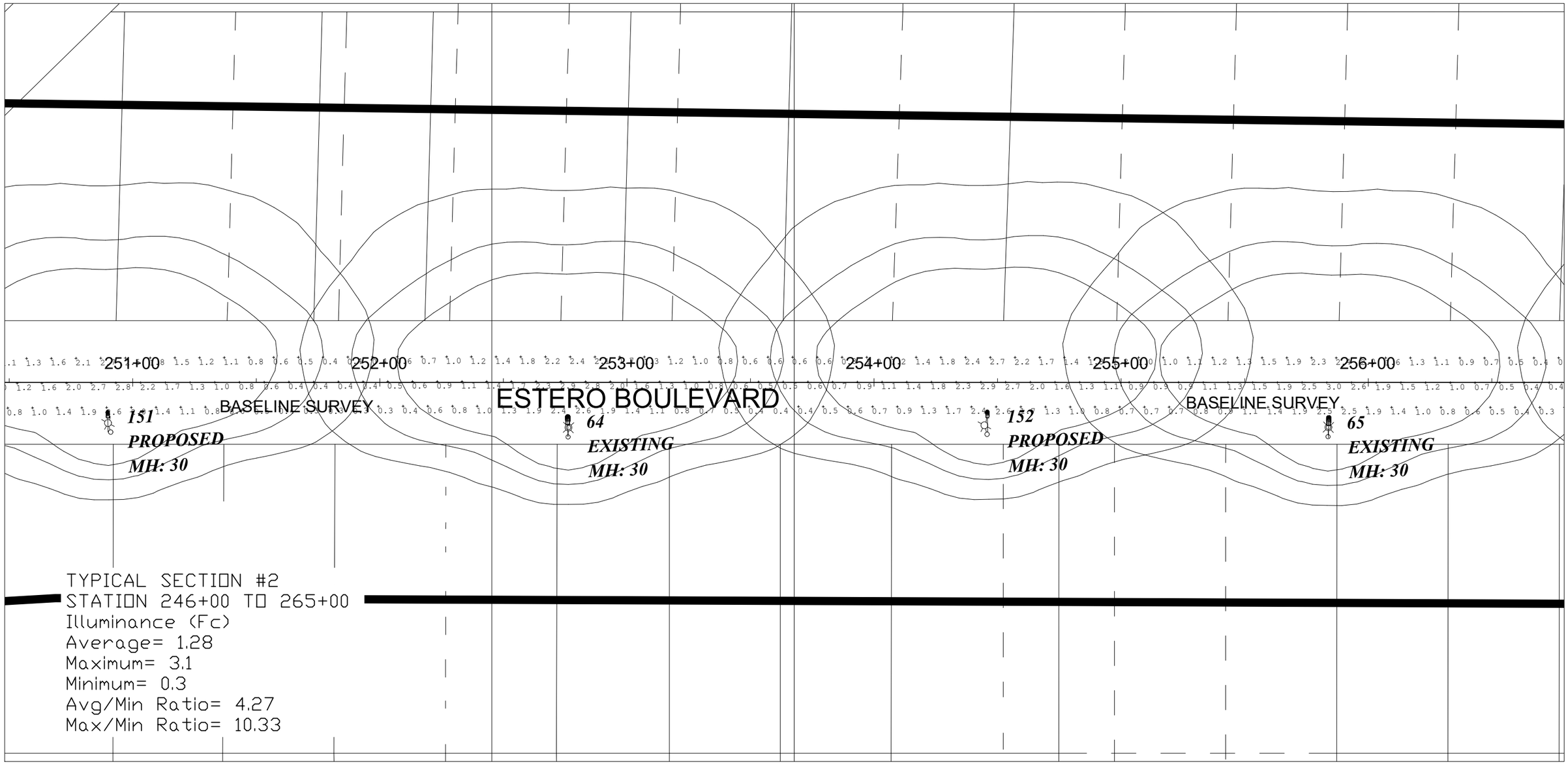
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
244+16.77 TO 250+47.93

SHEET NUMBER
24
24 OF 54



Calculation Summary								
Label	**CalcType**	**Description**	**Units**	**Avg**	**Max**	**Min**	**Avg/Min**	**Max/Min**
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule									
Symbol	**Qty**	**Label**	**Arrangement**	**LLF**	**Description**	**Lum. Lumens**	**Arm**	**Lum. Watts**	**Total Watts**
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	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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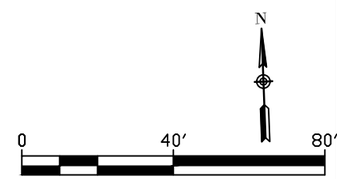


NO.	DATE	REVISION

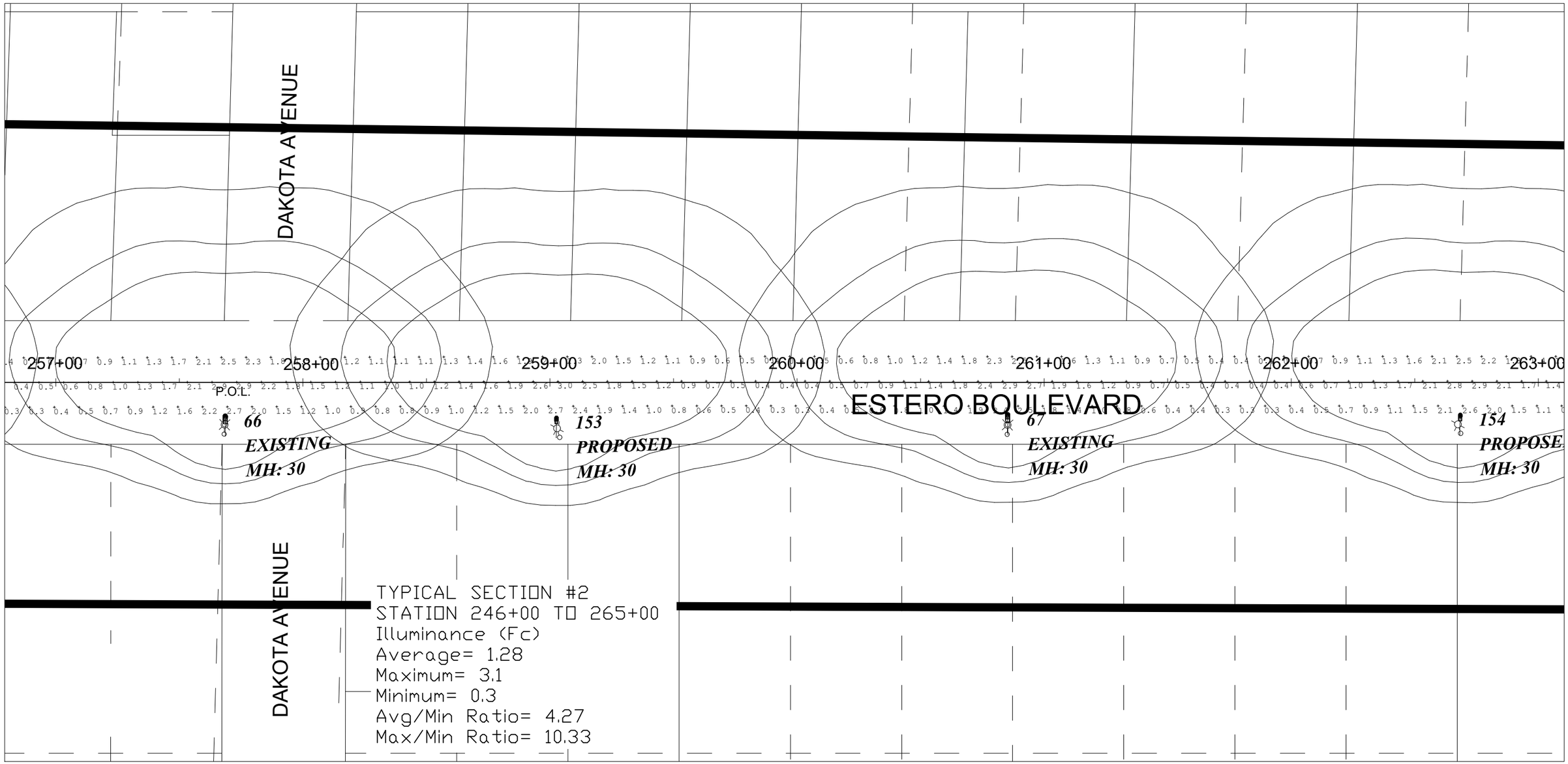
TEAM ENGINEERING

PHOTOMETRIC STUDY
FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
250+47.93 TO 256+79.09

SHEET NUMBER
25
25 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
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Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
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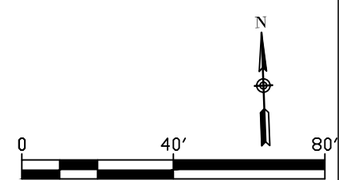


NO.	DATE	REVISION

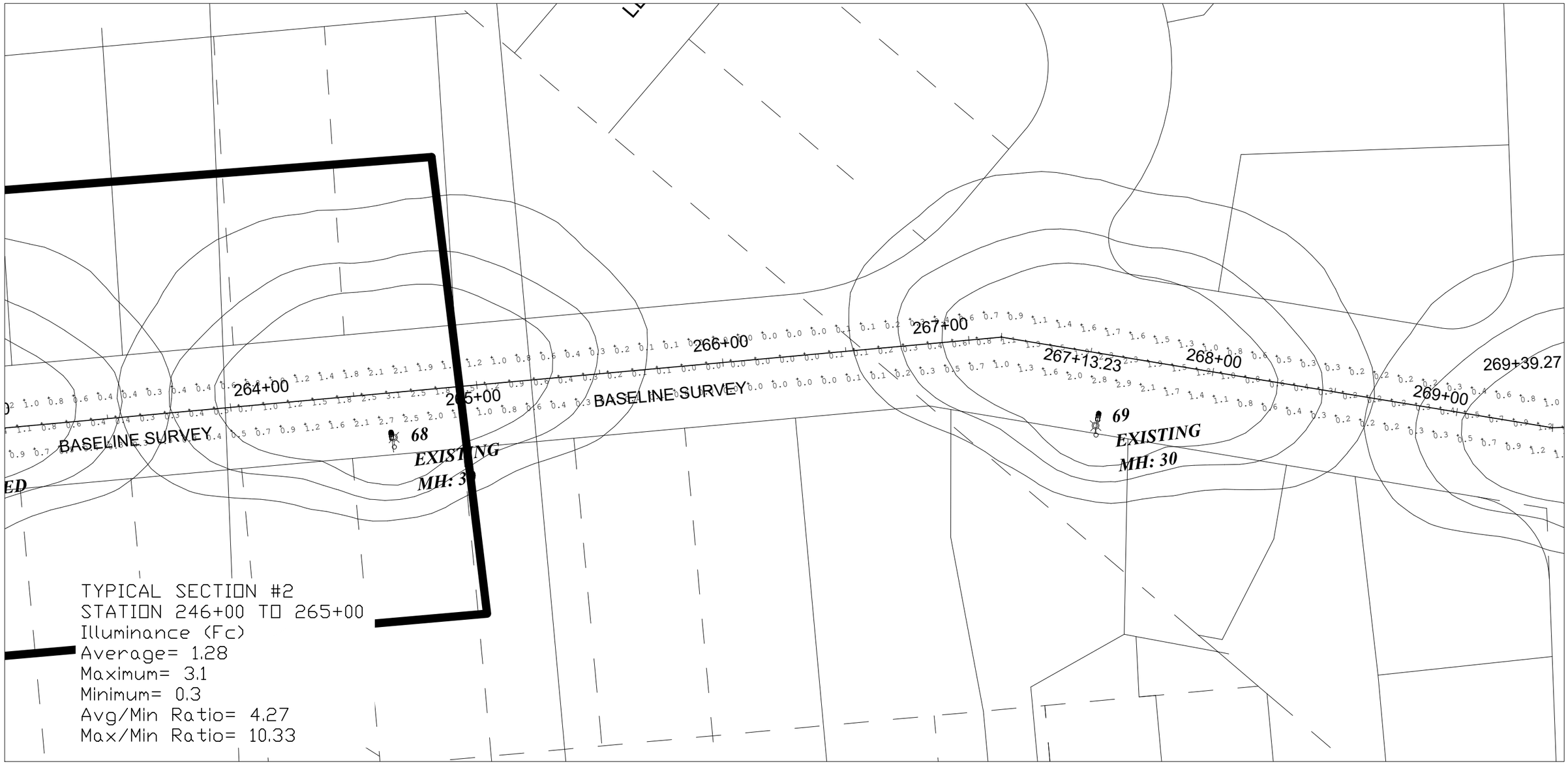
TEAM ENGINEERING

PHOTOMETRIC STUDY
FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
256+79.09 TO 263+10.26

SHEET NUMBER
26
26 OF



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
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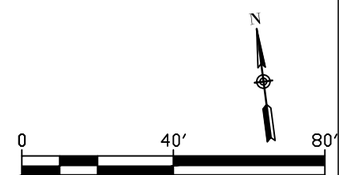


NO.	DATE	REVISION

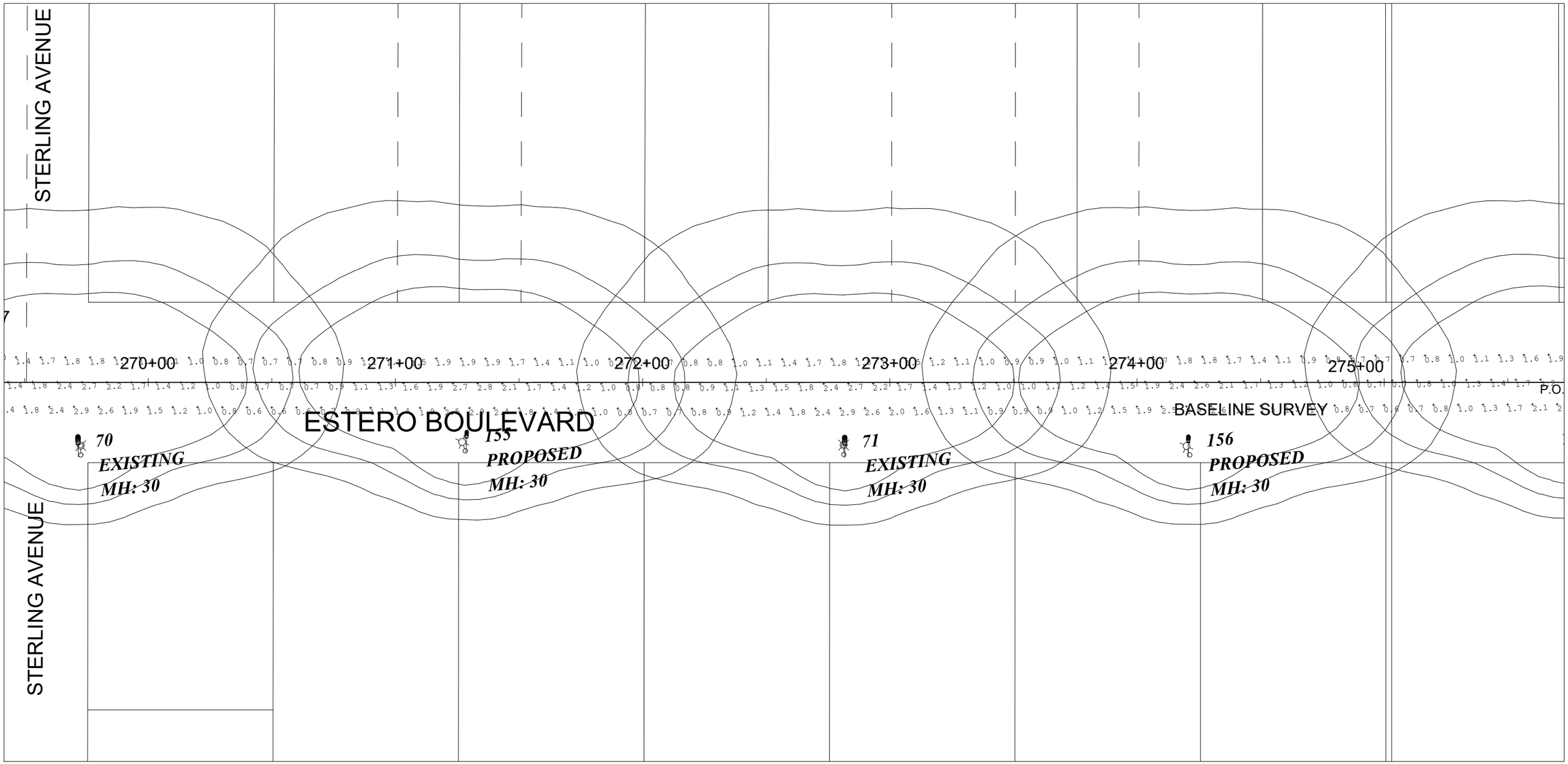
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
263+10.26 TO 269+41.42

SHEET NUMBER
27
27 OF 54



Calculation Summary

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ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
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	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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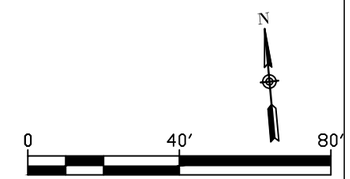


NO.	DATE	REVISION

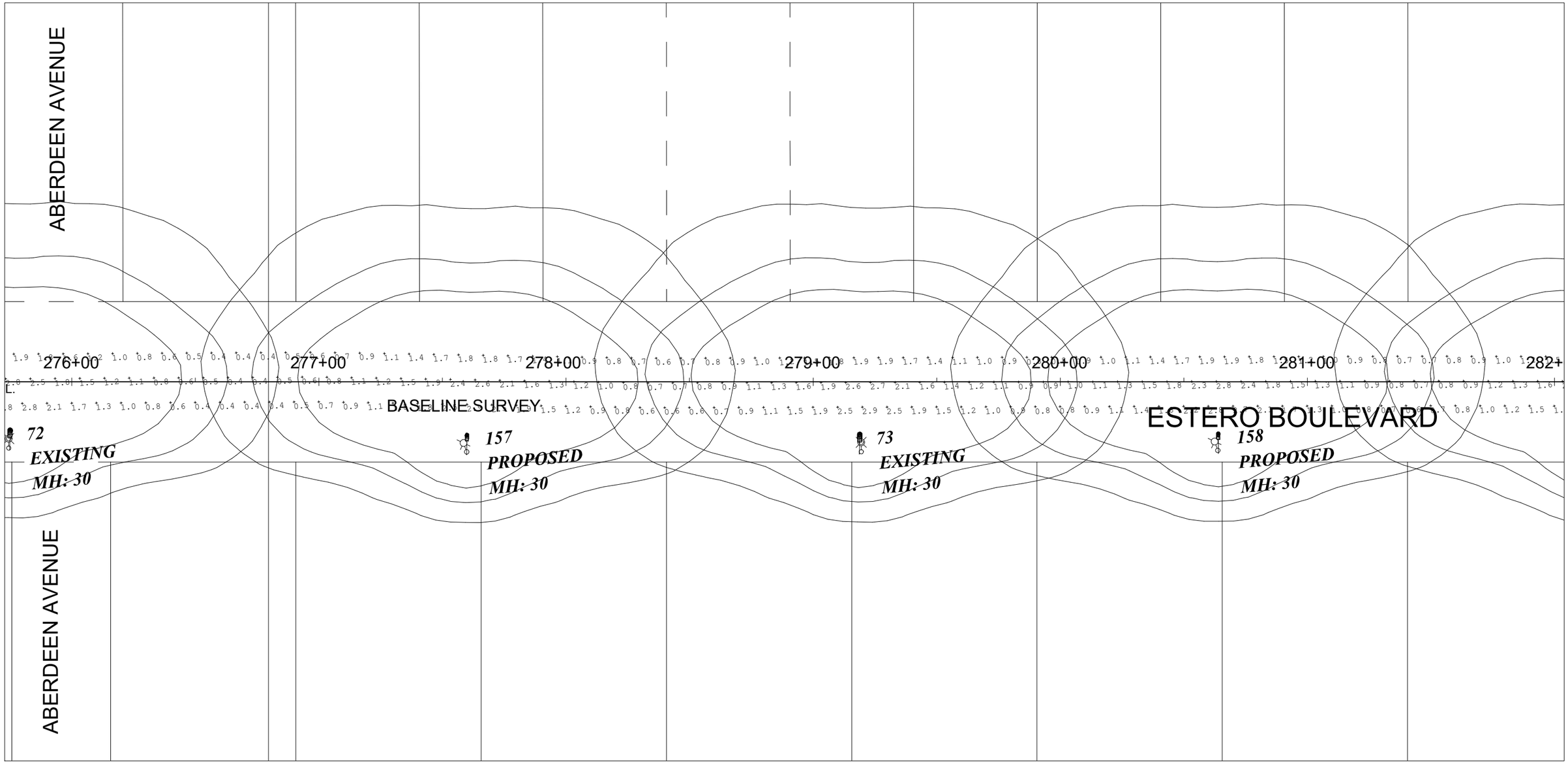
TEAM ENGINEERING

PHOTOMETRIC STUDY
FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
269+41.42 TO 275+72.58

