CALIFORNIA ENERGY COMMISSION

Appendices: California Outdoor Lighting Baseline Assessment

California Outdoor Lighting Baseline Assessment: Appendices (product 7.7.2)

TECHNICAL REPORT

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CALIFORNIA ENERGY COMMISSION

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PREFACE

The Public Interest Energy Research (PIER) Program supports public interest energy research and development that will help improve the quality of life in California by bringing environmentally safe, affordable, and reliable energy services and products to the marketplace.

This document is one of 33 technical attachments to the final report of a larger research effort called *Integrated Energy Systems: Productivity and Building Science Program* (Program) as part of the PIER Program funded by the California Energy Commission (Commission) and managed by the New Buildings Institute.

As the name suggests, it is not individual building components, equipment, or materials that optimize energy efficiency. Instead, energy efficiency is improved through the integrated design, construction, and operation of building systems. The *Integrated Energy Systems: Productivity and Building Science Program* research addressed six areas:

- Productivity and Interior Environments
- Integrated Design of Large Commercial HVAC Systems
- Integrated Design of Small Commercial HVAC Systems
- Integrated Design of Commercial Building Ceiling Systems
- Integrated Design of Residential Ducting & Air Flow Systems
- Outdoor Lighting Baseline Assessment

The Program's final report (Commission publication #P500-03-082) and its attachments are intended to provide a complete record of the objectives, methods, findings and accomplishments of the *Integrated Energy Systems: Productivity and Building Science Program*. The final report and attachments are highly applicable to architects, designers, contractors, building owners and operators, manufacturers, researchers, and the energy efficiency community.

This attachment, "California Outdoor Lighting Baseline Assessment: Appendices" (Attachment A-19) provides supplemental information to the program's final report within the **Outdoor Lighting Baseline Assessment** research area. These appendices consist of two documents:

1. **Outdoor Lighting Baseline Assessment Final Report Appendices.** A set of seven appendices containing methodologies, results, data and other detailed information associated with this study.

2. **Supplemental Gas Station and Car Dealership Sites.** Includes additional data on outdoor lighting at gas stations and car dealerships, collected after the completion of the main study.

The Buildings Program Area within the Public Interest Energy Research (PIER) Program produced these documents as part of a multi-project programmatic contract (#400-99-413). The Buildings Program includes new and existing buildings in both the residential and the non-residential sectors. The program seeks to decrease building energy use through research that will develop or improve energy efficient technologies, strategies, tools, and building performance evaluation methods.

For other reports produced within this contract or to obtain more information on the PIER Program, please visit www.energy.ca.gov/pier/buildings or contact the Commission's Publications Unit at 916-

654-5200. All reports, guidelines and attachments are also publicly available at www.newbuildings.org/pier.

ABSTRACT

This document, "California Outdoor Lighting Baseline Assessment: Appendices," was produced as part of the Outdoor Lighting Baseline Assessment project. This was one of six research projects within the *Integrated Energy Systems: Productivity and Building Science* Program, funded by the California Energy Commission's Public Interest Energy Research (PIER) Program.

The California Outdoor Lighting Baseline Assessment is the first major study to provide real data about commercial building outdoor lighting in the state. The report identifies statewide outdoor lighting design practices; estimates energy demand and consumption; and provides a framework for outdoor lighting standards in California and future investigations of outdoor lighting.

This attachment, "California Outdoor Lighting Baseline Assessment: Appendices" (Attachment A-19) provides supplemental information to the California Outdoor Lighting Baseline Assessment. This attachment consists of two documents:

1. **Outdoor Lighting Baseline Assessment Final Report Appendices.** A set of seven appendices containing methodologies, results, data and other detailed information associated with this study. The seven appendices are: A) Impact Evaluation of Proposed Standards; B) Nighttime Subjective Lighting Evaluation; C) Lighting Fixture Catalogue; D) Outdoor Lighting Onsite Survey Instrument; E) Onsite Surveyors Manual; F) Telephone Survey Instrument; and G) Database Documentation.

2. **Supplemental Gas Station and Car Dealership Sites.** Includes additional data on outdoor lighting at gas stations and car dealerships, collected after the completion of the main study to provide supplemental data to inform the proposed California Outdoor Lighting Standards.

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Key words: outdoor lighting, lighting design, building lighting, façade lighting, lighting controls, lighting power density, light trespass, exterior lighting, lighting code, glare

Outdoor Lighting Baseline Assessment

Appendices

Integrated Energy Systems
Productivity and Building Science

On behalf of the:
California Energy Commission
Public Interest Energy Research (PIER) Program

August 12, 2002
Element 7 / Sam Pierce, PE

RLW ANALYTICS

NEW BUILDINGS INSTITUTE

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Appendix A

Impact Evaluation of Proposed Standards

Supporting information for use with the attached table "Standards values vs. RLW statewide baseline study results"

1. Explanation of the content of attached table:

The attached spreadsheet compares the results from the NBI PIER element 7 outdoor lighting baseline study to the proposed California Outdoor Lighting Standards dated June 6, 2002. These standards provide proposed allowable Lighting Power Densities (LPD) for a range of Functional Use Areas (FUA) listed by Lighting Zones (LZ). The percentage of nonconforming FUA area (sqft) in the state of California is listed beside each of these proposed standards, based on the findings of the baseline research. These percentages are not limited to areas within the LZ. For example, the proposed standard for parking lots within LZ1 is 0.040 watts/sqft. Our research indicates that 80% of all parking lot area in the state of California, regardless of LZ, has a LPD greater than 0.04 and will not comply with this standard.

Gas Station Canopies and Outdoor Sales (car lots) are two functional use areas which have garnered special attention. Due to the small sample size of these areas, the data serves best as case studies. The specific sites and their LPD's are listed to the side for this purpose.

2. The difference between the baseline statistical selection method versus the standards committee needs for specific use types:

The statistical method used in our analysis allowed the extrapolation of our results from 303 sites to the statewide population of all commercial /industrial sites. This sampling methodology included a wide range of commercial types and included representative sites from all geographical regions of the state. Because of the demands for broad inclusion of building types and geographical regions, combined with the limited total number of sites, specific building types and functional use areas are frequently represented by small sample sizes. This limits the ability to extrapolate detailed analysis to the statewide population with any degree of confidence. This is particularly apparent when comparing parking lots with outdoor retail sales and gas station canopies. There are 221 data sets for parking lots, but only 7 for gas station canopies and 4 for Outdoor retail sales. This affects the error bounds of the results. For example: the average LPD for parking lots is 0.11 (w/sqft) and the error bound is .02. This means that there is a 90% certainty that the actual average LPD (statewide) is between 0.09 and 0.13. However, the error bounds for gas station canopies are much greater, resulting in a 90% certainty that the average LPD (statewide) is between 0.03 and 0.15 (w/sf). This range of values is much less informative.

This example demonstrates the limits of this work. Clearly, it does not answer all questions regarding outdoor lighting in California. The limitation is, appropriately, budget (and therefore sample size) induced. However, this study answers the requisite questions at the

statewide level. Furthermore, it has created an excellent foundation for more specific studies by providing a repeatable methodology for targeted data collection and by establishing a set of results from which to design more specific inquiries.

3. Areas and metrics researched that are aligned with the standards committee needs versus those for which, in hindsight, more data is desired:

As one would expect with a study of this type, the wide range of results are associated with a broad range of error bounds. The results which utilize all of the sample data, such as the statewide usage numbers for all sites, have reasonable error bounds. Similarly, parking lots, walkways and small office values also have reasonable error bounds when the results are extrapolated to the statewide population, due to their relatively large sample sizes.

Parking lot data, in particular, is quite thorough in depth of investigation and the number of sites examined. There are 221 sites within the sample size for this functional use area. This data is a solid reference point for both LPD and illuminance values for parking lots throughout California. The methodology that was used to determine the physical boundary of parking lot FUA's is in line with the method proposed in the standards. Other common criteria includes lit vs unlit parking areas, boundary definitions, and illumance measurement methodology.

Of course, when reviewing the results, there are areas where more information would be desired. These include more sample sites for gas stations and car dealerships to allow the results to be extrapolated to the statewide population with confidence. Another specific business type which tends to over-light their properties are fast food restaurants. More sample sites for these categories would be helpful in supporting the work of the Standards Committee.

Another consideration for further investigation are the Lighting Zones. The proposed standards are based on the Lighting Zones for the commercial/industrial property. If the RLW baseline data is segregated by Lighting Zone the sample sizes become too small and their associated error bounds become too large. The resolution for future research is to create sufficient samples for each Lighting Zone to ensure adequate error bounds and meaningful statewide results.

In summary, the proposed standards provide an excellent template for research into the impact of the specific allowances. Unfortunately, this list was not available until well after the beginning of data collection in January, 2002. For future efforts, a comprehensive list of desired research can be derived from this list of criteria published in the "California Outdoor Lighting Standards; Table 1-Summary of Lighting Power Allowances" dated June 6, 2002. The execution of this future research will be greatly enhanced by the methodology and results contained in this baseline study.

Outdoor Lighting Research CA Outdoor Lighting Standards 7/30/02

Standards values vs. RLW statewide baseline study results

	Standards Committee	Comparison to RLW Baseline Values
	Proposed standard (LPD)	% of sq-ft (statewide) with LPD above standard
Parking Lots		
LZ 1	0.040	80%
LZ 2	0.060	55%
LZ 3	0.080	44%
LZ 4	0.200	4%
Building Grounds	LPD	
LZ 1	0.300	17%
LZ 2	0.350	15%
LZ 3	0.400	14%
LZ 4	0.450	7%
Building Entrances	LPD	
LZ 1	0.500	50%
LZ 2	0.500	50%
LZ 3	1.000	18%
LZ 4	1.500	10%
Facades proposed	LPD	
LZ 1	not allowed	100%
LZ 2	0.180	15%
LZ 3	0.300	10%
LZ 4	0.500	8%
Gas Station Canopies		
LZ 1	0.330	97%
LZ 2	0.670	97%
LZ 3	1.250	65%
LZ 4	2.500	2%
Outdoor Sales (includes car dealerships)		
	LPD	
LZ 1	not allowed	100%
LZ 2	0.250	20%
LZ 3	0.500	0%
LZ 4	1.000	0%
Outdoor Sales Street Frontage		Not reported

Note:

The RLW baseline values are based on the all statewide results. They are not restricted to the Lighting Zone.

Gas Station Canopies and Outdoor Sales Site data

Details: Gas Station Canopies	LPD
Modern Style (small retail)	1.075
Modern Style (small retail)	1.569
Older Style (small retail)	1.921
Modern Style (large retail)	1.787
Modern Style (large retail)	1.590
Older Style (lt industrial)	2.794
Older Style (restaurant)	0.270

Details: Outdoor Sales	
Modern Dlr (large retail)	0.055
Modern Dlr (large retail)	0.335
RV sales (large retail)	0.083
unconventional (large retail) (auto auction facility)	0.375

Appendix B

Nighttime Subjective Lighting Evaluation

Site ID #	

Surveyor _____

OR

On-site user ☐

All of the statements below (except question 1) refer to the lighting of the area around you, at night.

1. It would be safe to walk here, alone, *during the day.*	***Yes***	***No***
2. It would be safe to walk here, alone, at night.	***Yes***	***No***
3. The lighting is comfortable.	***Yes***	***No***
4. This is a good example of security lighting.	***Yes***	***No***
5. The lighting is too bright.	***Yes***	***No***
6. The lighting is too dark.	***Yes***	***No***
7. The lighting is uneven (patchy).	***Yes***	***No***
8. The lighting is glaring.	***Yes***	***No***
9. The lighting is too limited in area.	***Yes***	***No***
10. The lighting is poorly matched to the site.	***Yes***	***No***
11. I cannot tell the colors of things.	***Yes***	***No***

12. How does the lighting here compare with the lighting of similar areas at night?

Worse ***About the same*** ***Better***

Gender: M F (Please Select One)

Appendix C

Lighting Fixture Catalogue

Luminaire Catalogue for Exterior Lighting Equipment Surveys

Integrated Energy Systems Productivity & Building Science Program

A project of the State of California PIER Program

New Buildings Institute, Inc.

Typical Lamp Types / Wattages

Refer to training slides for specific information on lamp identification

Metal Halide

- May be coated or clear lamp, normally clear lamp
- Will normally be found in higher budget installations or retail applications
- 'White' or 'Cool White' light color
- Typical Lamp Wattages:
  - 50
  - 70
  - 100
  - 175
  - 250
  - 400
  - 1000

High Pressure Sodium

- Never coated lamp; always clear
- Used on more utilitarian installations, not normally found on retail
- 'Yellow-orange' light color
- Typical Lamp Wattages:
  - 50
  - 70
  - 100
  - 150
  - 250
  - 400
  - 1000

Low Pressure Sodium

- Never coated lamp; always clear
- Used on more utilitarian installations, not normally found on retail
- Monochromatic 'Orange' light color, no other colors present
- Typically found only in southern CA
- Typical Lamp Wattages:
  - 90 (21" length)
  - 135 (31" length)
  - 180 (45" length)

Fluorescent

- Always coated lamp, never clear
- Traditional '4-foot tube' style lamp
- Used in retail, gas stations, building façade lighting, signage
- 'White' light color
- Typical Normal Output Lamp Wattages:
  - 25 (2' length, T12 lamp, magnetic ballast)
  - 30 (3' length, T12 lamp, magnetic ballast)
  - 34 (4' length, T12 lamp, magnetic ballast)
  - 40 (4' length, T12 lamp, magnetic ballast) (Uncommon)
  - 50 (5' length, T12 lamp, magnetic ballast)
  - 56 (6' length, T12 lamp, magnetic ballast)
  - 75 (8' length, T12 lamp, magnetic ballast)

  - 17 (2' length, T8 lamp, elec. ballast)
  - 25 (3' length, T8 lamp, elec. ballast)
  - 32 (4' length, T8 lamp, elec. ballast)
  - 40 (5' length, T8 lamp, elec. ballast)
  - 59 (8' length, T8 lamp, elec. ballast)

- Typical High Output (HO) Lamp Wattages:
  - 35 (2' length, T12 lamp, magnetic ballast)
  - 50 (3' length, T12 lamp, magnetic ballast)
  - 60 (4' length, T12 lamp, magnetic ballast)
  - 75 (5' length, T12 lamp, magnetic ballast)
  - 85 (6' length, T12 lamp, magnetic ballast)
  - 95 (8' length, T12 lamp, magnetic ballast)

- Very High Output (VHO) lamps are not common but may be found

Compact Fluorescent

- Always coated lamp, never clear
- Small 'Bent-Tube' style lamp
- Used in downlights, small wall sconces, steplights, sometimes used in globes
- 'White' light color
- Typical Normal Output Lamp Wattages:
  - 13
  - 15
  - 18
  - 22
  - 26
  - 32
  - 42

Incandescent

- Normally frosted lamp, sometimes clear
- Traditional residential 'light bulb' shape most common
- Used in downlights, small wall sconces, steplights, globes
- 'White' light color
- Typical 'A-Lamp' Lamp Wattages:
  - 25
  - 40
  - 50
  - 60
  - 75
  - 100
  - 150

Incandescent – PAR or R

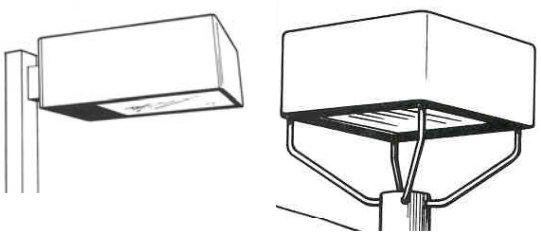
- Traditional residential 'floodlight' style PAR and R lamps
- Used in downlights, PAR floodlight holders, bare lamp socket holders
- 'White' light color
- Typical PAR or R Lamp Wattages:
  - 75
  - 100
  - 150
  - 250

Incandescent -- MR

- 'Projector' style low voltage MR lamps
- Used in downlights, landscape accent
- 'White' light color
- Typical MR Lamp Wattages:
  - 20
  - 50
  - 75

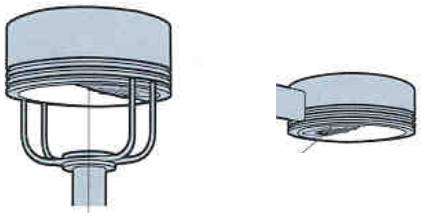
Incandescent -- Halogen

- 'Double-ended' style halogen lamp
- Used in 'halogen' floodlights primarily
- 'White' light color
- Typical Halogen Lamp Wattages:
  - 300
  - 500
  - 1000



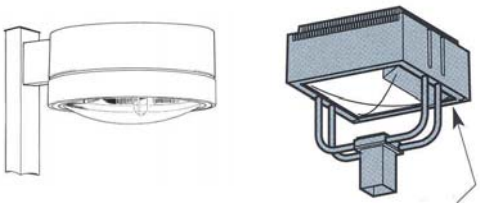
Type A – 'Shoebox' style fixture with horizontal lamp.

HPS: 70,100,150,250,400,1000
MH: 70,100,175,250,400,1000
Common in parking lots. Single lamp.



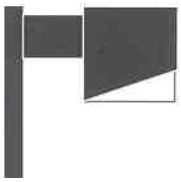
Type B – 'Hockey Puck' style fixture with horizontal lamp.

HPS: 70,100,150,250,400,1000
MH: 70,100,175,250,400,1000
Common in parking lots. Single lamp.



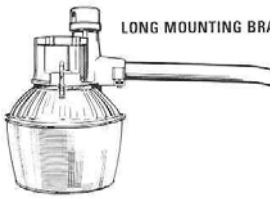
Type C – Parking Lot fixture with vertical lamp.

HPS: 250,400,1000
MH: 250,400,1000
Common in larger parking lots. Single lamp.



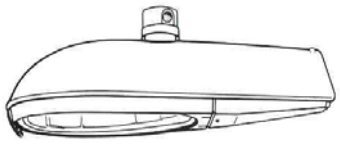
Type D – 'Cube' style fixture with vertical lamp.

HPS: 250,400,1000
MH: 250,400,1000
Common in auto dealership lots. Single lamp, normally very high wattage.



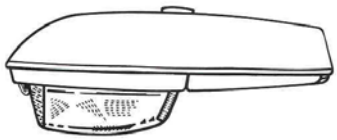
Type E – 'Barnyard' style fixture with vertical lamp.

HPS: 150,250,400
MH: 175,250,400,
MV: 175,250,400
Most commonly found in low budget properties and maintenance yards. Normally uses a MV lamp. Single vertical lamp.



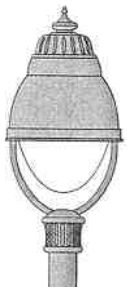
Type F –Flat Lens 'Cobra Head' style fixture with <u>horizontal</u> lamp.

HPS: 100,150,250,400
MH: 100,175,250,400
Used in parking lots, flat lens version not typically found with MV lamp. Single



Type G –Drop Lens 'Cobra Head' style fixture with <u>horizontal</u> lamp.

HPS: 100,150,250,400
MH: 100,175,250,400
MV: 100, 175, 250, 400
Used in parking lots, may have a MV lamp. Single horizontal lamp.

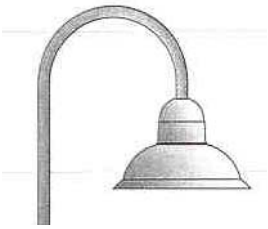


Type H – Decorative lantern fixture with optical tray.

HPS: 70,100,150,250
MH: 70,100,175,250
Lamp placed in upper optical chamber, generally not visible from a distance. May be

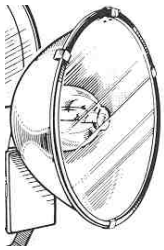
Type I – Decorative lantern fixture with refractor optics.

HPS: 70,100,150,250,400
MH: 70,100,175,250,400
Lamp mounted vertically in middle of lantern or globe. May have refractor or clear lens.



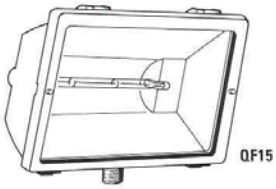
Type J – Cutoff decorative fixture

HPS: 70,100,150,250,400,1000
MH: 70,100,175,250,400,1000
IN: 60-250
Lamp not visible from distance. May be vertical or horizontal. Single lamp.



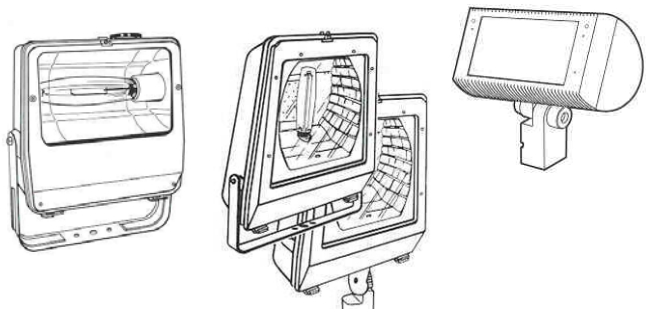
Type K –Sports floodlight fixture

MH: 400,1000, 1500
Very high wattage light for sports field. Not used anywhere else. If light is not used on sports field, use Type 'L' or 'M'.



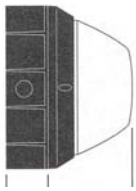
Type L – Floodlight

HPS: 70,100,150
MH: 70,100,175
Q: 150,300,500,1000
Typically a quartz lamp, used generally in low budget properties, or as temporary light. Single horizontal lamp. Never any glare control.



Type M – Floodlight with optics

HPS: 150,250,400,1000
MH: 175,250,400,1000
Single lamp floodlight, rarely with any glare control. May be HPS or MH lamp.

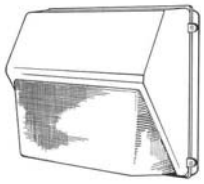
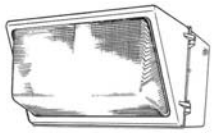



Type N – Dropped lens canopy or wall light

HPS: 100,150,250,400
MH: 100,175,250,400
Larger fixture with HID source. Commonly used under gas station canopies. Normally MH lamp. Single horizontal lamp.

Type O – Small, dropped lens canopy or wall light

HPS: 50, 70
MH: 50, 70
CF: 18,26,32,42
IN: 60-150
Smaller fixture with CF or IN source, may have low wattage HPS or MH. Used typically as light near building side entry. If larger than 12"x12", use Type 'N'.

Type P – 'Wall Pack' fixture

HPS: 70,100,150,250,400
MH: 70,100,175,250,400
Very common on back of buildings for 'security' lighting. Large glare source. Single horizontal lamp, often HPS.

Type Q – Cutoff 'Wall Pack' fixture

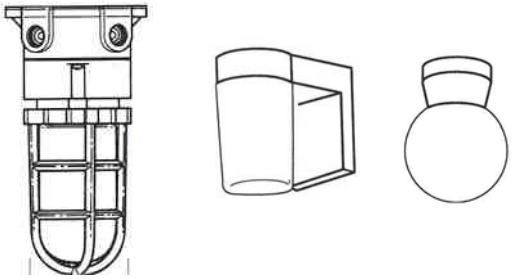
HPS: 70,100,150
MH: 70,100,175
CF: 26,32,42
Often used on higher budget projects at side entrances. Lamp not visible from a distance. Uses lower wattage lamps compared to Type 'P'. Single horizontal lamp.

Type R – 'Cylinder' fixture

HPS: 70,100,150
MH: 70,100,175
IN: PAR 50-250
CF: 26,32,42
Used at building entrances, may have two lamps, one pointing up, on pointing down

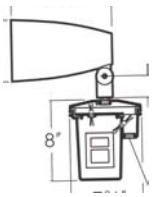
Type S – Bollard

HPS: 70,100,150
MH: 70,100,175
CF: 26,32,42
Typical light used along sidewalks in landscaped areas. Single lamp may be visible or not, mounted vertically



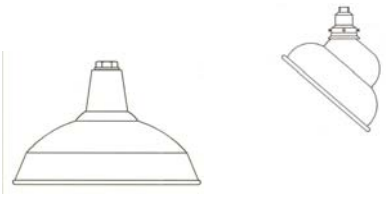
Type T – 'Jelly Jar' or 'Globe' surface mount

CF: 26,32,42
IN: 60-150
Used at building entrances, mostly with IN lamp. Newer fixtures may have CF lamp



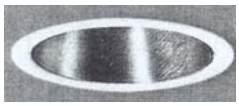
Type U – PAR Lamp Holder

MV: R 100, 175, 400
IN: PAR 75,100,150,250
Typically mounted as a floodlight on a building, it can also be mounted as a landscaping uplight. Lamp may be MV, if so, there will be a ballast box nearby



Type V – RLM Shade (Decorative)

IN: 60-150
Used to light signs sometimes, and for a decorative light under a canopy at restaurants. Single vertical lamp, may be retrofitted with CF screw-in retrofit lamp

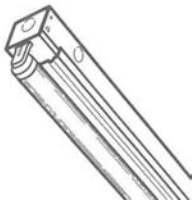


Type W – Open Downlight

HPS: 70,100,150,250
MH: 70,100,175,250
IN: 50-150
CF: 13,26,32,42
Used under soffits. One lamp, except for CF, which may have two lamps. NO LENS.

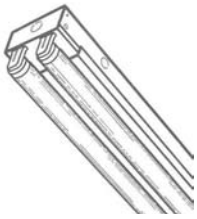
Type X – Lensed Downlight

HPS: 70,100,150,250
MH: 70,100,175,250
IN: 50-150
CF: 13,26,32,42
Used under soffits. One lamp, except for CF, which may have two lamps. Lens may be frosted, or segmented, or clear.



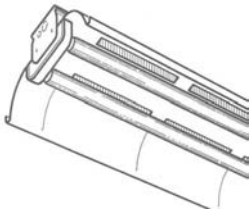
Type Y – Fluorescent one lamp 'Strip'

FL: 32,40,64,76
Used under soffits to light building walls, at edge of gas station canopies for accent lighting. Lamp can be 2,3,4,5,6,or 8 feet long, and normal output or high output. Common to have run of 4' lamps, and a 2' lamp at end to fit building length.



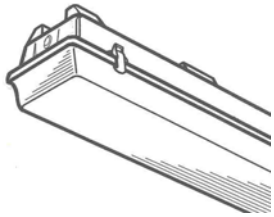
Type Z – Fluorescent two lamp 'Strip'

FL: 32,40,64,76
Same as Type 'Y', but with two lamps



Type AA – Fluorescent 'Wrap'

FL: 32,40,64,76
Similar to Types 'Y' and 'Z', but with a reflector. Normally two lamps, but may be 3 or 4 in cross section.



Type BB – Fluorescent 'Waterproof Wrap'

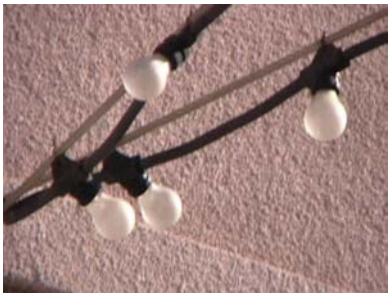
FL: 32,40,64,76
Similar to Types 'Y' and 'Z', but with a lens and gasketing, to keep moisture out. Normally two lamps per fixture

Type CC – Pole mounted 'Globe' area light

HPS: 70, 100, 150, 250, 400
MH: 50, 70, 100, 175, 250, 400
IN: 60, 75, 100, 150
CFL: 18, 26, 32,42
Globe normally frosted plastic, lamp not visible. Normally one lamp per fixture

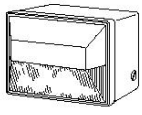
Type DD – Dropped lens downlight

HPS: 70,100,150
MH: 70,100,175
IN: 50-150
CFL: 13,26,32,42
Similar to Type 'X', but with lens that drops below ceiling surface. One lamp per fixture, except CFL, normally 2



Type EE – Decorative incandescent string lights

IN: .5 (mini lamps), 3, 7, 15
Used in retail areas commonly. Only count the lights if they are 'permanent'. DO NOT count 'holiday' installations. Count number of lamps total. Count # of lamps per LF and estimate or measure length of string runs.



Type FF – 'Steplight'

HPS: 50, 100, 150, 250
MH: 50, 70, 100, 175, 250
IN: 25-150
CFL: 13, 18, 26, 32, 42
Normally one lamp, sometimes two for CFL

Type GG – Pole mounted area light with angled head. Commonly found as FL, in old gas stations, or MV in old car dealerships.

MV: 250, 400
FL: 40, 64, 76
Single lamp, except FL, may be 2 or 4 lamp.

Type HH – 2x2 Fluorescent 'Troffer'

FL: 32U,40U, 40BX
Two lamp, except biax version, may have 3

Type JJ – 2x4 Fluorescent 'Troffer'

FL: 32,40
Normally 2, 3, or 4 lamps.

Type KK – Decorative landscape Path Light

IN: 5-100
Single lamp, often shaped like a scallop shell, with shielded lamp.

Type LL – Low voltage landscape/accent light

IN: MR16-20, 35, 50
Single lamp, normally remote transformer nearby.

Type MM – Wall mounted 'Bullseye' or 'Bulkhead' style decorative fixture

MH: 50, 70, 100
IN: 50-150
CFL: 18, 26, 32, 42
Single lamp, sometimes CFL have 2

Type NN – In-grade mounted 'Well light'

HPS: 70, 100, 150
MH: 50, 70, 100, 175
IN: PAR 50-150
Single lamp, often mounted in planters, or in pavement near building columns. Sometimes used at trees.

Type OO – Decorative 'steplight' or bollard

VARIOUS LAMPS, WATTAGES
Can be wide variety of shapes, sizes. Use as category for all fixtures that don't fit other categories.

Type PP – Custom or decorative sconce

VARIOUS LAMPS, WATTAGES
Can be wide variety of shapes, sizes. Use as category for all fixtures that don't fit other categories.

Type QQ – Fluorescent floodlight for landscape or signage

FL: 13, 26, 32
Normally single lamp, may be mounted in front of small signs or trees. May be compact fluorescent (CFL) or linear FL.

Appendix D

Outdoor Lighting On-site Survey Instrument

General Information

Site ID #	

Surveyor Name: Building Name:

Date: Primary Contact: Phone:

Building Address:

City Zip

Daytime Start Time: Finish Time: Travel Time:

Nighttime Start Time: Finish Time: Travel Time:

Interview Questions

The following interview questions will be used to help us identify unobservable aspects of your building. These aspects include exterior lighting schedules and unobservable equipment types, such as lamps. Answers to these questions will be coupled with data collected from our walk-through survey to produce a complete assessment of the exterior lighting at your building.

Building Overview

Q1. What is the overall building floor area? _____ SF

Q1A What is the building footprint? _____SF

Q2. What is the overall site area? _____SF

Q3. How many floors? _____

Q4. Circle the appropriate building type description:

1	Small office	11	Hotel
2	Large office	12	Small school
3	Small retail	13	Large school
4	Multi-story large retail	14	Community college
5	Single story large retail	15	Large university
6	Grocery	16	Assembly
7	Quick service restaurant	17	Hospital
8	Full-service restaurant	18	Lt. Manufacturing
9	Conditioned warehouse	19	Bio/Tech Manufacturing
10	Uncond. warehouse	29	Apartments and Condominiums

Functional Use Area Selection List			
1. Parking	2. Pedestrian & Walkway	3. Landscape	4. Outdoor Retail Sales (car lot)
5. Internal Roadway	6. Storage	7. ATM	8. Recreation
9. No Use	10. Façade & Aesthetic	11. Security	12. Point of Sales (fast food)
13. Entry (if different*)	14. Gas Station Canopy	15.	(*if lit differently from walkways)

 Site #_____

Building Areas

Q5. How many individual tenants (businesses) occupy this building? _____

Q6. Do the majority of tenants have their own electric meter? Y N

Ask the respondent of they have building plans available, this will provide site acreage, building area and possibly an outdoor lighting power plan with schedule of fixtures.

Exterior Lighting Lamp Types

Q7. Are you familiar with the lamp types and lamp wattage that are used at this facility? Y N

If yes, ask respondent to provide a description of lamp wattage and type for all surveyed fixtures (list below).

If no, ask respondent who would know (i.e., maintenance contractor, facility person) or ask if there is a location where spare lamps are stored.

Name:_____ Phone:_____

Ask to talk with person who would know (i.e., maintenance contractor, facility person) after the initial interview is completed.

Ask to be shown the lamp storage room after the initial interview is completed.

Functional Use Area Selection List			
12. Parking	13. Pedestrian & Walkway	14. Landscape	15. Outdoor Retail Sales (car lot)
16. Internal Roadway	17. Storage	18. ATM	19. Recreation
20. No Use	21. Façade & Aesthetic	22. Security	12. Point of Sales (fast food)
13. Entry (if different*)	16. Gas Station Canopy	17.	(*if lit differently from walkways)

Page: 3 Site #_____

Exterior Lighting Schedules and Controls

Q8. **Functional Use Area A :_____(SEE FOOTER FOR AREA SELECTION LIST)**

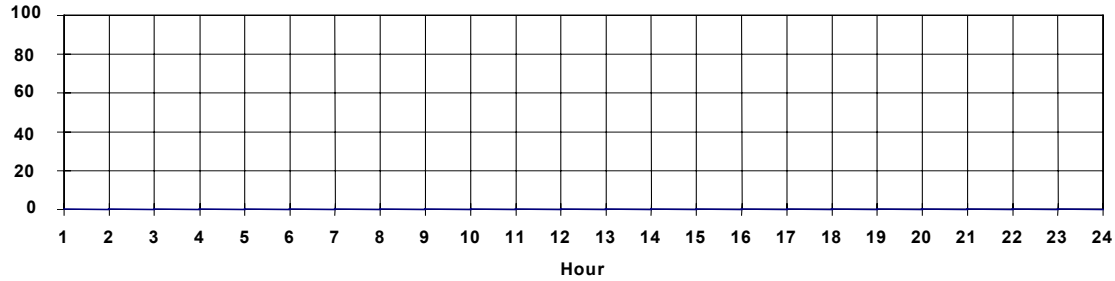
Q9. How are the exterior lights controlled?

❑ Manual ❑ Time Clock ❑ Photocell ❑ Both ❑ DK

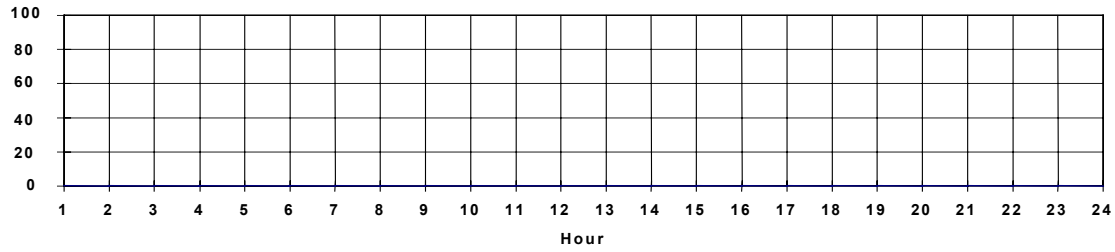
Q10. If the exterior lights are controlled manually or with a time clock, draw a line that describes the schedule.

If respondent doesn't know, ask if you can be given access to the time clock to ascertain time-of-use.

Weekdays (Summer = Blue/Winter = Red)



Weekends/Holidays *(Summer = Blue/Winter = Red)*



Q11. **Functional Use Area B:_____(SEE FOOTER FOR AREA SELECTION LIST)**

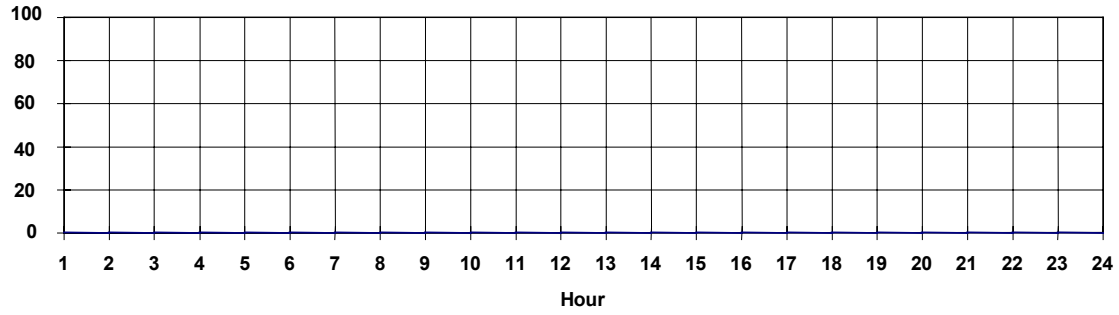
Q12. How are the exterior lights controlled?

❑ Manual ❑ Time Clock ❑ Photocell ❑ Both ❑ DK

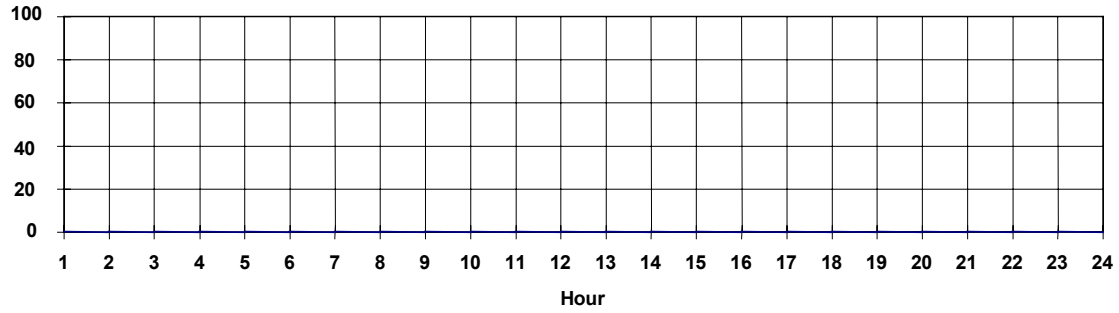
Q13. If the exterior lights are controlled manually or with a time clock, draw a line that describes the schedule.

Functional Use Area Selection List			
23. Parking	24. Pedestrian & Walkway	25. Landscape	26. Outdoor Retail Sales (car lot)
27. Internal Roadway	28. Storage	29. ATM	30. Recreation
31. No Use	32. Façade & Aesthetic	33. Security	12. Point of Sales (fast food)
13. Entry (if different*)	18. Gas Station Canopy	19.	(*if lit differently from walkways)

Weekdays (Summer = Blue/Winter = Red)



Weekends/Holidays *(Summer = Blue/Winter = Red)*



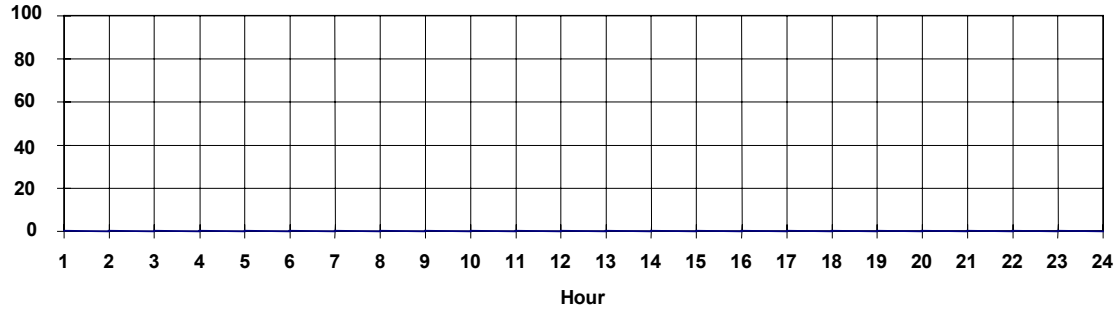
Q14. **Functional Use Area C:_____(SEE FOOTER FOR AREA SELECTION LIST)**

Q15. How are the exterior lights controlled?

❑ Manual ❑ Time Clock ❑ Photocell ❑ Both ❑ DK

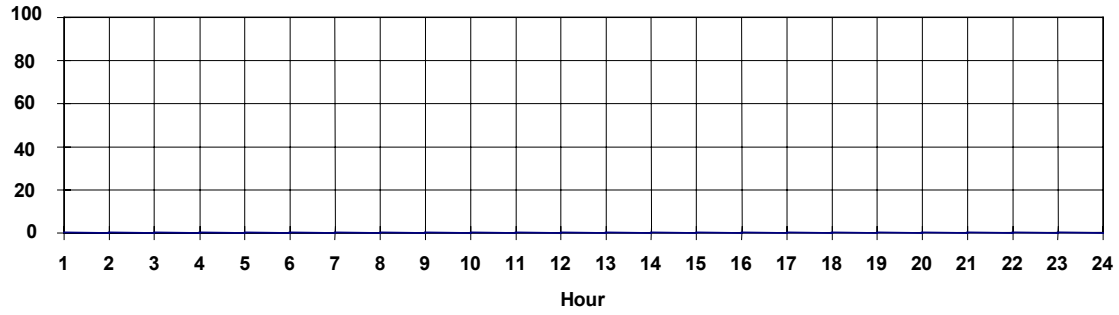
Q16. If the exterior lights are controlled manually or with a time clock, draw a line that describes the schedule.

Weekdays (Summer = Blue/Winter = Red)



Functional Use Area Selection List			
34. Parking	35. Pedestrian & Walkway	36. Landscape	37. Outdoor Retail Sales (car lot)
38. Internal Roadway	39. Storage	40. ATM	41. Recreation
42. No Use	43. Façade & Aesthetic	44. Security	12. Point of Sales (fast food)
13. Entry (if different*)	20. Gas Station Canopy	21.	(*if lit differently from walkways)

Weekends/Holidays (Summer = Blue/Winter = Red)



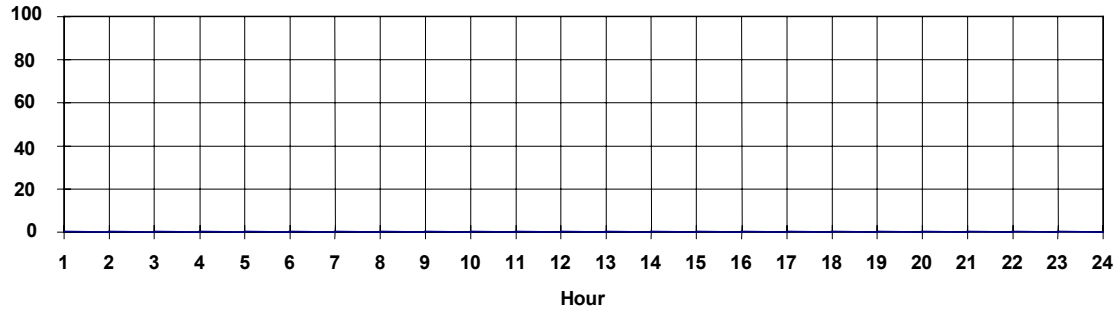
Q17. **Functional Use Area D:_____(SEE FOOTER FOR AREA SELECTION LIST)**

Q18. How are the exterior lights controlled?

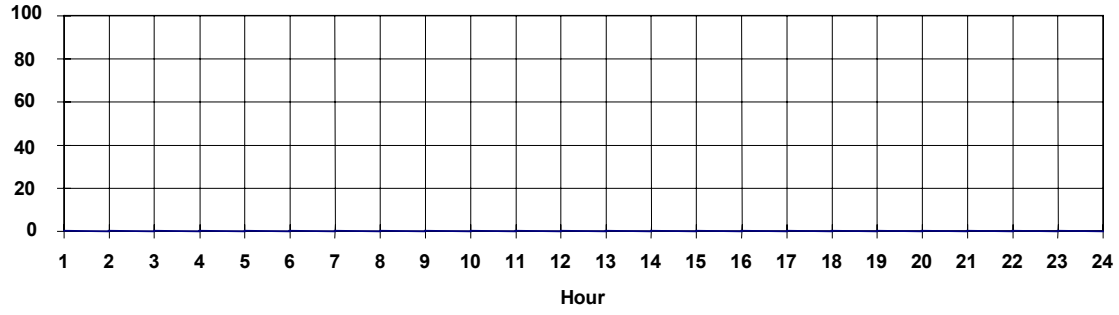
❑ Manual ❑ Time Clock ❑ Photocell ❑ Both ❑ DK

Q19. If the exterior lights are controlled manually or with a time clock, draw a line that describes the schedule.

Weekdays (Summer = Blue/Winter = Red)



Weekends/Holidays *(Summer = Blue/Winter = Red)*



Functional Use Area Selection List			
45. Parking	46. Pedestrian & Walkway	47. Landscape	48. Outdoor Retail Sales (car lot)
49. Internal Roadway	50. Storage	51. ATM	52. Recreation
53. No Use	54. Façade & Aesthetic	55. Security	12. Point of Sales (fast food)
13. Entry (if different*)	22. Gas Station Canopy	23.	(*if lit differently from walkways)

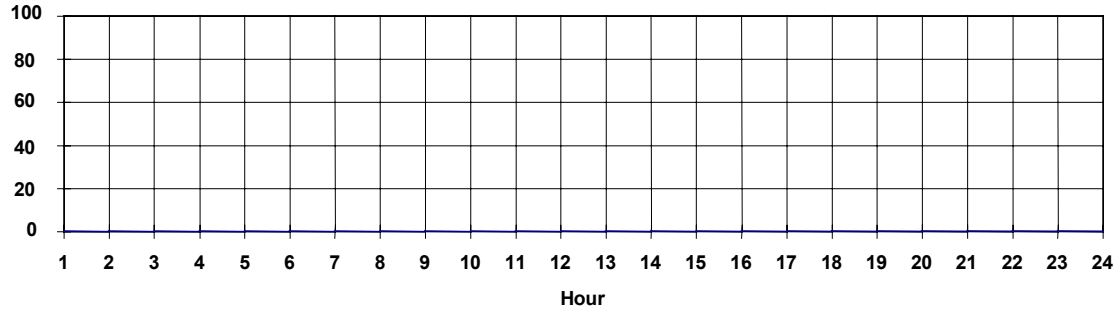
Q20. **Functional Use Area E:_____(SEE FOOTER FOR AREA SELECTION LIST)**

Q21. How are the exterior lights controlled?

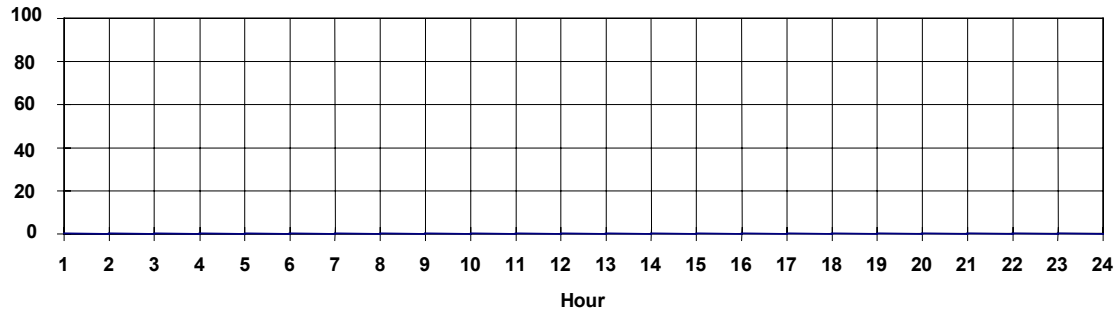
❑ Manual ❑ Time Clock ❑ Photocell ❑ Both ❑ DK

Q22. If the exterior lights are controlled manually or with a time clock, draw a line that describes the schedule.

Weekdays (Summer = Blue/Winter = Red)



Weekends/Holidays *(Summer = Blue/Winter = Red)*



Exterior Lighting Misc.

Q23. Are there any lights that are not turned on at night, except for special occasions (for example: loading dock lights)? Y N DK

If Yes, please provide information on the lights that are not used.

Q24. Are you familiar with Governor Gray Davis's recent legislation that restricts outdoor lighting use during non-business hours? Y N **(*If no, skip next question)***

Q25. Have you changed the schedule of operation for any of your outdoor lights in response to the Governor's legislation? Y N DK (If "DK", find out who would know:_____)

If yes, indicate on the schedule matrices in green pen what the old schedule was.

Functional Use Area Selection List			
1. Parking	2. Pedestrian & Walkway	3. Landscape	4. Outdoor Retail Sales (car lot)
5. Internal Roadway	6. Storage	7. ATM	8. Recreation
9. No Use	10. Façade & Aesthetic	11. Security	12. Point of Sales (fast food)
13. Entry (if different*)	24. Gas Station Canopy	25.	(*if lit differently from walkways)

Daytime Site Data Collection

Q26. Daytime weather conditions:

- ❑ Clear
- ❑ raining
- ❑ icy
- ❑ snowing
- ❑ foggy
- ❑ overcast/cloudy

Q27. Site conditions:

- ❑ flat
- ❑ hilly
- ❑ sloped
- ❑ clear

Q28. **Surrounding conditions:**

	Residential	Commercial	Roadway	Open	Other/Description
North					
South					
East					
West					

Check as each task is completed:

- ❑ Layout / determine calculation grid for parking / security lighting
- ❑ Layout / determine calculation grid for pedestrian paths
- ❑ Determine most likely locations for light trespass / glare ratio readings

Functional Use Area Summary Information

Area Description Lighted or Unlighted?	**FUA Area (square ft) (wall sq-ft if façade Ltng)**	**% of total FUA Area (if sampled)**	**% Covered by Canopy**
FUA A:			
FUA B:			
FUA C:			
FUA D:			
FUA E:			

Functional Use Area Selection List			
12. Parking	13. Pedestrian & Walkway	14. Landscape	15. Outdoor Retail Sales (car lot)
16. Internal Roadway	17. Storage	18. ATM	19. Recreation
20. No Use	21. Façade & Aesthetic	22. Security	12. Point of Sales (fast food)
13. Entry (if different*)	26. Gas Station Canopy	27.	(*if lit differently from walkways)

Luminaire Information

FUA (letter)	Ballast Type (FL)	Notes	Fixture Type	FixtureQty	Lamp Type	Lamp Wattage	Luminaire Height	Distance from Luminaire (see below)	Ft Cndle Reading (see below)	Suitability/Lens Cond
										G / F / P G / F / P
										G / F / P G / F / P
										G / F / P G / F / P
										G / F / P G / F / P
										G / F / P G / F / P
										G / F / P G / F / P
										G / F / P G / F / P
										G / F / P G / F / P
										G / F / P G / F / P
										G / F / P G / F / P
										G / F / P G / F / P
										G / F / P G / F / P
										G / F / P G / F / P
										G / F / P G / F / P

Note: record Qty of fixtures not poles: 4 poles with 2 fixtures each ---Qty=8

Wattage Determination (optional method)

If the wattage of lights are not available, the meter can be used. Follow these steps and record each in the space provided above.

Step 1: Determine post or fixture height. (record in "Luminaire Height / Distance")

Step 2: Measure from pole or wall to brightest point illuminated by fixture.
(record in "Luminaire Height / Distance" column)

Step 3: Point meter with snoot attached directly at fixture and take reading.
(record in "Ft Cndle Reading" column)

Signage Information

Qty of Signsl	Fixture Type	# of Faces	Fixture Qty per sign	Lamp Type	Lamp Wattage / Linear Feet	Size	Notes	Suitability
								G / F / P
								G / F / P
								G / F / P
								G / F / P
								G / F / P
								G / F / P
								G / F / P
								G / F / P
								G / F / P
								G / F / P
								G / F / P
								G / F / P
								G / F / P
								G / F / P
								G / F / P

Signage Classification List			
1. Cabinet	2. Front Lighted	3. Multi-bulb Flasher	4. Direct View Neon
5. Concealed Neon	6. LED	7. Gas Pump	8.
9.	10.	11.	12.

Nighttime Data Collection

Site Conditions

Q29. Nighttime weather conditions:

- ❑ Clear
- ❑ raining
- ❑ icy
- ❑ snowing
- ❑ foggy
- ❑ overcast/cloudy

Walk around and become familiar with the nighttime conditions of the site. Complete the Nighttime Subjective Lighting Evaluation Forms (One for each surveyor and one for available users of the site)

- ❑ Forms Completed

Answer Questions Q29. through Q31. from the edge of property line.

Q30. Describe the environmental conditions of the neighborhood:

- ❑ Area with intrinsically dark landscape
  (Residential areas with little or no streetlighting. Zone E1)
- ❑ Area of low ambient brightness
  (Outer urban and rural area, residential areas. Zone E2)
- ❑ Area of medium ambient brightness
  (Urban residential areas, lighted to higher traffic level. Zone E3)
- ❑ Area of high ambient brightness
  (Urban area with both residential and commercial use, high traffic volume. Zone E4)

Q31. The lighting at this site is:

- ❑ Inadequate
- ❑ Adequate
- ❑ More than needed

Q32. The lighting at this site is?

- ❑ Not Glary
- ❑ Somewhat Glary
- ❑ Very Glary

Glare Ratio:

	Reading UP	**Reading DOWN**	**Subjective Impression (1 is best, 5 is worst)**	**Measurement taken from**	**Offending Fixture**
1			1 • 2 • 3 • 4 • 5		
2			1 • 2 • 3 • 4 • 5		
3			1 • 2 • 3 • 4 • 5		

Glare Ratio Measurement Location List			
13. Parking area	14. Building entry	15. Property edge	16. Site entry / exit
17. Pedestrian conflict	18.	19.	20.
21.	22.	23.	24.

Light Trespass:

	Reading	**Subjective Impression (1 is best, 5 is worst)**	**Offending Fixture/s**
1		1 • 2 • 3 • 4 • 5	
2		1 • 2 • 3 • 4 • 5	
3		1 • 2 • 3 • 4 • 5	

Site Sketch

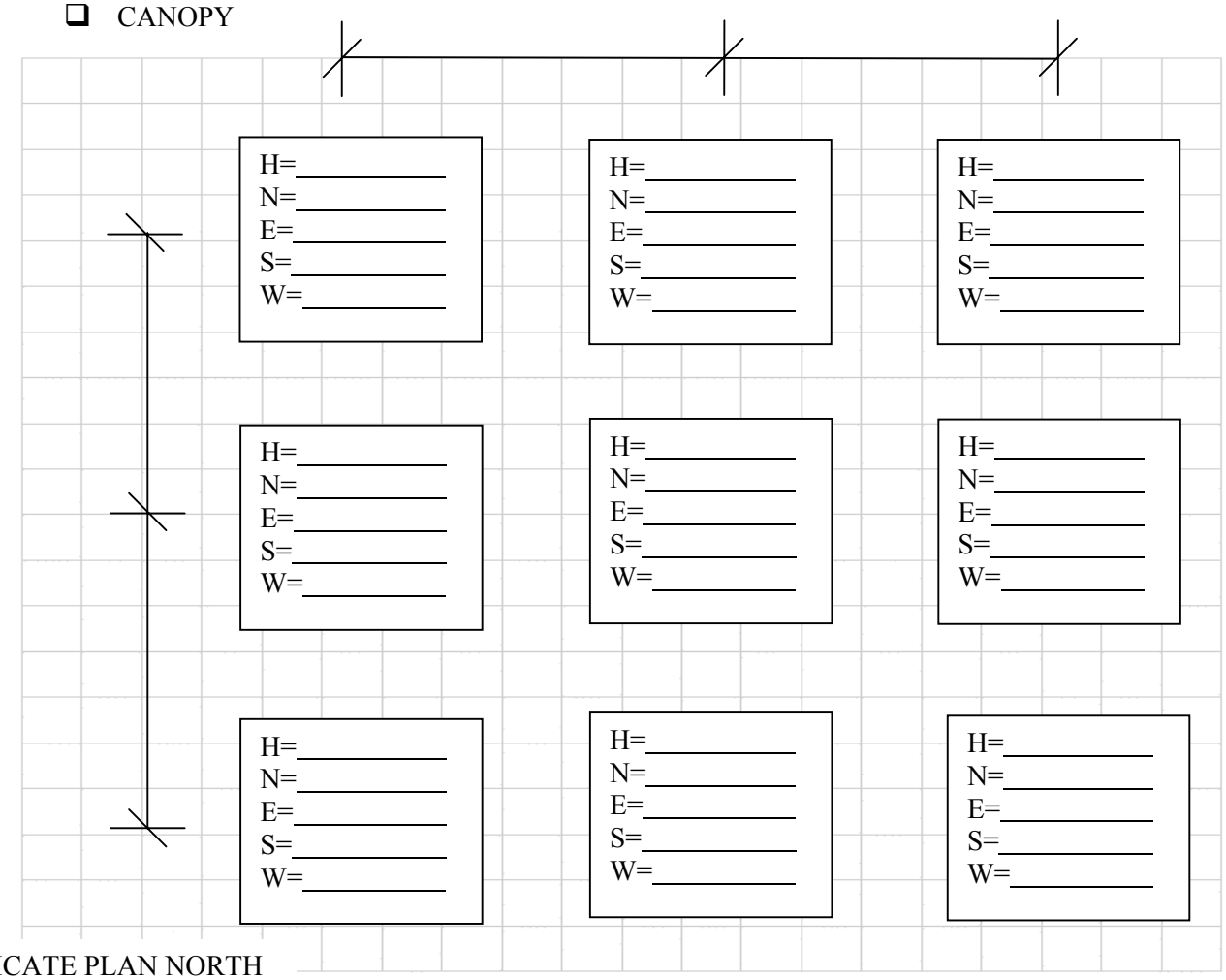
****INDICATE GLARE AND TRESPASS READING LOCATION**

Site Sketch and Geometry Information **(INCLUDE PLAN NORTH)**

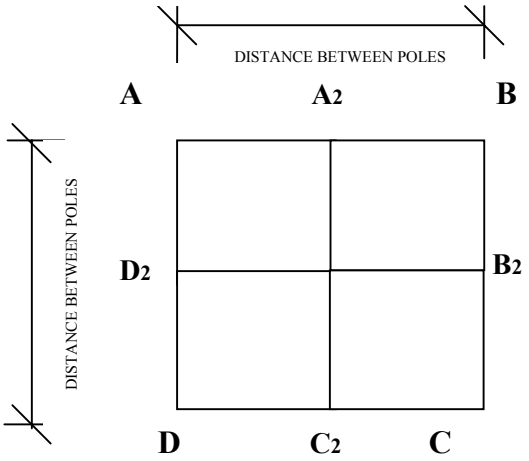
Lighting Measurements

- ❑ PARKING LOT
- ❑ SECURITY
- ❑ CANOPY

_____Other



INDICATE PLAN NORTH



_____FIXTURE LOCATION

_____FIXTURE TYPE

_____LAMP TYPE

_____LAMP WATTAGE

ADDITIONAL TYPES:

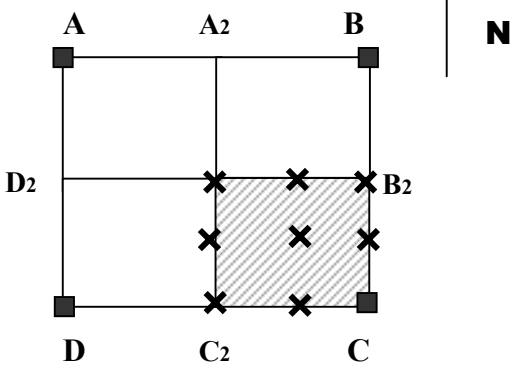
_____FIXTURE LOCATIONS

_____FIXTURE TYPE

_____LAMP TYPE

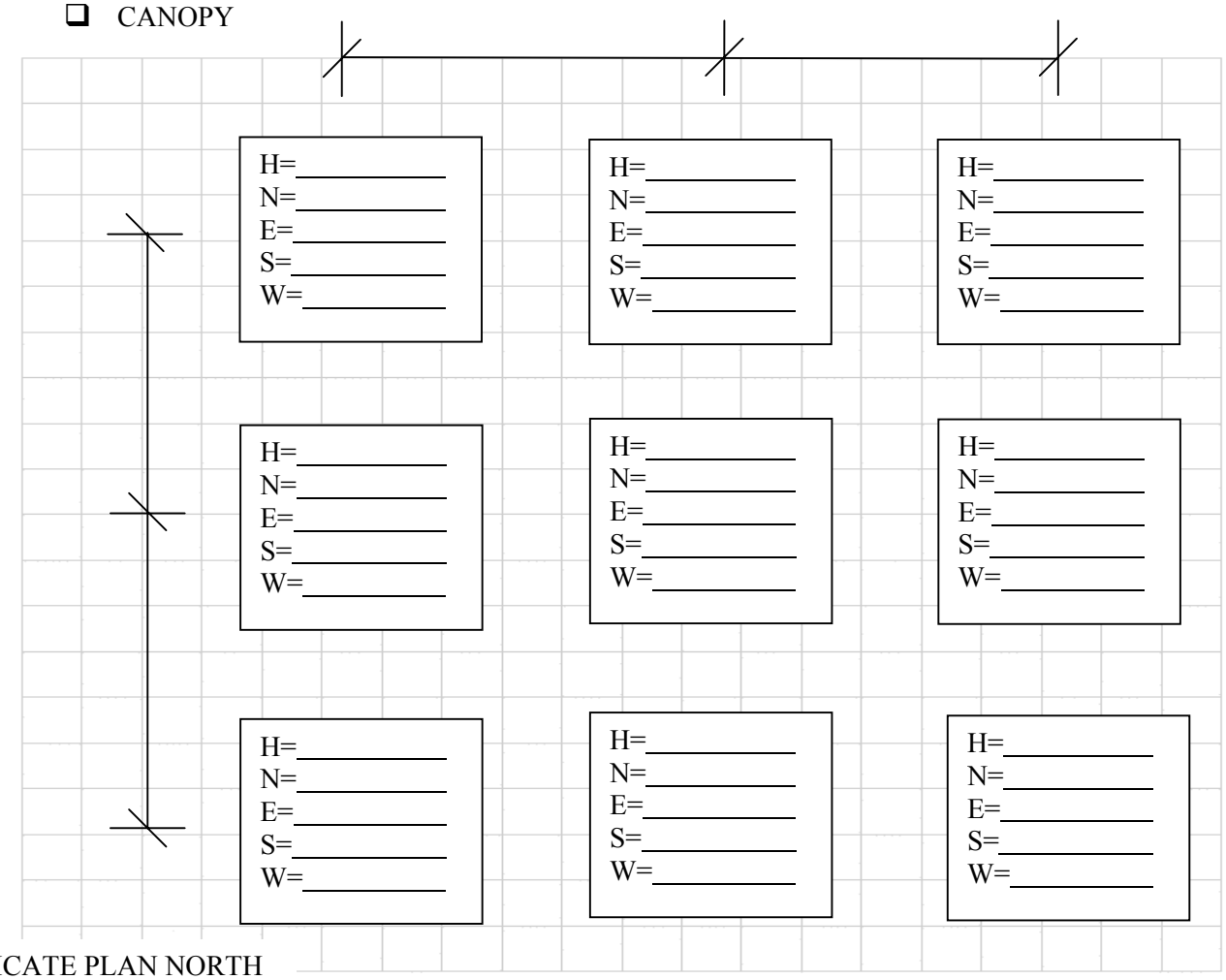
_____ LAMP WATTAGE

EXAMPL

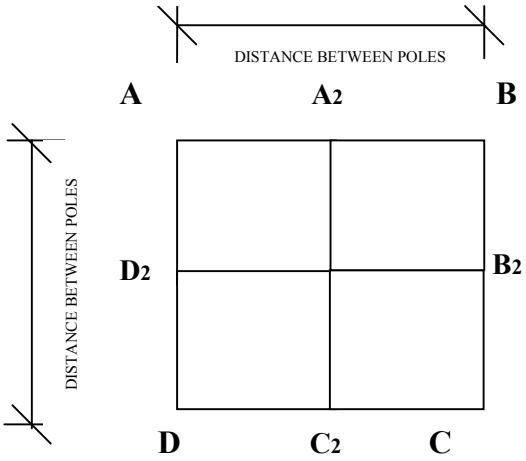


Lighting Measurements

- ❑ PARKING LOT _____Other
- ❑ SECURITY
- ❑ CANOPY



INDICATE PLAN NORTH



_____FIXTURE LOCATION

_____FIXTURE TYPE

_____LAMP TYPE

_____LAMP WATTAGE

ADDITIONAL TYPES:

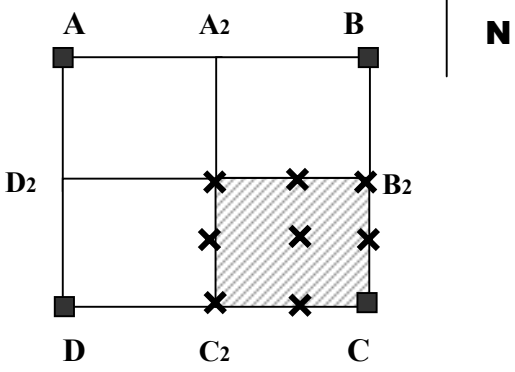
_____FIXTURE LOCATIONS

_____FIXTURE TYPE

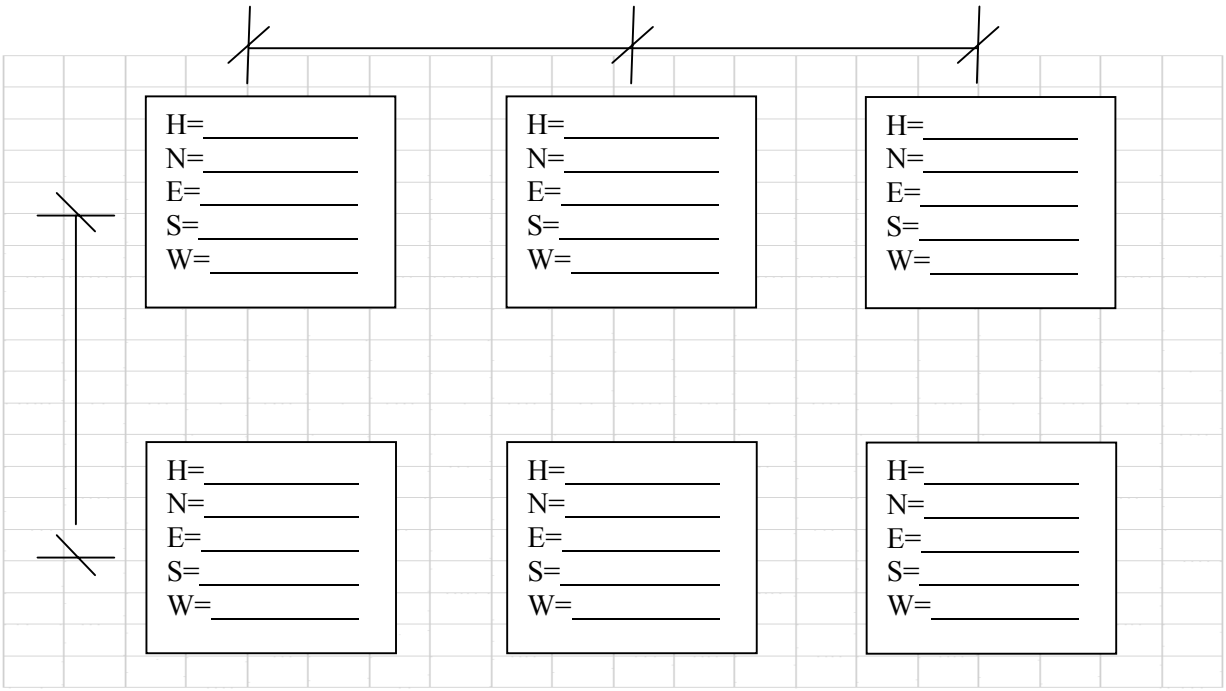
_____LAMP TYPE

_____ LAMP WATTAGE

EXAMPL



Sidewalk Lighting Measurements



_____ Fixture Location

_____ Fixture Type

_____ Lamp Type

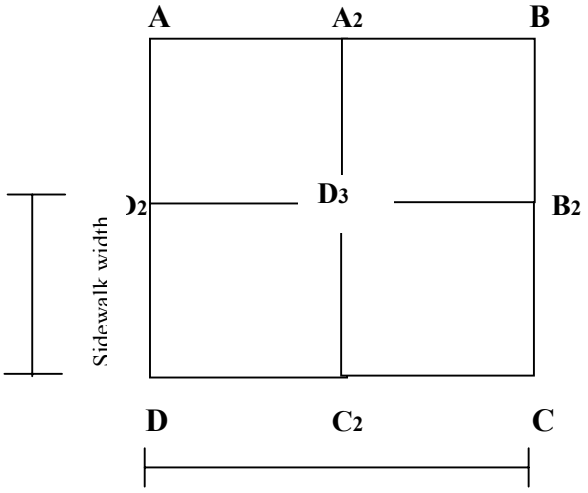
_____ Lamp Wattage

Example: C, D Fixture Location

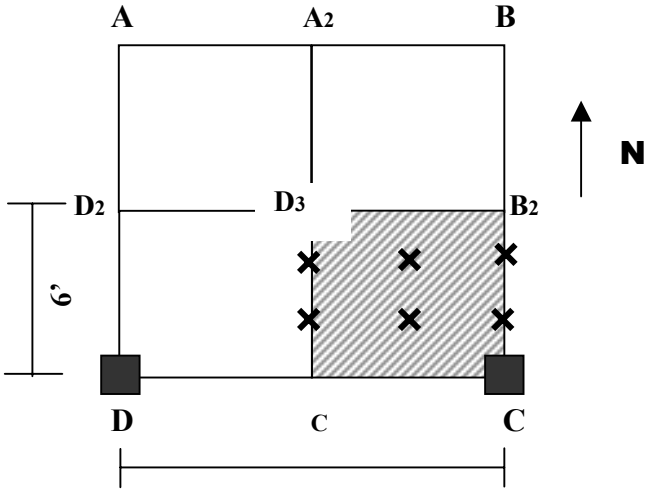
0 Fixture Type

MH Lamp Type

175 Lamp Wattage



DISTANCE BETWEEN LIGHTS



12'

Page: 15 Site #_____

Appendix E

On-Site Surveyors Manual

Included with hard copy of report

Appendix F

Telephone survey instrument

Customer:_____ RLWID #_____

Address:_____City: _____

Phone:_____ Interviewer: _____

Fill in the following at time of survey:

Date _____ Time _____

Respondent _____

Screening Questions

Hello, my name is _____ and I am calling from RLW Analytics. We are carrying out a study on behalf of the California Energy Commission to assess the amount of energy currently used by outdoor lighting in California.

