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May 15, 2018

David J. Turiano
Building/Engineering Department
Village of Briarcliff Manor
1111 Pleasantville Road
Briarcliff Manor, NY 10510
Delivered via email only: dturiano@briarcliffmanor.org

Re: The Club at Briarcliff Manor
Lighting Analysis
Chazen Project Number 31692.00

Dear Mr. Turiano:

The presence, volume and intensity of lights associated with building construction and development is regulated by the New York State Building Code. In our review of the Club at Briarcliff Manor Project, The Chazen Companies (Chazen) reviewed the lighting design. The following is a brief summary of our review and the projects overall compliance with the code and has been assembled in response to concerns expressed by residents about the potential impacts of the project lighting on the surrounding neighborhoods.

SAFETY

First and foremost, there are minimum standards for lighting intensity to provide both safe working environments and safe egress for permanent occupants. **Occupational Safety and Health Administration (OSHA) Section 1926.56** requires a minimum of 5-footcandles (FC) for general construction lighting at all locations under construction. It is practice for contractors to exceed this value in order to insure compliance. These temporary light fixtures are also not subject to any Building Code regulations and/or any other local regulations as they are federal standards.

The **New York State Building Code, Section 1008** provides for a minimum standard for exterior lighting as it pertains to any walking surfaces used for egress. This code standard requires a minimum of 1-FC of light for all means of egress as a minimum standard. Designers typically do not provide excess levels for energy conservation purposes.

Based upon the standards above, the volume of light pollution created by the construction phase of the project will be significantly greater than the final design.

ENERGY CODE CONSIDERATIONS

There are limits on overall lighting levels in all commercial buildings based on the New York State Energy Conservation Code. **Section 405.4.2 - Interior Lighting Power** limits the total wattage of interior lighting. As demonstrated in the attached memo the project is well below the allowable lighting levels for interior spaces. **Section 405.5.1 - Exterior Building Lighting Power** provides for a maximum allowable wattage for exterior lighting. As demonstrated in the attached memorandum the exterior lighting levels are also in compliance. It should be noted that Zone 2 was utilized for the exterior lighting which includes residential zoning.

In addition to the requirements identified above, the Code also requires occupancy sensors for all lighting controls in common areas. By requiring occupancy sensors, all lighting on the lower level floors will be turned off when not in use. Neither this section of the code, nor the maximum wattage tables apply to single family houses, which is the surrounding and underlying Zone district at the Club.

While all references above are based on the New York State Building Code and Energy Conservation Code, the project also complies with the current lighting levels as defined by ASHRAE/IES 90.1. The US Green Building Council references ASHRAE and prescribes that exterior lighting levels are designed in accordance with the lighting density table.

Both energy codes have consistently reduced allowable lighting levels. For example, a Multi-Family use has decreased from 1.15 W/sqft in 1989 to 0.6 in the 2010 version.

SUMMARY

Based upon the detailed building code review performed at permit application, as well as continuous oversight of construction phase lighting submittals, the Club at Briarcliff Manor is within code allowable lighting levels.

Sincerely,

Edward P. Larkin, P.E.
Principal
Code Services
EPL/ enc [Interior & Exterior Lighting Memos]

cc: Rachel Toleman, Chazen
File

Attachment 1:

Interior Lighting

Technical Memorandum

PROJECT NUMBER:	31692.00
SUBJECT:	The Club at Briarcliff Manor
ADDRESS:	150 Lodge Road, Briarcliff Manor, NY 10510
AREA(S) AFFECTED:	Interior Lighting Analysis
APPLICABLE CODES AND STANDARDS:	2012 International Energy Conservation Code (IECC)

BACKGROUND:

There has been some concern expressed regarding the luminosity level of interior lighting at the Club at Briarcliff Manor, a project currently under construction in the Village of Briarcliff Manor, New York. The Club at Briarcliff Manor is a nine-story assisted living complex.

Figure 1: Rendering of the Club at Briarcliff Manor

CODE REVIEW SUMMARY:

As shown below, the individual rooms at the Club of Briarcliff Manor are designed to utilize less than the maximum allowance of wattage per square feet. Numerous room wattage levels were calculated including individual living quarters, the fitness area, mechanical room, and others as shown below. These rooms each have a different wattage per square foot allowance and the results show that the output levels comply with the maximum level stated by the 2012 IECC.

COMPREHENSIVE CODE REVIEW:

The following figure (Figure 12) is from the 2012 International Energy Conservation Code **Table C405.5.2(2)** and shows the maximum allowable wattage for different room types inside of The Club at Briarcliff Manor, herein The Club.

TABLE C405.5.2(2)
INTERIOR LIGHTING POWER ALLOWANCES:
SPACE-BY-SPACE METHOD

COMMON SPACE-BY-SPACE TYPES	LPD (w/ft²)
Atrium – First 40 feet in height	0.03 per ft. ht.
Atrium – Above 40 feet in height	0.02 per ft. ht.
Audience/seating area – permanent	
For auditorium	0.9
For performing arts theater	2.6
For motion picture theater	1.2
Classroom/lecture/training	1.30
Conference/meeting/multipurpose	1.2
Corridor/transition	0.7
Dining area	
Bar/lounge/leisure dining	1.40
Family dining area	1.40
Dressing/fitting room performing arts theater	1.1
Electrical/mechanical	1.10
Food preparation	1.20
Laboratory for classrooms	1.3
Laboratory for medical/industrial/research	1.8
Lobby	1.10
Lobby for performing arts theater	3.3
Lobby for motion picture theater	1.0
Locker room	0.80
Lounge recreation	0.8
Office – enclosed	1.1
Office – open plan	1.0
Restroom	1.0
Sales area	1.6[a]
Stairway	0.70
Storage	0.8
Workshop	1.60
Courthouse/police station/penetentiary	
Courtroom	1.90
Confinement cells	1.1
Judge chambers	1.30
Penitentiary audience seating	0.5
Penitentiary classroom	1.3
Penitentiary dining	1.1
BUILDING SPECIFIC SPACE-BY-SPACE TYPES	
Automotive – service/repair	0.70
Bank/office – banking activity area	1.5
Dormitory living quarters	1.10
Gymnasium/fitness center	
Fitness area	0.9
Gymnasium audience/seating	0.40
Playing area	1.40

(continued)

Figure 2: Table C405.5.2(2) of 2012 IECC, space by space area light energy level allowed

Utilitizing the table in Figure 2 along with the electrical construction drawings it is shown below that The Club at Briarcliff Manor is within the Enegy Compliance level of lighting for the interior of the building.

Table C405.5.2(1) shows space by space wattage allowances per square foot. On the first floor of The Club the mechanical rooms and dining room apply to this table. The calculations and analysis for both rooms on the first floor are below.

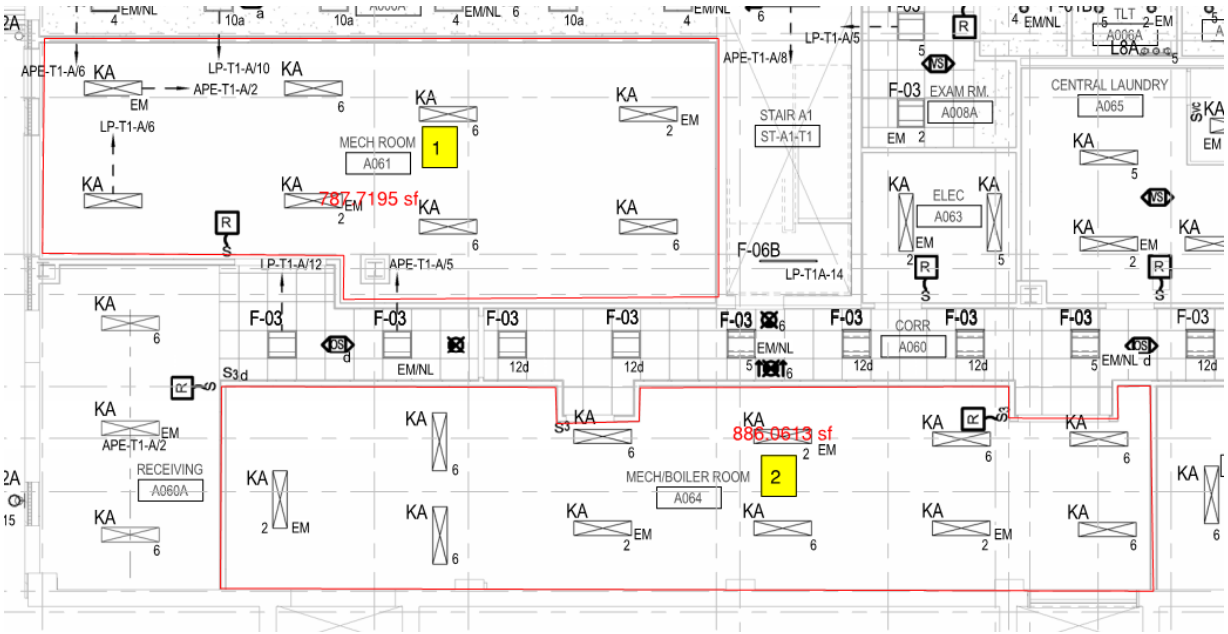

Figure 3: Mechanical rooms from drawing E-200A

Looking at Mechanical Room 1 (A061) from Figure 3 it can be see that the area of the room is 787.7195 sq. ft. This is then divided by the wattage of the 8 "KA" lights. The wattage of each KA light can be seen in Appendix A and the calculation is as follows:

8 KA fixtures at 40w gives a **total** wattage of **320w**

$$\frac{320\text{w}}{787.7195\text{sf}} = \frac{\mathbf{0.41w}}{\mathbf{sf}} < \frac{1.10\text{w}}{\text{sf}}$$

Mechanical Room 2 (A064) is a little larger with three more lights and the calculation for that room is:

11 KA fixtures at 40w gives a **total** wattage of **440w**

$$\frac{440\text{w}}{886.0613\text{sf}} = \frac{\mathbf{0.50w}}{\mathbf{sf}} < \frac{1.10\text{w}}{\text{sf}}$$

Both mechanical rooms fall at roughly 55 percent less than the maximum allowable wattage per square foot. This is a significant energy savings and lighting reduction.

The next room analyzed was the dining room (A122).

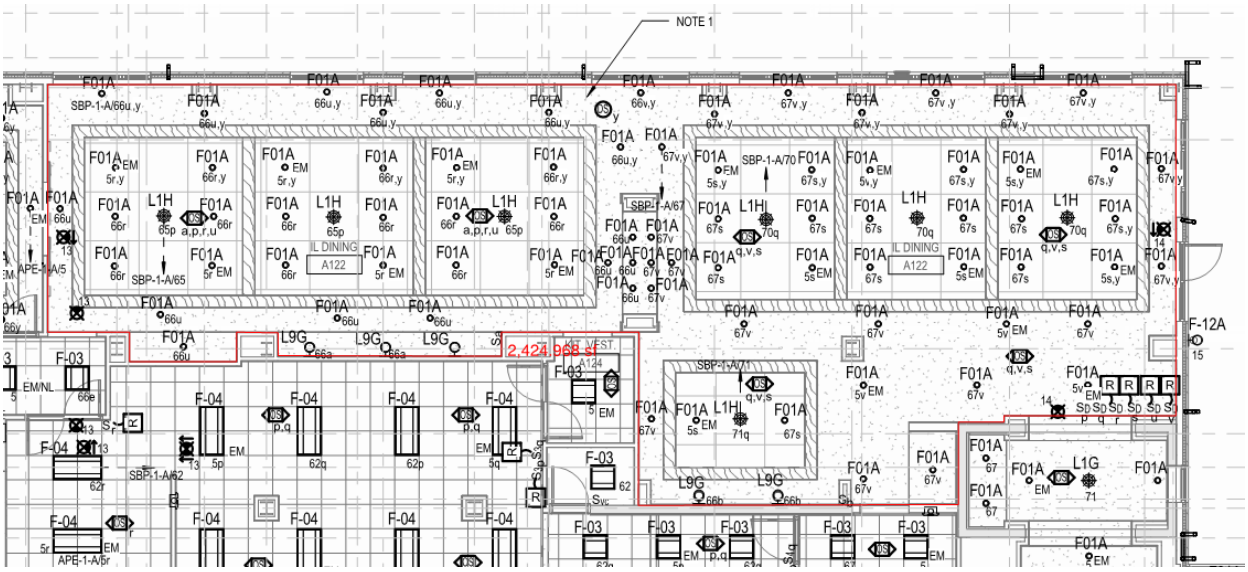

Figure 4: Dining area (A121) from drawing E-201A

The calculations for the dining room are:

F-01A with 78 fixtures at 24.8W gives a **total** wattage of **1934.4w**
L1H with 7 fixtures at 15w gives a **total** wattage of **105w**
L9G with 5 fixtures at 13w gives a **total** wattage of **65w**

Total watts = 2104.4

From Figure 2 the maximum allowable wattage per square foot in the dining room is 1.40w. The calculation for the dining room is as follows:

$$\frac{2104.4\text{w}}{2365.904\text{sf}} = \frac{\mathbf{0.89w}}{\mathbf{sf}} < \frac{1.40\text{w}}{\text{sf}}$$

The upper floors of The Club fall into a different table than the rooms on lower levels. This is because the upper floors are residential living quarters with limited other room types. For this reason, Table C405.5.2(1) applies (see Figure 5).

TABLE C405.5.2(1)
INTERIOR LIGHTING POWER ALLOWANCES:
BUILDING AREA METHOD

BUILDING AREA TYPE	LPD (w/ft²)
Automotive facility	0.9
Convention center	1.2
Courthouse	1.2
Dining: bar lounge/leisure	1.3
Dining: cafeteria/fast food	1.4
Dining: family	1.6
Dormitory	1.0
Exercise center	1.0
Fire station	0.8
Gymnasium	1.1
Health care clinic	1.0
Hospital	1.2
Hotel	1.0
Library	1.3
Manufacturing facility	1.3
Motel	1.0
Motion picture theater	1.2
Multifamily	0.7
Museum	1.1
Office	0.9
Parking garage	0.3
Penetentiary	1.0
Performing arts theater	1.6
Police station	1.0
Post office	1.1
Religious building	1.3
Retail	1.4
School/university	1.2
Sports arena	1.1
Town hall	1.1
Transportation	1.0
Warehouse	0.6
Workshop	1.4

Figure 5: TableC405.5.2(1) of 2012 IECC, building area light energy level allowed

From this table it is difficult to place The Club into one specific category, an argument could be made that it fits under several categories. Multifamily is the most stringent category that The Club fits under and for that reason 0.7watts per square foot was chosen.

As shown in the calculations for all floors the design of interior lights is under the most stringent condition for wattage allowed per square foot.

Floor 2:

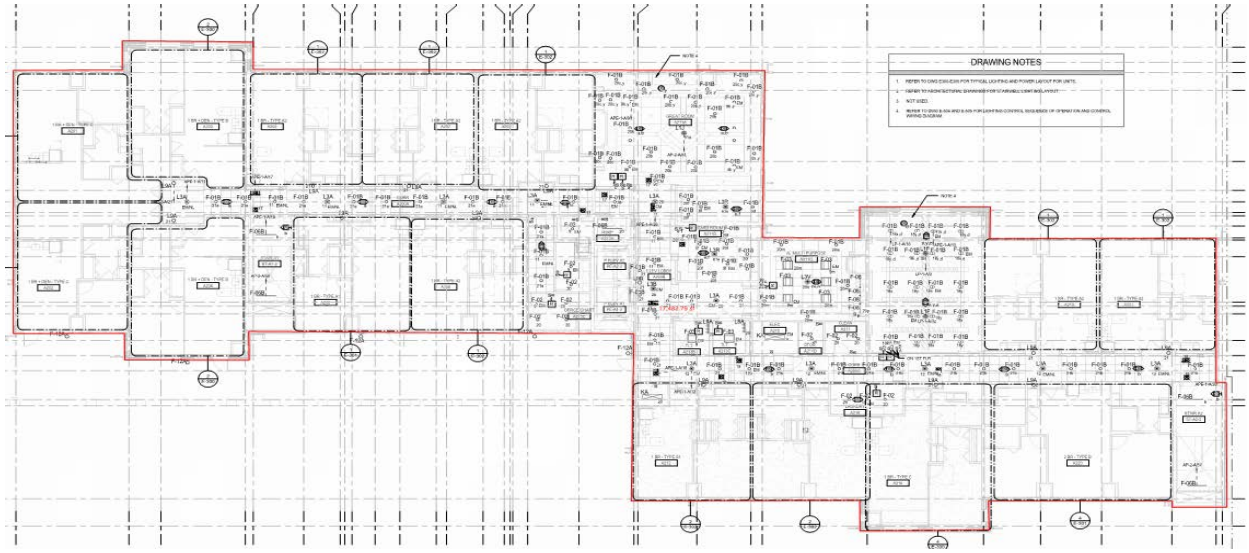

Figure 6: Drawing E-202A, building A square footage is 17,482.79

The fixture count for the second floor along with total wattage is below:

Fixture ID	# of Fixtures	watts per	total watts(w)
L9A	13	26w	338
L3A	11	30w	330
F-01B	99	24.8w	2455.2
F-06B	5	25w	125
F-02	12	12.9w	154.8
L1J	1	50w	50
L3R	1	45w	45
KA	2	40w	80
L3V	1	60w	60
F-03	8	31w	248
L3B	1	60w	60
F-08	4	3w	12
L9B	1	16w	16
Total Watts			**3974w**

excluding bedroom wattage

Approx 1-beroom wattage is 86.9w

Approx 20bedroom wattage is 155.4w

16 1-bedroom rooms on level 3

2 2-bedroom rooms on level 3

Total Watts including bedrooms is 5388.9w

Table 1: fixture count and wattage for level 2, 1 and 2 bedroom approximations in appendix B

Watts per Square foot is as follows:

$$\frac{5388.9\text{w}}{17{,}482.79\text{sf}} = \frac{\mathbf{0.31w}}{\mathbf{sf}} < \frac{0.70\text{w}}{\text{sf}}$$

Floor 3:

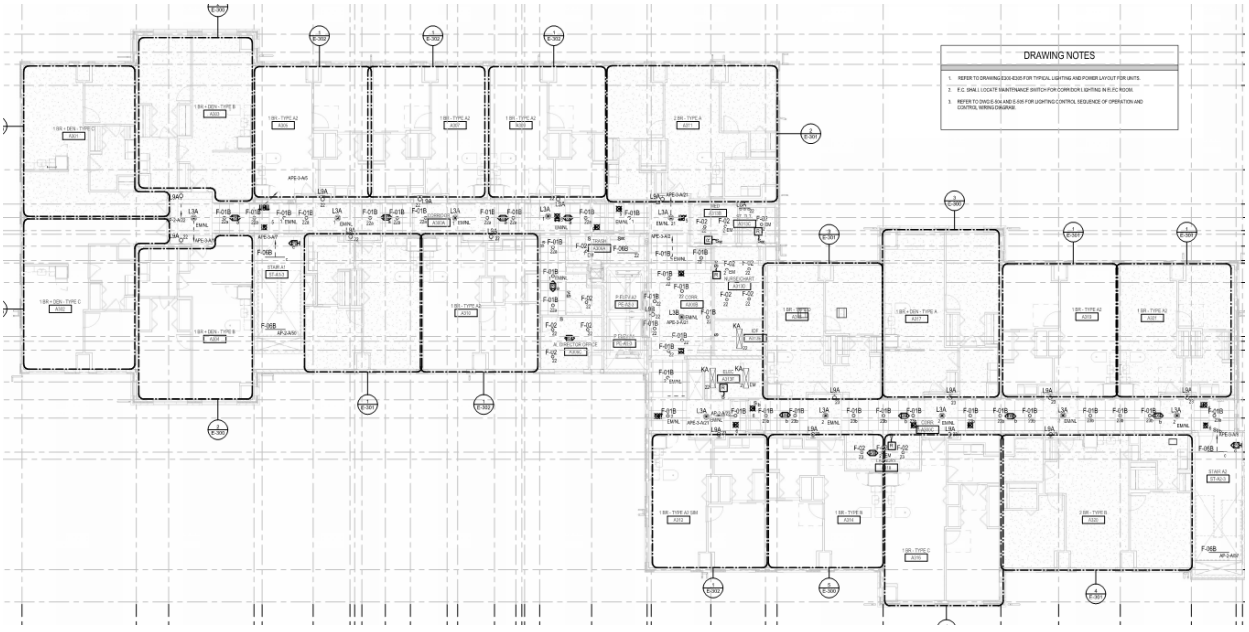

Figure 7: Drawing E-203A, Floor 3 lighting fixture layout, square footage same as level 2

The fixture count for the third floor along with total wattage is below:

Fixture ID	# of Fixtures	watts per	total watts(w)
L9A	16	26w	416
L3A	10	30w	300
F-01B	38	24.8w	942.4
F-06B	5	25w	125
F-02	14	12.9w	180.6
KA	3	40w	120
L3B	1	60w	60
L9B	1	16w	16
Total Watts			**2160w**

excluding bedroom wattage

Approx 1-beroom wattage is 86.9w

Approx 20bedroom wattage is 155.4w

16 1-bedroom rooms on level 3

1 2-bedroom rooms on level 3

Total Watts including bedrooms is 3818.3w

Table 2: fixture count and wattage for level 3, 1 and 2 bedroom approximations in appendix B

Watts per Square foot is as follows:

$$\frac{3818.3\text{w}}{17{,}482.79\text{sf}} = \frac{\mathbf{0.22w}}{\mathbf{sf}} < \frac{0.70\text{w}}{\text{sf}}$$

Floor 4-6:

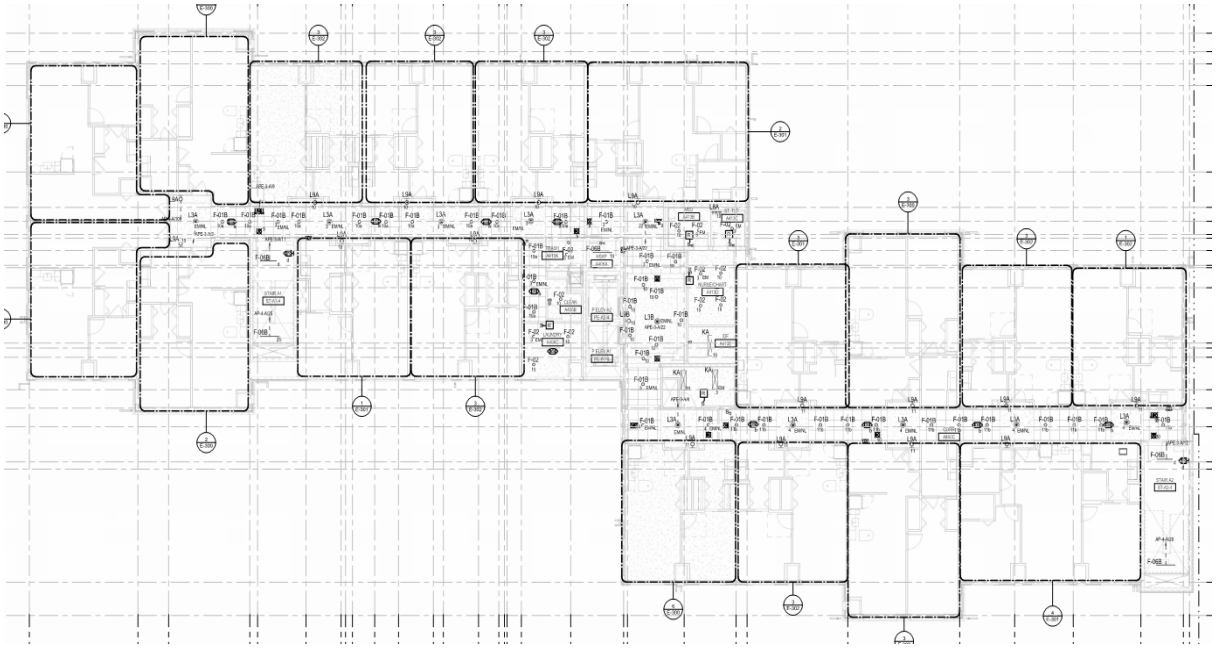

Figure 8: Drawing E-204A, Floor 4-6 lighting fixture layout, square footage same as level 2

The fixture count for the forth through sixth floors along with total wattage is below:

Fixture ID	# of Fixtures	watts per	total watts(w)
L9A	16	26w	416
L3A	10	30w	300
F-01B	38	24.8w	942.4
F-06B	5	25w	125
F-02	12	12.9w	154.8
KA	3	40w	120
L3B	1	60w	60
L9B	1	16w	16
Total Watts			**2134.2w**

excluding bedroom wattage

Approx 1-beroom wattage is 86.9w

Approx 20bedroom wattage is 155.4w

16 1-bedroom rooms on level 4-6

2 2-bedroom rooms on level 4-6

Total Watts including bedrooms is 3835.4

Table 3: fixture count and wattage for level 4-6, 1 and 2 bedroom approximations in appendix B

Watts per Square foot is as follows:

$$\frac{3835.4\text{w}}{17{,}482.79\text{sf}} = \frac{\mathbf{0.22w}}{\mathbf{sf}} < \frac{0.70\text{w}}{\text{sf}}$$

Floor 7:

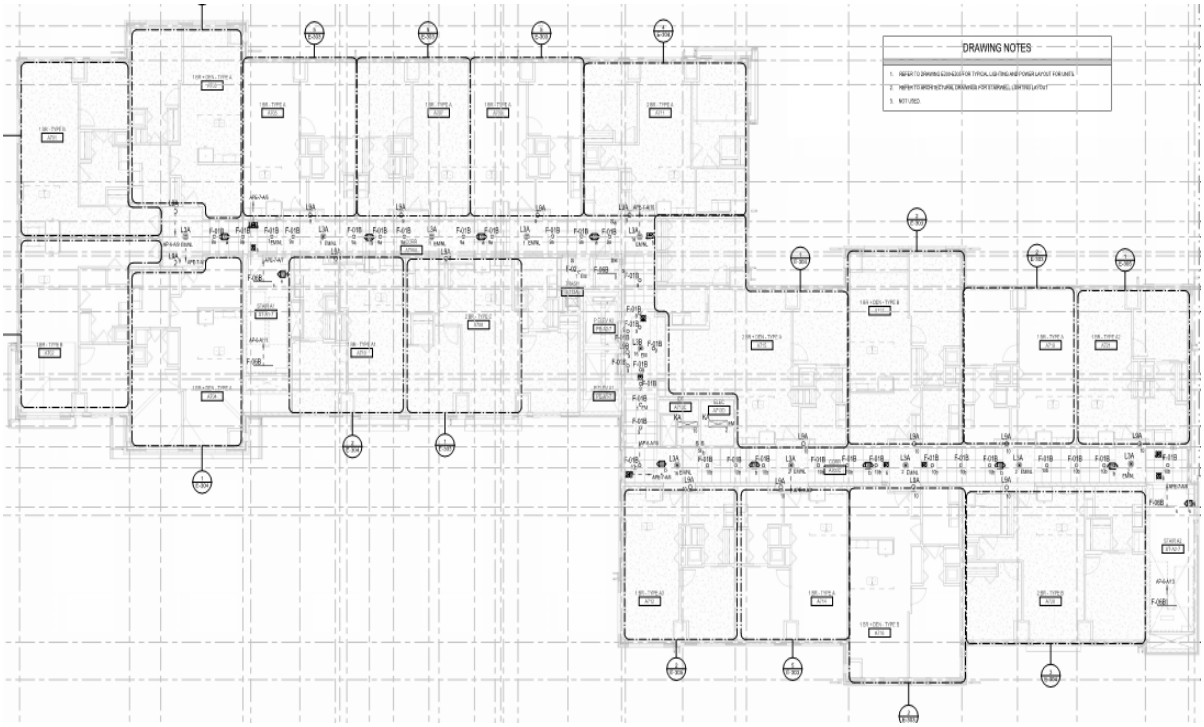

Figure 9: Drawing E-207A, Floor 7 lighting fixture layout, square footage same as level 2.

The fixture count for the seventh floor along with total wattage is below:

Fixture ID	# of Fixtures	watts per	total watts(w)
L9A	16	26w	416
L3A	10	30w	300
F-01B	36	24.8w	892.8
F-06B	5	25w	125
F-02	12	12.9w	12.9
KA	2	40w	80
L3B	1	60w	60
Total Watts			**1886.7w**

excluding bedroom wattage

Approx 1 bedroom wattage is 86.9w

Approx 20 bedroom wattage is 155.4w

14 1-bedroom rooms on level 7

4 2-bedroom rooms on level 7

Total Watts including bedrooms is 3724.9w

Table 4: fixture count and wattage for level 7, 1 and 2 bedroom approximations in appendix B

Watts per Square foot is as follows:

$$\frac{3724.9\text{w}}{17{,}482.79\text{sf}} = \frac{\mathbf{0.21w}}{\mathbf{sf}} < \frac{0.70\text{w}}{\text{sf}}$$

Floor 8:

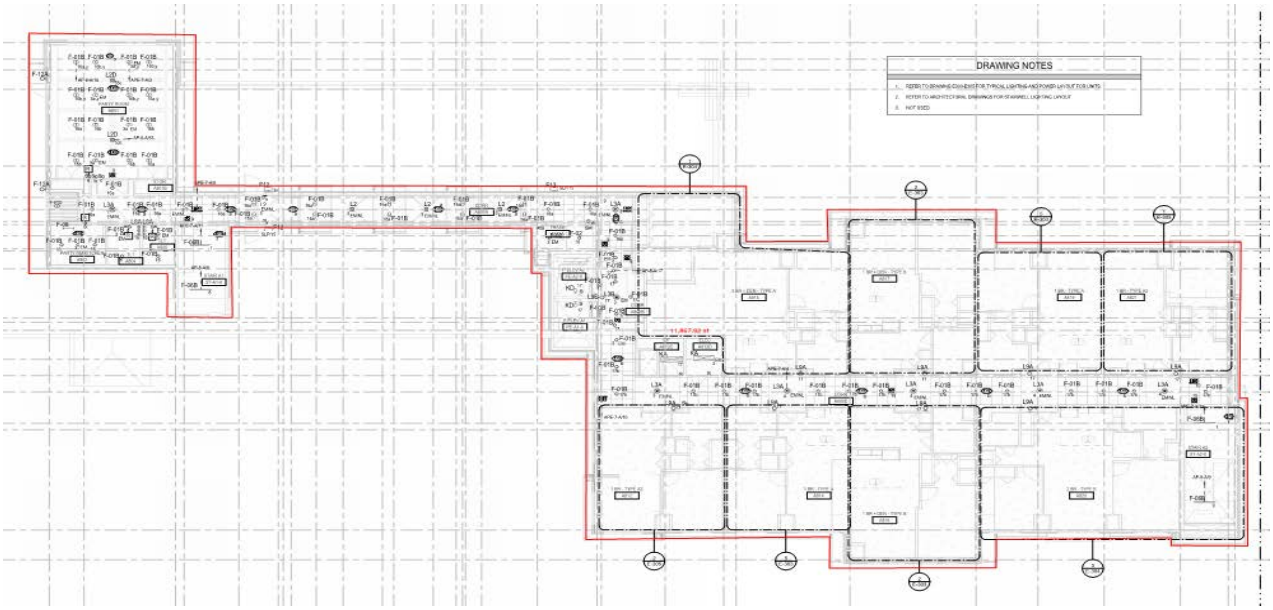

Figure 10: Drawing E-208A, Floor 8 lighting fixture layout, square footage 11,867.92

The fixture count for the eigth floor along with total wattage is below:

Fixture ID	# of Fixtures	watts per	total watts(w)
L9A	8	26w	208
L3A	7	30w	210
F-01B	66	24.8w	1636.8
F-06B	4	25w	100
F-02	2	12.9w	25.8
KA	2	40w	80
L3B	1	60w	60
KD	2	26W	52
L9B	1	16W	16
L2	4	45W	180
F-12	3	35W	105
L2D	2	240W	480
F-08	1	3W	3
Total Watts			**3156.6w**

excluding bedroom wattage

Approx 1-beroom wattage is 86.9w

Approx 20bedroom wattage is 155.4w

6 1-bedroom rooms on level 8

2 2-bedroom rooms on level 8

Total Watts including bedrooms is 3988.8w

Table 5: fixture count and wattage for level 8, 1 and 2 bedroom approximations in Appendix B

