Energy Management Plan

for Clean Buildings Performance Standard Compliance

Cavelero Mid-High School

LSSD

Current Date: 5/20/2026

HARGIS

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Introduction

The purpose of the Energy Management Plan (EMP) is to optimize the building's energy performance and indoor environmental quality by monitoring energy consumption, budgeting for future capital upgrades, surveying building occupants, and consolidating information from energy past projects and building contacts. The EMP should be completed annually to maximize its effectiveness. The Clean Buildings Performance Standard (CBPS) requires implementation of the EMP a minimum 12 months prior to the compliance deadline. The current CBPS compliance cycle deadline is June 1, 2026.

The building owner will review and sign the energy management plan ***annually***.

Building Owner Signature: _____ Date: _____ [2026]

_____ Date: _____ [2027]

_____ Date: _____ [2028]

_____ Date: _____ [2029]

_____ Date: _____ [2030]

_____ Date: _____ [2031]

_____ Date: _____ [2032]

_____ Date: _____ [2033]

This energy management plan is made available to occupants on an annual basis via the facility webpage. https://www.lkstevens.wednet.edu/departments/facilities

Building Summary

This section provides a summary of the building and systems in the table below, as well as identifies whether an item has changed since the last EMP was submitted.

Item	Description	Changes (Y/N)
Name	Cavelero Mid-High School	N/A
Address	8220 24th St SE, Lake Stevens, WA 98258	N/A
Gross Floor Area (SF)	236,670	N/A
Building Activity: Primary / Secondary (if applicable)	High School	N/A
Tenant(s)	N/A	N/A
Number of Occupants (average)		N/A
Weekly Operating Hours	50	N/A

Mechanical System: Heating Cooling Ventilation Service Water Heating	 Gas Boilers Air-Cooled Chillers AHUs DHW Heaters	N/A
Lighting Technology	LED and Fluorescent	N/A
HVAC Controls	DDC Controls	N/A

Building WN-EUI and EUI

[Compliance Section 5.1.2.2]

Annual utility data is listed in the table below for each type of energy used by the building. If renewable energy is used within the building, it does not need to be accounted for. However, if excess renewable energy is exported, it should be included in the table below. The net energy use is calculated by summing each type of energy usage in the table and subtracting the excess renewable production. Units for each energy source are listed below each type in brackets [ ]. Convert to the appropriate units before calculating the net energy use.

- To convert from kWh to kBTU, multiply electricity usage by 3.412.
- To convert from therms to kBTU, multiply gas usage by 100.
- To convert from gallons to kBTU, multiply propane usage by 125.

Net Energy Use = (Electricity Usage + Gas Usage + Bulk Fuel) – (Excess Renewable Production)

Year	Electricity Usage [kWh]	Gas Usage [therms]	Bulk Fuel (propane) [gal]	Excess Renewable Production [kWh]	Net Energy Use [kBTU]
2023	1,481,807	45,183	N/A	N/A	9,574,254
2024	1,506,997	39,774	N/A	N/A	9,119,364
2025	1,607,392	47,917	N/A	N/A	10,276,191
2026	1,607,400	45,596	N/A	N/A	10,044,070
2027					
2028					
2029					
2030					
2031					
2032					

Source: Energy Star Portfolio Manager

An example calculation to convert electricity and natural gas usage into EUI using values from 2024 is shown as follows:

Electricity Usage = 1,481,807 kWh/yr x 3.412 kBTU/kWh = 5,055,924 kBTU/yr

Gas Usage = 45,183 therms/yr x 100 kBTU/therm = 4,518,330 kBTU/yr

Total Energy Usage = Electricity Usage + Gas Usage = 5,055,924 kBTU/yr + 4,518,330 kBTU/yr = 9,574,254 kBTU/yr

EUI = Total Annual Energy Usage / Gross Floor Area = 9,574,254 kBTU/yr/ 236,670 sf = ***40.5***

Annual Update of Building Net Energy Use, EUI, WN-EUI, and EUI_t

[Compliance Sections 5.1.2.3, 5.1.2.4]

The EUI is the annual net energy usage per gross floor area (GFA) of the building. The target EUI (EUI_t) is the goal that building owners should aim to achieve to comply with the Clean Buildings Performance Standard. EUI_t is calculated by multiplying the operation shift normalization factor (S) with the starting EUI target (EUI_{t1}) listed in Tables 7.2 and 7.3 of the Clean Buildings Performance Standard.

$$EUI_t = S \times EUI_{t1}$$

For this building, the operation shift normalization factor (S) is **0.9** for all areas. The activity target (EUI_{t1}) is **48**. If the building contains multiple activity types, utilize Section 7.2.3 of the standard. Refer to the table below for the overall area weighted EUI_t. This table only needs to be updated if operating hours, usage, or space changes occur. The activity type is noted as Education with sub-type K-12 school (High School).

Space	Area [sf]	Weekly Operating Hours	Activity Type	EUI_t [kBTU/sf/yr]	S Factor	Adjusted EUI_t [kBTU/sf/yr]
All Buildings	233,970	50	K-12	48	0.9	43.2
Portables	2,700	40	K-12	48	0.9	43.2
Total Area	236,670				**Area Weighted EUI_t**	43.2

The table below outlines the prior and current year's net energy usage and various Energy Usage Intensity (EUI) metrics for the building. The Weather Normalized EUI (WN-EUI) is the adjusted energy consumption accounting for weather conditions during the performance period against average weather conditions of the region. The WN-EUI is provided by Energy Star Portfolio Manager (ESPM).

Year	Net Energy Use [kBTU]	EUI [kBTU/sf/yr]	WN-EUI [kBTU/sf/yr]	EUI_t [kBTU/sf/yr]
2023	9,574,254	42.3	40.5	43.2
2024	9,119,364	38.5	41.9	43.2
2025	10,276191	43.4	46.1	43.2
2026	10,044,070	42.4	43.1	43.2
2027				
2028				
2029				
2030				
2031				
2032				

Source: Energy Star Portfolio Manager, Utility Data

Building Characteristics Impacting Changes in WN-EUI and EUI

[Compliance Section 5.1.2.5]

Changes in building occupancy or operating hours that have impacted the measured WN-EUI are outlined in the table below.