1) Can we have five minutes to ask you a few questions about the outdoor lighting at your building?
   1) Yes **(record respondent's name and time of interview at top of page)**
   2) No, this is not a good time **(get time to call back)**

      Time to call back_____
   3) No, I am not the right person to talk to but that person is here

      (Repeat introduction to new respondent, record respondent's name and time of interview at top of page)
   4) No, I am not the right person to talk to but that person is not here

      (record respondent's name and get time to call back)

      Name: _____

      Time to call back: _____
2) Is your business a home-based business, or is it located in a commercial/industrial building?
   1) Home-based **(Thank and terminate)**
   2) Commercial/Industrial building **(Continue)**
   3) Don't know **(Thank and terminate)**

3) According to our information your building is located at **(address listed on cover sheet)** - Is that correct?
   1) Yes
   2) No **(thank and terminate)**
4) Are there other addresses associated with your building?
   1) Yes **(Record other addresses)**

      Other address numbers: _____

      _____

      _____

      _____

      _____
   2) No
   3) Don't know **(Thank and terminate)**

SURVEY QUESTIONS:

5) What are the primary business functions of this building?

Total must add to 100%

ONE OF THE FOLLOWING MUST BE DOMINATE %

Building Type		**Percentage Usage**
01	Commercial & Industrial Storage	
02	Grocery Store	
03	General Commercial & Industrial Work	
04	Medical/Clinical	
05	Office	
06	Other (Specify):	
07	Religious Worship, Auditorium, Convention	
08	Restaurant	
09	Retail and Wholesale Store	
10	School	
11	Theater	
12	Unknown	
13	Hotels/Motels	
14	Fire/Police/Jails	
15	Community Center	
16	Gymnasium	
17	Libraries	

6) Approximately how many employees work in the building?
   1) Fewer than 25
   2) 26 – 50
   3) 51 – 100
   4) 101 – 250
   5) 251 – 500
   6) 501 or Greater
7) Does your building have an outdoor parking lot?
   1) Yes
   2) No → **(Go To Q9)**
8) Approximately how many parking spaces does your outdoor parking lot contain?
   1) 25 or Fewer
   2) 26 – 50
   3) 51 – 100
   4) 101 – 250
   5) 251 or Greater
9) Is outdoor lighting an important part of the building's business?
   1) Yes
   2) No → **(Go to Q11)**
   3) Don't Know → **(Go to Q11)**
10) How is it important? **(Record Exact Response Verbatim, Probe for Specifics)**

_____

_____

_____

11) Is outdoor lighting used to attract customers or light showrooms?
   1) Yes
   2) No

12) Does your building serve customers at night?

1) Yes
2) No → **(Go to Q14)**

13) During what times does your building serve customers at night?

_____PM/AM TO _____ PM/AM

14) Does your building have a night shift?

1) Yes
2) No → **(Go to Q17)**

15) Approximately how many employees work on the night shift?

1) Fewer than 25
2) 26 – 50
3) 51 – 100
4) 101 or Greater

16) What are the hours of the building's night shift?

_____PM/AM TO _____ PM/AM

17) What are your building's operating hours?

_____PM/AM TO _____ PM/AM

18) Does your building have signs that are lit up at night?

1) Yes
2) No **(Go to Q21)**

19) How many signs that are lit up at night does your building have?

1) One
2) Two
3) Three – Five
4) Six or More

20) What are the approximate size(s) of these signs?

Sign 1: _____ Ft BY _____ Ft

Sign 2: _____ Ft BY _____ Ft

Sign 3: _____ Ft BY _____ Ft

Sign 4: _____ Ft BY _____ Ft

Sign 5: _____ Ft BY _____ Ft

Sign 6: _____ Ft BY _____ Ft

21) Are there lights meant to provide safety attached to the outside of the building or integrated into landscaping or walkways?

1) Yes
2) No
3) Don't know

22) Are there lights meant to light up the building that are attached to the outside of the building?

1) Yes
2) No
3) Don't know

23) A future component of this research study involves collecting outdoor lighting data on-site at a set of randomly selected buildings throughout the state of California. This information will be used to better understand outdoor lighting usage in California. The on-site survey usually begins with a meeting between our engineer/surveyor and your facility manager. What is the name, title and phone number of the most appropriate person to contact to secure permission in the event your building is randomly selected?

Name: _____

Title: _____

(If Property management) Company Name: _____

Phone Number: _____

Those are all my questions. Thank you very much for your cooperation on this study.

Appendix G

Database Documentation

Database Documentation

Integrated Energy Systems Productivity & Building Science Program

A project of the State of California PIER Program

PIER
Public Interest Energy Research
CALIFORNIA ENERGY COMMISSION

New Buildings Institute, Inc.

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The MBSS Software System

The MBSS Analysis Tool is a special software tool for summarizing site characteristics. This section describes how to use the software and the underlying principles.

Purpose of the Software

MBSS is a powerful way to summarize the information contained in the Outdoor Lighting Baseline Assesment database. Here are some examples of the type of statistic that you may obtain:

- The average LPD for various functional use areas
- The saturation of lamp types and fixture types
- The percentage of sites having particular efficiency LPD ranges
- The annual kWh energy use

This type of information can be developed for all sites, or for various classifications of sites. Using the standard queries provided in the database, the sites can be classified by any combination of the following variables:

- Functional Use Area
- Building Type
- Lighting Zone

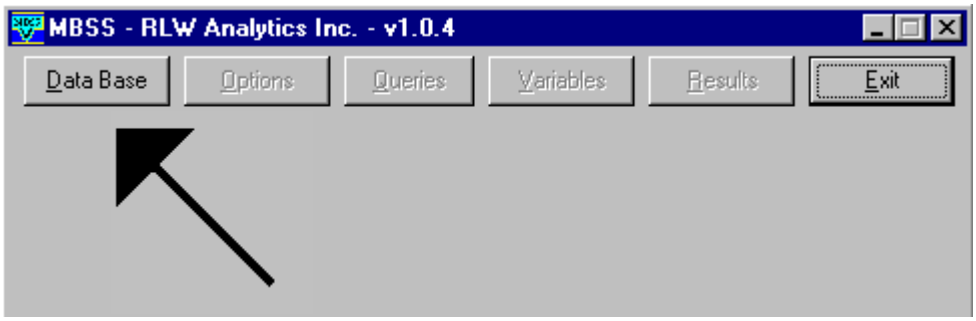
You can also use Access to design new queries to classify sites by any additional characteristics that you might want.
MBSS calculates all averages to reflect the characteristics of interest and the underlying sampling, so that the resulting statistics are representative of a statewide population in California. The software has options for calculating sample sizes and error bounds (at the 90% level of confidence).
MBSS has been used to prepare all of the information in this report. MBSS can be used to extract additional information from the underlying Access database using the queries that have been provided in the database. In addition, MBSS can be used to analyze new queries to provide even more specialized information.

Using the Software

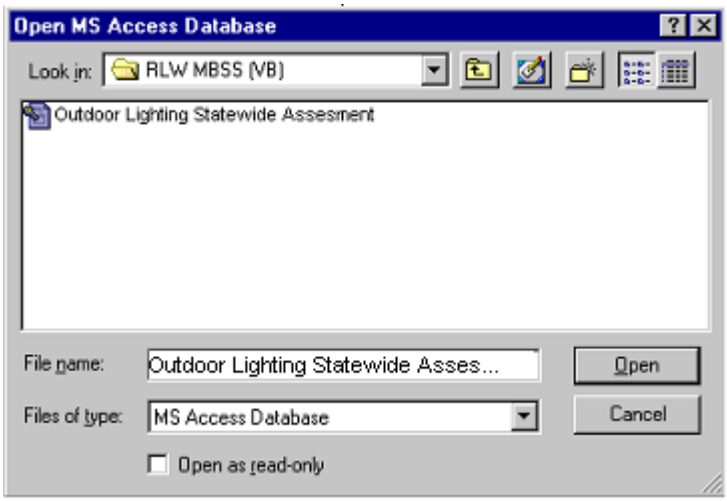
MBSS can be installed on any computer running Windows 97, 2000, XP or Windows NT and MS Access. An installation disk is available. The program is activated from the start menu >Programs>RLW Tools >MBSS (VB)>MBSS or with the shortcut on the desktop. When the software is run, the main menu will appear with the Data Base button enabled.

Data Base

Click on the Data Base button to select the Microsoft Access database containing the data to be analyzed. Note that MBSS will write the results to this database.

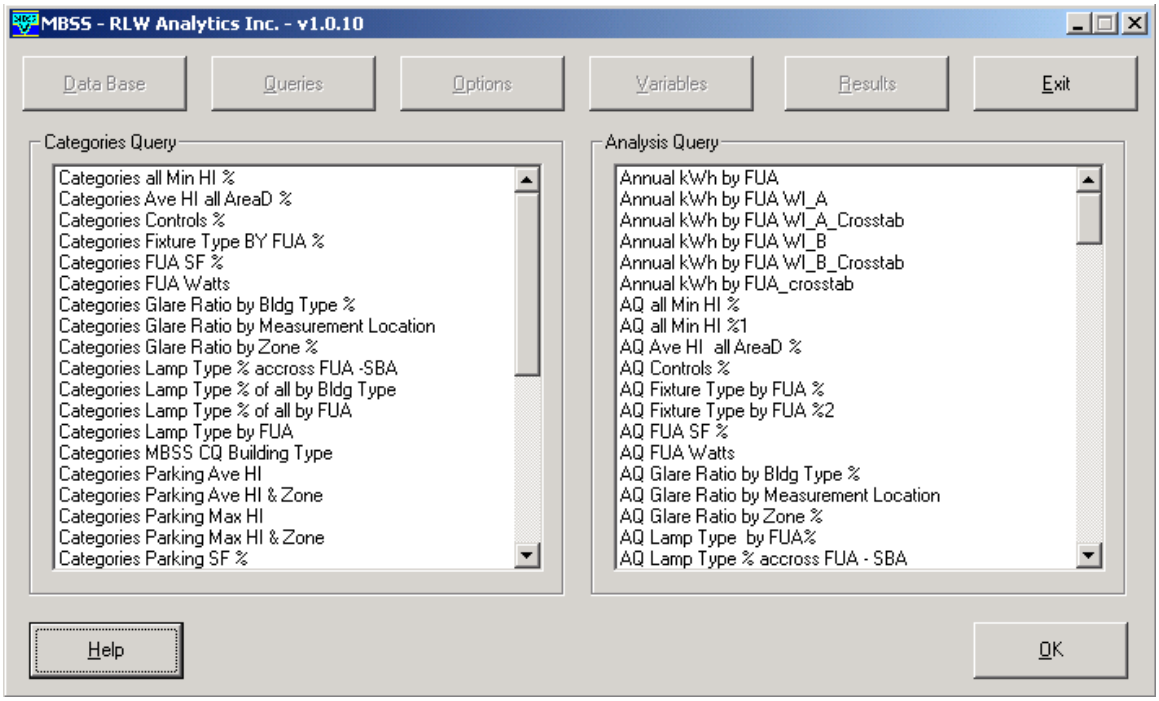


Installation of MBSS will place the database (**Outdoor Lighting Statewide Assement.mdb**) in the folder **Program Files\RLW MBSS (VB).** Click on the Data Base button to select the Microsoft Access database containing the data you would like to analyze. Note that MBSS will write the results to tables contained the same database that contains the data.



Queries

Click on the Queries command button to select your Categories and Analysis queries.



Selecting the Categories Query:
The categories Query selection box will list the categories queries that are available in each database. Each categories query begins with "Categories" and has a corresponding analysis query beginning with "AQ". For example, 'Categories Controls %' will be paired with AQ Controls %.

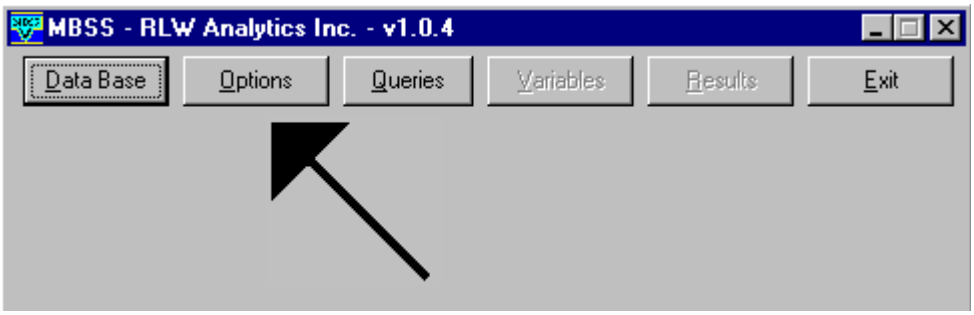
Selecting the Analysis Query

The information you wish to analyze is found in the Analysis Query, the filename of the analysis queries indicate the category query you will need to execute the analysis.

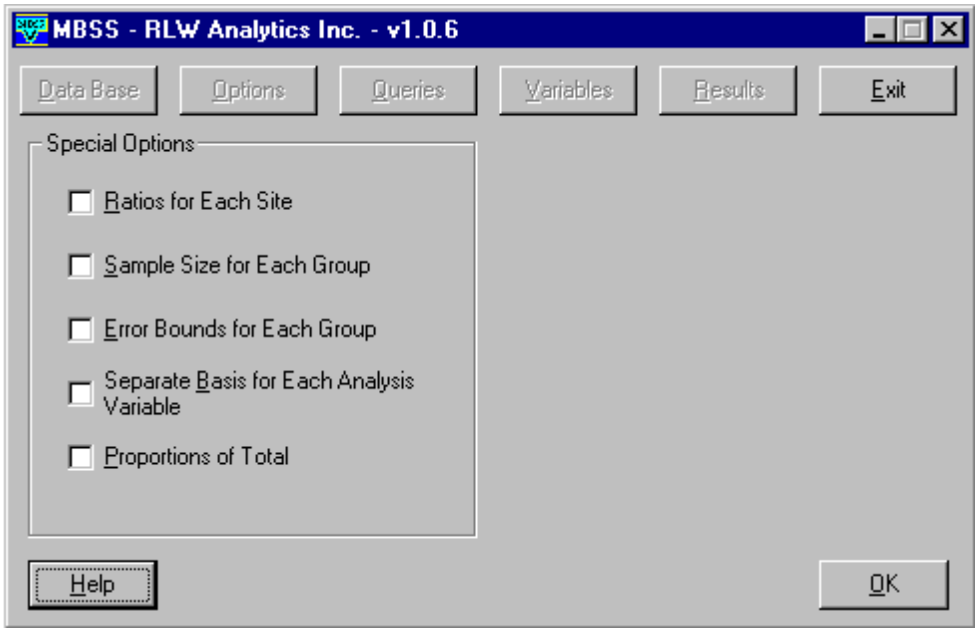
For the analysis queries ending in **–SBA,** (found in the lighting database) a corresponding separate basis query must be selected under the Options button. The corresponding separate basis query will have the same name as the analysis query with a **SB-** prefix instead of a **–SBA** suffix. To analyze the information within these queries choose the categories query associated with the analysis query as usual. Then choose **Options** from the main screen and the *Separate Basis Query* from the Special Options menu, the Separate Basis Query has the same root file name as the analysis query with a SB- prefix instead of a –SBA suffix; Namely SB- Lamp Type % across FUA. Choose the associated separate basis query and click OK.

Note: When using the separate basis option make certain that both queries are sorted in the exact same way, e.g. by FUA. If they are not sorted exactly the same, no results will be realized.

Options



If desired, click on the Options button to select special options. The following special options are available:



Ratios for each site – This option calculates ratios for each individual sample site and writes the ratios out to an Access table with the name "Sites_…" where … is the Analysis Query name. This is useful for reviewing the characteristics of each sample site. If the Ratio for Each Site option is selected, no other table will be written, i.e. sample size and error bound will not be available and there will be no "results" table.

Sample size for each group – This option calculates and writes out the number of sites used to calculate the results for each group of sites. The results are written to an Access table with the name "SamSizes_…" where … is the Analysis Query name. If a site has a zero basis for a particular characteristic it is not counted. This table will be generated simultaneously with the 'Results_…' table

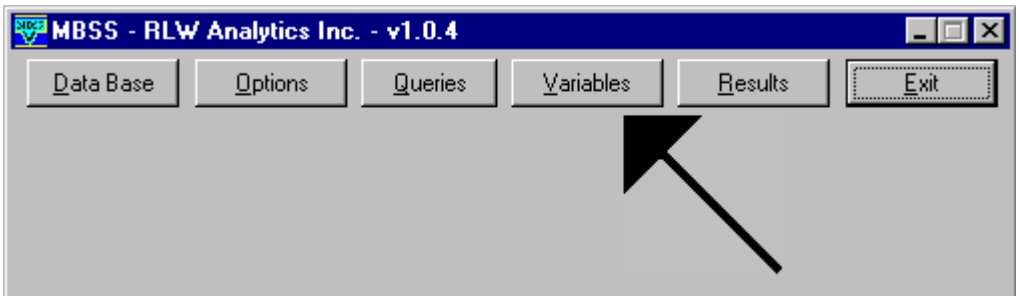
Error bounds for each group – calculate and write out the error bounds for each characteristic in each group. The 90% level of confidence is assumed. The results are written to an Access table with the name "ErrBnds_…" where … is the Analysis Query name. This table will be generated simultaneously with the 'Results_…' table

Separate basis for each analysis variable – For certain analyses, a separate basis for each variable is required. In order to accommodate these circumstances, separate bases queries have been created. All of these separate bases queries have been labeled with the prefix sb-. Once this special option has been selected, a selection bow will appear with the list of all the queries contained in the database, select the desired separate bases query from this list. Only choose from those queries with the sb- prefix. Once you have selected a separate bases query, you must select a Categories Query and an Analysis Query associated with that Separate Bases Query.

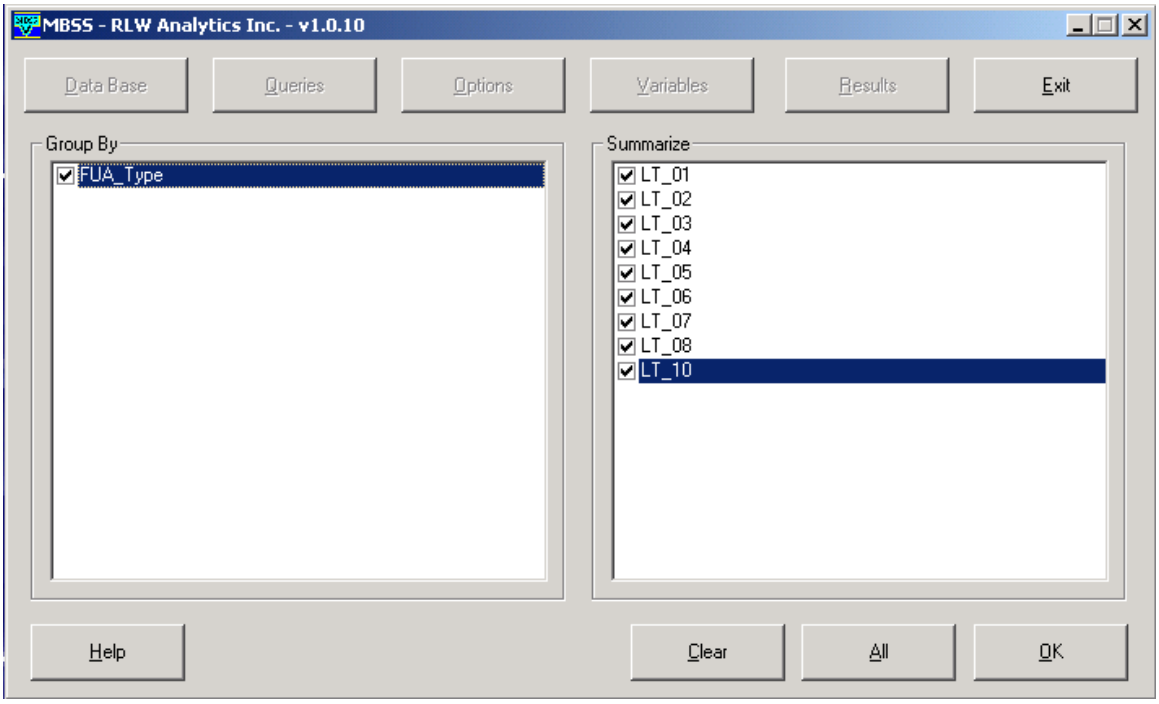
Proportions of Totals – calculate and write out the total of the characteristic in each group as a fraction of the total of the characteristic across all groups. The results are written to an Access table with the name "Proportions_…" where … is the analysis name. You can also request error bounds for each proportion and sample sizes. The sample size is the total number of sites across all groups, excluding a site if (a) it has zero case weight, or (b) the value of the characteristic is equal to zero.

Variables

Click on the Variable button to select the variables for grouping the sites and the variables to be summarized.



Selecting the Group By variables: The Group By list will contain one or more of the following variables: FUA, Building Type, or Zone. You can select or clear any of the variables by clicking the corresponding box. For example, if you select both FUA and Building Type, results will be developed for all possible combinations of FUA and Building Type. If no Group By variables are selected, the results will describe all residences taken together. In the example below the residences will be grouped by FUA Type.



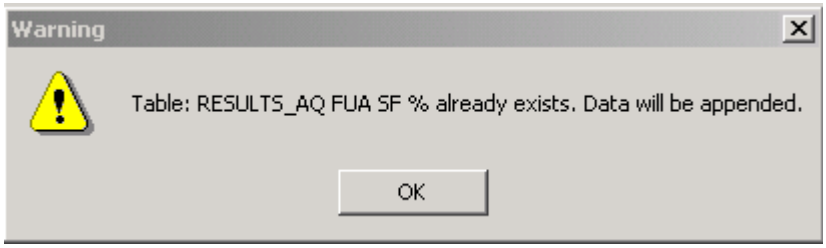
Selecting the Summarize variables: The list will display all of the variables contained in your analysis query except the Site ID and the basis. Each of the variables will be selected since you will usually want to summarize all of these variables.
If the list is very long, you may want to click on the Clear button to select NA of the Summarize variables, and then manually select the specific variables you want to analyze. Click on the All button to select all of the Summarize variables. Click OK when you are ready to proceed. In the example above there are ten variables to be summarized, there must be at least one variable checked for MBSS to run.

Results

Click on the Results button to execute the analysis.

The screen will show the default name for the results table (the same name as the analysis query).

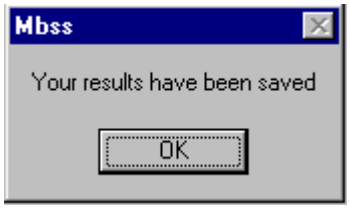
The actual table will be called "Results_…" where … is the name that is shown in Table Name box, in the case shown above the table will be called Results_AQ FUA SF %. The results table is added to the Access database. The ID field will have the value 1 for the first group, 2 for the second group, etc.
If the results table already exists in the Access database, this means that a previous run has been made using the same analysis query. A warning will appear as shown below:



Click OK and the new results will be appended to the bottom of the preexisting table, the previous results will be overwritten. The ID will be extended automatically. If you are appending to ratio, sample size, error bound or special basis, a warning will appear for each table you are appending to. You will not be able to append to any table that is currently open in Access.

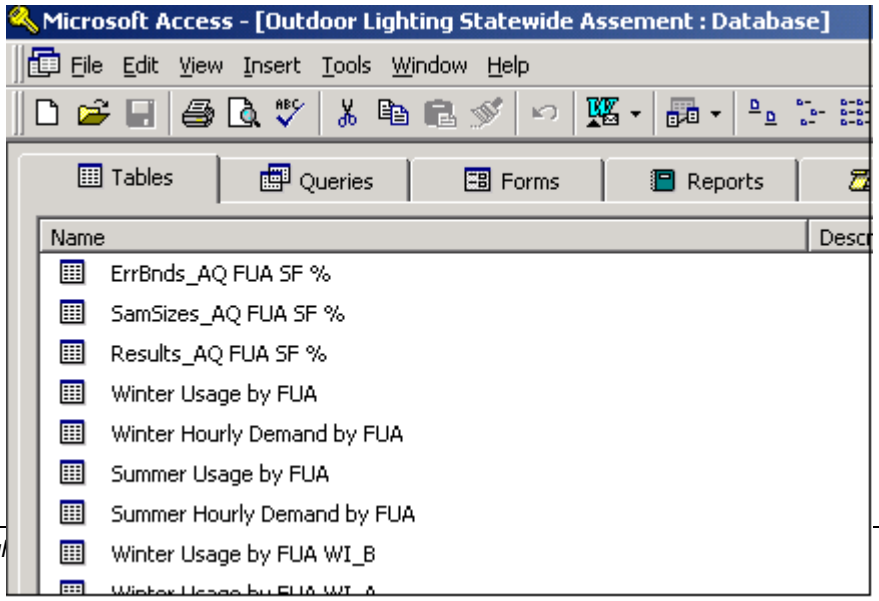
As MBSS is processing your analysis, a message box will be displayed with the SQL (standard query language) for your analysis. This can usually be ignored. If a separate basis for each variable is being used, the identical message box will be displayed a second time.

When the analysis is complete, a message box will be displayed indicating that your results have been saved.

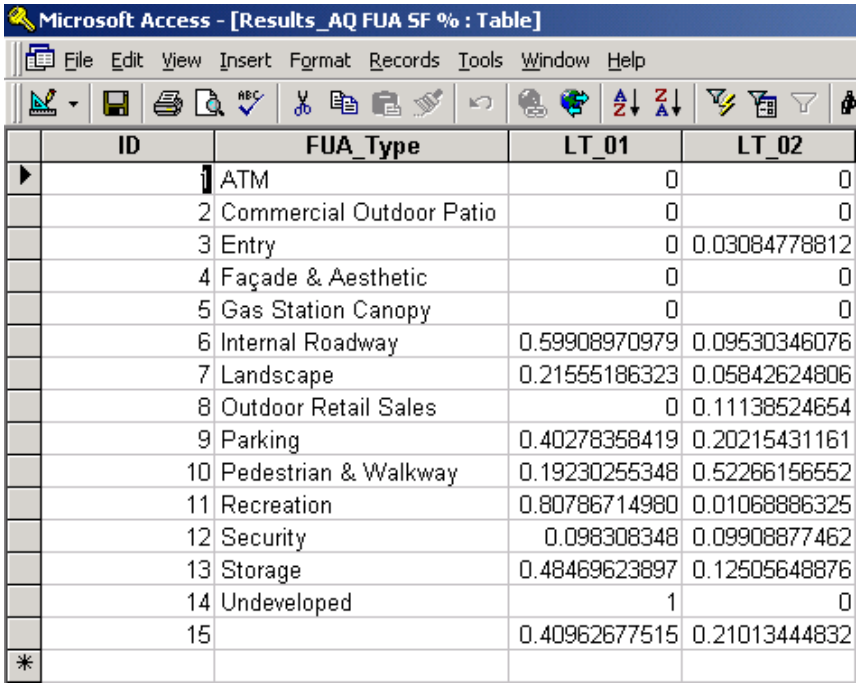


After the results have been written, you must use Access itself to review the results and to prepare reports.

Open the Access database, if not already open, and select the 'Tables' list, the results table you have just created should be there. If the Access database was open while MBSS was running, you may need refresh the view. One way of doing this is to click on the queries tab and quickly return to the 'Tables' list before the new tables appear on the list.



After obtaining your results, you can change the options, queries, or variables and repeat the analysis. For example, suppose you have selected FUA Type as the Group By variable in your first analysis. You may want to continue the analysis by selecting no group by variables. This will summarize your analysis variables for California. A message box will be displayed indicating that your new results will be appended to your existing results table unless you have typed in a new table name.



ID	FUA_Type	LT_01	LT_02
1	ATM	0	0
2	Commercial Outdoor Patio	0	0
3	Entry	0	0.03084778812
4	Façade & Aesthetic	0	0
5	Gas Station Canopy	0	0
6	Internal Roadway	0.59908970979	0.09530346076
7	Landscape	0.21555186323	0.05842624806
8	Outdoor Retail Sales	0	0.11138524654
9	Parking	0.40278358419	0.20215431161
10	Pedestrian & Walkway	0.19230255348	0.52266156552
11	Recreation	0.80786714980	0.01068886325
12	Security	0.098308348	0.09908877462
13	Storage	0.48469623897	0.12505648876
14	Undeveloped	1	0
15		0.40962677515	0.21013444832

Here is an example of a results table, row 15 is all FUAs taken together – or the statewide number.

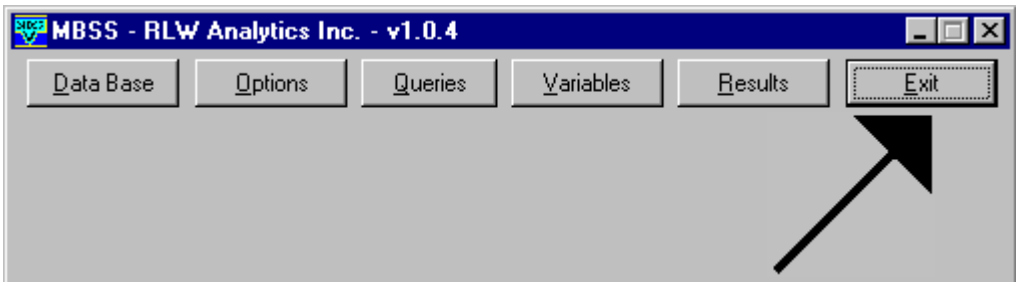
Note: You must click on the Results button each time you select different options, queries, or variables.

Note: You can open a results table in Access while MBSS is running. However, if you do additional MBSS analysis, you must re-open the database in Access to see the new MBSS results.

Hint: First select all of the Group By variables that you intend to use, and then drop variables from the analysis. This will improve the organization of your results table.

Exit

Click on exit to shut down MBSS.



Using Access to Create New Queries

You can obtain a wealth of information from the queries that are provided with the database. However, you can also use Access to create additional queries. But if you create a new query you must make sure it follows the following format.
Note: You can not open an Access Table directly in MBSS. If your data is in a table, design an Access query based on your table.
Note: The name of each of your variables (fields) should start with a letter. Do not use numbers alone as field names.

Creating a new Categories Query

The Categories query contains the categorical variables that can be used to form groups of sites. For example, if you want to group the sites by size you can create a new Categories query with a Size categorical variable.
Note: Each categorical variable should take a limited number of distinct values. For example, you should use several square footage intervals rather than square footage itself.

Format of the Categories Query

The following format is required. Any deviation will cause an error.

Field 1:	Site ID (required)
Field 2:	Case weight (required)
Fields 3 to j:	Any desired categorical variables

Creating a new Analysis Query

The Analysis query is used to specify the variables to be analyzed. Usually the Analysis query also includes the basis to be used in the analysis of each of the variables. In some cases, however, each of the analysis variables requires a separate basis. In this case the bases are provided in a separate query.

Format of the Analysis Query

The following format is required. Any deviation will cause an error.

Field 1:	Site ID (required)
Field 2:	Case weight (required)
Fields 3 to j:	Exactly the same categorical variables as the Categories query
Field j+1:	Site ID (required)
Field j+2:	Basis (required unless a Special Basis is used; if a Special Basis is used this field must be omitted)
Added fields:	All variables to be analyzed or summarized

Note: Fields 1 to k are the same as the Categories query. These are usually obtained by using Access to join the Categories query to a table containing the basis variable and the variables to be analyzed.
Note: Your Categories and Analysis queries must have the same number of records. This is usually achieved by joining the underlying tables or queries by Site ID.

Note: The basis and the variables to be summarized must be numeric. Empty fields are converted to zeros.

Note: If the basis is equal to 1.0 for all sites, then MBSS will give the average value of the analysis variable per site in the population. See the underlying principles for more information.

Creating a new Separate Basis Query

A separate basis query is used to summarize a set of related variables using a unique basis for each variable.

Format of the Separate Basis Query

The following format is required. Any deviation will cause an error.

Field 1:	Site ID (required)
Field 2:	Case weight (required)
Fields 3 to j:	Exactly the same categorical variables as the Categories query
Field j+1:	Site ID (required)
Added fields:	The basis for each analysis variable included in the Analysis query.

Note: The Special Basis query must have the same number of variables as the Analysis query. The name of each basis variable in the special basis query must be identical to the corresponding variable in the Analysis query. This includes case sensitivity
Note: Fields 1 to k are the same as the Categories query. These are usually obtained by using Access to join the Categories query to a table containing the basis variables.
Note: The basis variables to be summarized must be numeric. Empty fields are converted to zeros.
Note: Your Categories, Summarize, and Special Basis queries must have the same number of records. This is usually achieved by joining the underlying tables or queries by Site ID.

Underlying Principles

Why is a special tool needed? Two issues must be considered in summarizing the characteristics of a set of sites. First, the summary must reflect the basis of each characteristic. Second, the summary must reflect appropriate sampling weights.

Example 1

As a first example, suppose you want to know the energy factor, EF, of water heaters in a given population. Note that for water heaters, EF is defined as the energy content in the hot water delivered divided the total energy use of the water heater.
Similarly, the EF of a set of water heater supplied hot water energy delivered to the residents divided by the total annual kWh energy use. This can be written as

$$EF = \frac{\sum_{k \in P} AED_k}{\sum_{k \in P} AEC_k}$$

Here AED_k is the annual energy content delivered from each water heater *k* and AEC_k is annual energy consumed by water heater *k* in the target population *P*. The denominator of this equation, annual energy consumption, will be called the *basis* of this EF characteristic.
The preceding equation can also be written as

$$EF = \frac{\sum_{k \in P} \left(EF_k \times AEC_k \right)}{\sum_{k \in P} AEC_k}$$

Here EF_k is the energy factor of each site *k*. This second equation shows that the average EF is a weighted average of the EF of each site, using annual energy consumption as the weight.
In practice, of course, we must work with a sample of sites rather than the full population. In this case, we define the case weight w_k of each sample site *k* to be the number of sites in the population that it is thought to represent. The case weight w_k is the key to unbiased extrapolation from the sample sites to the population sites. In theory, the case weight should be the reciprocal of the inclusion probability under the sample design. For example, if the sample design specifies that 10 sites are to be randomly selected for the sample from a stratum containing 1,000 sites, the inclusion probability in this stratum is 10 / 1,000 and the case weight is 100.

We can estimate the water heater population EF using the following equation:

$$EF = \frac{\sum_{k \in s} w_k \ AED_k}{\sum_{k \in s} w_k \ AEC_k}$$

Here *s* denotes the sample sites. This can also be written as

$$EF = \frac{\sum_{k \in P} w_k \left(EF_k \times AEC_k \right)}{\sum_{k \in P} w_k \ AEC_k}$$

Example 2

Consider a second example. Suppose we want to estimate the proportion of freezers in a particular age range. We define a variable L_k to be the indicator variable for the characteristic 'home has a freezer of known age.' Specifically L_k = 1 if home *k* has a freezer and the age of the freezer is known, = 0 otherwise. Similarly we define L_{hk} to be the indicator variable for the characteristic 'home has a freezer of

known age and the size is in a particular age range *h*.' Then the population proportion p_h of freezers in the age range *h* is equal to

$$p_h = \frac{\sum_{k \in P} L_{hk}}{\sum_{k \in P} L_k}$$

If we are working with a sample, we can estimate the population proportion of freezers in the age range *h* by calculating the following for each hour *h*.

$$p_h = \frac{\sum_{k \in s} w_k \ L_{hk}}{\sum_{k \in s} w_k \ L_k}$$

This type of calculation can be carried out for any desired selection of sites. For example, we can calculate energy factors or proportions for various building types, climate zones, or utility service areas, i.e., for any group in the population that is identified by the selected categories variables. In this case *s* denotes the set of sites falling within the designated group.

General Form

The preceding examples have the same general form – that of a stratified ratio estimator.
For each site *k*, the characteristic of interest is often a ratio $R_k = y_k / x_k$, e.g., kWh per square foot, or kW in hour *h* divided by total connected kW. In general MBSS terminology, y_k is called the dependent variable and x_k is the explanatory variable. In the present application, we have called y_k the variable to be analyzed or summarized, and we have called x_k the basis variable.
Then the population characteristic of interest is the ratio

$$R = \frac{\sum_{k \in P} y_k}{\sum_{k \in P} x_k}$$

The preceding equation can also be written

$$R = \frac{\sum_{k \in P} x_k \ R_k}{\sum_{k \in P} x_k}$$

In this form it is evident that *R* is a weighted average of the values of R_k for all sites in the target population.
Generally we do not the values of both y_k and x_k for all sites in the population. But for each site in the sample, we do have a weight w_k that can be used to extrapolate the sample to the population. In this case we calculate an estimate of *R* that is denoted $\hat{R}$ and calculated using the equation:

$$\hat{R} = \frac{\sum_{k \in s} w_k \ y_k}{\sum_{k \in s} w_k \ x_k}$$

The preceding equation can also be written

$$\hat{R} = \frac{\sum_{k \in s} w_k \; x_k \; R_k}{\sum_{k \in s} w_k \; x_k}$$

Error Bounds

MBSS can calculate the statistical error bound for any ratio estimate. The error bound can be used to calculate a confidence interval for the true characteristic in the population. For example suppose the EF has been found to be 0.60, with an error bound of 0.02. Then corresponding confidence interval is 0.60 ± 0.02 kWh / square foot, or 0.58 to 0.62 . All error bounds are at the 90% level of confidence. Following MBSS principles, the error bound *eb* is calculated using the following equations:

$$e_k = y_k - \hat{R}\, x_k$$

$$V\left(\hat{R}\right) = \frac{\sum_{k \in s} w_k \left(w_k - 1\right) e_k^2}{\left(\sum_{k \in s} w_k \; x_k\right)^2}$$

$$eb = 1.645 \sqrt{V\left(\hat{R}\right)}$$

With ratio estimation, the error bound is affected by several factors including the sample size and the weights. But the most important factor is generally the strength of the association between the two variables y_k and x_k for all sample sites. If y_k is consistently close to $\hat{R}$ times x_k for all sample sites, then there is a strong association between the two variables. In this case, the error bound will be small. In effect, if R_k is fairly stable from site to site, then we can estimate the value of *R* in the population with good statistical precision.

Averages

MBSS can also estimate the average value of a variable in a population. We define *N* to be the total number of sites in the population. Then the population average of *y*, denoted μ, is defined to be

$$\mu = \frac{1}{N} \sum_{k=1}^{N} y_k$$

The sample estimate of the population mean μ is denoted $\bar{y}$. With a weighted sample, the sample mean is calculated using the equation

$$\bar{y} = \frac{\sum_{k \in s} w_k \; y_k}{\sum_{k \in s} w_k}$$

The preceding equation can be obtained from the standard ratio equation by defining $x_k = 1$. In words, the average of *y* is obtained by using *y* as the variable to be summarized and by choosing 1 as the basis. Note: The error bound calculated by MBSS may be misleading in this situation since it does not reflect stratification.

General form of the Queries

This section describes the format of the queries using the notation developed in the preceding sections.

1.1.1.1.1 Categories Query

Field 1 Site ID, k

Field 2 Case weight, w_k

Field 3 to j Any desired categorical variables used to group the sites

1.1.1.1.2 Analysis Query

Field 1 Site ID, k

Field 2 Case weight, w_k

Field 3 to j The same categorical variables as in the categories query

Field j+1 Site ID, k

Field j+2 Basis, x_k (omitted if a special basis is used)

Added Fields One or more y_k

1.1.1.1.3 Special Basis Query

Field 1 Site ID, k

Field 2 Case weight, w_k

Field 3 to j The same categorical variables as in the categories query

Field j+1 Site ID, k

Added Fields Basis, x_k for each y_k in the analysis query (with the same name)

Additional Options

MBSS provides special options for calculating:

- The sample size option calculates the number of sample sites for each result, excluding cases for which $w_k x_k = 0$ and $w_k y_k = 0$.
- The site specific ratios option calculates $R_k = y_k / x_k$ for each site *k*.
- The proportions of total option calculates

$$\hat{p} = \frac{\sum_{k \in g} w_k \ y_k}{\sum_{k \in s} w_k \ y_k}$$

Here *g* is any specific group determined by the selected category variables, and *s* is the full sample across all groups.

MBSS (Fortran)[1]

The primary purpose of this section is to establish the basic concepts and terminology of model-based statistical sampling – Fortran version (MBSS - Fortran). We will discuss load research and related applications of MBSS- Fortran, describe the study life cycle that will be discussed throughout this book, explain how MBSS- Fortran is used through the various steps of a study and explain how to run several demonstrations of the MBSS- Fortran software.

Model based statistical sampling (MBSS- Fortran) is a statistical methodology for studying a large population by collecting data in a carefully selected sample. For example, in a typical load research

[1] Source: MBSS User's Guide/Reference Manual

study, time-of-use meters would be placed on a sample of accounts to describe the load profile of all accounts in a rate class.

MBSS builds on conventional finite population sampling theory as developed in standard references such as Cochran [1], but MBSS- Fortran goes beyond the standard theory. MBSS- Fortran is particularly tailored to applications such as load research directed to collecting highly quantitative information. The theory of MBSS- Fortran is developed in Wright [6, 8] and Sarndal, et. al. [4]. Applications are discussed in Godfrey, et. al. [2], McCarthy, et. al. [3], EPRI [4], Wright [7] and Wright, et. al. [9].

Making MBSS- Fortran Files

Preparing your MBSSPOP file

One of the features of MBSS- Fortran is its access to the population data base, MBSSPOP. At the sample design stage, you will need to prepare the MBSSPOP file for the target population. This file gives MBSS information about the distribution of the stratification variable. In load research and engineering modeling applications, the stratification variable is usually annual use. However, in DSM applications, the target population is usually a set of program participants listed in the program tracking system, and the stratification variable is the estimated energy or demand savings of each project.

In creating an appropriate version of MBSSPOP for your own application, some of the following questions may arise.

Question: *How do I start?*
You will need to create a data base listing each unit in the population. This data base, called the sampling frame, should include the value of the stratification variable, any sector variables, and any appropriate identification variables such as account numbers.

In a traditional class load research study, your target population would be the set of accounts in a rate class, and the stratification variable would probably be the annual use of each account. You would create a sampling frame by using your billing system to create a file of all accounts in the rate class, together with their annual use, and account number. You might add other potential sector variables identifying market segments, geographical regions, operating companies, etc.

In some cases your sampling frame may contain a relatively small number of units, i.e., less than 2,000 accounts. In this case, you can use the data directly in MBSSPOP. Otherwise, the sampling frame must be summarized into a bin frequency distribution such as MBSSPOP.DEM. A SAS program, called BINS.SAS, can be used for this purpose. BINS.SAS is distributed with MBSS.

Question. *How do I use BINS.SAS?*
Print out the file or look at it in your word processor. You will find instructions for modifying the program for your application. You will want to give the appropriate format for reading in the annual use of each account from your sampling frame. You may want to specify a particular class or sector variable. This variable should take integer values in your sampling frame, i.e., 1, 2, etc. Depending on your application, you may want to change the scale of measurement, e.g., from kWh to MWh. Finally, you may want to change the number of bins to be produced for each class. Of course, you will need to have SAS to run this program. Your output will be written to a file named mbss_pop. The results will be similar in format to demo_pop but the number of accounts per bin will decrease as the maximum value increases.

Question. *Should I include accounts who joined the system recently and do not have a full year of use?*
A common approach is to exclude such accounts from the target population. But we like to keep the number of exclusions as small as possible. So we recommend that you estimate each account's annual use by dividing the account's total use by the number of billing days and then multiplying by 365.

Question. *Does the estimation of annual use as just discussed introduce a bias into the ratio estimate of total demand?*
According to statistical theory, you will not introduce any bias as long as you calculate annual use the same way in both the load research sample and the population.

Question. *What do you do about accounts with zero annual use?*
We usually drop them–they cause a whole host of problems.

Question. *Can I substitute some other variable for annual use?*
Sure, you can use any variable known for each customer in your target population. For example, if your company is summer peaking you might try using summer use instead of annual use. Your objective is to get a variable that is highly correlated with your target demands. We encourage you to experiment with various alternatives.

But remember to be consistent between the load research sample and the population. You might create a bias, for example, by calculating summer use on a calendar basis for the sample and on a billing cycle basis for the population.

Question. *Do I need to have a segment or class variable?*
No. The primary purpose of the segment or class variable is to allow you to investigate different subdomains of the population, and to run your job in batch mode as discussed in Chapter 5. If you do provide a class variable, use a one or two digit integer to identify each class. Character-valued class names, such as R1 or SC2, should be recoded as simple integers such as 1 and 2.

Question. *Do I need to have the population data in a special order?*
If you prepare your data using BINS.SAS, your MBSSPOP file will be sorted appropriately. If you are using your own MBSSPOP file, you need to be aware of the order of cases and variables in your file.

The cases in your file should be sorted by increasing values of the stratification variable, e.g., increasing annual use. If you set up a sector variable, your cases should be sorted by sector and then annual use within sector.

MBSS is flexible about the order of your variables. You must specify the labels to MBSS in the order that the corresponding variables appear in MBSSPOP. For example if you specify the variables as 27 25 26 29 then variable 27 refers to the first column in your file, 25 to the second column, etc.

Question. *How does free format input work?*
Free format input is very convenient and can be used in most applications. However, the following restrictions must be honored. These rules apply to the sample data base as well as the population data base.

Each new case (bin or account) must start on a new line. If there are too many variables to fit on a single line, the case can extend over several lines. However, the value of a variable must not be split between lines and each new case should start on a new line.

Within each line, the values of the variables can be separated by commas, by one or more spaces, or by tabs.

Decimal points must be used for fractional values. If a decimal point is omitted, the value will be read as a whole number.

A value cannot be omitted. If necessary, a missing value can be represented by a special value such as -9999999 or 9999999. The missing data code must be beyond the range of the variables. The SAS missing data code "." is not allowed.

Only numeric values are allowed. Customer ID's or sector names that include alphabetical characters are not allowed.

Question. *I have a standard report generator on my system to produce a bill frequency distribution. Can I use its output to create my MBSSPOP file?*

Probably, as long as it provides the upper bound of each bin, the mean or total use of the accounts in each bin, and the number of accounts in each bin. You may want to import the data into a spread sheet and then reformat the information so that it is similar to MBSSPOP.DEM. See Section 2.1.

Question. *What file do I use for my own population data base?*
By default, MBSS assumes the population data base is always in a file named MBSSPOP. You can use the control option on the main menu of MBSS to name a special file if you wish. But we recommend you use MBSSPOP to hold the population data for your current application. Of course you must remember to save the data in another file before you move to a new application. The same goes for MBSSSAM.

Question. *Ok, I have my MBSSPOP file. What next?*
You can proceed directly with sample design as shown in Sections 2.2 - 2.6. Alternatively, you may want to collect prior sample data to help with the sample plan. Or you may be interested in analyzing the sample data for its own sake.

Preparing your MBSSSAM file

Now we assume you have collected sample data. To analyze it, either for its own sake or to develop a new sample design, you must prepare your MBSSSAM file. If you want, you can use MBSS to analyze a full year of hourly load data, i.e., 8,760 hours. But you will need the batch processing methods discussed in Section 5.4.

In this section, we will assume that your application is simpler, focused on a few key demand characteristics, i.e., demands over a few key periods such as your system's peak hours. Then, of course, MBSSSAM should include the measured values of your demand variables for each customer in your sample. In addition to the demand variables you choose, MBSSSAM must include the value of your stratification variable (e.g., annual use). It may also include a class or sector variable and possibly a stratum id and case weight.

The following questions first deal with the demands, then turn to the annual use, weight, and class variables.

Question: *How many demand variables can MBSS handle?*
The limit depends on the amount of computer memory you have available and how your version of MBSS is configured. The standard version handles up to 60 variables in MBSSSAM. You will generally

want to include a stratification variable such as annual use, a class variable, and perhaps a weight variable. So you will be able to analyze up to 57 demand variables at one time.

However, you can analyze as many sets of demand variables as you like. For example, MBSS is designed to analyze twenty-four hourly demands for each of several day types or for all 365 days for each of several rate classes. In practice, you might analyze the peak day and the typical summer and winter week days. You can keep each class and day type in a separate file and use the methods discussed here. But it is much easier to use a class variable to distinguish the day types as well as the classes as discussed in Section 5.4.

Question: *Are there any restrictions on how I label my variables in the sample data base?*
The main requirement is that all explanatory variables, such as annual use, be labeled identically in the sample and population data bases. Thus, in Chapter 2 annual use was labeled 26 in both MBSSSAM and MBSSPOP. Usually you will want to do the same with the weight and class variables, but this is not a requirement. Otherwise you are free to use any labels from 1 to 90. However, if you are analyzing 24-hourly demands, you will probably find it convenient to label the variables 1-24.

Variable 91 is reserved for a variable that is always equal to 1.0, primarily for use in regression models. Variable 99 is equal to the case number, useful in listing the data. These two variables are created within MBSS and can be used in both the sample and population data bases. Variable 92 is reserved for a calculated stratum identifier and variable 93 is reserved for a calculated weight.

Question. *I want to analyze hourly demands but I have fifteen-minute measurements. How do I calculate a customer's demand during a given hour?*
You have to be careful. For example your measurements may be either in kW or in kWh. If your measurements are in kW, then the demand for a particular hour is the average of the kW measurements during each 15-minute period within the hour. If your measurements are in kWh, then the demand for a particular hour is the sum of the kWh measurements during each 15-minute period within the hour. If you are in doubt, validate your calculations using a customer's billing data for the month or year. If you get it wrong you will be off by a factor of 4 or 1/4.

Question. *I can't decide whether to work with a day type such as the average August weekday or a single particular day such as the peak day in August. What do you advise?*
Your choice will depend on circumstances. But you should be aware that you may be able to obtain more reliable results for a day type than for an individual day. When the target demand is an average over several days it is likely to have less variation from account to account than the demand on a single day. This is especially true for residential and small general service accounts, less true for large commercial or industrial accounts.

Question. *I want to analyze hourly demands for a particular day type such as the average August weekday. How do I prepare the sample data?*
You should calculate the average August weekday hourly loads for each individual account in your sample. We usually use SAS to carry out this type of data preparation.

Question. *What if the customer has some missing demand measurements?*
Some companies estimate the missing measurements by analyzing the customer's pattern of use. If you have estimated values, you probably want to use them in calculating the average hourly load for the customer. Otherwise we recommend you compute the average of the available measurements. For each account, drop the days with missing data and using the remaining days to calculate the average hourly load for the customer.

Question. *What if I am analyzing a single day, such as the summer peak day, and a load research customer has some missing data for this day?*
We recommend you drop the customer from the sample for that day.

Question. *What about annual use in MBSSSAM?*
Assuming you wish to use annual use for stratification or ratio expansion, then MBSSSAM must include the annual use of each sample customer. Generally you would want this to reflect the customer's use in the year corresponding to the demands in your data. In principle, you should retrieve the customer's annual use from the billing system in the same way you created the population billing file. In practice, it is sometimes easier to calculate annual use from the load research data itself.

Question. *Can I use monthly use for expansion? How would I prepare the data?*
Yes, but you may not find it effective. You should be aware of several potential problems. First, you may have difficulty getting good measurements of monthly use for your sample accounts from your billing system due to different billing cycles, estimated readings, and other problems. You could calculate each sample account's use for the calendar month from the load data itself. But then you would face the problem of measuring the total use in the population on a comparable calendar-month basis.

Of course, your sample can only be actually stratified by a single stratification variable. So you may still want to stratify by annual use even if you use monthly use in the expansion. If you go this route, you will want your MBSSPOP file to contain information on annual use for calculating the weight variable, and on the use in each month for use in ratio expansion. You might modify the BINS.SAS job to calculate the average monthly use of the accounts falling in each bin.

After all this work, please be aware that we find that monthly use usually provides very little improvement in statistical precision beyond annual use.

Question. *Tell me about the stratum ID weight variable.*
If desired, MBSSSAM can include a stratum id and weight variable calculated from the sampling plan originally used to select the load research sample. The weight of each sample customer is based on the stratum that the customer was in at the time of sampling–the weight is the population size of the stratum divided by the final sample size of the stratum after adjusting for refusals, missing data, etc. In practice, however, we usually use MBSS to calculate the stratum ID and sample weight using the current population. See Sections 3.2 and 4.2.

Question. *I have load research data for a simple random sample. What is the easiest way to give each customer the same weight?*
When you read your sample data into MBSS, specify `0` as the weight variable. This will give each sample customer a weight of 1. Technically the weight is defined to be the population size divided by the sample size, but MBSS calculations will automatically adjust the weights for the sizes of the population and the sample. With a weight of 1, however, the sample descriptive statistics procedure will calculate the total value of the specified variable in the sample rather than the sample-based estimate of the population total.

However, you may want to calculate a new weight even with a simple random sample. This is a good way to adjust for nonresponse, missing data, etc., and help match the sample to the current population

Question. *I am trying to put together an MBSSSAM file to help develop a sample design for a new load research study. But my only prior load research data is from a rather poor sample. Is there any sense in using these data to plan the new study?*

We would rather have really good data, but it is often necessary to make do with less-than-ideal data. We have found that a prior sample–sometimes with as few as ten customers–can be helpful in planning a new project. Remember the primary purpose of the load research sample is to estimate the error ratios for demand, and hence to estimate the required sample size. Even a small sample can give you a general idea how much variation you are dealing with. But a small sample will usually work better for a day type than for a single day due to the reduced variation achieved by averaging demands across several days.

Question. *I do not have a prior load research sample, but I do have a number of large customers that are billed from load research-type meters. Can I use these customers to build a MBSSSAM file for planning a sample?*
Even these data may be better than none. Of course you should regard the results with caution, but they may be adequate for an initial sampling plan. Remember the worse that can happen is that your sample may be too large or too small. Regardless, your final results–based on your new, real sample–will be unbiased estimates of the population characteristics. And when you have these new data you will be in a good position to develop more accurate plans for future projects.

Question: *I have end-use-metered data. How should I arrange my MBSSSAM file?*
With conventional load research data, we usually set up MBSSSAM to have 24 hourly measurements in each record or line of data. Different records are used for the different accounts in the sample. Then we usually label the variables 1-24 so that it is easy to read the results of the analysis.

By contrast with end use metered data, we usually have hourly measurements for one or more end uses plus the total load. We often create an additional variable, called the residual load, as the difference between the total load and the sum of the measured end uses. So we end up with the following variables: the total load, each of the measured end use loads, and the residual load.

In this case, we often arrange the data in MBSSSAM so that each record or line of data provides the measured values of these variables for a single particular hour. Different records are used for the different accounts in the sample. Then variable 1 denotes the total load, variable 2 the first end use, etc.

Question: *Another question about end-use-metered data. With the approach you have just described, I can provide all of the end use data for a single hour. But what do I do if I am interested in more than one hour?*

Use the 'period' part of the class variable to identify each hour. For example, if you are analyzing 8760-hour data, the period would take values from 0001 to 8760. If you were analyzing 24-hour data for each of 24 day types, the period would take values from 001 to 576. The class variable is discussed in depth in Section 5.4.

Question: *Using MBSSSAM sounds good but I am under a tight time constraint. I have to draw my sample and start the field work very soon and I do not have time for much data preparation. So I need to develop my sample design as quickly as possible.*
Then forget the MBSSSAM file. Prepare your MBSSPOP file as described in Section 6.2 and then estimate your error ratio as discussed in Sections 1.4 and 2.5. Finally develop your sample design as shown in Section 2.6.

Running MBSS – Fortran with the supplied database

To run MBSS-Fortran, simply right-click on the MBSS Fortran icon and choose Properties. In 'Start-in', enter in the directory path for the MBSSPOP and MBSSSAM files provided. Press OK and start MBSS-Fortran by clicking on the icon. Once the program is running, simply choose options 6, then option 1 then option 2. Your results files will be outputted in the same directory as your MBSSPOP and MBSSSAM files.

Database Documentation

The outdoor lighting database delivered with the final report consists of a collection of tables, forms, and queries. The tables contain the data. The forms were designed as similar as possible to the on-site survey instrument to allow for accurate data entry. The collection of queries is used to analyze the data gathered on-site.

Tables

There are two types of tables contained in the database: raw on-site data tables and analysis tables. These two types of tables are documented separately. More detailed descriptions of the two types of tables can be found in the two sections.

For each table in the database, a brief description of the table as well as detailed definitions of each variable are provided. For each field in each table, the field name as given in the study database, a brief description of the variable, and a comprehensive listing of all response codes will be provided. If a variable has the value "NA" in the column "Response Codes", then there are no response codes affiliated with that variable, either because the responses are unique or because the variable is derived from others.

Raw On-Site Data Tables

The raw on-site data tables are those tables that are used to store the raw data collected on-site. Tables that were designed for data entry purposes are considered also raw on-site data tables.

Add-NSLE

The table *Add-NSLE* contains the data collected through the Nighttime Subjective Lighting Evaluation surveys, which were completed by the on-site surveyor and whenever possible, a user of the site. The Nighttime Subjective Lighting Evaluation surveys consisted of a series of subjective questions regarding the quality of the light at the site.

Field Heading	Description	Response Codes
Site#	Unique RLW Site Identification Number	NA
SrvyrName-a	Name of the On-Site Surveyor	NA
On-site-a	Is the survey filled out by an on-site user?	1=Yes, 2=No
Q1-a	It would be safe to walk here alone, during the day.	1=Yes, 2=No
Q2-a	It would be safe to walk here alone, at night.	1=Yes, 2=No
Q3-a	The lighting is comfortable.	1=Yes, 2=No
Q4-a	This is a good example of security lighting..	1=Yes, 2=No
Q5-a	The lighting is too bright.	1=Yes, 2=No
Q6-a	The lighting is too dark.	1=Yes, 2=No
Q7-a	The lighting is uneven (patchy).	1=Yes, 2=No
Q8-a	The lighting is glaring.	1=Yes, 2=No
Q9-a	The lighting is too limited in area.	1=Yes, 2=No

Q10-a	The lighting is poorly matched to the site.	1=Yes, 2=No
Q11-a	I cannot tell the colors of things.	1=Yes, 2=No
Q12-a	How does the lighting area here compare with the lighting of similar areas at night?	1=Worse 2=About the same 3=Better
Gender-a	Gender of Survey Respondent	1=Male 2=Female

Table 1: Add-NSLE

FUA1Info

FUA1Info, contains information about functional use area A. The table contains the description of the functional use area (FUA), the square footage of the FUA, the percentage of the FUA that is covered by a canopy, the luminaire control type, and hourly operational schedules for summers and winters and weekdays and weekends. The detailed description of each variable is provided below.