SHEET NUMBER
28
28 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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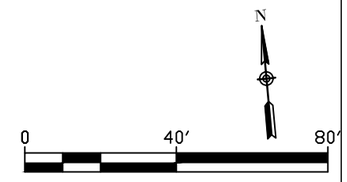


NO.	DATE	REVISION

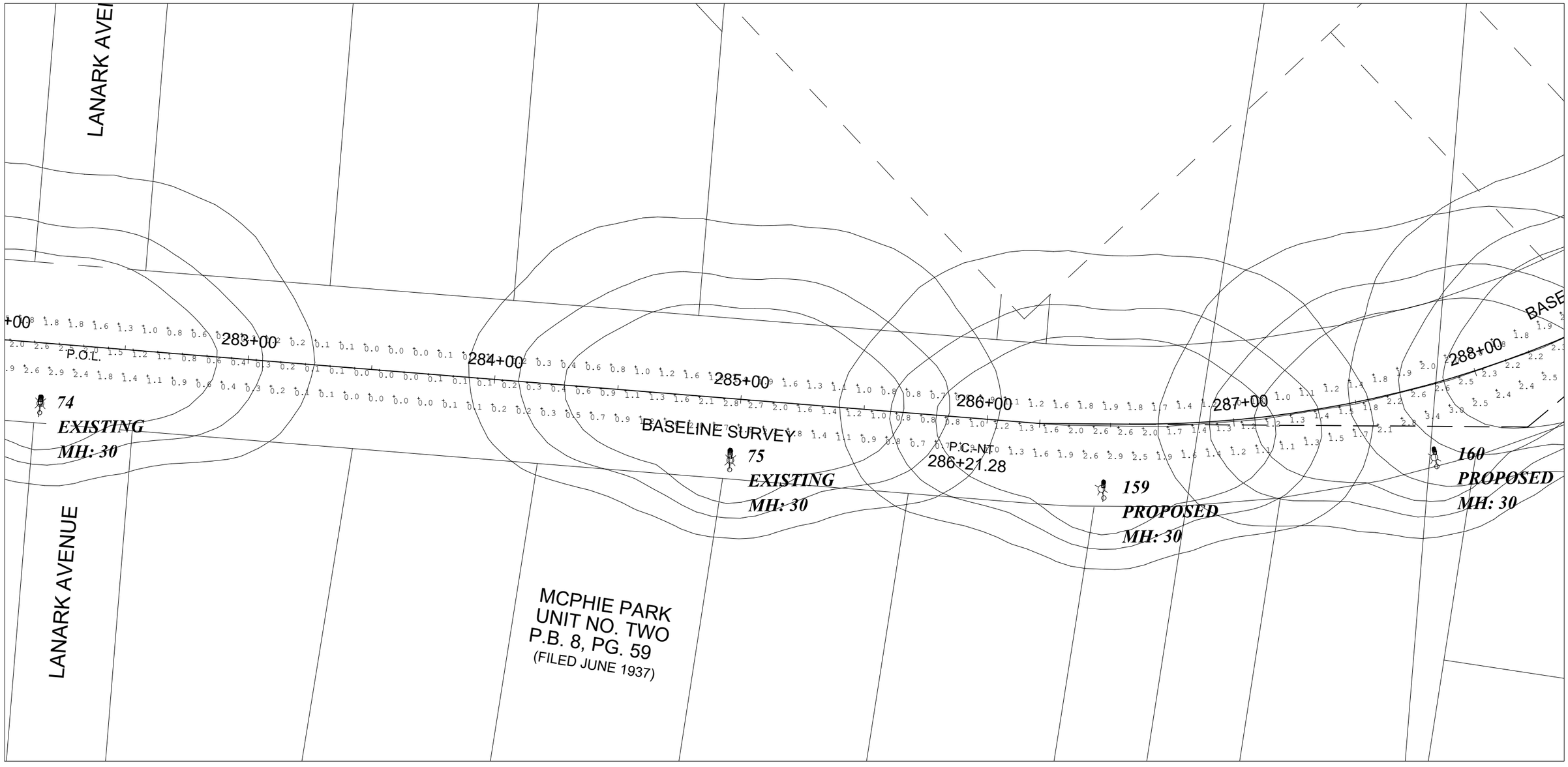
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
275+72.58 TO 282+03.75

SHEET NUMBER
29
29 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
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TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
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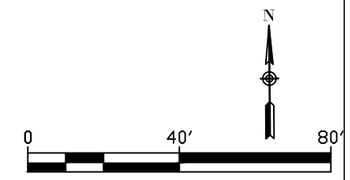


NO.	DATE	REVISION

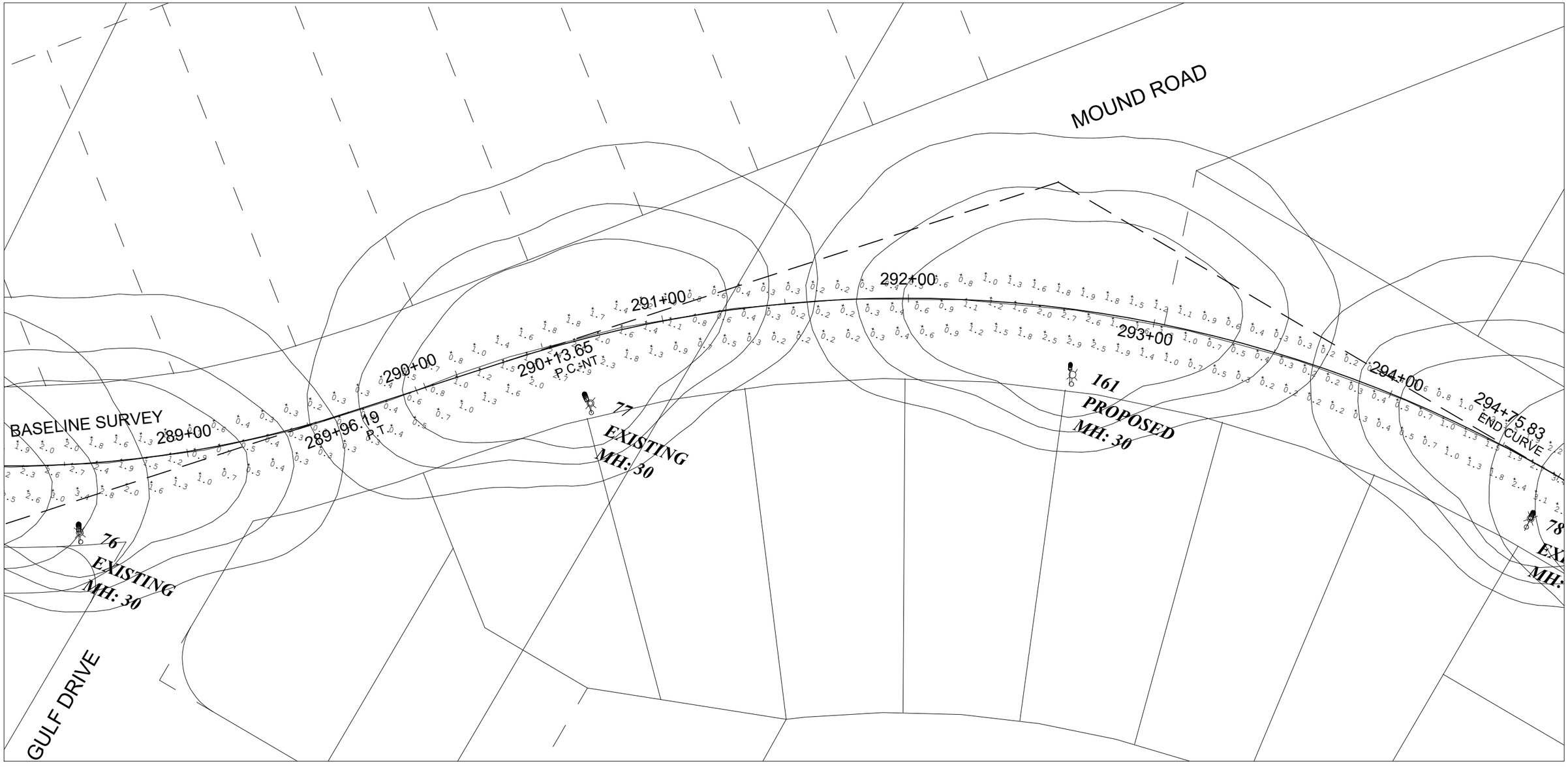
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
282+03.75 TO 288+34.91

SHEET NUMBER
30
30 OF 54



Calculation Summary								
Label	**CalcType**	**Description**	**Units**	**Avg**	**Max**	**Min**	**Avg/Min**	**Max/Min**
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
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Luminaire Schedule									
Symbol	**Qty**	**Label**	**Arrangement**	**LLF**	**Description**	**Lum. Lumens**	**Arm**	**Lum. Watts**	**Total Watts**
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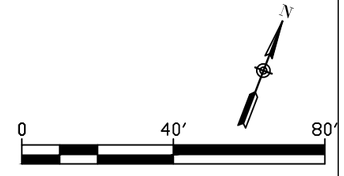


NO.	DATE	REVISION

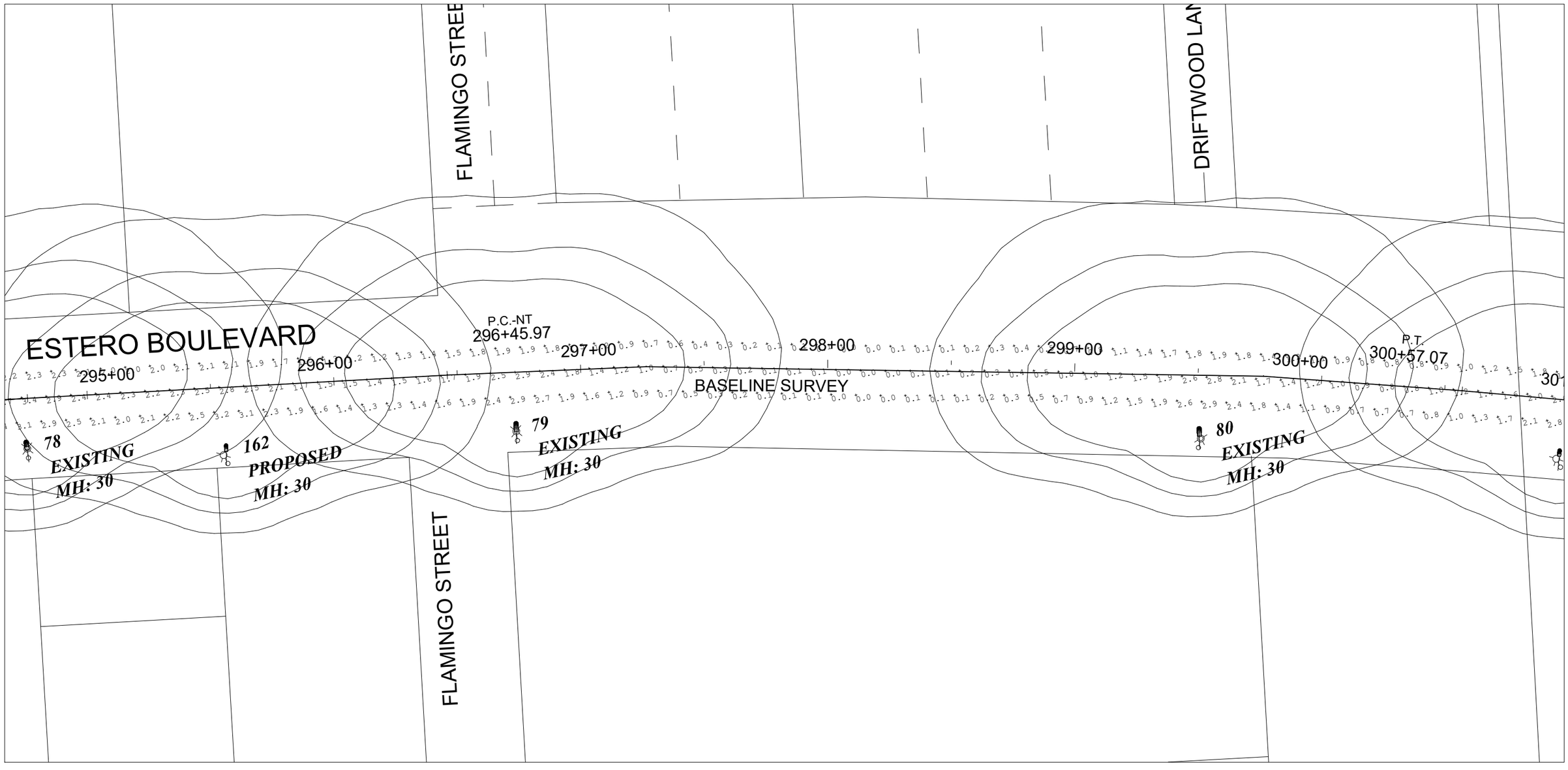
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
288+34.91 TO 294+66.07

SHEET NUMBER
31
31 OF 54



Calculation Summary								
Label	**CalcType**	**Description**	**Units**	**Avg**	**Max**	**Min**	**Avg/Min**	**Max/Min**
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
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Luminaire Schedule									
Symbol	**Qty**	**Label**	**Arrangement**	**LLF**	**Description**	**Lum. Lumens**	**Arm**	**Lum. Watts**	**Total Watts**
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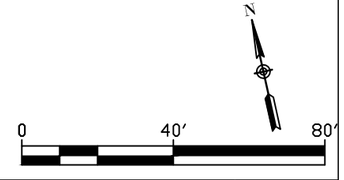


NO.	DATE	REVISION

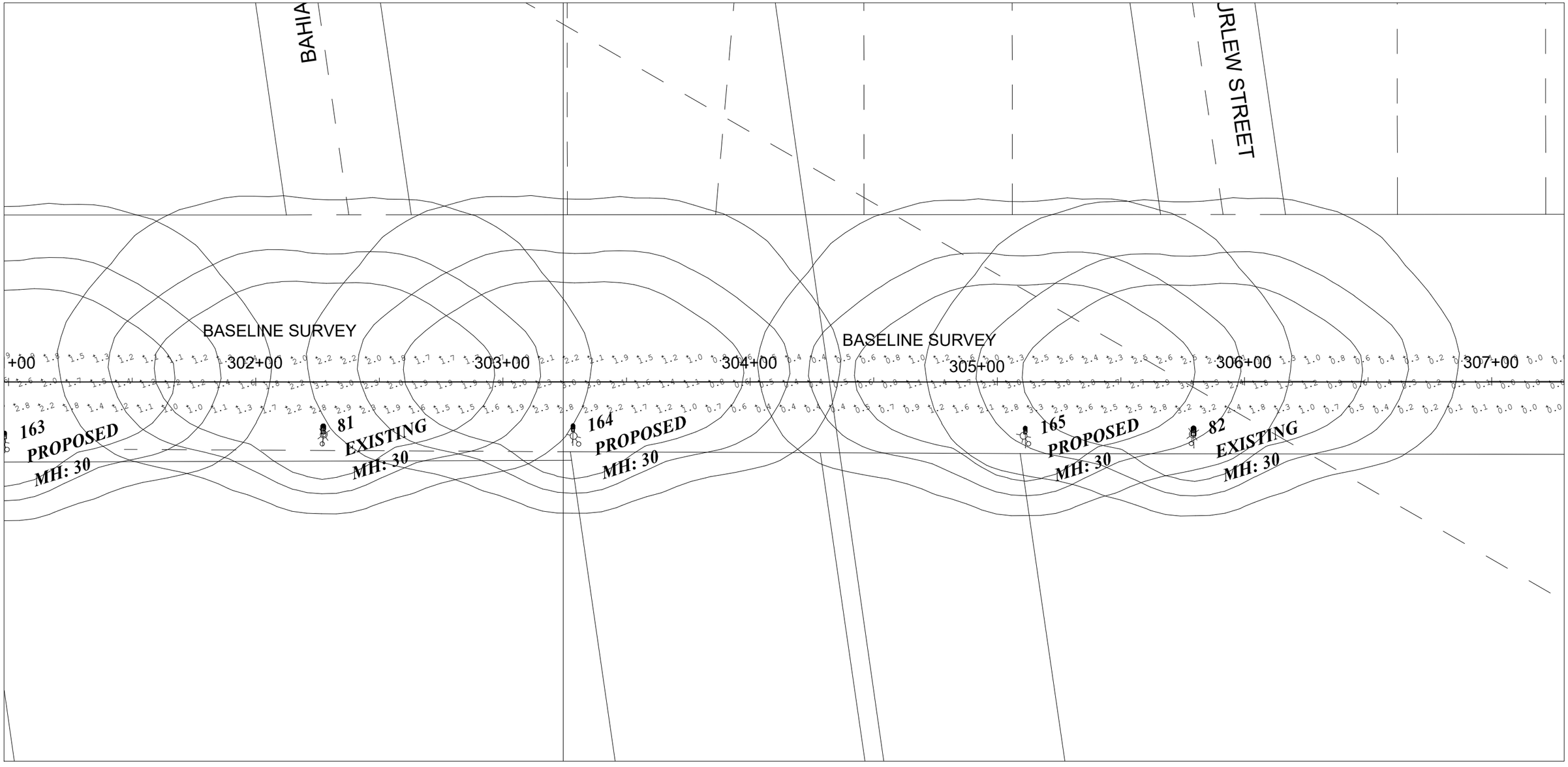
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
294+66.07 TO 300+97.24