Year	Occupancy	Operating Hours
2023	1463 Students / 161 Staff	50/week
2024	1405 Students / 161 Staff	50/week
2025	1433 Students / 163 Staff	50/week
2026	1495 Students/ 163 Staff	50/week
2027		
2028		
2029		
2030		
2031		
2032		

Changes in operational factors that may impact WN-EUI are outlined in the table below.

Year	Temperature Setpoints	Equipment Schedules
2023	N/A	N/A
2024	N/A	N/A
2025	65-72	9hrs 5 days/WK
2026	65-72	9hrs 5 days/WK
2027		
2028		
2029		
2030		
2031		
2032		

Changes in gross floor area (GFA) and/or major buildings systems that have impacted WN-EUI are outlined in the table below.

Year	Gross Floor Area (SF)	Building System(s) Changes
2023	236,670	N/A

Energy Audit Reports and EEM Recommendations

[Compliance Section 5.1.2.6]

Document energy audit(s) completed within the past 5 years including a list of recommended Energy Efficiency Measures (EEM) from each audit. An energy audit was completed and is included in Appendices C and D for reference along with a list of recommended EEMs.

Refer to Appendix D for EEM recommendations.

Year Completed	Service Provider	List of Recommended EEMs
2024	Hargis Engineers	BMS Controls Efficiency Improvements

EEM Implementation

[Compliance Section 5.1.2.7]

Document implemented EEMs since the last Energy Management Plan was completed. Include the following documentation for the EEMs:

1) Operations and Maintenance plan.
2) Implementation plan, including commissioning.
3) Staff training plan.
4) Ongoing commissioning plan.

Implemented EEMs	Implementation Date	Predicted EUI Savings [kBTU/sf/yr]	Measured EUI Savings (if known) [kBTU/sf/yr]
BMS Controls Update	8/2026	Unknown	Unknown

Occupant Awareness

[Compliance Section 5.1.2.8]

Document method to inform occupants about the benefits of efficient energy use, and to instruct them in the use and adjustment of operable windows, HVAC system controls, and lighting system components and controls. In addition, document method to inform occupants of the Energy Management Plan, which should occur on an annual basis. See Appendix G for educational documents used to raise occupant awareness.

Topic #1: CBPS			
Participants	Instruction Method	Date	Year
All school admin and office staff	Direct in person	Month of February	2026

Board members and public	Direct in person	May 27th	2026

Topic #2: Tennant Assistance			
Participants	Instruction Method	Date	Year
Building Admin and Office Staff	Direct in person	September	2026
Building Staff	Messaging from Facilities Dept.	October	2026

O&M Personnel Training Plan

[Compliance Section 5.1.2.9]

This section outlines how the operations and maintenance staff will be trained to achieve established indoor environmental targets while optimizing energy efficiency. Refer to construction documents, program standards, and building requirements for optimal indoor environmental targets.

Building System: Central Plant

Employee Name	Date Completed	Training Hours	Topics Covered
Steve Hendrickson	5/11/2026	1	Systems, how they operate, and service required
Don Hayes	5/11/2026	1	Systems, how they operate, and service required
James Main	5/11/2026	1	Systems, how they operate, and service required
Scott Walker	5/11/2026	1	Systems, how they operate, and service required
Ted Human	5/11/2026	1	Systems, how they operate, and service required
Brett Hottendorf	5/11/2026	1	Systems, how they operate, and service required
Kellie Gibbs	5/11/2026	1	Systems, how they operate, and service required
Bobby Vaughn	5/11/2026	1	Systems, how they operate, and service required

Building System: HVAC

Employee Name	Date Completed	Training Hours	Topics Covered
Steve Hendrickson	5/11/2026	1	Systems, how they operate, and service required

Don Hayes	5/11/2026	1	Systems, how they operate, and service required
James Main	5/11/2026	1	Systems, how they operate, and service required
Scott Walker	5/11/2026	1	Systems, how they operate, and service required
Ted Human	5/11/2026	1	Systems, how they operate, and service required
Brett Hottendorf	5/11/2026	1	Systems, how they operate, and service required
Kellie Gibbs	5/11/2026	1	Systems, how they operate, and service required
Bobby Vaughn	5/11/2026	1	Systems, how they operate, and service required

Building System: DHW

Employee Name	Date Completed	Training Hours	Topics Covered
Steve Hendrickson	5/11/2026	1	Systems, how they operate, and service required
Don Hayes	5/11/2026	1	Systems, how they operate, and service required
James Main	5/11/2026	1	Systems, how they operate, and service required
Scott Walker	5/11/2026	1	Systems, how they operate, and service required
Brett Hottendorf	5/11/2026	1	Systems, how they operate, and service required
Kellie Gibbs	5/11/2026	1	Systems, how they operate, and service required
Bobby Vaughn	5/11/2026	1	Systems, how they operate, and service required

Ted Human	5/11/2026	1	Systems, how they operate, and service required

Building System: Lighting			
Employee Name	Date Completed	Training Hours	Topics Covered
Ted Human	5/12/2026	1	Systems, how they operate, and service required
Brett Hottendorf	5/12/2026	1	Systems, how they operate, and service required
James Main	5/12/2026	1	Systems, how they operate, and service required
Scott Walker	5/12/2026	1	Systems, how they operate, and service required
Don Hayes	5/12/2026	1	Systems, how they operate, and service required
Steve Hendrickson	5/12/2026	1	Systems, how they operate, and service required
Kellie Gibbs	5/12/2026	1	Systems, how they operate, and service required
Bobby Vaughn	5/12/2026	1	Systems, how they operate, and service required

Capital Management Plan

[Compliance Section 5.1.2.10]

This section identifies equipment that is at or nearing end-of-life and target funding year to replace. All replacement equipment should be Energy Star certified (or similar). Refer to Operations and Maintenance Plan Equipment List for remaining useful life, manufacturer information, and other data. All replacement equipment will meet current energy codes.