Field Heading	Description	Response Codes
Site#	RLW Site ID	NA
Q8-FUA1	Functional Use Area A Description	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio
Manual	Are the exterior lights controlled manually?	-1=Yes 0 or a blank Space=No
Time Clock	Are the exterior lights controlled by time clock?	-1=Yes 0 or a blank Space=No
Photocell	Are the exterior lights controlled by photocell?	-1=Yes 0 or a blank Space=No
SqeFt	Square Footage of Functional Use Area A	NA
%Canopy	Percentage of FUA A covered by canopy	NA
AreaD	Description of the functional use area	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio
Q10-01-Wdays-Win	% of exterior lights turned on 12 AM - 1 AM on weekdays in winter (if timeclock or manual controls)	NA

Q10-02-Wdays-Win	% of exterior lights turned on 1 AM – 2 AM on weekdays in winter (if timeclock or manual controls)	NA
Q10-03-Wdays-Win	% of exterior lights turned on 2 AM – 3 AM on weekdays in winter (if timeclock or manual controls)	NA
Q10-04-Wdays-Win	% of exterior lights turned on 3 AM – 4 AM on weekdays in winter (if timeclock or manual controls)	NA
Q10-05-Wdays-Win	% of exterior lights turned on 4 AM – 5 AM on weekdays in winter (if timeclock or manual controls)	NA
Q10-06-Wdays-Win	% of exterior lights turned on 5 AM – 6 AM on weekdays in winter (if timeclock or manual controls)	NA
Q10-07-Wdays-Win	% of exterior lights turned on 6 AM – 7 AM on weekdays in winter (if timeclock or manual controls)	NA
Q10-08-Wdays-Win	% of exterior lights turned on 7 AM – 8 AM on weekdays in winter (if timeclock or manual controls)	NA
Q10-09-Wdays-Win	% of exterior lights turned on 8 AM – 9 AM on weekdays in winter (if timeclock or manual controls)	NA
Q10-10-Wdays-Win	% of exterior lights turned on 9 AM – 10 AM on weekdays in winter (if timeclock or manual controls)	NA
Q10-11-Wdays-Win	% of exterior lights turned on 10 AM – 11 AM on weekdays in winter (if timeclock or manual controls)	NA
Q10-12-Wdays-Win	% of exterior lights turned on 11 AM – 12 PM on weekdays in winter (if timeclock or manual controls)	NA
Q10-13-Wdays-Win	% of exterior lights turned on 12 PM – 1 PM on weekdays in winter (if timeclock or manual controls)	NA
Q10-14-Wdays-Win	% of exterior lights turned on 1 PM – 2 PM on weekdays in winter (if timeclock or manual controls)	NA
Q10-15-Wdays-Win	% of exterior lights turned on 2 PM – 3 PM on weekdays in winter (if timeclock or manual controls)	NA
Q10-16-Wdays-Win	% of exterior lights turned on 3 PM – 4 PM on weekdays in winter (if timeclock or manual controls)	NA
Q10-17-Wdays-Win	% of exterior lights turned on 4 PM – 5 PM on weekdays in winter (if timeclock or manual controls)	NA
Q10-18-Wdays-Win	% of exterior lights turned on 5 PM – 6 PM	NA

	on weekdays in winter (if timeclock or manual controls)	
Q10-19-Wdays-Win	% of exterior lights turned on 6 PM – 7 PM on weekdays in winter (if timeclock or manual controls)	NA
Q10-20-Wdays-Win	% of exterior lights turned on 7 PM – 8 PM on weekdays in winter (if timeclock or manual controls)	NA
Q10-21-Wdays-Win	% of exterior lights turned on 8 PM – 9 PM on weekdays in winter (if timeclock or manual controls)	NA
Q10-22-Wdays-Win	% of exterior lights turned on 9 PM – 10 PM on weekdays in winter (if timeclock or manual controls)	NA
Q10-23-Wdays-Win	% of exterior lights turned on 10 PM – 11 PM on weekdays in winter (if timeclock or manual controls)	NA
Q10-24-Wdays-Win	% of exterior lights turned on 11 PM – 12 AM on weekdays in winter (if timeclock or manual controls)	NA
Q10-01-Wdays-Sum	% of exterior lights turned on 12 AM - 1 AM on weekdays in summer (if timeclock or manual controls)	NA
Q10-02-Wdays-Sum	% of exterior lights turned on 1 AM – 2 AM on weekdays in summer (if timeclock or manual controls)	NA
Q10-03-Wdays-Sum	% of exterior lights turned on 2 AM – 3 AM on weekdays in summer (if timeclock or manual controls)	NA
Q10-04-Wdays-Sum	% of exterior lights turned on 3 AM – 4 AM on weekdays in summer (if timeclock or manual controls)	NA
Q10-05-Wdays-Sum	% of exterior lights turned on 4 AM – 5 AM on weekdays in summer (if timeclock or manual controls)	NA
Q10-06-Wdays-Sum	% of exterior lights turned on 5 AM – 6 AM on weekdays in summer (if timeclock or manual controls)	NA
Q10-07-Wdays-Sum	% of exterior lights turned on 6 AM – 7 AM on weekdays in summer (if timeclock or manual controls)	NA
Q10-08-Wdays-Sum	% of exterior lights turned on 7 AM – 8 AM on weekdays in summer (if timeclock or manual controls)	NA
Q10-09-Wdays-Sum	% of exterior lights turned on 8 AM – 9 AM on weekdays in summer (if timeclock or manual controls)	NA
Q10-10-Wdays-Sum	% of exterior lights turned on 9 AM – 10 AM on weekdays in summer (if timeclock or	NA

	manual controls)	
Q10-11-Wdays-Sum	% of exterior lights turned on 10 AM – 11 AM on weekdays in summer (if timeclock or manual controls)	NA
Q10-12-Wdays-Sum	% of exterior lights turned on 11 AM – 12 PM on weekdays in summer (if timeclock or manual controls)	NA
Q10-13-Wdays-Sum	% of exterior lights turned on 12 PM – 1 PM on weekdays in summer (if timeclock or manual controls)	NA
Q10-14-Wdays-Sum	% of exterior lights turned on 1 PM – 2 PM on weekdays in summer (if timeclock or manual controls)	NA
Q10-15-Wdays-Sum	% of exterior lights turned on 2 PM – 3 PM on weekdays in summer (if timeclock or manual controls)	NA
Q10-16-Wdays-Sum	% of exterior lights turned on 3 PM – 4 PM on weekdays in summer (if timeclock or manual controls)	NA
Q10-17-Wdays-Sum	% of exterior lights turned on 4 PM – 5 PM on weekdays in summer (if timeclock or manual controls)	NA
Q10-18-Wdays-Sum	% of exterior lights turned on 5 PM – 6 PM on weekdays in summer (if timeclock or manual controls)	NA
Q10-19-Wdays-Sum	% of exterior lights turned on 6 PM – 7 PM on weekdays in summer (if timeclock or manual controls)	NA
Q10-20-Wdays-Sum	% of exterior lights turned on 7 PM – 8 PM on weekdays in summer (if timeclock or manual controls)	NA
Q10-21-Wdays-Sum	% of exterior lights turned on 8 PM – 9 PM on weekdays in summer (if timeclock or manual controls)	NA
Q10-22-Wdays-Sum	% of exterior lights turned on 9 PM – 10 PM on weekdays in summer (if timeclock or manual controls)	NA
Q10-23-Wdays-Sum	% of exterior lights turned on 10 PM – 11 PM on weekdays in summer (if timeclock or manual controls)	NA
Q10-24-Wdays-Sum	% of exterior lights turned on 11 PM – 12 AM on weekdays in summer (if timeclock or manual controls)	NA
Q10-01-Wends-Win	% of exterior lights turned on 12 AM - 1 AM on weekends in winter (if timeclock or manual controls)	NA
Q10-02-Wends-Win	% of exterior lights turned on 1 AM – 2 AM on weekends in winter (if timeclock or manual controls)	NA

Q10-03-Wends-Win	% of exterior lights turned on 2 AM – 3 AM on weekends in winter (if timeclock or manual controls)	NA
Q10-04-Wends-Win	% of exterior lights turned on 3 AM – 4 AM on weekends in winter (if timeclock or manual controls)	NA
Q10-05-Wends-Win	% of exterior lights turned on 4 AM – 5 AM on weekends in winter (if timeclock or manual controls)	NA
Q10-06-Wends-Win	% of exterior lights turned on 5 AM – 6 AM on weekends in winter (if timeclock or manual controls)	NA
Q10-07-Wends-Win	% of exterior lights turned on 6 AM – 7 AM on weekends in winter (if timeclock or manual controls)	NA
Q10-08-Wends-Win	% of exterior lights turned on 7 AM – 8 AM on weekends in winter (if timeclock or manual controls)	NA
Q10-09-Wends-Win	% of exterior lights turned on 8 AM – 9 AM on weekends in winter (if timeclock or manual controls)	NA
Q10-10-Wends-Win	% of exterior lights turned on 9 AM – 10 AM on weekends in winter (if timeclock or manual controls)	NA
Q10-11-Wends-Win	% of exterior lights turned on 10 AM – 11 AM on weekends in winter (if timeclock or manual controls)	NA
Q10-12-Wends-Win	% of exterior lights turned on 11 AM – 12 PM on weekends in winter (if timeclock or manual controls)	NA
Q10-13-Wends-Win	% of exterior lights turned on 12 PM – 1 PM on weekends in winter (if timeclock or manual controls)	NA
Q10-14-Wends-Win	% of exterior lights turned on 1 PM – 2 PM on weekends in winter (if timeclock or manual controls)	NA
Q10-15-Wends-Win	% of exterior lights turned on 2 PM – 3 PM on weekends in winter (if timeclock or manual controls)	NA
Q10-16-Wends-Win	% of exterior lights turned on 3 PM – 4 PM on weekends in winter (if timeclock or manual controls)	NA
Q10-17-Wends-Win	% of exterior lights turned on 4 PM – 5 PM on weekends in winter (if timeclock or manual controls)	NA
Q10-18-Wends-Win	% of exterior lights turned on 5 PM – 6 PM on weekends in winter (if timeclock or manual controls)	NA
Q10-19-Wends-Win	% of exterior lights turned on 6 PM – 7 PM	NA

	on weekends in winter (if timeclock or manual controls)	
Q10-20-Wends-Win	% of exterior lights turned on 7 PM – 8 PM on weekends in winter (if timeclock or manual controls)	NA
Q10-21-Wends-Win	% of exterior lights turned on 8 PM – 9 PM on weekends in winter (if timeclock or manual controls)	NA
Q10-22-Wends-Win	% of exterior lights turned on 9 PM – 10 PM on weekends in winter (if timeclock or manual controls)	NA
Q10-23-Wends-Win	% of exterior lights turned on 10 PM – 11 PM on weekends in winter (if timeclock or manual controls)	NA
Q10-24-Wends-Win	% of exterior lights turned on 11 PM – 12 AM on weekends in winter (if timeclock or manual controls)	NA
Q10-01-Wends-Sum	% of exterior lights turned on 12 AM - 1 AM on weekends in summer (if timeclock or manual controls)	NA
Q10-02-Wends-Sum	% of exterior lights turned on 1 AM – 2 AM on weekends in summer (if timeclock or manual controls)	NA
Q10-03-Wends-Sum	% of exterior lights turned on 2 AM – 3 AM on weekends in summer (if timeclock or manual controls)	NA
Q10-04-Wends-Sum	% of exterior lights turned on 3 AM – 4 AM on weekends in summer (if timeclock or manual controls)	NA
Q10-05-Wends-Sum	% of exterior lights turned on 4 AM – 5 AM on weekends in summer (if timeclock or manual controls)	NA
Q10-06-Wends-Sum	% of exterior lights turned on 5 AM – 6 AM on weekends in summer (if timeclock or manual controls)	NA
Q10-07-Wends-Sum	% of exterior lights turned on 6 AM – 7 AM on weekends in summer (if timeclock or manual controls)	NA
Q10-08-Wends-Sum	% of exterior lights turned on 7 AM – 8 AM on weekends in summer (if timeclock or manual controls)	NA
Q10-09-Wends-Sum	% of exterior lights turned on 8 AM – 9 AM on weekends in summer (if timeclock or manual controls)	NA
Q10-10-Wends-Sum	% of exterior lights turned on 9 AM – 10 AM on weekends in summer (if timeclock or manual controls)	NA
Q10-11-Wends-Sum	% of exterior lights turned on 10 AM – 11 AM on weekends in summer (if timeclock or	NA

	manual controls)	
Q10-12-Wends-Sum	% of exterior lights turned on 11 AM – 12 PM on weekends in summer (if timeclock or manual controls)	NA
Q10-13-Wends-Sum	% of exterior lights turned on 12 PM – 1 PM on weekends in summer (if timeclock or manual controls)	NA
Q10-14-Wends-Sum	% of exterior lights turned on 1 PM – 2 PM on weekends in summer (if timeclock or manual controls)	NA
Q10-15-Wends-Sum	% of exterior lights turned on 2 PM – 3 PM on weekends in summer (if timeclock or manual controls)	NA
Q10-16-Wends-Sum	% of exterior lights turned on 3 PM – 4 PM on weekends in summer (if timeclock or manual controls)	NA
Q10-17-Wends-Sum	% of exterior lights turned on 4 PM – 5 PM on weekends in summer (if timeclock or manual controls)	NA
Q10-18-Wends-Sum	% of exterior lights turned on 5 PM – 6 PM on weekends in summer (if timeclock or manual controls)	NA
Q10-19-Wends-Sum	% of exterior lights turned on 6 PM – 7 PM on weekends in summer (if timeclock or manual controls)	NA
Q10-20-Wends-Sum	% of exterior lights turned on 7 PM – 8 PM on weekends in summer (if timeclock or manual controls)	NA
Q10-21-Wends-Sum	% of exterior lights turned on 8 PM – 9 PM on weekends in summer (if timeclock or manual controls)	NA
Q10-22-Wends-Sum	% of exterior lights turned on 9 PM – 10 PM on weekends in summer (if timeclock or manual controls)	NA
Q10-23-Wends-Sum	% of exterior lights turned on 10 PM – 11 PM on weekends in summer (if timeclock or manual controls)	NA
Q10-24-Wends-Sum	% of exterior lights turned on 11 PM – 12 AM on weekends in summer (if timeclock or manual controls)	NA
Q10-01-Wdays-Win-D, …, Q10-24-Wends-Sum-D	The equivalent revised numbers if the schedule was changed due to Governor Davis' legislation	NA

Table 2: FUA1 Info

FUA2Info

FUA2Info, contains information about functional use area B. The table contains the description of the functional use area (FUA), the square footage of the FUA, the percentage of the FUA that is covered by a

canopy, the luminaire control type, and hourly operational schedules for summers and winters and weekdays and weekends. The detailed description of each variable is provided below.

Field Heading	Description	Response Codes
Site#	RLW Site ID	NA
Q11-FUA2	Functional Use Area B Description	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio
Manual	Are the exterior lights controlled manually?	-1=Yes 0 or a blank Space=No
Time Clock	Are the exterior lights controlled by time clock?	-1=Yes 0 or a blank Space=No
Photocell	Are the exterior lights controlled by photocell?	-1=Yes 0 or a blank Space=No
SqeFt	Square Footage of Functional Use Area B	NA
%Canopy	Percentage of FUA B covered by canopy	NA
AreaD	Description of the functional use area	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio
Q13-01-Wdays-Win	% of exterior lights turned on 12 AM - 1 AM on weekdays in winter (if timeclock or manual controls)	NA
Q13-02-Wdays-Win	% of exterior lights turned on 1 AM – 2 AM on weekdays in winter (if timeclock or manual controls)	NA
Q13-03-Wdays-Win	% of exterior lights turned on 2 AM – 3 AM on weekdays in winter (if timeclock or manual controls)	NA
Q13-04-Wdays-Win	% of exterior lights turned on 3 AM – 4 AM on weekdays in winter (if timeclock or manual controls)	NA
Q13-05-Wdays-Win	% of exterior lights turned on 4 AM – 5 AM on weekdays in winter (if timeclock or manual controls)	NA
Q13-06-Wdays-Win	% of exterior lights turned on 5 AM – 6 AM	NA

	on weekdays in winter (if timeclock or manual controls)	
Q13-07-Wdays-Win	% of exterior lights turned on 6 AM – 7 AM on weekdays in winter (if timeclock or manual controls)	NA
Q13-08-Wdays-Win	% of exterior lights turned on 7 AM – 8 AM on weekdays in winter (if timeclock or manual controls)	NA
Q13-09-Wdays-Win	% of exterior lights turned on 8 AM – 9 AM on weekdays in winter (if timeclock or manual controls)	NA
Q13-10-Wdays-Win	% of exterior lights turned on 9 AM – 10 AM on weekdays in winter (if timeclock or manual controls)	NA
Q13-11-Wdays-Win	% of exterior lights turned on 10 AM – 11 AM on weekdays in winter (if timeclock or manual controls)	NA
Q13-12-Wdays-Win	% of exterior lights turned on 11 AM – 12 PM on weekdays in winter (if timeclock or manual controls)	NA
Q13-13-Wdays-Win	% of exterior lights turned on 12 PM – 1 PM on weekdays in winter (if timeclock or manual controls)	NA
Q13-14-Wdays-Win	% of exterior lights turned on 1 PM – 2 PM on weekdays in winter (if timeclock or manual controls)	NA
Q13-15-Wdays-Win	% of exterior lights turned on 2 PM – 3 PM on weekdays in winter (if timeclock or manual controls)	NA
Q13-16-Wdays-Win	% of exterior lights turned on 3 PM – 4 PM on weekdays in winter (if timeclock or manual controls)	NA
Q13-17-Wdays-Win	% of exterior lights turned on 4 PM – 5 PM on weekdays in winter (if timeclock or manual controls)	NA
Q13-18-Wdays-Win	% of exterior lights turned on 5 PM – 6 PM on weekdays in winter (if timeclock or manual controls)	NA
Q13-19-Wdays-Win	% of exterior lights turned on 6 PM – 7 PM on weekdays in winter (if timeclock or manual controls)	NA
Q13-20-Wdays-Win	% of exterior lights turned on 7 PM – 8 PM on weekdays in winter (if timeclock or manual controls)	NA
Q13-21-Wdays-Win	% of exterior lights turned on 8 PM – 9 PM on weekdays in winter (if timeclock or manual controls)	NA
Q13-22-Wdays-Win	% of exterior lights turned on 9 PM – 10 PM on weekdays in winter (if timeclock or	NA

	manual controls)	
Q13-23-Wdays-Win	% of exterior lights turned on 10 PM – 11 PM on weekdays in winter (if timeclock or manual controls)	NA
Q13-24-Wdays-Win	% of exterior lights turned on 11 PM – 12 AM on weekdays in winter (if timeclock or manual controls)	NA
Q13-01-Wdays-Sum	% of exterior lights turned on 12 AM - 1 AM on weekdays in summer (if timeclock or manual controls)	NA
Q13-02-Wdays-Sum	% of exterior lights turned on 1 AM – 2 AM on weekdays in summer (if timeclock or manual controls)	NA
Q13-03-Wdays-Sum	% of exterior lights turned on 2 AM – 3 AM on weekdays in summer (if timeclock or manual controls)	NA
Q13-04-Wdays-Sum	% of exterior lights turned on 3 AM – 4 AM on weekdays in summer (if timeclock or manual controls)	NA
Q13-05-Wdays-Sum	% of exterior lights turned on 4 AM – 5 AM on weekdays in summer (if timeclock or manual controls)	NA
Q13-06-Wdays-Sum	% of exterior lights turned on 5 AM – 6 AM on weekdays in summer (if timeclock or manual controls)	NA
Q13-07-Wdays-Sum	% of exterior lights turned on 6 AM – 7 AM on weekdays in summer (if timeclock or manual controls)	NA
Q13-08-Wdays-Sum	% of exterior lights turned on 7 AM – 8 AM on weekdays in summer (if timeclock or manual controls)	NA
Q13-09-Wdays-Sum	% of exterior lights turned on 8 AM – 9 AM on weekdays in summer (if timeclock or manual controls)	NA
Q13-10-Wdays-Sum	% of exterior lights turned on 9 AM – 10 AM on weekdays in summer (if timeclock or manual controls)	NA
Q13-11-Wdays-Sum	% of exterior lights turned on 10 AM – 11 AM on weekdays in summer (if timeclock or manual controls)	NA
Q13-12-Wdays-Sum	% of exterior lights turned on 11 AM – 12 PM on weekdays in summer (if timeclock or manual controls)	NA
Q13-13-Wdays-Sum	% of exterior lights turned on 12 PM – 1 PM on weekdays in summer (if timeclock or manual controls)	NA
Q13-14-Wdays-Sum	% of exterior lights turned on 1 PM – 2 PM on weekdays in summer (if timeclock or manual controls)	NA

Q13-15-Wdays-Sum	% of exterior lights turned on 2 PM – 3 PM on weekdays in summer (if timeclock or manual controls)	NA
Q13-16-Wdays-Sum	% of exterior lights turned on 3 PM – 4 PM on weekdays in summer (if timeclock or manual controls)	NA
Q13-17-Wdays-Sum	% of exterior lights turned on 4 PM – 5 PM on weekdays in summer (if timeclock or manual controls)	NA
Q13-18-Wdays-Sum	% of exterior lights turned on 5 PM – 6 PM on weekdays in summer (if timeclock or manual controls)	NA
Q13-19-Wdays-Sum	% of exterior lights turned on 6 PM – 7 PM on weekdays in summer (if timeclock or manual controls)	NA
Q13-20-Wdays-Sum	% of exterior lights turned on 7 PM – 8 PM on weekdays in summer (if timeclock or manual controls)	NA
Q13-21-Wdays-Sum	% of exterior lights turned on 8 PM – 9 PM on weekdays in summer (if timeclock or manual controls)	NA
Q13-22-Wdays-Sum	% of exterior lights turned on 9 PM – 10 PM on weekdays in summer (if timeclock or manual controls)	NA
Q13-23-Wdays-Sum	% of exterior lights turned on 10 PM – 11 PM on weekdays in summer (if timeclock or manual controls)	NA
Q13-24-Wdays-Sum	% of exterior lights turned on 11 PM – 12 AM on weekdays in summer (if timeclock or manual controls)	NA
Q13-01-Wends-Win	% of exterior lights turned on 12 AM - 1 AM on weekends in winter (if timeclock or manual controls)	NA
Q13-02-Wends-Win	% of exterior lights turned on 1 AM – 2 AM on weekends in winter (if timeclock or manual controls)	NA
Q13-03-Wends-Win	% of exterior lights turned on 2 AM – 3 AM on weekends in winter (if timeclock or manual controls)	NA
Q13-04-Wends-Win	% of exterior lights turned on 3 AM – 4 AM on weekends in winter (if timeclock or manual controls)	NA
Q13-05-Wends-Win	% of exterior lights turned on 4 AM – 5 AM on weekends in winter (if timeclock or manual controls)	NA
Q13-06-Wends-Win	% of exterior lights turned on 5 AM – 6 AM on weekends in winter (if timeclock or manual controls)	NA
Q13-07-Wends-Win	% of exterior lights turned on 6 AM – 7 AM	NA

	on weekends in winter (if timeclock or manual controls)	
Q13-08-Wends-Win	% of exterior lights turned on 7 AM – 8 AM on weekends in winter (if timeclock or manual controls)	NA
Q13-09-Wends-Win	% of exterior lights turned on 8 AM – 9 AM on weekends in winter (if timeclock or manual controls)	NA
Q13-10-Wends-Win	% of exterior lights turned on 9 AM – 10 AM on weekends in winter (if timeclock or manual controls)	NA
Q13-11-Wends-Win	% of exterior lights turned on 10 AM – 11 AM on weekends in winter (if timeclock or manual controls)	NA
Q13-12-Wends-Win	% of exterior lights turned on 11 AM – 12 PM on weekends in winter (if timeclock or manual controls)	NA
Q13-13-Wends-Win	% of exterior lights turned on 12 PM – 1 PM on weekends in winter (if timeclock or manual controls)	NA
Q13-14-Wends-Win	% of exterior lights turned on 1 PM – 2 PM on weekends in winter (if timeclock or manual controls)	NA
Q13-15-Wends-Win	% of exterior lights turned on 2 PM – 3 PM on weekends in winter (if timeclock or manual controls)	NA
Q13-16-Wends-Win	% of exterior lights turned on 3 PM – 4 PM on weekends in winter (if timeclock or manual controls)	NA
Q13-17-Wends-Win	% of exterior lights turned on 4 PM – 5 PM on weekends in winter (if timeclock or manual controls)	NA
Q13-18-Wends-Win	% of exterior lights turned on 5 PM – 6 PM on weekends in winter (if timeclock or manual controls)	NA
Q13-19-Wends-Win	% of exterior lights turned on 6 PM – 7 PM on weekends in winter (if timeclock or manual controls)	NA
Q13-20-Wends-Win	% of exterior lights turned on 7 PM – 8 PM on weekends in winter (if timeclock or manual controls)	NA
Q13-21-Wends-Win	% of exterior lights turned on 8 PM – 9 PM on weekends in winter (if timeclock or manual controls)	NA
Q13-22-Wends-Win	% of exterior lights turned on 9 PM – 10 PM on weekends in winter (if timeclock or manual controls)	NA
Q13-23-Wends-Win	% of exterior lights turned on 10 PM – 11 PM on weekends in winter (if timeclock or	NA

	manual controls)	
Q13-24-Wends-Win	% of exterior lights turned on 11 PM – 12 AM on weekends in winter (if timeclock or manual controls)	NA
Q13-01-Wends-Sum	% of exterior lights turned on 12 AM - 1 AM on weekends in summer (if timeclock or manual controls)	NA
Q13-02-Wends-Sum	% of exterior lights turned on 1 AM – 2 AM on weekends in summer (if timeclock or manual controls)	NA
Q13-03-Wends-Sum	% of exterior lights turned on 2 AM – 3 AM on weekends in summer (if timeclock or manual controls)	NA
Q13-04-Wends-Sum	% of exterior lights turned on 3 AM – 4 AM on weekends in summer (if timeclock or manual controls)	NA
Q13-05-Wends-Sum	% of exterior lights turned on 4 AM – 5 AM on weekends in summer (if timeclock or manual controls)	NA
Q13-06-Wends-Sum	% of exterior lights turned on 5 AM – 6 AM on weekends in summer (if timeclock or manual controls)	NA
Q13-07-Wends-Sum	% of exterior lights turned on 6 AM – 7 AM on weekends in summer (if timeclock or manual controls)	NA
Q13-08-Wends-Sum	% of exterior lights turned on 7 AM – 8 AM on weekends in summer (if timeclock or manual controls)	NA
Q13-09-Wends-Sum	% of exterior lights turned on 8 AM – 9 AM on weekends in summer (if timeclock or manual controls)	NA
Q13-10-Wends-Sum	% of exterior lights turned on 9 AM – 10 AM on weekends in summer (if timeclock or manual controls)	NA
Q13-11-Wends-Sum	% of exterior lights turned on 10 AM – 11 AM on weekends in summer (if timeclock or manual controls)	NA
Q13-12-Wends-Sum	% of exterior lights turned on 11 AM – 12 PM on weekends in summer (if timeclock or manual controls)	NA
Q13-13-Wends-Sum	% of exterior lights turned on 12 PM – 1 PM on weekends in summer (if timeclock or manual controls)	NA
Q13-14-Wends-Sum	% of exterior lights turned on 1 PM – 2 PM on weekends in summer (if timeclock or manual controls)	NA
Q13-15-Wends-Sum	% of exterior lights turned on 2 PM – 3 PM on weekends in summer (if timeclock or manual controls)	NA

Q13-16-Wends-Sum	% of exterior lights turned on 3 PM – 4 PM on weekends in summer (if timeclock or manual controls)	NA
Q13-17-Wends-Sum	% of exterior lights turned on 4 PM – 5 PM on weekends in summer (if timeclock or manual controls)	NA
Q13-18-Wends-Sum	% of exterior lights turned on 5 PM – 6 PM on weekends in summer (if timeclock or manual controls)	NA
Q13-19-Wends-Sum	% of exterior lights turned on 6 PM – 7 PM on weekends in summer (if timeclock or manual controls)	NA
Q13-20-Wends-Sum	% of exterior lights turned on 7 PM – 8 PM on weekends in summer (if timeclock or manual controls)	NA
Q13-21-Wends-Sum	% of exterior lights turned on 8 PM – 9 PM on weekends in summer (if timeclock or manual controls)	NA
Q13-22-Wends-Sum	% of exterior lights turned on 9 PM – 10 PM on weekends in summer (if timeclock or manual controls)	NA
Q13-23-Wends-Sum	% of exterior lights turned on 10 PM – 11 PM on weekends in summer (if timeclock or manual controls)	NA
Q13-24-Wends-Sum	% of exterior lights turned on 11 PM – 12 AM on weekends in summer (if timeclock or manual controls)	NA
Q13-01-Wdays-Win-D, …, Q13-24-Wends-Sum-D	The equivalent revised numbers if the schedule was changed due to Governor Davis' legislation	NA

Table 3: FUA2Info

FUA3Info

FUA3Info, contains information about functional use area C. The table contains the description of the functional use area (FUA), the square footage of the FUA, the percentage of the FUA that is covered by a canopy, the luminaire control type, and hourly operational schedules for summers and winters and weekdays and weekends. The detailed description of each variable is provided below.

Field Heading	Description	Response Codes
Site#	RLW Site ID	NA
Q14-FUA3	Functional Use Area C Description	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 =

		Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio
Manual	Are the exterior lights controlled manually?	-1=Yes 0 or a blank Space=No
Time Clock	Are the exterior lights controlled by time clock?	-1=Yes 0 or a blank Space=No
Photocell	Are the exterior lights controlled by photocell?	-1=Yes 0 or a blank Space=No
SqeFt	Square Footage of Functional Use Area C	NA
%Canopy	Percentage of FUA A covered by canopy	NA
AreaD	Description of the functional use area	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio
Q16-01-Wdays-Win	% of exterior lights turned on 12 AM - 1 AM on weekdays in winter (if timeclock or manual controls)	NA
Q16-02-Wdays-Win	% of exterior lights turned on 1 AM – 2 AM on weekdays in winter (if timeclock or manual controls)	NA
Q16-03-Wdays-Win	% of exterior lights turned on 2 AM – 3 AM on weekdays in winter (if timeclock or manual controls)	NA
Q16-04-Wdays-Win	% of exterior lights turned on 3 AM – 4 AM on weekdays in winter (if timeclock or manual controls)	NA
Q16-05-Wdays-Win	% of exterior lights turned on 4 AM – 5 AM on weekdays in winter (if timeclock or manual controls)	NA
Q16-06-Wdays-Win	% of exterior lights turned on 5 AM – 6 AM on weekdays in winter (if timeclock or manual controls)	NA
Q16-07-Wdays-Win	% of exterior lights turned on 6 AM – 7 AM on weekdays in winter (if timeclock or manual controls)	NA
Q16-08-Wdays-Win	% of exterior lights turned on 7 AM – 8 AM on weekdays in winter (if timeclock or manual controls)	NA
Q16-09-Wdays-Win	% of exterior lights turned on 8 AM – 9 AM on weekdays in winter (if timeclock or manual controls)	NA
Q16-10-Wdays-Win	% of exterior lights turned on 9 AM – 10	NA

	AM on weekdays in winter (if timeclock or manual controls)	
Q16-11-Wdays-Win	% of exterior lights turned on 10 AM – 11 AM on weekdays in winter (if timeclock or manual controls)	NA
Q16-12-Wdays-Win	% of exterior lights turned on 11 AM – 12 PM on weekdays in winter (if timeclock or manual controls)	NA
Q16-13-Wdays-Win	% of exterior lights turned on 12 PM – 1 PM on weekdays in winter (if timeclock or manual controls)	NA
Q16-14-Wdays-Win	% of exterior lights turned on 1 PM – 2 PM on weekdays in winter (if timeclock or manual controls)	NA
Q16-15-Wdays-Win	% of exterior lights turned on 2 PM – 3 PM on weekdays in winter (if timeclock or manual controls)	NA
Q16-16-Wdays-Win	% of exterior lights turned on 3 PM – 4 PM on weekdays in winter (if timeclock or manual controls)	NA
Q16-17-Wdays-Win	% of exterior lights turned on 4 PM – 5 PM on weekdays in winter (if timeclock or manual controls)	NA
Q16-18-Wdays-Win	% of exterior lights turned on 5 PM – 6 PM on weekdays in winter (if timeclock or manual controls)	NA
Q16-19-Wdays-Win	% of exterior lights turned on 6 PM – 7 PM on weekdays in winter (if timeclock or manual controls)	NA
Q16-20-Wdays-Win	% of exterior lights turned on 7 PM – 8 PM on weekdays in winter (if timeclock or manual controls)	NA
Q16-21-Wdays-Win	% of exterior lights turned on 8 PM – 9 PM on weekdays in winter (if timeclock or manual controls)	NA
Q16-22-Wdays-Win	% of exterior lights turned on 9 PM – 10 PM on weekdays in winter (if timeclock or manual controls)	NA
Q16-23-Wdays-Win	% of exterior lights turned on 10 PM – 11 PM on weekdays in winter (if timeclock or manual controls)	NA
Q16-24-Wdays-Win	% of exterior lights turned on 11 PM – 12 AM on weekdays in winter (if timeclock or manual controls)	NA
Q16-01-Wdays-Sum	% of exterior lights turned on 12 AM - 1 AM on weekdays in summer (if timeclock or manual controls)	NA
Q16-02-Wdays-Sum	% of exterior lights turned on 1 AM – 2 AM on weekdays in summer (if timeclock or	NA

	manual controls)	
Q16-03-Wdays-Sum	% of exterior lights turned on 2 AM – 3 AM on weekdays in summer (if timeclock or manual controls)	NA
Q16-04-Wdays-Sum	% of exterior lights turned on 3 AM – 4 AM on weekdays in summer (if timeclock or manual controls)	NA
Q16-05-Wdays-Sum	% of exterior lights turned on 4 AM – 5 AM on weekdays in summer (if timeclock or manual controls)	NA
Q16-06-Wdays-Sum	% of exterior lights turned on 5 AM – 6 AM on weekdays in summer (if timeclock or manual controls)	NA
Q16-07-Wdays-Sum	% of exterior lights turned on 6 AM – 7 AM on weekdays in summer (if timeclock or manual controls)	NA
Q16-08-Wdays-Sum	% of exterior lights turned on 7 AM – 8 AM on weekdays in summer (if timeclock or manual controls)	NA
Q16-09-Wdays-Sum	% of exterior lights turned on 8 AM – 9 AM on weekdays in summer (if timeclock or manual controls)	NA
Q16-10-Wdays-Sum	% of exterior lights turned on 9 AM – 10 AM on weekdays in summer (if timeclock or manual controls)	NA
Q16-11-Wdays-Sum	% of exterior lights turned on 10 AM – 11 AM on weekdays in summer (if timeclock or manual controls)	NA
Q16-12-Wdays-Sum	% of exterior lights turned on 11 AM – 12 PM on weekdays in summer (if timeclock or manual controls)	NA
Q16-13-Wdays-Sum	% of exterior lights turned on 12 PM – 1 PM on weekdays in summer (if timeclock or manual controls)	NA
Q16-14-Wdays-Sum	% of exterior lights turned on 1 PM – 2 PM on weekdays in summer (if timeclock or manual controls)	NA
Q16-15-Wdays-Sum	% of exterior lights turned on 2 PM – 3 PM on weekdays in summer (if timeclock or manual controls)	NA
Q16-16-Wdays-Sum	% of exterior lights turned on 3 PM – 4 PM on weekdays in summer (if timeclock or manual controls)	NA
Q16-17-Wdays-Sum	% of exterior lights turned on 4 PM – 5 PM on weekdays in summer (if timeclock or manual controls)	NA
Q16-18-Wdays-Sum	% of exterior lights turned on 5 PM – 6 PM on weekdays in summer (if timeclock or manual controls)	NA

Q16-19-Wdays-Sum	% of exterior lights turned on 6 PM – 7 PM on weekdays in summer (if timeclock or manual controls)	NA
Q16-20-Wdays-Sum	% of exterior lights turned on 7 PM – 8 PM on weekdays in summer (if timeclock or manual controls)	NA
Q16-21-Wdays-Sum	% of exterior lights turned on 8 PM – 9 PM on weekdays in summer (if timeclock or manual controls)	NA
Q16-22-Wdays-Sum	% of exterior lights turned on 9 PM – 10 PM on weekdays in summer (if timeclock or manual controls)	NA
Q16-23-Wdays-Sum	% of exterior lights turned on 10 PM – 11 PM on weekdays in summer (if timeclock or manual controls)	NA
Q16-24-Wdays-Sum	% of exterior lights turned on 11 PM – 12 AM on weekdays in summer (if timeclock or manual controls)	NA
Q16-01-Wends-Win	% of exterior lights turned on 12 AM - 1 AM on weekends in winter (if timeclock or manual controls)	NA
Q16-02-Wends-Win	% of exterior lights turned on 1 AM – 2 AM on weekends in winter (if timeclock or manual controls)	NA
Q16-03-Wends-Win	% of exterior lights turned on 2 AM – 3 AM on weekends in winter (if timeclock or manual controls)	NA
Q16-04-Wends-Win	% of exterior lights turned on 3 AM – 4 AM on weekends in winter (if timeclock or manual controls)	NA
Q16-05-Wends-Win	% of exterior lights turned on 4 AM – 5 AM on weekends in winter (if timeclock or manual controls)	NA
Q16-06-Wends-Win	% of exterior lights turned on 5 AM – 6 AM on weekends in winter (if timeclock or manual controls)	NA
Q16-07-Wends-Win	% of exterior lights turned on 6 AM – 7 AM on weekends in winter (if timeclock or manual controls)	NA
Q16-08-Wends-Win	% of exterior lights turned on 7 AM – 8 AM on weekends in winter (if timeclock or manual controls)	NA
Q16-09-Wends-Win	% of exterior lights turned on 8 AM – 9 AM on weekends in winter (if timeclock or manual controls)	NA
Q16-10-Wends-Win	% of exterior lights turned on 9 AM – 10 AM on weekends in winter (if timeclock or manual controls)	NA
Q16-11-Wends-Win	% of exterior lights turned on 10 AM – 11	NA

	AM on weekends in winter (if timeclock or manual controls)	
Q16-12-Wends-Win	% of exterior lights turned on 11 AM – 12 PM on weekends in winter (if timeclock or manual controls)	NA
Q16-13-Wends-Win	% of exterior lights turned on 12 PM – 1 PM on weekends in winter (if timeclock or manual controls)	NA
Q16-14-Wends-Win	% of exterior lights turned on 1 PM – 2 PM on weekends in winter (if timeclock or manual controls)	NA
Q16-15-Wends-Win	% of exterior lights turned on 2 PM – 3 PM on weekends in winter (if timeclock or manual controls)	NA
Q16-16-Wends-Win	% of exterior lights turned on 3 PM – 4 PM on weekends in winter (if timeclock or manual controls)	NA
Q16-17-Wends-Win	% of exterior lights turned on 4 PM – 5 PM on weekends in winter (if timeclock or manual controls)	NA
Q16-18-Wends-Win	% of exterior lights turned on 5 PM – 6 PM on weekends in winter (if timeclock or manual controls)	NA
Q16-19-Wends-Win	% of exterior lights turned on 6 PM – 7 PM on weekends in winter (if timeclock or manual controls)	NA
Q16-20-Wends-Win	% of exterior lights turned on 7 PM – 8 PM on weekends in winter (if timeclock or manual controls)	NA
Q16-21-Wends-Win	% of exterior lights turned on 8 PM – 9 PM on weekends in winter (if timeclock or manual controls)	NA
Q16-22-Wends-Win	% of exterior lights turned on 9 PM – 10 PM on weekends in winter (if timeclock or manual controls)	NA
Q16-23-Wends-Win	% of exterior lights turned on 10 PM – 11 PM on weekends in winter (if timeclock or manual controls)	NA
Q16-24-Wends-Win	% of exterior lights turned on 11 PM – 12 AM on weekends in winter (if timeclock or manual controls)	NA
Q16-01-Wends-Sum	% of exterior lights turned on 12 AM - 1 AM on weekends in summer (if timeclock or manual controls)	NA
Q16-02-Wends-Sum	% of exterior lights turned on 1 AM – 2 AM on weekends in summer (if timeclock or manual controls)	NA
Q16-03-Wends-Sum	% of exterior lights turned on 2 AM – 3 AM on weekends in summer (if timeclock or	NA

	manual controls)	
Q16-04-Wends-Sum	% of exterior lights turned on 3 AM – 4 AM on weekends in summer (if timeclock or manual controls)	NA
Q16-05-Wends-Sum	% of exterior lights turned on 4 AM – 5 AM on weekends in summer (if timeclock or manual controls)	NA
Q16-06-Wends-Sum	% of exterior lights turned on 5 AM – 6 AM on weekends in summer (if timeclock or manual controls)	NA
Q16-07-Wends-Sum	% of exterior lights turned on 6 AM – 7 AM on weekends in summer (if timeclock or manual controls)	NA
Q16-08-Wends-Sum	% of exterior lights turned on 7 AM – 8 AM on weekends in summer (if timeclock or manual controls)	NA
Q16-09-Wends-Sum	% of exterior lights turned on 8 AM – 9 AM on weekends in summer (if timeclock or manual controls)	NA
Q16-10-Wends-Sum	% of exterior lights turned on 9 AM – 10 AM on weekends in summer (if timeclock or manual controls)	NA
Q16-11-Wends-Sum	% of exterior lights turned on 10 AM – 11 AM on weekends in summer (if timeclock or manual controls)	NA
Q16-12-Wends-Sum	% of exterior lights turned on 11 AM – 12 PM on weekends in summer (if timeclock or manual controls)	NA
Q16-13-Wends-Sum	% of exterior lights turned on 12 PM – 1 PM on weekends in summer (if timeclock or manual controls)	NA
Q16-14-Wends-Sum	% of exterior lights turned on 1 PM – 2 PM on weekends in summer (if timeclock or manual controls)	NA
Q16-15-Wends-Sum	% of exterior lights turned on 2 PM – 3 PM on weekends in summer (if timeclock or manual controls)	NA
Q16-16-Wends-Sum	% of exterior lights turned on 3 PM – 4 PM on weekends in summer (if timeclock or manual controls)	NA
Q16-17-Wends-Sum	% of exterior lights turned on 4 PM – 5 PM on weekends in summer (if timeclock or manual controls)	NA
Q16-18-Wends-Sum	% of exterior lights turned on 5 PM – 6 PM on weekends in summer (if timeclock or manual controls)	NA
Q16-19-Wends-Sum	% of exterior lights turned on 6 PM – 7 PM on weekends in summer (if timeclock or manual controls)	NA

Q16-20-Wends-Sum	% of exterior lights turned on 7 PM – 8 PM on weekends in summer (if timeclock or manual controls)	NA
Q16-21-Wends-Sum	% of exterior lights turned on 8 PM – 9 PM on weekends in summer (if timeclock or manual controls)	NA
Q16-22-Wends-Sum	% of exterior lights turned on 9 PM – 10 PM on weekends in summer (if timeclock or manual controls)	NA
Q16-23-Wends-Sum	% of exterior lights turned on 10 PM – 11 PM on weekends in summer (if timeclock or manual controls)	NA
Q16-24-Wends-Sum	% of exterior lights turned on 11 PM – 12 AM on weekends in summer (if timeclock or manual controls)	NA
Q16-01-Wdays-Win-D, …, Q16-24-Wends-Sum-D	The equivalent revised numbers if the schedule was changed due to Governor Davis' legislation	NA

Table 4: FUA3Info

FUA4Info

FUA4Info, contains information about functional use area D. The table contains the description of the functional use area (FUA), the square footage of the FUA, the percentage of the FUA that is covered by a canopy, the luminaire control type, and hourly operational schedules for summers and winters and weekdays and weekends. The detailed description of each variable is provided below.

Field Heading	Description	Response Codes
Site#	RLW Site ID	NA
Q17-FUA4	Functional Use Area D Description	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio
Manual	Are the exterior lights controlled manually?	-1=Yes 0 or a blank Space=No
Time Clock	Are the exterior lights controlled by time clock?	-1=Yes 0 or a blank Space=No
Photocell	Are the exterior lights controlled by photocell?	-1=Yes 0 or a blank Space=No
SqeFt	Square Footage of Functional Use Area A	NA
%Canopy	Percentage of FUA A covered by canopy	NA
AreaD	Description of the functional use area	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 =

		Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio
Q19-01-Wdays-Win	% of exterior lights turned on 12 AM - 1 AM on weekdays in winter (if timeclock or manual controls)	NA
Q19-02-Wdays-Win	% of exterior lights turned on 1 AM – 2 AM on weekdays in winter (if timeclock or manual controls)	NA
Q19-03-Wdays-Win	% of exterior lights turned on 2 AM – 3 AM on weekdays in winter (if timeclock or manual controls)	NA
Q19-04-Wdays-Win	% of exterior lights turned on 3 AM – 4 AM on weekdays in winter (if timeclock or manual controls)	NA
Q19-05-Wdays-Win	% of exterior lights turned on 4 AM – 5 AM on weekdays in winter (if timeclock or manual controls)	NA
Q19-06-Wdays-Win	% of exterior lights turned on 5 AM – 6 AM on weekdays in winter (if timeclock or manual controls)	NA
Q19-07-Wdays-Win	% of exterior lights turned on 6 AM – 7 AM on weekdays in winter (if timeclock or manual controls)	NA
Q19-08-Wdays-Win	% of exterior lights turned on 7 AM – 8 AM on weekdays in winter (if timeclock or manual controls)	NA
Q19-09-Wdays-Win	% of exterior lights turned on 8 AM – 9 AM on weekdays in winter (if timeclock or manual controls)	NA
Q19-10-Wdays-Win	% of exterior lights turned on 9 AM – 10 AM on weekdays in winter (if timeclock or manual controls)	NA
Q19-11-Wdays-Win	% of exterior lights turned on 10 AM – 11 AM on weekdays in winter (if timeclock or manual controls)	NA
Q19-12-Wdays-Win	% of exterior lights turned on 11 AM – 12 PM on weekdays in winter (if timeclock or manual controls)	NA
Q19-13-Wdays-Win	% of exterior lights turned on 12 PM – 1 PM on weekdays in winter (if timeclock or manual controls)	NA
Q19-14-Wdays-Win	% of exterior lights turned on 1 PM – 2 PM on weekdays in winter (if timeclock or	NA

	manual controls)	
Q19-15-Wdays-Win	% of exterior lights turned on 2 PM – 3 PM on weekdays in winter (if timeclock or manual controls)	NA
Q19-16-Wdays-Win	% of exterior lights turned on 3 PM – 4 PM on weekdays in winter (if timeclock or manual controls)	NA
Q19-17-Wdays-Win	% of exterior lights turned on 4 PM – 5 PM on weekdays in winter (if timeclock or manual controls)	NA
Q19-18-Wdays-Win	% of exterior lights turned on 5 PM – 6 PM on weekdays in winter (if timeclock or manual controls)	NA
Q19-19-Wdays-Win	% of exterior lights turned on 6 PM – 7 PM on weekdays in winter (if timeclock or manual controls)	NA
Q19-20-Wdays-Win	% of exterior lights turned on 7 PM – 8 PM on weekdays in winter (if timeclock or manual controls)	NA
Q19-21-Wdays-Win	% of exterior lights turned on 8 PM – 9 PM on weekdays in winter (if timeclock or manual controls)	NA
Q19-22-Wdays-Win	% of exterior lights turned on 9 PM – 10 PM on weekdays in winter (if timeclock or manual controls)	NA
Q19-23-Wdays-Win	% of exterior lights turned on 10 PM – 11 PM on weekdays in winter (if timeclock or manual controls)	NA
Q19-24-Wdays-Win	% of exterior lights turned on 11 PM – 12 AM on weekdays in winter (if timeclock or manual controls)	NA
Q19-01-Wdays-Sum	% of exterior lights turned on 12 AM - 1 AM on weekdays in summer (if timeclock or manual controls)	NA
Q19-02-Wdays-Sum	% of exterior lights turned on 1 AM – 2 AM on weekdays in summer (if timeclock or manual controls)	NA
Q19-03-Wdays-Sum	% of exterior lights turned on 2 AM – 3 AM on weekdays in summer (if timeclock or manual controls)	NA
Q19-04-Wdays-Sum	% of exterior lights turned on 3 AM – 4 AM on weekdays in summer (if timeclock or manual controls)	NA
Q19-05-Wdays-Sum	% of exterior lights turned on 4 AM – 5 AM on weekdays in summer (if timeclock or manual controls)	NA
Q19-06-Wdays-Sum	% of exterior lights turned on 5 AM – 6 AM on weekdays in summer (if timeclock or manual controls)	NA

Q19-07-Wdays-Sum	% of exterior lights turned on 6 AM – 7 AM on weekdays in summer (if timeclock or manual controls)	NA
Q19-08-Wdays-Sum	% of exterior lights turned on 7 AM – 8 AM on weekdays in summer (if timeclock or manual controls)	NA
Q19-09-Wdays-Sum	% of exterior lights turned on 8 AM – 9 AM on weekdays in summer (if timeclock or manual controls)	NA
Q19-10-Wdays-Sum	% of exterior lights turned on 9 AM – 10 AM on weekdays in summer (if timeclock or manual controls)	NA
Q19-11-Wdays-Sum	% of exterior lights turned on 10 AM – 11 AM on weekdays in summer (if timeclock or manual controls)	NA
Q19-12-Wdays-Sum	% of exterior lights turned on 11 AM – 12 PM on weekdays in summer (if timeclock or manual controls)	NA
Q19-13-Wdays-Sum	% of exterior lights turned on 12 PM – 1 PM on weekdays in summer (if timeclock or manual controls)	NA
Q19-14-Wdays-Sum	% of exterior lights turned on 1 PM – 2 PM on weekdays in summer (if timeclock or manual controls)	NA
Q19-15-Wdays-Sum	% of exterior lights turned on 2 PM – 3 PM on weekdays in summer (if timeclock or manual controls)	NA
Q19-16-Wdays-Sum	% of exterior lights turned on 3 PM – 4 PM on weekdays in summer (if timeclock or manual controls)	NA
Q19-17-Wdays-Sum	% of exterior lights turned on 4 PM – 5 PM on weekdays in summer (if timeclock or manual controls)	NA
Q19-18-Wdays-Sum	% of exterior lights turned on 5 PM – 6 PM on weekdays in summer (if timeclock or manual controls)	NA
Q19-19-Wdays-Sum	% of exterior lights turned on 6 PM – 7 PM on weekdays in summer (if timeclock or manual controls)	NA
Q19-20-Wdays-Sum	% of exterior lights turned on 7 PM – 8 PM on weekdays in summer (if timeclock or manual controls)	NA
Q19-21-Wdays-Sum	% of exterior lights turned on 8 PM – 9 PM on weekdays in summer (if timeclock or manual controls)	NA
Q19-22-Wdays-Sum	% of exterior lights turned on 9 PM – 10 PM on weekdays in summer (if timeclock or manual controls)	NA
Q19-23-Wdays-Sum	% of exterior lights turned on 10 PM – 11	NA

	PM on weekdays in summer (if timeclock or manual controls)	
Q19-24-Wdays-Sum	% of exterior lights turned on 11 PM – 12 AM on weekdays in summer (if timeclock or manual controls)	NA
Q19-01-Wends-Win	% of exterior lights turned on 12 AM - 1 AM on weekends in winter (if timeclock or manual controls)	NA
Q19-02-Wends-Win	% of exterior lights turned on 1 AM – 2 AM on weekends in winter (if timeclock or manual controls)	NA
Q19-03-Wends-Win	% of exterior lights turned on 2 AM – 3 AM on weekends in winter (if timeclock or manual controls)	NA
Q19-04-Wends-Win	% of exterior lights turned on 3 AM – 4 AM on weekends in winter (if timeclock or manual controls)	NA
Q19-05-Wends-Win	% of exterior lights turned on 4 AM – 5 AM on weekends in winter (if timeclock or manual controls)	NA
Q19-06-Wends-Win	% of exterior lights turned on 5 AM – 6 AM on weekends in winter (if timeclock or manual controls)	NA
Q19-07-Wends-Win	% of exterior lights turned on 6 AM – 7 AM on weekends in winter (if timeclock or manual controls)	NA
Q19-08-Wends-Win	% of exterior lights turned on 7 AM – 8 AM on weekends in winter (if timeclock or manual controls)	NA
Q19-09-Wends-Win	% of exterior lights turned on 8 AM – 9 AM on weekends in winter (if timeclock or manual controls)	NA
Q19-10-Wends-Win	% of exterior lights turned on 9 AM – 10 AM on weekends in winter (if timeclock or manual controls)	NA
Q19-11-Wends-Win	% of exterior lights turned on 10 AM – 11 AM on weekends in winter (if timeclock or manual controls)	NA
Q19-12-Wends-Win	% of exterior lights turned on 11 AM – 12 PM on weekends in winter (if timeclock or manual controls)	NA
Q19-13-Wends-Win	% of exterior lights turned on 12 PM – 1 PM on weekends in winter (if timeclock or manual controls)	NA
Q19-14-Wends-Win	% of exterior lights turned on 1 PM – 2 PM on weekends in winter (if timeclock or manual controls)	NA
Q19-15-Wends-Win	% of exterior lights turned on 2 PM – 3 PM on weekends in winter (if timeclock or	NA

	manual controls)	
Q19-16-Wends-Win	% of exterior lights turned on 3 PM – 4 PM on weekends in winter (if timeclock or manual controls)	NA
Q19-17-Wends-Win	% of exterior lights turned on 4 PM – 5 PM on weekends in winter (if timeclock or manual controls)	NA
Q19-18-Wends-Win	% of exterior lights turned on 5 PM – 6 PM on weekends in winter (if timeclock or manual controls)	NA
Q19-19-Wends-Win	% of exterior lights turned on 6 PM – 7 PM on weekends in winter (if timeclock or manual controls)	NA
Q19-20-Wends-Win	% of exterior lights turned on 7 PM – 8 PM on weekends in winter (if timeclock or manual controls)	NA
Q19-21-Wends-Win	% of exterior lights turned on 8 PM – 9 PM on weekends in winter (if timeclock or manual controls)	NA
Q19-22-Wends-Win	% of exterior lights turned on 9 PM – 10 PM on weekends in winter (if timeclock or manual controls)	NA
Q19-23-Wends-Win	% of exterior lights turned on 10 PM – 11 PM on weekends in winter (if timeclock or manual controls)	NA
Q19-24-Wends-Win	% of exterior lights turned on 11 PM – 12 AM on weekends in winter (if timeclock or manual controls)	NA
Q19-01-Wends-Sum	% of exterior lights turned on 12 AM - 1 AM on weekends in summer (if timeclock or manual controls)	NA
Q19-02-Wends-Sum	% of exterior lights turned on 1 AM – 2 AM on weekends in summer (if timeclock or manual controls)	NA
Q19-03-Wends-Sum	% of exterior lights turned on 2 AM – 3 AM on weekends in summer (if timeclock or manual controls)	NA
Q19-04-Wends-Sum	% of exterior lights turned on 3 AM – 4 AM on weekends in summer (if timeclock or manual controls)	NA
Q19-05-Wends-Sum	% of exterior lights turned on 4 AM – 5 AM on weekends in summer (if timeclock or manual controls)	NA
Q19-06-Wends-Sum	% of exterior lights turned on 5 AM – 6 AM on weekends in summer (if timeclock or manual controls)	NA
Q19-07-Wends-Sum	% of exterior lights turned on 6 AM – 7 AM on weekends in summer (if timeclock or manual controls)	NA

Q19-08-Wends-Sum	% of exterior lights turned on 7 AM – 8 AM on weekends in summer (if timeclock or manual controls)	NA
Q19-09-Wends-Sum	% of exterior lights turned on 8 AM – 9 AM on weekends in summer (if timeclock or manual controls)	NA
Q19-10-Wends-Sum	% of exterior lights turned on 9 AM – 10 AM on weekends in summer (if timeclock or manual controls)	NA
Q19-11-Wends-Sum	% of exterior lights turned on 10 AM – 11 AM on weekends in summer (if timeclock or manual controls)	NA
Q19-12-Wends-Sum	% of exterior lights turned on 11 AM – 12 PM on weekends in summer (if timeclock or manual controls)	NA
Q19-13-Wends-Sum	% of exterior lights turned on 12 PM – 1 PM on weekends in summer (if timeclock or manual controls)	NA
Q19-14-Wends-Sum	% of exterior lights turned on 1 PM – 2 PM on weekends in summer (if timeclock or manual controls)	NA
Q19-15-Wends-Sum	% of exterior lights turned on 2 PM – 3 PM on weekends in summer (if timeclock or manual controls)	NA
Q19-16-Wends-Sum	% of exterior lights turned on 3 PM – 4 PM on weekends in summer (if timeclock or manual controls)	NA
Q19-17-Wends-Sum	% of exterior lights turned on 4 PM – 5 PM on weekends in summer (if timeclock or manual controls)	NA
Q19-18-Wends-Sum	% of exterior lights turned on 5 PM – 6 PM on weekends in summer (if timeclock or manual controls)	NA
Q19-19-Wends-Sum	% of exterior lights turned on 6 PM – 7 PM on weekends in summer (if timeclock or manual controls)	NA
Q19-20-Wends-Sum	% of exterior lights turned on 7 PM – 8 PM on weekends in summer (if timeclock or manual controls)	NA
Q19-21-Wends-Sum	% of exterior lights turned on 8 PM – 9 PM on weekends in summer (if timeclock or manual controls)	NA
Q19-22-Wends-Sum	% of exterior lights turned on 9 PM – 10 PM on weekends in summer (if timeclock or manual controls)	NA
Q19-23-Wends-Sum	% of exterior lights turned on 10 PM – 11 PM on weekends in summer (if timeclock or manual controls)	NA
Q19-24-Wends-Sum	% of exterior lights turned on 11 PM – 12	NA

	AM on weekends in summer (if timeclock or manual controls)	
Q19-01-Wdays-Win-D, …, Q19-24-Wends-Sum-D	The equivalent revised numbers if the schedule was changed due to Governor Davis' legislation	NA

Table 5: FUA4Info

FUA5Info

FUA5Info, contains information about functional use area E. The table contains the description of the functional use area (FUA), the square footage of the FUA, the percentage of the FUA that is covered by a canopy, the luminaire control type, and hourly operational schedules for summers and winters and weekdays and weekends. The detailed description of each variable is provided below.