Watts per Square foot is as follows:

$$\frac{3988.8\text{w}}{11{,}867.92\text{sf}} = \frac{\mathbf{0.34w}}{\mathbf{sf}} < \frac{0.70\text{w}}{\text{sf}}$$

Appendix A

BACK-OF-HOUSE LIGHT FIXTURE SCHEDULE				
TYPE	LAMP	VOLTAGE	MOUNTING	DESCRIPTION
⊠	LED	120V	CEILING/WALL SURFACE	UNIVERSAL EDGE-LIT EXTRUDED ALUMINUM HOUSING EXIT SIGN, GREEN LETTER REFER TO DRAWINGS FOR NUMBER OF FACES, CHEVRON LOCATION AND MOUNTING CONFIGURATION PHILIPS CHLORIDE #ER44RLDU1(2)G
KA	40W LED	120V	CEILING PENDANT/SURFACE	4' INDUSTRIAL FLUIDSTREAM LED LINEAR WITH REFLECTOR CHAIN HANGING KIT, 4000K - PHILIPS DAY-BRITE #LFR4IFLSLD3740UDZTEMLED
KD	26W CFL	120V	WALL SURFACE	GLASS GLOBE ELEVATOR PIT MOUNTED FIXTURE COMPACT FLUORESCENT ROUGHLYTE SERIERS DIE CAST ALUMINUM ELECTRICAL ENCLOSURE PHILIPS STONCO #VW0L26I-FLEB-8
KE	26W CFL	120V	WALL SURFACE	EMERGENCY LIGHTING UNIT SELF TEST ELECTRONICS - - DUAL LITE #EZ-2 SERIES

Figure 11: Lighting schedule part 1 from drawing E-002

ARCHITECTURAL LIGHT FIXTURE SCHEDULE				
TYPE	LAMP	VOLTAGE	MOUNTING	DESCRIPTION
F-01	24.8W LED	120V	CEILING RECESSED	HALO 6" LED 1200 SERIES 86 CRI, HIGH LUMEN 0-10V DC DIMMABLE MODULE IN NON IC HOUSING, 3580K, REGRESSED LENS WITH WHITE BAFFLE AND WHITE TRIM RING COOPER LIGHTING #HT50T
F-01A	24.8W LED	120V	CEILING RECESSED	HALO 6" LED 1200 SERIES 86 CRI, HIGH LUMEN 0-10V DC DIMMABLE MODULE IN NON IC HOUSING, 3580K,SOLITE REGRESSED LENS SHOWER RATED. ARCHITECT TO SELECT FINISH COOPER LIGHTING #HT50T
F-01B	24.8W LED	120V	CEILING RECESSED	HALO 6" LED 1200 SERIES 86 CRI, HIGH LUMEN 0-10V DC DIMMABLE MODULE IN NON IC HOUSING, 3580K, WHITE BAFFLE WHITE TRIM RING. - COOPER LIGHTING #HT50T
F-01C	3W LED	120V	CEILING RECESSED	4" LOW VOLTAGE FLOOD LED, E-129V ELECTRONIC, AMBER LIGHT 12V AC/DC - DMF LIGHTING #DH44ST-E
F-01D	LED	120V	CEILING RECESSED	SLENDER FORM CANOPY LUMINAIRE, CONCENTRATED DOWNLIGHT,480K,TICRI, 48LED, NEUTRAL WHITE - PHILIPS GARDCO #SFCR SERIES
F-02	12.9W LED	120V	CEILING RECESSED	HALO 6" LED DOWNLIGHT , 90CR, 3080K, 0-10V DIMMING,WHITE FINISH - - COOPER LIGHTING #SLD SERIES
F-02A	(2) 13W CFL, (1) 4WCFL	120V	CEILING RECESSED	VENTILATION FAN HEATER, LIGHT, NL COMBINATION - - WHISPER WARM #FV-11VHL2
F-03	31W LED	120V	CEILING RECESSED	ARSOSD RECESSED LED RIBBED 2x2 ACRYLIC FIXTURE, 3500K,80CRI ACR SHIELDING,0-10V DIMMING - PHILIPS DAYBRITE# ARSO 2X4E SERIES
F-04	48W LED	120V	CEILING RECESSED	HIGH OUTPUT RECESSED LED 2x4 FIXTURE, 3500K,82 CRI,20 GUAGE STANDARD HOUSING, 0-10V DIMMING - KENALL LIGHTING SIMPLE SEAL #CSEDO SERIES
F-05	15W LED	120V	CEILING RECESSED	4" ROUND LED ADJUSTABLE 2ND GENERATION,2700K,90CRI, 0-10V DIMMING ARCHITECT TO SELECT FINISH - COOPER LIGHTING #HALO H4 SERIES
F-06A	25W LED	UNIV.	CEILING SURFACE	2' NARROW SEMI FROSTED LENSE LED LENSED STRIPLIGHT, 3800 LUMENS ARCHITECT TO SELECT FINISH - EATON METALUX SMLED LENSED SERIES
F-06B	25W LED	UNIV.	CEILING SURFACE	4' NARROW SEMI FROSTED LENSE LED LENSED STRIPLIGHT,3800 LUMENS ARCHITECT TO SELECT FINISH - EATON METALUX SMLED LENSED SERIES
F-06C	25W LED	UNIV.	CEILING SURFACE	6' NARROW SEMI FROSTED LENSE LED LENSED STRIPLIGHT, 3800 LUMENS ARCHITECT TO SELECT FINISH - EATON METALUX SMLED LENSED SERIES
F-08	3W/FT LED	120V	CEILING SURFACE	LED UNDERCABINETS, 90CRI,3500K - ELV DIMMING PHILIPS DAYBRITE#LUMCS SERIES
F-09	1.44W LED	120V	STEP LIGHT	LED MINI STEP LIGHTING - - PEGASUS LIGHTING #LINCS SERIES
F-10	20W LED	120V	WALL MOUNT	GLASS ETCHED,3800K,80CRI - - PHILIPS EDGE # FL3080830 SERIES
F-11	57W LED	120V	EXTERIOR WALL	4' TWO PIECE ASYMMETRIC LIGHT BAR, 3500K,42 LEDs,NON DIMMING - - ELLIPTIPAR #3171
F-12	35W LED	UNIV	WALL MOUNT	WALL PACK MEDIUM WPM 16LED, 4000K FINISH SPECIFIED BY ARCHITECT - PHILIPS STONCOWPM SERIES
F-12A	LED	120V	WALL MOUNT	EXTERIOR WALL MOUNT PENDENT GOLD WHITE IRIDESCENT FINISH SPECIFIED BY ARCHITECT G-24 SOCKET FOR LED INVERAWAY #IS-8 SERIES
BK	LED	120V	COVE	ROUND DIE CAST ALUMINUM FIXTURE 2700K, 85CRI, CLASS 2 24V TRANSFORMER ARCHITECT TO SELECT FINISH WAC LIGHTING #HR SERIES
BK2	100W LED	120V	COVE	LINEAR WHITE LED COVE LIGHTING FIXTURE, 3800K, PROVIDE 120V/24V POWER SUPPLY , JUMPER CABLES AND ACCESSORIES - PHILIPS #WA COVE LP
BK3	2W/FT LED	120V	COVE	LED LINEAR CUTTABLE INCREMENTS 6" WITH CONNECTORS, LM79 , 120 DEGREES, 24V DC, 3" ALONG VERTICAL PLANE, 3080K, 48FT MAX LENGTH - LEIBREND #LP-238

Figure 12: Lighting schedule continued from drawing E-002

L1H	7	BUILDING A: LEVEL 1 IL DINING	CONTEMPORARY CHANDELIER	HAMMERTON	CH2062-SH-A35 CUSTOMIZED	36"DIA. X 18"H OVERALL HEIGHT :33" (CUSTOM DIA. & HEIGHT)	FLAT BRONZE / BLOWN GLASS CYLINDER LIGHT	MANUFACTURER RECOMMENDS (8) 15W LED 2700K (MFR. TO ADVISE ON QUANTITY BASED ON CUSTOM SIZE)	BOTTOM OF FIXTURE @ 8'-6" AFF	ACCOUNT FOR THE USE OF LED BULBS IN FIXTURE.
L4A	-	IL, AL & MS RESIDENT UNITS	FLUSH MOUNT FIXTURE	PROGRESS LIGHTING	P3564--09EB	19-3/8"DIA. X 5.5" H OVERALL HEIGHT: 5.5"	BRUSHED NICKEL / SATIN ETCHED GLASS	(3) HYBIRD (13-15W), 2700K OR (3) LED, 2700K	REFER TO ARCHITECTURAL DRAWINGS FOR UNIT CEILING HEIGHTS	ACCOUNT FOR THE USE OF LED BULBS IN FIXTURE.
L9G	5	BUILDING A: LEVEL 1 IL DINING	CONTEMPORARY SCONCE	HAMMERTON	CS2168 - ONYX	6"W X 22.5"H X 3"EXT. ADA COMPLIENT	FLAT BRONZE WITH HAMMERED TEXTURE MO-46/STANDARD GLASS SHADE IN SH-G10 STYLE	(1) 13W LED 2700K	JBOX TO BE MOUNTED @ 6'-8"AFF	ACCOUNT FOR THE USE OF LED BULBS IN FIXTURE.