Equipment ID	Year added to EMP	Target Funding Year for Replacement	Estimated Replacement Cost	Energy Star of Similar Replacement Equipment

All equipment currently within useful life.

Supplier and Manufacturer Contact List

[Compliance Section 5.1.2.11]

This section provides a contact list of relevant building contacts, such as equipment suppliers, manufacturers, service contractors, consultants, qualified energy auditors, qualified energy managers, resource conservation managers, and building owners.

Name	Company	Role	Phone	Email
Bobby Vaughn	LSSD	Manager of Facilities and Operations	425-335-1633	Bobby_vaughn@lkstevens.wednet.edu
Kellie Gibbs	LSSD	Assistant Supervisor of Facilities and Operations	425-335-1646	Kellie_gibbs@lkstevens.wednet.edu
Ed Campbell	Commercial Chemtech	Water Treatment	206-932-0841	Ed.campbell@commercialchemtech.com
Mike Baranick	Hargis Engineers	Qualified Energy Auditor	206-436-0448	Michael.baranick@hargis.biz
Cary Bombino	ATS	BMS Controls	425-251-9680	Cary.bombino@atspnw.com
Ty Hershaw	Harris	HVAC/Boiler	360-305-8888	thershaw@harriscompany.com

Lighting Schedule and LPD

[Compliance Section 5.1.2.12]

Note that buildings that meet the EUI_t can be excluded from this requirement. Tier 2 buildings are also excluded. Buildings that have implemented a utility program lighting upgrade covering 75% of the building's GFA within the previous five years can use the lighting schedule provided by the utility program. For buildings that do not meet the EUI_t, separate lighting schedule and lighting power density documents should be included.

Refer to Appendix E for lighting schedule and lighting power density.

Lighting Satisfaction Survey and Checklist

[Compliance Section 5.1.2.13]

Note that buildings that meet the EUI_t can be excluded from this requirement. Tier 2 buildings are also excluded. Buildings that have implemented a utility program lighting upgrade covering 75% of the building's GFA within the previous five years can use the lighting schedule provided by the utility program. For buildings that do not meet the EUI_t, a separate lighting satisfaction survey and checklist should be included.

Refer to Appendix F for example survey and checklist.

Operations and Maintenance Plan

[Compliance Section 5.1.2.14]

Refer to separate Operations and Maintenance Plan document.

Appendix A: Abbreviations

Terms	BMS	Building Management System. A computer-based, automated control system that can be used to monitor and manage the mechanical, electrical, and electromechanical systems in a building; also referred to as Building Automated Systems (BAS).
	CBPS	Clean Building Performance Standard
	EEM	Energy Efficiency Measure. An action taken in the operation or equipment in a building which reduces energy use of the building while maintaining or enhancing the building's safety, comfort, and functionality.
	EMP	Energy Management Plan
	ESPM	Energy Star Portfolio Manager
	EUI	Energy Use Intensity. EUI is a metric that analyzes a building's annual energy performance and is normalized by the building's area, allowing for a meaningful comparison between buildings of different sizes. The units of EUI are kBTU/ft^2/Yr and include both electrical and heating fuel energy consumption.
	GFA	Gross Floor Area
	GHG	Greenhouse Gas Emissions
	LPD	Lighting Power Density
	WN-EUI	Weather Normalized Energy Use Intensity.
Units	BTU	British Thermal Unit. A BTU is the amount of energy needed to heat one point of water by one degree Fahrenheit.
	kBTU	One thousand BTUs
	kW	Kilowatt. A unit of power, equal to one thousand watts.
	kWh	Kilowatt-hour. A unit of electrical energy consumption, equal to 3,413 BTUs.
	kBTU	One thousand BTUs per hour
	MBTU	One million BTUs

Appendix B: Energy Benchmarking Analysis

LSSD

Cavelero MS-HS

Building Identification:

Address: 8220 24th St SE
Lake Stevens, WA 98258
ESPM # 23795122
CBPS # TBD

Compliance Outlook:

Compliance **Complies with EUI_t path (with exception to 2022)**

Margin 0-25% depending on year

Recommendation(s)
1) Evaluate Building Management System (BMS) for no/low-cost ECMs.
2) Update building details within ESPM.
3) Ensure Operations and Maintenance Plan is developed and implemented 12 months before compliance deadline.
4) Ensure Energy Management Plan is developed and implemented 12 months before compliance deadline.
5) Continue to benchmark energy performance up through compliance deadline.

Compliance Deadline:

>220,000 GFA	June 2026
>90,000 GFA	June 2027
>50,000 GFA	June 2028
>20,000 GFA	TBD

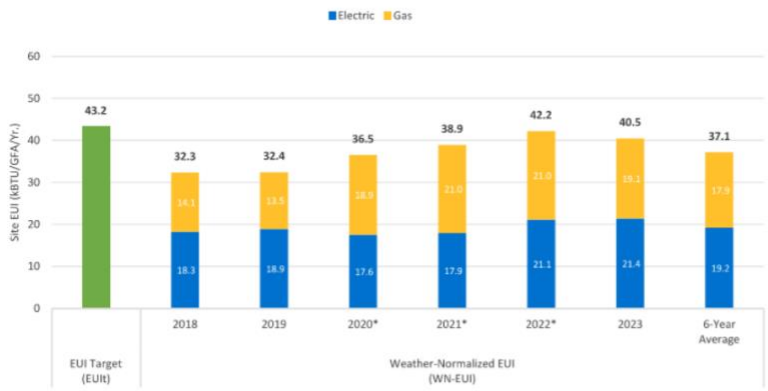
Note: EUI performance period not to exceed two-years prior to compliance deadline.