Field Heading	Description	Response Codes
Site#	RLW Site ID	NA
Q20-FUA5	Functional Use Area E Description	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio
Manual	Are the exterior lights controlled manually?	-1=Yes 0 or a blank Space=No
Time Clock	Are the exterior lights controlled by time clock?	-1=Yes 0 or a blank Space=No
Photocell	Are the exterior lights controlled by photocell?	-1=Yes 0 or a blank Space=No
SqeFt	Square Footage of Functional Use Area E	NA
%Canopy	Percentage of FUA A covered by canopy	NA
AreaD	Description of the functional use area	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio
Q22-01-Wdays-Win	% of exterior lights turned on 12 AM - 1 AM on weekdays in winter (if timeclock or manual controls)	NA
Q22-02-Wdays-Win	% of exterior lights turned on 1 AM – 2 AM on weekdays in winter (if timeclock or	NA

	manual controls)	
Q22-03-Wdays-Win	% of exterior lights turned on 2 AM – 3 AM on weekdays in winter (if timeclock or manual controls)	NA
Q22-04-Wdays-Win	% of exterior lights turned on 3 AM – 4 AM on weekdays in winter (if timeclock or manual controls)	NA
Q22-05-Wdays-Win	% of exterior lights turned on 4 AM – 5 AM on weekdays in winter (if timeclock or manual controls)	NA
Q22-06-Wdays-Win	% of exterior lights turned on 5 AM – 6 AM on weekdays in winter (if timeclock or manual controls)	NA
Q22-07-Wdays-Win	% of exterior lights turned on 6 AM – 7 AM on weekdays in winter (if timeclock or manual controls)	NA
Q22-08-Wdays-Win	% of exterior lights turned on 7 AM – 8 AM on weekdays in winter (if timeclock or manual controls)	NA
Q22-09-Wdays-Win	% of exterior lights turned on 8 AM – 9 AM on weekdays in winter (if timeclock or manual controls)	NA
Q22-10-Wdays-Win	% of exterior lights turned on 9 AM – 10 AM on weekdays in winter (if timeclock or manual controls)	NA
Q22-11-Wdays-Win	% of exterior lights turned on 10 AM – 11 AM on weekdays in winter (if timeclock or manual controls)	NA
Q22-12-Wdays-Win	% of exterior lights turned on 11 AM – 12 PM on weekdays in winter (if timeclock or manual controls)	NA
Q22-13-Wdays-Win	% of exterior lights turned on 12 PM – 1 PM on weekdays in winter (if timeclock or manual controls)	NA
Q22-14-Wdays-Win	% of exterior lights turned on 1 PM – 2 PM on weekdays in winter (if timeclock or manual controls)	NA
Q22-15-Wdays-Win	% of exterior lights turned on 2 PM – 3 PM on weekdays in winter (if timeclock or manual controls)	NA
Q22-16-Wdays-Win	% of exterior lights turned on 3 PM – 4 PM on weekdays in winter (if timeclock or manual controls)	NA
Q22-17-Wdays-Win	% of exterior lights turned on 4 PM – 5 PM on weekdays in winter (if timeclock or manual controls)	NA
Q22-18-Wdays-Win	% of exterior lights turned on 5 PM – 6 PM on weekdays in winter (if timeclock or manual controls)	NA

Q22-19-Wdays-Win	% of exterior lights turned on 6 PM – 7 PM on weekdays in winter (if timeclock or manual controls)	NA
Q22-20-Wdays-Win	% of exterior lights turned on 7 PM – 8 PM on weekdays in winter (if timeclock or manual controls)	NA
Q22-21-Wdays-Win	% of exterior lights turned on 8 PM – 9 PM on weekdays in winter (if timeclock or manual controls)	NA
Q22-22-Wdays-Win	% of exterior lights turned on 9 PM – 10 PM on weekdays in winter (if timeclock or manual controls)	NA
Q22-23-Wdays-Win	% of exterior lights turned on 10 PM – 11 PM on weekdays in winter (if timeclock or manual controls)	NA
Q22-24-Wdays-Win	% of exterior lights turned on 11 PM – 12 AM on weekdays in winter (if timeclock or manual controls)	NA
Q22-01-Wdays-Sum	% of exterior lights turned on 12 AM - 1 AM on weekdays in summer (if timeclock or manual controls)	NA
Q22-02-Wdays-Sum	% of exterior lights turned on 1 AM – 2 AM on weekdays in summer (if timeclock or manual controls)	NA
Q22-03-Wdays-Sum	% of exterior lights turned on 2 AM – 3 AM on weekdays in summer (if timeclock or manual controls)	NA
Q22-04-Wdays-Sum	% of exterior lights turned on 3 AM – 4 AM on weekdays in summer (if timeclock or manual controls)	NA
Q22-05-Wdays-Sum	% of exterior lights turned on 4 AM – 5 AM on weekdays in summer (if timeclock or manual controls)	NA
Q22-06-Wdays-Sum	% of exterior lights turned on 5 AM – 6 AM on weekdays in summer (if timeclock or manual controls)	NA
Q22-07-Wdays-Sum	% of exterior lights turned on 6 AM – 7 AM on weekdays in summer (if timeclock or manual controls)	NA
Q22-08-Wdays-Sum	% of exterior lights turned on 7 AM – 8 AM on weekdays in summer (if timeclock or manual controls)	NA
Q22-09-Wdays-Sum	% of exterior lights turned on 8 AM – 9 AM on weekdays in summer (if timeclock or manual controls)	NA
Q22-10-Wdays-Sum	% of exterior lights turned on 9 AM – 10 AM on weekdays in summer (if timeclock or manual controls)	NA
Q22-11-Wdays-Sum	% of exterior lights turned on 10 AM – 11	NA

	AM on weekdays in summer (if timeclock or manual controls)	
Q22-12-Wdays-Sum	% of exterior lights turned on 11 AM – 12 PM on weekdays in summer (if timeclock or manual controls)	NA
Q22-13-Wdays-Sum	% of exterior lights turned on 12 PM – 1 PM on weekdays in summer (if timeclock or manual controls)	NA
Q22-14-Wdays-Sum	% of exterior lights turned on 1 PM – 2 PM on weekdays in summer (if timeclock or manual controls)	NA
Q22-15-Wdays-Sum	% of exterior lights turned on 2 PM – 3 PM on weekdays in summer (if timeclock or manual controls)	NA
Q22-16-Wdays-Sum	% of exterior lights turned on 3 PM – 4 PM on weekdays in summer (if timeclock or manual controls)	NA
Q22-17-Wdays-Sum	% of exterior lights turned on 4 PM – 5 PM on weekdays in summer (if timeclock or manual controls)	NA
Q22-18-Wdays-Sum	% of exterior lights turned on 5 PM – 6 PM on weekdays in summer (if timeclock or manual controls)	NA
Q22-19-Wdays-Sum	% of exterior lights turned on 6 PM – 7 PM on weekdays in summer (if timeclock or manual controls)	NA
Q22-20-Wdays-Sum	% of exterior lights turned on 7 PM – 8 PM on weekdays in summer (if timeclock or manual controls)	NA
Q22-21-Wdays-Sum	% of exterior lights turned on 8 PM – 9 PM on weekdays in summer (if timeclock or manual controls)	NA
Q22-22-Wdays-Sum	% of exterior lights turned on 9 PM – 10 PM on weekdays in summer (if timeclock or manual controls)	NA
Q22-23-Wdays-Sum	% of exterior lights turned on 10 PM – 11 PM on weekdays in summer (if timeclock or manual controls)	NA
Q22-24-Wdays-Sum	% of exterior lights turned on 11 PM – 12 AM on weekdays in summer (if timeclock or manual controls)	NA
Q22-01-Wends-Win	% of exterior lights turned on 12 AM - 1 AM on weekends in winter (if timeclock or manual controls)	NA
Q22-02-Wends-Win	% of exterior lights turned on 1 AM – 2 AM on weekends in winter (if timeclock or manual controls)	NA
Q22-03-Wends-Win	% of exterior lights turned on 2 AM – 3 AM on weekends in winter (if timeclock or	NA

	manual controls)	
Q22-04-Wends-Win	% of exterior lights turned on 3 AM – 4 AM on weekends in winter (if timeclock or manual controls)	NA
Q22-05-Wends-Win	% of exterior lights turned on 4 AM – 5 AM on weekends in winter (if timeclock or manual controls)	NA
Q22-06-Wends-Win	% of exterior lights turned on 5 AM – 6 AM on weekends in winter (if timeclock or manual controls)	NA
Q22-07-Wends-Win	% of exterior lights turned on 6 AM – 7 AM on weekends in winter (if timeclock or manual controls)	NA
Q22-08-Wends-Win	% of exterior lights turned on 7 AM – 8 AM on weekends in winter (if timeclock or manual controls)	NA
Q22-09-Wends-Win	% of exterior lights turned on 8 AM – 9 AM on weekends in winter (if timeclock or manual controls)	NA
Q22-10-Wends-Win	% of exterior lights turned on 9 AM – 10 AM on weekends in winter (if timeclock or manual controls)	NA
Q22-11-Wends-Win	% of exterior lights turned on 10 AM – 11 AM on weekends in winter (if timeclock or manual controls)	NA
Q22-12-Wends-Win	% of exterior lights turned on 11 AM – 12 PM on weekends in winter (if timeclock or manual controls)	NA
Q22-13-Wends-Win	% of exterior lights turned on 12 PM – 1 PM on weekends in winter (if timeclock or manual controls)	NA
Q22-14-Wends-Win	% of exterior lights turned on 1 PM – 2 PM on weekends in winter (if timeclock or manual controls)	NA
Q22-15-Wends-Win	% of exterior lights turned on 2 PM – 3 PM on weekends in winter (if timeclock or manual controls)	NA
Q22-16-Wends-Win	% of exterior lights turned on 3 PM – 4 PM on weekends in winter (if timeclock or manual controls)	NA
Q22-17-Wends-Win	% of exterior lights turned on 4 PM – 5 PM on weekends in winter (if timeclock or manual controls)	NA
Q22-18-Wends-Win	% of exterior lights turned on 5 PM – 6 PM on weekends in winter (if timeclock or manual controls)	NA
Q22-19-Wends-Win	% of exterior lights turned on 6 PM – 7 PM on weekends in winter (if timeclock or manual controls)	NA

Q22-20-Wends-Win	% of exterior lights turned on 7 PM – 8 PM on weekends in winter (if timeclock or manual controls)	NA
Q22-21-Wends-Win	% of exterior lights turned on 8 PM – 9 PM on weekends in winter (if timeclock or manual controls)	NA
Q22-22-Wends-Win	% of exterior lights turned on 9 PM – 10 PM on weekends in winter (if timeclock or manual controls)	NA
Q22-23-Wends-Win	% of exterior lights turned on 10 PM – 11 PM on weekends in winter (if timeclock or manual controls)	NA
Q22-24-Wends-Win	% of exterior lights turned on 11 PM – 12 AM on weekends in winter (if timeclock or manual controls)	NA
Q22-01-Wends-Sum	% of exterior lights turned on 12 AM - 1 AM on weekends in summer (if timeclock or manual controls)	NA
Q22-02-Wends-Sum	% of exterior lights turned on 1 AM – 2 AM on weekends in summer (if timeclock or manual controls)	NA
Q22-03-Wends-Sum	% of exterior lights turned on 2 AM – 3 AM on weekends in summer (if timeclock or manual controls)	NA
Q22-04-Wends-Sum	% of exterior lights turned on 3 AM – 4 AM on weekends in summer (if timeclock or manual controls)	NA
Q22-05-Wends-Sum	% of exterior lights turned on 4 AM – 5 AM on weekends in summer (if timeclock or manual controls)	NA
Q22-06-Wends-Sum	% of exterior lights turned on 5 AM – 6 AM on weekends in summer (if timeclock or manual controls)	NA
Q22-07-Wends-Sum	% of exterior lights turned on 6 AM – 7 AM on weekends in summer (if timeclock or manual controls)	NA
Q22-08-Wends-Sum	% of exterior lights turned on 7 AM – 8 AM on weekends in summer (if timeclock or manual controls)	NA
Q22-09-Wends-Sum	% of exterior lights turned on 8 AM – 9 AM on weekends in summer (if timeclock or manual controls)	NA
Q22-10-Wends-Sum	% of exterior lights turned on 9 AM – 10 AM on weekends in summer (if timeclock or manual controls)	NA
Q22-11-Wends-Sum	% of exterior lights turned on 10 AM – 11 AM on weekends in summer (if timeclock or manual controls)	NA
Q22-12-Wends-Sum	% of exterior lights turned on 11 AM – 12	NA

	PM on weekends in summer (if timeclock or manual controls)	
Q22-13-Wends-Sum	% of exterior lights turned on 12 PM – 1 PM on weekends in summer (if timeclock or manual controls)	NA
Q22-14-Wends-Sum	% of exterior lights turned on 1 PM – 2 PM on weekends in summer (if timeclock or manual controls)	NA
Q22-15-Wends-Sum	% of exterior lights turned on 2 PM – 3 PM on weekends in summer (if timeclock or manual controls)	NA
Q22-16-Wends-Sum	% of exterior lights turned on 3 PM – 4 PM on weekends in summer (if timeclock or manual controls)	NA
Q22-17-Wends-Sum	% of exterior lights turned on 4 PM – 5 PM on weekends in summer (if timeclock or manual controls)	NA
Q22-18-Wends-Sum	% of exterior lights turned on 5 PM – 6 PM on weekends in summer (if timeclock or manual controls)	NA
Q22-19-Wends-Sum	% of exterior lights turned on 6 PM – 7 PM on weekends in summer (if timeclock or manual controls)	NA
Q22-20-Wends-Sum	% of exterior lights turned on 7 PM – 8 PM on weekends in summer (if timeclock or manual controls)	NA
Q22-21-Wends-Sum	% of exterior lights turned on 8 PM – 9 PM on weekends in summer (if timeclock or manual controls)	NA
Q22-22-Wends-Sum	% of exterior lights turned on 9 PM – 10 PM on weekends in summer (if timeclock or manual controls)	NA
Q22-23-Wends-Sum	% of exterior lights turned on 10 PM – 11 PM on weekends in summer (if timeclock or manual controls)	NA
Q22-24-Wends-Sum	% of exterior lights turned on 11 PM – 12 AM on weekends in summer (if timeclock or manual controls)	NA
Q22-01-Wdays-Win-D, …, Q22-24-Wends-Sum-D	The equivalent revised numbers if the schedule was changed due to Governor Davis' legislation	NA

Table 6: FUA5 Info

FUACOMBO

FUACOMBO is a lookup table that designates a number to each of the functional use area types.

Field Heading	Description	Response Codes
Number	A number from 1, 2, …, 15	NA

Description	Description of functional use area type associated with the above number	NA

Table 7: FUACOMBO

FUALetter

FUALetter is used only to lookup functional use area letters in some of the subforms for data entry. In particular, luminaire information is recorded by functional use area letter in order to relate the luminaires at a site to particular functional use areas.

Field Heading	Description	Response Codes
Type	Functional use area type	A, B, C, D, E

Table 8: FUALetter

Lookup AreaD

Lookup AreaD is a lookup table that designates a number to each of the functional use area types. *Lookup AreaD* is identical to *FUACOMBO*.

Field Heading	Description	Response Codes
Number	A number from 1, 2, …, 15	NA
Description	Description of functional use area type associated with the above number	NA

Table 9: FUACOMBO

LOOKUP Direction

Lookup Direction is a lookup table that is used for data entry purposes. Specifically, when horizontal and vertical illuminance measurements were taken, the locations of the luminaires relative to the measurements were also recorded. For each luminaire, the number of lamps and the direction of each lamp were also recorded. *Lookup Direction* was designed into the data entry tool in order to restrict entries to only those combinations that are theoretically possible.

Field Heading	Description	Response Codes
Luminaire	Number of Luminaires	NA
Direction1	Direction of the first luminaire	N=North S=South E=East W=West NA=Not Applicable
Direction2	Direction of the second luminaire	N=North S=South E=East W=West NA=Not Applicable
Direction3	Direction of the third luminaire	N=North S=South E=East W=West

		NA=Not Applicable
Direction4	Direction of the fourth luminaire	N=North S=South E=East W=West NA=Not Applicable

Table 10: LOOKUP Direction

LOOKUP Glare Location

LOOKUP Glare Location is a lookup table that designates a number to each of the glare measurement location types.

Field Heading	Description	Response Codes
Number	A number from 1, 2, …, 7	NA
Classification	Description of Glare Measurement Location type associated with the above number	NA

Table 11: Lookup Glare Location

LOOKUP Luminaire

Lookup Luminaire is a lookup table that is used to calculate the fixture wattage for a specific fixture, incorporating the lamp type, ballast type, lamp wattage, and the number of lamps collected on-site.

Field Heading	Description	Response Codes
Lamp Type	Lamp Type	CFL = Compact Fluorescent Lamp, FL = Fluorescent Lamp, HAL = Halogen, HPS = High Pressure Sodium, INC = Incandescent, LPS = Low Pressure Sodium, MH = Metal Halide, MV = Mercury Vapor
Ballast	Ballast Type	Electronic, Magnetic, Not Applicable
# lamps	Number of Lamps per Fixture	1, 2, 3, 4, 6, 8
Watts/Lamp	Lamp Wattage	NA
Watpfixt	Fixture Wattage	NA

Table 12: Lookup Luminaire

LOOKUP Signage

LOOKUP Signage is a lookup table that designates a number to each of the signage types.

Field Heading	Description	Response Codes
Number	A number from 1, 2, …, 7	NA
Classification	Description of Signage type associated with the above number	NA

Table 13: Lookup Signage

LOOKUP Type

LOOKUP Type lists the different luminaire types used in this study. For detailed definitions of the luminaire types, refer to "Lighting Fixture Catalogue" chapter.

Field Heading	Description	Response Codes
Type	Luminaire Type	A=Type A, B = Type B, … QQ = Type QQ

Table 14: LOOKUP Type

LOOKUP Zone

LOOKUP Signage is a lookup table that designates a number to each of the lighting zones.

Field Heading	Description	Response Codes
Q30	A number from 1, 2, …, 4	NA
Description	Lighting Zone associated with the above number	NA

Table 15: Lookup Zone

Luminaire

Luminaire contains all of the specific luminaire information gathered on-site. For each site, the functional use area letter, luminaire type, quantity of luminaires, lamp type, ballast type (if applicable), quantity of lamps, lamps wattage, luminaire wattage, luminaire height, and surveyor subjective assessments of the suitability and condition of the lens are provided in *Luminaire*.

Field Heading	Description	Response Codes
Site#	RLW Site ID	NA
FUALetter	Functional Use Area Enumeration (A, B, C, D, or E)	NA
Ballast	Ballast Type	Electronic, Magnetic, Not Applicable
Type	Luminaire Type	A=Type A, B = Type B, … QQ = Type QQ
Qty	Quantity of Lamps	1, 2, 3, 4, 6, 8
LampType	Lamp Type	CFL = Compact Fluorescent Lamp, FL = Fluorescent Lamp, HAL = Halogen, HPS = High Pressure Sodium, INC = Incandescent, LPS = Low Pressure Sodium, MH = Metal Halide, MV = Mercury Vapor
LampWatt	Lamp Wattage	NA
LumHeight	Luminaire Height (in Feet)	NA
Notes	Luminaire Related Notes	NA
FixWatt	Luminaire Wattage	NA

QtyFix	Quantity of Luminaires	NA
Cond	Lens Condition	1=Good, 2=Fair, 3=Poor
Suitab	Lens Suitability	1=Good, 2=Fair, 3=Poor
DistLum	Distance from Illuminance Meter Reading to Luminaire	NA
Ftcndle	Number of Foot Candles from Illuminance Meter Reading	NA

Table 16: Luminaire

Main

Main contains site-level information for each site. Information on the size of the site, the size of the building, the building type, the weather conditions associated with both the daytime and nighttime data collection, the on-site contact interview responses, as well as information on the lighting conditions of the surrounding neighborhood are all stored in *Main*.

Field Heading	Description	Response Codes
Site#	RLW Site ID	NA
Weight	Site Case Weight	NA
SrvyrName	Surveyor Name	NA
Building	Building Name	NA
Date	Date of On-Site Survey	NA
Contact	Primary On-Site Contact Name	NA
Phone	On-Site Contact Phone number	NA
StrAddress	Building Address	NA
City	City	NA
Zip	Zip Code	NA
Mainnotes	Additional Notes or Comments	NA
DayST	Start Time for Daytime survey	NA
DayFT	Finish Time for Daytime survey	NA
DayTT	Travel Time for Daytime survey	NA
NightST	Start Time for Nighttime survey	NA
NightFT	Finish Time for Nighttime survey	NA
NightTT	Travel Time for Nighttime survey	NA
Q1	Overall Building Floor Area (Square Feet)	NA
Q1a-BF	Building Footprint (Square Feet)	NA
Q2SF	Overall Site Area (Square Feet)	NA
Q2Acres	Overall Site Area (Acres)	NA
Q3	Number of Floors in Building	NA
Q4	Building Type	1=Small Office 2=Large Office 3=Small Retail 4=Multi-story large retail 5=Single story large retail 6=Grocery 7=Quick Service Restaurant 8=Full-service Restaurant 9=Conditioned Warehouse

		10=Unconditioned Warehouse 11=Hotel 12=Small School 13=Large School 14=Community College 15=Large University 16=Assembly 17=Hospital 18=Lt. Manufacturing 19=Bio/Tech Manufacturing 20=Recreation 21=Other 29=Apartments/Condominiums
Q4Other	If Q4 = Other, Description of the Building Type	NA
Q5	Number of individual tenants (businesses)	NA
Q6	Do the majority of tenants own their own meters?	-1=Yes, 0=No
Q7	Is On-Site Contact Familiar with Lamps? [2]	-1=Yes, 0=No
Q7Yes	If Q7 = Yes, Description of Lamp Wattage and Type	NA
Q7Name	If Q7 = No, Name of the Person Who Would Know	NA
Q7Ph	If Q7 = No, Phone Number of the Person Who Would Know	NA
No_FUA?	Indicator Variable = -1 if Site Contains NO Lit Functional Use Areas	-1 = Site has no Lit FUAs 0 or blank = Site has Lit FUA
Q23	Are There Any Lights Not Turned On At Night, Except For Special Occasions?	1=Yes, 2=No, 3=Don't know
Q23Info	If Q23 = Yes, Specific Information On Lights That Are Not Used	NA
Q24	Is Site Contact Familiar with Governor Gray Davis' Recent Legislation (which restricts outdoor lighting use during non-business hours)?	-1=Yes 0=No
Q25	Has Site changed the schedule of outdoor lighting operation in response to Governor's legislation?	1=Yes 2=No 3=Don't know
Q25Contact	If Q25 = Don't Know, Name of the Person Who Would Know	NA
Q26	Daytime Weather Conditions	1=Clear, 2=Raining, 3=Icy, 4=Snowing, 5=Foggy, 6=Overcast/Cloudy
Q27	Site Conditions	1=Flat, 2=Hilly, 3=Sloped, 4=Clear

[2] This field along with the related Q7 fields was used primarily by the on-site surveyor as a mechanism for gathering the luminaire specific information at the site with accuracy and ease. For most sites, this field is blank, as the relevant information was entered in the *Luminaire* table.

Q29	Nighttime Weather Conditions	1=Clear, 2=Raining, 3=Icy, 4=Snowing, 5=Foggy, 6=Overcast/Cloudy
Q30	Environmental Lighting Conditions of the Neighborhood	1=Area with intrinsically dark landscape (ZoneE1) 2=Area of low ambient brightness (Zone E2) 3=Area of medium ambient brightness (Zone E3) 4=Area of high ambient brightness (Zone E4)
Q31	Assessment of Adequacy of Lighting at Site	1=Inadequate, 2=Adequate, 3=More Than Needed
Q32	Assessment of Glare of Lighting at Site	1=Not Glary, 2=Somewhat glary, 3=Very Glary
Sreceived	On-Site Survey Received?	-1=Yes 0 or blank=No
Sreviewed	On-Site Survey Reviewed for Data Entry?	-1=Yes 0 or blank=No
SHold	On-Site Survey On Hold?	-1=Yes 0 or blank=No
SrelData	Surveys Released to Data Entry?	-1=Yes 0 or blank=No
SReqRev	Review Requested for On-Site Survey?	-1=Yes 0 or blank=No
SCompleted	On-Site Survey Data Entry Complete?	-1=Yes 0 or blank=No
Entby	The name of the data-entry person (Entered by)	NA

Table 17: Main

Parking

Parking contains all information relating to the nine point illuminance grids that were defined during the on-site data collection. The functional use area of the grid is recorded[3]. At each of the nine points in the defined grid, horizontal and vertical illuminance measurements were taken. The relative locations of all luminaires affecting the measurements as well as the luminaire type, lamp type, and lamp wattage are also recorded.

Field Heading	Description	Response Codes
Site#	RLW Site ID	NA
AreaD	Functional Use Area Description	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 =

[3] Originally, we thought that nine point illuminance grids were only going to be taken in the parking lot. The complexity of outdoor lighting application throughout the state necessitated allowing for the possibility of nine point illuminance grids being taken in functional use areas other than parking. So, any defined functional use area where a nine point illuminance grid was defined is stored in the *Parking* table.

		Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio
PSX=	Horizontal Length Between Poles	NA
PSY=	Vertical Length Between Poles	NA
1-H	Illuminance Grid Point 1[4] – Horizontal Illuminance	NA
1-N	Illuminance Grid Point 1 – Vertical Illuminance North	NA
1-E	Illuminance Grid Point 1 – Vertical Illuminance East	NA
1-S	Illuminance Grid Point 1 – Vertical Illuminance South	NA
1-W	Illuminance Grid Point 1 – Vertical Illuminance West	NA
2-H	Illuminance Grid Point 2 – Horizontal Illuminance	NA
2-N	Illuminance Grid Point 2 – Vertical Illuminance North	NA
2-E	Illuminance Grid Point 2 – Vertical Illuminance East	NA
2-S	Illuminance Grid Point 2 – Vertical Illuminance South	NA
2-W	Illuminance Grid Point 2 – Vertical Illuminance West	NA
3-H	Illuminance Grid Point 3 – Horizontal Illuminance	NA
3-N	Illuminance Grid Point 3 – Vertical Illuminance North	NA
3-E	Illuminance Grid Point 3 – Vertical Illuminance East	NA
3-S	Illuminance Grid Point 3 – Vertical Illuminance South	NA
3-W	Illuminance Grid Point 3 – Vertical Illuminance West	NA
4-H	Illuminance Grid Point 4 – Horizontal Illuminance	NA
4-N	Illuminance Grid Point 4 – Vertical Illuminance North	NA
4-E	Illuminance Grid Point 4 – Vertical Illuminance East	NA
4-S	Illuminance Grid Point 4 – Vertical	NA

[4] The 9 points on the illuminance grid are numbered from left to right, top to bottom. See the form *Parking* for a visual representation.

	Illuminance South	
4-W	Illuminance Grid Point 4 – Vertical Illuminance West	NA
5-H	Illuminance Grid Point 5 – Horizontal Illuminance	NA
5-N	Illuminance Grid Point 5 – Vertical Illuminance North	NA
5-E	Illuminance Grid Point 5 – Vertical Illuminance East	NA
5-S	Illuminance Grid Point 5 – Vertical Illuminance South	NA
5-W	Illuminance Grid Point 5 – Vertical Illuminance West	NA
6-H	Illuminance Grid Point 6 – Horizontal Illuminance	NA
6-N	Illuminance Grid Point 6 – Vertical Illuminance North	NA
6-E	Illuminance Grid Point 6 –Vertical Illuminance East	NA
6-S	Illuminance Grid Point 6 –Vertical Illuminance South	NA
6-W	Illuminance Grid Point 6 –Vertical Illuminance West	NA
7-H	Illuminance Grid Point 7 –Horizontal Illuminance	NA
7-N	Illuminance Grid Point 7 –Vertical Illuminance North	NA
7-E	Illuminance Grid Point 7 –Vertical Illuminance East	NA
7-S	Illuminance Grid Point 7 –Vertical Illuminance South	NA
7-W	Illuminance Grid Point 7 –Vertical Illuminance West	NA
8-H	Illuminance Grid Point 8 –Horizontal Illuminance	NA
8-N	Illuminance Grid Point 8 –Vertical Illuminance North	NA
8-E	Illuminance Grid Point 8 –Vertical Illuminance East	NA
8-S	Illuminance Grid Point 8 –Vertical Illuminance South	NA
8-W	Illuminance Grid Point 8 –Vertical Illuminance West	NA
9-H	Illuminance Grid Point 9 –Horizontal Illuminance	NA
9-N	Illuminance Grid Point 9 –Vertical Illuminance North	NA
9-E	Illuminance Grid Point 9 –Vertical Illuminance East	NA

9-S	Illuminance Grid Point 9 –Vertical Illuminance South	NA
9-W	Illuminance Grid Point 9 –Vertical Illuminance West	NA
Pic1st	Indicator Variable = -1 If the Illuminance Measurements Were Taken in the First Quadrant of the Area Defined by Luminaires Affecting Measurements[5]	-1 = Illuminance Measurements Were Taken in 1st Quadrant 0 or blank = Illuminance Measurements Were NOT Taken in 1st Quadrant
Pic2nd	Indicator Variable = -1 If the Illuminance Measurements Were Taken in the Second Quadrant of the Area Defined by Luminaires Affecting Measurements	-1 = Illuminance Measurements Were Taken in 2nd Quadrant 0 or blank = Illuminance Measurements Were NOT Taken in 2nd Quadrant
Pic3rd	Indicator Variable = -1 If the Illuminance Measurements Were Taken in the Third Quadrant of the Area Defined by Luminaires Affecting Measurements	-1 = Illuminance Measurements Were Taken in 3rd Quadrant 0 or blank = Illuminance Measurements Were NOT Taken in 3rd Quadrant
Pic4th	Indicator Variable = -1 If the Illuminance Measurements Were Taken in the Fourth Quadrant of the Area Defined by Luminaires Affecting Measurements	-1 = Illuminance Measurements Were Taken in 4th Quadrant 0 or blank = Illuminance Measurements Were NOT Taken in 4th Quadrant
Opt1	Indicator Variable = -1 If There is a Luminaire at Location A	-1 = Luminaire at Location A 0 or blank = No Luminaire at Location A
1Lum	Number of Luminaires at Location A	1, 2, 3, or 4
1Dir1	Direction of the First Luminaire at Location A	N=North, S=South, E=East, W=West, NA=Not Applicable
1Dir2	Direction of the Second Luminaire at Location A	N=North, S=South, E=East, W=West, NA=Not Applicable
1Dir3	Direction of the Third Luminaire at Location A	N=North, S=South, E=East, W=West, NA=Not Applicable
1Dir4	Direction of the Fourth Luminaire at Location A	N=North, S=South, E=East, W=West, NA=Not Applicable
Opt2	Indicator Variable = -1 If There is a Luminaire at Location A_2	-1 = Luminaire at Location A_2 0 or blank = No Luminaire at Location A_2
2Lum	Number of Luminaires at Location A_2	1, 2, 3, or 4
2Dir1	Direction of the First Luminaire at Location A_2	N=North, S=South, E=East, W=West, NA=Not Applicable
2Dir2	Direction of the Second Luminaire at Location A_2	N=North, S=South, E=East, W=West, NA=Not Applicable
2Dir3	Direction of the Third Luminaire at Location A_2	N=North, S=South, E=East, W=West, NA=Not Applicable

[5] For a visual representation of the quadrants, luminaire locations, and the area defined by the luminaires affecting the illuminance measurements, refer to the form *Parking*.

2Dir4	Direction of the Fourth Luminaire at Location A_2	N=North, S=South, E=East, W=West, NA=Not Applicable
Opt3	Indicator Variable = -1 If There is a Luminaire at Location B	-1 = Luminaire at Location B 0 or blank = No Luminaire at Location B
3Lum	Number of Luminaires at Location B	1, 2, 3, or 4
3Dir1	Direction of the First Luminaire at Location B	N=North, S=South, E=East, W=West, NA=Not Applicable
3Dir2	Direction of the Second Luminaire at Location B	N=North, S=South, E=East, W=West, NA=Not Applicable
3Dir3	Direction of the Third Luminaire at Location B	N=North, S=South, E=East, W=West, NA=Not Applicable
3Dir4	Direction of the Fourth Luminaire at Location B	N=North, S=South, E=East, W=West, NA=Not Applicable
Opt4	Indicator Variable = -1 If There is a Luminaire at Location B_2	-1 = Luminaire at Location B_2 0 or blank = No Luminaire at Location B_2
4Lum	Number of Luminaires at Location B_2	1, 2, 3, or 4
4Dir1	Direction of the First Luminaire at Location B_2	N=North, S=South, E=East, W=West, NA=Not Applicable
4Dir2	Direction of the Second Luminaire at Location B_2	N=North, S=South, E=East, W=West, NA=Not Applicable
4Dir3	Direction of the Third Luminaire at Location B_2	N=North, S=South, E=East, W=West, NA=Not Applicable
4Dir4	Direction of the Fourth Luminaire at Location B_2	N=North, S=South, E=East, W=West, NA=Not Applicable
Opt5	Indicator Variable = -1 If There is a Luminaire at Location C	-1 = Luminaire at Location C 0 or blank = No Luminaire at Location C
5Lum	Number of Luminaires at Location C	1, 2, 3, or 4
5Dir1	Direction of the First Luminaire at Location C	N=North, S=South, E=East, W=West, NA=Not Applicable
5Dir2	Direction of the Second Luminaire at Location C	N=North, S=South, E=East, W=West, NA=Not Applicable
5Dir3	Direction of the Third Luminaire at Location C	N=North, S=South, E=East, W=West, NA=Not Applicable
5Dir4	Direction of the Fourth Luminaire at Location C	N=North, S=South, E=East, W=West, NA=Not Applicable
Opt6	Indicator Variable = -1 If There is a Luminaire at Location C_2	-1 = Luminaire at Location C_2 0 or blank = No Luminaire at Location C_2
6Lum	Number of Luminaires at Location C_2	1, 2, 3, or 4
6Dir1	Direction of the First Luminaire at Location C_2	N=North, S=South, E=East, W=West, NA=Not Applicable
6Dir2	Direction of the Second Luminaire at Location C_2	N=North, S=South, E=East, W=West, NA=Not Applicable
6Dir3	Direction of the Third Luminaire at Location C_2	N=North, S=South, E=East, W=West, NA=Not Applicable
6Dir4	Direction of the Fourth Luminaire at Location	N=North, S=South, E=East,

	C_2	W=West, NA=Not Applicable
Opt7	Indicator Variable = -1 If There is a Luminaire at Location D	-1 = Luminaire at Location D 0 or blank = No Luminaire at Location D
7Lum	Number of Luminaires at Location D	1, 2, 3, or 4
7Dir1	Direction of the First Luminaire at Location D	N=North, S=South, E=East, W=West, NA=Not Applicable
7Dir2	Direction of the Second Luminaire at Location D	N=North, S=South, E=East, W=West, NA=Not Applicable
7Dir3	Direction of the Third Luminaire at Location D	N=North, S=South, E=East, W=West, NA=Not Applicable
7Dir4	Direction of the Fourth Luminaire at Location D	N=North, S=South, E=East, W=West, NA=Not Applicable
Opt8	Indicator Variable = -1 If There is a Luminaire at Location D_2	-1 = Luminaire at Location D_2 0 or blank = No Luminaire at Location D_2
8Lum	Number of Luminaires at Location D_2	1, 2, 3, or 4
8Dir1	Direction of the First Luminaire at Location D_2	N=North, S=South, E=East, W=West, NA=Not Applicable
8Dir2	Direction of the Second Luminaire at Location D_2	N=North, S=South, E=East, W=West, NA=Not Applicable
8Dir3	Direction of the Third Luminaire at Location D_2	N=North, S=South, E=East, W=West, NA=Not Applicable
8Dir4	Direction of the Fourth Luminaire at Location D_2	N=North, S=South, E=East, W=West, NA=Not Applicable
Fix1	Fixture Type of Luminaire at Location A	A=Type A, B = Type B, … QQ = Type QQ
Lt1	Lamp Type of Luminaire at Location A	CFL = Compact Fluorescent Lamp, FL = Fluorescent Lamp, HAL = Halogen, HPS = High Pressure Sodium, INC = Incandescent, LPS = Low Pressure Sodium, MH = Metal Halide, MV = Mercury Vapor
Lw1	Lamp Wattage of Luminaire at Location A	
Fix2	Fixture Type of Luminaire at Location A_2	A=Type A, B = Type B, … QQ = Type QQ
Lt2	Lamp Type of Luminaire at Location A_2	CFL = Compact Fluorescent Lamp, FL = Fluorescent Lamp, HAL = Halogen, HPS = High Pressure Sodium, INC = Incandescent, LPS = Low Pressure Sodium, MH = Metal Halide, MV = Mercury Vapor
Lw2	Lamp Wattage of Luminaire at Location A_2	
Fix3	Fixture Type of Luminaire at Location B	A=Type A, B = Type B, … QQ = Type QQ
Lt3	Lamp Type of Luminaire at Location B	CFL = Compact Fluorescent Lamp, FL = Fluorescent Lamp,

		HAL = Halogen, HPS = High Pressure Sodium, INC = Incandescent, LPS = Low Pressure Sodium, MH = Metal Halide, MV = Mercury Vapor
Lw3	Lamp Wattage of Luminaire at Location B	
Fix4	Fixture Type of Luminaire at Location B_2	A=Type A, B = Type B, … QQ = Type QQ
Lt4	Lamp Type of Luminaire at Location B_2	CFL = Compact Fluorescent Lamp, FL = Fluorescent Lamp, HAL = Halogen, HPS = High Pressure Sodium, INC = Incandescent, LPS = Low Pressure Sodium, MH = Metal Halide, MV = Mercury Vapor
Lw4	Lamp Wattage of Luminaire at Location B_2	
Fix5	Fixture Type of Luminaire at Location C	A=Type A, B = Type B, … QQ = Type QQ
Lt5	Lamp Type of Luminaire at Location C	CFL = Compact Fluorescent Lamp, FL = Fluorescent Lamp, HAL = Halogen, HPS = High Pressure Sodium, INC = Incandescent, LPS = Low Pressure Sodium, MH = Metal Halide, MV = Mercury Vapor
Lw5	Lamp Wattage of Luminaire at Location C	
Fix6	Fixture Type of Luminaire at Location C_2	A=Type A, B = Type B, … QQ = Type QQ
Lt6	Lamp Type of Luminaire at Location C_2	CFL = Compact Fluorescent Lamp, FL = Fluorescent Lamp, HAL = Halogen, HPS = High Pressure Sodium, INC = Incandescent, LPS = Low Pressure Sodium, MH = Metal Halide, MV = Mercury Vapor
Lw6	Lamp Wattage of Luminaire at Location C_2	
Fix7	Fixture Type of Luminaire at Location D	A=Type A, B = Type B, … QQ = Type QQ
Lt7	Lamp Type of Luminaire at Location D	CFL = Compact Fluorescent Lamp, FL = Fluorescent Lamp, HAL = Halogen, HPS = High Pressure Sodium, INC = Incandescent, LPS = Low Pressure Sodium, MH = Metal Halide, MV = Mercury Vapor
Lw7	Lamp Wattage of Luminaire at Location D	
Fix8	Fixture Type of Luminaire at Location D_2	A=Type A, B = Type B, … QQ = Type QQ
Lt8	Lamp Type of Luminaire at Location D_2	CFL = Compact Fluorescent

		Lamp, FL = Fluorescent Lamp, HAL = Halogen, HPS = High Pressure Sodium, INC = Incandescent, LPS = Low Pressure Sodium, MH = Metal Halide, MV = Mercury Vapor
Lw8	Lamp Wattage of Luminaire at Location D_2	
DirNNorth	Indicator Variable = -1 If the Upward Direction is Plan North in the Illuminance Grid	-1=Yes, Upward is Plan North 0 or blank=No, Not Upward
DirNSouth	Indicator Variable = -1 If the Downward Direction is Plan North in the Illuminance Grid	-1=Yes, Downward is Plan N. 0 or blank=No, Not Downward
DirNEast	Indicator Variable = -1 If the Rightward Direction is Plan North in the Illuminance Grid	-1=Yes, Rightward is Plan N. 0 or blank=No, Not Rightward
DirNWest	Indicator Variable = -1 If the Leftward Direction is Plan North in the Illuminance Grid	-1=Yes, Leftward is Plan N. 0 or blank=No, Not Leftward

Table 18: Parking

Q28Table

Q28Table stores all information relevant for Q28 on on-site survey instrument. Specifically, the description of the areas surrounding the site are recorded.

Field Heading	Description	Response Codes
Site#	RLW Site ID	NA
ResiN	Is the Area to the North Residential?	-1=Yes 0 or blank=No
CommN	Is the Area to the North Commercial?	-1=Yes 0 or blank=No
RdwyN	Is the Area to the North a Roadway?	-1=Yes 0 or blank=No
OpnN	Is the Area to the North Open Space?	-1=Yes 0 or blank=No
OthrN	Is the Area to the North Other?	-1=Yes 0 or blank=No
DescN	Description of the Area to the North if OthrN = -1.	NA
ResiS	Is the Area to the South Residential?	-1=Yes 0 or blank=No
CommS	Is the Area to the South Commercial?	-1=Yes 0 or blank=No
RdwyS	Is the Area to the South a Roadway?	-1=Yes 0 or blank=No
OpnS	Is the Area to the South Open Space?	-1=Yes 0 or blank=No
OthrS	Is the Area to the South Other?	-1=Yes 0 or blank=No
DescS	Description of the Area to the South if OthrN = -1.	NA
ResiE	Is the Area to the East Residential?	-1=Yes

		0 or blank=No
CommE	Is the Area to the East Commercial?	-1=Yes 0 or blank=No
RdwyE	Is the Area to the East a Roadway?	-1=Yes 0 or blank=No
OpnE	Is the Area to the East Open Space?	-1=Yes 0 or blank=No
OthrE	Is the Area to the East Other?	-1=Yes 0 or blank=No
DescE	Description of the Area to the East if OthrN = -1.	NA
ResiW	Is the Area to the West Residential?	-1=Yes 0 or blank=No
CommW	Is the Area to the West Commercial?	-1=Yes 0 or blank=No
RdwyW	Is the Area to the West a Roadway?	-1=Yes 0 or blank=No
OpnW	Is the Area to the West Open Space?	-1=Yes 0 or blank=No
OthrW	Is the Area to the West Other?	-1=Yes 0 or blank=No
DescW	Description of the Area to the West if OthrN = -1.	NA

Table 19: Q28Table

Q32-Glare

All data related to the glare measurements are stored in *Q32-Glare*. This includes 2 glare measurements, the surveyor's subjective impression of the extent of the glare, the location from which the glare measurements were recorded, as well as information on the offending fixture(s).

Field Heading	Description	Response Codes
Site#	RLW Site ID	NA
Q32-1-LR	Glare Measurement 1, Large Reading	NA
Q32-1-SR	Glare Measurement 1, Small Reading	NA
Q32-1-SI	Surveyor's Subjective Impression of Glare at Location 1.	1 = Best, …, 5 = Worse.
Q32-1-Msre	Location of Glare Measurement 1	1 = Parking, 2 = Building Entry, 3 = Property Edge, 4 = Site Entry / Exit, 5 = Pedestrian / Walkway
Q32-1-OF	Glare Measurement 1, Offending Fixture	NA
Q32-2-LR	Glare Measurement 2, Large Reading	NA
Q32-2-SR	Glare Measurement 2, Small Reading	NA
Q32-2-SI	Surveyor's Subjective Impression of Glare at Location 2.	1 = Best, …, 5 = Worse.
Q32-2-Msre	Location of Glare Measurement 2	1 = Parking, 2 = Building Entry, 3 = Property Edge, 4 = Site Entry / Exit, 5 = Pedestrian / Walkway
Q32-2-OF	Glare Measurement 2, Offending Fixture	NA

Q32-3-LR	Glare Measurement 3, Large Reading	NA
Q32-3-SR	Glare Measurement 3, Small Reading	NA
Q32-3-SI	Surveyor's Subjective Impression of Glare at Location 3.	1 = Best, …, 5 = Worse.
Q32-3-Msre	Location of Glare Measurement 3	1 = Parking, 2 = Building Entry, 3 = Property Edge, 4 = Site Entry / Exit, 5 = Pedestrian / Walkway
Q32-3-OF	Glare Measurement 3, Offending Fixture	NA

Table 20: Q32-Glare

Sidewalk

Sidewalk contains all information relating to the six point illuminance grids that were defined on sidewalks during the on-site data collection. At each of the six points in the defined grid, horizontal and vertical illuminance measurements were taken. The relative locations of all luminaires affecting the measurements as well as the luminaire type, lamp type, and lamp wattage are also recorded.

Field Heading	Description	Response Codes
Site#	RLW Site ID	NA
PSX=	Horizontal Length Between Poles	NA
PSY=	Vertical Length Between Poles	NA
1-H	Illuminance Grid Point 1[6] – Horizontal Illuminance	NA
1-N	Illuminance Grid Point 1 – Vertical Illuminance North	NA
1-E	Illuminance Grid Point 1 – Vertical Illuminance East	NA
1-S	Illuminance Grid Point 1 – Vertical Illuminance South	NA
1-W	Illuminance Grid Point 1 – Vertical Illuminance West	NA
2-H	Illuminance Grid Point 2 – Horizontal Illuminance	NA
2-N	Illuminance Grid Point 2 – Vertical Illuminance North	NA
2-E	Illuminance Grid Point 2 – Vertical Illuminance East	NA
2-S	Illuminance Grid Point 2 – Vertical Illuminance South	NA
2-W	Illuminance Grid Point 2 – Vertical Illuminance West	NA
3-H	Illuminance Grid Point 3 – Horizontal Illuminance	NA
3-N	Illuminance Grid Point 3 – Vertical Illuminance North	NA
3-E	Illuminance Grid Point 3 – Vertical	NA

[6] The 9 points on the illuminance grid are numbered from left to right, top to bottom. See the form *Parking* for a visual representation.

	Illuminance East	
3-S	Illuminance Grid Point 3 – Vertical Illuminance South	NA
3-W	Illuminance Grid Point 3 – Vertical Illuminance West	NA
4-H	Illuminance Grid Point 4 – Horizontal Illuminance	NA
4-N	Illuminance Grid Point 4 – Vertical Illuminance North	NA
4-E	Illuminance Grid Point 4 – Vertical Illuminance East	NA
4-S	Illuminance Grid Point 4 – Vertical Illuminance South	NA
4-W	Illuminance Grid Point 4 – Vertical Illuminance West	NA
5-H	Illuminance Grid Point 5 – Horizontal Illuminance	NA
5-N	Illuminance Grid Point 5 – Vertical Illuminance North	NA
5-E	Illuminance Grid Point 5 – Vertical Illuminance East	NA
5-S	Illuminance Grid Point 5 – Vertical Illuminance South	NA
5-W	Illuminance Grid Point 5 – Vertical Illuminance West	NA
6-H	Illuminance Grid Point 6 – Horizontal Illuminance	NA
6-N	Illuminance Grid Point 6 – Vertical Illuminance North	NA
6-E	Illuminance Grid Point 6 –Vertical Illuminance East	NA
6-S	Illuminance Grid Point 6 –Vertical Illuminance South	NA
6-W	Illuminance Grid Point 6 –Vertical Illuminance West	NA
Pic1st	Indicator Variable = -1 If the Illuminance Measurements Were Taken in the First Quadrant of the Area Defined by Luminaires Affecting Measurements[7]	-1 = Illuminance Measurements Were Taken in 1st Quadrant 0 or blank = Illuminance Measurements Were NOT Taken in 1st Quadrant
Pic2nd	Indicator Variable = -1 If the Illuminance Measurements Were Taken in the Second Quadrant of the Area Defined by Luminaires Affecting Measurements	-1 = Illuminance Measurements Were Taken in 2nd Quadrant 0 or blank = Illuminance Measurements Were NOT Taken in 2nd Quadrant
Pic3rd	Indicator Variable = -1 If the Illuminance	-1 = Illuminance Measurements

[7] For a visual representation of the quadrants, luminaire locations, and the area defined by the luminaires affecting the illuminance measurements, refer to the form *Parking*.

	Measurements Were Taken in the Third Quadrant of the Area Defined by Luminaires Affecting Measurements	Were Taken in 3rd Quadrant 0 or blank = Illuminance Measurements Were NOT Taken in 3rd Quadrant
Pic4th	Indicator Variable = -1 If the Illuminance Measurements Were Taken in the Fourth Quadrant of the Area Defined by Luminaires Affecting Measurements	-1 = Illuminance Measurements Were Taken in 4th Quadrant 0 or blank = Illuminance Measurements Were NOT Taken in 4th Quadrant
Opt1	Indicator Variable = -1 If There is a Luminaire at Location A	-1 = Luminaire at Location A 0 or blank = No Luminaire at Location A
1Lum	Number of Luminaires at Location A	1, 2, 3, or 4
1Dir1	Direction of the First Luminaire at Location A	N=North, S=South, E=East, W=West, NA=Not Applicable
1Dir2	Direction of the Second Luminaire at Location A	N=North, S=South, E=East, W=West, NA=Not Applicable
1Dir3	Direction of the Third Luminaire at Location A	N=North, S=South, E=East, W=West, NA=Not Applicable
1Dir4	Direction of the Fourth Luminaire at Location A	N=North, S=South, E=East, W=West, NA=Not Applicable
Opt2	Indicator Variable = -1 If There is a Luminaire at Location A_2	-1 = Luminaire at Location A_2 0 or blank = No Luminaire at Location A_2
2Lum	Number of Luminaires at Location A_2	1, 2, 3, or 4
2Dir1	Direction of the First Luminaire at Location A_2	N=North, S=South, E=East, W=West, NA=Not Applicable
2Dir2	Direction of the Second Luminaire at Location A_2	N=North, S=South, E=East, W=West, NA=Not Applicable
2Dir3	Direction of the Third Luminaire at Location A_2	N=North, S=South, E=East, W=West, NA=Not Applicable
2Dir4	Direction of the Fourth Luminaire at Location A_2	N=North, S=South, E=East, W=West, NA=Not Applicable
Opt3	Indicator Variable = -1 If There is a Luminaire at Location B	-1 = Luminaire at Location B 0 or blank = No Luminaire at Location B
3Lum	Number of Luminaires at Location B	1, 2, 3, or 4
3Dir1	Direction of the First Luminaire at Location B	N=North, S=South, E=East, W=West, NA=Not Applicable
3Dir2	Direction of the Second Luminaire at Location B	N=North, S=South, E=East, W=West, NA=Not Applicable
3Dir3	Direction of the Third Luminaire at Location B	N=North, S=South, E=East, W=West, NA=Not Applicable
3Dir4	Direction of the Fourth Luminaire at Location B	N=North, S=South, E=East, W=West, NA=Not Applicable
Opt4	Indicator Variable = -1 If There is a Luminaire at Location B_2	-1 = Luminaire at Location B_2 0 or blank = No Luminaire at Location B_2
4Lum	Number of Luminaires at Location B_2	1, 2, 3, or 4

4Dir1	Direction of the First Luminaire at Location B_2	N=North, S=South, E=East, W=West, NA=Not Applicable
4Dir2	Direction of the Second Luminaire at Location B_2	N=North, S=South, E=East, W=West, NA=Not Applicable
4Dir3	Direction of the Third Luminaire at Location B_2	N=North, S=South, E=East, W=West, NA=Not Applicable
4Dir4	Direction of the Fourth Luminaire at Location B_2	N=North, S=South, E=East, W=West, NA=Not Applicable
Opt5	Indicator Variable = -1 If There is a Luminaire at Location C	-1 = Luminaire at Location C 0 or blank = No Luminaire at Location C
5Lum	Number of Luminaires at Location C	1, 2, 3, or 4
5Dir1	Direction of the First Luminaire at Location C	N=North, S=South, E=East, W=West, NA=Not Applicable
5Dir2	Direction of the Second Luminaire at Location C	N=North, S=South, E=East, W=West, NA=Not Applicable
5Dir3	Direction of the Third Luminaire at Location C	N=North, S=South, E=East, W=West, NA=Not Applicable
5Dir4	Direction of the Fourth Luminaire at Location C	N=North, S=South, E=East, W=West, NA=Not Applicable
Opt6	Indicator Variable = -1 If There is a Luminaire at Location C_2	-1 = Luminaire at Location C_2 0 or blank = No Luminaire at Location C_2
6Lum	Number of Luminaires at Location C_2	1, 2, 3, or 4
6Dir1	Direction of the First Luminaire at Location C_2	N=North, S=South, E=East, W=West, NA=Not Applicable
6Dir2	Direction of the Second Luminaire at Location C_2	N=North, S=South, E=East, W=West, NA=Not Applicable
6Dir3	Direction of the Third Luminaire at Location C_2	N=North, S=South, E=East, W=West, NA=Not Applicable
6Dir4	Direction of the Fourth Luminaire at Location C_2	N=North, S=South, E=East, W=West, NA=Not Applicable
Opt7	Indicator Variable = -1 If There is a Luminaire at Location D	-1 = Luminaire at Location D 0 or blank = No Luminaire at Location D
7Lum	Number of Luminaires at Location D	1, 2, 3, or 4
7Dir1	Direction of the First Luminaire at Location D	N=North, S=South, E=East, W=West, NA=Not Applicable
7Dir2	Direction of the Second Luminaire at Location D	N=North, S=South, E=East, W=West, NA=Not Applicable
7Dir3	Direction of the Third Luminaire at Location D	N=North, S=South, E=East, W=West, NA=Not Applicable
7Dir4	Direction of the Fourth Luminaire at Location D	N=North, S=South, E=East, W=West, NA=Not Applicable
Opt8	Indicator Variable = -1 If There is a Luminaire at Location D_2	-1 = Luminaire at Location D_2 0 or blank = No Luminaire at Location D_2
8Lum	Number of Luminaires at Location D_2	1, 2, 3, or 4
8Dir1	Direction of the First Luminaire at Location D_2	N=North, S=South, E=East,

		W=West, NA=Not Applicable
8Dir2	Direction of the Second Luminaire at Location D_2	N=North, S=South, E=East, W=West, NA=Not Applicable
8Dir3	Direction of the Third Luminaire at Location D_2	N=North, S=South, E=East, W=West, NA=Not Applicable
8Dir4	Direction of the Fourth Luminaire at Location D_2	N=North, S=South, E=East, W=West, NA=Not Applicable
Opt9	Indicator Variable = -1 If There is a Luminaire at Location D_3	-1 = Luminaire at Location D_2 0 or blank = No Luminaire at Location D_2
9Lum	Number of Luminaires at Location D_3	1, 2, 3, or 4
9Dir1	Direction of the First Luminaire at Location D_3	N=North, S=South, E=East, W=West, NA=Not Applicable
9Dir2	Direction of the Second Luminaire at Location D_3	N=North, S=South, E=East, W=West, NA=Not Applicable
9Dir3	Direction of the Third Luminaire at Location D_3	N=North, S=South, E=East, W=West, NA=Not Applicable
9Dir4	Direction of the Fourth Luminaire at Location D_3	N=North, S=South, E=East, W=West, NA=Not Applicable
Fix1	Fixture Type of Luminaire at Location A	A=Type A, B = Type B, … QQ = Type QQ
Lt1	Lamp Type of Luminaire at Location A	CFL = Compact Fluorescent Lamp, FL = Fluorescent Lamp, HAL = Halogen, HPS = High Pressure Sodium, INC = Incandescent, LPS = Low Pressure Sodium, MH = Metal Halide, MV = Mercury Vapor
Lw1	Lamp Wattage of Luminaire at Location A	
Fix2	Fixture Type of Luminaire at Location A_2	A=Type A, B = Type B, … QQ = Type QQ
Lt2	Lamp Type of Luminaire at Location A_2	CFL = Compact Fluorescent Lamp, FL = Fluorescent Lamp, HAL = Halogen, HPS = High Pressure Sodium, INC = Incandescent, LPS = Low Pressure Sodium, MH = Metal Halide, MV = Mercury Vapor
Lw2	Lamp Wattage of Luminaire at Location A_2	
Fix3	Fixture Type of Luminaire at Location B	A=Type A, B = Type B, … QQ = Type QQ
Lt3	Lamp Type of Luminaire at Location B	CFL = Compact Fluorescent Lamp, FL = Fluorescent Lamp, HAL = Halogen, HPS = High Pressure Sodium, INC = Incandescent, LPS = Low Pressure Sodium, MH = Metal Halide, MV = Mercury Vapor
Lw3	Lamp Wattage of Luminaire at Location B	

Fix4	Fixture Type of Luminaire at Location B_2	A=Type A, B = Type B, … QQ = Type QQ
Lt4	Lamp Type of Luminaire at Location B_2	CFL = Compact Fluorescent Lamp, FL = Fluorescent Lamp, HAL = Halogen, HPS = High Pressure Sodium, INC = Incandescent, LPS = Low Pressure Sodium, MH = Metal Halide, MV = Mercury Vapor
Lw4	Lamp Wattage of Luminaire at Location B_2	
Fix5	Fixture Type of Luminaire at Location C	A=Type A, B = Type B, … QQ = Type QQ
Lt5	Lamp Type of Luminaire at Location C	CFL = Compact Fluorescent Lamp, FL = Fluorescent Lamp, HAL = Halogen, HPS = High Pressure Sodium, INC = Incandescent, LPS = Low Pressure Sodium, MH = Metal Halide, MV = Mercury Vapor
Lw5	Lamp Wattage of Luminaire at Location C	
Fix6	Fixture Type of Luminaire at Location C_2	A=Type A, B = Type B, … QQ = Type QQ
Lt6	Lamp Type of Luminaire at Location C_2	CFL = Compact Fluorescent Lamp, FL = Fluorescent Lamp, HAL = Halogen, HPS = High Pressure Sodium, INC = Incandescent, LPS = Low Pressure Sodium, MH = Metal Halide, MV = Mercury Vapor
Lw6	Lamp Wattage of Luminaire at Location C_2	
Fix7	Fixture Type of Luminaire at Location D	A=Type A, B = Type B, … QQ = Type QQ
Lt7	Lamp Type of Luminaire at Location D	CFL = Compact Fluorescent Lamp, FL = Fluorescent Lamp, HAL = Halogen, HPS = High Pressure Sodium, INC = Incandescent, LPS = Low Pressure Sodium, MH = Metal Halide, MV = Mercury Vapor
Lw7	Lamp Wattage of Luminaire at Location D	
Fix8	Fixture Type of Luminaire at Location D_2	A=Type A, B = Type B, … QQ = Type QQ
Lt8	Lamp Type of Luminaire at Location D_2	CFL = Compact Fluorescent Lamp, FL = Fluorescent Lamp, HAL = Halogen, HPS = High Pressure Sodium, INC = Incandescent, LPS = Low Pressure Sodium, MH = Metal Halide, MV = Mercury Vapor

Lw8	Lamp Wattage of Luminaire at Location D_2	
Fix9	Fixture Type of Luminaire at Location D_3	A=Type A, B = Type B, … QQ = Type QQ
Lt9	Lamp Type of Luminaire at Location D_3	CFL = Compact Fluorescent Lamp, FL = Fluorescent Lamp, HAL = Halogen, HPS = High Pressure Sodium, INC = Incandescent, LPS = Low Pressure Sodium, MH = Metal Halide, MV = Mercury Vapor
Lw9	Lamp Wattage of Luminaire at Location D_3	
DirNNorth	Indicator Variable = -1 If the Upward Direction is Plan North in the Illuminance Grid	-1=Yes, Upward is Plan North 0 or blank=No, Not Upward
DirNSouth	Indicator Variable = -1 If the Downward Direction is Plan North in the Illuminance Grid	-1=Yes, Downward is Plan N. 0 or blank=No, Not Downward
DirNEast	Indicator Variable = -1 If the Rightward Direction is Plan North in the Illuminance Grid	-1=Yes, Rightward is Plan N. 0 or blank=No, Not Rightward
DirNWest	Indicator Variable = -1 If the Leftward Direction is Plan North in the Illuminance Grid	-1=Yes, Leftward is Plan N. 0 or blank=No, Not Leftward

Table 21: Sidewalk

Signage

Signage contains all data collected on-site that was related to signage. Specifically, for each site, the signage type, the quantity of signs, the number of faces, the lamp type, the lamp wattage (if sign type = 1, 2, or 6) or the linear of feet of neon tubing contained in the sign (if sign type = 4 or 5).

Field Heading	Description	Response Codes
Site#	RLW Site ID	NA
Type	Signage Type	1 = Cabinet, 2 = Front Lighted, 3 = Multi-bulb Flasher, 4 = Direct View Neon, 5 = Concealed Neon, 6 = LED, 7 = Gas Pump
#Faces	Number of Faces	NA
Qty	Quantity of Signs	NA
LamType	Lamp Type	NA
WattLinFt	If Type = 1, Lamp Wattage If Type = 2, Lamp Wattage If Type = 4, Linear Feet of Neon Tubing If Type = 5, Linear Feet of Neon Tubing If Type = 6, Lamp Wattage	NA
Size	If Type = 1, Size of Sign (Square Feet) If Type = 2, Size of Sign (Square Feet) If Type = 6, Size of Sign (Square Feet)	NA
Notes	Notes	NA
Suitab	Suitability of Sign	1=Good 2=Fair 3=Poor

Table 22: Signage

TablFormLghtTrspass

All data related to the light trespass measurements are stored in *TablFormLghtTrspass*. This includes up to 3 light trespass measurements, the surveyor's subjective impression of the extent of the light trespass for each measurement, as well as information on the offending fixture(s).

Field Heading	Description	Response Codes
Site#	RLW Site ID	NA
Read1	Light Trespass Measurement 1 (footcandles)	NA
Read2	Light Trespass Measurement 2(footcandles)	NA
Read3	Light Trespass Measurement 3(footcandles)	NA
OffFix1	Offending Fixture(s) for Measurement 1	NA
OffFix2	Offending Fixture(s) for Measurement 2	NA
OffFix3	Offending Fixture(s) for Measurement 3	NA
SubImp1	Surveyor's Subjective Impression of Extent of Trespass for Measurement 1	1 = Best example of trespass, …, 5 = Worst example of trespass.
SubImp2	Surveyor's Subjective Impression of Extent of Trespass for Measurement 2	1 = Best example of trespass, …, 5 = Worst example of trespass.
SubImp3	Surveyor's Subjective Impression of Extent of Trespass for Measurement 3	1 = Best example of trespass, …, 5 = Worst example of trespass.

Table 23: TablFormLghtTrspass

Field Heading	Description	Response Codes
Building ID	RLW Site ID	
Weights	Weights	
Points	Points	
Class	Class	
Stratum	Stratum	

Table 24: Weighting Data

Analysis Tables

Analysis tables are those tables that were either derived from the raw on-site data tables for analysis purposes. Tables that were created to aid in the creation of efficient analysis queries are also considered analysis tables.

Hours

Hours is used to aid in the design of efficient queries that either transpose data or perform cross-tabulations.

Field Heading	Description	Response Codes
Hour	Hour of the Day	1, 2, …, 24

Table 25: Hours

IDENTITY FUA

IDENTITY FUA is used to perform efficient cross-tabulations. Essentially, *IDENTITY FUA* consists of the FUA numbers in the first column followed by an identity matrix.

Field Heading	Description	Response Codes
FUA#	Functional Use Area Description	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
FUA1	Indicator Variable = 1 if FUA# = 1	NA
FUA2	Indicator Variable = 1 if FUA# = 2	NA
FUA3	Indicator Variable = 1 if FUA# = 3	NA
FUA4	Indicator Variable = 1 if FUA# = 4	NA
FUA5	Indicator Variable = 1 if FUA# = 5	NA
FUA6	Indicator Variable = 1 if FUA# = 6	NA
FUA7	Indicator Variable = 1 if FUA# = 7	NA
FUA8	Indicator Variable = 1 if FUA# = 8	NA
FUA9	Indicator Variable = 1 if FUA# = 9	NA
FUA10	Indicator Variable = 1 if FUA# = 10	NA
FUA11	Indicator Variable = 1 if FUA# = 11	NA
FUA12	Indicator Variable = 1 if FUA# = 12	NA
FUA13	Indicator Variable = 1 if FUA# = 13	NA
FUA14	Indicator Variable = 1 if FUA# = 14	NA
FUA15	Indicator Variable = 1 if FUA# = 15	NA
FUA16	Indicator Variable = 1 if FUA# = 16	NA

Lookup Bldg Type Old-New

Due to the fact that there some building types in the on-site sample that had extremely small sample sizes, we decided to consolidate the original list of building types. The building types were combined in such a way that the general classification of the building did not change but also allowed for slightly larger sample sizes. For example, the categories “Unconditioned Warehouse” and “Conditioned Warehouse” were consolidated into “Warehouse”.

Lookup Bldg Type Old-New is used to consolidate the set of building types as recorded on the on-site surveys into the set of building types used for reporting purposes. The use of this lookup table allowed us retain the original building type classifications in the database, while at the same time consolidating the list for analysis and reporting.

Field Heading	Description	Response Codes
Bldg Type ID	Unique Identification Number for Each	NA

	Combination	
Orig Bldg Type	Building Type as Recorded by On-Site Surveyor	
New Bldg Type	Building Type Revised for Reporting Purposes	

Table 26: Lookup Bldg Type Old-New

Summer Hourly Demand by FUA

Summer Hourly Demand by FUA was created using the data collected on-site. The table lists for each site, by functional use area, schedule time period (weekdays or weekends), hour of the day, and kW demand. The corresponding case weight is also provided.

Field Heading	Description	Response Codes
Site#	RLW Site ID	NA
Weights	Site Case Weight	NA
FUA#	FUA #	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
Period	Schedule Time Period	1 = Summer Weekdays, 2 = Summer Weekends
Hour	Hour of the Day (1-24)	1 = 12 AM – 1 AM, 2 = 1 AM – 2 AM, 3 = 2 AM – 3AM, …, 23 = 10 PM – 11 PM, 24 = 11 PM – 12 AM
kW	Demand (kW)	

Table 27: Summer Hourly Demand by FUA

Summer Usage by FUA

Summer Usage by FUA provides the annual kWh usage attributable to summertime. *Summer Usage by FUA* was created using the data collected on-site. The table lists for each site, by functional use area, the annual kWh usage attributable to summer weekdays and summer weekends. The corresponding case weight is also provided.

Field Heading	Description	Response Codes
Site#	RLW Site ID	NA
Weights	Site Case Weight	NA
FUA#	FUA #	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 =

		Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
SumWday	Annual kWh Usage Attributable to Summer Weekdays	
SumWend	Annual kWh Usage Attributable to Summer Weekends	

Table 28: Summer Usage by FUA

Summer Usage by FUA WI_A

Summer Usage by FUA WI_A provides the annual kWh usage attributable to summertime, under What-IF Scenario A[8]. *Summer Usage by FUA WI_A* was created using the data collected on-site and the assumptions of What-IF Scenario A. The table lists for each site, by functional use area, the annual kWh usage attributable to summer weekdays and summer weekends. The corresponding case weight is also provided.

Field Heading	Description	Response Codes
Site#	RLW Site ID	NA
Weights	Site Case Weight	NA
FUA#	FUA #	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
SumWday	Annual kWh Usage Attributable to Summer Weekdays	
SumWend	Annual kWh Usage Attributable to Summer Weekends	

Table 29: Summer Usage by FUA WI_A

[8] What-IF Scenario A calls for replacing all high pressure sodium lamps with metal halide lamps, assuming an efficacy ratio of 0.67.

Summer Usage by FUA WI_B

Summer Usage by FUA WI_B provides the annual kWh usage attributable to summertime, under What-IF Scenario B[9]. *Summer Usage by FUA WI_B* was created using the data collected on-site and the assumptions of What-IF Scenario B. The table lists for each site, by functional use area, the annual kWh usage attributable to summer weekdays and summer weekends. The corresponding case weight is also provided.

Field Heading	Description	Response Codes
Site#	RLW Site ID	NA
Weights	Site Case Weight	NA
FUA#	FUA #	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
SumWday	Annual kWh Usage Attributable to Summer Weekdays	
SumWend	Annual kWh Usage Attributable to Summer Weekends	

Table 30: Lookup Bldg Type Old-New

Winter Hourly Demand by FUA

Winter Hourly Demand by FUA was created using the data collected on-site. The table lists for each site, by functional use area, schedule time period (i.e weekdays or weekends), hour of the day, and kW demand. The corresponding case weight is also provided.

Field Heading	Description	Response Codes
Site#	RLW Site ID	NA
Weights	Site Case Weight	NA
FUA#	FUA #	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy,

[9] What-IF Scenario B calls for replacing all mercury vapor lamps with metal halide lamps, assuming an efficacy ratio of 56/90.