SHEET NUMBER
32
32 OF 54



Calculation Summary								
Label	**CalcType**	**Description**	**Units**	**Avg**	**Max**	**Min**	**Avg/Min**	**Max/Min**
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
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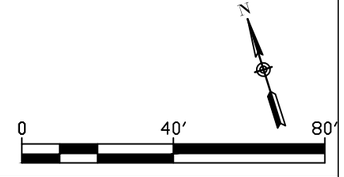


NO.	DATE	REVISION

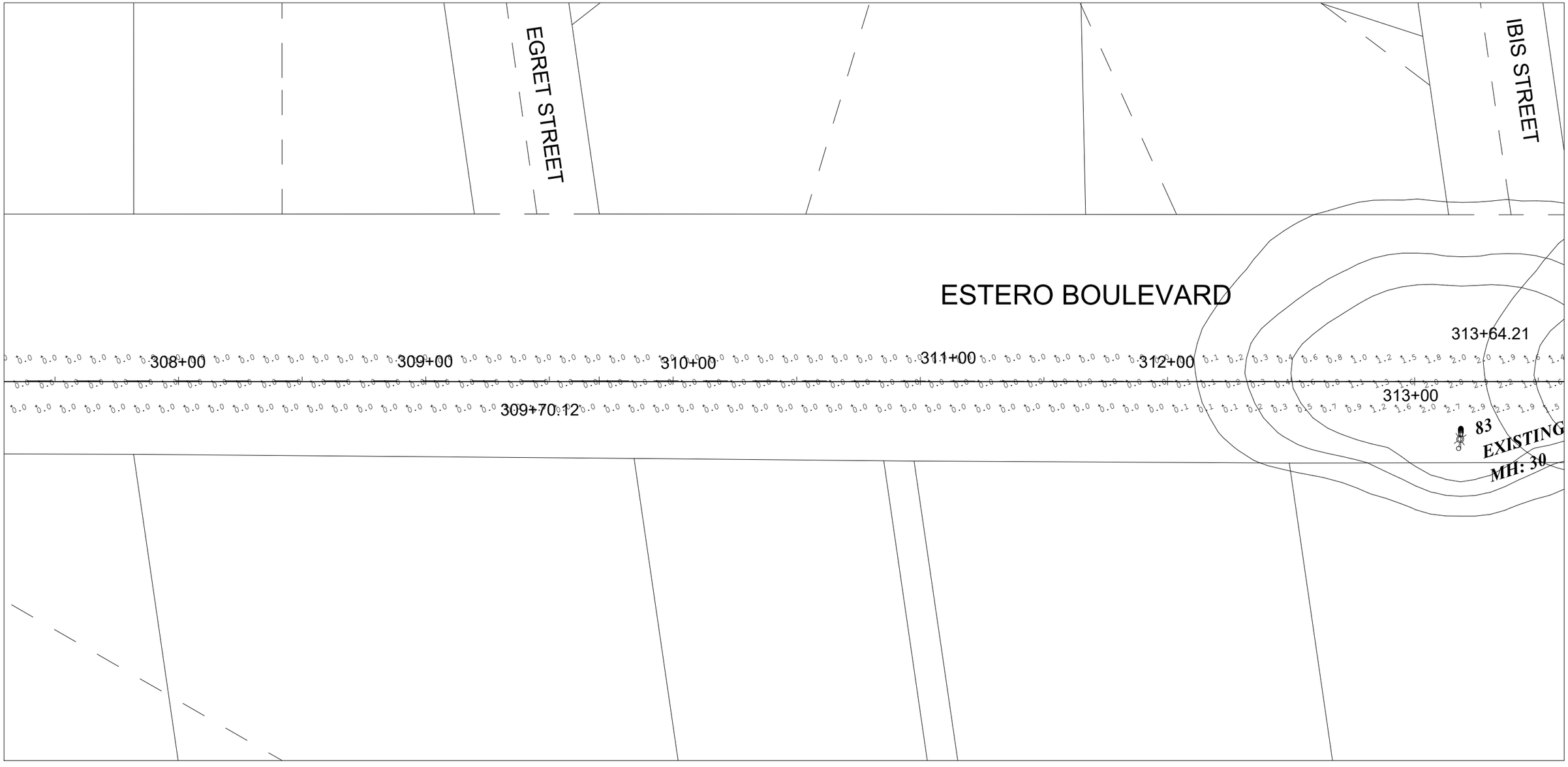
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
300+97.24 TO 307+28.40

SHEET NUMBER
33
33 OF 54



Calculation Summary								
Label	**CalcType**	**Description**	**Units**	**Avg**	**Max**	**Min**	**Avg/Min**	**Max/Min**
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
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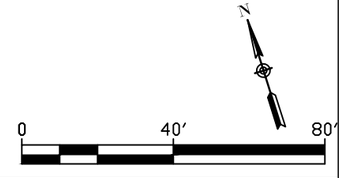


NO.	DATE	REVISION

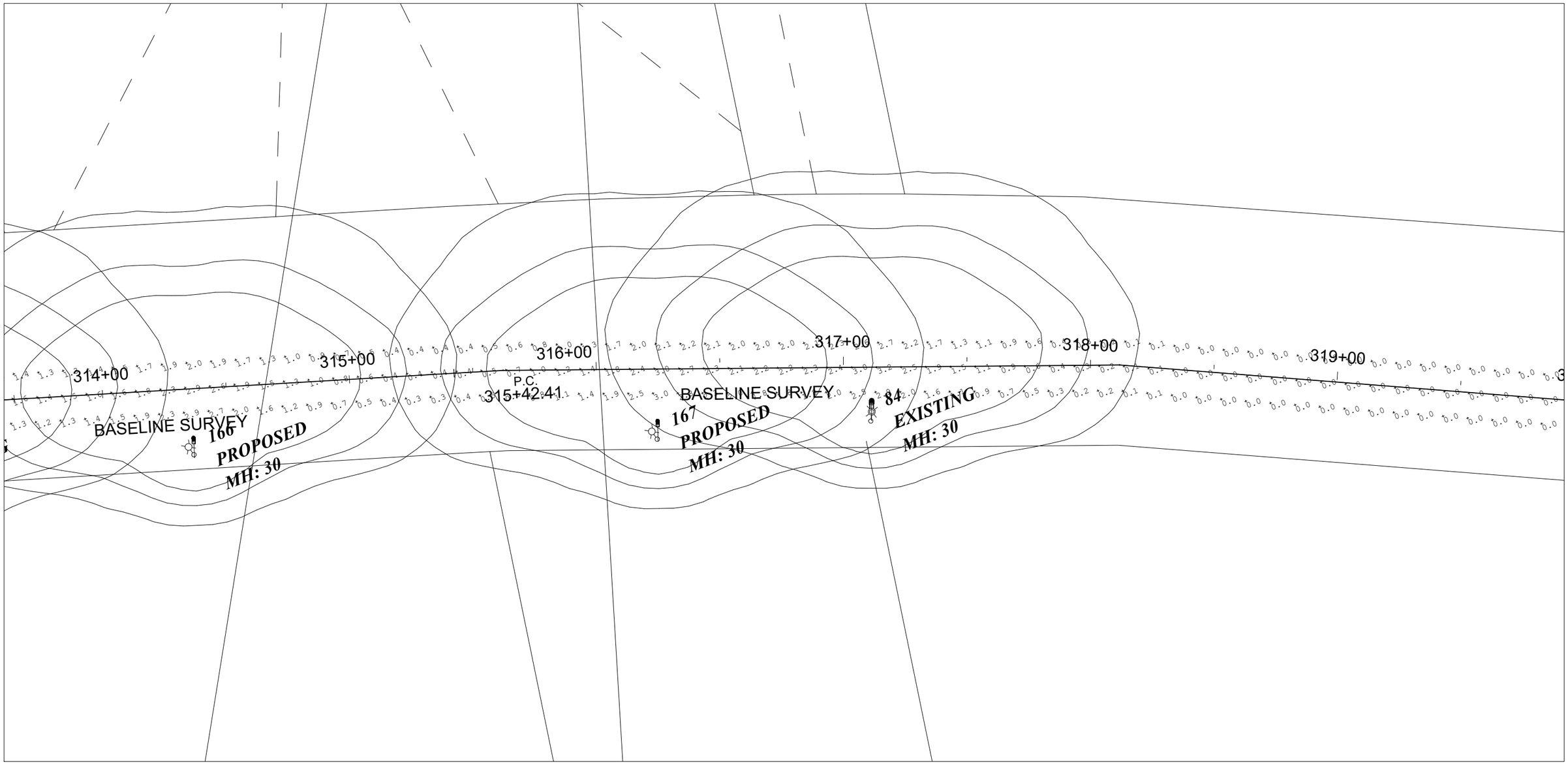
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
307+28.40 TO 313+59.57

SHEET NUMBER
34
34 OF 54



Calculation Summary								
Label	**CalcType**	**Description**	**Units**	**Avg**	**Max**	**Min**	**Avg/Min**	**Max/Min**
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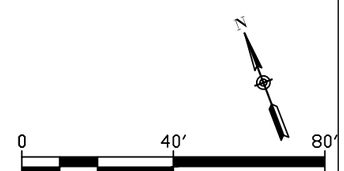


NO.	DATE	REVISION

TEAM ENGINEERING

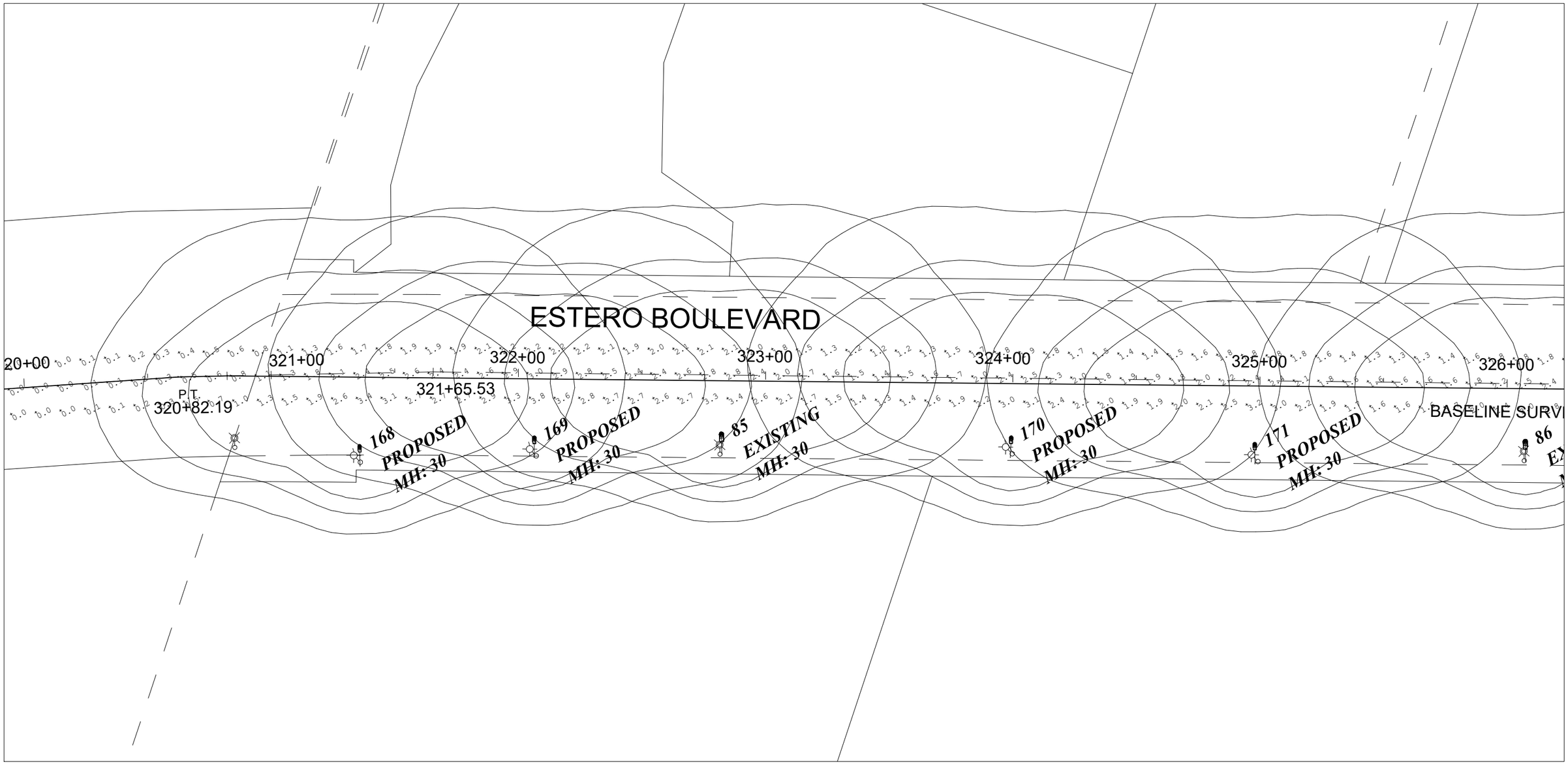
PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:

DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
313+59.57 TO 319+90.73

SHEET NUMBER
35
35 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
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Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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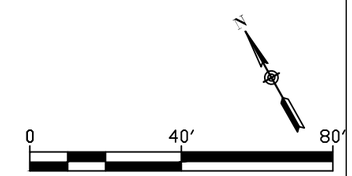


NO.	DATE	REVISION

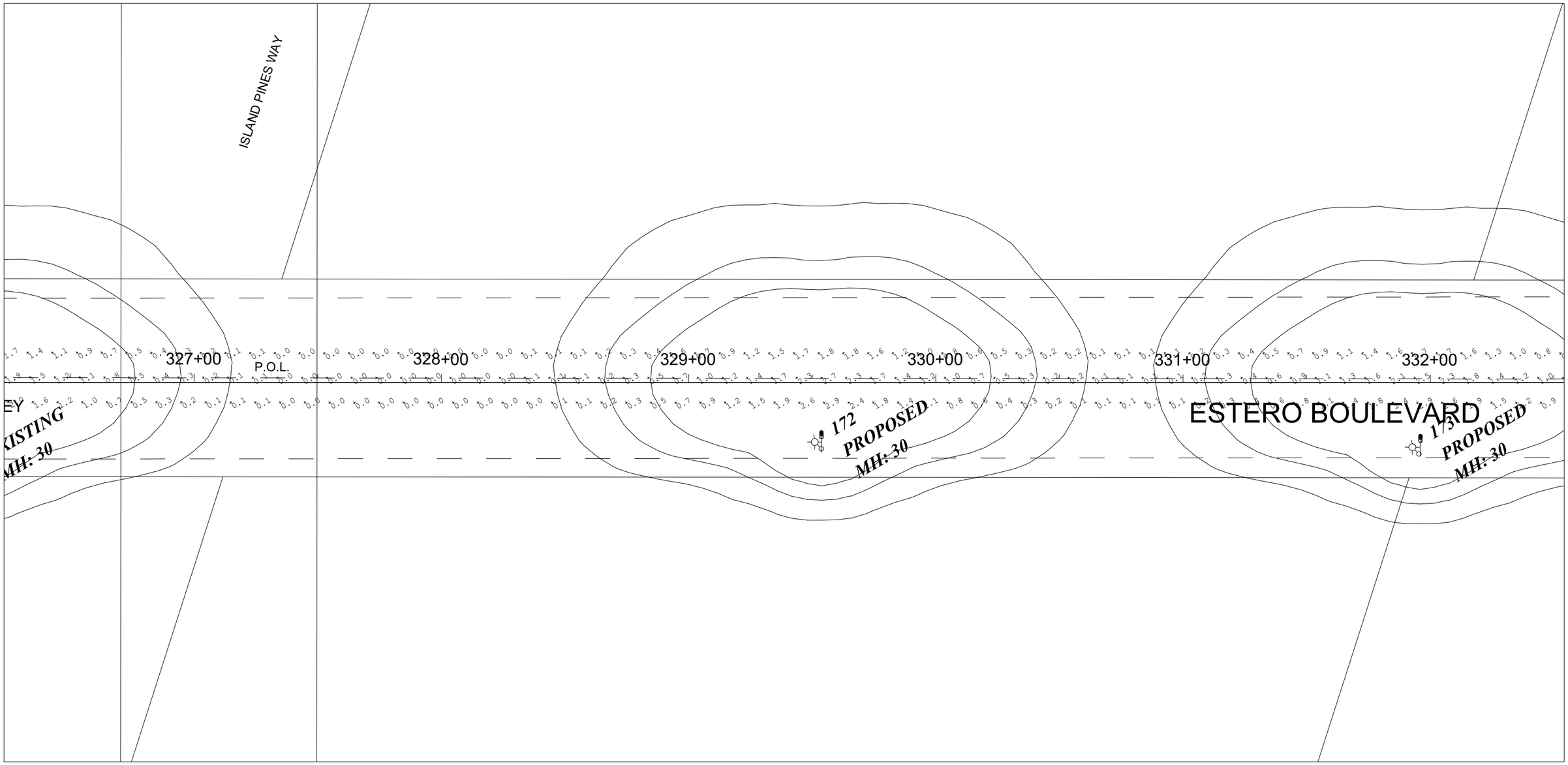
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
319+90.73 TO 326+21.89

SHEET NUMBER
36
36 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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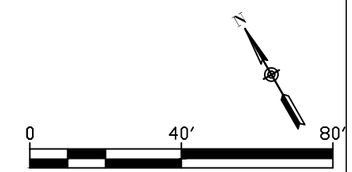