Energy Use Intensity Target (EUI_t) Calculation :

Climate Zone 4C
New Building* N *permitted after June 30th, 2016

Area #	Area Description	Gross Floor Area (GFA)	Weekly Operating Hours	Portfolio Manager Types	Portfolio Manager Sub-Types	Sub-Types: Detailed	EUI_t	Operating Shift Normalization Factor	Adjusted EUI_t
1	Educational Buildings	233,970	50	Education	K-12 School	High school	48	0.9	43.2
2	Gymnasium	0	50	Education	K-12 School	High school	48	0.9	43.2
3	Portables	2,700	50	Education	K-12 School	High school	48	0.9	43.2
		236,670						Overall Area-Weighted EUI_t	43.2

Historical EUI Comparison:



Comments:

1) Missing May and Sept 2018 gas consumption.

2) Missing July, Aug, Oct, and Nov 2019 gas consumption.

*EUI likely impacted due to COVID-19

Site Map:

Appendix C: Energy Audit Report Summary

N/A – no energy audits completed at the time of this report.

Appendix D: Recommended EEM Summary

EEM		CBPS Compliance Analysis		Measure Implementation			
EEM Number	Description	Required to meet EUI_t	Required to meet FIC	Implemented (Y/N)	Implementation Plan	Staff Training Plan	Ongoing Commissioning Plan