		15 = Commercial Outdoor Patio, 16 = Signage
Period	Schedule Time Period	3 = Winter Weekdays, 4 = Winter Weekends
Hour	Hour of the Day (1-24)	1 = 12 AM – 1 AM, 2 = 1 AM – 2 AM, 3 = 2 AM – 3AM, …, 23 = 10 PM – 11 PM, 24 = 11 PM – 12 AM
kW	Demand (kW)	

Table 31: Winter Hourly Demand by FUA

Winter Usage by FUA

Winter Usage by FUA provides the annual kWh usage attributable to wintertime. *Winter Usage by FUA* was created using the data collected on-site. The table lists for each site, by functional use area, the annual kWh usage attributable to winter weekdays and winter weekends. The corresponding case weight is also provided.

Field Heading	Description	Response Codes
Site#	RLW Site ID	NA
Weights	Site Case Weight	NA
FUA#	FUA #	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
WinWday	Annual kWh Usage Attributable to Winter Weekdays	
WinWend	Annual kWh Usage Attributable to Winter Weekends	

Table 32: Winter Usage by FUA

Winter Usage by FUA WI_A

Winter Usage by FUA WI_A provides the annual kWh usage attributable to wintertime, under What-IF Scenario A[10]. *Winter Usage by FUA WI_A* was created using the data collected on-site and the assumptions of What-IF Scenario A. The table lists for each site, by functional use area, the annual kWh usage attributable to winter weekdays and winter weekends. The corresponding case weight is also provided.

[10] What-IF Scenario A calls for replacing all high pressure sodium lamps with metal halide lamps, assuming an efficacy ratio of 0.67.

Field Heading	Description	Response Codes
Site#	RLW Site ID	NA
Weights	Site Case Weight	NA
FUA#	FUA #	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
WinWday	Annual kWh Usage Attributable to dWinter Weekdays	
WinWend	Annual kWh Usage Attributable to Winter Weekends	

Table 33: Summer Usage by FUA WI_A

Winter Usage by FUA WI_B

Winter Usage by FUA WI_B provides the annual kWh usage attributable to wintertime, under What-IF Scenario B[11]. *Winter Usage by FUA WI_B* was created using the data collected on-site and the assumptions of What-IF Scenario B. The table lists for each site, by functional use area, the annual kWh usage attributable to winter weekdays and winter weekends. The corresponding case weight is also provided.

Field Heading	Description	Response Codes
Site#	RLW Site ID	NA
Weights	Site Case Weight	NA
FUA#	FUA #	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
WinWday	Annual kWh Usage Attributable to Winter Weekdays	
WinWend	Annual kWh Usage Attributable to Winter Weekends	

[11] What-IF Scenario B calls for replacing all mercury vapor lamps with metal halide lamps, assuming an efficacy ratio of 56/90.

Table 34: Summer Usage by FUA WI_A

Forms

The series of forms was designed for data entry purposes. The *Main* form is a "pop-up" form that will open immediately upon opening the database. To visually view the data for a specific site using the series of forms, start on the form *Main.* In the field labeled *SITE ID*, press ctrl-f to find the site ID of interest. Press the button labeled "Click Here for On-Site Interview Questions" to begin to view the on-site survey data for the site of interest.

Queries

There are two main types of queries contained within the outdoor lighting project database: queries that were designed to calculate energy and demand quantities and queries that were designed to analyze outdoor lighting design characteristics. The energy and demand related queries are used to calculate estimates of statewide totals using the MBSS Fortran software, which requires the input data to be in a *.txt* format. The outdoor lighting design characteristics queries are used to calculate ratio estimates using the MBSS VB software, which works interactively with the Access database. For a thorough description of the MBSS Fortran software and the MBSS VB software, refer to the chapter entitled "The MBSS Software System".

Energy and Demand Queries

This section documents the queries that are used to generate the energy and demand results in the final report. Energy and demand results were calculated for three different scenarios: the actual energy and demand resulting from the reported operational schedules and installed wattage, the energy and demand resulting from the reported operational schedules and the replacement of all high pressure sodium lamps with metal halide lamps assuming an efficacy ratio of 0.67 (What-IF Scenario A), and the energy and demand resulting from the reported operational schedules and the replacement of all mercury vapor lamps with metal halide lamps assuming an efficacy ratio of 56/90 (What-IF Scenario B). This section is further segmented by these three scenarios.

Queries Common to All 3 Scenarios

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
FUA_Letter	FUA Letter	NA
FUA Type	FUA Type	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
sqft	FUA Area	
Manual	Indicator variable = -1 if FUA has manual control type	

TimeClock	Indicator variable = -1 if FUA has Time-Clock control type	
Photocell	Indicator variable = -1 if FUA has Photocell control type	
Both	Indicator variable = -1 if FUA has all control types	
DK	Indicator variable = -1 if don't know FUA control types	
01-Wdays-Win	Percentage light is on at hour 01 Winter Weekdays	
02-Wdays-Win	Percentage light is on at hour 02 Winter Weekdays	
03-Wdays-Win	Percentage light is on at hour 03 Winter Weekdays	
04-Wdays-Win	Percentage light is on at hour 04 Winter Weekdays	
05-Wdays-Win	Percentage light is on at hour 05 Winter Weekdays	
06-Wdays-Win	Percentage light is on at hour 06 Winter Weekdays	
07-Wdays-Win	Percentage light is on at hour 07 Winter Weekdays	
08-Wdays-Win	Percentage light is on at hour 08 Winter Weekdays	
09-Wdays-Win	Percentage light is on at hour 09 Winter Weekdays	
10-Wdays-Win	Percentage light is on at hour 10 Winter Weekdays	
11-Wdays-Win	Percentage light is on at hour 11 Winter Weekdays	
12-Wdays-Win	Percentage light is on at hour 12 Winter Weekdays	
13-Wdays-Win	Percentage light is on at hour 13 Winter Weekdays	
14-Wdays-Win	Percentage light is on at hour 14 Winter Weekdays	
15-Wdays-Win	Percentage light is on at hour 15 Winter Weekdays	
16-Wdays-Win	Percentage light is on at hour 16 Winter Weekdays	
17-Wdays-Win	Percentage light is on at hour 17 Winter Weekdays	
18-Wdays-Win	Percentage light is on at hour 18 Winter Weekdays	
19-Wdays-Win	Percentage light is on at hour 19 Winter Weekdays	
20-Wdays-Win	Percentage light is on at hour 20 Winter Weekdays	
21-Wdays-	Percentage light is on at hour 21	

Win	Winter Weekdays	
22-Wdays-Win	Percentage light is on at hour 22 Winter Weekdays	
23-Wdays-Win	Percentage light is on at hour 23 Winter Weekdays	
24-Wdays-Win	Percentage light is on at hour 24 Winter Weekdays	
01-Wdays-Sum	Percentage light is on at hour 01 Summer Weekdays	
02-Wdays-Sum	Percentage light is on at hour 02 Summer Weekdays	
03-Wdays-Sum	Percentage light is on at hour 03 Summer Weekdays	
04-Wdays-Sum	Percentage light is on at hour 04 Summer Weekdays	
05-Wdays-Sum	Percentage light is on at hour 05 Summer Weekdays	
06-Wdays-Sum	Percentage light is on at hour 06 Summer Weekdays	
07-Wdays-Sum	Percentage light is on at hour 07 Summer Weekdays	
08-Wdays-Sum	Percentage light is on at hour 08 Summer Weekdays	
09-Wdays-Sum	Percentage light is on at hour 09 Summer Weekdays	
10-Wdays-Sum	Percentage light is on at hour 10 Summer Weekdays	
11-Wdays-Sum	Percentage light is on at hour 11 Summer Weekdays	
12-Wdays-Sum	Percentage light is on at hour 12 Summer Weekdays	
13-Wdays-Sum	Percentage light is on at hour 13 Summer Weekdays	
14-Wdays-Sum	Percentage light is on at hour 14 Summer Weekdays	
15-Wdays-Sum	Percentage light is on at hour 15 Summer Weekdays	
16-Wdays-Sum	Percentage light is on at hour 16 Summer Weekdays	
17-Wdays-Sum	Percentage light is on at hour 17 Summer Weekdays	
18-Wdays-Sum	Percentage light is on at hour 18 Summer Weekdays	
19-Wdays-Sum	Percentage light is on at hour 19 Summer Weekdays	
20-Wdays-Sum	Percentage light is on at hour 20 Summer Weekdays	
21-Wdays-Sum	Percentage light is on at hour 21 Summer Weekdays	

22-Wdays-Sum	Percentage light is on at hour 22 Summer Weekdays	
23-Wdays-Sum	Percentage light is on at hour 23 Summer Weekdays	
24-Wdays-Sum	Percentage light is on at hour 24 Summer Weekdays	
01-Wends-Win	Percentage light is on at hour 01 Winter Weekends	
02-Wends-Win	Percentage light is on at hour 02 Winter Weekends	
03-Wends-Win	Percentage light is on at hour 03 Winter Weekends	
04-Wends-Win	Percentage light is on at hour 04 Winter Weekends	
05-Wends-Win	Percentage light is on at hour 05 Winter Weekends	
06-Wends-Win	Percentage light is on at hour 06 Winter Weekends	
07-Wends-Win	Percentage light is on at hour 07 Winter Weekends	
08-Wends-Win	Percentage light is on at hour 08 Winter Weekends	
09-Wends-Win	Percentage light is on at hour 09 Winter Weekends	
10-Wends-Win	Percentage light is on at hour 10 Winter Weekends	
11-Wends-Win	Percentage light is on at hour 11 Winter Weekends	
12-Wends-Win	Percentage light is on at hour 12 Winter Weekends	
13-Wends-Win	Percentage light is on at hour 13 Winter Weekends	
14-Wends-Win	Percentage light is on at hour 14 Winter Weekends	
15-Wends-Win	Percentage light is on at hour 15 Winter Weekends	
16-Wends-Win	Percentage light is on at hour 16 Winter Weekends	
17-Wends-Win	Percentage light is on at hour 17 Winter Weekends	
18-Wends-Win	Percentage light is on at hour 18 Winter Weekends	
19-Wends-Win	Percentage light is on at hour 19 Winter Weekends	
20-Wends-Win	Percentage light is on at hour 20 Winter Weekends	
21-Wends-Win	Percentage light is on at hour 21 Winter Weekends	
22-Wends-	Percentage light is on at hour 22	

Win	Winter Weekends	
23-Wends-Win	Percentage light is on at hour 23 Winter Weekends	
24-Wends-Win	Percentage light is on at hour 24 Winter Weekends	
01-Wends-Sum	Percentage light is on at hour 01 Summer Weekends	
02-Wends-Sum	Percentage light is on at hour 02 Summer Weekends	
03-Wends-Sum	Percentage light is on at hour 03 Summer Weekends	
04-Wends-Sum	Percentage light is on at hour 04 Summer Weekends	
05-Wends-Sum	Percentage light is on at hour 05 Summer Weekends	
06-Wends-Sum	Percentage light is on at hour 06 Summer Weekends	
07-Wends-Sum	Percentage light is on at hour 07 Summer Weekends	
08-Wends-Sum	Percentage light is on at hour 08 Summer Weekends	
09-Wends-Sum	Percentage light is on at hour 09 Summer Weekends	
10-Wends-Sum	Percentage light is on at hour 10 Summer Weekends	
11-Wends-Sum	Percentage light is on at hour 11 Summer Weekends	
12-Wends-Sum	Percentage light is on at hour 12 Summer Weekends	
13-Wends-Sum	Percentage light is on at hour 13 Summer Weekends	
14-Wends-Sum	Percentage light is on at hour 14 Summer Weekends	
15-Wends-Sum	Percentage light is on at hour 15 Summer Weekends	
16-Wends-Sum	Percentage light is on at hour 16 Summer Weekends	
17-Wends-Sum	Percentage light is on at hour 17 Summer Weekends	
18-Wends-Sum	Percentage light is on at hour 18 Summer Weekends	
19-Wends-Sum	Percentage light is on at hour 19 Summer Weekends	
20-Wends-Sum	Percentage light is on at hour 20 Summer Weekends	
21-Wends-Sum	Percentage light is on at hour 21 Summer Weekends	
22-Wends-Sum	Percentage light is on at hour 22 Summer Weekends	

23-Wends-Sum	Percentage light is on at hour 23 Summer Weekends	
24-Wends-Sum	Percentage light is on at hour 24 Summer Weekends	

Table 35: Combine ALL FUA Data; Combine FUA 1&2 Data; Combine FUA 3&4 Data; Combine FUA 5 Data

1.1.1.1.4 Cartesian Product – ID by FUA

This query is used to calculate a Cartesian product of Site # and FUA #. This query was designed to ensure that all functional use areas were present for all sites in the following queries: WdaysSum by FUA, WendsSum by FUA, WdaysWin by FUA, WendsWin by FUA.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
No_FUA?	Indicator Variable = -1 if site has no lit functional use areas	
Number	Functional Use Area Number	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
Description	Functional Use Area Description	(in text)
Weights	Site Case Weight	
Points	Proxy for Amount of Outdoor Lighting from Phone Survey	
Class	Sampling Class	
Stratum	Stratum	

Table 36: Cartesian Product – ID by FUA

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
No_FUA?	Indicator Variable = -1 if site has no lit functional use areas	
Weights		
Points		
Class		
Stratum		
FUA #	Functional Use Area #	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 =

		Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
FUA Type		
Manual		
TimeClock		
Photocell		
Hr1 Wdays Sum	Percentage lighting is on at Hr 1 Summer Weekdays	
Hr2 Wdays Sum	Percentage lighting is on at Hour 2 Summer Weekdays	
Hr3 Wdays Sum	Percentage lighting is on at Hour 3 Summer Weekdays	
Hr4 Wdays Sum	Percentage lighting is on at Hour 4 Summer Weekdays	
Hr5 Wdays Sum	Percentage lighting is on at Hour 5 Summer Weekdays	
Hr6 Wdays Sum	Percentage lighting is on at Hour 6 Summer Weekdays	
Hr7 Wdays Sum	Percentage lighting is on at Hour 7 Summer Weekdays	
Hr8 Wdays Sum	Percentage lighting is on at Hour 8 Summer Weekdays	
Hr9 Wdays Sum	Percentage lighting is on at Hour 9 Summer Weekdays	
Hr10 Wdays Sum	Percentage lighting is on at Hour 10 Summer Weekdays	
Hr11 Wdays Sum	Percentage lighting is on at Hour 11 Summer Weekdays	
Hr12 Wdays Sum	Percentage lighting is on at Hour 12 Summer Weekdays	
Hr13 Wdays Sum	Percentage lighting is on at Hour 13 Summer Weekdays	
Hr14 Wdays Sum	Percentage lighting is on at Hour 14 Summer Weekdays	
Hr15 Wdays Sum	Percentage lighting is on at	

	Hour 15 Summer Weekdays	
Hr16 Wdays Sum	Percentage lighting is on at Hour 16 Summer Weekdays	
Hr17 Wdays Sum	Percentage lighting is on at Hour 17 Summer Weekdays	
Hr18 Wdays Sum	Percentage lighting is on at Hour 18 Summer Weekdays	
Hr19 Wdays Sum	Percentage lighting is on at Hour 19 Summer Weekdays	
Hr20 Wdays Sum	Percentage lighting is on at Hour 20 Summer Weekdays	
Hr21 Wdays Sum	Percentage lighting is on at Hour 21 Summer Weekdays	
Hr22 Wdays Sum	Percentage lighting is on at Hour 22 Summer Weekdays	
Hr23 Wdays Sum	Percentage lighting is on at Hour 23 Summer Weekdays	
Hr24 Wdays Sum	Percentage lighting is on at Hour 24 Summer Weekdays	

Table 37: Wdays Sum by FUA

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
No_FUA?	Indicator Variable = -1 if site has no lit functional use areas	
Weights		
Points		
Class		
Stratum		
FUA #	Functional Use Area #	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 =

		Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
FUA Type		
Manual		
TimeClock		
Photocell		
Hr1 Wends Sum	Percentage lighting is on at Hr 1 Summer Weekends	
Hr2 Wends Sum	Percentage lighting is on at Hour 2 Summer Weekends	
Hr3 Wends Sum	Percentage lighting is on at Hour 3 Summer Weekends	
Hr4 Wends Sum	Percentage lighting is on at Hour 4 Summer Weekends	
Hr5 Wends Sum	Percentage lighting is on at Hour 5 Summer Weekends	
Hr6 Wends Sum	Percentage lighting is on at Hour 6 Summer Weekends	
Hr7 Wends Sum	Percentage lighting is on at Hour 7 Summer Weekends	
Hr8 Wends Sum	Percentage lighting is on at Hour 8 Summer Weekends	
Hr9 Wends Sum	Percentage lighting is on at Hour 9 Summer Weekends	
Hr10 Wends Sum	Percentage lighting is on at Hour 10 Summer Weekends	
Hr11 Wends Sum	Percentage lighting is on at Hour 11 Summer Weekends	
Hr12 Wends Sum	Percentage lighting is on at Hour 12 Summer Weekends	
Hr13 Wends Sum	Percentage lighting is on at Hour 13 Summer Weekends	
Hr14 Wends Sum	Percentage lighting is on at Hour 14 Summer Weekends	
Hr15 Wends Sum	Percentage lighting is on at Hour 15 Summer Weekends	

Hr16 Wends Sum	Percentage lighting is on at Hour 16 Summer Weekends	
Hr17 Wends Sum	Percentage lighting is on at Hour 17 Summer Weekends	
Hr18 Wends Sum	Percentage lighting is on at Hour 18 Summer Weekends	
Hr19 Wends Sum	Percentage lighting is on at Hour 19 Summer Weekends	
Hr20 Wends Sum	Percentage lighting is on at Hour 20 Summer Weekends	
Hr21 Wends Sum	Percentage lighting is on at Hour 21 Summer Weekends	
Hr22 Wends Sum	Percentage lighting is on at Hour 22 Summer Weekends	
Hr23 Wends Sum	Percentage lighting is on at Hour 23 Summer Weekends	
Hr24 Wends Sum	Percentage lighting is on at Hour 24 Summer Weekends	

Table 38: Wends Sum by FUA

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
No_FUA?	Indicator Variable = -1 if site has no lit functional use areas	
Weights		
Points		
Class		
Stratum		
FUA #	Functional Use Area #	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of

		Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
FUA Type		
Manual		
TimeClock		
Photocell		
Hr1 Wdays Win	Percentage lighting is on at Hr 1 Winter Weekdays	
Hr2 Wdays Win	Percentage lighting is on at Hour 2 Winter Weekdays	
Hr3 Wdays Win	Percentage lighting is on at Hour 3 Winter Weekdays	
Hr4 Wdays Win	Percentage lighting is on at Hour 4 Winter Weekdays	
Hr5 Wdays Win	Percentage lighting is on at Hour 5 Winter Weekdays	
Hr6 Wdays Win	Percentage lighting is on at Hour 6 Winter Weekdays	
Hr7 Wdays Win	Percentage lighting is on at Hour 7 Winter Weekdays	
Hr8 Wdays Win	Percentage lighting is on at Hour 8 Winter Weekdays	
Hr9 Wdays Win	Percentage lighting is on at Hour 9 Winter Weekdays	
Hr10 Wdays Win	Percentage lighting is on at Hour 10 Winter Weekdays	
Hr11 Wdays Win	Percentage lighting is on at Hour 11 Winter Weekdays	
Hr12 Wdays Win	Percentage lighting is on at Hour 12 Winter Weekdays	
Hr13 Wdays Win	Percentage lighting is on at Hour 13 Winter Weekdays	
Hr14 Wdays Win	Percentage lighting is on at Hour 14 Winter Weekdays	
Hr15 Wdays Win	Percentage lighting is on at Hour 15 Winter Weekdays	
Hr16 Wdays Win	Percentage lighting is on at Hour 16 Winter Weekdays	
Hr17 Wdays Win	Percentage lighting is on at Hour 17 Winter Weekdays	
Hr18 Wdays Win	Percentage lighting is on at Hour 18 Winter Weekdays	
Hr19 Wdays Win	Percentage lighting is on at Hour 19 Winter Weekdays	
Hr20 Wdays Win	Percentage lighting is on at Hour 20 Winter Weekdays	

Hr21 Wdays Win	Percentage lighting is on at Hour 21 Winter Weekdays	
Hr22 Wdays Win	Percentage lighting is on at Hour 22 Winter Weekdays	
Hr23 Wdays Win	Percentage lighting is on at Hour 23 Winter Weekdays	
Hr24 Wdays Win	Percentage lighting is on at Hour 24 Winter Weekdays	

Table 39: Wdays Win by FUA

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
No_FUA?	Indicator Variable = -1 if site has no lit functional use areas	
Weights		
Points		
Class		
Stratum		
FUA #	Functional Use Area #	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
FUA Type		
Manual		
TimeClock		
Photocell		
Hr1 Wends Win	Percentage lighting is on at Hr 1 Winter Weekends	
Hr2 Wends Win	Percentage lighting is on at Hour 2 Winter Weekends	
Hr3 Wends Win	Percentage lighting is on at Hour 3 Winter Weekends	
Hr4 Wends Win	Percentage lighting is on at Hour 4 Winter Weekends	
Hr5 Wends Win	Percentage lighting is on at Hour 5 Winter Weekends	
Hr6 Wends Win	Percentage lighting is on at Hour 6 Winter Weekends	
Hr7 Wends Win	Percentage lighting is on at Hour 7 Winter Weekends	
Hr8 Wends Win	Percentage lighting is on at Hour 8	

	Winter Weekends	
Hr9 Wends Win	Percentage lighting is on at Hour 9 Winter Weekends	
Hr10 Wends Win	Percentage lighting is on at Hour 10 Winter Weekends	
Hr11 Wends Win	Percentage lighting is on at Hour 11 Winter Weekends	
Hr12 Wends Win	Percentage lighting is on at Hour 12 Winter Weekends	
Hr13 Wends Win	Percentage lighting is on at Hour 13 Winter Weekends	
Hr14 Wends Win	Percentage lighting is on at Hour 14 Winter Weekends	
Hr15 Wends Win	Percentage lighting is on at Hour 15 Winter Weekends	
Hr16 Wends Win	Percentage lighting is on at Hour 16 Winter Weekends	
Hr17 Wends Win	Percentage lighting is on at Hour 17 Winter Weekends	
Hr18 Wends Win	Percentage lighting is on at Hour 18 Winter Weekends	
Hr19 Wends Win	Percentage lighting is on at Hour 19 Winter Weekends	
Hr20 Wends Win	Percentage lighting is on at Hour 20 Winter Weekends	
Hr21 Wends Win	Percentage lighting is on at Hour 21 Winter Weekends	
Hr22 Wends Win	Percentage lighting is on at Hour 22 Winter Weekends	
Hr23 Wends Win	Percentage lighting is on at Hour 23 Winter Weekends	
Hr24 Wends Win	Percentage lighting is on at Hour 24 Winter Weekends	

Table 40: Wend Win by FUA

Actual Energy and Demand Queries

Field Heading	Value	Comments
Site#	RLW Site ID	
Weights	Weight	
Points	Points	
Class	Class	
Stratum	Straturm	
FUA #	FUA Number	
HR1	FUA Watts * % light on at Hr1	Calculates Hr1 FUA Wattage for Summer Weekdays
HR2	FUA Watts * % light on at Hr2	Calculates Hr2 FUA Wattage for

		Summer Weekdays
HR3	FUA Watts * % light on at Hr3	Calculates Hr3 FUA Wattage for Summer Weekdays
HR4	FUA Watts * % light on at Hr4	Calculates Hr4 FUA Wattage for Summer Weekdays
HR5	FUA Watts * % light on at Hr5	Calculates Hr5 FUA Wattage for Summer Weekdays
HR6	FUA Watts * % light on at Hr6	Calculates Hr6 FUA Wattage for Summer Weekdays
HR7	FUA Watts * % light on at Hr7	Calculates Hr7 FUA Wattage for Summer Weekdays
HR8	FUA Watts * % light on at Hr8	Calculates Hr8 FUA Wattage for Summer Weekdays
HR9	FUA Watts * % light on at Hr9	Calculates Hr9 FUA Wattage for Summer Weekdays
HR10	FUA Watts * % light on at Hr10	Calculates Hr10 FUA Wattage for Summer Weekdays
HR11	FUA Watts * % light on at Hr11	Calculates Hr11 FUA Wattage for Summer Weekdays
HR12	FUA Watts * % light on at Hr12	Calculates Hr12 FUA Wattage for Summer Weekdays
HR13	FUA Watts * % light on at Hr13	Calculates Hr13 FUA Wattage for Summer Weekdays
HR14	FUA Watts * % light on at Hr14	Calculates Hr14 FUA Wattage for Summer Weekdays
HR15	FUA Watts * % light on at Hr15	Calculates Hr15 FUA Wattage for Summer Weekdays
HR16	FUA Watts * % light on at Hr16	Calculates Hr16 FUA Wattage for Summer Weekdays
HR17	FUA Watts * % light on at Hr17	Calculates Hr17 FUA Wattage for Summer Weekdays
HR18	FUA Watts * % light on at Hr18	Calculates Hr18 FUA Wattage for Summer Weekdays
HR19	FUA Watts * % light on at Hr19	Calculates Hr19 FUA Wattage for Summer Weekdays
HR20	FUA Watts * % light on at Hr20	Calculates Hr20 FUA Wattage for Summer Weekdays
HR21	FUA Watts * % light on at Hr21	Calculates Hr21 FUA Wattage for Summer Weekdays
HR22	FUA Watts * % light on at Hr22	Calculates Hr22 FUA Wattage for Summer Weekdays
HR23	FUA Watts * % light on at Hr23	Calculates Hr23 FUA Wattage for Summer Weekdays
HR24	FUA Watts * % light on at Hr24	Calculates Hr24 FUA Wattage for Summer Weekdays

Table 41: Schedules Wdays Sum by FUA

Field Heading	Value	Comments
Site#	RLW Site ID	
Weights	Weight	
Points	Points	
Class	Class	
Stratum	Straturm	
FUA #	FUA Number	
HR1	FUA Watts * % light on at Hr1	Calculates Hr1 FUA Wattage for Winter Weekdays
HR2	FUA Watts * % light on at Hr2	Calculates Hr2 FUA Wattage for Winter Weekdays
HR3	FUA Watts * % light on at Hr3	Calculates Hr3 FUA Wattage for Winter Weekdays
HR4	FUA Watts * % light on at Hr4	Calculates Hr4 FUA Wattage for Winter Weekdays
HR5	FUA Watts * % light on at Hr5	Calculates Hr5 FUA Wattage for Winter Weekdays
HR6	FUA Watts * % light on at Hr6	Calculates Hr6 FUA Wattage for Winter Weekdays
HR7	FUA Watts * % light on at Hr7	Calculates Hr7 FUA Wattage for Winter Weekdays
HR8	FUA Watts * % light on at Hr8	Calculates Hr8 FUA Wattage for Winter Weekdays
HR9	FUA Watts * % light on at Hr9	Calculates Hr9 FUA Wattage for Winter Weekdays
HR10	FUA Watts * % light on at Hr10	Calculates Hr10 FUA Wattage for Winter Weekdays
HR11	FUA Watts * % light on at Hr11	Calculates Hr11 FUA Wattage for Winter Weekdays
HR12	FUA Watts * % light on at Hr12	Calculates Hr12 FUA Wattage for Winter Weekdays
HR13	FUA Watts * % light on at Hr13	Calculates Hr13 FUA Wattage for Winter Weekdays
HR14	FUA Watts * % light on at Hr14	Calculates Hr14 FUA Wattage for Winter Weekdays
HR15	FUA Watts * % light on at Hr15	Calculates Hr15 FUA Wattage for Winter Weekdays
HR16	FUA Watts * % light on at Hr16	Calculates Hr16 FUA Wattage for Winter Weekdays
HR17	FUA Watts * % light on at Hr17	Calculates Hr17 FUA Wattage for Winter Weekdays
HR18	FUA Watts * % light on at Hr18	Calculates Hr18 FUA Wattage for Winter Weekdays
HR19	FUA Watts * % light on at Hr19	Calculates Hr19 FUA Wattage for Winter Weekdays
HR20	FUA Watts * % light on at Hr20	Calculates Hr20 FUA Wattage for Winter Weekdays
HR21	FUA Watts * % light on at Hr21	Calculates Hr21 FUA Wattage for Winter Weekdays

HR22	FUA Watts * % light on at Hr22	Calculates Hr22 FUA Wattage for Winter Weekdays
HR23	FUA Watts * % light on at Hr23	Calculates Hr23 FUA Wattage for Winter Weekdays
HR24	FUA Watts * % light on at Hr24	Calculates Hr24 FUA Wattage for Winter Weekdays

Table 42: Schedules Wdays Win by FUA

Field Heading	Value	Comments
Site#	RLW Site ID	
Weights	Weight	
Points	Points	
Class	Class	
Stratum	Straturm	
FUA #	FUA Number	
HR1	FUA Watts * % light on at Hr1	Calculates Hr1 FUA Wattage for Summer Weekends
HR2	FUA Watts * % light on at Hr2	Calculates Hr2 FUA Wattage for Summer Weekends
HR3	FUA Watts * % light on at Hr3	Calculates Hr3 FUA Wattage for Summer Weekends
HR4	FUA Watts * % light on at Hr4	Calculates Hr4 FUA Wattage for Summer Weekends
HR5	FUA Watts * % light on at Hr5	Calculates Hr5 FUA Wattage for Summer Weekends
HR6	FUA Watts * % light on at Hr6	Calculates Hr6 FUA Wattage for Summer Weekends
HR7	FUA Watts * % light on at Hr7	Calculates Hr7 FUA Wattage for Summer Weekends
HR8	FUA Watts * % light on at Hr8	Calculates Hr8 FUA Wattage for Summer Weekends
HR9	FUA Watts * % light on at Hr9	Calculates Hr9 FUA Wattage for Summer Weekends
HR10	FUA Watts * % light on at Hr10	Calculates Hr10 FUA Wattage for Summer Weekends
HR11	FUA Watts * % light on at Hr11	Calculates Hr11 FUA Wattage for Summer Weekends
HR12	FUA Watts * % light on at Hr12	Calculates Hr12 FUA Wattage for Summer Weekends
HR13	FUA Watts * % light on at Hr13	Calculates Hr13 FUA Wattage for Summer Weekends
HR14	FUA Watts * % light on at Hr14	Calculates Hr14 FUA Wattage for Summer Weekends
HR15	FUA Watts * % light on at Hr15	Calculates Hr15 FUA Wattage for Summer Weekends
HR16	FUA Watts * % light on at Hr16	Calculates Hr16 FUA Wattage for Summer Weekends

HR17	FUA Watts * % light on at Hr17	Calculates Hr17 FUA Wattage for Summer Weekends
HR18	FUA Watts * % light on at Hr18	Calculates Hr18 FUA Wattage for Summer Weekends
HR19	FUA Watts * % light on at Hr19	Calculates Hr19 FUA Wattage for Summer Weekends
HR20	FUA Watts * % light on at Hr20	Calculates Hr20 FUA Wattage for Summer Weekends
HR21	FUA Watts * % light on at Hr21	Calculates Hr21 FUA Wattage for Summer Weekends
HR22	FUA Watts * % light on at Hr22	Calculates Hr22 FUA Wattage for Summer Weekends
HR23	FUA Watts * % light on at Hr23	Calculates Hr23 FUA Wattage for Summer Weekends
HR24	FUA Watts * % light on at Hr24	Calculates Hr24 FUA Wattage for Summer Weekends

Table 43: Schedules Wends Sum by FUA

Field Heading	Value	Comments
Site#	RLW Site ID	
Weights	Weight	
Points	Points	
Class	Class	
Stratum	Straturm	
FUA #	FUA Number	
HR1	FUA Watts * % light on at Hr1	Calculates Hr1 FUA Wattage for Winter Weekends
HR2	FUA Watts * % light on at Hr2	Calculates Hr2 FUA Wattage for Winter Weekends
HR3	FUA Watts * % light on at Hr3	Calculates Hr3 FUA Wattage for Winter Weekends
HR4	FUA Watts * % light on at Hr4	Calculates Hr4 FUA Wattage for Winter Weekends
HR5	FUA Watts * % light on at Hr5	Calculates Hr5 FUA Wattage for Winter Weekends
HR6	FUA Watts * % light on at Hr6	Calculates Hr6 FUA Wattage for Winter Weekends
HR7	FUA Watts * % light on at Hr7	Calculates Hr7 FUA Wattage for Winter Weekends
HR8	FUA Watts * % light on at Hr8	Calculates Hr8 FUA Wattage for Winter Weekends
HR9	FUA Watts * % light on at Hr9	Calculates Hr9 FUA Wattage for Winter Weekends
HR10	FUA Watts * % light on at Hr10	Calculates Hr10 FUA Wattage for Winter Weekends
HR11	FUA Watts * % light on at Hr11	Calculates Hr11 FUA Wattage for Winter Weekends
HR12	FUA Watts * % light on at Hr12	Calculates Hr12 FUA Wattage for

		Winter Weekends
HR13	FUA Watts * % light on at Hr13	Calculates Hr13 FUA Wattage for Winter Weekends
HR14	FUA Watts * % light on at Hr14	Calculates Hr14 FUA Wattage for Winter Weekends
HR15	FUA Watts * % light on at Hr15	Calculates Hr15 FUA Wattage for Winter Weekends
HR16	FUA Watts * % light on at Hr16	Calculates Hr16 FUA Wattage for Winter Weekends
HR17	FUA Watts * % light on at Hr17	Calculates Hr17 FUA Wattage for Winter Weekends
HR18	FUA Watts * % light on at Hr18	Calculates Hr18 FUA Wattage for Winter Weekends
HR19	FUA Watts * % light on at Hr19	Calculates Hr19 FUA Wattage for Winter Weekends
HR20	FUA Watts * % light on at Hr20	Calculates Hr20 FUA Wattage for Winter Weekends
HR21	FUA Watts * % light on at Hr21	Calculates Hr21 FUA Wattage for Winter Weekends
HR22	FUA Watts * % light on at Hr22	Calculates Hr22 FUA Wattage for Winter Weekends
HR23	FUA Watts * % light on at Hr23	Calculates Hr23 FUA Wattage for Winter Weekends
HR24	FUA Watts * % light on at Hr24	Calculates Hr24 FUA Wattage for Winter Weekends

Table 44: Schedules Wends Win by FUA

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Weight	
FUA #	Functional Use Area Number	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
Period	Schedule Time Period	
HR1	kW Demand for Hour 1	
HR2	kW Demand for Hour 2	
HR3	kW Demand for Hour 3	
HR4	kW Demand for Hour 4	
HR5	kW Demand for Hour 5	
HR6	kW Demand for Hour 6	

HR7	kW Demand for Hour 7	
HR8	kW Demand for Hour 8	
HR9	kW Demand for Hour 9	
HR10	kW Demand for Hour 10	
HR11	kW Demand for Hour 11	
HR12	kW Demand for Hour 12	
HR13	kW Demand for Hour 13	
HR14	kW Demand for Hour 14	
HR15	kW Demand for Hour 15	
HR16	kW Demand for Hour 16	
HR17	kW Demand for Hour 17	
HR18	kW Demand for Hour 18	
HR19	kW Demand for Hour 19	
HR20	kW Demand for Hour 20	
HR21	kW Demand for Hour 21	
HR22	kW Demand for Hour 22	
HR23	kW Demand for Hour 23	
HR24	kW Demand for Hour 24	

Table 45: Combine Summer Schedules; Combine Winter Schedules

1.1.1.1.5 Characteristic Fcn – Summer Hourly Demand Table

The *Characteristic Fcn – Summer Hourly Demand Table* query is used to make the table named *Summer Hourly Demand by FUA*. The query uses a characteristic function[12] to efficiently transpose the data generated by the query *Combine Summer Schedules*.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
FUA #	Functional Use Area Number	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
Period	Schedule Time Period	1 = Summer Weekdays, 2 = Summer Weekends
Hour	Hour of the Day (1-24)	1 = 12 AM – 1 AM, 2 = 1 AM – 2 AM, 3 = 2 AM – 3AM, …, 23 = 10 PM – 11 PM, 24 = 11 PM – 12 AM
kW	Demand (kW)	

Table 46: Characteristic Fcn – Summer Hourly Demand Table

[12] A characteristic function converts a logical expression into a one if it is true and a zero if it is false.

1.1.1.1.6 Characteristic Fcn – Winter Hourly Demand Table

The *Characteristic Fcn – Winter Hourly Demand Table* query is used to make the table named *Winter Hourly Demand by FUA*. The query uses a characteristic function[13] to efficiently transpose the data generated by the query *Combine Winter Schedules*.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
FUA #	Functional Use Area Number	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
Period	Schedule Time Period	3 = Winter Weekdays, 4 = Winter Weekends
Hour	Hour of the Day (1-24)	1 = 12 AM – 1 AM, 2 = 1 AM – 2 AM, 3 = 2 AM – 3AM, …, 23 = 10 PM – 11 PM, 24 = 11 PM – 12 AM
kW	Demand (kW)	

Table 47: Characteristic Fcn – Winter Hourly Demand Table

1.1.1.1.7 Sum Wdays Hourly Demand by FUA_crosstab

The *Sum Wdays Hourly Demand by FUA_crosstab* query cross-tabulates the data contained in the table named *Summer Hourly Demand by FUA* for summer weekdays. Essentially, the data contained in *Summer Hourly Demand by FUA* is re-formatted to create the file *FUASumWdays_sam.txt* in the format required by the MBSS Fortran software[14].

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
Period	Schedule Time Period	1 = Summer Weekdays
Hour	Hour of the Day (1-24)	1 = 12 AM – 1 AM, 2 = 1 AM – 2 AM, 3 = 2 AM – 3AM, …, 23 = 10 PM – 11 PM, 24 = 11 PM – 12 AM
Total of kW	Total kW Demand for Site	
1	kW Demand for FUA #1 (Parking)	
2	kW Demand for FUA #2 (Pedestrian and Walkway)	
3	kW Demand for FUA #3 (Landscape)	
4	kW Demand for FUA #4 (Outdoor	

[13] A characteristic function converts a logical expression into a one if it is true and a zero if it is false.
[14] For a complete description of the input files for use with the MBSS Fortran software, refer to the MBSS (Fortran) Section.

	Retail Sales (car lot))	
5	kW Demand for FUA #5 (Internal Roadway)	
6	kW Demand for FUA #6 (Storage)	
7	kW Demand for FUA #7 (ATM)	
8	kW Demand for FUA #8 (Recreation)	
9	kW Demand for FUA #9 (Undeveloped)	
10	kW Demand for FUA #10 (Façade and Aesthetic)	
11	kW Demand for FUA #11 (Security)	
12	kW Demand for FUA #12 (Point of Sales (fast food))	
13	kW Demand for FUA #13 (Entry)	
14	kW Demand for FUA #14 (Gas Station Canopy)	
15	kW Demand for FUA #15 (Commercial Outdoor Patio)	
16	kW Demand for FUA #16 (Signage)	

Table 48: Sum Wdays Hourly Demand by FUA_crosstab

1.1.1.1.8 Win Wdays Hourly Demand by FUA_crosstab

The *Win Wdays Hourly Demand by FUA_crosstab* query cross-tabulates the data contained in the table named *Winter Hourly Demand by FUA* for winter weekdays. Essentially, the data contained in *Winter Hourly Demand by FUA* is re-formatted to create the file *FUAWinWdays_sam.txt* in the format required by the MBSS Fortran software[15].

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
Period	Schedule Time Period	3 = Winter Weekdays
Hour	Hour of the Day (1-24)	1 = 12 AM – 1 AM, 2 = 1 AM – 2 AM, 3 = 2 AM – 3AM, …, 23 = 10 PM – 11 PM, 24 = 11 PM – 12 AM
Total of kW	Total kW Demand for Site	
1	kW Demand for FUA #1 (Parking)	
2	kW Demand for FUA #2 (Pedestrian and Walkway)	
3	kW Demand for FUA #3 (Landscape)	
4	kW Demand for FUA #4 (Outdoor Retail Sales (car lot))	
5	kW Demand for FUA #5 (Internal Roadway)	
6	kW Demand for FUA #6 (Storage)	
7	kW Demand for FUA #7 (ATM)	

[15] For a complete description of the input files for use with the MBSS Fortran software, refer to the MBSS (Fortran) Section.

8	kW Demand for FUA #8 (Recreation)	
9	kW Demand for FUA #9 (Undeveloped)	
10	kW Demand for FUA #10 (Façade and Aesthetic)	
11	kW Demand for FUA #11 (Security)	
12	kW Demand for FUA #12 (Point of Sales)	
13	kW Demand for FUA #13 (Entry)	
14	kW Demand for FUA #14 (Gas Station Canopy)	
15	kW Demand for FUA #15 (Commercial Outdoor Patio)	
16	kW Demand for FUA #16 (Signage)	

Table 49: Win Wdays Hourly Demand by FUA_crosstab

1.1.1.1.9 Sum Wends Hourly Demand by FUA_crosstab

The *Sum Wends Hourly Demand by FUA_crosstab* query cross-tabulates the data contained in the table named *Summer Hourly Demand by FUA* for summer weekends. Essentially, the data contained in *Summer Hourly Demand by FUA* is re-formatted to create the file *FUASumWends_sam.txt* in the format required by the MBSS Fortran software[16].

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
Period	Schedule Time Period	2 = Summer Weekends
Hour	Hour of the Day (1-24)	1 = 12 AM – 1 AM, 2 = 1 AM – 2 AM, 3 = 2 AM – 3AM, …, 23 = 10 PM – 11 PM, 24 = 11 PM – 12 AM
Total of kW	Total kW Demand for Site	
1	kW Demand for FUA #1 (Parking)	
2	kW Demand for FUA #2 (Pedestrian and Walkway)	
3	kW Demand for FUA #3 (Landscape)	
4	kW Demand for FUA #4 (Outdoor Retail Sales (car lot))	
5	kW Demand for FUA #5 (Internal Roadway)	
6	kW Demand for FUA #6 (Storage)	
7	kW Demand for FUA #7 (ATM)	
8	kW Demand for FUA #8 (Recreation)	
9	kW Demand for FUA #9 (Undeveloped)	
10	kW Demand for FUA #10 (Façade and Aesthetic)	

[16] For a complete description of the input files for use with the MBSS Fortran software, refer to the MBSS (Fortran) Section.

11	kW Demand for FUA #11 (Security)	
12	kW Demand for FUA #12 (Point of Sales (fast food))	
13	kW Demand for FUA #13 (Entry)	
14	kW Demand for FUA #14 (Gas Station Canopy)	
15	kW Demand for FUA #15 (Commercial Outdoor Patio)	
16	kW Demand for FUA #16 (Signage)	

Table 50: Sum Wends Hourly Demand by FUA_crosstab

1.1.1.1.10 Win Wends Hourly Demand by FUA_crosstab

The *Win Wends Hourly Demand by FUA_crosstab* query cross-tabulates the data contained in the table named *Winter Hourly Demand by FUA* for winter weekends. Essentially, the data contained in *Winter Hourly Demand by FUA* is re-formatted to create the file *FUAWinWends_sam.txt* in the format required by the MBSS Fortran software[17].

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
Period	Schedule Time Period	2 = Summer Weekends
Hour	Hour of the Day (1-24)	1 = 12 AM – 1 AM, 2 = 1 AM – 2 AM, 3 = 2 AM – 3AM, …, 23 = 10 PM – 11 PM, 24 = 11 PM – 12 AM
Total of kW	Total kW Demand for Site	
1	kW Demand for FUA #1 (Parking)	
2	kW Demand for FUA #2 (Pedestrian and Walkway)	
3	kW Demand for FUA #3 (Landscape)	
4	kW Demand for FUA #4 (Outdoor Retail Sales (car lot))	
5	kW Demand for FUA #5 (Internal Roadway)	
6	kW Demand for FUA #6 (Storage)	
7	kW Demand for FUA #7 (ATM)	
8	kW Demand for FUA #8 (Recreation)	
9	kW Demand for FUA #9 (Undeveloped)	
10	kW Demand for FUA #10 (Façade and Aesthetic)	
11	kW Demand for FUA #11 (Security)	
12	kW Demand for FUA #12 (Point of Sales (fast food))	
13	kW Demand for FUA #13 (Entry)	
14	kW Demand for FUA #14 (Gas Station	

[17] For a complete description of the input files for use with the MBSS Fortran software, refer to the MBSS (Fortran) Section.

	Canopy)	
15	kW Demand for FUA #15 (Commercial Outdoor Patio)	
16	kW Demand for FUA #16 (Signage)	

Table 51: Win Wends Hourly Demand by FUA_crosstab

1.1.1.1.11 Summer Hourly Demand by FUA_crosstab

The *Summer Hourly Demand by FUA_crosstab* query cross-tabulates the data contained in the table named *Summer Hourly Demand by FUA*.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
Period	Schedule Time Period	1 = Summer Weekdays, 2 = Summer Weekends
Hour	Hour of the Day (1-24)	1 = 12 AM – 1 AM, 2 = 1 AM – 2 AM, 3 = 2 AM – 3AM, …, 23 = 10 PM – 11 PM, 24 = 11 PM – 12 AM
Total of kW	Total kW Demand for Site	
1	kW Demand for FUA #1 (Parking)	
2	kW Demand for FUA #2 (Pedestrian and Walkway)	
3	kW Demand for FUA #3 (Landscape)	
4	kW Demand for FUA #4 (Outdoor Retail Sales (car lot))	
5	kW Demand for FUA #5 (Internal Roadway)	
6	kW Demand for FUA #6 (Storage)	
7	kW Demand for FUA #7 (ATM)	
8	kW Demand for FUA #8 (Recreation)	
9	kW Demand for FUA #9 (Undeveloped)	
10	kW Demand for FUA #10 (Façade and Aesthetic)	
11	kW Demand for FUA #11 (Security)	
12	kW Demand for FUA #12 (Point of Sales (fast food))	
13	kW Demand for FUA #13 (Entry)	
14	kW Demand for FUA #14 (Gas Station Canopy)	
15	kW Demand for FUA #15 (Commercial Outdoor Patio)	
16	kW Demand for FUA #16 (Signage)	

Table 52: Summer Hourly Demand by FUA_crosstab

1.1.1.1.12 Winter Hourly Demand by FUA_crosstab

The *Winter Hourly Demand by FUA_crosstab* query cross-tabulates the data contained in the table named *Winter Hourly Demand by FUA*.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
Period	Schedule Time Period	3 = Winter Weekdays, 4 = Winter Weekends
Hour	Hour of the Day (1-24)	1 = 12 AM – 1 AM, 2 = 1 AM – 2 AM, 3 = 2 AM – 3AM, …, 23 = 10 PM – 11 PM, 24 = 11 PM – 12 AM
Total of kW	Total kW Demand for Site	
1	kW Demand for FUA #1 (Parking)	
2	kW Demand for FUA #2 (Pedestrian and Walkway)	
3	kW Demand for FUA #3 (Landscape)	
4	kW Demand for FUA #4 (Outdoor Retail Sales (car lot))	
5	kW Demand for FUA #5 (Internal Roadway)	
6	kW Demand for FUA #6 (Storage)	
7	kW Demand for FUA #7 (ATM)	
8	kW Demand for FUA #8 (Recreation)	
9	kW Demand for FUA #9 (Undeveloped)	
10	kW Demand for FUA #10 (Façade and Aesthetic)	
11	kW Demand for FUA #11 (Security)	
12	kW Demand for FUA #12 (Point of Sales (fast food))	
13	kW Demand for FUA #13 (Entry)	
14	kW Demand for FUA #14 (Gas Station Canopy)	
15	kW Demand for FUA #15 (Commercial Outdoor Patio)	
16	kW Demand for FUA #16 (Signage)	

Table 53: Winter Hourly Demand by FUA_crosstab

1.1.1.1.13 Summer Usage

The *Summer Usage* query calculates the annual kWh usage attributable to outdoor lighting for each site by Functional Use Area number for summer weekdays and summer weekends. This query is based on the *Summer Hourly Demand by FUA* table and is used to create the table named *Summer Usage by FUA*.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
FUA #	Functional Use Area Number	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 =

		Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
SumWday	Summer Weekday kWh Usage	
SumWend	Summer Weekend kWh Usage	

Table 54: Summer Usage

1.1.1.1.14 Winter Usage

The *Winter Usage* query calculates the annual kWh usage attributable to outdoor lighting for each site by Functional Use Area number for winter weekdays and winter weekends. This query is based on the *Winter Hourly Demand by FUA* table and is used to create the table named *Winter Usage by FUA*.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
FUA #	Functional Use Area Number	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
WinWday	Winter Weekday kWh Usage	
WinWend	Winter Weekend kWh Usage	

Table 55: Winter Usage

1.1.1.1.15 Annual kWh by FUA

The *Annual kWh by FUA query* calculates the annual kWh usage attributable to outdoor lighting for each site by Functional Use Area number. This query is based on the *Summer Usage by FUA* table and the *Winter Usage by FUA* table. The output of this query is later reformatted using a crosstab query (Annual kWh by FUA_crosstab) which is used to generate the *Annual_sam.txt* file required for input into the MBSS Fortran software.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
FUA #	Functional Use Area Number	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage

Annual kWh	Annual kWh Usage	

Table 56: Annual kWh by FUA Query

1.1.1.1.16 Annual kWh by FUA_crosstab

The *Annual kWh by FUA_crosstab* query cross-tabulates the data generated in the query *Annual kWh by FUA*. Essentially, the output of *Annual kWh by FUA* is re-formatted to create the file *annual_sam.txt* in the format required by the MBSS Fortran software[18].

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
Total of Annual kWh	Total Annual kWh Usage for Site	
1	Annual kWh Usage for FUA #1 (Parking)	
2	Annual kWh Usage for FUA #2 (Pedestrian and Walkway)	
3	Annual kWh Usage for FUA #3 (Landscape)	
4	Annual kWh Usage for FUA #4 (Outdoor Retail Sales (car lot))	
5	Annual kWh Usage for FUA #5 (Internal Roadway)	
6	Annual kWh Usage for FUA #6 (Storage)	
7	Annual kWh Usage for FUA #7 (ATM)	
8	Annual kWh Usage for FUA #8 (Recreation)	
9	Annual kWh Usage for FUA #9 (Undeveloped)	
10	Annual kWh Usage for FUA #10 (Façade and Aesthetic)	
11	Annual kWh Usage for FUA #11 (Security)	
12	Annual kWh Usage for FUA #12 (Point of Sales (fast food))	
13	Annual kWh Usage for FUA #13 (Entry)	
14	Annual kWh Usage for FUA #14 (Gas Station Canopy)	
15	Annual kWh Usage for FUA #15 (Commercial Outdoor Patio)	
16	Annual kWh Usage for FUA #16 (Signage)	

Table 57: Annual kWh by FUA_crosstab

[18] For a complete description of the input files for use with the MBSS Fortran software, refer to the MBSS (Fortran) Section.

What-IF Scenario A Energy and Demand Queries

1.1.1.1.17 WI_A FUA Watt

The *WI_A FUA Watt* query calculates, for each site by functional use area, the wattage that would be installed under What-IF Scenario A. What-IF Scenario A calls for replacing all high pressure sodium lamps with metal halide lamps, assuming an efficacy ratio of 0.67.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
FUA Type	Functional Use Area Type (in text)	
FUA_Watts	Installed Wattage What-IF A	

Table 58: WI_A FUA Watt

1.1.1.1.18 Schedules Summer by FUA WI_A

The query *Schedules Summer by FUA WI_A* is used to combine the reported summer use schedules by Functional Use Area with the associated installed wattage under What-If Scenario A.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
FUA #	Functional Use Area Number	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
Period	Schedule Time Period	1 = Summer Weekdays, 2 = Summer Weekends
HR1	Demand 12 AM – 1 AM What-IF A	Watts
HR2	Demand 1 AM – 2 AM What-IF A	Watts
HR3	Demand 2 AM – 3 AM What-IF A	Watts
HR4	Demand 3 AM – 4 AM What-IF A	Watts
HR5	Demand 4 AM – 5 AM What-IF A	Watts
HR6	Demand 5 AM – 6 AM What-IF A	Watts
HR7	Demand 6 AM – 7 AM What-IF A	Watts
HR8	Demand 7 AM – 8 AM What-IF A	Watts
HR9	Demand 8 AM – 9 AM What-IF A	Watts
HR10	Demand 9 AM – 10 AM What-IF A	Watts
HR11	Demand 10 AM – 11 AM What-IF A	Watts
HR12	Demand 11 AM – 12 PM What-IF A	Watts
HR13	Demand 12 PM – 1 PM What-IF A	Watts
HR14	Demand 1 PM – 2 PM What-IF A	Watts
HR15	Demand 2 PM – 3 PM What-IF A	Watts
HR16	Demand 3 PM – 4 PM What-IF A	Watts
HR17	Demand 4 PM – 5 PM What-IF A	Watts
HR18	Demand 5 PM – 6 PM What-IF A	Watts

HR19	Demand 6 PM – 7 PM What-IF A	Watts
HR20	Demand 7 PM – 8 PM What-IF A	Watts
HR21	Demand 8 PM – 9 PM What-IF A	Watts
HR22	Demand 9 PM – 10 PM What-IF A	Watts
HR23	Demand 10 PM – 11 PM What-IF A	Watts
HR24	Demand 11 PM – 12 AM What-IF A	Watts

Table 59: Schedules Summer by FUA WI_A

1.1.1.1.19 Schedules Winter by FUA WI_A

The query *Schedules Winter by FUA WI_A* is used to combine the reported winter use schedules by Functional Use Area with the associated installed wattage under What-If Scenario A.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
FUA #	Functional Use Area Number	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
Period	Schedule Time Period	3 = Winter Weekdays, 4 = Winter Weekends
HR1	Demand 12 AM – 1 AM What-IF A	Watts
HR2	Demand 1 AM – 2 AM What-IF A	Watts
HR3	Demand 2 AM – 3 AM What-IF A	Watts
HR4	Demand 3 AM – 4 AM What-IF A	Watts
HR5	Demand 4 AM – 5 AM What-IF A	Watts
HR6	Demand 5 AM – 6 AM What-IF A	Watts
HR7	Demand 6 AM – 7 AM What-IF A	Watts
HR8	Demand 7 AM – 8 AM What-IF A	Watts
HR9	Demand 8 AM – 9 AM What-IF A	Watts
HR10	Demand 9 AM – 10 AM What-IF A	Watts
HR11	Demand 10 AM – 11 AM What-IF A	Watts
HR12	Demand 11 AM – 12 PM What-IF A	Watts
HR13	Demand 12 PM – 1 PM What-IF A	Watts
HR14	Demand 1 PM – 2 PM What-IF A	Watts
HR15	Demand 2 PM – 3 PM What-IF A	Watts
HR16	Demand 3 PM – 4 PM What-IF A	Watts
HR17	Demand 4 PM – 5 PM What-IF A	Watts
HR18	Demand 5 PM – 6 PM What-IF A	Watts
HR19	Demand 6 PM – 7 PM What-IF A	Watts
HR20	Demand 7 PM – 8 PM What-IF A	Watts
HR21	Demand 8 PM – 9 PM What-IF A	Watts
HR22	Demand 9 PM – 10 PM What-IF A	Watts

HR23	Demand 10 PM – 11 PM What-IF A	Watts
HR24	Demand 11 PM – 12 AM What-IF A	Watts

Table 60: Schedules Winter by FUA WI_A

1.1.1.1.20 Characteristic Fcn – Summer WI_A

The *Characteristic Fcn – Summer WI_A* query is used efficiently transpose the data generated by the query *Schedules Summer by FUA WI_A*.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
FUA #	Functional Use Area Number	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
Period	Schedule Time Period	1 = Summer Weekdays, 2 = Summer Weekends
Hour	Hour of the Day (1-24)	1 = 12 AM – 1 AM, 2 = 1 AM – 2 AM, 3 = 2 AM – 3AM, …, 23 = 10 PM – 11 PM, 24 = 11 PM – 12 AM
kW	Demand (kW) What-IF A	

Table 61: Characteristic Fcn – Summer WI_A

1.1.1.1.21 Characteristic Fcn – Winter WI_A

The *Characteristic Fcn – Winter WI_A* query is used efficiently transpose the data generated by the query *Schedules Winter by FUA WI_A*.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
FUA #	Functional Use Area Number	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
Period	Schedule Time Period	3 = Winter Weekdays, 4 = Winter Weekends
Hour	Hour of the Day (1-24)	1 = 12 AM – 1 AM, 2 = 1 AM – 2 AM, 3 = 2 AM – 3AM, …, 23 = 10 PM – 11 PM, 24 = 11 PM – 12 AM

kW	Demand (kW) What-IF A	

Table 62: Characteristic Fcn – Winter WI_A

1.1.1.1.22 Summer Hourly Loads WI_A FUA1_FUA8

The *Summer Hourly Loads WI_A FUA1_FUA8* query uses an identity matrix to efficiently perform a cross-tabulation on the data contained in the query named *Characteristic Fcn - Summer WI_A*. Essentially, the data contained in *Characteristic Fcn - Summer WI_A* is re-formatted and combined with the output of *Summer Hourly Loads WI_A FUA9_FUA16* to create the files *WI_AsumWdays_sam.txt* and *WI_ASumWends_sam.txt*[19] in the format required by the MBSS Fortran software[20].

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
Period	Schedule Time Period	1 = Summer Weekdays, 2 = Summer Weekends
Hour	Hour of the Day (1-24)	1 = 12 AM – 1 AM, 2 = 1 AM – 2 AM, 3 = 2 AM – 3AM, …, 23 = 10 PM – 11 PM, 24 = 11 PM – 12 AM
FUA1KW	kW Demand for FUA #1 (Parking) What-IF A	
FUA2KW	kW Demand for FUA #2 (Pedestrian and Walkway) What-IF A	
FUA3KW	kW Demand for FUA #3 (Landscape) What-IF A	
FUA4KW	kW Demand for FUA #4 (Outdoor Retail Sales (car lot)) What-IF A	
FUA5KW	kW Demand for FUA #5 (Internal Roadway) What-IF A	
FUA6KW	kW Demand for FUA #6 (Storage) What-IF A	
FUA7KW	kW Demand for FUA #7 (ATM) What-IF A	
FUA8KW	kW Demand for FUA #8 (Recreation) What-IF A	

Table 63: Summer Hourly Loads WI_A FUA1_FUA8

1.1.1.1.23 Summer Hourly Loads WI_A FUA9_FUA16

The *Summer Hourly Loads WI_A FUA9_FUA16* query uses an identity matrix to efficiently perform a cross-tabulation on the data contained in the query named *Characteristic Fcn - Summer WI_A*. Essentially, the data contained in *Characteristic Fcn - Summer WI_A* is re-formatted and combined with

[19] Due to computer system resource constraints, it is necessary to manually combine the output of *Summer Hourly Loads WI_A FUA1_FUA8* with *Summer Hourly Loads WI_A FUA9_FUA16* in Excel to create the files *WI_AsumWdays_sam.txt* and *WI_AsumWends_sam.txt*.

[20] For a complete description of the input files for use with the MBSS Fortran software, refer to the MBSS (Fortran) Section.

the output of *Summer Hourly Loads WI_A FUA1_FUA8* to create the files *WI_AsumWdays_sam.txt* and *WI_ASumWends_sam.txt*[21] in the format required by the MBSS Fortran software[22].

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
Period	Schedule Time Period	1 = Summer Weekdays, 2 = Summer Weekends
Hour	Hour of the Day (1-24)	1 = 12 AM – 1 AM, 2 = 1 AM – 2 AM, 3 = 2 AM – 3AM, …, 23 = 10 PM – 11 PM, 24 = 11 PM – 12 AM
FUA9KW	kW Demand for FUA #9 (Undeveloped)	
FUA10KW	kW Demand for FUA #10 (Façade and Aesthetic)	
FUA11KW	kW Demand for FUA #11 (Security)	
FUA12KW	kW Demand for FUA #12 (Point of Sales (fast food))	
FUA13KW	kW Demand for FUA #13 (Entry)	
FUA14KW	kW Demand for FUA #14 (Gas Station Canopy)	
FUA15KW	kW Demand for FUA #15 (Commercial Outdoor Patio)	
FUA16KW	kW Demand for FUA #16 (Signage)	

Table 64: Summer Hourly Loads WI_A FUA9_FUA16

1.1.1.1.24 Winter Hourly Loads WI_A FUA1_FUA8

The *Winter Hourly Loads WI_A FUA1_FUA8* query uses an identity matrix to efficiently perform a cross-tabulation on the data contained in the query named *Characteristic Fcn - Winter WI_A*. Essentially, the data contained in *Characteristic Fcn - Winter WI_A* is re-formatted and combined with the output of *Winter Hourly Loads WI_A FUA9_FUA16* to create the files *WI_AWinWdays_sam.txt* and *WI_AWinWends_sam.txt*[23] in the format required by the MBSS Fortran software[24].

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
Period	Schedule Time Period	1 = Summer Weekdays, 2 = Summer Weekends
Hour	Hour of the Day (1-24)	1 = 12 AM – 1 AM, 2 = 1 AM – 2 AM, 3

[21] Due to computer system resource constraints, it is necessary to manually combine the output of *Summer Hourly Loads WI_A FUA1_FUA8* with *Summer Hourly Loads WI_A FUA9_FUA16* in Excel to create the files *WI_AsumWdays_sam.txt* and *WI_AsumWends_sam.txt*.

[22] For a complete description of the input files for use with the MBSS Fortran software, refer to the MBSS (Fortran) Section.

[23] Due to computer system resource constraints, it is necessary to manually combine the output of *Winter Hourly Loads WI_A FUA1_FUA8* with *Winter Hourly Loads WI_A FUA9_FUA16* in Excel to create the files *WI_AwinWdays_sam.txt and WI_AWinWends_sam.txt*.

[24] For a complete description of the input files for use with the MBSS Fortran software, refer to the MBSS (Fortran) section.

		= 2 AM – 3AM, …, 23 = 10 PM – 11 PM, 24 = 11 PM – 12 AM
FUA1KW	kW Demand for FUA #1 (Parking) What-IF A	
FUA2KW	kW Demand for FUA #2 (Pedestrian and Walkway) What-IF A	
FUA3KW	kW Demand for FUA #3 (Landscape) What-IF A	
FUA4KW	kW Demand for FUA #4 (Outdoor Retail Sales (car lot)) What-IF A	
FUA5KW	kW Demand for FUA #5 (Internal Roadway) What-IF A	
FUA6KW	kW Demand for FUA #6 (Storage) What-IF A	
FUA7KW	kW Demand for FUA #7 (ATM) What-IF A	
FUA8KW	kW Demand for FUA #8 (Recreation) What-IF A	

Table 65: Winter Hourly Loads WI_A FUA1_FUA8

1.1.1.1.25 Winter Hourly Loads WI_A FUA9_FUA16

The *Winter Hourly Loads WI_A FUA9_FUA16* query uses an identity matrix to efficiently perform a cross-tabulation on the data contained in the query named *Characteristic Fcn - Winter WI_A*. Essentially, the data contained in *Characteristic Fcn - Winter WI_A* is re-formatted and combined with the output of *Winter Hourly Loads WI_A FUA1_FUA8* to create the files *WI_AWinWdays_sam.txt* and *WI_AWinWends_sam.txt*[25] in the format required by the MBSS Fortran software[26].

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
Period	Schedule Time Period	1 = Summer Weekdays, 2 = Summer Weekends
Hour	Hour of the Day (1-24)	1 = 12 AM – 1 AM, 2 = 1 AM – 2 AM, 3 = 2 AM – 3AM, …, 23 = 10 PM – 11 PM, 24 = 11 PM – 12 AM
FUA9KW	kW Demand for FUA #9 (Undeveloped)	
FUA10KW	kW Demand for FUA #10 (Façade and Aesthetic)	
FUA11KW	kW Demand for FUA #11 (Security)	
FUA12KW	kW Demand for FUA #12 (Point of Sales (fast food))	
FUA13KW	kW Demand for FUA #13 (Entry)	

[25] Due to computer system resource constraints, it is necessary to manually combine the output of *Summer Hourly Loads WI_A FUA1_FUA8* with *Summer Hourly Loads WI_A FUA9_FUA16* in Excel to create the files *WI_AWinWdays_sam.txt* and *WI_AsumWends_sam.txt*.