NO.	DATE	REVISION

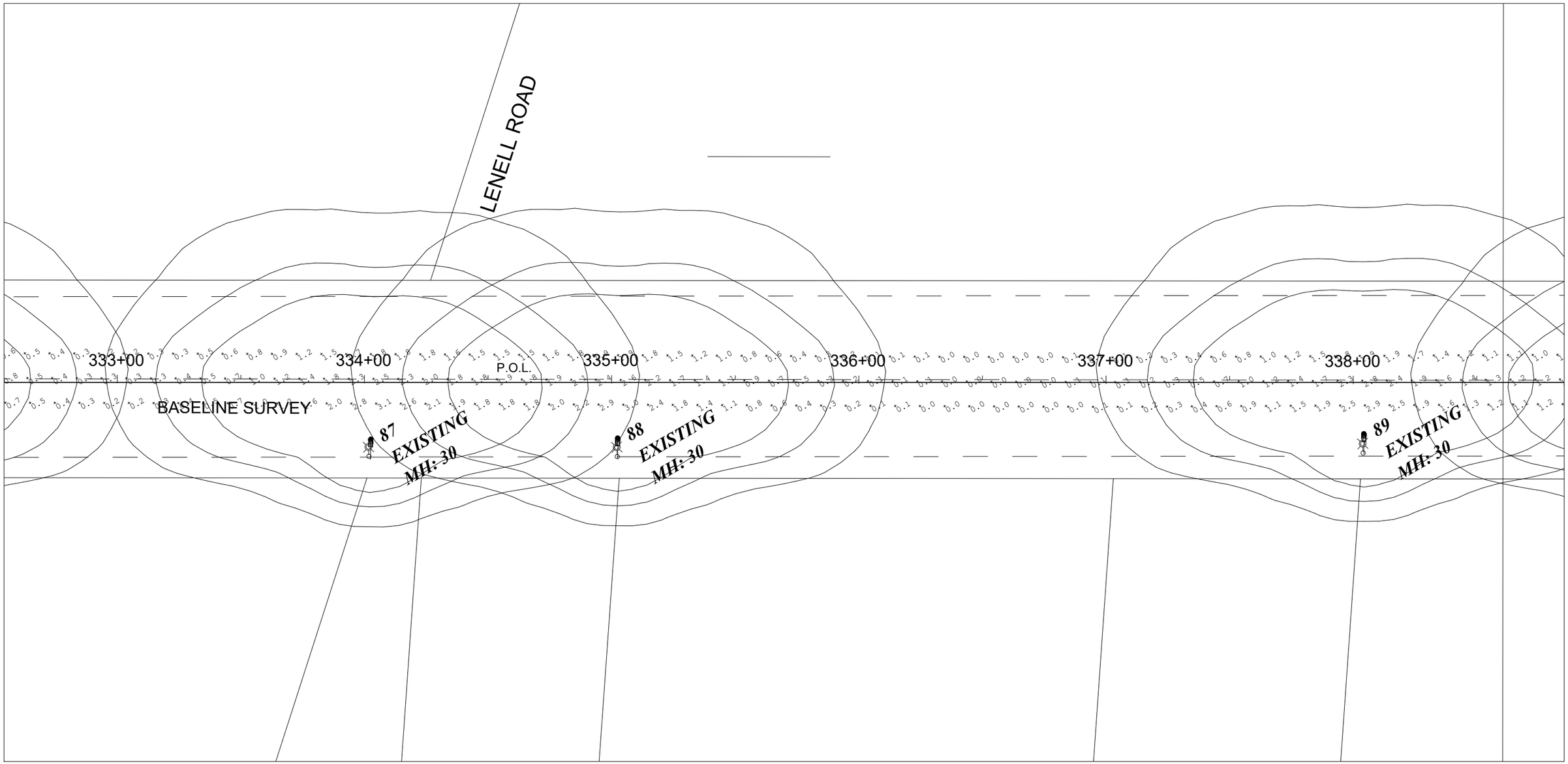
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
326+21.89 TO 332+53.06

SHEET NUMBER
37
37 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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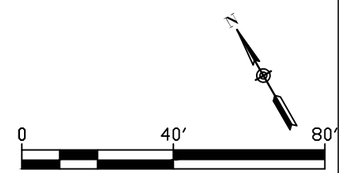


NO.	DATE	REVISION

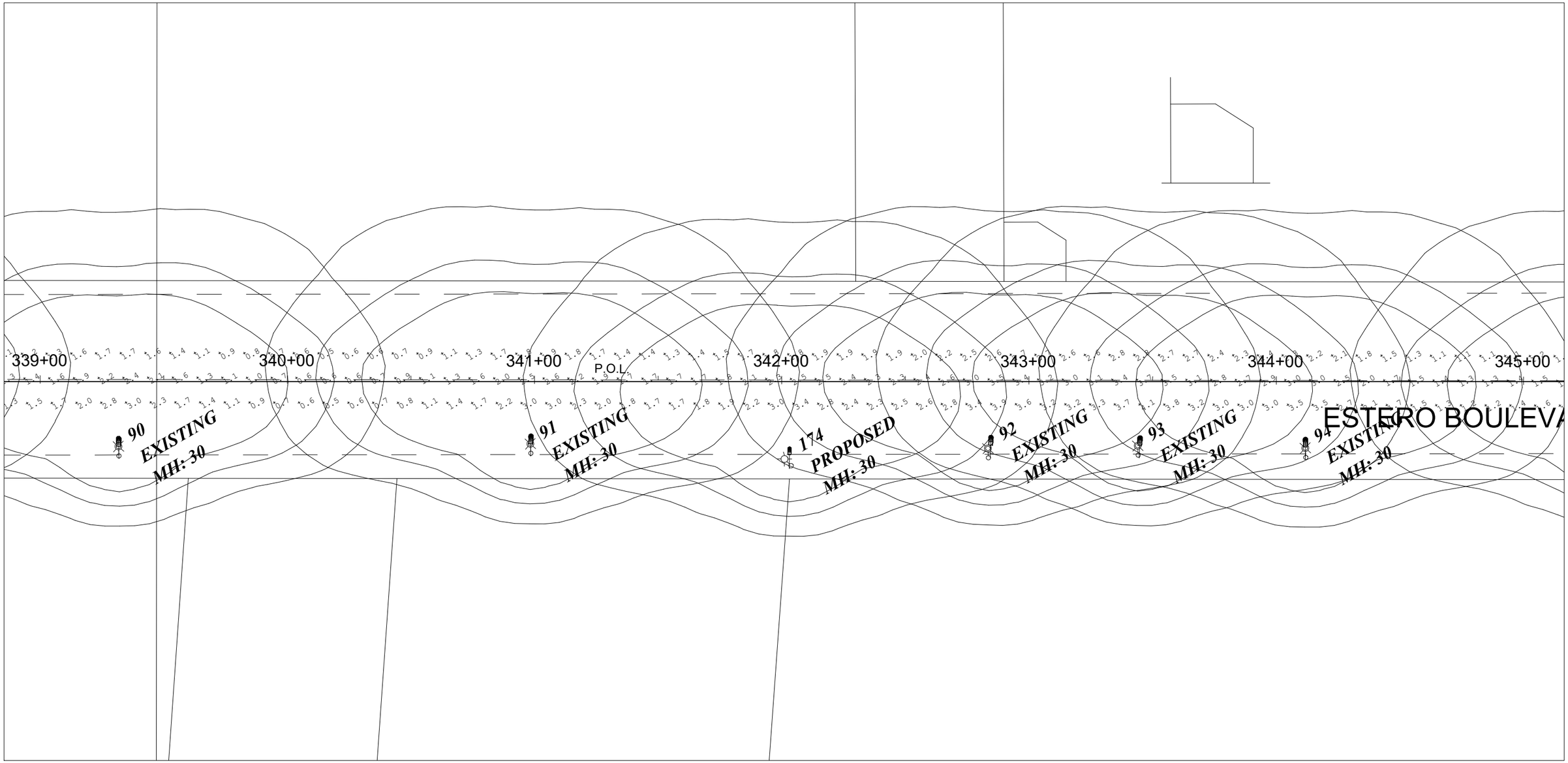
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
332+53.06 TO 338+84.22

SHEET NUMBER
38
38 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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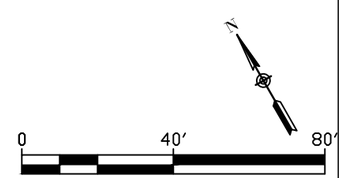


NO.	DATE	REVISION

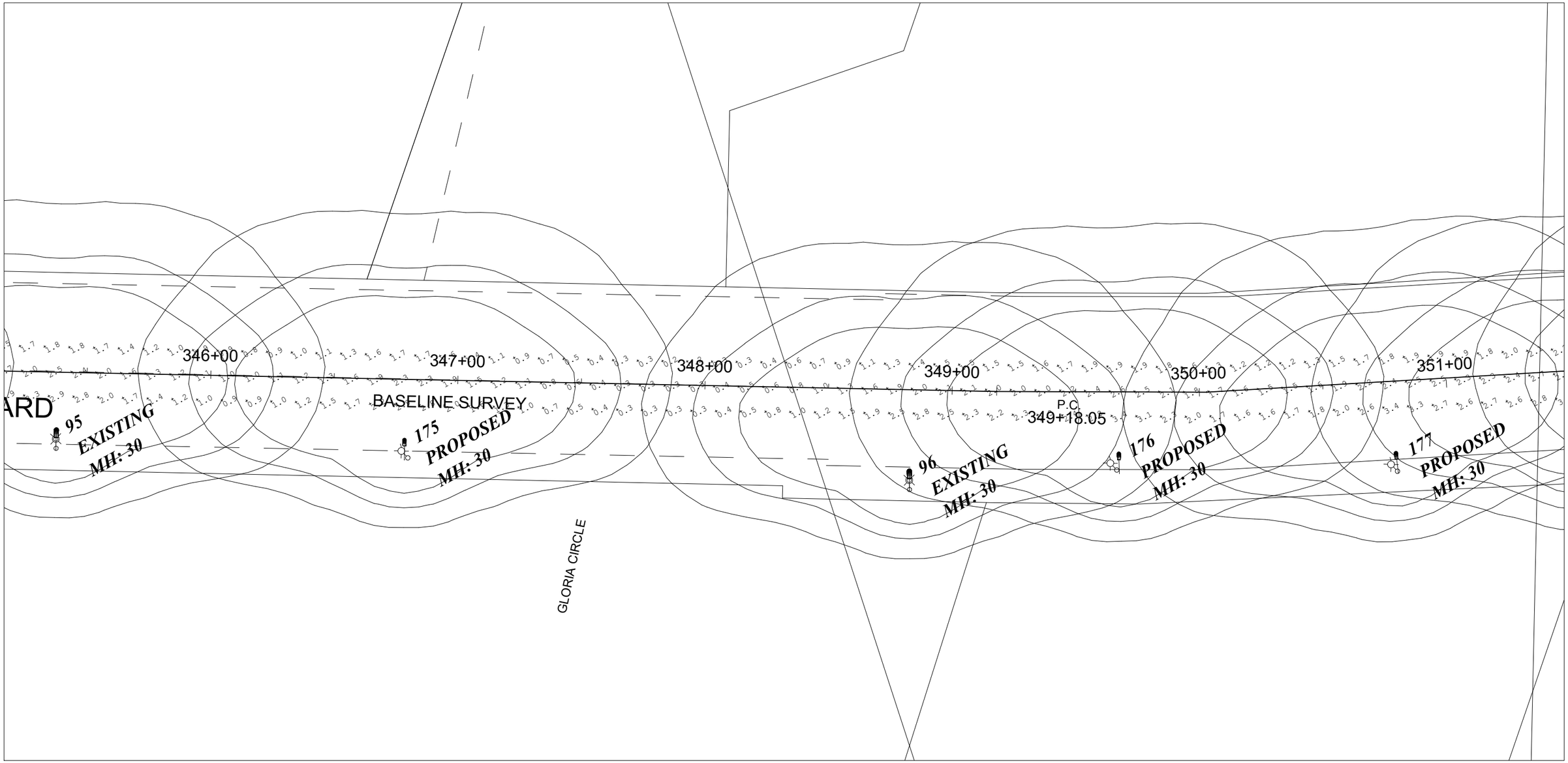
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
338+84.22 TO 345+15.38

SHEET NUMBER
39
39 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
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TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
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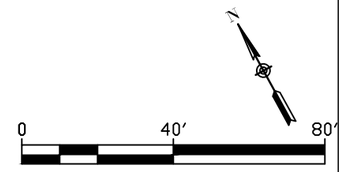


NO.	DATE	REVISION

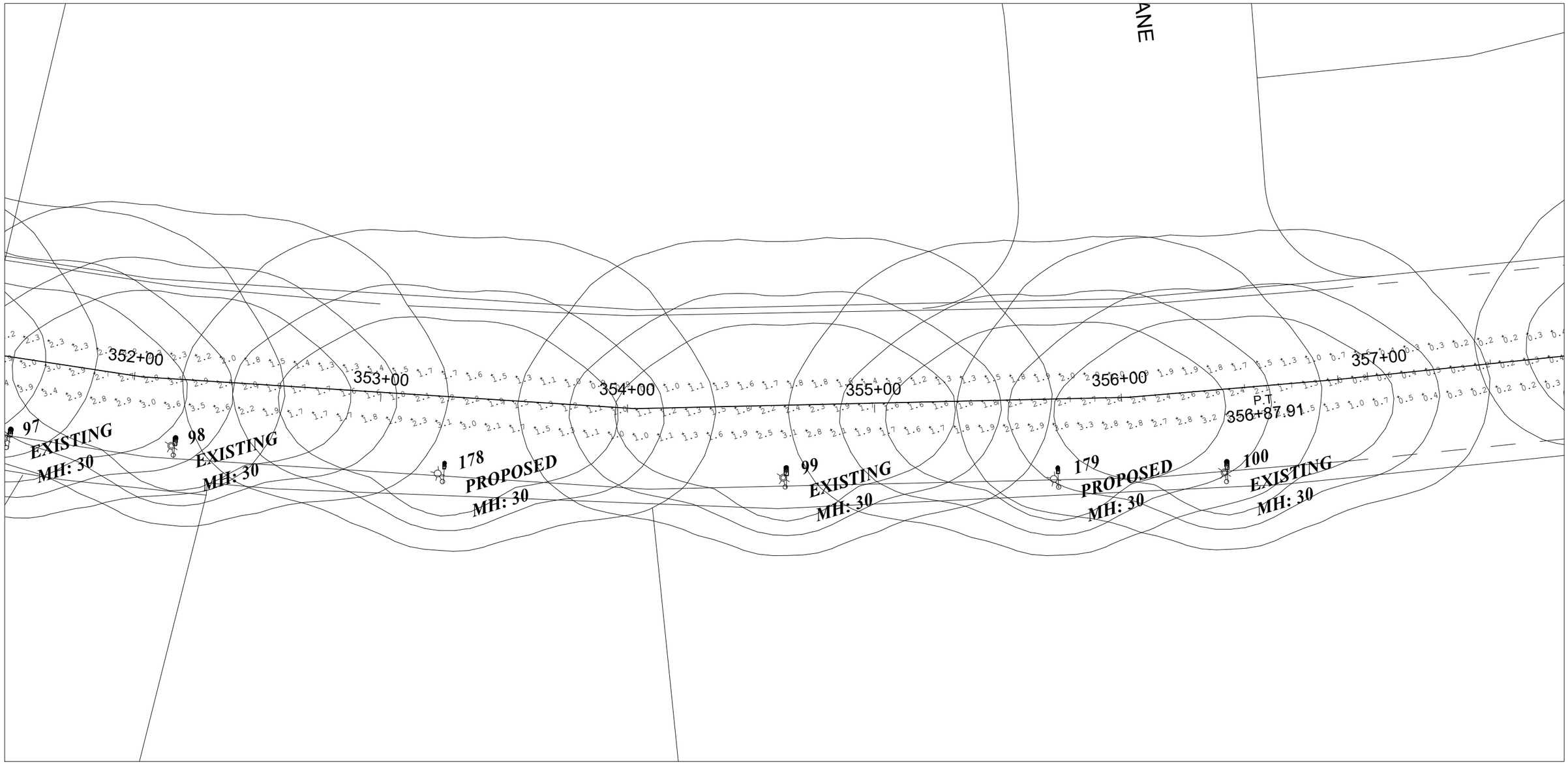
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
345+15.38 TO 351+46.55

SHEET NUMBER
40
40 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
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TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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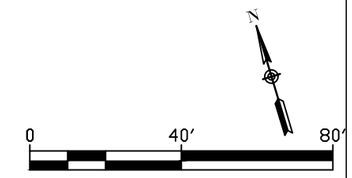


NO.	DATE	REVISION

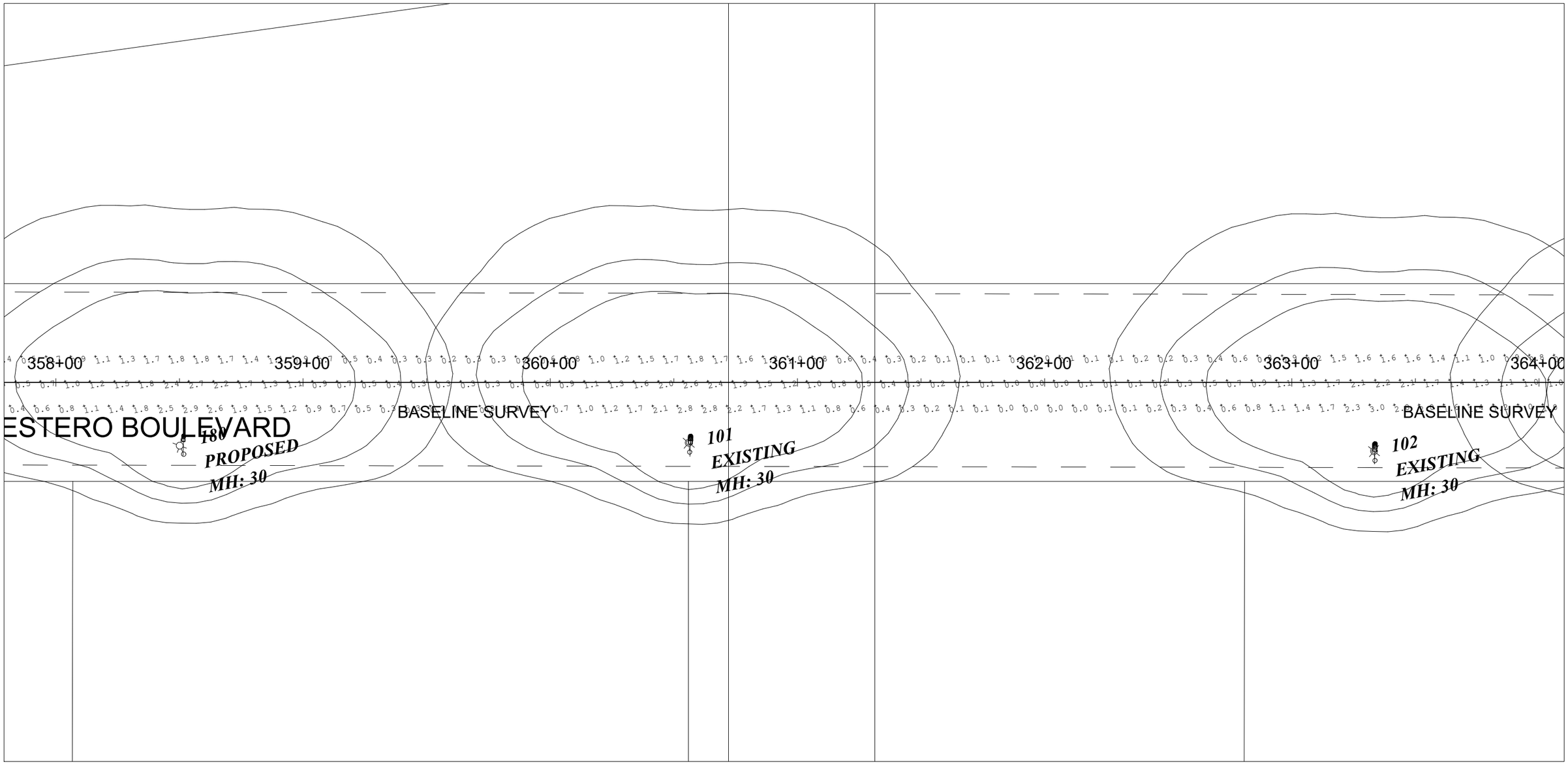
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
351+46.55 TO 357+77.71

SHEET NUMBER
41
41 OF 54



Calculation Summary								
Label	**CalcType**	**Description**	**Units**	**Avg**	**Max**	**Min**	**Avg/Min**	**Max/Min**
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule									
Symbol	**Qty**	**Label**	**Arrangement**	**LLF**	**Description**	**Lum. Lumens**	**Arm**	**Lum. Watts**	**Total Watts**
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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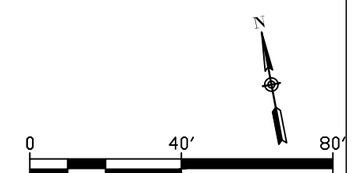