Figure 13: Remaining light fixtures from calculations taken from drawing E-002

Appendix B

1-bedroom

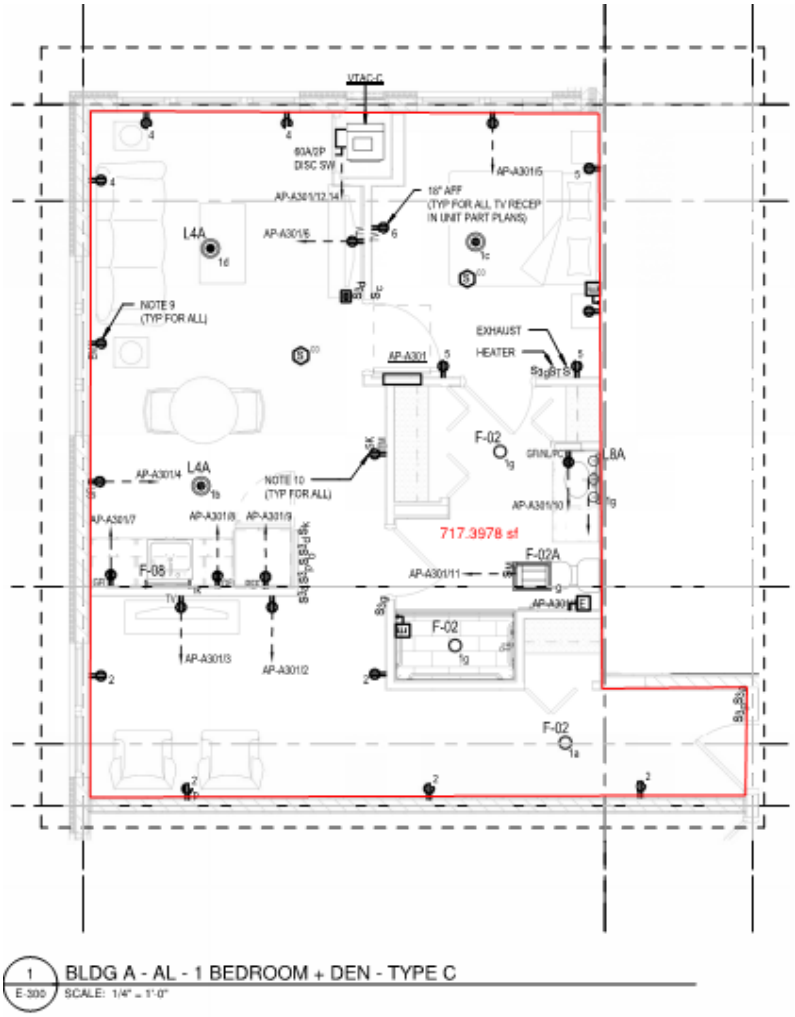

Figure 14: 1-bedroom guest room from drawing E-300

Calculations for 1-bedroom apartment are as follows:

L4A with 2 fixtures at 15w gives a total wattage of 30w
F-02 with 3 fixtures at 12.9w gives a total wattage of 38.7w
F-02A with 1 fixture at 15w gives a total wattage of 15w
F-08 with 1 fixture at 3w gives a total wattage of 3w

Total wattage = 86.9

$$\frac{86.9\text{w}}{717.3978\text{sf}} = \frac{\mathbf{0.12w}}{\mathbf{sf}}$$

2-bedroom

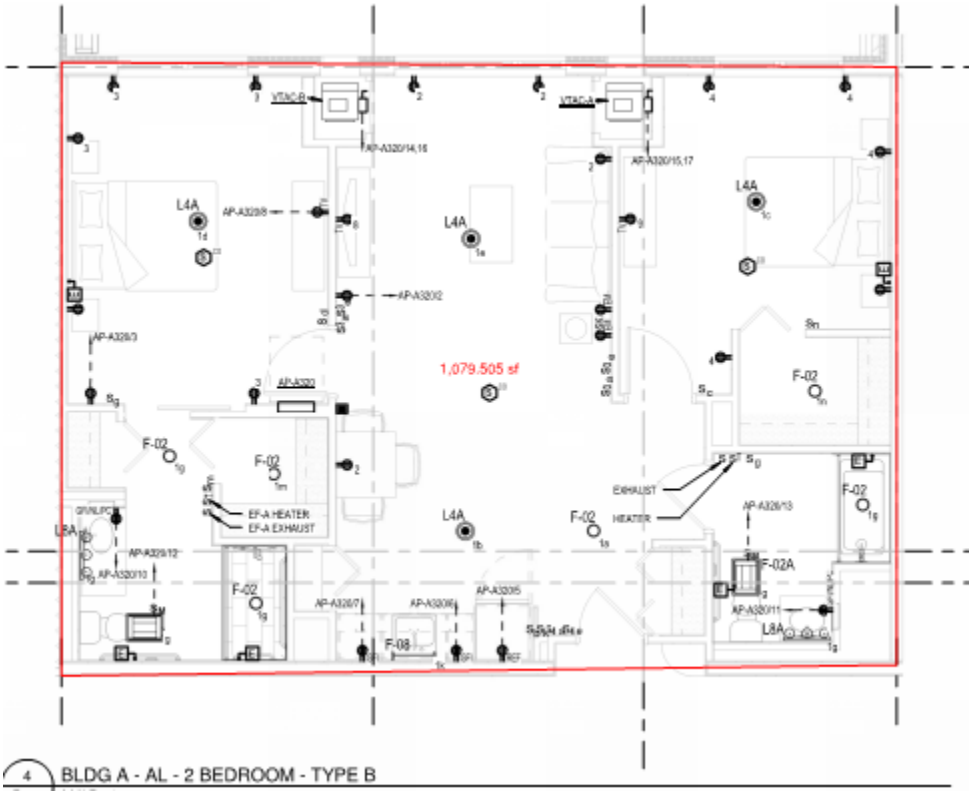

Figure 15: 1-bedroom guest room from drawing E-301

Calculations for 2-bedroom apartment are as follows:

L4A with 4 fixtures at 15w gives a total wattage of 60w
F-02 with 6 fixtures at 12.9w gives a total wattage of 77.4w
F-02A with 1 fixture at 15w gives a total wattage of 15w
F-08 with 1 fixture at 3w gives a total wattage of 3w

Total wattage = 155.4

$$\frac{155.4\text{w}}{1{,}079.595\text{sf}} = \frac{\mathbf{0.14w}}{\mathbf{sf}}$$

Attachment 2:

Exterior Lighting

Technical Memorandum

PROJECT NUMBER:	31692.00
SUBJECT:	The Club at Briarcliff Manor
ADDRESS:	150 Lodge Road, Briarcliff Manor, NY 10510
AREA(S) AFFECTED:	Exterior Lighting Analysis
APPLICABLE CODES AND STANDARDS:	2012 International Energy Conservation Code (IECC)

BACKGROUND:

There has been some concern expressed with regard to the amount of exterior lighting at the Club at Briarcliff Manor, a project currently under construction in the Village of Briarcliff Manor, New York. The Club at Briarcliff Manor is a nine story assisted living complex.

CODE REVIEW SUMMARY:

As shown below, the driveway and parking lot of the Club at Briarcliff Manor is designed to utilize less than the maximum allowance of wattage per square foot. Building entrances and exits were also designed to utilize less than the maximum allowance per square foot. Once construction is complete the Club at Briarcliff Manor will comply with the levels put forth in the 2012 IECC.