[26] For a complete description of the input files for use with the MBSS Fortran software, refer to the MBSS (Fortran) section.

FUA14KW	kW Demand for FUA #14 (Gas Station Canopy)	
FUA15KW	kW Demand for FUA #15 (Commercial Outdoor Patio)	
FUA16KW	kW Demand for FUA #16 (Signage)	

Table 66: Winter Hourly Loads WI_A FUA9_FUA16

1.1.1.1.26 Summer Usage WI_A

The *Summer Usage WI_A* query calculates the annual kWh usage attributable to outdoor lighting for each site by Functional Use Area number under What-IF Scenario A for summer weekdays and summer weekends. This query is based on the *Characteristic Fcn - Summer WI_A* query and is used to create the table named *Summer Usage by FUA WI_A*.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
FUA #	Functional Use Area Number	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
SumWday	Summer Weekday Annual kWh Usage	
SumWend	Summer Weekend Annual kWh Usage	

Table 67: Summer Usage WI_A

1.1.1.1.27 Winter Usage WI_A

The *Winter Usage WI_A* query calculates the annual kWh usage attributable to outdoor lighting for each site by Functional Use Area number under What-IF Scenario A for winter weekdays and winter weekends. This query is based on the *Characteristic Fcn - Winter WI_A* query and is used to create the table named *Winter Usage by FUA WI_A*.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
FUA #	Functional Use Area Number	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
SumWday	Summer Weekday Annual kWh Usage	
SumWend	Summer Weekend Annual kWh Usage	

Table 68: Winter Usage WI_A

1.1.1.1.28 Annual kWh by FUA WI_A

The *Annual kWh by FUA WI_A query* calculates the annual kWh usage attributable to outdoor lighting for each site by Functional Use Area number, under What-If scenario A. This query is based on the *Summer Usage by FUA WI_A* table and the *Winter Usage by FUA WI_A* table. The output of this query is later reformatted using a crosstab query (*Annual kWh by FUA WI_A*) which is used to generate the *WI_A_annual_sam.txt* file required by the MBSS Fortran software.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
FUA #	Functional Use Area Number	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
Annual	Annual kWh Usage (What-IF A)	

Table 69: Annual kWh by FUA WI_A Query

1.1.1.1.29 Annual kWh by FUA WI_A Crosstab

The *Annual kWh by FUA WI_A Crosstab* query cross-tabulates the data generated in the query *Annual kWh by FUA WI_A*. Essentially, the output of *Annual kWh by FUA WI_A* is re-formatted to create the file *WI_A_annual__sam.txt* in the format required by the MBSS Fortran software[27].

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
Total of Annual kWh	Total Annual kWh Usage for Site What-IF A	
1	Annual kWh Usage for FUA #1 (Parking) What-IF A	
2	Annual kWh Usage for FUA #2 (Pedestrian and Walkway) What-IF A	
3	Annual kWh Usage for FUA #3 (Landscape) What-IF A	
4	Annual kWh Usage for FUA #4 (Outdoor Retail Sales (car lot)) What-IF A	
5	Annual kWh Usage for FUA #5 (Internal Roadway) What-IF A	
6	Annual kWh Usage for FUA #6 (Storage) What-IF A	

[27] For a complete description of the input files for use with the MBSS Fortran software, refer to the MBSS (Fortran) section.

7	Annual kWh Usage for FUA #7 (ATM) What-IF A	
8	Annual kWh Usage for FUA #8 (Recreation) What-IF A	
9	Annual kWh Usage for FUA #9 (Undeveloped) What-IF A	
10	Annual kWh Usage for FUA #10 (Façade and Aesthetic) What-IF A	
11	Annual kWh Usage for FUA #11 (Security) What-IF A	
12	Annual kWh Usage for FUA #12 (Point of Sales (fast food)) What-IF A	
13	Annual kWh Usage for FUA #13 (Entry) What-IF A	
14	Annual kWh Usage for FUA #14 (Gas Station Canopy) What-IF A	
15	Annual kWh Usage for FUA #15 (Commercial Outdoor Patio) What-IF A	
16	Annual kWh Usage for FUA #16 (Signage) What-IF A	

Table 70: Annual kWh by WI_A_Crosstab

What-IF Scenario B Energy and Demand Queries

1.1.1.1.30 WI_B FUA Watt

The *WI_B FUA Watt* query calculates, for each site by functional use area, the wattage that would be installed under What-IF Scenario B, which calls for replacing all mercury vapor lamps with metal halide lamps, assuming an efficacy ratio of 56/90.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
FUA Type	Functional Use Area Type (in text)	
FUA_Watts	Installed Wattage What-IF B	

Table 71: WI_B FUA Watt

1.1.1.1.31 Schedules Summer by FUA WI_B

The query *Schedules Summer by FUA WI_B* is used to combine the reported summer use schedules by Functional Use Area with the associated installed wattage under What-If Scenario B.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
FUA #	Functional Use Area Number	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 =

		Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
Period	Schedule Time Period	1 = Summer Weekdays, 2 = Summer Weekends
HR1	Demand 12 AM – 1 AM What-IF B	Watts
HR2	Demand 1 AM – 2 AM What-IF B	Watts
HR3	Demand 2 AM – 3 AM What-IF B	Watts
HR4	Demand 3 AM – 4 AM What-IF B	Watts
HR5	Demand 4 AM – 5 AM What-IF B	Watts
HR6	Demand 5 AM – 6 AM What-IF B	Watts
HR7	Demand 6 AM – 7 AM What-IF B	Watts
HR8	Demand 7 AM – 8 AM What-IF B	Watts
HR9	Demand 8 AM – 9 AM What-IF B	Watts
HR10	Demand 9 AM – 10 AM What-IF B	Watts
HR11	Demand 10 AM – 11 AM What-IF B	Watts
HR12	Demand 11 AM – 12 PM What-IF B	Watts
HR13	Demand 12 PM – 1 PM What-IF B	Watts
HR14	Demand 1 PM – 2 PM What-IF B	Watts
HR15	Demand 2 PM – 3 PM What-IF B	Watts
HR16	Demand 3 PM – 4 PM What-IF B	Watts
HR17	Demand 4 PM – 5 PM What-IF B	Watts
HR18	Demand 5 PM – 6 PM What-IF B	Watts
HR19	Demand 6 PM – 7 PM What-IF B	Watts
HR20	Demand 7 PM – 8 PM What-IF B	Watts
HR21	Demand 8 PM – 9 PM What-IF B	Watts
HR22	Demand 9 PM – 10 PM What-IF B	Watts
HR23	Demand 10 PM – 11 PM What-IF B	Watts
HR24	Demand 11 PM – 12 AM What-IF B	Watts

Table 72: Schedules Summer by FUA WI_B

1.1.1.1.32 Schedules Winter by FUA WI_B

The query *Schedules Winter by FUA WI_B* is used to combine the reported winter use schedules by Functional Use Area with the associated installed wattage under What-If Scenario B.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
FUA #	Functional Use Area Number	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
Period	Schedule Time Period	3 = Winter Weekdays,

		4 = Winter Weekends
HR1	Demand 12 AM – 1 AM What-IF B	Watts
HR2	Demand 1 AM – 2 AM What-IF B	Watts
HR3	Demand 2 AM – 3 AM What-IF B	Watts
HR4	Demand 3 AM – 4 AM What-IF B	Watts
HR5	Demand 4 AM – 5 AM What-IF B	Watts
HR6	Demand 5 AM – 6 AM What-IF B	Watts
HR7	Demand 6 AM – 7 AM What-IF B	Watts
HR8	Demand 7 AM – 8 AM What-IF B	Watts
HR9	Demand 8 AM – 9 AM What-IF B	Watts
HR10	Demand 9 AM – 10 AM What-IF B	Watts
HR11	Demand 10 AM – 11 AM What-IF B	Watts
HR12	Demand 11 AM – 12 PM What-IF B	Watts
HR13	Demand 12 PM – 1 PM What-IF B	Watts
HR14	Demand 1 PM – 2 PM What-IF B	Watts
HR15	Demand 2 PM – 3 PM What-IF B	Watts
HR16	Demand 3 PM – 4 PM What-IF B	Watts
HR17	Demand 4 PM – 5 PM What-IF B	Watts
HR18	Demand 5 PM – 6 PM What-IF B	Watts
HR19	Demand 6 PM – 7 PM What-IF B	Watts
HR20	Demand 7 PM – 8 PM What-IF B	Watts
HR21	Demand 8 PM – 9 PM What-IF B	Watts
HR22	Demand 9 PM – 10 PM What-IF B	Watts
HR23	Demand 10 PM – 11 PM What-IF B	Watts
HR24	Demand 11 PM – 12 AM What-IF B	Watts

Table 73: Schedules Winter by FUA WI_B

1.1.1.1.33 Characteristic Fcn – Summer WI_B

The *Characteristic Fcn – Summer WI_B* query is used efficiently transpose the data generated by the query *Schedules Summer by FUA WI_B*.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
FUA #	Functional Use Area Number	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
Period	Schedule Time Period	1 = Summer Weekdays, 2 = Summer Weekends
Hour	Hour of the Day (1-24)	1 = 12 AM – 1 AM, 2 = 1 AM – 2 AM, 3 = 2 AM – 3AM, …, 23 = 10 PM – 11 PM, 24 = 11 PM – 12 AM

kW	Demand (kW) What-IF B	

Table 74: Characteristic Fcn – Summer WI_B

1.1.1.1.34 Characteristic Fcn – Winter WI_B

The *Characteristic Fcn – Winter WI_B* query is used efficiently transpose the data generated by the query *Schedules Winter by FUA WI_B*.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
FUA #	Functional Use Area Number	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
Period	Schedule Time Period	3 = Winter Weekdays, 4 = Winter Weekends
Hour	Hour of the Day (1-24)	1 = 12 AM – 1 AM, 2 = 1 AM – 2 AM, 3 = 2 AM – 3AM, …, 23 = 10 PM – 11 PM, 24 = 11 PM – 12 AM
kW	Demand (kW) What-IF B	

Table 75: Characteristic Fcn – Winter WI_B

1.1.1.1.35 Summer Hourly Loads WI_B FUA1_FUA8

The *Summer Hourly Loads WI_B FUA1_FUA8* query uses an identity matrix to efficiently perform a cross-tabulation on the data contained in the query named *Characteristic Fcn - Summer WI_B*. Essentially, the data contained in *Characteristic Fcn - Summer WI_B* is re-formatted and combined with the output of *Summer Hourly Loads WI_B FUA9_FUA16* to create the files *WI_BsumWdays_sam.txt* and *WI_BSumWends_sam.txt*[28] in the format required by the MBSS Fortran software[29].

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
Period	Schedule Time Period	1 = Summer Weekdays, 2 = Summer Weekends
Hour	Hour of the Day (1-24)	1 = 12 AM – 1 AM, 2 = 1 AM – 2 AM, 3 = 2 AM – 3AM, …, 23 = 10 PM – 11 PM, 24 = 11 PM – 12 AM
FUA1KW	kW Demand for FUA #1 (Parking) What-IF B	

[28] Due to computer system resource constraints, it is necessary to manually combine the output of *Summer Hourly Loads WI_B FUA1_FUA8* with *Summer Hourly Loads WI_B FUA9_FUA16* in Excel to create the files *WI_BsumWdays_sam.txt* and *WI_BsumWends_sam.txt*.

[29] For a complete description of the input files for use with the MBSS Fortran software, refer to the MBSS (Fortran) section.

FUA2KW	kW Demand for FUA #2 (Pedestrian and Walkway) What-IF B	
FUA3KW	kW Demand for FUA #3 (Landscape) What-IF B	
FUA4KW	kW Demand for FUA #4 (Outdoor Retail Sales (car lot)) What-IF B	
FUA5KW	kW Demand for FUA #5 (Internal Roadway) What-IF B	
FUA6KW	kW Demand for FUA #6 (Storage) What-IF B	
FUA7KW	kW Demand for FUA #7 (ATM) What-IF B	
FUA8KW	kW Demand for FUA #8 (Recreation) What-IF B	

Table 76: Summer Hourly Loads WI_B FUA1_FUA8

1.1.1.1.36 Summer Hourly Loads WI_B FUA9_FUA16

The *Summer Hourly Loads WI_B FUA9_FUA16* query uses an identity matrix to efficiently perform a cross-tabulation on the data contained in the query named *Characteristic Fcn - Summer WI_B*. Essentially, the data contained in *Characteristic Fcn - Summer WI_B* is re-formatted and combined with the output of *Summer Hourly Loads WI_B FUA1_FUA8* to create the files *WI_BSumWdays_sam.txt* and *WI_BSumWends_sam.txt*[30] in the format required by the MBSS Fortran software[31].

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
Period	Schedule Time Period	1 = Summer Weekdays, 2 = Summer Weekends
Hour	Hour of the Day (1-24)	1 = 12 AM – 1 AM, 2 = 1 AM – 2 AM, 3 = 2 AM – 3AM, …, 23 = 10 PM – 11 PM, 24 = 11 PM – 12 AM
FUA9KW	kW Demand for FUA #9 (Undeveloped)	
FUA10KW	kW Demand for FUA #10 (Façade and Aesthetic)	
FUA11KW	kW Demand for FUA #11 (Security)	
FUA12KW	kW Demand for FUA #12 (Point of Sales (fast food))	
FUA13KW	kW Demand for FUA #13 (Entry)	
FUA14KW	kW Demand for FUA #14 (Gas Station Canopy)	
FUA15KW	kW Demand for FUA #15 (Commercial Outdoor Patio)	

[30] Due to computer system resource constraints, it is necessary to manually combine the output of *Summer Hourly Loads WI_B FUA1_FUA8* with *Summer Hourly Loads WI_B FUA9_FUA16* in Excel to create the files *WI_BsumWdays_sam.txt* and *WI_BsumWends_sam.txt*.

[31] For a complete description of the input files for use with the MBSS Fortran software, refer to the MBSS (Fortran) section.

FUA16KW	kW Demand for FUA #16 (Signage)	

Table 77: Summer Hourly Loads WI_B FUA9_FUA16

1.1.1.1.37 Summer Usage WI_B

The *Summer Usage WI_B* query calculates the annual kWh usage attributable to outdoor lighting for each site by Functional Use Area number under What-IF Scenario B for summer weekdays and summer weekends. This query is based on the *Characteristic Fcn - Summer WI_B* query and is used to create the table named *Summer Usage by FUA WI_B*.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
FUA #	Functional Use Area Number	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
SumWday	Summer Weekday Annual kWh Usage	
SumWend	Summer Weekend Annual kWh Usage	

Table 78: Summer Usage WI_B

1.1.1.1.38 Winter Hourly Loads WI_B FUA1_FUA8

The *Winter Hourly Loads WI_B FUA1_FUA8* query uses an identity matrix to efficiently perform a cross-tabulation on the data contained in the query named *Characteristic Fcn - Winter WI_B*. Essentially, the data contained in *Characteristic Fcn - Winter WI_B* is re-formatted and combined with the output of *Winter Hourly Loads WI_B FUA9_FUA16* to create the files *WI_BWinWdays_sam.txt* and *WI_BWinWends_sam.txt*[32] in the format required by the MBSS Fortran software[33].

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
Period	Schedule Time Period	1 = Summer Weekdays, 2 = Summer Weekends
Hour	Hour of the Day (1-24)	1 = 12 AM – 1 AM, 2 = 1 AM – 2 AM, 3 = 2 AM – 3AM, …, 23 = 10 PM – 11 PM, 24 = 11 PM – 12 AM
FUA1KW	kW Demand for FUA #1 (Parking) What-IF A	
FUA2KW	kW Demand for FUA #2 (Pedestrian and Walkway) What-IF A	

[32] Due to computer system resource constraints, it is necessary to manually combine the output of *Winter Hourly Loads WI_B FUA1_FUA8* with *Winter Hourly Loads WI_B FUA9_FUA16* in Excel to create the files *WI_BWinWdays_sam.txt and WI_BWinWends_sam.txt*.

[33] For a complete description of the input files for use with the MBSS Fortran software, refer to the MBSS (Fortran) section.

FUA3KW	kW Demand for FUA #3 (Landscape) What-IF A	
FUA4KW	kW Demand for FUA #4 (Outdoor Retail Sales (car lot)) What-IF A	
FUA5KW	kW Demand for FUA #5 (Internal Roadway) What-IF A	
FUA6KW	kW Demand for FUA #6 (Storage) What-IF A	
FUA7KW	kW Demand for FUA #7 (ATM) What-IF A	
FUA8KW	kW Demand for FUA #8 (Recreation) What-IF A	

Table 79: Winter Hourly Loads WI_B FUA1_FUA8

1.1.1.1.39 Winter Hourly Loads WI_B FUA9_FUA16

The *Winter Hourly Loads WI_B FUA9_FUA16* query uses an identity matrix to efficiently perform a cross-tabulation on the data contained in the query named *Characteristic Fcn - Winter WI_B*. Essentially, the data contained in *Characteristic Fcn - Winter WI_B* is re-formatted and combined with the output of *Winter Hourly Loads WI_B FUA1_FUA8* to create the files *WI_BWinWdays_sam.txt* and *WI_BWinWends_sam.txt*[34] in the format required by the MBSS Fortran software[35].

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
Period	Schedule Time Period	1 = Summer Weekdays, 2 = Summer Weekends
Hour	Hour of the Day (1-24)	1 = 12 AM – 1 AM, 2 = 1 AM – 2 AM, 3 = 2 AM – 3AM, …, 23 = 10 PM – 11 PM, 24 = 11 PM – 12 AM
FUA9KW	kW Demand for FUA #9 (Undeveloped)	
FUA10KW	kW Demand for FUA #10 (Façade and Aesthetic)	
FUA11KW	kW Demand for FUA #11 (Security)	
FUA12KW	kW Demand for FUA #12 (Point of Sales (fast food))	
FUA13KW	kW Demand for FUA #13 (Entry)	
FUA14KW	kW Demand for FUA #14 (Gas Station Canopy)	
FUA15KW	kW Demand for FUA #15 (Commercial Outdoor Patio)	
FUA16KW	kW Demand for FUA #16 (Signage)	

Table 80: Winter Hourly Loads WI_B FUA9_FUA16

[34] Due to computer system resource constraints, it is necessary to manually combine the output of *Summer Hourly Loads WI_B FUA1_FUA8* with *Summer Hourly Loads WI_B FUA9_FUA16* in Excel to create the files *WI_BWinWdays_sam.txt* and *WI_BSumWends_sam.txt*.

[35] For a complete description of the input files for use with the MBSS Fortran software, refer to the MBSS (Fortran) section.

1.1.1.1.40 Winter Usage WI_B

The *Winter Usage WI_B* query calculates the annual kWh usage attributable to outdoor lighting for each site by Functional Use Area number under What-IF Scenario B for winter weekdays and winter weekends. This query is based on the *Characteristic Fcn - Winter WI_B* query and is used to create the table named *Winter Usage by FUA WI_B*.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
FUA #	Functional Use Area Number	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
SumWday	Summer Weekday Annual kWh Usage	
SumWend	Summer Weekend Annual kWh Usage	

Table 81: Winter Usage WI_B

1.1.1.1.41 Annual kWh by FUA WI_B

The *Annual kWh by FUA WI_B query* calculates the annual kWh usage attributable to outdoor lighting for each site by Functional Use Area number, under What-If scenario B, This query is based on the *Summer Usage by FUA WI_B* table and the *Winter Usage by FUA WI_B* table. The output of this query is later reformatted using a crosstab query (*Annual kWh by FUA WI_B*) which is used to generate the WI_B_*annual_sam.txt* file required by the MBSS Fortran software.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weights	Site Case Weight	
FUA #	Functional Use Area Number	1 = Parking, 2 = Pedestrian and Walkway, 3 = Landscape, 4 = Outdoor Retail Sales (car lot) 5 = Internal Roadway, 6 = Storage, 7 = ATM, 8 = Recreation, 9 = Undeveloped, 10 = Façade and Aesthetic, 11 = Security, 12 = Point of Sales (fast food), 13 = Entry, 14 = Gas Station Canopy, 15 = Commercial Outdoor Patio, 16 = Signage
Annual kWh	Annual kWh Usage What-IF B	

Table 82: Annual kWh by FUA WI_B Query

1.1.1.1.42 Annual kWh by FUA WI_B Crosstab

The *Annual kWh by FUA WI_B Crosstab* query cross-tabulates the data generated in the query *Annual kWh by FUA WI_B*. Essentially, the output of *Annual kWh by FUA WI_B* is re-formatted to create the file WI_B_*annual_sam.txt* in the format required by the MBSS Fortran software[36].

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weights	Site Case Weight	NA
Total of Annual kWh	Total Annual kWh Usage for Site What-IF B	NA
1	Annual kWh Usage for FUA #1 (Parking) What-IF B	NA
2	Annual kWh Usage for FUA #2 (Pedestrian and Walkway) What-IF B	NA
3	Annual kWh Usage for FUA #3 (Landscape) What-IF B	NA
4	Annual kWh Usage for FUA #4 (Outdoor Retail Sales (car lot)) What-IF B	NA
5	Annual kWh Usage for FUA #5 (Internal Roadway) What-IF B	NA
6	Annual kWh Usage for FUA #6 (Storage) What-IF B	NA
7	Annual kWh Usage for FUA #7 (ATM) What-IF B	NA
8	Annual kWh Usage for FUA #8 (Recreation) What-IF B	NA
9	Annual kWh Usage for FUA #9 (Undeveloped) What-IF B	NA
10	Annual kWh Usage for FUA #10 (Façade and Aesthetic) What-IF B	NA
11	Annual kWh Usage for FUA #11 (Security) What-IF B	NA
12	Annual kWh Usage for FUA #12 (Point of Sales (fast food)) What-IF B	NA
13	Annual kWh Usage for FUA #13 (Entry) What-IF B	NA
14	Annual kWh Usage for FUA #14 (Gas Station Canopy) What-IF B	NA
15	Annual kWh Usage for FUA #15 (Commercial Outdoor Patio) What-IF B	NA
16	Annual kWh Usage for FUA #16 (Signage) What-IF B	NA

Table 83: Annual kWh by WI_B_Crosstab

[36] For a complete description of the input files for use with the MBSS Fortran software, refer to the MBSS (Fortran) section.

Outdoor Lighting Design Related Queries

1.1.1.1.43 AQ all Min HI %

The *AQ all Min HI %* query calculates the percentage of FUAs with minimum horizontal illuminace within certain ranges.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Description	FUA Description	NA
Site2	RLW Site Identification Number	NA
Basis	1 for all sites with available data	Basis
LT_01	Indicator Variable = 1 if Minimum Horizontal Illuminance < 0.1	Calculates % FUAs with Minimum Horizontal Illuminace < 0.1
LT_02	Indicator Variable = 1 if Minimum Horizontal Illuminance >=0.1 and < 0.25	Calculates % sites with Minimum Horizontal Illuminace >=0.1 and < 0.25
LT_03	Indicator Variable = 1 if Minimum Horizontal Illuminance >= 0.25 and < 0. 5	Calculates % sites with Minimum Horizontal Illuminace >= 0.25 and < 0. 5
LT_04	Indicator Variable = 1 if Minimum Horizontal Illuminance >= 0.5 and < 1	Calculates % sites with Minimum Horizontal Illuminace >= 0.5 and < 1
LT_05	Indicator Variable = 1 if Minimum Horizontal Illuminance >= 1 and < 2.5	Calculates % sites with Minimum Horizontal Illuminace >= 1 and < 2.5
LT_06	Indicator Variable = 1 if Minimum Horizontal Illuminance >= 2.5 and < 5	Calculates % sites with Minimum Horizontal Illuminace >= 2.5 and < 5
LT_07	Indicator Variable = 1 if Minimum Horizontal Illuminance >= 5 and < 8	Calculates % sites with Minimum Horizontal Illuminace >= 5 and < 8
LT_08	Indicator Variable = 1 if Minimum Horizontal Illuminance >= 8 and < 12	Calculates % sites with Minimum Horizontal Illuminace >= 8 and < 12
LT_09	Indicator Variable = 1 if Minimum Horizontal Illuminance >=12 and < 20	Calculates % sites with Minimum Horizontal Illuminace >=12 and < 20
LT_10	Indicator Variable = 1 if Minimum Horizontal Illuminance >=20	Calculates % sites with Minimum Horizontal Illuminace >=20

Table 84: AQ all Min HI %

1.1.1.1.44 Categories all Min HI %

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Description	FUA Description	NA

Table 85: Categories all Min HI %

1.1.1.1.45 AQ Ave HI all AreaD %

The AQ Ave HI all AreaD % query calculates the percentage of FUAs with average horizontal illuminance within certain ranges.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA

Weight	Weight	NA
Description	FUA Description	NA
Site2	RLW Site Identification Number	NA
Basis	1 for all sites with available data	Basis
LT_01	Indicator Variable = 1 if Average Horizontal Illuminance < 0.5	Calculates % FUAs with Average Horizontal Illuminace < 0.5
LT_02	Indicator Variable = 1 if Average Horizontal Illuminance >=0.5 and < 1	Calculates % sites with Average Horizontal Illuminace >=0.5 and < 1
LT_03	Indicator Variable = 1 if Average Horizontal Illuminance >= 1 and < 1. 5	Calculates % sites with Average Horizontal Illuminace
LT_04	Indicator Variable = 1 if Average Horizontal Illuminance >= 1.5 and < 2.5	Calculates % sites with Average Horizontal Illuminace >= 1.5 and < 2.5
LT_05	Indicator Variable = 1 if Average Horizontal Illuminance >= 2.5 and < 5	Calculates % sites with Average Horizontal Illuminace >= 2.5 and < 5
LT_06	Indicator Variable = 1 if Average Horizontal Illuminance >= 5 and < 8	Calculates % sites with Average Horizontal Illuminace >= 5 and < 8
LT_07	Indicator Variable = 1 if Average Horizontal Illuminance >= 8 and < 10	Calculates % sites with Average Horizontal Illuminace >= 8 and < 10
LT_08	Indicator Variable = 1 if Average Horizontal Illuminance >= 10 and < 15	Calculates % sites with Average Horizontal Illuminace >= 10 and < 15
LT_09	Indicator Variable = 1 if Average Horizontal Illuminance >=15 and < 25	Calculates % sites with Average Horizontal Illuminace >=15 and < 25
LT_10	Indicator Variable = 1 if Average Horizontal Illuminance >=25	Calculates % sites with Average Horizontal Illuminace >=25

Table 86: AQ Ave HI all AreaD %

1.1.1.1.46 Categories Ave HI all AreaD %

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Description	FUA Description	NA

Table 87: Categories Ave HI all AreaD %

1.1.1.1.47 AQ Controls %

The AQ Controls % query calculates the percentage of FUAs with manual, timeclock, or photocell control types.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Description	FUA Description	NA
Site2	RLW Site Identification Number	NA
Basis	1 for all sites with available data	Basis
Man	Indicator Variable = 1 if control type = manual	Calculates % FUAs with control type = manual
Time	Indicator Variable = 1 if control type =	Calculates % sites with control type =

	timeclock	timeclock
Photo	Indicator Variable = 1 if control type = photocell	Calculates % sites with control type = photocell

Table 88: AQ Controls %

1.1.1.1.48 Categories Controls %

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Description	FUA Description	NA

Table 89: Categories Controls %

1.1.1.1.49 AQ Fixture Type by FUA %

The AQ Fixture Type by FUA % query calculates the percentage of FUAs with various fixture types.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Description	FUA Description	NA
Site2	RLW Site Identification Number	NA
Basis	1 for all sites with available data	Basis
Type A	Indicator Variable = 1 if site has Fixture Type A	Calculates % FUAs with Fixture Type A
Type B	Indicator Variable = 1 if site has Fixture Type B	Calculates % FUAs with Fixture Type B
Type C	Indicator Variable = 1 if site has Fixture Type C	Calculates % FUAs with Fixture Type C
Type D	Indicator Variable = 1 if site has Fixture Type D	Calculates % FUAs with Fixture Type D
Type E	Indicator Variable = 1 if site has Fixture Type E	Calculates % FUAs with Fixture Type E
Type F	Indicator Variable = 1 if site has Fixture Type F	Calculates % FUAs with Fixture Type F
Type G	Indicator Variable = 1 if site has Fixture Type G	Calculates % FUAs with Fixture Type G
Type H	Indicator Variable = 1 if site has Fixture Type H	Calculates % FUAs with Fixture Type H
Type I	Indicator Variable = 1 if site has Fixture Type I	Calculates % FUAs with Fixture Type I
Type J	Indicator Variable = 1 if site has Fixture Type J	Calculates % FUAs with Fixture Type J
Type K	Indicator Variable = 1 if site has Fixture Type K	Calculates % FUAs with Fixture Type K
Type L	Indicator Variable = 1 if site has Fixture Type L	Calculates % FUAs with Fixture Type L
Type M	Indicator Variable = 1 if site has Fixture Type M	Calculates % FUAs with Fixture Type M
Type N	Indicator Variable = 1 if site has Fixture	Calculates % FUAs with Fixture Type N

	Type N	
Type O	Indicator Variable = 1 if site has Fixture Type O	Calculates % FUAs with Fixture Type O
Type P	Indicator Variable = 1 if site has Fixture Type P	Calculates % FUAs with Fixture Type P
Type Q	Indicator Variable = 1 if site has Fixture Type Q	Calculates % FUAs with Fixture Type Q
Type R	Indicator Variable = 1 if site has Fixture Type R	Calculates % FUAs with Fixture Type R
Type S	Indicator Variable = 1 if site has Fixture Type S	Calculates % FUAs with Fixture Type S
Type T	Indicator Variable = 1 if site has Fixture Type T	Calculates % FUAs with Fixture Type T
Type U	Indicator Variable = 1 if site has Fixture Type U	Calculates % FUAs with Fixture Type U
Type V	Indicator Variable = 1 if site has Fixture Type V	Calculates % FUAs with Fixture Type V
Type W	Indicator Variable = 1 if site has Fixture Type W	Calculates % FUAs with Fixture Type W
Type X	Indicator Variable = 1 if site has Fixture Type X	Calculates % FUAs with Fixture Type X
Type Y	Indicator Variable = 1 if site has Fixture Type Y	Calculates % FUAs with Fixture Type Y
Type Z	Indicator Variable = 1 if site has Fixture Type Z	Calculates % FUAs with Fixture Type Z
Type AA	Indicator Variable = 1 if site has Fixture Type AA	Calculates % FUAs with Fixture Type AA
Type BB	Indicator Variable = 1 if site has Fixture Type BB	Calculates % FUAs with Fixture Type BB
Type CC	Indicator Variable = 1 if site has Fixture Type CC	Calculates % FUAs with Fixture Type CC
Type DD	Indicator Variable = 1 if site has Fixture Type DD	Calculates % FUAs with Fixture Type DD
Type EE	Indicator Variable = 1 if site has Fixture Type EE	Calculates % FUAs with Fixture Type EE
Type FF	Indicator Variable = 1 if site has Fixture Type FF	Calculates % FUAs with Fixture Type FF
Type GG	Indicator Variable = 1 if site has Fixture Type GG	Calculates % FUAs with Fixture Type GG
Type HH	Indicator Variable = 1 if site has Fixture Type HH	Calculates % FUAs with Fixture Type HH
Type II	Indicator Variable = 1 if site has Fixture Type II	Calculates % FUAs with Fixture Type II
Type JJ	Indicator Variable = 1 if site has Fixture Type JJ	Calculates % FUAs with Fixture Type JJ
Type KK	Indicator Variable = 1 if site has Fixture Type KK	Calculates % FUAs with Fixture Type KK
Type LL	Indicator Variable = 1 if site has Fixture Type LL	Calculates % FUAs with Fixture Type LL

Type MM	Indicator Variable = 1 if site has Fixture Type MM	Calculates % FUAs with Fixture Type MM
Type NN	Indicator Variable = 1 if site has Fixture Type NN	Calculates % FUAs with Fixture Type NN
Type OO	Indicator Variable = 1 if site has Fixture Type OO	Calculates % FUAs with Fixture Type OO
Type PP	Indicator Variable = 1 if site has Fixture Type PP	Calculates % FUAs with Fixture Type PP
Type QQ	Indicator Variable = 1 if site has Fixture Type QQ	Calculates % FUAs with Fixture Type QQ

Table 90: AQ Fixture Type by FUA %

1.1.1.1.50 AQ Fixture Type by FUA2 %

The AQ Fixture Type by FUA2 % query calculates the percentage of certain fixture types in a particular FUA.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weight	Weight	
Description	FUA Description	
Site2	RLW Site Identification Number	
Basis: TotFix	Total Number of Fixtures	Basis
Type A	Number of fixtures if site has Fixture Type A	Calculates % Fixture Type A by FUA
Type B	Number of fixtures if site has Fixture Type B	Calculates % Fixture Type B by FUA
Type C	Number of fixtures if site has Fixture Type C	Calculates % Fixture Type C by FUA
Type D	Number of fixtures if site has Fixture Type D	Calculates % Fixture Type D by FUA
Type E	Number of fixtures if site has Fixture Type E	Calculates % Fixture Type E by FUA
Type F	Number of fixtures if site has Fixture Type F	Calculates % Fixture Type F by FUA
Type G	Number of fixtures if site has Fixture Type G	Calculates % Fixture Type G by FUA
Type H	Number of fixtures if site has Fixture Type H	Calculates % Fixture Type H by FUA
Type I	Number of fixtures if site has Fixture Type I	Calculates % Fixture Type I by FUA
Type J	Number of fixtures if site has Fixture Type J	Calculates % Fixture Type J by FUA
Type K	Number of fixtures if site has Fixture Type K	Calculates % Fixture Type K by FUA
Type L	Number of fixtures if site has Fixture Type L	Calculates % Fixture Type L by FUA
Type M	Number of fixtures if site has Fixture Type M	Calculates % Fixture Type M by FUA
Type N	Number of fixtures if site has Fixture	Calculates % Fixture Type N by FUA

	Type N	
Type O	Number of fixtures if site has Fixture Type O	Calculates % Fixture Type O by FUA
Type P	Number of fixtures if site has Fixture Type P	Calculates % Fixture Type P by FUA
Type Q	Number of fixtures if site has Fixture Type Q	Calculates % Fixture Type Q by FUA
Type R	Number of fixtures if site has Fixture Type R	Calculates % Fixture Type R by FUA
Type S	Number of fixtures if site has Fixture Type S	Calculates % Fixture Type S by FUA
Type T	Number of fixtures if site has Fixture Type T	Calculates % Fixture Type T by FUA
Type U	Number of fixtures if site has Fixture Type U	Calculates % Fixture Type U by FUA
Type V	Number of fixtures if site has Fixture Type V	Calculates % Fixture Type V by FUA
Type W	Number of fixtures if site has Fixture Type W	Calculates % Fixture Type W by FUA
Type X	Number of fixtures if site has Fixture Type X	Calculates % Fixture Type X by FUA
Type Y	Number of fixtures if site has Fixture Type Y	Calculates % Fixture Type Y by FUA
Type Z	Number of fixtures if site has Fixture Type Z	Calculates % Fixture Type Z by FUA
Type AA	Number of fixtures if site has Fixture Type AA	Calculates % Fixture Type AA by FUA
Type BB	Number of fixtures if site has Fixture Type BB	Calculates % Fixture Type BB by FUA
Type CC	Number of fixtures if site has Fixture Type CC	Calculates % Fixture Type CC by FUA
Type DD	Number of fixtures if site has Fixture Type DD	Calculates % Fixture Type DD by FUA
Type EE	Number of fixtures if site has Fixture Type EE	Calculates % Fixture Type EE by FUA
Type FF	Number of fixtures if site has Fixture Type FF	Calculates % Fixture Type FF by FUA
Type GG	Number of fixtures if site has Fixture Type GG	Calculates % Fixture Type GG by FUA
Type HH	Number of fixtures if site has Fixture Type HH	Calculates % Fixture Type HH by FUA
Type II	Number of fixtures if site has Fixture Type II	Calculates % Fixture Type II by FUA
Type JJ	Number of fixtures if site has Fixture Type JJ	Calculates % Fixture Type JJ by FUA
Type KK	Number of fixtures if site has Fixture Type KK	Calculates % Fixture Type KK by FUA
Type LL	Number of fixtures if site has Fixture Type LL	Calculates % Fixture Type LL by FUA

Type MM	Number of fixtures if site has Fixture Type MM	Calculates % Fixture Type MM by FUA
Type NN	Number of fixtures if site has Fixture Type NN	Calculates % Fixture Type NN by FUA
Type OO	Number of fixtures if site has Fixture Type OO	Calculates % Fixture Type OO by FUA
Type PP	Number of fixtures if site has Fixture Type PP	Calculates % Fixture Type PP by FUA
Type QQ	Number of fixtures if site has Fixture Type QQ	Calculates % Fixture Type QQ by FUA

Table 91: AQ Fixture Type by FUA2 %

1.1.1.1.51 Categories Fixture Type by FUA

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Description	FUA Description	NA

Table 92: Categories Fixture Type by FUA

1.1.1.1.52 AQ FUA SF %

The *AQ FUA SF %* query calculates the percentage of FUA Area within certain LPD ranges by FUA.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
FUA_Type	FUA Description	NA
Site2	RLW Site Identification Number	NA
Basis	FUA Area	Basis
LT_01	Indicator Variable = FUA Area if LPD < 0.025	Calculates % FUA Area with LPD < 0.025
LT_02	Indicator Variable = FUA Area if LPD >= 0.025 and < 0.05	Calculates % FUA Area with LPD >= 0.025 and < 0.05
LT_03	Indicator Variable = FUA Area if LPD >= 0.05 and < 0.075	Calculates % FUA Area with LPD >= 0.05 and < 0.075
LT_04	Indicator Variable = FUA Area if LPD >= 0.075 and < 0.1	Calculates % FUA Area with LPD >= 0.075 and < 0.1
LT_05	Indicator Variable = FUA Area if LPD >= 0.1 and < 0.25	Calculates % FUA Area with LPD >= 0.1 and < 0.25
LT_06	Indicator Variable = FUA Area if LPD >= 0.25 and < 1	Calculates % FUA Area with LPD >= 0.25 and < 1
LT_07	Indicator Variable = FUA Area if LPD >= 1 and < 3	Calculates % FUA Area with LPD >= 1 and < 3
LT_08	Indicator Variable = FUA Area if LPD >= 3and < 8	Calculates % FUA Area with LPD >= 3and < 8
LT_09	Indicator Variable = FUA Area if LPD >= 8	Calculates % FUA Area with LPD >= 8

Table 93: AQ FUA SF %

1.1.1.1.53 Categories FUA SF %

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
FUA_Type	FUA Description	NA

Table 94: Categories FUA SF %

1.1.1.1.54 AQ FUA Watts %

The *AQ FUA Watts %* query calculates the average LPD by FUA and building type.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
New Building Type	Building Type Description	NA
FUA_Type	FUA Description	NA
Site2	RLW Site Identification Number	NA
FUA_sqft	FUA Area	Basis
FUA_Watts	Total FUA Wattage	Calculates Average LPD by FUA and Building Type

Table 95: AQ FUA Watts

1.1.1.1.55 Categories FUA Watts %

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
New Building Type	Building Type Description	NA
FUA_Type	FUA Description	NA

Table 96: Categories FUA Watts

1.1.1.1.56 AQ Glare Ratio by Bldg Type %

The *AQ Glare Ratio by Bldg Type %* query calculates the percentage of sites with glare ratio within certain ranges by building type.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
New Building Type	Building Type Description	NA
Site2	RLW Site Identification Number	NA
Basis	1 for all sites with available data	NA
LT_01	Indicator Variable = 1 if Glare Ratio > 0 and < 4	Calculates % Sites with Glare Ratio > 0 and < 4
LT_02	Indicator Variable = 1 if Glare Ratio >= 4 and < 8	Calculates % Sites with Glare Ratio >= 4 and < 8
LT_03	Indicator Variable = 1 if Glare Ratio >=	Calculates % Sites with Glare Ratio >= 8

	8 and < 12	and < 12
LT_04	Indicator Variable = 1 if Glare Ratio >= 12 and < 16	Calculates % Sites with Glare Ratio >= 12 and < 16
LT_05	Indicator Variable = 1 if Glare Ratio >= 16 and < 20	Calculates % Sites with Glare Ratio >= 16 and < 20
LT_06	Indicator Variable = 1 if Glare Ratio >= 20	Calculates % Sites with Glare Ratio >= 20

Table 97: AQ Glare Ratio by Bldg Type %

1.1.1.1.57 Categories Glare Ratio by Bldg Type %

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
New Building Type	Building Type Description	NA

Table 98: Categories Glare Ratio by Bldg Type %

1.1.1.1.58 AQ Glare Ratio by Bldg Type & Zone %

The *AQ Glare Ratio by Bldg Type & Zone %* query calculates percentage of sites with glare ratio within certain ranges by zone.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Zone	Lighting Zone Description	NA
Site2	RLW Site Identification Number	NA
Basis	1 for all sites with available data	NA
LT_01	Indicator Variable = 1 if Glare Ratio > 0 and < 4	Calculates % Sites with Glare Ratio > 0 and < 4
LT_02	Indicator Variable = 1 if Glare Ratio >= 4 and < 8	Calculates % Sites with Glare Ratio >= 4 and < 8
LT_03	Indicator Variable = 1 if Glare Ratio >= 8 and < 12	Calculates % Sites with Glare Ratio >= 8 and < 12
LT_04	Indicator Variable = 1 if Glare Ratio >= 12 and < 16	Calculates % Sites with Glare Ratio >= 12 and < 16
LT_05	Indicator Variable = 1 if Glare Ratio >= 16 and < 20	Calculates % Sites with Glare Ratio >= 16 and < 20
LT_06	Indicator Variable = 1 if Glare Ratio >= 20	Calculates % Sites with Glare Ratio >= 20

Table 99: AQ Glare Ratio by Bldg Type & Zone %

1.1.1.1.59 Categories Glare Ratio by Bldg Type & Zone %

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Zone	Lighting Zone Description	NA

Table 100: Categories Glare Ratio by Bldg Type & Zone %

1.1.1.1.60

1.1.1.1.61 AQ Glare Ratio by Measurement Location %

The *AQ Glare Ratio by Measurement Location %* query calculates the percentage of sites with glare ratio within certain ranges by measurement location.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weight	Weight	
Location	Measurement Location Description	
Site2	RLW Site Identification Number	
Basis	1 for all sites with available data	
LT_01	Indicator Variable = 1 if Glare Ratio > 0 and < 4	Calculates % Sites with Glare Ratio > 0 and < 4
LT_02	Indicator Variable = 1 if Glare Ratio >= 4 and < 8	Calculates % Sites with Glare Ratio >= 4 and < 8
LT_03	Indicator Variable = 1 if Glare Ratio >= 8 and < 12	Calculates % Sites with Glare Ratio >= 8 and < 12
LT_04	Indicator Variable = 1 if Glare Ratio >= 12 and < 16	Calculates % Sites with Glare Ratio >= 12 and < 16
LT_05	Indicator Variable = 1 if Glare Ratio >= 16 and < 20	Calculates % Sites with Glare Ratio >= 16 and < 20
LT_06	Indicator Variable = 1 if Glare Ratio >= 20	Calculates % Sites with Glare Ratio >= 20

Table 101: AQ Glare Ratio by Measurement Location %

1.1.1.1.62 Categories Glare Ratio by Measurement Location %

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Location	Measurement Location Description	NA

Table 102: Categories Glare Ratio by Measurement Location %

1.1.1.1.63 AQ Lamp Type by FUA %

The *AQ Lamp Type by FUA % query* calculates the percentage of FUAs with different lamp types by FUA.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Description	FUA Description	NA
Site2	RLW Site Identification Number	NA
Basis	1 for all sites with available data	NA
Type CFL	Indicator Variable = 1 if Lamp Type = CFL	Calculates % FUAs with Lamp Type = CFL
Type FL	Indicator Variable = 1 if Lamp Type = FL	Calculates % FUAs with Lamp Type = FL
Type HAL	Indicator Variable = 1 if Lamp Type = HAL	Calculates % FUAs with Lamp Type = HAL

Type HPS	Indicator Variable = 1 if Lamp Type = HPS	Calculates % FUAs with Lamp Type = HPS
Type INC	Indicator Variable = 1 if Lamp Type = INC	Calculates % FUAs with Lamp Type = INC
Type LPS	Indicator Variable = 1 if Lamp Type = LPS	Calculates % FUAs with Lamp Type = LPS
Type MH	Indicator Variable = 1 if Lamp Type = MH	Calculates % FUAs with Lamp Type = MH
Type MV	Indicator Variable = 1 if Lamp Type = MV	Calculates % FUAs with Lamp Type = MV

Table 103: AQ Lamp Type by FUA %

1.1.1.1.64 Categories Lamp Type by FUA %

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Description	FUA Description	NA

Table 104: Categories Lamp Type by FUA %

1.1.1.1.65 AQ Lamp Type % across FUA – SBA

The *AQ Lamp Type % across FUA – SBA* query calculates the percentage of CFL lamps within certain FUAs.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Site2	RLW Site Identification Number	NA
FUA1 CFL	# of CFL lamps within FUA1	Calculates % of CFL lamps within FUA1
FUA2 CFL	# of CFL lamps within FUA2	Calculates % of CFL lamps within FUA2
FUA3 CFL	# of CFL lamps within FUA3	Calculates % of CFL lamps within FUA3
FUA4 CFL	# of CFL lamps within FUA4	Calculates % of CFL lamps within FUA4
FUA5 CFL	# of CFL lamps within FUA5	Calculates % of CFL lamps within FUA5
FUA6 CFL	# of CFL lamps within FUA6	Calculates % of CFL lamps within FUA6
FUA7 CFL	# of CFL lamps within FUA7	Calculates % of CFL lamps within FUA7
FUA8 CFL	# of CFL lamps within FUA8	Calculates % of CFL lamps within FUA8
FUA9 CFL	# of CFL lamps within FUA9	Calculates % of CFL lamps within FUA9
FUA10 CFL	# of CFL lamps within FUA10	Calculates % of CFL lamps within FUA10
FUA11 CFL	# of CFL lamps within FUA11	Calculates % of CFL lamps within FUA11
FUA12 CFL	# of CFL lamps within FUA12	Calculates % of CFL lamps within FUA12
FUA13 CFL	# of CFL lamps within FUA13	Calculates % of CFL lamps within FUA13
FUA14 CFL	# of CFL lamps within FUA14	Calculates % of CFL lamps within FUA14
FUA15 CFL	# of CFL lamps within FUA15	Calculates % of CFL lamps within

		FUA15
FUA1 FL	# of FL lamps within FUA1	Calculates % of FL lamps within FUA1
FUA2 FL	# of FL lamps within FUA2	Calculates % of FL lamps within FUA2
FUA3 FL	# of FL lamps within FUA3	Calculates % of FL lamps within FUA3
FUA4 FL	# of FL lamps within FUA4	Calculates % of FL lamps within FUA4
FUA5 FL	# of FL lamps within FUA5	Calculates % of FL lamps within FUA5
FUA6 FL	# of FL lamps within FUA6	Calculates % of FL lamps within FUA6
FUA7 FL	# of FL lamps within FUA7	Calculates % of FL lamps within FUA7
FUA8 FL	# of FL lamps within FUA8	Calculates % of FL lamps within FUA8
FUA9 FL	# of FL lamps within FUA9	Calculates % of FL lamps within FUA9
FUA10 FL	# of FL lamps within FUA10	Calculates % of FL lamps within FUA10
FUA11 FL	# of FL lamps within FUA11	Calculates % of FL lamps within FUA11
FUA12 FL	# of FL lamps within FUA12	Calculates % of FL lamps within FUA12
FUA13 FL	# of FL lamps within FUA13	Calculates % of FL lamps within FUA13
FUA14 FL	# of FL lamps within FUA14	Calculates % of FL lamps within FUA14
FUA15 FL	# of FL lamps within FUA15	Calculates % of FL lamps within FUA15
FUA1 HAL	# of HAL lamps within FUA1	Calculates % of HAL lamps within FUA1
FUA2 HAL	# of HAL lamps within FUA2	Calculates % of HAL lamps within FUA2
FUA3 HAL	# of HAL lamps within FUA3	Calculates % of HAL lamps within FUA3
FUA4 HAL	# of HAL lamps within FUA4	Calculates % of HAL lamps within FUA4
FUA5 HAL	# of HAL lamps within FUA5	Calculates % of HAL lamps within FUA5
FUA6 HAL	# of HAL lamps within FUA6	Calculates % of HAL lamps within FUA6
FUA7 HAL	# of HAL lamps within FUA7	Calculates % of HAL lamps within FUA7
FUA8 HAL	# of HAL lamps within FUA8	Calculates % of HAL lamps within FUA8
FUA9 HAL	# of HAL lamps within FUA9	Calculates % of HAL lamps within FUA9
FUA10 HAL	# of HAL lamps within FUA10	Calculates % of HAL lamps within FUA10
FUA11 HAL	# of HAL lamps within FUA11	Calculates % of HAL lamps within FUA11
FUA12 HAL	# of HAL lamps within FUA12	Calculates % of HAL lamps within FUA12
FUA13 HAL	# of HAL lamps within FUA13	Calculates % of HAL lamps within FUA13
FUA14 HAL	# of HAL lamps within FUA14	Calculates % of HAL lamps within FUA14
FUA15 HAL	# of HAL lamps within FUA15	Calculates % of HAL lamps within FUA15
FUA1 HPS	# of HPS lamps within FUA1	Calculates % of HPS lamps within FUA1
FUA2 HPS	# of HPS lamps within FUA2	Calculates % of HPS lamps within FUA2

FUA3 HPS	# of HPS lamps within FUA3	Calculates % of HPS lamps within FUA3
FUA4 HPS	# of HPS lamps within FUA4	Calculates % of HPS lamps within FUA4
FUA5 HPS	# of HPS lamps within FUA5	Calculates % of HPS lamps within FUA5
FUA6 HPS	# of HPS lamps within FUA6	Calculates % of HPS lamps within FUA6
FUA7 HPS	# of HPS lamps within FUA7	Calculates % of HPS lamps within FUA7
FUA8 HPS	# of HPS lamps within FUA8	Calculates % of HPS lamps within FUA8
FUA9 HPS	# of HPS lamps within FUA9	Calculates % of HPS lamps within FUA9
FUA10 HPS	# of HPS lamps within FUA10	Calculates % of HPS lamps within FUA10
FUA11 HPS	# of HPS lamps within FUA11	Calculates % of HPS lamps within FUA11
FUA12 HPS	# of HPS lamps within FUA12	Calculates % of HPS lamps within FUA12
FUA13 HPS	# of HPS lamps within FUA13	Calculates % of HPS lamps within FUA13
FUA14 HPS	# of HPS lamps within FUA14	Calculates % of HPS lamps within FUA14
FUA15 HPS	# of HPS lamps within FUA15	Calculates % of HPS lamps within FUA15
FUA1 INC	# of INC lamps within FUA1	Calculates % of INC lamps within FUA1
FUA2 INC	# of INC lamps within FUA2	Calculates % of INC lamps within FUA2
FUA3 INC	# of INC lamps within FUA3	Calculates % of INC lamps within FUA3
FUA4 INC	# of INC lamps within FUA4	Calculates % of INC lamps within FUA4
FUA5 INC	# of INC lamps within FUA5	Calculates % of INC lamps within FUA5
FUA6 INC	# of INC lamps within FUA6	Calculates % of INC lamps within FUA6
FUA7 INC	# of INC lamps within FUA7	Calculates % of INC lamps within FUA7
FUA8 INC	# of INC lamps within FUA8	Calculates % of INC lamps within FUA8
FUA9 INC	# of INC lamps within FUA9	Calculates % of INC lamps within FUA9
FUA10 INC	# of INC lamps within FUA10	Calculates % of INC lamps within FUA10
FUA11 INC	# of INC lamps within FUA11	Calculates % of INC lamps within FUA11
FUA12 INC	# of INC lamps within FUA12	Calculates % of INC lamps within FUA12
FUA13 INC	# of INC lamps within FUA13	Calculates % of INC lamps within FUA13
FUA14 INC	# of INC lamps within FUA14	Calculates % of INC lamps within FUA14
FUA15 INC	# of INC lamps within FUA15	Calculates % of INC lamps within FUA15
FUA1 LPS	# of LPS lamps within FUA1	Calculates % of LPS lamps within FUA1
FUA2 LPS	# of LPS lamps within FUA2	Calculates % of LPS lamps within FUA2
FUA3 LPS	# of LPS lamps within FUA3	Calculates % of LPS lamps within FUA3
FUA4 LPS	# of LPS lamps within FUA4	Calculates % of LPS lamps within FUA4
FUA5 LPS	# of LPS lamps within FUA5	Calculates % of LPS lamps within FUA5
FUA6 LPS	# of LPS lamps within FUA6	Calculates % of LPS lamps within FUA6
FUA7 LPS	# of LPS lamps within FUA7	Calculates % of LPS lamps within FUA7
FUA8 LPS	# of LPS lamps within FUA8	Calculates % of LPS lamps within FUA8

FUA9 LPS	# of LPS lamps within FUA9	Calculates % of LPS lamps within FUA9
FUA10 LPS	# of LPS lamps within FUA10	Calculates % of LPS lamps within FUA10
FUA11 LPS	# of LPS lamps within FUA11	Calculates % of LPS lamps within FUA11
FUA12 LPS	# of LPS lamps within FUA12	Calculates % of LPS lamps within FUA12
FUA13 LPS	# of LPS lamps within FUA13	Calculates % of LPS lamps within FUA13
FUA14 LPS	# of LPS lamps within FUA14	Calculates % of LPS lamps within FUA14
FUA15 LPS	# of LPS lamps within FUA15	Calculates % of LPS lamps within FUA15
FUA1 MH	# of MH lamps within FUA1	Calculates % of MH lamps within FUA1
FUA2 MH	# of MH lamps within FUA2	Calculates % of MH lamps within FUA2
FUA3 MH	# of MH lamps within FUA3	Calculates % of MH lamps within FUA3
FUA4 MH	# of MH lamps within FUA4	Calculates % of MH lamps within FUA4
FUA5 MH	# of MH lamps within FUA5	Calculates % of MH lamps within FUA5
FUA6 MH	# of MH lamps within FUA6	Calculates % of MH lamps within FUA6
FUA7 MH	# of MH lamps within FUA7	Calculates % of MH lamps within FUA7
FUA8 MH	# of MH lamps within FUA8	Calculates % of MH lamps within FUA8
FUA9 MH	# of MH lamps within FUA9	Calculates % of MH lamps within FUA9
FUA10 MH	# of MH lamps within FUA10	Calculates % of MH lamps within FUA10
FUA11 MH	# of MH lamps within FUA11	Calculates % of MH lamps within FUA11
FUA12 MH	# of MH lamps within FUA12	Calculates % of MH lamps within FUA12
FUA13 MH	# of MH lamps within FUA13	Calculates % of MH lamps within FUA13
FUA14 MH	# of MH lamps within FUA14	Calculates % of MH lamps within FUA14
FUA15 MH	# of MH lamps within FUA15	Calculates % of MH lamps within FUA15
FUA1 MV	# of MV lamps within FUA1	Calculates % of MV lamps within FUA1
FUA2 MV	# of MV lamps within FUA2	Calculates % of MV lamps within FUA2
FUA3 MV	# of MV lamps within FUA3	Calculates % of MV lamps within FUA3
FUA4 MV	# of MV lamps within FUA4	Calculates % of MV lamps within FUA4
FUA5 MV	# of MV lamps within FUA5	Calculates % of MV lamps within FUA5
FUA6 MV	# of MV lamps within FUA6	Calculates % of MV lamps within FUA6
FUA7 MV	# of MV lamps within FUA7	Calculates % of MV lamps within FUA7
FUA8 MV	# of MV lamps within FUA8	Calculates % of MV lamps within FUA8
FUA9 MV	# of MV lamps within FUA9	Calculates % of MV lamps within FUA9
FUA10 MV	# of MV lamps within FUA10	Calculates % of MV lamps within FUA10
FUA11 MV	# of MV lamps within FUA11	Calculates % of MV lamps within FUA11
FUA12 MV	# of MV lamps within FUA12	Calculates % of MV lamps within

		FUA12
FUA13 MV	# of MV lamps within FUA13	Calculates % of MV lamps within FUA13
FUA14 MV	# of MV lamps within FUA14	Calculates % of MV lamps within FUA14
FUA15 MV	# of MV lamps within FUA15	Calculates % of MV lamps within FUA15

Table 105: AQ Lamp Type % across FUA - SBA

1.1.1.1.66 SB – Lamp Type % across FUA

The SB – Lamp Type % across FUA query is the separate basis query for AQ Lamp Type % across FUA – SBA.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Site2	RLW Site Identification Number	NA
FUA1 CFL	Total # of CFL Lamps	NA
FUA2 CFL	Total # of CFL Lamps	NA
FUA3 CFL	Total # of CFL Lamps	NA
FUA4 CFL	Total # of CFL Lamps	NA
FUA5 CFL	Total # of CFL Lamps	NA
FUA6 CFL	Total # of CFL Lamps	NA
FUA7 CFL	Total # of CFL Lamps	NA
FUA8 CFL	Total # of CFL Lamps	NA
FUA9 CFL	Total # of CFL Lamps	NA
FUA10 CFL	Total # of CFL Lamps	NA
FUA11 CFL	Total # of CFL Lamps	NA
FUA12 CFL	Total # of CFL Lamps	NA
FUA13 CFL	Total # of CFL Lamps	NA
FUA14 CFL	Total # of CFL Lamps	NA
FUA15 CFL	Total # of CFL Lamps	NA
FUA1 FL	Total # of FL Lamps	NA
FUA2 FL	Total # of FL Lamps	NA
FUA3 FL	Total # of FL Lamps	NA
FUA4 FL	Total # of FL Lamps	NA
FUA5 FL	Total # of FL Lamps	NA
FUA6 FL	Total # of FL Lamps	NA
FUA7 FL	Total # of FL Lamps	NA
FUA8 FL	Total # of FL Lamps	NA
FUA9 FL	Total # of FL Lamps	NA
FUA10 FL	Total # of FL Lamps	NA
FUA11 FL	Total # of FL Lamps	NA
FUA12 FL	Total # of FL Lamps	NA
FUA13 FL	Total # of FL Lamps	NA
FUA14 FL	Total # of FL Lamps	NA
FUA15 FL	Total # of FL Lamps	NA

FUA1 HAL	Total # of HAL Lamps	NA
FUA2 HAL	Total # of HAL Lamps	NA
FUA3 HAL	Total # of HAL Lamps	NA
FUA4 HAL	Total # of HAL Lamps	NA
FUA5 HAL	Total # of HAL Lamps	NA
FUA6 HAL	Total # of HAL Lamps	NA
FUA7 HAL	Total # of HAL Lamps	NA
FUA8 HAL	Total # of HAL Lamps	NA
FUA9 HAL	Total # of HAL Lamps	NA
FUA10 HAL	Total # of HAL Lamps	NA
FUA11 HAL	Total # of HAL Lamps	NA
FUA12 HAL	Total # of HAL Lamps	NA
FUA13 HAL	Total # of HAL Lamps	NA
FUA14 HAL	Total # of HAL Lamps	NA
FUA15 HAL	Total # of HAL Lamps	NA
FUA1 HPS	Total # of HPS Lamps	NA
FUA2 HPS	Total # of HPS Lamps	NA
FUA3 HPS	Total # of HPS Lamps	NA
FUA4 HPS	Total # of HPS Lamps	NA
FUA5 HPS	Total # of HPS Lamps	NA
FUA6 HPS	Total # of HPS Lamps	NA
FUA7 HPS	Total # of HPS Lamps	NA
FUA8 HPS	Total # of HPS Lamps	NA
FUA9 HPS	Total # of HPS Lamps	NA
FUA10 HPS	Total # of HPS Lamps	NA
FUA11 HPS	Total # of HPS Lamps	NA
FUA12 HPS	Total # of HPS Lamps	NA
FUA13 HPS	Total # of HPS Lamps	NA
FUA14 HPS	Total # of HPS Lamps	NA
FUA15 HPS	Total # of HPS Lamps	NA
FUA1 INC	Total # of INC Lamps	NA
FUA2 INC	Total # of INC Lamps	NA
FUA3 INC	Total # of INC Lamps	NA
FUA4 INC	Total # of INC Lamps	NA
FUA5 INC	Total # of INC Lamps	NA
FUA6 INC	Total # of INC Lamps	NA
FUA7 INC	Total # of INC Lamps	NA
FUA8 INC	Total # of INC Lamps	NA
FUA9 INC	Total # of INC Lamps	NA
FUA10 INC	Total # of INC Lamps	NA
FUA11 INC	Total # of INC Lamps	NA
FUA12 INC	Total # of INC Lamps	NA
FUA13 INC	Total # of INC Lamps	NA
FUA14 INC	Total # of INC Lamps	NA
FUA15 INC	Total # of INC Lamps	NA
FUA1 LPS	Total # of LPS Lamps	NA

FUA2 LPS	Total # of LPS Lamps	NA
FUA3 LPS	Total # of LPS Lamps	NA
FUA4 LPS	Total # of LPS Lamps	NA
FUA5 LPS	Total # of LPS Lamps	NA
FUA6 LPS	Total # of LPS Lamps	NA
FUA7 LPS	Total # of LPS Lamps	NA
FUA8 LPS	Total # of LPS Lamps	NA
FUA9 LPS	Total # of LPS Lamps	NA
FUA10 LPS	Total # of LPS Lamps	NA
FUA11 LPS	Total # of LPS Lamps	NA
FUA12 LPS	Total # of LPS Lamps	NA
FUA13 LPS	Total # of LPS Lamps	NA
FUA14 LPS	Total # of LPS Lamps	NA
FUA15 LPS	Total # of LPS Lamps	NA
FUA1 MH	Total # of MH Lamps	NA
FUA2 MH	Total # of MH Lamps	NA
FUA3 MH	Total # of MH Lamps	NA
FUA4 MH	Total # of MH Lamps	NA
FUA5 MH	Total # of MH Lamps	NA
FUA6 MH	Total # of MH Lamps	NA
FUA7 MH	Total # of MH Lamps	NA
FUA8 MH	Total # of MH Lamps	NA
FUA9 MH	Total # of MH Lamps	NA
FUA10 MH	Total # of MH Lamps	NA
FUA11 MH	Total # of MH Lamps	NA
FUA12 MH	Total # of MH Lamps	NA
FUA13 MH	Total # of MH Lamps	NA
FUA14 MH	Total # of MH Lamps	NA
FUA15 MH	Total # of MH Lamps	NA
FUA1 MV	Total # of MV Lamps	NA
FUA2 MV	Total # of MV Lamps	NA
FUA3 MV	Total # of MV Lamps	NA
FUA4 MV	Total # of MV Lamps	NA
FUA5 MV	Total # of MV Lamps	NA
FUA6 MV	Total # of MV Lamps	NA
FUA7 MV	Total # of MV Lamps	NA
FUA8 MV	Total # of MV Lamps	NA
FUA9 MV	Total # of MV Lamps	NA
FUA10 MV	Total # of MV Lamps	NA
FUA11 MV	Total # of MV Lamps	NA
FUA12 MV	Total # of MV Lamps	NA
FUA13 MV	Total # of MV Lamps	NA
FUA14 MV	Total # of MV Lamps	NA
FUA15 MV	Total # of MV Lamps	NA

Table 106: SB – Lamp Type % across FUA

1.1.1.1.67 Categories Lamp Type % across FUA – SBA

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA

Table 107: Categories Lamp Type % across FUA – SBA

1.1.1.1.68 AQ Lamp Type % of all by Bldg Type

The *AQ Lamp Type % of all by Bldg Type* query calculates the percentage of lamp types by building type.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
New Building Type	Building Type Description	NA
Site2	RLW Site Identification Number	NA
Basis	Total number of lamps	NA
No Lamps	Indicator variable= for buildings with no lamps	NA
CFL	# of CFL lamps	Calculates % of CFL
FL	# of FL lamps	Calculates % of FL
HAL	# of HAL lamps	Calculates % of HAL
HPS	# of HPS lamps	Calculates % of HPS
INC	# of INC lamps	Calculates % of INC
LPS	# of LPS lamps	Calculates % of LPS
MH	# of MH lamps	Calculates % of MH
MV	# of MV lamps	Calculates % of MV