NO.	DATE	REVISION

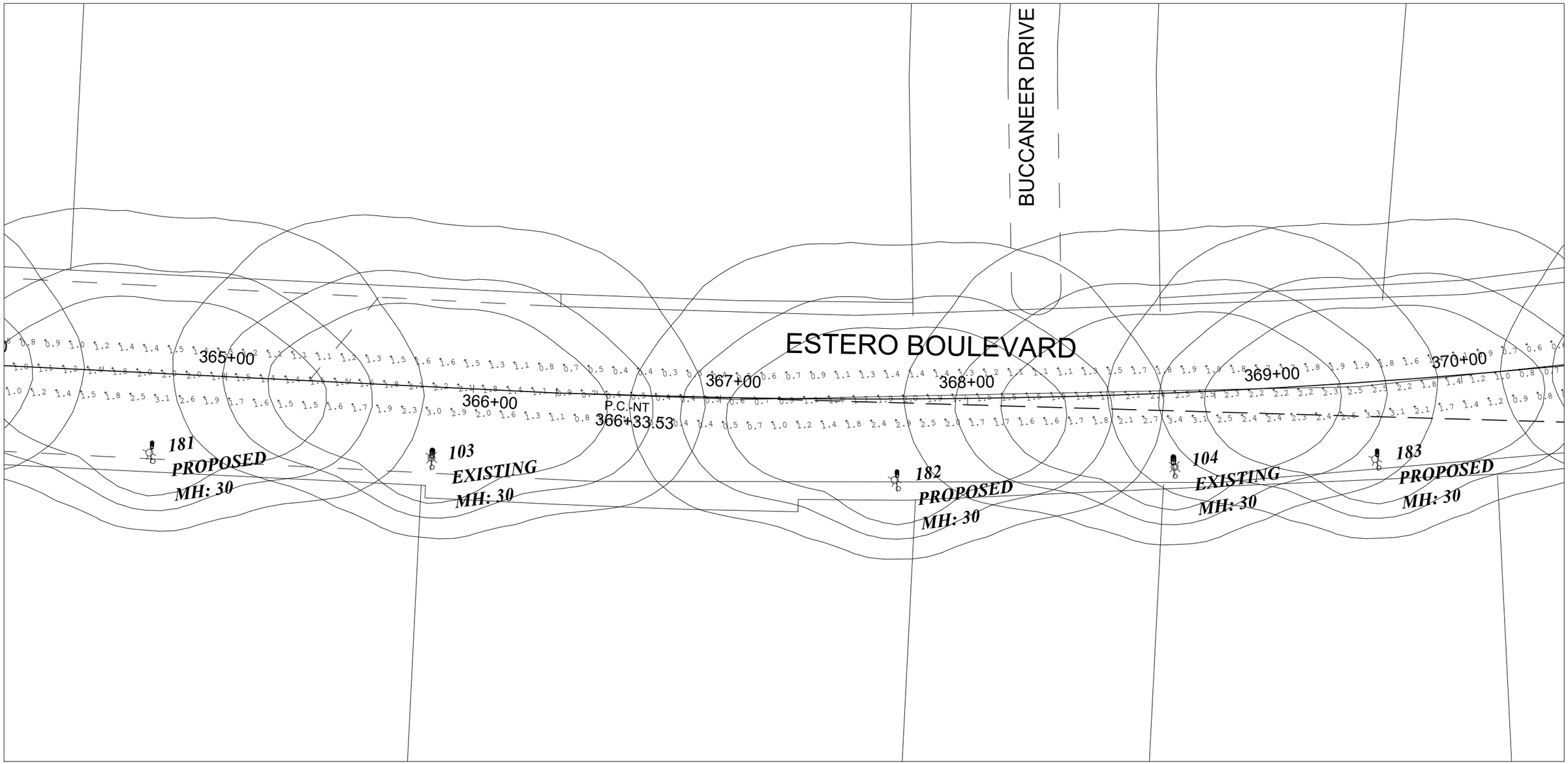
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
357+77.71 TO 364+08.88

SHEET NUMBER
42
42 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
—■	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
—■	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
—■	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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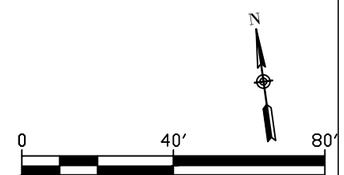


NO.	DATE	REVISION

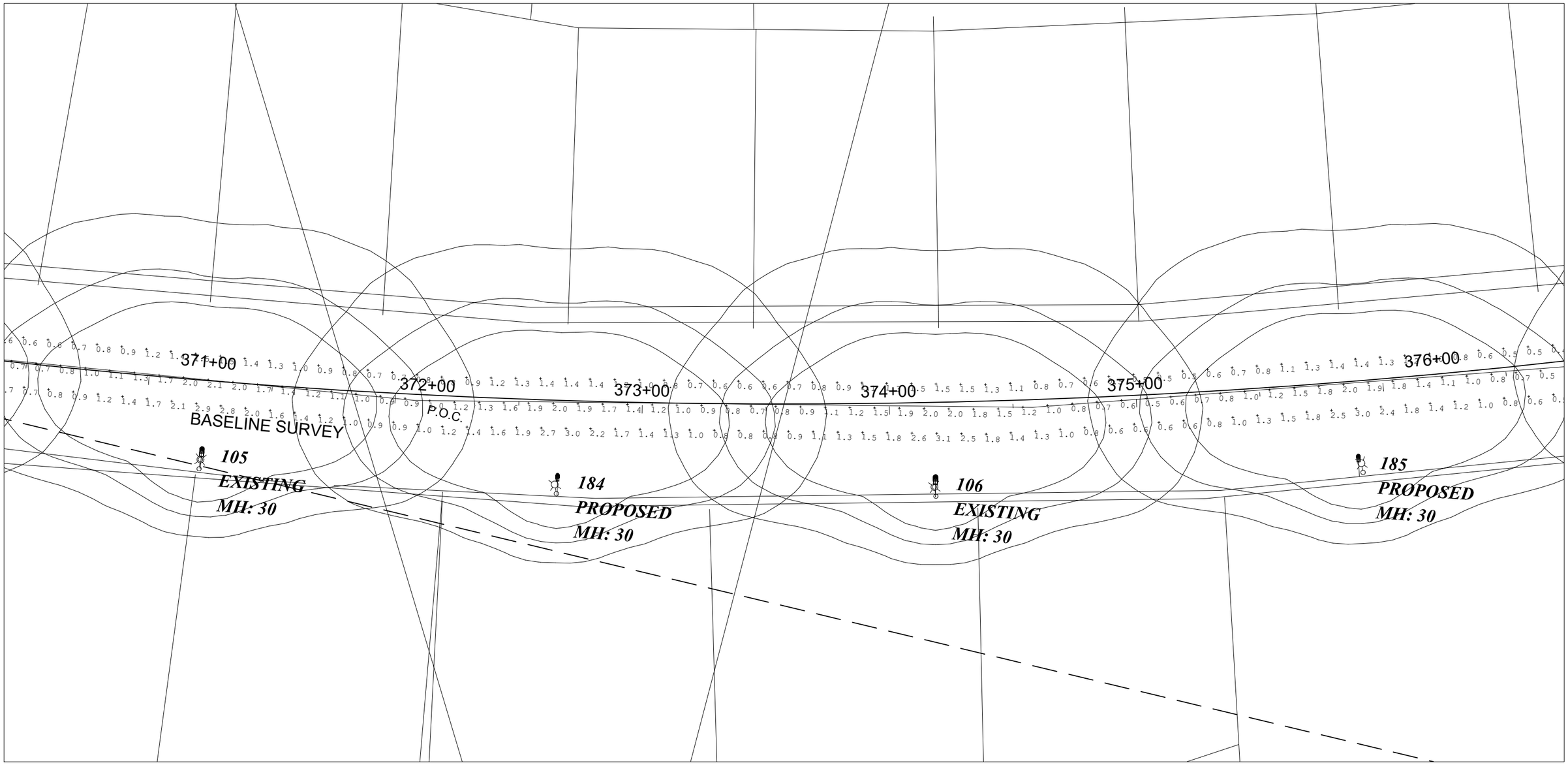
TEAM ENGINEERING

PHOTOMETRIC STUDY
FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
364+08.88 TO 370+40.04

SHEET NUMBER
43
43 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
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Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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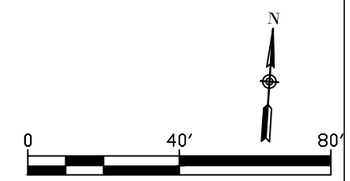


NO.	DATE	REVISION

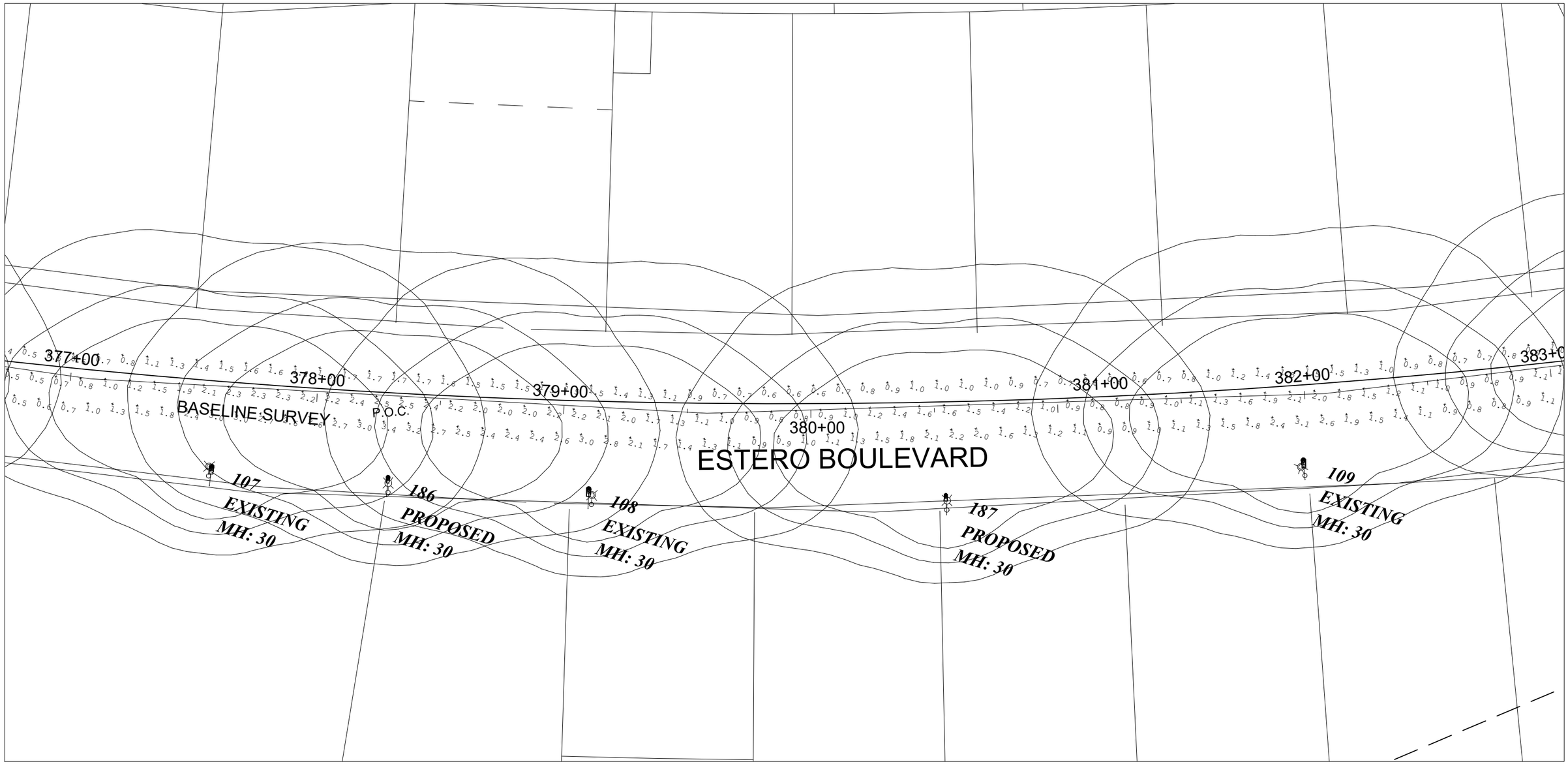
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
370+40.04 TO 376+71.20

SHEET NUMBER
44
44 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
TYPICAL SECTION #1	Illuminance	STATION # 106 - # 126	Fc	1.56	3.8	0.3	5.20	12.67
TYPICAL SECTION #2	Illuminance	STATION # 246 - # 265	Fc	1.28	3.1	0.3	4.27	10.33
TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens	Arm	Lum. Watts	Total Watts
	5	ADDITIONAL	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	590
	115	EXISTING	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	13570
	76	PROPOSED	SINGLE	0.910	ATBM P30 XXXXX R3 4K_5K	15452	8	118	8968

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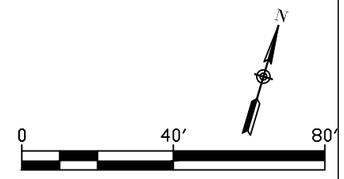


NO.	DATE	REVISION

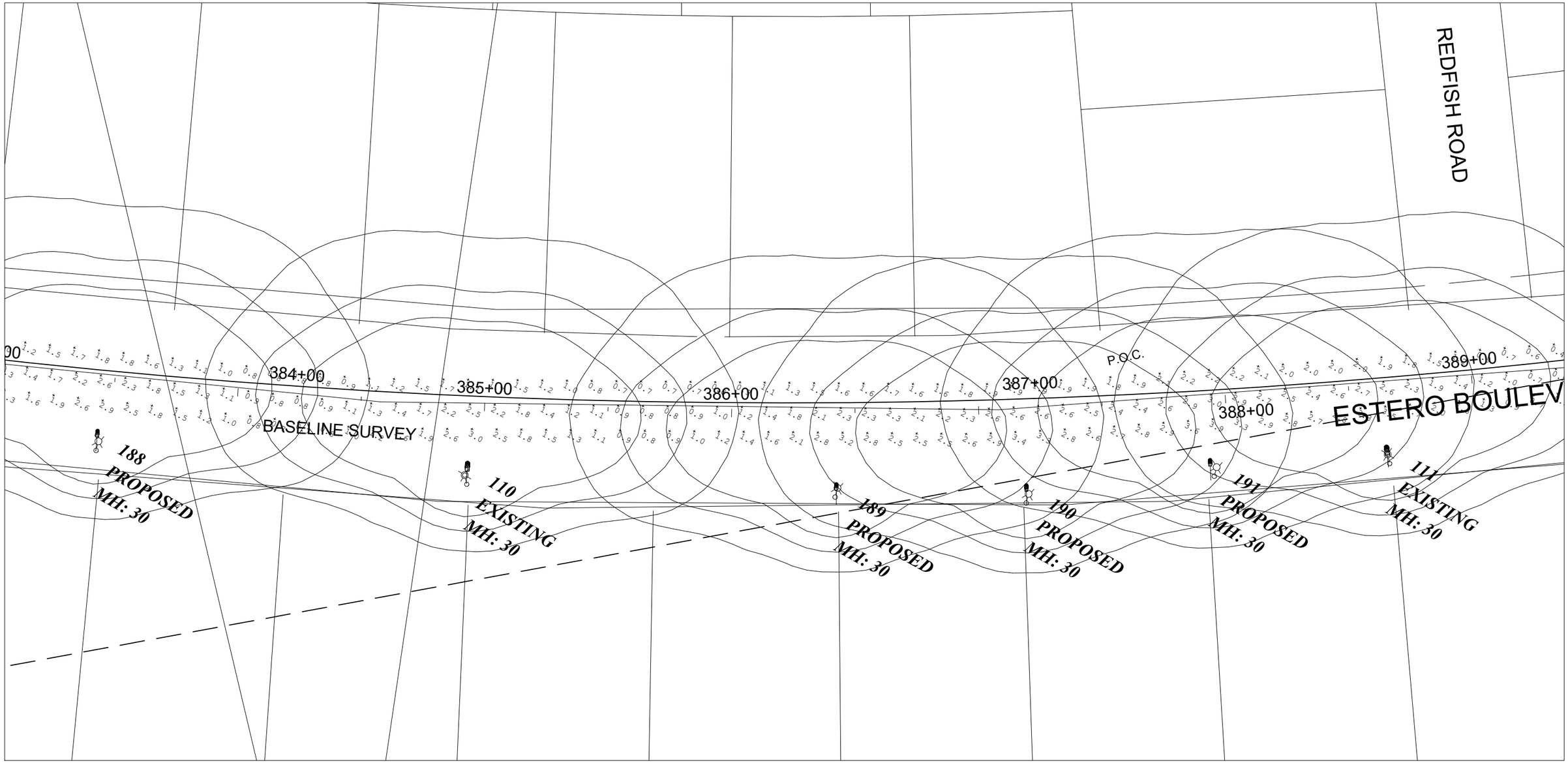
TEAM
ENGINEERING

PHOTOMETRIC STUDY
FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
376+71.20 TO 383+02.37

SHEET NUMBER
45
45 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
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TYPICAL SECTION #3	Illuminance	STATION # 391 - # 403	Fc	1.36	3.1	0.3	4.53	10.33

Luminaire Schedule

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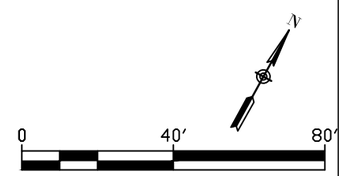