COMPREHENSIVE CODE REVIEW:

The following is from the 2012 International Energy Conservation Code **Table C405.5.2(1).** Briarcliff Manor falls into Exterior Lighting Zone 2 (Figure 1).

TABLE C405.5.2(1)
EXTERIOR LIGHTING ZONES

LIGHTING ZONE	DESCRIPTION
1	Developed areas of national parks, state parks, forest land, and rural areas
2	Areas predominantly consisting of residential zoning, neighborhood business districts, light industrial with limited nighttime use and residential mixed-use areas
3	All other areas not classified as lighting zone 1, 2 or 4
4	High-activity commercial districts in major metropolitan areas as designated by the local land use planning authority

Figure 1: Table C405.5.2(1)

This table allows for very specific lighting requirements as given by **Table C405.5.2(2).**

TABLE C405.5.2(2)
INDIVIDUAL LIGHTING POWER ALLOWANCES FOR BUILDING EXTERIORS

		LIGHTING ZONES			
		Zone 1	Zone 2	Zone 3	Zone 4
Base Site Allowance (Base allowance is usable in tradable or nontradable surfaces.)		500 W	600 W	750 W	1300 W
Tradable Surfaces (Lighting power densities for uncovered parking areas, building grounds, building entrances and exits, canopies and overhangs and outdoor sales areas are tradable.)	**Uncovered Parking Area**				
	Parking areas and drives	0.04 W/ft²	0.06 W/ft²	0.10 W/ft²	0.13 W/ft²
	Building Grounds				
	Walkways less than 10 feet wide	0.7 W/linear foot	0.7 W/linear foot	0.8 W/linear foot	1.0 W/linear foot
	Walkways 10 feet wide or greater, plaza areas special feature areas	0.14 W/ft²	0.14 W/ft²	0.16 W/ft²	0.2 W/ft²
	Stairways	0.75 W/ft²	1.0 W/ft²	1.0 W/ft²	1.0 W/ft²
	Pedestrian tunnels	0.15 W/ft²	0.15 W/ft²	0.2 W/ft²	0.3 W/ft²
	Building Entrances and Exits				
	Main entries	20 W/linear foot of door width	20 W/linear foot of door width	30 W/linear foot of door width	30 W/linear foot of door width
	Other doors	20 W/linear foot of door width	20 W/linear foot of door width	20 W/linear foot of door width	20 W/linear foot of door width
	Entry canopies	0.25 W/ft²	0.25 W/ft²	0.4 W/ft²	0.4 W/ft²
	Sales Canopies				
	Free-standing and attached	0.6 W/ft²	0.6 W/ft²	0.8 W/ft²	1.0 W/ft²
	Outdoor Sales				
	Open areas (including vehicle sales lots)	0.25 W/ft²	0.25 W/ft²	0.5 W/ft²	0.7 W/ft²
	Street frontage for vehicle sales lots in addition to "open area" allowance	No allowance	10 W/linear foot	10 W/linear foot	30 W/linear foot
Nontradable Surfaces (Lighting power density calculations for the following applications can be used only for the specific application and cannot be traded between surfaces or with other exterior lighting. The following allowances are in addition to any allowance otherwise permitted in the "Tradable Surfaces" section of this table.)	Building facades	No allowance	0.075 W/ft² of gross above-grade wall area	0.113 W/ft² of gross above-grade wall area	0.15 W/ft² of gross above-grade wall area
	Automated teller machines (ATM) and night depositories	270 W per location plus 90 W per additional ATM per location	270 W per location plus 90 W per additional ATM per location	270 W per location plus 90 W per additional ATM per location	270 W per location plus 90 W per additional ATM per location
	Entrances and gatehouse inspection stations at guarded facilities	0.75 W/ft² of covered and uncovered area	0.75 W/ft² of covered and uncovered area	0.75 W/ft² of covered and uncovered area	0.75 W/ft² of covered and uncovered area
	Loading areas for law enforcement, fire, ambulance and other emergency service vehicles	0.5 W/ft² of covered and uncovered area	0.5 W/ft² of covered and uncovered area	0.5 W/ft² of covered and uncovered area	0.5 W/ft² of covered and uncovered area
	Drive-up windows/doors	400 W per drive-through	400 W per drive-through	400 W per drive-through	400 W per drive-through
	Parking near 24-hour retail entrances	800 W per main entry	800 W per main entry	800 W per main entry	800 W per main entry

For SI: 1 foot = 304.8 mm, 1 watt per square foot = W/0.0929 m².
W = watts.

Figure 2: Table C405.5.2(2)

The table shown in Figure 2 states that for all parking and driveways the maximum wattage per square foot cannot exceed .06.

Tabulating the square footage from the entrance on Scarborough Road to the building entrance including the parking areas we get the following:

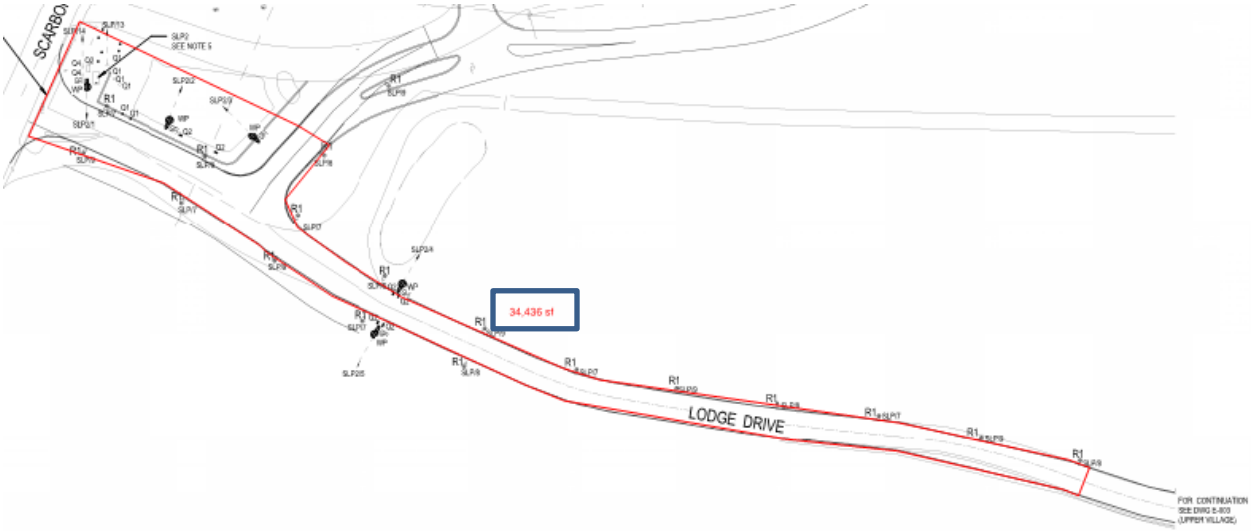

Figure 3: 34,436 sf from entrance to halfway up Lodge Drive (Sheet E-004 revised 10/31/16).