Table 108: AQ Lamp Type % of all by Bldg Type

1.1.1.1.69 Categories Lamp Type % of all by Bldg Type

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
New Building Type	Building Type Description	NA

Table 109: Categories Lamp Type % of all by Bldg Type

1.1.1.1.70 AQ Lamp Type % of all by FUA

The *AQ Lamp Type % of all by FUA* query calculates the percentage of lamp types by FUA by FUA.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Description	FUA Description	NA
Site2	RLW Site Identification Number	NA
Basis	Total # of Lamps	NA
CFL	# of CFL lamps	Calculates % of CFL
FL	# of FL lamps	Calculates % of FL

HAL	# of HAL lamps	Calculates % of HAL
HPS	# of HPS lamps	Calculates % of HPS
INC	# of INC lamps	Calculates % of INC
LPS	# of LPS lamps	Calculates % of LPS
MH	# of MH lamps	Calculates % of MH
MV	# of MV lamps	Calculates % of MV

Table 110: AQ Lamp Type % of all by FUA

1.1.1.1.71 Categories Lamp Type % of all by FUA

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Description	FUA Description	NA

Table 111: Categories Lamp Type % of all by FUA

1.1.1.1.72 AQ Parking Ave HI%

The *AQ Parking Ave HI%* query calculates the percentage of sites with average horizontal illuminance within certain ranges by building type.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
New Building Type	Building Type	NA
Site2	RLW Site Identification Number	NA
Basis	1 for all sites with available data	NA
LT_01	Indicator variable = 1 if Average Horizontal Illuminance < 0.5	Calculates % of sites with Average Horizontal Illuminance < 0.5
LT_02	Indicator variable = 1 if Average Horizontal Illuminance >= 0. 5 and < 1	Calculates % of sites with Average Horizontal Illuminance >= 0. 5 and < 1
LT_03	Indicator variable = 1 if Average Horizontal Illuminance >= 1 and < 2.5	Calculates % of sites with Average Horizontal Illuminance >= 1 and < 2.5
LT_04	Indicator variable = 1 if Average Horizontal Illuminance >= 2. 5 and < 5	Calculates % of sites with Average Horizontal Illuminance >= 2. 5 and < 5
LT_05	Indicator variable = 1 if Average Horizontal Illuminance >= 5 and < 8	Calculates % of sites with Average Horizontal Illuminance >= 5 and < 8
LT_06	Indicator variable = 1 if Average Horizontal Illuminance >= 8	Calculates % of sites with Average Horizontal Illuminance >= 8

Table 112: AQ Parking Ave HI%

1.1.1.1.73 Categories Parking Ave HI

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Bldg Type	Building Type	NA

Table 113: Categories Parking Ave HI

1.1.1.1.74 AQ Parking Ave HI & Zone %

The *AQ Parking Ave HI & Zone %* query calculates the percentage of sites with average horizontal illuminance within certain ranges by lighting zone.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	
Weight	Weight	
Zone	Lighting Zone Description	
Site2	RLW Site Identification Number	
Basis	1 for all sites with available data	
LT_01	Indicator variable = 1 if Average Horizontal Illuminance < 0.5	Calculates % of sites with Average Horizontal Illuminance < 0.5
LT_02	Indicator variable = 1 if Average Horizontal Illuminance >= 0. 5 and < 1	Calculates % of sites with Average Horizontal Illuminance >= 0. 5 and < 1
LT_03	Indicator variable = 1 if Average Horizontal Illuminance >= 1 and < 2.5	Calculates % of sites with Average Horizontal Illuminance >= 1 and < 2.5
LT_04	Indicator variable = 1 if Average Horizontal Illuminance >= 2. 5 and < 5	Calculates % of sites with Average Horizontal Illuminance >= 2. 5 and < 5
LT_05	Indicator variable = 1 if Average Horizontal Illuminance >= 5 and < 8	Calculates % of sites with Average Horizontal Illuminance >= 5 and < 8
LT_06	Indicator variable = 1 if Average Horizontal Illuminance >= 8	Calculates % of sites with Average Horizontal Illuminance >= 8

Table 114: AQ Parking Ave HI & Zone %

1.1.1.1.75 Categories Parking Ave HI & Zone %

Field Heading	Value	Comments
Site #	RLW Site Identification Number	NA
Weight	Weight	NA
Zone	Lighting Zone Description	NA

Table 115: Categories Parking Ave HI & Zone %

1.1.1.1.76 AQ Parking Max HI %

The *AQ Parking Max HI %* query calculates the percentage of sites with maximum horizontal illuminance within certain ranges by building type.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
New Building Type	Building type description	NA
Site2	RLW Site Identification Number	NA
Basis	1 for all sites with available data	NA
LT_ 01	Indicator variable = 1 if Maximum Horizontal Illuminance < 0.5	Calculates % of sites with Maximum Horizontal Illuminance < 0.5
LT_02	Indicator variable = 1 if Maximum	Calculates % of sites with Maximum

	Horizontal Illuminance >= 0.5 and < 0.99	Horizontal Illuminance >= 0.5 and < 0.99
LT_03	Indicator variable = 1 if Maximum Horizontal Illuminance >= 1 and < 2.49	Calculates % of sites with Maximum Horizontal Illuminance >= 1 and < 2.49
LT_04	Indicator variable = 1 if Maximum Horizontal Illuminance >= 2.5 and < 4.99	Calculates % of sites with Maximum Horizontal Illuminance >= 2.5 and < 4.99
LT_05	Indicator variable = 1 if Maximum Horizontal Illuminance >= 5 and < 10	Calculates % of sites with Maximum Horizontal Illuminance >= 5 and < 10
LT_06	Indicator variable = 1 if Maximum Horizontal Illuminance >= 10 and < 15	Calculates % of sites with Maximum Horizontal Illuminance >= 10 and < 15
LT_07	Indicator variable = 1 if Maximum Horizontal Illuminance >= 15 and < 20	Calculates % of sites with Maximum Horizontal Illuminance >= 15 and < 20
LT_08	Indicator variable = 1 if Maximum Horizontal Illuminance >= 20	Calculates % of sites with Maximum Horizontal Illuminance >= 20

Table 116: AQ Parking Max HI %

1.1.1.1.77 Categories Parking Max HI

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
New Building Type	Building type description	NA

Table 117: Categories Parking Max HI

1.1.1.1.78 AQ Parking Max HI & Zone %

The *AQ Parking Max HI & Zone %* query calculates percentage of sites with maximum horizontal illuminance within certain ranges by lighting zone.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Zone	Lighting zone description	NA
Site2	RLW Site Identification Number	NA
Basis	1 for all sites with available data	NA
LT_ 01	Indicator variable = 1 if Maximum Horizontal Illuminance < 0.5	Calculates % of sites with Maximum Horizontal Illuminance < 0.5
LT_02	Indicator variable = 1 if Maximum Horizontal Illuminance >= 0.5 and < 0.99	Calculates % of sites with Maximum Horizontal Illuminance >= 0.5 and < 0.99
LT_03	Indicator variable = 1 if Maximum Horizontal Illuminance >= 1 and < 2.49	Calculates % of sites with Maximum Horizontal Illuminance >= 1 and < 2.49

LT_04	Indicator variable = 1 if Maximum Horizontal Illuminance >= 2.5 and < 4.99	Calculates % of sites with Maximum Horizontal Illuminance >= 2.5 and < 4.99
LT_05		Calculates % of sites with Maximum Horizontal Illuminance >= 5 and < 10
LT_06	Indicator variable = 1 if Maximum Horizontal Illuminance >= 10 and < 15	Calculates % of sites with Maximum Horizontal Illuminance >= 10 and < 15

Table 118: AQ Parking Max HI & Zone %

1.1.1.1.79 Categories Parking Max HI & Zone

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Zone	Lighting zone description	NA

Table 119: Categories Parking Max HI & Zone

1.1.1.1.80 AQ Parking SF %

The *AQ Parking SF %* query calculates the percentage of parking area within certain LPD ranges by FUA.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
FUA_Type	FUA Description = Parking	NA
Site2	RLW Site Identification Number	NA
Basis	FUA Area	NA
LT_01	Indicator variable = FUA Area if LPD < 0.025	Calculates % of Parking Area with LPD < 0.025
LT_02	Indicator variable = FUA Area if LPD >= 0.025 and < 0.05	Calculates % of Parking Area with LPD >= 0.025 and < 0.05
LT_03	Indicator variable = FUA Area if LPD >= 0.05 and < 0.075	Calculates % of Parking Area with LPD >= 0.05 and < 0.075
LT_04	Indicator variable = FUA Area if LPD >= 0.075 and < 0.1	Calculates % of Parking Area with LPD >= 0.075 and < 0.1
LT_05	Indicator variable = FUA Area if LPD >= 0.1 and < 0.15	Calculates % of Parking Area with LPD >= 0.1 and < 0.15
LT_06	Indicator variable = FUA Area if LPD >= 0.15	Calculates % of Parking Area with LPD >= 0.15

Table 120: AQ Parking SF %

1.1.1.1.81 Categories Parking SF %

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
FUA_Type	FUA Description = Parking	NA

Table 121: Categories Parking SF %

1.1.1.1.82 AQ Parking Uniformity SF %

The *AQ Parking Uniformity SF %* query calculates the percentage of sites with uniformity within certain ranges by FUA.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
FUA_Type	FUA Description = Parking	NA
Site2	RLW Site Identification Number	NA
Basis	1 for all sites with available data	NA
LT_01	Indicator variable = 1 if Uniformity < 5	Calculates % of sites with Uniformity < 5
LT_02	Indicator variable = 1 if Uniformity >= 5 and < 10	Calculates % of sites with Uniformity >= 5 and < 10
LT_03	Indicator variable = 1 if Uniformity >= 10 and < 15	Calculates % of sites with Uniformity >= 10 and < 15
LT_04	Indicator variable = 1 if Uniformity >= 15 and < 20	Calculates % of sites with Uniformity >= 15 and < 20
LT_05	Indicator variable = 1 if Uniformity >= 20 and < 30	Calculates % of sites with Uniformity >= 20 and < 30
LT_06	Indicator variable = 1 if Uniformity >= 30	Calculates % of sites with Uniformity >= 30

Table 122: AQ Parking Uniformity SF %

1.1.1.1.83 Categories Parking Uniformity SF %

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
FUA_Type	FUA Description = Parking	NA

Table 123: Categories Parking Uniformity SF %

1.1.1.1.84 AQ Parking Uniformity SF & Zone %

The *AQ Parking Uniformity* query calculates the percentage of sites with uniformity within certain ranges by lighting zone.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Zone	Lighting Zone Description	NA
Site2	RLW Site Identification Number	NA
Basis	1 for all sites with available data	NA
LT_01	Indicator variable = 1 if Uniformity < 5	Calculates % of sites with Uniformity < 5
LT_02	Indicator variable = 1 if Uniformity >= 5 and < 10	Calculates % of sites with Uniformity >= 5 and < 10
LT_03	Indicator variable = 1 if Uniformity >= 10 and < 15	Calculates % of sites with Uniformity >= 10 and < 15
LT_04	Indicator variable = 1 if Uniformity	Calculates % of sites with Uniformity

	>= 15 and < 20	>= 15 and < 20
LT_05	Indicator variable = 1 if Uniformity >= 20 and < 30	Calculates % of sites with Uniformity >= 20 and < 30
LT_06	Indicator variable = 1 if Uniformity >= 30	Calculates % of sites with Uniformity >= 30

Table 124: AQ Parking Uniformity SF & Zone %

1.1.1.1.85 Categories Parking Uniformity SF & Zone %

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Zone	Lighting Zone Description	NA

Table 125: Categories Parking Uniformity SF & Zone %

1.1.1.1.86 AQ Q31 %

The *AQ Q31 %* query calculates the percentage of sites that have different degrees of lighting by building type.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Un-weighted = 1	NA
New Building Type	Building Type Description	NA
Site2	RLW Site Identification Number	NA
Basis	1 for all sites with available data	NA
Inadequate	Indicator variable = 1 if answered inadequate	Calculates % of sites that have inadequate lighting
Adequate	Indicator variable = 1 if answered adequate	Calculates % of sites that have adequate lighting
More than needed	Indicator variable = 1 if answered more than needed	Calculates % of sites that have more than needed lighting

Table 126: AQ Q31 %

1.1.1.1.87 AQ Q32 %

The *AQ Q32 %* query calculates percentage of sites with different glare levels by building type.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Un-weighted = 1	NA
New Building Type	Building Type Description	NA
Site2	RLW Site Identification Number	NA
Basis	1 for all sites with available data	NA
Not Glary	Indicator variable = 1 if answered not glary	Calculates % of sites that lighting is glary
Somewhat Glary	Indicator variable = 1 if answered somewhat glary	Calculates % of sites that lighting is somewhat glary
Very Glary	Indicator variable = 1 if answered very glary	Calculates % of sites that lighting is very glary

Table 127: AQ Q32 %

1.1.1.1.88 Categories Q31 and Q32

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Un-weighted = 1	NA
New Building Type	Building Type Description	NA

Table 128: Categories Q31 and Q32

1.1.1.1.89 AQ 31 & Zone %

The *AQ 31 & Zone %* query calculates the percentage of sites that have different lighting adequacy levels by lighting zone.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Un-weighted = 1	NA
Zone	Lighting Zone Description	NA
Site2	RLW Site Identification Number	NA
Basis	1 for all sites with available data	NA
Inadequate	Indicator variable = 1 if answered inadequate	Calculates % of sites that have inadequate lighting
Adequate	Indicator variable = 1 if answered adequate	Calculates % of sites that have adequate lighting
More than needed	Indicator variable = 1 if answered more than needed	Calculates % of sites that have more than needed lighting

Table 129: AQ 31 & Zone %

1.1.1.1.90 AQ Q32 & Zone %

The *AQ Q32 & Zone %* query calculates percentage of sites with different lighting levels by lighting zone.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Un-weighted = 1	NA
Zone	Lighting Zone Description	NA
Site2	RLW Site Identification Number	NA
Basis	1 for all sites with available data	NA
Not Glary	Indicator variable = 1 if answered not glary	Calculates % of sites that lighting is glary
Somewhat Glary	Indicator variable = 1 if answered somewhat glary	Calculates % of sites that lighting is somewhat glary
Very Glary	Indicator variable = 1 if answered very glary	Calculates % of sites that lighting is very glary

Table 130: AQ Q32 & Zone %

1.1.1.1.91 Categories Q31 and Q32 & Zone

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Un-weighted = 1	NA
New Building	Building Type Description	NA

Type		

Table 131: Categories Q31 and Q32 & Zone

1.1.1.1.92 AQ Site LPD SF %

The *AQ Site LPD SF %* query calculates the percentage of site area within certain LPD ranges by building type.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Bldg Type	Building Type Description	NA
Site2	RLW Site Identification Number	NA
Basis	Site Area	NA
NonLit	Indicator variable = site area LPD = 0	Calculates % of site area that have LPD = 0
LT_01	Indicator variable = site area if LPD > 0 and < 0.005	Calculates % of site area that have LPD > 0 and < 0.005
LT_02	Indicator variable = site area if LPD >= 0.005 and < 0.01	Calculates % of site area that have LPD >= 0.005 and < 0.01
LT_03	Indicator variable = site area if LPD >= 0.01 and < 0.05	Calculates % of site area that have LPD >= 0.01 and < 0.05
LT_04	Indicator variable = site area if LPD >= 0.05 and < 0.1	Calculates % of site area that have LPD >= 0.05 and < 0.1
LT_05	Indicator variable = site area if LPD >= 0.1	Calculates % of site area that have LPD >= 0.1

Table 132: AQ Site LPD SF %

1.1.1.1.93 Categories Site LPD SF %

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Bldg Type	Building Type Description	NA

Table 133: Categories Site LPD SF %

1.1.1.1.94

1.1.1.1.95 AQ Site LPD SF & Zone%

The *AQ Site LPD SF & Zone%* query calculates the percentage of site area that have LPDs within certain ranges by lighting zone.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Zone	Lighting Zone Description	NA
Site2	RLW Site Identification Number	NA
Basis	Site Area	NA
NonLit	Indicator variable = site area LPD = 0	Calculates % of site area that have LPD = 0
LT_01	Indicator variable = site area if LPD > 0 and < 0.005	Calculates % of site area that have LPD > 0 and < 0.005

LT_02	Indicator variable = site area if LPD >= 0.005 and < 0.01	Calculates % of site area that have LPD >= 0.005 and < 0.01
LT_03	Indicator variable = site area if LPD >= 0.01 and < 0.05	Calculates % of site area that have LPD >= 0.01 and < 0.05
LT_04	Indicator variable = site area if LPD >= 0.05 and < 0.1	Calculates % of site area that have LPD >= 0.05 and < 0.1
LT_05	Indicator variable = site area if LPD >= 0.1	Calculates % of site area that have LPD >= 0.1

Table 134: AQ Site LPD SF & Zone%

1.1.1.1.96 Categories Site LPD SF & Zone%

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Zone	Lighting Zone Description	NA

Table 135: Categories Site LPD SF & Zone%

1.1.1.1.97 AQ Subjective Response by Bldg Type

The *AQ Subjective Response by Bldg Type* query calculates the percentage of subjective responses on outdoor lighting by building type.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Un-Weighted = 1	NA
New Bldg Type	Building Type Description	NA
Site2	RLW Site Identification Number	NA
Basis	1 for all sites with available data	NA
Lighting is Comfortable	Indicator variable = 1 if answered yes to Q3a	Calculates % of responses that felt site lighting is comfortable
A good example for security lighting	Indicator variable = 1 if answered yes to Q4a	Calculates % of responses that felt site lighting was a good example for security lighting
Able to tell the color of things	Indicator variable = 1 if answered no to Q11a	Calculates % of responses that felt site lighting enabled respondents to tell the color of things
Site lighting compared to lighting at similar areas (Worse)	Indicator variable = 1 if answered “worse” to Q12a	Calculates % of responses that felt site lighting was worse than lighting at similar areas
Site lighting compared to lighting at similar areas (Same)	Indicator variable = 1 if answered “same” to Q12a	Calculates % of responses that felt site lighting was the same as lighting at similar areas
Site lighting compared to	Indicator variable = 1 if answered “better” to Q12a	Calculates % of responses that felt site lighting was better than lighting at

lighting at similar areas (Better)		similar areas

Table 136: AQ Subjective Response by Bldg Type

1.1.1.1.98 Categories Subjective Response by Bldg Type

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
New Bldg Type	Building Type Description	NA

Table 137: Categories Subjective Response by Bldg Type

1.1.1.1.99 AQ Subjective Response by Parking Lamp Type

The *AQ Subjective Response by Parking Lamp Type* query calculates the percentage of subjective responses on lighting by different lamp types.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Un-Weighted = 1	NA
LampType	Lamp Type	NA
Site2	RLW Site Identification Number	NA
Basis	1 for all sites with available data	NA
Lighting is Comfortable	Indicator variable = 1 if answered yes to Q3a	Calculates % of responses that felt parking lighting is comfortable
A good example for security lighting	Indicator variable = 1 if answered yes to Q4a	Calculates % of responses that felt site lighting was a good example for security lighting
Able to tell the color of things	Indicator variable = 1 if answered no to Q11a	Calculates % of responses that felt parking lighting enabled respondents to tell the color of things
Site lighting compared to lighting at similar areas (Worse)	Indicator variable = 1 if answered “worse” to Q12a	Calculates % of responses that felt parking lighting was worse than lighting at similar areas
Site lighting compared to lighting at similar areas (Same)	Indicator variable = 1 if answered “same” to Q12a	Calculates % of responses that felt parking lighting was the same as lighting at similar areas
Site lighting compared to lighting at similar areas (Better)	Indicator variable = 1 if answered “better” to Q12a	Calculates % of responses that felt parking lighting was better than lighting at similar areas

Table 138: AQ Subjective Response by Parking Lamp Type

1.1.1.1.100 Categories Subjective Response by Parking Lamp Type

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Un-Weighted = 1	NA
LampType	Lamp Type	NA

Table 139: Categories Subjective Response by Parking Lamp Type

1.1.1.1.101 AQ Tresspass by Bldg %

The *AQ Tresspass by Bldg %* query calculates the percentage of sites with trespass reading within certain ranges by building type.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weighted = 1	NA
New Building Type	Building Type Description	NA
Site2	RLW Site Identification Number	NA
Basis	1 for all sites with available data	NA
No Light Tresspass	Indicator variable = 1 if trespass reading = 0	Calculates % of sites with trespass reading = 0
LT_01	Indicator variable = 1 if trespass reading > 0 and < 0.5	Calculates % of sites with trespass reading > 0 and < 0.5
LT_02	Indicator variable = 1 if trespass reading >= 0.5 and < 1	Calculates % of sites with trespass reading >= 0.5 and < 1
LT_03	Indicator variable = 1 if trespass reading >= 1 and < 1.5	Calculates % of sites with trespass reading >= 1 and < 1.5
LT_04	Indicator variable = 1 if trespass reading >= 1.5 and < 2	Calculates % of sites with trespass reading >= 1.5 and < 2
LT_05	Indicator variable = 1 if trespass reading >= 2	Calculates % of sites with trespass reading >= 2

Table 140: AQ Tresspass by Bldg %

1.1.1.1.102 Categories Tresspass by Bldg %

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weighted = 1	NA
New Building Type	Building Type Description	NA

Table 141: Categories Tresspass by Bldg %

1.1.1.1.103 AQ Tresspass by Bldg & Zone %

The *AQ Tresspass by Bldg & Zone %* query calculates the percentage of sites with trespass reading within certain ranges by lighting zone.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weighted = 1	NA
Zone	Lighting Zone Description	NA
Site2	RLW Site Identification Number	NA

Basis	1 for all sites with available data	NA
No Light Tresspass	Indicator variable = 1 if trespass reading = 0	Calculates % of sites with trespass reading = 0
LT_01	Indicator variable = 1 if trespass reading > 0 and < 0.5	Calculates % of sites with trespass reading > 0 and < 0.5
LT_02	Indicator variable = 1 if trespass reading >= 0.5 and < 1	Calculates % of sites with trespass reading >= 0.5 and < 1
LT_03	Indicator variable = 1 if trespass reading >= 1 and < 1.5	Calculates % of sites with trespass reading >= 1 and < 1.5
LT_04	Indicator variable = 1 if trespass reading >= 1.5 and < 2	Calculates % of sites with trespass reading >= 1.5 and < 2
LT_05	Indicator variable = 1 if trespass reading >= 2	Calculates % of sites with trespass reading >= 2

Table 142: AQ Tresspass by Bldg & Zone %

1.1.1.1.104 Categories Tresspass by Bldg & Zone %

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weighted = 1	NA
Zone	Lighting Zone Description	NA

Table 143: Categories Tresspass by Bldg & Zone %

1.1.1.1.105 AQ VI %

The *AQ VI %* query calculates the percentage of sites with minimum illuminance within certain ranges by FUA.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
Weight	Weight	NA
Description	FUA Description	NA
Site2	RLW Site Identification Number	NA
Basis	1 for all sites with available data	NA
LT_01	Indicator variable = 1 if Minimum Vertical Illuminance < 0.025	Calculates % of sites with Minimum Vertical Illuminance < 0.025
LT_02	Indicator variable = 1 if Minimum Vertical Illuminance >= 0.025 and < 0.05	Calculates % of sites with Minimum Vertical Illuminance >= 0.025 and < 0.05
LT_03	Indicator variable = 1 if Minimum Vertical Illuminance >= 0.05 and < 0.1	Calculates % of sites with Minimum Vertical Illuminance >= 0.05 and < 0.1
LT_04	Indicator variable = 1 if Minimum Vertical Illuminance >= 0.1 and < 0.15	Calculates % of sites with Minimum Vertical Illuminance >= 0.1 and < 0.15
LT_05	Indicator variable = 1 if Minimum Vertical Illuminance >= 0.15 and < 0.25	Calculates % of sites with Minimum Vertical Illuminance >= 0.15 and < 0.25
LT_06	Indicator variable = 1 if Minimum Vertical Illuminance >= 0.25 and <	Calculates % of sites with Minimum Vertical Illuminance >= 0.25 and < 0.5

	0.5	
LT_07	Indicator variable = 1 if Minimum Vertical Illuminance >= 0.5 and < 1	Calculates % of sites with Minimum Vertical Illuminance >= 0.5 and < 1
LT_08	Indicator variable = 1 if Minimum Vertical Illuminance >= 1 and < 2	Calculates % of sites with Minimum Vertical Illuminance >= 1 and < 2
LT_09	Indicator variable = 1 if Minimum Vertical Illuminance >= 2	Calculates % of sites with Minimum Vertical Illuminance >= 2

Table 144: AQ VI %

1.1.1.1.106
1.1.1.1.107 Categories VI%

Field Heading	Value	Comments
Site#	RLW Site ID	NA
Weight	Weight	NA
Description	Building Type Description	NA

Table 145: Categories VI%

1.1.1.1.108 Combine ALL FUA Data; Combine FUA 1&2 Data; Combine FUA 3&4 Data; Combine FUA 5 Data; SUB Combine FUA 1234 Data

This set of queries combines and transposes the tables *FUA1info, FUA2info, FUA2info, FUA4info* and *FUA5info*.

Field Heading	Value	Comments
Site#	RLW Site Identification Number	NA
FUA_Letter	FUA Letter	NA
FUA Type	FUA Type	NA
sqft	FUA Area	NA
Manual	Indicator variable = -1 if FUA has manual control type	NA
TimeClock	Indicator variable = -1 if FUA has Time-Clock control type	NA
Photocell	Indicator variable = -1 if FUA has Photocell control type	NA
01-Wdays-Win	Percentage light is on at hour 01 Winter Weekdays	NA
02-Wdays-Win	Percentage light is on at hour 02 Winter Weekdays	NA
03-Wdays-Win	Percentage light is on at hour 03 Winter Weekdays	NA
04-Wdays-Win	Percentage light is on at hour 04 Winter Weekdays	NA
05-Wdays-Win	Percentage light is on at hour 05 Winter Weekdays	NA
06-Wdays-Win	Percentage light is on at hour 06 Winter Weekdays	NA
07-Wdays-Win	Percentage light is on at hour 07 Winter Weekdays	NA
08-Wdays-	Percentage light is on at hour 08	NA

Win	Winter Weekdays	
09-Wdays-Win	Percentage light is on at hour 09 Winter Weekdays	NA
10-Wdays-Win	Percentage light is on at hour 10 Winter Weekdays	NA
11-Wdays-Win	Percentage light is on at hour 11 Winter Weekdays	NA
12-Wdays-Win	Percentage light is on at hour 12 Winter Weekdays	NA
13-Wdays-Win	Percentage light is on at hour 13 Winter Weekdays	NA
14-Wdays-Win	Percentage light is on at hour 14 Winter Weekdays	NA
15-Wdays-Win	Percentage light is on at hour 15 Winter Weekdays	NA
16-Wdays-Win	Percentage light is on at hour 16 Winter Weekdays	NA
17-Wdays-Win	Percentage light is on at hour 17 Winter Weekdays	NA
18-Wdays-Win	Percentage light is on at hour 18 Winter Weekdays	NA
19-Wdays-Win	Percentage light is on at hour 19 Winter Weekdays	NA
20-Wdays-Win	Percentage light is on at hour 20 Winter Weekdays	NA
21-Wdays-Win	Percentage light is on at hour 21 Winter Weekdays	NA
22-Wdays-Win	Percentage light is on at hour 22 Winter Weekdays	NA
23-Wdays-Win	Percentage light is on at hour 23 Winter Weekdays	NA
24-Wdays-Win	Percentage light is on at hour 24 Winter Weekdays	NA
01-Wdays-Sum	Percentage light is on at hour 01 Summer Weekdays	NA
02-Wdays-Sum	Percentage light is on at hour 02 Summer Weekdays	NA
03-Wdays-Sum	Percentage light is on at hour 03 Summer Weekdays	NA
04-Wdays-Sum	Percentage light is on at hour 04 Summer Weekdays	NA
05-Wdays-Sum	Percentage light is on at hour 05 Summer Weekdays	NA
06-Wdays-Sum	Percentage light is on at hour 06 Summer Weekdays	NA
07-Wdays-Sum	Percentage light is on at hour 07 Summer Weekdays	NA
08-Wdays-Sum	Percentage light is on at hour 08 Summer Weekdays	NA

09-Wdays-Sum	Percentage light is on at hour 09 Summer Weekdays	NA
10-Wdays-Sum	Percentage light is on at hour 10 Summer Weekdays	NA
11-Wdays-Sum	Percentage light is on at hour 11 Summer Weekdays	NA
12-Wdays-Sum	Percentage light is on at hour 12 Summer Weekdays	NA
13-Wdays-Sum	Percentage light is on at hour 13 Summer Weekdays	NA
14-Wdays-Sum	Percentage light is on at hour 14 Summer Weekdays	NA
15-Wdays-Sum	Percentage light is on at hour 15 Summer Weekdays	NA
16-Wdays-Sum	Percentage light is on at hour 16 Summer Weekdays	NA
17-Wdays-Sum	Percentage light is on at hour 17 Summer Weekdays	NA
18-Wdays-Sum	Percentage light is on at hour 18 Summer Weekdays	NA
19-Wdays-Sum	Percentage light is on at hour 19 Summer Weekdays	NA
20-Wdays-Sum	Percentage light is on at hour 20 Summer Weekdays	NA
21-Wdays-Sum	Percentage light is on at hour 21 Summer Weekdays	NA
22-Wdays-Sum	Percentage light is on at hour 22 Summer Weekdays	NA
23-Wdays-Sum	Percentage light is on at hour 23 Summer Weekdays	NA
24-Wdays-Sum	Percentage light is on at hour 24 Summer Weekdays	NA
01-Wends-Win	Percentage light is on at hour 01 Winter Weekends	NA
02-Wends-Win	Percentage light is on at hour 02 Winter Weekends	NA
03-Wends-Win	Percentage light is on at hour 03 Winter Weekends	NA
04-Wends-Win	Percentage light is on at hour 04 Winter Weekends	NA
05-Wends-Win	Percentage light is on at hour 05 Winter Weekends	NA
06-Wends-Win	Percentage light is on at hour 06 Winter Weekends	NA
07-Wends-Win	Percentage light is on at hour 07 Winter Weekends	NA
08-Wends-Win	Percentage light is on at hour 08 Winter Weekends	NA
09-Wends-	Percentage light is on at hour 09	NA

Win	Winter Weekends	
10-Wends-Win	Percentage light is on at hour 10 Winter Weekends	NA
11-Wends-Win	Percentage light is on at hour 11 Winter Weekends	NA
12-Wends-Win	Percentage light is on at hour 12 Winter Weekends	NA
13-Wends-Win	Percentage light is on at hour 13 Winter Weekends	NA
14-Wends-Win	Percentage light is on at hour 14 Winter Weekends	NA
15-Wends-Win	Percentage light is on at hour 15 Winter Weekends	NA
16-Wends-Win	Percentage light is on at hour 16 Winter Weekends	NA
17-Wends-Win	Percentage light is on at hour 17 Winter Weekends	NA
18-Wends-Win	Percentage light is on at hour 18 Winter Weekends	NA
19-Wends-Win	Percentage light is on at hour 19 Winter Weekends	NA
20-Wends-Win	Percentage light is on at hour 20 Winter Weekends	NA
21-Wends-Win	Percentage light is on at hour 21 Winter Weekends	NA
22-Wends-Win	Percentage light is on at hour 22 Winter Weekends	NA
23-Wends-Win	Percentage light is on at hour 23 Winter Weekends	NA
24-Wends-Win	Percentage light is on at hour 24 Winter Weekends	NA
01-Wends-Sum	Percentage light is on at hour 01 Summer Weekends	NA
02-Wends-Sum	Percentage light is on at hour 02 Summer Weekends	NA
03-Wends-Sum	Percentage light is on at hour 03 Summer Weekends	NA
04-Wends-Sum	Percentage light is on at hour 04 Summer Weekends	NA
05-Wends-Sum	Percentage light is on at hour 05 Summer Weekends	NA
06-Wends-Sum	Percentage light is on at hour 06 Summer Weekends	NA
07-Wends-Sum	Percentage light is on at hour 07 Summer Weekends	NA
08-Wends-Sum	Percentage light is on at hour 08 Summer Weekends	NA
09-Wends-Sum	Percentage light is on at hour 09 Summer Weekends	NA

10-Wends-Sum	Percentage light is on at hour 10 Summer Weekends	NA
11-Wends-Sum	Percentage light is on at hour 11 Summer Weekends	NA
12-Wends-Sum	Percentage light is on at hour 12 Summer Weekends	NA
13-Wends-Sum	Percentage light is on at hour 13 Summer Weekends	NA
14-Wends-Sum	Percentage light is on at hour 14 Summer Weekends	NA
15-Wends-Sum	Percentage light is on at hour 15 Summer Weekends	NA
16-Wends-Sum	Percentage light is on at hour 16 Summer Weekends	NA
17-Wends-Sum	Percentage light is on at hour 17 Summer Weekends	NA
18-Wends-Sum	Percentage light is on at hour 18 Summer Weekends	NA
19-Wends-Sum	Percentage light is on at hour 19 Summer Weekends	NA
20-Wends-Sum	Percentage light is on at hour 20 Summer Weekends	NA
21-Wends-Sum	Percentage light is on at hour 21 Summer Weekends	NA
22-Wends-Sum	Percentage light is on at hour 22 Summer Weekends	NA
23-Wends-Sum	Percentage light is on at hour 23 Summer Weekends	NA
24-Wends-Sum	Percentage light is on at hour 24 Summer Weekends	NA

Table 146: Combine ALL FUA Data; Combine FUA 1&2 Data; Combine FUA 3&4 Data; Combine FUA 5 Data; SUB Combine FUA 1234 Data

1.1.1.1.109 CQ FUA 3C

The *CQ FUA 3C* query lists FUA square footage by building type and FUA descriptoion.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
Weight	Weight	NA
FUA_Type	FUA Description	NA
Sqft	FUA Area	NA
Number	FUA Number	NA
New Building Type	Building Type Description	NA

Table 147: CQ FUA 3C

1.1.1.1.110 Entered Surveys

This query provides a list of surveys there is available data for.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
Scompleted	-1 for all surveys completed	NA

Table 148: Entered Surveys

1.1.1.1.111 Table 149: LumFix_Crosstab

The *LumFix_Crosstab* query cross-tabulates the fixture type data contained in the *Luminaire* table and query named *Combined All FUA Data*.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
FUA Type	FUA Number	NA
TotFix	Total Number of Fixtures	NA
A	Number of Fixture Type A	NA
AA	Number of Fixture Type AA	NA
B	Number of Fixture Type B	NA
BB	Number of Fixture Type BB	NA
C	Number of Fixture Type C	NA
CC	Number of Fixture Type CC	NA
D	Number of Fixture Type D	NA
DD	Number of Fixture Type DD	NA
E	Number of Fixture Type E	NA
EE	Number of Fixture Type EE	NA
F	Number of Fixture Type F	NA
FF	Number of Fixture Type FF	NA
G	Number of Fixture Type G	NA
GG	Number of Fixture Type GG	NA
H	Number of Fixture Type H	NA
HH	Number of Fixture Type HH	NA
I	Number of Fixture Type I	NA
J	Number of Fixture Type J	NA
JJ	Number of Fixture Type JJ	NA
K	Number of Fixture Type K	NA
KK	Number of Fixture Type KK	NA
L	Number of Fixture Type L	NA
LL	Number of Fixture Type LL	NA
M	Number of Fixture Type M	NA
MM	Number of Fixture Type MM	NA
N	Number of Fixture Type N	NA
NN	Number of Fixture Type NN	NA
O	Number of Fixture Type O	NA
OO	Number of Fixture Type OO	NA
P	Number of Fixture Type P	NA
PP	Number of Fixture Type PP	NA
Q	Number of Fixture Type Q	NA
QQ	Number of Fixture Type QQ	NA
R	Number of Fixture Type R	NA
S	Number of Fixture Type S	NA

T	Number of Fixture Type T	NA
U	Number of Fixture Type U	NA
V	Number of Fixture Type V	NA
W	Number of Fixture Type W	NA
X	Number of Fixture Type X	NA
Y	Number of Fixture Type Y	NA
Z	Number of Fixture Type Z	NA

Table 150: LumFix_Crosstab

1.1.1.1.112 LumLamp_Crosstab

The *LumLamp_Crosstab* query cross-tabulates the lamp type data contained in the *Luminaire* table and query named *Combined All FUA Data*.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
FUA Type	FUA Number	NA
New Bldg Type	Building Type Description	NA
TotLamp	Total Number of Lamps	NA
CFL	Number of CFL Lamps	NA
FL	Number of FL Lamps	NA
HAL	Number of HAL Lamps	NA
HPS	Number of HPS Lamps	NA
INC	Number of INC Lamps	NA
LPS	Number of LPS Lamps	NA
MH	Number of MH Lamps	NA
MV	Number of MV Lamps	NA

Table 151: LumLamp_Crosstab

1.1.1.1.113 MBSS: AQ Calc Site Level Watts

The *MBSS: AQ Calc Site Level Watts* query calculates the total wattage of each site.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
Weight	Weight	NA
Bldg Type	Building Type Description	NA
Site2	RLW Site ID	NA
Square Feet	Site Area	NA
TotalWatt	Luminaire Wattage + Signage Wattage	NA

Table 152: MBSS: AQ Calc Site Level Watts

1.1.1.1.114 Categories MBSS CQ Building Type

Field Heading	Value	Comments
Site#	RLW Site ID	NA
Weight	Weight	NA
Bldg Type	Building Type Description	NA

Table 153: Categories MBSS CQ Building Type

1.1.1.1.115 MBSS: Sub Signage

The *MBSS: Sub Signage* query calculates the total signage wattage for each site.

Field Heading	Value	Comments
Site #	RLW Site ID	NA
Signage	Total Watts for Signage	NA

Table 154: MBSS: Sub Signage

1.1.1.1.116 MBSS: SubAQ FUA Lum

The *MBSS: SubAQ FUA Lum* query calculates wattage by each FUA.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
FUALetter	FUA Letter	NA
LumWatt	FUA Luminaire Wattage = Fixture Wattage * Quantity of Fixtures	NA

Table 155: MBSS: SubAQ FUA Lum

1.1.1.1.117 MBSS: SubAQ FUA Lum including NonLit

The *MBSS: SubAQ FUA Lum including NonLit* query calculates wattage by each FUA including non-lit FUA's.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
FUALetter	FUA Letter	NA
LumWatt	FUA Luminaire Wattage = Fixture Wattage * Quantity of Fixtures	NA

Table 156: MBSS: SubAQ FUA Lum including NonLit

1.1.1.1.118 Table 157: MBSS: SubAQ Site Level Watts

The *MBSS: SubAQ Site Level Watts* query calculates site wattage and signage wattage for each site.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
LumWatt	Total Site Wattage = FixWatt * QtyFix	NA
Signage	Total Wattage for Signage	NA
Q2SF	Site Area	NA

Table 158: MBSS: SubAQ Site Level Watts

1.1.1.1.119 Signage Wends Win

The *Signage Wends Win* query calculates signage wattage for hours 1 to 24 for winter weekends.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
Weights	Weight	NA

HR1	SIGNAGE Watts * % sign on at Hr1	Calculates Hr1 SIGNAGE Wattage for Winter Weekends
HR2	SIGNAGE Watts * % sign on at Hr2	Calculates Hr2 SIGNAGE Wattage for Winter Weekends
HR3	SIGNAGE Watts * % sign on at Hr3	Calculates Hr3 SIGNAGE Wattage for Winter Weekends
HR4	SIGNAGE Watts * % sign on at Hr4	Calculates Hr4 SIGNAGE Wattage for Winter Weekends
HR5	SIGNAGE Watts * % sign on at Hr5	Calculates Hr5 SIGNAGE Wattage for Winter Weekends
HR6	SIGNAGE Watts * % sign on at Hr6	Calculates Hr6 SIGNAGE Wattage for Winter Weekends
HR7	SIGNAGE Watts * % sign on at Hr7	Calculates Hr7 SIGNAGE Wattage for Winter Weekends
HR8	SIGNAGE Watts * % sign on at Hr8	Calculates Hr8 SIGNAGE Wattage for Winter Weekends
HR9	SIGNAGE Watts * % sign on at Hr9	Calculates Hr9 SIGNAGE Wattage for Winter Weekends
HR10	SIGNAGE Watts * % sign on at Hr10	Calculates Hr10 SIGNAGE Wattage for Winter Weekends
HR11	SIGNAGE Watts * % sign on at Hr11	Calculates Hr11 SIGNAGE Wattage for Winter Weekends
HR12	SIGNAGE Watts * % sign on at Hr12	Calculates Hr12 SIGNAGE Wattage for Winter Weekends
HR13	SIGNAGE Watts * % sign on at Hr13	Calculates Hr13 SIGNAGE Wattage for Winter Weekends
HR14	SIGNAGE Watts * % sign on at Hr14	Calculates Hr14 SIGNAGE Wattage for Winter Weekends
HR15	SIGNAGE Watts * % sign on at Hr15	Calculates Hr15 SIGNAGE Wattage for Winter Weekends
HR16	SIGNAGE Watts * % sign on at Hr16	Calculates Hr16 SIGNAGE Wattage for Winter Weekends
HR17	SIGNAGE Watts * % sign on at Hr17	Calculates Hr17 SIGNAGE Wattage for Winter Weekends
HR18	SIGNAGE Watts * % sign on at Hr18	Calculates Hr18 SIGNAGE Wattage for Winter Weekends
HR19	SIGNAGE Watts * % sign on at Hr19	Calculates Hr19 SIGNAGE Wattage for Winter Weekends
HR20	SIGNAGE Watts * % sign on at Hr20	Calculates Hr20 SIGNAGE Wattage for Winter Weekends
HR21	SIGNAGE Watts * % sign on at Hr21	Calculates Hr21 SIGNAGE Wattage for Winter Weekends
HR22	SIGNAGE Watts * % sign on at Hr22	Calculates Hr22 SIGNAGE Wattage for Winter Weekends
HR23	SIGNAGE Watts * % sign on at Hr23	Calculates Hr23 SIGNAGE Wattage for Winter Weekends
HR24	SIGNAGE Watts * % sign on at Hr24	Calculates Hr24 SIGNAGE Wattage for Winter Weekends

Table 159: Signage Wends Win

1.1.1.1.120 Signage Wdays Win

The *Signage Wdays Win* query calculates signage wattage for hours 1 to 24 for winter weekdays.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
Weights	Weight	NA
HR1	SIGNAGE Watts * % sign on at Hr1	Calculates Hr1 SIGNAGE Wattage for Winter Weekdays
HR2	SIGNAGE Watts * % sign on at Hr2	Calculates Hr2 SIGNAGE Wattage for Winter Weekdays
HR3	SIGNAGE Watts * % sign on at Hr3	Calculates Hr3 SIGNAGE Wattage for Winter Weekdays
HR4	SIGNAGE Watts * % sign on at Hr4	Calculates Hr4 SIGNAGE Wattage for Winter Weekdays
HR5	SIGNAGE Watts * % sign on at Hr5	Calculates Hr5 SIGNAGE Wattage for Winter Weekdays
HR6	SIGNAGE Watts * % sign on at Hr6	Calculates Hr6 SIGNAGE Wattage for Winter Weekdays
HR7	SIGNAGE Watts * % sign on at Hr7	Calculates Hr7 SIGNAGE Wattage for Winter Weekdays
HR8	SIGNAGE Watts * % sign on at Hr8	Calculates Hr8 SIGNAGE Wattage for Winter Weekdays
HR9	SIGNAGE Watts * % sign on at Hr9	Calculates Hr9 SIGNAGE Wattage for Winter Weekdays
HR10	SIGNAGE Watts * % sign on at Hr10	Calculates Hr10 SIGNAGE Wattage for Winter Weekdays
HR11	SIGNAGE Watts * % sign on at Hr11	Calculates Hr11 SIGNAGE Wattage for Winter Weekdays
HR12	SIGNAGE Watts * % sign on at Hr12	Calculates Hr12 SIGNAGE Wattage for Winter Weekdays
HR13	SIGNAGE Watts * % sign on at Hr13	Calculates Hr13 SIGNAGE Wattage for Winter Weekdays
HR14	SIGNAGE Watts * % sign on at Hr14	Calculates Hr14 SIGNAGE Wattage for Winter Weekdays
HR15	SIGNAGE Watts * % sign on at Hr15	Calculates Hr15 SIGNAGE Wattage for Winter Weekdays
HR16	SIGNAGE Watts * % sign on at Hr16	Calculates Hr16 SIGNAGE Wattage for Winter Weekdays
HR17	SIGNAGE Watts * % sign on at Hr17	Calculates Hr17 SIGNAGE Wattage for Winter Weekdays
HR18	SIGNAGE Watts * % sign on at Hr18	Calculates Hr18 SIGNAGE Wattage for Winter Weekdays
HR19	SIGNAGE Watts * % sign on at Hr19	Calculates Hr19 SIGNAGE Wattage for Winter Weekdays
HR20	SIGNAGE Watts * % sign on at Hr20	Calculates Hr20 SIGNAGE Wattage for Winter Weekdays
HR21	SIGNAGE Watts * % sign on at Hr21	Calculates Hr21 SIGNAGE Wattage for Winter Weekdays
HR22	SIGNAGE Watts * % sign on at	Calculates Hr22 SIGNAGE

	Hr22	Wattage for Winter Weekdays
HR23	SIGNAGE Watts * % sign on at Hr23	Calculates Hr23 SIGNAGE Wattage for Winter Weekdays
HR24	SIGNAGE Watts * % sign on at Hr24	Calculates Hr24 SIGNAGE Wattage for Winter Weekdays

Table 160: Signage Wdays Win

1.1.1.1.121 Signage Wdays Sum

The *Signage Wdays Sum* query calculates signage wattage for hours 1 to 24 for summer weekdays.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
Weights	Weight	NA
HR1	SIGNAGE Watts * % sign on at Hr1	Calculates Hr1 SIGNAGE Wattage for Summer Weekdays
HR2	SIGNAGE Watts * % sign on at Hr2	Calculates Hr2 SIGNAGE Wattage for Summer Weekdays
HR3	SIGNAGE Watts * % sign on at Hr3	Calculates Hr3 SIGNAGE Wattage for Summer Weekdays
HR4	SIGNAGE Watts * % sign on at Hr4	Calculates Hr4 SIGNAGE Wattage for Summer Weekdays
HR5	SIGNAGE Watts * % sign on at Hr5	Calculates Hr5 SIGNAGE Wattage for Summer Weekdays
HR6	SIGNAGE Watts * % sign on at Hr6	Calculates Hr6 SIGNAGE Wattage for Summer Weekdays
HR7	SIGNAGE Watts * % sign on at Hr7	Calculates Hr7 SIGNAGE Wattage for Summer Weekdays
HR8	SIGNAGE Watts * % sign on at Hr8	Calculates Hr8 SIGNAGE Wattage for Summer Weekdays
HR9	SIGNAGE Watts * % sign on at Hr9	Calculates Hr9 SIGNAGE Wattage for Summer Weekdays
HR10	SIGNAGE Watts * % sign on at Hr10	Calculates Hr10 SIGNAGE Wattage for Summer Weekdays
HR11	SIGNAGE Watts * % sign on at Hr11	Calculates Hr11 SIGNAGE Wattage for Summer Weekdays
HR12	SIGNAGE Watts * % sign on at Hr12	Calculates Hr12 SIGNAGE Wattage for Summer Weekdays
HR13	SIGNAGE Watts * % sign on at Hr13	Calculates Hr13 SIGNAGE Wattage for Summer Weekdays
HR14	SIGNAGE Watts * % sign on at Hr14	Calculates Hr14 SIGNAGE Wattage for Summer Weekdays
HR15	SIGNAGE Watts * % sign on at Hr15	Calculates Hr15 SIGNAGE Wattage for Summer Weekdays
HR16	SIGNAGE Watts * % sign on at Hr16	Calculates Hr16 SIGNAGE Wattage for Summer Weekdays
HR17	SIGNAGE Watts * % sign on at Hr17	Calculates Hr17 SIGNAGE Wattage for Summer Weekdays
HR18	SIGNAGE Watts * % sign on at Hr18	Calculates Hr18 SIGNAGE Wattage for Summer Weekdays

HR19	SIGNAGE Watts * % sign on at Hr19	Calculates Hr19 SIGNAGE Wattage for Summer Weekdays
HR20	SIGNAGE Watts * % sign on at Hr20	Calculates Hr20 SIGNAGE Wattage for Summer Weekdays
HR21	SIGNAGE Watts * % sign on at Hr21	Calculates Hr21 SIGNAGE Wattage for Summer Weekdays
HR22	SIGNAGE Watts * % sign on at Hr22	Calculates Hr22 SIGNAGE Wattage for Summer Weekdays
HR23	SIGNAGE Watts * % sign on at Hr23	Calculates Hr23 SIGNAGE Wattage for Summer Weekdays
HR24	SIGNAGE Watts * % sign on at Hr24	Calculates Hr24 SIGNAGE Wattage for Summer Weekdays

Table 161: Signage Wdays Sum

1.1.1.1.122 Signage Wends Sum

The Signage Wends Sum query calculates signage wattage for hours 1 to 24 for summer weekends.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
Weights	Weight	NA
HR1	SIGNAGE Watts * % sign on at Hr1	Calculates Hr1 SIGNAGE Wattage for Summer Weekends
HR2	SIGNAGE Watts * % sign on at Hr2	Calculates Hr2 SIGNAGE Wattage for Summer Weekends
HR3	SIGNAGE Watts * % sign on at Hr3	Calculates Hr3 SIGNAGE Wattage for Summer Weekends
HR4	SIGNAGE Watts * % sign on at Hr4	Calculates Hr4 SIGNAGE Wattage for Summer Weekends
HR5	SIGNAGE Watts * % sign on at Hr5	Calculates Hr5 SIGNAGE Wattage for Summer Weekends
HR6	SIGNAGE Watts * % sign on at Hr6	Calculates Hr6 SIGNAGE Wattage for Summer Weekends
HR7	SIGNAGE Watts * % sign on at Hr7	Calculates Hr7 SIGNAGE Wattage for Summer Weekends
HR8	SIGNAGE Watts * % sign on at Hr8	Calculates Hr8 SIGNAGE Wattage for Summer Weekends
HR9	SIGNAGE Watts * % sign on at Hr9	Calculates Hr9 SIGNAGE Wattage for Summer Weekends
HR10	SIGNAGE Watts * % sign on at Hr10	Calculates Hr10 SIGNAGE Wattage for Summer Weekends
HR11	SIGNAGE Watts * % sign on at Hr11	Calculates Hr11 SIGNAGE Wattage for Summer Weekends
HR12	SIGNAGE Watts * % sign on at Hr12	Calculates Hr12 SIGNAGE Wattage for Summer Weekends
HR13	SIGNAGE Watts * % sign on at Hr13	Calculates Hr13 SIGNAGE Wattage for Summer Weekends
HR14	SIGNAGE Watts * % sign on at Hr14	Calculates Hr14 SIGNAGE Wattage for Summer Weekends
HR15	SIGNAGE Watts * % sign on at	Calculates Hr15 SIGNAGE

	Hr15	Wattage for Summer Weekends
HR16	SIGNAGE Watts * % sign on at Hr16	Calculates Hr16 SIGNAGE Wattage for Summer Weekends
HR17	SIGNAGE Watts * % sign on at Hr17	Calculates Hr17 SIGNAGE Wattage for Summer Weekends
HR18	SIGNAGE Watts * % sign on at Hr18	Calculates Hr18 SIGNAGE Wattage for Summer Weekends
HR19	SIGNAGE Watts * % sign on at Hr19	Calculates Hr19 SIGNAGE Wattage for Summer Weekends
HR20	SIGNAGE Watts * % sign on at Hr20	Calculates Hr20 SIGNAGE Wattage for Summer Weekends
HR21	SIGNAGE Watts * % sign on at Hr21	Calculates Hr21 SIGNAGE Wattage for Summer Weekends
HR22	SIGNAGE Watts * % sign on at Hr22	Calculates Hr22 SIGNAGE Wattage for Summer Weekends
HR23	SIGNAGE Watts * % sign on at Hr23	Calculates Hr23 SIGNAGE Wattage for Summer Weekends
HR24	SIGNAGE Watts * % sign on at Hr24	Calculates Hr24 SIGNAGE Wattage for Summer Weekends

Table 162: Signage Wends Sum

1.1.1.1.123 SUB Control Type

The *SUB Control Type* query is used to analyze the percentage of control types in the *AQ Controls %* query.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
Weights	Weight	NA
Description	FUA Description	NA
Building Type	Building Type Description	NA
Manual1	Indicator Variable = 1 if control type = manual	NA
Timeclock1	Indicator Variable = 1 if control type = timeclock	NA
Photocell1	Indicator Variable = 1 if control type = photocell	NA

Table 163: SUB Control Type

1.1.1.1.124 SUB Glare Ratio

The *SUB Glare Ratio* query is used to calculate the percentage of sites with certain glare ratios in the *AQ Glare Ratio…* queries.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
Weights	Weight	NA
New Building Type	Building Type Description	NA
GR1	1st Glare Ratio	NA
GR2	2nd Glare Ratio	NA

GR3	3rd Glare Ratio	NA
A	The larger value between GR1 and GR2	NA
Glare Ratio	The larger value between A and GR3	NA
Q-32-1-Msre	Measurement Location 1	NA
Q-32-2-Msre	Measurement Location 2	NA
Q-32-3-Msre	Measurement Location 3	NA
Location	Location Number that matches Glare Ratio	NA

Table 164: SUB Glare Ratio

1.1.1.1.125 SUB HI all areaD and Square Foot

The *SUB HI all areaD and Square Foot* query calculates the square footage for one quadrant of the illuminance grid.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
HI	Horizontal Illuminance	NA
AreaD	AreaD Number	NA
Grid Sqft	Illuminance grid square footage	Calculates 1 quadrant's value of illuminance grid

Table 165: SUB HI all areaD and Square Foot

1.1.1.1.126 SUB Min Max Ave HI

The SUB Min Max Ave HI query is used to analyze horizontal illuminance in *AQ all min HI %* and *AQ Ave HI all AreaD* queries.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
AreaD	AreaD Number	NA
Description	FUA Description	NA
Max HI	Maximum Horizontal Illuminance value	NA
Min HI	Minimum Horizontal Illuminance value	NA
Ave HI	Average Horizontal Illuminance value	NA
Grid Sqft	Illuminance grid square footage	Calculates 1 quadrant's value of illuminance grid

Table 166: SUB Min Max Ave HI

1.1.1.1.127 SUB Min Max Ave VI

The SUB Min Max Ave VI query calculates the square footage for one quadrant of the illuminance grid.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
AreaD	AreaD Number	NA
Description	FUA Description	NA
Max HI	Maximum Vertical Illuminance	NA

	value	
Min HI	Minimum Vertical Illuminance value	NA
Ave HI	Average Vertical Illuminance value	NA
Grid Sqft	Illuminance grid square footage	Calculates 1 quadrant's value of illuminance grid

Table 167: SUB Min Max Ave VI

1.1.1.1.128 SUB Parking Uniformity

The *SUB Parking Uniformity* query calculates the square footage for one quadrant of the illuminance grid.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
Description	FUA Description	NA
Uniformity	Uniformity values = MaxHI/MinHI	NA
Grid Sqft1	Illuminance Grid Square Footage	Calculates 1 quadrant's value of illuminance grid

Table 168: SUB Parking Uniformity

1.1.1.1.129 SUB Trespass Reading

The *SUB Trespass Reading* query calculate the trespass value for use in the *AQ Trespass*… queries.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
Read1	First trespass reading if value > 0	NA
Read2a	Second trespass reading if value > 0	NA
Read3a	Third trespass reading if value > 0	NA
A	The greater value of Read1 and Read2a	NA
Trespass Read	The greater value of A and Read3a	NA

Table 169: SUB Trespass Reading

1.1.1.1.130 SUB VI all areaD and sqft

The SUB VI all areaD and sqft query calculates the square footage for one quadrant of the illuminance grid.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
VI	Vertical Illuminance values	NA
AreaD	AreaD Numbers	NA
Grid Sqft	Grid Area	Calculates 1 quadrant's value of illuminance grid

Table 170: SUB VI all areaD and sqft

1.1.1.1.131 SUB1 Min Max Ave HI (43 and 664)

The *SUB1 Min Max Ave HI (43 and 664)* query assigns a pre-calculated horizontal illuminance value to site 43 and 664 due to the floor-plan of the site.

Field Heading	Value	Comments
Site#	RLW Site ID	NA

AreaD	AreaD Number	NA
Description	FUA Description	NA
MinHI	Minimum Horizontal Illuminance value	Assigns a pre-calculated MinHI to sites 43 and 664
MaxHI	Maximum Horizontal Illuminance value	Assigns a pre-calculated MaxHI to sites 43 and 664
AveHI	Average Horizontal Illuminance value	Assigns a pre-calculated AveHI to sites 43 and 664
GridSqft1	Grid Area	Assigns a pre-calculated Grid Area to sites 43 and 664

Table 171: SUB1 Min Max Ave HI (43 and 664)

1.1.1.1.132 SUB1 Min Max Ave VI (43 and 664)

The SUB1 Min Max Ave VI (43 and 664) query assigns a pre-calculated vertical illuminance value to site 43 and 664 due to the floor-plan of the site.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
AreaD	AreaD Number	NA
Description	FUA Description	NA
MinHI	Minimum Vertical Illuminance value	Assigns a pre-calculated MinVI to sites 43 and 664
MaxHI	Maximum Vertical Illuminance value	Assigns a pre-calculated MaxVI to sites 43 and 664
AveHI	Average Vertical Illuminance value	Assigns a pre-calculated AveVI to sites 43 and 664
GridSqft1	Grid Area	Assigns a pre-calculated Grid Area to sites 43 and 664

Table 172: SUB1 Min Max Ave VI (43 and 664)

1.1.1.1.133 Transpose Sidewalk VI

The *Transpose Sidewalk VI* query transposes the data in the *Sidewalk* table.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
VI	Vertical Illuminance Values	NA
AreaD	AreaD Number	NA
PSX=	Illuminance grid X-value	NA
PSY=	Illuminance grid Y-value	NA

Table 173: Transpose Sidewalk VI

1.1.1.1.134 TransposeHI-P

The *TransposeHI-P* query transposes the horizontal illuminance data in the *Parking* table.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
HI	Horizontal Illuminance	NA
AreaD	AreaD Number	NA
PSX=	Illuminance grid X-value	NA

PSY=	Illuminance grid Y-value	NA

Table 174: TransposeHI-P

1.1.1.1.135 TransposeVI-P

The *TransposeVI-P* query transposes the vertical illuminance data in the *Parking* table.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
VI	Vertical Illuminance	NA
AreaD	AreaD Number	NA
PSX=	Illuminance grid X-value	NA
PSY=	Illuminance grid Y-value	NA

Table 175: TransposeVI-P

1.1.1.1.136 TransposeVI-Parking

The *TransposeVI-Parking* query transposes the horizontal illuminance data in the *Parking* table for FUA Parking.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
VI	Vertical Illuminance	NA
AreaD	AreaD Number	NA
PSX=	Illuminance grid X-value	NA
PSY=	Illuminance grid Y-value	NA

Table 176: TransposeVI-Parking

1.1.1.1.137 What IF C-Entry

The *What IF C-Entry* query calculates the percentage of Entry area with LPD within ranges specified by the Standards Committee.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
Weight	Weight	NA
FUA_Type	FUA Description	NA
Site2	RLW Site ID	NA
Basis	Basis	NA
LT_01	Variable = FUA Area if LPD <= 0.4	Calucalate % FUA area with LPD <= 0.4
LT_02	Variable = FUA Area if LPD > 0.4 and LPD <= 0.45	Calucalate % FUA area with LPD > 0.4 and LPD <= 0.45
LT_03	Variable = FUA Area if LPD > 0.45 and LPD <= 0. 5	Calucalate % FUA area with LPD > 0.45 and LPD <= 0. 5
LT_04	Variable = FUA Area if LPD > 0.5 and LPD <= 0.55	Calucalate % FUA area with LPD > 0.5 and LPD <= 0.55
LT_05	Variable = FUA Area if LPD > 0.55 and LPD <= 0.6	Calucalate % FUA area with LPD > 0.55 and LPD <= 0.6
LT_06	Variable = FUA Area if LPD > 0.6 and LPD <= 0.75	Calucalate % FUA area with LPD > 0.6 and LPD <= 0.75
LT_06a	Variable = FUA Area if LPD > 0.75 and LPD <= 0.9	Calucalate % FUA area with LPD > 0.75 and LPD <= 0.9

LT_07	Variable = FUA Area if LPD > 0.9 and LPD <= 0.95	Calucalate % FUA area with LPD > 0.9 and LPD <= 0.95
LT_08	Variable = FUA Area if LPD > 0.95 and LPD <= 1	Calucalate % FUA area with LPD > 0.95 and LPD <= 1
LT_09	Variable = FUA Area if LPD > 1 and LPD <= 1.05	Calucalate % FUA area with LPD > 1 and LPD <= 1.05
LT_10	Variable = FUA Area if LPD > 1.05 and LPD <= 1.1	Calucalate % FUA area with LPD > 1.05 and LPD <= 1.1
LT_11	Variable = FUA Area if LPD > 1.1 and LPD <= 1.4	Calucalate % FUA area with LPD > 1.1 and LPD <= 1.4
LT_12	Variable = FUA Area if LPD > 1.4 and LPD <= 1.45	Calucalate % FUA area with LPD > 1.4 and LPD <= 1.45
LT_13	Variable = FUA Area if LPD > 1.45 and LPD <= 1.5	Calucalate % FUA area with LPD > 1.45 and LPD <= 1.5
LT_14	Variable = FUA Area if LPD > 1.5 and LPD <= 1.55	Calucalate % FUA area with LPD > 1.5 and LPD <= 1.55
LT_15	Variable = FUA Area if LPD > 1.55	Calucalate % FUA area with LPD > 1.55

Table 177: What IF C-Entry

1.1.1.1.138 Categories - What IF C-Entry

Field Heading	Value	Comments
Site#	RLW Site ID	NA
Weight	Weight	NA
FUA_Type	FUA Description	NA

Table 178: Categories - What IF C-Entry

1.1.1.1.139

1.1.1.1.140 What IF C-Gas Station Canopy

What IF C-Gas Station Canopy query calculates the percentage of Gas Station Canopy area with LPD within ranges specified by the Standards Committee.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
Weight	Weight	NA
FUA_Type	FUA Description	NA
Site2	RLW Site ID	NA
Basis	Basis	NA
LT_01	Variable = FUA Area if LPD <= 0.3	Calucalate % FUA area with LPD <= 0.3
LT_02	Variable = FUA Area if LPD > 0.3 and LPD <= 0.33	Calucalate % FUA area with LPD > 0.3 and LPD <= 0.33
LT_03	Variable = FUA Area if LPD > 0.33 and LPD <= 0.6	Calucalate % FUA area with LPD > 0.33 and LPD <= 0.6
LT_04	Variable = FUA Area if LPD > 0.6 and LPD <= 0.67	Calucalate % FUA area with LPD > 0.6 and LPD <= 0.67
LT_05	Variable = FUA Area if LPD > 0.67 and LPD <= 0.75	Calucalate % FUA area with LPD > 0.67 and LPD <= 0.75
LT_06	Variable = FUA Area if LPD > 0.75 and LPD <= 1.2	Calucalate % FUA area with LPD > 0.75 and LPD <= 1.2

LT_07	Variable = FUA Area if LPD > 1.2 and LPD <= 1.25	Calucalate % FUA area with LPD > 1.2 and LPD <= 1.25
LT_08	Variable = FUA Area if LPD > 1.25 and LPD <= 1.3	Calucalate % FUA area with LPD > 1.25 and LPD <= 1.3
LT_09	Variable = FUA Area if LPD > 1.3 and LPD <= 2.4	Calucalate % FUA area with LPD > 1.3 and LPD <= 2.4
LT_10	Variable = FUA Area if LPD > 2.4 and LPD <= 2.45	Calucalate % FUA area with LPD > 2.4 and LPD <= 2.45
LT_11	Variable = FUA Area if LPD > 2.45 and LPD <= 2.5	Calucalate % FUA area with LPD > 2.45 and LPD <= 2.5
LT_12	Variable = FUA Area if LPD > 2.5	Calucalate % FUA area with LPD > 2.5

Table 179: What IF C-Gas Station Canopy

1.1.1.1.141 What IF C-Gas Station Canopy

Field Heading	Value	Comments
Site#	RLW Site ID	NA
Weight	Weight	NA
FUA_Type	FUA Description	NA

Table 180: Categories - What IF C-Gas Station Canopy

1.1.1.1.142 What IF C-Outdoor Sales

If What IF C-Outdoor Sales query calculates the percentage of Outdoor Sales area with LPD within ranges specified by the Standards Committee.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
Weight	Weight	NA
FUA_Type	FUA Description	NA
Site2	RLW Site ID	NA
Basis	Basis	NA
LT_01	Variable = FUA Area if LPD <= 0.2	Calucalate % FUA area with LPD <= 0.2
LT_02	Variable = FUA Area if LPD > 0.2 and LPD <= 0.25	Calucalate % FUA area with LPD > 0.2 and LPD <= 0.25
LT_03	Variable = FUA Area if LPD > 0.25 and LPD <= 0.3	Calucalate % FUA area with LPD > 0.25 and LPD <= 0.3
LT_04	Variable = FUA Area if LPD > 0.3 and LPD <= 0.45	Calucalate % FUA area with LPD > 0.3 and LPD <= 0.45
LT_05	Variable = FUA Area if LPD > 0.45 and LPD <= 0.5	Calucalate % FUA area with LPD > 0.45 and LPD <= 0.5
LT_06	Variable = FUA Area if LPD > 0.5and LPD <= 0.55	Calucalate % FUA area with LPD > 0.5and LPD <= 0.55
LT_07	Variable = FUA Area if LPD > 0.55 and LPD <= 0.6	Calucalate % FUA area with LPD > 0.55 and LPD <= 0.6
LT_08	Variable = FUA Area if LPD > 0.6 and LPD <= 0.9	Calucalate % FUA area with LPD > 0.6 and LPD <= 0.9
LT_09	Variable = FUA Area if LPD > 0.9 and LPD <= 0.95	Calucalate % FUA area with LPD > 0.9 and LPD <= 0.95
LT_10	Variable = FUA Area if LPD > 0.95	Calucalate % FUA area with LPD

	and LPD <= 1	> 0.95 and LPD <= 1
LT_11	Variable = FUA Area if LPD > 1 and LPD <= 1.05	Calucalate % FUA area with LPD > 1 and LPD <= 1.05
LT_12	Variable = FUA Area if LPD > 1.05	Calucalate % FUA area with LPD > 1.05

Table 181: What IF C-Outdoor Sales

1.1.1.1.143 Categories - What IF C- Outdoor Sales

Field Heading	Value	Comments
Site#	RLW Site ID	
Weight	Weight	
FUA_Type	FUA Description	

Table 182: Categories - What IF C- Outdoor Sales

1.1.1.1.144 What IF C-Parking

The What IF C-Parking query calculates the percentage of Parking area with LPD within ranges specified by the Standards Committee.