NO.	DATE	REVISION

TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
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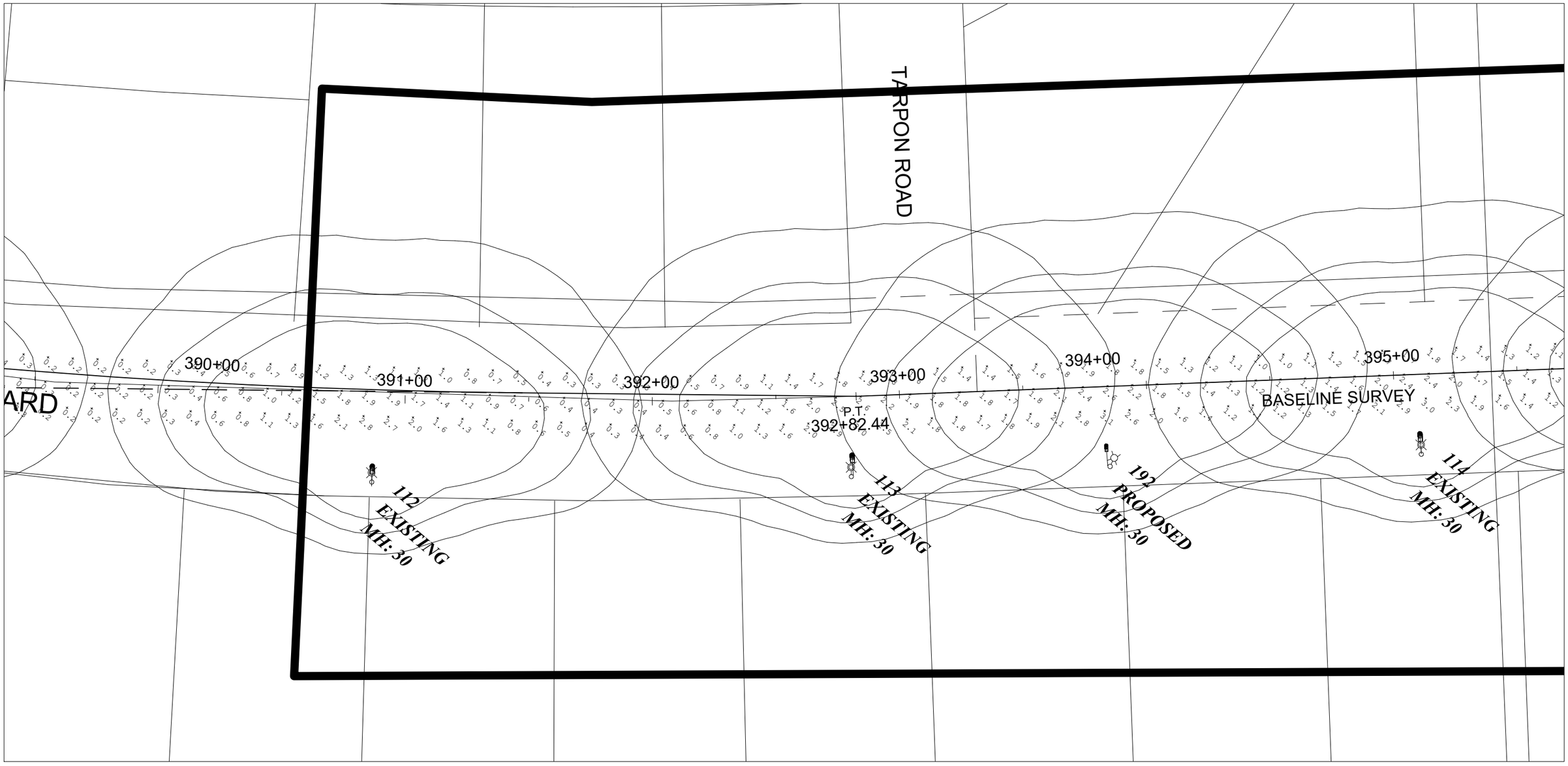
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
383+02.37 TO 389+33.53

SHEET NUMBER
46
46 OF 54



Calculation Summary								
Label	**CalcType**	**Description**	**Units**	**Avg**	**Max**	**Min**	**Avg/Min**	**Max/Min**
ESTERO BLVD	Illuminance	COMPLETE ROADWAY	Fc	1.27	4.7	0.0	N.A.	N.A.
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Luminaire Schedule									
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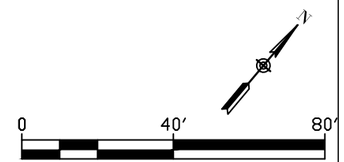

NO.	DATE	REVISION

TEAM ENGINEERING

PHOTOMETRIC STUDY
FORT MYERS BEACH

DRAWN BY:
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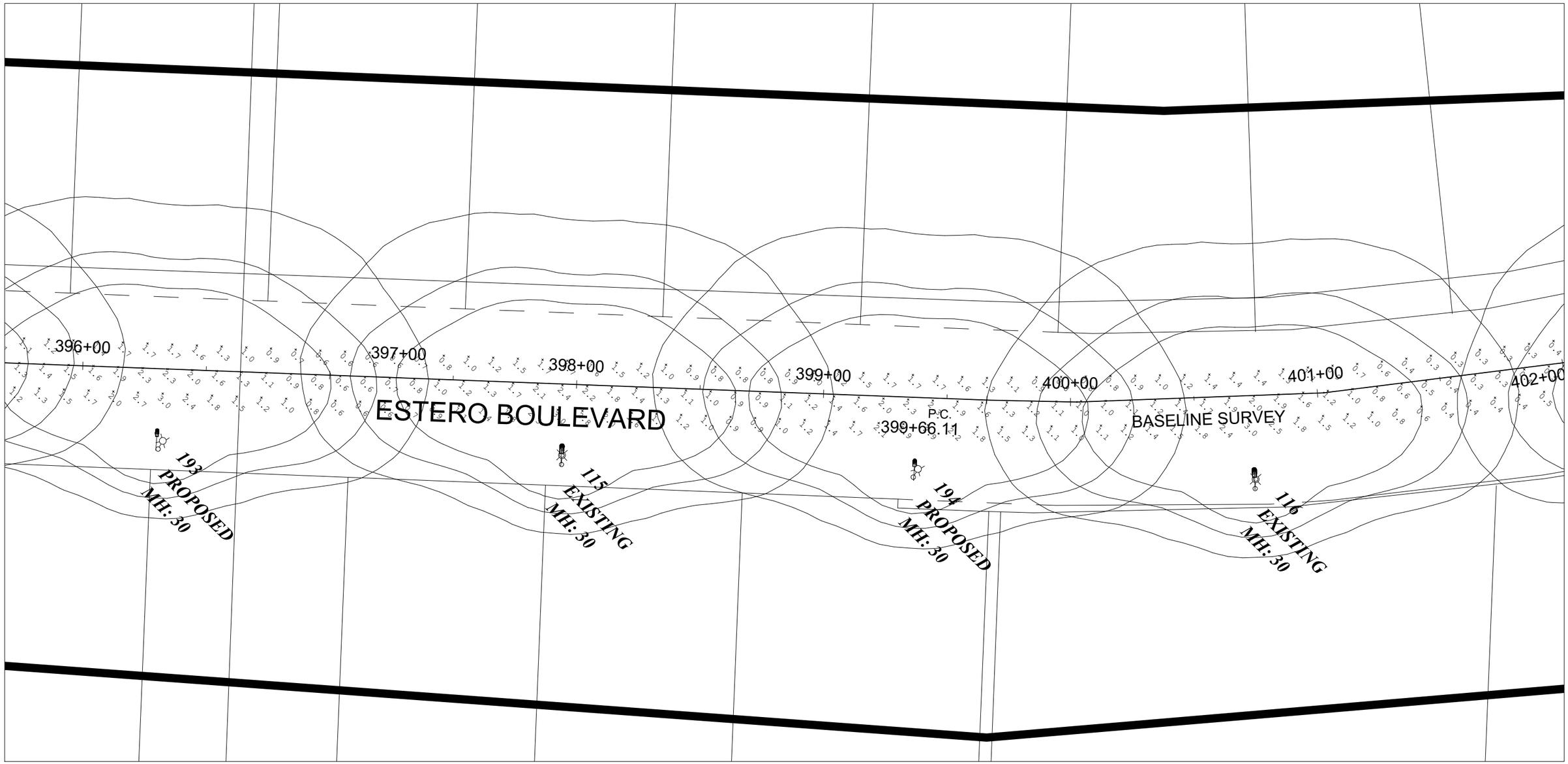
CHECKED BY:

DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
389+33.53 TO 395+64.69

SHEET NUMBER
47
47 OF 54



Calculation Summary

Label	CalcType	Description	Units	Avg	Max	Min	Avg/Min	Max/Min
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Luminaire Schedule

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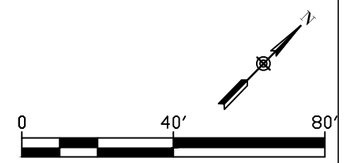

NO.	DATE	REVISION

TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
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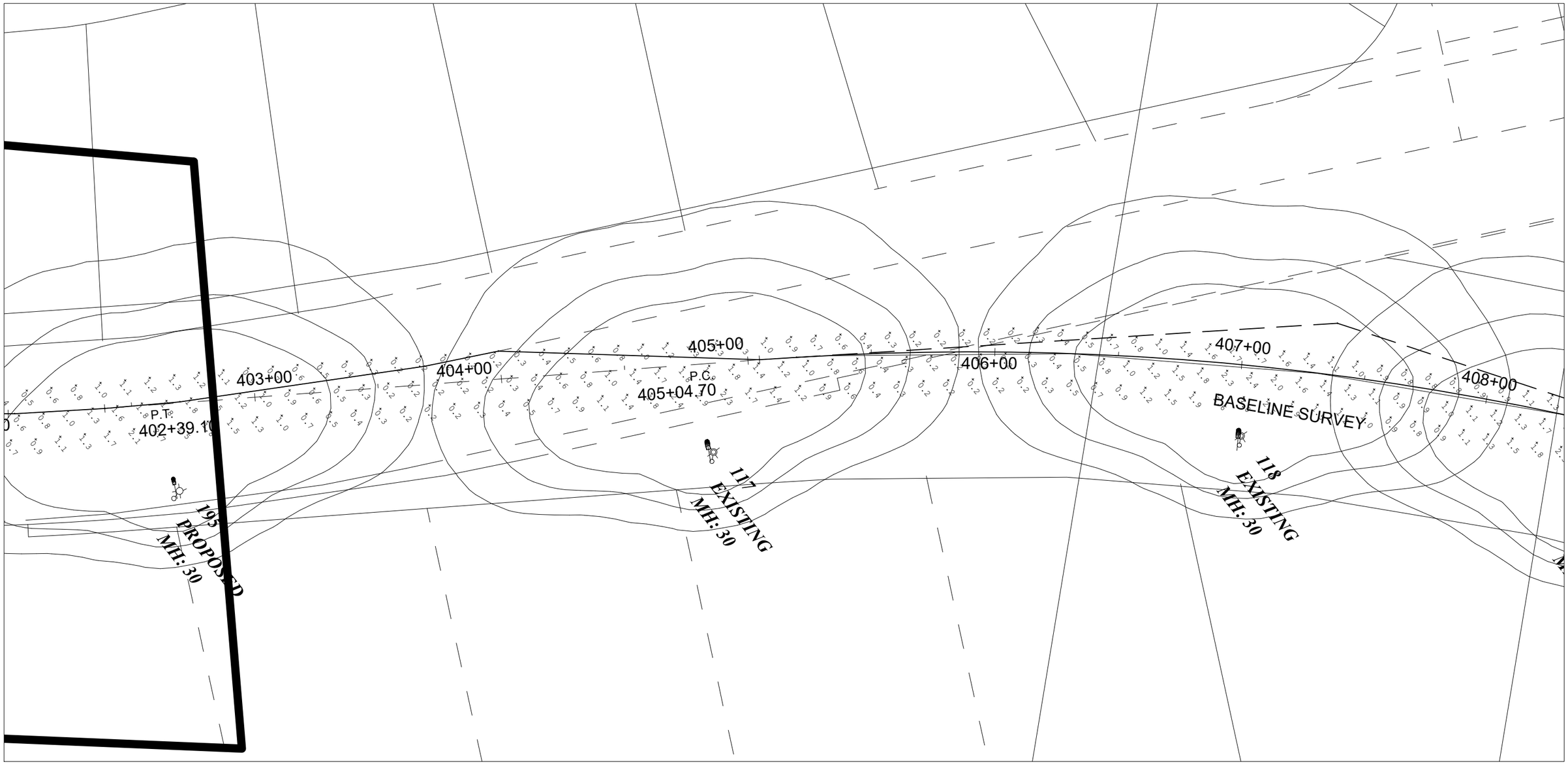
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
395+64.69 TO 401+95.86

SHEET NUMBER
48
48 OF 54



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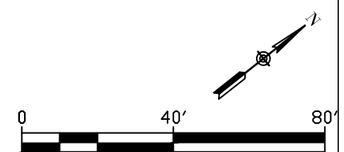

NO.	DATE	REVISION

TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
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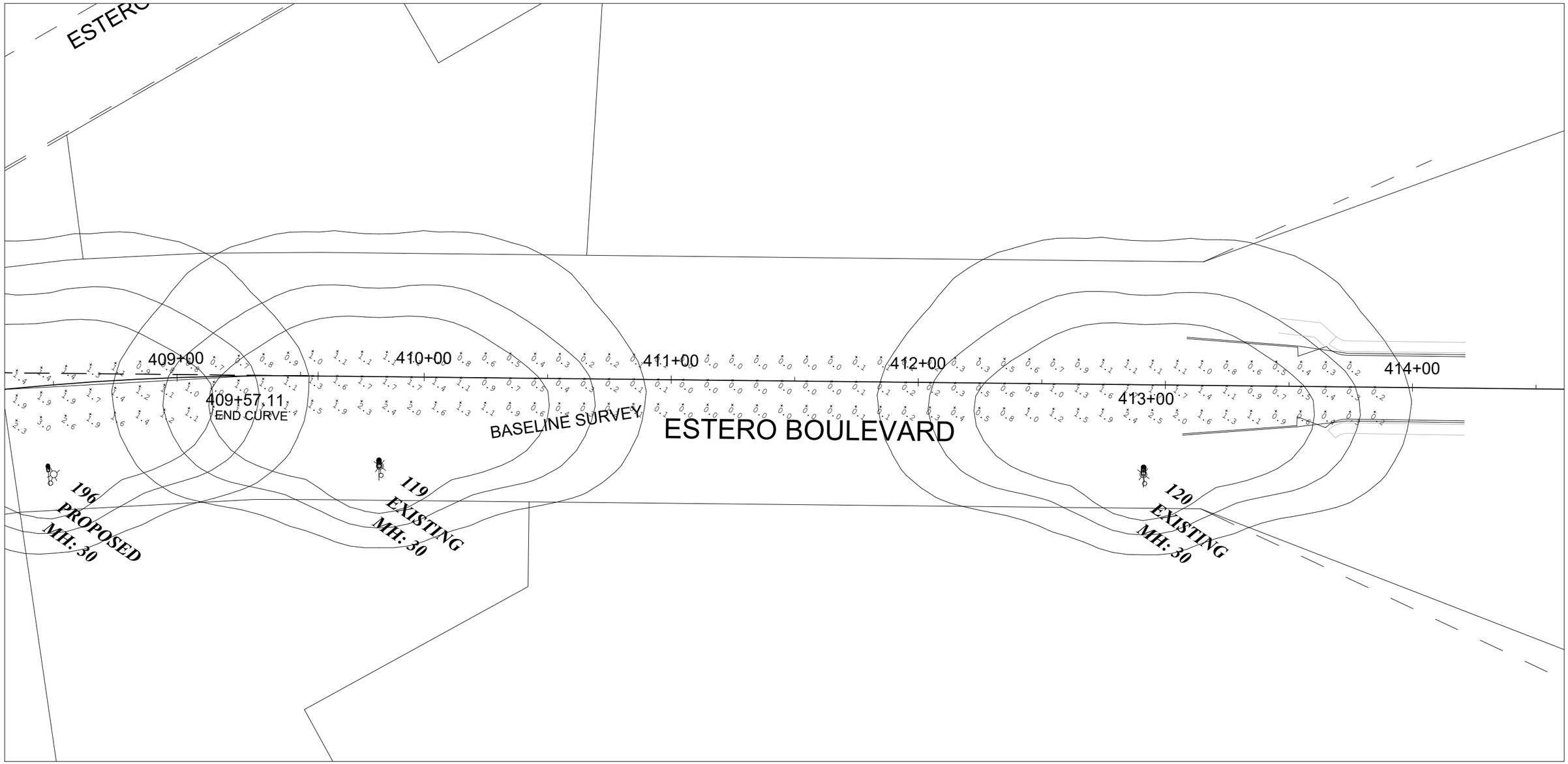
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
401+95.86 TO 408+27.02

SHEET NUMBER
49
49 OF 54



Calculation Summary								
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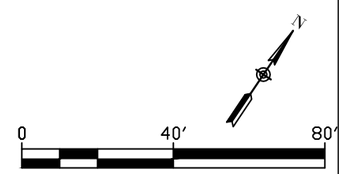


NO.	DATE	REVISION

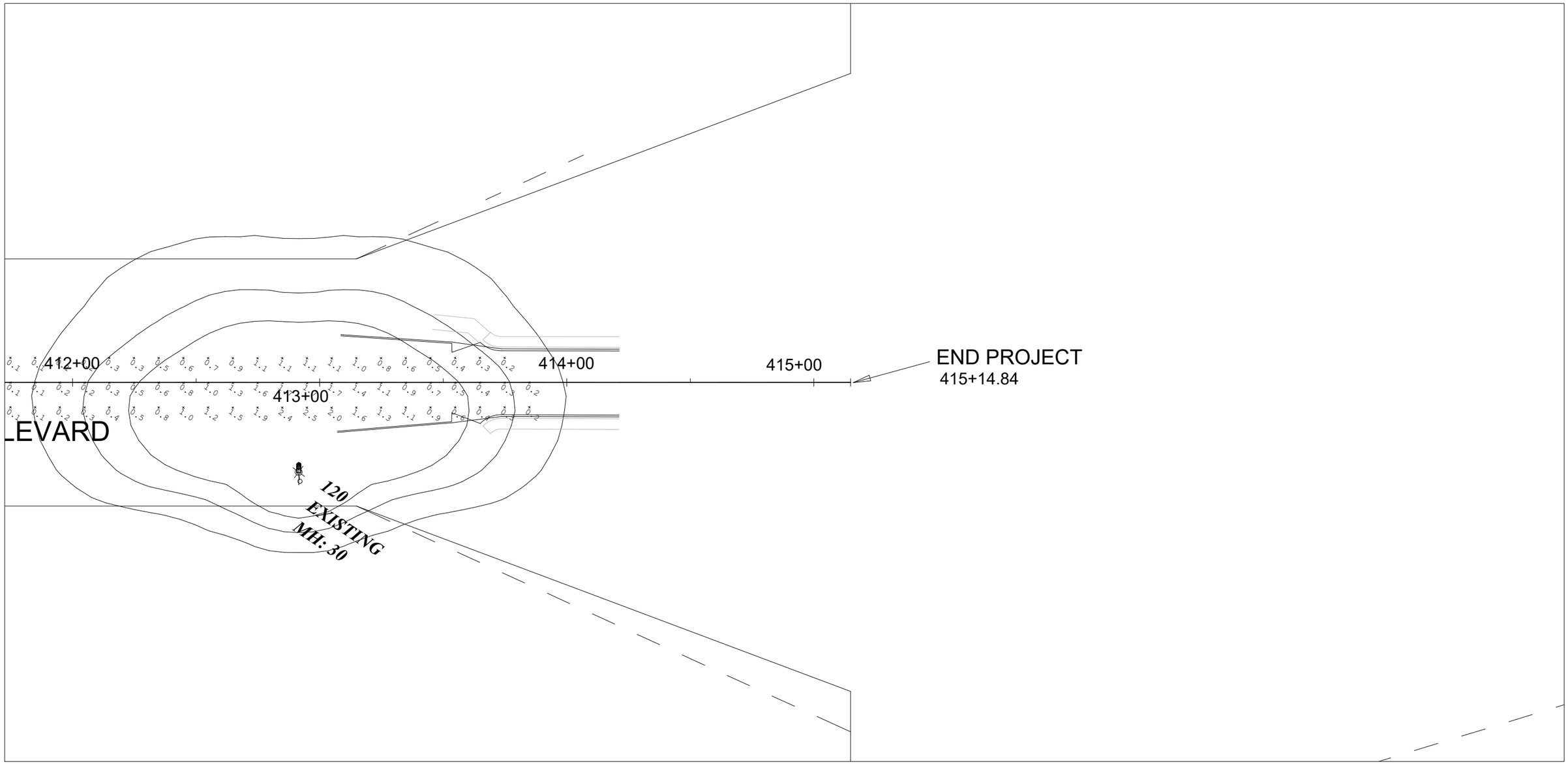
TEAM ENGINEERING

PHOTOMETRIC STUDY FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
408+27.02 TO 414+58.19