Appendix E: Lighting Schedule and Lighting Power Density

LUMINAIRE SCHEDULE

Type	Description	Lamps	W/VA	Manufacturer
DF.A1	RECESSED DOWN LIGHT 5" OPEN APERTURE DOWN LIGHT, SELF-FLANGED, VERTICAL LAMP WITH CLEAR SPECULAR LOW-IRIDESCENT REFLECTOR.	(1) 32TRT T4 GX24q-3	36/37	PEACHTREE "PFT" SERIES IRIS "P5" SERIES GOTHAM "5"AFV" SERIES VANTAGE "A5VF" SERIES
DF.A1A	SAME AS DF.A1, EXCEPT WITH DIMMING BALLAST			
DF.B1	SURFACE SHALLOW EXTERIOR CANOPY DOWNLIGHT 13" ROUND, SURFACE MOUNTED, UV STABALIZED, HIGH IMPACT, POLYCARBONATE LENS, NEOPRENE GASKETED SEAL, UL WET LOCATION, MAX DEPTH OF 7" WITH SURFACE ADAPTER.	(2) 13TT T4 GX24q-3	29/30	KENALL "MR13FL" SERIES LUMINAIRE 'ARV' SERIES DAYBRITE
DF.C1	RECESSED WET LOCATION DOWN LIGHT 6 3/4" APERATURE, FLUSH BREAK RESISTANT POLYCARBONATE LEXAN DIFFUSER, UL WET LOCATION.	(1) 32TRT T4 GX24q-3	36/37	PRESCOLITE "TBX" SERIES OMEGA LIGHTING "S6" SERIES
DF.D1	DECORATIVE DOWN LIGHT SEMI RECESSED DOWNLIGHT WITH HAND BLOWN GLASS DIFFUSER	(1) 32TRT T4 GX24q-3	36/37	WILA "DECO LITES" SERIES LOUIS POULSEN "BALLERUP" SERIES HESS "MESSINA" SERIES
DH.A1	ADJUSTABLE HALOGEN ACCENT LIGHT, DISPLAY CASES PINHOLE TYPE WITH BLACK OCULUS, 36 DEGREE BEAM ANGLE, REMOTE 12V TRANSFORMER	(1) 37 MR-16 GU5.3	37/41	ARDEE "AD35" SERIES IRIS "PN3MR E3PIN" LITHONIA "DLV" SERIES DASAL "PICOLO" SERIES
DM.A1	METAL HALIDE WET/DAMP LOCATION DOWN LIGHT 7" APERTURE LENSED DOWN LIGHT, SELF-FLANGED, VERTICAL LAMP WITH CLEAR SPECULAR LOW-IRIDESCENT REFLECTOR.	(1) 39 T6 CMH	45/47	ERCO "81030" SERIES KIRLIN CO. "HRR" SERIES PEACHTREE "PMH" SERIES
EL.A1	EXIT SIGN CAST ALUMINUM EXIT SIGN, SINGLE OR DOUBLE FACE AS REQUIRED, FIELD INSTALLED. DIRECTIONAL ARROWS, UNIVERSAL MOUNTING HARDWARE.	GREEN LED	3/3	MCPHILBEN "ER55" SERIES LITHONIA "SIGNATURE" SERIES COOPER LIGHTING "CX" SERIES DUAL LITE "SEMPRA" SERIES
EL.B1	SEVERE DUTY EXIT SIGN CAST ALUMINUM EXIT SIGN, VANDAL RESISTANT, SINGLE OR DOUBLE FACE AS REQUIRED, FIELD INSTALLED. DIRECTIONAL ARROWS, UNIVERSAL MOUNTING HARDWARE.	GREEN LED	3/3	MCPHILBEN "ER60" SERIES LITHONIA "EXTREME" SERIES COOPER LIGHTING "UX" SERIES DUAL LITE "SEMPRA SC" SERIES
GM.A1	IN GRADE SPOT SPOT REFLECTOR, UL WET LOCATION, DIRECT BURIAL AND CONCRETE POUR, DOUBLE LENSED, HONEYCOMB LOUVER, FLUSH FACE PLATE, CORROSION-FREE COMPOSITE FIXTURE HOUSING, AIMING BRACKET ROTATES 360 DEGREES, HIGH HEAT, SHOCK RESISTANT, TEMPERED 1/4" THICK BOROSILICATE FLAT GLASS LENS, CONDUIT SEALS. PROVIDE INTERNAL TEMPERATURE REDUCTION LENS.	(1) 39 PAR20 CMH	45/47	HYDREL "M9400A" SERIES EXTERIEUR VERT "SPITP" SERIES BRONZELITE "DB5000" SERIES
GM.B1	IN-GRADE METAL HALIDE, SIGN LIGHT GROUND MOUNTED METAL HALIDE, WIDE FLOOD DISTRIBUTION, UL WET LOCATION TAMPER PROOF SCREWS, 360 HORIZONTAL & 90 DEGREE VERTICAL ADJUSTMENT, NPF BALLAST, PROVIDE GUARD. PROVIDE FUSING.	(1) 39WT4 MH	39/56	GARDCO "MINIRAY"
HF.A1	PENDANT MOUNTED DIRECT/INDIRECT LINEAR FLUORESCENT INDIRECT DOWN LIGHT COMPONENT, LENS HOUSING, 20-GAUGE STEEL, ADJUSTABLE AIRCRAFT CABLE SUSPENSION. MOUNT 18" BELOW CEILING UON. INTEGRATE WATTSTOPPER OCCUPANCY SENSOR W/DAYLIGHT OPTION INTO FIXTURE. REFER TO SPEC SECTION 16500.	(2) F54T5HO	118/121	LITECONTROL "PID" SERIES LIGHTOLIER "ENERGOS" PEERLITE "CERRA ID" SERIES PAL "LMS" SERIES
HF.A1A	SAME AS HF.A1, EXCEPT PROVIDE WITH SLOTTED HOUSING			
HF.B1	PENDANT MOUNTED INDIRECT LINEAR FLUORESCENT INDIRECT DOWN LIGHT COMPONENT, LENS HOUSING, 20-GAUGE STEEL, ADJUSTABLE AIRCRAFT CABLE SUSPENSION. MOUNT 18" BELOW CEILING UON. INTEGRATE WATTSTOPPER OCCUPANCY SENSOR W/DAYLIGHT OPTION INTO FIXTURE. REFER TO SPEC SECTION 16500.	(1) F54T5HO	60/62	LIGHTOLIER "ENERGOS" PEERLITE "CERRA ID" SERIES PAL "LMS" SERIES LITECONTROL "PID" SERIES
HF.C1	FLUORESCENT PRISMATIC GYM PENDANT LOW PROFILE SPUN STEEL HOUSING, CLEAR PRISMATIC ACRYLIC IMPACT RESISTANT LENS, THERMOSET POLYESTER POWDER COAT FINISH, UL DAMP LOCATION. PROVIDE WITH POWER HOOK ASSEMBLY AND RIGID STEM PENDANT.	(8) 40W BIAX	288/320	SPI LIGHTING "IPS" SERIES LAM "LX32" SERIES
HF.D1	FLUORESCENT PRISMATIC GYM PENDANT LOW PROFILE SPUN STEEL HOUSING, CLEAR PRISMATIC ACRYLIC IMPACT RESISTANT LENS, INTEGRAL ELECTRONIC BALLAST, THEREMOSET POLYESTER POWDER COAT FINISH, UL DAMP LOCATION. PROVIDE WITH POWER HOOK ASSEMBLY AND RIGID STEM PENDANT.	(3) 40W BIAX	108/120	SPI LIGHTING "IPS" SERIES LAM "LX32" SERIES
HF.E1	PENDANT MOUNTED IMPACT RESISTANT PENDANT MOUNTED, LINEAR FLUORESCENT, UL LISTED FOR WET LOCATIONS, 22-GAUGE GALVANIZED STEEL, FULLY NEOPRENE GASKETED.	(2) F54T5HO	118/121	PRUDENTIAL "P-5160" SERIES PARAMOUNT LIGHTING "C4" SERIES KURTZON "WLB" SERIES
HF.F1	NOT USED			
HF.G1	SAME AS SF.E1, EXCEPT PENDANT MOUNTED			
HM.A1	DECORATIVE PENDANT CLEAR POLYCARBONATE CONE SHAPE, OPAL POLYCARBONATE SHADE, SPUN ALUMINUM REFLECTOR, DIE CAST ALUMINUM RING, HOUSING AND STRUTS. STAINLESS STEEL AIRCRAFT CABLE SUSPENSION, WHITE CANOPY, POWER CORD WITH GREY BRAIDED COVERING, UL DAMP LOCATION.	(1) 70CMH ED28	70/80	LOUIS POULSEN "LP CHARISMA" SERIES WINONA LIGHTING "MOD-CUSTOM" SERIES
HM.B1	SAME AS SM.A1, EXCEPT PENDANT MOUNTED			
PM.A1	30' POLE MOUNTED LUMINAIRES SINGLE HEAD, DISTRIBUTION TYPE III, PAINTED FIBERGLASS POLE.	(1) 250 ED28 CMH	288/320	AAL "LARGENT" SERIES INVUE "MESA" SERIES BEGA/US "8082" SERIES
PM.A2	30' POLE MOUNTED LUMINAIRES DOUBLE HEAD, DISTRIBUTION TYPE III, PAINTED FIBERGLASS POLE.	(2) 250 ED28 CMH	576/640	AAL "LARGENT" SERIES INVUE "MESA" SERIES BEGA/US "8082" SERIES
PM.A3	12' POLE MOUNTED LUMINAIRES SINGLE HEAD, DISTRIBUTION TYPE IV, 20" HEAD ALUMINUM POLE,	(1) 70 ED28 CMH	90/100	AAL "LARGENT" SERIES INVUE "MESA" SERIES BEGA/US "8081" SERIES
PM.B1	FLOOD LIGHT MOUNT ON FIXTURE TYPES PM.A1 AND PM.A2 AS SHOWN ON DRAWINGS AT 26' AFF. PROVIDE WITH A 65 DEGREE TILT. FINISH TO MATCH PM.A1,PM.A2 & PM.A3	(1) 250 ED28 CMH	288/320	KIM LIGHTING "AFL20" SERIES GARDCO "DF12-VFL" HYDREL "7200" SERIES INVUE "VISION" SERIES HADCO "WA3-VF" SERIES
RF.A1	NOT USED			