Field Heading	Value	Comments
Site#	RLW Site ID	NA
Weight	Weight	NA
FUA_Type	FUA Description	NA
Site2	RLW Site ID	NA
Basis	Basis	NA
LT_01	Variable = FUA Area if LPD <= 0.03	Calucalate % FUA area with LPD <= 0.03
LT_02	Variable = FUA Area if LPD > 0.03 and LPD <= 0.035	Calucalate % FUA area with LPD > 0.03 and LPD <= 0.035
LT_03	Variable = FUA Area if LPD > 0.035 and LPD <= 0.04	Calucalate % FUA area with LPD > 0.035 and LPD <= 0.04
LT_04	Variable = FUA Area if LPD > 0.04 and LPD <= 0.045	Calucalate % FUA area with LPD > 0.04 and LPD <= 0.045
LT_05	Variable = FUA Area if LPD > 0.045and LPD <= 0.05	Calucalate % FUA area with LPD > 0.045and LPD <= 0.05
LT_06	Variable = FUA Area if LPD > 0.05 and LPD <= 0.055	Calucalate % FUA area with LPD > 0.05 and LPD <= 0.055
LT_07	Variable = FUA Area if LPD > 0.055 and LPD <= 0.06	Calucalate % FUA area with LPD > 0.055 and LPD <= 0.06
LT_08	Variable = FUA Area if LPD > 0.06 and LPD <= 0.065	Calucalate % FUA area with LPD > 0.06 and LPD <= 0.065
LT_09	Variable = FUA Area if LPD > 0.065and LPD <= 0.07	Calucalate % FUA area with LPD > 0.065and LPD <= 0.07
LT_10	Variable = FUA Area if LPD > 0.07 and LPD <= 0.075	Calucalate % FUA area with LPD > 0.07 and LPD <= 0.075
LT_11	Variable = FUA Area if LPD > 0.075 and LPD <= 0.08	Calucalate % FUA area with LPD > 0.075 and LPD <= 0.08
LT_12	Variable = FUA Area if LPD > 0.08 and LPD <= 0.085	Calucalate % FUA area with LPD > 0.08 and LPD <= 0.085
LT_13	Variable = FUA Area if LPD >	Calucalate % FUA area with LPD

	0.085 and LPD <= 0.09	> 0.085 and LPD <= 0.09
LT_14	Variable = FUA Area if LPD > 0.09 and LPD <= 0.095	Calucalate % FUA area with LPD > 0.09 and LPD <= 0.095
LT_15	Variable = FUA Area if LPD > 0.095 and LPD <= 0.1	Calucalate % FUA area with LPD > 0.095 and LPD <= 0.1
LT_16	Variable = FUA Area if LPD > 0.1 and LPD <=0.15	Calucalate % FUA area with LPD >0.1 and LPD <=0.15
LT_17	Variable = FUA Area if LPD > 0.15 and LPD <=0.2	Calucalate % FUA area with LPD > 0.15 and LPD <=0.2
LT_18	Variable = FUA Area if LPD > 0.2 and LPD <=0.25	Calucalate % FUA area with LPD >0.2 and LPD<= 0.25
LT_19	Variable = FUA Area if LPD > 0.25	Calucalate % FUA area with LPD > 0.25

Table 183: What IF C-Parking

1.1.1.1.145 Categories - What IF C- Parking

Field Heading	Value	Comments
Site#	RLW Site ID	NA
Weight	Weight	NA
FUA_Type	FUA Description	NA

Table 184: Categories - What IF C- Parking

Outdoor Lighting Baseline Assessment

Appendices

Integrated Energy Systems
Productivity and Building Science

On behalf of the:
California Energy Commission
Public Interest Energy Research (PIER) Program

November 11, 2002
Element 7 / Sam Pierce, PE

APPENDIX A 2

SUPPLEMENTAL GAS STATION AND CAR DEALERSHIP SITES 2
IMPACT EVALUATION OF PROPOSED OUTDOOR LIGHTING STANDARDS 2

APPENDIX B 9

STATEWIDE IMPACT OF THE CALIFORNIA 2005 ENERGY EFFICIENCY STANDARDS FOR COMMERCIAL OUTDOOR LIGHTING 9

Appendix A

Supplemental Gas Station and Car Dealership Sites Impact Evaluation of Proposed Outdoor Lighting Standards

1. Supplemental Sites:

The results for two important functional use areas, modern gas station canopies, and modern car dealerships, were supplemented with additional sites to support the impact evaluation of the proposed outdoor lighting standards. The results are presented in Table 1 through Table 11. The data for these sites have been incorporated into the database, substantially enhancing the quality of reporting for these two areas. This additional work was made possible, in part, by additional CEC funding administered through the PIER program.

2. Baseline statistical selection method versus the standards committee needs for specific use types:

The statistical method used in our analysis allowed the extrapolation of our results from the original 303 sites to the statewide population of all commercial /industrial sites. This sampling methodology included a wide range of commercial types and included representative sites from all geographical regions of the state. Because of the demands for broad inclusion of building types and geographical regions, combined with the limited total number of sites, specific building types and functional use areas are frequently represented by small sample sizes. This limits the ability to extrapolate detailed analysis to the statewide population with any degree of confidence. This was particularly apparent when comparing parking lots with outdoor retail sales and gas station canopies. There were 221 data sets for parking lots, but only 7 for gas station canopies and 4 for Outdoor retail sales in the original sample. This affected the ability to evaluate the impact of the proposed standards to any degree of confidence for these areas. The supplemental sites have increased the sample to 14 gas stations and 10 outdoor retail sales areas. This work has significantly the ability to report on these two highly visible uses of commercial outdoor lighting.

This example demonstrates the limits of this work, and its potential. Clearly, it does not answer all questions regarding outdoor lighting in California. The limitation is, appropriately, budget (and therefore sample size) induced. However, this study answers the requisite questions at the statewide level. Furthermore, it has created an excellent foundation for more specific studies by providing a repeatable methodology for targeted data collection and by establishing a set of results from which to design more specific inquiries. The addition of the gas station and car dealership research is the first example of this capability for integrated expansion.

The specific results of the supplemental sites (10 gas stations and 5 car dealerships) are presented in the following tables. The results of the outdoor lighting standards impact analysis are included in Appendix B.

3. Areas and metrics researched that are aligned with the standards committee needs versus those for which, in hindsight, more data is desired:

As one would expect with a study of this type, the wide range of results are associated with a broad range of error bounds. The results that utilize all of the sample data, such as the statewide usage

numbers for all sites, have reasonable error bounds. Similarly, parking lots, walkways and small office values also have reasonable error bounds when the results are extrapolated to the statewide population, due to their relatively large sample sizes.

Parking lot data, in particular, is quite thorough in depth of investigation and the number of sites examined. There are 221 sites within the sample size for this functional use area. This data is a solid reference point for both LPD and illuminance values for parking lots throughout California. The methodology that was used to determine the physical boundary of parking lot FUA's is in line with the method proposed in the standards. Other common criteria include lit vs unlit parking areas, boundary definitions, and illumance measurement methodology.

Of course, when reviewing the results, there are areas where more information would be desired. These included more sample sites for gas stations and car dealerships to allow the results to be extrapolated to the statewide population with confidence. This was addressed with the supplemental sites reported in this appendix. Another specific business type which tends to over-light their properties are fast food restaurants. More sample sites for these categories would be helpful in supporting the work of the Standards Committee.

Another consideration for further investigation are the Lighting Zones. The proposed standards are based on the Lighting Zones for the commercial/industrial property. If the RLW baseline data is segregated by Lighting Zone the sample sizes become too small and their associated error bounds become too large. The resolution for future research is to create sufficient samples for each Lighting Zone to ensure adequate error bounds and meaningful statewide results.

In summary, the proposed standards provide an excellent template for research into the impact of the specific allowances. Unfortunately, this list was not available until well after the beginning of data collection in January, 2002. For future efforts, a comprehensive list of desired research can be derived from this list of criteria published in the "California Outdoor Lighting Standards; Table 1-Summary of Lighting Power Allowances" dated June 6, 2002. The execution of this future research will be greatly enhanced by the methodology and results contained in this baseline study. The addition of the gas station and car dealership sites is valuable example of this capability and an important first step in the enhancement of this database.

4. Results from the Supplemental Sites

The additional sites are presented in the tables below along with the sites from the original baseline study. The new sites have a site number in the 2100 series. The first few tables present the raw data that should be viewed as case studies. The following tables present the results in the format of the original report and can be compared to the tables containing therein. These results have been extrapolated to the statewide population using the methodology explained in the baseline report.

Table 1 below provides the data collected for car dealerships. The sites with a 2100 series site number are the supplemental sites visited after the baseline study was completed. These additional sites were used in the standards impact evaluation. The supplemental sites are not included in the original baseline report.

Frontage Car Sales Lots																		
Site#	Name	Urban Rural	FUA_ sqft	FUA_ Watts	LPD	Max Illum	Min Illum	Ave. Illum	**Horizontal Illumination Data**									
223	Toyota	Urban	63306	4610	0.073	No data	No data	No data										
2111	VW	Urban	15420	2360	0.153	8.6	3.3	5.0	6.7	6.6	8.6	4.2	3.3	4.1	4.1	3.9	3.6
1651	Volvo	Urban	28980	4830	0.167	No data	No data	No data										
2109	Honda	Urban	28200	5900	0.209	63.4	14.8	35.8	15.8	40.9	32.4	14.8	39.8	63.4	14.8	38	62.7
2113	Volvo	Urban	16440	9220	0.561	No data	No data	No data										
2112	BMW	Urban	15360	12840	0.836	No data	No data	No data										
2110	Toyota	Urban	16920	14980	0.885	No data	No data	No data										
			184626	54740	0.296	Average												
					0.412	Average of Averages												
					0.209	Median												

Table 1: Frontage Car Sales Lots (Including supplemental sites)

Table 2 below provides the data for all outdoor retail sales sites. The sites with a 2100 series site number are the sites visited after the baseline study was completed. The results from these sites are not included in the baseline report. They were incorporated into the standards impact report.

Outdoor Retail Sales																		
Site#	Name	Urban Rural	FUA_ sqft	FUA_ Watts	LPD	Max Illum	Min Illum	Ave. Illum	**Horizontal Illumination Data**									
1651	Volvo	Urban	162816	12180	0.075	17.2	2.2	8.8	14.4	17.2	11.4	7.5	8.05	5.98	7.84	4.23	2.24
2104	Gas Station	Urban	7519	590	0.078	No data	No data	No data										
970	RV Sales	Urban	1219766	101237	0.083	No data	No data	No data										
2111	VW	Urban	60446	8630	0.143	29.8	3.3	11.4	29.8	24.4	17.2	7.6	6.9	6.1	3.7	3.6	3.3
2109	Honda	Urban	57804	10030	0.174	40.0	21.0	26.8	37.8	23.3	23.9	40	25	21.5	26	23	21
2113	Volvo	Urban	148446	25816	0.174	No data	No data	No data										
2110	Toyota	Urban	151274	42344	0.280	No data	No data	No data										
354	Auto Auction	Urban	2400	900	0.375	No data	No data	No data										
223	Toyota	Urban	214994	88717	0.413	30.7	5.6	14.9	21.3	13.8	7.03	22.8	12.6	6.25	30.7	13.9	5.58
2112	BMW	Urban	61076	47347	0.775	No data	No data	No data										
			2086541	337791	0.162	Average												
					0.257	Average of Averages												
					0.174	Median												

Table 2: Outdoor Retail Sales (Including supplemental sites)

Table 3 presents the data collected for all modern gas station and vehicle service station sites. The sites with a 2100 series site number are the sites visited after the baseline study was completed. The results on these sites are not included in the baseline report. They are included in the impact report.

Modern Gas Station Canopy & Vehicle Service Station																
Site#	Name	Urban Rural	FUA sqft	FUA Watts	LPD	Max Illum	Min Illum	Ave. Illum	Horizontal Illumination Readings							
247	Indep.	Urban	3990	4290	1.075	no data	no data	no data								
2114	Chevron	Urban	3268	3780	1.157	24.6	9.4	18.1	23.8	21.67	19.61	24.6	16.58	14.79	19.28	13.55	9.42
2103	Tesaro	Urban	3480	4720	1.356	33.5	19.3	25.5	29.9	28.6	33.5	22.6	25.1	27.9	19.3	20.3	22.4
463	Costco	Urban	4190	7486	1.787	no data	no data	no data								
2108	Indep.	Urban	2530	4720	1.866	no data	no data	no data								
2100	Chevron	Urban	3420	7080	2.070	68.5	27.1	38.7	34.2	34.7	68.5	32.6	31.6	38	27.1	31.8	49.5
2104	Chevron	Urban	1600	3540	2.213	39.8	20.7	30.2	39.8	24.5	33	38.8	32	25.8	36	21.5	20.7
1872	Texaco	Urban	1100	2950	2.682	17.9	5.6	12.5	17.88	14.73	8.2	12.81	12.05	5.57	15.72	15.64	9.63
968	Indep.	Urban	1320	3688	2.794	64.7	38.7	51.1	64.7	61.2	61.9	49.8	51.7	50.7	38.7	40.3	40.7
2101	Texaco	Urban	966	3130	3.240	25.3	7.9	15.8	13.7	15.3	7.9	25.3	23.3	19.2	9.2	14.6	13.3
2106	76	Urban	1711	5900	3.448	no data	no data	no data								
2105	76	Urban	3230	11690	3.619	no data	no data	no data								
2102	Arco	Urban	800	3688	4.610	no data	no data	no data								
2107	Indep.	Urban	760	3688	4.853	no data	no data	no data								
		Totals	32365	70350	2.174	Average										
					2.626	Average of Averages										
					2.447	Median										

Table 3: Modern Gas Station Canopy and Vehicle Service Stations

Table 4 incorporates the new sites into the equivalent table presented in the baseline report. A comparison of this table to the original reveals a finding of higher light levels when the sample was expanded to 14 sites.

Minimum Horizontal Illuminance Results	% of Sites										
	< 0.1 (FC)	0.1 to 0.249 (FC)	0.25 to 0.49 (FC)	0.5 to 0.99 (FC)	1 to 2.49 (FC)	2.5 to 4.99 (FC)	5 to 7.99 (FC)	8 to 11.99 (FC)	12 to 19.99 (FC)	20 to 40 (FC)	Sample Size
ATM	-	-	-	-	100.0%	-	-	-	-	-	1
Entry	-	4.9%	15.8%	35.7%	17.8%	24.1%	-	-	-	1.8%	13
Frontage Car Sales Lots	-	-	-	-	-	50.0%	-	-	50.0%	-	2
Gas Station Canopy	-	-	-	-	33.9%	-	16.8%	10.0%	13.2%	26.2%	10
Internal Roadway	33.3%	-	-	-	66.7%	-	-	-	-	-	3
Outdoor Retail Sales	-	-	-	-	25.0%	25.0%	25.0%	-	-	25.0%	4
Parking	18.0%	33.1%	18.7%	14.4%	11.8%	2.0%	0.8%	1.2%	-	-	183
Pedestrian & Walkway	3.0%	14.3%	17.8%	21.2%	19.1%	9.7%	8.1%	4.4%	2.2%	0.1%	155
Security	7.4%	22.7%	37.1%	4.9%	14.9%	13.1%	-	-	-	-	22
Storage	-	23.9%	-	-	20.0%	56.1%	-	-	-	-	3
All FUAs	**10.5%**	**23.2%**	**18.8%**	**16.9%**	**16.1%**	**6.9%**	**3.8%**	**2.4%**	**1.0%**	**0.3%**	**396**

Table 4: Minimum Horizontal Illuminance (compare to Baseline Table 26)

Table 5 presents the error bound for the results in Table 4. The error bound for gas stations and car dealerships are not available due to the use of a different selection methodology than used in the original baseline report.

Minimum Horizontal Illuminance Error Bounds	% of Sites									
	< 0.1 (FC)	0.1 to 0.249 (FC)	0.25 to 0.49 (FC)	0.5 to 0.99 (FC)	1 to 2.49 (FC)	2.5 to 4.99 (FC)	5 to 7.99 (FC)	8 to 11.99 (FC)	12 to 19.99 (FC)	20 to 40 (FC)
ATM	-	-	-	-	-	-	-	-	-	-
Entry	-	8.1%	19.4%	26.7%	19.6%	26.8%	-	-	-	3.0%
Frontage Car Sales Lots	-	-	-	-	-	-	-	-	-	-
Gas Station Canopy	-	-	-	-	-	-	-	-	-	-
Internal Roadway	46.4%	-	-	-	46.4%	-	-	-	-	-
Outdoor Retail Sales	-	-	-	-	-	-	-	-	-	-
Parking	5.7%	7.7%	5.7%	5.8%	4.8%	1.6%	1.3%	1.9%	-	-
Pedestrian & Walkway	3.9%	6.0%	6.5%	7.3%	6.2%	4.7%	5.5%	3.1%	2.5%	0.1%
Security	11.7%	16.4%	21.3%	6.3%	16.8%	19.4%	-	-	-	-
Storage	-	37.9%	-	-	33.0%	49.6%	-	-	-	-
All FUAs	**3.3%**	**4.7%**	**4.1%**	**4.2%**	**3.7%**	**2.7%**	**2.3%**	**1.5%**	**1.0%**	**0.2%**

Table 5: Error Bounds

Table 6 provides the average horizontal illuminance results including the supplemental sites.

Average Horizontal Illuminance Results	% of Sites										
	< 0.5 (FC)	0.5 to 0.99 (FC)	1 to 1.49 (FC)	1.5 to 2.49 (FC)	2.5 to 4.99 (FC)	5 to 7.99 (FC)	8 to 9.99 (FC)	10 to 14.99 (FC)	15 to 24.99 (FC)	25 to 51 (FC)	Sample Size
ATM	-	-	-	-	-	-	100.0%	-	-	-	1
Entry	8.5%	-	3.8%	33.2%	47.6%	-	5.1%	-	-	1.8%	13
Frontage Car Sales Lots	-	-	-	-	-	50.0%	-	-	-	50.0%	2
Gas Station Canopy	-	-	-	-	33.9%	-	-	10.0%	21.6%	34.6%	10
Internal Roadway	-	-	-	50.2%	-	49.8%	-	-	-	-	3
Outdoor Retail Sales	-	-	-	-	-	-	25.0%	50.0%	-	25.0%	4
Parking	21.7%	14.8%	16.9%	13.0%	21.8%	7.7%	1.5%	2.5%	-	-	183
Pedestrian & Walkway	14.7%	17.8%	15.0%	12.7%	13.9%	15.0%	2.8%	3.4%	4.6%	0.1%	155
Security	9.2%	36.3%	13.8%	10.3%	17.4%	13.1%	-	-	-	-	22
Storage	-	-	-	23.9%	20.0%	56.1%	-	-	-	-	3
All FUAs	**17.1%**	**16.3%**	**15.0%**	**13.6%**	**19.1%**	**11.3%**	**2.4%**	**2.7%**	**2.0%**	**0.4%**	**396**

Table 6: Average Horizontal Illuminance (Compare to Baseline Table 24)

Average Horizontal Illuminance Error Bound	% of Sites									
	< 0.5 (FC)	0.5 to 0.99 (FC)	1 to 1.49 (FC)	1.5 to 2.49 (FC)	2.5 to 4.99 (FC)	5 to 7.99 (FC)	8 to 9.99 (FC)	10 to 14.99 (FC)	15 to 24.99 (FC)	25 to 51 (FC)
ATM	-	-	-	-	-	-	-	-	-	-
Entry	10.3%	-	6.4%	24.6%	28.4%	-	8.4%	-	-	3.00%
Frontage Car Sales Lots	-	-	-	-	-	-	-	-	-	-
Gas Station Canopy	-	-	-	-	-	-	-	-	-	-
Internal Roadway	-	-	-	51.2%	-	51.2%	-	-	-	-
Outdoor Retail Sales	-	-	-	-	-	-	-	-	-	-
Parking	6.7%	5.5%	5.6%	5.0%	6.6%	4.0%	1.6%	2.9%	-	-
Pedestrian & Walkway	6.4%	6.7%	6.3%	5.2%	5.8%	6.5%	2.3%	2.9%	3.1%	0.14%
Security	11.7%	21.3%	12.3%	10.4%	18.3%	19.4%	-	-	-	-
Storage	-	-	-	37.9%	33.0%	49.6%	-	-	-	-
All FUAs	**4.2%**	**4.0%**	**3.8%**	**3.4%**	**4.3%**	**3.6%**	**1.4%**	**1.8%**	**1.3%**	**0.26%**

Table 7: Error Bound

Table 8 presents the horizontal illuminance results including the supplemental sites.

Maximum Horizontal Illuminance Results	% of Sites								
	< 0.5 (FC)	0.5 to 0.99 (FC)	1 to 2.49 (FC)	2.5 to 4.99 (FC)	5 to 9.99 (FC)	10 to 14.99 (FC)	15 to 19.99 (FC)	20 to 50 (FC)	Sample Size
ATM	-	-	-	-	-	-	-	100.0%	1
Entry	3.6%	4.9%	16.7%	39.3%	16.4%	17.2%	-	1.8%	13
Frontage Car Sales Lots	-	-	-	-	50.0%	-	-	50.0%	2
Gas Station Canopy	-	-	-	-	33.9%	-	10.0%	56.2%	10
Internal Roadway	-	-	-	16.9%	33.3%	-	49.8%	-	3
Outdoor Retail Sales	-	-	-	-	-	-	25.0%	75.0%	4
Parking	9.4%	5.9%	21.9%	19.6%	19.1%	11.2%	5.2%	7.7%	183
Pedestrian & Walkway	8.5%	9.8%	31.3%	14.9%	14.5%	10.1%	5.5%	4.9%	155
Security	7.1%	13.4%	25.0%	20.0%	34.6%	-	-	-	22
Storage	-	-	-	23.9%	76.1%	-	-	-	3
All FUAs	**8.4%**	**7.7%**	**25.0%**	**18.2%**	**18.6%**	**10.0%**	**5.2%**	**6.7%**	**396**

Table 8: Maximum Horizontal Illuminance

Maximu Horizontal Illuminance Error Bound	% of Sites							
	< 0.5 (FC)	0.5 to 0.99 (FC)	1 to 2.49 (FC)	2.5 to 4.99 (FC)	5 to 9.99 (FC)	10 to 14.99 (FC)	15 to 19.99 (FC)	20 to 50 (FC)
ATM	-	-	-	-	-	-	-	-
Entry	6.1%	8.1%	16.2%	28.4%	23.9%	20.0%	-	3.0%
Frontage Car Sales Lots	-	-	-	-	-	-	-	-
Gas Station Canopy	-	-	-	-	-	-	-	-
Internal Roadway	-	-	-	28.4%	46.4%	-	51.2%	-
Outdoor Retail Sales	-	-	-	-	-	-	-	-
Parking	4.8%	4.0%	6.6%	5.8%	6.0%	4.8%	3.6%	4.3%
Pedestrian & Walkway	5.4%	4.9%	8.1%	5.9%	6.5%	4.8%	3.6%	3.2%
Security	11.2%	17.1%	17.4%	14.7%	22.9%	-	-	-
Storage	-	-	-	37.9%	37.9%	-	-	-
All FUAs	**3.3%**	**2.9%**	**4.7%**	**3.9%**	**4.3%**	**3.1%**	**2.4%**	**2.5%**

Table 9: Error Bounds

Table 10 presents the minimum vertical illuminance results including the supplemental sites.

Minimum Vertical Illuminance Results	% of Sites									
	< 0.025 (FC)	0.025 to 0.049 (FC)	0.05 to 0.09 (FC)	0.1 to 0.149 (FC)	0.15 to 0.249 (FC)	0.25 to 0.49 (FC)	0.5 to 0.99 (FC)	1 to 2 (FC)	2 to 5 (FC)	Sample Size
ATM	-	-	-	-	100.0%	-	-	-	-	1
Entry	-	-	15.8%	12.9%	45.4%	13.3%	10.9%	-	1.8%	13
Frontage Car Sales Lots	-	-	-	-	-	-	50.0%	50.0%	-	2
Gas Station Canopy	-	-	-	33.9%	-	-	10.0%	25.3%	30.9%	10
Internal Roadway	-	50.2%	-	-	-	49.8%	-	-	-	3
Outdoor Retail Sales	-	-	-	-	-	-	-	66.7%	33.3%	3
Parking	24.7%	8.8%	30.8%	10.7%	12.1%	9.7%	2.4%	-	0.8%	183
Pedestrian & Walkway	7.1%	3.5%	19.1%	17.6%	13.6%	12.8%	17.4%	6.8%	2.3%	155
Security	17.9%	22.6%	13.5%	11.6%	7.2%	14.2%	13.1%	-	-	22
Storage	-	-	-	23.9%	-	76.1%	-	-	-	3
All FUAs	**15.7%**	**7.3%**	**23.7%**	**13.7%**	**13.6%**	**12.0%**	**9.3%**	**3.0%**	**1.6%**	**395**

Table 10: Minimum Vertical Illuminance (Compare to Baseline Table 28)

Minimum Vertical Illuminance Error Bound	% of Sites								
	< 0.025 (FC)	**0.025 to 0.049 (FC)**	**0.05 to 0.09 (FC)**	**0.1 to 0.149 (FC)**	**0.15 to 0.249 (FC)**	**0.25 to 0.49 (FC)**	**0.5 to 0.99 (FC)**	**1 to 2 (FC)**	**2 to 5 (FC)**
ATM	-	-	-	-	-	-	-	-	-
Entry	-	-	19.4%	14.8%	28.4%	16.1%	16.9%	-	3.0%
Frontage Car Sales Lots	-	-	-	-	-	-	-	-	-
Gas Station Canopy	-	-	-	-	-	-	-	-	-
Internal Roadway	-	51.2%	-	-	-	51.2%	-	-	-
Outdoor Retail Sales	-	-	-	-	-	-	-	-	-
Parking	6.8%	3.8%	7.6%	4.2%	5.2%	4.2%	2.5%	-	1.3%
Pedestrian & Walkway	4.7%	2.3%	6.9%	7.0%	5.5%	5.0%	7.3%	3.5%	2.2%
Security	15.4%	19.7%	11.6%	12.9%	9.7%	16.4%	19.4%	-	-
Storage	-	-	-	37.9%	-	37.9%	-	-	-
All FUAs	**4.0%**	**2.5%**	**4.8%**	**3.7%**	**3.6%**	**3.1%**	**3.5%**	**1.4%**	**1.1%**

Table 11: Error Bounds

Appendix B

Statewide Impact of the California 2005 Energy Efficiency Standards for Commercial Outdoor Lighting

Statewide Impact of the California

2005 Energy Efficiency Standards for

Commercial Outdoor Lighting

Prepared for
Eley and Associates
Project 0121
CEC Outdoor Lighting Standard
Task Number 0701

On behalf of the

California Energy Commission
.
February 5, 2003

Executive Summary

RLW Analytics, Inc has been asked to estimate the statewide impact of the outdoor lighting standards proposed for the 2005 Building Energy Efficiency Standards. This work was completed under the direction of Eley Associates, on behalf of the California Energy Commission. The proposed standards that are analyzed in this report are published in the 2005 Energy Efficiency Standards for Commercial Outdoor Lighting, Feb 4, 2003[1].

The analysis was performed by applying the proposed standards to the California Outdoor Lighting Baseline Assessment database and model[2]. This model describes the use of commercial outdoor lighting statewide. The use of this model to evaluate the proposed outdoor lighting standard has allowed the detailed estimation of the statewide impacts presented in this report.

The impacts are determined for both electricity consumption and demand. Outdoor lighting has no impact on gas consumption. The total annual energy savings are projected to be 20,985 MWh, 30% of the total energy consumption for these lighting applications. The total demand savings are estimated to be 6,344 MW, 35% of the total demand at the peak nighttime hour. These savings are for the first year and would double for two years, triple for three years, etc.

Savings are concentrated in three lighting applications, parking lots and hardscape, driveways and walkways, and signs (internally and externally illuminated). The applications that experience the least impacts include outdoor sales and outdoor sales frontage (which includes car dealerships), sales canopies (excluding gas station canopies), and non-sales canopies.

The standards require that controls be installed so that outdoor lighting can be turned off or reduced during a voluntary reduction. However, the standards do not require voluntary reductions. Therefore, the associated energy and demand savings are estimated separately. Table 12 below presents the statewide impacts of the measures alone, and with the impact of the voluntary reduction. The voluntary reduction is assumed to be in effect from dusk to dawn and has a duration of 30 days.

Table 12: Statewide Impacts

Statewide Impacts	Current Practice	Measures Applied	Impact due to Measures	Impact due to Measures and Voluntary Reductions	Total Impact as Percentage of Current Practice
Energy Consumption	69,833 MWh	48,848 MWh	20,985 MWh	22,210 MWh	31.8%
Energy Demand	18.2 MW	11.8 MW	6.3 MW	7.3 MW	40.3%

[1] 2005 Energy Efficiency Standards for Residential and Nonresidential Buildings Workshop Draft #3, Feb 4, California Energy Commission, http://www.energy.ca.gov/2005_standards/documents/index.html

[2] This report was completed by RLW Analytic, Inc on November 8, 2002 and submitted the New Buildings Institute (NBI) on behalf of the California Energy Commission Public Interest Energy Research (PIER) Program. It can be downloaded from the NBI website: www.newbuildings.org.

These results are presented in Figure 1 below by lighting application. The horizontal scale represents energy savings in MWh per year (cumulative). Hardscape and parking lots have the greatest consumption of all the lighting applications included in the proposed standards. Driveway and walkways are responsible for the greatest savings when the proposed standard is applied.

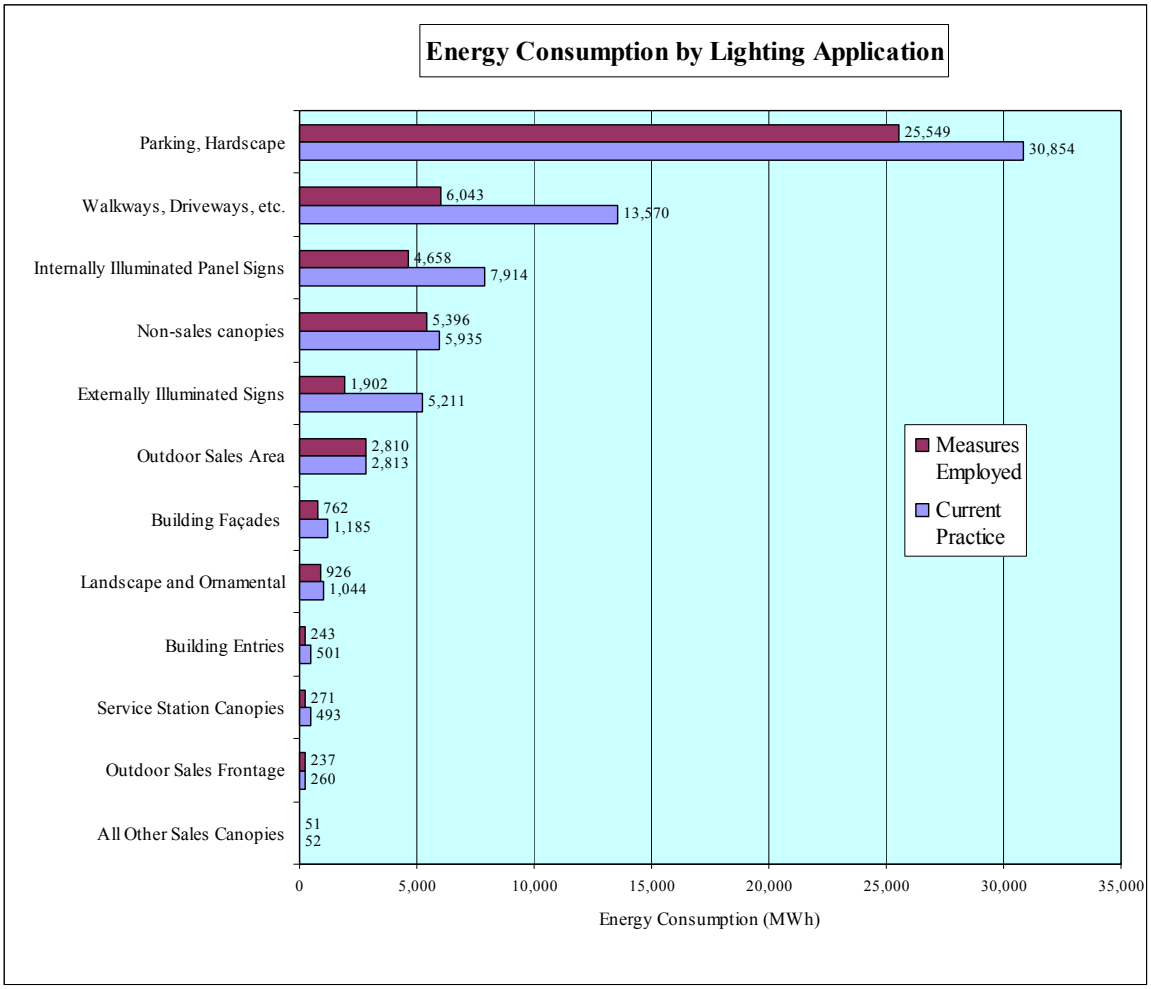


Figure 1: Statewide Energy Consumption Comparison

The energy consumption impacts are dependent on two factors, the stringency of the proposed standard relative to current practice, and the intensity of the lighting application. Parking and other hardscape, for example, is responsible for the greatest annual energy usage because of the intensity of the application. While walkways have less annual energy consumption, they are responsible for the greatest energy savings (percent reduction) due to the stringency of the code. The two categories of signs, when considered together, also have a greater percent savings than parking, even though the original consumption is less than half of the consumption of the parking and hardscape category.
The results are investigated in greater detail and presented in the tables within the Findings section of this report. The methodology and assumptions are detailed in the Methodology section. This section also includes the proposed lighting power allowances used in determining the impact of the standards.

Findings

The energy and demand impacts of the proposed standards are presented in Table 13 below. Hardscape including parking lots consume the most energy. However, driveways, walkways etc. provide the greatest energy impact of 7,526 MWh, and the greatest demand impact of 2,366 kW. The impact on outdoor sales areas is very slight as current practice is generally below the proposed standards. The impact on all "other sales canopies" is small due to the limited representation of these areas in the baseline database. These findings are presented in greater detail in the following tables.

Table 13: Statewide Energy Consumption and Demand Impacts

Annual Energy and Demand Impacts	Demand Savings	Energy Savings	Original Energy Consumption
	kW	MWh	MWh
Hardscape including parking lots	1,827	5,305	30,854
Driveways, Site Roads, Sidewalks, Walkways and Bikeways	2,366	7,526	13,570
Internally Illuminated Panel Signs	848	3,256	7,914
Non-sales canopies	154	539	5,935
Externally Illuminated Signs	863	3,309	5,211
Outdoor Sales Area	1	4	2,813
Building Façades	127	423	1,185
Landscape and Ornamental Lighting	31	118	1,044
Building Entrances (without canopy)	61	258	501
Vehicle Service Station Canopies	61	222	493
Outdoor Sales Frontage (Frontage in linear feet)	4	23	260
All Other Sales Canopies	0	1	52

Energy Consumption Impacts

Table 14 through Table 17 provide more detail on the energy and demand impacts.

Table 14: Energy Consumption Impacts as Percentage of Total Consumption

This table presents the energy impacts in greater detail. The last column, "Savings as Percent of Lighting Application Consumption," provides an indication of the stringency of the proposed standard relative to the current design practice for lighting application. Driveways, building entrances, and externally illuminated signs all experience an impact of more than 50%. Vehicle service station canopies and internally illuminated signs are close at 45% and 41% impact. Notably, the outdoor sales area classification has a very low (0.1%) impact indicating current practice is generally within the proposed allowables.

Annual Energy Impacts	Baseline Annual Energy Consumption (New Construction)	Total Energy Impact due to new standards	Savings as Percent of Lighting Application Consumption
Lighting Standard	kWh	kWh	%
Hardscape including parking lots	30,854,073	5,305,346	17.2%
Driveways, Site Roads, Sidewalks, Walkways and Bikeways	13,569,535	7,526,475	55.5%
Building Entrances (without canopy)	501,172	258,354	51.6%
Outdoor Sales Area	2,813,184	3,569	0.1%
Building Façades	1,185,224	422,930	35.7%
Outdoor Sales Frontage (Frontage in linear feet)	260,156	22,995	8.8%
Vehicle Service Station Canopies	492,896	221,954	45.0%
All Other Sales Canopies	52,031	1,079	2.1%
Non-sales canopies	5,934,877	538,868	9.1%
Landscape and Ornamental Lighting	1,044,413	117,975	11.3%
Internally Illuminated Panel Signs	7,914,108	3,256,162	41.1%
Externally Illuminated Signs	5,211,146	3,308,991	63.5%
Total	**69,832,813**	**20,984,698**	**30%**

Table 15: Energy Consumption Impacts by Lighting Zone

This table explores the energy impact of each lighting application by lighting zone. The greatest savings for most of the applications occur within LZ3 due to the large percentage of statewide commercial activity within this zone[3]. While the areas assumed for LZ1 and LZ4 are equivalent for each (1%), the energy impacts of LZ1 are significantly higher than LZ4 due to the much more stringent lighting power allowances for this lighting zone which addresses rural parks and wilderness areas.

Annual Energy Impacts	Energy Impact by Lighting Zone (kWh)				Total Energy Impact (kWh)
Lighting Standard	LZ1	LZ2	LZ3	LZ4	All Lighting Zones
Hardscape including parking lots	129,921	830,303	4,328,112	17,011	5,305,346
Driveways, Site Roads, Sidewalks, Walkways and Bikeways	104,905	266,756	7,087,408	67,405	7,526,475
Building Entrances (without canopy)	3,466	35,562	217,228	2,098	258,354
Outdoor Sales Area	1,967	1,602	0	0	3,569
Building Façades	11,852	26,911	381,120	3,047	422,930
Outdoor Sales Frontage (Frontage in linear feet)	2,602	5,476	14,918	0	22,995
Vehicle Service Station Canopies	3,345	18,665	198,830	1,114	221,954
All Other Sales Canopies	520	555	0	3	1,079
Non-sales canopies	27,600	136,038	371,928	3,302	538,868
Landscape and Ornamental Lighting	10,444	0	107,219	312	117,975
Internally Illuminated Panel Signs	79,141	133,024	3,008,098	35,899	3,256,162
Externally Illuminated Signs	42,935	132,147	3,097,104	36,804	3,308,991
Totals	**418,698**	**1,587,039**	**18,811,966**	**166,996**	**20,984,698**

[3] See the methodology section for the lighting zone percentages by lighting application.

Table 16: Lighting Zone Impacts as Percentage of Total Consumed

This table shows the lighting zone results as a percentage of total energy impact for the associated lighting application. The results reinforce the observation that lighting zone 3 is responsible for the greatest impact, 90.95% overall. It is notable that the LZ3 impact is near 0% for outdoor sales areas, outdoor sales frontage, and all other sales canopies which suggests that the current practice for these applications is within the proposed LZ3 allowable.

Annual Energy Impacts	Energy Impact by Lighting Zone as Percentage of Total Standard Impact				Savings as Percent of Lighting Application Consumption
Lighting Standard	LZ1 %	LZ2 %	LZ3 %	LZ4 %	All Lighting Zones
Hardscape including parking lots	0.42%	2.69%	14.03%	0.06%	17.2%
Driveways, Site Roads, Sidewalks, Walkways and Bikeways	0.77%	1.97%	52.23%	0.50%	55.5%
Building Entrances (without canopy)	0.69%	7.10%	43.34%	0.42%	51.6%
Outdoor Sales Area	0.07%	0.06%	0.00%	0.00%	0.1%
Building Façades	1.00%	2.27%	32.16%	0.26%	35.7%
Outdoor Sales Frontage (Frontage in linear feet)	1.00%	2.10%	5.73%	0.00%	8.8%
Vehicle Service Station Canopies	0.68%	3.79%	40.34%	0.23%	45.0%
All Other Sales Canopies	1.00%	1.07%	0.00%	0.01%	2.1%
Non-sales canopies	0.47%	2.29%	6.27%	0.06%	9.1%
Landscape and Ornamental Lighting	1.00%	0.00%	10.27%	0.03%	11.3%
Internally Illuminated Panel Signs	1.00%	1.68%	38.01%	0.45%	41.1%
Externally Illuminated Signs	0.82%	2.54%	59.43%	0.71%	63.5%
Totals	**2.00%**	**7.56%**	**89.65%**	**0.80%**	**100%**

Table 17: Impact by Lighting Application as a Percentage of LZ Baseline Usage

This table reconfigures the results to present the energy saved within each lighting zone as a percentage of the total baseline value for that lighting zone. For example, 100% of the energy used in LZ1 of Outdoor Sales Frontage is eliminated by the standard that states "not allowed" for this lighting zone[4]. Because this table is independent of amount of commercial activity, it provides an understanding of the relative stringency of each allowable relative to the maximum theoretical value for that lighting zone.

Lighting Application	Total Impact	Percentage of LZ total			
	kWh	LZ1	LZ2	LZ3	LZ4
Hardscape including parking lots	5,305,346	42.1%	33.4%	17.7%	5.5%
Driveways, Site Roads, Sidewalks, Walkways and Bikeways	7,526,475	77.3%	71.3%	61.6%	49.7%
Internally Illuminated Panel Signs	3,256,162	100.0%	45.1%	45.4%	45.4%
Non-sales canopies	538,868	46.5%	29.4%	7.9%	5.6%
Externally Illuminated Signs	3,308,991	82.4%	80.1%	70.5%	70.6%
Outdoor Sales Area	3,569	7.0%	0.8%	0.0%	0.0%
Building Façades	422,930	100.0%	27.6%	40.6%	25.7%
Landscape and Ornamental Lighting	117,975	100.0%	0.0%	12.2%	3.0%
Building Entrances (without canopy)	258,354	69.2%	62.1%	57.0%	41.9%
Vehicle Service Station Canopies	221,954	67.9%	54.1%	44.3%	22.6%
Outdoor Sales Frontage (Frontage in linear feet)	22,995	100.0%	30.1%	6.3%	0.0%
All Other Sales Canopies	1,079	100.0%	9.0%	0.0%	0.7%

[4] See Table 24 Proposed Lighting Standards for the lighting application allowables for each lighting zone.

Energy Demand Impacts

The demand impacts are presented in the tables that follow. The demand impact results follow the patterns described in the preceding energy impacts tables. The demand impact was determined for the winter at 8pm, the time of greatest outdoor lighting usage.

Table 18: Demand Impacts as Percentage of Total Demand

This table presents the demand impact by lighting application, and provides the impact as a percentage of the total demand of each lighting application. Driveways and walkways experience the greatest impacts, while outdoor sales, which includes car dealerships, and "all other sales canopies" produce the least demand savings.

Annual Demand Impacts	Baseline Annual Demand by Lighting Application (New Construction)	Standard Total Demand Savings	Savings as Percent of Lighting Application Demand
Lighting Application	kW	kW	%
Hardscape including parking lots	8,095	1,827	22.6%
Driveways, Site Roads, Sidewalks, Walkways and Bikeways	3,999	2,366	59.2%
Building Entrances (without canopy)	148	61	41.4%
Outdoor Sales Area	662	1	0.1%
Building Façades	343	127	36.9%
Outdoor Sales Frontage (Frontage in linear feet)	62	4	5.9%
Vehicle Service Station Canopies	138	61	44.1%
All Other Sales Canopies	8	0	5.7%
Non-sales canopies	1,468	154	10.5%
Landscape and Ornamental Lighting	257	31	12.2%
Internally Illuminated Panel Signs	1,812	848	46.8%
Externally Illuminated Signs	1,193	863	72.4%
Total	**18,185**	**6,344**	**35%**

Table 19: Demand Impacts by Lighting Zone

This table displays the demand impact results by lighting zone. As with the energy consumption impacts, the greatest savings are within LZ3 due to the vast majority of commercial activity in this lighting zone.

Annual Demand Impacts	Demand Impact by Lighting Zone (kW)				Total Demand Impact (kW)
Lighting Application	LZ1	LZ2	LZ3	LZ4	All Lighting Zones
Hardscape including parking lots	35	519	1,269	4	1,827
Driveways, Site Roads, Sidewalks, Walkways and Bikeways	30	60	2,257	19	2,366
Building Entrances (without canopy)	1	8	51	0	61
Outdoor Sales Area	0	0	0	0	1
Building Façades	3	5	117	1	127
Outdoor Sales Frontage (Frontage in linear feet)	1	0	3	0	4
Vehicle Service Station Canopies	1	5	54	0	61
All Other Sales Canopies	0	0	0	0	0
Non-sales canopies	7	40	106	1	154
Landscape and Ornamental Lighting	3	0	29	0	31
Internally Illuminated Panel Signs	18	35	787	8	848
Externally Illuminated Signs	10	35	810	8	863
Totals	**109**	**709**	**5,484**	**42**	**6,344**

Table 20 Lighting Zone Demand Impacts as Percentage of Total Consumed

This table presents the lighting zone results as a percentage of the total energy consumption of the lighting application.

Annual Demand Impacts	Demand Impact by Lighting Zone as Percentage of Total Standard Impact				Savings as Percent of Lighting Application Demand
Lighting Application	LZ1 %	LZ2 %	LZ3 %	LZ4 %	All Lighting Zones
Hardscape including parking lots	0.43%	6.41%	15.68%	0.05%	22.6%
Driveways, Site Roads, Sidewalks, Walkways and Bikeways	0.76%	1.51%	56.43%	0.47%	59.2%
Building Entrances (without canopy)	0.63%	5.72%	34.67%	0.33%	41.4%
Outdoor Sales Area	0.07%	0.06%	0.00%	0.00%	0.1%
Building Façades	1.00%	1.58%	34.05%	0.28%	36.9%
Outdoor Sales Frontage (Frontage in linear feet)	1.00%	0.00%	4.93%	0.00%	5.9%
Vehicle Service Station Canopies	0.67%	3.74%	39.44%	0.22%	44.1%
All Other Sales Canopies	1.00%	4.64%	0.00%	0.03%	5.7%
Non-sales canopies	0.46%	2.74%	7.24%	0.07%	10.5%
Landscape and Ornamental Lighting	1.00%	0.00%	11.13%	0.03%	12.2%
Internally Illuminated Panel Signs	1.00%	1.92%	43.44%	0.45%	46.8%
Externally Illuminated Signs	0.82%	2.90%	67.92%	0.71%	72.4%
Totals	**1.72%**	**11.17%**	**86.44%**	**0.67%**	**100%**

Table 21: Percentage of Commercial Activity by Climate Zone

This table applies the statewide impact of the standards to the 16 climate zones. The percentages of new construction by climate zone were derived from the Non-Residential New Construction (NRNC) database developed by RLW and Architectural Energy Corporation (AEC).[5] This study utilized the F. W. Dodge database to determine new construction activity in the State of California.

Energy Impact by Climate Zone	Representative City	Percentage of New Construction within Climate Zone	Climate Zone Impact
			kWh
1	Arcata	0.31%	65,053
2	Santa Rosa	7.01%	1,471,027
3	Oakland	15.86%	3,328,173
4	Sunnyvale	7.13%	1,496,209
5	Santa Maria	1.87%	392,414
6	Los Angeles	6.02%	1,263,279
7	San Diego	7.46%	1,565,458
8	El Toro	8.76%	1,838,260
9	Pasadena	10.36%	2,174,015
10	Riverside	8.43%	1,769,010
11	Red Bluff	1.40%	293,786
12	Sacramento	14.50%	3,042,781
13	Fresno	5.96%	1,250,688
14	China Lake	2.40%	503,633
15	El Centro	1.98%	415,497
16	Mount Shasta	0.55%	115,416
Total		100.00%	20,984,698

[5] Values obtained by communication with the AEC project manager responsible for the ongoing NRNC study.

Table 22: Voluntary Reduction Energy Consumption Impacts

This table presents the estimated energy consumption savings due to the imposition of a dawn to dusk voluntary reduction for a duration of 30 days during the winter months, the period of greatest outdoor lighting demand. During this period, the energy consumption of several lighting applications would be reduced by 50%. The affected applications are building facades, parking lots, outdoor sales areas, outdoor sales frontage, and outdoor sales canopies. Because the energy consumption impact calculations assume that the voluntary reduction is applied at sundown and last till dawn, the results should be considered an upper limit.

Voluntary Reduction Energy Consumption Impacts	Original Consumption	Consumption After Measures Applied	Consumption After Measures and Voluntary Reduction Applied	Savings due to Measures and Voluntary Reduction	Savings due to Voluntary Reduction
	kWh	kWh	kWh	kWh	kWh
Hardscape including parking lots	30,854,073	25,548,727	24,484,196	6,369,877	1,064,530
Driveways, Site Roads, Sidewalks, Walkways and Bikeways	13,569,535	6,043,060	6,043,060	7,526,475	0
Building Entrances (without canopy)	501,172	242,817	242,817	258,354	0
Outdoor Sales Area	2,813,184	2,809,615	2,692,547	120,636	117,067
Building Façades	1,185,224	762,294	730,532	454,692	31,762
Outdoor Sales Frontage (Frontage in linear feet)	260,156	237,160	227,278	32,877	9,882
Vehicle Service Station Canopies	492,896	270,943	270,943	221,954	0
All Other Sales Canopies	52,031	50,951	48,828	3,202	2,123
Non-sales canopies	5,934,877	5,396,009	5,396,009	538,868	0
Landscape and Ornamental Lighting	1,044,413	926,438	926,438	117,975	0
Internally Illuminated Panel Signs	7,914,108	4,657,946	4,657,946	3,256,162	0
Externally Illuminated Signs	5,211,146	1,902,155	1,902,155	3,308,991	0
Total	69,832,813	48,848,115	47,622,751	22,210,062	1,225,364

Table 23: Voluntary Reduction Demand Impacts

This table shows the impact on demand from the voluntary reduction. These are calculated at 8pm, the time of greatest winter demand due to commercial outdoor lighting.

Voluntary Reduction Demand Impacts	Original Demand	Demand After Measures Applied	Demand After Measures and Voluntary Reduction Applied	Savings due to Measures and Voluntary Reduction	Savings due to Voluntary Reduction
	kW	kW	kW	kW	kW
Hardscape including parking lots	8,095.4	1,827.2	913.6	7,181.8	913.6
Driveways, Site Roads, Sidewalks, Walkways and Bikeways	3,998.6	2,366.3	2,366.3	1,632.4	0.0
Building Entrances (without canopy)	147.9	61.1	61.1	86.7	0.0
Outdoor Sales Area	662.1	0.8	0.4	661.7	0.4
Building Façades	342.8	126.5	63.3	279.5	63.3
Outdoor Sales Frontage (Frontage in linear feet)	62.5	3.7	1.9	60.6	1.9
Vehicle Service Station Canopies	137.9	60.8	60.8	77.1	0.0
All Other Sales Canopies	7.7	0.4	0.2	7.5	0.2
Non-sales canopies	1,468.4	154.4	154.4	1,314.0	0.0
Landscape and Ornamental Lighting	256.5	31.2	31.2	225.3	0.0
Internally Illuminated Panel Signs	1,811.8	848.2	848.2	963.6	0.0
Externally Illuminated Signs	1,193.0	863.2	863.2	329.9	0.0
Total	18,184.5	6,343.8	5,364.5	12,820.1	979.3

Methodology and Assumptions

The values and methodology for determining the new allowable wattages and areas were based on the language contained in the 2005 Energy Efficiency Standards for Residential and Nonresidential Buildings Workshop Draft #3, Feb. 4, Section 147. The version used for this analysis was downloaded January 14, 2003. Any changes to the standards after this date are not incorporated in this analysis. The Outdoor Lighting Baseline Assessment database was modified to match the requirements of the standards methodology where required. These modifications and assumptions are listed below. The detailed description of the methodologies employed in building the Outdoor Lighting Database can be found in the Outdoor Lighting Baseline Assessment[6].

Lighting Power Allowances

The task to determine the energy and demand impacts of the proposed outdoor lighting standard required the application of the proposed standards to the California Outdoor Lighting Baseline Assessment database and associated model. The specific standards were applied to the data to generate a basecase (current practice) and the proposed standards case. The difference between these two model results provided the energy and demand impact. The standards values are listed below in Table 24. These proposed lighting power density allowables for each lighting application by lighting zone are published in the 2005 Energy Efficiency Standards for Residential and Nonresidential Building Workshop Draft #3, Feb 4.

[6] This report was completed by RLW Analytic, Inc on November 8, 2002 and submitted the New Buildings Institute (NBI) on behalf of the California Energy Commission Public Interest Energy Research (PIER) Program. It can be downloaded from the NBI website: www.newbuildings.org.

Table 24: Proposed Lighting Standards

Table 147-A: Lighting Power Allowances for General Site Illumination	Allowance (w/sqft unless otherwise noted)			
	LZ1	LZ2	LZ3	LZ4
Hardscape including parking lots	0.04	0.06	0.08	0.15
Driveways, Site Roads, Sidewalks, Walkways and Bikeways	0.04	0.06	0.08	0.15
Building Entrances (without canopy)	0.35	0.50	0.70	1.00
Outdoor Sales Area	0.35	0.70	1.25	2.00
Building Façades	Not allowed	0.18	0.35	0.50
Outdoor Sales Frontage (Frontage in linear feet)	Not allowed	22.5 w/lf	38.5 w/lf	55 w/lf
Vehicle Service Station Canopies	0.70	1.00	1.25	2.00
All Other Sales Canopies	Not allowed	0.70	1.00	1.25
Non-sales canopies	0.12	0.25	0.50	0.70
Landscape and Ornamental Lighting	Not allowed	0.01	0.02	0.04
Internally Illuminated Panel Signs	Not allowed	11.00	11.00	11.00
Externally Illuminated Signs	1.00	1.80	2.30	2.30

Definitions and Methods

"Lighting Zones" determine the allowable lighting power density for the lighting applications. The determination of baseline energy consumption, and associated standards impact, required the allocation of each lighting application area between the four lighting zones.

The zones are divided into two general conditions, rural (LZ1 and LZ2) and urban (LZ3 and LZ4). The relative distribution between these conditions was based on the percentage of urban and rural energy consumption determined from the baseline analysis, using the US Census definitions by census block. This analysis provided an overall distribution of 92% of the statewide energy consumption in urban areas, and in 8% rural areas. The census information is reported by census block but is actually determined at the larger census block group level. This methodology defines many rural blocks within urban block groups and therefore over-represents the urban classification.

The baseline database allows for the determination of urban or rural classification at the site level for most lighting applications that have large sample sizes. However, the sample sizes for outdoor retail sales, gas station canopies, and outdoor sales frontage were too limited to determine a reliable estimate of urban and rural classification. For these lighting applications the statewide urban/rural ratio was used.

Information on the commercial activity for two of lighting zones, LZ1 (a subset of rural) and LZ4 (a subset of urban) is not available from the baseline database or published research. Therefore, an energy demand of 1% of the total new energy demand is assumed for each of these. The associated impact reported for each is calculated by determining the impact of the new standard applied to 100% of the new construction, then by multiplying the result by 1%. For example: To determine the impact of the LZ1 standard on parking, the LZ1 standard is applied to all new parking area resulting in a impact of 12,992,100 kWh. However, the area of new parking within LZ1 is assumed to be 1%. Therefore, the impact of the LZ1 standard is (12,992,100 kWh) x 0.01 = 129,921 kWh.

Table 25 below presents the lighting zone percentages for each of the lighting applications. These percentages originated from the California Outdoor Lighting Baseline Assessment using data from the US Census.[7]

Table 25: Statewide Commercial Activity by Lighting Zone

Lighting Zone Designations	**New Construction Energy Consumption by Lighting Zones** (Defined_by_US_Census)				**% Urban**
	LZ1 (Rural)	LZ2 (Rural)	LZ3 (Urban)	LZ4 (Urban)	All Zones
Lighting Application	kWh	kWh	kWh	kWh	%
Hardscape including parking lots	1.0%	8.2%	89.8%	1.0%	90.8%
Driveways, Site Roads, Sidewalks, Walkways and Bikeways	1.0%	2.2%	95.8%	1.0%	96.8%
Building Entrances (without canopy)	1.0%	12.1%	85.9%	1.0%	86.9%
Outdoor Sales Area	1.0%	7.0%	91.0%	1.0%	92.0%
Building Façades	1.0%	8.4%	89.6%	1.0%	90.6%
Outdoor Sales Frontage (Frontage in linear feet)	1.0%	7.0%	91.0%	1.0%	92.0%
Vehicle Service Station Canopies	1.0%	7.0%	91.0%	1.0%	92.0%
All Other Sales Canopies	1.0%	12.6%	85.4%	1.0%	86.4%
Non-sales canopies	1.0%	7.9%	90.1%	1.0%	91.1%
Landscape and Ornamental Lighting	1.0%	2.6%	95.4%	1.0%	96.4%
Internally Illuminated Panel Signs	1.0%	3.3%	94.7%	1.0%	95.7%
Externally Illuminated Signs	1.0%	2.6%	95.4%	1.0%	96.4%

Antiquated technologies: The Outdoor Lighting Baseline Assessment database was reviewed for antiquated methodologies and equipment. However, all equipment reported in the study is currently available. While there are clearly inappropriate applications of outdoor lighting, there is no indication that these practices have been discontinued in current lighting configurations. Therefore, all data in the Outdoor Lighting Baseline Assessment database is considered to be applicable for the evaluation of new construction.

Voluntary reduction impact was determined by assuming 50% impact on the energy consumption of those affected lighting applications. The affected applications are building facades, parking lots, outdoor sales areas, outdoor sales frontage, and outdoor sales canopies. The energy consumption impact calculations assume that the voluntary reduction is applied at sundown and lasts till dawn. Therefore, the results should be considered an upper limit.

[7] U.S. Census Bureau: www.factfinder.census.gov

Lighting Applications

Vehicle Service Station Canopies include only newer modern gas stations. The older gas station canopies were reclassified as "all other sales canopies". This allowed a more accurate representation of the vehicle service station canopies in the results.

Outdoor Sales Frontage is an entirely new lighting application that required conversion of the baseline methodology. The area assigned as "frontage" was the sales area edge along the "principal viewing area" multiplied by 3 times the luminaire height. This area was deducted from the area defined as "outdoor retail sales". No more than one edge was defined as frontage.

Because the database is based on area for each lighting application, the areas had to be converted to linear feet as specified by the standard. Area was converted to a linear ft value by dividing by 50 ft (2.5 times the assumed luminaire height of 20ft). For example, a frontage area of 15,000 sqft would be converted to 300lnft (15,000/50). If the installed wattage for the frontage area is 12,000 watts, the LPD would be 40 watts/lnft..

Hardscape includes parking lots, security lighting and storage area lighting. These were reported separately in the baseline report.

Walkway areas were converted to linear feet by assuming a typical width of 6 feet. The areas recorded within the baseline assessment for this application were divided by 6 to convert to linear ft. Method 1 of the standard defines the area to include 5 feet on either side of the walkway. Therefore the baseline areas were converted to the code equivalent by multiplying the baseline area by (5+6+5)/6.

Non-sales Canopies draw baseline data from a wide range of lighting applications. The standard specifies that the "illuminated area is defined as any area within a square pattern… less any that is under a canopy". Therefore the lit parking area that is under a canopy is governed by the non-sales canopies standards, rather than the parking standards. Walkways and entries also have significant areas redefined as non-sales canopies for this analysis.

Landscape and Ornamental Lighting area calculations are based on the total area of the site. This comprehensive area calculation is balanced by allowables that are roughly 25% of those for parking areas.

Internally Illuminated Panel Sign baseline information is calculated from the measured area of the cabinet signs on each site, due to the typical lack of nameplate information in the field. This recorded area was multiplied by 20 watts / sqft to determine the baseline energy consumption of each sign.

Conclusions

The application of the California Outdoor Lighting Baseline Assessment database and model to the proposed 2005 Energy Efficiency Standards for Commercial Outdoor Lighting has allowed the detailed estimation of the expected statewide impact. The total annual energy savings are projected to be 20,985 MWh, 30% of the total energy consumption for these lighting applications. The total demand savings are estimated to be 6,344 MW, 35% of the total demand at the peak nighttime hour. Estimates were made for the voluntary reductions provision. However, the actual impact will depend on the duration of the voluntary reductions.

These savings are concentrated in three lighting applications, parking lots and hardscape, driveways and walkways, and signs (internally and externally illuminated). The applications that experience the least impacts include outdoor sales and outdoor sales frontage (which includes car dealerships), sales canopies (excluding gas station canopies), and non-sales canopies.