SHEET NUMBER
50
50 OF 54



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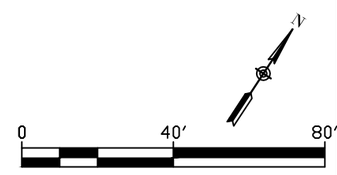

NO.	DATE	REVISION

TEAM ENGINEERING

PHOTOMETRIC STUDY
FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:

DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

PLAN
414+58.19 TO 415+11.69

SHEET NUMBER
51
51 OF 54

Luminaire Location Summary					
LumNo	**Label**	**X**	**Y**	**Z**	**Orient**
1	ADDITIONAL	988.717	432.903	30	109.985
2	ADDITIONAL	1199.261	516.501	30	112.833
3	ADDITIONAL	1323.901	567.827	30	111.059
4	ADDITIONAL	1504.669	642.4	30	111.372
5	ADDITIONAL	2226.95	931.207	30	112.166
6	EXISTING	943.6	478.458	30	287.301
7	EXISTING	1555.988	661.768	30	109.832
8	EXISTING	1688.072	713.482	30	111.801
9	EXISTING	1850.79	780.018	30	111.94
10	EXISTING	2012.519	894.975	30	292.087
11	EXISTING	2117.923	884.105	30	111.675
12	EXISTING	2361.01	989.179	30	109.925
13	EXISTING	2607.968	1090.137	30	113.053
14	EXISTING	2860.773	1191.423	30	111.25
15	EXISTING	3062.523	1267.182	30	106.535
16	EXISTING	3284.86	1349.528	30	109.12
17	EXISTING	3391.911	1433.11	30	290.555
18	EXISTING	3473.022	1415.817	30	110.199
19	EXISTING	3569.78	1449.579	30	108.65
20	EXISTING	3829.585	1545.101	30	109.397
21	EXISTING	4017.748	1614.685	30	110.251
22	EXISTING	4206.322	1732.853	30	289.208
23	EXISTING	4418.777	1759.616	30	109.113
24	EXISTING	4755.989	1882.313	30	110.557
25	EXISTING	4970.091	1959.719	30	110.226
26	EXISTING	5093.611	2003.363	30	110.063
27	EXISTING	5194.074	2041.243	30	111.596
28	EXISTING	5361.65	2102.179	30	108.97
29	EXISTING	5508.639	2156.117	30	109.263
30	EXISTING	5723.564	2235.582	30	112.38
31	EXISTING	5868.082	2286.224	30	113.049
32	EXISTING	6009.307	2337.691	30	109.093
33	EXISTING	6228.272	2411.34	30	108.911
34	EXISTING	6447.726	2430.691	30	74.578
35	EXISTING	6769.703	2359.873	30	90
36	EXISTING	7028.272	2401.87	30	102.994
37	EXISTING	7151.793	2430.691	30	102.632
38	EXISTING	7793.687	2569.548	30	101.976
39	EXISTING	7912.575	2645.719	30	282.913
40	EXISTING	8093.739	2627.706	30	100.954
41	EXISTING	8319.678	2670.424	30	101.465
42	EXISTING	8617.671	2724.465	30	97.883
43	EXISTING	8836.92	2762.035	30	99.462
44	EXISTING	8985.144	2787.254	30	98.383
45	EXISTING	9288.798	2841.294	30	99.782
46	EXISTING	9459.668	2867.543	30	97.549
47	EXISTING	9668.624	2902.541	30	100.912
48	EXISTING	9933.162	2943.715	30	98.921
49	EXISTING	10296.003	2999.814	30	99.544
50	EXISTING	10666.049	3059.001	30	97.989
51	EXISTING	10898.164	3098.115	30	98.345
52	EXISTING	11137.484	3136.715	30	100.46
53	EXISTING	11432.389	3185.608	30	100.783
54	EXISTING	11687.665	3225.135	30	97.326
55	EXISTING	11938.823	3262.191	30	91.192
56	EXISTING	12105.061	3270.425	30	93.18
57	EXISTING	12511.134	3295.13	30	92.047
58	EXISTING	12797.804	3309.541	30	93.469
59	EXISTING	13806.682	3361.136	30	92.322
60	EXISTING	14086.533	3373.36	30	91.592
61	EXISTING	14422.354	3383.653	30	91.488
62	EXISTING	14857.89	3401.023	30	90
63	EXISTING	15105.574	3413.247	30	90
64	EXISTING	15478.065	3404.24	30	88.265
65	EXISTING	15785.58	3392.016	30	86.729
66	EXISTING	15970.217	3385.583	30	87.877
67	EXISTING	16286.738	3374.003	30	88.853
68	EXISTING	16665.02	3356.633	30	90
69	EXISTING	16947.444	3327.683	30	71.223
70	EXISTING	17161.032	3273	30	85.913
71	EXISTING	17469.833	3244.694	30	85.425
72	EXISTING	17761.907	3220.89	30	83.454
73	EXISTING	18104.162	3188.08	30	83.291
74	EXISTING	18401.382	3160.416	30	82.117
75	EXISTING	18680.59	3135.97	30	85.364
76	EXISTING	19046.648	3162.99	30	112.11
77	EXISTING	19220.992	3287.154	30	131.986
78	EXISTING	19590.265	3378.507	30	85.425
79	EXISTING	19784.552	3343.124	30	78.905
80	EXISTING	20054.11	3281.364	30	79.511
81	EXISTING	20317.232	3205.451	30	71.288
82	EXISTING	20653.053	3098.658	30	73.74
83	EXISTING	21357.827	2876.064	30	72.159
84	EXISTING	21730.318	2756.404	30	68.662
85	EXISTING	22234.692	2499.069	30	61.645
86	EXISTING	22516.473	2336.948	30	60.945
87	EXISTING	23204.196	1938.725	30	58.851
88	EXISTING	23291.047	1889.188	30	59.589
89	EXISTING	23553.527	1739.934	30	60.321
90	EXISTING	23662.894	1674.314	30	60.781

NO.	DATE	REVISION

TEAM ENGINEERING

PHOTOMETRIC STUDY
FORT MYERS BEACH

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE: 9/30/19
SCALE:
HORIZ.
VERT.
JOB NO.: 0000000

LUMINAIRE LOCATION SUMMARY

SHEET NUMBER
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91	EXISTING	23807.644	1591.966	30	59.037
92	EXISTING	23968.477	1498.683	30	57.994
93	EXISTING	24020.588	1468.446	30	57.488
94	EXISTING	24078.488	1434.349	30	59.501
95	EXISTING	24187.855	1371.302	30	59.99
96	EXISTING	24482.504	1190.526	30	61.594
97	EXISTING	24727.615	1069.579	30	65.727
98	EXISTING	24790.661	1047.062	30	67.068
99	EXISTING	25024.835	964.072	30	74.358
100	EXISTING	25196.606	915.178	30	76.357
101	EXISTING	25607.698	843.767	30	77.347
102	EXISTING	25879.185	789.084	30	77.905
103	EXISTING	26125.423	741.477	30	76.57
104	EXISTING	26422.965	697.248	30	84.289
105	EXISTING	26666.628	681.968	30	88.452
106	EXISTING	26964.171	690.814	30	93.866
107	EXISTING	27306.746	737.457	30	99.659
108	EXISTING	27456.322	772.036	30	104.421
109	EXISTING	27731.348	865.32	30	111.161
110	EXISTING	28004.765	987.553	30	115.201
111	EXISTING	28328.04	1174.122	30	124.509
112	EXISTING	28512.999	1305.201	30	127.875
113	EXISTING	28659.358	1433.868	30	133.182
114	EXISTING	28829.841	1588.269	30	134.145
115	EXISTING	29041.336	1778.857	30	130.333
116	EXISTING	29248.811	1968.641	30	136.507
117	EXISTING	29493.28	2303.175	30	151.823
118	EXISTING	29621.947	2472.854	30	136.636
119	EXISTING	29837.465	2638.513	30	123.96
120	EXISTING	30095.603	2808.997	30	123.311
121	PROPOSED	2476.213	1036.199	30	109.654
122	PROPOSED	2718.725	1135.427	30	108.905
123	PROPOSED	2948.884	1223.95	30	107.819
124	PROPOSED	3150.635	1299.708	30	108.436
125	PROPOSED	3739.827	1513.398	30	109.655
126	PROPOSED	3943.636	1587.922	30	110.926
127	PROPOSED	4353.311	1738.617	30	108.435
128	PROPOSED	4548.885	1807.377	30	110.659
129	PROPOSED	4874.156	1921.84	30	108.726
130	PROPOSED	6353.027	2436.045	30	92.008
131	PROPOSED	6637.124	2368.108	30	75.344
132	PROPOSED	7429.817	2491.319	30	106.536
133	PROPOSED	7712.884	2546.903	30	104.875
134	PROPOSED	7945	2598.37	30	102.805
135	PROPOSED	8247.11	2658.586	30	99.111
136	PROPOSED	8471.505	2697.7	30	101.07
137	PROPOSED	8911.032	2774.902	30	97.594
138	PROPOSED	9792.659	2922.098	30	97.387
139	PROPOSED	10133.368	2978.712	30	101.31
140	PROPOSED	10796.26	3082.057	30	98.049
141	PROPOSED	11040.213	3123.745	30	99.782
142	PROPOSED	11290.857	3163.889	30	99.866
143	PROPOSED	11561.572	3208.665	30	97.294
144	PROPOSED	12220.347	3277.116	30	92.728
145	PROPOSED	12369.085	3284.322	30	94.456
146	PROPOSED	12608.406	3301.306	30	92.521
147	PROPOSED	13948.216	3367.57	30	91.398
148	PROPOSED	14264.737	3376.577	30	91.103
149	PROPOSED	14643.018	3393.303	30	91.977
150	PROPOSED	14998.137	3404.24	30	90
151	PROPOSED	15292.141	3413.247	30	88.532
152	PROPOSED	15647.905	3399.737	30	88.897
153	PROPOSED	16104.031	3379.793	30	87.167
154	PROPOSED	16469.445	3366.927	30	86.186
155	PROPOSED	17317.361	3260.777	30	82.405
156	PROPOSED	17608.15	3232.47	30	84.175
157	PROPOSED	17945.901	3202.233	30	83.831
158	PROPOSED	18248.912	3175.213	30	85.136
159	PROPOSED	18831.774	3121.817	30	87.139
160	PROPOSED	18967.518	3134.04	30	101.31
161	PROPOSED	19397.265	3367.571	30	108.969
162	PROPOSED	19668.109	3359.851	30	79.38
163	PROPOSED	20193.713	3241.477	30	72.582
164	PROPOSED	20413.732	3175.214	30	71.906
165	PROPOSED	20588.076	3119.244	30	73.102
166	PROPOSED	21469.124	2840.037	30	72.159
167	PROPOSED	21646.685	2779.564	30	70.017
168	PROPOSED	22104.738	2566.619	30	61.742
169	PROPOSED	22167.785	2535.095	30	59.676
170	PROPOSED	22335.696	2440.525	30	58.202
171	PROPOSED	22420.616	2389.702	30	61.22
172	PROPOSED	22816.909	2165.178	30	60.642
173	PROPOSED	23025.993	2042.944	30	59.621
174	PROPOSED	23895.781	1535.353	30	59.238
175	PROPOSED	24309.445	1299.892	30	60.726
176	PROPOSED	24560.347	1155.785	30	63.048
177	PROPOSED	24659.421	1101.745	30	68.385
178	PROPOSED	24892.308	1005.888	30	69.444
179	PROPOSED	25130.342	932.548	30	75.749
180	PROPOSED	25406.334	882.368	30	77.735

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TEAM ENGINEERING

PHOTOMETRIC STUDY
FORT MYERS BEACH

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JOB NO.: 0000000

LUMINAIRE LOCATION SUMMARY

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181	PROPOSED	26013.642	760.134	30	77.3
182	PROPOSED	26311.186	706.898	30	82.506
183	PROPOSED	26504.99	688.402	30	84.557
184	PROPOSED	26811.379	681.164	30	92.338
185	PROPOSED	27134.654	710.919	30	96.91
186	PROPOSED	27376.709	753.54	30	101.659
187	PROPOSED	27596.247	810.636	30	108.8
188	PROPOSED	27867.252	926.436	30	113.962
189	PROPOSED	28139.865	1052.691	30	118.81
190	PROPOSED	28207.415	1089.684	30	119.667
191	PROPOSED	28267.727	1134.717	30	121.328
192	PROPOSED	28735.754	1503.027	30	134.384
193	PROPOSED	28919.906	1668.686	30	130.28
194	PROPOSED	29147.486	1874.553	30	130.601
195	PROPOSED	29371.045	2124.65	30	152.488

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FORT MYERS BEACH

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ATTACHMENT 4

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Introduction

The Town of Ft. Myers Beach is situated on a barrier island to the west of Ft. Myers, FL. The Town has a resident population of approximately 7,100, and hosts approximately 1.8 million visitors per year. As with most West Coast towns, tourism has become a year-round event, meaning the Town's effective population fluctuates greatly, and the quantity of tourists outnumbers local population.

Because it lies on a barrier island, the Town's roadway network is limited. Estero Boulevard is the main transportation facility, and runs in a north-south direction. To the north, Estero Boulevard becomes San Carlos Boulevard, and connects to Fort Myers. To the south, Estero Boulevard continues across another barrier Island, and eventually to Bonita Springs.

As the economy has rebounded, and tourism has picked back up, the Town of Fort Myers Beach has experienced increasing traffic congestion, increasing bicyclists and pedestrians, and increasing conflicts and crashes where travel modes conflict.

In September, 2017, Hurricane Irma hit near Fort Myers Beach as a Category 4 hurricane, damaging much of its infrastructure. Along Estero Boulevard, much of the lighting system was damaged by this storm.

The project location is shown in Figure 1. The length of the corridor is approximately 6.0 miles.

Purpose

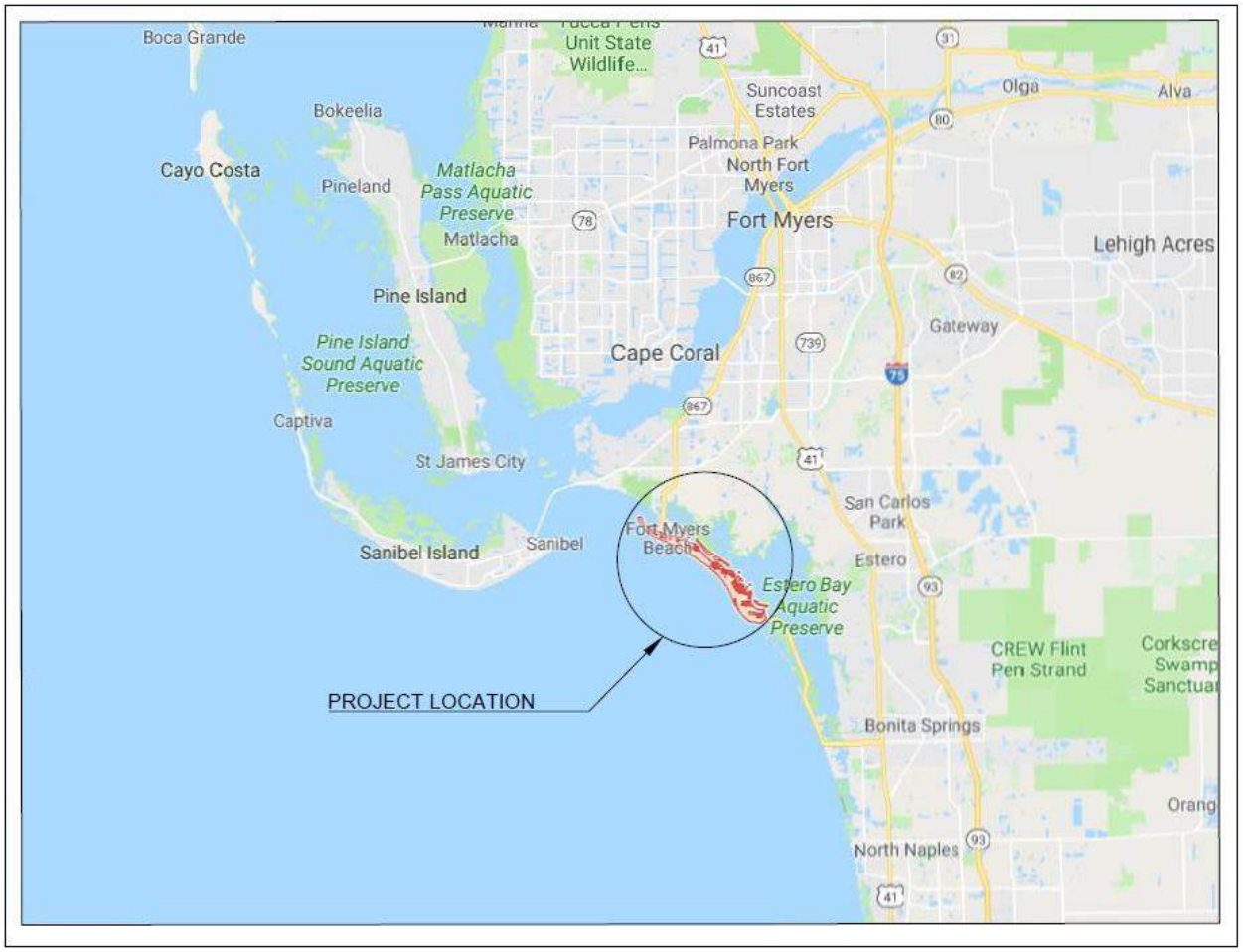
The purpose of this report is to provide a Lighting Justification Analysis consistent with Federal Highway Administration (FHWA) and Florida Department of Transportation (FDOT) guidelines. The procedures are summarized in the following documents:

- Florida Department of Transportation (FDOT) Manual on Uniform Traffic Studies (MUTS), Chapter 14
- Transportation Association of Canada (TAC) Guide for the Design of Roadway Lighting
- FHWA Lighting Handbook
- American Association of State Highway and Transportation Officials (AASHTO) Roadway Lighting Design Guide Warranting System, which references the TAC Guidelines

An overall lighting summary plan was developed for the corridor to comply with other requirements, such as nesting turtle interference and Tow lighting ordinances. This Ft Myers Beach Lighting Report (FMBLR) is a supplement to specifically explore lighting warrants and justification.

The FDOT MUTS Chapter 14 provides for a two-step process to determine lighting justification. The first step is to analyze the corridor to determine if lighting criteria, as developed by the TAC, are met. If warrants are met, then a net present value (NPV) analysis is to performed to determine the cost effectiveness of the lighting proposal. If the NPV returns a positive result, the lighting proposal is determined to be warranted and justified.

Figure 1
Project Location Map



Existing Conditions

Estero Boulevard is a two-lane roadway with intermittent turn lanes provided. Sidewalks are present on both sides of the roadway, and pedestrian and bicycle traffic is high, which is indicative of the tourist activities present in the corridor.