RF.B1	RECESSED 2' X 4' TROFFER CODE GAUGE STEEL HOUSING, REGRESSED ALUMINUM, FULLY GASKETED DOOR FRAME, SPECIFICATION-GRADE, 0.125" ACRYLIC 12 PATTERN LENS.	(2) F32T8	46/47	COLUMBIA "ST824" SERIES DAYBRITE "TG8" SERIES METALUX "2GC8" SERIES LITHONIA "2SP8" SERIES
RF.B2	RECESSED 1' X 4' TROFFER CODE GAUGE STEEL HOUSING, REGRESSED ALUMINUM, FULLY GASKETED DOOR FRAME, SPECIFICATION-GRADE, 0.125" ACRYLIC 12 PATTERN LENS.	(2) F32T8	46/47	COLUMBIA "ST814" SERIES DAYBRITE "TG" SERIES METALUX "2GC8" SERIES LITHONIA "SP8" SERIES
RF.B3	RECESSED 2'X4' TROFFER CODE GAUGE STEEL HOUSING, REGRESSED ALUMINUM, FULLY GASKETED DOOR FRAME, SPECIFICATION-GRADE, 0.125" ACRYLIC 12 PATTERN LENS.	(3) F32T8	71/69	COLUMBIA "ST824" SERIES DAYBRITE "TG8" SERIES METALUX "2GC8" SERIES LITHONIA "2SP8" SERIES
RF.B4	RECESSED 2'X2' TROFFER CODE GAUGE STEEL HOUSING, REGRESSED ALUMINUM, FULLY GASKETED DOOR FRAME, SPECIFICATION-GRADE, 0.125" ACRYLIC 12 PATTERN LENS.	(2) F17T8	46/47	COLUMBIA "ST824" SERIES DAYBRITE "TG8" SERIES METALUX "2GC8" SERIES LITHONIA "2SP8" SERIES
RF.C1	RECESSED 1'X4' WALL WASH RECESSED WALL WASH, LINEAR FLUORESCENT, 4' LENGTH, WITH LIGHT BAFFLE, ASYMMETRIC DISTRIBUTION. MOUNT NO MORE THAN 30" FROM WALL.	(1) F54T5HO	60/58	PINNACLE "EDGE 4W" SERIES FOCAL POINT "AVENUE A" SERIES PEERLESS "LWAR9" SERIES
RF.D1	RECESSED 2X4 FLUORESCENT DIRECT/INDIRECT 22-GAUGE STEEL HOUSING, FLAT ACRYLIC PANELS AND EXTRUDED CURVED ACRYLIC OPTICAL ASSEMBLY, SEALED OPTICAL COMPARTMENT.	(1) F54T5HO	60/62	LEDALITE "PURE FX" SERIES
RF.D1A	SAME AS RF.D1, EXCEPT WITH DIMMING BALLAST			
RF.D2	RECESSED 2X2 FLUORESCENT DIRECT/INDIRECT 22-GAUGE STEEL HOUSING, FLAT ACRYLIC PANELS AND EXTRUDED CURVED ACRYLIC OPTICAL ASSEMBLY, SEALED OPTICAL COMPARTMENT.	(1) F55T5	29/27.5	LEDALITE "PURE FX" SERIES

LUMINAIRE SCHEDULE

Type	Description	Lamps	W/VA	Manufacturer
RF.D2A	SAME AS RF.D2, EXCEPT WITH DIMMING BALLAST			
RF.E1	2 LAMP RECESSED 1X4 FLUORESCENT VANDAL RESISTANT TROFFER CODE GAUGE STEEL HOUSING, INDUSTRIAL-GRADE, .250 POLYCARBONATE LENS, BAKED WHITE ENAMEL FINISH	(2) F32T8	60/62	DAYBRITE "1DG" SERIES COLUMBIA LIGHTING "4VS" SERIES COOPER LIGHTING "VRGC" LITHONIA "VRT" SERIES
RF.F1	NOT USED			
RF.G1	LINEAR RECESSED FLUORESCENT PERIMETER FIXTURE COVE MOUNTED, DIE-FORMED 20-GAGUGE STEEL, DIE-FORMED SPECULAR HAMMERTONE REFLECTOR, LINEAR FLUORESCENT, ASYMMETRIC DISTRIBUTION, CONTINUOUS ROW	(1) F54T5HO (1) F39T5 (1) F24T5	60/62	LITECONTROL "LGNW05" SERIES PRUDENTIAL "P59" SERIES METALUMEN "CS3" SERIES
RL.A1	RECESSED ROUND LED STEP LIGHT 5.9" CORROSION RESISTANT ZINK CAST FACE PLATE, POWDER COAT FINISH, OPTICALLY CLEAR UV STABILIZED POLYCARBONATE LED HOUSING, UL WET LOCATIONS	LED WHITE	3/3	WINONA LIGHTING "Q29718 CUSTOM" SERIES
SF.A1	SURFACE MOUNTED FLUORESCENT STRIP STEEL HOUSING, NARROW PROFILE, PROVIDE WIRE GUARD, CLEAR PLASTIC SLEEVES	(2) F32T8	58/60	COLUMBIA "CH4" SERIES DAYBRITE "T" SERIES METALUX "SN" SERIES LITHONIA "C" SERIES
SF.A2	SURFACE MOUNTED FLUORESCENT STAGGERED STRIP LOW PROFILE, CONTINUOUS ROW, 20 GAUGE WELDED STEEL HOUSING, PROVIDE ROSCO COLORED SLEEVE, COLOR AS SELECTED BY ARCHITECT	(1) F32T8	32/32	METALUX "SM" SERIES LITHONIA "MSS" SERIES DAYBRITE "MSS" SERIES COLUMBIA "CN" SERIES
SF.B1	SURFACE MOUNTED IMPACT RESISTANT SURFACE MOUNTED, LINEAR FLUORESCENT, UL WET LOCATION, 22-GAUGE GALVANIZED STEEL, FULLY NEOPRENE GASKETED.	(2) F32T8	58/60	KURTZON "WLB" SERIES PRUDENTIAL "P-5160" SERIES PARAMOUNT LIGHTING "C4" SERIES
SF.B2	NOT USED			
SF.C1	1X4 SURFACE MOUNTED LOW PROFILE WRAPAROUND SPECIFICATION GRADE, STEEL HOUSING AND A12 LENS, WHITE	(2) F32T8	58/62	COLUMBIA LITHONIA METALUX "UT" SERIES DAYBRITE
SF.D1	SURFACE MOUNTED LINEAR FLUORESCENT SURFACE MOUNTED LINEAR FLUORESCENT STRIP FIXTURE. 20 GAUGE WELDED STEEL HOUSING	(1) F32T8	32/32	BIRTCHWOOD LIGHTING "WP" SERIES LV LIGHTING "LV" SERIES
SF.E1	SURFACE MOUNTED DIRECT LINEAR FLUORESCENT SURFACE MOUNTED, LINEAR FLUORESCENT, WITH ACYLIC LENS	(2) F54T5HO	118/121	LIGHTOLIER "SILHOUTTE SE"SERIES
SF.F1	NOT USED			
SF.G1	NOT USED			
SF.H1	SURFACE MOUNTED LINEAR FLUORESCENT WALL WASH SURFACE MOUNTED, LINEAR FLUORESCENT, 18" SETBACK, CANTILEVER MOUNTING ASSEMBLY, EXTRUDED HIGH-PURITY ALUMINUM WITH CLEAR ANODIZED SPECULAR FINISH. PROVIDE MOUNTING PLATE FOR STEEL APPLICATION, REMOTE BALLAST.	(1) F54T5HO	60/62	ELLIPTIPAR "F101" SERIES WINONA LIGHTING "P1" SERIES PINNACLE "PS" SERIES
SL.A1	SURFACE MOUNTED CONTINUOUS ROW LED STRIP SYMMETRIC DISTRIBUTION, ALUMINUM HOUSING, STAINLESS STEEL END CAPS, UV STABILIZING ACRYLIC LENS, COLOR AS SELECTED BY ARCHITECT, REMOTE DRIVER(S). 45 DEGREE BEAM SPREAD.	3W LED 3200K	3W LF	IO LIGHTING "LINE SERIES .75" SERIES