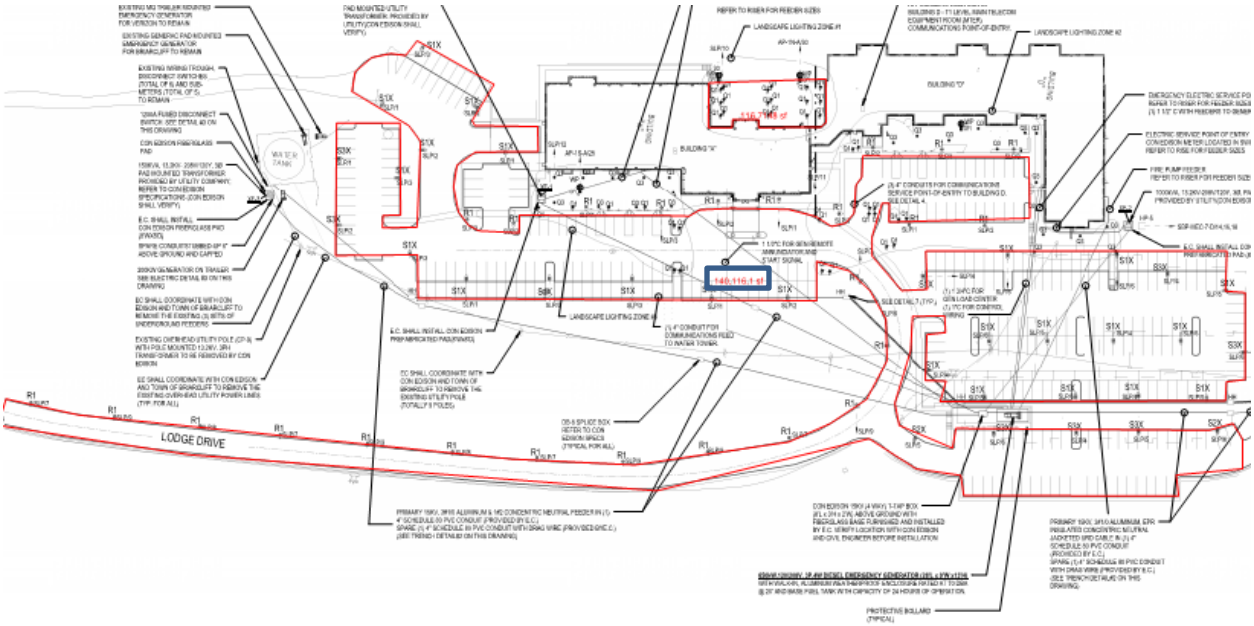

Figure 4: 140,116.1 sf of parking space and remain entrance from Lodge Drive (Sheet E-003 revised 10/31/16).

From Figures 3 and 4 it can be shown that the square footage of the parking areas and driveway roughly totals **174,552 sf.**

In the permitted construction set lighting fixture schedules were provided and can be seen in Appendix A. The lighting fixture schedules show individual watt levels for each type of light fixture and the list below provides the fixture type quantity and total wattage:

Type R1 = 37 fixtures for a total wattage of **2590W**
Type S1X = 24 fixtures for a total wattage of **2472W**
Type S2X = 1 fixtures for a total wattage of **103W**
Type S3X = 6 fixtures for a total wattage of **618W**
Type Q1 = 18 fixtures for a total wattage of **180W**
Type Q2 = 3 fixtures for a total wattage of **36W**
Type Q4 =2 fixtures for a total wattage of **8W**

Total wattage: **6007W**

$$\frac{6{,}007\text{w}}{174{,}552\text{sf}} = \frac{.\mathbf{034w}}{\mathbf{sf}} < \frac{.06\text{w}}{\text{sf}}$$

The equation shows that the driveway and parking lot structure utilizes approximately a little over half of the maximum allowance of wattage per square foot.

Other areas reviewed were building entrances and exits.

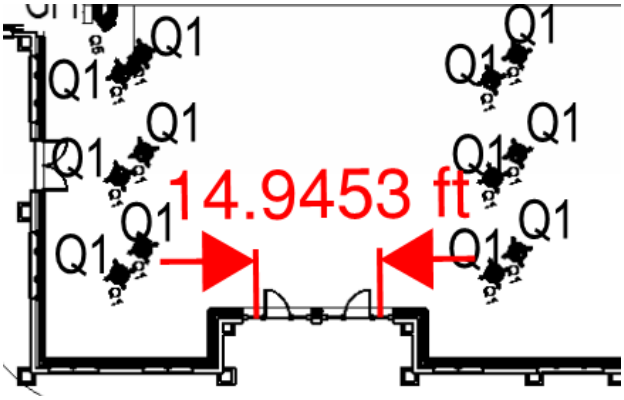

Figure 6: 15 linear foot door width (Sheet E-003 revised 10/31/16).

Table C405.5.2(2) shows the 20 Watts per linear foot of door width is allowed.

Figure 6 shows a door width of 15 feet with 12 Q1 fixtures surrounding the door, this becomes 12 times 10 (10W per light) and gives a **total wattage of 120W.**

$$\frac{120\text{w}}{15\text{ft}} = \frac{\mathbf{8w}}{\mathbf{ft}} < \frac{20\text{w}}{\text{ft}}$$

The main entrance canopy also applies to table Table C405.5.2(2). The square footage of the canopy is approximately 854sf. See figure 7 below.

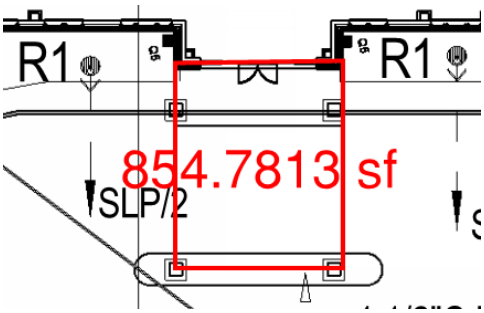

Figure 7: 854 sf canopy (Sheet E-003 revised 10/31/16)

This entrance has two R1 type light fixtures (70 watts per light) for a **total wattage of 140W.**

$$\frac{140\text{w}}{854\text{sf}} = \frac{\mathbf{0.16w}}{\mathbf{ft}} < \frac{0.25\text{w}}{\text{ft}}$$

In conclusion the entrances also are also less than the allowable maximum wattage.

Appendix A:

LIGHTING FIXTURE SCHEDULE

TYPE	LAMP	VOLTAGE	MOUNTING	DESCRIPTION
R1	70W LED	UNIV.	SITE POLE	TRADITIONAL STYLE STREET LIGHTING FIXTURE, 4000K COLOR TEMPERATURE BLACK FINISH AND CLEAR PANELS. PROVIDE INTEGRAL PHOTOCELL - PHILIPS HARDCO # VX8911-32-A-C-3-N---A-5-N-S-S; POLE:P1950-10-A-X-X
S1X	103W LED	UNIV.	SITE POLE	LOW PROFILE LED LUMINAIRE WITH RETROFIT ARM KIT MOUNTED ON 15' ROUND ALUMINUM POLE, 4000K 70 CRI LED, PROVIDE INTEGRAL PHOTOCELL ARCHITECT TO SPECIFY FINISH GARDCO # ECF-APD-MRI-5-100LA-6453-NW-UNV-FINISH; POLE: RA4-STB-D1-15-FINISH
S2X	103W LED	UNIV.	SITE POLE	LOW PROFILE LED LUMINAIRE WITH RETROFIT ARM KIT MOUNTED ON 15' ROUND ALUMINUM POLE, 4000K 70 CRI LED, PROVIDE INTEGRAL PHOTOCELL ARCHITECT TO SPECIFY FINISH GARDCO # ECF-APD-MRI-3-100LA-6453-NW-UNV-FINISH; POLE: RA4-STB-D1-15-FINISH
S3X	103W LED	UNIV.	WALL SURFACE	LOW PROFILE LED LUMINAIRE WITH RETROFIT ARM KIT MOUNTED ON 15' ROUND ALUMINUM POLE, 4000K 70 CRI LED, PROVIDE INTEGRAL PHOTOCELL ARCHITECT TO SPECIFY FINISH GARDCO # ECF-APD-MRI-4-100LA-6453-NW-UNV-FINISH; POLE: RA4-STB-D1-15-FINISH

Lighting Fixture Schedule (Sheet E-004 Rev 10/31/16)

LANDSCAPE LIGHTING FIXTURE SCHEDULE

TYPE	LAMP	VOLTAGE	MOUNTING	DESCRIPTION
Q1	10W LED	12V	IN GROUND	IN GROUND 9 (LED) 35 DEGREE MEDIUM FIXTURE WITH BLACK SURFACE,12V, PROVIDE 277V TRANSFORMER KICHLER #15757BKT
Q2	12W LED	12V	IN GROUND	2700K WARM-WHITE LED WALL WASH BKT FIXTURE WITH BLACK FINISH, 12V,PROVIDE 277V TRANSFORMER KICHLER #16070BKT27R
Q3	3.4W LED	12V	BOLLARD	LED GARDEN AND PATHWAY BOLLARD,COLOR TEMPERATURE 3000K, 80CRI, 12V, PROVIDE 277V TRANSFORMER; LED MODULE LED-0234/830, LED DRIVER-86067 BEGA-US #77263
Q4	4W LED	12V	IN GROUND	IN GROUND LED FIXTURE WITH TEXTURED BLACK SURFACE,12V, PROVIDE 277V TRANSFORMER KICHLER #16003BKT27

Lighting Fixture Schedule (Sheet E-004 Rev 10/31/16)