Roadway lighting exists in some sections of the corridor. The FMB Lighting Report documented existing ambient light levels along the corridor. This analysis found that several areas have alternating dark and light areas, which can cause issues related to vehicle operators eye adjustments to the differing light levels.

This corridor has a high density of single family driveways, beach access points, large condominium and hotel accesses, and business and government facility accesses.

Crash Analysis

Crash data along Estero Boulevard were analyzed to identify crash frequency, location, severity, and potential mitigation strategies.

Crash data were obtained from the Signal 4 crash database. Data were collected for the years 2013-2017. Table 1 presents an overall summary of crash data by year.

Review of Table 1 indicates that a significant portion, nearly 25%, of all crashes occur during nighttime. Approximately 10% of the bicycle crashes, and nearly half of the pedestrian crashes occur at night.

Based on these crash analyses, there appears to be a strong indication that lighting may be a contributing factor to a significant number of overall crashes, and pedestrian crashes in particular.

Based upon the FDOT online traffic database, existing average annual daily traffic is estimated to be 10,500 vehicles per day (vpd).

Lighting Warrants

The TAC Guide provides a warranting system based on data for four key criteria:

- Geometric conditions
- Operational conditions
- Environmental conditions, and
- Crash conditions

Multiple items in each criteria are evaluated, and each item is assigned a scoring criterion and a weighting factor. The scores for all areas are summed, and a score greater than 60 is deemed to meet lighting warrants per the TAC Guidelines.

Analysis of these criteria is provided on FDOT Form 750-020-20, which is provided as Table 2. Review of Table 2 indicates that this corridor scores 72, which exceeds the warrant criteria. It should be noted that, irrespective of the aggregate score, the study segment would meet lighting warrants based upon the continuous presence of either no turn lanes, or a two way left turn lane.

Table 1
Crash Data Summary by Year

Year	Motorized Vehicles			Bicycles			Pedestrians			Total Crashes	Fatalities
	Day	Night	Lighting not reported	Day	Night	Lighting not reported	Day	Night	Lighting not reported		
2013	74	3	10	1	0	1	0	0	0	89	0
2014	89	30	12	6	1	0	1	1	0	140	0
2015	121	40	6	16	0	0	4	2	0	189	0
2016	70	33	0	9	1	0	6	2	0	121	0
2017	78	32	0	6	1	0	1	6	0	124	1
TOTALS	**432**	**138**	**28**	**38**	**3**	**1**	**12**	**11**	**0**	**663**	**1**

Net Present Value (NPV) Analysis

A net present value analysis is used to compare the cost of the construction plus operating costs of the proposed lighting system to the cost of the crashes along the corridor.

The Highway Safety Manual (HSM) predictive crash rates are utilized in the analysis. The HSM provides these predictive rates for build and no-build scenarios.

For facilities with lighting systems in place, the analysis will predict the crash rates for unlighted conditions, and compare those with the lighted conditions.

The HSM analysis was performed for the no-build (unlighted) and build (lighted conditions).

FDOT Form 750-020-021 was completed for the No-Build and Build Conditions, and are provided as Tables 3 and 4.

Review of Tables 3 and 4 indicates that the proposed lighting plan would have a NPV savings of $178,823,270 over the 15 year service life utilized for the analysis.

The lighting plan proposed for this corridor includes upgrades of the existing lighting to LED bulbs, provision of new fixtures on existing power poles, and provision of additional poles with corresponding lighting fixtures. There are 113 existing fixtures to be upgraded with LED bulbs, 83 proposed fixtures to be mounted to existing poles, and 4 new poles and fixtures. Florida Power and Light has agreed to provide to provide all upgrades and new equipment at no initial cost to the Town of Ft Myers Beach. However, the annual cost per fixture will be $54.

FPL has also provided an annual maintenance cost of $21.12 per fixture, and an annual energy cost of $31.20 per fixture.

Table 2
Lighting Warrant Analysis

State of Florida Department of Transportation

Form 750-020-20
TRAFFIC ENGINEERING
10/15

LIGHTING GEOMETRIC AND OPERATIONAL FACTORS

Item No.	Classification Factor	Rating Factor "R"					Weigh t "W"	Enter "R" Here	Score "R"x"W"
		1	2	3	4	5			
	Geometric Factors (See Note 6)								
1	Number of Lanes	≤4	5	6	7	≥8	0.15	1	0.15
2	Lane Width (ft.)	>11.8	11.2 to 11.8	10.5 to 11.2	9.8 to 10.5	<9.8	0.35	3	1.05
3	Median Openings/mile	<4 or 1-way	4 to 8	8 to 12	12 to 15	>15 or No Median	1.40	5	7
4	Driveways and Entrances/mile	<32	32 to 64	64 to 97	97 to 129	>129	1.40	3	4.2
5	Horizontal Curve Radius (ft.)	>1969	1476 to 1969	738 to 1476	574 to 738	<574	5.90	4	23.6
6	Vertical Grades (%)	<3	3 to 4	4 to 5	5 to 7	>7	0.35	1	0.35
7	Sight Distance (ft.)	>689	492 to 689	295 to 492	197 to 295	<197	0.15	3	0.45
8	Parking	Prohibited	Loading	Off Peak	One Side	Both Sides	0.10	1	0.1
								Subtotal Geometric Factors	36.9 G
	Operational Factors								
9	Signalized Intersections (%)	80 to 100	70 to 80	60 to 70	50 to 60	0 to 50	0.15	5	0.75
10	Left Turn Lane	All Major Intersections or 1-way	Substantial Number of Major Intersections	Most Major Intersections	Half of the Intersections	Infrequent Number or TWTL (See Notes 1 & 3)	0.70	5	3.5
11	Median Width (ft.)	> 32	20 to 32	10 to 20	4 to 10	0 to 4	0.35	4	1.4
12	Operating or Posted Speed (mph) (See Note 5)	≤ 25	30	35	45	≥50	0.60	1	0.6
13	Pedestrian Activity Level (See Note 2)			Low	Medium	High	3.15	5	15.75
								Subtotal Environmental Factors	22 O
	Environmental Factors								
14	Percentage of Development Adjacent to Road (%) (See Note 4)	nil	nil to 30	30 to 60	60 to 90	>90	0.15	5	0.75
15	Area Classification	Rural	Industrial	Residential	Commercial	Downtown	0.15	3	0.45
16	Distance from Development to Roadway (ft) (See Note 4)	>200	150 to 200	100 to 150	50 to 100	<50	0.15	4	0.6
17	Ambient (off Roadway) Lighting	Nil	Sparse	Moderate	Distracting	Intense	1.38	4	5.52
18	Raised Curb Median	None	Continuous	At All Intersections (100%)	At Most Intersections (51% to 99%)	At Few Intersections (≤50%) (See Note 7)	0.35	1	0.35
								Subtotal Environmental Factors	7.67 E
	Collision Factors								
19	Night-to-Day Collision Ratio	<1	1.0 to 1.2	1.2 to 1.5	1.5 to 2.0	>2.0 (See Note 1)	5.55	1	5.55
								Subtotal Collision Factors	5.55 A

Notes: 1 Lighting Warranted
2 Pedestrian Activity Level
3 Two Way Left Turn Lane
4 Development defined as Commercial, Industrial or Residential Buildings
5 85th Percentile night speed should be used if available, otherwise posted Speed Limit shall be used
6 Worst case geometric factors for a segment of roadway shall apply
7 Also includes isolated medians (non-continuous) between intersections

G + O + E + A = Total Warranting Points	72.12
Warranting Condition	60.00
Difference ±	12.12 D

Table 3
No-Build HSM NPV Analysis

State of Florida Department of Transportation

Form 750-020-21-c
TRAFFIC ENGINEERING
01/17

Present Worth Analysis
Urban/Suburban Arterial - 2 Lane Undivided
No-Build Alternative

General Information				Site Information	
Analyst:		Date:		Location ID:	County:
Agency or Company:				City:	M.P. - M.P.

Manual Input from Analysis

Growth Rate =	1.0%	Current Year =	2018	Project Opening Year =	2020		
Opening Year AADT =	10,500	Rate of Return =	4.0%	Analysis Period =	15		
Segment Length =	6	Segment Type =	2U		E	Analyze	
Crash Data Used =	Yes	Segment =	Segment1		2.534014453		

Default Distribution for Crash Severity Level (2010-2014 Florida HSM Crash Distribution)

Fatality =	0.9%	Possible Injury =	22.3%
Incapacitating =	6.2%	Property Damage Only =	54.0%
Non-Incapacitating =	16.6%		100.0%

	Year	AADT	Annual Number of Crashes						Annual Cost						
			Site Specific ($N_{predicted\ /\ expected}$)	Fatality	Incap.	Non-Inc.	Possible Injury	PDO	Fatality	Incap.	Non-Inc.	Possible Injury	PDO	Total Cost	Present Value
	2018	10,500		0.000	0.000	0.000	0.000	0.000	$0	$0	$0	$0	$0	$0	$0
	2019	10,605		0.000	0.000	0.000	0.000	0.000	$0	$0	$0	$0	$0	$0	$0
1	2020	10,711	131.2	1.181	8.133	21.775	29.251	70.833	$12,077,004	$4,719,547	$3,422,306	$2,856,394	$538,330	$23,613,581	$22,705,366
2	2021	10,818	132.7	1.194	8.225	22.021	29.582	71.634	$12,213,526	$4,772,898	$3,460,993	$2,888,684	$544,415	$23,880,516	$22,078,879
3	2022	10,926	134.2	1.207	8.318	22.270	29.917	72.444	$12,351,770	$4,826,922	$3,500,167	$2,921,381	$550,577	$24,150,817	$21,469,988
4	2023	11,036	135.7	1.221	8.412	22.522	30.256	73.265	$12,491,758	$4,881,628	$3,539,836	$2,954,490	$556,817	$24,424,530	$20,878,191
5	2024	11,146	137.2	1.235	8.507	22.778	30.599	74.097	$12,633,517	$4,937,025	$3,580,007	$2,988,018	$563,136	$24,701,703	$20,302,999
6	2025	11,257	138.8	1.249	8.604	23.037	30.947	74.939	$12,777,069	$4,993,124	$3,620,686	$3,021,970	$569,535	$24,982,383	$19,743,940
7	2026	11,370	140.4	1.263	8.702	23.299	31.299	75.791	$12,922,439	$5,049,933	$3,661,880	$3,056,353	$576,015	$25,266,620	$19,200,554
8	2027	11,484	142.0	1.278	8.801	23.564	31.656	76.655	$13,069,654	$5,107,462	$3,703,597	$3,091,171	$582,577	$25,554,461	$18,672,394
9	2028	11,599	143.6	1.292	8.902	23.833	32.017	77.529	$13,218,737	$5,165,722	$3,745,843	$3,126,432	$589,222	$25,845,957	$18,159,026
10	2029	11,715	145.2	1.307	9.003	24.105	32.382	78.415	$13,369,716	$5,224,723	$3,788,626	$3,162,140	$595,952	$26,141,159	$17,660,030
11	2030	11,832	146.9	1.322	9.106	24.381	32.753	79.312	$13,522,617	$5,284,475	$3,831,954	$3,198,304	$602,768	$26,440,117	$17,174,996
12	2031	11,950	148.6	1.337	9.210	24.660	33.128	80.220	$13,677,465	$5,344,988	$3,875,835	$3,234,928	$609,670	$26,742,885	$16,703,527
13	2032	12,069	150.3	1.352	9.316	24.943	33.508	81.140	$13,834,289	$5,406,273	$3,920,274	$3,272,019	$616,660	$27,049,516	$16,245,238
14	2033	12,190	152.0	1.368	9.423	25.229	33.892	82.071	$13,993,116	$5,468,340	$3,965,282	$3,309,584	$623,740	$27,360,062	$15,799,754
15	2034	12,312	153.7	1.384	9.531	25.519	34.282	83.015	$14,153,973	$5,531,201	$4,010,864	$3,347,629	$630,910	$27,674,578	$15,366,711
	2035	12,435		0.000	0.000	0.000	0.000	0.000	$0	$0	$0	$0	$0	$0	$0
	2036	12,560		0.000	0.000	0.000	0.000	0.000	$0	$0	$0	$0	$0	$0	$0
	2037	12,685		0.000	0.000	0.000	0.000	0.000	$0	$0	$0	$0	$0	$0	$0
	2038	12,812		0.000	0.000	0.000	0.000	0.000	$0	$0	$0	$0	$0	$0	$0
	2039	12,940		0.000	0.000	0.000	0.000	0.000	$0	$0	$0	$0	$0	$0	$0
	2040	13,070		0.000	0.000	0.000	0.000	0.000	$0	$0	$0	$0	$0	$0	$0
	2041	13,200		0.000	0.000	0.000	0.000	0.000	$0	$0	$0	$0	$0	$0	$0
	2042	13,332		0.000	0.000	0.000	0.000	0.000	$0	$0	$0	$0	$0	$0	$0
	2043	13,466		0.000	0.000	0.000	0.000	0.000	$0	$0	$0	$0	$0	$0	$0
	2044	13,600		0.000	0.000	0.000	0.000	0.000	$0	$0	$0	$0	$0	$0	$0
	Shaded cell indicates the AADT is outside the limits													Total Present Value	$282,161,596

Table 4
Build HSM NPV Analysis

State of Florida Department of Transportation

Form 750-020-21-c
TRAFFIC ENGINEERING
01/17

Present Worth Analysis
Urban/Suburban Arterial - 2 Lane Undivided
Build Alternative

General Information				Site Information	
Analyst:		Date:		Location ID:	County:
Agency or Company:				City:	M.P. - M.P.

Manual Input from Analysis

Growth Rate =	1.0%	Current Year =	2018	Project Opening Year =	2020
Opening Year AADT =	10,500	Rate of Return =	4.0%	Analysis Period =	15
Segment Length =	6	Segment Type =	2U		
Crash Data Used =	Yes	Segment =	Segment1	0.928052632	Analyze

Default Distribution for Crash Severity Level (2010-2014 Florida HSM Crash Distribution)

Fatality =	0.9%	Possible Injury =	22.3%
Incapacitating =	6.2%	Property Damage Only =	54.0%
Non-Incapacitating =	16.6%		100.0%

	Year	AADT	Annual Number of Crashes						Annual Cost						
			Site Specific ($N_{predicted\ /\ expected}$)	Fatality	Incap.	Non-Inc.	Possible Injury	PDO	Fatality	Incap.	Non-Inc.	Possible Injury	PDO	Total Cost	Present Value
	2018	10,500		0.000	0.000	0.000	0.000	0.000	$0	$0	$0	$0	$0	$0	$0
	2019	10,605		0.000	0.000	0.000	0.000	0.000	$0	$0	$0	$0	$0	$0	$0
1	2020	10,711	48.0	0.432	2.978	7.975	10.713	25.942	$4,423,059	$1,728,478	$1,253,379	$1,046,120	$197,157	$8,648,193	$8,315,570
2	2021	10,818	48.6	0.437	3.012	8.065	10.834	26.235	$4,473,059	$1,748,017	$1,267,547	$1,057,946	$199,386	$8,745,955	$8,086,127
3	2022	10,926	49.1	0.442	3.046	8.156	10.957	26.532	$4,523,689	$1,767,803	$1,281,895	$1,069,921	$201,642	$8,844,949	$7,863,128
4	2023	11,036	49.7	0.447	3.081	8.249	11.081	26.833	$4,574,958	$1,787,838	$1,296,423	$1,082,047	$203,928	$8,945,193	$7,646,389
5	2024	11,146	50.3	0.452	3.116	8.342	11.207	27.137	$4,626,875	$1,808,127	$1,311,135	$1,094,326	$206,242	$9,046,705	$7,435,732
6	2025	11,257	50.8	0.457	3.151	8.437	11.334	27.445	$4,679,449	$1,828,672	$1,326,033	$1,106,761	$208,585	$9,149,501	$7,230,983
7	2026	11,370	51.4	0.463	3.187	8.533	11.463	27.758	$4,732,690	$1,849,478	$1,341,120	$1,119,353	$210,959	$9,253,599	$7,031,974
8	2027	11,484	52.0	0.468	3.223	8.630	11.593	28.074	$4,786,605	$1,870,547	$1,356,398	$1,132,105	$213,362	$9,359,017	$6,838,542
9	2028	11,599	52.6	0.473	3.260	8.729	11.726	28.394	$4,841,205	$1,891,884	$1,371,870	$1,145,018	$215,796	$9,465,774	$6,650,527
10	2029	11,715	53.2	0.479	3.297	8.828	11.860	28.718	$4,896,499	$1,913,493	$1,387,539	$1,158,096	$218,260	$9,573,888	$6,467,776
11	2030	11,832	53.8	0.484	3.335	8.929	11.995	29.047	$4,952,497	$1,935,376	$1,403,408	$1,171,341	$220,756	$9,683,378	$6,290,138
12	2031	11,950	54.4	0.490	3.373	9.031	12.133	29.380	$5,009,209	$1,957,538	$1,419,478	$1,184,754	$223,284	$9,794,263	$6,117,468
13	2032	12,069	55.0	0.495	3.412	9.135	12.272	29.716	$5,066,644	$1,979,983	$1,435,754	$1,198,338	$225,845	$9,906,563	$5,949,625
14	2033	12,190	55.7	0.501	3.451	9.240	12.413	30.058	$5,124,812	$2,002,714	$1,452,237	$1,212,096	$228,437	$10,020,297	$5,786,472
15	2034	12,312	56.3	0.507	3.491	9.346	12.555	30.403	$5,183,724	$2,025,737	$1,468,931	$1,226,029	$231,063	$10,135,485	$5,627,875
	2035	12,435		0.000	0.000	0.000	0.000	0.000	$0	$0	$0	$0	$0	$0	$0
	2036	12,560		0.000	0.000	0.000	0.000	0.000	$0	$0	$0	$0	$0	$0	$0
	2037	12,685		0.000	0.000	0.000	0.000	0.000	$0	$0	$0	$0	$0	$0	$0
	2038	12,812		0.000	0.000	0.000	0.000	0.000	$0	$0	$0	$0	$0	$0	$0
	2039	12,940		0.000	0.000	0.000	0.000	0.000	$0	$0	$0	$0	$0	$0	$0
	2040	13,070		0.000	0.000	0.000	0.000	0.000	$0	$0	$0	$0	$0	$0	$0
	2041	13,200		0.000	0.000	0.000	0.000	0.000	$0	$0	$0	$0	$0	$0	$0
	2042	13,332		0.000	0.000	0.000	0.000	0.000	$0	$0	$0	$0	$0	$0	$0
	2043	13,466		0.000	0.000	0.000	0.000	0.000	$0	$0	$0	$0	$0	$0	$0
	2044	13,600		0.000	0.000	0.000	0.000	0.000	$0	$0	$0	$0	$0	$0	$0
	Shaded cell indicates the AADT is outside the limits												Total Present Value		$103,338,326

With the number of fixtures proposed for this project, the total annual costs are:

- Fixtures – $10,800
- Maintenance – $4,224
- Energy – $6,240
- Total - $21,264

These costs were utilized to develop an aggregate Net Present Value of $236,421 for the cost of the proposed lighting plan.

Comparing these cost value to the savings value indicates a substantial positive value, indicating the lighting plan is justified.

Summary

Based upon the analysis contained herein, and consistent with Chapter 14 of FDOT MUTS, the lighting plan proposed for Estero Boulevard is warranted and justified.