SM.A1	SURFACE-MOUNTED METAL HALIDE 12" DIAMETER LIGHT PIPE CLEAR POLYCARBONATE LENS, EXTRUDED ALUMINUM SIDE PANELS, REMOTE BALLAST	(1) 920 BT56 CMH	972/1080	TIR "ILLUMIWAVE" SERIES
TI.A1	TRACK LIGHTING ONE-CIRCUIT TRACK, FIELD BENDABLE, PENDANT MOUNTED	(1) 37 MR-16 GU5.3		CAPRI LIGHTING "CR16" SERIES/CAPRI LIGHTING "CTX" SERIES LITHONIA "LTC"SERIES/LITHONIA "LT4" SERIES HALO "LV2002CB16"SERIES/HALO "LF" SERIES
UF.A1	UNDERCABINET FLUORESCENT COORDINATE LENGTHS WITH CASE WORK SHOP DRAWINGS	(1) 54T5HO	60/62	ALKCO "HP 100/200" SERIES NULITE "112" SERIES METALUX "CL" SERIES
WF.A1	OVER MIRROR FLUORESCENT	(1) F17 T8 (1) F32T8	17/19 32/29	ALKCO "TABLEAU" SERIES ENERGIE LIGHTING"MIS" SERIES
WF.B1	LOW PROFILE LINEAR FLUORESCENT POLYCARBONATE LENS, EXTRUDED ALUMINUM BODY, LOCKABLE AIMING, PROVIDE WITH DIMMING BALLAST	(1) F54T5HO	60/62	EXTERIEUR VERT "LINEOS" SERIES ARDEE "105" SERIES DESIGN PLAN "NIGHTLINE" SERIES
WF.C1	2 LAMP CORNER MOUNT VANDAL RESISTANT LINEAR FLUORESCENT	(2) F32T8	60/62	KURTZON "VL" SERIES FAILSAFE "FMCCR" SERIES PARAMOUNT "K8" SERIES KENALL "CD" SERIES
WF.D1	WALL MOUNTED LINEAR FLUORESCENT WALL WASH PROVIDE WITH DIMMING BALLAST	(1) F54T5HO	60/62	ELLIPTIPAR "F115" SERIES WINONA LIGHTING "P1" SERIES PINNACLE "PS" SERIES
WF.E1	SAME AS SF.A1, EXCEPT WALL MOUNTED			
WM.A1	WALL SCONCE PROVIDE WITH INTEGRAL BALLAST	(1) 39 T4.5 PAR 20 CMH Bipin G12	45/47	BEGA "2173" SERIES WINONA LIGHTING "64502" SERIES DESIGN PLAN "MCA" SERIES
WM.B1	LINEAR METAL HALIDE WALLWASH 36" CANTILEVERED ARM, REMOTE BALLAST.	(1) 150 T6 G12 CMH	185/206	ELLIPTIPAR "F102" SERIES WINONA LIGHTING "P1" SERIES
GM.B1	INGRADE METAL HALIDE FLOOD LIGHT GROUND MOUNTED METAL HALIDE, WIDE FLOOD DISTRIBUTION, UL WET LABEL LOCATION, TAMPER PROOF SCREWS, 360 HORIZONTAL AND 90 DEGREE VERTICAL ADJUSTMENT, NPF BALLAST. PROVIDE GUARD. PROVIDE FUSING. PROVIDE SONOTUBE AND THREAD RODS.	(1)39W MH		GARDCO "MINIRAY" SERIES

GENERAL NOTES:

1. LUMINAIRES TO BE COMPLETE WITH ROUGH-IN TRIM ASSEMBLIES, AS REQUIRED FOR A COMPLETE INSTALLATION.
2. VERIFY VOLTAGE OF ALL FIXTURES. REFER TO PLANS FOR SPECIFIC VOLTAGE REQUIREMENTS.
3. ALL LUMINAIRES ARE TO HAVE "UL" LISTING.
4. ALL FIXTURES TO BE SPECIFICATION GRADE.
5. ALL FIXTURES TO HAVE INTEGRAL BALLAST UNLESS NOTED OTHERWISE.
6. ALL FIXTURES TO BE PROVIDED WITH CUSTOM COLOR, TO BE SELECTED DURING SUBMITTAL PROCESS BY ARCHITECT.
7. ALL FIXTURES TO HAVE ELECTRONIC BALLAST UNLESS NOTED OTHERWISE.
8. PROVIDE A CWA BALLAST FOR ALL METAL HALIDE LAMPS >150W.
9. PROVIDE A HX-HPF BALLAST FOR ALL METAL HALIDE LAMPS <150W.
10. PROVIDE OPEN FIXTURE RATED METAL HALIDE LAMPS; "O" RATING.
11. PROVIDE PULSE START METAL HALIDE BALLASTS.
12. WATTAGE FIXTURE LUMENS IS INITIAL LUMENS
13. FOR FIXTURES WITH REMOTE BALLASTS, TRANSFORMERS OR DRIVERS, INSTALL AND WIRE THESE DEVICES IN AN ACCESSIBLE CEILING LOCATION. COORDINATE LOCATIONS WITH ENGINEER.

Appendix F: Lighting Survey and Checklist

Lighting Survey

The objective of the lighting survey is to determine and rate occupant satisfaction and identify lighting quality problems. Below is an example occupant satisfaction survey for lighting.

1. Select the space type that best describes your workspace:

   __ Office
   __ Classroom
   __ Maintenance/Garage
   __ Library
   __ Food Service
   __ Gym

2. Rate your satisfaction level with the amount of light provided in your workspace:

   __ Very Satisfied
   __ Satisfied
   __ Neutral
   __ Dissatisfied
   __ Very Dissatisfied

3. Rate your satisfaction level in terms of visual comfort. Consider any issues with glare, reflections, or contrast, for example.

   __ Very Satisfied
   __ Satisfied
   __ Neutral
   __ Dissatisfied
   __ Very Dissatisfied

4. What lighting controls can you modify in your workspace? Select all that apply.

   __ Light Switch
   __ Desk Light
   __ Window Cover (blinds, shades)
   __ Light Dimmer
   __ Whiteboard Light
   __ None of the Above
   __ Other _____

5. If you are dissatisfied with the lighting in your workspace, identify the issue(s) below. Select all that apply.

   __ Too Bright
   __ Light Color
   __ Glare / Reflection on Surfaces
   __ Too Dark
   __ Not Enough Natural Light
   __Flickering
   __ Other _____

   Provide additional description of these issues: _____
   _____

_____
_____

6. Rate your satisfaction level with lighting in hallways, lobbies, and stairwells.

   __ Very Satisfied
   __ Satisfied
   __ Neutral
   __ Dissatisfied
   __ Very Dissatisfied

7. Rate your satisfaction level with lighting in gathering areas, such as auditoriums and cafeteria.

   __ Very Satisfied
   __ Satisfied
   __ Neutral
   __ Dissatisfied
   __ Very Dissatisfied

8. If you are dissatisfied with lighting in the areas described in questions (6) or (7), describe the issue(s) in more detail:

   _____
   _____
   _____
   _____

Lighting Checklist

The objective of the lighting checklist is to identify lighting quality issues through operator survey and spot measurement of illuminance. The tables below outline the illuminance levels recommended by the Illuminating Engineering Society (IES) to ensure adequate illumination and safety for occupants. These values can provide appropriate light levels while achieving energy efficiency. Two types of measurements are specified: horizontal and vertical. The horizontal measurement (E_h) is the reading taken when the light meter is held parallel to the ground. The vertical measurement (E_v) is the reading taken when the light meter is held perpendicular to the ground. Note that E_h and E_v elevations, where specified, are based on conventional worksurface and seated eye height. Where other elevations are used, adjust the plane of measurement accordingly.

Educational Lighting Guide					
Building Area	Horizontal Measurement		Vertical Measurement		Comments
	Average Maintained Footcandles [FC]	Range of Maintained Footcandles [FC]	Average Maintained Footcandles [FC]	Range of Maintained Footcandles [FC]	
Classroom	40	30-50	-	-	At 30” AFF
Gymnasium (Elementary School)	30	-	100	-	
Gymnasium (High School)	50	-	150	-	
Auditorium	7.5	3-10	5	2.5-10	
Corridor	25	10-40	-	-	
Enclosed Office	40	30-50	-	-	At 30” AFF
Conference	30	7.5-30	-	-	
Break Room	15	5-20	-	-	

Office Lighting Guide			
Building Area	Horizontal Measurement		Comments
	Average Maintained Footcandles [FC]	Range of Maintained Footcandles [FC]	
Open Office	40	30-50	At 30” AFF
Enclosed Office	40	30-50	At 30” AFF
Conference	30	-	
Corridor	25	10-40	
Restroom	18	7.5-30	
Corridor	25	10-40	
Break Room	15	5-20	

Fill out the table below with spot measurements of lighting levels.

Light Level Measurements				
Building Area	Horizontal Measurement [FC]	Vertical Measurement [FC]	Measurement meets the Recommended Light Level per Table Above	
			Yes	No

Appendix G: Occupant Awareness Documentation

This section outlines how the client informs occupants about the benefits of efficiency energy use, and to instruct them in the use and adjustment of operable windows, HVAC system controls, and lighting system components and controls per 5.1.2.8 of the Clean Building Performance Standard (v. July 2024).

Meetings with building administrators.

Communications sent to building tenants on operable window usage during shoulder seasons, our HVAC setpoints for energy efficiency, and lighting schedules.

Appendix H: Energy Management Plan Distribution to Occupants

The client has committed to helping staff understand and support their energy efficiency priorities by sharing this Energy Management Plan on an annual basis, per section 5.1.3 of the CBPS. To ensure compliance, this document is posted to the facility website.

Information on CBPS sent to building tenants.

Building specific periodic communication to tenants.

Energy Management Plan posted on facilities webpage.